Attachment 1

Proposed Changed Pages

Unit 1	Revision
Page 3/4 7-20	Replace
Page 3/4 7-20a	Add
Page B 3/4 7-5	Replace

Unit 2	Revision
Page 3/4 7-20	Replace
Page 3/4 7-20a	Add
Page B 3/4 7-5	Replace

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3/4.7.9 SNUBBERS

LIMITING CONDITION FOR OPERATION

3.7.9 All snubbers shall be OPERABLE. The only snubbers excluded from this requirement are those installed on nonsafety-related systems and then only if their failure or the failure of the system on which they are installed would have no adverse effect on any safety-related system.

APPLICABILITY: MODES 1, 2, 3 and 4. (MODES 5 and 6 for snubbers located on systems required OPERABLE in those MODES).

ACTION:

With one or more snubbers inoperable, within 72 hours replace or restore the inoperable snubber(s) to OPERABLE status and perform an engineering evaluation per Specification 4.7.9.c on the supported component or declare the supported system inoperable and follow the appropriate ACTION statement for that system.

SURVEILLANCE REQUIREMENTS

4.7.9 Each snubber shall be demonstrated OPERABLE by performance of the following augmented inservice inspection program and the requirements of Specification 4.0.5.

a. Visual Inspections

Snubber visual inspections shall be performed in accordance with the schedule provided in Table 4.7-3. This table is applicable for populations of at least 200 snubbers. The snubbers may be categorized into two groups: those accessible and those inaccessible during reactor operation. Each group may be inspected independently in accordance with the schedule provided in Table 4.7-3.

TABLE 4.7-3

Snubber Visual Inspection Schedule

Current Visual Inspection Period*	Number of Inoperable Snubbers	Next Visual Inspection Period #
18 Months ± 25%	0, 1, 2, 3	18 Months ± 25%
"	4	12 Months ± 25%
"	5	6 Months ± 25%
"	6	4 Months ± 25%
"	7	2 Months ± 25%
"	8 or more	1 Month ± 25%
12 Months ± 25%	0, 1	18 Months ± 25%
"	2, 3	12 Months ± 25%
"	4	6 Months ± 25%
"	5	4 Months ± 25%
"	6, 7	2 Months ± 25%
"	8 or more	1 Month ± 25%
6 Months ± 25%	0	12 Months ± 25%
"	1	6 Months ± 25%
"	2	4 Months ± 25%
"	3, 4	2 Months ± 25%
"	5 or more	1 Month ± 25%
4 Months ± 25%	0	6 Months ± 25%
"	1	4 Months ± 25%
"	2	2 Months ± 25%
"	3 or more	1 Month ± 25%
2 Months ± 25%	0	4 Months ± 25%
"	1	2 Months ± 25%
"	2 or more	1 Month ± 25%
1 Month ± 25%	0	2 Months ± 25%
"	1 or more	1 Month ± 25%

The provisions of Specification 4.0.2 are not applicable.

* Earlier visual inspections than required may be utilized. If this option is chosen, the criteria for determining the next visual inspection period shall be the criteria associated with the earlier visual inspection period selected.

3/4.7.9 SNUBBERS

All snubbers are required OPERABLE to ensure that the structural integrity of the reactor coolant system and all other safety related systems is maintained during and following a seismic or other event initiating dynamic loads. Snubbers excluded from this inspection program are those installed on nonsafety related systems and then only if their failure or failure of the system on which they are installed, would have no adverse effect on any safety related system. A manual, which contains a tabulation of the hydraulic and mechanical snubbers which are within the scope of Technical Specification 3/4.7.9, is maintained as a comprehensive list of snubbers which are to be included in the snubber inspection and test program. The manual includes, as a base line, the snubbers identified in Technical Specification Tables 3.7-4a and 3.7-4b as of License Amendment No. 43. The manual will be controlled in accordance with 10CFR50.59.

The visual inspection frequency is based upon maintaining a constant level of snubber protection to systems. Therefore, the required inspection interval varies inversely with the observed snubber failures and is determined by the number of inoperable snubbers found during an inspection. Inspections performed before that interval has elapsed may be used as a new reference point to determine the next inspection. However, the results of such early inspections performed before the original required time interval has elapsed (nominal time less 25%) may not be used to lengthen the required inspection interval. Any inspection whose results require a shorter inspection interval will override the previous schedule. Adherence to the visual inspection schedule will provide a 95% confidence level that at least 90% of the snubbers in the plant are operable as defined by the visual acceptance criteria.

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 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.

When a snubber is found inoperable, an engineering evaluation is performed. The engineering evaluation shall determine whether or not the snubber mode of failure has imparted a significant effect or degradation on the attached component.

To provide assurance of snubber functional reliability, a representative sample of the installed snubbers will be functionally tested during plant shutdowns at 18 month intervals. Selection of a representative sample according to the expression $35(1+{}^{c}/_{2})$ provides a confidence level of approximately 95% that 90% to 100% of the snubbers in the plant will be OPERABLE within acceptance limits, where c is the allowable number of snubbers not meeting the acceptance criteria. Observed failures of these sample snubbers shall require functional testing of additional units.

Hydraulic snubbers and mechanical snubbers may each be treated as a different entity for the above surveillance programs.

PLANT SYSTEMS

3/4.7.9 SNUBBERS

LIMITING CONDITION FOR OPERATION

3.7.9 All snubbers shall be OPERABLE. The only snubbers excluded from this requirement are those installed on nonsafety-related systems and then only if their failure or the failure of the system on which they are installed would have no adverse effect on any safety-related system.

APPLICABILITY: MODES 1, 2, 3 and 4. (MODES 5 and 6 for snubbers located on systems required OPERABLE in those MODES).

ACTION:

With one or more snubbers inoperable, within 72 hours replace or restore the inoperable snubber(s) to OPERABLE status and perform an engineering evaluation per Specification 4.7.9.c on the supported component or declare the supported system inoperable and follow the appropriate ACTION statement for that system.

SURVEILLANCE REQUIREMENTS

4.7.9 Each snubber shall be demonstrated OPERABLE by performance of the following augmented inservice inspection program and the requirements of Specification 4.0.5.

a. Visual Inspections

Snubber visual inspections shall be performed in accordance with the schedule provided in Table 4.7-3. This table is applicable for populations of at least 200 snubbers. The snubbers may be categorized into two groups: those accessible and those inaccessible during reactor operation. Each group may be inspected independently in accordance with the schedule provided in Table 4.7-3.

TABLE 4.7-3

Snubber Visual Inspection Schedule

Current Visual Inspection Period*	Number of Inoperable Snubbers	Next Visual Inspection Period #
18 Months ± 25%	0, 1, 2, 3	18 Months ± 25%
"	4	12 Months ± 25%
"	5	6 Months ± 25%
"	6	4 Months ± 25%
"	7	2 Months ± 25%
"	8 or more	1 Month ± 25%
12 Months ± 25%	0, 1	18 Months ± 25%
"	2, 3	12 Months ± 25%
"	4	6 Months ± 25%
"	5	4 Months ± 25%
"	6, 7	2 Months ± 25%
"	8 or more	1 Month ± 25%
6 Months ± 25%	0	12 Months ± 25%
"	1	6 Months ± 25%
"	2	4 Months ± 25%
"	3, 4	2 Months ± 25%
"	5 or more	1 Month ± 25%
4 Months ± 25%	0	6 Months ± 25%
"	1	4 Months ± 25%
"	2	2 Months ± 25%
"	3 or more	1 Month ± 25%
2 Months ± 25%	0	4 Months ± 25%
"	1	2 Months ± 25%
"	2 or more	1 Month ± 25%
1 Month ± 25%	0	2 Months ± 25%
"	1 or more	1 Month ± 25%

The provisions of Specification 4.0.2 are not applicable.

* Earlier visual inspections than required may be utilized. If this option is chosen, the criteria for determining the next visual inspection period shall be the criteria associated with the earlier visual inspection period selected.

3/4.7.9 SNUBBERS

All snubbers are required OPERABLE to ensure that the structural integrity of the reactor coolant system and all other safety related systems is maintained during and following a seismic or other event initiating dynamic loads. Snubbers excluded from this inspection program are those installed on nonsafety related systems and then only if their failure or failure of the system on which they are installed, would have no adverse effect on any safety related system. A manual, which contains a tabulation of the hydraulic and mechanical snubbers which are within the scope of Technical Specification 3/4.7.9, is maintained as a comprehensive list of snubbers which are to be included in the snubber inspection and test program. The manual includes, as a baseline, the snubbers identified in Technical Specification Tables 3.7-4a and 3.7-4b as of License Amendment No. 34 and also includes the changes identified in Alabama Power Company letter dated December 8, 1983 entitled "Safety-Related Snubber Technical Specification Table Changes". The manual will be controlled in accordance with 10CFR50.59.

The visual inspection frequency is based upon maintaining a constant level of snubber protection to systems. Therefore, the required inspection interval varies inversely with the observed snubber failures and is determined by the number of inoperable snubbers found during an inspection. Inspections performed before that interval has elapsed may be used as a new reference point to determine the next inspection. However, the results of such early inspections performed before the original required time interval has elapsed (nominal time less 25%) may not be used to lengthen the required inspection interval. Any inspection whose results require a shorter inspection interval will override the previous schedule. Adherence to the visual inspection schedule will provide a 95% confidence level that at least 90% of the snubbers in the plant are operable as defined by the visual acceptance criteria.

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 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.

When a snubber is found inoperable, an engineering evaluation is performed. The engineering evaluation shall determine whether or not the snubber mode of failure has imparted a significant effect or degradation on the attached component.

To provide assurance of snubber functional reliability, a representative sample of the installed snubbers will be functionally tested during plant shutdowns at 18 month intervals. Selection of a representative sample according to the expression $35(1+^{c}/_{2})$ provides a confidence level of approximately 95% that 90% to 100% of the snubbers in the plant will be OPERABLE within acceptance limits, where c is the allowable number of snubbers not meeting the acceptance criteria. Observed failures of these sample snubbers shall require functional testing of additional units.

Hydraulic snubbers and mechanical snubbers may each be treated as a different entity for the above surveillance programs.

ATTACHMENT 2

Conservatism Included in the Calculation of the Percent (r) of Snubbers Found Inoperable Identified in Table 4.7-3 of September 2, 1986 Submittal

As requested by the NRC, the Visual Inspection Schedule included with this submittal is based on a hypothetical snubber population of 200. It should be noted, however, that the new Technical Specification Table 4.7-3 was not derived by applying the population size of 200 to the percentages included in the September 2, 1986 Table 4.7-3. Although the methodology included with the original submittal has not been altered, slight conservatism has been removed by a closer representation of a population size of 200 snubbers. The resulting table conservatively meets the stated goal of 95% confidence that at least 90% of the safety-related snubbers are operable at all times. The following paragraphs provide a detailed discussion of this adjustment to Table 4.7-3.

Consider the snubber visual inspection schedule per Table 4.7-3 of Reference 1. In this table, for a given current visual inspection period (T_c) and new visual inspection period (t_n), the percent (r) of snubbers found inoperable per T_c is calculated by using Equation 15 in Attachment 3 of Reference 1 such that the target of 90% reliability at 95% confidence level is satisfied or exceeded. Note that in Equation 15, (1) n denotes the snubber group size and I denotes the total number of snubbers found inoperable per T_c, (2) the relationship among r, n and I is $rn/100 = I$, and (3) for 90% reliability the integer, $s \leq 0.1n$.

Each r in Table 4.7-3 is calculated using its corresponding minimum group size (n') which is determined by choosing I = 1, i.e., $rn'/100 = I = 1$, provided that $rn'/100 = 1$ yields $n' \leq 200$ (no lower limit is imposed on n'). In the case where $rn'/100 = 1$ results in $n' > 200$, n' is 200, r = 0 and I = 0 (no inoperable snubber is allowed per T_c) so long as the reliability target is satisfied or exceeded. All the r's identified in Table 4.7-3 are corresponding to n' less than 200 except for the cases of r = 0 where n' = 200. In all cases of r = 0 (with n' = 200) in Table 4.7-3, the reliability target is substantially exceeded. Note that per the relationship $rn'/100 = 1$, the higher the r is the lower the resulting n'.

Consider the estimate ($\hat{\theta}$) of the snubber failure (inoperable) rate per Equation 13 in Attachment 3 of Reference 1. For a fixed r, based on the fact that I is the largest integer $\leq rn/100$, and per Equation 13, (1) $\hat{\theta}$ is inversely proportional to n and (2) the rate of increase of the chi-square term with respect to n is much smaller than the rate of decrease of the 1/n term with respect to n. This implies that for a fixed r, the larger the value of n, the smaller the value of $\hat{\theta}$. A smaller snubber inoperable rate ($\hat{\theta}$) leads to a higher reliability level. Therefore, for a given r, T_c and t_n, the larger the value of n, the higher the reliability level.

As mentioned earlier, all the nonzero r cases in Table 4.7-3 are corresponding to an n' less than 200. These n' values range from 41 to 172. By increasing the group size to 200 (substantially higher than n') and keeping the same r in Table 4.7-3, as described previously the reliability level for n = 200 will exceed the reliability target. This is the conservatism hidden in Table 4.7-3 whenever it is applied to any snubber group size larger than n'. In creating the proposed snubber visual inspection schedule based on a group size of n = 200, this hidden conservatism is utilized to increase the allowable number, I, of inoperable snubbers found per T_c beyond the I given by I = rn/100. As an illustration, a numerical example is provided below.

Numerical Example - Consider a group of snubbers with a group size of n = 200 under a current visual inspection period, T_c of 18 months $\pm$ 25% and a new visual inspection period, t_n of 18 months $\pm$ 25%. Per Table 4.7-3 in Reference 1, in order to have t_n = 18 months $\pm$ 25%, the maximum number (I) of snubbers found inoperable must be $\leq$ 0.76 x 200/100 = 1.52. Therefore, only one inoperable snubber is acceptable. (Note that for r = 0.76%, n' = I x 100/0.76 = 131 < 200.) For n = 200, I = 1, T_c = 18 months $\pm$ 25% and t_n = 18 months $\pm$ 25%, per Equation 15 the corresponding reliability is 93.5% at 97.4% confidence level. This substantially exceeds the required 90% reliability of 95% confidence level and occurs because n = 200 is substantially larger than n' = 131. This indicates that an I higher than 1 may be used. Consider the case of I = 3. For I = 3, n = 200, T_c = 18 months $\pm$ 25%, and t_n = 18 months $\pm$ 25%, per Equation 15 the corresponding reliability is 90.5% at 97% confidence level which slightly exceeds the required 90% reliability at 95% confidence level. Therefore, I $\leq$ 3 is used for T_c = 18 months $\pm$ 25% and t_n = 18 months $\pm$ 25% in the proposed snubber visual inspection schedule.

All the other maximum allowable values of I for snubbers found inoperable in the proposed snubber visual inspection schedule are determined by the same manner as in the above numerical example.

Reference:

(1) The letter dated September 2, 1986 from R. P. McDonald of Joseph M. Farley Nuclear Plant - Units 1 and 2 to L. S. Rubenstein of U. S. Nuclear Regulatory Commission on the subject of Snubber Surveillance Requirements Technical Specification Change, Docket Nos. 50-348 and 50-364.

ATTACHMENT 3

Comparison of Reliabilities Obtained from Existing and Proposed Inspection Schedules Based on a Snubber Group Size of 200

Current Inspection Period, T (Months)	Next Inspection Period, t (Months)	Existing Visual Inspection Program: Number of Inoperable Snubbers, I, per T	Existing: Confidence Level (%)	Existing: Reliability Level (%)	Proposed Visual Inspection Program: Number of Inoperable Snubbers, I, per T	Proposed: Confidence Level (%)	Proposed: Reliability Level (%)
18 ± 25%	18 ± 25%	I = 0	97.3	95.5	I = 3	97.0	90.5
	12 ± 25%	I = 1	96.1	95.5	I = 4	95.2	92.5
	6 ± 25%	I = 2	97.4	96.5	I = 5	96.4	95.0
	4 ± 25%	I = 3, 4	97.7	96.5	I = 6	96.3	96.0
	2 ± 25%	I = 5, 6, 7	95.9	97.5	I = 7	95.9	97.5
12 ± 25%	18 ± 25%	I = 0	96.5	94.0	I = 1	95.7	91.5
	12 ± 25%	I = 1	97.4	93.5	I = 2, 3	97.0	90.5
	6 ± 25%	I = 2	96.1	95.5	I = 4	95.6	94.0
	4 ± 25%	I = 3, 4	96.6	95.5	I = 5	96.4	95.0
	2 ± 25%	I = 5, 6, 7	96.4	96.5	I = 6, 7	96.4	96.5
6 ± 25%	12 ± 25%	I = 1	96.7	89.0	I = 0	96.4	92.5
	6 ± 25%	I = 2	96.9	92.0	I = 1	97.4	93.5
	4 ± 25%	I = 3, 4	95.2	92.5	I = 2	95.2	94.5
	2 ± 25%	I = 5, 6, 7	96.3	94.0	I = 3, 4	96.6	95.5
4 ± 25%	6 ± 25%	I = 2	96.7	89.0	I = 0	96.6	94.0
	4 ± 25%	I = 3, 4	95.5	89.5	I = 1	97.4	93.5
	2 ± 25%	I = 5, 6, 7	97.1	91.5	I = 2	96.1	95.5
2 ± 25%	4 ± 25%	I = 3, 4	95.6	81.5	I = 0	96.4	92.5
	2 ± 25%	I = 5, 6, 7	96.2	85.5	I = 1	97.4	93.5
1 ± 25%	2 ± 25%	I = 5, 6, 7	95.6	75.0	I = 0	96.4	92.5

ATTACHMENT 4

Statistical Merits of Separate Functional Testing and Visual Inspections

The current and proposed Technical Specifications for snubbers each require visual inspections and functional testing to verify snubber system reliability. As stated in the Bases to the Technical Specifications, the functional testing program is based on providing a 95% confidence that 90 to 100% of the snubbers are operable within acceptance limits. The performance of visual examinations is a separate process which provides additional confidence in snubber system operability. The proposed visual inspection program is also based on providing a 95% confidence that 90 to 100% of the snubbers are operable as defined by the visual inspection acceptance criteria. The performance of visual inspections is complementary to the functional testing program. The ultimate acceptance criteria are similar in that the visual inspections may result in functional tests for snubbers with identified indications. However, each process has its own reliability goal which is not diminished by other inspections or tests.

The Farley Nuclear Plant Technical Specification functional test program requires the testing of a representative sample of at least 88 snubbers at least once per 18 months. If more than 3 snubbers do not meet the functional test acceptance criteria, an additional sample selected according to the expression 22(a-3) is functionally tested, where a is the total number of snubbers found inoperable during the functional testing of the initial representative sample. Functional testing continues according to the expression (22)b where b is the number of snubbers found inoperable in the previous re-sample, until no additional inoperable snubbers are found within a sample. Conservatism is added to the program by requiring any snubbers which failed the previous functional test to be retested in addition to the regular sample and any resulting expansion due to failures.

As stated above, the functional testing program is based on providing a 95% confidence that 90 to 100% of the snubbers are operable within acceptance limits. This has been confirmed by three different methods which require the testing of a random or an unbiased sample of the total population of snubbers. These methods are applicable for homogeneous populations with random sampling or for non-homogeneous populations with stratified sampling. The population of snubbers at Farley Nuclear Plant may be considered to be homogeneous even though it is comprised of different types of hardware. This is true because a population is considered to be homogeneous if the failure rates of the various hardware are similar, especially if the failure rates are low.[1] Failure modes and mechanisms are generic for snubbers of various sizes. The Farley Nuclear Plant snubbers are expected to continue to perform with consistently low failure rates due to the snubber refurbishment program employed at Farley Nuclear Plant. This program provides for the rebuilding or replacement of snubbers in accordance with vendor recommendations, thus ensuring that the relative age of degradable snubber components does not vary greatly.

Even if the population is considered to be non-homogeneous, a stratified sampling plan may be employed. Although not statistically necessary due to the homogeneous nature of the Farley Nuclear Plant snubbers, the current

Technical Specifications require that a stratified sample be chosen for the functional testing. The required sample is representative of the various configurations, operating environments and the range of size and capacity of the snubbers. Sampling, however, could be biased if it is not performed proportionately and if the stratification of the population is extreme. However, in the previous paragraph, the various strata in the population are not dissimilar enough to result in a biased sample. The Technical Specification requirement to choose a representative sample ensures that all groups will be functionally tested. This avoids the possibility that a group with a relatively high failure rate would not be included in the sample. Slight conservative bias is introduced by the requirement that at least 25% of the snubbers in the representative sample include snubbers from the following three categories:

- the first snubber away from each reactor vessel nozzle
- snubbers within five feet of heavy equipment (valve, pump, turbine, motor, etc.)
- snubbers within ten feet of the discharge from a safety relief valve.

This causes the sample to contain a high proportion of the snubbers considered to be most critical in case of an initiating event. This, if anything, is a desirable bias. In conclusion, although a perfectly random sample is not achieved for functional testing, the sample is not greatly biased. Therefore, the statistical methods utilized below to show the confidence and reliability of the current functional testing program are appropriate.

The first and most appropriate method employed involves a calculation of the confidence and reliability levels using the hypergeometric distribution. The hypergeometric distribution gives the probability of obtaining a specified number of successes in sampling from a finite population using a "sampling without replacement" scheme.[2] A computer program was used to calculate the confidence level for the success rate. The results show that for a sample of 88 snubbers, 3 failures yield a 95.6% confidence that at least 92.5% are operable within acceptance limits.

Two other methods of verifying the Technical Specification criteria were employed due to their familiarity. These methods were based on the binomial distribution and although not as accurate as the hypergeometric distribution for this particular application also conservatively indicate that the current functional testing sampling plan provides a greater than 95% confidence that at least 90% of the snubbers are operable.

The three statistical methods all indicate that the current functional testing program meets the reliability goal for functional testing as stated in the Bases to the Technical Specifications. It can also be concluded that although the visual inspection and functional testing programs are complementary, input from the visual inspection program is not necessary to statistically verify the reliability attained by functional testing.

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1 Statistics: Probability, Inference, and Decision, R. L. Winkler and W. L. Hays, Holt, Rinehart, and Winston, 1975, pp. 737-739.

2 Mathematical Statistics, John E. Freund, Prentice Hall, Inc. 1962, pp. 70-71

ATTACHMENT 5

Unit 1 Snubber Failure Mode

Hydraulic snubber Mark Numbers RC-R91 and RC-R219 failed their visual inspections performed during the Unit 1 seventh refueling outage. Both snubbers were found with empty fluid reservoirs and with the fluid port uncovered. In accordance with Technical Specification requirements, both snubbers were removed and functionally tested in their as-found condition. The functional test results in each case indicated failed snubbers due to high lock-up rates. High lock-up rates are typical of snubber performance with inadequate fluid levels and air in the hydraulic system.

In reviewing the available service history of each snubber, it was determined that both had performed satisfactorily for over five years until the conditions described above were discovered during the seventh refueling outage. The results of numerous prior visual inspections indicated no signs of degradation and verified that there was no evidence of fluid leakage. RC-R219 was also functionally tested during February 1983, and results of the test indicated an acceptable snubber. Both snubbers were rebuilt during March 1984 and were functionally tested with acceptable results following the rebuild and prior to being returned to service.

Following the determination that these snubbers had failed visual inspection and functional tests, each was completely rebuilt. During the rebuild, conditions were documented which indicate that the snubbers had been damaged since the last visual inspection performed at the sixth refueling outage. RC-R91 showed evidence of fluid leakage at the fittings which connect the snubber reservoir to the fluid cylinder. Further investigation showed that the reservoir mounting brackets were bent and these were subsequently replaced. Based on this evidence it is concluded that the snubber reservoir was inadvertently shifted out of position. This led to fluid leakage and loss of all fluid in the reservoir through the fittings. RC-R219 showed no evidence of fluid leakage; however, the remote reservoir and tubing connected to this snubber were completely dry. Also, this snubber operates in an area of high ambient temperature which would have dissipated any fluid leaking from the snubber. Upon disassembly and inspection of the snubber parts, it was determined that the fittings connecting the hydraulic cylinder to the reservoir tubing were bent and required replacement. It was concluded that accidental bending of these fittings permitted the loss of the fluid in the reservoir and tubing.

In each of these cases, the snubber reservoir hardware was inadvertently damaged in such a manner as to allow loss of the fluid, thus rendering the snubbers inoperable. The primary purpose of the snubber visual inspection is to detect signs of degradation and to take appropriate corrective actions to ensure component operability during each successive inspection period. To provide a constant level of snubber protection, the inspection frequency is decreased as the number of snubber failures increases. This is appropriate where the snubber population is generically degrading due to various factors primarily related to reaching the end of snubber seal life. Therefore, as the end of seal life is approached, increasing numbers of snubber failures will occur due to the loss of seal integrity.

For the two cases cited above, snubber seal life was not the cause of failure. Each snubber had been rebuilt (with all seals replaced) and functionally tested approximately two and one half years prior to failure, which is well within the seven year vendor-recommended seal service life. The damaged components found, and subsequently replaced, on each snubber contributed to or caused the loss of snubber fluid which resulted in snubber failure. Since this damage was caused accidentally and is not due to or indicative of generic snubber degradation or deficiency in snubber maintenance, these two snubbers should not be counted as failures for the purpose of determining the next snubber visual inspection period.