FLEX Guidance Inquiry Form

A. TOPIC: Screening for High Wind Conditions Inq. No.: 2012-01

Source document: NEI 12-06 Section: 7.2.1

B. DESCRIPTION: If a plant has a specific design basis for tornado winds that is greater than the screening criteria in NEI 12-06, which value is used to perform the screening per section 7.2.1?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: 1)

The screening is performed using the NEI 12-06 wind value despite what the plant's wind design basis is.

D. RESOLUTION: (Include additional pages if necessary. Total pages: 1)

The proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: The answer is consistent with the NEI 12-06 guidance.

F. Industry Approval:

Documentation Method: FAQ approval Date: 09/26/12

FLEX Guidance Inquiry Form

A. TOPIC: N+1 Applicability to offsite equipment Inq. No.: 2012-02

Source document: NEI 12-06 Section: 3.2.2

B. DESCRIPTION:
How does N+1 apply to the offsite equipment?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: 1)
The offsite locations will have sufficient equipment to respond simultaneously to 4 units. To ensure 4 sets of equipment are available to be deployed, the offsite locations will have 4+1 sets of equipment to account for equipment that is not available.

D. RESOLUTION: (Include additional pages if necessary. Total pages: 1)
The proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position
Explanation: This answer is consistent with the Regional Response Center request for proposal criteria.

F. Industry Approval:

Documentation Method: FAQ . Date: 09/26/12

FLEX Guidance Inquiry Form

A. TOPIC: Common connections Inq. No.: 2012-03

Source document: NEI 12-06 Section: 12.2

B. DESCRIPTION: Is the phasing of generators a special case of common connections that needs to be separately identified in the guidance?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: 1)
This is a level of detail beyond which the guidance was intended to address. This issue will be addressed by the equipment committees working with the regional response centers.

D. RESOLUTION: (Include additional pages if necessary. Total pages: 1)
Proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position
Explanation: This is a level of detail beyond the guidance documents that will be addressed in implementation documents.

F. Industry Approval:

Documentation Method: FAQ Date: 09/26/2012

FLEX Guidance Inquiry Form

A. TOPIC: Drills for FLEX Deployment Inq. No.: 2012-04

Source document: NEI 12-06 Section: 11.6.5

B. DESCRIPTION: Do the drills demonstrating the ability to deploy the FLEX equipment need to demonstrate debris removal?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: 1)
The drills should simulate or otherwise account for the potential for debris removal in demonstrating that time-sensitive actions can be performed.

D. RESOLUTION: (Include additional pages if necessary. Total pages: 1)
Proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position
Explanation: Position is consistent with the guidance

F. Industry Approval:

Documentation Method: FAQ Date: 09/26/12

FLEX Guidance Inquiry Form

A. TOPIC: Unavailability of FLEX connections Inq. No.: 2012-05

Source document: NEI 12-06 Section: 11.5.3.c

B. DESCRIPTION:

What actions should be taken if FLEX connections are unavailable for more than 90 days?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: 1)

The equivalent actions of 11.5.3.d or 11.5.3.f, as appropriate, should be invoked if FLEX connections cannot be returned to service within 90 days.

A new paragraph (g) will be added to the guidance in the next revision to the effect of:

g. If connections to permanent plant equipment required for FLEX strategies are unavailable for greater than 90 days, initiate actions within 24 hours to restore the FLEX capability and implement compensatory measures within 72 hours.

D. RESOLUTION: (Include additional pages if necessary. Total pages: 1)

The proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: The answer is a logical application of the existing guidance.

F. Industry Approval:

Documentation Method: Will be incorporated into the next revision of NEI 12-06 Date: 10/05/12

FLEX Guidance Inquiry Form

A. TOPIC: Staffing considerations-personnel injuries Inq. No.: 2012-06

Source document: NEI 12-06 Section: 11.7

B. DESCRIPTION: In assessing site minimum staffing for FLEX deployment, are there assumptions that need to be made with regard to the potential for personnel unavailability due to injuries?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: 1)

No. Site staffing assessments do not need to consider the potential for personnel unavailability due to the initiating event.

D. RESOLUTION: (Include additional pages if necessary. Total pages: 1)

The proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: The guidance does not require an assumption of personnel unavailability due to the event.

F. Industry Approval:

Documentation Method: FAQ Date: 09/26/2012

FLEX Guidance Inquiry Form

A. TOPIC: Loss of normal access to the UHS Inq. No.: 2012-07

Source document: NEI 12-06 Section: 3.2.1.3(4) and Glossary

B. DESCRIPTION:

If a plant has a diesel-driven service water pump in the UHS intake structure, do they have to assume a loss of normal access to the UHS since the pump is not lost due to the extended loss of ac power?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: 1)

Yes, the plant still needs to assume a loss of normal access to the UHS. Any pump, whether in the intake structure or not, that takes a direct suction from the UHS is considered to be lost and not restorable as part of the coping strategy.

D. RESOLUTION: (Include additional pages if necessary. Total pages: 1)

The proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: The position is consistent with the NRC Order EA-12-049 and the industry guidance.

F. Industry Approval:

Documentation Method: FAQ Date: 09/26/12

FLEX Guidance Inquiry Form

A. TOPIC: Battery calculations Inq. No.: 2012-08

Source document: NEI 12-06 Section:

B. DESCRIPTION:

In performing battery coping calculations, should the industry consistently use 80% battery capacity?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: 1)

No.

NEI 12-06 Revision 0, Section 3.2.1.2, Initial Plant Conditions, Subsection (2) contains the following guidance:

"At the time of the postulated event, the reactor and supporting systems are within normal operating ranges for pressure, temperature, and water level for the appropriate plant condition. All plant equipment is either normally operating or available from the standby state as described in the plant design and licensing basis."

Consistent with this guidance, the battery is assumed to be at its normal operating capacity and this should be used for battery calculations. A minimum battery capacity for OPERABILTY is not required to be assumed (e.g., 80% capacity).

D. RESOLUTION: (Include additional pages if necessary. Total pages:)

The proposed resolution is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: The answer is consistent with the guidance.

F. Industry Approval:

Documentation Method: FAQ Date: 10/05/12

FLEX Guidance Inquiry Form

A. TOPIC: Availability of ac Distribution Equipment Inq. No.: 2012-09

Source document: NEI 12-06 Section: 3.2.1.3.8

B. DESCRIPTION:

Is a strategy to have the primary connection on an 'A' Train electrical bus (e.g., 4kV) and the alternate connection to the same bus on the 'B' Train acceptable?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: 1)

Yes, this is an acceptable strategy but is not optimally diverse. To achieve greater diversity, the alternate strategy should account for the possible unavailability of the electrical distribution equipment and select a connection point accordingly.

D. RESOLUTION: (Include additional pages if necessary. Total pages: 1)

The proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: This position is consistent with the approved guidance.

F. Industry Approval:

Documentation Method: FAQ Date: 09/26/12

FLEX Guidance Inquiry Form

A. TOPIC: Screening for flooding Inq. No.: 2012-10

Source document: NEI 12-06 Section: 6.2.1

B. DESCRIPTION:

If the UFSAR defines the site as "dry," is this sufficient to screen the plant out in accordance with NEI 12-06, Section 6.2.1?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: 1)

Yes, that is sufficient to screen the plant out of the flooding evaluation.

D. RESOLUTION: (Include additional pages if necessary. Total pages: 1)

The proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: The answer is consistent with the guidance document.

F. Industry Approval:

Documentation Method: FAQ Date: 09/26/12

FLEX Guidance Inquiry Form

A. TOPIC: Impact of EDG Field Flash on battery loading calculations Inq. No.: 2012-11

Source document: NEI 12-06 Section: Initial coping time 3.2.2 (6)

B. DESCRIPTION: NTTF 4.2 and NEI 12-06 assume a complete loss of AC power and do not allow crediting of any installed EDG. NEI 12-06 discusses the need for DC power. As part of the initial coping it is expected to strip DC loads subsequent to the loss of all AC. The time frame assumed for the DC load stripping in conjunction with the remaining loads defines the time the battery will produce sufficient voltage and directly affects the time needed to re-power the battery chargers (or similar action to sustain the DC loads). It is expected most stations will perform a DC loading calculation to formally document this time frame. All calculations require inputs and assumptions. A DC calculation has many inputs, one of which is the EDG field flashing circuitry. This is a rather large load on the DC system. However, most DC flashing circuits are interlocked so as not to provide flashing power until a certain speed is reached on a machine. This low speed relay is set at 250 rpm for Fairbanks Morse engines (and assumed to be similar for other EDG's). As NEI 12-06 and the NRC order do not allow crediting the EDG's for any AC power there has to be some assumed failure of the machines. If the assumed failure does not allow the EDG's to rotate faster than the low speed relay then there is no need to penalize the stations for the DC loading of the EDG field flashing circuit.

EDG's also have starting logic and starting solenoids that are DC powered. These are relatively low amperage loads and do not need to be excluded from the DC calculations. Additionally, the DC logic will always perform its function regardless of whether or not the EDG starts.

C.PROPOSED ANSWER

For DC loading analysis, stations may omit the DC load associated with flashing of the EDG generator fields. This is consistent with the assumed failure of all EDG's on site.

D. RESOLUTION: (Include additional pages if necessary. Total pages: 2)

No. The guidance does not specify the failure mode of the EDG. One field flash should be included assuming the EDG started and then failed. Any additional attempts to start the EDG fail and the EDG doesn't run.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: This FAQ will be presented to the NRC for review

F. Industry Approval:

Documentation Method: FAQ Date: 10/05/12

FLEX Guidance Inquiry Form

A. TOPIC: Wind Load Combinations Inq. No.: 2012-12

Source document: NEI 12-06 Section: 7.3.1

B. DESCRIPTION:

Section 7.3.1 states to design the storage building to ASCE 7-10 given the limiting tornado wind speed from Regulatory Guide 1.76. I understand this to imply that ASCE 7-10 methodology with Reg Guide 1.76 wind speed should be used for design. Design of normal condition is to be per ASCE 7-10 using the basic wind speed from the ASCE 7-10 wind speed map. Since ASCE 7-10 does not include a load combination with tornado, is it the intent of NEI 12-06 to use the load combinations from ASCE 7-10 for all those conditions except those with tornado and to use the combinations that include tornado, considering the tornado wind speed from Reg Guide 1.76, from another industry document such as ASCE N690? Note that when using the mapped wind speeds from ASCE 7-10, the load combinations from ASCE 7-10 should be used. This can be seen by the differences between ASCE 7-10 and 7-05. The mapped wind speeds have increased and the load factor on wind has decreased in ASCE 7-10.

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: 1)

The load combination for wind speeds for mapped wind speeds contained in ASCE 7-10 should use the load combinations from 7-10. Since the load combinations in ASCE 7-10 are not applicable to tornado winds, the design wind speeds from Regulatory Guide 1.76 should use the combinations required consistent with the Standard Review Plan and other safety-related applications (i.e., wind speed by factor of 1.0).

D. RESOLUTION: (Include additional pages if necessary. Total pages: 1)

Proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary x Interpretation Agency Position

Explanation: This is a normal application of the wind loading combinations

F. Industry Approval:

Documentation Method: FAQ Date: 10/05/12

FLEX Guidance Inquiry Form

A. TOPIC: Flooding Event Timeline Inq. No.: 2012-13

Source document: NEI 12-06 Section: 6

B. DESCRIPTION:

If a DB or BDB flooding event provides days of advance warning, can we assume that the plant can be shutdown and cooled down normally without having to assume ELAP and LUHS prior to flooding?

C.PROPOSED ANSWER(Include additional pages if necessary. Total pages:)

In general, ELAP and LUHS need not be assumed prior to flooding. If the origin of flood is the failure of an upstream dam that can be attributed to an earthquake, then the dam must be more than 25 miles away to assume that the same earthquake would not cause an ELAP and LUHS.

D. RESOLUTION: (Include additional pages if necessary. Total pages:)

The answer to the question asked is Yes if there is sufficient time (not necessarily days) prior to an impending flood to achieve the plant shutdown and cooldown.

The proposed answer, however, expands the scope of the question to a seismic induced flood and attempts to establish criteria for when a seismic induced flood can only be considered a flood and not a seismic event at the plant. In this case, it cannot be unilaterally stated that 25 miles distance between the dam and the plant means that a seismic event that takes out the dam can't also cause an ELAP and LUHS.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: Answer is consistent with guidance

F. Industry Approval:

Documentation Method: FAQ Date: 11/29/12

FLEX Guidance Inquiry Form

A. TOPIC: High Wind Protection Inq. No.:2012-14

Source document: NEI 12-06 Section: 7.3.1.1.b

B. DESCRIPTION:

BACKGROUND

We intend to build one "bunker building" at each site for storage of all FLEX equipment. The building will be designed to protect the equipment from seismic hazards in accordance with ASCE 7-10, "Minimum Design Loads for Buildings and Other Structures," as defined in NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, Section 5.3.1 1.b.

To meet the protection requirements from high wind hazards as defined in NEI 12-06, Section 7.3.1 1.b, these concrete buildings will be designed to ASCE 7-10 for all of the conditions defined by Regulatory Guide (RG) 1.76, "Design-Basis Tornado and Tornado Missiles for Nuclear Power Plants," Revision 1 for Region I. Specifically, the buildings will be designed for 230 MPH winds, 1.2 psi pressure drops, and the tornado missiles specified in Table 2 of RG 1.76 R1.

Note that RG 1.76 R1 states that the specified wind speeds therein "... correspond to an exceedance frequency of 10^{-7} per year ..." By comparison, Figure 7-2 of NEI 12-06 shows a range of tornado wind speeds of 186 to 196 MPH for the locations of our plants at a frequency of 10^{-6} per year. Consequently, the use of 230 MPH provides substantial margin as compared to the 10^{-6} wind speeds. (Wind forces at 230 MPH are 38% higher than at 196 MPH.)

The second bullet under NEI 12-06, section 7.3.1, 1.b states that the need for diverse locations for FLEX equipment is necessitated by consideration of tornado or hurricane missiles. The implication is that if the RG 1.76 R1 missiles are considered in the protection of FLEX equipment, there is no need for diverse locations.

FAQ

Q1 Does a building designed to these requirements, including accounting for tornado winds, missiles and pressure drop per RG 1.76 R1, meet the intent of NEI 12-06 for protection of FLEX equipment from high wind hazards?

Q2 By accounting for tornado wind, pressure drop, and missiles per RG 1.76 R1, does this eliminate the need for storing FLEX equipment in diverse locations?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: _____)

None provided

FLEX Guidance Inquiry Form

D. RESOLUTION: (Include additional pages if necessary. Total pages: _____)

7.3.1.1a – Structure designed to meet the site's design basis.

If you are building only one structure that must survive, the intent is to use the existing plants design basis.

7.3.1.1b- This entire section was trying to allow for building with designs not meeting all design basis (missiles, etc), but would provide diverse buildings such that all buildings would not be damaged for any external event. This would include assumptions for tornado wind speeds using Reg Guide 1.76 rev 1 and for tornado missiles. Using "less than design basis wind speeds" would require diverse buildings.

Revision:_____ Date:_____

E. NRC Review:

Not Necessary X Interpretation_____ Agency Position_____

Explanation: Answer agrees with the approved guidance.

F. Industry Approval:

Documentation Method: FAQ Date: 11/29/12

FLEX Guidance Inquiry Form

A. TOPIC: High Temperature Inq. No.: 2012-15

Source document: NEI 12-06 Section: 9

B. DESCRIPTION:

All sites will address high temperatures. Virtually every state in the lower 48 contiguous United States has experienced temperatures in excess of 110°F. Many states have experienced temperatures in excess of 120°F.

In this case, sites should consider the impacts of these conditions on deployment of the FLEX equipment.

The question is should existing (installed) equipment be evaluated for limitations following an ELAP (ventilation calcs) based on 120 deg F or greater exterior ambient temperatures?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: _____)

No. The discussion in Section 9 applies to FLEX equipment not installed equipment. The intent of the section is to ensure FLEX equipment can be deployed and operated given a high ambient temperature condition. Additionally the storage of FLEX equipment should account for high ambient temperatures.

D. RESOLUTION: (Include additional pages if necessary. Total pages: _____)

Task force agrees with the proposed answer.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: Answer agrees with the guidance

F. Industry Approval:

Documentation Method: FAQ Date: 11/29/12

FLEX Guidance Inquiry Form

A. TOPIC: Availability of Fire Header Following a BDBEE Inq. No.:2012-16

Source document: NEI 12-06 Section: 3.2.1.3(10)

B. DESCRIPTION:

Section 3.2.1.3(10) states that the fire protection system ring header may be relied on as a water source only if the header is shown to be robust with respect to seismic events, floods, and high winds and associated missiles. If the fire header can be shown to be available during all but a seismic event (and current procedures allow the use of the fire header during a design basis event such as a flood), can the fire header be used during the other events provided an alternate method is available for use during the seismic event?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: 1)

Yes, the fire header can be credited as available for use during any event for which the fire header has been shown to be available, provided an alternate method is used during those events (i.e. – seismic event, etc.) for which the fire header is unavailable.

D. RESOLUTION: (Include additional pages if necessary. Total pages:)

Proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: Answer is consistent with NEI 12-06

F. Industry Approval:

Documentation Method: FAQ and future clarification to NEI 12-06 Section 3.2.1.3(10) Date: 1/8/13

FLEX Guidance Inquiry Form

A. TOPIC: Seabrook Supplemental Emergency Power System Inq. No.: 2012-17

Source document: NEI 12-06 Section: 11.3

B. DESCRIPTION:

The Seabrook plant design includes a Supplemental Emergency Power System (SEPS) and a Seismic Class 1 Service Water Forced Draft Cooling Tower. The two diesel generator sets (N+1) for the SEPS automatically start on a loss of offsite power with a concurrent loss of both Emergency Diesel Generators but are manually connected to either the 'A' or 'B' emergency buses (primary and alternate connections). The SEPS diesel generators are not credited as an alternate ac source for the station blackout event. Seabrook is a 4-hour coping plant that does not rely on an alternate ac source.

Is it acceptable per Section 11.3 of NEI 12-06 to use the SEPS diesel generators as pre-staged Phase 2 equipment provided they are adequately protected to prevent a common mode failure?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: _____)

Yes.

NEI 12-06 Section 11.3, Equipment Storage, Item 6 says, "If portable FLEX equipment is pre-staged such that it minimizes the time delay and burden of hook-up following an external event, then the equipment should be evaluated to not have an adverse effect on existing SSCs and the primary connection point should be as close to the intended point of supply as possible, e.g., a staged power supply to recharge batteries should be connected as close to the battery charger as practicable to maintain diversity and minimize the reliance on other installed equipment."

The SEPS diesel generators meet the intent of NEI 12-06, Section 11.3, and can be credited as pre-staged Phase 2 equipment. The primary and alternate connection criteria and N+1 criteria of Section 3.2.2 still apply and must be met as it appears the SEPS diesel generators do. In addition, the SEPS diesel generators must be robust with respect to design basis external events.

D. RESOLUTION: (Include additional pages if necessary. Total pages: _____)
The proposed answer is correct.

Revision: _____ Date: _____

E. NRC Review:

Not Necessary X Interpretation _____ Agency Position _____
Explanation: Interpretation is consistent with the guidance

F. Industry Approval:

Documentation Method: FAQ Date: 1/10/13

FLEX Guidance Inquiry Form

A. TOPIC: Seabrook Backup UHS Inq. No.: 2012-18

Source document: NEI 12-06 Section: 3.2.1.3(6)

B. DESCRIPTION:

Seabrook Station has a unique Service Water System design. The normal ultimate heat sink is provided by the Atlantic Ocean via subterranean cooling water tunnels. Seabrook also has a backup service water ultimate heat sink in the form of a large, seismic Cat 1, missile and flood protected forced draft cooling tower supplied by ac-powered pumps. In accordance with the event assumptions in NEI 12-06 we are assuming that the normal service water pumps are not available as a result of the BDBEE (loss of normal access to the normal UHS). Can Seabrook credit the backup service water ultimate heat sink in accordance with Section 3.2.1.3(6) of NEI 12-06?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages:)

Since the backup UHS is robust, it would be available and can be relied on per Section 3.2.1.3(6) of NEI 12-06.

D. RESOLUTION: (Include additional pages if necessary. Total pages:)

Proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: Answer is consistent with NEI 12-06

F. Industry Approval:

Documentation Method: FAQ Date: 1/10/13

FLEX Guidance Inquiry Form

A. TOPIC: Implementation in all modes Inq. No.: 2012-19

Source document: NEI 12-06 Section: 2.0 and Table D-1

B. DESCRIPTION:

NRC order (EA-12-049) states "(4) Licensees or CP holders must be capable of implementing the strategies in all modes. ". Mitigation of events occurring when a steam generator is not available are fundamentally different. Implementing the strategy applicable under operating conditions will not be effective when the steam generator is not available. Please clarify requirements and cite NRC endorsement.

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: _____)

NEI 12-06, Section 2.0 says, "The boundary conditions for core cooling and containment strategies assume all reactors on the site are initially at power because this is more challenging in terms of core protection, and containment integrity. The FLEX strategies have been designed for this condition. However, the FLEX strategies are also "diverse and flexible" such that they can be implemented in many different conditions as it is not possible to predict the exact site conditions following a beyond-design-basis external event. As such, the strategies can be implemented in all modes by maintaining the portable FLEX equipment available to be deployed during all modes."

Additionally, Table D-1 has a strategy for Modes 5 and 6 with steam generators not available. Recognizing that there may be short periods of time when the steam generators are not available and an RCS vent has not been established and the strategy would not be successful, footnote ** was added to the table to say, "Note: There may be short periods of time during Modes 5 & 6 where plant configuration may preclude use of this strategy." During this period of time it is not required to have a strategy because of the already low probability of such a beyond-design-basis event occurring. This provision of the guidance document was endorsed when the NRC issued the ISG endorsing NEI 12-06.

In addition, Table D-1 does provide for RCS connection sizing and flow rates that address the decay heat removal requirements in Modes 5 and 6.

D. RESOLUTION: (Include additional pages if necessary. Total pages: _____)

Proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: Answer consistent with NEI 12-06

F. Industry Approval:

Documentation Method: FAQ Date: 1/8/13

FLEX Guidance Inquiry Form

A. TOPIC: Backup Diesel Generator Inq. No.: 2012-20

Source document: NEI 12-06 Rev. 0 Section: 3.2.1.3, 2.1, 3.2.2 and 10.1

B. DESCRIPTION:

Consideration is being given to installing a dedicated backup diesel generator set to provide power to the Standby Steam Generator (SSG) Feed Water Pumps which would provide required makeup water to the steam generators for decay heat removal and cooldown. The backup diesel generator will be designed to be robust with respect to design basis external events and installed within a robust structure. Manual action will be required to align this backup AC power source.

Section 3.2.1.3 Initial Conditions implies that we cannot consider any installed AC source as available for dealing with the BDBEE however 3.2.1.3(2) implies that this restriction only applies to emergency and SBO ac sources.

3.2.1.3(1) No specific initiating event is used. The initial condition is assumed to be a loss of off-site power (LOOP) at a plant site resulting from an external event that affects the off-site power system either throughout the grid or at the plant with no prospect for recovery of the off-site power for an extended period. The LOOP is assumed to affect all units at a plant site.

3.2.1.3(2) All installed sources of emergency on-site ac power and SBO Alternate ac power sources are assumed to be not available and not imminently recoverable.

Does this mean that a dedicated backup diesel generator installed specifically for dealing with a BDBEE as defined in the NEI document cannot be assumed as available?

Does the N+1 requirement apply to new equipment that is permanently installed in response to the NRC Order as part of a coping strategy and meets the definition of robust?

C.PROPOSED ANSWER(Include additional pages if necessary. Total pages: 2)

Equipment including backup ac power supplies that are installed as part of a BDBEE coping strategy can be considered available as long as it meets the requirements of robust design and is protected from external events.

Per Section 2.1 “While initial approaches to FLEX strategies will take no credit for installed ac power supplies, longer term strategies may be developed to prolong Phase 1 coping that will allow greater reliance on permanently installed, bunkered or hardened ac power supplies that are adequately protected from external events.”

The N+1 requirement does not apply to new or existing permanently installed equipment that is utilized as part of a coping strategy as long as it meets the definition of robust and is protected from external events. Per Section 3.2.2 the N+1 capability applies to the portable FLEX equipment described in Tables 3-1 and 3-2 (i.e. that equipment that directly supports maintenance of the key safety functions). Per Section 10.1 Provision of at least N+1 sets of portable on-site equipment stored in diverse locations or in structures designed to reasonably protect from applicable BDBEEs is essential to provide reasonable assurance that N sets of FLEX equipment will remain deployable to assure success of the FLEX strategies.

FLEX Guidance Inquiry Form

D. RESOLUTION: (Include additional pages if necessary. Total pages: _____)
There are a couple of questions being asked in this FAQ.

If installation of the dedicated diesel generator is to support Phase 1 coping on installed equipment, the equipment does not need to meet the N+1 requirement. However, if the diesel generator is being installed as a Phase 1 strategy a Phase 2 FLEX strategy is also required.

If the installation of the diesel generator is being performed as pre-staging of Phase 2 equipment, under the provisions of Section 11.3 of NEI 12-06, then the provisions of NEI 12-06, Section 11.3 apply and the equipment does need to meet N+1 and does need to be adequately protected. In the example cited, a single diesel generator is being pre-staged to power the feed pumps. This would not meet N+1. However, if two generators were used so that independently they each supply a redundant pump that would provide the diversity and reliability of N+ 1. NEI 12-06, Section 3.2.2 in the second to last paragraph provides for independent strategies as opposed to requiring N+1 for a single strategy.

Revision:_____ Date:_____

E. NRC Review:

Not Necessary X_____ Interpretation_____ Agency Position_____
Explanation:_____Answer is consistent with NEI 12-06_____
_____

F. Industry Approval:

Documentation Method:_____FAQ_____ Date:__2/8/13_____

FLEX Guidance Inquiry Form

A. TOPIC: Tornado Missile Separation Inq. No.: 2013-01

Source document: NEI 12-06 Rev. 0 Section: 7.3.1

B. DESCRIPTION:

NEI 12-06 Section 7.3.1 specifies that FLEX equipment may be stored in "diverse locations" considering high wind hazards to provide reasonable assurance that N sets of FLEX equipment will remain deployable. However, "diverse locations" is not defined since it will vary between the plants.

Without considering site specifics (probability of strike, plant location/region, geography, quantity and types of missiles, size of buildings, existing protection, etc.) and performing a PRA, is there a minimum separation distance that can be considered between two or more storage locations without further analysis?

C.PROPOSED ANSWER(Include additional pages if necessary. Total pages: 2)

The separation distance is not intended to bound the width of all tornados but to provide reasonable assurance for most tornados since the probability of the tornado path being exactly in line to damage the plant and the multiple storage locations in combination with a large tornado and loss of EDGs is not reasonable. For reasonable protection, the diverse storage locations should be separated by the width of a typical tornado.

The typical tornado width can be considered to be a tornado width that bounds a large percentile of tornados that have been recorded in the United States.

Based on tornado widths from NOAA's Storm Prevention Center for 1950 – 2011, 1,200 feet should be considered as the minimum separation distance for which further analysis is not required to justify diversity for the sites located in Region 1 and Region 2 as shown in Figure 7-2 of NEI 12-06.

As stated in NEI 12-06, the diverse buildings should be located considering the typical tornado path for the site location. Generally, this path is from the West-Southwest.

Sites may use a lower or higher separation distance if the site specifics warrant a different value.

D. RESOLUTION: (Include additional pages if necessary. Total pages:)

Proposed answer is correct.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: Answer is consistent with NEI 12-06 to provide "reasonable" protection

F. Industry Approval:

Documentation Method: FAQ Date: 2/7/13

FLEX Guidance Inquiry Form

A. TOPIC: High Wind Loading Designs Inq. No.: 2013-02

Source document: NEI 12-06 Rev. 0 Section: 7.3.1

B. DESCRIPTION:

Is the following statement in compliance with NEI Guide 12-06, Section 7.3.1.1.c?

FLEX equipment will be stored in buildings designed to meet ASCE 7-10 requirements with consideration of the design basis hurricane wind loading for the site. Multiple buildings will be situated in diverse locations separated by sufficient distance to minimize the probability that a tornado would affect more than one structure, such that N sets of FLEX equipment would remain deployable following a high wind event.

C.PROPOSED ANSWER(Include additional pages if necessary. Total pages: 2)

Yes

D. RESOLUTION: (Include additional pages if necessary. Total pages:)

Section 7.3.1.1.c specifically states that that section is not applicable for sites with hurricane wind.

In evaluated storage locations separated by a sufficient distance that minimizes the probability that a single event would damage all FLEX mitigation equipment such that at least N sets of FLEX equipment would remain deployable following the high wind event. (This option is not applicable for hurricane conditions).

The intent of exclusion of this section to hurricane conditions was that separation as a basis for minimizing the probability that the "event" would not damage equipment would not apply to hurricanes in that separation to prevent buildings from being subject to the hurricane wind conditions could not be justified. If the building is designed for hurricane winds and separation is used for tornado events only, this would meet the intent of 7.3.1.1.c. This clarification will be included in future revisions to NEI 12-06.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: Answer is consistent with NEI 12-06

F. Industry Approval:

Documentation Method: FAQ Date: 1/8/13

FLEX Guidance Inquiry Form

A. TOPIC: Spent Fuel Pool Timeline Based on Makeup or Spray Inq. No.: 2013-03

Source document: NEI 12-06 Section: 3.2.1.6

B. DESCRIPTION: Per section 3.2.1.6 the spent fuel pool (SFP) remains intact following the beyond design basis event. In this case, the response time necessary for implementation of FLEX actions to provide makeup to the SFP is determined by the maximum design basis heat load for the site. The response time needed to install hoses, pumps, etc., must be less than the time when the SFP level is reduced by boiling to a level where room conditions (steam, temperature, and/or radiation) are hazardous and prevent personnel entering the SFP room. The question is whether or not FLEX strategies can be based on this calculable time or must be based on a potential breach of the pool boundary and rapid loss of pool inventory. The breach of the SFP boundary is not explicitly postulated in NEI 12-06 but can be inferred based on the inclusion of the spray nozzle strategy in NEI 12-06 tables 3-1, 3-2, etc. The difficulty with basing the FLEX response on the loss of the SFP boundary is that the breach size and time required to render the SFP room inaccessible is unknown and subject to conjecture.

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: 1) For purposes of developing the FLEX SFP response strategies, since section 3.2.1.6 of NEI 12-06 states that all SFP boundaries are intact, the response timeline can assume that the SFP room is accessible until boiling of the water in the SFP renders the room inaccessible.

D. RESOLUTION: (Include additional pages if necessary. Total pages:)

The proposed answer is correct. The baseline assumption is that the SFP boundaries are intact as Section 3.2.1.6 states. The spray strategy has been included for diversity and flexibility to provide a more robust capability.

Revision: Date:

E. NRC Review:

Not Necessary X Interpretation Agency Position
Explanation: Consistent with the approved guidance document.

F. Industry Approval:

Documentation Method: FAQ Date: 2/6/13

FLEX Guidance Inquiry Form

A. TOPIC: Pre-staged Diesel Pump access to the UHS Inq. No.: 2013-04

Source document: NEI 12-06 Section: 3.2.1.3(4)

B. DESCRIPTION:

Consideration is being given to use an existing diesel fire pump or installing a new diesel pump to provide makeup water to the steam generators via the turbine driven auxiliary feed water pump. The pumps would be located within the existing pump house and draw water from the ultimate heat sink. The pumps are located near the normal ultimate heat sink pumps and draw from the same area within the pump house structure which is downstream of the intake structure and traveling water screens.

Because these pumps are located in the same area and draw water from the same location as the normal ultimate heat sink pumps do we have to assume that they are also lost?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: _____)

Installed diesel pumps may be considered available for FLEX phase 1 response as long as they are fully AC independent, located within a robust structure that protects them from severe weather and they meet the "robust" requirements with respect to seismic events, flood, and high winds and associated missiles.

The connection (flow path) from the UHS or credited water inventory must meet the following definitions:

NEI 12-06 Rev. 0 defines *Loss of normal access to the ultimate heat sink* as "Loss of ability to provide forced flow of water to key plant systems (i.e., the pumps are unavailable and not restorable as part of the coping strategy)."

Per 3.2.1.3(4) Normal access to the ultimate heat sink is lost, but the water inventory in the UHS remains available and robust piping connecting the UHS to plant systems remains intact. The motive force for UHS flow, i.e. pumps, is assumed to be lost with no prospect for recovery.

Section 3.2.2(5) states: Cooling and makeup water inventories contained in systems or structures with designs that are robust with respect to seismic events, flood, and high winds and associated missiles are assumed to be available in an ELAP/LUHS at their normal capacities. Water in robust UHS piping may also be available for use but would need to be evaluated to ensure adequate NPSH can be demonstrated and, for example, that the water does not drain back to the UHS. Alternate water delivery systems can be considered available on a case-by-case basis.

The section also states: Finally, when all other preferred water sources have been depleted, lower water quality sources may be pumped as makeup flow using available equipment (e.g. a diesel driven fire pump or a portable pump drawing from a raw water source).

Although not specifically stated anywhere there were several potential scenarios envisioned that could result in loss of normal access to the UHS. Events such as but not limited to debris plugging of the intake structure, debris plugging of traveling water screens, frazil ice blockage, ice flow blockage, collapse of intake piping, collapse of canal walls, drop in water level below intake level due to dam or berm failure. Thus loss of normal access can also be defined as loss of the normal flow path supplying water from the UHS to the suction of the normal and emergency UHS pumps. Pumps that are connected to the UHS via a flow path that is independent of the normal plant connection from the UHS or can be connected via an alternate flow path can be considered available for FLEX as long as the flow path is not affected by the same external event. The pumps and flow path have to meet the "robust" requirements with respect to seismic, flood, wind, tornado missiles and severe weather conditions.

The FLEX phase 1 pumps may be located within the same structure as the normal UHS pumps as long as the pumps, flow path and/or water inventory are not lost due to the Beyond Design Basis External Event. The basis for the pumps, flow path and/or water inventory surviving the BDBEE should be included in the sites response to NRC Order EA-12-049. Include a description of the flow path and assumptions such as; blockage of the traveling water screens would impact circulating water flow but it is assumed that the small make up flow rate for decay heat removal (several hundred gpm vs. several hundred thousand gpm) would still pass through the screens.

FLEX Guidance Inquiry Form

D. RESOLUTION: (Include additional pages if necessary. Total pages: _____)

Section 3.2.1.3(4) of NEI 12-06 requires that the normal pumps that access the UHS for Service Water flow are lost in the event with no prospect for recovery. The assumption is that a screen blockage event has occurred or the pumps have been inundated such that they are neither functional nor recoverable.

Using an installed diesel fire pump to provide a suction source for the turbine driven auxiliary feedwater pump would be an acceptable Phase 1 strategy provided the fire pump can be shown to be available following the beyond-design-basis external event that rendered the installed UHS pumps unavailable. In addition, the basis for the needed flow rate must be justified based on the volume of water in the pump bays and/or the needed flow rate can be reasonably determined to pass through the blocked screens.

A Phase 2 strategy would also be required to back up the Phase 1 strategy.

Revision:_____ Date:_____

E. NRC Review:

Not Necessary X Interpretation_____ Agency Position_____

Explanation: Answer is consistent with the guidance

F. Industry Approval:

Documentation Method: FAQ Date: 1/31/13

FLEX Guidance Inquiry Form

A. TOPIC: Event timeline and associated prioritization for Integrated Plan Inq. No.: 2013-05

Source document: NEI 12-06 Section: 13.1

B. DESCRIPTION:

The Overall Integrated Plan Submittal per NEI 12-06 section 13.1 does not require development of an event timeline, and therefore does not provide guidance on the subject. Order EA-12-049 Integrated Plan Reporting Template Rev. 5a requires submittal of a sequence of events timeline (Attachment 1a), along with identifying the supporting analysis (General Integrated Plan Elements).

NEI 12-06 requires the licensee to develop a strategy to cool the fuel in the Spent Fuel Pool (SFP), assuming the worst case conditions that could be encountered in the SFP. For most plants, when these worst case conditions exist in the SFP there are no challenges to providing cooling to fuel in the reactor (fuel is located in the SFP). Assuming the worst case SFP and worst case reactor conditions when developing the sequence of events timeline could unrealistically create conflicts in prioritization of operator actions/operator resources.

What SFP conditions should be assumed when developing the sequence of events timeline for the Integrated Plan submittal? Should a separate timeline be developed to identify the sequence/required actions when the worst case SFP conditions would exist?

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: _____)

The core cannot be in two places at one time. So for development of the sequence of events timeline in Attachment 1a (initial condition – 100% power), the SFP maximum heat load should be the heat load applicable to that condition to determine the time to boil and boil-off rate. Therefore, actions associated with SFP cooling should be prioritized and sequenced based on the SFP timeline developed for plant conditions that will be current at the time. If the maximum heat load were used there could be an unwarranted competition for resources to deploy core cooling strategies at the same time as deploying SFP strategies.

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 states that "Licensees should establish and maintain current estimates of their capabilities to maintain core and SFP cooling and containment functions assuming a loss of alternate current (ac) electric power to the essential and nonessential switchgear buses except for those fed by station batteries through inverters. This estimate provides the time period in which the licensee should be able to initiate the transition phase and maintain or restore the key safety functions using portable on-site equipment." Therefore, the SFP conditions that should be considered for the sequence of events should be those conditions that are "current" for the Mode 1 condition.

The worst case condition SFP timeline should be described in the General Integrated Plan Elements section labeled "Provide a sequence of events and identify any time constraint required for success including the technical basis for the time constraint." This description should include identification of time constraints (time to boil, time to top of fuel) and a justification on how the time constraint can be reasonably met.

Regardless of the heat load used for the sequence of events, the sizing of portable equipment used to cool the SFP should be based on the maximum design basis heat load for the site in accordance with Section 3.2.1.6.

D. RESOLUTION: (Include additional pages if necessary. Total pages: _____)

The proposed answer is correct.

Revision: _____ Date: _____

FLEX Guidance Inquiry Form

E. NRC Review:

Not Necessary X Interpretation Agency Position

Explanation: Answer is in agreement with the guidance as approved through the ISG

F. Industry Approval:

Documentation Method: FAQ Date: 2/5/13

FLEX Guidance Inquiry Form

A. TOPIC: Use of installed equipment for RCS Inventory Control/Long - Term Subcriticality Inq. No.: 2013-06

Source document: NEI 12-06 Section: 3.2, 3.2.1.3(6), 3.2.1.12, 3.2.2(13), Table D-1

B. DESCRIPTION:

Can a PWR use 2 installed Charging Pumps as the primary and alternate means of RCS makeup and boration control, without reliance on a portable FLEX pump?

The strategy includes the following elements.

- 1 Charging Pump can deliver >40gpm at >1600psig.
- 2 separate division Charging Pumps will be repowered through their normal bus power supplies (different divisions), each with a primary and alternate strategy from FLEX generators.
- Analysis supports operation of the charging pumps without cooling water for up to 72 hours.
- Outage RCS makeup strategy uses the SG Feed portable FLEX pumps via an external tap.

There seems to be contradictory guidance in NEI 12-06.

In support of this strategy are the following statements (these seems to indicate the strategy of installed equipment only is sufficient):

- *"3.2 PERFORMANCE ATTRIBUTES - …The baseline assumptions have been established on the presumption that other than the loss of the ac power sources and normal access to the UHS, installed equipment that is designed to be robust with respect to design basis external events is assumed to be fully available. Installed equipment that is not robust is assumed to be unavailable…"*

- *"3.2.1.3 Initial Conditions - (6) Permanent plant equipment that is contained in structures with designs that are robust with respect to seismic events, floods, and high winds, and associated missiles, are available."*

- From Table D-1 – Summary of Performance Attributes for PWR Core Cooling Functions
  - *"Safety Function - RCS Inventory Control/Long - Term Subcriticality*
  - *Method - Low Leak RCP Seals and/or borated high pressure RCS makeup required*
  - *Baseline Capability - Site analysis required to determine RCS makeup requirements / Boration and/or letdown path may be required*
  - *Purpose - Extended coping without RCS makeup is not possible without minimal RCS leakage. Plants must evaluate use of low leak RCP seals and/or providing a high pressure RCS makeup pump.*
  - *Performance Attributes - Makeup capability to maintain core cooling*. / Sufficient letdown to support required makeup and ensure subcriticality*.*
    **Note: Items are subject to generic or plant-specific analysis"*
- Another quote from Table D-1 related to core cooling in modes 5 and 6 says – "*In order to address the requirement for diversity, if re-powering of installed charging pumps is used for this function, then either (a) multiple power connection points should be provided to the charging pump, or (b) provide a single power supply connection point for the charging pump and a single connection point for a portable makeup pump."*

In conflict with this strategy is this statement which seems to indicate that a strategy involving portable equipment is required:

- *"3.2.2 Minimum Baseline Capabilities - (13) …Regardless of installed coping capability, all plants will include the ability to use portable pumps to provide RPV/RCS/SG makeup as a means to provide a diverse capability beyond installed equipment. The use of portable pumps to provide RPV/RCS/SG makeup requires a transition and interaction with installed systems. For example, transitioning from RCIC to a portable FLEX pump as the source for RPV makeup…"*

FLEX Guidance Inquiry Form

C.PROPOSED ANSWER (Include additional pages if necessary. Total pages: _____)

As long as the installed equipment can be powered in a manner that meets diversity requirements and are on separate trains, the use of multiple installed charging pumps for RCS Inventory Control and Long-Term Subcriticality is acceptable without the use of a portable FLEX pump.

D. RESOLUTION: (Include additional pages if necessary. Total pages: _____)

As noted there is an inconsistency between Section 3.2.2(13) and the entry quoted from Table D-1. Section 3.2.2(13) addresses the transition from Phase 1 installed equipment to Phase 2 equipment and stipulates that portable pump capability is required for, among other things, RCS makeup. The quoted entry from Table D-1 would allow a strategy of re-powering an installed charging pump as the Phase 2 strategy without requiring a portable pump. Either strategy should be an acceptable strategy but if the strategy to re-power a charging pump is selected, then the integrated plan submittal should justify its acceptability and note that a deviation from Section 3.2.2(13) is being taken.

The inconsistency will be corrected in the next revision of NEI 12-06.

Furthermore, the quoted section from Appendix D, Table D-1 is in the wrong place in the table and will need to be relocated in the next revision. This discussion on the strategy to re-power charging pumps should be in the section of the table for RCS inventory as opposed to the section on core cooling in Modes 5 and 6.

Revision:_____ Date:_____

E. NRC Review:

Not Necessary X_____ Interpretation_____ Agency Position_____

Explanation: If the Table D-1 option for re-powering a charging pump is used, a deviation from NEI 12-06 needs to be noted which will undergo NRC review on a case-by-case basis.

F. Industry Approval:

Documentation Method: FAQ and Revision to NEI 12-06 to correct the inconsistency and Table D-1_____

Date:_____2/06/13_____