

Part 21 (PAR)

Event # 50299

<b>Rep Org:</b> SOR INC.		<b>Notification Date / Time:</b> 07/23/2014 15:15 (EDT)	
<b>Supplier:</b> SOR INC.		<b>Event Date / Time:</b> 07/16/2014 (CDT)	
<b>Last Modification:</b> 04/02/2015			
<b>Region:</b> 4	<b>Docket #:</b>		
<b>City:</b> LENEXA	<b>Agreement State:</b>		Yes
<b>County:</b>	<b>License #:</b>		
<b>State:</b> KS			
<b>NRC Notified by:</b> MELANIE DIRKS		<b>Notifications:</b> MEL GRAY	R1DO
<b>HQ Ops Officer:</b> STEVE SANDIN		RANDY MUSSER	R2DO
<b>Emergency Class:</b> NON EMERGENCY		STEVE ORTH	R3DO
<b>10 CFR Section:</b>		GEOFFREY MILLER	R4DO
21.21(d)(3)(i) DEFECTS AND NONCOMPLIANCE		NRR PART 21	EMAIL

## PART 21 REPORT - POTENTIALLY DEFECTIVE PRESSURE &amp; TEMPERATURE SWITCHES

The following information was originally received in NRC Region IV on July 16, 2014 via email. Relevant portions of the submittal are provided below without graphs, tables or pictures.

"SOR is a supplier of basic components to the nuclear power industry. The components of concern for this notification are SOR nuclear qualified Pressure and Temperature switches with TA housings manufactured from 2004 through 2009.

"The defect being reported is a potential out of tolerance condition concerning the machined sealing surface for an environmental seal on the SOR nuclear TA housing. Other switches with a similar defect have the potential to not meet their intended safety function.

"Summary: SOR Inc. began a 10CFR21 evaluation on 6/4/14 upon receipt of three SOR pressure switches, model number 5TA-B45-U8-C1A-JJTTNQ (SN's 041100627, 041100628, and 041100629). These were returned from Entergy Nuclear Vermont Yankee (VY) due to inspections which questioned the suitability of the sealing surfaces on the face of the housings where the cover O-ring seals.

"The product evaluation was concluded on 6/24/14 and it was determined that this issue is a reportable defect as defined by 10CFR Part 21. If the switch housing has an inadequate machined sealing surface, the potential exists for steam permeation into the switch housing during accident conditions. This could result in an increase in set point as well as allow moisture into the housing potentially causing electrical consequences such as current leakage or a short. It is anticipated that the above noted condition represents a small percentage of the total number of housings from this batch of castings. Also, the potential risk is thought to be small due to a second redundant seal on the cover. This condition is being reported as a conservative measure.

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"Evaluation: There are 2 (redundant) environmental seals on the cover of the nuclear TA housing. One O-ring seals on the undercut of the cover threads (151 O-ring). This seal is not in question and is not part of this evaluation. The other O-ring seals between the face of the enclosure and the O-ring groove on the cover (042 O-ring). This is the seal that is the subject of this evaluation.

"Redundant O-ring seals are used on the SOR 'TA' cover to minimize steam permeation into the housing during LOCA or HELB conditions. The consequences of permeation are that it can result in an increase in the set point and also allow moisture into the housing which could have electrical consequences. The returned switches have a suspect sealing surface on the face of the housing where one of the two O-rings (the 042 O-ring) is intended to seal. For the purposes of this Part 21 evaluation, consideration needs to be given to whether this suspect sealing surface could result in increased permeation into the switch enclosure.

"Switches #041100627 and 041100628 both have an area on the face of the housing where the casting did not have sufficient material for cleanup when the housing was machined. This area was characterized by use of the SOR CMM and measuring the area where the O-ring is expected to seal.

"Switch #041100629 was different from #041100627 and 041100628 in that it had one small indentation in the sealing surface which was immeasurable but does not meet surface finish requirements.

"The TA housings on the returned switches are clearly out of tolerance. It is SOR's position that the environmental seals on any switch with a similar defect has the potential to not meet its' intended safety function. . .

"Evaluation of Previous Shipments: SOR has validated shipments for a quantity of 56 pressure and temperature switches with the subject TA housing.

"Potentially affected customers/utilities include: TVA/Watts Bar, TVA/Browns Ferry, TVA/Sequoyah, Entergy Nuclear/Vermont Yankee, Entergy Operations/River Bend, Southern California Edison, Third Qinshan Nuclear/QSNPP-3-A (TQNPC), Fairbanks Morse Engine, STP Nuclear Operating Co., Hydro Quebec /Gentilly II, Progress Energy/Shearon Harris, Control Components Inc./Korea Hydro Nuclear Shin-Kori & Wolsong, Control Components Inc./KHPN Shin Kori 3 & 4, Korea Hydro & Nuclear/KHPN Yonggwang NPP #5, Konan Engineering/Yonggwang Nuclear, and First Energy/Davis-Besse Nuclear. (Total Potentially Affected = 56.

"Root Cause: The returned TA housing castings did not meet print and therefore did not allow enough material for cleanup of the machined sealing surface.

"Permanent Corrective Action: SOR internal documentation is being changed to require 100% inspection of the raw casting height. Also, the 1/8 [inch] minimum finish dimension is being added to the housing machining drawings.

"Action by Nuclear Power Plant: SOR recommends that the application for each switch noted in the above table be reviewed to determine if it is being used in a LOCA or HELB application. If so, SOR recommends an inspection to visually check for an adequate sealing surface of the housing . This inspection is also recommended for switches that have not yet been installed. The minimum required sealing surface is 1/8 [inch] (0.125 [inch]). After inspection, all units should have the 042 and 151 O-rings replaced if the units do not exhibit the deviation.

"SOR will send replacement O-rings at no charge upon request. If units are found that do not meet the acceptance criteria, they will be replaced free of charge by SOR. Contact SOR Director of Customer Service, Greg Barber for the replacements:

"Greg Barber  
"913-956-3059  
"gbarber@sorinc.com"

\*\*\* UPDATE FROM MELANIE DIRKS TO VINCE KLCO ON 4/2/15 AT 1421 EDT \*\*\*

The following information was excerpted from a facsimile:

04/02/2015

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Korea Hydro Nuclear power plants were added to include Shin-Kori 1 & 2; Shin Wolsong 1 & 2.

Notified the Part 21 Reactors Group via email.

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