



## **Catawba Nuclear Station (CNS)**

# **NEI 12-01, Phase 1 - Staffing Assessment Report**

**Revision 0**

**(DRAFT of Revision 0, Dated: February 13, 2013)  
(Provided to the NRC for Public Meeting Comments)**

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## 1 INTRODUCTION

In response to the Fukushima Dai-Ichi accident, US Nuclear Regulatory Commission (NRC) issued a 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.

The information requests related to Emergency Preparedness (EP) are contained in Enclosure 5, "Recommendation 9.3: Emergency Preparedness" of this §50.54(f) Letter. Within this enclosure are two Requested Actions (Communications and Staffing). Both Requested Actions involve performance of an assessment. The action for the staffing assessment is summarized below:

*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 9.3.*

The requirements for an on-shift and augmented emergency response organization (ERO) are provided in 10 CFR 50.47(b) and 10 CFR 50 Appendix E.

§50.47(b)(1) states, in part:

*...each principal response organization has staff to respond and to augment its initial response on a continuous basis.*

§50.47(b)(2) states, in part:

*On-shift facility licensee responsibilities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available...*

§50 Appendix E.IV, Content of Emergency Plans, subsection A states, in part:

*The organization for coping with radiological emergencies shall be described, including definition of authorities, responsibilities, and duties of individuals assigned to the licensee's emergency organization and the means for notification of such individuals in the event of an emergency...*

The industry's phased approach was developed with recognition of 1) the higher priority placed upon the completion of licensee actions necessary to comply with the EP Rule promulgated in Federal Register Volume 76, Number 226; dated November 23, 2011; Pages 72560-72600; and 2) the dependency of certain assessment elements upon future definition of new response requirements associated with Fukushima NTTF Recommendation 4.2, as subsequently modified by the staff and issued as NRC Order EA-12-049.

A letter to Susan Perkins-Grew, dated May 15, 2012 from the US NRC states, in part:

*The staff has reviewed NEI-12-01, Revision 0, dated May 2012, and has found this guidance to be an acceptable method for licensees to employ when responding to the 10 CFR 50.54(f) letters regarding NTTF Recommendation 9.3.*

As part of the overall Emergency Preparedness rulemaking published in November of 2011, the Commission amended §50, Appendix E, Section IV.A, "Organization" to address concerns regarding the assignment of tasks or responsibilities to on-shift ERO personnel that would potentially overburden them and prevent the timely performance of their emergency plan functions. §50 Appendix E.IV subsection A.9 was added to state:

*By **December 24, 2012**, for nuclear power reactor licensees, a detailed analysis demonstrating that on-shift personnel assigned emergency plan implementation functions are not assigned responsibilities that would prevent the timely performance of their assigned functions as specified in the emergency plan.*

In conjunction with the new rule, the NRC issued, Interim Staff Guidance (ISG) NSIR/DPR-ISG-01. ISG Section IV.C provides specific detail on the criteria and acceptable methods for the conduct of the on-shift staffing analysis, including the endorsement of NEI 10-05. The NEI analysis methodology composed of the following:

- Identification of the on-shift ERO staffing and response time requirements.
- Identification of the site specific event scenarios described in the ISG.
- Documentation of an On-shift Staffing Analysis (OSA) for each event scenario.
- Documentation of a Time Motion Study (TMS), if deemed necessary.

While NSIR/DPR-ISG-01 and NEI 10-05 address a Station Blackout (SBO) affecting a single-unit site, and one unit on a multi-unit site, they do not consider the scenario of an extended loss of AC power affecting all units on a multi-unit site. Licensees of multi-unit sites should perform an assessment of this scenario using the assumptions listed in NEI 12-01 and the methodology provided in NEI 10-05. In particular, the assessment should determine the ability of the on-shift staff to implement Initial Phase coping actions and, consistent with the site access assumptions, any Transition Phase actions that must be performed prior to the end of the "no site access" time period.

NEI 12-01 Executive Summary states, in part:

*...A licensee should be able to provide the staffing necessary for responding to a beyond design basis external event affecting all units on a site. The number and composition of the response staff should be sufficient to implement mitigation strategies and repair actions intended to maintain or restore the functions of core cooling, containment, and spent fuel pool cooling for all affected units...*

Duke Energy proposed an alternative course of action from the §50.54(f) letters in B. C. Waldrep letter to U.S. Nuclear Regulatory Commission (NRC), "Duke Energy 60-Day Response to 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," dated May 9, 2012,

For multi-unit plants, the **NEI 12-01, Phase 1 staffing assessment** will be performed by March 29, 2013, and **provided to the NRC by April 30, 2013**. This NEI 12-01, Phase 1 assessment will consider all requested functions except those related to Fukushima NTF Recommendation 4.2. Staffing functions related to NTF Recommendation 4.2 will be considered in the NEI 12-01, Phase 2 staffing assessment.

This report for Catawba Nuclear Station (CNS) provides the NEI 12-01, Phase 1 staffing assessment, as requested by the §50.54(f) letter, conducted using the guidance in NEI 12-01 and material from NEI 10-05.

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## **2 ON-SHIFT STAFFING COMPLEMENT**

### **2.1 Shift Staffing Licensing Basis**

Revision 12-3 of the Catawba Nuclear Station Emergency Plan, dated December 2012, is established as the licensing basis for the on-shift staffing complement.

Only personnel required to be on-shift are credited in the staffing analysis. The on-shift personnel complement is limited to the minimum required number and composition as described in Figure B-1a of the Duke Energy CNS Emergency Plan, Revision 12-3, dated December 2012.

<b>Functional Area</b>	<b>Major Tasks</b>	<b>Emergency Positions</b>	<b>Analysis Shift Staffing</b>
1. Plant Operations and Assessment of Operational Aspects (a)	--	Unit Supervisor (SRO) CR Supervisor (SRO) Control Room Operator (RO) Non-Licensed Operator (NLO)	1 1 3 3
2. Emergency Direction and Control	Command and Control	Operations Shift Manager	1
3. Notification & Communication	Licensee	Operator (SRO/RO/NLO)	1 <sup>(b)</sup>
	Local/ State	Operator (SRO/RO/NLO)	1 <sup>(b)</sup>
	Federal	Operator (SRO/RO/NLO)	1 <sup>(b)</sup>
4. Radiological Assessment	Dose Assessment	RP Qualified Individual	1
	In-plant Surveys	RP Qualified Individual	1
	Onsite Surveys	RP Qualified Individual	1
	Chemistry	Chemistry Technician	1
5. Plant System Engineering, Repair, and Corrective Actions	Tech Support – OPs	Shift Technical Advisor	1
	– Core Damage	Shift Technical Advisor	1 <sup>(b)</sup>
	Repair and Corrective Actions	Mechanical Maintenance IAE Maintenance	1 2
6. In-Plant PAs	Radiation Protection (such as access control, job coverage and personnel monitoring)	RP Qualified Individual	2 <sup>(b)</sup>
7. Fire Fighting (c)	--	Fire Brigade Lead (RO/SRO/NLO) Fire Brigade Member (NLO) Fire Brigade Member (SPOC)	1 2 2 <sup>(b)</sup>
8. 1 <sup>st</sup> Aid and Rescue	--	MERT (d)	2
9. Site Access Control and Accountability	Security & Accountability	SAS Operator Security Personnel	1 (e)
<b>Minimum # of Personnel:</b>			<b>23</b>

(a) The Control Room staff complement is reflective of 2 Units in operation in accordance with §50.54(m).

(b) May be performed by an individual filling another position provided they are qualified to do the collateral function.

(c) The Fire Brigade requirement of five members is met by using three personnel from Operations (including the Fire Brigade Leader) and two personnel from SPOC (SLC 16.13-1).

(d) The Medical Emergency Response Team (MERT) can be filled by any qualified technician.

(e) Per Duke Energy CNS Security Plan.

### 3 BEYOND DESIGN BASIS EXTERNAL EVENT (BDBEE)

#### 3.1 General Assumptions and Limitations

##### 3.1.1 NEI 12-01 - Assumptions Common to Both Assessment (Staffing and Communications)

1. A large-scale external event occurs that results in:
  - a. all onsite units affected
  - b. extended loss of AC power
  - c. impeded access to the units
2. Initially, all on-site reactors are operating at full power and are successfully shut down.
3. A Hostile Action directed at the affected site does not occur during the period that the site is responding to the event.
4. The event impedes site access as follows:
  - a. Post event time: 6 hours - No site access. This duration reflects the time necessary to clear road way obstructions, use different travel routes, mobilize alternate transportation capabilities, etc.
  - 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.
  - 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.

Each licensee should identify transportation and site access-enhancing methods in accordance with Section 3.9 of NEI 12-01, and include this information in the response to Staffing Information Request #4. The Information Request #4 response should also include an overview discussion of how the identified methods will be implemented following a beyond design basis external event.

A staffing assessment may utilize a “no site access” end time of less than 6 hours and greater than or equal to 4 hours, if supported by a documented basis. This basis should include a discussion of the site-specific transportation-related resources and capabilities, and related supporting arrangements, which provide assurance that augmented staff would be available on the site starting at the time used in the assessment. These resources and capabilities could be provided by Company-internal, private or public sources (including vehicles and aircraft, such as helicopters from military and National Guard organizations). All arrangements with the anticipated service providers should be documented (e.g., Letter of Agreement, contract, etc.).

A staffing assessment may not utilize a “no site access” end time of less than 4 hours.

**3.1.2 NEI 12-01 - Assumptions for Staffing Assessment**

1. On-shift personnel are limited to the minimum complement allowed by the site emergency plan (i.e., the minimum required number for each required position). This would typically be the on-shift complement present during a backshift, weekend, or holiday.
2. The NEI 12-01, Phase 1 staffing assessment considered the applicable actions from the Station Blackout (SBO) coping strategies in place at the time of the assessment.
  - a. Such actions may 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.
  - b. These actions do not include those associated with cross-tying AC power sources or electrical distribution busses between units since all on-site units are experiencing an extended loss of AC power.

Following the accident at Fukushima Dai-Ichi, the Institute of Nuclear Power Operations (INPO) issued three Event Reports (referred to IERs) requiring the assessment and implementation of a range of actions intended to improve the capabilities for responding to a beyond design basis event and an extended loss of AC power, including events that impact the cooling of spent fuel. The staffing assessments performed in response to the NRC letter should include consideration of those IER improvement actions already implemented at the time of the assessment (e.g., incorporated into plant procedures).

Sites with existing strategies for responding to an extended loss of AC power affecting all on-site units should consider those actions in their NEI 12-01, Phase 1 staffing assessment.

**3.1.3 Other Assumptions for Staffing Assessment**

1. 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.

***Initial Phase*** - Implementation of strategies that generally rely upon installed plant equipment.

***Transition Phase*** - Implementation of strategies that involve the use of portable equipment and consumables to extend the coping period, and maintain or restore the functions of core cooling, containment, and spent fuel pool cooling.

2. Offsite facilities and staging areas are available.



3.1.4 NEI 10-05 - Applicable Assumptions to Support Methodology

1. On-shift personnel can report to their assigned response locations within timeframes sufficient to allow for performance of assigned actions. The following are the typical locations of the on shift personnel:
  - Operations Shift Manager..... Work Control Center
  - Shift Technical Advisor..... Work Control Center
  - Unit Supervisor ..... Work Control Center
  - Control Room Supervisor..... Control Room
  - U1 Control Room Operator (U1 CRO)..... Control Room
  - U2 Control Room Operator (U2 CRO)..... Control Room
  - Balance of Plant Operator (BOP) ..... Control Room
  - Non-Licensed Operator #1 ..... Break Room
  - Non-Licensed Operator #2..... Break Room
  - Non-Licensed Operator #3..... Break Room
  - Non-Licensed Operator #4 (Fire Brigade) ..... Break Room
  - Non-Licensed Operator #5 (Fire Brigade) ..... Break Room
  - Fire Brigade Leader (SRO or RO or NLO) ..... Break Room
  - RP Qualified Individual #1 ..... Auxiliary Building (RP Lab)
  - RP Qualified Individual #2..... Auxiliary Building (RP Lab)
  - RP Qualified Individual #3..... Auxiliary Building (RP Lab)
  - Chemistry Technician ..... Auxiliary Building
  - Mechanical Maintenance Technician – Fire Brigade ..... SPOC Area
  - IAE Technician #1 – Fire Brigade..... SPOC Area
  - IAE Technician #2..... SPOC Area
  - MERT #1 ..... PAP
  - MERT #2 ..... PAP
  - SAS Operator ..... SAS
2. 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 Radiation Protection Technician.
3. It is assumed that personnel assigned to the major response area of Plant Operations & Safe Shutdown meet the requirements and guidance established by NRC regulations. Staff performance within this area is not evaluated as part of this assessment, unless a role/function/task from another major response area is assigned as a collateral duty.

4. The on-site security organization is able to satisfactorily perform all tasks related to Site and Protected Area Access Controls, under all event or accident conditions. 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.
5. Individuals holding the position of radiation protection technician or chemistry technician are qualified to perform the range of tasks expected of their position.
6. 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 (ORO) or the NRC.
7. 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.
8. The analyzed event occur 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). The ERO augmentation time is based on the time of event declaration until the time of turnover of the function/responsibility. Specifically, any time needed by the augmenting ERO to acquire materials or prepare for turnover is accounted for. Facility activation includes the turnover of functions from the on shift staff  
  
For purposes of this analysis, 360 minutes will be used as the time period for the conduct of on-shift ERO response actions.

### **3.2 Scope/Sequence of Events**

#### **3.2.1 Beyond Design Basis External Event (BDBEE): Station Blackout (SBO)**

A large-scale external event occurs that results in:

- All on-site units affected
- Extended loss of AC power
- Impeded access to the units.

Initially, both on-site reactors are operating at full power and are successfully shut down.

The event consists of a loss of offsite power and a failure of all emergency AC power sources resulting in a Station Blackout (Loss of all AC power). All of the emergency diesel generators (EDGs) experience a catastrophic failure, resulting in a complete loss of all AC power.

Both units experience the extended loss of AC power; there is no "unaffected" unit.

The BDBEE occurs such that restoration of any AC power source is not possible before the arrival of the augmented ERO personnel. (e.g., 360 minutes)

The event results in a Site Area Emergency based on EAL 4.5.S.1.

**3.2.2 Severe Accident Management Guideline (SAMG)**

The BDBEE did not result in the conditions necessary for entry into SAMG space during the on-shift staffing analysis.

All licensed operators receive SAMG Decision Maker Training immediately after completion of ILT and classroom training on the two Control Room guidelines every two years as part of requalification.

The BDBEE did not result in entry conditions into SAMG procedures prior to the ERO augmentation. Entry conditions into SAMG procedures are not expected to occur until after the augmenting ERO has responded. CNS SACRG-1 entry conditions are as follows:

- EP/1/A/5000/ECA-0.0, Loss of All AC Power, when core exit T/Cs are greater than 1200°F and actions to cool the core are unsuccessful
- EP/1/A/5000/FR-S.1, Response To Nuclear Power Generation/ATWS when core exit T/Cs are greater than 1200°F and actions to cool the core are unsuccessful
- EP/1/A/5000/FR-C.1, Response To Inadequate Core Cooling, when core exit T/Cs are greater than 1200°F and actions to cool the core are unsuccessful
- EP/1/A/5000/ECA-1.3 (Containment Sump Blockage), Step 48, when core exit T/Cs are greater than 1200°F.

It is therefore concluded that the on shift ERO would not be called upon to perform SAMG functions and activities for the event analyzed for this report prior to the assistance of the greater ERO in the emergency facilities being available.

### 3.3 Procedures Identified

**Table 3-1: Procedures Identified in the Task Analysis**

	Analysis Event: BDSEE: SBO
EM/1/A/5200/003 - Troubleshooting Cause for a Diesel Generator Failing to Start	X
EM/2/A/5200/003 - Troubleshooting Cause for a Diesel Generator Failing to Start	X
EP/1/A/5000/E-0 - Reactor Trip or Safety Injection	X
EP/2/A/5000/E-0 - Reactor Trip or Safety Injection	X
EP/1/A/5000/ECA-0.0 - Loss of All AC Power	X
EP/2/A/5000/ECA-0.0 - Loss of All AC Power	X
RP/0/A/5000/001- Classification of Emergency	X
RP/0/A/5000/004 - Site Area Emergency	X
RP/0/A/5000/006A - Notifications to States and Counties from the Control Room	X
RP/0/A/5000/010 - Conducting a Site Assembly or Preparing the Site for an Evacuation	X
RP/0/B/5000/013 - NRC Notification Requirements	X
SD 28 - Security Staff Position Specific Guide	X
SOMP 1-4 - Conduct of Operations	X

#### 4 ON-SHIFT STAFFING TASK ANALYSIS RESULTS

Refer to Attachment 2, Parallel NEI 10-05 Appendix B On-Shift Staffing Analysis Results Tables, for additional documentation of the on-shift staffing task analysis results.

##### 4.1 Non-Validated Task Analysis Results

Parallel NEI 10-05 Table 5 – Emergency Plan Implementation task analysis controlling methods are correlated with the site specific JPM and performance objective references in Attachment 1.

The task analysis did not identify any non-validated tasks that were performed by the on-shift positions.

##### 4.2 Potential Task Overlap Requiring Time Motion Study

Table 4-1 summarizes the results of the potential overlaps identified in the task analysis.

The task analysis identified two (2) on-shift positions that may experience task overlap:

- 1) The BOP experiences potential overlap for tasks:
  - (5/9) *Perform State/local notifications*
  - (5/16) *Perform site assembly announcements*
- 2) The NLO #4 experiences potential overlap for tasks:
  - (5/9) *Perform State/local notifications*

**Table 4-1: Task Analysis Summary**

Line	On-shift Position	Role in Table # / Line#
<b>Analysis Event – Beyond Design Basis External Event (BDBEE): Station Blackout (SBO)</b>		
7	BOP	2 / 7 Direct in-plant operations <b>5 / 9 Perform State/local notifications</b> <b>5 / 16 Perform site assembly announcements</b>
11	NLO #4	2 / 11 In-plant/local operations <b>5 / 9 Perform State/local notifications</b>

Note: Orange text indicates potential task overlap.

##### 4.3 BDBEE: SBO: Task Analysis Summary

Based on the results of the task analysis, the following on-shift positions were identified as meeting the requirements for further analysis under the NEI 10-05 time motion study for this event:

1. The BOP performs tasks:
  - (5/9) *Perform State/local notification and*
  - (5/16) *Perform site assembly announcements every five minutes while accountability is in progress, which takes 30 minutes.*

Per Table 3.1 of NEI 10-05, operations positions that perform table 2 tasks and this EP task are required to have the collective performance of those tasks analyzed and validated by a time motion study.

2. The NLO #4 performs task (5/9) *Perform State/local notification*.

Per Table 3.1 of NEI 10-05, operations positions that perform table 2 tasks and these EP tasks are required to have the collective performance of those tasks analyzed and validated by a time motion study.

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## 5 **ON-SHIFT STAFFING TIME MOTION STUDY**

Refer to Attachment 3, Parallel NEI 10-05 Appendix D & E On-Shift Staffing Analysis Results Tables, for additional documentation of the on-shift staffing time motion study results.

### 5.1 **Confirmed Task Overlaps**

The time motion study identified one (1) on-shift positions that experienced task overlap:

- 1) Shift Technical Advisor

Overlap occurred in the following tasks:

Task (5/9) Perform State/local Notifications – This task was performed by the Shift Technical Advisor when a communicator was not available during the Beyond Design Bases External Event (BDBEE) for the initial State/local Notification and the first follow-up State/local Notifications. The Shift Technical Advisor (STA) is responsible for observation and oversight of the event and response actions taking place. The performance of administrative tasks that are not compatible with or do not enhance the oversight function are distractions and considered overlaps. This task is evaluated as an overlap.

### 5.2 **Resolved Task Overlaps**

Task (5/9) Perform State/local notification – Time motion study determined that this task did not result in an overlap for NLO#4 observed during the event. NLO#4 was capable of performing and completing assigned operations tasks prior to performing the State and local notifications. Performance of the tasks was sequential with no delay in timing.

Task (5/16) Perform site assembly announcements – Time motion study determined that this task did not result in an overlap for the BOP observed during the event. The BOP was capable of performing and completing assigned operations tasks prior to performing site assembly announcements. Performance of the tasks was sequential with no delay in timing.

### 5.3 **Compensatory and Corrective Actions**

The following has been entered into the Corrective Action Program (CAP) system to document the analysis and strategies associated with relieving the task overlap as identified in this analysis report for a beyond design basis external event:

- 1) Task (5/9) Perform State/local Notifications – PIP C-13-XXXX

#### 5.4 **BDBEE: SBO: Time Motion Study Summary**

- A. Time motion study results for potential overlaps identified in the task analysis are as follows:

##### 1. **Balance of Plant Operator (BOP)**

Task (5/9) Perform State/local Notifications: Task analysis indicated that the BOP was assigned initial and follow-up State and local notifications during the event. Time motion study determined that the BOP was unavailable and the STA performed the initial and first follow-up State/local Notification during the event. Refer to the STA in section B for the overlap evaluation of this task.

Task (5/16) Perform Site Assembly Announcements: Time motion study determined that this task did not result in an overlap with task (2/7) *Direct in-plant operations*, as the BOP was capable of performing and completing assigned operations tasks prior to performing site assembly announcements. Performing site assembly announcements, although repetitive for 30 minutes, is a brief action. Performance of the tasks was sequential with no delay in timing.

##### 2. **NLO #4**

Task (5/9) Perform State/Local Notifications: Time motion study determined that this task did not result in an overlap with task (2/11) *In-plant/local operations*. NLO#4 was capable of performing and completing assigned operations tasks prior to performing the State and local notifications. Performance of the tasks was sequential with no delay in timing.

- B. Time motion study results for potential overlaps not identified in the task analysis are as follows:

##### 1. **STA**

Task (5/9) Perform State/local Notifications – This task was performed by the Shift Technical Advisor when a communicator was not available during the Beyond Design Bases External Event (BDBEE) for the initial and first follow-up State/local Notifications. The STA is responsible for observation and oversight of the event and response actions taking place. The performance of administrative tasks that are not compatible with or do not enhance the oversight function are distractions and considered overlaps.

##### 2. **NLOs: (#1, #2, and #4)**

Task (2/8-12) In-plant/local operations – These tasks were generally performed when the procedure step directed action from a NLO with no delay in timing. However, there were four (4) occasions during the time motion study when a step directed action and a NLO was not immediately available to perform the action. These steps were performed by the next available NLO. The four (4) delays were as follows:

- NEO#1: 2 minute delay from procedure step to ensure 1EMSX-F03E (Reactor Vessel Head Vent Motor) - Closed
- NEO#4 : 3 minutes delay from procedure step to close steam generator isolation valves.



- NEO#2: 13 minutes delay from procedure step to open breakers for large non-vital DC loads to be Shed During Loss of All AC Power.
- NEO #2: 30 minutes delay to close outside containment isolation valves. These valves are not designated as Design Basis Time Critical, but Probabilistic Risk Assessment (PRA) does classify them as a medium response time. During this scenario there was no loss of core cooling nor was there core damage. Therefore, this delay was not significant for this scenario.

None of these delays significantly impacted the functions of core cooling, containment, or spent fuel pool cooling; the actions were not related to "time critical tasks;" and all actions were performed in an effective and timely manner, consistent with applicable regulatory requirements and station commitments with the exception of those four (4) tasks disclosed above.

## **6 AUGMENTED ERO STAFFING ASSESSMENT**

The augmented ERO staffing was assessed from 6 hours to 24 hours with respect to the assumptions listed in Section 3 of this report:

- 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.
- Post event time: 6 to 24 hours - Limited site access.

### **6.1 Augmented ERO - General Response**

#### **6.1.1 CNS Minimum Augmented ERO Staffing Requirements for Emergencies**

**Table 6-1: CNS Minimum Augmented ERO Staffing Requirements for Emergencies**

Major Functional Area	Major Task	Position, Title or Expertise	Capability for Additions	
			45 Min.	75 Min.
Emergency Direction and Control (Emergency Coordinator)		TSC Emergency Coordinator		1
Notification/Communication	Notify Company Personnel, State, County, Federal Agencies and Maintain Communication	Off-Site Agency Communicator		2
Emergency Operations Facility (EOF) Radiological Accident Assessment and Support	EOF Director Dose Assessment Plant Status Access Control Communications Off-Site Surveys	Senior Manager Radiological Assessment Manager Accident Assessment Manager Electronic Card Reader Off-Site Agency Communicators FMT Members (2 Teams)		1 1 1*** # 2 4*****
Radiological Support and Protective Actions	RP Coverage for Repair/Corrective Actions, Access Control, Search & Rescue, Radiochemistry, Contaminated Injury Medical Response, Personnel Monitoring, Dosimetry, Firefighting	RP Qualified Individuals		6
	Out of Plant Surveys		1	1
	In-Plant Surveys		1	1
	Dose Assessment	Off-Site Dose Assessor		1 (TSC)
	Chem/Radwaste Operations	Radwaste Operator		1
Plant System Engineering, Repair and Corrective Actions	Technical Support	Core/Thermal Hydraulics Electrical Mechanical		1*** 1 1
	Repair and Corrective Actions	Mechanical Maint. Tech. IAE Technician		1 2
Firefighting		Fire Brigade		****
Rescue Operations and First Aid		MERT		****

**Table 6-1 (Continued): CNS Minimum Augmented ERO Staffing Requirements for Emergencies**

The 75 minute clock begins at the time of the initial Emergency Classification. The Technical Support Center (TSC)/ Operations Support Center (OSC) are required to be activated within the same time. The EOF must be operational within 75 minutes of the Emergency Declaration. All facilities are required to be activated at an Alert or Higher Classification.

\*\*\* The TSC Reactor Engineer and the Accident Assessment Manager in the EOF will provide additional support in the area of core thermal hydraulics within 75 minutes.

\*\*\*\* Augmentation in these areas is provided by local support. The local support agencies respond in accordance with existing letters of agreement. Response is expected to occur similar to any other industrial facility.

\*\*\*\*\* The Field Monitoring Teams (FMT) will initially report to the Operations Support Center (OSC). If needed, the Field Monitoring Teams will be dispatched from the Operations Support Center (OSC). Once the Emergency Operations Facility (EOF) Field Monitoring Coordinator is ready he/she will assume control of the Field Monitoring Teams. An FMT consists of one RP qualified individual and one vehicle driver

# An electronic card reader in conjunction with a posted building security officer fulfills the function for controlling access to the EOF during emergencies.

#### 6.1.2 Notification of the Emergency Response Organization (ERO)

According to NEI 12-01, *to promote timely staff augmentation by the ERO, licensees should verify the following:*

- *ERO members can be notified of the emergency using a method that would be operable under the assumed event conditions (e.g., satellite pagers), AND/OR*
- *ERO members are trained to automatically respond to their assigned facilities or a designated staging area when made aware of an area wide loss-of-grid (e.g., by direct observation, media reports, word-of-mouth, etc.).*

Per the 90 day response:

Duke Energy will evaluate how to best utilize the Nuclear Callout System and other means of notifying the ERO during beyond design basis events that result in degraded communications capabilities. Once the alternate means of notification have been thoroughly evaluated, Duke Energy will ensure the development of, and changes to, appropriate response procedures and guidelines and train the ERO.

Evaluation:

A natural disaster or any emergency event rendering CNS offsite communications totally inoperable or unusable would also render the pager system and the nuclear call out system inoperable or unusable. Using the 25 mile radius as a benchmark the paging system relaying towers, the main transmitter located on College Street and the backup transmitter located at MNS would be inoperable. Personnel living within the 25 mile radius most likely would have lost telephone landline capability. Cell phone towers within the 25 mile radius should also be considered inoperable. The most reliable method to activate the CNS ERO would be the "CNS ERO Self-Activation Guidelines" in which members of the CNS ERO staff understand the process of self activation.

Using information from Harris Nuclear Plant, the following guideline was developed;

##### **CNS ERO Self Activation Guidelines**

In the event a natural disaster or any other event that would render the ERO notification system inoperable at CNS, it is the expectation that ERO members would self activate.

If an event occurred on site at CNS and you would be expecting an electronic ERO activation that did not occur, then perform the following checklist:

1. Is your family safe?
2. Is your home safe and stable?
3. Can you leave your family and home in a safe condition?
4. Can you safely travel?
5. IF answers to the first four questions are yes, proceed to safely travel to CNS or a designated alternate response location to perform ERO duties.

This guideline has been provided to the ERO members as follows:

1. CNS Nuclear System Directive (NSD) 117 "Emergency Response Organization Staffing, Training, and Responsibilities" (Section 4.4)
2. CNS News Letter
3. Email to CNS ERO members

4. Electronic Read training for the Duke Energy fleet was sent to all ERO members to emphasize "ERO Self Activation."
5. To be considered: Develop a Computer Based Training (CBT) for present and new CNS ERO members. This CBT would be used as annual refresher training and serve as initial training for future ERO members.

**6.1.3 Mobilization of Expanded Response Capability Staffing:**

Per the assumptions in NEI 12-01:

*The event impedes site access as follows:*

*Post event time: 6 hours - No site access. This duration reflects the time necessary to clear roadway obstructions, use different travel routes, mobilize alternate transportation capabilities (e.g., private resource providers or public sector support), etc.*

**Table 6-2: CNS Access Routes**

<b>Catawba Nuclear Station (CNS) Unit Nos. 1 and 2</b>	
<b>Method</b>	<b>Description</b>
Roadway	There are only two directions by roads into the CNS: <ul style="list-style-type: none"> <li>• Take 274 North from Newport then right onto Concord Rd and left into CNS.</li> <li>• Take 49 South from Charlotte through Lake Wylie to SC 274, then turn left the left onto Concord Rd and left into CNS.</li> </ul>
Air	Access to CNS can be provided from staging areas and a landing zone via helicopters arranged for by Duke Energy.
Water	CNS can also be accessed from Lake Wylie on the North East. Lake Wylie can be accessed from multiple roadways. Access to CNS can be through personal watercraft or watercraft arranged for by Duke Energy.
Rail	CNS can be accessed via an inactive rail line arranged for by Duke Energy. (Would take time to access this way)

Per the CNS 90 day response,

In the event of a large scale external event impacting a Duke Energy site (the "affected site"), the offsite infrastructure supporting communications systems within a twenty-five mile area surrounding the affected site is assumed to be nonfunctional. However, the satellite phones are assumed to remain functional. Furthermore, it is assumed that onsite communication devices and the offsite infrastructure supporting communications systems at Duke Energy sites located beyond the twenty-five mile impact area (the "unaffected sites") are not significantly impacted by the event given that all three Duke Energy sites are separated by more than twenty-five miles in all directions.

The normal pager system is the primary means for notification of the Emergency Response Organization (ERO). The normal pager system has its primary equipment hub in Charlotte, North Carolina, and a backup equipment hub at

McGuire which is located in Huntersville, North Carolina. Since the primary and backup hubs are located within twenty-five miles of McGuire, the normal paging system is not expected to be available for beyond design basis events that impact McGuire. However, the ERO could be notified using the Nuclear Callout System. The Nuclear Callout System is wholly contained at the site of the vendor who provides this service. The vendor site is located greater than twenty-five miles from any Duke Energy site. Use of the normal pager system and the Nuclear Callout System are proceduralized and periodically activated during drills and exercises to demonstrate proficiency.

Duke Energy is currently evaluating how to best utilize the Nuclear Callout System to notify the ERO during beyond design basis events that result in degraded communications capabilities. In addition, Duke Energy plans to train ERO members to automatically respond to their assigned facilities or a designated staging area when made aware of an area wide loss-of-grid (e.g., by direct observation, media reports, word-of-mouth, etc.). Once the alternate means of notification have been thoroughly evaluated, Duke Energy will ensure the development of, and changes to, appropriate response procedures and guidelines and train the ERO. These actions are expected to be completed by November 30, 2012.

Per PIP C-12-4953 CA#10:

In the event of a natural or any other type disaster that renders roads and passage ways unusable, a plan is purposed to air lift Catawba Nuclear Station essential staff from two preplanned landing zones. The Northern landing zone would be the Duke Energy Shelby Operations Center. The South West landing zone would be the Duke Energy Chester Operations Center. The two landing zones are Duke Energy properties and can provide shelter, communications and storage capacity for necessary gear. The Helicopter provider will be under a contract or agreement letter to provide support.

In the event of a natural or any other type disaster that affects the CNS site the ERO members and other essential personnel are expected to self activate the ERO and not rely upon the nuclear call out system or beepers. IF the disaster renders roads and passage ways unusable, ERO members and other essential personnel are to assemble at either Duke Energy 'Shelby Operations Center' or Duke Energy 'Chester Operations Center' where they could be transported to the CNS site. Personnel arriving at these facilities would setup and maintain communications with the plant, and transportation resources, and/or essential personnel until relieved. IF these personnel cannot reach these facilities, they should travel outward away from the center of the disaster where phone service is available then call one of these facilities and provide information of their location so they could possibly be picked up by their designated transportation. Essential Personnel would require training on this plan

CNS has evaluated the need for written agreements with companies that would be available and have the necessary resources to provide transportation for ERO members to CNS in the event the roads were impassable. Companies with the necessary resources to provide transportation for ERO members to CNS in the event the roads were impassable were identified.

PIP C-12-04953 CA # 12:

Establish written agreements with helicopter resource provider(s) to help facilitate timely staff augmentation during beyond design basis events that impede normal site access.

Therefore, it is reasonable to assume that augmented ERO resources will be available at six (6) hours post event time.

#### 6.1.4 Work Areas For Personnel Performing Expanded Response Functions

CNS should identify additional work areas necessary for the performance of expanded response functions. The use of alternate emergency response facilities should be considered. **(Enhancement)**

### 6.2 Augmented ERO - Position Specific Response

#### 6.2.1 On-Site Radiation Protection Technicians

Following a beyond design basis external event, on-site Radiation Protection (RP) Technicians should be available in sufficient numbers to support performance of assigned emergency plan functions and the expanded response capability. CNS currently has an Enterprise Agreement for resource sharing, and the Duty Manager is tasked by procedure to acquire the required resources. The equation in NEI 12-01 Section 3.5.1 should be used to determine the required number of on-site RP Technicians (RPTs) for a BDBEE.

The equation in NEI 12-01, Section 3.5.1 is as follows:

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

Where:

$RPT_T$  = Total required number of on-site RP Technicians

$RPT_{COP}$  = Number needed to support implementation of any 2 extended loss of AC power coping 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.

In the event of fuel damage, prevailing dose rates would likely require that the site's RP Technician complement be augmented with technicians from outside sources. CNS should verify that provisions exist for obtaining additional RP Technicians (e.g., from other fleet or alliance sites, INPO emergency resources manual, contracted service providers). **(Enhancement)**

### 6.2.2 Administrative Support Personnel

CNS should determine if current assignments and locations of administrative support personnel are adequate for implementation of the expanded response capability, and should identify necessary changes. **(Enhancement)**

## 6.3 Augmented ERO - Expanded Response Functions

### 6.3.1 Expanded Response Capability for Responding to a Multi-Unit Event

A typical augmented ERO for a multi-unit site would be challenged to effectively respond to a beyond design basis external event that resulted in an extended loss of AC power affecting more than one unit. In an event of this magnitude, it would be necessary to “expand” the capability of the augmented ERO in order to facilitate timely and effective performance of critical emergency response functions. The focus of this “expanded response capability” at CNS should be to enable the performance of unit-specific accident assessment and mitigation functions.

To be effective, the expanded response capability at CNS should encompass those functions necessary for preventing damage to irradiated fuel, or if such damage occurs, minimizing radiological releases. Selected functions must directly support the assessment and implementation of a range of mitigation strategies intended to maintain or restore the functions of core cooling, containment, and spent fuel pool cooling.

NEI 12-01, Tables 3.1 and 3.2 list the emergency response functions identified by the NEI Beyond Design Basis Event Response Staffing Study Task Force as meeting these requirements.

NEI 12-01, Tables 3.1 and 3.2 (Table 6-3 and Table 6-4, respectively) further provide key roles and staffing considerations for each expanded response function and specifies the staffing necessary to support the simultaneous deployment of emergency repair and corrective action teams to each affected unit.

The personnel required for implementation of strategies for a Beyond Design Basis External Event (BDBEE) may vary depending upon several factors. However, the process should facilitate a flexible response strategy that can be applied in a graded approach by the ERO personnel on a unit/priority specific basis (i.e., the extent/type of BDBEE and associated event challenges would correspond to the expansion/contraction of the expanded ERO and the assignment of unit specific expanded ERO response functions and unit specific resources).



**Table 6-3: Expanded ERO Response Functions (NEI 12-01, Phase 1)**

<b>Expanded Response Function</b>	<b>Typical Location</b>	<b>Key Roles and Considerations</b>
Unit Response Coordination	TSC	<ul style="list-style-type: none"> <li>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.</li> <li>One individual per unit; individuals should not be assigned other functions.</li> </ul>
Operations Coordination	TSC	<ul style="list-style-type: none"> <li>Provides coordination of Operations staff and support for an assigned unit.</li> <li>One individual per unit; individuals should not be assigned other functions.</li> </ul>
Maintenance Coordination	TSC or OSC	<ul style="list-style-type: none"> <li>Provides coordination of Maintenance staff and support for an assigned unit.</li> <li>One individual per unit; individuals should not be assigned other functions.</li> </ul>
Engineering Coordination	TSC or EOF	<ul style="list-style-type: none"> <li>Provides coordination of Engineering staff and support for an assigned unit.</li> <li>One individual per unit; individuals should not be assigned other functions.</li> </ul>
Engineering Assessments	TSC or EOF	<ul style="list-style-type: none"> <li>One team for each unit to perform engineering assessments in support repair and corrective actions.</li> <li>Team composition (i.e., number and represented disciplines) as described in the emergency plan.</li> <li>Team may include personnel responsible for performing other functions for the same assigned unit.</li> </ul>
Evaluation of Severe Accident Management (SAM) Strategies	TSC or EOF	<ul style="list-style-type: none"> <li>One team for each unit to evaluate selection of SAM strategies; team performs evaluations not done by Control Room personnel.</li> <li>Team composition (i.e., number and represented disciplines) as described in governing site programs, procedures and guidelines.</li> <li>Team may include personnel responsible for performing other functions for the same assigned unit.</li> </ul>
Unit In-Plant Team Coordination	OSC	<ul style="list-style-type: none"> <li>Overall cognizance of on-site and in-plant teams performing or supporting repair and corrective actions for an assigned unit.</li> <li>One individual per unit; individuals should not be assigned other functions.</li> </ul>
Non-Licensed Operators	OSC	<ul style="list-style-type: none"> <li>Two individuals per unit to assist with implementation of repair and corrective actions.</li> <li>Should not include members of the on-shift staff.</li> </ul>
Mechanical Maintenance Repair and Corrective Action	OSC	<ul style="list-style-type: none"> <li>Two individuals per unit to implement repair and corrective actions.</li> <li>Staffing may include an on-shift individual (i.e., 2 individuals for a unit composed of 1 on-shift and 1 augmented).</li> </ul>
Electrical Maintenance Repair and Corrective Action	OSC	<ul style="list-style-type: none"> <li>Two individuals per unit to implement repair and corrective actions.</li> <li>Staffing may include an on-shift individual (i.e., 2 individuals for a unit composed of 1 on-shift and 1 augmented).</li> </ul>
I&C Repair and Corrective Action	OSC	<ul style="list-style-type: none"> <li>Two individuals per unit to implement repair and corrective actions.</li> <li>Staffing may include an on-shift individual (i.e., 2 individuals for a unit composed of 1 on-shift and 1 augmented).</li> </ul>
Implementation of SAM Strategies	OSC	<ul style="list-style-type: none"> <li>Number and composition of personnel capable of simultaneous implementation of any 2 SAM strategies at each unit.</li> <li>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 Transition Phase coping strategies.</li> </ul>

**Table 6-4: Expanded ERO Response Functions (NEI 12-01, Phase 2)**

Expanded Response Function	Typical Location	Key Roles and Considerations
Evaluation of Transition Phase Coping Strategies	TSC or EOF	<ul style="list-style-type: none"> <li>One team for each unit to evaluate selection of Transition Coping strategies; team performs evaluations not done by Control Room personnel.</li> <li>Team composition (i.e., number and represented disciplines) as described in governing site programs, procedures, and guidelines.</li> <li>Team may include personnel responsible for performing other functions for the same assigned unit.</li> </ul>
Implementation of Transition Phase Coping Strategies	OSC	<ul style="list-style-type: none"> <li>Number and composition of personnel capable of simultaneous implementation of any 2 Transition Phase coping strategies at each unit.</li> <li>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.</li> </ul>

### 6.3.2 Staffing for Expanded Response Functions

According to NEI 12-01:

*A licensee should ensure the availability of a sufficient number of personnel to perform expanded response functions. This may be done in several ways, including:*

- Assign responsibilities to existing ERO positions. Per NRC Letter staffing information request #1, the potential impacts from the assignment of new collateral duties should be assessed.*
- Establish provisions for calling out additional individuals from the existing augmented ERO staff (e.g., calling out 2 engineering teams at a 2-unit site).*
- Select and qualify additional personnel. Sources of additional staffing include site, corporate or contracted personnel. Site Security Department resources may also be considered.*
- Consider the application of remote data access, meeting and other communications technologies to support the availability of required staffing.*

*Personnel identified by the staffing assessment as necessary for performing a planned or expected response action (e.g., an action described in a procedure or guideline) should be provided with appropriate training. Licensees should consider the applicability of the training requirements specified in 10 CFR 50, Appendix E, and related guidance.*

Per Nuclear System Directive (NSD) 117, " Emergency Response Organization Staffing, Training, and Responsibilities:"

*For actual emergencies and after hours augmentation drills, all ERO personnel not on duty are expected to report to their respective facility if fit for duty and if it does not present a hardship.*

CNS conducts an "all-call, all-come" augmented ERO system that consists of five rotating teams. These existing teams consist of CNS Minimum Augmented ERO Staffing listed in Table 6-1 and found in the CNS Emergency Plan Figure B-1b and would provide the depth of personnel to fill the Expanded ERO Response Functions.

#### 6.3.3 Activating an Expanded Response Capability

In accordance with the assumptions, an expanded response capability will be needed following a beyond design basis external event that results in an extended loss of AC power affecting multiple units on a site. CNS should develop an implementing strategy to integrate the expanded response capability into existing augmented ERO (i.e., put in place the ability to transition to unit-specific performance of expanded response functions).

Suggested criteria for requiring activation of an expanded response capability would include:

- Loss of ALL offsite and ALL on-site power sources to AC emergency busses at more than 1 unit, OR
- Plant parameters or conditions require implementation of SAM strategies for more than 1 unit.

This staffing will promote timely evaluation of accident conditions and mitigation strategies, and facilitate subsequent performance of mitigation actions, for each affected unit. Furthermore, the availability of this staffing will promote timelier restoration of installed plant safety systems to service and facilitate implementation of component modifications necessary to utilize equipment brought-in from offsite locations.

This process should facilitate a flexible response strategy that can be applied in a graded approach by the ERO personnel on a unit/priority specific basis (i.e., the extent/type of BDBEE and associated event challenges would correspond to the expansion/contraction of the expanded ERO and the assignment of unit specific expanded ERO response functions and unit specific resources). Such a strategy would include decision-making criteria for initiating the actions necessary to ensure timely performance of expanded response functions. The expanded response strategy should be contained in a controlled document not subject to §50.54(q) with appropriate training provided to ERO members prior to implementing. **(Enhancement)**

#### 6.3.4 On-site Staff's Ability to Move Back-up Equipment

US Nuclear Regulatory Commission (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 REQUESTED INFORMATION states in part:

*The following functions are requested to be assessed:*

- *How onsite staff will move back-up equipment (e.g., pumps, generators) from alternate onsite storage facilities to repair locations at each reactor as described in the Order regarding the NTIF Recommendation 4.2. It is requested that consideration be given to the major functional areas of NUREG-0654, Table 8-1, such as plant operations and assessment of operational aspects, emergency direction and control, notification/communication, radiological accident assessment, and support of operational accident assessment, as appropriate.*

This question cannot be addressed at this time; CNS will respond to this question as part of the NEI 12-01, Phase 2 staffing assessment.

## 7 NEI 12-01, PHASE 1 - STAFFING ASSESSMENT SUMMARY

Per NEI 12-01 guidance, the on-shift personnel limited to the minimum complement allowed by the site emergency plan performed all primary coping actions required by operating and emergency plan procedures during the "6 hour - No site access" period relying only on installed structures, systems and components available during the initial phase of the response.

Plant conditions did not require any secondary coping actions related to the NEI 12-01 Transition/Final Phases or Contingency Phase during the "6 hour - No site access" period.

***Transition/Final Phases*** - Implementation of strategies that involve the use of portable equipment and consumables to extend the coping period, and maintain or restore the functions of core cooling, containment, and spent fuel pool cooling.

***Contingency Phase*** - In the event that coping actions are not successful, implementation of strategies intended to arrest incipient or ongoing fuel damage, protect containment, and minimize radiological releases.

The Shift Technical Advisor performed State/local Notifications when a communicator was not available during the Beyond Design Bases External Event (BDBEE) for the initial and first follow-up State/local Notifications. The STA is responsible for observation and oversight of the event and response actions taking place. The performance of administrative tasks that are not compatible with or do not enhance the oversight function are distractions and considered overlaps.

In-plant/local operations of NLOs were generally performed when the procedure step directed action from a NLO with no delay in timing. However, there were four (4) occasions during the time motion study when a step directed action and a NLO was not immediately available to perform the action. These steps were performed by the next available NLO. The four (4) delays were 2 minutes, 3 minutes, 13 minutes, and 30 minutes in duration. None of these delays significantly impacted the functions of core cooling, containment, or spent fuel pool cooling; the actions were not related to "time critical tasks;" and all actions were performed in an effective and timely manner, consistent with applicable regulatory requirements and station commitments with the exception of those tasks disclosed above.

All other duty assignments were determined to be acceptable, i.e., all actions can be performed in an effective and timely manner, consistent with applicable regulatory requirements and station commitments, until relieved by the augmenting ERO staff. No overlaps, conflicts, or delay in timing were identified, with exception to those already mentioned, during the analysis of tasks required to be performed by onsite operations and support personnel in response to a Beyond Design Basis External Event: Station Blackout.

**8 Duke Energy - CNS Enhancements**

	<b>CNS Enhancements</b>	<b>Completion Date</b>
<b>1</b>	Identify additional work areas necessary for the performance of expanded response functions.	<b>TBD</b>
<b>2</b>	Verify that provisions exist for obtaining additional Radiation Protection (RP) Technicians (e.g., from other fleet or alliance sites, INPO emergency resources manual, contracted service providers) in sufficient numbers to support performance of assigned emergency plan functions and the expanded response capability.	<b>TBD</b>
<b>3</b>	Determine if current assignments and locations of administrative support personnel are adequate for implementation of the expanded response capability, and identify necessary changes.	<b>TBD</b>
<b>4</b>	Develop and implement a process to integrate the expanded response capability into existing augmented ERO (i.e., put in place the ability to transition to unit-specific performance of expanded response function).	<b>TBD</b>

**9 LIST OF REFERENCES**

- 9.1** E. J. Leeds (NRC) and M. R. Johnson, (NRC) letter to All Power Reactor Licensees and Holders of Construction Permits in Active or Deferred Status, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendation 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. (ML12053A340)
- 9.2** B. C. Waldrep letter to U.S. Nuclear Regulatory Commission (NRC), " Duke Energy 60-Day Response to 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," dated May 9, 2012. (ML12132A377)
- 9.3** B. C. Waldrep letter to U.S. Nuclear Regulatory Commission (NRC), Duke Energy 90-Day Response "Emergency Preparedness Information Requested by 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," dated June 8, 2012. (ML12164A389)
- 9.4** D. L. Skeen (NRR) letter 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 2012." dated May 15, 2012.
- 9.5** 10 CFR 50.47(b)(2)
- 9.6** 10 CFR 50 Appendix E Section IV.A.9
- 9.7** NSIR/DPR-ISG-01, Interim Staff Guidance – Emergency Planning for Nuclear Power Plants, Rev. 0, dated November 2011.
- 9.8** NEI 10-05, Assessment of On-Shift Emergency Response Organization Staffing and Capabilities, Rev 0, dated June 2011.
- 9.9** NEI 12-01, Guideline for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities, Rev 0, dated May 2012.
- 9.10** NRC staff report entitled, "Recommendations for Enhancing Reactor Safety in the 21st Century," dated July 12, 2011. (ML111861807)
- 9.11** CNS Emergency Plan Rev 12-3, Effective December, 2012.
- 9.12** CNS SLC 16.13-1, Fire Brigade
- 9.13** CNS SLC 16.13-4, Minimum Station Staffing Requirements
- 9.14** CNS Tech Specifications, Section 5.2, Organization, Amendment Nos. 253/248.
- 9.15** SOMP 1-4, Conduct of Operations
- 9.16** SLC 16.13-4, Minimum Station Staffing Requirements

- 9.17** EG/1/A/CSAM/SACRG1, Severe Accident Control Room Guideline Initial Response
- 9.18** EG/2/A/CSAM/SACRG1, Severe Accident Control Room Guideline Initial Response
- 9.19** EM/1/A/5200/003, Troubleshooting Cause for a Diesel Generator Failing to Start
- 9.20** EM/2/A/5200/003, Troubleshooting Cause for a Diesel Generator Failing to Start
- 9.21** EP/1/A/5000/E-0, Reactor Trip or Safety Injection
- 9.22** EP/2/A/5000/E-0, Reactor Trip or Safety Injection
- 9.23** EP/1/A/5000/ECA-0.0, Loss of All AC Power
- 9.24** EP/2/A/5000/ECA-0.0, Loss of All AC Power
- 9.25** RP/0/A/5000/001, Classification of Emergency
- 9.26** RP/0/A/5000/004, Site Area Emergency
- 9.27** RP/0/A/5000/006A, Notifications to States and Counties from the Control Room
- 9.28** RP/0/A/5000/010, Conducting a Site Assembly or Preparing the Site for an Evacuation
- 9.29** RP/0/B/5000/013, NRC Notification Requirements
- 9.30** SD 28, Security Staff Position Specific Guide
- 9.31** SRPMP 7-1, Use of Sample Manager for Radiation Protection Equipment
- 9.32** CNS Operator JPM Index
- 9.33** Nuclear System Directive (NSD) 117, Emergency Response Organization Staffing, Training, and Responsibilities
- 9.34** EPFAM 3.19, Drills and Exercises

**Attachment 1: Parallel NEI 10-05 Table 5 Controlling Method Correlation**

Line	Function/Task	OPs Training Program and EP Drill Program Task Analysis Controlling Method
1.	Declare the Emergency Classification Level (ECL)	JPM SEP-001 to 007, 011 to 018, 020 to 022, 024 and 097. D.1.2 The correct Event Classification Level was formally declared within 15 minutes.
2.	Approve Offsite Protective Action Recommendations	JPM SEP-098 J.7.1 Accurate PARs were developed within 15 minutes of a General Emergency declaration.
3.	Approve content of State/local notifications	JPM SEP-001 to 007, 011 to 018, 020 to 022, 024 and 097. E.2.2 The ENF was approved prior to transmittal.
4.	Approve extension to allowable dose limits	K.1.3 Emergency exposure was approved by the Emergency Coordinator.
5.	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	B.1 Demonstrate the ability of the normal staff complement to perform the functions of the on-shift ERO. [includes 8 demonstration criteria]
6.	ERO notification	E.1.2 The ERO group page(s) was (were) initiated within 15 minutes of event declaration. E.1.3 The Nuclear ERO Call-out System was initiated within 15 minutes of the event declaration.
7.	Abbreviated NRC notification for DBT event	E.4.1 The NRC was notified within 15 minutes from discovery of a security-based event.
8.	Complete State/local notification form	JPM SEP-001 to 007, 011 to 018, 020 to 022, 024 and 097. E.2.1 The ENF was completed accurately.
9.	Perform State/local notifications	JPM SEP-001 to 007, 011 to 018, 020 to 022, 024 and 097. E.2.3 State / local notifications were performed within 15 minutes of the declaration or change in conditions requiring notification.
10.	Complete NRC event notification form	E.4.2 The NRC form was completed accurately.
11.	Activate ERDS	F.3.2 ERDS initiated within one hour of an ALERT or higher declaration.
12.	Offsite radiological assessment	RP-2705, Initial Response On-shift Dose Assessment I.3.2 Dose projections were performed for the most likely release path(s) to confirm and refine the event classification and PAR determinations.
13.	Perform NRC notifications	E.4.1 The NRC was notified via Event Notification System (ENS) immediately after completing State / local notification and within one hour of event classification. E.4.2 A communicator was assigned to maintain an open line over the ENS circuit when requested by the NRC.
14.	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	E.5.1 ANI was contacted and updated every eight hours on the status of the event.
15.	Personnel accountability	J.2.2 All unaccounted-for individuals were identified by name within 30 minutes of announcing Site Assembly.



**Attachment 1: Parallel NEI 10-05 Table 5 Controlling Method Correlation**

Line	Function/Task	OPs Training Program and EP Drill Program Task Analysis Controlling Method
16.	Other: Perform site assembly announcements	J.1.3 A station Public Address (PA) System announcement was made within 15 minutes of site assembly.

Notes: Demonstration Criteria J.1.3 does not reflect the station specific procedural process for making site assembly announcements every five minutes until accountability has been completed.

EP performance objectives taken from EP FAM 3.19.

DRAFT

## Attachment 2: Parallel NEI 10-05 Appendix B On-Shift Staffing Analysis Results Tables

TABLE 1 – On-Shift Positions

Analysis Event – BDBEE: Station Blackout (SBO)

Line	On-shift Position	Emergency Plan Reference	Augmentation Elapsed Time (min)	Role in Table # / Line#	Unanalyzed Task?	TMS Required?
1.	Operations Shift Manager	Figure B-1a		2 / 1 5 / 1 5 / 3 5 / 5 5 / 8	No	No
2.	Unit Supervisor	Figure B-1a		2 / 2 5 / 5	No	No
3.	Control Room Supervisor	Figure B-1a		2 / 3.A 2 / 3.B	No	No
4.	Shift Technical Advisor	Figure B-1a		2 / 4	No	No
5.	U1 Control Room Operator	Figure B-1a		2 / 5	No	No
6.	U2 Control Room Operator	Figure B-1a		2 / 6	No	No
7.	BOP	Figure B-1a		2 / 7 5 / 9 5 / 16	No	Yes
8.	NLO #1	Figure B-1a		2 / 8	No	No
9.	NLO #2	Figure B-1a		2 / 9	No	No
10.	NLO #3	Figure B-1a		2 / 10	No	No
11.	NLO #4	Figure B-1a		2 / 11 5 / 9	No	Yes
12.	NLO #5	Figure B-1a		2 / 12	No	No
13.	Fire Brigade Leader	Figure B-1a		5 / 6 5 / 10 5 / 11 5 / 13	No	No
14.	Mechanical Maint Technician	Figure B-1a		2 / 13	No	No
15.	IAE Technician #1	Figure B-1a		2 / 14	No	No
16.	IAE Technician #2	Figure B-1a		2 / 15	No	No
17.	RP Qualified Individual #1	Figure B-1a	90	N/A	No	No
18.	RP Qualified Individual #2	Figure B-1a	90	N/A	No	No
19.	RP Qualified Individual #3	Figure B-1a	90	N/A	No	No
20.	Chemistry Technician	Figure B-1a		N/A	No	No
21.	MERT #1	Figure B-1a		N/A	No	No
22.	MERT #2	Figure B-1a		N/A	No	No
23.	SAS Operator	Figure B-1a		5 / 15	No	No

**Attachment 2: Parallel NEI 10-05 Appendix B On-Shift Staffing Analysis Results Tables**

**TABLE 2 – Plant Operations & Safe Shutdown**

**Analysis Event – BDBEE: Station Blackout (SBO)**

**Minimum Operations Crew (Two Units – One Control Room)**

Line	Generic Title/Role	On-Shift Position	Task Description	Controlling Method
1.	Shift Manager	Operations Shift Manager	Plant and crew oversight	Ops Training Program
2.	Unit Supervisor	Unit Supervisor	Perform and direct EP/AP actions	Ops Training Program
3.	Unit Supervisor	Control Room Supervisor	A. Plant and crew oversight B. Perform and direct EP/AP actions	Ops Training Program Ops Training Program
4.	Shift Technical Advisor	Shift Technical Advisor	STA tasks	Ops Training Program
5.	Reactor Operator #1	U1 Control Room Operator	Perform EP/AP actions	Ops Training Program
6.	Reactor Operator #2	U2 Control Room Operator	Perform EP/AP actions	Ops Training Program
7.	Other	BOP	Direct in-plant operations	Ops Training Program
8.	Auxiliary Operator #1	NLO #1	In-plant/local operations	Ops Training Program
9.	Auxiliary Operator #2	NLO #2	In-plant/local operations	Ops Training Program
10.	Auxiliary Operator #3	NLO #3	In-plant/local operations	Ops Training Program
11.	Other	NLO #4	In-plant/local operations	Ops Training Program
12.	Other	NLO #5	In-plant/local operations	Ops Training Program
13.	Other	Fire Brigade Leader	N/A	N/A

**Other (non-Operations) Personnel**

Line	Generic Title/Role	On-Shift Position	Task Description	Controlling Method
14.	Mechanic	Mechanical Maint Technician	In-plant/local operations	Maintenance Training Program
15.	Electrician	IAE Technician #1	In-plant/local operations	Maintenance Training Program
16.	I&C Technician	IAE Technician #2	In-plant/local operations	Maintenance Training Program

**TABLE 3 – Firefighting**

**Analysis Event – BDBEE: Station Blackout (SBO)**

Line	Performed By	Task Description	Controlling Method
1.	Fire Brigade Leader	N/A	N/A
2.	FBT Member #1 (NLO #4)	N/A	N/A
3.	FBT Member #2 (NLO #5)	N/A	N/A
4.	FBT Member #3 (MMT)	N/A	N/A
5.	FBT Member #4 (IAE Technician #1)	N/A	N/A

**Attachment 2: Parallel NEI 10-05 Appendix B On-Shift Staffing Analysis Results Tables**

**TABLE 4 – Radiation Protection and Chemistry**

**Analysis Event – BDBEE: Station Blackout (SBO)**

#	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)									
		0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
1.	In-Plant Radiological Survey On-Shift Position:										
2.	On-Site Radiological Survey On-Shift Position:										
3.	Personnel Monitoring On-Shift Position:										
4.	Job Coverage On-Shift Position:										
5.	Offsite Radiological Assessment On-Shift Position:										
6.	Other: Equipment Set-up On-Shift Position:										
7.	Sampling On-Shift Position:										

**Note:** The basis for the selected performance time period was established by the subject matter experts during the task analysis review. Specific performance time periods for concurrent tasks will be analyzed as part of the time motion study

**Attachment 2: Parallel NEI 10-05 Appendix B On-Shift Staffing Analysis Results Tables**

**TABLE 4 – Radiation Protection and Chemistry (Continued)**

**Analysis Event – BDBEE: Station Blackout (SBO)**

#	Position Performing Function/Task	Performance Time Period After Emergency Declaration (minutes)									
		100-130	130-160	160-190	190-210	210-240	240-270	270-300	300-330	330-360	360-390
1.	In-Plant Radiological Survey On-Shift Position:										
2.	On-Site Radiological Survey On-Shift Position:										
3.	Personnel Monitoring On-Shift Position:										
4.	Job Coverage On-Shift Position:										
5.	Offsite Radiological Assessment On-Shift Position:										
6.	Other: Equipment Set-up On-Shift Position:										
7.	Sampling On-Shift Position:										

**Note:** The basis for the selected performance time period was established by the subject matter experts during the task analysis review. Specific performance time periods for concurrent tasks will be analyzed as part of the time motion study.

**Attachment 2: Parallel NEI 10-05 Appendix B On-Shift Staffing Analysis Results Tables**

**TABLE 5 – Emergency Plan Implementation**

**Analysis Event – BDBEE: Station Blackout (SBO)**

Line	Function/Task	On-Shift Position	Controlling Method
1.	Declare the Emergency Classification Level (ECL)	Operations Shift Manager	Ops Training Program EP Drill Program
2.	Approve Offsite Protective Action Recommendations	N/A	Ops Training Program EP Drill Program
3.	Approve content of State/local notifications	Operations Shift Manager	Ops Training Program EP Drill Program
4.	Approve extension to allowable dose limits	N/A	EP Drill Program
5.	Notification and direction to on-shift staff (e.g., to assemble, evacuate, etc.)	Unit Supervisor Operations Shift Manager	EP Drill Program
6.	ERO Notification	Fire Brigade Leader	EP Drill Program
7.	Abbreviated NRC notification for DBT event	N/A	EP Drill Program
8.	Complete State/local notification form	Operations Shift Manager	Ops Training Program EP Drill Program
9.	Perform State/local notifications	NLO #4 BOP	EP Drill Program
10.	Complete NRC event notification form	Fire Brigade Leader	EP Drill Program
11.	Activate ERDS	Fire Brigade Leader	EP Drill Program
12.	Offsite radiological assessment	N/A	RP Training Program EP Drill Program
13.	Perform NRC notifications	Fire Brigade Leader	EP Drill Program
14.	Perform other site-specific event notifications (e.g., INPO, ANI, etc.)	N/A	EP Drill Program
15.	Personnel accountability	SAS Operator	EP Drill Program
16.	Other: Perform site assembly announcements	BOP	EP Drill Program

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

**Attachment 3: Parallel NEI 10-05 Appendix D & E On-Shift Staffing Analysis Results Tables**

**Analysis Event – BDBEE: Station Blackout (SBO)**

**Position: STA**

**Line #: 1-4**

**Appendix D: Function / Responsibility (Task) Analysis**

Function	Responsibility (Task)	Action Step	Duration
1. Plant Operations (status monitoring and EOP actions)	1.1 STA tasks (2/4)	1.1.1 SOMP 1-4	Thru Event
2. Local/State Event Notification (ECL and PAR)	2.1 Perform State/local notifications (5/9)	2.1.2 RP/0/A/5000/006A (initial and follow-up notifications)	5

**Appendix E: Work Activities Analysis**

Time	Plant/equipment/environmental events and conditions applicable to the functions and tasks	Task / Action Step description (start & stop)
08:37	Actions completed in the Control Room. Refer to section 3.1.2.1 for event and conditions description.	STA tasks: monitor critical safety function parameters and plant status (08:37 – Thru Event)
09:50	Actions completed in the Control Room. Refer to section 3.1.2.1 for event and conditions description.	Perform State/local notifications: initial notification (09:50 – 09:52)
10:47	Actions completed in the Control Room. Refer to section 3.1.2.1 for event and conditions description.	Perform State/local notifications: follow-up notification (10:47 – 10:50)

**Attachment 3: Parallel NEI 10-05 Appendix D & E On-Shift Staffing Analysis Results Tables**

**Analysis Event – BDBEE: Station Blackout (SBO)**

**Position: BOP**

**Line #: 1-7**

**Appendix D: Function / Responsibility (Task) Analysis**

Function	Responsibility (Task)	Action Step	Duration
1. Plant Operations (status monitoring and EOP actions)	1.1 Direct in-plant operations (2/7)	1.1.1 EP/1/A/5000/ECA-0.0	5
2. Assembly and Accountability	5.1 Perform site assembly announcements (5/16)	2.1.1 RP/0/A/5000/010	4

**Appendix E: Work Activities Analysis**

Time	Plant/equipment/environmental events and conditions applicable to the functions and tasks	Task / Action Step description (start & stop)
08:33	Actions completed in the Control Room. Refer to section 3.1.2.1 for event and conditions description.	Direct in-plant operations (08:33 – 08:38)
08:58	Actions completed in the Control Room. Refer to section 3.1.2.1 for event and conditions description.	Perform site assembly announcements (08:58 – 08:58)*
09:03	Actions completed in the Control Room. Refer to section 3.1.2.1 for event and conditions description.	Perform site assembly announcements (09:03 – 09:03)*
09:08	Actions completed in the Control Room. Refer to section 3.1.2.1 for event and conditions description.	Perform site assembly announcements (09:08 – 09:08)*
09:13	Actions completed in the Control Room. Refer to section 3.1.2.1 for event and conditions description.	Perform site assembly announcements (09:08 – 09:08)*

\* Four (4) site assembly announcements were made over the period of 15 minutes in sequence with task (2/7) *Direct in-plant operations*.



**Attachment 3: Parallel NEI 10-05 Appendix D & E On-Shift Staffing Analysis Results Tables**

**Analysis Event – BDBEE: Station Blackout (SBO)**

**Position: NLO #4**

**Line #: 1-11**

**Appendix D: Function / Responsibility (Task) Analysis**

Function	Responsibility (Task)	Action Step	Duration
1. Plant Operations (status monitoring and EOP actions)	1.1 In-plant/local operations (2/11)	1.1.1 EP/1/A/5000/ECA-0.0	144
2. Local/State Event Notification (ECL and PAR)	2.1 Perform State/local notifications (5/9)	2.1.2 RP/0/A/5000/006A (follow-up notifications)	9

**Appendix E: Work Activities Analysis**

Time	Plant/equipment/environmental events and conditions applicable to the functions and tasks	Task / Action Step description (start & stop)
08:40	Actions completed in plant. Refer to section 3.1.2.1 for event and conditions description.	In-plant/local operations (08:40 – 11:04)
11:47	Actions completed in the Control Room. Refer to section 3.1.2.1 for event and conditions description.	Perform State/local notifications: follow-up notification (11:47 – 11:50)
12:47	Actions completed in the Control Room. Refer to section 3.1.2.1 for event and conditions description.	Perform State/local notifications: follow-up notification (12:47 – 10:50)
13:47	Actions completed in the Control Room. Refer to section 3.1.2.1 for event and conditions description.	Perform State/local notifications: follow-up notification (13:47 – 11:50)