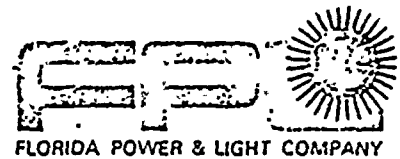


Reference 4



March 25, 1974

Mr. Norman C. Moseley
Director Region II
Directorate of Regulatory Operation
U. S. Atomic Energy Commission
230 Peachtree Street, N. W., Suite 818
Atlanta, Georgia 30303

Dear Mr. Moseley:

TURKEY POINT PLANT
DOCKET NOS. 50-250 & 50-251
UNIT TRIPS - MARCH 1, 1974

The following information is submitted in response to your telephone request of March 4, 1974, and is based on review of plant records (logs, data sheets and charts), statements by operating personnel on shift at the time of the trips, and data provided by our system operations department.

DESCRIPTION OF OCCURRENCE

On Friday, March 1, 1974, the Turkey Point #4 Unit was increasing load after a reduction test (50% load reduction test portion of the start up test program) which had occurred at 1:15 AM. The unit was generating 640 MW, the voltage regulator control was switched from the automatic to the manual mode. The output voltage of this unit began to oscillate and the operator attempted to stabilize the voltage by controlling generator voltage manually. At the same time, there were oscillations of the power output of the Turkey Point #3 Unit which was generating 750 MW. Turkey Point #4 Unit tripped due to loss of field and the Turkey Point #3 Unit was tripped by the operator.

The minimum system frequency recorded during the transient was 58.95 Hertz. Underfrequency load shedding relays reduced the interconnected system electrical load by 387 MWe by automatic opening feeder breakers. This caused short term power interruptions scattered over peninsular Florida.

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The underfrequency relay trips shed the system load as follows:

Florida Power & Light	197 MW
Jacksonville Electric Authority	75 MW
Florida Power Corporation	60 MW
Tampa Electric Company	35 MW
Orlando Utilities Commission	20 MW
TOTAL	387 MW

There were no critical loads lost as a result of the disturbance. Most of the shed load on the Florida Power & Light Company system was restored within thirty minutes and the maximum outage time was two hours sixteen minutes.

Both units were placed in safe hot shutdown condition and various required maintenance was performed including inspection and check of Unit #4 generator, exciter and voltage regulator and the Unit #3 voltage regulator.

Turkey Point Unit #3 was returned to service at 2:20 PM, March 1, 1974, and Unit #4 was returned to service at 3:14 PM, March 1, 1974.

ANALYSIS OF OCCURRENCE

In order to conserve fuel oil, both Turkey Point nuclear units are operated at maximum power around the clock. During the minimum load periods, the units have operated with a leading power factor; i.e., taking reactive power from the system. In order to attempt to hold the system voltage down during the minimum load periods, the machine voltage is lowered, causing the machine to operate in the lead and approach its stability limit.

Preoperational Test Procedure T-0201.24, Large Load Reduction, had been performed on Turkey Point Unit #4 at 1:15 AM. This test had been successfully completed and unit load was being increased in an orderly fashion after the test. Voltage oscillations affecting both Unit Nos. 3 & 4 had occurred on the evening shift February 28, 1974, and Unit #3 voltage regulator had been in manual control since that time. A decision was made to attempt to place both Units 3 & 4 voltage regulators in automatic. In view of the voltage oscillations experienced earlier with both voltage regulators in automatic, it was decided to place Unit #4 voltage regulator in test, then place Unit #3 voltage regulator in automatic and monitor for oscillation. If none occurred, Unit #4 voltage regulator would then be returned to automatic. This operation was in progress and Turkey Point Unit #4 tripped from 640 MWe almost immediately after its voltage regulator was transferred from automatic to manual control and a voltage transient was experienced. The cause of the trip was loss of field which actuated the generator lockout relay.

Turkey Point Unit #3 tripped approximately one minute later from about 750 MWe during the transient following the trip of Unit #4. Initial findings that overpower ΔT Reactor trip was the initiating event have been discounted by subsequent detailed investigation and it now appears that the cause of the Unit #3 trip was premature actuation of the turbine manual trip pushbutton.

The oscillation observed at Turkey Point before the loss of the two units are indicative of system instability. Since these units were operating at light excitation, full load and with the voltage regulators in the manual mode, it is concluded that the #3 generator reached the stability limit and its variations along with the manual readjustment of the #4 voltage regulator caused the #4 generator to trip from loss of field.

PREVENTIVE ACTION

The following measures are being taken by FPL to avoid repetition of this occurrence:

1. The problem of machine stability has been recognized and procedures to avoid instabilities will be established.
2. Stability limit curves are being prepared for each unit on the system and will be issued to System Operations dispatchers and power plant operating personnel with instructions not to exceed the prescribed limit. (Voltage limits for each unit will be established with a 15% margin above the stability limit).
3. 50,000 KVAR of distribution capacitors have been removed from the system to reduce the leading reactive power on units during the minimum load periods. These capacitors will be reconnected as soon as the minimum load level of the system will permit.
4. The voltage regulator settings of Turkey Point Units 3 & 4 have been reviewed and revised, and both Units 3 & 4 voltage regulators are now operated in the automatic mode.

If you have any further questions about this occurrence, please do not hesitate to call me.

Very truly yours,


A. D. Schmidt

Director of Power Resources

GEL/kmw

cc: Mr. J. F. O'Leary
Mr. Jack R. Newman

