



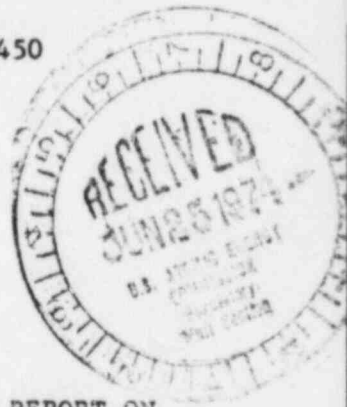
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BBS Ltr.#451-74

Dresden Nuclear Power Station  
R. R. #1  
Morris, Illinois 60450  
June 20, 1974

Mr. J. F. O'Leary, Director  
Directorate of Licensing  
U. S. Atomic Energy Commission  
Washington, D. C. 20545

50-237



SUBJECT: LICENSE DPR-19, DRESDEN NUCLEAR POWER STATION, UNIT #2, REPORT ON  
INSPECTION OF BERGEN PATERSON SHOCK SUPPRESSORS AND RESTRAINTS.

Dear Mr. O'Leary:

This letter is to report information concerning the station's fifth inspection of Bergen Paterson shock suppressors on Unit 2. The unit was shutdown on June 8, 1974 because of off gas rechar system piping tie-in and the 120 day drywell snubber inspection.

PROBLEM

The inspection of the Bergen Paterson shock suppressors revealed that eight (8) of the thirty-one (31) snubbers in the drywell were found to be inoperable. Of the eight (8) failed snubbers, six (6) were found without any fluid level indication, one (1) with extremely low fluid contents and one snubber that was apparently not installed on the feedwater line subsequent to the last inspection in February, 1974. This snubber was removed and repaired with ethylene-propylene seals in February.

In addition to the eight (8) failed snubbers, six (6) snubbers were found with low oil levels.

Also an inspection was made of the torus snubbers which revealed that four (4) of them had low oil level indications on the accumulator. Subsequently, oil was added to these accumulators.

Eleven Grinnell snubbers, located in the turbine and isolation condenser pipeways, were inspected to supplement the above described inspection. All were operable, but two of the snubbers had a low oil indication. The above mentioned snubbers exhibiting low oil level were filled prior to resuming power operation.

Following is a list of the failed drywell snubbers giving the actual piston extension, fluid level indicated position and seal material used during the past 120 days of reactor operation:

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PDR ADOCK 05000237  
G PDR

*Handwritten:* 50-237 (ROB 03-4)

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June 20, 1974

SNUBBER AS-FOUND CONDITION

<u>Snubber I.D. No.</u>	<u>Actual Piston Rod Extension</u>	<u>Fluid Level Indicated Position</u>	<u>Seal Material</u>
1	3.5	4.25	E-P
2	3.5	3.0	PU
3	3.37	3.75	PU
4	3.0	4.5 (low)	PU
5	3.25	4.5 (low)	PU
6	3.25	3.75	PU
7	3.5	3.25	PU
8	3.0	3.25	PU
9	4.0	5.5 (low)	PU
10	3.5	6.0 (inop)	PU
11	3.0	2.0	PU
12	3.75	4.0	E-P
13	4.0	6.0 (low)	E-P/PU
14	3.5	4.0	PU
15	3.5	1.0	PU
16	3.5	3.5	PU
17	4.0	5.0 (low)	PU
18	1.5	2.5 (low)	PU
19	1.25	1.0	E-P
20	2.0	not visible (inop)	E-P
21	4.0	4.0	PU
22	1.5	1.5	E-P
23	4.25	not visible (inop)	E-P
24	3.75	4.5	PU
25	4.75	not visible (inop)	PU
26	2.25	not visible (inop)	E-P
27	3.5	3.75	E-P
28	Snubber laying on Grating - Not attached to pipe -		E-P
29	3.0	not visible (inop)	E-P
30	3.0	not visible (inop)	E-P
31	2.75	3.5	E-P

E-P - Ethylene Propylene Seal Material

PU - Polyurethane Seal Material

INVESTIGATION

As shown by the above list, six (6) of the failed snubbers contained all ethylene-propylene seals with the remaining two containing the polyurethane seal material. Upon disassembly of each inoperable snubber, the following conditions were observed:

Snubber #20

Accumulator Cylinder - Internals had score marks. Maintenance honed out the cylinder and appeared satisfactory.

Main Piston - Chrome plating on piston shaft appeared to be slightly deteriorated (pitting). Possible source of oil leakage. Radial score marks on piston head.

Piston Cylinder - Radial score marks on walls.

Ethylene Propylene Seals - Good condition, no apparent deterioration.

Snubber #23

Accumulator Cylinder - Good condition.

Main Piston - Scores on piston rings and piston head.

Piston Cylinder - Longitudinal and circumferential score marks.

Ethylene Propylene Seals - Good condition, no apparent deterioration.

Snubber #25

Accumulator Cylinder - Radial score marks.

Main Piston - Radial score marks on piston head.

Piston Cylinder - Radial score marks on walls.

Ethylene Propylene Seals - Good condition, no apparent deterioration.

Polyurethane Seals - Quite brittle with several being broken.

Snubber #26

Accumulator - Broken off from main snubber body with retaining rods for accumulator badly worn. Apparently due to rubbing action on grating while laying free.

Accumulator Cylinder - Slight axial score marks.

Main Piston - Head scored with shaft showing signs of chrome deterioration (pitting).

Piston Cylinder - Several radial score marks on walls.

Ethylene Propylene Seals - Good condition.

Note: Snubber oil appeared to be dirty.

Snubber #28

Accumulator - Not disassembled.

Main Piston - Head was badly scored. Scratches located on piston shaft.

Piston Cylinder - Axial score marks. Internal surface quite rough from honing process in February, 1974.

Ethylene Propylene Seals - Good condition.

Snubber #29

Not disassembled

Snubber #30

Accumulator - Considerable amount of black cruddy material in accumulator oil. Appears that oil may have broken down the black painted surface of the spring.

Accumulator Cylinder - Satisfactory condition.

Main Piston - Head scored with slight chrome deterioration on the shaft.

Piston Cylinder - Satisfactory condition.

Ethylene Propylene Seals - Good condition.

Note: Leakage appeared to be in the accumulator end plate due to the manifold block bolts being loose.

Snubber #31

Note: This snubber taken out by mistake, however, as found conditions are listed below.

Accumulator - Not disassembled.

Main Piston - Score marks on piston head with slight chrome deterioration on the shaft.

Piston Cylinder - Radial score marks on walls.

Ethylene Propylene - Good condition.

#### Snubber #10

Removed the polyurethane seals, which were brittle, and replaced them with the ethylene propylene seal material.

#### CORRECTIVE ACTION

The corrective actions taken was to replace snubber numbers 20, 23, 25, 26, 28, 29, 30, 31 with new snubbers and rebuild snubber number 10 with ethylene propylene seal material. In addition to the above actions, two other snubbers were replaced; snubber number 9 and 18 due to the availability of new snubbers. These new snubber contained ethylene propylene seal material rather than the presently installed polyurethane. The reason for not replacing the remaining fifteen (15) snubbers with ethylene propylene seal material was due to the limited time availability.

In the case of the snubber found unattached to its respective feedwater line pipe lug, an inspection was made of snubbers that were rebuilt or replaced subsequent to there reinstallation to determine as-left condition. In the future, an as-left condition inspection will be made and documented, subsequent to any snubber changes. The results of the as-left condition of the thirty-one (31) drywell snubbers is listed below:

#### SNUBBER AS-LEFT CONDITION

<u>Snubber I.D. No.</u>	<u>Actual Piston Rod Extension</u>	<u>Fluid Level Indicated Position</u>	<u>Seal Material</u>
1	3.0	2.0	E-P
2	2.75	3.0	PU
3	3.5	4.0	PU
4	2.75	2.0	PU
5	3.0	2.0	PU
6	3.00	2.0	PU
7	3.0	3.5	PU
8	3.0	3.0	PU
9	3.5	2.5	E-P (new)
10	3.0	3.25	E-P (rebuilt)
11	3.00	1.75	PU
12	3.75	4.0	E-P
13	2.25	2.5	E-P/PU
14	5.0	2.5	PU
15	3.375	1.25	PU

SNUBBER AS-LEFT CONDITION (Cont'd)

<u>Snubber I.D. No.</u>	<u>Actual Piston Rod Extension</u>	<u>Fluid Level Indicated Position</u>	<u>Seal Material</u>
16	3.375	3.5	PU
17	4.0	1.0	PU
18	1.5	1.0	E-P (new)
19	1.0	1.0	E-P
20	1.625	1.5	E-P (new)
21	4.25	5.0	PU
22	1.50	1.50	E-P
23	4.0	3.0	E-P (new)
24	3.25	4.0	PU
25	4.0	3.5	E-P (new)
26	3.0	3.0	E-P (new)
27	3.25	4.0	E-P
28	2.0	1.0	E-P (new)
29	3.0	2.0	E-P (new)
30	3.0	1.5	E-P (new)
31	2.75	2.0	E-P (new)

E-P - Ethylene Propylene Seal Material  
PU - Polyurethane Seal Material

The mode of failure of the six (6) snubbers containing the ethylene propylene seal material has not been determined at this time but an investigation is underway. Presently, snubber #28 badly scored piston head and associated cylinder has been sent to the company's Operational Analysis Department Material Section to possibly determine cause of scoring. In addition, an oil sample and several previously in-service seal material will be sent to this department for further testing. The results of these tests will dictate further steps in this investigation.

EVALUATION

In evaluating the safety implications of the inoperable snubbers, it is apparent that they do not have a backup system and if a situation arose for their use (i.e. earthquake), the possibility exists for damage to the primary system piping. As a result of these factors, the directive from the Atomic Energy Commission to inspect these snubbers on a 120 day basis minimizes the possibility of more inoperable snubbers.

With the introduction of the new seal material, ethylene propylene, it was felt that this would considerably minimize failures but as a result of recent events renewed investigation is underway. From the initial

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inspection of the parts, it appears that the mode of failure is not the seals themselves but another mechanism, and this new investigation will hopefully uncover this.

Sincerely,

*Arthur M Roberts*

*for* B. B. Stephenson  
Superintendent

BBS:RLW:do