

I. INTRODUCTION

The North American Electric Reliability Corporation (“NERC”), in compliance with the directives in paragraph 108 of the Commission’s June 8, 2007 Order in Docket Nos. RR07-11,¹ hereby submits its explanation regarding consistency of Western Electricity Coordinating Council (“WECC”) regional standard WECC-TOP-STD-007-0 Requirement WR1.b with NERC Reliability Standard IRO-005-1.

II. NOTICES AND COMMUNICATIONS

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¹ *Order Approving Regional Reliability Standards for the Western Interconnection and Directing Modifications*, 119 FERC ¶ 61,260 (2007) (“June 8 Order”).

III. BACKGROUND

On March 26, 2007, NERC submitted for Commission approval eight proposed WECC regional Reliability Standards. In its June 8 Order,² the Commission approved the proposed regional Reliability Standards but directed several modifications when WECC developed permanent, replacement standards. Regional Reliability Standard WECC-STD-007-0 (Operating Transfer Capability) was one of the eight approved by the Commission. Its goal is to ensure that the operating transfer capability limit requirements of the Western Interconnection are not exceeded. In its decision to approve WECC-TOP-STD-007-0, the Commission expressed concern regarding a potential inconsistency within the standard between Requirement WR1.b and Measure WM1, and as it relates to NERC Reliability Standard IRO-005-1 Requirement 3. The specific language contained in these standards is:

IRO-005-1 (Reliability Coordination – Current Day Operations) Requirement R3: “If a potential or actual IROL violation cannot be avoided through proactive intervention, the Reliability Coordinator shall initiate control actions or emergency procedures to relieve the violation without delay, and no longer than 30 minutes.”

WECC-TOP-STD-007-0 (Operating Transfer Capability) Requirement WR1.b: “Stability. The interconnected power system shall remain stable upon loss of any one single element without system cascading that could result in the successive loss of additional elements.”

WECC-TOP-STD-007-0 (Operating Transfer Capability) Measure WM1: “Actual power flow on all transmission paths shall at no time exceed the OTC for more than 20 minutes for paths that are stability limited, or more than 30 minutes for paths that are thermally limited.”

Specifically, WECC Requirement WR1.b could be interpreted that the power system is being operated two contingencies away from a cascading outage while WECC Measure WM1 results in the power system being operated one contingency away from a cascading outage. Thus, it may be possible that WECC Measure WM1 is less stringent than NERC Reliability

² *Id.*

Standard IRO-005-1 if the latter is interpreted to allow an IROL to be exceeded only after a contingency occurs with subsequent positioning of the system to a secure state as soon as possible but within 30 minutes. The Commission expressed in Paragraph 108 of its Order approving WECC's regional Reliability Standards it is "concerned regarding the circumstances under which WECC_TOP_STD-007-0 would be implemented and the amount of time an entity is allowed to be in violation of an IROL without the possibility of being found in non-compliance. Accordingly, the Commission directs NERC to submit a filing within 30 days of the date of this order explaining whether Requirement WR1.b is consistent with the second interpretation of IRO-005-1 (two contingencies away from cascading failure)."

IV. DISCUSSION

We will address the Commission's concerns in two parts: a) time element of an IROL violation; and b) number of contingencies away from cascading failure. As discussed below, WECC operates its system in such a manner that the system is at least two contingencies away from a cascading failure.

a) Time Element of an IROL Violation

WECC utilizes procedure *RC-003-1 WECC Reliability Coordinator Monitoring and Directives Procedure* to implement regional Reliability Standard WECC-TOP-STD-007-0.³ This procedure requires reliability coordinator action to be taken immediately when a transfer path exceeds its System Operating Limit (SOL) or Interconnection Reliability Operating Limit (IROL). The *RC-003-1 WECC Reliability Coordinator Monitoring and Directives Procedure* states in part:

³ This is available at <http://www.wecc.biz/modules.php?op=modload&name=Downloads&file=index&req=getit&lid=1302>.

“When a transfer path is exceeding its System Operating Limit (SOL) or Interconnection Reliability Operating Limit (IROL), the system, sub-region, and/or Interconnection is at risk and **action must be initiated immediately** [emphasis added] to prepare the system for the next contingency. Insuring that timely action is taken to minimize the amount of time an SOL/IROL has been exceeded (through corrective action coordinated between affected parties) is a primary responsibility of the RC.”

Further, Requirement R4 of the procedure states:

R4. Reliability Coordinator IROL/SOL Communications Protocol
When an SOL/IROL is exceeded, the RC shall take the following actions:

Within 2 minutes of detecting the overload the RC shall:

- R4.1. Communicate with the affected Path Operator and ask what actions are being taken to reduce path loading below the limit. Appropriate actions include the movement of phase shifters, generation re-dispatch, D.C. circulation, transmission line re-configuration, controller (AGC) adjustments, or the reduction of load. In some cases opening the tie may be an option if it does not adversely affect another area or subregion.
- R4.2. Advise the Path Operator that in 5 minutes there will be a conference call with all affected parties if there is not measurable progress in reducing the path loading.
- R4.3. Continue to monitor the path loading,
- R4.4. Begin making arrangements for a conference call if appropriate.

After 5 minutes (from the initial RC communication)

- R4.5. If after 5 minutes (from the initial communication) the RC is NOT convinced that actions being taken to mitigate the exceeded SOL/IROL will successfully return the system to within limits: the RC shall conference the affected parties.
- R4.6. Ask all parties what phase shifter or generation changes they are making or can make which will mitigate the Path overload.
- R4.7. Notify all parties that WECC policy shall require the RC to issue a WECC Reliability Coordinator Directive if appropriate action is not being taken. The RC Directive may require re-dispatch of generation or shedding load.
- R4.8. RC shall continue to monitor the path loading.

Issuance of an RC Directive

R4.9. Fifteen (15) minutes after the SOL/IROL is exceeded for stability limited paths or twenty-five (25) minutes after the SOL/IROL is exceeded for thermally limited paths, the RC shall issue a Reliability Coordinator Directive to move sufficient generation or reduce sufficient load to reduce Path flows below the exceeded SOL/IROL.

RC-003-1 WECC Reliability Coordinator Monitoring and Directives Procedure clearly illustrates that a WECC reliability coordinator must take immediate action, initially through the transmission operators, and then issues directives, to return the system to a secure condition as soon as possible after identification of a transfer path exceeding its SOL/IROL. This procedure thereby implements the requirements contained in WECC-TOP-STD-007-0 regional Reliability Standard. Further, Measure WM1 of WECC-TOP-STD-007-0 identifies the time frame (no more than 20 minutes for paths that are stability limited, or more than 30 minutes for paths that are thermally limited) that a transmission operator must resolve a SOL/IROL limit violation before the transmission operator is deemed of being in non-compliance of the standard. Section D.2 of the standard clearly defines the levels of non-compliance for failing to meet the time-bound objectives when violating an SOL/IROL.

b) Number of Contingencies Away from Cascading Failure.

WECC operates its system in such a manner that the system is at least two contingencies away from a cascading failure. WECC develops Operating Transfer Capability (OTC) Limits in accordance with the NERC requirements and WECC processes described in the *Western Electricity Coordinating Council NERC/WECC Planning Standards*⁴ document. WECC's system must perform in accordance with NERC and WECC planning criteria identified in Tables

⁴ Western Electricity Coordinating Council NERC/WECC Planning Standards document was created to merge NERC Planning Standards that were in effect before Revision 0 with the more stringent or specific WECC requirements. This is available at <http://www.wecc.biz/modules.php?op=modload&name=Downloads&file=index&req=getit&lid=1030>.

I and W-1 found in Section 1.A. Specifically, Western Electricity Coordinating Council NERC/WECC Planning Standards, Section I.A requires that cascading will not occur under normal operation and as a result of the loss of elements as discussed in Requirements S2 and S3, and companion Measures M2 and M3.

S2. The interconnected transmission systems shall be planned, designed, and constructed such that the network can be operated to supply projected customer demands and projected firm (non-recallable reserved) transmission services, at all demand levels, under the conditions of the contingencies as defined in Category B of Table I.

Transmission system capability and configuration, reactive power resources, protection systems, and control devices shall be adequate to ensure the system performance prescribed in Table I.

The transmission systems also shall be capable of accommodating planned bulk electric equipment outages and continuing to operate within thermal, voltage, and stability limits under the contingency conditions as defined in Category B of Table I.

M2. Entities responsible for the reliability of the interconnected transmission systems shall ensure that the system responses for Standard S2 contingencies are as defined in Category B (event resulting in the loss of a single element) of Table I and summarized below:

- a. Line and equipment loadings shall be within applicable rating limits.
- b. Voltage levels shall be maintained within applicable limits.
- c. No loss of customer demand (except as noted in Table I, footnote b) shall occur, and no projected firm (non-recallable reserved) transfers shall be curtailed.
- d. Stability of the network shall be maintained.
- e. Cascading outages shall not occur.⁵

S3. The interconnected transmission systems shall be planned, designed, and constructed such that the network can be operated to supply projected customer demands and projected firm (non-recallable reserved) transmission services, at all demand levels over the range of forecast system demands, under the conditions of the contingencies as defined in Category C of Table I.

The controlled interruption of customer demand, the planned removal of generators, or the curtailment of firm (non-recallable reserved) power transfers may be necessary to meet this standard.

⁵ See *id.* at P XI-21 of Section XI Planning and Operating Criteria of Western Electricity Coordinating Council Planning Coordination Committee Handbook.

Transmission system capability and configuration, reactive power resources, protection systems, and control devices shall be adequate to ensure the system performance prescribed in Table I. The transmission systems also shall be capable of accommodating planned bulk electric equipment outages and continuing to operate within thermal, voltage, and stability limits under the conditions of the contingencies as defined in Category C of Table I.

M3. Entities responsible for the reliability of the interconnected transmission systems shall ensure that the system responses for Standard S3 are as defined in Category C (event(s) resulting in the loss of two or more elements) of Table I and summarized below:

- a. Line and equipment loadings shall be within applicable thermal rating limits.
- b. Voltage levels shall be maintained within applicable limits.
- c. Planned (controlled) interruption of customer demand or generation (as noted in Table I, footnote d) may occur, and contracted firm (nonrecallable reserved) transfers may be curtailed.
- d. Stability of the network shall be maintained.
- e. Cascading outages shall not occur.

The WECC transmission grid must be operated such that no cascading occurs following a single contingency. The OTC limits are derived in the seasonal system analysis performed using critical operating conditions and are adjusted in the day-ahead planning and in real-time operations as necessary to account for actual system conditions. Critical contingencies are identified that result in the most restrictive OTC limit. Therefore, as these OTC limits are employed in operations, the effect of the most limiting single contingency is already considered in the derived limit. Day-Ahead or Real-time studies are done using advanced applications to ensure if another contingency could result in an OTC violation, Reliability Coordinators in conjunction with transmission operators develop mitigation plans. Therefore, no single contingency should result in cascading while respecting the OTC limit. There may be occasions, in practice, whereby an OTC limit is violated under normal conditions without a contingency occurring. This is not an acceptable condition and transmission operators are instructed to take actions they deem necessary to avoid the OTC limit violation under normal non-contingency

conditions. However, should this occur, it is imperative that immediate action is taken by the transmission operator to mitigate this event. This system is vulnerable to the most critical contingency should it occur. Cascading is a potential outcome under these conditions.

Thus, the transmission operators can operate the system up to but not in excess of the OTC limit with the knowledge that no single contingency will cause cascading, *i.e.* that a second contingency is required to introduce the potential for cascading. If, however, the OTC limit is violated under normal conditions, not an acceptable operating state, the system is vulnerable to potential cascading upon the single contingency loss of the most critical contingency that served to identify the OTC limit in the first instance.

Therefore, there is no inconsistency between IRO-005-1 and WECC-TOP-STD-007-0. In order to support Requirement WR1.b in the WECC-TOP-STD-007-0 regional Reliability Standard, the system cannot be operated such that a single contingency will cause cascading of the system. This is implicit in the identification of the OTC limit derivation. If, however, there is a flow that exceeds the OTC limit, the transmission operator must take (proactive) immediate corrective action within 20 minutes for stability-limited paths and 30 minutes for thermally limited paths to return the system to below the OTC limit, thus protecting the system from potential cascading for a subsequent contingency.

Thus, as the Commission noted in paragraph 106 of its June 8 Order, and as discussed above, WECC operates its system in such a manner that the system is at least two contingencies away from a cascading failure.

IV. CONCLUSION

The North American Electric Reliability Corporation respectfully requests that the Commission accept this filing as compliant with paragraph 108 of the Order Approving Regional Reliability Standards for the Western Interconnection and Directing Modifications.

Respectfully submitted,

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CERTIFICATE OF SERVICE

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

Dated at Washington, DC this 9th day of July, 2007.

/s/ Rebecca J. Michael

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