



Attachment To LER 80-09/03L  
Beaver Valley Power Station  
Duquesne Light Company  
Docket No. 50-334

Event Description And Probable Consequences (continued)

services the B train of equipment. The failure of the sequencer was found while checking locally for any relay actuations. It was found that motor control centers MCC-E7, E9 and E11 and Supplementary Leak Collection and Release Fan [VS-F-4A] did not sequence onto their respective busses. Power was restored to the 1A Station Service Transformer at 1046 hours. The backup timer has operated spuriously before, once possibly two times. The No. 1 Emergency Diesel Generator auto-sequencer has never failed electrically prior to this incident. All previous problems have been due to timing sequence duration being out of specification in the 1/100 of a second range.

Cause Description And Corrective Actions (continued)

neutral lead was also disconnected. See accompanying report of sequencer troubleshooting. The backup timer was checked and found to be operating properly so it was put back in service. The timer problem will continue to be investigated. The No. 1 Emergency Diesel Generator auto-sequencer was wired correctly and tested. The No. 2 Emergency Diesel Generator was verified to be wired correctly. No permanent actions at present are planned to preclude any spurious backup timer operation. A Maintenance Work Request has been issued to install locks on the auto-sequencers.

DUQUESNE LIGHT COMPANY  
Beaver Valley Power Station

February 25, 1980

Report On Partial Loss Of Power On February 1, 1980 And  
Failure Of No. 1 Diesel Generator Load Sequencer

On February 1, 1980 at 1038 hours, BVPS Unit 1 experienced a partial loss of power due to loss of the 138 KV Bus that supplies the 4160V 1A Station Service Transformer. This 1A Transformer, in turn, supplies the 4160V 1A and 1B Station Service Busses. The 1A Transformer also supplies the 1AE Emergency Bus.

Upon investigation of the No. 1 sequencer (CKT SEQ1 DWG 11700-RE-21CE) which was instituted due to the failure of MCC-E7, E9, E11 and [VS-F-4A] to auto-load, station personnel found that the cam of 62-SEQ was stopped on division eight (8) of the timer. Work was to begin at 1230 hours.

Work began with the approach that personnel could physically look at the equipment and then check the relays and the timers electrically. Within about thirty (30) minutes, the first class electrician found a lead that was totally disconnected. When he checked the wiring, and additionally followed the lead out physically, it was decided that this could be the problem. Approximately two hours had transpired to this point. The lead that was found free was Lead No. 8 to neutral, on Relay 74 SEQ1, which is an alarm relay. The reason it was felt that this could be the problem is that the neutral system in the sequencer is "daisy chained", or a series neutral, and is not one where each separate lead goes to a neutral bus. Proximity of relay is the only requirement for running the leads; that is, there is no special order. The sequencer panel is randomly wired without wire markings.

It was decided to manually actuate the timer to check all contacts. When personnel checked the microswitch for cam #6 (top switch), it was found that it never opened to reset. One of the workers on the job had touched this microswitch so it was felt that, possibly, this person had knocked the microswitch out of adjustment. It was readjusted with a slight cam movement. The method used to check the microswitch operation was by manual timer rotation and an ohmmeter to contact closure. At this point, it was felt that a couple of obvious problems that need no further checking had been solved. After talking to the shift supervisor, it was decided to put all operable equipment in "PULL-TO-LOCK" and manually initiate the timer.

Report On Partial Loss Of Power On February 1, 1980 (continue')

When circuit breaker BKR 1-22 was closed on Vital Bus 1, the timer motor ran continuously. The timer did not have to be manually initiated. Contact closure was checked at this time, using a voltmeter, and found that cam #6 contact was working properly but would not reset the timer. Further checking with the wiring diagram revealed that the timer motor was mis-wired. After approximately ten or so wiring checks, the leads were switched back to the positions where both the schematic (RE-21CE) and the wiring diagram (RE-14C) indicated that they should be connected. At this point, five manually-initiated tests were run and the timer appeared to work satisfactorily. More auto-load tests will be run before station startup.

On the morning of February 27, 1980, the following checks and tests were performed:

1. Checked to assure that cabinet was in the same condition as it was left in on February 1, 1980.
2. Removed the neutral lead #8 that was originally found disconnected. Timer was manually run through its paces and it was found that the only two relays that operated were 62-AEX2 and 162-AEX2. This does not coincide with the test that was run when the maintenance work request (No. 791330) was signed-off. All relays worked correctly at that time.
3. Opened Vital Bus No. 1 BKR 1-22 to replace lead #8 SEQLY. Received alarm A9-56 "AUTO SEQUENCER LOSS OF CONTROL POWER" which proved that the alarm works on a loss of power.
4. Replaced #8 neutral lead and manually actuated the timer again. All relays operated from the cam switch in the order they are supposed to.

Two of the cognizant personnel involved in the troubleshooting of this sequencer after the last auto-load test were interviewed. It is felt that these personnel would not have left the sequencer in the shape that it was in. It has been concluded that the circuit was intact when maintenance personnel completed their work. It was also intact when the shift supervisor signed-off the maintenance work request; therefore, the problem originated after the maintenance work request sign-off date of August 10, 1979.

It is the conclusion of the Onsite Safety Committee that this event was not malicious since experience is needed to read and understand the drawing and also due to the lack of wire markings and random wiring. Also, the time that would be needed to study the circuitry in the cabinets is a factor against malicious intent.