Interim Staff Guidance
Compliance with 10 CFR 50.54(hh)(2) and 10 CFR 52.80(d)
Loss of Large Areas of the Plant due to Explosions or Fires
from a Beyond-Design Basis Event
DC/COL-ISG-016

Purpose

This interim staff guidance (ISG) is provided to assist new applicants for, and new holders of a combined license (COL)[1] issued under Title 10 of the *Code of Federal Regulations*, Part 52 (10 CFR Part 52), with the identification of measures needed to comply with requirements to address loss of large areas (LOLAs) of the plant due to explosions or fires from a beyond-design basis event (BDBE). These requirements are contained in Section 50.54(hh)(2) of 10 CFR Part 50 and Section 52.80(d) of 10 CFR Part 52. This ISG provides one acceptable approach for satisfying the requirements in Section 50.54(hh)(2) of 10 CFR Part 50 and Section 52.80(d) of 10 CFR Part 52. New applicants for and new holders of a COL issued under 10 CFR Part 52 may use other methods for satisfying these requirements. The U.S. Nuclear Regulatory Commission (NRC) staff will review such methods and determine their acceptability on a case by case basis.

Background

On March 27, 2009, the NRC amended 10 CFR Part 50 and 10 CFR Part 52 of its regulations with new requirements [74 FR 13926, March 27, 2009] to address LOLAs of the plant due to explosions or fires from a BDBE. Section 50.54(hh)(2) requires power reactor licensees to develop guidance and strategies for addressing the LOLAs of the plant due to explosions or fires from a BDBE. Specifically, licensees must develop and implement guidance and strategies intended to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling capabilities under the circumstances associated with LOLAs of the plant due to explosions or fire, to include strategies in the following areas: (i) Fire fighting; (ii) Operations to mitigate fuel damage; and (iii) Actions to minimize radiological release. These strategies are intended to be part of licensees' response to events that are beyond the design basis of the facility. The requirements in the final rule are based on similar requirements originally found in Section B.5.b of the NRC's Interim Compensatory Measures (ICM) order issued February 25, 2002 (hereafter referred to as the "ICM Order") [Reference 1].

Section 52.80(d) is added to require an applicant for a COL to submit a description and plans for implementation of the guidance and strategies intended to maintain or restore core cooling, containment, and SFP cooling capabilities under the circumstances associated with the LOLAs of the plant due to explosions or fire as required by Section 50.54(hh)(2). The NRC views the strategies required by Section 50.54(hh)(2) as similar to those operational programs for which a description of the program is provided as part of the COL application and subsequently implemented before plant operation.

---

[1] Application docketed after September 1, 2007.

Enclosure

The NRC reviews the program description provided in the application as part of the licensing process and performs subsequent inspections of procedures and plant hardware to verify implementation.

Reactor licensees currently licensed in accordance with 10 CFR Part 50[2] comply with 10 CFR 50.54(hh)(2) through the use of 14 general strategies that have been required through an operating license (OL) condition. Licensees implemented these strategies using guidance issued by the NRC and the Nuclear Energy Institute (NEI).

The NRC issued guidance to current reactor licensees on February 25, 2005 [Reference 2]. Following issuance of the guidance, the NRC staff conducted inspections at operating reactor sites using Temporary Instruction (TI) 2515/164 (Safeguards Information (SGI)) to gather information on actions taken in response to the February 25, 2005 guidance. The NRC staff then convened assessment panels to evaluate the adequacy of licensee actions taken to date. These assessment panels developed acceptance criteria to determine the adequacy of licensee responses to each of the 34 expectations identified in Attachment B to the February 25, 2005, guidance. On January 18 and 26, 2006, the NRC staff met with industry representatives and provided further clarifying information, including staff acceptance criteria on how licensees could meet Section B.5.b of the ICM Order. The NRC clarifying information for acceptance of each expectation was disseminated in Section 05.02.c and 05.02.d of TI 2515/168 (SGI). This clarifying information represents acceptable methods, along with staff acceptance criteria, for satisfying the expectations. The staff used this clarifying information in developing its safety evaluation and inspection of current reactor licensee's compliance with Section B.5.b of the ICM Order.

In December 2006, NEI issued NEI 06-12, Revision 2, "B.5.b Phase 2 &3 Submittal Guideline" [Reference 3]. The NRC endorsed NEI 06-12, Revision 2, by letter dated December 22, 2006 [Reference 4] as an acceptable means for developing and implementing the mitigation strategies requirement in Section B.5.b of the ICM Order. NEI 06-12, Revision 2 provides guidance for implementing a set of strategies intended to maintain or restore core cooling, containment, and SFP cooling capabilities under the circumstances associated with LOLAs of the plant due to explosions or fire, in the following areas:

(b)(2),(b)(4)

The specific strategies covered in NEI 06-12, Revision 2 were developed based on the results of assessments conducted at currently licensed power reactor facilities for the purpose of enhancing plant specific mitigation capability for damage conditions caused by a large explosion or fire. These assessments identified a wide spectrum of potential plant specific strategies. NEI 06-12, Revision 2 specifies one set of strategies applicable to all currently licensed pressurized-water reactors (PWR) and another set applicable to all currently licensed

[2] Commercial nuclear power facilities with an operating license issued prior to September 1, 2007.

boiling-water reactors (BWR). Both sets are derived from the results of the plant specific assessments.

Guidance issued by the NRC on February 25, 2005, and NEI 06-12, Revision 2 were used by each licensee in preparing information submitted to the NRC that describes a plant specific approach to implementing mitigating strategies and supports each plant specific license condition. The NRC staff has completed its review of the information submitted by each licensee, as well as information obtained during prior NRC inspections, and has issued a safety evaluation report that documents the bases for its approval of the license condition for each facility. Current reactor licensees have implemented procedures and guidance that comply with the requirements of 10 CFR 50.54(hh)(2). The NRC has performed an inspection at each facility to confirm that the licensee has implemented strategies in accordance with information submitted by the licensee and approved by the NRC. Current reactor licensees do not require any additional action to comply with requirements in 10 CFR 50.54(hh)(2).

On July 17, 2009, the NEI published Revision 3 of NEI 06-12 [Reference 5]. This revision includes the guidance approved for the implementation of NEI 06-12, Revision 2, at current operating facilities and provides additional guidance and a template for new nuclear power plant (NPP) applicants and licensees to assist them in complying with the requirements in 10 CFR 50.54(hh)(2) and 10 CFR 52.80(d).

(b)(2),(b)(4)

Rationale

1. 10 CFR 50.54(hh)(2) states: Each licensee shall develop and implement guidance and strategies intended to maintain or restore core cooling, containment, and SFP cooling capabilities under the circumstances associated with LOLAs of the plant due to explosions or fire, to include strategies in the following areas: (i) Fire fighting; (ii) Operations to mitigate fuel damage; and, (iii) Actions to minimize radiological release. The Commission's Statement of Consideration for these requirements states that new reactor licensees must address core cooling, SFP cooling, and containment integrity by employing the same 14 general strategies that have been required through an OL condition for current power reactor licensees [74 FR 13926, 13957, March 27, 2009]. The mitigation strategies employed by new reactors as required by the rule also need to account for, as appropriate, the specific features of the plant design, or any design changes made as a result of an aircraft impact assessment that will be performed in accordance with the Commission's Aircraft Impact Assessment rule [74 FR 28111, June 12, 2009]. New reactor applicants and new holders of a COL may have additional safety and design features and functions beyond those of operating reactors. The effects of these additional features and design differences on the original guidance in

NEI 06-12, Revision 2 are addressed through this additional guidance that is beyond that developed for current power reactor licensees.

2. Section 52.80(d) is added to Section 52.80 to require a COL applicant to submit a description and plans for implementation of the guidance and strategies intended to maintain or restore core cooling, containment, and SFP cooling capabilities under the circumstances associated with the LOLAs of the plant due to explosions or fire as required by Section 50.54(hh)(2). New reactor applicants need guidance for providing the information necessary for the NRC staff to complete its licensing review.

3. As the final step in closure of action items with respect to Section B.5.b of the ICM Order, the NRC staff performed an inspection at each licensed power reactor facility using TI 2515/171 [Reference 7 and 8]. During these inspections, the NRC staff identified a number of areas in which licensees either failed to implement their strategies in accordance with guidance in NEI 06-12, or interpreted the guidance in substantially different ways. In many cases, the source of these problems was traced to either vagueness or incompleteness in the industry guidance. These issues have been resolved at licensed power reactor facilities. This ISG serves as an interim source of information for a COL applicant regarding the nature of these issues and approaches for addressing them that are acceptable to the staff.

Applicability

As discussed above, current reactor licensees have already implemented procedures and guidance that comply with the requirements of 10 CFR 50.54(hh)(2) and do not require any additional action to comply with these rule provisions. Consequently, the guidance in this document is only applicable to new applicants for and new holders of a COL issued under 10 CFR Part 52.

This ISG shall be implemented on the day following its approval. It shall remain in effect until it has been superseded, withdrawn, or incorporated into a regulatory guide and the Standard Review Plan (SRP) [Reference 9].

Proposed ISG

As discussed above, this ISG is applicable to new reactors at the COL application stage and the new reactor licensee stage. The Commission views the mitigative strategies and guidance required by Section 50.54(hh)(2) as similar to those operational programs for which a description of the program is provided as part of the COL application and subsequently implemented before plant operation. High level development of strategies and guidance is performed at the COL application stage. The results of this activity are provided in the application and reviewed by the Commission as part of the licensing process. Lower level detailed development and implementation of strategies and guidance into operating procedures and associated basis documents is performed following plant construction and prior to initial operation. The Commission performs subsequent inspections of procedures and plant hardware to verify implementation.

The NRC expects that the strategies will be described at the COL application stage in sufficient detail to permit the NRC to make the findings required for licensing. Specific level of detail guidance has been included in NEI 06-12, Revision 3 (i.e., Appendix D) to assist COL applicants in providing the information needed by the NRC to make the findings required for licensing. Additional guidance in NEI 06-12, Revision 3 and in this ISG is provided to assist applicants in determining the information, including the results of specific evaluations that support procedures, that is not required by the NRC prior to licensing but must be available for inspection after the license is issued and prior to initial plant operation. The NRC will subsequently perform inspection of this information, including specific procedures, and plant hardware to verify that the strategies identified in the license application have been implemented subsequent to licensing. To support the NRC inspection program, an item related to 10 CFR 50.54(hh)(2) should be incorporated into the standard license conditions in Chapter 13 of the FSAR related to (1) implementation of specified programs and (2) submitting schedules to support planning for and conduct of NRC inspections. The NRC expects that the guidance and strategies required under 10 CFR 50.54(hh)(2) will be fully implemented no later than the time nuclear fuel is first loaded into the reactor and maintained until all nuclear fuel is permanently removed from the site.

The NRC staff considers conformance with the guidance in NEI 06-12, Revision 3, an acceptable method for use by applicants for and holders of a license to operate a new power reactor facility in satisfying the Commission's requirements in 10 CFR 50.54(hh)(2) and 10 CFR 52.80(d), with the following exceptions:

1. Section 4.2.1 of NEI 06-12, Revision 3 states that new nuclear power plants should address the Phase 1[3] issues as current power reactor licensees have done, by implementing guidance issued by the NRC on February 25, 2005. As discussed above, this guidance alone was not sufficient to ensure that current licensees met the requirements of the ICM Order. Additional clarifying information documented in Sections 05.02(c) and 05.02(d) of NRC TI 2515/168 was disseminated to licensees on January 18 and 26, 2006. This clarifying information describes acceptable methods, along with staff acceptance criteria, for satisfying the staff's expectations documented in the February 25, 2005, guidance document.

   The February 25, 2005 guidance document and TI 2515/168 contain SGI. These documents may be obtained from the NRC by applicants for and holders of a license to operate a new NPP who are in compliance with the Commission's requirements in 10 CFR Part 73 for protection of SGI.

   <u>Staff Position</u>

[3] Current holders of an operating license addressed the requirements of the ICM Order in three Phases. Phase 1 addressed all requirements except for requirements to develop and implement specific measures to mitigate damage to fuel in the SFP and requirements to develop and implement specific measures to mitigate damage to fuel in the reactor vessel and minimize radiological releases from the containment. Development and implementation of the former measures is considered Phase 2 and development and implementation of the later measures is considered Phase 3.

Applicants for and holders of a license to operate a new nuclear power reactor facility should use the guidance in Attachment 1 to this ISG along with the guidance issued by the NRC on February 25, 2005, to develop and implement strategies and guidance as required by 10 CFR 50.54(hh)(2). This additional guidance is consistent with the guidance provided in TI 2515/168 and recognizes that there will be differences between the designs of new power reactor facilities and those of facilities currently operating.

The NRC staff recognizes that new nuclear power reactor facilities may incorporate design features and functional capabilities that may lead applicants for, and holders of, a license to operate such a facility to propose alternative approaches to meeting the NRC staff's expectations described in Attachment 1. For each of the expectations described in Attachment 1, applicants should provide a description of the strategy to be implemented, a commitment to implement an approach acceptable to the NRC as described in the Attachment, or a description of their alternative approach, including the design feature(s) or functional capability(s) that have led to that approach. This information should be included with the description and plans for implementation of the guidance and strategies that applicants are required to submit to the NRC per 10 CFR 52.80(d). NEI 99-04 R0 "Guidelines for Managing NRC Commitment Changes" (ML003680088), accepted in RIS 2000-017 (ML091190065), provides reasonable guidance for the control of these regulatory commitments.

2. Guidance in Section 4.2.2 of NEI 06-12, Revision 3 describes conditions under which an applicant for a license to operate a new nuclear power reactor facility may use guidance in Chapter 2 of NEI 06-12, Revision 3 for developing guidance and strategies intended to maintain or restore SFP cooling and preparing plans for future implementation of the guidance and strategies. Section 4.2.3 of NEI 06-12, Revision 3 describes conditions under which an applicant for a license to operate a new nuclear power reactor facility may use guidance in Chapter 3 of NEI 06-12, Revision 3 for developing guidance and strategies intended to maintain or restore core cooling and containment capabilities, and preparing plans for future implementation of the guidance and strategies. These chapters of NEI 06-12, Revision 3 have not been updated from Revision 2 to address the necessary improvements in the guidance identified during NRC inspections at licensed power reactor facilities.

   Staff Position

   Applicants for a license to operate a new nuclear power reactor facility should ensure that the guidance and strategies developed to comply with 10 CFR 50.54(hh)(2) reflect the experience gained from the implementation of guidance and strategies at licensed power reactor facilities that are applicable to their facility, as described in Attachment 2. Holders of a license to operate a new nuclear power reactor facility should ensure that the strategies and guidance are translated into operating procedures that reflect this experience.

Final Resolution

The contents of this ISG will subsequently be incorporated into Section 19.0 of the SRP, and other guidance documents, as appropriate.

Attachments

1. Supplementary Guidance for Developing and Implementing Mitigation Strategies.

2. Experience Gained from Implementation of TI 2515/171 at Currently Licensed Power Reactor Sites and Related Staff Positions.

References

1. Order Modifying Licenses (Effective Immediately), Samuel J. Collins (NRC), EA-02-026, February 25, 2002.

2. Letter from James E. Dyer (NRC) to Holders of Licenses for Operating Power Reactors, "NRC Staff Guidance for Use in Achieving Satisfactory Compliance with February 25, 2002 Order Section B.5.b," February 25, 2005.

3. Letter from Anthony R. Pietrangelo (NEI) to James E. Dyer (NRC), "NEI 06-12, Revision 2, B.5.b Phases 2 & 3 Submittal Guideline," December 14, 2006.

4. Letter from James E. Dyer (NRC) to Anthony R. Pietrangelo (NEI), December 22, 2006.

5. Letter from Douglas J. Walters (NEI) to (NRC), "NEI 06-12, Revision 3, B.5.b Phases 2 & 3 Submittal Guideline," July 2009.

6. Letter from Douglas J. Walters (NEI) to Thomas A. Bergman (NRC), "Revision to NEI 06-12, B.5.b Phase 2 and 3 Submittal Guideline, Revision 2, December 2006," May 1, 2009.

7. NRC TI 2515/171, "Verification of Site Specific Implementation of B.5.B Phase 2 & 3 Mitigating Strategies," February 6, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML073120469).

8. NRC TI 2515/171, Revision 1, "Verification of Site Specific Implementation of B.5.B Phase 2 & 3 Mitigating Strategies," July 25, 2008 (ADAMS Accession No. ML081340110

9. NRC NUREG-0800, Revision 2, SRP, ADAMS Accession No. ML071700652, June 2007.

10. NEI 99-04 R0, "Guidelines for Managing NRC Commitment Changes," July 1999 (ADAMS Accession No. ML003680088)

11. NRC TI 2515/168, "Closeout Inspection of Nuclear Reactor Safeguards Interim Compensatory Measures - Section B.5.b Plant Mitigating Strategies to Address Loss of Large Areas of the Plant due to Explosion or Fire," May 2006

Attachment 1

Supplementary Guidance for Implementing Mitigation Strategies

Staging of Fire Brigade Equipment (Item B.1.a of Reference 1)

(b)(2)

The NRC staff expects the strategies to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Dispersal of Personnel (Items B.1.b and B.2.a of Reference 1)

(b)(2)

The NRC staff expects the strategies to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

(b)(2)

(b)(2)

(b)(2)

(b)(2)

Airlifted Resources (Item B.1.c of Reference 1)

(b)(2)

The NRC staff expects the strategies for use of airlifted resources to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Command and Control (Item B.1.d of Reference 1)

(b)(2)

The NRC staff expects the strategies to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Evaluating Capabilities of Offsite Resources (Item B.1.e of Reference 1)

(b)(2)

The NRC staff expects the plans and strategies for using the capabilities of mutual aid or other local/regional resources to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Evaluation of MOUs for Offsite Resources (Item B.1.f of Reference 1)

(b)(2)

(b)(2)

The NRC staff expects the plans and strategies for developing MOUs with offsite response organizations to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Coordination with Regional Resources (Item B.1.g of Reference 1)

(b)(2)

The NRC staff expects the plans and strategies for acquiring regional resources to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Controlling Emergency Response Vehicles and Dosimetry for Responders (Item B.1.h of Reference 1)

(b)(2)

The NRC staff expects the plans and strategies for controlling emergency response vehicles and dosimetry for responders to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Communications Equipment (Items B.1.i and B.2.b of Reference 1)

(b)(2)

(b)(2)

The NRC staff expects the plans and strategies for providing communication equipment to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

(b)(2)

Mass Casualties (Item B.1.j of Reference 1)

(b)(2)

The NRC staff expects the plans and strategies for handling a mass casualty situation to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Triage Areas (Item B.1.k of Reference 1)

(b)(2)

The NRC staff expects the plans and strategies for establishing triage areas to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Firefighting Training and Exercises (Item B.1.l of Reference 1)

(b)(2)

The NRC staff expects the strategies to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Means for Feeding the Fire Protection Ring Header (Item B.1.m of Reference 1)

(b)(2)

The NRC staff expects the plans and strategies for feeding the fire protection ring header from alternate water supplies to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Best Practices for BWRs: Containment Venting and Vessel Flooding (Item B.2.e of Reference 1)

(b)(2)

The NRC staff expects the plans and strategies for containment venting and vessel flooding to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Use of Plant Equipment During Loss of Power Situations (Item B.2.g of Reference 1)

(b)(2)

The NRC staff expects the plans and strategies for use of plant equipment during loss of power situations to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Compartmentalization (Item B.2.h of Reference 1)

(b)(2)

The NRC staff expects the plans and strategies for and analysis or walk down of target areas to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Enclosure

SFP Mitigative Measures (Item B.2.m in Reference 1)

(b)(2)

(b)(2)

The NRC staff expects the strategies to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Training (Item B.2.n of Reference 1)

(b)(2)

(b)(2)

The NRC staff expects the plans for training to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the training program by the licensee.

Water Spray Scrubbing and Runoff (Item B.3.a of Reference 1)

(b)(2)

The NRC staff expects the plans and strategies for water spray scrubbing and containment of contaminated runoff to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

Staging of Equipment for Water Spray Scrubbing (Item B.3.b of Reference 1)

(b)(2)

References

1. Letter from James E. Dyer (NRC) to Holders of Licenses for Operating Power Reactors, "NRC Staff Guidance for Use in Achieving Satisfactory Compliance with February 25, 2002 Order Section B.5.b," February 25, 2005.

Attachment 2

Experience Gained from Implementation of Temporary Instruction 2515/171
at Currently Licensed Power Reactor Sites and Related Staff Positions

1. In November of 2007 the PWR Owners Group issued recommendations that directly affect three of the PWR strategies that could be used in responding to beyond-design-basis events (BDBEs) addressed by 10 CFR 50.54(hh)(2). The three strategies are included in NEI 06-12, Revision 3.

(b)(2)

Staff Position

Applicants for a license to operate a new NPP utilizing a PWR should review the recommendations from the PWR Owners Group, and where applicable, consider them in the development of strategies and guidance. The NRC staff expects the strategies to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

2.

(b)(2)

Staff Position

(b)(2)

3.

(b)(2)

Staff Position

(b)(2)

4. At some licensed facilities, licensees choose to make minor plant modifications to facilitate implementation of various strategies. These types of modifications include

(b)(2)

(b)(2)

The licensees who made these modifications stated that they were relatively inexpensive and, in their engineering judgment, worth the expense. Based on the inspections at 65 sites, the NRC staff concluded that these types of simple modifications significantly decrease the time required to implement strategies and increase the likelihood that these strategies can be implemented successfully.

Staff Position

Applicants for a license to operate a new NPP should consider incorporating design enhancements or facility modifications to facilitate implementation of strategies when such an enhancement or modification can substantially reduce the time required implement the strategy and its cost is justified in light of the benefit achieved. The NRC staff expects the strategies to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee.

5. Guidance provided in NEI 06-12, Revision 3 states that strategies can be implemented through guidance or procedures, consistent with the user's chosen approach, and that procedural steps are expected to be general in nature, consistent with the need for flexibility of deployment. NRC inspections at licensed power reactor facilities revealed the level of detail and guidance provided in procedures varied considerably between facilities. Some licensees had established high quality, comprehensive procedures with clear guidance for responding to LOLA events. However, at many sites the guidance was incomplete, erroneous, or inadequate which called into question the quality of the validation of these procedures or whether verification and validation were performed.

Staff Position

Implementation procedures for strategies and the level of training on those procedures will be considered adequate by the NRC if licensee staff members are able to walk through the strategies successfully using those procedures.

6. During inspections at licensed power reactor facilities, the NRC staff found that some licensees had not established a maintenance program for equipment relied upon to implement strategies. A few licensees did not even test portable pumps required for some strategies. On the other hand, some licensees have established comprehensive maintenance programs which include: monthly surveillance checks, quarterly start and run checks, and annual pump flow tests. The staff has found these programs acceptable.

Staff Position

Equipment relied upon to implement the strategies required by 10 CFR 50.54(hh)(2) must be maintained and periodically tested to ensure it will operate when called upon. Installed plant equipment with established maintenance and testing requirements may not need additional maintenance and testing. However, if these systems are modified to accommodate the strategies (e.g., adding fire hose connections) then licensees should confirm that existing maintenance and testing are adequate.

(b)(2)

(b)(2)

(b)(2)

7. (b)(2)

Staff Position

(b)(2)

8. NEI 06-12, Revision 3 requires that many strategies have an engineering basis that provides reasonable assurance that the intended makeup rate and capacities can be provided. NEI 06-12, Revision 3 also states that this basis should be auditable, but not necessarily based on a quality related calculation. Licensees for currently operating plants used a number of different methods for establishing an engineering basis for these strategies including, engineering handbooks and computer models. The NRC staff found that all of these methods were acceptable for establishing an engineering basis. However, at many sites the inspectors found errors in implementing these methods.

(b)(2)

Staff Position

The NRC staff expects the strategies to be described in the COL application in a manner consistent with guidance in Appendix D of NEI 06-12, Revision 3 and subsequently implemented in the site procedures by the licensee. When the technical bases for strategies and implementing procedures are developed, they must follow engineering practice and proper implementation of that practice. The quality of calculations and analyses performed by applicants in the development of strategies or by licensees during development of implementing procedures must be assured to a reasonable level. However, the level of quality required by 10 CFR Part 50, Appendix B, is not necessary.

9. During system walk downs by NRC inspectors at licensed power reactor sites, the inspectors noted that many licensees had not clearly labeled or tagged plant equipment,

(b)(2)

Staff Position

Applicants for a license to operate a new NPP should establish measures to ensure that personnel responsible for implementing mitigation strategies following a LOLA event can locate the equipment needed to implement these strategies in a timely manner during an emergency. Labeling or tagging all applicable equipment with distinctive and reflective tags is an acceptable measure.

10. NRC inspectors noted many instances where inadequacies in procedures, limited training or oversights in engineering analyses, resulted in the plant operations staff being unable to successfully perform a walkthrough of a strategy. (b)(2) These types of inadequacies could have been identified if the licensee had performed a thorough validation of each strategy.

Staff Position

Holders of a license to operate a new NPP should verify the adequacy of the procedures, training and engineering bases for each mitigating strategy by performing a walkthrough or other type of exercise of the strategy. A walkthrough should include all steps of the procedure, either by actual performance or by simulation where considerations of personnel safety, operational restrictions, technical specifications or other license conditions would prohibit the actual performance of the step.

11. (b)(2)

Staff Position

(b)(2)

(b)(2)

(b)(2)

12. (b)(2)

Staff Position

(b)(2)

(b)(2)

(b)(2)

13. (b)(2)

Staff Position

(b)(2)

14.

(b)(2)

Staff Position

(b)(2)

(b)(2)

(b)(2)

List of Acronyms

AC	Alternating Current
BDBE	Beyond-Design Basis Event
BWR	Boiling Water Reactor
CFR	Code of Federal Regulations
COL	Combined License
DC	Direct Current
EDMG	Extensive Damage Mitigation Guidelines
ICM	Interim Compensatory Measures
ISG	Interim Staff Guidance
LLEA	Local Law Enforcement Agencies
LOLA	Loss of Large Area
MOU	Memorandum of Understanding
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
OL	Operating License
OSC	Operations Support Center
PWR	Pressurized Water Reactor
SFP	Spent Fuel Pool
SG	Steam Generator
SGI	Safeguards Information
SRP	Standard Review Plan
TI	Temporary Instruction