WESTERN MASSACHUSETTS ELECTRIC COMPANY'S
STRAY VOLTAGE AND MANHOLE SAFETY REPORT

January 10, 2006

Western Massachusetts Electric Company ("WMECO") is pleased to submit this plan in compliance with the Department of Telecommunications and Energy's ("Department") letter dated December 9, 2005. This plan responds to the reports on: (1) the Independent Assessment of Stray Voltage in Underground Distribution Systems of Massachusetts Electric Companies ("Stray Voltage Final Report") as prepared by Navigant Consulting, Inc. ("Navigant"); and (2) the Independent Assessment of Dislodged Manhole Covers ("Manhole Safety Report") as prepared by Siemens Power Transmission & Distribution, Inc. ("Siemens") (together these reports will be referred to as the "Final Reports"). WMECO commends the Department for its efforts on the two very important public safety issues of stray voltage and manhole cover safety.

WMECO will work to implement the recommendations in the Final Reports. As stated in prior correspondence with the Department on these two topics, WMECO currently has plans in place to implement portions of the Final Reports' recommendations but has formed a project team that will develop a comprehensive plan that will respond to each of the Final Reports' recommendations. Accordingly, this interim plan will be replaced by a further plan that will be submitted to the Department at such time as WMECO has

additional opportunity to work through all the issues and can assure that the plan is sustainable.

In developing its further plan WMECO is also cognizant that other utilities in the Commonwealth may have helpful ideas on how best to meet the Department's goals. Other Massachusetts utilities, in fact, may have had more experience in developing such plans as a result of requirements in other states. WMECO shares the Department's goal that all of the Massachusetts utilities have common practices and reporting systems in place. Therefore, WMECO feels it is prudent to review what others are doing before we fix in place our own plan. As described below, the lack of a final, comprehensive plan does not mean that WMECO is waiting to begin implementation where actions can be taken.

Stray Voltage Recommendations

WMECO will achieve the 20-volt detection level that the Department has determined must be reached and will work toward achieving a detection level of 8 volts or less over time. WMECO will also evaluate the test results that are obtained during our stray voltage testing on an ongoing basis and will adjust our inspection intervals as appropriate.

Presently, WMECO has plans in place to perform stray voltage testing on its direct buried facilities as part of our existing five-year direct buried inspection program. WMECO has formed a team to develop a plan to test the additional items recommended for testing by Navigant. In addition to developing plans to test the equipment, WMECO will develop inspection forms to collect the data and databases to store the data. WMECO has detailed its planned course of action for each of the recommendations below.

(1) Prepare or update preventative maintenance plans to include inspection and testing of low voltage secondary equipment and facilities. Plans and documents should include:

- **Sources:**
  - **Metallic street lights and fixtures**

WMECO tested all of its metal street light poles in 2004. In addition to testing poles owned by WMECO, tests were performed on poles owned by the City of Springfield that are supplied by WMECO. Tests were performed by street not by specific pole location and records were kept as such. WMECO tested the metal street light poles during the day as they have individual photocells and the conductors supplying them are energized at all times. Some of the Springfield-owned poles that were tested are group controlled by a

single photocell and these were also tested during the day by covering the photocell to turn all of the lights on.

WMECO's testing revealed that all incidents of stray voltage were due to installation errors and not from insulation degradation. WMECO added training on the construction standards for metal street light poles to the annual refresher training classes of its line workers. WMECO also has added the requirement that all new metal street light poles are to be tested for stray voltage when installed and all existing metal street light poles are to be tested for stray voltage whenever they are worked on.

Based on WMECO's findings during our testing in 2004 and the added training provided to our line workers, WMECO does not believe that this population of equipment poses a significant stray voltage risk. However, WMECO will develop a plan to test all metal street light poles on a five-year rolling basis. WMECO is currently gathering GPS data on its metal street light poles in Springfield. This will ultimately allow future testing to be done on a pole-specific basis rather than by street.

- **Metallic risers, sweeps and conduits**

The testing of all metallic risers, sweeps and conduits located on poles within the WMECO service territory will be a challenge for WMECO because a list of this equipment does not currently exist. WMECO's first step to testing this equipment will be creating a list of this equipment. WMECO will determine the best way to accurately gather this data quickly and cost effectively. WMECO expects that it will take a significant amount of time and effort to create this list and does not expect to perform

testing on this equipment in the near future. Once WMECO determines the number of locations that require testing, a schedule will be developed that will complete all testing by the end of 2010 such that it all has been tested within five years. WMECO will adjust the initial schedule to spread this testing out evenly over the subsequent five-year periods after 2010. WMECO believes that this approach is appropriate because this type of equipment is typically located in our overhead areas where it is not accessible to large numbers of people. If the results of the testing reveal that this equipment poses an extremely low risk to the public WMECO may propose to extend the test interval beyond five years.

- **Manhole and handhole covers**

Manhole covers – WMECO will develop a schedule to test all manholes covers that will complete all testing by the end of 2010 such that all have been tested within five years. WMECO will incorporate the stray voltage testing into the manhole inspection process that will be done to meet the recommendations in the Manhole Safety Report. WMECO will begin this testing in 2006 but may do less than 20% of the population in the first year.

Handhole covers – WMECO tested all metal service box (handhole) covers in its conventional underground (duct and manhole) areas in 2004. WMECO will retest the service boxes in its conventional underground when testing the manhole covers that are adjacent to them as described above.

WMECO also has some metal handhole covers in its direct buried areas. WMECO will test these handholes in our direct buried inspection program which is performed on a five-year rolling basis and has been amended to include stray voltage testing. Manhole and handhole covers that are non-metallic will not be tested.

- **Secondary pedestals**

WMECO does not believe that it owns any secondary pedestals and as such will not develop a formal plan to test this type of equipment. The WMECO team that is developing our stray voltage testing plan will research this issue. If it is found that WMECO has some secondary pedestals, a schedule will be developed to test them. WMECO will also investigate the need to test secondary pedestals that are owned by others and supplied by WMECO.

- **Padmount transformers and enclosures**

WMECO will begin testing padmount transformers in its residential direct buried areas as part of its direct buried inspection program in 2006.

WMECO has numerous other padmount transformers and enclosures in its service territory. The first step will be to assure that the list of equipment locations is complete. WMECO will determine the best way to accurately gather this data quickly and cost effectively. WMECO will begin testing some of these other equipment locations in 2006 but expects to do less than 20% of the population in the first year. Once WMECO determines the number of locations that require testing, a schedule will be developed that will complete all testing by the end of 2010 such that it all has been tested within five

years. WMECO will adjust the initial schedule to spread this testing out evenly over the subsequent five-year periods after 2010. WMECO believes that this approach is appropriate because this type of equipment poses a low risk of stray voltage. Non-metallic enclosures will not be tested.

- **Padmount switchgear, termination cabinets and junction boxes**

WMECO has numerous padmount switchgear, termination cabinets and junction boxes in its service territory. The first step will be to assure that the list of equipment locations is complete. WMECO will determine the best way to accurately gather this data quickly and cost effectively. WMECO will begin testing some of these equipment locations in 2006 but expects to do less than 20% of the population in the first year. Once WMECO determines the number of locations that require testing, a schedule will be developed that will complete all testing by the end of 2010 such that it all has been tested within five years. WMECO will adjust the initial schedule to spread this testing out evenly over the subsequent five-year periods after 2010. WMECO believes that this approach is appropriate because this type of equipment poses a low risk of stray voltage. Non-metallic padmount switchgear, termination cabinets and junction boxes will not be tested.

- **Control cabinets such as pole-mounted capacitor controls**

WMECO's control cabinet population is typically made up of recloser, regulator, and capacitor controls. The WMECO team developing our testing plan will verify that this list includes all types of control cabinets. A list of this type of equipment should be fairly easy to compile. It is expected that the testing of control boxes can be completed in

2006. The WMECO team will propose an appropriate interval for retesting based on the results of the first round of testing.

- **Schedules - Based on susceptibility or prior history of stray voltage, minimum rolling five-year basis.**

WMECO only has stray voltage susceptibility data on its metal street light pole and metal service box population. As mentioned elsewhere the results of the testing does not indicate a high risk of stray voltage in either of these populations.

WMECO will develop plans that will test all of the recommended equipment within five years. WMECO will monitor the test results as they are being obtained for each type of equipment and will adjust its test plan accordingly. For example, if testing reveals that a specific item is found to pose significantly more risk the testing on this population will be accelerated.

- **Seasonal factors - Schedule testing during the winter if we believe that stray voltage is more likely due to increased salt and moisture in the environment.**

WMECO does not plan to limit testing to the winter because there is insufficient data to support the position that stray voltage events are more prevalent during the winter months. In order to determine if such a correlation exists it is necessary to perform testing year round and evaluate the results. Also, some of the equipment to be tested is located flush with the ground and weather conditions such as ice and snow will make winter testing problematic.

- **Mitigation and remediation - Immediate repair if voltage is 20 volts or more, repair within 24 hours if voltage is between 8 and 20 volts.**

WMECO's current safety practices prohibit leaving any location where stray voltage has been detected without making the location safe. If a location cannot be made safe immediately WMECO requires that someone stand by the location to protect the public while awaiting a qualified repairperson. In some cases it is appropriate to make the area safe by disconnecting the supply to the energized object. In the case of a disconnect, follow-up repairs are made based on the need for the affected equipment.

The stray voltage testers that WMECO currently has in use can detect stray voltage to the 20 volt threshold which is the minimum required level to ensure public safety. WMECO will replace its existing testers with those that can detect stray voltage to the 8 volt threshold in early 2006.

(2) Implement consistent monitoring and tracking systems that record and document stray voltage events. The monitoring and tracking system should include the ability to query data and produce interim reports via menu-based systems. The utilities are encouraged to jointly discuss development and use of a common tracking and recording system.

WMECO needs to develop monitoring and tracking systems that record and document stray voltage events and the team will investigate how best to do so. WMECO will endeavor to include within these systems the attributes and features that the Stray Voltage Final Report recommends. WMECO will adopt a system that includes the best features of other utility plans to the extent possible given existing computer programs and software in use at WMECO.

(3) Submit reports to the DTE that document and summarize information obtained in recommendation 2. The utilities should consider assigning individual(s) who are responsible for issuing these reports and responding to questions regarding the company's stray voltage program.

WMECO will develop its monitoring and tracking systems such that they can produce the reports that are listed under this recommendation in the Stray Voltage Final Report. WMECO will manually provide reports while the systems are being developed.

(4) Monitor and assess alternate testing methods, including new equipment that will improve inspection efficiency and cost.

WMECO will monitor and assess alternate testing methods, including new equipment that will improve inspection efficiency and cost as it becomes aware of such items. WMECO will continue to attend the annual conference on Stray Voltage and Manhole Safety that is held at Consolidated Edison in New York City. WMECO recently visited the Sarnoff Corp in New Jersey to investigate their remote stray voltage detection device and will be following its deployment in New York City by Consolidated Edison.

(5) Promote safety awareness via mail, bill stuffers and contractor bulletins to the extent these processes are not already in place.

WMECO has an external safety awareness communications plan in place and will continue to work the plan in 2006. Programs and Initiatives underway include the School Safety program, bi-monthly public service announcements, safety as a regular feature of the monthly *Consumer News*, participation in safety fairs and community events, a contractor safety brochure, an annual safety advertising campaign, an annual public officials safety refresher, a kids safety Web site and promotion of safety awareness on the WMECO Web site. Topics for the Public Service Announcements and Consumer News

include: downed wires, storms, generators, space heaters, appliances, general electrical safety, home office safety, Dig Safe, home improvement safety, safety for kids, safety for college students, lightning, working outdoors/fall chores, holiday lighting, flooding, pools/spas, extension cords, power tool use, landscaping, streetlights, contractor safety. WMECO will integrate information regarding stray voltage into its existing communications plan.

(6) Explore and promote the development of protective equipment with electric equipment suppliers that can differentiate and isolate stray voltage from normal customer electrical loads.

WMECO will explore and promote the development of protective equipment with electric equipment suppliers that can differentiate and isolate stray voltage from normal customer electrical loads. At this time WMECO is not aware of any equipment with these capabilities but believes that Consolidated Edison has done some research and will monitor their efforts in this regard.

Manhole Safety Recommendations

The WMECO team that has been formed to develop a plan to implement the Navigant recommendations will also create the plan to implement the Siemens' recommendations. As with the Navigant recommendations, WMECO needs to develop inspection forms to collect the data and databases to store the data for the Siemens' recommendations. WMECO has detailed its planned course of action for each of the recommendations below.

(1) Definition of Manhole Events - PTI recommends the following definition for manhole events, which addresses smoking manholes, manhole fires, and manhole explosions:

Smoking Manhole – A manhole event in which smoke is visible, but no visible flame is escaping from the edge of the manhole cover or from holes in the cover.
Manhole Fire – A manhole event in which the cover remains seated in its frame and here is visible flame escaping from the cover's edge or from holes in the cover.
Manhole Explosion – A manhole event in which a release of energy from the manhole occurs and the manhole cover is dislodged from its frame, or debris such as cement and dirt is projected into the air although the manhole cover remains seated.

WMECO agrees that the current practice of defining a manhole event as an occurrence where the manhole cover is dislodged does not adequately capture information on all significant events that occur in its underground distribution system. WMECO also believes that it is important for all of the Massachusetts utilities to use common definitions for manhole events for data collection and reporting purposes.

WMECO has attended conferences at Consolidated Edison in New York City on the subject of manhole safety and proposes that the definitions used by Consolidated Edison be used in Massachusetts. The Consolidated Edison definitions are as follows:

Smoking Manhole – A manhole event in which smoke, but no visible flame is escaping from holes in the cover or around the cover's edge and the cover remains seated in its frame.

Manhole Fire – A manhole event in which flame is visible at holes in the manhole cover or around the cover's edge and the cover remains seated in its frame.

Manhole Open – A manhole event in which a release of energy from the manhole occurs and one or more manhole covers are dislodged from their respective frames. There is no reported injury or damage.

Manhole Explosion – A manhole event in which a release of energy from the manhole is accompanied by physical injury to people and/or damage to vehicles or surrounding structures, including windows.

WMECO believes the use of the Consolidated Edison definitions will provide more meaningful information as they separate out dislodged covers from explosions. WMECO proposes to work with the other Massachusetts utilities and the Department through a Working Group (discussed in Recommendation 6, below) to determine if the Consolidated Edison definitions are appropriate for use in Massachusetts. In the interim, WMECO will use the definitions recommended by Siemens.

(2) Inspection and Maintenance Practices - PTI recommends implementation of a program designed to inspect all manholes over the five-year period beginning January 1, 2006 and create a database of manhole conditions and required repairs. The resulting data should be used to prioritize future manhole inspections and/or determine an appropriate periodic re-inspection cycle for each individual company. Required repairs should be prioritized in accordance with a standardized repair priority schedule, and the resulting manhole inspection repair backlog should be monitored and tracked by priority level. (Abnormal conditions found during the manhole inspections should be recorded and reported per Recommendation 5, below.)

WMECO will implement a manhole inspection program in 2006 utilizing existing inspection forms and will plan to complete inspections of all manholes within five years. WMECO may inspect less than 20% of its manholes in 2006. WMECO will manually collect the inspection data while it works to develop a database of manhole conditions and required repairs. WMECO has an existing repair priority matrix that will be compared with the repair priority checklist in Appendix B.1 of the Manhole Safety Report. WMECO will make adjustments to its existing repair priority matrix as determined by the project team.

(3) Splicing Logs - PTI recommends that each company maintain a database of new and repair splices made by employees and contractor crews in order to determine possible workmanship issues and related splicing training needs.

WMECO is not currently recording new and repair splices made by employees. WMECO does not use contractor crews to perform splicing work on its underground system.

WMECO questions the actual value of the creation and maintenance of a splice log as WMECO does not believe a meaningful reduction in splice failures will be obtained from this effort. WMECO records failure data on splices, as well as all other types of equipment, in its Equipment Failure Reporting System ("EFRS"). The EFRS can be queried to determine if a specific type of splice is failing at an alarming rate. WMECO has annual refresher training for all of its underground cable splicers and if problems are found with a particular type of splice provides training to all splicers to assure that all future splices are made correctly. If a serious workmanship issue is found that requires training between sessions of the scheduled refresher training WMECO holds training classes soon after the problem is discovered. WMECO will evaluate failed splices and will provide additional training if the evaluations reveal any workmanship issues. WMECO believes that its current practices adequately identify and correct workmanship problems in its underground system.

WMECO believes that a splice log will prove to be overly burdensome and proposes that the Working Group address this topic to determine if an alternative approach can be developed. If it is determined that a splice log is the best choice it will be used to record

splices made in WMECO's conventional underground (duct and manhole system) and not those that are made elsewhere such as in our direct buried system.

(4) Failure Analysis and Trends - PTI recommends that each company train a sufficient number of employees in forensic failure analysis so that a field failure analysis is performed and a report generated for all manhole events in order to determine the root cause of the event. Additionally, the failure analyses reports should be compiled and assessed each year, and a report of annual trends prepared and submitted to the DTE.

In this area, WMECO currently obtains assistance from the Northeast Utilities Underground Standards Group. Northeast Utilities is WMECO's corporate parent. WMECO will determine if there is a need to train its own employees in addition to those resources it receives from its affiliates.

WMECO proposes that the Working Group addresses the creation of a failure analysis process such that a common approach is being used by all Massachusetts utilities. A standard approach to failure analysis and the associated data collection will result in the best possible conclusions from the data. WMECO will use the information in Appendix B.3 of the Manhole Safety Report as a guide when performing failure analysis until a standard approach is developed.

(5) Data Collection and Reporting - PTI recommends that the companies employ standardized manhole inspection and manhole event data collection forms that maximize checklists and minimize the need for free-form comments. Quarterly and annual manhole inspection and manhole event reports with a prescribed summary analysis should be prepared and submitted to the DTE. Additionally, individual standardized reports on all events involving dislodged covers should be submitted to the DTE as soon after the event as possible. A suggested manhole event data collection form and manhole inspection checklist items are shown in Appendix B.4

and B.5, respectively. At minimum, the reports should contain the information shown in Appendix B.6.

While WMECO agrees that standardized manhole inspection forms and event data collection forms that maximize checklists and minimize the need for free-form comments are desirable, WMECO has existing manhole inspection forms that have been developed by an affiliate. WMECO believes its current manhole inspection form gathers all of the information necessary to assess the condition of its underground system. However, the WMECO team will review the items the Manhole Safety Report recommends be included as well as the inspection forms of the other Massachusetts utilities (through the Working Group) to determine if the current form needs to be modified.

WMECO also needs to develop the required quarterly and annual reports to be submitted to the Department. WMECO will collaborate with the other Massachusetts utilities in an effort to provide standardized information to the Department.

WMECO will provide reports to the Department on all events involving dislodged covers as soon as possible after the event.

(6) Inter-Company Cooperation - PTI recommends the creation of a Working Group comprised of representatives from the four companies and DTE Staff to meet quarterly for sharing information on manhole event trends, root cause analyses, research studies, results of pilot programs, new technologies, and lessons learned. The Working Group could also address broader issues related to electric distribution reliability and safety, as appropriate.

WMECO has been in contact with representatives of the other three Massachusetts utilities and all parties have agreed to create a Working Group as described above.

(7) Outreach - PTI recommends a survey be taken of non-jurisdictional operators of underground electric distribution systems in Massachusetts. The survey should consist of questions regarding manhole events and manhole inspection practices, and determine the responding municipalities/organizations interest in participating in the Working Group (see Recommendation 6).

WMECO believes that a survey as described above should be distributed by the Department and not by any one of the four Massachusetts utilities under the Department's jurisdiction. Should the Department decide to perform such a survey WMECO would welcome the input and ideas of those surveyed and hope that they are also interested in joining the Working Group.