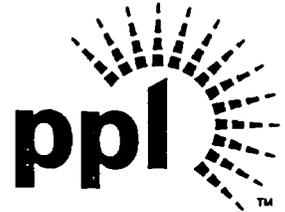


**Robert A. Saccone**  
Vice President – Nuclear Operations

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JUN 06 2005

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

**SUSQUEHANNA STEAM ELECTRIC STATION  
LICENSEE EVENT REPORT 50-388/2005-002-00  
LICENSE NO. NPF-22  
PLA-5904**

**Docket No. 50-388**

Attached is Licensee Event Report (LER) 50-388/2005-002-00. This event was determined to be reportable per 10 CFR 50.73(a)(2)(i)(A) because the plant was shutdown as required by Technical Specification action statements.

On April 10, 2005 at 0352 hours, the Unit 2 Control Room received a 125-VDC battery charger trouble alarm. Investigation revealed that the 2D633 battery charger output had failed to zero volts. The associated battery subsystem could not be returned to operable status within the LCO required action time. Unit #2 was shutdown, as required by Technical Specifications, at 1728 hours on April 10, 2005. There were no actual consequences to the health and safety of the public.

No new regulatory commitments have been created through issuance of this report.

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

Robert Saccone  
Vice President – Nuclear Operations

Attachment

IE22

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

Mr. A. Blamey  
Sr. Resident Inspector  
U.S. Nuclear Regulatory Commission  
P.O. Box 35  
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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)

1. FACILITY NAME Susquehanna Steam Electric Station Unit 2	2. DOCKET NUMBER 05000388	3. PAGE 1 OF 3
---------------------------------------------------------------	------------------------------	-------------------

4. TITLE Degraded 125 VDC Battery Charger Results in Technical Specification Required Shutdown

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
4	10	2005	2005	002	00	6	6	2005	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)											
10. POWER LEVEL 100%	<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)	<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)	<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)
	<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)	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	<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)
	<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)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER	<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)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME Eric J. Miller, Senior Engineer – Nuclear Regulatory Affairs	TELEPHONE NUMBER (Include Area Code) (570) 542-3321
-------------------------------------------------------------------------------	--------------------------------------------------------

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	EJ	BYC	P319	Yes					

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

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

On April 10, 2005, with Susquehanna Unit 2 in Mode 1 at 100% power, a 125-VDC (EIS Code: EJ) battery charger's output failed low. Because the DC electrical power subsystem could not be returned to normal operating status within the required LCO action statement time, Unit 2 was shutdown (Mode 3) at 1728 hours as mandated by Technical Specifications. Root cause analysis concluded that a short circuit caused three fast acting fuses to actuate. The short circuit was most probably caused by contact of circuit wiring that had experienced insulation heat damage because of its close proximity to a resistor. However, damage to the wiring itself was not observed, thus rendering this explanation less than conclusive. It is also possible, but less likely, that capacitors or surge suppressors associated with the battery charger shorted but subsequently cleared the condition. Future testing is planned to further investigate these possibilities at the next 125-volt battery charger outage of sufficient duration. Engineering evaluation concluded that Battery 2D630 maintained adequate reserve to meet all accident profile requirements and Station Blackout loads despite the discharge that occurred when the charger failed. In response to this event, circuit wiring was rerouted away from the resistor heat source in all Unit 2 125-VDC chargers. The same rerouting effort is planned for Unit 1. Additionally, preventive maintenance work instructions will be revised to specifically identify and provide inspection criteria for the resistor and wiring.

Following repairs, the plant was re-started on April 12. This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(A) as a plant shutdown required by Technical Specifications. There were no safety consequences or compromises to public health and safety as a result of this event.

**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	-- 002	-- 00	

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

**EVENT DESCRIPTION**

On April 10, 2005, with Susquehanna Unit 2 in Mode 1 at 100% power, a 125-VDC (EIS Code: EJ) battery charger trouble alarm was received at 0352 hours. Investigation revealed that the 2D633 battery charger output had failed to zero volts. 2D633 is one of four 125 volt battery chargers on Unit 2. The charger normally supplies 125-volt DC power to various station loads while maintaining a charge on its associated 125-volt battery bank 2D630. Upon loss of battery charger 2D633, battery bank 2D630 assumed load and discharged an estimated 130 amp-hours out of a rated capacity of 825 amp-hours over an approximately 13 hour period. Because the DC electrical power subsystem could not be returned to normal operating status within the required LCO action statement time, Unit 2 was shutdown (Mode 3) at 1728 hours as mandated by Technical Specification 3.8.4. Following repairs, the plant was re-started on April 12. This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(A) as a plant shutdown required by Technical Specifications. There were no ECCS initiations resulting from the shutdown. No radioactive releases resulted from this event.

**CAUSE OF THE EVENT**

A root cause analysis was performed to address the failure of the 2D633 charger, specifically, the actuation of all three fast-acting fuses that caused the charger output to fail to zero amps. The analysis concluded that the fuse actuations were caused by a short circuit.

This short circuit was most probably attributable to wire-to-wire contact of damaged filter circuit wiring. Original construction of the 125-VDC charger placed the wiring within an inch of a 225-watt resistor heat source. Subsequent inspection revealed significant heat related degradation of the wiring insulation. This degradation was not detected during routine periodic inspection efforts because access to the filter circuit resistor is limited and because the resistor was not specifically addressed in preventive maintenance inspection plans.

It is also possible, but of low probability, that the short circuit was caused by capacitors or surge suppressors that shorted but subsequently cleared the condition. There was, however, no evidence of an initiating electrical event that would cause the surge suppressors to fail. Further, no capacitor in the bank of 12 exhibited bulging or relief that could be expected when energy from 11 other capacitors discharges through a shorted capacitor. Additional testing is planned to determine if either the capacitors or the surge suppressor could have caused the 2D633 failure.

In summary, wire-to-wire contact is the most likely explanation for the short circuit. However, other possibilities have not been completely eliminated from consideration. Further testing may provide more definitive conclusions about the battery charger failure mechanism.

## 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	-- 002	-- 00	

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

**ANALYSIS / SAFETY SIGNIFICANCE**Actual Consequences

The failure of battery charger 2D633 resulted in an entry into Technical Specification action statements and the subsequent shutdown of Unit 2. Battery bank 2D630 discharged for approximately 13 hours. It has been conservatively estimated that the battery discharged an estimated 130 amp-hours out of a rated capacity of 825 amp-hours over this period. Engineering evaluation concluded that Battery 2D630 maintained adequate reserve to meet all accident profile requirements and Station Blackout loads despite the discharge. Thus, the 125-VDC system remained capable of meeting all load profile requirements with the associated charger out of service.

Potential Consequences

Extended loss of the charger would have required an entry into Mode 4 within 36 hours of entering LCO 3.8.4 Condition B.1.

**CORRECTIVE ACTIONS**Completed Actions

Filter circuit wiring was rerouted away from the resistor heat source in Unit 2 125-VDC chargers.

Planned Actions

Filter circuit wiring will be rerouted away from the resistor heat source in Unit 1 125-VDC chargers.

Preventive maintenance work instructions will be revised to specifically identify and provide inspection criteria for the resistor and filter circuit wiring.

Additional testing is planned to determine if either the capacitors or the surge suppressor could have caused the 2D633 failure.

**ADDITIONAL INFORMATION**Failed Component Information

Component: 2D633 125-VDC Battery Charger  
 Manufacturer: Power Conversion Products  
 Model #: 3SD-130-100 CE

Past Similar Events

None