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**Docket:** NRC-2018-0028

Draft Flood Penetration Seal Performance at Nuclear Power Plants Literature Review (Task 1.1) and Test Methodology (Task 1.2)

**Comment On:** NRC-2018-0028-0001

Draft Flood Penetration Seal Performance at Nuclear Power Plants; Literature Review (Task 1.1) and Test Methodology (Task 1.2)

**Document:** NRC-2018-0028-DRAFT-0003

Comment on FR Doc # 2018-03340

## Submitter Information

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## General Comment

See attached file(s)

## Attachments

PT-032018-140 EPRI Public Comments on Flood Seal Test Plan

83 FR-7239

2/20/2018

SUNSI Review Complete  
Template = ADM - 013  
E-RIDS= ADM-03  
Add= Mark H. Salley (MX53)

March 20, 2018  
PT-032018-140

Ms. May Ma  
Office of Administration  
Mail Stop: TWFN-7-A60M  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Subject: EPRI Comments on Task 1.1 and Task 1.2 of the project entitled, "Flood Penetration Seal Performance at Nuclear Power Plants," Docket ID NRC-2018-0028

Dear Ms. Ma:

Thank you for the opportunity to provide comments on the subject Task 1.1 and Task 1.2 of the project entitled, "Flood Penetration Seal Performance at Nuclear Power Plants." The comments in Attachment 1 contain general and specific recommendations on the subject matter.

We appreciate the NRC staff's consideration of the attached comments. If you have any questions concerning this letter or the attached comments, please contact Hasan Charkas at 704-595-2645 or via [hcharkas@epri.com](mailto:hcharkas@epri.com).

Sincerely,



Kelli Voelsing  
Program Manager  
Risk and Safety Management

c: Mr. Thomas Aird, RES/DRA/FXHAB, NRC  
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PT-032018-140

Attachment 1 – EPRI Comments on Task 1.1 and Task 1.2 of the project entitled, "Flood Penetration Seal Performance at Nuclear Power Plants," Docket ID NRC-2018-0028"

**PT-032018-140 - Attachment 1:  
EPRI comments on  
“Flood Penetration Seal Performance at Nuclear Power Plants”**

General Comments:

Comment	Recommendation
<p>The flood seal testing methodology is written as if it could be used by a manufacturer to validate a defined leakage rating (Enclosure 1, Section 1.2.1) or by an end user, such as a nuclear power plant operator or regulator, to assess particular seal configurations for defined flood scenarios (Enclosure 1, Section 1.2.2). However, the methodology specifically avoids potential effects that might be needed to assess a particular flood event. These effects include debris impacts, vibration, and aging, which are specifically called out in Appendix B (Section B-3) as being outside the scope of the testing methodology. As a result this testing methodology does not seem well suited to be used by an end user to evaluate how a particular seal configuration would perform in a given flood event.</p>	<p>Clearly state the purpose of the methodology at the beginning of the document and the purpose of the test protocol. For example, the sentence in Appendix B that states, in part, “This methodology is not intended to be an NRC-approved standard test method...” should come at the beginning of the document. This new text should either be in the Discussion section or in a new section prior to the Discussion section of the main document.</p> <p>Clarify the limitations in using this document for an end user attempting to assess the performance of a particular flood barrier seal for specific flood scenarios. This clarification should be contained in the same section with the above recommendation.</p> <p>Address the plan for follow-on research to include additional factors that would allow an end user to assess particular flood penetration seal configurations for particular flood scenarios.</p>
<p>There is a concern that the testing protocol is limited to a specific vendor. As stated on page 2, NUVIA Corporation is a manufacturer of flood-rated penetration seals and is a member of the team developing this testing protocol. Also, page 2 states that the test apparatus used by NUVIA formed the basis for the template. No discussion of alternative testing apparatus protocols is provided.</p>	<p>A discussion of other test apparatus protocols that were evaluated and how they compared to the proposed NUVIA testing apparatus should be included in the plan. It would be particularly useful to include alternate test setups that are also acceptable.</p>

Specific Comments

Section	Comment	Recommendation
Enclosure 1, Section 1.5.	The discussions related to the establishment of specified duration to mimic flooding is unclear and is missing detail on who is responsible to establish the process for determining the designated pressures and duration.	Recommend adding a discussion similar to Section 1.4 to clearly define the method of establishing the "specified duration" and the responsibilities of manufacturers and end users.
Enclosure 1, Section 1.7.	The text states "...testing for appropriate use in flood-rated barriers having specific, analyzed flood-resistance performance parameters." The intended applicability or non-applicability of this testing protocol to those seals rated first for fire barrier protection with a secondary function of flood mitigation is not clear.	Recommend adding a statement to clarify whether fire barrier protection assemblies are included in this section.
Enclosure 1, Sections 3.3 and 3.8.	These sections specify a make-up system for the chamber.	Recommend adding specification for measuring the leakage rate and using the makeup rate or rate of loss from the makeup chamber for corroboration of measured leak rate.
Enclosure 1, Section 3.4.	There are no specific discussions on how the duration of event will be analyzed or measured.	Recommend adding specification to include a measuring device for the specified duration of the test.
Enclosure 1, Section 3.5.	Appendix A does not indicate an external pressure gauge.	Recommend adding an external pressure gauge symbol on the drawing.
Enclosure 1, Section 3.6.	For the reader, this section is hard to visualize without a drawing showing the expected configuration for this arrangement.	Recommend adding a figure for this configuration.

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Section	Comment	Recommendation
Enclosure 1, Section 4.4.	It is not clear what are acceptable techniques for "sealing" the hollow spaces.	Recommend adding specifications for acceptable sealing techniques of hollow spaces.
Enclosure 1, Section 4.8.	It is not clear what the reference standards used for determining moisture content for the installed penetration seal assemblies/materials are.	Recommend adding a reference for the values provided for end users.
Enclosure 1, Section 5.1.	Based on these requirements, the manufacturer needs to specify the environmental conditions (range of temperatures and relative humidity) each seal type is qualified for. Additional testing should, therefore, only need to be carried out if the conditions are exceeded.	Recommend specifying that the manufacturer list testing conditions and range of parameters in which the seal type is qualified for.
Enclosure 1, Section 5.3.	The meaning of "standard industry practice" as used is not clear. Does this mean to follow the seal manufacturer's requirements for installing the seal?	Recommend adding a reference for standard industry practice or adding clarifying statements to explain what is acceptable.
Enclosure 1, Section 5.4.	If other than air pressure is used then venting may still leave an ambient amount of air in the chamber before anything else is used to pressurize the chamber. Evacuating the chamber to ensure complete removal of air could have a detrimental effect on the penetration/seal assemble.	Recommend adding specification on how the end user of this protocol should ensure proper venting of the chamber.
Enclosure 1, Section 5.5.	There are multiple types of flooding events. The term event could be confused with source of flooding in PRA.	Recommend replacing the word "event" by "scenario". Since this section is intended to mimic pressure and rate at which it is achieved.

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Section	Comment	Recommendation
Enclosure 1, Section 5.6.	Visual examinations frequency has not been specified.	Recommend specifying the minimum acceptable frequency of the visual examination, since the tests are expected to be carried out for the expected duration of a flooding event.
Enclosure 1, Section 5.7.	Each flooding event may be unique with respect to the location and type of event, such as a dam breach versus local intense precipitation. This raises the question as to how different scenarios should be considered or whether there should be bounding criteria established.	Recommend adding rate(s) for which pressure may be applied. If a bounding criteria is chosen, then it should be made clear in the testing and results that it was in fact based on a bounding limit.
Enclosure 1, Section 5.8.	The methodology does not discuss acceptable methods for measuring the leak rate.	The protocol should be updated to clarify how the leakage rate is determined and whether the leakage rate is being measured as a function of pressure applied as described in Section 5.7.
Enclosure 1, Section 5.9.	It is not clear whether there is a minimum expected duration for each test.	Recommend adding discussion of the minimum expected durations and minimum expectations for each test.
Enclosure 1, Section 6.1.4.	This section stipulates that a summary of results or data acquisition printout be included that requires only pressure and leakage data as a function of time (duration). This should be compared against manufacturer's criteria/data. See also comments on sections 5.2, 6.1.2.1, 6.1.3, and 6.1.6.2.	Recommend adding a comparison of the data acquisition against manufacturer criteria/data.

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Section	Comment	Recommendation
Enclosure 1, Section 6.1.6.2.	It is not clear how it is determined that leakage rates have stabilized since makeup rate and pressure can both vary during the test.	If stable leakage rates are necessary for defining the test duration, explain criteria that define a stable leakage rate. An example may be useful here.
Enclosure 1, Section 6.1.6.3.	Given the comment above, is there termination criteria for a test at a certain point if stabilization is not attained?	Recommend specifying a criterion to demonstrate leakage rate stabilization.
Enclosure 1, Section 6.1.6.4.	It is not clear how detailed this statement needs to be and what specific supporting information should be included.	Recommend supporting the statement with data from the test and describe conditions associated under which the statement is made. It is further suggested that an example statement of flood resistance performance with the associated supporting information and parameters could be included.
Appendix B, Section B-3 Criteria. Fourth paragraph.	It is not clear how seal leakage versus water removal capabilities during a flood event are to be evaluated in order to demonstrate successful flood mitigation.	Recommend adding description of how to utilize this data to accomplish the evaluation.
Appendix B, Section B-4 Test Sample.	First paragraph states "...shall be representative." It is not clear how the test samples will be selected to assure they are "representative." The section only discussed variation in configuration and omitted seal types.	Recommend adding guidelines on how to select representative configurations and seal types.

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Section	Comment	Recommendation
Appendix B, Section B-4 Test Sample.	Last paragraph. If the "...tested configurations may not be representative of "worst case" field conditions," is a good caution to the end user however, more guidance is needed to determine if the test data is valid and can be used for flood risk evaluations.	Recommend adding criteria for when a limitation should be considered and an acceptable method/guidance for addressing the limitation in the flood risk evaluation.