Enclosure 2

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
PLANT SYSTEMS BRANCH - REGION II TECHNICAL INTERFACE AGREEMENT
COMPONENT COOLING WATER HEAT EXCHANGER DEGRADED MODE
OPERATION (SRP SECTIONS 9.2.1 AND 9.2.2)
TURKEY POINT, UNITS 3 AND 4
DOCKET NOS. 50-250/251

INTRODUCTION

By letter dated June 29, 1987, Region II identified concerns related to the operation of the intake cooling water (ICW) system and the component cooling water (CCW) system at the Turkey Point, Units 3 and 4 nuclear plants. These concerns were relative to the licensee's implementation of a Technical Specification (TS) Limiting Condition for Operation (LCO) for out of service ICW/CCW heat exchangers, and relative to the adequacy and prudence of a licensee safety evaluation for the operation of the CCW heat exchangers with fouled heat transfer tubes.

Each unit at Turkey Point has three 50 percent design capacity CCW heat exchangers and three 100% design capacity CCW pumps. The CCW heat exchangers are supplied cooling water from the ultimate heat sink by three 100% design capacity ICW pumps for each unit. The present TS specify that one CCW heat exchanger may be inoperable for up to 24 hours. After 24 hours, the unit must be shutdown. In the summer of 1986, the 24 hour action statement was repeatedly entered to allow cleaning of the three Unit 3 heat exchangers. The data indicate that one heat exchanger or another was out of service for extended periods of time on a repetitive basis. However, no single heat exchanger remained out of service in excess of 24 continuous hours. It is anticipated that the Unit 4 heat exchangers will require cleaning at frequencies similar to those of Unit 3.

The licensee's evaluation for the operation of the CCW heat exchangers with fouled heat transfer tubes was originally performed to address a 10 CFR Part 21 issue related to a single failure in the ICW system. It was subsequently revised to address fouling and to allow Units 3 and 4 to remain at power provided a cumulative outage time of 24 hours was not exceeded during a 3-month period when two ICW pumps were required to provide flow to two CCW heat exchangers in order to mitigate the consequences of the Maximum Hypothetical Accident (MHA) which is a worst case loss-of-coolant-accident (LOCA). The design basis as identified in the Final Safety Analysis Report (FSAR) specifies that one ICW pump with two CCW heat exchangers is capable of mitigating the consequences of the MHA. The licensee therefore, allowed operation outside the plant's design basis since two ICW pumps were required to be operable at this time. The licensee justified continued operation by limiting the time period such that a small vulnerability exists from a probabilistic risk assessment standpoint. However, such justification was not provided to the staff for approval. The licensee believes that the time period (24 hours total in three months) is philosphically in keeping with the intent of other 24 hour LCOs (such as for an out of service ICW pump or CCW heat exchanger) which create single failure potentials. It should be noted that the failure of the "B" emergency diesel generator removes emergency onsite power from two of the three ICW pumps.

The following specific questions were posed by Region II relative to the above issues.

1. Is the ICW system technically inoperable when the heat exchangers are sufficiently fouled such that more than one ICW pump is required for the system to fulfill its design functions?

2. What is the proper course of action for plant management when the ICW system is found degraded?

3. Should the licensee have performed a 10 CFR 50.59 evaluation for this condition since the situation potentially involved an "unreviewed safety question"?

4. Is 10 CFR 50.59 applicable when the licensee has not made intentional changes to the system but the system is being operated differently than that addressed in the FSAR?

5. If a 10 CFR 50.59 is not applicable under these circumstances, then what type of evaluation, with associated NRC reporting, is appropriate?

6. Is clearing the Unit 4 CCW heat exchangers at intervals similar in frequency and duration to those of Unit 3 acceptable?

EVALUATION

On February 13, 1986, the licensee determined that the ICW system contained two valves which were susceptible to single active failures. The discrepancies were evaluated as not reportable under 10 CFR 21 in Substantial Safety Hazards' Evaluation JPE-L-85-38, Revision 0. However, the licensee did determine that the inability to accommodate a single failure in these valves constituted an "unnecessary contribution" to overall risk and therefore implemented plans to evaluate and modify the ICW system to correct the condition. Although Region II did not request clarification in this regard, the staff disagrees with the licensee's conclusion that the single failure vulnerability is not reportable under 10 CFR 21 as discussed below.

The ICW system provides for a single flow path and air operated valve downstream of the CCW heat exchanger and a single flow path and air operated valve downstream of the turbine plant cooling water (TPCW) system heat exchangers. The single valve downstream of the TPCW heat exchangers is identified in the FSAR as a fail closed valve that receives a close signal in the event of a safety injection signal (SIS) or a loss of voltage (i.e., loss of offsite power). A solenoid valve senses the SIS or loss of voltage and is positioned to bleed air from one side of the diaphram causing the valve to close. The single valve downstream of the CCW heat exchanger is designed to open or go further open as CCW temperature increases and it is not equipped with a solenoid valve to bleed air from either side of the air operator diaphram. The licensee has identified certain single active failures that could result in the valves not failing in the safe position. However, the

licensee claims that since the ICW system as licensed pursuant to 10 CFR 50 could not accommodate the single failure criteria, then this single failure vulnerability is not reportable under Part 21. The licensee cites 10 CFR 21.3(k) as defining a substantial safety hazard to mean a loss of safety function to the extent there is a major reduction in the degree of protection. Therefore, since the safety function was originally degraded there was no major reduction. The staff disagrees with the licensee's evaluation and interpretation of Part 21 in that if the staff was aware of this specific single active failure problem, the ICW system would have been technically unacceptable. It should also be noted that the FSAR shows the TPCW valve to be a fail closed valve which infers no single active failure will prevent it from closing. The valve at the CCW heat exchanger shows no failure position and a reviewer would likely assume that it either fails in its as is position which is normally open or fails open. Therefore, a major reduction in the degree of protection did occur from what was assumed or thought to have existed at the time of licensing and a Part 21 notification was appropriate. That notwithstanding, the design deficiency was definitely reportable under 50.72 or 50.73 since the plant was found to be in an unanalyzed condition that significantly compromised plant safety and the ICW system function.

Revision 1 to JPE-L-85-38 was issued on February 16, 1986 to promulgate graphs depicting the relationship of post accident ICW flow through the CCW heat exchangers, ICW system (cooling canal) temperatures, and CCW heat exchanger cleanliness. Based on these parameters, the licensee was able to determine when personnel were to be stationed at the TPCW system manual isolation valve in the ICW system to shut the valve in the event of a MHA. For some optimum conditions, analyses showed that if the TPCW valve did not automatically close following a MHA, the ICW safety function could still be performed. A CCW heat exchanger performance monitoring program was also developed to ensure that the heat transfer capability of the heat exchangers remained sufficient to remove accident heat loads.

It was determined that the effectiveness of the heat exchangers was heavily dependent on precipitation of calcium carbonate from the canal water on the heat exchanger tubes. The high levels of calcium carbonate in the canal system rapidly degraded the heat transfer capability of the heat exchangers. Consequently, the licensee implemented a program to periodically clean them. During the summer months, cleaning was required approximately weekly based on the graphs contained in Revision 1 to the licensee's evaluation.

In June 1986, it was postulated that, with one heat exchanger out of service for cleaning, canal temperatures might rise to the point where the remaining two heat exchangers could not handle the MHA heat load even after posting an operator at the manual valve. Revision 2 to JPE-L-85-38 was issued on August 5, 1986 to address this possibility.

Revision 2 states that should, during the 24 hour LCO period for the cleaning of a CCW heat exchanger, the performance of the remaining two heat exchangers degrade to the point where the flow from two ICW pumps is necessary to remove the accident heat load, the plant may continue operation for a total of 24 hours during any three month period.

Revision 3 to the evaluation was issued November 7, 1986 and involved a clarification to the use of the term "OPERABLE" and did not significantly change the evaluation.

The staff disagrees with the licensee's conclusion in the analysis that the plant is permitted to take credit for the provisions of the evaluation for a cumulative time period of 24 hours in any three month period. It is the staff's position that LCOs are meant to apply to single unplanned events and are not meant to be convenience tools to keep the plant operating under adverse conditions. When the performance of the remaining two heat exchangers degrades to the point where two ICW pumps are required, the provisions of TS 3.0.3 should apply, requiring plant shutdown within one hour. Continued operation would require a justification for continued operation (JCO) approved by the staff since such operation is outside the scope of the TSs and the FSAR design basis.

The following responses are intended to address the Region II specific questions identified in the Introduction of this evaluation:

1. The CCW system should be declared inoperable when the heat exchangers are sufficiently fouled such that more than one ICW pump is required for the system to perform its design safety function. Anytime a CCW heat exhanger is known to be fouled to the point where it cannot remove its design basis heat load, then it should be declared inoperable, and the appropriate CCW system action statement should be followed. It is not appropriate as inferred by the licensee's analysis for the CCW system to be operable with no LCO when three CCW heat exchangers are required to be operable because of fouling. For example, with the present TS, if two of the CCW heat exchangers are 100 percent efficient (totally unfouled) and the third heat exchanger is fouled to the point where it cannot remove its design basis accident heat load, then the 24 hour action statement for the CCW system should be followed.

2. The proper course of action for plant management when the ICW system (CCW heat exchangers) is found degraded is to follow the appropriate TS. If an analysis exists to show that plant operation may continue at reduced power levels, then operation may continue provided the analysis shows that the design basis accident decay heat loads can be handled by the ICW system with one ICW pump. This analysis should be used as a JCO and provided to the NRC for approval of temporary waiver until a TS licensing amendment is issued. The appropriate TSs should be revised (note that more than one TS section is affected, such as power level trip setpoints) to account for reduced power levels under degraded conditions.

3. A 50.59 evaluation under these conditions is not appropriate because without a reduction in the flux level trip setpoints, the safety margins are reduced. The staff takes the view that operability of a system is defined in terms of the maximum power level authorized by the license, and any degradation of the system which would render it incapable of performing its function at the fully licensed power level would cause the system to be inoperable.

4. 10 CFR 50.59 can be applicable when the licensee has not made intentional changes to the system but the system is being operated differently than that addressed in the FSAR. 10 CFR 50.59 is not limited to design changes as it specifically points out that changes in the facility as described in the FSAR or changes in the procedures as described in the FSAR may require a 50.59 analysis. However, the specific problem at Turkey Point does not come under 50.59 because it violates the design bases of the TS and reduces the plant safety margins without a corresponding reduction in the trip setpoints identified in the TS.

5. The Turkey Point circumstances are reportable under 10 CFR 50.72 and 50.73 because continued operation is outside the design bases identified in the existing TS which specifically address single ICW pump operation as being the minimum required, and because operation at a reduced power level is not allowed since it results in a reduced safety margin. An analysis to justify continued operation should be performed and submitted to NRC if operation is desired beyond a TS action statement.

6. Although it is not the intention of the TS to allow recurring entry into an action statement to compensate for such degraded conditions, the operation of Unit 4 for an interim period with the heat exchangers periodically unavailable due to cleaning in a manner similar to what was done for Unit 3 is acceptable because:

   a. A long term fix has been identified and has already been installed on Unit 3. This consists of an Amertap system which provides for continuous on-line cleaning by passing specially designed cleaning balls through the tubes;

   b. The same fix is scheduled to be installed in Unit 4 during the scheduled March 1988 outage, and much of the time span before installation of the modification is during winter when the fouling is less severe; and

   c. Operation has been approved by NRC at other plants under similar conditions when such plants identified a long term fix as in a) above, and had a reasonable schedule for implementation as in b), above.

CONCLUSIONS

Based on its review of the information and data provided by Region II and the licensee's evaluation, JPE-L-85-38, Revision 3, the staff has reached the following conclusions:

1. The single active failure susceptibility of the ICW system identified by the licensee should have been reported under 10 CFR 21 regardless of the fact that it existed in the original design.

2. The CCW system should be declared inoperable whenever it is known that the heat exchangers are sufficiently fouled such that more than one ICW pump is required using two CCW heat exchangers to remove design basis accident heat loads assuming initial power levels of 100 percent in each unit. A CCW heat excbanger should be declared inoperable and the appropriate action statement entered when it becomes known that the CCW heat exchanger cannot remove its design basis heat load.

3. The proper course of action to be taken when it becomes known that more than one ICW pump is required in conjunction with two heat exchangers should be to follow the applicable TS which in these circumstances is Specification 3.0.3 (plant shutdown within one hour). Otherwise, justification for continued operation with NRC approval is required.

4. The CCW degradation problem is reportable under 10 CFR 50.72 and 50.73. Justification for continued operation must be supported by analysis to show safe operation can continue at reduced power levels and appropriate consideration must be given to maintaining adequate safety margins. A license amendment would be required including modifications to the plant Technical Specifications to reduce the high flux trip setpoint.

5. The licensee's evaluation to allow operation with more than one ICW pump being required to meet the design basis accident is inappropriate in that cumulative outage times are not considered acceptable and such operation/conditions should be reportable under 10 CFR 50.72 and 50.73.

6. Unit 4 can continue to operate with recurring entry into the 24 hour LCO for cleaning the CCW heat exchangers provided conditions do not degrade to the point where more than one ICW pump is required. If such conditions occur then the plant should reduce power as appropriate or should shutdown within one hour according to TS 3.0.3.

CURRENT TECH SPECS

LCO & ACTIONS

3.4.4. COMPONENT COOLING SYSTEM

a. The reactor shall not be made critical, except for low power physics tests unless the following conditions are met:

1. THREE component cooling pumps are operable.

2. THREE component cooling heat exchangers are operable.

3. All valves, interlocks and piping associated with the above components are operable.

b. During power operation, the requirements of 3.4.4.a may be modified as stated below. If the system is not restored to meet the conditions of 3.4.4.a within the time period specified, the reactor shall be placed in the hot shutdown condition. If the requirements of 3.4.4.a are not satisfied within an additional 48 hours, the reactor shall be placed in the cold shutdown condition. Specification 3.0.1 applies to 3.4.4.b.

1. ONE pump may be out of service for 7 days.

2. ONE additional pump and ONE heat exchanger may be out of service for period of 24 hours.

3.4.5. INTAKE COOLING WATER SYSTEM

a. The reactor shall not be made critical unless the following conditions are met:

1. THREE intake cooling water pumps and TWO headers are operable.

2. All valves, interlocks and piping associated with the operation of these pumps, and required for post accident operation, are operable.

b. During power operation, the requirements of 3.4.5.a., above, may be modified to allow any one of the following components to be inoperable provided the remaining systems are in continuous operation. If the system is not restored to meet the requirements of 3.4.5.a. within the time period specified, the reactor shall be placed in the hot shutdown condition. If the requirements of 3.4.5.a are not satisfied within an additional 48 hours, the reactor shall be placed in the cold shutdown condition. Specification 3.0.1 applies to 3.4.5.b.

1. One of the two headers may be out of service for a period of 24 hours.

2. One intake cooling water pump may be out of service for a period of 24 hours.

BASES

B 3.4.4. Component Cooling System

One pump and two heat exchangers meet the requirements of the MHA analysis. (10) — FSAR 9.3

B 3.4.5. Intake Cooling Water System — FSAR 14.3

One pump meets the requirements of the MHA analysis. (6)

4.18 SAFETY RELATED SYSTEMS FLOWPATH

Applicability: Applies to the availability of the required flowpaths for the systems specified in Table 4.18-1.

Objective: To verify the availability of an operable flowpath for the systems specified in Table 4.18-1.

Specification: Monthly, perform a system walkdown, a specified in Table 4.18-1, to demonstrate the availability of required flowpaths by:

1. Verifying that each accessible valve (manual, power operated, or automatic) is in its correct position.
2. Verifying the availability of power to those components related to the operability of the designated flowpaths.

TABLE 4.18-1
MINIMUM FREQUENCIES FOR SAFETY RELATED SYSTEMS FLOWPATH VERIFICATIONS

	SYSTEM DESCRIPTION (Note 1)	FREQUENCY	APPLICABILITY MODE
1.	High Head Safety Injection	M,P	1,2
2.	Low Head Safety Injection	M,P	1,2
3.	Auxiliary Feedwater	M,P	1,2(Note 2)
4.	Containment Spray	M,P	1,2
5.	Emergency Diesel Generators	M	1,2(Note2)
6.	Component Cooling Water	M,P	1,2
7.	Intake Cooling Water	M,P	1,2
8.	Boric Acid Flowpath to the Core	M	1,2,3,4
9.	Post-accident Containment Ventilation	M,P	1,2,(Note 2)
10.	In-plant AC Electrical Distribution	M,P	1,2
11.	Post-accident Hydrogen Monitoring	M	1,2,3,4 (Note 2)
12.	Post-accident Sampling	M	1,2,3,4 (Note 2)
13.	Fire Suppression Water System	M	1,2,3,4 (Note 2)

Frequency:
M - Monthly
P - Within one surveillance Interval prior to criticality.

B4.18 BASES FOR SAFETY RELATED SYSTEM FLOWPATH VERIFICATION

This surveillance is designed to verify that flowpaths exist in order for the specified safety related systems to perform as required by Section 14 of the FSAR.

Verify that all readily accessible valves that are in the flowpath of the safety related systems listed below are in the proper positions to fulfill the described requirements of the systems. Also verify that power is being fed through the in-plant AC electrical distribution system from 4160-volt buses down to the 480-volt MCC's.

PLANT SYSTEMS

3/4.7.3 COMPONENT COOLING WATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.3 ~~At least two independent component cooling water loops shall be OPERABLE.~~

The CCW system shall be OPERABLE with:

a. Two OPERABLE CCW pumps with independent power supplies, and

b. Two CCW heat exchangers in service that are capable of removing design basis heat loads*.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

~~With only one component cooling water loop OPERABLE, restore at least two loops to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~

a. With only one CCW pump OPERABLE or with two CCW pumps OPERABLE but not from independent power supplies, restore two pumps from independent power supplies to OPERABLE status in 72 hours or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With one of the required CCW heat exchangers out of service, restore the out of service heat exchanger to service in 1 hour or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

* Two heat exchangers, in conjunction with one ICW pump and one CCW pump, must be capable of removing design basis heat loads.

SURVEILLANCE REQUIREMENTS

required for post accident operation

4.7.3.1 ~~At least two~~ The component cooling water ~~loops~~ system shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) ~~servicing safety-related equipment~~ that is not locked, sealed, or otherwise secured in position is in its correct position and that power is available to those components which require power for post accident operation; and

b. At least once per ~~18 months during shutdown~~ refueling, by verifying that:

1) Each automatic valve ~~servicing safety-related equipment~~ actuates to its correct position on a SI test signal, and

2) Each Component Cooling Water System pump starts automatically on a SI test signal.

3) Interlocks required for system operability are OPERABLE.

4.7.3.2 Measure intake cooling water inlet temperature at least once per 12 hours and verify that two CCW heat exchangers, in conjunction with one CCW pump and one ICW pump, are capable of removing design basis heat loads.

[redacted]

PLANT SYSTEMS

3/4.7.4 ~~SERVICE WATER SYSTEM~~ INTAKE COOLING WATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.4 ~~At least two independent service water loops shall be OPERABLE.~~

The ICW system shall be OPERABLE with two OPERABLE ICW pumps with independent power supplies.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

~~With only one service water loop OPERABLE, restore at least two loops to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~

With only one ICW pump OPERABLE or with two ICW pumps OPERABLE but not from independent power supplies, restore two pumps from independent power supplies to OPERABLE status in 72 hours or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

required for post accident operation

SURVEILLANCE REQUIREMENTS

The intake cooling water system

4.7.4 ~~At least two service water loops~~ shall be demonstrated OPERABLE:

a. At least once per 31 days by verifying that each valve (manual, power-operated, or automatic) ~~servicing safety-related equipment~~ that is not locked, sealed, or otherwise secured in position is in its correct position and that power is available to those components which require power for post accident operation; and

b. At least once per ~~18 months during shutdown~~ refueling, by verifying that:

1) Each automatic valve ~~servicing safety-related equipment~~ actuates to its correct position on a SI test signal, and

2) Each ~~service water system~~ intake cooling water pump starts automatically on a SI test signal.

3) Interlocks required for system operability are OPERABLE.

[redacted]

(8E)

PLANT SYSTEMS

3/4.7.5 ULTIMATE HEAT SINK [OPTIONAL]

LIMITING CONDITION FOR OPERATION

3.7.5 The ultimate heat sink shall be OPERABLE with:

a. A minimum water level at or above elevation ___ Mean Sea Level, USGS datum, and

b. An average supply water temperature of less than or equal to 95 °F. to the Intake Cooling Water System

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With the requirements of the above specification not satisfied, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.7.5 The ultimate heat sink shall be determined OPERABLE at least once per 24 hours by verifying the average water temperature and water level to be within their limits.

DELETE. APPLICABLE REQUIREMENTS HAVE BEEN INCORPORATED INTO TECH SPEC 3/4.7.3.

3/4.7.3 COMPONENT COOLING WATER SYSTEM

provided by the required equipment

The OPERABILITY of the Component Cooling Water System ensures that sufficient cooling capacity is available for continued operation of safety-related equipment during normal and accident conditions. The redundant cooling capacity ~~of this system~~, assuming a single failure, is consistent with the assumptions used in the safety analyses.

active

ANALYSIS RESULTS HAVE SHOWN THAT ONE PUMP AND THE COMBINED PERFORMANCE OF TWO HEAT EXCHANGERS WILL MEET THE COOLING REQUIREMENTS ASSUMED IN THE ACCIDENT ANALYSIS. A PROGRAM FOR MONITORING INTAKE COOLING WATER INLET TEMPERATURE AND CORRELATING IT WITH OTHER SYSTEM PARAMETERS PROVIDES ASSURANCE THAT THESE REQUIREMENTS ARE MET.

INTAKE COOLING WATER

3/4.7.4 ~~SERVICE WATER~~ SYSTEM

Intake Cooling Water

The OPERABILITY of the ~~Service Water~~ System ensures that sufficient cooling capacity is available for continued operation of safety-related equipment during normal and accident conditions. ~~The redundant cooling capacity of this system, assuming a single failure, is consistent with the assumptions used in the safety analyses.~~

The design and operation of this system, assuming a single active failure, ensures cooling capacity consistent with the assumptions in the accident analyses.

3/4.7.5 ULTIMATE HEAT SINK [OPTIONAL]

The limitations on the ultimate heat sink level and temperature ensure that sufficient cooling capacity is available either: (1) provide normal cooldown of the facility or (2) mitigate the effects of accident conditions within acceptable limits.

The limitations on minimum water level and maximum temperature are based on providing a 30-day cooling water supply to safety-related equipment without exceeding its design basis temperature and is consistent with the recommendations of Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Plants," March 1974.

NOT REQUIRED.

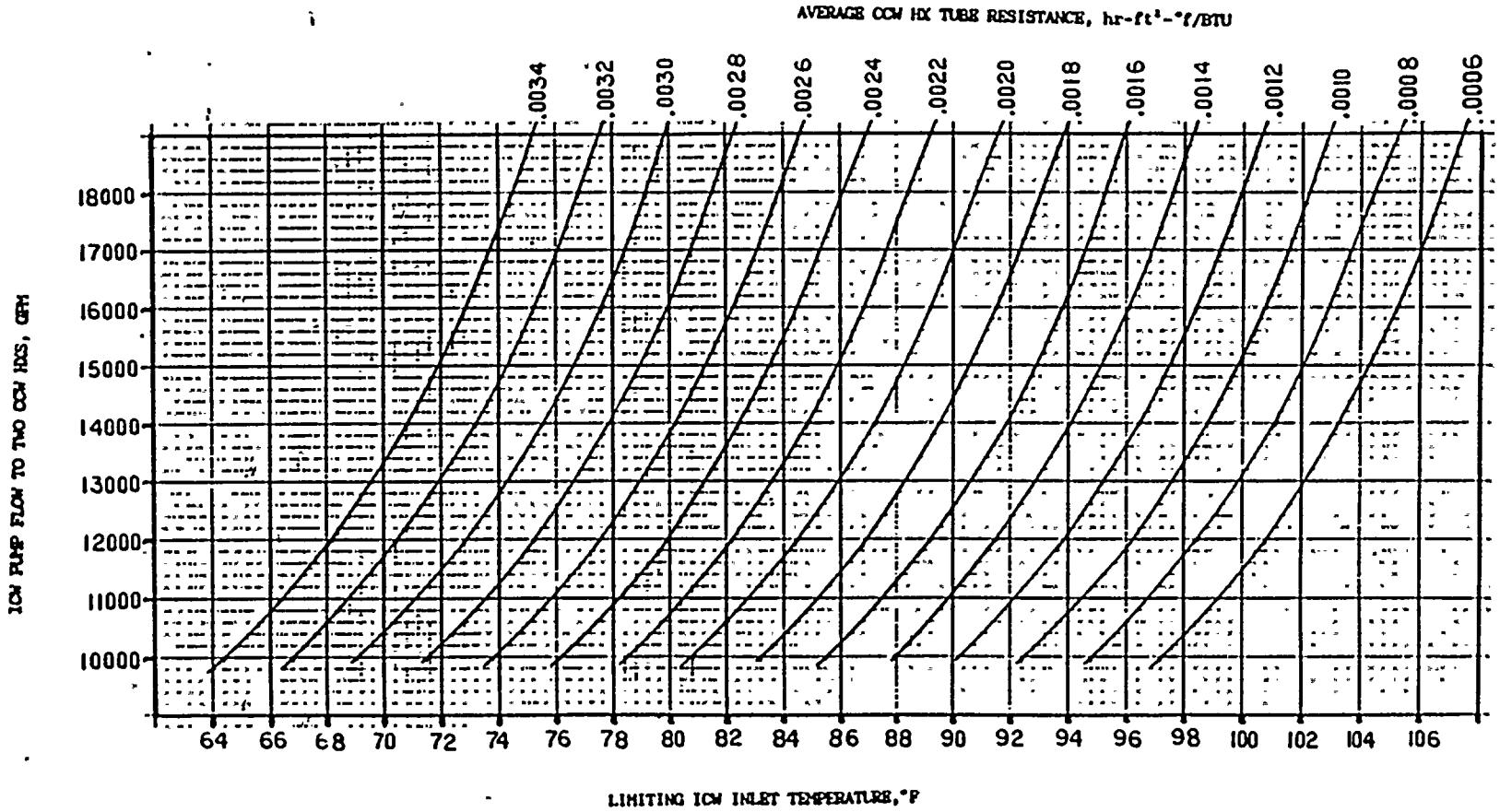


FIGURE 2: ICW FLOW VERSUS CCW HX TUBE RESISTANCE VERSUS ICW LIMITING INLET TEMPERATURE FOR MHA WITH TWO CCW HX OPERATION AND 0% TUBE PLUGGAGE

ASSUMPTION: CCW HX SHELL SIDE FLOW IS 1,710,000 LBS/HR/HX

9A

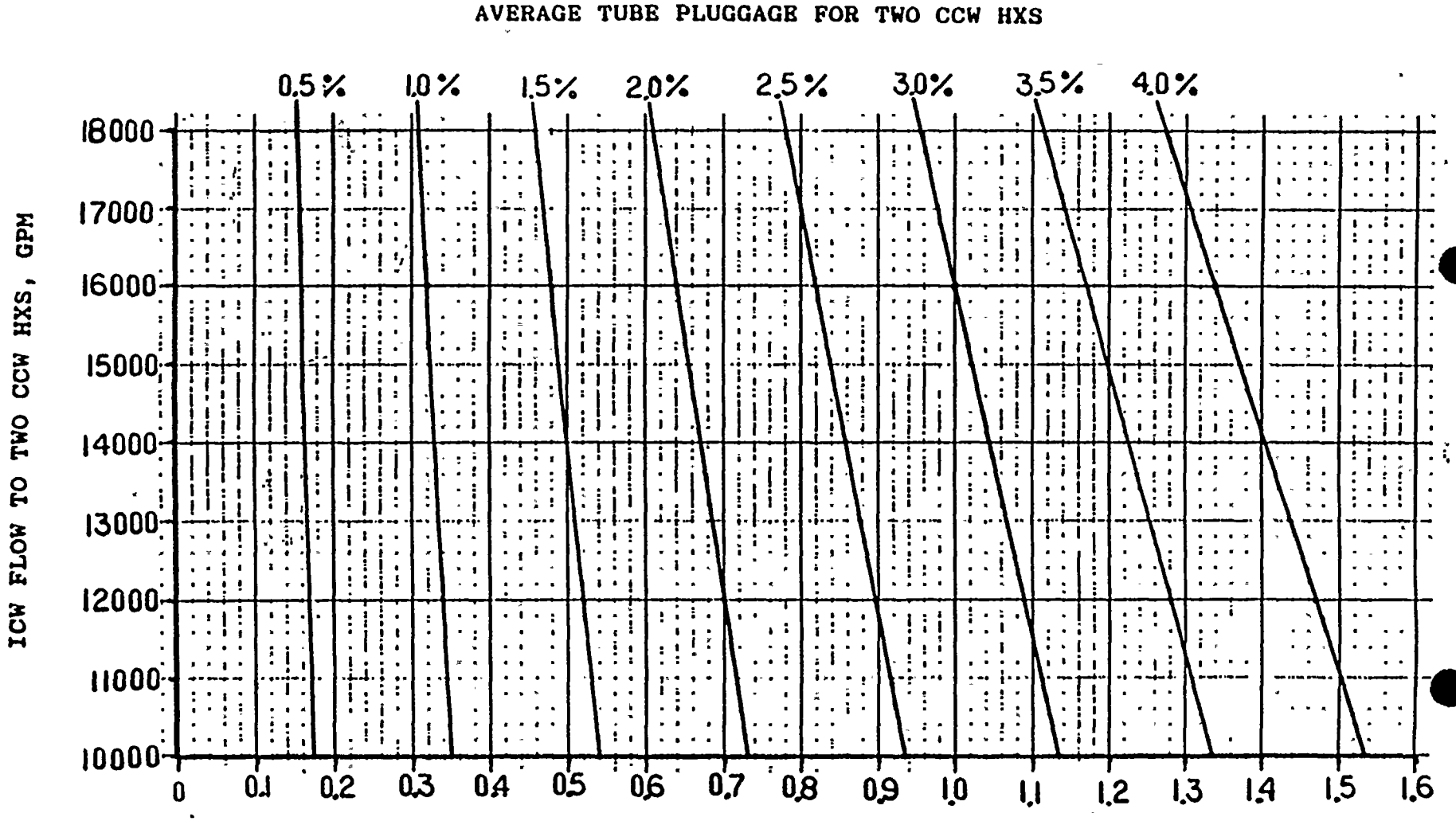


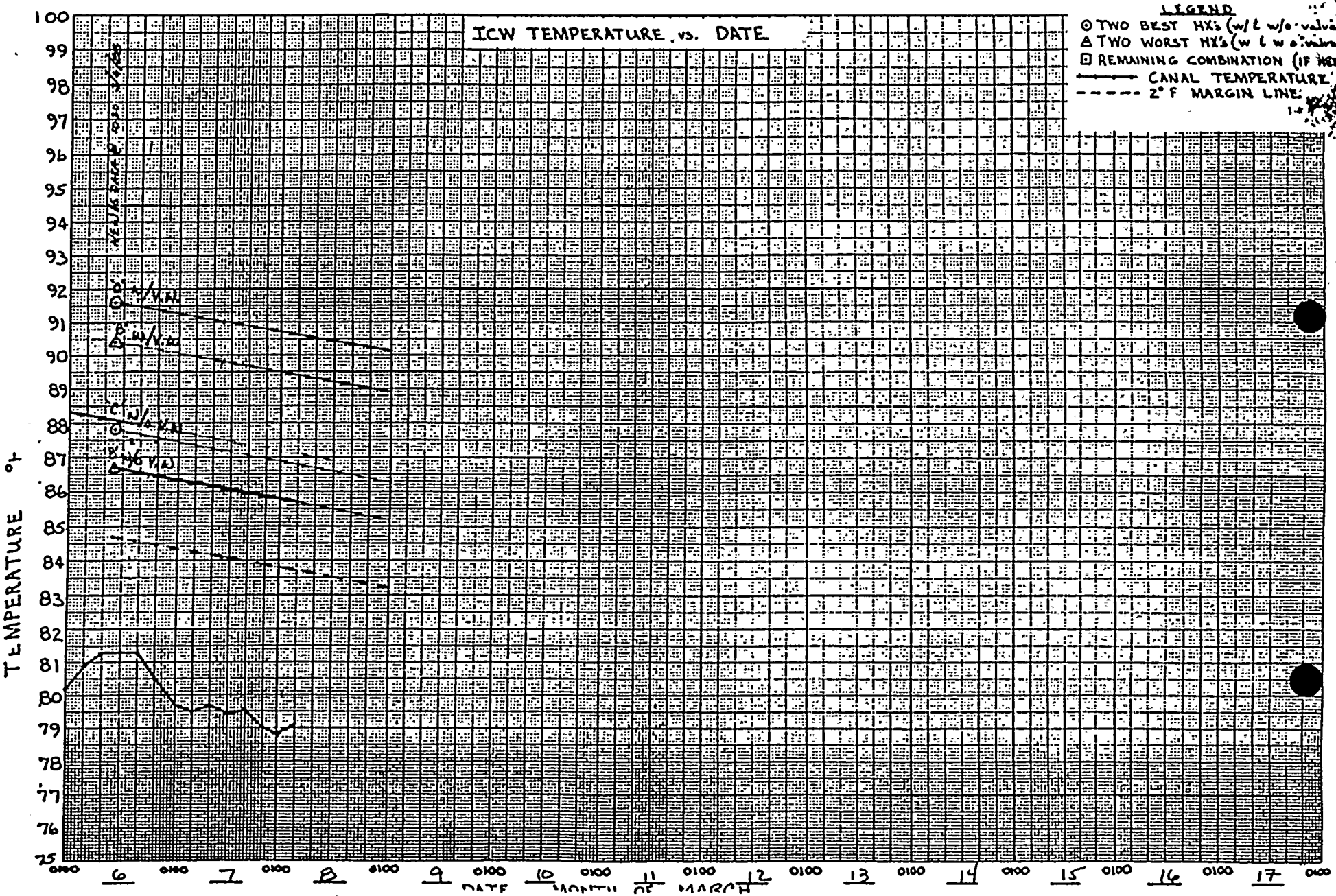
FIGURE 3: EFFECT OF INCREASED TUBE PLUGGAGE ON LIMITING ICW INLET TEMPERATURE FOR VARIOUS ICW FLOW RATES TO TWO CCW HXS

(4B)

ENCLOSURE 2

Attendance List for March 15, 1988 Meeting with
Florida Power & Light concerning ICW/CCW Systems

Name	Organization
G. E. Edison	NRC/Licensing PM
J. S. Wermiel	NRC/NRR/DEST/SPLB
J. W. Craig	NRC/NRR/DEST/SPLB
A. Gill	NRC/NRR/DEST/SPLB
P. Pace	FP&L - Nuclear Licensing
L. Pabst	FP&L - Power Plant Engineering
B. P. Burdick	FP&L - Power Plant Engineering
T. Grozan	FP&L - Nuclear Licensing
C. Moon	NRC/NRR/DOEA/OTSB
R. V. Crlenjak	NRC/RII/Section Chief
D. R. Brewer	NRC/RII/Sr. Resident Insp. - Turkey Point
J. Arias, Jr.	FP&L - PTN - Regulation and Compliance Supv.
T. W. Fisher	FP&L - PTN - Plant Support Engineer
E. M. Vaughn	FP&L - Power Plant Engineering, Juno Beach
W. T. LaFave	NRR/DEST/SPLB
H. A. Bailey	AEOD/DOA/DEIIB
V. Leung	RES/DRPS
E. J. Leeds	AEOD/DOA/DEIIB
P. Norian	RES/DRPS/RPSIB
S. Rubin	AEOD/DOA/DEIIB


ICW TEMPERATURE vs. DATE
LEGEND
⊙ TWO BEST HX's (w/ & w/o valve
△ TWO WORST HX's (w & w/o valve
⊡ REMAINING COMBINATION (IF NEEDED
CANAL TEMPERATURE
2° F MARGIN LINE
TEMPERATURE °F
100
99
98
97
96
95
94
93
92
91
90
89
88
87
86
85
84
83
82
81
80
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14
15
16
17
DATE
MARCH