

**THE STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION**

Unitil Energy Systems, Inc.

**RELIABILITY PROGRAM
AND
VEGETATION MANAGEMENT PROGRAM
ANNUAL REPORT – FISCAL YEAR 2022**

1. Introduction

Pursuant to the Settlement Agreement approved by the New Hampshire Public Utilities Commission (“Commission”) in Docket No. DE 10-055¹, Unitil Energy Systems, Inc. (“UES” or “Company”) is submitting the results of the Reliability Enhancement Plan (“REP”) and Vegetation Management Plan (“VMP”) for Fiscal Year 2022 (“FY 2022”), report the period, January 1, 2022 – December 31, 2022.

The Settlement Agreement provides that Unitil will provide an annual report to the Commission, Staff and OCA showing actual REP and VMP activities and costs for the previous calendar year, and its planned activities and costs for the current calendar year. Actual and planned REP and VMP costs shown in the report will be reconciled along with the revenue requirements associated with the actual and planned capital additions and expenses. Please note that the Company previously filed in this docket its *planned* VMP activities for fiscal year 2023 on November 22, 2022, pursuant to Order 26,388 in DE 20-098. Accordingly, the instant filing contains the reconciliation of expenditures during fiscal year 2022. This report includes the following information:

- (A) A description of Unitil’s VMP;
- (B) A comparison of FY2021 and FY2022 actual to budgeted spending on O&M activities related to the VMP
- (C) Detail on the O&M spending related to the FY2022 VMP estimated expenditures and work to be completed;
- (D) A summary of the Vegetation Management Storm Resiliency Program results;
- (E) A summary of the O&M spending related to REP Enhanced Tree Trimming.

2. Vegetation Management Plan

¹ Order 25,214 dated April 26, 2011

The VMP is based upon the recommended program provided in the report of Unitil’s consultant Environmental Consultants, Inc. (“ECI”)², modified to incorporate a 5-year prune cycle with 10-foot side and 15-foot top prune zones.

2.1. Plan Description

Unitil’s VMP is comprised of five components; 1) circuit pruning; 2) hazard tree mitigation; 3) mid-cycle review; 4) forestry reliability assessment; and 5) storm resiliency work. This program is designed to support favorable reliability performance, reduce damage to lines and equipment, as well as provide a measure of public safety. The main benefits and risks addressed by these programs are reliability, regulatory, efficiency, safety and customer satisfaction.

2.1.1. Circuit Pruning

Vegetation maintenance pruning is done on a cyclical schedule by circuit. The optimal cycle length was calculated by balancing five important aspects: 1) clearance to be created at time of pruning; 2) growth rates of predominant species; 3) risk to system performance; 4) aesthetics / public acceptance of pruning; and 5) cost to implement. For New Hampshire, this optimal cycle length was calculated as 5 years for all lines.

2.1.2. Hazard Tree Mitigation

The Hazard Tree Mitigation program (“HTM”) consolidates tree removal activities into a formalized program with risk tree assessment. This program is aimed at developing a more resistant electrical system that is more resilient under the impacts of typical wind, rain and snow events. The intention is to accomplish this through minimizing the incidence and resulting damage of large tree and limb failures from above and alongside the conductors through removal of biologically unhealthy or structurally unstable trees and limbs.

HTM circuits are identified and prioritized through reliability assessment risk ranking, identification as a worst performing circuit, field problem identification, and time since last worked. Once circuits are identified they are scheduled in two ways: 1) while the circuit is undergoing cycle pruning; or 2) scheduled independently of cycle pruning. In New Hampshire, HTM circuit selection corresponds closely with cycle pruning, as both pruning and HTM are on a 5 year cycle.

²A copy of the ECI reliability report, originally provided in response to data request Staff 1-29 (Confidential), was made part of the record in DE 10-055, UES’s 2010 base rate case, as a Confidential Exhibit, accompanied by a public redacted version, during the hearing before the Commission.

In order to produce the greatest reliability impact quickly and cost effectively, HTM circuit hazard tree assessment and removal is focused primarily on the three phase only, with most emphasis on the portion of the circuit from the substation to the first protection device. In circuits that have undergone storm resiliency work, the HTM focus also includes single phase circuitry.

2.1.3. Mid-Cycle Review

The mid-cycle review program targets circuits for inspection and pruning based on time since last circuit pruning and forecasted next circuit pruning. The aim of this program is to address the fastest growing tree species that will grow into the conductors prior to the next cyclic pruning, potentially causing reliability, restoration and safety issues. Circuit selection is based on number of years since last prune and field assessment.

2.1.4. Forestry Reliability Assessment

The Forestry Reliability Assessment program targets circuits for inspection, pruning, and hazard tree removal based on recent historic reliability performance. The goal of this program is to allow reactive flexibility to address immediate reliability issues not addressed by the scheduled maintenance programs. Using recent historic interruption data, poor performing circuits are selected for analysis of tree related interruptions. Circuits or portions of circuits showing a high number of tree related events per mile, customers interrupted per event, and/or customer minutes interrupted per event are selected for field assessment. After field assessment, suitable circuits are scheduled and a forestry work prescription is written for selected circuits or areas.

2.1.5. Storm Resiliency Work

The SRP targets critical sections of circuits for tree exposure reduction by removing all overhanging vegetation or pruning “ground to sky”, as well as performing intensive hazard tree review and removal along these critical sections and the remaining three phase of the circuit. The goal of this program is to reduce tree related incidents and resulting customers interrupted along these portions in minor and major weather events. In turn, the aim is to reduce the overall cost of storm preparation and response, and improve restoration.

2.2. 2022 Actual Expenditures and Work Completed

Table 1 depicts the 2021 and 2022 VMP expenditures by activity in relation to the anticipated budget expenditures. As the program progressed in 2022 there were some deviations in the anticipated expenditures. In the VMP spending, the hazard tree mitigation work for one circuit was not completed by year end due to increased cost to do work and contractor workforce issues. This work was carried over into 2023. Other deviations include an increase in forestry reliability driven work, higher traffic control costs, an increase in customer calls, and a decrease in expected Sub-Transmission costs. Sub-Transmission was \$171,538 under the estimate, as pricing and field conditions were better than expected. The work cost for the SRP was extremely high this year, coming significantly higher than estimated costs, as a result, two circuits were not able to be completed in 2022 and were carried over into 2023. As shown in the table below, total spending for all VMP and SRP components was above the budget by \$649,397.

Table 1

2021& 2022 VMP O&M Activities				
VM Activity	2021 Cost Proposal	2021 Actual Cost	2022 Cost Proposal	2022 Actual Cost
Cycle Prune	\$ 1,746,507	\$ 1,238,981*	\$ 2,332,666	\$ 2,440,420
Hazard Tree Mitigation	\$ 840,000	\$ 900,470**	\$ 882,000	\$ 1,138,999
Forestry Reliability Work	\$ 25,603	\$ 28,937	\$ 26,371	\$ 73,013
Mid-Cycle Review	\$ 115,360	\$ 20,833	\$ 118,821	\$ 89,363
Police / Flagger	\$ 619,515	\$ 552,501	\$ 561,747	\$ 640,143
Core Work	\$ 154,500	\$ 180,606	\$ 154,500	\$ 228,154
VMP Planning	\$ -	\$ -	\$ -	\$ -
Distribution Total	\$ 3,501,485	\$ 2,922,329	\$ 4,080,740	\$ 4,610,092
Sub-T	\$ 620,069	\$ 565,474	\$ 635,082	\$ 463,544
Substation Spraying	\$ 13,431	\$ 12,225	\$ 13,834	\$ 26,556
VM Staff	\$ 364,491	\$ 418,049	\$ 382,916	\$ 638,907
Program Total	\$ 4,499,476	\$ 3,918,077	\$ 5,112,572	\$ 5,739,099
Storm Resiliency Program	\$ 1,465,690	\$ 1,374,836	\$ 1,465,690	\$ 1,488,560
Grand Total	\$ 5,965,166	\$ 5,292,913	\$ 6,578,262	\$ 7,227,659

*\$532,693 awarded contract not finished and carried over to 2022

**\$132,747 awarded HT not finished and carried over to 2022

The following tables detail the 2022 VMP work completed by activity. Table 2 details the cycle pruning work. A total of 263.7 miles of cycle pruning was completed in 2022.

Table 2

2022 VMP Completed Cycle Pruning Details					
District	Feeder	Overhead Miles	Scheduled Miles	Completed Miles	
Capital	C18W2	33.7	33.7*	33.7	
Capital	C8X3	106.5	106.5	106.5	
Seacoast	E43X1	30.7	30.7*	30.7	
Seacoast	E11X1	11.9	11.9	11.9	
Seacoast	E11X2	11.9	8.9	8.9	
Seacoast	E19X2	3.2	3.2	3.2	
Seacoast	E20H1	4.5	4.2	4.2	
Seacoast	E28X1	10.1	8.1	8.1	
Seacoast	E2X3	13.7	10.6	10.6	
Seacoast	E2X2	19.9	16.8	16.8	
Seacoast	E46X1	2.7	1.7	1.7	
Seacoast	E54X1	22.1	22.1	22.1	
Seacoast	E54X2	22.1	22.1	22.1	
Seacoast	E56X1	16.9	16.9	16.9	
Total			263.7	263.7	

*2021 Carry-Over Circuit

Table 3 details the hazard tree mitigation work. A total of 83.8 miles of line across 13 circuits were mitigated for hazard tree risk. Unitil had estimated approximately 2,242 hazard tree removals in the budget. The actual results indicate 1,726 total hazard trees were removed on these circuits and various other circuits as found through the course of work over the year. Consistent with the trend from 2020 and 2021, the increase in average cost of tree removal is due to increased contractor costs for labor and increased unit prices for hazard tree removal.

Table 3

2022 VMP Completed Hazard Tree Mitigation Details					
District	Feeder	Overhead Miles	Scheduled Miles	Completed Miles	# of Removals
Capital	C18W2	33.7	3.4*	3.4	197
Capital	C6X3	14.9	4.4*	4.4	48
Capital	C13W1	33.9	6.2	6.2	168
Capital	C4W4	14.2	4.0	4.0	24
Capital	C4X1	24.0	7.8	7.8	22
Capital	C8X3	106.5	27.6	17.6*	390
Capital	Various				137
Seacoast	E43X1	29.9	7.2*	7.2	95
Seacoast	E21W1	29.8	9.9	9.9	32
Seacoast	E18X1	18.5	9.2	9.2	3

Seacoast	E7X2	19.4	6.6	6.6	5
Seacoast	E54X1	22.1	4.9	4.9	26
Seacoast	E54X2	22.1	5.6	5.6	36
Seacoast	E56X1	16.9	4.7	4.7	13
Seacoast	Various				530
Total		93.8	83.8	83.8	1,726

*2021 carry-over circuit

Tables 4 and 5 detail the forestry reliability work and mid-cycle work respectively. A total of 9.3 miles of line underwent forestry reliability work and 129.4 miles of line were completed for mid-cycle work.

Table 4

2022 VMP Completed Reliability Analysis Details				
District	Feeder	Overhead Miles	Scheduled Miles	Completed Miles
Capital	C13W3	83.5	5.8	5.8
Capital	C7W3	31.5	0.6	0.6
Seacoast	E58X1	31.3	0.7	0.7
Seacoast	E47X1	14.8	1.0	1.0
Seacoast	E21W2	29.8	1.2	1.2
Total			9.3	9.3

Table 5

2022 VMP Completed Mid-Cycle Review Details				
District	Feeder	Overhead Miles	Scheduled Miles	Completed Miles
Capital	C13W1	33.9	6.2	6.2
Capital	C22W1	4.4	3.1	3.1
Capital	C22W2	0.9	0.9	0.9
Capital	C38	8.3	5.9	5.9
Capital	C4W4	14.2	3.9	3.9
Capital	C4X1	24.0	7.9	7.9
Capital	C7W4	7.4	4.2	4.2
Capital	C8X5	7.4	7.2	7.2
Seacoast	E13W1	4.7	18.5	18.5
Seacoast	E18X1	9.2	18.3	18.3
Seacoast	E21W1	9.9	29.7	29.7
Seacoast	E21W2	8.5	21.6	21.6
Seacoast	E47X1	6.0	14.7	14.7
Seacoast	E7X2	6.6	19.3	19.3
Total			129.4	129.4

Table 6 details the sub-transmission right-of-way clearing work. A total of 16.3 linear miles of right-of-way floor were cleared.

Table 6

2022 Sub Transmission Clearing Details			
District	Feeder	Scheduled Miles	Completed Miles
Capital	396X1	2.9	2.9
Capital	396	0.4	0.4
Capital	375	2.8	2.8
Capital	374	1.3	1.3
Capital	3376/3387	0.6	0.6
Seacoast	3358	1.1	1.1
Seacoast	3356/3345	4	4
Seacoast	3354/3343	3.2	3.2
Total		16.3	16.3

The sub-transmission right-of-way that was cleared in both Capital and Seacoast in 2021 underwent the integrated vegetation management (IVM) program’s low-volume foliar herbicide application as planned in 2022.

3. 2022 Vegetation Management Storm Resiliency Program Results

In 2022, Unitil continued the SRP, targeting the resiliency efforts in communities in both the Capital and Seacoast areas. This program, now through its tenth year, has been very successful. Unitil is experiencing less damage during storm events resulting in a quicker restoration. As in previous program years, the 2022 circuits were selected through analysis of tree related reliability performance. The 2022 circuits are shown below in Table 7. In 2022, 32.4 miles of critical three phase line were work-planned for hazard tree removals and ground-to-sky pruning but only 21 miles were completed in the field. A total of 1,076 hazard trees were removed along these portions of line. Due to the extremely high cost of work, a decision was made to carry over the work implementation portion of two circuits into 2023.

Table 7

2022 Storm Program Work Details			
Circuit	Scheduled Miles	Completed Miles	# of Removals
C7W3	2.1	2.1	242
C7W4	4.2	4.2	59
E13X3	2.5	2.5	201

E15X1	6.2	0	-
E17W1	4.1	4.1	95
E17W2	1.8	1.8	144
E28X1	5.1	0	-
E46X1	1.2	1.2	16
E5X3	5.2	5.2	319
Total	32.4	21.0	1,076

Due to the varying nature of storm resiliency work and traffic control, as well as the lack of workforce availability, the Company expects costs may continue to experience minor variances, with final annual costs being slightly above or below the estimated budget. Even with yearly fluctuations, the average cost for the SRP program has remained close to the original estimate.

4. Reliability O&M Expenditures

The Company had allocated \$300,000 to Reliability O&M expenditures for enhanced tree trimming in 2021. The Enhanced Tree Trimming funding is intended to target “problem” areas identified through engineering analysis.

4.1. Enhanced Tree Trimming

Each year, the Company completes reliability analysis on the distribution and sub-transmission system. The reliability analysis identifies areas of the system which have experienced an abnormal or increasing amount of tree related outages in the previous year. Distribution Engineering provides the Manager of Forestry Operations a prioritized list of recommended sub-transmission lines and/or distribution circuits which would benefit the most from enhanced tree trimming.

In 2022, Distribution Engineering recommended hazard tree removal on the Sub-Transmission lines emanating from the system supply substations as well as continuing thorough inspection of the trees along the sub-transmission lines that experienced a tree related outages in the UES Capital area. In total, \$202,136 was spent on Enhanced Tree Trimming and 305 hazard tree removals were completed along with sideline clearing on selected portions.

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