

**Robert A. Saccone**  
Vice President – Nuclear Operations

**PPL Susquehanna, LLC**  
769 Salem Boulevard  
Berwick, PA 18603  
Tel. 570.542.3698 Fax 570.542.1504  
rasaccone@pplweb.com



SEP 16 2005

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Mail Stop OP1-17  
Washington, DC 20555

**SUSQUEHANNA STEAM ELECTRIC STATION  
LICENSEE EVENT REPORT 50-388/2005-005-01  
LICENSE NO. NPF-22  
PLA-5953**

---

**Docket No. 50-388**

Licensee Event Report (LER) 50-388/2005-005, "Reactor Automatic Scram due to a Main Generator Lockout" was submitted August 5, 2005 in accordance with 10 CFR 50.73(a)(2)(iv)(A). The attached Revision 1 provides supplemental information regarding the root cause and corrective actions to prevent recurrence that were not available at the time of the original LER submittal.

No commitments are associated with this LER.

A handwritten signature in black ink, appearing to read "R. Saccone", written over a horizontal line.

Robert Saccone  
Vice President – Nuclear Operations

Attachment

JE22

cc: Mr. S. Collins  
Regional Administrator  
U. S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

Mr. F. W. Jaxheimer  
Sr. Resident Inspector  
U. S. Nuclear Regulatory Commission  
P.O. Box 35  
Berwick, PA 18603-0035

Mr. R. Osborne  
Allegheny Electric Cooperative  
P. O. Box 1266  
Harrisburg, PA 17108-1266

Mr. R. R. Janati  
Bureau of Radiation Protection  
Rachel Carson State Office Building  
P. O. Box 8469  
Harrisburg, PA 17105-8469

**LICENSEE EVENT REPORT (LER)**

(See reverse for required number of digits/characters for each block)

|   |                                     |                          |
|---|-------------------------------------|--------------------------|
| <b>1. FACILITY NAME</b> Susquehanna Steam Electric Station Unit 2 | <b>2. DOCKET NUMBER</b><br>05000388 | <b>3. PAGE</b><br>1 OF 3 |
|---|-------------------------------------|--------------------------|

**4. TITLE** Reactor Automatic Scram due to a Main Generator Lockout

| 5. EVENT DATE |     |      | 6. LER NUMBER |                   |         | 7. REPORT DATE |     |      | 8. OTHER FACILITIES INVOLVED |               |
|---------------|-----|------|---------------|-------------------|---------|----------------|-----|------|------------------------------|---------------|
| MONTH         | DAY | YEAR | YEAR          | SEQUENTIAL NUMBER | REV NO. | MONTH          | DAY | YEAR | FACILITY NAME                | DOCKET NUMBER |
| 6             | 6   | 2005 | 2005          | 005               | 01      | 9              | 16  | 2005 | FACILITY NAME                | DOCKET NUMBER |

|                                |  |
|--------------------------------|--|
| <b>9. OPERATING MODE</b><br>1  | <b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)</b><br><input type="checkbox"/> 20.2201(b) <input type="checkbox"/> 20.2203(a)(3)(i) <input type="checkbox"/> 50.73(a)(2)(i)(C) <input type="checkbox"/> 50.73(a)(2)(vii)<br><input type="checkbox"/> 20.2201(d) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(A)<br><input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.73(a)(2)(ii)(B) <input type="checkbox"/> 50.73(a)(2)(viii)(B)<br><input type="checkbox"/> 20.2203(a)(2)(i) <input type="checkbox"/> 50.36(c)(1)(i)(A) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 50.73(a)(2)(ix)(A)<br><input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 50.36(c)(1)(ii)(A) <input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A) <input type="checkbox"/> 50.73(a)(2)(x)<br><input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.73(a)(2)(v)(A) <input type="checkbox"/> 73.71(a)(4)<br><input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 50.46(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(v)(B) <input type="checkbox"/> 73.71(a)(5)<br><input type="checkbox"/> 20.2203(a)(2)(v) <input type="checkbox"/> 50.73(a)(2)(i)(A) <input type="checkbox"/> 50.73(a)(2)(v)(C) <input type="checkbox"/> OTHER<br><input type="checkbox"/> 20.2203(a)(2)(vi) <input type="checkbox"/> 50.73(a)(2)(i)(B) <input type="checkbox"/> 50.73(a)(2)(v)(D)<br>Specify in Abstract below or in NRC Form 366A |
| <b>10. POWER LEVEL</b><br>100% |  |
|                                |  |

**12. LICENSEE CONTACT FOR THIS LER**

|   |   |
|---|---|
| <b>FACILITY NAME</b><br>Dayne R. Brophy, Senior Engineer – Nuclear Regulatory Affairs | <b>TELEPHONE NUMBER (Include Area Code)</b><br>(570) 542-3365 |
|---|---|

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX |
|-------|--------|-----------|--------------|--------------------|-------|--------|-----------|--------------|--------------------|
|       |        |           |              |                    |       |        |           |              |                    |

|  |  |
|--|--|
| <b>14. SUPPLEMENTAL REPORT EXPECTED</b><br><input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO | <b>15. EXPECTED SUBMISSION DATE</b><br>MONTH:      DAY:      YEAR: |
|--|--|

**ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)**

At 1233 hours on 6/6/2005 with Unit 2 operating in Mode 1 at 100% power, the reactor automatically scrammed as a result of a turbine trip from a generator lockout. The main generator excitation system had failed to positively respond to changes to the offsite grid, which resulted in a loss of generator field, causing the lockout. Although plant data was inconclusive in determining what initiated the event, the most probable cause was an increased resistance in the main generator exciter field circuitry. Based on the unplanned actuation of RPS, this event was determined to be reportable under 10 CFR 50.72, reference ENS Notification EN #41746.

Following the automatic scram, two Main Steam Safety Relief Valves opened and then closed to initially control reactor pressure. The Main Steam Bypass Valves were subsequently able to control pressure. Several balance of plant systems were impacted by the generator voltage perturbation but there were no unusual electrical transients or challenges to the station's safety-related electrical systems. All plant safety systems responded per design. Reactor water level dropped to -6 inches and was restored to +35 inches by normal feedwater level control. There were no challenges to containment or evidence of fuel failure. The automatic scram was an unplanned actuation of a system designed to mitigate the consequences of a significant event and is reportable per 10 CFR 50.73(a)(2)(iv)(A).

This event resulted in no actual adverse consequences to the health and safety of the public.

**LICENSEE EVENT REPORT (LER)**

| 1. FACILITY NAME                          | 2. DOCKET | 6. LER NUMBER |                   |                 | 3. PAGE |
|---|-----------|---------------|-------------------|-----------------|---------|
| Susquehanna Steam Electric Station Unit 2 | 05000388  | YEAR          | SEQUENTIAL NUMBER | REVISION NUMBER | 2 OF 3  |
|   |           | 2005          | - 005             | - 01            |         |

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

**PLANT CONDITIONS AT TIME OF EVENT**

Unit 1, Mode 1, 100%  
Unit 2, Mode 1, 100%

**EVENT DESCRIPTION**

At 1233 hours on 6/6/2005 with Unit 2 in Mode 1 at 100% power, the reactor automatically scrambled as result of a turbine trip from a main generator (EISS Code: TB) lockout. The main generator exciter (EISS Code: TL) voltage regulator circuit had failed to positively respond to changes to the offsite grid which resulted in a loss of exciter field, causing the lockout. The most probable cause was an increased resistance in the generator exciter field circuitry. This led to an inability of the system to properly respond to the grid changes.

All control rods inserted and all safety systems responded as designed in response to the automatic scram. Immediately following the scram, two Safety Relief Valves (EISS Code: SB) opened and then properly reseated in response to the transient. The Main Steam Bypass Valves were subsequently able to control reactor pressure. Reactor water level dropped to -6 inches and was restored to +35 inches by normal feedwater level control. Several balance of plant systems were impacted by the generator voltage perturbation but there were no unusual electrical transients or challenges to the station's safety-related electrical systems. There also were no challenges to containment or evidence of fuel failure. The event was determined to be reportable under 10 CFR 50.72, reference ENS Notification EN #41746.

The automatic scram was an unplanned actuation of a system designed to mitigate the consequences of a significant event and is reportable per 10 CFR 50.73(a)(2)(iv)(A).

This event resulted in no actual adverse consequences to the health and safety of the public.

**CAUSE OF THE EVENT**

On June 6, 2005 when Unit 2 experienced changes in the offsite grid, the generator output voltage decreased in response to this change. The generator excitation system output voltage that controls generator output, also decreased as designed. The controlling circuitry for the excitation system has a minimum voltage requirement for it to perform properly, thereby maintaining stable operation of the system. Because of an increased resistance in the circuitry, the actual minimum voltage required for stable operation was higher than an established value. When voltage dropped below the actual minimum voltage requirement, the excitation system was no longer capable of properly functioning, resulting in a loss of exciter field.

**LICENSEE EVENT REPORT (LER)**

| 1. FACILITY NAME                          | 2. DOCKET | 6. LER NUMBER |                   |                 | 3. PAGE |
|---|-----------|---------------|-------------------|-----------------|---------|
| Susquehanna Steam Electric Station Unit 2 | 05000388  | YEAR          | SEQUENTIAL NUMBER | REVISION NUMBER | 3 OF 3  |
|   |           | 2005          | -- 005            | -- 01           |         |

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

**ANALYSIS / SAFETY SIGNIFICANCE**

Actual Consequences

The actuation of the generator lockout caused a turbine trip, resulting in a reactor scram. All control rods inserted and safety systems functioned as designed. The health and safety of the public was not affected.

Potential Consequences

Challenges to nuclear safety can result from equipment failure or human errors during recovery of the reactor to normal shutdown conditions. The potential consequence results in a negligible increase in the probabilistic risk to the health and safety of the public.

**CORRECTIVE ACTIONS**

Completed Actions

- 1) Inspected generator voltage regulator circuit for potential faults/failures.
- 2) Replaced possible degraded potentiometer in voltage regulator circuitry.
- 3) Changed the existing minimum exciter voltage limit setting to increase the range of generator voltages to which the regulator circuitry can respond.

Planned Actions

- 1) On Unit 1 and Unit 2, identify high resistance paths in the voltage regulator circuits and correct.

**ADDITIONAL INFORMATION**

None