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## **I. INTRODUCTION**

The North American Electric Reliability Corporation (“NERC”) submits this informational compliance filing to paragraph 77 of Order No. 693, issued by the Commission on March 16, 2007.<sup>1</sup> In paragraph 77, the Commission directed NERC to submit, within 90 days, “an informational filing that includes a complete set of regional definitions of bulk electric system and any regional documents that identify critical facilities to which the Reliability Standards apply (i.e., facilities below a 100 kV threshold that have been identified by the regions as critical to system reliability).” NERC is submitting this informational filing in compliance with that directive.

## **II. NOTICES AND COMMUNICATIONS**

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<sup>1</sup> *Mandatory Reliability Standards for the Bulk Power System*, Order No. 693, 118 FERC ¶61,218 (2007).

### **III. DISCUSSION**

#### **A. NERC/Regional Entity Compliance Registration Process**

In Order No. 693, the Commission approved as mandatory and enforceable, pursuant to §215 of the Federal Power Act (“FPA”), 83 proposed Reliability Standards and six regional differences, as well as the NERC *Glossary of Terms Used in Reliability Standards* (“*Glossary*”).<sup>2</sup> The Commission addressed, in §II.C., “Applicability,” of Order No. 693, several issues relating to the applicability of Reliability Standards to entities, including the scope of the “bulk-power system” as defined in §215(a)(1) and as compared to the term “bulk electric system” defined in the NERC *Glossary*.<sup>3</sup> The Commission concluded “for at least an initial period, the Commission will rely on the NERC definition of bulk electric system and NERC’s registration process to provide as much certainty as possible regarding the applicability to and the responsibility of specific entities to comply with the Reliability Standards in the start-up phase of a mandatory Reliability Standard regime.”<sup>4</sup> However, the Commission also directed:

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<sup>2</sup> The definitions in the NERC *Glossary* have been developed through the stakeholder-driven process established in the NERC *Reliability Standards Development Procedure*, which the Commission found to be acceptable (with specific directed revisions and clarifications) in its Order certifying NERC as the electric reliability organization. *Order Certifying North American Electric Reliability Corporation as the Electric Reliability Organization and Ordering Compliance Filing*, 116 FERC ¶61,062, at PP 10-11 and 220-292. Accordingly, any proposed changes to definitions in the NERC *Glossary* must be processed using the *Reliability Standards Development Procedure*.

<sup>3</sup> “As defined by the Regional Reliability Organization, the electrical generation resources, transmission lines, interconnections with neighboring systems, and associated equipment, generally operated at voltages of 100 kV or higher. Radial transmission facilities serving only load with one transmission source are generally not included in this definition.” For purposes of monitoring and enforcing compliance with mandatory Reliability Standards pursuant to §215 of the FPA and the approved delegation agreements, the Regional Entities have now replaced Regional Reliability Organizations.

<sup>4</sup> Order No. 693, at P 75 (footnotes omitted).

Although we are accepting the NERC definition of bulk electric system and NERC's registration process for now, the Commission remains concerned about the need to address the potential for gaps in coverage of facilities. For example, some current regional definitions of bulk electric system exclude facilities below 230 kV and transmission lines that serve major load centers such as Washington, DC and New York City. The Commission intends to address this matter in a future proceeding. As a first step in enabling the Commission to understand the reach of the Reliability Standards, we direct the ERO, within 90 days of this Final Rule, to provide the Commission with an informational filing that includes a complete set of regional definitions of bulk electric system and any regional documents that identify critical facilities to which the Reliability Standards apply (i.e., facilities below a 100 kV threshold that have been identified by the regions as critical to system reliability).<sup>5</sup>

In §III.B below, NERC provides information on the definition of "bulk electric system" used by each Regional Entity including additional criteria, if any, used by the Regional Entity to identify (or exclude) entities that should be registered as responsible for complying with requirements of one or more Reliability Standards.

As the Commission's discussion in §II.C of Order No. 693 demonstrates, the ultimate objective is not merely to determine the scope of the "bulk-power system," but rather to identify those entities required to comply with mandatory and enforceable Reliability Standards approved by the Commission. The scope of the bulk electric system as defined in the NERC *Glossary* pertains to the facilities that generally comprise the bulk electric system. NERC's *Statement of Compliance Registry Criteria* and the registration process specified therein and in Section 500 of the NERC Rules of Procedure provide the implementing vehicle to identify the entities that have a material impact on the reliability of the bulk electric system as defined in the NERC *Glossary*. The NERC *Statement of Compliance Registry Criteria* and registration process support the mandate of Section 215(b)(2) of the FPA that "All users, owners, and operators of the bulk-power system shall comply with reliability standards that take effect under this section." In its

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<sup>5</sup> *Id.*, at P 77 (footnote omitted).

comments on the Commission's Notice of Proposed Rulemaking in Docket No. RM06-16-000, NERC stated:

NERC's approach to moving forward with the enforcement of mandatory reliability standards is a practical one: to register the specific entities that NERC will hold accountable for compliance with the standards. The registration will identify all entities that are material to the reliability of the bulk power system. Such registration is readily achievable and is an entirely sufficient starting point from which to begin enforcement of reliability standards. Registration is based on the facts and circumstances of each entity with regard to how it is organized and its reliability responsibilities. Registration requirements are straightforward in many cases (*e.g.*, the existing reliability coordinators), and can be readily resolved based on the specific facts in more complex cases. NERC has established registration criteria to identify all entities with a material impact on the reliability of the bulk-power-system. The criteria will be further refined or expanded as necessary based on approved reliability standards and further determinations of materiality to the bulk power-system. The current registration criteria are provided for information as Attachment B to these comments.<sup>6</sup>

In paragraph 75, as well as paragraphs 92-101, of Order No. 693, the Commission concluded that it will rely on NERC's registration and compliance registry processes, as embodied in the NERC *Statement of Compliance Registry Criteria*, to provide as much certainty as possible regarding the applicability of Reliability Standards to specific entities and the responsibility of those entities to comply with approved Reliability Standards. Section 501 of NERC's Rules of Procedure provides that NERC will maintain a compliance registry of the bulk power system owners, operators and users that are subject to approved reliability standards, and will set forth the identity and functions performed for each organization responsible for meeting requirements of the Reliability Standards.<sup>7</sup> Section 501.1.2 sets forth factors that shall be considered by NERC and the Regional Entities in determining which organizations should be

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<sup>6</sup> Comments of the North American Electric Reliability Corporation on the Notice of Proposed Rulemaking for Mandatory Reliability Standards for the Bulk Power System, Docket RM06-16-000, January 3, 2007 ("NOPR Comments"), at 36-37.

<sup>7</sup> See §501.1.1 of the NERC Rules of Procedure.

placed in the compliance registry. Further, §2.0 of the NERC Compliance Monitoring and Enforcement Program, which is incorporated in Exhibit D to the delegation agreements between NERC and the Regional Entities, specifies that the “Compliance Enforcement Authority” (*i.e.*, either NERC or, where authority has been delegated pursuant to a delegation agreement, the Regional Entity) shall register the organizations responsible for complying with Reliability Standards, in accordance with Section 500 of the NERC Rules of Procedure.<sup>8</sup>

NERC’s *Statement of Compliance Registry Criteria* was developed to provide detailed criteria for compiling the compliance registry in accordance with Section 501 of the NERC Rules of Procedure. NERC emphasizes that at this stage in the implementation and enforcement of mandatory Reliability Standards, the basis for identifying and registering entities which are responsible for complying with Reliability Standards is the criteria embodied in the NERC *Statement of Compliance Registry Criteria*.

As NERC has described in previous filings, the *Statement of Compliance Registry Criteria* is the result of a collaborative effort among NERC and the Regional Entities, with input from a wide range of stakeholders.<sup>9</sup> NERC originally included the *Statement of Compliance Registry Criteria* (Version 2) as Attachment B to its NOPR Comments. NERC then submitted Version 3 of the *Statement of Compliance Registry Criteria* in a supplemental filing on February 6, 2007.<sup>10</sup> Most recently, NERC included Version 3.1 of the *Statement of Compliance Registry*

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<sup>8</sup> The Commission approved, subject to certain modifications, the NERC Compliance Monitoring and Enforcement Program, and the delegation agreements between NERC and the eight Regional Entities, in its April 19, 2007 Order in Docket Nos. RR06-1-004 *et al.* *Order Accepting ERO Compliance Filing, Accepting ERO/Regional Entity Delegation Agreements, and Accepting Regional Entity 2007 Business Plans*, 119 FERC ¶61,060 (2007).

<sup>9</sup> See Request of the North American Electric Reliability Corporation for Leave to File Supplemental Information, Docket RM06-16-000, February 6, 2007.

<sup>10</sup> See *id.*

*Criteria* with its May 15, 2007 compliance filing in response to paragraph 107 of Order No. 693.<sup>11</sup> In Order No. 693, the Commission (based on review of Version 2) concluded that:

We believe that NERC has set reasonable criteria for registration and, thus, we approve the ERO's compliance registry process as an appropriate approach to allow the ERO, Regional Entities and, ultimately, the entities responsible for compliance with mandatory Reliability Standards to know which entities are responsible for initial implementation of and compliance with the new Reliability Standards. Further, based on supplemental comments of APPA, TAPS and NRECA, it appears that there is support among many of the smaller entities for the NERC compliance registry process. Thus, at this juncture, the Commission will rely on the NERC registration process to identify the set of entities that are responsible for compliance with particular Reliability Standards.<sup>12</sup>

Moreover, as the Commission recently emphasized in its May 18, 2007 Order in Docket No. RM07-11-000, adopting amendments to 18 C.F.R Part 292, "The reliability criteria adopted by NERC and approved by the Commission, as well as the compliance registry process adopted by NERC and approved by the Commission, are designed to ensure that only those facilities needed to maintain the reliability of the bulk-power system are subject to the reliability standards."<sup>13</sup>

The *Statement of Compliance Registry Criteria* is being used by NERC and the Regional Entities to identify those entities to which each approved Reliability Standard is applicable and that must comply with one or more requirements of the standard. The *Statement of Compliance Registry Criteria* is based on two key principles:

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<sup>11</sup> Compliance Filing of the North American Electric Reliability Corporation in Response to Paragraph 107 of Order No. 693, Docket RM06-16-000, May 15, 2007, Attachment 2A. The revisions to the *Statement of Compliance Registry Criteria* from Version 3 to Version 3.1 were primarily the removal of detailed provisions concerning joint registrations and joint registration organizations, which were incorporated into Sections 501 and 507 of the NERC Rules of Procedure in accordance with the Commission's direction in P 107 of Order No. 693.

<sup>12</sup> Order No. 693, at P 95 (footnote omitted).

<sup>13</sup> *Applicability of Federal Power Act Section 215 to Qualifying Small Power Production and Cogeneration Facilities*, 119 FERC ¶61,149 (2007), at P 30.

1. There needs to be consistency between regions and across the continent with respect to which entities are registered; and
2. Any entity reasonably deemed material to the reliability of the bulk power system will be registered, irrespective of other considerations.<sup>14</sup>

The detailed criteria in the *Statement of Compliance Registry Criteria* were developed, and are used, by NERC and the Regional Entities “in order to promote consistency” in “determining whether particular entities should be identified as candidates for registration;” and “[a]ll organizations meeting or exceeding the criteria will be identified as candidates.”<sup>15</sup> Thus, the criteria in the *Statement of Compliance Registry Criteria* expressly address the concerns reflected in the discussion in §II.C.1 of Order No. 693 about potential differences among regions in the definition of bulk electric system and therefore in the determination of which entities must comply with Reliability Standards.

#### **B. Regional Definitions of “Bulk Electric System”**

The information requested in paragraph 77 of Order No. 693 is provided below on a Regional Entity-by-Regional Entity basis. Each Regional Entity utilizes the definition of bulk electric system in the NERC *Glossary*; however, as permitted by that definition and as discussed below, several Regional Entities define specific characteristics or criteria that the Regional Entity uses to identify the bulk electric system facilities for its members. In addition, the Reliability Standards apply to load shedding and special protection relay facilities below 100 kV, which are monitored by Regional Entities, in compliance with NERC’s Reliability Standards.

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<sup>14</sup> *Statement of Compliance Registry Criteria*, Rev. 3.1, May 14, 2007, at 3.

<sup>15</sup> *Id.*

**1. Texas Regional Entity (“TRE”), a Division of Electric Reliability Council of Texas**

**Does TRE use the definition of “bulk electric system” in the NERC *Glossary*?**

Yes, without additional criteria, for enforcement of NERC and regional Reliability Standards.

**Has TRE established criteria to supplement the NERC definition to identify critical facilities below 100 kV?**

No.

**Has TRE specifically identified any critical facilities below 100 kV?**

No.

**2. Florida Reliability Coordinating Council (“FRCC”)**

**Does FRCC use the definition of “bulk electric system” in the NERC *Glossary*?**

Yes, without additional criteria.

**Has FRCC established criteria to supplement the NERC definition to identify critical facilities below 100 kV?**

No.

**Has FRCC specifically identified any critical facilities below 100 kV?**

No.

**3. Midwest Reliability Organization (“MRO”)**

**Does MRO use the definition of “bulk electric system” in the NERC *Glossary*?**

Yes.

**Has MRO established criteria to supplement the NERC definition to identify critical facilities below 100 kV?**

No.

**Has MRO specifically identified any critical facilities below 100 kV?**

No.

**4. Northeast Power Coordinating Council: Cross Border Regional Entity (“NPCC CBRE”)**

**Does NPCC CBRE use the definition of “bulk electric system” in the NERC *Glossary*?**

Yes, supplemented by additional criteria. NPCC CBRE identifies elements of the bulk-power system using an impact-based methodology, not a voltage-based methodology. NPCC CBRE’s definition of “bulk power system” is:

the interconnected electrical systems within northeastern North America comprised of system elements on which faults or disturbances can have a significant adverse impact outside of the local area.

NPCC analyzes all system elements in the interconnected electric systems within its U.S. and Canadian footprint regardless of size (voltage) to determine impact based on this definition. NPCC has been using an impact-based methodology for more than 30 years to ensure its reliability objectives are met. Provided in **Attachment 1** are (i) the NPCC CBRE Document A-10 *Classification of Bulk Power System Elements*, adopted by the members of NPCC on April 28, 2007, which provides further information on the definition and how it is applied, and (ii) the *NPCC Glossary of Terms*, which provides the definitions of terms used in the *Classification of Bulk Power System Elements*.

**Has NPCC CBRE established criteria to supplement the NERC definition to identify critical facilities below 100 kV?**

NPCC applies an impact-based testing methodology, A-10 *Classification of Bulk Power System Elements* (see **Attachment 1**) to all parts of the interconnected electric systems within its U.S. and Canadian footprint. All facilities below 100 kV within NPCC’s geographic footprint were tested and found not to impact the bulk power system. NPCC members apply the testing methodology and review their bulk power system lists at least once every three years, or more often if system changes dictate the need.

**Has NPCC CBRE specifically identified any critical facilities below 100 kV?**

Through the application of the impact-based methodology described above, no facilities below 100 kV impact the bulk power system.

**5. ReliabilityFirst Corporation (“RFC”)**

**Does RFC use the definition of “bulk electric system” in the NERC Glossary?**

Yes, supplemented by additional criteria. The “bulk electric system” within the RFC footprint is defined as all:

1. Individual generation resources larger than 20 MVA or a generation plant with aggregate capacity greater than 75 MVA that is connected via a step-up transformer(s) to facilities operated at voltages of 100 kV or higher,
2. Lines operated at voltage of 100 kV or higher,
3. Transformers (other than generator support) with both primary and secondary windings of 100 kV or higher, and
4. Associated auxiliary and protection control system equipment that could automatically trip a bulk electric system facility, independent of the protection and control equipment’s voltage level.

The RFC “bulk electric system” excludes:

1. Radial facilities connected to load serving facilities or individual generation resources smaller than 20 MVA or a generation plant with aggregate capacity less than 75 MVA where the failure of the radial facilities will not adversely affect the steady-state operation of other facilities operated at voltages of 100 kV or higher, and
2. Balance of generating plant control and operation functions (other than protection systems that directly control the unit itself and step-up transformer); these facilities would include relays and systems that automatically trip a unit for boiler, turbine, environmental, and/or other plant restrictions, and
3. All other facilities operated at voltages below 100 kV.

**Has RFC established criteria to supplement the NERC definition to identify critical facilities below 100 kV?**

See preceding response.

**Has RFC specifically identified any critical facilities below 100 kV?**

No.

**Other comments.**

RFC is comprised of the former ECAR, MAAC and MAIN reliability regions, each of which had different definitions of the bulk electric system. **Attachment 2** provides the definitions used by ECAR, MAAC and MAIN. In the spirit of promoting consistency and advancing reliability, on May 9, 2007, the RFC Board of Directors unanimously approved the new definition of bulk electric system shown above for determining compliance to Reliability Standards across the RFC footprint. This definition is consistent with the NERC definition of “bulk electric system” accepted by the Commission in Order No. 693 and is a departure from those of the former ECAR, MAAC and MAIN reliability regions, wherein each had a different legacy definition of the bulk electric system. Accordingly, it will take time for registered entities in the RFC footprint to assess what will be necessary for their facilities, especially those below 230 kV, to become fully compliant with application of the new region-wide definition. A Bulk Electric System definition transition plan will be filed with the ERO by October 1, 2007 that will set forth actions needed by the registered entities, the applicable transition monitoring requirements, and the date by which all registered entities will be expected to be compliant with the new region-wide definition. Until such time as that transition plan is filed with and accepted by the ERO, RFC will continue to enforce Reliability Standards per the current definitions from the legacy reliability councils, as RFC has done since the inception of RFC on January 1, 2006.

**6. SERC Reliability Corporation (“SERC”)**

**Does SERC use the definition of “bulk electric system” in the NERC *Glossary*?**

Yes, without additional criteria. The bulk electric system in the SERC region is generally defined as (i) the transmission lines and interconnections with neighboring systems, and associated equipment, that are operated at voltages of 100 kV or higher, and (ii) electric generation resources directly connected on the high side of the step up transformer to transmission facilities operated at voltages of 100 kV or higher. Radial transmission facilities serving only load with one transmission source are not included in this definition.

**Has SERC established criteria to supplement the NERC definition to identify critical facilities below 100 kV?**

No.

**Has SERC specifically identified any critical facilities below 100 kV?**

No.

**7. Southwest Power Pool (“SPP”)**

**Does SPP use the definition of “bulk electric system” in the NERC *Glossary*?**

Yes, with additional criteria. SPP uses the criteria specified in the NERC *Statement of Compliance Registry Criteria* with one modification, to section III.c.4 (“any generator, regardless of size, that is material to the reliability of the bulk power system”). Specifically, with respect to section III.c.4, SPP requires that any generator, regardless of size, that is included in capacity margin calculations by a SPP member must be registered. This requirement is applicable to SPP members only.

**Has SPP established criteria to supplement the NERC definition to identify critical facilities below 100 kV?**

See preceding response.

**Has SPP specifically identified any critical facilities below 100 kV?**

No.

**8. Western Electricity Coordinating Council (“WECC”)**

**Does WECC use the definition of “bulk electric system” in the NERC *Glossary*?**

Yes, with additional criteria. WECC uses the following characteristics to add clarity to the term

“generally,” which is used in two places in the NERC definition of “bulk electric system”:<sup>16</sup>

1. The system element is listed in the definition of a Transfer Path.
2. An (N-1) outage of the system element necessitates a reduction in a Transfer Path’s limit on actual power flow.
3. Measurements of the system element’s electrical parameters (e.g. MW, MVA<sub>r</sub>, amperes, frequency or volts) are included in either a System Operating Limit or an Interconnection Reliability Operating Limit being monitored by the Reliability Coordinator.
4. An (N-1) outage of the system element is included in the list of outages used by a Reliability Coordinator in real-time contingency analysis.
5. Planned outages of the system element are coordinated with neighboring transmission providers. As examples, the elements identified in the Northwest Power Pool Coordinated Outage System list of Significant Facilities for Outage Coordination in Section H Appendix B.
6. The system element is either directly involved in supplying off-site station service to nuclear power plants, or its loss causes station service problems that require corrective actions.
7. The system element is listed in the “WECC-Wide Key Facility List – Transmission” table in Appendix A of the WECC Regional Reliability Plan.<sup>17</sup>
8. The system element’s status or electrical parameters are incorporated into a remedial action scheme described in the WECC Operating Procedures.

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<sup>16</sup> In the context of these characteristics, a “Transfer Path” is defined as: (i) a transmission path in WECC’s current Path Rating Catalog; (ii) a transmission path that has an operating transfer capacity limit currently approved by the WECC Operating Transfer Capability Policy Committee.

<sup>17</sup> The Key Facility List grew from the EHV facilities list the Western System Coordinating Council maintained previously. Each year, the WECC reliability coordinators update the Key Facilities List based on input they receive from their respective balancing authorities and transmission operators.

9. The system element is identified by that region's Reliability Coordinator as being part of the "Bulk Electric System".

**Has WECC established criteria to supplement the NERC definition to identify critical facilities below 100 kV?**

See preceding response.

**Has WECC specifically identified any critical facilities below 100 kV?**

Yes, WECC has identified one 60 kV line and five 13.8 kV reactors. These facilities are included in the WECC-Wide Key Facility List, Appendix A of the WECC Regional Reliability Plan.<sup>18</sup>

**Other Comments**

At the present time, WECC utilizes the NERC definition of "bulk electric system." However, the WECC Joint Guidance Committee recently endorsed recommendations previously developed by the WECC Bulk Electric System Task Force ("BESTF"). The BESTF determined that the WECC should consider defining the discretion inherent in the word "generally" included in the NERC definition of "bulk electric system." These recommendations are comprised of nine tests, listed above, that further clarify the facilities which should be included in the "bulk electric system." This approach allowed WECC to adopt the NERC definition of "bulk electric system," but provide additional clarity surrounding the term "generally" such that facilities that are and are not included are clearly delineated.

**IV. CONCLUSION**

The North American Electric Reliability Corporation respectfully requests that the Commission accept this filing as compliance with paragraph 77 of Order No. 693.

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<sup>18</sup> Because the list of critical facilities below 100 kV identified by WECC (**Attachment 3**) is critical energy infrastructure information, it is not being included in this public filing but will be provided to the Commission separately.

Respectfully submitted,

/s/ Rick Sergel

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**ATTACHMENT 1**

**NPCC CBRE DOCUMENTS**



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## **Classification of Bulk Power System Elements**

Adopted by the Members of the Northeast Power Coordinating Council Inc., this April 28, 2007 based on recommendation by the Reliability Coordinating Committee, in accordance with Section VIII of the NPCC Inc. Bylaws dated May 18, 2006 as amended to date.

## 1.0 Introduction

The NPCC *Basic Criteria for Design and Operation of Interconnected Power Systems* (Document A-2) and related criteria documents define specific requirements applicable to design, operation, and **protection** of the **bulk power system**. This *Classification of Bulk Power System Elements* (Document A-10) provides the methodology for the identification of those elements of the interconnected NPCC Region to which NPCC **bulk power system** criteria are applicable.

Each **Area** has an existing list of **bulk power system** elements. The methodology in this document is used to classify elements of the **bulk power system** and may result in elements being added to or removed from the existing lists.

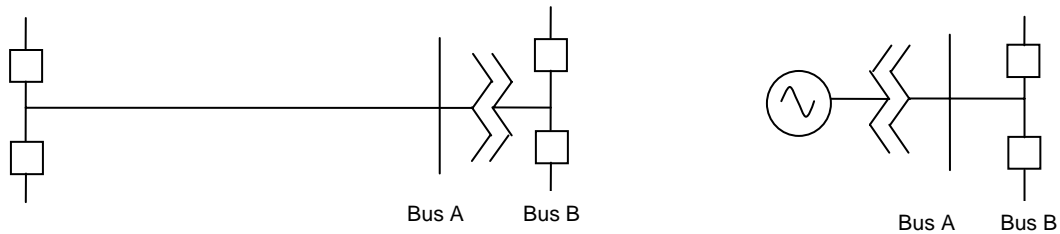
The methodology in this document is based on the following principles:

- The objective is to determine which **elements**, or parts thereof, are part of the **bulk power system**. In practice however, the analysis is performed on a *bus* basis. Results of the analysis for a *bus* can be applied to determine which **elements** or portions thereof connected to the *bus* are part of the **bulk power system**.
- It is applicable to all voltage levels. **Elements** shall not automatically be included or excluded from the **bulk power system** based on voltage class. Application of this methodology may be omitted at *buses* that are already classified as part of the **bulk power system**, and at *buses* that can be logically excluded from the **bulk power system** based on study results at other *buses*.
- **Areas** may adopt methodologies that exceed the requirements set forth in this document for their own purposes. However, NPCC criteria and compliance monitoring shall consider only the system elements that qualify as **bulk power system** elements under the NPCC criteria.

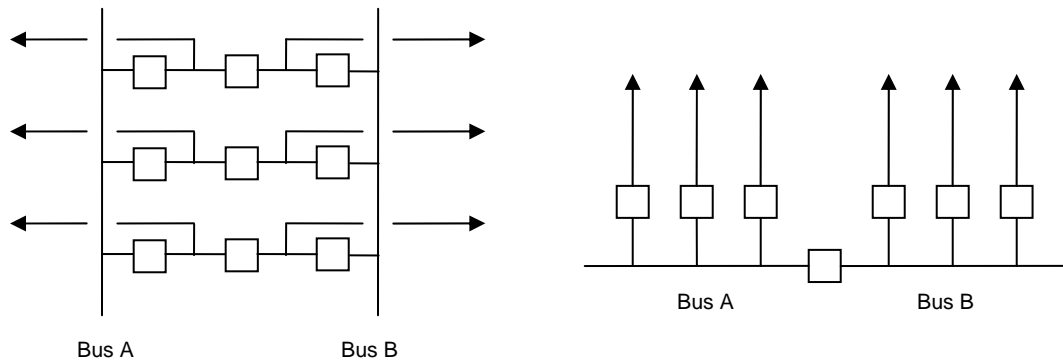
(Terms that appear in bold typeface through out the document are defined in the Glossary located in Document A-7, the *NPCC Glossary of Terms*.)

The Classification of Bulk Power System Elements are based on three defined terms; **bulk power system**, **local area**, and **significant adverse impact**. Definitions for these are included in Document A-7, the *NPCC Glossary of Terms*.

Within this document, the term *bus* refers to an electrical node within a substation to which multiple elements are connected. In some cases faults may be cleared locally by circuit breakers located at another bus within the same substation. The examples in Figure 1 depict two such configurations. In some configurations a *bus* may include more than one physical bus, such as in a breaker-and-a-half arrangement or a single-line-single-breaker arrangement, where two physical buses are connected through a bus-tie breaker. The examples in Figure 2 depict two of many possible configurations. Regardless of the impedance between them, two switchyards at the same voltage level that are connected by an open bus-tie breaker or have separate control buildings are considered as two *buses*.



**Figure 1 – Configurations where Bus A and Bus B are tested as two separate buses.**



**Figure 2 – Configurations where Bus A and Bus B are tested as one bus.**

## **2.0 Classification of Bulk Power System Elements**

### **2.1 Testing Conditions**

Studies conducted for the purpose of determining the **elements** of the **bulk power system** shall assume power flow conditions utilizing transfers, **load** and **generation** conditions which stress the system in a manner critical to the classification of the *bus* to be tested. These studies shall be based on the interface limits, **load** and **generation** conditions expected to exist for the period under study. All **reclosing** facilities shall be assumed in service unless it is known that such facilities will be rendered inoperative.

## 2.2 Test Methodology

These criteria utilize both **transient stability** analysis and steady-state power flow analysis to determine the impact on system performance resulting from power system **faults**. The criteria steps are ordered to reduce the required number of simulations. **Fault clearing** by the remote **protection** is acceptable.

A **transient stability** test is used first to identify *buses* at which **faults** may cause a **significant adverse impact** outside the **local area**. This test is done based on either conservative **fault clearing** time assumptions, or actual **fault clearing** times at remote terminals. Either actual or conservative **fault clearing** times may be used.

The test is based on application of a *bus fault* at a single voltage level that is uncleared locally. Tripping of un-faulted elements as a consequence of the **fault** is part of the test and does not constitute a **significant adverse impact**. Operation of **Special Protection Systems**, including undervoltage load shedding, shall be taken into account in these tests.

For those buses which are not classified as **bulk power system elements** in the first test, a power flow test is used to identify buses at which **faults** may cause a **significant adverse impact** outside the **local area** based on steady-state parameters such as post-contingency thermal loading and voltage. If either the transient stability test or the power flow test identifies a **significant adverse impact**, then a determination must be made as to whether the **significant adverse impact** is contained within the **local area**. Determination that a **significant adverse impact** is contained within a **local area** is made by **Area(s)**, and affirmed by NPCC.

### *Transient Stability Based Test*

1. The Transient Stability Based Test may be conducted either by simulating an extended fault assuming a conservative clearing time at remote terminals, or by using actual clearing times, as stated in option (a) or (b) below:
  - a) Apply a three-phase **fault** at the bus, uncleared locally<sup>1</sup>, and simulate tripping of the remote terminals of all transmission lines that will open to interrupt the **fault**. Remote clearing times shall be based on a conservative estimate of **fault clearing** times assuming no communications from the station under test to the remote terminals. Transformers connected to the *bus* shall not be tripped.

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<sup>1</sup> Local clearing includes operation of all circuit breakers required to clear the fault at one substation and may include operation of circuit breakers at another bus, as defined in Section 1.0.

If the **fault** has a **significant adverse impact** outside the **local area**, then the *bus* is classified as part of the **bulk power system**, or option (b) may be used to classify the bus. Otherwise, continue with the Power Flow Based Test in Step 2.

- b) Apply a three-phase **fault** at the *bus*, uncleared locally<sup>1</sup> and simulate tripping of the remote terminals of all elements that will open to interrupt the **fault**. Remote clearing times shall be based on designed fault clearing times, assuming no communications from the station under test to the remote terminals.

Transformers connected to the *bus* shall be tripped by operation of independent remote protection groups capable of clearing a fault on the bus under test.

If the **fault** has a **significant adverse impact** outside the **local area**, the *bus* is classified as part of the **bulk power system**. Otherwise, continue with the Power Flow Based Test in step 2.

Some **protection groups** (e.g. directional comparison blocking) at remote terminals may provide high-speed **fault clearing** for faults at the bus under test. In order to test the effects of longer **fault clearing** times for fault conditions when these remote **protection groups** would not provide high-speed **fault clearing**, for either test (a) or (b) above:

- High-speed **fault clearing** at remote terminals must be ignored; or
- Testing must vary the placement of the 3-phase **fault** on the elements connected to the bus under test to include locations beyond the reach of the high-speed tripping relay element at the remote terminal.

If a *bus* is classified as part of the **bulk power system** in step 1, the **protective relay** settings may be reviewed to determine whether the *bus* could be classified as "non-bulk" if faster remote fault clearing can be achieved. If **protective relay** settings are modified, an assessment shall be conducted to ensure that the faster clearing time does not compromise the security of the **protection system**.

#### *Power Flow Based Test*

2. For those buses not already classified as part of the bulk power system in step 1, simulate the post-contingency steady-state conditions following a

**fault** at a *bus* that is un-cleared locally and cleared by tripping of the remote terminals of all elements that may open to interrupt the **fault**.

In cases where transformers are connected to the *bus*, the transformers shall be tripped by operation of independent remote protection groups capable of clearing a fault on the bus under test. In cases where the transformer would not be tripped, all elements connected to the same buses as the transformer terminals shall be tripped.

If the **fault** has a **significant adverse impact** outside the **local area**, the *bus* is classified as part of the **bulk power system**. Note that Step 2 can be done prior to Step 1. If a bus is classified as part of the **bulk power system** by the Power Flow Based Test, the Transient Stability Based Test need not be done for that *bus*.

Utilization of Test Results to Classify on an Element-by-Element Basis.

3. Classification of **bulk power system elements** is achieved by applying the results of the above tests to the **elements** connected to the tested *bus*:
  - An **element** with only one terminal such as a generator, shunt reactor, or capacitor bank, is classified as part of the **bulk power system** if the *bus* at which it is connected is classified as part of the **bulk power system**.
  - An **element** with multiple terminals such as a transformer or transmission line, is classified as part of the **bulk power system** if all terminals are connected to *buses* that are classified as part of the **bulk power system**. If all terminals are not connected to **bulk power system buses**, application of **faults** between the terminals may be used to determine what portion of the element is part of the **bulk power system**.

### **3.0 Application and List Maintenance**

Each Area shall be responsible for application of the *Classification of Bulk Power System Elements* as described in this document, and shall maintain a list of **bulk power system** elements. These lists will be compiled into the “NPCC Inc. BPS List” and maintained by the Task Force on System Studies (TFSS) and presented as an informational item to the Reliability Coordinating (RCC) annually. The **Areas** shall review and update their lists as necessary at least every three years. Application of NPCC criteria and compliance monitoring shall be based upon these lists of **bulk power system elements**.

#### **3.1 Elements upgraded to BPS**

Existing system elements that are reclassified as BPS as a result of system changes shall be presented to and approved by the TFSS. If design and construction is required as a result of the reclassification, a proposed implementation plan shall be included. Once the BPS element and implementation plan are approved by TFSS, it will be added to the NPCC Inc. BPS list with the appropriate comments and information.

3.2 Elements downgraded from BPS

After obtaining TFSS approval, elements that are reclassified as no longer being part of the BPS as a result of system changes will be removed from the NPCC Inc. BPS list.

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Lead Task Force:	Task Force on System Studies
Reviewed for concurrence by:	TFCO, TFSP, TFCP, and TFIST
Review frequency:	4 years
References:	<i>Basic Criteria for Design and Operation of Interconnected Power Systems</i> (Document A-2)  <i>NPCC Glossary of Terms</i> (Document A-7)



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## **NPCC Glossary of Terms**

Adopted by the Members of the Northeast Power Coordinating Council in September 1998 based on recommendations by the Reliability Coordinating Committee, in accordance with paragraph IV, subheading (a), of NPCC's Memorandum of Agreement dated January 19, 1966 as amended to date.

Partially Revised:	November 1, 2002
Partially Revised	November 14, 2002
Partially Revised	February 6, 2006
Partially Revised	April 30, 2007

## 1.0 Introduction

The *NPCC Glossary of Terms* (the Glossary) originated as Appendix A to the *Criteria for Review and Approval of Documents* (Document A-1). It includes terms from NPCC Criteria (A), Guideline (B) and Procedure (C) Documents, as well as the North American Electric Reliability Council (NERC) *Glossary of Terms*, August 1996. The *IEEE Standard Dictionary of Electrical and Electronics Terms*, Sixth Edition, has also been used as a source for some definitions.

In general, only one entry is presented for each term, and where applicable, the definition from the *NERC Glossary of Terms* is used. All entries are listed alphabetically, and related sub-definitions are listed in alphabetic order under a main definition. For example, listed under **Fault** are the sub-definitions for Permanent Fault and Transient Fault. In a number of cases, where the main definition originated in the *NERC Glossary of Terms*, NPCC Specific Definitions have been added.

### 1.1 Applicability

The terms in the Glossary should be used in NPCC Documents ONLY with the defined meaning, so as to avoid ambiguity and confusion.

### 1.2 Bolding

Terms that are defined in the Glossary have been bolded when they appear in other definitions. However, a defined term is not bolded in its own definition.

### 1.3 Source Identification

The source of each definition is indicated just above the dividing line between items. For example, the following notation indicates that the NERC definition is used, and that similar A-1 and C-1 definitions are available:

NERC (A-1, C-1)

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## 2.0 The Glossary

**Applicable emergency limits** — These limits depend on the duration of the occurrence, and on the policy of the various member systems of NPCC regarding loss of life to equipment, voltage limitations, etc.

**Emergency** limits are those which can be utilized for the time required to take corrective action, but in no case less than five minutes.

The limiting condition for voltages should recognize that voltages should not drop below that required for suitable system **stability** performance, and should not adversely affect the operation of the **bulk power system**.

The limiting condition for equipment loadings should be such that cascading outages will not occur due to operation of protective devices upon the failure of facilities. (Various definitions of equipment **ratings** are found elsewhere in this glossary.)

A-1

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**Area** — An **Area** (when capitalized) refers to one of the following: New England, New York, Ontario, Quebec or the Maritimes (New Brunswick, Nova Scotia and Prince Edward Island); or, as the situation requires, area (lower case) may mean a part of a system or more than a single system. Within NPCC, Areas (capitalized) operate as **control areas** as defined by the North American Electric Reliability Council (NERC) (the definition can be found on page 6 of this glossary).

A-1 (A-3, A-6, C-1)

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**Area Control Error** — The instantaneous difference between actual and net **scheduled interchange**, taking into account the effects of frequency bias.

NERC (C-1)

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**Automatic Generation Control (AGC)** — Equipment that automatically adjusts a **Control Area's generation** to maintain its **interchange schedule** plus its share of frequency regulation.

The following AGC modes are typically available:

- a. **Tie Line Bias** Control — Automatic generation control with both frequency and net **interchange** terms of **Area Control Error** considered.

### Automatic Generation Control (AGC) – continued

- b. Constant Frequency (Flat Frequency) Control — Automatic generation control with the net **interchange** term of **Area Control Error** ignored. This Automatic Generation Control mode attempts to maintain the desired frequency without regard to **interchange**.
- c. Constant Net **Interchange** (Flat **Tie Line**) Control — Automatic generation control with the frequency term of **Area Control Error** ignored. This Automatic Generation Control mode attempts to maintain net **interchange** at the desired level without regard to frequency.

NERC (A-3, C-1)

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**Availability** — A measure of time a generating unit, transmission line, or other facility is capable of providing service, whether or not it actually is in service. Typically, this measure is expressed as a percent available for the period under consideration.

NERC (C-1)

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**Basic Minimum Power System** — Consists of one or more generating stations, transmission lines, and substations operating in the form of an **island**. Such a system can be restarted independently and later **synchronized** to other **islands** or the main grid. The transmission **elements** included in the basic minimum power system connect the units which have **blackstart capability** to those units without **blackstart capability** which have been designated in the restoration plan to be restarted in the first stages of the restoration process. Also included are selected tie lines and corresponding substations, which are considered essential to the formation of a larger power system. The intent is to focus on the ability to create smaller electrical systems or islands, which can be expanded and synchronized to other such islands and the main grid.

A-3

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**Bipolar** — Operation of HVdc with two **poles** of opposite polarity with negligible ground current.

A-2

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**Blackstart Capability** — The ability of a generating unit or station to go from a shutdown condition to an operating condition and start delivering **power** without assistance from the electric system.

NERC (A-3, C-1)

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**Bottled Energy/Power/Capacity** — Energy/Power/Capacity which is available at the source but which cannot be delivered to the point of use because of restrictions in the transmission system. Also referred to as Locked-In Energy/Power/Capacity.

A-10, (C-1)

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**Bulk power system** — The interconnected electrical systems within northeastern North America comprised of system **elements** on which **faults** or **disturbances** can have a **significant adverse impact** outside of the **local area**.

A-1 (A-3, C-1, NERC)

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**Cable** — An underground or underwater circuit.

C-13

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**Capability, Operating** — The maximum load carrying ability of generating equipment or other electrical apparatus under specified conditions for a given time interval.

C-1

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**Capacity** — The rated continuous load-carrying ability, expressed in megawatts (MW) or megavolt-amperes (MVA) of **generation**, transmission, or other electrical equipment.

Baseload Capacity — Capacity used to serve an essentially constant level of customer **demand**. Baseload generating units typically operate whenever they are available.

Firm Capacity — Capacity that is as firm as the seller's native **load** unless modified by contract. Associated energy may or may not be taken at option of purchaser. Supporting **reserve** is carried by the seller.

Intermediate Capacity — Capacity intended to operate fewer hours per year than **baseload capacity** but more than peaking capacity. Typically, such generating units have a capacity factor of 20% to 60%.

Net Capacity — The maximum capacity (or effective **rating**), modified for ambient limitations, that a generating unit, **power** plant, or electric system can sustain over a specified period, less the capacity used to supply the **demand** of station service or auxiliary needs.

Peaking Capacity — Capacity used to serve **peak demand**. Peaking generating units operate a limited number of hours per year, and their capacity factor is normally less than 20%.

NERC (C-1)

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**Capacity Benefit Margin (CBM)** — See under **Transfer Capability**.

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**Commutation Failure** — A fault in a thyristor valve group where the current transfer from one valve to the next is interrupted.

A-5, C-15

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**Component** — refers to components of equipment or protection systems rather than **elements** of a **power** system. See **Element**.

A-5, B-11

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**Contingency** — An event, usually involving the loss of one or more **elements**, which affects the **power** system at least momentarily.

NPCC Specific Definitions:

NPCC Emergency Criteria Contingencies — The set of contingencies to be observed when operating the **bulk power system** under **emergency** conditions. (C-1, also reference Document A-2, Section 6.2, Emergency Transfers.)

NPCC Normal Criteria Contingencies — The set of contingencies to be observed when operating the **bulk power system** under normal conditions. (C-1, also reference Document A-2, Section 6.1, Normal Transfers.)

Double Element Contingency — A **contingency** involving the loss of two **elements**.(C-1)

Single Contingency — A single event, which may result in the loss of one or more **elements**.

Single Element Contingency — A **contingency** involving the loss of one **element**.(C-1)

Limiting Contingency — The **contingency** which establishes the **transfer capability**. (C-1)

## Contingency--continued

First Contingency Loss — The largest **capacity** outage including any assigned Ten-Minute Reserve which would result from the loss of a single **element** (A-6, C-1)

Second Contingency Loss — The largest **capacity** outage which would result from the loss of a single **element** after allowing for the First Contingency Loss. (A-6, C-1)

NERC (except as indicated)

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**Contingency Reserve Adjustment Factor** — A factor used in determining the additional **ten-minute reserve** that each **Area**, not meeting the DCS requirement for a given quarter, must carry. It is calculated using the following formula:

$$CRA_{\text{quarter}} = 2 - \{\text{the average percentage DCS (expressed as a decimal) for the quarter of measurement}\}$$

A-6

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**Control Area** — An electric system or systems, bounded by interconnection metering and telemetry, capable of controlling **generation** to maintain its net **interchange schedule** with other Control Areas and contributing to frequency regulation of the **Interconnection**.

NERC (C-1)

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**Converter** — An operative unit comprised of either a rectifier or inverter bridge connected to an ac system through transformers and switching devices with the associated control equipment.

A-5

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**Converter Transformer** — A **power** transformer which transfers the energy from the thyristor valves to the connected ac system and vice-versa.

A-5

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**Critical Components** — Equipment required for continued and proper operation of a **key facility** in the event of a total loss of AC supply. Critical components include but are not limited to blackstart generating units, substation backup power supplies, control center and telecommunication center backup power supplies and computer systems, control center and telecommunication center computer room air conditioning and telecommunication facilities backup power supplies.

**Demand** — The rate at which energy must be generated or otherwise provided to supply an electric **power** system. Types of Demand include:

Instantaneous Demand — The rate of energy delivered at a given instant.

Average Demand — The electric energy delivered over any interval of time as determined by dividing the total energy by the units of time in the interval.

Integrated Demand — The average of the instantaneous demands over the demand interval.

Demand Interval — The time period during which electric energy is measured, usually in 15-, 30-, or 60-minute increments.

Peak Demand — The highest electric **power** requirement occurring in a given period (e.g., an hour, a day, month, season, or year). For an electric system, it is equal to the sum of the metered net outputs of all generators within a system and the metered line flows into the system, less the metered line flows out of the system.

Coincident Demand — The sum of two or more demands that occur in the same demand interval.

Noncoincident Demand — The sum of two or more demands that occur in different demand intervals.

Contract Demand — The amount of **capacity** that a supplier agrees to make available for delivery to a particular entity and which the entity agrees to purchase.

Firm Demand — That portion of the Contract Demand that a **power** supplier is obligated to provide except when system **reliability** is threatened or during **emergency** conditions.

Billing Demand — The demand upon which customer billing is based as specified in a rate schedule or contract. It may be based on the contract year, a contract minimum, or a previous maximum and, therefore, does not necessarily coincide with the actual measured demand of the billing period.

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#### NERC (C-1)

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**Disturbance** – Severe oscillations or severe step changes of current, voltage and/or frequency usually caused by **faults**.

## **Disturbance--continued**

System Disturbance — An event characterized by one or more of the following phenomena: the loss of **power** system **stability**; cascading outages of circuits; oscillations; abnormal ranges of frequency or voltage or both.

A-3 (NERC, C-1)

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**Economic Dispatch** — The optimization of the incremental cost of delivered **power** by allocating generating requirements among the on-control units with consideration of such factors as incremental generating costs and incremental transmission losses.

B-3, C-18 (IEEE definition PE 94-1991)

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**Element** — Any electric device with terminals that may be connected to other electric devices, such as a generator, transformer, circuit, circuit breaker, or bus section.

Limiting Element — The element that is either operating at its appropriate **rating** or would be following a limiting **contingency** and, as a result, establishes a system limit.

NERC (slightly modified)

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**Emergency** — Any abnormal system condition that requires automatic or manual action to prevent or limit loss of transmission facilities or **generation** supply that could adversely affect the **reliability** of the electric system.

NPCC Specific Definition:

**Emergency** — An **Emergency** is considered to exist in an Area if **firm load** may have to be shed. (TFCO)

C-38

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**Emergency Regional Reserve Redispatch** — The regional coordination of actions to enhance **reliability** among **Areas** in response to a **Regional Reserve Deficiency**.

C-38

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**Emergency Regional Reserve Redispatch Energy** — Electrical energy that is received and delivered among **Areas** in response to a **Regional Reserve Deficiency** to enhance regional **reliability**.

NERC (except as indicated)

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**Energize** — To make a piece of equipment or circuit alive.

A-5 and B-1

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**Fault** — An electrical **short circuit**.

Permanent Fault — A fault which prevents the affected **element** from being returned to service until physical actions are taken to effect repairs or to remove the cause of the fault.

**Fault--continued**

Transient Fault — A fault which occurs for a short or limited time, or which disappears when the faulted **element** is separated from all electrical sources and which does not require repairs to be made before the **element** can be returned to service either manually or automatically.

C-1 (NERC)

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**Fault Clearing**

Delayed fault clearing — Fault clearing consistent with correct operation of a breaker failure **protection group** and its associated breakers, or of a backup **protection group** with an intentional time delay.

High speed fault clearing — Fault clearing consistent with correct operation of high-speed relays and the associated circuit breakers without intentional time delay.  
*Notes:* The specified time for high-speed relays in present practice is 50 milliseconds (three cycles on a 60Hz basis) or less. [IEEE C37.100-1981]. For planning purposes, a total clearing time of six cycles or less is considered high speed.

Normal fault clearing — Fault clearing consistent with correct operation of the **protection system** and with the correct operation of all circuit breakers or other automatic switching devices intended to operate in conjunction with that **protection system**.

A-1 (C-1)

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**Generation (Electricity)** — The process of producing electrical energy from other forms of energy; also, the amount of electric energy produced, usually expressed in kilowatthours (kWh) or megawatthours (MWh).

**Gross Generation** — The electrical output at the terminals of the generator, usually expressed in megawatts (MW).

**Net Generation** — Gross generation minus station service or unit service **power** requirements, usually expressed in megawatts (MW).

NERC (C-1)

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**Generation Rejection** — The process of deliberately removing preselected **generation** from a **power** system, or initiating HVdc power runback, in response to a **contingency** or an abnormal condition in order to maintain the integrity of the system. Synonym: Generator Dropping.

A-3 (C-1)

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**Grounded** — Connected to earth or some extended conducting body that serves instead of the earth, whether the connection is intentional or accidental.

A-5

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**Harmonic** — A sinusoidal component of a periodic wave or quantity having a frequency that is an integral multiple of the fundamental frequency. Note: For example, a component, the frequency of which is twice the fundamental frequency, is called a second harmonic.

A-5

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**Harmonic current** — A periodic component of current having a frequency that is an integral multiple of that current's fundamental frequency. Harmonic currents are normally measured in amperes or in percent of the fundamental frequency current, generally at specific frequencies, such as second and third harmonics. Harmonic currents can, for example, be generated by HVdc converters, **Static Var Compensators** (SVC) and geomagnetically induced currents (GIC).

C-15

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**HVdc Link** — A high Voltage direct current connection between two **power** systems, often used to interconnect two asynchronous **power** systems.

A-5

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**Inadvertent Interchange** — The difference between a **Control Area's** net **actual interchange** and net **scheduled interchange**.

NERC (C-1)

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**Interconnection** — When capitalized, any one of the five major electric system networks in North America: Eastern, Western, ERCOT, Québec, and Alaska. When not capitalized, the facilities that connect two systems or **Control Areas**. Additionally, an interconnection refers to the facilities that connect a nonutility generator to a **Control Area** or system.

NERC

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**Interchange** — Electric **power** or energy that flows from one entity to another.

Actual Interchange — Metered electric **power** that flows from one entity to another.

Interchange Schedule — An agreed-upon transaction size (megawatts), start and end time, beginning and ending ramp times and rate, and type required for delivery and receipt of **power** and energy between the contracting parties and the **Control Area(s)** involved in the transaction.

Interchange Scheduling — The actions taken by scheduling entities to arrange transfer of electric **power**. The schedule consists of an agreement on the amount, start and end times, ramp rate, and degree of firmness.

Scheduled Interchange — Electric **power** scheduled to flow between entities, usually the net of all sales, purchases, and **wheeling** transactions between those areas at a given time. .

NERC (C-1)

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**Interface** — The specific set of transmission **elements** between two areas or between two areas comprising one or more electrical systems.

NERC (C-1)

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**Island** — A portion of a **power** system or several power systems that is electrically separated from the interconnection due to the disconnection of transmission system **elements**.

NERC (A-3, C-1)

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**Key Facilities** — Facilities required to establish a **basic minimum power system** following a system blackout. These facilities are essential to the restoration plan of the **Control Area** and include generating stations having blackstart units and other selected generating stations, transmission **elements** which are part of the **basic minimum power system**, control centers and telecommunication centers and telecommunication facilities which are necessary to support **protection** and control facilities, voice and data between and within control centers and voice and data between control centers and key generating / transmission substations.

A-3

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**Load** — The electric **power** used by devices connected to an electrical generating system. (IEEE Power Engineering). Also see **Demand**.

NPCC Specific Definitions:

Firm Load — Loads that are not **Interruptible Loads**.

Interruptible Load — Loads that are interruptible under the terms specified in a contract.

(Referenced in A-3)

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**Load Cycle** — The normal pattern of **demand** over a specified time period associated with a device or circuit.

NERC (C-1)

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**Load Relief** — **Load** reduction accomplished by **voltage reduction** and/or **load shedding**.

A-3 (C-1)

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**Load Shedding** — The process of deliberately removing (either manually or automatically) preselected customers' **load** from a power system in response to an abnormal condition to maintain the integrity of the system and minimize overall customer outages.

A-10

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**Local area** — An electrically confined or radial portion of the system. The geographic size and number of system elements contained will vary based on system characteristics. A local area may be relatively large geographically with

relatively few buses in a sparse system, or be relatively small geographically with a relatively large number of buses in a densely networked system.

C-38

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**Negative Shared Activation Reserve Energy** — Energy received by an assisting **Area** from a contingent **Area** for an eligible **resource** loss having a concurrent effective loss of demand that exceeds the loss of energy from the **resource** loss, and is implemented at a zero time ramp rate immediately following allocation notification, maintained until the Contingent **Area** requests a return to normal but not longer than thirty minutes, and ramped out at a ten-minute ramp rate following communications initiated by the Contingent **Area** which have resulted in mutually established **interchange schedules**.

NERC (A-3, C-1)

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**Operating Limit** — The maximum value of the most critical system operation parameter(s) which meet(s): (a) pre-**contingency** criteria as determined by equipment loading capability and acceptable voltage conditions; (b) **stability** criteria; (c) post-**contingency** loading and voltage criteria.

A-3 (C-1)

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**Operating Capacity** — The **capacity** claimed for any generating source recognizing any temporary deratings, governor load limits, proven maximum loading rates, starting times and equipment limitations including transmission **operating limits**.

A-6

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**Operating Procedures** — A set of policies, practices, or system adjustments that may be automatically or manually implemented by the **system operator** within a specified time frame to maintain the operational integrity of the interconnected electric systems.

Automatic Operating Systems — **Special protection systems**, remedial action schemes, or other operating systems installed on the electric systems that require *no intervention* on the part of **system operators**.

Normal (Precontingency) Operating Procedures — Operating procedures that are normally invoked by the **system operator** to alleviate potential facility overloads or other potential system problems in anticipation of a **contingency**.

Postcontingency Operating Procedures — Operating procedures that may be invoked by the **system operator** to mitigate or alleviate system problems after a **contingency** has occurred.

NERC

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**Operator, System** — Person responsible for operating control of the **bulk power system** in an **Area** of NPCC or an adjoining system interconnected with NPCC. This could be a Security Coordinator, a **Control Area Operator** or in some cases a bulk power utility operator (e.g. NYPA, Niagara Mohawk, etc)

A-3

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**Outage**

**Forced Outage** — The removal from service of a generating unit, transmission line, or other facility for **emergency** reasons or a condition in which the equipment is unavailable due to unanticipated failure.

**Forced Outage Rate** — The hours a generating unit, transmission line, or other facility is forced out of service, divided by the sum of the hours it is removed from service, plus the total number of hours the facility was connected to the electricity system expressed as a percent.

**Maintenance Outage** — The removal of equipment from service **availability** to perform work on specific **elements** that can be deferred, but requires the equipment be removed from service before the next planned outage. Typically, a Maintenance Outage may occur anytime during the year, have a flexible start date, and may or may not have a predetermined duration.

**Planned Outage** — Removing the equipment from service **availability** for inspection and/or general overhaul of one or more major equipment groups. This outage usually is scheduled well in advance.

NERC (C-1)

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**Phase Shifting Transformer** — A transformer that advances or retards the phase angle relationship of one circuit with respect to another to control **power** flow. Synonyms: Phase angle regulator, phase shifter.

A-2, C-25

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**Pole (of an ac switching device)** — That portion of the device associated exclusively with one electrically separated conducting path of the main circuit of the device.

B-1 (IEEE definition C37.100-1992)

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**Pole (HVdc term)** — A rectifier and an inverter, with associated filter banks and control equipment, tied together by a transmission line or bus.

A-2, A-6, C-20

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## Power

**Apparent Power** — The product of the volts and amperes. It comprises both *real* and *reactive* power, usually expressed in kilovoltamperes (kVA) or megavoltamperes (MVA).

**Reactive Power** — The portion of electricity that establishes and sustains the electric and magnetic fields of alternating-current equipment. Reactive power must be supplied to most types of magnetic equipment, such as motors and transformers. It also must supply the reactive losses on transmission facilities. Reactive power is provided by generators, **synchronous condensers**, or electrostatic equipment such as capacitors. Reactive power directly influences electric system voltage. It is usually expressed in kilovars (kVAr) or megavars (MVar).

**Real Power** — The rate of producing, transferring, or using electrical energy, usually expressed in kilowatts (kW) or megawatts (MW).

NERC (C-1)

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**Power Pool** — Two or more interconnected electric systems operated and/or planned to supply **power** for their combined **demand** requirements.

NERC (slightly modified)

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**Power Swing** — A transient change in the **power** flows on a system, usually of an oscillatory nature.

A-2 and A-5

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**Protected element** — The power system **element** protected by the subject **protection system**.

Examples: Line, bus, transformer, generator.

A-1

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**Protection** — The provisions for detecting power system **faults** or abnormal conditions and taking appropriate automatic corrective action.

**Protection group** — A fully integrated assembly of **protective relays** and associated equipment that is designed to perform the specified protective functions for a power system **element**, independent of other groups.

## Protection--continued

### Notes:

(a) Various identified as Main Protection, Primary Protection, Breaker Failure Protection, Back-Up Protection, Alternate Protection, Secondary Protection, A Protection, B Protection, Group A, Group B, System 1 or System 2.

(b) Pilot protection is considered to be one protection group.

### Protection system

#### Element Basis

One or more protection groups; including all equipment such as instrument transformers, station wiring, circuit breakers and associated trip/close modules, and communication facilities; installed at all terminals of a power system **element** to provide the complete protection of that **element**.

#### Terminal Basis

One or more protection groups, as above, installed at one terminal of a power system **element**, typically a transmission line.

Pilot Protection — A form of line protection that uses a communication channel as a means to compare electrical conditions at the terminals of a line.

## A-1

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**Protective relay** — A **relay** that detects a power system **fault** or abnormal condition and initiates appropriate control system action.

## A-1 (C-1)

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**Rating** — The operational limits of an electric system, facility, or **element** under a set of specified conditions.

Continuous Rating — The rating – as defined by the equipment owner – that specifies the level of electrical loading, usually expressed in megawatts (MW) or other appropriate units that a system, facility, or **element** can support or withstand indefinitely without loss of equipment life. (Normally not used in NPCC)

## Rating--continued

Normal Rating — The rating – as defined by the equipment owner – that specifies the level of electrical loading, usually expressed in megawatts (MW) or other appropriate units that a system, facility, or **element** can support or withstand through the daily **demand** cycles without loss of equipment life.

Emergency Rating — The rating – as defined by the equipment owner – that specifies the level of electrical loading, usually expressed in megawatts (MW) or other appropriate units, that a system, facility, or **element** can support or withstand for a finite period. The rating assumes acceptable loss of equipment life or other physical or safety limitations for the equipment involved.

### NPCC Specific Definitions:

Long Time Emergency (LTE) Rating — The maximum rating of electrical equipment based on nominal ambient conditions and recognizing the nominal **load cycle** for a long period such as 24 hours. (C-1)

Short Time Emergency (STE) Rating — The maximum loading of electrical equipment which can be sustained for 15 minutes based on nominal ambient conditions and recognizing preloading conditions. (C-1)

### NERC (except as indicated)

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## Reclosing

Autoreclosing — The automatic closing of a circuit breaker in order to restore an **element** to service following automatic tripping of the circuit breaker. Autoreclosing does not include automatic closing of capacitor or reactor circuit breakers.

High-speed autoreclosing — The autoreclosing of a circuit breaker after a necessary time delay (less than one second) to permit **fault** arc deionization with due regard to coordination with all **relay** protective systems. This type of autoreclosing is generally not supervised by voltage magnitude or phase angle.

Manual Reclosing — The closing of a circuit breaker by operator action after it has been tripped by **protective relays**. Operator initiated closing commands may originate from local control or from remote (supervisory) control. Either local or remote close commands may be supervised or unsupervised.

Supervision — A closing command is said to be supervised if closing is permitted to occur only if certain prerequisite conditions are met (e.g., **synchronism-check**).

## Reclosing--continued

Synchronism-check — refers to the determination that acceptable voltages exist on the two sides of the breaker and the phase angle between them is within a specified limit for a specified time.

C-38

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**Regional Reserve Deficiency** — When two or more **Areas** are deficient in **ten minute reserve** after all **Area** coordinated actions have been deployed, including acquiring emergency energy and/or capacity but excluding the shedding of firm load.

C-38

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**Regional Reserve Sharing** — Procedure that allows participating **Areas** to reduce the requirement for **reserve** within its **Area** due to the availability and deliverability of **reserve** from other **Areas**.

A-6 and C-38

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**Regional Reserve Sharing Energy** — Energy delivered to a contingent **Area** from assisting **Areas** that is converted from delivered **Shared Activation Reserve Energy** after the **Shared Activation Reserve Energy** has been delivered for 30 minutes; maintained until the Contingent **Area** requests a return to normal but not longer than sixty minutes, and ramped out at a ten-minute ramp rate following communications initiated by the Contingent **Area** which have resulted in mutually established **interchange schedules**.

B-1 and C-1

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**Relay** — An electrical device designed to respond to input conditions in a prescribed manner and after specified conditions are met to cause contact operation or similar abrupt change in associated electric control circuits. (Also: see **protective relay**).

A-1

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**Reliability** — The degree of performance of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired. Reliability may be measured by the frequency, duration, and magnitude of adverse effects on the electric supply. Electric system reliability can be addressed by considering two basic and functional aspects of the electric system — **Adequacy** and **Security**.

## Reliability-continued

Adequacy — The ability of the electric system to supply the aggregate electrical **demand** and energy requirements of the customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system **elements**.

Security — The ability of the electric system to withstand **disturbances** such as electric **short circuits** or unanticipated loss of system **elements**.

NERC (slightly modified)

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**Reportable Events** — **System disturbances** involving losses of **load, generation** or transmission facilities within NPCC **Control Areas** which equal or exceed the following criteria are reportable events:

- (1) Actual net **interchange** deviations equal to or greater than 500 MW (Maritime: 300 MW).
- (2) Loss of **generation** or **load** equal to or greater than 500 MW (Maritime: 300 MW).
- (3) System frequency deviations equal to or greater than 0.03 Hz (Hydro-Quebec: 0.5 Hz). (System frequency deviations that occur for events outside of the NPCC are reported for analysis of frequency response, but are not included in the reporting for the NERC Disturbance Control Standard.)

A-6 (also see NERC DAWG *System Disturbances Reports*)

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**Reserve** — In normal usage, reserve is the amount of **capacity** available in excess of the **demand**

Reserve Requirement — That capability above firm system **demand** required to provide for regulation, **load** forecasting error, equipment forced and scheduled outages, and local area supply **adequacy**.

### NPCC Specific Definitions:

Non-Synchronized Reserve — That portion of **operating capacity**, which is available for synchronizing to the network and that capacity which can be made available by applying load management techniques such as curtailing **interruptible loads** or implementing **voltage reductions**. (A-6, C-1)

Operating Reserve — The sum of **ten-minute** and **thirty-minute reserve**. (A-3, A-6, C-1)

## Reserve--continued

Reserve on **Automatic Generation Control (AGC)** — That portion of **synchronized reserve** which is under the command of an automatic controller to respond to **load demands** without need for manual action. (A-6, C-1)

Synchronized Reserve — The unused portion of generating capacity which is synchronized to the system and ready to pick up **load** to claimed capacity and capacity which can be made available by curtailing pumping hydro units. (A-6, C-1)

Ten-minute reserve — The sum of **synchronized** and **non-synchronized reserve** that is fully available in ten minutes. (A-6, C-1)

Thirty-Minute Reserve — The sum of **synchronized** and **non-synchronized reserve** that can be utilized in thirty minutes, excluding capacity assigned to **ten-minute reserve**. (A-6, C-1)

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**Resource** — Resource refers to the total contributions provided by supply-side and **demand**-side facilities and/or actions. Supply-side facilities include utility and non-utility **generation** and purchases from neighboring systems. **Demand**-side facilities include measures for reducing **load**, such as conservation, **demand** management, and **interruptible load**.

C-38

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**Shared Activation Reserve Energy** — Energy delivered from an assisting **Area** to a contingent **Area** that is implemented at a zero time ramp rate immediately following allocation notification, maintained until the Contingent **Area** requests a return to normal but not longer than thirty minutes, and ramped out at a ten-minute ramp rate following communications initiated by the Contingent **Area** which have resulted in mutually established **interchange schedules**.

A-1

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**Short Circuit** — An abnormal connection (including an arc) of relatively low impedance, whether made accidentally or intentionally, between two points of different potential. *Note:* The term **fault** or short-circuit **fault** is used to describe a short circuit.

A-10, IEEE C37.100-1981

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**Significant adverse impact** — With due regard for the maximum operating capability of the affected systems, one or more of the following conditions arising from **faults** or **disturbances**, shall be deemed as having **significant adverse impact**:

- a. instability;
  - any instability that cannot be demonstrably contained to a well-defined local area.
  - any loss of synchronism of generators that cannot be demonstrably contained to a well-defined local area
- b. unacceptable system dynamic response;
  - an oscillatory response to a contingency that is not demonstrated to be clearly positively damped within 30 seconds of the initiating event.
- c. unacceptable equipment tripping
  - tripping of an un-faulted bulk power system element (element that has already been classified as bulk power system) under planned system configuration due to operation of a protection system in response to a stable power swing
  - operation of a Type I or Type II Special Protection System in response to a condition for which its operation is not required
- d. voltage levels in violation of applicable **emergency** limits;
- e. loadings on transmission facilities in violation of applicable **emergency** limits;

A-1

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**Special Protection System (SPS)** – A **protection system** designed to detect abnormal system conditions, and take corrective action other than the isolation of faulted **elements**. Such action may include changes in **load**, **generation**, or system configuration to maintain system **stability**, acceptable voltages or **power** flows. Automatic underfrequency **load shedding** as defined in the *Emergency Operation Criteria A-3*, is not considered an SPS. Conventionally switched, locally controlled shunt devices are not SPSs.

A-1

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**Stability** — The ability of an electric system to maintain a state of equilibrium during normal and abnormal system conditions or **disturbances**.

**Small-Signal Stability** — The ability of the electric system to withstand small changes or **disturbances** without the loss of synchronism among the synchronous machines in the system.

**Transient Stability** — The ability of an electric system to maintain synchronism between its parts when subjected to a **disturbance** and to regain a state of equilibrium following that disturbance.

NERC (slightly modified) (C-1)

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**Stability Limit** — The maximum **power** flow possible through some particular point in the system while maintaining **stability** in the entire system or the part of the system to which the stability limit refers.

NERC (C-1)

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**Static Var Compensator (SVC)** — A combination of controlled shunt reactors and switched capacitor banks, used to affect the **reactive power** flow of the system or to regulate the system voltage.

A-5, B-3, C-5 and C-18

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**Supervision** — see **Reclosing**

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**Supervisory Control** — A form of remote control comprising an arrangement for the selective control of remotely located facilities by an electrical means over one or more communications media.

NERC (C-1)

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**Surge** — A transient variation of current, voltage, or **power** flow in an electric circuit or across an electric system.

NERC (C-1)

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**Synchronism-check** — see **Reclosing**

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**Synchronism-check Relay** — A verification **relay** whose function is to operate when two input voltages satisfy predetermined operating parameters.

B-1

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**Synchronize** — The process of connecting two previously separated alternating current apparatuses or systems after matching frequency, voltage, phase angles, etc. (e.g., paralleling a generator to the electric system).

NERC (slightly modified) (C-1)

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**Synchronous Condenser** — A synchronous machine which operates without mechanical load to supply or absorb **reactive power** for voltage control purposes.

B-3, C-15

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**Teleprotection** — A form of **protection** that uses a communication channel.

A-1

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**Tie Line** — A circuit connecting two or more **Control Areas** or systems of an electric system.

NERC A-3 (C-1)

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**Tie Line Bias** — A mode of operation under automatic **generation** control in which the **area control error** is determined by the actual net **interchange** minus the biased scheduled net **interchange**.

NERC (C-1)

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**Transfer Capability** — The measure of the ability of interconnected electric systems to move or transfer **power** *in a reliable manner* from one area to another over all transmission lines (or paths) between those areas under specified system conditions. The units of transfer capability are in terms of electric **power**, generally expressed in megawatts (MW). In this context, "area" may be an individual electric system, **power pool**, **Control Area**, subregion, or NERC Region, or a portion of any of these. Transfer capability is directional in nature. That is, the transfer capability from "Area A" to "Area B" is *not* generally equal to the transfer capability from "Area B" to "Area A."

Available Transfer Capability (ATC) — A measure of the transfer capability remaining in the physical transmission network for further commercial activity over and above already committed uses. ATC is defined as the Total Transfer Capability (TTC), less the **Transmission Reliability Margin (TRM)**, less the sum of existing transmission commitments (which includes retail customer service) and the Capacity Benefit Margin (CBM).

Nonrecallable Available Transfer Capability (NATC) — Total Transmission Capability less the **Transmission Reliability Margin**, less nonrecallable reserved transmission service (including the Capacity Benefit Margin).

Recallable Available Transmission Capability (RATC) — Total Transmission Capability less the **Transmission Reliability Margin**, less recallable transmission service, less non-recallable transmission service (including the Capacity Benefit Margin).

Total Transfer Capability (TTC) — The amount of electric **power** that can be transferred over the interconnected transmission network in a *reliable* manner based on *all* of the following conditions:

1. For the existing or planned system configuration, and with normal (pre-**contingency**) **operating procedures** in effect, all facility

loadings are within normal **ratings** and all voltages are within normal limits.

2. The electric systems are capable of absorbing the dynamic **power swings**, and remaining stable, following a **disturbance** that results in the loss of any single electric system **element**, such as a transmission line, transformer, or generating unit.

3. After the dynamic **power swings** subside following a **disturbance** that results in the loss of any single electric system **element** as described in 2 above, and after the operation of any automatic operating systems, but before any post-**contingency** operator-initiated system adjustments are implemented, all transmission facility loadings are within **emergency ratings** and all voltages are within **emergency** limits.

4. With reference to condition 1 above, in the case where precontingency facility loadings reach normal thermal **ratings** at a transfer level below that at which any first **contingency** transfer limits are reached, the transfer capability is defined as that transfer level at which such normal **ratings** are reached.

5. In some cases, individual system, **power pool**, subregional, or Regional planning criteria or guides may require consideration of specified multiple contingencies, such as the outage of transmission circuits using common towers or rights-of-way, in the determination of transfer capability limits. If the resulting transfer limits for these multiple contingencies are more restrictive than the single **contingency** considerations described above, the more restrictive **reliability** criteria or guides must be observed. See Available Transfer Capability [shown above].

Capacity Benefit Margin (CBM) — CBM is defined as that amount of transmission transfer capability reserved by **load** serving entities to ensure access to **generation** from interconnected systems to meet **generation reliability** requirements.

Transmission Reliability Margin (TRM) — TRM is defined as that amount of transmission transfer capability necessary to ensure that the interconnected transmission network is secure under a reasonable range of uncertainties in system conditions.

First Contingency Incremental Transfer Capability (FCITC) — The amount of **power**, incremental above normal base **power** transfers, that can be transferred over the transmission network in a reliable manner based on the following conditions:

### First Contingency Incremental Transfer Capability--continued

1. For the existing or planned system configuration, and with normal (pre-**contingency**) **operating procedures** in effect, all facility loadings are within normal **ratings** and all voltages are within normal limits.
2. The electric systems are capable of absorbing the dynamic **power swings**, and remaining stable, following a **disturbance** that results in the loss of any single electric **element**, such as a transmission line, transformer, or generating unit.
3. After the dynamic **power swings** subside following a **disturbance** that results in the loss of any single electric system **element** as described in 2 above, and after the operation of automatic operating systems, but before any post-**contingency** operator-initiated system adjustments are implemented, all transmission facility loadings are within **emergency ratings** and all voltages are within **emergency** limits.

First Contingency Total Transfer Capability (FCTTC) — The algebraic sums of the FCITC values and the appropriate total interregional transfers assumed in the base load flow model used for the FCITC calculations.

Normal Incremental Transfer Capability (NITC) — The amount of electric **power**, incremental above normal base power transfers, that can be transferred between two areas of the interconnected transmission systems under conditions where pre-**contingency** loadings reach the normal thermal **rating** of a facility prior to any first **contingency** transfer limits being reached. When this occurs, NITC replaces FCITC as the most limiting transfer capability.

#### NPCC Specific Definitions:

Transfer Capability — An **operating limit** relating to the permissible **power** transfer between specified areas of the transmission system. (C-1)

Emergency Transfer Capability — The amount of **power** transfer allowed between Areas or within an Area when operating to meet NPCC **emergency** criteria contingencies [as defined in the *Basic Criteria for Design and Operation of Interconnected Power Systems* (Document A-2).] (A-3, C-1)

Normal Transfer Capability — The amount of **power** transfer allowed between Areas or within an Area when operating to meet NPCC normal criteria contingencies [as defined in Document A-2.] (A-3, C-1)

NERC (except as indicated)

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**Transmission Reliability Margin (TRM)** — See under **Transfer Capability**

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**Voltage Reduction** — A means to reduce the **demand** by lowering the customer's voltage.

NERC (C-1)

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**Voltage Regulating Transformer** — A transformer that increases or decreases the voltage magnitude relationship of one circuit with respect to another, most often used to control voltage but also to control **reactive power** flow.

B-3

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**Wheeling** — The contracted use of electrical facilities of one or more entities to transmit electricity for another entity.

NERC (C-1)

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**With due regard to reclosing** — This phrase means that before any manual system adjustments, recognition will be given to the type of **reclosing** (i.e., manual or automatic) and the kind of **protection**.

A-1

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Compiled by the Joint Glossary Working Group under the auspices of the Task Force on Coordination of Planning.

Reviewed for concurrence by: TFCO, TFEMT, TFSP and TFSS

Review frequency: 1 year

References: *Criteria for Review and Approval of Documents* (Document A-1)

*Basic Criteria for Design and Operation of Interconnected Power Systems*  
(Document A-2)

*Emergency Operation Criteria* (Document A-3)

*Bulk Power System Protection Criteria* (Document A-5)

*Operating Reserve Criteria* (Document A-6)

*Guide for the Application of Autoreclosing to the Bulk Power System*  
(Document B-1)

*Guidelines for Inter-AREA Voltage Control* (Document B-3)

*Special Protection System Guideline* (Document B-11)

*Glossary of Standard Operating Terms* (Document C-1)

*Monitoring Procedures for Emergency Operation Criteria* (Document C-5)

*Operational Planning Coordination* (Document C-13)

*Procedures for Solar Magnetic Disturbances on Electrical Power Systems*  
(Document C-15)

*Procedure for Testing and Analysis of Extreme Contingencies* (Document  
C-18)

*Procedures During Abnormal Operating Conditions* (Document C-20)

*Procedure to Collect Real Time Data for Inter-Area Dynamic Analysis*  
(Document C-25)

The North American Electric Reliability Council (NERC) *Glossary of  
Terms*, August 1996.

The IEEE *Standard Dictionary of Electrical and Electronics Terms*, Sixth  
Edition.

**ATTACHMENT 2**

**ECAR, MAAC AND MAIN DEFINITIONS OF  
BULK ELECTRIC SYSTEM**

**ECAR** has no formal definition of the bulk electric system. The following related definitions are included in ECAR documents:

From ECAR Doc 7 – Definitions:

**Transmission Element** – A transmission element is any equipment, conductors, connectors, protective relay and control systems, etc., directly associated with the delivery of electric power at 100 kV and above.

**Transmission Facility** – A transmission facility is the combination of transmission elements that constitute an electrical circuit between terminal points, typically station buses, taken as a single entity.

From ECAR Doc 1 – Definitions:

**Transmission Provider** – Any entity that owns and/or operates a network transmission system rated 100 kV or higher in the ECAR region.

**MAAC** – The MAAC Compliance Facilities Lists, available on the MAAC website at <http://www.maacrc.org/>, define the MAAC Bulk Power System. Below are the general requirements for including elements in the MAAC Compliance Facilities Lists:

- 230 kV and above non-radial transmission lines, buses and breakers.
- Control area to control area tie lines.
- Facilities identified as “flow gate” elements in the NERC Interchange Distribution Calculator.
- Transformers with a low side voltage of 230 kV or above, and all transformers connected at 500 kV.
- All generators 100 MW and greater, no matter of kV interconnection level.
- Additional facilities that affect the overall reliability of the interconnected MAAC system.

All elements that fall under these general requirements must be included in the MAAC Compliance Facilities Lists unless exempted. The MAAC Planning Committee has the final authority as to which facilities are included in the Lists.

**MAIN** has no formal definition of the bulk electric system. The following related definition is contained in one of the MAIN Guides:

“Transmission Owning Member” shall be a Regular Member owning, or having by contract Rights Equivalent to Transmission Ownership in, facilities for the transmission of electric power at 100 kV or greater and extending for 500 miles or more that are directly connected with and capable of operating as part of the interconnected grid of such facilities within the MAIN Region. Partial ownership, or Rights Equivalent to Transmission Ownership in a mile of line, shall be represented as a fractional share of the mile.

**ATTACHMENT 3**

**WECC CRITICAL FACILITIES BELOW 100 kV**

**CONTAINS  
CRITICAL ENERGY INFRASTRUCTURE INFORMATION –  
NOT INCLUDED IN PUBLIC FILING**

**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 Chicago, Illinois this 14th day of June, 2007.

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