

APR 11 1986

Docket No. 50-395

Distribution:

**Docket No. 50-395**

LICENSEE: South Carolina Electric and Gas Company

FACILITY: V. C. Summer Nuclear Station

SUBJECT: SUMMARY OF MEETING WITH SOUTH CAROLINA ELECTRIC AND GAS COMPANY

NRC PDR D. Miller  
Local PDR OELD  
PAD#2 R/F E. Jordan  
L. Rubenstein B. Grimes  
J. Hopkins ACRS (10)  
P. Madden R. Anand

J. Wilson  
B. Mann  
J. Shapaker  
A. Singh  
K. West

GENERAL

On April 2, 1986, the NRC staff met with the South Carolina Electric and Gas Company (SCE&G) to discuss fire protection for the V. C. Summer Nuclear Station. The meeting was held in Bethesda, MD. A list of those persons who attended the meeting is included as Enclosure 1.

DISCUSSION

The fire protection items discussed were  $T_H/T_C$  indication for a reactor coolant loop, the three deviations identified in the licensee's letter of May 29, 1985, local control transfer switches, and modification schedule. Copies of the viewgraphs used during discussion are included as Enclosure 2.

The NRC staff stated that they desired additional information on  $T_H/T_C$  indication regarding the capability to read core exit thermocouples, reliability of core subcooling monitor, and cost of the alternative. The NRC staff also requested additional information for deviation Nos. one and three regarding walkdowns of the fire areas and the latest Fire Protection Evaluation Report information. The licensee stated that they would provide the requested information.

151  
Jon B. Hopkins, Project Manager  
PWR Project Directorate #2  
Division of PWR Licensing-A

Enclosures:  
As stated

cc: See next page

LA:PAD#2  
DMiller  
4/9/86

PM:PAD #2  
JHopkins:as  
4/9/86

B:PAD#2  
LRubenstein  
4/10/86

8604230051 860411  
PDR ADOCK 05000395  
F PDR

Mr. D. A. Nauman  
South Carolina Electric & Gas Company

Virgil C. Summer Nuclear Station

cc:

Mr. William A. Williams, Jr.  
Technical Assistant - Nuclear Operations  
Santee Cooper  
P.O. Box 764 (Mail Code 167)  
Columbia, South Carolina 29218

J. B. Knotts, Jr., Esq.  
Bishop, Liberman, Cook, Purcell  
and Reynolds  
1200 17th Street, N.W.  
Washington, D. C. 20036

Resident Inspector/Summer NPS  
c/o U.S. Nuclear Regulatory Commission  
Route 1, Box 64  
Jenkinsville, South Carolina 29065

Regional Administrator, Region II  
U.S. Nuclear Regulatory Commission,  
101 Marietta Street, N.W., Suite 2900  
Atlanta, Georgia 30323

Chairman, Fairfield County Council  
P.O. Box 293  
Winnsboro, South Carolina 29180

Attorney General  
Box 11549  
Columbia, South Carolina 29211

Mr. Heyward G. Shealy, Chief  
Bureau of Radiological Health  
South Carolina Department of Health  
and Environmental Control  
2600 Bull Street  
Columbia, South Carolina 29201

ENCLOSURE 1

ATTENDEES

NRC

J. Hopkins  
R. Anand  
J. Wilson  
B. Mann  
J. Shapaker  
A. Singh  
K. West  
L. Rubenstein  
P. Madden

SCE&G

J. Connelly  
A. Paglia  
J. Barker  
L. Lunden  
T. Keckeisen

Gilbert/Commonwealth Inc.

D. Kelley

PROPOSED AGENDA

SCE&G and NRR STATUS MEETING

APRIL 2, 1986

- I. REVIEW OF STATUS TABLES PRESENTED IN  
LETTER TO DR. GRACE FROM D. A.  
NAUMAN ON FEB. 27, 1986.
- II. DISCUSS USE OF  $P_{sat}$  AS AN  
ALTERNATIVE TO  $T_{cold}$  FOR A LIMITED  
NUMBER OF SPECIFIC FIRE AREAS.
- III. DEVIATIONS REQUESTS FROM MAY 29 LETTER.
- IV. CLARIFICATIONS ON LOCAL CONTROL

Appendix R  
OPEN ITEMS STATUS  
2-27-86

Item/Due Date	Response	Comment
85-26-01 -----	Sept. 4 Letter to H.R. Denton Sections 2,3,4,5,7,8,9,10	Method of Analysis & safe shutdown philosophy (Currently under NRC evaluation, no SCE&G action at this time.)
85-26-02 -----	Sept. 4 Letter to H.R. Denton Sections 5,6,8  May 29 Letter to H.R. Denton  Sept. 16 Letter to H.R. Denton  Nov. 1 Letter to H.R. Denton  MRF-20784,20785,20786,20788, 20789,20790,20791,20801,20896	Local control and spurious operation (Currently under NRC evaluation, no SCE&G action at this time.)  Modification and Deviation Requests  PORV Modification  $T_{hot}/T_{cold}$ discussion  See Rev. 1 to Table 14.0 of Sept. 4 Letter (enclosure #2 to this letter).
85-26-03 1st Qtr 86	MRF-31971	Wrap tray 3088, field installation <i>complete</i> almost complete (will meet date).
85-26-04 1st Qtr 86	MRF-31968	Protect NI-31, 32, work <i>complete</i> now in field (will meet date).

Appendix R  
OPEN ITEMS STATUS  
2-27-86

Item/Due Date	Response	Comment
85-26-05 -----	Supplemental Coordina- tion Study	(Study complete, and ready for closure.)
85-26-06 -----	Report	(Report on charging pump protection is under development.)
85-26-07 -----	Sept. 4th Letter to H.R. Denton, Section 9	Common enclosure. (Currently under NRC evaluation, no SCE&G action at this time.)
85-26-08 -----	Sept. 4th Letter to H.R. Denton, Section 11	Procedure changes and Bulletin 84-09. (Currently under NRC evaluation, no SCE&G action at this time.)
	FEP 1.0 Rev. 4	Estimated issue 4-1-86 <i>Complete</i>
	FEP 1.1 Rev. 0	Estimated issue 4-1-86 <i>Complete</i>
4th Qtr 86	MRF 20579	Level indication for RWST
85-26-09 -----	Sept. 4th Letter to H.R. Denton, Section 12	Timeline Questions (Currently under NRC evaluation, no SCE&G action at this time.)

Appendix R  
OPEN ITEMS STATUS  
2-27-86

Item/Due Date	Response	Comment
85-26-10 -----	Sept. 4 Letter to H.R. Denton Section 12	Cold shutdown (Currently under NRC evaluation, no SCE&G action at this time.)
3rd Qtr 86	Issue FEP 2.X Series	Waiting completion of engineering analysis, some preparation underway.
85-26-11 -----	Verify Training on all FEP's	Will be done after FEP 2.X series are developed.
85-26-12 -----	Sept. 4 to H.R. Denton, Section 13	Emergency lighting (Currently under NRC evaluation, no SCE&G action at this time).
2nd Qtr 86	MRF 20840	Install additional lighting units. (on schedule)
85-26-13 -----	Repair Fire Barrier	Work is complete.

Appendix R  
OPEN ITEMS STATUS  
2-27-86

Item/Due Date	Response	Comment
85-26-14 -----	Repair raceway wrap	Work is complete.
85-26-15 -----	Fire barrier support study.	Report is complete.
85-26-16 -----	Sept. 20 to H.R. Denton  Dec. 30 to H.R. Denton	"M" Board Letter  Clarification Letter (Currently under NRC evaluation, no SCE&G action at this time.)
85-26-17 -----	Fire watch log corrected and special report written.	SCE&G actions complete.
Other NRC 2nd Qtr 86	Rewrite FPER	On schedule.
2nd Qtr 86	Upgrade 023 drawings	Required for FPER, on schedule.



V. C. SUMMER NUCLEAR STATION  
SCHEDULE OF MODIFICATION IMPLEMENTATION

Page 1 of 3

MRF DESCRIPTION  MRF # _____	OUTAGE REQ.	ESTIMATES*		SCE&G CONST. COMPL. DATE
		ENGR. COMPL. DATE	MATERIAL DELIVERY DATE	
Add 2nd power disconnect for air operated valves <u>20784</u>	Yes	4/86	4/86	3rd Refuel (2nd Qtr. '87)
Add Thyrite protectors to current transformers <u>20785</u>	No	Complete	Complete	4/86
Add Fire Switches to 480V switchgear <u>20786</u>	Yes	4/86	4/86	3rd Refuel (2nd Qtr. '87)
Upgrade DG-B Controls <u>20788</u>	Yes	Complete	Complete	Complete
Add Fire Switch to 7.2kV switchgear <u>29789</u>	Yes	3/86	3/86	3rd Refuel (2nd Qtr. '87)
Upgrade Fire Switch for S.W. Pp. "B" and add Fire Switch for C.C. Pp. "B" <u>20790</u>		7/86	11/86	3rd Refueling (2nd Qtr. '87)
Upgrade Chiller B Contr. Transfer Switch <u>20791</u>	Yes	4/86	Complete	3rd Refueling (2nd Qtr. '87)

V. C. SUMMER NUCLEAR STATION  
SCHEDULE OF MODIFICATION IMPLEMENTATION

Page 2 of 3

MRF DESCRIPTION  MRF # _____	OUTAGE REQ.	ESTIMATES*		SCE&G CONST. COMPL. DATE
		ENGR. COMPL. DATE	MATERIAL DELIVERY DATE	
Armor cables for solenoid valves (see also 20784) <u>20800</u> <u>20784</u>	Yes	10/19/86	10/19/86	3rd Refuel (2nd Qtr.'87)
Change RC Loop $T_h/T_c$ instru- mentation to one power train per loop <u>20801</u>	Yes	To be com- pleted as a resolu- tion to R.G. 1.97 issues (9/86)	2/87	3rd Refuel (2nd Qtr.'87)
Remove cables DGM21B and DGM22B from tower cable spreading room <u>20788</u>	No	Complete	Complete	Complete
Install additional self-con- tained emergency lighting units <u>20840</u>	No	Complete	Complete	2nd Qtr.'86
Protect conduits for NI-31/ NI-32 or install transfer switch for NI-33 <u>31968</u>	No	Complete	Complete	1st Qtr.'86

V. C. SUMMER NUCLEAR STATION  
SCHEDULE OF MODIFICATION IMPLEMENTATION

Page 3 of 3

MRF DESCRIPTION  MRF # _____	OUTAGE REQ.	ESTIMATES*		SCE&G CONST. COMPL. DATE
		ENGR. COMPL. DATE	MATERIAL DELIVERY DATE	
Addition of direct reading level guage for RWST <u>20579</u>	No	9/86	9/86	4th Qtr.'86
Revision of power circuit breaker overcurrent settings for coordination <u>20846</u>	Yes	Complete	Complete	Complete
Add fire switches to 480V MCC's, XFN-45A-AH, XFN-45B- AH, XFN-46B-VL, XFN-80B-VL <u>20896</u>	Yes	9/86	10/86	3rd Refueling (2nd Qtr.'87)
Wrap Tray 3088 <u>31971</u>	No	Complete	Complete	1st Qtr.'86
Upgrade S W B Pp 45A barrier (supports) <u>20895</u>	No	3/86	4/86	2nd Qtr.'86
Change M.S. PORV control logic to pre-1980 design (IPV-2000, 2010, 2020-MS)	No	9/86	N/A	4th Qtr.'86
Upgrade the FPER	No	6/86	N/A	2nd Qtr.'86

**BASIS FOR GRANTING  
DEVIATION FROM INTERNAL  
GUIDANCE ON  $T_h/T_c$**

1. THE DEVIATION IS REQUIRED FOR ONLY 4 FIRE AREAS/ZONES IN THE PLANT (NONE OF WHICH REQUIRE THE OPERATORS TO LEAVE THE CONTROL ROOM).
2. A WELL REASONED BACKUP METHODOLOGY IS AVAILABLE FOR THESE CASES. ( $P_{sat}$  vs.  $T_{cold}$ ).
3. THE GUIDANCE GIVEN FOR APPENDIX "R" IS NOT CONSISTENT WITH THE WESTINGHOUSE GENERIC AND SUMMER STATION SPECIFIC REQUIREMENTS FOR R.G. 1.97 TYPE 1A or 1B INSTRUMENTATION.
4. THE GUIDANCE GIVEN FOR APPENDIX "R" IS NOT CONSISTENT WITH THE WESTINGHOUSE OWNERS GROUP, EMERGENCY RESPONSE GUIDELINES.

FIRE AREAS/ZONES OF  
INTEREST FOR  
LOSS OF  $T_h/T_c$

FIRE AREA IB-3      TRAIN A BATTERY CHARGER  
AND MAIN DISTRIBUTION  
PANEL ROOM

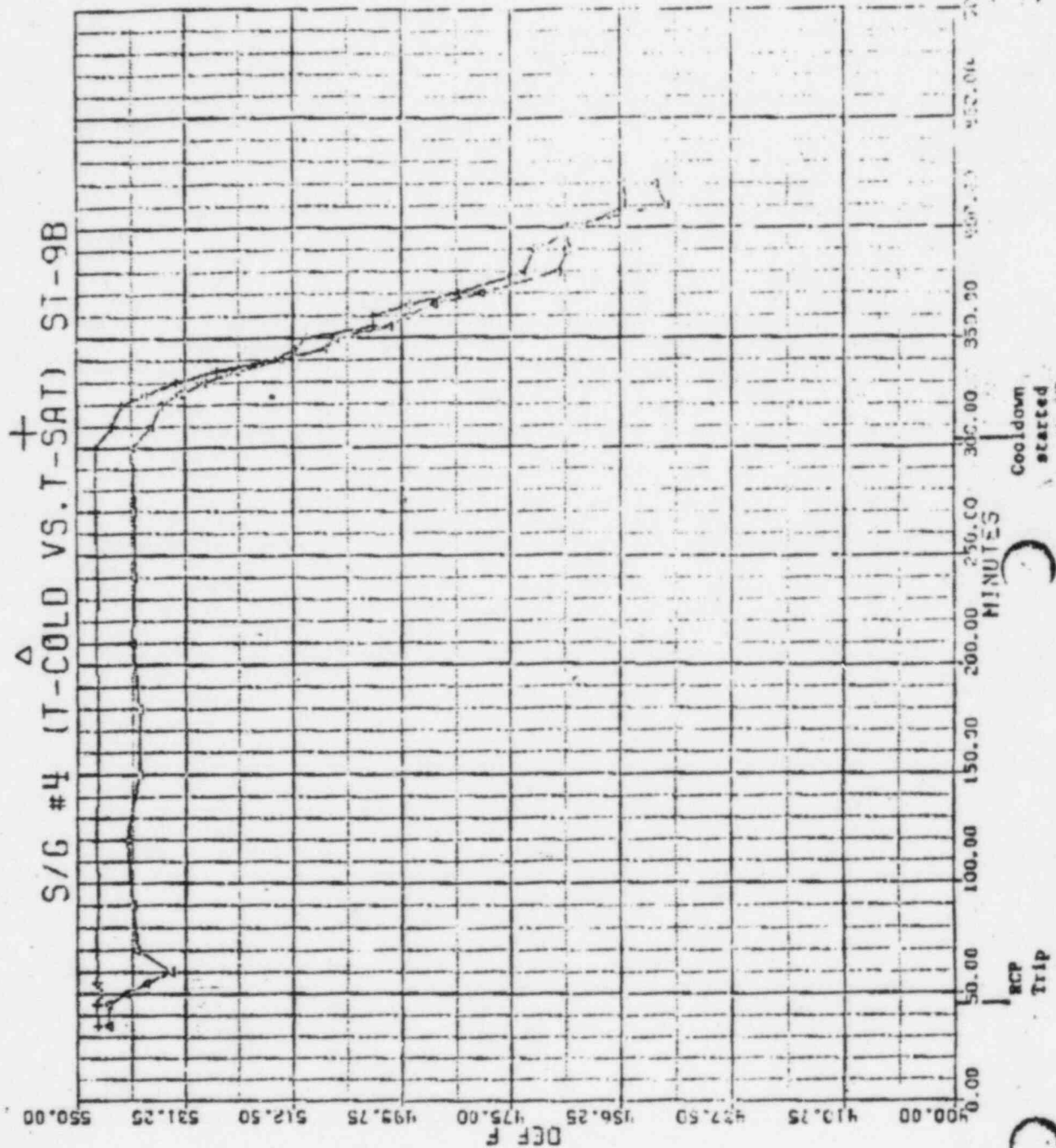
FIRE AREA IB-4      TRAIN B BATTERY CHARGER  
AND MAIN DISTRIBUTION  
PANEL ROOM

FIRE ZONE RB 1.1    WEST SIDE OF REACTOR  
BUILDING AT 412'  
ELEVATION

FIRE ZONE IB 25.4   WEST PENETRATION ROOM  
ADJACENT TO REACTOR  
BUILDING FIRE ZONE 1.1

NOTE THAT CONTROL ROOM EVACUATION IS NOT  
REQUIRED FOR ANY OF THESE AREAS. FULL  
 $T_h/T_c$  FOR AT LEAST ONE GENERATOR IS  
AVAILABLE FOR FIRES THAT REQUIRE USE OF  
THE CREP.

S/G #4 (T-COLD VS. T-SAT) ST-9B



Cooldown started

RCF Trip

FIG. 4

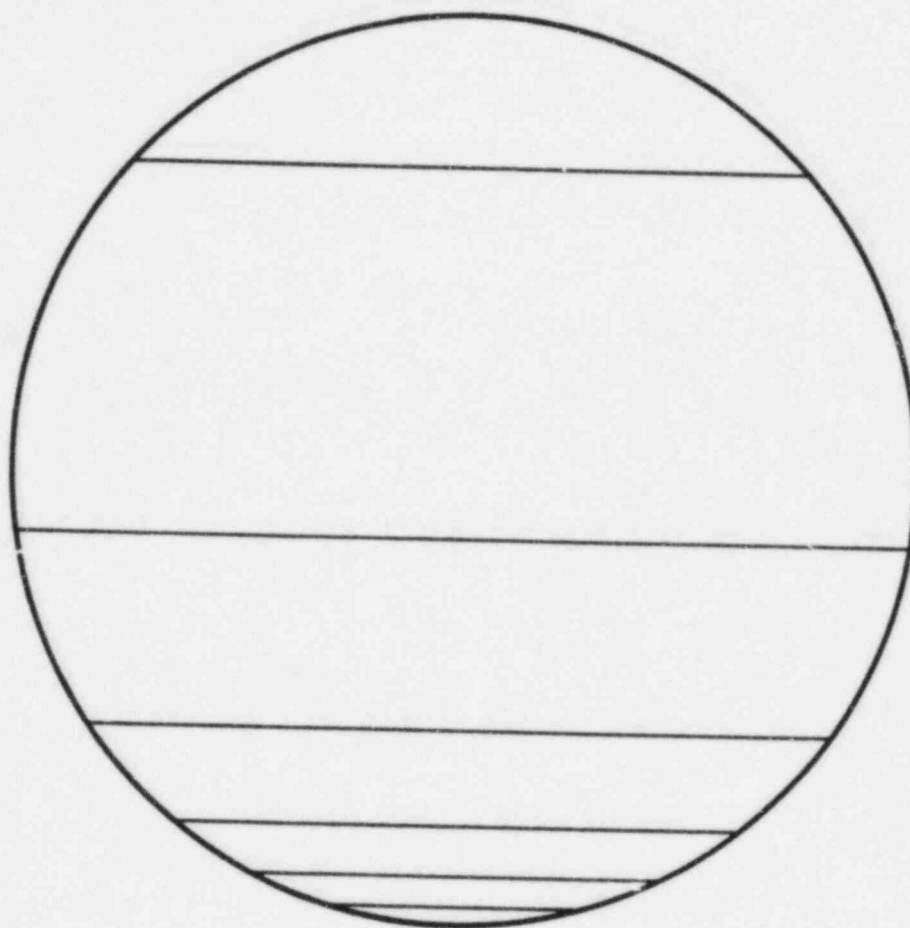
1. WESTINGHOUSE OWNERS GROUP ERG'S AND SUMMER STATION EOP'S GENERATED IN RESPONSE TO RG 1.97 REQUIRE THAT AT LEAST  $T_h$  or  $T_c$  BUT NOT BOTH BE AVAILABLE ON EACH STEAM GENERATOR.
2. APPENDIX R REQUIRES THAT  $T_h$  and  $T_c$  BOTH BE AVAILABLE ON ONE STEAM GENERATOR BUT NOT ON ALL LOOPS.

1.97			APPENDIX R GUIDANCE		
LOOP	$T_h$	$T_c$	LOOP	$T_h$	$T_c$
1	A	B	1	A	B
2	A	B	2	A	A
3	B	A	3	B	B

A SINGLE FAILURE OF A OR B TRAIN POWER WILL ALLOW ONE BUT NOT BOTH TO BE SATISFIED.

Westinghouse Owners Group

# **EMERGENCY RESPONSE GUIDELINES**



**Executive Volume**



BACKGROUND INFORMATION  
FOR  
WESTINGHOUSE OWNERS GROUP  
EMERGENCY RESPONSE GUIDELINES

GENERIC ISSUE  
NATURAL CIRCULATION

HP/LP-Rev. 1  
September 1, 1983

The continuous recording will provide trending information on the parameters of importance in order to eliminate the effects of pointwise variations in the readings and minimize the chance of misinterpretation of any one set of readings. Variations in discrete readings, and between the same parameters in different loops, can result from several causes:

- o Asymmetry in the heat transfer and heat transport processes between loops.
- o Instrument inaccuracies.
- o Differences in instrument sensing element placement between loops.
- o Variations in feed flowrates to steam generators.
- o Differences in location of various auxiliary system connections to the reactor coolant loop piping (e.g., charging line, letdown line, pressurizer surge line, etc.).

During natural circulation operations, the primary means available to the operator for verifying the continued safe state of the core in the subcooled convective heat transfer regime at any given time is the verification of at least minimum subcooling based on core exit TCs. Hot leg RTD readings can also be used, but the individual wide range instruments for hot leg temperature ( $T_{HL}$ ) have a higher expected error, do not measure the coolant parameter of interest in the location of interest, and are subject to the effects of thermocouple locations; such as, auxiliary system flow impingement, loopwise variations in natural circulation flow, etc., which may cause their instantaneous readings to be non-representative of the actual bulk coolant.

For the purposes of evaluating the progress of the natural circulation core cooling process, wide range  $T_{HL}$ , core exit temperature and SG pressure are valuable; the trending of these temperatures and pressure over a relatively long period (say 3 to 4 consecutive sets of readings taken at 20 minute intervals) should show a gradual decrease as decay heat decreases if the RCS is in a stable free convection operating mode.

The cold leg temperature ( $T_{CL}$ ) readings can be used as additional verification that heat removal through the steam generators is occurring. The loop  $T_{CL}$  readings in active loops are quite sensitive to changes in heat transfer

↑  
rates from the reactor to the secondary sides of the steam generators. Actual tests have shown that loop  $T_{CL}$ 's follow almost exactly (in trends) the steam generator steam pressure variations, with minimal time lag. Again, literal acceptance of the individual temperature values is to be cautioned against, since loop  $T_{CL}$  instruments can have errors ranging up to  $\pm 10^{\circ}\text{F}$ ; trending of cold leg temperature readings is recommended.

The presence of a loop  $\Delta T$  is necessary if any free convection flow is to occur. Calculated  $\Delta T$ 's for Westinghouse PWRs in a stable free convection mode are in the range of approximately 120% of full power loop  $\Delta T$  and downwards, with the higher  $\Delta T$ 's obtainable only at the highest expected decay heat levels. These higher  $\Delta T$ 's are probably not observable on RCS instrumentation since a stable free convection process will not be set up until core decay heat levels have dropped significantly from their highest theoretically attainable values.

○ Regardless of the foregoing discussion, the operator should immediately investigate any extreme or suspicious variation in an instantaneous reading of  $T_{HL}$  or  $T_{CL}$ ; the key parameter for verification of continued acceptable system operation is the RCS subcooling based on core exit temperature.

## 2.2 Relations Describing System Performance

If transient equilibrium is assumed, simple analytical expressions for the mass flowrate and loop temperature difference obtained during natural circulation operations can assist in understanding the effect of various perturbations on the system performance. These expressions, given below, are not intended to replace detailed analyses of the natural circulation process and should be treated as approximate relations for describing the system performance under quasi-steady-state heat removal conditions. These expressions are, however, useful in predicting the optimum conditions for natural circulation decay heat removal.

DEVIATION REQUEST

FROM MAY 29, 1985

LETTER O. W. DIXON

TO H. R. DENTON

FIRE AREA: AB-1  
MH-2  
IB-25

## LOCAL CONTROL SWITCHES

- 1) TABLE 5.3 IN SEPTEMBER 4, 1985 SUBMITTAL IS STRICTLY TRUE FOR CONTROL ROOM EVACUATION.
- 2)
  - A) AS DESCRIBED IN SECTION 7.0 OF THE SAME SUBMITTAL SOME LOCAL CONTROL MAY BE REQUIRED FOR INDIVIDUAL FIRE AREAS THAT DO NOT REQUIRE CONTROL ROOM EVACUATION.
  - B) NO REPAIRS ON HOT STAND BY EQUIPMENT NEEDED SOONER THAN 8 HOURS. SOME FUSE PULLING IN THE MAIN CONTROL BOARD AND LOCAL SWITCHGEAR OPERATION AS WELL AS MANUAL OPERATION OF VALVES MAY BE REQUIRED.

CHANGE TO TABLE 5.3

SEPT 4, 1985 LETTER

O. W. DIXON TO H. R. DENTON

CHANGE THE ENTRY FOR COMPONENT COOLING  
PUMP "B" FROM FIRE SWITCH TO PERMANENT  
JUMPER PROCEDURE.

- BASIS:
1. THE COMPONENT COOLING SYSTEM IS NOT  
REQUIRED FOR ENTRY INTO NOR MAINTENANCE  
OF HOT STAND BY.
  2. IT IS EASY TO OPERATE FROM ITS ASSOCIATED  
SWITCHGEAR.
  3. SUCH OPERATION HAS NO IMPACT ON THE  
TIME LINE FOR REACHING COLD SHUTDOWN  
WITHIN 72 HOURS.
  4. IT OFFERS NO SAFETY HAZARD TO THE  
OPERATOR.