



NORTH AMERICAN ELECTRIC RELIABILITY COUNCIL

Princeton Forrestal Village, 116-390 Village Boulevard, Princeton, New Jersey 08540-5731

June 22, 2004

TO: Transmission Owners and Operators

Clarification of the Transmission Line Emergency Ampere Rating to be Used to Determine Compliance with Loadability Requirements for Zone 3 Relays (Blackout Recommendation 8a)

On February 10, 2004, the NERC Board of Trustees approved a series of recommendations following the August 14 blackout. Recommendation 8a (below) involves the evaluation of Zone 3 relay settings to ensure that these relays do not trip at load levels lower than desired.

Recommendation 8a: All transmission owners shall, no later than September 30, 2004, evaluate the zone 3 relay settings on all transmission lines operating at 230 kV and above for the purpose of verifying that each zone 3 relay is not set to trip on load under extreme emergency conditions⁶. In each case that a zone 3 relay is set so as to trip on load under extreme conditions, the transmission operator shall reset, upgrade, replace, or otherwise mitigate the overreach of those relays as soon as possible and on a priority basis, but no later than December 31, 2005. Upon completing analysis of its application of zone 3 relays, each transmission owner may no later than December 31, 2004 submit justification to NERC for applying zone 3 relays outside of these recommended parameters. The Planning Committee shall review such exceptions to ensure they do not increase the risk of widening a cascading failure of the power system.

⁶ The NERC investigation team recommends that the zone 3 relay, if used, should not operate at or below 150% of the emergency ampere rating of a line, assuming a .85 per unit voltage and a line phase angle of 30 degrees.

In the draft meeting minutes of the March 23–24, 2004 NERC Planning Committee meeting, Exhibit R indicated that the emergency ampere rating of the line referred to in footnote 6 was the “long term

summer emergency ampere rating of the line.” Some, but not all, interested parties were aware of this exhibit, and based their evaluations on their summer long-term emergency limit.

In May, the System Protection and Control Task Force (SPCTF) was established by the NERC Planning Committee to address the issues associated with Recommendation 8 in its entirety. As a part of that work, after discussion with the Executive Committee of the Planning Committee, the definition of “emergency ampere rating” of a line in Footnote 6 is to be clarified as:

Emergency Ampere Rating — “The highest seasonal ampere circuit rating (that most closely approximates a 4-hour rating) that must be accommodated by relay settings to prevent incursion.” That rating will typically be the winter short-term (four-hour) emergency rating of the line and series elements. The line rating should be determined by the lowest ampere rated device in the line (conductor, airswitch, breaker¹, wavetrap, series transformer, series capacitors, reactors, etc) or by the sag design limit of the transmission line for the selected conditions. The evaluation of all Zone 3 relays should use whatever ampere rating currently used that most closely approximates a 4-hour rating.

Recommendation 8a calls for an evaluation of the Zone 3 relay settings on lines operating 230 kV and above to verify that they meet the loadability requirement as outlined in Footnote 6 by September 30, 2004. It is desirable that this evaluation be done against the loadability criteria using the “emergency ampere rating” as defined above. However, since this rating was not clearly defined prior to now, it is acceptable to complete this evaluation using whatever “emergency ampere rating” that you chose to use. In your evaluation, please state the basis of the current level used (i.e. long term summer rating, 15 minute summer rating, etc.).

However, prior to December 31, 2004, you should complete the evaluation of all Zone 3 relays against the definition for “emergency ampere rating” stated above and submit justification for any Zone 3 relays that are applied outside the Recommendation 8 parameters.

The SPCTF recognizes that in many cases, especially on longer transmission lines, other factors, such as system stability, voltage drop, or VAR consumption, may be the realistic limiting factor for the power transfer capability of the line. The SPCTF will develop (for the Planning Committee’s approval) the criteria where facilities will receive exceptions to the thermal loading criteria based on these other factors. The SPCTF will develop that criteria and communicate to the transmission owners by October 30, 2004.

Also, the NERC Planning Committee and the SPCTF agree that the other distance relays used on the transmission system should conform to the same loadability criteria that are applied to the Zone 3 relays. However, the SPCTF will develop an appropriate compliance timeframe for the Planning Committee’s consideration. As the Zone 3 evaluation is performed, the SPCTF recommends that the

¹ Where parallel breakers are used to terminate a transmission line, the lowest ampere rated breaker should be used to determine if the breaker is the most limiting element on the line, assuming the higher rated breaker is open.

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other distance relays that can initiate a trip operation be evaluated to determine their settings relative to the loadability criteria.

If there are any questions, please contact the SPCTF through Bob Cummings of the NERC Staff at Bob.Cummings@NERC.net.

Sincerely,

A handwritten signature in black ink that reads "Charles W. Rogers". The signature is written in a cursive, flowing style.

Charles W. Rogers
SPCTF Chairman

CWR:rcw

cc: Planning Committee
Operating Committee
Regional Managers
RCWG
SPCTF