



SECRETARY

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

December 4, 2018

COMMISSION VOTING RECORD

DECISION ITEM:                   SECY-18-0096

TITLE:                               FUNCTIONAL CONTAINMENT PERFORMANCE CRITERIA FOR  
NON-LIGHT-WATER-REACTORS

The Commission acted on the subject paper as recorded in the Staff Requirements Memorandum (SRM) of December 4, 2018.

This Record contains a summary of voting on this matter together with the individual vote sheets, views and comments of the Commission.

A handwritten signature in blue ink that reads "Annette L. Vietti-Cook".

Annette L. Vietti-Cook  
Secretary of the Commission

Enclosures:

1. Voting Summary
2. Commissioner Vote Sheets

cc: Chairman Svinicki  
Commissioner Baran  
Commissioner Burns  
Commissioner Caputo  
Commissioner Wright  
OGC  
EDO  
PDR

VOTING SUMMARY – SECY-18-0096

RECORDED VOTES

	<u>APPROVED</u>	<u>DISAPPROVED</u>	<u>ABSTAIN</u>	<u>NOT PARTICIPATI NG</u>	<u>COMMENTS</u>	<u>DATE</u>
Chrm. Svinicki	X				X	10/30/18
Cmr. Baran	X				X	11/29/18
Cmr. Burns	X				X	11/16/18
Cmr. Caputo	X				X	11/28/18
Cmr. Wright	X				X	11/28/18

**NOTATION VOTE**

**RESPONSE SHEET**

**TO:** Annette Vietti-Cook, Secretary  
**FROM:** CHAIRMAN SVINICKI  
**SUBJECT:** SECY-18-0096: Functional Containment Performance  
Criteria for Non-Light-Water Reactor Designs

Approved XX Disapproved \_\_\_\_\_ Abstain \_\_\_\_\_ Not Participating \_\_\_\_\_

COMMENTS: Below XX Attached \_\_\_\_\_ None \_\_\_\_\_

I approve the staff's proposed methodology for establishing functional containment performance criteria for non-light-water-reactors (non-LWRs). The staff's detailed description of the proposed methodology contained in Enclosure 2 of the paper appears reasonable and draws upon both the NRC's historic consideration of functional containment concepts and the work of the Licensing Modernization Project. The proposed methodology is intended to be made available to designers for their use in evaluating certain design choices or aspects of their designs with respect to the identification and analyses of possible licensing-basis events. As designers mature their designs, certain design attributes require an ability to assess tradeoffs between possible benefits and costs for various design features, as well as possible operating and maintenance costs for prevention and mitigation alternatives. In light of this, the methodology is needed to provide a regulatory foundation for the staff's continued progress on interrelated activities associated with developing a framework for licensing non-LWR designs. The staff should notify the Commission if future policy issues arise as this work progresses.

  
\_\_\_\_\_  
SIGNATURE

10/30/18  
\_\_\_\_\_  
DATE

Entered on "STARS" Yes  No \_\_\_\_\_

**NOTATION VOTE**

**RESPONSE SHEET**

**TO:** Annette Vietti-Cook, Secretary  
**FROM:** Commissioner Baran  
**SUBJECT:** SECY-18-0096: Functional Containment Performance  
Criteria for Non-Light-Water Reactor Designs

Approved  Disapproved  Abstain  Not Participating

**COMMENTS:** Below  Attached  None

**Entered in "STARS"**

Yes

No

  
\_\_\_\_\_  
**SIGNATURE**

11/29/18  
\_\_\_\_\_  
**DATE**

**Commissioner Baran's Comments on SECY-18-0096,  
"Functional Containment Performance Criteria for Non-Light-Water Reactors"**

One of the fundamental safety functions of a nuclear reactor is to limit the release of radioactive materials from the facility into the environment. The entire U.S. fleet of light-water reactors uses a leak-tight, steel-reinforced concrete containment structure around the reactor to meet this basic safety requirement. However, as the staff paper explains, non-light water reactor designs may have operating conditions, coolants, and fuel types that differ from the light water reactors in ways that "may allow or possibly require different approaches to fulfilling the safety function of limiting the release of radioactive materials." As a result, the staff recommends developing performance-based "functional containment" standards that would allow non-light-water reactors to rely on one or more alternative barriers to limit the release of radioactive materials instead of a traditional containment structure.

I have no objection to this general concept, provided that NRC requires an applicant to demonstrate that the particular functional containment mechanism being relied on is as at least as safe as a traditional containment. As the Advisory Committee on Reactor Safeguards explained, the methodology proposed by the staff "remains a rough description of what will eventually be needed," using it to develop functional containment performance criteria "is no easy task, and implementing them to ensure sufficient reliability of functional containment may be even more difficult."<sup>1</sup> If adequate functional containment performance criteria can be developed and implemented, non-light-water reactor vendors would have more regulatory clarity during the design stage. Therefore, I approve further development of the proposed methodology for functional containment performance criteria for non-light-water reactors.

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<sup>1</sup> Letter from Michael L. Corradini, Chairman, Advisory Committee on Reactor Safeguards to Chairman Svinicki (May 10, 2018).



NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary  
FROM: Commissioner Caputo  
SUBJECT: SECY-18-0096: Functional Containment Performance  
Criteria for Non-Light-Water Reactor Designs

Approved  Disapproved  Abstain  Not Participating

COMMENTS: Below  Attached  None

Entered in STARS

Yes

No

  
\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

11/28/18

**SECY-18-0096**  
**AXC Comments**

Non-LWR technologies have operating conditions, coolants, and fuel forms that differ dramatically from current LWRs and therefore, presents different approaches to providing a set of barriers that would limit the physical transport of radioactive materials. To that end, the staff has proposed a methodology that could be used by non-LWR designers to define containment performance criteria in a manner that is risk informed, performance based and technology inclusive. The staff's description of the proposed methodology found in Enclosure 2 of the paper appears reasonable and supported by previous Commission direction. Therefore, I approve the staff's proposed methodology for establishing functional containment performance criteria for non-LWRs.

As the ACRS noted in their May 2018 letter to the Chairman, the staff's methodology is worthy of further development and if successfully developed could provide a rational basis for developing functional containment performance criteria for new designs. They also note that the details of how the analysis would proceed remain to be specified. However, it is important that the Commission provide designers of non-LWRs a methodology for use that would permit them to evaluate design tradeoffs between possible benefits and costs for various design features, as well as possible operating and maintenance costs.

While I support the staff's conceptual methodology to employ a risk-informed performance based process, I consider the design objective frequency-consequence values to be problematic. The staff has stated that the design objective values are "not to be considered as a demarcation of acceptable and unacceptable results" and the staff did not ask for the Commission to approve the design objective curve in the paper before us. Nonetheless, I cannot support design objective frequency-consequence values that would exceed the NRC safety goals as an acceptable design objective. The staff has stated that there are other factors that would not let a designer employ values on the lower right portion of the curve; however, there is nothing in the provided methodology that would require a designer to do something if the designer finds themselves in the lower right portion of the curve. The staff notes that there are continuing interactions with stakeholders related to such things as lower bounds for event frequencies and establishing specified acceptable radionuclide release design limits. I await further discussion on design objectives and other technical topics as part of the Licensing Modernization Project activities coming to the Commission in a future paper.

I agree with the sentiments expressed by Commissioner Burns that licensing a plant under functional containment performance criteria will be a major change in the implementation of our licensing requirements. For that reason, I support the view that the staff should continue to keep the Commission informed of progress in developing the licensing framework for non-LWRs and should notify the Commission if future policy issues arise as the work progresses.



**NOTATION VOTE**

**RESPONSE SHEET**

**TO:** Annette Vietti-Cook, Secretary  
**FROM:** Commissioner Wright  
**SUBJECT:** SECY-18-0096: Functional Containment Performance Criteria for Non-Light-Water Reactor Designs

Approved  Disapproved  Abstain  Not Participating

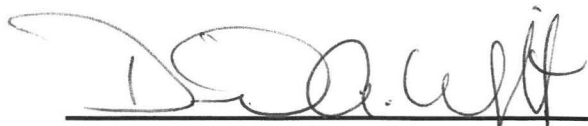
**COMMENTS:** Below  Attached  None

I approve the staff's proposed methodology for establishing functional containment performance criteria for non-light-water reactors (non-LWRs). As the staff notes, non-LWR technologies have operating conditions, coolants, and fuel designs that differ from LWRs, and these differences may allow or even require different approaches for limiting the release of radioactive materials. Building on prior Commission direction, the staff proposes a risk-informed, performance-based approach for developing functional containment performance criteria that further advances the NRC's and industry's efforts to modernize the licensing framework for non-LWRs. Specifically, the staff's proposed approach provides an integrated framework that starts with identifying and categorizing licensing-basis events and leads to the definition of appropriate performance criteria for the structure, systems, and components as well as programmatic controls needed to appropriately limit the release of radioactive materials for each event category. This process provides flexibility for the designer to choose design features to retain radioactive materials. These design features may or may not include a building enclosing the reactor. I believe the staff's proposed methodology provides a reasonable approach for reactor designers to determine design-specific functional containment performance criteria. This proposed approach allows for consideration of a design's unique attributes and risk insights and provides appropriate flexibility in preventing or mitigating plant transients and accidents.

The staff should continue to keep the Commission informed as it develops the licensing framework for non-LWRs and should notify the Commission if future policy issues arise as this work progresses.

**Entered in STARS**

Yes   
No

  
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**Signature**  
11/28/18  
\_\_\_\_\_  
**Date**