

Reference 13



June 13, 1978

PRN-LI-78-154

Mr. James P. O'Reilly, Director, Region II  
Office of Inspection and Enforcement  
U. S. Nuclear Regulatory Commission  
230 Peachtree Street, N. W., Suite 1217  
Atlanta, Georgia 30303

Dear Mr. O'Reilly:

REPORTABLE OCCURRENCE 335-78-17  
ST. LUCIE UNIT 1  
DATE OF OCCURRENCE: MAY 14, 1978

OFF-SITE POWER

The attached Licensee Event Report is being submitted in accordance with Technical Specification 6.9 to provide 30-day notification of the subject occurrence.

Very truly yours,

A. D. Schmidt  
Vice President  
Power Resources.

MAS/ms

Attachment

cc: Harold F. Reis, Esquire  
Director, Office of Inspection and Enforcement (30)  
Director, Office of Management Information and  
Program Control (3)

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### INTRODUCTION

Florida Power & Light Co. (FPL) experienced an electrical power system disturbance on Sunday, May 14, 1978, which resulted in the loss of power to an area of the FPL system. This blacked out area included the loss of off-site power to St. Lucie Plant for approximately 8 minutes.

Fault recorder records, the West Palm Beach computer printout, and logs were used to reconstruct the sequence of events.

### PRE-DISTURBANCE CONDITIONS

Only conditions in affected area are listed:

- 1 - St. Lucie Plant unit No. 1 off for refueling.
- 2 - Pratt & Whitney 240kV ring bus open (240G36835 open) prior to switching. This switch had been previously reported to be arcing. The Dispatcher believed the switch to still be inoperative.
- 3 - Two 240/138kV autotransformers (49-1035 & 49-1168) at Midway Substation were recently installed to replace smaller capacity units.

### DISTURBANCE

On Sunday, May 14, 1978, at approximately 7:45AM while switching out the Pratt & Whitney-Ranch 240kV circuit for a routine clearance, a condition was created on the Pratt & Whitney south 240kV bus that caused lightning arresters on this bus to fail destructively.

Hot ionized gas from the lightning arresters caused a "C" phase to ground fault on the Midway-Ranch 240kV circuit which passes directly over the Pratt & Whitney bus.

At Midway Substation improper connection of the relay current polarizing circuit resulted in incorrect operation of the Directional Carrier Ground Relays (CLPG) on the Malabar-Midway 240kV No. 1, Malabar-Midway 240kV No. 2 and the Midway-Plumosis 138kV circuits. Erroneous current polarizing likewise resulted in failure to trip by the ground relays of the Midway terminal of the faulted Midway-Ranch 240kV circuit. Failure of this terminal to trip resulted in a back-up operation of the autotransformer tertiary relay at Midway Substation.

The Hartman-Midway and Okeechobee-Midway lines then tripped, interrupting service to St. Lucie and other stations. On-site power was supplied at St. Lucie by automatic diesel generator operation. St. Lucie remained on diesel power until after system conditions stabilized.



For given phase to ground fault, the north autotransformer tertiary relay is more sensitive than the south autotransformer tertiary relay. This accounts for the operation of only the north autotransformer tertiary relay.

The two main contributing factors to the power loss were:

- 1 - Improper switching at Pratt & Whitney Substation.
- 2 - Improper connection of both 240/138kV autotransformer polarizing CT circuits at Midway Substation.

#### RESTORATION

Several attempts were made to energize the north bus at Midway Substation via the Malabar 240kV No. 2 circuit. However, the lockout relay previously tripped by the tertiary relay had not been reset. The south bus at Midway Substation was energized via the Ranch 240kV circuit.

As switching continued to normalize the system, a breaker at Pratt & Whitney was closed and the original lightning arrester problem was recreated. This resulted in the deenergizing of Midway Substation.

Final reenergization of Midway Substation and St. Lucie Plant was accomplished by the closing of the Ranch 240kV circuit at 7:53:30.

This resulted in the loss of off-site power to St. Lucie Plant for approximately eight minutes and sixteen and one-half seconds.

Switching was then carried out until the entire affected area was returned to normal with the exception of Midway Substation's north autotransformer.

#### CORRECTIVE ACTIONS

- 1 - The improper polarizing at Midway Substation has been corrected.
- 2 - The north and south buses at Pratt & Whitney Substation have been tied together to avoid the bus high voltage problem encountered during switching.
- 3 - Drawings in use at the time were reviewed and an error was detected. As a result of this, System Protection Memorandum No. 3.10.1-A titled "The Connection of CT's In An Autotransformer When Used As a Source For Ground Polarizing Circuit" was issued May 22, 1978. This memorandum outlines the procedures for checking transformer nameplate data against FPL drawings as well as the electrical tests which are to be made. This memorandum will be incorporated into the Power Supply Procedures Manual and will prevent a recurrence of this event.
- 4 - System Operators and Dispatchers have been advised of the hazards of an ungrounded delta.

