

136 FERC ¶ 61,132
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Jon Wellinghoff, Chairman;
Marc Spitzer, Philip D. Moeller,
John R. Norris, and Cheryl A. LaFleur.

Grand River Dam Authority

Docket No. IN11-7-000

ORDER APPROVING STIPULATION AND CONSENT AGREEMENT

(Issued August 29, 2011)

1. The Commission approves the attached Stipulation and Consent Agreement (Agreement) between the Office of Enforcement (Enforcement), the staff of the North American Electric Reliability Corporation (NERC) and the Grand River Dam Authority (GRDA). This order is in the public interest because it resolves on fair and reasonable terms an investigation of GRDA, conducted by Enforcement, the Commission's Office of Electric Reliability (OER) and NERC staff into possible violations of Reliability Standards associated with GRDA's operation of a portion of the Bulk Power System (BPS). GRDA agreed to pay a civil penalty of \$175,000 to the United States Treasury and \$175,000 to NERC.

2. GRDA also agreed to commit to a mitigation and compliance plan. The compliance plan, in which GRDA will invest \$2 million within two years, will include additional measures to enhance and continue to ensure compliance with the Reliability Standards. These measures will maintain organizational oversight on compliance issues to ensure compliance is a meaningful component of the organization's daily operations. GRDA will also conduct an internal audit of its compliance after one year, and make semi-annual compliance reports to Enforcement and NERC staff for a period of up to two years.

I. Background

3. GRDA is an agency of the state of Oklahoma that operates hydroelectric and thermal generation facilities and a transmission system located within the Southwest Power Pool (SPP) transmission footprint. GRDA's transmission customers include municipalities, industrial customers and electric cooperatives. Because GRDA operates transmission lines with voltages as high as 345 kV and sells generation into the Eastern Interconnection, GRDA is subject to the Commission's regulations under

section 215 of the Federal Power Act. GRDA is registered with NERC to perform the following reliability-related functions: Balancing Authority, Transmission Owner, Transmission Operator, Transmission Planner, Generator Owner, Generator Operator, Distribution Provider, Load Serving Entity, Purchasing-Selling Entity and Resource Planner.

4. On March 16, 2007, the Commission approved the Reliability Standards at issue in this matter,¹ which had been submitted by NERC, pursuant to section 215 of the Federal Power Act.² These standards became mandatory and enforceable within the contiguous United States on June 18, 2007.

5. Enforcement and NERC staff investigated whether GRDA's operation of its transmission system complied with a range of applicable Reliability Standards, of which the following are relevant to the findings in this investigation. The Transmission Operations (TOP-) group of Reliability Standards covers the responsibilities and decision-making authority for reliable operations.³ The Communications (COM-) group of Reliability Standards requires transmission operators to have facilities for the internal and external exchange of interconnection and operating information adequate for maintaining reliability.⁴ The Emergency Procedures (EOP-) group of Reliability Standards includes requirements for necessary communications and analysis relevant to system events.⁵ The Facility (FAC-) Reliability Standards address topics including facility interconnection requirements and facility ratings.⁶ The Transmission Planning (TPL-) group of Reliability Standards is intended to make sure the transmission system is "planned and designed to meet a specific set of reliability criteria."⁷ The Protection and Control (PRC-) Reliability Standards cover a range of protection system-related topics,⁸ including design, coordination and maintenance of functional protection systems.

¹ *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, FERC Stats. & Regs. ¶ 31,242, *order on reh'g*, Order No. 693-A, 120 FERC ¶ 61,053 (2007).

² 16 U.S.C. § 824o (2006).

³ Order No. 693, FERC Stats. & Regs. ¶ 31,242 at P 1567.

⁴ *Id.* P 472.

⁵ *Id.* P 604.

⁶ *Id.* P 677.

⁷ *Id.* P 1683.

⁸ *Id.* P 1418.

Finally, the Personnel Performance, Training and Qualifications (PER-) Reliability Standards address the need to suitably train and qualify personnel who can affect reliable operation of the Bulk Power System.⁹

II. Investigation

6. In March 2009, and in coordination with NERC staff, Commission staff initiated a non-public, preliminary investigation into allegations that GRDA's operation of its transmission system was in violation of the Reliability Standards. In June 2009, GRDA and NERC signed a Settlement Agreement in Lieu of a Remedial Action Directive (2009 Agreement). Pursuant the 2009 Agreement, GRDA agreed to take certain immediate actions to address unrepaired protection system devices, failure to use a communications system monitoring device, and organizational issues interfering with operator authority. At the conclusion of the investigation, Enforcement and NERC concluded that GRDA violated 52 Requirements of 19 Reliability Standards, as described in the following paragraphs.

7. Enforcement and NERC concluded that GRDA is in violation of Requirements R5, R6, R10, R11 and R19 of TOP-002-2a; Requirements R1, R2 and R4 of TOP-004-2; and Requirements R2 and R4 of TOP-008-1 because it did not perform or make use of operational planning studies necessary and sufficient to assess its local day-ahead and current system conditions and to prepare for responding to emergency conditions. GRDA relied exclusively upon daily planning undertaken for the overall region by its reliability coordinator, Southwest Power Pool Reliability Coordinator (SPP), using the latter's model of the larger SPP footprint. In addition, the model used by SPP did not reflect protection system deficiencies known by GRDA, such as long-enduring outages of a substantial number of protection system communication devices ("carriers"). Nor did GRDA provide to SPP for modeling accurate facility ratings. Finally, GRDA system operators acknowledged they did not regularly review SPP's daily assessment. Without the benefit of effective operational planning studies, GRDA operated in an unknown state, unprepared to avoid exceeding system operating limits (SOLs), instability, cascading outages or uncontrolled separation as a result of severe single or multiple contingencies. Also, without effective operational studies, GRDA did not have the information to determine the cause of an SOL violation and how to mitigate the problem.

8. GRDA also did not notify its Reliability Coordinator of its ongoing and substantial carrier outages, which disable high speed relaying and result in potentially longer times to clear a fault on the system. SPP needed to be aware of these conditions to determine if the longer clearing times and potentially different post-contingency configurations on GRDA's system would affect performance or operations in the larger SPP footprint.

⁹ *Id.* P 1324.

GRDA failed to notify SPP of its disabled or unreliable carrier equipment before June 2009. Enforcement and NERC concluded that this violated TOP-002-2a, Requirement R16.1.

9. Enforcement and NERC further concluded that GRDA is in continued violation of TOP-006-2, Requirement R6. Current transformers reduce the useful measurement range of certain facilities' monitoring equipment to less than operational limits for certain equipment. Also, GRDA's monitoring software will not report, for certain equipment, the real time values that surpass a certain limit, which limit is less than the operational limit for that equipment. Therefore, GRDA's ability to monitor its system in some normal and emergency conditions is impaired by limited metering of unsuitable range.

10. Enforcement and NERC further concluded that GRDA violated Requirement R1 and all sub-requirements of COM-001-1.1 because GRDA's communications network architecture prior to fall 2009 did not provide adequate and reliable telecommunications. Until substantial completion of a network upgrade, outdated network architecture and ongoing project work interfered with visibility to and control of the system. GRDA did not have a complete and accurate network configuration diagram, such that upgrade-related work on its communications system often resulted in unplanned outages of communications equipment. Almost daily, transmission operator log entries indicated the failure of various types of telecommunications equipment that resulted in decreased ability to monitor and control the transmission system. In addition, GRDA's communications system had many paths and critical facilities that were neither redundant nor diversely routed, which undermined the reliability of internal communications and communications with the Reliability Coordinator.

11. Enforcement and NERC concluded that GRDA violated Requirement R2 of COM-001-1.1, because, for a period of several months, GRDA failed to manage, alarm, test or actively monitor and diagnose problems with vital telecommunications facilities.

12. Enforcement and NERC concluded that GRDA violated Requirement R5 of COM-001-1.1 because GRDA did not have adequate written procedures for continuing operations of the system in the event of loss of telecommunications facilities.

13. Enforcement and NERC concluded that GRDA violated Requirements R1.1 through R1.8 of EOP-008-0 because GRDA had neither a viable and executable plan, nor interim measures, to continue operations in the event GRDA lost its control center functionality; nor did GRDA meet the requirements to annually update the plan and test and train personnel on plan implementation.

14. Enforcement and NERC concluded that GRDA violated Requirement 3 of EOP-004-1 because GRDA did not report to NERC a fault at a transformer on September 5, 2008 that prompted over thirty protection system operations and the temporary isolation of a substation.

15. Enforcement and NERC concluded that GRDA did not have an established facility ratings methodology until May 2010, in violation of FAC-008-1 Requirement R1. Enforcement and NERC further concluded that GRDA was in violation of FAC-009-1 Requirement R1 because, without a methodology, it cannot apply facility ratings to its equipment consistent with a proper methodology, and it continues to be without proper documentation for some of its existing facility ratings.

16. Enforcement and NERC concluded that GRDA is in violation Requirements R1, R2 and R3 of FAC-001-0 because it does not publish facility connection requirements and does not keep those requirements current.

17. Enforcement and NERC concluded that GRDA violated Requirements R1, R2 and R3 of the TPL- series of Reliability Standards because GRDA did not conduct long term planning assessments of its system, and instead improperly relied on SPP to identify and determine the studies needed for GRDA's own transmission system. As a Transmission Owner, GRDA is responsible for its own system planning. Moreover, because GRDA did not maintain accurate or proper facility ratings for its transmission equipment, or ensure models of its system reflected the long-running and significant carrier issues, SPP's assessment of GRDA's system for the purpose of long-term planning assessments could not have been valid. GRDA also failed to document projects or corrective plans designed to address performance issues identified in valid assessments.

18. GRDA did not ensure the functionality and responsiveness of its protection systems by ensuring familiarity with the purpose and limitations of its protection systems or by revisiting coordination as necessary and appropriate. GRDA's relay engineering department does not review design and coordination of existing protection systems, unless and until prompted by a system disturbance. Furthermore, it does not have adequate resources to maintain familiarity with existing protection systems and also design and coordinate new systems at new or modified interconnects or facilities. Neither the engineering nor system operations departments recognized the need for and assumed the responsibility to study how the significant carrier outages compromised the protection system coordination that contemplated high speed relaying consistent with functioning carriers. Consequently, Enforcement and NERC concluded that GRDA violated Requirements R1 and R4 of PRC-001-1.

19. Prior to March 2010, GRDA did not have a process for performing, and did not adequately perform analyses and corrective actions for protection system misoperations. Enforcement and NERC concluded that GRDA violated PRC-004-1, Requirement R1.

20. Enforcement and NERC further concluded that GRDA violated Requirement R2.2 of PRC-001-1 and Requirements R1, R2.1 and R2.2 of PRC-005-1 because GRDA failed to test, maintain or repair its carriers until October 2009, did not maintain an adequate summary of testing procedures for all protection system-related devices, and did not notify its Reliability Coordinator or neighbors of the significant number of carriers on its system in disrepair or out of service.

21. Enforcement and NERC concluded that GRDA violated Requirement R1 of PRC-018-1 for failing to timely install disturbance monitoring equipment at appropriate locations until late 2010.
22. Enforcement and NERC concluded that GRDA violated Requirement 1 of PER-002-0 because it failed to train system operators in certain areas fundamental to system operations that should have been included in the GRDA training program.
23. Enforcement and NERC also concluded that GRDA violated Requirement R3.4 of PER-002-0 because GRDA did not have, until 2011, training staff competent in both knowledge of system operations and instructional capabilities.

III. Stipulation and Consent Agreement

24. Under the Agreement GRDA agrees to pay a \$175,000 civil penalty to the United States Treasury and a \$175,000 civil penalty to NERC. This amount is to be paid in a manner that reflects the dual nature of this investigation that both Commission staff and NERC staff conducted. GRDA does not admit nor deny that its actions constituted violations of the Reliability Standards or that it committed any violations of the Reliability Standards.

25. In consideration of the appropriate sanction, Commission staff considered the serious nature of the disturbance and the risk it posed to the Bulk Power System. However, staff also considered that GRDA has undertaken substantial efforts during the course of this investigation to address reliability-related concerns identified by staff and by its own internal examination. These mitigation measures reflect a commitment to Reliability Standards compliance by GRDA's executive management and the board, which was necessary to provide the resources required to support system operators and also infuse the entire organization with a culture of compliance. These measures include several organizational changes to create coordination among and leadership of the various departments involved in operating the transmission system; investment in system operations tools, including an operational planning tool; upgrades of the communications network and Energy Management System; modernization of its control centers; an initiative to document and implement and continue to enhance procedures related to reliable operations; and development and implementation of more and better training modules.

26. Under the Settlement Agreement, GRDA has also committed to additional mitigation efforts to fully resolve the findings identified in the investigation, and is committed to perpetuating these improvements through an expenditure of \$2 million in two years in compliance enhancements. The expenditures will include but will not be limited to a training program, which will, *inter alia*, specifically address the conduct identified in this investigation and ensure that mitigation efforts specified in this settlement are periodically reinforced and perpetuated. The expenditures will also include purchases of software to enhance compliance efforts and compliance awareness;

improvement of certain transmission system equipment; enhancement of the communications network that serves the transmission system and operations; additional personnel for compliance oversight; and continued improvement of written procedures regarding reliable operation of the transmission system. GRDA will conduct an internal audit and report to Enforcement and NERC staff after one year as to the status of its obligations under the Settlement Agreement and of its compliance, generally, and shall also make semi-annual reports to Enforcement and NERC staff for up to two years.

IV. Determination of the Appropriate Sanctions

27. We conclude that the penalties and other sanctions set forth in the Agreement are a fair and equitable resolution of this matter and are in the public interest, as they reflect the nature and seriousness of GRDA's conduct, and recognize the company-specific considerations as stated above and in the attached Agreement. We also conclude that, under the specific circumstances of this case, the payment of a portion of the total civil penalty to NERC reflects a balanced and sensible approach. We also conclude that the reliability enhancement measures set forth in the Agreement will enhance the reliability of the Bulk Power System and are therefore also fair and in the public interest.

The Commission orders:

The attached Stipulation and Consent Agreement is hereby approved without modification.

By the Commission.

(S E A L)

Nathaniel J. Davis, Sr.,
Deputy Secretary.

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Grand River Dam Authority

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Docket No. IN11-7-000

STIPULATION AND CONSENT AGREEMENT

I. INTRODUCTION

Staff of the Office of Enforcement (Enforcement) of the Federal Energy Regulatory Commission (Commission), staff of the North American Electric Reliability Corporation (NERC) and Grand River Dam Authority (GRDA) enter into this Stipulation and Consent Agreement (Agreement) to resolve an investigation conducted under Part 1b of the Commission's regulations, 18 C.F.R. Part 1b (2010) and NERC's Compliance Monitoring and Enforcement Program. Enforcement and NERC staff determined that GRDA violated 52 Requirements of 19 Reliability Standards. Enforcement, NERC and GRDA agree that GRDA will pay a civil penalty of \$175,000 to the United States Treasury and \$175,000 to NERC and also commit to mitigation and compliance measures going forward, subject to compliance monitoring, as detailed in the following paragraphs of this Agreement.

II. STIPULATIONS

A. Background

1. GRDA is an agency of the state of Oklahoma that operates hydroelectric and thermal generation facilities and a transmission system located within the Southwest Power Pool (SPP) transmission footprint. GRDA's transmission customers include municipalities, industrial customers and electric cooperatives. Because GRDA operates transmission lines with voltages as high as 345 kV and sells generation into the Eastern Interconnection, GRDA is subject to the Commission's regulations under section 215 of the Federal Power Act. GRDA is registered with NERC to perform the following reliability-related functions: Balancing Authority, Transmission Owner, Transmission Operator, Transmission Planner, Generator Owner, Generator Operator, Distribution Provider, Load Serving Entity, Purchasing-Selling Entity and Resource Planner.
2. In March 2009, staff of NERC and FERC each opened an investigation into allegations that GRDA did not support reliable operation of its transmission system; staff of these organizations coordinated their efforts as a joint investigation. In June 2009, GRDA and NERC signed a Settlement Agreement in Lieu of a Remedial Action Directive (2009 Agreement). Pursuant the 2009

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Agreement, GRDA agreed to take certain immediate actions to address unrepaired protection system devices, failure to use a communications system monitoring device, and organizational issues interfering with operator authority. In the fall of 2009, GRDA hired an independent consultant to conduct an internal investigation of its compliance with the Reliability Standards. In December 2009, GRDA hired outside legal counsel to facilitate efforts to address investigation findings. During the course of the investigation, GRDA has undertaken numerous efforts specifically aimed at addressing compliance concerns and achieving compliance with the Reliability Standards. During the course of this investigation, GRDA also reported to SPP potential violations related to the conduct examined in this investigation. Those reports invoking the following Standards and Requirements have been addressed in the course of this investigation and are finally resolved through this settlement agreement: PRC-018-1, Requirement R1; EOP-008-0 Requirement R1.1; FAC-001-0 Requirements R1, R2 and R3; FAC-009-1 Requirement R1; PRC-001-1 Requirements R1 and R2; and TOP-002-2 Requirement R11.

3. The joint investigation found violations of 52 Requirements of 19 Reliability Standards. Staff finds these violations to be serious deficiencies undermining reliable operation of GRDA's portion of the Bulk Power System. Staff further finds that these violations resulted from a lack of direction from within the organization necessary to create the mechanisms and incentives to ensure attention to and compliance with the Reliability Standards. Through recent efforts of GRDA's senior executives and its board of directors, GRDA has voluntarily made substantial improvements in its operations and has addressed many of the findings in advance of the close of the investigation. The conduct, violations, and mitigation to date are described below.

B. Conduct and Violations

1. TOP- Standards and Requirements Regarding Transmission Operations

4. a. **Conduct** - GRDA did not perform or make use of operational planning studies necessary and sufficient to assess its local day-ahead and current system conditions and to prepare for responding to emergency conditions. GRDA relied exclusively upon daily planning undertaken for the overall region by its reliability coordinator, Southwest Power Pool Reliability Coordinator (SPP), using the latter's model of the larger SPP footprint. In addition, the model used by SPP did not reflect protection system deficiencies known by GRDA, such as long-enduring outages of a substantial number of protection system communication devices ("carriers). Nor did GRDA report to the SPP model accurate facility ratings. Finally, GRDA system operators acknowledged they did not regularly review SPP's daily assessment. Without the benefit of effective operational

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planning studies, GRDA operated in an unknown state, unprepared to avoid exceeding system operating limits (SOLs), instability, cascading outages or uncontrolled separation as a result of severe single or multiple contingencies.

b. **Violation** – GRDA’s failure with regard to operational and planning studies failed to satisfy GRDA’s own responsibilities to comply with certain Reliability Standards requiring operational planning at its local transmission level and analysis of the full set of relevant contingencies or conditions internal to GRDA’s transmission system. The conduct described in Paragraph 4.a violates Requirements R5, R6, R10, R11 and R19 of TOP-002-2a; Requirements R1, R2 and R4 of TOP-004-2; and Requirement R2 of TOP-008-1.

5. a. **Conduct** - Because of the continued absence of effective operational studies, GRDA is not adequately prepared to mitigate conditions in which equipment exceeds its SOLs. When in an abnormal or emergency operating state where equipment is experiencing conditions exceeding SOLs, the operators must have the information and tools to determine the cause of the SOL violation and how to mitigate the problem. Before March 2011, when GRDA completed the first phase of development of its operational planning tool, GRDA did not have the tools to analyze current system conditions and to perform real time contingency analyses – information necessary to diagnose issues and also determine which actions to take to immediately mitigate the situation.

b. **Violation** - The lack of capability described in Paragraph 5.a violates TOP-008-1, Requirement R4.

6. a. **Conduct** - GRDA also did not notify its Reliability Coordinator of its ongoing and substantial carrier outages, which could have potentially affected reliable operation of the BPS in the SPP footprint in the event of faults originating in/on GRDA’s system. Numerous high speed relays implemented by GRDA in its protection systems depend upon available and functioning carriers. Dysfunctional or out-of-service carriers disable high speed relaying, resulting in potentially longer times to clear a fault on the system. SPP needed to be aware of these conditions to determine if the longer clearing times and potentially different post-contingency configurations on GRDA’s system would affect performance or operations in the larger SPP footprint. GRDA failed to notify SPP of its disabled or unreliable carrier equipment before June 2009.

b. **Violation** - GRDA’s failure to notify SPP of its disabled or unreliable carrier equipment, as described in Paragraph 6.a violated TOP-002-2a, Requirement R16.1.

7. a. **Conduct** - The limited metering range of certain critical instruments constrained GRDA’s ability to monitor its system in normal and emergency conditions, and occurred for two reasons. First, GRDA programs its monitoring

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software with “functional reasonable limits” (FRLs), which in some cases GRDA set as more conservative than operational limits. In these cases, when a facility’s real-time value exceeds the FRL, the real-time monitoring software stops reporting a system value for that equipment and reports an alert. Thus, the operators cannot know the exact system value or by how much it exceeds the operational limit. Second, current transformers that are part of the facilities monitoring circuitry reduce the useful measurement range to less than operational limits for certain equipment.

b. **Violation** - Both circumstances described in Paragraph 7.a impose an artificially low limit on the ability of the operators to monitor the measurable attributes of the transmission facilities, violating TOP-006-2, Requirement R6. This violation continues and will need to be addressed by GRDA in mitigation.

2. COM-001-1.1

8. a. **Conduct** - GRDA uses a single, common communications network that carries both power system operations and other, headquarters traffic. GRDA’s communications network architecture prior to fall 2009 did not provide adequate and reliable telecommunications. In 2005, GRDA commenced a project to modernize and improve the communications network and related equipment it uses to transfer system data, monitor, communicate with and control its transmission system. That project was substantially complete only as of August 2009. Throughout the course of the project, outdated network architecture and ongoing project work interfered with the adequacy and reliability of GRDA’s communications between the control center and transmission system: Almost daily, transmission operator log entries indicated the failure of various types of telecommunications equipment that resulted in decreased ability to monitor and control the transmission system. GRDA did not have a complete and accurate network configuration diagram detailing the old network, and the guesswork involved in project-related field work combined with the older architecture lacking redundant or diversely routed critical facilities and paths often resulted in inadvertent outages of communications equipment.

b. **Violation** - The old communications network described in Paragraph 8.a constituted an ongoing violation of COM-001-1.1, Requirement R1 and all sub-requirements until GRDA substantially completed the network project in fall 2009.

9. a. **Conduct** - GRDA did not manage and monitor vital telecommunications facilities for a period of many months. As GRDA’s communications network improvement project progressed, the upgrade work involved incremental disassociation of network equipment from GRDA’s TSM-2500, a tool the operators used to manage and monitor GRDA’s telecommunications equipment and diagnose problems with that equipment. As

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early as April 2008, the operators reported that the TSM-2500 was not accurately reporting on field equipment. Although GRDA had available a later-model replacement for the TSM-2500, the TSM-8000, the operators were not trained on this tool, and consequently disconnected it. GRDA did not train the operators to use the TSM-8000 until directed to do so as part of the 2009 Agreement in the summer of 2009.

b. **Violation** - Until the summer of 2009, failure to use a reliable and accurate monitoring tool, without alternative means of managing, alarming, testing or actively monitoring vital telecommunications facilities, as described in Paragraph 9.a, violated COM-001-1.1, Requirement R2.

10. a. **Conduct** - Moreover, before November 2010, GRDA did not have adequate written procedures for continuing operations of the system in the event of loss of telecommunications facilities. GRDA's original document designed to comply with COM-001-1.1, Requirement R5, which mandates that it have written procedures for how to continue operations if telecommunications are lost, provided only information on available voice communications equipment and restoration of that equipment to service.

b. **Violation** - While the current version of the procedure is comprehensive and satisfactory, GRDA's prior lack of appropriate procedure, as described in Paragraph 10.a, violated COM-001-1.1, Requirement R5.

3. **EOP-008-0 Regarding Plan for Loss of Functionality of the Control Center**

11. a. **Conduct** - EOP-008-0 requires a plan for the emergency condition of loss of control center functionality that addresses specific issues set forth in Requirements R1.1 through R1.8. First, GRDA did not create these documents until March 28, 2008. Before recent upgrades to its control center, GRDA's primary emergency plan was to relocate from its primary control center to its alternate control center, or, in case neither control center is functional, to deploy personnel to critical field sites and have them call information into the operators for as long as needed until control center functionality can be restored. Second, until January 2010, GRDA had not yet demonstrated to itself through testing whether its alternate control center had voice and data capability independent of the primary control centers. Third, the alternate plan, as written in 2008, did not contain enough specific procedures to execute it, other than to state that personnel in the field will call operators periodically with system information. Fourth, although GRDA trained its system operators in relocating from the primary to the alternate control center, it did not also drill the operators on switching operations to the alternate site. GRDA no longer retains its alternate plan of deploying personnel to the field, but, while that plan was in place, it did not train and drill on that alternative, either.

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b. **Violation** – As described in Paragraph 11.a, GRDA’s documentation for an EOP-008-0 plan did not set forth an executable plan satisfying this Standard. As provided in the compliance measure for EOP-008-0, a documented procedure is required to execute a current contingency plan because of the number and nature of the procedures that must be included as specified in Requirements R1.1 through R1.8 of the Standard. GRDA’s failure to demonstrate through testing, prior to January 2010, whether its alternate control center had voice and data capability independent of the primary control centers, violated Requirement R1.1. The failure of the alternate plan, as written in 2008, to contain enough specific procedures to execute it violated Requirements R1.2 through R1.4. Moreover, because GRDA has not yet trained and drilled on switching operations to the alternate site, it continues to violate Requirements R1.5 and R1.6, which mandate that GRDA test the viability of the plan and train the operators on the plan.

12. a. **Conduct** - In addition, GRDA did not update the plan annually or as needed under Requirement R1.7. GRDA supplemented the plan when it temporarily relocated operations to its alternate control center to permit major renovation activity at its primary control center, but the supplement did not resolve the plan’s deficiencies. Finally, GRDA incorrectly determined that it did not need interim control provisions under R1.8 to address the possibility that it could not execute the EOP-008-0 Plan within one hour; as an initial matter, accessing the system at the backup control center sometimes required unplanned-for technical support from the communications department.

b. **Violation** - As described in Paragraph 12.a, GRDA’s failure to update the plan annually or as needed violated Requirement R1.7 and GRDA’s lack of interim provisions violated Requirement R1.8.

4. EOP-004-1 for Failure to Report an Event to NERC

13. a. **Conduct** - GRDA did not recognize its reporting obligations to NERC upon the occurrence of certain more significant disturbances on its system. On September 5, 2008, a fault at a transformer prompted over thirty protection system operations and the temporary isolation of a substation. The event resulted in GRDA generating lessons learned and equipment modification related to protection system coordination and design. GRDA never reported this event to NERC. Since October 2010, GRDA has established procedures to identify and make notifications for reportable events.

b. **Violation** - As described in Paragraph 13.a, GRDA’s failure to report this event to NERC violated EOP-004-1, Requirement R3, Attachment 1-EOP-004 criteria 1.b and 1.c.

5. FAC- Accurate Facility Ratings

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14. a. **Conduct** - GRDA did not have an established facility ratings methodology until May 2010. As a result, GRDA could not apply facility ratings to its equipment consistent with a proper methodology. Furthermore, GRDA continues to be without proper documentation for some of its existing facility ratings, which necessitates review and change of ratings as necessary to come into compliance.

b. **Violation** - As described in Paragraph 14.a, GRDA's failure to have an established facility ratings methodology until May 2010 violated FAC-008-1, Requirement R1. As a result, GRDA could not apply facility ratings to its equipment consistent with a proper methodology, thus violating FAC-009-1, Requirement R1.

6. FAC- Facility Connection Requirements

15. a. **Conduct** - GRDA does not publish facility connection requirements, and does not keep those requirements current.

b. **Violation** - As described in Paragraph 15.a, GRDA's failure to publish facility connection requirements (which must include specific criteria listed in Requirement R2) and its failure to keep those requirements current was and continues to be a violation of FAC-001-0, Requirements R1, R2 and R.3.

7. TPL- Long Term Planning

16. a. **Conduct** - Through the 2010 planning year, GRDA improperly relied on the regional, coordinated long term planning process by the relevant SPP working group to identify and determine the long term planning needs for GRDA's own transmission system. Staff found that GRDA did not ensure that the modeling performed through the collaborative process provided a "valid assessment" of conditions and issues on GRDA's own transmission system because GRDA did not provide the modelers with relevant information about its system, e.g., the long-term outages of a significant number of its carriers and properly calculated facility ratings. Moreover, GRDA did not demonstrate that it evaluated the results of the regional modeling to determine the need for additional studies. .

b. **Violation** - As described in Paragraph 16.a, failure to model the overall effect of the carrier outages also violated Requirement R1.3.12 of TPL-002-0a and no assessment of GRDA's system could be "valid" under Requirements R1 of TPL-001 through TPL-004 series of Standards.

17. a. **Conduct** - In addition, GRDA did not document projects designed to address performance issues identified in the valid assessments. To the extent GRDA relied upon the regional system studies to satisfy Requirement R1 planning, GRDA did not document its plans to achieve system performance in

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response to identified issues and did not document the results of its assessments and corrective plans.

b. **Violation** - As described in Paragraph 17.a, GRDA's failure to document projects designed to address performance issues identified in the valid assessments violated Requirements R2 and R3 of the TPL- series of Standards.

8. PRC- Protection System Functionality

18. a. **Conduct** - GRDA did not ensure the functionality and responsiveness of its protection systems by ensuring familiarity with the purpose and limitations of its protection systems or by revisiting coordination as necessary and appropriate. GRDA's relay engineering department does not review design and coordination of existing protection systems, unless and until prompted by a system disturbance. Furthermore, it does not have adequate resources to maintain familiarity with existing protection systems and also design and coordinate new systems at new or modified interconnects or facilities. Neither the engineering nor system operations departments recognized the need for and assumed the responsibility to study how the significant carrier outages compromised the protection system coordination that contemplated high speed relaying consistent with functioning carriers.

b. **Violation** - Failure to ascertain how the carrier outages affected protection system operations, and failure to be generally familiar with the design and functionality of protection systems, as described in Paragraph 18.a, constitute violations of PRC-001-1, Requirements R1 and R4.

19. a. **Conduct** - Prior to March 2010, GRDA did not have a process for performing, and did not adequately perform analyses and corrective actions for protection system misoperations pursuant to PRC-004-1, Requirement R1. When GRDA did identify misoperations, it failed to perform a complete analysis of the events in question or formulate corrective action plans to address the cause of the misoperations. For other events involving protection system misoperations, GRDA failed to identify the misoperations.

b. **Violation** - As described in Paragraph 19.a, GRDA's failure, prior to March 2010, to have a process for performing, and to adequately perform analyses and corrective actions for protection system misoperations violated PRC-004-1, Requirement R1.

20. a. **Conduct** - GRDA's protection system maintenance and testing program exhibited significant gaps in that it did not cover carriers before fall 2009. GRDA had an average of eleven lines with protection system communications out of service each week over a period from June 27, 2007 through February 24, 2009, with a peak on three different occasions of fifteen out of thirty-six transmission

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line carriers out of service. Twenty-five of the lines out of service during that twenty-month period are 138 kV and above, up to 345 kV.

b. **Violation** - The failure to test and maintain the carriers, as described in Paragraph 20.a, violated PRC-005-1, Requirements R1, R2.1 and R2.2 until GRDA instituted a carrier maintenance program, upon completion of carrier repairs, in October 2009.

21. a. **Conduct** - In addition, during the period of significant carrier outages, GRDA did not notify its Reliability Coordinator or neighbors of the carriers' condition and its effects on system reliability. The many carriers in disrepair or out of service included several lines above 100 kV, including a 345 kV line, and some intertie lines.

b. **Violation** - Because, as described in Paragraph 21.a, the carriers' condition reduced relaying times and affected protection system responses on major lines, potentially undermining protection system coordination with neighbors, GRDA was in violation of PRC-001-1, Requirement R2.2 for failing to notify its Reliability Coordinator and affected neighbors.

22. a. **Conduct** - GRDA also did not have, prior to November 2010, a testing and maintenance program summary document pursuant to PRC-005-1, Requirement R1.2. The prior summaries did not include any procedures for carrier testing or other protection system-related communication, procedures for testing of protection-system DC control circuitry, a summary of testing procedures or sources for testing procedures, or the basis for testing intervals for voltage and current sensing devices and DC control circuitry.

b. **Violation** - As described in Paragraph 22.a, GRDA's failure, prior to November 2010, to have a sufficient testing and maintenance program summary document violated PRC-005-1, Requirement R1.2.

23. a. **Conduct** - GRDA did not timely install required disturbance monitoring equipment at appropriate locations pursuant to PRC-018-1 Requirement R1. GRDA completed installation of this equipment as of late 2010.

b. **Violation** - As described in Paragraph 23.a, GRDA's failure to timely install required disturbance monitoring equipment at appropriate locations violated PRC-018-1 Requirement R1.

9. PER- System Operator Training

24. a. **Conduct** - Reliability Standard PER-002-0, Requirement R1 states that system operators must be adequately trained. Staff observed certain significant oversights in GRDA's training regime. Operations personnel were not trained on how to use the TSM-8000, the tool for monitoring and diagnosing

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problems with communications equipment needed to monitor and control the transmission system. System operators also were not properly trained on operating the alternate control center independently from the primary control center. In addition, system operators were not trained on the capability and limitations of GRDA's protection system schemes – either with or without the carriers in service.

b. **Violation** - The examples described in Paragraph 24.a are areas fundamental to system operations that should have been included in the GRDA training program, and thus constitute violations of PER-002-2, Requirement R1.

25. a. **Conduct** - Moreover, GRDA did not have, until 2011, training staff competent in both knowledge of system operations and instructional capabilities. GRDA reassigned training responsibilities in April 2009 to an individual without instructional capabilities, and did not fully address the deficiency in its training staff capabilities until it trained that individual on instructional capabilities more than a year later, and also subsequently hired an experienced individual as dedicated training staff.

b. **Violation** - As described in Paragraph 25.a, GRDA's training staff deficiencies prior to 2011 violated Reliability Standard PER-002-0, Requirement R3.4.

C. Mitigation to Date

26. GRDA has undertaken substantial efforts to address Reliability-related concerns identified by staff and by its own internal investigation during the course of this investigation. Staff commends GRDA for the following proactive measures, by which GRDA has completely or partially addressed the findings of this investigation in advance of finalization of settlement. Staff also observes that these mitigation measures reflect a commitment to Reliability Standards compliance by GRDA's executive management and the board, which was necessary to provide the resources required to support system operators and also infuse the entire organization with a culture of compliance.

27. Significantly, GRDA has made several organizational changes to create coordination among and leadership of the various departments involved in operating the transmission system. These changes include consolidating several departments under unified oversight; increasing staffing in the areas of system operations and engineering; and creating means to improve communication and coordination between system operations and personnel who maintain the transmission system and communications network. GRDA has also created a compliance department and a training department, each of which reports to management directly. In addition, GRDA has established an anonymous hotline that employees may call to report compliance and reliability concerns. These

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organizational changes indicate that management has committed to reliable operations as a business priority and has created the mechanisms to ensure oversight of reliability issues.

28. Since the initiation of this investigation, GRDA has invested resources in further developing for use a previously defunct contingency analysis tool that the system operators use to perform system analyses in the operational time frame. The ability to use this tool as of March 2011, and creation of related processes to use the tool and report changes in transmission facility status to the reliability coordinator and neighboring registered entities, represents steps towards satisfying GRDA's obligation to perform its reliability responsibilities. GRDA operators have been trained on this tool and are currently applying the tool, which is pending completion of its system model and further refinements to improve its accuracy and capability. GRDA advises that, upon completion of the model and those refinements, the use of the tool will improve their operators' current capability, and be applied towards operational planning and devising operational solutions to system emergencies.

29. In addition to the telecommunications network upgrade completed in 2009, GRDA has also implemented appropriate procedures to ensure continued operations in the event of communications failures. GRDA advises that it is currently working on additional upgrades to its Energy Management System (EMS) that will support full automation of fail-over from one control center to the other. GRDA also advises that it continues to explore permanent solutions to network congestion issues that, on an ongoing but intermittent basis, continue to interfere with communications between the control center and the transmission system, including the ability to operate breakers.

30. GRDA has created a written plan for continued operations in the emergency situation of loss of functionality of a control center, which is subject to testing whether the alternate control centers operate independently of one another. In addition, and although unrelated to specific findings in this investigation, GRDA has, since the initiation of the investigation, completed renovation of its primary control center.

31. In its initiative to improve its compliance record generally, GRDA has developed and implemented several new written procedures addressing obligations under the Reliability Standards and how personnel are responsible for satisfying those obligations. In addition, GRDA has hired and appointed experienced personnel as dedicated training staff to develop and solidify training and compliance solutions that ensure ongoing satisfaction of the Reliability Standards.

32. Specific to its efforts to improve Reliability-related training, GRDA has developed and implemented training to ensure the system operators are familiar with the purpose and limitations of the protection systems on GRDA's system.

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GRDA has also developed procedures, to be implemented, to ensure engineering review of protection system design and coordination. The procedures also address the need to coordinate protection system changes with neighboring entities. In addition, GRDA has developed and implemented procedures on identifying and appropriately addressing protection system misoperations. GRDA has also revised its protection system maintenance and testing procedures and related documents to ensure full coverage of all protection system devices, including carriers and DC control circuitry, and that the documentation adequately reflects all relevant procedures and intervals for testing and maintenance. Finally, GRDA effectively addressed the absence of certain disturbance monitoring equipment at certain locations and developed a procedure to ensure proper reporting of disturbance data.

III. REMEDIES AND SANCTIONS

33. GRDA agrees to the facts stipulated in this Agreement. GRDA neither admits nor denies the conclusions that the conduct violated the Reliability Standards as described in this Agreement. To resolve the findings contained in this Agreement, GRDA agrees to the remedies set forth in the following paragraphs.

A. Civil Penalty

34. GRDA agrees to pay a civil penalty of \$175,000 to the United States Treasury and \$175,000 to NERC within 30 days of the Effective Date of this Agreement.

B. Additional Mitigation

35. GRDA commits to the following actions as necessary to complete mitigation of the violations described in this settlement agreement. GRDA commits to completion of the mitigation items identified in this Section III.B no later than one year after the Effective Date of this Agreement, unless otherwise stated in this section.

36. GRDA will complete the further refinements of its operational planning tool within six months of the Effective Date of this Agreement. Also by that date, GRDA system operators shall be trained on how to use the tool and shall be using it to conduct daily operational planning studies, including real time contingency analyses, to devise operational solutions to real time emergency conditions, and shall otherwise be making full use of the tool as part of daily system operations.

37. GRDA shall create training modules on using the operational planning tool on GRDA's system to be used as instruction for new system operators and for

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refreshing the capabilities of currently employed system operators and shall have all new and currently employed system operators attend annual, or more frequent, training classes offered by certified third parties that meet NERC continuing education requirements.

38. GRDA will continue improving its Energy Management System so as to support, in the event a control center loses communication with the transmission system, automated fail-over to the alternate control center.

39. GRDA will identify and plan to resolve the congestion on its communications network that is producing interference with communications between the control centers and the transmission system. In the interim, GRDA shall implement a formal process for maintaining records of these network congestion-related problems. The process will include reporting to the system operators the analysis and resolution of these problems. Final resolution of the issue causing congestion shall be complete no later than two years after the effective date of this Agreement.

40. GRDA will develop and maintain a network diagram that accurately reflects its communication network equipment and paths; a router/switch configuration diagram for its entire system; and an EMS system architecture diagram for both control centers.

41. GRDA shall maintain a record of events and other instances in which it has applied its procedure of determining whether the event in question should be reported to NERC or the Department of Energy pursuant to Reliability Standard EOP-004-1, Requirement R3.

42. GRDA will ensure through testing that its primary control center can fail over to the alternate control center, and that the control centers can receive voice and data communications independently of one another. GRDA will ensure, and also conduct training exercises and drills with the system operators and all relevant personnel, to confirm their ability to start up and timely resume operations from the alternate control center.

43. GRDA shall develop, maintain and update facility connection criteria and publish the same consistent with FAC-001-0, Requirements R1 through R3.

44. GRDA shall complete and document its methodology for determining facility ratings in compliance with reliability standard FAC-008-1 and calculate facility ratings consistent with that methodology as required by FAC-009-1. GRDA shall communicate any new or revised facility ratings to SPP, neighboring entities, and GRDA system operators, as well as other individuals in GRDA who perform

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functions requiring an accurate model of GRDA's transmission system pursuant to the relevant and applicable NERC reliability standards.

45. GRDA shall create and implement a procedure for GRDA engineers to study extended carrier outages or other Protection System relay or equipment failure or dysfunction that reduces system reliability and to report the results of that analysis to the system operators and initiate prompt corrective action. The procedure shall also include a means of reporting the failure or dysfunction, and its effects, to SPP and neighboring Transmission Operators or Balancing Authorities who may be affected.

46. GRDA shall ensure on an ongoing basis that all Protection System misoperation analyses are maintained as records and that relevant and appropriate findings are communicated to the system operators. GRDA shall ensure that lessons learned from misoperation analyses regarding protection system operations are communicated to the system operators, and that information and lessons learned are updated and reissued to the system operators as necessary and appropriate.

47. GRDA shall ensure on an ongoing basis that all models of GRDA's system used by its system operators, system planners and engineering department, are timely maintained with consistent and accurate current information. GRDA shall ensure that this information is timely and accurately provided to SPP for use by SPP in its models.

48. GRDA shall obtain the planning resources necessary to supplement SPP-lead regional long term planning with the appropriate studies specific to the GRDA system and required by Requirement R1 of the TPL- series of Standards. GRDA shall also ensure that it documents its plans to achieve the required system performance throughout the long-term planning horizon, and the results of those corrective plans, pursuant to Requirements R2 and R3 of the TPL- series of Standards.

49. Where functional reasonability limits (FRLs) limit the monitoring capability of facilities, GRDA must address the issue to achieve sufficient metering of suitable range as required by TOP-006-2, Requirement R6.

C. Investment in Compliance

50. GRDA agrees to invest \$2 million in additional measures to enhance and continue to ensure compliance with the Reliability Standards. These measures will be designed to address compliance issues and compliance awareness at all levels of personnel within the organization, and maintain organizational oversight on compliance issues to ensure compliance is a meaningful component of the

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organization's daily operations. GRDA commits to spend at least \$1 million of this investment within the first year following the Effective Date of this Agreement and the remainder of the \$2 million of this investment in the second year following the Effective Date of this Agreement. The expenditures will include but will not be limited to a training program with a comprehensive set of training modules and computer-based training to address various aspects of transmission and generation operation; tracking of the training; and all relevant paperwork. The training developed shall specifically address the conduct identified in this settlement agreement and ensure that mitigation efforts identified in this Agreement are periodically reinforced and perpetuated. GRDA may hire a document specialist to support the training department. The expenditures will also include:

- Transmission Outage Application Suite (TOA) software for outage coordination that ensures better compliance with certain Standards related to real-time system operating;
- Training tracking software to support the maintenance and organization of training records;
- Standby generators at microwave repeater sites to ensure backup power for communications from substations and remote sites;
- A split of the communications network to serve corporate and system operations functions separately to resolve bandwidth congestion issues;
- An upgrade of the control center network equipment from [Alcatel-Lucent] 7450 service switches to [Alcatel-Lucent] 7750 service routers to ensure more capable handling of higher volume traffic related to the transmission system;
- The creation of a new position of Superintendent of CIP Compliance to ensure one person has oversight of SCADA, Communications, and Network Security working groups that are responsible for CIP compliance; and
- Continued development and improvement of the recently implemented series of compliance processes and procedures designed to ensure ongoing compliance with the Reliability Standards, which Enforcement and NERC staff does not endorse as complete or fully effective at this time.

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51. GRDA shall control, maintain, and manage its information technology assets related to the functions for which GRDA is registered on the NERC Registry so as to ensure compliance with the Reliability Standards.

D. Compliance Monitoring

52. GRDA shall make semi-annual reports to Enforcement and NERC staff for one year following the Effective Date of this Agreement. The first semi-annual report shall be submitted no later than ten days after the end of the second calendar quarter after the quarter in which the Effective Date of this Agreement falls. The subsequent reports shall be due in six month increments thereafter. Each report shall detail: (1) actions taken as of the date of the report to satisfy the terms of this agreement, including all mitigation items; (2) updates of compliance measure implementation and expenditure, including the investments in compliance outlined in paragraph 50, above, that are and training administered during the preceding period; and (3) any additional violations that have occurred and whether and how GRDA has addressed those new violations. In addition, GRDA shall submit in conjunction with the first semi-annual report the revisions and improvements to the compliance processes and procedures related to the conduct and Reliability Standards identified in this Agreement, which compliance processes and procedures will be subject to review and comment by Enforcement and NERC staff. The reports must include an affidavit executed by an officer of GRDA that the compliance reports are true and accurate and also include corroborative documentation or other evidence supporting the reports. Enforcement and NERC staff may require a second year of biannual reporting if the internal review by GRDA or other circumstances indicate the need for further monitoring. GRDA agrees that one year after the Effective Date of this Agreement it will hire an independent auditor, to be approved by Enforcement and NERC staff, to conduct a comprehensive audit of GRDA's completion of the mitigation items listed in Section III.B of this Agreement, compliance program and related procedures, and, in particular, compliance with the Requirements and Standards violated.

IV. TERMS

53. The "Effective Date" of this Agreement shall be the date on which the Commission issues an order approving this Agreement without material modification. When effective, this Agreement shall resolve the matters specifically addressed herein, and that arose on or before the Effective Date, as to GRDA, any affiliated entity, and any successor in interest to GRDA.

54. Commission approval of this Agreement without material modification shall release GRDA and forever bar the Commission and NERC from holding GRDA, any affiliated entity, and any successor in interest to GRDA liable for any and all

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administrative or civil claims arising out of, related to, or connected with Enforcement's determination of violations addressed in this Agreement that arose on or before the Effective Date.

55. Failure to make timely civil penalty payments or to comply with the compliance program improvements and monitoring agreed to herein, or any other provision of this Agreement, shall be deemed a violation of a final order of the Commission issued pursuant to the Federal Power Act (FPA), 16 U.S.C. §792, *et seq.*, and may subject GRDA to additional action under the enforcement provisions of the FPA.

56. If GRDA does not make the civil penalty payment described above at the times agreed by the parties, interest payable to the United States Treasury and NERC will begin to accrue pursuant to the Commission's regulations at 18 C.F.R. § 35.19(a)(2)(iii) from the date that payment is due, in addition to the penalty specified above.

57. The Agreement binds GRDA and its agents, successors, and assignees. The Agreement does not create any additional or independent obligations on GRDA, or any affiliated entity, its agents, officers, directors, or employees, other than the obligations identified in this Agreement.

58. The signatories to this Agreement agree that they enter into the Agreement voluntarily and that, other than the recitations set forth herein, no tender, offer or promise of any kind by any member, employee, officer, director, agent or representative of Enforcement, NERC or GRDA has been made to induce the signatories or any other party to enter into the Agreement.

59. Unless the Commission issues an order approving the Agreement in its entirety and without material modification, the Agreement shall be null and void and of no effect whatsoever, and neither Enforcement, NERC nor GRDA shall be bound by any provision or term of the Agreement, unless otherwise agreed to in writing by Enforcement and GRDA.

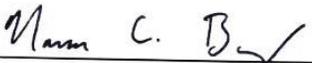
60. In connection with the payment of the civil penalty provided for herein, GRDA agrees that the Commission's order approving the Agreement without material modification shall be a final and unappealable order assessing a civil penalty under sections 215 and 316A(b) of the FPA, 16 U.S.C. § 825o-1(b), as amended. GRDA waives findings of fact and conclusions of law, rehearing of any Commission order approving the Agreement without material modification, and judicial review by any court of any Commission order approving the Agreement without material modification.

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61. Each of the undersigned warrants that he or she is an authorized representative of the entity designated, is authorized to bind such entity and accepts the Agreement on the entity's behalf.
62. The undersigned representatives of GRDA affirm that they have read the Agreement, that all of the matters set forth in the Agreement are true and correct to the best of their knowledge, information and belief, and that they understand that the Agreement is entered into by Enforcement in express reliance on those representations.
63. The Agreement may be signed in counterparts.
64. This Agreement is executed in duplicate, each of which so executed shall be deemed to be an original.

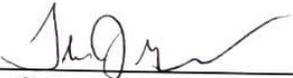
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AGREED TO AND ACCEPTED:



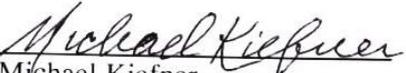
Norman C. Bay
Director, Office of Enforcement
Federal Energy Regulatory Commission

8.8.11
Date



Tom Galloway
Senior Vice President & Chief Reliability Officer
North American Electric Reliability Corporation

8/4/11
Date



Michael Kiefner
Interim General Manager
Grand River Dam Authority

7-15-11
Date

Document Content(s)

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