

BOSTON EDISON COMPANY
GENERAL OFFICES 800 BOYLSTON STREET
BOSTON, MASSACHUSETTS 02199

A. V. MORISI
MANAGER
NUCLEAR OPERATIONS SUPPORT DEPARTMENT

June 10, 1982

BECO. Ltr. #82-176

Mr. Ronald C. Haynes, Director
Office of Inspection and Enforcement
Region I
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

License No. DPR-35
Docket No. 50-293

IE Bulletin 81-01: Report on Inspection
of Mechanical Snubbers at Pilgrim Station

Reference: (A) Boston Edison letter dated August 11,
1981 from Mr. A. V. Morisi to Mr. Boyce
H. Grier

Dear Sir:

In Reference (A), Boston Edison stated that it would submit the results of inspections performed to satisfy Item 3b of IE Bulletin 81-01 after start-up.

These results would be contained in a report which would address the following:

- A description of the visual examinations and tests performed.
- Number of snubbers examined and tested. Grouping by manufacturer name, model number, and size.
- Number of failures identified; manufacturer name, model number, size, mode of failure, cause of failure, corrective action, snubber location, effect of failure on plant and system safety, and justification for continuing or resuming operation.

Pilgrim Station has 35 mechanical snubbers, all manufactured by Pacific Scientific Corporation, all of PSA-10 load capacity (10 Kip). These snubbers are all located in the Drywell, supporting the four branch lines of the main steam relief discharge system. We classified the total population of mechanical snubbers as one group for our inspection because they are all of the same size, capacity, manufacture and their location subjects them to very similar environmental conditions.

All 35 mechanical snubbers were the subject of visual and manual testing as specified in Station Procedure 3.M.4-28. The details of the requirements specified in that procedure are to be found in Attachment A of this submittal. No snubbers failed this examination.

Mr. Ronald C. Haynes, Director
June 10, 1982
Page 2

In addition to the inspection performed in accordance with Procedure 3.M.4-28, one snubber from each of the four branch lines was selected for further testing, representing 10% of the total mechanical snubber population. On each branch line we selected the snubber situated closest to the relief valve because we believe it to be the most critical, and as being the most likely to have received the highest loading when in service.

Each selected snubber was tested to determine its Drag and Activation Level. Each test was performed at three extensional positions of the snubbers, fully extended, mid position and fully retracted. Furthermore, tests were conducted in the Tension mode (snubber extending) and the Compressive mode (snubber retracting) at each of the three piston settings.

The DRAG FORCE was determined by placing a Force Transducer in line between the snubber Piston Rod and the piston of an air operated cylinder. The pressure applied to the air operated cylinder was controlled by a two stage valve, and adjusted to the lowest possible pressure needed to overcome the STATIC DRAG FORCE of the snubber.

The ACTIVATION LEVELS were derived by applying a force to the snubber piston of sufficient magnitude to ensure activation and measuring the time taken for the snubber to traverse two inches of stroke. The ACTIVATION LEVEL was computed by substituting the derived values in the expression:

$$S = \frac{a t^2}{2} \text{ where}$$

S = distance traveled

and t = time, in seconds

a = activation level

The results of this additional testing is contained in Attachment B. All four snubbers met predefined criteria for Drag and Activation levels consistent with the requirements of the Standard Technical Specification applicable to mechanical snubbers issued by the USNRC on November 20, 1980; therefore, they were returned to service. Since no failures were experienced in the first sample of snubbers tested, no further testing was mandated.

We believe this submittal satisfactorily responds to the issues contained in Bulletin 81-01. Should you require further information after reviewing it, please contact us.

Very truly yours,

Armstrong

Attachments

- (A) Details of Procedure 3.M.4-28
- (B) Test Results

Attachment A

Procedure 3.M.4-28 details visual and manual testing as follows:

Visual

- Inspection of physical condition.
- Verification that field welds attaching the rear bracket assembly to plant structure/support are intact.
- Verification that the bolts attaching the forward bracket/transition tube assembly to the arrestor housing are tight and intact.
- Verification that the screws keeping the cylinder end plug on the arrestor end are secured.
- Verification that the retainer pins of the rear and forward bracket assembly are in good shape and the cotter pins keeping the retainer pin in place are in place.
- Verification that the retainer pin of the rear bracket is not tight fit in the spherical bearing of the arrestor end cap and that the spherical bearing is free to rotate.
- Recording the extension of the arrestor by noting the position of the arrestor housing on the number scale.
- Recording all unusual indications.

Manual

- Unusual indications (loose bolts, bent retainer pins, loose cotter pins, broken welds, etc.) be reported to the maintenance staff engineer for corrective action.
- Misoriented mechanical shock arrestor units will be readjusted
- Arrestor extension readings will be compared to the cold and hot settings listed on procedural form. Unacceptable units will be operationally/functionally tested unless otherwise designated by the maintenance staff engineer.
- The functional/operational test for the mechanical shock arrestor on the spot, is performed by the following:

Detach one end of the arrestor from its retaining fittings.

Manually extend and retract the arrestor through its full stroke range.

Document the functional/operational test of the arrestor on procedural form.

If extension or retraction of the arrestor is not possible, the unit shall be disconnected for more elaborate testing.

Attachment B

Test Results

Snubber Serial Number 338

Visual inspection revealed no signs of damage, corrosion or undue degradation other than some degradation of paint on the exterior surfaces.

The maximum drag force of 69.6 lb. was recorded at the mid stroke position in the compressive mode and the maximum activation level of 0.016 g recorded in the fully extended, and the mid stroke position, in the tension mode.

Having met the requirements of both the Drag and Activation Levels, the snubber was judged to be operable, and returned to service.

Snubber Serial Number 345

Visual inspection revealed paint degradation and slight corrosion in the Piston Rod, Ball End, at the Pin interface. The level of corrosion was very slight, and would have no detrimental effect on the strength of the Ball unit, or the Pin to Ball fit. One of the countersunk Phillips Head screws in the Piston Body was missing, the second screw being tight, and still in place. This unit was subjected to the Drag and Activation Level tests without replacing the missing screw, which is the required procedure.

The highest Drag Level recorded was 72.5 lb. in the mid stroke position, compressive mode.

The highest Activation Level recorded was 0.011 g at numerous points on the snubber.

Having passed the required tests the missing screw was replaced by an identical screw from a spare unit, and the snubber was returned to service.

Snubber Serial Number 450

Again, slight corrosion in the Ball Bushing and some paint degradation was evident. Neither were sufficient to degrade the capability of the snubber.

Maximum Drag Force was found to be 66.7 lb. in the fully extended position, compressive mode.

Maximum Activation Level was determined to be 0.011 g at numerous positions on the snubber.

The snubber was declared operable and returned to service.

Snubber Serial Number 465

No evidence of paint peeling or corrosion were found.

Maximum Drag Force 58.0 lb. at three positions on the snubber.

Maximum Activation Level 0.013 g at two positions.

The snubber was declared operable and returned to service.