



September 14, 1973

Mr. John F. O'Leary, Director
Director of Licensing
Office of Regulation
U.S. Atomic Energy Commission
Washington, D.C. 20545



TURKEY POINT UNIT NO. 3
DOCKET NUMBER 50 - 250
ABNORMAL OCCURRENCE REPORT NO. 3-73-9
FAILURE ON NO. A EMERGENCY DIESEL-GENERATOR TO START

Dear Mr. O'Leary:

I. INTRODUCTION

This report is submitted in accordance with Technical Specification 6.6.2.a for Turkey Point Unit No. 3, Operating License No. DPR-31 and describes an abnormal occurrence which was identified on September 5, 1973. The Directorate of Regulatory Operations, Region II, was notified on September 5, 1973.

II. DESCRIPTION OF OCCURRENCE

On September 5, 1973 at about 5:55 a.m., No. A Emergency Diesel-generator failed to start when the control center Start pushbutton was manually actuated for the performance of a functional test. This failure of No. A Emergency Diesel-generator to start is an abnormal occurrence.

III. ANALYSIS OF OCCURRENCE

An immediate investigation by plant personnel revealed that No. A Diesel-generator lockout relay had actuated and locked out. Visual check of the generator bus differential, over-current, reverse power, and loss of field relays showed that no targets were down. There were no indications of low starting air pressure, low bearing oil pressure, or similar conditions which could cause the actuation of the lockout relay. Review, analysis, and evaluation of the results of the initial investigation concluded that the actuation of the Diesel-generator lockout relay terminated the start of No. A Diesel-generator. Although the cause of the lockout actuation was not determined, the absence of protective relay targets indicated that the problem was not associated

Mr. John F. O'Leary, Director

September 14, 1973

with operation of the protective relays.

INVESTIGATIVE ACTION AND RESULTS

1. No. A Emergency Diesel-generator was tested after an operator was assigned to closely monitor starting conditions. When the Start pushbutton in the control center was manually actuated, the operator reported that he heard a solenoid operate two cycles quickly. On the third cycle the engine started to turn and increase speed, but stopped before the engine had gained very much speed. Immediate inspection revealed that the relays or protective devices showed no targets. However, the Diesel-generator lockout relay was tripped and the Start Failure indicating light was illuminated. The other trip and alarm indicating lights were normal for engine shutdown conditions. Review, analysis and evaluation of the results of this test concluded that the actuation of the lockout relay was caused by the failure of the engine to reach minimum speed within the time required for a confirmed start.
2. No. A Emergency Diesel-generator was then tested after stationing additional personnel in the area to provide for increased surveillance during the starting cycle. When the local Start pushbutton was actuated, the starting motors engaged, turned the engine, and a successful start was accomplished. This test demonstrated operability of the engine but was inconclusive in determining the cause of the failures to start.
3. No. A Emergency Diesel-generator was then tested by actuating the Start pushbutton in the control center and started successfully. This test was repeated and identical results were obtained.
4. No. A Emergency Diesel-generator was tested again using the local Start pushbutton and successfully started.
5. Evaluation of the results of the tests performed concluded that No. A Emergency Diesel-generator demonstrated operability considering the four consecutive successful starts.

DISCUSSION

Review, analyses, and evaluation of the results of the investigation and tests described above concluded that the failure of No. A Emergency Diesel-generator to start was caused by the actuation of the diesel-generator lockout relay. The relays and protective devices associated with the generator and electrical system showed no targets or flags following the failures to start.

6939

However, the Diesel-generator lockout relay tripped and locked out after each unsuccessful engine start.

Considering the observation that the engine started to roll but automatically shutdown before the engine speed increased appreciably, it was concluded that actuation of the lockout relay was caused by the failure of the engine to reach the minimum speed within the time required for a confirmed start. Evaluation of results of investigations to determine possible mechanical problems was inconclusive. However, it should be recognized that No. A Emergency Diesel-generator starting system components which could have caused the failure of the engine to start were exercised during the performance of the tests described above.

Review of operation and maintenance records for Nos. A and B Emergency Diesel-generators show that on March 10, 1973 No. A Emergency Diesel-generator failed to automatically start. This failure was determined to be caused by a malfunction of the starting air solenoid and was reported on abnormal occurrence report No. 3-73-3.

IV. CORRECTIVE ACTION

Immediate corrective action taken was to perform additional starting tests on No. A Emergency Diesel-generator. Performance of these starting tests exercised all of the components in the engine starting system. If the failure to start the engine had been caused by a malfunction of a starting system component, exercising the component by operation could have corrected the problem.

No. A Emergency Diesel-generator was successfully started four consecutive times. It was concluded that this demonstrated operability of the Diesel-generator. The cause of the failure to start was not determined.

V. ANALYSIS AND EVALUATION OF SAFETY IMPLICATIONS OF THE OCCURRENCE

Nos. A and B Emergency Diesel-generators provide a source of emergency power. Each Diesel-generator can be connected to either of the two units. In addition each Diesel-generator has sufficient capacity to provide for the orderly shutdown of both units including the operation of engineered safety features on one unit while the other unit is in safe shutdown condition. Therefore No. B Emergency Diesel-generator being operable meets the above criteria. This was successfully demonstrated during the startup testing program.

During the time No. A Emergency Diesel-generator was considered inoperable, the two fossil units and the two nuclear units were supplying the 240 Kv switchyard and the transmission system

Mr. John F. O'Leary, Director

September 14, 1973

through seven transmission lines. If a complete loss of off-site power had occurred because of the simultaneous loss of these off-site power supplies, No. B. Emergency Diesel-generator would have automatically started to provide the required emergency auxiliary power to operate the engineered safety features for one unit and place the second unit in a safe shutdown condition. Therefore the failure of No. A Emergency Diesel-generator to start did not adversely affect the safe operation of Unit Nos. 3 and 4.

Comparison of the actual conditions during the incident described above, with the safety analyses presented in Turkey Point Unit Nos. 3 and 4 Final Safety Analysis Report shows that the conditions assumed in the safety analyses are more conservative than the actual conditions which existed during the time No. A Emergency Diesel-generator was considered inoperable. Because the No. B Emergency Diesel-generator was operable, it was concluded that the safe operation of Unit Nos. 3 and 4 was not adversely affected.

VI. CONCLUSIONS

- a. Failure of No. A Emergency Diesel-generator to start after the Start pushbutton was actuated is an abnormal occurrence.
- b. This failure to start was caused by the actuation of No. A Emergency Diesel-generator lockout relay. Results of an immediate investigation to determine the cause of the lockout relay actuation pointed toward the engine starting cycle because the relay and protective devices showed no targets.
- c. Immediate corrective action taken was to perform starting tests while closely monitoring starting conditions. Results of the first test showed the engine started to turn, but automatically shut down before the engine speed increased appreciably. After this test a Start Failure indicating light was illuminated and the lockout relay had tripped. It was concluded that the lockout relay actuated because the engine failed to attain minimum speed in the time required for a confirmed start.
- d. During the performance of the next four starting tests, successful starting was accomplished. Review, analysis, and evaluation of the results of the test concluded that No. A Emergency Diesel-generator had demonstrated operability and was returned to normal standby service.
- e. During the performance of the tests, the engine starting system components which could cause the start failure were exercised. Exercising the engine starting system components could have corrected the malfunction. The cause of the start failure was not determined.

Mr. John F. O'Leary, Director

September 14, 1973

CONCLUSIONS (Continued)

- f. Review of operation and maintenance records for Nos. A and B Emergency Diesel-generators show that on March 10, 1973, No. A Emergency Diesel-generator failed to automatically start. This failure was determined to be caused by malfunction of the engine starting air solenoid.
- g. Each Diesel-generator has sufficient capacity to provide for the orderly shutdown of both units including the operation of engineered safety features on one unit while the other unit is placed in a safe shutdown condition. No. B Emergency Diesel-generator being operable meets the above criteria. Comparison of the actual conditions which existed during the incident described above with the safety analyses presented in PSAR Section 14, concludes that the safe operation of Unit Nos. 3 and 4 was not adversely affected.
- h. The abnormal occurrence did not present any danger to the public health and safety.

Very truly yours,

JRB
for A.D. Schmidt
Director of Power Resources

ADS/JKH/VTC/dd

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