NRC FORM 366 (7-77)

U. S. NUCLEAR REGULATORY COMMISSION

CENSEE EVENT REPORT

S AL: RSEP/79-1133

CONTROL BLOCK: | | | | | | | (1) (PLEASE PRINT OR TYPE ALL REQUIRED INFORMATION)

0 1 | LICENSEE CODE: S C H B R 2 (2) | LICENSE NUMBER: 0 0 - 0 0 0 0 0 - 0 0 (3) | LICENSE TYPE: 4 1 1 1 1 (4) | CAT: (5)

CON'T 0 1 | REPORT SOURCE: L (6) | DOCKET NUMBER: 0 5 0 0 0 2 6 1 (7) | EVENT DATE: 0 8 0 2 7 9 (8) | REPORT DATE: 1 0 2 9 7 9 (9)

EVENT DESCRIPTION AND PROBABLE CONSEQUENCES (10)

0 2 This LER is a supplement to LER 79-26 Rev. 0 which dealt with the failure of a
0 3 Blaw-Knox snubber during a functional test. The original failure was a broken shaft
0 4 which was attributed to incorrect shaft material and possible side loadings imposed on
0 5 the snubber during the test. The snubber had been repaired with a new shaft of the
0 6 correct material and was being retested when a second shaft failure occurred. The
0 7 snubber was being used as a spare at the time of the second failure and, therefore,
0 8 the failure did not affect the safe operation of the plant.

SYSTEM CODE	CAUSE CODE	CAUSE SUBCODE	COMPONENT CODE	COMP. SUBCODE	VALVE SUBCODE
C G (11)	E (12)	X (13)	S U P O R T (14)	D (15)	Z (16)

(17) LER/RO REPORT NUMBER

EVENT YEAR		SEQUENTIAL REPORT NO.		OCCURRENCE CODE	REPORT TYPE		REVISION NO.
7 9	—	0 2 6	/	0 3	L	—	1

ACTION TAKEN	FUTURE ACTION	EFFECT ON PLANT	SHUTDOWN METHOD	HOURS (22)	ATTACHMENT SUBMITTED	NPRD-4 FORM SUB.	PRIME COMP. SUPPLIER	COMPONENT MANUFACTURER
A (18)	G (19)	Z (20)	Z (21)	0 0 0 0	Y (23)	N (24)	X (25)	T 2 4 4 (26)

CAUSE DESCRIPTION AND CORRECTIVE ACTIONS (27)

1 0 Prior to testing, the front mounting bracket was not threaded fully onto the shaft's
1 1 front end; thus the small diameter threaded region of the shaft failed since it was
1 2 exposed to excessive loadings designed for the larger diameter shaft. It is believed
1 3 that this procedural problem could have contributed significantly to the originally
1 4 reported failure. Precautionary steps are to be included in both the testing and the reinstallation instructions to prevent this problem from recurring.

	FACILITY STATUS	% POWER	OTHER STATUS (30)	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION (32)
1 5	E (28)	0 9 5 (29)	NA	B (31)	During functional test

	ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY (35)	LOCATION OF RELEASE (36)
1 6	Z (33)	Z (34)	NA	NA

PERSONNEL EXPOSURES

	NUMBER	TYPE	DESCRIPTION (39)
1 7	0 0 0 (37)	Z (38)	NA

PERSONNEL INJURIES

	NUMBER	DESCRIPTION (41)
1 8	0 0 0 (40)	NA

LOSS OF OR DAMAGE TO FACILITY (43)

	TYPE	DESCRIPTION
1 9	Z (42)	NA

7911010 263

PUBLICITY

	ISSUED	DESCRIPTION (45)
2 0	Z (44)	NA

NRC USE ONLY

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NAME OF PREPARER R. B. Starkey, Jr. PHONE: 803/383-4524

GPO 917-926

SUPPLEMENTAL INFORMATION

FOR

LICENSEE EVENT REPORT 79-26 REV. 1

1. Cause Description and Analysis:

On September 18, 1979, the shaft on a Blaw Knox snubber failed during a functional test. The snubber had been repaired with a new shaft following a previous shaft failure (LER 79-26 Rev. 0) believed to have been caused by incorrect shaft material. During the test, the snubber had exhibited proper piston movement and tension lock-up and bleed rates. However, when lock up was obtained in the compression mode, the shaft bent at the threaded end. The snubber was properly attached to the tester (Grinnell Model 5434-3) with the compression drive mechanism set at the proper pressure in accordance with the test procedure (CPL-PT-31.0).

Following the failure, it was noticed that the snubber's front mounting piece had not been threaded fully onto the front end of the shaft (see attached drawing). This resulted in the threaded end being subjected to loads much higher than normal. Angular loads are generated at the time of compression lockup due to the inherent flexibility of the 5/8 inch diameter, 6 inch stroke shaft. If the front mounting bracket had been seated against the shaft step, the threaded end would not have been exposed to these loads. Thus, the rigidity and strength of the shaft as a whole would have been enhanced to the extent that the failure probably would not have occurred.

Following the failure, the shaft was sent to the CP&L metallurgical laboratory in order to determine if a problem inherent with material factored into the failure. The analysis determined that the material used was the proper type (SAE type 1050 carbon steel). Therefore this failure has been attributed to the improper positioning of the front mounting bracket during the test. The Material Laboratory Supervisor who analyzed the failed shaft agreed with this conclusion.

Since the snubber was being used as a spare, the failure did not affect the safe operation of the plant. However, since this failure may add some insight into a possible cause of the shaft failure incurred during the first event (LER 79-26 Rev. 0), this information is being forwarded for review. It is believed that this procedural problem could have been the root cause of the original failure.

As mentioned in the original LER, the shafts on the remaining (4) safety related Blaw Knox snubbers were to be replaced with shafts verified to be of the correct material. Also the old shafts were to be analyzed to determine if the problem of incorrect shaft material cited in the first failure exist in the other snubbers.

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Two of the four shafts in question have been replaced. The analysis showed that both were manufactured from the same incorrect material, type 1144 carbon steel. The other two snubbers are classified as inaccessible during power operation (approximately 200 mRem/min. field) and, therefore, cannot be removed until the plant is shutdown. Even though the two remaining shafts may be of improper material, the testing and inspection performed on them as described in the original LER in addition to the new information regarding the probable failure mode of that event clearly support continued operability of the two snubbers until their shaft replacement can be accomplished.

2. Corrective Actions:

Following the installation of a new shaft, the snubber was functional tested satisfactorily in both the tension and compression modes. Also the other similar safety related snubbers (4 total) were inspected to see if they were mounted with the front bracket seated against the shaft step. All the snubbers were found to be installed properly.

Since three out of five shafts have been identified as being manufactured by the incorrect material, it is believed that this discrepancy could be generic in nature for that particular vintage snubber. However, based on the events surrounding the second failure it is further believed that this discrepancy had no significant contribution to the original failure.

3. Corrective Action to Prevent Further Occurrence:

Precautionary instructions will be added to both the functional test procedure and the reinstallation instructions to ensure that the front mounting bracket is seated against the shaft step. This action should eliminate further occurrences during either testing or while the snubber is in service.

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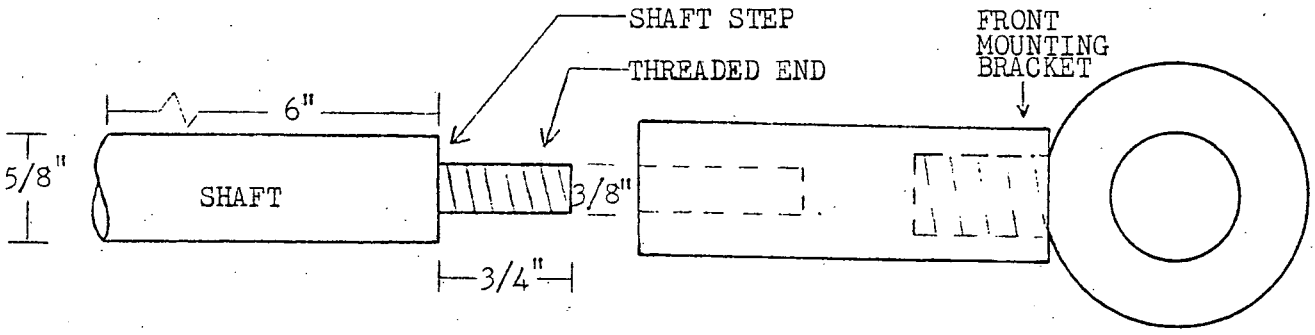
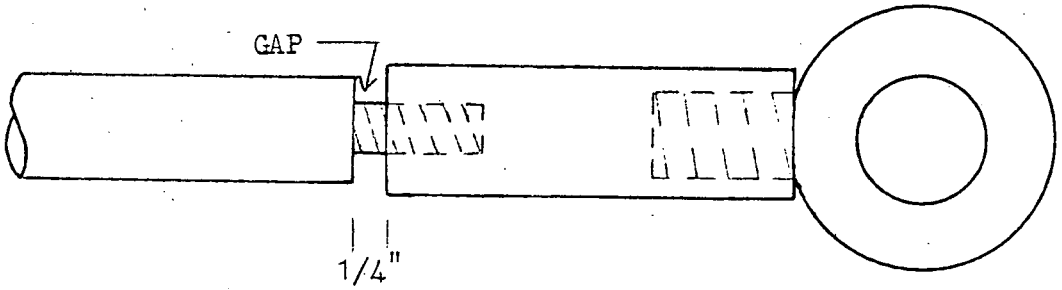
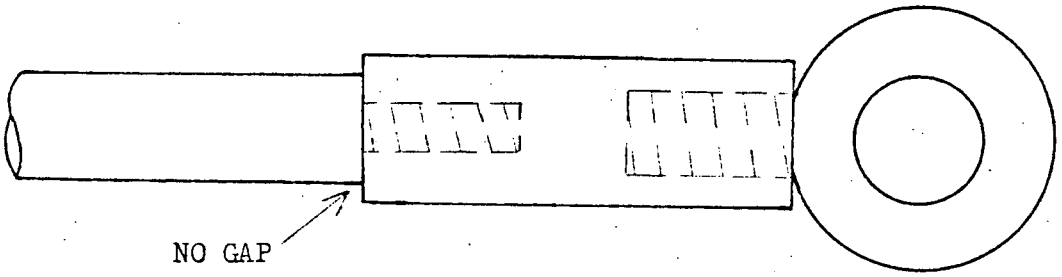


POSITION PRIOR TO FAILURE



Since the threaded end is exposed, it must act as a load supporting part of the shaft. Due to its smaller diameter it is much more vulnerable to failure than the shaft when exposed to angular loading.

CORRECT POSITION



The threaded end is no longer exposed since the front mounting bracket is seated against the shaft step. Therefore the joint between the front mounting bracket and the shaft is more rigid and able to withstand the angular loads experienced by the snubber during the functional test.