

Initial NRC Comments on
EPRI 1022873, “Improved Basis
and Requirements for Break
Location Postulation”

U.S. Nuclear Regulatory Commission

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EPRI Proposal: Four-Phase Approach

- 1) **Initial Screening:** Screen out locations with low consequences of rupture.
- 2) **Degradation Mechanism Review:** Identify relevant damage mechanisms and screen out locations which can reasonably be demonstrated to have a slow rate of propagation, based on operating experience and literature review.
- 3) **Mitigation/Management:** Screen out locations which have damage mechanisms that can propagate rapidly, if it can be demonstrated that these mechanisms can be effectively mitigated.
- 4) **Probabilistic Risk Assessment:** Assess risk of failure for remaining locations/mechanisms against acceptance criteria.

Overall Comments

- Development of a risk-informed approach seems feasible, but the five principles of risk-informed decision making would need to be specifically evaluated.
- Report broadly describes the proposed method, but specific details need to be developed and these will be important for NRC to determine acceptability.
- The scope of a risk-informed approach will likely need to address all hazards, including the seismic hazard curve.
- Key assumptions and sources of uncertainty should be identified and justified for each phase (or an alternative to RG 1.174 criteria proposed).
- Current approach is risk-informed but a deterministic approach that incorporates risk-informed aspects may also be possible.

Informal Comments on Phase 1: Initial Screening

- Additional detail should describe how failure consequence is determined and causal variables are addressed
 - System operating conditions
 - Postulated break/crack locations
 - Failure type (e.g., crack or rupture)
 - Potential dynamic and environmental targets
 - Vulnerability and integrity of potential targets

Informal Comments on Phase 2: Degradation Mechanism Review

- Aspects of the review need to be formalized
 - Considering the full spectrum of postulated pipe failures
 - Determining the potential for rupture for each failure mechanism
 - Developing acceptance criteria for applicable slow-growing, non-rupture generating mechanisms
- Impact of existing or additional performance measurement strategies (e.g., periodic inspections, operational experience review) is an important consideration
 - Confirm active degradation mechanisms
 - Address potential consequences

Informal Comments on Phase 3: Mitigation/Management

- Appropriate crediting of mitigation and aging management programs is an important consideration to demonstrate that a degradation mechanism is effectively managed to ensure negligible failure risk.
- Effect on risk resulting from inspection sampling strategies need to be considered
- Existing or additional performance measurement strategies may be needed to confirm that a degradation mechanism is effectively managed.

Informal Comments on Phase 4: Risk Assessment

- Technical adequacy of the probabilistic risk assessment will need to be established.
- Risk associated with aspects which were screened out in Phases 1-3 may need to be considered.
- Performance measurement strategies may be needed to confirm key assumptions.

Path Forward

- NRC is amenable to considering a revision of current position on break location, including CUF criteria.
- It may be possible to use a deterministic or risk-informed approach as the basis for this revision.
 - Approach selected should consider industry need and targeted margin.
- Important to establish process for a proposed revision.
 - Define NRC and industry roles in basis development.
 - Identify implementation plan for licensees/applicants.