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DMB

PRINCIPAL STAFF			
RA		DPRP	orig+1
D/RA		DE	
A/RA		DRMSP	
RC		CRMA	
PAO		SCS	
SGA		ML	
ENF		File	

May 11, 1984

Mr. James G. Keppler
Regional Administrator
U.S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

Subject: Quad Cities Station Units 1 and 2
125 Volt DC Battery Operability
NRC Docket Nos. 50-254 and 50-265

Reference (a): J. G. Keppler letter to Cordell Reed dated May 7, 1984 (Confirmatory Action Letter).

Dear Mr. Keppler:

In the Reference (a) Confirmatory Action Letter, we were required to provide your offices with written justification for the continued operation of our Quad Cities facility based on a battery profile analysis which demonstrates the actual capabilities of the station's batteries are within the accident analysis requirements. Also, Quad Cities Station must implement procedures to reduce the 125 Volt DC loads below 62.3 amperes within 30 minutes upon the loss of the associated battery chargers.

The enclosed attachment to this letter addresses the battery profile for the worst case of the following:

1) No Break 2) Small Break 3) Large Break

Detailed operating sequences are shown in attachment B.

When the design events analyzed in the FSAR (Small Break, Large Break) are evaluated against the battery capacity, a factor of 9 exists in the battery capacity.

The no break scenario appears to be the most severe due to the four hour need, for DC power to allow for the normal cooldown rate (70°F/HR) to drop to 280°F, at which time RHR could be initiated and maintained without DC power.

This particular worst case scenario was not considered in the original design basis of the plant. However, with the procedure being implemented to reduce DC load to 62.3 amps within 30 minutes the battery capacity will meet the requirements of this scenario.

If you have any further questions regarding this matter, please contact this office.

Very truly yours,

Dennis L. Farrar
Director of Nuclear Licensing

EJR:mnh
cc: NRC Resident Inspector - Quad Cities
Attachment
8600N

5-11-84

QUAD CITIES DC SYSTEM ANALYSIS

NRC RESPONSE

Based on the attached scenarios, (Attachment "B") battery capacity calculations have been performed to determine whether the battery has sufficient capacity to energize the DC System loads for the required duration. The load cycle utilized for these calculations is illustrated in Attachment "A". This load cycle has been modified from the load cycle used in the original battery sizing calculation to more accurately reflect present loading and to reflect the new station procedure that reduces the 125 volt Direct Current Loads below 62.3 amperes within 30 minutes on loss of the associated chargers.

Conclusion:

Based on the calculation, the batteries were found to have sufficient capacity to energize the system loads for 4 hours, which envelops the requirements for (a) the no line break scenario and (b) the small and large break scenarios.

125 VDC Control Battery

Attachment A
5-11-84

Total Elapsed Time:	1 min.	1/4 Hr	1/2 Hr	1 Hr	2-1/2 Hr	3 Hrs	4 Hrs
Tabulation of Loading:	1st Min.	next 14 mins	next 1/4 Hr.	next 1/2 Hr.	next 1-1/2 Hr.	next 1/2 Hr	next 1 Hr.
Escape Lighting	100	100	100	-	-	-	-
Annunciator Relay Cabinet & Visual Annunciator	15	15	15	15	15	15	-
Indicating Lamps & Auxiliary Relays	42	42	42	37	37	37	37
RICI Valve	5	5	-	-	-	-	-
Plant Sirens	15	15	-	-	-	-	-
Electromatic Relief Valves	32	4	4	-	-	-	-
Trip OCBS (Sw. Yd.)	120	-	-	-	-	-	-
Trip Field ACB	10	-	-	-	-	-	-
Trip ACBS	120	-	-	-	-	-	-
Trip Turb. Mts.	10	-	-	-	-	-	-
Close ACBS	40	-	-	-	-	-	-
Standby Diesel Field Flashing	140	-	-	-	-	-	-
HPCI Turbine Controls	5	5	5	5	5	5	5
Tip System Shear Valves	50	-	-	-	-	-	-
HPCI Turb. Drain Valves	5	5	5	5	5	5	5
Total Discharge Currents:	709	191	171	62	62	62	62

ATTACHMENT B

QUAD CITIES STATION UNIT 2 5/11/84

LOSS OF BATTERY CHARGERS

Operating Sequence for LOOP Without LOCA

- Auto disconnect safety buses 23-1 and 24-1 from buses 23 and 24
- Auto trip loads supplied by 23-1 and 24-1
- Auto trip loads on 23 and 24 (includes feedwater pump trip)
- Scram (Note 1)
- Main Steam Line Isolation from Condenser (Note 2)
- Generator Trip
- Diesel Generator Auto Start
- Breakers auto close energizing 23-1 and 24-1 from DG
- Auto Sequence Loads onto 23-1 and 24-1
- Auto open Target Rock and Electromatic Relief Valves
- Auto Initiate HPCI and RCIC (Note 3)
- Auto trip HPCI (Note 4)
- Manual stop RCIC (Note 5)
- Manually control RCIC and Electromatic relief valves to depressurize (Note 6)
- Manual closure of breakers from 23-1 to 23 and 24-1 to 24
- Manual start service RBCCW System, Service Water Pump and CRD pump
- Manually start RHRS for Suppression Pool Cooling
- Manually realine RHRS for Shutdown Cooling

Note 1: On low-voltage to protection system.

Note 2: Turbine stop and bypass valve closure due to loss of condenser vacuum.

Note 3: On low-low water level.

Note 4: On high water level approximately 5-10 minutes after initiation.

Note 5: After refilling reactor approximately 5-10 minutes after initiation.

Note 6: A four-hour cooldown is assumed based on a 70°F/hr cooldown rate from 550°F (Reactor operating temperature) to 280°F (RHR initiation temperature).
(Reference: Abnormal Procedure QGA-12).

QUAD CITIES STATION UNIT 2

5/11/84

LOSS OF BATTERY CHARGERS

Operating Sequ... ...r LOOP with Small Break LOCA (Note 7)

- Auto disconnect safety buses 23-1 and 24-1 from buses 23 and 24
- Auto trip loads supplied by 23-1 and 24-1
- Auto trip loads on 23 and 24 (includes feedwater pump trip)
- Scram (Note 1)
- Main Steam Line Isolation from Condenser (Note 2)
- Generator Trip
- Diesel Generator Auto Start
- Breakers auto close energizing 23-1 and 24-1 from DG
- Auto Sequence Loads onto 23-1 and 24-1
- Auto initiate HPCI and RCIC or ADS
- Auto open admission valves for CS/LPCI (Note 3)
- Auto close HPCI steam isolation valves (Note 4)
- Auto close RCIC steam isolation valves (Note 5)
- Manually close breakers from 23-1 to 23 and 24-1 to 24
- Manually realine RHRS from LPCI to containment cooling mode (Note 6)

Note 1: On low-voltage to protection system.

Note 2: MSIV closure or turbine stop and bypass valve closure due to loss of condenser vacuum.

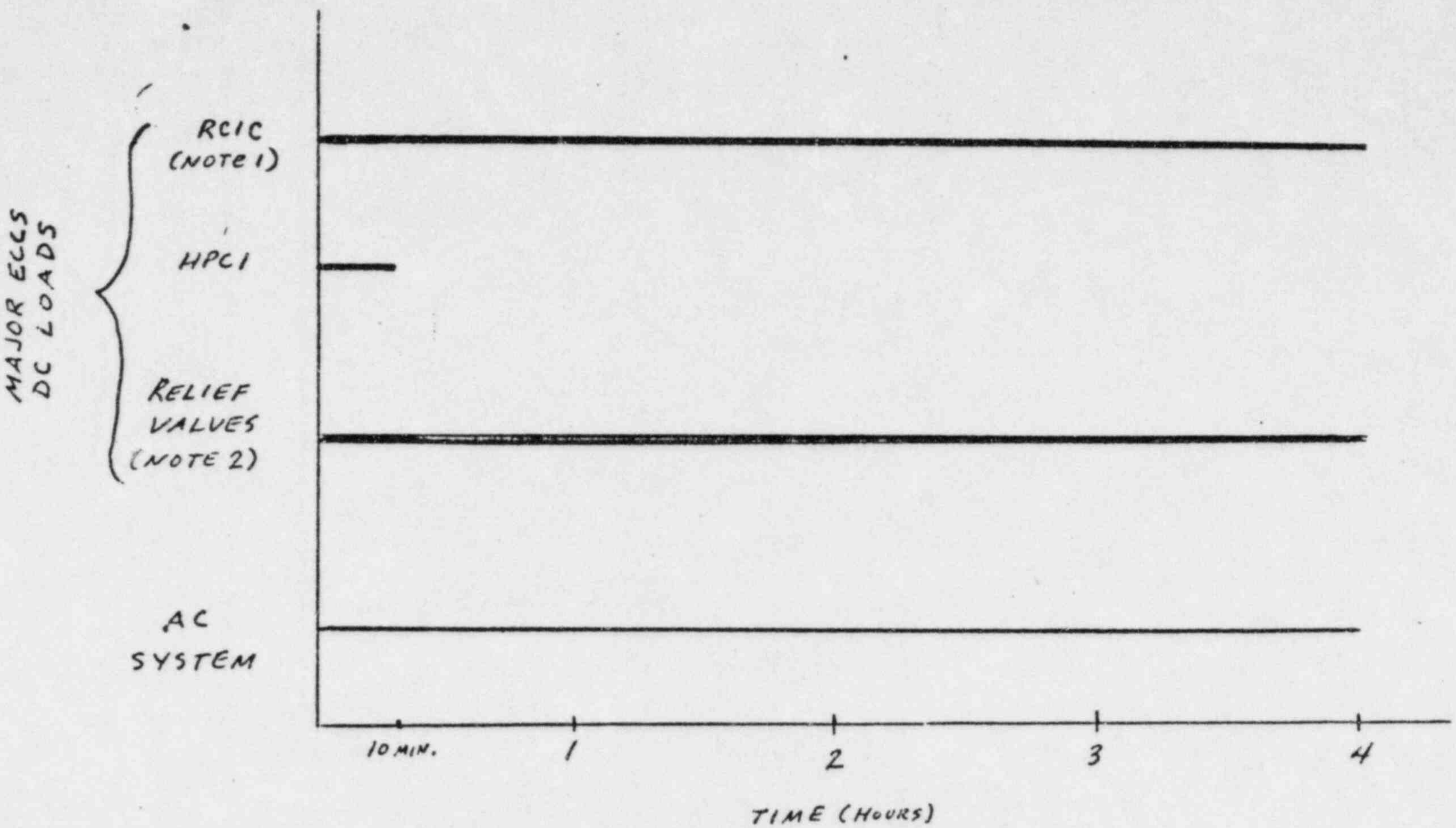
Note 3: Reactor pressure equals 325 psig.

Note 4: Reactor pressure equals 100 psig.

Note 5: Reactor pressure equals 50 psig.

Note 6: Approximately 10 minutes after initiation.

Note 7: FSAR Figure 6.2.17 shows that reactor pressure is reduced to approximately 120 psig in less than 10 minutes. Fifteen minutes is conservatively assumed for depressurization for dc load on battery.



MAJOR ECCS DC LOADS VS TIME - LOOP WITHOUT LOCA

NOTE 1: RCIC DC LOADS ARE CONSERVATIVELY ASSUMED TO BE EQUAL TO THE HPCI DC LOADS.

NOTE 2: FOR LOAD CALCULATION PURPOSES THE TOTAL RELIEF VALVE DC LOAD WAS PLACED IN THE FIRST 1/2 HOUR OF THE LOAD CYCLE.

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Operating Sequence for LOOP with Large Break LOCA (Note 8)

- Auto disconnect safety buses 23-1 and 24-1 from buses 23 and 24
- Auto trip loads supplied by 23-1 and 24-1
- Auto trip on 23 and 24 (includes feedwater pump trip)
- Scram (Note 1)
- Main Steam Line Isolation from Condenser (Note 2)
- Generator Trip
- Diesel Generator Auto Start
- Breakers auto close energizing 23-1 and 24-1 from DG
- Auto Sequence Loads onto 23-1 and 24-1
- Auto Initiate HPCI and RCIC or ADS (Note 3)
- Auto open admission valves for CS/LPCI (Note 4)
- Auto close HPCI steam isolation valves (Note 5)
- Auto close RCIC steam isolation valves (Note 6)
- Manually close breakers from 23-1 to 23 and 24-1 to 24
- Manually realine RHRS from LPCI to containment cooling mode (Note 7)

Note 1: On low-voltage to protection system.

Note 2: MSIV closure or turbine stop and bypass valve closure due to loss of condenser vacuum.

Note 3: On large breaks HPCI, RCIC, or ADS will actuate. However, no credit is taken for their use because rapid depressurization causes closure of system isolation valves. LPCI and CS will completely handle core cooling.

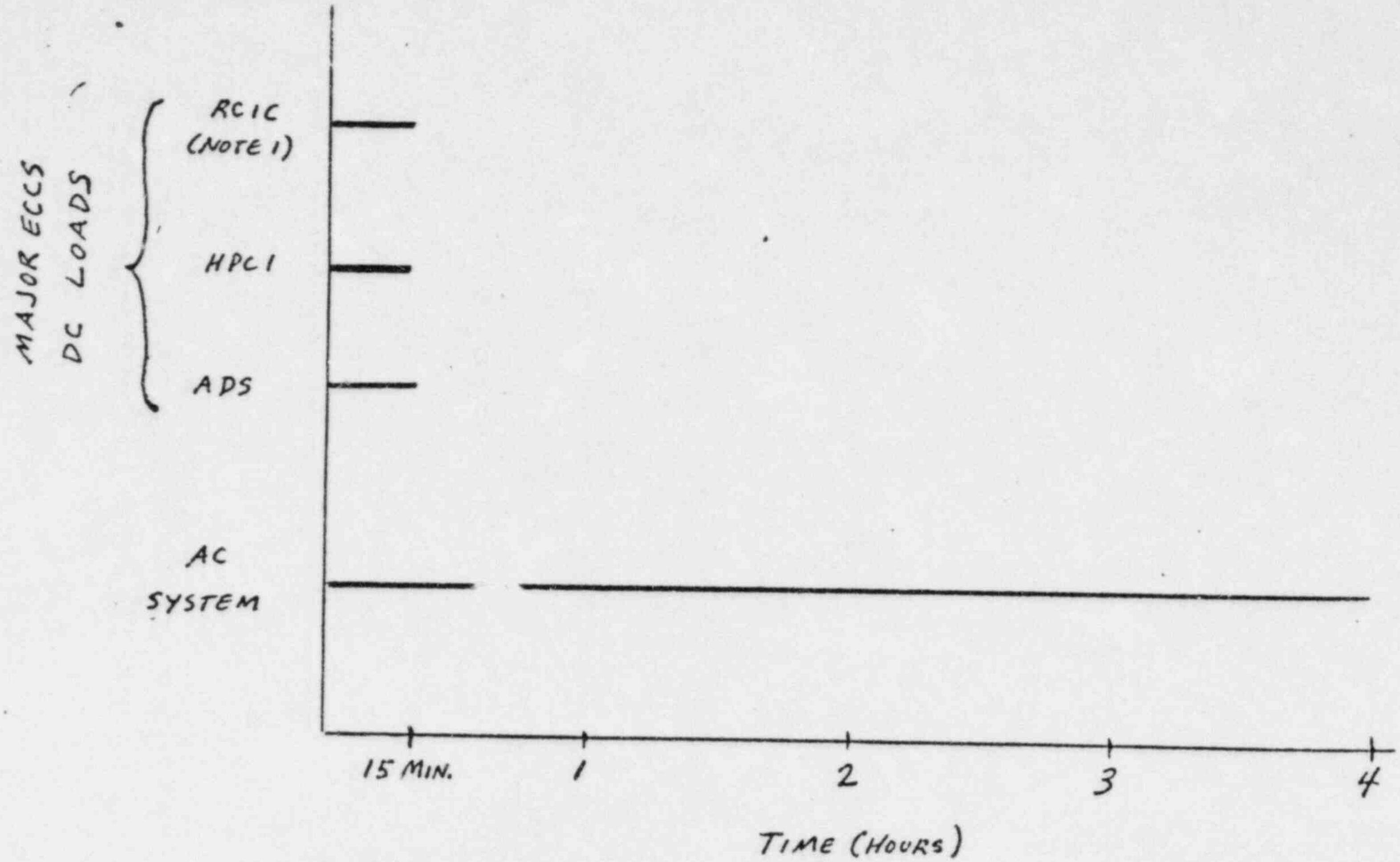
Note 4: Reactor pressure equals 325 psig.

Note 5: Reactor pressure equals 100 psig.

Note 6: Reactor pressure equals 50 psig.

Note 7: Approximately 10 minutes after initiation.

Note 8: FSAR Figure 6.2.13 shows that reactor pressure is reduced to 150 psig in less than 7 minutes. Fifteen minutes is conservatively assumed for depressurization for dc load on battery.



MAJOR ECCS DC LOADS vs TIME - LOOP WITH LOCA (NOTE 2)

NOTE 1: RCIC DC LOADS ARE CONSERVATIVELY ASSUMED TO BE EQUAL TO THE HPCI DC LOADS.

NOTE 2: BOTH LARGE AND SMALL BREAKS ARE CONSIDERED.

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