

23-9

NRC/NEI/Industry Technical Meeting
Regulatory Framework Pertaining to SG Tube Integrity
February 10, 1999

Discussion of Technical Issues

J/205

High Priority Technical Issues
(i.e., Issues Associated with Proposed Requirements)

1. When may probabilistic structural criteria be used? (Risk issue)
2. What are the appropriate values of these criteria? (See item 5 below)
3. When is it appropriate to allow calculated accident leakage to exceed 1 gpm to a value consistent with that assumed in licensing basis accident analyses? (Risk issue)
4. What is appropriate definition of burst? (See item 2 below, responding to NEI response to NRC Comments on NEI 97-06 dated December 17, 1998)
5. Industry proposal in NEI December 17, 1998, letter to substitute "full power" for "normal operating conditions, including ..." in the deterministic structural performance criteria. (See item 1 below)
6. What are the appropriate reporting requirements? (See item 22 below)

Response to NEI Letter dated 12/17/99

Item 1, Deterministic Structural Performance Criteria

- Any description of performance criteria in tech specs or license conditions may delete reference to ASME Section III and simply refer to the factor of 3 and 1.4. Given that the staff is proposing to make this criteria a regulatory requirement, this criteria should be included in the NEI top-tier document.
- Industry guideline documents (e.g., tube integrity assessment guidelines) should note that in instances where interpretation of the factor of 3 and 1.4 criteria is complex (e.g., in cases of combined pressure, temperature, and external loading), the interpretation should include consideration of appropriate Section XI analogies (e.g., austenitic piping).
- We do not agree with the substitution of “full power” for “normal plant operating conditions, including startup, operation in the power range, hot standby, and cooldown, and all anticipated transients that are included in the plant design specification.” Tube integrity is important to safety in more than just “full power” modes of operation.
- We agree with the general words proposed concerning the treatment of uncertainties/variabilities, but believe these words should be in the top-tier NEI guideline document.

Item 2, Definition of Burst and Rupture

- Industry did not propose an alternative definition.
- Staff believes proposed definitions in DG-1074 are appropriate, but is willing to discuss any alternatives that industry may propose.

Item 3, Alternate Repair Criteria

- Industry response is conceptually OK. References cited (ASME Code, Section XI, Reference 6) may need to be revised to reflect outcome of regulatory framework issue and risk guidance.

Item 4, Risk-Informed Guidance

- Will be addressed by the NRC Probabilistic Safety Assessment Branch.

Item 5, Probabilistic Performance Criteria

- Staff disagrees with industry position on unknown defect types and continues to believe that the criteria should allow for these.
- Industry response did not provide a basis for not providing allowance for known defect types for which no probability of rupture has been calculated.
- Probabilistic criteria could have risk implications. The industry response did not address how their regulatory framework would allow for NRC review of a risk assessment to support use of such criteria on an SGDSM-specific basis.

Item 6, Accident Leakage Performance Criteria

- Industry response is acceptable.

Item 7, Accident Leakage Performance Criteria

- This issue is being addressed by the NRC Probabilistic Safety Assessment Branch.

Item 8, Tube Inspections

- Industry response does not address staff comment. EPRI examination guidelines give choice of two sampling strategies. One choice is prescriptive and the other is performance-based. If the existing prescriptive regulatory framework is to be replaced by one which is performance based, then industry guidelines should direct the user to the performance based examination guidelines. Such direction should be included in either the NEI top-tier document or the sub-tier examination guidelines.

Item 9, Deviation from EPRI Examination Guidelines

- Industry response is acceptable.

Item 10, NDE Validation

- Staff agrees EPRI Guidelines (Appendices G & H, Section 6) ensure NDE techniques and personnel for given application have adequate capability such that when implemented in conjunction with other elements of the SG program, reasonable assurance of tube integrity can be provided.
- Staff agrees that licensees may disposition tubes on the basis of flaw depth measurements when NDE techniques and personnel are qualified in accordance with the EPRI guidelines.
- As acknowledged by the industry in response to this item and item 15, qualification per the EPRI guidelines does not provide guidance for quantifying the flaw detection and sizing performance of the integrated NDE system (technique, personnel, data analysis procedures, process controls) as needed to support condition monitoring and operational assessments. This issue is addressed further under item 15 below.

Item 11, Active Degradation Mechanisms

- Industry response is acceptable

Item 12, Directive vs. Non-Directive Guidelines

- Staff agrees with rationale that guidelines should be non-directive until SGMP is satisfied that they are capable of performing as intended.

Item 13, Submittal of Non-Directive Guidelines

- Industry stated these guidelines will be provided to staff when ready to issue to the industry. Staff notes that licensees committed to implement these guidelines beginning January 1, 1999.
- The staff requests a copy of the non-directive guidelines as soon as possible.

The staff does not believe that all technical issues need to be resolved before the staff agrees to a new regulatory framework. There have been and will continue to be issues concerning the best way to ensure that tube integrity is being maintained. For this reason, the staff does not believe that it must be in a position to endorse the sub-tier guidelines at the time it

accepts a new regulatory framework. However, it would be beneficial to the staff and the industry if the staff has information concerning the approach industry will be following in order to have confidence in the industry program. The staff and the industry will need to continue to work together to address technical issues concerning these sub-tier guidelines both as part of the NRC/industry initiative to establish a new regulatory framework and beyond as experience and insight is gained concerning the effectiveness of these guidelines.

Item 14, Treatment of Uncertainties

- The industry response is acceptable. However, we do think “growth rates” and “NDE detection and measurement uncertainties” should be explicitly spelled out for purposes of clarification.

Item 15, NDE Sizing Measurements

- The staff believes that the sub-tier guidelines (e.g., tube integrity assessment guidelines) should provide guidelines for estimating detection and sizing performance for the integrated NDE system (technique, personnel, data analysis procedures, process controls, etc) for a given defect type. The industry response states that methods for accomplishing this task and the role of the EPRI guideline performance demonstrations (Appendices G & H and Section 6) in accomplishing this task will be determined on a plant-specific basis. Estimation of NDE detection and sizing performance is a key element of tube integrity assessments relative to tube integrity performance criteria. Guidelines would be beneficial in this area. The staff has previously cited a recent example (Sequoyah/Diablo) of where this issue has been successfully dealt with.

Item 16, Condition Monitoring and Operational Assessment

- Industry response is acceptable.

Item 17, Corrective Actions

- Industry response is acceptable.

Item 18, Tube Repair Limits

- Industry response appears inconsistent with response to item 3.
 - NRC approval is required by ASME Code vs. seeking NRC approval of any “first of a kind.” “First of kind” is vague.
- Tube repair criteria should not need to be regulatory requirements under a fully performance based approach. But in order to achieve this goal, guidance on the treatment of uncertainties and levels of conservatism to be implemented as part of condition monitoring and operational assessments should be developed. The industry stated in response to item 7 that such guidance is under development. Staff comments under item 15 above are also applicable to this item.

Item 19, Plug on Detection

- The NEI words “no depth sizing capability exists” should be clarified to say “no qualified depth sizing capability (per EPRI Appendices G & H, Section 6) exists.”

Item 20, Alternate Repair Criteria

- Industry response is conceptually OK. References cited (ASME Code, Section XI, Reference 6) may need to be revised to reflect outcome of regulatory framework issue and risk guidance.

Item 21, Tube Repair Methods

- Industry proposal to seek NRC approval for “first of kind” repair methods is vague and would not be a requirement (i.e., licensee could change this commitment under 50.59).
- Staff believes there is a continuing need for new sleeving methods to be reviewed and approved by NRC. ASME Code has been substantially upgraded in recent years in this area. However, new sleeving methodologies frequently involve additional technical issues not satisfactorily addressed by the Code including NDE inspectibility, plugging limits, IGSCC resistance, and accident leakage.

Item 22, Reporting Requirements (Not addressed in NEI letter date 12/17/98)

- Staff proposes:
 - 12 month report per DG-1074 (similar to NEI 97-06)
 - Failure of condition monitoring to satisfy the performance criteria shall be reported within 24 hours, with written followup report (with description of investigations as to cause and corrective actions taken) prior to restart. (Similar to DG-1074 and NEI 97-06)