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

June 25, 2013

Mr. Joseph W. Shea
Corporate Manager, Nuclear Licensing
Tennessee Valley Authority
3R Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2 AND 3 - STAFF ASSESSMENT OF LICENSEE'S RESPONSE TO INFORMATION REQUEST PURSUANT TO 10 CFR 50.54(F) LETTER –THE NEAR TERM TASK FORCE RECOMMENDATION 9.3, COMMUNICATIONS (TAC NOS ME9993, ME9994, AND ME9995)

Dear Mr. Shea:

By letter dated March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued a Request for Information (RFI) pursuant to Section 50.54, paragraph (f) of Title 10 of the *Code of Federal Regulations*, hence referred to as the RFI. This request was issued as a part of implementing lessons-learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 5 to the RFI letter contained specific requested information associated with the NRC's Near Term Task Force (NTTF) Recommendation 9.3 for "Emergency Preparedness." The NRC, in Enclosure 5, requested that the licensees assess their current communications systems and equipment used during an emergency event due to a large-scale natural event causing an extensive damage to normal and emergency communications systems both onsite and offsite. The NRC also requested that the licensees identify any enhancements that may be needed, and assess the means to power the new and existing communications equipment onsite and offsite during a prolonged station blackout event.

By letters dated May 11, June 11, and October 31, 2012, the Tennessee Valley Authority (the licensee) responded to this request for Browns Ferry Nuclear Plant, Units 1, 2, and 3 (BFN). The licensee, in its letter dated May 11, 2012 committed to submit its partial response by June 11, 2012 and its completed response by October 31, 2012. The licensee, in its letter dated June 11, 2012, identified interim actions taken or planned to enhance existing communications systems power supplies during implementation of the communication systems improvements. By letter dated October 31, 2012, the licensee provided an assessment of the current communications systems and equipment to be used during an emergency event for BFN.

On January 23, 2013, a letter to all power reactor licensees and holders of construction permits regarding eight generic technical issues for resolution regarding licensee communication submittals associated with Recommendation 9.3 was issued by the NRC. By letter dated February 22, 2013, the licensee provided the NRC the requested information in response to these generic technical issues.

The NRC staff has reviewed the licensee's responses to the RFI letter and the supplemental information associated with NTTF Recommendation 9.3 for communications for BFN, as documented in the enclosed staff assessment. The NRC staff determined that the licensee's assessment for communications is reasonable, and the interim measures, analyzed existing systems, and proposed enhancements will help to ensure that communications are maintained during a beyond design basis accident.

Further, in coordination with the NTTF Recommendation 4.2 (mitigating strategies), the NRC staff plans on following up with the licensee to confirm that enhancements to the site's communications systems are completed.

If you have any questions, please contact me at (301) 415-1447.

Sincerely,

Farideh E Saba

Farideh E. Saba, Senior Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-259, 50-260, and 50-296

Enclosure:
Safety Assessment

cc w/encl: Distribution Via Listserv

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

SAFETY ASSSESSMENT BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ASSESSMENT OF COMMUNICATIONS IN RESPONSE TO

REQUEST FOR INFORMATION LETTER DATED MARCH 12, 2012

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3

DOCKET NOS. 50-259; 50-260; 50-296

1.0 INTRODUCTION

By letters dated May 11, 2012 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12136A131), June 11, 2012 (ADAMS Accession No. ML12164A678), October 31, 2012 (ADAMS Accession No. ML12311A297), and February 22, 2013 (ADAMS Accession No. ML13058A067), the Tennessee Valley Authority (TVA, the licensee) provided information related to an assessment of its communications capabilities in response to the U.S. Nuclear Regulatory Commission's (NRC's) March 12, 2012 (ML12053A340), request for information (RFI), regarding the Near-Term Task Force (NTTF) Recommendation 9.3 on emergency preparedness communications for Browns Ferry Nuclear Plant, Units 1, 2, and 3 (BFN).

The licensee's letter dated June 11, 2012, identified the interim actions taken or planned to take during the period of implementation of the planned improvements to the communications systems and procedures. The licensee, in its letters dated October 31, 2012, and February 22, 2013, provided an assessment of the current communications systems and equipment to be used during an emergency event and identified any enhancements needed to ensure communications are maintained during and following a beyond design basis large-scale natural event. In this assessment it was assumed that a large-scale natural event causes: (1) a loss of all alternating current (ac) power; and (2) extensive damage to normal and emergency communications systems both onsite and in the area surrounding the site (i.e., within 25 miles of the site, consistent with the industry guidance that was found acceptable by NRC in its May 15, 2012, letter (ADAMS Accession No. ML12131A043).

1.1 Background

By letter dated March 12, 2012 (ADAMS Accession No. ML12053A340), the NRC issued an RFI pursuant to Section 50.54, paragraph (f) of Title 10 of the *Code of Federal Regulations* (10 CFR). This request was issued as a part of implementing lessons-learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 5 to the RFI letter contained specific requested information associated with the NRC's NTTF Recommendation 9.3 for emergency preparedness for communications. In Enclosure 5 of RFI, NRC requested licensees assess

their current communications systems and equipment used during a prolonged station blackout due to a large-scale natural event causing extensive damage to normal and emergency communications systems both onsite and offsite; identify any enhancements that may be needed; and assess the means to power the new and existing communications equipment onsite and offsite during a prolonged station blackout (SBO) event. Specifically, the licensees' assessment should:

- identify any planned or potential improvements to existing onsite communications systems and their required normal and/or backup power supplies;
- identify any planned or potential improvements to existing offsite communications systems and their required normal and/or backup power supplies;
- provide a description of any new communications system(s) or technologies that will be deployed based upon a large-scale natural event and damage to communications systems onsite and offsite; and
- provide a description of how the new and/or improved systems and power supplies will be able to provide for communications during a loss of all ac power.

The RFI letter also asked the licensees to:

- describe any interim actions that have been taken or are planned to be taken to enhance existing communications systems power supplies until the communications assessment and the resulting actions are complete; and
- provide a schedule of the time needed to implement the results of the communications assessment.

The NRC, in the RFI letter, requested that addressees submit a written response to the items in Recommendation 9.3, related to communications, within 90 days of the date of issuance of the letter. The March 12, 2012, letter states that if an addressee cannot meet the requested response date, then the addressee must respond within 60 days of the date of the letter, and describe the alternative course of action that it proposes to take, including any estimated completion date.

The licensee in its letter dated May 11, 2012, committed to submitting its partial response to the requested information by June 11, 2012, and its completed response regarding communications assessment and implementation schedule by October 31, 2012. By letter dated June 11, 2012, the licensee provided its description of any interim actions (discussed in further detail in Section 3.0) that have been taken or are planned to be taken to enhance existing communications systems power supplies until the communications assessment and the resulting actions are complete. The NRC staff acknowledged, by letter dated July 26, 2012 (ADAMS Accession No. ML12200A106), that the licensee provided the information requested in the RFI regarding the 90-day response for Recommendation 9.3 for interim actions.

A letter to all power reactor licensees and holders of construction permits for eight generic technical issues for resolution regarding licensee communication submittals associated with Recommendation 9.3 was issued by the NRC on January 23, 2013 (ADAMS Accession No. ML13010A162). By letter dated February 22, 2013, the licensee provided its responses to these technical issues.

2.0 REGULATORY EVALUATION

The NRC staff reviewed the licensee's responses to the March 12, 2012, RFI against the regulations and guidance described below.

2.1 Regulations

Section 50.47, "Emergency plans," to 10 CFR Part 50, sets forth emergency plan requirements for nuclear power plant facilities.

Section 50.47(b) establishes the standards that the onsite and offsite emergency response plans must meet for NRC staff to make a positive finding that there is reasonable assurance that the licensee can and will take adequate protective measures in the event of a radiological emergency. Planning Standard (6) of this section requires that a licensee's emergency response plan contain provisions for communications among response organizations to emergency personnel and the public. Planning Standard (8) requires that the design should include adequate emergency facilities and equipment to support emergency response.

Section IV.D of Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50, requires that a licensee have the capability to notify responsible State and local governmental agencies within 15 minutes after declaring an emergency. The design objective of the alert and notification system shall be to have the capability to complete the alerting and initiate notification of the public within the plume exposure pathway within approximately 15 minutes. This alerting and notification capability will include a backup method of public alerting and notification.

Section IV.E of Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50, states that adequate provisions will be made and described for emergency facilities including at least one onsite and one offsite communications system; and each system shall have a backup power source. These arrangements will include:

a. Provision for communications with contiguous State/local governments within the plume exposure pathway emergency planning zone.
b. Provision for communications with Federal emergency response organizations.
c. Provision for communications among the nuclear power reactor control room, the onsite technical support center, and the emergency operations facility; and among the nuclear facility, the principal State and local emergency operations centers, and the field assessment teams.
d. Provisions for communications by the licensee with NRC Headquarters and the appropriate NRC Regional Office Operations Center from the nuclear power reactor control room, the onsite technical support center, and the emergency operations facility.

2.2 Guidance

Nuclear Energy Institute (NEI) 12-01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," Revision 0, dated May 2012 (ADAMS Accession No, ML12125A410), provides criteria to assist the licensees with their assessments and identification of enhancements that could provide a means to power equipment needed to communicate on-site and offsite during an extended loss of ac power event. The NRC staff previously reviewed (ADAMS Accession No. ML12131A043) NEI 12-01 and determined that this guidance is an acceptable method for licensees to use in responding to the NRC's March 12, 2012, information request.

The NRC staff reviewed the licensee's assessments against the assumptions and guidance within NEI 12-01, Sections 2.2, 2.4 and 4. These sections provide a discussion on the assumptions and criteria to be used for a communications assessment.

3.0 TECHNICAL EVALUATION

In its October 31, 2012, letter, the licensee submitted its assessment of communications assuming a large-scale natural event, which would lead to an extended loss of all ac power. This letter included a discussion of required communications links, primary and backup methods of communications, and any identified improvements.

By letter dated February 22, 2013, the licensee submitted supplemental information to its October 31, 2012, letter in response to the NRC's generic technical issues for resolution dated January 23, 2013. In addition to the letter dated October 31, 2012, the NRC staff reviewed the licensee's letters dated June 11, 2012 (regarding interim actions), and February 22, 2013, as part of this safety assessment.

3.1 Communication Areas Reviewed

3.1.1 Communication Links

The licensee at Browns Ferry Nuclear Plant Units 1, 2, and 3 currently has communications capabilities with offsite response organizations, the NRC, between licensee emergency response facilities, with field and offsite monitoring teams, and with in-plant and offsite licensee emergency response organization staff. As part of its communications assessment, the licensee has determined that many of the communications equipment described in their emergency plan can be assumed to not be available. However, certain existing onsite communications system equipment such as portable satellite phones, radio-to-radio communications, and sound powered phones would be available after implementation of planned enhancements, for some communication links listed above given a seismic, high wind, or flooding event. The availability of these systems was determined by evaluating the equipment against seismic, flooding, and high wind events. The final location of the portable equipment will be consistent with criteria contained within NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide." NEI 12-01 discusses that this FLEX criteria is a reasonable definition of protectiveness.

As an interim measure prior to the implementation of all planned enhancements, the licensee purchased additional supplies of portable satellite phones that are available for use onsite.

Existing sound powered telephones and radio-to-radio communications are available to allow for onsite communications; a repeater with antenna will be added prior to June 30, 2013, to augment radio communications. Portable generators have been purchased for the site as well, to help power satellite phone and radio batteries. Portable communications equipment is currently stored in the technical support center.

As the planned enhancement, the licensee plans on purchasing a new radio system for the site and enhancing existing communication systems for links outlined in Section 4 of NEI 12-01. The new radio system and portable satellite phones will be utilized as one of the key methods for maintaining each offsite communication link. Communications onsite will utilize combinations of the sound powered phones, and radio communications. The existing radio-to-radio communications will be enhanced by the new radio system and associated repeaters. The new radio system and repeaters will be in a protected area with backup power. The existing sound powered phones provide a backup onsite communications system to the radio system, if necessary. The licensee also confirmed that satellite phone communications with offsite response organizations are available at these offsite locations. The licensee will put most of these enhancements in place by December 30, 2014.[1]

The NRC staff has reviewed the licensee's expected communications links within their communications assessment. In reviewing their submittal, the NRC staff considered whether it is reasonable that each communication link can be maintained, after the implementation of all planned enhancements, in accordance with the NRC-endorsed guidance of NEI 12-01. The onsite portable satellite telephones are expected to help maintain communications offsite by their ability to function without infrastructure postulated to be damaged by a large-scale natural event. The new radio system will help maintain communications offsite and between emergency response facilities due to it being in a protected location with backup power. The new radio system and associated repeaters will also help ensure communications in areas of the plant due to its protective location and backup power. The sound powered phones will provide communications capabilities to augment the radio system in needed areas of the plant. The NRC staff concludes that since the licensee's assessment for the availability of communications systems is reasonable, and planned enhancements are to be made for communications areas to help ensure reliability, the licensee's interim measures and proposed enhancements will help to ensure that communications are maintained consistent with the assumptions in NEI 12-01 guidance.

3.1.2 Equipment Location

The licensee for BFN has analyzed the survivability of their existing equipment for large-scale natural events by utilizing guidance in Electric Power Research Institute NP-6041 "Nuclear Power Plant Seismic Margin" and/or criterion similar to FLEX guidance. Further, equipment locations were also analyzed to be protective against wind, and flooding. Enhancements to equipment protection will be made by storing portable equipment in accordance with FLEX criteria. Specifically, a new building is to be constructed to meet NEI 12-06, which will house portable communications equipment, and contain its own stand-alone electrical system. Protectiveness criteria (e.g., seismic, winds, and flooding) was also used to determine ancillary equipment storage locations, including the new radio repeaters and generators that will be used

[1] Power source items related to FLEX will be completed in alignment with NRC Order EA-12-049.

to support the interim measures and/or planned enhancements. The completion of the new protective building will be in alignment with FLEX.

NRC staff reviewed the licensee's submittal and verified that the licensee has considered the equipment location and protection contained within the NEI 12-01 guidance. The NRC staff also verified that all equipment discussed in Section 3.1.1 of this document has been analyzed to be available after a large-scale natural event or would be stored in a reasonably protected area from seismic, flooding, and high wind events as discussed in NEI 12-01. The NRC staff also ensured that ancillary equipment, such as generators also would be protected from seismic, flooding, and high wind events.

Based on this review, the staff considers the licensee's analysis of communications assessment equipment survivability and proposed enhancements for equipment location to be consistent with the NEI 12-01 guidance. This determination of equipment protection, support the conclusion that these measures will help to ensure communications equipment availability for a large-scale natural event.

3.1.3 Equipment Power and Fuel

The licensee for BFN has analyzed the availability of their communications system power supplies following the loss of all ac power. The licensee has proposed a combination of batteries and generators to power site communications equipment, including the satellite phones, and radios. The site strategies will result in: (1) radios allowing for generator charging of batteries; (2) satellite phones allowing for generator charging of batteries; (3) the new site radio system and associated repeaters will have an 8-hour battery backup with generator charging after that period; and (4) sufficient fuel for the generators for a greater than 24-hour duration. It is expected that this equipment has power to support communications for a minimum of 24 hours, based on assumptions for impeded site access. Finalized procedures for the generator operator actions will be completed in alignment with NRC order EA-12-049 and will be completed in accordance with licensee procedure NPG-SPP-09.3 "Plant Modifications and Engineering Change Control."

The NRC staff has reviewed the licensee's communications assessment power supplies. In reviewing its submittal, the NRC staff finds it reasonable that power for the existing equipment and proposed enhancement equipment, as listed in Section 3.1.1 of this document, would remain available for a 24-hour duration, based on the availability of generator fuel, and generators. Additionally, the licensee's proposed enhancement is in accordance with the NEI 12-01 guidance.

Based on this review, the NRC staff considers the licensee's analysis of equipment power and proposed enhancements for equipment power to be consistent with the NEI 12-01 guidance. This determination of available equipment power, support the conclusion that these measures will help to ensure communications equipment functionality for a large-scale natural event.

3.1.4 Procedures and Training

The licensee for BFN plans on implementing site programmatic control strategies for communications equipment, in accordance with procedure NPG-SPP-09.3, "Plant Modifications and Engineering Change Control," and FLEX. This will ensure programmatic controls for potential shared use, operator action, testing, and maintenance. Procedures for emergency preparedness related communications equipment will be in-place by October 15, 2014. Licensee staff training will be evaluated and the results will be incorporated into operations and emergency response organization training programs by October 15, 2014.

Existing site procedures allow for the notification of plant employees after a large-scale natural event. The licensee also has procedures in place for emergency response organization staff self-activation due to large-scale disasters. These existing site capabilities will activate the offsite emergency response organization and notify plant staff.

The NRC staff reviewed the licensee's commitments on the planned quality assurance and maintenance of the equipment and licensee staff training on the use of this equipment. The NRC staff determined that the licensee's submittal is in accordance with the NEI 12-01 guidance.

Based on this review, the staff considers the licensee's planned procedures for equipment use and licensee staff training to be consistent with the NEI 12-01 guidance. This determination of equipment availability and functionality, support the conclusion that these measures will help to ensure communications equipment functionality for a large-scale natural event.

3.2 Regulatory Commitments

In response to the RFI dated March 12, 2012, the following regulatory commitments were provided in the licensee's letters dated June 11 and October 31, 2012.

June 11, 2012 letter

1. TVA will develop documented guidance for deploying the portable generators procured for charging satellite phone batteries during and after a beyond design basis external event by March 29, 2013.

October 31, 2012 letter

1. A new radio system will be ready for service at Browns Ferry, Sequoyah, and Watts Bar Nuclear Plants by October 15, 2014.

2. TVA will purchase mobile radios and supply a portable satellite phone and spare battery for use in the nuclear power group radiological emergency preparedness vans by October 15, 2014.

3. TVA will evaluate moving the fixed satellite phone antenna at each site to the roof of the control building so that the fixed satellite phone will remain protected from environmental

and radiological conditions and available for use in the emergency response facilities by October 15, 2014.

4. TVA will purchase a mobile meteorological tower for each site by October 15, 2014.

5. TVA will establish programmatic controls for emergency preparedness related communications systems/equipment to ensure availability and reliability including the requirements in Section 4.8 of NEI 12-01 by October 15, 2014.

6. TVA will evaluate the need for programmatic controls for the government emergency telephone system/wireless priority service programs by October 15, 2014.

7. TVA will evaluate the need for SBO/extended loss of ac power actions/tasks associated with shedding/restoring loads (sequencing) once ac power is restored or available by October 15, 2014.

8. TVA will evaluate the need for extended loss of ac power actions/tasks using a systematic approach to training process and include results in the operations training, applicable technical training, security, and emergency response organization training programs by October 15, 2014.

4.0 CONCLUSION

The NRC staff has reviewed the licensee's communications assessment for communications with or among: offsite response organizations, NRC, licensee emergency response facilities, field and offsite monitoring teams, and on-site and in-plant response teams. In reviewing their submittal, the NRC staff considered the factors outlined above, and determined that their assessment of existing equipment, proposed enhancements and interim actions was in accordance with the NEI 12-01 guidance, which previously was found acceptable by the NRC. The NRC staff concludes that the licensee's assessment for communications is reasonable, and the licensee's interim measures, analyzed existing systems, and proposed enhancements will help to ensure that communications are maintained.

Further, in coordination with the NTTF Recommendation 4.2 (mitigating strategies), NRC staff is planning on following up with the licensee to confirm that enhancements to the site's communications systems have been completed.

Principal Contributor: Richard Chang

Date: June 25, 2013

The NRC staff has reviewed the licensee's responses to the RFI letter and the supplemental information associated with NTTF Recommendation 9.3 for communications for BFN, as documented in the enclosed staff assessment. The NRC staff determined that the licensee's assessment for communications is reasonable, and the interim measures, analyzed existing systems, and proposed enhancements will help to ensure that communications are maintained during a beyond design basis accident.

Further, in coordination with the NTTF Recommendation 4.2 (mitigating strategies), the NRC staff plans on following up with the licensee to confirm that enhancements to the site's communications systems are completed.

If you have any questions, please contact me at (301) 415-1447.

Sincerely,

/RA/

Farideh E. Saba, Senior Project Manager
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-259, 50-260, and 50-296

Enclosure:
Safety Assessment

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