U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-263/89013(DRS)

Docket No. 50-263 License No. DPR-22

Licensee: Northern States Power Company
414 Nicollet Mall
Minneapolis, MN 55401

Facility Name: Monticello Nuclear Generating Station

Meeting At: Region III Office, Glen Ellyn, Illinois

Meeting Conducted: April 27, 1989

Type of Meeting: Enforcement Conference

R.N. Gardner for

Inspector: A. S. Gautam 6-1-89
Date

R.N. Gardner

Approved By: R. N. Gardner, Chief 6-1-89
Plant Systems Section Date

Inspection Summary

Inspection on April 27, 1989 (Report No. 50-263/89013(DRS))
Areas Inspected: Apparent violations of 10 CFR 50, Appendix B, Criterion XVI in regard to inadequate licensee corrective action to correct and prevent recurrence of previously identified 10 CFR 50.49 environmental qualification (EQ) deficiencies.
Results: No violations of NRC requirements were identified.

DETAILS

1. Persons Contacted

a. Northern States Power Company (NSP)

C. Larson, Vice President, Nuclear Generation
L. Eliason, General Manager, Nuclear Generation
W. Shamla, Plant Manager, Monticello
S. Hammer, Superintendent, Operations Engineering
B. Day, General Superintendent, Engineering and Radiation Protection
A. Wojchouski, Lead Production Engineer
B. Linde, Senior Production Engineer
M. Hammer, Lead I&C Engineer

b. Nuclear Regulatory Commission (NRC)

H. Miller, Division Director, DRS
R. Cooper, Chief, Engineering Branch, DRS
R. Gardner, Chief, Plant Systems Section, DRS
I. Jackiw, Chief, Reactor Projects Section 2B, DRP

2. Enforcement Conference

As a result of apparent violations of NRC requirements, an Enforcement Conference was held in the Region III Office on April 27, 1989. The preliminary findings, which were the bases for these apparent violations of NRC requirements, were documented in NRC Inspection Report No. 50-263/89006(DRS) and were transmitted to the licensee by letter dated April 14, 1989. The attendees at this Conference are noted in Paragraph 1 of this report.

The purpose of this conference was to discuss:

a. What controls were established to ensure the effective implementation of equipment qualification (EQ) violation corrective action (procedure, records, training, etc.)?

b. What type of verification was established to ensure that the corrective action was completed?

c. What was the root cause of the failure to correct previously identified weep hole discrepancies for all enclosures inside and outside the drywell?

d. What was the root cause of the failure to correct the previously identified Fenwal temperature switch assembly qualification deficiencies? The licensee's EQ file did not contain adequate qualification for their installed life.

e. What was the root cause of the failure to correct the previously identified Rome SIS cable qualification deficiencies? The licensee's EQ file did not include a similarity analysis for reference tests.

In opening the conference, the NRC representatives identified the following apparent violation of 10 CFR 50, Appendix B:

Criterion XVI - Corrective Action: Failure to identify and correct all instances in which weep holes were not installed in electrical enclosures; failure to provide in their EQ files a justification to qualify the installed Fenwal temperature switches for their remaining installed life; and failure to perform similarity analyses for Rome SIS cable.

The licensee provided a summary of their review of the NRC findings, the root cause analysis, and corrective actions taken.

3. Previously Identified Findings

During the enforcement conference, the licensee took issue with the three examples of the apparent violation. During and following the conference, an NRC review was conducted with the licensee's technical staff to evaluate the licensee's responses to the NRC concerns.

Details are noted below:

a. (Closed) Unresolved Item (50-263/87013-04(DRS)): This item was open (Inspection Report No. 50-263/89006(DRS)) due to the apparent lack of corrective action by the licensee to qualify the Fenwal temperature switch assemblies for their installed life. In a May 11, 1989 submittal, the licensee clarified, through documentation, that the assemblies had, in fact, been evaluated for higher radiation doses caused by hydrogen addition in the reactor coolant system. These assemblies have currently been justified to be removed from the Monticello EQ program.

No further concerns were identified.

b. (Closed) Unresolved Item (50-263/87013-05(DRS)): This item was open (Inspection Report No. 50-263/89006(DRS)) due to the apparent lack of corrective action to qualify the Rome SIS cable for its installed life. During the enforcement conference, the licensee described how, in their previous corrective action, they had evaluated the qualification of this cable based on various tests done in the industry, and had concluded that the cable was qualified. The licensee stated that they had, in fact, done a similarity analysis of the installed cable to the tested cable to conclude that the cable was qualified, but may not have adequately documented this analysis. The inspector reviewed the similarity analysis and determined that sufficient evidence existed to qualify the installed cable. No further concerns were identified.

c. (Closed) Unresolved Item (50-263/89005-02(DRS)): This item was identified during the March 1989 NRC inspection and addressed apparent inadequate corrective actions by the licensee in regard to a February 1988 NRC finding concerning a lack of drain (weep) holes in electrical enclosures whose contents are subject to submergence during service conditions, including an accident. During the enforcement conference, the licensee stated that they had taken adequate corrective action in regard to the drain holes, in that it was their understanding that the NRC February 1988 finding only addressed the accumulation of moisture in motor lead junctions boxes during normal operating conditions and not during an accident. Subsequent to the enforcement conference, the licensee submitted a May 5, 1989 "Moisture Intrusion Followup Report" to provide further evidence that they had reviewed enclosures other than the motor lead terminal boxes. This report stated that subsequent to the February 1988 NRC finding, the licensee had reviewed past and present problems related to moisture or corrosion in enclosures of devices and that the licensee had reviewed indications of past or present moisture intrusion in junction boxes inspected during maintenance. Based on this review, the licensee had concluded that they had taken adequate corrective action as there was no evidence of moisture problems in appropriate enclosures under normal operating conditions. The NRC reviewed the licensee's responses and determined that the licensee had taken adequate corrective action in regard to the enclosures identified during the February 1988 inspection.

However, the qualification of 10 CFR 50.49 components and their associated enclosures for submergence above flood level in accident conditions had not been previously addressed. In order to address these new NRC concerns, the licensee reviewed all electrical enclosures inside and outside the drywell that would be subject to postulated submergence of their contents when required to perform a safety function. As a result of this review, the licensee reported that all cables and splices in enclosures in the drywell required to perform a safety function under conditions of postulated submergence were qualified for submergence. The basis for the licensee's conclusion was that all appropriate electrical splices had Raychem heat shrink tubing; all appropriate devices were sealed; none of the subject enclosures had terminal blocks; and all appropriate cables had been tested for water absorption and post LOCA submergence. In some cases, the licensee also took credit for conduit configurations that would prevent moisture from entering the device (confirmed through licensee walkdown of installation). In order to be prudent, however, the licensee reported installing drain holes in all appropriate enclosures.

In regard to the postulated submergence of circuits in enclosures outside the drywell, the licensee performed a test to simulate actual steam conditions during an accident. This test, performed at the Monticello site, provided some evidence that a 8" x 10" x 4" Hoffman gasketed junction box with two top entry 1" conduit stubs open to the chamber, when subjected to mild steam conditions (212°F, atmospheric pressure) for approximately 5.5 minutes would not

accumulate enough water in the short duration to submerge the contents of the box. The NRC inspector was concerned that this test did not simulate condensation in longer lengths of conduit and did not simulate water entering the box through conduits from enclosures at upper elevations. The licensee, however, reported that for all EQ equipment outside the drywell the relatively mild HELB environment is of a very short duration, and that during a HELB the temperature in the proximity of EQ equipment peaks at 175°F and returns to 80°F in five minutes.

The NRC concluded that based on the information presented, the licensee took prudent corrective action in regard to the motor lead junction box moisture intrusion issue, pursuant to the February 1988 NRC finding. The NRC also determined that the licensee had presented adequate new information to justify the question of submergence in other 10 CFR 50.49 designated enclosures.

No violations of NRC requirements were identified.

MONTICELLO PLANT

ENVIRONMENTAL QUALIFICATION CONCERNS

APRIL 27, 1989

NSP

AGENDA

○ WEEP HOLES	ALAN WOJCHOUSKI
○ FENWAL TEMPERATURE SWITCHES	MIKE HAMMER
○ ROME SIS CABLE	MIKE HAMMER
○ MANAGEMENT CONTROLS	BYRON DAY
○ IMPROVEMENT ITEMS	BYRON DAY
○ SUMMARY	BYRON DAY

NSP

WEEP HOLES

- CHRONOLOGY OF EVENTS
- ROOT CAUSE
- CORRECTIVE ACTIONS

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CHRONOLOGY

- IEIN 84-057 ISSUED (7/84)
- JUNCTION BOXES INSPECTIONS (12/86 - 2/87)
- OUTSTANDING EQ ISSUES WERE REVIEWED (7/87)
- FIRST ENVIRONMENTAL QUALIFICATION INSPECTION (10/87 - 1/88)
- NOTICE OF VIOLATION AND RESPONSE (2/88)
- INITIATED MODIFICATION TO INSTALL WEEP HOLES (12/88)
- FOLLOW-UP ENVIRONMENTAL QUALIFICATION INSPECTION (3/89)
- INSTALLED WEEP HOLES (3/89 - 4/89)

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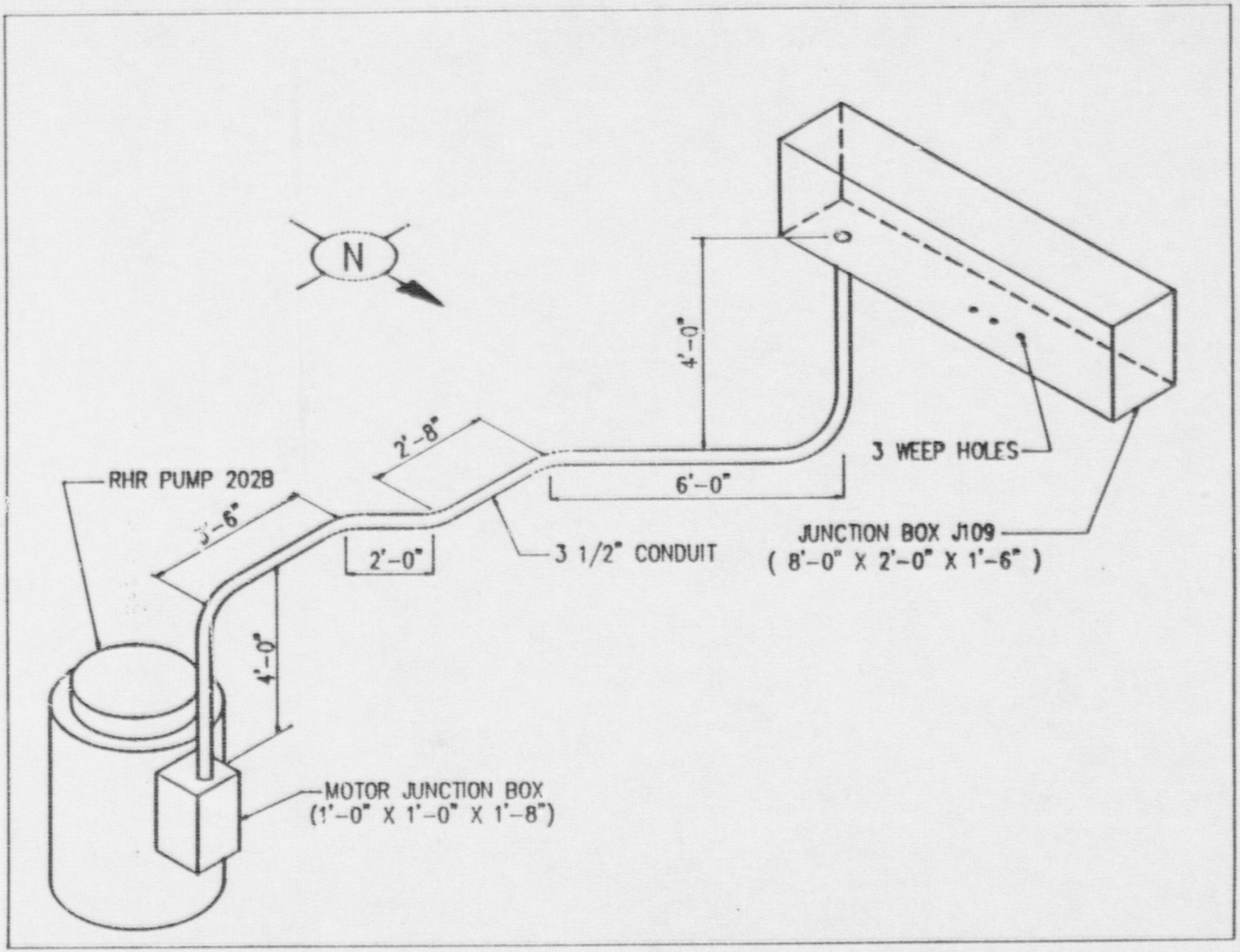
N
RHR PUMP 202B
3'-6"
2'-8"
2'-0"
4'-0"
6'-0"
4'-0"
3 1/2" CONDUIT
3 WEEP HOLES
JUNCTION BOX J109
(8'-0" X 2'-0" X 1'-6")
MOTOR JUNCTION BOX
(1'-0" X 1'-0" X 1'-8")

ROOT CAUSE

CORRECTIVE ACTIONS FOR INITIAL DEFICIENCY BELIEVED ADEQUATE BASED UPON:

- IN 84-057 ADDRESSED NORMAL PLANT ENVIRONMENT
- RHR MOTOR MOISTURE INTRUSION ISOLATED EVENT
- MARK 1 DESIGN - NO REACTOR BUILDING SPRAY
  - NO FIRE DELUGE SPRAY
- MODERATE HELB PROFILES
- NO HISTORY OF MOISTURE INTRUSION
- NO APPRECIABLE AMOUNTS OF MOISTURE ANTICIPATED

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CORRECTIVE ACTIONS

- INSTALLED WEEP HOLES FOR MOISTURE INTRUSION
- REVISED ELECTRICAL INSTALLATION STANDARD
- TRAINING PROGRAM ENHANCEMENT
- ANALYSIS OF CONDENSATION ACCUMULATION
- TESTING TO CONFIRM ANALYSIS
- CABLE AND SPLICE QUALIFICATION

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FENWAL TEMPERATURE SWITCH ASSEMBLIES

- DESCRIPTION
- ORIGINAL DEFICIENCIES
- RESPONSE TO ORIGINAL DEFICIENCIES
- FOLLOW-UP INSPECTION DEFICIENCIES
- QUALIFICATION METHOD
- ADDITIONAL ACTIONS
- ROOT CAUSE
- CORRECTIVE ACTIONS

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FENWAL TEMPERATURE SWITCH ASSEMBLIES

- PROVIDE STEAM LINE LEAK DETECTION FOR PRIMARY CONTAINMENT ISOLATION
- CONSIST OF SWITCH, LEAD WIRES AND NYLON CONNECTORS
- DOR GUIDELINES QUALIFICATION REQUIREMENTS APPLY

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ORIGINAL DEFICIENCIES

- LACK OF STEAM ENVIRONMENT TEST FOR FENWAL SWITCH
- WEAR OF OUTER FIBERGLASS INSULATION OF LEAD WIRES
- LACK OF STEAM ENVIRONMENT TEST FOR NYLON CONNECTOR

RESPONSE TO ORIGINAL DEFICIENCIES

- STEAM TEST PERFORMED ON SWITCH WITH WORN FIBERGLASS AND CONNECTORS PRIOR TO STARTUP FROM 1987 REFUELING OUTAGE
- QUALIFICATION FILE REVISED TO INCLUDE STEAM TEST AND ENHANCE EVALUATION OF LEAD WIRE INSULATION

FOLLOW-UP INSPECTION DEFICIENCY

- FILE DID NOT PROVIDE EVIDENCE OF QUALIFICATION OF THE ASSEMBLY

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QUALIFICATION METHOD

- DOR GUIDELINES METHODOLOGY
- PRESSURE, TEMPERATURE AND HUMIDITY BY TESTING
- RADIATION AND AGING BY ANALYSIS
- RADIATION IS LIMITING PARAMETER: INSTALLED LIFE OF 20 YEARS (i.e. UNTIL 1991) IDENTIFIED FOR STEAM CHASE

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ADDITIONAL ACTIONS

- RECOGNIZED THAT END OF QUALIFIED LIFE APPROACHING
- SCHEDULED REPLACEMENT OF ALL SWITCHES FOR 1989 REFUELING OUTAGE
- NEW, 50.49 QUALIFIED SWITCHES WERE ON SITE AT TIME OF MARCH INSPECTION

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ROOT CAUSE

- CORRECTIVE ACTIONS FOR INITIAL DEFICIENCIES BELIEVED ADEQUATE BASED UPON:
  - PROMPT STEAM TEST
  - FILE ENHANCEMENTS
  - SCHEDULED REPLACEMENT

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CORRECTIVE ACTIONS

- REMOVED MAIN STEAM SYSTEM SWITCHES FROM EQ LIST

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ROME SIS CABLE

- DESCRIPTION
- ORIGINAL DEFICIENCY
- RESPONSE TO ORIGINAL DEFICIENCY
- FOLLOWUP INSPECTION DEFICIENCY
- QUALIFICATION METHODS
- ROOT CAUSE
- CORRECTIVE ACTIONS

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ROME SIS CABLE

- CROSS-LINKED POLYETHYLENE (XLPE) INSULATED SWITCHBOARD WIRE
- USED FOR WIRING IN HPCI AND RCIC OUTBOARD STEAM LINE ISOLATION MOTOR OPERATED VALVE STARTERS
- DOR GUIDELINES QUALIFICATION REQUIREMENTS APPLY

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ORIGINAL DEFICIENCY

- NO QUALIFICATION DATA IN FILE

RESPONSE TO ORIGINAL DEFICIENCY

- STEAM TEST PERFORMED AND QUALIFICATION FILE PREPARED PRIOR TO STARTUP FROM 1987 REFUELING OUTAGE

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FOLLOWUP INSPECTION DEFICIENCY

- LACK OF SIMILARITY ANALYSIS TO JUSTIFY APPLICATION TO INSTALLED CABLE.

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QUALIFICATION METHODS

- STEAM EXPOSURE TEST OF SAMPLE WITH SEVEN YEARS OF NATURAL AGING
- SUPPLEMENTAL AGING ANALYSIS TO JUSTIFY A 40 YEAR INSTALLED LIFE
- AGING ANALYSIS USED OKONITE RESEARCH PAPER FOR XLPE DATA:
  - LIFE OF 8000 YEARS AT 90°F
  - AGING OF VARIOUS FORMULATIONS OF XLPE CAN BE REPRODUCED WITH A SPREAD LESS THAN 10%

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ROOT CAUSE

- CORRECTIVE ACTIONS FOR INITIAL DEFICIENCY BELIEVED ADEQUATE BASED UPON:
  - SIMILARITY ANALYSIS CONTAINED IN OKONITE PAPER
  - XLPE CABLES FROM NUMEROUS MANUFACTURERS HAVE BEEN QUALIFIED TO CONDITIONS MUCH MORE SEVERE THAN REQUIRED FOR THIS CABLE
  - NO QUESTION THAT XLPE IS A SUITABLE NUCLEAR CABLE INSULATION
  - CONSIDERING MODERATE ENVIRONMENT AND KNOWN CAPABILITIES OF XLPE, THE ANALYSIS WAS REASONABLE

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CORRECTIVE ACTIONS

- PROVIDED ADDITIONAL SIMILARITY JUSTIFICATION DURING FOLLOWUP INSPECTION

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MANAGEMENT CONTROLS

- ORGANIZATION
- PERSONNEL QUALIFICATIONS
- ADMINISTRATIVE CONTROLS
- EQ PROGRAM SUPPORT
- RESPONSE TO 1987 INSPECTION FINDINGS

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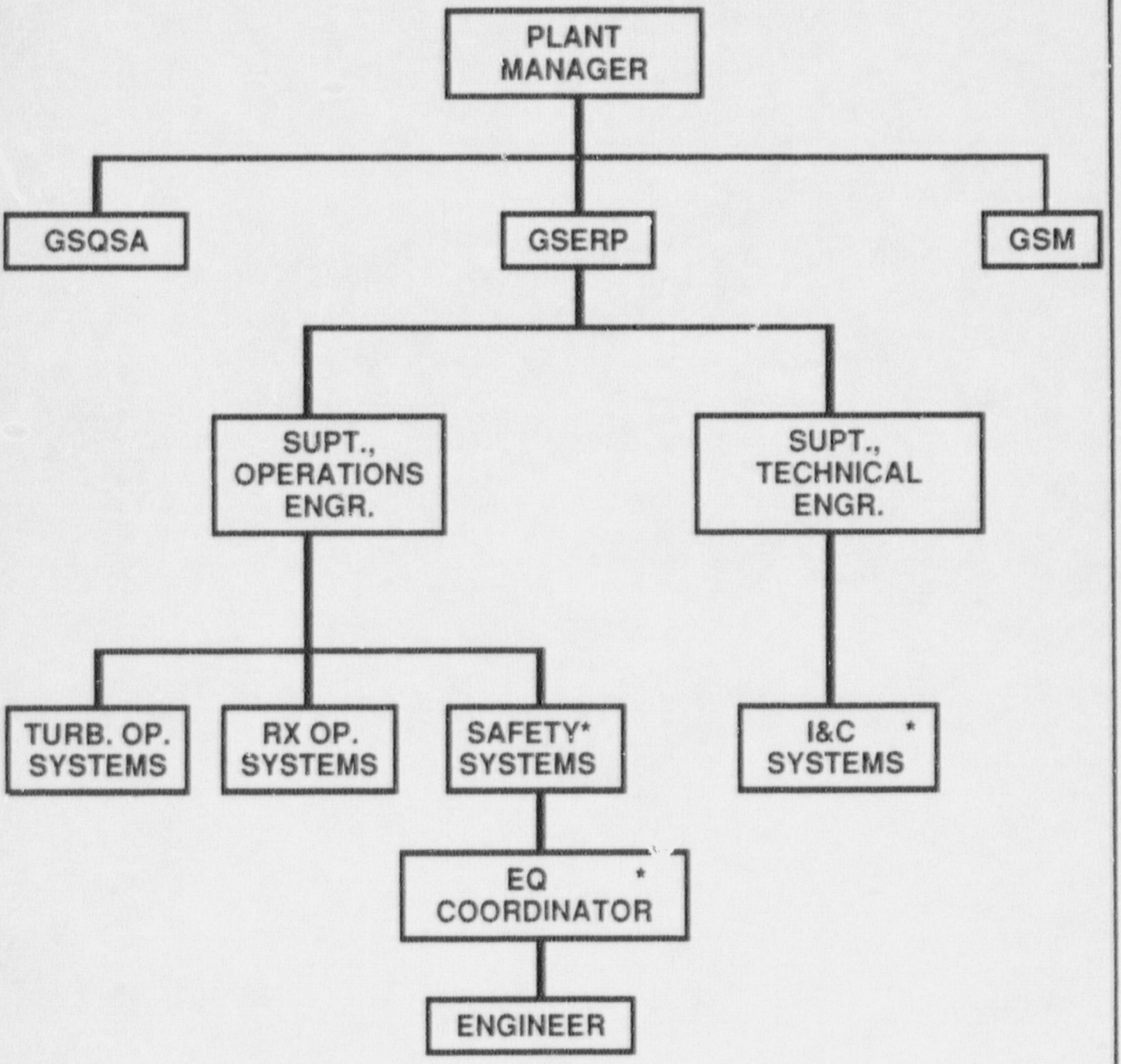
ORGANIZATION



* KEY EQ PROGRAM SUPPORT PERSONNEL

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PERSONNEL QUALIFICATIONS

- EQ COORDINATOR
  - BACHELOR OF MECHANICAL ENGINEERING (1979)
  - NAVY NUCLEAR OFFICER
  - START-UP ENGINEER IN GE's NUCLEAR PROGRAM
  - SRO CERTIFIED
  - RECEIVED TRAINING IN EQ
  - ATTENDS MEETINGS OF THE UTILITY GROUP ON EQ
  - DEDICATED TO EQ PROGRAM SINCE 1986

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PERSONNEL QUALIFICATIONS

- LEAD ENGINEER - SAFETY SYSTEMS
  - MASTER OF NUCLEAR ENGINEERING (1977)
  - 11 YEARS NUCLEAR EXPERIENCE
  - 9 YEARS AT MONTICELLO - INVOLVED WITH SAFETY RELATED SYSTEMS
  - SRO CERTIFIED
  - INVOLVED WITH EQ PROGRAM IMPLEMENTATION SINCE 1982

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PERSONNEL QUALIFICATIONS

- LEAD ENGINEER - I&C SYSTEMS

  - BACHELOR OF ELECTRICAL ENGINEERING (1971)
  - 17 YEARS EXPERIENCE AT MONTICELLO
  - SRO CERTIFIED
  - INVOLVED IN EQ SINCE 11/77 (IEB 77-05)
  - COORDINATED RESPONSE TO IEB 79-01B

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ADMINISTRATIVE CONTROLS

- EQ USERS MANUAL
- EQ REQUIREMENTS INTEGRATED INTO WORK AND MODIFICATION CONTROLS
- PM PROGRAM
- NONCONFORMING ITEM PROCESS

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EQ PROGRAM SUPPORT

- INVOLVEMENT IN INDUSTRY ACTIVITIES
- EQ ISSUES COMMITTEE
  - MANAGEMENT OVERSIGHT GROUP
  - IDENTIFY AND ENSURE RESOLUTION OF EQ ISSUES
- PSQA AUDITS
- CONSULTING ENGINEERS
- $5 MILLION INVESTED IN EQ IMPROVEMENTS

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RESPONSE TO

1987 INSPECTION FINDINGS

- PLANT ASSIGNED ITEM PROCESS USED TO ASSIGN RESPONSIBILITY FOR INVESTIGATING AND RESPONDING TO OPEN ITEMS, UNRESOLVED ITEMS AND VIOLATION.

- FOLLOW-UP ACTIVITIES ASSIGNED TO EQ SUPPORT ORGANIZATION

- RESPONSE TO VIOLATION DRIVEN BY NRC REQUIREMENTS

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RESPONSE TO

1987 INSPECTION FINDINGS (CONT'D)

- RESPONSE TO VIOLATION REVIEWED IN DETAIL BY:
  - LEAD ENGINEER SAFETY SYSTEMS
  - LEAD ENGINEER I&C SYSTEMS
  - SITE LICENSING ENGINEER
  - SUPT., TECHNICAL ENGINEERING
  - SUPT., OPERATIONS ENGINEERING
  - ASSISTANT TO THE PLANT MANAGER
- RESPONSE REVIEWED BY OPERATIONS COMMITTEE
- LINE MANAGEMENT ENSURED AND VERIFIED EFFECTIVE IMPLEMENTATION OF IDENTIFIED FOLLOW-UP ACTIVITIES

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RESPONSE TO

1987 INSPECTION FINDINGS (CONT'D)

- RESULTS ACHIEVED
  - RESPONSE TO VIOLATION PARTS A, B AND D ACCEPTABLE.
  - ACTIONS COMMITTED TO IN RESPONSE TO VIOLATION PART C COMPLETED (WEEP HOLES DRILLED IN RHR AND CORE SPRAY MOTOR J-BOXES).
  - 2 UNRESOLVED ITEMS DETERMINED TO BE VIOLATIONS; HOWEVER, DUE TO FOLLOW-UP ACTIONS TAKEN, NO FURTHER RESPONSE REQUIRED.
  - 2 UNRESOLVED ITEMS (FENWAL T/S's AND ROME SIS CABLE) REMAIN OPEN.
  - RESPONSE TO 4 OPEN ITEMS FOUND ACCEPTABLE.

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IMPROVEMENT ITEMS

- STRENGTHEN PROCESS FOR INVESTIGATING AND RESPONDING TO NRC VIOLATIONS

- IMPLEMENT PERIODIC REVIEW OF EQ STATUS BY EQ ISSUES COMMITTEE

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SUMMARY

- WEEP HOLES WERE PROVIDED IN RHR AND CORE SPRAY MOTOR J-BOXES ONLY DUE TO IDENTIFIED NEED TO SOLVE SITUATION UNIQUE CIRCUMSTANCES.

- QUALIFIED LIFE FENWAL TEMP SWITCHES BASED ON ANALYSIS AS PERMITTED BY APPLICABLE DOR GUIDELINES.

- QUALIFICATION OF ROME SIS CABLE WAS BASED ON SIMILARITY TO OTHER QUALIFIED CABLES WHICH WAS ESTABLISHED BY EQ FILE REFERENCES.

- IMPLEMENTATION AND VERIFICATION OF EFFECTIVE VIOLATION CORRECTIVE ACTIONS BASED ON SOUND MANAGEMENT PRINCIPLES.

- IDENTIFIED IMPROVEMENT ITEMS ENHANCE COMPREHENSIVE AND TIMELY RESPONSE TO CONDITIONS ADVERSE TO QUALITY.

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