NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

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TITLE (4)
Four Operational Events And Subsequent Start Of All Diesel Generators Resulting From An Area Thunderstorm

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)
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0 8	1 5	8 8	8 8	0 3 4	0 0	0 9	0 8	8 8	Sequoyah, Unit 1	0 5 0 0 0 3 2 7

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
1		20.402(b)	20.405(c)	XX 50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
0 9 8		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	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)	
		20.405(a)(1)(iv)	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
	AREA CODE
K. W. Fenn, Plant Reporting Section	6 1 5 8 7 0 - 6 5 1 1

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	

SUPPLEMENTAL REPORT EXPECTED (14)

		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	XX NO				

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

On August 15, 1988, with unit 1 in mode 5 (cold shutdown) and unit 2 in mode 1 (98 percent), four separate incidents affecting plant operations occurred as a result of an area thunderstorm. These four incidents involved: (1) a loss of power and monitoring functions at the Meteorological (MET) Tower, common to both units; (2) a momentary trip of the unit 2 condenser circulating water (CCW) pumps 2A and 2B resulting in a perturbation in the condenser vacuum; (3) an inadvertent trip of the intertie bank between the 161kV and 500kV switchyards; and (4) a loss of power from the common station service transformer (CSST)-A to the start buses 1A, 2A, and the 6.9kV shutdown board (SDBD) 1B-B which resulted in an automatic start of all four diesel generators (D/Gs).

The loss of power to the 6.9kV SDBD and resultant D/G start is reportable under 10 CFR 50.73, paragraph a.2.iv. The other three events are included for informational purposes. The cause of events (1) and (2) is attributed to separate local lightning strikes which caused a trip of the subject equipment. The CCW pumps trip caused a condenser vacuum perturbation but the operations personnel were able to restart the pumps and stabilize the unit without tripping the turbine. The cause of the intertie bank trip was the result of a fault condition on an offsite 161kV power line and a suspected erroneous relay operation. The CSST 'A' trip was caused by a phase to ground fault in the start bus 2A normal feeder breaker compartment resulting from an apparent moisture and dust collection in the compartment allowing a low impedance current path from the C-phase bus bar to the cabinet wall. The MET tower computer link to the plant was restored on the same day. The CCW pumps were immediately restarted without incident. The 161kV/500kV intertie bank was restored on August 16, 1988, and the associated protective relays will be tested to ensure future proper operation. The start buses 1A, 2A and 6.9kV SDBD have been reenergized via the spare CSST-B. Repair of the damaged start bus 2A breaker compartment will be completed prior to placing this compartment into operation.

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DESCRIPTION OF EVENT

On August 15, 1988, between the approximate times of 1614 EDT and 1651 EDT, with unit 1 in mode 5 (0 percent, 6 psig, 123 degrees F) and unit 2 in mode 1 (98 percent, 2235 psig, 576 degrees F), four separate incidents affecting Sequoyah Nuclear Plant (SQN) operations occurred as a result of an area thunderstorm. The thunderstorm entered the area of the plant at approximately 1600 EDT accompanied by severe lightning, wind and rain, and had diminished at approximately 1640 EDT. Only one of the events (item number IV) is considered reportable under 10 CFR 50.73. The other events are included for informational purposes. These incidents are described as follows:

I. LOSS OF METEOROLOGICAL (MET) MONITORING TOWER (1614 EDT) (EIIS Code IS)

At approximately 1614 EDT, a loss of electrical power to the MET tower occurred. The MET tower station is located outside of the site boundary and the loss of power resulted in a loss of data transmission to the plant. All MET monitoring functions (wind speed, wind direction and air temperature) at the plant as required by Technical Specification (TS) 3.3.3.4 were lost. The MET tower immediately transferred to emergency local generator power and maintained local wind monitoring parameters. The TS action requires a special report to be submitted to the NRC if the MET tower is inoperable for more than seven days. The MET tower computer was reestablished at approximately 1729 EDT on the same day and the Central Emergency Control Center (CECC) computer link to the plant was reestablished at approximately 1500 EDT, on August 16, 1988 and the plant exited the TS action.

II. LOSS OF UNIT 2 MAIN CONDENSER CIRCULATING WATER PUMPS 2A and 2B (1620 EDT) (EIIS CODE SG)

At approximately 1620 EDT, the unit 2 Condenser Circulating Water (CCW) pumps 2A and 2B tripped off-line and as a result, condenser back pressure started to increase. Three identical CCW pumps are supplied for each unit (A,B,C) which are connected in parallel and discharge to a common header. The 2C CCW pump continued to operate throughout this event. Operations personnel responded exceptionally well to the condenser vacuum perturbation and immediately reestablished vacuum by restarting the 2A and 2B CCW pumps from the main control room (MCR). The condenser back pressure increased to approximately 3.7 psia but the shift operations supervisor (SOS) elected not to trip the unit because vacuum was being reestablished. No relay targets were observed for the CCW pumps trip and no relay resets were required to restart the pumps.

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III. INTERTIE BANK BETWEEN 161 kV and 500 kV SYSTEMS TRIPPED OFFLINE (1620 EDT)

At approximately 1620 EDT, an electrical fault occurred on the 161 kV transmission line to the Moccasin substation and the transmission line protective Power Circuit Breaker (PCB) 984 opened. A subsequent review of the line oscillograph reading indicated a phase A to phase C to ground fault condition had occurred close in to the plant which had caused the breaker operation. The fault condition on the Moccasin line cleared itself and PCB 984 immediately reclosed automatically. All four of the intertie bank PCBs (934, 938 on the 161 kV side and 5054, 5058 on the 500 kV side) tripped offline within approximately .070 seconds after the 984 operation which resulted in deenergizing of the intertie bank between the 161 kV system and the 500 kV system (including the intertie bank transformer). The investigation showed 586T and 586T1 lockout relays were the cause of the intertie transformer bank trip, however, no relay targets were observed on the protective relays which activate 586T and 586T1. These relays are actuated on overcurrent and differential voltage conditions on the intertie transformer bank as well as transformer sudden pressure. The 586 relays not only trip but also lockout the PCBs , and in this event, required manual actions to reset the relays.

Approximately two and a half minutes after PCB 5058 tripped, it reclosed automatically on low dielectric pressure apparently caused by an air leak in the pneumatic system of PCB 5058. The switchyard operators had not yet had time to open the Motor-Operated Disconnects (MODS) 5057 and 5059 on each side of PCB 5058 and hence, the breaker reclosing caused the intertie bank from the 500 kV side up to the PCBs on the 161 kV side to be reenergized for approximately 25 minutes. Standard procedure (per switchyard operations procedure SWYD16, "Test and Operating Procedures for Generators, Power Transformers and Shunt Reactor after Being Tripped By Protective Relaying") is to maintain the intertie bank deenergized after a trip until transformer oil samples are taken for gas-in-oil analysis and satisfactory results are obtained from various electrical tests (Bridge, Ratio, Megger and Doble test). An exception to this requirement, is when the relay operation which caused the trip is determined to be false, the intertie bank can be reenergized. As a precaution to prevent damaging the MODS, the 500 kV bus was removed from service and at approximately 1645 EDT, the MODS 5057 and 5059 were opened to isolate PCB 5058. MOD 5057 required manual operation locally to open the disconnect because of a malfunction in the switch operating mechanism. Later in the evening, at approximately 1820 EDT, when PCB 5058's pneumatic tank was being repressurized, the ceramic insulator on the PCB's current limiting resistor exploded. This had no affect on the PCB 5058 operation since the circuit breaker had already reclosed.

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Since no protective relays actuated when the PCB 5058 reclosed on low air pressure and since the Moccasin transmission line fault condition was not believed to have been sufficient enough to have caused the initial protective relay operations, the intertie bank was restored to service at approximately 0900 EDT on August 16, 1988, without further testing. The intertie transformer bank trip was believed to have been caused by an inadvertent (false) relay operation.

At the time of the intertie bank trip, SQN operations personnel immediately notified the offsite dispatching office at Chickamauga Hydro plant and reported the loss of the intertie bank in accordance with General Operating Instruction (GOI)-6N, "Loss of the 500 kV Intertie Transformer." The dispatchers informed SQN within the 10-minute period as required by GOI-6N, that the power system was in the proper configuration to support the plant (i.e., sufficient offsite power available) with the intertie bank offline. SQN operations personnel believed the dispatchers were maintaining the required TVA power system configuration to ensure sufficient offsite A.C. electric power was available for a safe shutdown of the plant and to mitigate any Design Basis Accidents (DBAs) without the use of the onsite emergency power. Technical Specification (TS) 3.8.1.1 requires two independent circuits between the offsite power network and the onsite distribution system when in modes 1, 2, 3 and 4.

The SQN plant was informed the following day by the offsite Power Transmission and Customer Service, that the TVA 161 kV power system had not been maintained in the proper configuration in three aspects during the time the intertie bank was out-of-service on August 15, 1988.

1. The 161 kV system voltage was not maintained at the proper levels,

2. MVAR output from SQN was not reduced to proper levels

3. Pumping at Raccoon Mountain Pumped Storage Plant was permitted during the event, causing voltage drops in the system.

With the intertie bank out-of-service simultaneous with these conditions existing, the potential existed for a less than adequate offsite power source to be available to meet the TS 3.8.1.1 requirement. The two independent circuits between the offsite power network and the onsite power system were operable, but the offsite power network may not have been sufficient to support a safe plant shutdown without the use of the onsite emergency power system. When the plant was notified of the less than adequate offsite power condition, the intertie bank network had already been restored to operable status and hence, no further actions were required to meet operability requirements.

IV. LOSS OF COMMON STATION SERVICE TRANSFORMER (CSST)-A AND START BUSES 1A AND 2A (1651 EDT) (EIIS CODE EB)

The storm passed the plant shortly after the intertie bank had tripped. At approximately 1651 EDT a flashover (phase to ground fault) occurred from the 6.9kV start bus 2A, phase C bus bar to the cabinet wall causing an arc burn. This phase to ground fault triggered neutral overcurrent relay A51CN actuation which resulted in other various actuations as follows:

PCBs 994 and 998 opened (161 kV yard supply to CSST-A); breakers 1512 and 1514 opened (6.9kV normal feeder breakers for start buses 2A and 1A); breakers 2916 and 2918 opened (6.9kV feeder breakers for CCW cooling tower board "A" and the Power Operations Training Center); and the CSST "A" fire suppression system was initiated. The net results of the six breaker trips were loss of power to start bus 1A and 2A; loss of power to 6.9 kV common board "A"; loss of power to the 6.9 kV unit board 1C; and loss of power to 6.9 kV shutdown board (SDBD) "1B-B" (EIIS Code EA). All four diesel generators (D/Gs) (EIIS Code EK) started as a result of the loss of voltage condition on the 6.9kV SDBD and D/G 1B-B tied to its associated shutdown board 1B-B as designed. The loss of power to the start buses 1A and 2A from CSST-A, required entry into the action statement (a) of TS 3.8.1.1 as only CSST-C was available to supply an offsite AC power source. CSST-B was out of service for maintenance activities as was cooling tower transformer "B". Action (a) of TS 3.8.1.1. requires restoration of both offsite power circuits within 72 hours.

The cooling tower lights and lift pumps were deenergized on both cooling towers as a result of the power loss to the CCW cooling tower transformer A, which is fed from the 161 kV switchyard via PCBs 994 and 998. The CCW cooling tower transformer B was out-of-service being prepared for maintenance which prevented it from powering the cooling tower lift pumps and lights. An assistant unit operator (AUO) was immediately dispatched to open two more cooling tower lift pump station discharge gates to preclude flooding of the CCW discharge pond. One discharge gate was already open but problems were encountered in opening the other gates because of the lack of 480V power. The water level in the discharge pond rose slightly during the first hour of the event but stabilized by approximately 1800 EDT, hence, opening of no other discharge gates was required.

The plant security computer was lost at 1652 EDT because of voltage perturbations on the 6.9kV common board A, which is also fed from start bus 2A. The plant security computer is powered from the 6.9 kV common board A. Plant personnel accountability was maintained in protected areas of the plant by the Nuclear Security Service (NSS) personnel.

At approximately 1732 EDT, power was restored to the 6.9kV unit board 1C and the 6.9kV common board A via the Unit Station Service Transformer (USST)-1B, which was back-fed from the 500 kV switchyard. This restored power to the security computer and the computer was rebooted. The restoration of voltage to the 6.9 kV Unit board 1C also allowed the normal feed to the 6.9 kV SDBD to be restored and D/G 1B-B was shutdown.

At approximately 2048 EDT the Federal Aviation Administration (FAA) was notified of the cooling tower lights being out of service and subsequently the Nuclear Regulatory Commission (NRC) notified of the same in accordance with 10 CFR 50.72, B.2.vi at approximately 2111 EDT.

At approximately 2200 EDT, the CSST-B was returned to service, which restored power to the CCW cooling tower transformer B and subsequently to the cooling tower lights, cooling tower lift pumps and the POTC. At approximately 2235 EDT, start bus 1A was returned to service receiving power from CSST-B. Start bus 2A and CSST-A remained out of service until further testing was completed. An inspection of the breaker compartment for the start bus 2A normal feeder breaker 1512 showed extensive damage in the compartment where the fault condition had occurred. After extensive testing of the 2A start bus which had been isolated from the normal feeder breaker 1512, the start bus was declared acceptable for service. The start bus 2A was returned to service at approximately 1100 EDT on August 17, 1988 at which time the action (a) of TS 3.8.1.1 was exited.

CAUSE OF THE EVENT

The basic cause of all four events detailed in this report is attributed to the thunderstorm with accompanied lightning and rain. No other common causes between the four events could be determined. The causes of each event are listed as follows:

I. The loss of power to the MET tower is attributed to an apparent local lightning strike which caused a temporary local interruption of power to the MET tower. Even though the MET tower receives AC electrical power from the plant via the CCW cooling tower transformers, this event is not considered to be related to the loss of CSST-A (event number IV) since this event occurred approximately 37 minutes earlier.

II. The trip of the unit 2 CCW pumps 2A and 2B is also attributed to a local lightning strike which may have caused a voltage perturbation on the motor exciters for the pumps. The CCW pumps each are driven by a synchronous type motor which uses an exciter unit to produce the field current. The exciter units for 2A and 2B CCW motors are fed from the 6.9 kV unit boards 2A and 2B respectively which were both being fed from the USST-2A during this event. The exciter units for these motors are very sensitive to voltage perturbations and a small perturbation either on the USST-2A output or locally at the CCW pumping station may have caused the motors to trip offline.

III. The cause of the 161kV intertie bank trip is suspected to be an erroneous relay operation during the fault condition on the Moccasin transmission line. This resulted in tripping of the intertie PCBs 934, 938, 5054 and 5058. Although the intertie PCBs tripped open almost simultaneously (within approximately .070 seconds) with the Moccasin line PCB 984 operation (as a result of the fault condition), calculations derived from oscillograph readings indicate that the Moccasin line fault current should not have been sufficient to trip the protective relays which actuate relays 586T and 586T1. The Moccasin line fault condition caused by the storm most likely initiated the intertie protective relays operation, however the relays should not have operated. The intertie PCB 5058 inadvertently reclosing after the intertie bank trip was a result of low air pressure in the pneumatic system which is used to operate the breaker. The low air pressure was most likely caused by a leak in the PCB 5058 resistor assembly ceramic housing. This is suspected because when the pneumatic system was being repressurized, the resistor ceramic housing exploded which indicated that a weak point in the ceramic housing had existed. The MOD 5057 which is used to isolate PCB 5058 did not operate properly from the remote handswitch because of a malfunction in the switch operating mechanism. During the approximate 16 1/2 hours that the intertie bank was out of service, the offsite power transmission dispatchers, who control the operation of the offsite transmission system, allowed the offsite power system to be maintained below the limits required to supply SQN with sufficient offsite voltage capacity to maintain plant safety loads during a Design Basis Accident (DBA). This was caused by peak loading of the TVA power grid during this time which required practically full output from the operating unit (unit 2) at SQN to maintain the offsite grid voltage levels. The SQN operations personnel were unaware of the less then adequate offsite power source being available during the time the intertie bank was out of service and hence, were not aware of a need to enter the TS 3.8.1.1 action (c) requirement with both offsite power circuits unavailable. This was caused by a lack of communication from the offsite dispatcher to inform the SQN operations personnel of the adverse condition.

IV. The immediate cause of all four D/Gs automatically starting was a loss of voltage on the 1B-B 6.9kV SDBD sensed by the SDBD undervoltage relays which in turn started the D/Gs. The voltage loss on the SDBD was a result of the CSST-A tripping offline and subsequent trip of the 1A and 2A start buses and the 6.9kV unit board 1C which feed the 6.9kV SDBD. The breaker actuations which caused these electrical power boards to trip was caused by an overcurrent condition in the 2A start bus which resulted from a phase C to ground fault in the 2A start bus normal feeder breaker (151[illegible]) cabinet.

The apparent cause of the short circuit condition in the start bus breaker compartment was a mixture of moisture from the rain and dust in the compartment. The dust and moisture mixture on the surface of the C-phase current transformer (CT) apparently allowed a low impedance current path from the C-phase conductor to the cabinet wall. After the incident, discoloration spots were noticed in the breaker compartment that indicated moisture was apparently present. Inspections on other nearby breaker compartments revealed a thick layer of dust on insulators, CTs, etc., and indications of water droplets. When the 2A cabinet was partially disassembled, another inspection was performed. This inspection showed signs of degraded seals on the start bus bars. Sunlight was visible when looking up through the top of the breaker cabinet with the doghouse cover off.

The breaker actuations isolating the CSST-A also caused a loss of power to the CCW cooling tower transformer A which resulted in a loss of power to the cooling tower lights, the cooling tower lift pumps and the cooling tower pump station discharge gates.

The loss of voltage on the 2A start bus also caused a voltage loss on the 6.9kV common board A which resulted in a loss of power to the plant security computer.

ANALYSIS OF EVENT

Event IV as detailed in this report which resulted in a start of all four D/Gs, is being reported as an event which resulted in automatic actuation of an engineered safety feature (ESF).

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This event is being reported pursuant to 10 CFR 50.73, paragraph a.2.iv. The other events detailed in this report are being included for informational purposes as they were a resultant of the same thunderstorm. Each event is analyzed individually as follows:

I. The loss of the MET tower caused a loss of meteorological monitoring functions at the plant (i.e. wind speed, wind direction and air temperature which are required by TS 3.3.3.4 at all times). These functions are used to provide data for estimating potential radiation doses to the public as a result of routine or accidental radioactive releases to the public. TS 3.3.3.4 allows the MET tower functions to be inoperable up to seven days without any action required. Since the MET tower computer transmissions link to the plant was reestablished within one day, this event is considered to have had an insignificant impact on the safety of plant personnel or the general public.

II. The inadvertent trip of the 2A and 2B CCW pumps caused an unexpected perturbation in the main condenser vacuum. However, the pumps were restarted immediately and condenser vacuum stabilized without the shift operations personnel having to trip the turbine manually. The condenser back pressure reached approximately 3.7 PSIA before vacuum was stabilized. Typically with the unit operating above 30 percent power, the turbine will be manually tripped when condenser back pressure reaches 2.7 psia, however, since vacuum was being reestablished, the shift operations supervisor (SOS) elected not to trip the turbine. The operations personnel responded exceptionally well to this event and were able to stabilize plant conditions immediately, hence, this event is not considered to have had a significant impact on nuclear safety.

III. Because of peak loading conditions being present on the TVA power grid during the time the SQN 161kV/500kV intertie bank was out of service, the offsite voltage requirements were not maintained to ensure an adequate offsite power source to SQN. SQN operations personnel were unaware of this condition and hence, were unaware of the need to enter action (c) of TS 3.8.1.1 with both offsite power circuits inoperable. This TS action requires that the operability of all four D/Gs be demonstrated within one hour and every eight hours thereafter until both offsite power circuits are returned to service.

The event IV occurring at approximately 1651 EDT caused all four D/Gs to start and because of the loss of the start bus 2A, the TS 3.8.1.1 action (a) was being complied with which also requires the operability of the D/Gs to be demonstrated within one hour and every eight hours thereafter.

Hence, the demonstration of the operability requirements was being performed and satisfied the requirements of the TS 3.8.1.1 action (c). The TS 3.8.1.1 action (c) also requires that at least one of the offsite power circuits be restored to operable status within 24 hours and this was satisfied when the intertie bank was restored to service at approximately 0900 EDT on August 16, 1988 (approximately 16 1/2 hours). The TS 3.8.1.1 requirements were satisfied at all times when the intertie bank was out of service and the D/Gs were available as an emergency AC power source to provide power for the safety loads required for a safe plant shutdown and to mitigate the consequences of any DBA. Hence, this event is not considered to have had an adverse impact on nuclear safety.

IV. The loss of the CSST-A ultimately caused a voltage loss to the start bus 2A, the 6.9 kV SDBD, the cooling tower lights, the cooling tower lift pumps, the cooling tower discharge pond lift gates, and the plant security computer. The loss of power to the cooling tower equipment did not create conditions which affected the safe operation of the plant. The FAA was notified of the cooling tower lights being inoperable to preclude any accidents from low flying aircraft in the area.

During the loss of the plant security computer, plant security was maintained in the protected areas of the plant by the Nuclear Security Service (NSS) personnel and passage into the protected area was prohibited until the computer was put back into service.

The loss of the 6.9kV SDBD 1B-B resulted in an automatic start of all four D/Gs as designed. All four D/Gs accelerated to full operating parameters and power to SDBD 1B-B was automatically restored via the D/G 1B-B. With the CSST-A and the start bus 2A inoperable, only one circuit was available from the offsite power network to the onsite distribution system and hence, TS 3.8.1.1 action (a) was complied with by verifying operability of all four D/Gs. TS 3.8.1.1 allows one offsite power circuit to be inoperable for up to 72 hours without initiation of plant shutdown. The CSST-C remained operational throughout this event to provide one offsite power circuit from the 161kV offsite system. The inoperable circuit was restored within the 72 hour requirement when the start bus 2A was returned to service at approximately 1100 EDT on August 17, 1988, and was being fed from the CSST-B. The plant operated within the bounds of the TS requirements during this event and all ESF equipment operated as designed. Sufficient AC power was available at all times to ensure a safe plant shutdown in the case of an accident. Hence, this event is considered to have had an insignificant impact on the safety of the plant and the general public.

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CORRECTIVE ACTIONS

I. The immediate actions of the plant with the MET tower transmission lost to the plant was to enter the TS 3.3.3.4 action requirements and to notify the MET tower personnel. The MET tower computer link to the plant was reestablished at approximately 1729 EDT on August 15, 1988 (approximately 75 minutes later), and the T3 3.3.3.4 action was exited. No further corrective actions are required as a result of this event.

II. The immediate actions when the CCW pumps 2A and 2B were tripped offline was to restart the pumps in an attempt to reestablish condenser vacuum. The operations personnel responded immediately to the condenser pressure perturbation and were able to restore vacuum to the condenser without tripping the unit. Since this event was considered to have been caused by an isolated voltage perturbation resulting from the storm, no other corrective actions are planned.

III. When the [illegible]kV/500kV intertie bank tripped offline, the SQN operations personnel immediately notified the offsite power transmission dispatcher of the condition in accordance with GOI-6N. An investigation into the cause of the intertie bank trip was initiated but could not be determined because no relay targets were found indicating which protective relays had actuated to initiate the trip. Delays in returning the intertie bank to service were encountered because of the air leak on the PCB 5058 pneumatic system and the subsequent explosion of the PCB 5058 resistor assembly. Manual actions were also required to isolate the intertie bank after the PCB 5058 reclosing. The intertie bank was restored to operable status at approximately 0900 EDT on August 16, 1988. The PCB 5058 resistor assembly was repaired on August 17, 1988 under Work Request (WR) B277825. MOD 5057 switching mechanism was repaired and the disconnect returned to service on August 22, 1988 under WR-B768665.

Subsequent to this event, a training session was performed by the offsite Transmission Operations group for the offsite transmission dispatchers. This training session included a review of the guidelines recently implemented by the Transmission Operations group to maintain the SQN offsite power system within the specified parameters, including the reactive power output of SQN (MVARs). This training session also reemphasized the importance of the dispatchers maintaining the offsite power system for SQN and if not, the necessity of notifying the plant immediately. Retraining of the dispatchers on these guidelines is planned to be performed on a six month frequency to ensure the importance of the SQN offsite power system is maintained.

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Corrective action still to be taken as a result of this event is as follows:

1. Because of a suspected erroneous relay operation on the intertie bank PCBs, the relays controlling the intertie bank PCBs will be tested to ensure proper operation. This testing will be complete by October 16, 1988.

IV. Immediate actions resulting from the loss of the CSST-A were to comply with the action of TS 3.8.1.1 by verifying the D/G start. The 1B-B D/G was verified to energize its' associated 6.9kV SDBD 1B-B. At approximately 1732 EDT on the same day, power was restored to the 6.9kV unit board 1C, the 6.9kV common board A, and the 6.9kV SDBD 1B-B via the USST 1B and D/G 1B-B was shutdown. Operations personnel were immediately dispatched to the cooling tower lift pump station in an attempt to manually open the discharge pond gates but problems were encountered in opening the gates. Ultimately, opening of the gates was not required as the discharge pond level stabilized before overflowing occurred. Immediate actions were also taken to place the CSST-B in service as a replacement for the tripped CSST-A and to return power to start buses 1A and 2A. The CSST-B was returned to service at approximately 2200 EDT and start bus 1A at approximately 2235 EDT, on August 15, 1988. The start bus 2A was not returned to service until approximately 1100 EDT on August 17, 1988 because of additional testing required to ensure no damage had occurred from the fault condition in the start bus 2A breaker compartment. Because of power being lost to the cooling tower lights, the FAA and NRC were notified of this condition at approximately 2048 EDT and 2111 EDT, respectively, on August 15, 1988. An inspection was performed on the start bus 2A breaker compartment and other nearby breaker compartments. This inspection showed extensive damage had occurred in the start bus 2A breaker compartment and evidence of moisture and dust build-up was noted in the breaker compartments.

Subsequent to the event, oil samples were taken from the CSST-A and the CCW cooling tower transformer "A" for a gas-in-oil analysis to be performed to ensure no internal damage to the transformers had occurred.

Actions still remaining as a result of this event are as follows:

1. The damage caused by the fault condition in the start bus 2A breaker compartment will require replacement of the damaged components . The bus bar seals and compartment jointed connections on this compartment will be inspected further and will be repaired/replaced as necessary. This repair/replacement will be complete prior to placing start bus 2A breaker into service.

2. Preventive Maintenance (PM) instructions on the 6.9kV start bus switchgear will be reviewed for adequacy (particularly in the area of cleanliness tasks/inspections and inspecting the compartments for potential moisture intrusion points) and will be revised/implemented as necessary. This review will be complete by October 30, 1988.

ADDITIONAL INFORMATION

There have been no previous reportable occurrences as a result of thunderstorms.

COMMITMENTS

1. Testing of the protective relays which actuate the 161kV/500kV intertie bank PCBs will be performed by October 16, 1988. (Power System Operations-PSO)

2. Repair/replacement of the start bus 2A breaker compartment components, bus bar seals and compartment jointed connections will be completed prior to placing the breaker compartment into service. (Electrical Maintenance Section)

3. PM procedures on the 6.9kV start bus switchgear will be reviewed for adequacy by October 30, 1988 (Systems Engineering)

TENNESSEE VALLEY AUTHORITY
Sequoyah Nuclear P'ant
Post Office Box 2000
Soddy-Daisy, Tennessee 37379

September 8, 1988

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

Gentlemen:

TENNESSEE VALLEY AUTHORITY - SEQUOYAH NUCLEAR PLANT UNIT 2 - DOCKET NO. 50-328 - FACILITY OPERATING LICENSE DPR-79 - REPORTABLE OCCURRENCE REPORT SQRO-50-328/88034

The enclosed licensee event report provides details concerning four operational events and subsequent start of all diesel generators resulting from an area thunderstorm.

Very truly yours,

TENNSSSEE VALLEY AUTHORITY

S. J. Smith
Plant Manager

Enclosure
cc (Enclosure):

J. Nelson Grace, Regional Administrator
U. S. Nuclear Regulatory Commission
Suite 2900
101 Marietta Street, NW
Atlanta, Georgia 30323

Records Center
Institute of Nuclear Power Operations
Suite 1500
1100 Circle 75 Parkway
Atlanta, Georgia 30339

NRC Inspector, Sequoyah Nuclear Plant

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