ACCESSION #: 9903050371

NON-PUBLIC?: N

LICENSEE EVENT REPORT (LER)

FACILITY NAME: South Texas Unit 2 PAGE: 1 OF 4

DOCKET NUMBER: 05000499

TITLE: Automatic Reactor Trip Due to Loss of Power to the

Turbine Control System

EVENT DATE: 01/21/1999 LER #: 1999-002-0 REPORT DATE: 02/18/1999

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100%

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Scott Head-Licensing Supervisor TELEPHONE: (512) 972-7136

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE EPIX:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On January 21, 1999, Unit 2 was in Mode 1 at 100% power. At 0607 hours CDT, Unit 2 experienced an automatic reactor trip due to closure of the turbine throttle valves. The throttle valves closed due to a loss of power to the turbine control circuitry resulting from an inadvertent opening of a 120-volt supply breaker. All control rods fully inserted. The Engineered Safeguards Features System actuated the Auxiliary Feedwater System and Feedwater Isolation as expected for a reactor trip. Efforts were underway to isolate a ground on 480-volt Load Center 2G1. The individual performing the ground checks

opened breakers in Distribution Panel DP0408 when he should have been in Distribution Panel DP0407. The root cause for being in the wrong panel was inadequate self-verification by the individual. The inadequate verification was due to fatigue and overconfidence in performing an evolution perceived as being low risk. A contributing factor was inadequate guidance for ground isolation. Actions taken or planned in response to the cause of the trip include addressing personnel performance issues with the individuals involved in accordance with the Constructive Discipline Program, reviewing self verification training with plant operators and reactor operators, development of guidance for ground isolation, and guidance for identifying and discussing error-likely situations in pre-job briefings, and training on electrical theory for licensed operators.

DESCRIPTION OF EVENT

On January 21, 1999, Unit 2 was in Mode 1 at 100% power. At 0607 Unit 2 experienced an automatic Reactor trip due to closure of the turbine throttle valves. The turbine throttle valves closed due to a loss of power to the turbine latch signal resulting from an inappropriate opening of a 120 VAC supply breaker. All control rods fully inserted. The Engineered Safeguards Features System actuated the Auxiliary Feedwater System and Feedwater Isolation as expected for a reactor trip. Details of the reactor trip are as described below.

The control room's trouble annunciator alarm associated with Load Center 2G1 was not alarming when a ground was being indicated by the load center's local ground detector. During the investigation of this annunciator problem, it was reported to the control room that the local ground indication was functioning correctly and there was a hard ground on 480V Load Center 2G1. A plan to isolate the ground was developed to initially cycle only non-essential loads such as lighting and heater supply breakers powered from Load Center 2G1 The cycling of these breakers would be

coordinated with monitoring the ground indication on Load Center 2G1 The control room would monitor the evolution on the radio. The lighting and heater supply breakers to be cycled were identified on the load list printouts of the various distribution panels powered from Load Center 2G1. The ground isolation plan was approved and a pre-job briefing was conducted in the control room with all involved personnel in attendance. The control room staff was confident in the ability to perform the evolution without error. This confidence was based on demonstrated technical knowledge and experience level. The conditions listed below were present at the time of the fault isolation investigation:

o Although the potential for a reactor/turbine trip was discussed and the plant operators were reminded to stay away from some specific breaker panels, the evolution was perceived as a low risk evolution since only lighting and heater supply breakers would be cycled initially.

o Operator fatigue was not covered in the pre-job briefing even though this evolution was being performed late into the shift on the second night shift.

o The load lists provided to the plant operators did not provide the locations of the affected distribution panels and this information, though available, was not discussed or provided during the pre-job briefing.

o The use of peer checks was not discussed during the pre-job briefing

for the evolution.

There is not an approved formal ground isolation process to ensure operators are provided with the necessary information and guidance to develop and execute an effective plan of action for isolating grounded equipment. The shifts ground isolation plan was flawed in that it did not eliminate subsidiary loads supplied by transformers off Load Center 2G1. Since there is no electrical conduction through the magnetic coupling of transformers, grounds can not be sensed across transformers. The distribution panel from which the breakers were cycled in the reactor trip is supplied by a transformer powered off Load Center 2G1 and should not have been included in the ground isolation.

The group of distribution panels to be ground checked included distribution panel DP-0407. The individual performing the check had a preconceived idea that DP-0407 was located in the Turbine Generator Building on the 55' level in the vicinity of lighting panel 15R. In the area is a distribution panel DP-0408 that is physically identical to DP-0407. An inadequate self check of the distribution panel was done.

When the individual opened breaker #13 on distribution panel DP-0408, he caused a loss of electrical power to the turbine control circuitry. The loss of power caused the turbine throttle valves to close. The automatic reactor trip was initiated by the closure of the throttle valves above 50% power.

CAUSE OF EVENT

The root cause for the reactor trip was the inadequate self-verification which led to the misidentification of DP0408 as DP-0407, and the subsequent opening of the wrong breaker. The inadequate verification was attributed to fatigue and overconfidence in performing a perceived low risk evolution.

The primary contributing causal factors were:

o Control room staff's overconfidence in the ability of the plant operator to perform the evolution.

o A lack of electrical theory knowledge that electrical grounds are not transmitted through transformers.

o Lack of a formal process for ground isolation.

ANALYSIS OF EVENT

Automatic reactor trips and Engineered Safeguards Features actuations are reportable pursuant to 10CFR50.73(a)(2)(iv).

The reactor trip had minimal safety significance. The initiating condition was the loss of power to the turbine control circuitry which resulted in the turbine throttle valves going closed. The Reactor Protection System responded correctly by initiating an automatic reactor trip when it sensed two of four turbine throttle valves closed above fifty-percent power. All safety systems functioned as designed during the condition and there was no significant risk to the health and safety of the general public or station personnel.

CORRECTIVE ACTION

1. Operations Management has briefed all Operations personnel regarding the cause of the event and reemphasized the requirements for self verification.

2. Operations Management has suspended ground isolation evolutions performed solely by Operations personnel until a formal process has been approved.

3. The Conduct of Operations document has been revised to require pre-job briefings to address error-likely situations such as fatigue recognition and overconfidence.

4. Personnel performance issues have been addressed with the individuals involved in accordance with the Constructive Discipline Program.

5. A formal process for Operations ground isolation activities, including appropriate technical guidance on the selection of the breakers to be checked, will be evaluated and implemented by April 15, 1999.

6. Nuclear Training will provide training on electrical theory upgrades during Licensed Operator Requalification training by August 12, 1999.

7. Self verification training for all Plant Operators and Reactor Operators is ongoing and will be completed by March 15, 1999.

ADDITIONAL INFORMATION

Unit 2 Licensee Event Report LER 98-002 (October 15, 1998) describes a Unit 2 reactor trip involving inadequate error detection where the contributing factors were somewhat similar to this occurrence. The

similarities have been considered in the corrective actions above.

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