



STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC UTILITY CONTROL
TEN FRANKLIN SQUARE
NEW BRITAIN, CT 06051

**DOCKET No. 97-11-1097-
11-10**

**DPUC REVIEW OF ELECTRIC UTILITY LINE MAINTENANCE PLANS -
1998DPUC REVIEW OF ELECTRIC UTILITY LINE MAINTENANCE
PLANS - 1998**

and

DOCKET NO. 86-12-03

**LONG RANGE INVESTIGATION TO EXAMINE THE
ADEQUACY OF THE TRANSMISSION AND DISTRIBUTION
SYSTEMS OF THE CONNECTICUT LIGHT AND POWER
COMPANY AND THE UNITED ILLUMINATING COMPANY**

August 21, 1998

By the following Commissioners:

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DECISION

I. INTRODUCTION

A. SUMMARY

In this Decision, the Department finds the Line Maintenance Plans of The Connecticut Light and Power Company (CL&P) and The United Illuminating Company (UI; collectively, Companies) to be acceptable. The Department also orders the Companies to eliminate the quarterly reliability report, and establishes new reporting requirements. For CL&P, the Department orders reporting on the status of replacement of certain failure prone equipment. For UI, the Department orders reporting on the status of changes to its line maintenance plan.

B. BACKGROUND OF PROCEEDING

Docket No. 97-11-10

Pursuant to Connecticut General Statutes (Conn. Gen. Stat.) §16-32g and Regulations of Connecticut State Agencies (Conn. Agencies Regs.) §16-32g-1, the Companies filed their respective biannual Line Maintenance Plans (CL&P Plan or UI Plan) with the Department of Public Utility Control (Department). The Department opened this proceeding to investigate all aspects of these Plans.

Docket No. 86-12-03

CL&P and UI have a number of reporting requirements pursuant to Orders issued in one or more prior Decisions in this docket. The most significant of these requirements is the annual Transmission and Distribution Reliability Performance (TDRP) Report that is the focus of Docket No. 86-12-03. The Department has recognized that some of the information the Companies have been filing is no longer needed by the Department. In addition, since 1995, CL&P has been utilizing a method for selecting circuits for reliability corrective action plans (RCAPs) that is not in compliance with direct Orders issued in this Docket. The Department, by its own motion, reopened Docket No. 86-12-03 to review the Companies' reporting requirements, and review CL&P's proposed method for selecting circuits for RCAPs.

C. CONDUCT OF PROCEEDING

Pursuant to Conn. Gen. Stat. 16-32g and 16-9 and a Notice of Hearing dated April 8, 1998, a hearing was held on these matters at the Department's office, Ten Franklin Square, New Britain, Connecticut on April 20, 1998. The hearing was continued to the late-filed date of April 30, 1998, that was later deemed unnecessary and canceled. A notice of close of hearing was issued dated May 21, 1998.

D. PARTIES AND INTERVENORS

The Department recognized the following as parties in this proceeding: The Connecticut Light and Power Company, P. O. Box 270, Hartford, CT 06141-0270; The United Illuminating Company, P. O. Box 1564, New Haven, CT 06506-0901; The Office of Consumer Counsel, Ten Franklin Square, New Britain, CT 06051. Robert Fromer; Linda L. Randell, Esq., of Wiggin & Dana; Anne MacClintock, Esq., for the Southern New England Telephone Company; and William Urban for Connecticut Conservation Association were granted intervenor status.

II. DEPARTMENT ANALYSIS

A. THE CONNECTICUT LIGHT AND POWER COMPANY

1. Reliability

The Department most recently investigated CL&P's (also referred to in this section as Company) overall reliability in its December 31, 1997, Decision in Docket No. 97-05-12, DPUC Financial and Operations Review of The Connecticut Light and Power Company. In that proceeding, the Department determined that CL&P's overall system reliability showed improvement over the period 1992-1996, when examined without major storms; however, overall system reliability had declined significantly over the same period when the impact of major storms is considered. The Department found that trees making contact with lines was the primary cause of outages on CL&P's system, and determined that the Company needed to design its system to be more resistant to tree contact outages.

The following table, extracted from the Decision in Docket No. 97-05-12 and updated with 1997 numbers, shows CL&P's reliability indices for the years 1992-1997.

CL&P Reliability Indices 1992 - 1997

YEAR	WITHOUT MAJOR STORMS			WITH MAJOR STORMS		
	SAIDI ¹	SAIFI ²	CAIDI ³	SAIDI	SAIFI	CAIDI
1992	142	1.35	105	266	1.62	164
1993	136	1.26	108	262	1.68	156
1994	169	1.49	114	288	1.70	169
1995	150	1.32	113	515	2.21	233
1996	130	1.16	112	893	2.54	352
1997	118	1.24	95	321	1.70	*

Note: All of the above reliability indices reflect the new major storm exclusion criterion.

*Not provided

Decision dated December 31, 1997, in Docket No. 97-05-12, p. 51; CL&P 1998 TDRP Report, pp. 4-7.

When examining the above data, it becomes evident that CL&P's reliability, excluding major storms, has been generally improving since 1992. When the impact of major storms is considered, however, reliability has been generally declining. This is the trend the Department noted in Docket No. 97-05-12, and it continued to be true in 1997. Although the Department recognizes that it is impossible to design an overhead system to be completely resistant to major storm conditions, the Department reaffirms its position that significant improvement is possible in the performance of CL&P's system under storm conditions.

In 1997, the Department opened two dockets in response to complaints regarding electric service reliability in three towns in Connecticut. The Towns of Simsbury and Bloomfield filed separate formal complaints with the Department in 1997 requesting that the Department commence an investigation of electric service interruptions experienced by customers of CL&P in those towns. The Department opened Docket No. 97-04-21, DPUC Investigation of the Connecticut Light and Power Company Facilities Pursuant to Section 16-12 of the General Statutes of Connecticut (Simsbury), to conduct that investigation for both towns. In 1996, Bruce D. Rubenstein requested that the Department investigate electric service interruptions to his residence in West Hartford and to the northwest quadrant of West Hartford. The Department opened Docket No. 97-05-24, Petition of Bruce D. Rubenstein for an Investigation of the Reliability of Electric Service Provided by the Connecticut Light and Power Company in West Hartford (West Hartford) for that purpose. The Town of West Hartford requested, and was granted intervenor status in that docket, and its scope was then expanded to include all of West Hartford.

¹ SAIDI (System Average Interruption Duration Index): The average interruption duration in minutes per customer served. It is calculated by dividing the sum of all customer interruption duration during a year by the number of customers served.

² SAIFI (System Average Interruption Frequency Index): The average number of times that a system customer is interrupted during a year. It is calculated by dividing the total number of customers interrupted in a year by the average number of customers served during the year. A customer interruption is considered to be one interruption to one customer.

³ CAIDI (Customer Average Interruption Duration Index): The average service restoration time or the average interruption duration for those customers interrupted during a year. It is calculated by dividing the sum of all customer interruption duration by the total number of customers interrupted in a year.

In the above-cited proceedings, the Department determined that, for Simsbury, Bloomfield and West Hartford, certain improvements to the distribution systems were needed and warranted to improve reliability. Customers in these towns experienced frequent and/or lengthy power interruptions in the past few years. The majority of the reliability problems were associated with four major storms that occurred in the winter of 1996/1997. In both proceedings, CL&P proposed an Action Plan for the implementation of certain corrective measures to its distribution system. These measures addressed specific reliability problems, especially those relating to the storm outages.

The Department is concerned that the reliability problems in these three towns, the bulk of which were due to storms that affected many parts of Connecticut, are not unique to these areas in CL&P's service territory. The Department has reviewed CL&P's Line Maintenance Plan (CL&P Plan) to determine the efforts the Company is making to improve system-wide electric service reliability. These efforts are discussed in the following sections.

2. CL&P's Completion of Scheduled Maintenance

In Docket Nos. 97-04-21 and 97-05-12, the Attorney General questioned CL&P's failure to complete the scheduled maintenance of certain distribution equipment in the previous five years (1992-1996), and the incidence of outages due to equipment failure in CL&P's system. The equipment items the Attorney General noted as not having been maintained or inspected in accordance with CL&P's maintenance schedules in 1993-1996 include: reclosers, sectionalizers, network/underground transformers and switches, underground plant, and direct-buried facilities and switches. In the Decisions for both of these dockets, the Department noted that the record of those dockets was insufficient for thorough analysis of this issue, but the issue would be examined in the instant docket. Decision dated January 28, 1998, in Docket No. 97-04-21, p. 22; Decision dated December 31, 1997, in Docket No. 97-05-12, p. 56.

CL&P contends that there is no correlation between uncompleted scheduled equipment maintenance and reliability of electric service. The Company noted that it completed all of its scheduled line maintenance in 1997, with the exception of 29% of the monthly recloser inspections. Response to Interrogatory EL-30. The Company further believes that scheduled equipment inspections are not as effective as its unscheduled inspections in uncovering equipment problems, because unscheduled inspections generally occur while the equipment is operating. Unscheduled equipment inspections are performed after major storms and, in many cases, following known equipment operations. Id.

Every year the Company tracks "carry-over" maintenance work that was not completed in the previous year, and schedules it in the current year. CL&P Plan, p. 12. CL&P is also required to report all maintenance to the Department in its biannual line maintenance filing that is not completed within the prescribed frequency. The fact that missed inspection and maintenance work is not performed precisely on schedule should not significantly impact equipment breakdown rates, provided the work is completed in a reasonably timely manner.

Equipment failures are a significant contributor to outages on CL&P's system. CL&P's 1998 Transmission and Distribution Performance Report (TDRP Report) provides information on the causes of all CL&P system outages back to 1993. The table below

shows the proportion of equipment failures to total outages, excluding major storms. Response to Interrogatory EL-26.

Power Outages Caused by Equipment Failures (CL&P)

	<u>1993-1997 total</u>	<u>1996</u>	<u>1997</u>
Total Power Outages: CL&P System	55,208	9,908	10,816
Number (and %) of outages caused by equipment failure	10,724 (19.4%)	2,049 (21%)	1,878 (17%)

The majority of equipment failures involved overhead (OH) facilities. Failures of primary and secondary conductors account for approximately 50% of all outages resulting from equipment failure. Aside from those particular items on the overhead system, transformers, underground (UG) cable in conduit and direct buried (DB) cable are the only other specific item of distribution equipment that experienced a notable number of failures. Response to Interrogatory EL-26; First Supplemental Response to Interrogatory EL-29. The following chart illustrates how the failures of cables and conductors, cutouts and transformers have impacted the total number of outages caused by equipment failures. Id.

Failure Rates of Equipment (CL&P)

	<u>1996</u>		<u>1997</u>	
	Number of Failures	% of Total	Number of Failures	% of Total
Primary and Secondary Cable and Conductor	1,047	51%	1,020	54%
Cutouts	165	8%	151	8%
Transformers	486	24%	441	24%
All other equipment	351	17%	266	14%
Total Number of Equipment Failure Interruptions	2,049	100%	1,878	100%

As can be seen from the above data, equipment failures declined from 1996 to 1997. In 1996, the only maintenance not performed by CL&P was 395 transformer inspections. There are 42,399 total transformers in the system; therefore, less than 1% were not inspected. CL&P Plan, p. 12. The number of transformer failures declined from 1996 to 1997. The missed inspections cannot therefore be correlated to an increase in transformer failures, indicating that the small proportion of missed inspections did not result in increased outages.

In 1997, CL&P completed all scheduled maintenance on its system, except for approximately 29% of its reclosers. The Department believes this represents a strong effort on the part of the Company to complete scheduled maintenance on its system, at least over the last two years which is the focus of this proceeding. The Department is satisfied that the Company is making reasonable efforts to perform necessary inspection and maintenance activities. There is no evidence that CL&P's failure to complete all scheduled inspections and maintenance of distribution equipment on time resulted in a negative impact on reliability. However, since preventive maintenance is an important component of the Company's line maintenance plan, CL&P should ensure this work is performed on schedule to the best of its ability. In the future, if CL&P consistently fails to complete significant scheduled maintenance on its distribution system, the Department will consider whether any actions are necessary to prevent degradation in service reliability.

3. Circuit Owners

In conjunction with a recent Company reorganization, the Company has developed an Energy Delivery group. Many aspects of this Energy Delivery group, including newly-created positions with specific responsibilities, are intended to enhance CL&P's abilities to improve reliability. Among the numerous newly-defined positions in the Energy Delivery group are Circuit Zone Managers and Circuit Owners. There are five Circuit Zone Managers, each assigned to a specific region within CL&P service territory.

The Circuit Zone Managers are responsible for the performance of circuitry (or reliability) within their "zone." Response to Interrogatory EL-14.

Circuit Owners report directly to Circuit Zone Managers. Many of the duties of the Circuit Owners are directly related to maintaining and improving electric service reliability. Circuit Owners are provided with power outage reports on a daily basis. Their responsibilities include determining the root cause of outages, and ordering the changes or improvements that may be necessary to prevent similar outages. Circuit Owners perform inspections of fault locations to gain first hand knowledge of the condition of the distribution system and to identify areas in need of improvement. They may identify the need for such improvements as equipment replacement, tree trimming and additional fusing, and then initiate necessary corrective action. Tr. 2/20/98, pp. 32-39; Response to Interrogatories EL-14, EL-15 and EL-40. The Department believes that if the Circuit Owners perform their duties as described with competence, and if CL&P makes the improvements recommended by them, these efforts will be effective in improving system reliability.

One of the things Circuit Owners are currently doing to improve system reliability is surveying all circuits for proper fusing, and ordering the installation of additional fuses where existing fusing is not adequate. Tr. 4/20/98, pp. 31-32. This activity is important because adequate and proper fusing minimizes the extent of outages and contributes significantly to system reliability. In both reliability dockets of 1997 (Simsbury and West Hartford) the Company identified the need for a significant number of **additional** fuses in those towns. The Department finds no reason to believe that the inadequate fusing problem is unique to Simsbury, Bloomfield and West Hartford. Therefore, the Department believes that this effort is necessary and perhaps overdue, and should contribute to improving CL&P system reliability.

4. Replacing Failure-Prone Equipment

CL&P is aware of certain items of equipment in its distribution system that are prone to premature failure. Among those are approximately 13,000 primary splices, 800 load break connectors and over six million feet of direct buried medium voltage cable. These components are all in the Company's underground distribution system. Response to Interrogatories EL-28 and EL-33.

The Company has formal procedures for the replacement of the "failure prone" splices, connectors and cable in service. These procedures specify the conditions under which the Company will replace them prior to or in the event of, their failure but the Company does not plan to systematically replace all "failure prone" equipment. The procedure for the cable replacement was originally issued in 1985; and the procedure for the connectors and splices was established in 1994. Response to Interrogatory EL-33. Both of these procedures do not provide a very aggressive means of replacing these equipment items, since the equipment is replaced only in areas that experience a high number of failures, and where the highest amount of load is interrupted by the failure. However, the Company is currently in the process of revising both of these procedures to accelerate the rate in which these equipment items are all replaced. The revised splice replacement procedure, for instance, calls for the replacement of all of these "failure prone" splices in any residential direct buried development where even one of them fails. The current procedure does not call for a response to only a single failure. Tr. 4/20/98, pp. 25-26. In addition, all of these splices that are located in manholes in the network systems will be systematically replaced over the next five years. Id.

CL&P has in place an Equipment Failure Reporting System that is used to track equipment failures on a company-wide basis and identify particular items of equipment that experience a “higher than normal” or excessive number of failures. Response to Interrogatory EL-27. CL&P’s practice of tracking equipment failures to identify and address problems in its distribution system has obvious merits. The following table shows the failure rate of the subject equipment (this data was calculated from information supplied by CL&P in the response to Interrogatory EL-33).

CL&P Failure Prone Equipment - Failure Rate

	Cable Splices	Load Break Connectors	Medium Voltage Cable
Failure Rate (per year)	1.07%	3.75%	0.16/mile

The Department notes that the failure rate for the 23kV load break connectors is relatively high (3.75%). Using a linear projection based on this failure rate, all connectors would fail within 27 years of installation, or an average service life of 13.5 years. This is a short service life for an overhead system, where most equipment is designed for an average service life of greater than 30 years. The Department believes the Company should act to replace these connectors in an expeditious manner. Based on its recent interactions with CL&P, the Department finds that the Company is more willing to make proactive changes than has historically been the case. Also, as previously noted, CL&P is already in the process of revising its procedures to replace this equipment in a timely manner. Therefore, the Department will not order CL&P to replace these connectors on a specific time schedule. However, the Department believes the Company should, in implementing its revised procedures for replacing this equipment, replace the equipment on its own initiative. The Department will order the Company to report on the replacement of these connectors.

The situation with the direct buried cable is much more problematic. The vast majority of this cable is buried directly in the ground, without conduit in residential neighborhoods. Replacing it would be extremely expensive because of the trenching and land restoration that would be involved. In addition, the majority of the residential direct buried developments containing this cable are not designed with “loop feeds.” Therefore, customers will probably have to be out of service for extended periods of time for the replacement work. The Company’s policy on this cable replacement calls for replacement of some greater quantity of the cable when a failure of just a small section of it forces a power outage. Response to Interrogatory EL-33. Taking advantage of the outage caused by the cable failure allows the Company to get some of the cable replaced without extending the outage or creating another one.

The Company has identified an alternative to replacing all of its “failure prone” direct buried cable. The Company has been experimenting with “rejuvenating” or repairing the insulation of some of its direct buried cable by injecting it with a silicone-type substance. Injecting the cable with silicone fills any voids there may be in the cable insulation. Voids in the insulation are the primary cause of cable failures. Tr. 4/20/98, pp. 27-28. CL&P has been injecting cables with silicone for only about two years, but UI has used this procedure for six years. *Id.*, pp. 28 and 126. UI testified that it has not had a single failure in its silicone injected cables since it started using this procedure. *Id.*, pp. 126-127. CL&P testified that injecting a cable with silicone costs them approximately 40% of what it would to replace the cable, so the Company is able to affect more cable for the same expenditure. Tr. 4/20/98, p. 27.

CL&P does not have a plan in place to systematically replace or silicone inject all of its existing "failure prone" direct buried cable. However, its policy does call for the replacement of all the cable in any residential development that has experienced two or more failures within five years. Response to Interrogatory EL-33. Since the Company has millions of feet of this cable in service, the Department is concerned that CL&P may have some areas that qualify for complete cable replacement, but the Company has not initiated cable replacement or silicone injection because of the significant expense associated with either of these endeavors. The Department needs a better understanding of the quantity of this particular cable that CL&P has identified as being in need of replacement or silicone injection, and CL&P's current schedule, if any, for such work. Therefore, the Department will order the Company to report on this issue.

The Department finds that, overall, CL&P's new policies for the replacement of equipment prone to failure are necessary and should be adequate to help improve system reliability, but CL&P must proceed with necessary replacement or repair of the above-noted equipment in a reasonably aggressive manner. The Department will pursue this issue in future line maintenance proceedings.

3. Covered Wire

Covered wire is distribution wire that has a protective covering intended to inhibit outages caused by some tree contact. Most covered wire presently being installed in utility systems has a 175 mil thickness covering. Covered wire is superior to bare wire in utility distribution systems, where distribution lines transit through treed areas. CL&P states that covered wire is roughly twice as effective as bare wire in preventing tree-related outages in non-storm conditions. Response to Interrogatory EL-45.

Covered wire constitutes approximately 35% of CL&P distribution system. Response to Interrogatory EL-45. It is CL&P's policy to install covered wire in areas where trees present a hazard to the lines for all new overhead construction and in the reconstruction of existing distribution facilities. Response to Interrogatory EL-43. In addition, it has been CL&P's practice to re-conductor with tree wire in response to reliability problems, in which case the re-conducting is usually limited to those areas that qualify for reliability corrective action plans pursuant to CL&P's worst circuit rankings. CL&P has no comprehensive plan for upgrading its entire overhead system to include covered wire in all treed areas. However, CL&P is presently revisiting this issue and plans to submit a report on future plans for conversion to covered wire by June 1, 1998. Response to Interrogatory EL-44.

In Docket No. 97-05-12, DPUC Financial and Operations Review of The Connecticut Light and Power Company, the Department found that reliability is decreasing when the effects of major storms are considered, and that CL&P should take actions to reduce tree-related outages. Decision dated December 31, 1997, in Docket No. 97-05-12, pp. 46-51. In Docket No. 97-04-21, the Department affirmed the value of covered wire in preventing tree-caused outages, and ordered CL&P to re-conductor certain three-phase lines that were scheduled to undergo area rebuild work but were not previously scheduled to be re-conducted. Decision dated January 27, 1998, in Docket No. 97-04-21, pp. 15, 24. CL&P's own data shows that covered wire is far more effective than bare wire in preventing outages caused by tree contact. For example, in 1996 - 1997 tree-caused interruptions averaged 0.0685 interruptions per mile of covered wire (excluding major storms), whereas tree-caused interruptions averaged 0.192 interruptions per mile of bare wire (excluding major storms). Response to Interrogatory EL-45. In 1996, tree-related outages accounted for

24.6% of all outages, far more than any other cause except major storms. CL&P 1997 TDRP Report, p. 9. In the years 1992 through 1995, trees were the single largest cause of outages, including major storms. *Id.*, p. 10. By comparison, UI's distribution system is comprised of approximately 83% covered wire. Response to Interrogatory EL-38. Tree-related outages accounted for only 17.5% of outages on UI's distribution system in 1996. UI 1997 TDRP Report, Chart I-3.1. UI's reliability has historically been better than CL&P's, and this is borne out by comparison of the Companies' reliability indices. UI's system average SAIDI and SAIFI rankings for 1992 through 1996 were 76.4 and 1.00 respectively, whereas the equivalent CL&P indices were 457 and 2.02. UI 1997 TDRP Report Charts I-1 and I-2; CL&P 1997 TDRP Report, pp. 5 and 6. While the Companies' systems are not strictly comparable and the Department does not believe UI's system should not be held as a model or standard, this data does demonstrate that there is substantial room for improvement of CL&P's system. This data also supports the effectiveness of covered wire in preventing tree-related outages, since UI's system consists almost exclusively of covered wire in treed areas, incurs far fewer tree-related outages, and has substantially superior overall reliability performance.

Widespread use of covered wire and ~~an aggressive~~ **a well-planned and managed** tree trimming program are the primary ingredients of a successful reliability improvement program. CL&P has, for many years, expressed a desire that any improvements in its system be done in a cost-effective manner. In the mid-1980's, the Company drastically reduced tree trimming and consequently reliability was negatively impacted. Decision dated June 16, 1993, in Docket No. 92-11-11, p. 104. The Department has considered CL&P's pleas for many years that consideration be given to CL&P's financial condition prior to ordering significant changes in distribution reliability programs. *Id.*, p. 101. However, the Department will wait no longer for significant improvements in CL&P's reliability. Also, the Department notes that, in the past, concerns regarding CL&P's financial condition have primarily originated from the generation side of the business, not distribution. Since generation will no longer be regulated after the year 2001, the Department will have no reason to consider any financial impacts that arise from the generation side of CL&P's (or Northeast Utilities') business.

As with UI's proposed changes to its single phase tree trimming program, the Department believes cost effectiveness should not override all other concerns, particularly where small numbers of consumers may be left out of a reliability improvement program entirely, or may see reliability decrease over time. CL&P should be mindful of the Department's position on this issue in any future reliability improvement programs. CL&P is therefore placed on notice that the Department expects significant improvements in CL&P's system reliability, and the Department believes expansion of covered wire is a major part of any reliability improvement plan. The Department will closely examine CL&P's ~~June 1, 1998, filing,~~ and will take appropriate action as necessary depending on the extent to which CL&P's future plans for covered wire conversions satisfy the Department's concerns.

4. Tree Trimming

UI and CL&P have programs that require periodic trimming of trees and trimming and removal of small trees and brush. Periodic tree trimming is essential to ensure that sufficient clearance is maintained near overhead wires to prevent contact with limbs. In this proceeding, the Department reviewed tree trimming programs of both Companies to

determine if they are adequate and to determine if recent or proposed changes are reasonable and appropriate.

The Department periodically receives complaints that CL&P's tree trimming program is either excessive, not aggressive enough, or is not being followed. The Department most recently investigated these complaints in Docket No. 96-10-33, Petition of Stuart Zimmerman for an investigation of the Connecticut Light and Power Company's Wire Maintenance Plan. In that proceeding, the Complainant alleged that tree limbs were growing in close proximity to wires and were not sufficiently trimmed to avoid outages. The Department investigated this complaint and concluded that CL&P's tree trimming program appropriately balanced reliability, safety, and aesthetics. Decision dated May 28, 1997, in Docket No. 96-10-33, p. 2. The Department has also subsequently investigated aspects of CL&P's tree trimming program in Docket Nos. 97-04-21 and 97-05-24. The Department has never found reason to conclude that the Company's standard tree trimming program should be modified in frequency or line clearance standards. The Company has expanded the scope of its trimming operation over the past few years to address outages associated with tree contact. New features which include enhanced tree trimming, hot spot trimming, mid cycle inspections and dedicated circuit owners are discussed below.

The Department last comprehensively reviewed CL&P's tree trimming program in Docket No. 92-11-11, Application of The Connecticut Light and Power Company to Amend its Rate Schedules. In that proceeding, the Department found that CL&P's tree trimming program appropriately balances competing interests in environmental preservation and reliability. Decision dated June 16, 1993, in Docket No. 92-11-11, pp. 103 - 104. As discussed below, the tree trimming program has evolved since that time.

In this proceeding, the Department considered arguments from Mr. Robert Fromer that the Company's tree trimming program is excessive and results in environmental damage, and that CL&P should be ordered to take compensatory measures, including tree replanting to replace lost biomass, monetary compensation to towns, undergrounding lines, establishing a tree replanting trust fund, and ordering CL&P to refrain from pressuring property owners to allow their trees to be trimmed. Fromer Brief, pp. 9 - 10. The Department has investigated many of these arguments before, most recently in Docket No. 92-11-11. In that Decision, the Department concluded that "...the Authority is not convinced that the value of trees should or needs to be considered in connection with alternatives to tree work associated with existing lines" and that "the Company is not in the tree planting business and the cost of such a program is ultimately borne by ratepayers." Decision dated June 16, 1993, in Docket No. 92-11-11, pp. 101-103. Since the Department has ruled on these matters before, and since minimal evidence was presented in this proceeding relative to them, the Department sees no reason to revisit these issues or to modify its previous determinations on them.

CL&P performs standard tree trimming on a four year cycle, with approximately one quarter of the nearly 16,000 miles of overhead distribution lines cleared each year. This trimming interval has been generally maintained since its propriety was affirmed in Docket No. 92-11-11. However, in 1995 CL&P initiated a pilot program in its Eastern Region that extended the trimming interval to six years. In 1997, the Company abandoned this pilot program and returned the Eastern Region to the standard four year cycle. Response to Interrogatory EL-1. CL&P abandoned this program because lines on the extended trimming interval were experiencing extensive limb regrowth into the lines and increased outages

caused by tree contact. Tr. 4/20/98, pp. 48-49. Since reliability was being jeopardized, the Department agrees that it is appropriate to abandon this program.

CL&P has recently instituted a program whereby each circuit backbone is inspected halfway through the trimming interval, and selected locations are trimmed where tree limb regrowth presents a hazard to the lines. The cost of this program is minimal compared to overall maintenance costs, at approximately \$1000/mile. Tr. 4/20/98, p. 45. CL&P plans to perform mid-cycle hot spot inspections on 600 miles of circuit backbone per year. Response to Interrogatory EL-7. It is widely known that tree limb and branch regrowth rapidly occur within the first two years after trimming, then at a slower rate thereafter. In Docket No. 96-10-33, the Department found circumstantial evidence indicating that tree limb regrowth was impacting reliability in Stamford toward the end of the trim cycle. Decision dated May 28, 1997, in Docket No. 96-10-33, p. 4. Also, as previously mentioned, CL&P found that tree limb and branch regrowth threatened reliability in the Eastern Region pilot program after four years had elapsed since the last trimming.

Since tree limb and branch regrowth occurs rapidly during the first two years following trimming and since there is evidence that regrowth impacts reliability, the mid-cycle inspection and hot spot trimming program could reasonably be expected to be a worthwhile contribution to improve or maintain system reliability. Since the cost is relatively low, it could reasonably be expected to be cost-beneficial as well. If this proves to be the case, the Department believes that expanding the program to include some non-backbone circuitry would prove beneficial as well. However, the program is still in its infancy and such a conclusion is premature. The Department will review the reliability impact of the mid-cycle inspection and hot spot trimming in future line maintenance proceedings, at which time CL&P should have data indicating the benefit of this program.

CL&P has a pilot program to remove hazard tree limbs and entire trees outside of the normal trim zone. This program, called enhanced tree trimming, was introduced on a limited basis in 1996 but has not been formally adopted by the Company as a permanent feature of its line maintenance program. In 1998, CL&P is performing enhanced tree trimming on 300 miles of circuit backbone, in addition to enhanced tree trimming that is performed in conjunction with the Reliability Strategy and Asset Management capital improvement program. The average cost of enhanced tree trimming is approximately \$18,000 per mile. Response to Interrogatory EL-34. However, the Department believes that the average cost per mile should substantially decrease after all three phase backbones have received enhanced tree trimming, and previously trimmed backbone comes due for a second cycle of enhanced trimming, since much of the most cost-intensive tree removal work will have been done on the initial enhanced trimming effort.

The Company incorporated enhanced tree trimming guidelines in its Line Maintenance Plan. CL&P Plan, Appendix 3. The Department believes enhanced tree trimming is an important part of CL&P's overall line maintenance plan. In Docket No. 96-10-33, the Department ordered CL&P to submit a plan for the implementation of the enhanced tree trimming strategy. The plan was submitted on September 30, 1997, in the aforementioned docket. The plan states that the Company intends to perform enhanced tree trimming on all three phase backbones, although it does not give a projected completion date nor does it explicitly state CL&P's plans for enhanced tree trimming after all backbones are completed. Letter to Robert J. Murphy dated September 30, 1997, in Docket No. 96-10-33. In Docket No. 97-04-21, the Department found that tree related outages seriously impacted reliability in Simsbury shortly after normal maintenance tree

trimming was completed, and that enhanced tree trimming plans for that area were crucial to increasing system reliability performance during major storms. Decision dated January 27, 1998, in Docket No. 97-04-21, p. 13.

The Company states that it is still evaluating the cost effectiveness of enhanced tree trimming and will report to the Department on future plans for enhanced tree trimming by September 30, 1998. Response to Interrogatory EL-8. The Department will defer further review of the enhanced tree trimming program until this report is filed.

In addition, the expected role of the "Circuit Owners," as discussed above in Section II.B.3, in maintaining the distribution system and initiating necessary improvements promptly such as tree trimming, will be important to maintaining limbs clear of the lines, provided the circuit owners are properly supported by the Company.

In conclusion, CL&P's tree trimming program has evolved considerably since the last time the Department comprehensively reviewed it in Docket No. 92-11-11. The addition of enhanced trimming, mid-cycle inspections and hot spot trimming, and dedicated circuit owners should be viewed as essential contributors in maintaining the system, since they will provide additional protection against tree related outages, particularly on three phase backbones. However, in recognition of these evolving features of the line maintenance program, they will require subsequent review as data becomes available on their effectiveness in mitigating tree related outages in a cost-effective matter. In future reviews of CL&P's line maintenance program, the Department intends to examine these programs in more detail.

5. Wood Pole Inspections

CL&P is implementing a new plan for inspecting the condition of its wood poles. CL&P discontinued its wood pole inspection program in 1990. Response to Interrogatory EL-11. The specific maintenance each pole will receive depends on the type of pole. There are primarily two types of wood poles: poles treated with pentachlorophenol or creosote (collectively, Penta poles) and poles treated with chromated copper arsenate (CCA poles). CCA poles are more resistant to decay and insect attack. CL&P Plan, p. 7. CCA poles are newer than Penta poles, and CL&P has been purchasing CCA poles exclusively since 1983. Tr. 4/20/98, p. 47. Currently, between 25% and 30% of all wood poles are CCA poles.

CL&P's pole inspection plan will result in visual inspection of all poles every ten years. Penta poles between 10 and 14 years old and CCA poles more than 20 years old receive a partial excavation and sound and bore inspection. Penta poles more than 15 years old are excavated, sounded, bored, and treated. CL&P Plan, p. 7.

CL&P's pole inspection interval is the same as the interval when the program was discontinued in 1990. Response to Interrogatory EL-11. It is also similar to UI's pole inspection interval, which is presently 12 years. UI Plan, p. 26. The reduced sound and bore interval for CCA poles is reasonable given the higher quality and durability of these poles. Therefore, the Department approves the pole inspection program as filed.

The Department occasionally receives complaints that utility poles are leaning excessively, primarily on the grounds that leaning poles are unattractive. CL&P investigates leaning poles primarily to determine if the pole is in danger of falling. If a leaning pole is not in danger of falling, the Company generally takes no corrective action for aesthetic reasons

only. Response to Interrogatory EL-13. The Department rarely orders a company to make aesthetic improvements to its facilities. Most poles lean to some degree, and the degree of list that is visually unpleasant is highly judgmental. At this time, the Department does not believe a valid reason exists to order CL&P to establish a policy for aesthetic improvement of its distribution facilities.

B. THE UNITED ILLUMINATING COMPANY

1. Reliability

The Department last reviewed UI's (also hereinafter referred to as Company) reliability in Docket No. 96-03-29, DPUC Financial and Operational Review of The United Illuminating Company. In that proceeding, the Department found that UI's reliability performance has been generally improving since 1988, and has recently been exceptionally good. Decision dated December 31, 1996, in Docket No. 96-03-29, page 57. The table below shows UI's reliability indices for the last five years.

UI Reliability Indices 1993 - 1997

YEAR	WITHOUT MAJOR STORMS			WITH MAJOR STORMS		
	SAIDI	SAIFI	CAIDI	SAIDI	SAIFI	CAIDI
1993	57	0.85	65	82	1.06	*
1994	53	0.87	61	70	0.98	*
1995	54	0.84	65	67	0.95	*
1996	46	0.67	68	67	0.86	*
1997	48	0.78	62	62	0.90	*

Note: All of the above reliability indices reflect the new major storm exclusion criterion.

*Not Provided

1998 UI TDRP Report, pp. 5, 16-17.

As can be seen from the above data, UI's reliability has generally continued to improve since the Decision in Docket No. 96-03-29 was issued, both including and excluding major storms.

2. Tree Trimming

Since UI's reliability has always been generally good, the Department has never investigated its tree trimming program in depth. In this proceeding, however, UI is proposing major changes to its tree trimming program, therefore an investigation of UI's proposed tree trimming program is warranted.

UI previously trimmed all three phase and single phase lines on a five year interval. In this proceeding, UI notified the Department that, beginning in 1998, it plans to decrease the trimming interval on three phase lines to four years and increase the trimming interval on single phase lines to eight years. UI Plan, p. 24. The Company is basing this change on a desire to apply tree trimming resources in a more cost-effective manner, since three phase line outages affect more customers than single phase line outages. Response to Interrogatory EL-22.

UI states that, by decreasing the trimming interval on three phase lines, reliability on these lines can be expected to improve, and this should at least offset any decrease in reliability attributable to the increase in trimming interval on single phase lines. Id. Since single phase lines comprise approximately 65% of the system (Id.), UI could be expected to achieve significant cost savings by increasing the trimming interval on these lines.

Increasing the trimming interval on single phase lines will result in increased tree limb regrowth into the trim clearance zone around the lines, due to the longer time between trims. This could reasonably be expected to result in increased tree contacts on those lines; however, the resulting outages should be at least partially offset by the increased trimming frequency on the associated three phase lines. Therefore, the customers served by the single phase lines may not see a significant decrease in reliability. UI estimates that less than 1% of customers will see a net decrease in reliability. Id. These are exclusively residential customers. Tr. 4/20/98, p. 117. However, this is only an estimate and the results of the program cannot be accurately assessed until it is put into practice.

UI is not simply extending the single phase trimming interval to eight years. Instead, it plans to implement performance based aspects to the trimming program, whereby if a single phase line experiences two tree contact outages in a rolling 36 month period, the line will be trimmed. Response to Interrogatory EL-22. Therefore, no circuits should degrade to a condition where repetitive tree contact outages occur due to lack of trimming.

UI states that the large amount of covered wire in the distribution system allows the transition to an eight year trimming interval. Response to Interrogatory EL-22. Covered wire is designed to resist repetitive tree limb contact and makes up 83% of UI's single phase subsystem. Response to Interrogatory EL-38. UI also states that additional sectionalizing devices that have been installed in its distribution system in the 1990s limit the extent of any outages that may occur. Response to Interrogatory EL-22. UI also plans to monitor for limb regrowth that presents a safety hazard during routine system inspection. Tr. 4/20/98, p. 106.

As previously noted, in the Department's judgment UI's reliability has always been generally good. Therefore, the Department believes UI should be allowed more flexibility with trying alternative approaches to maintenance than would be the case if UI had historically poor reliability. This does not mean the Department will allow UI's reliability to degrade. UI's approach to its tree trimming program shows a responsible approach to more cost effective management, and alleviates most concerns the Department would have if UI were simply decreasing the frequency of tree trimming on single phase lines with no compensatory actions. The performance based aspects are critical in preventing tree contacts from substantially degrading reliability on single phase lines.

Nonetheless, the Department has several concerns with UI's proposal. Reliability to customers on the single phase lines may degrade more than UI expects. CL&P has recently abandoned a pilot program to reduce the trimming interval in its Eastern Region to six years, due to a threat to reliability from increased tree contacts. It should be noted, however, that the two companies are not strictly comparable, due to differing terrain, population density, ~~and~~ ~~and~~ approach to distribution system construction. Also, given recent enactment of restructuring legislation, it could also be to UI's competitive advantage to increase reliability to large commercial and industrial customers (who are served by three phase circuits) at the expense of residential customers served by single phase circuits. UI's own documents confirm this concern. In its Line Maintenance Plan, UI states "[d]eteriorating

reliability would create a climate that could lead to the loss of customers to competing energy suppliers.” UI Plan, p. 6. The Department cannot allow serious degradation in reliability of service to even small numbers of customers.

UI’s tree trimming program changes and system reliability must be monitored closely as the tree trimming interval on single phase lines is extended. Therefore, the Department will order UI to report to the Department on the status of this program. Although the exact contents of this report are negotiable and will probably require some refinement, it will require a high level of detail in order for the Department to accurately assess how customers on single phase lines are being affected by the reduced trimming interval. Therefore, beginning October 1, 1999, and annually thereafter, UI shall submit a report to the Department on the progress of its pilot tree trimming program. At a minimum, the report shall include:

- A list of all single phase lines that have not been trimmed in the last six years;
- For each single phase line that has not been trimmed in the last six years, a list of all tree contact outages occurring on those lines in the previous 36 months, including dates and lengths of the outages;
- A list of all single phase lines that have been trimmed (or scheduled to be trimmed) as a result of meeting the performance-based criteria for mandatory tree trimming.

3. Performance Based Maintenance Program

UI is in the process of instituting a reliability centered maintenance (RCM) system in its distribution system. RCM replaces the traditional time-based maintenance interval with a performance-based predictive maintenance approach. This approach relies extensively on computerized records and data analysis, to ensure preventive maintenance is performed at the proper time to prevent failure but not too often. UI believes this approach to maintenance is more cost effective than traditional time-based maintenance. UI Plan, p. 23.

RCM methods are not new or experimental. Its use was pioneered in the airline industry in the 1960s and the generation side of UI and CL&P has been using these techniques for several years. The change to RCM will result in extension of the maintenance interval on some distribution equipment, and the maintenance interval on other equipment will be based on performance data. UI Plan, pp. 26-27.

An example of the shift to RCM is infrared inspections. Infrared inspections on three phase systems will be scheduled annually, whereas these inspections on single phase lines will be done when the performance criteria is met; in this case, when two thermal breakdown outages occur in any 36 month interval. Response to Interrogatory EL-21. UI states that reduced infrared surveillance of single phase lines is desirable since improvements in equipment design, particularly hotline connectors, has substantially reduced the occurrence of hot spot problems. Additionally, the lesser current loading of single phase lines reduces the effectiveness of thermal inspection techniques, since the imaging instruments require high load current to make hot spots visible. Response to Interrogatory EL-17.

Generally, RCM will result in the extension of maintenance intervals on equipment associated with single phase lines, whereas the maintenance on three phase system remains time-based. UI Plan, pp. 26 - 27. This appears appropriate from a cost-benefit perspective, since three phase lines serve more load and carry more current than single phase lines. The reasons for the transition to RCM appear well-founded, and the Department does not see a reason to be concerned that it will result in a negative impact on UI's overall reliability. However, as with UI's change to an eight year tree trimming interval on single phase lines, the Department is concerned that UI's emphasis on three phase lines may result in a substantial negative impact to reliability for small customers, particularly those located distant from the tap to the three phase line. The Department's concern is somewhat assuaged by the RCM provisions that require a reliability investigation if any customer incurs three outages in any 12 month period, six outages in any 36 month period, or any outage of four hours duration. Response to Interrogatory EL-44. The Department cannot be reasonably assured that reliability will be preserved for small customers without closely monitoring RCM results. Therefore, beginning October 1, 1999, and annually thereafter, UI shall submit a report to the Department on the reliability impact of its RCM program. At a minimum, the report shall include:

- A list of all circuits (or portions thereof) that experienced three outages in the prior 12 month period, six outages in the prior 36 month period, or any outage of at least four hours duration;
- A list of all reliability investigations conducted in the previous 12 months that were initiated by RCM program requirements, and the results of those investigations;
- Reliability indices for those customers affected by any circuit (or portions thereof) that was the subject of a reliability investigation per RCM program requirements;
- Composite reliability indices for all customers served by single phase lines.

Following issuance of this Decision, the Department will convene a technical meeting to discuss the reporting requirements associated with the Company's tree trimming program and RCM changes.

C. UI AND CL&P

1. REPORTS FILED UNDER 86-12-03

a. Background

In 1986, the Department opened Docket No. 86-12-03 to investigate the adequacy of UI and CL&P's transmission and distribution lines and to study a variety of related issues including service reliability. Subsequent to the original decision in this docket on March 23, 1988, the Department opened the docket four other times to address specific issues relating to this topic. Orders set forth the various Decisions include periodic reporting requirements of, primarily, company reliability statistics. The Decisions included the following orders for CL&P and UI:

- Order No. 4 of 3/23/88 Decision

The Companies were ordered to file quarterly reports of outage statistics by company region, division and area work center, which include reliability indices, worst circuits lists and the number of customers who denied CL&P permission to trim trees on their property.

- Order No. 1 of 3/23/88 Decision (which was later revised 4/13/89)

The Companies were ordered to file annual TDRP Reports which include, but are not limited to, numerous one-year and five-year reliability statistics and outage reports for a number of different parameters (such as “cause” and “construction type”) and geographical areas within the companies’ service territories; worst circuits lists; reliability corrective action plans; and tree trimming reports.

- Order No. 1 of 6/7/90 Decision

The Companies were ordered to file quarterly reports of power surges, low power incidents and other voltage irregularities, plus a list of all customer complaints and claims filed as a result of any of these power irregularities.

In addition, in its Decision dated June 7, 1990, the Department found that CL&P completed only 70% of the scheduled inspection and maintenance activities called for in its Line Maintenance Plan in 1989. Decision dated June 7, 1990, in Docket No. 86-12-03, p. 19. In that Decision the Department ordered CL&P to report on a quarterly basis its progress of completing the planned maintenance and inspections included in its Line Maintenance Plan.

b. Changes to Reporting Requirements

The Quarterly Reliability Report contains outage statistics based on a rolling 12 months of data, including worst circuit lists, compiled at the end of every quarter. The Department does not believe that compiling this information every quarter is a productive use of the Companies’ resources. Equivalent reliability information is provided by the Companies in the annual TDRP filings, which are done on a calendar year basis. The Department has always relied on reliability statistics on a calendar year basis, never on a calendar quarter basis. Additionally, quarterly reliability statistics encompass too short a time period to represent any meaningful trends in a Company’s distribution system. The Department therefore finds that the annual reliability statistics filed in the TDRP reports is sufficient for the Department’s purposes, and rescinds the quarterly reliability reporting requirements of Docket No. 86-12-03, Decision dated March 23, 1988, Order No. 4.

The Quarterly Reliability Report also includes a report of all voltage irregularity and power surge events, including the number of claimants affected by each event. This requirement was imposed by Order No. 1 in Docket No. 86-12-03, Decision dated June 7, 1990. This order was a response to the occurrence of two relatively severe power surge events that affected a total of 90 customers. However, the vast majority of the events currently reported only involve one customer. This level of detail is of no value to the Department. However, significant voltage irregularity or power surge events that affect a larger number of customers is of interest to the Department, since an increasing trend in

these events could indicate a defect in the Company's system, particularly if they recurred in a given area. Therefore, the Department will modify its requirement, and will require the Companies to only report those events that affect ten or more customers. Additionally, the Companies shall report this information only once per year to the Department, as part of the annual TDRP report.

The Quarterly Reliability Report also includes a report of all scheduled maintenance that CL&P (only) failed to perform during that quarter. This order was issued in response to the failure of CL&P to complete substantial portions of its regularly scheduled maintenance. However, quarterly information on missed maintenance activity is of little use, particularly when other events such as major storms interfere with a company's ability to complete the maintenance. Often, CL&P will miss a substantial portion of its scheduled maintenance but will 'catch up' during a subsequent time period. The appropriate time period to examine the scheduled maintenance activities is therefore once per year. The annual CL&P TDRP Report already includes a section wherein the Company reports all scheduled maintenance activity that was not completed during the prior year. By eliminating this reporting requirement, in conjunction with the other changes outlined above, the Department has rescinded or modified all reporting requirements applicable to the Quarterly Reliability Reports, eliminating the necessity for these reports. The Companies shall continue to file the annual TDRP reports.

UI has requested that the Department rescind all reporting requirements, including the annual TDRP. Response to Interrogatory EL-41. As noted above, the Department has eliminated the Quarterly Reliability Reports for both companies, which relieves some burden from them. However, the Department finds that the TDRP reports are useful in providing the Department with an understanding of what problems the Companies are encountering on their systems, and in what areas those problems are occurring most often. Additionally, given the scope of changes UI is making in its line maintenance program, this is not an appropriate time to grant this request. UI has offered to provide the Department copies of internal reliability reports in lieu of the TDRP. In order to consider this request, the Department would need to review these reports to determine whether they fully satisfy its needs. The Department has not had time in this proceeding to review these reports; however, it intends to more comprehensively review this issue in the future.

It should be noted that the original orders that initiated the TDRP Reports, detailed in the March 23, 1988, Decision in Docket No. 86-12-03, were issued at a time when the reliability of both Companies had been declining for a relatively long time. This is no longer the case. Regardless, the Department believes some level of routine reliability reporting will always be necessary. The Department does not desire to burden the Companies with requirements that are not useful to any party. In future proceedings in Docket No. 86-12-03, the Department intends to focus on ways the TDRP Reports, and other routine reports such as the daily outage report and the monthly reliability reports, may be modified to balance the needs of the Department with the Companies' desire to reduce unnecessary regulatory burden. Also, the Department would consider whether these reports could be more conveniently filed electronically or by other means. The Department would particularly entertain a joint filing by UI and CL&P, detailing ways the TDRP reports may be modified to be more useful.

2. SELECTING CIRCUITS FOR RELIABILITY CORRECTIVE ACTION PLANS

The March 23, 1988, Decision in Docket No. 86-12-03 required the Companies to implement corrective measures, or Reliability Corrective Action Plans (RCAPs), for some of their worst performing circuits. The Decision is very specific with respect to how the Companies are to select circuits for RCAPs. Page 7 of the April 13, 1989 Decision states, "The Companies shall provide an RCAP for a total number of circuits equal to 4 percent of the Company's total circuits, split equally between top "worst circuits" from each (SAIDI and SAIFI) list." The reliability statistics used to produce the worst circuits lists are calculated using one year of outage history and do not include major storms.

For CL&P, this method for selecting circuits for RCAPs was not very effective in identifying all of its areas/circuits in need of corrective action. In 1995, CL&P adopted a new methodology, called "Composite Rankings" for ranking and identifying circuits for RCAPs. This approach uses four years of reliability history, instead of just one, and includes outages caused by major storms. With this new methodology, CL&P has increased the number of circuits it selects for RCAPs from the ordered "4% of the total number of circuits," (which equates to approximately 46 circuits for CL&P) to 100. Response to Interrogatory EL-41.

CL&P's need to include major storms in the process of selecting circuits for RCAPs became apparent in the Simsbury Docket. Prior to the occurrence of the four major storms in the winter of 1996/1997, Simsbury and Bloomfield had, for the most part, acceptable electric service reliability. Reliability statistics and circuit rankings from 1992-1996 did not indicate any need for corrective action. Decision of Docket No. 97-04-21, pp. 6 and 7. However, both of these towns were severely affected by the four major storms. The Department found that although reliability for the principal circuits serving Bloomfield and Simsbury was acceptable prior to the storms, electric service was inadequate in connection with these storms, and improvements to the electrical distribution system were needed to withstand storm-related outages better. Id., p. 1.

UI agrees with CL&P's inclusion of major storms in the selection of circuits for RCAPs. UI believes that "some levels of storms need to be included in the analysis." Tr. 4/20/98, pp. 139-140. The Department believes that CL&P has demonstrated that its "Composite Ranking" method for ranking circuits and selecting circuits for RCAPs is effective in addressing reliability problems, since it incorporates the effects of major storms and adopts a longer-term methodology, thereby addressing the performance of circuits under all weather conditions and smoothing the effects of yearly variations. The Department hereby approves this method for both CL&P and UI as an optional alternative to the SAIDI/SAIFI method specified in the Decision. The Companies, therefore, shall not be required to comply with the specific orders of Docket No. 86-12-03 concerning the process for selecting circuits for RCAPs. For this particular process, improvements have been, and should continue to be made as the Companies gain further knowledge and experience in refining the methodology. Therefore, the Department believes that the Companies should have the opportunity to change their methodologies for selecting circuits for RCAPs at any time, subject to specific Department approval. In the event that a Company wants to employ a methodology other than the SAIDI/SAIFI method specified in Order No. 1 in the April 13, 1989 Decision Docket No. 86-12-03, or the Composite Ranking method presently used by CL&P, the Company shall submit a written request to the Department. Such request must thoroughly describe the proposed methodology and specify how it will aid the company in efficiently and effectively identifying circuits in need of improvements and, ultimately, in improving electric service reliability. The Department will issue a written response to each Company proposal. The Company(ies) shall not consider any proposal acceptable until it is in receipt of a written notification of approval

from the Department. In all cases, the Department will continue to require that the Companies take corrective action on at least 4% of its total number of circuits each year. In its annual TDRP Reports, the Companies shall include information relevant to the circuits that were chosen for RCAPs. The Department shall also require the Companies to continue to file SAIDI and SAIFI worst circuits lists in its annual TDRP Report for comparison purposes, as it has done in the past.

iii. FINDINGS OF FACT

CL&P's reliability, excluding major storms, has been generally improving since 1992. When the impact of major storms is considered, reliability has been generally declining.

Equipment failures are a significant contributor to outages on CL&P's system. The majority of equipment failures involve overhead facilities.

In 1996 and 1997, CL&P completed nearly all scheduled maintenance on its system.

The number of equipment failures declined in 1996 and 1997.

CL&P is presently revising its policies for replacing failure-prone equipment.

The failure rate of CL&P's 23kV load break connectors is high (3.75%/year).

CL&P has over 5 million feet of direct buried primary cable in service that is prone to premature failure.

CL&P is currently utilizing a method for selecting circuits for Reliability Corrective Action Plans that is not in compliance with direct orders of Decisions of Docket No. 86-12-03. The method that CL&P has adapted is more effective in identifying areas in need of improvement with respect to storms.

In the years 1992 through 1995, trees were the single largest cause of outages in CL&P's system.

CL&P performs regular tree trimming on a four year cycle.

In 1995, CL&P initiated a Pilot Program in its eastern region that increased the tree trimming interval to six years.

In 1997, CL&P returned the eastern region trimming interval to four years, due to tree limb regrowth into the lines and increased tree contact outages.

CL&P has instituted a program to inspect and trim circuit backbones halfway through the trimming cycle.

CL&P has instituted a program to remove hazard tree limbs and entire trees outside of the normal trim zone. This program is called "enhanced tree trimming".

CL&P will provide a report to the Department by September 30, 1998, detailing its future plans for enhanced tree trimming.

CL&P is implementing a new plan for inspecting the condition of its wood poles.

The maintenance each pole will receive will depend on the type of pole.

CCA poles are assigned a reduced sound and bore interval due to their greater decay resistance and insect resistance.

Covered wire is superior to bare wire where distribution lines transit through wooded areas.

Covered wire comprises 35% of CL&P's distribution system, and 83% of UI's distribution system.

CL&P has no comprehensive plan for increasing the proportion of covered wire in its system.

UI's reliability has been generally improving since 1988, and has recently been exceptionally good.

UI previously trimmed the trees on all lines on a five year interval.

UI is changing the trimming interval on three phase lines to four years, and the interval on single phase lines to eight years.

Increasing the tree trimming interval will result in increased limb regrowth into the lines. This could increase tree contacts on those lines.

UI plans to trim single phase lines that experience two tree contacts in any 36 month period.

UI's tree trimming program and system reliability must be monitored closely as the tree trimming interval on single phase lines is extended.

UI is in the process of implementing a reliability centered maintenance program in its distribution system.

UI's change to reliability centered maintenance will result in extension of the maintenance interval on some equipment, and the maintenance interval on other equipment will be based on performance.

The Companies currently file a variety of reports on a periodic basis in accordance with Orders set forth in decisions issued under Docket No. 86-12-03. These reports include, but are not limited to, reliability statistics and progress reports on scheduled maintenance and inspections. Some of this information is no longer useful to the Department.

IV. CONCLUSION**Docket No. 97-11-10**

The Department has reviewed the Line Maintenance Plans filed by CL&P and UI pursuant to Section 16-32g of the Regulations of Connecticut State Agencies. The plans, as filed, are accepted at this time subject to orders herein.

Docket No. 86-12-03

The Department has concluded that it no longer needs the Quarterly Reliability Reports that the Companies currently file in accordance with Orders issued in the instant docket. In addition, the Department approves CL&P proposed method for selecting circuits for reliability corrective action plans.

V. ORDERS

1. Beginning December 31, 1998, and annually thereafter, CL&P shall provide a report of all "failure prone" direct buried primary cable that has been identified as "eligible for replacement" in accordance with CL&P's Procedure TD 829. Such report shall include the number of individual residential developments (or industrial parks, etc.) that are affected, and the number of feet (or miles) of cable associated with each. CL&P's schedule for its replacement, if one has been established, shall also be included.
2. Beginning December 31, 1998, and annually thereafter, CL&P shall report on the status of replacement of the Cooper/RTE 23kV load break connectors.
3. Beginning with the 1999 TDRP report, CL&P and UI shall alter the filings of the annual TDRP report that were ordered in previous Decisions of Docket No. 86-12-03, as directed herein in Section II.C.1.
4. Beginning October 1, 1999, and annually thereafter, UI shall file a report on the progress of its pilot tree trimming program as directed herein in Section II.B.2.
5. Beginning October 1, 1999, and annually thereafter, UI shall file a report on the reliability impact of its RCM program as directed herein in Section II.B.3.

DOCKET No. 97-11-10

**DPUC REVIEW OF ELECTRIC UTILITY LINE MAINTENANCE PLANS -
1998**

AND

DOCKET NO. 86-12-03

**LONG RANGE INVESTIGATION TO EXAMINE THE
ADEQUACY OF THE TRANSMISSION AND DISTRIBUTION
SYSTEMS OF THE CONNECTICUT LIGHT AND POWER
COMPANY AND THE UNITED ILLUMINATING COMPANY**

This Decision is adopted by the following Commissioners:

Glenn Arthur

Jack R. Goldberg

John W. Betkoski, III

CERTIFICATE OF SERVICE

The foregoing is a true and correct copy of the Decision issued by the Department of Public Utility Control, State of Connecticut, and was forwarded by Certified Mail to all parties of record in this proceeding on the date indicated.

Nicholas E. Neeley
Acting Executive Secretary
Department of Public Utility Control

Date

J. BUCKINGHAM