

PSNH

Reliability Enhancement Program

Docket DE 09-035

2012 Year End Report

PSNH

Reliability Enhancement Program

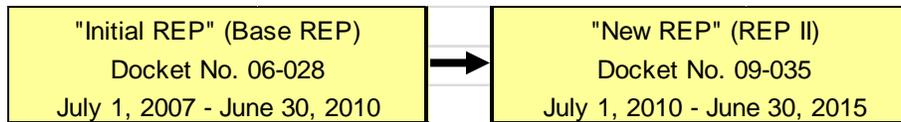
Docket DE 09-035

Executive Summary

Executive Summary
Reliability Enhancement Program
 Docket DE 09-035

This report provides program-specific details for the full calendar year of PSNH's enhanced Reliability Enhancement Program (REP II) ending December 31, 2012 as well as the Operation and Maintenance (O&M) expenditures formerly included in the Company's initial REP (Base REP). The initial REP was established as a 5-year effort under the settlement agreement approved by the Commission in Order No. 24,750 in Docket No. DE 06-028 and became effective July 1, 2007. The results of the reliability work under the initial REP were documented in the report submitted by PSNH on February 18, 2011. As part of the Settlement Agreement on Permanent Distribution Rates (the "Settlement Agreement") approved by the Commission in Order No. 25,123 issued in Docket No. DE 09-035, the settling parties agreed that PSNH should continue its existing REP expenditures from the initial REP and incorporate the revenue requirement for the O&M portion into base distribution rates. Additionally, the Settlement Agreement provided for an additional \$4 million per year of revenue for the duration of the Settlement to support enhanced O&M and capital spending under a so-called "REP II" initiative.

Reliability Enhancement Program (REP)



As noted above, this report provides results of the calendar year ending December 31, 2012 and includes all capital and O&M spending included under both the initial REP and REP II. Additionally, this report includes details on proposed capital spending now funded under REP II for calendar year 2013.

2009 RATE CASE	
Docket DE 09-035	
<u>Revenue Requirement Allocations</u>	
Initial REP O&M	\$8,200,000
REP II O&M Programs	2,500,000
Capital Financing	1,500,000
Total	\$12,200,000

The combined REP provides PSNH with \$12.2 million in annual (program year) distribution revenue requirements to stabilize reliability through enhanced distribution capital investment and operation and maintenance (O&M) expenditures.

Annual revenue was allocated between the components shown in the table to the left pursuant to agreement reached during settlement discussions for docket DE 09-035. The capital component was designed to provide for between \$12.8 and 14 million of additional capital investment annually. The

O&M component was determined by assessing various existing maintenance and repair activities as well as new activities. The base component was also O&M-related, but focused specifically on vegetation management and National Electrical Safety Code (NESC) inspections. See *PSNH Rate Case DE No. 09-035 REP Revenue Allocations* for first year detail breakdown by area and activity.

The table at the top of the next page shows actual expenditures for calendar year 2012 under the current REP. These general REP areas represent multiple tracked programs and activities.

Actual O&M results through December 31, 2012 show \$12.3 million spent and 57,310 tasks completed, exceeding the 2012 plan by over \$0.5 million. Completed tasks were approximately 1% less than planned. PSNH was approximately on schedule most of the year and was able to make up the carryover activities from 2011 as well as complete the 2012 work. Certain expenditures were reassigned in 2012 due to an accounting change. Hazard Tree Removal and Inspect/Reclaim ROWs were changed from O&M activities to Capital activities in the 3rd quarter. Associated charges for both

2012 O&M Plan vs Actual:	
2012 Planned O&M Expenditures	\$ 9,845,500
2011 Carryover	1,917,633
2012 Total Planned O&M Expenditures	11,763,133
2012 Actual O&M Expenditures	12,292,065
Variance	\$ 528,932
Accounting Change:	
2012 Actual O&M Expenditures	\$ 12,292,065
Capitalized Hazard Tree Removal	(1,207,600)
Capitalized Inspect/Reclaim ROWs	(1,914,900)
2012 Adjusted O&M Expenditures	\$ 9,169,565

Executive Summary
Reliability Enhancement Program
 Docket DE 09-035

activities were reallocated for the entire year, adjusting the total O&M expenditures to \$9.2 million. See Section 1, *Year End 2012 Summary of PSNH Reliability Enhancement Program – O&M* for details on individual activity cost and unit count. See Section 7, *2013 O&M and Capital Summary Plan*, for details on individual activity cost and unit count to complete the 2012 program.

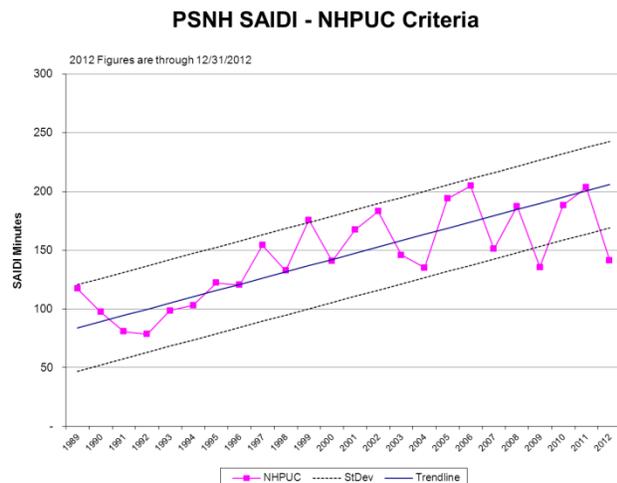
2012 EXPENDITURES

REP AREA	12-mo Ending Dec 2012
Base REP - Vegetation Manag	2,804,376
Base REP - NESC Inspect/Rej	4,163,552
Base REP - O&M Activities	895,998
REP II O&M Programs	1,288,877
Accounting Adjustment	16,762
Total O&M	\$9,169,565
New REP Specific Capital	\$12,204,600
Capital due to Base REP	5,380,500
Specific Capital Projects	\$17,585,100
Capital Financing Required (Annualized Carrying Charge)	\$2,110,212
Total REP Revenue Req'ts.	\$11,279,777

For capital expenditures, PSNH spent \$17.6 million on the stipulated 17 budget line items or projects. See Section 5, *Year End 2012 Summary of PSNH Reliability Enhancement Program – Capital* for details on budget item/project descriptions and expenditures by item or project. PSNH tracks all reliability capital projects in order to ensure the funding allocated to REP is over and above what normally would have been accomplished.

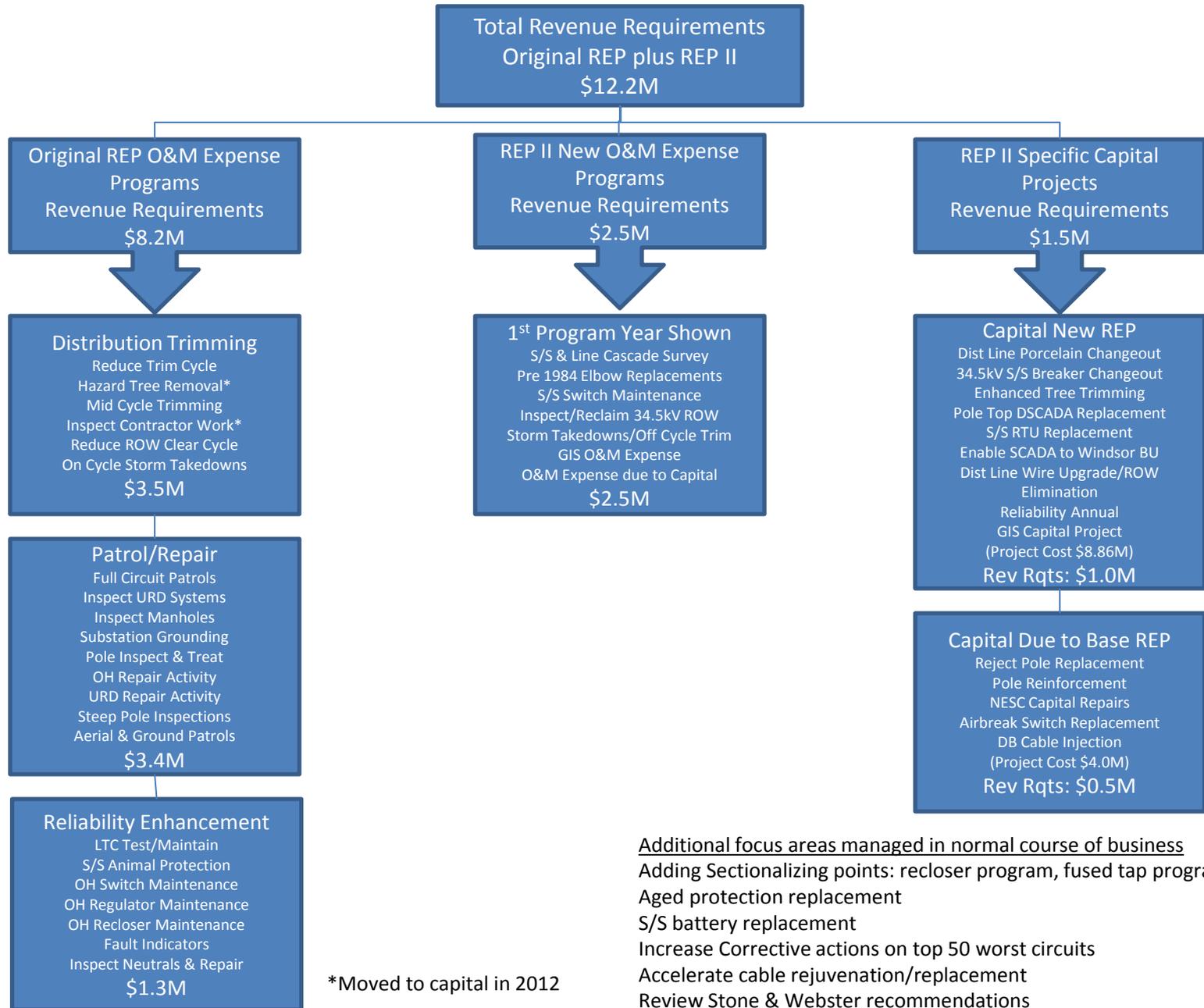
As noted above, the Settlement Agreement provides that the initial REP O&M activities discussed in this report are now included with those O&M and capital programs included under REP II. Funding for these Initial REP activities is based on a level amount of revenues annually amounting to \$8.2M.

Reliability performance as measured by SAIDI shows continued stabilization through year end 2012. During 2012, New Hampshire experienced difficult weather with numerous storm days, including Hurricane Sandy in August. Storm related impacts to the electric system affected PSNH's absolute SAIDI performance. We note, however, since the REP was implemented, the trend from 2006 onward has been markedly improved. We continue to see benefits from the REP activities and fully believe we are preventing problems from occurring and reducing repair effort and outage times by having the PSNH electric system work as designed. The REP activities are critical and important in concert with PSNH's continued efforts to maintain the system in the normal course of business.
 See Section on NHPUC SAIDI Graphs.



PSNH Reliability Enhancement Program (REP) Effective July 1, 2010

Rate Case DE 09-035 REP Revenue Allocations



NHPUC

RELIABILITY GRAPHS

NHPUC SAIDI Graphs Summary
Reliability Enhancement Program
Docket DE 09-035

The following is a brief description of the SAIDI Graphs contained in this section and the related REP activities for them:

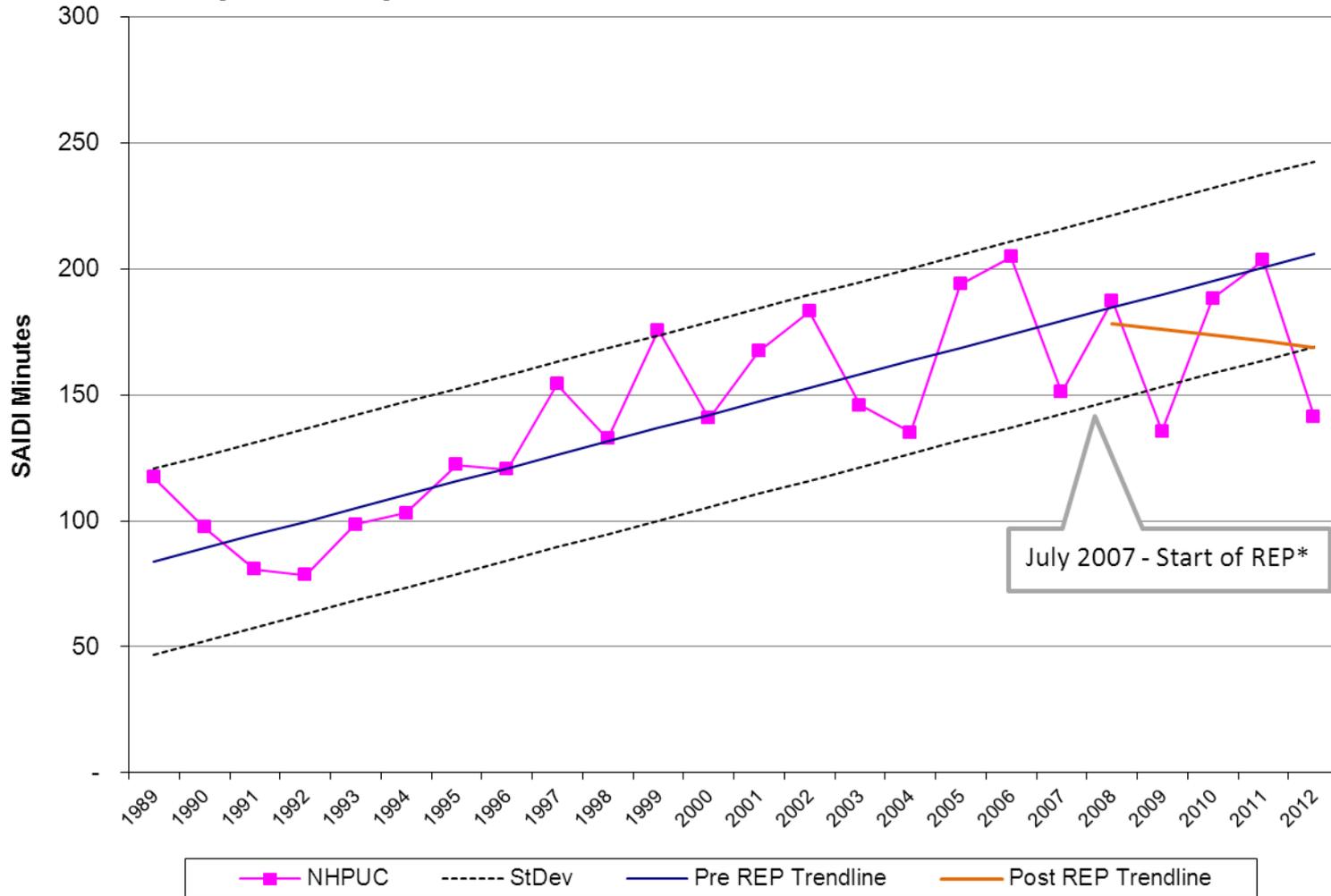
1. PSNH SAIDI – NHPUC Criteria. The company SAIDI went down in 2012 compared with 2011, and remains below 2006 performance. The trend since 2005 is generally declining and we are establishing a new improving trend. Trend lines shown are for 1989 through 2005.
2. Top 50 Hit List SAIDI Contribution from Year to Year. Each year PSNH reviews SAIDI by circuit and determines which have contributed the most minutes according to the NHPUC Criteria. Shown on this graphic are the total SAIDI minutes for the top 50 circuits in a year, the amount of SAIDI minutes for those circuits remaining on the top 50 list from the previous year, and the percentage of SAIDI these carry forward circuits represent compared to the Top 50 total. In 2012 we had a decrease in SAIDI contribution coming from the top 50, and a decrease in SAIDI from circuits remaining in the top 50 from 2011 to 2012.
 - a. *See section 6 Other summary for specific actions taken on each circuit*
3. PSNH SAIDI – NHPUC Criteria With and Without Storms. NHPUC SAIDI does not include emergency events which are booked to the storm reserve. These are catastrophic events and are shown on this chart over and above the NHPUC reported SAIDI. Off-scale impacts are shown for the December Ice Storm in 2008; the February wind storm in 2010; the two major storms declared in 2011, Tropical Storm Irene and a major snowstorm occurred in August and October, respectively; and Hurricane Sandy in 2012. A major storm is declared when there are 200 concurrent power outages affecting 10% of customers served or 300 concurrent power outages. PSNH also tracks minor storms when 100 or more primary power outages occur within a storm timeframe and not deemed a NHPUC major storm. PSNH experienced 10 minor storm events in 2012. This minor storm component subtracted from NHPUC reported SAIDI leaves a Weather normalized SAIDI. As shown, that component continues to be below levels present when REP was initiated in July, 2007.
4. PSNH Tree Related SAIDI. The largest cause group for SAIDI is trees and limbs either in the clearance area or outside of it. Tree related SAIDI and the NHPUC reported SAIDI trend very closely and are sensitive to weather. Weather Normalized Tree SAIDI had been trending upward slightly with a slowing trend in recent years. However, 2012 performance is the best since the beginning of the REP program. There is a cumulative effect for vegetation management and we believe the effort from last half of 2007 through year end 2012 is showing results. Our efforts to establish the target 4.5 year trimming cycle for the distribution system has been achieved. PSNH's current trimming cycle is approximately 4.2 years. REP activities relating to this are:
 - a. O&M expense Vegetation Management activities including Scheduled Maintenance trimming to shorten the maintenance cycle, Hazard tree removals, Mid cycle trimming
 - b. Capital trimming at Enhanced Tree Trimming specifications for establishing larger clearance both for existing lines and whenever new additions and upgrades are made to the system.
5. PSNH Equipment Related SAIDI. The second largest cause group for SAIDI is equipment failures in substations and on distribution lines. There is much less weather effect and the difference between them is small. A decrease has occurred in this area in 2012 compared with 2011. Performance in 2010 was unusually low. This component is nearly 25% below levels present when REP was initiated in July, 2007. A variety of REP actions affect this and include:
 - a. Porcelain changeouts
 - b. Switch maintenance and replacement programs
 - c. Recloser Maintenance, Cable testing and replacement

NHPUC SAIDI Graphs Summary
Reliability Enhancement Program
Docket DE 09-035

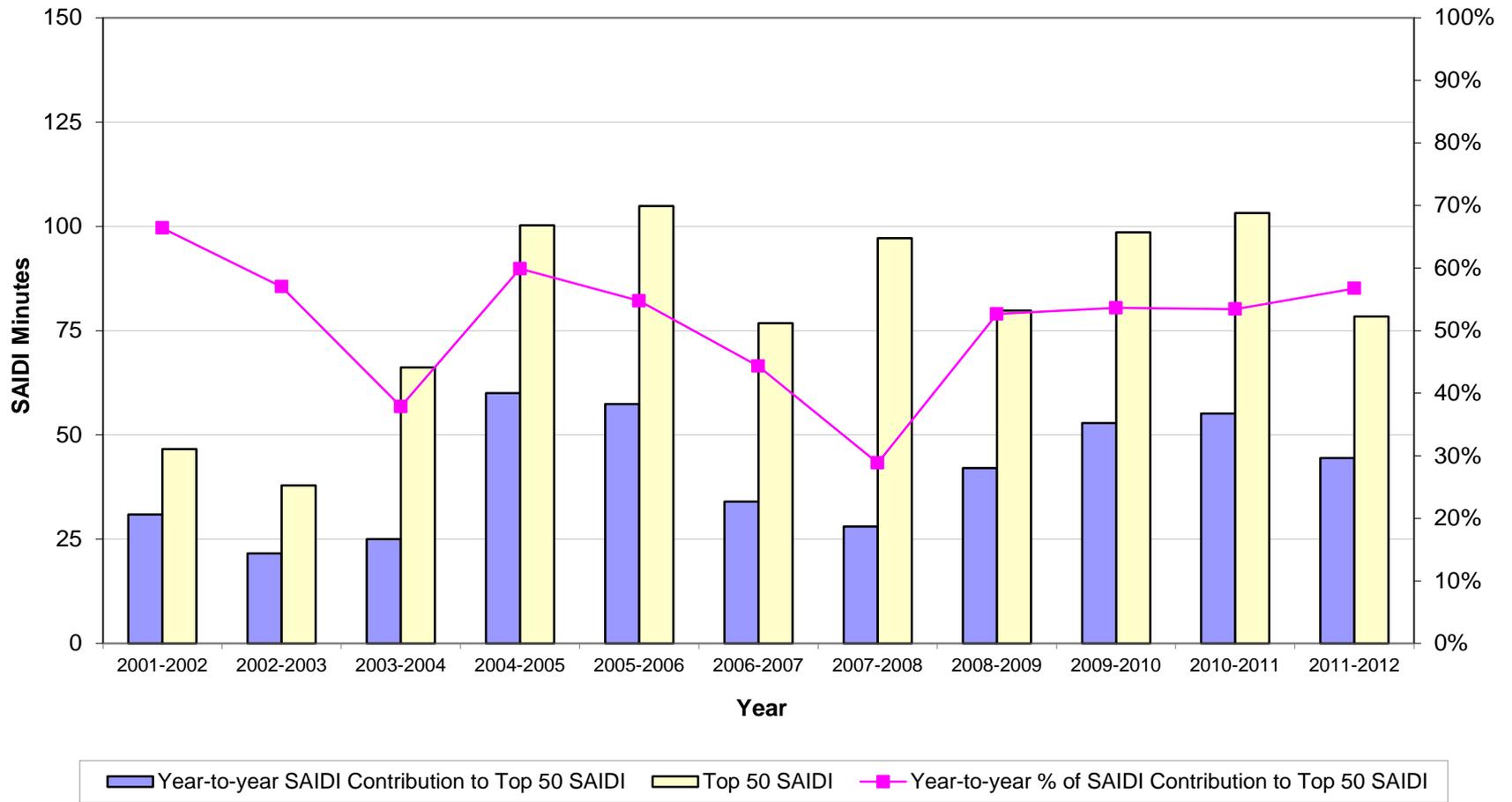
6. PSNH SAIDI – NHPUC Criteria Substation Reliability. Power outages caused by actions or problems inside substations are typically large and widespread. The amount of SAIDI minutes relating to these events is generally declining and there is essentially no difference due to weather. There was a decrease in SAIDI minutes in 2012. We continue to track a very low SAIDI contribution in this area through 2012, which represents the best performance for Substation Reliability since before REP began in July, 2007. This can be associated with REP activities such as:
 - a. 34.5 kV Substation Breaker replacement program
 - b. Animal Protection in Substations
 - c. Efforts made reducing the corrective maintenance backlog to zero.

PSNH SAIDI - NHPUC Criteria

2012 Figures are through 12/31/2012



Top 50 Hit List SAIDI Contribution from year to year NHPUC Criteria

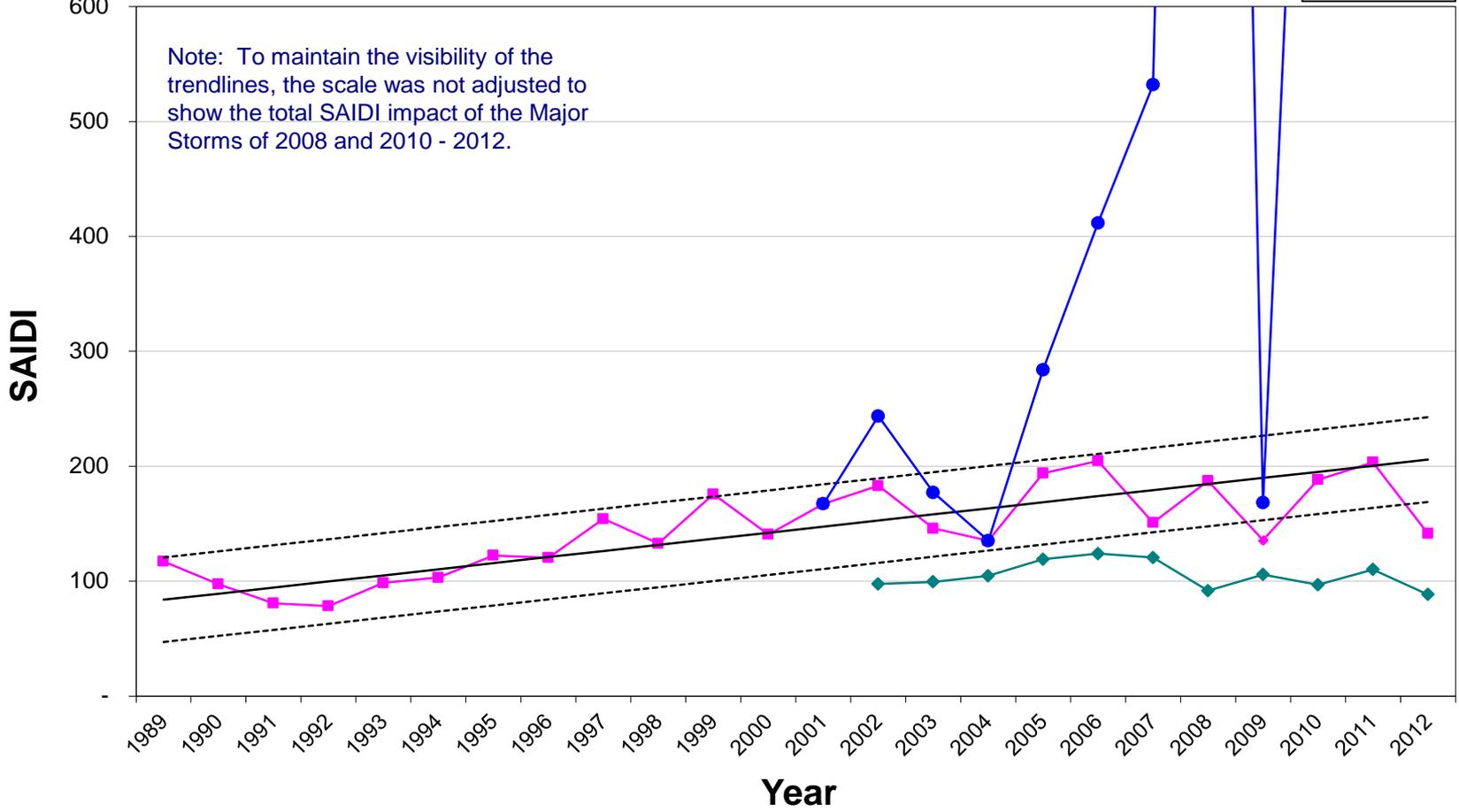


PSNH SAIDI - NHPUC Criteria

With and Without Storms

Off scale SAIDI values:
 2008: 2477
 2010: 1236
 2011: 2281
 2012: 613

2012 Figures are through 12/31/2012

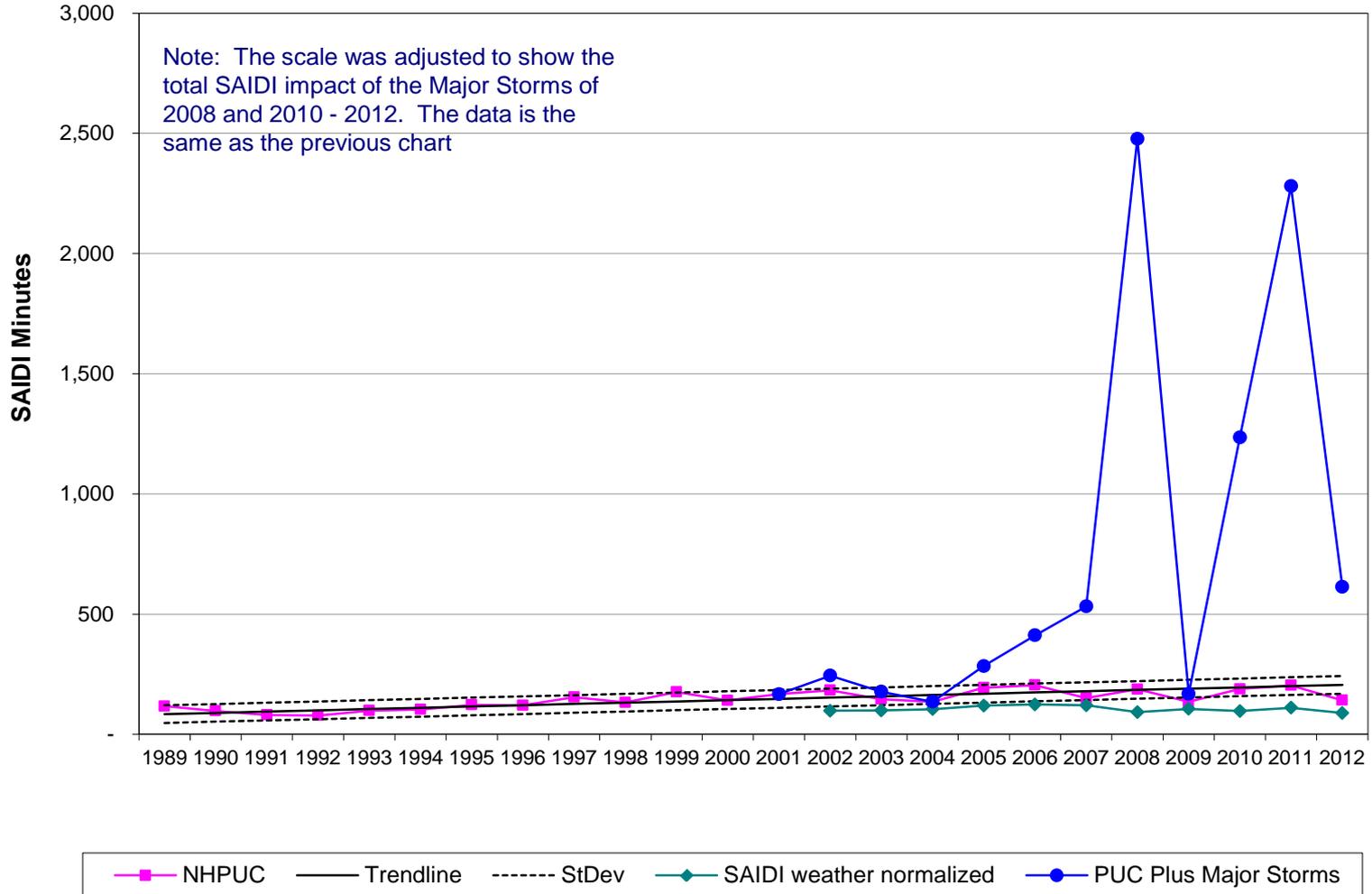


■ NHPUC
 — Trendline
 - - - - - StDev
 ◆ SAIDI weather normalized
 ● PUC Plus Major Storms

PSNH SAIDI - NHPUC Criteria

With and Without Storms

2012 Figures are through 12/31/2012

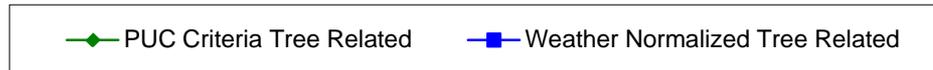
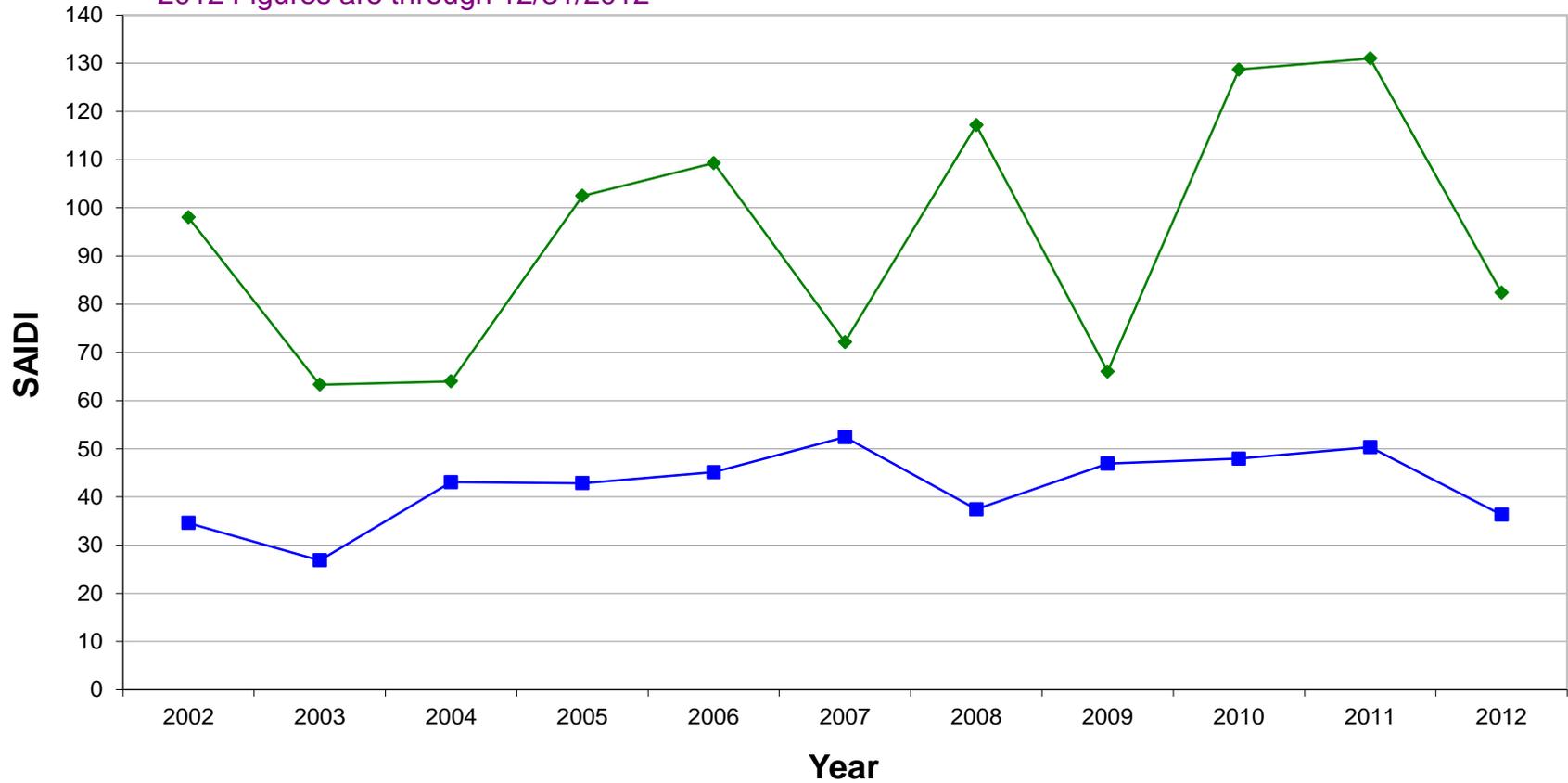


PSNH Tree Related SAIDI

NHPUC Criteria

(100% of Trees/Limbs, 50% of Ice/Sleet/Snow & Wind and 40% of Patrolled Nothing Found related troubles)

2012 Figures are through 12/31/2012

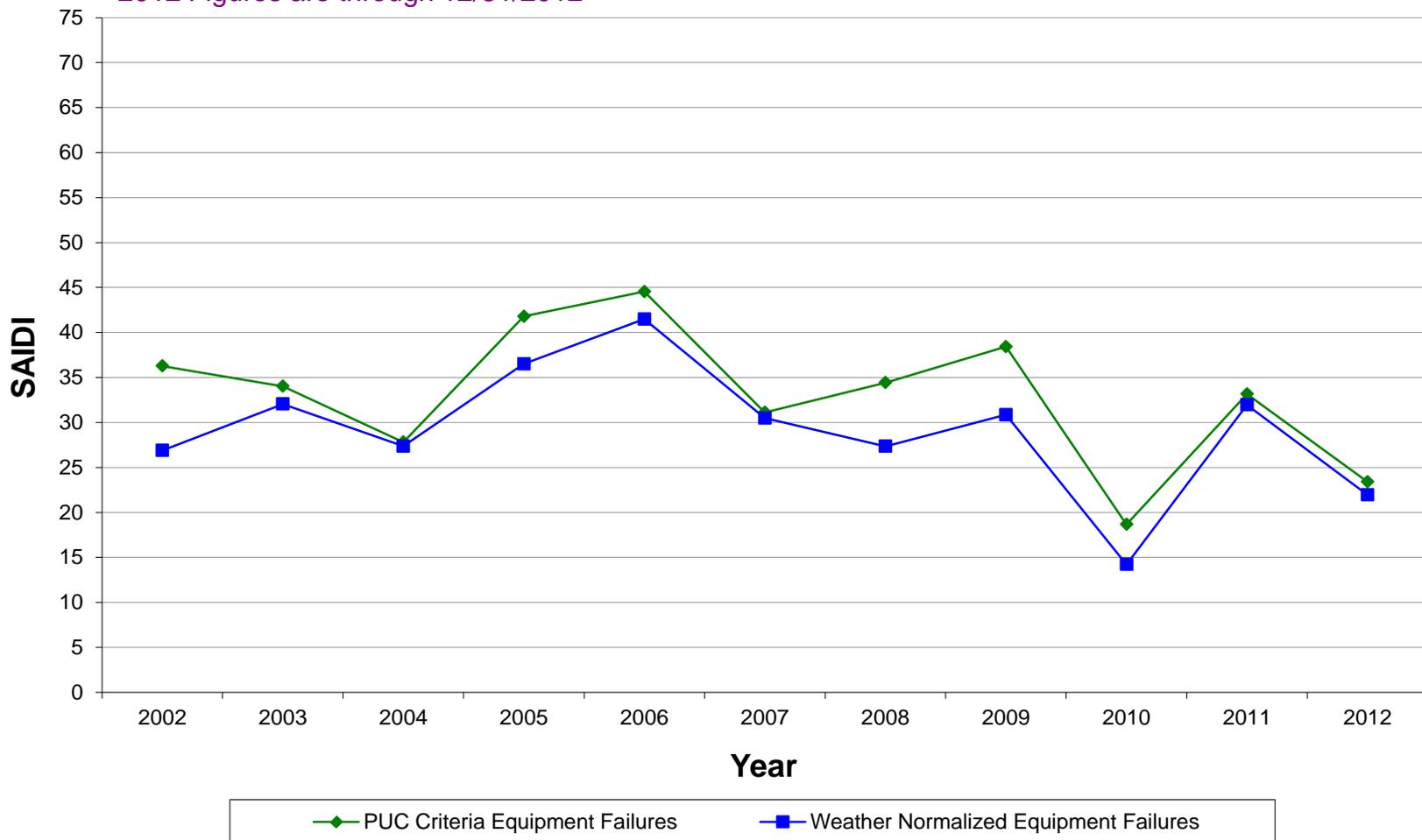


PSNH Equipment Related SAIDI

NHPUC Criteria

(100% of Equipment Failure, Improper Install, Loose Connection, Open Neutral and Overload related troubles)

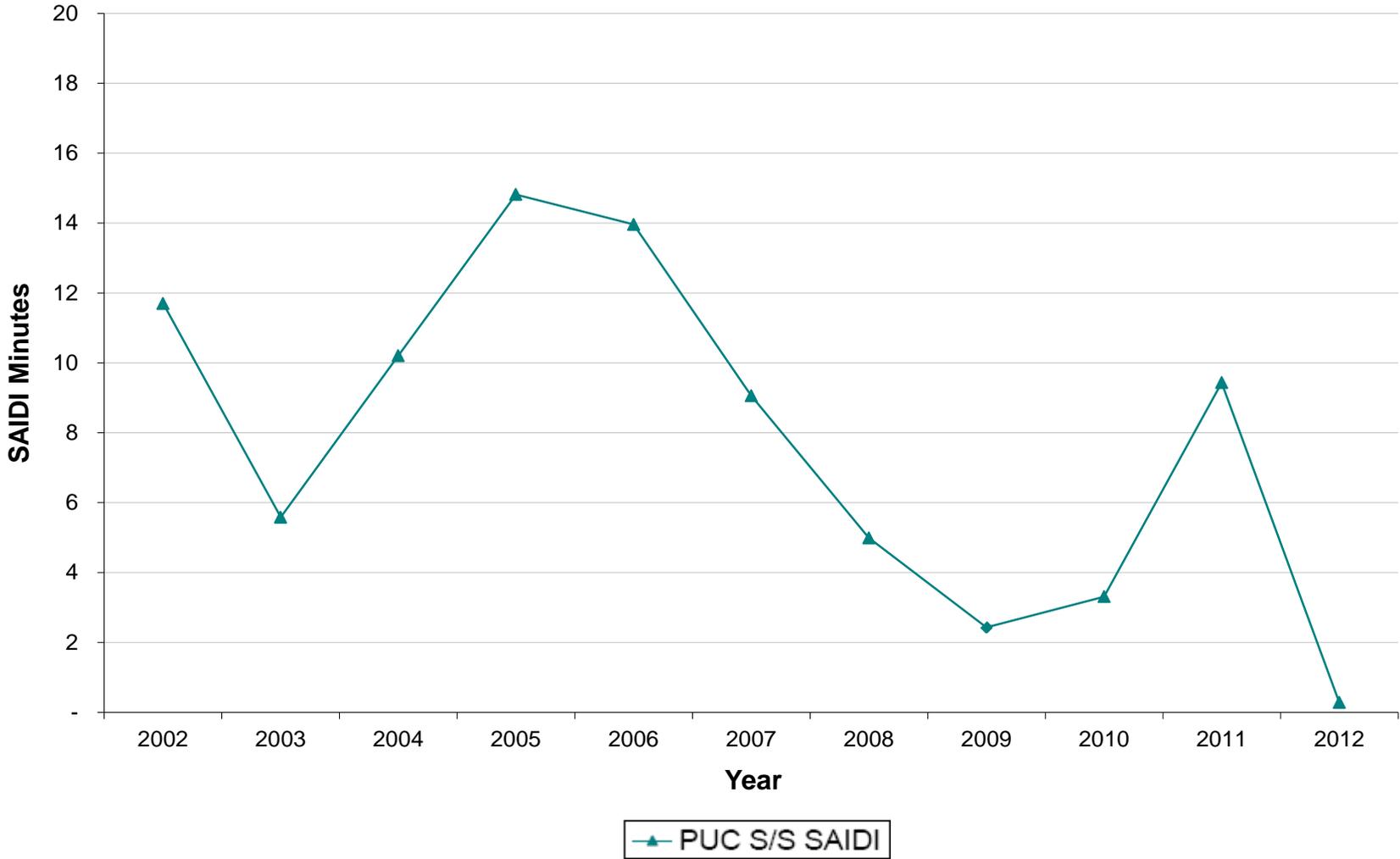
2012 Figures are through 12/31/2012



PSNH SAIDI - NHPUC Criteria

Substation Reliability

2012 figures are through: 12/31/2012



PSNH 2012 YEAR END RELIABILITY ENHANCEMENT PROGRAM

TOPIC	SECTION
2012 O&M SUMMARY	1
2012 O&M VEGETATION MANAGEMENT PROGRAMS	2
2012 O&M NATIONAL ELECTRICAL SAFETY CODE PROGRAMS	3
2012 O&M OTHER RELIABILITY PROGRAMS	4
2012 CAPITAL SUMMARY	5
2012 OTHER ACTIVITIES	6
2013 O&M AND CAPITAL SUMMARY PLAN	7

Section 1

2012 O&M Summary



Year End 2012 Summary of PSNH Reliability Enhancement Program – O&M

Public Service
of New Hampshire
The Northeast Utilities System

Docket No. DE 09-035

Jan 1 2012 - Dec 31 2012



TRIMRC - VEGETATION MANAGEMENT (O&M)				
	Units	\$ Expended	Units Completed	Cost Per Unit
Reduce Scheduled Maintenance Trim Cycle	# Miles	\$1,715,480	429	\$3,999
Hazard Tree Removal	N/A	\$290,000	N/A	N/A
Mid Cycle Trimming	# Miles	\$573,707	104	\$5,516
Inspect Contractor	# Miles	N/A (1)	2,500	N/A
Reduce Distribution Rights-of-Way Cycle	# Acres	\$225,189	345	\$653
Storm Damage Premium	N/A	0	0	\$0
Subtotal - Base REP		\$2,804,376	3,378	
Takedowns	N/A	N/A (1)	N/A (1)	N/A
Cycle Impact	N/A	N/A (1)	N/A (1)	N/A
ETT Maintenance Trimming	# Miles	\$603,133	113	\$5,337
S/S Perimeter Trimming	# Substations	N/A (1)	N/A (1)	N/A
Subtotal - REP II		\$603,133	113	
Total TRIMRC		\$3,407,509	3,491	

NESCRC - National Electrical Safety Code (O&M)				
	Units	\$ Expended	Units Completed	Cost Per Unit
Full Circuit Patrol	# Miles	\$53,624	1,106	\$48
Inspect and Repair Underground Systems	# Underground Maps	\$471,592	975	\$484
Inspect Manholes	# Manholes	N/A (1)	57	N/A
Pole Inspection and Treatment	# Poles	\$660,665	24,008	\$28
Overhead Repair Activity	# Repair Orders	\$2,960,461	25,358	\$117
Foot Patrol ROW	# Miles	\$17,210	149	\$116
Subtotal - Base REP		\$4,163,552	51,653	
Subtotal - REP II		\$0	0	
TOTAL NESCRC		\$4,163,552	51,653	

RELIOM - RELIABILITY (O&M)				
	Units	\$ Expended	Units Completed	Cost Per Unit
Overhead Switch Maintenance	# Switches	\$195,818	129	\$1,518
Recloser Maintenance	# Recloser Orders	\$273,078	148	\$1,845
Fault Indicators	# Fault Indicators	\$269,346	1,738	\$155
Test & Repair Direct Buried Unjacketed Cable	# Runs	\$157,756	151	\$1,045
Subtotal - Base REP		\$895,998	2,166	
Cascade Entry	Entry	\$32,921	N/A	N/A
GIS O&M	N/A	\$36,345	N/A	N/A
Damage Assessment Pilot	N/A	\$12,691	N/A	N/A
O&M Portion of Capital	N/A	\$603,787	N/A	N/A
Subtotal - REP II		\$685,744	0	
TOTAL RELIOM		\$1,581,742	2,166	

TOTAL O&M ONGOING FROM BASE REP	\$7,863,926	57,197
NEW O&M FOR REP II	\$1,288,877	113
Accounting Adjustment (2)	\$16,762	
TOTAL O&M	\$9,169,565	57,310

(1) Data is imbedded in another category as specified in O&M Briefing Sections.

(2) Correction for incorrect charging activity.

VEGETATION MANAGEMENT- O&M

REDUCE SCHEDULED MAINTENANCE TRIM CYCLE (BASE REP):

Program Description: Reduce the schedule maintenance trimming (SMT) cycle to a system average of less than 4.5 years.

Total Unit Population: PSNH is responsible for trimming approximately 11,000 miles of overhead distribution lines.

Maintenance Cycle: The current maintenance cycle is 4.19 years with 2624 miles planned for 2013. Included is approximately 100 miles that had previously had ETT applied. An additional 75 miles of ETT is planned for 2013 which provides an effective trim cycle of 4.04 years.

Reliability Benefit: Increasing the number of miles trimmed annually will reduce the number of growing seasons between maintenance trimming cycles. This will result in less tree growth toward the conductors between trimming operations. This will also result in a circuit being inspected for hazard trees more frequently, which will reduce the number of "outside the trim zone" outages.

O&M Cost:

\$ Expended	Miles Trimmed	Cost Per Mile
\$ 1,715,470	429	\$ 3,999

HAZARD TREE REMOVALS (BASE REP):

Moved to Capital. See Section 5.2.

HOT SPOT TRIMMING (BASE REP)

Program Description: Trim locations identified outside normal maintenance cycle that have been identified during reliability improvement inspections.

Total Unit Population: PSNH is responsible for trimming approximately 11,000 miles of overhead distribution line.

Maintenance Cycle: None.

Reliability Benefit: Prevent outages that may occur prior to the next maintenance cycle.

O&M Cost:

\$ Expended	Units	Cost Per Unit
\$290,000	N/A	N/A

MID CYCLE TRIMMING (BASE REP):

Program Description: Perform mid-cycle trimming in areas where vegetation problems develop between maintenance cycles.

Total Unit Population: PSNH is responsible for trimming approximately 11,000 miles of overhead distribution line. Vegetation problems develop between maintenance cycles in areas where tree growth is excessive and where owners have not given permission to trim to full clearance specification.

Maintenance Cycle: The current maintenance program does not identify areas that could benefit from trimming between cycles. The Reliability Enhancement Program will target a limited mid-cycle program of approximately 50 miles in 2010 and 100 miles annually thereafter.

Reliability Benefit: Mid-cycle inspections will identify areas of vegetation problems resulting from owner refusals for full clearance trimming. More frequent trimming in these problem areas will reduce “inside the zone” outages. The mid-cycle trimming was more extensive than original estimated and thus the cost per mile was higher than budgeted. Fewer miles were completed because budgeted funds were expended.

O&M Cost:

\$ Expended	Miles Trimmed	Cost Per Mile
\$573,707	104	\$5,516

INSPECT ALL CONTRACTOR WORK (BASE REP):

Program Description: Inspect 100% scheduled maintenance trimming to ensure that the contractor is trimming to specification within the bounds of owner permissions.

Total Unit Population: PSNH is responsible for trimming approximately 11,000 miles of overhead distribution line. Inspections will be made of 100% of the miles trimmed under the scheduled maintenance trimming program.

Inspection Cycle: The current maintenance program trims approximately 2,200 miles annually with an additional 300 miles trimmed annually under the Reliability Enhancement Program. The quality assurance program currently targets inspections on approximately 80% of the circuit miles. The Reliability Enhancement Program will target inspecting 100% of the circuit miles trimmed annually.

Reliability Benefit: Performing contractor inspections on 100% of the circuit miles trimmed will ensure that trimming specifications are being met and that no area is skipped or trimmed below standards which could cause “inside the zone” outages. Additionally, it will ensure that danger trees identified for removal have been addressed.

Results: 100% of the trimmed miles (2,561 miles including REP and non-REP)

O&M Cost: No expenditures are reported here because the cost for these inspections is included within the maintenance trimming budget.

REDUCE DISTRIBUTION RIGHTS-OF-WAY (ROW) MOWING CYCLE (BASE REP):

Program Description: Reduce the average maintenance mowing cycle of 34.5 kV rights-of-way to an average of 4 years. Vegetative growth is close to conductors at the end of the current 5 year maintenance cycle. Reducing the mowing cycle to 4 years will also identify hazard trees and potential problems in wetlands, buffers and backyards on a shortened schedule. This includes mowing the deck of the rights-of-way, removal of hazard trees outside the rights-of-way and manual cutting for buffers, wetlands and other sensitive areas. This will also bring the maintenance schedule of 34.5 kV right-of-ways more in line with the transmission mowing schedule of 3 to 4 years.

Total Unit Population: PSNH is responsible for mowing approximately 7,930 acres of 34.5 kV right-of-ways. Approximately 6,641 acres are in "distribution only" rights-of-way and approximately 1,289 acres in rights-of-way shared with transmission lines.

Inspection Cycle: ROW mowing averages 1,660 acres per year, which results in a four year cycle. The amount mowed each year varies; in 2012 it was approximately 1,000 acres and in 2013 2,100 acres are planned.

Reliability Benefit: Increasing the number of rights-of-way acres maintained annually will reduce the number of growing seasons between maintenance mowing cycles. This will result in less tree growth toward the conductors and more frequent inspections for hazard trees.

O&M Cost:

\$ Expended	Acres Mowed	Cost Per Acre
\$225,189	345	\$653

STORM DAMAGE PREMIUM (BASE REP):

Program Description: The extensive damage of the December 2008 ice storm has added to the cost of planned maintenance trimming. This item will offset that cost and allow maintenance trimming to remain on cycle. This item serves to increase the Vegetation Management Budget by \$500,000 for 2011 to \$1,668,731.

Total Unit Population: There are approximately 11,000 miles of overhead lines along the street.

Inspection Cycle: Less than 4.5 years

Reliability Benefit: Reduce the potential for outages by maintaining the maintenance trimming cycle.

O&M Cost: No funding for 2012 was provided. No funding for 2013 is provided.

TAKEDOWNS AND CYCLE IMPACT (REP II):

Program Description: Additional tree takedowns are required due to the recent December Storm. While post storm cleanup has eliminated immediate problems, damage to vegetation will continue to cause decay and disease. This program will attempt to target the hardest hit areas during the storm and proactively remove trees and limbs outside of the normal trim zone. The Cycle Impact will be utilized to trim additional miles to reduce the trimming cycle with the goal of less than 4.5 years. This item serves to increase the Vegetation Management Budget by \$ 300,000 for 2012. There is no funding for 2013.

Total Unit Population: Approximately 11,000 miles of overhead line along the street.

Inspection Cycle: 4.19 years

Reliability Benefit: Remove hazard trees and branches that resulted from the 2008 ice storm. Reduce the trimming cycle to less than 4.5 years.

O&M Cost: Included in "Hazard Tree Removal" and "Cycle Impact" items.

INSPECT & RECLAIM RIGHTS-OF-WAY (REP II):

Moved to Capital. See Section 5.2.

ETT MAINTENANCE TRIMMING (REP II):

Program Description: The specification and bid price for scheduled maintenance trimming is insufficient to meet ETT specifications. The program is to perform maintenance trimming to ETT specifications on lines that ETT has been performed and are on cycle for maintenance trimming.

Total Unit Population: Total of 573 miles through 2012. Approximately 70 miles is being added per year.

Inspection Cycle: Trimming cycle is identical to the maintenance trimming cycle of less than 4.5 years.

Reliability Benefit: ETT provides additional clearance to conductors resulting in fewer outages.

O&M Cost:

\$ Expended	Miles Completed	Cost Per Mile
\$603,133	113	\$5,337

SUBSTATION PERIMETER TRIMMING (REP II):

Program Description: The Substation Perimeter Trimming Project requires that trees and limbs be cleared away from the perimeter of substations to ensure that conductors and bus work are not contacted.

Total Unit Population: Total number of substations is estimated at 180.

Inspection Cycle: Single year only. The 2012 contract for maintenance trimming of circuits included all required substation perimeter trimming.

Reliability Benefit: Clearing of trees and branches away from the perimeter of substations will reduce outages.

O&M Cost: The cost of this program is imbedded in the Scheduled Maintenance Trimming budget for distribution circuits. The substation perimeter is addressed at the same time.

NATIONAL ELECTRICAL SAFETY CODE (NESC) – O&M

FULL CIRCUIT PATROL (BASE REP):

Program Description: Establish a full circuit patrol cycle for distribution lines to inspect for adherence to the National Electrical Safety Code including primary distribution lines, secondaries and services. Identify and log all issues requiring maintenance, additions or replacement, including animal protection, within a reasonable time period.

Total Unit Population: PSNH is responsible for approximately 11,000 circuit miles of distribution lines.

Maintenance Cycle: Initially, complete a full circuit patrol of the 11,000 miles in four years. Beyond the initial cycle, perform full circuit patrols on a cycle similar to vegetation management - scheduled maintenance trimming (SMT).

Reliability Benefit: Proactive identification of potential problems related to safety, grounding, clearance, attachments, asset maintenance and replacement.

Results: Most common repair items have been grounding guys, adding squirrel guards, and repairing clearance problems to communications equipment. Inspection of the entire 11,000 miles of distribution lines was completed in 2011. In 2012, 10% of the system was inspected to transition to a 10 year inspection cycle.

O&M Cost:

\$ Expended	Miles Completed	Cost Per Mile
\$ 53,624	1,106	\$48

INSPECT & REPAIR UNDERGROUND SYSTEMS (BASE REP):

Program Description: Establish an inspection cycle for underground systems to identify any issues and to install fault indicators – refer to next section on “Other Reliability – O&M – Install Fault Indicators”.

Total Unit Population: PSNH is responsible for approximately 2,142 underground development system maps in addition to underground facilities providing service from the company’s overhead system.

Maintenance Cycle: Initially, a complete cycle of the underground system maps will be completed in five years. Beyond the initial cycle, perform inspections on a five year cycle as specified in the NU Maintenance Manual (NUMM).

Results: Mostly minor repair items are identified and corrected at the time of inspection. Some of the other findings included ornamental shrubs planted in front of the doors, minor rusting of the cabinets, and updates needed to the URD maps. PSNH uses its own crews to perform these inspections. .

Reliability Benefit: Potential problems related to transformer assets are identified proactively.

O&M Cost:

\$ Expended	Maps Completed	Cost Per Map
\$471,592	975	\$484

INSPECT MANHOLES (BASE REP):

Program Description: Establish a cycle program to inspect manholes. A rating is given to each manhole to indicate the structural condition. A program has been established to replace the structurally deficient manholes.

Total Unit Population: PSNH has approximately 634 manholes.

Maintenance Cycle: Inspect on a cycle not to exceed five years per NU Maintenance Manual, except those requiring inspection more frequently.

Reliability Benefit: National Electrical Safety Code (NESC) requires facilities to be inspected on a periodic basis. Expected reliability benefits are proactively correcting structural problems and repairing cable and switch equipment prior to failure.

Results: 417 manholes had been inspected since July, 2007, and 3 were re-inspected. 57 were inspected in 2012. Approximately 160 remain to be inspected and are planned to be done in 2013.

O&M Cost: (Note 1) Cost is included in Underground System Inspection cost.

\$ Expended	Manholes Inspected	Cost Per Manhole
N/A (1)	57	N/A

SUBSTATION GROUNDING (BASE REP):

Program Description: Test substation ground grids up to two nodes distant from infrastructure capacity additions. Populate a computer software program (WinIGS) with the model of each PSNH substation ground grid. These models will be utilized to test the adequacy of each substation's grid.

Total Unit Population: Approximately 195 locations.

Maintenance Cycle: Once the population of all substations is in the computer program is complete, the update of computer models for new substation additions or major upgrades shall be included in the project scope.

Method: The process includes visiting and testing yards, using WinIGS software for geometric ground grid modeling, network analysis grid modeling and developing conceptual remedial grid improvements.

Reliability Benefit: This will ensure personnel safety as identified in the rate case. It may benefit reliability if insufficient grounding is found and corrected. Insufficient grounding may affect the proper operation of the system.

Results: Approximately 75% of the substation yard ground grids were found to exceed maximum allowable touch potential. 12% of the substation yards analyzed required no improvements, 37% required minor upgrades, and 51% required ground grid upgrades. Upgrading substation grounding as required will be performed as part of non-REP work prioritized based upon the findings. Testing of substation grounds was completed in 2011; no work was done in 2012.

O&M Cost:

\$ Expended	Substations Analyzed	Cost Per Substation
\$ 0	0	N/A

POLE INSPECT AND TREAT (BASE REP):

Program Description: Establish a long-term preventive maintenance cycle for roadside distribution poles to inspect, treat, reinforce or replace decayed or damaged poles to ensure reliable and safe use of this asset.

Total Unit Population: PSNH is responsible for 240,000 poles to inspect and treat. PSNH performs pole inspect and treatment in PSNH set areas only.

Maintenance Cycle: 10 years at 24,000 poles annually to inspect and treat (240,000 divided by 10).

Reliability Benefit: Reliable performance and safety of poles in high winds, heavy wet snow, pole accidents or other events that cause undue stress in addition to normal service of this asset.

Results: Inspection performed in 2012 found that approximately 1.1% of the poles required either reinforcement or replacement.

O&M Cost:

\$ Expended	# Poles Inspected	Cost Per Pole
\$660,665	24,008	\$28

OVERHEAD REPAIR ACTIVITY (BASE REP):

Program Description: Complete O&M maintenance orders generated from National Electrical Safety Code (NESC) inspection including work associated with animal guards.

Total Unit Population: Dependent on program inspection results.

Maintenance Cycle: Complete maintenance orders within a reasonable period of time from initial identification.

Reliability Benefit: Proactive identification of potential problems related to safety, grounding, clearance, attachments, asset maintenance and replacement.

Results: Approximately 58% of the O&M repair orders have been completed.

O&M Cost:

\$ Expended	# Repair Orders Completed	Cost Per Repair Order
\$2,960,461	25,358	\$117

FOOT PATROL RIGHT-OF-WAY (BASE REP):

Program Description: Inspect from the ground the 841 miles of overhead line in ROW. Identify for correction all NESC code violations and reliability issues.

Total Unit Population: 841 miles

Maintenance Cycle: Based upon the results of the foot patrol, future inspections may be performed by helicopter.

Reliability Benefit: Identify for correction items that may cause an outage or an NESC violation.

Results: The annual aerial patrol of lines in ROW was completed. Foot patrol of lines in ROW was performed in conjunction with the field work associated with Inspect and Reclaim Rights of Way. 293 miles have been completed; the remaining 548 miles are expected to be completed in 2013. .

O&M Cost:

\$ Expended	Miles Patrolled	Cost Per Mile
\$ 17,210	149	\$116

OTHER RELIABILITY – O&M

SUBSTATION ANIMAL PROTECTION (BASE REP):

Program Description: Install animal protection systems in distribution substations, preventing intrusions that cause a variety of problems and faults, which can result in power outages, reduced equipment life, or severely damaged equipment.

Total Unit Population: 181 substations to complete.

Maintenance Cycle: Based on major pieces of equipment in a substation yard and the associated maintenance frequency. 10 years for substations with transformers. 12 years for switching only substations with circuit breakers.

Reliability Benefit: Reliable performance of substations due to the blockage of wildlife entry into high voltage areas. This could equate to a 3 minute reduction in the System Average Interruption Duration Index (SAIDI) based on historical experience.

Results: Animal protection was completed in 2011, no work was done in 2012, no work is planned for 2013..

O&M Cost:

\$ Expended	Substations Completed	Cost Per Substation
\$0	0	N/A

OVERHEAD LINE SWITCH MAINTENANCE (BASE REP):

Program Description: Establish program to maintain and exercise overhead switches to ensure reliable operation when needed. Bypass switching will be installed as needed to facilitate this program going forward.

Total Unit Population: PSNH has approximately 775 switches to be included in this program.

Maintenance Cycle: NUMM specifies a six year maintenance cycle.

Reliability Benefit: Proactive identification of potential problems related to switching. Maintenance will minimize failure of the switch to operate when called on.

Results: The initial maintenance of switches was completed in 2011. The six year cycle requires approximately 129 switches be maintained per year,

O&M Cost:

\$ Expended	Switches Maintained	Cost Per Switch
\$195,818	129	\$1,518

OVERHEAD RECLOSER MAINTENANCE (BASE REP):

Program Description: Reclosers are scheduled to be maintained on a time and fault operation based frequency. .

Total Unit Population: PSNH has 1701 reclosers installed.

Maintenance Cycle: Starting in 2013, NUMM specifies 12 years for oil type reclosers and 200 fault operations for reclosers with contacts in vacuum.

Reliability Benefit: Improved reliability due to improved operational performance of equipment.

Results: PSNH is now back on prescribed maintenance cycle.

O&M Cost:

\$ Expended	Reclosers Maintained	Cost Per Recloser
\$273,078	148	\$1,845

INSTALL FAULT INDICATORS (BASE REP):

Program Description: Install fault indicators on equipment and at locations which will facilitate identifying the locations of faults on the distribution system. On the underground system, they will be installed at transformers and sector cabinets on outgoing primary cables. Refer to previous section “NESC – O&M – Inspect & Repair Underground Systems.” On the overhead system, locations will be determined by the Circuit Owners during trouble report, top 50 worst circuits, three or more outages, and 200 or more customers out analyses. Installation will reduce the outage duration.

Total Unit Population: Underground - 1:1 ratio with single phase padmount transformers, overhead to be determined.

Maintenance Cycle: Battery life is in excess of 20 years. Fault indicators will be replaced before the end of its useful life. Underground replacement will be performed during underground inspections, within an appropriate timeframe. Overhead fault indicator locations will be entered into CASCADE maintenance data base with an appropriate trigger for replacement.

Reliability Benefit: Expedited recognition of faults locations in the underground and overhead systems.

Results: Equipped PSNH underground system with fault indicators. Fault indicators are installed in conjunction with the underground systems inspection item. Because fewer underground systems were inspected than planned, fewer fault indicators were required.

O&M Cost:

\$ Expended	Fault Indicators Installed	Cost Per F.I. Installed
\$269,346	1,738	\$155

TEST & REPAIR DIRECT BURIED UNJACKETED CABLE - CONCENTRIC NEUTRALS (BASE REP):

Program Description: Testing of direct buried unjacketed cable concentric neutral to determine if there is a sufficient neutral path. Determine if the underground system cable is a candidate for cable rejuvenation.

Total Unit Population: PSNH has approximately 2,000,000 feet or 5,764 runs of direct buried cable. Not all direct buried cable is a candidate for rejuvenation. Cable which is not a candidate for rejuvenation will not be tested.

Maintenance Cycle: Once.

Reliability Benefit: Replacement or rejuvenation of direct buried cable will save outages to customers by preventing faults on the cable.

Results: The failure rate (no neutral remaining) was less in 2012 than previous years, most probably as a result of testing in newer developments.

O&M Cost:

\$ Expended	# Runs Completed	Cost Per Run
\$157,756	151	\$1,045

CASCADE DATABASE FIELD SURVEY AND ENTRY (REP II):

Program Description: The CASCADE Database Field Survey requires infield survey of key equipment in substations and on distribution lines. The information about these components, manufacturer, size, rating, model, date of manufacture, location, and other items will be recorded in the CASCADE Database which is used to plan and execute maintenance and perform analyses for vintage and product problem mitigation. At the same time, these key pieces of equipment will be compared to the operating drawings used for switching and tagging, and to property records for asset accuracy. It is anticipated that many of these components will require qualified electrical workers to disconnect or work within energized areas to obtain this information. Database entry and updates, map and drawing updates and property record updates will also be required.

Reliability Benefit: Provide accurate records to assure proper execution of the Northeast Utilities Maintenance Manual (NUMM). Provide a firm basis for the operating characteristics of key components in the electric system that will be used by a GIS or other network models. Capture basic GPS coordinate information.

Results: One vendor was utilized for part of the year to update Cascade. No work for this item is intended for 2013.

O&M Cost: \$32,921

GEOSPACIAL INFORMATION SYSTEM (GIS) O&M PORTION OF CAPITAL (REP II):

Program Description: This item represents the O&M portion (allocation) from Capital work related to the GIS project at PSNH.

Results: Significant effort and time has been dedicated to selecting the appropriate vendor and coordinating the overall installation within the NU organization. The O&M component of GIS in 2012 was primarily training.

Two reports were provided to the PUC in 2012:
6/28/12 - Semi-Annual report to the Public Utilities Commission detailing completion of the Enterprise architecture and conversion progress.
12/11/12 - Semi-Annual report to the Public Utilities Commission detailing the conversion of seven geographic areas in 2012.

O&M Cost: \$36,345

DAMAGE ASSESSMENT PILOT (REP II):

Program Description: This item is a pilot to review the potential use of mobile damage assessment devices that can allow real time data collection and mapping to GIS during storm situations.

Results: In 2012 reviewed the potential use of mobile damage assessment using ArgGIS from ESRI. This included various devices – laptops, smart phones and tablets.

Reliability Benefit: Mapping directly to GIS will allow more timely assessment of damage and restoration of service to customers.

O&M Cost: \$12,691

O&M PORTION OF CAPITAL (REP II):

Program Description: This represents the O&M portion (allocation) from Capital work related to the Reliability Enhancement Program.

Results: The O&M portion of REP II capital projects averaged 3.47% in 2012.

O&M Cost: \$603,787

Section 2

2012 O&M VEGM Programs



Public Service
of New Hampshire
The Northeast Utilities System

**RELIABILITY ENHANCEMENT PROGRAM -
VEGETATION MANAGEMENT (O&M)**



2012 PLAN AND PROGRESS

<u>PROGRAMS:</u>	<u>PAGE</u>
PLAN & PROGRESS SUMMARY	1
PROGRAM GRAPH - COST	2
PROGRAM GRAPH - UNITS COMPLETED	4

Year End 2012 Summary of PSNH Reliability Enhancement Program – O&M
Docket No. DE 09-035

Jan 1 2012 - Dec 31 2012

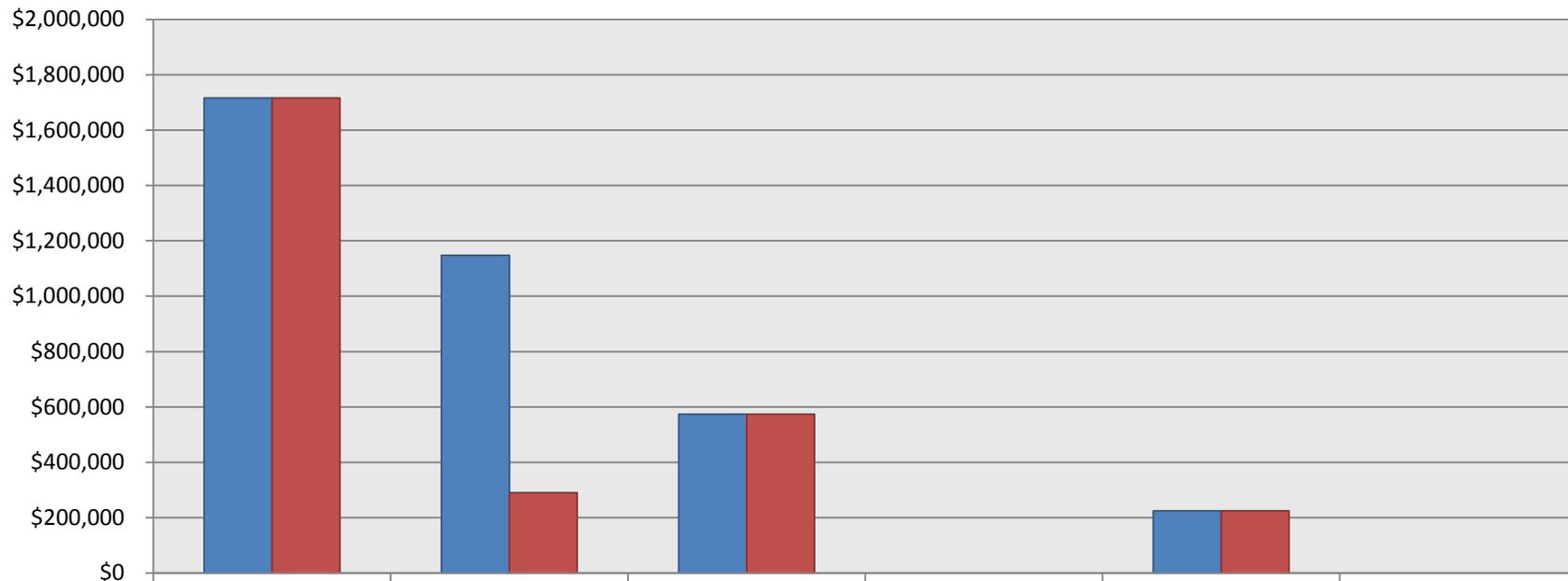
REP #	TRIMRC - VEGETATION MANAGEMENT (O&M)								
	Units	\$ Planned	\$ Expended	\$ Variance	Units Planned	Units Completed	Units Variance	Cost Per Unit	
1	Reduce Scheduled Maintenance Trim Cycle	# Miles	\$1,715,480	\$1,715,480	\$0	429	429	0	\$3,999
1	Hot Spot Trimming	N/A	\$1,147,414	\$290,000	(\$857,414)	3,520	N/A	N/A	N/A
1	Mid Cycle Trimming	# Miles	\$573,707	\$573,707	\$0	104	104	0	\$5,516
1	Inspect Contractor	# Miles	N/A (1)	N/A (1)	N/A	2,520	2,500	(20)	N/A
1	Reduce Distribution Rights-of-Way Cycle	# Acres	\$225,189	\$225,189	\$0	345	345	0	\$653
1	Storm Damage Premium	N/A	\$0	\$0	\$0	0	0	0	\$0
	Subtotal - Base REP		\$3,661,790	\$2,804,376	(\$857,414)	6,918	3,378	(20)	
2	Takedowns	N/A	\$0	N/A (1)	N/A	0	N/A (1)	N/A	N/A
2	Cycle Impact	N/A	\$0	N/A (1)	N/A	0	N/A (1)	N/A	N/A
2	ETT Maintenance Trimming	# Miles	\$722,428	\$603,133	(\$119,295)	107	113	6	\$5,337
2	S/S Perimeter Trimming	# Substations	N/A (1)	N/A (1)	N/A	N/A (1)	N/A (1)	N/A	N/A
	Subtotal - REP II		\$722,428	\$603,133	(\$119,295)	107	113	6	
	TOTAL NESCR		\$4,384,218	\$3,407,509	(\$976,709)	7,025	3,491	(14)	

(1) Data is imbedded in another category as specified in O&M Briefing Sections.

TRIMRC - VEGETATION MANAGEMENT (O&M)



Cost - Base REP

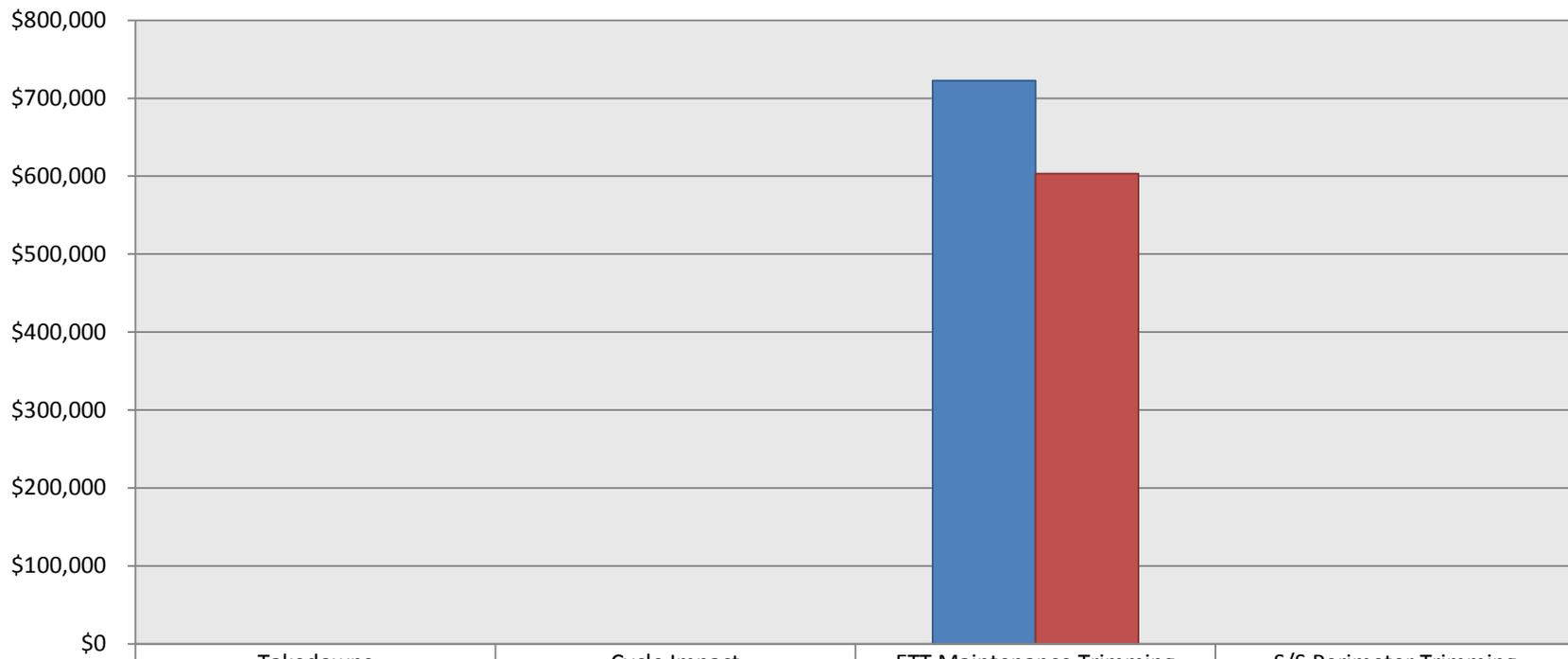


	Reduce Scheduled Maintenance Trim Cycle	Hot Spot Trimming	Mid Cycle Trimming	Inspect Contractor	Reduce Distribution Rights-of-Way Cycle	Storm Damage Premium
Planned	\$1,715,480	\$1,147,414	\$573,707	\$0	\$225,189	\$0
Expended	\$1,715,480	\$290,000	\$573,707	\$0	\$225,189	\$0

TRIMRC - VEGETATION MANAGEMENT (O&M)



Cost - REP II

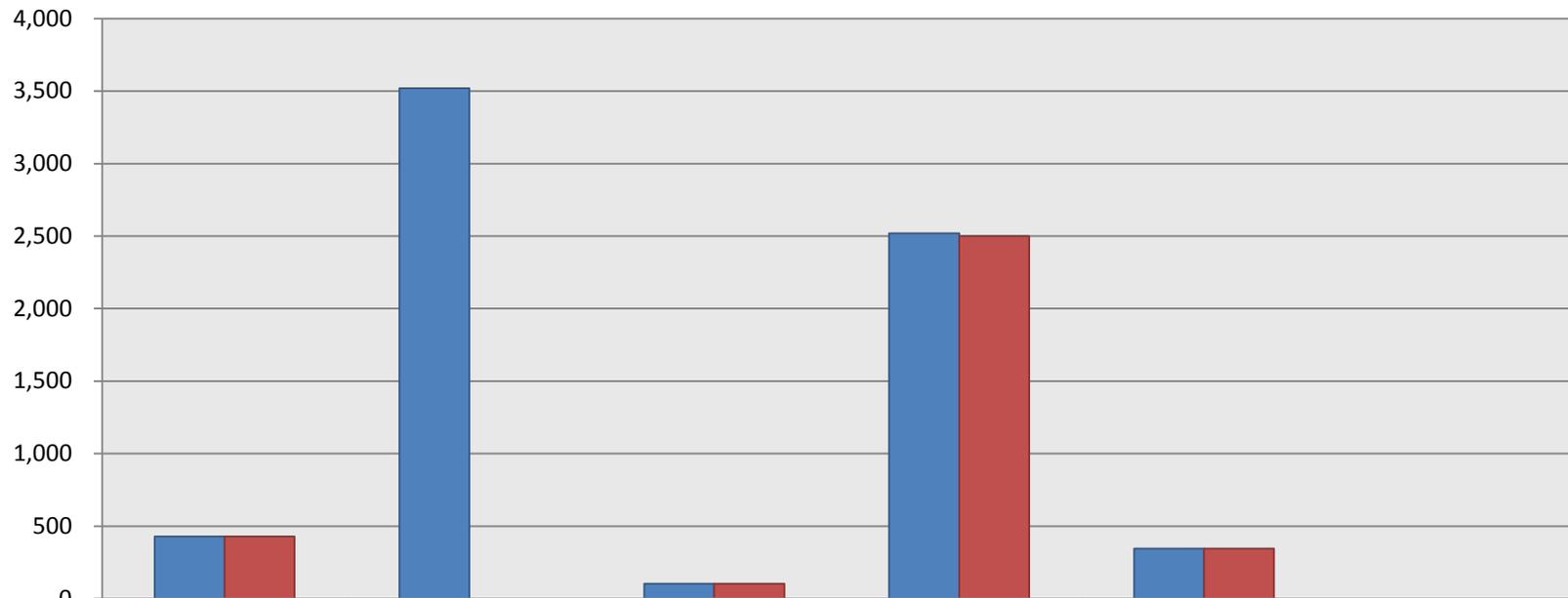


	Takedowns	Cycle Impact	ETT Maintenance Trimming	S/S Perimeter Trimming
Planned	\$0	\$0	\$722,428	\$0
Expended	\$0	\$0	\$603,133	\$0

TRIMRC - VEGETATION MANAGEMENT (O&M)



Units Completed - Base REP

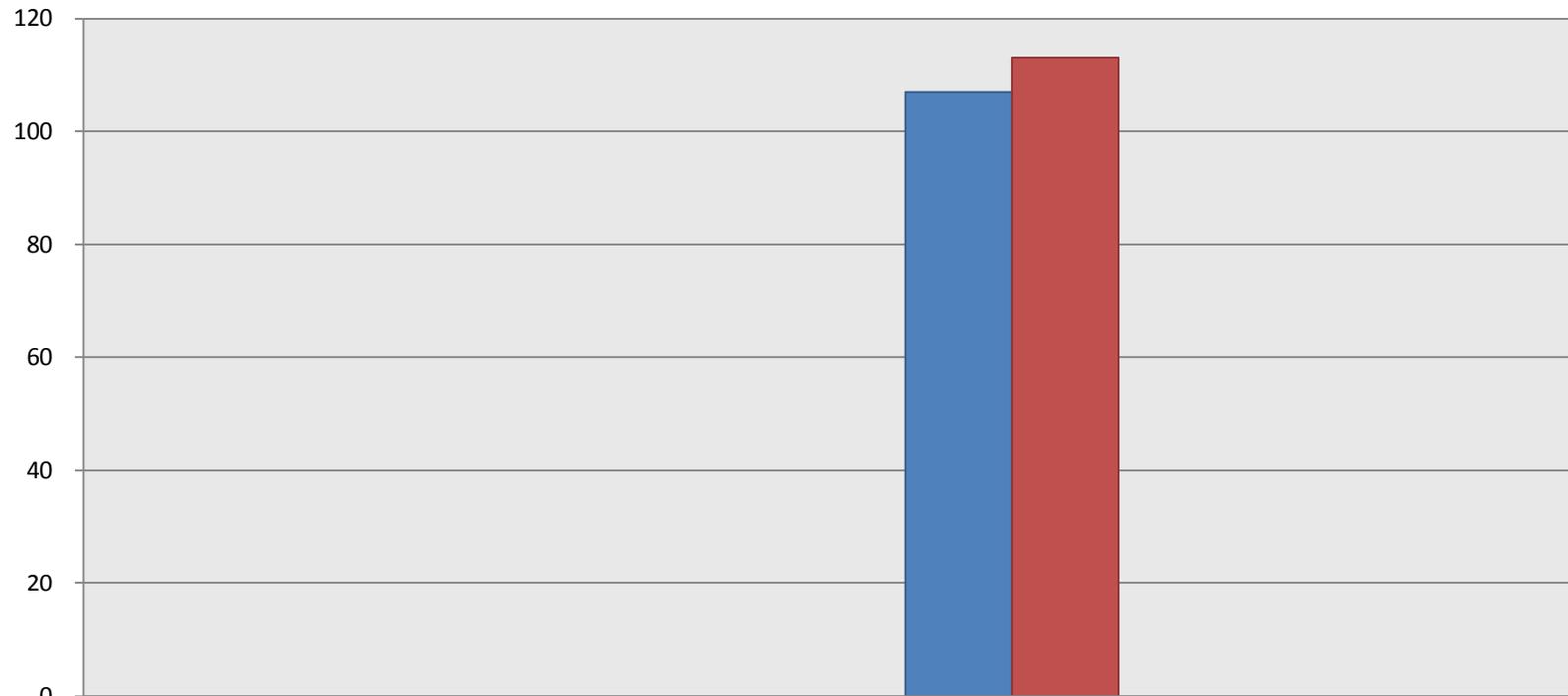


	Reduce Scheduled Maintenance Trim Cycle	Hot Spot Trimming	Mid Cycle Trimming	Inspect Contractor	Reduce Distribution Rights-of-Way Cycle	Storm Damage Premium
Planned	429	3,520	104	2,520	345	0
Completed	429	0	104	2,500	345	0

TRIMRC - VEGETATION MANAGEMENT (O&M)



Units Completed - REP II



Planned

Completed

Takedowns

Cycle Impact

ETT Maintenance Trimming

S/S Perimeter Trimming

0

0

107

0

0

0

113

0

Section 3

2012 O&M NESC Programs



Public Service
of New Hampshire
The Northeast Utilities System

**RELIABILITY ENHANCEMENT PROGRAM -
NATIONAL ELECTRICAL SAFETY CODE**



2012 PLAN AND PROGRESS

<u>PROGRAMS:</u>	<u>PAGE</u>
PLAN & PROGRESS SUMMARY	1
PROGRAM GRAPH - COST	2
PROGRAM GRAPH - UNITS COMPLETED	3

Year End 2012 Summary of PSNH Reliability Enhancement Program – O&M
Docket No. DE 09-035

Jan 1 2012 - Dec 31 2012

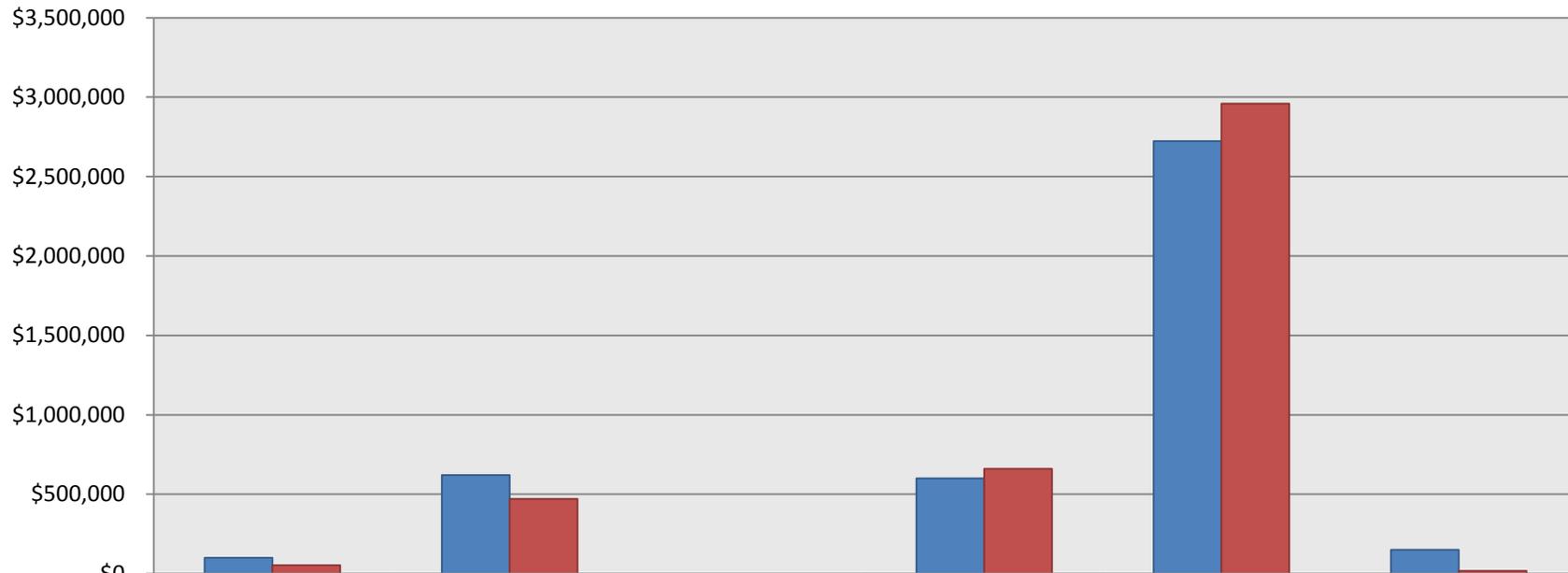
NESCR - National Electrical Safety Code (O&M)									
REP #		Units	\$ Planned	\$ Expended	\$ Variance	Units Planned	Units Completed	Units Variance	Cost Per Unit
1	Full Circuit Patrol	# Miles	\$100,000	\$53,624	(\$46,376)	1,085	1,106	21	\$48
1	Inspect and Repair Underground Systems	# Underground Maps	\$620,000	\$471,592	(\$148,408)	540	975	435	\$484
1	Inspect Manholes	# Manholes	N/A (1)	N/A (1)	N/A	32	57	25	N/A
1	Pole Inspection and Treatment	# Poles	\$600,000	\$660,665	\$60,665	24,000	24,008	8	\$28
1	Overhead Repair Activity	# Repair Orders	\$2,723,204	\$2,960,461	\$237,257	23,326	25,358	2032	\$117
1	Foot Patrol ROW	# Miles	\$150,000	\$17,210	(\$132,790)	841	149	(692)	\$116
	Subtotal - Base REP		\$4,193,204	\$4,163,552	(\$29,652)	49,824	51,653	1,829	
	Subtotal - REP II		\$0	\$0	\$0	0	0	0	
	TOTAL NESCR		\$4,193,204	\$4,163,552	(\$29,652)	49,824	51,653	1,829	

(1) Data is imbedded in another category as specified in O&M Briefing Sections.

NESCRC - National Electrical Safety Code (O&M)



Cost

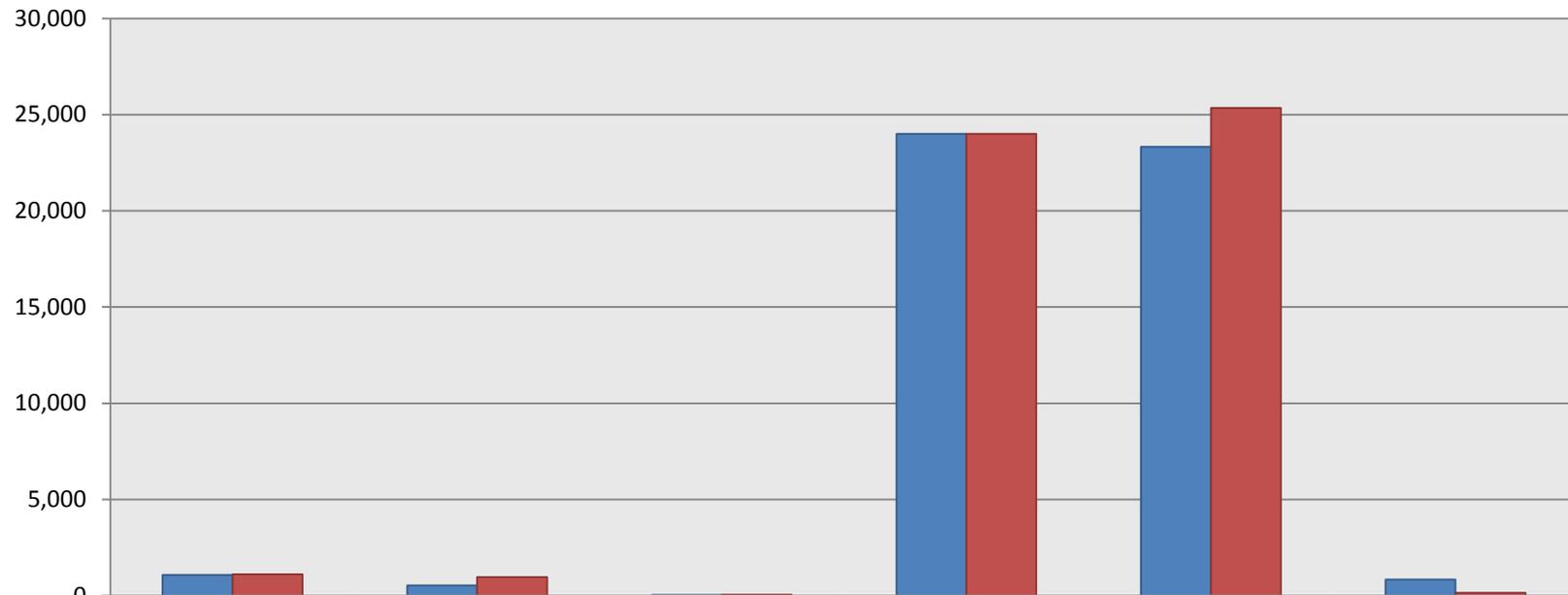


	Full Circuit Patrol	Inspect and Repair Underground Systems	Inspect Manholes	Pole Inspection and Treatment	Overhead Repair Activity	Foot Patrol ROW
Planned	\$100,000	\$620,000	\$0	\$600,000	\$2,723,204	\$150,000
Expended	\$53,624	\$471,592	\$0	\$660,665	\$2,960,461	\$17,210

NESCRC - National Electrical Safety Code (O&M)



Units Completed



Planned	1,085	540	32	24,000	23,326	841
Completed	1,106	975	57	24,008	25,358	149

Section 4

2012 Other Reliability Programs



Public Service
of New Hampshire
The Northeast Utilities System

RELIABILITY ENHANCEMENT PROGRAM - RELIABILITY (O&M)



2012 PLAN AND PROGRESS

<u>PROGRAMS:</u>	<u>PAGE</u>
PLAN & PROGRESS SUMMARY	1
PROGRAM GRAPH - COST	2
PROGRAM GRAPH - UNITS COMPLETED	4

Year End 2012 Summary of PSNH Reliability Enhancement Program – O&M
Docket No. DE 09-035

Jan 1 2012 - Dec 31 2012

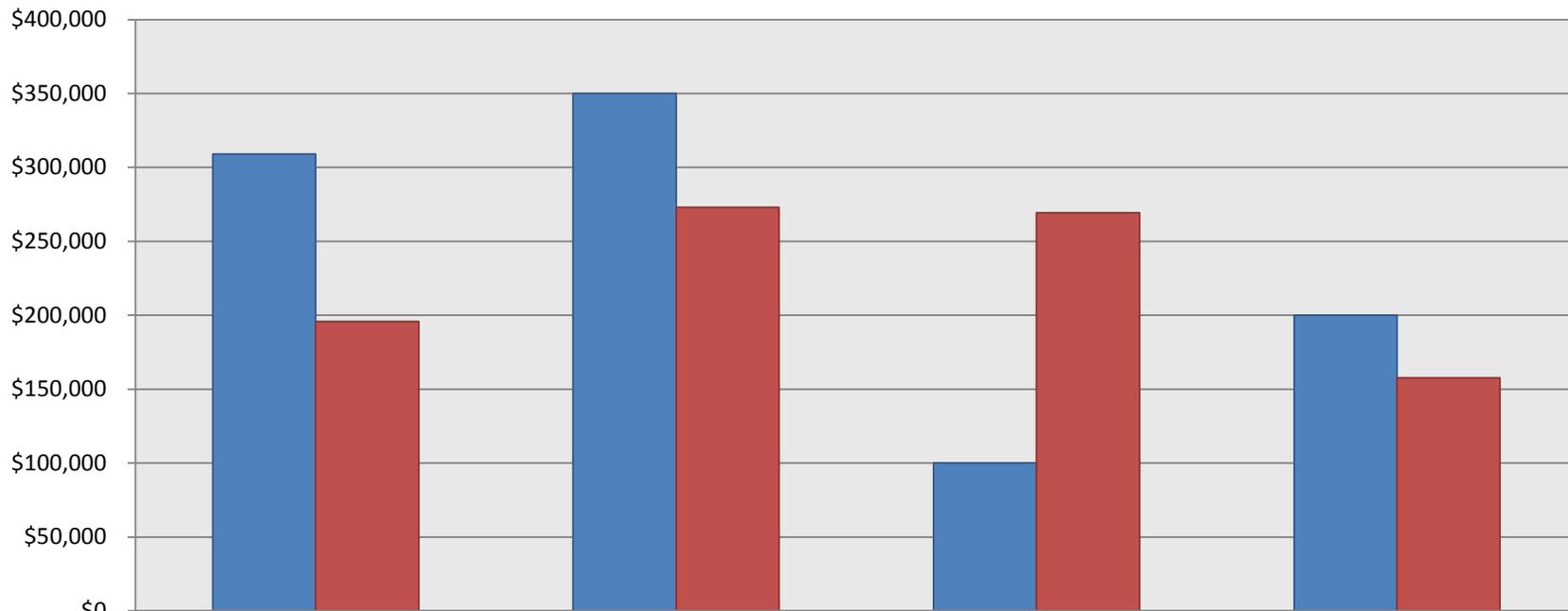
REP #	RELIOM - RELIABILITY (O&M)								
	Units	\$ Planned	\$ Expended	\$ Variance	Units Planned	Units Completed	Units Variance	Cost Per Unit	
1	Overhead Switch Maintenance	# Switches	\$309,000	\$195,818	(\$113,182)	75	129	54	\$1,518
1	Recloser Maintenance	# Recloser Orders	\$350,000	\$273,078	(\$76,922)	182	148	(34)	\$1,845
1	Fault Indicators	# Fault Indicators	\$100,000	\$269,346	\$169,346	645	1,738	1093	\$155
1	Test & Repair Direct Buried Unjacketed Cable	# Runs	\$200,000	\$157,756	(\$42,244)	188	151	(37)	\$1,045
	Subtotal - Base REP		\$959,000	\$895,998	(\$63,002)	1,090	2,166	1,076	
2	Cascade Entry	Entry	\$75,000	\$32,921	(\$42,079)	N/A	N/A	N/A	N/A
2	GIS O&M	N/A	\$100,000	\$36,345	(\$63,655)	N/A	N/A	N/A	N/A
2	Damage Assessment Pilot	N/A	\$75,000	\$12,691	(\$62,309)	N/A	N/A	N/A	N/A
2	O&M Portion of Capital	N/A	\$560,000	\$603,787	\$43,787	N/A	N/A	N/A	N/A
	Subtotal - REP II		\$810,000	\$685,744	(\$124,256)	0	0	0	
	TOTAL NESCR		\$1,769,000	\$1,581,742	(\$187,258)	1,090	2,166	1,076	

(1) Data is imbedded in another category as specified in O&M Briefing Sections.

RELIOM - RELIABILITY (O&M)



Cost - Base REP

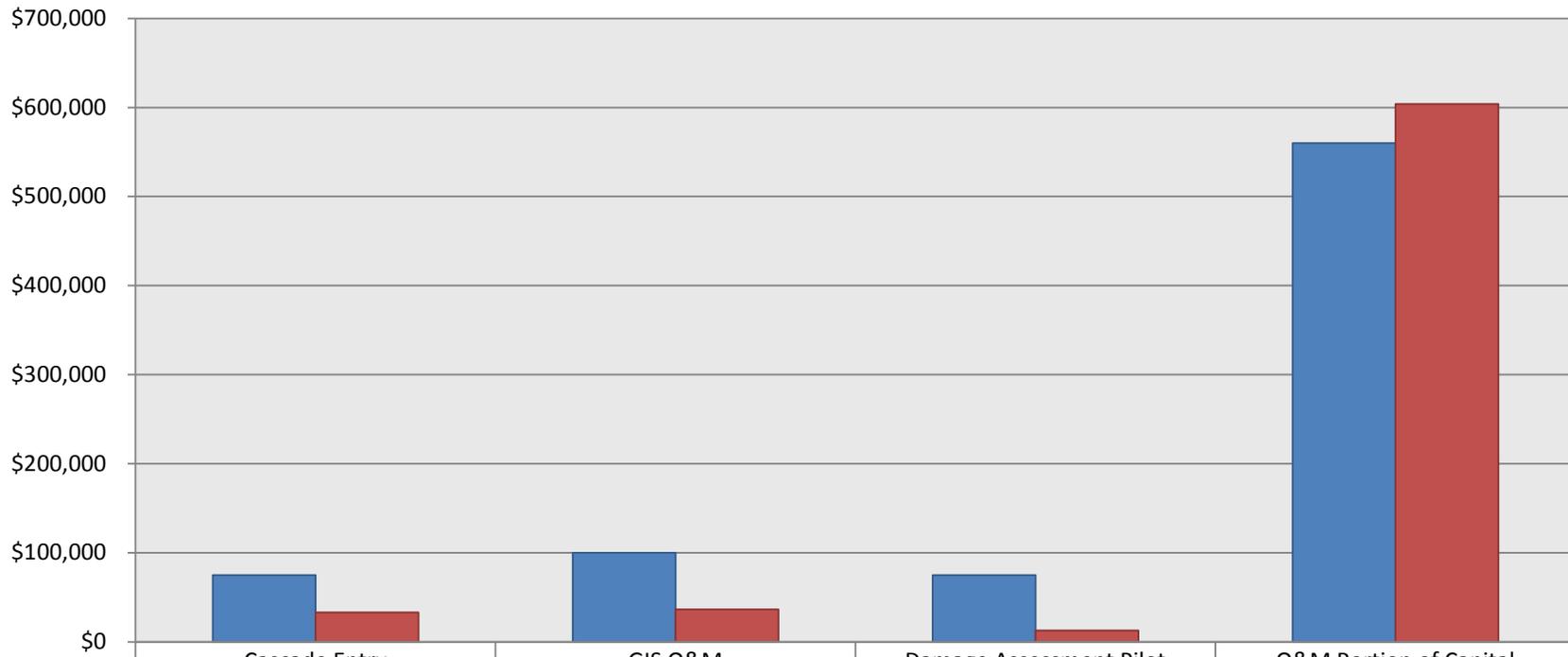


	Overhead Switch Maintenance	Recloser Maintenance	Fault Indicators	Test & Repair Direct Buried Unjacketed Cable
Planned	\$309,000	\$350,000	\$100,000	\$200,000
Expended	\$195,818	\$273,078	\$269,346	\$157,756



RELIOM - RELIABILITY (O&M)

Cost - REP II

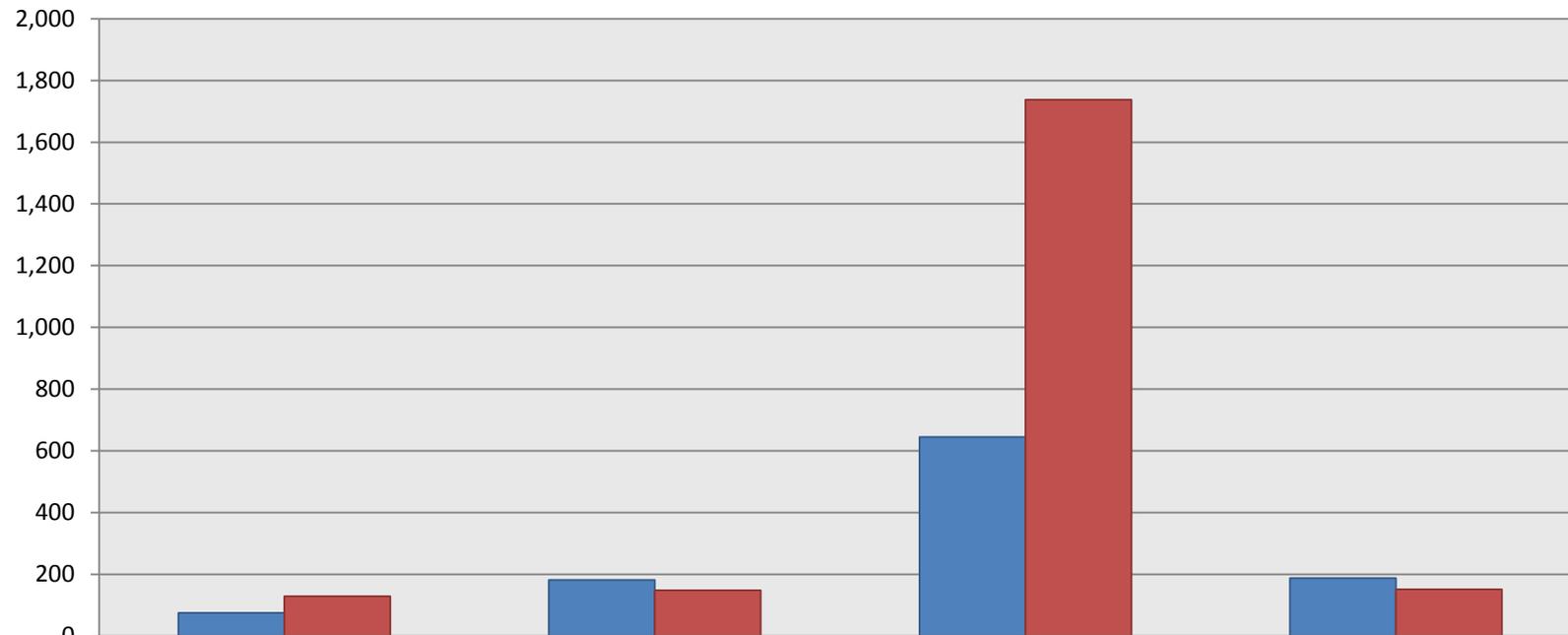


■ Planned	\$75,000	\$100,000	\$75,000	\$560,000
■ Expended	\$32,921	\$36,345	\$12,691	\$603,787



RELKOM - RELIABILITY (O&M)

Units Completed - Base REP



Planned	75	182	645	188
Completed	129	148	1,738	151

Section 5

2012 Capital Summary



CAPITAL - REP II

	\$ PLAN	\$ ACTUAL	\$ VARIANCE
Distribution Line Porcelain Changeout	\$1,194,100	\$873,200	(\$320,900)
34.5kV Substation Breaker Replacement	\$0	\$346,100	\$346,100
Enhanced Tree Trimming	\$2,090,100	\$2,778,800	\$688,700
Pole Top DSCADA Replacement	\$523,000	\$276,600	(\$246,400)
Substation RTU Replacement	\$340,200	\$245,000	(\$95,200)
Enable SCADA to Windsor Backup	\$0	\$16,100	\$16,100
Distrib. Line Wire Upgrade/Eliminate Narrow ROW	\$300,100	\$258,200	(\$41,900)
Reliability Improvements Annual (Ongoing)	\$500,000	\$805,800	\$305,800
GIS Capital Project	\$4,999,900	\$3,482,300	(\$1,517,600)
Hazard Tree Removal (new)		\$1,207,600	\$1,207,600
Inspect/Reclaim ROWs (new)		\$1,914,900	\$1,914,900
	\$9,947,400	\$12,204,600	\$2,257,200

CAPITAL - DUE TO BASE REP

	\$ PLAN	\$ ACTUAL	\$ VARIANCE
Reject Pole Replacement	\$1,330,100	\$700,100	(\$630,000)
Pole Reinforcement	\$50,100	\$7,400	(\$42,700)
NESC Capital Work	\$530,100	\$1,921,800	\$1,391,700
Airbreak Switch Replacement	\$100,100	\$559,600	\$459,500
Direct Buried Cable Replacement	\$900,000	\$1,153,000	\$253,000
Direct Buried Cable Injection	\$355,000	\$1,038,600	\$683,600
	\$3,265,400	\$5,380,500	\$2,115,100

TOTAL REP CAPITAL	\$13,212,800	\$17,585,100	\$4,372,300
--------------------------	---------------------	---------------------	--------------------

CAPITAL – REP II

DISTRIBUTION LINE PORCELAIN PRODUCT CHANGEOUT (REP II):

Program Description: This targeted capital project, addressing safety and reliability, is a proactive program aimed at eliminating distribution line porcelain equipment with a known impact on the System Average Interruption Duration Index (SAIDI).
 The specific goal is to replace all designated porcelain equipment with polymer in ten years. The program will specifically replace porcelain 4 ¼” disc insulators, cutouts, non-transformer lightning arrestors, and solid core in-line disconnect switches with new polymer equipment.

Total Unit Population: Estimate of 150,000 porcelain units to change out. PSNH has 11,000 miles of line so this equates to 13.6 pieces of porcelain per mile on average.

Maintenance Cycle: Complete in 10 years.
 150,000 pieces of porcelain divided by 10 years equals 15,000 units per year.

Reliability Benefit: Reduced failure of this product.

Results: An estimated 1,927 porcelain cutouts, insulators, lightning arrestors and in-line disconnect were replaced with polymer units in 2012. Failures of polymer insulators and cutouts have been very low.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$1,194,100	\$873,200	(\$320,900)

34.5 KV SUBSTATION BREAKER REPLACEMENT (REP II):

Program Description: This program addresses the replacement of existing substation 34.5 kV breakers which are old, problematic repair or operation, unique or no longer supported by vendors for parts and repair material. There are 251- 34.5 kV breakers on the system of various manufacturers, models, types and vintage.

Total Unit Population: 251- 34.5 kV breakers (replace 2 breakers first program year)

Maintenance Cycle: Breakers are maintained at the time the substation is maintained, on a 10 year cycle.

Reliability Benefit: Reduce failure to operate of breakers. Reduce maintenance costs.

Results: One breaker was replaced in 2012 as part of REP and an additional ten were replaced as part of non REP projects.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$0	\$346,100	\$346,100

ENHANCED TREE TRIMMING (ETT) (REP II):

Program Description: Trim main lines for reliability using an enhanced tree trimming (ETT) specification to create ground to sky clearance versus the smaller maintenance trim zone.

Expanded clearance is obtained by performing greater off zone takedowns and clearing and higher than normal vertical clearing. Approximately 11,000 miles of overhead line exists with the project targeted up to 50 miles per year on circuits with highest tree related reliability (top 50 list).

Total Unit Population: PSNH is responsible for trimming approximately 11,000 miles of overhead distribution line. A portion of these miles are candidates for ETT to improve reliability on main lines.

Reliability Benefit: Increasing the trim zone at targeted main line locations significantly reduces the risk of tree outages associated with significant SAIDI (customer) impact.

Results: In 2012, 58 miles of ETT was performed.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$2,090,100	\$2,778,800	\$688,700

POLE TOP DSCADA REPLACEMENT (REP II):

Program Description: Replace obsolete remote terminal units (RTUs) at the same time the radios are upgraded to 220 MHz.

Total Unit Population: 135 total unit population. Replace at approximately 20 per year.

Reliability Benefit: Existing RTUs have reliability issues and parts are no longer available for repair. Additionally, the existing hardware at the Electric System Control Center (ESCC) will not accept the installation of any additional units in the field. New RTUs provide advanced technology e.g. time stamped events, line readings, and connection of multiple devices with different communication protocols.

Results: Five sites with obsolete RTU's were upgraded during 2012. Additional RTUs and other DSCADA devices were installed as part of Smart Grid and other reliability driven projects.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$523,000	\$276,600	(\$246,400)

SUBSTATION RTU REPLACEMENT (REP II):

Program Description: This project is to replace the remaining estimated 15 of 23 older Remote Terminal Units at various substations. Older units are not supported by vendors for repair and utilize single REDAC 70 communication protocol. New RTUs provide time stamp, line reading data, and connection to devices with different communication protocols.

Total Unit Population: 15 of 23 older Remote Terminal Units (replace 3 first program year)

Maintenance Cycle: Substation RTUs normally are repaired or replaced when they fail to operate.

Reliability Benefit: Fewer failures to communicate with substation SCADA controlled devices.

Results: In 2012, 3 obsolete substation RTUs were upgraded. There are 6 remaining; 3 will be replaced as part of substation upgrades, leaving 3 to be done as part of this REP project.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$340,200	\$245,000	\$95,200

ENABLE SCADA TO WINDSOR BACKUP (REP II):

Program Description: Connect existing remote terminal units (RTUs) to the backup computer server in Windsor, CT. Supervisory Control and Data Acquisition (SCADA) refers to a centralized control system to perform automated activities through RTUs.

Total Unit Population: 33 total unit population.

Reliability Benefit: In the event of a computer server failure at the Electric System Control Center in Manchester NH, all RTUs will be able to be accessed via the backup server at Windsor CT providing redundant/reliable operations. This also meets NERC and ISO requirements.

Results: No sites were completed in 2012. One remaining site was completed in January, 2013. The 3 remaining sites are waiting for cables to be installed to complete the installation.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$0	\$16,100	\$16,100

DISTRIBUTION LINE WIRE UPGRADE/ELIMINATE NARROW RIGHT-OF-WAY (REP II):

Program Description: Replace #6 and #4 copper conductor in locations where it is susceptible to burn down by tree limbs. Primary locations are in rural areas of the western part of the company - Peterborough, New Ipswich, Rindge, Jaffrey, Dublin, but may be in other areas. Bring overhead lines out onto the street. These lines are currently located in narrow rights-of-way which are difficult to patrol and repair and expensive to maintain.

Total Unit Population: Unknown.

Reliability Benefit: Reduce repair time by replacing small copper conductor that burns down and relocating lines out of narrow inaccessible ROWs.

Results: Three projects were completed in 2012, one was substantially worked on which was completed in January, 2013.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$300,100	\$258,200	(\$41,900)

RELIABILITY IMPROVEMENTS ANNUAL (REP II):

Program Description: This project provides funding for a variety of activities relating to reliability of service, each of which costs less than \$50,000. This includes unfused lateral protection, recloser upgrades and installs, line construction to provide added phases or alternate feeds, switch and manual disconnect installations, and other specific capital work to improve circuit and area reliability. Average cost per typical Engineering Work Request (EWR) is about \$8,900.

Total Unit Population: N/A

Maintenance Cycle: None.

Reliability Benefit: Reduce the number of customers affected by outages by fusing laterals and add additional sectionalizing devices. Reduce permanent outages by installing reclosers. Perform other activities as identified.

Results: Reliability projects were completed on most hit list circuits. An additional \$397,000 of work was done under the non-REP project Circuit Hit List annual.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$500,000	\$805,800	\$305,800

GIS CAPITAL PROJECT (REP II):

Program Description:

Define overall scope and desired end products and determine technology requirements, select vendors and define overall implementation plan to establish a GIS at PSNH. Initial deliverables would include establishing PSNH's overhead maps onto a land base, connecting the new GIS to existing internal databases including Customer Information and Vegetation management with outputs to automate engineering models and analysis tools. Next steps would include capturing underground systems, incorporating switching and distribution operating information (DSCADA), as well as right-of-way lines. Integration with other readily available GIS data from other entities would also be performed such as for wetlands and property ownership information that is available from federal, state and municipal agencies. PSNH would also explore ways to share our information with others. Subsequent steps are to move the GIS to desktop/infield design of line extensions and system upgrades. An outage management system and work management opportunities would then become practical expansions of this system.

Reliability Benefit:

Provide a single location for data that can be easily accessed to analyze the distribution system, provide a base for future Outage Management System and provide mapping of the distribution system that is geographically correct.

Results:

6/28/12 - Semi-Annual report to the Public Utilities Commission detailing completion of the Enterprise architecture and conversion progress.
12/11/12 - Semi-Annual report to the Public Utilities Commission detailing the conversion of seven geographic areas in 2012.

Conversion of all areas will be completed in 2013 along with business process rollout. There will be stabilization activities in 2014.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$4,999,900	\$3,482,300	(\$1,517,600)

HAZARD TREE REMOVAL (REP II):

Program Description: Remove trees greater than 16 inches in diameter within the trim zone and others outside the trim zone that are identified as a hazard to falling onto primary conductors.

Due to an accounting change, this project is a new capital item in 2012; previously, this program was completed as O&M.

Total Unit Population: Population is unknown. Candidates are identified during maintenance trimming and by employees during reliability investigations.

Reliability Benefit: Identifying and removing trees that have a high likelihood of contacting primary conductors significantly reduces the risk of tree outages associated with significant SAIDI (customer) impact.

Results: In 2012, 7,800 trees were removed.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$0	\$1,207,600	\$1,207,600

RECLAIM ROWS TO FULL WIDTH (REP II):

Program Description: Research easements, determine the easement boundaries and clear ROWs to the full extent of the easements.

Due to an accounting change, this project is a new capital item in 2012; previously, this program was completed as O&M.

Total Unit Population: Distribution in ROW is approximately 841 miles. ROWs are prioritized based upon outage histories.

Reliability Benefit: Clearing ROWs to the full width of the easements will reduce the risk of tree outages associated with significant SAIDI (customer) impact.

Results: In 2012, 30 miles of ROWs were reclaimed.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$0	\$1,914,900	\$1,914,900

CAPITAL DUE TO BASE REP

REJECT POLE REPLACEMENT (BASE REP):

Program Description: The preventive maintenance cycle for distribution poles to inspect, treat, reinforce or replace decayed or damaged poles to ensure reliable and safe use of this asset will generate approximately 2% of the poles inspected for replacement.

PSNH maintains 240,000 poles on its system. These are inspected every 10 years or 24,000 poles per year. Estimated reject rate is 2% requiring 480 poles to be replaced or reinforced. Poles are reviewed in the field for suitability to be reinforced; otherwise they are replaced. Estimate >70% replaced.

Total Unit Population: Dependent upon inspection results, estimate 4,800 poles to replace or reinforce.

Reliability Benefit: Reliable performance and safety of poles in high winds, heavy wet snow, pole accidents or other events that cause undue stress in addition to normal service of this asset.

Results: A total of 169 poles were replaced in 2012. Through 2012, 131,336 poles have been inspected and 2,293 have been rejected for a failure rate of 1.75%. Per company requirements, poles in imminent danger are made safe within five work days and all poles are replaced or reinforced within one year. Pole inspections take place from May through September with many poles being replaced from October through December.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$1,330,100	\$700,100	(\$630,000)

POLE REINFORCEMENT (BASE REP):

Program Description: Inspection of poles generates approximately 0.6% of poles that require being made safe or replaced within five working days, approximately 0.8% of poles must be replaced within one year and approximately 0.5% are eligible for reinforcement. Each of the poles eligible for reinforcement are reviewed in the field to determine if they will be reinforced.

PSNH maintains 240,000 poles on its system. These are inspected every 10 years or 24,000 poles per year. Approximately 120 poles are reviewed each year in the field to determine if they will be reinforced.

Total Unit Population: Dependent upon inspection results.

Reliability Benefit: Reliable performance and safety of poles in high winds, heavy wet snow, pole accidents or other events that cause undue stress in addition to normal service of this asset.

Results: In 2012, 21 poles were reinforced.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$50,100	\$7,400	(\$42,700)

NATIONAL ELECTRICAL SAFETY CODE (NESC) GENERATED CAPITAL WORK (BASE REP):

Program Description: Replace distribution plant units with deficiencies identified during NESC inspections which are required to conform to the National Electrical Safety Code (NESC).

Correct NESC violations by installing plant units. Most often, the installation of poles and conductors are required to meet clearance problems to buildings, communications conductors, or over streets and roadways.

Total Unit Population: Approximately 6,200 plant units.

Reliability Benefit: This work is required to conform to NESC requirements.

Results: The most common requirement is to replace poles to gain additional height to meet clearance to communications conductors or clearance to buildings or structures.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$530,100	\$1,921,800	\$1,391,700

AIRBREAK SWITCH REPLACEMENT (BASE REP):

Program Description: Of the 725 airbreak switches on the system, 535 are on distribution lines. They are of various manufacturers, models, type, and vintage. This project accounts for the replacement of distribution line switches that are not suitable to be maintained, but remain in service. Replace with a new switch or recloser.

Total Unit Population: 535

Maintenance Cycle: Airbreak Switches are maintained on a six year cycle with inspection every year.

Reliability Benefit: Parts cannot be obtained for obsolete switches. Obsolete switches may not have sufficient capacity to break the load current of the circuit. Replacement with a recloser reduces the maintenance required and reduces the number of permanent outages.

Results: Nine obsolete airbreak switches required replacement.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$100,100	\$559,600	\$459,500

DIRECT BURIED CABLE REPLACEMENT (BASE REP):

Program Description: Replace direct buried cable with cable in conduit.

2,000,000 feet of direct buried cable was installed at PSNH until 1985 with earliest vintages from 1970. Cable insulation is subject to age failure and bare concentric neutral conductors are subject to corrosion. Testing has indicated that in many locations the concentric neutral is no longer sufficient to provide a path to ground for the electric system. This project is to replace unjacketed direct buried cable in specific developments which have experienced a high failure rate or where cable has been rejected as a candidate for cable injection. Live front transformers and/or pre-1987 elbows are replaced along with the cable.

Total Unit Population: 2,000,000 feet

Reliability Benefit: Direct buried cable was installed at PSNH until approximately 1985 with a significant amount installed in the 1970's. New cable and new construction standards will provide enhanced reliability for the long-term.

Results: An estimated 23,060 feet of direct buried cable was replaced with new cable in conduit in 2012 as part of this project. An additional estimated 31,000 feet of direct buried cable was replaced in conduit as part of non-REP projects.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$900,000	\$1,153,000	\$253,000

DIRECT BURIED CABLE INJECTION (BASE REP):

Program Description: 2,000,000 feet of direct buried cable was installed at PSNH until 1985 with earliest vintages from 1970. The cable insulation is subject to age failure and the bare concentric neutral is subject to corrosion. This project is to inject unjacketed direct buried cable if it has shown by test that the concentric neutral has the majority of its integrity remaining.

Total Unit Population: 2,000,000 feet of direct buried cable. The actual amount eligible for injection is determined after concentric neutral testing.

Maintenance Cycle: None.

Reliability Benefit: The insulating capability of the cable is restored reducing the probability of a cable failure. Pre-1987 elbows and live front transformers are replaced as they are encountered.

Results: An estimated 70,000 feet of cable was injected in 2012. The estimated cost was \$14.83 per foot as compared to \$55 per foot for cable replacement in conduit.

Capital Cost:

\$ PLAN	\$ ACTUAL	\$ VARIANCE
\$355,000	\$1,038,600	\$683,600

Section 6

2012 Other Activities

2012 ACTIVITIES ON TOP 50 RANKED BY COSAIDI (2010)

2010 Rank	2012 Co SAIDIR ank	Change in Rank Gain (Worse) from 2010	Circuit	AWC	SMT	Hazard Tree Removal	Mid Cycle	ETT	NESC Full Circuit Patrol	NESC Repair Activity	Inspect URD Systems and Replace Fault Indicators	Pole Inspect & Test	Pole Replace or Reinforce	ROW Patrol	Switch Maint	Recloser Maint	Recloser Additions	Test & Repair DB Cable	DB Replace	Porcelain Change Out	Other Corrective Actions	Corrective Actions Comments	
1	37	36	78X1	KEENE						√											√	Backbone Rehabilitation, Thermovision Repairs	
2	31	29	39X1	KEENE						√												√	Unfused Laterals
3	8	5	355X10	LANCASTER	√	√			√	√				√	√	√	√					Replaced a sectionalizer, added two reclosers	
4	15	11	23X5	MILFORD			√		√	√	√			√	√							Replaced off road #6 copper, replaced main line 2/0 WP Cu, added radio to voltage sensing switch 5J1.	
5	6	1	3271X2	MANCHESTER WEST						√	√					√						√	
6	5	(1)	3133X	DERRY						√	√	√				√	√	√	√	√		√	Installed trip saver recloser, smart grid project 3133/3128.
7	10	3	316X1	NEWPORT	√	√				√	√	√				√						√	Unfused laterals, thermovision repairs
8	13	5	316	NEWPORT			√	√		√	√	√				√	√					√	Fusing upgrades
9	1	(8)	3141X	DERRY				√		√	√	√	√									√	Installation of fused cutouts on unfused side taps
10	9	(1)	319X1	PITTSFIELD						√	√											√	Unfused laterals
11	38	27	313X1	MONADNOCK	√	√				√	√	√										√	Added fusing, thermovision repairs
12	69	57	323X5	MANCHESTER WEST				√		√	√	√					√	√				√	Installation of fused cutouts on unfused side taps
13	160	147	23X6	MILFORD	√	√				√	√	√				√				√		√	
14	17	3	3410	NEWPORT			√	√		√	√	√				√				√		√	Added fusing, thermovision repairs
15	114	99	314X4	MILFORD						√	√	√											
16	NR	NR	3798	FRANKLIN						√	√	√											
17	52	35	333XS	CHOCORUA						√	√	√											Added multiple reclosers, reconfigured in 2011
18	28	10	348X1	LANCASTER	√	√				√	√	√				√							
19	154	135	333XW	CHOCORUA			√			√	√	√											Added multiple reclosers, reconfigured in 2011
20	530	510	313	MONADNOCK						√	√	√		√	√		√					√	Installed overhead fault indicators. Automation added to the 313J11
21	97	76	12W1	NEWPORT						√	√	√				√						√	Relocated main line out of ROW along Hwy 10. Replaced failed URD along Rte 116
22	64	42	3020X	NASHUA	√	√		√		√	√	√					√	√		√		√	Fused 32 locations. Split circuit into 3 circuits (Thornton).
23	43	20	3525X5	BERLIN	√	√				√	√	√											
24	151	127	1W2	LANCASTER					√	√	√	√	√									√	Added in-line disconnect switches
25	549	524	3172	PORTSMOUTH						√	√	√		√									Replaced 3 old switches at Sagamore Golf Club
26	32	6	3128X	DERRY			√			√	√	√				√	√	√	√	√		√	Smart grid installation 3133/3128.
27	506	479	392X	ROCHESTER						√	√	√		√	√								
28	NR	NR	371	ROCHESTER						√	√	√											
29	434	405	3178X2	KEENE						√	√	√				√						√	Installed overhead fault indicators
30	217	187	3137X	EPPING	√	√				√	√	√		√	√		√						Replaced 37J2 with SCADA VIPER
31	19	(12)	311	HILLSBORO						√	√	√		√	√							√	Removed DNR locations. Installed overhead fault indicators. Replaced table-top switch structure
32	147	115	334X18	MANCHESTER EAST						√	√	√					√						
33	NR	NR	4W2	KEENE						√	√	√											
34	343	309	32W1	ROCHESTER				√		√	√	√				√	√		√				DB cable and recloser control changeout complete
35	45	10	336X	CHOCORUA						√	√	√											
36	NR	NR	3115X	EPPING						√	√	√											
37	104	67	3120	KEENE						√	√	√											
38	23	(15)	3271X4	MANCHESTER WEST						√	√	√				√	√					√	New feed from 3108 down Twin Bridge.
39	34	(5)	24X1	HILLSBORO	√	√				√	√	√					√						DV Reclosers replaced with Viper
40	65	25	392X1	ROCHESTER			√			√	√	√											
41	112	71	3136X	NASHUA						√	√	√	√										
42	89	47	362	ROCHESTER						√	√	√											
43	366	323	3614X3	MANCHESTER EAST						√	√	√											
44	130	86	19W2	CHOCORUA						√	√	√											
45	542	497	3148X2	ROCHESTER						√	√	√		√									
46	7	(39)	W13	KEENE						√	√	√					√			√	√		Installed overhead fault indicators. Tripsaver installed
47	275	228	318X2	MANCHESTER EAST						√	√	√											
48	60	12	3137X1	EPPING	√	√				√	√	√		√	√								
49	128	79	3615X1	MANCHESTER EAST	√	√				√	√	√					√					√	Fuse unfused side-taps
50	24	(26)	3116X1	CHOCORUA						√	√	√											

38 # of Circuits Improving in Rank
8 # of Circuits Worsening in Rank
128 Avg. Improvement (change in position) in Rank for all 50 Circuits
NR NR indicates this circuit had no outages so it is Not Ranked

Section 7
2013 O&M and Capital
Summary Plan



2013 SUMMARY PLAN OF PSNH RELIABILITY PROGRAM



TRIMRC - VEGETATION MANAGEMENT (O&M)				
	Unit of Measure	\$ Budget	Unit Budget	Cost Per Unit
Reduce Scheduled Maintenance Trim Cycle	# Miles	\$2,338,000	508	\$4,602
Mid Cycle Trimming	# Miles	\$500,000	104	\$4,808
Hot Spot Trimming	N/A	\$550,000	N/A	N/A
Inspect Contractor	# Miles	N/A ⁽¹⁾	2,520	N/A
Reduce Distribution Rights-of-Way Cycle	# Acres	\$283,000	687	\$412
Storm Damage Premium	# Miles	N/A ⁽¹⁾	N/A ⁽¹⁾	N/A
Subtotal - Base REP		\$3,671,000		
Takedowns	# Trees	N/A ⁽¹⁾	N/A ⁽¹⁾	N/A
Cycle Impact	# Miles	N/A ⁽¹⁾	N/A ⁽¹⁾	N/A
ETT Maintenance Trimming	# Miles	\$660,000	100	\$6,600
S/S Perimeter Trimming	# Substations	\$0	0	N/A
Tree Outage Assessment Pilot	N/A	\$250,000	N/A	N/A
Subtotal - REP II		\$910,000		
Total TRIMRC		\$4,581,000		

NESCR - National Electrical Safety Code (O&M)				
	Unit of Measure	\$ Budget	Unit Budget	Cost Per Unit
Full Circuit Patrol	# Miles	\$55,000	1,100	\$50
Inspect and Repair Underground Systems	# UG Maps	\$450,000	982	\$458
Inspect Manholes	# Manholes	N/A ⁽¹⁾	222	N/A
Pole Inspection and Treatment	# Poles	\$660,000	24,000	\$28
Overhead Repair Activity	# Repair Orders	\$3,452,000	30,000	N/A
Foot Patrol ROW	# Miles	\$50,000	697	\$72
Subtotal - Base REP		\$4,667,000		
Subtotal - REP II		\$0		
TOTAL NESCR		\$4,667,000		

RELIOM - RELIABILITY (O&M)				
	Unit of Measure	\$ Budget	Unit Budget	Cost Per Unit
Overhead Switch Maintenance	# Switches	\$255,000	126	\$2,024
Recloser Maintenance	# Recloser Orders	\$168,000	61	N/A
Fault Indicators	# Fault Indicators	\$160,000	1,032	\$155
Test & Repair Direct Buried Unjacketed Cable	# Runs	\$200,000	150	\$1,333
Subtotal - Base REP		\$783,000		
Cascade Entry	Entry	\$0	N/A	N/A
Damage Assessment Pilot	N/A	\$75,000	N/A	N/A
Install CLFs 12 kV Main Lines	# Circuits	\$811,000	4	\$202,750
GIS O&M	\$ Expended	\$52,000	1	\$52,000
O&M Portion of Capital	\$ Expended	\$600,000	N/A	N/A
Subtotal - REP II		\$1,538,000		
TOTAL RELIOM		\$2,321,000		N/A

Total O&M Spending 2013 **\$11,569,000**

Rate Case O&M Plan	\$9,033,000
Booked Reserve (Carried Over from 2012)	\$2,461,287
Accounting Credit (2)	\$75,000
TOTAL O&M Spending 2013	\$11,569,287

(1) Data is imbedded in another category as specified in O&M Briefing Sections.

(2) Unvouchered Liability Adjustment in 2012



**Public Service
of New Hampshire**
The Northeast Utilities System

**2013 SUMMARY PLAN OF PSNH RELIABILITY PROGRAM
CAPITAL
Docket No. DE 09-035**



CAPITAL - REP II		
	Project #	\$ Budget
Distribution Line Porcelain Changeout	UBCAD	\$1,000,000
34.5kV Substation Breaker Replacement	A07X44	\$538,000
Enhanced Tree Trimming	C12ETT	\$3,000,000
Pole Top DSCADA Replacement	A07DL41	\$350,000
Substation RTU Replacement	A07SS41	\$350,000
Enable SCADA to Windsor Backup	A07WI47	\$0
Distrib. Line Wire Upgrade/Eliminate Narrow ROW	A10X06	\$300,000
Reliability Improvements Annual	DR9R	\$1,046,000
GIS Capital Project	A10X05	\$3,500,000
Hazard Tree Removal	A13X04	\$1,147,000
Full Width ROW Clearing	A13X05	\$1,417,000
OMS Capital Project		\$100,000
		\$12,748,000
CAPITAL - DUE TO BASE REP		
	Project #	\$ Budget
Reject Pole Replacement	A07X45	\$1,330,000
Pole Reinforcement	A07X99	\$35,000
NESC Capital Work	A07X98	\$750,000
Airbreak Switch Replacement	A08X44	\$100,000
Direct Buried Cable Replacement	A04S34	\$850,000
Direct Buried Cable Injection	A10X04	\$400,000
		\$3,465,000
TOTAL REP CAPITAL		\$16,213,000