UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North American Electric Reliability Corporation	**)** **)**	**Docket No. RM16-7** **RD18-7**

INFORMATIONAL FILING OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION REGARDING IMPLEMENTATION OF RELIABILITY STANDARD BAL-002-2

Pursuant to paragraphs 46 and 58 of the Federal Energy Regulatory Commission's ("FERC" or "Commission") Order No. 835,[1] the North American Electric Reliability Corporation ("NERC") hereby submits a report on implementation of Reliability Standard BAL-002-2 (Disturbance Control Standard—Contingency Reserve for Recovery from a Balancing Contingency Event). In particular, the attached report responds to the Commission's directives that requested information regarding megawatt losses during the Contingency Reserve Restoration Period and most severe single contingency ("MSSC") exceedances that do not cause energy emergencies. As reflected in the report, NERC has evaluated disturbance control standard ("DCS") data voluntarily submitted after implementation of the standard and reliability risks associated with MSSC exceedances that do not cause energy emergencies. Based on its analysis, NERC has determined that data regarding implementation of the standard does not indicate any risk of adverse impact to reliability.

[1] *Disturbance Control Standard—Contingency Reserve for Recovery from a Balancing Contingency Event Reliability Standard*, Order No. 835, 158 FERC ¶ 61,030 (2017). Reliability Standard BAL-002-3 is currently effective, however, the directives for an informational filing were issued in connection with version 2 of the standard and Reliability Standard BAL-002-2 is therefore referenced in this filing. *See, supra* n. 3 (citing letter order accepting Reliability Standard BAL-002-3).

I. NOTICES AND COMMUNICATIONS

Notices and communications with respect to this filing may be addressed to the following:[2]

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II. BACKGROUND

In Order No. 835, the Commission approved Reliability Standard BAL-002-2 (Disturbance Control Standard—Contingency Reserve for Recovery from a Balancing Contingency Event). The standard is designed to ensure that balancing authorities ("BAs") and reserve sharing groups ("RSGs") are able to recover from system contingencies by deploying adequate reserves to return their Area Control Error ("ACE") to defined values and by replacing the capacity and energy lost due to generation or transmission equipment outages.

The standard applies three requirements to achieve this aim:

- Requirement R1, requires a BA or RSG experiencing a Reportable Balancing Contingency Event to deploy contingency reserves to recover ACE to certain values within the 15-minute Contingency Event Recovery Period. The standard relieves entities from strict compliance with the 15-minute Contingency Event Recovery Period if a BA or RSG (1) is experiencing a Reliability Coordinator ("RC") declared Energy Emergency Alert Level ("EEA"), (2) is utilizing its contingency reserve to mitigate an operating emergency in accordance with its emergency Operating Plan, and (3) has depleted its contingency reserves below its MSSC.
- Requirement R2, requires responsible entities to develop, review, maintain, and implement an Operating Process to determine its MSSC and to make preparations

[2] Persons to be included on the Commission's service list are identified by an asterisk. NERC respectfully requests a waiver of Rule 203 of the Commission's regulations, 18 C.F.R. § 385.203, to allow the inclusion of more than two persons on the service list in this proceeding.

to have Contingency Reserve available in an amount equal to or greater than the responsible entity's MSSC.

- Requirement R3 states that each responsible entity shall restore Contingency Reserve to at least its MSSC after a Reportable Balancing Contingency Event before the end of the Contingency Reserve Restoration Period of 90 minutes. However, Requirement R3 adds that any Balancing Contingency Event occurring before the end of the Contingency Reserve Restoration Period resets the beginning of the Contingency Event Recovery Period.

The Commission approved the standard subject to a directive that NERC modify Requirement R1 to obligate responsible entities to provide certain information to the RC when the entity does not timely recover ACE due to an intervening disturbance. In 2018, the Commission accepted NERC's petition to revise the standard in accordance with this directive.[3]

In addition to this directive for revision to the standard, Order No. 835 mandated an informational filing on two issues related to implementation of Reliability Standard BAL-002-2. First, the Commission directed NERC to do the following:

> [T]o collect and report data pertaining to: (1) additional megawatt losses following Reportable Balancing Contingency Events during the Contingency Reserve Restoration Period; and (2) the time periods for contingency reserve restoration under Requirement R3 and the number of resets of the 90-minute restoration period, and submit a report to the Commission two years following the first day of implementation of Requirement R3.[4]

Second, Order No. 835 described the Commission's concerns regarding megawatt losses that exceed MSSC and various commenters' responses to these concerns. Based on comments submitted, the Order stated the following:

> The Commission finds the arguments and historical data provided by commenters to be helpful regarding whether there is a need to expand the requirements of Reliability Standard BAL-002-2 to address most severe single contingency exceedances that do not cause energy emergencies, as contemplated in the NOPR. Nonetheless, we believe the comments do not fully resolve open questions regarding the potential reliability impact of

[3] *See, N. Am. Elec. Reliability Corp.,* Docket No. RD18-7-000 (Letter Order, Sept. 25, 2018). The revisions modified Requirement R1 to require BAs or RSGs to do the following: (1) to notify the RC of the conditions set forth in Requirement R1, Part 1.3.1 preventing it from complying with the 15-minute ACE recovery period; and (2) to provide the RC with its ACE recovery plan, including a target recovery time.

[4] Order No. 835 at P 46.

> suspending the focus on the balancing of demand and load and ACE recovery—the purpose of Reliability Standard BAL-002-2—in exceedance scenarios.
>
> The Commission determines that it is important to better understand the potential impacts of the approach taken in Reliability Standard BAL-002-2 when megawatt losses exceed the most severe single contingency without causing an energy emergency. Accordingly, we direct NERC to study the reliability risks associated with most severe single contingency exceedances that do not cause energy emergencies and submit a report with findings to the Commission two years from Reliability Standard BAL-002-2 implementation.[5]

The attached report reflects NERC's findings based on data available after implementation of Reliability Standard BAL-002-2.

III. REPORT ON REPORTABLE BALANCING CONTINGENCY EVENTS AND LOSSES ABOVE THE MOST SEVERE SINGLE CONTINGENCY

To complete this report, NERC reviewed DCS data voluntarily submitted by BAs and RSGs in the Eastern Interconnection, Western Interconnection, and Texas Interconnection from January 1, 2018, through September 30, 2019.[6] *See* Appendix A: DCS Source Data (providing an anonymized version of raw data used). In response to the Commission's questions regarding Requirement R3, NERC found that there were no events reported with additional megawatt losses following Reportable Balancing Contingency Events during the Contingency Reserve Restoration Period. Therefore, NERC determined that the data did not indicate any reliability concerns.

NERC also examined the number of DCS events where the Balancing Contingency Event was greater than MSSC and where NERC confirmed the issuance of an EEA related to that event. There were 17 reported events with megawatt losses due to a Balancing Contingency Event were greater than MSSC. In all except seven of those events, entities recovered ACE within 15 minutes. The seven outlier events were reported by a single small generation only BA with very small

[5] *Id.* at PP 57-58.

[6] Fourth quarter data will be submitted in January 2020, as noted in the report.

MSSC and where ACE recovery was impacted by tagging rules. Finally, NERC found that an EEA was declared only once related to a Balancing Contingency Event exceeding MSSC. As detailed in the report, NERC concludes that evidence does not indicate an adverse impact to reliability when MSSC exceedances occur that do not result in EEAs.

IV. CONCLUSION

NERC respectfully requests that the Commission accept this informational filing in accordance with its directive in Order No. 835.

Respectfully submitted,

/s/ Candice Castaneda

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January 2, 2020

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 2nd day of January, 2020.

/s/ Candice Castaneda

Candice Castaneda
Counsel for North American Electric Reliability Corporation

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

NERC Standard BAL-002-2

Informational Filing in Compliance with FERC Order No. 835

December 2019

RELIABILITY | RESILIENCE | SECURITY




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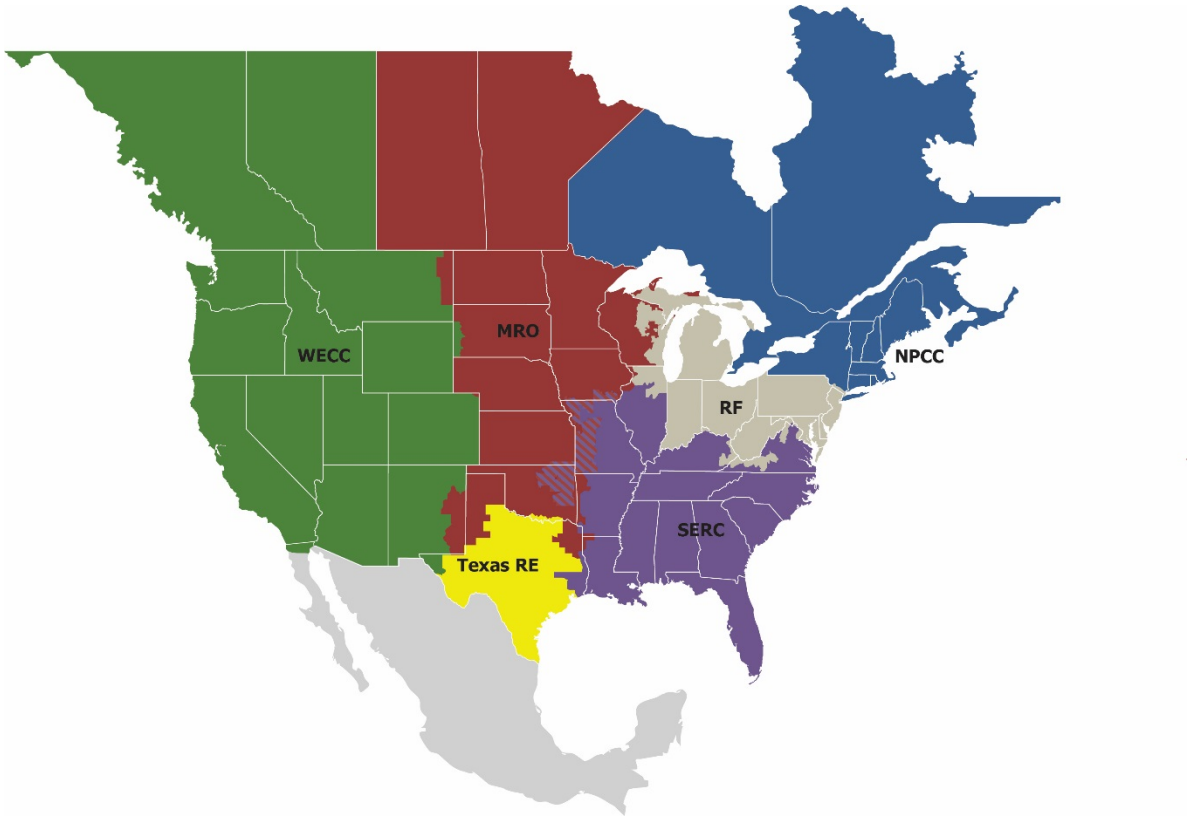
Preface

Electricity is a key component of the fabric of modern society and the Electric Reliability Organization (ERO) Enterprise serves to strengthen that fabric. The vision for the ERO Enterprise, which is comprised of the North American Electric Reliability Corporation (NERC) and the six Regional Entities (REs), is a highly reliable and secure North American bulk power system (BPS). Our mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid.

Reliability | Resilience | Security
Because nearly 400 million citizens in North America are counting on us

The North American BPS is divided into six RE boundaries as shown in the map and corresponding table below. The multicolored area denotes overlap as some load-serving entities participate in one Region while associated Transmission Owners/Operators participate in another.



MRO	Midwest Reliability Organization
NPCC	Northeast Power Coordinating Council
RF	ReliabilityFirst
SERC	SERC Reliability Corporation
Texas RE	Texas Reliability Entity
WECC	Western Electricity Coordinating Council

Executive Summary

In Order No. 835, the Federal Energy Regulatory Commission (FERC/Commission) approved *Reliability Standard BAL-002-2* and issued two directives for an informational filing that described the results of implementation of the standard. In the order, the Commission directed NERC to do the following:

> "… collect and report data pertaining to: (1) additional megawatt losses following Reportable Balancing Contingency Events during the Contingency Reserve Restoration Period; and (2) the time periods for contingency reserve restoration under Requirement R3 and the number of resets of the 90-minute restoration period, and submit a report to the Commission two years following the first day of implementation of Requirement R3."[1]

Further, the Commission added the following:

> "… we direct NERC to study the reliability risks associated with most severe single contingency exceedances that do not cause energy emergencies and submit a report with findings to the Commission two years from Reliability Standard BAL-002-2 implementation."[2]

NERC is submitting this report to satisfy those directives. NERC prepared this report by using the disturbance control standard (DCS) data submitted by Balancing Authorities (BAs) and Reserve Sharing Groups (RSGs) in the Eastern Interconnection, Western Interconnection, and Texas Interconnection from January 1, 2018, through September 30, 2019, in accordance with a request for voluntary data issued by the NERC Operating Committee. Key findings from the analysis described below are examined in this report and summarized in this executive summary.

Response to Order No. 835 Directives

The following are the findings and recommendations pertaining to the two directives in FERC Order No. 835:

- **Evaluation of additional megawatt losses during, and resets of, the Contingency Reserve Restoration Period:** There were no reported events where additional megawatt losses following a reportable balancing contingency event (RBCE) that occurred during the Contingency Reserve Restoration Period resulted in a reset of the 90-minute restoration period in accordance with Requirement R3. NERC concludes that based on analysis of the DCS event and performance data collected since the implementation of *Reliability Standard BAL-002-2* there is no indication of an adverse impact to BPS reliability due to additional megawatt losses that may occur during the Contingency Reserve Restoration Period.
- **Evaluation of reliability risks associated with most severe single contingency exceedances that do not cause energy emergencies:** There were a total of 17 events reported where the megawatt loss due to a balancing contingency event (BCE) exceeded the entity's most severe single contingency (MSSC). The reporting entity recovered their area control error (ACE) within 15 minutes in 10 of the 17 events. All 7 events where ACE was not recovered were reported by the same entity—a small generation-only BA with a very small MSSC. The BA has no load and was unable to cut energy schedules with their neighbors within a 15-minute time frame due to tagging rules. None of these events had an adverse impact on BPS reliability. For all other BCEs greater than MSSC, the reporting entities recovered ACE without the need for an Energy Emergency Alert (EEA) declaration. NERC concludes that based on data collected since the implementation of Reliability Standard BAL-002-2 there is no indication of an adverse impact to BPS reliability when MSSC exceedances occur that do not cause energy emergencies.

[1] Order No. 835, P 46.
[2] Order No. 835, P 58.

Chapter 1: Megawatt Losses during the Contingency Reserve Restoration Period

Megawatt Losses during the Contingency Reserve Restoration Period

The purpose of *Reliability Standard BAL-002-2* is to ensure that BAs and RSGs balance resources and demand and return the BA's or RSG's ACE to defined values (subject to applicable limits) following a RBCE. In Order No. 835, the Commission directed NERC to do the following:

> "… collect and report data pertaining to: (1) additional megawatt losses following Reportable Balancing Contingency Events during the Contingency Reserve Restoration Period; and (2) the time periods for contingency reserve restoration under Requirement R3 and the number of resets of the 90-minute restoration period, and submit a report to the Commission two years following the first day of implementation of Requirement R3."[3]

This report documents NERC's collection of quarterly DCS data from January 1, 2018, through September 30, 2019,[4] pertaining to additional megawatt losses during the 90-minute Contingency Reserve Restoration Period and the analysis as to whether the data suggests an elevated risk to BPS reliability.[5]

Table 1.1 contains the aggregated data submitted by BAs and RSGs that includes the number of RBCEs, the number of BCEs greater than MSSC, and the number of RBCEs where the Contingency Event Restoration Period was extended.

Table 1.1: DCS Submittal Data

Calendar Quarter	RBCEs (See BAL-002-3 R1.1)		BCEs > MSSC (See BAL-002-3 R1.3.2)		RBCEs where Contingency Event Restoration Period was Extended (See BAL-002-3 R3)		
	Number of Events	Number Recovered	Number of Events	Number Recovered	Number of Events	Number Recovered	Maximum Extension
2018 Q1	41	41	2	2	0	0	0
2018 Q2	36	36	3	2	0	0	0
2018 Q3	41	41	3	2	0	0	0
2018 Q4	37	37	1	0	0	0	0
2019 Q1	28	28	3	1	0	0	0
2019 Q2	22	22	1	0	0	0	0
2019 Q3	40	40	4	3	0	0	0
Total	**245**	**245**	**17**	**10**	**0**	**0**	**0**

As shown in **Table 1.1**, there were 245 RBCEs reported during the seven calendar quarters subject to this analysis. The applicable entities recovered their ACE during the 15-minute Contingency Event Recovery Period for all 245 events in accordance with BAL-002-3 Requirement 1.1.

Additionally, there were 17 BCEs reported that were greater than the reporting entities' MSSC. While the Contingency Event Recovery Period is not applicable for compliance purposes for BCEs greater than MSSC, the entities recovered their ACE within 15 minutes during 10 of the 17 events. Note that all 7 BCEs greater than MSSC where ACE was not

[3] Order No. 835, P 46.

[4] Historically, DCS data was required to be submitted under *Reliability Standard BAL-002-1*. Under the revised version of the standard, this data was collected on a voluntary basis in accordance with a request from the NERC Operating Committee.

[5] DCS data for the fourth quarter of 2019 will not be available until the first quarter of 2020 and is not included in this report.

recovered within 15 minutes were reported by the same entity—a small generation-only BA with a very small MSSC. During each of the 7 events, the BA experienced multiple unit trips within one minute of each other with a total MW loss greater than their MSSC. The generation-only BA had no load to shed, and its generation was being delivered to other BAs via tagging rules that did not allow them to cut their energy schedules with adjacent BAs immediately after the contingency occurred. Since the difference between net actual interchange and net interchange schedule is a component of the ACE calculation, this resulted in a negative ACE that could not be recovered to predisturbance levels until the BA was able to cut their energy schedules with adjacent BAs. None of these events had an adverse impact on BPS reliability.

There were no RBCEs reported during the seven calendar quarters subject to this analysis where the Contingency Event Restoration Period was extended in accordance with *Reliability Standard BAL-002-2 Requirement 3*.

Conclusion

There were no reported events where additional megawatt losses during the Contingency Reserve Restoration period that followed an RBCE resulted in a reset of the 90-minute restoration period in accordance with Requirement R3. NERC concludes that, based on analysis of the DCS event and performance data collected since the implementation of *Reliability Standard BAL-002-2,* there is no indication of an adverse impact to BPS reliability due to additional megawatt losses that may occur during the Contingency Reserve Restoration Period.

Chapter 2: MSSC Exceedances that do not Cause Energy Emergencies

Each BA is required to develop, maintain, and implement one or more operating plans reviewed by a Reliability Coordinator (RC) to mitigate emergencies in their BA area in accordance with *Reliability Standard EOP-001-1*. The operating plan must include processes to notify the BA's RC when experiencing a capacity or energy emergency and to request an EEA. An EEA may be initiated only by an RC at the RC's own request or upon the request of an energy deficient BA.[6] In Order No. 835, the Commission directed NERC to do the following:

> "… study the reliability risks associated with most severe single contingency exceedances that do not cause energy emergencies and submit a report with findings to the Commission two years from Reliability Standard BAL-002-2 implementation."

The EEA levels defined in *Reliability Standard EOP-011-1 Attachment 1* are as follows:

- EEA 1: All available generation resources in use
- EEA 2: Load management procedures in effect
- EEA 3: Firm Load interruption is imminent or in progress
- EEA 0: Termination of the EEA

Table 1.2 provides a summary of the events reported where a BCE exceeded the MSSC and the issuance of an EEA related to the event was confirmed.

Table 1.2: BCE > MSSC versus EEA Summary Data

Calendar Quarter	Number of DCS Events Where BCE > MSSC	Number of EEAs Related To BCE > MSSC Event	Additional Information
2018 Q1	2	0	
2018 Q2	3	0	
2018 Q3	3	0	
2018 Q4	1	0	
2019 Q1	3	1	EEA2 for RSG member to replenish RSG obligation
2019 Q2	1	0	
2019 Q3	4	0	
Total	**17**	**1**	

Conclusion

There were 17 reported events where the megawatt loss due to a BCE exceeded the MSSC. For those events, entities recovered their ACE within 15 minutes with the exception of 7 events reported by a single small generation only BA with a very small MSSC that was unable to cut energy schedules with their neighbors within a 15-minute time frame due to tagging rules. None of these events had an adverse impact on BPS reliability.

Additionally, an EEA related to a BCE that exceeded MSSC was declared only once. The BCE involved the loss of three units with a total megawatt loss equal to 127% of the responsible entity's MSSC at the time. The responsible entity,

[6] An RC that initiates an EEA notifies all other RCs of the situation via the Reliability Coordinator Information System (RCIS) message board. RCIS data was used in this analysis.

an RSG, recovered ACE in approximately eight minutes and was never deficient in required contingency reserves during the event. An EEA2 was issued to one of the RSG members during the Contingency Event Restoration Period to allow the RSG member to resupply their reserve obligation to the RSG. NERC concludes that this analysis suggests there is no an adverse impact to BPS reliability when MSSC exceedances occur that do not result in EEAs.

Appendix A: DCS Source Data

Table A.1: Disturbance Control Standard Report										
2018Q1	Reportable Disturbances		Disturbances Greater Than MSSC		Extended Recovery Period Disturbances			Extended Restoration Period Disturbances		
BA/RSG	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Maximum Extension	Number of Disturbances	Number Recovered	Maximum Extension
Entity #1	0	0	0	0	0	0	0	0	0	0
Entity #2	1	1	0	0	0	0	0	0	0	0
Entity #3	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #4	2	2								
Entity #5	0	0	0	0	0	0	0	0	0	0
Entity #6	2	2	0	0	0	0	0	0	0	0
Entity #7	2	2								
Entity #8										
Entity #9	2	2	0	0	0	0	N/A	0	0	N/A
Entity #10	7	7	0	0	0	0	0	0	0	0
Entity #11	2	2	0	NA	0	NA	NA	0	NA	NA
Entity #12	1	1	0	0	0	0	0	0	0	0
Entity #13	0	0	0	0	0	0	0	0	0	0
Entity #14	1	1	0	0	0	0	0	0	0	0
Entity #15										
Entity #16	1	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Entity #17	1	1	0	0	0	0	N/A	0	0	N/A
Entity #18	0	NA	0	NA	0	NA	NA	0	NA	NA
Entity #19			2	2						
Entity #20	7	7	0	0	N/A	N/A	N/A	N/A	N/A	N/A
Entity #21										
Entity #22	0	0	0	0	0	0	0	0	0	0
Entity #23	0	0	0	0	0	0	0	0	0	0
Entity #24	5	5	0	0	0	0	0	0	0	0
Entity #25	0	0	0	0	0	0	0	0	0	0
Entity #26	0	0	0	0	0	0	0	0	0	0
Entity #27	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #28	1	1	0	0	0	0	0	0	0	0
Entity #29	6	6	0	0	0	0	NA	0	0	NA

Table A.2: Disturbance Control Standard Report										
2018Q2	Reportable Disturbances		Disturbances Greater Than MSSC		Extended Recovery Period Disturbances			Extended Restoration Period Disturbances		
BA/RSG	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Maximum Extension	Number of Disturbances	Number Recovered	Maximum Extension
Entity #1	0	0	0	0	0	0	0	0	0	0
Entity #2	1	1	0	0	0	0	0	0	0	0
Entity #3	2	2	0	0	0	0	N/A	0	0	N/A
Entity #4	0	NA	0	NA	0	NA	NA	0	NA	NA
Entity #5	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #6	2	2	0	0	0	0	NA	0	0	NA
Entity #7	1	1	0	n/a	0	n/a	n/a	0	n/a	n/a
Entity #8	0	0	0	0	0	0	0	0	0	0
Entity #9										
Entity #10	2	2	0	0	0	0	0	0	0	0
Entity #11	0	0	0	0	0	0	0	0	0	0
Entity #12	0	0	0	0	0	0	0	0	0	0
Entity #13										
Entity #14	2	2	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #15										
Entity #16	1	1	1	0	0	0	NA	0	0	NA
Entity #17	0	0	0	0	0	0	0	0	0	0
Entity #18	0	0	0	0	0	0	N/A	0	0	N/A
Entity #19	9	9	1	1	n/a	n/a	n/a	n/a	n/a	n/a
Entity #20	0	0	0	0	0	0	0	0	0	0
Entity #21	1	1	0	0	0	0	0	0	0	0
Entity #22	0	0	0	0	0	0	0	0	0	0
Entity #23	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #24	7	7	0	0	0	0	0	0	0	0
Entity #25	0	0	0	0	0	0	0	0	0	0
Entity #26										
Entity #27	7	7	0	0	0	0	0	0	0	0
Entity #28	1	1	1	1	0	0	0	0	0	0
Entity #29										

Table A.3: Disturbance Control Standard Report

2018Q3	Reportable Disturbances		Disturbances Greater Than MSSC		Extended Recovery Period Disturbances			Extended Restoration Period Disturbances		
BA/RSG	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Maximum Extension	Number of Disturbances	Number Recovered	Maximum Extension
Entity #1	0	0	1	1	0	0	0	0	0	0
Entity #2	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #3	0	0	0	0	0	0	0	0	0	0
Entity #4	3	3	0	0	0	0	0	0	0	0
Entity #5										
Entity #6	6	6	0							
Entity #7										
Entity #8	0	0	1	0	0	0	NA	0	0	NA
Entity #9	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #10	7	7	0	0	0	0	0	0	0	0
Entity #11	1	1	0	0	0	0	N/A	0	0	N/A
Entity #12	2	2	0	0	0	0	0	0	0	0
Entity #13	0	0	0	0	0	0	0	0	0	0
Entity #14	0	NA	0	NA	0	NA	NA	0	NA	NA
Entity #15	0	0	0	0	0	0	0	0	0	0
Entity #16	2	2	0	0	0	0	NA	0	0	NA
Entity #17	5	5	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #18	0	0	0	0	0	0	0	0	0	0
Entity #19	0	0	0	0	0	0	0	0	0	0
Entity #20										
Entity #21	0	0	0	0	0	0	0	0	0	0
Entity #22										
Entity #23	4	4	0	0	0	0	0	0	0	0
Entity #24	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #25	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #26	1	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Entity #27	5	5	1	1						
Entity #28	1	1	0	0	0	0	N/A	0	0	N/A
Entity #29	4	4	0	0	0	0	0	0	0	0

Table A.4: Disturbance Control Standard Report										
2018Q4	Reportable Disturbances		Disturbances Greater Than MSSC		Extended Recovery Period Disturbances			Extended Restoration Period Disturbances		
BA/RSG	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Maximum Extension	Number of Disturbances	Number Recovered	Maximum Extension
Entity #1	4	4	0	0	0	0	0	0	0	0
Entity #2	0	0	0	0	0	0	0	0	0	0
Entity #3	3	3	0	0	0	0	0	0	0	0
Entity #4	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #5	1	1	0	0	0	0	0	0	0	0
Entity #6	8	8	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #7	0	0	0	0	0	0	0	0	0	0
Entity #8	1	1	0	0	0	0	0	0	0	0
Entity #9	5	5	0	0	0	0	0	0	0	0
Entity #10	2	2								
Entity #11	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Entity #12	0	0	0	0	0	0	0	0	0	0
Entity #13										
Entity #14	1	1	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #15										
Entity #16	0	0	0	0	0	0	0	0	0	0
Entity #17	1	1	0	0	0	0	0	0	0	0
Entity #18	0		0		0			0		
Entity #19										
Entity #20										
Entity #21	0	0	0	0	0	0	0	0	0	0
Entity #22	4	4	1	0	0	0	NA	0	0	NA
Entity #23	0		0		0			0		
Entity #24	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #25	2	2	0	0	0	0	0	0	0	0
Entity #26	0	0	0	0	0	0	0	0	0	0
Entity #27	1	1	0	0	0	0	N/A	0	0	N/A
Entity #28	0	NA	0	NA	0	NA	NA	0	NA	NA
Entity #29	4	4	0	0	0	0	0	0	0	0

Table A.5: Disturbance Control Standard Report										
2019Q1	Reportable Disturbances		Disturbances Greater Than MSSC		Extended Recovery Period Disturbances			Extended Restoration Period Disturbances		
BA/RSG	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Maximum Extension	Number of Disturbances	Number Recovered	Maximum Extension
Entity #1	0	0	0	0	0	0	0	0	0	0
Entity #2	0	0	0	0	0	0	0	0	0	0
Entity #3	1	1								
Entity #4	0	0	2	0	0	0	NA	0	0	NA
Entity #5	0	0	0	0	0	0	0	0	0	0
Entity #6	0	0	0	0	0	0	0	0	0	0
Entity #7	2	2	0	0	0	0	N/A	0	0	N/A
Entity #8	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #9	7	7	0	0	0	0	0	0	0	0
Entity #10	3	3	0	0	0	0	0	0	0	0
Entity #11	2	2	0		0			0		
Entity #12										
Entity #13	0	0	0	0	0	0	0	0	0	0
Entity #14	5	5	0	0	0	0	0	0	0	0
Entity #15	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #16	0		0		0			0		
Entity #17	1	1	0	0	0	0	n/a	0	0	n/a
Entity #18	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #19	0	NA	0	NA	0	NA	NA	0	NA	NA
Entity #20	3	3	1	1	N/A	N/A	N/A	N/A	N/A	N/A
Entity #21	0	n/a	0	n/a	0	n/a	n/a	0	n/a	n/a
Entity #22	1	1	0	NA	0	NA	NA	0	NA	NA
Entity #23										
Entity #24	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #25										
Entity #26	0	0	0	0	0	0	0	0	0	0
Entity #27	1	1								
Entity #28	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #29	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table A.6: Disturbance Control Standard Report

2019Q2	Reportable Disturbances		Disturbances Greater Than MSSC		Extended Recovery Period Disturbances			Extended Restoration Period Disturbances		
BA/RSG	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Maximum Extension	Number of Disturbances	Number Recovered	Maximum Extension
Entity #1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #2	0	0	0	0	0	0	0	0	0	0
Entity #3	0	0	0	0	0	0	0	0	0	0
Entity #4										
Entity #5	1	1								
Entity #6	0	0	0	0	0	0	0	0	0	0
Entity #7	4	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #8	0	0	0	0	0	0	0	0	0	0
Entity #9	0	0	0	0	0	0	0	0	0	0
Entity #10	2	2	0	0	0	0	0	0	0	0
Entity #11	1	1	0	0	0	0	N/A	0	0	N/A
Entity #12	0	NA	0	NA	0	NA	NA	0	NA	NA
Entity #13	2	2	0	0	0	0	0	0	0	0
Entity #14										
Entity #15	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #16	0	0	0	0	0	0	0	0	0	0
Entity #17	3	3	0	0	0	0	0	0	0	0
Entity #18	1	1	0	0	0	0	0	0	0	0
Entity #19	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #20	2	2	0	n/a	0	n/a	n/a	0	n/a	n/a
Entity #21	0	0	1	0	0	0	NA	0	0	NA
Entity #22	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #23	1	1	0	NA	0	NA	NA	0	NA	NA
Entity #24	0	0	0	0	0	0	0	0	0	0
Entity #25	1	1								
Entity #26	1	1	0	0	0	0	n/a	0	0	n/a
Entity #27										
Entity #28	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #29	2	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table A.7: Disturbance Control Standard Report										
2019Q3	Reportable Disturbances		Disturbances Greater Than MSSC		Extended Recovery Period Disturbances			Extended Restoration Period Disturbances		
BA/RSG	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Number of Disturbances	Number Recovered	Maximum Extension	Number of Disturbances	Number Recovered	Maximum Extension
Entity #1	5	5	0	0	0	0	0	0	0	0
Entity #2	0	0	0	0	0	0	0	0	0	0
Entity #3	0	0	0	0	0	0	0	0	0	0
Entity #4	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #5										
Entity #6	0	0	0	0	0	0	0	0	0	0
Entity #7	8	8	1	1						
Entity #8	0		0							
Entity #9	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #10	2	2	0	0	0	0	N/A	0	0	N/A
Entity #11	3	3	0	0	0	0	0	0	0	0
Entity #12	9	9	0	0	0	0	0	0	0	0
Entity #13	1	1	2	2	0	N/A	N/A	0	N/A	N/A
Entity #14										
Entity #15	2	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #16	2	2	0	0	0	0	0	0	0	0
Entity #17	2	2	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #18	3	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Entity #19	2	2	0	n/a	0	n/a	n/a	0	n/a	n/a
Entity #20	0	NA	0	NA	0	NA	NA	0	NA	NA
Entity #21	0	0	1	0	0	0	NA	0	0	NA
Entity #22	0	0	0	0	0	0	0	0	0	0
Entity #23	0	0	0	0	0	0	0	0	0	0
Entity #24	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #25	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A
Entity #26										
Entity #27	0	0	0	0	0	0	0	0	0	0
Entity #28	0	0	0	0	0	0	0	0	0	0
Entity #29	0	N/A	0	N/A	0	N/A	N/A	0	N/A	N/A