NUCLEAR ENERGY INSTITUTE

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December 17, 2004

Dr. P. T. Kuo
Program Director, License Renewal and Environmental Impacts
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

PROJECT NUMBER: 689

Dear Dr. Kuo:

On November 5, 2004, the NRC provided informal comments on NEI 95-10, Revision 4. We are enclosing our response to your comments to support your issuing a draft revision of the GALL report by January 31, 2005. This enclosure describes the nature of the response and provides the proposed text for the next revision of NEI 95-10. We will issue Revision 5 of NEI 95-10 following resolution of any remaining issues.

We can also utilize a portion of the meeting being planned for January 13, 2005 for addressing and resolving any remaining issues on NEI 95-10.

If you have questions or wish to further discuss our responses, please contact me (202-739-8080; am@nei.org) or Fred Emerson (202-739-8086; fae@nei.org).

Sincerely,

Alex Marion

Enclosure

c: Ken Chang, NRC
Jerry Dozier, NRC
Mark Lintz, NRC
NRC Document Control Desk

Enclosure

NEI 95-10 Revision 4
December 09, 2004 – Resolution of NRC Comments

Note editorial comments not listed will be incorporated

#	NRC Comment	Resolution
1	*Section 3.3 Documenting the Scoping Process* See Exhibit #1 for full text Applicant should submit: (1) drawings showing the mechanical components that are within the scope of license renewal in accordance with 10 CFR 54.4(a), (2) the system intended functions that meet 10 CFR 54.4(a), and (3) a list of components that are subject to aging management review	See Exhibit 1 for proposed change
2	*Table 4.1-1 Typical Passive Structure and Component Intended Functions* Add "Structural Support for Criterion (a)(1) equipment" with a description of "Provide structural support and/or functional support to safety related equipment"	Not accepted Table 4.1-1 currently includes "Structural Support" with a description of "Provide structural and / or functional support to safety-related components"
3	*Table 5.1-2 Potential TLAAs* Deleted GSI-190 Added GSI-168 Added additional plant specific TLAAs	Accepted
4	Appendix E Interim Staff Guidance Documents Numerous Updates based on 11-01-04 List See Markups in NEI 95-10	Accepted with the following modifications: - LR Guidance that incorporates the change has been indicated - Industry position for ISG-02 & ISG-03 retained
5	Appendix F Section 4.0 Non-Safety SSCs Directly Connected to	See Exhibit 2 for proposed change

	Safety-Related SSCs NRC requests revision of this section Full text of requested revision is in Exhibit 2	
6	Appendix F 5.2.2.2.1 High Energy Systems See Exhibit 2 highlighted sections	Accepted in part as indicated on Exhibit 2 A review of site specific operating experience is not required to verify assumptions. An absence of site OE could lead an evaluator to exclude non-safety high-energy piping. The guidance currently requires: "Non-safety high-energy piping with a potential for spatial interaction …..with vulnerable safety-related equipment that is not protected from the effects of a failure of the high energy line must be included within the scope of license renewal per 54.4(a)(2)."
7	Appendix F 5.2.2.2.2 Moderate/Low Energy Systems Add: "A review of site-specific operating experience should be performed to verify this assumption."	Not accepted A review of site specific operating experience is not required to verify assumptions. An absence of site OE could lead an evaluator to exclude non-moderate/low energy piping.
8	Appendix F 5.2.2.3 Non-Seismic and Seismic II/I Piping and Supports editorial change to add "during a seismic event" to the end of the first paragraph.	Not accepted Replaced "during a seismic event" with "as a result of aging". Need to determine the detrimental effects of aging on NSR SSC whose failure could prevent satisfactory accomplishment of any of the functions noted in 54.4(a)(1).
9	Appendix F 5.2.3.1 Exposure Duration NRC requests removal of this section Full text of NRC Comment is in Exhibit 2	NEI has considered the NRC position that the use of inspections, operator rounds, or other means of identifying age related degradation of NSR SSCs should not be used as a basis for excluding NSR SSCs from scope. Section 5.2.3.1 has been revised to focus on aging management considerations.

		See Exhibit 2 for proposed change.
10	Appendix F 5.2.3.2 Fail-Safe Components See Exhibit 2 italics sections	Accepted with editorial change ("the" deleted – see Exhibit 2)
11	Appendix F section 6.F (changes in italic) The results from the application of this methodology ~~*will*~~ *should* be plant specific (commodity lists, component lists, or boundary drawings, etc.), *included in the LRA* and ~~should be~~ documented in a retrievable and auditable form……	Accepted with editorial change Editorial indicated in original comment: the second "should be" was deleted.

Exhibit 1
NRC Comments on Boundary Drawings

NRC Comment (Full Text)
"To be consistent with NRC staff review guidance in SRP-LR, the NEI guidance document should also specify to include the scoping drawings. To facilitate NRC staff review, the applicants should submit (1) drawings showing the mechanical components that are within the scope of license renewal in accordance with 10 CFR 54.4(a), (2) the system intended functions that meet 10 CFR 54.4(a), and (3) a list of components that are subject to aging management review. The drawings showing only the components that require aging management review would not be sufficient to facilitate staff's scoping review.

The NRC staff reviews the scoping and screening in accordance with Section 2.3 of the Standard Review Plan for License Renewal (NUREG-1800). In its review, the staff first verifies whether all the components that have the intended functions as defined in 10CFR 54.4(a) (i.e., within the scope of license renewal, WSLR) are included without omission. In the second step, the staff verifies that all the passive and long-lived components being identified in the first step are included for an aging management review (AMR). In doing the first step, the staff uses the information Items (1) and (2), identified above, to test there have been no omissions of the SSCs WSLR. In doing the second step, the staff uses information Item (1) and (3), identified above, to test there have been no omissions of the SSCs subject to AMR. Although the scoping drawings are not required by the Rule, providing the scoping drawings facilitates an efficient staff review because the AMR boundary drawings represent only a portion of the components in the scoping boundary drawings. Simply reviewing the AMR boundary drawings precludes the staff from concluding that 10 CFR 54.4 are met without omission. Therefore, if the staff doesn't have the scoping drawings additional questions will be raised to reach the same conclusion that there were no omissions of the SSCs WSLR."

Proposed Change to NEI 95-10
Revise the last paragraph of section 3.3, Documenting the Scoping Process, to read as noted below. Changes are shown in italics.

Applicants have typically provided *mechanical system* drawings to the NRC concurrent with the application. The drawings are generally not a part of the application and are submitted only to facilitate NRC staff review. ~~*Some applicants have submitted drawings showing the mechanical components that are within the scope of license renewal. Others have submitted drawings showing the mechanical components that require aging management review. Both approaches have been found acceptable by the NRC staff. The applicant should discuss their drawing format with the NRC prior to submittal to ensure the drawing format provides information that facilitates NRC staff review.*~~ *The NRC staff reviews the scoping and screening in accordance with Section 2.3 of the Standard Review Plan for*

License Renewal (NUREG-1800). To facilitate NRC staff review, the applicants should submit drawings showing the mechanical components that are within the scope of license renewal in accordance with 10 CFR 54.4(a), and in addition, system functions that meet 10 CFR 54.4(a) should also be identified.

Exhibit 2
Appendix F Changes

4.0. Non-Safety SSCs Directly Connected to Safety-Related SSCs

Proposed NRC revision (full text)
"For non-safety SSCs directly connected to safety-related SSCs (typically piping systems), the non-safety piping and supports, up to and including the first equivalent anchor beyond the safety/non-safety interface, are within the scope of license renewal per 54.4(a)(2). For this purpose, the "first equivalent anchor" is defined such that the failure in the non-safety related pipe run including the first equivalent anchor will not render the safety-related portion of the piping unable to perform its intended function under CLB design conditions.

4.1 In order to comply, in part, with the requirements of 10 CFR 54.4(a)(2), all applicants must include all NSR piping attached directly to SR piping in scope up to and including a defined anchor point consistent with the plant CLB. This anchor point may be served by a true anchor (i.e., a device or structure that ensures that forces and moments are restrained in three (3) orthogonal directions) or an equivalent anchor, such as a large piece of plant equipment (e.g., a heat exchanger), determined by an evaluation of the plant-specific piping design (e.g., design documentation such as piping stress analysis for the facility).

4.2 All applicants should be able to provide a definition for equivalent anchor consistent with their CLB (e.g., described in the UFSAR or other CLB documentation), that is being credited for the 10 CFR 54.4(a)(2) evaluation, and also be able to describe the structures and components that are part of the NSR piping segment boundary up to and including the anchor point or equivalent anchor point within scope of the rule.

4.3 There may be isolated cases where an equivalent anchor point for a particular piping segment is not clearly described within the existing CLB information. In those instances, the applicant may use a combination of restraints or supports such that the NSR piping and associated structures and components attached to SR piping is included in scope up to a boundary point that encompasses at least two (2) supports in each of three (3) orthogonal directions."

Proposed Revision to NEI 95-10 Appendix F

For non-safety SSCs directly connected to safety-related SSCs (typically piping systems), the non-safety piping and supports, up to and including the first seismic or equivalent anchor beyond the safety/non-safety interface, are within the scope of license renewal per 54.4(a)(2). For this purpose, the applicant must define the "first seismic or equivalent anchor" such that the failure in the non-safety related pipe run beyond the first seismic or equivalent anchor will not render the safety-related portion of the piping unable to perform its intended function under CLB design conditions. The applicant must be able to describe the structures and components that are part of the NSR piping segment up to and including the first seismic or equivalent anchor. The following apply:

4.1 A seismic anchor is defined as a device or structure that ensures that forces and moments are restrained in three (3) orthogonal directions.

4.2 An equivalent anchor may be defined in the CLB (i.e., UFSAR or other CLB documentation) and thus can be credited for the 10 CFR 54.4(a)(2) evaluation.

4.3 An equivalent anchor may also consist of a large piece of plant equipment (e.g., a heat exchanger) or a series of supports that have been evaluated as a part of a plant-specific piping design analysis to ensure that forces and moments are restrained in three orthogonal directions.

4.4 There may be isolated cases where an equivalent anchor point for a particular piping segment is not clearly described within the existing CLB information or original design basis. In those instances, the applicant may use a combination of restraints or supports such that the NSR piping and associated structures and components attached to SR piping is included in scope up to a boundary point that encompasses at least two (2) supports in each of three (3) orthogonal directions.

4.5 In the event the applicant chooses not to determine the exact location of an equivalent anchor, the following approach may be used to establish conservative end points such that the equivalent anchor is encompassed. The following approach would normally extend the LR boundary to points such as:

4.5.1 A base mounted component (e.g., pump, heat exchanger, tank, etc.) – including the base mounted component, or

4.5.2 A flexible connection, or

4.5.3 Another SR component, or

4.5.4 A point where buried piping exits the ground, or

4.5.5 A smaller branch line where the moment of inertia of the larger piping to the smaller piping is ≥ 10 (or as specified in your original design basis), or

4.5.6 The end of the piping run when the above does not apply (e.g., a drain line).

5.2.2.2.1. High-Energy Systems

A high-energy system, without regard to seismic classification, is defined in each plant's CLB, either as a system that operates >200°F and >275 psig, or that operates >200°F or >275 psig. Physical impacts resulting from piping failures, pipe whip and jet impingement are credible only with high-energy systems. Industry experience has shown that physical impacts can occur due to high-energy piping failures caused by flow-accelerated corrosion. ~~A review of site-specific operating experience should be performed to verify this assumption.~~ The effects of spray and harsh environment also need to be considered.

Non-safety high-energy piping with a potential for spatial interaction (pipe whip, jet impingement, physical impacts due to high energy system pipe ~~falling~~ failure due to FAC. ~~failures~~, spray or harsh environment) with vulnerable safety-related equipment that is not protected from the effects of a failure of the high energy line must be included within the scope of license renewal per 54.4(a)(2).

See Section 5.2.3 for definitions of vulnerable equipment.

5.2.3.2. Fail-Safe Components

Some safety-related components are fail-safe by design. Fail-safe components are components whose failure (through interaction with the failed NSR SSC) cannot prevent the accomplishment of the safety-related intended function. Fail-safe devices may not be vulnerable because their function may be accomplished as a result of their failure. As long as the NSR SSC failure causes the SR SSC to attain its fail-safe state, the NSR SSCs would NOT be considered in scope for 54.4(a)(2). *If an applicant chooses to utilize this position, ~~the~~ justification should be provided that failure of the NSR SSC would not result in a failure of the SR SSC to attain its fail-safe state. The current licensing basis , plant specific operating experience or industry operating experience can be used in the justification.* If an applicant chooses to utilize this position, it should be documented in a retrievable and auditable form.

5.2.3.1 Exposure Duration

NRC Comments for NEI
(NRC proposes approach as one possible method of managing Aging)

"In section 5.2.3.1, "Exposure Duration," NEI appears to link exposure duration to the frequency of inspection opportunity. NEI states, "For example, short-term exposure may be considered less than one fuel cycle for an SSC in primary containment that is only accessible during an outage." NEI then states that short-term exposure would not cause the failure of a pressure boundary intended function. An opportunity for inspection does not equate to an actual inspection. A licensee should demonstrate that an SSC is actually inspected, rather than demonstrating that the SSC is "accessible" periodically. Furthermore, it is not clear that a short-term exposure definition based only on opportunity for inspection would preclude pressure boundary failure or any other plausible failures. For example, in 18 months (a typical refueling cycle) boric acid may be capable of compromising the pressure boundary of a carbon steel component. It seems that the definition of short-term exposure should be based on an evaluation of the material/environment combination and the frequency of inspection.

Importantly, the use of inspections, operator rounds, or other means of identifying age related degradation of NSR SSCs should not be used as a basis for excluding NSR SSCs from scope. Rather such strategies or programs could, in combination with additional aging management programs, provide a reasonable approach to managing aging effects of NSR SSCs whose failure could prevent or adversely affect SR SSCs. As a result those NSR SSCs should be brought into scope and evaluated to determine what combination of AMPs are appropriate for managing the applicable aging effects.

Dialog with several recent license renewal applicants on this subject has resulted in several applicants revising their 10 CFR 54.4(a)(2) scoping evaluations to include NSR SSCs that could potentially interact (spraying or wetting) with both passive and active SR SSCs.

As an example, Exelon recently provide a revised description of their 10 CFR 54.4(a)(2) scoping evaluations which states, in part,

> *Exelon has revised the methodology utilized in the scoping of non safety related moderate energy piping systems that have the potential to spatially interact with safety related systems. Specifically, Exelon has eliminated the 20 foot separation criterion previously utilized to exclude moderate energy systems from the scope of License Renewal. The revised methodology assumes that all safety related components, active as well as passive, could be adversely affected by spray or wetting from a non safety moderate energy system located in the same general area of the plant. As such, early detection of leakage was also eliminated from the revised scoping methodology.*
>
> *Under the revised scoping methodology, all components from moderate energy non-safety related systems located in the same general area as a safety related component (active or passive) will be included within the scope of license renewal. General area is defined as the same floor (elevation) of a major building with no barrier walls between the fluid source and the safety related component. Barrier walls were defined as barriers that form the boundary of a room on the same elevation of a major building separating the safety related components from a spray or leak generated by a non safety related component located on the other side of the barrier wall.*

Additionally, the arguments that certain SR SSCs may not be susceptible to short term exposure is already treated under section 5.2.3.3, Components Qualified/Designed for Environment. As such, applicants that can provide technical justification that a SR SSC will not be susceptible to exposure from expected fluid-filled spray or leakage based on qualification or design, can exercise this option as part of their scoping strategy.

The staff believes a removal of Section 5.2.3.1, Exposure Duration, is warranted given the points discussed above and the recent staff/applicant interactions on the subject."

Proposed Revision to NEI 95-10 Appendix F

Exposure duration can be used in the screening/evaluation process to determine the need for aging management. The failure of an in scope NSR SSC (e.g., spray or leakage) will normally not result in a prolonged change in the environmental conditions in the general area of SR equipment since normal housekeeping, maintenance and operation practices in most areas of a plant typically identify

and restore failures in a reasonable amount of time. Short-term exposure to spray or leakage from a failed NSR SCC could result in a loss of intended function for unprotected and/or unshielded electrical equipment such as a SR motor or switchgear, but would normally not result in a loss of pressure boundary for a passive component such as a pipe or valve due to its inherent ruggedness.

Exceptions to this argument can include inaccessible areas, areas that are not frequented because of radiological conditions (e.g, containment), and where plant-specific operating experience has shown continued operation under changed environmental conditions. As such, fluid-containing NSR SSCs in the general area of SR equipment (both active and passive) could result in a loss of intended function and would normally be conservatively considered in the scope of license renewal for 54.4(a)(2). However, subsequent license renewal evaluations can reasonably be focused on NSR system components near unprotected and unshielded electrical equipment, in inaccessible or limited access areas, and where plant-specific operating experience has shown continued operation with the conditions of normal operation changed by a failed NSR SSC. A technical basis showing that the duration of a leak in a fluid-bearing NSR SSC in a given space may be insufficient to cause a failure of a SR SSC in the same space should be developed when excluding SSCs from aging management. Any technical position developed regarding exposure duration should be documented in a retrievable and auditable form and should discuss one or more of the following:

a. The duration of the leak from the fluid-bearing NSR component.
b. The actual frequency of inspection of the space containing the NSR and SR SSCs.
c. The amount of and type of fluid that can leak from the NSR SSC (some NSR systems will have only small volumes of fluid or may contain boric acid or salt water).
d. The capacity of the plant to detect the leak with equipment that is within the scope of 10 CFR 54.4(a).
e. Plant and industry operating experience with regard to leaks, in general, and to leaks in the specific space.
f. The ability of the plant to convey the leaking fluids away from the SR SSCs with SSCs that are in the scope of 10 CFR 54.4(a); e.g. in-scope drains, open gratings, etc.
g. The aging management program for the exterior surface of the SR SSCs, if any.
h. The impact of contact between the SR SSC and the leaking fluid such as borated or salt water for the exposure duration, including corrosion rates and equipment qualification for the post-leak environment, if available. See also 5.2.3.3, below.