Commonwealth Edison
Dresden Nuclear Power Station
R.R. #1
Morris, Illinois 60450
Telephone 815/942-2920

August 26, 1991

Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attn: Document Control Desk

Subject: Dresden Nuclear Power Station Units 2 and 3
Additional Information Regarding the
Dresden Station Electrical Distribution
System Functional Inspection (EDSFI)
NRC Docket Nos. 50-237 and 50-249

Reference: CECo-NRR-Region III Conference Call on August 19, 1991.

The referenced teleconference discussed Dresden Station EDSFI issues with respect to 4 kV safety bus degraded voltage, the voltage response of the 4 kV safety buses and system grid to the recent Unit 3 scram, and 120 V-ac contactor testing. The Enclosure to this letter presents additional information on these matters discussed during the teleconference.

The Compensatory Measures in place at Dresden Station provide adequate guidance to the Operations Department to provide plant protection if safety bus voltages below 4000 volts exist.

With these Compensatory Measures and based on information currently available through plant walkdowns, equipment testing, formal calculations, and engineering evaluations, Commonwealth Edison continues to believe that Class 1E equipment will perform its intended safety function during plant conditions above a degraded voltage of 3850 volts on the safety buses.

Please contact this office should further information be required.

Respectfully,

Milton H. Richter

Milton H. Richter
Nuclear Licensing Administrator

MHR/ade

Enclosure

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ENCLOSURE

Attachment A - Compensatory Measures for Degraded Voltage Condition

Attachment B - Unit 3 Scram During Main Turbine Surveillance Testing

Attachment C - Grid Response to Scram Event

Attachment D - 120 VAC Contactors

Attachment E - Ongoing Actions

ATTACHMENT A

COMPENSATORY MEASURES FOR DEGRADED VOLTAGE CONDITION

COMPENSATORY MEASURES FOR DEGRADED VOLTAGE CONDITION

During the Dresden Station Electrical Distribution System Functional Inspection (EDSFI), the NRC performed a review of a preliminary Electrical Load Management System (ELMS) calculation of the auxiliary power system. This preliminary calculation showed that several 480 V-ac Motor Control Centers (MCC) exhibited low voltage conditions. Based on these results, the NRC requested Commonwealth Edison Company (CECo) to verify that the existing degraded voltage relay setpoint (3708 volts on the 4 kV safety bus) was sufficient to start and operate all Class 1E equipment.

CECo performed a preliminary calculation of auxiliary power system voltages for Dresden Unit 2 Division II utilizing the Unit 2 Emergency Diesel Generator Cooling Water Pump (DGCWP) as the most limiting Class 1E load. This load path was selected to support the review activities of the EDSFI inspection team.* The DGCWP was selected since it was the largest electrical load on the lowest voltage MCC. The preliminary calculations determined that the minimum 4 kV-ac safety bus voltage necessary to operate the DGCWP is 3850 volts. Additionally, it was further identified that the estimated minimum 4 kV-ac safety bus voltage to assure starting the DGCWP is approximately 3960 volts. Based on these results, compensatory measures were developed to ensure the availability of the DGCWP. These compensatory measures were discussed with NRR and Region III personnel on August 1, 1991, and incorporated into Dresden Operating Order 20-91, Revision 0 (attached). On-shift operations personnel were trained on this operating order prior to assuming their shift duties.

As a result of a recent Unit 3 scram during main turbine surveillance testing, additional compensatory measures were implemented as discussed in Attachment 'B'. In addition, upon further review of the Unit 3 scram, Revision 1 to Operating Order 20-91 (attached) was implemented as discussed in Attachment 'B'.

* - Additional auxiliary power system calculations will be completed for Unit 2 Division II by September 30, 1991, Unit 2 Division I by November 30, 1991, and Unit 3 Divisions I and II by January 31, 1992.

Subject: Operator Compensatory Actions Associated with A Degraded Voltage on Buses 23-1 (33-1), 24-1 (34-1)

I. Unit NSO's shall set the computer alarm for buses 23-1 (33-1), 24-1 (34-1) low voltage at 3900 V on the Operator Selected Computer Alarm Annunciator.

II. Utilize the associated "4 kV VOLTAGE DEGRADED" Alarm DAN for additional guidance in restoring and monitoring voltage.

NOTE: If power is lost to the 4 kV bus review loads for that 4 kV bus. DWG 12E-2304, 12E-3304

III. Degraded Voltage Action Level

A. 4000 V Permanent Computer Alarm Annunciates

1. Center desk NSO notifies load dispatcher to raise 138 kV (345 kV) yard voltage.

2. An operator is dispatched to start the affected units Diesel Generator Cooling Water Pump (DGCWP) and an operator is dispatched to the Cribhouse to verify proper operation.

NOTE: If the Diesel Generator Cooling Water Pump fails to start due to inadequate voltage, proceed to Step C.1.a.

B. 3900 V Operator Selected Computer Alarm Annunciates

1. Center desk NSO notifies LD of impending degraded voltage condition.

2. Unit or Utility NSO provides frequent monitoring of 4 kV bus voltage.

C. 3850 V From Control Room Metering and Computer

1. If this condition exists for more than 1 minute the NSO shall immediately:

(a) OPEN BUS TIE ACB for affected Bus (i.e.: 23 to 23-1 etc.)

(b) Verify Diesel Generator AUTO STARTS

(c) Verify D/G ACB to Bus AUTO CLOSES

(d) Verify Bus Voltage restored to 4160 V

(e) Verify operation of D/G per DOP 6600-02

2. ENTER DGA-12, Partial or Complete Loss of AC Power

3. Refer to Technical Specifications, Section 3.9

SUBJECT: MANDATORY OPERATOR COMPENSATORY ACTIONS ASSOCIATED WITH A DEGRADED VOLTAGE ON BUSES 23-1 (33-1), 24-1 (34-1)

I. Unit NSO's shall set the computer alarm for buses 23-1 (33-1), 24-1 (34-1) low voltage at 3900 V on the Operator Selected Computer Alarm Annunciator.

II. Utilize the associated "4 kV VOLTAGE DEGRADED" Alarm DAN for additional guidance in restoring and monitoring voltage.

NOTE:
IF POWER IS LOST TO THE 4 KV BUS REVIEW LOADS FOR THAT 4 KV BUS. DWG 12E-2304, 12E-3304.

III. DEGRADED VOLTAGE ACTION LEVEL

A. 4000 V Permanent Computer Alarm Annunciates

1. IF low voltage condition occurs with the affected unit off line, THEN go to Step C.

2. IF low voltage condition occurs with the affected unit on line, THEN go to step B.

B. Actions taken on the affected unit with the affected unit on line

1. A qualified person is immediately dispatched to start the affected units Diesel Generator Cooling Water pump (DGCWP) and an operator is dispatched to the Cribhouse to verify proper operation. IF the Diesel generator cooling water pump fails to start due to inadequate voltage, THEN proceed to step E.1.a

NOTE
It is not desireable to increase VARS on Unit 3 to assist Unit 3 voltage due to the risk of degraded voltage after a unit trip. Vars are not increased on Unit 3 to assist Unit 2 voltage because Unit 2 aux power is off the 138 kV yard.

2. Center desk NSO notifies Southern Division load dispatcher to raise 138 kV (345 kV) yard voltage but using Unit 3 as a last resort and returning Unit 3 to normal as conditions permit.

3. (For Unit 3 affected only) Increase vars on unit 2 generator until effected 4 kV bus voltage is above 4000v OR generator maximum ratings are reached OR Unit 2 4 kV high voltage alarms are received.

4. IF 3 Circ Water Pumps are operating, AND unit conditions permit, THEN secure one pump from the bus with the lowest voltage.

5. Place computer points for affected Buses 23-1(33-1), 24-1(34-1) [E211(E311), E212(E312)] on continuous trend.

C. Action taken on the affected unit with the affected unit off line

1. A qualified person is immediately dispatched to start the affected units Diesel Generator Cooling Water pump (DGCWP) and an operator is dispatched to the Cribhouse to verify proper operation. IF the Diesel generator cooling water pump fails to start due to inadequate voltage, THEN proceed to step E.1.a

NOTE

Depending on system conditions, the Southern Division load dispatcher may not authorize closing the 345 kV Bus Tie 4-8.

2. Center desk NSO notifies Southern Division load dispatcher to raise 138 kV (345 kV) yard voltage and close 345 kV bus Tie 4-8.

3. IF 3 Circ Water Pumps are operating, THEN secure one pump from the bus with the lowest voltage.

NOTE

Vars are not increased on Unit 3 to assist Unit 2 voltage because Unit 2 aux power is off the 138 kV yard.

4. (For Unit 3 affected only). Increase vars on Unit 2 generator until effected 4 kV bus voltage is above 4000v OR generator maximum ratings are reached OR Unit 2 4 kV high voltage alarms are received.

5. Place computer points for affected Buses 23-1(33-1), 24-1(34-1) [E211(E311), E212(E312)] on continuous trend.

D. 3900 V Operator Selected Computer Alarm Annunciates

1. Center desk NSO notifies Southern Division LD of degraded voltage condition

2. Unit or Utility NSO provides frequent monitoring of 4 kV bus voltage

E. 3850 V From Control Room Metering and Computer

1. If this condition exists for more than 1 minute the NSO shall immediately:

(a) OPEN BUS TIE ACB For affected Bus (ie: 23 to 23-1 etc.)

(b) Verify Diesel Generator AUTO STARTS

(c) Verify D/G ACB to Bus AUTO CLOSES

(d) Verify Bus Voltage restored to 4160 V

(e) Verify operation of D/G per DOP 6600-02

2. ENTER DGA-12, Partial or Complete Loss of AC Power

3. Refer to Technical Specifications, Section 3.9

ATTACHMENT B

UNIT 3 SCRAM DURING MAIN
TURBINE SURVEILLANCE TESTING

UNIT 3 SCRAM DUR[illegible]G MAIN TURBINE SURVEILLANCE TE[illegible]NG

At approximately 0100 hours on August 17, 1991, Dresden Operating Surveillance (DOS) 5600-2, "Monthly and Weekly Turbine Checks", was in progress for Unit 3 at approximately 60% power. During the exercising of the #2 main turbine stop valve (MSV), the stop valve portion of the combined intermediate valves were observed to ramp fast closed while the #2 MSV was returning to its normal open position. Main generator load dropped from 394 MWe to approximately 25 MWe. Reactor parameters (level, pressure, power) were monitored and observed to be stable. It was determined that the turbine crossover piping relief valves had actuated to relieve steam to the main condenser. As reactor recirculation flow was reduced in preparation for performing a manual scram, main generator output dropped sufficiently to result in an automatic reverse power turbine/generator trip and automatic reactor scram on MSV closure at 0116 hours. After the scram, the turbine bypass valves controlled reactor pressure. Normal reactor cooldown and scram recovery then proceeded.

Figure 1 presents a simplified single line diagram of the AC power distribution system for Dresden Station. Prior to the scram, 4 kV safety bus 33-1 was fed from the unit auxiliary transformer (UAT) through bus 33, and 4 kV safety bus 34-1 was fed from the reserve auxiliary transformer (RAT) through bus 34 (see Figure 1). In preparation for the manual scram, bus 33 was manually transferred to the RAT.

The voltage response of the 345 kV switchyard and 4 kV safety buses (33-1 and 34-1) are presented in the following table. Figure 2 presents the voltage response for safety bus 33-1 during the event.

	345 kV Switchyard	4 kV Safety Bus 33-1	4 kV Safety Bus 34-1*
Before scram	355 kV	4240V	4370V (4160V)
Following scram	352 kV	3940V	4160V (3950V)

* Voltage in parenthesis is a corrected value following calibration of bus voltage computer point.

Actions were performed to investigate the indicated bus voltage differences between safety buses 33-1 and 34-1. A review of the loading on each bus was performed, and it was determined that loads were essentially balanced. Additionally, a calibration of the control room meters and computer points associated with bus voltage for buses 33-1 and 34-1 was performed. As a result of this calibration, it was determined that the computer point for bus 34-1 voltage was out of tolerance and indicating approximately 210 volts higher than actual. Additionally, a calibration was performed on the control room meters and computer points associated with bus voltage for safety buses 23-1 and 24-1. To ensure continued accuracy of this instrumentation, a calibration frequency of 18 months will be established.

As shown on the previous page, the voltage on the 345 kV switchyard decreased by approximately 1% following the scram. This decrease is expected since the Unit 3 output is provided to the 345 kV switchyard. Voltage on 4 kV safety bus 34-1, which was fed from normal off-site power throughout the event, decreased by approximately 210 volts (approximately 5%). Voltage on bus 33-1, which was transferred from the UAT to the RAT, decreased approximately 300 volts (approximately 7%) and indicated below 4000 volts. The majority of the voltage decrease on the safety buses has been attributed to the increased load on the RAT due to bus 33-1 load transfer to the RAT. A historical review of the most recent previous scram (from power) for each unit revealed that safety bus voltage had not decreased below 4000 volts. It is difficult, however, to predict the exact voltage drop associated with a scram due to variable operational factors such as: system load, switchyard voltage, UAT and RAT loading, and generator output (MWe and MVARs).

During the scram event, the initial Low voltage alarm (at 4000 volts) for 4 kV safety bus 33-1 came in at 01:16:39 during the Scram and was not immediately recognized by the Operators who were busy working to stabilize the Unit. At 01:43:14 the Low voltage alarm cleared and came back up at 01:43:20. The Unit NSO and Shift Engineer discussed the Operating Order, and the Center Desk NSO was instructed to talk to the Load Dispatcher about raising voltage (in accordance with the first step in the Operating Order). It needs to be noted at this time that the Center Desk NSO, the High Voltage Operator (HVO), and the Load Dispatcher were busy attempting to restore the 345 kV Switchyard configuration following the Unit 3 Scram, consequently the HVO (who would normally start the DGCWP) was in the Switchyard. Therefore, due to the prioritization of duties following the scram, the HVO was not immediately assigned to start the DGCWP.

Approximately ten minutes later (at 01:53), the 345 kV bustie breaker OCB 4-8 was closed and voltage immediately improved but bus 33-1 voltage still remained slightly below 4000 volts until 02:42:36. The Unit NSO continued to monitor bus voltage during the time while the Center Desk NSO again pursued increased system voltage with the Load Dispatcher.

At 02:42:36 the Unit NSO notified the Shift Engineer that the bus 33-1 Low voltage alarm was clearing and annunciating. The Unit NSO logged the action that was being taken and the Shift Engineer called the Load Dispatcher about raising voltage. The HVO was dispatched to start the Unit 3 and 2/3 DGCWP's. At 03:03:06 VARS were raised on Unit 2 Main Generator and voltage subsequently increased in the 345 kV Switchyard. As a result, bus 33-1 voltage increased above 4000 volts. The Unit 3 and 2/3 DGCWP's were started at 03:08:12 and 03:11:02.

Dresden Station's evaluation of this event determined that during a scram recovery period (a period of high operator activity) dependency on the low bus voltage computer alarm for prompt initiation of the compensatory measures associated with Operating Order 20-91 was not sufficient. Therefore, a temporary procedure change was initiated (on August 17, 1991) for DGP 2-3, "Unit 2(3) Reactor Scram", which directs the operator to check the 4 kV safety buses for a low voltage condition. If a low voltage condition exists, the procedure references Operating Order 20-91 for guidance. Additionally, a training package was developed on this scram event for all on-shift operations personnel. This training package addressed the degraded voltage condition which occurred and the temporary procedure change to DGP 2-3.

ZR18/1645/9

Further review of the event determined that additional instructions were necessary to ensure prompt action is taken in accordance with the Operating Order. Operating Order 20-91 has been revised (Revision 1) to emphasize that the actions in the Operating Order are mandatory. The revision instructs the Operating Staff to immediately (as a first step) dispatch a qualified individual to start the DGCWP. Additionally, the Operating Order provides additional guidance on actions which would increase bus voltage, actions to be taken if the unit is on or off line, and immediate trending of bus voltage with the process computer. A training package for the Operating Order 20-91 (Revision 1) is being developed and will be presented to shift personnel starting on August 26, 1991. Furthermore, the Operating Order will be incorporated into a Dresden Abnormal Operating Procedure by September 14, 1991.

To further address 345 kV switchyard voltage, discussions will be held with Southern Division Power Supply Supervisor in order to develop instructions for the Load Dispatcher to maintain switchyard voltages for Dresden Station. This action will be initiated during the week of August 26, 1991.

FIGURE 1

DRESDEN STATION

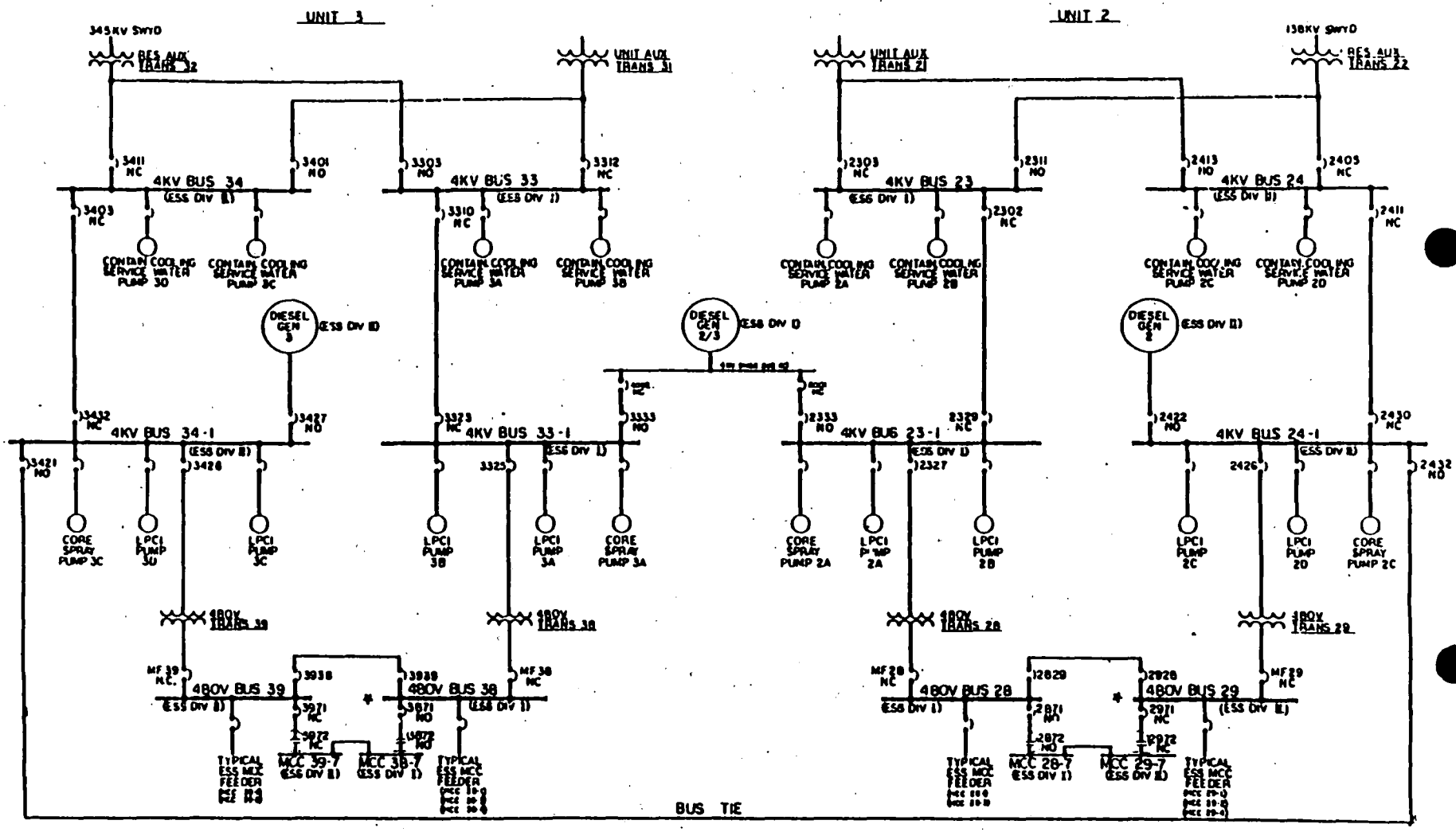
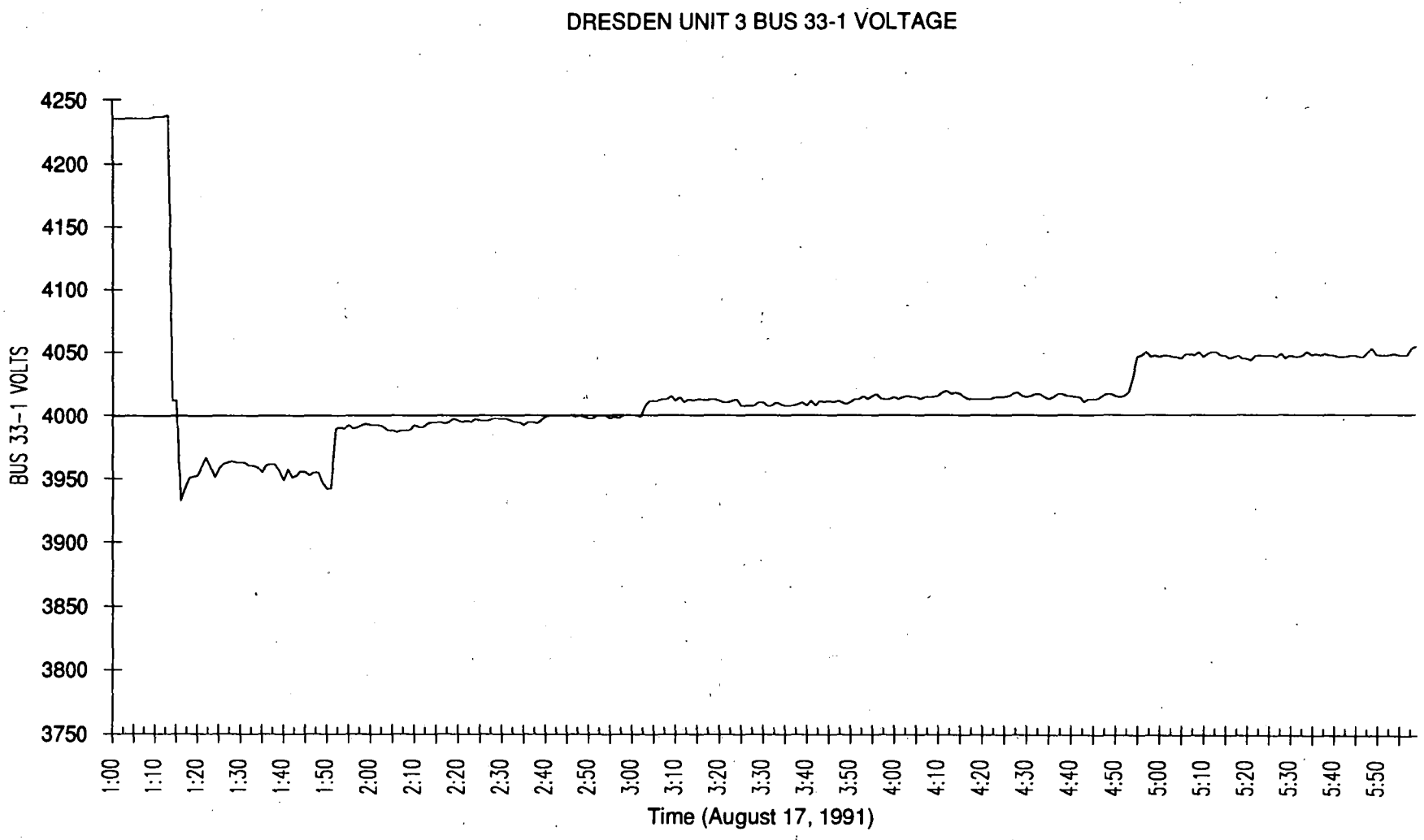


FIGURE 2


DRESDEN UNIT 3 BUS 33-1 VOLTAGE
BUS 33-1 VOLTS
4250
4200
4150
4100
4050
4000
3950
3900
3850
3800
3750
1:00
1:10
1:20
1:30
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5:40
5:50
Time (August 17, 1991)

ATTACHMENT C

GRID RESPONSE TO SCRAM EVENT

GRID RESPONSE TO SCRAM EVENT

As indicated previously, the 345 kV switchyard voltages decreased from 355 kV to 352 kV (approximately 1%) as a result of the August 17th scram. Grid voltage after the scram event was restored to approximately 354 kV primarily by the manual closing of the cross-tie breaker in the 345 kV switchyard. The grid voltage responded as expected with minimal disturbance.

On August 22, 1991, System Planning Department performed an analysis assuming 18500 MWe system load with Unit 3 at maximum VARs output. This analysis was performed to determine the effect of a U-3 generator trip (from full power) on the offsite power source voltage to the U-3 RAT. Results indicate that the worst voltage drop would be 9 kV (354 kV to 345 kV) or approximately 2.5%, which is consistent with current power flow analysis. Additionally, the analysis indicates that closing of the 345 kV switchyard cross-tie breaker post-trip would result in restored voltage to 349 kV.

It should be noted that a trip of Dresden Unit 2 main generator from full power has minimal affect, if any affect on the Unit 2 source of offsite power. The Unit 2 Reserve Auxiliary Transformer (RAT) normal feed is from a 138 kV transmission system which is electrically separated (through many miles of transmission lines) from the Unit 2 main power transformer 345 bus connection.

With respect to the requirements of GDC-17, these results indicate that the possibility of losing electric power from the transmission network due to the loss of power generation from a unit is minimal.

ATTACHMENT D

120 VAC CONTACTORS

120 VAC CONTACTORS

On August 8, 1991, the EDSFI Inspection Team requested that CECo perform a bounding analysis to show that all 120 V-ac control circuitry would be operable assuming the compensatory degraded voltage value of 3850 volts. In order to have preliminary information available by the EDSFI exit meeting on August 9, 1991, CECo selected two 120 V-ac circuits for review. These control circuits were the DGCWP and the control circuit for the 202-5B Recirculation Pump Discharge Valve. These circuits were selected based on; 1) minimal MCC voltage; 2) large contactor size (DGCWP); and 3) long control circuit length (202-5B valve). Based on estimated results presented prior to the EDSFI exit meeting, both circuits were operable. The NRC noted, and CECo agreed, that these estimates should be refined and additional circuits reviewed. CECo stated that several additional circuits would be reviewed within one week (August 16, 1991).

A total of five 120 V-ac circuits were reviewed during the week of August 12, 1991. These circuits included the original two (the DGCWP and the 202-5B valve) and three additional circuits (two Stand-by Gas Treatment loads and the LPCI 1501-22B valve). These additional circuits were chosen to better represent all sizes of contactors (size 1 through 4) utilized in Class 1E applications, and to provide additional assurance that long control circuit lengths were bounded. Specifically, the two Stand-by Gas Treatment circuits were selected to include a size 1 and size 3 contactor. The 2-1501-22B valve circuit was chosen because, after further evaluation of circuit lengths, this circuit is estimated to have the longest length for any control circuit containing a size 2 contactor. During the finalization of the calculations presented during the EDSFI exit meeting several assumptions changed resulting in new conclusions for the 202-5B valve case as discussed below.

First, circuits with size 3 (Stand-by Gas Treatment Fan Train B) and size 4 (Unit 2 DGCWP) contactors were not limiting at the degraded voltage setting due to the inclusion of an interposing relay with the contactor. The interposing relay effectively reduces the current required to close the contactor. Additionally, the size 1 contactor case reviewed was also not limiting due to the low in-rush current of the contactor. In all three cases the calculated voltage available at the contactor exceeds the NEMA criteria of 85 percent of nominal voltage (98 volts) for contactor closing by between 7 and 15 percent.

The finalized calculations for the two size 2 circuits (2-1501-22B and 2-202-5B valves) reviewed did not meet the 85 percent of nominal voltage criteria. Of the two circuits which did not meet the acceptance criteria the 2-1501-22B (LPCI Injection Valve) is the most limiting. This circuit is estimated to contain the longest circuit length due to the interconnection of the circuit with other LPCI Loop Select Logic circuits. The results of the 2-1501-22B voltage drop calculation indicated an available voltage across the contactor coil of a minimum of 95 volts at the degraded voltage condition. This available voltage level is 82.6 percent of the 115 volt coil rating (below the NEMA criteria of 85 percent of nominal voltage). Due to this result, CECo decided that testing a representative sample of contactors to establish the actual contactor pick-up voltage would be necessary.

A single size 2 contactor similar to the contactors found in the Class 1E applications of interest was identified and tested within 24 hours. The results of this single test showed that the contactor closed at approximately 90 volts, well below the NEMA criteria. This result was reported to the NRC in the August 16, 1991 letter. During this time a search was taking place for additional contactors located within the plant to increase the testing population. It was decided that the existing Class 1E control circuits in question would not be directly tested. This decision was based on the requirement of taking required safety systems out of service to perform this testing when a representative population of contractors was thought to be present in the Dresden Storeroom or the balance of plant.

The starter contactor is a General Electric type CR109DO. The CR109DO is a reversing contactor used in motor operated valve (MOV) applications. One contactor is needed for each function (open or close); therefore each MOV has 2 contactors. Since these type of General Electric contactors are no longer manufactured and no spares were available in the storeroom, it was necessary to temporarily remove plant equipment from service to perform testing. To minimize the impact on safety system availability, six contactors from a total of three Balance-of-Plant (BOP) MOV's were tested. This resulted in 2 of the 6 having pick-up voltage greater than 95 volts. The acceptance value of 95V came from the calculated available voltage for the 2-1501-22B.

The two failures of BOP contactors are attributed to binding of the auxiliary contacts. The valves are normally open inlet and outlet valves on the Unit 3 3D3 H.P. feedwater heater. Given these test results the decision was made to test all safety-related NEMA size 2 MOV contactors on both units. The location of the size 2 contactors was identified by reviewing equipment qualification walkdown information from 1985 and a preliminary walkdown of all non EQ safety related MCCs on August 25, 1991. Results of the tests of the 6 MOV's with size 2 contactors on each unit are presented in the attached table.

The acceptance criteria presented in the table for the SR/EQ contactors is based on calculations of the available operating voltage at the motor control center motor contactor for Unit 2 "B" train and conservative estimates of Unit 3 "B" train. These calculations are believed to bound "A" train operating voltages for each unit.

Two of the SR/EQ contactors that failed were on the 3-1501-38B valve. The valve was declared inoperable and a limiting condition of operation was entered. This motor starter has been replaced with a qualified replacement which was tested after installation to pick up at 93 volts or less. The third SR/EQ contactor that failed the NEMA acceptance criteria was the open contactor on the 2-202-5B valve. Since the safety function of this valve is to close, only the closing contactor was required to meet an acceptance criteria for the valve to remain operable. We performed PM on the contactor in an attempt to improve the pick-up voltage. This resulted in a new pick up voltage on the opening coil of 88V.

Our planned activity for testing additional SR/EQ size 2 contactors is to test 2 non reversing motors (2 contactors) (U2/3 Diesel Transfer Pump and Standby Gas Treatment A Train Fan). This will complete the testing of 100% of our NEMA 2 SR/EQ contactors. This testing will be completed by Monday, August 26, 1991. We currently believe we have no non-EQ safety-related contactors but will verify this via a final walkdown of all safety-related MCC's by August 28, 1991.

Currently, we are pursuing replacement of all SR/EQ series 100 size 2 contactors with series 300 contactors. The series 300 is designed to pick-up at 75% of the nominal control voltage and have been tested to pickup at approximately 58 percent voltage at ambient conditions. This is a significant improvement over the series 100 contactor, which is designed to pick-up at 85% of the control voltage. The scheduled shipment date for the new size 2 contactors is mid-September, 1991.

SAFETY RELATED ENVIRONMENTALLY QUALIFIED

VALVE NUMBERS	FUNCTION	ACCEPTANCE CRITERIA	PICKUP VOLTAGE	PASS/FAIL
3-1501-38A	CLOSED	95 (4)	90	PASS
	OPEN	95	89	PASS
2-1501-38B	CLOSED	96 (1)	84	PASS
	OPEN	96	85	PASS
3-1501-38B	CLOSED	95 (3)	102	FAIL
	OPEN	95	101	FAIL
2-1501-38A	CLOSED	96 (2)	83	PASS
	OPEN	96	81	PASS
3-202-5B	CLOSED	94 (3)	87	PASS
	OPEN	*	86	N/A
3-1501-22B	CLOSED	* (3)	85	N/A
	OPEN	93	88	PASS
2-202-5B	CLOSED	96 (1)	94	PASS
	OPEN	*	101	N/A
2-1501-22B	CLOSED	*	89	N/A
	OPEN	95 (1)	93	PASS
2-1501-22A	CLOSED	*	83	N/A
	OPEN	95 (2)	85	PASS
2-202-5A	CLOSED	96 (2)	90	PASS
	OPEN	*	92	N/A
3-1501-22A	CLOSED	*	87	N/A
	OPEN	93 (4)	85	PASS
3-202-5A	CLOSED	94 (4)	90	PASS
	OPEN	*	86	N/A
3-1501-38B (RE-TEST)	CLOSED	95 (3)	87	PASS
	OPEN	95	93	PASS
3-202-5B (RE-TEST)	CLOSED	96 (1)	94	PASS
	OPEN	*	88	N/A

* THIS FUNCTION IS NOT SAFETY RELATED
(1) DETERMINED BY CALCULATIONS
(2) BOUNDED BY CALCULATIONS
(3) EXTRAPOLATED FROM CALCULATIONS
(4) BOUNDED BY EXTRAPOLATIONS

ATTACHMENT E

ONGOING ACTIONS

CURRENT ACTIONS

1. Complete testing of the remaining two size 2 non-reversing motor contactors (Unit 2/3 Diesel Transfer Pump and Standby Gas Treatment 'A' Train Fan).

2. Complete confirmatary walkdowns of all Safety-Related MCCs to identify any remaining size 2 contactors.

3. Test any additional size 2 Safety-Related contactors found during the walkdown to determine minimum pickup voltage.

4. Develop a Southern Division Load Dispatcher Operating Order to close the 345 yard cross-tie breaker after a trip of the Unit 3 generator so that 345 yard voltage will be restored.

5. Verify transformer voltage tap settings are correct as modeled in the analysis.

6. Train shift personnel on the modified Station Operating Order which provide action to improve 4 kV voltage by securing a circulating water pump, address closure of the 345 yard cross-tie breaker, and increase VARs on the operating unit following a generator trip.

7. Perform heightened awareness training with the Station Control Room Engineers (SCRE) and Load Dispatchers (LDs).

SHORT TERM

(1-4 Weeks)

1. Review Quad Cities and Zion Stations for applicability.

2. Procure new '300' series contractors from General Electric Co.

3. Pursue what effect, if any, environmental effects have on contactor pickup voltage.

MID TERM ACTIONS
(1-6 MONTHS)

1. Evaluate performing a test program to obtain actual motor loading data for varying operating conditions to calibrate the loading models in the ELMS program.

2. Study potential design change alternatives to restore margins.

3. Upgrade '100' series (85% rated pickup voltage) to '300" series (75% rated pickup voltage) for all size 2 Safety-Related contactor application.

4. Evaluate the possibility of transformer TAP changes to achieve higher bus voltages.

5. Upgrade existing ITE model 27D degraded voltage relay with a ABB model 27N improved accuracy relay.

6. Perform new degraded voltage protection relay setpoint calculations to support Technical Specification changes.

7. Assess sensitivity of other electrical devices to degraded voltage condition.

8. Utilize the upcoming Unit 3 outage (start date, September 8, 1991) to evaluate equipment, perform testing, and replace components as necessary.

LONG TERM ACTION

Long term actions will be discussed in CECO's response to the Dresden EDSFI Inspection Report.