

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

May 7, 2014

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

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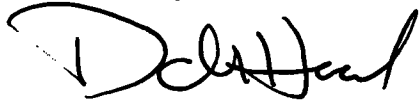
VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2
MARCH 12, 2012 INFORMATION REQUEST
PHASE 2 STAFFING ASSESSMENT REPORT

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident" (Information Request). Enclosure 5 of the letter contains specific Requested Actions and Requested Information associated with Recommendation 9.3 for Emergency Preparedness (EP) programs.

In accordance with Enclosure 5 of the March 12, 2012 Information Request, in a letter dated May 9, 2012, Virginia Electric and Power Company (Dominion) submitted a schedule for responding to the Emergency Preparedness – Staffing, Requested Information Items 1, 2, and 6. Accordingly, Attachment 1 provides the Phase 2 Staffing Assessment Report for North Anna Power Station. The report follows the assessment process provided in NEI 12-01, Guidelines for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," Revision 0, dated May, 2012. Attachment 2 provides the implementation schedule for the staffing analysis result items that require follow up action.

If you have any questions, please contact Mr. Thomas Shaub at (804) 273-2763.

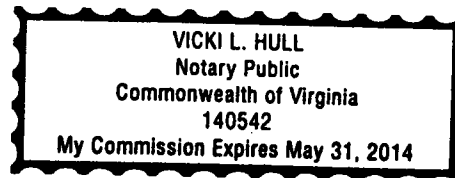
Sincerely,



David A. Heacock
President and Chief Nuclear Officer
Virginia Electric and Power Company

COMMONWEALTH OF VIRGINIA)

COUNTY OF HENRICO)



The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by David A. Heacock, who is President and Chief Nuclear Officer of Virginia Electric and Power Company. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 7TH day of May, 2014.

My Commission Expires: May 31, 2014

Vicki L. Hull
Notary Public

A010
NR2

Commitments made in this letter: No new regulatory commitments

Enclosures:

1. North Anna Power Station Units 1 and 2 NEI 12-01 Phase 2 Extended Loss of Alternating Current Power (ELAP) Emergency Response Organization (ERO) Staffing Analysis Report
2. Implementation Schedule for the Staffing Analysis Result Items

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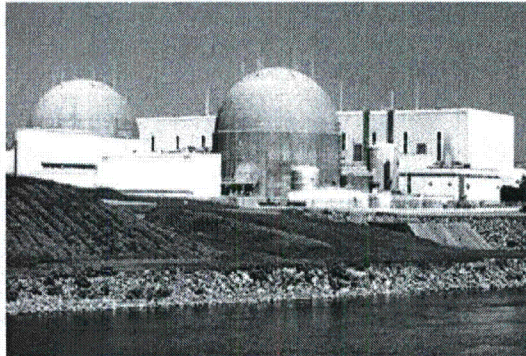
ATTACHMENT 1

**NORTH ANNA POWER STATION UNITS 1 AND 2
NEI 12-01 PHASE 2 EXTENDED LOSS OF ALTERNATING CURRENT
POWER (ELAP) EMERGENCY RESPONSE ORGANIZATION (ERO)
STAFFING ANALYSIS REPORT**

**VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2**



Dominion



**North Anna
Power Station
(NAPS)
Units 1 and 2**

**NEI 12-01 Phase 2 Extended
Loss of Alternating Current
Power (ELAP) Emergency
Response Organization
(ERO) Staffing Analysis
Report**

Revision 0

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1 **EXECUTIVE SUMMARY**

Using the methodology of (Nuclear Energy Institute) NEI 12-01, Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities, this report presents the results of an assessment of the capability of the North Anna Power Station (NAPS) on-shift staff and augmented Emergency Response Organization (ERO) to respond to a beyond design basis external event (BDBEE). The assumptions for the NEI 12-01 Phase 2 scenario postulate that the BDBEE involves a large-scale external event that results in:

- A. an extended loss of AC power (ELAP)
- B. an extended loss of ultimate heat sink (UHS)
- C. impact on units (all units are in operation at the time of the event)
- D. impeded access to the units by off-site responders as follows:
 - 0 to 6 Hours Post Event – No site access.
 - 6 to 24 Hours Post Event – Limited site access. Individuals may access the site by walking, personal vehicle or via alternate transportation capabilities (e.g., private resource providers or public sector support).
 - 24+ Hours Post Event – Improved site access. Site access is restored to a near-normal status and/or augmented transportation resources are available to deliver equipment, supplies and large numbers of personnel.

To conduct the on-shift portion of the assessment, a team of subject matter experts from Operations, Maintenance, Radiation Protection, Chemistry, Security, Emergency Preparedness and industry consultants performed tabletop exercises in December 2013 and January 2014. The participants reviewed the assumptions and applied existing procedural guidance, including applicable draft FLEX Support Guidelines (FSGs) for coping with a BDBEE using minimum on-shift staffing. Particular attention was given to the sequence and timing of each procedural step, its duration, and the on-shift individual performing the step to account for both the task and time motion analyses of NEI 10-05, Assessment of On-Shift Emergency Response Organization Staffing and Capabilities.

The on-shift staffing analysis concluded that there were no task overlaps for the activities that were assigned to the on-shift personnel. However, FSG task training is not complete and incorporated in the applicable departmental training programs. The qualification of on-shift auxiliary operators (AOs) requires further review to ensure their capabilities to implement the FSG strategies. (Refer to Section 3.4).

The expanded ERO analysis concluded that sufficient personnel resources exist in the current NAPS augmented ERO to fill positions for the expanded ERO functions. Thus, the ERO resources and capabilities necessary to implement Transition Phase coping strategies performed after the end of the “no site access” 6-hour time exist in the current program.

Analysis result items are listed in Section 3.4 and have been entered into the corrective action program.

2 INTRODUCTION

In March 2012, the Nuclear Regulatory Commission (NRC) issued a request for information in accordance with §50.54(f) regarding recommendations from the near-term task force review of insights from the Fukushima Dai-Ichi accident. Information requests related to Emergency Preparedness were contained in Enclosure 5 of the §50.54(f) letter¹. Enclosure 5 contained two requested actions; one involving performance of a staffing assessment and the other a communications assessment. The actions for the staffing assessment are summarized as follows:

It is requested that addressees assess their current staffing levels and determine the appropriate staff to fill all necessary positions for responding to a multi-unit event during a beyond design basis natural event and determine if any enhancements are appropriate given the considerations of Near-Term Task Force (NTTF) Recommendation 9.3².

A two-phased approach was established by the industry to respond to the information requests contained in the §50.54(f) letter associated with staffing. Additionally, NEI developed a technical report (NEI 12-01, Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities) that includes the recommended criteria for use in performing the staffing assessment for a beyond design basis external event. The criteria presented in NEI 12-01 provide for documenting the organizational capabilities that will facilitate simultaneous performance of extended coping capabilities following a beyond design basis external event as defined in NEI 12-01.

Note – Use of the term ELAP throughout this report also assumes a loss of the ultimate heat sink as part of the event.

Phase 1 Staffing Assessment

The objective of the Phase 1 staffing assessment was to evaluate the on-site and augmented staff needed to respond to a large-scale external event at a multi-unit site meeting the conditions described in the NEI 12-01 assumptions, NOT including staffing needed to implement actions that address NRC Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (EA-12-049). That is, the Phase 1 staffing assessment considered the requested functions except those related to Order EA-12-049.

The Phase 1 staffing assessment was completed for NAPS on March 29, 2013 and submitted to the NRC on April 29, 2013. NRC letter, "Response Regarding Licensee Phase 1 Staffing Submittals Associated with Near-Term Task Force Recommendation 9.3 Related to the Fukushima Dai-Ichi Nuclear Power Plant Accident," dated October 23, 2013, provided regulatory approval of the Phase 1 staffing report.

¹ NRC Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, dated March 12, 2012 [ADAMS ML12053A340]

² For background information, refer to NRC staff report entitled, Recommendations for Enhancing Reactor Safety in the 21st Century, dated July 12, 2011 [ADAMS ML111861807 - NTTF report]

Phase 2 Staffing Assessment

Sites with one or more operating units are required to perform a Phase 2 staffing assessment no later than 4 months prior to beginning of the second refueling outage (as used within the context of NRC Order EA-12-049) or December 31, 2016, whichever comes first. In contrast to the Phase 1 staffing assessment, the Phase 2 staffing assessment considers the requested functions related to Order EA-12-049.

The Phase 2 staffing assessment for response functions related to Order EA-12-049 must be based on the actions delineated in the procedures and guidelines developed in response to the Order to ensure accurate results. Once the site-specific actions associated with the new response strategies are defined (i.e., down to the procedure or guideline step level), the staffing needed to perform these actions can be assessed with the necessary level of accuracy.

Draft Emergency Operating Procedure (EOP) and FSG documents were used to conduct the staffing assessments. Facility, equipment and Emergency Plan procedure changes were identified that are needed to support the functions of the ERO staffing during an ELAP. The results of the Phase 2 assessment have been verified and validated to ensure adequacy and accuracy. In accordance with the requirements of 10 CFR 50, Appendix B, corrective actions and enhancements identified during the assessment are entered into the corrective action program. The analysis result items related to ERO staffing that constitutes an unsatisfactory or inconclusive result with regard to the standards of NEI 10-05, Assessment of On-Shift Emergency Response Organization Staffing and Capabilities, and 12-01 are listed in Section 3.4 and entered into the corrective action program.

Additionally, prior to the NAPS implementation date associated with Order EA-12-049 (October 10, 2014 per the current refueling outage schedule), a review of this report will be performed based on the final validated FSGs and use any applicable new procedures not available when the staffing table tops were performed. This action item has been entered into the corrective action program. This report will be updated if the staffing assessment results change.

3 PHASE 2 STAFFING ANALYSIS SUMMARY

The current NAPS on-shift staffing for the “no site access” period may not be sufficient to perform the FSG tasks. Shift personnel are not yet trained to perform the FSG tasks. The qualification of on-shift auxiliary operators (AOs) requires further review to ensure their capabilities to implement the FSG strategies. These items have been entered into the corrective action program.

In addition, the timeliness of completing offsite notifications are adversely affected by the beyond design basis assumptions in this study.

The current NAPS augmented ERO provides sufficient resources to fill positions for the expanded ERO functions. Thus, the ERO resources and capabilities necessary to implement Transition Phase coping strategies performed after the end of the “no site access” 6-hour time exist in the current program.

3.1 Task Analysis Results

Refer to Section 6.2, On-Shift Staffing Analysis Results Tables, for documentation of the on-shift staffing task analysis results.

3.1.1 Unassigned Tasks

The task analysis did not identify any unassigned tasks.

3.1.2 Potential Overlap

The task analysis did not identify any potential task overlaps that were performed by the on-shift positions in response to the ELAP event.

The Security Shift Supervisor and/or other on-shift security personnel perform security contingency plan and EP tasks (ERO notification and personnel accountability) during the ELAP event. A representative of the NAPS Security Department analyzed the EP tasks assigned to on-shift security individuals. It was concluded that performance of the EP tasks did not cause an overlap with their tasks related to the Security Plan. Tasks related to the Security Plan are not specifically documented in this analysis due to their security-sensitive nature. No security personnel credited in the Security Plan were assigned tasks associated with the implementation of mitigating strategies during the ELAP event.

3.1.3 Performance Validation

Note – Per NEI 10-05, a validated task is one that has a controlling method (i.e., a program or process) by which the capability to perform the task has been analyzed, such as within the Operations Training Program or the EP Drill Program.

The task analysis did not identify any EOP or EPIP tasks performed by the on-shift positions that were not validated. The task analysis identified that the performance of FSG tasks is currently not incorporated into the operator or other appropriate training program. In addition, the qualification of on-shift auxiliary operators (AOs) requires further review to ensure their capabilities to implement the FSG strategies. (Refer to Analysis Result Items # 1 & 2 - Section 3.4).

The timeliness of offsite notifications will be affected by the use of satellite phones. As such, time constraints were not placed on the completion of such notifications.

3.2 Time Motion Study (TMS) Results

Note – Time motion analysis data was developed during the task analysis using draft FSGs and the informed judgment of the FLEX subject matter experts. In accordance with the methodology provided in NEI 10-05, informed judgment can be used for tasks where directly applicable operating experience is not available and actual timed performance is not practical.

The time motion analysis did not identify any unassigned tasks or task overlaps performed by the on-shift positions in response to the ELAP event.

Refer to Section 6.3, ELAP On-Shift Staffing Task Timetable, for the on-shift staffing task timing and sequence analysis results.

3.3 Augmented and Expanded ERO Assessment Results

The expanded ERO analysis did not identify a shortage of qualified augmenting ERO personnel to fill the expanded ERO positions assigned to perform the ELAP functions.

Refer to Section 7 for details of the expanded ERO functional staffing resources.

3.4 List of Analysis Results

The following analysis result items that potentially hinder station personnel from performing response tasks in a timely manner have been entered into the corrective action program to document the actions associated with this assessment report:

| Analysis Result Items Description |
|--|
| #1: FSG task training is not complete and incorporated in the applicable departmental training programs. |
| #2: The qualification of on-shift auxiliary operators (AOs) requires further review to ensure their capabilities to implement the FSG strategies. |

4 SCOPE OF THE ELAP ERO STAFFING ASSESSMENT

1. Evaluate the ability of the on-shift staff to implement Initial Phase coping actions and, consistent with the site access assumption, evaluate Transition Phase actions that must be performed prior to the end of the “no site access” time period.
 - Initial Phase – Implementation of strategies that generally rely upon installed plant equipment.
 - Transition Phase – Implementation of strategies that involve the use of on-site portable equipment and consumables to extend the coping period, and prevent a loss of functions needed for core cooling, containment, and spent fuel pool cooling. Setup for these strategies may be performed prior to the end of the Initial Phase as determined by procedure.
2. Evaluate the applicable actions from the Station Blackout (SBO) coping strategies in place at the time of the assessment.
 - Such actions include the shedding of non-essential battery loads, use of portable generators or batteries, opening room and cabinet doors, water/coolant conservation or makeup using portable equipment, etc.
 - These actions do not include those associated with cross-tying AC power sources or electrical distribution busses between units since both units are experiencing an extended loss of AC power.
3. Evaluate the existing EOPs and draft FSGs for responding to an extended loss of AC power affecting both units.
4. Evaluate whether the ability of the on-shift staff to perform any required emergency response functions would be degraded or lost prior to the arrival of the augmented ERO.
5. Consistent with the site access assumption, evaluate the ability of the augmented staff to implement Transition Phase coping strategies performed after the end of the “no site access” time period.

5 ASSUMPTIONS OF THE ELAP ERO STAFFING ASSESSMENT

1. The ELAP event occurs during off-normal work hours at a time when augmented ERO responders are not at the site (e.g., during a backshift, weekend or holiday). This analysis uses 6 hours as the time period to conduct the on-shift ERO response actions. See assumption 13.A below.
2. Only personnel required to be on-shift are credited in the staffing analysis. Interim minimum on-shift staffing reductions allowed by Technical Specifications and/or Technical Requirements Manual are not invoked for the study.

The on-shift personnel complement for this event includes the minimum required number and composition as described in Table 5.1 of the NAPS Emergency Plan. The minimum shift total is obtained by adding shift staffing numbers in the far right column that do not contain any footnote references.

| Functional Area | Major Tasks | Shift Positions | Shift Staffing |
|---|-------------------------------|------------------------------|--------------------------------------|
| 1. Plant Operations and Assessment of Operational Aspects | Control Room Staff | Shift Manager | 1 |
| | | Unit Supervisor | 2 |
| | | Reactor Operator | 4 |
| | | Auxiliary Operator | 8 |
| 2. Emergency Direction and Control | Command and Control | Shift Manager | 1 ^(a) |
| 3. Notification & Communication | Local/ State | Auxiliary Operator | 1 ^(a) |
| | Federal (ENS) | Auxiliary Operator | 1 ^(a) |
| 4. Radiological Assessment | Dose Assessment | RP Technician | 1 |
| | In-plant Surveys | RP Technician | 1 |
| | Onsite Surveys | RP Technician | 1 |
| | Chemistry | Chemistry Technician | 1 |
| 5. Plant System Engineering, Repair, and Corrective Actions | Technical Support | Shift Technical Advisor | 1 |
| | Repair and Corrective Actions | Mech. Maint. Elec. Maint. | 1 ^(d) 1 ^(d) |
| 6. In-Plant Protective Actions | Radiation Protection (RP) | RP Technician | 2 ^(a) |
| 7. Fire Fighting ^(b) | --- | Fire Brigade | 3 ^(a) |
| | | Fire Brigade | 2 |
| 8. 1 st Aid and Rescue Operations | --- | First Aid Team | 2 ^(a) |
| 9. Site Access Control and Accountability | Security & Accountability | Security Personnel | (c) |
| TOTAL: | | | 22 |

(a) May be filled by someone filling another position having functional qualifications.

(b) Fire Brigade per Technical Requirements Manual (TRM) and Fire Protection Evaluation Report (FPER).

(c) The overall shift security staffing is safeguards information per NAPS Security Plan.

(d) Maintenance personnel positions are not staffed 24/7.

3. On-shift personnel can report to their assigned response locations within timeframes sufficient to allow for performance of assigned actions. Unit-specific staff is identified where appropriate (e.g., Unit 1 (U1) operator at the controls (ATC) and Unit 2 (U2) balance of plant (BOP) operator). The following are the assumed locations of the on shift personnel who perform tasks reviewed as part of this assessment at the time the event is initiated:
 - Shift Manager Control Room
 - Shift Technical Advisor Control Room
 - U1 Unit Supervisor..... Control Room
 - U2 Unit Supervisor..... Control Room
 - U1 Reactor Operator (U1 ATC)..... Control Room
 - U1 Reactor Operator (U1 BOP) Control Room
 - U2 Reactor Operator (U2 ATC)..... Control Room
 - U2 Reactor Operator (U2 BOP) Control Room
 - Auxiliary Operator #1 Break Room
 - Auxiliary Operator #2 Break Room
 - Auxiliary Operator #3 Break Room
 - Auxiliary Operator #4 Break Room
 - Auxiliary Operator #5 Break Room
 - Auxiliary Operator #6 Break Room
 - Auxiliary Operator #7 Break Room
 - Auxiliary Operator #8 Break Room
 - RP Technician #1 (RAD).....HP Office
 - RP Technician #2HP Office
 - RP Technician #3HP Office
 - Chemistry Technician Chemistry Office
 - Security #1 (Fire Brigade Member #3)Access Control Building
 - Security #2 (Fire Brigade Member #4)Access Control Building
 - Security Shift Supervisor/Personnel (SSS/P) Security Alarm Station
 - Security Shift Supervisor/Personnel (SSS/P) Security Alarm Station

4. Equipment credited in current coping strategies remains available for use including the FLEX equipment connections and system interfaces.

5. The extended loss of AC power affecting both units assumes the following:
 - Appendix "R" emergency lighting is available for 8 hours.
 - The security emergency diesel generator (EDG) is unavailable.
 - Gaitronics is not powered, although sound powered phones are available.
 - Credit for plant radios is not taken as a means of reliable communications for the first 6 hours.
 - Satellite phones are available for a period of 8 hours under normal use.
 - ERDS communications capabilities are lost as a result of the 25 mile telecommunications blackout range.
 - Power operated door locks can be overridden by key.
6. A Hostile Action directed at the affected site does not occur during the period that the site is responding to the event.
7. The on-shift staff possesses the necessary Radiation Worker qualifications to obtain normal dosimetry and to enter Radiologically Controlled Areas (but not high, locked high or very high radiation areas) without the aid of a RP Technician.
8. The on-site security organization is able to satisfactorily perform tasks related to Site and Protected Area Access Controls. Performance of this function is regularly analyzed through other station programs and will not be evaluated here, unless a role or function from another major response area is assigned as a collateral duty.

The use of Security personnel for any mitigation actions must be in accordance with NEI guidance. (Refer to Attachment 1 Reference #4)
9. Individuals holding the position of RP Technician or Chemistry Technician are qualified to perform the range of tasks expected of their position.
10. The task of making a simple and brief communication has minimal impact on the ability to perform other assigned functions/tasks, and is therefore an acceptable collateral duty for all positions. Examples include making a plant page announcement or placing a call for assistance to an offsite resource such as local law enforcement. This assumption does not apply to emergency notification to an Offsite Response Organization or the NRC.
11. The task of performing a peer check has minimal impact on the ability to perform other assigned functions/tasks, and is therefore an acceptable collateral duty for all positions. Examples include performing a peer check on a recommended emergency classification or notification form for transmittal to offsite authorities.
12. For purposes of assessing augmented staffing, it is assumed that the on-shift staff successfully performs all Initial Phase, and any required Transition Phase, coping actions. Thus, adequate core cooling is maintained throughout the 6 hour duration. No core damage occurs and no entry into Severe Accident Management Guidelines (SAMGs) is required.

13. The event impedes site access as follows:

A. Post event time: 6 hours – No site access.

It is therefore assumed that those Emergency Plan functions performed by the augmented ERO will be delayed for the 6-hour period (e.g., field monitoring).

B. Post event time: 6 to 24 hours – Limited site access. Individuals may access the site by walking, personal vehicle or via alternate transportation capabilities (e.g., private resource providers or public sector support).

C. Post event time: 24+ hours – Improved site access. Site access is restored to a near-normal status and/or augmented transportation resources are available to deliver equipment, supplies and large numbers of personnel.

14. All offsite facilities and staging areas are available including those located within the 25 mile telecommunications blackout range.

6 ON-SHIFT ERO RESPONSE CAPABILITY

This section of the assessment documents the ability of the on-shift ERO to implement emergency procedures and coping strategies performed prior to the end of the 6 hour "no site access" time period.

6.1 ELAP Event Description and Initial Conditions

A large-scale external event occurs that results in a loss of off-site power combined with a failure of the emergency and SBO diesel generators to load. The scope of the event includes the following conditions:

- an ELAP event occurs
- an extended loss of UHS occurs
- both units are impacted (both units are in operation at the time of the event)
- station access is impeded

Initially, both reactors are operating at full power. Upon the loss of AC power, both reactors are successfully shut down.

This event results in a Site Area Emergency classification level based on EAL SS1.1 which escalates to a General Emergency classification level based on EAL SG1.1 once it has been determined that power cannot be restored before the coping time will be exceeded (i.e., an ELAP). The scenario is designed such that restoration of any installed AC power source is not possible before the arrival of ERO personnel (360 minutes).

Initial Conditions

Both units 100% power at equilibrium, end of core life.

Scenario Events

An extreme external event causes an electrical transient resulting in a loss of all offsite power.

None of the EDGs (including the SBO diesel) can be synchronized to any Unit 1 or Unit 2 AC bus, resulting in a dual-unit loss of all AC power.

Adequate core cooling is maintained throughout the 6-hour duration. No core damage occurs and no entry into SAMG is required.

No abnormal radiological conditions exist during this event.

Note – refer to Attachment 1 for a list of procedures used to assess the tasks performed during the ELAP scenario.

6.2 On-Shift Staffing Analysis Results Tables

TABLE 1 – On-Shift Positions

Extended Loss of All Power (ELAP)

| Line | On-shift Position | Emergency Plan Reference | Augmentation Elapsed Time (min) | Role in Table # / Line# | Unanalyzed Task? | TMS Required? |
|------|-------------------------------------|--------------------------|---------------------------------|---|------------------|---------------|
| 1. | Shift Manager | Table 5.1 | | 2 / 1 5 / 1 5 / 2 5 / 3 5 / 5 | Yes | Yes |
| 2. | Shift Technical Advisor | Table 5.1 | | 2 / 2 | Yes | Yes |
| 3. | U1 Unit Supervisor | Table 5.1 | | 2 / 3 | Yes | Yes |
| 4. | U1 Reactor Operator – ATC | Table 5.1 | | 2 / 4 | Yes | Yes |
| 5. | U1 Reactor Operator – BOP | Table 5.1 | | 2 / 5 | No | No |
| 6. | U2 Unit Supervisor | Table 5.1 | | 2 / 6 | Yes | Yes |
| 7. | U2 Reactor Operator – ATC | Table 5.1 | | 2 / 7 | Yes | No |
| 8. | U2 Reactor Operator – BOP | Table 5.1 | | 2 / 8 | Yes | Yes |
| 9. | Auxiliary Operator #1 | Table 5.1 | | 5 / 8 5 / 9 | No | No |
| 10. | Auxiliary Operator #2 | Table 5.1 | | 5 / 10 5 / 13 | No | No |
| 11. | Auxiliary Operator #3 | Table 5.1 | | 2 / 11 | Yes | Yes |
| 12. | Auxiliary Operator #4 | Table 5.1 | | 2 / 12 | Yes | Yes |
| 13. | Auxiliary Operator #5 | Table 5.1 | | 2 / 13 | No | No |
| 14. | Auxiliary Operator #6 | Table 5.1 | | 2 / 14 | No | No |
| 15. | Auxiliary Operator #7 | Table 5.1 | | 2 / 15 | No | No |
| 16. | Auxiliary Operator #8 | Table 5.1 | | 2 / 16 | No | No |
| 17. | RPT #1 (RAD) | Table 5.1 | | 4 / 5 | No | No |
| 18. | RPT #2 | Table 5.1 | | 4 / 1 4 / 4 | No | No |
| 19. | RPT #3 | Table 5.1 | | 4 / 3 | No | No |
| 20. | Chemistry Technician | Table 5.1 | | 4 / 3 | No | No |
| 21. | Security #1 (FB Member #3) | Table 5.1 | | 2 / 17 | N/A | N/A |
| 22. | Security #2 (FB Member #4) | Table 5.1 | | 2 / 18 | N/A | N/A |
| 23. | Security Shift Supervisor/Personnel | Table 5.1 | | 5 / 6 | No | No |
| 24. | Security Shift Supervisor/Personnel | Table 5.1 | | 5 / 15 | No | No |

Note: NEI 10-05 requirements for Time Motion Study analysis following the identification of potential task overlap are satisfied by evaluating the timing and duration of the activities by subject matter experts during the task analysis table top. See Section 3.2.

TABLE 2 – Plant Operations & Safe Shutdown

Extended Loss of All Power (ELAP)

Minimum Crew (Two Units – Single Control Room)

| Line | Generic Title/Role | On-Shift Position | Task Description | Controlling Method |
|------|-------------------------|---------------------------|---|--|
| 1. | Shift Manager | Shift Manager | Direct immediate actions (ECA 0.0) | Shift Manager qualification SRO qualification |
| | | | Declare ELAP Contact Regional Response Center to initiate FLEX | None in place |
| 2. | Shift Technical Advisor | Shift Technical Advisor | Monitor immediate actions (ECA 0.0) | STA qualification |
| | | | Perform Plant / Equip Assessment (FSG-5 Step 1) | None in place |
| 3. | Unit Supervisor | U1 Unit Supervisor | Direct U1 immediate actions (ECA 0.0) | SRO qualification |
| | | | Initiate and direct U1 FSG-4 & FSG-5 actions | None in place |
| 4. | Reactor Operator #1 | U1 Reactor Operator – ATC | Perform U1 immediate actions (ECA 0.0) CR panel actions to restore power (ECA 0.0 Step 6) CR panel actions to restore power (ECA 0.0 Att 5) CR RCS Isolation Checks Verify AFW flow CR panel actions to restore power (ECA 0.0 Step 9) CR actions to strip buses Determine SBO available Direct Local Turbine Building Operations (Att 3) | RO qualification |
| | | | CR panel actions (FSG-4 and FSG-6) Initiate Fuel Building ventilation (FSG 5 Att 2) | None in place |
| 5. | Reactor Operator #3 | U1 Reactor Operator – BOP | Perform U1 immediate actions (ECA 0.0) Check for Appendix R fire Perform U1 and U2 ECA 0.0 actions in CR | RO qualification |
| 6. | Other | U2 Unit Supervisor | Direct U2 immediate actions (ECA 0.0) | SRO qualification |
| | | | Initiate and direct U2 FSG-4 & FSG-5 actions | None in place |
| 7. | Reactor Operator #2 | U2 Reactor Operator – ATC | Perform U2 immediate actions (ECA 0.0) CR panel actions to restore power (ECA 0.0 Step 6) CR panel actions to restore power (ECA 0.0 Att 5) CR RCS Isolation Checks Verify AFW flow CR panel actions to restore power (ECA 0.0 Step 9) CR actions to strip buses Determine SBO available Direct Local Turbine Building Operations (Att 3) | RO qualification |
| | | | CR panel actions (FSG-4 and FSG-6) Initiate Fuel Building ventilation (FSG 5 Att 2) | None in place |

| Line | Generic Title/Role | On-Shift Position | Task Description | Controlling Method |
|------|-----------------------|---------------------------|--|----------------------|
| 8. | Other | U2 Reactor Operator – BOP | Perform U2 immediate actions (ECA 0.0) | RO qualification |
| | | | Perform Loss of Electrical Power actions (AP-10) | |
| | | | Reduce AC bus loads U1/U2 (FSG-4 Att 7) | None in place |
| | | | Establish natural Fuel Bldg ventilation (FSG 5 Att 2) Hook up 480V DG to U1/U2 bus (FSG-4 Att 1) | |
| 9. | Auxiliary Operator #1 | Auxiliary Operator #1 | S&L Communicator | Step 4 qualification |
| 10. | Auxiliary Operator #2 | Auxiliary Operator #2 | NRC Communicator | Step 7 qualification |
| 11. | Auxiliary Operator #3 | Auxiliary Operator #3 | Perform local checks on U1 DGs | Step 5 qualification |
| | | | Vent H2 and Break Vacuum on U1 | |
| | | | Isolate U1 Condenser Hotwell (Att 3 Step 4) | |
| | | | Reduce DC bus loads U1 (FSG-4 Att 6) Transport and stage 480V DG to U1 (FSG-5 Att 8) Hook up 480V DG to U1 bus (FSG-4 Att 1) | None in place |
| 12. | Other | Auxiliary Operator #4 | Perform local checks on U2 DGs | Step 5 qualification |
| | | | Vent H2 and Break Vacuum on U2 | |
| | | | Isolate U2 Condenser Hotwell (Att 3 Step 4) | |
| | | | Reduce DC bus loads U2 (FSG-4 Att 6) Transport and stage 480V DG to U2 (FSG-5 Att 8) Hook up 480V DG to U2 bus (FSG-4 Att 1) | None in place |
| 13. | Other | Auxiliary Operator #5 | Locally throttle AFW flow U1 | Step 5 qualification |
| | | | Realign U1 AFW (AP-22.4) | |
| | | | Local U1 AFW ops (ECA 0.0 and AP 22.5) | |
| 14. | Other | Auxiliary Operator #6 | Locally throttle AFW flow U2 | Step 5 qualification |
| | | | Realign U2 AFW (AP-22.4) | |
| | | | Local U2 AFW ops (ECA 0.0 and AP 22.5) | |
| 15. | Other | Auxiliary Operator #7 | RCP seal and PG blender isolation U1 & U2 (Att 4) Control U1 SG PORV locally (ECA 0.0) | Step 5 qualification |
| 16. | Other | Auxiliary Operator #8 | Communications Runner for DG status Investigate SBO diesel Control U2 SG PORV locally (ECA 0.0) | Step 5 qualification |

Analysis Result Item #1: FSG task training is not complete and incorporated in the applicable departmental training program.

Analysis Result Item #2: The qualification of on-shift auxiliary operators (AOs) requires further review to ensure their capabilities to implement the FSG strategies.

Other (non-Operations) Personnel

| Line | Generic Title/Role | On-Shift Position | Task Description | Controlling Method |
|------|--------------------|----------------------------|--|--------------------|
| 17. | N/A | Security #1 (FB Member #3) | Perform debris removal (FSG-5) Transport and stage 480V DG to U1 (FSG-5 Att 8) Assist with hook up 480V DG to U1 bus (FSG-4 Att 1) | None in place |
| 18. | N/A | Security #2 (FB Member #4) | Perform debris removal (FSG-5) Transport and stage 480V DG to U2 (FSG-5 Att 8) Assist with hook 480V DG to U1 bus (FSG-4 Att 1) | None in place |

TABLE 3 – Firefighting**Extended Loss of All Power (ELAP)**

| Line | Performed By | Task Description | Controlling Method |
|------|---------------------|------------------|--------------------|
| 1. | Fire Brigade Leader | N/A | N/A |
| 2. | FB Member #1 | N/A | N/A |
| 3. | FB Member #2 | N/A | N/A |
| 4. | FB Member #3 | N/A | N/A |
| 5. | FB Member #4 | N/A | N/A |

Note: The Fire Brigade Leader, Fire Brigade Team Member #1 and Fire Brigade Team Member #2 positions are filled by the on-shift Auxiliary Operators. The Fire Brigade Team Member #3 and Fire Brigade Team Member #4 positions are filled by additional on-shift Security personnel.

TABLE 4 – Radiation Protection and Chemistry

Extended Loss of All Power (ELAP)

| # | Position Performing Function/Task | Performance Time Period After Emergency Declaration (minutes) | | | | | | | | | | |
|----|--|---|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| | | 0-30 | 30-60 | 60-90 | 90-120 | 120-150 | 150-180 | 180-210 | 210-240 | 240-300 | 300-330 | 330-360 |
| 1. | In-Plant Survey On-Shift Position: RPT#2 | | X | X | | X | X | X | X | X | X | X |
| 2. | On-Site Radiological Survey On-Shift Position: RPT#3 Chemistry Technician | | X X | X X | X X | X X | X X | X X | X X | X X | X X | X X |
| 3. | Personnel Monitoring On-Shift Position: | | | | | | | | | | | |
| 4. | Job Coverage On-Shift Position: RPT#2 | X | | | X | | | | | | | |
| 5. | Offsite Radiological Assessment On-Shift Position: RPT #1 (RAD) | X | X | X | X | X | X | X | X | X | X | X |
| 6. | Other HP – Describe: On-Shift Position: | | | | | | | | | | | |
| 7. | Sampling On-Shift Position: | | | | | | | | | | | |
| 8. | Other Chem – Describe: On-Shift Position: | | | | | | | | | | | |

Note: RPT#2 job coverage tasks were specific for RCP seal/PG blender isolation and opening Fuel Building doors per FSG-5 Attachment 2.

TABLE 5 – Emergency Plan Implementation

Extended Loss of All Power (ELAP)

| Line | Function/Task | On-Shift Position | Controlling Method |
|------|--|-------------------------|-----------------------------|
| 1. | Declare the Emergency Classification Level (ECL) | Shift Manager | Shift Manager qualification |
| 2. | Approve Offsite Protective Action Recommendations | Shift Manager | Shift Manager qualification |
| 3. | Approve content of State/local notifications | Shift Manager | Shift Manager qualification |
| 4. | Approve extension to allowable dose limits | N/A for ELAP | |
| 5. | Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.) | Shift Manager | Shift Manager qualification |
| 6. | ERO notification | SSS/P | Security Training Program |
| 7. | Abbreviated NRC notification for design basis threat (DBT) event | N/A for ELAP | |
| 8. | Complete State/local notification form | Auxiliary Operator #1 | Step 4 qualification |
| 9. | Perform State/local notifications | Auxiliary Operator #1 | Step 4 qualification |
| 10. | Complete NRC event notification form | Auxiliary Operator #2 | Step 7 qualification |
| 11. | Activate Emergency Response Data System (ERDS) | N/A for ELAP (no power) | |
| 12. | Offsite radiological assessment | N/A | |
| 13. | Perform NRC notifications | Auxiliary Operator #2 | Step 7 qualification |
| 14. | Perform other site-specific event notifications (e. g., Institute of Nuclear Power Operations (INPO), American Nuclear Insurers (ANI), etc.) | N/A for ELAP | |
| 15. | Personnel accountability | SSS/P | Security Training Program |

Note: Line #3, #8 and #9 includes initial and follow-up State/local notifications.

6.3 ELAP On-Shift Staffing Task Timetable

| Time (T+mins) | Position(s) | Action | Duration (min) |
|------------------|------------------|--|-------------------|
| 0 | | Complete loss of station AC power event occurs | |
| 1 | All CR operators | Immediate actions (ECA 0.0) | 4 |
| 3 | All AOs | Report to Control Room | 1 |
| 5 | RO3 | Check for Appendix R fire | 1 |
| 5 | RO1 RO2 | CR panel actions to restore power (ECA 0.0 Step 6) | 2 |
| 5 | AO3 | Perform local checks on U1 DGs | 30 |
| 5 | AO4 | Perform local checks on U2 DGs | 30 |
| 5 | AO8 | Communications Runner for DG status | 20 |
| 5 | RO4 | Perform Loss of Electrical Power actions (AP-10) | 40 |
| 7 | RO1 RO2 | CR panel actions to restore power (ECA 0.0 Att 5) | 2 |
| 9 | AO7 | RCP seal and PG blender isolation U1 & U2 (Att 4) | 30 |
| 9 | RO1 RO2 | CR RCS Isolation Checks | 1 |
| 10 | RO1 RO2 | Verify AFW flow | 1 |
| 10 | SM | Declaration of SS1.1 | 1 |
| 10 | AO1 | Complete initial SAE state / location notification form | 10 |
| 10 | AO2 | Complete ENS form | 20 |
| 11 | RP1 | Reports to CR as Rad Assessment Director (dose assessment) | duration |
| 11 | RP2 | Support AO7 for seal isolation (job coverage) | 28 |
| 11 | AO5 | Locally throttle AFW flow U1 | 7 |
| 11 | AO6 | Locally throttle AFW flow U2 | 9 |
| 11 | RO1 RO2 | CR panel actions to restore power (ECA 0.0 Step 9) | 10 |
| 15 | SSS/P | ERO Notification | 5 |
| 15 | SM | Direct Assembly / Accountability | 1 |
| 16 | SSS/P | Perform Accountability | 30 |
| 18 | AO5 | Realign U1 AFW (AP-22.4) | 10 |
| 20 | SM | Approve content of initial SAE state / local notification form | 1 |
| 20 | AO6 | Realign U2 AFW (AP-22.4) | 10 |
| 21 | SM | Notification and direction to on-shift staff | duration |
| 21 | AO1 | Perform initial SAE state / local notification | 30 |
| 21 | RO1 RO2 | CR actions to strip buses | 5 |
| 26 | RO1 RO2 | Determine SBO available | 5 |
| 28 | AO5 | Local U1 AFW ops (ECA 0.0 and AP 22.5 using 1-FP-P-2) | duration |
| 30 | AO6 | Local U2 AFW ops (ECA 0.0 and AP 22.5 using 1-FP-P-2) | duration |
| 31 | AO8 | Investigate SBO diesel | 30 |
| 32 | AO2 | Perform ENS notification | duration |
| 35 | RO1 RO2 | Direct Local Turbine Building Operations (Att 3) | 4 |
| 39 | AO3 | Vent H2 and Break Vacuum on U1 (Att 3, Steps 1 & 2) | 10 |
| 39 | AO4 | Vent H2 and Break Vacuum on U2 (Att 3, Steps 1 & 2) | 10 |
| 39 | SM | Declare ELAP | 1 |
| 40 | US1 | Initiate and direct U1 FSG-4 & FSG-5 actions | duration |

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| Time (T+mins) | Position(s) | Action | Duration (min) |
|--------------------------|------------------------------------|---|---------------------------|
| 40 | US2 | Initiate and direct U2 FSG-4 & FSG-5 actions | duration |
| 40 | RO3 | Perform U1 and U2 ECA 0.0 actions in CR | 180 |
| 40 | SM | Declaration of SG1.1 | 1 |
| 40 | AO1 | Complete initial GE state / location notification form | 10 |
| 41 | RP2 | In plant rad surveys | 51 |
| 41 | RP3 Chem Tech | Perform on-site (out of plant) rad surveys | duration |
| 41 | Sec #1 (FBM #3) Sec #2 (FBM #4) | Perform debris removal (FSG-5) | 180 |
| 41 | STA | Perform Plant / Equip Assessment (FSG-5 Step 1) | duration |
| 41 | SM | Perform PAR determination | 10 |
| 42 | AO3 | Isolate U1 Condenser Hotwell (Att 3 Step 4) | 10 |
| 49 | AO4 | Isolate U2 Condenser Hotwell (Att 3 Step 4) | 10 |
| 50 | AO3 | Reduce DC bus loads U1 (FSG-4 Att 6) | 15 |
| 50 | AO4 | Reduce DC bus loads U2 (FSG-4 Att 6) | 15 |
| 51 | SM | Approve content of initial GE state / local notification form | 1 |
| 52 | AO1 | Perform initial GE state / local notification (including PAR) | 30 |
| 52 | RO4 | Reduce AC bus loads U1 (FSG-4 Att 7) | 15 |
| 55 | SM | Contact Regional Response Center to initiate FLEX equip | 5 |
| 59 | RO1 RO2 | CR panel actions (FSG-4 and FSG-6) | 30 |
| 67 | RO4 | Reduce AC bus loads U2 (FSG-4 Att 7) | 15 |
| 90 | RO1 RO2 | Initiate Fuel Building ventilation (FSG 5 Att 2) | 2 |
| 92 | RO4 RP2 | Establish natural Fuel Bldg ventilation (FSG 5 Att 2) | 30 |
| 93 | RO1 RO2 | CR panel actions (FSG-4 and FSG-6) | duration |
| 100 | AO1 | Complete follow-up GE state / location notification form | 15 |
| 115 | SM | Approve content of follow-up GE state / local notification form | 5 |
| 120 | AO1 | Perform follow-up GE state / local notification | 40 |
| 120 | AO7 | Control U1 SG PORV locally (ECA 0.0) | duration |
| 120 | AO8 | Control U2 SG PORV locally (ECA 0.0) | duration |
| 122 | RP2 | In plant rad surveys | duration |
| 160 | AO1 | Complete follow-up GE state / location notification form | 15 |
| 175 | SM | Approve content of follow-up GE state / local notification form | 5 |
| 180 | AO1 | Perform follow-up GE state / local notification | 40 |
| 220 | AO1 | Complete follow-up GE state / location notification form | 15 |
| 225 | AO3 Sec #1 (FBM #3) | Transport and stage 480V DG to U1 (FSG-5 Att 8) | 105 |
| 225 | AO4 Sec #2 (FBM #4) | Transport and stage 480V DG to U2 (FSG-5 Att 8) | 105 |
| 235 | SM | Approve content of follow-up GE state / local notification form | 5 |
| 240 | AO1 | Perform follow-up GE state / local notification | 40 |
| 280 | AO1 | Complete follow-up GE state / location notification form | 15 |
| 295 | SM | Approve content of follow-up GE state / local notification form | 5 |
| 300 | AO1 | Perform follow-up GE state / local notification | 40 |
| 330 | RO4 AO3 Sec #1 (FBM #3) | Hook up 480V DG to U1 bus (FSG-4 Att 1) | 70 |

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| Time (T+mins) | Position(s) | Action | Duration (min) |
|------------------|---|---|-------------------|
| 330 | RO4 AO4 Sec #2 (FBM #4) | Hook up 480V DG to U2 bus (FSG-4 Att 1) | 70 |
| 340 | AO1 | Complete follow-up GE state / location notification form | 15 |
| 355 | SM | Approve content of follow-up GE state / local notification form | 5 |
| 360 | End of Shift Staffing Task Sequence Analysis | | |

Note: Estimated durations associated with performing external communications need to be verified using the final approved BDB communications equipment.

7 AUGMENTED AND EXPANDED ERO RESPONSE CAPABILITY

This section of the assessment documents the ability of the augmented and expanded ERO to implement Transition Phase coping strategies performed after the end of the 6 hour "no site access" time period. The expanded ERO is defined as the required augmented ERO for a multi-unit event.

7.1 ERO Notification and Response during an ELAP

Assessment of staffing resources for the expanded ERO is provided by the depth of personnel filling the existing augmented ERO positions. Table 7-1 below documents the augmented ERO minimum and full staffing requirements from the NAPS Emergency Plan. The recommended depth for each augmenting ERO minimum and full staffing positions is four (4) as specified in VPAP-2601, Maintaining Emergency Preparedness. The number qualified is based on the North Anna ERO Qualification Roster dated January, 14, 2014 and specific numbers can vary with time.

Table 7-1 Augmented ERO Response Resources - Minimum & Full Staffing

| ERO Title | Assigned Major Function/Task | # Required Min. / Full | # Qualified |
|-------------------------------------|--|-----------------------------------|--------------------|
| EOF | | | |
| LEOF Recovery Manager (RM) | Emergency Direction and Control | 1/1 | 4 |
| LEOF Rad. Assess. Coord. (RAC) | Radiological Command & Control | 1/1 | 4 |
| LEOF Asst. RAC | Radiological Command & Control | 0/1 | 3 |
| LEOF Field Team Radio Operator | Communicates w/RP Field Teams | 1/1 | 4 |
| LEOF Dose Assessment Team | Radiological Accident Assessment | 1/1 | 3 |
| LEOF HPN Communicator | Communicates with NRC | 1/1 | 4 |
| LEOF EPA | Emergency Plan Advisor | 0/1 | 3 |
| LEOF Ops Support Coordinator | Provides Operational Guidance | 1/1 | 5 |
| LEOF Ops Communicator | Communicates w/ Ops | 0/1 | 5 |
| LEOF S&L Communicator | Communicates with S&L Agencies | 1/1 | 5 |
| LEOF Services Coordinator | Assists LEOF Staff | 0/1 | 4 |
| LEOF Administrative Coordinator | Assists LEOF Staff | 0/1 | 8 |
| LEOF Telecom Coordinator | Assists w/IT-Telecom for Site | 0/1 | 3 |
| LEOF PI Technical Advisor | Assists RM | 0/1 | 4 |
| TSC & HPO & Security | | | |
| TSC Station Emergency Manager | Emergency Direction and Control | 1/1 | 4 |
| TSC Emergency Operation Dir. | Directs Operations Effort | 1/1 | 3 |
| TSC NRC Communicator | Communicates with NRC | 1/1 | 4 |
| TSC S&L Communicator | Communicates with S&L Agencies | 1/1 | 5 |
| TSC Plant Status Communicator | Communicates w/ Ops | 0/1 | * |
| TSC Emergency Technical Dir. | Directs Engineering Efforts | 1/1 | 6 |
| TSC Tech Support Leader | Assists w/Engineering Activities | 0/1 | 4 |
| TSC Core/Hydraulic RX Engr. | Assists w/Engineering Activities | 1/1 | 6 |
| TSC Mech Engr. | Assists w/Engineering Activities | 1/1 | 6 |
| TSC Elec Engr. | Assists w/Engineering Activities | 1/1 | 8 |
| TSC Ops Advisor | Provides Operational Guidance | 1/1 | 5 |
| TSC Emergency Maint. Director | Directs Maintenance Efforts | 1/1 | 5 |
| TSC Emergency Admin Director | Directs Security & Admin Efforts | 0/1 | 5 |
| TSC Admin Support Team Leader | Assists w/ Security & Admin Activities | 0/1 | 6 |
| TSC Clerks | Assists TSC Staff | 0/1 | 10 |
| TSC Logkeeper | Maintains ESOMS Log | 0/1 | 4 |
| TSC Emergency Procs Coord. | Assists Emergency Ops Director | 0/1 | 4 |
| TSC Rad. Assess. Director (RAD) | Radiological Command & Control | 1/1 | 4 |

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| ERO Title | Assigned Major Function/Task | # Required Min. / Full | # Qualified |
|----------------------------------|-----------------------------------|------------------------|-------------|
| TSC Dose Assess. Team Leader | Leads Dose Assessment Efforts | 1/1 | 4 |
| TSC HPN Communicator | Communicates with NRC | 1/1 | 4 |
| HP Monitoring Team Leader | Performs HP monitoring | 6/7 | 21 |
| HP Monitoring Team Member | Performs HP monitoring | 7/7 | 26 |
| Chemistry Team Leader | Directs Chemistry Activities | 1/1 | 6 |
| Chemistry Team Member | Performs Chemistry Activities | 2/2 | 6 |
| Security Team Leader | Supports Security Efforts | 1/1 | Sfgd. Info |
| Security Team Member | Assists w/Security Efforts | Sfgd. Info | Sfgd. Info |
| OSC | | | |
| OSC Director | Directs Maintenance Efforts | 1/1 | 3 |
| OSC Mech DCT Member | Performs Mechanical Maint. | 2/4 | 59 |
| OSC Elec DCT Member | Performs Electrical Maint. | 3/4 | 39 |
| OSC I&C DCT Member | Performs I&C Maint. | 2/4 | 27 |
| OSC Auxiliary Operators | Supports Operations | 0/0 | 72 |
| OSC Fire Team | Fire Brigade | 0/5 | * |
| OSC First Aid Team | First Aid Responders | 0/2 | * |
| OSC Search & Rescue Team | Search & Rescue Responders | 0/2 | * |
| OSC Team Leader | Assists the OSC Director | 0/1 | 5 |
| OSC Ops Coordinator | Communicates w/Operations | 0/1 | 4 |
| OSC RP Coordinator | Communicates with the HPO | 0/1 | 3 |
| OSC S&L Prevention Coordinator | Assists the DCTs | 0/1 | 4 |
| OSC Material Coordinator | Assists the DCTs | 0/1 | 4 |
| OSC O&P Coordinator | Assists the DCTs | 0/1 | 4 |
| OSC Logkeeper | Maintains ESOMS Logs | 0/1 | 4 |
| OSC Status Board Keeper | Tracks Maintenance Activities | 0/1 | 4 |
| OSC Mech Maint. Rep. | Leads Mechanical Maint. | 0/1 | 4 |
| OSC Elec Maint. Rep. | Leads Electrical Maint. | 0/1 | 8 |
| OSC I&C Maint. Rep. | Leads I&C Maint. | 0/1 | 5 |
| OSC Maintenance. Engineer Rep. | Provides Engineering Assistance | 0/1 | 4 |
| OSC Operations Team Leader | Communicates w/Ops | 0/1 | * |
| OSC Rad Waste Operator | Supports Operations | 0/1 | * |
| Joint Information Center | | | |
| JIC Chief Technical Spokesperson | Dominion Spokesperson at JIC | 1/1 | 5 |
| JIC Technical Advisor | Assists the CTS | 0/1 | 5 |
| CERC Corp. Response Manager | Directs Corporate Recovery Effort | 1/1 | 8 |
| Nuclear News Manager | Prepares News Releases | 1/1 | 6 |

Totals 48/92 492

* Positions filled by off-shift operators that respond during an emergency. Off-shift security personnel support the Fire Brigade Team and First Aid / Search & Rescue functions. Staffing numbers for security personnel are safeguards information.

Note - In addition to the ERO members identified above, other qualified ERO members not credited in this analysis, are available in the Corporate Emergency Response Center in Richmond, VA to assist with recovery management, dose assessment and communications tasks.

7.1.1 General ERO Response

1. Implementing Strategy for the Expanded ERO

The ERO augmentation process consists of an “all call/all come” expectation. When the ERO notification system is operable, the qualified ERO members are contacted and expected to report if fit for duty.

ERO members are expected to monitor local radio, television and emergency alert system (EAS) communications for impact to the grid structure. Should the situation appear to be a major disturbance, then ERO members are trained to report to their designated ERO facility as soon as safely possible. If access to the primary emergency response facilities is not possible, ERO members are trained to report to their alternate location (i.e., Fire Training Center in Louisa County, VA).

This requirement and expectation was communicated to augmenting ERO personnel in December 2012 via the Learning Management System (LMS).

This requirement and expectation was communicated to on-shift ERO personnel (off-duty Operations and Security personnel, and supplemental Maintenance personnel) in November 2013 and January 2014 respectively via the LMS.

Review of the North Anna ERO roster confirmed that sufficient numbers of qualified individuals are available to fill the positions in Table 7.2 with adequate depth to staff at least two 12-hour shifts.

2. Response Timeliness for the Expanded ERO

The NAPS ERO augmentation process consists of an “all call/all come” expectation. Callout of an expanded ERO is subsumed within the callout of the augmented ERO.

In the absence of the call out system, ERO members are trained to respond automatically per VPAP-2601 as described in the implementing strategy above.

3. Work Location for the Expanded ERO

If access to the primary emergency response facilities is not possible, ERO members are trained to report to their alternate location (i.e., Fire Training Center in Louisa County, VA).

In addition, if the primary emergency response facilities remain inaccessible, an onsite BDB Storage Building is available for use by ERO personnel as a work location once site access has been restored.

4. Transportation for the Expanded ERO

In a letter dated June 11, 2012, (SN 12-207B), Dominion stated that the following methods of access to the site are available:

- There is one major roadway into the North Anna Power Station: State Route 700 (Haley Drive). State Route 700 intersects State Route 652 (Kentucky Springs Road) approximately one mile from the Owner Controlled Area checkpoint. From this intersection, Route 700 (now Johnson Road) continues southwest and connects to the wider road network eventually leading to a series of major state roads and Interstate 64. Route 652 runs northwest and southeast and crosses over bridges as it connects to the road network.
- A secondary access road to the North Anna Power Station crosses over Dike 1 and is normally blocked by vehicle barriers which can be removed if the primary route is unavailable. Access via this route onto the public road network requires crossing one or more bridges depending on the route taken. An agreement is in place with the Virginia State Police to permit passage of Virginia Electric and Power Company (Dominion) personnel if public roads are closed, but safe passage is possible.
- The Local Emergency Operations Facility (LEOF) is east-southeast of the Protected Area accessible by a road atop an earthen berm that separates the Discharge Canal from Lake Anna. In the event this vehicle access route was unavailable, vehicle access would be limited to the secondary access road that crosses over Dike 1. Depending upon the nature of the disruption to vehicle access, ERO members would be able to walk to the LEOF after parking in the station parking area.
- Access to North Anna Power Station can be provided from staging areas via helicopters arranged by need for Dominion or the Virginia Department of Emergency Management.

5. ERO Drill & Exercise Program

NEI 12-01 states that a licensee should determine if any changes are necessary to documents describing the emergency response drill and exercise program. In particular, standard objectives and extent-of-play may need to be revised to clarify the expected demonstration of functions that are dependent upon the type of scenario event or accident (i.e., within or beyond design basis, and number of affected units). For example, functions associated with an expanded response capability would not be demonstrated during a drill or exercise that involved a design basis accident affecting only one unit.

Current NAPS drill and exercise procedures include evaluation objectives and demonstration criteria for dual unit events and expanded ERO activities. As future guidance is expected from the NRC in this area, no further changes are necessary to the drill and exercise procedures at this time.

7.1.2 Position Specific ERO Response

1. Radiation Protection Technicians (RPTs)

The equation below was used to determine the required number of on-site RP Technicians (on-shift plus augmented ERO RP Technicians that perform on-site response functions) for NAPS:

$$RPT_T = RPT_{COP} + RPT_{RCA} + RPT_{NC}$$

Where:

RPT_T = Total required number of on-site HP Technicians.

RPT_{COP} = Number needed to support implementation of any 2 extended loss of AC power coping strategies, including FLEX strategies, per unit. Determine this number by reviewing strategies for each unit.

RPT_{RCA} = Number needed for repair and corrective action (2 x the number of units).

RPT_{NC} = Number of on-site RP Technicians performing other emergency plan functions that would preclude them from performing job coverage for extended loss of AC power coping, repair or corrective action teams.

For NAPS, the resulting number of RPTs is:

| <u>RPT Category</u> | <u>Number Required</u> | <u>Comments</u> |
|---------------------|------------------------|---|
| RPT_{COP} | 4 | Staffing assessment results indicate that tasks in FSGs 1, 7, 8, 11 and 12 each require the support of one RPT. 2 RPTs could be used for FSG tasks for each unit. |
| RPT_{RCA} | 4 | 2 units. |
| RPT_{NC} | 8 | EP functions (i.e. in-plant surveys, in-plant monitoring and off-site monitoring). |
| RPT_T | 16 | |

Thus, the total number of on-site RPTs required for the expanded ERO is 28, which is based on the staffing needed to:

- 1) Support the two most limiting RP resource intense FSGs which do not require rotating shifts (4 RPT_{COP})
- 2) Operate on 12-hour shifts for other RP tasks (2 shifts of RPT_{RCA} + 2 shifts of RPT_{NC} = 24 total RPTs).

Following a beyond design basis external event, 47 RPTs are available to support performance of assigned emergency plan functions and the expanded response capability (refer to Table 7-1).

Provisions exist for obtaining additional RPT resources from other stations within the Dominion Resources fleet and/ or within the industry (i.e., INPO Emergency Resource Manual).

2. Administrative Support Personnel

The administrative support personnel who assist the augmented ERO members are not assigned critical response tasks. Augmented ERO personnel are capable of performing their assigned tasks and responsibilities without requiring administrative support.

3. FSG Implementers

The assessment considered the number of personnel required for simultaneous implementation of the two FSG strategies for each unit that require the greatest number of staff to implement. Due to unit similarities, the most labor intensive FSG strategies are the same for Unit 1 and Unit 2. There are five (5) FSG strategies for the site:

- 1) Maintain Instrumentation
- 2) Decay Heat Removal
- 3) RCS Injection
- 4) Containment Integrity
- 5) Spent Fuel Pool (SFP) Makeup & Cooling

Based on the analysis performed for these strategies, the following two FSG strategies have been selected:

- Strategy #2 – Decay Heat Removal
- Strategy #4 – Containment Integrity

Implementation of Strategy #2 requires FSGs 2, 3, 5, 6 and 9 to be implemented, and will require the following personnel resources:

| Personnel | Total (2 Units) | Function |
|------------------|----------------------------|--|
| Operators | 6 | Operate pumps, control flow, PORV control and direct field actions. |
| Mechanics | 10 | Stage AFW pumps and High Capacity Pumps (HCP) and run hoses. Install flanges/fittings. Connect hoses to Emergency Condensate Storage Tank (ECST) and pump discharge. |

Implementation of Strategy #4 requires FSGs 5 & 12 to be implemented, and will require the following personnel resources:

| Personnel | Total (2-Units) | Function |
|------------------|----------------------------|---|
| Operators | 10 | Operate Regional Response Center (RRC) equipment (i.e., hi-volume pumps and 4160V generators) and direct field actions. Align service water (SW) system and electrical busses to support use of the Containment Air Recirculation Fans. |
| Electricians | 10 | Route 4160V cables from Truck Bay to Emergency Switchgear Rooms. Connect cables and support generator operation. |
| Mechanics | 10 | Stage RRC equipment. Route hoses and install fittings to SW system. |

A total of 46 personnel are required to simultaneously implement these two FSG activities on both units. The number of RP Technicians required to support the FSG strategies is contained in Section 7.1.2.1. The number of Security personnel required to provide access control to required vital areas will be provided per the Station Security Plan (Safeguards Information).

7.2 Expanded Response Functions for Phase 2 Staffing Assessment

Table 7-2 addresses NEI 12-01 Table 3.1, as modified by the requirements of NEI 12-01 Table 3.2 (FSG implementation vs. SAMG implementation) expanded staffing requirements and documents the staffing necessary to support the simultaneous deployment of emergency repair and corrective action teams to each affected unit. Except where noted, the number required is equal to two times the specified staffing consideration per unit in order to support 24-hour expanded ERO staffing based on 12-hour shifts. Implementation of the two most limiting FSG tasks (last row) does not require 24-hour coverage. The number available is the number of personnel qualified to the position.

Table 7-2 Augmented ERO Response Comparison

| Function | Location | Key Roles & Staffing Considerations | NAPS ERO Position | # Required U1 & U2 | # Available U1 & U2 |
|----------------------------|-----------|--|--|--------------------|---------------------|
| Unit Response Coordination | TSC | <ul style="list-style-type: none"> Overall cognizance of the activities related to implementation of repair and corrective actions and implementation of Transition Phase coping and Severe Accident Management (SAM) strategies for an assigned unit. One individual per unit; individuals should not be assigned other functions. (Note -1) | TSC Station Emergency Manager | 2 | 4 |
| Operations Coordination | TSC | <ul style="list-style-type: none"> Provides coordination of Operations staff and support for an assigned unit. One individual per unit; individuals should not be assigned other functions. (Note -1) | TSC Emergency Operations Director | 2 | 3 |
| Maintenance Coordination | TSC / OSC | <ul style="list-style-type: none"> Provides coordination of Maintenance staff and support for an assigned unit. One individual per unit; individuals should not be assigned other functions. (Note -1) | TSC Emergency Maint Director OSC Director | 2 2 | 5 3 |
| Engineering Coordination | TSC | <ul style="list-style-type: none"> Provides coordination of Engineering staff and support for an assigned unit. One individual per unit; individuals should not be assigned other functions. (Note -1) | TSC Emergency Technical Director | 2 | 6 |
| Engineering Assessments | TSC | <ul style="list-style-type: none"> One team for each unit to perform engineering assessments in support of repair and corrective actions. (Note -1) Team composition (i.e., number and represented disciplines) as described in the Emergency Plan. Team may include personnel responsible for performing other functions for the same assigned unit. | Mechanical Engineer Electrical Engineer Reactor Engineer Operations Advisor | 2 2 2 2 | 6 8 6 5 |

| Function | Location | Key Roles & Staffing Considerations | NAPS ERO Position | # Required U1 & U2 | # Available U1 & U2 |
|--|-----------------|---|--|-----------------------------------|------------------------------------|
| Evaluation of Transition Phase Coping Strategies | TSC or EOF | <ul style="list-style-type: none"> One team for each unit to evaluate selection of Transition Coping strategies; team performs evaluations not done by Control Room personnel. (Note -1) Team composition (i.e., number and represented disciplines) as described in governing site programs, procedures and guidelines. Team may include personnel responsible for performing other functions for the same assigned unit. | Operations Advisor Mechanical Engineer Electrical Engineer Reactor Engineer | 2 2 2 2 | 5 6 8 6 |
| Unit In-Plant Team Coordination | OSC | <ul style="list-style-type: none"> Overall cognizance of on-site and in-plant teams performing or supporting repair and corrective actions for an assigned unit. One individual per unit; individuals should not be assigned other functions. (Note -1) | OSC Team Leader | 2 | 5 |
| Non-Licensed Operators | OSC | <ul style="list-style-type: none"> Two individuals per unit to assist with implementation of repair and corrective actions. Should not include members of the on-shift staff. | OSC Auxiliary Operators | 8 | 72 |
| Mechanical Maintenance Repair and Corrective Action | OSC | <ul style="list-style-type: none"> Two individuals per unit to implement repair and corrective actions. Staffing may include an on-shift individual (i.e., 2 individuals for a unit composed of 1 on-shift and 1 augmented). | OSC Mechanical Damage Control Team | 8 | 59 |
| Electrical Maintenance Repair and Corrective Action | OSC | <ul style="list-style-type: none"> Two individuals per unit to implement repair and corrective actions. Staffing may include an on-shift individual (i.e., 2 individuals for a unit composed of 1 on-shift and 1 augmented). | OSC Electrical Damage Control Team | 8 | 39 |
| I&C Repair and Corrective Action | OSC | <ul style="list-style-type: none"> Two individuals per unit to implement repair and corrective actions. Staffing may include an on-shift individual (i.e., 2 individuals for a unit composed of 1 on-shift and 1 augmented). | OSC I&C Damage Control Team | 8 | 27 |
| Implementation of Transition Phase Coping Strategies | OSC | <ul style="list-style-type: none"> Number and composition of personnel capable of simultaneous implementation of any 2 Transition Phase coping strategies at each unit. Should not include personnel assigned to other functions (e.g., emergency repair and corrective actions); however, may include members of the on-shift staff and personnel responsible for implementation of SAM strategies. | OSC Auxiliary Operators Mechanics Electricians RPTs | 16 20 10 4 | 72 59 39 47 |

(Note -1: For continuity of command, only one position is used. Others are available as necessary).

Attachment 1: List of References

1. EA-12-049, "NRC Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 3, 2012
2. NEI 12-01, "Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities," Revision 0
3. NEI 10-05, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities," Revision 0
4. NEI document to industry peers, "Generic Basis for Responses to Staffing Assessment Questions Related to Use of Security Personnel During a BDB Event Response," dated December 23, 2013
5. NRC Letter, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident," dated March 12, 2012
6. Letter from David A. Heacock (Dominion) to NRC Document Control Desk, "North Anna Power Station Units 1 & 2 60 Day Response to March 12, 2012 Information Request," dated May 9, 2012
7. Letter from David A. Heacock (Dominion) to NRC Document Control Desk, "North Anna Power Station Units 1 & 2 90 Day Response to March 12, 2012 Information Request Regarding Recommendation 9.3 for Emergency Preparedness," dated June 11, 2012
8. Letter from L. Skeen (NRR) to S. Perkins-Grew (NEI), "U.S. Nuclear Regulatory Commission Review of NEI 12-01, 'Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities,' Revision 0, dated May 15, 2012
9. NRC letter, "Response Regarding Licensee Phase 1 Staffing Submittals Associated with Near-Term Task Force Recommendation 9.3 Related to the Fukushima Dai-Ichi Nuclear Power Plant Accident," dated October 23, 2013
10. North Anna Power Station Emergency Plan, (Rev. 40)
11. 1/2-ECA-0.0 (Revision 27/24), Loss of All AC Power
12. 1-ECA-0.0 (Revision 28 Draft A), Loss of All AC Power
13. 0-AP-10, (Revision 76), Loss of Electrical Power
14. 1-E-0 (Revision 45), Reactor Trip or Safety Injection
15. 1-FSG-1 (Revision 0 Draft C), RCS Inventory Control
16. 1-FSG-2 (Revision 0 Draft C), Alternate AFW Suction Source
17. 1-FSG-3 (Revision 0 Draft C), Alternate Low Pressure Feedwater
18. 1-FSG-4 (Revision 0 Draft C), ELAP DC Bus Load Shed/Management

Attachment 1: List of References

19. 0-FSG-5 (Revision 0 Draft C), Initial Assessment and Flex Equipment Scheduling
20. 1-FSG-6 (Revision 0 Draft C), Alternate ECST Makeup
21. 1-FSG-7 (Revision 0 Draft B), Loss of Vital Instrumentation or Control Power
22. 1-FSG-8 (Revision 0 Draft C), Alternate RCS Boration
23. 1-FSG-9 (Revision 0 Draft B), Low Decay Heat Temperature Control
24. 1-FSG-10 (Revision 0 Draft B), SI Accumulator Isolation
25. 1-FSG-11 (Revision 0 Draft B), Alternate SFP Makeup and Cooling
26. 1-FSG-12 (Revision 0 Draft A), Alternate Containment Cooling
27. 1-FSG-13 (Revision 0 Draft A), Alternate Transition from FLEX Equipment
28. ETE-CPR-2012-0012 (Revision 1), BDB FLEX Strategy Overall Integrated Plan Basis Document
29. ETE-CPR-2013-0003 (Revision 0), BDB Communications Strategy/Plan
30. EPIP-1.01 (Revision 49), Emergency Manager Controlling Procedure
31. EPIP-1.04 (Revision 21), Response to Site Area Emergency
32. EPIP-1.05 (Revision 23), Response to General Emergency
33. EPIP-1.06 (Revision 9), Protective Action Recommendations
34. EPIP-2.01 (Revision 37), Notification of State and Local Governments
35. EPIP-2.02 (Revision 21), Notification of NRC
36. EPIP-3.05 (Revision 8), Augmentation of Emergency Response Organization
37. EPIP-4.01 (Revision 30), Radiological Assessment Director Controlling Procedure
38. EPIP-4.02 (Revision 23), Radiation Protection Supervisor Controlling Procedure
39. EPIP-4.03 (Revision 18), Dose Assessment Team
40. EPIP-4.14 (Revision 8), Inplant Monitoring
41. EPIP-4.15 (Revision 14), Onsite Monitoring
42. EPIP-5.03 (Revision 20), Personnel Accountability
43. EPIP-5.04 (Revision 16), Access Control
44. EPIP-5.09 (Revision 12), Security Team Leader Controlling Procedure

Attachment 1: List of References

45. VPAP-2601 (Revision 23), Maintaining Emergency Preparedness
46. EP-AA-100 (Revision 2), Maintaining Emergency Preparedness

Attachment 2: List of Acronyms

| | |
|-------|---|
| AC | Alternating Current |
| AFW | Auxiliary Feedwater |
| ANI | American Nuclear Insurers |
| AO | Auxiliary Operator |
| AP | Abnormal Procedure |
| ATC | At the Controls |
| BDB | Beyond Design Basis |
| BDBEE | Beyond Design Basis External Event |
| BOP | Balance of Plant |
| CAS | Central Alarm Station |
| CERC | Corporate Emergency Response Center |
| CR | Control Room |
| CFR | Code of Federal Regulations |
| CRS | Central Reporting System |
| DBT | Design Basis Threat |
| DC | Direct Current |
| DCT | Damage Control Team |
| DG | Diesel Generator |
| EAL | Emergency Action Level |
| EAS | Emergency Alert System |
| ECA | Emergency Contingency Action |
| ECL | Emergency Classification Level |
| ECST | Emergency Condensate Storage Tank |
| EDG | Emergency Diesel Generator |
| ELAP | Extended Loss of AC Power |
| EOP | Emergency Operating Procedure |
| EP | Environmental Plan |
| EPIP | Emergency Plan Implementing Procedure |
| ERDS | Emergency Response Data System |
| ENS | Emergency Notification System |
| ERO | Emergency Response Organization |
| ESOMS | Electronic Shift Operations Management System |
| FBM | Fire Brigade Member |
| FPER | Fire Protection Evaluation Report |
| FSG | FLEX Support Guideline |
| GE | General Emergency |
| HCP | High Capacity Pump |
| HP | Health Physics |
| HPN | Health Physics Network |
| I&C | Instrumentation and Controls |
| INPO | Institute of Nuclear Power Operations |

Attachment 2: List of Acronyms

| | |
|----------|--|
| JIC | Joint Information Center |
| LEOF | Local Emergency Operations Facility |
| LMS | Learning Management System |
| NAPS | North Anna Power Station |
| NEI | Nuclear Energy Institute |
| NRC | Nuclear Regulatory Commission |
| NTTF | Near Term Task Force |
| O&P | Outage and Planning |
| OSC | Operations Support Center |
| PAR | Protective Action Recommendation |
| PG | Primary Grade |
| PI | Public Information |
| PORV | Power-Operated Relief Valve |
| RAC | Radiological Assessment Coordinator |
| RAD | Radiological Assessment Director |
| RCP | Reactor Coolant Pump |
| RCS | Reactor Coolant System |
| RM | Recovery Manager |
| RO | Reactor Operator |
| RP/RPT | Radiation Protection/ Radiation Protection Technician |
| RRC | Regional Response Center |
| RX | Reactor |
| S&L | State and Local |
| SAE | Site Area Emergency |
| SAM/SAMG | Severe Accident Management/ Severe Accident Management Guideline |
| SAS | Secondary Alarm Station |
| SBO | Station Blackout |
| SEG | Security Event Guideline |
| SFP | Spent Fuel Pool |
| SG | Steam Generator |
| SSS/P | Security Shift Supervisor/Personnel |
| TRM | Technical Requirements Manual |
| TSC | Technical Support Center |
| UHS | Ultimate Heat Sink |
| V | Volt |
| VA | Virginia |
| VEOC | Virginia Emergency Operations Center |
| VPAP | Virginia Power Administrative Procedure |

ATTACHMENT 2

**IMPLEMENTATION SCHEDULE
FOR STAFFING ANALYSIS RESULT ITEMS**

**VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2**

Implementation Schedule for Staffing Analysis Result Items
(provided for information only)

| Item | Staffing Analysis Result Items | Estimated Completion Date |
|-------------|--|----------------------------------|
| 1 | Develop FSG task training and incorporate in the applicable departmental training programs. | August 29, 2014 |
| 2 | Evaluate the staffing assessment using 1) the final approved versions of FSG procedures, 2) personnel formally trained on the FSG strategies and 3) the final approved on-shift communications equipment. | September 4, 2014 |
| 3 | Verify minimum shift qualifications for AOs (i.e., step levels to perform required tasks) to support FSG/EOP task assignments. | October 10, 2014 |
| 4 | Revise and resubmit the staffing assessment report, if required, after evaluation of the staffing assessment using the final approved versions of FSG procedures and the final approved on-shift communications equipment. | January 30, 2015 |