



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

February 24, 2020

SECRETARY

COMMISSION VOTING RECORD

DECISION ITEM: SECY-18-0091

TITLE: RECOMMENDATIONS FOR MODIFYING THE REACTOR
OVERSIGHT PROCESS FOR NEW LARGE LIGHT WATER
REACTORS WITH PASSIVE SAFETY SYSTEMS SUCH AS THE
AP1000 (GENERATION III+ REACTOR DESIGNS)

The Commission acted on the subject paper as recorded in the Staff Requirements Memorandum (SRM) of February 24, 2020.

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, appearing to read "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 Caputo
Commissioner Wright
OGC
EDO
PDR

VOTING SUMMARY – SECY-18-0091

RECORDED VOTES

	<u>APPROVED</u>	<u>DISAPPROVED</u>	<u>ABSTAIN</u>	<u>NOT PARTICIPATING</u>	<u>COMMENTS</u>	<u>DATE</u>
Chrm. Svinicki	X				X	02/07/20
Cmr. Baran	X				X	12/21/18
Cmr. Caputo	X				X	01/27/20
Cmr. Wright	X				X	10/18/19

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary
FROM: CHAIRMAN SVINICKI
SUBJECT: SECY-18-0091: Recommendations for Modifying the Reactor Oversight Process for New Large Light Water Reactors with Passive Safety System Such as the AP100 (Generation III+ Reactor Designs)

Approved X Disapproved Abstain Not Participating

COMMENTS: Below X Attached None

I approve the staff's recommended Option 1, to eliminate the Mitigating Systems Performance Index performance indicators for the AP1000, with no new performance indicators being developed during initial operation and with limited modifications being made to the baseline inspection program, as described by the staff in the paper. The staff has concluded that, due to the enhanced presence of passive safety systems and the use of fewer components in the AP1000 design, it is appropriate to reduce inspection sample requirements in certain baseline inspection systems. The staff has further noted that operating experience being obtained from the currently operating AP1000 units at Sanmen and Haiyang will provide useful insights into the staff estimates of inspection efforts for the Vogtle AP1000 units.

The staff is under current Commission direction to notify the Commission through the annual report on the Reactor Oversight Process (ROP) self-assessment if the staff identifies any further changes that are necessary, once the staff has gained operating experience with new Generation III+ plants. The staff anticipates that three years of operating experience data would be needed before assessing certain changes. Waiting three years, however, may delay the opportunity to consider and implement nearer term adjustments that emerge sooner than three years. In the first three annual self-assessment reports for the ROP that occur after the Vogtle AP1000 units are operating, the staff should include in the self-assessment report a section reporting on any insights, trends, or lessons learned in applying this modified ROP at the Vogtle units. The staff should also provide an assessment in its report of utilization of the "larger-than-normal complement of inspectors" and the projected workforce plan to arrive at steady-state staffing levels.



SIGNATURE

02/ 7 /2020

DATE

Entered on "STARS" Yes ✓ No

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary
FROM: Commissioner Baran
SUBJECT: SECY-18-0091: Recommendations for Modifying the Reactor Oversight Process for New Large Light Water Reactors with Passive Safety System Such as the AP100 (Generation III+ Reactor Designs)

Approved Disapproved Abstain Not Participating

COMMENTS: Below Attached None

Entered in "STARS"

Yes

No



SIGNATURE

12/21/18

DATE

Commissioner Baran's Comments on SECY-18-0091, "Recommendations for Modifying the Reactor Oversight Process for New Large Light Water Reactors with Passive Safety Systems Such as the AP1000 (Generation III+ Reactor Designs)"

In this paper, the NRC staff discusses how the Reactor Oversight Process would be applied to new, large light-water reactors with passive safety systems, such as the AP1000. For this category of reactors, the staff recommends: (1) eliminating the Mitigating Systems Performance Index (MSPI) indicators without replacing them with new performance indicators at this time; and (2) making only limited modifications to the baseline inspection program (Option 1).

The staff evaluated the existing performance indicators and concluded that they all remain valid for reactors like the AP1000 except for the MSPI indicators. The staff found that the MSPI indicators "could not be applied to the AP1000 reactors" because there is currently insufficient performance data on its passive systems and components "to develop meaningful industry-averaged performance baselines that are a key aspect of MSPI formulation." The existing MSPI indicators were developed with the benefit of decades of performance data. The staff plans to assess the viability of new performance indicators for the AP1000 to replace the current MSPI indicators after sufficient operating experience has been gained.¹

With respect to the baseline inspection program, the staff has concluded that current inspection procedures will require three primary changes to be suitable for new, large light-water reactors with passive safety systems. Sample sizes will need to be adjusted to account for a smaller number of risk-significant components in the passive designs. Inspection procedures will also need to address Regulatory Treatment of Non-Safety Systems "because of the importance of these systems to defense-in-depth." In addition, since many of the AP1000's risk-significant systems are located inside containment and can only be inspected during refueling outages, more baseline inspection resources will be needed during outages and fewer baseline inspection resources will be needed when the reactors are operating.

I find the staff's analysis to be thorough and its conclusions well-supported. I therefore approve the staff's recommended Option 1.

¹ Separately, the staff is already considering revisions to the current MSPI indicators for large light-water reactors.

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary
FROM: Commissioner Caputo
SUBJECT: SECY-18-0091: Recommendations for Modifying the Reactor Oversight Process for New Large Light Water Reactors with Passive Safety System Such as the AP1000 (Generation III+ Reactor Designs)

Approved Disapproved Abstain Not Participating

COMMENTS: Below Attached None

Entered in STARS

Yes
No



Signature

1/27/2020

Date

Commissioner Caputo's Comments on SECY-18-0091:
Recommendations for Modifying the Reactor Oversight Process for
New Large Light Water Reactors with Passive Safety System Such as the AP1000
(Generation III+ Reactor Designs)

The NRC staff has completed a review of the Reactor Oversight Process (ROP) to determine what revisions to the current oversight program are necessary to provide reasonable assurance of the safe operation of new reactor designs. The staff focused its efforts on the AP1000 design but determined the process would be identical for other Generation III+ designs.

The staff concluded that the existing ROP is sufficiently flexible to accommodate new large light water reactor technologies through modest adjustments to the program. The staff provided the Commission with three options for such adjustments to accommodate the AP1000. The staff recommends Option 1, which would make limited modifications to the baseline inspection program and eliminate the Mitigating Systems Performance Index (MSPI) indicators without replacing them during initial operation. The staff would apply the current Safety System Functional Failure (SSFF) performance indicator (PI) coupled with the baseline inspection program to ensure adequate oversight of the mitigating systems cornerstone. This approach will ensure that the mitigating systems cornerstone objectives are met and will result in the lowest impact on the current ROP framework. Implementation of this approach would also require the lowest number of resources. In addition, the staff will reevaluate the feasibility of new performance indicators after gaining sufficient operating experience.

For those reasons, I approve staff's recommended Option 1.

In SECY 18-0091, the staff recognized that “the risk profiles of the AP1000 are lower, and the plants should be safer to operate” due to the incorporation of operating experience, risk insights, and the use of passive safety features in the design.¹ The staff used risk information matrices for operating reactors as well as draft matrices to determine the risk significance of the AP1000 safety systems and systems subject to Regulatory Treatment of Non-Safety Systems (RTNSS) to identify inspectable areas, frequency, sample sizes, and expected resource effort. The staff stated that “RTNSS system risk worth is so low that, in combination with the low baseline CDF for the AP1000, risk-based PIs such as the MSPI would remain Green under virtually all circumstances for these systems,” indicating that “cornerstone objectives are met and licensee performance does not warrant additional regulatory oversight.”² This was examined in more detail in a staff white paper, in which the staff concluded,

Based on the test indicators, no risk significant non-safety-related systems were identified (i.e. all non-safety-related candidate indicators were found

¹ SECY 18-0091 at 2.

² *Id.* at 7.

to be insensitive). Therefore, the use of the risk-informed approach does not require the inclusion of non-safety-related systems.³

However, the staff plans to include these systems in baseline inspections. Given this lower risk profile of the AP1000 design and the numerous staff findings that these non-safety-related systems have low risk worth and are risk-insignificant, it is difficult to justify dedicating inspection resources to these low-risk systems. The staff should closely scrutinize whether this approach is consistent with the NRC's efforts to risk-inform our inspections and examine our transformation efforts to become a modern, risk-informed regulator.

Based on the discussion of the Significance Determination Process in SECY-18-0091, I am also concerned about the potential to develop an overreliance on the "structured qualitative assessment tool" at the expense of more objective quantitative analyses.

In SRM-SECY-10-0121, "Modifying the Risk-Informed Regulatory Guidance for New Reactors," the Commission disapproved the staff's recommendation to modify risk guidance for new reactors and reaffirmed "that the existing safety goals, safety performance expectations, subsidiary risk goals and associated risk guidance, key principles and *quantitative* metrics for implementing risk-informed decision making, are sufficient for new plants."⁴

In SRM-SECY-13-0137, "Recommendations for Risk-Informing the Reactor Oversight Process for New Reactors," the Commission disapproved the staff's recommendation "to develop an integrated risk-informed approach for evaluating the safety significance of inspection findings for new reactor designs using *qualitative* measures to supplement the risk evaluations" but approved staff "enhancing the significance determination process (SDP) by developing a *structured qualitative assessment* for events or conditions that are not evaluated in the supporting plant risk models."⁵ The Commission further clarified that, "[t]he SDP should continue to place emphasis on the use of the existing quantitative measures of the change in plant risk for both operating and new reactors."⁶

Later, in SRM-SECY-14-0087 "Qualitative Consideration of Factors in the Development of Regulatory Analyses and Backfit Analyses," the Commission approved the staff's plans for updating guidance regarding the use of qualitative factors to improve the clarity, transparency, and consistency of the agency's regulatory analyses and backfit analyses. However, the Commission was very clear that "[t]his approval does not authorize an expansion of the consideration of qualitative factors in regulatory analyses

³ "Mitigating Systems Performance Indicators for New Reactors" NRC Staff White Paper (Sept. 2, 2016), at 46 (ML16251A018).

⁴ Staff Requirements—SECY-10-0121—"Modifying the Risk-Informed Regulatory Guidance for New Reactors" (Mar. 2, 2011), at 1 (ML110610166) (emphasis added).

⁵ Staff Requirements—SECY-13-0137—"Recommendations for Risk-Informing the Reactor Oversight Process for New Reactors" (June 30, 2014) (ML14181B398) (emphasis added).

⁶ *Id.*

and backfit analyses. *The appropriate degree of weight of application of qualitative factors in regulatory decision making ultimately lies with the Commission.*⁷ The Commission also directed the staff to “use qualitative factors to inform decision making, in limited cases, when quantitative analyses are not possible or practical (i.e. due to lack of methodologies or data).”⁸

In this paper, SECY-18-0091, the staff indicates that it will revise IMC 0609, Appendix M, “Significance Determination Process Using Qualitative Criteria,” to consider the AP1000 design and develop a structured *qualitative* assessment tool for conditions that are not evaluated in the supporting plant risk models. Revisions to Appendix M provide the increased potential for regulatory decisions to be based on subjective, qualitative information instead of measurable quantitative data.

The record clearly shows the Commission’s concern over the years regarding the use of qualitative factors in the NRC’s regulatory decision making. In keeping with the NRC’s Principles of Good Regulation, “Once established, regulation should be perceived to be reliable and not unjustifiably in a state of transition.” The use of qualitative factors in the NRC’s regulatory decisionmaking can undermine that reliability. Thus, the staff should be judicious in the use of qualitative factors in their consideration of proposed revisions to Appendix M. The staff should collaborate with external stakeholders when considering those revisions. Any significant revision to Appendix M should be submitted to the Commission for approval.

⁷ Staff Requirements—SECY-14-0087—Qualitative Consideration of Factors in the Development of Regulatory Analyses and Backfit Analyses (Mar. 4, 2015), at 1 (ML15063A568) (emphasis added).

⁸ *Id.*

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary
FROM: Commissioner Wright
SUBJECT: SECY-18-0091: Recommendations for Modifying the Reactor Oversight Process for New Large Light Water Reactors with Passive Safety System Such as the AP1000 (Generation III+ Reactor Designs)

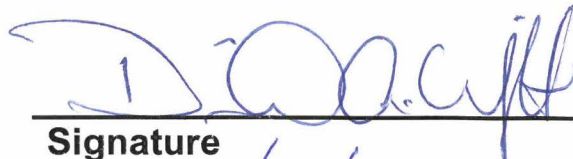
Approved Disapproved Abstain Not Participating

COMMENTS: Below Attached None

I approve the staff's recommended Option 1. This option modifies the Reactor Oversight Process for new large light-water reactors with passive safety systems, such as the AP1000, by (1) eliminating the Mitigating Systems Performance Index (MSPI) indicators without replacing them at this time and (2) making limited modifications to the baseline inspection program. The staff concluded that this option ensures adequate oversight of the mitigating systems cornerstone through the Safety System Functional Failure performance indicator, coupled with the baseline inspection program. The staff's recommendation is well supported and consistent with the NRC's Principles of Good Regulation. I commend the staff for basing its recommendation on data and for planning to further assess the viability of new performance indicators for the AP1000 once sufficient operating experience has been gained. In my view, the use of data and operating experience is critical to the NRC's continued efforts to regulate more efficiently and effectively.

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Yes
No



Signature
10/18/19

Date