SG Program – NRC Comments and Actions

GLCP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
GL CP	43	SGAP response, "Other"	Surveillance requirements in SR 3.4.13.2	Emmett's Matrix	2	SGTF		Will be addressed by the resolution of the GLCP TS requirements. Write-up revision does not seem to be required	Closed
GLCP	45	SGAP response, LL3b	Adequacy of operational leakage limits The staff is reviewing the industry proposal as part of its review of the NEI SG generic change package. No further action on this operational leakage limit issue is requested by the staff. The staff's final safety evaluation concerning the generic change package will constitute closure of this issue.	8-30 01 Emmett Murphy e-mail	1	SGTF	N/A	SGMP SGAP response LL3b	Write-up revision not required

GP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
GLCP	48	SG Tech Specs	SG Inspection interval regulatory controls Operating Interval Restriction - Proposed Administrative Technical Specification: 5.5.9 Steam Generator Program 4. SG Inspection Interval - Inspection intervals for SG tubing shall not exceed the maximum intervals defined in the SG Program. Revisions to these maximum operating intervals require review and approval by the NRC staff. The maximum inspection intervals may be revised to incorporate changes approved generically by the NRC subject to the limitations and conditions set forth in the staffs approving document. Proposed Inspection Interval Restriction (to be located outside of technical specifications): Inspection intervals shall not exceed that supported by degradation and operational assessment demonstrating reasonable assurance that all tubes will continue to satisfy the performance criteria prior to the next scheduled SG inspection. Degradation assessments shall consider the potential for the initial site-specific occurrence of potential degradation mechanisms. Operational assessments shall consider all known degradation mechanisms at the site. In addition, the following inspection intervals shall not be exceeded except as approved by NRC: ▪ All steam generators shall be inspected at the first refueling outage, or at the first refueling outage following steam generator replacement. ▪ For plants where each steam generator was found to be inspection Category C-1 (as defined in Section 3.5 of the EPRI PWR SG Examination Guidelines, Revision 5) during its most recent inspection, at least one steam generator shall be inspected each 40 calendar months (rotating basis) or two refueling outages, which ever is greater. ▪ For plants where any steam generator was found to be inspection Category C-2 or C-3 during its most recent inspection, all steam generators shall be inspected at the next refueling outage Inspection intervals may not be extended	8/2/01 NRC letter, Att D	1	SGTF	N/A	NRC position changed with the Perry Decision Letter [18].	CLOSED – COMMENT SUPERCEEDED BY COMMENT 77.

SG Program – NRC Comments and Actions

GP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
GLCP	77	GLCP TS	The GLCP TS Should be revised to identify the approved performance criteria, maximum inspection intervals, tube repair criteria., and tube repair methods. Changes to these parameters would, therefore, necessitate amending the technical specifications. In addition, the staff concludes that the proposed generic approval process in the GLCP is inappropriate. A plant specific TS amendment would be necessary.	Perry Decision [18]	1	SGTF		Industry agreed to add the performance criteria, repair criteria, and inspection intervals to the admin TS. Repair methods will be descried as an important parameter in the SG Program, but may be approved via license amendment or by NRC approved changes to the ASME Code.	
In Situ	19	In Situ G/L	In Situ Test Screening Criteria In general, the screening criteria should be developed making conservative bounding assumptions to account for all significant uncertainties. Alternatively, if statistical methods are being employed, all indications found to contribute unacceptably to the probability of one or more tubes not meeting the performance criteria should be in situ pressure tested.	8/2/01 NRC letter, Att B, Topic 4	2	In Situ and IA G/L Ad Hocs		The new revision is clear on accounting for all uncertainties and all indications predicted to fail performance criteria are required to be tested. The issue of the probability of one or more tubes not meeting the performance criteria is being addressed by the IA G/L Ad Hoc committee.	
In Situ	20	In Situ G/L	In Situ Pressure Test Sample Criteria Because of the randomness of much of the eddy current sizing error and the variability of material properties from tube to tube, it is possible that the actual most limiting indications are not those tested. A sampling strategy for in situ testing is only justified if the ability of the NDE system to discriminate flaws potentially exceeding the performance criteria from among a population of flaws has been demonstrated. The EPRI guidelines provide no guidance on how such a capability may be demonstrated.	8/2/01 NRC letter, Att B, Topic 5	2	In Situ G/L Ad Hoc		The In Situ guidelines will be revised to include an approach for indications where the correlation is inadequate for sizing.	
In Situ	22	In Situ G/L	Assessment of Incomplete In Situ Test Results Section 7 (also Section 5.2.7) of the EPRI in situ test guidelines states that if leakage is observed at the proof pressure or prevents attainment of the proof pressure, and sealing bladders are not available due to location or tooling limitations, structural margin may be verified by via visual or ECT examination or by extrapolation of the leakage data. The staff is concerned that the guidance provided to this effect may be non-conservative in some cases.	8/2/01 NRC letter, Att B, Topic 7	2	In Situ Ad Hoc		Section 7 has been deleted from the draft of the revised In Situ G/L. However section 5.6.7 still encourages the collection of data to support analysis. Additional guidance on analysis will be evaluated for inclusion in the next revision of the IA G/L.	
In Situ	34	SGAP response, RIS 6, LL2h, LL 2i	In situ test screening criteria 1. Guidance in the EPRI tube integrity assessment guidelines correctly identifies the need to quantify POD and sizing performance of the NDE system (technique, analyst, and process controls). However, the guidance is not totally consistent on	4-5-02 E Murphy e-mail	2	In Situ Ad Hoc IA Tools Ad Hoc		SGMP SGAP response RIS6/LL2h/LL2i #1 Guidance in the draft revision to the In Situ Guidelines require system NDE uncertainties. #2 Guidance in the draft revision to the In Situ Guidelines regarding uncertainties have been made consistent with the Integrity Assessment Guidelines	

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			this, particularly for sizing uncertainties. 2. The guidance on NDE uncertainties when determining screening criteria for in situ pressure testing in the EPRI in situ test guidelines are inconsistent with the intent of the EPRI tube integrity assessment guidelines. 3. The Appendix H technique POD and sizing performance is evaluated relative to ground truth whereas the Appendix G analyst performance is evaluated relative to expert opinion. 4. In the EPRI tube integrity assessment guidelines this approach (supplemental performance demonstration) is not presented as a guideline concerning acceptable approaches for establishing NDE uncertainties for the total NDE system. It is simply an observation about what some people do. 5. The multi-tiered sequential approach to screening indications may be sufficient for prioritizing the tubes for in situ pressure testing, but it is not sufficient to justify not performing in situ pressure tests of a sample of tubes in cases where measurement uncertainty is not fully characterized through performance demonstration. 6. There is evidence from Appendix H qualifications and from operating experience indicating that the statement: *"total measured crack length is conservative due to probe lead in lead out effects and need not be adjusted for measurement error"*, as a general statement, is not always correct. 7. Appendix B.2.F of the In Situ G/L states that the maximum measured depth may be applied to the limiting depth criterion with no adjustment for depth. This assumption may not always be true. 8. The guidelines fail to note that the same is true with respect to analyst performance in the Appendix G qualification. The guidelines fail to identify under what circumstances the Appendix H and G data might not be suitable. Nor do the guidelines identify what are the needed attributes of a performance demonstration in order to sufficiently quantify the NDE POD and sizing uncertainties to support site-specific tube integrity assessments.					#3 The Integrity Ad Hoc Committee is developing a performance demonstration protocol for system uncertainties. #4 The Integrity Ad Hoc Committee is developing a performance demonstration protocol for system uncertainties. #5 The draft revision of the In Situ Guidelines includes a section with guidance when uncertainties are not adequately quantified. #6 The industry maintains the opinion that data supports the fact that for axial cracks, length will be overestimated by probe lead in and lead out effects. #7 This step in the screening criteria uses maximum depth measurement but applies it as average depth. Therefore, no uncertainties are necessary. #8 Necessary attributes for a performance demonstration are being developed by the Integrity Ad Hoc Committee. #9 This has been deleted from the current draft of the revision to the In Situ Guidelines #10 This basis is being developed by the Integrity Assessment Guidelines Committee #11 The draft revision to the In Situ Guidelines requires considerations of all uncertainties #12 Using past data to bound threshold screening values has been deleted from the current draft revision of the In Situ Guidelines	

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			9. The EPRI in situ test guidelines, state that prior in situ pressure test results can be used to characterize NDE sizing uncertainties. No guidance for such an approach is provided. 10. Given several indications each satisfying the performance criteria with a probability of 0.9, there may be, nevertheless, a relatively high probability that one or more these indications actually doesn't meet the performance criteria. 11. In general, the screening criteria should be developed making conservative bounding assumptions to account for all significant uncertainties. 12. The staff does have concerns about the interpretation of "TUBE 2 - In-Situ Testing Screening Criteria." We believe this interpretation adds little to the reference guideline and is not sufficient to prevent users from misapplying the guidelines when selecting tubes for in-situ pressure testing.						
In Situ	36	SGAP response, RIS 7	Assessment of test results The staff's concern was that ANO-2's in situ test assessment was not performed in a rigorous manner. Further, the staff concluded that the tube was actually at the point of incipient burst at the time the test was terminated. The staff believes that the EPRI in situ test guidelines may be non-conservative in some cases relative to this issue.	8/2/01 NRC letter, Att C, RIS 7, and 8-30 01 Emmett Murphy e-mail	2	In Situ Ad Hoc		SGMP SGAP response RIS7 Section 7 (Data Analysis) has been deleted in the current draft of the In Situ Guidelines revision. The guidelines provides several suggested precautions and steps for acquiring data. Actions for dispositioning flaws will be incorporated into the next revision of the IA G/L.	
NDE	23	SG Exam G/L	Inspection and Condition Monitoring Intervals The staff is concerned that without adequate justification, longer inspection intervals may result in condition monitoring being unable to fulfill its 10 CFR 50, Appendix B, Criterion 16 obligation; namely, **prompt** detection of conditions adverse to quality.	8/2/01 NRC letter, Att B, Topic 8	1	NDE IRG		Maximum inspection intervals are defined in the admin TS in the GLCP and in revision 6 of the NDE G/L, including a 20% sample of susceptible areas at the midpoint of each period.	Industry actions are considered complete.
NDE	29	SGAP response, RIS 3, LL2a	Need for data quality and accept criteria Poor data quality can significantly degrade the effectiveness of in-service inspection, condition monitoring, and operational assessment. Draft guidelines for inclusion into Revision 6 of the EPRI examination guidelines are under staff review.	8/2/01 NRC letter, Att C, RIS 3, LL2a, and 8-30 01 Emmett Murphy e-mail	2	NDE IRG		SGMP SGAP response RIS3/LL2a	Revision 6 of the PWR SG Examination Guidelines address this. Industry considers this item CLOSED

SGP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
NDE	30	SGAP response, LL2b	Data quality for new tubing The staff acknowledges that the EPRI examination guidelines contain general guidelines concerning the need for qualification data sets to incorporate noise levels that are representative of those in the field. The industry is requested to provide additional information with respect to its response. These questions relate to tube noise (e.g., inner diameter surface irregularities), rather than noise not related to the tubing itself such as surface deposits or noise associated with electronics.	8/2/01 NRC letter, Att C, LL2b, and 8-30 01 Emmett Murphy e-mail	2	NDE IRG		SGMP SGAP response LL2b	Industry considers this item closed upon issue of rev 6 of the SG Exam G/L
NDE	31	SGAP response, LL2c	Use of noise minimization techniques The staff concludes that the guidelines do address noise minimization techniques and, thus, this issue may be considered closed.	8/2/01 NRC letter, Att C, LL2c, and 8-30 01 Emmett Murphy e-mail	2	NDE IRG	N/A	SGMP SGAP response LL2c	Closed
NDE	32	SGAP response, RIS 4	Use realistic flaws A number of Appendix H qualification data sets did include EDM notches to simulate cracks; this despite the fact that the Appendix H guidelines have provided that the data set should be representative of real flaws. The industry was not implementing Appendix H consistent with the Appendix H guidelines. The staff acknowledges that the guidelines do address this issue. The staff also acknowledges the industry's intent to further strengthen the guidelines to this effect in Revision 6 of the guidelines.	8/2/01 NRC letter, Att C, RIS 4, and 8-30 01 Emmett Murphy e-mail	3	NDE IRG		SGMP SGAP response RIS4 Industry agrees. EDM notch data is being replaced by actual flaw information as samples become available.	
NDE	33	SGAP response, RIS 5, LL2d, LL2g	Site specific qualification Revision 5 of the examination guidelines discusses key issues relating to determining the site applicability of generic NDE qualifications. The forthcoming revision 6 of the guidelines is expected to further enhance this guidance, particularly with respect to establishing whether site-specific noise conditions are within that considered in the generic qualification. However, future revisions to the guidelines need to better address the issues as to whether there are acceptable alternatives to the use of site-qualified NDE and, if so, what the alternatives are. In addition, improved guidance is needed to address the necessary attributes of a [illegible] integrity assessments.	8-30 01 Emmett Murphy e-mail	3	IA Tools Ad Hoc		SGMP SGAP response RIS5/LL2d/LL2g Revision 6 of the PWR SG Examination Guidelines addresses most of this issue. The necessary attributes of a performance demonstration are being developed by the IA Ad Hoc.	

TP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
NDE	35	SGAP response, LL2n	Computer data analysis Existing guidelines address the staffs concerns in his area. The staff concludes this issue is closed.	8-30 01 Emmett Murphy e-mail	2	NDE IRG	N/A	SGMP SGAP response LL2n	Closed
NDE	46	SGAP response, LL4a, NEI 97-06	Contractor oversight Inclusion of this guidance in the next revision of NEI 97-06 will increase the visibility of this guidance and, thus, enhance its effectiveness. Although the guidance is very general, the staff believes it is on target. More detailed guidance would not be expected to add significantly to assurance of adequate contractor oversight. The staff concludes that the industry appears headed on a path to resolve this issue. The staff hopes to be able to consider this issue closed once NEI 97-06 is revised appropriately.	8-30 01 Emmett Murphy e-mail	3	IIG		SGMP SGAP response LL4a Section 6.9 of rev 6 addresses contractor oversight. Contractor oversight will be included in all the guidelines as they are revised.	

TP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
NDE	49	SG Exam G/L, rev 6 section 3	The one fuel cycle limitation should be one fuel cycle or 24 EFPM, whichever is shorter. Similarly, the two cycle limitation should not exceed 48 EFPM and the three cycle limitation should not exceed 72 EFPM Although the industry states it is agreement with the staff comment, the proposed resolution is not consistent with the staff's comment. The latest version of Revision 6 deletes the 1, 2, and 3-cycle limitation for 600MA, 600TT, and 690TT tubing, respectively, and replaces them with the 24, 48, and 72 EFPM limitations. The industry response is not acceptable without technical justification for deleting the fuel cycle limitations. In particular, it needs to be demonstrated that SCC growth is dominantly a linear function of time at temperature with little contribution from growth associated with plant heatup and cooldown cycles. The two cycle limitation on inspection intervals for SGs with 600TT tubing and three cycle limitation for SGs with 690TT tubing, as proposed in earlier drafts of Revision 6, have been eliminated in the latest draft and replaced by a 48 EFPM limitation for 600TT SGs and 72 EFPM limitation for 690TT SGs. For plants with short fuel cycles, this would allow more than two cycle intervals for 600TT SGs and more than 3 cycles for 690 SGs. For such an approach to be technically defensible, it needs to be demonstrated that SCC growth is dominantly a linear function of time at temperature with little contribution from growth associated with heatup and cooldown cycles.	9/18/01 NRC Memo, section 4 – Preliminary Conclusions, item 1; 9/9/02 NRC Memo [20], Enc 2, Comm 1 9/9/02 NRC Memo [20], Enc 3	1	NDE IRG		Industry does not consider a fuel cycle requirement appropriate. [19] Section 3 in Revision 6 removes reference to "skipping" fuel cycles and establishes limits of 24 EFPM for 600MA, 48 EFPM for 600TT, and 72 EFPM for 690TT as the maximum length of time that the SG can operate without being inspected. There is no evidence supporting a relationship between start-ups and shutdowns and degradation of SG tubes. In addition the suggested tie to fuel cycles does not take into account unscheduled shutdowns that may occur during an SG inspection interval.	Industry Questions / NRC Clarification from 9-25-01 telecon: ▪ The 24 EFPM is in relation to 600MA, 48 EFPM pertains to 600TT, and 72 EFPM relates to 690TT. ▪ The EFPM cited are a maximum. They should not be interpreted to allow operation to the RFO nearest the value. Industry considers its actions complete.

TP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
NDE	51	SG Exam G/L, rev 6 section 3	For plants with Alloy 690 TT tubing, three cycle inspection intervals shall be preceded by a two cycle inspection interval The staff's comment is based on the uncertainties associated with application of growth rates observed during a previous one fuel cycle inspection interval to a subsequent three cycle interval. The industry response does not address this concern.	9/18/01 NRC Memo, section 4 – Preliminary Conclusions, item 3 9/9/02 NRC memo [20], Enc 2, Comm 3	1	NDE IRG		[19] - Preceding a three cycle interval by a two cycle interval is not necessary. Tubes are in their best condition early in life. Operating history of SGs with alloy 600TT and 690TT tubes indicates that any problems that may eventually occur do not exhibit themselves until well after three cycles.	Industry believes this item is CLOSED
NDE	55	SG Exam G/L, rev 6	Inspection intervals extending over multiple fuel cycles should be preceded and followed by inspections which utilize qualified NDE techniques for all potential degradation mechanisms and locations. Axial SCC is a potential degradation mechanism over the entire tube length. Circumferential SCC is a potential degradation mechanism at locations of geometry variations with length, including expansion transitions, u-bends, and dings or dents. The staff comment can be resolved by clarifying the draft Revision 6 guidelines for tube integrity assessment as is discussed in enclosure 4 to ref 20 entitled "NRC Staff Comments Pertaining to EPRI PWR Steam Generator Examination Guidelines, Revision 6 (draft dated May 8, 2002).	9/18/01 NRC Memo, section 4 – Preliminary Conclusions, item 7 9/9/02 NRC memo [20], Enc 2, Comm 7	1	NDE IRG		[19] - Industry agrees that qualified NDE techniques should be used. Section 3.1 and associated sections of Rev. 6 of the PWR SG Examination Guidelines requires that all examinations be conducted with qualified techniques selected in accordance with the degradation assessment. Qualified technique requirements are described in Section 6 of the PWR SG Examination Guidelines.	Industry believes this item is CLOSED
NDE	56	SG Exam G/L, rev 6	Indications shall be considered service induced flaw indications in the absence of compelling evidence that the indications are actually associated with manufacturing flaws, surface deposits, tube and/or tube geometry variations, or other inspection artifacts for purposes of determining whether there is active degradation. The industry response nor Revision 6 of the guidelines addresses the concern identified in the staff's September 18, 2001 letter underlying the staff comment. Guidance addressing the staff comment is needed. For example, when faced with anomalous signals at the expansion transitions such as happened in recent years at the Turkey Point units, what actions (e.g., tube pulls, data analysis look-backs to prior inspections) are necessary to establish with high confidence that such indications are not service related such that multi-cycle inspection intervals can continue to be implemented.	9/18/01 NRC Memo, section 4 – Preliminary Conclusions, item 8 9/9/02 NRC memo [20], Enc 2, Comm 8	1	NDE IRG		[19] - The signal analysis process in the SG Examination Guidelines is intended to be conservative and is sufficient to determine if there are active damage mechanisms. The guidelines require that each of the signals encountered during a steam generator examination be recognized and correctly classified. Also, all crack like indications are considered active damage mechanisms in accordance with the definition Examination Guidelines requires evidence to prove the damage mechanism was never present.	Industry believes this item is CLOSED

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NDE	57	SG Exam G/L, rev 6	If primary-to-secondary leakage exceeds 5 gpd prior to shutdown for a refueling outage, an inspection in accordance with the EPRI SG Examination Guidelines for leaker forced outages shall be performed as a minimum. The industry's latest proposal is largely responsive to the staff's September 18, 2001 comment and the underlying concern. However, one area of needed improvement is to clarify the circumstances under which eddy current inspections should be performed in the event that the source of leakage cannot determined visually from hydrostatic pressure testing, etc.	9/18/01 NRC Memo, section 4 – Preliminary Conclusions, item 9 9/9/02 NRC memo [20], Enc 2, Comm 9	2	NDE IRG		[19] - Revision 6 of the PWR SG Examination Guidelines addresses this Issue in Sections 3.7, 4.5 and 5.5.	Industry considers this item CLOSED
NDE	58		Provide detailed information on degradation experience with tubes and sleeves fabricated from Alloy 600 TT and 690 TT, both foreign and domestic.	9/18/01 NRC Memo, section 5 – Requested Information, item 1	1	NDE IRG		[19] - See report "Experience of U.S. and Foreign PWR Steam Generators with Alloy 600TT and Alloy 690TT Tubes and Sleeves"	Industry believes this item is CLOSED
NDE	59		Provide additional information concerning hundreds of reported SCC indications in 600 TT tubing worldwide and discuss whether there is a preponderance of evidence than none of these indications are actually SCC.	9/18/01 NRC Memo, section 5 – Requested Information, item 2	1	NDE IRG		[19] - See report "Experience of U.S. and Foreign PWR Steam Generators with Alloy 600TT and Alloy 690TT Tubes and Sleeves"	Industry believes this item is CLOSED
NDE	60	SG Exam G/L	Submit revised, complete proposal for prescriptive limits on inspection intervals, including supporting definitions.	9/18/01 NRC Memo, section 5 – Requested Information, item 3	1	NDE IRG		[19] - See reference 19 and Section 3 of Rev. 6 of the PWR SG Examination Guidelines	Industry believes this item is CLOSED
NDE	78	SG Exam G/L, sec 3.3.1	Revision 6 would only require use of bobbin probes even though the guidelines state there are degradation types and locations for which the bobbin is not qualified. It is the staff's position that, consistent with 10 CFR 50, Appendix B, Criterion IX, steam generator inspections should always be performed with techniques and personnel that are qualified for existing and potential degradation mechanisms and their associated locations.	9/9/02 NRC memo [20], Enc 3				This comment was based on an early draft of revision 6. Industry agrees that qualified NDE techniques should be used. Section 3.1 and associated sections of Rev. 6 of the PWR SG Examination Guidelines requires that all examinations be conducted with qualified techniques selected in accordance with the degradation assessment. Qualified technique requirements are described in Section 6 of the PWR SG Examination Guidelines. Section 3.3.10 and 3.3.15 requires 20% of the tubes in each SG be examined at the inspection nearest the midpoint of the period.	Industry considers this item closed.

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NDE	79	SG Exam G/L, sec 3.3.11, 3.3.12, 3.3.13, 3.3.16, and 3.3.18	These sections need clarification. For example, sleeves are generally installed at several different inspection outages. Does the "first inservice examination" in the first sentence of these sections refer to the first examination of each sleeve, or does it refer to the first inservice examination of any sleeve of that design and/or material? Etc…..	9/9/02 NRC memo [20], Enc 3		NDE IRG		Industry does not believe that any changes are required. The implementation of these guidelines requires a period be determined. Sleeves could be in different periods. However the parent tubing (pressure boundary) will also be in a different period and must be inspected in accordance with the pressure boundary material.	Industry believes that its actions on this item are closed.
NDE	80	SG Exam G/L, sec 3.3.17	The latest version of Revision 6 deletes requirements for volumetric examination for alloy 690TT plug designs, even where such examinations are possible. There is no apparent explanation for why the NDE inspection philosophy for 690TT tubing should not apply equally to 690TT plugs. Inspection guidance should be similar to that in Section 3.3.12 for alloy 600TT plugs.	9/9/02 NRC memo [20], Enc 3		NDE IRG		Industry does not believe that any changes are required. Industry experience indicates that a visual examination of tube plugs is adequate to determine degradation or if leakage is present. No ASME Code requirement for volumetric exams exists for plugs.	Industry considers this item closed.
NDE	81	SG Exam G/L, sec 3.4.1	Consistent with Revision 5, this section should state that the minimum 20% sampling requirement applies to all active tubes and sleeves, plugs, and other types of repairs. The latest version of Revision 6 appears to add a new criterion to inspect all peripheral tubes, etc. as part of the periodic sample to monitor for loose parts. However, the guideline partially negates this improvement by stating that a secondary side FOSAR examination may be used to meet this requirement. Although not new in Revision 6, the staff has comments concerning the guidance on temperature sensitive degradation mechanisms.	9/9/02 NRC memo [20], Enc 3		NDE IRG		The wording in section 3.4.1 of rev 6 was revised to reflect the different types of materials being used for SG tubes. Section 3.3 of rev 6 retains the same requirements for sampling MA 600 tubes as rev 5. Accepting this comment would create inconsistency within rev 6 which credits improved materials. The remaining guidance in section 3.4.1 is adequate.	Industry considers this item closed.
NDE	82	SG Exam G/L, sec 3.5	The definition of the inspection results category has been relaxed relative to Revision 5 of the guidelines and relative to current technical specifications. Until now, the inspection results category was determined based on the total count of all indications found (and meeting the growth criteria), regardless of how these indications were detected or their location. Revision 6 would determine the inspection results category separately for indications found by different inspection methods and at different locations.	9/9/02 NRC memo [20], Enc 3		NDE IRG		This inspection results categories are unchanged from rev 5 and were never intended to match tech spec requirements. The categories discussed in the staff's comment define the expansion requirements for this examination only.	Industry considers its actions on this item closed.

#P #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
NDE	83	SG Exam G/L, sec 3.6.2	Optional Expansion of the Periodic Sample to a Critical Area – For clarity, this section should define "critical area", "C-A", and "buffer zone" or should reference the definitions in Appendix F. In addition, Revision 6 deletes discussion of buffer zones that are critical to their proper implementation.	9/9/02 NRC memo [20], Enc 3		NDE IRG		Revision 6 is not intended to allow inspection of less than 100% of the critical area. The definition is clear in appendix F.	Industry considers its actions on this item closed.
NDE	84	SG Exam G/L, sec 3.6.3	This is a new section and addresses expanded inspection samples in response to the finding of loose parts. This section states that if loose parts are detected during the examination, a buffer zone shall be defined and inspected to the extent necessary to bound the loose part. Additionally, a secondary side inspection should be considered. The staff believes this introduces an inconsistency into the guidelines.	9/9/02 NRC memo [20], Enc 3		NDE IRG		Industry does not believe there is an inconsistency. Section 3.4.1 is a periodic sample requirement, section 3.6.3 is a response to detection of a loose part.	Industry considers its actions on this item closed.
ND E	86	SG Exam G/L, App F	The definition of critical area in Appendix F needs clarification to ensure that the user of the guideline does not misinterpret its definition.	9/9/02 NRC memo [20], Enc 3		NDE IRG		Industry believes that the appendix F definition is adequate to ensure proper implementation of the critical area requirements.	
NEI 97-06	1	NEI 97-06, 1.5, third from last paragraph	The industry committed to forward SG Review Board decisions to the NRC in its response to the NRC's SG Action Plan issues. This commitment should be included in NEI 97-06.	SGAP industry response	3	SGTF		Will be incorporated in rev 2	.
NEI 97-06	2	NEI 97-06, 1.5, last paragraph	The industry committed to forward EPRI Guideline revisions to the NRC in its response to the NRC's SG Action Plan issues. This commitment should be included in NEI 97-06.	SGAP industry response	3	SGTF		Will be incorporated in rev 2	
NEI 97-06	5	NEI 97-06, 2.3	The description of the basis for the operational leakage performance criterion should also state that the performance criterion matches the LCO operational leakage limit in the technical specifications. This limit provides added assurance that should tube leakage develop, the plant will be shutdown before rupture of the tube.	8/2/01 NRC letter, Att. A, #2	1	SGTF		Incorporated. The following words were added to section 2.3: "*The operational leakage performance criterion matches the primary-to-secondary leakage limit in the RCS Operational Leakage technical specification*." In addition the words "and provides added assurance that should tube leakage develop, the plant will be shutdown before rupture of the tube." Were added to the second paragraph in the section.	NRC wants an updated copy of NEI 97-06 at the time of GLCP submittal to allow their endorsement.
NEI 97-06	6	NEI 97-06, 3.1.3, 3rd sentence	NDE flaw sizing and leakage prediction models should also be identified as potential significant sources of uncertainty.	8/2/01 NRC letter, Att. A, #3	1	SGTF		Intent incorporated. The sentence already reads: "Potential significant sources of uncertainty include uncertainties associated with the projected limiting defect or indication size, material properties, and modeling." No additional information is necessary to address the comment.	NRC wants an updated copy of NEI 97-06 at the time of GLCP submittal to allow their endorsement.

TP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
NEI 97-06	7	NEI 97-06, 3.1.3, 6th paragraph	This paragraph is confusing as to whether voltage based limits are an ARC and whether NRC approval is needed prior to a plants initial use of voltage based limits. This can be fixed by replacing the words "a voltage-based repair limit per GL 95-05 or other alternate repair criteria (ARC)" with the words "or alternate repair criteria (ARC) such as a voltage-based repair limit in accordance with Generic Letter 95-05.	8/2/01 NRC letter, Att A, #4	1	NEI, J Riley		Incorporated in draft rev 2.	NRC wants an updated copy of NEI 97-06 at the time of GLCP submittal to allow their endorsement.
NEI 97-06	8	NEI 97-06, 3.1.3, 7th paragraph	This paragraph should be revised consistent with the words (plug on detection) agreed to in the latest version of the SG Tube Integrity Technical Specification Bases.	8/2/01 NRC letter, Att A, #5	1	NEI, J Riley		Incorporated in draft rev 2 of NEI 97-06. The following words replaced the first sentence in this paragraph: "Since not all forms of tube degradation can be accurately measured for flaw depth in terms of percentage of tube wall thickness, some tubes are "plugged or repaired on detection" to ensure that detected flaws that exceed the depth based criterion are not left in service. In addition, since the probability of detecting a flaw is not a certainty for a given eddy current technique, it is probable that some flaws will not be detected during an inspection. This condition does not mean that "plug on detection" has not been followed or that the depth-based criterion has been violated."	NRC wants an updated copy of NEI 97-06 at the time of GLCP submittal to allow their endorsement.
NEI 97-06	9	NEI 97-06, 3.1.3, last paragraph	This one sentence paragraph has no context. Suggest deleting or else describing the circumstances under which a licensee would want to be risk informed.	8/2/01 NRC letter, Att A, #6	1	SGTF		Not incorporated. This sentence ("If a risk-based assessment is required, guidance may be found in Regulatory Guide 1.174.") was added in response to comments on revision 0 to provide general guidance on the use of risk informed approaches.	NRC wants an updated copy of NEI 97-06 at the time of GLCP submittal to allow their endorsement.
NEI 97-06	10	NEI 97-06, 3.1.4, last paragraph	The first sentence should be revised to state that NRC approval is required prior to a plant's initial use of any specific repair method other than plugging.	8/2/01 NRC letter, Att A, #7	1	SGTF		Incorporated. The last paragraph will read: "New repair methods shall be reviewed and approved by the NRC either through license amendment requests or through changes to the ASME Code prior to implementation. New plugging designs or methods do not require prior approval by the NRC."	NRC wants an updated copy of NEI 97-06 at the time of GLCP submittal to allow their endorsement.
NEI 97-06	11	NEI 97-06, 3.1.7	The staff understands that the NRC Reports section will be revised as discussed by NEI at April 26, 2001 meeting with NRC staff.	8/2/01 NRC letter, Att A, #8	1	SGTF		Incorporated. Section 3.1.7 addresses NRC reporting requirements. It will be made consistent with the approved version of the GLCP	NRC wants an updated copy of NEI 97-06 at the time of GLCP submittal to allow their endorsement.

GP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
NEI 97-06	12	NEI 97-06, App B	Definition of Limiting Design Basis Accident The definition is incorrect with respect to what is the limiting accident from a structural standpoint. There may be loadings other than pressure which affect structural integrity. The limiting accident is that which results in the minimum margin with respect to meeting the structural performance criteria.	8/2/01 NRC letter, Att A, #9	1	NEI, J Riley		Incorporated The comment on the definition of Limiting /Design Basis Accident resulted in changes to the structural integrity and accident induced leakage performance criteria to avoid the use of the term. The definition was then deleted from NEI 97-06. The revised structural integrity criterion now reads: "*Steam generator tubing shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cooldown and all anticipated transients included in the design specification) and design basis accidents. This includes retaining a safety factor of 3.0 against burst under normal steady state full power operation primary-to-secondary pressure differential and a safety factor of 1.4 against burst for the largest primary-to-secondary pressure differential associated with Level D service. Additional conditions identified in the design and licensing basis shall be evaluated to determine if the associated loads contribute significantly to burst. Contributing loads that do affect burst shall be assessed with a safety factor of 1.0 and combined with the appropriate load due to the defined pressure differential.*" *The revised accident induced leakage performance criteria reads: "The primary to secondary Accident Induced Leakage Rate for **all design basis accidents**, other than a steam generator tube rupture, shall not exceed the Leakage rate assumed in the accident analysis in terms of total leakage rate for all steam generators and leakage rate for an individual steam generator. Leakage is not to exceed [1 gpm per steam generator, except for specific types of degradation at specific locations where the NRC has approved greater accident-induced leakage as part of a plant's licensing basis. Exceptions to the 1 gpm limit can be applied if approved by the NRC in conjunction with approved Alternate Repair*	NRC wants an updated copy of NEI 97-06 at the time of GLCP submittal to allow their endorsement.

GP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
NEI 97-06	14	NEI 97-06, App B	Definition of "Repair Limit" The definition should include a statement that repair limits must be reviewed and approved by the NRC staff or else the second sentence of the definition should be deleted.	8/2/01 NRC letter, Att A, #11	1	NEI, J Riley		Not incorporated. This information is not appropriate for a definition. Also, the requirement for NRC approval of new ARCs is already addressed in section 3.1.3 of NEI 97-06..	NRC wants an updated copy of NEI 97-06 at the time of GLCP submittal to allow their endorsement.
NEI 97-06	44	SGAP response, LL3a	Update TS to reflect current knowledge The staff is currently reviewing the NEI SG generic change package. As part of this review, the staff must make a finding that the change package provides reasonable assurance that tube integrity will be maintained. The staff's final safety evaluation approving the generic change package will constitute closure of this issue.	8-30 01 Emmett Murphy e-mail	1	NEI, J Riley		SGMP SGAP response LL3a	Write-up revision not required
Other	47	SGAP response, LL4b, 4c	Feedback - Application by licensees of IP2 LL Feedback - planned changes to NEI 97-06 initiative Industry responses to the individual NRC action plan issues, including IP-2 lessons learned, have been reviewed and commented on by the NRC staff. The staff will have the opportunity to observe the licensees' implementation of these guidelines and documented deviations from these guidelines as part of the regional baseline inspection program. The staff is reviewing the NEI SG generic change package. As part of this review, the staff must make a finding that the change package provides reasonable assurance that tube integrity will be maintained. The staff's final safety evaluation approving the generic change package will constitute closure of these issues	8-30 01 Emmett Murphy e-mail	3	SGTF		SGMP SGAP response LL4b/LL4c	Industry considers this item closed. Write-up revision not required.

TP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
SG Integrity	3	NEI 97-06, 2.1, IA Guidelines, GLCP	Structural Integrity Performance Criteria The use of the 1.4 safety factor as stated is not correct. ASME Code requires that the calculated stresses due to different loading conditions imposed on the tubes comply with stress limits established by the Code. The 1.4 Safety Factor was developed based on the 0.7Su. The 1.4 Safety Factor should only be applied to the "Faulted Condition" of the tube's design basis. The 1.4 Safety Factor should not be technically specified against the other design conditions required to be evaluated per the SG Design Specification in accordance with the Code (i.e., "Design", "Normal", "Upset", "Emergency" and "Test"), since they were not evaluated against 0.7Su.	Industry comments on the GLCP – summer 2001. Issue communicated to the NRC in August 2001 meeting.	1	IIG		Performance criterion changed to: "Steam generator tubing shall retain structural integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cooldown and all anticipated transients included in the design specification) and design basis accidents. This includes retaining a safety factor of 3.0 against burst under normal steady state full power operation primary-to-secondary pressure differential and a safety factor of 1.4 against burst for the largest primary-to-secondary pressure differential associated with Level D service. Additional conditions identified in the design and licensing basis shall be evaluated to determine if the associated loads contribute significantly to burst. Contributing loads that do affect burst shall be assessed with a safety factor of 1.0 and combined with the appropriate load due to the defined pressure differential."	Basis for performance criterion contained in White Paper. Industry will include in affected documents.
SG Integrity	4	NEI 97-06, 2.1, last paragraph, GLCP, IA Guidelines	The words "primary pressure stress" conflict with the words "membrane stress" in the SG Tube Integrity Technical Specification Bases and with the words, "primary membrane stress. The staff believes that "stress" (primary or secondary) is the proper wording, but if the industry disagrees, the staff would like to understand the basis. Industry needs to look at the "no yield criteria" and the types of stresses included within it. Irrespective, the wording should be consistent among all the documents.	8/2/01 NRC letter, Att. A, #1	1	IA G/L Ad Hoc, SGTF		The words "primary membrane stress" will be used in place of other references to membrane stress anywhere yield strength allowables are discussed.	NEI 97-06 and the IA G/Ls will be revised. NRC wants an updated copy of NEI 97-06 at the time of GLCP submittal to allow their endorsement.
SG Integrity	13	NEI 97-06, App B, IA G/L	Definition of "Primary Stress" This definition is incorrect. This definition should be corrected consistent with Section III of the ASME Code, or should be deleted.	8/2/01 NRC letter, Att A, #10	1	IA G/L and SGTF		A definition of primary stress has been developed and will be included in NEI 97-06 and the IA G/L- needs IIG approval.	NRC wants an updated copy of NEI 97-06 at the time of GLCP submittal to allow their endorsement.
SG Integrity	15	NEI 97-06, App B, IA G/L	Definition of "Secondary Stress" The definition is incorrect. The example is also incorrect since stresses associated with dynamic, hydrodynamic, and flow induced forces are generally primary stress, not secondary stress. This definition should be corrected consistent with Section III of the ASME Code, or should be deleted.	8/2/01 NRC letter, Att A, #12	1	IIG (EPRI)		A definition of secondary stress has been developed and will be included in NEI 97-06 and the IA G/L- needs IIG approval.	NRC wants an updated copy of NEI 97-06 at the time of GLCP submittal to allow their endorsement.

TP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
SG Integrity	16	IA G/L, In Situ G/L	Performance Standards The EPRI tube integrity assessment guidelines, Section 5.2, provides two performance standards for tube integrity assessments relative to the deterministic structural performance criteria (e.g., 3 delta p). The first of these standards applies to each defect or indication under consideration. The second of these standards applies to the universe of flaws or indications in a steam generator. The staff further notes that the EPRI performance standards are applied inconsistently in the tube integrity assessment guidelines and in the in situ pressure test guidelines. In conclusion, an appropriate performance standard applicable to the population of flaws is needed when using statistical methods to account for various uncertainties. When using non-statistical methods, uncertainties should be conservatively bounded.	8/2/01 NRC letter, Att B, Topic 1	3	IA G/L Ad Hoc		The basis for the current guidance is being developed in more detail. The inconsistencies will be corrected in the next revisions of both guidelines.	
SG Integrity	17	IA G/L, In Situ G/L	NDE Uncertainties 1. Guidance in the EPRI tube integrity assessment guidelines correctly identifies the need to quantify POD and sizing performance of the NDE system (technique, analyst, and process controls). However, the guidance is not totally consistent on this, particularly for sizing uncertainties. 2. The Appendix H technique POD and sizing performance is evaluated relative to ground truth whereas the Appendix G analyst performance is evaluated relative to expert opinion. The guideline method for establishing NDE system performance assumes that the experts would perform identically to the Appendix H technique qualification for the same data set. The industry has not documented a technical basis for such an approach. 3. The multi-tiered sequential approach may be sufficient for prioritizing the tubes for in situ pressure testing, but it is not sufficient to justify not performing in situ pressure tests of a sample of tubes in cases where measurement uncertainty is not fully characterized through performance demonstration	8/2/01 NRC letter, Att B, Topic 2	3	IA Tools Ad Hoc		For issues 1 and 2, EPRI SGMP has chartered an ad hoc committee to address structural integrity and NDE performance issues. Phase 1 activities include system performance for ODSCC, including a performance demonstration. For issue 3, the In Situ guidelines will be revised to include an approach for indications where the correlation is inadequate for sizing.	

TP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
SG Integrity	18	IA G/L, In Situ G/L	Needed Attributes of Performance Demonstration to Quantify NDE System Uncertainty The guidelines fail to identify under what circumstances the Appendix H and G data might not be suitable. Nor do the guidelines identify what are the needed attributes of a performance demonstration in order to sufficiently quantify the NDE POD and sizing uncertainties to support site-specific tube integrity assessments.	8/2/01 NRC letter, Att B, Topic 3	3	IA Tools Ad Hoc Committee		See response to item 17.	
SG Integrity	21	Integrity Assessment G/L	Burst and Leakage Models Based on Prior In Situ Test Results Section 5.5.2 of the EPRI tube integrity assessment guidelines addresses the use of prior in situ test data in empirical burst pressure models as a function of an NDE measurement parameter. In such cases, however, the guidelines should specify that the test data set for burst include a statistically significant number of data samples with burst pressures above **and** below the burst pressure performance criteria. Similarly, the guidelines for accident leakage should specify that the leakage data set should include a statistically significant set of leakers and non-leakers at the limiting accident pressure and the leakage data should cover the full range of interest.	8/2/01 NRC letter, Att B, Topic 6	2	IA and In Situ G/L Ad Hocs		The ability to use in situ test results for burst and leakage models is being removed from the IA and In Situ Guidelines.	
SG Integrity	24	IA G/L, SGAP response RIS 1 and 2	Consideration of relevant operating experience / Assess root cause for all degradation mechanisms The guidance is not of sufficient detail to enable the user to anticipate or recognize the many types of degradation mechanisms or developing failure mechanism precursors. The staff believes that more detailed industry guidance is needed relative to these issues.	8/2/01 NRC letter, Att C RIS 1 and 2; and 8-30 01 Emmett Murphy e-mail	2	IA G/L Ad Hoc		SGMP SGAP response RIS1 and RIS2. Interim guidance issued by the SGMP is incorporated into the following revision of the guidelines. Revision 6 of the SG Examination Guidelines includes additional guidance on degradation assessments. The Integrity Assessment Guidelines are in the process of being revised. Additional guidance will be developed.	
SG Integrity	25	IA G/L, SGAP response, LL2e and 2f	Hour-glassing More detailed guidance is needed to ensure that all potential degradation mechanisms are considered in the degradation assessment and that potential precursor conditions are recognized. For example, guidance is needed with respect to implications of denting, denting thresholds at which hour-glassing poses a potential concern, and methods for detecting hour-glassing at the top-most support.	8-30-01 Emmett Murphy e-mail	3	IA G/L Ad Hoc		SGMP SGAP responses LL2e and LL2f The industry believes that the issue of hour glassing is best addressed through enhanced guidance on degradation assessments. Revision 6 of the SG Examination Guidelines was recently revised to include some guidance in this area. The Integrity Assessment Guidelines are in the process of being revised. The IA Guidelines will include an expanded section dedicated to degradation assessments.	

TIP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
SG Integrity	26	SGAP response, LL2k	Prudent measures upon finding of new degradation mechanisms Issue is closed subject to issuance of rev 6 of SG Exam G/L	4/5/02 E. Murphy e-mail	3	NDE IRG	N/A	SGMP SGAP response LL2k	Closed
SG Integrity	27	IA G/L, SGAP response, LL2l	Tube integrity implications of new mechanisms The new industry guideline is clearly worthwhile and on this basis the staff concludes that issue LL 2l is closed.	8/2/01 NRC letter, Att C, LL2l, and 8-30 01 Emmett Murphy e-mail	3	IA G/L Ad Hoc	N/A	SGMP SGAP response LL2l	Closed contingent upon issue of the IA Guidelines
te a	28	SGAP Response 2o	Address all degradation modes and locations	[3] SGAP, Att 3, item 2o		E&R IRG		SGMP SGAP response LL2o	
SG Integrity	37	In Situ G/L, SGAP response, RIS 8	Pressurization rate The staff is continuing to evaluate the pressurization rate issue. The SGMP interim guidance on in situ testing addresses several significant shortcomings in the existing In Situ guidelines. Staff is in the process of reviewing the pressurization rate report. Some initial observations: ○ Testing did not include performing tests under a slow pressurization rate with a foil. ○ Preliminary testing by RES indicates there are time-dependent increases in leak rates in deep stress corrosion cracks under constant pressure NRR has requested RES to perform a research program on the issue. Industry should comment on NRR's request. Before final conclusions can be reached, the industry needs to specifically identify the conditions under which different types of degradation mechanisms may be subject to a pressurization effect.	5/5/02 E Murphy e-mail	3	E&R IRG		SGMP SGAP response RIS8	Forwarded the final study to the NRC on November 5, 2001. Industry will respond to the NRC May 5, 2002 e-mail and expects to obtain additional information from the RES work.
SG Integrity	38	SGAP response, RIS 9	Fractional flaw methodology The staff is reviewing the industry response and has not yet reached a conclusion regarding whether this issue is satisfactorily resolved.	8/2/01 NRC letter, Att C, RIS 9, and 8-30 01 Emmett Murphy e-mail	3	E&R IRG		SGMP SGAP response RIS9	Awaiting final NRC comments
SG Integrity	39	IA G/L, SGAP response, RIS 10, LL2m	Benchmarking Staff acknowledges industry's general guidance to this effect. However, this guidance is not of sufficient detail to guide users from repeating inappropriate benchmarking assessments performed in the past such as the example cited in the RIS.	8/2/01 NRC letter, Att C, RIS 10, LL 2m, and 8-30 01 Emmett Murphy e-mail	3	IA G/L Ad Hoc		SGMP SGAP response RIS10/LL2m Enhanced guidance will be provided in the next revision of the IA G/L.	

SG Program – NRC Comments and Actions

SGP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
SG Integrity	40	SGAP response, LL2i	POD and sizing accuracy The staff finds that the industry guidelines do not provide complete or consistent guidance on how to characterize sizing uncertainty. The staff believes that a site applicable performance demonstration of the NDE system is needed to establish sizing uncertainty.	8/2/01 NRC letter, Att C, LL 2i, and 8-30 01 Emmett Murphy e-mail	3	IA Ad Hoc Committee		SGMP SGAP response RIS5/LL2i SGMP has chartered an ad hoc committee to address structural integrity and NDE performance issues. Phase 1 activities include system performance for ODSCC, including a performance demonstration. Industry believes this generic approach is sufficient to address staff comments.	Response needs to be expanded to address POD
SG Integrity	41	SGAP response, LL2j	Growth rates The staff concurs that this issue is addressed in current guidelines. The staff considers this issue to be closed.	8-30 01 Emmett Murphy e-mail	3	E&R IRG	N/A	SGMP SGAP response LL2j	Closed?
SG Integrity	42	SGAP response, LL2l	New degradation mechanisms		3	E&R IRG		See response to item 27.	May be a duplicate comment (se item 27). NRC will check.

TP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
SG Integrity	50	GLCP, SG Exam G/L, rev 6 section 3	Definition of "active damage mechanism" should be redefined as follows: Active ~~damage mechanism~~ degradation: - A combination of ten or more new indications of degradation (>=20% TW) and previous indications of degradation which display an adjusted, average growth rate equal to or greater than 25% of the repair limit per ~~cycle~~ **inspection interval** in any one SG. **Adjusted growth rate refers to scaling the growth rate for the previous inspection interval to reflect the length of the next scheduled inspection interval. For example, if the next schedule inspection interval is twice the length of the previous interval, the adjusted growth rate is twice the value observed over the previous inspection interval.** - one or more new or previously identified indications of degradation~~, including cracks,~~ which display a **an adjusted** growth **rate** greater than or equal to the repair limit in ~~one cycle of operation~~ **per inspection interval**. - damage related to loose parts or foreign objects is subject to the above criteria, irrespective of whether the causal objects are believed to have been retrieved. - **any indications associated with cracks** Regarding the second element of the staff's comment, loose parts related damage, the Revision 6 definition would exclude such damage from the definition. That is, loose parts related damage would, by definition, not be active degradation, even if the causal loose part is not found and removed. The staff believes this to be inappropriate. Loose parts related damage has historically been a major contributor to loss of tube integrity and tube rupture.	9/18/01 NRC Memo, section 4 – Preliminary Conclusions, item 2; 9/9/02 NRC memo [20], Enc 2, Comm 2	1	IA G/L Ad Hoc		[19] - Industry definition of active degradation: • A combination of ten or more, new indications (≥ 20% TW) of thinning, pitting, wear (excluding loose part wear) or impingement and previous indications which display an average growth rate equal to or greater than 25% of the repair limit in one inspection-to-inspection interval in any one SG, • One or more new or previously identified indications (≥ 20% TW) which display a growth greater than or equal to the repair limit in one inspection-to-inspection interval, or • Any crack indication (outside diameter IGA/SCC or primary side SCC). A requirement to revert back to 24 month inspections upon identification of corrosion cracking has been included in the administrative technical specifications in the GLCP. Loose part wear evaluations are included in the operational assessment. A generic inspection interval requirement imposed upon identification of loose parts is not appropriate. The current requirements in the integrity guidelines will be revised to increase the emphasis on the need for evaluation for foreign object wear and its effects on inspection intervals.	

TP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
SG Integrity	52	SG Exam G/L, IA G/L	The initial finding (industry wide) of indications associated with a cracking mechanism shall define the "time to detectable cracking threshold" for Alloy 600 TT SGs or Alloy 690 TT, as applicable. The time to cracking threshold shall be normalized to a reference temperature. The licensee shall take action as necessary to ensure that cognizant personnel at all plants utilizing the same tubing material are promptly informed of the finding. Upon receipt of such information, the other licensees shall consider the information as part of the degradation assessment which is to be performed prior to the next scheduled refueling outage to assess the need for modification to the schedule for the next SG inspection. Inspections shall be performed at each refueling outage after the equivalent accumulated full power operating time on the SGs (i.e., normalized for reference temperature) exceeds 75% of the "time to detectable cracking threshold." The industry response does not fully address the staff's concern. Revision 6 of the guidelines would not require or direct licensees to inspect at single cycle intervals once the "time to detectable cracking threshold" is crossed. The industry has provided no information supporting the conservatism of the proposed inspection intervals, in-of-themselves, to ensure that cracks just below the inspection threshold during a given inspection will continue to satisfy the tube integrity performance criteria at the next scheduled inspection two or three fuel cycles hence.	9/18/01 NRC Memo, section 4 – Preliminary Conclusions, item 4 9/9/02 NRC memo [20], Enc 2, Comm 4 and 5	1	IA G/L ad hoc		[19] - The use of a "time to detectable cracking threshold" tied to one plant's experience does not take into account the unique nature of each SG's operating conditions. The industry's proposed inspection periods are selected to be sufficiently conservative for generic application based on the current knowledge of 600TT and 690 TT materials (see report, "Experience of U.S. and Foreign PWR Steam Generators with Alloy 600TT and Alloy 690TT Tubes and Sleeves"). The notification issue was partially addressed in rev 6 and will be addressed in more detail in the next revision of the IA G/L.	
SG Integrity	53	SG Exam G/L, IA G/L	The "time to detectable cracking" should be revised downward as necessary to lower bound subsequent findings (industry wide) of crack indications occurring after equivalent, accumulated full power operating times less than that observed earlier. Again, the affected licensee shall take action as necessary to ensure that cognizant personnel at all plants utilizing the same tubing material are promptly informed of the finding. The other licensees shall respond as described in item 4.	9/18/01 NRC Memo, section 4 – Preliminary Conclusions, item 5 Also see 9/9/02 NRC memo [20], Enc 2, Comm 4 and 5 above	1	IA G/L ad hoc		See Response to item 52.	

TIP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
SG Integrity	54	IA G/L	For purposes of tube integrity assessments supporting multi-cycle inspection intervals, ligament tearing of volumetric flaws shall be considered "burst." That is, volumetric flaws should have a factor of three margin against such ligament tearing. The staff is revising its comment as follows: Section M.2.2 of the EPRI Steam Generator Integrity Guidelines, which discusses the definition of burst, should include additional discussion to clarify what constitutes burst for volumetric flaws such as wear, wastage, and loose parts damage. Specifically, the minimum size of a volumetric perforation of the tube wall constituting burst should be discussed.	9/18/01 NRC Memo, section 4 – Preliminary Conclusions, item 6 9/9/02 NRC memo [20], Enc 2, Comm 6	1	IA G/L Ad Hoc		Industry believes that this does not require a new definition of burst or a change to the structural integrity performance criteria. We agree that this condition is significant and it will be addressed in the next revision of the IA guidelines.	
SG Integrity	61	IA G/L, SG Exam G/L	Submit proposed industry protocol for ensuring that the initial occurrence of SCC, industry wide, for Alloy 600 TT or Alloy 690 TT is communicated to all applicable licensees. This protocol should identify the reference temperature at which the "time to detectable cracking" is determined. This protocol should also address the communication of subsequent findings (industry wide) of crack indications occurring after equivalent, accumulated full power operating times less than that observed earlier.	9/18/01 NRC Memo, section 5 – Requested Information, item 4	3	IA G/L Ad Hoc		The notification issue was partially addressed in rev 6 and will be addressed in more detail in the next revision of the IA G/L	
SG Integrity	62	IA G/L	Recent events at Three Mile Island Unit 1 illustrate an effect where a plugged steam generator tube can sever and affect adjacent tubes to the point where the active tubes no longer meet established structural performance criteria. Industry is to determine what actions it plans on taking in response to the TMI-1 experience.	11/26/01 NRC letter	2	E&R IRG, IIG		Industry initial response submitted on 12/21/01 – No immediate concern. Draft report has been completed. Necessary guidance will be developed.	Need to meet with the NRC in January 2003 after the Phase 1 study is complete
SG Integrity	63	Dec 21, 2001 NEI Response to NRC on TMI Plug Tube Sever	On pages 2 to 4 of the EPRI SGMP report (reference 6), operating experience with swelled and ruptured tubes is provided; however, the operating experience appears to be limited to row 1 tubes. Clarify whether this observation reflects that visual inspections are only typically performed for row 1 tubes (and perhaps some peripheral tubes) rather than a comprehensive examination of the tube bundle.	1/25/02 NRC letter, item 1	2	E&R IRG	N/A	3/29/02 NEI Response to NRC	Closed
SG Integrity	64	Dec 21, 2001 NEI Response to NRC on TMI Plug Tube Sever	Address the likelihood that a plugged tube may sever over the long term	1/25/02 NRC letter, item 2	2	E&R IRG	N/A	3/29/02 NEI Response to NRC	Closed

TP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
SG Integrity	65	Dec 21, 2001 NEI Response to NRC on TMI Plug Tube Sever	In recognition of broad industry experience, additional technical justification is needed to support the BWOG conclusion that the tube swelling and burst/severance phenomenon is only applicable to tubes with repaired/replaced alloy 600 plugs.	1/25/02 NRC letter, item 3 and 6	2	E&R IRG, B&W OG	N/A	3/29/02 NEI Response to NRC	Closed
SG Integrity	66	Dec 21, 2001 NEI Response to NRC on TMI Plug Tube Sever	Provide a discussion of the types and numbers of plugs installed at B&W plants including the dates of installation and the dates of repair or replacement, as applicable.	1/25/02 NRC letter, item 4	2	E&R IRG, B&W OG	N/A	3/29/02 NEI Response to NRC	Closed
SG Integrity	67	Dec 21, 2001 NEI Response to NRC on TMI Plug Tube Sever	In Table 1of reference 6 enclosure 2, the BWOG report divides plugged tubes into those which were more than 50% filled with water. Discuss the basis for the 50%.	1/25/02 NRC letter, item 5	2	E&R IRG, B&W OG	N/A	3/29/02 NEI Response to NRC	Closed
SG Integrity	68	Dec 21, 2001 NEI Response to NRC on TMI Plug Tube Sever	Provide the estimated Flow Stability Margin at tube locations B66-130 and A2-24.	1/25/02 NRC letter, item 7 a).	2	E&R IRG, B&W OG	N/A	3/29/02 NEI Response to NRC	Closed
SG Integrity	69	Dec 21, 2001 NEI Response to NRC on TMI Plug Tube Sever	Enclosure 2 of reference 6 states that B66-130 failed because it was “near instability (indicated by an FSM <1.0), which caused amplitudes of vibration in excess of those that would be predicted if the tube were completely stable.” Clarify this discussion.	1/25/02 NRC letter, item 7 a) 1)	2	E&R IRG, B&W OG	N/A	3/29/02 NEI Response to NRC	Closed
SG Integrity	70	Dec 21, 2001 NEI Response to NRC on TMI Plug Tube Sever	If the FSMs for tubes B66-130 and A2-24 (discussed in enclosure 2 of reference 6) are not less than 1.0, the basis for the screening criteria for determining which tubes are susceptible to flow-induced vibration (and subsequently fatigue) is not evident. A key issue to be addressed is what relative improvement in FSM is needed with respect to B66-130 to ensure that a tube will not sever.	1/25/02 NRC letter, item 7 a) 2)	2	E&R IRG, B&W OG	N/A	3/29/02 NEI Response to NRC	Closed
SG Integrity	71	Dec 21, 2001 NEI Response to NRC on TMI Plug Tube Sever	Given that lower bound input parameters (i.e., damping values for a swollen tube) were used in the calculations discussed in enclosure 2 of reference 6, it appears that the FSM prediction model may be somewhat non-conservative. Please discuss. This discussion should include the results from calculations performed if nominal input parameters were used in the FSM calculations.	1/25/02 NRC letter, item 7 a) 3)	2	E&R IRG, B&W OG	N/A	3/29/02 NEI Response to NRC	Closed

TP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
SG Integrity	72	Dec 21, 2001 NEI Response to NRC on TMI Plug Tube Sever	The B&WOG generic risk assessment in enclosure 2 of reference 6 is based on the risk associated with the specific amount of wear observed in the TMI-1 tubes; it does not appear to adequately address the risk associated with the generic issue.	1/25/02 NRC letter, item 8	2	E&R IRG, B&W OG	N/A	3/29/02 NEI Response to NRC	Closed
SG Integrity	73	Feb 14, 2002 NEI letter to NRC on B&W OG Short Term Recommend ations for SG Inspections	The BWOG short term recommendations state that the most susceptible tube populations are those included in the NEI letter dated December 21, 2001, and include in general any repaired locations that resulted in a change in the leak tightness of a mechanical joint. Clarify that repaired locations would include Alloy (Inconel) 600 (I600) and Alloy (Inconel) 690 (I690) plugs, ribbed plugs (Westinghouse (W) and Framatome (F)), rolled plugs (W, F, Combustion Engineering (CE)), roll sleeve plugs (F), explosive welded plugs (F), and TIG welded plugs (F, CE) that have been repaired or replaced. Clarify also whether the susceptible tubes would be limited to tubes passing through drilled holes in the uppermost support plate as is indicated in the December 21, 2001, letter.	2//02 NRC letter, Question 1	1	B&W OG	N/A	3/29/02 NEI Response to NRC	Closed
SG Integrity	74	Feb 14, 2002 NEI letter to NRC on B&W OG Short Term Recommend ations for SG Inspections	Describe any improvements in process controls for expanding and sealing I690 rolled plugs compared to I600 rolled plugs which have leaked. This comparison should address the full range of process controls in place for I600 plugs over the years these plugs were used. Explain why the process controls for I690 plugs should significantly reduce the potential for leakage in these plugs relative to I600 plugs.	2//02 NRC letter, Question 2	1	B&W OG	N/A	3/29/02 NEI Response to NRC	Closed
SG Integrity	75	Feb 14, 2002 NEI letter to NRC on B&W OG Short Term Recommend ations for SG Inspections	471 Alloy 690 rolled plugs have reportedly been repaired or replaced. Provide a detailed description of why repair or replacement of these plugs was necessary.	2//02 NRC letter, Question 3	1	B&W OG	N/A	3/29/02 NEI Response to NRC	Closed
SG Integrity	76	Feb 14, 2002 NEI letter to NRC on B&W OG Short Term Recommend ations for SG Inspections	Describe the ultrasonic test (UT) technique used for the detection and the determination of the water level in a plugged tube. Describe how it was qualified. Discuss whether its performance has been demonstrated in the field (i.e., compare field UT results to observed water level upon plug removal). How accurately does it determine water level?	2//02 NRC letter, Question 4	1	B&W OG	N/A	3/29/02 NEI Response to NRC	Closed
SG Integrity	85	IA G/L, SG Exam G/L, sec 5.2.	The staff believes this section on degradation assessment should be revised to include a clear statement of objectives and purpose.	9/9/02 NRC memo [20], Enc 3 and Enc 4		IA G/L Ad Hoc		We agree and this will be added to the tube integrity document	

TP #	#	Affected Doc, Sec	Summary of NRC Comment	Source *	Pri	Reso. Resp.	Due Date	Proposed Resolution	Status / Comments
SG Integrity	87	SG IA G/L, App M	EPRI Steam Generator Integrity Assessment Guidelines, Appendix M, "Discussion - Recommended Definition of Burst": Clarification is needed that wear flaws are not necessarily local. Wear flaws were the cause of two SG tube rupture events in the US. Perforations of the tube wall of sufficient size to cause leakage approaching tube rupture accident proportions constitute gross structural failure and, thus, burst.	9/9/02 NRC memo [20], Enc 4		IA G/L Ad Hoc		Industry believes that this does not require a new definition of burst or a change to the structural integrity performance criteria. We agree that this condition is significant and it will be addressed in the next revision of the IA guidelines	

***References:**

1. TAC No. MA9163, "*Indian Point Steam Generator Tube Failure Lessons-Learned Report*", October 23, 2000
2. RIS 200-22, "*Issues Stemming from NRC Staff Review of Recent Difficulties Experienced in Maintaining Steam Generator Tube Integrity"*, November 3, 2000
3. NRC (S Collins) memo to NRC (W Travers), "*Steam Generator Action Plan*", November 16, 2000
4. NEI (J Riley) e-mail to NRC (T Sullivan), "*, Industry responses to SGAP Items*", April 24, 2001
5. NEI (J Riley) e-mail to NRC (E Murphy), "*,SGAP Issue Write-ups*", August 1, 2001
6. NRC (E. Murphy) memo to NEI (J Riley), "*NEI Steam Generator Generic Change Package*"', August 2, 2001
7. EPRI (D Steininger) e-mail to the IIG, dated August 27, 2001, "*NRC CM Data Quality White Paper*"
8. NRC (E Murphy) e-mail to NEI (J Riley), dated August 30, 2001, "*Review of Industry Responses to Action Plan Issues*"
9. NRC Internal Memo (E.J. Sullivan to W.H. Bateman), dated September 18, 2001, "*NRC Staff Comments on Steam Generator Inspection Intervals*"
10. NRC (B Sheron) letter to NEI (A Marion) dated November 26, 2001, "*Potential for Plugged Steam Generator Tubes to Impact the Integrity of Active Tubes*"
11. NEI (A Marion) letter to the NRC (B Sheron) dated December 21, 2001, "*Generic Implications of the TMI Tube Sever Issue*"
12. NRC (B Bateman) letter to NEI (A Marion) dated January 25, 2002, "*Generic Implications of the TMI Steam Generator Tube Severance Issue*"
13. NEI (A Marion) letter to NRC (B Sheron), "*Industry Meeting With the NRC on January 31, 2002: B&W Owners Group Recommendations Regarding the TMI Steam Generator Tube Sever Condition",* February 14, 2002
14. NRC (W Bateman) letter to NEI (A Marion), dated February28, 2002, "*NRC Staff Question And Comments Concerning BWOG Short Term Recommendations Concerning Potential For Severing Plugged Tubes*"
15. NEI (A Marion) letter to NRC (B Sheron), "*Response to NRC Questions on the TMI Steam Generator Tube Sever Issue*", March 29, 2002
16. NRC (E Murphy) e-mail to NEI (J Riley), dated April 5, 2002, "*Review of Industry Responses*"
17. NRC (E Murphy) e-mail to NEI (J Riley), dated May 13, 2002, "*Updated Draft - Issue 8 fr RIS*"
18. NRC (C Casto) letter to NEI (R Beedle), dated June 10, 2002, *NEI SG Generic Change Package*
19. NEI (A Marion) letter to NRC (B Sheron), dated August 13, 2002, *Steam Generator Inspection Intervals and Non Destructive Examination Requirements*
20. NRC (L Lund) memo to NEI (J Riley), dated September 9, 2002, *NEI SG GLCP Tech Specs – Rev 6 of SG Exam G/L*
21. NRC (L Lund) memo to NEI (J Riley), dated September 20, 2002, *September 11, 2002 NRC Staff/NEI Public Meeting Regarding SG Issues. Resolution Status – Technical Issues Relating to NEI SG GLCP*

KEY TO TABLE HEADINGS

GP # = Group number. All issues have been re-grouped in the following 4 categories to facilitate review:

1. NDE Issues
2. Tube Integrity Issues
3. In-situ/Leakage Issues
4. NEI /Task Force

 # = Original running number (1 to 87) in the Table that NEI/Jim Riley provided

Pri. = Priority. The following priorities (1 to 3) had been assigned to many of the old/outstanding issues:

1. Requires resolution prior to final submittal of the GLCP.
2. Resolve prior to GLCP implementation or within approximately the next year.
3. Resolve as time permits and supporting issues are completed.

Reso. Resp. = Resolution Responsibility