



Northern States Power Company

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March 14, 1983

Director
Office of Nuclear Reactor Regulation
U S Nuclear Regulatory Commission
Washington, DC 20555

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

Response to NRC Generic Letter 82-28 dated December 10, 1982
Inadequate Core Cooling Instrumentation

Generic Letter 82-28 required the submittal of certain information related to inadequate core cooling instrumentation in use at the Prairie Island Nuclear Generating Plant or planned for future installation to meet the requirements of the Commission. The purpose of this letter is to provide a response in accordance with 10 CFR Part 50, Section 50.54(f), to this Generic Letter.

We have carefully reviewed the requirements outlined in Generic Letter 82-28 and have provided the required information and schedules in the attachment to this letter. Please contact us if you have any questions related to our response.

David Musolf
Manager - Nuclear Support Services

DMM/bd

cc: Regional Administrator-III, NRC
NRR Project Manager, NRC
Resident Inspector, NRC
G Charnoff

Attachments

A002

UNITED STATES NUCLEAR REGULATORY COMMISSION

NORTHERN STATES POWER COMPANY

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

Docket No. 50-282
50-306

LETTER DATED DECEMBER 30, 1980
RESPONDING TO NRC GENERIC LETTER 82-28 DATED DECEMBER 10, 1982
INADEQUATE CORE COOLING INSTRUMENTATION

Northern States Power Company, a Minnesota corporation, by this letter dated March 14, 1983 hereby submits information in response to NRC Generic Letter 82-28 dated December 10, 1982 which contained revised post TMI requirements related to inadequate core cooling instrumentation.

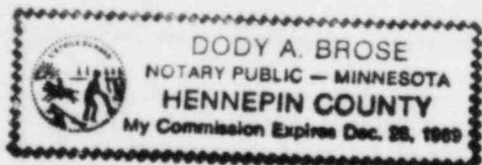
This letter contains no restricted or other defense information.

NORTHERN STATES POWER COMPANY

By David Musolf
David Musolf
Manager - Nuclear Support Services

On this 14 day of March, 1983 before me a notary public in and for said County, personally appeared David Musolf, Manager - Nuclear Support Services, and being first duly sworn acknowledged that he is authorized to execute this document on behalf of Northern States Power Company, that he knows the contents thereof and that to the best of his knowledge, information and belief, the statements made in it are true and that it is not interposed for delay.

Dody A. Brose



Director of Nuclear Reactor Regulation
March 14, 1983
Attachment

Prairie Island Nuclear Generating Plant

SUBJECT: INADEQUATE CORE COOLING INSTRUMENTATION SYSTEMS
(GENERIC LETTER No. 82-28) RESPONSE

Enclosed is the required information requested in Generic Letter No. 82-28.

1. Design & Schedule - Reactor Coolant Inventory System Northern States Power is procuring a Westinghouse RVLIS system for each Prairie Island unit. The intended system is adequately described in Westinghouse generic documents, except for the control board display. The standard Westinghouse display will be located in or near the control room. The Prairie Island control board instruments will be level indicators receiving an analog signal from the RVLIS system.

Detailed engineering is in progress and is expected to be essentially complete by November 1983.

Procurement is in progress through Westinghouse. The necessary materials are expected on site by October 1983 and March 1984 for Unit 1 and Unit 2 respectively.

Installation work is expected to begin with the December 1983 Unit 1 refueling outage. Non-outage installation work for both units will occur during 1984. Because of the scope and complexity of the physical installation, in-containment work will be performed during both 1984 and 1985 refueling outages. System completion is expected by May 1985 and December 1985 for Unit 1 and Unit 2 respectively.

2. Status of Conformance of Instrumentation for Detection of Inadequate Core Cooling

- a. Subcooling Meters

The installed subcooling meters and the plant process computer subcooling program were previously described in our submittals of December 31, 1979, March 13, 1980, April 11, 1980 and December 30, 1980.

At the present time, there are 3 indications of Subcooling Margin. The Plant Process computer, a Westinghouse model P-250, supplies the operators with one indication. This is "MARGIN TO SATURATION" in °F and is displayed on the operators console on a CRT. If desired it may also be printed on a trend typer, recorded on a trend recorder or displayed on a digital operators display.

The inputs to the process computer are:

1. RCS Wide Range Pressure (0-3000 PSIG)
2. Pressurizer Narrow Range Pressure (1700-2500 PSIG)
3. RCS Narrow Range Bypass Manifold RTD's (520°F to 620°F)
4. Incore Thermocouples (0-1345°F)

The inputs are chosen as follows; If RCS pressure is greater than 1700 psig, Narrow Range Pressure is used. If Narrow Range Bypass Manifold RTD's are between 520°F and 620°F and the reactor coolant pumps are running, then the Bypass Manifold RTD's are used. If these conditions are not met then the average of the incore thermocouples plus the RCS wide range pressure is used to calculate subcooling margin.

The remaining 2 indications of subcooling margin are the control board mounted Combustion Engineering model 001 Subcooled Margin Monitors. These indicators are fully environmentally and seismically qualified input instrumentation. The inputs are 4 of the incore thermocouples (auctioneered highest of the 4) and an RCS wide range pressure channel per instrument. These feature a digital display of margin to saturation in either psig or degrees Fahrenheit. They can also display the value of any one of the inputs at any time.

At present the status of the subcooling margin monitors is that the procedures rely on the plant process computer as the primary subcooling indication with the other indications serving a backup function.

b. Core Exit Thermocouple

The core exit thermocouples have been undergoing a large upgrading project which included many new components and design changes. The core exit thermocouples system has been modified so that 8 thermocouples are now environmentally and seismically qualified instrument channels, and the remaining 28 serve as non-qualified indications. The range of all 36 thermocouples has been increased to a range of 32°F to 2250°F. The in-containment reference temperature boxes have been eliminated and replaced with qualified boxes mounted in a protected environment outside containment. All in-containment wiring has been changed to environmentally qualified wiring, as have all the connectors. New containment penetrations have been installed to transmit the thermocouple signals through the containment shell. New instrument racks were installed to convert the thermocouple signals to interface with the subcooling monitors and the tech support center.

The 28 non-qualified thermocouples can be displayed on the control room indicators and the plant process computers. The 8 qualified thermocouples can be displayed on the subcooling monitors, and in the technical support center.

At present the status of the core exit thermocouples is that the upgrade has been completed but some problems have occurred with the containment penetrations installed for the thermocouple wiring. Some signals are being lost at the penetrations connector interface. We are presently investigating improvements to the connectors or replacement of the penetrations in order to increase the number of signals through the penetrations.

With respect to NUREG 0737, Section II.F.2, Attachment 1, the core exit thermocouple system should meet all the requirements with the exception of possibly number (8), in that only 2 thermocouples per quadrant can be provided by the primary and backup display channels. In addition, the Human-Factors analysis of the present indications is still ongoing and will be addressed in future submittals.

- c. Review of Status of Conformance - NUREG 0737 (II.F.2)
[Ref. Appendix Checklist (Generic Letter 82-28)] for RVLIS

This response refers to Westinghouse submittals (see attachment 1) which have been recommended to us as appropriate references for NRC Generic Letter 82-28. We have not yet received copies of all of them for local review.

1. a. The RVLIS system for Prairie Island will include all standard Westinghouse hardware (Westinghouse references A and B), but the standard display will not be installed on the control board. The control board display is still undergoing detailed design. A final design description will be available by December 31, 1983.
 - b. The RVLIS system being purchased is as described in Westinghouse submittals I and H.
 - c. N/A
2. Refer to Westinghouse submittals A, B, C, D, E, and F for this information.

3. Additional testing of standard RVLIS items is covered in Westinghouse references C, D, E and F. The additional instrumentation is expected to consist of several analog level indicators. Qualification will be determined during detailed design and equipment purchase. Preinstallation testing will be in accordance with plant QA practices. Periodic testing will be in accordance with preventive maintenance scheduling, and will be similar to testing and calibration done on other safety-related systems.
4. Appendix B (NUREG-0737, II.F.2) for RVLIS
 1. Westinghouse submittal G and K describes equipment qualification data for RVLIS. Prairie Island is purchasing Barton Type A level transmitters, qualified to a harsher environment than the Barton Type B level transmitters which are part of the standard Westinghouse RVLIS system.
 - 2-9. The specific conformance of the Prairie Island RVLIS system with the Appendix B item listed will be confirmable after detailed design of the system is complete. The requirements of Appendix B are part of the design criteria for the system.

RVLIS - Specific Questions

- A1. Instrument uncertainty is addressed within Westinghouse submittals A, B, and/or C.
 2. The proposed location for the transmitters is in the auxiliary building outside of containment.
 3. The impulse lines are being designed in accordance with the standard Westinghouse RVLIS system, described in Westinghouse submittals A, B, and C.
5. See Section 2a and 2b, and Westinghouse submittals A and B.
6. All new instrumentation will be identified during the control room design review referenced in GL 82-33.
7. The guidelines for use of the RVLIS were developed through the Westinghouse Owner's Group, and are as described under submittal(s) J.
8. Emergency operating procedures are being developed under guidelines resulting from the Westinghouse Owner's Group effort (see item 7 above).
9. A design description of display instrumentation will be available by December 31, 1983.

ATTACHMENT 1

WESTINGHOUSE REFERENCE ITEMS FOR REPLY TO
NRC GENERIC LETTER 82-28

REFERENCE ITEM A

SUMMARY REPORT

Westinghouse Reactor Vessel Level Instrumentation System for Monitoring Inadequate Core Cooling December, 1980.

[NOTE: Discussion of Upper Range Does Not Apply]

Submittal Letter T.M. Anderson (W) to Darrell G. Eisenhut (NRC)
NS-TMA-2358 of December 23, 1980

REFERENCE ITEM B

25 RESPONSES TO NRC REQUEST FOR ADDITIONAL INFORMATION

On the Westinghouse R.V.L.I.S. Summary Report

REFERENCE ITEM C

SUPPLEMENTARY INFORMATION

Submittal Letter E.P. Rahe (W) to L.E. Phillips (NRC) NS-EPR-2579 of March 19, 1982

REFERENCE ITEM D

W EVALUATION OF TESTS

S-UT-3, S-UT-6, S-UT-7, S-NC-2, S-NC-3, S-NC-8
Submittal

Letter E.P. Rahe (W) to L.E. Phillips (NRC)
NS-EPR-2526 of December 9, 1981

REFERENCE ITEM E

W EVALUATION OF TEST S-UT-8

Submittal Letter E.P. Rahe (W) to L.E. Phillips (NRC) NS-EPR-2542 of January 13, 1982

REFERENCE ITEM F

W EVALUATION OF TEST S-IB-1 AND FUNCTIONAL TEST

Submittal Letter E.P. Rahe (W) to L.E. Phillips (NRC) SED-SA-0081 of June 28, 1982

REFERENCE ITEM G

RESPONSE TO REQUEST TO WOG FOR ADDITIONAL INFORMATION

Submittal Letter E.P. Rahe (W) to L.E. Phillips (NRC) NS-EPR-2597 of May 14, 1982

REFERENCE ITEM H

RCS WIDE RANGE PRESSURE INSTRUMENTATION

REFERENCE ITEM I

RELEVANT DRAWINGS OF EXISTING INSTRUMENTATION SYSTEMS

W Process Block Diagrams
(See Sheet for W.R. RCS T_{HOT})

W Flow Diagram [P&ID] for RCS
FSAR Fig. RCS Flow Diagram

Concerning W Process Block Diagram which shows W.R. RCS Pressure interfacing instrumentation, Refer to Item H.

REFERENCE ITEM J

Critical safety function status trees for core cooling and system inventory volumes 1, 2, and 3 Emergency Response Guidelines (ERG) Developed by Westinghouse Owner's Group (WOG) Sections FR-C.1 and C.2, FR-I.3, FR-P.1

Refer also E20.26 (which is a new section to be added, for natural circulation cooldown regarding depressurization in the upper head. Although this shows the use of the RVLIS instrumentation, it is not specifically for inadequate core cooling (ICC) monitoring.

Volume 1 and 2 was under cover of OG-64, 11/30/81 O. Kingsley (WOG) to D. Eisenhut (NRC)

Volume 3 was under cover of OG-83, 1/4/83, O. Kingsley (WOG) to D. Eisenhut (NRC)

All member utilities received copies under cover of letters:

WOG-81-235, 12/2/81

WOG-83-100, 1/4/83

REFERENCE ITEM K

ENVIRONMENTAL QUALIFICATION

(Note Various Equipment Data Qualification Packages) - i.e. EQDP - for RVLIS instrumentation are submittals as supplements to the Environmental Qualification topicals WCAP-8587, non-proprietary (which provides summary EDQP's) and WCAP-8687, proprietary (which provides detailed EDQP's).

EQDP References are as follows:

1. ESE-4 D/P Transmitters Outside Containment - Previously submitted (Note, this EQDP does not specifically reference transmitters to RVLIS, but this will be done)
2. ESE-48 High Volume Pressure Sensor Submittal by 2/15/83
3. ESE-49 Hydraulic Isolator Submittal by 2/15/83
4. ESE-42 Strap-on RTD's Submittal by 2/15/83
5. ESE-46 Remote Digital Displays (MCR) Submittal by 6/30/83
6. ESE-41 Micro () Processors Submittal by 6/30/83
7. ESE-50 Entire RVLIS Package Submittal by 6/30/83