

## NON-CONCURRENCE PROCESS COVER PAGE

The U.S. Nuclear Regulatory Commission (NRC) strives to establish and maintain an environment that encourages all employees to promptly raise concerns and differing views without fear of reprisal and to promote methods for raising concerns that will enhance a strong safety culture and support the agency's mission.

Employees are expected to discuss their views and concerns with their immediate supervisors on a regular, ongoing basis. If informal discussions do not resolve concerns, employees have various mechanisms for expressing and having their concerns and differing views heard and considered by management.

Management Directive, MD 10.158, "NRC Non-Concurrence Process," describes the Non-Concurrence Process (NCP), <http://nrcweb.nrc.gov:8600/policy/directives/catalog/md10.158.pdf>.

The NCP allows employees to document their differing views and concerns early in the decision-making process, have them responded to (if requested), and attach them to proposed documents moving through the management approval chain to support the decision-making process.

NRC Form 757, "Non-Concurrence Process" is used to document the process.

Section A of the form includes the personal opinions, views, and concerns of a non-concurring NRC employee.

Section B of the form includes the personal opinions and views of the non-concurring employee's immediate supervisor.

Section C of the form includes the agency's evaluation of the concerns and the agency's final position and outcome.

NOTE: Content in Sections A and B reflects personal opinions and views and does not represent official factual representation of the issues, nor official rationale for the agency decision. Section C includes the agency's official position on the facts, issues, and rationale for the final decision.

At the end of the process, the non-concurring employee(s):

- Concurred
- Continued to non-concur
- Agreed with some of the changes to the subject document, but continued to non-concur
- Requested that the process be discontinued
- The non-concurring employee(s) requested that the record be non-public.
- The non-concurring employee(s) requested that the record be public.
- This record is non-public and for official use only.
- This record has been reviewed and approved for public dissemination.



**NON-CONCURRENCE PROCESS**

NCP-2015-010

**SECTION A - TO BE COMPLETED BY NON-CONCURRING EMPLOYEE**

TITLE OF SUBJECT DOCUMENT 10 CFR 50.46c: Emergency Core Cooling Systems Performance During Loss-of-Coolant Accidents		ADAMS ACCESSION NO. ML15238A947
DOCUMENT SIGNER Victor McCree		SIGNER TELEPHONE NO. (301) 415-1700

TITLE Executive Director of Operations	ORGANIZATION NRC
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NAME OF NON-CONCURRING EMPLOYEE(S) Steven A. Laur	TELEPHONE NUMBER (301) 415-1465
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TITLE Sr. Reliability & Risk Analyst	ORGANIZATION NRR/DRA/APLA
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DOCUMENT AUTHOR    
  DOCUMENT CONTRIBUTOR    
  DOCUMENT REVIEWER    
  ON CONCURRENCE

NON-CONCURRING EMPLOYEE'S SUPERVISOR  
Stacey Rosenberg

TITLE Chief, PRA Licensing Branch	ORGANIZATION NRR/DRA/APLA
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I WOULD LIKE MY NON-CONCURRENCE CONSIDERED AND WOULD LIKE A WRITTEN EVALUATION IN SECTION B AND C.  
 I WOULD LIKE MY NON-CONCURRENCE CONSIDERED, BUT A WRITTEN EVALUATION IN SECTIONS B AND C IS NOT NECESSARY.

WHEN THE PROCESS IS COMPLETE, I WOULD LIKE THE NCP FORM:    
 PUBLIC    
 NON-PUBLIC

REASONS FOR NON-CONCURRENCE AND PROPOSED ALTERNATIVES (use continuation pages or attach Word document)

The final draft rule, 10 CFR 50.46c, includes in paragraph (e) an alternate risk-informed approach for addressing the effect of debris on long-term core cooling. The Commission directed the staff to include this alternative approach to address Generic Safety Issue (GSI) 191 in SRM-SECY-12-0034 and SRM-SECY-12-0093. As-written, the final draft rule would allow the introduction of problematic insulation and other debris sources to new reactors or as modifications to currently operating reactors. That is, the scope of the rule is clearly much broader than addressing the emergent, unforeseen issue that led to GSI-191. The non-concurring individual believes there are several issues with this broader scope of the alternate risk-informed approach; these are discussed more fully on the continuation pages.

The proposed alternative is to explicitly state in the final rule that the NRC will only approve a risk-informed approach for addressing the effects of debris on long-term core cooling for cases where a situation arises that could not have been readily foreseen and where the burden associated with removing or justifying such debris deterministically would not be justified in terms of the safety improvement of such removal or deterministic justification. It should be noted that small amounts of debris, even if introduced for a new design before the fact, can likely be justified using traditional (deterministic) engineering approaches, such as has been done by some licensees in addressing GSI-191.

Note that this issue was presented to the 50.46c steering committee (April 2015), which agreed that allowing new designs to intentionally introduce problematic insulation was not the intent of the rule. The recommended path forward was to state this intention in the Statements of Consideration (SOC), but not in the rule itself. Comments on the rule package during the concurrence process (September 2015) pointed out that this solution was not viable, because the SOC "intent" was contrary to the rule language. For this reason, the non-concurring individual believes that the rule language must be changed to explicitly state the NRC's intent regarding use of the risk-informed approach for assessing the effect of debris on long-term core cooling for new designs or modifications to currently operating plants. (Please see continuation sheet.)

SIGNATURE	DATE
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**NON-CONCURRENCE PROCESS**

NCP-2015-010

TITLE OF SUBJECT DOCUMENT

10 CFR 50.46c: Emergency Core Cooling Systems Performance During Loss-of-Coolant Accidents

ADAMS ACCESSION NO.

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CONTINUATION OF SECTION

✓ A B C

As currently written, the draft final 50.46c would allow a new reactor (Part 50 or 52) to use the risk-informed approach to justify use of problematic insulation that could not be justified under deterministic design basis methods. Any licensee could modify its plant to replace "good" insulation with problematic insulation (e.g., during modifications).

The non-concurring individual believes that there are at least four issues with allowing new designs to use the risk-informed alternative for addressing the effects of debris on long-term core cooling. Specifically, the rule:

1. may lead to an unintended increase in risk and decrease in defense-in-depth;
2. may be beyond what the Commission intended in its SRMs on GSI-191;
3. is not consistent with Commission expectations for new reactors; and,
4. is not consistent with good engineering principles.

Each of these is discussed in more detail below:

1. Unintended increase in risk and decrease in defense-in-depth - The rule would allow licensees and applicants to use a risk-informed process for initial design and later plant changes to justify installation of debris material that, under certain circumstances, will consequently fail long term recirculation. Safety margins and defense in depth serve to complement risk insights and help compensate for uncertainty. Debris in the containment clearly compromises defense-in-depth by representing a common-cause failure mechanism for not only ECCS systems but also containment heat removal systems. Unlike currently operating plants, where this issue was discovered after construction and operation, licensees and applicants could employ non-problematic insulation for future modifications or initial plant design, thus increasing risk and degrading defense-in-depth.

2. SRM-SECY-12-0034 and SRM-SECY-12-0093 clearly referred to "licensees" and to the resolution of GSI-191. The Commission clearly desired that risk information be used in conjunction with traditional engineering and other information (the "risk-informed approach" as defined in SRM-SECY-98-0144) in order to resolve an unforeseen and complex issue that is captured as GSI-191. It is not clear whether the Commission desired that new designs (modifications of operating reactors or new reactors) should be allowed to use the risk-informed approach to introduce problematic insulation or other debris. Also, extending the alternate risk-informed approach to new designs is not consistent with the basis provided by industry for requesting a risk-informed treatment of debris, which focused on prohibitive cost and person-rem to remove installed insulation.

3. Allowing future plant designs to incorporate debris is at odds with the Commission's expectation that new plants be safer than the currently operating plants and that future plants should benefit from advances in knowledge and lessons from operation of the current fleet of plants. For example, 10 CFR 52.79(a)(37) requires an applicant to submit information necessary to demonstrate how operating experience insights have been incorporated into the plant design. The non-concurring individual would interpret this requirement to apply to the debris issue; that is, the nuclear reactor community now knows that debris in the containment can adversely affect the core cooling and containment cooling functions.

4. It is poor engineering practice to design a pumping system that can be failed by debris that is a consequence of the conditions that the system is intended to operate in. Specifically, if the conditions for which the system is designed lead to failure of the system, the engineering codes and standards have not been met. A low risk number alone is not sufficient justification for a design under the Commission's risk-informed approach to regulation; relying solely on low risk would be risk-based. Codes and standards, including the General Design Criteria of Appendix A to Part 50, provide the safety margins that form one part of the risk-informed approach. Note also that, based on review of the GSI-191 pilot plant, there are LOCA scenarios that would go directly to core damage unless operator actions are taken (such as re-filling the refueling water storage tank; switching back from recirculation to injection; stopping and starting pumps). Excessive reliance on such actions is at odds with NRC's historical preference for engineered safety features as compared to operator action. For plants that are already constructed and operating, it makes sense to judge the risk and rely on the historically large margins of safety in order to allow plants to address the GSI-191 issue. However, granting relief to already built and operating plants, which uses up some existing margin of safety, is not a valid justification for relaxing the engineering standards for future modifications or designs.

**NON-CONCURRENCE PROCESS**

NCP-2015-010

**SECTION B - TO BE COMPLETED BY NON-CONCURRING EMPLOYEE'S SUPERVISOR**

TITLE OF SUBJECT DOCUMENT

10 CFR 50.46c: Emergency Core Cooling Systems Performance During Loss-of-Coolant Accidents

ADAMS ACCESSION NO.

ML15238A947

NAME

Stacey Rosenberg

TITLE

Branch Chief

TELEPHONE NUMBER

415-2357

ORGANIZATION

NRR/DRA/APLA

COMMENTS FOR THE NCP REVIEWER TO CONSIDER (use continuation pages or attach Word document)

I believe that the issues raised by the non concurring individual (NCI) have merit. Specifically, I agree with his conclusion that the original intent of the Commission (as stated in SRM-SECY-12-0034 and SRM-SECY-12-0093) was to allow a risk-informed treatment of debris only for operating plants and only because of the known adverse consequences of the alternative (i.e., cost/time/dose associated with removing problematic insulation). This is point #2 in his NCP write-up. It should be noted that the Commission direction did not explicitly say not to let new reactors use this approach but the stated rationales for allowing it (e.g., dose) would not apply to new reactors. Therefore, restricting its use to the operating fleet seems like a logical interpretation.

The NCI's points 1, 3, and 4 are also rational and well stated but could probably be argued either way. For example, I agree with his overall argument about "good engineering practice" but this is somewhat subjective.

I think the stronger argument is point 2: allowing the risk-informed approach for intentional introduction of debris (either for an existing plant or a new reactor) does not appear to be consistent with Commission direction. The risk-informed approach should be used to solve an existing problem, not to justify creating a new one.

The 50.46c working group responded to the NCI's concerns by changing the rule package to restrict the application of the risk informed approach for design modifications and new reactors only to those situations where there is "a significant safety or security issue that cannot be practicably addressed by other means." These changes were approved by the 50.46c steering committee and are reflected in the current rule package that is out for concurrence as of 11-5-15.

I believe these changes are an appropriate response to the NCI's concerns because they do not limit a priori the ability to use the risk-informed approach for plant modification or new reactor designs should a unique and unforeseen situation exist BUT they put the burden on the entity to justify the need. This approach wisely balances concerns about misapplication of the risk-informed approach with the acknowledgment that unforeseen circumstances are always a possibility.

SIGNATURE

*Stacey Rosenberg*

DATE

11/09/2015

NON-CONCURRENCE PROCESS

NCP-2015-010

SECTION C - TO BE COMPLETED BY NCP COORDINATOR

TITLE OF SUBJECT DOCUMENT

10 CFR 50.46c: Emergency Core Cooling Systems Performance During Loss-of-Coolant Accidents

ADAMS ACCESSION NO.

ML15238A947

NAME

Aby Mohseni

TITLE

TELEPHONE NUMBER

301-415-6686

ORGANIZATION

AGREED UPON SUMMARY OF ISSUES (use continuation pages or attach Word document)

See Attachment.

EVALUATION OF NON-CONCURRENCE AND RATIONALE FOR DECISION (use continuation pages or attach Word document)

See Attachment.

TYPED NAME OF NCP COORDINATOR

Aby Mohseni

TITLE

Deputy Director

ORGANIZATION

Division of Policy & Rulemaking, NRR

SIGNATURE--NCP COORDINATOR



DATE

1/29/2016

TYPED NAME OF NCP APPROVER

William M. Dean

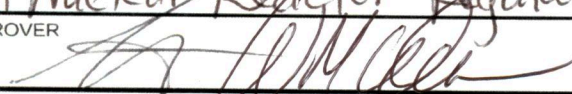
TITLE

Director

ORGANIZATION

Office of Nuclear Reactor Regulation

SIGNATURE--NCP APPROVER



2/22/2016

DATE

2/11/16

**NCP-2015-010: Draft Section C Writeup**  
**10 CFR 50.46c: Emergency Core Cooling Systems Performance During Loss-of-Coolant Accidents**

Agreed Upon Summary of Issues:

The non-concurring individual has concerns, that, as written, the 10 CFR 50.46c draft final rule would allow the introduction of problematic insulation and other debris sources to new reactors or as modifications to currently operating reactors. The scope, as written, is much broader than addressing the emergent, unforeseen issue that led to GSI-191. This scope:

- May lead to unintended increase in risk and decrease in defense-in-depth;
- May be beyond what the Commission intended in SRM-SECY-12-0024 and SRM-SECY-12-0093;
- Is not consistent with Commission expectations for new reactors; and
- Is not consistent with good engineering principles.

Evaluation of Non-concurrence and Rationale for Decision:

As the nonconcurring individual indicates, the 10 CFR 50.46c draft final rule contains a provision that would allow entities to use an alternate risk-informed approach to address Generic Safety Issue (GSI)-191. The Commission directed (in SRM-SECY-12-0034) that the staff add this provision into the proposed rule prior to its publication. Similar direction was also provided in SRM-SECY-12-0093. Prior to the steering committee's concurrence on the draft final rule (and concurrent with the submittal of this nonconcurrence), the scope of the provision could have been interpreted as allowing the introduction of problematic insulation and other debris sources to new reactors or as modifications to currently operating reactors.

I agree with the nonconcurring individual that the broader scope could have resulted in unintended consequences, including the potential for unintended increases in risk with decreases in defense-in-depth, potential for a larger scope of applicability than originally intended by the Commission, inconsistencies with the Commission's expectations for new reactors, and inconsistencies with good engineering principles.

The nonconcurring individual presented his views to the 10 CFR 50.46c Steering Committee, and, as a result of his interactions with fellow working group members and associated management, the draft final rule package was altered to address the concerns stated in this nonconcurrence. Specifically, the language below was added to the rule text to limit the scope of the risk-informed alternative:

“An entity may request to use the alternate risk-informed approach for design modifications or new reactor designs that introduce debris sources only if the

**NCP-2015-010: Draft Section C Writeup**  
**10 CFR 50.46c: Emergency Core Cooling Systems Performance During Loss-of-Coolant Accidents**

entity demonstrates there is a significant safety or security issue that cannot be practicably addressed by other means.”

In addition to the aforementioned rule text, the text below is available in the Statements of Consideration, in the description of the risk-informed alternative:

“It is not the NRC’s intent that the alternate risk-informed approach of paragraph (e) be used to justify the introduction of debris sources during plant modifications or in new reactor designs. Therefore, in these cases the rule requires that an entity demonstrate a significant safety or security issue that cannot be practicably addressed without the use of debris sources. The NRC expects entities to minimize the introduction of additional debris sources during the design process. The NRC also notes that, by itself, paragraph (e) only applies to long term cooling. Therefore, if an entity wishes to use the risk-informed approach in paragraph (e) to demonstrate compliance with the main ECCS requirements in § 50.46 or § 50.46c when introducing debris sources into the plant design, then an exemption from § 50.46 or § 50.46c, as applicable, will be necessary.

The NRC expects that licensees would wish to use the alternate risk-informed approach in paragraph (e) to address GSI-191 or other pre-existing debris issues. The rule requires the entity to justify there are no other means practicable to avoid the need for the use of materials which could become debris sources. Consideration of “other means” includes, but is not limited to, deterministic testing and analysis, minimizing or removing debris source material in the design phase, and encapsulation of potential debris sources. The NRC reiterates that, by itself, paragraph (e) only applies to long term cooling. Therefore, if an entity wishes to use the risk-informed approach in paragraph (e) to demonstrate compliance with the main ECCS requirements in § 50.46 or § 50.46c with respect to GSI-191, then an exemption from § 50.46 or § 50.46c, as applicable, will be necessary.”

I commend the nonconcurring individual for identifying this concern and for the dedication to document and pursue the concern through the nonconcurrency process. Furthermore, I commend the members of the interoffice working group for considering the issues and for identifying these changes to the rulemaking package. The result is a clearly written risk-informed alternative that will minimize unintended consequences as the rule is implemented.