PSNH

Reliability Enhancement Program

Docket DE 09-035

2013 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, 2013 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)

"Initial REP" (Base REP)	→	"New REP" (REP II)
Docket No. 06-028		Docket No. 09-035
July 1, 2007 - June 30, 2010		July 1, 2010 - June 30, 2015

As noted above, this report provides results of the calendar year ending December 31, 2013 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 2014.

2009 RATE CASE
Docket DE 09-035
Revenue Requirement Allocations

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 2013 under the current REP. These general REP areas represent multiple tracked programs and activities.

2013 O&M Plan vs Actual:		
2013 Planned O&M Expenditures	$	9,108,000
2012 Carryover		2,461,287
2013 Total Planned O&M Expenditures		11,569,287
2013 Actual O&M Expeditures		10,811,806
Variance	$	(757,481)

Actual O&M results through December 31, 2013 show $10.8 million spent and 59,302 tasks completed, leaving $757,481[1] to carry over to 2014. Completed tasks were approximately 10% more than planned. PSNH was approximately on schedule most of the year and was able to make up the carryover activities from 2012 as well as complete most of the 2013 work. See Section 1, *Year End 2013 Summary of PSNH Reliability Enhancement Program – O&M* for details on individual activity cost and unit count. See Section 7, *2014*

[1] Carryover is the budgeted O&M per Docket DE 09-035 compared with actual O&M spend.

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O&M and Capital Summary Plan, for details on individual activity cost and unit count to complete the 2013 program.

2013 EXPENDITURES

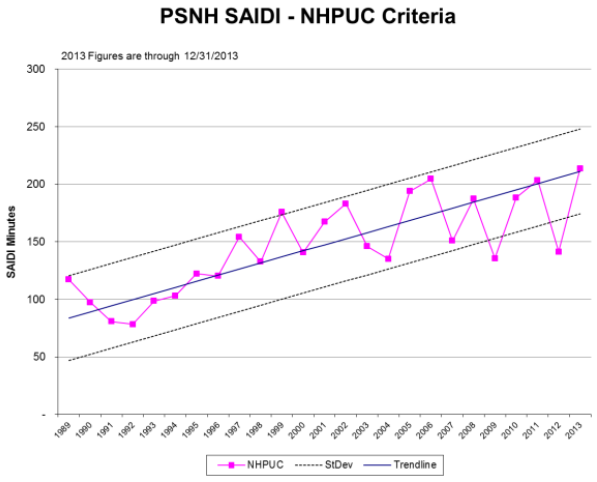
REP AREA	12-mo Ending Dec 2013
Base REP - Vegetation Manag	3,671,000
Base REP - NESC Inspect/Rep	4,608,578
Base REP - O&M Activities	1,323,627
REP II O&M Programs	1,273,036
Accounting Adjustment	(64,435)
Total O&M	**$10,811,806**
New REP Specific Capital	$14,998,230
Capital due to Base REP	6,418,370
Specific Captial Projects	$21,416,600
Capital Financing Required	**$2,569,992**
(Annualized Carrying Charge)	
Total REP Revenue Req'ts.	**$13,381,798**

For capital expenditures, PSNH spent $21.4 million on the stipulated 18 budget line items or projects. See Section 5, *Year End 2013 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.

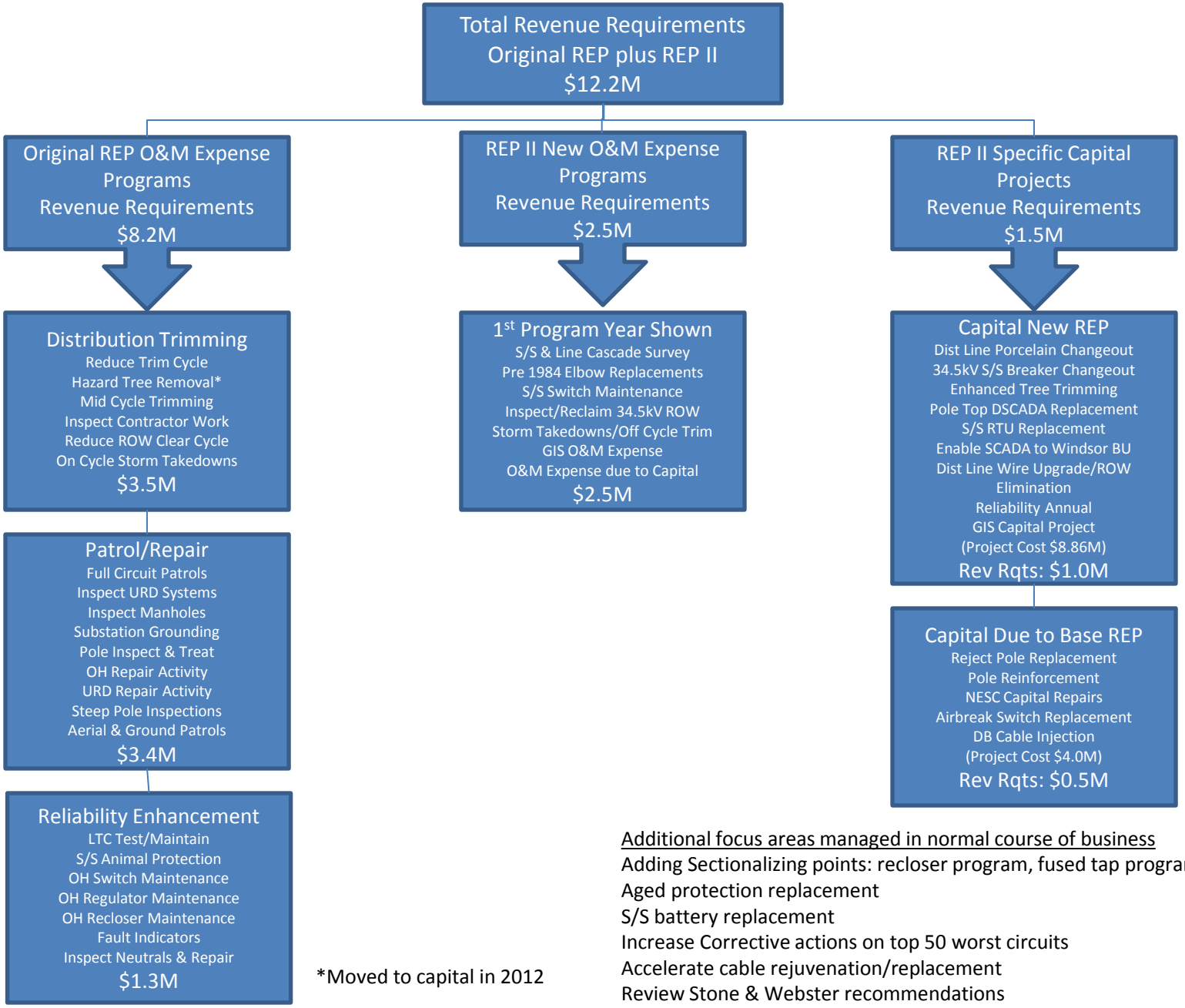
Although O&M was underspent by $757,481 in 2013, the Capital plan was overspent by $5,203,600; therefore the entire program was underspent by $133,049 in Revenue Requirements.

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.

Storm related impacts to the electric system affected PSNH's absolute SAIDI performance. While there were no declared Major Storms during 2013, there were 11 minor storm days which contributed 113.8 minutes to PSNH SAIDI. We note, however, since the REP was implemented, the trend from 2006 onward has been improved on a weather normalized basis. 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



*Moved to capital in 2012

<u>Additional focus areas managed in normal course of business</u>

Adding Sectionalizing points: recloser program, fused tap program
Aged protection replacement
S/S battery replacement
Increase Corrective actions on top 50 worst circuits
Accelerate cable rejuvenation/replacement
Review Stone & Webster recommendations

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 up in 2013 compared with 2012. 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 2013 we had an increase in SAIDI contribution coming from the top 50, but a decrease in percent SAIDI from circuits remaining in the top 50 from 2012 to 2013.
    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 11 minor storm events in 2013, contributing 113.8 SAIDI minutes to PSNH's performance.. 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. There is a cumulative effect for vegetation management and we believe the effort from last half of 2007 through year end 2013 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 small increase has occurred in this area in 2013 compared with 2012. Performance in 2010 was unusually low. A variety of REP actions affect this and include:
    a. Porcelain changeouts
    b. Switch maintenance and replacement programs
    c. Recloser maintenance
    d. Cable testing and replacement

NHPUC SAIDI Graphs Summary
Reliability Enhancement Program
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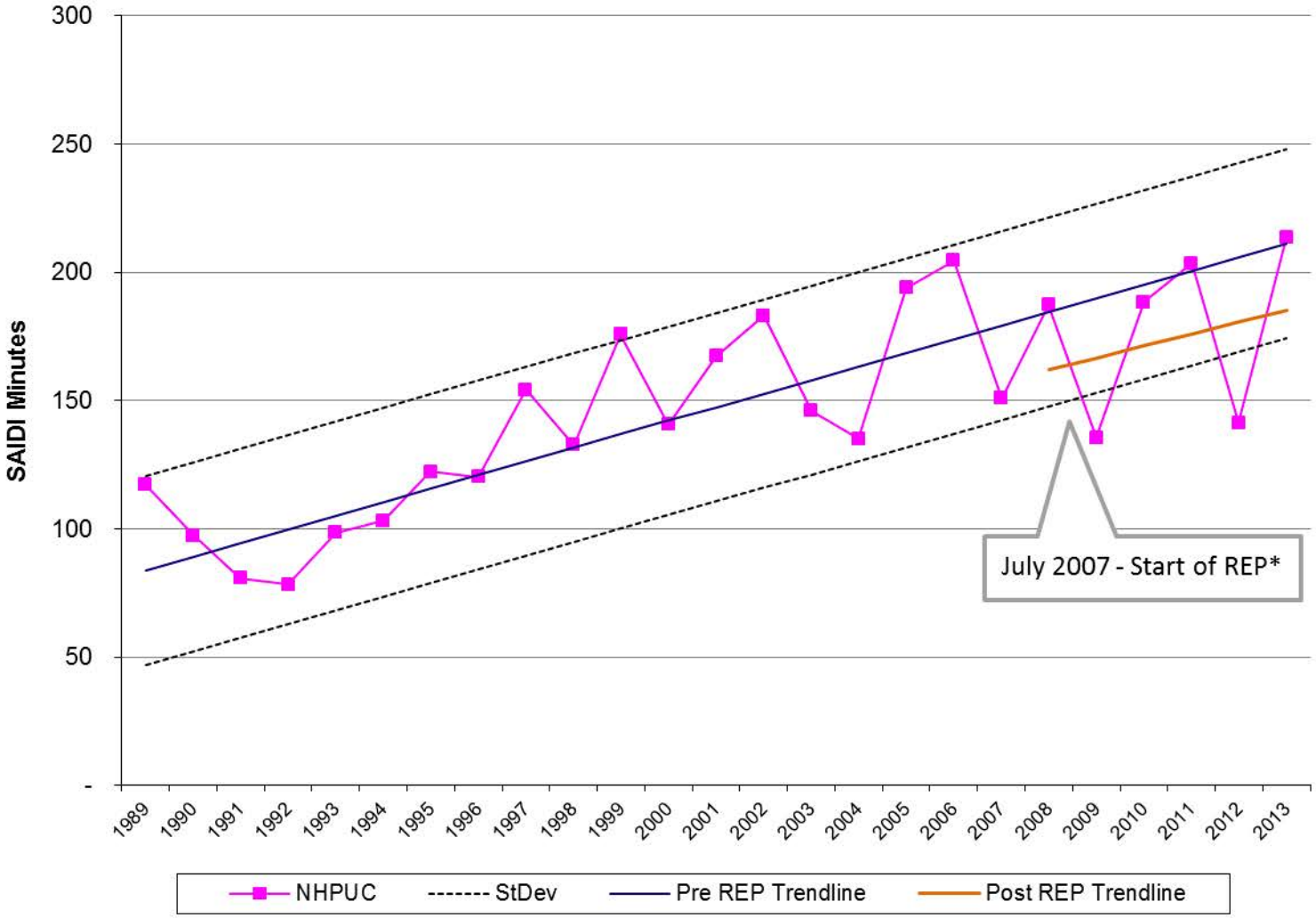
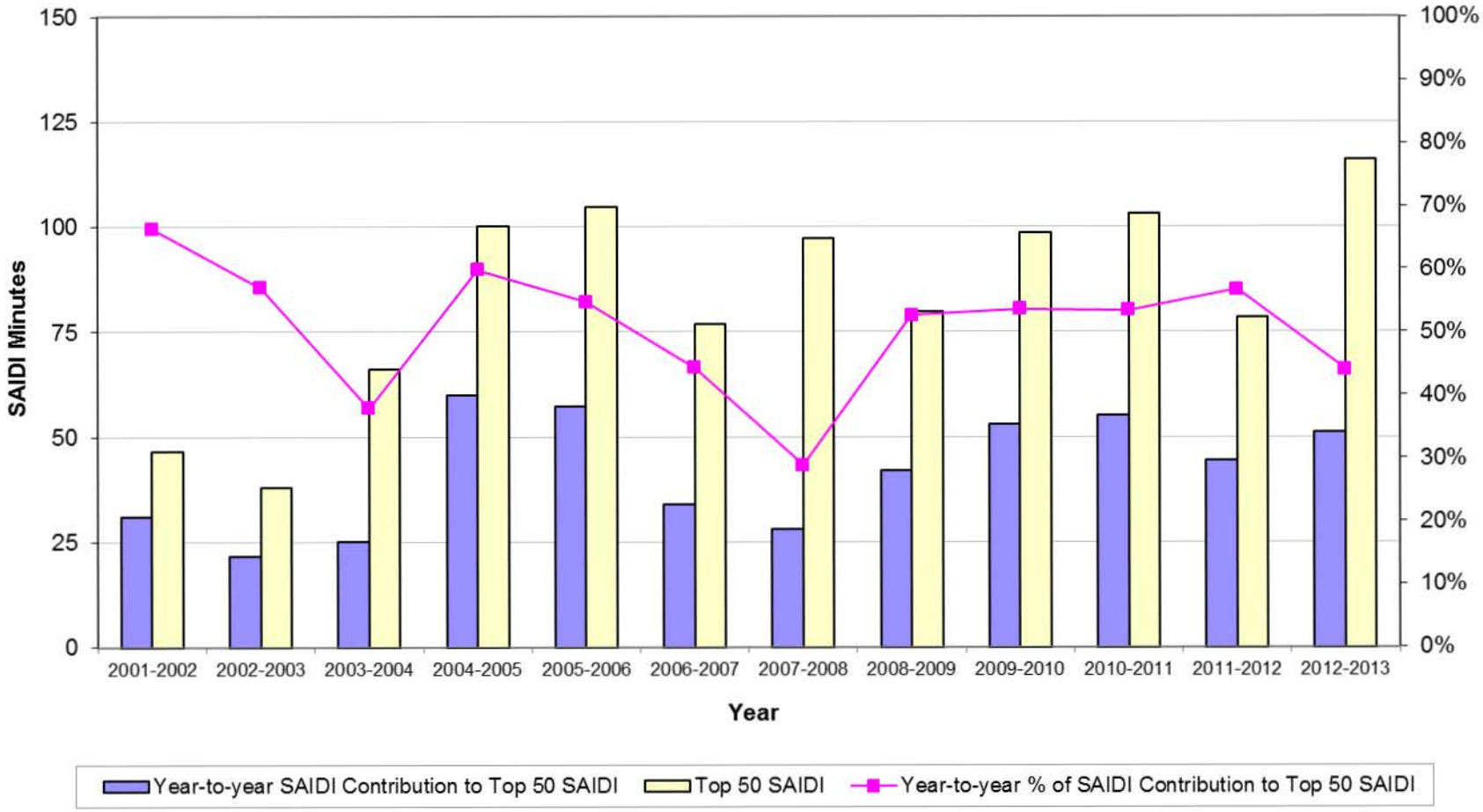
6. PSNH SAIDI – NHPUC Criteria Substation Reliability. Power outages caused by actions or problems inside substations are typically large and widespread. The amount of SAIDI minutes relating to these events is generally declining and there is essentially no difference due to weather. There was a small increase in SAIDI minutes in 2013. We continue to track a very low SAIDI contribution in this area through 2013 and 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.

PSNH SAIDI - NHPUC Criteria



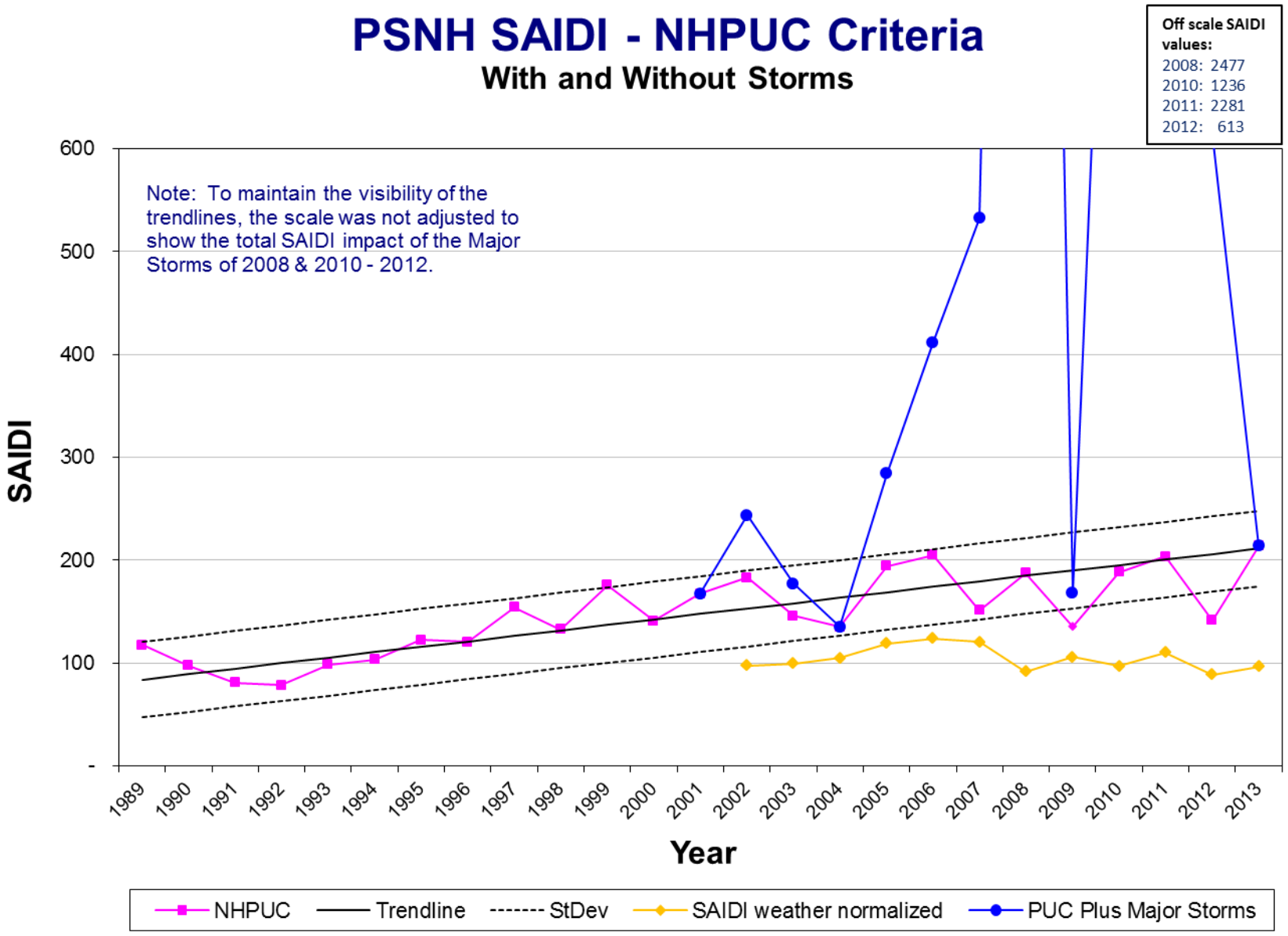
Top 50 Hit List SAIDI Contribution from year to year

NHPUC Criteria



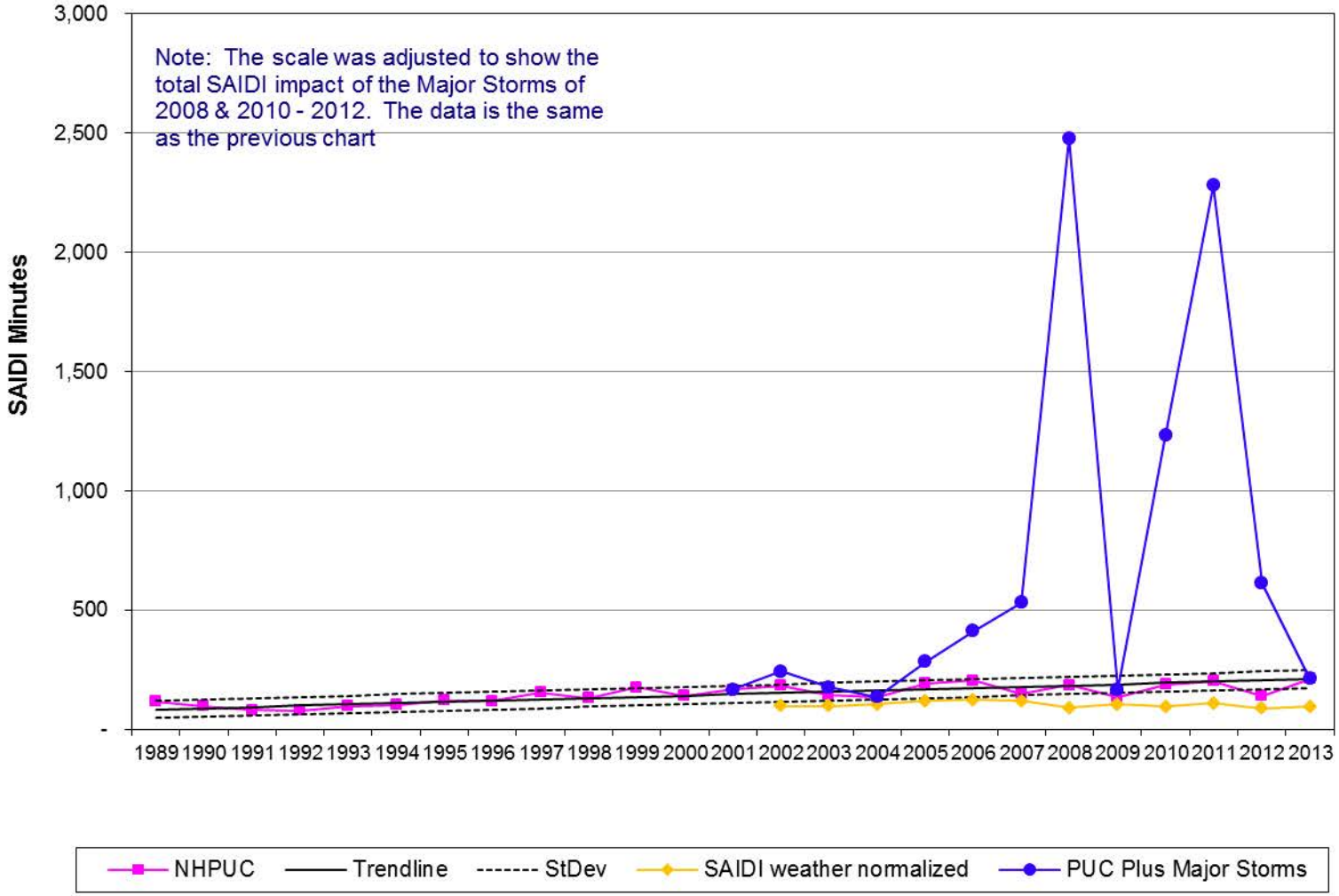
PSNH SAIDI - NHPUC Criteria

With and Without Storms



PSNH SAIDI - NHPUC Criteria

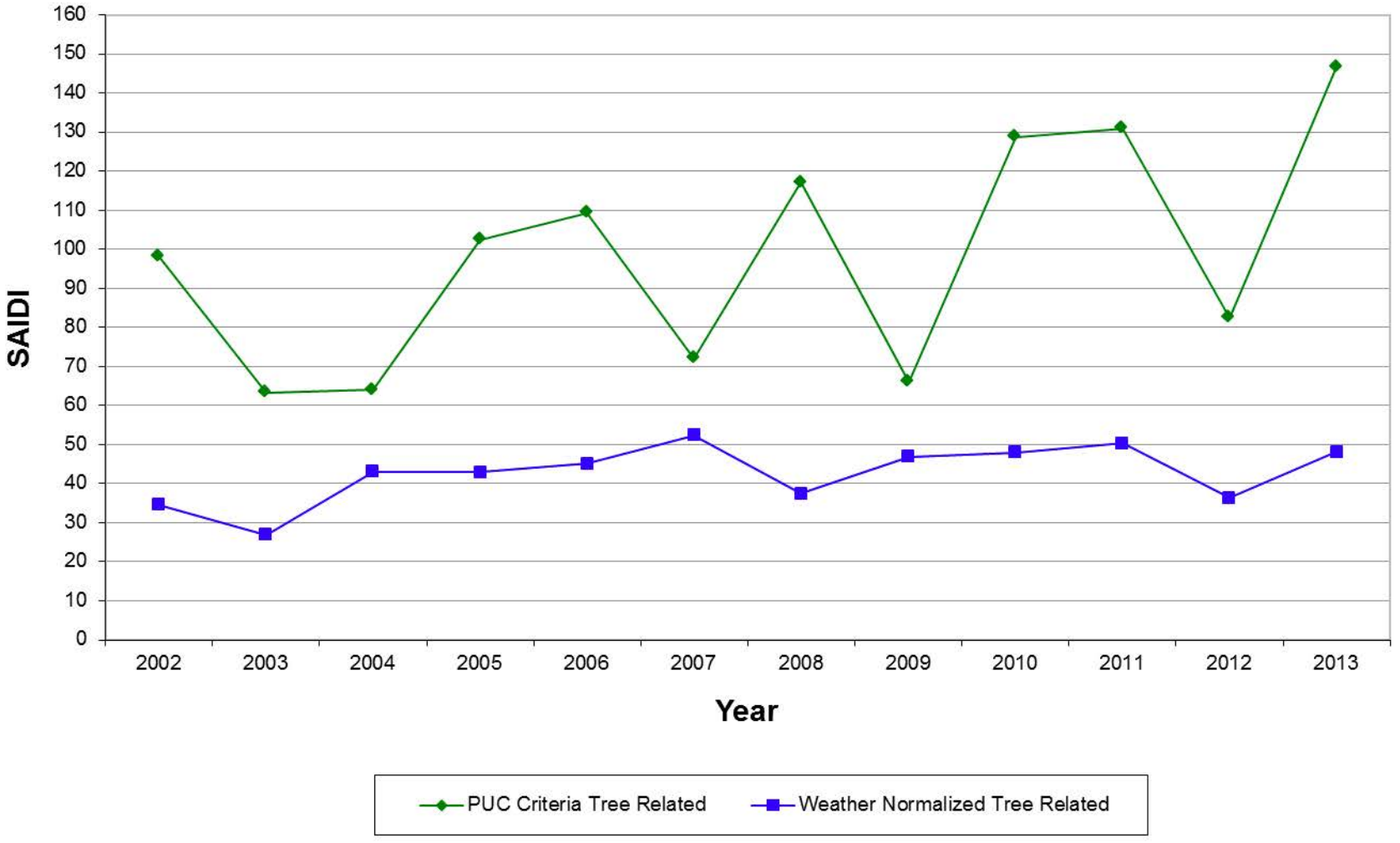
With and Without Storms



PSNH Tree Related SAIDI

NHPUC Criteria

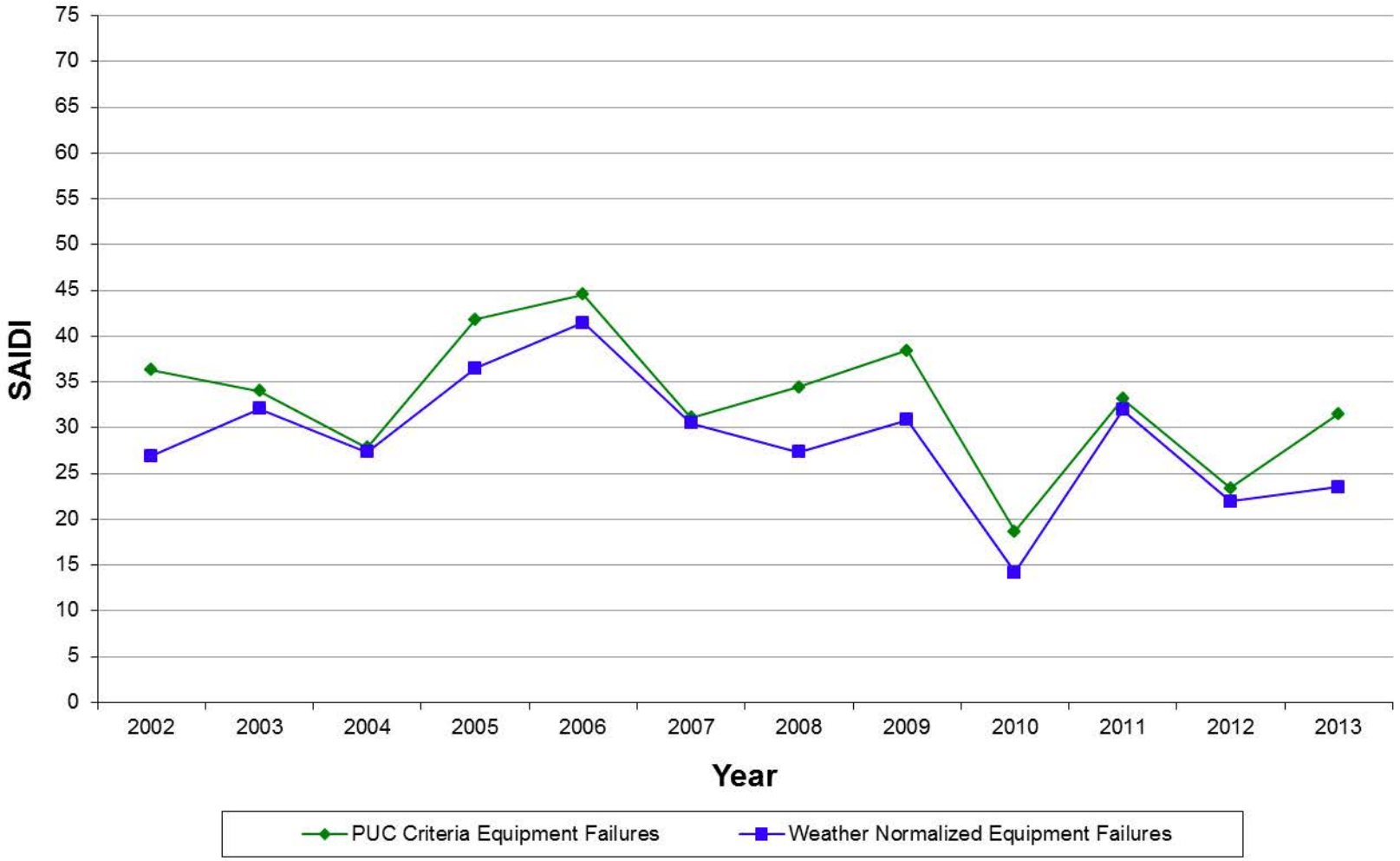
(100% of Trees/Limbs, 50% of Ice/Sleet/Snow & Wind and 40% of Patrolled Nothing Found related troubles)



PSNH Equipment Related SAIDI

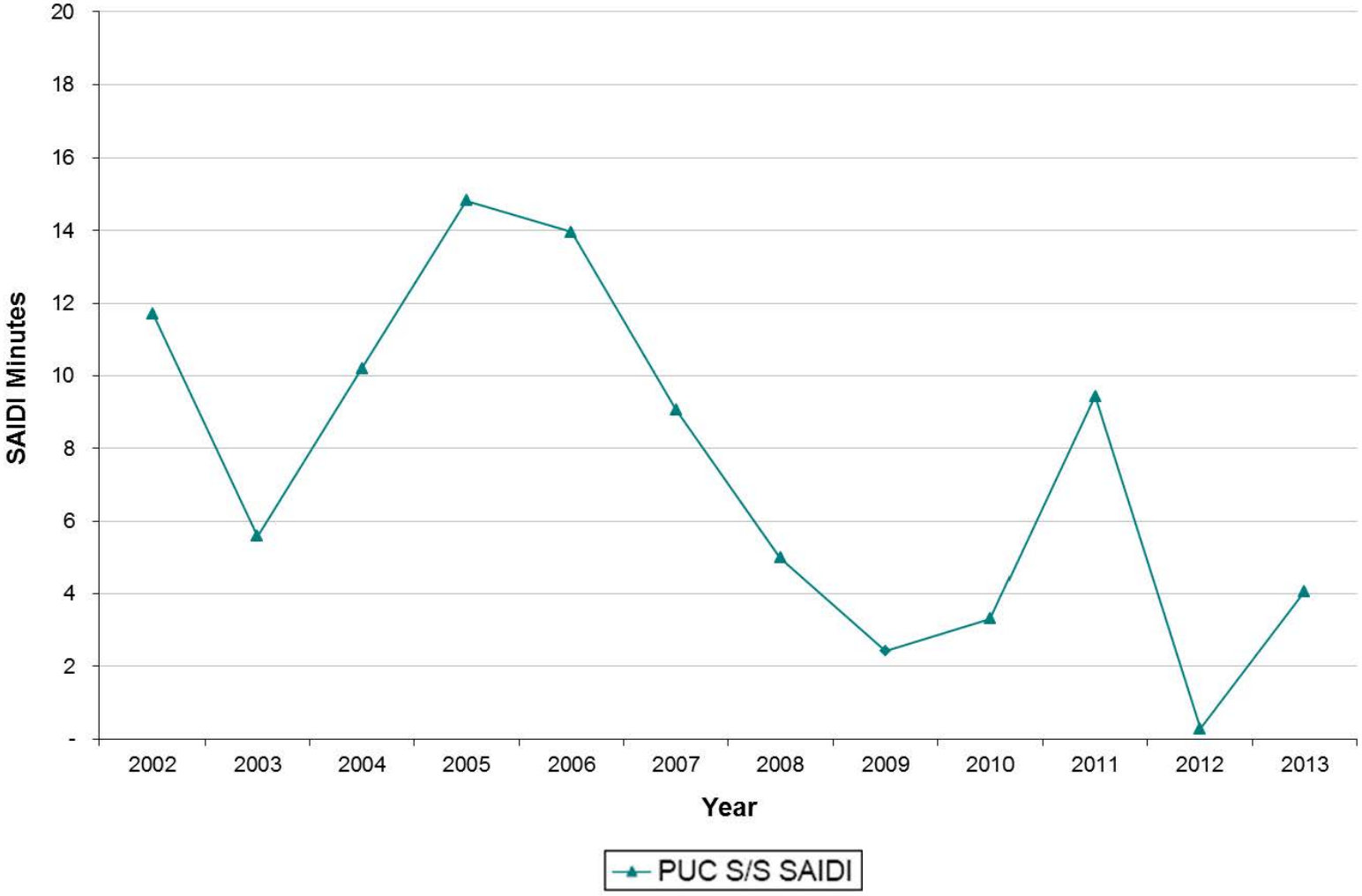
NHPUC Criteria

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



PSNH SAIDI - NHPUC Criteria

Substation Reliability



PSNH 2013 YEAR END RELIABILITY ENHANCEMENT PROGRAM

TOPIC	SECTION
2013 O&M SUMMARY	1
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2013 O&M NATIONAL ELECTRICAL SAFETY CODE PROGRAMS	3
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Section 1

2013 O&M Summary

Year End 2013 Summary of PSNH Reliability Enhancement Program – O&M
Docket No. DE 09-035
Jan 1 2013 - Dec 31 2013

Public Service of New Hampshire
The Northeast Utilities System

POWERUP

TRIMRC - VEGETATION MANAGEMENT (O&M)				
	Units	**$ Expended**	**Units Completed**	**Cost Per Unit**
Reduce Scheduled Maintance Trim Cycle	# Miles	$2,827,000	635	$4,452
Hot Spot Trimming	N/A	$134,000	N/A	N/A
Mid Cycle Trimming	# Miles	$500,000	179	$2,793
Inspect Contractor	# Miles	N/A (1)	2,610	N/A
Reduce Distribution Rights-of-Way Cycle	# Acres	$210,000	537	$391
Subtotal - Base REP		**$3,671,000**	**3,961**	
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	$438,095	102	$4,295
Tree Outage Assessment Pilot	N/A	$0	N/A	N/A
Subtotal - REP II		**$438,095**	**102**	
Total TRIMRC		**$4,109,095**	**4,063**	

NESCRC - National Electrical Safety Code (O&M)				
	Units	**$ Expended**	**Units Completed**	**Cost Per Unit**
Full Circuit Patrol	# Miles	$64,948	1,205	$54
Inspect and Repair Underground Systems	# Underground Maps	$611,821	595	$1,028
Inspect Manholes	# Manholes	N/A (1)	359	N/A
Pole Inspection and Treatment	# Poles	$541,370	26,964	$20
Overhead Repair Activity	# Repair Orders	$3,261,283	22,648	$144
Foot Patrol ROW	# Miles	$129,156	272	$475
Subtotal - Base REP		**$4,608,578**	**52,043**	
Subtotal - REP II		**$0**	**0**	
TOTAL NESCRC		**$4,608,578**	**52,043**	

RELIOM - RELIABILITY (O&M)				
	Units	**$ Expended**	**Units Completed**	**Cost Per Unit**
Overhead Switch Maintenance	# Switches	$237,642	112	$2,122
Recloser Maintenance	# Recloser Orders	$383,643	81	$4,736
Fault Indicators	# Fault Indicators	$445,523	2,874	$155
Test & Repair Direct Buried Unjacketed Cable	# Runs	$256,819	119	$2,158
Subtotal - Base REP		**$1,323,627**	**3,186**	
Damage Assessment Pilot	N/A	$21,851	N/A	N/A
Install CLFs on 12 kV Circuits	# Circuits	$56,624	10	$5,662
GIS O&M	N/A	$210,967	N/A	N/A
O&M Portion of Capital	N/A	$545,499	N/A	N/A
Subtotal - REP II		**$834,941**	**10**	
TOTAL RELIOM		**$2,158,568**	**3,196**	

TOTAL O&M ONGOING FROM BASE REP	**$9,603,205**	**59,190**
NEW O&M FOR REP II	**$1,273,036**	**112**
Accounting Adjustment (2)	**($64,435)**	
TOTAL O&M	**$10,811,806**	**59,302**

(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: For 2013, the trim cycle is 3.92 years -- 2,610 miles of regular maintenance, 102 miles of ETT Maintenance and 94 miles of ETT miles.

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
$2,827,000	635	$4,452

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
$134,000	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.

O&M Cost:

$ Expended	Miles Trimmed	Cost Per Mile
$500,000	179	$2,793

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 (2,712 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. In 2013, 2,205 acres were completed.

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
$210,000	537	$391

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. PSNH is adding approximately 70 miles 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
$438,095	102	$4,295

TREE OUTAGE ASSESSMENT PILOT (REP II):

Program Description:	Program was intended to analyze tree outages to determine the effectiveness of the PSNH trimming program.
Total Unit Population:	N/A
Inspection OR Maintenance Cycle:	One time analysis.
Reliability Benefit:	Recommendations would be made to the vegetation management program that would result in improvements in reliability and cost effectiveness.
Results:	The program was not implemented. A common trimming standard and cycle is being implemented at Northeast Utilities. The effectiveness of the NU program will be analyzed with improvement recommendations implemented as part of the Northeast Utilities Maintenance Manual process.
O&M Cost:	This program was not funded in 2013.

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. Beginning 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
$64,948	1,205	$54

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. NU Maintenance requirements were revised in 2013 incorporating a 10 year inspection cycle.

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. Costs include the inspection of manholes and other underground equipment.

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

O&M Cost:

$ Expended	Maps Completed	Cost Per Map
$611,821	595	$1,028

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 ten 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: In 2013, 359 manholes were inspected, 199 of which were re-inspections from previous inspections.

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

$ Expended	Manholes Inspected	Cost Per Manhole
N/A (1)	359	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 2013 found that approximately 2% of the poles required either reinforcement or replacement.

O&M Cost:

$ Expended	# Poles Inspected	Cost Per Pole
$541,370	26,964	$20

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 49% of open repair orders were completed in 2013. .

O&M Cost:

$ Expended	# Repair Orders Completed	Cost Per Repair Order
$3,261,283	22,648	$144

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: Starting in 2013, the NU Maintenance Manual requires an annual helicopter patrol and a foot patrol on a minimum of a five year cycle.

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

Results: Foot patrols were performed on 272 miles of lines in ROW. Items found were prioritized with items identified during aerial patrols and corrected as required.

O&M Cost:

$ Expended	Miles Patrolled	Cost Per Mile
$129,156	272	$475

OTHER RELIABILITY – O&M

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
$237,642	112	$2,122

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 1,701 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
$383,643	81	$4,736

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 analyses, 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 fault indicator battery 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 fault 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.

O&M Cost:

$ Expended	Fault Indicators Installed	Cost Per F.I. Installed
$445,523	2,874	$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: Testing in 2013 included older residential developments where a substantially higher failure rate of the neutrals was found. Temporary overhead neutrals were required for those locations where the neutrals had completely failed. Cost includes the installation of temporary overhead neutrals.

O&M Cost:

$ Expended	# Runs Completed	Cost Per Run
$256,819	119	$2,158

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: The pilot was completed in 2013. Equipment was demonstrated that would collect data and map to GIS. Implementation has been delayed in anticipation of mapping to OMS instead of GIS.

Reliability Benefit: Utilizing a single system and mapping directly to OMS will allow more timely assessment of damage and restoration of service to customers.

O&M Cost: $21,851

INSTALL CLFS ON 12 KV MAIN LINES (REP II):

Program Description: Install full range current limiting fuses (CLFs) on 12 kV transformers on circuit main lines.

Total Unit Population: 122 12 kV circuits

Maintenance Cycle: One time

Reliability Benefit: The installation of CLFs will prevent the operation of upstream protection devices for transformer bushing failures and animal contacts at the transformer bushings. The installation on main lines will result in preventing outages to entire circuits for single transformer events.

Results: CLFs were installed on main line transformers on ten 12 kV circuits in 2013.

O&M Cost:

$ Expended	# Circuits Completed	Cost Per Circuit
$56,624	10	$5,662

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 2013 components of GIS O&M include training and the elimination of duplicate circuit numbers in the GIS. The elimination of duplicate circuits will continue in 2014 and 2015 in anticipation of the Outage Management System (OMS) installation.
O&M Cost:	$210,967

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 2.55% in 2013
O&M Cost:	$545,499

Section 2

2013 O&M VEGM Programs

Public Service of New Hampshire
The Northeast Utilities System

RELIABILITY ENHANCEMENT PROGRAM - VEGETATION MANAGEMENT (O&M)

POWERUP
Taking reliability to the next level

2013 PLAN AND PROGRESS

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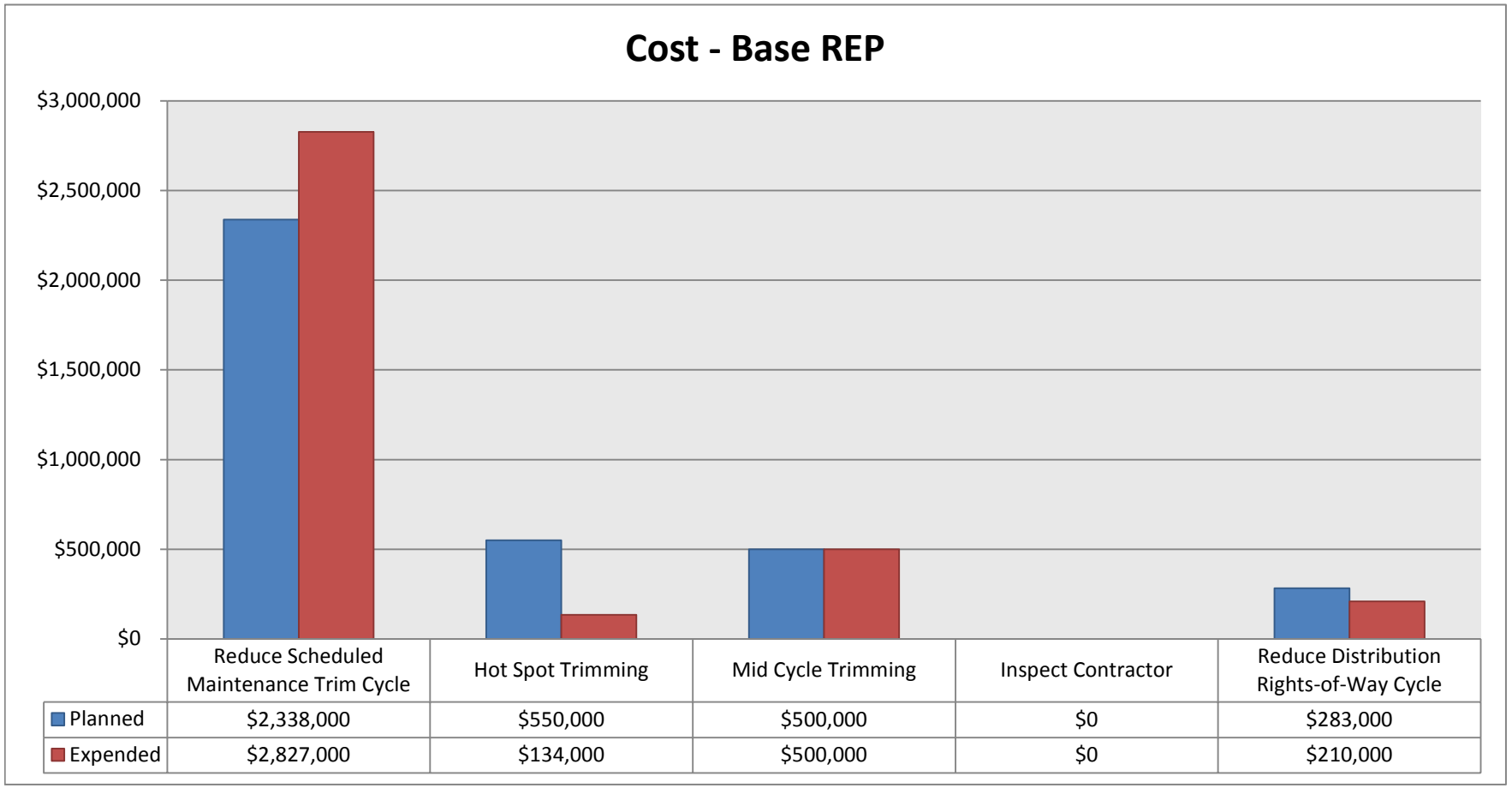
Year End 2013 Summary of PSNH Reliability Enhancement Program – O&M
Docket No. DE 09-035

Jan 1 2013 - Dec 31 2013

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	$2,338,000	$2,827,000	$489,000	508	635	127	$4,452
1	Hot Spot Trimming	N/A	$550,000	$134,000	($416,000)	N/A (1)	N/A	N/A	N/A
1	Mid Cycle Trimming	# Miles	$500,000	$500,000	$0	104	179	75	$2,793
1	Inspect Contractor	# Miles	N/A (1)	N/A (1)	N/A	2,520	2,610	90	N/A
1	Reduce Distribution Rights-of-Way Cycle	# Acres	$283,000	$210,000	($73,000)	687	537	(150)	$391
	Subtotal - Base REP		**$3,671,000**	**$3,671,000**	**$0**	**3,819**	**3,961**	**142**	
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	$660,000	$438,095	($221,905)	100	102	2	$4,295
2	Tree Outage Assessment Pilot	N/A	$250,000	$0	($250,000)	N/A	N/A	N/A	N/A
	Subtotal - REP II		**$910,000**	**$438,095**	**($471,905)**	**100**	**102**	**2**	
	TOTAL NESCRC		**$4,581,000**	**$4,109,095**	**($471,905)**	**3,919**	**4,063**	**144**	

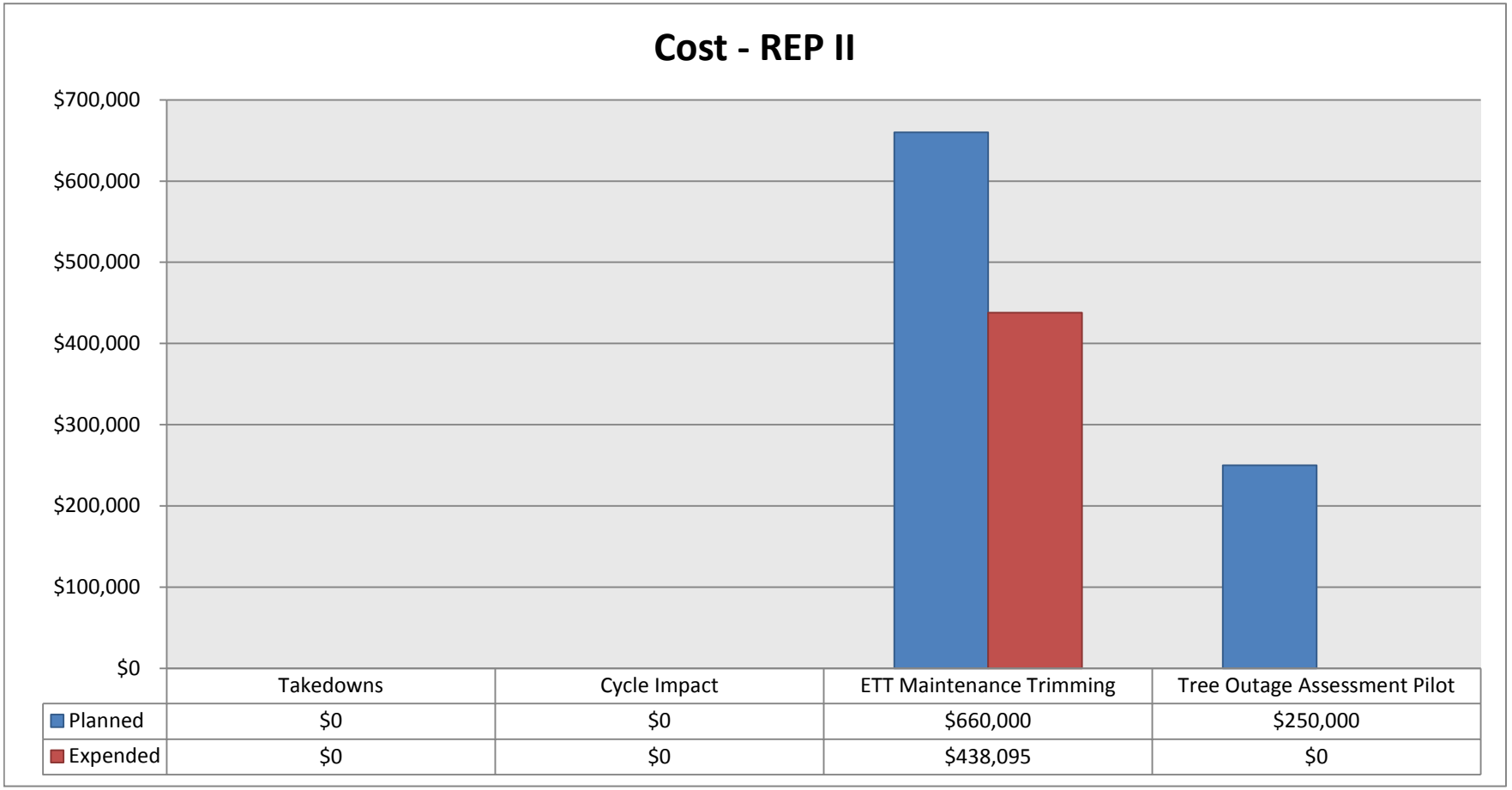
(1) Data is imbedded in another category as specified in O&M Briefing Sections.

TRIMRC - VEGETATION MANAGEMENT (O&M)



	Reduce Scheduled Maintenance Trim Cycle	Hot Spot Trimming	Mid Cycle Trimming	Inspect Contractor	Reduce Distribution Rights-of-Way Cycle
Planned	$2,338,000	$550,000	$500,000	$0	$283,000
Expended	$2,827,000	$134,000	$500,000	$0	$210,000

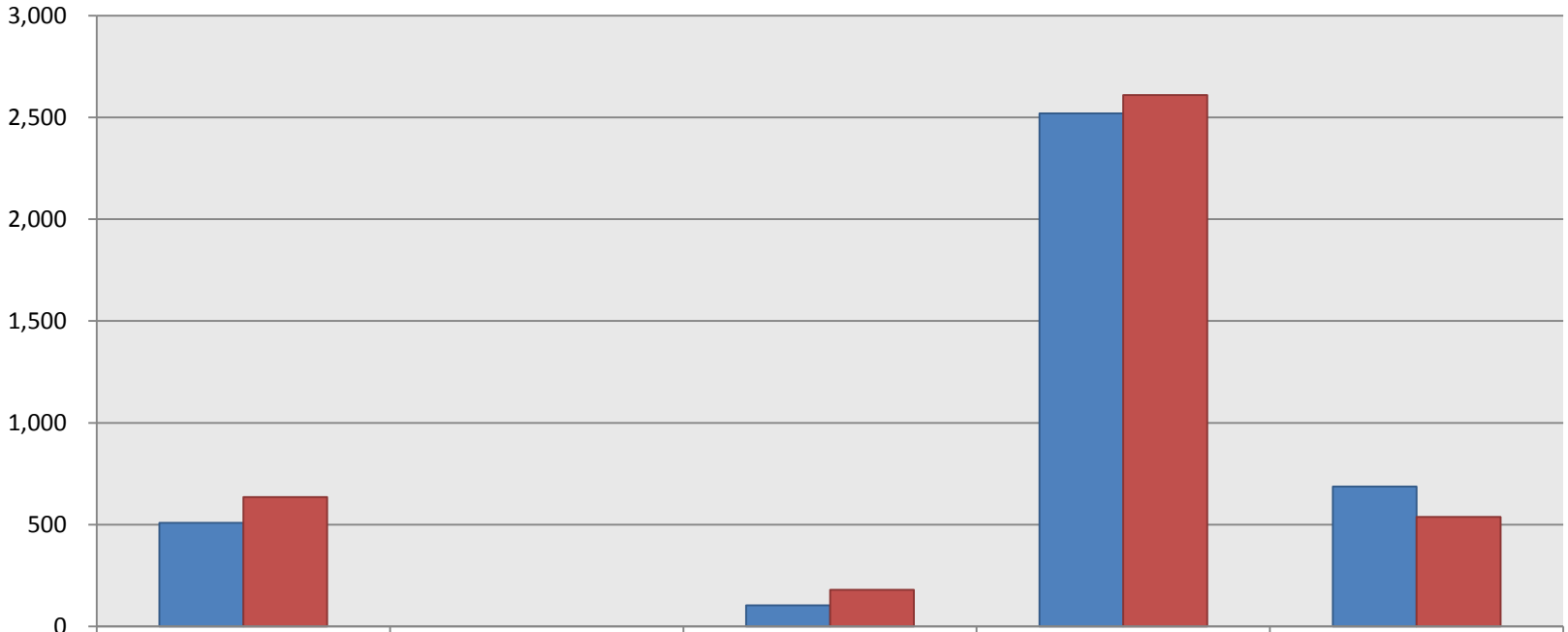
TRIMRC - VEGETATION MANAGEMENT (O&M)



	Takedowns	Cycle Impact	ETT Maintenance Trimming	Tree Outage Assessment Pilot
Planned	$0	$0	$660,000	$250,000
Expended	$0	$0	$438,095	$0

TRIMRC - VEGETATION MANAGEMENT (O&M)

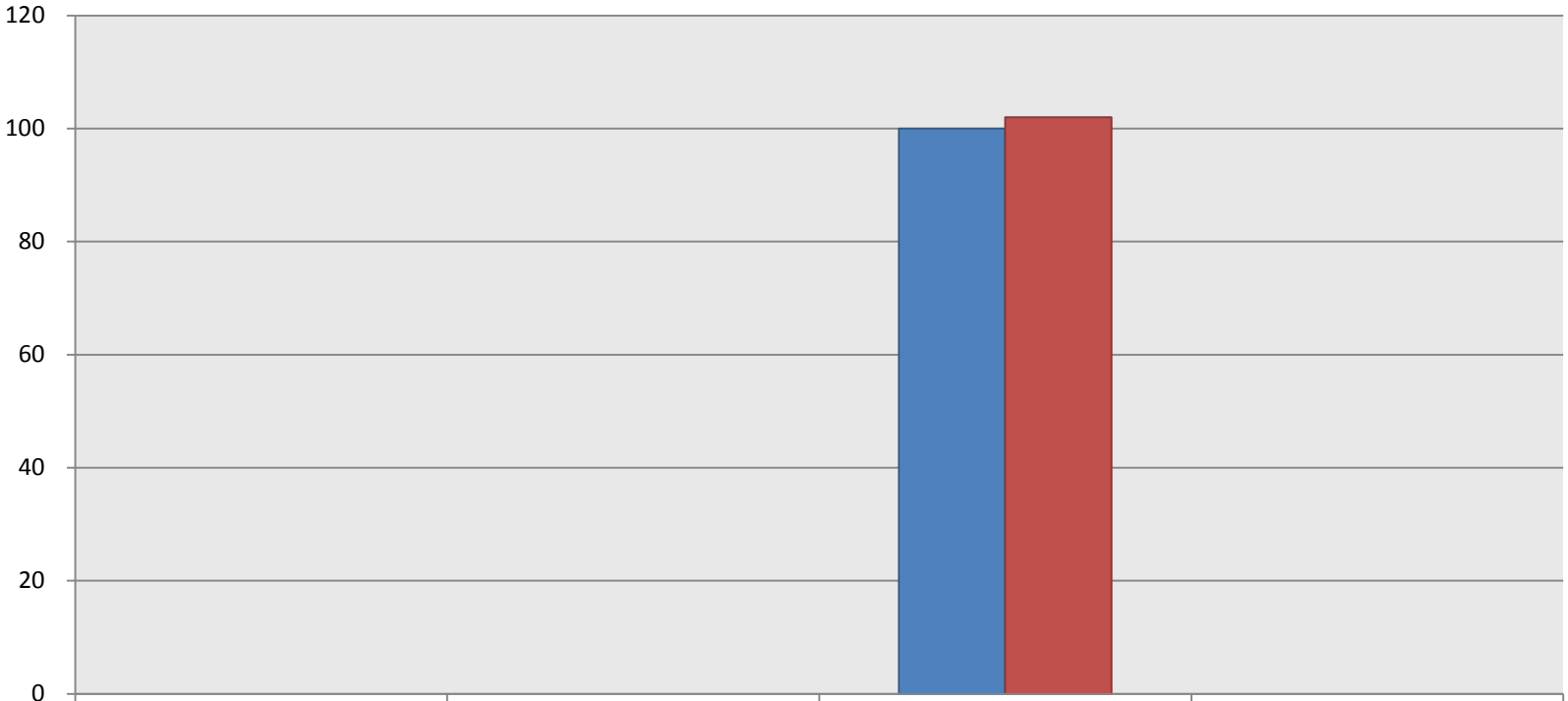
Units Completed - Base REP



	Reduce Scheduled Maintenance Trim Cycle	Hot Spot Trimming	Mid Cycle Trimming	Inspect Contractor	Reduce Distribution Rights-of-Way Cycle
Planned	508	0	104	2,520	687
Completed	635	0	179	2,610	537

TRIMRC - VEGETATION MANAGEMENT (O&M)

Units Completed - REP II



	Takedowns	Cycle Impact	ETT Maintenance Trimming	Tree Outage Assessment Pilot
Planned	0	0	100	0
Completed	0	0	102	0

Section 3

2013 O&M NESC Programs

Public Service of New Hampshire
The Northeast Utilities System

RELIABILITY ENHANCEMENT PROGRAM - NATIONAL ELECTRICAL SAFETY CODE

POWERUP
Taking reliability to the next level

2013 PLAN AND PROGRESS

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Year End 2013 Summary of PSNH Reliability Enhancement Program – O&M
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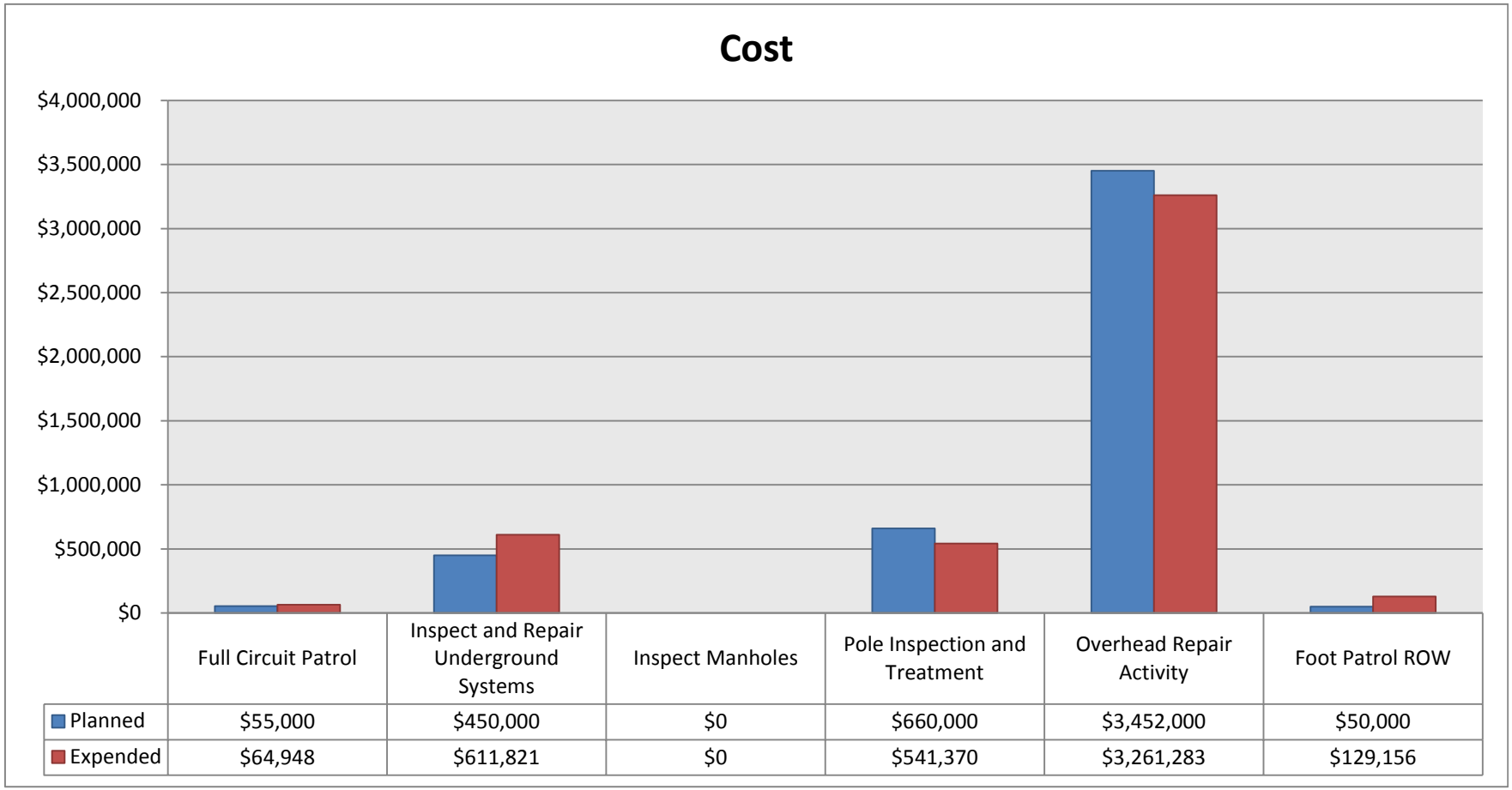
Jan 1 2013 - Dec 31 2013

REP #	NESCRC - National Electrical Safety Code (O&M)								
		Units	**$ Planned**	**$ Expended**	**$ Variance**	**Units Planned**	**Units Completed**	**Units Variance**	**Cost Per Unit**
1	Full Circuit Patrol	# Miles	$55,000	$64,948	$9,948	1,100	1,205	105	$54
1	Inspect and Repair Underground Systems	# Underground Maps	$450,000	$611,821	$161,821	982	595	-387	$1,028
1	Inspect Manholes	# Manholes	N/A (1)	N/A (1)	N/A	222	359	137	N/A
1	Pole Inspection and Treatment	# Poles	$660,000	$541,370	($118,630)	24,000	26,964	2964	$20
1	Overhead Repair Activity	# Repair Orders	$3,452,000	$3,261,283	($190,717)	30,000	22,648	-7352	$144
1	Foot Patrol ROW	# Miles	$50,000	$129,156	$79,156	697	272	(425)	$475
	Subtotal - Base REP		**$4,667,000**	**$4,608,578**	**($58,422)**	**57,001**	**52,043**	**($4,958)**	
	Subtotal - REP II		**$0**	**$0**	**$0**	**0**	**0**	**0**	
	TOTAL NESCRC		**$4,667,000**	**$4,608,578**	**($58,422)**	**57,001**	**52,043**	**($4,958)**	

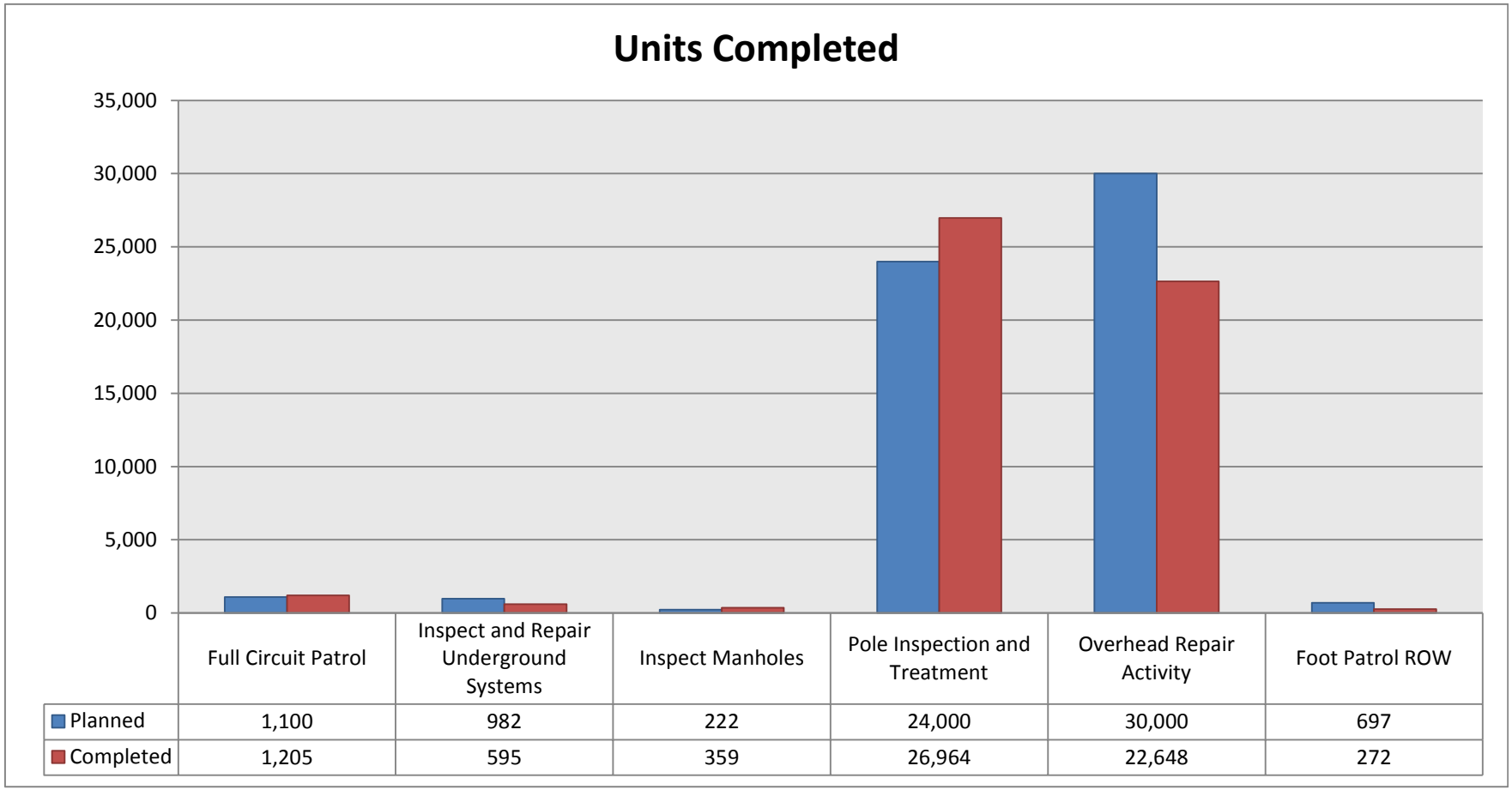
(1) Data is imbedded in another category as specified in O&M Briefing Sections.

NESCRC - National Electrical Safety Code (O&M)



	Full Circuit Patrol	Inspect and Repair Underground Systems	Inspect Manholes	Pole Inspection and Treatment	Overhead Repair Activity	Foot Patrol ROW
Planned	$55,000	$450,000	$0	$660,000	$3,452,000	$50,000
Expended	$64,948	$611,821	$0	$541,370	$3,261,283	$129,156

NESCRC - National Electrical Safety Code (O&M)



	Full Circuit Patrol	Inspect and Repair Underground Systems	Inspect Manholes	Pole Inspection and Treatment	Overhead Repair Activity	Foot Patrol ROW
Planned	1,100	982	222	24,000	30,000	697
Completed	1,205	595	359	26,964	22,648	272

Section 4

2013 Other Reliability Programs

Public Service of New Hampshire
The Northeast Utilities System

RELIABILITY ENHANCEMENT PROGRAM - RELIABILITY (O&M)

POWERUP
Taking reliability to the next level

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Year End 2013 Summary of PSNH Reliability Enhancement Program – O&M
Docket No. DE 09-035

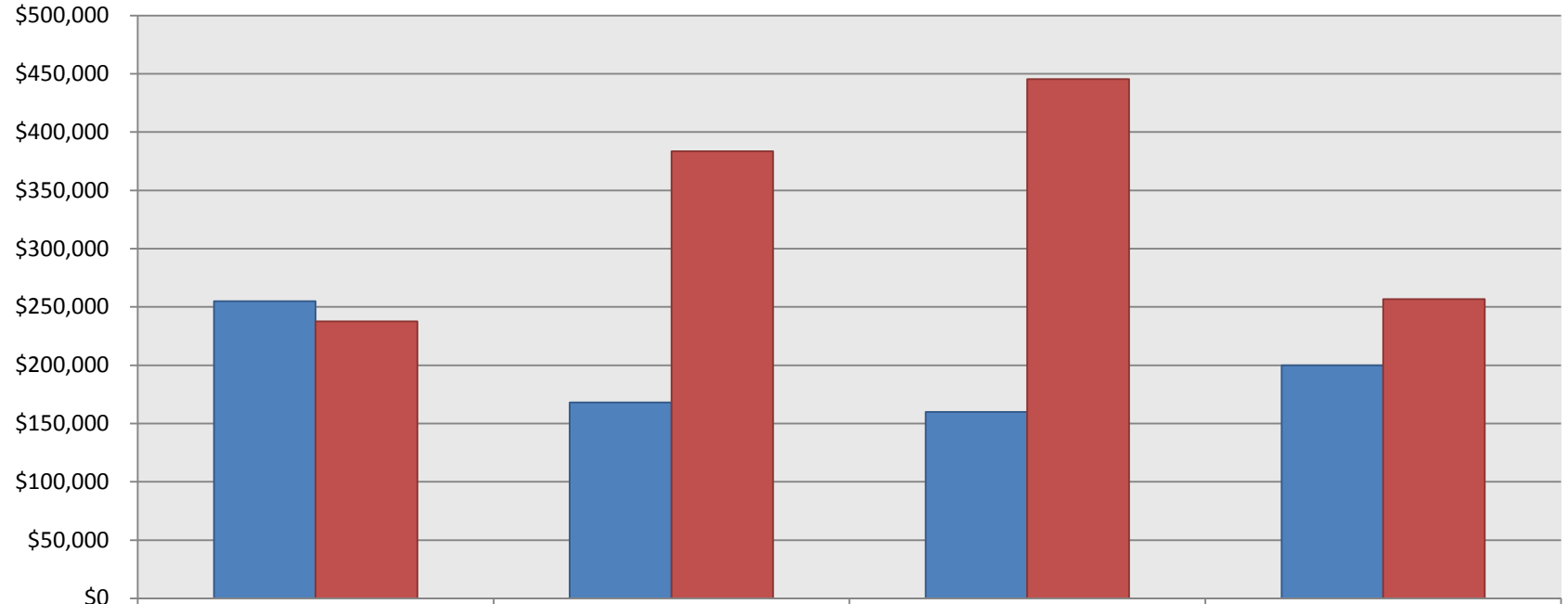
Jan 1 2013 - Dec 31 2013

REP #	RELIOM - RELIABILITY (O&M)								
		Units	**$ Planned**	**$ Expended**	**$ Variance**	**Units Planned**	**Units Completed**	**Units Variance**	**Cost Per Unit**
1	Overhead Switch Maintenance	# Switches	$255,000	$237,642	($17,358)	126	112	(14)	$2,122
1	Recloser Maintenance	# Recloser Orders	$168,000	$383,643	$215,643	61	81	20	$4,736
1	Fault Indicators	# Fault Indicators	$160,000	$445,523	$285,523	1,032	2,874	1,842	$155
1	Test & Repair Direct Buried Unjacketed Cable	# Runs	$200,000	$256,819	$56,819	150	119	(31)	$2,158
	Subtotal - Base REP		**$783,000**	**$1,323,627**	**$540,627**	**1,369**	**3,186**	**1,817**	
2	GIS O&M	N/A	$52,000	$210,967	$158,967	N/A	N/A	N/A	N/A
2	Install CLF's on 12 kV circuits		$811,000	$56,624	($754,376)	4	10	6	$5,662
2	Damage Assessment Pilot	N/A	$75,000	$21,851	($53,149)	N/A	N/A	N/A	N/A
2	O&M Portion of Capital	N/A	$600,000	$545,499	($54,501)	N/A	N/A	N/A	N/A
	Subtotal - REP II		**$1,538,000**	**$834,941**	**($703,059)**	**4**	**10**	**6**	
	TOTAL NESCRC		**$2,321,000**	**$2,158,568**	**($162,432)**	**1,373**	**3,196**	**1,823**	

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

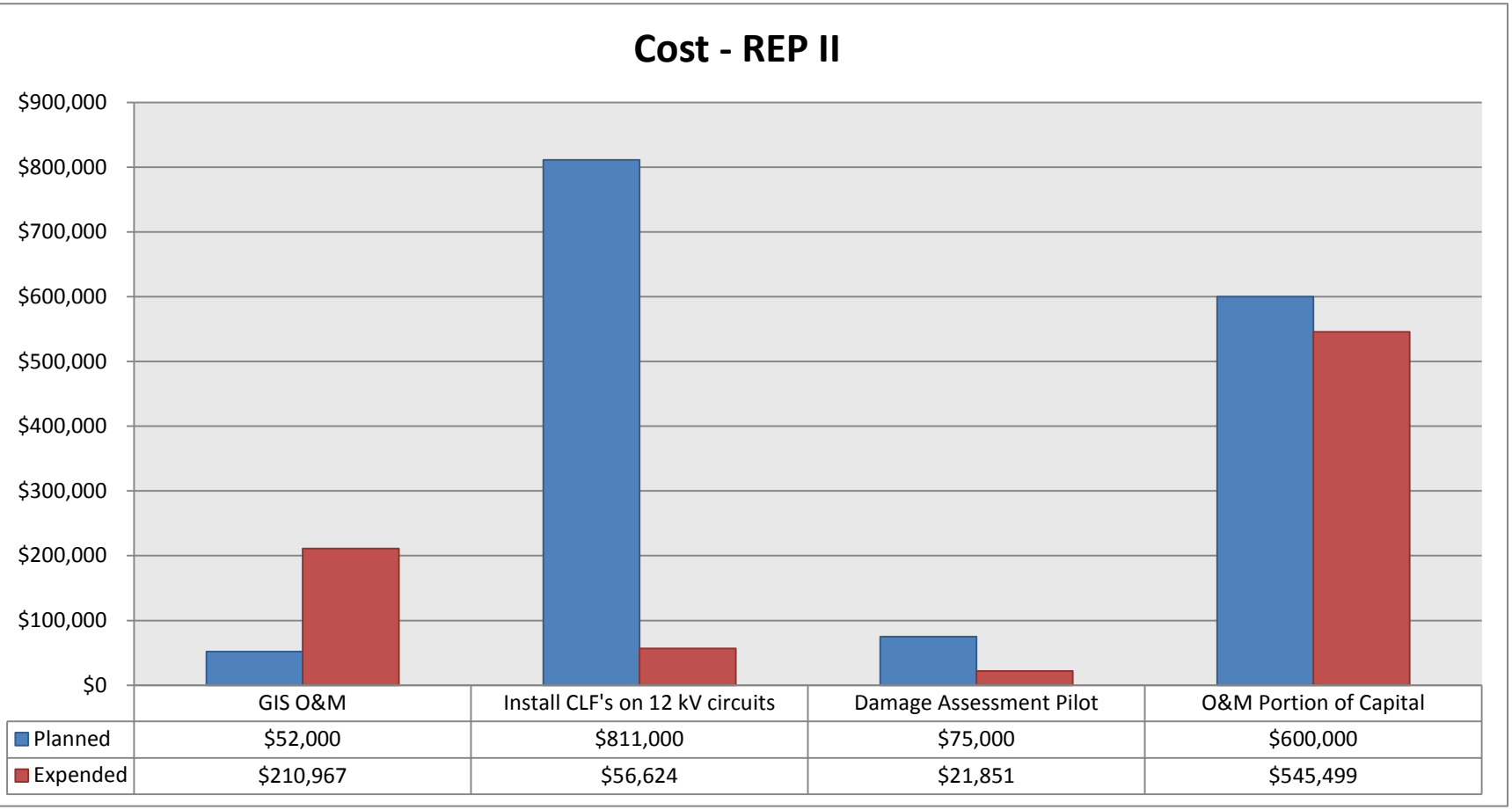
RELIOM - RELIABILITY (O&M)

Cost - Base REP



	Overhead Switch Maintenance	Recloser Maintenance	Fault Indicators	Test & Repair Direct Buried Unjacketed Cable
Planned	$255,000	$168,000	$160,000	$200,000
Expended	$237,642	$383,643	$445,523	$256,819

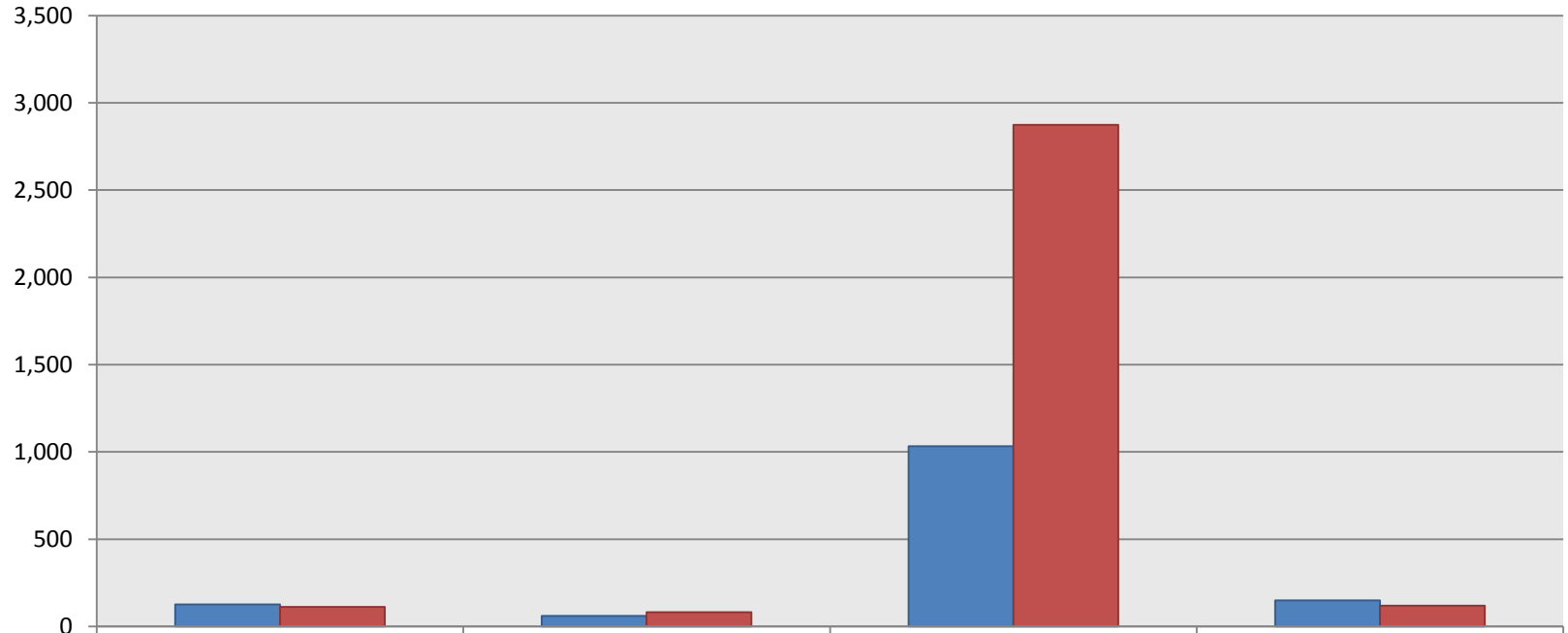
RELIOM - RELIABILITY (O&M)



	GIS O&M	Install CLF's on 12 kV circuits	Damage Assessment Pilot	O&M Portion of Capital
Planned	$52,000	$811,000	$75,000	$600,000
Expended	$210,967	$56,624	$21,851	$545,499

RELIOM - RELIABILITY (O&M)

Units Completed - Base REP



	Overhead Switch Maintenance	Recloser Maintenance	Fault Indicators	Test & Repair Direct Buried Unjacketed Cable
Planned	126	61	1,032	150
Completed	112	81	2,874	119

Section 5

2013 Capital Summary

Year End 2013 Summary of PSNH Reliability Enhancement Program – CAPITAL
Docket No. DE 09-035

Public Service of New Hampshire
The Northeast Utilities System

Jan 1 2013 - Dec 31 2013

POWERUP Taking reliability to the next level

CAPITAL - REP II			
	$ PLAN	**$ ACTUAL**	**$ VARIANCE**
Distribution Line Porcelain Changeout	$1,000,000	$1,181,984	$181,984
34.5kV Substation Breaker Replacement	$538,000	$2,949	($535,051)
Enhanced Tree Trimming	$3,000,000	$4,166,105	$1,166,105
Pole Top DSCADA Replacement	$350,000	$130,951	($219,049)
Substation RTU Replacement	$350,000	$284,531	($65,469)
Enable SCADA to Windsor Backup	$0	$38,923	$38,923
Distrib. Line Wire Upgrade/Eliminate Narrow ROW	$300,000	$211,198	($88,802)
Reliability Improvements Annual (Ongoing)	$1,046,000	$1,022,966	($23,034)
GIS Capital Project	$3,500,000	$3,734,080	$234,080
Hazard Tree Removal	$1,147,000	$3,305,141	$2,158,141
Full Width ROW Clearing	$1,417,000	$919,402	($497,598)
OMS Capital Project	$100,000	$0	($100,000)
	$12,748,000	**$14,998,230**	$2,250,230

CAPITAL - DUE TO BASE REP			
	$ PLAN	**$ ACTUAL**	**$ VARIANCE**
Reject Pole Replacement	$1,330,000	$890,367	($439,633)
Pole Reinforcement	$35,000	$27,619	($7,381)
NESC Capital Work	$750,000	$2,879,781	$2,129,781
Airbreak Switch Replacement	$100,000	$168,031	$68,031
Direct Buried Cable Replacement	$850,000	$1,820,784	$970,784
Direct Buried Cable Injection	$400,000	$631,787	$231,787
	$3,465,000	**$6,418,370**	$2,953,370

TOTAL REP CAPITAL	**$16,213,000**	**$21,416,600**	$5,203,600

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 2,608 porcelain cutouts, insulators, lightning arresters and in-line disconnect were replaced with polymer units in 2013. Failures of polymer insulators and cutouts have been very low.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$1,000,000	$1,181,984	$181,984

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 on a 10 year cycle at the time the substation is maintained.

Reliability Benefit:

Reduce failure to operate of breakers. Reduce maintenance costs.

Results:

No breakers were replaced in 2013 as part of REP. Six were replaced as part of non-REP projects.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$538,000	$2,949	($535,051)

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 2013, 94 miles of ETT was performed.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$3,000,000	$4,166,105	$1,166,105

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:

One obsolete RTU was replaced as part of REP. An additional 10 were replaced as part of non-REP work.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$350,000	$130,951	($219,049)

SUBSTATION RTU REPLACEMENT (REP II):

Program Description: This project is to replace the remaining estimated 15 of 23 older Remote Terminal Units (RTUs) 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 2013, 2 obsolete S/S RTUs were replaced. .

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$350,000	$284,531	($65,469)

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: In 2013, 2 additional sites were completed. There is 1 site is remaining to be completed.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$0	$38,923	$38,923

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 (ROW) 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: In 2013, 3 projects were completed.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$300,000	$211,198	($88,802)

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 adding additional sectionalizing devices. Reduce permanent outages by installing reclosers. Perform other activities as identified.

Results: Reliability projects were completed on most hit list (top 50) circuits. .

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$1,046,000	$1,022,966	($23,034)

GIS CAPITAL PROJECT (REP II):

Program Description:

Define overall scope and desired end products; 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:

Conversion of all areas was completed in 2013 along with business process rollout. GIS system is functional and in production.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$3,500,000	$3,734,080	$234,080

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.

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 2013, 11,187 trees were removed.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$1,147,000	$3,305,141	$2,158,141

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.

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 2013, 22 miles of ROWs were reclaimed.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$1,417,000	$919,402	($497,598)

OMS CAPITAL PROJECT:

Program Description: Develop an Outage Management System (OMS) utilizing GIS as the base data source for the PSNH distribution system.

Total Unit Population: N/A.

Reliability Benefit: An overall improvement in reliability performance is an expected outcome of OMS implementation.

Results: PSNH has been actively participating in a four company, three state enterprise project to implement a common OMS across the Northeast Utilities System. For 2013, a contribution of $100,000 was anticipated, however all resources utilized to date were non-REP funds.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$100,000	$0	($100,000)

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:

In 2013, 27,145 poles were inspected with 570 found to be defective and required replacement (2.1% defective rate). The vendor was bought out by a competitor; therefore, the inspection was started later than normal and was not completed until December. Only 74 poles were replaced in 2013. The remainder will be replaced in 2014.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$1,330,000	$890,367	($439,633)

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 2013, no poles were reinforced. Costs incurred in 2013 were unpaid invoices from 2012.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$35,000	$27,619	($7,381)

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: For 2014, 4,584 plant units were identified for replacement. Additional units are identified during the Overhead Plant inspections.

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. In 2013, 1,362 plant units were replaced.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$750,000	$2,879,781	$2,129,781

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: In 2013, 4 obsolete airbreak switches were replaced. Several others were substantially worked, but were not commissioned until 2014.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$100,000	$168,031	$68,031

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 33,100 feet of direct buried cable was replaced with new cable in conduit as part of this project in 2013. An additional estimated 62,000 feet of direct buried cable was replaced in conduit as part of non-REP projects.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$850,000	$1,820,784	$970,784

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 42,000 feet of cable was injected in 2013. The estimated cost was $14.83 per foot, compared to $55 per foot for cable replacement in conduit.

Capital Cost:

$ PLAN	$ ACTUAL	$ VARIANCE
$400,000	$631,787	$231,787

Section 6

2013 Other Activities

Public Service of New Hampshire
The Northeast Utilities System

POWERUP

2013 ACTIVITIES ON TOP 50 RANKED BY COSAIDI IN 2011

2011 Rank	2013 Co SAIDI Rank	Change in Rank Gain (Worse) from 2011	Circuit	AWC	SMT	Hazard Tree Removal	Mid Cycle	ETT	NESC Full Circuit Patrol	NESC Repair Activity	Inspect URD Systems	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	5	4	3133X	DERRY	√	√	√	√		√	√					√	√	√	√		√	Preventive repair due to thermovision
2	2	0	316X1	NEWPORT		√			√	√											√	Replace hot line clamps with ampact connectors
3	148	145	315	NEWPORT										√	√							
4	23	19	39X1	KEENE	√	√				√	√		√			√					√	Fuse additions, Removed small wire out of ROW
5	35	30	360	MANCHESTER WEST										√							√	Install overhead fault indicators
6	12	6	3410	NEWPORT		√				√	√				√				√		√	Fuse additions, Smart Grid Project 316/3410, Oakledge DB URD Replacement
7	286	279	3157X1	ROCHESTER		√				√						√						
8	11	3	3141X	DERRY	√	√		√		√	√		√		√					√	√	Replace damaged oil switches
9	3	(6)	355X10	LANCASTER	√	√		√		√	√											
10	352	342	3103	EPPING						√	√			√								
11	NR	NR	3115X	DERRY		√				√					√						√	Improve coordination between protective devices
12	4	(8)	316	NEWPORT	√	√	√			√	√			√	√						√	Fuse additions, Smart Grid Project 316/3410, Backbone Rehabilitation, and addition of fault indicators
13	39	26	3137X	EPPING	√	√			√	√		√		√	√							
14	44	30	60W1	NEWPORT						√											√	Thermovision repairs
15	58	43	24X1	HILLSBORO	√	√				√	√		√			√	√			√	√	Protection and fusing upgrades, Thermovision repair
16	10	(6)	18W1	FRANKLIN	√	√				√	√		√			√				√	√	Fuse additions, Install CLFs on main line (backbone) transformers, Trimming for new circuit out of substation
17	95	78	3222X	LACONIA						√		√		√	√						√	Fusing upgrades
18	88	70	392X7	ROCHESTER		√				√					√	√						
19	222	203	3105X1	PORTSMOUTH	√	√				√						√						
20	77	57	3271X2	MANCHESTER WEST	√	√	√			√						√						
21	99	78	78X1	KEENE		√										√				√	√	Protection and fusing upgrades
22	25	3	55W2	NEWPORT		√				√						√				√	√	Retired damaged switch, Removed small wire out of ROW
23	29	6	319X1	PITTSFIELD						√	√											
24	47	23	3525X5	BERLIN	√					√		√	√			√						
25	90	65	323X5	MANCHESTER WEST	√	√												√	√			
26	43	17	392X1	ROCHESTER		√				√												
27	196	169	3615X3	MANCHESTER EAST	√	√		√		√					√	√						
28	8	(20)	73W2	ROCHESTER						√												
29	17	(12)	42X3	NEWPORT	√	√	√	√		√	√	√	√									
30	131	101	3114X	FRANKLIN		√			√	√	√	√	√								√	Fusing upgrades
31	139	108	4W1	KEENE	√	√															√	Thermovision repairs
32	563	531	389	NASHUA		√								√								
33	13	(20)	3128X	DERRY		√		√		√	√						√	√	√			
34	164	130	3211X	NASHUA	√	√	√			√	√											
35	133	98	11W1	LACONIA						√	√				√						√	Substation getaway cables replaced with new, Install CLFs on main line (backbone) transformers.
36	9	(27)	3152X	EPPING	√	√	√			√				√								
37	356	319	32W1	ROCHESTER	√	√				√	√	√										
38	41	3	73W1	NEWPORT	√	√				√												
39	326	287	388	MANCHESTER EAST						√											√	Fusing upgrades
40	94	54	3140	HILLSBORO	√					√				√	√		√				√	Thermovision repairs
41	65	24	3217X	NASHUA		√				√	√			√								
42	26	(16)	23X5	MILFORD	√	√				√	√								√		√	Add fault indicators and sectionalizing points
43	322	279	3614X3	MANCHESTER EAST	√	√				√	√										√	Replace damaged spacer cable
44	170	126	3178X4	KEENE	√	√				√												
45	110	65	371X1	ROCHESTER						√	√					√						
46	36	(10)	348X1	LANCASTER	√	√		√		√						√						
47	340	293	3271X4	MANCHESTER WEST						√											√	Shift town of New Boston to new more reliable feed
48	NR	NR	313	MONADNOCK										√	√						√	Replaced tabletop airbreak switches with new.
49	NR	NR	3601	ROCHESTER										√								
50	14	(36)	W13	KEENE	√	√				√	√			√							√	Protection upgrades

36	# Circuits Improving in Rank
10	# Circuits Worsening in Rank
84	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

2014 O&M and Capital

Summary Plan

2014 SUMMARY PLAN OF PSNH RELIABILITY PROGRAM
O&M
Docket No. DE 09-035

Public Service of New Hampshire
The Northeast Utilities System

POWERUP

TRIMRC - VEGETATION MANAGEMENT (O&M)				
	Unit of Measure	**$ Budget**	**Unit Budget**	**Cost Per Unit**
Reduce Scheduled Maintenance Trim Cycle	# Miles	$2,835,000	614	$4,617
Mid Cycle Trimming	# Miles	$500,000	104	$4,808
Hot Spot Trimming	N/A	$135,000	N/A	N/A
Inspect Contractor	# Miles	N/A (1)	2,520	N/A
Reduce Distribution Rights-of-Way Cycle	# Acres	$210,000	400	$525
Subtotal - Base REP		**$3,680,000**		
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	$600,000	107	$5,607
Subtotal - REP II		**$600,000**		
Total TRIMRC		**$4,280,000**		

NESCRC - National Electrical Safety Code (O&M)				
	Unit of Measure	**$ Budget**	**Unit Budget**	**Cost Per Unit**
Full Circuit Patrol	# Miles	$50,000	1,085	$46
Inspect and Repair Underground Systems	# UG Maps	$200,000	540	$370
Inspect Manholes	# Manholes	N/A (1)	32	N/A
Pole Inspection and Treatment	# Poles	$770,000	24,000	$32
Overhead Repair Activity	# Repair Orders	$1,740,000	23,326	N/A
Foot Patrol ROW	# Miles	$100,000	168	$595
Subtotal - Base REP		**$2,860,000**		
Subtotal - REP II		**$0**		
TOTAL NESCRC		**$2,860,000**		

RELIOM - RELIABILITY (O&M)				
	Unit of Measure	**$ Budget**	**Unit Budget**	**Cost Per Unit**
Overhead Switch Maintenance	# Switches	$200,000	75	$2,667
Recloser Maintenance	# Recloser Orders	$200,000	65	N/A
Fault Indicators	# Fault Indicators	$100,000	645	$155
Test & Repair Direct Buried Unjacketed Cable	# Runs	$200,000	188	$1,064
Subtotal - Base REP		**$700,000**		
GIS O&M	$ Expended	$300,000	N/A	N/A
O&M Portion of Capital	$ Expended	$600,000	N/A	N/A
Subtotal - REP II		**$900,000**		
TOTAL RELIOM		**$1,600,000**		

Total O&M Spending 2014 **$8,740,000**

Rate Case O&M Plan		**$8,740,000**
Booked Reserve (2) **(Carried Over from 2013)**		**$757,481**
TOTAL O&M Spending 2014		**$9,497,481**

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

(2) Carryover is the budgeted O&M per Docket DE 09-035 compared with actual O&M spend.

NOTE: 2014 line item O&M initiatives are subject to change based on carrying cost requirements for existing in service capital projects and 2014-2015 capital investment.

2014 SUMMARY PLAN OF PSNH RELIABILITY PROGRAM
CAPITAL
Docket No. DE 09-035

Public Service of New Hampshire
The Northeast Utilities System

POWERUP
Taking reliability to the next level

CAPITAL - REP II		
	Project #	**$ Budget**
Distribution Line Porcelain Changeout	UBCAD	$2,000,000
34.5kV Substation Breaker Replacement	A07X44	$570,000
Enhanced Tree Trimming	C12ETT	$3,090,000
Pole Top DSCADA Replacement	A07DL41	$500,000
Substation RTU Replacement	A07SS41	$0
Enable SCADA to Windsor Backup	A07WI47	$0
Distrib. Line Wire Upgrade/Eliminate Narrow ROW	A10X06	$0
Reliability Improvements Annual	DR9R	$1,000,000
GIS Capital Project	A10X05	$1,000,000
Hazard Tree Removal	A13X04	$1,068,000
Full Width ROW Clearing	A13X05	$3,443,000
		$12,671,000

CAPITAL - DUE TO BASE REP		
	Project #	**$ Budget**
Reject Pole Replacement	A07X45	$1,248,000
Pole Reinforcement	A07X99	$0
NESC Capital Work	A07X98	$1,000,000
Airbreak Switch Replacement	A08X44	$0
Direct Buried Cable Replacement	A04S34	$1,000,000
Direct Buried Cable Injection	A10X04	$1,000,000
		$4,248,000

TOTAL REP CAPITAL		**$16,919,000**

NOTE: 2014 line item capital investment is subject to change based on carrying cost requirements for existing in service capital projects and 2014-2015 capital investment.