

# WOLF CREEK

NUCLEAR OPERATING CORPORATION

August 25, 2015

Jaime H. McCoy  
Vice President Engineering

ET 15-0020

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

- Reference:
- 1) Letter dated March 12, 2012, from E. J. Leeds and M. R. Johnson, USNRC, to M. W. Sunseri, WCNO, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events"
  - 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, August 29, 2012
  - 3) NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, August 2012
  - 4) Letter ET 12-0029, dated October 29, 2012, from J. P. Broschak, WCNO, to USNRC
  - 5) Letter WO 13-0014, dated February 28, 2013, from R. A. Smith, WCNO, to USNRC
  - 6) Letter ET 13-0027, dated August 28, 2013, from J. P. Broschak, WCNO, to USNRC
  - 7) Letter ET 14-0011, dated February 26, 2014, from J. P. Broschak, WCNO, to USNRC
  - 8) Letter ET 14-0024, dated August 28, 2014, from C. O. Reasoner, WCNO, to USNRC
  - 9) Letter ET 15-0005, dated February 24, 2015, from J. H. McCoy, WCNO, to USNRC

Subject: Docket No. 50-482: Wolf Creek Nuclear Operating Corporation's Fifth 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"

A151  
NRR

Gentlemen:

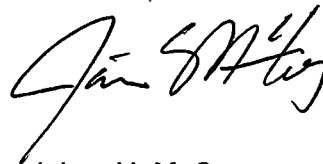
On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued Order EA-12-049 (Reference 1) to Wolf Creek Nuclear Operating Corporation (WCNOC). Reference 1 was immediately effective and directs WCNOC to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, 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.

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 (OIP) pursuant to Section IV, Condition C. Reference 2 endorses industry guidance document Nuclear Energy Institute (NEI) 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided the WCNOC initial status report regarding mitigation strategies. Reference 5 provided the WCNOC OIP. References 6, 7, 8, and 9 provided the first, second, third, and fourth six-month status report for the implementation of Order EA-12-049, respectively.

Reference 1 requires submission of a status report at six-month intervals following submittal of the OIP. Reference 3 provides direction regarding the content of the status reports. The purpose of this letter is to provide the fifth 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 submittal of Reference 9, including any changes to the compliance method, schedule, or need for relief and the basis, if any.

This letter contains no commitments. If you have any questions concerning this matter, please contact me at (620) 364-4156, or Cynthia R. Hafenstine (620) 364-4204.

Sincerely,



Jaime H. McCoy

JHM/rit

Attachment

cc: M. L. Dapas (NRC), w/a  
C. F. Lyon (NRC), w/a  
N. H. Taylor (NRC), w/a  
Senior Resident Inspector (NRC), w/a

STATE OF KANSAS    )  
                                  ) SS  
COUNTY OF COFFEY )

Jaime H. McCoy, of lawful age, being first duly sworn upon oath says that he is Vice President Engineering of Wolf Creek Nuclear Operating Corporation; that he has read the foregoing document and knows the contents thereof; that he has executed the same for and on behalf of said Corporation with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By *Jaime H. McCoy*  
Jaime H. McCoy  
Vice President Engineering

SUBSCRIBED and sworn to before me this 25<sup>th</sup> day of August, 2015.



*Gayle Shephard*  
Notary Public

Expiration Date 7/24/2019

**Wolf Creek Nuclear Operating Corporation’s (WCNOC) Fifth Six-Month Status Report for the Implementation of Order EA-12-049, “Order to Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events”**

**1. Introduction**

WCNOC developed an Overall Integrated Plan (OIP) (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 OIP, including any changes to the compliance method, schedule, or need for relief/relaxation and the basis, if any.

**2. Milestone Accomplishments**

As of August 5, 2015, the following milestones have been completed since the submittal of the last six-month status report (Reference 3).

- N-1 Walkdown (FLEX Modifications) – Complete
- Develop Training Plan - Complete

**3. Milestone Schedule Status**

The following provides an update to Attachment 2 of the OIP. It provides the activity status of each item, and whether the expected completion date has changed. The dates are planning dates and are subject to change as design and implementation details are developed.

The revised milestone target completion dates do not impact the order implementation outage. Italicized text denotes that a Milestone was updated since the fourth six-month status update.

| <b>Milestone</b>                       | <b>Target Completion Date</b> | <b>Activity Status</b> | <b>Revised Target Completion Date</b> |
|--|-------------------------------|------------------------|---------------------------------------|
| 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                      | Complete               | -                                     |
| Update 4                               | Feb 2015                      | Complete               | -                                     |
| <i>Update 5</i>                        | <i>Aug 2015</i>               | <i>Complete</i>        | -                                     |
| FLEX Strategy Evaluation               | Apr 2013                      | Complete               | -                                     |
| <i>Walk-Throughs or Demonstrations</i> | <i>Sep 2014</i>               | <i>Not Started</i>     | <i>Nov 2015</i>                       |
| Perform Staffing Analysis              | Dec 2013                      | On-Going               | May 2016                              |

|   |                 |                 |                 |
|---|-----------------|-----------------|-----------------|
| <b>Modifications:</b>   |                 |                 |                 |
| Modifications Evaluation  | Apr 2013        | Complete        | -               |
| <i>N-1 Walkdown</i>   | <i>Apr 2014</i> | <i>Complete</i> | -               |
| Design Engineering  | Jan 2014        | Complete        | -               |
| Condensate Storage Tank (CST)<br>Reinforcement Design Engineering                     | Oct 2015        | On-Going        | -               |
| Implementation Outage   | Feb 2015        | As Scheduled    | Sep 2016        |
| <b>FLEX Equipment:</b>  |                 |                 |                 |
| <i>Procure On-Site Equipment</i>  | <i>Dec 2014</i> | <i>On-Going</i> | <i>Dec 2015</i> |
| <i>Develop Strategies with Regional<br/>Response Center (RRC)</i>                     | <i>Nov 2013</i> | <i>Started</i>  | <i>Oct 2015</i> |
| Install Off-Site Delivery Station (if<br>necessary)                                   | Sep 2014        | On-Going        | Sep 2016        |
| <b>Procedures:</b>  |                 |                 |                 |
| Pressurized Water Reactor Owners<br>Group (PWROG) issues NSSS-<br>specific guidelines | Jun 2013        | Complete        | -               |
| <i>Create WCGS FLEX Support<br/>Guidelines (FSG)</i>                                  | <i>Jun 2014</i> | <i>On-Going</i> | <i>Oct 2015</i> |
| <i>Create Maintenance Procedures</i>  | <i>Jul 2014</i> | <i>Started</i>  | <i>Mar 2016</i> |
| <b>Training:</b>  |                 |                 |                 |
| <i>Develop Training Plan</i>  | <i>Jul 2014</i> | <i>Complete</i> | -               |
| Training Complete   | Feb 2015        | Not Started     | Sep 2016        |
| Submit Completion Report*   | Mar 2015        | Not Started     | Jan 2017        |

\* The report will be submitted 90 days after the completion of Refueling Outage 21.

#### **4. Changes to Compliance Method**

No changes have been made to the compliance method since the submittal of Reference 3.

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

WCNOC requested (Reference 4) relaxation for the implementation of Order EA-12-049. The Wolf Creek Generating Station (WCGS) FLEX strategies rely on the low leakage Reactor Coolant Pump (RCP) seals and a seismic and missile protected Condensate Storage Tank (CST). Compliance with the original Order EA-12-049 schedule requirement for full completion and implementation of mitigation strategies would have resulted in hardship or unusual difficulty without a compensating increase in the level of safety.

An extension of one additional refueling cycle was requested in Reference 4. Reference 10 approved the relaxation of the order implementation date. This moves the implementation date

to completion of the fall 2016 refueling outage, which is still within the maximum allowed timeframe of December 2016.

**6. Open Items from Overall Integrated Plan and Interim Staff Evaluation**

The following table provides a summary of the open items documented in the OIP and the status of each item. Italicized text denotes that an Open Item was updated since the fourth six-month status update.

| <b>Open Item #</b> | <b>Overall Integrated Plan Open Item</b>   | <b>Status</b>  |
|--------------------|--|--|
| OI 1               | Finalize the location of the FLEX storage building. The deployment routes, distances, and times provided in this report are bounded for the currently proposed locations but will be updated as necessary.   | Closed – The locations of the two FLEX storage buildings have been selected. Construction of both buildings has been completed and the deployment routes and distances have been confirmed. The verification and validation process (Milestone: Walk-Throughs or Demonstrations) will confirm that deployment times are consistent with analysis values. |
| OI 2               | Perform containment evaluation, using GOTHIC, 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. | Closed – The Generation of Thermal Hydraulic Information for Containment (GOTHIC) analysis has been completed. The containment structure and instrumentation inside containment critical to coping with an Extended Loss of ac Power (ELAP) event are shown to be acceptable following a 7-day duration (Reference 5).                                   |

| Open Item # | Overall Integrated Plan Open Item   | Status   |
|-------------|---|--|
| OI 3        | <p>The current CST and CST pipe chase are non-seismic. Therefore, WCNOG is currently pursuing two options; the qualification and hardening of the existing CST, or the construction of a new 670,000 gallon seismically qualified and missile protected CST. One of these options must be completed before the volume of the CST can be credited.</p> | <p>On-Going – An evaluation was performed to show that the existing CST met current licensing basis for seismic and tornado missile hazards (References 6, 7, and 9).</p> <p>The CST can withstand an Operating Basis Earthquake (OBE) but will require reinforcement in order to withstand a Safe Shutdown Earthquake (SSE).</p> <p>Evaluation and design activities, ensuring the CST can be credited for all of the required FLEX strategies, are on-going. Necessary modification work will be complete by the end of RF21.</p> <p>The CST pipe chase has been evaluated and can withstand the current licensing basis for seismic and tornado missile hazards (Reference 12).</p> |
| OI 4        | <p>Modify the RWST to protect it from tornado missiles or identify a borated source that is protected for tornados and can be utilized to provide core cooling when steam generators are not available.</p>   | <p>Started - Evaluation and design activities, ensuring the RWST can be credited for all of the required FLEX strategies, are ongoing. Final evaluations and necessary modification work will be complete by the end of RF21 (References 6, 8, and 11).</p>  |
| OI 5        | <p>For non-Class 1E instrumentation that will be repowered using a temporary battery, an analysis will need to be performed to determine battery life and frequency of replacing battery.</p>   | <p>Closed – The final plant strategies do not rely on any equipment that is not powered by a Class 1E source.</p>  |
| OI 6        | <p>The method for isolating accumulators during Reactor Coolant System [RCS] inventory control has not been finalized.</p>  | <p>Closed – It was confirmed that the accumulator isolation valves are on a bus that is being re-powered for the primary electrical FLEX strategy.</p> <p>For the alternate electrical FLEX strategy, nitrogen injection will be prevented by venting the accumulators.</p>  |
| OI 7        | <p>The method for repowering the SFP cooling pumps has not been finalized.</p>  | <p>Closed – Powering a Spent Fuel Pool (SFP) cooling pump is a Phase 3 action. The pump will be re-powered by a 4160V generator provided by the RRC.</p>   |

The following table provides a summary of the open items documented in the Interim Staff Evaluation Report (Reference 15) and the status of each item.

| Open Item # | ISE Open Item   | Status   |
|-------------|---|--|
| 3.1.1.2.A   | Verify that the potential for liquefaction considerations to impede movement of FLEX equipment following a severe seismic event at Wolf Creek are evaluated.  | Not Started – A review of the FLEX deployment paths will be completed.   |
| 3.1.1.2.B   | Verify that power that might be required to deploy equipment, such as power to open roll up doors at a storage location, is evaluated.  | Closed – The deployment of FLEX equipment will not require external power. Equipment such as roll up doors, will have provisions to be opened manually.  |
| 3.2.1.8.A   | Verify resolution of the generic concern associated with the modeling of the timing and uniformity of the mixing of a liquid boric acid solution injected into the RCS under natural conditions potentially involving two-phase flow.   | Closed – WCNOG will conform to the position expressed by the NRC staff in the letter dated January 8, 2014 to the PWROG (Reference 13). The NRC letter states that the NRC staff has reviewed the information submitted to date and concluded that use of the industry approach in PWROG letter OG-13-284 dated August 19, 2013 (Reference 14) is acceptable with clarifications listed in the letter. |
| 3.2.4.8.B   | Verify that instrumentation that will be used to monitor portable/FLEX electrical power equipment ensures that: 1) the electrical equipment remains protected (from an electrical power standpoint – e.g., power fluctuations) and, 2) the operator is provided with accurate information to maintain core cooling, containment, and spent fuel cooling strategies. | Started – Analysis work has begun to support this item.  |
| 3.4.A       | Verify the licensee has fully addressed considerations (2) through (10) of NEI 12-06, Section 12.2, Minimum Capability of Off-Site Resources, which requires each site to establish a means to ensure the necessary resources will be available from off-site.  | Started – When finalized, a copy of the RRC playbook will be provided to the NRC for review.   |



## References

1. WCNOC Letter WO 13-0014, "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," February 28, 2013. ADAMS Accession No. ML13070A026.
2. Letter from E. J. Leeds and M. R. Johnson, USNRC, to M. W. Sunseri, WCNOC, "Issuance of Order to Modify Licenses with Regard to Requirements For Mitigation Strategies for Beyond-Design-Basis External Events," March 12, 2012. ADAMS Accession No. ML12054A735.
3. WCNOC Letter ET 15-0005, "Wolf Creek Nuclear Operating Corporation's Fourth 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'," February 24, 2014. ADAMS Accession No. ML15062A033.
4. WCNOC Letter WO 14-0023, "Request for Schedule Relaxation of NRC Order EA-12-049, Requirement IV.A.2, at Wolf Creek Generating Station," March 31, 2014. ADAMS Accession No. ML14097A072.
5. CN-OA-13-7, Revision 1, "Wolf Creek ELAP Containment Heat-Up," June 16, 2014.
6. 020542.13.01-C-001, Revision 0, "Condensate Storage Tank and Refueling Water Storage Tanks Tornado Missile Impact Analyses," November 2013.
7. 020542.13.01-C-002, Revision 0, "Structural Analysis of Condensate Storage Tank," November 2013.
8. 020542.13.01-C-003, Revision 0, "Condensate Storage Tank Valve House and Refueling Water Storage Tank Valve House Missile Impact and Seismic Analysis," December 2013.
9. 020542.13.01-C-004, Revision 0, "Condensate Storage Tank Pipe Stress Analysis," December 2013.
10. Letter from E. J. Leeds, USNRC, to A. C. Heflin, WCNOC, "Wolf Creek Generating Station, Unit 1 – Relaxation of the Schedule Requirements for Order EA-12-049 'Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events'," May 20, 2014. ADAMS Accession No. ML14104A029.
11. 020542.13.01-C-008, Revision 0, "Refueling Water Storage Tank Pipe Stress Analysis," December 2013.
12. 020542.13.01-C-009, Revision 0, "Condensate Storage Tank Pipe Tunnel Evaluation," December 2013.
13. Letter from J. Davis, USNRC, to N. J. Stringfellow, PWROG, January 8, 2013. ADAMS Accession No. ML13276A183.

14. PWROG Letter OG 13-284, "Submittal of LTR-FSE-13-46, Revision 0, P-Attachment, "Westinghouse Response to NRC Generic Request for Additional Information (RAI) on Boron Mixing in Support of the Pressurized Water Reactor Owners Group (PWROG)" (Proprietary) (PA-ASC-1184)," August 19, 2013.
15. Letter from J. S. Bowen, USNRC, to A. C. Heflin, WCNOG, "Wolf Creek Generating Station, Unit 1 – Interim Staff Evaluation Relating to Overall Integrated Plan in Response to Order EA-12-049 (Mitigation Strategies)(TAC NO. MF0788)," February 6, 2014. ADAMS Accession No. ML14002A190.