

Part 21 (PAR)

Event # 49895

<b>Rep Org:</b> ASCO VALVE INCORPORATED	<b>Notification Date / Time:</b> 03/11/2014 13:00 (EDT)
<b>Supplier:</b> ASCO VALVE INCORPORATED	<b>Event Date / Time:</b> 03/11/2014 (EDT)
	<b>Last Modification:</b> 03/11/2014
<b>Region:</b> 1	<b>Docket #:</b>
<b>City:</b> AIKEN	<b>Agreement State:</b> Yes
<b>County:</b>	<b>License #:</b>
<b>State:</b> SC	
<b>NRC Notified by:</b> BOB ARNONE	<b>Notifications:</b> THOMAS FARNHOLTZ R4DO
<b>HQ Ops Officer:</b> CHARLES TEAL	PART 21 GROUP EMAIL
<b>Emergency Class:</b> NON EMERGENCY	
<b>10 CFR Section:</b>	
21.21(a)(2) INTERIM EVAL OF DEVIATION	

## PART 21 - SCRAM SOLENOID PILOT VALVE NOT EXHAUSTING PROPERLY

The following was excerpted from a fax received from ASCO Valve, Inc.:

## "Problem Description

"GE Hitachi Nuclear Energy (GEH) customer Energy Northwest reported that an ASCO scram solenoid pilot valve (SSPV) Catalog number HVL266000010J 115/60, GE-H part number 107E6022P014, serial number A272718-054, CRD-SPV-118/1043 did not exhaust properly. The valve had been installed in Energy Northwest's Columbia facility for approximately 7 months and had been cycled 60-70 times. Energy Northwest's internal investigation revealed the pilot head assembly spring was not in the groove of the associated core.

## "Conclusion

"Various tests were performed to rule out possible manufacturing non-conformances in the spring or core. The successful completion of these tests has established that when the spring is properly installed on the core, the spring will not come off in service. We have not yet identified any other conditions that could cause the spring to come off the core, except for improper assembly.

"This configuration of spring and core design was used on the original 090405 scram valve. There has not been any design change to this core assembly since its inception in 1959. This spring/core assembly makes up the bulk of ASCO core solenoid offering. It is used across all of ASCO valve ranges in the Commercial, Nuclear, Military, and Petrochemical markets. ASCO has supplied over 10 million valves to these markets over the entire product offering. This includes over 50,000 Nuclear Qualified Valves. With the exception of the 1994 and 2012 events, a review of ASCO return records found no other cases of this condition where a spring disengaged from the core.

IE19  
HRC

"Since ASCO does not have adequate knowledge of the actual installations and operating conditions of these valves, it was not able to be determined if this could create a 'Substantial safety hazard' as defined in 10 CFR Part 21. This information is intended to provide interim investigation results.

"If you have any questions, you can contact Bob Arnone at 803-641-9395."

\*\*\*\*\*



## Facsimile

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To: **NRC Documents Control Desk** No. of Pages (including cover sheet) **6**

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Company: **NRC**

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Fax Number: **301-816-5151**

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Date **March 11, 2014**

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From: **Bob Arnone**

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Phone: **803-641-9395**

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Comments: **To whom it may concern:**

**Attached is Interim Letter to NRC Document Control Desk and one referenced exhibit. If there are any questions and/or the transmission is not legible, please call 803-641-9395.**

**Sincerely,**

**Bob Arnone  
Sr. Technical Service Engineer**



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March 11th, 2014

Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Subject: Interim Report on HVL266000010J Valve

Reference A - ASCO letter to GE Hitachi Nuclear Energy dated Nov. 9, 2012.

#### **Problem Description:**

GE Hitachi Nuclear Energy (GEH) customer Energy Northwest reported that an ASCO scram solenoid pilot valve (SSPV) Catalog number HVL266000010J 115/60, GE-H part number 107E6022P014, serial number A272718-054, CRD-SPV-118/1043 did not exhaust properly. The valve had been installed in Energy Northwest's Columbia facility for approximately 7 months and had been cycled 60-70 times. Energy Northwest's internal investigation revealed the pilot head assembly spring was not in the groove of the associated core.

#### **Cause Analysis:**

Energy Northwest dis-assembled the valve for inspection and determined that the core spring was disengaged from the core assembly. In addition, the diaphragm assemblies of the valve were inspected and Energy Northwest determined them to conform to specifications. Inspection also found small amounts of foreign material in the valve internals. This foreign material (found as brass debris) is typically generated during dis-assembly and would not affect the function of the valve.

ASCO received the loosely assembled valve from Energy Northwest on RMA 58315. The core, spring, and Solenoid Base Sub-Assembly were inspected by ASCO Quality Assurance. All components were verified to be in compliance with specifications. A spring cycle test was performed and confirmed that a properly installed spring will not detach from the core assembly. This test was performed with the solenoid both vertical and horizontal. An additional 42 valves from the same order were subsequently inspected during this investigation and all were properly assembled.

ASCO had investigated a similar occurrence in October, 2012 on RMA 53914 (GEH CAR # 58997). That investigation concluded that this was an isolated case of an improperly assembled spring. Corrective action was implemented by ASCO on November 9, 2012, involving an additional inspection step to verify the spring was installed properly on all valves that use the conical spring/core assembly. Ref. A. Prior to October 2012, the only other similar occurrence was in 1994 at Commonwealth Edison's Dresden facility. At that time ASCO determined it was an isolated case and implemented an additional quality inspection step of the core and spring assembly to verify proper installation of the spring.

**Interim Action:**

Prior to 2010, these valves were manufactured in ASCO's Florham Park facility, and it was general practice to have Quality inspect the spring/core assembly. Such inspection would have discovered the misassembly of the spring in the Energy Northwest valve. In 2010, manufacturing of these valves was transferred to the Aiken facility. The spring/core assemblies of valves manufactured at the Aiken facility were not inspected until the additional inspection step described above was implemented starting November 9, 2012.

From March 29, 2010 through November 9, 2012, 449 SSPV's were manufactured at the Aiken facility. 45 valves were recently returned to ASCO on RMA's 58315, 58449 and 58472. 44 valves were inspected and determined to have properly installed springs. The remaining one is the subject of this report. Two valves were reworked on RMA 53914 of Nov. 2012 and three returned on RMA 54714 were scrapped. Thus, 401 of the 449 original SSPV's remain to be inspected.

Pending the completion of the investigation described below, ASCO believes that the only way to verify that a spring is properly installed on a core is visual inspection of the spring/core assembly. ASCO does not recommend inspection to be performed in the field as dis-assembly of the top retaining nut may cause a piece of the nylon thread locker to fall down into the core/plugnut area and cause improper operation and noise. ASCO believes it is unlikely that other SSPV valves are affected. In order to further support the investigation, it is requested that valves removed from installation or inventory be returned for further evaluation at the earliest convenience.

Complete Catalog Number	GEH PO Number	ASCO OB No.	Valve S/N	Shipment Date	Year		
					2010	2011	2012
HV266000010J115/60JA	437028521	213561	A171767	Apr 09 2010	50		
HV266000010J115/60JA	437028521	213579	A321861	Mar 29 2010	50		
HV266000010J115/60EA	437046605	477985	A726654	Mar 11 2011		3	
HV266000010J115/60EA	437058358	651136	A113888	Jan- Feb 2012			158*
HV266000010R115/60KA	437051484	551580	A793691	Jul - Sep 2011		108	
HV266000010J115/60KA	437067889	802504	A272718	Sep 28 2012			80**

\*Included 2 valves that were reworked and 3 that were scrapped.

\*\*Of the 80 valves shipped on GEH PO 437067889, 45 have been returned on RMA's 58315, 58449 and 58472. A complete list of serial numbers for affected valves still in the field will be supplied to GEH for transmittal to their customers.

**Continuing ASCO Investigation:**

ASCO is performing additional tests to attempt to determine the maximum number of cycles an improperly installed spring can handle in the particular application of the SSPV operating conditions. In bench testing, ASCO confirmed that an improperly installed spring can in some cases outlast the qualified cycle life of the valve when rapidly cycled. This condition is now being tested in the actual operating conditions of the operating plant. This testing can take up to 3 months (end of June 2014) to complete. ASCO believes it is unlikely that other SSPV valves are affected. In order to further support the investigation, it is requested that valves removed from installation or inventory be returned for further evaluation at the earliest convenience.

**Closure and Conclusion:**

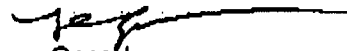
Various tests were performed to rule out possible manufacturing non-conformances in the spring or core. The successful completion of these tests has established that when the spring is properly installed on the core, the spring will not come off in service. We have not yet identified any other conditions that could cause the spring to come off the core, except for improper assembly.

This configuration of spring and core design was used on the original 090405 scram valve. There has not been any design change to this core assembly since its inception in 1959. This spring/core assembly makes up the bulk of ASCO core solenoid offering. It is used across all of ASCO valve ranges in the Commercial, Nuclear, Military, and Petrochemical markets. ASCO has supplied over 10 million valves to these markets over the entire product offering. This includes over 50,000 Nuclear Qualified Valves. With the exception of the 1994 and 2012 events, a review of ASCO return records found no other cases of this condition where a spring disengaged from the core.

Since ASCO does not have adequate knowledge of the actual installations and operating conditions of these valves, it was not able to be determined if this could create a "substantial safety hazard" as defined in 10 CFR Part 21. This information is intended to provide interim investigation results.

If you have any questions, you can contact Bob Arrone at 803-641-9395.

Sincerely,



Lars Gacad  
Vice President Quality Americas  
Asco Valve Inc.



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**REFERENCE A**

November 9, 2012

GE-Hitachi Nuclear Energy  
3901 Castle Hayne Road  
Wilmington, NC 28401  
Attn: Darion Jeralds  
Ref: RMA 53914

Dear Darion,

Two of valve catalog number HV266000010J 115/60, were returned assembled in series from Plant Fermi II. The reported problem is the valves were not shifting to the de-energized position when required. Serial numbers are A113888-025 (Valve 117, inbound), and A113888-068 (Valve 118, outbound).

During dis-assembly of valve A113888-068 (#118) it was discovered that the spring was not installed on the core. ASCO performed tests showing that this was the cause of the valve not exhausting properly in its as-received condition. The -025 (#117) valve passed all ASCO tests and operated acceptably in it's as- received condition.

An inspection step has been implemented to verify that the spring is installed properly. This has been done on all nuclear valves that use the conical spring/core assembly.

As there was no tamper sealant on the valve, ASCO cannot determine if the valve has been disassembled prior to its return. ASCO will be including tamper proof sealant on the pressure boundary joints of all Scram Solenoid Pilot Valves on all future shipments.

ASCO has not identified any process, material, assembler, design or equipment changes or non-conformances related to the core and spring which would affect its assembly. Based on experience ASCO believes this is an isolated case of one valve because:

1. This configuration of spring & core design was used on the original 090405 scram valve.
2. There has not been any design change to this core assembly since its inception in 1959
3. This spring/core design makes up the bulk of our core solenoid offering. It is used across all of our valve ranges in the Commercial, Nuclear, Military, and Petrochemical markets. ASCO has supplied over 10 million valves to these markets over the entire product offering.

4. In all cases we have not identified a single case of this condition where the spring came free of the core.
5. ASCO identified over 50,000 Nuclear Valves made using this same configuration. There have been no incidences of this anomaly recorded.

Based on the above analysis ASCO maintains that this is an isolated case. ASCO believes the above is a complete decision basis for isolation and to treat this as a singular anomaly,

At the Request of GE-H ASCO inspected the diaphragms of both valves. The material is in good condition, no foreign material is in the bleed holes of all 4 diaphragms.

Due to variations in core & spring tolerances ASCO does not feel any further testing attempting to replicate a partially installed spring would yield any reliable conclusions and ASCO would not be able to support any conclusions gained from additional tests.

The core and spring from valves 117 & 118 where both checked, which showed that the spring and core meet all of their required dimensions. A spring cycle test was then performed to determine if a properly installed spring would come off of cores 117 & 118 with the springs installed on the cores properly. The successful completion of this test proves that when the spring is properly installed on the core that the spring will not come off in service.

The spring/core assembly issue and the reported leakage from the tubes (see CAR #58596) are not linked.

ASCO does not have adequate knowledge of the actual installations and operating conditions of these valves to determine whether this condition could create a "substantial safety hazard" as defined in 10 CFR Part 21. This information is intended to provide investigation results and to answer the questions sent via email. This has been verified in accordance with 10CFR part 50 Appendix B.

Sincerely,



Bob Arnone  
Technical Service Engineer