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FEB 11 2003

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

**SUSQUEHANNA STEAM ELECTRIC STATION  
LICENSEE EVENT REPORT 50-387/2003-001-00,  
LICENSE NO. NPF-14  
PLA-5593**

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**Docket No. 50-387**

Attached is Licensee Event Report (LER) 50-387/2003-001-00.

This report is submitted as a voluntary LER per the Susquehanna Steam Electric Station Emergency Plan in that an Unusual Event was declared. This declaration occurred after receipt of an alarm indicating elevated radioactive iodine release rates on the Unit 1 Turbine Building Ventilation Monitoring System.

Subsequently, it was determined that the alarm was not due to a release of iodine and radioactive release rates were well below limits specified within the Technical Requirements Manual. There are no commitments included in this LER.

A handwritten signature in black ink, appearing to read "Richard L. Anderson".

Richard L. Anderson  
Vice President-Nuclear Operations

Attachment

JE22

cc: Mr. H. J. Miller  
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	G. F. Ruppert	NUCSB3
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	R. R. Sgarro	GENA61
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	H. D. Woodeshick	SSO
	NRA File	GENA61
	DCS	GENA62
	Attn: S. Vierling	

Estimated burden per response to comply with this mandatory information collection request 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [bjr1@nrc.gov](mailto:bjr1@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NE0B-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

# 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 1	<b>2. DOCKET NUMBER</b> 05000387	<b>3. PAGE</b> 1 OF 6
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**4. TITLE**  
Unusual Event Declared after Alarm on Unit 1 Turbine Building Ventilation Monitoring System.

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	29	2003	2003	001	00	02	11	2003	FACILITY NAME	DOCKET NUMBER

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

**12. LICENSEE CONTACT FOR THIS LER**

<b>NAME</b> John L. Tripoli - Nuclear Regulatory Affairs	<b>TELEPHONE NUMBER (Include Area Code)</b> 570 / 542-3021
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**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
X	WF	LSV	A499	N	X	WF	LS	M235	N

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>				<b>15. EXPECTED SUBMISSION DATE</b>		
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO		MONTH	DAY	YEAR

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

At 19:36 on January 29, 2003 a Ventilation Stack Monitoring System alarm was received in the Unit 1 Control Room. The cause of the alarm was a high indicated iodine release rate from the Unit 1 Turbine Building Ventilation Exhaust Stack. Control Room personnel responded to the alarm per plant procedure. After evaluation, an Unusual Event was declared at 20:32 based on the criteria in EAL 15.1.a.A.2. Evidence gathered to date indicates that the most likely cause is a simultaneous failure of the two in-series drain valves on the delay line drain pot in the Unit 1 Offgas System. This would have created a flow path for non-condensable gases from the offgas stream to the turbine building environment and subsequently to the Unit 1 Turbine Building Ventilation Exhaust Stack. After further evaluation, it was determined that the release stream did not contain an iodine component and the release rates were well below limits established in the Technical Requirements Manual. The iodine detector was responding to Nitrogen-13. The Unusual Event was terminated within six hours at 01:25 on January 30, 2003. A Root Cause Analysis (RCA) Team has been formed to evaluate this event and to determine the causes and corrective actions. In conjunction with this RCA team, a systematic troubleshooting effort is in progress. Iodine detector sensitivity to Nitrogen-13 was previously recognized. A similar event occurred in February of 2002. The Emergency Plan was not entered for this event because an Emergency Action Level criterion was not reached. An RCA Team evaluated this event; however, the corrective actions identified by this team were not completed when this latest event occurred.

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

**EVENT DESCRIPTION**

At 19:36 on January 29, 2003 a Stack Monitoring Hi Hi Alarm was received from the Ventilation Stack Monitoring System (EIS Code: IL) in the Unit 1 Control Room. The alarm was investigated and it was determined that high indicated iodine levels from the Unit 1 Turbine Building Ventilation Exhaust Stack were causing the alarm. Control Room personnel responded to the alarm per plant procedure. The Unit 1 Turbine Building Iodine channel indicated a maximum release rate of 483 microcuries per minute.

The Shift Manager declared an Unusual Event per Emergency Action Level (EAL) 15.1.a.A.2 based on the following: indicated release rates were not decreasing, alarms had been validated, noble gas readings had increased by a factor of 100, actions initiated via off normal procedure had not resulted in a change in release rate, and the time the elevated readings were present was approaching 60 minutes. This EAL requires the declaration of an Unusual Event when radiological gaseous effluents exceed 2 times the limits listed in the Technical Requirements Manual for 60 minutes or longer. This condition is evidenced by a valid Ventilation Stack Monitoring System indication of Iodine-131 greater than 208 microcuries per minute.

**CAUSE OF EVENT**

The most probable cause is a simultaneous failure of the two in-series drain valves on the delay line drain pot in the Unit 1 Offgas System (EIS Code: WF). The offgas system is designed to reduce the radioactivity in the offgas stream. The system utilizes catalytic recombination for volume reduction and control of hydrogen concentration. Selective adsorption of fission product gases on activated carbon is used to provide time for delay of short-lived radioisotopes before release. The offgas stream passes through a long stretch of piping called the "delay line". At a nominal flowrate of 21.8 scfm, the delay line provides approximately 12.9 minutes of decay time for radioactive products in the offgas stream.

A drain pot is located at the beginning of the delay line to collect entrained moisture and drains to the Turbine Building Central Area Sump (EIS Code: WK). A float switch maintains drain pot water level. Two level control valves act in conjunction to control the water level. If both level control valves remain open due to a failure or combination of failures, the drain pot could completely empty of water. Without water, the offgas stream can flow through the drain pot. Investigations thus far indicate that these valves may have remained open, providing a flow path from the Unit 1 Offgas system to the Turbine Building Central Area Sump. The Turbine Building Filtered Exhaust System (EIS Code: VK) services this sump. Air handled by this system passes through two 50 percent capacity filter housings. Each filter housing contains a prefilter bank, a HEPA filter bank, and a charcoal adsorber filter bank. After filtration, the air is discharged through the Unit 1 Turbine Building Ventilation Exhaust Stack. Gases flowing through the stack are monitored by the Ventilation Stack Monitoring System. The system monitors and records particulate, iodine and noble gas levels. Alarms initiate when high levels of any parameter are detected.

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

**CAUSE OF EVENT** (continued)

The system also performs continuous sampling on a particulate filter and silver zeolite cartridge that provides a capability to determine the isotopic composition of particulates and iodine within the gas stream. As a result of this sampling and analysis, it was determined that the release stream did not contain an iodine component.

The iodine channel uses an integrating radiation monitor for alarm and indication. PPL Susquehanna has concluded that there are several short-lived noble gas nuclides that will produce alarms on the iodine channel, either directly, or as a result of their particulate decay products accumulating in the silver zeolite cartridge. Short-lived Nitrogen-13, a fraction in the ammonia form, is produced during plant operations and if released, it can react with and accumulate on the silver zeolite cartridge to produce alarms. During this event, Nitrogen-13 accumulated on the silver zeolite cartridge leading to the alarms.

Iodine detector sensitivity to Nitrogen-13 was previously recognized. In February of 2002, an event occurred which is very similar to the subject of this LER. Although the indicated release associated with the 2002 event did exceed the Unusual Event EAL for approximately 10 minutes, this did not meet the 60-minute criterion required for Unusual Event declaration. The root cause analysis developed in response to the event concluded that the most probable cause was a malfunction of the drain pot level control system. The Root Cause Analysis (RCA) team identified six (6) corrective actions to prevent recurrence. Four (4) of these corrective actions to prevent recurrence had not been completed on January 29, 2003. Corrective actions not completed were: (1) testing & inspecting the drain pot control systems, (2) the development of an improved process to respond to Ventilation Monitoring System alarms, (3) improving the computer system presentation of release data, and (4) modifying the PPL Susquehanna Emergency Plan to remove iodine channel alarm related EAL criteria.

A Root Cause Analysis (RCA) Team has been established to conduct a thorough review of the 1/29/2003 event. The following potential root causes are under evaluation by this team:

- The most likely cause is a simultaneous failure of the two in-series drain valves on the offgas delay line drain pot.
- There were no procedure steps to validate iodine release using a noble gas/iodine ratio in time to avoid entering the Unusual Event.
- The offgas delay line drain pot flowpath was not identified as a potential release path in procedures for operator action in response to a high iodine alarm.

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

**REPORTABILITY DETERMINATION/ASSESSMENT OF SAFETY CONSEQUENCES**

This report is submitted as a voluntary LER per the Susquehanna Steam Electric Station Emergency Plan Table 5.2 in that an Unusual Event was declared. In accordance with the guidance provided in Susquehanna Steam Electric Station Emergency Plan Table 5.2, the required submission date for this report is February 12, 2003.

There were no safety consequences from this event. Subsequent sampling and analysis determined that the indicated high iodine levels were caused by Nitrogen-13 and release rates were well below Technical Requirement Manual limits.

The Unusual Event was terminated within six hours at 01:25 on January 30, 2003. Although not required by the PPL Emergency Plan, during the Unusual Event the Technical Support Center (TSC) and the Emergency Operations Facility (EOF) were activated to assist Control Room personnel and to improve information flow to the offsite agencies. Feedback from the Control Room staff and the offsite agencies indicates that the TSC and EOF personnel staffing was beneficial. Prior to terminating the Unusual Event, the emergency response organization verified that no iodine had been released, ensured that the most likely pathway leading to the increased indications was identified and understood, and that actions had been taken to isolate this pathway.

**CORRECTIVE ACTIONS**

Interim actions have been taken to isolate the drain valves and provide for manual control of the level valves on appropriate drain pots until final corrective actions can be implemented.

A Root Cause Analysis (RCA) Team has been established to conduct a thorough review of this event. Additional corrective actions are anticipated from this review.

A systematic troubleshooting plan to determine the malfunction on the drain pots has been developed and has been implemented. As a result of this effort, several components associated with level control on the drain pots have been replaced or rebuilt. At this time interim actions remain in place and drain valves are closed under operator control.

Procedure changes have been developed and issued to improve the process for responding to a Ventilation Monitoring System alarm. These changes aid the operator in discerning detector response to Nitrogen-13.

Prior to this event, PPL had submitted proposed changes to the PPL Susquehanna Emergency Plan (PLA-5511 dated 9/6/2002). These changes require NRC prior approval for implementation. Among the changes proposed is removal of the EAL criteria based on iodine and particulate channel alarms. Pending NRC approval, PPL expects to implement this change before June 30, 2003.

A supplement to this LER will be provided if the conclusions of the Root Cause Analysis Team significantly change the information provided herein.

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

**ADDITIONAL INFORMATION**

Failed Component Information: The troubleshooting effort mentioned above resulted in the replacement/rebuild of the following components:

Solenoid Valves – SV17106, SV17107  
 Manufacturer – ASCO  
 Model Number – HT8345C11

Level Valves – LV17106, LV17107(rebuilt actuators,  
 Manufacturer – Valtek valves tested leak  
 Model Number – Mark I tight)

Level Switch – LSL17107, LSH/LSHH17106  
 Manufacturer – Mercoid  
 Model Number – 195-6WT-7806-06

Past Similar Events: PPL Susquehanna has had similar events. None of these previous events required an Emergency Plan entry. On February 5, 2002, an event occurred which is very similar to the subject of this LER. The Emergency Plan was not entered for this event because an Emergency Action Level criterion was not reached. The release during this event exceeded the Unusual Event EAL for 10 minutes, but not for the required 60 minutes. The RCA Team is reviewing operating experience as part of their evaluation of the 1/29/2003 event.

