Docket No. 86-12-03

The Reliability and Performance of
The United Illuminating Company's
Transmission and Distribution System for 2008

Annual Report **2009**

FINAL REPORT
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I. Executive Summary

This is the twenty-second annual submission of the Transmission and Distribution Reliability Performance (TDRP) report filed by The United Illuminating Company (UI) to the Connecticut Department of Public Utility Control (Department) as required by the Department's Docket No. 86-12-03, Order No. 1. This report provides an assessment of the service reliability provided to UI's customers during calendar year 2008, as measured by the frequency and duration of service outages.

										2000 – 2007	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	High Value	Low Value
SAIFI	0.77	0.85	0.73	0.87	0.61	0.71	0.64	0.69	0.75	0.87	0.61
SAIDI	58	62	69	80	62	66	54	69	73	80	62
ASAI	99.989	99.988	99.987	99.985	99.888	99.988	99.99	99.987	99.986	99.99	99.888
CAIDI	76	73	95	92	101	93	85	99	98	101	76

Table 1

	2005	2006	2007	2008	4-Yr Ave
SAIFI	0.71	0.64	0.69	0.75	0.70
SAIDI	66	54	69	73	66
ASAI	99.988	99.99	99.987	99.986	99.988

Table 2

During the one-year period from January 1, 2008 to December 31, 2008, UI's achieved system interruption frequency (SAIFI) was 0.75. UI's achieved system outage duration index (SAIDI) was 73 minutes. The availability of service index (ASAI) achieved for UI was 99.986%. The achieved customer outage duration index (CAIDI) was 98 minutes. The reliability statistics shown in Table 1 above indicates that the 2008 indices fall within the high and low values from the years 2000 through 2007. Table 2 represents the most recent four years of reliability data along with the four-year average.

Per the Department's definition of "major storms," there were five "major storms" during 2008 as defined by Docket Number 86-12-03 (see Appendix 7: Excluded Storm Summary).

Reliability management is integrated with UI's strategic planning. Not only is the delivery of safe, reliable electric service part of UI's corporate mission and vision, it is part of the entire UI culture as reliability performance is integrated with compensation through UI's Management Compensation Program. Three ranges of performance levels are set: threshold, target and maximum. Managers at all levels of the organization, including the President, have a portion of their compensation tied to electric service reliability. Goals are consistent with maintaining UI's position as a regional performance leader. Progress toward achieving these goals is analyzed, reported, and reviewed on a monthly basis via key performance indicators.

UI is continuously reviewing its standards and equipment used for its infrastructure to use the most cost effective technologies to maintain UI's high level of reliability.

The Company has recognized aging infrastructure as an emerging threat to system performance. As a proactive step in managing this threat, UI continues to increase and enhance equipment inspections and analysis, and increase the scope of aging infrastructure replacement programs. The Company continues to expand inspection and analysis capabilities to provide the decision-making framework for future infrastructure investment. One such asset class which is being replaced on a programmatic basis is the Company's Paper Insulated Lead Covered Cable. The program, which entails a measured phase-out of this aging asset class, continues to deliver positive results.

II. Introduction

This is the twenty-second annual submission of the Transmission and Distribution Reliability Performance (TDRP) report filed by The United Illuminating Company (UI) to the Connecticut Department of Public Utility Control (Department) as required by the Department's Docket No. 86-12-03, Order No. 1. This report provides an assessment of the service reliability provided to UI's customers during calendar year 2008, as measured by the frequency and duration of service outages.

III. Description of UI's Geographic Service Area

The United Illuminating Company is located in the southwest area of Connecticut along Long Island Sound. UI serves approximately 321,000 customers in the seventeen towns surrounding the principal cities of New Haven and Bridgeport. The service territory is approximately 335 square miles, equal to approximately 7% of the state's total geographical area. The 2008 peak load was 1,301.4 MW, established on June 10. Appendix 23 contains a map illustrating UI's territory as it is situated in the state and the municipalities that UI serves.

To serve its customers in 2008, 26 bulk electric supply substations with a capacity of 1,917 MVA, and 21 distribution substations with a capacity of 107 MVA. UI has 3,119 pole-line miles of overhead distribution lines and 131 conduit-bank distribution miles. The majority (approximately 92%) of the distribution system load is fed at 13,800 volts with the remainder supplied at 4,160 volts or 2,400 volts. The downtown areas of New Haven and Bridgeport are supplied by underground network systems with interconnected secondary cables (208Y/120 volt) designed primarily for high density urban areas. Some of the larger downtown loads are supplied by 480Y/277 volt systems that are not interconnected and are called "spot networks."

The UI transmission system consists of approximately 101 circuit miles of overhead lines and approximately 28 circuit miles of underground lines, all operated at 345-kV or 115-kV and located within or immediately adjacent to the territory served by UI.

A summary of the conductor types used in the UI system is found in Appendix 9. This table contains mileage of conductor types categorized by voltage level. Complete definitions of each conductor type can be found in the Glossary, Appendix 22.

The Company's service area is composed of urban, suburban, and, to a lesser extent, rural areas. The urban areas are located in the downtown centers of Bridgeport and New Haven, as well as in the smaller downtown areas of Fairfield, Shelton, Derby, Ansonia, Stratford, Milford, West Haven, Hamden, and East Haven.

The remaining service area is almost entirely suburban and is in the towns of North Branford, North Haven, Orange, Trumbull, and Woodbridge. Most of UI's commercial customers occupy land adjoining the major intercity highways, such as US #1 from Fairfield to East Haven, Route #8 from Bridgeport to Ansonia, US #5 from New Haven to North Haven and Route #10 from New Haven to Hamden. Most of the large industrial customers are situated along the MetroNorth right-of-way on the shoreline, and into the Housatonic and Quinnipiac River Valleys.

Almost all of the non-commercial areas are suburban residential tracts. Except for scattered farms in North Haven, North Branford, and Orange, and state and local park lands, the only true rural area left in the service territory is in Easton. Much of the rural, suburban, and residential areas just outside the urban centers are heavily treed.

Service reliability is of utmost importance for all our customers. Industrial and commercial customers need high reliability for their processes and operations. Service reliability, without

question, is of vital importance to the viability of our customers, the Company, and the local economy. In particular, the very existence of our commercial and industrial customers, which comprise approximately 60% of our sales base, depends on UI's ability to provide reliable service.

UI's MWh sales mix for the period 2006 - 2008 is as follows:

Customer Class	2006 (%)	2007 (%)	2008 (%)	2009 Forecast (%)
Residential	39.86	39.65	39.67	39.35
Industrial	14.20	13.27	12.05	11.76
Commercial	45.21	46.35	47.55	48.15
Street Lighting	0.73	0.73	0.73	0.74
Total	100.00	100.00	100.00	100.00

IV. Reliability Performance in 2008

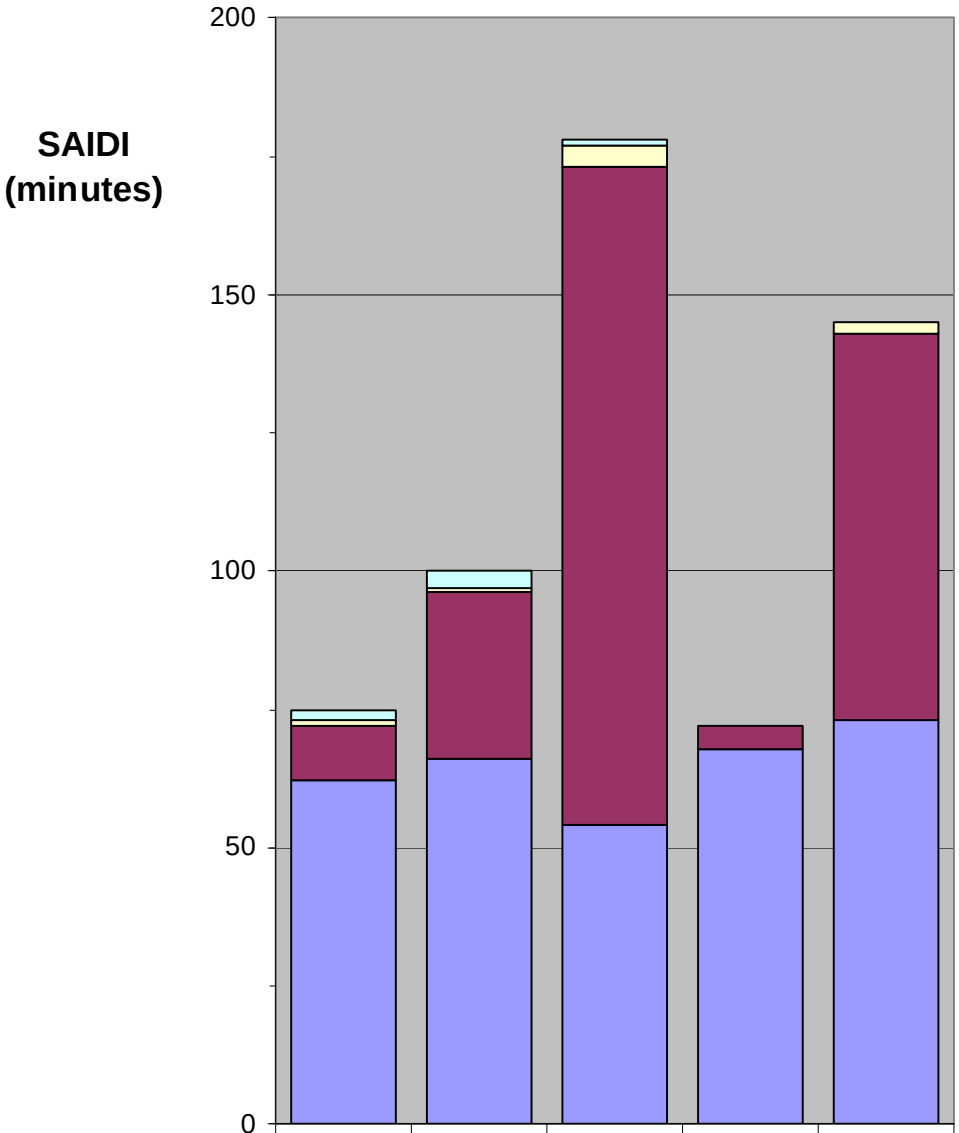
During the one-year period from January 1, 2008 to December 31, 2008, UI's achieved system interruption frequency (SAIFI) was 0.75. UI's achieved system outage duration index (SAIDI) was 73 minutes. The availability of service index (ASAI) achieved for UI was 99.986%. The achieved customer outage duration index (CAIDI) was 98 minutes. These 2008 indices fall within acceptable ranges when compared with high and low values of each statistic from the years 2000 through 2007. UI's average reliability over the past several years continues to be first quartile when benchmarked against regional investor-owned utilities.

As can be seen in Appendix 26: Reliability Performance Against Goals, UI continues to provide its customers with highly reliable electric service. All indices indicate that UI's customers are generally receiving adequate service, which meets or exceeds the levels set by the Company's Reliability Criteria.

Per the Department's definition of "major storms," there were five "major storms" during 2008 as defined by this Docket (see Appendix 7: Excluded Storm Summary).

Charts IV-1.1: System Average Interruption Duration Index (2004-2008) and IV-1.2: System Average Interruption Frequency Index (2004-2008) are shown on the next two pages. These charts illustrate present calendar year and previous years' SAIDI and SAIFI indices categorized by outage type. Coupled with Appendix 26: Reliability Performance Against Goals, current reliability performance can be "benchmarked" against past performance.

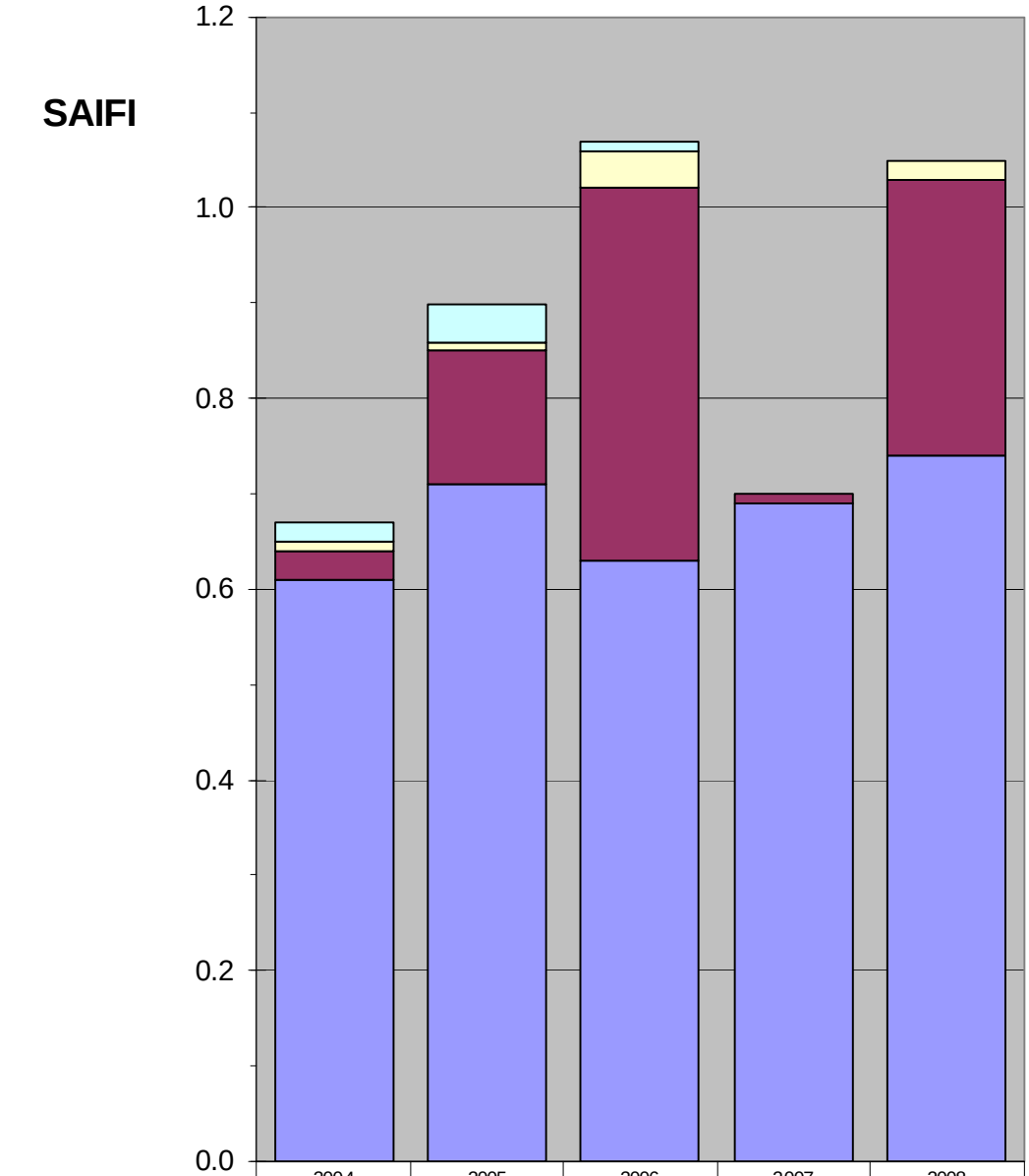
System Average Interruption Duration Index
2004 - 2008



	2004	2005	2006	2007	2008
Transmission/Power Supply	0	0	0	0	0
Customer Caused	2	3	1	0	0
Scheduled or Prearranged	1	1	4	0	2
Major Storm	10	30	119	4	70
Distribution System	62	66	54	68	73

Chart IV-1.1 – System Average Duration Index (2004 – 2008)

System Average Interruption Frequency Index
2004 - 2008



	2004	2005	2006	2007	2008
Transmission/Power Supply	0.00	0.00	0.00	0.00	0.00
Customer Caused	0.02	0.04	0.01	0.00	0.00
Scheduled or Prearranged	0.01	0.01	0.04	0.00	0.02
Major Storm	0.03	0.14	0.39	0.01	0.29
Distribution System	0.61	0.71	0.63	0.69	0.74

Chart IV-1.2 – System Average Frequency Index (2004 – 2008)

V. Causes of Outages

The causes of service interruptions have been classified into five categories in accordance with Docket 86-12-03, Order 1.b. These categories are as follows:

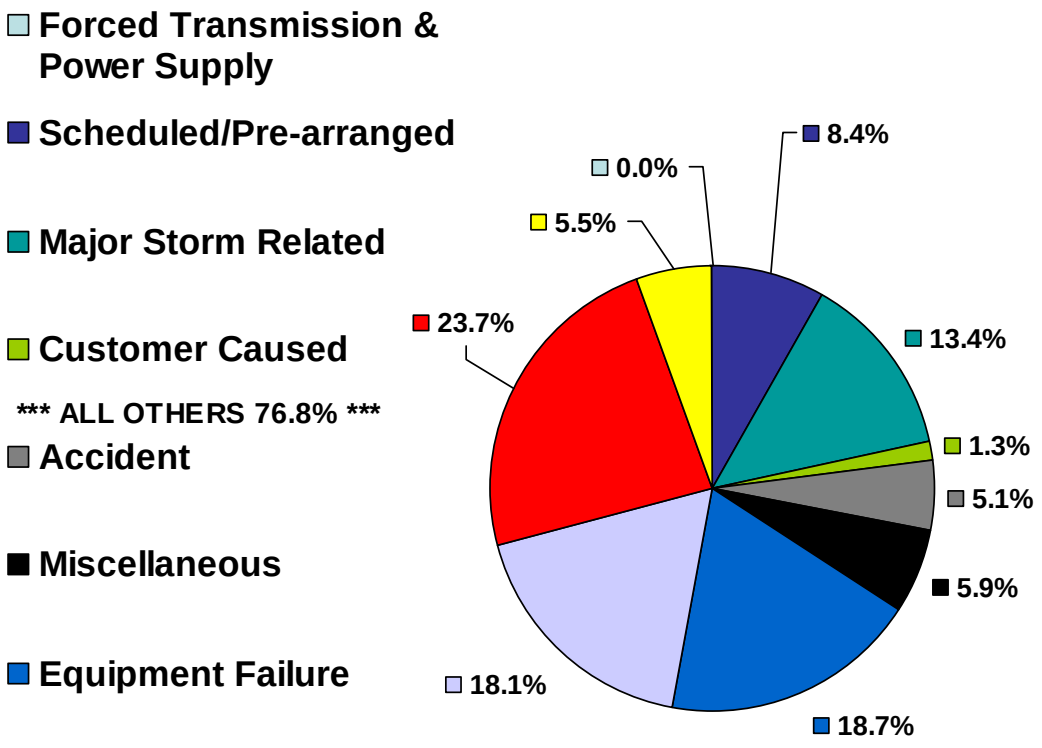
1. Forced Transmission & Power Supply Related Outages
2. Scheduled or Prearranged Outages for Maintenance & Construction
3. Major Storm Related Outages
4. Customer Caused Outages
5. Distribution System

The components of the "Distribution System" category are as follows:

- Animal/Bird Contact
- Lightning
- Tree Contact
- Accident
  a. Vehicle
  b. Foreign Objects
  c. Employee Error
- Equipment Failure
  a. Overhead System
  b. Underground Cable
  c. Direct-Buried Cable
  d. Transformer
  e. Substation
  f. Transmission
  g. Other Equipment
- Miscellaneous
  a. Overload
  b. Other
  c. Unknown

Percentage of outages caused by each category can be seen on Charts V-1.1 and 1.2, V-2.1 and 2.2, and V-3.1 and 3.2. As is evident from these charts, the category "All Others," which corresponds to "Distribution System," contains the majority of customer interruptions and lost meters. Lost meter-time can be greatly affected by major storms, but barring a major storm, lost meter-time is affected to the greatest degree by the "Distribution System" category.

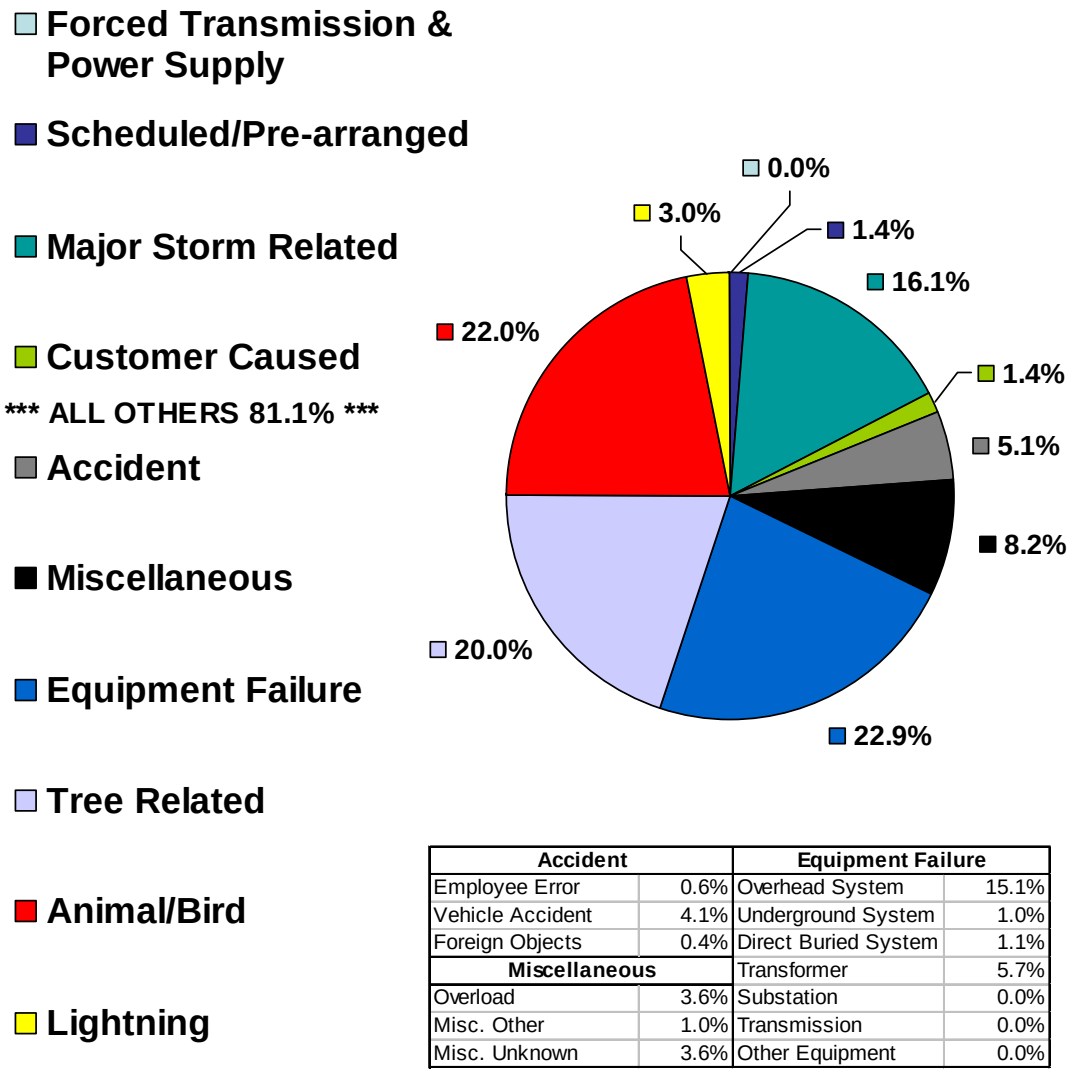
Cause Of Outages
2008
By Interruptions



Accident		Equipment Failure	
Employee Error	0.6%	Overhead System	12.8%
Vehicle Accident	4.2%	Underground System	1.0%
Foreign Objects	0.3%	Direct Buried System	1.1%
Miscellaneous		Transformer	3.8%
Overload	1.1%	Substation	0.0%
Misc. Other	1.3%	Transmission	0.0%
Misc. Unknown	3.5%	Other Equipment	0.0%

Chart V-1.1 – Causes of Outages by Interruptions (2008)

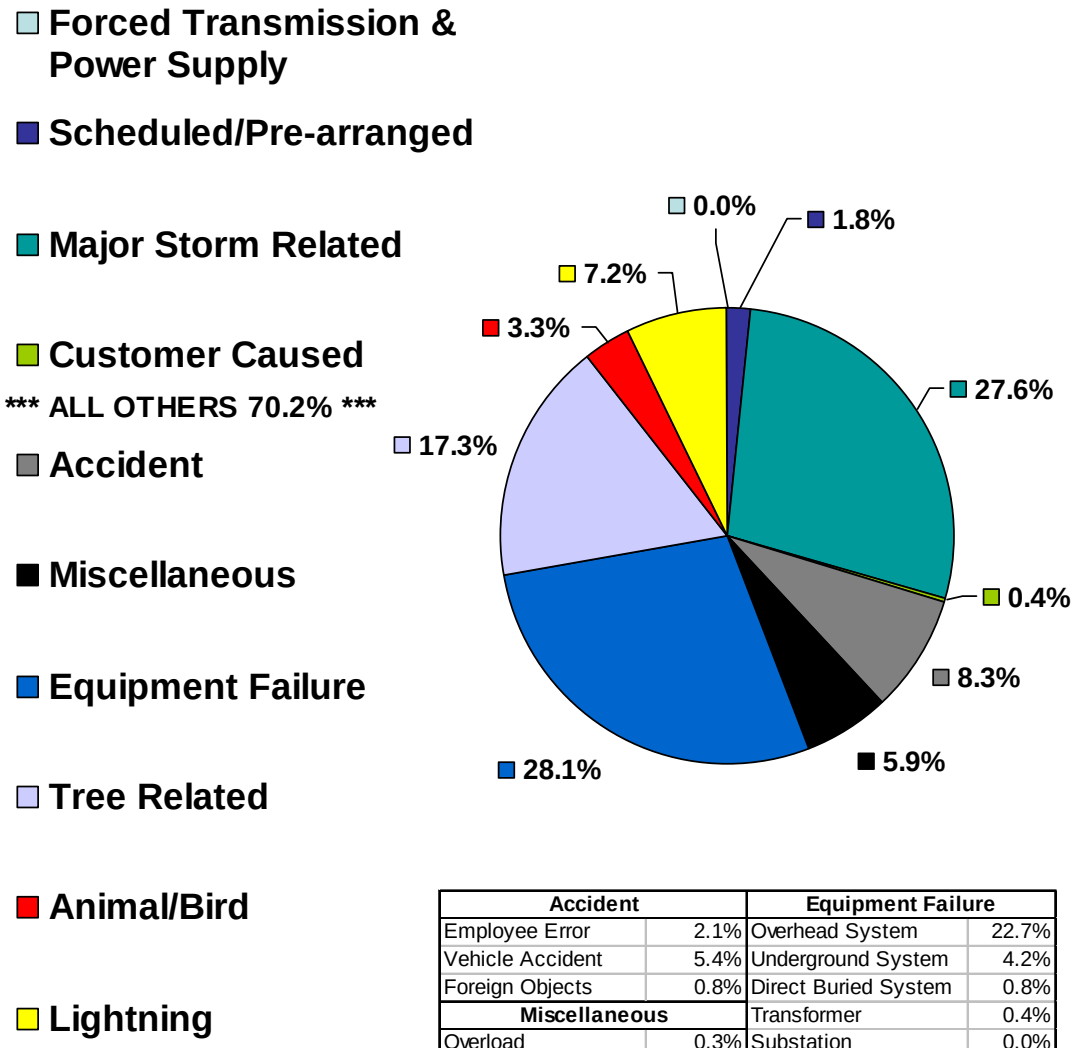
Cause Of Outages
2004 – 2007
By Interruptions



Accident		Equipment Failure	
Employee Error	0.6%	Overhead System	15.1%
Vehicle Accident	4.1%	Underground System	1.0%
Foreign Objects	0.4%	Direct Buried System	1.1%
Miscellaneous		Transformer	5.7%
Overload	3.6%	Substation	0.0%
Misc. Other	1.0%	Transmission	0.0%
Misc. Unknown	3.6%	Other Equipment	0.0%

Chart V-1.2 – Causes of Outages by Interruptions (2004 - 2007)

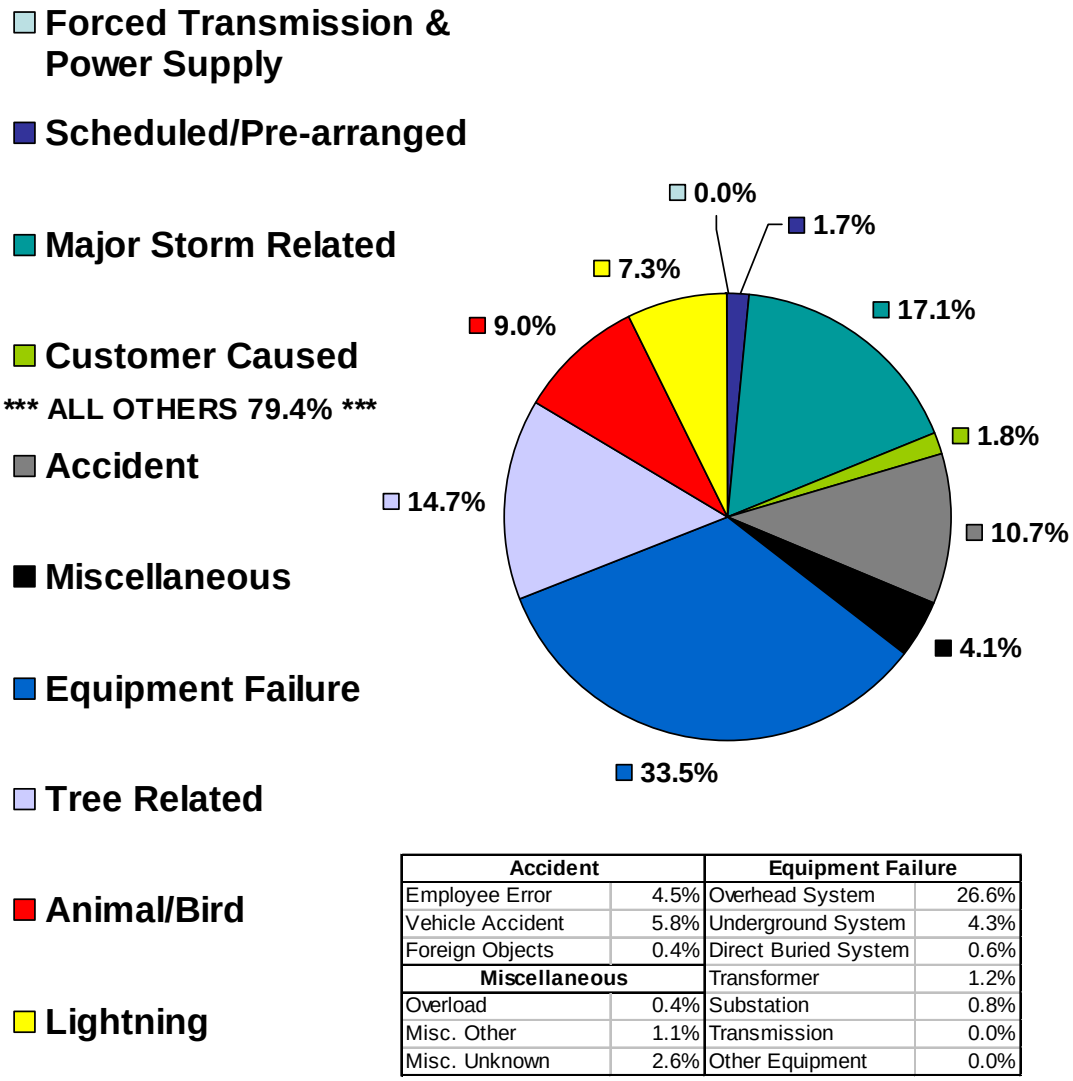
Cause Of Outages
2008
By Meter Outages



Accident		Equipment Failure	
Employee Error	2.1%	Overhead System	22.7%
Vehicle Accident	5.4%	Underground System	4.2%
Foreign Objects	0.8%	Direct Buried System	0.8%
Miscellaneous		Transformer	0.4%
Overload	0.3%	Substation	0.0%
Misc. Other	4.0%	Transmission	0.0%
Misc. Unknown	1.6%	Other Equipment	0.0%

Chart V-2.1 – Causes of Outages by Meter Outages (2008)

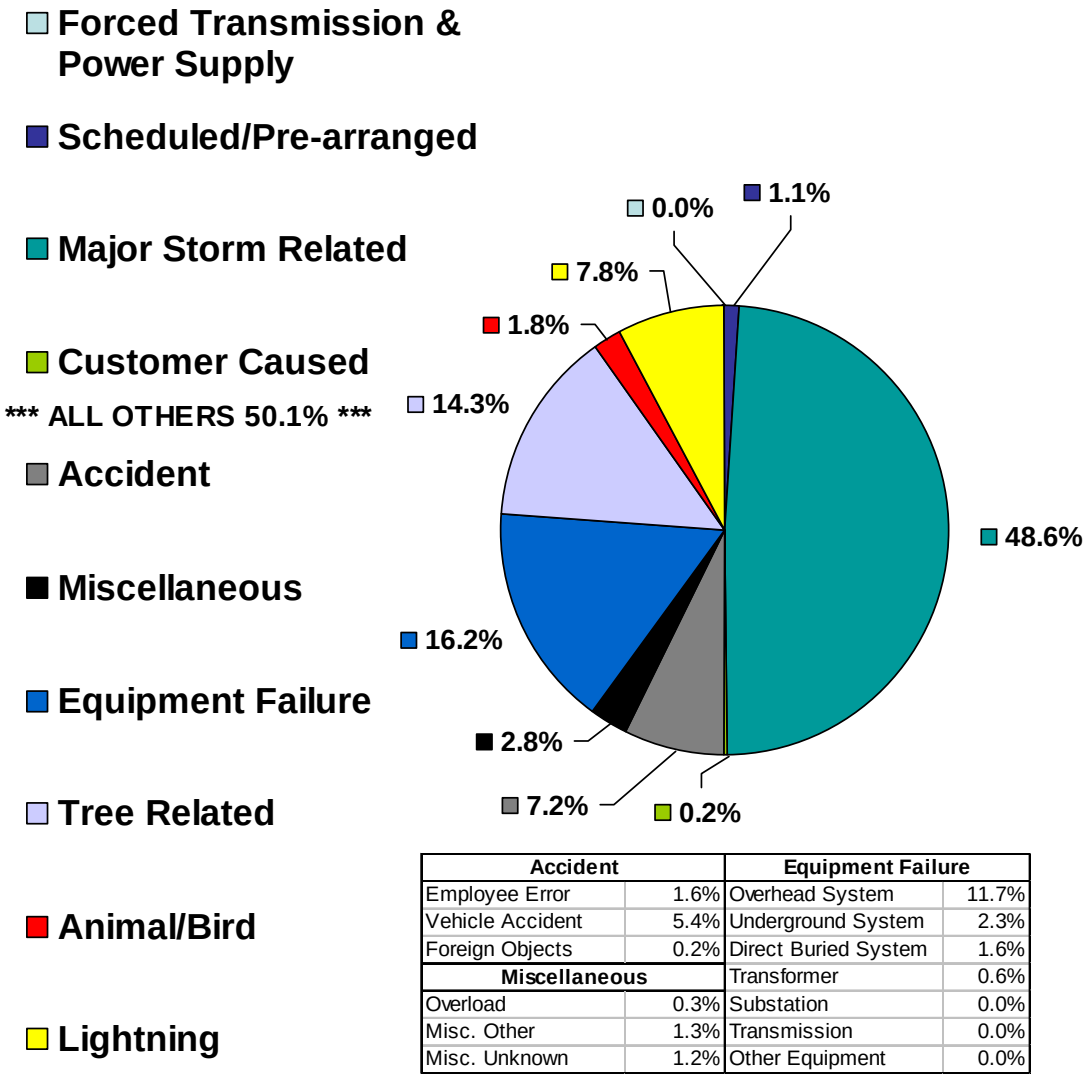
Cause Of Outages
2004 – 2007
By Meter Outages



Accident		Equipment Failure	
Employee Error	4.5%	Overhead System	26.6%
Vehicle Accident	5.8%	Underground System	4.3%
Foreign Objects	0.4%	Direct Buried System	0.6%
Miscellaneous		Transformer	1.2%
Overload	0.4%	Substation	0.8%
Misc. Other	1.1%	Transmission	0.0%
Misc. Unknown	2.6%	Other Equipment	0.0%

Chart V-2.2 – Causes of Outages by Meter Outages (2004 - 2007)

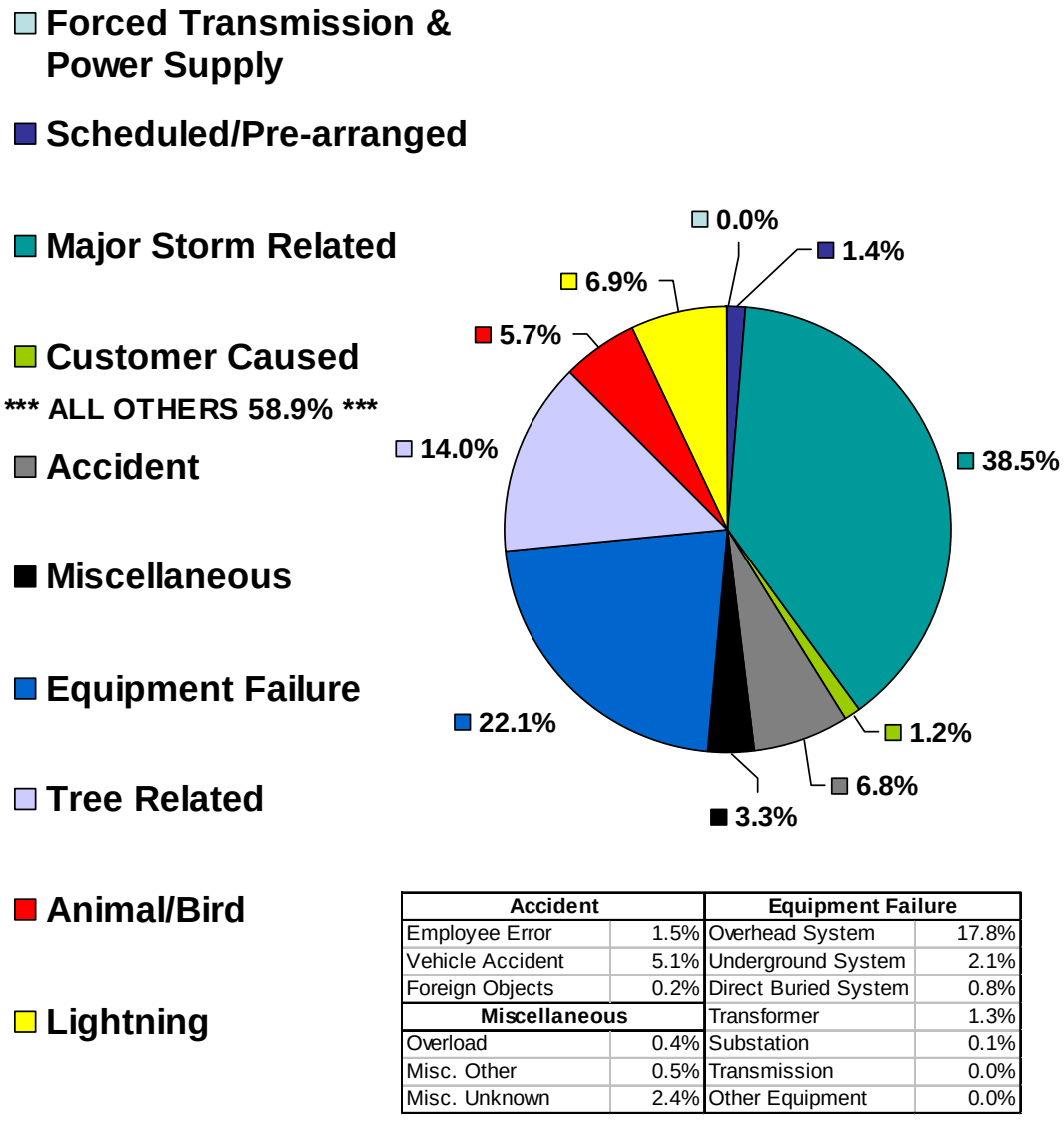
Cause Of Outages
2008
By Meter Time Lost



Accident		Equipment Failure	
Employee Error	1.6%	Overhead System	11.7%
Vehicle Accident	5.4%	Underground System	2.3%
Foreign Objects	0.2%	Direct Buried System	1.6%
Miscellaneous		Transformer	0.6%
Overload	0.3%	Substation	0.0%
Misc. Other	1.3%	Transmission	0.0%
Misc. Unknown	1.2%	Other Equipment	0.0%

Chart V-3.1 – Causes of Outages by Meter Time Lost (2008)

Cause Of Outages
2004 – 2007
By Meter Time Lost



Accident		Equipment Failure	
Employee Error	1.5%	Overhead System	17.8%
Vehicle Accident	5.1%	Underground System	2.1%
Foreign Objects	0.2%	Direct Buried System	0.8%
Miscellaneous		Transformer	1.3%
Overload	0.4%	Substation	0.1%
Misc. Other	0.5%	Transmission	0.0%
Misc. Unknown	2.4%	Other Equipment	0.0%

Chart V-3.2 – Causes of Outages by Meter Time Lost (2004 - 2007)

The outage category in which the Company can exercise significant influence is the "Distribution System" category. Although the actual number of interruptions, meter outages, and lost meter-time vary from year to year, UI believes that through continued efforts, outages in this category can be controlled, with a balanced concern for economics.

In 2008, tree contact incidents (17.3%) as in previous years (14.7%), continue as a significant cause of customer outages. As part of the Vegetation Management Program, UI continues to include a hazard tree removal program and a vine clearing program. The hazard tree removal program is designed to remove trees identified as dead, dying, diseased or structurally defective and that are outside the normal trim area, but are a potential hazard to UI facilities. The hazard tree program addresses locations that are not within the current year's line clearance maintenance trim cycle. The vine clearing program includes ground cutting all encroaching vines at pole and down guy locations and clearing the growth from UI facilities on circuits that are not in the current year's line clearance maintenance program.

Also in 2008, the number of wildlife contact incidents (3.3%) as in previous years (9%), continue as a significant cause of customer outages. UI recognizes this problem and continues to replace existing wildlife (bird/squirrel) guards on existing equipment, such as distribution transformers, with more effective wildlife guards. UI also coats the tops of critical overhead equipment, such as regulators and reclosers, with an insulating coating designed to minimize the potential for phase-to-ground squirrel or bird contacts.

Equipment failure (16.2%), as in previous years (22.1%), continues to be a significant contributor to customer minutes interrupted in 2008. The United Illuminating Company recognizes this situation, and is cautious in its selection of new equipment, so that it selects durable equipment and material to construct and maintain its overhead and underground distribution system. UI has taken steps to analyze assets throughout their life cycle. One such analysis is the periodic in-service inspection of equipment to determine where the assets reside on their life cycle curves. This aids in making prudent asset replacement and/or rehabilitation decisions before customer reliability is impacted. Also, UI analyzes certain equipment failures to determine what type of equipment has a significant failure rate and is negatively impacting customer reliability.

Referring to Appendix 1: Five-Year Outage by Cause Summary (excluding major storms), a comparison of 2008 data with previous years' data (2004 – 2007) reveals the following:

- Distribution system outages continue to account for the majority of customer interruptions and customer minutes of interruption (Appendix 1: Five-Year Outage by Cause Summary).

- Tree-related incidents, wildlife contacts, and failure of overhead equipment continue to dominate other categories of outage events (Appendix 1: Five-Year Outage by Cause Summary).

VI. Reliability Programs

Reliability programs are deterministic / reactive or probabilistic / proactive in nature, or a combination of both. Deterministic, or reactive, programs are designed to address circuit reliability or customer reliability outlier performance. Probabilistic, or proactive, programs are designed to prevent circuit or customer reliability performance from becoming an outlier. UI reliability programs consist of five principal elements as follows:

1. Design of Reliability into Systems
   UI's policy is to design all distribution systems to meet the Company's Reliability Criteria (DEG 80). Each project is analyzed to determine what features (for example, tree-wire, buried cable, line reclosers, sectionalizing switches, lightning arresters, additional fusing, wildlife protection, etc.) are necessary to produce the desired level of reliability. Repair time and circuit backup requirements are analyzed such that rapid service restoration is possible through switching and sectionalizing to minimize the extent of the actual outage. Construction design standards provide additional details of how reliability is incorporated as a part of every project. This principal element is probabilistic in nature.

2. Maintenance Procedures
   UI's personnel follow specific procedures designed to reduce certain types of service outages. Among these procedures are the following:

   - Tree trimming
     A continual inspection cycle is practiced in our line clearance program, trimming trees on a time and performance basis to minimize the potential for tree-related outages.
   - Infrared Survey
     An annual infrared inspection of overhead circuit mainlines and substations to detect potential failures.
   - Equipment inspections
     A periodic inspection of overhead and underground facilities.

   These maintenance procedures are based on mainly probabilistic performance.

3. Enhancing Existing Systems
   UI enhances the existing distribution system as follows:

   - Line reclosers
     One strategy the Company has employed to maintain our reliability performance in the face of the aging infrastructure challenge is the distribution recloser program. This program has the following reliability benefits:

     - Improved sectionalizing - reducing the number of customers impacted by an outage.
     - Outage mitigation - reducing the risk of temporary events from becoming permanent outages.

- Cable replacements
  UI continues to replace aerial and underground Paper Insulated Lead Cable with EPR cable on a scheduled, programmatic basis. Paper Insulated Lead Cable replacement criteria are based primarily on the history of cable failures on the individual circuits.
- URD project rebuilds/rehabilitations
  Cable replacement and/or refurbishment, coupled with transformer replacements, in older underground residential projects where UI's equipment may be approaching the end of its useful life.
- Animal/wildlife guards
  Existing transformer and overhead equipment animal guards are replaced with new, more effective guards in areas subject to excessive interruptions.
- Insulating coatings
  Further wildlife protection is gained on critical overhead equipment such as reclosers and regulators, by applying an insulating coating to the cover of the equipment.

Enhancements to the existing distribution system are based on both deterministic and probabilistic performance.

4. Circuit Performance Correction
   UI employs an incident-based outage reporting system to help determine the need for corrective action on circuits whose reliability has fallen outside of UI's Reliability Criteria. The Company has found this system to be highly responsive in that it minimizes the cycle time between outage, determination of a reliability problem, and corrective action. The trigger for circuit performance correction is deterministic; however, the corrective action typically involves construction and/or maintenance which will help minimize the probability of a future interruption.

5. Failaure Analysis and Condition Assessment
   UI continues to use forensic analysis and condition assessment. Certain events and/or equipment are analyzed after a failure. UI also performs analysis of equipment during the pre-procurement process. The analysis encompasses evaluating the equipment's design and construction. Also, equipment that has been in service for a period of time is analyzed. The in-service analysis examines the remaining useful life of the asset. Additional emphasis will be placed on asset condition assessment to understand where on the useful life curve our assets lie. This will aid in making prudent asset replacement / rehabilitation decisions before customer reliability is negatively impacted.

VII. Reliability Improvement Programs Budget

Reliability is an inherent element in all of UI's construction projects. System designs are based on the Design Criteria which include elements addressing service reliability. In addition to this basic approach to system construction, there are major construction projects which have been identified to deal with specific reliability issues. Due to current unfavorable economic and financing conditions, the Company has reduced its 2009 capital spending plan. The following describes the major reliability projects originally proposed for 2009. These projects are not all currently funded and are designated as such with an asterisk (*). Capital projects will be re-instated on a priority basis when economic and/or financing conditions improve.

1. Bulk Substation Replacement

UI currently operates 26 bulk substations to deliver electricity to its customers. These substations transform power from the 115 kV transmission system down to the 13.8 kV level to be distributed on utility poles. The performance of a single substation can impact 10,000 to 15,000 customers. Many of the substations are nearing the end of their useful life.

In 2008, 80 percent of UI's substations will be thirty years or older. This concentration of assets in the fourth quartile of their useful life represents a significant risk to the Company and its customers. It takes four years to bring a substation project from planning to design, siting approval and construction and requires many engineering, project management, and construction person-hours to complete. As a result, the Company's ability to site and build substations is finite.

The Company plans to begin a proactive replacement program to address this situation. Waiting until there are imminent failures at substations will place the Company in a reactive position that will adversely impact reliability performance and in the long run will be more costly to customers.

The 2009 budget for Bulk Substation Replacement is $140,636*.

2. Distribution Substation Removal

Distribution substations originated at the dawn of the utility industry in the early 1900's. These substations transform the voltage down from 13.8 kV to the 4 kV or 2.4 kV voltages that were predominantly the distribution voltages during the 1920s, 1930s and 1940s.

Due to equipment condition, obsolescence and maintenance issues, the Company has been pursuing the replacement of distribution substations for many years. Originally, the Company had over 100 of these substations in service; today there are 21.

In 2005, the Company completed a detailed assessment of the condition of distribution substations and validated that replacement of these substations was warranted. The Company's plan includes the resources necessary to convert and remove the distribution substations by 2016.

The 2009 budget for Distribution Substation Removal is $967,402*.

3. Distribution Networks

A vast majority of UI's distribution network infrastructure was installed in the 1950s, 1960s and early 1970s and is now well into the 4th quartile of its useful life.

In 2006, the Company improved its inspection process for distribution networks to include techniques for assessing and recording the condition of the infrastructure and prioritizing replacement and maintenance activities.

During 2007, the Company executed a detailed inspection of all network vaults and found 36 of 143 network transformers required replacement over the next ten years. The inspection also provided the basis for the replacement of 15 of 82 network vaults over the next ten years. The Company began the replacement activity in 2007.

The 2009 budget for Distribution Networks is $836,495.

4. Distribution Transformers

The Company owns and maintains nearly 54,000 distribution transformers on the electric system. In 2006, the Company experienced a heat storm that resulted in 169 transformer overload events. The widespread nature of the outages resulted in an unacceptable total restoration time of nearly three days.

In 1976, the manufacturing of polychlorinated biphenlys (PCBs) was banned. In 1982, the Company put in place a specification for electrical insulating oil which required the transformer manufacturer to supply transformers with zero parts per million PCB content. At the time, the Company did not engage in a program of replacing all transformers prior to 1982. Therefore, pre-1982 transformers, with unknown PCB content, still exist on the system.

During 2007, the Company developed a request for proposal to support an engineering survey of all distribution transformers on the system. The survey will allow the Company to determine the load connected to transformers, the overload conditions, if they exist, and the marginal capacity remaining to support growth. The survey will also determine the PCB label color of each transformer as well as the general condition of the unit. Transformers with insufficient marginal capacity, unknown PCB content, or transformers in poor condition will be replaced. The Company estimates replacing 10,000 transformers over the next ten years.

The Company began the pilot phase of the survey in 2008. Completion of the survey was expected to occur by the end of 2009, however, the project is not fully funded in 2009.

The 2009 budget for Transformer Replacement in 2009 is $865,728*.

5. Splicing Chambers

The Company owns and maintains approximately 2,750 underground splicing chambers, the vast majority of which are located in public roads. 1,400 of the splicing chambers are greater than 60 years old including many constructed with roofs supported by steel railroad rails that are susceptible to corrosion. Additionally, prior to the 1950s, these structures were typically constructed with dimensions that do not meet current working clearance requirements.

During 2006, the Company improved the inspection process for splicing chambers by incorporating a methodology to assess the condition of the chambers and to prioritize action items. The key replacement criterion for spicing chambers is the structural integrity of the roof and walls and the working clearances.

Since 2006, the Company has inspected nearly 1,600 splicing chambers and plans to inspect another 987 in 2009. From these inspections, the Company has identified nearly 600 splicing chambers that require remediation. The plan includes resources to rebuild 500 splicing chambers and 1,000 roofs over the next ten years.

The 2009 budget for Splicing Chambers is $3,981,572*.

6. Paper-Insulated Lead Cable

In 2001, the Company recognized an increasing trend in the number of cable faults associated with paper-insulated lead cable (PILC) and conducted a study to assess the impact of these failures on future reliability performance.

In 2002, the Company instituted a cable replacement program to replace the PILC aerial cable on the system over a fifteen year period and the underground PILC cable over a 33 year period. This program has reduced the number of cable faults and continues to deliver positive results.

The 2009 budget for PILC Cable Replacement is $1,581,782*.

7. Utility Poles

UI is the custodian of roughly 83,000 poles in the service territory.

In 2005, the Company improved its pole inspection process and, in 2006, began a six-year inspection cycle of all 83,000 poles. The 2009 plan calls for the replacement of approximately 225 poles. This number of pole replacements is expected to increase over time as the pole population grows and ages.

The 2009 budget for Utility Pole Replacement is $1,409,014*.

8. Highest SAIDI/SAIFI Circuit Improvements

Appendix 14 describes the proposed reliability corrective action plans UI designed to improve the reliability of the four percent of the circuits with the highest four-year average SAIDI and SAIFI as determined by 2005 - 2008 interruption data. These corrective action plans are not all currently funded, but are estimated to cost $349,000.

The reliability corrective action plans presented in Appendix 14 of the previous year's TDRP report have all been completed except for the plans for one circuit which is 90% complete. Status of the previous years corrective action plans can be found in Appendix 18.

9. Tree Trimming

UI performs tree trimming on a circuit-based, four-year (three phase portions) and eight-year (single phase portions) cycle. In addition, line clearance on the single phase portions is performed on a performance basis. This means approximately 25% of the three phase portions will be trimmed each year and approximately 12.5% of the single phase portions will be trimmed each year. Additions to the Vegetation Management Program starting in year 2005 and continuing to present, include a hazard tree removal program, a vine clearing program, and modifications to the clearance specification.

UI's actual expenditures in 2008 for related contractor line clearance program trimming totaled $3,229,003.

The budget for program tree trimming for 2009 is as follows:

Year	Company Distribution	Transmission ROW's
2009**	$3,099,032	$400,464

**2009 dollars reflect Rate Case decision funding which includes an approximately 10% reduction.

10. Infrared Survey

The infrared inspection is included in the Reliability Centered Maintenance (RCM) Program. UI's trained personnel inspect three phase main lines and three phase fused side taps annually. Single phase fused side taps off main lines are done on a performance basis. Bulk substations are inspected semi-annually and distribution substations annually.

The budget for the infrared inspection survey excluding material is as follows:

Year	Amount
2009	$66,000

VIII. Summary

UI continues to regard reliability as a culture; beyond the projects noted in this report, we focus on ways to prevent outages, minimize the size of an outage and reduce service restoration time if an outage does occur. System operation, equipment selections, and modifications to installation practices where improvements in reliability can be achieved, are standard operational procedures, not special projects.

UI is committed to provide highly reliable electric service and maintain its regional operational excellence status. The historic performance is proof of the Company's commitment.

Appendix 1: Five-Year Outage by Cause Summary

The United Illuminating Company
Five Year Outage by Cause Summary

Docket No: 86-12-03
DPUC Order
Appendix 1

2004 to 2008

	2008 Totals		2007 Totals		2006 Totals		2005 Totals		2004 Totals	
Causes	**Number of Interrupts**	**Number of Customers Interrupted**	**Number of Interrupts**	**Number of Customers Interrupted**	**Number of Interrupts**	**Number of Customers Interrupted**	**Number of Interrupts**	**Number of Customers Interrupted**	**Number of Interrupts**	**Number of Customers Interrupted**
Planned	166	6,222	18	497	34	11,756	17	3,355	16	2,825
Animal/Bird	467	11,243	458	28,924	453	26,830	216	19,259	213	20,607
Customer Caused	26	1,386	19	260	13	2,224	35	11,223	18	5,536
Employee Error	11	7,079	8	28,271	12	4,169	5	6,298	9	8,890
Foreign Object	5	2,563	7	81	4	1,538	4	1,019	7	2,039
Lightning	108	24,413	53	20,885	42	8,801	43	32,413	43	15,397
Other	26	13,463	18	1,438	13	1,252	21	7,079	11	1,496
Overload	22	1,172	28	695	44	678	117	2,173	32	608
Power Supply	0	0	0	0	0	0	0	0	0	0
Tree Related	356	58,471	276	43,476	342	41,580	349	45,680	251	24,337
Vehicle Accident	82	18,192	61	18,751	58	17,205	62	11,251	66	14,307
EQP Fail OH Sys	252	76,421	208	51,673	241	67,992	237	78,981	236	82,365
EQP Fail DB Sys	21	2,687	15	2,518	19	1,327	19	408	12	2,342
EQP Fail XFMR	74	1,506	74	1,926	76	2,421	93	2,323	102	5,771
EQP Fail UG Sys	19	14,129	13	12,781	11	9,488	17	10,939	22	12,322
EQP Fail SUB	0	0	0	0	2	8,911	0	0	0	0
EQP Fail TRANS	0	0	0	0	0	0	0	0	0	0
Unknown	69	5,277	71	9,497	72	7,592	44	7,674	35	2,402
Major Storm	264	92,871	34	3,468	691	123,531	210	43,988	46	9,558
System Totals	1,968	337,095	1,361	225,141	2,127	337,295	1,489	284,063	1,119	210,802
Average Number of Customers Served	320,770		319,649		318,187		316,993		314,537	

The United Illuminating Company
Five Year Outage by Cause Summary

Docket No: 86-12-03
DPUC Order
Appendix 1

2004 to 2008

	2008 Totals		2007 Totals		2006 Totals		2005 Totals		2004 Totals	
Causes	**Number of Interrupts**	**Customer Minutes Interrupted**	**Number of Interrupts**	**Customer Minutes Interrupted**	**Number of Interrupts**	**Customer Minutes Interrupted**	**Number of Interrupts**	**Customer Minutes Interrupted**	**Number of Interrupts**	**Customer Minutes Interrupted**
Planned	166	494,164	18	76,993	34	1,116,404	17	396,947	16	337,934
Animal/Bird	467	821,762	458	2,897,327	453	1,728,437	216	1,403,268	213	1,685,686
Customer Caused	26	91,452	19	23,365	13	309,804	35	836,137	18	474,315
Employee Error	11	753,202	8	488,059	12	323,976	5	649,680	9	512,403
Foreign Object	5	112,390	7	4,298	4	92,034	4	68,293	7	137,948
Lightning	108	3,619,452	53	2,766,678	42	1,044,217	43	3,355,365	43	2,071,747
Other	26	606,275	18	77,152	13	110,957	21	320,023	11	172,525
Overload	22	125,499	28	72,857	44	88,150	117	254,786	32	65,368
Power Supply	0	0	0	0	0	0	0	0	0	0
Tree Related	356	6,649,393	276	6,132,050	342	4,043,057	349	5,888,447	251	2,756,677
Vehicle Accident	82	2,517,657	61	2,124,131	58	1,958,782	62	1,095,876	66	1,701,190
EQP Fail OH Sys	252	5,428,419	208	4,647,910	241	5,394,226	237	5,864,386	236	8,108,765
EQP Fail DB Sys	21	728,276	15	368,957	19	345,938	19	146,827	12	237,843
EQP Fail XFMR	74	276,944	74	341,144	76	300,577	93	466,581	102	672,283
EQP Fail UG Sys	19	1,061,514	13	888,318	11	563,514	17	448,083	22	970,381
EQP Fail SUB	0	0	0	0	2	190,396	0	0	0	0
EQP Fail TRANS	0	0	0	0	0	0	0	0	0	0
Unknown	69	555,443	71	1,082,839	72	854,239	44	956,243	35	299,618
Major Storm	264	22,538,506	34	1,326,960	691	38,008,286	210	9,359,902	46	3,052,623
System Totals	1,968	46,380,348	1,361	23,319,038	2,127	56,472,994	1,489	31,510,844	1,119	23,257,306
Average Number of Customers Served	320,770		319,649		318,187		316, 993		314, 537	

Appendix 7: Excluded Storm Summary

2008 Major Storms

Period Excluded	Type	Duration (Hours)	Total Meters Affected	Total Meterhours Affected
06/10/2008 to 06/11/2008	LIGHTNING	48	19,531	84,137
06/16/2008	LIGHTNING	24	13,139	38,985
08/02/2008	LIGHTNING	24	10,492	38,069
08/07/2008	LIGHTNING	24	18,977	43,327
10/25/2008	HEAVY WIND AND RAIN	24	30,732	171,123

Appendix 8: Excel File of Circuit Data

The United Illuminating Company
Reliability Threshold Violations
Excel File of Circuit Data

Docket No. 86-12-03
DPUC – Order #1 H
Appendix: 8

SUBSTATION IDENTIFICATION	VOLTAGE	CIRCUIT NUMBER	NUMBER OF CUSTOMERS	SAIDI (MIN)	SAIFI	CAIDI (MIN)
Goffe St.	4,160V	14	2	0	0	0
Jackson Ave	4,160V	41	463	0	0	0
Jackson Ave	4,160V	46	643	9.7	0	209
Jackson Ave	4,160V	49	190	0	0	0
Whitney	4,160V	79	1,362	0	0	0
Forbes Ave	4,160V	200	313	0	0	0
Forbes Ave	4,160V	201	250	0	0	0
Forbes Ave	4,160V	205	91	0	0	0
Forbes Ave	4,160V	206	1,210	435.9	3.1	140
Court St.	2,400V	217	291	0	0	0
Court St.	2,400V	218	10	0	0	0
Court St.	2,400V	221	382	0	0	0
Court St.	2,400V	225	29	0	0	0
Court St.	2,400V	226	411	0	0	0
Court St.	2,400V	229	4	0	0	0
Freeman St.	4,160V	230	192	27.5	1	26
Freeman St.	4,160V	232	625	18.2	0.1	137

Page 1 output only – Complete data on Excel diskette for 2008 TDRP – Appendix 8

Appendix 9: Transmission and Distribution System Miles per Construction Type and Voltage Level

	15kV or less	115kV	345kV & More
Construction Type	**Circuit Miles**	**Circuit Miles**	**Circuit Miles**
TREE WIRE	2283	0	0
NON-TREE WIRE	331	95	6
AERIAL CABLE	175	0	0
SELF-SUPPORTING CABLE	4	0	0
UNDERGROUND CABLE*	697	17	11
TOTALS	3490	112	17

* Secondaries and services excluded

DEFINITIONS:

TREE WIRE
All primary wire used in open wire construction that is covered with a 10/64 polyethylene coating.

NON-TREE WIRE
All primary wire used in open wire construction that either has no insulation (bare) or is covered with a material having little or no insulation value.

AERIAL CABLE
Shielded primary cable suspended from a messenger attached to poles.

SELF SUPPORTING CABLE
Unshielded, insulated primary wire triplexed around a messenger attached to poles.

***UNDERGROUND CABLE**
Includes both shielded primary cable in a splicing chamber and duct system, and direct buried cable.

Appendix 11: 100 Worst SAIDI Circuits

The United Illuminating Company
SAIDI/SAIFI 100 Worst Circuit List
Sorted by Worst Circuit

Docket No. 86-12-03
DPUC-Order #1E
Appendix 11

		Average	*2008*	*2007*	*2006*	*2005*
Rank	**Circuit**	**SAIDI**	***SAIDI***	***SAIDI***	***SAIDI***	***SAIDI***
1	1605	293	405	189	125	453
2	2689	261	435	104	152	353
3	473	259	0	556	471	7
4	1608	250	298	328	250	125
5	470	234	0	608	326	0
6	2621	231	443	220 *	10	253
7	472	230	0	554	346	20
8	2682	224	237	132	144	385
9	206	220	436	165	1	276
10	471	212	2	543	292	10
11	3638	199	94	687	3	11
12	2688	187	116	368	146	117
13	321	187	301	387	50	13
14	1755	184	453	164	106	11
15	3224	184	304	310	2	120
16	2687	175	97 *	163	230	211
17	2683	172	21	191	326 *	149
18	3636	169	660	11	4	1
19	3547	166	31	183 *	34	417
20	2639	165	76	78	264	243
21	2542	164	1	225 *	108	322
22	1704	163	128	66	222	235
23	290	157	94	383	1	151
24	2668	155	304	76	215 *	27 *
25	3542	152	317	136	147	10
26	1690	144	194	16	236	130
27	2673	140	102	151	82	226
28	1441	140	225	131	89	114
29	503	136	212	133	132	67
30	1694	135	359	15	16	152
31	2740	131	138	91 *	70	224
32	2643	124	407	0	0 *	90
33	2637	121	232	158	96	0 *
34	2662	120	21 *	205	91	165
35	320	118	392	79	0 *	0
36	1270	116	157	63	0 *	243
37	3659	116	238	181	17	27
38	2504	114	47	241 *	166	0 *
39	1545	114	9	150	11	285
40	2733	112	83	20	2	344
41	2505	112	5	2	196	244 *

		Average	*2008*	*2007*	*2006*	*2005*
Rank	**Circuit**	**SAIDI**	***SAIDI***	***SAIDI***	***SAIDI***	***SAIDI***
42	1752	111	69	98	130	147
43	1281	111	186	88	157	13
44	632	110	149	0	148	143
45	323	110	335	78	0	26
46	3631	109	135	44	7	250
47	1697	106	139	233	37	17
48	3641	105	2	22	388	8
49	1520	104	0	268	147	0
50	1708	104	241	3	96	75 *
51	550	104	2	281	53	79 *
52	1880	104	294	3	102	16 *
53	2622	103	62	312	14	26
54	322	102	318	85	0	6
55	3657	100	180	217	4	0
56	2664	100	95	20	141	143
57	414	99	0	0	395	0
58	1433	98	321	28	42	2
59	1688	98	251	0	142	0
60	2500	97	223	113	50	1
61	410	97	0	0	0 *	388
62	3635	96	375	2	2	6
63	512	96	182	12	20	171
64	626	95	25	55	219	82
65	291	95	95	129	23 *	133
66	3221	95	10	354	15	0 *
67	2626	93	3	170	114	86
68	3652	93	40	98	0 *	234 *
69	513	92	299	0	0	69
70	2685	90	23	293	24	22
71	1756	89	67	40	183	63 *
72	1440	89	175	62	12	106
73	3677	87	17	97	74	159
74	1646	87	17	199	125	7
75	2633	86	46	0	183	114
76	2644	86	55	68	119	101 *
77	2734	86	141	113	87	5
78	2667	86	48	222	9	65
79	3210	86	207	1	121	15
80	1703	85	57	123	47	112 *
81	3660	85	167	11	35	129
82	2636	85	112	0	227	0
83	3650	82	45	50	105 *	130
84	2660	82	23	6	186	112
85	1890	80	311	0	0	9
86	200	77	0	138	0	171 *
87	2684	75	117	88	46	49

		Average	*2008*	*2007*	*2006*	*2005*
Rank	**Circuit**	**SAIDI**	***SAIDI***	***SAIDI***	***SAIDI***	***SAIDI***
88	2669	74	10	12	135	140
89	1201	73	8	1	188	97
90	501	73	66	7	3	218
91	1685	71	20	42 *	24 *	196 *
92	2545	71	6	0 *	272	5
93	1283	68	134	88	51	0
94	1546	68	53	83	37	98
95	621	68	15	104	151	0
96	3220	68	3	267	0	0
97	272	68	89	1	46	135
98	1282	68	125	87	49	12
99	262	65	21	0	62	175
100	3679	65	20	213	15	11

*Denotes 20% change in circuit population

Excludes the following:

- Outages caused by Power Supply or Transmission Problems external to UI Scheduled Outages
- Outages caused by Customer equipment connected to UI lines
- Major Storms

Appendix 12: 100 Worst SAIFI Circuits

The United Illuminating Company
SAIDI/SAIFI 100 Worst Circuit List
Sorted by Worst Circuit

Docket No. 86-12-03
DPUC-Order #1E
Appendix 12

		Average	*2008*		*2007*		*2006*		*2005*	
Rank	**Circuit**	**SAIFI**	***SAIFI***		***SAIFI***		***SAIFI***		***SAIFI***	
1	2689	2.74	4.78		1.1		1.12		3.96	
2	2687	2.39	1.89	*	1.72		2.99		2.96	
3	2542	2.31	0.03		2.15	*	2.04		5.02	*
4	2621	2.29	3.29		3.05	*	1.06		1.74	*
5	1608	2.28	2.95		2.69		2.09		1.37	
6	2683	1.99	0.20		2.04		4.15	*	1.56	
7	1755	1.74	4.08		1.39		1.46		0.02	
8	1704	1.70	2.19		0.54		2.06		2.01	
9	2662	1.67	1.09	*	0.73		2.02		2.85	
10	3542	1.62	3.12		1.02		1.34		1.00	
11	1281	1.58	1.93		1.00		2.38		1.00	
12	1605	1.56	1.78		1.45		1.52		1.47	
13	321	1.53	2.98		2.03		1.05		0.05	
14	473	1.52	0.00		2.00		3.99		0.09	
15	2682	1.52	2.09		0.32		0.62		3.04	
16	206	1.48	3.13		1.55		0.02		1.22	
17	3547	1.47	0.43		2.01	*	1.23		2.22	*
18	2734	1.44	2.65		2.01		1.04		0.07	
19	2504	1.44	1.11		3.34	*	1.32		0.00	*
20	1520	1.42	0.00		3.66		2.00		0.00	
21	503	1.40	1.43		2.03		1.54		0.61	
22	2633	1.39	1.04		0.01		2.53		1.99	
23	2688	1.38	0.39		3.19		1.14		0.79	
24	512	1.36	3.41		0.11		0.24		1.66	
25	2637	1.36	3.02		1.43		1.00		0.00	
26	472	1.35	0.00		2.18		3.04		0.19	
27	632	1.35	1.63		0.00		2.02		1.75	
28	2669	1.34	0.25		0.14		2.96		2.01	
29	470	1.32	0.00		2.17		3.10		0.00	
30	2626	1.3	0.05		2.15		2.01		0.99	
31	2644	1.29	1.10		1.06		1.63		1.38	
32	2617	1.28	0.01		3.07		0.00		2.03	
33	1441	1.27	1.57		1.82		0.65		1.02	
34	1688	1.26	2.57		0.00		2.48		0.00	
35	2639	1.25	0.11		1.28		1.02		2.59	
36	320	1.24	3.95		1.00		0.00	*	0.00	
37	471	1.24	0.01		1.96		2.84		0.13	
38	2643	1.23	1.16		0.00		0.00	*	3.77	
39	2740	1.22	1.03		1.20	*	0.66		1.97	*
40	2673	1.21	0.42		1.35		0.72		2.35	
41	1641	1.21	0.00		0.02		0.68		4.13	

		Average	*2008*	*2007*	*2006*	*2005*
Rank	**Circuit**	**SAIFI**	***SAIFI***	***SAIFI***	***SAIFI***	***SAIFI***
42	513	1.21	2.87	0.00	0.00	1.98
43	322	1.19	3.67	1.06	0.00	0.02
44	1703	1.18	1.09	1.16	0.85	1.63
45	2660	1.18	1.27	0.09	2.62	0.74
46	2622	1.17	1.25	3.06	0.18	0.20
47	2664	1.16	1.34	0.09	2.07	1.15
48	1752	1.14	1.49	1.00	1.09	0.98
49	3652	1.13	1.03	0.99	0.00 *	2.49
50	2668	1.12	1.86	0.59	1.89 *	0.13
51	2632	1.11	2.07	0.04	0.32	2.01
52	290	1.1	0.89	2.85	0.01	0.66
53	2625	1.08	0.09	1.06	0.00	3.17
54	3548	1.08	0.45 *	0.08	2.15	1.64
55	323	1.05	3.03	0.99	0.00	0.19
56	2733	1.04	1.66	0.1	0.02	2.36
57	3636	1.03	4.00	0.08	0.03	0.01
58	1754	1.02	1.05	1.09	1.79	0.14
59	2500	1.02	2.00	1.04	1.02	0.02
60	1708	1.00	0.69	0.03	2.02	1.26
61	1282	1.00	0.98	0.99	1.00	1.01
62	1440	0.99	1.35	1.05	0.03	1.52
63	626	0.99	0.12	0.67	2.56	0.62
64	3543	0.99	0.04	1.90	1.93	0.10
65	1880	0.98	2.53	0.06	1.03	0.28
66	1697	0.96	1.18	2.04	0.50	0.12
67	272	0.96	0.68	0.01 *	0.12	3.04 *
68	1546	0.94	1.02	1.01	1.06	0.66
69	2627	0.94	0.01	2.93 *	0.08	0.73 *
70	1545	0.94	0.03	1.22	0.08	2.43
71	1690	0.91	1.35	0.12	1.38	0.77
72	2667	0.91	1.09	1.35	0.10	1.09
73	205	0.89	0.00	1.11	1.32	1.13
74	2619	0.89	1.32	1.03	0.16	1.06
75	2623	0.88	2.04	1.25	0.06	0.17
76	501	0.87	1.04	0.07	0.02	2.34
77	2505	0.87	0.04	0.03	2.03	1.37
78	2642	0.87	2.08	0.18	0.10	1.12
79	2640	0.87	1.87	0.10	0.01	1.48
80	1694	0.86	2.3	0.07	0.07	1.00
81	1707	0.85	3.00	0.00	0.30	0.10
82	3677	0.85	0.11	1.06	1.11	1.12
83	1706	0.84	0.17	1.17	1.94	0.06
84	3224	0.83	1.09	1.13	0.02	1.06
85	248	0.82	1.05	1.22	1.02	0.00
86	2541	0.82	2.10	1.03	0.08	0.05
87	3638	0.81	1.11	2.00	0.03	0.08

		Average	*2008*	*2007*	*2006*	*2005*
Rank	**Circuit**	**SAIFI**	***SAIFI***	***SAIFI***	***SAIFI***	***SAIFI***
88	2624	0.80	0.71	1.30	0.27	0.90
89	550	0.80	0.03	0.90	0.98	1.27
90	291	0.79	1.06	0.90	0.71 *	0.50
91	2630	0.79	1.40	0.05	0.36	1.33
92	1283	0.77	1.05	1.00	1.04	0.00
93	1910	0.76	0.02	0.07	1.94 *	1.00
94	2631	0.76	0.79	0.01	0.64	1.60
95	3659	0.76	1.15	1.53	0.16	0.21
96	3633	0.76	0.12	0.49	1.39	1.03
97	2535	0.76	0.09	2.00	0.00	0.94
98	2636	0.75	1.20	0.00	1.81	0.00
99	1532	0.75	0.52	1.01	0.03	1.45
100	3631	0.74	0.97	0.55	0.08	1.34

*Denotes 20% change in circuit population

Excludes the following:

- Outages caused by Power Supply or Transmission Problems external to UI Scheduled Outages
- Outages caused by Customer equipment connected to UI lines
- Major Storms

Appendix 13: SAIDI/SAIFI Worst 4% of All Circuits

The United Illuminating Company
SAIDI/SAIFI Worst 4% of All Circuits

Ranked by Average SAIDI

		Average		2008		2007		2006		2005	
Rank	Circuit	SAIDI mins	SAIFI	SAIDI mins	SAIFI	SAIDI mins	SAIFI	SAIDI mins	SAIFI	SAIDI mins	SAIFI
1	1605	293	1.56	405	1.78	189	1.45	125	1.52	453	1.47
2	2689	261	2.74	435	4.78	104	1.1	152	1.12	353	3.96
3	473	259	1.52	0	0	556	2	471	3.99	7	0.09
4	1608	250	2.28	298	2.95	328	2.69	250	2.09	125	1.37
5	470	234	1.32	0	0	608	2.17	326	3.1	0	0
6	2621	231	2.29	443	3.29	220	3.05	10	1.06	253	1.74
7	472	230	1.35	0	0	554	2.18	346	3.04	20	0.19
8	2682	224	1.52	237	2.09	132	0.32	144	0.62	385	3.04
9	206	220	1.48	436	3.13	165	1.55	1	0.02	276	1.22
10	471	212	1.24	2	0.01	543	1.96	292	2.84	10	0.13
11	3638	199	0.81	94	1.11	687	2	3	0.03	11	0.08
12	321	187	1.53	301	2.98	387	2.03	50	1.05	13	0.05
13	2688	187	1.38	116	0.39	368	3.19	146	1.14	117	0.79
14	1755	184	1.74	453	4.08	164	1.39	106	1.46	11	0.02
15	3224	184	0.83	304	1.09	310	1.13	2	0.02	120	1.06

Excludes the following:

- Outages caused by Power Supply or Transmission Problems external to UI
- Scheduled outages
- Outages caused by Customer Equipment connected to UI lines
- Major Storms

The United Illuminating Company
SAIDI/SAIFI Worst 4% of All Circuits

Ranked by Average SAIFI

		Average		2008		2007		2006		2005	
Rank	Circuit	SAIFI	SAIDI mins	SAIFI	SAIDI mins	SAIFI	SAIDI mins	SAIFI	SAIDI mins	SAIFI	SAIDI mins
1	2689	2.74	261	4.78	435	1.10	104	1.12	152	3.96	353
2	2687	2.39	175	1.89	97	1.72	163	2.99	230	2.96	211
3	2542	2.31	164	0.03	1.00	2.15	225	2.04	108	5.02	322
4	2621	2.29	231	3.29	443	3.05	220	1.06	10	1.74	253
5	1608	2.28	250	2.95	298	2.69	328	2.09	250	1.37	125
6	2683	1.99	172	0.20	21	2.04	191	4.15	326	1.56	149
7	1755	1.74	184	4.08	453	1.39	164	1.46	106	0.02	11
8	1704	1.70	163	2.19	128	0.54	66	2.06	222	2.01	235
9	2662	1.67	120	1.09	21	0.73	205	2.02	91	2.85	165
10	3542	1.62	152	3.12	317	1.02	136	1.34	147	1.00	10
11	1281	1.58	111	1.93	186	1.00	88	2.38	157	1.00	13
12	1605	1.56	293	1.78	405	1.45	189	1.52	125	1.47	453
13	321	1.53	187	2.98	301	2.03	387	1.05	50	0.05	13
14	2682	1.52	224	2.09	237	0.32	132	0.62	144	3.04	385
15	473	1.52	259	0.00	0	2.00	556	3.99	471	0.09	7

Excludes the following:

- Outages caused by Power Supply or Transmission Problems external to UI
- Scheduled outages
- Outages caused by Customer Equipment connected to UI lines
- Major Storms

Appendix 14: Reliability Corrective Action Plans for Worst 4% of All Circuits

Ash Creek Circuit 2662 - City of Bridgeport, Town of Fairfield

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
1	Animal Contact	6	Lightning Strikes
1	Bird Contact	1	Maintenance
1	Cable Fault	2	Tree Contacts
1	Lightning Arrester Failure	1	TXF Overload

Reliability Improvement – 2009 Recommendations

1. Replace the 4-skirt cutout fused at 25K and refuse it at 65K on P.2395 on Rhode Island Avenue corner of Kings Highway East (Map E15B4).

2. Install transformer current limiting fuse and animal guard on P.1629 Rhode Island Avenue corner of Kings Highway East (Map E15B4).

3. Reconductor secondary section from P.2905 to P.2101 on Frank Street corner of Kings Highway East to triplex aluminum secondary (Map E15B4).

Cost Estimate

Total improvement cost is approximately $1,500.

	SAIDI (Minutes)	SAIFI
4-year Average	120	1.67
Projected	63	0.74

East Shore Circuit 1704 - Town of East Haven, City of New Haven

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
5	Animal Contacts	2	Other - Unknown
1	Cable Fault	1	Splice Failures
1	Cutout Failure	6	Tree Contacts
1	Loose Connection	2	Vehicle Accidents

Reliability Improvement – 2009 Recommendations

1. Reconductor the three phase #4 bare copper with 1/0 aluminum tree wire from P.528 on Columbus Avenue corner of Main Street to P.713 on Doran Street (7 sections) (Map G13PQ4).

2. Reconductor single phase # 4 bare copper with 1/0 aluminum tree wire from P.955 on Columbus Avenue corner of Doran Street to P.788 on Wilson Street, including Lincoln Street and Doran Street west of Columbus Avenue (7 sections) (Map G13PQ4).

3. Install single phase cutouts at the following locations:
   a. P.1423 fused at 65K on Saltonstall Parkway (Route 1) corner of Estelle Road (Map 13B5).
   b. P.1394 fused at 25K on Saltonstall Parkway (Route 1) corner of Estelle Road (Map H13B5).
   c. P.411 fused at 25K on Elm Street corner of Elm Court to protect Elm Court (Map H13A5).
   d. P.62 fused at 65K on Kimberly Avenue corner of Forbes Place to protect Kimberly Avenue east of Forbes Place (Map H13A4).
   e. P.990 fused at 25K on Charter Oak Avenue corner of Street Paul Avenue to protect St Paul Avenue (Map G13P4).
   f. P.996 fused at 65K on Charter Oak Avenue corner of Street Andrew Avenue (Map G13P4).
   g. P.1373 fused at 25K on Street Andrew Avenue and Church Street to protect Church Street (Map G13P4).
   h. P.955 fused at 40K on Columbus Avenue to protect Dolan Street and Columbus Avenue (Map G13P4).
   i. P.129 fused at 80K on Cass Street corner of Lenox Street to protect both sides of Hughes Street (Map G13P4).
   j. P.6558 fused at 25K on Boston Avenue corner of Clarendon Street to protect Clarendon Street (Map G13P4).
   k. P.6280 fused at 25K on Terrace Street to protect the side tap going west off Terrace Street (Map G13P4).

East Shore Circuit 1704 - Town of East Haven, City of New Haven

4. Replace the 4-skirt cutout(s) at the following locations:
   a. P.1430 fuse at 15K (3) on Estelle Road (Map H13B5).
   b. P.6722 fuse at 100K on Main Street corner of Terrace Street (Map G13P4).
   c. P.6719S fuse at 25K (3) on Peat Meadow Road north of Main Street (Map G13P4).

5. Refuse cutouts at the following locations:
   a. P.1065 to 65K on Tuttle Place west of High Street (Map H13A5).
   b. P.857 to 65K on Sidney Street corner of Elm Street (Map H13A45).
   c. P.523 to 140K (3) on Main Street corner of Lenox Street (Map G13P4).
   d. P.6278 to 65K on Terrace Street south of Main Street (Map G13P4).

6. Install three cutouts at the following locations:
   a. P.1436 fused at 65K on Estelle Road south on Saltonstall Parkway (Map H13B5).
   b. P.3021 fused at 65K on High Street corner of Laurel Street (Map H13A4).
   c. P.1493 fused at 65K on Saltonstall Parkway west of Forbes Place (Map H13A4).
   d. P.521 fused at 65K on Main Street corner of Massachusetts Avenue (Map G13P4).
   e. P.522 fused at 65K on Main Street east of Massachusetts Avenue (Map G13P4).

7. Relocate cutout from P.1408 to P.1407 fused at 65K on Joyce Road north of Saltonstall Parkway (Map H13B5).

8. Install transformer current limiting fuse and animal guard on P.375 on Laurel Street west of High Street (Map H13A4).

9. Remove the three cutouts from the following locations
   a. P.4390 on Kimberly Avenue (Map H13A4).
   b. P.2357 on Old Bradley Street (Map H13A4).

Cost Estimate

Total improvement cost is approximately $50,000.

	SAIDI (Minutes)	SAIFI
4-year Average	163	1.70
Projected	63	0.74

Forbes Circuit 206 - City of New Haven

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
2	Animal Contacts	1	Other - Unknown
1	Conductor Off Pin	5	Tree Contacts
1	Cutout Failure	1	TXF Overload
1	Disconnect Failure	5	Vehicle Accidents
1	Lightning Strike		

Reliability Improvement – 2009 Recommendations

1. Replace 4-skirt cutout(s) at the following locations:
   a. P.7816 fuse at 100K (3) on Goodwin Street east of Fulton Street (Map G13O3).
   b. P.9035 fuse at 100K (3) on East Ferry Street corner of Fairmont Avenue (Map G13O2).
   c. P.2804 fused at 100K on Lenox Street corner of East Grand Avenue (Map G13P1).

2. Install cutouts at the following locations:
   a. P.378 and fuse at 25K (2) on Fulton Street corner of Faren Avenue, for both side taps (Map G13O2).
   b. P.6072 and fuse at 65K (3) on Faren Avenue corner of Lancraft Street (Map G13O2).
   c. P.1063 fused at 25K on Oxford Street corner of Lenox Street to protect Lenox Street, north of Oxford Street (Map G13P2).
   d. P.4829 fused at 25K on Lexington Avenue corner of Eldridge Street (Map G13P2).
   e. P.4779 fused at 40K (3) on East Grand Avenue corner of Quinnipiac Avenue (Map G13P1).
   f. P.683 fused at 25K on Lenox Street corner of Clifton Street (Map G13P1).
   g. P.825 fused at 25K on Leila Street corner of Russell Street (Map G13Q1).
   h. P.10103 fused at 25K on Mountain Top Road corner of Highview Street (Map G13Q2).
   i. P.9648 fused at 25K on Summit Street (Map G13P2).
   j. P.4825 fused at 25K on Sherland Street corner of Howard Street to protect both sides of Howard Street (Map G13P1).
   k. P.622 on Quinnipiac Avenue corner of Welcome Street (Map G13P1).

3. Install dead-end bells on P.10054 on Russell Street south of Skyview Lane (Map G13Q2).

Cost Estimate

Total improvement cost is approximately $12,000.

	SAIDI (Minutes)	SAIFI

4-year Average	220	1.48
Projected	63	0.74

Hawthorne Circuit 2682 - Town of Easton

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
29	Animal Contacts	1	Maintenance
1	Cable Fault	8	Other - Unknown
1	Clearance	1	Other Accident
3	Conductor Off Pin	2	Permanent Repairs
2	Connector Failures	1	Splice Failure
1	Cutout Failure	3	Transformer Failures
2	Fuse Failures	59	Tree Contacts
1	Insulator Failure	2	TXF Overloads
7	Lightning Strikes	1	UI Human Error
1	Lightning Arrester Failure	1	Vehicle Accident
1	Loose Connection	1	Wire Shorted

Reliability Improvement – 2009 Recommendations

1. Reconductor secondary section from P.1156 to P.1158 on Wilson Road to triplex aluminum secondary (Map D14L3).

2. Replace 4-skirt cutout(s) at the following locations:
   a. P.166 and fuse at 65K on Beers Road (North Street) corner of Rolling Hills Road (Map D14M3).
   b. P.1320 and fuse at 25K by 170 Bibbons Road (Map D13J6).

3. Install cutouts at the following locations:
   a. P.602 fused at 25K on Jesse Lee Drive south of Old Orchard Road (Map D14O3).
   b. P.2195 fused at 25K on Harvest Moon Road corner of far Horizon Drive (Map D14O2).
   c. P.303 fused at 30K on Bibbons Road corner of far Cedar Hill Road (Map D13J6).
   d. P.1324 fused at 65K on Rock House Road corner of Valley Road (Map D13G4).

4. Remove cutout from P.2206 on Harvest Moon Road, corner of Far Horizon Drive (Map D14O3).

5. Install transformer current limiting fuses at the following locations:
   a. P.955 by 445 Rock House Road (Map D13J2).
   b. P.1509 by 260 Rock House Road (Map D13J3).

Hawthorne Circuit 2682 - Town of Easton

6. Install transformer animal guards at the following locations:
   a. P.2964 by 109 Wilson Road (Map D14L3).
   b. P.1180 by 135 Beers Road (Map D14N3).
   c. P.2197 by 29 Harvest Moon Road (Map D14O3).
   d. P.349 by 36 Barrows Road (Map D13M7).
   e. P.1121 by 56 Burroughs Road (Map D13M6).
   f. P.1131 by 45 Burroughs Road (Map D13M6).
   g. P.3134 by 15 Deerfield Drive (Map D13H6).

Cost Estimate

Total improvement cost is approximately $4,500.

	SAIDI (Minutes)	SAIFI
4-year Average	224	1.52
Projected	63	0.74

Hawthorne Circuit 2683 - Towns of Fairfield

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
10	Animal Contacts	1	Line Fuse Overload
1	Bird Contact	1	Maintenance
1	Clearance	6	Other - Unknown
5	Conductor Off Pin	2	Relocation Extensions
1	Connector Failure	3	Transformer Failures
3	Cutout Failures	42	Tree Contacts
2	Fuse Failures	2	TXF Overloads
1	Insulator Failure	1	UI Human Error
3	Lightning Strikes	1	Vehicle Accident
1	Lightning Arrestor		

Reliability Improvement – 2009 Recommendations

1. Install transformer current limiting fuse and animal guard on P.8015 by B 650 Banks North Road (Map D14J8).

2. Install animal guard on transformer on P.4399 by 40 Verna Field Drive (Map D15M3).

Cost Estimate

Total improvement cost is approximately $500.

	SAIDI (Minutes)	SAIFI
4-year Average	172	1.99
Projected	63	0.74

Hawthorne Circuit 2687 - Town of Trumbull

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
31	Animal Contacts	3	Maintenance
3	Bird Contacts	6	Other - Unknown
1	Clearance	1	Recloser Failure
3	Conductor Off Pin	1	Relocation Extension
2	Connector Failures	1	Splice Failure
1	Cutout Failure	3	Transformer Failures
1	Disconnect Failure	20	Tree Contacts
1	Equipment Change	1	TXF Change
2	Fuse Failures	1	TXF Overload
2	Lightning Strikes	3	Vehicle Accidents

Reliability Improvement – 2009 Recommendations

1. Install single phase cutouts at the following locations:
   a. P.3668 and fuse at 25K on Woodhaven Drive corner of Woodfield Drive to protect Woodhaven Drive (Map E13A4).
   b. P.3646 and fuse at 25K on Crocus Lane corner of Pomana Road to protect both sides of Crocus Lane (Map E13B4).
   c. P.2881 and fuse at 25K on Gisella Road corner of Doris Street for Doris Street protection (Map E13B5).
   d. P.2853 and fuse at 25K on Cold Spring Drive corner of Fresh Meadow Drive (Map D13P4).
   e. P.3508 and fuse at 25K on Asbury Road corner of Stemway Road to protect both sides of Stemway Road (Map E13B6).
   f. P.3510 and fuse at 25K on Asbury Road corner of Raven Road (Map E13B6).
   g. P.927 and fuse at 65K on Dayton Road corner of Asbury Road to protect the tap S/O Asbury Road (Map E13A6).

2. Replace 4-skirt single phase cutouts at the following locations:
   a. P.1082 and fuse at 65K on Jade Tree Lane corner of Madison Avenue (Map D13Q5).
   b. P.1062 and fuse at 65K on Goldenrod Trail corner of Seeley Road (Map D13Q6).

3. Refuse single phase cutout on P.927 to 65K on Asbury Road corner of Dayton Road (Map E13A6).

4. Install transformer current limiting fuse and animal guard on P.3525 on Raven Road S/O Asbury Road (Map E13B6).

Hawthorne Circuit 2687 - Town of Trumbull

Cost Estimate

Total improvement cost is approximately $5,000.

	SAIDI (Minutes)	SAIFI
4-year Average	175	2.39
Projected	63	0.74

Hawthorne Circuit 2689 - Town of Fairfield

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
19	Animal Contacts	2	Lightning Arrestor Failures
4	Conductor Off Pin	6	Other - Unknown
2	Connector Failures	1	Transformer Failure
2	Cutout Failures	20	Tree Contacts
1	Insulator Failure	2	TXF Overloads
4	Lightning Strikes	2	Vehicle Accidents

Reliability Improvement – 2009 Recommendations

1. Install two single phase cutouts fused at 25K on each branch coming out of the junction pole P.4446 on Szost Drive south of Reid Street (Map D15Q2).

2. Install animal guard on the transformer on P.5472 on Tuckahoe Lane corner of Windsor Place (Map D15Q2).

3. Install single phase cutout fused at 65K on the Pell Meadow branch on junction pole P.6038 on Pell Meadow Drive corner of Doreen Drive (Map D15O4).

4. Install transformer current limiting fuses at the following locations:
   a. P.7108 on Lancelot Drive (Map D15N2)
   b. P.7432 on a tap off Galloping Hill Road (Map D15O1).
   c. P.7403 on a tap off Galloping Hill Road (Map D15O1).

Cost Estimate

Total improvement cost is approximately $1,500.

	SAIDI (Minutes)	SAIFI
4-year Average	261	2.74
Projected	63	0.74

June Street Circuit 1605 - Town of Woodbridge

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
13	Animal Contacts	1	Other Accident
1	Fuse Failure	5	Transformer Failures
6	Lightning Strikes	39	Tree Contacts
2	Other - Unknown	4	Vehicle Accidents

Reliability Improvement – 2009 Recommendations

1. Install a set of dead-end bells on P.906 on Litchfield Turnpike North of Bond Road and make the section(s) south of P.906 dead (Map G12B3).

2. Remove the under arm disconnects and install three cutouts fused at 100K on P.927 on Litchfield Turnpike, north of Clark Road (Map G12C2).

3. Remove the cutouts on P.948 on Litchfield Turnpike (Map G12C2).

4. Replace 4-skirt cutouts at the following locations:
   a. P.977 fuse at 40K on Litchfield Turnpike south of Sargent Drive (Map G11CD8).
   b. P.196 fuse at 15K on Dillon Road between Sperry Road and Blue Trial Drive (Map G12B1).
   c. P.192 fuse at 15K on Dillon Road east of Amity Road (Map G12A1).

5. Relocate the single phase cutouts at the following locations:
   a. P.2322 on Field Stone Drive to P.1187 Amity Road corner of Field Stone Drive fuse at 65K and (Map F11Q8).
   b. P.169 Walker Lane to P.1161 on Amity Road corner of Walker Lane fuse at 25K (Map F11l6).
   c. P.1969 on Woodbine Road to P.1122 on Amity Road corner of Woodbine Road and fuse at 65K (Map G12B3).
   d. P.2400 to P.573 on Center Road, east of Pease Road and fuse at 40K (Map G12A3)

6. Refuse single phase cutouts at the following locations:
   a. P.1210 at 80K on Spring Valley Road, west of Amity Road (Map F11Q8).
   b. P.678 at 65K on Seymour Road, west of Amity Road (Map F11Q8).
   c. P.1169 at 65K on Amity Road corner of Swamp Road for the side tap going east on Swamp Road (Map G12A1).

June Street Circuit 1605 - Town of Woodbridge

7. Poly-phase Westward Road and create a tie with June Street Circuit 1608 by performing the following steps:
   a. Replace poles and reconductor secondary as necessary.
   b. Reconductor the 3-1/0 aluminum tree wire with 3-397 aluminum tree wire on North Racebrook Road from P.423 to P.427 (two sections) (Map F12N3).
   c. Replace the normally open disconnect switch on P.427 North Racebrook Road south of Westward Road with a normally open air break switch (Map F12N3).
   d. Polyphase Westward Road east of North Racebrook Road with 3-397 aluminum tree wire from P.423 to P.541 for a total of 3470 feet (28 sections) (Map F12NO3).
   e. Install the 3-397 aluminum tree wire primary on Center Road from P.541 to P.2625 for a total of 640 feet (Map F12P3).
   f. Reconductor the 3-1/0 aluminum tree wire with 3-397 aluminum tree wire on Center Road west of Newtown Road from P.2625 to P.603, for a total of 380 feet (3 sections) (Map F12P3).
   g. Remove the three cutouts on P.603 Center Road and install a normally closed air break switch west of Newtown Road (Map F12P3).
   h. Remove the normally closed disconnect switch on P.1157 and make a dead section on North Racebrook Road south of Indian Trail (Map F12N2).
   i. Install three cutouts on P.423 fused at 100K on Westward Road corner of North Racebrook Road to protect North Racebrook Road north of Westward Road (Map F12N3).
   j. Install single phase cutout fused at 65K on P.423 on Westward Road corner of N Racebrook Road to protect the tap going West on Westward Road (Map F12N3).
8. Install single phase cutout on P.1793 fused at 25K on Hallsey Lane, west of Acorn Hill Road (Map F11L7).
9. Install transformer current limiting fuse and animal guard on P.2402 (Map G12A3).

Cost Estimate

Total improvement cost is approximately $190,000.

	SAIDI (Minutes)	SAIFI
4-year Average	293	1.56
Projected	63	0.74

June Street Circuit 1608 - Town of Woodbridge

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
28	Animal Contacts	2	Line Fuse Overloads
2	Cable Faults	5	Other - Unknown
1	Clearance	1	Other Accident
6	Conductor Off Pin	3	Transformer Failures
1	Connector Failure	52	Tree Contacts
3	Cutout Failures	1	TXF Overload
1	Equipment Change	1	TXF Secondary Breakers
2	Fuse Failures	1	UI Human Error
2	Hot Line Clamp Failures	6	Vehicle Accident
9	Lightning Strikes		

Reliability Improvement – 2009 Recommendations

1. Reconductor the 3-1/0 aluminum tree wire with 3-397 aluminum tree wire on North Racebrook Road south of Westward Road from P.427 to P.146 for a total of 1,100 feet (9 sections) (Map F12N34).

2. Replace the 4-skirt cutouts at the following locations:
   a. P.2412 and fuse at 15K on the tap going north on Old Quarry Road west of Newtown Drive (Map F12L1).
   b. P.1705 and fuse at 25K on Sunbrook Road (Map F12N4).
   c. P.17 and fuse at 65K on Peck Hill Road corner of Knollwood Road (Map F12M2).
   d. P.7 and fuse at 15K on the tap going east on Peck Hill Road (Map F12M3).
   e. P.2658 and fuse at 100K on Ansonia Road West of Northrop Road Woodbridge (Map F12M6).
   f. P.707 and fuse at 15K on the tap going east to P.2468 (Map F12N6).
   g. P.1431 and fuse at 25K on Deer Run Road for the tap going east to P.1495 (Map F12O5).

3. Refuse the cutouts at the following locations:
   a. P.2418 to 30K (3) on Old Quarry Road (Map F12L1).
   b. P.598 to 30K on Ford Road corner of Osborne Lane (Map F12L3).
   c. P.618 to 80K on Ford Road corner of Milan Road (Map F12L4).
   d. P.1413 to 100K (3) on Johnson Road S/O Ansonia Road (Map F12Q6).
   e. P.2815 to 30K on Old Farm Road E/O Baldwin Road (Map F12L8).

June Street Circuit 1608 - Town of Woodbridge

4. Install single phase cutouts at the following locations:
   a. P.2159 fused at 15K on Nettleton Drive north of Old Quarry Road (Map F11L8).
   b. P.2161 fused at 15K on Nettleton Drive north of Old Quarry Road (Map F11L8).
   c. P.192 fused at 25K on Rimmon Road west of Rimmon Hill Road (Map F12L3).
   d. P.5 fused at 25K on Rimmon Road (Map F12K2).
   e. P.1710 fused at 25K on Sunbrook Road (Map F12M3).
   f. P.613 fused at 40K on Debby Lane corner of Ford Road to protect Debby Lane (Map F12L4).
   g. P.710 fused at 40K on Milan Road corner of Fawn Drive (Map F12M45).
   h. P.2692 fused at25K on Davis Road on the tap going east to P.2718 (Map F12M6).
   i. P.686 fused at 25K on Cedar Acres Road (Map F12O4).
   j. P.1295 fused at 65K for the tap going East on Oak Hill Lane (Map F12P4).
   k. P.2332 fused at 25K on Deer Run Road (Map F12O5).
   l. P.1559 fused at 25K on Deer Run Road (Map F12O5).
   m. P.574 fused at 30K on Pease Road (Map G12A4).
   n. P.199 fused at 25K on Pease Road, north of Rimmon Road (Map G12A6).

5. Relocate the three phase cutouts at the following locations:
   a. From P.1771 on Rimmon Hill Road corner of Hemlock Hollow Road to P.188 Rimmon Road corner of Rimmon Hill Road fused at 65K on (Map F12L2).
   b. From P.712 on Milan Road, to P.715 on Milan Road corner of Northrop Road fuse at 140K (Map F12M45).

6. Remove the single phase cutout from P.660 on Milan Road, east of Ford Road (Map F12L4).

7. Install transformer current limiting fuses and animal guards at the following locations:
   a. P.1420 on Mullberry Road east of Ford Road (Map F12L4).
   b. P.1296 on Oak Hill Lane (Map F12P4).
   c. P.1468 on Oak Hill Lane (Map F12P4).
   d. P.1469 on Oak Hill Lane (Map F12P4).
   e. P.1276 on Jenick Lane (Map F12P4).
   f. P.1278 on Jenick Lane (Map F12P4).
   g. P.1280 on Jenick Lane (Map F12P4).

8. Remove the cutout on P.1205 on Fawn Drive south of Milan Road (Map F12M45).

9. Install dead-end bell insulators on P.2696 Davis Road (Map F12M6).

10. Refuse single phase cutout on P.335 to 100K on Jenick Lane corner of Beecher Road (Map F12P4).

June Street Circuit 1608 - Town of Woodbridge

11. Remove field phase cutout that is open from P.55 on Millhaven Road, south of Ansonia Road (Map F12O6).

12. Install two cutouts fused at 25K on P.1122 on Inwood Road corner of Short Road (Map F12P7).

Cost Estimate

Total improvement cost is approximately $25,000.

	SAIDI (Minutes)	SAIFI
4-year Average	250	2.28
Projected	63	0.74

New Congress Circuit 2542 - City of Bridgeport

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
6	Animal Contacts	3	Other - Unknown
2	Bird Contacts	1	Overload
1	Clearance	1	Secondary Revamp
2	Conductor off the Pin	1	Terminator Failure
1	Connector Failure	1	Transformer Failure
1	Cutout Failure	6	Tree Contacts
2	Lightning Strikes	1	TXF Overload
3	Lightning Arrestor Failures	2	Vehicle Accident
1	Loose Connection		

Reliability Improvement – 2009 Recommendations

1. Tree trim the entire circuit (1.67 miles).

2. Install two animal guards on each transformer on P.2593 on Spring Street (Map E14J7).

3. Install animal guard on transformer on P.968 on Noble Avenue corner of Roosevelt Street (Map E14J7).

Cost Estimate

Total improvement cost is approximately $4,000.

	SAIDI (Minutes)	SAIFI
4-year Average	164	2.31
Projected	63	0.74

North Haven Circuit 1755 - Town of North Haven

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
5	Animal Contacts	3	Other - Unknown
1	Bird Contact	1	Transformer Failures
1	Cable Fault	3	Tree Contacts
3	Lightning Strikes		

Reliability Improvement – 2009 Recommendations

1. Open the disconnect switch on P.3856 on Ulbricht Stainless Right of Way (Map H11E2).

2. Remove jumper on bells on P.3020 on Right of Way (Map H11D2).

3. Close the normally open air break switch on P.4027 on Dwight Street (Map H11D3).

4. Replace the 4-skirt cutouts at the following locations:
   a. P.4326 fused at 30K on Dwight Street (Map H11D3).
   b. P.1215 fuse at 65K on Scrub Oak Road corner of Lawncrest Drive (Map H11F2).
   c. P.2159 fuse at 25K on Lawncrest Drive corner of Evergreen Place (Map H11F3).

5. Install single phase cutout fused at 25K on P.2700 on Bowling Green Drive corner of Bradley Street (Map H11F3).

6. Install transformer current limiting fuse and animal guard on P.2900 on Bowling Green Drive south of Bradley Street (Map H11F3).

Cost Estimate

Total improvement cost is approximately $5,000.

	SAIDI (Minutes)	SAIFI
4-year Average	184	1.74
Projected	63	0.74

Old Town Circuit 2621 - Towns of Shelton and Trumbull

4 – Year Outage Cause Summary:

Number of Outages	Outage Type	Number of Outages	Outage Type
10	Animal Contacts	6	Other - Unknown
1	Capacitor Failure	2	Transformer Failures
1	Clearance	12	Tree Contacts
1	Conductor Off the Pin	1	TXF Overload
3	Cutoff Failures	2	UI Human Error
1	Fuse Failure	1	Vehicle Accident
1	Lightning Arrester Failure	1	Wire Shorted
1	Maintenance		

Reliability Improvement – 2009 Recommendations

1. Tree trim the three phase portion of the circuit (9 miles).

2. Refuse the single phase cutouts at the following locations:
   a. P.821 to 65K on Laurel Road west of Daniels Farm Road (Map E14G1).
   b. P.1619 to 65K on Park Street corner of Riverbend Road (Map E13G8).
   c. P.1368 to 100K on Park Street west of Daniels Farm Road (Map E13G8).
   d. P.541 to 65K on Daniels Farm Road corner of Inca Drive (Map E13G7).
   e. P.639 to 25K on Hedgehog Road (Map E13G8).
   f. P.547 to 65K on Daniels Farm Road corner of Sky top Drive (Map E13G7).
   g. P.558 to 65K on Daniels Farm Road corner of Marigold Lane (Map E13G7).
   h. P.1590 to 100K on Waverly Road corner of Adams Drive (Map E13L3).
   i. P.3612 to 65K on Waverly Road corner of Walnut Tree Hill Road (Map E13M4).
   j. P.1581 to 100K on Walnut Tree Hill Road corner of Isinglass Road (Map E13M4).
   k. P.8551 to 65K on Far Mill Street corner of Copper Penny Lane (Map E13K3).
   l. P.1765 to 100K on Waverly Road corner of Far Mill Street (Map E13L4).
   m. P.3431 to 100K on Waverly Road corner of Farm House Lane (Map E13L3).
   n. P.7101 to 25K on Cali Drive (Map E13L4).
   o. P.7577 to 25K on Autumn Ridge Road corner of Cali Drive (Map E13L4).

2. Install transformer current limiting fuses and animal guards at the following locations:
   a. P.2780 on Manor Drive (Map E14H1).
   b. P.3217 on Manor Drive (Map E14H1).
   c. P.3219 on Manor Drive (Map E14H1).
   d. P.2479 on Drew Circle (Map E13G8).
   e. P.4622 on Riverbend Road (Map E13G8).
   f. P.4625 on Riverbend Road (Map E14G1).
   g. P.4150 on Harvest Hill Drive (Map E13H7).

Old Town Circuit 2621 - Towns of Shelton and Trumbull

h. P.3079 on Inca Drive (Map E13G78).
i. P.3080 on Inca Drive (Map E13G78).
j. P.4756 on Maple Ridge Road (Map E13F7).
k. P.3352 on Glenarden Road (Map E13G7).
l. P.4592 on Great Brook Road (Map E13F67).
m. P.4596 on Great Brook Road (Map E13F67).
n. P.4582 on Putting Green Road, north of Great Brook Road (Map E13F6).
o. P.4580 on Putting Green Road (Map E13F6).
p. P.2072 Mohawk Drive (Map E13G5).
q. P.3951 on Country Club Road (Map E13G6).
r. P.3955 on Country Club Road (Map E13GH6).
s. P.4212 on Brookside Drive (Map E13H6).
t. P.3155 on Brookhedge Drive (Map E13H6).
u. P.3486 on Oldfield Road (Map E13G6).
v. P.3481 on Chalon Road (Map E13G6).
w. P.3329 on Oxen Hill Road (Map E13F5).
x. P.3333 on Oxen Hill Road (Map E13F5).
y. P.3335 on Oxen Hill Road (Map E13F5).
z. P.3637 on Clover Hill Road (Map E13F4).
aa. P.3496 on Lewis Road (Map E13F5).
bb. P.1499 on Walnut Tree Hill Road (Map E13M4).
cc. P.7637 on Pound View Road (Map E13M4).
dd. P.6738 on Walnut Tree Hill Road (Map E13M4).
ee. P.3614 on Walnut Tree Hill Road (Map E13M3).
ff. P.5597 on Walnut Tree Hill Road (Map E13M3).
gg. P.7579 on Autumn Ridge Road (Map E13L4).
hh. P.7085 on Autumn Ridge Road (Map E13L4).
ii. P.3755 on High Meadow Road (Map E13J5).
jj. P.3748 on Spinning Wheel Road (Map E13J5).
kk. P.3744 on Spinning Wheel Road (Map E13HJ5).
ll. P.3735 on Quaker Lane (Map E13H5).

3. Install transformer current limiting fuses and animal guards at the following locations:
   a. P.3731 on Quaker Lane (Map E13H5).
   b. P.3716 on Beacon Hill Road (Map E13H5).
   c. P.3722 on Beacon Hill Road (Map E13J5).
   d. P.5603 on Coral Drive (Map E13J45).
   e. P.5603 on Coral Drive (Map E13J45).

4. Install single phase cutouts at the following locations:
   a. P.2779 fused at 25K on Manor Drive corner of Gregory Place (Map E14H1).
   b. P.4751 fused at 25K on Old Hollow Road corner of Maple Ridge Road (Map E13F7).
   c. P.3849 fused at 25K on Scenic Hill Road corner of Putting Green Road (Map E13F6).

d. P.3779 fused at 25K on Scenic Hill Road corner of Par Lane (Map E13F6).
e. P.1236 fused at 25K on Scenic Hill Road corner of Roosevelt Drive (Map E13F6).
f. P.3658 fused at 65K on Long Meadow Road corner of Roosevelt Drive (Map E13F6).
g. P.3954 fused at 25K on Country Club Road (Map E13GH6).
h. P.4215 fused at 25K on Country Club Road (Map E13H6).
i. P.3491 fused at 65K on Old Field Road corner of Old Stream Lane (Map E13H6).
j. P.3482 fused at 25K on Chalon Road for Chalon Road (Map E13G6).
k. P.4504 fused at 65K on Firehouse Road corner of Park Wood Road (Map E13G5).
l. P.3501 fused at 65K on Barnswallow Road corner of Haylot Road (Map E13F5).
m. P.3630 fused at 65K on Barn Swallow Drive (Map E13F5).
n. P.8466 fused at 65K on Adams Drive corner of Misty Lane (Map E13L3).
o. P.7718 fused at 65K on Adams Drive corner of Cali Drive (Map E13M4).
p. P.6739 fused at 25K on Walnut Tree Hill Road corner of Pound view Road (Map E13M4).
q. P.7880 fused at 65K on Laurel Glen Drive corner of Horse Stable Circle (Map E13L3).
r. P.8046 fused at 25K on Horse Stable Circle corner of Corn Hill Road (Map E13K3).
s. P.8554 fused at 25K on Copper Penny Lane (Map E13K3).
t. P.8559 fused at 25K on Copper Penny Lane (Map E13K3).
u. P.4705 fused at 25K on Matiloas Lane corner of Princess Terrace (Map E13L4).
v. P.7139 fused at 65K on Tower Lane corner of Patricia Drive #2 to protect Patricia Drive #2 (Map E13K4).
w. P.7199 fused at 25K on Hunters Ridge Road corner of Stoney Brook Court (Map E13K4).
x. P.5891 fused at 25K on Ladyslipper Drive corner of Buttercup Lane (Map E13K5).
y. P.4602 fused at 65K on Ladyslipper Drive corner of Rolling Ridge Drive (Map E13K5).

5. Relocate the cutouts at the following locations:
   a. From P.2967 to P.507 and fuse at 65K (3) on Daniels Farm Road (Map E14G1).
   b. From P.636 to P.1368 and fuse at 100K (3) on Hedgehog Road corner of Daniels Farm Road (Map E13G8).
   c. From P.3947 on Country Club Road to P.2849 on Daniels Farm Road fuse at 100K (Map E13G6).
   d. From P.1743 (right of way west off Booth Hill Road), and P.7824 (east off Booth Hill Road on Rouleau Drive) to P.3455. (Map E13J5).

6. Replace the 4-skirt cutouts at the following locations:
   a. P.1871 and refuse at 65K on Aldor Drive (Map E13G8).
   b. P.4129 and fuse at 25K (3) on Hedgehog Road (Map E13H8).
   c. P.4145 and fuse at 65K on Harvest Hill Drive (Map E13H8).
   d. P.4561 and fuse at 65K on Putting Green Road south of Great Brook Road (Map E13F67).

e. P.4579 and fuse at 65K on Putting Green Road corner of Under Cliffford Road (Map E13F6).
f. P.3658 and fuse at 25K on Long Meadow Road corner of Roosevelt Drive tap going east to P.379. (Map E13F6).
g. P.4764 and fuse at 65K on Heavenly Lane, west of Roosevelt Drive (Map E13F65).
h. P.2071 and fuse at 100K on Mohawk Drive, west of Daniels Farm Road (Map E13G5).
i. P.3421 and fuse at 100K on Roosevelt Drive, west of Daniels Farm Road (Map E13G6).
j. P.3458 and fuse at 65K on Spinning Wheel Road corner of Booth Hill Road (Map E13J5).

7. Remove the cutout on P.1578 on Isinglass Road corner of Adams Drive (Map E13M4)

Cost Estimate

Total improvement cost is approximately $50,000.

	SAIDI (Minutes)	SAIFI
4-year Average	231	2.29
Projected	63	0.74

Tunxis Hill Circuit 470 - Town of Fairfield

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
1	Animal Contact	2	Splice Failures
1	Cable Fault	1	Tree Contact
1	Other - Unknown	1	UI Human Error

Reliability Improvement – 2007 Recommendations

The entire circuit (three phase and single phase) was tree trimmed in 2007 (1.8 miles).

Reliability Improvement – 2009 Recommendations

No further recommendations are required. Necessary reliability corrective actions have been identified and performed in 2008.

Cost Estimate

Total improvement cost is approximately $0.

	SAIDI (Minutes)	SAIFI
4-year Average	234	1.32
Projected	63	0.74

Tunxis Hill Circuit 471 - Town of Fairfield

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
1	Animal Contact	2	Splice Failures
1	Cable Fault	4	TXF Overloads
1	Connector Failure	1	UI Human Error

Reliability Improvement – 2007 Recommendations

The entire circuit (three phase and single phase) was tree trimmed in 2007 (3.95 miles).

Reliability Improvement – 2009 Recommendations

No further recommendations are required. Necessary reliability corrective actions have been identified and performed in 2008.

Cost Estimate

Total improvement cost is approximately $0.

	SAIDI (Minutes)	SAIFI
4-year Average	212	124
Projected	63	0.74

Tunxis Hill Circuit 472 - Town of Fairfield

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
1	Animal Contact	1	Maintenance
1	Cable Fault	2	Splice Failure
1	Conductor Off the Pin	2	Tree Contacts
1	Lightning Arrestor	1	TXF Overload
1	Line Fuse Overload	1	UI Human Error

Reliability Improvement – 2007 Recommendations

The entire circuit (three phase and single phase) was tree trimmed in 2007 (4.01 miles).

Reliability Improvement – 2009 Recommendations

No further recommendations are required. Necessary reliability corrective actions have been identified and performed in 2008.

Cost Estimate

Total improvement cost is approximately $0.

	SAIDI (Minutes)	SAIFI
4-year Average	230	1.35
Projected	63	0.74

Tunxis Hill Circuit 473 - Town of Fairfield

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
1	Animal Contact	2	Splice Failures
1	Cable Fault	2	Tree Contacts
1	Cutout Failure	1	UI Human Error
1	Other Accident		

Reliability Improvement – 2007 Recommendations

The entire circuit (three phase and single phase) was tree trimmed in 2007 (2.89 miles).

Reliability Improvement – 2009 Recommendations

No further recommendations are required. Necessary reliability corrective actions have been identified and performed in 2008.

Cost Estimate

Total improvement cost is approximately $0.

	SAIDI (Minutes)	SAIFI
4-year Average	259	1.52
Projected	63	0.74

Appendix 15: Reliability Corrective Action Plans for Optional Circuits

Trap Falls Circuit 3542 - Towns of Shelton and Stratford

4 – Year Outage Cause Summary

Number of Outages	Outage Type	Number of Outages	Outage Type
2	Cable Fault	1	Splice Failure
1	Conductor Off Pin	1	Terminator Failure
2	Lightning	1	Tree Contacts
3	Other - Unknown	1	Vehicle Accident
1	Permanent Repair		

Reliability Improvement – 2009 Recommendations

1. Replace the three 4-skirts cutouts and fuse to 80K on P.1997 on Bridgeport Avenue, (Fairchild Heights Park, after the Step Down Bank).

2. Cut in bells and install a single phase cutout fused at 40K on P.7623, on Bridgeport Avenue (Fairchild Heights Park) Shelton. (Map E13Q6).

Cost Estimate

Total improvement cost is approximately $2,000.

	SAIDI (Minutes)	SAIFI
4-year Average	317	3.12
Projected	63	0.74

Appendix 16: Common Categories for Causes of Outages

Common Title	Definition
A. Forced Transmission and Power Supply	
Power supply	Outages caused by the operation of the system in conjunction with other companies such as ISO-NE imposed load shedding or loss of an external transmission line supplying the company.
B. Scheduled or Pre-Arranged Outages	
Planned	Intentionally de-energizing facilities serving customers for the purpose of apparatus change out, conversion, maintenance, relocation/extension, permanent repair, or customer request.
C. Major Storm-Related Outages	
Storm	In March 1995, the DPUC approved a new major storm definition, which is based on a statistical analysis of the most recent four calendar years of reliability data. Under the new definition, a major storm will be declared when the number of restoration steps exceeds the 98.5 percentile of all days in the most recent four years. All reliability data associated with interruptions beginning on that qualifying day would be excluded, even if the interruptions extend into subsequent days.
D. Customer-Caused Outages	
Customer owned	Any interruption caused by customer-owned equipment failure or customer operation.
E. All Other Outages: Transmission and Distribution	
Animals/birds	Any interruption caused by animals or birds contacting energized facilities.
Lightning	Any interruption caused by lightning affecting energized facilities.
Overload	Any interruption caused by an electrical overload.
Tree-related	Any interruption caused by vegetation contacting energized facilities, other than customer or employee felled trees.
Vehicle accident	Any interruption caused by a vehicle contacting a structure, guy, or enclosure.
Contact with foreign objects	Any interruption caused by unintentional contact with energized facilities brought about by human error. Examples would be ladders, kites, metallic balloons, customer-felled trees, dig-ins, boats, antennas, cranes, and human contact.
Employee operating error	Any interruption caused by an inadvertent operating error by an employee or contractor working for the Company, including employee felled trees.
Other	Any interruption for which the cause is known but not covered above such as fire, flood, vandalism, or intentional de-energizing to protect crew/public.
Equipment Failure: OH Conductor/Cable System	Any interruption caused by the failure of a component of the OH Conductor/Cable System.
Equipment Failure: UG Cable System	Any interruption caused by the failure of a component of the UG Cable System (excludes the Direct Buried Cable System).

Common Title	Definition
Equipment Failure: Direct Buried Cable System	Any interruption caused by the failure of a component of the Direct Buried Cable System.
Equipment Failure: Transformers	Any interruption caused by the failure of a distribution transformer.
Equipment Failure: Other	Any interruption caused by the failure of a component of the distribution system not covered above.
Equipment Failure: Transmission	Any interruption caused by the failure of a component of the Company's transmission system.
Equipment Failure: Substation	Any interruption caused by the failure of a component of the substation (bulk and distribution) facilities.
Unknown	Any interruption caused by unknown source. For example, if a substation circuit-breaker opens and after patrolling the line no cause is found and the circuit breaker is successfully reclosed, the interruption cause would be classified unknown.

Appendix 18: Status of Previous Corrective Actions

				Percent Complete			Original		Original Expected Improvement		2008 Current Values		
Rank	Circuit	Yr(s) Identified	Compl Date	OH (%)	UG	Aerial	SAIDI (MIN)	SAIFI	SAIDI (MIN)	SAIFI	SAIDI (MIN)	SAIFI	Comments
1	473	2007	Jan-09	100	NA	NA	259	1.52	90	0.78	0	0.00	Entire circuit tree trimmed in 2007. Improved sectionalizing and fuse coordination.
2	2542	2007	Jan-09	100	NA	NA	169	2.40	85	1.2	1	0.03	Improved sectionalizing and fuse coordination and installed animal protection throughout circuit.
	2542	2006	Jan-08	100	NA	NA	113	1.87	60	0.78			Improved sectionalizing and fuse coordination and installed animal protection throughout circuit. Installed two tie reclosers.
3	1605	2007	Jan-09	100	NA	NA	242	1.80	120	0.90	405	1.78	Improved sectionalizing and fuse coordination and installed animal protection throughout circuit.
	1605	2006	Jun-08	100	NA	100%	205	1.48	60	0.78			Replaced approximately 800 ft. of aerial paper insulated lead cable with EPR insulated cable. Improved sectionalizing and fuse coordination and installed animal protection throughout circuit. Installed tie recloser. Three phase portion of feeder tree trimmed in 2006. Reconductored bare copper primary with 1/0 aluminum tree wire on one street.
	1605	2005	Jun-08	100	NA	NA	190	1.25	60	0.78			Replaced two three-phase reclosers with triple single phase reclosers. Improved sectionalizing. Reconductored bare copper primary with 1/0 aluminum tree wire on three streets.
4	2683	2007	Jan-09	100	NA	NA	181	2.07	90	1.00	21	0.20	Improved sectionalizing and fuse coordination and installed animal protection throughout circuit. Reconductored bare copper primary with 1/0 aluminum tree wire on two streets.
	2683	2006	Sep-07	100	NA	NA	205	2.09	60	0.78			Improved sectionalizing and fuse coordination and installed animal protection throughout circuit. Installed two tie reclosers. Three phase portion of feeder tree trimmed in 2006.
5	470	2007	Jan-09	100	NA	NA	234	1.33	90	0.78	0	0.00	Entire circuit tree trimmed in 2007. Improved sectionalizing and fuse coordination.

				Percent Complete			Original		Original Expected Improvement		2008 Current Values		
Rank	Circuit	Yr(s) Identified	Compl Date	OH (%)	UG	Aerial	SAIDI (MIN)	SAIFI	SAIDI (MIN)	SAIFI	SAIDI (MIN)	SAIFI	Comments
6	2689	2007	Jan-09	100	NA	NA	201	2.05	100	1.02	435	4.78	Improved sectionalizing and fuse coordination and installed animal protection throughout circuit. Reconductored bare copper primary with 1/0 aluminum tree wire on one street.
	2689	2006	Jan-08	100	NA	NA	185	1.84	60	0.78			Improved sectionalizing and fuse coordination and installed animal protection throughout circuit. Installed tie recloser and inline recloser. Reconductored bare copper primary with 1/0 aluminum tree wire on three of four streets (Pansy Road not completed). Three phase portion of feeder tree trimmed in 2007.
7	472	2007	Jan-09	100	NA	NA	230	135	90	0.78	0	0.00	Entire circuit tree trimmed in 2007. Improved sectionalizing and fuse coordination.
8	2687	2007	Jan-09	100	NA	NA	153	1.94	90	1.00	97	1.89	Entire circuit tree trimmed in 2008. Improved sectionalizing and fuse coordination.
	2687	2006	Jun-08	100	NA	NA	152	1.82	60	0.78			Improved sectionalizing and fuse coordination and installed animal protection throughout circuit. Installed tie recloser and inline recloser. Reconductored bare copper primary with 1/0 aluminum tree wire on eight streets.
9	471	2007	Jan-09	100	NA	NA	213	1.26	90	0.78	2	0.01	Entire circuit tree trimmed in 2007. Improved sectionalizing and fuse coordination.
10	3547	2007	Jan-09	100	NA	NA	187	1.87	90	0.90	31	0.43	Three phase portion of circuit tree trimmed in 2007. Improved sectionalizing and fuse coordination and installed animal protection throughout circuit.
11	2682	2007	Jan-09	100	NA	NA	201	1.29	101	0.78	237	2.09	Improved sectionalizing and fuse coordination and installed animal protection throughout circuit. Reconductored bare copper primary with 1/0 aluminum tree wire on one street.
	2682	2006	Jun-08	100	NA	NA	193	1.52	60	0.78			Improved sectionalizing and fuse coordination and installed animal protection throughout circuit. Installed tie recloser. Reconductored bare copper primary with 1/0 aluminum tree wire on one street.
	2682	2005	Jun-06	100	NA	NA	249	2.07	60	0.78			Three-phase portion of the feeder tree trimmed in 2006. Improved sectionalizing and fuse coordination. Installed additional animal protection.

				Percent Complete			Original		Original Expected Improvement		2008 Current Values		
Rank	Circuit	Yr(s) Identified	Compl Date	OH (%)	UG	Aerial	SAIDI (MIN)	SAIFI	SAIDI (MIN)	SAIFI	SAIDI (MIN)	SAIFI	Comments
	2682	2004	Jun-06	100	NA	NA	184	1.89	60	0.78			Improved sectionalizing and fuse coordination. Installed additional animal protection. Reconductored bare copper primary with 1/0 aluminum tree wire on two streets.
12	2633	2007	Dec-09	100	NA	0%	115	1.84	60	1.00	46	1.04	Entire circuit tree trimmed in 2008. Improved sectionalizing and fuse coordination. Installing a three phase recloser to improve sectionalizing on aerial cable by 4th quarter of 2009.
	2633	2006	Jun-07	100	NA	NA	145	2.20	60	0.78	0.4	0	Improved sectionalizing and installed animal protection throughout circuit. Installed tie recloser.
	2633	2005	Jun-06	100	NA	NA	135	2.07	60	0.78	0.4	0	Improved sectionalizing and installed animal protection throughout circuit.
13	3638	2007	Jan-09	100	NA	NA	193	0.95	90	0.78	94	2.00	Improved sectionalizing and fuse coordination and installed animal protection throughout circuit.
14	1281	2007	Jan-09	100	NA	NA	78	1.59	60	0.78	186	1.93	Entire circuit tree trimmed in 2008.
	1281	2006	Dec-07	100	NA	100%	79	1.58	60	0.78			Replaced approximately 9,575 ft. of aerial paper insulated lead cable with EPR insulated cable. Improved sectionalizing and fuse coordination throughout the circuit.
15	1608	2007	Dec-09	90	NA	NA	184	1.58	90	0.78	298	2.95	Improved sectionalizing and fuse coordination and installed animal protection throughout circuit. Remainder of work to be completed by 4th quarter of 2009.
	1608	2006	Jan-08	100	NA	100%	179	1.45	60	0.78			Replaced approximately 500 ft. of aerial paper insulated lead cable with EPR insulated cable. Improved sectionalizing and fuse coordination and installed animal protection throughout the circuit. Installed tie recloser. The three phase portion of the feeder was tree trimmed in 2006. Reconductored the bare copper primary with 1/0 aluminum tree wire on one street.
16	1703	2007	Jan-09	100	NA	NA	156	1.56	90	1.00	57	1.09	Entire circuit tree trimmed in 2008. Improved sectionalizing and fuse coordination and installed animal protection throughout circuit. Reconductored bare copper primary with 1/0 aluminum tree wire on two streets.

				Percent Complete			Original		Original Expected Improvement		2008 Current Values		
Rank	Circuit	Yr(s) Identified	Compl Date	OH (%)	UG	Aerial	SAIDI (MIN)	SAIFI	SAIDI (MIN)	SAIFI	SAIDI (MIN)	SAIFI	Comments
	1703	2006	Jan-08	100	NA	NA	170	1.99	60	0.78			Improved sectionalizing and fuse coordination. Installed tie recloser. Reconductored bare copper primary with 1/0 aluminum tree wire on one street.
	1703	2005	Jul-06	100	NA	NA	161	1.80	60	0.78			Three phase portion of feeder tree-trimmed in 2005. Improved sectionalizing and fuse coordination.

Appendix 20: Percent Polespans Trimmed

Docket No. 86-12-03
DPUC - Order 1

	Planned Program Trimming Completed for Year 2008	**4-Year Cycle Trim Percentage to Date (as of 12/31/08)**
Companywide Mainline	90.2%	97.5%
Companywide Sidetaps	90.2%	48.7%

Notes:

1. Mainline is trimmed on a four-year cycle and sidetaps are trimmed on an eight-year cycle.
2. In 2008, 40 miles of the planned 461 miles was deferred into 2009.
3. Actual 2008 miles trimmed was 216.

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Appendix 21: Tree Trimming Denials

TOWN	CIRCUIT NO.	DENIALS
East Haven	1703	3
	1707	7
	1708	1
	1711	12
Hamden	1642	1
	1645	1
	1684	2
New Haven	1711	1
	1906	1
	1643	3
Stratford	385	3
	386	7
	2637	4
	2642	1
	2731	1
	2734	6
	2737	10
	2739	1
	2740	4
	2741	6
Trumbull	2731	3
West Haven	382	1
Totals		**79**

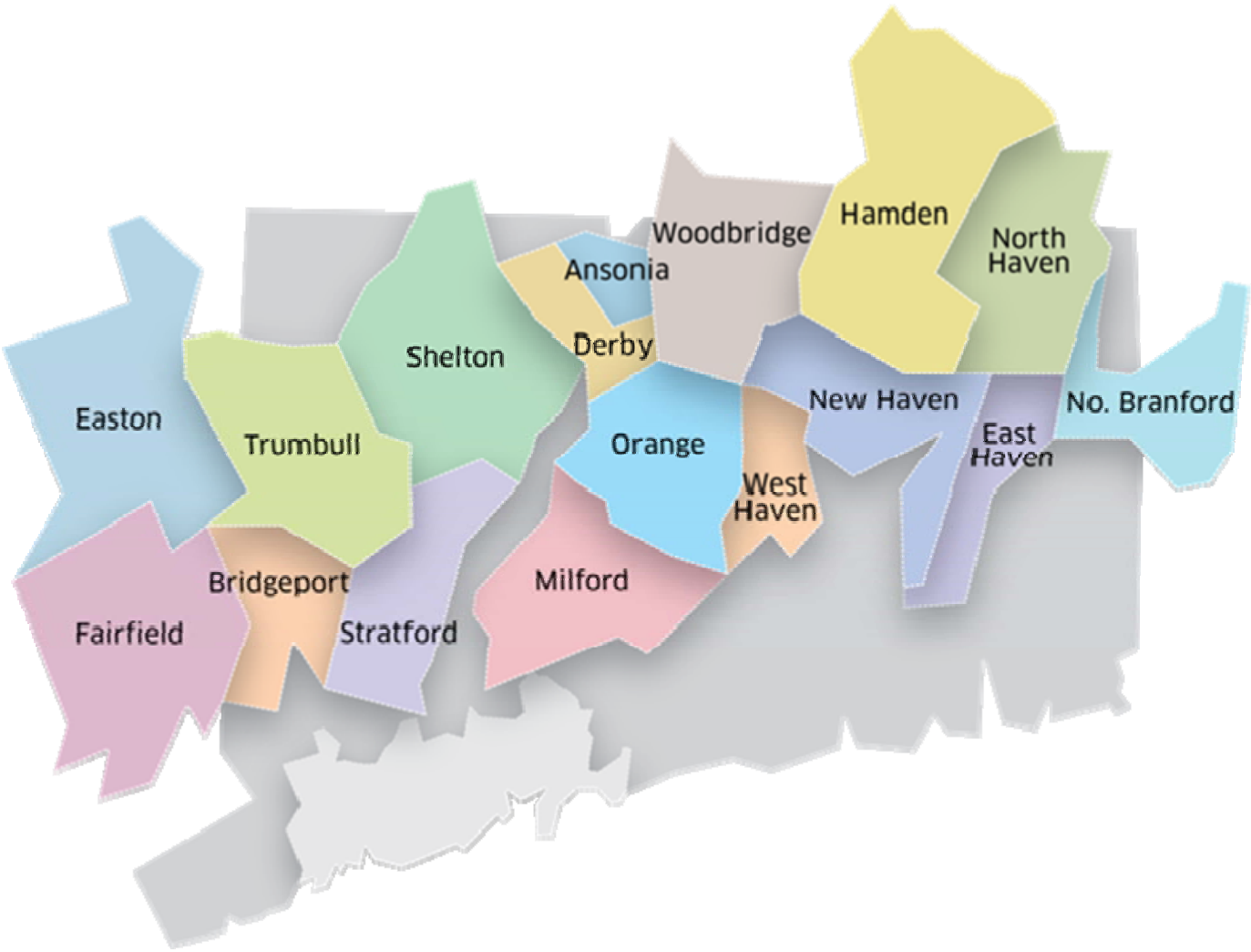
Appendix 22: Definition of Terms

Term	Definition
Aerial Cable	A conductor system in which each conductor is covered with a fully insulated covering. The cables are supported from a wire suspended on poles. Aerial cable is often installed in areas of heavy trees where other systems such as tree-wire would not be adequate.
ASAI (Average Service Availability Index)	The ratio of the total number of customer hours that service was available during a year to the total customer hours demanded. Customer hours demanded are determined as the twelve-month average number of customers served multiplied by 8760 hours. **ASAI** = customer hours of available service/customer hours demanded
Autoloop	A scheme where two or more distribution circuits are tied together with a normally-open tie recloser capable of automatically restoring service to portions of a feeder that were de-energized due to an outage.
Backbone Feeder	The portion of the three-phase distribution circuit beginning at the substation and ending at transitions to single- or multi-phase circuitry protected by single-phase devices.
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 determined by dividing the sum of all customer interruption durations by the total number of customers interrupted in a year. **CAIDI** = sum of customer interruption durations/total number of customer interruptions
CAIFI (Customer Average Interruption Frequency Index)	The average number of interruptions per customer interrupted per year. It is determined by dividing the number of customer interruptions observed in a year by the number of customers affected. The customers affected are counted only once, regardless of the number of interruptions that each may have experienced during the year. This index is generally difficult to compile due to problems associated with gathering data on the number of customers affected. **CAIFI** = total number of customer interruptions/total number of customers affected
Circuit Breaker	A device which is utilized to interrupt the flow of current under normal or abnormal conditions. Circuit breakers are normally intended to operate infrequently and are operated by an external set of controls.
Covered Conductor	A conductor covered with a dielectric having no rated insulating strength or having a rated insulating strength less than the voltage of the circuit in which the conductor is used.
Distribution Circuit	An electric line which operates at voltage levels below 35,000 volts and from which the customer's ultimate utilization voltage (e.g., 120V, 240V, 480V) is directly provided through a distribution transformer.
Fault	A short circuit which occurs on an electric system. A fault is an abnormal occurrence which may be a result of a failed piece of equipment, a foreign object such as a tree limb contacting wires, or wires slapping together due to weather conditions such as high winds, snow, or ice.
Feedback	The return to a point of origin of evaluative or corrective information about an action or process.

Term	Definition
Fuse	A device which opens when overheated by the passage of abnormally high current such as a short circuit.
Interruption	Loss of electric service to one or more customers for a period of time. See "Outage".
KVA	Kilo-Volt-Amperes. A measure of electrical capacity equal to the product of the voltage multiplied by the current divided by 1,000. Electrical equipment capacities are sometimes stated in KVA.
Loop Feed	A number of power lines forming a closed loop or ring. There are two or more routes by which any point on a loop fed circuit can receive energy.
Major Storm	In March 1995, the DPUC approved a new major storm definition, which is based on a statistical analysis of the most recent four calendar years of reliability data. Under the new definition, a major storm will be declared when the number of restoration steps exceeds the 98.5 percentile of all days in the most recent four years. All reliability data associated with interruptions beginning on that qualifying day would be excluded, even if the interruptions extend into subsequent days.
Momentary Interruption	An interruption which results in a loss of electric service for a brief period of time. Service is usually restored by devices which operate automatically, often in less than one second.
Network Primary System	An electrical system in which the high voltage (i.e. 15,000 volt) primaries of transformers are loop fed by two or more circuits.
Network Secondary System	An electrical system in which the low voltage (i.e. 120/208, 277/480 volt) secondaries of transformers are connected to a common network of wires for supplying light and power directly to consumers. (See also loop feed.)
Non-Tree Wire	Bare wire or any other wire not intended to withstand abrasion to tree contact.
Outage	An extended interruption (greater than 5 minutes) of service to one or more customers which usually requires human intervention to restore electric service. See Appendix 16 for descriptions of the causes of outages used in this report.
Phase Spacing	The distance between the current carrying conductors in a power delivery system.
Primary (Distribution) Feeder	A primary voltage distribution circuit, usually considered to be between a substation or point of supply and the distribution transformers, which supply lower voltage distribution circuits or consumer service circuits.
Radial System	An electrical distribution or transmission system which provides only one path for power to flow. It is generally considered to be the least reliable system but is also the least costly as compared to a network system.
Recloser	A device which isolates a short circuited component from its voltage source. A recloser, unlike a fuse, may restore voltage one or more times to determine if the short circuit has cleared.
Reclosing	A technique used with circuit breakers and reclosers where voltage is interrupted to allow a short circuit to clear (i.e., a tree branch to fall to the ground) and then voltage is restored to determine if the short circuit has cleared.
Reliability	The degree to which electric service is supplied continuously.

Term	Definition
Rights-of-way	The land over which a utility line, railroad, or roadway passes. Utility facilities may also be buried in a right-of-way.
SAIDI (System Average Interruption Duration Index)	The average interruption duration in minutes per customer served. It is determined by dividing the sum of all customer interruption durations during a year by the number of customers served. **SAIDI** = sum of customer interruption durations/total number of customers.
SAIFI (System Average Interruption Frequency Index)	The average number of times that a system customer is interrupted during a year. It is computed 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. **SAIFI** = ((sum of number of customers interrupted/customers served) times 12) divided by the number of months.
SCADA	An acronym for Supervisory Control and Data Acquisition, which is a system for controlling and gathering data on a utility system.
Sectionalizer	Similar to a switch, this device does not have the capability to isolate electric devices under short circuit conditions and must rely on some other device such as a recloser or breaker to interrupt the short circuit before opening itself to isolate the short circuit.
Service Drop	The overhead conductors between the electric supply, such as the nearest pole, and the building or structure being served.
Side Tap	A single or multi-phase portion of a distribution circuit that is supplied by the backbone feeder and protected by single-phase devices.
Spacer Cable	A type of electric supply line construction consisting of an assembly of one or more covered conductors, separated from each other and supported from a messenger by insulating spacers.
Storm	Refer to the definition of Major Storm.
Subtransmission	A functional classification relating to that portion of utility plant used for the purpose of distributing electric energy in bulk from convenient points of the transmission system to the distribution system and in certain cases to ultimate consumers.
Switch	A device that can open or close an electrical circuit. Some switches are able to interrupt load current (loadbreak) while others can only be operated with the circuit de-energized (non-loadbreak).
Thermovision	A trade name for a system of infrared cameras and sensors used to detect heat. On an electric utility system, excessive heating of hardware is often a sign of impending failure due to loose or poor connections or other overheating equipment.
Transformer (Line)	An electromagnetic device for changing the voltage of alternating-current electricity which has been classified as distribution equipment.
Tree-Wire	A conductor with an abrasion-resistant outer covering, usually nonmetallic, and intended for use on overhead lines passing through trees (Refer to the definition of Covered Conductor).

Appendix 23: Service Territory Map



Appendix 26: Reliability Performance against Goals

Year	CAIDI Goal*	CAIDI Actual	ASAI Goal*	ASAI Actual	SAIDI Goal*	SAIDI Actual	SAIFI Goal*	SAIFI Actual
2009	N/A		N/A		74		0.80	
2008	N/A	98	N/A	99.986	73	73	0.80	0.75
2007	N/A	99	N/A	99.987	70	69	0.73	0.69
2006	N/A	85	N/A	99.990	70	54	0.79	0.64
2005	N/A	93	N/A	99.988	70	66	0.79	0.71
2004	N/A	101	N/A	99.988	64	62	0.81	0.61
2003	N/A	92	N/A	99.985	68	79	0.85	0.86
2002	N/A	95	N/A	99.987	68	70	0.95	0.73
2001	N/A	72	N/A	99.989	68	62	0.95	0.85
2000	N/A	76	N/A	99.989	68	58	0.95	0.77
1999	N/A	74	N/A	99.989	68	58	0.95	0.79
1998	72	79	N/A	99.988	57	61	0.95	0.78
1997	72	62	N/A	99.991	57	48	0.90	0.78

Excluding: Outages caused by power supply or transmission problems external to UI.
Scheduled (planned) outages.
Outages caused by major storms or by customer equipment connected to UI lines.

* Goals stated represent threshold level.

Appendix 27: Customers Served

The United Illuminating Company

Docket Number 86-12-10
DPUC Order 1

Customers Served

2008	January	320,972
	February	321,305
	March	321,506
	April	321,209
	May	320,986
	June	320,436
	July	320,033
	August	319,912
	September	320,111
	October	320,273
	November	321,133
	December	321,358
	(Average)	**320,770**

Appendix 28: 2008 Voltage Irregularity Claims

Docket 86-12-03
Appendix 28

2008
Voltage Irregularity Events Resulting In 10 or More Damage Claims

None for 2008.