

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Browns Ferry Nuclear Plant (BFN) Unit 1
DOCKET NUMBER (2) | PAGE (3) | 050002 | 5910606
TITLE (4) Engineered Safety Feature Actuation Caused By A Sudden Pressure Relay Being Struck By Tool.

EVENT DAY (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES			DOCKET NUMBER(S)
04	19	93	003	0	05	14	93	BFN Unit 3			05000296
								BFN Unit 2			05000260

OPERATING MODE (9) | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following)(11)

POWER LEVEL (10)	20.402(b)	20.405(c)	X 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)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
	20.405(a)(1)(iii)	50.73(a)(2)(i)(B)	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
E. J. Knuttel, Compliance Licensing Engineer	205729-2919

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)

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

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

On April 19, 1993, at 1359 hours, during the BFN Unit 2 refueling outage, the Athens 161 kV offsite power supply deenergized when a sudden pressure relay closed. This event was initiated by an electrician working overhead who inadvertently dropped a tool onto the sudden pressure relay causing it to close. The loss of this offsite power initiated several Engineered Safety Features systems as designed. Emergency Diesel Generators C, D, 3A, and 3B auto-started, and the Control Room Emergency Ventilation and Standby Gas Treatment Systems initiated. This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv) as a condition that resulted in manual or automatic actuation of an engineered safety feature.

The root cause of the event was inadequate prejob planning that failed to prepare the work area to provide sufficient level of protection for sensitive plant equipment. Specifically, the barriers that were installed to protect the relays from modification activities were insufficient and the scaffolding configuration was inadequate.

As a result of this event, TVA will conduct briefings on this incident with both management and field personnel to reiterate the importance of identifying all sensitive equipment in the area of work activity. Additionally, BFN procedures will be expanded to include an evaluation of work performed around sensitive equipment in the 3C relay room.

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Browns Ferry Unit 1	0500025993	00	03	00	02	06	

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

I. PLANT CONDITIONS

Unit 2 was defueled and in the Unit 2, cycle 6 refueling outage. Units 1 and 3 were shutdown and in a defueled condition.

II. DESCRIPTION OF EVENT

A. Event:

On April 19, 1993, a Modification apprentice electrician was using a manual type knockout tool to enlarge a hole in an overhead light fixture in the Control Room Emergency Ventilation (CREV) [IV] room. At 1359 hours, the electrician lost control of the tool and the tool fell over the barrier dividing the CREVS room from the relay room. The knockout tool struck the sudden pressure relay and the relay closed, resulting in the loss of the Athens 161 kV line [FK].

The loss of the Athens 161 kV offsite power supply resulted in the initiation of several unplanned Engineered Safety Feature (ESF) system actuations. Emergency Diesel Generators (EDGs) [EK] C, D, 3A, and 3B auto-started. EDGs 3A and 3B tied onto their respective 4 kV shutdown boards due to the "43" auto/manual start bus transfer switch being in the manual position to support breaker maintenance. EDGs C and D did not tie onto their respective 4 kV shutdown boards due to the 4 kV shutdown bus successfully transferring. The CREV and Standby Gas Treatment (SGT) [BH] systems also initiated. Additionally, Reactor Protection System (RPS) [JC] circuit protectors 2C1, 2C2, 3A1, and 3A2 also tripped open due to the undervoltage condition.

At approximately 1400 hours, operations personnel were dispatched to each 4 kV shutdown board and the relay room to check the status of the Athens 161 kV relays and inspect these relays to determine the cause of the ESF actuations. The cause of the ESF actuation was promptly identified and corrective actions initiated.

At 1555 hours the electrical alignment was returned to its original lineup.

This event is being reported in accordance with 10 CFR 50.73(a)(2)(iv) as an event or condition that resulted in manual or automatic actuation of an ESF.

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

B. Inoperable Structures, Components, or Systems that Contributed to the Event:

None.

C. Dates and Approximate Times of Major Occurrences:

April 19, 1993, at 1359 CDT Loss of Athens 161 kV line caused ESF actuation. EDGs C, D, 3A, and 3B auto started.

April 19, 1993, at 1555 CDT Electrical alignment returned to the original lineup.

April 19, 1993, at 1711 CDT Four hour nonemergency notification to NRC in accordance with 10 CFR 50.72(b)(2)(ii).

D. Other Systems or Secondary Functions Affected:

None.

E. Method of Discovery:

Control room operators immediately recognized that ESF actuations (diesel generator, CREVs, and RPS auto-start) had occurred based on indications in the control room.

F. Operator Actions:

Upon receipt of ESF indication in the control room, Operations personnel went to each 4 kV shutdown board and the relay room to check status of the Athens 161 kV relays. Based on discussions with involved personnel and inspection of both the relay and CREVS room, the cause of the ESF was promptly identified and corrective actions initiated. Return to original electrical alignment was achieved without incident.

G. Safety System Responses:

The plant systems responded as designed for the loss of power to a shutdown bus under the outage electrical alignment.

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

III. CAUSE OF THE EVENT

A. Immediate Cause:

A sudden pressure relay was struck by a tool which caused the relay to close, resulting in the loss of the Athens 161 kV off-site power.

B. Root Cause:

The root cause of the event was inadequate pre-job planning that failed to prepare the work area to provide sufficient level of protection for sensitive plant equipment. Specifically, the barriers that were installed to protect the relays from modification activities in the CREVS room were insufficient and the scaffolding configuration in relation to the work activity caused the electrician to work in an awkward position. The electrician had to work overhead while leaning over the scaffolding handrails.

C. Contributing Factors:

The craft performing the overhead work were not aware that their work activity could affect sensitive equipment in locations external to the CREVS room.

IV. ANALYSIS OF THE EVENT

This event occurred with Unit 2 defueled and in the Unit 2, cycle 6 refueling outage. Units 1 and 3 were shutdown and in a defueled condition. The plant was in an outage alignment with the 43 (auto/manual) transfer switch for 1A 4 kV start bus in manual position. When the Athens 161 kV offsite power supply deenergized due to closure of the sudden pressure relay, the ESF systems responded correctly to the start bus power loss. Since the actuation logic of the ESF system performed as designed, this event had no safety significance.

If this event had occurred during normal power operation with all three units operating at 100 percent power and with a normal system alignment, the loss of the Athens 161 kV line would not have caused an ESF actuation of the diesel generators. The normal supply to the start bus 1A from the Athens 161 kV line would have automatically transferred to the alternate supply from the Trinity 161 kV line. Only the supply to Common Station Service Transformer A and the cooling tower transformer Number 1 would have been lost, causing loss of power to the 4 kV outside loop.

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Browns Ferry Unit 1		93	03	00	05	06

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

V. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

The scaffolding was reconfigured to allow personnel to work in a less awkward position and to shield the pressure relay against falling objects. Additionally, a protective cover was fabricated and placed over the relay. Briefings were also held among the personnel involved in the incident to stress the importance of identifying sensitive equipment in the area of work activities prior to performing the work.

B. Corrective Actions to Prevent Recurrence:

- Briefings will be held with the Modification Task Managers, Supervisors, Foreman, and Field Engineers to stress the importance of identifying all sensitive equipment in the area of work activities prior to performing the work. The importance of equipment protection during the work activities and the need for monitoring the work areas to stay cognizant of the changing work environment will be stressed during these briefings.
- BFN's Plant Modification and Design Change Control procedure will be expanded to include an evaluation of work around sensitive equipment. This procedure will specifically address work in the 3C relay room. If work is to occur in 3C relay room, a walk down with operations must be performed and methods devised to protect the sensitive equipment during the work. The method of protection will be annotated in the work plan and signed off by the responsible engineer and operations representative.

VI. ADDITIONAL INFORMATION

A. Failed Components:

None.

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

B. Previous LERs on Similar Events:

Several BFN LERs have been written to address ESF actuations caused by inadvertent bumping of sensitive equipment relays, instruments, or switches by craft personnel. However, none of these events were caused by relays being struck by a falling object. Previous corrective actions to prevent recurrence of these types of events included: training of personnel, installing protective devices for sensitive equipment, enhancing procedures, and adding precautionary information placards.

The most recent similar event (LER 50-259/91006) occurred when maintenance personnel performing work in a control panel inadvertently bumped the contacts of a relay associated with a radiation monitor. Although part of the immediate corrective actions taken for this previous event were the same (e.g, added protective cover for the relay), the root cause was attributed to a design which made it difficult to perform work. Therefore, the corrective actions specified by this LER would not have prevented this event.

VII. COMMITMENTS

1. Briefings will be held with the Modification Task Managers, Supervisors, Foreman, and Field Engineers to stress the importance of identifying all sensitive equipment in the area of work activities. This will be completed by July 1, 1993.
2. BFN's Plant Modification and Design Change Control procedure will be expanded to include an evaluation of work around sensitive equipment. This procedure will specifically address work in the 3C relay room. If work is to occur in 3C relay room, a walk down with operations must be performed and methods devised to protect the sensitive equipment during the work. The method of protection will be annotated in the work plan and signed off by the responsible engineer and operations representative. This will be completed by July 1, 1993.

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].