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March 14, 2007

Honorable Philip L. Bartlett II, Senate Chair
Honorable Lawrence Bliss, House Chair
Joint Standing Committee on Utilities and Energy
115 State House Station
Augusta, Maine 04333

Re: Review of Central Maine Power Company's Distribution System and Distribution Practices and Procedures

Dear Senator Bartlett and Representative Bliss:

On February 23, 2004, the Joint Standing Committee on Utilities and Energy (Committee) sent a letter to the Public Utilities Commission (Commission) directing the Commission to examine the practices of Maine's transmission and distribution (T&D) utilities that affect the safety and reliability of the electric grid. On June 17, 2005, we issued our Final Report in response to the Committee's request.

As noted in our Final Report, the Commission found that, as a general matter, the T&D utilities in the state were adequately operating and maintaining the grid. The Commission found however, that while Central Maine Power Company (CMP) had done a good job in meeting the performance measures of its Alternative Rate Plan (ARP), there appeared to be a significant discrepancy between CMP's worst performing circuits and its overall performance. This disparity along with CMP's suspension of its distribution inspection program, the aging of CMP's plant, the increasing number of outages on its system and an apparent problem with CMP's distribution planning and maintenance operations record-keeping, led the Commission to believe that a further, more in depth review of CMP's distribution system was warranted. The Commission and CMP met prior to the issuance of the Commission's Final Report and agreed that this was an appropriate time to further review CMP's distribution system as a means of addressing the areas of concern raised during the general grid review, to assess the effectiveness of the ARP's current reliability mechanism and to clarify any areas of misunderstanding between CMP and the Commission which may have arisen as a result of the initial general examination.

On September 1, 2005, the Commission issued an RFP for purposes of selecting an independent party to conduct the additional and more extensive review of CMP's distribution system. After a very thorough evaluation process, which included input from CMP, the Commission selected Williams Consulting, Inc. (WCI) to conduct the review.

Please find attached WCI's Final Report (the Williams Report) submitted to the Commission on February 26, 2007. As more fully discussed in the Williams Report, based on its interviews with CMP personnel, data analysis, industry comparisons and field inspections of CMP's electric distribution system, WCI reached the following findings and conclusions:

- CMP has achieved a high level of information system integration and development of support tools. Based on its experience, WCI believes that they are among the leaders in the utility industry in this area.

- WCI believes that the Company's record retention policies and practices are adequate with the exception of distribution betterments. The retention policy should be revised to maintain betterment project requests and records for a longer period than one year back.

- CMP instituted a 10-year circuit inspection program in 2005. The inspection records are maintained electronically which should facilitate tracking and preventative maintenance.

- CMP's distribution plant is relatively young, particularly pole plant. Some of this is due to recovery from ice storms and other damaging storms in the recent past.

- CMP's overhead distribution plant appears to be in good mechanical condition. CMP has undertaken a number of pro-active programs to improve the performance of the system, such as the focused animal guard program. However, based on WCI's field observations and professional experience, WCI found that the state of vegetation encroachment was less than satisfactory.

- Based on the physical condition inspection results, CMP faces a significant risk of outages due to vegetation encroachment on the overhead primary distribution system. The risk includes events such as tree fires, momentary customer interruptions, flickering lights, damage to customers' equipment, hazard to the general public, and increased recloser operations. This latter event could require CMP to inspect and/or replace reclosers more frequently. Of major concern is that between 12.7% and 19% of the circuits have vegetation in direct contact with the conductor posing an immediate risk of outages, potential fires, hazard to the general public, momentary interruptions, flickering lights, damage to customers' equipment and increased recloser operations.

- CMP does not employ a cycle trim program. CMP sets an informal goal of trimming 15% to 20% of its 3-phase circuits annually. However, these circuits only comprise 20% of the system. The remaining 80% are planned for trim on a reactive basis. While the arborists have good analytical tools to plan the trim program, the level of funding for distribution vegetation management is the constraining element.

- The current ARP targets for Customer Average Interruption Duration Index (CAIDI) and System Average Interruption Frequency Index (SAIFI) appear to be a protective minimum or floor intended to assure that reliability performance does not deteriorate. These annual targets have always been met by CMP and have been adjusted several times in the recent past to accommodate changes in reporting levels and exclusions. The current ARP targets are measured at the Company level and do not provide targets at the Service Center or circuit level.

- CMP has stated that its approach to reliability performance is to "manage to the ARP targets". While this may be understandable from a cost perspective it virtually assures that CMP's reliability performance will not improve.

- CMP identifies its 10 worst performing circuits annually and focuses efforts to improve their performance so that they fall from the list during the year following remediation. However, WCI found a number of worst performing circuits that remained on the list in subsequent years.

- Although meeting the ARP reliability targets, CMP's reliability performance falls into the third quartile (i.e., poorer than average performance) for CAIDI, as compared to the Institute of Electrical and electronic Engineers (I.E.E.E.) survey of U.S. utilities. Further, CMP's SAIFI falls within the fourth quartile (i.e., worst performers), and has been increasing (getting worse) during the period 2001-2005. CMP's comparative performance against <u>rural-only</u> Northeast utilities is better. CMP falls within the third quartile, ranking 6th out of 9 utilities.

The Commission intends to address the findings and the recommendations contained in the Williams Report in CMP's upcoming revenue requirement/ARP renewal case which is expected to commence on May 1, 2007.

Should the Committee desire a more detailed presentation of the Report, or any additional information related to this matter, please feel free to contact us.

Sincerely,

Kurt Adams
Chairman

Sharon Reishus
Commissioner

Vendean Vafiades
Commissioner

CC/clm

Final Report
Docket No. 2005-705
CMP Distribution Plant Evaluation

Submitted to:

MPUC
Maine Public Utilities Commission

February 26, 2007

Submitted by:

WCI

Williams Consulting, Inc.

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1. Executive Summary

1.1. Background

As a result of a 2005 examination of issues associated with the safety and reliability of Maine's electric transmission and distribution systems, the Maine Public Utilities Commission (MPUC) determined that an in-depth review of Central Maine Power's (CMP) distribution system and operation and maintenance practices and procedures should be performed. In December 2005, the Commission retained Williams Consulting, Inc. to undertake a Distribution Plant Evaluation of CMP. This Report summarizes our independent assessment; sets forth the findings derived from data requests, interviews, data analysis, industry comparisons, and field inspections of the condition of CMP's electric distribution system; and makes certain recommendations for consideration. CMP responded to some factual matters before the final report was issued, however, has not responded in its entirety to the Report.

1.2. Scope and Methodology

The overall project scope was designed to address the following questions:

- Is the distribution system adequate (e.g., design standards and physical plant condition)?
- Is investment in distribution facilities adequate to ensure reliable service?
- What is the physical condition of the distribution system?
- Do distribution operation and maintenance practices, procedures, and inspection programs provide adequate coverage of both urban and rural areas?
- Are distribution system planning, improvements, and record keeping proper to meet demands across CMP's service area?
- Is CMP's distribution vegetation management program effective?

Our project methodology included:

- Interview meetings with 29 CMP management, technical, and field personnel
- Development and analysis of 182 data requests to CMP
- Development of a statistically valid sample designed to represent the overall electric distribution system
- Independent physical field inspections of 16 circuits, including 2,597 poles, to assess the condition of the overall distribution system
- A review and evaluation of CMP's distribution record keeping practices
- Review and evaluation of the Company's Field Operating Procedures related to distribution system operation and maintenance procedures and practices
- Periodic meetings with MPUC Staff, Commissioners, and CMP management in Augusta, Maine

1.3. Findings

1.3.1. Systems and Record keeping

- CMP has achieved a high level of information system integration and development of support tools. Based on our experience, we believe they are among the leaders in the utility industry.
- CMP has a formal records retention program which specifies the type of document, its form (e.g., paper or electronic), and its retention period. CMP developed its record retention policies by first examining records retention requirements recommended by the Federal Energy Regulatory Commission (FERC). CMP then expanded its policies to incorporate applicable state requirements, and further expanded them to include CMP and Energy East record retention needs from a business perspective.
- Area or regional power supply and transmission studies, which are conducted on an as-needed basis (periods ranging from 3-11 years), are retained until the following full study is completed and approved. CMP stated that the frequency of area studies for a given area is based on changing customer needs, distribution system needs and how the system is operating and what operational constraints are being experienced. CMP actively monitors the areas and prioritizes studies based on these factors. Planning engineers coordinate with the Energy Services Advisors (ESAs) and Distribution Engineers during the study process. These long-range (5-10 year horizon) area studies identify distribution circuits that are expected to become loaded in excess of their capacity either through normal load growth or anticipated development projects. As part of the area planning process, mitigation of overload situations on the distribution system circuits are incorporated into the plan in the form of load shifting, re-configuration, and/or provision of new transmission to distribution substations in the area. Detailed distribution planning studies are not included in these area studies; instead, they are performed on a shorter-term basis at the Service Center level by the Distribution Engineers.
- Distribution system betterment plans and studies prepared by CMP's Distribution Engineers are retained for the prior, current, and plan year by both the Distribution Engineer and the Manager of Distribution Engineering. CMP utilizes a Project Review Committee to assess proposed projects, including distribution betterments. The committee is made up of 33 members covering practically all aspects of the operating side of the company.
- CMP's record retention requirements for circuit loadings, capacities and betterment records are not individually identified in record retention schedules. Betterments appear under the headings Projects/Condition (under Power Delivery), while circuit loadings and capacities were previously maintained in a legacy FoxPro database (with an Excel copy), and are currently held in the SAP system. These records go back 10 years. However, these data do not appear on a record retention schedule.
- We believe that the Company's record retention policies and practices are adequate with the exception of distribution betterments. The retention

policy should be revised to maintain betterment project requests and records for a longer period than one year back.

1.3.2. Reliability

- Although within the Alternative Rate Plan (ARP) reliability targets, CMP's reliability performance falls into the third quartile (i.e., poorer than average performance) for Customer Average Interruption Duration Index (CAIDI), as compared to the Institute of Electrical and Electronic Engineers (I.E.E.E) survey of U.S. utilities. Further, CMP's System Average Interruption Frequency Index (SAIFI) falls within the fourth quartile (i.e., worst performers), and has been increasing (getting worse) during the period 2001-2005. CMP's comparative performance against rural-only Northeast utilities is better. CMP falls within the third quartile, ranking 6th out of 9 utilities. It should be noted that comparisons against relatively small panels can distort the meaning of quartiles.
- The current ARP targets for CAIDI and SAIFI appear to be a protective minimum or floor intended to assure that reliability performance does not deteriorate. These annual targets have always been met by CMP and have been adjusted several times in the recent past to accommodate changes in reporting levels and exclusions. The current ARP targets are measured at the Company level and do not provide targets at the Service Center or circuit level.
- CMP has stated that its approach to reliability performance is to "manage to the ARP targets". While this may be understandable from a cost perspective it virtually assures that CMP's reliability performance will not improve.
- CMP identifies its 10 worst performing circuits annually and focuses efforts to improve their performance so that they fall from the list during the year following remediation. However, we found a number of worst performing circuits that remained on the list in subsequent years. Additionally, these circuits are selected based on their "contribution" to system-wide SAIFI and CAIDI[1]. While remediation efforts for these circuits will bring about overall system-level reliability improvement, there is no guarantee that worst performing circuits measured at the Service Center[2] or circuit level are being adequately addressed.
- CMP appears to do a good job of classifying outage causes and has in the past focused improvement programs on mitigating problem areas. For example, CMP has significantly reduced the percentage of outages caused

[1] System-wide SAIFI and CAIDI are based on the total number of customers for the system in the denominator of the calculation; while the circuit's connected customers is part of the numerator calculation. So a circuit's "contribution" to system-wide figures will assign a higher contribution for those circuits with higher number of connected customers than for those with fewer connected customers, assuming the same number of outages and restoration times.

[2] CMP manages its distribution system through 11 Service Centers geographically spread through its service area at Portland, Alfred, Augusta, Bridgton, Brunswick, Dover, Fairfield, Farmington, Lewiston, Portland, Rockland and Skowhegan.

by animal contact through its pro-active program of installing animal guards on distribution transformers. However, CMP's tree-related outages are among the highest in the industry. During 2005, they accounted for 42.3% of the outages compared to Edison Electric Institute's (EEI) U.S. average of 21%. This clearly indicates that vegetation management presents significant improvement opportunities.

- Our analysis suggests that tree-related outages are more frequent in areas with lower customer density. This implies that the Company focuses its vegetation management and overhead lines maintenance resources on its more heavily populated service areas. Given the ARP targets and measurements, this is not surprising. However, no compelling evidence was found to suggest that dense vs. less-dense areas had materially different outage performance other than tree-related, and our condition inspection results indicated that the physical condition of the system is uniform across Service Centers and dense and less-dense areas.

1.3.3. Operations and Maintenance Expenditures

- As compared to several New England utilities and to the other Energy East operating companies, we found that CMP is in the mid-range with regard to overall O&M expenditures per customer and per line mile. Due to the accounting methodology employed at CMP, we were unable to derive meaningful comparisons of per unit operations expenses or maintenance expenses separately.
- We compared CMP's vegetation management expenditures as a percent of total O&M budget as well as on a dollar per line mile basis. CMP's expenditures for vegetation management were fairly consistent with those for the other Energy East companies.
- On average, CMP completes 97% of its annual work orders each year. Its backlog of distribution work orders has remained fairly constant during the period 2001-2005, indicating that CMP is keeping up with its distribution maintenance efforts (excluding vegetation management). However, the suspension of the formal circuit inspection program during the 2001 to 2005 period prevents us from commenting if all needed work orders were actually written. With the re-implementation of a formal circuit inspection program in February 2005, CMP stated that they plan to retain records of the work-orders that emanate from that program indefinitely.

1.3.4. Capital Expenditures

- A comparison of CMP's distribution capital expenditures against the other Energy East companies demonstrated that CMP appears to be receiving its fair share of capital funds, as measured on a per customer and per line mile basis. We did not attempt to compare CMP against other utilities in the area of capital expenditures because capital expenditures tend to be lumpy due to the nature of and need for company-specific improvement projects. Therefore, such a comparison would not yield meaningful results.

1.3.5. Distribution System

- CMP's distribution plant is relatively young, particularly pole plant. Some of this is due to recovery from ice storms and other damaging storms in the recent past.
- CMP instituted a formal 10-year circuit inspection program in 2005. The inspection records are maintained electronically, which should facilitate tracking and preventative maintenance. However, the circuit inspection program does not require physical inspection of poles unless the inspector detects a potential problem. Many poles are inspected visually from a distance. Additionally, this program does not require the inspectors to record the state of vegetation around the circuits unless there is contact with the conductor or if a danger tree is observed. We understand that in the 1990s and prior to abandoning the former inspection program, CMP's inspectors did record the state of vegetation as part of their inspection process.
- CMP's system planning function, including staff capabilities and methodologies appear to be at industry standards. However, during the interview process, it was suggested that CMP no longer had a sufficient number of Distribution Engineers to meet the engineering workload in the Service Centers, particularly betterment planning studies. CMP stated that they are more effectively employing technology to permit each engineer to accomplish more analysis. For example, CMP has implemented the CYME set of distribution analysis programs to aid the distribution engineers in modeling the system at the distribution level, eliminating manual estimation and calculation work. CMP is in the process of linking CYME to the GIS database. Once tested and available to the distribution engineers, they will have a tool that helps them greatly with their planning work, particularly for system improvement studies, which is one of several component of their work. The CYME link to GIS will also help new distribution engineers learn the CMP distribution system quickly. While we found that the Distribution Engineers at the Service Center level do not conduct distribution planning studies beyond a 1-2 year horizon, they have input to the area studies conducted by the Transmission Planning Engineers. These studies capture expected distribution circuit issues over the longer term planning horizon.

1.3.6. Condition Assessment

- CMP's overhead distribution plant appears to be in good mechanical and electrical condition. CMP has undertaken a number of pro-active programs to improve the performance of the system, such as the focused animal guard program. However, based on our field observations and professional experience, the state of vegetation encroachment is less than satisfactory.

1.3.7. Vegetation Management

- CMP does not employ a cycle trim program. CMP sets an informal goal of trimming 15% to 20% of its 3-phase circuits annually. However, these circuits only comprise 20% of the system. The remaining 80% are planned for trim on a reactive basis. While the arborists have good analytical tools to plan the trim program, the level of funding for distribution vegetation management is the constraining element.
- Annual distribution vegetation management program budgets and actual expenditures have remained relatively flat over the past five years, while tree-related outages have increased each year. In 2003 CMP negotiated a new agreement for vegetation management services with John Lucas Tree Experts. This was a competitive bid process and Requests for Proposal were sent to 40+ companies for these services. So although expenditures were relatively flat there has been an approximately 20% increase in the volume of work performed starting in 2003. This contract with Lucas Tree continues through December 31, 2010.
- Based on our physical condition inspection results, CMP faces a significant risk of outages due to vegetation encroachment on the overhead primary distribution system. The risk includes events such as tree fires, momentary customer interruptions, flickering lights, damage to customers' equipment, hazard to the general public, and increased recloser operations. This latter event could require CMP to inspect and/or replace reclosers more frequently. Of major concern is that between 12.7% and 19% of the circuits have vegetation in direct contact with the conductor posing an immediate risk of outages, potential fires, hazard to the general public, momentary interruptions, flickering lights, damage to customers' equipment, and increased recloser operations. This latter event would require CMP to inspect and/or replace reclosers more frequently. Another 15.8% to 23.8% of the circuits have vegetation within 3 feet[3], which is likely to pose a risk to the system within one year, as illustrated in the following table.

[3] It should be noted that with an average of 8 ft clearance and an average growth rate of 1.5 ft/yr some 20% of the circuits on a five year trim cycle can be expected to have vegetation within 3 ft of the conductor, however these circuits would be scheduled for trim within the next year.

ROW Condition	Raw Percent	Adjusted Percent*	Risk Factors
0-Clear (No trees or Underbrush)	46.6%	20.0%	
1-Trees/Limbs >8'	9.8%	14.7%	Risk Factor in 3-5 Years
2-Trees/Limbs 3>d<8'	14.7%	22.1%	Risk Factor in 1-3 years
3-Trees/Limbs < 3'	15.8%	23.8%	Risk Factor within 1 year
4-Trees/Limb Contact	12.6%	18.9%	Immediate Risk Factor
5-Danger Tree	0.1%	0.1%	
6-Underbrush w/in 3'	0.2%	0.2%	
7-Vines, Moderate	0.1%	0.1%	
8-Vines, Severe	0.1%	0.1%	
9-Other	0.0%	0.0%	

*Note: The survey contained several circuits that were industrial or urban in nature, which resulted in lower percentage of treed distribution spans than the 80% reported by CMP. We adjusted the results accordingly to simulate an 80% level of treed spans

1.4. Recommendations

1.4.1. ARP Targets

- Continue current reliability performance reporting at system level. Individual circuits that exceed 1 standard deviation[4] above the ARP targets should be identified and mitigation efforts stated and followed by CMP as part of an expanded reporting requirement to the MPUC.
- Along with the changes to the vegetation management program, consider tightening ARP targets such that CMP's SAIFI reliability performance improves into the third quartile of national reliability performance within a period of 3 years.
- Consider providing CMP with an incentive for exceeding ARP targets. For example, a provision to permit rewards that would encourage CMP to go beyond managing to the ARP targets and promote continuous reliability improvement programs.

1.4.2. Records Retention

- The retention policy should be revised to maintain betterment project requests and records for a longer period than one year back.

1.4.3. Distribution System Planning and Maintenance

- CMP should review its Distribution Engineer complement and the status of their capability to conduct sufficient long-term planning studies to accommodate both immediate needs and longer-term system needs.
- CMP should maintain a listing of all proposed betterments and provide updates that indicate the disposition of the proposed betterments. For example: completed, budgeted, deferred, no longer needed (with explanation).
- CMP should enhance its formal 10-year circuit inspection program (that was implemented in 2005) as follows:

[4] Standard deviation is the most common measure of statistical dispersion, measuring how spread out the values in a data set are.

- Extend visual inspection to include pole sounding and visual check from the base of each pole.
- Include assessment of the status of vegetation encroachment in the inspection report – categorize by contact, danger tree, and within specified clearance ranges. This information should be shared with Vegetation Management to assist in their planning.
- Implement tracking of resulting work orders (those emanating from immediate hazards and those classified as L1, L2, and L3). Provide tracking information to the MPUC by work order that shows its status. For example: completed, planned, scheduled, deferred, and dropped with explanations for the work order's status.
- As the distribution system continues to age, implement specially focused inspection programs that further identify requirements for preventative maintenance actions. For example, as pole plant average age reaches 35-40 years, CMP should consider implementing pole strength testing and pole integrity testing, particularly on poles older than system average.

1.4.4. Vegetation Management

- Modify the current reactive vegetation management program and provide sufficient budget funding to implement a proactive tree trim cycle of 4 to 5 years. In order to accomplish this, CMP should develop a formal estimate of annual costs to maintain a 4-5 year trim cycle as well as the additional up-front expenditures required to reach a 4-5 year cycle within a reasonable time frame. Environmental Consultants, Inc. offered similar recommendations in a 1988 report entitled "Distribution Line Clearance Program", and Barakat & Chamberlin, Inc. in a 1990 report entitled "Assessment of Environmental and Other Impacts of Central Maine Power's Line Clearance Program". To maintain a 5-year trim cycle, CMP should increase its vegetation management budget to accommodate trimming 102,000 segments annually (CMP currently trims about 60,000 segments annually). CMP estimates that this will require an annual trim budget in the range of $15 million (at current pricing), excluding storm budget. This is an increase of $6 million over current spending. This spending level is based on today's pricing as set forth in the current Lucas Tree contract and does not reflect any adjustments for contract price increases. Further, CMP should undertake to remediate clearances immediately where vegetation is in direct contact with conductor and within one year where it is within 3 feet of the conductor. As a more general observation, it is likely that what is important to customers is the performance of the system rather than any particular level of expenditures. This suggests that, should the Commission conclude that some metric for performance is warranted here, an outcome based measure (such as a SAIFI or CAIDI) rather than an expenditure target, should be preferred.
- Without a complete vegetation survey or extensive analytical study, we cannot accurately estimate the level or period of catch-up costs. We suggest that CMP prioritize its first year of catch-up activities to mitigate

all of the tree limbs that are in contact with primary conductor and a sizeable portion of those that are within 3 feet of the conductor. Assuming an average vegetation growth rate of 1.5 feet per year, a portion of the balance of the limbs initially within 3 feet will, by the second year, be in contact with the primary conductor and should be mitigated on a priority basis. Again, given the average growth rate, there may always be limbs that grow into contact with the primary conductor, even with a 5 year trim cycle, and these should receive priority during the then current year. While we cannot accurately determine the costs of the catch-up effort, we have estimated that the catch-up will cost in the range of $4 million to $5 million, based on the condition assessment results for trees in contact or within 3 feet.

2. Introduction

2.1. Background

During the State of Maine's 2004 Legislative session, the Joint Standing Committee on Utilities and Energy directed the Maine Public Utilities Commission (Commission) to undertake an examination of issues associated with the safety and reliability of Maine's electric transmission and distribution systems. The examination was completed during the spring of 2005, and a report summarizing the findings was issued on June 17, 2005. As detailed in the report, the examination found that a further and more in-depth review of Central Maine Power's (CMP) distribution system and operation and maintenance practices and procedures should be performed. In December 2005, the Commission awarded a contract to Williams Consulting, Inc. to undertake a Distribution Plant Evaluation.

This report summarizes our independent assessment and sets forth our findings derived from data request reviews, interviews, data analysis, and field inspections of the condition of the electric distribution system. .

2.2. Scope and Methodology

The overall project scope included the following areas:

- Distribution system adequacy, including: (1) whether CMP's distribution system meets its design and construction standards, and (2) physical plant condition.
- Investment in distribution facilities and whether such investment is adequate to ensure reliable service throughout CMP's service territory for both current and future loads.
- Physical inspection of a statistically valid sample of the distribution system, including inspection of both rural and urban facilities as well as an inspection of both above ground and underground facilities (note: underground inspections subsequently decided against due to small size of underground system).
- Distribution operation and maintenance practices and procedures and distribution inspection programs that focus on: coverage of both urban and rural areas; review of procedures to properly identify and prioritize maintenance activities; review utility practices for inspection and maintenance.
- Distribution system planning, improvements, and record keeping with focus on whether CMP is conducting the appropriate level of planning with regard to the design of its distribution facilities to meet future power demands in both remote and urban areas, including prioritization.
- Distribution vegetation management program including: evaluation of the effectiveness of CMP's vegetation management program, a review of the procedures in place for trimming planning and targeted circuits (both urban and rural), and record-keeping practice.

Our methodology included:

- Interview meetings with CMP management, technical, and field personnel to obtain a thorough understanding of the Company's maintenance and operating policies and practices regarding its distribution system.
- Field inspections of a sufficiently representative sample of distribution facilities to

evaluate the condition of the overall distribution system.

- Review and evaluation of CMP's documentation (including record keeping) of the activities associated with the items identified above.
- Review and evaluation of the Company's Field Operating Procedures (FOPs) related to distribution system operation and maintenance procedures and practices.
- Technical explanations and advice regarding CMP's practices and procedures with the Commission Staff.
- Periodic meetings with MPUC Staff, Commissioners, and CMP management in Augusta, Maine.

2.3. Interviews

We conducted two series of interviews with 29 CMP management and staff: the first set with CMP management during the week of February 13, 2006, and the second set with CMP field-level staff during the week of March 20, 2006. During the interview meetings, CMP had in-house legal representation in attendance. While we opposed this, we generally felt that it did not diminish the value of the interviews, nor cause, as far as we could determine, the interviewee(s) to be less than candid. In order not to influence the independent assessments of the consultants, MPUC Staff did not attend these interviews.

CMP was cooperative and flexible in arranging the interviews. Additionally, during the second set of interviews conducted at field locations, CMP provided us with tours of several circuits in each service area we visited in order to get an initial understanding of the distribution system, its construction, and vegetation challenges. A complete listing of the interviews held is contained in Appendix 6.3.

2.4. Data Requests

We submitted, received and reviewed 182 data requests. A detailed listing may be found in Appendices 6.2.1 through 6.2.5.

2.5. Physical Condition Assessment

We performed a comprehensive physical inspection of CMP's overhead electric distribution facilities to determine the electrical and mechanical condition of the assets including a review of the status of vegetation management. In order to accomplish this in an effective manner, we developed a stratified sample designed to adequately represent the overall system. The sample resulted in the selection of 16 circuits that geographically covered and represented CMP's overall service territory. Within the sample set of circuits, we selected individual poles to inspect using a random selection process, resulting in a total of 2,550 poles that were inspected. The inspection process included sounding the pole and visual inspection of the aerial components. Our inspection team was comprised of three experienced consultants, and CMP provided Line Supervisors/Line Inspectors for each of our inspection team members. CMP's efforts in providing a high level of field expertise, maps, and route planning allowed us to complete the inspection program in three weeks, which was ahead of schedule.

3. Findings

3.1. Systems and Support

CMP has achieved a high level of information system integration and development of support tools as described below. Based on our experience, we believe they are among the leaders in the utility industry.

3.1.1. GIS Connectivity

CMP uses ESRI's GIS product and has implemented a number of enhancements to facilitate support and analysis of Company assets. CMP has implemented a full connectivity model that ties each customer (meter) to a geographic location as well as to the upstream transformer and circuit. The system provides a high level of information support and data exchange with the customer information system, outage management system, and other asset information systems.

3.1.2. SmartMap

CMP has developed its SmartMap system that is driven by the GIS and contains comprehensive mapping, asset, and customer information. In addition, the system contains historical outage data by circuit, device and cause, and tracks individual spans (i.e., segments of circuits) for vegetation management by year. The system is used to produce hard copies of distribution maps for field use and to support on-line research and analysis.

3.1.3. Vegetation Outage Management System

CMP has developed a reporting package named Vegetation Outage that depicts the spans that have been trimmed, color coded by year, and plots tree- and animal-related outages on maps for each circuit. This tool is used extensively by Company arborists, contract tree trimming personnel, and others involved in vegetation management and distribution operations. It provides a clear graphical view of the status of each circuit and is useful in looking for outage cause patterns and the status of vegetation management on each circuit.

3.1.4. Records Retention

CMP has a formal records retention program which specifies the type of document, its form (e.g., paper or electronic), and its retention period. CMP developed its record retention policies by first examining records retention requirements recommended by the Federal Energy Regulatory Commission (FERC). CMP expanded its policies to incorporate applicable state requirements and further expanded its policies to include CMP and Energy East record retention needs from a business perspective. CMP maintains a comprehensive retention schedule that lists record types, retention codes and retention classes, document type (paper and/or electronic) and the period of retention. Specifics follow:

- For the 10-year circuit inspection program, the inspection results are maintained in a database, and CMP plans to retain these records for 10 years. For distribution betterments, CMP's Distribution Engineers and Distribution Management (e.g., the Manager of Distribution Engineering) maintain the prior year, current year and following year detailed betterment project analysis documents.

- Area or regional power supply and transmission studies, which are conducted on an as-needed basis (periods ranging from 3-11 years), are retained until the following full study is completed and approved. Planning engineers coordinate with the ESAs and Distribution Engineers during the study process. These long-range (5-10 year horizon) area studies identify distribution circuits that are expected to become loaded in excess of their capacity either through normal load growth or anticipated development projects. As part of the area planning process, mitigation of overload situations on the distribution system circuits are incorporated into the plan in the form of load shifting, re-configuration, and/or provision of new transmission to distribution substations in the area. Detailed distribution planning studies are not included in these area studies. Instead, they are performed on a shorter-term basis at the Service Center level by the Distribution Engineers.
- Distribution system betterment plans and studies prepared by CMP's Distribution Engineers are retained for the prior, current, and plan year by both the Distribution Engineer and the Manager of Distribution Engineering. CMP utilizes a Project Review Committee (PRC) to review proposed projects, including distribution betterments. The PRC is made up of 33 members comprising virtually all aspects of the operating side of the company. The committee provides a secondary layer of continuity in assuring that projects are not forgotten or missed. The make-up of the PRC is as follows:

Title	**Functional Area**		**Title**	**Functional Area**
Engineer	Telecom Engineer III		Lead Analyst	(not specified)
Manager	Electric System		Supervisor	Regulatory
Supervisor	System Dispatch		Director	Maintenance Engineering
Supervisor	Substation Maintenance		Supervisor	Telecommunications
Manager	T&D Support		Supervisor	Electric Maintenance
Director	T&D Support		Manager	T&D Support
Engineer	System Planning		Manager	Sales
Manager	System Planning		VP	Technical Services
Manager	CMP Fleet & Stores		Manager	Meter Services
Manager	Electric Distribution		Manager	Strategic Sourcing
Manager	Substation Operations		Supervisor	Dispatch
Lead Analyst	Compliance		Director	Finance (EEMC)
Manager	Projects		Lead Analyst	Regulatory
Manager	Public Affairs		(not specified)	Supply Chain (RG&E)
Supervisor	System Protection		Manager	Vegetation Management
Manager	Real Estate		Manager	Electric System
(not specified)	Supply Chain – RG&E			

- CMP's record retention requirements for circuit loadings, capacities and betterment records are not individually identified in record retention schedules. Betterments appear under the headings Projects/Condition (under Power Delivery), while circuit loadings and capacities were previously maintained in a legacy FoxPro database (with an Excel copy), and are currently held in the SAP system. These records go back 10 years. However, this information does not appear on a record retention schedule.

3.2. Reliability

CMP utilizes two performance indicators to measure and report on the reliability of its electric distribution system: 1) SAIFI (System Average Interruption Frequency Index), and 2) CAIDI (Customer Average Interruption Duration Index). A company's maintenance, inspection, and testing policies and practices primarily affect the former, while the latter is primarily affected by the quantity and quality of company resources available to respond to service outages. Both these indices are widely used by electric distribution companies and state regulatory agencies to monitor, track, and compare electric reliability performance results. The Maine Public Utilities Commission adopted SAIFI and CAIDI as two of the eight[5] measures used to assess performance under CMP's Alternative Rate Plan (ARP). The current SAIFI and CAIDI baselines contained in ARP 2000 are 2.10 interruptions per year and 2.32 hours (139.2 minutes) per year, respectively. (ODR-01-20, Attachment 4, Page 12 of 13).

3.2.1. Benchmarks & Quartiles

Shown below are the results of a national electric reliability survey performed by the Institute of Electrical & Electronic Engineers (IEEE) through its task force on distribution reliability. The intent of the IEEE efforts is to provide utilities and regulators with a common set of measurements, terms, and definitions intended to enable discussions and comparisons of electric reliability performance from a common basis.

[5] The eight measures are:

1) Customer Average Interruption Duration Index (CAIDI): Baseline is 2.32 hours per year. Outages affecting more than 10 percent of customers in CMP's service territory are excluded.

2) System Average Interruption Frequency Index (SAIFI): Baseline is 2.10 interruptions per year, again excluding outages affecting more than 10 percent of customers in CMP's service territory.

3) MPUC Complaint Ratio: Baseline is 1.17 complaints per 1,000 customers per year.

4) Percent of Business Calls Answered: Baseline is 80 percent of calls answered within 30 seconds, except on days when more than 10 percent of customers in CMP's service territory are affected by outages. CMP may also ask to exclude calls if uncontrollable events cause a temporary surge in call volumes.

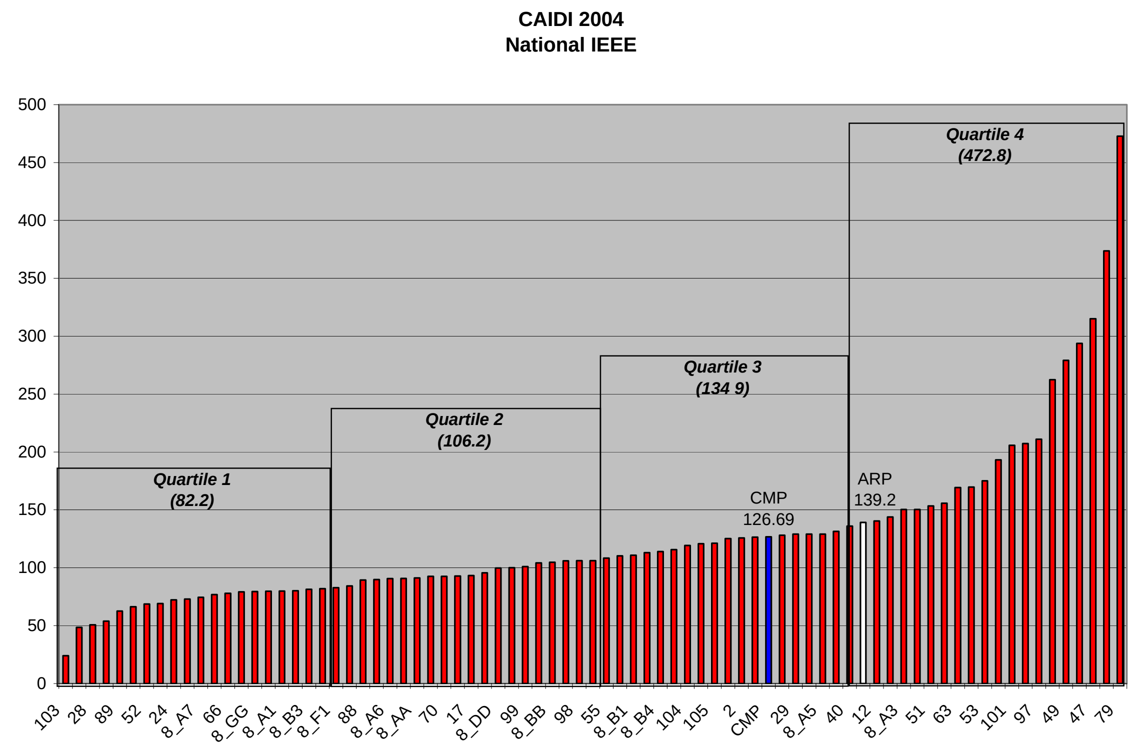
5) Percent of Outage Calls Answered: Baseline is 80 percent of calls answered within 30 seconds by Customer Rep, Interactive Voice Response, or third-party facility for high-volume calls.

6) New Service Installation: Baseline is 93 percent of new services installed and energized by date promised under Customer Service Guarantee.

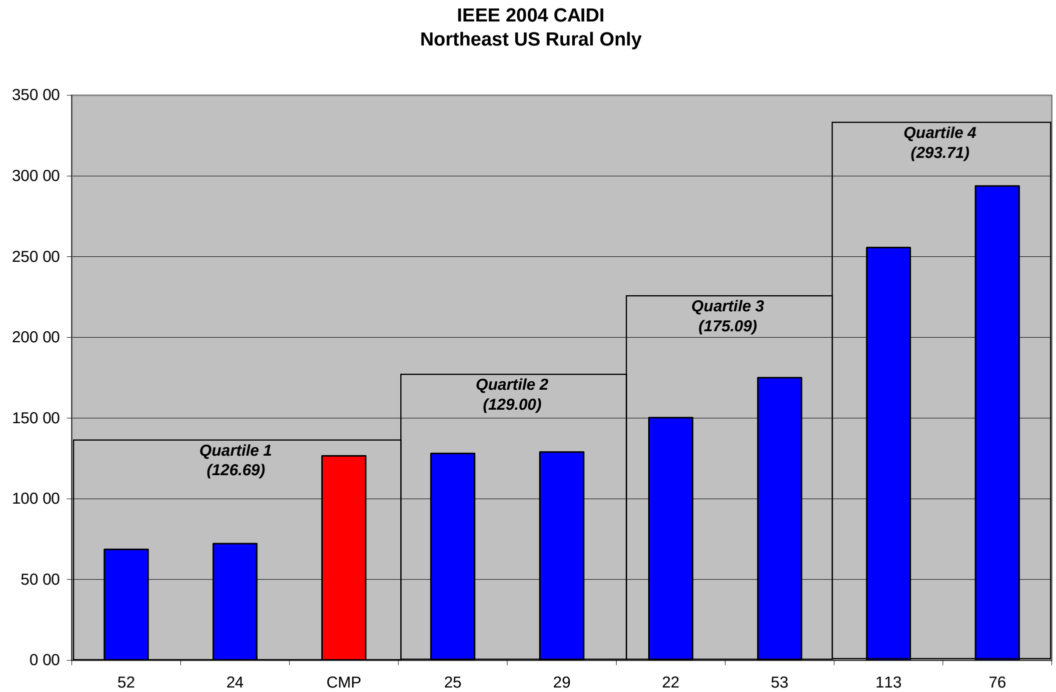
7) Call Center Service Quality: Baseline is 84 percent favorable survey response on the Rep's knowledge, ability and customer satisfaction with call.

8) Market Responsiveness: Baseline is 95 percent of all complete and properly transmitted enrollments from Competitive Electricity Providers processed within PUC rules' timeframe.

3.2.1.1. CAIDI

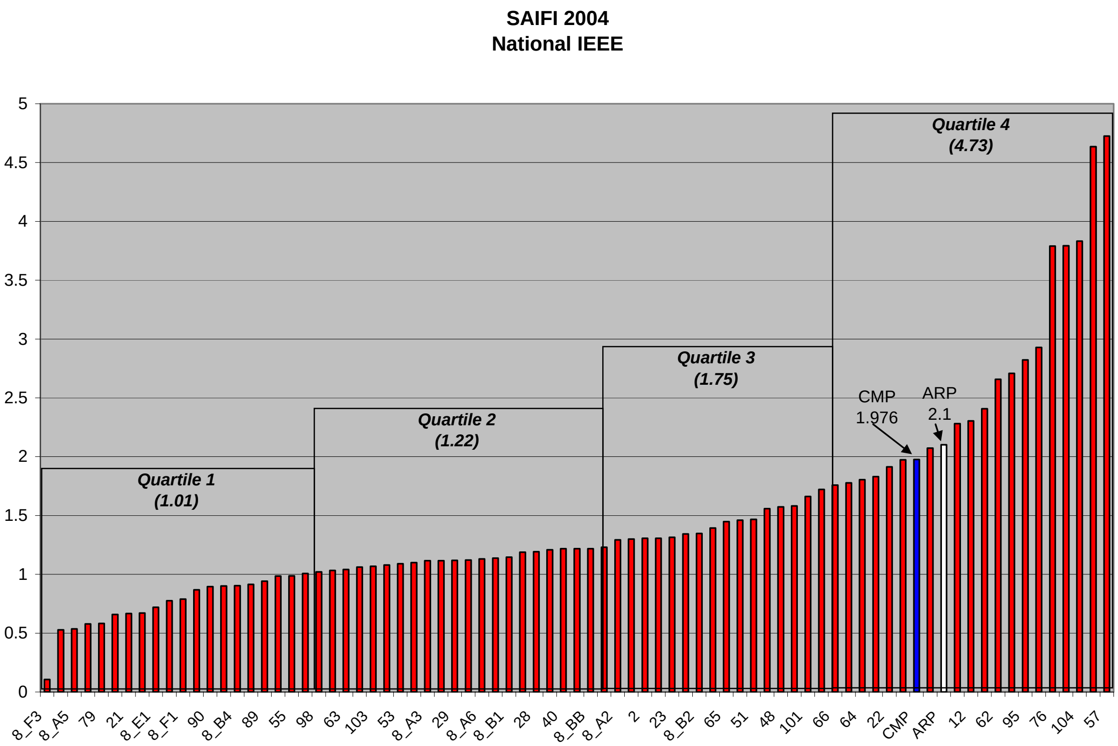


As shown on the CAIDI survey, the ARP 2000 baseline of 139.2 minutes falls in the 4th quartile of the survey data, representing relatively poor reliability performance. CMP's actual CAIDI performance of 126.69 minutes is better than the ARP 2000 baseline but it still ranks among the upper third quartile (poorer performers) nationally. It is important to note that exact comparisons between utilities may not be appropriate since these national surveys include utilities of varying sizes, service area and operational challenges. Further, each utility calculates its reliability somewhat differently. The primary differences in calculation are their individual thresholds for momentary vs. permanent outages and major event exclusion criteria. Therefore, these comparisons indicate relative performance and serve as a mechanism to identify areas in which improvement may be possible. Further, national benchmarks are important for understanding how the entire national population ranks. However, for operational measures, it is often more instructive to benchmark against peers with similar systems and operating conditions. Such a comparison reduces to the greatest extent possible the variations between companies, service territories, etc. and provides a more meaningful comparison for similar companies. In this context, we have provided benchmark information from the I.E.E.E for rural utilities in the Northeast Region of the U.S. as shown in the following chart:



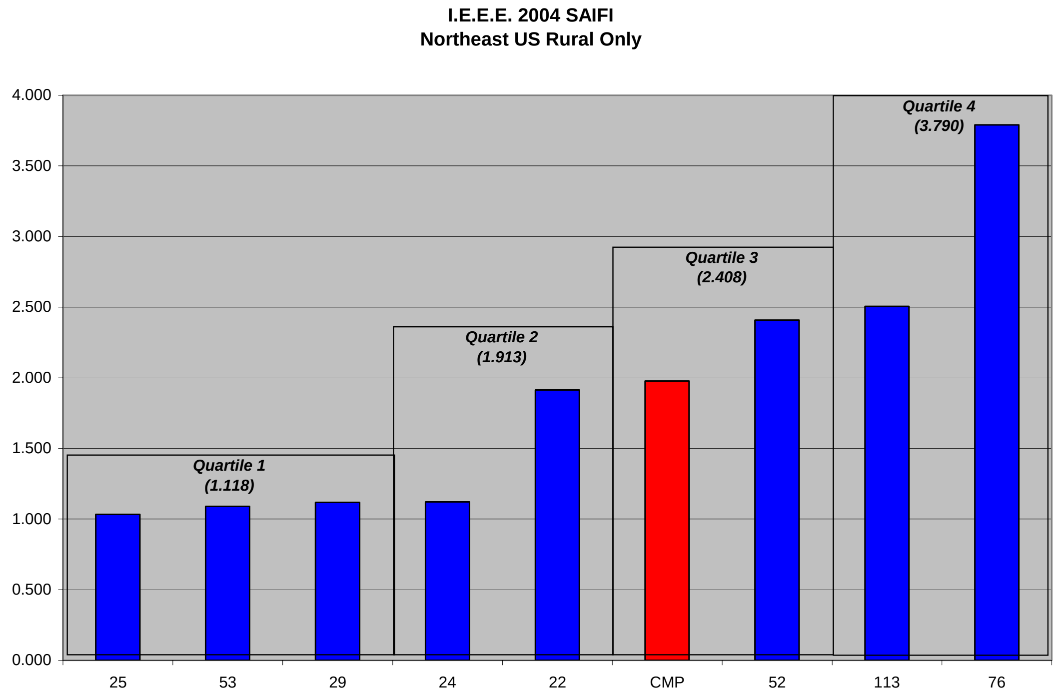
When compared against <u>rural-only</u> Northeast US Regions utilities, CMP's CAIDI is within the first quartile. It should be noted that such a small sample can distort the meaning of quartiles since CMP's CAIDI is within 1% of companies 25 and 29 above and thus it is difficult to say if their performance is first or second quartile.

3.2.1.2. SAIFI



As shown on the SAIFI survey, the ARP 2000 baseline (of 2.1) falls well into the 4th quartile of the survey data. The 4th quartile represents worst reliability performance. While CMP's actual SAIFI (1.976) is better (lower) than the ARP 2000 baseline, it too falls well into the 4th quartile, which still represents electric reliability performance significantly worse than the survey average.

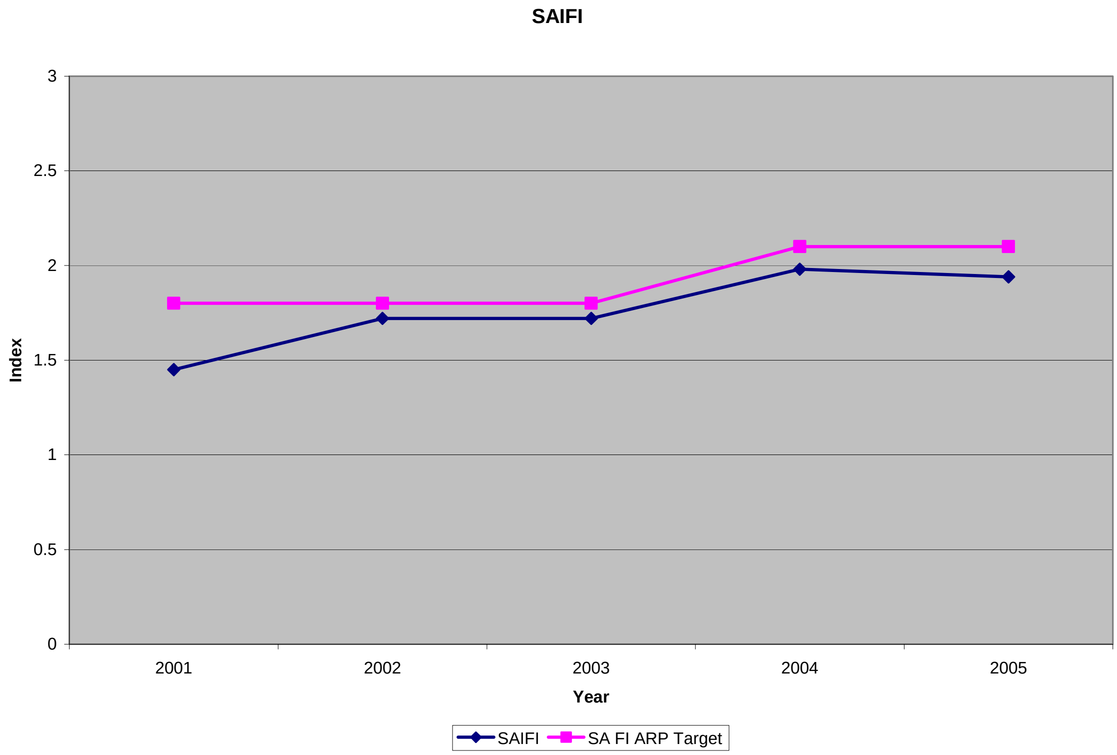
CMP's comparative performance against rural-only Northeast utilities is better having moved into the lower third quartile, ranking 6th out of 9 utilities.



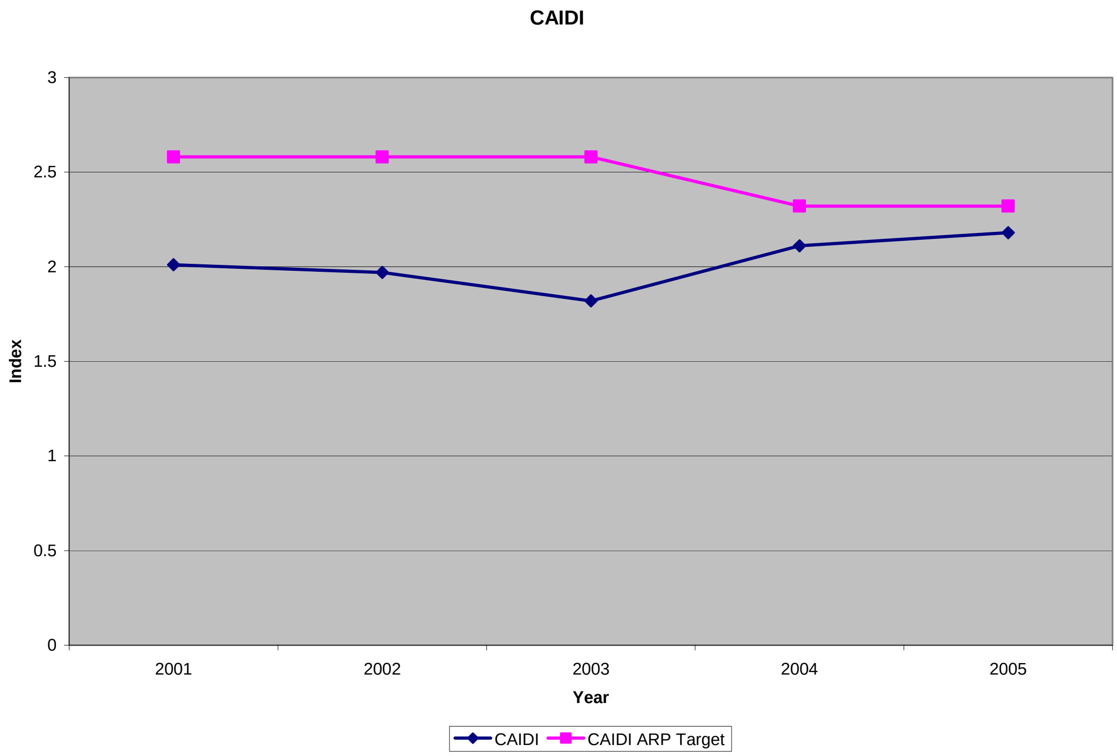
During our interview discussions with CMP management, we found that CMP's goal is to manage and allocate resources to achieve baseline reliability performance levels (i.e., SAIFI and CAIDI) as set forth in the ARP. Sufficient resources are made available to achieve that goal. However, in our opinion, the ARP baselines are set at levels that do not represent superior or even average reliability performance. Their purpose is to assure no degradation of service based on the ARP incentives. As a result, we believe the baselines should be re-calibrated at levels closer to electric distribution industry averages. If this is done, it will require CMP to budget additional resources to its overhead distribution line maintenance activities, particularly tree-trimming, in order to improve its distribution system reliability performance.

3.2.2. Trends

CMP's SAIFI and CAIDI performance trends are shown in the following tables.



As can be seen from the preceding table, CMP's SAIFI has stayed within the ARP targets, but is trending upward, or getting worse. It is worthy to note that following adjustments to the ARP target in 2004 to 2.1 interruptions, CMP's SAIFI for 2005 appears to be improving. However, a single year's data does not necessarily indicate a trend reversal. It should be noted that there was a change in exclusion criteria that generally worked to change the calculated CAIDI (decreased) and SAIFI (increased) figures. Beginning in 2004, CMP was allowed to exclude only events where 10% or more of CMP's total customers experience outages. Prior to 2004, CMP excluded outages by service area (11 such areas) when the event resulted in 10% or more of CMP's customers in the service area experiencing an outage.



As shown in the preceding table, CMP's CAIDI reliability performance has worsened (i.e., increased) over the past five years. However, CAIDI performance has been below the ARP target through 2005, even with a reduction (tightening) in the ARP target in 2004.

CMP is clearly focused on meeting the baselines established in the ARP. However, as stated above, we believe these levels of reliability generally reflect performance that is significantly worse than industry averages.

3.2.3. Worst Performing Circuits

In accordance with the Alternative Rate Plan, CMP reports its 10 worst performing circuits annually including planned and actual mitigation efforts. In the subsequent year, CMP reports on the performance of the prior year's worst performing circuits. As currently calculated, the ten worst performing circuits are identified on a CMP-wide basis in terms of contribution to company-level reliability performance[6]. If worst performing circuits are also viewed at a lower level, such as at the Service Center or individual circuit level, a different set of worst performing circuits often results, whose performance may be considerably worse from an absolute performance basis than those identified in the ARP filing

[6] System-wide SAIFI and CAIDI are based on the total number of customers for the system in the denominator of the calculation; while the circuit's connected customers is part of the numerator. So a circuit's "contribution" to system-wide figures will assign a higher contribution for those circuits with higher number of connected customers than for those with fewer connected customers, assuming the same number of outages and restoration times.

and may not get the attention that is needed to remediate reliability performance issues.

3.2.3.1. Company-Wide Basis

Our analysis of worst performing circuits for the period 2001 through 2005 found a surprisingly high number of circuits that fell into the category of ten worst performers for more than one year. These are shown in the following table that contains data taken from CMP's ARP filings.

			Year				
Circuit	**Length (Pole Miles)**	**Service Center**	**01**	**02**	**03**	**04**	**05**
204D6	132	Brunswick		X		X	
210D1	205	Brunswick			X	X	X
217D3	143	Brunswick		X		X	
262D1	244	Augusta				X	X
413D1	154	Bridgton	X	X			
419D1	237	Alfred	X		X		X
430D1	162	Bridgton	X	X			
445D1	288	Bridgton	X		X	X	X
454D1	235	Lewiston	X		X		
806D2	225	Rockland			X	X	
820D1	103	Dover				X	X
834D2	114	Dover				X	X
873D1	61	Fairfield	X	X			

Of the repeat circuits shown above, the majority are located in less densely populated and more rural service areas (i.e., Bridgton, Rockland, Dover and Fairfield) and appear in sequential years. These also tend to be the longer circuits within CMP's system (CMP's distribution circuits average 58 pole miles). Good utility practice is to assure that worst performing circuits do not appear more than twice in annual reporting and certainly not in consecutive years.

3.2.3.2. Circuit Basis

We analyzed outage data by circuit for 2001-2005 (please refer to Appendix-6.5) and found that these differ from the 10 worst circuits filed in the ARP (calculated and ranked on the basis of contribution to Company-wide totals), since at the circuit level, these are calculated and ranked on the basis of SAIFI for the circuit. Based on these data, we believe it would be appropriate to focus on the overall worst performing circuits as well as by Company-wide SAIFI impact. This would have the additional value of focusing attention on circuits located in the less densely populated areas of CMP's service territory. We defined the cut-off for the worst performing circuits at the circuit level as those circuits whose calculated SAIFI exceeded one standard deviation[7] above the ARP target for each year as shown in the table below:

[7] We calculated the standard deviation of the range of SAIFI (calculated on an individual circuit basis) for all CMP distribution circuits, excluding several anomalous data points.

Year	ARP Target	One Standard Deviation	Equivalent SAIFI Level
2001	1.800	3.872	5.672
2002	1.800	2.872	4.672
2003	1.800	2.802	4.602
2004	2.100	2.264	4.364
2005	2.100	1.700	3.800

As circuit performance improves, that list should contain fewer circuits. On this basis, the worst performing circuits (grouped by Service Center) are shown below:

Count of Circuits with SAIFI > 1 STD over ARP					
Service Center	**2001**	**2002**	**2003**	**2004**	**2005**
Alfred	4	10	8	4	9
Augusta	2	2	3	3	2
Bridgton	8	5	8	2	2
Brunswick	0	8	1	3	3
Dover	0	2	0	3	5
Fairfield	1	1	3	1	1
Farmington	0	4	1	0	4
Lewiston	3	5	6	2	4
Portland	4	3	2	5	4
Rockland	1	3	2	2	2
Skowhegan	0	2	2	5	4
Total	**23**	**45**	**36**	**30**	**40**

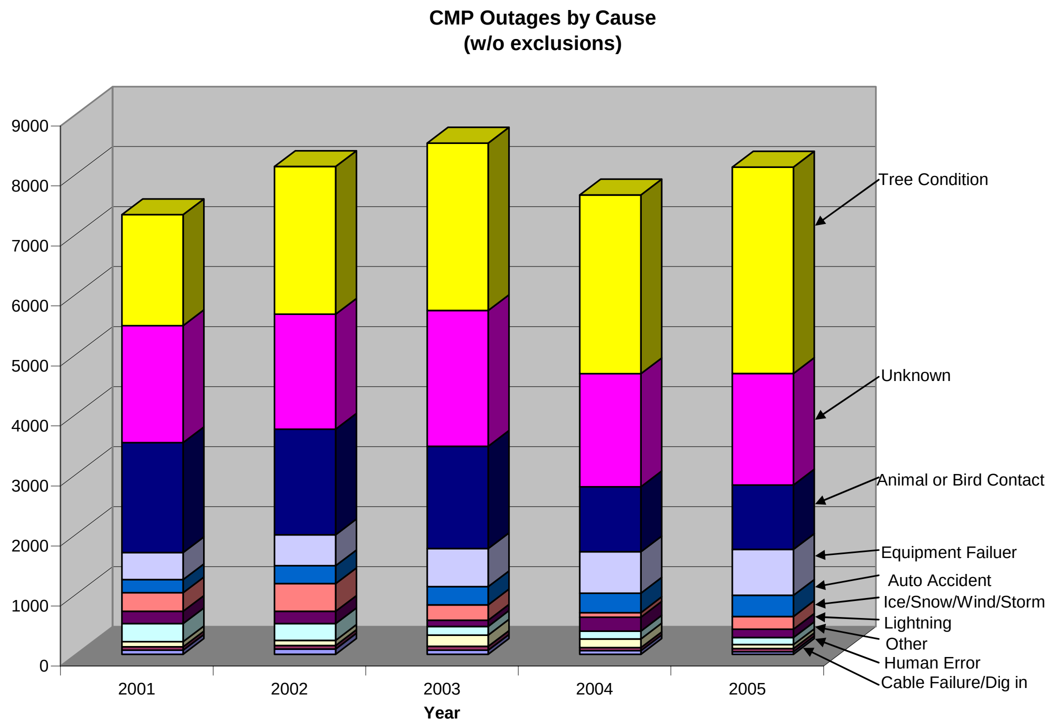
As mentioned above in regard to circuits that are repeatedly classified as worst performers, the following table lists specific circuits (grouped by Service Center) that had multiple occurrences over the 2001-2005 period and shows the number of consecutive years the circuit was a worst performer.

Repeat Worst Performing Circuits 2001-2005			
Service Center	Circuit	Occurances	Consecutive Years
Alfred	687D1	2	
	685D3	3	3
	677D2	4	4
	634D1	2	2
	612D1	3	2
	605D1	2	
	602D1	4	3
Augusta	216D1	2	
	262D1	4	4
Bridgton	413D1	2	2
	419D1	3	
	435D2	3	3
	437D1	2	2
	438D1	2	
	444D1	2	2
	445D1	3	3
	638D1	2	
Brunswick	204D6	2	
	213D1	2	
	217D3	2	
	250D2	2	2
Dover	820D1	2	2
	834D1	2	
	834D2	3	2
Fairfield	865D2	2	
	873D1	3	2
Farmington	447D2	2	2
Lewiston	220D1	2	2
	411D2	3	3
	420D4	2	2
	420D6	4	4
	436D3	2	2
Portland	620D2	2	2
	631D1	2	2
	644D1	2	
	645D7	2	2
Rockland	214D4	3	2
	246D1	2	2
Skowhegan	822D1	2	2
	823D2	4	4
	824D1	3	2
	868D1	2	2

3.2.4. Outage Cause Analysis

CMP appears to do a good job capturing outage cause data and frequency. For example, the level of "Unknown" causes at 23% (for 2005) is considerably lower than recorded by many other utilities. CMP's "Unknown" causes have remained fairly constant over the 2001-2005 period and have averaged 24.8%. The Edison

Electric Institute (EEI) survey average for "other" causes (which includes "unknown") was 34% for its 2002 survey data, compared to equivalent data for CMP at 30.7%.

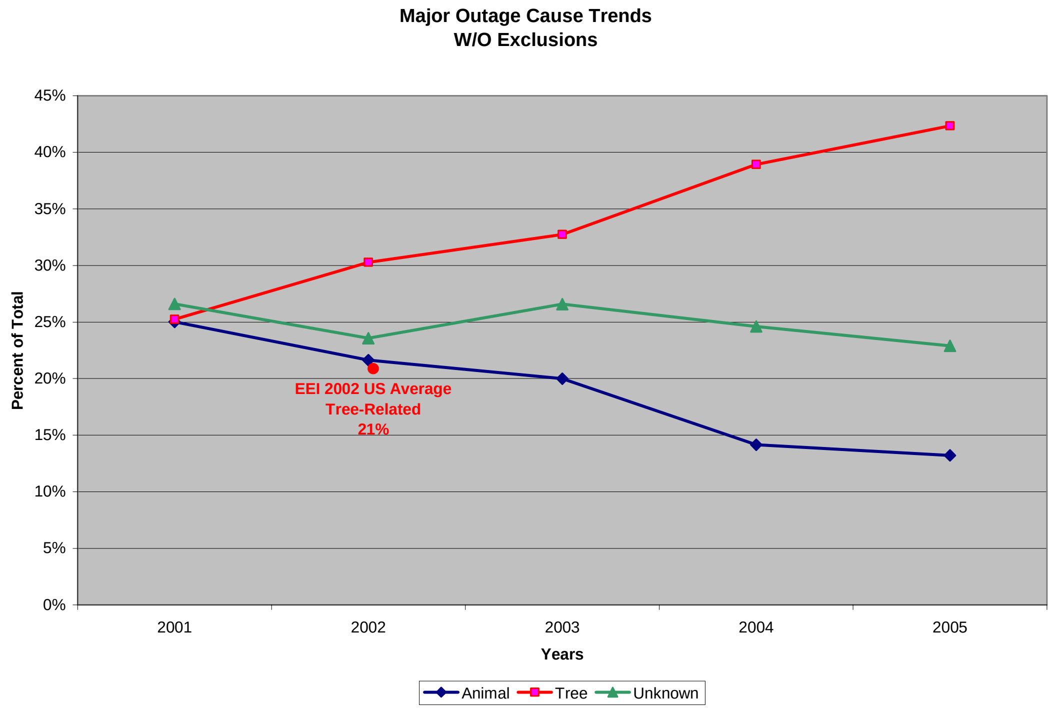


As depicted above, tree-related outages comprise the largest and growing component of overall outages. In fact, for 2005, CMP's tree-related outages at 42.3% are high in comparison to other utilities and as compared to the 2002 EEI survey average of 21%. Animal related outages at 13% are higher than EEI averages, and OH equipment failures at 9.5% are below EEI survey data at 16%. The following table provides a comparison of the EEI 2002 survey with recent CMP statistics:

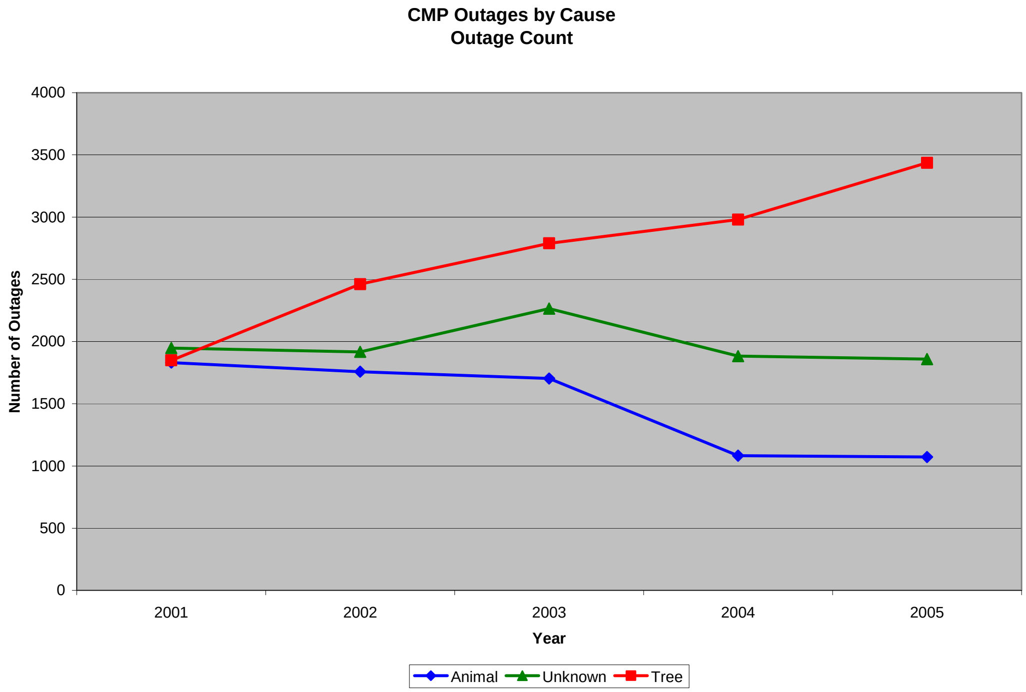
Outage Cause Comparison
CMP 2005 vs. EEI 2002

Outage Cause	EEI (%)	CMP (%)
Vegetation	21	42.3
Animals	7	13.2
Ice/Snow	3	0.6
Lightning	9	1.7
OH Equipment	16	9.5
UG Equipment	6	0.7
Planned/Prearranged	3	0.5
Operator Errors	1	0.8
Other	34	30.7

Over the 2001 through 2005 period, tree-related outages as a percent of total outages have increased significantly, while animal-related outages have declined by half as illustrated in the following chart (based on annual ARP filing data):

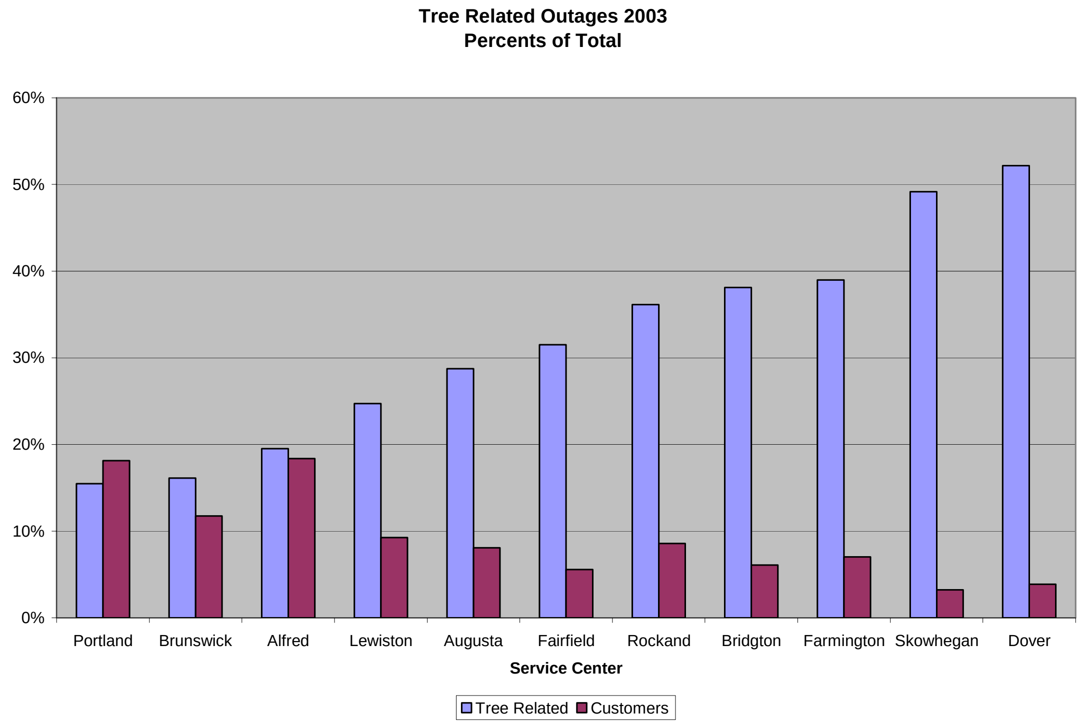


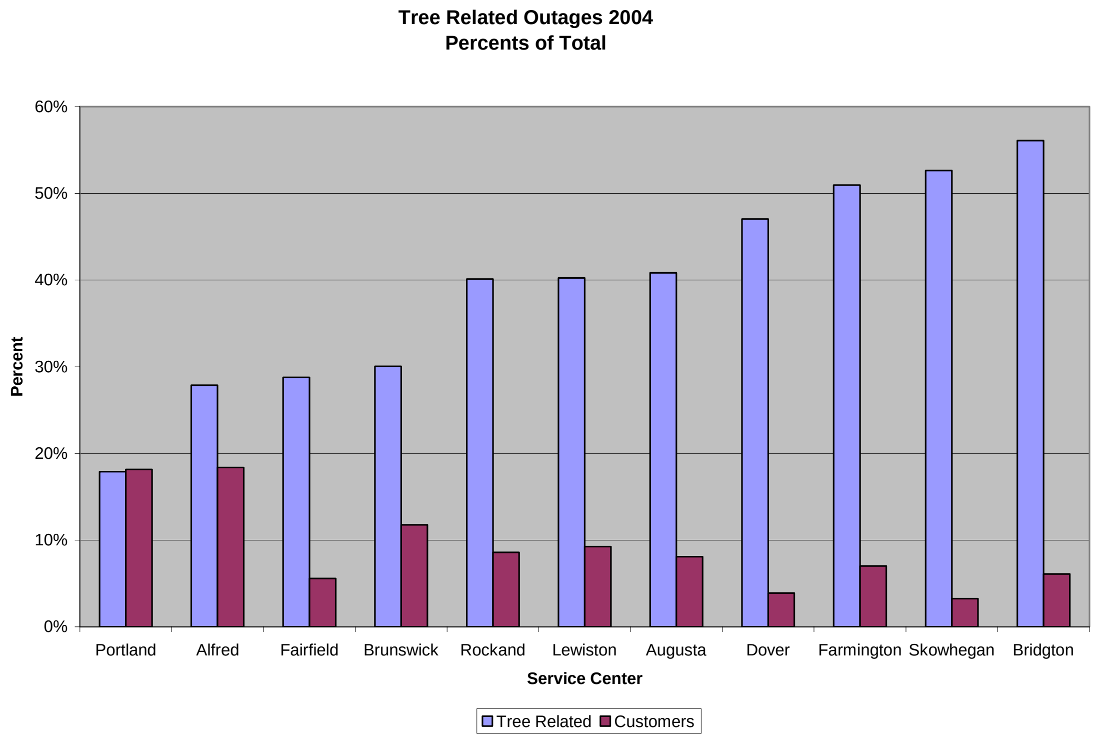
This suggests that the work that CMP has accomplished over the past several years installing animal (wildlife) guards on distribution pole equipment has had a positive and measurable impact. However, it also suggests that vegetation management and tree trimming programs are not keeping up with tree growth. To further clarify this observation, we have provided the following chart which shows the raw outage counts for the same categories. The pattern of increases in tree-related outages remains consistent.

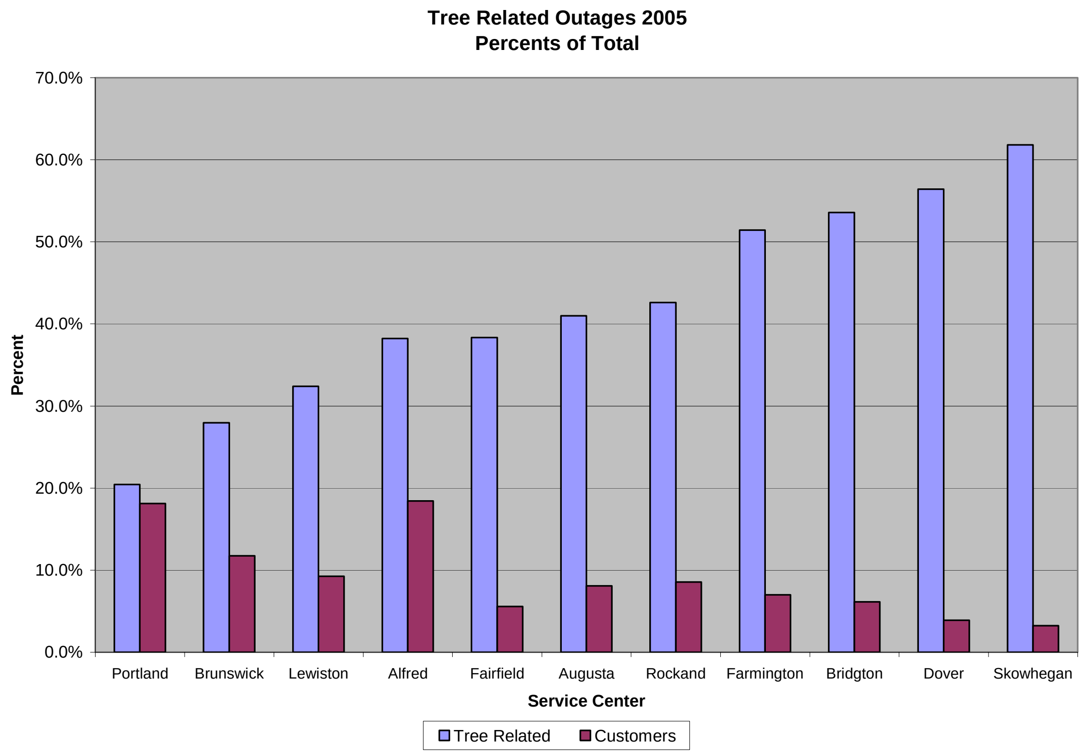


3.2.5. Circuit Performance (Dense and Less Dense Areas)

The following charts containing CMP data for years 2003 through 2005, suggest that tree-related outages are more frequent in areas with lower customer density. This implies that the Company focuses its vegetation management and overhead lines maintenance resources on its more heavily populated service areas. Given the ARP targets and measurements, this is not surprising.


Tree Related Outages 2003
Percents of Total
60%
50%
40%
30%
20%
10%
0%
Portland
Brunswick
Alfred
Lewiston
Augusta
Fairfield
Rockand
Bridgton
Farmington
Skowhegan
Dover
Service Center
Tree Related
Customers


Tree Related Outages 2004
Percents of Total
Percent
60%
50%
40%
30%
20%
10%
0%
Portland
Alfred
Fairfield
Brunswick
Rockand
Lewiston
Augusta
Dover
Farmington
Skowhegan
Bridgton
Service Center
Tree Related
Customers



3.3. Operations & Maintenance Expenditures

3.3.1. Industry Comparisons

Our analysis of CMP's distribution operation and maintenance expenditures found that operations expenses were higher than maintenance. This is contrary to what we have found in most of the previous studies of electric utilities that we have conducted. As a result, CMP undertook a comparative review of other utilities to ascertain if there was a trend regarding the division of expenses. CMP benchmarked twelve companies as shown below:

Company	**Higher Maintenance**
Niagara Mohawk	**X**
Orange & Rockland	**X**
NYSEG	**X**
RGE	**X**
Sierra Pacific Power	
Kansas City Power & Light	
Atlantic City Electric	
The Narragansett Electric Company	
Massachusetts Electric Company	
Mississippi Power	**X**
Indiana Michigan Power	**X**
Central Illinois Public Service	**X**

The **X** denotes those companies whose maintenance expenses were higher than operations. As can be seen, seven of the twelve companies (58%) had higher maintenance expenses. It is interesting to note that two of those seven companies, NYSEG and RGE, are sister companies of CMP.

WCI independently compared a group of twelve electric distribution companies that included eight New England utilities. The results are shown below:

Company	**Higher Maintenance**
Western Massachusetts Electric Company	**X**
Unitil Energy Systems, Inc.	
Public Service Company of New Hampshire	**X**
Granite State Electric Company	**X**
Green Mountain Power Corporation	**X**
Fitchburg Gas and Electric Light Company	
Central Vermont Public Service Corporation	**X**
Bangor Hydro-Electric	**X**
PacifiCorp	**X**
Wisconsin Electric Power Company	**X**
Wisconsin Public Service Corp	
Nevada Power Company	

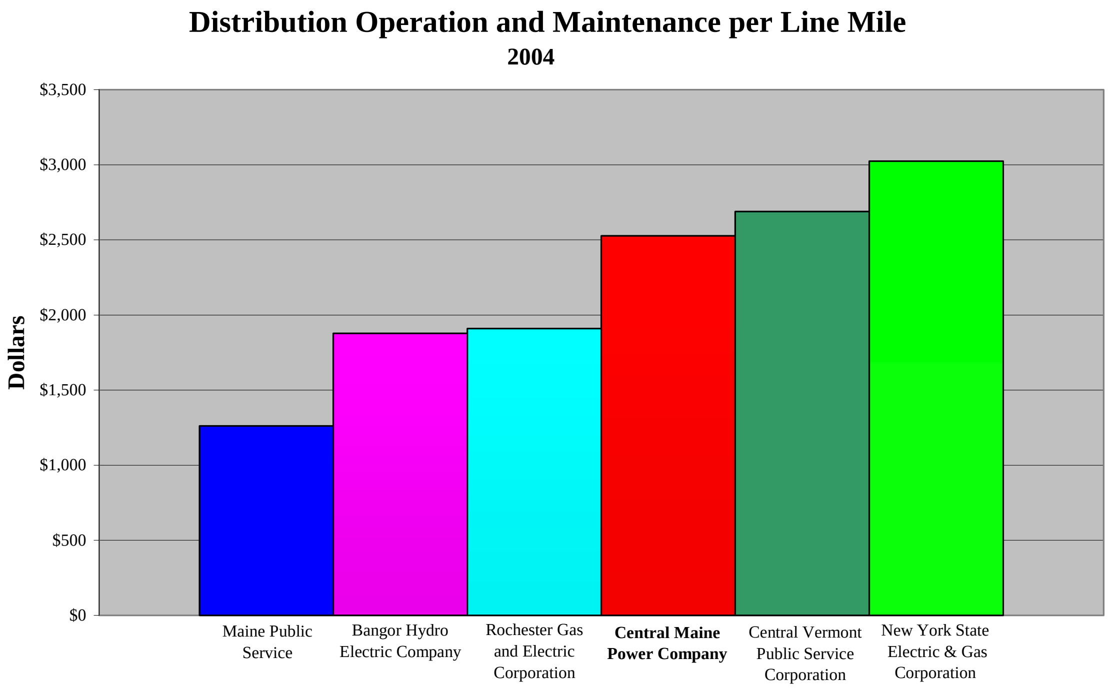
As can be seen, eight of the twelve companies (67%) had higher maintenance expenses. Interestingly, five of the seven (71%) New England companies also had higher maintenance costs.

The combined CMP and WCI panels show that fifteen of the twenty-four electric utilities (62.5%) had distribution maintenance costs that were higher than their respective distribution operations costs.

Since it is beyond the scope of our study to look at how CMP or its parent company categorizes distribution expenses compared with other electric utilities, and in order to be fair to CMP, we have chosen to focus on a comparison of overall operations and maintenance per line mile as well as operation, maintenance, and overhead line maintenance expenses per customer and per line mile among CMP, NYSEG, and RG&E.

3.3.2. Distribution Operations & Maintenance Costs per Line Mile

We selected a representative panel of six companies, four of which are located in the New England area, to compare total distribution operations and maintenance expenses per line mile. As shown below, CMP falls within the mid-range of the panel.

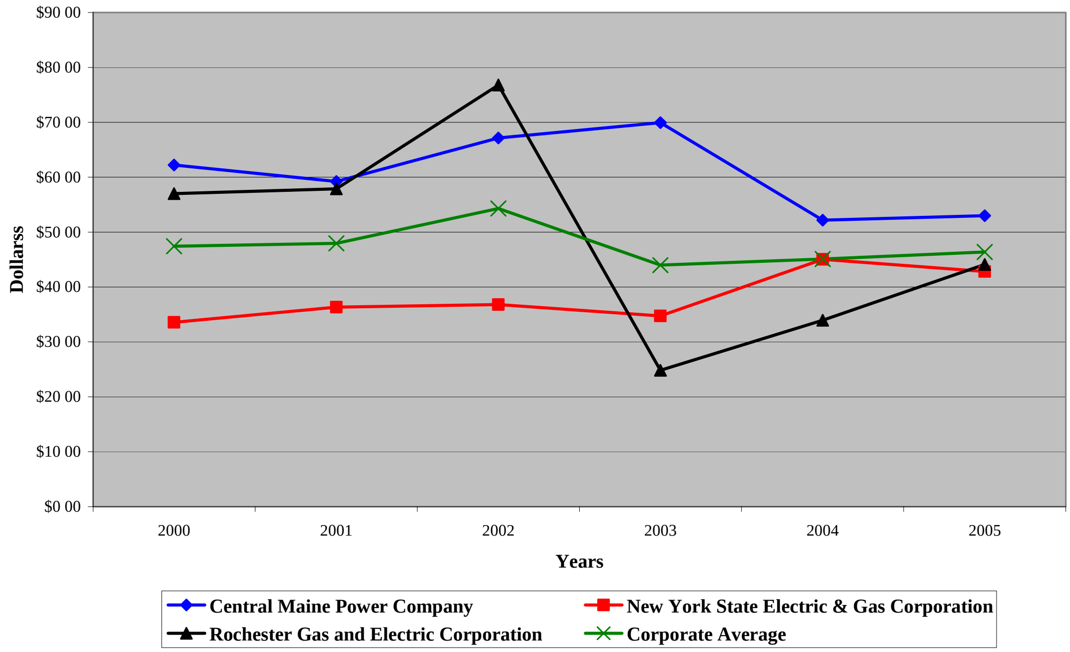


3.3.3. Operations

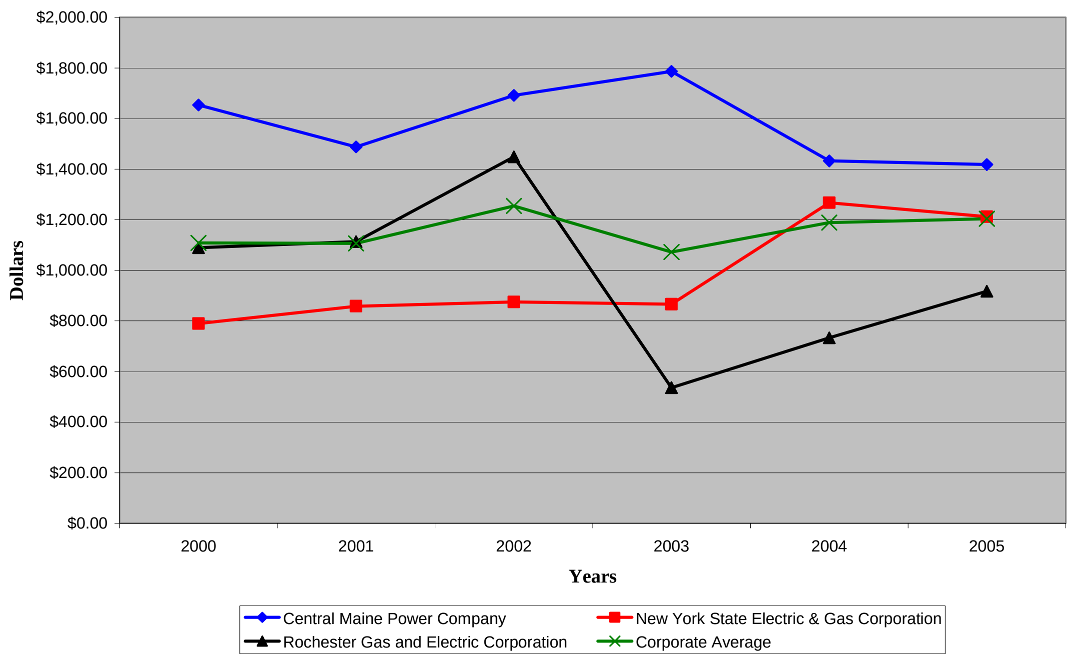
Our analysis of CMP's distribution operations expenses per customer and per line mile indicates that it is consistently higher than the average of the three Energy East operating companies. This is shown in the following two graphs[8].

[8] It should be noted that these charts are intended to reflect CMP's expenditure levels in comparison to those of the other Energy East companies and were not intended to analyze year to year trends or patterns. However, it should also be noted that the decrease from 2003 to 2004 for CMP's operations and maintenance expenses may in part have been caused by an expense category reclassification as part of CMP's migration to the SAP accounting system.

Operations Expenses per Customer



Operation Expenses per Line Mile

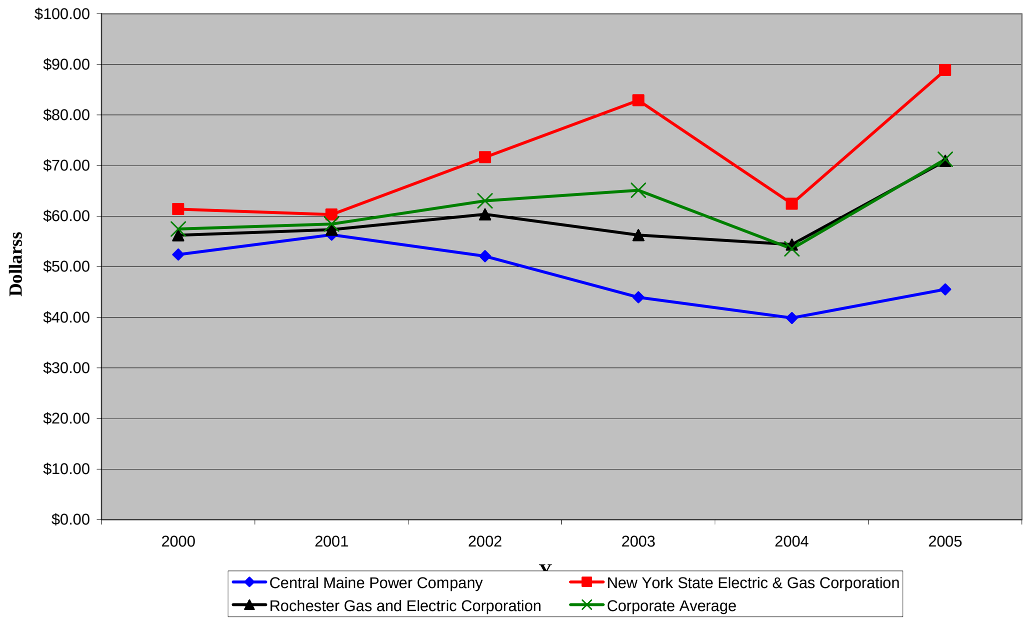


3.3.4. Maintenance

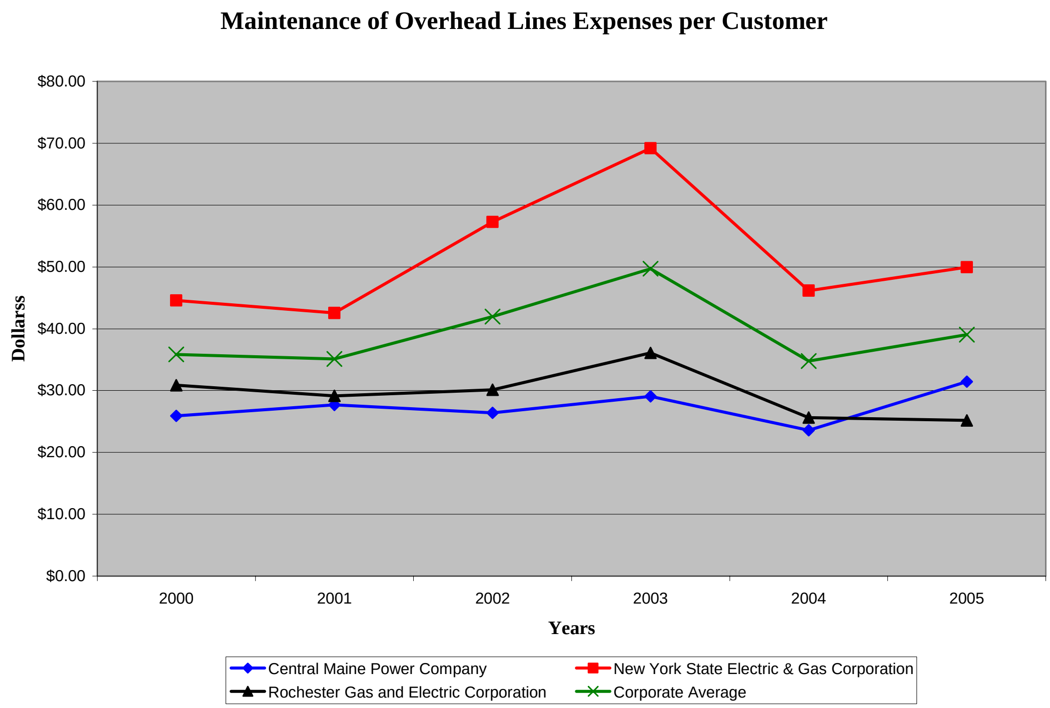
Our analysis indicates that CMP's distribution maintenance expense per customer has been consistently lower than the Energy East average and both NYSEG and

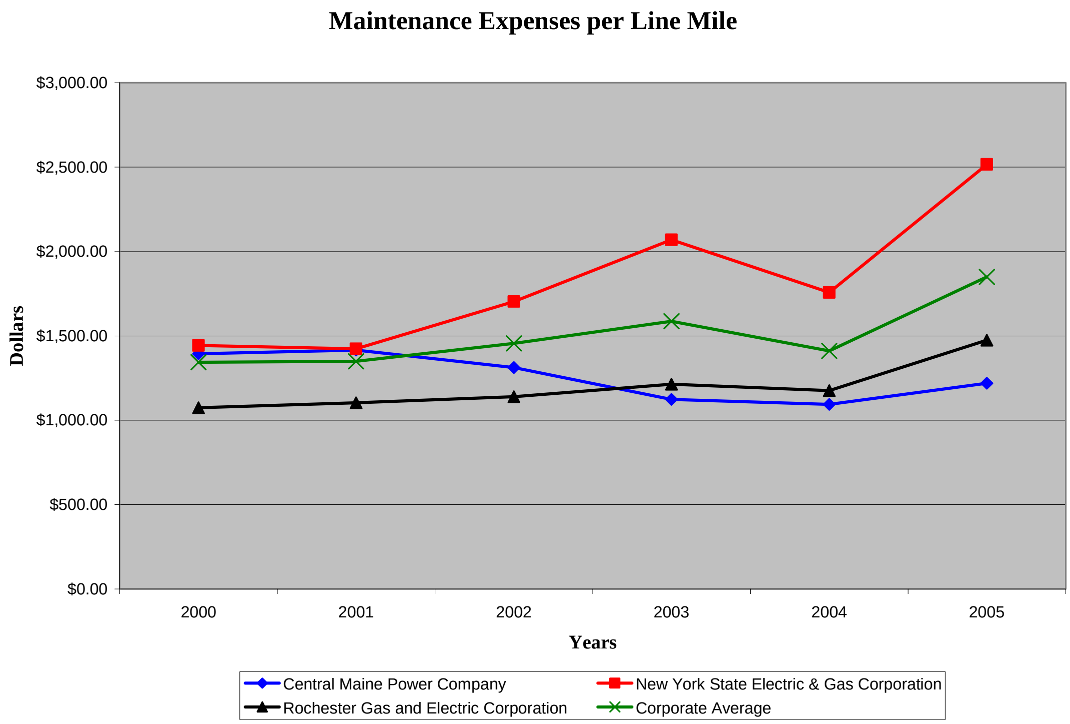
RGE. In order to minimize possible difference in the booking of costs, we performed a focused comparison of the maintenance of overhead lines sub-account. This is the key indicator of resources, including vegetation management expenses, earmarked to maintain the electric distribution system. This comparison also showed that CMP spends less than the Energy East average and the other operating companies on maintenance of overhead lines[9].

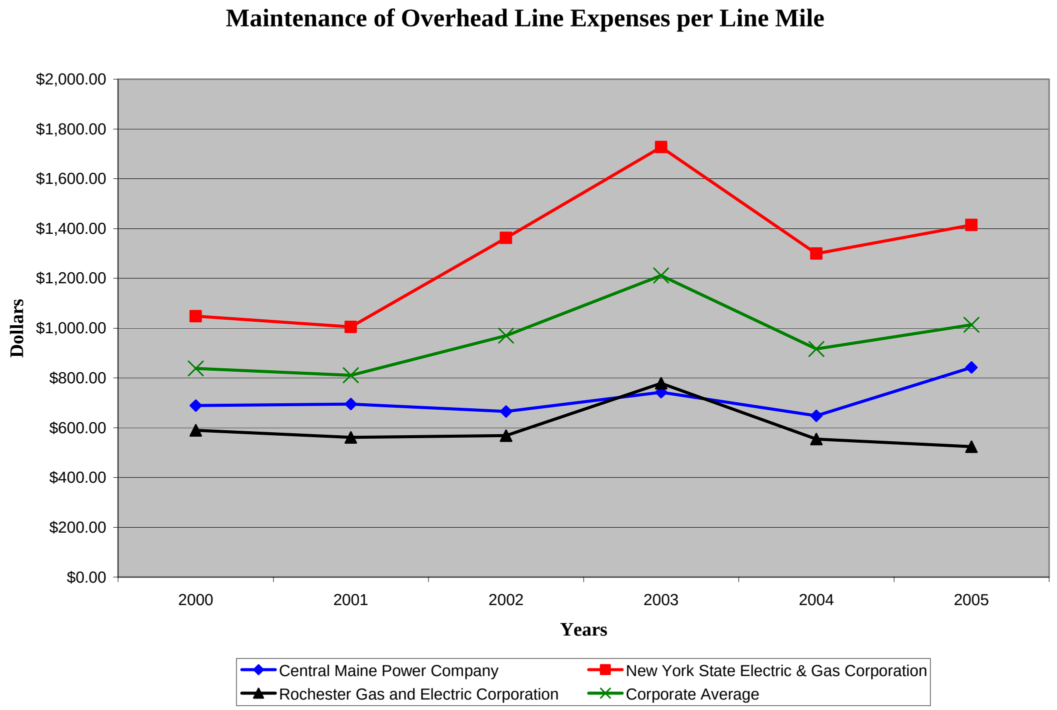
Maintenance Expenses per Customer



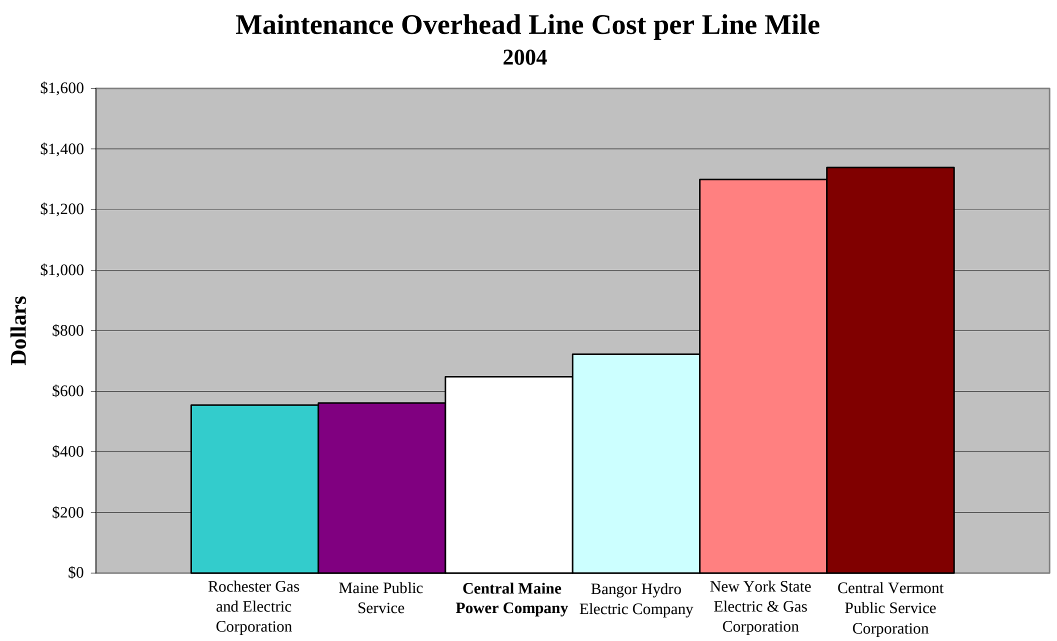
[9] It should be noted that these charts are intended to reflect CMP's expenditure levels in comparison to those of the other Energy East companies and were not intended to analyze year to year trends or patterns. However, it should also be noted that the decrease from 2003 to 2004 for CMP's operations and maintenance expenses may in part have been caused by an expense category reclassification as part of CMP's migration to the SAP accounting system.


Maintenance of Overhead Lines Expenses per Customer
$80.00
$70.00
$60.00
$50.00
$40.00
$30.00
$20.00
$10.00
$0.00
Dollarss
2000
2001
2002
2003
2004
2005
Years
Central Maine Power Company
New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation
Corporate Average


Maintenance Expenses per Line Mile
$3,000.00
$2,500.00
$2,000.00
$1,500.00
$1,000.00
$500.00
$0.00
Dollars
2000
2001
2002
2003
2004
2005
Years
Central Maine Power Company
New York State Electric & Gas Corporation
Rochester Gas and Electric Corporation
Corporate Average

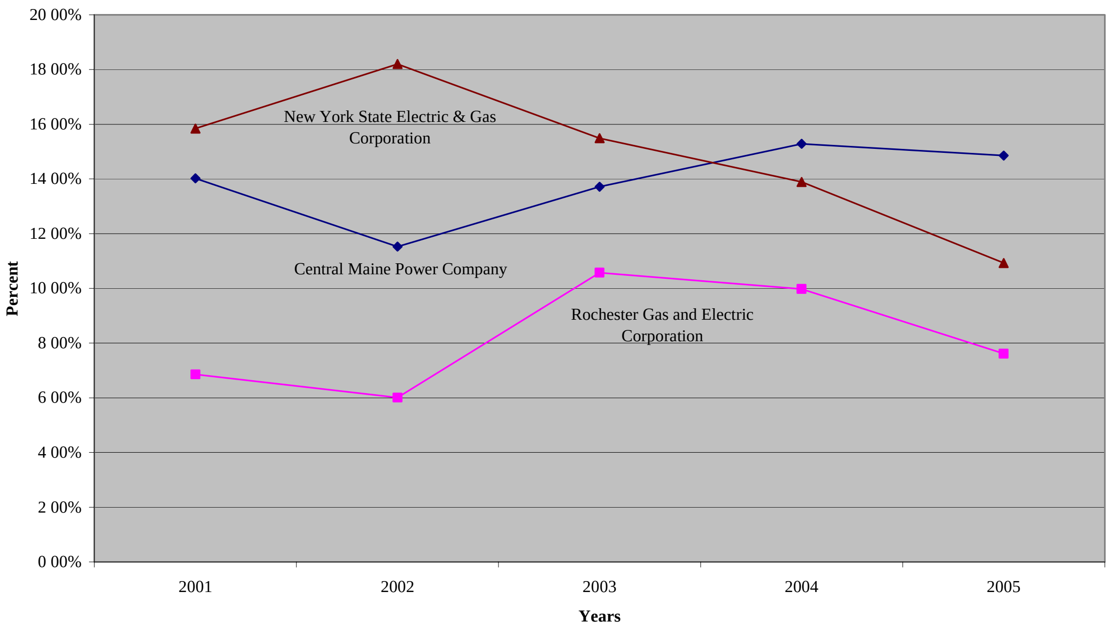


However, comparing 2004 expenses against an expanded panel, including Bangor Hydro, Maine Public Service and Central Vermont Public Service Corporation, shows CMP is at about the middle of the range. While, as noted above, CMP spends less per line mile as compared against the Energy East corporate average, they do spend at a higher level than at least one other New England utility.



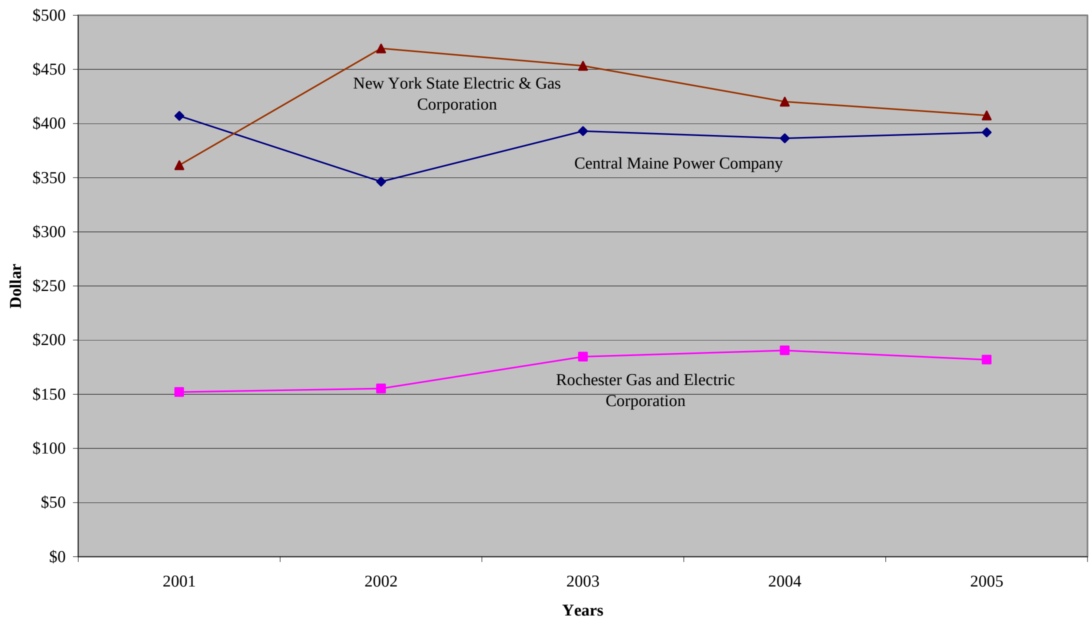
We examined vegetation management expenditures as a percent of total O&M expenses and compared these against the other Energy East companies. CMP's vegetation management expenditures account for 14% to 15% of the budget. On average, over the past five years, this is higher than comparable expenditures for RG&E and in about the same range as vegetation management expenditures for NYSEG.

Vegetation Management Percentage of O&M



We also examined vegetation management expenses per line mile among the Energy East companies. CMP's vegetation management expenses per line mile are higher than RG&E's expenses, but are lower that of NYSEG.

Vegetation Management Expenses per Line Mile



We conclude, based on the foregoing discussion and tree-related outage cause data, as well as our field observations discussed later in this report, that CMP's vegetation management program has been and continues to be under-funded.

3.3.5. Distribution Work Orders

As shown below, CMP's backlog of distribution work orders has not grown during the five-year period of 2001 – 2005. On average, the Company field forces have completed 97% of the annual distribution work orders issued. However, the suspension of the formal circuit inspection program during the 2001 to 2005 period prevents us from commenting if all needed work orders were actually written. With the re-implementation of a formal circuit inspection program in February 2005, CMP stated that they plan to retain records of the work-orders that emanate from that program indefinitely.

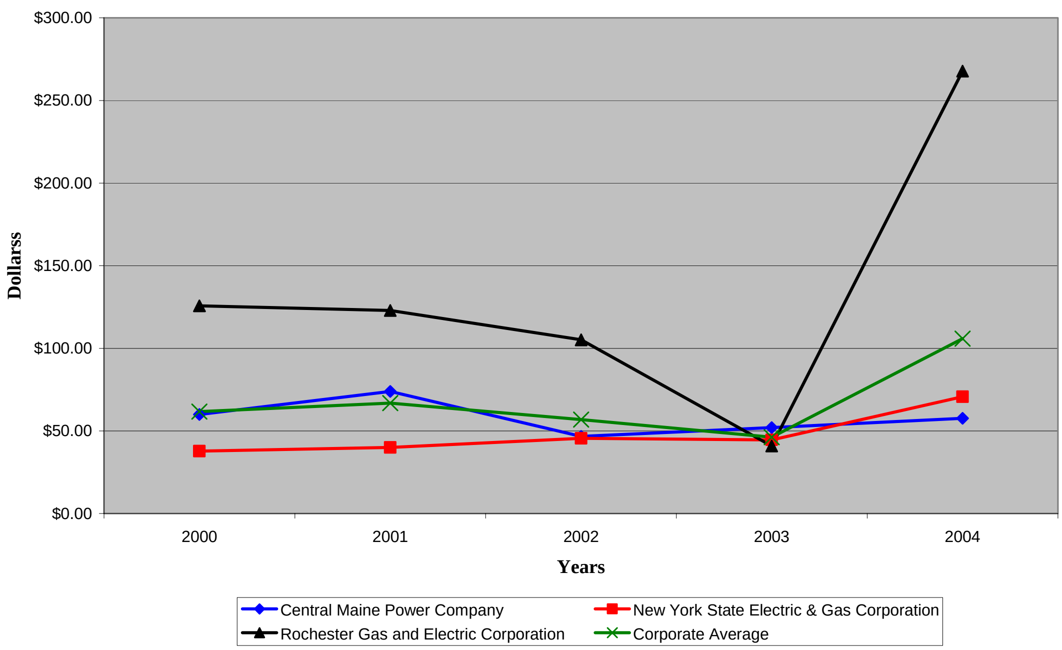
CMP Distribution Work Orders					
Year	**Created**	**Completed**	**% Completed**	**Field Staff**	**Completed/ Field Staff**
2001(1)	103,747	96,749	93%	624	155
2002	166,114	163,784	99%	634	258
2003	160,759	154,992	96%	609	255
2004	141,307	135,821	96%	612	222
2005(2)	120,802	123,234	102%	583	211
Total	692,729	674,580	97%		

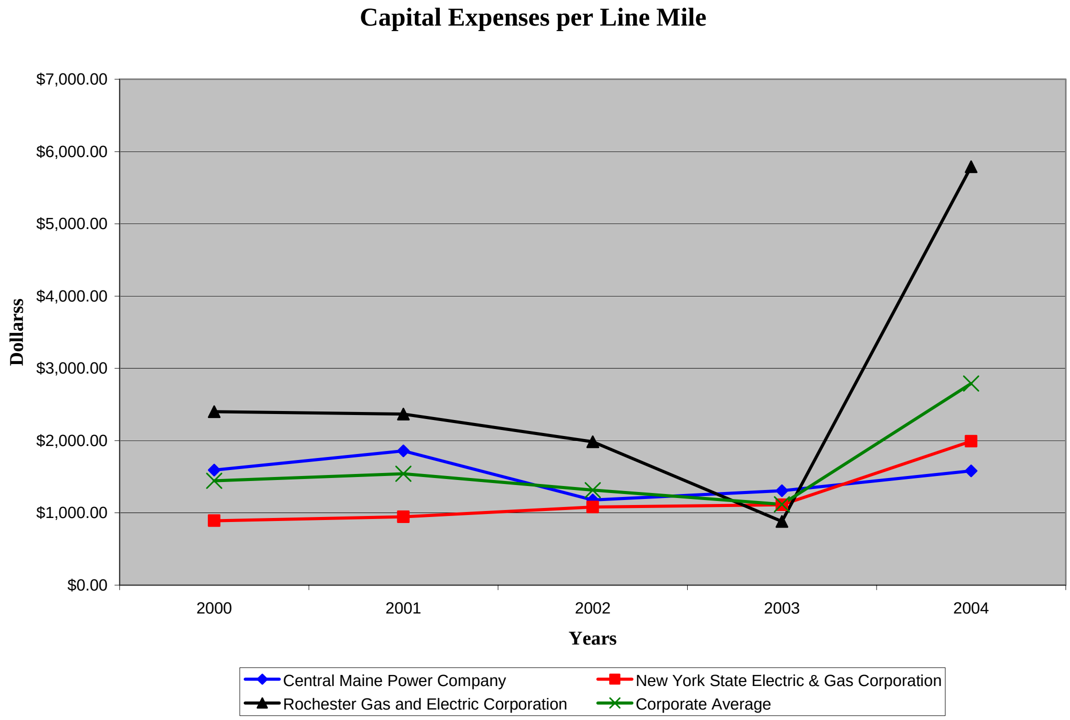
Notes: (1) 6/3/2001 to 12/31/2001 only.
(2) Higher level of work done in 2005 to close out earlier WOs to facilitate conversion to SAP.

3.4. Capital Expenditures

As shown on the following graphs, CMP's capital spending per customer and per line mile has been roughly at the same level as the corporate average until 2004 when RGE had a large increase in capital expenditure. According to CMP, the increase in RGE capital expenditures for 2004 was due in part to a reclassification of distribution and other property classes from CWIP accounts.

Capital Expenses per Customer





3.5. Distribution System

3.5.1. Average Plant Age

The average age of CMP's distribution plant components is shown in the following table. It is interesting to note that pole plant is significantly newer than conductor, indicating that relatively more poles have been replaced than entire circuits or portions of circuits. While age of plant is not a definitive indicator of performance, as components age they are increasingly prone to failure. CMP's distribution plant (excluding capacitors and reclosers) has been aging at an average of approximately 0.5 year annually over the past 5 years, which indicates that older plant is not being replaced on a basis that will maintain the existing age profile. However, as mentioned earlier, pole plant, in particular, is fairly young and could be allowed to age somewhat before additional annual replacements are needed. As plant age increases, it is good practice to increase inspection frequency to identify impending problems before they contribute to reliability performance issues.

Average Distribution Plant Age

Asset	2001	2002	2003	2,004	2005
Poles	25.1	25.8	26.3	26.8	27.2
Conductor	33.3	33.8	34.1	34.6	35.1
Transformers	17.6	17.8	17.9	19.2	19.4
Regulators	14.7	15	15.6	16.0	16.6
Capacitors	15.6	15.5	15.7	15.8	16.3
Reclosers	n/a	3	3.4	3.5	3.6

3.5.2. Circuit Inspection Program

In 2005, CMP implemented a formal 10-year inspection program for its distribution system circuits and poles. 10% of the system is inspected each year plus the ten worst performing circuits reported in the ARP. The inspection program is primarily visual, but suspect poles are examined and sounded for rot. Since the beginning of 2005, circuit inspection records are maintained in an Access database, which facilitates analysis and prioritization. The data recording form was designed with substantial input from CMP's line inspectors from each Service Center. According to Company procedures, the line inspectors immediately report problems that present a safety hazard or an urgent risk of outage to the dispatcher for attention. Other issues are categorized according to the following priority listing:

Category	Timeframe
L1	Repair within current year of inspection
L2	Repair within the following calendar year after inspection
L3	Repair within the following 2 calendar years after inspection

Previously, the line inspectors also recorded the status of vegetation along the circuit. However, since the end of 2005, line inspectors no longer record the status of vegetation unless there is a tree-conductor contact or tree hazard situation. Additionally, CMP does not currently utilize outside pole strength testing or treatment contract services.

3.5.3. System Planning & System Improvement

Annual betterments projects (i.e., distribution system capital improvements) are developed each year by the Distribution Engineers at the Service Centers. They base their recommendations on information related to new loads, existing load growth, recloser operation logs, system and component age, and known problem areas. Readings (e.g., regulator voltage ranges, phase Amperes, recloser odometer readings, etc.) are recorded monthly at the substations. Line regulator readings are taken during the annual inspections. Circuit load forecasts are not generally rolled up to the Service Center level unless Transmission Planning requests these as part of their planning process. CMP has rolled out the planning tools from Cyme, but links to the GIS are still in progress. Once tested and available to the distribution engineers, they will have a tool that helps them greatly with their planning work, particularly for system improvement studies, which is one of several component of their work. The CYME link to GIS will help new distribution engineers learn the CMP distribution system quickly. So there will be some productivity improvements. There is a formal Distribution Planning Criteria that sets forth engineering and operational parameters. Proposed betterments are formalized using a standardized template, which includes technical and economic justifications. The betterment templates (list) are reviewed and prioritized at the Service Center level and are then submitted to the corporate T&D Group where the betterments are prioritized on a CMP wide basis. Following project prioritization at the CMP level, the overall budget is submitted to EnergyEast and funding levels are set by EnergyEast. Therefore, not all projects in the CMP budget request are allocated funding. The list is returned with a "budget line" indicating how much capital has been authorized. Projects above the line are included while projects below the line are rejected. Depending on the actual amount of other construction that is required, for example additional road jobs, etc., some betterments projects may slide off the current year's list while others, below the line, may be included. The Distribution Engineer has the responsibility to keep track of and re-propose rejected betterments projects each year since they are not carried over automatically.

System load forecasts are developed at the CMP level using a variety of techniques, including end-use methods for the residential class, and segment-based methods for commercial and industrial customer classes. Peak loads are estimated using monthly load shapes. The system level forecasts are generally used for determining energy requirements and for transmission planning. If problems are found that impact the distribution system, they are communicated to the Distribution Engineers at the Service Center level.

3.5.3.1. Staff Adequacy

During the interview process, it was suggested that CMP no longer had a sufficient number of Distribution Engineers to meet the engineering workload in the Service Centers. As a result, it was stated that not enough long-term distribution system planning was being performed. Consequently, it is possible that the Company is making sub-optimal investments in its distribution system due to short-term focus and reaction to immediate needs. However, this subject requires additional study before rigorous conclusions can be reached.

3.5.3.2. Accuracy of Load Forecasting

The Service Center load forecasts track reasonably well. Generally, forecast results are slightly below actual peak loads. The following table illustrates the forecast results compared to actual. The first column indicates the year the forecast was prepared. The second column indicates the years in that forecast that were compared to actual peak load growth. The last two columns show the range of forecast error in percent:

Forecast	Forecast years	Results	
2000	2001-2005	-1% to -2%	Under
2001	2002-2005	2% to 8%.	Over
2002	2003-2005	-5% to 2%	Under/Over
2003	2004-2005	-3% to -6%	Under
2004	2005	-6%	Under

3.6. Vegetation Management

Vegetation management, and tree trimming in particular, is a cornerstone maintenance activity of electric distribution companies with systems comprised primarily of overhead (as opposed to underground) lines. For many companies, vegetation management represents the single greatest maintenance expenditure for its overhead lines. However, this expense is well advised and critical to support the safe, reliable, and successful operation of an electric distribution company. A properly designed and funded vegetation management program results in several key benefits including:

- Fewer tree-caused outages of electric service
- Decreased amounts of storm damage and outages caused by trees during various types of storms
- Improved electric reliability performance and customer satisfaction

CMP's vegetation management department is organized within its maintenance engineering services division. A manager with outstanding professional credentials heads the department. His direct reports include a group of seven distribution arborists and one transmission arborist. Each arborist possesses Maine State Arborist and Pesticide Application Licenses.

3.6.1. Budget Levels and Trends

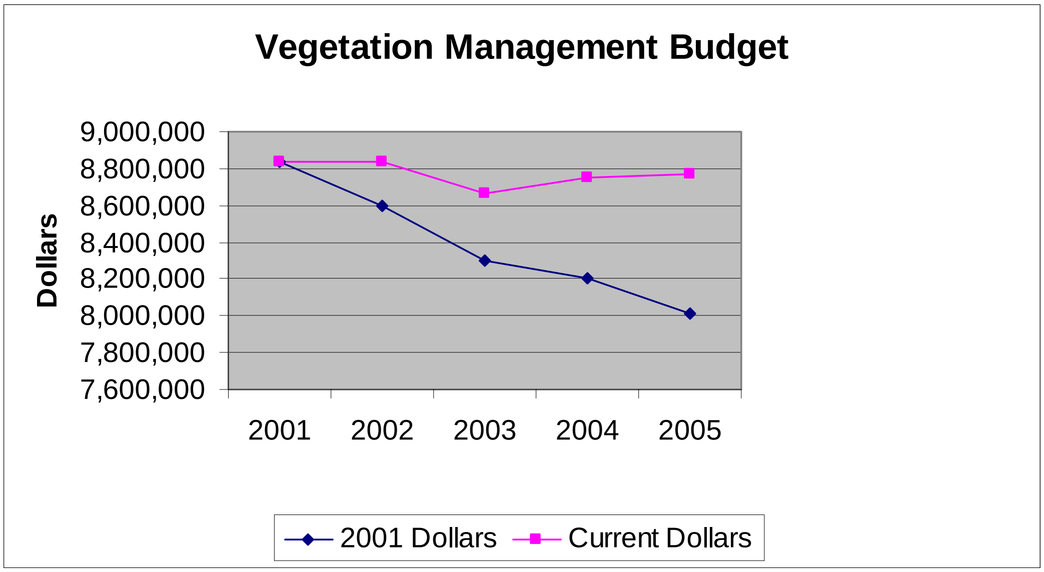
In CMP's last rate case (Docket No. 97-580) rates were based on a 1996 test year for vegetation management expense levels projected forward to the rate effective year beginning on March 1, 2000. Subsequent to that rate case, CMP has been under an Alternative Rate Plan (ARP) that includes inflation and productivity adjustments annually. The embedded and adjusted vegetation management funds embedded in rates are depicted in the following table:

Distribution Vegetation Management Funds Embedded in Rates							
Category	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Maintenance	$6,827,293	$6,827,293	$6,818,418	$6,805,463	$6,728,561	$6,705,684	$6,743,236
Hot Spot	2,460,438	2,460,438	2,457,239	2,452,571	2,424,857	2,416,612	2,430,145
Danger Tree	0	0	0	0	0	0	
Subtotal	**$9,287,731**	**$9,287,731**	**$9,275,657**	**$9,258,033**	**$9,153,417**	**$9,122,296**	**$9,173,381**
Storm	642,280	642,280	641,445	640,226	632,991	630,839	634,372
Total	**$9,930,011**	**$9,930,011**	**$9,917,102**	**$9,898,259**	**$9,786,409**	**$9,753,135**	**$9,807,753**
Inflation & Productivity		*0*	*-0.0013*	*-0.0019*	*-0.0113*	*-0.0034*	*0.0056*

Shown in the table below are the budgeted and actual distribution vegetation management expenditures for the years 2001 through 2005.

Annual Vegetation Management Program Budget and Actual Expenses (Distribution)						
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Annual budget distribution Veg. Mgmt.	8,837,708	8,837,707	8,667,209	8,749,776	8,767,724	8,737,564
Annual storm budgets	500,000	500,000	489,500	390,000	390,000	420,000
Annual actual distribution Veg. Mgmt.	8,936,624	7,692,689	8,864,827	8,103,805	8,554,170	9,058,290
Annual Actual storm	387,834	460,696	461,631	198,475	542,443	988,986

As shown above, the annual distribution vegetation management program budget has been approximately 4% to 5% below expenditure levels accommodated in rates. Actual expenditures have been on average 3% below budget and 7% below rates. Further, the budget has remained relatively flat over the past five years, and in real terms (based on 2001 dollars) the vegetation management budget has declined as shown in the following chart.



Except for years 2002 and 2004, actual expenditures have been within about 3% of the budget. The flat expenditure pattern is not surprising given that CMP manages its electric reliability performance to the ARP, whose baseline performance levels have changed little since its inception. In fact, CMP states that, "Vegetation management performance measures are the PUC ARP targets for CAIDI and SAIFI." (WCI-01-03) It should be recognized that in 2003 CMP negotiated a new agreement for vegetation management services with John Lucas Tree Experts. This was a competitive bid process and Requests for Proposal were sent to 40+ companies for these services. So although expenditures were relatively flat there has been an approximately 20% increase in the volume of work performed. This contract with Lucas Tree continues through December 31, 2010.

The table below shows the total overhead distribution circuit miles and the calculated portion that are treed, and shows the number of spans (i.e., section of overhead distribution circuits) trimmed annually for the period 2001 through 2005.

Overhead Distribution Circuit Miles					
Year	**2001**	**2002**	**2003**	**2004**	**2005**
Total	21,948	22,216	22,555	20,979	21,833
Treed	17,558	17,773	18,044	16,638	17,466
Percent treed	80.0%	80.0%	80.0%	79.3%	80.0%

Note: data adjusted for duplicate spans

Trim Statistics					
OH Spans Cleared	50,608	42,515	60,021	59,754	59,746
OH Calc Miles Trim	1,947	1,635	2,309	2,298	2,298
Equiv Cycle (years)	9.0	10.9	7.8	7.2	7.6

Note that the table above is taken directly from the ARP filed in 2006 in which the title incorrectly read "Total OH Distribution Miles Trimmed"

CMP has been able to reduce the equivalent trim cycle from 9-10 years to about 7 years, but with an average vegetation growth rate of 1.5 feet per year and an average 8 foot side clearance, vegetation would grow back into the primary conductor in about 5 years. So with an effective 7 plus year trim cycle, vegetation encroachment continues to be a problem. As discussed in industry trade articles[10] tree liability increases in a geometric fashion if vegetation management programs are under funded, leading to increased tree-related outages and significantly higher costs to catch up.

On August 1, 2003, CMP entered into a long-term tree-trimming contract with Lucas Tree Experts. The contract is primarily based on a fixed price per span rather than time and materials. As a result, and as shown in the table above for years 2003-2005 as compared to year 2001, about 20% more spans are being trimmed for roughly the same cost. While this is beneficial, we noted tree trimming being performed by independent subcontractors to Lucas during our circuit tours of several CMP service centers. Additionally, during our interviews, two of the regional distribution arborists and line supervisors indicated that the number of tree trimming crews currently working in their regions was less than expected based on past history and trim schedules, and the uncompleted work would have to be performed later in the year[11]. This raised questions regarding the sufficiency of Lucas' resources to service all CMP service centers on an optimal schedule. However, CMP recently stated that per their request, during August 2006 Lucas increased the number of crews actively trimming from 53 to 83. As of October 2006, CMP had 93 subcontractor crews working its system.

The contract with Lucas initially ran through December 31, 2006, with options for 2007 and 2008. CMP has recently executed a contract extension with Lucas Tree

[10] "Managing Trees to Improve the Bottom Line", Siegfried Guggenmoos, President, Ecological Solutions, Inc. dated 4-26-2004 Power Marketing Association.

[11] As part of the cost savings obtained in the current contract, Lucas Tree is performing their work differently than they did under the prior contract. Prior to the new contract entered in 2003, tree crews were based in service centers throughout the Company. Each day the local arborist would tell crews where to go to trim for that day. Typically these crews did not work outside their service territory unless they were involved in storm restoration activities. Under the new contract, CMP provides Lucas with a work plan in December for the following year's work. Lucas Tree is using a Super Crew concept where they put together large crews and move around the service territory working on the circuits that are prioritized by CMP arborists. This allows them to work more efficiently.

Experts with a potential to award a higher level of work. This contract continues until December 31, 2010.

3.6.2. Trim Cycle

CMP's Field Operating Procedure (FOP) Section 400, "Vegetation Management Procedure" (original date of May 18, 2000; revised date of August 17, 2004) states: "The distribution system goal will be to trim on a regular cycle." Unfortunately, this goal has never been achieved, nor does the budget for distribution tree trimming support this goal. According to a proprietary survey conducted several years ago, about 76% of the electric utilities questioned were using cycle trimming to maintain their overhead distribution systems. The majority of those companies were on 3 to 5 year trimming cycles. Variations were primarily due to species growth rates.

Our interview discussions with CMP management personnel suggest that the Company sets an informal annual goal of trimming 15 to 20% of its three phase circuits each year. Even if this is being achieved, three phase circuits only comprise about 20% of the total overhead distribution system. The remaining 80% are subject to a variety of criteria including:

- The tree SAIFI for each circuit
- The prior year's SAIFI
- The number of tree caused power outages
- Visual inspection of tree and brush conditions by a CMP arborist
- A review of power quality issues
- Distance of circuits from service center
- Coordination with CMP betterments or MDOT projects

While all of these are important considerations, they result in judgments by CMP arborists as to which circuit spans should be trimmed based on essentially reactive (as opposed to proactive) criteria. These judgments are assisted by analytical software including the Smart Maps and Vegetation Outage Management programs. However, judgments can and do differ among professionals. The common thread is that the vegetation management program is primarily constrained by the amount of funding allocated among the Service Centers by way of a top-down budgeting process.

CMP has adopted an 8-foot side clearance as part of its vegetation management policies. The Maine Department of Transportation (MDOT) in the past has provided sufficient right-of-way (ROW) along its roadways to give CMP an 8-foot clearance. The MDOT issued new "Guidelines for Electric Utilities Located Near Right-of-Way Lines" in February 2005. These guidelines appear to supercede or supplement the "Memo of Understanding" signed in 1992 by the MDOT and Utilities Task Force. The new guidelines reflect changes in process that the MDOT's Regional Project Group has adopted. These changes have reportedly created issues for planning, design and construction of the regional projects. MDOT is not purchasing as much, if any, additional ROW as they had in the past for these projects. They are still requiring CMP and other utilities to relocate their facilities to the very edge of the ROW, which limits the publicly accessible clearance areas to less than 8 feet. It then becomes incumbent on CMP to privately arrange, where possible, access permissions and/or easements. In these and other cases, where CMP is unable to obtain sufficient clearances, they rely on alley-arms and criss-crossing the street to provide more clearance, but often this is less than 8 feet. CMP does use tree wire where necessary, but acknowledges that this is not a replacement for trim. This situation has become more problematic in the last several years and, according to CMP, is affecting all Maine utilities. In fact, the major investor owned utilities along with telecommunication companies have formed a consortium to address this issue with the MDOT.

It is our opinion that a properly funded cycle trimming program will provide better results with less reliance on reacting to problems. Based on the annual average growth rate of approximately 1.5 ft/year for common tree species in CMP's service territory and considering CMP's distribution line clearance guidelines (FOP Section 400), a 4 to 5 year trim cycle would be required.

3.6.3. Tree-Related Outages

An acid test of the efficacy of a company's vegetation management program is the frequency of tree-related outages. Shown below are CMP's annual outages by cause for the period 2001 through 2005.

ODR-01-25
Attachment 1, p. 1 of 1
Docket No. 2005-705

CMP Outages By Cause

(2001 / 2005)

All Outage Data Included

Outage Cause	*2001*	*2002*	*2003*	*2004*	*2005*
Animal or Bird Contact	1831	1758	1702	1083	1072
Auto Accident	220	300	303	323	351
Cable Dig In	17	5	5	6	5
Cable Failure	42	53	60	45	48
CATV Crew Error	5	6	2	0	0
CMP Cont. Error	5	3	3	0	0
CMP Crew Error	8	14	11	6	8
CMP Tree Cont. Error	5	0	2	1	2
Connector or Splice Failure	29	47	51	18	28
Crane Contact	4	4	1	5	1
Crossarm Failure	5	7	7	7	15
Customer Error	18	19	23	25	15
Cutout Broken, Burned, etc.	98	97	112	86	88
Fire	15	9	25	13	9
Guy/Anchor Failure	6	2	3	3	4
Hot Line Clamp-(Specify)	6	5	7	2	3
Hot Line Clamp-Burned Conducto	25	26	41	30	20
Ice or Snow Broken Conductors	6	12	14	3	11
Insulator Broken or Defective	89	99	120	163	177
Lightning	205	207	104	232	137
Lightning Arrestor Failure	54	61	65	158	168
Obsolete - Do Not Use	181	171	0	0	0
Other Equipment Failure	49	65	86	73	92
Other Human Error	20	22	26	30	21
Other Natural Cause	18	14	39	41	13
Overload	27	29	23	23	43
Planned	66	88	67	59	41
Pole Failure	17	9	18	22	27
Recloser Failure	4	6	4	14	4
Road Cont. Error	7	11	7	11	2
Snowplow Damage	13	6	7	1	9
Station Outage	11	17	11	10	9
Storm	99	334	192	25	165
Switching Error	2	2	0	2	2
Telephone Crew Error	1	2	0	1	0
Terminator Failure	2	7	8	4	7
Tie Wire Failure	12	12	27	15	13
Transformer Failure	55	72	86	96	121
Transmission	18	7	17	12	20
Tree Condition	1848	2461	2789	2980	3437
Tree Cont. Error	29	27	136	95	31
Unknown	1948	1916	2264	1883	1859
Wind or Snow Crossed Conductor	202	114	49	48	38
Total	**7322**	**8126**	**8517**	**7654**	**8116**

Analysis of the outage cause data shows a consistent increase in tree-related outages every year. Specifically, tree-related outages have increased from 1848 in year 2001, to 3437 in year 2005. This represents an increase of 86% over the five-year period. Also of note, tree-related outages as a percentage of total outages have increased from 25% in year 2001, to 42% in year 2005. By way of comparison, the Edison Electric Institute (EEI) 2002 reliability report containing survey data from 64 electric utilities found that vegetation caused 21% of the service interruptions reported.

CMP's consistently increasing level of tree-related outages provides further support of the need for the Company to adopt and fully fund a cycle trimming program for its distribution system.

3.7. Condition Assessment

We undertook a comprehensive, independent physical inspection of CMP's distribution facilities to determine the electrical and mechanical condition of the assets including a review of the condition of vegetation management. The following sections describe how the sample was developed, the inspection methodology, the schedule of inspections and a summary of the results.

3.7.1. Sample Development

Objective

The objective of developing a reasonable and statistically valid sample is to assure that the results of the physical distribution system condition assessment are representative of the system as a whole and are able to be used to indicate the general condition of the system and to identify components and/or areas of the system that may require problem mitigation, enhanced maintenance, or reinforcement.

Sample Requirements

WCI proposed utilizing a binomial sampling methodology using a 90% confidence level with a 10% error rate, as is typically used in the utility industry to formulate condition assessments. This methodology generally requires a minimum sample of 67-70 observations from a consistent population to achieve the 90% confidence level at an error rate of 10%.

There are several factors that differentiate the CMP distribution system population: performance (CAIDI and CAIFI/SAIFI), length of circuits, customer density and geographic area. Therefore we developed a stratified sample to take into account these differentiating factors to develop a set of consistent populations upon which to base the sample selection.

Methodology

We developed the sample into three strata:

1. ***Overall Performance*** **-** to identify a list of best and worst performing circuits
2. ***Specific Performance*** **–** to further identify the better and worst performers within the list of best and worst performers above
3. ***3-Phase and 1-***Phase – to differentiate the sample

The approach is shown in the figure below and described in detail in the following:

<table>
<tr><td rowspan="8">Better Performers
(CAIFI below median)</td><td rowspan="4">Best of the Better Performers
(Upper half)</td><td>Quartile 1 (CAIFI)</td></tr>
<tr><td>Quartile 2 (CAIFI)</td></tr>
<tr><td>Quartile 3 (CAIFI)</td></tr>
<tr><td>Quartile 4 (CAIFI)</td></tr>
<tr><td rowspan="4">Worst of the Better Performers
(Lower half)</td><td>Quartile 1 (CAIFI)</td></tr>
<tr><td>Quartile 2 (CAIFI)</td></tr>
<tr><td>Quartile 3 (CAIFI)</td></tr>
<tr><td>Quartile 4 (CAIFI)</td></tr>
<tr><td rowspan="8">Worse Performers
(CAIFI above median)</td><td rowspan="4">Best of the Worse Performers
(Upper half)</td><td>Quartile 1 (CAIFI)</td></tr>
<tr><td>Quartile 2 (CAIFI)</td></tr>
<tr><td>Quartile 3 (CAIFI)</td></tr>
<tr><td>Quartile 4 (CAIFI)</td></tr>
<tr><td rowspan="4">Worst of the Worse Performers
(Lower half)</td><td>Quartile 1 (CAIFI)</td></tr>
<tr><td>Quartile 2 (CAIFI)</td></tr>
<tr><td>Quartile 3 (CAIFI)</td></tr>
<tr><td>Quartile 4 (CAIFI)</td></tr>
</table>

Performance

Since the system condition assessment is intended to capture the condition of the distribution facilities, including the impact of vegetation, we have chosen the Circuit Average Interruption Frequency Index (CAIFI) as the major indicator. The first stratum was developed by examining 2005 reliability performance by circuit, excluding major events. We divided the population into two equal strata of 191 circuits each. We excluded four circuits whose CAIFI was above 10 as outliers (659D5, 437D1, 631D1 and 645D7) in order to better model the system as a whole.

Specific Performance

Next, we evenly divided the first stratum into two additional strata that further devise the performance of the better and worse performing circuit populations according to the following:

Population	**CAIFI Range**
Best of the better	0.000 to 0.0546
Worst of the better	0.577 to 1.227
Best of the worse	1.255 to 2.407
Worst of the worse	2.438 to 9.500

Within each of these specific performance strata, we established quartiles based on CAIFI and chose the midpoint circuit within each quartile. To validate that the resulting sample circuits reasonably represented customer density, we reviewed the customer density range for the chosen circuits.

3-Phase and 1-Phase

We randomly selected 67-70 poles from each of the 3-phase and 1-phase portions of each of the selected circuits. For each of the selected sample circuits, CMP provided an extract from the GIS system that listed all town, road and pole numbers for the circuit. We then developed a random selection of these poles to inspect (stratified by 3-phase and 1-phase) by using the respective population of pole numbers for each category and calculating a random selection of poles for each category using a standard random selection tools. The random sample returned 67-70 poles from each stratum, as required fulfilling the 90% confidence/10% error sampling criteria, for a total of 2,597 poles.

Sample

Based on the analysis and sample selection methodology described above, the following circuits were selected for the distribution system condition assessment.

Strata	Circuit	Service Area	2005 CAIFI (with Exclusions)	Customer Density Cust/Mile
Worst of the Better	237D1	Augusta	0.653	17
Worst of the Better	444D3	Bridgton	0.821	23
Worst of the Better	818D1	Farmington	1.017	11
Worst of the Better	211D1	Augusta	1.154	57
Best of the Better	844D1	Farmington	0.000	43
Best of the Better	634D2	Alfred	0.086	147
Best of the Better	803D4	Rockland	0.233	66
Best of the Better	213D4	Brunswick	0.431	26
Worst of the Worse	420D7	Lewiston	2.585	18
Worst of the Worse	834D1	Dover	3.104	12
Worst of the Worse	629D2	Alfred	3.909	55
Worst of the Worse	823D2	Skohegan	6.337	9
Best of the Worse	835D1	Farmington	1.340	8
Best of the Worse	439D1	Bridgton	1.572	17
Best of the Worse	214D3	Rockland	1.909	41
Best of the Worse	870D2	Fairfield	2.217	72

3.7.2. Inspection Methodology

We developed and employed a tailored Circuit Inspection Form (Please refer to Appendix 6.4.1) that conformed to CMP's "Distribution Line Inspection Form". For each pole, we visually inspected and recorded the following information:

Inspection Item	Methodology
Location	Roadside or in the right-of-way
Pole Condition	Visual check for damage, leaning and sounding the pole for rot at the butt or at about 4 feet up.
Number of phases	Number

Inspection Item	Methodology
X-Arms	Type and condition
Insulators	Type and condition
Devices	Type and condition
Guys	Type and condition
Attachments	Type
ROW condition	Encroachment of vegetation along the span from the prior pole to the subject pole

The sample included 16 circuits, of which we inspected 2,597 poles. In cases where the specified pole could not be located (e.g., the pole was not identifiable, the phase was incorrect, etc.), an adjacent pole that matched the number of phases was substituted. If for example, a pole was labeled on the GIS data sheet as 1-phase but actually was a 3-phase pole, the selected pole was not inspected, and was replaced with the nearest 1-phase pole, or vice versa. We found a total of 129 such instances or 4% of the sample.

3.7.3. Inspection Schedule

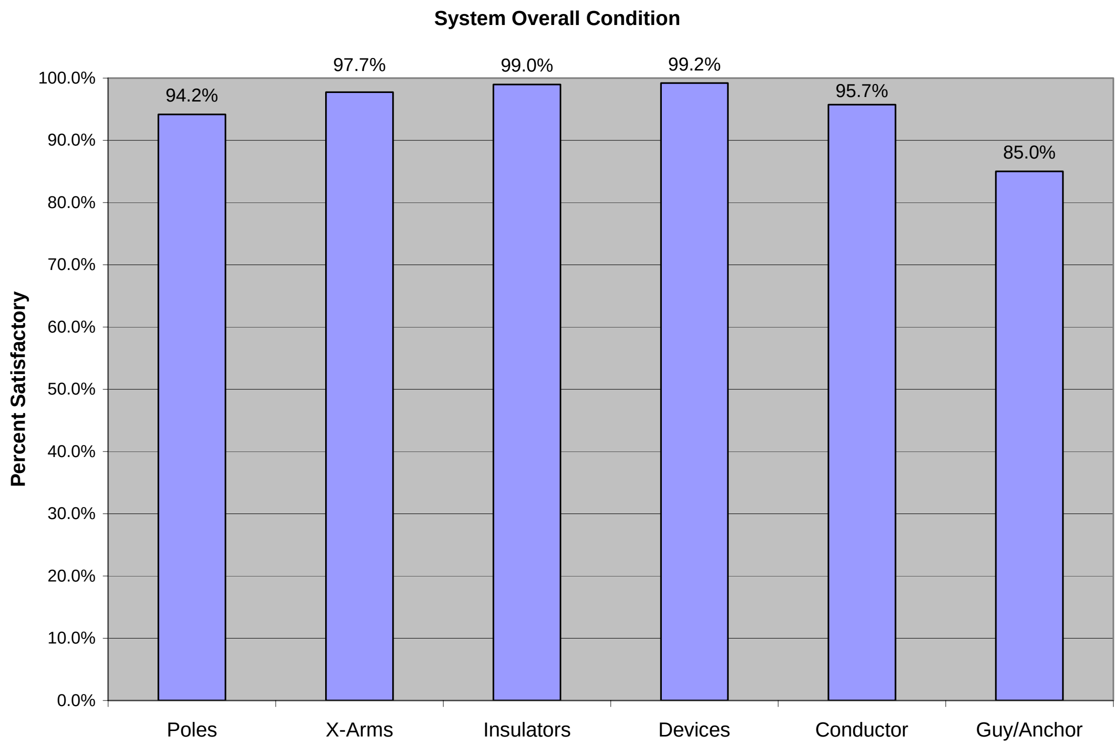
In collaboration with CMP, we developed an aggressive inspection schedule that was optimized to minimize the drive times between samples. We appreciate the efforts of CMP and in particular their Line Supervisors, Line Inspectors and Service Center Managers to facilitate and support our inspection process. The inspection schedule is shown in Appendix 6.4.2.

3.7.4. Inspection Data

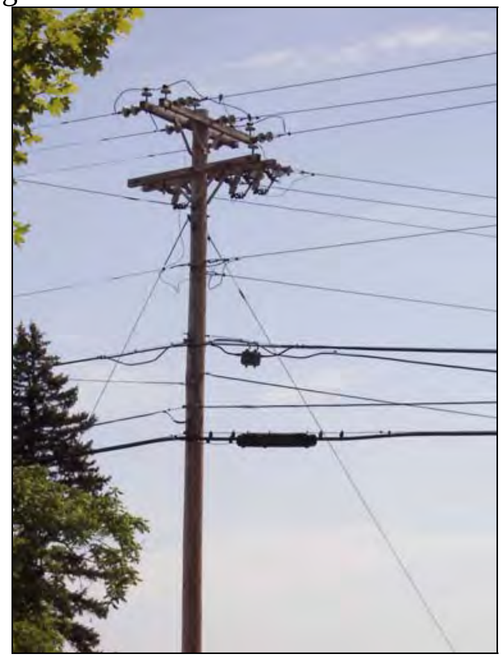
The data we collected from the inspection process was faxed to our office daily from the Service Centers, entered into a database, and validated against entries and counts. The resulting dataset was analyzed to produce a tabulation of the condition of the sampled distribution system poles. Based on the sample design methodology, these results are indicative of the condition of the overall distribution system at a 90% confidence level with a 10% error rate. Detailed inspection results may be found in Appendix-6.6.

3.7.5. Inspection Results Summary

CMP's distribution system appears to be in good condition electrically and mechanically based on the inspection results shown below:

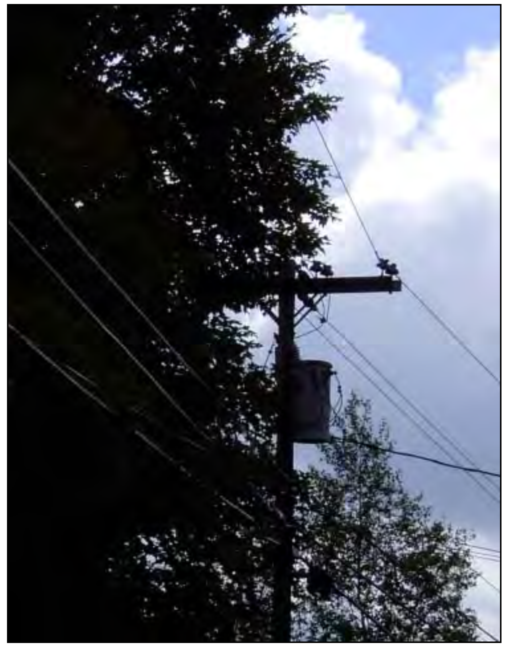


We have provided several photographs that illustrate the electrical and mechanical condition of the system, along with several photographs that clearly show serious vegetation encroachment.


Typical 3-phase pole

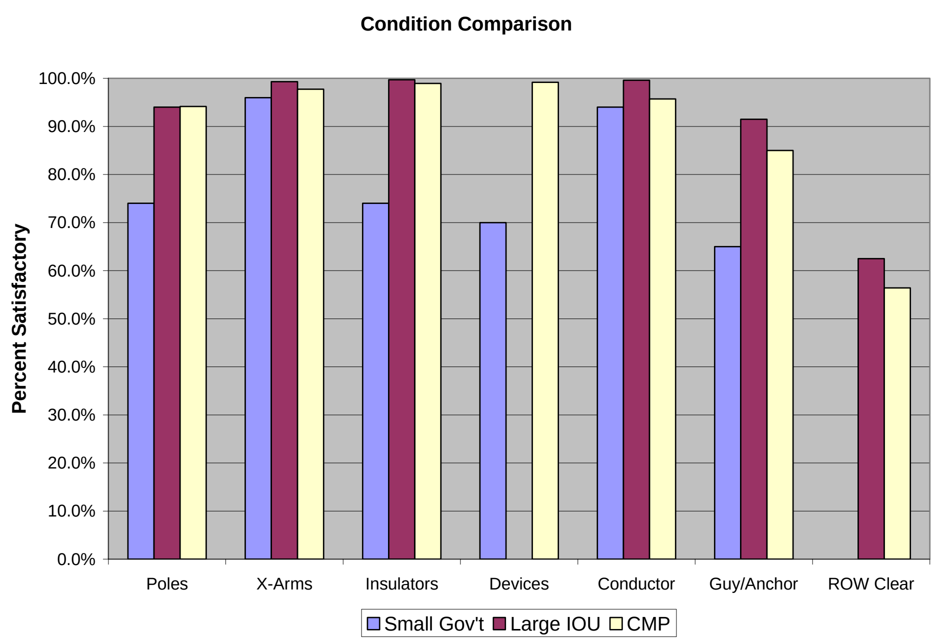

Typical 1-phase circuit

Heavy vegetation in contact with 1-phase circuit



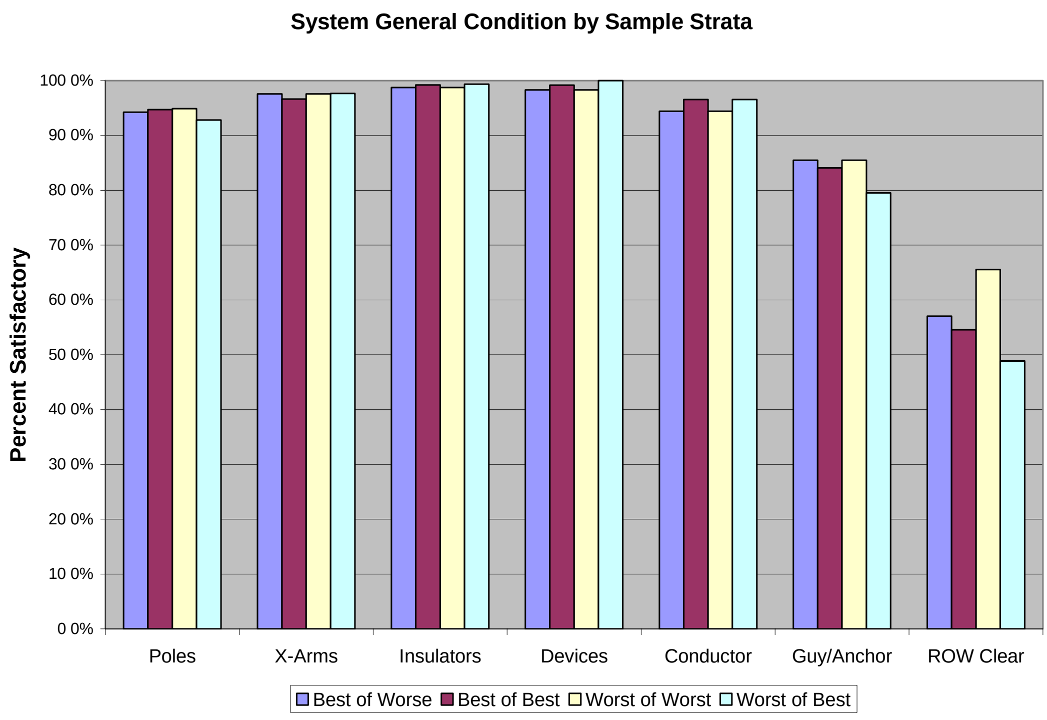
Heavy vegetation in contact with 3-phase circuit

Excluding the status of its vegetation management, CMP's overhead electric distribution system condition compares favorably with several other utilities[12] for which we have conducted condition assessments:

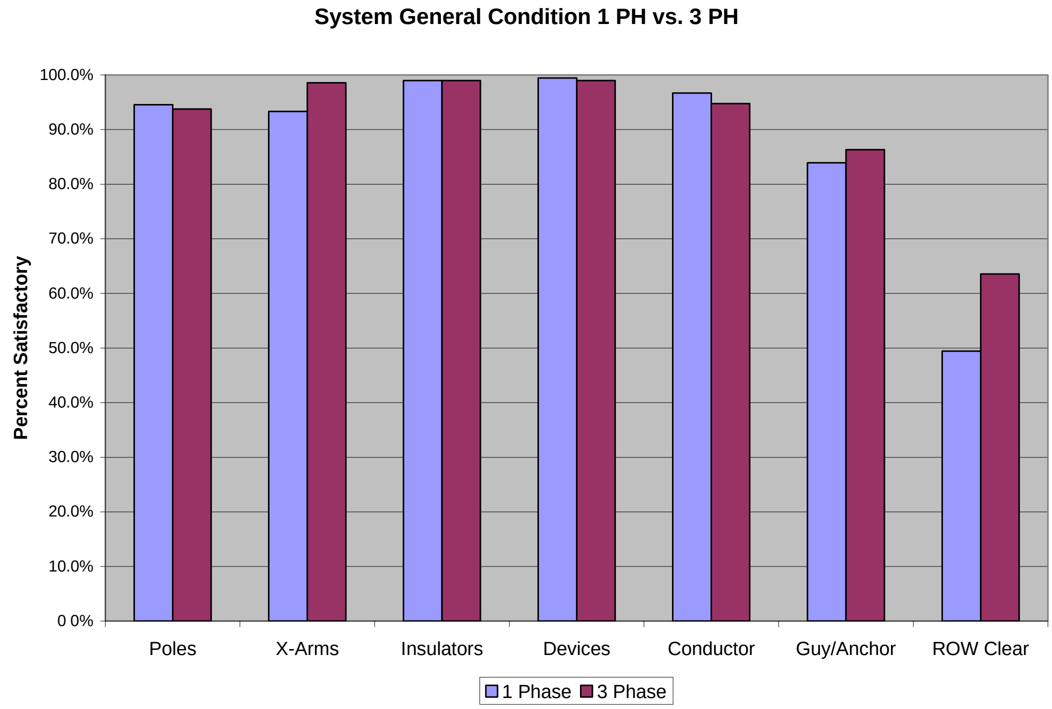


[12] The Large IOU (whose identity is confidential due to agreements signed during that study) did not report condition for devices and the Small Government utility did not report ROW or vegetation condition as their system was primarily devoid of vegetation.

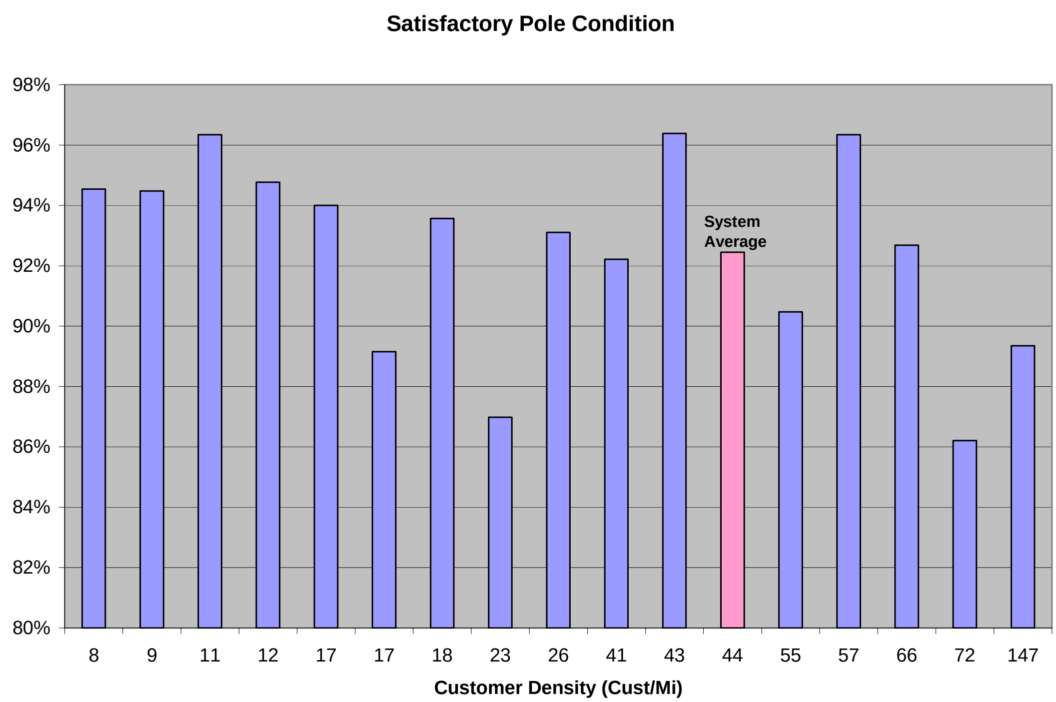
The following charts depict distribution system condition broken out by sample strata and by single-phase and three-phase circuits, which we believe are representative of CMP's service area. Therefore, we conclude that the system mechanical and electrical condition is generally uniform across the service area. The percent of ROW that is clear of vegetation, or where vegetation is more than 8 feet away from the conductor, varies within the sample strata from 49% to 65%.

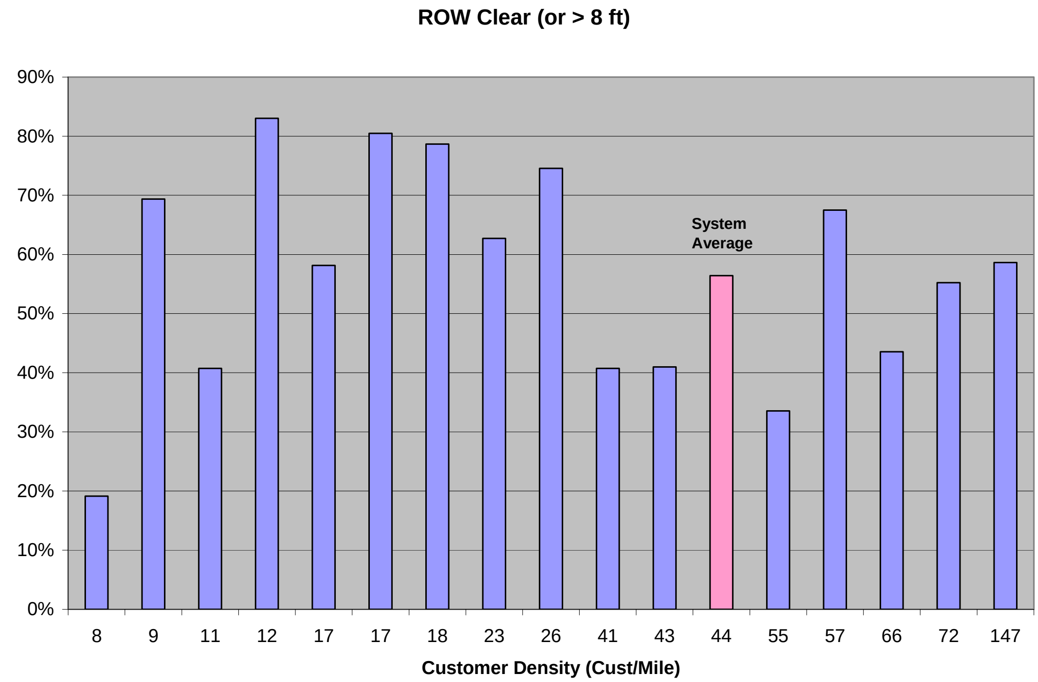


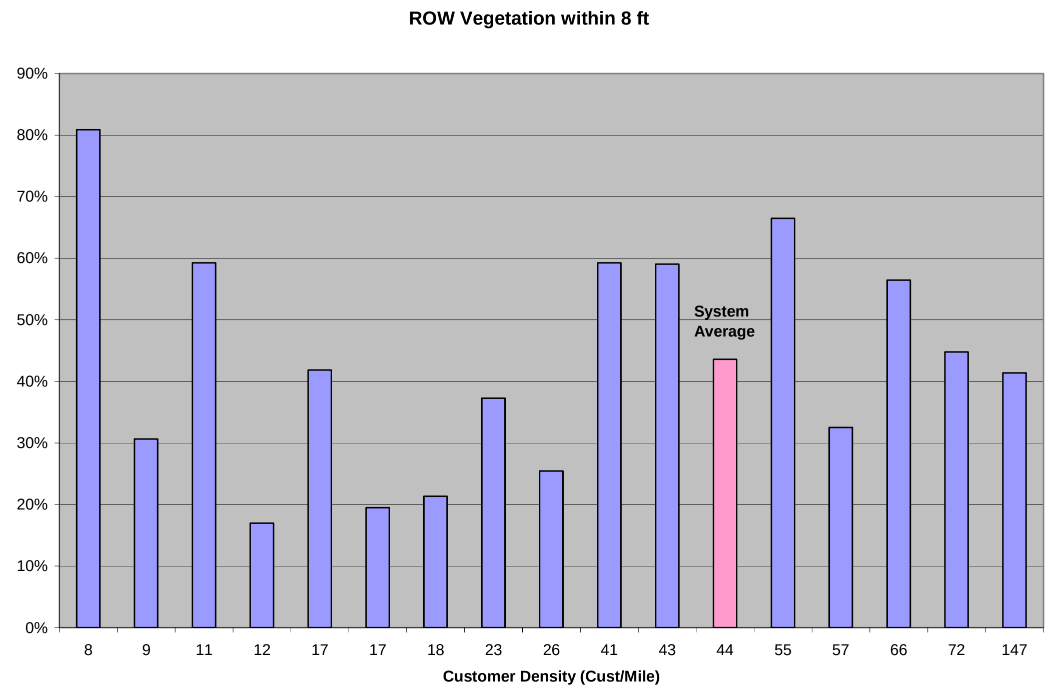
For single-phase vs. three-phase, as shown in the chart below, the three-phase sample circuits at 63.3% clear of vegetation encroachment were significantly better than the single-phase sample circuits at only 49.4% clear. This is in line with our expectations and indicates that more tree-related outages could be expected to occur on single-phase circuits.



As depicted on the following charts, the results indicate that system condition is fairly uniform across various customer densities. While there are differences in satisfactory pole condition and vegetation clearance (for example), we do not detect any bias toward less dense circuits.







Based on our physical inspection, before and after adjustment, between 12.7% and 19% of the circuits have vegetation in direct contact with the conductor posing an immediate risk of outages, potential fires, hazard to the general public, momentary interruptions, flickering lights, damage to customers' equipment, and increased recloser operations. This latter event would require CMP to inspect and/or replace reclosers more frequently. Another 15.8% to 23.8% of the circuits have vegetation within 3 feet that is likely to pose a risk to the system within one year[13]. While 56.4% of the ROW (based on raw inspection figures) is clear of vegetation or with vegetation beyond 8 feet, this is considerably below results for other large IOUs, at 62.5% clear which indicates the heavily-treed nature of CMP's service areas. The overall ROW condition is depicted in the following:

ROW Condition	Raw Percent	Adjusted Percent*	Risk Factors
0-Clear (No trees or Underbrush)	46.6%	20.0%	
1-Trees/Limbs >8'	9.8%	14.7%	Risk Factor in 3-5 Years
2-Trees/Limbs 3>d<8'	14.7%	22.1%	Risk Factor in 1-3 years
3-Trees/Limbs < 3'	15.8%	23.8%	Risk Factor within 1 year
4-Trees/Limb Contact	12.6%	18.9%	Immediate Risk Factor
5-Danger Tree	0.1%	0.1%	
6-Underbrush w/in 3'	0.2%	0.2%	
7-Vines, Moderate	0.1%	0.1%	
8-Vines, Severe	0.1%	0.1%	
9-Other	0.0%	0.0%	

*Note: The survey contained several circuits that were industrial or urban in nature, which resulted in lower percentage of treed distribution spans than the 80% reported by CMP. We adjusted the results accordingly to simulate an 80% level of treed spans

Of the 12.7% to 19% of the circuits that were identified as being in contact with primary conductor many showed evidence of burning. These segments require immediate attention. Another 15.8% to 23.8% of the segments have tree limbs or branches within 3 feet of the conductor. These should be addressed with relative immediacy since under high wind conditions contact is very possible.

Additionally, 14.7% to 22.1% of the segments have tree limbs within a range of 3 to 8 feet of the conductor. With an average growth rate of 18 inches annually (some species have faster growth rates) these segments will be at risk within the next 1-3 years and should be addressed well within that time frame.

Finally, 9.8% to 14.7% of the segments have vegetation that is at or beyond 8 feet from the conductor. These segments will require attention within the next 3-5 years, based on an average growth rate of 1.5 ft per year. If CMP were able to reach a 4-5 year trim cycle in the next several years, many of the potential tree-related risks on these segments would be mitigated.

3.8. Outage vs. Trim Analysis

Based on the results of our physical inspection combined with data from CMP on the last trim dates for the corresponding segments, it is clear that trim frequency is critical to maintaining adequate clearance and mitigating potential tree-related outages. For

[13] It should be noted that with an average of 8 ft clearance and an average growth rate of 1.5 ft/yr some 20% of the circuits on a five year trim cycle can be expected to have vegetation within 3 ft of the conductor.

example, as shown in the table below, segments with direct vegetation contact amounted to 12.6% of the system, but only 17.1% of these had been trimmed within the past 4 years. In contrast, 61% of those segments where vegetation was at least 8 feet away from the conductor had been trimmed within the past 4 years.

			Last Trim (years)	
Condition	**Description**	**% of System**	**<= 4**	**> 4**
Cond=1	Tree/limb >8 ft	9.90%	61.0%	39.0%
Cond=2	Tree/limb 3>d<8 ft	14.7%	39.8%	60.2%
Cond=3	Tree/limb <3 ft	15.8%	33.0%	67.0%
Cond=4	Tree/limb contact	12.6%	17.1%	82.9%

4. Conclusions

4.1. Improvement Opportunities

Based on our interviews with CMP staff and the results of our physical condition assessment, there are several areas in which we believe CMP can improve its electric distribution system reliability performance:

1. Implementing stretch goals for reliability indices, with gradual improvement targets set year by year will provide an incentive to continue efforts to improve performance.
2. Creating additional reporting to cover reliability performance by circuit will help to focus on problem areas.
3. Modifying the 10-year Circuit Inspection Program to include reporting on the state of vegetation on the circuit by segment will provide additional information to the arborists in planning for vegetation management.
4. Increasing the base level of vegetation trim resource commitment will permit CMP to keep up with vegetation growth and encroachment.
5. Moving to a 4 to 5 year cycle trim plan for vegetation management, in combination with hot spot and hazard tree treatments, and response to customer requests, will improve reliability performance.

4.2. System Condition

CMP's overhead distribution plant appears to be in good mechanical and electrical condition. CMP has undertaken a number of pro-active programs to improve the performance of the system, such as the focused animal guard program. However, the state of vegetation encroachment is less than satisfactory.

4.3. ARP Targets

The SAIFI and CAIDI baselines contained in the current ARP are set at levels that are significantly worse than industry averages. This, coupled with CMP's practice of managing to the ARP, virtually assures that reliability performance will not improve. As a result, we believe the next version of the ARP should establish new SAIFI and CAIDI baselines that provide an incentive for CMP to achieve reliability performance trending toward electric distribution industry averages.

4.4. Worst Circuit Performance

The current ARP requires CMP to report its ten worst performing circuits on an annual basis, including a review of current performance on circuits identified the prior year. In addition, the ARP requires a narrative on each of the circuits that sets forth the work activities planned and/or accomplished to improve circuit reliability performance. The ten worst performing circuits are identified on a company-wide basis in terms of contribution to company-level performance. As discussed earlier, if viewed at a lower level, such as at the Service Center or individual circuit level, a different set of worst performing circuits may result, whose performance may be considerably worse than those identified in the ARP filing. These circuits may not receive the attention needed to mitigate reliability performance issues.

4.5. Vegetation Management

The vegetation management program for the electric distribution system is constrained by insufficient budget funding to allow a four or five year tree trimming cycle. While CMP's vegetation management staff and software systems are impressive, they are not able to reverse the rising number and percentage of tree caused service outages. Additionally, it is likely that the insufficient budget funding levels may be linked to the ARP reliability baselines for SAIFI and CAIDI. As stated by CMP, "Vegetation management performance measures are the PUC ARP targets for CAIDI and SAIFI."

An article in Electric Light and Power, May/June 2006 reported that Public Service Company of Oklahoma and AEP operating company, in its Oklahoma service territory, has been able to reduce power outages by 80% in some areas of Tulsa as a result of their tree trimming campaign[14].

If CMP implements an improved vegetation management program to catch up to and maintain a 4-5 year trim cycle, tree-related outages should decrease substantially. In order to gain a perspective on this, we have estimated the impact of both a 20% and 35% reduction in tree-related outages on SAIFI, SAIDI[15], and CAIDI as shown below:

	2006 ARP (2005 Data)	Reliability Indices for a reduction in Tree-Related Outages of:	
		20%	35%
CMP Total			
SAIFI	1.94	1.80	1.69
SAIDI	4.24	3.87	3.60
CAIDI	2.18	2.15	2.12

We recognize to achieve an accurate measure of reliability performance improvement for a reduction in tree related outages one should adjust specific data for each "avoidable" outage and compute the indices based on these data[16]. However, as a high-level estimate, our calculation is based on a reduction in outage count, customers affected, and customer hours out of service. Therefore, our estimate is only indicative of the possible improvement in reliability indices corresponding to a reduction in tree-related outages. A 35% reduction in tree-related outages would move CMP's SAIFI

[14] It should be noted that while service areas and vegetation challenges could be very different between Maine and Oklahoma, significant improvements in reliability performance can be gained with effective vegetation trim programs.

[15] SAIDI is defined as the System Average Interruption Duration Index and is a combination of CAIDI and SAIFI resulting in the average amount of time that customers are interrupted during the year.

[16] Reliability indices are computed according to formulas that sum the number of customers affected and/or the customer interruption durations for each outage. Therefore to accurately calculate indices for a reduction in tree-related outages, one should identify those outages individually and remove them from the formula calculation. Definitions used by CMP and the industry in general for calculating reliability indices are shown in Appendix 6.1.

and CAIDI performance from the 4th quartile to the 3rd quartile of the IEEE 2004 survey noted earlier.

Further, also as noted earlier, CMP's tree-related outages comprise 42% of all outages. A 20% reduction in tree-related outages would reduce this to 37%, and a 35% reduction in tree-related outages would further reduce this to 32%, which is closer to industry averages of 21 %. We understand that it may be difficult for CMP to reach industry averages due to the extremely heavy tree concentration in Maine.

Percent reduction in tree-related outages	Reduction in tree-related outages	Tree-related outages (w/o exclusions)	Total Outages (w/o exclusions)	Tree-related outages as a Percent of total outages
0%	None	3,437	8,116	42%
20%	687	2,750	7,429	37%
35%	1,203	2,234	6,913	32%

Based on vegetation management budget levels, CMP has recently achieved between a 7 and 8 year effective trim cycle as depicted below:

Overhead Distribution Circuit Miles					
Year	**2001**	**2002**	**2003**	**2004**	**2005**
Total	21948	22216	22555	20979	21833
Treed	17558	17773	18044	16638	17466
Percent treed	80.0%	80.0%	80.0%	79.3%	80.0%
Trim Statistics					
OH Spans Cleared	50608	42515	60021	59754	59746
OH Calc Miles Trim	1947	1635	2309	2298	2298
Equiv Cycle (years)	9.0	10.9	7.8	7.2	7.6

Based on the preceding, and assuming continuation of current contracted per section trim costs of approximately $150 per section trimmed, the vegetation management budget ($8,554,170 for 2005) would need to be increased to approximately $15 million to maintain a 5-year trim cycle. These figures do not include expenditures required to "catch up" or expenditures for storm and new construction requirements. While these figures are rough estimates, they are within the range of costs estimated in two vegetation management studies done earlier for CMP:

1. Environmental Consultants, Inc. (ECI) entitled "Distribution Line Clearance Program", (1988), and
2. Barakat & Chamberlin, Inc. (BCI) entitled "Assessment of Environmental and Other Impacts of Central Maine Power's Line Clearance Program", (1990).

Both consultants recommended a five-year trim cycle and estimated annual costs, after catch-up, in the range of $6.5 million (ECI - 1988$) to $10.3 million (BCI-1990$). ECI's figures do not include construction trim or storm costs. BCI's figures appear to include construction trim, but do not include storm costs. ECI stated that for 1988, CMP's vegetation budget of $7.6 million included $1.8 million for construction trim and $700,000 for storms. The equivalent ECI steady state budget figures, including construction trim would be $8.3 million (1988$). These figures correspond to a range of $14.2 million to $16.1 million, respectively (adjusted for inflation to 2006 based on CPI). A 5-year trim cycle would require trimming about 102,000 sections annually (based on equivalent treed miles of distribution lines). Using an average per span contract cost of $150, we estimate an annual expenditure of **$**15.0M excluding storm costs, and after "catch-up" trims, which is consistent with the adjusted figures estimated by ECI and BCI.

ECI's budget estimates included a two-year "catch-up" period and amounted to $9.6 million the first year and $7.4 million the second. This amounts to a 48% increase and a 14% increase for the first and second years, respectively, over the steady state budget level for a 5-year cycle. As part of their cost estimate, ECI estimated a 25% to 30% vegetation/conductor contact rate.

Our field inspections showed an unadjusted contact rate of 12.6%. Our results also showed that 46.6% of the sample circuit segments were clear of vegetation, while CMP's estimates are that 20% of its entire overhead system is devoid of trees. Of the 16 circuits we inspected, at least 2 were in industrial and/or city areas that were virtually devoid of trees. We have therefore adjusted the ROW condition factors to approximate 80% treed ROW and 20% clear ROW. The adjusted figures show that the equivalent percent of contact is about 18.9%, which indicates that CMP has made some progress in mitigating vegetation contact, but still has a way to go.

While we cannot accurately estimate the level of catch-up costs without a complete system survey, we suggest that CMP prioritize its first year of catch-up activities to mitigate all of the tree limbs that are in contact with primary conductor and a sizeable portion of those that are within 3 feet of the conductor. Assuming an average vegetation growth rate of 1.5 feet per year, a portion of the balance of the limbs initially within 3 feet will, by the second year, be in contact with the primary conductor and should be mitigated on a priority basis. Again, given the average growth rate, there may always be limbs that grow into contact with the primary conductor, even with a 5 year trim cycle, and these should receive priority during the then current year. While we cannot accurately determine the costs of the catch-up effort, we have estimated that the catch-up will cost in the range of $4 million to $5 million, based on the condition assessment results for trees in contact or within 3 feet.

5. Recommendations

Based on our investigation, interviews, system condition assessment, and data analysis, we offer the following recommendations designed to address our areas of concern and to serve as a foundation for CMP to continue to improve its distribution system performance.

5.1. ARP Targets

The current ARP targets appear to be a protective minimum or floor designed to assure that reliability performance does not deteriorate as a result of other incentives under ARP 2000. These targets have always been met by CMP and have been adjusted several times in the recent past to accommodate changes in reporting levels and exclusions. The current ARP targets are measured at the Company level and do not provide targets at the Service Center or circuit level. The calculations for the Service Centers are based on contribution to Company SAIFI, CAIDI and SAIDI and therefore may not accurately depict the actual performance at the Service Center level.

Furthermore, CMP has stated that they "manage to the ARP", which may be understandable from a shareholder perspective. Therefore, it is conceivable that CMP's reliability performance could, over time, actually decline while still meeting the targets in the ARP. For example, if CMP has historically performed at some performance level that is above the ARP targets, and its performance declines, but still remains above the ARP target, the overall service level will have declined, but not to the point at which CMP is penalized under the stipulations of the ARP. (Please refer to the CAIDI chart in section 3.2.2).

We also note that there are no incentives or upside provisions in the ARP; if CMP's performance exceeds the ARP targets, the Company does not realize any economic benefit. However, if their performance falls below the targets, they are subject to penalties. While this arrangement is not uncommon in the regulated utility industry with performance based regulation, some regulators have implemented a more balanced penalty/reward system that provides both positive and negative incentives to the utility.

5.1.1. Company-Wide

We recommend that CMP continue to report its reliability and customer service metrics to the MPUC on a Company-wide basis, including reporting on the ten worst-performing circuits, their performance improvement plans, and following year results of the mitigation efforts.

5.1.2. Service Center/Region

We believe that CMP should also be required to report reliability metrics on a Service Center or individual circuit basis in addition to its current company-wide reporting. These metrics should reflect both contributions to Company reliability performance as well as raw performance at the Service Center or circuit level. We do not suggest that ARP targets be imposed on these Service Center or circuit metrics, but instead that they be used as an additional source for identifying worst performing circuits, along with mitigation plans and following year results. We recommend that circuits, as measured on their own merits, that exceed, for example, 1 standard deviation above the ARP targets, should be identified and mitigation efforts stated and followed by CMP.

5.1.3. Goals

As mentioned above, the current ARP targets do not provide a mechanism to foster continued improvement. We recommend that the MPUC consider implementing an achievable set of stretch goals or targets that recognize a realistic improvement timeline and take into consideration industry-wide reliability performance. Improvements in reliability resulting from an enhanced vegetation management program will require a number of years to achieve. Therefore, a realistic goal for CMP might be to improve its reliability performance into the third quartile of national reliability performance within a period of 3 years. Obviously, this will require CMP to fund expanded tree trimming and other reliability improvement programs.

5.1.4. Incentives

We recommend that the MPUC consider providing CMP with an up-side incentive for exceeding ARP targets. While it is outside the scope of this evaluation to suggest the mechanics of such a program or to specify the level and type of incentives, a provision to permit a higher level of ROI or other earnings enhancement could provide CMP more incentive to exceed the targets and promote continuous improvement programs.

5.2. Records Retention

The retention policy should be revised to maintain betterment project requests and records for a longer period than one year back.

5.3. Circuit Inspection Program

We recommend that CMP enhance its formal 10-year circuit inspection program (that was formalized in 2005) as follows:

1. Extend visual inspection to include pole sounding and visual check from base of pole.
2. Include assessment of the status of vegetation encroachment in the inspection report – categorize by contact, danger tree, and within specified clearance ranges. This information should be shared with Vegetation Management to assist in their planning.
3. Implement tracking of resulting work orders (those emanating from immediate hazards and those classified as L1, L2, and L3). Provide tracking information to the MPUC by work order that shows its status. For example: completed, planned, scheduled, deferred, and dropped with explanations for the work order's status.

4. As the distribution system continues to age, design and implement focused inspection programs such as pole strength testing and pole integrity testing that further identify requirements for preventative maintenance actions.

5.4. Vegetation Management

5.4.1. Situation Assessment

CMP should conduct a comprehensive review of its current vegetation management program based on the findings in this report and then proactively develop a plan of action to address immediate and on-going vegetation management program requirements.

5.4.2. Cycle Trim

Modify the current reactive vegetation management program to include a formalized trim cycle of 4 to 5 years. Given the existing maximum trim clearance of 8 feet, coupled with average vegetation growth rates of 1.5 feet per year, a four-year cycle will help in reducing tree-related outages. However, achieving and maintaining a four-year cycle will cause the vegetation management budget to increase significantly. CMP should identify its annual costs to maintain a 4-5 year trim cycle as well as the additional up-front expenditures required to reach a 4-5 year cycle within a reasonable time frame.

6. Appendices

The following Appendices contain detailed study information and results.

Appendix 6.1	Reliability Index Definitions
Appendix 6.2	Data Requests
Appendix 6.3	Interviews
Appendix 6.4	Circuit Inspections
Appendix 6.5	Ten Worst Performing Circuits
Appendix 6.6	Condition Inspection Results

6.1. Reliability Index Definitions

The following definitions were taken from CMP's ARP filing, dated March 15, 2005. These definitions are consistent with standard industry practice.

Customer Interruption: The loss of electrical service to a customer for five (5) minutes or more.

CAIDI: **C**ustomer **A**verage **I**nterruption **D**uration **I**ndex

The average amount of time required restoring electric service to those customers that experience an interruption during the year.

$$\text{CAIDI} = \frac{\text{Sum of Customers Interrupted Duration}}{\text{Total Number of Customers Interrupted}}$$

SAIFI **S**ystem **A**verage **I**nterruption **F**requency **I**ndex

The average number of times that a customer is interrupted during the year.

$$\text{SAIFI} = \frac{\text{Total Number of Customers Interrupted}}{\text{Total Number of Customers Served}}$$

SAIDI **S**ystem **A**verage **I**nterruption **D**uration **I**ndex

A combination of CAIDI and SAIFI resulting in the average amount of time that customers are interrupted during the year.

$$\text{SAIDI} = \text{CAIDI X SAIFI or } \frac{\text{Sum of Customers Interrupted Duration}}{\text{Total Number of Customers Served}}$$

6.2. Data Requests

6.2.1. Typical Data Request (per proposal)

Williams Data Request:	Corresponds with:
1. Circuit maps of the primary distribution system, preferably in electronic format	
2. Inspection and maintenance standards for overhead and underground facilities	EX01-27 (a)(d)(f); EX-01-28(b)(d)(f); EX-08-11; EX-01-13; EX-08-10; ODR-01-04
3. Maintenance practices and procedure manuals	EX-01-30
4. Vegetation Management program	EX-01-10: ODR-01-09:
5. Capital and operating budgets (last five and planned five year periods)	EX-01-04; EX-08-01(b).
6. Staffing levels, including previous five year staffing by location and job classifications	
7. Employee listings by location showing ages, years of service and other demographics	
8. Copies of succession and manpower planning programs and studies	
9. Work center locations and average drive times	
10. Normal and emergency operating plans including table-top exercise reviews as applicable	EX01-29; EX-01-38
11. System protection standards	EX-0 1-23
12. Equipment loading guidelines	EX-01-20 EX-08.13: EX- 08-15,
13. Field crew and operator training program outlines	EX-01-30 ; EX-08-10;
14. System planning philosophies and methods for distribution	EX-01-22; EX-01-23; EX-08-14; ODR-01-02
15. The most recent organizational, management and operations studies performed internally or by external consultants	EX-01-26
16. Results of most recent manpower forecasts, training needs analysis, and skills inventory studies	
17. Listing of any other staff reductions in the past 5 years by position and quantity as well as the reason(s) for the reductions	
18. Benchmarking results for Electric Distribution including system reliability indices	EX-01-06; EX-01-07
19. Information systems overview ~ SCADA	EX-01-41
20. Service territory characteristics -geography, demographics, load, etc.	
21. Capital and O&M cost analysis methodologies	EX-08-02; EX-08-16; ODR-01-01
22. Budget process description	EX-01-10 (f)(g)

Williams Data Request:	Corresponds with:
23. Project prioritization process	EX-01-12; EX-01-13; EX- 01-25
24. Outsourcing agreements	ODR-0 1-03 (reference made in this ODR)
25. Data supporting high level and low level cost analysis methodologies	EX-08-02
26. Details of activity based cost programs	
27. Benchmarking data covering capital and O&M expenditures	EX-01.03; EX-01-04;
28. Asset records for electric plant	EX-05-09
29. Budget variances and budget levels	EX-01.24; EX-08-09; ODR-02-01
30. Material Standards	

6.2.2. MPUC provided data requests assembled during the 2005 study

MPUC Scan Reference	Scan/Page	Subject	Relevance/Comments
EX-01-01	1-1	MWh sold, Avg. # customers, O&M Expenses, Cap Additions	1994-2003
EX-01-02	1-3	FERC Vegetation Management Report	2004
EX-01-03	1-17		Have from CMP
EX-01-04	1-24		Have from CMP
EX-01-05	1-25	Age of T&D Sys	Through 2003
EX-01-06	1-41	Reliability data	Have from CMP
EX-01-07	1-75		Have from CMP
EX-01-08	1-179	T&D Reliability Improvement Reports	With attachments covering 2001-2003
EX-01-09	1-373	Transmission ROW and Vegetation Management	1994-2003
EX-01-10	1-381	Distribution Vegetation management stats	Have from CMP
EX-01-11	1-385	DOE incident and disturbance report	1998 ice storm report
EX-01-12	2-1		Have from CMP
EX-01-13	2-93		Have from CMP
EX-01-14	2-258	Reliability Criteria used for additions 1999-2003	Refers to EX-01-12
EX-01-15	2-259	Transmission criteria for looping	Refers to EX-01-12
EX-01-16	2-260	Transmission projects >$250k for 1999-2003	
EX-01-17	2-263	Reliability criteria for distribution system additions 1999-2003	
EX-01-18	2-275	Criteria used for looping distribution in urban and rural areas for 1999-2003	
1-Examiner's-1	2-278	Major Distribution projects >$100k 1999-2003	
EX-01-19	2-279	Major Distribution projects >$100k 1999-2003 justified by application of reliability criteria	
EX-01-20	2-281	Service area forecast	Have from CMP
EX-01-21	2-292	Load flow modeling reports 1999-2003	

MPUC Scan Reference	Scan/Page	Subject	Relevance/Comments
EX-01-22	2-294	Capacity Planning T&D	Have from CMP
Construction Standards	2-295	Appears to be EX-01-23	Have from CMP
EX-01-24	3-1	Identification of new technology	Have from CMP
EX-01-25	3-2	Improvement priority reports	Have from CMP
EX-01-26	3-7	Operational Performance Studies	Have from CMP
EX-01-32	3-129	Definition of key facilities	
EX-01-33	3-182	Vulnerability Assessment	
EX-01-34	3-183	Security improvements to key facilities	
EX-01-35	3-184	Communications security	
EX-01-36	3-210	Security arrangements agencies and other utilities	
EX-01-37	3-243	Security Testing	
EX-01-38	3-244	Storm Response	Have from CMP
EX-01-39	3-375	Facility security methods	
EX-01-40	3-376	Number of Transmission subs under SCADA control	
EX-01-41	3-378	Number of Distribution subs under SCADA control	
EX-05-02	4-4	Follow-up to EX-01-06 (CAIDI/SAIFI calcs)	
EX-05-03	4-11	Follow-up to EX-01-07	
EX-05-04	4-24	Follow-up to EX-01-08	
EX-05-05	4-25	Follow-up to EX-01-10	Average spans on Dist is 26.4 (poles) per mile
EX-05-06	4-26	Follow-up to EX-01-16	No trans projects 1999 or 2003
EX-05-07	4-27	Follow-up to EX-01-17	Reliability design criteria not used
EX-05-08	4-28	Follow-up to EX-01-18	Loop feed only for UG primary, does not answer question
EX-05-09	4-29	Follow-up to EX-01-19	Have from CMP
EX-08-01	4-31	Follow-up to EX-01-01	Have from CMP
EX-08-02	4-33	Follow-up to EX-01-03	Have from CMP
EX-08-03	4-34	Follow-up to EX-01-05	Average age of distribution plant
EX-08-04	4-36	Follow-up to EX-01-06	Refer to EX-05-02
EX-08-05	4-37	Follow-up to EX-01-07 (08?)	Dist circuits customers, svc area SAIFI, customer hrs, etc
EX-08-07	4-59	Follow-up to EX-01-15	Transmission loops (attachment missing)
EX-08-08	4-60	Follow-up to EX-01-16	Transmission line projects
EX-08-09	4-62	Follow-up to EX-01-24	Have from CMP – T&D technologies
EX-08-10	4-66	Follow-up to EX-01-26	Have from CMP – Dist operational performance procedures
EX-08-11	4-67	Follow-up to EX-01-27	Ground line inspection/treatment

MPUC Scan Reference	Scan/Page	Subject	Relevance/Comments
			programs - none
EX-08-12	4-68	Follow-up to EX-01-28	Inspection on air-break switches and Field Operating Procedure 509
EX-08-13	4-92	Follow-up to EX-01-29	Have from CMP – Thermal ratings
EX-08-14	4-93	Follow-up to EX-01-30	Have from CMP – distribution circuit loading
EX-08-15	4-94	Tools & Measurements for dist planning	Have from CMP
EX-08-16	4-95	Deferred T&D projects 1999-2004	Have from CMP
ODR-01-01	4-97	Capital projects >$100k	Have from CMP
ODR-01-02	4-116	O&M Plan Targets	Have from CMP
ODR-01-03	4-117	T&D O&M efficiency measures	Referenced by CMP as relevant to Vegetation
ODR-01-04	4-119	Changes to inspection cycles	Have from CMP
ODR-01-05	4-120	Percent of distribution system that is 3-phase	21%
ODR-01-06	4-121	Transmission infrared inspection	
ODR-01-07	4-122	Number of pending work requests for transmission	
ODR-01-08	4-123	PM for transmission line switches	
ODR-01-09	4-124	Vegetation management prioritization	Have from CMP
ODR-01-10	4-127	Trouble orders completed excluding outages 2002-2004	
ODR-01-11	4-131	ANSI Vegetation Management Guidelines (draft)	
ODR-01-12	4-141	Changes in vegetation management policy	
ODR-01-13	4-142	Customer Satisfaction Survey	Questions only, no results
ODR-01-14	4-189	Circuits at 90% or above for 2005	Appear to be only those that were set as improvements
ODR-01-15	4-191	Grounds per mile distribution	At least 4 per mile
ODR-01-16	4-192	Step and touch potentials studies	

6.2.3. WCI Initial Data Request

DR ID	Status	Data Request Description
WCI-01-1	Received 1/31/06	Please provide a copy of all documents describing the current (year 2006) vegetation management policy, program, and procedures for the electric distribution system.
WCI-01-2	Received 1/31/06	Please provide copies of the same documents as above (i.e., all documents describing the vegetation management policy, program, and procedures for the electric distribution system) for years 2001-2005

DR ID	Status	Data Request Description
WCI-01-3	Received 1/30/06	For year 2006, please provide the following: 1. total number of OH distribution circuit miles 2. number of OH distribution circuit miles to be trimmed 3. expense budget for the distribution vegetation management program 4. number and functional responsibility of CMP employees, by title, performing trimming, inspection, and/or management of the program 5. vegetation management performance measures and targets 6. if cycle trimming is used, provide all studies, analyses and support for the selected cycle
WCI-01-4	Received 1/30/06	For each year of the period 2001-2005, please provide the following: 1. total number of OH distribution circuit miles 2. number of OH distribution circuit miles trimmed 3. annual budget and actual expense data for the distribution vegetation management program 4. vegetation management performance measures, targets, and results 5. trimming cycle in effect in each of those years
WCI-01-5	Received 1/30/06	For years 2004 and 2005, please provide the number of outages on the distribution system by cause (e.g., equipment, animal, vegetation, etc.)
WCI-01-6	Received 1/30/06	Please provide the distribution trimming clearance guidelines for side clearance, over wire clearance, and under wire clearance by voltage level/construction type including but not limited to: 1. Primaries: 4 kV open wire, 13 kV open wire and spacer cable 2. Sub-transmission 3. Aerial cable 4. Secondaries and services 5. Others as may be on the CMP distribution system
WCI-01-7	Received 1/30/06	Please describe CMP's policy and procedures for dealing with customer requests for tree trimming
WCI-01-8	Received 1/30/06	For the years 2001-2005, please quantify the number of customer requests for tree trimming received each year and the responses made by the Company.
WCI-01-9	Received 1/30/06	Please provide samples of customer communications materials dealing with tree trimming
WCI-01-10	Received 1/30/06	Please provide a listing of CMP's tree trimming contractors, the measures used by CMP to assess their performance, and the program(s) in place to inspect and assess the quality of their work

DR ID	Status	Data Request Description
WCI-01-11	Received 1/31/06	Please provide for years 2000-2005 the following: 1. Number of distribution work orders received by priority code 2. Number of distribution work orders completed by priority code
WCI-01-12	Received 1/30/06	Please provide the name and description of the work management system used.
WCI-01-13	Received 1/30/06	Please provide for years 2000-2005 the number of distribution field personnel by work centers.
WCI-01-14	Received 2/15/06	Please provide for years 2000-2005 the following: 1. distribution operation expense budgets. 2. distribution maintenance expense budgets. 3. distribution operation expense actuals. 4. distribution maintenances expense actuals
WCI-01-15	Received 2/1/06	Distribution reliability statistics Ref EX-01-06, please update through 2005 Distribution outages by cause codes Ref EX-01-07, please update through 2005
WCI-01-16	Received 1/31/06	Service Territory Forecast, Ref EX-01-20, please update through 2005
WCI-01-17	Received 1/30/06	CMP Job Priority List for Budget Year 2004, Ref EX-01-25, please update through 2006
WCI-01-18	Received 1/30/06	Please define how conductor and other equipment ratings are determined for distribution. Provide samples or a complete list. Ref EX-08-13
WCI-01-19	Received 2/15/06	Deferred T&D projects 1999-2004, Ref EX-08-16, please update through 2005
WCI-01-20	Received 2/1/06	2004 planned work circuits, Ref ODR-01-09, please update for: 1. actual 2004 2. planned and actual 2005 3. planned 2006
WCI-01-21	Received 1/31/06	MWh sold, Avg. # customers, O&M Expenses, Cap Additions, Ref EX-01-01, please update through 2005
WCI-01-22	Received 2/15/06	Age of distribution system, Ref EX-01-05, please update through 2005
WCI-01-23	Received 4/5/06	T&D Reliability Improvement Reports, Ref EX-01-08, please update through 2005
WCI-01-24	Received 1/31/06	New T&D Technologies employed since 1999, Ref EX-08-09, please update if any new since existing report
WCI-01-25	Received 1/31/06	3 capital projects >$100k, Ref ODR-01-01, please update through 2005
WCI-01-26	Received	1. Circuit maps, by service center, in PDF form.

DR ID	Status	Data Request Description
	2/13/06 and 2/16/06	2. Service Center Map in both paper and PDF form
WCI-01-27	Received 1/30/06	Organization charts for CMP at least drilling down 3 levels, with names and titles.

6.2.4. WCI Second Data Request

DR ID	Status	Description
WCI-02-13	Received 4/18/06	Provide copy of MS Access database that contains distribution line inspection results for 2005 and to date
ODR-01-01	Received 4/5/06	Please provide a copy of the request to extend ARP2000 filed with the Commission.
ODR-01-02	Received 7/7/06	Refer to WCI-01-14 and page 29 of the Commission's Report. Please explain why the relationship of CMP's distribution operations expenses to its maintenance expenses is so different than that of NYSEG and RG&E.
ODR-01-03	Received 3/6/06	Provide a distribution inspection form (reference EX-01-13 supplemental).
ODR-01-04	Received 3/16/06	Provide the inspection maintenance schedule (database) for major substation equipment. Don't recall this one [provided 1 266 page attachment – not printed and 1 6 page was printed]
ODR-01-05	Received 3/6/06	Provide the total miles of underground lines and overhead lines for distribution for 2005. [95% overhead]
ODR-01-06	Received 3/6/06	Provide the ten-year feeder inspection plan by circuit number and service center by year (provide electronically). [see 'dist 10 yr insp cycle.xls']
ODR-01-07	Received 4/5/06	Provide list of ten worst circuits for each year 2000-2005.
ODR-01-08	Received 3/24/06	Provide for each circuit its length, its voltage, the number of customers and in which service center the circuit is.
ODR-01-09	Received 3/16/06	How is SAIFI calculated for the ten worst circuits contained in CMP's annual reliability report? Please provide the calculation methodology for each year if different for 2000-2005.
ODR-01-10	Received 3/17/06	Provide a map showing service centers, satellite offices, and local reps. locations.
ODR-01-11	Received 3/17/06	Provide an org chart showing distribution staffing (service centers, satellites, and local reps.)
ODR-01-12	Received 3/24/06	Provide the WMS records for 10 worst circuits in SAP (new system) and old. Want to know repairs/improvements to 10 worst circuits.
ODR-01-13	Received 3/16/06	Provide the number of customer-owned spans and customer owned circuit miles (and percent where CMP maintains and where customer maintains) and number of customers served by customer-owned spans.
ODR-01-14	Received 3/6/06	Provide the milestone annual planning dates for O&M and capital.
ODR-01-15	Received 3/6/06	Provide documentation for prioritization of circuit inspection repairs. What kind of repair conditions fall into each priority?
ODR-01-16	Received	Provide a copy of CMP's Emergency Storm Restoration Plan.

DR ID	Status	Description
	3/22/06	
ODR-01-17	Received 3/22/06	Provide the safety handbook, safety and health program, and safety rules (or working rules) for contractors.
ODR-01-18	Received 3/24/06	Provide the current union contract.
ODR-01-19	Received 3/6/06	Provide the Resume/CV for Wes Davis.
ODR-01-20	Received 3/24/06	Provide the ARP 2000 Stipulation and Mid-period review Order and Stipulation.
ODR-01-21	Received 3/17/06	Provide the SmartMap GIS [we received the GIS on a CMP notebook computer during our visit along with pdf copies of the maps] and asset record data (see attached CD-ROM).
~~ODR-01-22~~		~~Provide the fields desired – by circuit outage causes and other information (coming from WCI).~~
ODR-01-23	Received 3/17/06	Provide the distribution – OH and URG – line miles for NYSEG & RG&E (2000-2005).
ODR-01-24	Received 3/17/06	Age demographics of current distribution field staff by classification: line worker and trouble shooter – individual ages. Regarding the pipeline of replenishment of line workers & trouble shooters. From where do we obtain skilled workers? How many hired from technical colleges, from 2001 through 2005
ODR-01-25	Received 3/6/06	Provide 2001-2005 outages by cause with <u>no exclusions</u>.
ODR-01-26	Received 3/16/06 and 3/24/06	Provide internal complaint report. Do we keep by Service Center or by circuit? (Provide if we have it.) [provided objections on confidentiality grounds, but stated will provide data]
ODR-01-27	Received 3/16/06	Provide a list of cost centers and cost codes (accounts) – electronically. List of internal orders – Doug's and Steve's. Copy of mapping approach for distribution operations & maintenance – all cost centers and IO's that are mapped to distribution O&M FERC accounts.
ODR-01-28	Received 3/6/06	Wanted three distribution betterments in WCI-01-25. Only provided one (other two were transmission projects, not distribution). Please provide two more.
ODR-01-29	Received 3/6/06	Please provide actuals and forecasts for system level and service center load forecasts for 2000-2005 (for example, for the forecast produced in 2000, please provide actuals; for the forecast produced in 2001, provide actuals, etc.) [forecasts are generally within 5-6% under forecast]
ODR-01-30	Received 3/17/06	Please provide several sample QA reports prepared by each CMP Arborist on inspections performed behind the vegetation management contractor's work. Also, please provide the actual number of inspections performed by each Arborist by year for 2001-2005.

6.2.5. WCI Third Data Request

DR ID	Status	Description
WCI-02-01	Received 4/21/06	Please provide latest five-year capital improvement spreadsheet (as maintained by Distribution Engineering)
	Received 3/22/06	Please provide written descriptions of priorities L1, L2 and L3 for distribution line inspection results
WCI-02-02	Received 4/18/06	Please provide current backlog (or uncompleted) work orders relative to distribution line inspections by priority L1, L2 and L3
WCI-02-03	Received 4/18/06	Please provide written policies and procedures for distribution line inspection
WCI-02-04	Received 4/21/06	Please provide job/position descriptions for the following: 1. VP Technical Services 2. VP Operations 3. Service Center Manager 4. Manager of Maintenance Services 5. Manager of Vegetation 6. Line Supervisor 7. Arborist/Forester 8. Distribution Line Inspector
WCI-02-05	Received 4/18/06	Please provide annual overtime from 2001 through 2005 for Line Workers and Trouble Shooters by service center, based on hours (not dollars)
WCI-02-06	New	Please provide original lists (for 2005 and 2006) of betterment projects prepared by the Distribution Engineers, including brief descriptions, estimated cost, and reason for/benefit from the project
WCI-02-07	Received 4/18/06	Please provide (for 2005 and 2006) a list of betterment projects approved and budgeted
	Received 7/27/06	Please provide updates to Smartmap on the Compaq notebook PC loaned to WCI to include outage and vegetation span/segment trim data for 2004 and 2005.
	Done 3/24/06	Please provide Adobe print capability (or equivalent) on the Compaq notebook PC loaned to WCI (that contains Smartmap
	Done 3/24/06	Please provide a working copy of the Vegetation-Outage program that the arborists utilize that displays color-coded spans trimmed and tree-related outages. Please install this program on the Compaq notebook PC loaned to WCI.
WCI-02-08	Received 4/18/06	Employee bonus compensation program description and goal levels for 2005 and 2006
WCI-02-09	Received 4/25/06	Copy of tree trimming contract with Lucas Tree
WCI-02-11	Received 4/21/06	Study done several years ago re VM catch up
WCI-02-10	New	Customer satisfaction surveys

6.3. Interviews

6.3.1. Week of Feb 13, 2006

Title	Area	Subject Areas
VP	Executive Administration	High level overview of: Regulatory issues and Budgeting
VP	Electric Technical Services	High level overview of: Planning, Forecasting, Standards, Engineering and Budgeting
Director	Maintenance Engineering	Maintenance Programs, including substation, Scheduling, Inspection Programs, Budgeting and database,
VP	Electric Technical Services	Vegetation Management
Director	Maintenance Engineering	Vegetation Management
Manager	Distribution Engineering	Distribution Standards, Planning, System Design, Circuit Capacity
Manager	System Engineering	Substation Engineering
VP	Operations	High-level overview of: Service Centers, Distribution Construction, Inspections, and Budgeting.
Director	T&D Operations	Communications Center, distribution construction process, namely betterments, and storm restoration)
Manager	Vegetation Management	Vegetation Management

6.3.2. Week of March 20, 2006

Title	Area	Subject Areas
Distribution Engineer Line Supervisor	Alfred	Distribution forecasting and planning, Budgeting, line crews, system performance
Arborist Line Inspector	Alfred	Vegetation management, inspection programs and results
Line Supervisor	Alfred	System Driving Tour
Distribution Engineer Line Supervisor	Brunswick	Distribution forecasting and planning, Budgeting, line crews, system performance
Arborist Line Inspector	Brunswick	Vegetation management, inspection programs and results
Line Supervisor	Brunswick	System Driving Tour
Distribution Engineer Line Supervisor	Farmington	Distribution forecasting and planning, Budgeting, line crews, system performance
Arborist Line Inspector	Farmington	Vegetation management, inspection programs and results
Arborist Line Supervisor	Farmington	System Driving Tour
Subst. Supervisor	Augusta	Debriefing, discussions and data requests
Distribution Engineer	Augusta	Substation operation and maintenance and coordination with line crews
Line Supervisor	Augusta/Fairfield	System Driving Tour

6.4. Circuit Inspections

6.4.1. Inspection Form

Pole No. or Count		Location		Pole Age	
Pole Class		Pole Height		Pole Type	
Pole Condtion		Feeder Type		No. of Phases	
X-arm Type		X-arm Condition		ROW Condition	
Insulator Type		Insulator Condition		Devices	
Device Condition		Conductor Type		Conductor Condition	
Shield Wire Condition		Guy/Anchor Type		Guy/Anchor Cond.	
Attachments		Comments:			

Pole No. or Count		Location		Pole Age	
Pole Class		Pole Height		Pole Type	
Pole Condtion		Feeder Type		No. of Phases	
X-arm Type		X-arm Condition		ROW Condition	
Insulator Type		Insulator Condition		Devices	
Device Condition		Conductor Type		Conductor Condition	
Shield Wire Condition		Guy/Anchor Type		Guy/Anchor Cond.	
Attachments		Comments:			

Pole No. or Count		Location		Pole Age	
Pole Class		Pole Height		Pole Type	
Pole Condtion		Feeder Type		No. of Phases	
X-arm Type		X-arm Condition		ROW Condition	
Insulator Type		Insulator Condition		Devices	
Device Condition		Conductor Type		Conductor Condition	
Shield Wire Condition		Guy/Anchor Type		Guy/Anchor Cond.	
Attachments		Comments:			

Pole No. or Count		Location		Pole Age	
Pole Class		Pole Height		Pole Type	
Pole Condtion		Feeder Type		No. of Phases	
X-arm Type		X-arm Condition		ROW Condition	
Insulator Type		Insulator Condition		Devices	
Device Condition		Conductor Type		Conductor Condition	
Shield Wire Condition		Guy/Anchor Type		Guy/Anchor Cond.	
Attachments		Comments:			

Pole No, or Count	**Location**	**Pole Age**
Number or serial count	0-On or Close-Public ROW 1-Off-Road 2-Underground Line/Tap	In Years
Pole Class	**Pole Height**	**Pole Type**
0-H1 1-Class 1 2-Class 2 3-Class 3 4-Class 4 5-Class 5 6-Class 6 7-Class 7 8-Other - List	In Feet	0-Southern pine 1-Douglas Fir 2-Western Red Cedar 3-Other Pine 4-Hardwood 5-Steel, Concrete 6-Other Owner (i.e., Bell) 7-Other - List
Pole Condition	**Circuit Type**	**No. of Phases**
0-Satisfactory 1-Upper Pole Decay 2-Ground Line Decay 3-Woodpecker Damage 4-Slight Lean (< 15 deg) 5-Severe Leaning (> 15 deg) 6-Broken 7-Treated (Wrap, etc) 8-C-Trussed 9-Adjacent Pole (Old & Needs Removal) 10-O her - List	0-Main Line 1-Lateral 2-Underbuild 3-Secondary	Number
X-Arm Type	**X-Arm Condition**	**ROW Condition**
0-Wooden (Single) 1-Wooden (Double) 2-Stand-Off-Metal 3-Stand-Off- Poly 4-Stand-Off w/ Squirrel Guard 5-Alley Arm 6-None 7-Other - list	0-Satisfactory 1-Split 2-Burnt/Rotted 3-No Braces (on X-arm) 4-Failing @ Thru-Bolt 5-Broken 6-Other - List	0-Clear (No trees or Underbrush) 1-Trees/Limbs >8' 2-Trees/Limbs 3>d<8' 3-Trees/Limbs < 3' 4-Trees/Limb Contact 5-Danger Tree 6-Underbrush w/in 3' 7-Vines, Moderate 8-Vines, Severe 9-Other - Describe
Insulator Type	**Insulator Condition**	**Device**
0-Pin Type 1-Suspension 2-Double Arm/Pin 3-Horizontal Post 4-Verticle Post 5-Dead-End 6-Cap & Pin 7-Wooden Pin 8-Unknown 9-Other - List	0-Satisfactory 1-Contaminated, Residue 2-Visible Crack 3-Broken 4-Leaning 5-Tie Unraveled 6-Pin Pull/Pushing Thru Arm 7-Pin Broken 8-Other - List	0-None 1-Fuse (Cut-Out) 2-Arrestor 3-XFMR 4-Capacitor-Fixed 5-Capacitor-Switched 6-Regulator (No.) 7-Recloser/Sectionalizer 8-Disconnects-Single Blade 9-3-Phase Tie Switch (Type) 10-Riser on Pole 11-Other - List
Device Condition	**Conductor Type**	**Conductor Condition**
0-Satisfactory 1-Corrosion, Rust, Pitting 2-Bushing Broken/Cracked 3-Arrestor - Missing 4-Arrestor - Obsolete 5-Arrestor - Long Lead 6-Arrestor/Failed/Damaged 7-Hardware Hanging 8-XFMR Disc'd (Needs Removal) 9-Riser Pothead/Connection Prob. 10-Riser w/o Ventilation 11-O her - Describe	Primary 0-Open Wire 1-Aluminum (if Known) 2-Copper (if Known) 3-Hendrix 4-Aerial Cable 5-Tree Wire 6-Other - List Secondary & Service 7-Open Wire, Covered 8-Open Wire, Bare 9-Triplex, Quadraplex 10-Other - List	0-No Visible Problems 1-Conductor Sag 2-Tight Phase Separation 3-Poss Clearance Violation 4-Clamps Worn/Loose 5-Ties Unraveled 6-Pitted,Corrosion 7-Strands Broken 8-Some Melting 9-Guy, Other Contact 10-Ground Wire Cut or Missing 11-Other - List
Shield Wire Condition	**Guy/Anchor Type**	**Guy/Anchor Condition**
0-Satisfactory 1-No Shield Wire 2-Shield Wire < 45 Degrees 3-Shield Wire > 45 Degrees 4-Corrosion 5-Broken Strands 6-Other - List	0-None 1-Pole-to-Pole Guy 2-Down Guy 3-Push Brace 4-Sidewalk Guy 5-Stub Pole 6-Other - List	0-Satisfactory 1-Guy Wire Strands Broken 2-Guy Rusted 3-Anchor-Tight 4-Anch - Loose or Broken 5-Guy Missing or Deteriorated 6-Slack Span on Stub 7-Guard Defective/Missing 8-Other - List

6.4.2. Inspection Schedule

WCI Field Visits

4 00 PM

(Revised) **Date** 6/30/2006

Week 1

	6/19/2006	6/20/2006	6/21/2006	6/22/2006	6/23/2006
John Gibson	211D1	211D1	237D1	237D1	803D4
	Farmingdale	Farmingdale	Vassalboro	Vassalboro	Searsport
	Augusta	Augusta	Augusta	Augusta	Belfast
	Tim Robbins	Jim Carey	Jim Carey	Jim Carey	Howard Klewin
	A	A	A	A	A
Ron Tomlin	870D2	870D2	870D2	823D2	823D2
	Winslow	Winslow	Winslow	Jackman	Jackman
	Fairfield	Fairfield	Fairfield	Skowhegan	Skowhegan
	John Rugan	John Rugan	John Rugan	Jim Tuttle	Jim Tuttle
	A	A	A	B	B
Mike Rafferty	213D4	213D4	420D7	420D7	444D3
	Brunswick	Brunswick	Auburn	Auburn	Raymond
	Brunswick	Brunswick	Lewiston	Lewiston	Bridgton
	Mike Giles	Mike Giles	Don Holt	Don Holt	Bob Fickett
	A	A	A	A	A

Week 2

	6/26/2006	6/27/2006	6/28/2006	6/29/2006	6/30/2006
John Gibson	803D4	803D4	214D3	214D3	
	Searsport	Searsport	Rockland	Rockland	
	Belfast	Belfast	Rockland	Rockland	
	Howard Klewin	Howard Klewin	Lanny Dean	Lanny Dean	
	E	E	D	D	
Ron Tomlin	834D1	834D1	818D1	818D1	
	Greenville	Greenville	Farmington Falls	Farmington Falls	
	Dover	Dover	Farmington	Farmington	
	Joe Champeon	Joe Champeon	Harry Clark	Harry Clark	
	F	F	G	G	
Mike Rafferty	444D3	444D3	439D1	439D1	
	Raymond	Raymond	Paris	Paris	
	Bridgton	Bridgton	Bridgton	Bridgton	
	Bob Fickett	Bob Fickett	Bob Fickett	Bob Fickett	
	C - guide to p/u @ hotel	C - guide to p/u @ hotel	C - guide to p/u @ hotel	C - guide to p/u @ hotel	

Week 3

	7/10/2006	7/11/2006	7/12/2006	7/13/2006	7/14/2006
John Gibson	634D2	634D2	629D2	629D2	629D2
	Biddeford	Biddeford	Kennebunkport	Kennebunkport	Kennebunkport
	Alfred	Alfred	Alfred	Alfred	Alfred
	Tony Matoin	Tony Matoin	Tony Matoin	Tony Matoin	Tony Matoin
	H - mngr to p/u @ hotel	H - mngr to p/u @ hotel	H - mngr to p/u @ hotel	H - mngr to p/u @ hotel	H - mngr to p/u @ hotel
Ron Tomlin	835D1	835D1	835D1	844D1	844D1
	New Portland	New Portland	New Portland	Farmington	Farmington
	Farmington	Farmington	Farmington	Farmington	Farmington
	Harry Clark	Harry Clark	Harry Clark	Harry Clark	Harry Clark
	G	G	G	G	G
Mike Rafferty					

Week 4 (week of 7/17/06) will be used as a backup week if inspections take longer than scheduled.

	Legend	*Lodge Legend
Line 1	Circuit #	A-Senator Inn-Augusta - 877-772-2224
Line 2	Town	B-Belmont Motel-Skowhegan - 207-474-8315
Line 3	Service Center	C-Hilton Garden-Auburn - 207-784-4433
Line 4	Tour Guide	D-Comfort Inn-Belfast - 207-338-2090

6.5. Worst Performing Circuits

6.5.1. Company Level

Year	Circuit	Svc Area	SAIFI	Interruptions	Customers
2002	204D6	Brunswick	3.27	87	2788
2004	204D6	Brunswick	0.0233	39	2868
2003	210D1	Brunswick	0.02637	75	3818
2004	210D1	Brunswick	0.02544	66	2784
2005	210D1	Brunswick	0.02793	41	3929
2002	217D3	Brunswick	4.89	93	3269
2004	217D3	Brunswick	0.03728	64	3709
2002	241D1	Brunswick	3.04	87	924
2003	246D1	Rockland	0.02588	38	2723
2003	252D2	Brunswick	0.02163	41	1767
2002	258D1	Brunswick	1.64	81	2773
2004	262D1	Augusta	0.04203	104	3403
2005	262D1	Augusta	0.03109	115	3402
2003	262D2	Augusta	0.04706	108	3314
2002	263D1	Augusta	3.43	60	3162
2001	406D1	Bridgton	6.91	117	3351
2001	413D1	Bridgton	6.8	107	1695
2002	413D1	Bridgton	4.46	84	1747
2001	419D1	Alfred	7.08	63	2374
2003	419D1	Alfred	0.024	41	3452
2005	419D1	Bridgton	0.03064	26	3532
2004	420D6	Lewiston	0.02659	34	528
2001	430D1	Bridgton	5.25	145	1908
2002	430D1	Bridgton	2.6	101	1964
2001	444D1	Bridgton	9.61	141	3925
2001	445D1	Bridgton	3.85	192	4763
2003	445D1	Bridgton	0.0375	193	5812
2004	445D1	Bridgton	0.03519	130	5264
2005	445D1	Bridgton	0.03147	159	6053
2005	450D2	Lewiston	0.02675	29	3611
2001	454D1	Lewiston	5.49	88	2946
2003	454D1	Lewiston	0.02807	77	3127
2005	612D1	Alfred	0.02744	53	1629
2001	612D2	Alfred	1.58	47	3307
2003	806D2	Rockland	0.02731	66	3528
2004	806D2	Rockland	0.03373	81	3605
2005	815D2	Dover	0.03047	72	2134
2004	820D1	Dover	0.02338	39	1943
2005	820D1	Dover	0.04468	64	1968
2002	834D1	Dover	3.15	27	930
2004	834D2	Dover	0.02474	48	1417
2005	834D2	Dover	0.03845	54	1424
2001	858D1A	Farmington	6.01	39	1559
2003	860D1	Fairfield	0.02813	72	2904
2001	873D1	Fairfield	6.14	173	4046
2002	873D1	Fairfield	6.65	148	4146
2003	873D1	Fairfield	0.03295	123	4154
2004	873D1	Fairfield	0.04202	127	4228
2002	875D1	Farmington	3.37	33	1663
2005	875D1	Farmington	0.03456	74	1751

6.5.2. Circuit Level

Alfred									
2001		2002		2003		2004		2005	
Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI
602D1	30.972	602D1	14.471	602D1	6.756			602D1	6.899
		605D1	6.645					605D1	4.148
		610D1	6.767						
		612D1	6.609			612D1	5.026	612D1	8.581
				617D2	5.521				
		621D2	5.436						
				621D3	6.479				
621D4	9.317								
						629D1	4.536		
								629D2	3.870
								633D1	5.314
		634D1	9.912	634D1	21.747				
		652D1	5.196						
				656D1	8.333				
								661D2	4.511
								663D2	4.589
				667D1	8.546				
								671D1	6.262
677D2	11.070	677D2	39.054	677D2	23.315	677D2	27.394		
						681D2	18.600		
685D3	35.786	685D3	70.600	685D3	35.314				
		687D1	8.462					687D1	3.973

Augusta									
2001		2002		2003		2004		2005	
Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI
						207D1	6.501		
								208D1	7.495
216D1	23.359			216D1	12.847				
		216D2	6.449						
						255D1	5.170		
				256D3	4.930				
		262D1	5.009	262D1	7.986	262D1	7.024	262D1	4.303
272D3	55.967								

Bridgton									
2001		**2002**		**2003**		**2004**		**2005**	
Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI
						152D1	5.141		
406D1	6.456								
413D1	6.416	413D1	5.229						
419D1	9.812			419D1	13.065			419D1	5.011
				435D1	5.115				
435D2	8.453	435D2	12.907	435D2	8.427				
						437D1	6.879	437D1	6.316
438D1	7.425			438D1	6.124				
				439D1	7.271				
444D1	21.954	444D1	12.248						
		444D2	27.345						
445D1	6.302	445D1	9.064	445D1	7.221				
638D1	7.388			638D1	7.369				
				691D1	11.427				

Brunswick									
2001		**2002**		**2003**		**2004**		**2005**	
Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI
		204D6	5.152			204D6	4.664		
								210D1	4.011
		213D1	5.603					213D1	4.254
		217D3	7.916			217D3	5.788		
						225D2	6.807		
		238D1	5.348						
		241D1	5.323						
		250D1	7.658						
		250D2	9.915	250D2	5.450				
								258D1	4.409
		263D1	10.182						

Dover									
2001		**2002**		**2003**		**2004**		**2005**	
Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI
								815D1	8.218
								815D2	7.578
						820D1	6.755	820D1	6.153
								821D3	3.981
		834D1	5.054			834D1	7.512		
		834D2	9.272			834D2	9.894	834D2	9.435

Fairfield									
2001		**2002**		**2003**		**2004**		**2005**	
Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI
				839D2	16.000				
				861D8	5.171				
				865D5	5.380			865D2	7.180
873D1	6.027	873D1	6.685			873D1	5.631		

Farmington									
2001		**2002**		**2003**		**2004**		**2005**	
Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI
								428D3	4.463
		435D1	5.268						
		447D3	10.843	447D2	7.177				
								841D1	5.574
		858D1A	10.564						
		858D1B	8.413					858D3	6.480
								875D1	6.570

Lewiston									
2001		**2002**		**2003**		**2004**		**2005**	
Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI
		220D1	6.394	220D1	6.252				
411D2	17.002	411D2	22.457	411D2	39.181				
								412D3	4.348
			10.859	420D4	9.688	420D4	12.414		
420D6	27.116	420D6	6.860	420D6	20.522	420D6	28.775		
								424D6	6.921
								431D1	3.863
		436D1	5.892						
436D3	12.193	436D3							
								450D2	4.312
				454D1	5.042				
				456D2	5.144				

Portland									
2001		**2002**		**2003**		**2004**		**2005**	
Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI
		218D1	6.770						
				620D1	11.105				
620D2	6.955	620D2	5.686						
						631D1	9.408	631D1	66.286
644D1	30.588			644D1	10.202				
		644D2	5.148						
						645D7	8.211	645D7	75.000
								659D5	10.949
659D6	26.041								
						668D2	15.476		
						668D3	12.603		
675D3	6.814								
								693D1	4.495
						696D3	18.750		

Rockland									
2001		**2002**		**2003**		**2004**		**2005**	
Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI
								214D1	5.316
214D4	43.351	214D2	5.038			214D4	5.952		
		246D1	6.384	246D1	5.422				
		246D2	5.215						
								803D3	5.361
				860D1	5.564				
						806D2	5.427		

Skowhegan									
2001		**2002**		**2003**		**2004**		**2005**	
Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI	Circuit	SAIFI
						801D1	6.436		
						822D1	5.110	822D1	4.291
		823D2	6.775	823D2	7.829	823D2	6.420	823D2	6.315
		824D1	6.002			824D1	4.511	824D1	5.219
				868D1	5.075	868D1	4.812		
								872D1	5.675

6.6. Condition Inspection Results

	System Summary		1 Phase		3 Phase		Best of Worst		Best of Best		Worst of Worst		Worst of Best	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Pole Condition														
0-Satisfactory	2401	94 2%	1215	94.6%	1186	93.8%	557	94.2%	625	94.7%	611	94.9%	608	92.8%
4-Slight Lean (< 15 deg)	33	1 3%	16	1.2%	17	1.3%	6	1.0%	11	1.7%	11	1.7%	5	0.8%
2-Ground Line Decay	51	2 0%	25	1.9%	26	2.1%	8	1.4%	22	3 3%	10	1.6%	11	1.7%
10-Other	4	0 2%	3	0.2%	1	0.1%	0	0.0%	0	0 0%	4	0.6%	0	0 0%
1-Upper Pole Decay	58	2 3%	28	2.2%	30	2.4%	13	2.2%	9	1.4%	13	2.0%	23	3.5%
6-Broken	0	0 0%	0	0.0%	0	0.0%	0	0.0%	0	0 0%	0	0 0%	0	0.0%
3-Termite Damage	6	0 2%	4	0.3%	2	0.2%	4	0.7%	1	0 2%	0	0 0%	1	0 2%
9-Adjacent Pole (Old & Needs Removal)	0	0 0%	0	0.0%	0	0.0%	0	0.0%	0	0 0%	0	0 0%	0	0.0%
5-Severe Leaning (> 15 deg)	0	0 0%	0	0.0%	0	0.0%	0	0.0%	0	0 0%	0	0 0%	0	0 0%
7-Treated (Wrap, etc)	15	0.6%	5	0.4%	10	0.8%	5	0.8%	2	0 3%	1	0 2%	7	1.1%
8-C-Trussed	29	1.1%	17	1.3%	12	0.9%	4	0.7%	3	0 5%	5	0.8%	17	2.6%
X-Arm Type	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**
0-Wooden (Single)	736	28 5%	112	9.6%	624	44.1%	159	29.3%	205	31 0%	176	25 8%	196	28.2%
1-Wooden (Double)	757	29 3%	101	8.7%	656	46.4%	141	26.0%	221	33.4%	204	29 9%	191	27.5%
2-Stand-Off-Metal	74	2 9%	18	1.5%	56	4.0%	5	0.9%	26	3 9%	9	1.3%	34	4.9%
3-Stand-Off- Poly	5	0 2%	4	0.3%	1	0.1%	2	0.4%	0	0 0%	2	0 3%	1	0.1%
4-Stand-Off w/ Squirrel Guard	9	0 3%	8	0.7%	1	0.1%	2	0.4%	4	0.6%	3	0.4%	0	0.0%
5-Alley Arm	58	2.2%	6	0.5%	52	3.7%	18	3.3%	22	3 3%	9	1 3%	9	1.3%
6-None	940	36.4%	918	78.7%	22	1.6%	215	39.7%	183	27.7%	279	40 8%	263	37.8%
7-Other - list	2	0.1%	0	0.0%	2	0.1%	0	0.0%	0	0 0%	1	0.1%	1	0.1%
	2581	100 0%	1167	100.0%	1414	100.0%	542	100.0%	661	100 0%	683	100.0%	695	100.0%
	X-Arms		**X-Arms**		**X-Arms**		**X-Arms**		**X-Arms**		**X-Arms**		**X-Arms**	
X-Arm Condition	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**
0-Satisfactory	1601	97.7%	238	93.3%	1363	98.6%	321	97.6%	460	96.6%	399	99.3%	421	97.7%
2-Burnt/Rotted	15	0 9%	4	1.6%	11	0.8%	3	0.9%	5	1.1%	2	0 5%	5	1.2%
1-Split	20	1 2%	13	5.1%	7	0.5%	4	1.2%	11	2 3%	1	0.2%	4	0.9%
6-Broken	0	0 0%	0	0.0%	0	0.0%	0	0.0%	0	0 0%	0	0.0%	0	0.0%
3-Termite Damage	0	0 0%	0	0.0%	0	0.0%	0	0.0%	0	0 0%	0	0 0%	0	0 0%
4-No Braces (on X-arm)	0	0 0%	0	0.0%	0	0.0%	0	0.0%	0	0 0%	0	0.0%	0	0.0%
5-Failing @ Thru-Bolt	2	0.1%	0	0.0%	2	0.1%	1	0.3%	0	0 0%	0	0 0%	1	0.2%
7-Corroded	0	0 0%	0	0.0%	0	0.0%	0	0.0%	0	0 0%	0	0 0%	0	0.0%
8-Other	0	0 0%	0	0.0%	0	0.0%	0	0.0%	0	0 0%	0	0 0%	0	0.0%
	1638	100 0%	255	100.0%	1383	100.0%	329	100.0%	476	100 0%	402	100.0%	431	100.0%
ROW Condition	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**
0-Clear (No trees or Underbrush)	1189	46.6%	502	39.1%	687	54.3%	282	47.7%	315	47.7%	381	59.2%	211	32.2%
1-Trees/Limbs >8'	250	9 8%	133	10.4%	117	9.2%	55	9.3%	45	6 8%	41	6.4%	109	16.6%
2-Trees/Limbs 3>d<8'	375	14.7%	201	15.6%	174	13.8%	88	14.9%	89	13 5%	78	12.1%	120	18.3%
3-Trees/Limbs < 3'	404	15 8%	227	17.7%	177	14.0%	102	17.3%	117	17.7%	56	8.7%	129	19.7%
4-Trees/Limb Contact	322	12.6%	216	16.8%	106	8.4%	63	10.7%	89	13 5%	87	13.5%	83	12.7%
5-Danger Tree	2	0.1%	2	0.2%	0	0.0%	0	0.0%	2	0 3%	0	0 0%	0	0.0%
6-Underbrush w/in 3'	4	0 2%	3	0.2%	1	0.1%	0	0.0%	3	0 5%	0	0 0%	1	0.2%
7-Vines, Moderate	2	0.1%	0	0.0%	2	0.2%	1	0.2%	0	0 0%	0	0 0%	1	0.2%
8-Vines, Severe	2	0.1%	1	0.1%	1	0.1%	0	0.0%	0	0 0%	1	0.2%	1	0.2%
9-Other	0	0 0%	0	0.0%	0	0.0%	0	0.0%	0	0 0%	0	0 0%	0	0.0%

	System Summary		1 Phase		3 Phase		Best of Worst		Best of Best		Worst of Worst		Worst of Best	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Insulator Type	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**
0-Pin Type	2041	68.0%	973	67.6%	1068	68.4%	479	66.5%	528	68.5%	486	64.7%	548	72.3%
1-Suspension	432	14.4%	249	17.3%	183	11.7%	122	16.9%	134	17.4%	89	11.9%	87	11.5%
2-Double Arm/Pin	115	3.8%	18	1.3%	97	6.2%	1	0.1%	37	4.8%	48	6.4%	29	3.8%
3-Horizontal Post	3	0.1%	0	0.0%	3	0.2%	2	0.3%	0	0.0%	1	0.1%	0	0.0%
4-Verticle Post	144	4.8%	54	3.8%	90	5 8%	74	10.3%	1	0.1%	50	6.7%	19	2.5%
5-Dead-End	262	8.7%	143	9.9%	119	7.6%	42	5.8%	70	9.1%	76	10.1%	74	9.8%
6-Cap & Pin	3	0.1%	2	0.1%	1	0.1%	0	0.0%	1	0.1%	1	0.1%	1	0.1%
7-Wooden Pin	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
8-Unknown	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
9-Other - List	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	3000	100.0%	1439	100.0%	1561	100.0%	720	100.0%	771	100.0%	751	100.0%	758	100.0%
	Insulators		**Insulators**		**Insulators**		**Insulators**		**Insulators**		**Insulators**		**Insulators**	
Insulator Condition	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**
0-Satisfactory	2977	99.0%	1424	99.0%	1553	99.0%	711	98.8%	769	99.2%	740	98.5%	757	99.3%
4-Leaning	5	0.2%	5	0.3%	0	0.0%	1	0.1%	2	0.3%	2	0.3%	0	0.0%
5-Tie Unraveled	4	0.1%	2	0.1%	2	0.1%	0	0.0%	3	0.4%	0	0.0%	1	0.1%
1-Contaminated, Residue	2	0.1%	2	0.1%	0	0.0%	1	0.1%	0	0.0%	1	0.1%	0	0.0%
2-Visible Crack	11	0.4%	2	0.1%	9	0.6%	6	0.8%	0	0.0%	1	0.1%	4	0.5%
3-Broken	9	0.3%	4	0.3%	5	0.3%	1	0.1%	1	0.1%	7	0.9%	0	0.0%
6-Pin Pull/Pushing Thru Arm	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
7-Pin Broken	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
8-Pin corroded	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
9-Other	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	3008	100.0%	1439	100.0%	1569	100.0%	720	100.0%	775	100.0%	751	100.0%	762	100.0%
Device	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**
0-None	794	27.8%	401	28.9%	393	26.6%	170	25.7%	131	18.8%	259	36.1%	234	29.8%
1-Fuse (Cut-Out)	336	11.7%	122	8.8%	214	14.5%	72	10.9%	77	11.0%	93	13.0%	94	12.0%
2-Arrestor	539	18.8%	282	20.3%	257	17.4%	146	22.1%	162	23.2%	94	13.1%	137	17.5%
3-XFMR	1131	39.5%	573	41.3%	558	37.8%	263	39.7%	315	45.2%	250	34.9%	303	38.6%
4-Capacitor-Fixed	6	0.2%	2	0.1%	4	0.3%	0	0.0%	1	0.1%	1	0.1%	4	0.5%
5-Capacitor-Switched	2	0.1%	1	0.1%	1	0.1%	1	0.2%	0	0.0%	0	0.0%	1	0.1%
6-Regulator (No.)	3	0.1%	2	0.1%	1	0.1%	1	0.2%	0	0.0%	2	0.3%	0	0.0%
7-Recloser/Sectionalizer	6	0.2%	2	0.1%	4	0.3%	3	0.5%	1	0.1%	1	0.1%	1	0.1%
8-Disconnects-Single Blade	17	0.6%	1	0.1%	16	1.1%	3	0.5%	7	1.0%	5	0.7%	2	0.3%
9-3-Phase Tie Switch (Type)	9	0.3%	0	0.0%	9	0.6%	1	0.2%	1	0.1%	4	0.6%	3	0.4%
10-Riser on Pole	9	0.3%	0	0.0%	9	0.6%	1	0.2%	1	0.1%	4	0.6%	3	0.4%
11-Other - List	9	0.3%	0	0.0%	9	0.6%	1	0.2%	1	0.1%	4	0.6%	3	0.4%
	2861	100.0%	1386	100.0%	1475	100.0%	662	100.0%	697	100.0%	717	100.0%	785	100.0%

	System Summary		1 Phase		3 Phase		Best of Worst		Best of Best		Worst of Worst		Worst of Best	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Device Condition	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**
0-Satisfactory	2191	99.2%	1051	99.4%	1140	99.0%	517	98.3%	599	99.2%	493	99.2%	582	100.0%
1-Corrosion, Rust, Pitting	11	0.5%	2	0.2%	9	0.8%	7	1.3%	3	0.5%	1	0.2%	0	0.0%
2-Bushing Broken/Cracked	1	0.0%	0	0.0%	1	0.1%	0	0.0%	0	0.0%	1	0.2%	0	0.0%
3-Arrestor - Missing	1	0.0%	1	0.1%	0	0.0%	0	0.0%	1	0.2%	0	0.0%	0	0.0%
4-Arrestor - Obsolete	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
5-Arrestor - Long Lead	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
6-Arrestor/Failed/Damaged	2	0.1%	1	0.1%	1	0.1%	1	0.2%	0	0.0%	1	0.2%	0	0.0%
7-Hardware Hanging	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
8-XFMR Disc'd (Needs Removal)	1	0.0%	1	0.1%	0	0.0%	0	0.0%	1	0.2%	0	0.0%	0	0.0%
9-Riser Pothead/Connection Prob.	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
10-Riser w/o Ventilation	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
11-Other	2	0.1%	1	0.1%	1	0.1%	1	0.2%	0	0.0%	1	0.2%	0	0.0%
	2209	100.0%	1057	100.0%	1152	100.0%	526	100.0%	604	100.0%	497	100.0%	582	100.0%
Conductor Condition	**Primary**		**Primary**		**Primary**		**Primary**		**Primary**		**Primary**		**Primary**	
	Count	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**
0-No Visible Problems	2485	95.7%	1258	96.7%	1227	94.7%	574	94.4%	642	96.5%	625	95.3%	644	96.6%
1-Conductor Sag	23	0.9%	10	0.8%	13	1.0%	9	1.5%	2	0.3%	10	1.5%	2	0.3%
2-Tight Phase Separation	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
3-Poss Clearance Violation	51	2.0%	19	1.5%	32	2.5%	19	3.1%	7	1.1%	12	1.8%	13	1.9%
4-Clamps Worn/Loose	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
5-Ties Unraveled	1	0.0%	1	0.1%	0	0.0%	0	0.0%	0	0.0%	1	0.2%	0	0.0%
6-Pitted,Corrosion	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
7-Strands Broken	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
8-Some Melting	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
9-Guy, Other Contact	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
10-Ground Wire Cut or Missing	30	1.2%	10	0.8%	20	1.5%	3	0.5%	13	2.0%	8	1.2%	6	0.9%
11-Other	6	0.2%	3	0.2%	3	0.2%	3	0.5%	1	0.2%	0	0.0%	2	0.3%
	2596	100.0%	1301	100.0%	1295	100.0%	608	100.0%	665	100.0%	656	100.0%	667	100.0%

	System Summary		1 Phase		3 Phase		Best of Worst		Best of Best		Worst of Worst		Worst of Best	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Guy/Anchor Condition	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**
0-Satisfactory	1405	85.0%	730	83.9%	675	86.3%	330	85.5%	338	84.1%	401	91.1%	338	79.5%
1-Guy Wire Strands Broken	8	0.5%	4	0.5%	4	0.5%	0	0.0%	1	0.2%	2	0.5%	5	1.2%
2-Guy Rusted	98	5.9%	54	6.2%	44	5.6%	22	5.7%	37	9.2%	13	3.0%	26	6.1%
3-Anchor-Tight	2	0.1%	1	0.1%	1	0.1%	1	0.3%	0	0.0%	0	0.0%	1	0.2%
4-Anch - Loose or Broken	46	2.8%	28	3.2%	18	2.3%	9	2.3%	16	4.0%	12	2.7%	9	2.1%
5-Guy Missing or Deteriorated	2	0.1%	1	0.1%	1	0.1%	0	0.0%	2	0.5%	0	0.0%	0	0.0%
6-Slack Span on Stub	8	0.5%	4	0.5%	4	0.5%	0	0.0%	2	0.5%	4	0.9%	2	0.5%
7-Guard Defective/Missing	90	5.4%	49	5.6%	41	5 2%	22	5.7%	11	2.7%	12	2.7%	45	10.6%
8-Other	6	0.4%	5	0.6%	1	0.1%	2	0.5%	1	0.2%	0	0.0%	3	0.7%
	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	100.9%
Attachments	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**	**Count**	**Percent**
1-Telephone	2368	92.9%	1200	93.4%	1168	92.3%	546	92.4%	628	95.2%	572	88.8%	622	95.0%
2-CATV	1869	73.3%	876	68.2%	993	78.5%	455	77.0%	604	91.5%	381	59.2%	429	65.5%
3-Unknown	24	0.9%	8	0.6%	16	1.3%	1	0.2%	7	1.1%	8	1.2%	8	1.2%
4-Pole Extender	14	0.5%	3	0.2%	11	0.9%	2	0.3%	8	1.2%	3	0.5%	1	0.2%
5-Secondary	519	20.4%	200	15.6%	319	25.2%	98	16.6%	173	26.2%	117	18.2%	131	20.0%
6-Service	1313	51.5%	640	49.8%	673	53.2%	275	46.5%	456	69.1%	266	41.3%	316	48.2%
7-Street Light/Spotlight	516	20.2%	183	14.2%	333	26.3%	81	13.7%	239	36.2%	96	14.9%	100	15.3%
8-Other	134	5.3%	27	2.1%	107	8.5%	66	11.2%	11	1.7%	43	6.7%	14	2.1%