UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

May 12, 1988

Docket No. 50-302

LICENSEE: Florida Power Corporation

FACILITY: Crystal River Unit 3

SUBJECT: SUMMARY OF MARCH 30, 1988 MEETING ON CRYSTAL RIVER UNIT 3 (CR-3) ON OSTI AND EFW ISSUES

On March 30, 1988, representatives of Florida Power Corporation (FPC) met with representatives of the NRC staff to discuss the matters summarized below. The list of attendees and slides presented during the meeting are enclosed.

1. Emergency Diesel Generator (EDG) Issues

The licensee noted that with the present plant configuration the worst-case scenario EDG loading is approximately 3113 KW, but that no scenario requires both the emergency feedwater pump (EFW) pump and the decay heat (DH) pump at the same time. The proposed EFW pump block/trip circuitry, which would prevent such concurrent operation, was described. With this circuitry, the controlling scenario then becomes an intermediate Loss of Coolant Accident (LOCA) where reactor coolant system pressure does not drop below 500 psi, in which case the EFW pump is needed and the DH pump is not. The EDG load in this case is 2882.5 KW. Comments regarding the block/trip solution included:

a. There is concern in removing the diverse low pressure injection (LPI) actuation signal (4 psi RB pressure). Can the 30 psi RB pressure signal be used instead?

b. The question of long-term need for loads not needed immediately must be addressed.

c. The possibility of additional risk or problems being introduced by the block/trip design in other perhaps more likely or more serious scenarios must be examined carefully. It must be assured that failures which could prevent operation of EFW or of decay heat removal are not made more likely.

d. The battery charger and other loads as appropriate should be added back on the EDG.

The licensee noted that it intended to install the block/trip modification during the next refueling outage. The schedule for submittal of the design is before the fall of 1988, with earlier responses to the concerns raised above.

With regard to EDG room temperature, current analysis indicates that 95°F ambient temperature will result in a combustion air inlet temperature to the EDG of 106.6°F, which could require EDG derating. The licensee is implementing an HVAC modification which would provide sufficient outside ambient air near the EDG suction to assure inlet temperatures below 105°F.

The licensee continues to examine various EDG upgrades. Those that are presently scheduled for the next refueling outage were described. These are intended primarily to improve EDG reliability rather than increase capacity, although by this summer any capacity benefits from these modifications will be defined. Further upgrades may be selected when costs and capacity benefits are available from the manufacturer.

2. Auxiliary Feedwater Pump

The design basis for this pump was discussed. In addition to those items on the slide (see Enclosure 2) it was noted that while the design is still developing, the capacity of the pump is expected to be 300-400 GPM. It will be independent of EFIC and powered from the reactor coolant pump transformer windings. Consideration is being given to use of the pump as a normal startup pump, in which case its discharge may be directed to either the normal feed nozzles on the steam generator or to the EFW feed ring. Tests and surveillance intervals will be defined in the Preventive Maintenance Program.

The licensee indicated that the earliest firm commitment for implementation which could be made at the present time is the refueling currently scheduled for the fall of 1993. The earliest possible date would be the 1991 refueling, which would require close cooperation with and by the NRC staff. The licensee is also considering proposing alternate AC power sources within several months to partially resolve the station blackout issue.

3. Ultimate Heat Sink

The licensee stated that the maximum observed raw water inlet temperature in the last 10 years is 90.5°F. Recent analysis shows that a temperature of 92°F will permit maintenance of the design basis temperature of 105°F in the Nuclear Services Closed Cycle Cooling System and the Decay Heat Closed Cycle Cooling System. In order to provide margin, the licensee desires to revise the raw water design basis (and the ultimate heat sink TS) to 95°F, which would cause a small increase in the closed cycle systems temperature. The licensee stated that a written commitment would be provided shortly to maintain a maximum raw water temperature of 92°F or shut down. The licensee agreed to submit a TS change request by July 1988 for 95°F maximum raw water temperature if analysis supports this figure, or failing such analytical support by that time, for 92°F.

It was noted that in its analysis the licensee should assure that the actual fouled heat exchanger capability is at least that used in the analysis.

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ENCLOSURE 1

EDG/EFW/UHS Meeting

MARCH 30, 1988

NAMES	ORGANIZATION
H. Silver	NRR, PM
T. Stetka	NRC, SRI, CR-3
J. W. Craig	NRR, SPLB
G. C. Lainas	NRR, ADRII
R. V. Crlenjak	NRC, RII DRP
H. N. Berkow	NRR PDII-2
R. H. Bernhard	Region II, DRS/EB/TPS
S. Varga	NRR
J. S. Wermiel	NRR/DEST/SPLB
H. J. Wong	NRC/OE
J. O. Schiffgens	NRR
J. Lazevnick	NRR/DEST/SELB
R. C. Jones	NRR/DEST/SRXB
W. R. Wilson	FPC/Mgr. Nuclear Licensing
W. S. Wilgus	V. P. Nuc. Ops. FPC
E. C. Simpson	FPC, Director, Nuc. Ops. Engr. & Projects
R. C. Widell	FPC, Manager, Nuclear Operations Engineering
M. Rahman	Sr. Electrical Engineer, FPC, Nuc. Engr.
J. R. Maseda	FPC, Nuclear Engineering Supervisor
G. W. Castleberry	FPC, Nuclear Engineering Supervisor
R. E. Clausen	FPC, I&C Engineering
R. Architzel	NRR, RSIB
S. F. Kobylarz	Consultant
G. J. Ouerbeck	Consultant
J. Stewart	NRR, ICSB
P. R. Tanguay	FPC, Mgr. Mech/Struct Engrg.
A. Thadani	NRR/DEST
F. Rosa	NRR/DEST/SELB
S. Saba	NRR/DEST/SELB

APPENDIX A

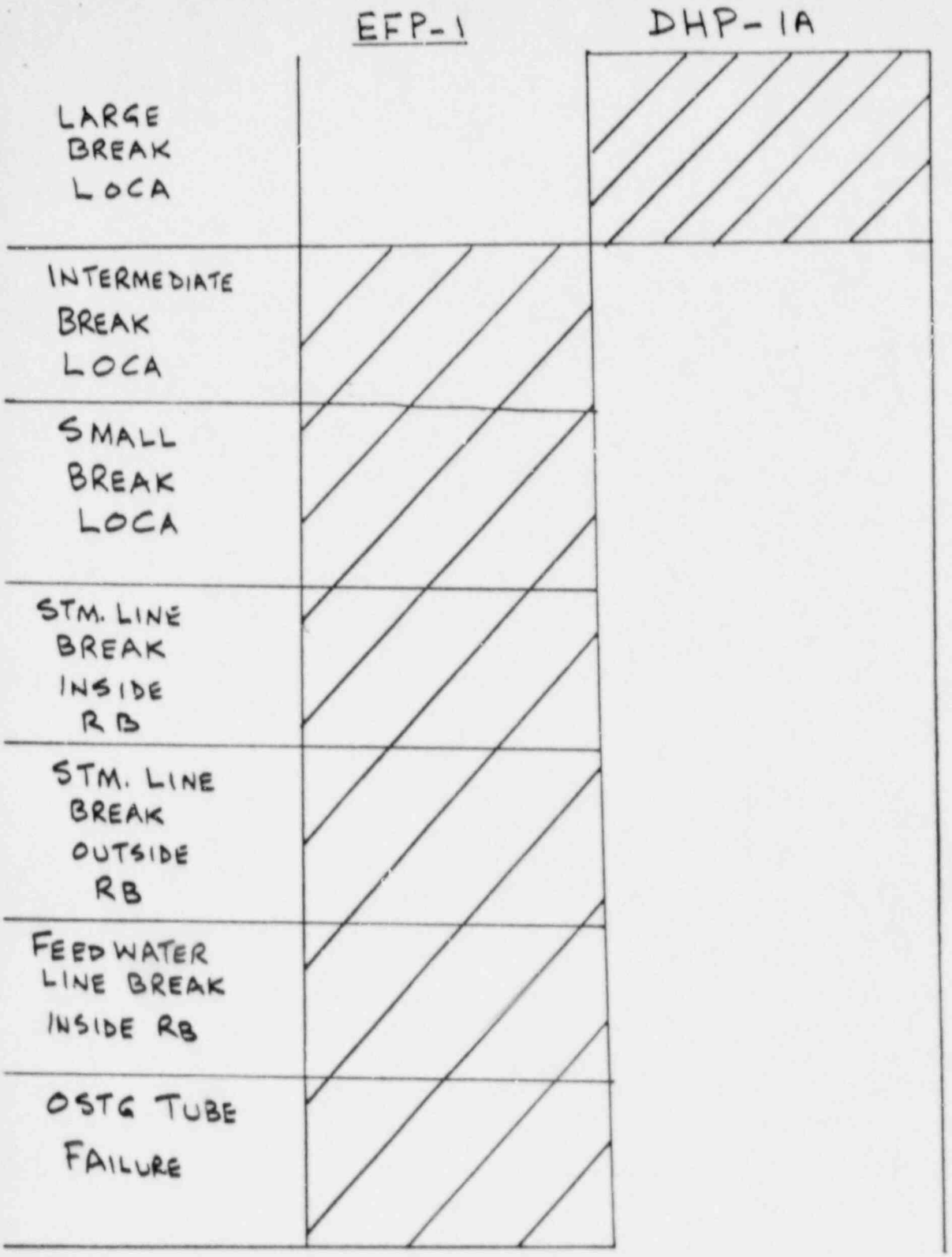
Auto Connected loads on EDG-A

EQUIPMENT	FLOW	CALC. KW	TEST KW
BSP-1A	1600	197	185.7 (2)
SWP-1A	8500(1)	480.5	485.5 (2)
MUP-1A	600	600	615.5 (2)
RWP-2A	15500(1)	507.7	537.8 (2)
RWP-3A	10500	195	194.5 (2)
DHP-1A	3250	282	273.6 (2)
EFP-1	430	522	527.9 (2)
DECAY HEAT CL CYCLE COOLING WATER PUMP DCP-1A	3400	74	74 (3)
CONTROL COMPLEX LIGHTING		32.6	32.6 (3)
INVERTERS		58.9	58.9 (3)
MISC AC DISTRIBUTION PANELS		14.7	14.7 (3)
MISC PUMPS AND SMALL MOTOR LOADS		34.3	34.3 (3)
REACTOR BLDG FAN AHF-1A		61	61 (3)
DECAY HEAT CLOSED CYCLE COOLING FAN AHF-15A		2.8	2.8 (3)
FLUSH WATER PUMP DOP-2A		8.9	8.9 (3)
TRANSFORMER AND CABLE LOSSES		5.1	5.1 (3)
TOTAL LOAD ON EDG-A (The Operator has been provided guidance to shed loads when in excess of 3000 KW.)		3076.5	3112.8

Notes

(1) The design flow rates have been revised. The justification for these revisions is attached.
(2) Test values corrected for kw instrument error.
(3) During SP-417 these loads tested at 134.7 KW (error corrected). However, the more conservative calculated value of 292.3 KW is being used to calculate the total EDG-A load.

THE BASIS FOR OUR PROPOSED MODIFICATION IS TO INITIATE ES EQUIPMENT (LPI OR EFW) WHEN NEEDED. THE EFW PUMP IS NOT NEEDED AFTER PRIMARY/ SECONDARY DECOUPLING. THE LPI PUMP IS NOT NEEDED UNTIL RCS PRESSURE REDUCES TO A POINT WHERE FLOW IS POSSIBLE.


EFP-1
DHP-1A
LARGE BREAK LOCA
INTERMEDIATE BREAK LOCA
SMALL BREAK LOCA
STM. LINE BREAK INSIDE RB
STM. LINE BREAK OUTSIDE RB
FEEDWATER LINE BREAK INSIDE RB
OSTG TUBE FAILURE

Auto Connected loads on "A" Emergency Diesel Generator (LB/LOCA with 500 # EFP-1 Trip/DHP-1A Start Modification)

EQUIPMENT	FLOW	CALC. KW	TEST KW	
BSP-1A	1600	197	185.7	(1)
SWP-1A	8500	480.5	485.5	(1)
MUP-1A	600	600	615.5	(1)
RWP-2A	15500	507.7	537.8	(1)
RWP-3A	10500	195	194.5	(1)
DHP-1A	3250	282	273.6	(1)
EFP-1	0	0	0	
DECAY HEAT CL CYCLE COOLING WATER PUMP DCP-1A	3400	74	74	(2)
CONTROL COMPLEX LIGHTING		32.6	32.6	(2)
INVERTERS		58.9	58.9	(2)
MISC AC DISTRIBUTION PANELS		14.7	14.7	(2)
MISC PUMPS AND SMALL MOTOR LOADS		34.3	34.3	(2)
REACTOR BLDG FAN AHF-1A		61	61	(2)
DECAY HEAT CLOSED CYCLE COOLING FAN AHF-15A		2.8	2.8	(2)
FLUSH WATER PUMP DOP-2A		8.9	8.9	(2)
TRANSFORMER AND CABLE LOSSES		5.1	5.1	(2)
TOTAL LOAD ON EDG 3A		2554.5	2584.9	

Manually connected loads applicable to both "A" and "B" Diesel Generators.

EQUIPMENT	KW
SPENT FUEL COOLANT PUMP	41
CHILLED WATER SUPPLY PUMP	17
CONTROL COMPLEX WATER CHILLER	193
EFIC CONTROL COMPLEX FAN	13
CONTROL COMPLEX EMER DUTY SUPPLY FAN	50
CONTROL COMPLEX RETURN AIR FAN	17

EDG "A" loads that are tripped and must be reconnected by Operator action

EQUIPMENT	KW
HEAT TRACING	40.9
BATTERY CHARGERS	93.1

Manually applied swing load normally alligned to "B" side

EQUIPMENT	KW
ES MCC 3AB	91

NOTES

(1) TEST VALUES CORRECTED FOR KW INSTRUMENT ERROR.
(2) DURING SP-417 THESE LOADS TESTED AT 134.7 KW(ERROR CORRECTED).HOWEVER, THE MORE CONSERVATIVE CALCULATED VALUE OF 292.3 KW IS BEING USED TO CALCULATE THE TOTAL EDG "A" LOAD.

Auto Connected loads on "A" Emergency Diesel Generator (IB/LOCA with 500 # EFP-1 Trip/DHP-1A Start Modification)

EQUIPMENT	FLOW	CALC. KW	TEST KW	
BSP-1A	1600	197	185.7	(1)
SWP-1A	8500	480.5	485.5	(1)
MUP-1A	600	600	615.5	(1)
RWP-2A	15500	507.7	537.8	(1)
RWP-3A	10500	195	194.5	(1)
DHP-1A	0	0	0	
EFP-1	550	560.9	571.2	(1)
DECAY HEAT CL CYCLE COOLING WATER PUMP DCP-1A	3400	74	74	(2)
CONTROL COMPLEX LIGHTING		32.6	32.6	(2)
INVERTERS		58.9	58.9	(2)
MISC AC DISTRIBUTION PANELS		14.7	14.7	(2)
MISC PUMPS AND SMALL MOTOR LOADS		34.3	34.3	(2)
REACTOR BLDG FAN AHF-1A		61	61	(2)
DECAY HEAT CLOSED CYCLE COOLING FAN AHF-15A		2.8	2.8	(2)
FLUSH WATER PUMP DOP-2A		8.9	8.9	(2)
TRANSFORMER AND CABLE LOSSES		5.1	5.1	(2)
TOTAL LOAD ON EDG 3A		2833.4	2882.5	

Manually connected loads applicable to both "A" and "B" Diesel Generators.

EQUIPMENT	KW
SPENT FUEL COOLANT PUMP	41
CHILLED WATER SUPPLY PUMP	17
CONTROL COMPLEX WATER CHILLER	193
EFIC CONTROL COMPLEX FAN	13
CONTROL COMPLEX EMER DUTY SUPPLY FAN	50
CONTROL COMPLEX RETURN AIR FAN	17

EDG "A" loads that are tripped and must be reconnected by Operator action

EQUIPMENT	KW
HEAT TRACING	40.9
BATTERY CHARGERS	93.1

Manually applied swing load normally alligned to "B" side

EQUIPMENT	KW
ES MCC 3AB	91

NOTES

(1) TEST VALUES CORRECTED FOR KW INSTRUMENT ERROR.
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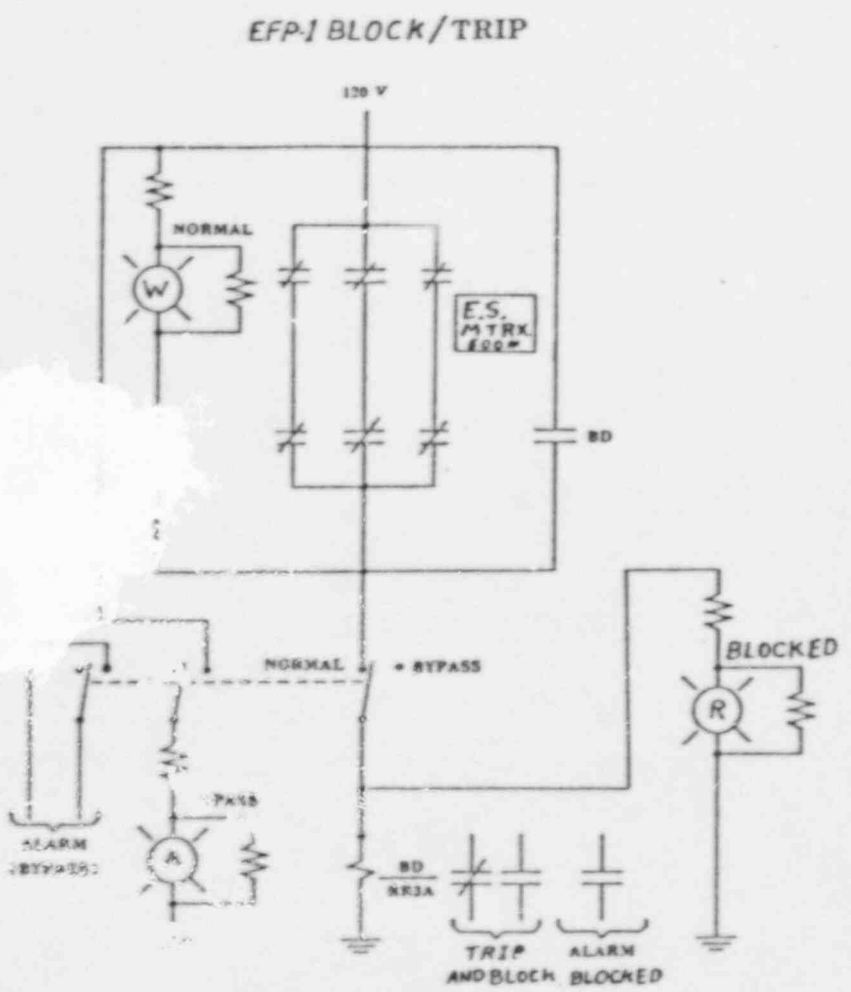
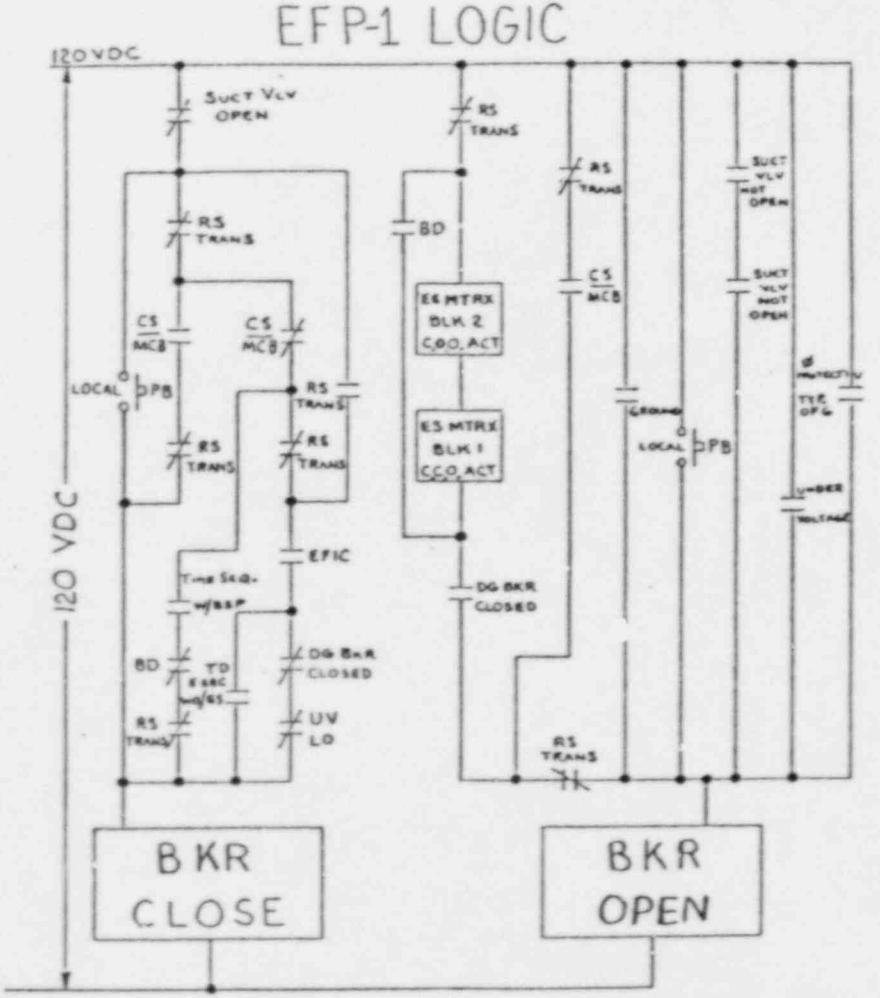
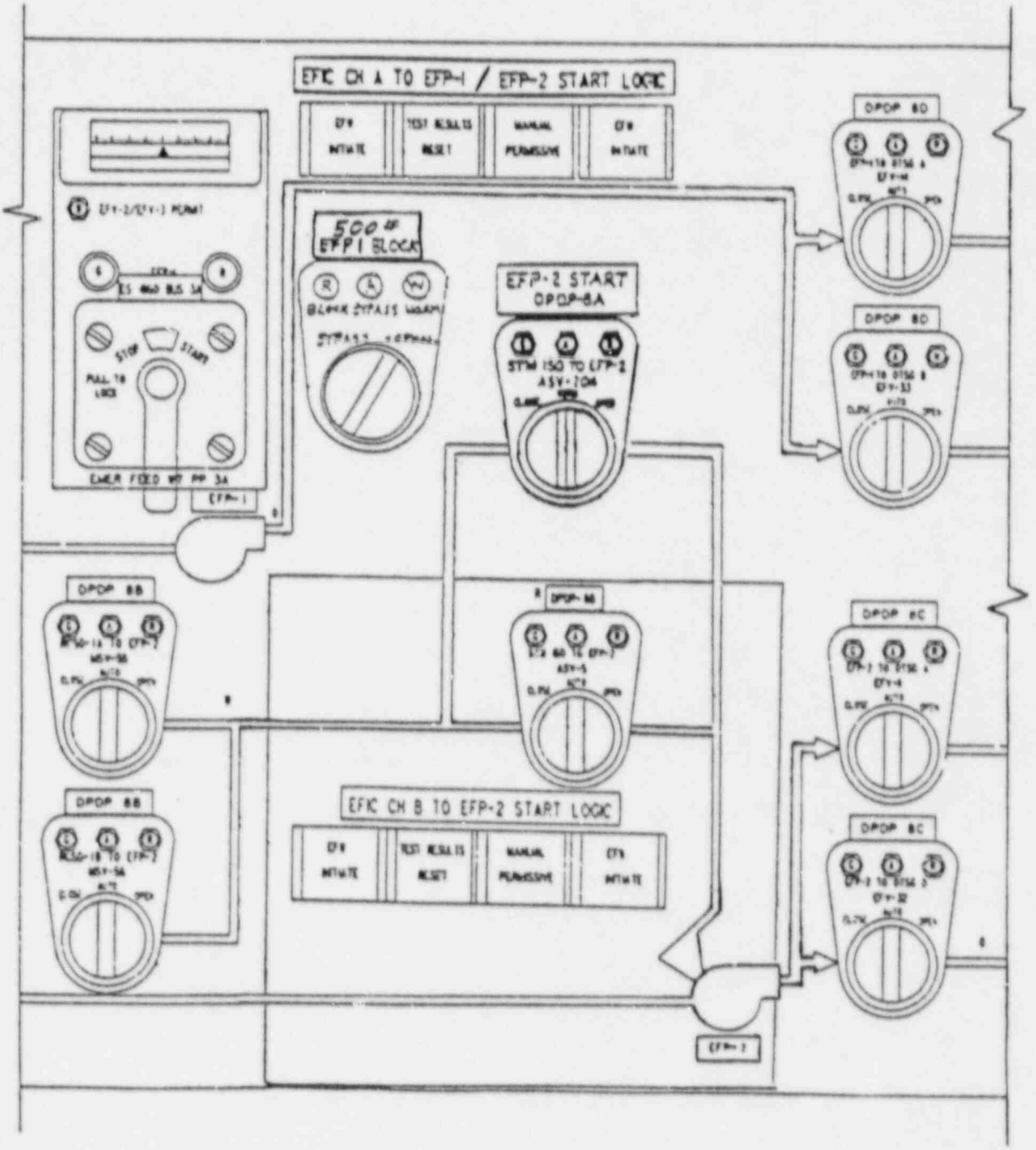
CHANGES TO LPI INITIATION

COMPONENT	CURRENT	PROPOSED
PUMPS	4# - RB PRESSURE	
	1500# - RCS PRESSURE	500# - RCS PRESSURE
	500# - RCS PRESSURE	
VALUES	4# - RB PRESSURE	NO CHANGE
	500# - RCS PRESSURE	NO CHANGE


EFP-1 BLOCK/TRIP
120 V
NORMAL
W
E.S. MTRX
BD
NORMAL
BYPASS
BLOCKED
R
PASS
A
ALARM
BD
TRIP
AND BLOCK
ALARM
BLOCKED


EFP-1 LOGIC
120 VDC
SUCT VLV OPEN
RS TRANS
CS MCB
LOCAL
PB
BD
EFIC
DG BKR CLOSED
UV LO
ES MTRX BLK 2 C.O.O. ACT
ES MTRX BLK 1 C.O.O. ACT
GROUND
SUCT VLV NOT OPEN
BKR CLOSE
BKR OPEN


EFIC CH A TO EFP-1 / EFP-2 START LOGIC
500 # EFP1 BLOCK
EFP-2 START
DPDP-8A
DPDP 8D
DPDP 8D
DPDP 8B
DPDP 8B
DPDP-8E
DPDP 8C
DPDP 8C
EFIC CH B TO EFP-2 START LOGIC
STOP
START
PULL TO LOCK

EDG ROOM AIR TEMPERATURE

- The EDG is presently locd rated at a combustion air temperature of 105 F

- Detailed analyses has projected a room temperature of up to 106.6 F with an outside air temperature of 95 F

- An HVAC modification is being implemented which will provide outside air (<105 F) directly to the EDG blower inlet for combustion.

EMERGENCY DIESEL GENERATOR UPGRADE

REPLACE/INSTALL

- Blower assemblies
- Blower flex drive gears (different ratio)
- Turbocharger air inlet piping w/ straight flow pipe
- Auxilliary blower air piping (and new air by-pass valve)
- Upper and lower pistons w/ new fixed, cooler design
- Cylinder liners (and O-rings)
- Injection nozzles w/ new gasketless nozzles
- Fuel/Air ratio control
- Scavenging air temperature controls

BENEFITS OF UPGRADE

- Potential increase in horsepower rating with improved piston life and reduced ring wear

- Increased equipment reliability:
  1) Air inlet check valve above turbocharger and associated piping have been removed, thereby simplifying maintenance

  2) The Turbo-Blower series arrangement system provides 20% more air at all loads. This results in:

     A) Exhaust smoke and temperature are reduced

     B) Cylinder liner, piston and piston ring temperatures are reduced

AUXILIARY FEEDWATER PUMP DESIGN BASES

- NON-SAFETY RELATED
- NON-SEISMIC
- MOTOR DRIVEN/NON-CODE PUMP
- NOT TIED TO EDG/NON-1E
- MANUAL START/CONTROL FROM M.C.R.
- NOT ON REMOTE SHUTDOWN PANEL
- NOT ENVIRONMENTALLY QUALIFIED
- NON-SAFETY RELATED SOURCE OF FW
- NOT TECH SPEC'D
- PIPING TO B31.1 CODE

4. General

The licensee indicated that its resources are becoming strained as a result of the above efforts, their normal work load, the configuration management and design basis verification programs, and the SPIP program. For its own use, the licensee has had an integrated schedule in place for some time, and proposed to submit that schedule during May 1988 as a basis for discussion of its proposed schedule for all those efforts. A meeting for this purpose will be arranged after receipt of that submittal.

Harley Silver, Project Manager
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Division of Reactor Projects-I/II
Office of Nuclear Reactor Regulations

Enclosures:
As stated

cc w/encls:
See next page

Distribution:
Docket File
NRC & Local PDRs
PDII-2 Rdg.
HBerkow
HSilver
DMiller
DTondi
OGC-WF
EJordan
JPartlow
NRC Participants
ACRS (10)
SNewberry
AThadani

(CR-3 MTG SUMMARY 3/30/88)

LA:PDII-2:DRPR:NRR	PM:PDII-2:DRPR:NRR	D:PDII-2:DRPR:NRR	SAD:NRR
DMiller:dlm	HSilver	HNBerkow	ACThadani
05/ /88	05/9 /88	05/ /88	05/12/88