



SECRETARY

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

February 8, 2016

COMMISSION VOTING RECORD

DECISION ITEM: SECY-15-0137

TITLE: PROPOSED PLANS FOR RESOLVING OPEN  
FUKUSHIMA TIER 2 & 3 RECOMMENDATIONS

The Commission acted on the subject paper as recorded in the Staff Requirements Memorandum (SRM) of February 8, 2016.

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, reading "Annette Vietti-Cook".

Annette L. Vietti-Cook  
Secretary of the Commission

Enclosures:

1. Voting Summary
2. Commissioner Vote Sheets

cc: Chairman Burns  
Commissioner Svinicki  
Commissioner Ostendorff  
Commissioner Baran  
OGC  
EDO  
PDR

**VOTING SUMMARY - SECY-15-0137**

**RECORDED VOTES**

	<u>APPROVED</u>	<u>DISAPPROVED</u>	<u>ABSTAINING</u>	<u>N/P*</u>	<u>COMMENTS</u>	<u>DATE</u>
Chrm. Burns	X				X	12/04/15
Comr. Svinicki	X				X	12/22/15
Comr. Ostendorff	X				X	12/02/15
Comr. Baran	X	X			X	01/08/16

\*Not Participating

**NOTATION VOTE**

**RESPONSE SHEET**

TO: Annette Vietti-Cook, Secretary

FROM: Chairman Burns

SUBJECT: SECY-15-0137: PROPOSED PLANS FOR RESOLVING  
OPEN FUKUSHIMA TIER 2 & 3 RECOMMENDATIONS

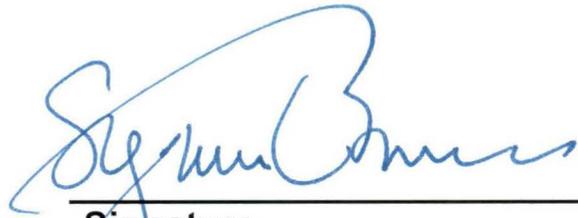
Approved  Disapproved  Abstain  Not Participating

COMMENTS: Below  Attached  None

Entered in  
STARS

Yes

No



Signature

7 December 2015

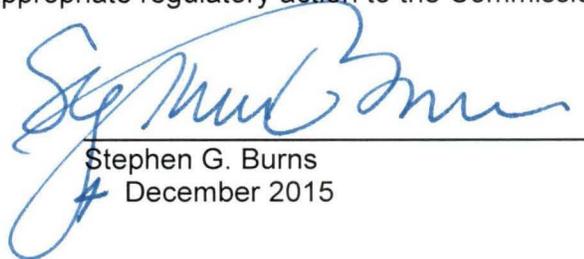
Date

**Chairman Burns Comments on SECY-15-0137  
“Proposed Plans for Resolving Open Fukushima  
Tier 2 and 3 Recommendations”**

I commend the staff for providing a timely response to the Commission’s direction in the Staff Requirements Memorandum to SECY-15-0065, “Proposed Rulemaking: Mitigation of Beyond-Design-Basis Events,” to provide a plan and schedule for resolving all remaining Tier 2 and 3 actions. I appreciate the effort to take an additional look at the Tier 2 and 3 recommendations in light of the substantial progress made towards completion of the Tier 1 recommendations and the significant safety benefit gained as a result. The staff sorted the resolution plans for Tier 2 and 3 recommendations into three groups:

- Group 1: Recommendations that should be closed now.
- Group 2: Recommendations that the staff’s initial assessment has concluded should be closed, but for which stakeholder interaction is warranted prior to finalizing its assessment.
- Group 3: Recommendations for which the staff has not yet completed its assessment, stakeholder interactions, and/or documentation.

I approve the staff’s proposed closure plans for the open Tier 2 and 3 recommendations as delineated in SECY-15-0137. Specifically, I approve the staff’s recommendation to close the items in Group 1. With respect to the potential enhancements to the capability to prevent or mitigate seismically-induced fires and floods, I support the staff’s recommendation to finalize the PRA feasibility study and to inform the Commission if any insights obtained as part of the completion of that study change the results of the staff’s assessment. For the recommendations placed in Groups 2 and 3, the staff should document the final results of each group’s evaluation following its interaction with external stakeholders and ACRS. The staff should present these results and recommendations for closure or appropriate regulatory action to the Commission for approval.

  
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Stephen G. Burns  
# December 2015

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: COMMISSIONER SVINICKI

SUBJECT: SECY-15-0137: PROPOSED PLANS FOR RESOLVING  
OPEN FUKUSHIMA TIER 2 & 3 RECOMMENDATIONS

Approved XX Disapproved  Abstain  Not Participating

COMMENTS: Below  Attached XX None

  
\_\_\_\_\_  
SIGNATURE

12/ 22 /15  
\_\_\_\_\_  
DATE

Entered on "STARS" Yes  No

**Commissioner Svinicki's Comments on SECY-15-0137**  
**Proposed Plans for Resolving Open Fukushima Tier 2 and 3 Recommendations**

I approve the staff's proposed closure plans for the open Tier 2 and 3 recommendations as summarized in the paper and as detailed in the enclosures to the paper. I approve the closure of each recommendation in Group 1 (i.e., items to be closed now) and Group 2 (i.e., items that the staff has concluded should be closed but about which it will communicate further with the Advisory Committee on Reactor Safeguards and/or external stakeholders). For items in Group 3 (i.e., items for which the staff has not yet concluded its assessment and/or documentation and about which the staff will continue external engagement), I approve the staff's closure plans.

Upon concluding its work for items in Group 3, the staff should inform the Commission if it proposes no regulatory action be taken on an item in Group 3 or submit for the Commission's review and approval any proposed regulatory action on that item. The staff should also inform the Commission promptly if significant analysis is required for items in Group 3, beyond that described in SECY-15-0137.<sup>1</sup>

In this paper, the staff has presented a complete and coherent set of actions to resolve the Tier 2 and 3 recommendations in a timely way, while respecting the important consideration of Fukushima lessons learned. As we approach the five year anniversary of the Great Tohoku earthquake and tsunami in March of next year, I find the staff's presentation of the status of activities to be a natural outgrowth and evolution of the careful and systematic approach the NRC has taken to its regulatory response to the events at Fukushima. As the staff notes in the paper, "[t]he majority of the open items consist of recommendations to evaluate the need for further regulatory action, rather than a recommendation to take a specific regulatory action. . . . As such, for each recommendation, the staff's reassessment began with an evaluation of the issue in light of existing requirements and voluntary measures to confirm their adequacy and to determine if any recommendation would provide for a substantial safety improvement. . . . [F]or the majority of the open Tier 2 and 3 recommendations, the staff's evaluation has determined that the NRC's existing regulatory framework and requirements are adequate and that no further regulatory action or analysis is needed."

In sum, the staff is justifiably proud of the technical integrity of the work they have done. Closure of certain of our initial recommendations is now timely and appropriate, based on this work. The important oversight of implementation of Tier 1 work is ongoing, of course, and will be for some time. As well, by virtue of our nature as a continuous-learning organization, we will continue to monitor and assess other efforts, such as any technical learnings revealed in the decommissioning of damaged Fukushima units or international results regarding long-term health studies in the areas around Fukushima Dai-ichi. Through this approach, we will continue our essential work in ensuring the post-Fukushima safety enhancements are appropriately incorporated in the NRC's existing oversight programs here in the United States.

  
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Kristine L. Svinicki 12/ 22 /15

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<sup>1</sup> In summary, if supported by a majority, recommendations in Groups 1 and 2 are closed and closure plans for recommendations in Group 3 are approved. Should the Commission fail to establish a majority on any of these points by splitting evenly 2-2, the outcome is as determined in the Commission's procedure on resolution of a 2-2 split vote; as operative in the instant case, "where the staff has authority to act but discretion requires it to first consult with the Commission before taking a proposed action . . . the SRM may advise the staff that it may proceed with its action even though the Commission has been unable to act." Internal Commission Procedures, Appendix 5, "Resolution of a 2-2 Vote," at 1-2.

**NOTATION VOTE**

**RESPONSE SHEET**

TO: Annette Vietti-Cook, Secretary

FROM: Commissioner Ostendorff

SUBJECT: SECY-15-0137: PROPOSED PLANS FOR RESOLVING  
OPEN FUKUSHIMA TIER 2 & 3 RECOMMENDATIONS

Approved XX Disapproved      Abstain      Not Participating     

COMMENTS: Below      Attached XX None     

Entered in  
STARS  
Yes ✓  
No     

W. Ostendorff  
Signature  
12/12/15  
Date

**Commissioner Ostendorff's Comments on SECY-15-0137:  
"Proposed Plans for Resolving Open Fukushima Tier 2 and 3 Recommendations"**

I approve the staff's proposed plan and schedule for resolving remaining open Fukushima Tier 2 and 3 actions. I also approve closure of the actions identified in "Group 1" in SECY-15-0137, as recommended by the staff.

I am proud of the significant accomplishments that have been achieved by the staff in response to the March 2011 accident at Fukushima Dai-ichi. The NRC's actions to enhance safety in response to the Fukushima lessons learned are thoughtful and comprehensive. I am also particularly pleased with the way in which the NRC has upheld its principles of good regulation and adhered to its regulatory framework in making these important regulatory decisions. As I discussed in my vote on SECY-15-0065, the remaining Tier 2 and Tier 3 post-Fukushima actions needed to be evaluated in light of the risk reduction from the proposed Mitigation-of-Beyond-Design-Basis-Events rulemaking and other ongoing regulatory action actions. The staff has done that.

Since March of 2011, I have been involved in all of the post-Fukushima Commission decision-making. I have watched closely as these issues have evolved from the original task force report and as the NRC's regulatory actions have come to fruition. I believe the Tier 1, 2 and 3 approach has served the Agency well and has resulted in a holistic evaluation of lessons learned that prioritized those actions with the greatest potential for safety improvement. I personally believe that we have achieved the safety enhancements necessary to address the Fukushima lessons learned with the regulatory actions that we have taken thus far. On that basis, I am comfortable in closing the remaining Tier 2 and Tier 3 items. However, I respect the need for the staff to complete its evaluation in certain areas, to engage stakeholders on its proposed resolution, and to thoroughly document its conclusions. It was never the Commission's expectation that all remaining issues would result in regulatory actions. Rather, the intention was that these items needed greater assessment to determine if regulatory action was warranted. The Tier 2 and 3 issues for which regulatory action was warranted have already been pulled forward and integrated with the ongoing Tier 1 actions.

In SRM-SECY-15-0065, the Commission directed the staff to provide the Commission with a plan and schedule for resolving all remaining Tier 2 and Tier 3 actions, resulting in SECY-15-0137. The staff did an outstanding job in analyzing the remaining Tier 2 and 3 actions and preparing SECY-15-0137 in the time since SRM-SECY-0065 was issued. The staff viewed remaining Tier 2 and 3 actions with an eye toward what incremental risk reduction was possible in light of the already completed Tier 1 and 2 actions. The staff also viewed these actions recognizing that any proposed new requirements must be appropriately justified in the context of the backfit rule. I thank the staff for its efforts and also thank the Advisory Committee for Reactor Safeguards (ACRS) for providing valuable insights during its review of the staff's proposed plans and for providing timely input to support Commission deliberations.

With regard to the actions the staff has proposed for "Group 2" (i.e., recommendations that the staff's initial assessment has concluded should be closed but for which interaction with the ACRS or external stakeholders is warranted prior to finalizing the assessment), the staff should provide an information paper to the Commission no later than the end of March 2016. This paper should describe insights gained from ACRS and stakeholder interactions and should provide the staff's final assessment.

Finally, I approve the staff's plan and schedule for addressing the "Group 3" actions (i.e., recommendations for which the staff has not yet completed its assessment, stakeholder interactions, and/or documentation). In the six-month status updates on post-Fukushima actions, the staff should continue to provide an update on these actions until they are closed. For the Tier 3 action regarding "Evaluation of Other Natural Hazards," the staff should provide an information paper to the Commission no later than May 2016, as an interim deliverable with the results of Task 2, "Determine and apply screening criteria to appropriately exclude certain natural hazards from further generic evaluations, or exclude some licensees from considering certain hazards."

The staff should promptly request Commission approval in a notation vote paper if the staff's preliminary assessment of any of the Group 2 or 3 actions changes, such that additional regulatory action should be considered, or if significant analysis is required beyond that described in SECY-15-0137.

**NOTATION VOTE**

**RESPONSE SHEET**

**TO:** Annette Vietti-Cook, Secretary

**FROM:** Commissioner Baran

**SUBJECT:** SECY-15-0137: PROPOSED PLANS FOR RESOLVING  
OPEN FUKUSHIMA TIER 2 & 3 RECOMMENDATIONS

Approved  X  Disapproved  X  Abstain      Not Participating    

**COMMENTS:** Below      Attached  X  None    

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STARS

Yes  XX

No    

  
\_\_\_\_\_  
**Signature**

1/8/16  
\_\_\_\_\_  
**Date**

**Commissioner Baran's Comments on SECY-15-0137,  
"Proposed Plans for Resolving Open Fukushima Tier 2 and 3 Recommendations"**

In this policy paper, the NRC staff is seeking Commission approval of the staff's proposed plans to resolve and close the open Tier 2 and Tier 3 recommendations developed in response to the March 11, 2011, Fukushima accident. Although the open items were not placed in the highest priority category for which work was started "without delay," the open Tier 2 and Tier 3 items constitute about half of the Commission-directed post-Fukushima activities. The staff's current proposal places ten open items into Groups 1, 2, or 3. The staff recommends (A) closing Group 1 items now without further assessment or stakeholder interaction; (B) closing Group 2 items once the staff's initial assessment is finalized after additional interaction with the Advisory Committee on Reactor Safeguards (ACRS) or external stakeholders; and (C) adopting the staff's closure plans for the Group 3 items, for which the staff has not yet completed its assessment. The staff proposes to inform the Commission of the final results of its Group 2 evaluations by the end of March 2016 and its Group 3 evaluations by the end of 2016.

Several general principles guide my evaluation of the staff's proposed resolution of the open Tier 2 and Tier 3 action items.

First, Fukushima lessons learned activities were placed in Tier 2 or Tier 3 based on skill set availability or the need for more analysis, not because they are not potentially significant safety issues. The staff and the Commission assigned priority levels to these Near-Term Task Force recommendations in late 2011 because they reflect important lessons learned from the Fukushima accident that required additional attention.

Second, although I share the staff's interest in addressing the open Tier 2 and Tier 3 items in a timely way, they should not be resolved and closed without an open-minded examination of the safety issues based on the latest information. The Near-Term Task Force and staff recommended a fresh reevaluation of these issues, not a regurgitation of decades-old studies. As an agency, we need to "resolve" these open items with thoughtful analysis informed by the latest data, not through hurried, administrative close-outs.

Third, proposals to address and resolve the open items must be supported by thorough safety analysis, not just a casual prediction of how a backfit analysis might turn out. If the staff concludes that additional action is unnecessary for a particular item, that conclusion needs to be supported by an in-depth safety examination. For the analysis that is performed, the staff must examine both the quantified and unquantified benefits and costs of potential regulatory actions. This approach is consistent with the staff's 2013 plan for final closeout of lessons-learned activities, which stated: "Regardless of the final outcome of a given activity, the staff plans to document its clear and thorough justification when it determines that an activity should be considered complete, and that justification will be provided to the Commission for each activity as determinations are made."<sup>1</sup>

Finally, in the absence of a final analysis, it would be premature for the Commission to approve today the closure of a given action item sometime next year. I agree with Chairman Burns that the staff should finalize its preliminary analyses in order to make recommendations for closure or appropriate regulatory action for the Group 2 and 3 items before the Commission makes a decision about how to proceed on those items. The staff should present its complete

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<sup>1</sup> See SECY-13-0095, "Fourth 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami" (Sep. 6, 2013) and Staff Requirements Memorandum (SRM).

analyses and the resulting proposed approaches for resolution of the Group 2 and 3 items to the Commission for approval. Each Group 2 and 3 action item should remain open until the Commission approves its closure.

With these basic principles in mind, I discuss each of the open Tier 2 and Tier 3 activities below.

### **Evaluation of Other External Natural Hazards (Enclosure 1)**

In response to comments from ACRS and section 402 of the Consolidated Appropriations Act of 2012, which directed NRC to “require reactor licensees to re-evaluate the seismic, tsunami, flooding, and other external hazards at their sites” and determine whether their design bases need to be updated, the staff is proposing to evaluate natural external hazards other than seismic and flooding hazards “using existing information and processes” to “assess the need for further regulatory actions.” The staff proposes a four-step process to further evaluate the risks to nuclear power plants from other external hazards: (1) determine which natural hazards other than seismic and flooding should be reviewed; (2) develop and apply screening criteria to focus the evaluations on the external hazards with higher probabilities of requiring further action; (3) perform site-specific technical evaluations for hazards and sites that have not screened out; and (4) based on these evaluations, determine if additional licensee or regulatory actions are warranted.

In my view, this basic four-step framework is a reasonable way to proceed on this open item. My approval of this general approach to addressing the other external hazards evaluations is contingent on two modifications. First, the staff should comprehensively consider all natural external hazards that could have potential safety consequences for a plant, including volcanic ash and solar flares. This is necessary to comply with the statutory direction from Congress and to ensure that we are meaningfully evaluating all plausible natural threats to U.S. reactors. Second, the staff should not begin this process with the assumption that it will only use existing information. If the staff determines that it is necessary to seek new or updated information to fully understand an external hazard, it should obtain that information. Several of the external hazards contemplated by the staff, including drought, extreme temperatures, and winter precipitation, are expected to worsen with climate change in some parts of the country. For this reason, we cannot assume that the frequency, intensity and duration of these events are static. A purely backwards look at historical conditions would not account for these changing conditions. Gathering additional information when it is needed is also consistent with the approach outlined by the staff in 2012. At that time, the staff proposed to issue 50.54(f) letters to request information from licensees about these external hazards, as it did for seismic and flooding hazards.<sup>2</sup> The Commission approved this approach in March 2012.<sup>3</sup>

### **Periodic Reconfirmation of External Hazards (Enclosure 2)**

Recognizing that external hazard data and models will evolve over time, the Near-Term Task Force recommended initiating a rulemaking to reevaluate seismic and flooding hazards every ten years to address any new and significant information. Similarly, the National Academy of Sciences found that “[t]he overarching lesson learned from the Fukushima Dai-ichi

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<sup>2</sup> See SECY-12-0025, “Proposed Orders and Requests for Information in Response to Lessons Learned from Japan’s March 11, 2011, Great Tohoku Earthquake and Tsunami” (Feb. 17, 2012).

<sup>3</sup> See SRM for SECY-12-0025 (Mar. 9, 2012).

accident is that nuclear plant licensees and their regulators must actively seek out and act on new information about hazards that have the potential to affect the safety of nuclear plants.”<sup>4</sup>

The staff determined that its current processes for assessing new external hazard information are too passive. As the staff explained, “NRC’s current practice generally involves initiating a hazard reassessment either after the occurrence of a major event that challenges a plant’s design basis or after receipt of information determined to have the potential to significantly impact plant safety.” The staff found that “there is no existing NRC process that actively seeks to determine if there is new hazard information available.” According to the staff, “when new information is identified, there is the potential that the information could be evaluated in isolation, rather than through a methodical evaluation of the cumulative effect of new data, models, and methods that accrue over time.” Therefore, the staff proposes to develop, by the end of 2016, a method to “enhance existing NRC processes and programs to ensure that information related to external hazards is proactively and routinely evaluated in a systematic manner.”

I agree with the staff that NRC’s current practices for assessing new external hazard information are too passive and reactive, and I approve the staff’s proposal to actively seek out new scientific information that may deepen and refine our understanding of external hazards. Periodic or continuous reassessment of external hazards is particularly important in light of the impacts of climate change on some hazards, such as flooding and drought, because these climate-related hazards are expected to exceed historical levels in the future. I look forward to the details of the staff’s proposal to ensure the proactive and routine evaluation of new external hazard information in a systematic manner. I approve the staff’s laudable goal of establishing a proactive and effective process for identifying and holistically considering the latest science but reserve judgment on whether a rulemaking is needed to establish periodic reevaluation requirements until the staff presents a concrete plan for attaining this goal.

### **Seismically-Induced Fires and Floods (Enclosure 3)**

The Near-Term Task Force found that “[s]eismically induced fires have the potential to cause multiple failures of safety-related systems and could create fires in multiple locations at the site.” The Task Force also concluded that “[s]eismically induced flooding events can potentially cause multiple failures of safety-related equipment.” The Task Force therefore recommended that NRC evaluate potential enhancements to the capability of nuclear power plants to prevent or mitigate seismically-induced fires and floods.

The staff proposes to close this action item without any enhancements to address seismically-induced fires and floods. According to the staff, the Commission-directed<sup>5</sup> development of a probabilistic risk assessment methodology to evaluate potential enhancements is challenging and would require “additional time and resources” to test, refine, and finalize a methodology. Citing several existing regulatory requirements, the staff then offers conclusory statements that “based on the information gathered thus far, the staff did not identify any information that indicates that [seismically-induced fires and floods] represent a significant safety issue” and “[t]he staff believes that the risk of a [seismically-induced fire or flood] would not be large enough to justify additional safety enhancements.”

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<sup>4</sup> National Academy of Sciences, “Lessons Learned from the Fukushima Nuclear Accident for Improving Safety of U.S. Nuclear Plants” (July 24, 2014).

<sup>5</sup> See SRM for SECY-11-0137 (Dec. 15, 2011).

The staff's response does not meaningfully address the concerns behind the Near-Term Task Force recommendation. The staff acknowledges that "the risk from a [seismically-induced fire or flood] is difficult to quantify because of the lack of methods and data for assessing concurrent hazards," but then assumes that the risks are not significant. What the risks actually are is unknown. In determining that further regulatory action is not warranted, the staff relies on the robustness of existing fire protection programs, National Fire Protection Association (NFPA) Standard 805, and the seismic walkdowns conducted after Fukushima. But fire protection systems (as well as certain pipes and tanks) are not required to be seismically qualified so that they can withstand earthquakes. NFPA 805 is a voluntary standard that fewer than half of the existing reactor units have committed to adopt. And the post-Fukushima seismic walkdowns did not require licensees to correct problems in the absence of a regulatory requirement to do so. In concluding that no additional action needs to be taken, the staff also cites existing regulations on internal flood protection that would have been known to the Task Force, mentions FLEX equipment that is not specifically related to addressing seismically-induced fires and floods, and notes that none of the past seismically-induced fire events have occurred in the United States. Frankly, it is a laundry list of not very convincing reasons for why nothing more needs to be done in this area.

I disapprove closing this action item as a Group 1 activity. The staff should instead move this action item to Group 3 and develop a reasonable approach to better characterize the risks posed by seismically-induced fires and floods. ACRS may be helpful in this regard as its members were "confounded that the PRA feasibility study did not identify a reasonable approach for [the staff's] assessment." If closure of this activity in Group 1 is approved, the staff should continue to engage with stakeholders on "methods and data for assessing concurrent hazards."

#### **Reliable Hardened Vents for Other Containment Designs and Hydrogen Control and Mitigation (Enclosure 4)**

On March 12, 2012, NRC issued an initial order requiring boiling water reactors (BWRs) with Mark I or Mark II containments to install reliable hardened vents to remove decay heat and maintain control of containment pressure. The Commission determined that this requirement was necessary to ensure reasonable assurance of adequate protection of public health and safety. The Near-Term Task Force recommended that NRC assess the need to require reliable hardened vents for other containment designs. Separately, the Task Force recommended that NRC "identify insights about hydrogen control and mitigation inside containment or in other buildings as additional information is revealed through further study of the Fukushima Dai-ichi accident."

The staff proposes to place these action items in Group 2 and does not expect that additional regulatory action will be needed to close them. The staff concluded that a requirement for reliable hardened vents for other containments, including ice condensers and Mark III containments, is unlikely to meet the backfit threshold of being a cost-justified substantial safety enhancement.

In my view, there are some significant gaps in the staff's analysis. First, the staff does not compare other containments with Mark I and II containments to assess whether other designs pose comparable over-pressurization risks or whether requiring reliable hardened vents for other containments would provide safety benefits comparable to the vents for Mark I and II containments. The staff should compare ice condensers and Mark III containments to the Mark I and II containments to evaluate whether there is a basis for the Commission to conclude that

reliable hardened vents should be required for these other containments as a matter of adequate protection.

Second, although the staff is evaluating an ice condenser plant as part of the State-of-the-Art Reactor Consequence Analyses (SOARCA) project, the staff is proposing to close this action before receiving these results. In 2012, the Commission approved additional SOARCA studies “in a way that complements and supports the post-Fukushima activities including Tier 3 items.”<sup>6</sup> These studies are scheduled to be completed by September 2016. Rather than speculating about what the results of the studies might show with respect to the benefits of or need for reliable hardened vents, the staff should wait for the results of these SOARCA studies before reaching any firm conclusions.

The staff’s analysis of large dry pressurized water reactor containments is adequate to conclude that those units do not require reliable hardened vents.

With respect to hydrogen control and mitigation, the staff determined that “issues of hydrogen mitigation in the reactor buildings of Mark I and Mark II containment BWRs do not merit further consideration because reliable vents will prevent over-pressurization of the containments and massive leakage of hydrogen into the reactor buildings.” ACRS found that this “conclusion neglects the potential for other pathways of hydrogen release to the reactor building under severe reactor accident conditions” and advised that it may “be more prudent for the staff to perform a comprehensive examination of potential hydrogen release pathways before they forego consideration of hydrogen mitigation in the reactor buildings.” In addition to the ACRS concerns, the staff should consider the new information on hydrogen control and mitigation that likely will become available from further analysis of the Fukushima event prior to closing this issue. There is no need to prematurely close an action item that has always assumed that additional information will be “revealed through further study of the Fukushima Dai-ichi accident” just because the data is not yet available.

I disapprove closing this action item as a Group 2 activity. The staff should move this action item to Group 3 and conduct the additional analysis outlined above.

### **Enhanced Reactor and Containment Instrumentation (Enclosure 5)**

In response to concerns expressed by the ACRS, the staff added a post-Fukushima action item in 2012 to examine whether the agency should require reactor and containment instrumentation to be enhanced to withstand beyond-design-basis accident conditions. The staff proposes to place this open item in Group 2.

The staff considered whether to require enhanced instrumentation as part of the ongoing Mitigating Beyond-Design-Basis Events rulemaking and determined that it was not needed for licensees to effectively implement Severe Accident Management Guidelines (SAMGs). In the current paper, the staff explains:

The SAMGs were developed and implemented based on a philosophy that makes use of available instrumentation, includes backup or alternative means for determining plant conditions when the primary means become available or unreliable, and includes a course of action to follow when the event degrades to the point where there is no reliable instrumentation available.

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<sup>6</sup> See SRM for SECY-12-0092 (Dec. 6, 2012).

I agree with the ACRS that the “staff should include a detailed demonstration of how the SAMGs and calculational aids are capable of leading the operators to take the correct actions, even if minimal instrumentation is available or their indications are suspect.” I approve treating this recommendation as a Group 2 item and look forward to reviewing the staff’s final evaluation.

**Emergency Planning Zone Size and Pre-Staging Potassium Iodide Beyond 10 Miles (Enclosure 6)**

After the Near-Term Task Force provided its report, the NRC staff identified an additional recommendation to reconsider the basis of the emergency planning zone (EPZ) size and practices associated with the pre-staging of potassium iodide beyond 10 miles. The staff proposes to close this item as part of Group 1 based on its conclusions that “the current size of EPZs is appropriate for existing reactors” and the current distribution program for potassium iodide tablets within the 10-mile EPZ adequately protects public health and safety.

The staff’s conclusion related to EPZ size appears to be well-supported by studies that examined 11 large-scale evacuations involving more than 10 million people, including those in response to Hurricanes Katrina, Rita, and Wilma. The staff explains that “[t]he 11 incidents covered wide geographical areas and affected 14 nuclear power plant EPZs, although none of the evacuations were related to issues associated with those nuclear power plants.” However, the staff’s discussion of this open item does not specifically describe how the staff assessed the adequacy of the potassium iodide distribution program, so this assessment should be provided to the Commission for information before closing this item. With that caveat, I approve closing this Group 1 item.

**Emergency Preparedness (Enclosure 7)**

The Near-Term Task Force’s recommendations 9, 10, and 11 relate to emergency preparedness. The Tier 3 open item involves portions of these recommendations. The staff proposes six resolution plans to address different aspects of the open item. I approve closing the first and sixth resolution plans (relating to recommendations subsumed in the Mitigation of Beyond-Design-Basis Events rulemaking and local training) as Group 1 items without additional action. Each of the remaining elements of this open item should be moved to Group 3 for additional work.

The second and third elements of this open item relate to the Emergency Response Data System (ERDS). ERDS electronically transmits data about the status of a reactor directly to NRC through an internet connection so that the agency has immediate access to accurate, real-time information about the plant in the event of an emergency, without the need for frequent phone calls interrupting licensee personnel who will be busy addressing the emergency. The Near-Term Task Force recommended evaluating whether ERDS should be hardened to maintain its capability during a severe accident; whether there are alternate methods, such as satellite transmission, to transmit ERDS data that do not rely on hardwired infrastructure that may be unavailable during a severe natural disaster; “whether the data set currently being received from each site is sufficient for modern assessment needs”; and “whether ERDS should be required to transmit continuously so that no operator action is needed during an emergency.” The Task Force explained that “the current regulatory approach and requirements do not ensure that ERDS data would be available during a prolonged [station blackout] or during other natural disasters when power supplies could be lost and transmission capability may be affected.” In its 2012 prioritization of these issues as a Tier 3 item, the staff stated that it had “determined that these aspects of the ERDS may need a more integrated and comprehensive set of requirements.”

The staff admits that it “has not made significant progress” on the ERDS issues, but nonetheless proposes to close them as Group 1 items based on a conclusory prediction that it is unlikely that additional action would represent a cost-justified substantial safety enhancement. Rather than discussing each of these ERDS issues in detail, I will focus on the question of whether NRC should pursue an alternate method to transmit ERDS data as a backup if internet connectivity is unavailable during a severe accident. This question is a good illustration of why more work needs to be done to meaningfully evaluate whether additional steps should be taken to enhance ERDS capability during a severe accident.

In 1991, NRC found that requiring ERDS was a cost-justified substantial safety enhancement. The Commission concluded that requiring ERDS would “provide a substantial increase in overall protection of public health and safety by ensuring far more accurate and timely flow of data for the NRC to fulfill its role during an alert or higher emergency.” The Commission also stated: “The direct and indirect costs estimated for the implementation of this rule are justified in view of this increased protection.” Twenty-five years of experience since the Commission decided to require ERDS have confirmed the benefits of the system. In response to my questions, the staff explained that, when a licensee provides data by telephone, “NRC can expect the licensee to provide an update about every 20 minutes versus ERDS data being sent/refreshed every 15 to 60 seconds.” The staff also stated that communications by phone “could reduce the accuracy of the information provided” and that licensees therefore typically provide data on fewer parameters by phone. According to the staff:

The reduced timeliness and number of parameters that can be tracked using [the telephone system] can impact the efficiency of the NRC’s independent assessment and evaluation functions. Specifically, loss of ready access to multiple data points in near-real time from ERDS can impact the NRC’s ability to understand current conditions and better predict future conditions and issues.

So there is no question that ERDS would be very valuable during an emergency. The question is whether the benefits of having ERDS when internet connectivity is lost outweigh the costs of installing a backup system that does not rely on a land-based internet connection to transmit data to NRC. As the staff explains in the paper, the need to evaluate a backup ERDS transmission capability was identified as a lesson learned from several natural disasters, including Hurricanes Katrina, Rita, and Wilma, and the earthquakes in Fukushima and Mineral, Virginia.

The staff previously planned to conduct a pilot to assess whether an ERDS backup system would be worthwhile. Based on quotes from three vendors, the staff estimated that the cost of the data transmission equipment would be between \$55,000 and \$65,000 to cover four nuclear power plant sites. Although this estimate does not include any costs associated with updating plant systems to accommodate a more reliable connection, the costs of the equipment itself are not exorbitant. A ballpark estimate of equipment costs for the entire U.S. power plant fleet would be around \$1 million. Yet, without any analysis or explanation of how it weighed the pros and cons of a pilot project or broader requirement, the staff merely concluded that “given the NRC’s role in incident response, the staff does not believe that further assessment will identify that requiring an alternative method of transmission of ERDS data is justified” under the backfit rule.

This superficial analysis is clearly inadequate. The staff should conduct a full examination of the quantified and unquantified benefits and costs of a pilot project to determine whether it makes sense to further invest in the reliability and durability of ERDS. The staff

should fully explore the options for establishing a backup transmission capability so that the system will work when we need it most – during a severe natural disaster or accident. The staff should move all four of the ERDS issues to Group 3 and conduct a thorough analysis of these issues.

The fourth element of this open item involves potential enhancements to the U.S. decision-making framework, including the concepts of recovery and reentry. The staff continues to work with other federal agencies to revise the Nuclear/Radiological Incident Annex to the National Response Framework. I appreciate the progress being made to address this Near-Term Task Force recommendation, but the item should remain open until the work is complete.

The fifth element involves a Task Force recommendation to study the efficacy of real-time radiation monitoring on-site and within the EPZ. The staff explains that it “is documenting the historical background of real-time radiation monitoring systems and the justifications for the historical decisions.” The staff acknowledges that it “has not made substantive progress on this recommendation since the development of the initial project plans,” but then proposes to close the item based on a prediction that it is “unlikely that changes to require real-time radiation monitoring would provide a cost-justified substantial safety improvement.” This is not a meaningful response to the Near-Term Task Force’s recommendation to take a fresh look at real-time radiation monitoring. A purely backward-looking examination of past findings and decisions will miss the significant technological progress that has occurred in this field. As the staff recommends, they should treat this issue as a Group 3 item. As part of its work, the staff should take a fresh look at the new technologies for real-time radiation monitoring and how they could inform emergency preparedness efforts.

#### **Reactor Oversight Process Modifications (Enclosure 8)**

The Near-Term Task Force recommended expanding the scope of the Reactor Oversight Process self-assessment and biennial realignment to more fully include defense-in-depth considerations. I approve the staff’s proposal to close this as a Group 1 item because the staff has been using separate processes to examine potential ROP changes.

#### **Enhanced Severe Accident Training for NRC Staff (Enclosure 9)**

The Near-Term Task Force recommended enhanced NRC staff training on severe accidents, including training resident inspectors on Severe Accident Management Guidelines. The staff proposes to close this as a Group 1 item in light of the progress made on a range of responsive initiatives. I approve closing this item upon completion of the ongoing activities outlined by the staff, including verifying the availability of the new SAMG staff training course and updating the inspector qualification program to incorporate training on SAMGs.

#### **Conclusion**

In conclusion, I approve closing all or portions of four Group 1 items (EPZ size, the first and sixth elements of emergency preparedness, ROP modifications, and severe accident training), subject to the conditions described above. I disapprove closing the remaining Tier 2 and Tier 3 items until such time as the appropriate analyses are complete and the staff presents for Commission approval its final conclusions regarding the need for additional steps or regulatory actions.