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

February 24, 2022

MEMORANDUM TO: Andrea D. Veil, Director
Office of Nuclear Reactor Regulation

FROM: Eric J. Benner, Director
Division of Engineering and External Hazards
Office of Nuclear Reactor Regulation

Signed by Benner, Eric on 02/24/22

SUBJECT: PROCESS FOR THE ONGOING ASSESSMENT OF NATURAL HAZARDS ANNUAL REPORT

This memorandum provides an overview of the status and progress of the Process for the Ongoing Assessment of Natural Hazards Information (POANHI) as reflected in the enclosed annual report. The U.S Nuclear Regulatory Commission (NRC) staff developed the POANHI framework in response to Japan Near Term Task Force (NTTF) Recommendation 2.2, which recommended periodic evaluations of natural hazards at U.S. nuclear power plants. The staff proposed an ongoing system that uses current NRC processes to enhance its collection and analysis of external hazard data in SECY-16-0144, "Proposed Resolution of Remaining Tier 2 and 3 Recommendations Resulting from the Fukushima Dai-ichi Accident", dated December 29, 2016 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16286A586). In SRM-SECY-16-0144, dated May 3, 2017 (ADAMS Accession No. ML17123A453), the Commission approved the staff's proposal and provided resources for staff to undertake POANHI. To create the POANHI framework, the staff first developed internal staff guidance, LIC-208, "Process for the Ongoing Assessment of Natural Hazard Information", issued November 2019 (ADAMS Accession No. ML19210C288), and the Natural Hazards Information Digest (NHID), an online tool used by the NRC staff to document and organize natural hazards information related to nuclear power plants in the United States.

The enclosed annual report documents the activities undertaken by the NRC staff during fiscal years 2020 and 2021 under the POANHI framework. While LIC-208 requires an annual report,

CONTACT: David Heeszel, NRR/DEX Barbara Hayes, NRR/DEX
(301)-415-7442

the staff spent 2020 performing startup activities, coordinating with stakeholders, and performing knowledge base activities that serve as a foundation for future POANHI efforts. The enclosed annual report discusses knowledge base activities, the NRC staff's engagement with the broader technical community, and the staff's assessment of new natural hazards information. During the period covered by this report, the staff did not identify the need for potential regulatory actions in response to the new hazards information assessed under the POANHI framework.

Enclosure:
As stated

SUBJECT: PROCESS FOR THE ONGOING ASSESSMENT OF NATURAL HAZARDS ANNUAL REPORT DATED: February 24, 2022

DISTRIBUTION:
Public
RidsNrrMailCenter Resource
RidsOgcMailCenter Resource
RidsNrrOd Resource
RidsResOd Resource
AKock, NRR
SRuffin, NRR
LBauer, NRR
MSalley, RES
DSeber, RES
LLund, RES
JMcKirgan, RES
MThaggard, RES
CAraguas, RES
RFurstenau, RES
SCoffin, RES

ADAMS ACCESSION No.: ML22039A273 *** via e-mail** **NRR-106**

OFFICE	NRR/DEX/EXHB: PM	NRR/DEX/EXHB	NRR/DEX/EXHB: BC	QTE
NAME	LCandelario- Quintana	DHeeszel	BHayes	JDougherty
DATE	02/01/2022	02/01/2022	02/01/2022	02/04/2022
OFFICE	OGC	NRR/DEX		
NAME	BHarris*	EBenner		
DATE	02/15/2022	02/24/2022		

OFFICIAL RECORD COPY

2021 POANHI Annual Report

Background

The staff of the U.S. Nuclear Regulatory Commission (NRC) developed the Process for the Ongoing Assessment of Natural Hazards Information (POANHI) framework in response to Japan Near Term Task Force (NTTF) Recommendation 2.2, which called for periodic evaluation of natural hazards at nuclear power plants in the United States. In SECY-16-0144, "Proposed Resolution of Remaining Tier 2 and 3 Recommendations Resulting from the Fukushima Dai-ichi Accident", dated December 29, 2016 (Agencywide Documents Access and Management (ADAMS) Accession No. ML16286A586), the staff proposed a framework for reviewing new natural hazards information that uses existing NRC regulatory processes to enhance its collection and analysis of external hazards data. In SRM-SECY-16-0144, dated May 3, 2017 (ADAMS Accession No. ML17123A453), the Commission approved the staff's proposal and provided resources to undertake POANHI development. To implement the POANHI framework, the staff developed guidance documented in NRC Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-208, "Process for Ongoing Assessment of Natural Hazard Information," issued November 2019 (ADAMS Accession No. ML19210C288), and developed the Natural Hazards Information Digest (NHID), an internal tool used by the NRC staff to document and organize natural hazards information related to U.S. nuclear power plants.

In accordance with LIC-208, this report documents the activities undertaken by the NRC staff during 2020 and 2021 under POANHI. While LIC-208 requires an annual report, the staff spent 2020 further developing internal infrastructure, performing startup activities, coordinating with stakeholders and performing knowledge base activities that serve as a foundation for future POANHI efforts. This report discusses these knowledge base activities in more detail below as well as the NRC staff's engagement with the broader technical community and its assessment of new natural hazards information.

Knowledge Base Activities

Knowledge base activities provide the foundation for the POANHI framework and are those activities related to the collection and archiving of natural hazards information in the NHID. The staff of the NRC Office of Nuclear Regulatory Research (RES) designed the NHID to provide a digital infrastructure for compiling and storing natural hazards information related to nuclear power plant sites. The NHID was developed by and is hosted by Idaho National Laboratory. It provides a single digital repository of natural hazards licensing-basis information (e.g., licensing basis flood elevations, safe-shutdown earthquakes, wind loads). This information is restricted to the NRC staff because some of the information is controlled unclassified information (CUI) or pre-decisional under NRC policies. The NHID will be updated with new information as it becomes available.

The initial NHID was populated and made available for NRC staff use in 2019. It contained licensing-basis information for operating nuclear power plants as well as information licensees submitted in response to NTTF Recommendation 2.1 regarding reevaluated seismic and flooding hazards at their sites. INL provided training to NRC staff in January 2019 and September 2019 on how to effectively navigate the NHID and on processes for updating existing information and adding new documentation. From July 2020 to August 2021, the NHID was not available to the NRC staff as a result of INL initiating mandatory cybersecurity upgrades. While the NHID was unavailable, the NRC staff relied on information available in ADAMS for its assessment activities under the POANHI framework. In November 2021, after

INL had completed the cybersecurity upgrades, INL provided NHID refresher training to the NRC staff. The purpose of this training was to ensure that the appropriate NRC staff could access the NHID, provide an overview for any staff new to the NHID, and solicit feedback from NRC users on NHID structure and content. The NRC staff identified a number of potential updates to the NHID that would facilitate more effective data capture and data presentation. The staff also identified updates to external data links (i.e., data from other federal agencies that is frequently accessed by the NRC staff). The NRC will evaluate contractor proposals to implement these updates and evaluate implementation based on need and the availability of contract funds.

During 2020-2021, the NRC staff completed two NUREG/KMs related to its review of licensee information submitted in response to NTTF Recommendation 2.1. NUREG/KMs preserve knowledge for future NRC staff and the regulated community by documenting lessons-learned during the staff's review and preserving that knowledge for future regulatory reviews.

NUREG/KM-0015, "Considerations for Estimating Site-Specific Probable Maximum Precipitation at Nuclear Power Plants in the United States of America: Draft Report for Comment," issued September 2021 (ADAMS Accession No. ML21245A418), contains no new hazards information but instead summarizes lessons learned and best practices as they relate to determining site-specific probable maximum precipitation.

NUREG/KM-0017, "Seismic Hazard Evaluations for U.S. Nuclear Power Plants: Near-Term Task Force Recommendation 2.1 Results," issued December 2021 (ADAMS Accession No. ML21344A126), summarizes the NRC's current best estimate seismic hazard for operating nuclear power plants. In NUREG/KM-0017, the NRC staff used information submitted by licensees as well as publicly available information to perform site-specific probabilistic seismic hazard assessments for each operating plant using a single, consistent methodology. These seismic hazard estimates represent a baseline against which future estimates of seismic hazards may be compared, using updated methods and models.

The NRC staff is also preparing additional NUREG/KMs with respect to flooding reviews. The staff anticipates releasing the first, introductory volume of this series by the end of fiscal year 2022.

Active Technical Engagement

An essential element of the POANHI framework is active NRC staff engagement with external stakeholders and the broader natural hazards community. This engagement happens in a variety of forums including public meetings, professional and academic conferences, the NRC's participation in the Interagency Committee on Dam Safety and other governmental working groups.

RES published several research information letters (RILs) during 2020 and 2021 that fall under the POANHI framework. RILs highlight new information about a specific topic in a technical area and discuss how that information may be used in regulatory activities. They provide important information concisely and are an efficient vehicle for the NRC staff to communicate new information. Table 1 lists RILs published during 2020 and 2021 under the POANHI framework.

Table 1 RILs Published under the POANHI Framework for 2020 and 2021

Document Number	Title	Publication Date	ADAMS Accession Number
2020-01	Proceedings of NRC Annual Probabilistic Flood Hazard Assessment Research Workshops I–IV	02/03/2020	ML20045F282 ML20045F283 ML20045F284 ML20045F285
2020-11	NRC Staff Evaluation of the Next Generation Attenuation for Central and Eastern North America Project (NGA-EAST) Ground Motion Model Characterization	09/01/2020	ML20255A115
2021-01	Proceedings of the Fifth Annual Probabilistic Flood Hazard Assessment Workshop	01/31/2021	ML21027A213
2021-06	Assessing Site Amplification Variability Using Downhole and Rock-Soil Pairs Site Recordings	08/26/2021	ML21235A106

During 2020 and 2021, the staff also participated in technical conferences on the topic of natural hazards. Table 2 summarizes the NRC staff's participation in external meetings and conferences during the time covered by this report. These meetings took place virtually due to the ongoing Coronavirus Disease 2019 (COVID-19) pandemic. Conference attendance enables the staff to maintain awareness of the state of practice in external hazards assessment. In addition, the NRC staff presented at several meetings listed in Table 2. The staff presentation in conference settings provides the public an opportunity to view NRC staff's thinking on topics relevant to external hazards and provide feedback on these topics outside of specific licensing or inspection activities. In addition, these meetings provide an opportunity for the staff, the regulated community, and outside researchers to gather, present research findings, and discuss areas of future research.

Table 2 List of External Meetings Participated in by the NRC Staff under POANHI

Hazard	Meeting	Dates
All	DOE/NRC Natural Phenomena Hazard (NPH) Meeting	Oct-20
Geology	Association of Engineering Geologists (AEG) Annual Meeting	Sep-20
Geology	AEG Annual Meeting	Sep-21
Geology	AEG Virtual Conference	Mar-22
Geology	Geological Society of America Annual Meeting	Oct-20
Hydrology	Interagency Committee for Dam Safety	Quarterly
Hydrology	National Dam Safety Review Board	Quarterly
Hydrology	Probabilistic Flood Hazard Analysis (PFHA) Research Workshop	Feb-21
Meteorology	Nuclear Meteorological Data User's Group	Sep-21
Meteorology	34th Conference on Hurricanes and Tropical Meteorology	May-21
Meteorology	American Meteorological Society Annual Meeting	Jan-21
Seismology	Organization for Economic Co-operation and Development, Nuclear Energy Agency (Workshop	May-21
Seismology	U.S. Geologic Survey (USGS) Alaska National Seismic Hazard Mapping (NSHM) Workshop	May-21
Seismology	USGS/NRC Workshop on Seismic Hazard	Jun-21
Seismology	The 6th International Association of Seismology and Physics of the Earth’s Interior /International Association for Earthquake Engineering International Symposium	Aug-21
Seismology	Seismological Society of America Annual Meeting	Apr-21
Seismology	USGS NSHM Workshop on Source Characterization	Jun-21

During the years covered by this report, NRR and RES staff have also been engaged with the USGS, through an interagency agreement, on a long-term research project devoted to seismic hazards. This research project focused on elements of seismic hazard characterization related to new and existing seismic sources, induced seismicity, earthquake recurrence rates, and the impact of ground motion model selection on seismic hazard results. Future staff evaluations of seismic hazard and guidance updates will apply the results of this research.

Assessment of Hazard Information

The final element of the POANHI framework assesses natural hazards information to determine whether new information would be passed on to other processes within the NRC for regulatory action. The assessment of new information is often straightforward. For example, licensee event reports concerning natural hazards are forwarded to the NRC staff. These event reports are also forwarded to relevant licensing and inspection groups within the NRC for evaluation against licensing bases, regulatory requirements, and for inspection, if necessary. The NRC staff also receives custom ShakeMap products from the USGS that provide a map of estimated ground motion based on local reports of earthquake shaking intensity and community developed ground motion models. The ShakeMap product that the NRC receives also provides a point estimate of ground motion at U.S. nuclear power plants in the vicinity of earthquakes. These single events, and the documents that accompany them, do not drive POANHI decisionmaking. They provide individual datapoints to the NRC staff that can be used to determine future research directions. During the period covered by this report, the staff did not identify the need for potential regulatory actions in response to the new hazards information assessed under the POANHI framework.

In addition to individual reports related to single events, the NRC staff working under the POANHI framework, is responsible for assessing new natural hazards information (i.e., new data, models, and methods) to determine whether additional regulatory action may be warranted. Currently, the NRC staff is assessing Pacific Earthquake Engineering Research Center Report No. 2018/08, "Central and Eastern North America Ground-Motion Characterization: NGA-East Final Report," issued December 2018, for its impact on seismic hazards at nuclear power plants in the central and eastern United States. By letter dated December 29, 2021 (ADAMS Accession No. ML21312A077), the NRC staff communicated next steps and a schedule for evaluating updated seismic hazard estimates using NGA-East and updated site response approaches outlined in RIL 2021-15 (ADAMS Accession No. ML21323A056). This schedule includes milestones and public meetings through the end of fiscal year 2022. In accordance with LIC-208, the results of this assessment will be documented, and the NHID will be updated as necessary.

Future Activities and Conclusion

During 2022, the NRC staff will continue its assessment of NGA-East and any potential impacts on seismic hazards that could affect existing licensees and applicants. In addition, the staff will participate in upcoming PFHA and NPH meetings and continue its engagement with external stakeholders, including other government agencies and the broader technical communities.