99-E-0930
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Martin F. Heslin
Assistant General Counsel
Consolidated Edison Company of New York, Inc.
4 Irving Place, Room 1815-S, New York NY 10003
212-460-4705 Fax: 212-677-5850
Email: Heslinm@coned.com

April 30, 2007
By Overnight Mail

Hon. Jaclyn A. Brilling
Secretary
New York State
Department of Public Service
Three Empire State Plaza
Albany, New York 12223

Re: Case 99-E0930 – Proceeding on Motion of the Commission to Investigate the July 6, 1999 Power Outage of Con Edison's Washington Heights Network

Dear Secretary Brilling:

Enclosed for filing are an original and five copies of the *May 1, 2007 Status Report of Consolidated Edison Company of New York, Inc. on the Implementation of the January 2000 Action Plan for Washington Heights Network Shutdown Reports*.

A copy of this filing is being sent to the City of New York and the Attorney General of the State of New York.

Very truly yours,

Martin F. Heslin

Enclosures

cc: Attorney General of the State of New York
City of New York

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Proceeding on Motion of the Commission to Investigate the July 6, 1999 Power Outage of Con Edison's Washington Heights Network	:	Case 99-E-0930

MAY 1, 2007 STATUS REPORT OF CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. ON THE IMPLEMENTATION OF THE JANUARY 2000 ACTION PLAN FOR WASHINGTON HEIGHTS NETWORK SHUTDOWN REPORTS

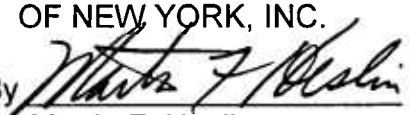
Immediately following the Washington Heights network shutdown in early July 1999, Consolidated Edison Company of New York, Inc. ("Con Edison" or "the Company") launched two investigations of the incident. One was undertaken by an Independent Review Board and the other by an internal Corporate Review Committee. The Independent Review Board (IRB) was comprised of three prominent high-level industry experts. The Corporate Review Committee (CRC) consisted of a core team of former Company executives supported by experienced engineering and operating personnel. Both teams issued their reports in December 1999. Both reports acknowledged Con Edison's long history of service reliability, as well as the soundness of its design and maintenance standards. The reports made recommendations geared toward reducing the probability of future network shutdowns.

In January 2000, the Company developed an Action Plan stating implementation activities to address the recommendations in each report. The attached Status Report provides the current status of the implementation activities stated in the Action Plan. As discussed in prior status reports filed by Con Edison, implementation of a number of these activities is complete. Accordingly, as in the prior status reports, the attached report addresses those Action Plan activities for which implementation is ongoing.

Dated: May 1, 2007

Respectfully submitted,

CONSOLIDATED EDISON COMPANY
OF NEW YORK, INC.

By 

Martin F. Heslin
Assistant General Counsel
4 Irving Place
New York, NY 10003
(212) 460-4705

ACTION PLAN NO. 3

3. Review existing methods of rating cables and transformers, giving special attention to the effects of high ambient temperatures on equipment performance. (Recommendations CRC-3, IRB-3.1, IRB-3.7)

Action Plan

Adopt the Committees' recommendations by initiating a review of our current methods of cable and transformer ratings considering load cycles and test results.

Implementation Steps

- Perform laboratory testing to determine the thermal capabilities of early vintage paper cable and revise specifications as required.
- Evaluate a multi-year program to provide additional loading margins on network transformers.
- Assess the use of both short-term and extended cable ratings to compliment the existing 24-hour load cable ratings.
- Based on field data collection during the summer 2000, make appropriate refinements to calculations relating to the cable current matrix to duct configuration.
- Develop and issue guidelines for the appropriate sizing of feeder cables in both new and replacement applications.

Implementation Step: Perform laboratory testing to determine the thermal capabilities of early vintage paper cable and revise specifications as required.

This item is completed. See Con Edison's November 1, 2001 status report for its implementation of PSC Recommendation II-8.

Implementation Step: Evaluate a multi-year program to provide additional loading margins on network transformers.

November 1, 2006 Status: Prior to summer 2006, the Company relieved all network transformers to no more than 25 points above emergency rating. The Company plans to relieve network transformers to no more than 25 points above emergency rating for summer 2007.

May 1, 2007 Status: Prior to summer 2007, the Company will relieve all network transformers to no more than 25 points above emergency rating.

Implementation Step: Assess the use of both short-term and extended cable ratings to compliment the existing 24-hour load cable ratings.

This item is completed. See Con Edison's November 1, 2002 status report.

Implementation Step: Based on field data collection during the summer 2000, make appropriate refinements to calculations relating to the cable current matrix to duct configuration.

This item is completed. See Con Edison's November 1, 2002 status report.

Implementation Step: Develop and issue guidelines for the appropriate sizing of feeder cables in both new and replacement applications.

This item is completed. See December 29, 2000 status report.

ACTION PLAN NO. 4

4. Evaluate improved protective relays on certain network protectors. (Recommendations CRC-5, IRB-3.10, IRB-3.13)

Action Plan

Adopt the Committees' recommendations by initiating improvements in specific distribution relay protection systems.

Implementation Steps

- Determine the specific conditions and configuration in which a station breaker will operate in lieu of a network protector. Locate these situations on distribution system and recommend a plan to address them.
- Investigate the feasibility of modifying the Sherman Creek feeder breaker relays to provide more selective directional protection.

November 1, 2006 Status: See Con Edison's status reports for its implementation of PSC Recommendation II-13.

May 1, 2007 Status:

Summary of Prior Actions

Relays are devices that sense an overcurrent condition and trip a feeder's circuit breaker to prevent the overcurrent from damaging the feeder. After a failure on Washington Heights feeder 1M03, a "Tempo" relay on a transformer that electrically connected 1M03 with feeder 1M05 failed to operate to prevent current from 1M05 from supplying the fault on 1M03. A backup relay sensed the overcurrent condition on 1M05 and tripped its circuit breaker and took 1M05 out of service. The transformer Tempo relay failed to operate in the very low voltage conditions existing at the time.

1. Tempo Relay Removal

All Tempo relays have been removed from isolated and spot networks and in fringe areas (where low voltage can occur when multiple feeders de-energize) and have been replaced with ETI microprocessor relays which are not susceptible to low voltage conditions. A total of 2,935 Tempo relays were removed.

2. Directional Over-Current Relays

Computer load-flow simulation studies (PVL) were run for Sherman Creek, Hellgate, E. 63rd ST, and Leonard St Substations to determine the magnitudes of 13kV fault contributions due to back-feed currents from the 120/208 Volt secondary distributed

network. It was determined that, under certain operating configurations, these current contributions can cause undesired tripping of 13 kV feeder over-current relays. This possibility can be eliminated by the application of directional over-current relays set to trip only for faults in the direction of normal load flow, and to not trip for back-feeding fault currents. These substations require directional relays because they are normally operated with their bus tie breakers open. When a three phase fault occurs it collapses the voltage only on one side of the bus tie breaker. On the other side of the bus tie breaker, the primary network voltage remains and provides the potential to contribute back-feed current to the fault. Directional relays would not operate since the fault current direction is opposite to the direction they are set to trip. This work has been completed at Sherman Creek, Hellgate, East 63rd Street 1 and 2 substations, and Leonard Street 1 and 2 substations.

This recommendation is completed

ACTION PLAN NO. 6

6. Develop a real time load monitoring capability for high-tension customers. (Recommendation CRC-7)

Action Plan

Adopt the Committee's recommendations by implement real time load monitoring capability for high-tension customers.

Implementation Step

Determine the best method to measure, transmit and integrate real time high-tension customer loads into the Control Center and Engineering systems.
Based on feasibility, develop an implementation program and schedule

November 1, 2006 Status: See Con Edison's status reports for its implementation of PSC Recommendation II-15.

May 1, 2007 Status:

Summary of Prior Actions

The Company funded an R&D project in attempt to find a way to monitor high-tension customer transformers. The R&D project was unsuccessful. The Company then turned to monitoring using the existing Remote Monitoring System. This approach was also unsuccessful because of the difficulties encountered with the installation portion of the project and the potential for high maintenance costs. . As a result, we have opted to use a newer technology that monitors HT customer load directly using a wireless demand meter. This system will obtain near real-time load information that will be available at the distribution control center and in addition will provide system modeling and power quality data.

Status Report (May 1, 2007)

The Company is actively working with a vendor to develop and deploy a viable High Tension Monitoring Data Acquisition System (HTMDAS). Many of the problems encountered in the development stage have been resolved, and the Company is currently field testing the metering device and the communication interface. Once the preliminary field testing is successfully completed, the Company plans to launch a pilot program by installing 25 HT remote monitoring devices in the Washington Heights network. Necessary metering components have already been ordered from General Electric and are scheduled to arrive at the beginning of May. First pilot installations will be initiated shortly after that. Once the pilot program is successful, the plan is to install these monitoring devices on all HT customer installations supplied from network feeders over the next three years.

ACTION PLAN NO. 10

10. Increase the reporting availability of existing remote monitoring equipment (Recommendation CRC-13)

Action Plan

Adopt the Committee's recommendations by increasing focus of RMS reporting, inspection and repair as part of summer preparedness program.

Implementation Steps

- Revise maintenance specification for the inspection and repair of non-reporting units and establish priority criteria for repair.
- Evaluate feasibility for advanced technology systems to improve monitoring of system status and loading.
- Explore alternate methods for estimating transformer loads on non-reporting units (i.e., Customer Service system data).

Implementation Step: Revise maintenance specification for the inspection and repair of non-reporting units and establish priority criteria for repair.

This project is completed. See June 29, 2001 status report.

Implementation Step: Evaluate feasibility for advanced technology systems to improve monitoring of system status and loading.

November 1, 2006 Status:

Update on RMS Receiver and Transmitter Installations

To date, we have installed 1021 new Remote Monitoring System (RMS) transmitters with RMSPTO (Pressure – Temperature – Oil Level) in selected transformer vault locations. We plan to have a total of 2,000 vaults installed with RMSPTO by the end of 2007. These transmitters monitor transformer secondary voltage and are outfitted to monitor additional analog and digital sensory inputs as above.

The RMSPTO installation is supplemented by contractor force personnel. The contractor, when required, adds nitrogen gas and repairs or replaces defective valves during scheduled work. This work is intended to help towards mitigating transformer failures and extending transformer reliability with corresponding public safety benefits.

The new analog pressure sensor is helping us to locate transformers that have extremely slow tank leaks that can pass the current transformer pressure test. Again, transformer

failure mitigation and public safety are enhanced as the project continues. 19 transformers have either been replaced, categorized as Cat 1 or 2, or are now on Candidate for Replacement (CFR) list since inception of project due to a follow up visual inspection resulting from the sensor data readings.

As of April 23, 2007, we have installed 38 new RMS receivers, and plan to replace the remaining 24 receivers by June 6th. The new receivers offer increased sensitivity and remote diagnostic tools including pick-up coil testing and improved data error correction. Following the installation of the 38 new receivers, there has been an improvement in RMS reporting rates. The schedule for receiver installations is as follows:

	Total Receiver	2004	2005	2006	2007	2007 Pending
Brooklyn	11	0	2	5	3	1
Queens	6	0	1	3	2	0
Bronx	6	0	4	0	1	1
Westchester	7	1	1	0	1	4
Manhattan	32	1	3	4	6	18
TOTAL	62	2	11	12	13	24
Units Installed	38					
Units Remaining	24					

In addition, last year we launched a pick-up coil testing and replacement initiative. This is part of our overall goal to improve the Remote Monitoring System by addressing all the system components and removing all defects or limitations. The new second generation receivers installed have the ability to remotely test the performance of the RMS pick-up coils, by identifying defective or non-optimum coils, which facilitates a more proactive pick-up coil maintenance program. Since last year we still had about 40 first generation receivers on our system without this ability, we contract with Digital Grid to manually test the remaining pick-up coils. The manual process was lengthy, but we were able to complete testing all the remaining coils on the system and are working to replace the defective ones. Of the 1,133 coils tested 163 were identified as defective or non-optimum. As of April 23, 2007, we replaced 105 coils, 58 are pending replacement. Feeder outages are needed to replace pick-up coils, since they are physically located in the high-voltage feeder cubicles.

Implementation Step: Explore alternate methods for estimating transformer loads on non-reporting units (i.e., Customer Service system data).

This project is completed. See March 31, 2002 status report.

ACTION PLAN NO. 12

12. Develop and implement methods and procedures to reduce feeder outage duration. (Recommendations CRC-16, IRB-3.9)

Action Plan

Adopt the Committees' recommendations by reducing feeder restoration time and minimizing the number of feeder outages by taking a process-centered approach in order to reduce handoffs, apply technology and streamline the work.

Implementation Steps

- A team has been established to investigate enhancing the process time for feeder work. This team will provide recommendations that include, but are not limited to, technology enhancements and process improvements by June 2000.
- Eliminate delays to expedite detection, inspection and testing components of feeder processing by obtaining additional high voltage test sets and ground and test devices.
- Incorporate results of R&D initiative for fault locating time reduction in Recommendation #17 as part of the feeder process redesign.
- Establish a computerized repository accessible to all working groups to maximize work completed during a feeder outage thus reducing the total number of scheduled outages.

Implementation Step: A team has been established to investigate enhancing the process time for feeder work. This team will provide recommendations that include, but are not limited to, technology enhancements and process improvements by June 2000.

This project is completed. See December 31, 2001 status report.

Implementation Step: Eliminate delays to expedite detection, inspection and testing components of feeder processing by obtaining additional high voltage test sets and ground and test devices.

This project is completed. See December 29, 2000 status report.

Implementation Step: Incorporate results of R&D initiative for fault locating time reduction in Recommendation #17 as part of the feeder process redesign.

May 1, 2007 Status: The first field trial of the Incident Wave Processing (IWP) system was completed on June 5, 2000 using a staged fault. The project proceeded with creation of feeder models and the database of wave patterns, and the vendor extended the

functionality of the off-line ("high-pot") system and established the hardware and software requirements for migration to real-time mode. The original project was envisioned to use a communication backbone that was to be established separately but that system was not established and was ultimately cancelled; therefore an independent communication system was built into the sensors. The system was a technical success, however, loss of commercial availability of the built-in communication system prevented fault locating field-testing. The vendor subsequently developed a breadboard assembly of a new communication system, but discussions revealed additional communication hurdles in the requirements for its full deployment. Communication needed for the IWP system developed on this project remained both an insurmountable technical and financial hurdle for its deployment. The final report was received and this project was closed.

Nonetheless, fault locating time reduction remains a significant part of our continuing feeder process redesign, and a new tool will provide much of the expected functionality of the IWP system. This "Reactance to Fault" (RTF) system was developed using PQ Nodes. The PQ nodes themselves are the result of R&D collaboration with other utilities via EPRI, and Con Edison engineers have extended their use to this function. The RTF system is in use in all Con Edison areas now. Within about 30 minutes of a network feeder open automatic (OA) caused by a single-phase or multi-phase fault, it has narrowed the likely location of the fault to a range of about 10% of the feeder's length. In the background, the system plots the fault location based on a calculation of the reactive component of impedance during the fault. This is possible because of the highly detailed and precise wave shapes captured by PQ Node hardware. The calculation is most precise when the fault involves a fundamental 60 Hz wave shape (about 60% of faults are single-phase and about 90% of those waveforms are mostly fundamental). Additional development is in progress to improve the precision, to expand the algorithms to cover high-harmonic (less fundamental) waveforms. Based on the demonstrated usefulness of the RTF fault locating system in Manhattan, it is being deployed system-wide. 46 of the 57 substations have at least one Node installed, and RTF is working for all 46.

Implementation Step: Establish a computerized repository accessible to all working groups to maximize work completed during a feeder outage thus reducing the total number of scheduled outages.

This project is completed. See December 29, 2000 status report.

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Proceeding on Motion of the Commission to Investigate the July 6, 1999 Power Outage of Con Edison's Washington Heights Network	:	Case 99-E-0930

MAY 1, 2007 STATUS REPORT OF CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. ON THE IMPLEMENTATION OF THE JANUARY 2000 ACTION PLAN FOR WASHINGTON HEIGHTS NETWORK SHUTDOWN REPORTS

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Dated: May 1, 2007

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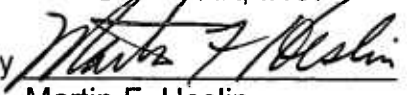
CONSOLIDATED EDISON COMPANY
OF NEW YORK, INC.

By 

Martin F. Heslin
Assistant General Counsel
4 Irving Place
New York, NY 10003
(212) 460-4705

ACTION PLAN NO. 3

3. Review existing methods of rating cables and transformers, giving special attention to the effects of high ambient temperatures on equipment performance. (Recommendations CRC-3, IRB-3.1, IRB-3.7)

Action Plan

Adopt the Committees' recommendations by initiating a review of our current methods of cable and transformer ratings considering load cycles and test results.

Implementation Steps

- Perform laboratory testing to determine the thermal capabilities of early vintage paper cable and revise specifications as required.
- Evaluate a multi-year program to provide additional loading margins on network transformers.
- Assess the use of both short-term and extended cable ratings to compliment the existing 24-hour load cable ratings.
- Based on field data collection during the summer 2000, make appropriate refinements to calculations relating to the cable current matrix to duct configuration.
- Develop and issue guidelines for the appropriate sizing of feeder cables in both new and replacement applications.

Implementation Step: Perform laboratory testing to determine the thermal capabilities of early vintage paper cable and revise specifications as required.

This item is completed. See Con Edison's November 1, 2001 status report for its implementation of PSC Recommendation II-8.

Implementation Step: Evaluate a multi-year program to provide additional loading margins on network transformers.

November 1, 2006 Status: Prior to summer 2006, the Company relieved all network transformers to no more than 25 points above emergency rating. The Company plans to relieve network transformers to no more than 25 points above emergency rating for summer 2007.

May 1, 2007 Status: Prior to summer 2007, the Company will relieve all network transformers to no more than 25 points above emergency rating.

Implementation Step: Assess the use of both short-term and extended cable ratings to compliment the existing 24-hour load cable ratings.

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Implementation Step: Based on field data collection during the summer 2000, make appropriate refinements to calculations relating to the cable current matrix to duct configuration.

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Implementation Step: Develop and issue guidelines for the appropriate sizing of feeder cables in both new and replacement applications.

This item is completed. See December 29, 2000 status report.

ACTION PLAN NO. 4

4. Evaluate improved protective relays on certain network protectors. (Recommendations CRC-5, IRB-3.10, IRB-3.13)

Action Plan

Adopt the Committees' recommendations by initiating improvements in specific distribution relay protection systems.

Implementation Steps

- Determine the specific conditions and configuration in which a station breaker will operate in lieu of a network protector. Locate these situations on distribution system and recommend a plan to address them.
- Investigate the feasibility of modifying the Sherman Creek feeder breaker relays to provide more selective directional protection.

November 1, 2006 Status: See Con Edison's status reports for its implementation of PSC Recommendation II-13.

May 1, 2007 Status:

Summary of Prior Actions

Relays are devices that sense an overcurrent condition and trip a feeder's circuit breaker to prevent the overcurrent from damaging the feeder. After a failure on Washington Heights feeder 1M03, a "Tempo" relay on a transformer that electrically connected 1M03 with feeder 1M05 failed to operate to prevent current from 1M05 from supplying the fault on 1M03. A backup relay sensed the overcurrent condition on 1M05 and tripped its circuit breaker and took 1M05 out of service. The transformer Tempo relay failed to operate in the very low voltage conditions existing at the time.

1. Tempo Relay Removal

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2. Directional Over-Current Relays

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network. It was determined that, under certain operating configurations, these current contributions can cause undesired tripping of 13 kV feeder over-current relays. This possibility can be eliminated by the application of directional over-current relays set to trip only for faults in the direction of normal load flow, and to not trip for back-feeding fault currents. These substations require directional relays because they are normally operated with their bus tie breakers open. When a three phase fault occurs it collapses the voltage only on one side of the bus tie breaker. On the other side of the bus tie breaker, the primary network voltage remains and provides the potential to contribute back-feed current to the fault. Directional relays would not operate since the fault current direction is opposite to the direction they are set to trip. This work has been completed at Sherman Creek, Hellgate, East 63rd Street 1 and 2 substations, and Leonard Street 1 and 2 substations.

This recommendation is completed

ACTION PLAN NO. 6

6. Develop a real time load monitoring capability for high-tension customers. (Recommendation CRC-7)

Action Plan

Adopt the Committee's recommendations by implement real time load monitoring capability for high-tension customers.

Implementation Step

Determine the best method to measure, transmit and integrate real time high-tension customer loads into the Control Center and Engineering systems.
Based on feasibility, develop an implementation program and schedule

November 1, 2006 Status: See Con Edison's status reports for its implementation of PSC Recommendation II-15.

May 1, 2007 Status:

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The Company funded an R&D project in attempt to find a way to monitor high-tension customer transformers. The R&D project was unsuccessful. The Company then turned to monitoring using the existing Remote Monitoring System. This approach was also unsuccessful because of the difficulties encountered with the installation portion of the project and the potential for high maintenance costs. . As a result, we have opted to use a newer technology that monitors HT customer load directly using a wireless demand meter. This system will obtain near real-time load information that will be available at the distribution control center and in addition will provide system modeling and power quality data.

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ACTION PLAN NO. 10

10. Increase the reporting availability of existing remote monitoring equipment (Recommendation CRC-13)

Action Plan

Adopt the Committee's recommendations by increasing focus of RMS reporting, inspection and repair as part of summer preparedness program.

Implementation Steps

- Revise maintenance specification for the inspection and repair of non-reporting units and establish priority criteria for repair.
- Evaluate feasibility for advanced technology systems to improve monitoring of system status and loading.
- Explore alternate methods for estimating transformer loads on non-reporting units (i.e., Customer Service system data).

Implementation Step: Revise maintenance specification for the inspection and repair of non-reporting units and establish priority criteria for repair.

This project is completed. See June 29, 2001 status report.

Implementation Step: Evaluate feasibility for advanced technology systems to improve monitoring of system status and loading.

November 1, 2006 Status:

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Implementation Step: Explore alternate methods for estimating transformer loads on non-reporting units (i.e., Customer Service system data).

This project is completed. See March 31, 2002 status report.

ACTION PLAN NO. 12

12. Develop and implement methods and procedures to reduce feeder outage duration. (Recommendations CRC-16, IRB-3.9)

Action Plan

Adopt the Committees' recommendations by reducing feeder restoration time and minimizing the number of feeder outages by taking a process-centered approach in order to reduce handoffs, apply technology and streamline the work.

Implementation Steps

- A team has been established to investigate enhancing the process time for feeder work. This team will provide recommendations that include, but are not limited to, technology enhancements and process improvements by June 2000.
- Eliminate delays to expedite detection, inspection and testing components of feeder processing by obtaining additional high voltage test sets and ground and test devices.
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Implementation Step: A team has been established to investigate enhancing the process time for feeder work. This team will provide recommendations that include, but are not limited to, technology enhancements and process improvements by June 2000.

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Implementation Step: Eliminate delays to expedite detection, inspection and testing components of feeder processing by obtaining additional high voltage test sets and ground and test devices.

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May 1, 2007 Status: The first field trial of the Incident Wave Processing (IWP) system was completed on June 5, 2000 using a staged fault. The project proceeded with creation of feeder models and the database of wave patterns, and the vendor extended the

functionality of the off-line ("high-pot") system and established the hardware and software requirements for migration to real-time mode. The original project was envisioned to use a communication backbone that was to be established separately but that system was not established and was ultimately cancelled; therefore an independent communication system was built into the sensors. The system was a technical success, however, loss of commercial availability of the built-in communication system prevented fault locating field-testing. The vendor subsequently developed a breadboard assembly of a new communication system, but discussions revealed additional communication hurdles in the requirements for its full deployment. Communication needed for the IWP system developed on this project remained both an insurmountable technical and financial hurdle for its deployment. The final report was received and this project was closed.

Nonetheless, fault locating time reduction remains a significant part of our continuing feeder process redesign, and a new tool will provide much of the expected functionality of the IWP system. This "Reactance to Fault" (RTF) system was developed using PQ Nodes. The PQ nodes themselves are the result of R&D collaboration with other utilities via EPRI, and Con Edison engineers have extended their use to this function. The RTF system is in use in all Con Edison areas now. Within about 30 minutes of a network feeder open automatic (OA) caused by a single-phase or multi-phase fault, it has narrowed the likely location of the fault to a range of about 10% of the feeder's length. In the background, the system plots the fault location based on a calculation of the reactive component of impedance during the fault. This is possible because of the highly detailed and precise wave shapes captured by PQ Node hardware. The calculation is most precise when the fault involves a fundamental 60 Hz wave shape (about 60% of faults are single-phase and about 90% of those waveforms are mostly fundamental). Additional development is in progress to improve the precision, to expand the algorithms to cover high-harmonic (less fundamental) waveforms. Based on the demonstrated usefulness of the RTF fault locating system in Manhattan, it is being deployed system-wide. 46 of the 57 substations have at least one Node installed, and RTF is working for all 46.

Implementation Step: Establish a computerized repository accessible to all working groups to maximize work completed during a feeder outage thus reducing the total number of scheduled outages.

This project is completed. See December 29, 2000 status report.

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Proceeding on Motion of the Commission to Investigate the July 6, 1999 Power Outage of Con Edison's Washington Heights Network	:	Case 99-E-0930

MAY 1, 2007 STATUS REPORT OF CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. ON THE IMPLEMENTATION OF THE JANUARY 2000 ACTION PLAN FOR WASHINGTON HEIGHTS NETWORK SHUTDOWN REPORTS

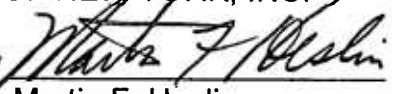
Immediately following the Washington Heights network shutdown in early July 1999, Consolidated Edison Company of New York, Inc. ("Con Edison" or "the Company") launched two investigations of the incident. One was undertaken by an Independent Review Board and the other by an internal Corporate Review Committee. The Independent Review Board (IRB) was comprised of three prominent high-level industry experts. The Corporate Review Committee (CRC) consisted of a core team of former Company executives supported by experienced engineering and operating personnel. Both teams issued their reports in December 1999. Both reports acknowledged Con Edison's long history of service reliability, as well as the soundness of its design and maintenance standards. The reports made recommendations geared toward reducing the probability of future network shutdowns.

In January 2000, the Company developed an Action Plan stating implementation activities to address the recommendations in each report. The attached Status Report provides the current status of the implementation activities stated in the Action Plan. As discussed in prior status reports filed by Con Edison, implementation of a number of these activities is complete. Accordingly, as in the prior status reports, the attached report addresses those Action Plan activities for which implementation is ongoing.

Dated: May 1, 2007

Respectfully submitted,

CONSOLIDATED EDISON COMPANY
OF NEW YORK, INC.

By 

Martin F. Heslin
Assistant General Counsel
4 Irving Place
New York, NY 10003
(212) 460-4705

ACTION PLAN NO. 3

3. Review existing methods of rating cables and transformers, giving special attention to the effects of high ambient temperatures on equipment performance. (Recommendations CRC-3, IRB-3.1, IRB-3.7)

Action Plan

Adopt the Committees' recommendations by initiating a review of our current methods of cable and transformer ratings considering load cycles and test results.

Implementation Steps

- Perform laboratory testing to determine the thermal capabilities of early vintage paper cable and revise specifications as required.
- Evaluate a multi-year program to provide additional loading margins on network transformers.
- Assess the use of both short-term and extended cable ratings to compliment the existing 24-hour load cable ratings.
- Based on field data collection during the summer 2000, make appropriate refinements to calculations relating to the cable current matrix to duct configuration.
- Develop and issue guidelines for the appropriate sizing of feeder cables in both new and replacement applications.

Implementation Step: Perform laboratory testing to determine the thermal capabilities of early vintage paper cable and revise specifications as required.

This item is completed. See Con Edison's November 1, 2001 status report for its implementation of PSC Recommendation II-8.

Implementation Step: Evaluate a multi-year program to provide additional loading margins on network transformers.

November 1, 2006 Status: Prior to summer 2006, the Company relieved all network transformers to no more than 25 points above emergency rating. The Company plans to relieve network transformers to no more than 25 points above emergency rating for summer 2007.

May 1, 2007 Status: Prior to summer 2007, the Company will relieve all network transformers to no more than 25 points above emergency rating.

Implementation Step: Assess the use of both short-term and extended cable ratings to compliment the existing 24-hour load cable ratings.

This item is completed. See Con Edison's November 1, 2002 status report.

Implementation Step: Based on field data collection during the summer 2000, make appropriate refinements to calculations relating to the cable current matrix to duct configuration.

This item is completed. See Con Edison's November 1, 2002 status report.

Implementation Step: Develop and issue guidelines for the appropriate sizing of feeder cables in both new and replacement applications.

This item is completed. See December 29, 2000 status report.

ACTION PLAN NO. 4

4. Evaluate improved protective relays on certain network protectors. (Recommendations CRC-5, IRB-3.10, IRB-3.13)

Action Plan

Adopt the Committees' recommendations by initiating improvements in specific distribution relay protection systems.

Implementation Steps

- Determine the specific conditions and configuration in which a station breaker will operate in lieu of a network protector. Locate these situations on distribution system and recommend a plan to address them.
- Investigate the feasibility of modifying the Sherman Creek feeder breaker relays to provide more selective directional protection.

November 1, 2006 Status: See Con Edison's status reports for its implementation of PSC Recommendation II-13.

May 1, 2007 Status:

Summary of Prior Actions

Relays are devices that sense an overcurrent condition and trip a feeder's circuit breaker to prevent the overcurrent from damaging the feeder. After a failure on Washington Heights feeder 1M03, a "Tempo" relay on a transformer that electrically connected 1M03 with feeder 1M05 failed to operate to prevent current from 1M05 from supplying the fault on 1M03. A backup relay sensed the overcurrent condition on 1M05 and tripped its circuit breaker and took 1M05 out of service. The transformer Tempo relay failed to operate in the very low voltage conditions existing at the time.

1. Tempo Relay Removal

All Tempo relays have been removed from isolated and spot networks and in fringe areas (where low voltage can occur when multiple feeders de-energize) and have been replaced with ETI microprocessor relays which are not susceptible to low voltage conditions. A total of 2,935 Tempo relays were removed.

2. Directional Over-Current Relays

Computer load-flow simulation studies (PVL) were run for Sherman Creek, Hellgate, E. 63rd ST, and Leonard St Substations to determine the magnitudes of 13kV fault contributions due to back-feed currents from the 120/208 Volt secondary distributed

network. It was determined that, under certain operating configurations, these current contributions can cause undesired tripping of 13 kV feeder over-current relays. This possibility can be eliminated by the application of directional over-current relays set to trip only for faults in the direction of normal load flow, and to not trip for back-feeding fault currents. These substations require directional relays because they are normally operated with their bus tie breakers open. When a three phase fault occurs it collapses the voltage only on one side of the bus tie breaker. On the other side of the bus tie breaker, the primary network voltage remains and provides the potential to contribute back-feed current to the fault. Directional relays would not operate since the fault current direction is opposite to the direction they are set to trip. This work has been completed at Sherman Creek, Hellgate, East 63rd Street 1 and 2 substations, and Leonard Street 1 and 2 substations.

This recommendation is completed

ACTION PLAN NO. 6

6. Develop a real time load monitoring capability for high-tension customers. (Recommendation CRC-7)

Action Plan

Adopt the Committee's recommendations by implement real time load monitoring capability for high-tension customers.

Implementation Step

Determine the best method to measure, transmit and integrate real time high-tension customer loads into the Control Center and Engineering systems.
Based on feasibility, develop an implementation program and schedule

November 1, 2006 Status: See Con Edison's status reports for its implementation of PSC Recommendation II-15.

May 1, 2007 Status:

Summary of Prior Actions

The Company funded an R&D project in attempt to find a way to monitor high-tension customer transformers. The R&D project was unsuccessful. The Company then turned to monitoring using the existing Remote Monitoring System. This approach was also unsuccessful because of the difficulties encountered with the installation portion of the project and the potential for high maintenance costs. As a result, we have opted to use a newer technology that monitors HT customer load directly using a wireless demand meter. This system will obtain near real-time load information that will be available at the distribution control center and in addition will provide system modeling and power quality data.

Status Report (May 1, 2007)

The Company is actively working with a vendor to develop and deploy a viable High Tension Monitoring Data Acquisition System (HTMDAS). Many of the problems encountered in the development stage have been resolved, and the Company is currently field testing the metering device and the communication interface. Once the preliminary field testing is successfully completed, the Company plans to launch a pilot program by installing 25 HT remote monitoring devices in the Washington Heights network. Necessary metering components have already been ordered from General Electric and are scheduled to arrive at the beginning of May. First pilot installations will be initiated shortly after that. Once the pilot program is successful, the plan is to install these monitoring devices on all HT customer installations supplied from network feeders over the next three years.

ACTION PLAN NO. 10

10. Increase the reporting availability of existing remote monitoring equipment (Recommendation CRC-13)

Action Plan

Adopt the Committee's recommendations by increasing focus of RMS reporting, inspection and repair as part of summer preparedness program.

Implementation Steps

- Revise maintenance specification for the inspection and repair of non-reporting units and establish priority criteria for repair.
- Evaluate feasibility for advanced technology systems to improve monitoring of system status and loading.
- Explore alternate methods for estimating transformer loads on non-reporting units (i.e., Customer Service system data).

Implementation Step: Revise maintenance specification for the inspection and repair of non-reporting units and establish priority criteria for repair.

This project is completed. See June 29, 2001 status report.

Implementation Step: Evaluate feasibility for advanced technology systems to improve monitoring of system status and loading.

November 1, 2006 Status:

Update on RMS Receiver and Transmitter Installations

To date, we have installed 1021 new Remote Monitoring System (RMS) transmitters with RMSPTO (Pressure – Temperature – Oil Level) in selected transformer vault locations. We plan to have a total of 2,000 vaults installed with RMSPTO by the end of 2007. These transmitters monitor transformer secondary voltage and are outfitted to monitor additional analog and digital sensory inputs as above.

The RMSPTO installation is supplemented by contractor force personnel. The contractor, when required, adds nitrogen gas and repairs or replaces defective valves during scheduled work. This work is intended to help towards mitigating transformer failures and extending transformer reliability with corresponding public safety benefits.

The new analog pressure sensor is helping us to locate transformers that have extremely slow tank leaks that can pass the current transformer pressure test. Again, transformer

failure mitigation and public safety are enhanced as the project continues. 19 transformers have either been replaced, categorized as Cat 1 or 2, or are now on Candidate for Replacement (CFR) list since inception of project due to a follow up visual inspection resulting from the sensor data readings.

As of April 23, 2007, we have installed 38 new RMS receivers, and plan to replace the remaining 24 receivers by June 6th. The new receivers offer increased sensitivity and remote diagnostic tools including pick-up coil testing and improved data error correction. Following the installation of the 38 new receivers, there has been an improvement in RMS reporting rates. The schedule for receiver installations is as follows:

	Total Receiver	2004	2005	2006	2007	2007 Pending
Brooklyn	11	0	2	5	3	1
Queens	6	0	1	3	2	0
Bronx	6	0	4	0	1	1
Westchester	7	1	1	0	1	4
Manhattan	32	1	3	4	6	18
TOTAL	62	2	11	12	13	24
Units Installed	38					
Units Remaining	24					

In addition, last year we launched a pick-up coil testing and replacement initiative. This is part of our overall goal to improve the Remote Monitoring System by addressing all the system components and removing all defects or limitations. The new second generation receivers installed have the ability to remotely test the performance of the RMS pick-up coils, by identifying defective or non-optimum coils, which facilitates a more proactive pick-up coil maintenance program. Since last year we still had about 40 first generation receivers on our system without this ability, we contract with Digital Grid to manually test the remaining pick-up coils. The manual process was lengthy, but we were able to complete testing all the remaining coils on the system and are working to replace the defective ones. Of the 1,133 coils tested 163 were identified as defective or non-optimum. As of April 23, 2007, we replaced 105 coils, 58 are pending replacement. Feeder outages are needed to replace pick-up coils, since they are physically located in the high-voltage feeder cubicles.

<u>Implementation Step</u>: Explore alternate methods for estimating transformer loads on non-reporting units (i.e., Customer Service system data).

This project is completed. See March 31, 2002 status report.

ACTION PLAN NO. 12

12. Develop and implement methods and procedures to reduce feeder outage duration. (Recommendations CRC-16, IRB-3.9)

Action Plan

Adopt the Committees' recommendations by reducing feeder restoration time and minimizing the number of feeder outages by taking a process-centered approach in order to reduce handoffs, apply technology and streamline the work.

Implementation Steps

- A team has been established to investigate enhancing the process time for feeder work. This team will provide recommendations that include, but are not limited to, technology enhancements and process improvements by June 2000.
- Eliminate delays to expedite detection, inspection and testing components of feeder processing by obtaining additional high voltage test sets and ground and test devices.
- Incorporate results of R&D initiative for fault locating time reduction in Recommendation #17 as part of the feeder process redesign.
- Establish a computerized repository accessible to all working groups to maximize work completed during a feeder outage thus reducing the total number of scheduled outages.

Implementation Step: A team has been established to investigate enhancing the process time for feeder work. This team will provide recommendations that include, but are not limited to, technology enhancements and process improvements by June 2000.

This project is completed. See December 31, 2001 status report.

Implementation Step: Eliminate delays to expedite detection, inspection and testing components of feeder processing by obtaining additional high voltage test sets and ground and test devices.

This project is completed. See December 29, 2000 status report.

Implementation Step: Incorporate results of R&D initiative for fault locating time reduction in Recommendation #17 as part of the feeder process redesign.

May 1, 2007 Status: The first field trial of the Incident Wave Processing (IWP) system was completed on June 5, 2000 using a staged fault. The project proceeded with creation of feeder models and the database of wave patterns, and the vendor extended the

functionality of the off-line ("high-pot") system and established the hardware and software requirements for migration to real-time mode. The original project was envisioned to use a communication backbone that was to be established separately but that system was not established and was ultimately cancelled; therefore an independent communication system was built into the sensors. The system was a technical success, however, loss of commercial availability of the built-in communication system prevented fault locating field-testing. The vendor subsequently developed a breadboard assembly of a new communication system, but discussions revealed additional communication hurdles in the requirements for its full deployment. Communication needed for the IWP system developed on this project remained both an insurmountable technical and financial hurdle for its deployment. The final report was received and this project was closed.

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Implementation Step: Establish a computerized repository accessible to all working groups to maximize work completed during a feeder outage thus reducing the total number of scheduled outages.

This project is completed. See December 29, 2000 status report.

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Proceeding on Motion of the Commission to Investigate the July 6, 1999 Power Outage of Con Edison's Washington Heights Network	:	Case 99-E-0930

MAY 1, 2007 STATUS REPORT OF CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. ON THE IMPLEMENTATION OF THE JANUARY 2000 ACTION PLAN FOR WASHINGTON HEIGHTS NETWORK SHUTDOWN REPORTS

Immediately following the Washington Heights network shutdown in early July 1999, Consolidated Edison Company of New York, Inc. ("Con Edison" or "the Company") launched two investigations of the incident. One was undertaken by an Independent Review Board and the other by an internal Corporate Review Committee. The Independent Review Board (IRB) was comprised of three prominent high-level industry experts. The Corporate Review Committee (CRC) consisted of a core team of former Company executives supported by experienced engineering and operating personnel. Both teams issued their reports in December 1999. Both reports acknowledged Con Edison's long history of service reliability, as well as the soundness of its design and maintenance standards. The reports made recommendations geared toward reducing the probability of future network shutdowns.

In January 2000, the Company developed an Action Plan stating implementation activities to address the recommendations in each report. The attached Status Report provides the current status of the implementation activities stated in the Action Plan. As discussed in prior status reports filed by Con Edison, implementation of a number of these activities is complete. Accordingly, as in the prior status reports, the attached report addresses those Action Plan activities for which implementation is ongoing.

Dated: May 1, 2007

Respectfully submitted,

CONSOLIDATED EDISON COMPANY
OF NEW YORK, INC.

By _____

Martin F. Heslin
Assistant General Counsel
4 Irving Place
New York, NY 10003
(212) 460-4705

ACTION PLAN NO. 3

3. Review existing methods of rating cables and transformers, giving special attention to the effects of high ambient temperatures on equipment performance. (Recommendations CRC-3, IRB-3.1, IRB-3.7)

Action Plan

Adopt the Committees' recommendations by initiating a review of our current methods of cable and transformer ratings considering load cycles and test results.

Implementation Steps

- Perform laboratory testing to determine the thermal capabilities of early vintage paper cable and revise specifications as required.
- Evaluate a multi-year program to provide additional loading margins on network transformers.
- Assess the use of both short-term and extended cable ratings to compliment the existing 24-hour load cable ratings.
- Based on field data collection during the summer 2000, make appropriate refinements to calculations relating to the cable current matrix to duct configuration.
- Develop and issue guidelines for the appropriate sizing of feeder cables in both new and replacement applications.

Implementation Step: Perform laboratory testing to determine the thermal capabilities of early vintage paper cable and revise specifications as required.

This item is completed. See Con Edison's November 1, 2001 status report for its implementation of PSC Recommendation II-8.

Implementation Step: Evaluate a multi-year program to provide additional loading margins on network transformers.

November 1, 2006 Status: Prior to summer 2006, the Company relieved all network transformers to no more than 25 points above emergency rating. The Company plans to relieve network transformers to no more than 25 points above emergency rating for summer 2007.

May 1, 2007 Status: Prior to summer 2007, the Company will relieve all network transformers to no more than 25 points above emergency rating.

Implementation Step: Assess the use of both short-term and extended cable ratings to compliment the existing 24-hour load cable ratings.

This item is completed. See Con Edison's November 1, 2002 status report.

Implementation Step: Based on field data collection during the summer 2000, make appropriate refinements to calculations relating to the cable current matrix to duct configuration.

This item is completed. See Con Edison's November 1, 2002 status report.

Implementation Step: Develop and issue guidelines for the appropriate sizing of feeder cables in both new and replacement applications.

This item is completed. See December 29, 2000 status report.

ACTION PLAN NO. 4

4. Evaluate improved protective relays on certain network protectors. (Recommendations CRC-5, IRB-3.10, IRB-3.13)

Action Plan

Adopt the Committees' recommendations by initiating improvements in specific distribution relay protection systems.

Implementation Steps

- Determine the specific conditions and configuration in which a station breaker will operate in lieu of a network protector. Locate these situations on distribution system and recommend a plan to address them.
- Investigate the feasibility of modifying the Sherman Creek feeder breaker relays to provide more selective directional protection.

November 1, 2006 Status: See Con Edison's status reports for its implementation of PSC Recommendation II-13.

May 1, 2007 Status:

Summary of Prior Actions

Relays are devices that sense an overcurrent condition and trip a feeder's circuit breaker to prevent the overcurrent from damaging the feeder. After a failure on Washington Heights feeder 1M03, a "Tempo" relay on a transformer that electrically connected 1M03 with feeder 1M05 failed to operate to prevent current from 1M05 from supplying the fault on 1M03. A backup relay sensed the overcurrent condition on 1M05 and tripped its circuit breaker and took 1M05 out of service. The transformer Tempo relay failed to operate in the very low voltage conditions existing at the time.

1. Tempo Relay Removal

All Tempo relays have been removed from isolated and spot networks and in fringe areas (where low voltage can occur when multiple feeders de-energize) and have been replaced with ETI microprocessor relays which are not susceptible to low voltage conditions. A total of 2,935 Tempo relays were removed.

2. Directional Over-Current Relays

Computer load-flow simulation studies (PVL) were run for Sherman Creek, Hellgate, E. 63rd ST, and Leonard St Substations to determine the magnitudes of 13kV fault contributions due to back-feed currents from the 120/208 Volt secondary distributed

network. It was determined that, under certain operating configurations, these current contributions can cause undesired tripping of 13 kV feeder over-current relays. This possibility can be eliminated by the application of directional over-current relays set to trip only for faults in the direction of normal load flow, and to not trip for back-feeding fault currents. These substations require directional relays because they are normally operated with their bus tie breakers open. When a three phase fault occurs it collapses the voltage only on one side of the bus tie breaker. On the other side of the bus tie breaker, the primary network voltage remains and provides the potential to contribute back-feed current to the fault. Directional relays would not operate since the fault current direction is opposite to the direction they are set to trip. This work has been completed at Sherman Creek, Hellgate, East 63rd Street 1 and 2 substations, and Leonard Street 1 and 2 substations.

This recommendation is completed

ACTION PLAN NO. 6

6. Develop a real time load monitoring capability for high-tension customers. (Recommendation CRC-7)

Action Plan

Adopt the Committee's recommendations by implement real time load monitoring capability for high-tension customers.

Implementation Step

Determine the best method to measure, transmit and integrate real time high-tension customer loads into the Control Center and Engineering systems.
Based on feasibility, develop an implementation program and schedule

November 1, 2006 Status: See Con Edison's status reports for its implementation of PSC Recommendation II-15.

May 1, 2007 Status:

Summary of Prior Actions

The Company funded an R&D project in attempt to find a way to monitor high-tension customer transformers. The R&D project was unsuccessful. The Company then turned to monitoring using the existing Remote Monitoring System. This approach was also unsuccessful because of the difficulties encountered with the installation portion of the project and the potential for high maintenance costs. As a result, we have opted to use a newer technology that monitors HT customer load directly using a wireless demand meter. This system will obtain near real-time load information that will be available at the distribution control center and in addition will provide system modeling and power quality data.

Status Report (May 1, 2007)

The Company is actively working with a vendor to develop and deploy a viable High Tension Monitoring Data Acquisition System (HTMDAS). Many of the problems encountered in the development stage have been resolved, and the Company is currently field testing the metering device and the communication interface. Once the preliminary field testing is successfully completed, the Company plans to launch a pilot program by installing 25 HT remote monitoring devices in the Washington Heights network. Necessary metering components have already been ordered from General Electric and are scheduled to arrive at the beginning of May. First pilot installations will be initiated shortly after that. Once the pilot program is successful, the plan is to install these monitoring devices on all HT customer installations supplied from network feeders over the next three years.

ACTION PLAN NO. 10

10. Increase the reporting availability of existing remote monitoring equipment (Recommendation CRC-13)

Action Plan

Adopt the Committee's recommendations by increasing focus of RMS reporting, inspection and repair as part of summer preparedness program.

Implementation Steps

- Revise maintenance specification for the inspection and repair of non-reporting units and establish priority criteria for repair.
- Evaluate feasibility for advanced technology systems to improve monitoring of system status and loading.
- Explore alternate methods for estimating transformer loads on non-reporting units (i.e., Customer Service system data).

Implementation Step: Revise maintenance specification for the inspection and repair of non-reporting units and establish priority criteria for repair.

This project is completed. See June 29, 2001 status report.

Implementation Step: Evaluate feasibility for advanced technology systems to improve monitoring of system status and loading.

November 1, 2006 Status:

Update on RMS Receiver and Transmitter Installations

To date, we have installed 1021 new Remote Monitoring System (RMS) transmitters with RMSPTO (Pressure – Temperature – Oil Level) in selected transformer vault locations. We plan to have a total of 2,000 vaults installed with RMSPTO by the end of 2007. These transmitters monitor transformer secondary voltage and are outfitted to monitor additional analog and digital sensory inputs as above.

The RMSPTO installation is supplemented by contractor force personnel. The contractor, when required, adds nitrogen gas and repairs or replaces defective valves during scheduled work. This work is intended to help towards mitigating transformer failures and extending transformer reliability with corresponding public safety benefits.

The new analog pressure sensor is helping us to locate transformers that have extremely slow tank leaks that can pass the current transformer pressure test. Again, transformer

failure mitigation and public safety are enhanced as the project continues. 19 transformers have either been replaced, categorized as Cat 1 or 2, or are now on Candidate for Replacement (CFR) list since inception of project due to a follow up visual inspection resulting from the sensor data readings.

As of April 23, 2007, we have installed 38 new RMS receivers, and plan to replace the remaining 24 receivers by June 6th. The new receivers offer increased sensitivity and remote diagnostic tools including pick-up coil testing and improved data error correction. Following the installation of the 38 new receivers, there has been an improvement in RMS reporting rates. The schedule for receiver installations is as follows:

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In addition, last year we launched a pick-up coil testing and replacement initiative. This is part of our overall goal to improve the Remote Monitoring System by addressing all the system components and removing all defects or limitations. The new second generation receivers installed have the ability to remotely test the performance of the RMS pick-up coils, by identifying defective or non-optimum coils, which facilitates a more proactive pick-up coil maintenance program. Since last year we still had about 40 first generation receivers on our system without this ability, we contract with Digital Grid to manually test the remaining pick-up coils. The manual process was lengthy, but we were able to complete testing all the remaining coils on the system and are working to replace the defective ones. Of the 1,133 coils tested 163 were identified as defective or non-optimum. As of April 23, 2007, we replaced 105 coils, 58 are pending replacement. Feeder outages are needed to replace pick-up coils, since they are physically located in the high-voltage feeder cubicles.

Implementation Step: Explore alternate methods for estimating transformer loads on non-reporting units (i.e., Customer Service system data).

This project is completed. See March 31, 2002 status report.

ACTION PLAN NO. 12

12. Develop and implement methods and procedures to reduce feeder outage duration. (Recommendations CRC-16, IRB-3.9)

Action Plan

Adopt the Committees' recommendations by reducing feeder restoration time and minimizing the number of feeder outages by taking a process-centered approach in order to reduce handoffs, apply technology and streamline the work.

Implementation Steps

- A team has been established to investigate enhancing the process time for feeder work. This team will provide recommendations that include, but are not limited to, technology enhancements and process improvements by June 2000.
- Eliminate delays to expedite detection, inspection and testing components of feeder processing by obtaining additional high voltage test sets and ground and test devices.
- Incorporate results of R&D initiative for fault locating time reduction in Recommendation #17 as part of the feeder process redesign.
- Establish a computerized repository accessible to all working groups to maximize work completed during a feeder outage thus reducing the total number of scheduled outages.

Implementation Step: A team has been established to investigate enhancing the process time for feeder work. This team will provide recommendations that include, but are not limited to, technology enhancements and process improvements by June 2000.

This project is completed. See December 31, 2001 status report.

Implementation Step: Eliminate delays to expedite detection, inspection and testing components of feeder processing by obtaining additional high voltage test sets and ground and test devices.

This project is completed. See December 29, 2000 status report.

Implementation Step: Incorporate results of R&D initiative for fault locating time reduction in Recommendation #17 as part of the feeder process redesign.

May 1, 2007 Status: The first field trial of the Incident Wave Processing (IWP) system was completed on June 5, 2000 using a staged fault. The project proceeded with creation of feeder models and the database of wave patterns, and the vendor extended the

functionality of the off-line ("high-pot") system and established the hardware and software requirements for migration to real-time mode. The original project was envisioned to use a communication backbone that was to be established separately but that system was not established and was ultimately cancelled; therefore an independent communication system was built into the sensors. The system was a technical success, however, loss of commercial availability of the built-in communication system prevented fault locating field-testing. The vendor subsequently developed a breadboard assembly of a new communication system, but discussions revealed additional communication hurdles in the requirements for its full deployment. Communication needed for the IWP system developed on this project remained both an insurmountable technical and financial hurdle for its deployment. The final report was received and this project was closed.

Nonetheless, fault locating time reduction remains a significant part of our continuing feeder process redesign, and a new tool will provide much of the expected functionality of the IWP system. This "Reactance to Fault" (RTF) system was developed using PQ Nodes. The PQ nodes themselves are the result of R&D collaboration with other utilities via EPRI, and Con Edison engineers have extended their use to this function. The RTF system is in use in all Con Edison areas now. Within about 30 minutes of a network feeder open automatic (OA) caused by a single-phase or multi-phase fault, it has narrowed the likely location of the fault to a range of about 10% of the feeder's length. In the background, the system plots the fault location based on a calculation of the reactive component of impedance during the fault. This is possible because of the highly detailed and precise wave shapes captured by PQ Node hardware. The calculation is most precise when the fault involves a fundamental 60 Hz wave shape (about 60% of faults are single-phase and about 90% of those waveforms are mostly fundamental). Additional development is in progress to improve the precision, to expand the algorithms to cover high-harmonic (less fundamental) waveforms. Based on the demonstrated usefulness of the RTF fault locating system in Manhattan, it is being deployed system-wide. 46 of the 57 substations have at least one Node installed, and RTF is working for all 46.

Implementation Step: Establish a computerized repository accessible to all working groups to maximize work completed during a feeder outage thus reducing the total number of scheduled outages.

This project is completed. See December 29, 2000 status report.

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Proceeding on Motion of the Commission to Investigate the July 6, 1999 Power Outage of Con Edison's Washington Heights Network	:	Case 99-E-0930

MAY 1, 2007 STATUS REPORT OF CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. ON THE IMPLEMENTATION OF THE JANUARY 2000 ACTION PLAN FOR WASHINGTON HEIGHTS NETWORK SHUTDOWN REPORTS

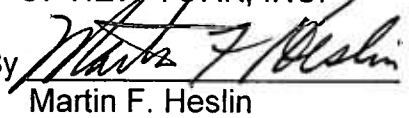
Immediately following the Washington Heights network shutdown in early July 1999, Consolidated Edison Company of New York, Inc. ("Con Edison" or "the Company") launched two investigations of the incident. One was undertaken by an Independent Review Board and the other by an internal Corporate Review Committee. The Independent Review Board (IRB) was comprised of three prominent high-level industry experts. The Corporate Review Committee (CRC) consisted of a core team of former Company executives supported by experienced engineering and operating personnel. Both teams issued their reports in December 1999. Both reports acknowledged Con Edison's long history of service reliability, as well as the soundness of its design and maintenance standards. The reports made recommendations geared toward reducing the probability of future network shutdowns.

In January 2000, the Company developed an Action Plan stating implementation activities to address the recommendations in each report. The attached Status Report provides the current status of the implementation activities stated in the Action Plan. As discussed in prior status reports filed by Con Edison, implementation of a number of these activities is complete. Accordingly, as in the prior status reports, the attached report addresses those Action Plan activities for which implementation is ongoing.

Dated: May 1, 2007

Respectfully submitted,

CONSOLIDATED EDISON COMPANY
OF NEW YORK, INC.

By 

Martin F. Heslin
Assistant General Counsel
4 Irving Place
New York, NY 10003
(212) 460-4705

ACTION PLAN NO. 3

3. Review existing methods of rating cables and transformers, giving special attention to the effects of high ambient temperatures on equipment performance. (Recommendations CRC-3, IRB-3.1, IRB-3.7)

Action Plan

Adopt the Committees' recommendations by initiating a review of our current methods of cable and transformer ratings considering load cycles and test results.

Implementation Steps

- Perform laboratory testing to determine the thermal capabilities of early vintage paper cable and revise specifications as required.
- Evaluate a multi-year program to provide additional loading margins on network transformers.
- Assess the use of both short-term and extended cable ratings to compliment the existing 24-hour load cable ratings.
- Based on field data collection during the summer 2000, make appropriate refinements to calculations relating to the cable current matrix to duct configuration.
- Develop and issue guidelines for the appropriate sizing of feeder cables in both new and replacement applications.

Implementation Step: Perform laboratory testing to determine the thermal capabilities of early vintage paper cable and revise specifications as required.

This item is completed. See Con Edison's November 1, 2001 status report for its implementation of PSC Recommendation II-8.

Implementation Step: Evaluate a multi-year program to provide additional loading margins on network transformers.

November 1, 2006 Status: Prior to summer 2006, the Company relieved all network transformers to no more than 25 points above emergency rating. The Company plans to relieve network transformers to no more than 25 points above emergency rating for summer 2007.

May 1, 2007 Status: Prior to summer 2007, the Company will relieve all network transformers to no more than 25 points above emergency rating.

Implementation Step: Assess the use of both short-term and extended cable ratings to compliment the existing 24-hour load cable ratings.

This item is completed. See Con Edison's November 1, 2002 status report.

Implementation Step: Based on field data collection during the summer 2000, make appropriate refinements to calculations relating to the cable current matrix to duct configuration.

This item is completed. See Con Edison's November 1, 2002 status report.

Implementation Step: Develop and issue guidelines for the appropriate sizing of feeder cables in both new and replacement applications.

This item is completed. See December 29, 2000 status report.

ACTION PLAN NO. 4

4. Evaluate improved protective relays on certain network protectors. (Recommendations CRC-5, IRB-3.10, IRB-3.13)

Action Plan

Adopt the Committees' recommendations by initiating improvements in specific distribution relay protection systems.

Implementation Steps

- Determine the specific conditions and configuration in which a station breaker will operate in lieu of a network protector. Locate these situations on distribution system and recommend a plan to address them.
- Investigate the feasibility of modifying the Sherman Creek feeder breaker relays to provide more selective directional protection.

November 1, 2006 Status: See Con Edison's status reports for its implementation of PSC Recommendation II-13.

May 1, 2007 Status:

Summary of Prior Actions

Relays are devices that sense an overcurrent condition and trip a feeder's circuit breaker to prevent the overcurrent from damaging the feeder. After a failure on Washington Heights feeder 1M03, a "Tempo" relay on a transformer that electrically connected 1M03 with feeder 1M05 failed to operate to prevent current from 1M05 from supplying the fault on 1M03. A backup relay sensed the overcurrent condition on 1M05 and tripped its circuit breaker and took 1M05 out of service. The transformer Tempo relay failed to operate in the very low voltage conditions existing at the time.

1. Tempo Relay Removal

All Tempo relays have been removed from isolated and spot networks and in fringe areas (where low voltage can occur when multiple feeders de-energize) and have been replaced with ETI microprocessor relays which are not susceptible to low voltage conditions. A total of 2,935 Tempo relays were removed.

2. Directional Over-Current Relays

Computer load-flow simulation studies (PVL) were run for Sherman Creek, Hellgate, E. 63rd ST, and Leonard St Substations to determine the magnitudes of 13kV fault contributions due to back-feed currents from the 120/208 Volt secondary distributed

network. It was determined that, under certain operating configurations, these current contributions can cause undesired tripping of 13 kV feeder over-current relays. This possibility can be eliminated by the application of directional over-current relays set to trip only for faults in the direction of normal load flow, and to not trip for back-feeding fault currents. These substations require directional relays because they are normally operated with their bus tie breakers open. When a three phase fault occurs it collapses the voltage only on one side of the bus tie breaker. On the other side of the bus tie breaker, the primary network voltage remains and provides the potential to contribute back-feed current to the fault. Directional relays would not operate since the fault current direction is opposite to the direction they are set to trip. This work has been completed at Sherman Creek, Hellgate, East 63rd Street 1 and 2 substations, and Leonard Street 1 and 2 substations.

This recommendation is completed

ACTION PLAN NO. 6

6. Develop a real time load monitoring capability for high-tension customers. (Recommendation CRC-7)

Action Plan

Adopt the Committee's recommendations by implement real time load monitoring capability for high-tension customers.

Implementation Step

Determine the best method to measure, transmit and integrate real time high-tension customer loads into the Control Center and Engineering systems.
Based on feasibility, develop an implementation program and schedule

November 1, 2006 Status: See Con Edison's status reports for its implementation of PSC Recommendation II-15.

May 1, 2007 Status:

Summary of Prior Actions

The Company funded an R&D project in attempt to find a way to monitor high-tension customer transformers. The R&D project was unsuccessful. The Company then turned to monitoring using the existing Remote Monitoring System. This approach was also unsuccessful because of the difficulties encountered with the installation portion of the project and the potential for high maintenance costs. . As a result, we have opted to use a newer technology that monitors HT customer load directly using a wireless demand meter. This system will obtain near real-time load information that will be available at the distribution control center and in addition will provide system modeling and power quality data.

Status Report (May 1, 2007)

The Company is actively working with a vendor to develop and deploy a viable High Tension Monitoring Data Acquisition System (HTMDAS). Many of the problems encountered in the development stage have been resolved, and the Company is currently field testing the metering device and the communication interface. Once the preliminary field testing is successfully completed, the Company plans to launch a pilot program by installing 25 HT remote monitoring devices in the Washington Heights network. Necessary metering components have already been ordered from General Electric and are scheduled to arrive at the beginning of May. First pilot installations will be initiated shortly after that. Once the pilot program is successful, the plan is to install these monitoring devices on all HT customer installations supplied from network feeders over the next three years.

ACTION PLAN NO. 10

10. Increase the reporting availability of existing remote monitoring equipment (Recommendation CRC-13)

Action Plan

Adopt the Committee's recommendations by increasing focus of RMS reporting, inspection and repair as part of summer preparedness program.

Implementation Steps

- Revise maintenance specification for the inspection and repair of non-reporting units and establish priority criteria for repair.
- Evaluate feasibility for advanced technology systems to improve monitoring of system status and loading.
- Explore alternate methods for estimating transformer loads on non-reporting units (i.e., Customer Service system data).

Implementation Step: Revise maintenance specification for the inspection and repair of non-reporting units and establish priority criteria for repair.

This project is completed. See June 29, 2001 status report.

Implementation Step: Evaluate feasibility for advanced technology systems to improve monitoring of system status and loading.

November 1, 2006 Status:

Update on RMS Receiver and Transmitter Installations

To date, we have installed 1021 new Remote Monitoring System (RMS) transmitters with RMSPTO (Pressure – Temperature – Oil Level) in selected transformer vault locations. We plan to have a total of 2,000 vaults installed with RMSPTO by the end of 2007. These transmitters monitor transformer secondary voltage and are outfitted to monitor additional analog and digital sensory inputs as above.

The RMSPTO installation is supplemented by contractor force personnel. The contractor, when required, adds nitrogen gas and repairs or replaces defective valves during scheduled work. This work is intended to help towards mitigating transformer failures and extending transformer reliability with corresponding public safety benefits.

The new analog pressure sensor is helping us to locate transformers that have extremely slow tank leaks that can pass the current transformer pressure test. Again, transformer

failure mitigation and public safety are enhanced as the project continues. 19 transformers have either been replaced, categorized as Cat 1 or 2, or are now on Candidate for Replacement (CFR) list since inception of project due to a follow up visual inspection resulting from the sensor data readings.

As of April 23, 2007, we have installed 38 new RMS receivers, and plan to replace the remaining 24 receivers by June 6th. The new receivers offer increased sensitivity and remote diagnostic tools including pick-up coil testing and improved data error correction. Following the installation of the 38 new receivers, there has been an improvement in RMS reporting rates. The schedule for receiver installations is as follows:

	Total Receiver	2004	2005	2006	2007	2007 Pending
Brooklyn	11	0	2	5	3	1
Queens	6	0	1	3	2	0
Bronx	6	0	4	0	1	1
Westchester	7	1	1	0	1	4
Manhattan	32	1	3	4	6	18
TOTAL	62	2	11	12	13	24
Units Installed	38					
Units Remaining	24					

In addition, last year we launched a pick-up coil testing and replacement initiative. This is part of our overall goal to improve the Remote Monitoring System by addressing all the system components and removing all defects or limitations. The new second generation receivers installed have the ability to remotely test the performance of the RMS pick-up coils, by identifying defective or non-optimum coils, which facilitates a more proactive pick-up coil maintenance program. Since last year we still had about 40 first generation receivers on our system without this ability, we contract with Digital Grid to manually test the remaining pick-up coils. The manual process was lengthy, but we were able to complete testing all the remaining coils on the system and are working to replace the defective ones. Of the 1,133 coils tested 163 were identified as defective or non-optimum. As of April 23, 2007, we replaced 105 coils, 58 are pending replacement. Feeder outages are needed to replace pick-up coils, since they are physically located in the high-voltage feeder cubicles.

Implementation Step: Explore alternate methods for estimating transformer loads on non-reporting units (i.e., Customer Service system data).

This project is completed. See March 31, 2002 status report.

ACTION PLAN NO. 12

12. Develop and implement methods and procedures to reduce feeder outage duration. (Recommendations CRC-16, IRB-3.9)

Action Plan

Adopt the Committees' recommendations by reducing feeder restoration time and minimizing the number of feeder outages by taking a process-centered approach in order to reduce handoffs, apply technology and streamline the work.

Implementation Steps

- A team has been established to investigate enhancing the process time for feeder work. This team will provide recommendations that include, but are not limited to, technology enhancements and process improvements by June 2000.
- Eliminate delays to expedite detection, inspection and testing components of feeder processing by obtaining additional high voltage test sets and ground and test devices.
- Incorporate results of R&D initiative for fault locating time reduction in Recommendation #17 as part of the feeder process redesign.
- Establish a computerized repository accessible to all working groups to maximize work completed during a feeder outage thus reducing the total number of scheduled outages.

Implementation Step: A team has been established to investigate enhancing the process time for feeder work. This team will provide recommendations that include, but are not limited to, technology enhancements and process improvements by June 2000.

This project is completed. See December 31, 2001 status report.

Implementation Step: Eliminate delays to expedite detection, inspection and testing components of feeder processing by obtaining additional high voltage test sets and ground and test devices.

This project is completed. See December 29, 2000 status report.

Implementation Step: Incorporate results of R&D initiative for fault locating time reduction in Recommendation #17 as part of the feeder process redesign.

May 1, 2007 Status: The first field trial of the Incident Wave Processing (IWP) system was completed on June 5, 2000 using a staged fault. The project proceeded with creation of feeder models and the database of wave patterns, and the vendor extended the

functionality of the off-line ("high-pot") system and established the hardware and software requirements for migration to real-time mode. The original project was envisioned to use a communication backbone that was to be established separately but that system was not established and was ultimately cancelled; therefore an independent communication system was built into the sensors. The system was a technical success, however, loss of commercial availability of the built-in communication system prevented fault locating field-testing. The vendor subsequently developed a breadboard assembly of a new communication system, but discussions revealed additional communication hurdles in the requirements for its full deployment. Communication needed for the IWP system developed on this project remained both an insurmountable technical and financial hurdle for its deployment. The final report was received and this project was closed.

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<u>Implementation Step</u>: Establish a computerized repository accessible to all working groups to maximize work completed during a feeder outage thus reducing the total number of scheduled outages.

This project is completed. See December 29, 2000 status report.

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Proceeding on Motion of the Commission to Investigate the July 6, 1999 Power Outage of Con Edison's Washington Heights Network	:	Case 99-E-0930

MAY 1, 2007 STATUS REPORT OF CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. ON THE IMPLEMENTATION OF THE JANUARY 2000 ACTION PLAN FOR WASHINGTON HEIGHTS NETWORK SHUTDOWN REPORTS

Immediately following the Washington Heights network shutdown in early July 1999, Consolidated Edison Company of New York, Inc. ("Con Edison" or "the Company") launched two investigations of the incident. One was undertaken by an Independent Review Board and the other by an internal Corporate Review Committee. The Independent Review Board (IRB) was comprised of three prominent high-level industry experts. The Corporate Review Committee (CRC) consisted of a core team of former Company executives supported by experienced engineering and operating personnel. Both teams issued their reports in December 1999. Both reports acknowledged Con Edison's long history of service reliability, as well as the soundness of its design and maintenance standards. The reports made recommendations geared toward reducing the probability of future network shutdowns.

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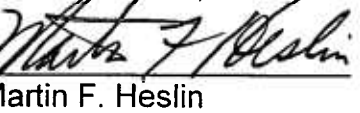
Dated: May 1, 2007

Respectfully submitted,

CONSOLIDATED EDISON COMPANY
OF NEW YORK, INC.

By 

Martin F. Heslin
Assistant General Counsel
4 Irving Place
New York, NY 10003
(212) 460-4705

Con Edison Action Plan Status Report
May 1, 2007

ACTION PLAN NO. 3

3. Review existing methods of rating cables and transformers, giving special attention to the effects of high ambient temperatures on equipment performance. (Recommendations CRC-3, IRB-3.1, IRB-3.7)

Action Plan

Adopt the Committees' recommendations by initiating a review of our current methods of cable and transformer ratings considering load cycles and test results.

Implementation Steps

- Perform laboratory testing to determine the thermal capabilities of early vintage paper cable and revise specifications as required.
- Evaluate a multi-year program to provide additional loading margins on network transformers.
- Assess the use of both short-term and extended cable ratings to compliment the existing 24-hour load cable ratings.
- Based on field data collection during the summer 2000, make appropriate refinements to calculations relating to the cable current matrix to duct configuration.
- Develop and issue guidelines for the appropriate sizing of feeder cables in both new and replacement applications.

Implementation Step: Perform laboratory testing to determine the thermal capabilities of early vintage paper cable and revise specifications as required.

This item is completed. See Con Edison's November 1, 2001 status report for its implementation of PSC Recommendation II-8.

Implementation Step: Evaluate a multi-year program to provide additional loading margins on network transformers.

November 1, 2006 Status: Prior to summer 2006, the Company relieved all network transformers to no more than 25 points above emergency rating. The Company plans to relieve network transformers to no more than 25 points above emergency rating for summer 2007.

May 1, 2007 Status: Prior to summer 2007, the Company will relieve all network transformers to no more than 25 points above emergency rating.

Implementation Step: Assess the use of both short-term and extended cable ratings to compliment the existing 24-hour load cable ratings.

This item is completed. See Con Edison's November 1, 2002 status report.

Implementation Step: Based on field data collection during the summer 2000, make appropriate refinements to calculations relating to the cable current matrix to duct configuration.

This item is completed. See Con Edison's November 1, 2002 status report.

Implementation Step: Develop and issue guidelines for the appropriate sizing of feeder cables in both new and replacement applications.

This item is completed. See December 29, 2000 status report.

ACTION PLAN NO. 4

4. Evaluate improved protective relays on certain network protectors. (Recommendations CRC-5, IRB-3.10, IRB-3.13)

Action Plan

Adopt the Committees' recommendations by initiating improvements in specific distribution relay protection systems.

Implementation Steps

- Determine the specific conditions and configuration in which a station breaker will operate in lieu of a network protector. Locate these situations on distribution system and recommend a plan to address them.
- Investigate the feasibility of modifying the Sherman Creek feeder breaker relays to provide more selective directional protection.

November 1, 2006 Status: See Con Edison's status reports for its implementation of PSC Recommendation II-13.

May 1, 2007 Status:

Summary of Prior Actions

Relays are devices that sense an overcurrent condition and trip a feeder's circuit breaker to prevent the overcurrent from damaging the feeder. After a failure on Washington Heights feeder 1M03, a "Tempo" relay on a transformer that electrically connected 1M03 with feeder 1M05 failed to operate to prevent current from 1M05 from supplying the fault on 1M03. A backup relay sensed the overcurrent condition on 1M05 and tripped its circuit breaker and took 1M05 out of service. The transformer Tempo relay failed to operate in the very low voltage conditions existing at the time.

1. Tempo Relay Removal

All Tempo relays have been removed from isolated and spot networks and in fringe areas (where low voltage can occur when multiple feeders de-energize) and have been replaced with ETI microprocessor relays which are not susceptible to low voltage conditions. A total of 2,935 Tempo relays were removed.

2. Directional Over-Current Relays

Computer load-flow simulation studies (PVL) were run for Sherman Creek, Hellgate, E. 63rd ST, and Leonard St Substations to determine the magnitudes of 13kV fault contributions due to back-feed currents from the 120/208-Volt secondary distributed

network. It was determined that, under certain operating configurations, these current contributions can cause undesired tripping of 13 kV feeder over-current relays. This possibility can be eliminated by the application of directional over-current relays set to trip only for faults in the direction of normal load flow, and to not trip for back-feeding fault currents. These substations require directional relays because they are normally operated with their bus tie breakers open. When a three phase fault occurs it collapses the voltage only on one side of the bus tie breaker. On the other side of the bus tie breaker, the primary network voltage remains and provides the potential to contribute back-feed current to the fault. Directional relays would not operate since the fault current direction is opposite to the direction they are set to trip. This work has been completed at Sherman Creek, Hellgate, East 63rd Street 1 and 2 substations, and Leonard Street 1 and 2 substations.

This recommendation is completed

ACTION PLAN NO. 6

6. Develop a real time load monitoring capability for high-tension customers. (Recommendation CRC-7)

Action Plan

Adopt the Committee's recommendations by implement real time load monitoring capability for high-tension customers.

Implementation Step

Determine the best method to measure, transmit and integrate real time high-tension customer loads into the Control Center and Engineering systems.
Based on feasibility, develop an implementation program and schedule

November 1, 2006 Status: See Con Edison's status reports for its implementation of PSC Recommendation II-15.

May 1, 2007 Status:

Summary of Prior Actions

The Company funded an R&D project in attempt to find a way to monitor high-tension customer transformers. The R&D project was unsuccessful. The Company then turned to monitoring using the existing Remote Monitoring System. This approach was also unsuccessful because of the difficulties encountered with the installation portion of the project and the potential for high maintenance costs. . As a result, we have opted to use a newer technology that monitors HT customer load directly using a wireless demand meter. This system will obtain near real-time load information that will be available at the distribution control center and in addition will provide system modeling and power quality data.

Status Report (May 1, 2007)

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ACTION PLAN NO. 10

10. Increase the reporting availability of existing remote monitoring equipment (Recommendation CRC-13)

Action Plan

Adopt the Committee's recommendations by increasing focus of RMS reporting, inspection and repair as part of summer preparedness program.

Implementation Steps

- Revise maintenance specification for the inspection and repair of non-reporting units and establish priority criteria for repair.
- Evaluate feasibility for advanced technology systems to improve monitoring of system status and loading.
- Explore alternate methods for estimating transformer loads on non-reporting units (i.e., Customer Service system data).

Implementation Step: Revise maintenance specification for the inspection and repair of non-reporting units and establish priority criteria for repair.

This project is completed. See June 29, 2001 status report.

Implementation Step: Evaluate feasibility for advanced technology systems to improve monitoring of system status and loading.

November 1, 2006 Status:

Update on RMS Receiver and Transmitter Installations

To date, we have installed 1021 new Remote Monitoring System (RMS) transmitters with RMSPTO (Pressure – Temperature – Oil Level) in selected transformer vault locations. We plan to have a total of 2,000 vaults installed with RMSPTO by the end of 2007. These transmitters monitor transformer secondary voltage and are outfitted to monitor additional analog and digital sensory inputs as above.

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<u>Implementation Step</u>: Explore alternate methods for estimating transformer loads on non-reporting units (i.e., Customer Service system data).

This project is completed. See March 31, 2002 status report.

ACTION PLAN NO. 12

12. Develop and implement methods and procedures to reduce feeder outage duration. (Recommendations CRC-16, IRB-3.9)

Action Plan

Adopt the Committees' recommendations by reducing feeder restoration time and minimizing the number of feeder outages by taking a process-centered approach in order to reduce handoffs, apply technology and streamline the work.

Implementation Steps

- A team has been established to investigate enhancing the process time for feeder work. This team will provide recommendations that include, but are not limited to, technology enhancements and process improvements by June 2000.
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Implementation Step: A team has been established to investigate enhancing the process time for feeder work. This team will provide recommendations that include, but are not limited to, technology enhancements and process improvements by June 2000.

This project is completed. See December 31, 2001 status report.

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Implementation Step: Incorporate results of R&D initiative for fault locating time reduction in Recommendation #17 as part of the feeder process redesign.

May 1, 2007 Status: The first field trial of the Incident Wave Processing (IWP) system was completed on June 5, 2000 using a staged fault. The project proceeded with creation of feeder models and the database of wave patterns, and the vendor extended the

functionality of the off-line ("high-pot") system and established the hardware and software requirements for migration to real-time mode. The original project was envisioned to use a communication backbone that was to be established separately but that system was not established and was ultimately cancelled; therefore an independent communication system was built into the sensors. The system was a technical success, however, loss of commercial availability of the built-in communication system prevented fault locating field-testing. The vendor subsequently developed a breadboard assembly of a new communication system, but discussions revealed additional communication hurdles in the requirements for its full deployment. Communication needed for the IWP system developed on this project remained both an insurmountable technical and financial hurdle for its deployment. The final report was received and this project was closed.

Nonetheless, fault locating time reduction remains a significant part of our continuing feeder process redesign, and a new tool will provide much of the expected functionality of the IWP system. This "Reactance to Fault" (RTF) system was developed using PQ Nodes. The PQ nodes themselves are the result of R&D collaboration with other utilities via EPRI, and Con Edison engineers have extended their use to this function. The RTF system is in use in all Con Edison areas now. Within about 30 minutes of a network feeder open automatic (OA) caused by a single-phase or multi-phase fault, it has narrowed the likely location of the fault to a range of about 10% of the feeder's length. In the background, the system plots the fault location based on a calculation of the reactive component of impedance during the fault. This is possible because of the highly detailed and precise wave shapes captured by PQ Node hardware. The calculation is most precise when the fault involves a fundamental 60 Hz wave shape (about 60% of faults are single-phase and about 90% of those waveforms are mostly fundamental). Additional development is in progress to improve the precision, to expand the algorithms to cover high-harmonic (less fundamental) waveforms. Based on the demonstrated usefulness of the RTF fault locating system in Manhattan, it is being deployed system-wide. 46 of the 57 substations have at least one Node installed, and RTF is working for all 46.

Implementation Step: Establish a computerized repository accessible to all working groups to maximize work completed during a feeder outage thus reducing the total number of scheduled outages.

This project is completed. See December 29, 2000 status report.