Richard P. Hevey
Senior Counsel

April 21, 2020

Harry Lanphear
Administrative Director
Maine Public Utilities Commission
#18 State House Station
Hallowell, ME 04347

RE: CENTRAL MAINE POWER COMPANY,
Request for Approval of Non-Transmission Alternative (NTA)
Pilot Projects for the Midcoast and Portland Areas,
Docket No. 2011-00138

Dear Mr. Lanphear:

On January 21, 2020, Central Maine Power Company ("CMP" or the "Company") filed a letter asking that the Hearing Examiners schedule a case conference in this matter. The issue that CMP sought to address is the Company's proposal to rebuild Section 80. A case conference was held on February 12, 2020. At the case conference, CMP requested that its petition for transmission upgrades in the Midcoast area be bifurcated so that review of the Section 80 rebuild can be considered initially and the other proposed upgrades for the Midcoast area be considered on a slower track.

On February 18, 2020, the Hearing Examiners issued a Report of Conference and Procedural Order, Scheduling ("Procedural Order"). The Procedural Order required that CMP make an initial filing by March 27, 2020. On March 25, 2020, the Company requested an extension until April 3, 2020 in order to make the required initial filing. CMP's requested extension was granted by Procedural Order dated March 26, 2020. CMP made the required initial filing on April 3, 2020.

CMP is working on producing a redacted, public version of those portions of its initial filing which were filed confidentially. CMP will produce that redacted, public version as soon as possible. In the meantime, CMP has developed the attached public summary of its initial filing.

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www.cmpco.com, email: richard.hevey@avangrid.com

Please contact me if the Commission has any questions regarding this filing.

Sincerely,

Richard P. Hevey

Richard P. Hevey
Senior Counsel

AVANGRID

Transmission Planning

Final Report

Public Summary of CMP Midcoast Section 80 Review

April 2019

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Section 1
Introduction

This Public Summary of Central Maine Power's April 3, 2020 ***CMP Midcoast Section 80 Review*** report has been prepared with general descriptions of the Critical Energy Infrastructure Information (CEII) results reported in the April 3, 2020 report. CEII clearance is needed in order to be provided the more detailed April 3, 2020 report.

1.1 Background

The Midcoast Area is located in the northeastern coastal corner of Central Maine Power's transmission system, serving the coastal Maine area northeast of Wiscasset to the Belfast/Searsport area, as illustrated in Figure 1-1.

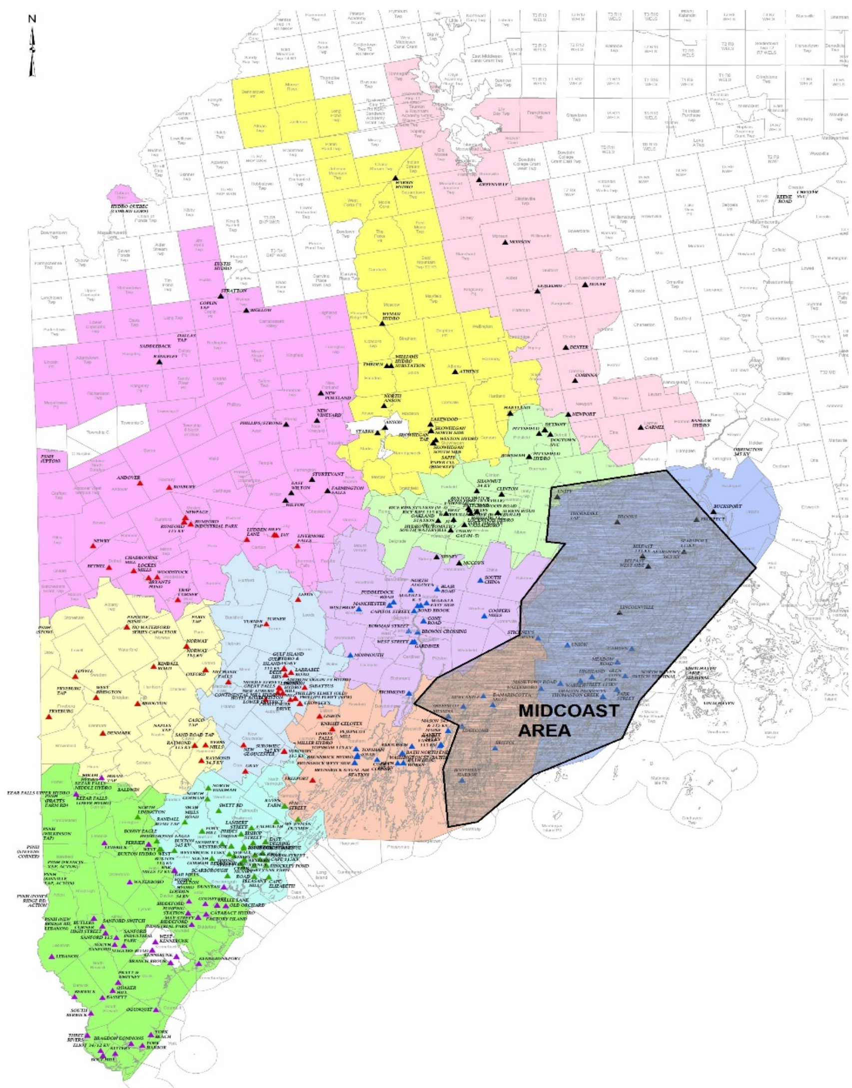

Figure 1-1 Midcoast Area Geographic Illustration

CMP's Midcoast Area is mainly served via three 115 kV transmission lines and two 34.5 kV sub-transmission lines into the area. An underlying 34.5 kV transmission network provides supply for distribution throughout the Midcoast area.

ISO New England's ***Final Upper Maine (ME) 2029 Needs Assessment***, dated March 2020, included thermal and voltage violation results for peak load conditions in CMP's Midcoast area under N-1 (single element outage) and N-1-1 (two elements out) conditions. Several contingency scenarios showed a resultant overloading of 115 kV line Section 80, as well as resultant low voltage violations. Additionally, local subarea violations were reported. ISO-NE has determined that the Section 80 thermal overload is a regional time-sensitive need. Therefore, the recommended mitigation measure, Section 80 rebuild, qualifies for regional cost allocation. The state of Maine would pay 8% of the total project cost, which is its load share in New England.

The May 2, 2014 ***Maine Power Reliability Program 2013 Midcoast Area NTA Study*** (solutions were proposed in a follow-up report in 2015) identified numerous reliability violations in the area (low voltage, thermal overloads and voltage collapse) for Peak load and Scheduled Maintenance (85% of 90/10 peak) conditions. The results are summarized in Table 1-1.

Table 1-1 Summary of Violations from 2013/14 Midcoast NTA Study

Load Level	Sub-Area	Contingency Type(s)	# of Unique Critical Contingencies	Reliability Issue			
				Voltage Collapse	High Voltage	Low Voltage	Thermal Overload
100% Peak Load	Highland	N-1	2	X	-	-	-
	Camden/Rockland	N-1-1	4	X	-	115 kV	-
	Section 80	N-1-1	4	-	-	115 kV	X
85% Peak Load (Scheduled Maintenance)	Section 80	N-1-1	2	-	-	115 kV	X
	Camden/Rockland	N-1-1	9	X	-	34.5 kV	X (5)
		N-1-1	1	-	34.5 kV	-	-

1.2 Study Objective

A benchmarking analysis was performed using base cases originating from ISO New England's 2019 Upper Maine Needs Assessment to compare post-contingency results to those of prior analyses. The focus of this analysis was to confirm that a rebuild of 115 kV Line Section 80 was still needed, and should be separated out from other identified Midcoast region needs.

Section 2
Study Assumptions

2.1 Software and Source of Models

Steady-state contingency analysis was performed using PSS/E rev 33.12. PSS/E base cases for this analysis were sourced from ISO New England's ***Draft UME 2029 Needs Assessment Study Files*** ZIP file dated 2/28/2020 (these were the same cases in the ***Final UME 2029 Needs Assessment Study Files*** ZIP file dated 3/23/2020).

2.2 Study Assumptions

2.2.1 Loads

Table 2-1 shows a comparison of the peak loads by Midcoast Area region that were included in the following:

- Original 2013 Midcoast NTA Study
- Most-recent ISO New England Upper Maine Needs Assessment (Included future 21.3 MW "New Load")
- Central Maine Power's 2018 all-time historical summer peak loads from August 7, 2018 at 14:00 hours.

The total Upper Maine Needs Assessment study load (163.8 MW) includes the addition of the planned 21.3 MW "New Load". Excluding this new load, when comparing the loads in the total Midcoast area between the 2013 NTA analysis and ISO's 2019 Needs Assessment, they only differ by 1.7 MW.

The overall load recorded at the August 7, 2018 system peak was approximately 0.8 MW higher than that of the 2013 NTA analysis; however, with an adjustment to an industrial load within the Camden-Rockland region to more accurately reflect a conservative output level that has been routinely observed during summer peak conditions, the adjusted historical load was 5.6 MW higher.

Therefore, the current loads in the Midcoast Area are consistent, slightly higher overall even when excluding the future "New Load", than the loads utilized in previous studies.

Table 2-1 – Regional Load Comparison 2013 Midcoast NTA vs. 2020 ISO-NE Upper ME Needs vs. Historical 2018 Summer Peak

Region	STUDY LOADS		HISTORICAL
	2013/14 Midcoast NTA Study 1800 MW CMP Load	2019 ISO-NE Upper ME Needs Assessment (Net)	2018 Summer Peak 8/7/2018 14:00
	MW	MW	MW
Camden-Rockland Total	71.8	74.6	75.6*
Boothbay Region Total	30	28.9	31.0
Belfast Region Total	39	60.3	39.7
Midcoast Area Total	140.8	163.8	146.4

* Includes Industrial Load Non-coincident peak—An industrial load within this region peaked in the morning, reduced for the 14:00 coincident load, then increased following the peak. The typical non-coincident load was included in this total.)

2.2.2 Case Sensitivities Tested

In addition to the 100% peak load level base case, several additional conditions were developed:

- 100% Midcoast peak load without the 23.1 MW "New Load" served from Belfast West Substation
- 85% Midcoast peak load (Scheduled Maintenance – Previous Safe Harbor assumption)—
    - Tested both with and without the 23.1 MW "New Load" served from Belfast West Substation
- 75% Midcoast peak load (Scheduled Maintenance – Representative of New Safe Harbor assumption)
    - Tested both with and without the 23.1 MW "New Load" served from Belfast West Substation

2.2.3 Sensitivity to Section 80 Rebuild

An additional sensitivity case was developed for each condition described above (except the 75% without "New Load" case), with an assumed rebuild of 115 kV Line Section 80 (Coopers Mills – Highland).

2.2.4 Contingencies Tested

Representative N-1 contingencies and N-1-1 contingency pairs from the ISO New England Upper Maine Needs Assessment study and from the 2013 Midcoast NTA study were tested during this analysis.

2.3 Performance Criteria

Voltage violations and thermal violations were flagged based on the following criteria.

2.3.1 Voltage

When analyzing the transmission system, voltage must remain within the steady state bandwidth of 0.95 to 1.05 V PU. This range is to be maintained prior to and after a contingency occurs on the transmission system. Table 2-2 summarizes the Avangrid voltage criteria limits.

Table 2-2 – AVANGRID Voltage Criteria

Limit	Level	Level
Maximum	1.05 per-unit	Applies to all planning time periods
Minimum (Steady State)	0.95 per-unit (Steady State)	Applies to time periods greater than 30 sec (i.e., after automatic actions including LTC's, etc.)
Minimum (Post-Transient)[1]	0.90 per-unit (Post-Transient)	Applies to time periods less than 30 sec (i.e., prior to automatic actions including LTC's, etc.)
Collapse	0.80 pu / Non-Convergence	Results calculated at or below 0.80 pu are considered to be indeterminate

[1] The "Minimum (Post Transient)" analysis (i.e., locked taps study) is not routinely performed for all area planning studies unless there are indications from study results that signal a potentially weak transmission system. If a weak transmission system is suspected as evidenced by marginal pre/post contingency voltages this post-Transient analysis is recommended.

2.3.2 Thermal

AVANGRID utilizes ratings of its facilities in its transmission planning studies to ensure safe operation without excessive loss of equipment life. Ratings to be used are consistent with those developed in compliance with the NERC FAC-008 standard for the BES and approved methods for local transmission facilities.

Three categories of ratings are utilized:

1. **Normal Rating**: This rating is the continuous rating of the transmission facility adjusted to seasonal ambient conditions. There are no restrictions on utilization of the full normal rating for any extent of time.
2. **Long Term Emergency Rating (LTE)**: Applicable for a 4-hour time period for all seasons in New York. For Maine and Connecticut, the Winter LTE rating utilizes a 4-hour duration and Summer LTE rating utilizes a 12-hour duration. Facilities may utilize the LTE rating only post contingency. The transmission facility must return to a loading level below its normal rating once the applicable LTE time duration has expired.
3. **Short Term Emergency Rating (STE)**: This rating is applicable for short term loadings on transmission facilities after a contingency has occurred. This is assuming the pre-contingent loading is within the facility's normal rating. The maximum length of time that a facility may be loaded utilizing its STE limit is 15 minutes. After which the loading must decrease below LTE.
4. **Drastic Action Limit (DAL)**: This rating has been developed for operational use only. It is not intended to be utilized in planning studies.

Table 2-3 – Thermal Rating Applicability

System Condition	Max Time Interval	Maximum Allowable Facility Loading
Normal	Continuous	Normal Rating
LTE	LTE duration (4 or 12 hours)	Long Time Emergency (LTE) Rating
STE	15 Minutes	Short Time Emergency (STE) Rating

Section 3 Results

3.1 Regional Testing

100% Peak Load cases were tested using representative contingencies from the 2019 ISO New England Upper Maine Needs Assessment. Needs were observed for four subareas: Section 80 and three others. With or without the 21.3 MW “New Load” addition, Section 80 was shown overloaded for loss of the other two area 115 kV lines. Voltage violations also were observed. The rebuilding of Section 80 not only eliminated the overload of Section 80, but also made significant improvements to the low voltage violations reported in the cases with the existing Section 80 modeling. The other subarea violations were not impacted by the Section 80 rebuild alone. Results are summarized in Table 3-1.

Table 3-1 Contingency Analysis Results Summary at 100% Midcoast Area Loads

Load Level	Sub-Area	Contingency Type(s)	# of Unique Critical Contingencies	Reliability Issue			
				Voltage Collapse	High Voltage	Low Voltage	Thermal Overload
100% Peak Load	Highland	N-1	5	X	-	-	-
		N-1-1	1	X	-	-	-
	Section 80	N-1	1	-	-	34.5 & 115 kV	X
		N-1-1	2	X	-	34.5 & 115	X
	Camden/Rockland	N-1-1	1	X	-	34.5 kV	X (4)
	Mason	N-1-1	1	X	-	-	-

3.2 Local/Safe Harbor Testing

85% and 75% Load cases were tested using representative contingencies from the 2013 Midcoast NTA study. With or without the 21.3 MW “New Load” addition, at 85% load level, Section 80 was shown overloaded for loss of the two other 115 kV lines. At the 75% load level, Section 80 was shown overloaded with the “New Load”, and at 93% of its LTE emergency rating without the “New Load” modeled. For both load levels, the rebuilding of Section 80 not only eliminated the overload of Section 80, but also made significant improvements to the low voltage violations reported in the cases with the existing Section 80 modeling.

Contingencies and contingency pairs involving loss of support to the 34.5 kV network were not impacted in the results with the Section 80 rebuild. These contingencies resulted in other Midcoast area violations and are independent of the Section 80 needs and proposed rebuild.

Results are summarized in Table 3-2.

Table 3-2 Contingency Analysis Results Summary at 85% and 75% Midcoast Area Loads

Load Level	Sub-Area	Contingency Type(s)	# of Unique Critical Contingencies	Reliability Issue			
				Voltage Collapse	High Voltage	Low Voltage	Thermal Overload
85% Peak Load	Section 80	N-1-1	2	X	-	115 & 34.5 kV	X
	Camden / Rockland	N-1-1	4	X	-	34.5 kV	X (4)
	Belfast Local	N-1	1	-	-	115 & 34.5 kV	-
75% Peak Load	Section 80	N-1-1	2	-	-	115 & 34.5 kV	X
	Camden / Rockland	N-1-1	4	X	-	34.5 kV	X (4)
	Belfast Local	N-1	1	-	-	115 & 34.5 kV	-

3.3 Critical Load Level Determination

A sensitivity case was created to determine the local Midcoast area load level required to avoid overloading the existing Section 80 following the loss of the other two area 115 kV lines. Residential/ commercial load at all Midcoast area buses were scaled down (maintaining same power factor at each bus) except the two industrial customer buses, one existing and the "New Load".

To avoid Section 80 overloading for the loss of the other two 115 kV lines, the Midcoast area residential/ commercial loads needed to be reduced to 59% of 90/10 summer peak, a reduction of the peak area load by approximately 58 MW, from 168 MW to 110 MW. This is an indication of the level of NWA resources that would be required to resolve the Section 80 overload.

Some of the other local subarea Midcoast area violations were still observed under the 59% peak load case.

3.4 Discussion of Midcoast Area Subareas – Independent Needs

Results of testing indicated needs in four subareas: Section 80 and three others. Each of these subareas are defined by a different contingency or contingency pair that result in unique system topologies in the Midcoast Area that require separate and unique system upgrades. These system needs and associated solutions had been previously identified in the 2015 NTA Solutions study report.

The Section 80 rebuild does not impact the violations or previously recommended solutions in these other sub-areas as they are all unique and independent of each other.

Section 4 Section 80 Cost Estimate Summary

ISO-NE has determined that the Section 80 thermal overload is a regional time-sensitive need. Therefore, the recommended mitigation measure, Section 80 rebuild, qualifies for regional cost allocation. The State of Maine would pay 8% of the total project cost, which is its load share in New England.

Section 80 Rebuild total project cost: $63.6M

Maine's cost responsibility: $5.1M

Section 5 Conclusion

The Midcoast area is served via three 115 kV lines as well as two weaker 34.5 kV lines. The peak load expected to be served in the Midcoast area, following the addition of a 21.3 MW "New Load", will be approximately 168 MW[2]. At peak load, following a loss of two of the major 115 kV lines, Section 80 is overloaded well above its 103 MVA LTE rating. To avoid this overload of Section 80, Midcoast area load would have to be reduced to approximately 110 MW[3], a reduction of approximately 58 MW from summer peak levels.

A rebuild of Section 80 would eliminate this potential overload condition, as well as provide some additional voltage support in the Midcoast area. ISO New England's 2019 Upper Maine Needs Assessment report determined that the Section 80 overload is a New England regional need. As the proposed rebuild of Section 80 would be required to address a regional need on a New England Pool Transmission Facility, the cost for rebuilding would be regionalized across New England, with Maine ratepayers being responsible for eight (8) percent of the cost. Thus, with an estimated cost of $63 million, Maine ratepayers would be responsible for roughly $5 million.

Other Midcoast area needs have been identified in three subareas. Proposed solutions from the 2015 Solutions Study for these other needs would not mitigate the Section 80 overload issue—they are proposed to mitigate separate independent reliability violations. In addition, the rebuild of Section 80 would have no impact on this other concerns. Only a major reduction of net load within the Midcoast area, or the rebuild Section 80 (or alternatively, addition of another support line into the Midcoast area hub) will mitigate the Section 80 overload concern.

[2] Total was 164 MW in the ISO New England Upper Maine Needs Assessment base cases, but is estimated to be closer to 168 MW using totals from historical August 7, 2018 summer peak loads.
[3] Assuming constant industrial load at Dragon Cement and the "New Load", and proportional scaling of the net loads at the other Midcoast area substations)