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January 30, 2018

VIA ELECTRONIC FILING

Ms. M. Lynn Jarvis, Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

**Re: Procedures for Non-Discriminatory Implementation of System
Emergency Curtailments of Qualifying Facilities
Docket No. E-100, Sub 148**

Dear Ms. Jarvis:

Pursuant to Ordering Paragraph 14 of the North Carolina Utilities Commission's October 11, 2017 *Order Establishing Standard Rates and Contract Terms for Qualifying Facilities* ("Order") and subsequent January 5, 2018 *Order Granting Joint Motion for Extension of Time*, Duke Energy Carolinas, LLC ("DEC") and Duke Energy Progress, LLC ("DEP" and together with DEC "the Companies") hereby enclose the System Operations Reference Manual for the Carolinas ("SORMC") for filing with the Commission. Ordering Paragraph 14 directed the Companies to file "procedures stating how they would curtail electric output from QFs on a nondiscriminatory basis when the utility is faced with a system emergency." The Companies' SORMC establishes a detailed set of operating procedures that the Companies' system operators will rely upon on an as-needed basis to manage system operations and implement emergency curtailments of QF generators on a non-discriminatory basis for the reasons addressed in Companies' testimony in the recent Docket No. E-100, Sub 148 avoided cost proceeding ("Sub 148 Proceeding").

The SORMC is designed to meet the growing system operational challenges associated with increasing installations of utility-scale QF solar that the Companies identified in the Sub 148 Proceeding. Both the Companies' Joint Initial Statement, filed in this docket on November 15, 2016, and testimony from the Companies' witnesses at the evidentiary hearing in this matter highlighted the challenges the Companies are increasingly facing in managing the significant, and growing, levels of energy from solar QFs being injected into the DEP Balancing Authority ("BA") and DEC BA. In particular, the Companies' expert witness, Vice President of the System Planning and Operations Department at Duke Energy, John Holeman III, testified that,

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under the current circumstances, DEP and DEC “will be increasingly challenged to maintain compliance” with the mandatory North American Reliability Corporation (“NERC”) BAL-001, BAL-002, and BAL-003 Reliability Standards. Order at 78. Witness Holeman went on to explain that the BAL Standards are designed to enhance the reliability of each interconnection by maintaining frequency within predefined limits every 30 minutes under all conditions. Id. Failure to comply with the BAL Reliability Standards could result in system emergencies, reliability failures, and penalties to the utility.

The Companies have projected that by end of 2018, DEP will have approximately 2,200 megawatts (“MW”) of solar generation injecting unscheduled and unconstrained energy into the DEP BA. Order at 79. This growing level of unscheduled solar QF energy being injected into the DEP BA requires the Companies’ system operators to manage both operationally excess and deficit energy to avoid potential BAL Standard violations. For example, as explained by witness Holeman, “if the BA experiences too much unscheduled solar QF energy relative to real time load, the system operator must ramp down load following generating resources to the [lowest reliable operating limit] LROL of its Security Constructed Unit Commitment which, if exceeded, can then require DEP to mitigate operationally excess energy to maintain proper frequency.” Id. Witness Holeman noted that the ability to curtail solar QFs will provide some measure of improved operational compliance during a system emergency situation. Id.

Based on witness Holeman’s testimony and the evidence in the record as a whole, the Commission approved the Companies’ request to amend the terms and conditions included in DEC’s and DEP’s standard offer contract documents available to eligible QFs to expressly include any circumstance that requires imminent action by DEC or DEP to comply with the North American Electric Reliability Corporation (“NERC”)/SERC Reliability Corporation regulations or standards as an emergency condition necessitating curtailment. The Commission further directed the Companies to file with the Commission their procedures stating how they would curtail electric output from QFs on a nondiscriminatory basis when the utility is faced with a system emergency. Order, Ordering ¶ 14 at 110.

DEC and DEP continue to experience increasing amounts of intermittent and variable solar energy connecting to their respective distribution and transmission systems, and, as shown in Figures 1 and 2 below, they continue to project increasing solar capacity in their service areas over the next decade:

Figure 1

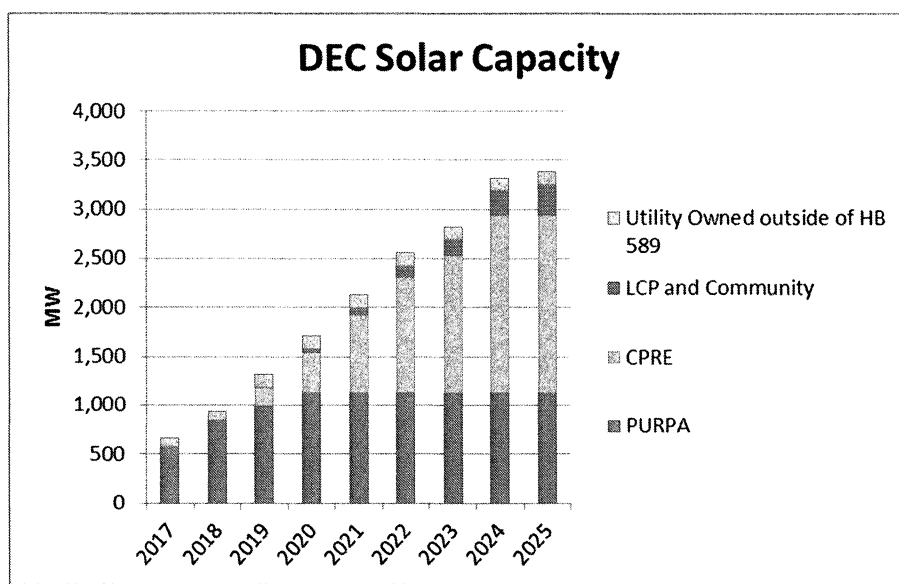
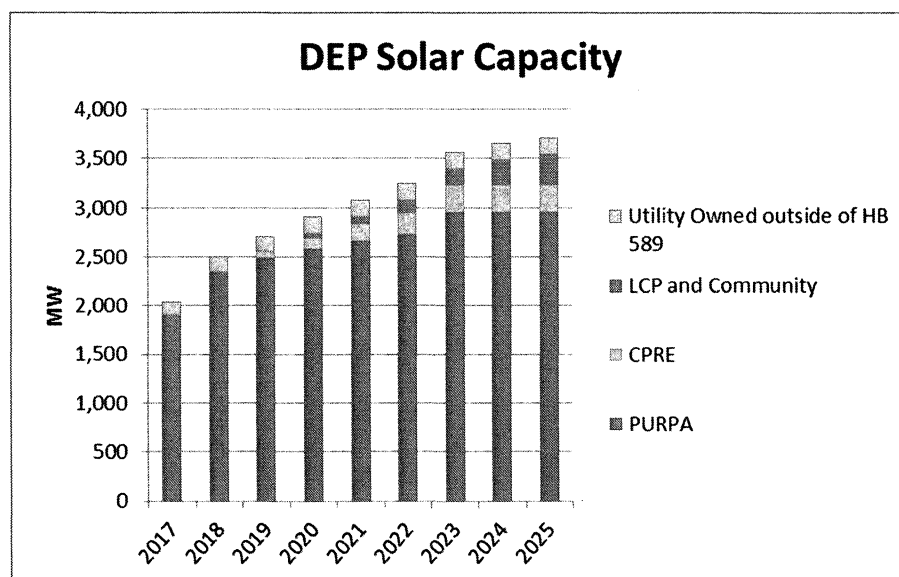
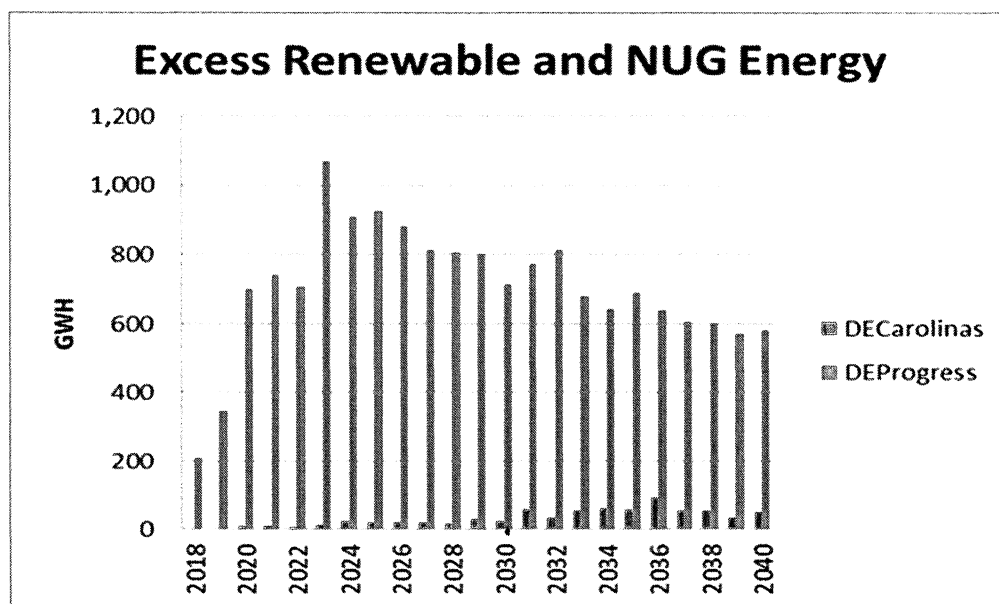


Figure 2



As solar energy facilities continue to interconnect to DEC's and DEP's respective distribution and transmission systems, the Companies project that the amount of operationally excess energy on their systems will likewise generally increase on each system independently and in totality on both systems, as demonstrated by Figure 3:

Figure 3



To effectively meet these near-term and growing operational challenges associated with increasing QF solar power, the Companies have worked diligently to develop detailed curtailment procedures that outline how DEC's or DEP's system operators will curtail and "dispatch down" electric output from QFs on a nondiscriminatory basis when facing a build-up of operationally excess energy that results in an imminent system emergency.

The SORMC is designed to be implemented as follows:

- 1) To avert a forecasted or prospective emergency on the DEP or DEC BA, the SORMC provides that currently-operational DEC or DEP-owned solar facilities will be dispatched down first in response to the circumstances.¹
- 2) If that step does not sufficiently mitigate the forecasted or prospective risk to operating the system safely, reliably and in compliance with the BAL standards, system operations would then dispatch the Companies' and third-party transmission-connected controllable "House Bill 589" ("HB589") solar facilities procured under the Competitive Procurement of Renewable Energy Program ("CPRE")² and Green Source Advantage Program ("GSA")³,

¹ Under the current circumstances, DEP would likely be the utility experiencing operationally excess energy, but, as shown in the chart above, DEC will likely begin to experience operationally excess energy in the future. Therefore, the curtailment procedures are the same for both DEC and DEP.

² See *Petition for Approval of Competitive Procurement of Renewable Energy Program to Implement N.C. Gen. Stat. § 62-110.8* at [Attachment 2](#), Docket Nos. E-2, Sub 1159, E-7, Sub 1156 (filed Nov. 27, 2017). This filing addresses curtailments for system emergencies and does not address dispatch control.

³ See *Petition for Approval of Green Source Advantage Program Rider GSA to Implement N.C. Gen. Stat. § 62-159.2*, Docket Nos. E-2, Sub 1170, E-7, Sub 1169 (filed Jan. 23, 2018).

respectively. The Companies' CPRE and GSA PPAs provide DEC and DEP rights to dispatch those facilities up or down under the respective 5%/10% full "discretionary dispatch" provisions "in the same manner as the utility's own generating resources."⁴

- 3) If that step does not sufficiently mitigate the forecasted or imminent risk to operating the system safely, reliably and in compliance with the BAL standards, the next step would be for system operations to employ the 5% megawatt hour a year "dispatch down" provisions included in the Companies' legacy or future negotiated QF PPAs or renewable PPAs entered into under the Renewable Energy and Energy Efficiency Portfolio Standard Program ("RPPAs").
- 4) Finally, if the mitigation efforts identified in Steps 1-3 above have not been successful and a system emergency is perceived to be imminent, system operations will exercise the emergency curtailment rights provided for in both HB589 and QF PPAs entered into under the Public Utility Regulatory Policies Act of 1978 ("PURPA"), including PPAs with cogeneration and non-renewable QFs, standard offer PPAs for QFs contracting to sell 1 MW or less, RPPAs, and CPRE and GSA PPAs.⁵ Emergency curtailments will be imposed on a rotating basis, which will ensure non-discriminatory treatment under this outlined procedure. The Companies will identify any such system emergency curtailment event in its quarterly system emergency reports to be filed publicly with the Commission documenting each instance where DEC or DEP is faced with, or declares an imminent violation of a NERC Standard or any other type of system emergency, that causes or potentially causes the utility to curtail QFs. *See Order at 83.*

The Companies presented these procedures to the Public Staff of the North Carolina Utilities Commission prior to filing them.

Portions of the filing contain confidential information. Such information designated by the Companies as confidential qualifies as "trade secrets" under N.C. Gen Stat. 66-152(3). The Companies respectfully request that the Commission treat this information as confidential and protect it from public disclosure pursuant to N.C. Gen. Stat 132-1.2. The Companies will make the confidential information available to parties to this proceeding who have executed an appropriate confidentiality agreement.

⁴ The lower 5% full discretionary dispatch in the DEC CPRE and GreenSource Advantage PPAs with DEC reflect the disparity between installed and proposed solar capacity in the DEP BA and the DEC BA.

⁵ See attached SORMC, at Appendix 3.

Please do not hesitate to contact me if you have any questions.

Very truly yours,

A handwritten signature in black ink, appearing to read "Kendrick C. Fentress". The signature is fluid and cursive, with a large initial "K" and a stylized "F".

Kendrick C. Fentress
Associate General Counsel

Enclosures

cc: Parties of Record

**ENERGY CONTROL CENTER
SYSTEM OPERATIONS REFERENCE MANUAL CAROLINAS**

I. Title:

System Operations Management of Lowest Reliability Operating Levels ("LROL") Generation, Operational Excess Energy, and Compliance with NERC Reliability Standards (collectively, "Compliance Events") Associated with Energy from Renewables/PURPA ("NUG" or "Non-Utility Generators") Facilities.

II. Purpose:

This procedure provides guidance for both planning and operating to manage Compliance Events associated with balancing resources and demand.

III. References:

- A. NERC Reliability Standard BAL-001: Real Power Balancing Control Performance
- B. NERC Reliability Standard BAL-005: Automatic Generation Control
- C. [REDACTED]
- D. SORMC-GOP-120: Operating Reserves and Non-Firm Energy Purchase Back-Standing Reserves

IV. General Information:

Compliance Events due to high levels of NUG facilities can be difficult to manage. The following consequences can occur:

- Curtailment
- Balance with other wholesale markets in real-time, if possible
- Violation of NERC Standards such as BAL-001 R2. BAAL
- Excessive unit cycling
- Spilling water at hydroelectric facilities
- Over-voltage problems
- Burdening neighboring utilities
- Atypical unit operations and impacts to nuclear generation

It is imperative the System Operators have a well- thought-out plan with appropriate contingencies ahead of time. This document provides guidelines to be used in both the planning and operating time frames.

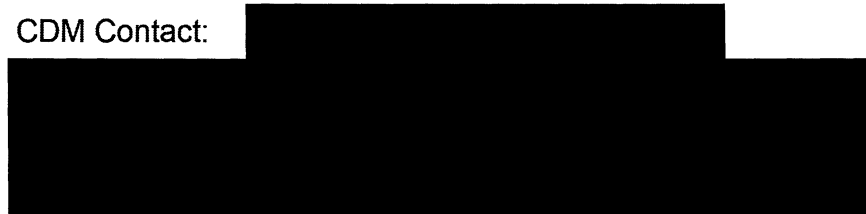
V. Procedure:**A. Generation Planning:**

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1. Forecasting the periods at risk for Compliance Events, and load shape must be given adequate attention. The Supervisor-SO should use all available resources to predict them accurately.
2. When the Control Margin on the Minimum Net Demand Forecast of the [7-Day Planning Report](#) approaches zero or becomes negative, the ECC Supervisor and Fuels & System Optimization (FSO) should begin formulating mitigation plans, including:
 - a. Ensure the units on-line in the Overnight Min Load and Minimum Net Demand Forecast are consistent with the current unit commitment strategy and consider the impact of the NUG facilities forecast. The commitment strategy may need to be revised by FSO based on the current forecast of demand and sales opportunities.
 - b. The Supervisor-SO should ensure COAs with the appropriate LROL (see Appendix 2) reason are entered for needed units.
 - c. Review the anticipated Compliance Event period with FSO and DEC BA Operator to raise awareness. Utilize the daily planning call at 07:45 if possible.
 - d. Evaluate DTRED forecast in the 7-Day Planning Report and communicate with FSO and DEC Generation Dispatch about the possibility of transferring more energy in real-time to the Duke Energy Carolinas system, if available and system conditions permit.
 - e. Communicate with FSO Power Trader via electronic means to raise awareness of possible need for sales, in real-time and if system conditions permit, to manage excess energy.
 - f. Request FSO to look at any requests in COA to see if there are opportunities to schedule maintenance activities across the potential Compliance Event periods.
 - g. Communicate with the Company's Regulated Renewables Operating Center (RROC) to manage DEP hydro daily inflow or declarations, if possible, and to prepare to dispatch down DEP utility-owned solar to avoid generation during potential Compliance Event periods.
 - h. If time permits, provide RROC with awareness that System Operations may request down dispatch of CPRE/LCP solar facilities.
 - For any NUG facilities cycled or down dispatch (includes solar facilities), the Supervisor-SO shall log the times in the [NUG Curtailment Log](#).
 - i. If there are any down-power events scheduled for the nuclear units, review the schedule to see if improvements can be made.

- j. Anticipated Compliance Event periods should be communicated to all DEP plant sites as early as possible. This will alert the plants and provide an opportunity to perform maintenance activities that may or may not have been requested through COA. It is particularly important to let the nuclear fleet know if nuclear reductions are expected.
- k. When a potential high risk Emergency event period is anticipated, the Supervisor-SO shall request the Nuclear Plant reduction priority list from the Corporate Duty Manager (CDM) and notify Portfolio Management.

CDM Contact:



- l. For anticipated potential high risk Emergency events, request FSO to evaluate Nuclear Plant reductions.

Note: The Supervisor-SO shall make requests for reductions of Nuclear Power Plants to the NPP Control Room Operator.

B. Generation Operations:**1. Retiring Units**

- a. Units that will not be needed to meet the near-term demand and sales forecast should be retired as soon as practical.
- b. Provide as much notice as possible when retiring units so that maintenance activities, if any, can be planned.

2. Cycling Units/ Reducing Generation with Consideration of LROL

- a. Request RROC to reduce output from DEP-owned solar facilities to minimum
- b. Validate minimums and operating limits when reducing combined cycle units to 1x1 operation.
- c. Request removal of SCRs at coal plants to achieve absolute minimum output, subject to environmental permits.
- d. Due to the thermal stresses and increased frequency of tube leaks associated with cycling coal units, every effort should be made to minimize cycling of coal units.
- e. Cycle only those units that will be needed for near-term demand adhering to the LROL. Other units should be retired.
- f. Consider real-time transfers opportunities to Duke Energy Carolinas or other wholesale markets, if system conditions permit, to reduce unit cycling and manage LROL generation.

3. Down Dispatch of NUG Facilities

- a. Consider requesting down dispatch of CPRE/LCP Full Dispatch Control solar facilities (*Complete NUG Curtailment Log for down dispatch requests*).
- b. Consider requesting down dispatch of 3rd Party Bilateral Agreements (>5MW facilities/ Legacy PURPA/RPPA) solar and co-generator facilities (*Complete NUG Curtailment Log for down dispatch requests*).
- c. Plan to utilize down dispatch of NUG facilities to manage periods of high net demand ramping for compliance with NERC Standards (i.e. BAL-001-2).

4. Excess Energy Sales

- a. The Supervisor-SO shall communicate with FSO for real-time excess energy sales for managing Compliance Events.

5. Regulatory Requirements

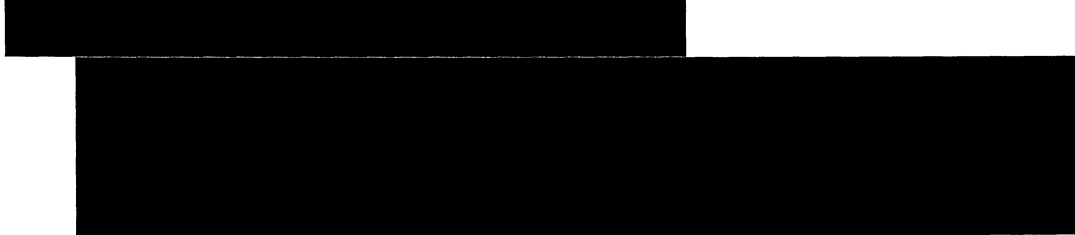
- a. Maintain adequate regulation to avoid [CPS1 and BAAL violations](#).

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- b. DTRED is a non-firm dynamic schedule and can be curtailed through the TLR process in either direction. Mitigation plans must be in place to prevent a curtailment from burdening the DEP generation balance.
 - CPLE:DUK curtailment: Consider how many MWs you can reduce CPLE generation within the 30-minute BAAL window based on the amount of DTRED. The Supervisor-SO may need to declare an Excess Energy Emergency immediately following a curtailment in this direction.
 - DUK:CPLE curtailment: Consider utilizing [Back-Standing reserves](#). However, Back-Standing reserves are calculated based on a 60-minute window while a BAAL violation may occur in only 30 minutes.
 - c. Plan appropriately for slow unit ramp rates when increasing generation from minimum. Consider backing down CTs in order to get a head start on raising coal generation and working equipment in service. This will allow for an overall larger CPLE ramp rate.
 - d. Coordinate in real-time with Duke Energy Carolinas and manually adjust the DTRED, if system conditions permit, to assist with avoiding BAAL violations, consistent with NERC Standard Requirements.
6. Declaring an Excess Energy Emergency
- a. The Supervisor-SO may declare an Excess Energy Emergency when anticipated or imminent generation-load imbalances could result in excessive cycling of fossil units, non-compliance with NERC Reliability Standards, and/or burdening neighboring Balancing Authorities in the Interconnection.
 - b. Communicate the Excess Energy Emergency to FSO Power Trading immediately via electronic means. This declaration allows alternate energy pricing methodologies to be deployed, which may create additional off-peak sales opportunities.
 - c. Communicate the Excess Energy Emergency to the nuclear plants to give them as much notice as possible that nuclear generation reductions may be needed so that they will have enough time to prepare.
 - d. Disconnect DEP-owned Transmission-connected Solar Generating Facilities by opening their interconnection Circuit Breaker via supervisory. This can be done without prior notification in an emergency. Contact Tariff Administration and the RROC as soon as practical to notify the Solar Facilities of the disconnect. If time allows, request RROC to gradually reduce DEP-owned solar

generation remotely. The RROC can adjust the output at these sites by a maximum of 5MW/minute via the FactoryTalk program.

- e. Dispatch down Co-generation/PURPA (Bilateral PPA and Standard Offer)/RPPA/CPRE facilities using guidance in Appendix 3.
- f. Disconnect 3rd Party Transmission-connected Solar Generating Facilities by opening their interconnection Circuit Breaker via supervisory. This can be done without prior notification in an emergency. Contact Tariff Administration as soon as practical to notify the Solar Facilities of the disconnect.
- g. Record all declarations in the Excess Energy Emergency Log as shown in Appendix 1. This log should be filed at the Supervisor-SO's desk in the Minimum Load Emergency Log file.





8. Reducing Nuclear Generation

During an Emergency, Boiling Water Reactors (BWR) can initially reduce power output quickly while Pressurized Water Reactors (PWR) are limited to set ramp rates.



- a. Emergency nuclear reductions should only be requested after an Emergency is declared. Prior to emergency nuclear plant reductions, all means of reducing generation or increasing demand and including all curtailment and sales opportunities have been exhausted.
- b. Units with end-of-cycle, fuel integrity, or any conditions that pose an operational risk from power maneuvers will be exempted from reductions. Nuclear management reserves the right to exercise exemptions when requested to reduce power. The nuclear fleet will support power maneuvers for grid reliability in accordance with long-standing policies.

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- c. Reductions should be requested in accordance with Nuclear Plant reduction priority list.
- d. Reductions must be recorded in the Nuclear Unit Reduction Log as shown in Appendix 1. This log should be filed at the Supervisor-SO's desk in the Nuclear Reduction Report file.
- e. Reduced nuclear units should be returned to full power as soon as practical.

VI. Approval:

Recommend: _____ Date: _____
E. C. Aumiller
Lead System Operator

Concur: _____ Date: _____
Supervisor-System Operations

Approve: _____ Date: _____
D. S. Roberts
Director-System Operations-ECC

VII. Editorial Change Approval:

Approve: _____ Date: _____
D. S. Roberts
Director-System Operations-ECC

VIII. Editorial Change Approval:

Approve: _____ Date: _____
D. S. Roberts
Director-System Operations-ECC

NOTE: Original signatures can be found in the Master copy at the ECC.

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Excess Energy Emergency Log

Start Date / Time	End Date / Time	Comments

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Nuclear Unit Reduction Log

Start Date / Time	Unit	Reduction MW	End Date / Time	Comments

Lowest Reliability Operating Level (LROL)

Solar generation facilities connected to the DEC and DEP transmission and distribution systems are intermittent and variable output resources. With the growing number of these facilities on the Duke Energy system, testimony was provided to the North Carolina Utilities Commission about the need for keeping certain Duke Energy units on-line to maintain reliability. The term Lowest Reliability Operating Level (LROL) was defined in that testimony to identify those units.

Lowest Reliability Operating Level (LROL): The base-load and must-run regulation units represent the foundational resources necessary to meet load and requirements, provide reliability, and meet mandatory NERC Reliability Standards. In the aggregate, the operationally constrained minimum reliable output of these generators represents the LROL of the BA's Security Constrained Unit Commitment. These essential generating resources cannot be de-committed in real time nor on an intra-day basis because they must run within specified engineering levels and provide essential frequency and regulation support to the BA, and they are needed to meet upcoming peak demands, such as the evening peak demands and next-day peak demands.

A. There are two LROL reason codes available in the COA tool.

1. Must Run – LROL RELIABILITY – to be used when a unit is needed for voltage support, transmission constraints or other reliability reasons.
2. Must Run – LROL RESERVES – to be used when a unit is needed for meeting upcoming peak demands or regulating reserve requirements.

B. COA LROL entry notes

1. When entering LROL COAs, the MW minimum is not required.
2. Nuclear units are assumed to stay baseload units and do not require an LROL COA.

Solar Curtailment Protocol

Solar generation facilities connected to the DEP transmission and distribution systems have different allowances for curtailments. This appendix is intended to provide information on how to proceed through different levels of curtailment.

Emergency condition means any one or more of the following: (a) any urgent, abnormal, operationally unstable, dangerous, and/or public safety condition that is existing or could imminently exist on the BA; (b) any urgent, abnormal, operationally unstable, dangerous, and/or public safety condition that is likely to result in any of the following: (i) loss or damage to any generating facility and/or the BA, as applicable to any action taken by the BA operator, (ii) disruption of generation by any Duke-owned or interconnected/delivering generating facility, (iii) disruption of service or stability on the BA, and/or (iv) endangerment to human life or public safety; and/or, (c) any circumstance that requires action by the BA operator to comply with standing NERC regulations or standards, including without limitation actions to respond to, prevent, limit, or manage loss or damage to any Duke-owned or interconnected/delivering generating facility, loss or damage to the BA, disruption of generation by Duke-owned or interconnected/delivering generating facilities, disruption of service on the BA, an abnormal condition on the BA, and/or endangerment to human life or safety.

If time allows, the System Operator should curtail solar facilities in the following order:

1. Tier-1 - DEP-owned solar facilities
2. Tier-2 - CPRE/LCP Full Dispatch Control (10% Dispatch Control Agreement)
3. Tier-3 - Legacy Bilateral PURPA PPA/RPPA Operational Dispatch Control (5% or Total Hour Limit)

Excess Energy Emergency Action/Curtailment

4. Tier-4 - System Emergency – Co-generation/PURPA(PPA and Standard Offer)/RPPA/CPRE Agreements

Last Resort Action

5. Tier-5 - Emergency – Nuclear Reduction

Requests made to Distribution to curtail solar facilities should be made with as much advanced notice as possible. These Distribution-connected solar facilities will be disconnected through DMS/DSCADA control of re-closers.

13: 09/22/2014

Annual review was performed on 08/15/2014, and changes are noted below:

- Changed all references from Power System Operations to System Operations to reflect new titles.
- Changed all references to reflect post-merger name.
- Miscellaneous editorial/grammatical changes made throughout the document.
- Updated links.
- Deleted regulation requirement per NERC BAL-005-0.2b AGC R2.
- Changed "NERC CPS violations" to "Violation of NERC Standards." (Ref. IV)
- Acquired adequate transmission to support needed transfers.
- Eliminated the following sentence: "Also ensure FSO has acquired adequate transmission to support needed transfers." (Ref. V.B.2.c.)
- Updated contacts and job titles. Deleted old distribution list that only included Mark Oliver. (Ref. V.B.2.i.)
- FSO no longer updates the MUCP. The ULF model should be used until a combined portfolio MUCP is created. (Ref. V.C.)
- Added statements referencing managing DEP hydro units during minimum load and emergency minimum load periods. (Ref. V.B.2.h and V.C.5.e.)

07/30/2015, Editorial

Annual review was performed on 07/26/2015, and changes are noted below:

- Updated hyperlinks.

14: 08/16/2016

Annual review was performed on 08/08/2016, and changes are noted below:

- Updated hyperlinks.
- Updated responsibilities of RROC and DEP Hydro Facilities.
- Added information about coordinating with RROC for Transmission Solar Curtailment.
- Moved Cogen/IPP Curtailment options to the Min Load Emergency section only.
- Updated Nuclear On-line Manager employee.
- Deleted section on SCR removal considerations since it is now common practice and included in FSO calculations. (*Ref. Section V.C.3 (old version)*)
- Deleted terminology for communicating with FSO via electronic means only. This is the preferred method, but phone calls are allowed. (*Ref. Section V.B.2.*)

15: 01/19/2017

Annual review was performed on 01/13/2017, and changes are noted below:

- Created Hyperlink G. for SORMC-GOP-120. (*Ref. Section III.G.*)
- Created section referencing compliance and load pickup after minimum considerations. (*Ref. Section V.B.4*)
- Added new paragraph for disconnecting generating solar facilities in an emergency. (*Ref. Section V.B.5.f*)

- Deleted note to consider reducing nuclear generation before cycling coal boilers on double boiler designs. (*Ref. Section V.B.7.b*)
- Created table outlining emergency nuclear reduction and timing. (*Ref. Section V.B.7.b*)
- Revamped nuclear contacts for the Nuclear Reduction Priority List. (*Ref. Section V.A.2.j*)
- Reference AD-WC-ALL-0260, a nuclear document, is in draft format and was excluded from the References section. The draft can be found in the SORMC source folder.
- Changed verbiage to include Excess Energy concerns which may not coincide with Minimum Load periods.

16: 08/11/2017

Solar eclipse review was performed, and changes are noted below:

- Updated Hyperlink B for new COA. (*Ref. Section III.B.*)
- Added Supervisor-SO should check COA for LROLs. (*Ref. Section V.A.1.b*)
- Added contract information regarding maximum curtailment hours for Cogeneration facilities and solar sites. (*Ref. Section V.A.2.i. and V.A.2.j.*)
- Calculate the minimum forecast with combine cycles 1x1 for generation operation. (*Ref. Section V.B.2.a.*)
- Added details regarding emergency reduction of solar and PURPA Cogens. (*Ref. Section V.B.2.f. and V.B.2.g.*)
- Added Appendix 2 that defines LROL and how it is used in COA.
- Added Appendix 3 that specifies a Solar Curtailment Protocol.

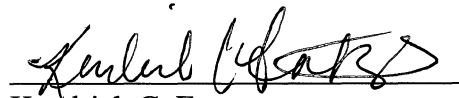
17: 01/24/2018

Revised to incorporate NUG Curtailments including CPRE/LCP facilities.

CERTIFICATE OF SERVICE

I certify that a copy of Duke Energy Carolinas, LLC and Duke Energy Progress, LLC's Procedures for Non-Discriminatory Implementation of System Emergency Curtailments of Qualifying Facilities in Docket Nos. E-100, Sub 148 has been served by electronic mail, hand delivery, or by depositing a copy in the United States Mail, 1st Class Postage Prepaid, properly addressed to parties of record.

This the 30th day of January, 2018.



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