



**Rafael Flores**  
Senior Vice President  
& Chief Nuclear Officer  
rafael.flores@luminant.com

**Luminant Power**  
P O Box 1002  
6322 North FM 56  
Glen Rose, TX 76043

**T** 254 897 5590  
**C** 817 559 0403  
**F** 254 897 6652

CP-201400244  
Log # TXX-14025

REF 10 CFR 2.202

February 27, 2014

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555-0001

**SUBJECT:** Comanche Peak Nuclear Power Plant, Docket Nos. 50-445 AND 50-446,  
Second Six-Month Status Report in Response to March 12, 2012, Commission Order  
Modifying Licenses with Regard to Requirements For Mitigation Strategies For Beyond-  
Design-Basis External Events (Order Number EA-12-049) (TAC NOS. MF0860 and  
MF0861)

**REFERENCES:** 1. NRC Order Number EA-12-049, Order Modifying Licenses with Regard to  
Requirements for Mitigation Strategies for Beyond-Design-Basis External Events  
dated March 12, 2012  
2. NRC Interim Staff Guidance JLD-ISG-2012-01, "Compliance with Order EA-12-049,  
Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for  
Beyond-Design-Basis External Events," Revision 0, dated August 29, 2012  
3. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide,"  
Revision 0, dated August 2012  
4. Luminant Generation Company LLC's Letter TXX-12158, Initial Status Report in  
Response to March 12, 2012 Commission Order Modifying Licenses with Regard to  
Requirements for Mitigation strategies for Beyond-Design-Basis External events  
(Order Number EA-12-049), dated October 25, 2012  
5. Luminant Generation Company LLC's Letter TXX-13030, Overall Integrated Plan in  
Response to March 12, 2012 Commission Order Modifying Licenses with Regard to  
Requirements for Mitigation strategies for Beyond-Design-Basis External events  
(Order Number EA-12-049), dated February 28, 2013

Dear Sir or Madam:

On March 12, 2012, the Nuclear Regulatory Commission (NRC) staff issued an order (Reference 1) to Luminant Generation Company LLC (Luminant Power). Reference 1 was immediately effective and directs Luminant to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event. Specific requirements are outlined in Attachment 2 of Reference 1.

A member of the STARS Alliance

Callaway · Comanche Peak · Diablo Canyon · Palo Verde · Wolf Creek

A151  
NRR

Reference 1 required submission of an initial status report 60 days following issuance of the final interim staff guidance (Reference 2) and an overall integrated plan pursuant to Section IV, Condition C. Reference 2 endorses industry guidance document NEI 12-06, Revision 0 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided Luminant Power's initial status report regarding mitigation strategies. Reference 5 provided Luminant Power's overall integrated plan.

Reference 1 requires submission of a status report at six-month intervals following submittal of the overall integrated plan. Reference 3 provides direction regarding the content of the status reports. The purpose of this letter is to provide the second six-month status report pursuant to Section IV, Condition C.2, of Reference 1, that delineates progress made in implementing the requirements of Reference 1. The attached report provides an update of milestone accomplishments since the overall integrated plan was submitted (Reference 5), including any changes to the compliance method, schedule, or need for relief and the basis, if any.

This letter contains no new regulatory commitments.

If you have any questions regarding this report, please contact Carl B. Corbin at 254-897-0121 or [carl.corbin@luminant.com](mailto:carl.corbin@luminant.com).

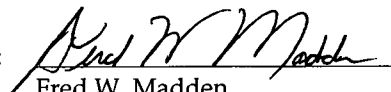
I state under penalty of perjury that the foregoing is true and correct.

Executed on February 27, 2014.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

By:   
Fred W. Madden  
Director, External Affairs

Attachment: Comanche Peak Nuclear Power Plant (CPNPP) Second Six Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design- Basis External Events

c - Eric J. Leeds, Director, Office of Nuclear Reactor Regulation  
Marc L. Dapas, Region IV  
Jessica A. Kratchman, NRR/JLD/PMB  
Balwant K. Singal, NRR  
Resident Inspectors, Comanche Peak Nuclear Power Plant

## **Comanche Peak Nuclear Power Plant (CPNPP) Second Six Month Status Report for the Implementation of Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events**

### **1. Introduction**

Comanche Peak Nuclear Power Plant (CPNPP) developed an Overall Integrated Plan (Reference 1), documenting the diverse and flexible strategies (FLEX), in response to Reference 2. This attachment provides an update of milestone accomplishments since submittal of the Overall Integrated Plan and first Six Month Status Report (Reference 3), including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

### **2. Milestone Accomplishments**

The following milestone(s) have been completed since the development of the Overall Integrated Plan (Reference 1), and are current as of February 20, 2014.

- FLEX Strategy Evaluation - Complete
- Modifications Evaluations - Complete
- Procedures - PWROG issues NSSS-specific guidelines - Complete

### **3. Milestone Schedule Status**

The following table provides an update to Attachment 2 of the Overall Integrated Plan (OIP). It provides the activity status of each item, and whether the expected completion date has changed. The dates are planning dates subject to change as design and implementation details are developed. Note, italicized items in the following table were not provided as milestone items in Attachment 2 of the OIP. However, these items are added here for consistency with the 6 month status update template and will be carried forward in future 6 month status updates.

Milestone	Target Completion Date*	Activity Status	Revised Target Completion Date*
Submit 60 Day Status Report	Oct 2012	Complete	
Submit Overall Integrated Plan	Feb 2013	Complete	
<b>Submit 6 Month Updates:</b>			
Update 1	Aug 2013	Complete	
Update 2	Feb 2014	Complete	
Update 3	Aug 2014	Not Started	
Update 4	Feb 2015	Not Started	
Update 5	Aug 2015	Not Started	
<i>FLEX Strategy Evaluation</i>	<i>Aug 2013</i>	<i>Complete</i>	
<i>Walk-throughs or Demonstrations</i>	<i>Apr 2015</i>	<i>Not Started</i>	
Perform Phase 2 Staffing Analysis	Jun 2014	Started	
<b>Modifications:</b>			
<i>Modifications Evaluation</i>	<i>Aug 2013</i>	<i>Complete</i>	
Develop Unit 1 Modifications	Mar 2014	Started	
Unit 1 Implementation Outage (1RF17)	Oct 2014	Not Started	
Develop Unit 2 Modifications	Mar 2015	Started	
Unit 2 Implementation Outage (2RF15)	Oct 2015	Not Started	
<b>Storage:</b>			
<i>Storage Design Engineering</i>	<i>Mar 2014</i>	<i>Started</i>	
<i>Storage Implementation</i>	<i>Oct 2014</i>	<i>Started</i>	
<b>FLEX Equipment:</b>			
Procure On-Site Equipment	Jul 2014	Started	
Develop "Playbook" with RRC	Nov 2013	Started	Apr 2014
<i>Install Off-Site Delivery Station (if Necessary)</i>	<i>Not Required</i>	<i>Not Required</i>	<i>Not Required</i>
Regional Response Center Operational	Aug 2014	Started	
<b>Procedures:</b>			
<i>PWROG issues NSSS-specific guidelines</i>	<i>May 2013</i>	<i>Complete</i>	
Issue FSGs	Aug 2014	Started	
Create Maintenance Procedures	Jul 2014	Started	
<b>Training:</b>			
<i>Develop Training Plan</i>	<i>May 2014</i>	<i>Started</i>	
Implement Training	Aug 2014	Not Started	Sep 2014
<i>Full Site FLEX Implementation</i>	<i>Oct 2015</i>	<i>Started</i>	
Submit Completion Report	Feb 2016	Not Started	

\* Dates are potentially impacted by schedule relief request (Reference 5) discussed in Section 5.

#### 4. Changes to Compliance Method

The following are either changes to the compliance method or clarifications of the staff's understanding of the OIP, as documented in the Interim Staff Evaluation (Reference 4) and are in addition to those identified in the First Six Month Status Report (Reference 3).

##### Auxiliary Building Connections for Spent Fuel Pool Cooling

Further evaluation has concluded that the two connections located inside the Fuel Building are sufficient to successfully perform the *primary* strategy for spent fuel pool cooling. Modifications to credit the additional connections from the Auxiliary Building through associated penetrations will not be performed. The Auxiliary Building connections are discussed on pages 9 and 16 of Reference 4. The *secondary* strategy continues to credit the two external connections and penetrations through the east wall of the Fuel Building such that building access is not required for successful performance of the *secondary* strategy.

##### Residual Heat Removal (RHR) System Restoration in Phase 3

Further review has concluded that the preferred method for maintaining core cooling in Phase 3 is continued steaming of the steam generators as fed by the turbine driven AFW pump, the Phase 2 steam generator FLEX pump, or the Phase 3 backup pump. Full restoration of RHR in Phase 3 will not be performed. Rather, RHR system alignment will be pursued but an RHR pump will not be placed into service until the transition from Phase 3 to recovery occurs. The previous strategy is discussed on pages 10, 45 and 53 of Reference 4.

##### Phase 3 4160V Generator Sizing

Because the restoration of RHR is no longer credited for indefinite coping, the required capacity of the Phase 3 4160V generators is reduced. Conceptual design concludes two 1 MW 4160V generators per unit are sufficient for performance of Phase 3 strategies. Luminant is awaiting confirmation from the equipment vendor regarding acceptability of the proposed load sequencing. The previous strategy is discussed on pages 10 and 55 of Reference 4.

##### Source Range Instrumentation

As discussed on pages 11 and 37 of Reference 4, readings for the core exit thermocouples (CETs) and reactor vessel level instrumentation system (RVLIS) cannot be taken locally. This limitation also applies to the source range instrumentation.

##### Stored Debris Removal Equipment

Equipment intended to facilitate debris removal stored within the protected storage building has changed. Rather than two Pettibones, as described on pages 21 and 50 of Reference 4, the stored debris removal equipment will consist of one four-wheel drive capable Pettibone and one track-loader (Bobcat).

### Reactor Coolant System Cooldown

Installation of low-leakage reactor coolant pump seals (SHIELD) supports acceptability of delaying initiation of the reactor coolant system (RCS) cooldown for approximately twelve hours post-Extended Loss of AC Power (ELAP). However, CPNPP has modified this approach (delayed cooldown) and now intends to complete RCS cooldown within four hours post-ELAP. This change maintains consistency with the current Station Blackout response, and ensures all important instrumentation powered by the station batteries remain available during the RCS cooldown. Additionally, this change ensures the steam generator atmospheric relief valves can be controlled remotely from the control room for the duration of the RCS cooldown. The previous strategy is discussed on pages 29, 32, 34, and 40 of Reference 4.

### Declaration of ELAP

Review of the latest revision of the Emergency Response Guidelines Footnote Basis Document indicates declaration of ELAP should be performed within the licensed station blackout coping time, four hours for CPNPP. Further review of the expected plant conditions following an ELAP with licensed Senior Reactor Operator personnel confirms four hours is appropriate for ELAP declaration. CPNPP will declare ELAP within four hours of initiation rather than the one hour documented on page 38 of Reference 4.

### Loss of Ventilation to Inverter Rooms

Further evaluation of expected inverter room temperatures during an ELAP indicates that timely deployment of forced ventilation is required to maintain equipment functionality. At five and a half hours after ELAP initiation, the doors to the inverter rooms will be blocked open, and at eighteen hours after ELAP initiation, forced ventilation using portable generators and fans will be deployed. The previous strategy is discussed on pages 39 and 47 of Reference 4.

### Pump Staging for Makeup from the Safe Shutdown Impoundment (SSI)

The FLEX pump designated for tank makeup from the SSI will be deployed to and staged near the Service Water Intake Structure. This change will facilitate access to the SSI and ensures the pump/eductor arrangement will draw suction from deep water. The previous strategy to deploy the pump to the SSI dam is discussed on pages 41, 42 and 53 of Reference 4.

### Battery Packs

As previously discussed, the restoration of RHR in Phase 3 is no longer the strategy for maintaining core cooling. However, the alignment of RHR, including opening and closing valves, can be accomplished using power available in Phase 3; therefore, battery packs will not be purchased or used during the alignment of RHR. The previous strategy for use of battery packs is discussed on pages 45 and 53 of Reference 4.

### Station Battery Life

Contrary to pages 48, 57 and 58 of Reference 4, no single train of station battery is expected to last 24 hours. The reduction in battery coping is primarily the result of implementation of the guidance and restrictions posed in the NEI position paper entitled "Battery Life Issue" (ADAMS Accession ML13241A186) as endorsed by the NRC in ML13241A188. Battery coping calculation revisions are being prepared with preliminary results indicating 12 hour coping for all station batteries. The battery coping calculations will be provided via the virtual audit response process following completion.

### 480V Generator Sizing

Conceptual design indicates that a single 500kW 480VAC generator is sufficient to power *three* battery chargers per unit, two battery room exhaust fans per unit, and one high-pressure RCS injection pump per unit. The associated connected loading and fraction of generator maximum loading discussed on page 55 of Reference 4 will necessarily increase, however, the generator sizing of 500kW remains sufficient. The associated generator sizing calculation has not been completed. The sizing calculation will be provided via the virtual audit response process following completion.

Because the station batteries are expected to deplete at approximately 12 hours (pending calculation completion), the 480VAC generator will be deployed and connected within 12 hours of ELAP initiation. This earlier deployment is considered achievable.

### Fuel Oil Day Tanks

Additional walkdowns have concluded that fuel stored in the Fuel Oil Day Tanks cannot be readily accessed without piping modifications. The small volume of fuel stored in the day tanks, relative to the underground storage tanks, does not warrant performance of the piping modification. Therefore, the Fuel Oil Day Tanks will not be credited in the FLEX strategies. The previous intended use of the day tanks is discussed on page 56 of Reference 4.

From Reference 4, the following were identified as items requiring additional discussion in the Second Six Month Status Report.

#### FLEX Storage Building

Phase 2 equipment, not otherwise stored within protected structures inside the protected area, will be stored within a single FLEX storage building designed to protect against all external events including safe shutdown earthquake and design basis tornado winds and associated missiles. One N+1 pump currently stored in a "non-protected" structure within the protected area is excluded from the above storage plan.

Debris removal equipment and tow equipment required for Phase 2 equipment deployment will be stored within the FLEX storage building, located as depicted in Figure A3-35 of Reference 3. CPNPP is not susceptible to extreme snowfall, however, the site can be subjected to ice storms for short durations. Existing severe weather procedures provide guidance for mitigation of icy site roads which include maintaining the capability to spread sand over site roadways (including credited deployment pathways) to enhance equipment traction.

For proper storage environment, the storage building will be provided with forced ventilation and heating, as appropriate. The FLEX storage building clarification request is documented on pages 10 and 24 of Reference 4.

#### Dry Site Clarification

The CPNPP probable maximum flood (PMF) level is based on the guidelines of RG 1.102 and is the same as the definition of Design Basis Flood Level (DBFL) in NEI 12-06 Section 6.2.1. At a current licensing basis PMF level of 789.7 feet, CPNPP is considered a dry site. Even under Recommendation 2.1 re-evaluation conditions the most limiting site PMF level given the spectrum of scenarios evaluated is still less than the proposed FLEX equipment storage and staging areas including onsite deployment paths. Thus, the plant site is not susceptible to external flooding events. The dry site clarification request is documented on page 13 of Reference 4.

#### Load Shedding Scheme

As discussed previously, calculations to determine battery coping time are being prepared. Assumed load shedding includes the loads documented in ECA-0.0A/B as well as additional load shedding to maximize battery life during an ELAP. The requested information from the battery calculations including load shedding scheme will be provided to the staff via the virtual audit response process following completion. The load shedding scheme request is documented on page 59 of Reference 4, as Confirmatory Item 3.2.4.10.A of Reference 4 and as Audit Question 37.

#### Regional Response Center (RRC) Resources and Agreements

The requested information regarding agreements for mobilization and deployment of off-site resources to sustain and backup the site's coping strategies, as documented on page 64 of Reference 4, will be provided following approval of the RRC Strategic Alliance for Flex Emergency Response (SAFER) Response Plan (otherwise referred to as the RRC Playbook). As noted in the Milestone Schedule above, the target completion date for the Playbook is now scheduled for April 2014. Luminant has provided the site specific input to the RRC regarding the Playbook and is awaiting RRC incorporation.



The following position papers as endorsed by the NRC will be used by Luminant in support of FLEX strategy development. Any exceptions to the NRC endorsed guidance will be communicated to the staff via the virtual audit process.

#### Battery Coping

The guidance provided in the position paper entitled "Battery Life Issue" (ML13241A186) as endorsed by ML13241A188 will be used to support the performance of ELAP battery coping calculations.

#### Shutdown / Refueling Modes

The guidance provided in the position paper entitled "Position Paper: Shutdown / Refueling Modes" (ML13273A514) as endorsed by ML13267A382 will be used to support the development of the shutdown mode FLEX strategies.

#### MAAP

The guidance provided in the position paper entitled "Use of Modular Accident Analysis Program (MAAP) in Support of Post-Fukushima Applications" (ML13190A201) as endorsed by ML13275A318 will be used to support the performance of ELAP containment analyses.

#### Boron Mixing

The guidance provided in the position paper entitled "Westinghouse Response to NRC Generic Request for Additional Information (RAI) on Boron Mixing in Support of the Pressurized Water Reactor Owners Group (PWROG)" (ML13235A135) as endorsed by ML13276A183 will be used to support the performance of analyses confirming subcriticality during an ELAP event.

### **5. Need for Relief/Relaxation and Basis for the Relief/Relaxation**

The Luminant response (Reference 1) stated that CPNPP Units 1 and 2 are crediting use of low-leakage RCP seals in the FLEX Strategies. There is an industry concern with the current performance of the credited seals and the vendor has developed a plan to improve the seal performance. In Reference 5, Luminant formally requested relief from the requirement of Section IV.A.2 of the Order (EA-12-049) regarding full implementation no later than two (2) refueling cycles after submittal of the Overall Integrated Plan, so that the option to credit the low-leakage seal may be pursued. The current required implementation date for Unit 1 is the 2014 fall refueling outage. An extension of one additional refueling cycle was requested which moves the Unit 1 implementation date to the spring of 2016, still within the maximum allowed time frame of December 2016. The extension will provide additional time to resolve industry issues and fully design and safely implement modifications that affect Units 1 and 2. Open Item OI4 tracks this concern. Pending NRC approval of the requested schedule relief, the Milestone Schedule in the next six month status letter will be revised, as appropriate.

**6. Open Items from Overall Integrated Plan and Draft Safety Evaluation**

The following table provides a summary of the open items documented in the OIP and the status of each item.

Overall Integrated Plan Open Items	Status
OI1. Finalize location and protection requirements of FLEX storage buildings. The storage buildings will be designed in accordance with the NEI guidance and the applicable hazards.	Complete. FLEX equipment will be stored in a new single structure designed as described in Section 4 of this attachment.
OI2. Perform containment evaluation based on the boundary conditions described in Section 2 of NEI 12-06. Based on the results of this evaluation, required actions to ensure maintenance of containment integrity and required instrument function will be developed as necessary.	The required analysis has not started.
OI3. Development of refueling equipment specifications, determination of fuel consumption rates, assessment of fuel supplies and determination of time frames for refueling of FLEX equipment in Phases 2 and 3 will be developed following generation of specifications for FLEX equipment.	Development of final specifications for all FLEX equipment has started.
OI4. Finalize FLEX strategies and required modifications following resolution of low-leakage RCP seal performance issue.	Issue resolution in progress, including low-leakage RCP seal design changes and testing. Schedule relief for FLEX implementation on Unit 1 has been requested (Reference 5).

Draft Safety Evaluation and Interim Staff Evaluation are considered synonymous. The following table provides a summary of additional open items documented in the Interim Staff Evaluation (Reference 4). These open items will be carried forward in future 6 month status updates. Luminant Power is participating in the voluntary NRC audit process described in Reference 6.

Interim Staff Evaluation Open Items	Status
<p>3.2.1.2.A</p> <p>Regarding the RCP seals, the only O-ring of interest with the safe shutdown low-leakage (SHIELD) installed is the RCP seal sleeve to shaft O-ring. Qualification of the RCP seal sleeve to shaft O-ring will be tracked as part of the SHIELD redesign to confirm the delayed cooldown, as documented in the Integrated Plan, is acceptable. CPNPP will align with testing results to be documented in the forthcoming SHIELD white paper.</p>	<p>As discussed in Section 4 of this letter, delayed RCS cooldown is no longer part of the planned ELAP response for CPNPP. However, the SHIELD white paper will be reviewed, when available, to confirm the discussed O-ring remains qualified to perform its function.</p>
<p>3.2.1.2.C</p> <p>If the RCP seals are changed to the newly designed Generation 3 SHIELD seals, or non-Westinghouse seals, the acceptability of the use of the newly designed Generation 3 SHIELD seals, or non-Westinghouse seals should be addressed, and the RCP seal leakages rates for use in the ELAP analysis should be provided with acceptable justification. During the audit process the licensee stated that CPNPP uses the Westinghouse model93A RCPs crediting SHIELD for FLEX strategies. Testing and qualification of SHIELD is ongoing and the licensee is closely following the re-design of SHIELD and will modify analyses and FLEX strategies if needed, based on the conclusions of the SHIELD white paper.</p>	<p>Acceptability of the use of SHIELD low-leakage seals will be provided in the forthcoming SHIELD white paper.</p>
<p>3.2.1.8.A</p> <p>The Pressurized Water Reactor Owners Group (PWROG) submitted to NRC a position paper, dated August 15, 2013 (ADAMS Accession No. ML 13235A 132, non-public, proprietary), which provides test data regarding boric acid mixing under single-phase natural circulation conditions and outlines applicability conditions intended to ensure that boric acid addition and mixing would occur under conditions similar to those for which boric acid mixing data is available. However, the NRC staff concluded that the August 15, 2013, position paper was not adequately justified and did not endorse this position paper. As such, ensuring adequate mixing of boric acid into the RCS under ELAP conditions is an open item for CPNPP.</p>	<p>Per ML13276A183, the NRC has endorsed the PWROG position paper with restrictions. Luminant is currently assessing the impact of these restrictions on the CPNPP FLEX strategy for maintaining subcriticality.</p>

## **7. Potential Draft Safety Evaluation Impacts**

Any potential impact to the Interim Staff Evaluation has been previously discussed in Section 4 of this attachment.

## **8. References**

The following references support the updates to the OIP described in this attachment.

1. Comanche Peak Nuclear Power Plant Docket Nos. 50-445 and 50-446 Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049), dated February 28, 2013.
2. NRC Order Number EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012.
3. Comanche Peak Nuclear Power Plant, Docket Nos. 50-445 and 50-446, First Six-Month Status Report in Response to March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements For Mitigation Strategies For Beyond- Design-Basis External Events (Order Number EA-12-049) (TAC Nos. MF0860 and MF0861), dated August 28, 2013.
4. NRC Interim Staff Evaluation, "Comanche Peak Nuclear Power Plant, Units 1 And 2 - Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies) (TAC Nos. MF0860 and MF0861)," dated December 19, 2013.
5. Comanche Peak Nuclear Power Plant (CPNPP), Docket Nos. 50-445 and 50-446, Request for Schedule Relaxation for the March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements For Mitigation Strategies For Beyond-Design-Basis External Events (Order Number EA-12-049) (TAC Nos. MF0860 and MF0861), dated February 12, 2014.
6. NRC Letter from Jack R. Davis to All Operating Reactor Licensees and Holders of Construction Permits, "Nuclear Regulatory Commission Audits of Licensee Responses to Mitigation Strategies Order EA-12-049," August 28, 2013.