

Part 21 (PAR)

Event # 51788

<b>Rep Org:</b> ANVIL ENGINEERING PIPE SUPPORT		<b>Notification Date / Time:</b> 03/14/2016 14:07 (EDT)	
<b>Supplier:</b> ANVIL ENGINEERING PIPE SUPPORT		<b>Event Date / Time:</b> 10/01/2015 (EDT)	
<b>Last Modification:</b> 04/26/2016			
<b>Region:</b> 1		<b>Docket #:</b>	
<b>City:</b> NORTH KINGSTOWN		<b>Agreement State:</b> Yes	
<b>County:</b>		<b>License #:</b>	
<b>State:</b> RI			
<b>NRC Notified by:</b> MARK R. WARD		<b>Notifications:</b> JAMES NOGGLE R1DO	
<b>HQ Ops Officer:</b> DONG HWA PARK		PART 21/50.55 REACTORS EMAIL	
<b>Emergency Class:</b> NON EMERGENCY			
<b>10 CFR Section:</b>			
21.21(a)(2)		INTERIM EVAL OF DEVIATION	
21.21(d)(3)(i)		DEFECTS AND NONCOMPLIANCE	

## PART 21 - HYDRAULIC SNUBBER SEAL MATERIAL DEVIATION INTERIM REPORT

"Anvil Engineered Pipe Supports (EPS) supplied 14 Fig. 200N Configuration 'A' style hydraulic snubbers to the Exelon owned and operated Peach Bottom Atomic Power Station (PBAPS) in 2013. During the course of routine refueling outage activities in October 2015, it was discovered that 9 of these 14 snubbers had no hydraulic fluid in the reservoir. The cause of the hydraulic fluid loss was premature aging of the reservoir piston seal due to vibration induced frictional heat. Subsequent laboratory testing of both replacement and degraded seal material by Exelon Power Labs suggested that a material substitution had been made from the Anvil approved Ethylene Propylene (EP) compound to a different grade of EP rubber.

"On February 17, 2016, Anvil determined that a material substitution was made by the seal vendor. A machined seal that was fabricated by the manufacturer was substituted for a seal molded with the approved Anvil compound. Prior to its installation in Fig. 200N/201N Configuration 'A' hydraulic snubbers, the machined seal compound was not tested to establish a service life for the compound.

"Anvil has bounded the extent of condition to 4 specific seal batches of 4" and 5" Fig. 200N/201N Configuration 'A' reservoir piston seals provided after January 1, 2013. Based on its Part 21 investigation, Anvil has yet to determine that a specific defect exists, based on the demonstrated operability of the snubbers at PBAPS despite severe service conditions beyond their published operational limits, and the compatibility of the EP base polymer with Anvil hydraulic fluids.

"Anvil is conducting a test campaign to approve and establish a service life for the machined seal compound. This testing will either qualify the machined compound for use at currently published Anvil service conditions (157 degrees F for 25 years with a total lifetime dose not to exceed 2e8 rads), or establish a reduced service life for the snubbers in which a material substitution was made. This testing is being conducted on an assembled reservoir

IE19  
NRR

with the substitute machined compound. It will include irradiation of the reservoir to 6.4e7 rads, accelerated temperature aging, and a final radiation exposure to bring the cumulative dose to 2e8 rads. As of 3/14/16, the reservoir specimen had been irradiated to 6.4e7 rads with no effect on the seal.

"Anvil expects to have this testing complete by May 1, 2016, with a formal evaluation to follow. PBAPS has been notified of the material substitution, and a full accounting of the affected snubbers by serial number, PO number, site, and utility is being assembled. Anvil will notify affected sites when the testing and equivalency evaluation is complete.

"Please feel free to contact me if you have any questions or require any additional information.

"Sincerely,  
Mark R Ward  
Operations Manager  
Anvil Engineered Pipe Supports  
160 Frenchtown Road  
North Kingstown, RI, 02852"

\* \* \* UPDATE ON 4/26/2016 AT 12:25 EDT FROM MARK WARD (VIA FAX) TO BETHANY CECERE \* \* \*

The following is a summary of information received from Anvil EPS:

Anvil performed qualification testing of the machined compound with satisfactory results. The machined compound is now qualified for a service life equivalent to the published service life of the molded compound when used as a reservoir piston seal for the Fig. 200N/201N Configuration "A". Anvil has determined that a specific defect does not exist and no action by licensees is needed. Fifty-nine (59) total snubbers were shipped to NRC licensees (Farley, Peach Bottom, Oconee, ANO, and Diablo Canyon); Anvil will advise sites.

Notified R1DO (Dwyer), R2DO (Ehrhardt), R4DO (Groom) and NRR Part 21 Group.

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**Fax Cover Sheet**

**To: NRC Operations Center**

**Fax 301-816-5151**

**From:**

**Anvil Engineered Pipe Supports**

**401-886-3000**

**Pages: 2**



EPS Manufacturing Plant  
Precision Park  
160 Frenchtown Road  
North Kingstown, RI-USA 02852  
Voice: (401) 886-3000  
Fax: (401) 886-3010

April 18th, 2016

US Nuclear Regulatory Commission  
Document Control Desk  
11555 Rockville Pike  
Rockville, MD, 20852-2746

Subject: Final Status and Closure of Anvil Fig. 200N/201N Configuration "A" Size 4" and 5" Hydraulic Snubber Seal Material Deviation

Reference: USNRC Operations Center Event Report # 51788 Submitted 3/14/16

This is to notify the US Nuclear Regulatory Commission that, in accordance with the provisions of 10CFR Part 21, Anvil Engineered Pipe Supports (Anvil) identified a potential issue in an interim report concerning Anvil Fig. 200N/201N Configuration "A" Size 4" and 5" Hydraulic Snubber Seals, and are submitting our final determination of the event, based on further evaluation and testing.

Anvil informed the NRC in the referenced March 14, 2016 Interim Part 21 Notification that a material substitution had been made by a seal vendor. A machined seal was supplied for (4) specific batches of Fig. 200N/201N 4" and 5" Configuration "A" hydraulic snubber reservoir piston seals. This machined compound was not on the list of compounds approved by Anvil, and was a deviation from the specified molded compound. Anvil determined that the material substitution occurred in 4 specific batches provided after January 1, 2013, and identified those snubbers by serial number, PO number, site and utility. See Attachment A for a full listing.

Anvil has performed qualification testing of the machined compound. The test campaign was designed to duplicate the qualification testing of the molded compound to determine the equivalency of the machined compound. The testing performed between 3/4/16 and 4/15/16 included irradiation of an installed seal to 2e8 rads gamma and accelerated temperature aging to simulate 25 years of service @ 157° F. It was concluded by verification of the seal's ability to hold pressure with satisfactory results. The machined compound is now qualified for a service life equivalent to the published service life of the molded compound when used as a reservoir piston seal for the Fig. 200N/201N Configuration "A".

In conclusion, Anvil has determined that a specific defect does not exist and no action by licensees is needed. Anvil will advise sites that received the subject snubbers of the results of its findings regarding the machined compound. Please feel free to contact me if you have any questions or require any additional information.

Sincerely,

Mark R Ward  
Operations Manager  
Anvil Engineered Pipe Supports  
160 Frenchtown Road  
North Kingstown, RI, 02852

Page 1 of 1

**BUILDING CONNECTIONS THAT LAST**



## Attachment A to Anvil Part 21 Hydraulic Seal Deviation Report Page 1/1

Utility	Plant	Size	Utility PO#	Ref. Anvil CO#	QTY	Snubber Serial Number
Alabama Power	Farley	5	SNA10048859	108657	3	38905
						38306
						38907
			SNA10057867	110456	1	88646
			SNA10062118	111557	1	39094
SNA10081535	115855	1	39411			
Exelon	Peach Bottom	5	90059053	110313	6	39079
						39080
						39081
						39082
						39083
						39084
			90064333	113762	4	39321
						39322
						39323
						39324
						Seal Kit
		90081845	10040388	6		
		4	90059053	110311	7	39028
						39029
						39030
						39031
						39032
						39033
						39034
			90 065508 R.2	114700	6	39371
						39372
						39373
39374						
39375						
39376						
Duke	Oconee	5	185353	115517	2	Seal Kit
			186234	115781	1	39414
		4	172543	110738	1	39018
			186239	115759	1	39391
Entergy	ANO	5	10418715	116324	3	Seal Kit
			10422138	116912	2	Seal Kit
			10451406	10035787	1	39759
		4	10393635	112163	1	Seal Kit
PG&E	Diablo Canyon	5	3501042219	10031269	1	31782
			3501044574	10032982	3	39752
						39753
						39754
3501052817	10035263	8	Seal Kit			
TPC	Chin Shan	5	PO15AEI017PD01	10039147	2	39874
						39875
Total Number of Seals					61	