

# ORPS Operating Experience Report

ORPS contains 55141 OR(s) with 58451 occurrences(s) as of 4/7/2011 11:01:49 AM  
 Query selected 1 OR(s) with 1 occurrences(s) as of 4/7/2011 11:02:34 AM

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**1)Report Number:** [EM-SR--SRNS-HBLINE-2011-0004](#) **After 2003 Redesign**

**Secretarial Office:** Environmental Management

**Lab/Site/Org:** Savannah River Site

**Facility Name:** HB-Line

**Subject/Title:** Actuation of Safety Class Interlock during Ventilation System Functional Test (U)

**Date/Time Discovered:** 02/18/2011 10:37 (ETZ)

**Date/Time Categorized:** 02/22/2011 09:40 (ETZ)

**Report Type:** Final

**Report Dates:**

Notification	02/23/2011	09:44 (ETZ)
Initial Update	03/31/2011	08:26 (ETZ)
Latest Update	03/31/2011	08:26 (ETZ)
Final	04/05/2011	08:22 (ETZ)

**Significance Category:** 2

**Reporting Criteria:** 4B(2) - Actuation of a Safety Class Structure, System, or Component (SSC), or its alarms, resulting from an actual unsafe condition. Spurious alarms (e.g., due to electronic noise, radon/thoron decay) should not be reported.

**Cause Codes:** A5B2C08 - Communications Less Than Adequate (LTA); Written Communication Content LTA; Incomplete / situation not covered  
 A6B1C02 - Training deficiency; No Training Provided; Training requirements not identified

**ISM:** 3) Develop and Implement Hazard Controls  
 5) Provide Feedback and Continuous Improvement

**Subcontractor Involved:**

No

**Occurrence Description:**

While performing the annual ventilation interlock test for HB-Line on 2/18/2011, the safety class (SC) interlock for loop 236 (building vacuum) was activated. The interlock was activated when operations personnel were attempting to reconfigure the room exhausters from both Room Exhaust Fans (REFs) being online to one REF online and one in standby. Section 5.4 of the functional test procedure, T/S 221-HBL-4816, instructed operations personnel to place the 236 loop in Manual and maintain the building vacuum until the system dampers adjusted and the 236 controller would then be returned to Automatic. The operator performing the task was unable to maintain the building vacuum while in Manual mode. As a result, the building pressure reached 0.33 inches water column ("WC) for approximately 18 seconds and the interlock activated as designed. Limiting Condition of Operations (LCO) 3.1.3.A requires the building vacuum interlock to activate when the building pressure exceeds 0.15 "WC for a time period up to, but not to exceed 32 seconds. The actual interlock set points are 0.1 "WC and 20 seconds.

**Cause Description:****Background:**

The fifth and sixth levels of HB-Line receive conditioned air from two separate air supply fans that service the building. The air from these areas is then exhausted into the H-Canyon Exhaust Ventilation System primarily by two identical REFs that are functionally classified as General Service (GS) equipment. Normally, one REF is configured to operate as the primary unit (i.e., lead fan) while the other fan is in standby or configured as the backup unit. The standby fan is interlocked to start automatically if the primary unit fails or is unable to maintain the required vacuum in the exhaust plenum.

On 2/18/2011, the SC building vacuum interlock for 236 Loop activated when a qualified Control Room Operator (CRO) attempted to reconfigure REF#1 as the primary

fan and place REF#2 in standby as instructed per Section 5.4 of the functional test procedure, T/S 221-HBL-4816. Because the CRO was not successful in maintaining sufficient vacuum while in Manual control, building pressure reached an unsafe condition (0.33 "WC) for approximately 18 seconds which caused the interlock to activate as designed. Appropriate Alarm Response Procedures (ARPs) and Abnormal Operation Procedures (AOPs) were initiated in response to the low building negative pressure alarm/interlock activation and subsequent process alarms. An occurrence was declared due to the actuation of a SC interlock resulting from an actual unsafe condition.

A primary cause of this event is classified as A5B2C08 - Communications LTA (A5); Written Communication Content LTA (B2); Incomplete / situation not covered (C08). For this case, specific information was not included as part of the instructions in the annual test procedure (T/S 221-HB-4816) to properly set and adjust the 236PC controller while in Manual control. Because expectations were not clearly identified in the procedure for performing the task, the controller output was set incorrectly (i.e., 40% closed) during switching of the REFs and the SC interlock for 236 Loop activated when the desired building vacuum was not maintained. The following corrective actions (CA) were taken to address the first cause identified for this event:

CA #1 - Revise procedure T/S 221-HB-4816 to include appropriate details on where to set the output for the control damper when controllers are switched from Automatic to Manual control to maintain desired building vacuum when fans are rotated. Refer to NOP 221-HB-4831 for details.

CA #2 - Perform an EoC review to identify procedures where ventilation dampers are operated in Manual

control, and revise documents as warranted to ensure appropriate details are included for setting controllers prior to performing fan switching operations.

A second primary cause of this event is classified as A6B1C02 - Training Deficiency (A6); No Training Provided (B1); Training requirements not identified (C02). For this case, task expectations are not widely known for setting and/or manipulating the 236PC in Manual control since controller operation and system interactions are not discussed as a part of the training requirements/activities for control room personnel. As a result, appropriate awareness was not demonstrated to ensure successful/consistent completion of the task during the fan switching operations. The following CAs were taken to address the second cause identified for this event:

CA #3 - Revise HB-Line Ventilation Training Course, #NSEGSY01, to include essential details for operating / switching controllers from Automatic to Manual control, sensitivity of the SC vacuum feedback control loop, and ease of activating associated interlock(s).

CA #4 - Develop a user aid and install at 236PC and similar stations to provide instructions for setting/adjusting controllers when switching from Automatic to Manual control.

The root cause of this occurrence was determined in accordance with the requirements of WSRC-SCD-9, "Problem Analysis Manual," and the results are documented in Savannah River Nuclear Solutions (SRNS) Correspondence, SRNS-N2000-2011-00049, titled "Actuation of Safety Class Interlock During Ventilation System Functional Test (U)."

**Operating Conditions:**

Normal operations.

**Activity Category:**

Normal Operations (other than Activities specifically

listed in this Category)

**Immediate Action(s):**

Personnel stopped work, and Operations and Engineering Management were notified of the interlock activation. Management deemed the interlock activated as designed, the test was allowed to resume and was successfully completed. The event was initially reviewed for reportability in ORPS with on-call Engineering and Operations personnel, and was determined to be non-reportable since the building pressure did not exceed 0.15 "WC for greater than 32 seconds.

**Categorization:**

The time between discovery of the occurrence on 2/18/2011, at 1037 hours (hrs), and categorization of the event on 2/22/2011, at 0940 hrs, exceeded two hours. Initial evaluation of this event over the weekend by Operations and Engineering Management determined that the event was not reportable since the time duration of 32 seconds was not exceeded. Therefore, an unsafe condition did not exist. Upon further review by the Facility Manager, it was determined that activation of the SC interlock for loop 236 (building vacuum) due to a positive building pressure represents an actual unsafe condition which warrants reporting. The initial evaluation deeming this to be non-reportable coupled with the fact the incident occurred over a weekend resulted in the late reporting of this event.

**FM Evaluation:**

There was no adverse impact to facility or personnel safety as a result of this occurrence. The 236 interlock activated as designed, the test was allowed to resume and was successfully completed on 2/18/2011. The 236 interlock was reset and building supply fans were restarted per appropriate procedures.

During the investigation for this event, opportunities for improvement (OFI) were identified. Although these issues were not identified as primary causes to the occurrence, the issues were considered potential

contributors to the event and warrants addressing.

First, the vacuum feedback control loop may not be fully optimized / tuned to allow fan swaps to occur in Automatic mode. Originally, fan swaps occurred with the controller in Automatic. However, since the installation of the 236 interlock swaps have had to be performed in Manual to prevent interlock activation. This contributor is classified as A4B5C05 - Management Problem (A4); Change Management LTA (B5); System interactions not considered (C05). The following CAs were taken to address the first potential contributor of this event:

OFI Action #1 - Evaluate the feasibility of initiating a DCF to upgrade the controller and add additional actions as needed.

OFI Action #2 - Evaluate feasibility for tuning various ventilation controller loops.

OFI Action #3 - Revise 221-HB-4816 and 4831 to start AHU#2 first with AHU#1 following. From past experience building vacuum is easier to control when AHU#2 is brought on line first.

Next, the building vacuum became unstable and fluctuated greatly because instructions (i.e., verbal and written) were not adequate or properly utilized to restrict entry into the facility during the fan switching operations. Because personnel access was not adequately controlled into and out of the facility during the switching operations, Door "Foxtrot" was opened before the building vacuum was allowed to fully stabilize. This contributor is classified as A5B4C05 - Communications LTA (A5); Verbal Communication LTA (B4); Information sent but not understood (C05) and A5B2C08 - Communications LTA (A5); Written Communication Content LTA (B2); Incomplete / situation not covered (C08). The following CA was taken to address the second potential contributor of this event:

OFI Action #4 - Revise procedures 221-HB-4811, 4816, 4817 and 4831 to install barricades at applicable doors to prevent personnel from entering or exiting the facility during times when building vacuum is unstable (i.e., fan switching).

These actions were entered and will be tracked to closure as part of issues documented per Site Tracking, Analysis, and Reporting (STAR) record, 2011-CTS-002420.

**DOE Facility Representative Input:** I have reviewed this occurrence, and concur with the categorization, cause determination/OFI(s), and corrective actions.

Entered by: GASKINS, JOSHUA J 04/05/2011

**DOE Program Manager Input:**

**Further Evaluation is Required:** No

**Division or Project:** SRNS/M&O/NMD/HMD

**Plant Area:** H-Area

**System/Building/Equipment:** 221-H B-Line/Room Exhaust Fans

**Facility Function:** Reprocessing

**Corrective Action 01:**

<b>Target Completion Date:</b> 04/30/2011	<b>Tracking ID:</b> STAR 2011-CTS-002420, CA-5
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Revise procedure T/S 221-HB-4816 to include appropriate details on where to set the output for the control damper when controllers are switched from Automatic to Manual control and to maintain desired building vacuum when fans are rotated. Refer to NOP 221-HB-4831 for details.

**Corrective Action 02:**

<b>Target Completion Date:</b> 03/31/2011	<b>Tracking ID:</b> STAR 2011-CTS-002420, CA-8
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Perform an EoC review to identify procedures where ventilation dampers are operated in Manual control, and

revise documents as warranted to ensure appropriate details are included for setting controllers prior to performing fan switching operations (similar to Action 5 in STAR record).

**Corrective Action 03:**

<b>Target Completion Date:</b> 05/16/2011	<b>Tracking ID:</b> STAR 2011-CTS-002420, CA-9
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Revise HB-Line Ventilation Training Course, #NSEGSY01, to include essential details for operating / switching controllers from Automatic to Manual control, sensitivity of the SC vacuum feedback control loop, and ease of activating associated interlock(s).

**Corrective Action 04:**

<b>Target Completion Date:</b> 05/16/2011	<b>Tracking ID:</b> STAR 2011-CTS-002420, CA-12
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Develop a user aid and install at 236PC and similar stations to provide instructions for setting/adjusting controllers when switching from Automatic to Manual control.

**Lessons(s) Learned:**

This occurrence highlights the adverse impacts that can occur when specific tasks are not adequately defined, and appropriate awareness is not demonstrated during performance of critical tasks that can potentially or negatively affect process operations and safety-related functions. Specifically, sufficient information and/or training should be provided to address situations likely to occur during the performance of work and to raise the level of awareness of key points/critical attributes necessary for completing the task.

The HB-Line Facility Manager, K.J. Gallahue, (803) 208-8888, has reviewed and signed a hard copy of this report and concurs with its content.

**HQ Keywords:**

01A--Inadequate Conduct of Operations - Inadequate Conduct of Operations (miscellaneous)  
 01F--Inadequate Conduct of Operations - Training Deficiency  
 01G--Inadequate Conduct of Operations - Inadequate



## Procedure

01I--Inadequate Conduct of Operations - Safety System Actuation/Evacuation

01P--Inadequate Conduct of Operations - Inadequate Oral Communication

01R--Inadequate Conduct of Operations - Management issues

05C--Mechanical/Structural - Ventilation System/Fan

12E--EH Categories - Equipment Degradation/Failure

14B--Quality Assurance - Training and Qualification Deficiency

14D--Quality Assurance - Documents and Records Deficiency

14E--Quality Assurance - Work Process Deficiency

## HQ Summary:

On February 18, 2011, while performing the annual ventilation interlock test for HB-Line, the safety class interlock for loop 236 (building vacuum) was activated when operations personnel were attempting to reconfigure the room exhausters from both online to one online and one in standby. The functional test procedure instructed operations personnel to place the 236 loop in manual and maintain the building vacuum until the system dampers adjusted and the 236 controller would then be returned to automatic. The operator performing the task was unable to maintain the building vacuum while in manual mode. As a result, the building pressure reached 0.33 inches water column for approximately 18 seconds, causing the 236 interlock to activate as designed. Limiting Condition of Operations 3.1.3.A requires the building vacuum interlock to activate when the building pressure exceeds 0.15 inches water column for a time period up to, but not to exceed 32 seconds. The actual interlock set points are 0.1 inches water column and 20 seconds. There was no adverse impact to facility or personnel safety as a result of this occurrence. The test was allowed to resume and was successfully completed. The 236 interlock was reset and building supply fans were restarted per procedures.

**Similar OR Report Number:** 1. EM-SR--SRNS-HBLINE-2010-0004

**Facility Manager:**

Name	Gallahue, K.J.
Phone	(803) 208-8888
Title	HB-Line Facility Manager

**Originator:**

Name	STALLINGS, GERALD L
Phone	(803) 208-8459
Title	OCCURRENCE INVESTIGATOR

**HQ OC Notification:**

Date	Time	Person Notified	Organization
NA	NA	NA	NA

**Other Notifications:**

Date	Time	Person Notified	Organization
02/22/2011	09:55 (ETZ)	Goergen, C.	EVP/DM
02/22/2011	10:15 (ETZ)	Barnes, J.	FR
02/22/2011	10:37 (ETZ)	Burnfield, D.	DNFSB
02/22/2011	10:37 (ETZ)	Sautman, M.	DNFSB
02/22/2011	09:40 (ETZ)	Anderson, D.	PROCESSM
02/22/2011	09:40 (ETZ)	Gallahue, K.	FM
02/22/2011	09:48 (ETZ)	Holloway, M.	SRSOC
02/22/2011	09:51 (ETZ)	Hudlow, S.	TECHM

**Authorized Classifier(AC):** Stallings, G.L.      Date: 02/23/2011

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