NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

# LICENSEE EVENT REPORT (LER)

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|---|---|---|
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TITLE (4)
Loss of Offsite Power to Unit 2.

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | |
|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAMES | DOCKET NUMBER(S) |
| 0 7 | 2 6 | 8 4 | 8 4 | 0 1 3 | 0 0 | 0 8 | 2 4 | 8 4 | | 0 5 0 0 0 |
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OPERATING MODE (9): [ ]
POWER LEVEL (10): 0 3 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

| | | | |
|---|---|---|---|
| [ ] 20.402(b) | [ ] 20.405(c) | [ ] 50.73(a)(2)(iv) | [ ] 73.71(b) |
| [ ] 20.405(a)(1)(i) | [ ] 50.36(c)(1) | [ ] 50.73(a)(2)(v) | [ ] 73.71(c) |
| [ ] 20.405(a)(1)(ii) | [ ] 50.36(c)(2) | [ ] 50.73(a)(2)(vii) | [X] OTHER (Specify in Abstract below and in Text, NRC Form 366A) |
| [ ] 20.405(a)(1)(iii) | [ ] 50.73(a)(2)(i) | [ ] 50.73(a)(2)(viii)(A) | 692 |
| [ ] 20.405(a)(1)(iv) | [X] 50.73(a)(2)(ii) | [ ] 50.73(a)(2)(viii)(B) | |
| [ ] 20.405(a)(1)(v) | [ ] 50.73(a)(2)(iii) | [ ] 50.73(a)(2)(x) | |

LICENSEE CONTACT FOR THIS LER (12)

| NAME | TELEPHONE NUMBER |
|---|---|
| R.W. Stanley, Compliance Engineer | AREA CODE 7 1 7 5 4 2 1 - 1 3 1 3 |

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPRDS | | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NPRDS | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | E B | I J C | W 1 2 0 | N | | | | | | | |
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SUPPLEMENTAL REPORT EXPECTED (14)

[ ] YES (If yes, complete EXPECTED SUBMISSION DATE) [X] NO

EXPECTED SUBMISSION DATE (15): MONTH | DAY | YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)


On July 26, 1984, at 0137, with Unit 2 operating at 30% power, a Loss of Turbine Generator and Off-Site Power, Startup Test ST31.1 was initiated from the Control Room by opening the Unit 2 Main Generator Output Breakers and the Startup Transformer Breaker. This resulted in a scram due to Turbine Control Valve Fast Closure also, De-energization of the 13.8KV, 4.16KV. The above events were expected plant response per ST31.1.

The four emergency diesel generators which provide power to the 4.16KV Bus did not automatically start. This was due to a misalignment during the breaker line up required for ST31.1. The DC Knife Swtiches which were opened were for the Bus Logic Circuits, which included the Diesel Generator Start Relays. This knife switch was opened instead of the knife switch for the control and trip DC power for the 4.16KV Feeder Breakers.

A relief valve opened to limit the Reactor Vessel pressure. The Loss of Reactor Vessel Water Inventory from the relief valve opening caused a decrease in water level. Reactor Core Injection Cooling (RCIC) was manually initiated to maintain vessel level.

Power was restored on the first of four 4.16KV Buses eleven (11) minutes into the transient and the final 4.16KV Bus was re-energized seventeen (17) minutes into the transient.

The plant experienced a safe shutdown with the health and safety of the public not jeopardized. This is re-enforced by the fact that the operator has at least eight (8) hours in which to restore AC power before any safety system degradation would be expected. (Reference PLA-1136 to NRC, June 15, 1982.)


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TEXT (If more space is required, use additional NRC Form 366A's) (17)

On July 26, 1984 Operations personnel were performing plant alignment in accordance with ST 31.1, Loss of Turbine-Generator and Off-Site Power Startup Test. Included in the line up was racking out the four (4) feeder breakers which supply power to the Unit 2 4.16KV Buses from the Unit 1 T10 ESS Transformer.

The normal operating practice for racking out a 4KV breaker is to ensure the breaker is open, open the DC knife switch to the DC control power for the breaker and then to rack out the breaker. The T10 ESS Transformer feeder breakers 2A20101, 2A20201, 2A20301, and 2A20401 are all in the 01 cubicles of the 4KV ESS buses. The 01 cubicle, has two DC knife switches, whereas all other breakers in the switchgear bus have only one DC knife switch which provides DC control power to the breaker. The additional DC knife switch in the 01 cubicle provides DC power to the logic circuitry for the bus. Prior to physically racking out the breaker, the operator opened the DC knife switch to the bus logic rather than the DC knife switch to the 01 breaker control circuit. The two DC knife switches in the Unit 2 4KV ESS Bus 01 cubicle were labeled as follows:

BREAKER AND CONTROL SWITCH AND TRIP CIRCUIT FUSES

D.C. CONTROL

The DC knife switch on the left supplies DC power to the 01 breaker. The DC knife switch on the right (the one operator opened) supplies DC Control Power to the bus logic. When the operator opened the first 01 cubicle door, he called the Control Room, informed them he was at the breaker, and requested confirmation that the breaker be racked out and the DC opened. The Control Room operator, after conferring with Supervision, directed that the breaker be racked out and the DC opened. The operator subsequently opened the 'DC Control' knife switch and racked out the breaker. This action was repeated at each 4KV '01' breaker.

At 0137 on July 26, 1984, with the Unit 2 Reactor operating at 30% power, a Loss of Turbine Generator and Off-Site Power Startup Test was initiated from the Control Room by opening the Unit 2 Main Generator 500KV Output Breakers 2T and 4T and the Startup Transformer T20 to Bus 20 Breaker 0A10401. This resulted in a reactor scram due to Turbine Control Valve Fast Closure, the de-energization of the ±3.8KV Buses 20, 12A and 12B, and the de-energization of 4.16KV Buses 2A, 2B, 2C, and 2D. These were expected actions and were indicated in ST 31.1. The Turbine Bypass Valves opened to limit the initial pressure transient and the loss of power to the RPS M/G Sets initiated a Primary Containment Isolation (MSIV Closure) and Secondary Containment Isolation. Immediately after the scram the Plant Control Operator at Reactor Control Panel 2C651 noted that he did not have indication that the Control Rods were fully inserted into the core due to the power loss which de-energized the Full Core Display. A PCO verified the reactor pressure was 1040 to 1050 psig and slowly rising per HPCI and RCIC pressure indicator located on 2C601. The Neutron Monitor indicated the count rate was down and a negitive period was noted. This indicated to the PCO that Control Rods had inserted and it was normal decay heat. The PCO observed the 3-Steam Releif Valve lifted and re-set several times and limited reactor vessel pressure increase caused by the core decay heat.

The reactor level was being monitored by the B and C narrow range instruments on the Standby Information Panel (SIP). When the level went offscale, below Instrument 0" (Instrument 0" is located approximately 160" above top of active fuel), the Control Room personnel contacted Instrument and Control (I&C) personnel. Level instruments, which are located at the Local Panel 2C004, were not effected by the power outage. The I&C personnel kept the Control Room informed of the reactor level.

Subsequently, the water level decrease was terminated at -28" indicated water level 38 minutes into the transient when the reactor operator manually initiated RCIC. At 20" indicated water level, the operator reduced RCIC flow to the vessel and at 45" indicated water level, tripped the RCIC turbine.

Following the initiation of the test, the PCO located at the Electrical Panel 0C653 noted that the four (4) Emergency Diesel Generators did not start. When the 4.16KV Buses were de-energized, he noted that the feeder breakers from the Bus 20 ESS Transformers 201 and 211 to the 4.16KV Ess Buses were closed. Since the 4.16KV Bus was de-energized, these four (4) feeder breakers should have opened. The PCO knew that the feeder breakers had to be open for the diesel generators to automatically start. He manually opened the feeder breakers and the diesel generators still did not start. He then manually started the four (4) diesel generators (D/G). The D D/G tripped on overvoltage, the B D/G tripped on overvoltage and underfrequency. The A and C D/G's idled but did not close into their associated 4.16KV Bus. The A D/G exhibited frequency oscillations and was manually tripped by the operator. The operator then tried to manually close the C D/G onto the 4.16KV Bus but the breaker would not close. The operator then re-energized Bus 20 by closing 0A10401 and re-energized ESS Transformers 201 and 211 by closing 0A10406 and 0A10412. He then attempted to close the feeder breakers from the ESS Transformer to the 4.16KV Buses. The feeder breakers would not close. The 4.16KV Buses were still de-energized. The Unit Supervisor then instructed the Reactor Building Plant Operator to rack in the feeder breakers and close the DC Knife Switch. As the feeder breakers from the T10 ESS Transformer were racked in the DC Knife Switches closed, the preferred feeder breaker to the ESS Bus closed, Re-energizing the bus.

As its associated bus was restored, the tripped diesel-generators (A,B and D) automatically started. Power was restored to the first bus eleven minutes into the transient and to the last bus seventeen minutes into the transient. When power was restored to all four ESS busses, the operator noted that A,B, and D D/G's had Hi Priority alarms so he manually shut them down. The operator in the diesel generator building reset the Hi Priority alarm on the A D/G but could not reset the Hi Priority alarm on the B and D D/G.

When the diesel generators failed to start and initial attempts at re-energizing the 4KV ESS Busses did not succeed, the shift supervisor entered the Emergency Plan, declared an Unusual Event at 0150 and activated the TSC. Once power was fully restored, the Unusual Event was terminated at 0230.

Following the diesel generator shutdowns and failure to clear the Hi Priority alarms on the B & D D/G, Unit 1 entered an LCO on two diesel generators inoperable. The Hi Priority alarms were subsequently cleared, the diesel generator surveillance tests were successfully performed and the LCO was cleared.

Diesel Generator Response

Regulatory Guide 1.108 requires all diesel generator failures, valid or invalid, to be reported.

When the manual start of the diesel generators was initiated, the D Diesel Generator tripped on over voltage and the B D/G tripped on overvoltage and underfrequency. These trips are bypassed in the emergency start mode so the D/G's would have been able to perform their required functions under LOCA or LOOP conditions. Therefore, these are qualified as non valid failures.

The 'A' Diesel Generator exhibited frequency oscillations after it was manually started and the operator shut it down. Since the diesel would have performed its intended

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emergency function the 'A' Diesel run was qualified as a non valid test.

At the time of the testing, there was one (1) valid test failure in the last 100 valid tests.

To prevent a recurrence of the overvoltage trip the generator voltage which was set at 4250 volts has been changed to 4160 volts. This should eliminate the overvoltage trips.

The 'A' Diesel Generator was tested for frequency oscillations by performing seven manual starts. In addition, the governor control settings were varied to demonstrate that the governor control circuit was operating in a region of stability. The frequency oscillations could not be reproduced. Additionally, the fuel racks on the diesel generator were upset and the oscillations immediately stabilized.

The three diesels were tested and declared operable within the hour Technical Specification limit.

The current surveillance test interval is every 31 days since there is only one vaild failure in the last 100 starts.

Attached is a detailed summary for the Unit 2 Loss of AC Power incident. Included is a list of corrective actions. The Plant Operations Review Committee (PORC) reviewed the status of corrective actions, items considered necessary for Unit restart were determined by the PORC to be satisfactorily completed. The status of the remaining actions and corrections or changes will be submitted to Region 1 under separate correspondencs.

# SUMMARY STATUS REPORT
# FOR THE SUSQUEHANNA STEAM ELECTRIC STATION
# UNIT NO. 2 LOSS OF AC POWER INCIDENT OF JULY 26, 1984

Date of Scram: 07-26-84

Time of Scram: 0137

Cause of Scram: Main Turbine Control Valve Fast Closure; initiated by ST31.1 Loss of Turbine - Generator and Off-Site Power.

## INTRODUCTION

This report is a summary of the status of our investigation of the subject incident as reviewed with NRC representatives on July 30, 1984. Those Corrective Actions required for a Unit restart have been completed. The status of short and long term Corrective Actions not completed will be described in a future report.

## EVENT

With the Unit 2 reactor operating at 30% power, the ST31.1 Loss of Turbine - Generator and Off-Site Power Startup Test transient was initiated by opening the Unit 2 Main Generator 500kV Output Breakers 2T and 4T and the Startup Transformer T20 to Bus 20 Breaker OA10401. This resulted in a reactor scram due to turbine control valve fast closure, de-energization of the 13.8 kV Busses 20, 12A and 12B and de-energization of 4.16 kV ESS Busses 2A, 2B, 2C and 2D which had their respective T10 feeder breakers racked out. The turbine bypass valves opened to limit the initial pressure transient and the loss of power to the RPS M/G sets initiated a primary containment isolation (MSIV closure) and secondary containment isolation. Immediately after the scram the Plant Control Operator (PCO) at the reactor control panel 2C651 noted that he did not have indication that the control rods were fully inserted into the core. The PCO at electrical distribution panel 2C653 noted that the four emergency diesel generators did not start when the 4kV ESS busses were de-energized and that the feeder breakers from the Bus 20 ESS transformers 201 and 211 to the 4kV ESS busses were closed. He opened the feeder breakers and when the diesel generator still did not start, he manually started all four diesel generators. The D D/G tripped on overvoltage and the B D/G tripped on overvoltage and underfrequency. The A and C D/G's idled but did not close in on their associated 4kV bus. The A D/G was exhibiting large frequency oscillations and was manually tripped by the operator.

The operator then tried to manually close the C D/G breaker onto the 2C Bus but the breaker would not close. The operator then re-energized Bus 20 by closing OA10401 and re-energized ESS transformers 201 and 211 by closing OA10406 and OA10412. He then attempted to close the feeder breakers from the ESS transformers to the 4kV ESS busses, but the feeder breakers would not close. The unit supervisor then instructed the reactor building plant operator to rack in the feeder breakers from the T10 ESS transformers 101 and 111 to the ESS busses. As the feeder breakers from the T10 ESS transformers were racked in and their D.C. knife switches closed, the preferred feeder breaker to the ESS bus closed, re-energizing the bus. As its associated bus was restored, the tripped diesel-generators (A,B and D) automatically started. Power was restored to the first bus eleven minutes into the transient and to the last bus seventeen minutes into the transient. When power was restored to all four ESS busses, the operator noted that A,B and D D/G's had Hi Priority alarms so he manually shut them down. The operator in the diesel generator building reset the Hi Priority alarm on the A D/G but could not reset the Hi Priority alarm on the B and D D/G.

When the diesel generators failed to start and initial attempts at re-energizing the 4kV ESS Busses did not succeed, the shift supervisor entered the Emergency Plan, declared an Unusual Event and activated the TSC. Once power was fully restored, the Unusual Event was terminated.

Following the diesel generator shutdowns and failure to clear the Hi Priority alarms on the B & D D/G, Unit 1 entered an LCO on two diesel generators inoperable. The Hi Priority alarms were subsequently cleared, the diesel generator surveillance tests were successfully performed and the LCO was cleared.

The reactor response was as expected except that the "J" relief valve opened at 1050 psig to limit the pressure transient after the MSIV's closed. The "J" S/RV is a group 4 relief valve, nominally set to actuate at 1106 psig. The "J" relief valve opened seven times at approximately 5 minute intervals to limit the reactor vessel pressure increase caused by the core decay heat. The loss of reactor vessel water inventory from the relief valve opening caused reactor water level to gradually decrease. The water level decrease was terminated at -28" indicated water level 38 minutes into the transient when the reactor operator manually initiated RCIC. At 20" indicated water level, the operator reduced RCIC flow to the vessel and at 45" indicated water level, tripped the RCIC turbine.

CAUSE

The cause of the failure of the diesel generators to start and subsequent difficulties encountered in re-energizing the ESS busses, has been identified as a problem in the ST31.1 pretest initial lineup of the 4kV ESS bus feeder breakers from the T10 ESS transformers. The ST31.1 breaker lineup checkoff list specified that the T10 ESS transformer 201 and 211 feeder breakers to the 4kV ESS busses be "Racked Out". The normal operating practice for racking out a 4kV breaker is to ensure the breaker is open, open the D.C. knife switch to the D.C. control power for the breaker and then to rack out the breaker. The T10 ESS transformer feeder breakers 2A20101, 2A20201, 2A20301 and 2A20401 are all in the 01 cubicle of the 4kV ESS bus. The 01 cubicle, has two D.C. knife switches, whereas all other breakers in the switchgear bus have only one D.C. knife switch which provides D.C. control power to the breaker. The additional D.C. knife switch in the 01 cubicle provides D.C. power to the logic circuitry for the bus. Prior to physically racking out the breaker, the operator opened the D.C. knife switch to the bus logic rather than the D.C. knife switch to the 01 breaker control circuit. The two D.C. knife switches in the Unit 2 4kV ESS Bus 01 cubicle were labeled as follows:

| BREAKER AND CONTROL SWITCH AND TRIP CIRCUIT FUSES | D.C. CONTROL |
|---|---|

The D.C. knife switch on the left supplies D.C. power to the 01 breaker. The D.C. knife switch on the right (the one the operator opened) supplies D.C. control power to the Bus Logic. When the operator opened the first 01 cubicle door, he called the control room, informed them he was at the breaker, and requested confirmation that the breaker be racked out and the D.C. opened. The control room operator, after conferring with Supervision, directed that the breaker be racked out and the D.C. opened. The operator subsequently opened the 'D.C. Control' knife switch and racked out the breaker. This action was repeated at each 4kV '01' breaker.

## NUCLEAR DEPARTMENT EVALUATION

1. Plant Staff performed a detailed investigation and identified immediate, short term, and long term action items. These items are fully displayed in the remaining body of this report.

2. Nuclear Plant Engineering has conducted an independent design review of this incident and will prepare an independent report for management review.

3. The Nuclear Safety Assessment Group had conducted an independent investigation of this incident and will prepare an independent report for management review.

4. The Nuclear Quality Assurance Group will conduct an audit of the numerous action items identified and dispositioned by Plant Staff. This audit will ensure conclusions reached are properly substantiated.

## PLANT STAFF INVESTIGATION AND CORRECTIVE ACTION

A detailed investigation of the incident has been performed by the Plant Staff. All available data from GETARS, the NSSS process computer, the BOP computer, the HRPD history tapes, SPDS and control room recorders has been gathered and analyzed. In addition, interviews with personnel directly involved in the incident have been conducted and documented.

The results of this substantial effort are:

- o An integrated time line that compiles information from monitoring equipment and pertinent facts from the interviews of personnel involved. This time line is displayed as Attachment 'A'.

- o A comprehensive list of action items that specify problems or areas of concern. Each action item identifies its description, specific action to accomplish resolution, the group responsible, and the priority. All of these action items are displayed as Attachment 'B'.

- o A list of specific NRC action items which were required for restart. This list is provided as Attachment 'C'.

The priority system used in Attachment 'B' is as follows:

- Priority 1: Required prior to start up of Unit 2.
- Priority 2: Short term.
- Priority 3: Long term with action plan to be completed in the short term.
- Priority 4: Required prior to performing a specific activity.

SUMMARY OF FINDINGS

As a result of the detailed investigation performed on this incident, an evaluation of several major areas of concern was made and is presented below. The section on Plant Response includes all major plant response items with the exception of 4kV ESS Bus Response, Diesel Generator Response, Instrumentation Response and Procedures and Training which are addressed as separate items.

I. Plant Response

The overall Unit 2 and Unit 1 plant response to the incident was per the plant design except for the following items:

A. The 'J' safety/relief valve lifted earlier than expected. The 'J' SRV is a group 4 SRV with a nominal setting of 1106 psig to open. Nominally, the 'B' and 'E' SRV's with setpoints of 1076 psig should open prior to 'J' on increasing pressure. The calibration of 'J' SRV relief pressure setpoint was checked and found to be 1050 psig. This valve was out of tolerance and the instrument was recalibrated. All other SRV relief setpoints were checked. Three additional setpoints were found out of tolerance and recalibrated.

B. Following the incident, when the scram was reset, the Scram Discharge Volume drain valve had dual indication. Investigation showed that the valve operator stem had pulled free from the valve disk stem. The cause of this failure was the bolt which holds the two halves of the threaded coupling together was torqued in such a fashion as to allow the upper portion of the threaded coupling halves to pull apart, allowing the actuator stem to come free from the coupling. This allowed the valve to fail close as per design. The valve coupling was repaired by fabricating a new coupling and tested. All similar valves on Units 1 and 2 (15) were identified and the Unit 2 valves (7) were inspected and found to be satisfactory. The Unit 1 valves will be inspected at a future time when they are more easily accessible.

C. The Standby Gas Treatment System started on the LOOP and then tripped. The SGTS is designed to control each affected zone (Zones II and III in this case) at a negative 0.25" w.c. Both fans started since both control switches are kept in the Auto Lead position. The power loss to the 4kV ESS busses prevented the air dampers from opening and thus the SGTS fans tripped on low delta pressure. NPE is performing a long term evaluation of this event.

D. The CREDASS was initiated during this event as per design but was reported to have tripped. Plant Staff engineers monitored the CREDASS control panel during the event and reported that CREDASS did not trip.

E. The Emergency Switchgear Room Cooling Compressors did not start. The auto start of these compressors comes from the diesel generator breaker 2A20104 which must close. Since this breaker did not close, the compressor did not start.

The event that occurred at SSES-2 on 07/26/84, (loss of all AC power for twelve to eighteen minutes) was analyzed in a letter PLA - 1136 submitted to the NRC on June 15, 1982. This analysis showed that the drywell air temperature stayed below 250°F for a period of up to three hours and the suppression pool temperature remained below 150°F for greater than one hour. The available data indicates that these parameters in the event were well below the predictions based on conservative assumptions. Therefore, it can be concluded that the event that occurred is within the bounds of the analysis in PLA - 1136. The analysis given in the letter shows that the operator had at least three hours before damage to drywell equipment might occur and approximately eight hours before any safety systems might be degraded. This analysis assumes that no operator action would be required other than maintaining level. The available data indicated that the plant response was slower than predicted in PLA - 1136. Therefore, the operator would have had much more than the three hours indicated in the letter before any equipment degradation might be expected. Therefore, it can be concluded that the operator had at least eight hours in which to restore AC power before any safety system degradation would be expected.

II. 4KV ESS Bus Response

The 4kV ESS Bus response was not as expected, however, since the investigation showed that the D.C. knife switch to the bus D.C. logic power was opened instead of the D.C. knife switch to the breaker control circuit, each observed anomaly is explained.

A. The labeling of the D.C. knife switches on the Unit 1 and 2 4kV ESS busses was found to be misleading. The labels were changed to be more clearly descriptive. The label on the D.C. control power for the 2A20101 breaker now reads in black letters on a white background.

BKR 2A20101
CONTROL AND TRIP
D.C. POWER

The label for the D.C. control power to the bus logic circuits reads in white letters on a red background.

BUS/DIESEL GEN A
AUX RELAY, CONTROL
D.C. POWER

In addition the handle for the D.C. knife switch for the bus logic circuits has been painted red and a caution label has been added which reads in white letters on a red background.

CAUTION
OPENING THIS SWITCH
DISABLES D/G AND BUS
TRANSFER

All Unit 1 and Unit 2 4kV ESS Bus 01 cubicle Breakers have been similarly labeled. The labeling on 4.16 kV and 13.8 kV switchgear and 480V Load Centers is being evaluated.

B. The failure of the diesel generators to start initially was due to the T20 ESS transformer feeder breakers being closed in on the dead ESS bus. The diesel generator start circuit requires the preferred, the alternate, and the diesel generator breakers to be open as a permissive to start. The T20 ESS transformer feeder breakers did not open because the open D.C. knife switch to the bus control logic prevented the bus undervoltage relay from energizing and giving a trip signal to the feeder breakers. When the operator manually opened the T20 ESS transformer feeder breakers, the diesel generators did not start because the open D.C. knife switch removed power to the bus 62A timers which must energize for the diesels to start.

C. During the investigation, the correct fuse sizes and types in the 4kV ESS busses were examined. Inspection of the Unit 1 and Unit 2 4kV ESS Busses revealed that the D.C. Logic Control fuses for Busses 1A20201 and 2A20201 were 15 amps but were required to be 30 amps. The 15 amp fuses were verified to be intact and were then replaced with 30 amp fuses. All other fuses were found to be satisfactory. NPE verified that all fuse types were acceptable. Fuse sizes for 13.8KV Switchgear in Unit 1 and 2 will be investigated.

D. With the "C" Diesel Generator running and the 2C Bus de-energized, the "C" D/G breaker did not close in on the dead bus nor could the operator manually close the breaker from the control room panel. That the breaker did not automatically close is explained by the open DC knife switch which removed power to the bus undervoltage relay which must energize for the D/G breaker to auto close. For the operator to manually close the breaker, he must turn the keylocked sync switch to the "ON" position and place the D/G breaker control switch to the close position. Additional permissives in the closing circuit are auxiliary relay V1 which de-energizes on loss of bus power (and should have been de-energized) and auxiliary relay V2 which energizes when diesel generator voltage is present (and should have been energized). A retest has been performed to demonstrate that the D/G breaker can be manually closed on to a dead bus from the control room.

III. Diesel Generator Response

A. When the manual start of the diesel generators was initiated, the B&D diesel generators tripped on over voltage and the B D/G tripped on underfrequency. These trips are bypassed in the emergency start mode so the D/G's would have been able to perform their required functions under LOCA or LOOP conditions. An emergency start can be initiated from the control room by manually initiating the Core Spray and LPCI systems. Over voltage trips have been experienced in the past on manual starts and is thought to be due to the operating procedure which requires that the generator voltage be set to 4250 volts prior to shutdown. This value has been changed to 4160 volts which, based on preoperational test data should eliminate the over voltage trips. The monitoring program on D/C trips during manual starts will be continued.

B. The plant operator in the diesel generator building had difficulty in resetting the over voltage and underfrequency trips. The alarm response procedures which cover the resetting of these trips was found to be lacking in appropriate detail. Detailed steps for resetting diesel generator trips have been given to Operations and will be incorporated into an Off-Normal procedure.

C. The 'A' diesel generator exhibited frequency oscillations after it was manually started and the operator shut it down. The 'A' diesel generator was tested for frequency oscillations by performing seven manual starts. In addition, the governor control settings were varied to demonstrate that the governor control circuit was operating in a region of stability. The frequency oscillations could not be reproduced.

## IV. INSTRUMENTATION RESPONSE

A. Immediately following the scram, the operator had an indication on the Reactor Full Core Display that not all control rods were fully inserted. Although the Full Core Display, the Four Rod Display, RDCS and RPIS were powered from uninterruptable power supplies, the rod position and HCU status information to the Full Core Display is fed through RSCS which is powered by Instrument A.C. (2Y218). When Instrument A.C. is lost, the information to the Full Core Display is unreliable. When Instrument A.C. is restored, the RSCS must be reset. A detailed explanation of the status of the Full Core Display has been given to Operations and will be incorporated into the appropriate Emergency Procedures for Loss of Power.

B. During the transient and subsequent investigation, there was some confusion as to what was the actual reactor vessel water level. During the transient, the operator monitored water level on the B and C Narrow Range water level indicators on the Standby Information Panel. When water level decreased below zero, water level information was phoned to the control room from I&C technicians monitoring water level on local instrumentation in the reactor building. When power was restored, the operator monitored water level using the Wide Range indicator LI-2R604 on the Standby Information Panel. This indication was verified to be reading conservatively low by the I&C technicians at the local instrument rack. RCIC was manually initiated when LI-2R604 indicated -34". The actual water level as determined by the majority of the level instrumentation operating at the time was -28". This discrepancy is within the design tolerance of LI-2R604. The -28" level indication was verified by SPDS The advisability of making a plant modification to label or mark those level instruments which will indicate during a loss of power is being evaluated.

V. Procedural and Training Response

A. During the activation of the Emergency Plan, it was discovered that the declaration of an Unusual Event required the notification of four specific emergency response agencies, whereas the clearing of the Unusual Event required the notification of the original four agencies plus two additional agencies who would not have procedurally been notified. This discrepancy has been corrected by revision to the Emergency Plan Implementing Procedures.

B. Operator training on procedure changes made as a result of this investigation and operator retraining on the proper method of D.C. knife switch operation when racking out 13.8KV Switchgear and 480V Load Centers will be conducted as applicable prior to any of the operators to whom the training is applicable assuming shift responsibility following plant startup.

C. During the investigation following the incident, it was discovered that some of the plant operators had not received some required non-routine training.

A long term evaluation of the plant program to ensure that operators are trained on non-routine training items will be conducted.

D. Specific changes to the operator procedure program have been identified and are noted in the detailed action items-Attachment B.

RETEST

The retests to be performed are:

1) Test the 'C' D/G to verify:

   a) It will energize its associated bus in an emergency situation with normal D.C. lineup.

   b) It will energize its associated bus with the bus de-energized and fuses removed to simulate that D.C. power to the bus control logic is open.

2) ST31.1 - Loss of Turbine-Generator and Off-Site Power.

Tom Sullivan
Prepared by

2/13/84
Date

D J Thompson
Approved by

2/13/84
Date

# UNIT 2 SCRAM NO. 2-84-04
## SEQUENCE OF EVENTS

| TIME | | EVENT DESCRIPTION |
|---|---|---|
| 2230 | (7/25/84) | Reactor Lineup complete except for Bus 10 2A-2D AND U1 & U2 Tie Bkr. |
| 2230 | | RX. Press 920 PSIG. |
| 2230 | | Level 39" |
| 0105 | (7/26/84) | 4KV Bus 10 Bkrs. to Busses 2A-2D and U1 & U2 Tie Bkr complete |
| 0105 | | Rx Pressure 910 PSIG, Rx Level 37" |
| 0137 | | U2 Loop and U2 Load Reject |
| 0137 | | Opened 500KV Bkrs. 2T and 4T and T20 to Bus 20 Bkr. |
| 0137 | | Scram 1:37:33:334 |
| 0137 | | Unit Primary LOR 1:37:33:648 |
| 0137 | | Rx Level Trip "A" |
| 0137 | | MSIV Isolation 1:37:43 |
| 0138 | | D/G's did not start |
| 0138 | | OPS Noted:<br>1) Feed Bkrs from ESS Xfrms 201 & 211 to 4KV Busses (no power) 2A, 2B, 2C & 2D closed. |
| 0138 | | OPS manually opened those feed bkrs from CR |
| 0138 | | D/G's still did not start |
| 0139 | | Start A,B,C, & D D/G's manually. |
| 0139 | | B D/G trip on over-voltage and under frequency |
| 0139 | | D D/G Trip on Overvoltage |
| 0139 | | A & C D/G idled but did not close in on bus |

| TIME | EVENT DESCRIPTION |
|---|---|
| 0139 | OPS manually tripped "A" due to frequency oscillations observed in Control Room |
| 0142 | Reenergized<br>1) Bus 20 (Closed OA10401)<br>2) ESS Xfmrs 201 and 211 (energized) |
| 0142 | 4KV Bkrs from ESS Xfmrs 201 and 211 to ESS Busses would not close. |
| 0142 | J SRV activated |
| 0146 | J SRV Activated |
| 0148 | Racked in Bkr 20201 (T-10 Source) from U1 ESS Xfmrs to 4KV ESS Bus 2B |
| 0148 | When D/G Knife Switch closed, Bkr 20209 closed, energizing Bus 2B from Unit 2 T-20 feed (preferred) |
| 0148 | D/G B Auto Start |
| 0148 | Rx Narrow Range Pressure:<br>NFPD1 - 917 PSIG<br>NFPD2 - 925 PSIG |
| 0148 | Reactor Level A - 35" (HRPD)<br>Reactor Level B - 35" (HRPD)<br>Reactor Level C - 8" (HRPD)<br>Reactor Upset Level - 37" (HRPD) |
| 0150 | Racked in Bkr 20401 T-10 feed to Bus 2D |
| 0150 | J SRV activated |
| 0150 | When D.C. Knife Switch closed, Bkr. 20408 closed, energizing Bus 2D from T-20 Feed (preferred) |
| 0150 | D/G D Auto Start |
| 0150 | Declared Unusual Event - TSC activated |
| 0153 | Racked in Bkr 20301 to feed to Bus 2C |

| TIME | EVENT DESCRIPTION |
|---|---|
| 0153 | When DC Knife Switch closed, Bkr 20301 closed, energizing Bus 2C from T-10 Unit 1 Feed preferred |
| 0154 | Racked in Bkr 20101 T-10 to Bus 2A. |
| 0154 | J SRV actuated |
| 0154 | When DC Knife Switch closed, Bkr 20109 closed, energizing Bus 2A preferred source from T-10 |
| 0154 | D/C A Auto Start |
| 0155 | Busses 2A & 2C were transferred to be fed from ESS Xfmrs 201 and 211 CR operator |
| 0155 | D/G's A, B, & D - Hi Priority Alarm |
| 0155 | D/G's A, B, & D shut down |
| 0155 | A Hi-Priority Alarm Reset, B & D would not |
| 0158 | J SRV actuated |
| 0203 | J SRV actuated |
| 0209 | J SRV actuated |
| 0217 | J SRV actuated |
| 0218 | RCIC manually initiated |
| 0218 | Rx level - 27" (SPDS) |
| 0220 | LCO Entry on B & D D/G's |
| 0228 | Rx Level -14" (SPDS) |
| 0228 | Rx Level 29" (GETARS) |
| 0230 | End Unusual Event |
| 0230 | B & D trips cleared, clearing Hi-Priority Alarms |
| 0240 | Reactor Level at 32" (GETARS) |
| 0240 | Operator manually tripped RCIC |

| TIME | EVENT DESCRIPTION |
|---|---|
| 0445 | LCO Cleared |
| 0445 | SO completed |
| 0720 | Swapped A & C to normal supply ESS 101 and 111 from alternate supply (from PCO Log) |

# UNIT 2 SCRAM NO. 2-84-04
# ACTION ITEM INDEX

| ACTION ITEM NUMBER | DESCRIPTION |
|---|---|
| 2-84-04-01 (SR-1) | Why did the D/G's fail to start? Provide a time line, actions to prevent recurrence and an HFE review of event. |
| 2-84-04-02 (SR-2) | Why did the "J" SRV lift first? |
| 2-84-04-03 (SR-3 & SR-13) | At what level was RCIC manually started? What level instruments were used to determine this level. |
| 2-84-04-04 (SR-4) | Condensate Demineralizer bypass valve requires repair. |
| 2-84-04-05 (SR-5 & SR-22 & NRC-2) | Verify the fuse size and types in the D.C. Control Power circuits for the 13.8 KV and 4KV switchgear in Units 1 and 2. |
| 2-84-04-06 (SR-6) | Should the 4KV Breakers from the D/G's to the ESS busses have been able to be closed remotely? |
| 2-84-04-07 (SR-7) | Repair SCRAM discharge volume drain valve (2F011) operator. |
| 2-84-04-08 (SR-8) | Why did the RFPT 9 and 10 valves fail to close after reenergization of Auxiliary Busses? |
| 2-84-04-09 (SR-9) | Are D/G overvoltage trip procedural controls adequate? |

| ACTION ITEM NUMBER | DESCRIPTION |
|---|---|
| 2-84-04-10 (SR-10) | Specify the indications available to detect a loss of Control and Trip D.C. Power to 13.8KV, 4KV Switchgear and 480V Load Center Breakers and a Loss of Auxiliary Relay and Control D.C. Power to the 13.8KV, 4KV Switchgear and 480V Load Centers. |
| 2-84-04-11 (SR-11 & NRC-10) | Evaluation and recommendation of testing on 4KV loss of power. D/G auto start to be performed prior to U-2 startup. |
| 2-84-04-12 (SR-12) | Explanation of partial full core display indications immediately after transient. |
| 2-84-04-13 (SR-14 & SR-24) | Evaluation of operation of SGTS during transient. |
| 2-84-04-14 (SR-15) | Evaluation of operation of CREDASS during transient. |
| 2-84-04-15 (SR-16) | Evaluation of operation of Emergency Switchgear Room Cooling during transient. |
| 2-84-04-16 (SR-17) | EP-IP-002 and EP-IP-008 need to be reviewed for coordination. NRC hotline found to be in need of repair. |
| 2-84-04-17 (SR-18) | Conduct operator training as a result of this event. |
| 2-84-04-18 (SR-19) | Conduct Startup PORC. |

| ACTION ITEM NUMBER | DESCRIPTION |
|---|---|
| 2-84-04-19 (SR-20) | Review 13.8 KV and 4 KV Bkr tagging requests to determine how often we apply tagging to those breakers. |
| 2-84-04-20 (SR-21) | How can an operator get a remote emergency start of the D/G's from the control or relay rooms? |
| 2-84-04-21 (SR-23) | D/G "A" was manually tripped immediately after its manual start due to large frequency oscillation. |
| 2-84-04-22 (NRC-1) | Training Concerns. |
| 2-84-04-23 (NRC-3) | RCIC Flow indication of GETARS |
| 2-84-04-24 (NRC-4) | Use of Wide Range Level During Event |
| 2-84-04-25 (NRC-5) | D/G Reset |
| 2-84-04-26 (NRC-6) | Reg. Guide 1.47 |
| 2-84-04-27 (NRC-7) | Suppression Pool Temperature Loss |
| 2-84-04-28 (NRC-8) | 08 and 09 Breakers |
| 2-84-04-29 (NRC-9) | Power Transfer Switches |

| ACTION ITEM NUMBER | DESCRIPTION |
|---|---|
| 2-84-04-30 (NRC-11) | Loss of AC Instrument Indications |
| 2-84-04-31 (NRC-12) | Independent Verification |
| 2-84-04-32 (P-1) | Review of standard electrical operating practices |
| 2-84-04-33 (P-2) | Review of Labeling Blackout Instrumentation |
| 2-84-04-34 (P-3) | Staffing Considerations |
| 2-84-04-35 (P-4) | Procedure Review: 480V, 4KV, & 13.8KV Bkrs. |
| 2-84-04-36 (P-5) | Review of RHR and CS circuit breaker response to various combinations of Motive and Control Power availability. |
| 2-84-04-37 (P-6) | Recorder Pen Colors Discrepancy between Unit 1 and 2 HFE Post Accident Inst. Levels Pressure |
| 2-84-04-38 (P-7) | Communications considerations |
| 2-84-04-39 (P-8) | Pre-test Walk-through |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-01

DESCRIPTION:

Why did the D/G's fail to start?
Provide a time line, actions to prevent recurrence and an HFE review of event.

| ACTION: | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Provide discussion. | Tech | 1 | C |
| 2. Revise Knife Switch labeling in the 4 kV "01" SWGR CUBICLES listed below:<br><br>1A201, 202, 203, & 204 and<br>2A201, 202, 203, & 204. | Maint | 1 | C |
| 3. Paint the handle of the knife switch for the "Bus/DG Aux Relay, Control D.C. Power" RED. | Maint | 1 | C |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-02

DESCRIPTION:

Why did the "J" SRV lift first?

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Provide discussion. | Tech | 1 | C |
| 2. Check all SRV Setpoints. | I&C | 1 | C |
| 3. Recalibrate as required. | I&C | 1 | C |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-03

DESCRIPTION:

At what level was RCIC manually started?
What level instruments were used to determine
this level?

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Provide discussion. | Tech | 1 | C |
| 2. What level instrument used/when? | Comp | 1 | C |
| 3. Explain observed level differences. | I&C | 1 | C |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-04

DESCRIPTION:

Condensate Demineralizer bypass valve requires repair.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Provide discussion. | Tech | 1 | C |
| 2. Repair Condensate Demin Bypass Valve | Maint | 1 | C |
| 3. Report on "as found condition" and repairs performed. | Maint | 1 | C |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-05

DESCRIPTION:

Verify the fuse size and types in the D.C. Control Power circuits for the 13.8KV and 4KV Switchgear, 480V Load Centers, 250VDC and 125VDC Load Centers and D/G Cabinets in Units 1 and 2.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Provide discussion. | Tech | 1 | C |
| 2. Complete the As-Built verification of fuse size, fuse type and labeling in all 4KV, 13.8KV, 480V LC's, and 250VDC and 125VDC Load Centers, and D/G Cabinets. Also, verify knife switch labeling. | Tech | 3 | C |
| 3. Replace fuses/change labels (for knife switches and fuses) as required. | Maint | 3 | |
| 4. Establish Fuse Control Policy | Ops | 3 | |
| 5. Determine proper Control Fuse size/type for: -13.8 breakers<br>- 4.16 breakers<br>-480V Load Centers (not MCC's) | NPE | 3 | C |
| 6. Statement that type of fuse is not critical. | NPE | 1 | C |
| 7. Determine fuse size and types in the 15A and 30A D.C. Control Power circuits for the 13.8KV and 4KV switchgear in Units 1 and 2. | Tech | 1 | C |
| 8. Replace fuses and relabel Control Fuse nameplates as required (for item No 7). | Maint | 1 | C |
| 9. Revise appropriate procedures including CCL's (refer to item #2). | Ops | 3 | |
| 10. Verify that there are no 480V Load Center alarms indicating open D.C. Knife Switches. | Ops | 1 | C |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-06

DESCRIPTION:

Should the 4KV Breakers from the D/G's to the ESS busses have been able to be closed remotely?

| ACTION | RESPONSIBLE GROUP | PRICRITY | STATUS |
|---|---|---|---|
| 1. Provide discussion. | Tech | 1 | C |
| 2. Provide copy of results of scheme checks performed by ET. | Maint | 1 | C |
| 3. Test the "C" D/G's ability to close in on a dead bus with the U/V relay disabled. | S&T | 1 | C |

Note: NRC requested notification regarding test schedule. Intend to witness tests. PP&L will provide notification.

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-07

DESCRIPTION:

Repair SCRAM discharge volume drain vlave (2F011) operator.

| ACTION | RESPONSIBLE GROUP | PRICRITY | STATUS |
|---|---|---|---|
| 1. What should the valve position be (before the SCRAM)? What position was it in? | Tech | 1 | C |
| 2. What was the Failure Mechanism? | Tech | 1 | C |
| 3. Did the valve fail to its proper position? What was the "As-Found" condition? | Maint | 1 | C |
| 4. What was failure method? | Maint | 1 | C |
| 5. How did we find SCRAM Discharge Volume Drain Valve failure? | Ops | 1 | C |
| 6. Inspect similar valves on Unit 2. | Maint | 1 | C |
| 7. Revise PM's for similar valves. | Maint | 3 | |
| 8. Inspect similar valves for Unit 1. | Maint | 3 (cold shutdown) | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-08

DESCRIPTION:

Why did the RFPT 9 & 10 valves fail to close after reenergization of Auxiliary Busses?

| ACTION | RESPONSIBLE GROUP | PRICRITY | STATUS |
|---|---|---|---|
| 1. Write up. | Tech | 1 | C |
| 2. Write up design of 9 & 10 valve operation on LOP. | NPE | 1 | C |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-09

DESCRIPTION:

Are D/G overvoltage trip procedural controls adequate?

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Provide discussion. | Tech | 1 | C |
| 2. Why left @ 4250 Volts. | Tech | 1 | C |
| 3. How do you position D/G voltage required to insure successful starts? | Tech | 1 | C |
| 4. Determine max T/D on Timing relay. | Maint | 3 | |
| 5. Recal overvoltage relay (ratio of pickup to dropout - should be as low as possible). | Maint | 3 | |
| 6. Implement recommendations from Tech/MT on Diesel Generator Voltage Regulator operation (SO's, OP's). | Ops | 1 | C |
| 7. Adequacy of procedures relating to D/G remote emergency start. | NPE | 2 | |
| 8. Provide RSCN for relay settings as required. | NPE | 3 | |
| 9. Optimize D.V. protective scheme - (long term fix). | NPE | 3 | |
| 10. Provide procedures for remote manual start of the D/G's from the control room to support emergency operations. | Ops | 2 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-10

DESCRIPTION:

Specify the indications available to detect a loss of Control and Trip D.C. Power to 13.8KV, 4KV Switchgear and 480V Load Center Breakers and a Loss of Auxiliary Relay and Control D.C. Power to the 13.8KV, 4KV Switchgear and 480V Load Centers.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Provide discussion. | Tech | 1 | C |
| 2. Expand definition to include lights on 13.8KV, 4KV, 480LC. | Tech | 1 | C |
| 3. Indications available and what it means. | Trng | 1 | C |
| 4. As result of re-label; incorporate proper terminology into training procedures, etc. | Trng | 3 | |
| 5. Evaluate changes to procedure as result of re-labeling (procedures, instructions, guidelines). | Ops | 3 | |
| 6. Revise surveillances and/or rounds to include Supv/Brk Control lights to the 4KV Switchgear. | Ops | 1 | C |
| 7. Revise guidelines in AD (Permit and Tag). | Ops | 1 | C |
| 8. Write CI for proper rack out of various breaker types (to include observation/ indication during sequence). | Ops | 2 | |
| 9. Indications available and what it means. | MPE | 1 | C |
| 10. Rectify labeling to prints. | MPE | 3 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-11

DESCRIPTION:

Evaluation and recommendation of testing on 4KV loss of power. D/G auto start to be performed prior to U-2 startup.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Evaluate/Recommend testing. (Identify testing, conditions, and basis for performing the test(s) - discuss safety implications). | S&T | 1 | C |
| 2. Perform ST31.1 (prior to leaving test plateau No. 2). | S&T | 2 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-12

DESCRIPTION:

Explanation of partial full core display indications immediately after transient.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Provide discussion. | Tech | 1 | C |
| 2. Provide discussion of full core display indications following loss of power. Actual indications observed. Provide information to OPS on how to restore. | I&C | 1 | C |
| 3. Train the operator regarding: Full core display response to loss of power and, how to power-up. | Trng | 1 | C |
| 4. Revise EO on Station Blackout procedure to address reset of Full Core Display. | Ops | 1 | C |
| 5. Evaluate and revise as required the ATWS procedure. | Ops | 3 | |
| 6. Review the differences between Units 1 and 2 relative to the full core display during blackout conditions and make recommendations. | NPE | 3 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-13

DESCRIPTION:

Evaluation of operation of SGTS during transient.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Provide write up. | Tech | 1 | C |
| 2. (a) Evaluate performance on restart following trip and subsequent LOCA init. | NPE | 1 | C |
| (b) Evaluate desirability of modifications for the SGTS based upon review of the trip experienced. | NPE | 3 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-14

DESCRIPTION:

Evaluation of operation of CREOASS during transient.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Provide write up. | Tech | 1 | C |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-15

DESCRIPTION:

Evaluation of operation of Emergency Switchgear Room Cooling during transient.

| ACTION | RESPONSIBLE GROUP | PRICRITY | STATUS |
|---|---|---|---|
| 1. Provide write up. | Tech | 1 | C |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-16

DESCRIPTION:

EP-IP-002 and EP-IP-008 need to be reviewed for coordination. NRC hotline found to be in need of repair.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Repair hotline to NRC. | Maint | 1 | C |
| 2. Revise EP-IP for consistant notification. | Trng | 1 | C |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-34-04-17

DESCRIPTION:

Conduct operator training as a result of this event.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Provide discussion. | Trng | 1 | C |
| 2. Define who (by position) get training (scope). | Ops | 4 | |
| 3. Review all action items and determine/ conduct training required prior to startup for Ops. | Trng | 1 | C |
| 4. Determine and provide additional training required for each group. | Trng | 4 | |
| 5. Conduct training and incorporate lessons learned into training programs. | Trng | 3 | |

Note: Preparations are being made to commence training activities. The NRC noted that they would like to attend a session.

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-18

DESCRIPTION:

Conduct Startup PORC.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Conduct PORC when ready. | Tech | 1 | C |

Note: PP&L will inform the NRC as to when the PORC will take place.

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-19

DESCRIPTION:

Review 13.8KV and 4KV Bkr tagging requests to determine how often we apply tagging to those breakers.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Survey Permit and Tag permits over past 6 months. | Ops | 2 | C |
| 2. What were the actual instructions on the permit? | Ops | 2 | C |
| 3. Evaluate acequacy of written tag out direction (results may be changed to AD). | Ops | 3 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-20

DESCRIPTION:

How can an operator get a remote emergency start of the D/G's from the control or relay room?

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Define how to get an emergency start of the Diesel Generators. | Tech | 2 | C |
| 2. Evaluate manual emergency start of the Diesel Generators. | NPE | 2 | C |
| 3. Evaluate the necessity of D/G emergency start capability from the Control Room other than by the methods currently available. | NPE | 3 | |

Note: Action item 2-84-04-09 includes related items.

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-21

DESCRIPTION:

D/G "A" was manually tripped immediately after its manual start due to large frequency oscillation.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Support MT/IC on evaluation of Diesel Generator "A" Frequency Oscillations. | Tech | 1 | C |
| 2. From operator interview, how large were frequency oscillations? | Comp | 1 | C |
| 3. Review records regarding performance of "A" D.G. (i.e., oscillations). | Maint | 2 | |
| 4. Evaluate testing for "A" D/G. | S&T | 1 | C |
| 5. Review/evaluate Diesel Generator test program for adequacy with respect to determining Diesel Generator performance. | NPE | 3 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-22

DESCRIPTION:

Training Concerns.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Describe administrative program to assure required operator training is performed. | Ops | 1 | C |
| 2. (a) Evaluate present program. | Ops | 1 | C |
| (b) Revise program as required. | Ops | 2 | |
| 3. Review Station Program for methods of assuring Non-Routing Training is performed. | Comp | 3 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-23

DESCRIPTION:

RCIC flow indication on GETARS.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Operator RCIC action. | Comp | 1 | C |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-24

DESCRIPTION:

Use of Wide Range Level During Event.

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. What Level Control Instruments were used during event? | Comp | 1 | C |
| 2. Which level Instrument indicated on GETARS? (Is label correct?) | I&C | 1 | C |
| 3. Determine which level instruments remain powered.<br>- Notify Ops to correct EO. | Tech | 1 | C |
| 4. Correct EO as required to 'identify level instruments'. | Ops | 1 | C |
| 5. Review and revise as required procedure, including ON-117-001 and 002, and ON-217-001 and 002. | Ops | 2 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-25

DESCRIPTION:

D/G Reset

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Write a procedure for reset of D/G on OV trip. | Ops | 1 | C* |
| 2. Perform training. | Trng | 1 | C |
| 3. How to reset the trips for various D/G trips AR-ODA-521, ODB, ODC, ODD. | Tech | 1 | C |

* Note: Item 1 closed pending NRC review.

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-26

DESCRIPTION:

Reg Guide 1.47

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Does our present design meet the intent of Reg. Guide 1.47 with respect to control power disconnect supervision, specifically the 30A fuse circuit. | NPE | 2 | |
| 2. Review adequacy of our present design with respect to Reg. Guide 1.47 as associated with Control Power disconnects, specifically the Bus/DG Auxiliary relay, Control D.C. Power Knife Switch. | NPE | 2 | |
| 3. Review and revise as appropriate monthly Surveillance Maintenance (SM) procedures to incorporate provisions for continuity checks on non-supervised circuits so as to assure full closure. | Maint | 4 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-27

DESCRIPTION:

Suppression Pool Temperature Loss

| ACTION | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Was SPOTMOS lost during the event? | Tech | 2 | C |
| 2. Provide a description of how to reset. | Tech | 3 | |
| 3. Revise ON-117 & 217. | Ops | 3 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-28

DESCRIPTION:

08 & 09 Breakers

| ACTION: | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. If the 13.8 Bkrs were open, the 08 & 09 Bkrs could be tripped; but could they be closed again due to the 27 relay (Knife Switch). | Tech | 1 | C |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-29

DESCRIPTION:

Power Transfer Switches

| ACTION: | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Listing of all Power Transfer Switches. (Manual and Auto) | NPE | 3 | |
| 2. Determine present lineup of all Power Transfer Switches and how these are checked and controlled. | Ops | 3 | |
| 3. What is the desired lineup for maximum reliability? | NPE | 3 | |
| 4. Review labels versus OP's/Col's and revise accordingly. | Ops | 3 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-30

DESCRIPTION:

Loss of AC Instrument Indication

| ACTION: | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Does the present design provide adequate instrumentation during a loss of AC power. Is the present instrumentation of sufficient range and is it in accordance with the General Design Criterion? | NPE | 3 | |
| 2. Perform an HFE Review of Instrumentation Locations for instruments used during a loss of AC power. | NPE | 3 | |
| 3. Are there sufficient instruments available for the operating staff to properly perform their activities during loss of AC power?<br>a. Are ranges proper?<br>b. Are locations proper?<br>c. Are there a sufficient number of instruments? | Ops | 3 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-31

DESCRIPTION:

Independent Verification

| ACTION: | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Review the Station Program for Independent Verification and provide recommendations (Common Mode Failure Considerations) | Comp | 3 | |

UNIT 2 SCRAM NO. 02-84-04
ACTION ITEMS OF 07/30/84

ACTION ITEM NO.
2-84-04-32

DESCRIPTION:

Review of standard electrical operating practices.

| ACTION: | RESPONSIBLE GROUP | PRIORITY | STATUS |
|---|---|---|---|
| 1. Review of standard electrical practices. | Ops | 3 | |
| 2. Poll the operators for review of standard electrical operating practices. | Comp | 3 | |

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August 24, 1984

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 84-013-00
ER 100450 FILE 841-23
PLA-2290

Docket No. 50-388
License No. NPF-22

Attached is Licensee Event Report 84-013-00. This event was determined reportable per 10CFR50.73(a)(2)(v), in that during performance of a Loss of Offsite Power Test the diesel generators failed to start.

H.W. Keiser
Superintendent of Plant-Susquehanna

RWS/pjg

cc: Dr. Thomas E. Murley
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