P.O. BOX 529100 MIAMI, FL 33152

FLORIDA POWER & LIGHT COMPANY

September 30, 1982

Mr. Darrell Eisenhut
Director of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Eisenhut:

At our meeting on July 29, 1982, where NRC representatives proposed Steam Generator Generic Requirements, the Steam Generator Owners Group (SGOG) committed to coordinating comments from U.S. PWR owners and providing them to the NRC in two months. My letters of August 18, 1982, and September 1, 1982, informed you of our progress.

Attached are the comments we agreed to coordinate and provide. The attachment was compiled from written comments provided by 22 utilities in response to the SGOG request. Several utilities also sent comments directly to the NRC and we have invited others to do so if there are points in addition to those in the attachment they wish to amplify.

We appreciate having had the opportunity to comment on the draft of Steam Generator Generic Requirements being considered by the NRC. Many of the issues raised in the draft are clearly worth raising. Our comments are intended to be constructive in identifying the best way for the NRC to deal with issues having a safety impact while leaving utilities the flexibility to handle questions that are really economic and plant specific.

Very truly yours,

A. D. Schmidt, Chairman
SGOG Executive Committee

ADS/nfb
Attachment

cc: U.S. PWR Owners
SGOG Member Representatives

Y601

EPRI

September 28, 1982

TO: Utilities that responded to NRC Proposed Steam Generator Generic Requirements

Attached is the response to the NRC's Steam Generator Generic Requirements compiled by the Steam Generator Project Office from written comments provided by your companies and revised based on conversations Jim Lang had with many of you. The response will be sent to the NRC on September 30, 1982, in accordance with the schedule agreed to at the July 29, 1982 meeting between Steam Generator Owners Group and NRC representatives.

This single response was compiled from all of your comments and is true to the flavor of those comments. However, some of the details and emphasis contained in individual comments may not have come through precisely as you desire. Several utilities have responded separately, directly to the NRC. You certainly have the prerogative to do this also if there are points in addition to those in the attachment you wish to make.

Sincerely,

Stanley J. Green

Stanley J. Green, Director
Steam Generator Project Office

JFL/SJG:nfb
Attachment

GENERAL COMMENTS

1. Steam generators and PWR plants were designed with the expectation that steam generator tubes would leak. All PWRs have been designed and analyzed to accomodate steam generator tube rupture. Complete elimination of the potential for steam generator tube leakage or rupture is not a realistic or necessary objective.

2. Research into the causes of steam generator tube leaks and extensive experience reveal that the causes are complex, vary from plant to plant and will not be eliminated by simple generic requirements uniformly prescribed.

3. The requirements proposed by the NRC contain a lot of detail arising from specific situations in specific plants. Moreover, most of the proposed requirements have no relationship, or at best an indirect relationship, to safety issues. Some of the requirements may increase radiation exposure and/or costs.

4. If a generic approach is to be followed, it would be best to do so in the same way proposed for secondary water chemistry programs, i.e., by a licensing requirement that a site/utility specific program be developed and implemented. This site/utility specific program could then be reviewed against a generic review plan taken from the requirements proposed and the comments herein.

II.1 Prevention and Detection of Loose Parts and Foreign Objects

Detection and removal of foreign objects is desirable but has to be balanced with other considerations such as avoiding tube corrosion associated with periods of moist/dry steam generator layup and reducing radiation exposure. Moreover, no set of requirements will guarantee total elimination of foreign objects--their probability will only be reduced.

II.1.1 As proposed, a one-time visual inspection through existing access ports near the tubesheets for foreign objects or loose parts (not tube damage) is reasonable. It should be conducted prior to startup for plants under construction or should be timed to coincide with the next outage of sufficient length scheduled for refueling or maintenance or modification of equipment. The following additional comments apply:

1. The requirement should be flexible enough to account for differences in steam generator design, e.g., limited access to the bundle periphery in OTSGs.

2. The requirement should be flexible enough to allow any safe, effective optical inspection technique, e.g., inspection between tube rows from the tube lane only.

Inspection after opening the secondary side or finding a tube flaw by eddy current inspection should not be automatic, but should be performed only on a case basis. The need for such inspection should be determined based on the type and location of maintenance, the potential for loose parts, and the QC/QA procedures in effect. Moreover, such inspections should be limited to areas which would be affected.

II.1.3 Emphasis should appropriately be on keeping foreign objects out of steam generators rather than on inspection. However, even the tightest controls on planning and preparing procedures may not eliminate the potential for introducing loose parts during execution of the work. The requirement should be flexible enough to allow appropriate QA/QC procedures to be selected--tight ones for activities with a risk of loose parts and lesser procedures for activities with low risk or where simple post activity inspection is sufficient.

II.1.3 Loose parts monitoring systems (LPMS) should not be required on the secondary sides of steam generators. The combination of a one-time visual inspection, appropriate QA/QC procedures during maintenance, and effective follow-up of eddy current indications should be adequate to prevent widespread tube damage due to a foreign object. Moreover, signals from secondary LPMS currently available have proven to be difficult to interpret. Consequently it is difficult to determine when action should be taken.

II.2 Stabilization and Monitoring of Degraded Tubes

Out of the large number of plugged tubes cited by the NRC there has been only one isolated case of plugged tubes later causing damage to adjacent tubes. This is because (1) there are few damage mechanisms which can cause a tube to sever where it is not restrained, then damage adjacent tubes, and (2) when such mechanisms exist, they usually have been recognized and accounted for in corrective actions. Any proposals aimed at controlling a situation that is already rare need to be carefully focused and reviewed to ensure they will not create more problems than they are likely to prevent.

1. Monitoring the continued degradation of non-leaking plugged tubes may provide research data but special actions to do so with the objective of preventing tube leaks are not warranted.

   A. Very few forms or progressive tube damage can cause a tube to sever in a region where it is unrestrained.

   B. If damage to tubes adjacent to a plugged tube is judged in a special case to be of concern, adjacent tubes can be inspected by eddy current during normal ISI.

c. "Limited leakage plugs" allow internal pressurization and slight internal heating of a tube, conditions which support tensile stress and continued tube corrosion, respectively. Leaks from these plugs could not be distinguished from other small leaks. Use of such plugs would mean that some tubes might have to be plugged twice with the attendant increase in radiation exposure.

d. Removing a tube plug to inspect a tube is a time consuming task involving high radiation exposure, cannot be performed repeatedly and may damage the tube-to-tubesheet region making replugging difficult.

2. As proposed, stabilization of a degraded tube should be undertaken only when the damage mechanism could cause the tube to sever in an unrestrained region and damage adjacent tubes, and then only after the case has been individually evaluated.

   a. Most damage mechanisms will not cause a tube to sever in an unrestrained region.

   b. In some cases, periodic eddy current inspection of adjacent tubes may be a desirable alternative to stabilizing a plugged tube.

   c. In cases where sleeving is performed to repair degraded tubes, stabilization and monitoring capability for the degraded tubes are also provided.

   d. Devices inserted into tubes to stabilize them could themselves cause tube wear from the inside. Such devices must be used judiciously.

3. The reporting proposal is open-ended in requiring identification of all progressive degradation mechanisms "likely to occur" as well as those which have occurred. Such a report, if required at all, should identify progressive damage mechanisms having the potential for causing damage to adjacent tubes, which have occurred in a unit or which have occurred elsewhere but to which the unit may be susceptible because of its mechanical design or materials of construction.

II.3 Inservice Inspection Program

Overall, the detailed requirements proposed are not appropriate for inclusion in Technical Specifications. Comments on each section follow:

II.3.1 Inspection of cold leg tubes is justified as noted by the NRC; however, the scope should be flexible. Detailed cold leg inspection plans should be plant specific, with the extent and frequency based on each plant's history and experience with tube degradation in the cold leg. As proposed, it is important to maintain that hot legs inspected and cold legs inspected do not have to be from the same tube.

II.3.2 Inspection intervals shorter than 160 months are justified as stated and a 48 month interval is a reasonable starting point. The following options are suggested.

A. The interval could be extended for a steam generator with a history of trouble-free operation and stable tube conditions.

B. Where degradation is not related to calendar time, it is convenient to express intervals in terms of operating cycles.

II.3.3 Category C-2 should not be eliminated.

A. Experience cited by the NRC in support of category C-1 also shows that category C-2 provides a desirable buffer zone. Under the current three categories, plants with widespread defects are led to inspection of 100% of the tubes while those with isolated defects need not go that far.

B. Removing category C-2 is a disincentive to a utility to initiate a more thorough inspection by choosing an initial sample size larger than the minimum. Without intermediate category C-2, the risk of a large initial sample leading to a 100% inspection, with attendant cost, time and radiation exposure increase, is unacceptably high with no significant increase in safety.

C. Utilities have incentives to know the conditions of their steam generators with confidence to avoid shutdowns and inspections due to tube leaks. ISI requirements should reinforce those incentives and be based upon plant history.

D. As noted by the NRC in the July 29, 1982 meeting, the analysis option is not realistic because of the cost and analysis effort required.

As a general comment, the criterion for passing from one category to the next could be based on the plugging limit with a tolerance (e.g., +/- 10%) applied. This would account for the case where an indication which really hasn't grown is sized just below the plugging limit in one inspection and just above it in the next.

II.3.4 Inspection for denting is justified; however, (1) denting inspection requirements do not belong in technical specifications, and (2) the requirements proposed are too broad.

A. The scope of the inspection should really be based on the progression of denting. If denting has been arrested, a widespread inspection upon finding a few dented tubes is not warranted.

B. Inspection of a sample of tubes previously found to be dented should suffice. The sample size should be determined on a plant specific basis.

C. Monitoring of denting by observing support plate hourglassing should be allowed.

D. Terms need to be carefully defined:

(1) A standard eddy current probe should be better identified. Also, the standard probe may change with time.

(2) Requirements should distinguish between corrosion induced dents and tube distortions caused mechanically either during manufacture or operation (e.g., dings or ovalization).

II.3.5 Full scale eddy current inspections should not be automatically required during any outage to repair any tube leak, no matter how small.

A. Outages to repair tube leaks are all critical path time. Requiring an eddy current inspection during one, without regard to size and cause of the leak, penalizes a utility for conservative operating practice.

B. If the tube leak is logically associated with a generic type of degradation known to exist, extensive inspection is not necessary.

C. If the tube leak is not associated with any generic type of degradation, a minimum inspection should focus on whether other tube leaks are imminent.

II.3.6 Plugging criteria for dented tubes are desirable for dented steam generators but do not belong in technical specifications. Rather, they should be the subject of utility evaluations and submittals to the NRC.

A. Denting does not affect all units.

B. At this time plugging levels for denting must be based on plant specific experience and empirical observations rather than on fundamental relationships.

II.3.7 The following comments on the reporting requirements are provided:

A. Eddy current inspection results which can be provided to the NRC immediately after an inspection, prior to returning a unit to power, are field evaluations. Detailed analysis can take several weeks and can yield some changes in interpretation of indications.

B. Requirements should clearly state that NRC review and approval are not required prior to restart. Such a practice is needed to avoid administrative delays and is the intent expressed by the NRC during the July 29, 1982 meeting.

II.4 Improved Eddy Current Techniques

1. The eddy current inspection techniques to be applied to specific steam generators should be established in plant specific programs prepared by utilities and submitted to the NRC rather than through generic requirements uniformly applied.

   A. The factors which determine the proper eddy current technique for a specific application are plant, and sometimes steam generator, specific. Selection of a technique may depend on metallurgy of the tube, composition and location of surrounding deposits, nature of degradation mechanisms that exist, and the type of data desired (e.g., sludge depth).

   B. Eddy current technology is currently evolving. Licensees should be free to change techniques as experience is gained in applying them in specific cases and as new techniques are proved. It is undesirable to require licensees to use techniques more complex than necessary or to discourage experiments with new techniques as they are developed.

   C. During the July 29, 1982 meeting, an NRC representative stated that there was a mistake in the draft and that the NRC did not intend to require use of eddy current techniques capable of distinguishing between multiple defects.

2. Use of a new "wear standard" in addition to the current ASME Section XI standards should not be required. Special standards, where warranted, should be handled via plant specific submittals. Development of any new generic standards should be the result of actions by the appropriate ASME Section XI Code Committee.

   A. The wear standard proposed is based only on a single isolated case of tube wear.

   B. Generation of a good wear standard at this time requires foreknowledge of the configuration of the wear scar. With the current state of knowledge it is not practical to generate a universally applicable, conservative standard for long, gradually tapered discontinuities.

C. Use of the current ASME Section XI standard has resulted in conservative errors in sizing wear scars in Westinghouse preheat steam generators.

II.5 Primary to Secondary Leakage Limits

There is general agreement with this change plus the following comments:

A. The NRC should be receptive to plant specific analysis which supports deviation from the standard technical specifications leak limits (up or down).

B. For two loop plants the combined leakage limit for all steam generators never applies. The leakage rate for each steam generator always is controlling (0.68 gpm vs. 1 gpm).

C. If the standard technical specification limit is technically satisfactory, further downward ratcheting of leakage limits should be unnecessary.

II.7 Secondary Water Chemistry Program

There is general agreement with this section subject to the following comments:

A. The secondary water chemistry guidelines are guidelines. Strict adherence will not guarantee that the steam generators will be corrosion-free and exceptions may not lead to corrosion. Moreover, the guidelines are subject to change as experience and more information are obtained. Water chemistry programs should be prepared by utilities on a plant specific basis as proposed to take into account differences in plants and operating conditions, the high expenditures sometimes required to comply, and differences in operating philosophy. NRC action on utility submittals should be flexible enough to accomodate such valid deviations from the guidelines.

B. Most utilities already have secondary water chemistry programs. It should be clearly stated, as it was at the July 29 meeting that if a plant is shut down for steam generator repair not due to corrosion, no commitment to a revised water chemistry program is required. If repairs are due to corrosion, a commitment to a revised water chemistry program would be required but actual implementation prior to startup would not be required because of the lead time and expenditures which are often required.

C. The SGOG secondary water chemistry guidelines do not represent an "industry consensus opinion." They were prepared by an SGOG committee for consideration and use by SGOG members, not all of whom agree with all sections.

II.8 Condenser Inservice Inspection Program

1. Generic requirements for a condenser inservice inspection program are not warranted and should not be a licensing condition.

   A. Condenser inspection and leakage are not safety issues.

   B. Maintenance of secondary water chemistry provides utilities with a strong incentive to prevent excessive condenser leaks.

2. Utilities should remain free to establish the condenser maintenance plans best suited for their plants. The frequency, extent, and type of inspections can be based upon:

   A. history of condenser operation,

   B. the presence of in-line leak surveillance techniques, e.g., cation conductivity monitors,

   C. plant design features, e.g., the role of polishers during cooling water inleakage,

   D. economic considerations.

II.9 Upper Inspection Ports

1. A generic requirement for upper inspection ports is not warranted for steam generators regardless of whether the plants they are in are operating or under construction.

   A. Visual inspection of the uppermost support plate or inner row U-bends is not normally necessary. Denting could be detected earlier lower in the tube bundle and can be adequately characterized by eddy current inspection or profilometry of tubes. Tube cracking cannot be detected visually from the OD of tubes even if it does occur in the inner row U-bends. Again, inspections from the tube ID are more useful.

   B. Ports are useful for removing sections of tubes or other steam generator internals to determine causes of degradation. For a given problem, sections are required from only a few steam generators--not all of them. Moreover, samples of U-bends have already been removed from steam generators to evaluate tube cracking and upper support plate samples have already been removed to evaluate denting.

   C. Tube samples may well be required from selected steam generators in the future to evaluate other types of degradation. However, the area of interest will not necessarily, or even likely, be the uppermost supports. Additional ports installed now may well be in the wrong place or of the wrong size to be useful later.

D. In general it is desirable to minimize the number of penetrations in vessels and the number of mechanical closures which may leak. Moreover, adding a penetration provides the opportunity to introduce foreign objects. While these considerations are all "motherhood," they argue against adding penetrations unless there is a supportable use for them.

E. The cost of adding ports in the field is estimated between $100,000 and $200,000 per steam generator. As noted above there are no particular generic benefits. Experience has shown that ports can be added later, if, when, and where they are needed.

2. The need for additional inspection ports in a steam generator should be evaluated individually for each case. Additional ports should not be required unless there is a demonstrated need, e.g., for use in solving or determining the cause of a problem.

III.1.1 Reactor Coolant System Pressure Control During a SGTR

This requirement is vague as written and could result in an extensive analytical and procedure revision effort which is not warranted.

The NSSS Owners Groups are currently evaluating means of controlling reactor coolant system pressure during a steam generator tube rupture. Specific requirements should not be issued by the NRC until these NSSS Owners Group efforts are completed and reviewed.

III.1.3.1 Safety Injection Signal Reset

There are no comments on this. The specific example of safety injection pump suction is of such limited applicability that a generic requirement does not apply.

III.1.3.2 Containment Isolation and Reset

There are no comments on this. Applicability appears to be limited. In any event, such issues are being considered by the NSSS Owners Groups.

V.1.4 Standard Technical Specification Limit for Coolant Iodine Activity

1. There are no comments on limiting coolant iodine activity and Standard Technical Specification limits are a good starting point; however, there may be plant specific reasons for exceptions. Such exceptions should be considered on a case basis.

2. At the July 29, 1982, meeting, special limits were proposed for plants with low head high pressure safety injection pumps based on the Ginna event. Such special limits are not now warranted for the following reasons:

   A. The basis for the current Ginna specification is extremely conservative and assumes that all RCS iodine was released to the environment.

   B. Analyses are currently being performed by RG&E relating to this issue. Thus, any requirement would be premature at this time.

   C. A requirement such as imposed here could have a substantial impact. A number of plants have, in the past, exceeded the proposed NRC special limit. The existence of such a reduced limit in those cases would have had severe financial impact, including a requirement for additional fuel purchases to replace leaking fuel and reduced plant output or additional outage time while waiting for fuel delivery.

NRC Proposed Actions

These proposed activities could have significant impact on utilities. For example, several steam generator sleeve designs are complete at this time. NRC guidance on sleeve design at this time would have severe financial impact on the utilities wishing to use sleeves and could stifle further development. Additional information and technical interchanges between the NRC and industry would be helpful in assessing the potential impact of the proposed actions.