JAN 29 1985

MEMORANDUM FOR: Darrell G. Eisenhut, Director
Division of Licensing

FROM: Dennis M. Crutchfield, Assistant Director
for Safety Assessment, DL

SUBJECT: SUMMARY OF THE OPERATING REACTOR EVENTS
MEETING ON JANUARY 17, 1985

On January 17, 1985, an Operating Reactor Events meeting was held to brief the Office Director, the Division Directors and their representatives on events which occurred since our last meeting on January 3, 1985. The list of attendees is included as Enclosure 1.

The events discussed and the significant elements of these events are presented in Enclosure 2. In addition, the assignment of follow-up review responsibility was discussed. The assignments made during this meeting and the status of previous assignments are presented in Enclosure 3.

Original Signed By

Dennis M. Crutchfield, Assistant Director
for Safety Assessment, DL

Enclosures:
As Stated

DISTRIBUTION
Central Files
NRC PDR
ORAB Rdg
ORAB Members

cc w/encl:

H. Denton	G. Edison
R. Berenero	P. Wagner
R. Vollmer	Regional Administrators
T. Speis	R. Starostecki, R-I
C. Heltemes	J. Olshinski, R-II
T. Novak	C. Norelius, R-III
H. Thompson	R. Denise, R-IV
J. Taylor	D. Kirsch, R-V
E. Jordan	G. Lainas
F. Rowsome	P. Baranowski, RES
W. Minners	E. Rossi, IE
L. Shao	R. Hernan
T. Ippolito	F. Schroeder
P. Kadambi	
R. Lewis	

PREVIOUS CONCURRENCE*

ORAB:DL*	ORAB:DL	C:ORAB:DL	AD/SA:DL
MCaruso:dm	RWessman	GHolahan	DCrutchfield
1/28/85	1/28/85	1/28/85	1/29/85

I DIR-5-1
OPERATING EXPERIENCE

ENCLOSURE 1

LIST OF ATTENDEES

OPERATING REACTORS EVENTS BRIEFING

JANUARY 17, 1985

M. Caruso, ORAB

R. Herman, NRR/TOSB

T. Dunning, NRR/ICSB

G. Rivenbark, NRR/ORB4

G. Knighton, NRR/DL/LB3

H. Bailey, IE/DEPER/EAB

A. Dromerick, IE/DEPER/EGLEB

D. Vassallo, NRR/DL/ORB2

H. Schierling, NRR/DL/LB3

F. Manning, RES/DRAO

W. Lanning, AEOD/ROAB

D. Allison, IE/EGCB

B. Wright, NRR/DE

K. Seyfrit, ROAB/AEOD

M. Chiramal, POAB/AEOD

T. Cintuza, ROAB/AEOD

D. Wigginton, NRR/ORB1

L. Rubenstein, NRR/DSI

D. Eisenhut, NRR

E. Case, NRR

I. Villalva, IE

G. Holahan, NRR/DL

R. Bernero, NRR/DSI

W. Minners, NRR/DST

F. Schroeder, NRR/DST

T. Novak, NRR/DL

B. Youngblood, NRR/DL/LB1

F. Miraglia, NRR/DL

C. E. Rossi, IE/EAB

R. S. Lee, NRR/DL/ORB3

E. Weiss, IE/EAB

S. Newberry, NRR

R. Singh, IE/EAB

D. Tarnoff, NRR/ORAB

W. Haass, IE/VPB

D. Lynch, NRR

J. Hannon, NRR

T. Alexion, NRR

OPERATING REACTOR EVENTS BRIEFING

JANUARY 17, 1985

SEQUOYAH 2 - REACTOR PROTECTION SYSTEM MALFUNCTION JANUARY 12, 1985 (I. VILLALVA, IE)

- PLANT STATUS
  - PLANT OPERATING AT FULL POWER PRIOR TO EVENT
- EVENT
  - RTB "A" FAILED TO OPEN AUTOMATICALLY UPON A REACTOR TRIP SIGNAL
- CAUSE
  - SHORTED TRANSISTOR (Q-3) IN WESTINGHOUSE SOLID STATE PROTECTION SYSTEM (SSPS)
- SAFETY CONSEQUENCES
  - NONE IN THIS CASE (I.E., THE REDUNDANT UV OUTPUT CIRCUIT FUNCTIONED PROPERLY AND SCRAMMED THE REACTOP BY OPENING RTB "B"). HOWEVER, SHORT CIRCUIT FAILURES OF BOTH REDUNDANT Q-3 TRANSISTORS COULD LEAD TO AN ATWS BY INHIBITING THE AUTOMATIC TRIPPING FEATURE (I.E., BOTH THE UV AND SHUNT TRIP FEATURES) OF BOTH RTB'S. SINCE SUCH FAILURES ARE NOT ROUTINELY MONITORED, THEY WOULD NOT BE ANNUNCIATED

- Generic Considerations
  - All Westinghouse designed plants with SSPS's have similar failure modes that will inhibit the automatic tripping of the RTB's upon a valid reactor trip signal. Such failure modes would inhibit the automatic tripping of the RTB's from either the UV or shunt trip device

- Corrective Actions Taken by NRC
  - Region II reviewed and approved the actions taken by Sequoyah regarding this event. IE is preparing an Information Notice describing this event as well as other similar failures that have occurred at North Anna Unit 2.

- Corrective Actions Taken at Sequoyah
  - RTB "A" Manually tripped - upon noticing that RTB "A" had not tripped, the operator manually tripped the breaker, thereby assuring a reactor scram

  - Post-trip review - during the post-trip review, the licensee diagnosed the failure as being in the UV output circuit of the SSPS. Thus, the output circuit card on the affected SSPS train was replaced, after which the trip function operated properly

- TESTING - EXTENSIVE SURVEILLANCE TESTING OF THE RPS WAS PERFORMED, INCLUDING RESPONSE TIME TESTING OF THE RTB'S AFTER THE DEFECTIVE CARD WAS REPLACED. IN ADDITION, THE FAILED CIRCUIT CARD WAS INSPECTED AND TESTED AT WHICH TIME IT WAS DETERMINED THAT THE FAILUPE WAS A SHORT CIRCUIT OF TRANSISTOR Q-3. ALL OTHER COMPONENTS WITHIN THE UV OUTPUT CIRCUIT TESTED OK

- <u>OTHER SIMILAR EVENTS</u>
  - NORTH ANNA 2 - THREE SIMILAR FAILURES HAVE OCCURRED AT NORTH ANNA 2, EACH OF WHICH WAS DETECTED DURING RPS TESTING. WESTINGHOUSE AND VEPCO HAVE APPARENTLY CONCLUDED THAT THE FIRST TWO FAILURES WERE CAUSED BY SHORT CIRCUITS AT THE RTB SWITCHGEAR CUBICLES, AND THAT THE THIRD WAS CAUSED WHILE INSTALLING THE AUTOMATIC SHUNT TRIP FEATURE ON THE RTB'S. THUS, THE CAUSE FOR EACH FAILURE HAS BEEN ATTRIBUTED TO EVENTS EXTERNAL TO THE SSPS.
  - FOREIGN REACTORS - SEVERAL FAILURES HAVE OCCURRED AT A FOREIGN SITE, EXACT NUMBER UNKNOWN BUT IN EACH CASE WESTINGHOUSE ATTRIBUTES THE FAILURES TO POOR MAINTENANCE AND TESTING OF THE SSPS.

NOTE: THE ABOVE EXPLANATIONS DO NOT SEEM APPLICABLE TO SEQUOYAH EVENT

ATTACHMENT I

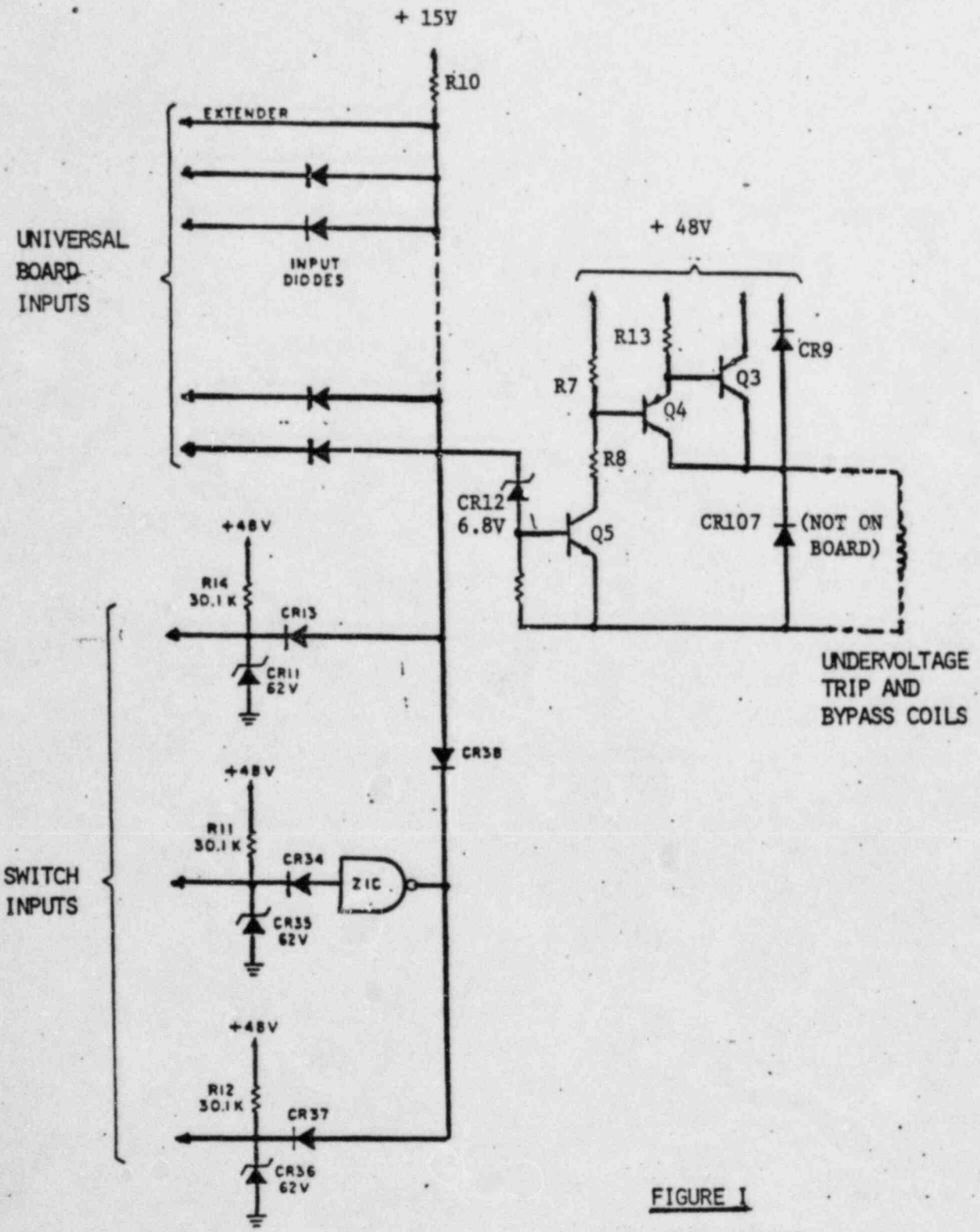


FIGURE I

UV OUTPUT CIRCUIT

FERMI 2 - DAMAGE TO THE EMERGENCY DIESEL GENERATORS (D. LYNCH)

- THE DIESEL GENERATOR (DG) TRIPPED ON LOW LUBE OIL PRESSURE; INSPECTION INITIATED
- TWO OF FOUR FAIRBANKS-MORSE DG'S DAMAGED
- PARTS OF BEARINGS, PISTON RINGS, PISTONS FOUND IN OIL IN ONE
- TWO OTHERS EXHIBIT NO APPARENT DAMAGE
- APPARENT "DRY" START FROM COLD
- PRE-LUBE MOD. AT FERMI 2 APPARENTLY DEFICIENT DESIGN
- PROCEDURES NOT SPECIFIC ON AVOIDING "DRY" STARTS
- PRELIMINARY TEARDOWN RESULTS:
  - FOUR CYLINDERS SEVERELY DAMAGED ON ONE DG; OTHERS YET TO BE TORN DOWN

DIABLO CANYON 1 - LOSS OF FEEDWATER TRANSIENT FROM 8% POWER JANUARY 4, 1985 (S. NEWBERRY)

- SIGNIFICANCE
  - MULTIPLE EQUIPMENT PROBLEMS (4)
  - OPERATOR PLANT CONTROL PROBLEMS
- INITIAL CONDITIONS
  - TURBINE AT 1800 RPM - NO LOAD
  - ONE MAIN FEED PUMP RUNNING - FEEDING ON BYPASS
  - SECOND MAIN FEED PUMP IN STANDBY
  - REACTOR AT 8% POWER
- SEQUENCE OF EVENTS
  - LOW LUBE OIL PRESSURE ON RUNNING MAIN FEED PUMP
  - STANDBY LUBE OIL PUMP DOESN'T RAISE OIL PRESSURE FAST ENOUGH, MAIN FEED PUMP TRIPS
  - SECOND MAIN FEED PUMP - SPEED CONTROL PROBLEMS
  - OPERATOR TRIPS TURBINE
  - OPERATOR ATTEMPTS TO START TURBINE AFW PUMP - UNABLE TO OPEN STEAM INLET VALVE
  - WITH STEAM GENERATOR LEVEL INCREASING, DECREASING RCS TEMPERATURE, OPERATOR PULLS RODS TO INCREASE RCS TEMPERATURE
  - REACTOR TRIPS WHEN POWER INCREASES TO 10%

- LICENSEE CORRECTIVE ACTIONS
  - LUBE OIL FOR MAIN FEEDWATER
  - MAIN FEED PUMP SPEED CONTROL
  - TURBINE DRIVEN AFW

DIABLO CANYON 1 - LOAD REJECTION STARTUP TEST FROM 50% POWER JANUARY 2, 1985 (S. NEWBERRY)

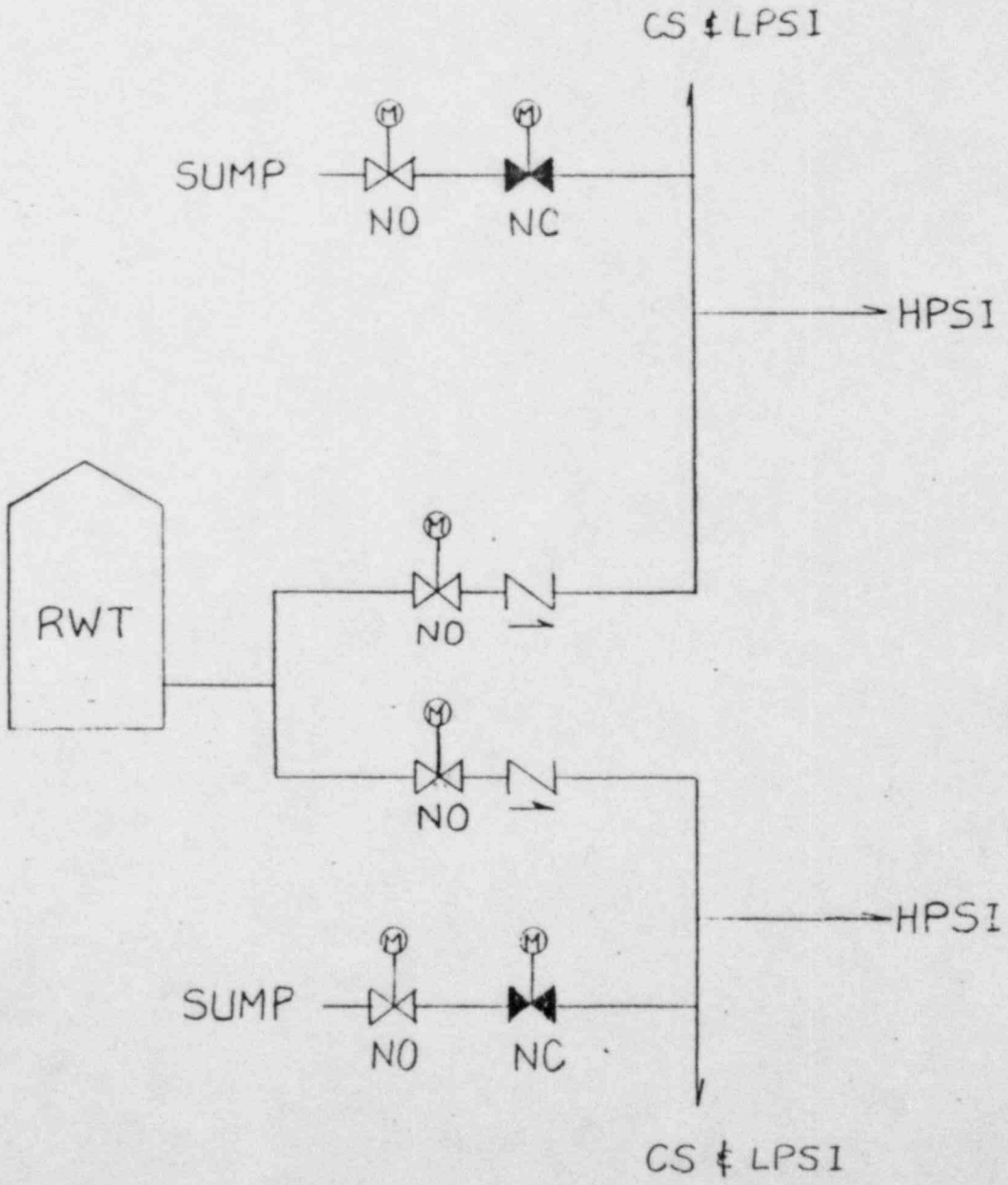
- SIGNIFICANCE
  - STAFF MONITORING STARTUP EXPERIENCE
  - UNSUCCESSFUL TEST
- SEQUENCE OF EVENTS
  - OPEN BREAKERS TO GRID TO INITIATE TEST
  - TURBINE GOVERNOR AND INTERCEPT VALVES CLOSE BUT FAIL TO REOPEN; GENERATOR FREQUENCY DROPS
  - FREQUENCY DROP CAUSES REACTOR COOLANT PUMPS TO SLOW; REACTOR TRIPS ON LOW FLOW (RCPs TRIP ON UNDER FREQUENCY)
  - DIESEL "1-2" STARTS ON UNDERVOLTAGE DUE TO SLOW BUS TRANSFER. BUS IS NOT DE-ENERGIZED. DIESEL MANUALLY SHUTDOWN
  - SAFETY RELATED SYSTEMS RESPOND AS DESIGNED
  - OPERATORS RESPOND IN ACCORDANCE WITH PLANT PROCEDURES
- LICENSEE CORRECTIVE ACTIONS
  - REPAIRED TURBINE CONTROLS
  - TEST REPEATED SUCCESSFULLY JANUARY 5, 1985
- NRC FOLLOWUP
  - RESIDENT INSPECTORS AND REGION

° HATCH-1 - HPCI, RCIC INOPERABLE FOLLOWING LOW VESSEL CONDITION JANUARY 16, 1985 (G. RIVENBARK)

- AC BUS LOST WITH UNIT AT 70% UNIT
- FEEDWATER CONTROL LOST AS RESULT
- REACTOR TRIP ON LOW VESSEL LEVEL
- HPCI AND RCIC ACTUATED AUTOMATICALLY
- VESSEL LEVEL RESTORED; AC BUS RESTORED; FEEDWATER RESTORED RCIC, HPCI SECURED
- COULD NOT RESET RCIC DUE TO LINKAGE PROBLEM. HPCI FLOW ERRATIC DUE TO STOP STUCK HALF OPEN. LICENSEE PROCEEDED TO REPAIR
- HPCI AND RCIC HAD PASSED SURVEILLANCE ONLY THREE DAYS BEFORE

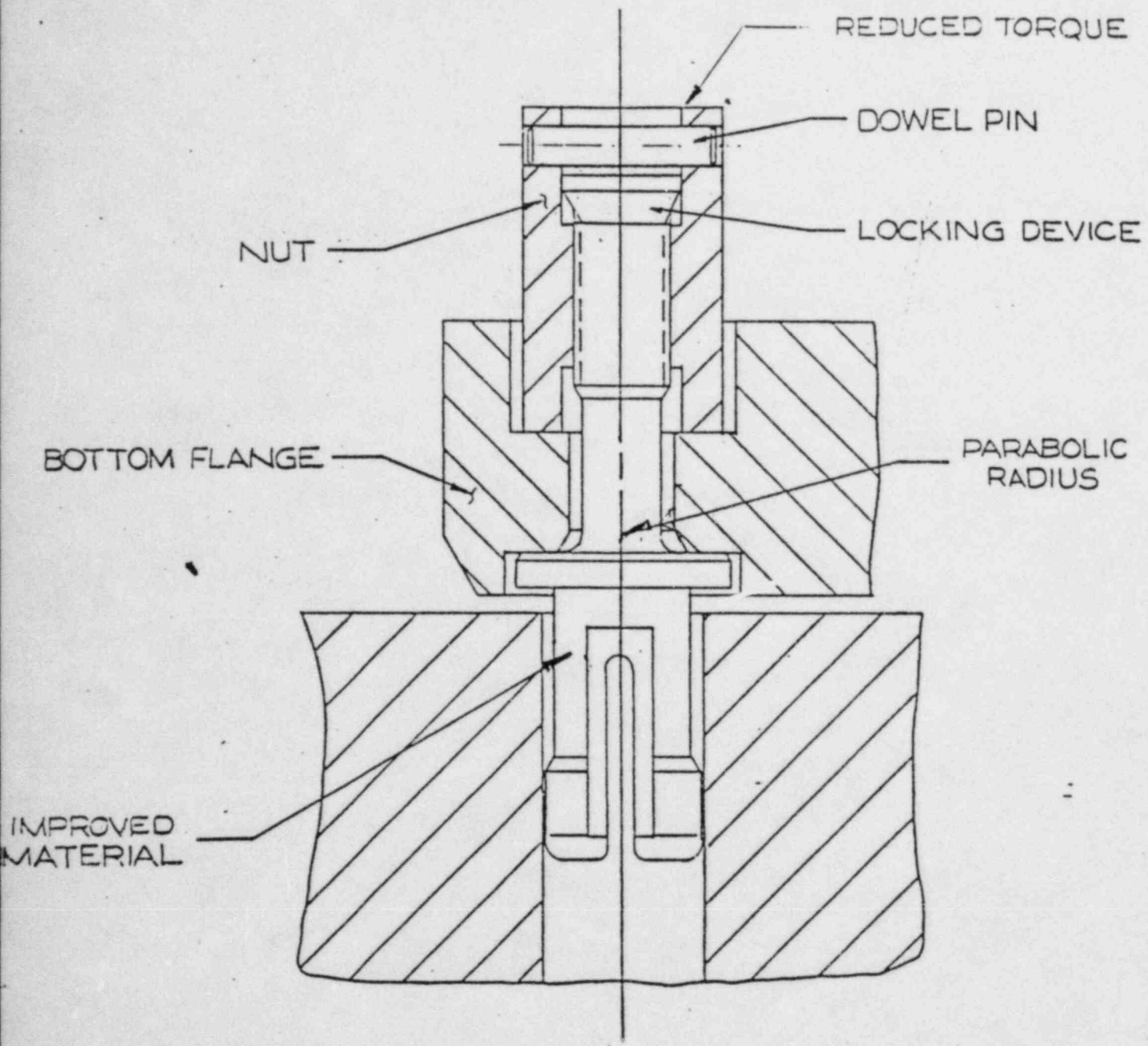
ANO-2 - SPURIOUS RECIRCULATION ACTUATION SIGNAL (RAS)
JANUARY 2, 1985 (R. LEE)

- PLANT PROTECTION SYSTEM BEING TESTED (PLANT AT FULL POWER)
- CHANNEL "A" OF RECIRCULATION ACTUATION SYSTEM (RAS) TRIPPED WHILE "B" OUT OF SERVICE FOR TESTING
- TWO-OUT-OF-FOUR LOGIC NECESSARY TO GENERATE RAS SATISFIED
- CONTAINMENT SUMP RECIRCULATION ISOLATION VALVES OPEN (~22 SECONDS NEEDED TO FULLY OPEN)
- REFUELING WATER TANK DISCHARGE VALVES CLOSE (~80 SECONDS NEEDED TO FULLY CLOSE)
- ABOUT 50,000 GALLONS OF RWT WATER FLOWED INTO CONTAINMENT
- CAUSE OF SPURIOUS ACTUATION BEING INVESTIGATED


CS & LPSI
SUMP
NO
NC
HPSI
RWT
NO
NO
HPSI
SUMP
NO
NC
CS & LPSI

D. C. COOK 2 - CONTROL ROD GUIDE TUBE SUPPORT PIN FAILURES JANUARY 3, 1985 (D. WIGGINTON)

- LOOSE PARTS INDICATIONS DETECTED IN TWO STEAM GENERATORS (SG) WHILE STARTING UP FROM OUTAGE
- WESTINGHOUSE NOISE ANALYSIS INDICATES CRDM GUIDE TUBE SUPPORT PINS
- PLANT COOLED DOWN AND SGs INSPECTED
- NUT, DOWEL PIN, LOCKING PIN AND BROKEN PIECE OF SHANK FOUND IN No. 2 SG
- NUT, LOCKING DEVICE AND DOWEL PIN FOUND IN No. 3 SG
- TUBE ENDS INSPECTED; MINOR PEENING DAMAGE
- UNIT 1 PINS TO BE REPLACED AT A 10-YEAR OUTAGE (APRIL 1985)
- REPLACEMENT OF UNIT 2 PINS AT NEXT REFUELING OUTAGE BEING CONSIDERED



GUIDE TUBE SUPPORT PIN ASSEMBLY

NON-UHI DESIGN

- CATAWBA - POTENTIAL INOPERABILITY OF ICE CONDENSER DOORS JANUARY 9, 1985 (ORAB)

  - 23 OF 24 ICE CONDENSER INLET DOORS FOUND BLOCKED CLOSED WITH PLANT IN MODE 2

  - BLOCKED DOORS COULD CUT-OFF COOLING PATH FOR CONTAINMENT ATMOSPHERE FOLLOWING LOCA OR MSLB

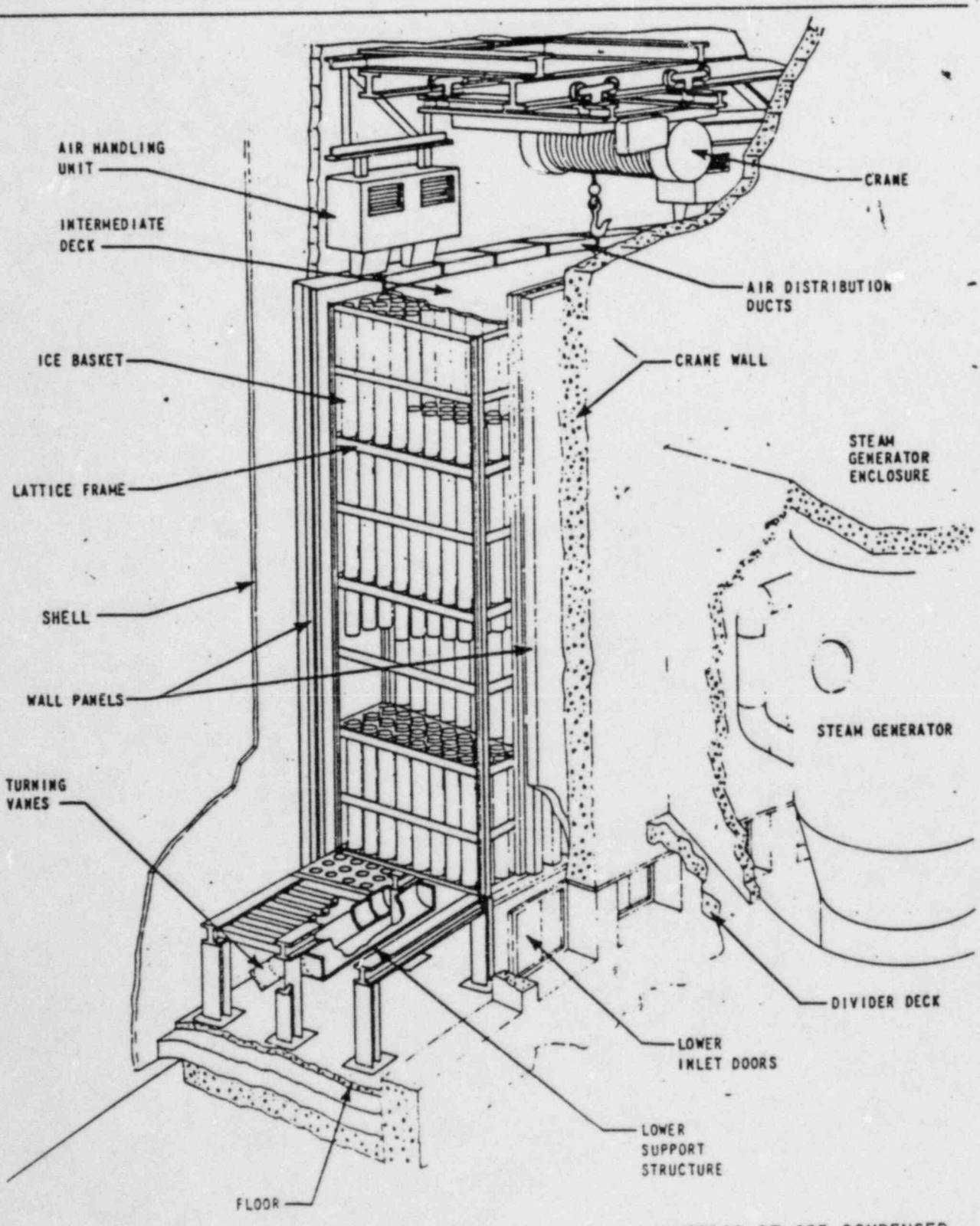
  - NO IMMEDIATE HAZARD SINCE PLANT IS IN INITIAL STARTUP PHASE WITH INSIGNIFICANT LEVELS OF DECAY HEAT

  - DOORS WERE BLOCKED CLOSED TO PREVENT ICE MELT WHILE IN MODES 5 AND 6; SHOULD HAVE BEEN UNBLOCKED CPER T. S. WHEN MODE 3 ENTERED ON 12/31/84

  - CAUSE WAS PERSONNEL ERROR IN FAILING TO COMPLETE ACTION REQUIRED BY T.S.; INVESTIGATION IN PROGRESS SINCE ACTION TO UNBLOCK DOORS HAD BEEN SIGNED OFF AS COMPLETE

  - BLOCKED DOORS FOUND INCIDENTALLY BY HP TECHNICIAN DOING RADIATION SURVEY IN AREA; NORMAL SURVEILLANCE PERIOD 3 MONTHS (1ST YEAR) 6 MONTHS (OTHER YEARS)

  - CORRECTIVE ACTIONS
    - LICENSEE DETERMINING LEVEL OF DEGRADATION OF DOOR PERFORMANCE DURING ACCIDENT AND POTENTIAL CONSEQUENCES
    - COMPLETION OF ALL ACTIONS REQUIRED BY T.S. ON MODE CHANGE BEING INDEPENDENTLY VERIFIED
    - DOOR BLOCKS ARE BEING PAINTED A BRIGHT COLOR; DOOR SIGNS WILL BE USED TO INDICATE BLOCKED DOORS IN FUTURE



ISOMETRIC OF ICE CONDENSER

REACTOR TRIPS

- Summary of reactor trip frequencies in 1984:

Year	No. of Plants	Reactor Trip Frequency Trip/Plant/Year		
		Auto	Manual	Total
1983	77	5.6	.9	6.5
1984	83	4.8	.4	5.2

- Average per plant annual frequency down 25% from 1983; evaluation of causes underway

- Detailed analysis of trends and patterns in trip frequency in progress in AEOD

ENCLOSURE 3

INCOMPLETE ITEMS

Meeting Date	Responsible Branch	Task Description	Comment
9/8/83	DL/Lead PM	Follow-up Briefing on BWR Vacuum Breakers after CSB evaluation complete	
11/22/83	PM (Oconee)	Issue TAC to Review need for Onsite Emergency Power System T/S Change.	Complete; memo to PSB in preparation
1/19/84	DSI/CSB/DL (Lead PM)	Evaluate Browns Ferry type system for maintaining dry well - torus P. Determine if this is acceptable fix for long term in similiar BWR.	Follow-up to be presented in CSB memo to E. Case.
4/10/84	DL/ORAB; DSI/CSB; and AEB, DHFS, AEOD, RES	ORAB to chair a meeting between NRR Divisions, IE, AEOD and RES to discuss operating experience related to containment systems vulnerability to degradation resulting from errors or design features. Meeting participants will make brief presentations in their area of expertise.	Preparations in progress
4/26/84	DST/GIB DL (Lead PM)	Review recent Waterhammer events at Maine Yankee, Palisades, Salem-2 and Calvert Cliffs. Determine Generic implications and need for additional staff action. DL (Lead PM) will coordinate RAI.	Waiting for additional info from licensees; Calvert Cliffs review completed

Meeting Date	Responsible Branch	Task Description	Comment
5/30/84	EQB	Have Franklin Research Center determine if new failure mechanism responsible for faulty DB-50 RTBs at North Anna-1	Investigation and testing at Franklin currently underway
8/7/84	DL/PM (Salem)	Determine if Velan (PORV) block valve qualified to close against 7/25/84 steam blow down transient at Salem 2. Check EPRI Test Program results	
8/7/84	DL/ORAB	Coordinate NRR review of Region I report on Susquehanna 2 Station Blackout; setup meeting to decide followup actions	In progress
9/26/84	DSI/ASB DL/PM	Review licensee (Grand Gulf) corrective actions regarding SSW waterhammer to ensure consistency with USI A-1 resolution; coordinate with Region II review	
10/16/84	ORAB/IE	Follow-up briefing after cause of Palisades RCP failure and generic implications determined	

Meeting Date	Responsible Branch	Task Description	Comment
11/29/84	DL/PM (Duane Arnold)	Issue TAC to DSI/PSB to re-review station adequacy analysis in light of 10/22 start-up transformer failure event	
12/13/84	DL/PM, ORAB TDI DG Task Force	Review multiple DG failures at North Anna-2 to identify potential common mode failure mechanism	
12/13/84	IE	Prepare Information Notice regarding stuck control rod at KORI-5	
12/13/84	DL/PM	Determine worker exposure from CRD screen replacement operation at Monticello forward to H. R. Denton in note	
1/3/85	DL/PM Susquehanna	Find out about existence of widespread potential maintenance problem or CRD air system contamination	
1/3/85	DL/PM, ORAB DST (F.Schroeder)	Determine if a change in Tech Specs should be considered in. view of Susquehanna scram solenoid problem	ORAB assist PM in preparing Task definition memo for DST
1/3/85	DL (P.Kadambi)	Summarize B&W licensing responses to questions subsequent to Rancho Seco loss of NNI event and present at follow-up OR Events briefing	

Meeting Date	Responsible Branch	Task Description	Comment
1/3/85	ICSB F. Rosa	Consider need for additional requirements on alarms/ annunciators	
1/3/85	IE	Evaluate incident response criteria concerning loss of plant annunciators	
1/3/85	IE	Prepare Information Notice regarding degradation of safety injection pumps due to boron crystallization	
1/17/85	TSRG/DL (E. Butcher)	Ensure that Tech Specs for NTOL plants reflect proper guidance regarding DG fast cold starts	Complete 1/23/84 STS revision in process
1/17/85	IE/ORAB	Continue review of Sequoyah and North Anna trip breaker failures for preparation of Information Notice and determination of need for additional action	