THE STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION

Unitil Energy Systems, Inc.

RELIABILITY PROGRAM AND VEGETATION MANAGEMENT PROGRAM ANNUAL REPORT – FISCAL YEAR 2020

1. Introduction

Pursuant to the Settlement Agreement approved by the New Hampshire Public Utilities Commission ("Commission") in Docket No. DE 10-055[1] , 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 2020 ("FY 2020"), report the period, January 1, 2020 – December 31, 2020.

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 2021 on November 16, 2020, pursuant to Order 26,388 in DE 20-098. Accordingly, the instant filing contains the reconciliation of expenditures during fiscal year 2020. This report includes the following information:

(A) A description of Unitil's VMP;
(B) A comparison of FY2020 actual to budgeted spending on O&M activities related to the VMP
(C) Detail on the O&M spending related to the FY2020 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.

[2] A 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. As the first full circuit pruning cycle is underway, mid-cycle review will be used to address only 13.8kV and above, three-phase portions of selected circuits. 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 flexibly 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. 2020 Actual Expenditures and Work Completed

Table 1 depicts the 2020 VMP expenditures by activity in relation to the anticipated budget expenditures. As the program progressed in 2020 there were some deviations in the anticipated expenditures. In the VMP spending, the Hazard Tree Mitigation work activities and the Police/Flagger had the most deviation in spending relative to anticipated costs. Hazard tree had spending above anticipated levels by $134,543 due to increased cost of labor, equipment, and vendor overheads like insurance and health care. The cost of Traffic Control/Flaggers also increased by $147,497 from estimated levels. As a result of these overages in budget projections, the mid-cycle work was kept at a minimum ($80,209 underspend) with only high priority work being done and a plan of monitoring of other concern areas into the growing season of 2021. The work spending for the SRP was on target at only $16,617 above the anticipated level. As shown in the table below, total spending for all VMP and SRP components was above the budget by $69,617.

Table 1

2020 VMP O&M Activities		
VM Activity	**2020 Cost Proposal**	**2020 Actual Cost**
Cycle Prune	$ 1,490,000	$ 1,487,245
Hazard Tree Mitigation	$ 800,000	$ 934,543
Forestry Reliability Work	$ 24,857	$ 18,168
Mid-Cycle Review	$ 112,000	$ 31,791
Police / Flagger	$ 529,500	$ 676,997
Core Work	$ 150,000	$ 176,578
VMP Planning	$ -	$ -
Distribution Total	**$ 3,106,357**	**$ 3,325,322**
Sub-T	$ 528,000	$ 363,327*
Substation Spraying	$ 11,021	$ 10,798
VM Staff	$ 377,827	$ 376,758
Program Total	**$ 4,023,205**	**$ 4,076,205**
Storm Resiliency Program	$ 1,423,205	$ 1,439,617
Grand Total	**$ 5,446,205**	**$ 5,515,822**

*$72,744 not spent and carried over to 2021 for herbicide application

The following tables detail the 2020 VMP work completed by activity. Table 2 details the cycle pruning work. A total of 212.9 miles of cycle pruning was completed in 2020.

Table 2

2020 VMP Cycle Pruning Details				
District	**Feeder**	**Overhead Miles**	**Scheduled Miles**	**Completed Miles**
Capital	C14H1	1.1	1.1	1.1
Capital	C14H2	3.8	3.8	3.8
Capital	C14X3	0.3	0.3	0.3
Capital	C15W1	16.8	16.8	16.8
Capital	C15W2	5.8	2.2	2.2
Capital	C1H1	0.6	0.6	0.6
Capital	C1H2	0.6	0.6	0.6
Capital	C1H3	2.3	2.3	2.3
Capital	C1H4	1.6	1.6	1.6
Capital	C1H5	0.8	0.8	0.8
Capital	C1H6	1.6	1.6	1.6
Capital	C22W3	40.2	40.2	40.2
Capital	C3H1	2.5	2.5	2.5
Capital	C3H2	2.4	2.4	2.4
Capital	C3H3	1.0	1.0	1.0
Capital	C7W3	23.2	23.2	23.2
Capital	C7X1	2.6	2.6	2.6
Seacoast	E1H3	1.6	1.6	1.6
Seacoast	E1H4	3.2	3.2	3.2
Seacoast	E22X1	37.6	37.6	37.6
Seacoast	E22X2	4.9	4.9	4.9
Seacoast	E23X1	24.0	21.4	21.4
Seacoast	E6W1	27.0	22.8	22.8
Seacoast	E6W2	20.2	17.9	17.9
Total			**212.9**	**212.9**

Table 3 details the hazard tree mitigation work. A total of 107.4 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 1,767 total hazard trees were removed on these circuits and various other circuits as found through the course of work over the year. The decline in the ability to do more hazard trees is due to the increase in average cost of tree removal due to increased contractor costs for labor and increased unit prices for hazard tree removal.

Table 3

2020 VMP Completed Hazard Tree Mitigation Details					
District	**Feeder**	**Overhead Miles**	**Scheduled Miles**	**Completed Miles**	**# of Removals**
Capital	C8X3	105.9	27.1	27.1	434
Capital	C22W3	40.2	11.3	11.3	40
Capital	Various				409
Seacoast	E43X1	30.8	3.9	3.9	52
Seacoast	E51X1	30.1	5.2	5.2	20
Seacoast	E13W1	18.5	3.7	3.7	78
Seacoast	E21W1	29.7	5.0	5.0	110
Seacoast	E21W2	21.6	7.5	7.5	62
Seacoast	E54X1	21.9	4.9	4.9	58
Seacoast	E54X2	22.1	5.6	5.6	29
Seacoast	E56X1	16.9	4.7	4.7	5
Seacoast	E11X2	11.9	6.6	6.6	9
Seacoast	E2X2	19.8	12.7	12.7	44
Seacoast	E22X1	37.6	9.2	9.2	133
Seacoast	Various				28
Total			**107.4**	**107.4**	**1,767**

Tables 4 and 5 detail the forestry reliability work and mid-cycle work respectively. A total of 6.7 miles of line underwent forestry reliability work and 62.2 miles of line were completed for mid-cycle work.

Table 4

2020 VMP Completed Reliability Analysis Details				
District	**Feeder**	**Overhead Miles**	**Scheduled Miles**	**Completed Miles**
Capital	C4W3	18.5	0.5	0.5
Capital	C13W3	82.9	3.8	3.8
Capital	C18W2	34.0	0.6	0.6
Seacoast	C17W2	4.6	0.7	0.7
Seacoast	C2X3	13.7	1.1	1.1
Total			**6.7**	**6.7**

Table 5

2020 VMP Completed Mid-Cycle Review Details				
District	**Feeder**	**Overhead Miles**	**Scheduled Miles**	**Completed Miles**
Capital	C18W2	34.0	2.0	2.0
Capital	C8X3	105.9	27.1	27.1
Seacoast	E43X1	30.8	3.9	3.9
Seacoast	E11X2	11.9	6.6	6.6
Seacoast	E19X2	2.8	1.8	1.8
Seacoast	E20H1	4.5	2.2	2.2
Seacoast	E28X1	10.2	5.1	5.1
Seacoast	E2X3	13.7	7.1	7.1
Seacoast	E2X2	19.8	7.2	7.2
Seacoast	E46X1	2.3	1.2	1.2
Total			**62.2**	**62.2**

Table 6 details the sub-transmission right-of-way clearing work. A total of 13.7 linear miles of right-of-way floor were cleared.

Table 6

2020 Sub Transmission Clearing Details			
District	**Feeder**	**Scheduled Miles**	**Completed Miles**
Capital	34	1.7	1.7
Capital	374	2.7	2.7
Capital	375	1.5	1.5
Seacoast	3342/3353	3.7	3.7
Seacoast	3346	2.0	2.0
Seacoast	3341/3352	2.1	2.1
Total		**13.7**	**13.7**

The sub-transmission right-of-way that was cleared in both Capital and Seacoast in 2019 was scheduled to undergo the integrated vegetation management (IVM) program's low-volume foliar herbicide application work in 2020. Due to COVID-19 pandemic workforce labor restrictions there were no qualified herbicide applicators available to perform the work in the application window. These acres were unable to be managed with IVM chemical control and will be carried over into 2021 to be treated in the spring.

3. 2020 Vegetation Management Storm Resiliency Program Results

In 2020, Unitil continued the SRP, targeting the resiliency efforts in communities in the Capital area. This program, now through its ninth year, has been very successful. Unitil is experiencing less damage

during storm events resulting in a quicker restoration and the ability to send line and tree crews to our neighboring utilities to assist with their restoration. As in previous program years, the 2020 circuits were selected through analysis of tree related reliability performance. The 2020 circuits are shown below in Table 7. In 2020, 33.5 miles of critical three phase line were work-planned for hazard tree removals and ground-to-sky pruning. A total of 1,594 hazard trees were removed along these portions of line.

Table 7

2020 Storm Program Work Details			
Circuit	**Scheduled Miles**	**Completed Miles**	**# of Removals**
C15W2	5.8	4.3	639
C2H2	8.8	5.3	293
C13W2	18.0	5.0	83
C37X1*	6.8	-	-
C4W4	14.2	4.0	59
C8X5	7.4	7.2	69
C16H1	3.2	2.1	125
C16H3	4.5	1.8	72
C16X4	6.6	3.8	254
Total	**34.7**	**33.5**	**1,594**

*circuit removed due to installation of new line protection device

As table 7 shows, 33.5 miles of planned work in 2020 was completed. The C37X1 circuit was removed from the planned SRP due to the installation of new recloser and fusing effectively hardening the circuit for the approximate 175 customers served off that line.

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 2020. 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 2020, Distribution Engineering recommended hazard tree removal on the 38 Line emanating from one of 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 Seacoast area. In total, $152,803 was spent on Enhanced Tree Trimming and 151 hazard tree removals were completed along with sideline clearing on selected portions.

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