



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
61 FORSYTH STREET SW SUITE 23T85  
ATLANTA, GEORGIA 30303-8931

February 2, 2001

SDP/EA-00-263

Carolina Power & Light Company  
ATTN: Mr. James Scarola  
Vice President - Harris Plant  
Shearon Harris Nuclear Power Plant  
P. O. Box 165, Mail Code: Zone 1  
New Hill, NC 27562-0165

SUBJECT: FINAL SIGNIFICANCE DETERMINATION FOR A WHITE FINDING AND  
NOTICE OF VIOLATION (NRC INSPECTION REPORT NOS. 50-395/00-03,  
50-395/00-10, SHEARON HARRIS NUCLEAR POWER PLANT)

Dear Mr. Scarola:

The purpose of this letter is to provide you with the final results of our significance determination of the preliminary White finding identified in the subject inspection reports. The inspection finding was assessed using the significance determination process and was preliminarily characterized as White, i.e., an issue of low to moderate safety significance, which may require additional NRC inspection. The finding involved your discovery in June 2000 that the 'C' Charging/Safety Injection Pump (CSIP) experienced a failed outboard thrust bearing that resulted in the pump being inoperable for a time in excess of the Technical Specification (TS) Limiting Condition for Operation (LCO) action statement requirements.

At Carolina Power & Light Company's (CP&L) request, an open regulatory conference was conducted with you and members of your staff on January 30, 2001, to discuss your views on this issue. The enclosures to this letter list the attendees at the regulatory conference, and provide copies of the material presented by CP&L and the NRC at the regulatory conference. During the conference, your staff described the details of the issue and your assessment of its significance. CP&L's review of the issue attributed the probable cause of the May 1999 failed bearing to a loss of bearing oil lubrication and/or an improper pump fill and vent evolution. Your estimate of the incremental increase in core damage frequency for the period of time during which the 'C' CSIP was inoperable (approximately 59 days) was  $5.1 \times 10^{-6}$  /year. This estimate was slightly lower than the NRC's estimate of  $9.5 \times 10^{-6}$  /year. The difference in the two estimates was attributed to nominal differences in risk modeling assumptions and techniques. The NRC considers CP&L's assessment of the probable cause of the failed bearing to be reasonable, and has determined that both risk values represent reasonable estimates of the change in risk to the facility for the period of time during which the 'C' CSIP was inoperable.

After considering the information developed during the inspection and the information you provided at the conference, the NRC has concluded that the inspection finding is appropriately characterized as White. This determination is consistent with CP&L's estimate of the risk significance of the finding, and was based on our review of the relevant risk information discussed at the conference and the information reviewed during and after our inspection.

You have ten business days from the date of this letter to appeal the staff's determination of significance for the identified White finding. Such appeals will be considered to have merit only if they meet the criteria given in NRC Inspection Manual Chapter 0609, Supplement 3.

The NRC also determined that two violations occurred, involving (1) your failure to comply with TS 3.5.2.a LCO action statement requirements, and (2) your failure to implement your corrective action procedure as required by 10 CFR 50, Appendix B, Criterion V. The failure to comply with Technical Specification 3.5.2.a is cited in the enclosed Notice of Violation (Notice), and the circumstances surrounding it is described in detail in the subject inspection reports. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions - May 1, 2000," NUREG-1600, as amended on November 3, 2000 (65 Federal Register 59274) (Enforcement Policy), the Notice is considered escalated enforcement action because it is associated with a White finding.

We have concluded that the second violation should be characterized as minor. As discussed during the conference, the NRC reviewed the corrective actions associated with the failed outboard thrust bearing on the "C" CSIP in parallel with CP&L's review. Because common cause failure implications, which could have significantly impacted risk, did not appear to have been adequately addressed, our staff shared these concerns with you in July 2000, before your adverse condition investigation was finalized. You subsequently reclassified the review and reached different conclusions from your original assessment regarding pump operability and root cause. However, we are unable to conclude that absent the NRC interaction with your staff that you would not have reached a significantly different final conclusion. As a result, we have determined that this violation did not have an actual or credible impact on safety and should be characterized as minor, and thus is not subject to formal enforcement action.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

Because plant performance for this issue has been determined to be in the increased regulatory response band, we will use the NRC Action Matrix to determine the most appropriate NRC response for this finding. We will notify you, by separate correspondence, of that determination.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures, and your response, will be available electronically for public inspection in the NRC Public Document Room (PDR) or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR

and PARS without redaction. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Should you have any questions regarding this letter, please contact Victor M. McCree, Deputy Director, Division of Reactor Projects at 404-562-4500.

Sincerely,

**/RA/**

Luis A. Reyes  
Regional Administrator

Docket No.: 50-400  
License No.: NPF-63

Enclosures:

1. Notice of Violation
2. List of Attendees
3. Conference material presented by CP&L
4. Conference material presented by NRC

cc w/encls: (see page 4)

CP&L

4

cc w/encls:

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Performance Evaluation and  
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Carolina Power & Light Company  
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Director of Site Operations  
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Plant General Manager--Harris Plant  
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Enforcement Coordinators  
RI, RIII, RIV  
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G. Caputo, OI  
H. Bell, OIG  
W. Dean, NRR  
R. Emch, NRR  
R. Laufer, NRR  
T. Reis, NRR  
S. Rosenberg, OEDO  
R. Borchardt, OE  
J. Dixon-Herrity, OE  
D. Nelson, OE  
C. Casto, RII  
L. Plisco, RII  
V. McCree, RII  
W. Rogers, RII  
A. Boland, RII  
B. Bonser, RII  
S. Sparks, RII  
J. Brady, RII  
C. Evans, RII  
G. MacDonald, RII  
R. Hannah, RII  
K. Clark, RII  
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NAME			VMCCREE	ABOLAND	CEVANS			
DATE								

OFFICIAL RECORD COPY

DOCUMENT NAME: C:\Harris final.wpd

## NOTICE OF VIOLATION

Carolina Power and Light Company  
Shearon Harris Nuclear Power Plant  
Unit 1

Docket No. 50-400  
License No. NPF-63  
SDP/EA-00-263

During an NRC inspection completed on September 30, 2000, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions - May 1, 2000," NUREG-1600, as amended on November 3, 2000 (65 Federal Register 59274) (Enforcement Policy), the violation is listed below:

Technical Specification Limiting Condition for Operation (LCO) 3.5.2 requires that two independent Emergency Core Cooling System (ECCS) subsystems shall be operable with each subsystem comprised of one operable charging/safety injection pump (CSIP), one operable RHR heat exchanger, one operable RHR pump, and an operable flow path capable of taking suction from the RWST on a safety injection signal and, upon being manually aligned, transferring suction to the containment sump during the recirculation phase of operation.

LCO action 3.5.2.a requires that with one ECCS subsystem inoperable, restore the inoperable subsystem to operable status within 72 hours or be in at least hot standby within the next six hours and in hot shutdown within the following 6 hours.

Contrary to the above, from May 15 to June 4, 1999, November 13 to December 18, 1999, and from January 3 to January 7, 2000, the licensee failed to have an operable charging/safety injection pump in each ECCS subsystem and failed to comply with LCO action statement (a), in that the C CSIP was inoperable due to a failed outboard thrust bearing and action was not taken within 72 hours to restore the inoperable charging/safety injection pump to service or to shutdown to hot standby.

This violation is associated with a White SDP finding.

Pursuant to the provisions of 10 CFR 2.201, Carolina Power and Light Company is hereby required to submit a written statement or explanation to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555, with a copy to the Regional Administrator, Region II, and a copy to the NRC Resident Inspector office at the facility that is the subject of this Notice, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previously docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

Enclosure 1

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room). If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.790(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 2<sup>nd</sup> day of February 2001

## LIST OF OPEN REGULATORY CONFERENCE ATTENDEES

### NUCLEAR REGULATORY COMMISSION:

L. Reyes, Regional Administrator, Region II (RII)  
V. McCree, Deputy Director, Division of Reactor Projects (DRP), RII  
A. Boland, Enforcement Officer, RII  
S. Sparks, Senior Enforcement Specialist, RII  
B. Bonser, Branch Chief, DRP, RII  
J. Brady, Senior Resident Inspector, DRP, RII  
C. Evans, Regional Counsel, RII  
R. Bernhard, Senior Reactor Analyst, DRS, RII  
R. Hannah, Public Affairs Officer, RII  
J. Dixon-Herrity, Enforcement Specialist, Office of Enforcement  
R. Correia, Chief, Section 2, Project Directorate II, Office of Nuclear Reactor Regulation (NRR),  
(teleconference)  
R. Laufer, Project Manager, Project Directorate II, NRR (teleconference)  
R. Pascarelli, Inspection Support Branch, NRR (teleconference)  
J. Colaccino, Mechanical and Civil Engineering Branch, NRR (teleconference)  
S. Rosenberg, RII Coordinator, Office of the Executive Director for Operations (teleconference)  
R. Hagar, Resident Inspector, DRP, RII (teleconference)

### CAROLINA POWER AND LIGHT COMPANY:

J. Scarola, Vice President, Harris Nuclear Plant (HNP)  
G. Attarian, Manager, Engineering Support Services, HNP  
C. Connors, System Engineer, HNP  
R. Duncan, Plant General Manager, HNP  
P. Fulford, Superintendent Technical Services, HNP  
S. Laur, Superintendent, Probabilistic Safety Assessment, HNP  
E. McCartney, Supervisor, Regulatory Affairs, HNP



# Regulatory Conference

Inspection Report 00-03  
Preliminary White Finding

Harris Nuclear Plant



**CP&L**

A Progress Energy Company

# Agenda

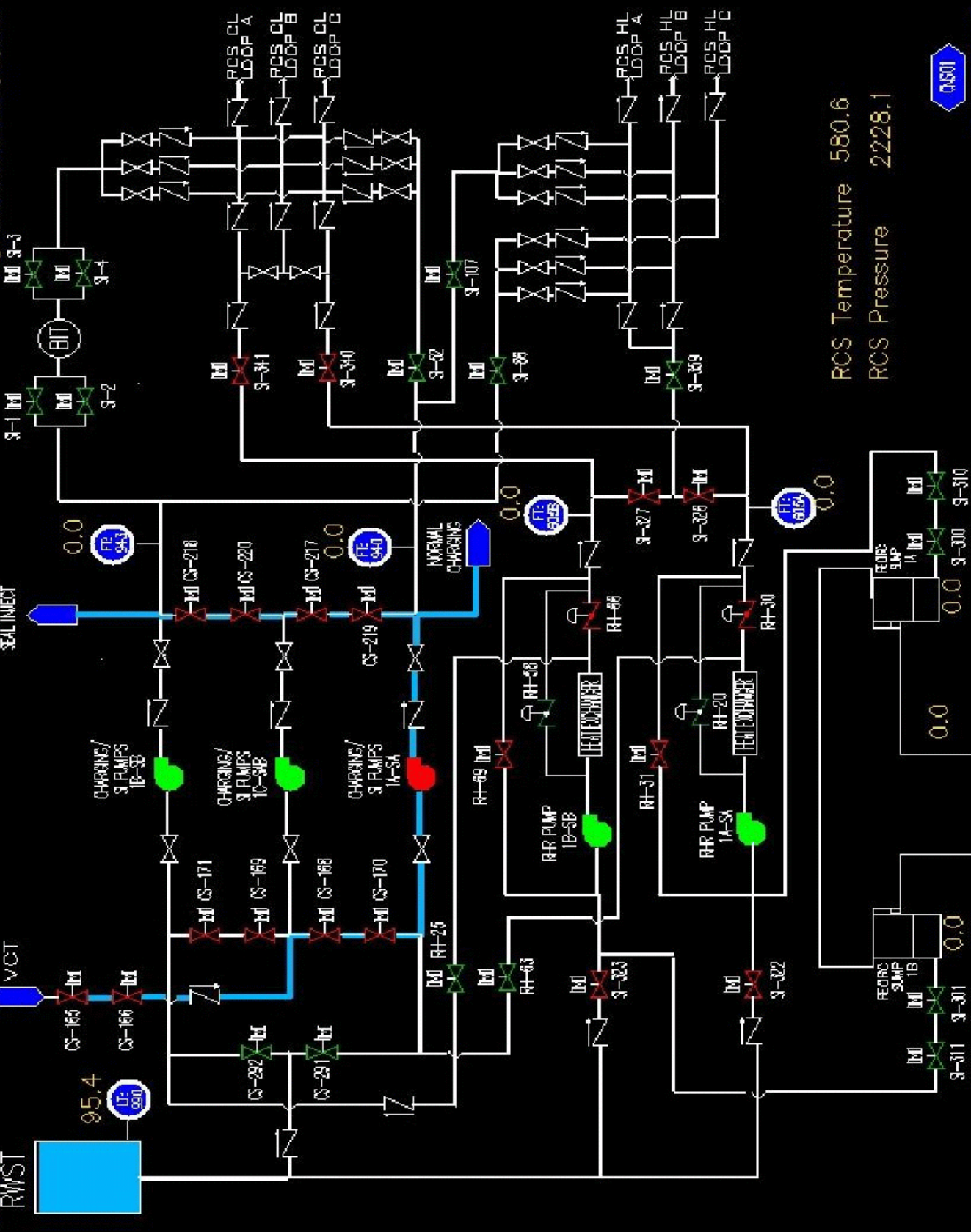
- Overview of the issue
- Pump performance history
- Risk Perspective
- Conclusions

## Inspection Report 00-03 Finding

- The “C” Charging Safety Injection pump had a failed outboard thrust bearing that resulted in the pump being inoperable for a period in excess of technical specifications.

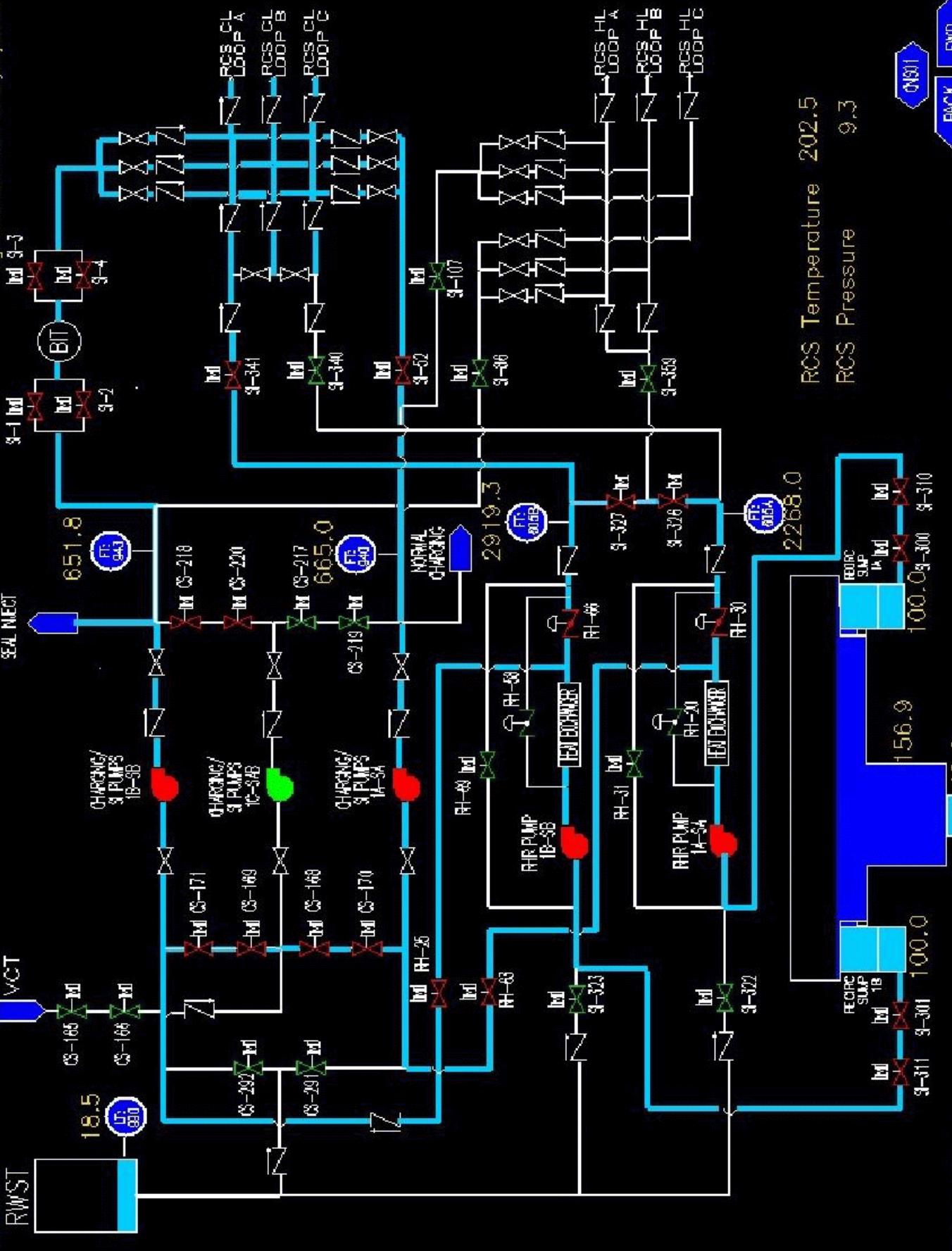
# System Description

- Chemical Volume and Control System
  - 3 Centrifugal, 11 stage pumps
  - 1 of these 3 is a standby or swing pump that can be aligned to either train
- Main functions
  - Reactivity control
  - Inventory control
  - Emergency core cooling



SISFLOW

High and Low Head Safety Injection



SFD 1308 & 1310

SI ACTUATE SI RESET

RCS Temperature 202.5  
RCS Pressure 9.3

ON31  
BACK FWD

# Design requirements

- Normal operation
  - Charging and makeup control - 120 gpm
  - RCP seal injection - 31 gpm
- Accident operation
  - High head safety injection flow up to 685 gpm
  - High pressure recirculation flow up to 685 gpm

# Surveillance Testing

- Quarterly
  - Pump Performance – pump curve single point verification
- Refueling interval
  - Full flow testing – verify pump and system performance under full flow conditions



# Design Requirements

- Event assumed to last 30 days
- LOCA acceptance criteria of 10 CFR 50.46
  - Peak clad temperature
  - Hydrogen generation
  - Local clad oxidation
  - Geometry amenable to cooling
  - Long-term decay heat removal

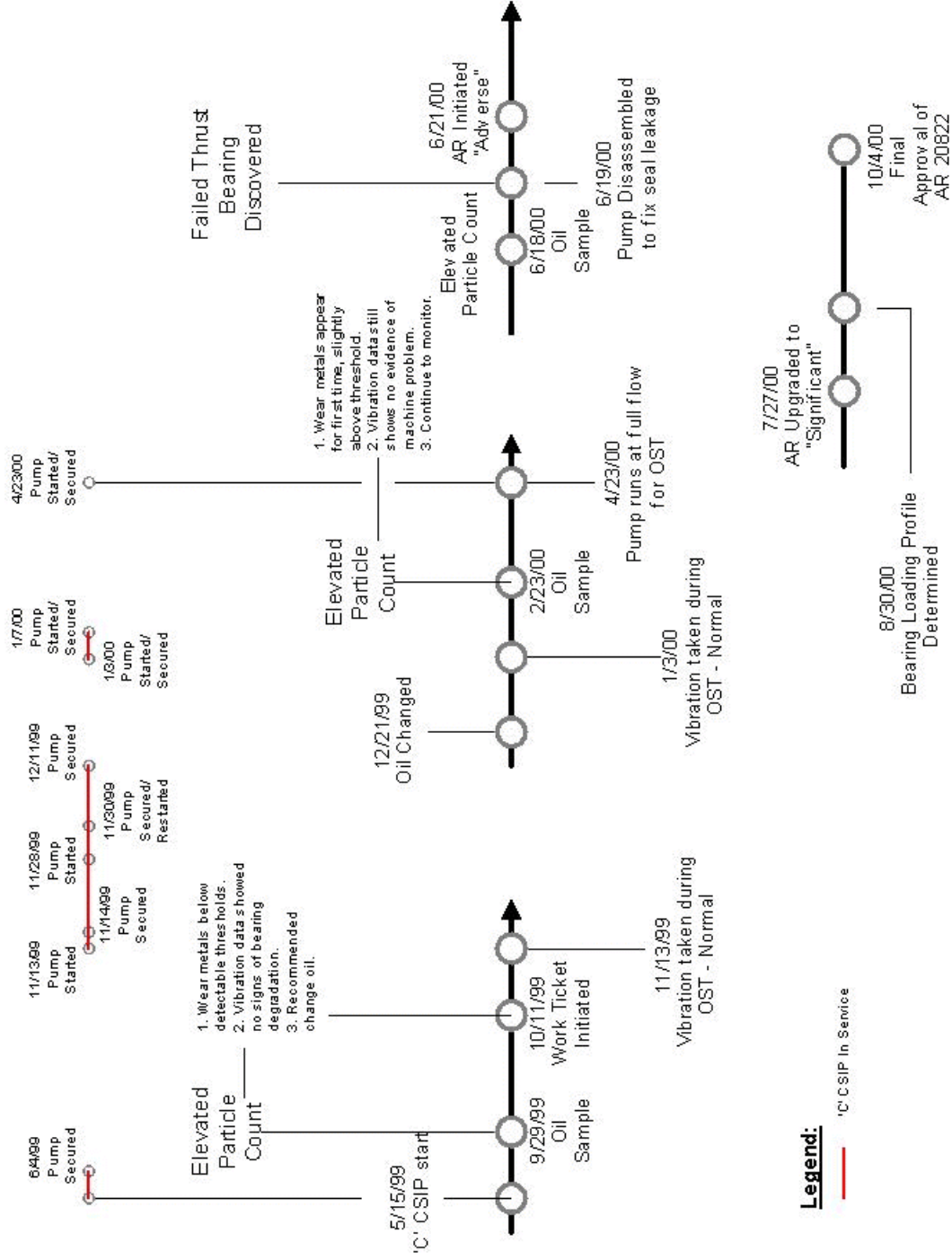
# Bearing failure

- On 6/19/00, while implementing pump seal leakage repairs, 'C' CSIP outboard thrust bearing discovered damaged.
- Root Cause investigation evaluated 22 potential causes.
- Elimination of all but two resulted in declaring 'C' CSIP inoperable back to 5/15/99.

# Predictive Maintenance

- Proactive Program used for identification and *trending* degradation on critical plant equipment.
- CSIPs are within the scope of HNP program based on importance and safety significance.
  - Oil Analysis – Semi-annual
  - Vibration – Quarterly (During Surveillance testing)
  - Thermography – Motor only

# Event Timeline



**Legend:**

— 'C' CSIP In Service

# Oil Analysis Program

- Oil Sample Analysis:
  - Particle count – 5 separate size distributions
  - Moisture
  - Viscosity
  - Neutrality
  - Color
  - Al
  - Cu
  - Ca
  - Fe
  - Pb
  - Mg
  - P
  - Sn
  - Cr
  - Zn
  - Si

# Risk Perspective

- PSA Approach
  - Considered time intervals with unique CSIP configurations
  - Determined CDF for each interval
  - Determined incremental CDF (ICDF) for each interval by comparing to baseline CDF
  - Multiplied each ICDF by interval duration to obtain Incremental Core Damage Probability (ICDP)
  - Summed the ICDPs for all the intervals

# Risk Perspective

- PSA Approach (continued)
  - CSIP “C” assumed to fail if flow rate between 250 and 450 gpm
  - CSIP “C” assumed acceptable for:
    - Emergency boration for ATWS
    - Maintaining RCP Seal Injection function
  - CSIP “C” assumed to fail for:
    - Small and medium LOCA
    - Steam generator tube rupture
    - Sequences requiring feed and bleed cooling

# Risk Perspective

- PSA Results
  - ICDP for this event was 5.13E-6
  - Result includes dominant fire initiating events identified in the IPEEE



# Risk Perspective

- PSA Conservatism
  - CSIP “C” was assumed to fail anytime flow could have been in 250 – 450 gpm range
  - Did not credit CSIP “C” for very small LOCAs where pressure would stay high and flow remain low (e.g., very small RCP seal LOCAs)
  - The fire analysis used IPEEE results, which did not employ “severity factors.”
  - Available “A” or “B” CSIP only credited during recirculation, not injection phase

# Conclusions

- Event significance
- Risk potential needs to drive actions
- Design basis functions are not exclusively demonstrated through surveillance testing
- Potential for undetected failures

OPEN REGULATORY CONFERENCE  
SHEARON HARRIS NUCLEAR POWER PLANT

JANUARY 30, 2001  
NRC REGION II OFFICE, ATLANTA, GA.

- I. OPENING REMARKS, INTRODUCTIONS AND MEETING INTENT  
L. Reyes, Regional Administrator
- II. NRC REGULATORY CONFERENCE POLICY  
A. Boland, Enforcement Officer
- III. STATEMENT OF THE ISSUE WITH RISK PERSPECTIVES  
V. McCree, Deputy Director, Division of Reactor Projects
- IV. LICENSEE RISK PERSPECTIVE PRESENTATION
- V. SUMMARY OF APPARENT VIOLATIONS  
V. McCree, Deputy Director, Division of Reactor Projects
- VI. LICENSEE RESPONSE TO APPARENT VIOLATIONS
- VII. BREAK / NRC CAUCUS  
L. Reyes, Regional Administrator
- VIII. CLOSING REMARKS  
L. Reyes, Deputy Regional Administrator

## Apparent Violation

- A. Technical Specification Limiting Condition for Operation (LCO) 3.5.2 requires that two independent Emergency Core Cooling System (ECCS) subsystems shall be operable with each subsystem comprised of one operable charging/safety injection pump, one operable RHR heat exchanger, one operable RHR pump, and an operable flow path capable of taking suction from the RWST on a safety injection signal and, upon being manually aligned, transferring suction to the containment sump during the recirculation phase of operation.

LCO action 3.5.2.a requires that with one ECCS subsystem inoperable, restore the inoperable subsystem to operable status within 72 hours or be in at least hot standby within the next six hours and in hot shutdown within the following 6 hours.

From May 15 to June 4, 1999; November 13 to December 18, 1999; and from January 3 to January 7, 2000, the licensee failed to have an operable charging/safety injection pump in each ECCS subsystem and failed to comply with LCO action statement (a), in that the C CSIP was inoperable due to a failed outboard thrust bearing and action was not taken within 72 hours of placing the C CSIP in service to restore an operable charging/safety injection pump to service or to shutdown to hot standby.

Note: The apparent violations discussed at this Regulatory Conference are subject to further review and are subject to change prior to any resulting enforcement action.

## Apparent Violation

- B. 10 CFR 50 Appendix B Criterion XVI, Corrective Action, requires that conditions adverse to quality are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude recurrence.

Program Manual NGGM-PM-0007, Quality Assurance Program Manual, Revision 4, Section 12, Conditions Adverse to Quality and Corrective Action, implements those requirements. In Section 12.7, Significant Evaluation Guidance, a significant degradation in the ability of a safety system to perform its function is identified as a significant condition adverse to quality.

Procedure CAP-NGGC-0200, Corrective Action Program, Revision 1, implements the corrective action program described in the Quality Assurance Program Manual. In Attachment 1, item 2c, “damage to major plant equipment including 4 KV and above motor-driven and diesel engine-driven equipment” is identified as a criterion for significant adverse condition determination. The procedure further indicates that a significant adverse condition investigation is required to find a root cause and prevent recurrence.

From June 19 to July 14, 2000, the licensee failed to treat a condition adverse to quality as significant and thus failed to take adequate actions to determine the cause, in that the licensee did not classify as significant the 6.9 KV motor driven C CSIP outboard thrust bearing failure, and failed to determine that loss of lubrication was a cause of that failure.

Note: The apparent violations discussed at this Regulatory Conference are subject to further review and are subject to change prior to any resulting enforcement action.