SECRETARY

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

January 12, 2017

COMMISSION VOTING RECORD

DECISION ITEM: SECY-16-0131

TITLE: DENIAL OF PETITION FOR RULEMAKING ON UNINTERRUPTIBLE MONITORING OF COOLANT AND FUEL IN REACTORS AND SPENT FUEL POOLS (PRM-50-113; NRC-2015-0230)

The Commission acted on the subject paper as recorded in the Staff Requirements Memorandum (SRM) of January 12, 2017.

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

Annette L. Vietti-Cook
Secretary of the Commission

Enclosures:
1. Voting Summary
2. Commissioner Vote Sheets

cc: Chairman Burns
Commissioner Svinicki
Commissioner Baran
OGC
EDO
PDR

VOTING SUMMARY – SECY-16-0131

RECORDED VOTES

	APPROVED	DISAPPROVED	ABSTAIN	NOT PARTICIPATING	COMMENTS	DATE
Chrm. Burns	X				X	12/19/16
Cmr. Svinicki	X				X	01/03/17
Cmr. Baran	X				X	12/13/16

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: Chairman Burns

SUBJECT: SECY-16-0131: DENIAL OF PETITION FOR RULEMAKING ON UNINTERRUPTIBLE MONITORING OF COOLANT AND FUEL IN REACTORS AND SPENT FUEL POOLS (PRM-50-113; NRC-2015-0230)

Approved X **Disapproved** ____ **Abstain** ____ **Not Participating** ____

COMMENTS: **Below** X **Attached** X **None** ____

I approve the NRC staff's recommendation to deny PRM-50-113 and the draft *Federal Register* notice and denial letter, subject to the attached edits.

Entered in STARS
Yes X
No ____

SIGNATURE

19 **December 2016**

DATE

SGB Edits [7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR Part 50

[Docket No. PRM-50-113; NRC-2015-0230]

Uninterruptible Monitoring of Coolant and Fuel in Reactors and Spent Fuel Pools

AGENCY: Nuclear Regulatory Commission.

ACTION: Petition for rulemaking; denial.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is denying a petition for rulemaking (PRM), dated September 10, 2015, submitted by Dr. Alexander DeVolpi (the petitioner). The petition was docketed by the NRC on September 21, 2015, and was assigned Docket No. PRM-50-113. The petitioner requested that the NRC amend its regulations to require "installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent-fuel pools." The NRC is denying the petition because the staff finds that the issues raised by the petitioner have been addressed by actions taken by the NRC in response to the Fukushima Dai-ichi nuclear accident.

DATES: The docket for the petition for rulemaking, PRM-50-113, is closed on **[INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

ADDRESSES: Please refer to Docket ID NRC-2015-0230, when contacting the NRC about the availability of information regarding this petition. You may obtain publicly-available information related to this petition by any of the following methods:

- **Federal Rulemaking Web Site:** Go to http://www.regulations.gov and search for Docket ID NRC-2015-0230. Address questions about NRC dockets to Carol Gallagher; telephone: 301-415-3463; e-mail: Carol.Gallagher@nrc.gov. For technical questions, contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.
- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may obtain publicly-available documents online in the ADAMS Public Documents collection at http://www.nrc.gov/reading-rm/adams.html. To begin the search, select "ADAMS Public Documents" and then select "Begin Web-based ADAMS Search." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov. For the convenience of the reader, instructions about obtaining materials referenced in this document are provided in Section IV, "Availability of Documents," of this document.
- **NRC's PDR:** You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

FOR FURTHER INFORMATION CONTACT: Jennifer C. Tobin, Office of Nuclear Reactor Regulation, telephone: 301-415-2328; e-mail: Jennifer.Tobin@nrc.gov; U.S. Nuclear Regulatory Commission, Washington DC 20555-0001.

SUPPLEMENTARY INFORMATION:

TABLE OF CONTENTS:

I. The Petition

Section 2.802 of title 10 of the *Code of Federal Regulations* (10 CFR), "Petition for rulemaking," provides an opportunity for any interested person to petition the Commission to issue, amend, or rescind any regulation. The NRC received a petition dated September 10, 2015, from Dr. Alexander DeVolpi and assigned it Docket No. PRM-50-113. The NRC published a notice of docketing in the *Federal Register* (FR) on December 1, 2015 (80 FR 75009). The NRC did not request public comment on PRM-50-113 because it had sufficient information to review the issues raised by the petitioner.

The petitioner requested that the NRC amend 10 CFR part 50, "Domestic licensing of production and utilization facilities," to require "installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent-fuel pools."

II. Reasons for Denial

The NRC is denying the petition because the issues raised by the petitioner have been addressed through actions taken in response to the Fukushima Dai-ichi nuclear accident. The NRC determined that there is no ~~current~~ technical or regulatory basis to amend the NRC's ~~for the~~ regulations as requested ~~challenged~~ by the petitioner ~~remains sound~~.

The petitioner proposed that Recommendation 5.1A in the 2014 National Academy of Sciences (NAS) report entitled "Lessons Learned from the Fukushima Nuclear Accident for

Improving Safety of U.S. Nuclear Plants" should be mandated (as an NRC regulation) to require installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent-fuel pools. The petitioner stated that NAS gave a high priority to this recommendation and the petitioner indicated that he has developed instrumentation that is capable of uninterruptible monitoring of critical thermodynamic parameters. The petitioner included diagrams and explanations of his patented instrumentation and supportive technical papers and requested that the NRC require use of such instrumentation to prevent or mitigate accidents. In particular, the petitioner contends that the accident at Three Mile Island, Unit 2 ~~accident~~ might have been prevented if real-time uninterruptible ex-vessel reactor water-level monitoring had been in place. Further, the petitioner states that one or two of the Fukushima-Dai-ichi meltdowns might have been delayed or averted if uninterruptible ex-vessel real-time reactor water-level monitoring had been in place and operating on self-contained low-current battery supplies.

The NRC staff responded to the NAS report and its recommendations in SECY-15-0059, "Seventh 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tōhoku Earthquake and Subsequent Tsunami," dated April 9, 2015. The NRC staff's discussion of Recommendation 5.1A in enclosure 6 of SECY-15-0059 addresses the installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent fuel pools. The NRC staff found that this recommendation was addressed by existing requirements and other ongoing activities. The issues that the petitioner's proposal would address are being or have already been addressed by NRC actions taken in response to the Fukushima Dai-ichi nuclear accident, as summarized in this document.

Instrumentation used to support strategies ~~used~~ in the mitigation of beyond-design-basis events ~~are~~is ~~being~~ addressed in ~~response to~~ Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis

External Events." This Order ~~will~~ ensures that plant operators have the information concerning key parameters that is needed to support implementation of mitigation strategies to maintain or restore core cooling, spent fuel pool cooling, and containment prior to the onset of core or~~and~~ spent fuel damage. Either installed instrumentation remains powered during an extended loss of alternating current power (ELAP) via safety-related batteries and other power supplies that provide coping capabilities for an indefinite period of time, or portable instruments are used that are powered independently from the plant power system~~do not rely on the functioning of intervening electrical equipment~~. If mitigation strategies are not successful and severe accident conditions develop, the enhancements made in response to Order EA-12-049 will provide for monitoring of key parameters on the condition of the reactor, containment, and spent fuel pool throughout the accident's progression until instrumentation becomes unavailable or unreliable. These enhancements~~This, in turn,~~ should also enable licensees to more easily transition to the use of computational aids when direct diagnosis of key plant conditions cannot be determined safely from instrumentation. Further,

~~s~~Spent fuel pool instrumentation is also required by Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," to remotely report three distinct water levels: normal level; low level but still enough to shield workers above the pools from radiation; and a level near the top of the spent fuel rods, at which more water should be added without delay.

The NRC staff presented its evaluation of enhanced instrumentation for beyond-design-basis conditions in enclosure 5 to SECY-15-0137, "Proposed Plans for Resolving Open Fukushima Tier 2 and 3 Recommendations." The staff recommended that that the Commission not pursue additional regulatory requirements for enhanced reactor and containment instrumentation. The NRC staff concluded that additional studies are unlikely to support additional regulatory requirements related to enhanced reactor and containment instrumentation

The additional NRC staff evaluations support the conclusion that regulatory actions to require enhancements to reactor and containment instrumentation to support the response to severe accidents would not provide a substantial safety enhancement, and therefore, additional regulatory actions would not be warranted when evaluated against the § 50.109 criteria. ~~In addition, t~~The ACRS agreed in its March 15, 2016, letter that no further regulatory action is warranted in support of the closure of the recommendation on enhanced instrumentation.

In addition to the discussion in SECY-15-0137 and SECY-16-0041, the NRC staff notes that, depending on an accident's progression, licensees will use available indicators and technical assessments of the evolving scenario to implement adequate measures to protect public health and safety in accordance with the NRC's emergency preparedness requirements. If an accident progresses to fuel damage, specific additional actions would may be required, including initiating predetermined protective actions for the public.

Moreover, the NRC is proposing to amend its regulations to establish regulatory requirements for nuclear power reactor applicants and licensees to mitigate beyond-design-basis events to reflect requirements imposed on current licensees by order and the lessons learned from the Fukushima Dai-ichi accident. This proposed rule, "Mitigation of Beyond-Design-Basis Events," which was published in the *Federal Register* on November 13, 2015 (80 FR 70610; corrected by 80 FR 74717, November 30, 2015), would, among other things, add a new regulation (proposed 10 CFR 50.155) to make Orders EA–12–049 and EA–12–051 generically applicable, establish regulatory requirements for an integrated response capability, and include requirements for enhanced onsite emergency response capabilities.

~~Further, the NRC staff will continue to participate in codes and standards activities, and the NRC staff will update regulatory guidance documents on instrumentation, as warranted. For example, the NRC plans to update the guidance in Regulatory Guide 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants." As a result, the NRC staff expects that~~

~~operating reactor licensees could use the revised guidance, on a voluntary basis, to enhance their reactor and containment instrumentation.~~

Therefore, in accordance with the NRC staff's evaluation in SECY-15-0137, the Commission's direction on SECY-15-0137, updated information provided in SECY-16-0041, ~~and~~ existing emergency preparedness requirements, and the proposed Mitigation of Beyond-Design-Basis Events rulemaking, the NRC has determined that additional instrumentation requirements to address severe accident conditions proposed in ~~the~~ PRM-50-113 are not necessary.

III. Conclusion

For the reasons cited in Section II of this document, the NRC has concluded that the issues raised by the petitioner have been addressed by NRC actions taken in response to the Fukushima Dai-ichi nuclear accident and there is no sufficient technical or regulatory basis to amend the NRC's regulations as requested by the petitioner. Therefore, the NRC is denying PRM-50-113.

IV. Availability of Documents

The documents identified in the following table are available to interested persons through one or more of the methods listed at the beginning of this notice.

DOCUMENT	ADAMS ACCESSION NO. / WEB LINK / *FEDERAL REGISTER* CITATION
ACRS Letter, "Plans for Resolving the NRC Near-Term Task Force Open Fukushima Tier 2 and 3 Recommendations," November 16, 2015.	ML15320A074
ACRS Letter, "Closure of Fukushima Tier 3 Recommendations Related to Vents, Hydrogen Control, and Enhanced Instrumentation," March 15, 2016.	ML16075A330
Federal Register notice, "Uninterruptible Monitoring of Coolant and Fuel in Reactors and Spent Fuel Pools," December 1, 2015.	80 FR 70059 (corrected by 80 FR 74717; November 30, 2015)
Federal Register notice, "Mitigation of Beyond-Design-Basis Events," November 13, 2015.	80 FR 70610
Letter from Nuclear Energy Institute to NRC, "Submittal of Industry Initiative to Maintain Severe Accident Management Guidelines," October 26, 2015.	ML15335A442
National Academy of Sciences, "Lessons Learned from the Fukushima Nuclear Accident for Improving Safety of U.S. Nuclear Plants," 2014.	http://www.nap.edu/read/18294/chapter/1
NRC Generic Letter 1982-033, "Supplement 1 to NUREG-0737 – Requirements for Emergency Response Capability," December 17, 1982.	ML031080548
NUREG-0933, "Resolution of Generic Safety Issues," December 2011.	http://nureg.nrc.gov/sr0933
Order EA-12-049, "Issuance of Order to Modify Licenses With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," March 12, 2012.	ML12054A735
Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," March 12, 2012.	ML12056A044
PRM-50-113, "Uninterruptible Monitoring of Critical Thermodynamic Parameters Coolant and Fuel in Reactors and Spent-Fuel Pools," September 10, 2015.	ML15264A857
Regulatory Guide 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants," June 2006.	ML061580448
SECY-15-0059, "Seventh 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami," April 9, 2015.	ML15069A444 ML15069A581 (enc. 3) ML15069A600 (enc. 6)
SECY-15-0065, "Proposed Rulemaking: Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49)," April 30, 2015.	ML15049A201
SECY-15-0137, "Proposed Plans for Resolving Open Fukushima Tier 2 and 3 Recommendations," October 29, 2015.	ML15254A006 ML15254A034 (enc. 5)

SGB Edits

Dr. Alexander DeVolpi, PhD
1371 Corte Paguera
Oceanside, CA 92057

Dear Dr. DeVolpi:

I am responding to your petition for rulemaking (PRM) dated September 10, 2015 (Accession No. ML15264A857 in the U.S. Nuclear Regulatory Commission's (NRC) Agencywide Documents Access and Management System). Your petition was docketed by the NRC as PRM-50-113. You requested that the NRC amend its regulations in Part 50 of Title 10 of the *Code of Federal Regulations* to require "installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent fuel pools."

The NRC published a notice of docketing in the *Federal Register* for PRM-50-113 on December 1, 2015 (80 FR 75009). The NRC did not request public comment on PRM-50-113 because the staff had sufficient information available to review the PRM.

The NRC has determined that the issues you raised have already been addressed by the actions that were taken in response to the Fukushima Dai-ichi nuclear accident, including orders associated with mitigation of beyond-design-basis accidents and spent fuel pool instrumentation. PRM-50-113 provided no sufficient basis to revise the regulations as requested; therefore, the NRC is denying PRM-50-113. The reasons for the denial are explained in the enclosed notice, which will be published in the *Federal Register*. Upon publication of the enclosed notice, the NRC will close the docket for PRM-50-113.

You may direct any questions regarding this matter to Jennifer C. Tobin, by calling 301-415-2328 or by e-mailing Jennifer.Tobin@nrc.gov.

Sincerely,

Annette L. Vietti-Cook
Secretary of the Commission

Enclosure:
Federal Register notice

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: COMMISSIONER SVINICKI

SUBJECT: SECY-16-0131: DENIAL OF PETITION FOR RULEMAKING ON UNINTERRUPTIBLE MONITORING OF COOLANT AND FUEL IN REACTORS AND SPENT FUEL POOLS (PRM-50-113; NRC-2015-0230)

Approved XX **Disapproved** ____ **Abstain** ____ **Not Participating** ___

COMMENTS: **Below** XX **Attached** XX **None** ____

I approve the NRC staff's recommendation to deny PRM-50-113 and the *Federal Register* notice and denial letter, subject to the attached edits.

SIGNATURE

01/13/17

DATE

Entered on "STARS" **Yes** ✓ **No** ___

KLS edits [7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR Part 50

[Docket No. PRM-50-113; NRC-2015-0230]

Uninterruptible Monitoring of Coolant and Fuel in Reactors and Spent Fuel Pools

AGENCY: Nuclear Regulatory Commission.

ACTION: Petition for rulemaking; denial.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is denying a petition for rulemaking (PRM), dated September 10, 2015, submitted by Dr. Alexander DeVolpi (the petitioner). The petition was docketed by the NRC on September 21, 2015, and was assigned Docket No. PRM-50-113. The petitioner requested that the NRC amend its regulations to require "installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent-fuel pools." The NRC is denying the petition because the Commissionstaff finds that the issues raised by the petitioner have been addressed by actions taken by the NRC in response to the Fukushima Dai-ichi nuclear accident.

DATES: The docket for the petition for rulemaking, PRM-50-113, is closed on **[INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

ADDRESSES: Please refer to Docket ID NRC-2015-0230, when contacting the NRC about the availability of information regarding this petition. You may obtain publicly-available information related to this petition by any of the following methods:

- **Federal Rulemaking Web Site:** Go to http://www.regulations.gov and search for Docket ID NRC-2015-0230. Address questions about NRC dockets to Carol Gallagher; telephone: 301-415-3463; e-mail: Carol.Gallagher@nrc.gov. For technical questions, contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.
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SUPPLEMENTARY INFORMATION:

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The petitioner requested that the NRC amend 10 CFR part 50, "Domestic licensing of production and utilization facilities," to require "installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent-fuel pools."

II. Reasons for Denial

The NRC is denying the petition because the issues raised by the petitioner have been addressed through actions taken in response to the Fukushima Dai-ichi nuclear accident. The NRC determined that there is no ~~current~~ technical or regulatory basis to amend the NRC's ~~for the~~ regulations as requested ~~challenged~~ by the petitioner ~~remains sound~~.

The petitioner proposed that Recommendation 5.1A in the 2014 National Academy of Sciences (NAS) report entitled "Lessons Learned from the Fukushima Nuclear Accident for

Improving Safety of U.S. Nuclear Plants" should be mandated (as an NRC regulation) to require installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent-fuel pools. The petitioner stated that NAS gave a high priority to this recommendation and the petitioner indicated that he has developed instrumentation that is capable of uninterruptible monitoring of critical thermodynamic parameters. The petitioner included diagrams and explanations of his patented instrumentation and supportive technical papers and requested that the NRC require use of such instrumentation to prevent or mitigate accidents. In particular, the petitioner contends that the accident at Three Mile Island, Unit 2, ~~accident~~ might have been prevented if real-time uninterruptible ex-vessel reactor water-level monitoring had been in place. Further, the petitioner states that one or two of the Fukushima Dai-ichi meltdowns might have been delayed or averted if uninterruptible ex-vessel real-time reactor water-level monitoring had been in place and operating on self-contained low-current battery supplies.

The NRC staff responded to the NAS report and its recommendations in SECY-15-0059, "Seventh 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tōhoku Earthquake and Subsequent Tsunami," dated April 9, 2015. The NRC staff's discussion of Recommendation 5.1A in enclosure 6 of SECY-15-0059 addresses the installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent fuel pools. The NRC staff found that this recommendation was addressed by existing requirements and other ongoing activities. The issues that the petitioner's proposal would address are being or have already been addressed by NRC actions taken in response to the Fukushima Dai-ichi nuclear accident, as summarized in this document.

Instrumentation used to support strategies ~~used~~ in the mitigation of beyond-design-basis events is~~are being~~ addressed in ~~response to~~ Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis

External Events." This Order ~~will~~ ensures that plant operators have the information concerning key parameters that is needed to support implementation of mitigation strategies to maintain or restore core cooling, spent fuel pool cooling, and containment prior to the onset of core or~~and~~ spent fuel damage. Either installed instrumentation remains powered during an extended loss of alternating current power (ELAP) via safety-related batteries and other power supplies that provide coping capabilities for an indefinite period of time, or portable instruments are used that are powered independently from the plant power system~~do not rely on the functioning of intervening electrical equipment~~. If mitigation strategies are not successful and severe accident conditions develop, the enhancements made in response to Order EA-12-049 will provide for monitoring of key parameters on the condition of the reactor, containment, and spent fuel pool throughout the accident's progression until instrumentation becomes unavailable or unreliable. These enhancements~~is, in turn,~~ should also enable licensees to more easily transition to the use of computational aids when direct diagnosis of key plant conditions cannot be determined reliability~~safely~~ from instrumentation.

~~S~~Further, spent fuel pool instrumentation is also required by Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," to remotely report three distinct water levels: normal level; low level but still enough to shield workers above the pools from radiation; and a level near the top of the spent fuel rods, at which more water should be added without delay.

~~T~~Following the issuance of the Orders, the NRC staff presented its evaluation of enhanced instrumentation for beyond-design-basis conditions in enclosure 5 to SECY-15-0137, "Proposed Plans for Resolving Open Fukushima Tier 2 and 3 Recommendations." The staff recommended that that the Commission not pursue additional regulatory requirements for enhanced reactor and containment instrumentation. The NRC staff concluded that additional studies are unlikely to support additional regulatory requirements related to enhanced reactor

and containment instrumentation for beyond-design-basis conditions, when evaluated against the criteria for operating reactors in § 50.109, "Backfitting," or the issue finality provisions of 10 CFR part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."

In the staff requirements memorandum associated with SECY-15-0137, the Commission directed the NRC staff to provide the final results of its evaluation following interactions with external stakeholders and the Advisory Committee on Reactor Safeguards (ACRS). Accordingly, the NRC staff provided updated information regarding enhanced reactor and containment instrumentation for beyond-design-basis conditions in enclosure 2 to SECY-16-0041, "Closure of Fukushima Tier 3 Recommendations Related to Containment Vents, Hydrogen Control, and Instrumentation." The updated information addressed the observations provided by the ACRS in letters dated November 16, 2015, and March 15, 2016, and insights provided by external stakeholders. For example, information was added to the final assessment that describes the technical support guidance (TSG) for the severe accident management guidelines (SAMGs) and related assessments of plant parameters as well as the status of safety functions that would be performed by plant personnel during a severe accident. The SAMGs are entered when plant conditions indicate that cooling of the spent fuel pool or core cannot be maintained and the fuel in the spent fuel pool or reactor is on a trajectory towards damage. The SAMGs then invoke the TSGs that are based on an engineering evaluation of the scenario. This would include an assessment of the available parameter indications, their functional consistency, and their trends as the plant transitions to severe accident conditions, which may be more severe than the conditions assumed in instrument design and environmental qualifications. The severe accident response strategies are then based on fundamental principles that do not rely on precise indications of parameter values, but rather on an integrated technical assessment of the evolving event scenario and the conditions that preceded the onset of fuel damage in the spent fuel pool or core.

The additional NRC staff evaluations further support the conclusion that regulatory actions to require enhancements to reactor and containment instrumentation to support the response to severe accidents would not provide a substantial safety enhancement, and therefore, additional regulatory actions would not be warranted when evaluated against the § 50.109 criteria. ~~In addition, t~~The ACRS agreed in its March 15, 2016, letter that no further regulatory action is warranted in support of the closure of the recommendation on enhanced instrumentation.

In addition to the discussion in SECY-15-0137 and SECY-16-0041, the NRC staff notes that, depending on an accident's progression, licensees will use available indicators and technical assessments of the evolving scenario to implement adequate measures to protect public health and safety in accordance with the NRC's emergency preparedness requirements. If an accident progresses to fuel damage, specific ~~would~~additional actions may be required, including initiating predetermined protective actions for the public.

Moreover, the NRC is proposing to amend its regulations to establish regulatory requirements for nuclear power reactor applicants and licensees to mitigate beyond-design-basis events to reflect requirements imposed on current licensees by Order and the lessons learned from the Fukushima Dai-ichi accident. This proposed rule, "Mitigation of Beyond-Design-Basis Events," which was published in the *Federal Register* on November 13, 2015 (80 FR 70610; corrected by 80 FR 74717, November 30, 2015), would, among other things, add a new regulation (proposed 10 CFR 50.155) to make Orders EA-12-049 and EA-12-051 generically applicable, establish regulatory requirements for an integrated response capability, and include requirements for enhanced onsite emergency response capabilities.

~~Further, the NRC staff will continue to participate in codes and standards activities, and the NRC staff will update regulatory guidance documents on instrumentation, as warranted. For example, the NRC plans to update the guidance in Regulatory Guide 1.97, "Criteria for Accident~~

~~Monitoring Instrumentation for Nuclear Power Plants." As a result, the NRC staff expects that operating reactor licensees could use the revised guidance, on a voluntary basis, to enhance their reactor and containment instrumentation.~~

Therefore, in accordance with the NRC staff's evaluation in SECY-15-0137, the Commission's direction on SECY-15-0137, updated information provided in SECY-16-0041, ~~and~~ existing emergency preparedness requirements, and the proposed Mitigation of Beyond-Design-Basis Events rulemaking, the NRC has determined that additional instrumentation requirements to address severe accident conditions proposed in ~~the~~ PRM-50-113 are not necessary.

III. Conclusion

For the reasons cited in Section II of this document, the NRC has concluded that the issues raised by the petitioner have been addressed by NRC actions taken in response to the Fukushima Dai-ichi nuclear accident and there is no sufficient technical or regulatory basis to amend the NRC's regulations as requested by the petitioner. Therefore, the NRC is denying PRM-50-113.

IV. Availability of Documents

The documents identified in the following table are available to interested persons through one or more of the methods listed at the beginning of this notice.

DOCUMENT	ADAMS ACCESSION NO. / WEB LINK / *FEDERAL REGISTER* CITATION
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Regulatory Guide 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants," June 2006.	ML061580448
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SECY-15-0065, "Proposed Rulemaking: Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49)," April 30, 2015.	ML15049A201
SECY-15-0137, "Proposed Plans for Resolving Open Fukushima Tier 2 and 3 Recommendations," October 29, 2015.	ML15254A006 ML15254A034 (enc. 5)

SECY-16-0041, "Closure of Fukushima Tier 3 Recommendations Related to Containment Vents, Hydrogen Control, and Enhanced Instrumentation," March 31, 2016.	ML16049A079
SRM-SECY-15-0065, "Proposed Rulemaking: Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49)," August 27, 2015.	ML15239A767
SRM-SECY-15-0137, "Proposed Plans for Resolving Open Fukushima Tier 2 and 3 Recommendations," February 8, 2016.	ML16039A175

Dated at Rockville, Maryland, this day of , 2016.

For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,
Secretary of the Commission.

KLS edits

Dr. Alexander DeVolpi, PhD
1371 Corte Paguera
Oceanside, CA 92057

Dear Dr. DeVolpi:

I am responding to your petition for rulemaking (PRM) dated September 10, 2015 (Accession No. ML15264A857 in the U.S. Nuclear Regulatory Commission's (NRC) Agencywide Documents Access and Management System). Your petition was docketed by the NRC as PRM-50-113. You requested that the NRC amend its regulations in Part 50 of Title 10 of the *Code of Federal Regulations* to require "installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent fuel pools."

The NRC published a notice of docketing in the *Federal Register* for PRM-50-113 on December 1, 2015 (80 FR 75009). The NRC did not request public comment on PRM-50-113 because the staff had sufficient information available to review the PRM.

The NRC has determined that the issues you raised have already been addressed by the actions that were taken in response to the Fukushima Dai-ichi nuclear accident, including orders associated with mitigation of beyond-design-basis accidents and spent fuel pool instrumentation. PRM-50-113 provided no sufficient basis to revise the regulations as requested; therefore, the NRC is denying PRM-50-113. The reasons for the denial are explained in the enclosed notice, which will be published in the *Federal Register*. Upon publication of the enclosed notice, the NRC will close the docket for PRM-50-113.

You may direct any questions regarding this matter to Jennifer C. Tobin, by calling 301-415-2328 or by e-mailing Jennifer.Tobin@nrc.gov.

Sincerely,

Annette L. Vietti-Cook
Secretary of the Commission

Enclosure:
Federal Register notice

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: Commissioner Baran

SUBJECT: SECY-16-0131: DENIAL OF PETITION FOR RULEMAKING ON UNINTERRUPTIBLE MONITORING OF COOLANT AND FUEL IN REACTORS AND SPENT FUEL POOLS (PRM-50-113; NRC-2015-0230)

Approved _X_ Disapproved ____ Abstain ____ Not Participating ____

COMMENTS: Below __X__ Attached __X__ None ____

I approve the draft *Federal Register* notice and letter, subject to the attached edits.

Entered in "STARS"
Yes ____ No ____

/RA/
SIGNATURE

12/13/16
DATE

[7590-01-P]

JMB Edits

NUCLEAR REGULATORY COMMISSION

10 CFR Part 50

[Docket No. PRM-50-113; NRC-2015-0230]

Uninterruptible Monitoring of Coolant and Fuel in Reactors and Spent Fuel Pools

AGENCY: Nuclear Regulatory Commission.

ACTION: Petition for rulemaking; denial.

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) is denying a petition for rulemaking (PRM), dated September 10, 2015, submitted by Dr. Alexander DeVolpi (the petitioner). The petition was docketed by the NRC on September 21, 2015, and was assigned Docket No. PRM-50-113. The petitioner requested that the NRC amend its regulations to require "installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent-fuel pools." The NRC is denying the petition because the staff finds that the issues raised by the petitioner have been addressed by actions taken by the NRC in response to the Fukushima nuclear accident.

DATES: The docket for the petition for rulemaking, PRM-50-113, is closed on **[INSERT DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

ADDRESSES: Please refer to Docket ID NRC-2015-0230, when contacting the NRC about the availability of information regarding this petition. You may obtain publicly-available information related to this petition by any of the following methods:

- **Federal Rulemaking Web Site:** Go to http://www.regulations.gov and search for Docket ID NRC-2015-0230. Address questions about NRC dockets to Carol Gallagher; telephone: 301-415-3463; e-mail: Carol.Gallagher@nrc.gov. For technical questions, contact the individual listed in the FOR FURTHER INFORMATION CONTACT section of this document.
- **NRC's Agencywide Documents Access and Management System (ADAMS):** You may obtain publicly-available documents online in the ADAMS Public Documents collection at http://www.nrc.gov/reading-rm/adams.html. To begin the search, select "ADAMS Public Documents" and then select "Begin Web-based ADAMS Search." For problems with ADAMS, please contact the NRC's Public Document Room (PDR) reference staff at 1-800-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov. For the convenience of the reader, instructions about obtaining materials referenced in this document are provided in Section V, "Availability of Documents," of this document.
- **NRC's PDR:** You may examine and purchase copies of public documents at the NRC's PDR, Room O1-F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852.

FOR FURTHER INFORMATION CONTACT: Jennifer C. Tobin, Office of Nuclear Reactor Regulation, telephone: 301-415-2328; e-mail: Jennifer.Tobin@nrc.gov; U.S. Nuclear Regulatory Commission, Washington DC 20555-0001.

SUPPLEMENTARY INFORMATION:

TABLE OF CONTENTS:

I. The Petition

Section 2.802 of title 10 of the *Code of Federal Regulations* (10 CFR), "Petition for rulemaking," provides an opportunity for any interested person to petition the Commission to issue, amend, or rescind any regulation. The NRC received a petition dated September 10, 2015, from Dr. Alexander DeVolpi and assigned it Docket No. PRM-50-113. The NRC published a notice of docketing in the *Federal Register* (FR) on December 1, 2015 (80 FR 75009). The NRC did not request public comment on PRM-50-113 because it had sufficient information to review the issues raised by the petitioner.

The petitioner requested that the NRC amend 10 CFR part 50, "Domestic licensing of production and utilization facilities," to require "installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent-fuel pools."

II. Reasons for Denial

The NRC is denying the petition because the issues raised by the petitioner have been addressed through actions taken in response to the Fukushima nuclear accident. The NRC determined that there is no ~~current~~ technical or regulatory basis to amend the NRC's ~~for the~~ regulations challenged by the petitioner ~~remains sound~~.

The petitioner proposed that Recommendation 5.1A in the 2014 National Academy of Sciences (NAS) report entitled "Lessons Learned from the Fukushima Nuclear Accident for

Improving Safety of U.S. Nuclear Plants" should be mandated (as an NRC regulation) to require installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent-fuel pools. The petitioner stated that NAS gave a high priority to this recommendation and the petitioner indicated that he has developed instrumentation that is capable of uninterruptible monitoring of critical thermodynamic parameters. The petitioner included diagrams and explanations of his patented instrumentation and supportive technical papers and requested that the NRC require use of such instrumentation to prevent or mitigate accidents. In particular, the petitioner contends that the accident at Three Mile Island, Unit 2 ~~accident~~ might have been prevented if real-time uninterruptible ex-vessel reactor water-level monitoring had been in place. Further, the petitioner states that one or two of the Fukushima meltdowns might have been delayed or averted if uninterruptible ex-vessel real-time reactor water-level monitoring had been in place and operating on self-contained low-current battery supplies.

The NRC staff responded to the NAS report and its recommendations in SECY-15-0059, "Seventh 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tōhoku Earthquake and Subsequent Tsunami," dated April 9, 2015. The NRC staff's discussion of Recommendation 5.1A in enclosure 6 of SECY-15-0059 addresses the installation of ex-vessel instrumentation for uninterruptible monitoring of coolant and fuel in reactors and spent fuel pools. The NRC staff found that this recommendation was addressed by existing requirements and other ongoing activities. The issues that the petitioner's proposal would address are being or have already been addressed by NRC actions taken in response to the Fukushima nuclear accident, as summarized in this document.

Instrumentation used to support strategies ~~used~~ in the mitigation of beyond-design-basis events ~~are~~ is being addressed in response to Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis

External Events." This Order ~~will~~ ensures that plant operators have the information concerning key parameters ~~that is~~ needed to support implementation of mitigation strategies to maintain or restore core cooling, spent fuel pool cooling, and containment prior to the onset of core ~~and~~ or spent fuel damage. Either installed instrumentation remains powered during an extended loss of alternating current power (ELAP) via safety-related batteries and other power supplies that provide coping capabilities for an indefinite period of time, or portable instruments are used that ~~do not rely on the functioning of intervening electrical equipment~~are powered independently from installed plant power systems. If mitigation strategies are not successful and severe accident conditions develop, the enhancements made in response to Order EA-12-049 will provide for monitoring of key parameters on the condition of the reactor, containment, and spent fuel pool throughout the accident's progression until instrumentation becomes unavailable or unreliable. ~~This, in turn,~~These enhancements should also enable licensees to more easily transition to the use of computational aids when direct diagnosis of key plant conditions cannot be determined reliably ~~safely~~ from instrumentation.

Spent fuel pool instrumentation is also required by Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," to remotely report three distinct water levels: normal level; low level but still enough to shield workers above the pools from radiation; and a level near the top of the spent fuel rods, at which more water should be added without delay. The Commission determined that the spent fuel pool instrumentation required by this Order represented a significant enhancement to the protection of public health and safety and was an appropriate response to the insights from the Fukushima Dai-ichi accident to ensure reliable and available indications so that plant personnel could effectively prioritize emergency actions.

Following the issuance of the Orders, ~~T~~the NRC staff presented its evaluation of enhanced instrumentation for beyond-design-basis conditions in enclosure 5 to SECY-15-0137,

"Proposed Plans for Resolving Open Fukushima Tier 2 and 3 Recommendations." The staff recommended that that the Commission not pursue additional regulatory requirements for enhanced reactor and containment instrumentation. The NRC staff concluded that additional studies are unlikely to support additional regulatory requirements related to enhanced reactor and containment instrumentation for beyond-design-basis conditions, when evaluated against the criteria for operating reactors in § 50.109, "Backfitting," or the issue finality provisions of 10 CFR part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants."

In the staff requirements memorandum associated with SECY-15-0137, the Commission directed the NRC staff to provide the final results of its evaluation following interactions with external stakeholders and the Advisory Committee on Reactor Safeguards (ACRS). Accordingly, the NRC staff provided updated information regarding enhanced reactor and containment instrumentation for beyond-design-basis conditions in enclosure 2 to SECY-16-0041, "Closure of Fukushima Tier 3 Recommendations Related to Containment Vents, Hydrogen Control, and Instrumentation." The updated information addressed the observations provided by the ACRS in letters dated November 16, 2015, and March 15, 2016, and insights provided by external stakeholders. For example, information was added to the final assessment that describes the technical support guidance (TSG) for the severe accident management guidelines (SAMGs) and related assessments of plant parameters as well as the status of safety functions that would be performed by plant personnel during a severe accident. The SAMGs are entered when plant conditions indicate that cooling of the spent fuel pool or core cannot be maintained and the fuel in the spent fuel pool or reactor is on a trajectory towards damage. The SAMGs then invoke the TSGs that are based on an engineering evaluation of the scenario. This would include an assessment of the available parameter indications, their functional consistency, and their trends as the plant transitions to severe accident conditions, which may be more severe than the conditions assumed in instrument

design and environmental qualifications. The severe accident response strategies are then based on fundamental principles that do not rely on precise indications of parameter values, but rather on an integrated technical assessment of the evolving event scenario and the conditions that preceded the onset of fuel damage in the spent fuel pool or core.

The additional NRC staff evaluations further support the conclusion that regulatory actions to require enhancements to reactor and containment instrumentation to support the response to severe accidents would not provide a substantial safety enhancement, and therefore, additional regulatory actions would not be warranted when evaluated against the § 50.109 criteria. In addition, the ACRS agreed in its March 15, 2016, letter that no further regulatory action is warranted in support of the closure of the recommendation on enhanced instrumentation.

In addition to the discussion in SECY-15-0137 and SECY-16-0041, the NRC staff notes that, depending on an accident's progression, licensees will use available indicators and technical assessments of the evolving scenario to implement adequate measures to protect public health and safety in accordance with the NRC's emergency preparedness requirements. If an accident progresses to fuel damage, specific ~~would~~ additional actions may be required, including initiating predetermined protective actions for the public.

~~Further, the NRC staff will continue to participate in codes and standards activities, and the NRC staff will update regulatory guidance documents on instrumentation, as warranted. For example, the NRC plans to update the guidance in Regulatory Guide 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants." As a result, the NRC staff expects that operating reactor licensees could use the revised guidance, on a voluntary basis, to enhance their reactor and containment instrumentation.~~

Therefore, in accordance with the NRC staff's evaluation in SECY-15-0137, the Commission's direction on SECY-15-0137, updated information provided in SECY-16-0041, and

existing emergency preparedness requirements, the NRC has determined that additional instrumentation requirements to address severe accident conditions proposed in the PRM are not necessary.

III. Conclusion

For the reasons cited in Section II of this document, the NRC has concluded that the issues raised by the petitioner have been addressed by NRC actions taken in response to the Fukushima nuclear accident and there is no sufficient technical or regulatory basis to amend the NRC's regulations as requested by the petitioner. Therefore, the NRC is denying PRM-50-113.

IV. Availability of Documents

The documents identified in the following table are available to interested persons through one or more of the methods listed at the beginning of this notice.

DOCUMENT	ADAMS ACCESSION NO. / WEB LINK / *FEDERAL REGISTER* CITATION
ACRS Letter, "Plans for Resolving the NRC Near-Term Task Force Open Fukushima Tier 2 and 3 Recommendations," November 16, 2015.	ML15320A074
ACRS Letter, "Closure of Fukushima Tier 3 Recommendations Related to Vents, Hydrogen Control, and Enhanced Instrumentation," March 15, 2016.	ML16075A330
Federal Register notice, "Uninterruptible Monitoring of Coolant and Fuel in Reactors and Spent Fuel Pools," December 1, 2015.	80 FR 70059
Federal Register notice, "Mitigation of Beyond-Design-Basis Events," November 13, 2015.	80 FR 70610
Letter from Nuclear Energy Institute to NRC, "Submittal of Industry Initiative to Maintain Severe Accident Management Guidelines," October 26, 2015.	ML15335A442
National Academy of Sciences, "Lessons Learned from the Fukushima Nuclear Accident for Improving Safety of U.S. Nuclear Plants," 2014.	http://www.nap.edu/read/18294/chapter/1
NRC Generic Letter 1982-033, "Supplement 1 to NUREG-0737 – Requirements for Emergency Response Capability," December 17, 1982.	ML031080548
NUREG-0933, "Resolution of Generic Safety Issues," December 2011.	http://nureg.nrc.gov/sr0933
Order EA-12-049, "Issuance of Order to Modify Licenses With Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," March 12, 2012.	ML12054A735
Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," March 12, 2012.	ML12056A044
PRM-50-113, "Uninterruptible Monitoring of Critical Thermodynamic Parameters Coolant and Fuel in Reactors and Spent-Fuel Pools," September 10, 2015.	ML15264A857
Regulatory Guide 1.97, "Criteria for Accident Monitoring Instrumentation for Nuclear Power Plants," June 2006.	ML061580448
SECY-15-0059, "Seventh 6-Month Status Update on Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami," April 9, 2015.	ML15069A444 ML15069A581 (enc. 3) ML15069A600 (enc. 6)
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For the Nuclear Regulatory Commission.

Annette L. Vietti-Cook,
Secretary of the Commission.

Dr. Alexander DeVolpi, PhD
1371 Corte Paguera
Oceanside, CA 92057

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Sincerely,

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