# OFFSITE POWER ISSUES

TAC No. MC3380

Last Update: 09/18/09
Lead Division: DE
Supporting Divisions: DORL, DSS, DRA, and DIRS
Supporting Office: RES

## GROUP ONE ISSUES TO BE RESOLVED BY TEMPORARY INSTRUCTION 2515/156

| Milestones | Responsibility | Estimated Completion Date |
|---|---|---|
| 1. Issue tasking memorandum. | ADPT | 01/08/04 (C) |
| 2. Establish interoffice coordination and areas of responsibility between NRR and RES. | NRR/DLPM | 01/16/04 (C) |
| 3. Collect and prioritize grid issues for review. | NRR/DE | 01/30/04 (C) |
| 4. Identify the applicable licensing basis assumptions that were evaluated in determining reasonable assurance of adequate protection of public health and safety for the offsite AC power requirements in GDC-17. | NRR/DE | 01/30/04 (C) |
| 5. Short-term risk insights.<br>a. Develop the risk significance of the identified issues.<br>b. Draft of preliminary ASP results available (internal).<br>c. Preliminary ASP analysis available for technical review (internal/external). | <br>NRR/DSSA<br>RES/DRAA<br>RES/DRAA | <br>05/12/04 (C)<br>02/06/04 (C)<br>02/27/04 (C) |
| 6. Using the licensing basis information and risk, determine and reconfirm if any immediate safety concerns exist that require the staff to take immediate action (or before summer 2004) and initiate action, as appropriate.<br>a. Issue RIS<br>b. Issue TI<br>c. Receipt of TI responses (key questions)<br>d. Receipt of TI responses (remainder) | NRR/DE<br><br><br><br>NRR/DIPM<br>NRR/DIPM<br>Regions<br>Regions | 05/21/04 (C)<br><br><br><br>04/15/04 (C)<br>04/29/04 (C)<br>06/01/04 (C)<br>06/30/04 (C) |
| 7. Public Meeting with Industry. | NRR/DLPM<br>NRR/DE | 03/05/04 (C)<br>04/15/04 (C) |
| 8. Regulatory Information Conference - Plenary Session. | NRR/DLPM | 03/10/04 (C) |
| 9. Using risk significance of each issue as a guide, develop an overall project strategy, evaluate the identified issues, and determine any corrective actions and the processes to attain implementation. Update the action plan as necessary. | NRR/DE | 07/30/04 (C) |
| 10. Commission meeting on grid reliability issues. | NRR/DLPM<br>NRR/DE | 05/10/04 (C)<br>04/26/05 (C) |

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| 11. Establish interfaces with grid reliability organizations. | NRR/DE | 8/27/2004, 9/1/2004, 6/2/2005 (C) |
| 12. Inform the Commission of the status of the Action Plan prior to the summer peak season. | NRR/DLPM<br>NRR/DE | 05/10/04 (C)<br>08/06/04 (C) |

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| 13. Evaluate Station Blackout Implications<br>a. Using data from recent LOOP events, update the SBO LOOP frequency and duration(draft report for internal/external review).<br>b. Re-evaluate SBO risk (CDF) with updated SPAR models for spectrum of plants (draft report for internal/external review).<br>c. Review SBO considerations and determine if regulatory actions are needed. | RES/DRAA<br><br>RES/DRAA<br><br>NRR/DE/EEIB | 11/16/04 (C)<br><br>02/28/05 (C)<br><br>08/15/04 (C) |
| 14. Incorporate unresolved concerns into Group Three concerns | NRR/DE/EEIB | 08/15/04 (C) |

**GROUP TWO ISSUES TO BE RESOLVED BY ACTIONS IDENTIFIED IN 2004 NERC AUDIT REPORTS**

| Milestones | Responsibility | Estimated Completion Date |
|---|---|---|
| 1. Receive NERC audit reports. | NRR/DE | 06/30/04 (C) |
| 2. Assess the information provided in the audit reports to ascertain whether NRC issues have been addressed. | NRR/DE | 07/09/04 (C) |
| 3. Incorporated results into paper (See Activity 12, page 6) to C | NRR/DE | 07/14/04 (C) |
| 4. Inform the Commission of the status of the Action Plan prior to the summer peak season. | NRR/DE | 08/06/04 (C) |
| 5. Develop additional requests for information to address any short falls in the report (send to NERC). | NRR/DE | 08/06/04 (C) |
| 6 Meet with NERC to discuss their response. | NRR/DE | 08/20/04 (C) |
| 7. Re-assess any additional NERC input. | NRR/DE | 09/03/04 (C) |
| 8. Develop Group Two disposition document if different from item 5 - Group Two disposition was the same. | NRR/DE | N/A |
| 9. Incorporate unresolved concerns into Group Three concerns. | NRR/DE | 09/17/04 (C) |

**GROUP THREE ISSUES TO BE RESOLVED BY NRR LED REVIEW GROUPS**

| Milestones | Responsibility | Estimated Completion Date |
|---|---|---|
| Assess input from TI responses and NERC report for possible resolution to any Group Three issues. | NRR/DE | 12/22/04 (C) |
| Organize issues by topic as described in Activity 9 for the Group One concerns. | NRR/DE | 08/30/04 (C) |
| Determine staff to be included in review groups. | NRR/DE | 08/30/04 (C) |
| Determine NRR leads for review groups | NRR/DE | 08/30/04 (C) |
| Incorporate Group Two issues not resolved in Group One or Two assessments into Group Three issues . | NRR/DE | 09/17/04 (C) |
| Develop schedule for review groups to review issues . | NRR/DE, RES, (Stakeholders input) | 02/03/05 (C) |
| Review groups obtain information necessary to address issues . | NRR/DE, RES, (Stakeholders input) | 01/31/05 (C) |
| Review groups assess issues including management briefings on LOOP risk analyses and EDG reliability and issue draft LOOP risk report for review. | NRR/DE, RES/DRAA, (Stakeholders input) | 02/28/05 (C) |
| Review group members develop regulatory position to present to Commission - Determined a regulatory position in not necessary at this time. | NRR/DE, RES | 04/12/05 (C) |
| Commission briefing | NRR/DE | 04/26/05 (C) |
| Final status of action plan on grid issues to Commission. | NRR/DE | 07/13/05 (C) |
| 12. Resolve public comments and issue as final - Generic Letter (GL) 2005-XX; "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power." | NRR/ADES/DE/ EEEB | 02/01/06 (C) |
| 13. Evaluate the results of the final GL to determine which regulatory requirements need to be revised to ensure safe NPP operation, including rulemaking if appropriate. | NRR/ADES/DE/ EEEB | 8/9/2007 (C) ~~12/06 (T)~~ |
| 14. Collection and on-going assessment of impact of grid operating experience and data by NERC and the NRC. | NRR/ADES/DE/ EEEB RES/DSARE | 8/27/2004, 9/1/2004, 6/2/2005 (C) |

Description: The power blackout event on August 14, 2003, highlighted the fact that the Nation's electric grid is no longer being operated in the manner that it was considered when it was designed and constructed. An unreliable grid cannot ensure the availability of the offsite power system (preferred power supply), which is essential to ensure the safe operation of nuclear power plants (NPPs).

In December 2003, the NRC Chairman directed the NRC Executive Director of Operations to conduct a review of the issues raised in a report entitled "State of U.S. Power Grid from a Nuclear Power Plant Perspective." Following deterministic and risk evaluations, it was concluded for that for the following reasons, that there was certain urgency to address, before the Summer of 2004, plant operational readiness for the possibility that an event similar to the August 14, 2003, event occurs: (1) Long duration Loss of Offsite Power events are safety significant, (2) Risk increases when the plant's ability to cope with event is decreased due to online equipment outages, and (3) Grid is less reliable during the Summer period .

The plan describes the methods for resolving the concerns related to the loss of power to nuclear power plants. The plan will guide the reviews and assessments of the staff's efforts as we proceed on a resolution path of 48 concerns related to the reliability of offsite power to nuclear power plants. These concerns have been divided into three groups to be resolved.

To resolve Group One concerns, the staff developed a three pronged approach. First, the staff raised awareness of the concerns by developing and issuing a Regulatory Issue Summary (RIS) 2004-05 highlighting the significance of the concerns with the reliability of offsite power to nuclear power plants. Second, the staff assessed the licensees readiness to manage any degraded or losses of offsite power through inspection and interview using Temporary Instruction TI 2515/156. Lastly, the staff maintained cognizance of conditions and events through the summer of 2004 and assessed findings to develop any proposals for long-term regulatory actions.

Concerns in Group Two may be addressed by a report to be published by North American Electric Reliability Corporation (NERC) assessing the grid operators implementation of the U.S. and Canada joint task force recommendations regarding the August 14, 2003, loss of electrical power outage. NERC's mission is to ensure that the bulk electric system in North America is reliable, adequate and secure. Since its formation in 1968, NERC has operated successfully as a voluntary organization, relying on reciprocity, peer pressure and the mutual self-interest of all those involved.

Group Three concerns are the remaining concerns not addressed by the other two approaches and also include those issues from two Staff Requirements Memoranda from the Commission. These concerns will be organized by topic and addressed by safety significance and the need for outside stakeholder input.

Historical Background: In 1992, the National Energy Policy Act (NEPA) encouraged competition in the electric power industry, which it defined as open generator access to the transmission system and statutory reforms to promote the wholesale of electricity. Built on that premise, in 1996, the Federal Energy Regulation Commission (FERC) issued its landmark Order 888 requiring open access to the Nation's electric power transmission system.

In 1997, the U.S. Nuclear Regulatory Commission (NRC) staff and representatives from the U.S. Department of Energy (DOE), FERC, and the electric industry briefed the NRC on the issues related to electric grid reliability and utility restructuring. In response to the staff briefing, the NRC asked the staff to give greater urgency to ensuring that health and safety issues within the NRC's jurisdiction are addressed, particularly in reviewing the terms of the licensing basis and validating assumptions about grid reliability.

In 1998 and 1999, the NRC staff evaluated the impact of deregulation on the reliability of the electric grid. This evaluation led to recommendations to confirm the licensing basis of the nuclear power plants and to reevaluate the under frequency protection trip settings.

In 2000, the NRC asked Nuclear Energy Institute (NEI) and other industry representatives to take the initiative to address the adequacy of reliable offsite power to nuclear power plants. A key aspect of that initiative was the use of recommendations contained in a Significant Operating Experience Report (SOER) on the "Loss of Grid," which Institute of Nuclear Power Operations (INPO) issued in December 1999. In that report INPO called for establishment of communication protocols between the nuclear power plant operator and the grid operator.

In December 2003, the NRC Chairman directed the Office of the Executive Director of Operations (EDO) to conduct a review of the issues raised in a report entitled "State of U.S. Power Grid from a NPP Perspective." Following deterministic and risk evaluations, it was concluded that there was certain urgency to address, before the Summer of 2004, those significant issues manifested by the August 14, 2003, event.

Originating Document: The originating document was a memorandum (ML033650075) to Dr. William Travers (EDO) from Chairman Nils Diaz, Chairman, dated December 16, 2003, regarding the "State of U.S. Power Grid from a Nuclear Power Plant Perspective."

Regulatory Assessment: The loss of all alternating current (AC) power at nuclear power plants involves the loss of offsite power (LOOP) combined with the loss of the onsite emergency power supplies (typically emergency diesel generators [EDGs]). This is also referred to as a station blackout (SBO). Risk analyses performed for nuclear power plants indicate that the loss of all AC power can be a large contributor to the core damage frequency, contributing up to 74 percent of the overall risk at some plants. Although nuclear power plants are designed to cope with a LOOP event through the use of onsite power supplies, LOOP events are considered to be precursors to an SBO. An increase in the frequency or duration of LOOP events increases the risk of core damage.

The staff has developed three technical papers on the safety significance of this issue: One on deterministic evaluation, another on risk, and the third incorporating deterministic and risk results. The staff has not identified any safety issues warranting immediate regulatory action. However, since the underlying assumptions in support of the licensing basis have changed, these assumptions will need to be investigated in order to establish a new baseline. The 2004 summer peak season allowed the staff to gain information regarding the licensees capabilities to cope with a loss-of-offsite power event similar to the August 14, 2003, power outage.

Current Status: All items are closed.

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