UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North American Electric Reliability Corporation	**)** **)**	**Docket No. RR15-4-00_**

INFORMATIONAL FILING OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

The North American Electric Reliability Corporation ("NERC") hereby submits this informational filing in accordance with the Federal Energy Regulatory Commission's ("Commission" or "FERC") October 15, 2015 Order ("October 15 Order").[1] In the October 15 Order, the Commission accepted NERC's proposal to remove the load-serving entity ("LSE") as a functional registration category from the NERC Compliance Registry ("NCR").[2] The Commission accepted that the risks posed by the elimination of the LSE functional registration category are likely to be minimal because load data will continue to be available.[3] Specifically, the Commission found that balancing authorities, planners and other affected entities continue to have access to necessary data to estimate demand and energy forecast in areas where LSEs are deregistered.[4]

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[1] *North American Electric Reliability Corp*., 153 FERC ¶ 61,024 (2015).

[2] This informational filing does not provide an update on sub-set lists of NERC Reliability Standards. *See North American Electric Reliability Corp*., 150 FERC ¶ 61,213 (2015). To date, NERC has received one request for the application of a sub-set list of Reliability Standards and reduced set of compliance obligations. As NERC receives and examines additional requests in the future, NERC will assess whether there are any consistent criteria or system characteristics among such applicants that define a group of lower risk registered entities qualifying for such reduced compliance obligations.

[3] October 15 Order at P 20.

[4] October 15 Order at P 23.

In the October 15 Order, the Commission directed NERC to submit an informational filing addressing two separate directives within 15 months of the order.[5] First, the Commission directed NERC to provide an update on the process of transferring commercial-related requirements covered by retired NERC Reliability Standard INT-011, the only Reliability Standard solely applicable to LSEs, to commercial standards issued by the North American Energy Standards Board ("NAESB"). NAESB develops and promotes standards to ensure a seamless marketplace for wholesale and retail natural gas and electricity. Second, the Commission directed NERC to conduct a follow-up analysis to assess whether the removal of LSEs affects transmission operators and balancing authorities' ability to conduct accurate next-day studies.

NERC respectfully requests that the Commission to accept this informational filing in response to the Commission's directives in the October 15 Order which affirms the commercial role of LSEs and the minimal impact of their removal from the NCR on the reliability of the Bulk Power System.

[5] October 15 Order at Ordering Paragraph (B).

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I. Completion of Coordination with NAESB

Prior to the issuance of the October 15 Order, NERC and NAESB discussed whether the retirement of any NERC Reliability Standards solely applicable to LSEs warranted the development of such a NAESB standard. NAESB identified NERC Reliability Standard INT-011-1 as a candidate for a NAESB standard. Requirement R1 of INT-011-1 required LSEs to submit a request for interchange for point-to-point transmission service for intra-balancing authority area transfers unless the transfer is included in an alternative congestion management procedure.

In October 2016, NAESB submitted Version 003.1 of its Wholesale Electric Quadrant ("WEQ") Business Practice Standards to FERC. In that filing to FERC, NAESB noted that it developed modifications to its WEQ-004 Coordinate Interchange Business Practice Standards incorporating language from INT-011. The modifications to the WEQ-004 Coordinate Interchange Business Practice Standards incorporate a requirement for LSEs related to the submittal of a request for interchange for certain intra-balancing authority transactions. Specifically, WEQ-004-1 now requires the submittal of a request for interchange, in addition to transactions between a source and sink balancing authority, for point-to-point intra-balancing authority transitions not already represented by alternative congestion management tools. Therefore, NERC's retirement of Reliability Standard INT-011-1 and NAESB's development of WEQ-004-1 confirms the continued commercial accountability of LSEs in interchange transactions.

II. Accuracy of Next-Day Studies

In the October 15 Order, the Commission directed NERC to perform a follow-up analysis to examine whether transmission operators and balancing authorities affected by the removal of the LSE functional registration category remain able to perform reasonably accurate next-day studies.[6] The Commission specifically directed NERC to do the following:

(a) identify a representative sample of affected transmission operators and balancing authorities;

(b) determine the extent to which next-day studies match or differ from real-time results; and,

(c) determine, if there are any differences, whether those differences are attributable to the removal of the LSE functional registration category.

A. Representative Sample of Affected Transmission Operators and Balancing Authorities

In response to the Commission's directive, NERC examined the following three Balancing Authorities affected by the removal of LSEs – Duke Energy Carolinas, ERCOT and PacifiCorp. In each of the footprints where LSEs were deactivated or deregistered, the affected load was small and represented less than 5% of the total load. Therefore, in order to evaluate the impact of deregistering LSEs on next-day study methodologies, NERC selected Balancing Authorities with the greatest amount of affected load. Specifically, NERC selected three Balancing Authorities whose affected load represented more than 1.0% of total load in their respective footprints. NERC also selected BAs from three different interconnections. Below is a table listing all load affected by the deregistration of LSEs organized by Balancing Authority.

[6] October 15 Order at P 40.

Load Served by Deactivated LSEs

Balancing Authority	Total 2013 BA Load (MW)	% of 2013 Balancing Authority Load Served by LSEs
CAISO	48,967	0.70
Duke Energy Carolinas	19,471	3.39
ERCOT	67,998	3.29
MISO	114,333	0.20
NYISO	33,725	0.22
PacifiCorp	12,700	2.64
PJM	155,553	0.10
Public Service Company of New Mexico	2,710	1.62
Southwest Power Pool	52,247	0.11
Louisville Gas and Electric & Kentucky Utilities ("LG&E/KU")	7,207	2.78

Load Served by Deregistered LSEs

Balancing Authority	Aggregated, Individual 2013 Peak Load (MW)	% of Balancing Authority Load Served by LSEs
ERCOT	2,238	3.37
PacifiCorp	317	2.56
California ISO	359	0.80
Public Service Company of New Mexico	44	1.70
Duke Energy Carolina	661	3.39
LG&E/KU	200	2.76
New York ISO	113	0.33
Midwest ISO	230	0.19
PJM	178	0.13

B. Next-Day Study Methods

The objective of next-day studies is to allow system operators to prepare for real-time operations. Next-day studies consist of several inputs including topology (i.e., planned and/or forced equipment outages), generator unit commitment, and load forecast data (i.e., prediction of system load for a given footprint). Planners typically receive equipment outage information from the owners and operators of such equipment. For example, generator owners and generator operators supply generation outage data and transmission owners and operators supply transmission outage data. Planners examine load forecast data for any given Balancing Authority Area ("BAA") footprint. For purposes of next-day studies, the relevant load forecasts used by planners are short-term or day-ahead load forecasts. Balancing Authority planners are responsible for developing these short-term forecasts for scheduling and dispatching generation units. Load forecast data can also be analyzed for smaller sub-regions (i.e., at the Transmission Operator level within a given BAA). The Balancing Authorities examined in this informational filing also operate as the Transmission Operators. Since planners' load forecasting methodologies vary across BAA footprints, NERC outlines the approach used by each of the affected Balancing Authorities identified by NERC in the preceding section.

1. Load Forecasting in ERCOT

ERCOT's short and mid-term load forecast models use historical telemetered boundary data representing data captured at metering points on a four-second basis. ERCOT supplements the short-term and mid-term load forecasts with weather variables described herein. The relevant load forecast for ERCOT's next-day studies is its Mid-Term Load Forecasting ("MTLF") Seven-Day Load Forecast. Weather is the primary variable or source of error for any short-term load forecast.[7] A change in temperature, wind speed or even precipitation affects electricity demand. To account for the weather variable, ERCOT examines two inputs: (a) hourly forecasted weather parameters for weather stations within weather zones (updated at least once per hour); and (b) training information based on historical hourly integrated weather zone loads. ERCOT uses the MTLF to predict hourly loads for the next 168 hours (seven days) based on current weather forecast parameters within each weather zone. ERCOT's implementation and configuration of its MTLF utilizes a "self-training" mode that allows ERCOT to review historical load data and to retrain the MTLF algorithm. ERCOT performs this analysis itself and does not rely upon LSEs for this operational MTLF forecast.

ERCOT's Long-Term Load Forecast ("LTLF") model differs from the MTLF in that the LTLF incorporates forecasted economic variables to account for the growth in ERCOT's forecasted demand given the longer period covered by this forecast. Unlike the MTLF, LSEs can inform the LTLF by assisting planners to assess load growth for the long-term horizon. The LTLF is an hourly forecast for the next 10 years for each weather zone. ERCOT aggregates these forecasts to create the ERCOT total forecast.

2. Duke Energy

Duke Energy Carolinas ("DEC") develops an hourly forecast of DEC's BAA load for a seven-day horizon for use in its next-day studies. This load forecast uses historical BAA load information extracted from the DEC energy accounting systems and weather history, in addition to a forecast of system average temperature and dew point. Like ERCOT, this historical BAA load information represents meter data aggregating generation minus interchange or load leaving DEC's Balancing Authority footprint. DEC gathers the weather data (actual and forecast) input

[7] *See* ERCOT Protocol Section 3.12.1, Seven-Day Load Forecast.

from weather stations close to load. DEC personnel maintain internal load forecasting models using a third-party application called Metrix.

To supplement the internal forecasting process, DEC also uses an external load forecasting service called Tesla. A blending mechanism tracks the accuracy of each model over time and provides a blended forecast using separate weightings for each hour of the day based on recent performance. In addition, each model creates two forecasts using two weather forecasts, one from the National Weather Service Model Output Statistics ("MOS"), and one from Duke internal meteorologists ("DUK"). DEC uses the same program that blends the Metrix and Tesla forecasts to blend the MOS and DUK forecasts to provide a single forecast.

DEC Unit Commitment personnel are responsible for selecting from among the available forecast versions and making adjustments to peak, valley, or shape as they deem appropriate based on their experience. DEC updates the forecast at least once per day. The update frequency depends on system conditions at the time.

3. PacifiCorp

PacifiCorp's BAAs also prepare short-term load forecasts based on historical BAA load data captured at meters as well as future weather forecasts. This methodology examines historical real-time metering data as captured every four seconds. This metering data represents net generation minus net interchange. A forecast group refines this data and blends weather and day of the week components into the forecast. PacifiCorp also conducts after the fact verification of load forecasts with inputs from merchants and LSEs.

C. Load Forecasting Error

Since LSEs do not provide inputs for the determination of short-term load forecasts, any differences identified in load forecasting error between 2015 and 2016 could not be attributed to any identifiable loss of load data from LSEs. Nonetheless, NERC requested that ERCOT, Duke Energy Carolinas, PacifiCorp and LG&E/KU compare load forecast accuracy in 2015 (the year in which LSEs were removed as a functional registration category) to load forecast accuracy in 2016 to determine whether there are any significant differences in load forecast accuracy. NERC proposed that the Balancing Authorities selected for this informational filing compare load forecasting accuracy in the aggregate for 2015 versus 2016 in order to minimize the large weather impact fluctuations on short-term forecasting. Below are the error percentages from each of the selected Balancing Authorities.

1. <u>ERCOT</u>

ERCOT's Mean Absolute Percentage Error ("MAPE") for calendar year 2015 is 2.9%. The MAPE for 1/1/2016 – 10/31/2016 is 2.6%. These values are not weather-adjusted, meaning that they represent the total ("true") error in the forecast (includes weather error). ERCOT does not use weather-adjusted forecasts when reporting forecast error nor are the values available. Weather adjusted errors would be much lower than non-weather adjusted errors.

2. <u>Duke Energy Carolinas</u>

DEC's day-ahead MAPE forecasting error for January - October 2015 was 2.89%. DEC's day-ahead load forecast MAPE for January - October 2016 was 2.84%. These values are not weather-adjusted, and thus include weather error as a normal factor in load forecasting.

3. <u>PacifiCorp</u>

Below, PacifiCorp provides the aggregate forecast error percentages based on the day-ahead forecast submitted to Peak Reliability by PacifiCorp in 2015 and in 2016.

	Forecast Error (%)	
Balancing Authority Area	**2015**	**2016**
PacifiCorp East	4.40	3.80
PacifiCorp West	4.60	4.70

III. Conclusion

In three of the Balancing Authorities with the largest percentage of deactivated and deregistered LSEs, the calculation of next-day studies does not require input from former LSEs. Therefore, these Balancing Authorities cannot attribute the identified changes to load forecasting error to the removal of LSEs from the NCR. NERC respectfully requests that the Commission accept this informational filing.

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, D.C. this 17th day of January 2017.

/s/ Nina H. Jenkins-Johnston

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