

Critical Energy Infrastructure Information
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October 31, 2008

VIA ELECTRONIC FILING

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

**Re: *North American Electric Reliability Corporation,*
Docket No. RM06-16-000**

Dear Ms. Bose:

The North American Electric Reliability Corporation (“NERC”) hereby submits this filing in compliance with paragraph 951 of the Commission’s Order No. 693 that required NERC to conduct a year-long survey of Interconnection Reliability Operating Limits (“IROL”) practices and actual operating experiences. NERC believes this filing fully satisfies the obligation established in the directive to collect and report on IROL practices and experiences.

NERC’s filing consists the following:

- This transmittal letter;
- A table of contents for the entire filing;
- A narrative description summarizing the results of the IROL survey;
- Official Data Request to Fulfill FERC Order No. 693 Requirements: Interconnection Reliability Operating Limits (**Exhibit A**);
- Reliability Coordinator Methodologies for Determining IROLs (**Exhibit B**), which contains Critical Energy Infrastructure Information that is removed from the public version; and
- Reliability Coordinator IROL Data: August 2007-2008 (**Exhibits C**), which contains Critical Energy Infrastructure Information that is removed from the public version.

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In accordance with the Commission's Rules of Practice and Procedure, 18 C.F.R. § 388.112, and its implementing orders, a non-public version of the information redacted from the public filing is provided under separate cover. This information constitutes critical energy infrastructure information. NERC respectfully requests that the confidential, non-public information be provided special treatment in accordance with the above regulation.

Please contact the undersigned if you have any questions.

Respectfully submitted,

/s/ Rebecca J. Michael

Rebecca J. Michael

*Attorney for North American Electric
Reliability Corporation*

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

**MANDATORY RELIABILITY STANDARDS) Docket No. RM06-16-000
FOR THE BULK POWER SYSTEM)**

**COMPLIANCE FILING OF THE
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION
IN RESPONSE TO PARAGRAPH 951 OF ORDER No. 693**

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EXHIBIT A – OFFICIAL DATA REQUEST TO FULFILL FERC ORDER NO. 693 REQUIREMENTS: INTERCONNECTION RELIABILITY OPERATING LIMITS

EXHIBIT B – RELIABILITY COORDINATOR METHODOLOGIES FOR DETERMINING IROLs
(Contains Critical Energy Infrastructure Information that has been removed from the public version)

EXHIBIT C – RELIABILITY COORDINATOR IROL DATA: AUGUST 2007-2008
(Contains Critical Energy Infrastructure Information that has been removed from the public version)

**UNITED STATES OF AMERICA
BEFORE THE
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**COMPLIANCE FILING OF THE
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION
IN RESPONSE TO PARAGRAPH 951 OF ORDER 693**

I. INTRODUCTION

In its March 16, 2007 Order,¹ the Federal Energy Regulatory Commission (“FERC” or the “Commission”) directed the North American Reliability Corporation (“NERC”), to conduct a year-long survey of the Reliability Coordinators’ Interconnection Reliability Operating Limit (“IROL”) practices and actual operating experiences beginning August 18, 2007 through August 17, 2008.²

This filing provides the results of the IROL survey NERC conducted as directed by the Commission and satisfies the requirement imposed in Paragraph 951 of Order No. 693.

¹ Mandatory Reliability Standards for the Bulk-Power System, 118 FERC ¶ 61,218, FERC Stats. & Regs. ¶ 31,242 (2007) (Order No. 693), order on reh’g, Mandatory Reliability Standards for the Bulk-Power System, 120 FERC ¶ 61,053 (Order No. 693-A) (2007).

² Order 693 at P 951: “Finally, the Commission directs the ERO to conduct a survey on IROL practices and actual operating experiences by requiring reliability coordinators to report any violations of IROL, their causes, the date and time, the durations and magnitudes in which actual operations exceeds IROLs to the ERO on a monthly basis for one year beginning two months after the effective date of the Final Rule. We may propose further modifications to IRO-005-1 based on the survey results.” NERC sent the first survey on Thursday, August 16, 2007, because August 18, 2007 fell on a Saturday, requesting that data be collected from August 17, 2007 through August 16, 2008.

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II. NOTICES AND COMMUNICATIONS

Notices and communications with respect to this filing may be addressed to the following:

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*Persons to be included on the Commission's service list are indicated with an asterisk.

III. SUMMARY OF INTERCONNECTION RELIABILITY OPERATING LIMIT PRACTICES AND ACTUAL OPERATING EXPERIENCES

Background

The Commission outlined in the Notice of Proposed Rulemaking³ and subsequently reinforced in Order No. 693 its concern regarding the two potential interpretations of Reliability Standard IRO-005-1 regarding how a system operator operates within IROLs.⁴ One interpretation is that the system operator allows the IROL to be exceeded during normal operations and prior to a contingency, provided corrective actions are taken within 30 minutes to reduce the flow below the IROL. In the second view, the system operator allows the IROL to be exceeded only after a contingency and

³ *Mandatory Reliability Standards for the Bulk Power System, Notice of Proposed Rulemaking*, 71 FR 64,770 (Nov. 3, 2006), FERC Stats. & Regs., Vol. IV, Proposed Regulations, ¶ 32,608 (2006).

⁴ Per NERC's Glossary of Terms, an Interconnection Reliability Operating Limit is "A System Operating Limit that, if violated, could lead to instability, uncontrolled separation, or Cascading Outages that adversely impact the reliability of the Bulk Electric System."

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returns the system to within the IROL as soon as possible but within 30 minutes. In the first interpretation, noted as “drifting in and out of IROLs,” the system can be one contingency away from potential cascading failure. Under the second interpretation, the system is two contingencies away from cascading failure.

In response to these alternative interpretations and applications, the Commission directed NERC to conduct a survey of IROL practices and actual operating experiences that required Reliability Coordinators in the United States to report any occasions when the flow exceeded an IROL, the cause of the exceedance, the date and time, and the duration and magnitude.

As discussed in NERC’s comments submitted in another proceeding, NERC notes that, according to the Commission:

The revised definition [of IROL Tv] is consistent with the intent of the statute with the exception of the phrase “that adversely impacts the reliability of the bulk electric system.” This may give the impression that violation of some IROLs that do not adversely impact the reliability of the bulk electric system are acceptable. The Commission proposes to accept the definition in FAC-014 with the understanding that all IROLs impact bulk electric system reliability.[]

NERC agrees with the Commission’s interpretation of the definition of IROL. An appropriate reading of the IROL definition does require that it impact reliability, otherwise it is not an IROL. It does not suggest that there is a subclass of IROLs that do not impact reliability.⁵

⁵ See *Notice of Proposed Rulemaking Facilities Design, Connections and Maintenance Reliability Standards*, “Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking for Facilities Design, Connections and Maintenance Reliability Standards,” Docket No, RM07-3-000 (September 19, 2007) at 31.

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The Commission directed the survey to be conducted monthly for one year beginning two months after the effective date of Order No. 693, specifically, August 18, 2007.⁶

NERC, in its role as the Electric Reliability Organization (“ERO”) and in accordance with Section 18 Part 39.2(d) of the Code of Federal Regulations, is required to provide information as necessary to the Commission to implement section 215 of the Federal Power Act. As such, users, owners and operators of the bulk power system are required to provide the ERO information as necessary in support of this same objective.

To collect the data necessary to respond to the Commission directive for IROL data, NERC utilized a process that was at the time drafted as a proposed rule of procedure that required NERC to post a proposed ERO data request for industry comment, followed by NERC Board of Trustees approval, before issuing a formal data request.⁷ NERC posted the IROL data request for a 30-day industry comment period that began on June 26, 2007. NERC reviewed the comments received and presented a final version of the data request that was adopted by the NERC Board of Trustees at its August 2, 2007 meeting. Due to the sensitive nature of IROL data that represent thresholds beyond which cascading failures could occur, all IROL exceedence data accumulated in the survey is treated as critical energy infrastructure information requiring confidentiality in submission to the Commission. The official Board of Trustees-approved ERO data request for IROL data is found in **Exhibit A**. In accord with this approved request,

⁶ NERC actually initiated the first survey on Thursday, August 16, 2007, because August 18, 2007 fell on a Saturday.

⁷ The Commission has since approved Section 1600 of the Rules of Procedure, known as the Data Rule, that establishes the process for issuing ERO data requests.

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NERC began to collect IROL data from U.S. Reliability Coordinators⁸ for a period that began on August 17, 2007 and concluded on August 16, 2008. The specific data requested for each occurrence when an IROL was exceeded is as follows:

- Reporting Reliability Coordinator
- Date when IROL is exceeded
- Start time when IROL is exceeded
- End time when system is within IROL
- Total duration when IROL exceeded
- Event that caused the IROL to be exceeded (normal non-contingency condition, *i.e.*, drifting in and out of an IROL limit or a contingency event)
- Name of component, path, circuit or flowgate involved in the IROL event
- IROL limit
- Maximum value experienced
- Difference between maximum value experienced versus IROL limit

In addition, in its initial monthly submission to NERC, Reliability Coordinators were requested to provide a brief summary to inform how its IROLs are determined. Each Reliability Coordinator complied with the request for monthly submissions of IROL data and additionally provided its summary of how IROLs are determined. **Exhibit B** contains a description of each Reliability Coordinator's methodology, including information on MW limits on some interfaces regarding existing infrastructure. In accordance with the Commission's Rules of Practice and Procedure, 18 C.F.R. § 388.112, and its implementing orders, a non-public version of the information redacted from the public filing is provided under separate cover. In addition to each Reliability Coordinator's methodology, Exhibit B contains information about existing infrastructure

⁸ U.S. Reliability Coordinators are Pacific Northwest Security Coordinator ("PNSC"), California-Mexico Reliability Coordinator ("CMRC"), Rocky Mountain-Desert Southwest Reliability Coordinator ("RDRC"), Midwest Independent System Operator ("MISO"), Southwest Power Pool (SPP), Electric Reliability Council of Texas ("ERCOT"), Entergy (performed through SPP Independent Coordinator of Transmission), Tennessee Valley Authority ("TVA"), Southeastern Reliability Coordinator, Virginia – Carolina South ("VACAR South"), Florida Reliability Coordinating Council ("FRCC"), Pennsylvania-New Jersey-Maryland Interconnection ("PJM"), New York Independent System Operator ("NYISO"), and Independent System Operator – New England ("ISONE").

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that goes beyond mere location. It pertains to specific engineering and design information regarding transmission facilities. As a result this information constitutes critical energy infrastructure information. NERC respectfully requests that the confidential, non-public information be provided special treatment in accordance with the above regulation.

Exhibit C provides the raw IROL data collected through the period of observation. In accordance with the Commission's Rules of Practice and Procedure, 18 C.F.R. § 388.112, and its implementing orders, a non-public version of the information redacted from the public filing is provided under separate cover. Exhibit C has been redacted to remove the actual raw IROL data collected through the period of observation, in accordance with the data survey, and in recognition that the information requested constitutes confidential critical energy infrastructure information. Specifically, Exhibit C contains information that, if released, could identify system weaknesses and pose a risk of attack on existing infrastructure. NERC respectfully requests that the confidential, non-public information be provided special treatment in accordance with the above regulation.

Reliability Coordinator Methodologies

Reliability Coordinators in the U.S. utilize varying methodologies to determine IROLs. As a component of the NERC data request to the U.S. Reliability Coordinators, NERC received a summary description of how each Reliability Coordinator determines IROLs. **Exhibit B** presents these summary methodologies. A number of Reliability Coordinators establish key interfaces or flowgates that are treated as IROLs, utilizing an N-1 analysis in day-ahead and real-time, and in some cases, N-2 analysis for areas that

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import into certain Reliability Coordinator footprints. Further, a number of the Reliability Coordinators identify the IROL and then apply a MW safety margin, or back off from the actual identified limit across these interfaces.

Additionally, a number of Reliability Coordinators identify System Operating Limits (“SOLs”) as the basis for determining appropriate IROLs using criteria defined by each Reliability Coordinator. Several utilize a percentage significantly above the identified SOL for thermally limited facilities that they analyze to determine if widespread overloads are anticipated following the loss of that facility. If so, that facility is defined as an IROL. An outage that causes depressed voltages over a defined number of buses is also recognized as an IROL in these areas. One Reliability Coordinator also identifies an IROL if an outage cascades into a neighboring Reliability Coordinator footprint.

Furthermore, some Reliability Coordinators rely on their Transmission Owners and Transmission Operators to identify the specific IROLs to which they should operate. And lastly, the Reliability Coordinators in the West operate only to study conditions and note that they do not operate in IROL conditions, only SOLs, unless there are one or more unanticipated outages. In these cases, when an IROL condition is experienced, the Reliability Coordinators must restore the system to a known operating state within 20 minutes for stability concerns or 30 minutes for thermal concerns.

Review of Monthly IROL Operating Experiences

During the survey period from August 17, 2007 through August 16, 2008, there were 105 occasions where a Reliability Coordinator reported the IROL value was

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exceeded. (See **Exhibit C.**⁹) Of these, 76 occurrences or 72% of the occasions were classified as “drifting in and out” of the IROL under normal non-contingency conditions. Twenty-nine occurrences of exceeding the IROL value resulted from an actual contingency condition. In no instance did a reported occurrence that exceeded the IROL value exist for more than the maximum 30-minute time frame allowed for mitigation without classifying the occasion as a potential Reliability Standard violation.

In reviewing the 76 occurrences of “drifting in and out” of the IROL without a contingency, the average duration the IROL was exceeded was 3 minutes, 27 seconds with a maximum duration experienced of 15 minutes, 35 seconds. The average peak magnitude beyond the IROL was 20 MW with a 211 MW maximum value in excess of the IROL. In 68% of these instances of drifting without a contingency, the Reliability Coordinators involved noted in its IROL methodology that it utilizes a safety margin in determining the IROL value. Thus, it is reasonable to conclude that the risk impact of drifting beyond the IROL for these entities is reduced with respect to the exposure of instability or cascading outages to the Bulk Electric System for a subsequent contingency.

For the 29 occasions where an IROL was exceeded following a contingency, the average duration the IROL was exceeded was 9 minutes, 25 seconds with a maximum duration noted at 29 minutes, 46 seconds. The associated average peak magnitude in excess of the IROL was 131 MW with a maximum MW value 542 MW beyond the IROL.

⁹ Exhibit C presents the total duration that the IROL was exceeded and the maximum MW value beyond the IROL that was realized.

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IV. CONCLUSION

For the foregoing reasons, NERC respectfully requests that the Commission accept this compliance filing submitted in response to the Commission's requests for supplemental information on IROL practices and actual operating experiences.

Respectfully submitted,

/s/ Rebecca J. Michael

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CERTIFICATE OF SERVICE

I hereby certify that I have served a copy of the foregoing document upon all parties listed on the official service list compiled by the Secretary in this proceeding.

Dated at Washington, D.C. this 31st day of October, 2008.

/s/ Rebecca J. Michael _____

Rebecca J. Michael

*Attorney for North American Electric
Reliability Corporation*

Exhibit A

Official Data Request to Fulfill FERC Order No. 693

Requirements: Interconnection Reliability Operating Limits



Gerry Adamski
Vice President and
Director of Standards

August 16, 2007

RELIABILITY COORDINATOR CONTACT
TITLE
COMPANY
ADDRESS
CITY, STATE ZIP CODE (TNR, 12pt)

Dear XXXXX:

**Official Data Request to Fulfill FERC Order No. 693 Requirements
Interconnection Reliability Operating Limits**

Pursuant to the authority granted by FERC Order 672 and as implemented in Title 18, Section 39.2 of the Code of Federal Regulations, NERC as the appointed electric reliability organization issues this official data request as described in Attachment 1.

The legal basis in the United States for this authority is explained in FERC's Order 672, paragraph 114:

114. The Commission agrees with commenters that, to fulfill its obligations under this Final Rule, the ERO or a Regional Entity will need access to certain data from users, owners and operators of the Bulk-Power System. Further, the Commission will need access to such information as is necessary to fulfill its oversight and enforcement roles under the statute. Section 39.2 of the regulations will include the following requirement:

(d) Each user, owner or operator of the Bulk-Power System within the United States (other than Alaska and Hawaii) shall provide the Commission, the Electric Reliability Organization and the applicable Regional Entity such information as is necessary to implement section 215 of the Federal Power Act as determined by the Commission and set out in the Rules of the Electric Reliability Organization and each applicable Regional Entity. The Electric Reliability Organization and each Regional Entity shall provide the Commission such information as is necessary to implement section 215 of the Federal Power Act.

Within the United States, failure to comply with an official data request would constitute a violation of FERC regulations. Enforcement action is available to FERC to deal with violations of its regulations. This is authority that FERC could exercise, not authority available to NERC. NERC's Compliance Monitoring and Enforcement Program, including the ability to impose penalties and sanctions, is limited to violations of reliability standards.

Please note the following additional pieces of information relative to this data request:

- An Excel spreadsheet (attached) to serve as a template for providing the requested information.
- Completed forms are to be submitted to sarcomm@nerc.net by the 20th of each month for the period the request is in place.
- September 20, 2007 is the date noted for the initial submission of Interconnection Reliability Operating Limit data for the period covering August 17–31, 2007. Since this period does not cover an entire month, NERC will utilize the September 20th date as a trial run of the data gathering and reporting process. You are encouraged, but not required, to submit the requested IROL data for this period by September 20th. If you choose not to participate and do not submit your report by September 20th, please notify me at sarcomm@nerc.net of your intention. Please be advised that you will be obligated to submit a report by October 20, 2007 that covers the period of August 17–September 30, 2007.

Thank you for your support of this effort. Please contact me should you have any questions.

Sincerely,

A handwritten signature in black ink, reading "Gerry Adamski". The signature is written in a cursive style and is centered below the word "Sincerely,".

Enclosure

cc: Reliability Coordinator Working Group
Regional Entity Management Group

Attachment 1

Interconnection Reliability Operating Limit Data Request

Background

In paragraph 951 of Order No. 693, FERC directs NERC to conduct a survey on IROL practices:

951. “Finally, the Commission directs the ERO to conduct a survey on IROL practices and actual operating experiences by requiring reliability coordinators to report any violations of IROL, their causes, the date and time, the durations and magnitudes in which actual operations exceeds IROLs to the ERO on a monthly basis for one year beginning two months after the effective date of the Final Rule. We may propose further modifications to IRO-005-1 based on the survey results.”

Description of Data Requested

This request is a monthly request for data that covers the period August 17, 2007 and concludes August 16, 2008. The following information is requested to be prepared and provided in a format developed and provided by NERC:

- Reporting reliability coordinator
- Date when IROL is exceeded
- Start time when IROL is exceeded
- End time when system is within IROL
- Total duration when IROL exceeded
- Event that caused the IROL to be exceeded (normal non-contingency condition, i.e., drifting in and out of an IROL limit, or a contingency event)
- Name of component, path, circuit, or flowgate involved in the IROL event
- IROL limit
- Maximum value experienced
- Difference between maximum value experienced versus IROL limit

Note: Each occurrence must be reported individually.

Reliability coordinators should also provide a brief summary to inform how its IROL limits are determined in its initial monthly submission to NERC.

The individual data submissions should be submitted to the NERC vice president and director of standards by the 20th day of the month (or the following Monday if the 20th falls on a weekend) representing data from the previous month. The data collection period will begin on August 17, 2007 through August 16, 2008. The first report is due September 20, 2007 for the period August 17–31, 2007.

To comply with FERC directives, NERC will provide a filing that includes the compiled data by October 31, 2008.

How the Data Will Be Used

The data will be used to respond to the FERC directive outlined above. The intent, as articulated in Order 693, is to learn about the operating experiences and practices of operating entities; specifically, how they operate their systems to respect IROLs in normal system conditions (i.e., prior to a contingency.) The survey results will facilitate future development and modifications of IROL-related reliability standards to better clarify and eliminate potential multiple interpretations of respecting IROLs that may exist. FERC discussed IRO-005-1 could be interpreted as allowing a system operator to respect IROLs in two possible ways: (1) allowing IROL to be exceeded during normal operations, i.e., prior to a contingency, provided that corrective actions are taken within 30 minutes; or (2) exceeding IROL only after a contingency and subsequently returning the system to a secure condition as soon as possible, but no longer than 30 minutes. Thus, the system can be one contingency away from potential cascading failure if operated under the first interpretation and two contingencies away from cascading failure under the second interpretation.

The survey will further identify the reliability risks and the frequency and number of operating practices involving drifting in and out of IROL. The term “drifting in and out of IROLs” refers to operating the normal system (i.e., prior to a contingency) with frequent occurrences in which IROLs are exceeded, but each occurrence lasting less than 30 minutes. Currently, this mode of operation is not considered as a violation of NERC Reliability Standards.

How the Data Will Be Collected and Validated

Reliability coordinators will forward its monthly IROL data in a format developed and provided by NERC to NERC’s vice president and director of standards. Reliability coordinators are expected to validate the data to be correct prior to submittal.

Reporting Entities

Reliability coordinators in the United States.

Reliability coordinators outside the United States are voluntarily encouraged to submit this information. NERC will seek permission from these non-U.S. entities for inclusion of its data in the information filed with FERC.

Due Date for the Information

Reliability coordinators are to report the requested data by the 20th day of the month for data captured during the previous month.

Restrictions on Disseminating Data (Confidential/CEII)

NERC will provide this data to FERC per its Order No. 693 directives. This information will be treated as critical energy infrastructure information when submitted to FERC.

Estimate on Burden Imposed to Collect Data

Ongoing costs for one year under review by this data request for reliability coordinators to collect, compile, and report to NERC the requested data. Some reliability coordinators may need to modify their monitoring systems, or develop applications to track potential

IROLs. Further, reliability coordinators may need to train its personnel on these applications and monitoring systems, and provide resources to validate potential IROLs.

Exhibit B

Reliability Coordinator Methodologies for Determining Interconnection Reliability Operating Limits (IROLs) Determination Methodologies

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Exhibit C

Reliability Coordinator IROL Data: August 2007 - 2008

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