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DENTON,H.R. Office of Nuclear Reactor Regulation, Director
STOLZ,J.F. Operating Reactors Branch 4

SUBJECT: Forwards technical evaluation of reactor coolant pump 2A2 hydraulic snubber operability,per 830919 visual insp. Snubber determined operable.Next visual insp required prior to 850214.

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May 11, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. John F. Stolz, Chief
Operating Reactors Branch No. 4

Subject: Oconee Nuclear Station
Docket No. 50-270

Dear Sir:

During a visual inspection of Unit 2's inaccessible hydraulic snubbers performed on September 19, 1983, two snubbers were declared inoperable. One of these snubbers was declared inoperable because a hydraulic reservoir with fluid was connected prior to performing the functional test.

Duke has recently performed a detailed technical evaluation of this situation and has determined that this particular snubber was in fact operable at the time of the inspection. This evaluation is provided in the attached Technical Justification. With this snubber being determined to be operable, the result of the September 19, 1983 inspections is that there was only one (1) inoperable snubber. In accordance with the Technical Specifications (4.18.1), the inspection interval becomes 12 months ± 25% rather than 6 months as had been previously required with two inoperable snubbers.

Accordingly, Duke Power considers that the next visual inspection of the Unit 2 inaccessible hydraulic snubbers is required prior to February 14, 1985 which is the 12 month ± 25% inspection as calculated from the last inspection which was on November 14, 1983, just prior to the end of the refueling outage. If there is a forced outage of sufficient duration prior to this required date, every effort will be made to complete the visual inspection during the forced outage. Unless informed to the contrary prior to June 28, 1984, Duke considers that this course of action is acceptable to the NRC.

Very truly yours,

H.B. Tucker

Hal B. Tucker

RLG/PFG/php

Attachment

A001

cc: Mr. James P. O'Reilly, Regional Administrator
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Duke Power Company
Oconee Nuclear Station
Technical Evaluation of RCP 2A2 Hydraulic Snubber Operability

I. Overview

During the visual inspection of the Unit 2 inaccessible hydraulic snubbers, performed on September 19, 1983, the fluid reservoirs for two snubbers were discovered empty and were declared unacceptable. One snubber was mounted on the side of the 2A1 Reactor Coolant Pump (RCP) motor housing. The other snubber was mounted on the side of the 2A2 RCP motor housing. See sketch of arrangement attached. Each of the four RCP motor housings has three snubbers. Nine of these snubbers utilize an independent remote reservoir while the other three snubbers are of the self-contained type. The two inoperable snubbers utilize a remote reservoir arrangement. The two rejected snubbers are of the ITT Grinnell 5 x 5 remote reservoir type. These two snubbers were removed for functional testing to determine operability. Both were determined at the time to be inoperable. Based on a technical review, Duke now considers that only the RCP 2A1 snubber need be considered to have been inoperable. The RCP 2A2 snubber was declared inoperable in error.

In the history of Oconee,* eighteen (18) snubbers which were initially declared unacceptable based on visual inspections have been functionally tested in the as-found condition. Twelve (12) of these passed the functional test and were declared operable. In two cases of snubbers which failed the functional test, the leak locations were relatively low in the snubber, so that it was possible for a relatively large quantity of fluid to leak out. There is no contrary data. In all cases where the leak location was relatively high, the snubber passed the functional test.

Thus, it is reasonable to expect that the higher the location of the leak in a snubber, the less fluid will leak out, and the more likely that the snubber remains functional. In the case of the 2A2 snubber (see sketch), the location of the leak is believed to be at the connection of the rubber hose (from the reservoir) to the tube coming from the valve body. There is no contrary evidence, and during functional test, no significant leaks were observed at any other location.

From this Duke has concluded that the 2A2 snubber's leak was as high or higher than that on any other of the 18 snubbers functionally tested, and therefore it is probable that it would also have passed the functional test had it been performed correctly. Additional details follow.

II. Technical Evaluation

During the visual inspection of the Unit 2 inaccessible hydraulic snubbers, performed on September 19, 1983, the fluid reservoirs for two snubbers were discovered empty. One snubber (2-50-0-1066A-RCPM-2A1-552) was mounted on the side of the 2A1 Reactor Coolant Pump (RCP) motor housing.

* For the purpose of this evaluation, the history of Oconee is considered from 1977 when all seals were changed to the EP style seal.

The other snubber (2-50-0-1066A-RCPM-2A2-552) was mounted on the side of the 2A2 RCP motor housing. Both snubbers are of the ITT Grinnell 5 x 5 remote reservoir type. These two snubbers were removed for testing to determine operability.

The snubber that was mounted on the side of the 2A1 RCP motor housing failed its functional test. This snubber was declared inoperable. In addition to the empty reservoir, this snubber had a damaged fitting at the valve to cylinder interface which allowed the hydraulic fluid to leak out (a low point leak). A visual inspection on the Unit 2 inaccessible hydraulic snubbers had been previously performed on April 19, 1982. At that time, no damage was observed on the snubber associated with the 2A1 RCP. Between the inspection intervals (April 19, 1982 and September 19, 1983), the Unit 2 Reactor Building was accessible for maintenance activities on three different occasions: August 25, 1982 through September 6, 1982; May 7, 1983 through May 16, 1983; and May 24, 1983 through May 29, 1983).

For the other snubber which had been mounted on the 2A2 RCP motor housing, no obvious damage was observed which could account for the loss of fluid. This snubber passed its functional test. However, prior to performing the test, a hydraulic reservoir with fluid was connected to the valve fitting. Therefore, the snubber was declared inoperable (due to not testing in the as-found condition as required per Specification 4.18.1.). When functionally tested, a small amount of hydraulic fluid was observed to be leaking from around the adjustment screw on the snubber valve. However, this leakage was insufficient to result in complete loss of hydraulic fluid from the reservoir during the interval period. The integrity of the hose and reservoir was also verified and thus could not be the source of leakage. It was thus determined that the loss of fluid from the snubber associated with the 2A2 RCP was due to leakage through the hose clamp fittings in the line between the valve body and the reservoir (a high point leak).

The type of fittings that had been utilized was the slip-on type, where the hose is slipped over a metal tube and secured with a hose clamp. When the hose clamp is not adequately secured, hydraulic fluid will leak out from the tubing above that point due to gravitational effects. To remedy this, the fittings on all nine of the generically susceptible hydraulic snubbers with remote reservoirs were replaced during the Unit 2 refueling outage with a crimp type fitting. The hoses were also replaced. These modifications should prevent the loss of fluid through the fittings for all of these snubbers.

The Bases of Technical Specficiation 4.18 states that when the cause of the rejection of a snubber is clearly established and remedied for that snubber and for any other snubbers that may be generically susceptible, and verified by inservice functional testing, that the snubber may be exempted from being counted as inoperable. Generically susceptible snubbers are those which are of a specific make or model and have the same design features directly related to rejection of the snubber by visual inspection, or are similarly located or exposed to the same environmental conditions such as temperature, radiation, and vibration.

Although the snubber mounted on the side of the 2A2 RCP motor housing was not properly tested to verify operability, Duke considers that this snubber would have passed its functional test, if tested properly, and thus could be classified as operable. In support of this position, Duke has reviewed previous Oconee experience with hydraulic snubbers in general and with hydraulic snubbers with empty reservoirs, in particular. Additionally, an analysis of this snubber was performed which justifies the conclusion that this snubber would most likely have passed its functional test.

Hydraulic snubbers with empty reservoirs have been encountered during past inspections and have been properly tested in the as-found condition. Our records indicate that eighteen (18) hydraulic snubbers have been found with empty reservoirs and were properly tested in the as-found condition. When these eighteen were tested, twelve (12) passed and six (6) failed (this includes the snubber which was associated with the 2A1 RCP). Based on this data, there is some degree of assurance that if the snubber associated with the 2A2 RCP was tested in the as-found condition, it would have passed.

The relative vertical position of the leak location to the snubber internals has a strong effect on the determination of operability. A "low point" leak such as that which occurred on the failed snubber 2A1-SS2 would have drained all fluid above its level. In that case, most of the fluid would be expected to leak out of the valve, tubing, and reservoir, and the snubber would be expected to fail the test.

In contrast, a "high point" leak which occurs above the valve and cylinder would leave these internals fluid filled even if no fluid from a reservoir were available. Snubber 2A2-SS2 is concluded to have had a "high point" leak. In fact, in comparing the design of this hydraulic snubber to others[1] it is apparent that its high leak point would have given it a probability of passing equal to or greater than other snubbers with high point leaks which have been tested with empty reservoir and passed.

The final technical conclusion drawn from the investigation is that snubber 2A2-SS2 was operable and would have passed the test without a full reservoir.

In addition to the above information, an investigation into the history of hydraulic snubber failures was conducted. The investigation encompassed the hydraulic snubbers for all three units, both inaccessible and accessible hydraulic snubbers. The results of the investigation are summarized in Table 1. The data indicate that the failure rate for hydraulic snubbers is historically very low.

In reviewing past Oconee visual inspection results from 1977 to the present (see Table 1), it appears reasonable to expect only one inoperable hydraulic snubber per unit per year. This provides assurance that the

[1] See attached sketch. All snubbers which have <u>failed</u> this functional test had the integral reservoir illustrated, with the bottom of the reservoir relatively lower than the top of the tube on the 2A1 snubber.

snubber population quality is high. Since the failure rate has been established over a 6-7 year period of time it is a strong predictor of future snubber failures, and it alleviates some of the concern about the operability of the 2A2 snubber.

Technical Specification 4.18.3 also requires that at least once per refueling outage, a minimum of 10 percent of the unit's hydraulic snubbers be functionally tested. As of May 8, 1984 a total of 151 hydraulic snubbers have been tested, per Specification 4.18.3, resulting in only 2 failures.

III. Conclusion

In accordance with the Technical Specifications, at each refueling outage a visual inspection of inaccessible snubbers is performed near the beginning and near the end of the outage. The beginning-of-outage visual inspection of Unit 2's hydraulic snubbers was performed on September 19, 1983. The end-of-outage inspection was performed November 14, 1983. The November 14, 1983 inspection established the new reference point for the start of the inspection interval whose length was determined by the results of the September 19 inspection. Utilizing the November 14 date, the six (6) month period (as a result of two inoperable snubbers) would have expired May 14, 1984, with the grace period scheduled to expire on June 29, 1984.

However, use of the information presented in this technical evaluation allows the conclusion that there is reasonable assurance that the 2A2 snubber would have passed its functional test without oil in the test reservoir. Thus, the test would have resulted in only one snubber being inoperable, establishing a 12 month ±25% inspection interval. Again, utilizing the November 14 date as the reference point, the 12 month period will expire November 14, 1984, with the grace period expiring February 14, 1985.

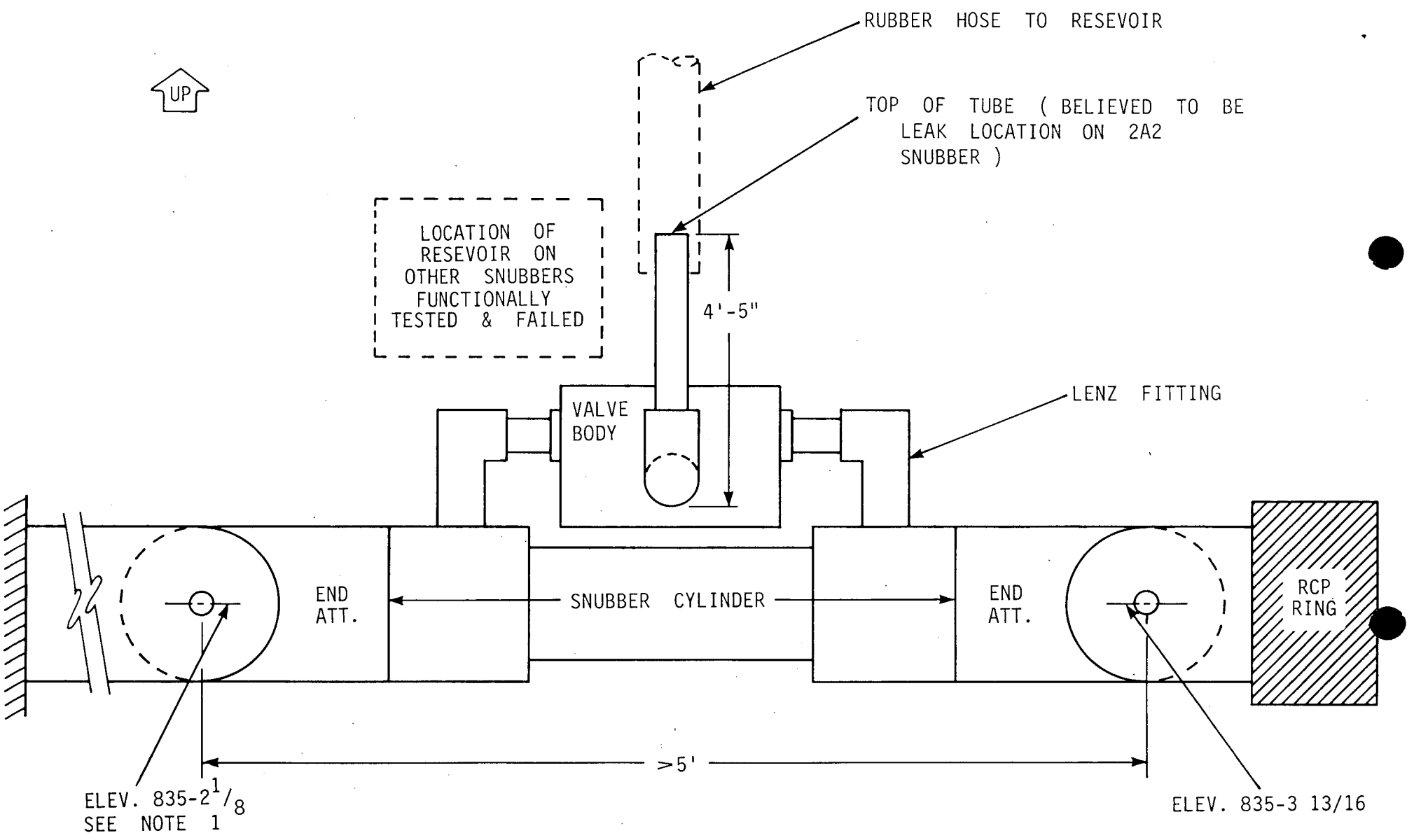
In conclusion, the cause for rejection of the snubber associated with the 2A2 RCP has been established and remedied. The other generically susceptible snubbers have been modified to prevent the loss of fluid through their fittings. Although not properly tested in the as-found condition, there exists a reasonable assurance that this snubber would have passed its functional testing. There is additional historical evidence that indicates a low probability that hydraulic snubbers will fail to perform their intended function. Furthermore, since snubber protection is required only during a severe transient or seismic disturbance, it is highly unlikely that the snubbers will be challenged. The 2A2 RCP snubber previously assumed inoperable should now be considered operable. This results in a 12 month ±25% inspection interval commencing from November 14, 1983.

TABLE 1
Oconee Nuclear Station
History of Hydraulic Snubber Failures

	1977[4]	1978	1979	1980	1981	1982	1983	1984[1]
Failures Involving Hydraulic Snubbers	1	9[2]	3	4	4	0	5	0
Failures Involving Inaccessible Hydraulic Snubbers	0	6[2]	3	2	0	0	3	0[3]

Note 1 - As of May 8, 1984
2 - Includes 5 hydraulic snubbers which passed their functional testing but were declared inoperable because fluid was added prior to testing
3 - Only Unit 3
4 - Start of Seals Extended-Life Program

There are approximately 360 hydraulic snubbers requiring surveillance throughout Oconee Nuclear Station.



NOTE 1: THE 2A2 SNUBBER IS VERY CLOSE TO HORIZONTAL. THE <2" DIFFERENCE IN ELEVATION OVER >5' LENGTH IS NOT SIGNIFICANT TO FLUID LEVELS IN THE SNUBBER VALVE BODY.