

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Turkey Point Plant - Unit 3										DOCKET NUMBER (2) 0 5 0 0 0 2 5 0										PAGE (3) 1 OF 0 5	
TITLE (4) Engineered Safety Features Actuation - Reactor Trip																					
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 2	1 6	8 4	8 4	0 0 7	0 0 0	3 1	9 8	4	Turkey Point Unit 4			0 5 0 0 0 2 5 1									
									N/A			0 5 0 0 0									
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)																			
N		20.402(b)				20.405(c)				<input checked="" type="checkbox"/> 50.73(a)(2)(iv)				73.71(b)							
POWER LEVEL (10)		20.405(a)(1)(i)				50.38(a)(1)				<input type="checkbox"/> 50.73(a)(2)(v)				73.71(a)							
1 1 0 1 0		20.405(a)(1)(ii)				50.38(a)(2)				<input type="checkbox"/> 50.73(a)(2)(vi)				OTHER (Specify in Abstract below and in Text, NRC Form 305A)							
		20.405(a)(1)(iii)				50.73(a)(2)(i)				<input type="checkbox"/> 50.73(a)(2)(viii)(A)											
		20.405(a)(1)(iv)				50.73(a)(2)(ii)				<input type="checkbox"/> 50.73(a)(2)(viii)(B)											
		20.405(a)(1)(v)				50.73(a)(2)(iii)				<input type="checkbox"/> 50.73(a)(2)(ix)											
LICENSEE CONTACT FOR THIS LER (12)																					
NAME										TELEPHONE NUMBER											
Jesus Arias, Jr., Regulation and Compliance Lead Engineer										AREA CODE 3 0 5 2 4 5 - 2 9 1 0											
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																					
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS											
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR							
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)										<input checked="" type="checkbox"/> NO											

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

While at steady state operation on both units, a loss of the 4C 4160 volt bus caused a reactor trip on Unit 4 from 100% power. The reactor trip actuation logic was steam flow greater than feed flow coincident with low level on 4A steam generator caused by 4B steam generator feedwater pump tripping upon loss of the 4C bus. Approximately 1 minute later, a lockout of the 3C 4160 volt bus transformer stripped the 3C bus and tripped the 3B steam generator feedwater pump. The ensuing transient caused a reactor trip on Unit 3 from 100% power due to high pressurizer pressure.

A detailed explanation of the root causes and corrective actions is included in the text portion of this report.

The health and safety of the public were not affected. Similar occurrences: 250-84-006 and 251-84-001.

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Turkey Point Plant - Unit 3	0500025084-007-00	84	007	00	02	OF	05

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

While at steady state operation on both units, a dual unit trip occurred from 100% power. In both cases, the loss of the 3C and 4C 4160 volt busses resulted in the reactor trips.

A Nuclear Turbine Operator (NTO) was directed to rack out breaker 4AC01 (alternate feed to 4C bus from Unit 3) which was already open. In opening the door to the breaker cubicle, interference was encountered with a bolt that bound the door. As the door opened, the jarring set up vibrations in the door. The vibrations spuriously actuated an auxiliary relay (174/4C1 TDDO) mounted on the cubicle door which caused a 4C bus lockout. This signal tripped all input and load breakers on 4C bus including the 4B steam generator feedwater pump. Loss of the B feed train caused a Unit 4 turbine governor runback followed by a reactor trip on steam flow greater than feed flow coincident with low level on 4A steam generator.

Approximately 1 minute later, the NTO proceeded to close the 4AC01 cubicle door. Again the door travel encountered interference by the same bolt. The resulting vibrations spuriously actuated a fault detector overcurrent relay (150/4CBTY) which was also mounted on the cubicle door. This coupled with the fact that breaker 4AC01 was open caused the 62/SAM timer to be energized, producing a Unit 3 3C transformer lockout. As a result, zone E of the Northeast bus differential protection was actuated and initiated a lockout on the Northeast bus de-energizing the 3C transformer, the Unit 3 start-up transformer and loss of voltage to the 3C 4160 volt bus thus de-energizing the 3B steam generator feedwater pump. System response was unable to control the transient and the reactor tripped due to high pressurizer pressure.

Unit 3 entered natural circulation (RCPs de-energized) following the loss of off-site power caused by the start-up transformer being de-energized. Natural circulation was verified by operating procedure 1008.7 and parameter displays for QSPDS (Inadequate Core Cooling System). A post trip review was performed for each unit and found all safety system responses to be adequate. Unit 4 was stable following the trip with off-site power available.

The following immediate actions were taken as a result of the dual unit trip:

- 1) A significant event notification was made to NRCOC via ENS following the Unit 4 trip in accordance with 10 CFR 50.72.
- 2) Subsequently, following the Unit 3 trip with loss of off-site power, an unusual event was declared activating the emergency plan. State and NRCOC were then notified of the declaration of an unusual event.
- 3) In order to centralize the recovery efforts, the Technical Support Center was activated. Technical and Management Staff proceeded to review the sequence of events and possible concerns arising from the transients.

A Plant Manager's directive was issued holding restart of either unit until an evaluation of the electrical system was performed and results discussed with NRC Region II staff members.

The following is a summary of recovery actions taken in an attempt to stabilize both units and related systems:

- 1) Cleared undervoltage condition on 3A and 3B 4160 volt busses upon auto start and loading of both Emergency Diesel Generators.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

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

- 2) Northeast bus differential reset and Unit 3 start-up transformer energized.
- 3) 3A and 3B 4KV busses energized, then secured the emergency diesel generators.
- 4) Started 3A reactor coolant pump and stabilized RCS temperature. Ended natural circulation.
- 5) Normal feed train back in service (3A S/G feed pump).
- 6) Terminated the unusual event and proper notifications were made to State and NRCOC.
- 7) 4C 4KV bus re-energized.
- 8) Using a PNSC approved temporary operating procedure, the 3C 4KV bus was energized from the 4C transformer.
- 9) Containment parameters and RCS chemistry (iodine) verified to be normal.

At this point, both units were stable and recovery actions continued to return all systems to normal configuration.

Root Cause

A bolt was found to interfere with 4ACG1 breaker cubicle door travel. When the door hit the bolt, the resulting vibrations spuriously actuated sensitive relaying mounted on the door. The equipment installed for the auxiliary power upgrade is non-class 1E.

Special Test 84-03 was performed to determine the root cause. The test consisted of 15 operations of the cubicle door. The circumstances were changed by removing the interfering bolt for some operations, putting the bolt back in the as-found location. The test proved beyond any reasonable doubt that the above mentioned root cause was correct.

Corrective Actions

The corrective actions are divided into two categories. Short term corrective actions which were completed prior to unit start-up and long term corrective actions.

Short Term

- 1) The interfering bolt was removed, and all other doors were checked and adjusted for proper clearances.
- 2) Signs were painted on breaker cubicle doors for 3AC01, 3AC02, 3AC03, 3AC15, and 3AC16 in Unit 3 C 4KV switchgear room and 4AC01, 4AC02, 4AC03, 4AC15, and 4AC16 in Unit 4 C switchgear room. These signs caution personnel to be careful when opening the cubicle doors.
- 3) Finalized the development and review of plant procedures for the alignment and administrative control of off-site and on-site power sources including Plant Nuclear Safety Committee review.

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U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/85

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

- 4) Required operator training was performed. This training included a review of the related incidents and changes made as a result.
- 5) Meggering and transformer turns ratio checks were performed on the 3C transformer and found no problems. This is normal practice when a transformer lockout is experienced.
- 6) Due to the sensitivity to vibration of certain relays when mounted on cubicle doors, the following relay relocations were implemented. These relays were installed inside the adjacent metering and relaying compartments in order to reduce the chance of inducing mechanical actuation (Unit 3 PC/M 84-36 and Unit 4 PC/M 84-37).

<u>Relay</u>	<u>Removed from Cubicle</u>	<u>Relocated to Cubicle</u>
174-3AC16	3AC16	3AC15
174-3AC03	3AC03	3AC02
174-3AC01	3AC01	3AC02
174-4AC16	4AC16	4AC15
174-4AC03	4AC03	4AC02
174-4AC01	4AC01	4AC02

These relays are manufactured by General Electric, Type HGA, Model No. 12HGA17C61. Their function is to perform as an auxiliary relay for breaker tripping and alarming with a 0.25 second Time Delay Drop Out feature.

- 7) A visual inspection of both 4KV C bus switchgear rooms and respective relays was conducted and any observed housekeeping deficiencies were corrected.
- 8) PC/M 84-35 was implemented to effectively isolate the Unit 3 Start-up and C bus transformers from: (1) The switchyard 240 KV Northeast bus and any protective relaying associated with that bus, and (2) the Flagami No. 2 line and any protective relaying associated with it. This modification will enhance the reliability of the off-site power availability to Unit 3 and prevent an electrical fault originated in the Fossil Units 1 and 2 to possibly affect the nuclear units' electrical system.
- 9) Replaced the synchronism relay on Unit 4 which had failed on the previous unit trip. (Refer to LER 251-84-001.)
- 10) Implemented switching modifications to:
- Cross feed the 4C 4KV bus from the 3C transformer and 3C 4KV bus from the 4C transformer.
 - Isolate all ties and alternate feeds to the C 4KV busses by racking out and locking all respective breakers.

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- 11) Performed Special Test 84-04 in an attempt to functionally test certain auxiliary power breaker interlocks. During the initial attempt to synchronize and close breaker 3AC01, breaker 3AC16 failed to trip open automatically. Attempts to repair breaker 3AC16 were unsuccessful. Then proceeded to replace 3AC16 with breaker from cubicle 4AC16. During attempts to repair breaker 3AC16 some loose bolts were noticed in the breaker mechanism. Based on this finding, further inspections were performed on all accessible breakers on the 3C switchgear and found no other loose bolts. Special Test 84-04 was then completed satisfactorily.
- 12) A design review for the Auxiliary Power Upgrade modifications was performed in conjunction with Bechtel Engineering Staff. Results showed the design to be acceptable.
- 13) The Plant Nuclear Safety Committee and the Company Nuclear Review Board performed a review on all PC/Ms designed to implement the Auxiliary Power Upgrade modifications. No safety concerns were encountered and, therefore, none of the PC/Ms represented an unreviewed safety question.
- 14) All operating drawings were field checked, updated and issued to the operating staff including all short term modifications described above.
- 15) Administrative controls were placed to assure that both start-up transformers will be operable whenever either nuclear unit is above 50% rated feedwater flow.

These short term corrective actions were discussed with the NRC Office at Region II and upon concurrence and completion of such actions, both units were returned to full power operation on February 24, 1984.

Long Term

- 1) As previously explained on LER 251-84-001, a task force review of the original nuclear unit power runback features has begun. We will keep your office informed of the ongoing status and final results of this review.
- 2) A review of past non-nuclear safety related PC/Ms will be conducted. We will keep your office informed of the ongoing status and final results of this effort.
- 3) A review of the plant off-site and on-site electrical power supply configurations and related Plant Technical Specifications is underway. The status and proposed completion date of this review will be provided to your office and the NRR Licensing Project Manager, Dan McDonald.
- 4) The need for relocating all relays mounted on cubicle doors in the C 4KV bus switchgear will be evaluated. Results requiring corrective actions will be submitted to your office.
- 5) A program to ensure cleanliness and proper housekeeping in switchgear rooms will be developed and implemented. Also, an evaluation of HVAC in the C switchgear rooms will be performed.



March 19, 1984
PNS-LI-84-99

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

Gentlemen:

Re: Reportable Event 84-07
Turkey Point Unit 3
Date of Event: February 16, 1984
Engineered Safety Feature Actuation - Reactor Trip

The attached Licensee Event Report is being submitted pursuant to the requirements of 10 CFR to provide notification of the subject event.

Very truly yours,

A handwritten signature in cursive script, appearing to read "J.W. Williams, Jr.", is written over a horizontal line.

J.W. Williams, Jr.
Vice President
Nuclear Energy

JWW/PLP:js

Attachment

cc: J. P. O'Reilly, Region II, USNRC
Harold F. Reis, Esquire
File 933.1 TP

IE-22

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