

INSPECTION OF THE IMPLEMENTATION OF MITIGATION STRATEGIES AND SPENT FUEL POOL INSTRUMENTATION ORDERS AND EMERGENCY PREPAREDNESS COMMUNICATION/STAFFING/MULTI-UNIT DOSE ASSESSMENT PLANS

CORNERSTONES: Initiating Events, Mitigating Systems, Barrier Integrity and Emergency Preparedness

APPLICABILITY: This temporary instruction (TI) applies to the plants subject to the Orders, except for plants that were granted rescission, and all plants subject to the 50.54(f) letter dated March 12, 2012.

2515/191-01 OBJECTIVE:

To confirm through inspection the implementation of:

- NRC Order EA-12-049 (Agencywide Documents Access and Management System (ADAMS) Accession No. [ML12056A045](#)) which added requirements for mitigation strategies for Beyond-Design-Basis external events
- NRC Order EA-12-051 (ADAMS Accession No. [ML12056A044](#)) which added requirements for spent fuel pool instrumentation
- Communications and staffing plans needed to respond to a large-scale event as requested in the March 12, 2012 request for information letter (ADAMS Accession No. [ML12053A340](#)) and multi-unit dose assessment capabilities per COMSECY-13-0010, *Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned*, dated March 27, 2013 (ADAMS Accession No. [ML12339A262](#)).

2515/191-02 BACKGROUND:

Following the earthquake and tsunami at the Fukushima Dai-ichi nuclear power plant in March 2011, the NRC established a senior-level task force referred to as the Near-Term Task Force (NTTF). The NTTF conducted a systematic and methodical review of the NRC regulations and processes to determine if the agency should make safety improvements in light of the events in Japan. As a result of this review, the NTTF issued SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan" (ADAMS Accession No. [ML11186A950](#)). Additionally, NRC staff issued SECY-11-0124, "Recommended Actions to be Taken Without Delay from the Near-Term Task Force Report" (ADAMS Accession No. [ML112911571](#)), and SECY-11-0137, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned" (ADAMS Accession No. [ML11272A111](#)) to establish prioritization of the recommendations. Recommendation 4.2, concerning mitigation

strategies, and Recommendation 7.1, concerning spent fuel pool instrumentation, were determined to be high-priority actions.

The events at Fukushima Dai-ichi highlight the possibility that extreme natural phenomena could challenge the prevention, mitigation and emergency preparedness (EP) defense-in-depth layers. At Fukushima, limitations in time and unpredictable conditions associated with the accident significantly challenged attempts by the responders to preclude core damage and containment failure. The challenges faced by the operators were beyond any faced previously at a commercial nuclear reactor. The NRC determined that additional requirements must be imposed to mitigate beyond-design-basis external events. These additional requirements impose guidance and strategies to be available if the loss of electrical power, motive force needed to provide cooling water to the reactor and spent fuel pool, and normal access to the ultimate heat sink to prevent fuel damage in the reactor and spent fuel pool affected all units at a site simultaneously.

Additionally, the events at Fukushima, demonstrated the confusion and misapplication of resources that can result from beyond-design-basis external events when adequate instrumentation is not available. Responders were without reliable instrumentation to determine level in the spent fuel pool. This caused concerns that the pool may have been dry, resulting in fuel damage.

Also, the accident at Fukushima reinforced the need for effective EP, the objective of which is to ensure the capability to implement effective measures to mitigate the consequences of a radiological emergency. The accident at Fukushima highlighted the need to determine and implement the required staff to fill all necessary positions responding to a multi-unit event, the need to ensure that the communication equipment relied upon to coordinate the event response during a prolonged station blackout can be powered, and the importance of multi-unit dose assessment capability when responding to a similar event.

The NRC staff issued interim staff guidance (ISG) JLD-ISG-2012-01, Revision 0, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. [ML12229A174](#)). The ISG endorses, with clarifications, the methodologies described in the industry guidance document, Nuclear Energy Institute (NEI) 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0 (ADAMS Accession No. [ML12242A378](#)). This industry document outlines one possible approach that can be used by licensees, construction permit holders, and combined license holders to address the requirements of the order.

2515/191-03 INSPECTION REQUIREMENTS:

Inspectors will verify that plans for complying with NRC Orders EA-12-049 (mitigation strategies for beyond-design-basis external events) and EA-12-051 (spent fuel pool instrumentation) are in place and are being implemented by the licensee. Inspectors will verify the establishment of staffing and communications plans provided in response to the March 12, 2012 request for information letter and multi-unit dose assessment information provided per COMSECY-13-0010, *Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned*, dated March 27, 2013 (ADAMS Accession No. ML12339A262).

These plans and information are provided in the site specific submittal(s). The NRC staff's understanding of these plans is documented in the NRC's plant safety evaluations (SEs) and safety assessments. See section 2515/191-11 for additional information.

See Appendix A for inspection requirements associated with mitigating strategies for beyond design basis external events.

See Appendix B for inspection requirements associated with spent fuel pool instrumentation.

See Appendix C for inspection requirements associated with communications, staffing, and multi-unit dose assessment.

2515/191-04 DOCUMENTATION AND REPORTING REQUIREMENTS:

Document the completion of the TI as a stand-alone inspection report. Specific reporting requirements are discussed in the Appendices to this TI.

The inspection report(s) containing the results should be forwarded to NRR/DLP/PBEB via e-mail to JLD_Regional.Resource@nrc.gov. Inspectors should contact NRR/DLP/PBEB with any questions related to the scope of this TI or with questions related to other inspector concerns identified while implementing this TI.

2515/191-05 COMPLETION SCHEDULE:

Appendices A and B of this TI are to be initiated after the NRC has issued the safety evaluation which follows licensee implementation of NRC Orders EA-12-049 and EA-12-51. Additionally, Appendix C of this TI is to be completed after the licensee implements multi-unit dose assessment capabilities and enhancements associated with the March 12, 2012, 10 CFR 50.54(f) letter on EP, and the NRC has issued associated staffing safety assessments. Appendices A, B, and C may be completed at different times, but should be completed as soon as practical after issuance of the safety evaluations and no later than 12/31/2019. NRR/DIRS has approved this TI to be in effect for greater than 24 months, based on the time necessary for the NRC headquarters staff to issue safety evaluations and staffing safety assessments and for the regions to plan and perform inspections associated with this TI for all licensees in their region.

2515/191-06 EXPIRATION

The TI will expire on June 30, 2020.

2515/191-07 CONTACT(S)

Any request for technical support, or any administrative, documentation, or reporting questions should be addressed to NRR/DLP/PBEB via e-mail to JLD_Regional.Resource@nrc.gov.

2515/191-08 STATISTICAL DATA REPORTING

All direct inspection effort expended on this TI is to be charged to 2515/191 with an IPE code of TI. All indirect inspection effort expended on this TI for preparation and documentation should be attributed to the new activity code for prep and doc: TPD.

2515/191-09 RESOURCE ESTIMATE

The estimated average time to complete the TI inspection requirements described is 100 hours per site (Appendix A – 80 hours, Appendix B – 12 hours, and Appendix C – 8 hours). Inspectors can take credit within the baseline inspection program for samples completed during this TI, as appropriate (e.g., flooding or readiness for impending adverse weather sample associated with IP 71111.01, “Adverse Weather Protection;” partial walkdown sample associated with IP 71111.04, “Equipment Alignment;” internal flooding associated with IP 71111.06, “Flood Protection Measures;” review of plant modifications associated with IP 71111.017T, “Evaluations of Changes, Tests, and Experiments and Permanent Plant Modifications;” IP 71111.18, “Plant Modifications;” and surveillance activities associated with IP 71111.22, “Surveillance Testing”).

2515/191-10 TRAINING

Training will be conducted by JLD staff via webinar for the first few TI inspections by request from the regions, and the training sessions will be recorded. For subsequent TI inspections, the regions will use the recorded webinars as a refresher or to train any new inspectors participating in the TI inspections. JLD will provide onsite and/or remote support for all of the TI inspections.

2515/191-11 REFERENCES

NEI 12-01, “Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities,” Revision 0, dated May 2012 (ADAMS Accession No. ML12125A412) NEI 12-02, “Industry Guidance for Compliance with NRC Order EA-12-051, “To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation,” Revision 1, dated August 24, 2012 (ADAMS Accession No. [ML12240A307](#))

NEI 12-06, “Diverse and Flexible Coping Strategies (FLEX) Implementation Guide,” Revision 0, dated August 2012 ([ML12242A378](#))

Final Interim Staff Guidance: JLD-ISG-2012-03, “Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation,” Revision 0, dated August 29, 2012 ([ML12221A339](#))

Final Interim Staff Guidance: JLD-ISG-2012-01, “Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events,” Revision 0, dated August 29, 2013 ([ML12229A174](#))

Licensee site-specific Final Integrated Plan and NRC Safety Evaluation covering EA-12-049 and EA-12-051

Licensee site-specific Communications Assessment and NRC Safety Assessment

Licensee site-specific Phase 1 and 2 Staffing Assessment and NRC Safety Assessment

Licensee site-specific Multi-Unit Dose Assessment Submittal

END

Appendices:

Appendix A: Mitigation Strategies for Beyond-Design Basis External Events

Appendix B: Spent Fuel Pool Instrumentation

Appendix C: Staffing and Communication Request for Information

Attachments:

Attachment 1: Revision History Table

APPENDIX A – MITIGATION STRATEGIES FOR BEYOND-DESIGN BASIS EXTERNAL EVENTS

2515/191-03 INSPECTION REQUIREMENTS:

03.01 General

The consequences of postulated beyond-design-basis external events that are most impactful to reactor safety are loss of power and loss of the ultimate heat sink. NEI 12-06 document titled, “Diverse and Flexible Coping Strategies (FLEX) Implementation Guide,” outlines an approach for adding diverse and flexible mitigation strategies that will increase defense-in-depth for beyond-design-basis scenarios to address an extended loss of alternating current (ac) power (ELAP) and loss of normal access to the ultimate heat sink (LUHS) occurring simultaneously at all units on a site.

The objective of FLEX is to establish an indefinite coping capability to prevent damage to the fuel in the reactor and spent fuel pools (SFPs) and to maintain the containment function by using:

- installed equipment;
- on-site portable equipment, and
- pre-staged off-site resources.

The FLEX strategies are focused on maintaining or restoring key plant safety functions and are not tied to any specific damage state or mechanistic assessment of external events. In some cases, additional hazard-specific boundary conditions are applied in order to cause the implementation strategies to be focused on the nature of challenges that are most likely for that hazard. A safety function-based approach is in keeping with the symptom-based approach taken to plant emergency operating procedures (EOPs) and facilitates the utilization of the FLEX strategies in support of the operating and emergency response network of procedures and guidance.

The underlying strategies for coping with these conditions involve a three-phase approach:

- 1) Initially cope by relying on installed plant equipment;
- 2) Transition from installed plant equipment to on-site FLEX equipment; and
- 3) Obtain additional capability and redundancy from off-site equipment until power, water, and coolant injection systems are restored or commissioned.

The purpose of Appendix A to this Temporary Instruction (TI) is to selectively verify through a sampling process that the plans for complying with NRC Order EA-12-049 (mitigation strategies for beyond-design-basis external events), as described in the final site specific submittals (Final Integrated Plan), are in place and are being implemented by the licensee. The NRC staff’s understanding of these plans is documented in the NRC’s plant safety evaluation (SE). Additional information on these strategies may be found in NEI 12-06, revision 0 (ADAMS Accession No. [ML12242A378](#)).

Note: While TI 2515/191 inspection requirements are primarily pulled from NEI 12-06, Revision 0, there are number of cases where licensees implemented strategies or part of their strategies that were alternative strategies to NEI 12-06, Revision 0 that JLD staff had reviewed and found to be acceptable. In these cases, the licensee shall implement their approved alternate strategy as they had described it to JLD. Inspectors can find the licensee's approved alternative strategies in the safety evaluations.

More specifically, Appendix A is focused on verification of satisfactory implementation of the FLEX strategies, verification that the FLEX equipment is available when needed, and verification that the FLEX equipment can provide indefinite coping capability to prevent damage to the fuel in the reactor and spent fuel pools and maintain the containment.

Appendix A will verify that the licensee has:

- developed and issued FLEX Support Guidelines (FSG) to implement the FLEX strategies for postulated external events;
- integrated their FSGs into their existing plant procedures such that entry into and exiting from the FSGs are clear when using existing plant procedures;
- protected FLEX equipment from site-specific hazards;
- developed and implemented adequate maintenance and testing of FLEX equipment to ensure their availability and capability;
- trained their staff to assure personnel proficiency in the mitigation of beyond-design-basis events; and
- developed means to ensure that the necessary off-site FLEX equipment and consumables will be available and can be delivered from off-site locations

03.02 Specific Inspection Requirements

a. FSGs

1. Review the plant SE to determine which specific extreme external hazards apply to the site. Inspectors will verify that the licensee has developed procedure(s) and guidance documents that address all applicable site-specific extreme external hazards:

- Seismic events,
- External flooding,
- Storms such as hurricanes, high winds and tornadoes,
- Extreme snow, ice and cold, and
- Extreme heat

2. Sample selected licensee's procedure(s) to verify that they address or contain the following attributes (sample size 6-12):

- (a) Plant procedures/guidance identifies site-specific actions necessary to restore ac power to essential loads. Plant procedure requires an alternate ac (AAC) power source to be started, if available, as soon as possible. If no AAC is available, the plant procedure requires actions to secure existing equipment alignments and

provide an alternate power source as soon as possible based on relative plant priorities. NOTE: Alignment of the ac sources is not necessary for compliance with EA-12-049. Backup FLEX pumps and portable instrumentation are sufficient.

- (b) Plant procedures/guidance identifies the sources of potential reactor inventory loss and specifies actions to prevent or limit significant loss. Examples include actions that would isolate letdown or isolate reactor coolant pump (RCP) seal leakage paths to maintain reactor coolant system (RCS) inventory.
- (c) Plant procedures/guidance ensures that a flow path is promptly established for makeup flow to the steam generator/nuclear boiler and identifies backup water sources in order of intended use. Additionally, plant procedures/guidance specifies clear criteria for transferring to the next preferred source of water.
- (d) Plant procedures/guidance identifies loads that need to be stripped from the plant direct current (dc) buses (both Class 1E and non-Class 1E) for the purpose of conserving dc power. Licensee documents confirm that the licensee can perform these actions within the timeframe credited in the battery life analysis.
- (e) Plant procedures/guidance specifies actions to permit appropriate containment isolation and safe shutdown valve operations while ac power is unavailable.
- (f) Plant procedures/guidance identify the portable lighting (e.g., flashlights or headlamps) and communications systems necessary for ingress and egress to plant areas required for deployment of FLEX strategies.
- (g) Plant procedures/guidance identifies actions for achieving area access during a loss of ac power, including the Protected Area and internal locked areas where remote equipment operation is necessary.
- (h) Plant procedures/guidance identifies actions to be taken to ensure that equipment failure does not occur as a result of a loss of forced ventilation/cooling. Areas requiring additional air flow are likely to be locations containing shutdown instrumentation and power supplies, turbine-driven decay heat removal equipment, and in the vicinity of the inverters.
- (i) Plant procedures provide guidance for access and pathways to locations where operators will be required to perform local manual operations.
- (j) For sample strategies involving “time critical” actions, verify that the licensee has established a valid technical basis for the determination that the capability could be implemented within the allotted time.
- (k) Plant procedures/guidance identifies actions to be taken to ensure equipment failure does not occur as a result of loss of heat tracing during ELAP.
- (l) Plant procedures/guidance specifies actions necessary to replenish fuel to diesel/gas powered equipment (e.g., FLEX diesel generators, pumps, etc.)

- (m) Use of portable equipment (e.g., portable power supplies, portable pumps, etc.) can extend plant coping capability. Verify the procedures/guidance for implementation of these portable systems includes the transitions from installed sources to portable sources.
- (n) Plant procedures/guidance includes monitoring and makeup options to the SFP.
- (o) Plant procedures/guidance for units with BWR Mark III and PWR Ice Condenser containments include the deployment of portable power supplies for providing backup power to the containment hydrogen igniters.
- (p) Plant procedures/guidance specifies the deployment routes and locations for FLEX portable equipment and prevents staging of material that would interfere with the FLEX equipment.
- (q) For plants relying on containment venting for heat removal (primarily BWR Mark I and Mark II containments), plant procedures/guidance include the timing, trigger points, and actions required to support the strategies.
- (r) During plant outages, written guidance covering the mitigation of the consequences of a beyond design basis external event will be provided to plant personnel. Inspectors will verify that the licensee has implemented one of the following options:
 1. The licensee has incorporated FLEX into outage planning processes/ procedures, where they would develop the guidance as part of the outage planning process and based on the specific plant configurations expected during the outage. NOTE: The guidance does not have to be specific plant procedures, but can be provided by other means, such as night orders, standing orders, or temporary instructions; or
 2. The licensee has developed site-specific procedures for implementation of FLEX in shutdown modes (i.e., FSG-14 “Loss of Shutdown Cooling”), and these procedures address the need to pre-deploy equipment due to shortened timelines.

b. Site Specific Hazard Evaluation

Review all applicable site specific hazards evaluated by the licensee to verify that the FLEX equipment is protected from the hazard and can be deployed as planned. Inspectors will verify the inspection attributes below, as applicable.

For structures designed and constructed or evaluated to the requirements of standard ASCE 7-10, “Minimum Design Loads for Buildings and Other Structures,” verify that the structure meets the standard’s design and/or construction requirement. NOTE: For example, inspectors should review documentation to verify that the structure was designed or evaluated by a licensed professional engineer, or, in the case of new

construction, that the structure was inspected and certified to meet the ASCE 7-10 standard by a licensed professional engineer or local code inspector.

1. Seismic Hazard

- (a) Licensee stores FLEX equipment in one or more of the following three configurations:
 - (1) In a structure that meets the plant's design basis for the Safe Shutdown Earthquake (SSE) (e.g., existing safety-related structure);
 - (2) In a structure designed to or evaluated equivalent to ASCE 7-10; or
 - (3) Outside a structure and evaluated for seismic interactions to ensure equipment is not damaged by non-seismically robust components or structures.
- (b) Licensee has secured large portable FLEX equipment such as pumps and power supplies are secured to protect them during a seismic event (i.e., SSE level).
- (c) Licensee has evaluated and protected stored equipment and structures from seismic interactions to ensure that unsecured and/or non-seismic components do not damage the equipment.
- (d) Licensee has reviewed the travel route for potential soil liquefaction concern if the equipment needs to be moved from a storage location to a different point for use.
- (e) Licensee has evaluated the availability of water source(s) if the FLEX strategy relies on a water source that is not seismically robust.
- (f) Licensee has provided power supplies as part of the FLEX deployment if the power is required to move or deploy the FLEX equipment.
- (g) Equipment that is needed to move the FLEX equipment is protected from a seismic event.
- (h) Licensee has verified that the FLEX equipment connection points to permanently installed plant systems and the permanently installed FLEX equipment are seismically qualified to the same extent as the permanently installed plant equipment. Note: Both the primary and alternate connection points do not need to be available for all applicable hazards.
- (i) Licensee has verified that staged tools used to connect FLEX equipment are acceptable/compatible with the connections used.

2. Flooding Hazard

- (a) Flex equipment is stored in one or more of the following configurations:
- (1) Above the flood elevation from the most recent site flood analysis (at the time of submittal of the original integrated plan).
 - (2) In a structure designed to protect the equipment from the flood.
 - (3) Below flood level, provided time is available and plant procedures/guidance address the needed actions to relocate the equipment.
- (b) Licensee has plans to support successful FLEX equipment deployment for floods which persist over a long time period, as described in the safety evaluation.
- (c) Licensee has plans to protect installed fuel oil storage tanks credited for FLEX which could be inundated by the flood or above ground tanks that could be damaged by the flood or provide an alternate source of fuel to the FLEX equipment during flood conditions.
- (d) Licensee has verified that the FLEX equipment connection points to permanently installed plant systems and the permanently installed FLEX equipment are seismically qualified to the same extent as the permanently installed plant equipment. Note: Both the primary and alternate connection points do not need to be available for all applicable hazards.
- (e) Licensee has verified that staged tools used to connect FLEX equipment are acceptable/compatible with the connections used.
- (f) Water extraction pumps capable of operating during an ELAP are available, if credited.
- (g) Temporary flood barriers, if credited, are stored in a location protected from the flood and can be deployed within the time available.

3. Severe Storms with High Winds

- (a) FLEX equipment is being stored in either:
- A structure that meets the plant's design basis for high wind hazards (e.g., existing safety-related structure), or
 - Storage locations designed to or evaluated equivalent to ASCE 7-10, given the limiting tornado wind speeds from Regulatory Guide 1.76 or design basis hurricane wind speeds for the site.
- (b) Pathways (i.e., from onsite storage areas to final deployment locations) are designated and evaluated for post storm accessibility for staging and connecting

FLEX equipment. Additionally, verify the licensee's staged tools used to connect FLEX equipment are acceptable/compatible with the connections used.

- (c) Evaluated storage locations are separated by a sufficient distance (specified in the SE or the licensee's Final Integrated Plan) that minimizes the probability that a single event would damage all FLEX mitigation equipment such that at least N sets of FLEX equipment (see paragraph 10.1 of NEI 12-06 guidance document for additional discussion on N+1 and N sets of portable on-site equipment) would remain deployable following the high wind event. (This option is not applicable for hurricane conditions).

4. Snow, Ice and Extreme Cold

- (a) FLEX equipment is being stored in one of two configurations:

- (1) In a structure that meets the plant's design basis for the snow, ice and cold conditions (e.g., existing safety-related structure) or
- (2) In a structure designed to or evaluated equivalent to standard ASCE 7-10, for the snow, ice, and cold conditions from the site's design basis.

- (b) FLEX equipment is maintained at a temperature within a range to ensure that it will function when called upon. For example, the equipment is protected by storage in a heated enclosure or by direct heating.

- (c) FLEX equipment was procured to function in the extreme snowfall and ice storm conditions applicable to the site. FLEX equipment can be moved from the storage to its deployment location during extreme snowfall and ice storms.

- (d) Licensee has evaluated the loss of UHS and its impact on room/equipment cooling for the deployment of the FLEX equipment for sites at which the UHS and flow path may be affected by extreme low temperatures due to ice blockage or formation of frazil ice.

5. Extreme High Temperatures

Expected high temperature have been evaluated to be within the FLEX equipment design temperature range.

c. Maintenance and Testing

For equipment that directly performs a FLEX mitigation strategy for the core, containment, or SFP, inspectors will verify the following, as applicable:

1. Licensee has verified that the equipment (including electrical cables) was tested or the licensee has other means available to verify that it can perform its required function.
2. Portable equipment is being maintained and tested in accordance with guidance provided in industry's Equipment Reliability Process (e.g., Institute of Nuclear Power

Operations' (INPO's) AP-913, Equipment Reliability Process or an acceptable alternative, as described in the plant specific SE), to verify proper function.

3. Licensee has programmatic controls in place to ensure that if equipment and applicable connections are unavailable (e.g., due to maintenance), the licensee implements compensatory measures in accordance with guidance outlined in section 11.5 of NEI 12-06, such that risk to mitigating strategy capability is minimized.
4. Review condition reports related to FLEX equipment (i.e. testing and validation, maintenance, failures, etc) to ensure that deficiencies are being appropriately addressed/resolved.

d. Training

Inspectors will verify the following:

1. Licensee has established a training program to assure personnel proficiency in the implementation of FLEX strategies and in the use of FLEX mitigation equipment.
2. Licensee has provided periodic training to site emergency response leaders on FLEX strategies and implementing guidelines.
3. Licensee has provided training to personnel assigned to direct the execution of mitigation strategies for beyond-design basis events to ensure familiarity with the associated tasks considering available job aids, instructions, and mitigating strategy time constraints.

e. Off-Site Resources

Inspectors will verify the following, as applicable:

Licensee's site procedures for implementation of off-site FLEX equipment address early notification to mobilize the offsite response, establishment of a point of delivery for the off-site equipment, arrangements for delivery and deployment at the site, and sufficient supplies of commodities to support the equipment and site personnel.

1. Licensee has evaluated what equipment and commodities are needed to sustain and backup the site's coping strategies.
2. Licensee has established means to ensure that fuel for FLEX equipment can be delivered to the site if onsite fuel is unusable or depleted.
3. Licensee has a process to revise the required supplied equipment due to changes in the FLEX strategies or plant equipment or equipment obsolescence.

4. Licensee has installed standard mechanical and electrical connections which are compatible with Phase 3 equipment.

f. Configuration Control

Licensee has ensured that all documents, drawings, sketches, calculations analyses, procedures/guidance and evaluations related to its mitigation strategies are controlled and maintained in accordance with the plant configuration control program.

2515/191-04 REPORTING REQUIREMENTS:

Inspectors will notify NRR/DLP/PBEB of any issues of concern and such issues will be screened through a cross-regional panel. Following consultation with NRR/DLP/PBEB, and outcome of a cross-regional panel, inspectors will document any issues in accordance with IMC 0612, "Power Reactor Inspection Reports" in a standalone inspection report.

If no more-than-minor issues of concern are identified, the following statements shall be included in the standalone inspection report:

"Based on samples selected for review, the inspector(s) verified that the licensee satisfactorily implemented appropriate elements of the FLEX strategy as described in the plant specific submittal(s) and the associated safety evaluation [provide ADAMS number] and determined that the licensee is in compliance with NRC Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (ADAMS Accession No. [ML12229A174](#))."

The inspectors verified that the licensee satisfactorily:

- developed and issued FLEX Support Guidelines (FSG) to implement the FLEX strategies for postulated external events;
- integrated their FSGs into their existing plant procedures such that entry into and departure from the FSGs are clear when using existing plant procedures;
- protected FLEX equipment from site-specific hazards;
- developed and implemented adequate testing and maintenance of FLEX equipment to ensure their availability and capability;
- trained their staff to assure personnel proficiency in the mitigation of beyond-design-basis events; and
- developed means to ensure that the necessary off-site FLEX equipment will be available from off-site locations.

The inspectors verified that noncompliances with requirements, and standards identified during the inspection were entered into the licensee's corrective action program (list the correction action program document(s) number)."

END

Appendix B – SPENT FUEL POOL INSTRUMENTATION

2515/191-03 INSPECTION REQUIREMENTS:

03.01 General

NRC Order EA-12-051 requires that licensees and construction permit holders install reliable means of remotely monitoring wide-range spent fuel pool (SFP) levels to support effective prioritization of event mitigation and recovery actions in the event of a beyond-design-basis external event. The SFP level instrumentation currently installed at nuclear power plants in the United States is typically narrow range and, therefore, only capable of monitoring normal and slightly off-normal conditions. The staff's review of the events at Fukushima Dai-ichi has revealed the benefits that can be derived from the availability of more diverse instrumentation. Reliable and available indication is essential to ensure plant personnel can effectively prioritize emergency actions during and after extreme natural events.

03.02 Specific Inspection Requirements

Inspectors will verify the following concerning SFP instrumentation is implemented as described in the plant specific submittal(s) and associated safety evaluation (SE):

a. Arrangement and Independence:

1. Licensee has installed the mounted SFP sensors as described in the plant specific submittal(s) and the associated SE.
2. Cabling for the power supplies and the indications for each SFP instrumentation channel are physically and electrically separated.

b. Display:

1. The display is in the location described in the plant specific submittal(s) and safety evaluation.
2. Verify the environmental conditions and accessibility to the panel is as described in the plant specific submittal(s) and SE.

c. Training:

Licensee has a training program that addresses the use, maintenance, calibration, surveillance, and the use of alternate power to the primary and backup SFP instrument channels.

d. Procedures:

The licensee has approved procedures for maintenance, testing, calibration, and use of the primary and backup SFP instrumentation channels. Verify these procedures follow the guidance contained in NEI 12-02 and that these procedures are part of an existing licensee process to be maintained.

2515/191-04 REPORTING REQUIREMENTS:

Inspectors will notify NRR/DLP/PBEB of any issues of concern and such issues will be screened through a cross-regional panel. Following consultation with NRR/DLP/PBEB, and outcome of a cross-regional panel, inspectors will document any issues in accordance with IMC 0612, "Power Reactor Inspection Reports" in a standalone inspection report.

If no more-than-minor issues of concern are identified, the following statements shall be included in the standalone inspection report:

"Based on samples selected for review, the inspector(s) verified that the licensee satisfactorily implemented appropriate elements of the FLEX strategy as described in the plant specific submittal(s) and the associated safety evaluation [provide ADAMS number] and determined that the licensee is in compliance with NRC Order EA-12-051, "Order to Modify Licenses With Regard To Reliable Spent Fuel Pool Instrumentation," (ADAMS) Accession No. ML 12054A679)."

The inspectors verified that the licensee satisfactorily:

- installed the SFP instrumentation sensors, cabling and power supplies to provide physical and electrical separation as described in the plant specific submittal(s) and safety evaluation;
- installed the SFP instrumentation display in the location, environmental conditions and accessibility as described in the plant specific submittal(s);
- trained their staff to assure personnel proficiency with the maintenance, testing, and use of the SFP instrumentation; and
- developed and issued procedures for maintenance, testing and use of the reliable SFP instrumentation.

The inspectors verified that noncompliances with requirements, and standards identified during the inspection were entered into the licensee's corrective action program (list the correction action program document(s) number)."

END

Appendix C – STAFFING AND COMMUNICATION REQUEST FOR INFORMATION

2515/191-03 INSPECTION REQUIREMENTS:

03.01 General

Per the March 12, 2012, request for information letter ([ML12053A340](#)), licensees were requested, in part, to provide an assessment of their current capabilities pertaining to Near-Term Task Force (NTTF) Recommendation 9.3 response to a large scale natural emergency event that results in an extended loss of all ac power to all site units, and impeded access to the site. Additionally, COMSECY-13-0010, *Schedule and Plans for Tier 2 Order on Emergency Preparedness for Japan Lessons Learned*, dated March 27, 2013 (ADAMS Accession No. ML12339A262) described industry's plans to provide multi-unit dose assessments. Together these licensee assessments include:

- A description of communications systems equipment and staffing needed for an extended loss of all ac power (ELAP) to all site units, and impeded access to the site.
- Any identified enhancements completed to ensure communications would be maintained and staffing levels would be appropriate to fill all necessary positions as defined in Phases 1 and 2 staffing assessments and the NRC safety assessment.
- For multi-unit sites, an assessment of the sites capability to perform multi-unit dose assessment and any enhancements completed to realize this capability.

This Temporary Instruction will verify that the licensee has:

- Implemented required staffing change(s) to support a multi-unit ELAP scenario as described in the licensee's Phase 1 and 2 staffing assessment and the NRC safety assessment.
- Emergency Preparedness communications equipment and facilities sufficient for dealing with multi-unit and ELAP scenarios as described in the licensee's communications assessment and the NRC safety assessment.
- Implemented multi-unit dose assessment (including releases from spent fuel pools) capability using the licensee's site-specific dose assessment software and approach as described in the licensee's multi-unit dose assessment submittal.

03.02 Specific Inspection Requirements

Inspectors will verify the following:

a. Communications

1. Planned improvements to existing onsite communications systems and their required normal and/or backup power supplies were completed;
2. Communications system(s), technologies, equipment and power supplies would be available from the beginning of the event and operate during an ELAP as described in the licensee assessment;
3. Off-site response organizations (ORO) communication systems as described in the licensee's communications assessment operate as designed by reviewing documentation of established maintenance and testing program activities;
4. The usability and applicability of the implementing procedures and/or guidance used to implement the communication capabilities;
5. The feasibility of communications system(s), technologies, equipment and power supplies by performing a system walk-down with a knowledgeable licensee staff member; and
6. That the new communications equipment, portable power supplies and/or systems have been added to testing and preventative maintenance program.

b. Staffing

Licensees were requested to provide an assessment of the onsite and augmented staff needed to respond to a large scale natural event that results in an extended loss of all alternating current power to all site units and impedes access to the site. This assessment was to include a discussion of the onsite and augmented staff available to implement the strategies as discussed in the emergency plan and/or described in plant operating procedures.

1. Functions/tasks identified as a result of the assessment have been appropriately staffed;
2. The site access methods (e.g., roadways, navigable bodies of water and dockage, airlift, etc.) expected to be available per the licensee's Phases 1 and 2 staffing assessments and NRC safety assessment have the appropriate documentation (e.g. contact phone numbers, signed letter of agreement, approved contract, etc.) available to the Emergency Response Organization (ERO); and

3. The testing, training and drills/exercises performed by the licensee demonstrate the ERO ability to utilize the communications systems and/or equipment.

c. Multi-unit Dose Assessment

1. The multi-unit dose assessment is capable of analyzing concurrent radiological releases from all on-site significant sources (including releases from spent fuel pools) consistent with the licensee's multi-dose assessment submittal;
2. The multi-unit dose assessment extended loss of ac power capability is consistent with the licensee's multi-unit dose submittal; and
3. The primary multi-unit dose assessment method is consistent with the licensee's multi-unit dose submittal.

2515/191-04 REPORTING REQUIREMENTS

Inspectors will notify NRR/DLP/PBEB of any issues of concern and such issues will be screened through a cross-regional panel. Following consultation with NRR/DLP/PBEB, and outcome of a cross-regional panel, inspectors will document any issues in accordance with IMC 0612, "Power Reactor Inspection Reports" in a standalone inspection report.

If no more-than-minor issues of concern are identified, the following statements shall be included in the standalone inspection report:

"The inspector(s) reviewed information provided in the licensee's multi-unit dose submittal and in response to the NRC's March 12, 2012, request for information letter ([ML12053A340](#)), and verified that the licensee satisfactorily implemented enhancements pertaining to Near-Term Task Force (NTTF) Recommendation 9.3 response to a large scale natural emergency event that results in an extended loss of all ac power to all site units and impedes access to the site.

The inspectors verified the following:

- Licensee satisfactorily implemented required staffing change(s) to support a multi-unit ELAP scenario.
- EP communications equipment and facilities are sufficient for dealing with a multi-unit ELAP scenario.
- [For multi-unit sites] Implemented multi-unit dose assessment capabilities (including releases from spent fuel pools) using the licensee's site-specific dose assessment software and approach.

The inspectors verified that noncompliances with requirements, and standards identified during the inspection were entered into the licensee's corrective action program (list the correction action program document(s) number).”

END

Attachment 1 – Revision History
TI 2515/191

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional, Non-Public Information)
	ML13336A744 10/06/14 CN 14-023	This is the initial issuance of a Temporary Instruction which will be used to verify licensee's satisfactory implementation of NRC Order EA-12-049, which added requirements for mitigation strategies for Beyond-Design-Basis external events; NRC Order EA-12-051, which added requirements for spent fuel pool instrumentation; and communications and staffing plans needed to respond to a large-scale event as requested in the NRC's March 12, 2012 request for information letter.		
	ML15257A188 12/23/15 CN 15-032	To incorporate Lessons Learned from the Watts Bar TI 191 pilot inspection completed in March 2015.		ML15257A192
	ML18191B074 07/10/18 CN 18-020	TI Completion Schedule extended to 12/31/2019 and Expiration extended to 6/30/2020 due to a few Safety Evaluations being issued in late 2018.	None	N/A