NRR-PMDAPEm Resource

From: MAUER, Andrew <anm@nei.org>
Sent: Thursday, April 07, 2016 2:34 PM
To: DiFrancesco, Nicholas; Shams, Mohamed
Subject: [External_Sender] Path 3 MSA Template
Attachments: Appendix H seismic MSA Path 3 Template NRC.docx

Mohamed/Nick,

Attached is the proposed MSA template that the industry has developed to support Path 3 MSA submittals for seismic. We would welcome any feedback and would appreciate hearing from you by April 22.

Thanks,
Andrew

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Subject: [External_Sender] Path 3 MSA Template
Sent Date: 4/7/2016 2:33:47 PM
Received Date: 4/7/2016 2:33:55 PM
From: MAUER, Andrew

Created By: anm@nei.org

Recipients:
"DiFrancesco, Nicholas" <Nicholas.DiFrancesco@nrc.gov>
Tracking Status: None
"Shams, Mohamed" <Mohamed.Shams@nrc.gov>
Tracking Status: None

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10 CFR 50.4

[DATE]

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Company/Licensee/Site Name
Company/Licensee/Site Docket Number(s)
Company/Licensee/Site Renewed License Number(s)

Subject: NEI 12-06, Appendix H, Revision 2, H.4.3 Path 3: GMRS > SSE but < IHS, Mitigating Strategies Assessment (MSA) report for the New Seismic Hazard Information

References:

1. NEI 12-06, Revision 2, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, December 2015, ADAMS Accession Number ML16005A625
2. JLD-ISG-2012-01, Revision 1, Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, February 2016, ADAMS Accession Number ML15357A163
3. [Company/Licensee Seismic Hazard Reevaluations submittal and any supplements, [DATE(S)], ADAMS Accession Number(s)]
4. [NRC Letter, Company/Licensee Staff Assessment of Information provided Pursuant to Title 10 of the Code of Federal Regulations Part 50, Section 50.54(f), Seismic Hazard Reevaluations for Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima DAI-ICHI Accident, dated [DATE], ADAMS Accession Number MLxxxxxxxxx]
5. U.S. NRC, “NUREG-1407: Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities”, ADAMS Number ML063550238, Washington, D.C., June, 1991.
6. NEI, “NEI 12-01 Revision 0: Guideline for Assessing Beyond-design-basis Accident Response Staffing and Communications Capabilities”, Washington, D.C., May, 2012.
7. EPRI, “Seismic Evaluation Guidance: Screening, Prioritization and Implementation Details (SPID) for the Resolution of Fukushima Near-Term Task Force Recommendation 2.1: Seismic”, Report Number 1025287, Palo Alto, CA, November, 2012.
8. EPRI, “High Frequency Program: Application Guidance for Functional Confirmation and Fragility Evaluation”, Report Number 3002004396, Palo Alto, CA, July 30, 2015.
9. [PLANT OIP/FIP Submittal Reference]

Ladies and Gentlemen,

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The purpose of this letter is to provide the results of the assessment for [PLANT/SITE] to demonstrate that an Individual Plant Examination of External Events (IPEEE) based alternate mitigating strategy (AMS) can be implemented considering the impacts of the reevaluated seismic hazard. The assessment was performed in accordance with the guidance provided in Appendix H of NEI 12-06 Revision 2 (Reference 1) which was endorsed by the NRC (Reference 2).

The Mitigating Strategies Seismic Hazard Information (MSSHI) is the licensee's reevaluated seismic hazard information at [PLANT/SITE], developed using Probabilistic Seismic Hazard Analysis (PSHA). The MSSHI includes a performance-based Ground Motion Response Spectrum (GMRS), Uniform Hazard Response Spectra (UHRS) at various annual probabilities of exceedance, and a family of seismic hazard curves at various frequencies and fractiles developed at the [PLANT/SITE].control point elevation. [PLANT/SITE] submitted the reevaluated seismic hazard information including the UHRS, GMRS and the hazard curves to the NRC on [DATE(s)] (Reference(s) 3, [x associated with blue text]), [Reference all supplemental submittals that may have been made in response to the 10 CFR 50.54(f) request for information]. The NRC staff concluded that the MSSHI that was submitted adequately characterizes the reevaluated seismic hazard for the site (Reference 4).

Consistent with Section H.4.3 of Reference 1, the [PLANT/SITE] GMRS is bounded by the high-confidence-of-low-probability-of-failure (HCLPF) spectrum developed from evaluations for the IPEEE between 1-10 Hz – referred to as the IHS. Section 6.1.2 of Reference 2 identified that the method described in Section H.4.3 of Reference 1 is applicable to [PLANT/SITE].

Based upon the mitigating strategies assessment in Attachment 1, the mitigating strategies for [PLANT/SITE] considering the impacts of the reevaluated seismic hazard [can be implemented as designed or will be modified as discussed in the attachment].

This letter contains no new Regulatory Commitments and no revision to existing Regulatory Commitments.

Should you have any questions regarding this submittal, please contact *[Company/Licensee/Site contact and phone number]*

I declare under penalty of perjury that the foregoing is true and correct. Executed on the [DATE].

Sincerely,

[Company/Licensee/Site Vice President]

Attachment: Mitigating Strategies Assessment for [Plant]

cc: *[Company/Licensee/Site specific distribution]*

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ATTACHMENT

Company/Licensee

Plant/Site Name

Company/Licensee/Site Docket Number(s)

Company/Licensee/Site Renewed License Number(s)

Mitigating Strategies Assessment for [Plant]

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INTRODUCTION

The purpose of this mitigating strategies assessment is to evaluate and demonstrate that [PLANT/SITE] can mitigate the effects of the reevaluated seismic hazard information developed pursuant to the NRC's 10CFR 50.54(f) letter dated March 12, 2012. the effects of the reevaluated seismic hazard developed in response to NRC letter pursuant to 10CFR 50.54(f) dated March 12, 2012. The assessment was performed in accordance with the guidance provided in Reference 1. Reference 1 discusses a method to develop an alternate mitigating strategy (AMS) to address the mitigating strategies seismic hazard information (MSSHI). This includes a modification of the general criteria and baseline assumptions included in Section 3.2.1 of Reference 1 to exclude consideration of losses such as an extended loss of AC power (ELAP), Loss of offsite power (LOOP) or loss of ultimate heat sink (LUHS) unless caused by the seismic hazard. Reference 2 provides an NRC staff position that the method described in Section H.4.3 of Reference 1 for an AMS is acceptable for mitigating a beyond design basis external event. Further, the protection of onsite power sources and normal access to the UHS from the seismic hazard is an acceptable method of mitigating a simultaneous loss of all AC power and loss of normal access to the ultimate heat sink.

An IPEEE-based alternate mitigating strategy (AMS) relies on the seismic evaluation of plant equipment to demonstrate robustness of structures, systems and components (SSCs) to the GMRS. The IPEEE for [PLANT/SITE] relied on the results of an [chose one: SPRA, an EPRI seismic margins assessment (SMA) methodology, or an NRC SMA methodology] to demonstrate the capability to bring the plant to a safe shutdown condition following a review level earthquake (RLE) as described in NUREG-1407 (Reference 5). The [chose one: SPRA, an EPRI seismic margins assessment (SMA) methodology, or an NRC SMA methodology] approach evaluated two safe shutdown success paths. The safe shutdown success paths provide independent means of achieving a safe shutdown condition following a severe seismic event (e.g., core cooling by heat removal from the steam generators and core cooling by RCS 'feed and bleed').

Seismic evaluations performed under IPEEE included SSCs in those two safe shutdown success paths. Therefore, based on the results of the IPEEE, safe shutdown of the plant following a seismic event can be accomplished, and consequences can be mitigated, for a seismic event up to the plant capacity level (i.e., the IHS) for which the SSCs in the IPEEE were evaluated.

Indefinite Coping

A plant-specific evaluation was performed and concluded that SSCs that limit the SMA-based IPEEE coping duration to 72 hours are available for an indefinite period following a beyond design-basis seismic event at the reevaluated seismic hazard level to support continued maintenance of the safe shutdown condition.

Example

The [PLANT/SITE] IPEEE was based on the EPRI SMA method. This approach defined the Seismic Equipment List (SEL) for evaluation of safe shutdown success paths to be comprised of those SSCs required to bring the plant to a stable condition (either hot or cold shutdown) and maintain that condition for at least 72 hours. Therefore, the IPEEE results have been evaluated for limitations that are based on the 72 hour coping duration. Generally, the conclusions of the SMA are not sensitive to coping

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duration. However, certain consumable items, such as water and fuel oil inventories, have been evaluated based on a limited onsite supply. The ability to continue coping would potentially require re-supply of consumables.

Site access is restored to a near-normal status and/or augmented transportation resources are available within a few days as determined by NEI 12-01 (Reference 6), to allow for additional supplies to be brought in and allow for continuation of coping strategies and maintain the plant in a stable condition. A plant-specific evaluation has been performed to identify consumables and/or SSCs that are limiting for the 72 hour coping duration assumed in the development of the IPEEE.

The coping evaluation concluded that only cooling water supply to the steam generators (auxiliary feedwater) was considered limiting in the IPEEE for an extended coping period. Several alternative water supplies are available to [PLANT/SITE] to support coping for an extended period following the beyond design-basis seismic event to support continued maintenance of the safe shutdown condition. Additional water sources include the 100,000 gallon primary water storage tank, site fire water system with two 245,000 gallon fire water tanks, and the condenser hotwell. The high-volume city water supply, if available, is an additional water source with essentially indefinite supply capability. Portable pumps are available from the National SAFER Response Centers (NSRC) to support water transfer from the alternate supplies.

Although not determined to be limiting, fuel oil supplies supporting diesel generator operation were also evaluated for extended coping. [PLANT/SITE] has established standing contracts with fuel providers to replenish diesel fuel supplies. The on-site supplies have been evaluated to last approximately [xxxx] days to continue the strategies evaluated under the IPEEE and/or on-site FLEX strategies. Additionally, the National SAFER Response Centers (NSRC) has the ability to air lift fuel bladders for use in the limited cases prior to roadways being made available for site access.

End of Example

IPEEE Upgrade to Full Scope *[only applies to plants that conducted focused-scope assessment, any reviews conducted below that have been performed and submitted in response to the 50.54(f) letter should be referenced below instead of restating the review/results.]*
The [PLANT/SITE] IPEEE was included in the focused scope bin, and an upgrade to a full scope assessment is required as described in EPRI 1025287 (Reference 7).

[PLANT/SITE] was binned as a 0.3g Focused Scope plant in NUREG-1407. As stated in Section 3.3.1 of the SPID, focused-scope IPEEE submittals may be used for screening against the GMRS provided they are enhanced to bring them in line with full scope assessments. The enhancements include (1) a full scope detailed review of relay chatter and (2) a full evaluation of soil failures.

Full Scope Relay Chatter Review
[PLANT/SITE] performed an assessment of relay chatter effects in accordance with the scope and procedures described in NUREG-1407 [Reference 5]. [PLANT/SITE] was an A-46 plant and the relay chatter review was conducted consistent with staff recommendations outlined in NUREG-1407, Appendix D, Table 7.17.2, which includes expansion of the A-46 relay scope to include IPEEE systems and evaluation of the entire expanded scope at the IPEEE Review Level Earthquake.

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Include conclusions from relay chatter review, including any modifications – reference submittal template for 2.1 relay chatter review for level of detail.

Soil Failure Analysis

[PLANT/SITE] has completed a soil failure analysis in accordance with the procedures described in NUREG-1407, which defers to the guidance provided in EPRI NP-6041-SL. Soil failure modes include soil liquefaction, foundation settlement, and slope instability (failure). The soil failure evaluation was conducted In accordance with Section 7 of EPRI NP-6041-SL.

Include conclusions from soil failure analysis review, including any modifications.

Spent Fuel Pool Cooling Evaluation

The evaluation of spent fuel cooling for [PLANT/SITE] was performed based on the initial conditions established in NEI 12-06 for spent fuel cooling coping in the event of an ELAP/LUHS. The evaluation also used the results of pool heatup analyses from the ELAP evaluation as input.

Example

Spent Fuel Pool Cooling

The FLEX strategy for spent fuel pool (SFP) cooling utilizes SFP level monitoring and make-up capability as described in Plant X OIP/ FIP (Reference 9). The SFP level is monitored using installed level monitoring instrumentation with remote monitoring capability [or other method described in the OIP/FIP]. SFP make-up capability is provided using the portable FLEX [SFP makeup] pump taking suction though a portable flexible hose and discharging through a permanently installed FLEX makeup connection tie-in to the SFP emergency make-up piping [through a flexible hose directly to the SFP]. The source of make-up water is the plant ultimate heat sink [pond, river, reservoir, lake, sound, as applicable] [or – is the plant XXX tank].

The permanently installed plant equipment relied on for the implementation of the SFP Cooling FLEX strategy has been designed and installed, or evaluated to remain functional, in accordance with the plant design basis to the SSE loading conditions. The portable FLEX equipment availability, including its storage and deployment pathways, and the permanently installed plant equipment needed to accomplish SFP cooling have subsequently been evaluated considering the GMRS-consistent loading conditions. [This can be accomplished in accordance with the guidance in NEI 12-06, Appendix H, Section H.4.4, Steps 2 and 3 since the GMRS to SSE ratio [PLANT/SITE] is ≤ 2 xSSE.]

[Note 1: If the plant's FLEX strategy for SFP cooling includes an option to run a flexible hose directly from the discharge of the portable pump to the pool, then no additional evaluation of the permanently installed FLEX makeup connection and the SFP emergency make-up piping is required. Modify the 3rd paragraph to align with this SFP cooling strategy]

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End of Example

High Frequency Evaluation

[PLANT/SITE] has conducted an evaluation of high frequency motion sensitive components (relays) in accordance with the guidance in EPRI 3002004396 (Reference 8) and found no adverse impact from the GMRS level seismic demands.

AVAILABILITY OF FLEX EQUIPMENT

With the exception of SFP cooling, the AMS described in H.4.3 does not rely upon availability of FLEX equipment.

On-site FLEX equipment may be available for deployment to support the maintenance of core cooling, containment, and spent fuel cooling functions. In order to provide additional potential mitigating capability, portable FLEX equipment not being used for the AMS is stored in accordance with Section 5.3.1 of NEI 12-06.

Additionally, [PLANT/SITE] maintains the capability to obtain additional portable FLEX equipment from offsite sources. No strategies need to be preplanned for the use of the offsite equipment.

Portable equipment is also available from offsite. The industry has established two (2) National SAFER Response Centers (NSRCs) to support utilities during beyond design basis events. [PLANT/SITE] has established contracts with the Pooled Equipment Inventory Company (PEICo) to participate in the process for support of the NSRCs as required. Each NSRC will hold five (5) sets of equipment, four (4) of which will be able to be fully deployed when requested, the fifth set will have equipment in a maintenance cycle. In the event of a BDB seismic event, equipment can be moved from an NSRC to a local assembly area established by the Strategic Alliance for FLEX Emergency Response (SAFER) team. From there, equipment can be taken to the site and staged at the SAFER onsite Staging Area by helicopter, if ground transportation is unavailable. Communications will be established between the site and the SAFER team via satellite phones and required equipment moved to the site as needed. First arriving equipment will be delivered to the site within 24 hours from the initial request. The order in which equipment is delivered is identified in the [PLANT/SITE] *SAFER Response Plan*.