UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-369/87-46 and 50-370/87-46

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos.: 50-369 and 50-370 License Nos.: NPF-9 and NPF-17

Facility Name: McGuire 1 and 2

Inspection Conducted: November 7, 1987 - January 13, 1988

Inspector: W. Orders for _____ 2/4/88
W. Orders, Senior Resident Inspector Date Signed

Accompanying Personnel: D. Nelson

Approved by: W. Orders for _____ 2/4/88
T. A. Peebles, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope: This special unannounced inspection involved the areas of operations safety verification and surveillance testing.

Results: In the areas inspected, one violation involving an inadequate surveillance test program which led to inoperable safety related equipment was identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*T. McConnell, Plant Manager
*B. Travis, Superintendent of Operations
*B. Hamilton, Superintendent of Technical Services
*N. McCraw, Compliance Engineer

Other licensee employees contacted included construction craftsmen, engineers, technicians, operators, mechanics, security force members, and office personnel.

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on January 4, 1988, with those persons indicated in paragraph 1 above. The licensee representatives present offered no dissenting comments nor did they identify as proprietary any of the information reviewed by the inspectors during the course of their inspection.

Subsequently, a management meeting was held in the NRC Region II offices on January 13, 1988, at the request of the licensee. In that meeting, the licensee explained the background behind, the scenario leading to, and corrective actions taken relative to the event described in this report. A list of meeting attendees is enclosed as attachment 2. A copy of the handout issued by the licensee during the meeting is enclosed as Attachment 3.

3. Unresolved Items

No unresolved items were identified in this report.

4. Executive Summary

On November 7, 1987, McGuire Unit 2 was restarted from a trip which occurred on November 5. Details of the trip are delineated in inspection report 50-369,370/87-41. At the time of the restart, based on the current test acceptance criteria, both trains of component cooling water (KC) would have failed the test due to fouling of the system heat exchangers.

The heat exchanger fouling was verified later when the Unit 2 KC heat exchangers were tested and failed to meet the test acceptance criteria. This testing was devised to detect fouling of the tube side of these

components which is cooled by nuclear service water (RN), a raw lake water system. Testing of these particular heat exchangers is an element of a comprehensive test program implemented in early 1986 as a result of operability concerns involving the fouling of various components in the RN system. This test program incorporated flow balance testing and heat exchanger testing along with heat exchanger cleaning.

Of concern are the following:

a. The effectiveness of the testing program.

b. The restart of Unit 2 with both trains of KC inoperable, which in turn made both trains of the residual heat removal system (ND) inoperable.

c. The decision to restart the unit when it appears there was ample evidence available prior to restart to challenge the operability of the KC system.

5. Background

In October 1985, a problem was identified concerning the fouling of heat exchangers cooled by Nuclear Service Water (RN). For more detail relative to the generic issue refer to report 50-369/85-38, 50-370/85-39. Stemming from that problem, which ultimately resulted in escalated enforcement, the licensee implemented an extensive heat exchanger testing program which encompassed the KC heat exchangers.

As illustrated on page 2 of Attachment 1, a plot of the McGuire Unit 2 KC heat exchanger test data for 1986 and 1987, there was at least one occurrence in the fall of 1986 and two in the fall of 1987 prior to the November 7 event, during which both trains of KC appear to have been inoperable simultaneously. Furthermore, if the Unit 1 KC heat exchanger test results are included in the analysis, there were five failures out of the six tests performed between September 4 and October 9, 1987.

6. Event Scenario

During a routine staff meeting on the morning of November 4, 1987, licensee management discussed the fact that the Unit 2 KC heat exchanger tests were due on Friday, November 6 on the A train and on Monday, November 9 on B train.

On the following morning, November 5, 1987, at about 7:00 a.m., Unit 2 tripped from full power due to a loss of vacuum in the main feedwater pump turbine condensers (Details in report 50-369,370/87-41). Later that morning during a routine staff meeting, licensee management again discussed the scheduled KC tests and the probability that the heat exchangers would need to be cleaned when tested.

Neither heat exchanger was tested until Saturday, November 7, after the unit had been restarted. It is of particular interest here to note that had the test been performed as scheduled on Friday, November 6 the heat exchanger would have failed. This statement is made based on the test results illustrated on Attachment 1. This would have precluded unit restart in that Technical Specification 3.0.4, applicable to the KC system, prevents a unit from changing modes while in the action statement of a T.S.

The A train KC heat exchanger was tested on Saturday, failed the test, was declared inoperable and subsequently cleaned. The heat exchanger was retested and declared operable on November 10.

During the period between November 7 and 10 the operability of the B KC heat exchanger was not considered. It is routine practice to assume a component is operable if it is within its surveillance period. This assumption, however, is predicated upon an adequate surveillance program.

On November 10, after returning the A heat exchanger to service, the B heat exchanger was tested, it also failed and was cleaned. The component was returned to service later that day.

Of concern is an apparent pattern of inoperability of these heat exchangers, and the restart of the unit on November 7, with what appears to be adequate information available prior to the unit restart forecasting the heat exchangers' degradation. This pattern is graphically depicted on Attachment 1.

7. KC System Design Basis

The Component Cooling System is designed to:

a. Remove residual and sensible heat from the Reactor Coolant System, via the Residual Heat Removal System, during normal station shutdown and during accident conditions.

b. Cool the letdown flow to the Chemical and Volume Control System during power operation.

c. Cool the spent fuel pool water.

d. Provide cooling to dissipate waste heat from various primary station components during normal operation and under accident conditions.

8. KC System Description

The Component Cooling System for each of the McGuire units normally functions as two independent sub-systems and consists basically of four pumps and two heat exchangers.

Cooling water is normally available to all components served by the system, even though one or more or these components may be individually isolated. Valves actuated by an Engineered Safety Features (ESF) signal are used to provide essential safety equipment with cooling water should it become necessary to place these components in service under loss-of-coolant accident conditions.

The component cooling heat exchangers are the shell and straight tube type. Raw river water from the Nuclear Service Water System is circulated through the straight tubes. During normal station operation, two pumps and one heat exchanger provide the necessary cooling requirements. Two pumps and one heat exchanger are adequate for normal cooldown, refueling, and in the event of a LOCA. The remaining pumps and heat exchanger serve as a backup.

Some of the more important equipment serviced by the KC system is:

a. residual heat removal heat exchangers

b. fuel pool cooling heat exchangers

c. letdown heat exchanger

d. excess letdown heat exchanger

e. reactor coolant pump motor bearings and thermal barriers

f. residual heat removal pump mechanical seal heat exchanger

9. System Safety Evaluation

As discussed in the FSAR, sufficient cooling capacity is provided to fulfill all system requirements under normal and accident conditions. Adequate safety margins are included in the size and number of components to preclude the possibility of a component malfunction adversely affecting operation of ESF equipment. Active system components considered vital to the operation of the system are redundant. Any single passive failure in the system should not prevent the system from performing its design function.

In consideration of single failure criteria, the Component Cooling System contains separate flow paths to the two trains of ESF Features equipment. Any piping connecting the separate flow paths contain isolation valves in series.

10. Applicable Regulatory Requirements

a. 10 CFR 50, Appendix B, Criterion XI, requires that a test program be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in

service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. The test program shall include, as appropriate, proof tests prior to installation, preoperational tests, and operational tests during nuclear power plant operation, of structures, systems, and components. Test results shall be documented and evaluated to assure that test requirements have been satisfied.

b. Technical Specification (TS) 3.7.3 requires that two independent component cooling water loops be operable for modes 1, 2, 3, and 4. With only one loop operable, both loops must be restored to an operable status within 72 hours or the unit be in hot standby within the next six hours and cold shutdown within the following 30 hours.

11. Conclusions

a. The test program, established to demonstrate that the KC system will perform satisfactorily in service, was inadequate in that five of the six tests performed between the dates of September 4 and October 9, 1987 failed. The test program, by design, was established to maintain system operability. The repeated test failures of the KC heat exchangers is, sufficient to question program adequacy.

Detailed below are the dates, components and results of KC heat exchanger fouling tests conducted between September 4 and November 25, 1987.

Date	KC Heat Exchanger	Acceptance Criteria DELTA P (PSID)	Actual DELTA P (PSID)	Results
Sept. 4	2A	8.8	10.00	Failed
Sept. 10	2B	8.8	10.00	Failed
Oct. 1	1A	8.8	7.00	Passed
Oct. 1	1B	8.8	15.00	Failed
Oct. 7	2A	8.8	12.60	Failed
Oct. 9	2B	8.8	9.59	Failed
Nov. 7	2A	8.8	15.15	Failed
Nov. 10	2B	8.8	20.18	Failed
Nov. 25	1B	8.8	14.00	Failed

This test data is depicted graphically in Attachment 1.

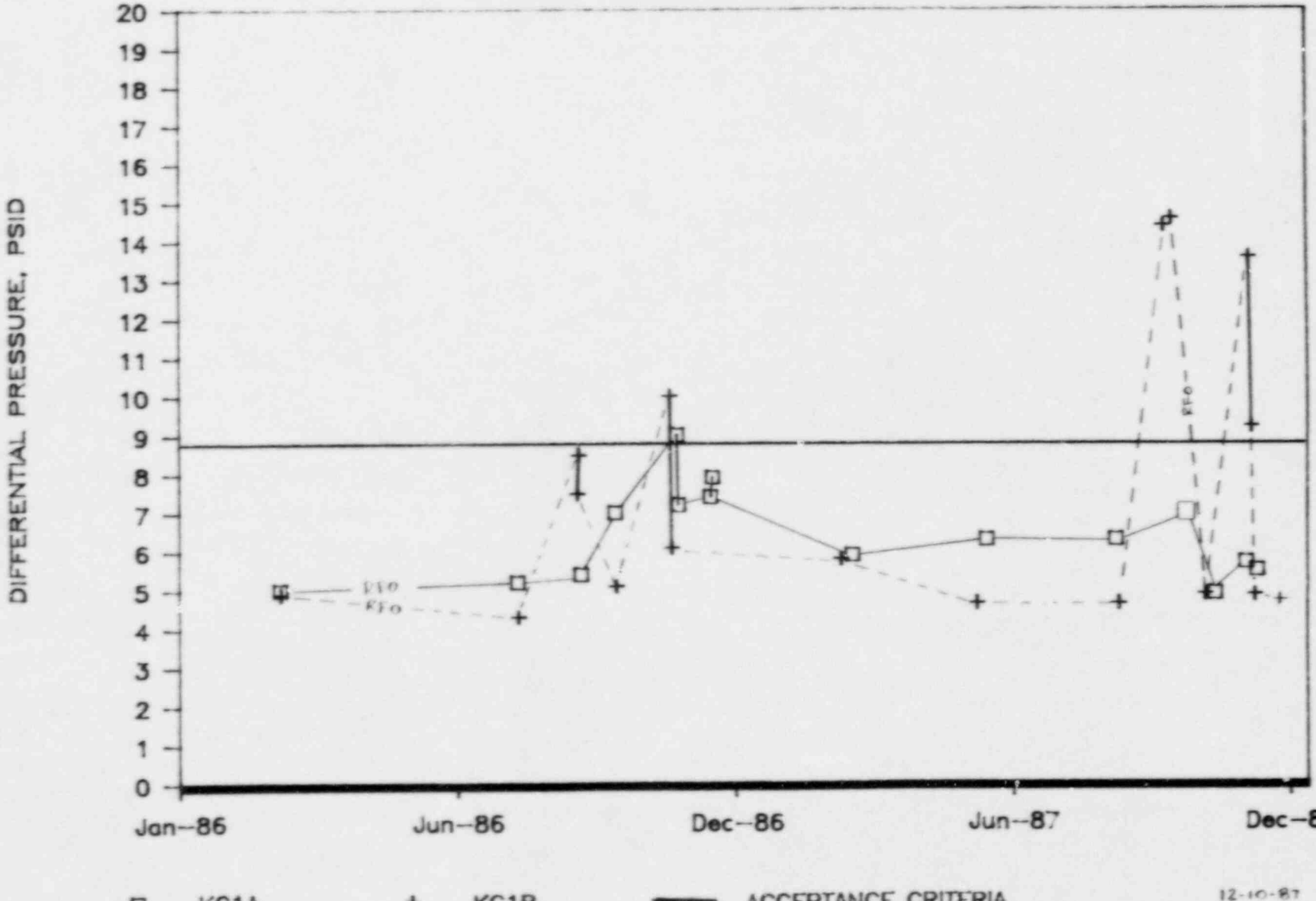
b. Test data indicates that both Unit 2 KC heat exchangers were inoperable simultaneously; once during the Fall of 1986 and a number of times during the Fall of 1987, when the unit was operating in modes requiring both trains to be operable.

Subsequent licensee analysis revealed however that based on a model assuming uniform depositing of silt on the HX tubes, the limiting DP for design basis heat transfer is 16.0 psid. Assuming that type of debris geometry, only one KC HX (2B) was actually inoperable during the Fall of 1987. The licensee's safety analysis is entailed in LER 370/87-22.

The above is identified as a violation (50-370/87-46-01).

McGUIRE 1

COMPONENT COOLING HX TEST RESULTS



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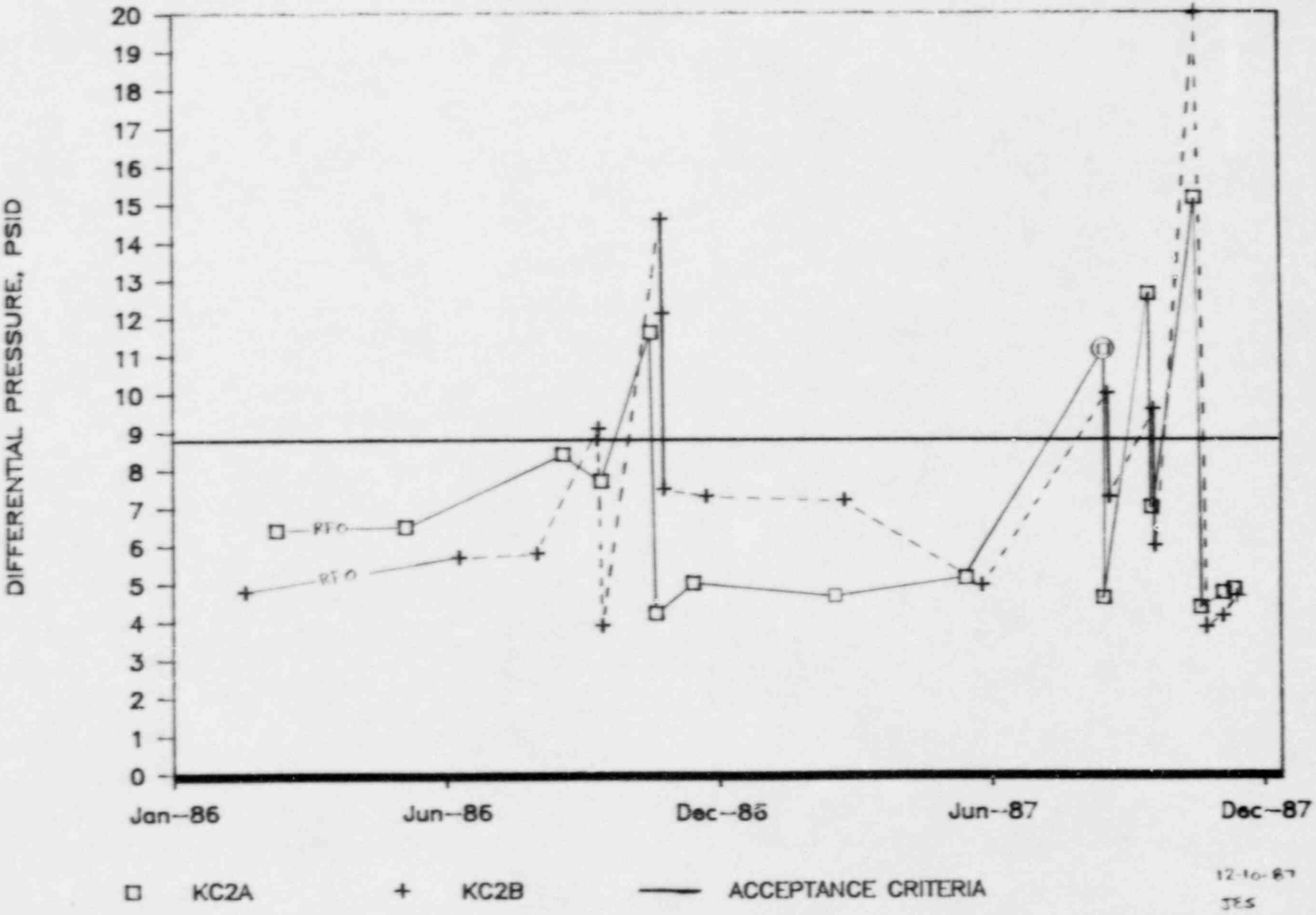
McGUIRE 2

COMPONENT COOLING HX TEST RESULTS



12-10-87
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ATTACHMENT 2

Duke Management Meeting Attendees January 13, 1988

Name	Organization	Position
T. Peebles	NRC	Section Chief Region II
W. T. Orders	NRC	Senior Resident Inspector, McGuire
M. Thomas	NRC	TPS, RII
C. Hehl	NRC	Deputy Director, DRP
M. L. Ernst	NRC	Deputy Regional Administrator
A. F. Gibson	NRC	Director, DRS
J. E. Synder	Duke	MNS/Performance Engineer
R. L. Gill	Duke	McGuire Licensing
E. O. McCraw	Duke	McGuire Compliance Engineer
M. A. Haller	Duke	G. O. Tech Service
M. D. McIntosh	Duke	General Manager - NRC Support
B. H. Hamilton	Duke	Support of Tech Services - MNS
Tony L. McConnel	Duke	Station Manager/MNS

ATTACHMENT 3

UNIT 2 COMPONENT COOLING SYSTEM (KC) INOPERABILITY IN THE FALL OF 1987

AS A RESULT OF THE McGUIRE NUCLEAR STATION'S NUCLEAR SERVICE WATER SYSTEM (RN) TEST PROGRAM WE DISCOVERED THAT THE INOPERABILITY OF THE COMPONENT COOLING SYSTEM (KC) CAN NOT BE ESTABLISHED FOR SOME PERIODS OF TIME DURING THE LATE FALL OF 1987. THE PERIODS IN QUESTION ARE BETWEEN THE MONTHLY SURVEILLANCES BEING CONDUCTED AT THAT TIME.

AGENDA FOR DISCUSSION

- BRIEF STATEMENT OF PURPOSE OF THE NUCLEAR SERVICE WATER SYSTEM (RN) AND THE COMPONENT COOLING SYSTEM (KC)

- DESCRIPTION OF THE NUCLEAR SERVICE WATER SYSTEM (RN) TEST PROGRAM AT McGUIRE NUCLEAR STATION

- DISCUSSION OF "WHAT WE KNEW", ON NOVEMBER 5, 1987

- DISCUSSION OF ADDITIONAL INFORMATION OBTAINED AFTER NOVEMBER 7, 1987

- McGUIRE NUCLEAR STATION'S IMMEDIATE REACTION TO THE ADDITIONAL INFORMATION

- CHANGES MADE TO THE NUCLEAR SERVICE WATER SYSTEM (RN) TEST PROGRAM AS A RESULT OF THE ADDITIONAL INFORMATION

- FUTURE PLANS AND ADDITIONAL STUDIES

- CONCLUSIONS

PURPOSES OF THE NUCLEAR SERVICE WATER SYSTEM (RN) AND THE COMPONENT COOLING WATER SYSTEM (KC)

- NUCLEAR SERVICE WATER SYSTEM (RN) THIS SYSTEM PROVIDES ASSURED COOLING WATER FOR VARIOUS AUXILIARY BUILDING AND REACTOR BUILDING HEAT EXCHANGERS DURING ALL PHASES OF STATION OPERATION. EACH UNIT HAS TWO REDUNDANT "ESSENTIAL HEADERS" SERVING TWO TRAINS OF EQUIPMENT NECESSARY FOR SAFE STATION SHUTDOWN, AND A "NON-ESSENTIAL HEADER" SERVING EQUIPMENT NOT REQUIRED FOR SAFE SHUTDOWN. IN CONJUNCTION WITH THE ULTIMATE HEAT SINK, COMPRISED OF LAKE NORMAN AND THE STANDBY NUCLEAR SERVICE WATER POND, THE NUCLEAR SERVICE WATER SYSTEM (RN) IS DESIGNED TO MEET DESIGN FLOW RATES AND HEADS FOR NORMAL STATION SHUTDOWN NORMALLY OR AS THE RESULT OF A POSTULATED LOCA. THE SYSTEM IS FURTHER DESIGNED TO TOLERATE A SINGLE FAILURE FOLLOWING A LOCA, AND/OR SEISMIC EVENT CAUSING A LOSS OF LAKE NORMAN, AND/OR LOSS OF STATION POWER PLUS OFFSITE POWER (STATION BLACKOUT).

- COMPONENT COOLING SYSTEM (KC)

  THIS SYSTEM IS DESIGNED TO:

  A. REMOVE RESIDUAL AND SENSIBLE HEAT FROM THE REACTOR COOLANT SYSTEM, VIA THE RESIDUAL HEAT REMOVAL SYSTEM, DURING STATION SHUTDOWN.
  B. COOL THE LETDOWN FLOW TO THE CHEMICAL & VOLUME CONTROL SYSTEM DURING POWER OPERATION.
  C. COOL THE SPENT FUEL POOL WATER.
  D. PROVIDE COOLING TO DISSIPATE WASTE HEAT FROM VARIOUS PRIMARY STATION COMPONENTS DURING NORMAL OPERATION AND ACCIDENT CONDITIONS.

DESCRIPTION OF THE COMPONENT COOLING SYSTEM (KC) HEAT EXCHANGER

THESE HEAT EXCHANGERS ARE STANDARD ONCE THROUGH, SHELL AND TUBE HEAT EXCHANGERS WITH THE FOLLOWING SPECIFICATIONS:

NUMBER PER UNIT	2
DESIGN PRESSURE, PSIG	150
DESIGN TEMPERATURE, ^{o}F	200
DESIGN FLOW (SHELL SIDE), LB/HR	2,610,751
DESIGN FLOW (TUBE SIDE), LB/HR	4,976,600
SHELL SIDE INLET TEMP, ^{o}F	106
SHELL SIDE OUTLET TEMP, ^{o}F	95
TUBE SIDE INLET TEMP, ^{o}F	90
TUBE SIDE OUTLET TEMP, ^{o}F	96
SHELL SIDE MATERIAL	CARBON STEEL
TUBE SIDE MATERIAL	INHIBITED ADMIRALTY
OVERALL HEAT EXCHANGER LENGTH, FT	41.5
OVERAL HEAT EXCHANGER DIA, FT	5.5
TUBE LENGHTH, FT	32
TUBE O.D., INCHES	5/8
NUMBER OF TUBES PER HEAT EXCHANGER	4100

NUCLEAR SERVICE WATER SYSTEM (RN) TEST PROGRAM AT MCGUIRE NUCLEAR STATION

AS A RESULT OF OPERABILITY CONCERNS INVOLVING THE FOULING OF VARIOUS COMPONENTS IN THE NUCLEAR SERVICE WATER SYSTEM (RN) A COMPREHESIVE TEST PROGRAM WAS IMPLEMENTED FOR THE SYSTEM IN EARLY 1986. THIS TEST PROGRAM INCORPORATED FLOW BALANCE TESTING AND HEAT EXCHANGER TESTING WITH AN AGGRESSIVE HEAT EXCHANGER CLEANING PROGRAM AND A PRE-EXISTING PUMP AND VALVE TEST PROGRAM.

THIS PROGRAM, AS CONFIRMED BY OUR SURVEYS AND BY THE MANY INQUIRIES FROM OTHER STATIONS, IS THE MOST COMPREHENSIVE AND AGGRESSIVE PROGRAM IN THE COUNTRY.

CURRENT NUCLEAR SERVICE WATER TESTING PROGRAM

NUCLEAR SERVICE WATER FLOW BALANCE

- QUARTERLY SURVEILLANCE
- CLEANING ANY TWO OF THE FOLLOWING HEAT EXCHANGERS RN/NS, RN/KC, AND RN/KD ON ONE TRAIN REQUIRES A FLOW BALANCE WITHIN 7 DAYS (OR WITHIN 7 DAYS AFTER THE UNIT RETURNS TO NORMAL OPERATION).
- PERIODIC CLEANING OF ALL OTHER HEAT EXCHANGERS DOES NOT REQUIRE A NEW FLOW BALANCE.

CONTAINMENT SPRAY (NS) HEAT EXCHANGERS

- QUARTERLY HEAT BALANCE TEST
- STRUCTURAL INTEGRITY TEST BIENNIALLY
- CLEAN YEARLY OR AS REQUIRED BY TEST RESULTS

COMPONENT COOLING (KC) HEAT EXCHANGERS

- QUARTERLY DIFFERIENTIAL PRESSURE TEST (MONTHLY DURING SEPT. - NOV.)
- CLEAN AT REFUELING OR AS REQUIRED BY TEST RESULTS

DIESEL GENERATOR COOLING WATER (KD) HEAT EXCHANGER

- SEMI-ANNUAL HEAT BALANCE TESTING*
- CLEAN AS REQUIRED BY TEST RESULTS

* TESTING HAS BEEN SUSPENDED WHILE CONFLICTING RESULTS ARE EVALUATED. IN THE INTERIM THE HEAT EXCHANGERS ARE CLEANED EVERY 6 MONTHS.

MOTOR COOLERS AND NI OIL COOLERS

- NO TESTING PERFORMED
- PERIODICALLY CLEANED DEPENDENT ON OBSERVED FOULING LEVELS FROM TWO OR MORE SUCCESSIVE CLEANINGS

CURRENT NUCLEAR SERVICE WATER TESTING PROGRAM

CENTRIFUGAL CHARGING PUMP (NV) OIL/GEAR COOLERS

- QUARTERLY DIFFERENTIAL PRESSURE TEST
- CLEAN AS REQUIRED BY TEST RESULTS BUT NOT LESS THAN ONCE PER FUEL CYCLE.

CONTROL ROOM VENTILATION (VC/YC) HEAT EXCHANGERS

- SEMI-ANNUAL DIFFERENTIAL PRESSURE TEST
- CLEAN AS REQUIRED BY TEST RESULTS BUT NOT LESS THAN ONCE PER FUEL CYCLE.

SPENT FUEL POOL (KF) PUMP AIR HANDLING UNIT

- QUARTERLY DIFFERENTIAL PRESSURE TEST
- CLEAN AS REQUIRED BY TEST RESULTS BUT NOT LESS THAN ONCE PER FUEL CYCLE.

CONTAINMENT SPRAY (NS) AND RESIDUAL HEAT REMOVAL (ND) PUMPS AIR HANDLING UNITS

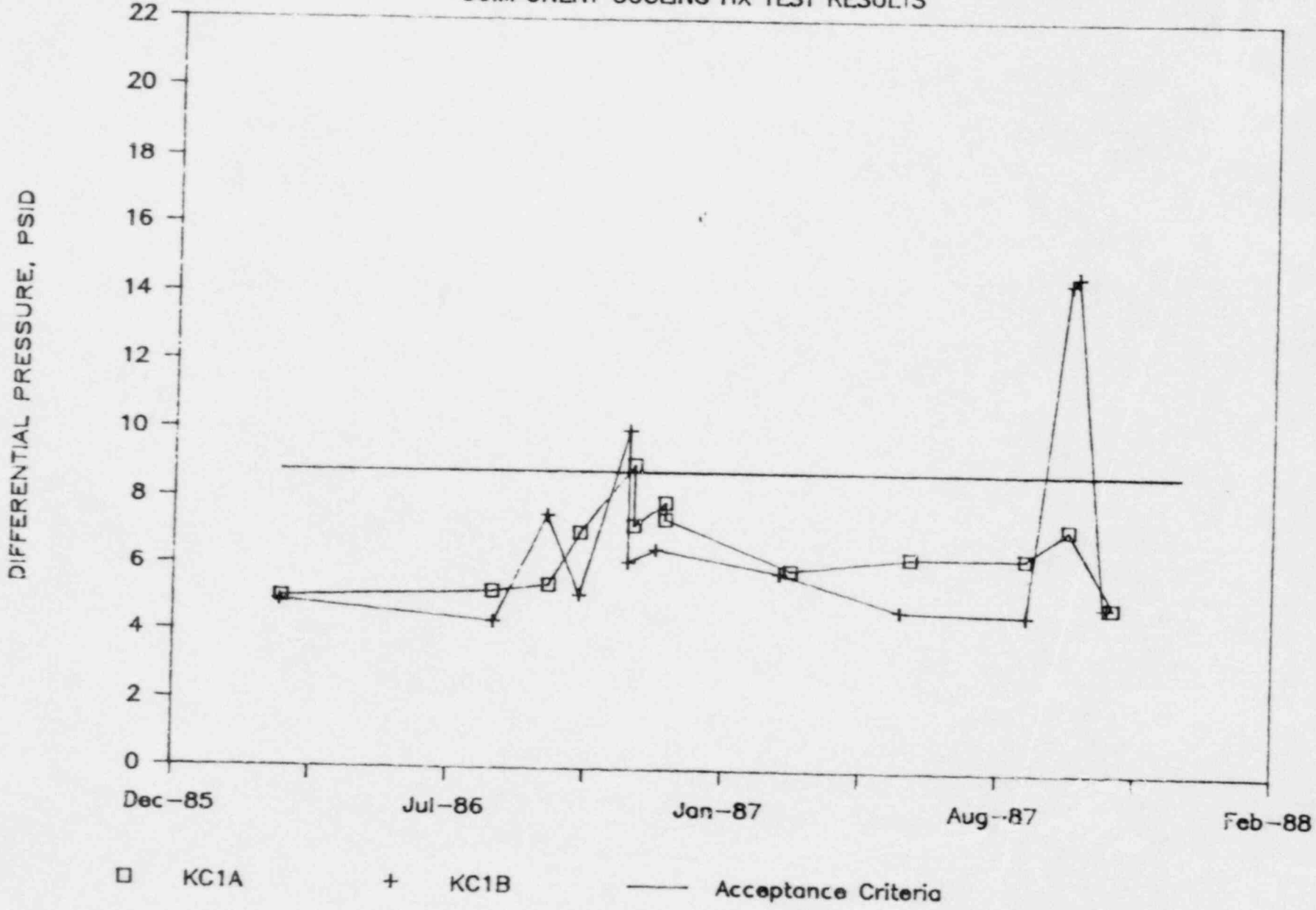
- SEMI-ANNUAL DIFFERENTIAL PRESSURE TEST
- CLEAN AS REQUIRED BY TEST RESULTS

RETEST POLICY

- RETEST IS REQUIRED AFTER MAINTENANCE WHEN THE COMPONENT WAS DECLARED INOPERABLE DUE TO TESTING. PERIODIC CLEANINGS AND OPTIONAL CLEANING WILL NOT REQUIRE RETEST BEFORE RETURNING TO SERVICE. RETEST WILL BE PERFORMED AS SOON AS POSSIBLE TO OBTAIN BASELINE DATA.

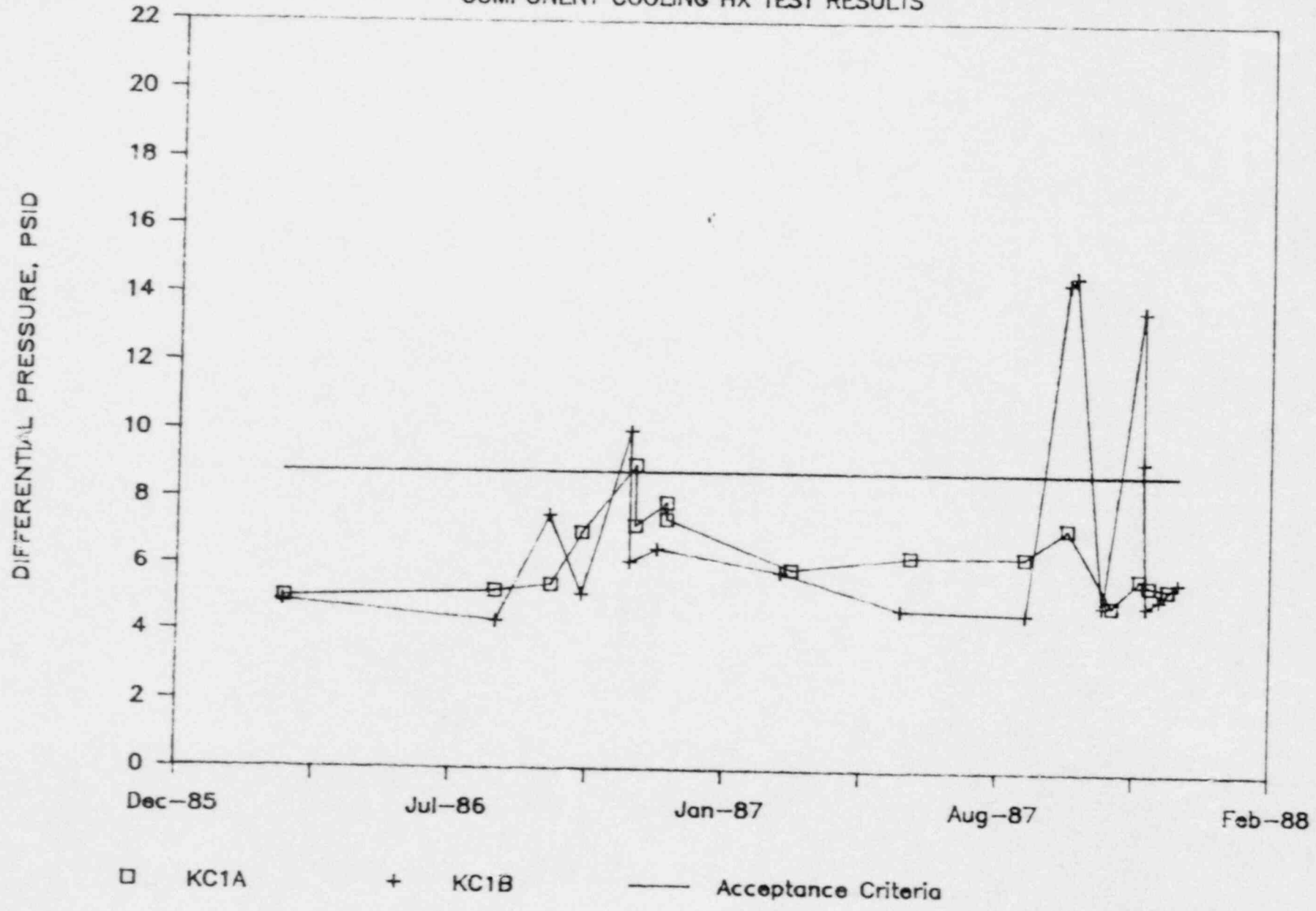
McGUIRE NUCLEAR STATION

COMPONENT COOLING HX TEST RESULTS



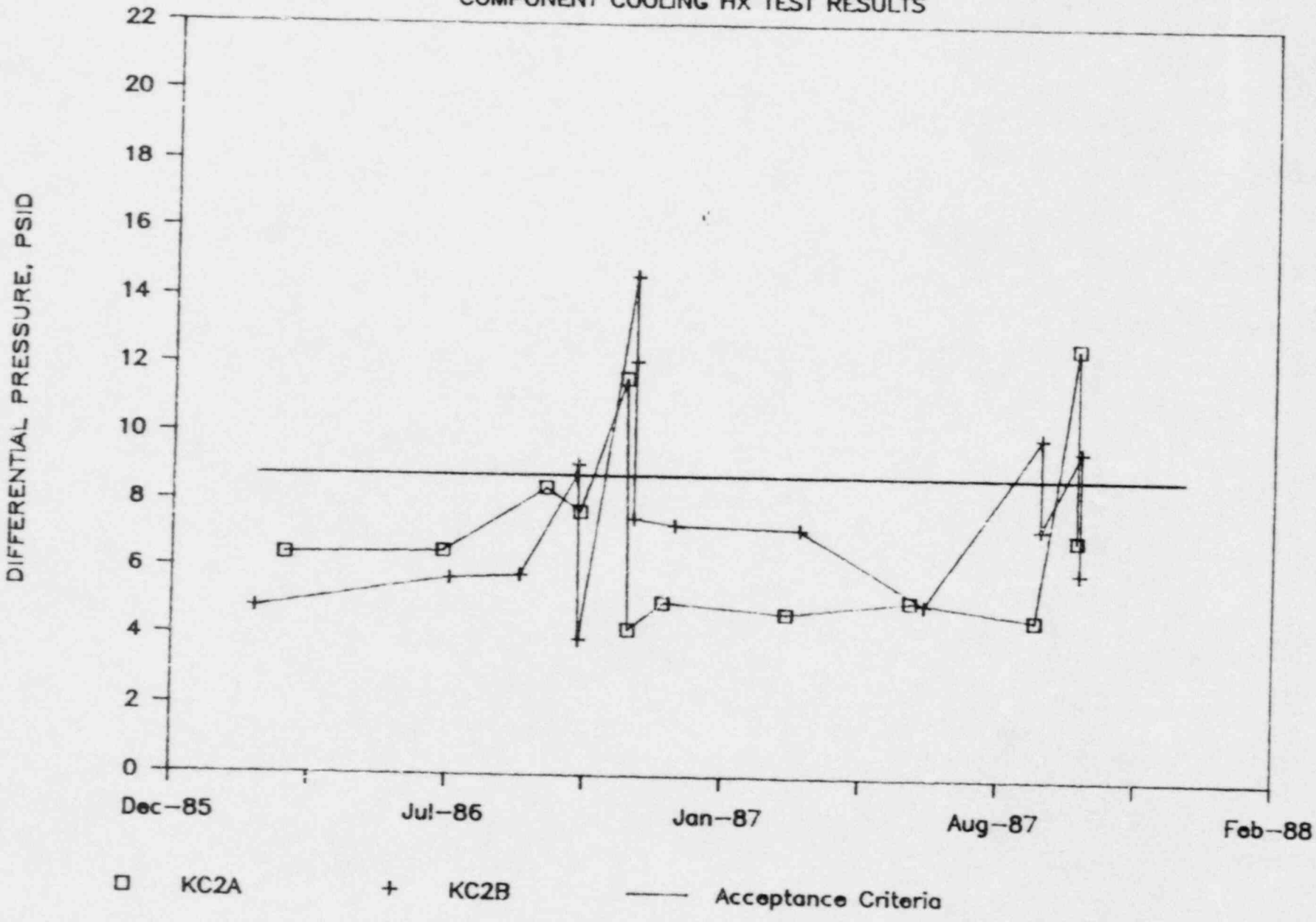
McGUIRE NUCLEAR STATION

COMPONENT COOLING HX TEST RESULTS



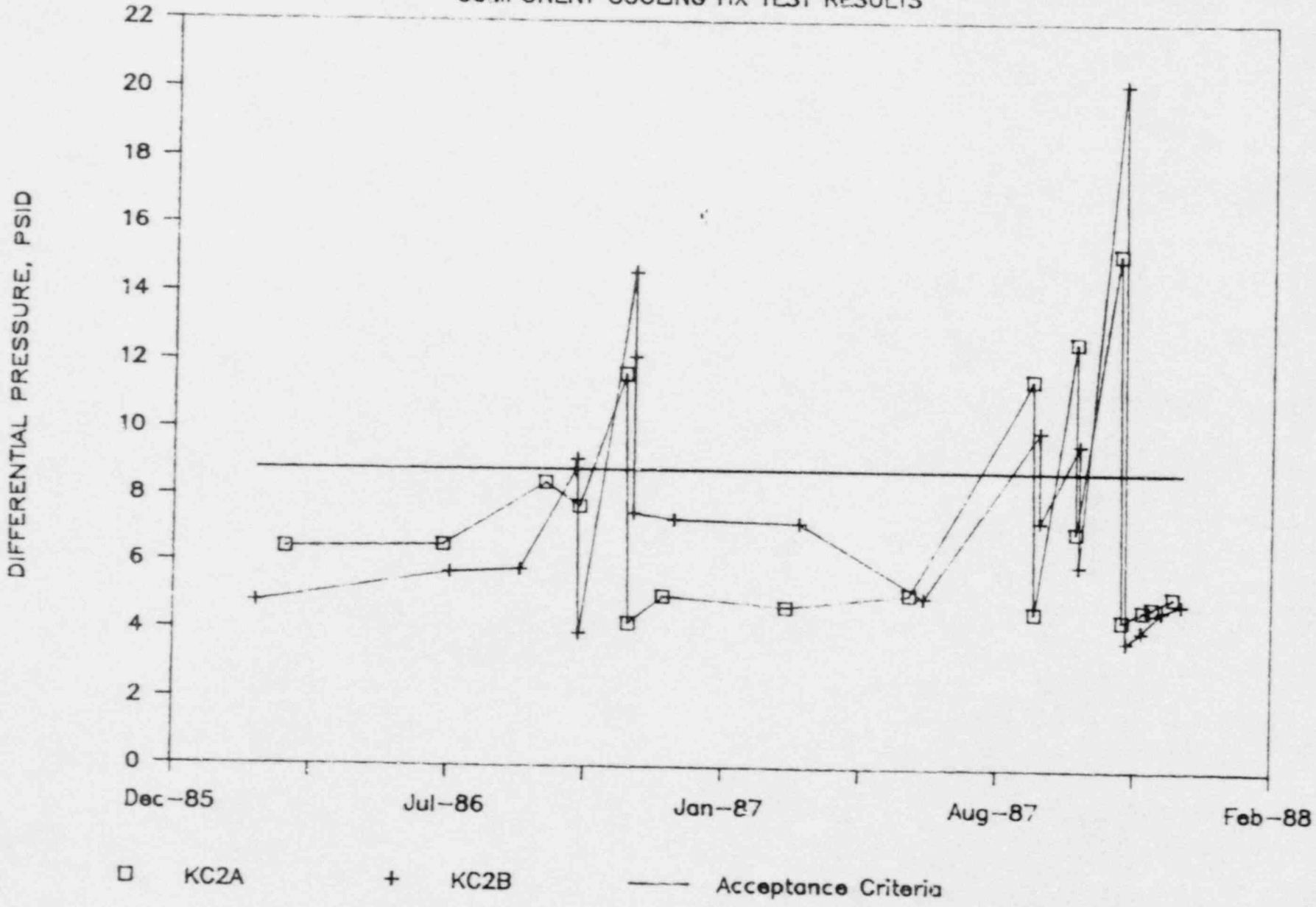
McGUIRE NUCLEAR STATION

COMPONENT COOLING HX TEST RESULTS



McGUIRE NUCLEAR STATION

COMPONENT COOLING HX TEST RESULTS



MCGUIRE NUCLEAR STATION'S IMMEDIATE REACTION

- DISCUSSION OF THE NEED OF PROGRAM ENHANCEMENT BETWEEN PERFORMANCE PERSONNEL AND THE SUPERINTENDENT OF TECHNICAL SERVICES

- COMMUNICATION OF RESULTS TO SENIOR STATION MANAGEMENT (SEE DATED PROFS NOTE)

- DISCUSSION OF TEST FAILURES WITH THE NRC RESIDENT INSPECTORS

- DOUBLING THE SURVEILLANCE FREQUENCY OF THE COMPONENT COOLING SYSTEM (KC) HEAT EXCHANGER PRESSURE DROP TESTING

CHANGES MADE TO THE NUCLEAR SERVICE WATER SYSTEM (RN) TEST PROGRAM

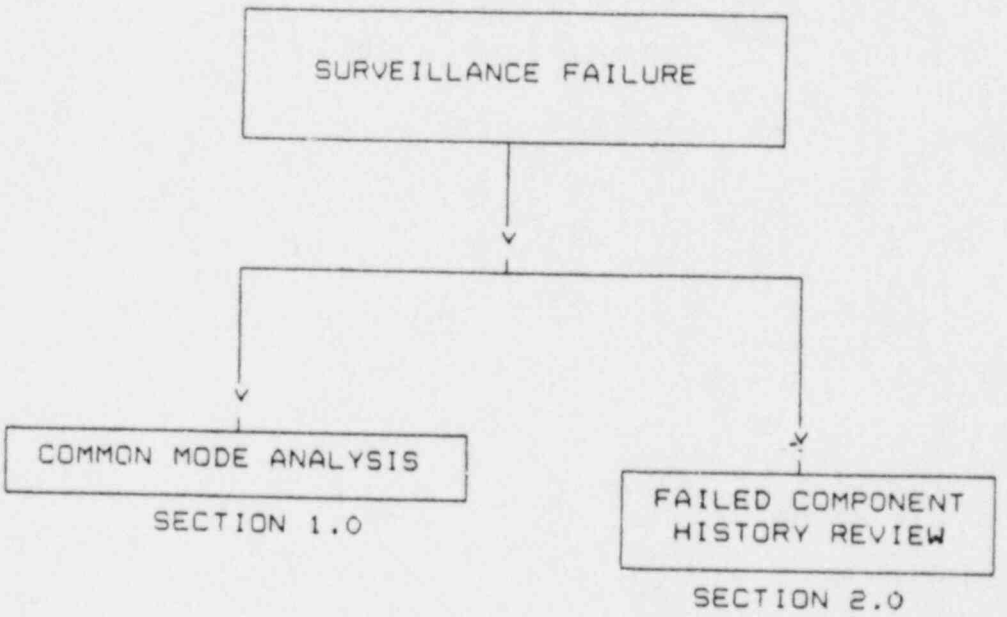
- TEMPORARY INSTRUMENTATION IS BEING INSTALLED TO ALLOW DAILY MONITORING OF COMPONENT COOLING SYSTEM (KC) HEAT EXCHANGERS. INSTALLATION WILL BE COMPLETE BY 3/1/88 AND WILL ALLOW A FULL 6 MONTHS OF BASELINE DATA TO BE COLLECTED PRIOR TO THE FALL OF 1988.

- ALL "FAILED" SURVEILLANCES IN THE PERFORMANCE TEST PROGRAM WILL RECEIVE A FORMAL, DOCUMENTED REVIEW AND APPROPRIATE LEVELS OF MANAGEMENT WILL BE INVOLVED. THIS PROGRAM WILL BE IN EFFECT BY 3/1/88. (SEE DRAFT VERSION)

MCGUIRE NUCLEAR STATION
PERFORMANCE SECTION
FAILED SURVEILLANCE TEST
POST-TEST ENGINEERING ANALYSIS

**********DRAFT VERSION**********
REV. 4/ 01-11-88

LOGIC DIAGRAM



FOCUS

OPERABILITY OF OTHER SAFETY-RELATED COMPONENTS

FOCUS

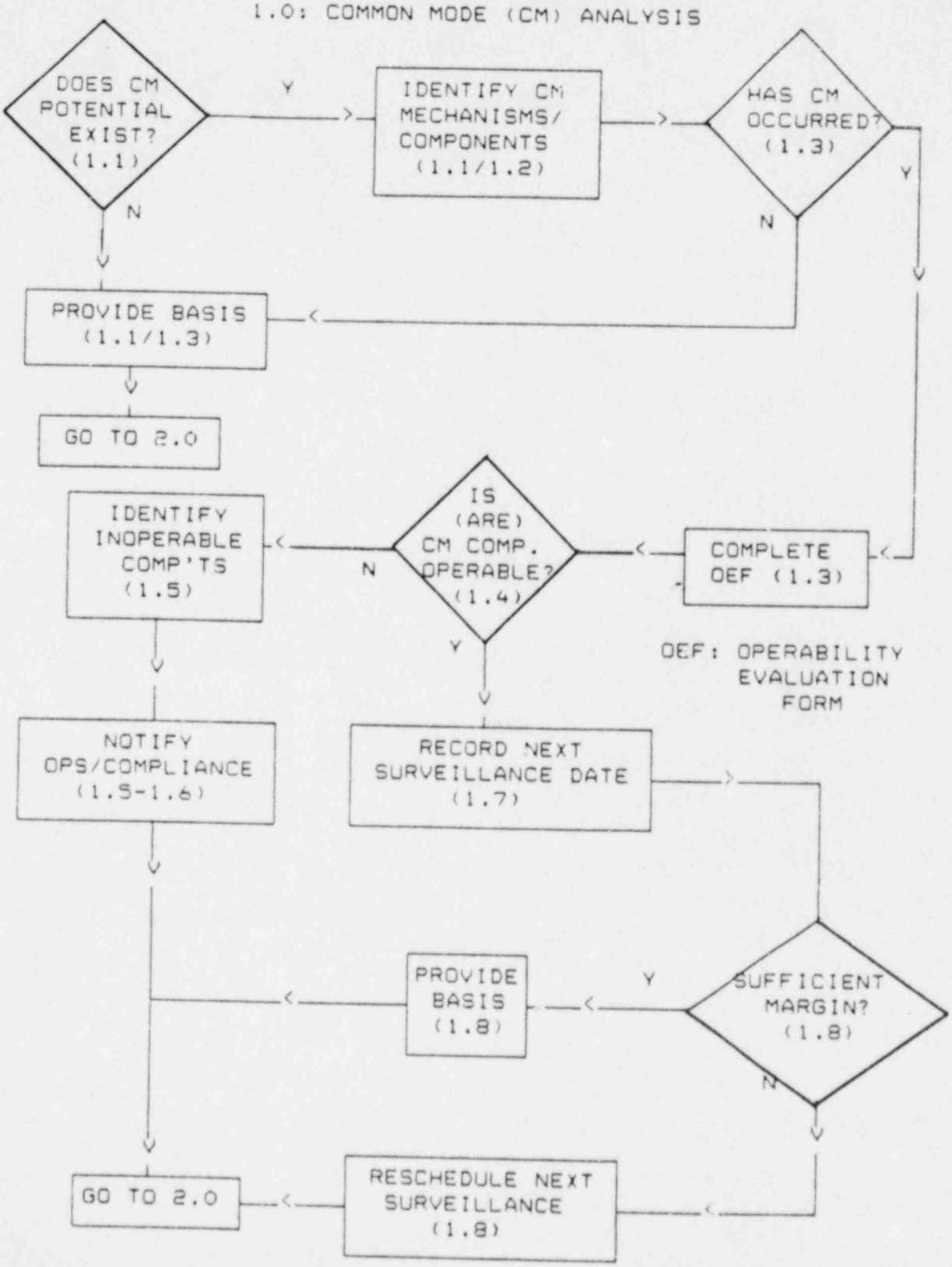
OPERATIONAL, MAINT., AND SURVEILLANCE HISTORY OF FAILED COMPONENT

MCGUIRE NUCLEAR STATION
PERFORMANCE SECTION
FAILED SURVEILLANCE TEST
POST-TEST ENGINEERING ANALYSIS

**********DRAFT VERSION**********
REV. 4/ 01-11-88

LOGIC DIAGRAM

1.0: COMMON MODE (CM) ANALYSIS

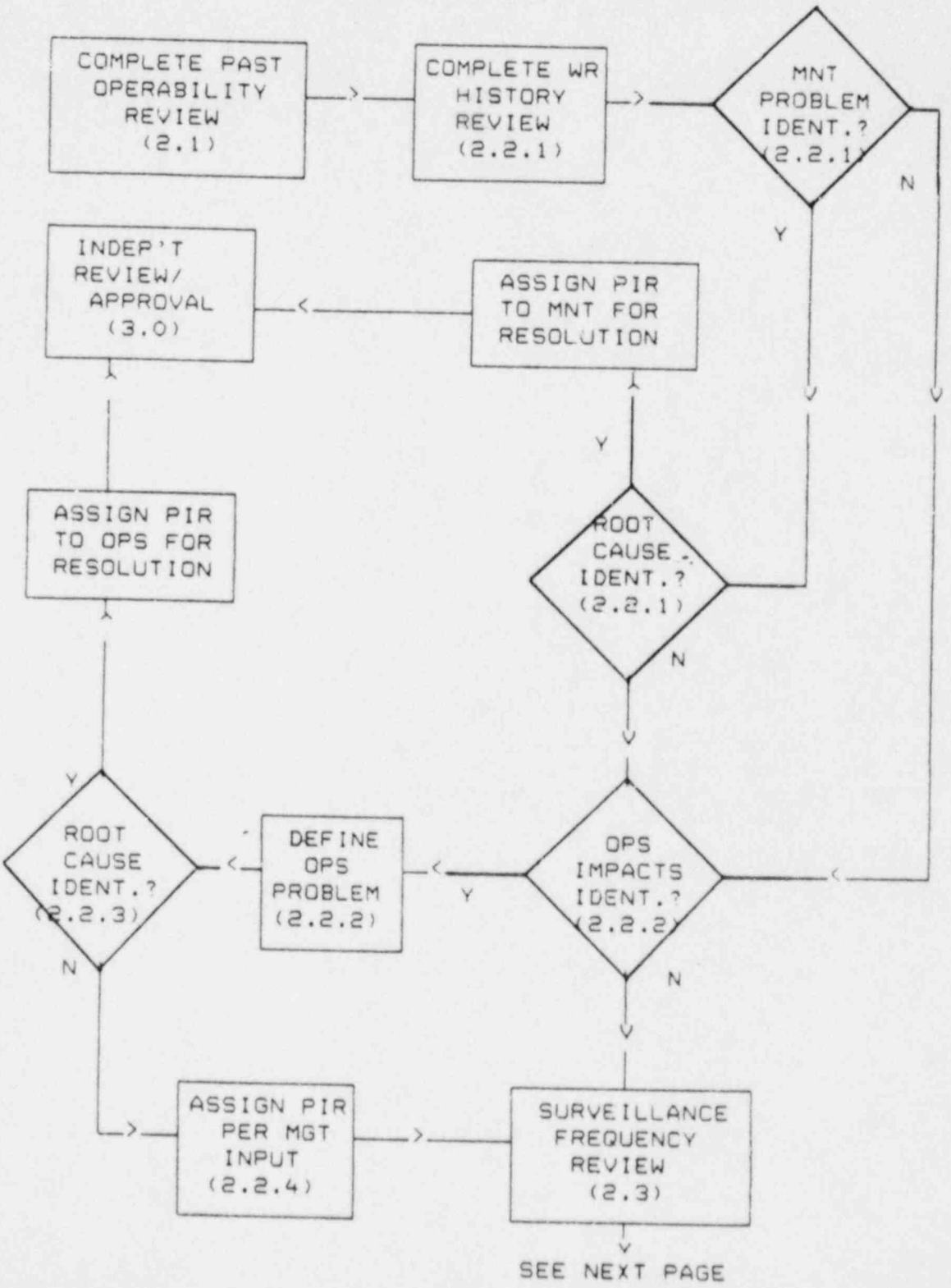


MCGUIRE NUCLEAR STATION
PERFORMANCE SECTION
FAILED SURVEILLANCE TEST
POST-TEST ENGINEERING ANALYSIS

**********DRAFT VERSION**********
REV. 4/ 01-11-88

LOGIC DIAGRAM

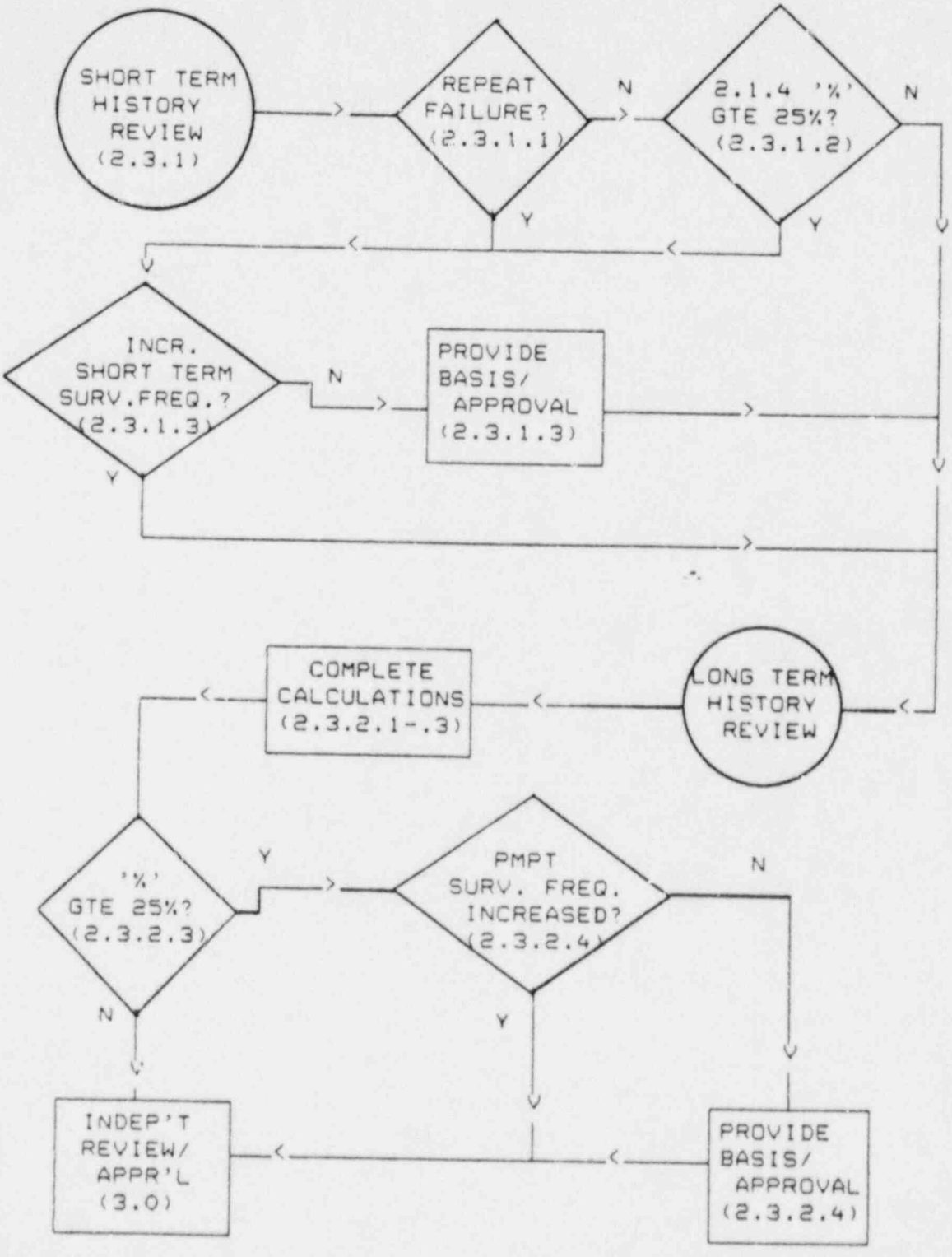
2.0: FAILED COMPONENT HISTORY REVIEW



**********DRAFT VERSION**********
REV. 4/ 01-11-88

LOGIC DIAGRAM

2.3: SURVEILLANCE/TEST FREQUENCY REVIEW



FUTURE PLANS AND ADDITIONAL STUDIES

- THE COMPONENT COOLING SYSTEM (KC) HEAT EXCHANGERS WILL BE PERMANENTLY INSTRUMENTED TO ALLOW CONTINUOUS MONITORING OF PRESSURE DROP BY THE PLANT COMPUTER.

- BASED ON CONTINUOUS MONITORING OBSERVATIONS THE COMPONENT COOLING SYSTEM (KC) HEAT EXCHANGERS WILL BE FLUSHED AT EARLY INDICATIONS OF FOULING.

- THE DESIGN ENGINEERING DEPARTMENT HAS BEEN REQUESTED TO CONSIDER VARIOUS ENGINEERING SOLUTIONS TO THE COMPONENT COOLING SYSTEM (KC) HEAT EXCHANGER FOULING PROBLEM.

CONCLUSIONS

- BASED ON THE INFORMATION AVAILABLE ON NOVEMBER 5, 1987, MCGUIRE NUCLEAR STATION TOOK APPROPRIATE ACTION DURING THE RESTART OF UNIT #2.

- BASED ON THE INFORMATION AVAILABLE NOW, THE UNIT 2 COMPONENT COOLING SYSTEM (KC) WAS DEGRADED AND UNABLE TO PASS ALL ITS ASSOCIATED SURVEILLANCE TESTS FOR PERIODS DURING THE LATE FALL OF 1987. THESE PERIODS WERE BETWEEN THE MONTHLY SURVEILLANCE INTERVALS USED AT THAT TIME.

- THE MCGUIRE NUCLEAR STATION NUCLEAR SERVICE WATER SYSTEM (RN) TEST PROGRAM, ALTHOUGH THE MOST EXTENSIVE IN THE COUNTRY, WAS INADEQUATE IN REGARDS TO ITS TREATMENT OF THE COMPONENT COOLING SYSTEM (KC) HEAT EXCHANGERS, IN THAT IT COULD NOT DETECT RAPID DEGRADATION DUE TO ACCELERATED FOULING.

- MCGUIRE NUCLEAR STATION HAS REACTED APPROPRIATELY AND IN A TIMELY FASHION TO ACCELERATED FOULING INCIDENTS OCCURRING DURING THE LATE FALL OF 1987. PROGRAM ENHANCEMENTS SHOULD PREVENT A REOCCURRENCE OF THIS PROBLEM.