Date Filed: September 17, 2026

Witness: John P. DiPaola-Tromba, Sean D. Redding and Jenna Turner
Request from: ALLCO

Question:

Separately from EOE-140 and EOE-151, state whether the Company or Eversource Energy Service Company has performed, commissioned, or received, since January 1, 2018, any analysis, study, model, or evaluation — whether by employees, consultants, or vendors — of whether distribution-infrastructure investments (including, without limitation, system hardening, covered or spacer cable, strategic undergrounding, enhanced or resiliency-based vegetation management, animal guards, or accelerated replacement of aged poles, cross-arms, or conductors) would reduce storm damage, storm outage frequency or duration, or storm restoration costs in Connecticut; produce each such analysis, study, model, or evaluation; identify each recommendation contained in any of them that the Company has not implemented, and state the reason it was not implemented and the estimated cost of implementation; and state whether any portion of the storm costs for which recovery is sought in this docket (including the costs compiled in the STORM-ACCT exhibits) arose on circuits, line segments, or assets that any such analysis had previously identified as candidates for hardening, undergrounding, resiliency vegetation management, or replacement, identifying each such circuit or asset and the associated storm cost.

Response:

The Company has identified the following responsive materials, produced herewith:

Please refer to ALLCO-045, Attachment 1: *Connecticut Reliability Performance by Tree Exposure Range and Construction Type.* An internal analysis prepared by Company personnel examining the historical outage performance of overhead distribution assets installed on the Connecticut system. The analysis compares observed failure rates, normalized per overhead mile per year, across bare conductor, covered conductor, and spacer cable construction, segmented by tree exposure band, under blue sky conditions, storm conditions, and the conditions observed during Tropical Storm Isaias. The analysis observed materially lower failure rates on spacer cable construction relative to bare conductor across every tree exposure band and every weather condition examined, with the difference generally increasing as tree exposure increased.

This analysis is the basis for the event-reduction assumption used in the Resiliency Plan. Every zone selected for reconductoring under the Plan is existing bare-wire overhead construction that would be rebuilt using spacer cable, so the spacer-versus-bare comparison is the applicable measure of expected performance improvement.

The Company applied an assumed 62 percent reduction in storm outage events on reconductored segments. That figure is the average reduction observed on segments in the highest tree exposure quartile during the Tropical Storm Isaias event. It was selected deliberately, on the following basis. First, the highest tree exposure quartile is where the Plan's work is targeted, so the improvement factor is drawn from the conditions in which the work will actually be performed rather than from system-wide averages. Second, an Isaias-level catastrophic event is the most severe condition examined in the analysis, and the reduction observed under that condition is lower than the reductions observed under blue sky and ordinary storm conditions. The Company therefore applied the least favorable observed result rather than a more favorable one, and the projected outage, customer-minute, and avoided-cost benefits of the Plan are correspondingly conservative.

Zone selection itself was performed separately and did not rely on this analysis. Candidate zones were identified through the Storm DEMI recurrence screen and ranked by predicted customer impact using the All-In SAIDI methodology. This analysis informed the expected benefit of treating those zones, not the choice of which zones to treat.

The Company notes one limitation regarding scope. Because construction type is not randomly distributed across the system, the analysis reflects observed performance differences among differently constructed segments rather than a controlled measurement of the effect of construction type in isolation.

Please refer to ALLCO-045, Attachment 2: *Review of Industry Resilience and Reliability Practices, prepared by Quanta Technology, LLC, dated September 2, 2021.*

Eversource engaged Quanta Technology to perform an independent review of Eversource's reliability and system resiliency programs and to summarize industry leading practices in reliability and resilience. The review addresses industry reliability and resilience frameworks, including the reliability indices defined in IEEE Standard 1366 and the resilience definitions and metrics developed by the IEEE Power and Energy Society; benchmarks Eversource's historical reliability performance against the IEEE PES Distribution Reliability Working Group annual benchmark under both the PURA and IEEE major event methodologies; catalogs industry standard resilience mitigations, including infrastructure hardening, covered and spacer cable, targeted undergrounding, enhanced vegetation management, and pole inspection and replacement; describes Eversource's enhanced structural and electrical resiliency design standards and its Pole Integrity, Vegetation Management, DSCADA, and Smart Switches programs; and presents case studies of resilience investment outcomes in other jurisdictions. The review further addresses the valuation of resilience benefits, observing that resilience planning is a risk-management discipline and that the value of resilience is generally quantified through the value of avoided customer interruptions. The Company notes that this review assesses Eversource's programs and industry practice generally. It does not quantify the storm damage, outage, or restoration cost reduction attributable to any specific Connecticut circuit, line segment, or asset, and the quantified outcomes it presents are drawn from case studies of other utilities.

Regarding analyses performed on whether "enhanced or resiliency-based vegetation management" would reduce storm damage or storm outage frequency, please refer to the Company's response to OCC-099[i]. The University of Connecticut has published multiple studies on the effectiveness of enhanced vegetation management, two of which are included in this docket: the University of Connecticut 2019 study, Assessing the effects of a vegetation management standard on distribution grid outage rates (refer to CLP-VMP-3), and the University of Connecticut 2022 study, A Statistical Framework for Evaluating the Effectiveness of Vegetation Management in Reducing Power Outages Caused during Storms in Distribution Networks (refer to CLP-VMP-4).

The results from the 2022 study demonstrated that, "enhanced vegetation management is particularly helpful in reducing trouble spots for lower severity storms, with reductions between 45.8% and 63.8%, and substantially reduces trouble spots during the most severe events when vegetation management is particularly comprehensive, demonstrating a 37.3% reduction when compared with circuits with little to no enhanced tree trimming." (Exhibit CLP-VMP-4, at 15). The reliability improvements were observed in individual storm events as well as in annual totals. The University of Connecticut 2022 study further elaborates that, "more rigorous vegetation management standards (applying ETT) help reduce outages at an individual event level, for both the more frequent events and those less frequent, stronger storms, which may also occur more frequently in the future due to climate change."

The Company's redesigned Reliability Tree Work ("RTW") program will allow the Company to address the locations on scheduled circuits where overhang and ETT clearances were not previously achieved on the portion of those circuits that serve the most customers and are highly susceptible to tree-related outages, particularly in relation to circuit backbones that were addressed through the ETT program over 20 years ago. The RTW program will encompass trimming of overhanging branches, as overhanging branches that break and fall on the power lines account for approximately 24% of the tree-related outages on the system (please refer to page 39 of Exhibit CLP-VMP-2). By targeting the zones with overhang that serve the highest number of customers through the RTW program, risk will be mitigated.

Please refer to Exhibit CLP-VMP-1 on page 30-31, summarized on page 19 of Exhibit CLP-VMP-2, where the Company proposes the RTW program. The RTW program will be key in preventing vegetation outages from outside zone overhanging limb fall-in and inside zone tree fall-in on high priority line segments with the goal of achieving clearance of 10 ft of vegetation from ground to sky where permission allows.

Prior Referenced Response:

[i] OCC-099 Question:

(VMP/Cost-Benefit) The University of Connecticut study, Assessing the Effects of a Vegetation Management Standard on Distribution Grid Outage Rates (Exhibit CLP-VMP-3) suggests that Enhanced Tree Trimming ("ETT") improves reliability however, it did not find that increasing ETT consistently resulted in a greater reduction of outages, after accounting for storm severity.
a. Has the Company evaluated whether increasing ETT beyond the currently proposed level will continue to produce reliability benefits that justify the cost?
b. If yes to (a), provide all analyses, studies, cost-benefit evaluations, or other documentation supporting the Company's conclusion.
c. If no such evaluation has been performed, explain how the Company determined that the proposed level of ETT represents a cost-effective investment for ratepayers.

OCC-099 Response:

Yes, the Company has evaluated whether increasing ETT beyond the currently proposed level to continue to produce reliability benefits. With respect to the evaluation, the Company is relying on the referenced 2019 study, assessing the effects of a vegetation management standard on distribution grid outage rates, (provided in Exhibit CLP-VMP-3), as well as the University of Connecticut 2022 Study, A Statistical Framework for Evaluating the Effectiveness of Vegetation Management in Reducing Power Outages Caused during Storms in Distribution Networks (refer to Exhibit CLP-VMP-4).

The results from the 2022 study demonstrated that, “enhanced vegetation management is particularly helpful in reducing trouble spots for lower severity storms, with reductions between 45.8% and 63.8%, and substantially reduces trouble spots during the most severe events when vegetation management is particularly comprehensive, demonstrating a 37.3% reduction when compared with circuits with little to no enhanced tree trimming.” (Exhibit CLP-VMP-4, at 15).

The reliability improvements were observed in individual storm events as well as in annual totals. The University of Connecticut 2022 study further elaborates that, “when compared with previous studies in the effectiveness of vegetation management activities, this analysis provides a better understanding of how more rigorous vegetation management standards (applying ETT) help reduce outages at an individual event level, for both the more frequent events and those less frequent, stronger storms, which may also occur more frequently in the future due to climate change.” (id.)

However, the Company is observing diminishing system impact from Customer Focus Enhanced Tree Trimming (“ETT”), as only lower priority laterals are available for prescription under the current capitalization structure required in PURA Docket No. 17-10-46. Previous ETT work completed on circuit backbones between 1998 to 2003, and large customer count laterals from 2004 until the ETT project was sunset in 2020 (PURA Docket No. 17-10-46), did not allow for previously completed zones to be readdressed if full clearance was limited by permissions. In addition, the November 25, 2020 ruling in PURA Docket No. 17-10-46 on Motion No. 53 declined the Company’s request to provide additional rate recovery for ETT post-2020 and directed the Company to seek permission to recover such “system resiliency program costs in its next rate case proceeding”. For this proceeding, the Company’s redesigned Reliability Tree Work (“RTW”) program will allow the Company to address the locations on scheduled circuits where overhang and ETT clearances were not previously achieved on the portion of those circuits that serve the most customers and are highly susceptible to tree-related outages, particularly in relation to circuit backbones that were

addressed through the ETT program over 20 years ago. The RTW program will encompass trimming of overhanging branches, as overhanging branches that break and fall on the power lines account for approximately 24% of the tree-related outages on the system (please refer to page 39 of Exhibit CLP-VMP-2). By targeting the zones with overhang that serve the highest number of customers through the RTW program, risk will be mitigated.

Please refer to Exhibit CLP-VMP-1 on page 30-31, summarized on page 19 of Exhibit CLP-VMP2, where the Company proposes the RTW program. The RTW program will be key in preventing vegetation outages from outside zone overhanging limb fall-in and inside zone tree fall-in on high priority line segments with the goal of achieving clearance of 10 ft of vegetation from ground to sky where permission allows. Please refer to pages 49-51 of Exhibit CLP-VMP-1 which is also summarized on page 11 of Exhibit CLP-VMP-2. The Company selected 21 circuit zones with high System Average Interruption Duration Index (SAIDI) for targeted vegetation management in 2023. The table and summary table on page 50 of Exhibit CLP-VMP-1 below shows pre- and post-treatment customer reliability (CMI and CI) for circuit zones that received targeted vegetation management. This targeted vegetation management included seeking to remove within 10 feet of the outermost conductor and all overhanging vegetation. On average, the segments where targeted vegetation management was performed experienced a 94% reliability improvement demonstrating a benefit for these circuits associated with removal of overhang, trees that are too close to the distribution system, and removal of high-risk trees.