THE STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION

Unitil Energy Systems, Inc.

RELIABILITY PROGRAM AND VEGETATION MANAGEMENT PROGRAM ANNUAL REPORT – FISCAL YEAR 2023

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 2023 ("FY 2023"), report the period, January 1, 2023 – December 31, 2023.

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 2024 on November 17, 2023, pursuant to Order 26,388 in DE 20-098. Accordingly, the instant filing contains the reconciliation of expenditures during fiscal year 2023. This report includes the following information:

(A) A description of Unitil's VMP;
(B) A comparison of FY2022 and FY2023 actual to budgeted spending on O&M activities related to the VMP
(C) Detail on the O&M spending related to the FY2023 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. 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. 2023 Actual Expenditures and Work Completed

Table 1 depicts the 2022 and 2023 VMP expenditures by activity in relation to the anticipated budget expenditures. As the program progressed in 2023 there were some deviations in the anticipated expenditures. In the VMP spending, cycle pruning costs to do all the planned work came back favorably from our vendors, well under expected costs. However, Hazard Tree Mitigation work, Police / Flagger costs and SRP costs were higher than expected. Due to factors beyond the Company's control, including increased costs of contractor labor and the poor health of urban forests in the Company's service territory, the work cost for the SRP was very high this year, coming in significantly higher than the estimated costs. As a result, two circuits were not able to be completed in 2023 and were carried over into 2024. As shown in the table below, total spending for all VMP and SRP components was below the budget by $218,615, largely due to favorable pricing on Sub-T work.

Table 1

2022& 2023 VMP O&M Activities				
VM Activity	**2022 Cost Proposal**	**2022 Actual Cost**	**2023 Cost Proposal**	**2023 Actual Cost**
Cycle Prune	$ 2,332,666	$ 2,440,420	$ 2,663,143	$ 1,923,284
Hazard Tree Mitigation	$ 882,000	$ 1,138,999	$ 926,100	$ 1,267,693
Forestry Reliability Work	$ 26,371	$ 73,013	$ 27,162	$ 64,364
Mid-Cycle Review	$ 118,821	$ 89,363	$ 122,385	$ 67,979
Police / Flagger	$ 561,747	$ 640,143	$ 578,599	$ 774,541
Core Work	$ 154,500	$ 228,154	$ 163,909	$ 188,007
VMP Planning	$ -	$ -	$ -	$ 17,042
Distribution Total	**$ 4,080,740**	**$ 4,610,092**	**$ 4,481,298**	**$ 4,302,910**
Sub-T	$ 635,082	$ 463,544	$ 654,134	$ 371,424
Substation Spraying	$ 13,834	$ 26,556	$ 13,834	$ 28,875
VM Staff	$ 382,916	$ 638,907	$ 677,611	$ 610,627
Program Total	**$ 5,112,572**	**$ 5,739,099**	**$ 5,826,877**	**$ 5,313,836**
Storm Resiliency Program	$ 1,465,690	$ 1,488,560	$ 1,156,670	$ 1,451,096
VMP & SRP Total	**$ 6,578,262**	**$ 7,227,659**	**$ 6,983,547**	**$ 6,764,932**
REP Forestry Allocation	**$ 300,000**	$ 202,163	$ 300,000	$ 202,383
Grand Total	**$ 6,878,262**	**$ 7,429,822**	**$ 7,283,547**	**$ 6,967,315**

The following tables detail the 2023 VMP work completed by activity. Table 2 details the cycle pruning work. A total of 226.8 miles of cycle pruning was completed in 2023.

Table 2

2023 VMP Completed Cycle Pruning Details				
District	**Feeder**	**Overhead Miles**	**Scheduled Miles**	**Completed Miles**
Capital	C13W3	83.8	83.8	83.8
Capital	C24H1	1.9	1.9	1.9
Capital	C24H2	1.9	1.9	1.9
Capital	C33X4	2.0	2.0	2.0
Capital	C34X4	0.2	0.2	0.2
Capital	C13W2	18.0	18.0	18.0
Seacoast	E13W2	29.3	27.4*	27.4
Seacoast	E5X3	9.0	6.3*	6.3
Seacoast	E13X3	3.9	2.7*	2.7
Seacoast	E56X2	2.5	2.5	2.5
Seacoast	E58X1	31.2	27.4*	27.4
Seacoast	E2H1	2.3	2.3	2.3
Seacoast	E15X1	9.6	7.3*	7.3
Seacoast	E17W1	10.0	10.0	10.0
Seacoast	E17W2	4.6	4.6	4.6
Seacoast	E27X1	19.9	19.9	19.9
Seacoast	E27X2	8.7	8.7	8.7
Total			**226.8**	**226.8**

*miles backed out for SRP work done in 2022 or 2023

Table 3 details the hazard tree mitigation work. A total of 88.5 miles of line across 11 circuits were mitigated for hazard tree risk. Unitil had estimated approximately 1,853 hazard tree removals in the budget. The actual results indicate 1,917 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 2022, there was an increase in average cost of tree removal.

Table 3

2023 VMP Completed Hazard Tree Mitigation Details					
District	**Feeder**	**Overhead Miles**	**Scheduled Miles**	**Completed Miles**	**# of Removals**
Capital	C8X3	106.5	10*	10	331
Capital	C15W1	16.8	5.1	5.1	72
Capital	C22W3	39.1	10.8	10.8	78
Capital	C7W3	31.5	16.4	16.4	85
Capital	C13W3	82.9	18.1	18.1	279
Capital	C13W2	24.8	5.0	5.0	99
Capital	Various				143
Seacoast	E22X1	37.6	9.2	9.2	14
Seacoast	E56X2	2.5	4.0	4.0	8

Seacoast	E2H1	2.3	1.4	1.4	10
Seacoast	E27X1	16.1	7.1	7.1	139
Seacoast	E27X2	8.7	1.4	1.4	50
Seacoast	Various				609
Total			**88.5**	**88.5**	**1,917**

*2022 carry-over circuit

Tables 4 and 5 detail the forestry reliability work and mid-cycle work respectively. A total of 10.8 miles of line underwent forestry reliability work and 69.6 miles of line were completed for mid-cycle work.

Table 4

2023 VMP Completed Reliability Analysis Details				
District	**Feeder**	**Overhead Miles**	**Scheduled Miles**	**Completed Miles**
Capital	C22W3	39.1	2.5	2.5
Capital	C3W3	3.1	0.4	0.4
Capital	C13W1	34.0	2.2	2.2
Seacoast	E13W1	19.0	2.4	2.4
Seacoast	E6W1	27.1	1.4	1.4
Seacoast	E19X3	39.1	1.9	1.9
Total			**10.8**	**10.8**

Table 5

2023 VMP Completed Mid-Cycle Review Details				
District	**Feeder**	**Overhead Miles**	**Scheduled Miles**	**Completed Miles**
Capital	C15W1	16.8	5.1	5.1
Capital	C15W2	3.7	2.7	2.7
Capital	C22W3	39.1	10.8	10.8
Capital	C7W3	31.5	16.4	16.4
Capital	C7X1	3.6	2.7	2.7
Seacoast	E22X1	37.6	9.2	9.2
Seacoast	E22X2	4.9	1.7	1.7
Seacoast	E23X1	24	9.7	9.7
Seacoast	E6W1	27	5.7	5.7
Seacoast	E6W2	20.2	5.6	5.6
Total			**69.6**	**69.6**

Table 6 details the sub-transmission right-of-way clearing work. A total of 17.9 linear miles of right-of-way floor were cleared.

Table 6

2023 Sub Transmission Clearing Details			
District	**Feeder**	**Scheduled Miles**	**Completed Miles**
Capital	34	2.2	2.2
Capital	35	3.8	3.8
Capital	38	3.1	3.1
Seacoast	3354/3343	8.8	8.8
Total		**17.9**	**17.9**

The sub-transmission right-of-way that was cleared in both Capital and Seacoast in 2022 underwent the integrated vegetation management (IVM) program's low-volume foliar herbicide application as planned in 2023.

3. 2023 Vegetation Management Storm Resiliency Program Results

In 2023, Unitil continued the SRP, targeting the resiliency efforts in communities in the Seacoast areas. This program, now through its first year of the second cycle, has been very successful. Unitil is experiencing less damage during storm events resulting in a quicker restoration. The 2023 circuits were selected using their last SRP date and analysis of tree related reliability performance. The 2023 circuits are shown below in Table 7. In 2023, 42.3 miles of critical three phase line were work-planned for hazard tree removals and ground-to-sky pruning but only 36.7 miles were completed in the field. A total of 1,824 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 remaining implementation work on the E21W2 into 2024.

Table 7

2023 Storm Program Work Details			
Circuit	**Scheduled Miles**	**Completed Miles**	**# of Removals**
E15X1	6.2*	6.2*	180
E28X1	5.1*	5.1*	571
E13W2	10.7	10.7	325
E58X1	12.9	12.9	615
E21W2	5.6	0**	0
E22X2	1.8	1.8	133
E51X1	1.4	0***	-
Total	**43.7**	**40.6**	**1,824**

*2022 carry-over circuit

**2023 carry-over into 2024

***scheduled for construction project in 2024

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 2023, 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 Seacoast and Capital areas. In total, $202,383 was spent on Enhanced Tree Trimming and 213 hazard tree removals were completed along with sideline clearing on selected portions.

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