

Staff Electric Infrastructure Investment Panel

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Case 13-E-0030

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Staff Electric Infrastructure Investment Panel

Exhibit___SEIIP-1 (Redacted)

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Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-8
Date of Response: 03/05/2013
Responding Witness: Electric Infrastructure Panel

Question No. :E0032

Subject: Substation Operations – Reliability – Area Substation Reliability and Auto Ground Circuit Switchers - 1. Provide a detailed breakdown of the labor, material & supply, accounts payable, indirect, overhead, contingency, and any other related costs for each of the circuit switchers installed from 2009 to 2012. Identify, for each installation, the transformer banks and its area substation. 2. What were the removal and other related costs for the Auto Ground Switch devices at the above area substations? 3. Provide the information requested in questions 1 and 2 for work completed in 2013 to date. 4. Provide the schedule and working estimates for the installation work at each of the area substations planned for 2013, 2014, and 2015.

Response:

Questions 1-3 - The information requested can be found in the attached files “DPS8-E0032 CS Installations and AGS Removals 2009-2012.pdf” and “DPS8-E0032 Area Substation Reliability Financial Data.pdf.” Note that we have included historic and planned expenditures for all aspects of this program, not only circuit switcher installations. Also note that, year to date in 2013, no circuit switchers have been installed.

Question 4 – The information requested can be found in the attached file “DPS8-E0032 Area Substation Reliability Installations Planned 2013-2015.pdf.” Note that this table shows the outages and work that is currently planned, which may change according to resource availability and system conditions. All work for 2015 has yet to be scheduled, as we would look to develop the work plan and outage requirements as we get closer to that year, in order to prioritize the overall work that will remain at that time, reflecting the outage availability we will have experienced for the work planned in 2013 and 2014.

Circuit Switcher Installations					Auto Ground Switch Removals		
Substation	Transformer #	Date Mo/Yr		Substation	Transformer #	Date Mo/Yr	
East 29th Street	2	Nov-09		East 29th Street	2	Nov-09	
	5	Feb-10			5	Feb-10	
	1	Nov-10			1	Nov-10	
East 36th Street	3	Nov-09		East 36th Street	3	Nov-09	
	5	Feb-10			5	Feb-10	
	4	Nov-10			4	Nov-10	
Cherry Street	3	Apr-09		Cherry Street	3	Nov-08	
				East 13 Street	5	Nov-08	
East 40th Street	3	Nov-11		No AGS			
	5	Mar-12		No AGS			
	1	Oct-12		No AGS			
East 179th Street	4	Apr-11		No AGS			

Reliability Outages 2/26/13												
Station			Outages					Banks Completed		Banks Planned		
								2011	2012	2013	2014	2015
East 179th Street			TR. 4 - Install Circuit Switcher #4 - 5/11/11 - completed					1				
Ossining / Millwood			Instal DTT - Tr. 2 / 38W42 - 10/01/11 - 10/07/11 - Completed					1				
			Install DTT - Tr. 1 / 38W41 - 4/15/12/11 - 4/21/12 - Completed						1			
Leonard Street # 1, # 2			Install Digital Transfer Tripping no AGS removals									
			69m32 - Tr.2 & 8 - 3/5/12 - 4/22/12 - Completed						2			
			69m33 - Tr. 3 & 9 - 10/13/12 - 11/19/12 - Completed						2			
			69m34 - Tr. 4 & 10 - 3/14/13 - 4/20/13 - Cancelled - To be re-scheduled.							2		
			69m35 - Tr. 5 & 12 - 10/05/13 - 11/15/13							2		
			69m31 - Tr. 1 & 7 - 12/1/13 - 1/15/14								2	
			69m36 - Tr. 6 & 11 - 4/4/14 - 5/11/14								2	
			69m37 - Tr. 13 & 14 - 1/5/15 - 2/9/15									2
Washington / Cedar Street / Dunwoodie			Install DTT, Remove 3 AGS's. Install CS3.									
			38W03 - Tr. 2 @ Wash.- Tr. 1 @ Cedar St. - 9/18/11 - 3/17/12 - Completed						2			
			38W04 - Tr. 4@ Wash. - Tr. 2 @ Cedar St. - To be rescheduled.							TBD	TBD	TBD
			38W09 - Tr. 1							TBD	TBD	TBD
			38W10 - Tr. 3 - Installation of new Circuit Switcher - 4/10/13 - 5/15/13							1		
Greenwood / Bensonhurst			Install DTT & Removal of 3 @ GW & 4 @ BH Auto Ground Switches									
			38B11 - Tr. 1 - Tr.1 & 9 @ BH - 1/6/-1/25/13 re-scheduled 1/4/14 - 1/25/14								2	
			38B12 - Tr. 4 - Tr. 2 & 8 @ BH - Remove AGS							TBD	TBD	TBD
			38B13 - Tr. 2 - Tr. 3 & 7 @ BH -12/10/12 Denied - Requesting window							TBD	TBD	TBD
			38B14 - Tr.3 - Tr. 4 & 6 @ BH - EC installing equip.							TBD	TBD	TBD
Willowbrook / Fresh Kills / Fox Hills			Install DTT, Circuit Interrupters & Remove AGS's									
			Below grade civil and electrical work to start March 2013.									
			29212 - Tr. 1 - Bkr. 4 @ FK - Bkr. 7N @ FXH Spring 2014 - need window								1	
			29211 - Tr. 2 - Bkr. 5 @ FK - Bkr. 4N @ FXH - 4/11/13 - 4/21/13 - cancelled, requested new fall 2013 outage window.							1		

Station	Outages	Banks Completed		Banks Planned		
		2011	2012	2013	2014	2015
Harrison	Install Circuit Switchers, Interrupters & Remove AGS's.					
	Foundations complete. Contractor to install steel during outage.					
	EC installing relaysm conduit & wiring.					
	38W14 - Tr. 1 - 11/26/12 - 1/31/13 Being re-scheduled to fall 2013.			1		
	38W13 - Tr. 2 - 2/8/13 - 4/11/13 - outage in progress.			1		
	38W02 - Tr. 3			TBD	TBD	TBD
Sherman Creek	Civil work in progress. - schedule outage for piling work 2013.					
	Spring outage conflicts with PAR N1. EC work IP panels, conduit, wiring.					
	DTT - Tr. 3 - Install new CS & Ground sw. & remove existing Disc. Sw.					
	Tr. 3 - Outage for piling installation - 4/2/13 -4/20/13			1		
	DTT - Tr. 4 - Install new CS & Ground sw. & remove existing Disc. Sw.			TBD	TBD	TBD
	DTT - Tr. 5 - Relay upgrade			TBD	TBD	TBD
	DTT - Tr. 6 - Relay upgrade			TBD	TBD	TBD
East 40th Street	Install new CS & CI station # 1. Install new relays station # 2					
	38M05 - Tr. 3 & 10 - 11/06/11 - 12/15/11 - Completed.	1				
	38M04 - Tr. 5 & 6 - 2/21/12 - 4/3/12 - Completed.		1			
	38M01 - Tr. 1 & 9 - 09/30/12 - 11/11/12 - Completed		1			
	38M03 - Tr. 2 & 7 - 01/16/13 - 2/17/13 - re-scheduled 1/13/14 - 2/14/14				2	
	38M06 - Tr. 4 & 8 - 9/30/13 - 11/11/13			2		
West 65th Street / West 65 / West 49 Street	EC work in progress installing panels, conduits, wiring.					
	Install DTT for 10 banks, Install MOD's in vaults 1 & 2,					
	Install removalble links and new gnd. Sws. in vaults 7 - 10					
	Remove 5 AGS sws. @ W65.st. and audiotone equipment.					
	38M74 - Tr. 1 & 6			TBD	TBD	TBD
	38M73 - Tr. 2 & 5			TBD	TBD	TBD
	38M71 - Tr. 3 & 8			TBD	TBD	TBD
	38M72 - Tr. 4 & 7					
	38M75 - Tr. 9 & 10					

Station			Outages				Banks Completed		Banks Planned		
							2011	2012	2013	2014	2015
Brownsville / Farragut			Not Scheduled - Engineering in Progress								
			Appropriation in progress								
			Install DTT on 10 banks, Install MOD's on vaults 1,5,6,7,9 & 10,								
			Install Removable links on valults 2,3,4 &8, Remove 5 AGS sws. @ B.V.								
			38B01 - Tr. 1 & 9 - Tr. 3 @ Farragut						TBD	TBD	TBD
			38B02 - Tr. 2 & 6 - Tr. 4 @ Farragut						TBD	TBD	TBD
			38B03 - Tr. 3 & 7 - Tr. 1 @ Farragut						TBD	TBD	TBD
			38B04 - Tr. 4 & 6 - Tr. 6 @ Farragut						TBD	TBD	TBD
			38B05 - Tr. 5 & 10 - Tr.2 @ Farragut						TBD	TBD	TBD

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-8
Date of Response: 03/05/2013
Responding Witness: Electric Infrastructure Panel

Question No. :E0037

Subject: Substation Operations – Reliability – Transformer Replacement Program - 1. Provide a detailed breakdown of the labor, material & supply, accounts payable, indirect, overhead, contingency, and any other related costs for the transformer replacement work performed from 2009 to 2012. Provide the same for 2013 to date. 2. Explain the reasons(s) for the variations, delays, or changes in actual spending from 2009 to 2012 versus the budget. 3. Provide a detailed breakdown of the anticipated labor, material & supply, accounts payable, indirect, overhead, contingency, and any other related costs for the transformer replacement work for each of the years 2013, 2014, 2015 and 2016. Include a detailed work plan for each year. 4. Provide the current technical evaluation and analysis conducted by the Electric Power Research Institute (EPRI) for the Intelligent Fleet Management. Describe to date the program EPRI developed for evaluating transformers using available data to make intelligent repair or replacement decisions.

Response:

Q1 – Provide a detailed breakdown of the labor, material & supply, accounts payable, indirect, overhead, contingency, and any other related costs for the transformer replacement work performed from 2009 to 2012.

The requested information can be found in the attachment “DPS8-E0037 Transformer Replacement EOE Detail 2009-2012.pdf.” This attachment breaks down expenditures into the requested categories by budget reference number, then by account number (which is basically a child of the budget reference). Location names are provided in the account number descriptions. Contingency costs are not noted as a separate category of expense for actual expenditures. Once incurred, they are counted in one or more of the standard element of expense categories that we note above.

Q2 – Explain the reasons(s) for the variations, delays, or changes in actual spending from 2009 to 2012 versus the budget.

The budget to variance amounts and explanations are provided in attachment “DPS8-E0037 Transformer Replacement Variance Explanations 2009-2012.pdf.”

Q3 – Provide a detailed breakdown of the anticipated labor, material & supply, accounts payable, indirect, overhead, contingency, and any other related costs for the transformer

replacement work for each of the years 2013, 2014, 2015 and 2016. Include a detailed work plan for each year.

The EOE allocations for this program can be found in the attached file “DPS8-E0037 Transformer Replacement EOE Detail 2013-2017.pdf.” This information has been previously provided in our workpapers. Additional EOE detail is not available for most of the work planned to be done in future years, as those projects have not yet been appropriated. The work plans for this period include:

2013: (Total - \$25.7M):

Dunwoodie PAR N1 – Installation Completion - \$7M
 Dunwoodie PAR S1/S2 – Start Installation - \$3M (does not include cost of the transformer)
 Avenue A Transformer #3 – Begin Installation - \$1M (does not include cost of the transformer)
 Final Payments on Dunwoodie PAR S1/S2 - \$4.5M
 Final Payment on Purchase of Cherry Street Transformer #1 - \$2.5M
 Final Payment on Purchase of Avenue A Transformers # 3- \$2.5M
 Total Planned Expenditures - \$20.5M
 Remaining Uncommitted - \$5.2M*
 *=being held as possible funding for Sandy restoration work or 179th St. Station Upgrade Project.

2014: (Total - \$25.9M)

Dunwoodie PAR S1/S2 – Installation completion - \$11.7M
 Cherry Street Transformer #1 – Begin Installation - \$1M (does not include cost of the transformer)
 Avenue A Transformer #3 – Installation Completion - \$4M
 Avenue A Transformer #1 – Begin Installation – \$1M (does not include cost of the transformer)
 Purchase Payment 234MVA Auto Transformer - \$1.6M
 Purchase Payment ER Auto Transformer 112 - \$0.8M
 Final Payment on Purchase of Avenue A Transformer # 1 &4 - \$5.0M
 Total Planned Expenditures - \$ 25.1M
 Remaining Uncommitted - \$800K

2015: (Total - \$25.4M)

Cherry Street Transformer #1 Installation Completion - \$5M
 Avenue A Transformer #1 – Installation Completion - \$4M
 179th St Transformer #6 - Begin Installation - \$2M (does not include cost of the transformer)
 E13th Street Transformer #11 – Begin Installation - \$2M (does not include cost of the transformer)
 Final Payment 234MVA Auto Transformer - \$6.5M
 Final Payment ER Auto Transformer 112 - \$2.8M
 Purchase Payment on Purchase of E63rd Street Transformer #3 - \$0.5M (10%)
 First Purchase Payment on Remaining 13 Banks for E63rd Street – 13 Transformers - \$3.25M (5% on PO)
 Total Planned Expenditures - \$26.05M
 Amount Overcommitted - \$650K

2016: (Total - \$25.3M)

179th St Transformer # 6 – Installation Completion - \$5M
E13th Street Transformer #11 – Installation Completion - \$5M
179th St Transformer #5 - Begin Installation - \$2M (does not include cost of the transformer)
Final Payment on E63rd Street #3 - \$4.5M
Purchase Payment on E63rd Street – 13 Transformers - \$4.5M (1 on hand of 13 purchased)
Total Planned Expenditures - \$21M
Remaining Uncommitted - \$4.3M

2017: (\$25.1M)

179th Street Transformer #5– Installation Completion - \$6M
Avenue A Transformer #4 – Begin Installation - \$1M (does not include cost of the transformer)
E63rd Street Transformer #3 – Begin Installation - \$2M (does not include cost of the transformer)
Purchase Payment on Remaining Banks for E63rd Street – 13 Transformers - \$13.5M (4 on hand of 13 purchased)
Total Planned Expenditures - \$22.5M
Remaining Uncommitted - \$2.6M

Q4 – Provide the current technical evaluation and analysis conducted by the Electric Power Research Institute (EPRI) for the Intelligent Fleet Management. Describe to date the program EPRI developed for evaluating transformers using available data to make intelligent repair or replacement decisions.

The attached file “DPS8-E0037 Transformer Replacement Tech Eval and Analysis.pdf” is the most recent power transformer fleet evaluation conducted by the EPRI Intelligent Fleet Management System.

The EPRI Intelligent Fleet Management System is a rule-based algorithm that uses the following inputs: dissolved gas-in-oil history, oil quality history, furan history, transformer nameplate information, maintenance history, and available degree of polymerization results. Using the available inputs, the EPRI analysis engine generates "abnormal" condition indices and a "normal degradation" index. The abnormal condition indices identify units that may be experiencing unexpected problems due to manufacturing defects or operating issues. The "normal degradation" index identifies units that may be approaching end of service life through the expected degradation of paper from normal operation over an extended time. These indices are used to rank the transformer priority for action.

"Abnormal" condition indices are categorized into three concerns: thermal, electrical and core. Any abnormal condition index with a value above 0.5 would warrant further review and monitoring of the transformer parameters. A "normal degradation" index greater than 0.25 would warrant further scrutiny of the transformer parameters. Based on experience a "normal degradation" index greater than 0.6, highly correlates with units with degraded insulating paper that may no longer provide reliable service.

SUMMARY - TRANSFORMER REPLACEMENT PROGRAM									
							ACTUALS THRU JAN		BUDGET
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013		2013
LABOR	1,562,086	1,054,071	2,941,647	199,119	568,278	767,397	309,691		6,402,000
M&S	142,250	65,837	285,960	858	2,382,451	2,383,309	42,940		0
A/P	7,007,530	6,853,943	7,692,235	1,378,835	133,547	1,512,382	12,014		4,543,000
OTHER	-591,990	1,130,359	-1,137,649	-510,623	-304,739	-815,362	7,845		560,800
INDIRECTS	2,830,788	4,148,077	5,976,336	745,628	1,751,785	2,497,413	363,578		9,144,700
	10,950,664	13,252,287	15,758,529	1,813,817	4,531,322	6,345,139	736,068		20,650,500

ACCT: 31987							
WASHINGTON ST: TRANSFORMER# 2 REPLACEMENT							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	0	0	0	0	17,373	17,373	0
M&S	0	0	0	0	0	0	0
A/P	0	0	0	0	21,076	21,076	0
OTHER	0	0	0	0	17,828	17,828	0
INDIRECTS	0	0	0	0	45,738	45,738	0
	0	0	0	0	102,015	102,015	0

TOTAL							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	0	0	0	0	17,373	17,373	0
M&S	0	0	0	0	0	0	0
A/P	0	0	0	0	21,076	21,076	0
OTHER	0	0	0	0	17,828	17,828	0
INDIRECTS	0	0	0	0	45,738	45,738	0
	0	0	0	0	102,015	102,015	0

ACCT: 30139							
DUNWOODIE: PAR S1 AND S2 REPLACEMENT							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	0	0	0	0	0	0	0
M&S	0	0	0	0	2,314,719	2,314,719	0
A/P	0	0	0	0	0	0	0
OTHER	0	0	0	0	-502,912	-502,912	0
INDIRECTS	0	0	0	0	843,808	843,808	0
	0	0	0	0	2,655,615	2,655,615	0

TOTAL							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	0	0	0	0	0	0	0
M&S	0	0	0	0	2,314,719	2,314,719	0
A/P	0	0	0	0	0	0	0
OTHER	0	0	0	0	-502,912	-502,912	0
INDIRECTS	0	0	0	0	843,808	843,808	0
	0	0	0	0	2,655,615	2,655,615	0

ACCT: 33211							
WEST 19TH ST: TRANSFORMER# 1 REPLACEMENT BANK 1							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	0	0	0	0	0	0	0
M&S	0	0	0	0	0	0	0
A/P	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0
INDIRECTS	-84	0	0	0	0	0	0
	-84	0	0	0	0	0	0

ACCT: 33212							
WEST 19TH ST: TRANSFORMER# 1 REPLACEMENT BANK 2							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	6,104	0	0	0	0	0	0
M&S	0	0	0	0	0	0	0
A/P	59,090	0	0	0	0	0	0
OTHER	-10,350	0	0	0	0	0	0
INDIRECTS	16,927	0	0	0	0	0	0
	71,771	0	0	0	0	0	0

TOTAL							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	6,104	0	0	0	0	0	0
M&S	0	0	0	0	0	0	0
A/P	59,090	0	0	0	0	0	0
OTHER	-10,350	0	0	0	0	0	0
INDIRECTS	16,843	0	0	0	0	0	0
	71,687	0	0	0	0	0	0

ACCT: 36607							
WEST 19TH ST: TRANSFORMER# 4 REPLACEMENT							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	13,473	0	0	0	0	0	0
M&S	0	0	0	0	0	0	0
A/P	140,066	0	0	0	0	0	0
OTHER	30,000	-30,000	0	0	0	0	0
INDIRECTS	52,187	-10,397	0	0	0	0	0
	235,726	-40,397	0	0	0	0	0

ACCT: 36606							
WEST 19TH ST: TRANSFORMER# 5 REPLACEMENT							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	163,078	0	0	0	0	0	0
M&S	434	0	0	0	0	0	0
A/P	524,641	145,000	0	0	0	0	0
OTHER	-330,983	-145,000	0	0	0	0	0
INDIRECTS	149,618	0	0	0	0	0	0
	506,788	0	0	0	0	0	0

TOTAL							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	176,551	0	0	0	0	0	0
M&S	434	0	0	0	0	0	0
A/P	664,707	145,000	0	0	0	0	0
OTHER	-300,983	-175,000	0	0	0	0	0
INDIRECTS	201,805	-10,397	0	0	0	0	0
	742,514	-40,397	0	0	0	0	0

ACCT: 33267							
CHERRY ST: TRANSFORMER# 3 REPLACEMENT							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	586,622	99,322	45,149	0	0	0	0
M&S	122,813	0	1,229	0	56	56	0
A/P	3,691,897	389,310	16,716	2,700	8,310	11,010	0
OTHER	339,109	-656,593	954,295	-9,500	5,310	-4,190	0
INDIRECTS	1,443,921	4,300	444,944	-3,350	3,896	546	0
	6,184,362	-163,661	1,462,333	-10,150	17,572	7,422	0

ACCT: 33266							
CHERRY ST: ESTABLISH FEEDER 38M53							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	410,735	0	0	0	0	0	0
M&S	-1,349	0	0	0	0	0	0
A/P	859,758	43,576	0	0	0	0	0
OTHER	-93,119	-26,902	0	0	0	0	0
INDIRECTS	461,639	6,001	0	0	0	0	0
	1,637,664	22,675	0	0	0	0	0

ACCT: 34352							
CHERRY ST: PURCHASE TRANSFORMER# 3							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	308,796	0	0	0	0	0	0
M&S	0	0	0	0	0	0	0
A/P	3,525	0	0	0	0	0	0
OTHER	61,495	-131,495	0	0	0	0	0
INDIRECTS	203,911	-45,421	0	0	0	0	0
	577,727	-176,916	0	0	0	0	0

ACCT: 34375							
CHERRY ST: PURCHASE TRANSFORMER# 4							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	18,920	35,067	0	0	0	0	0
M&S	0	0	0	0	0	0	0
A/P	9,213	1,992	0	0	0	0	0
OTHER	-1,573,243	0	0	0	0	0	0
INDIRECTS	-390,957	29,753	0	0	0	0	0
	-1,936,067	66,812	0	0	0	0	0

ACCT: 36783							
CHERRY ST: ESTABLISH FEEDER 38M54							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	1,208	0	0	0	0	0	0
M&S	0	0	0	0	0	0	0
A/P	0	57,135	0	0	0	0	0
OTHER	0	0	0	0	0	0	0
INDIRECTS	756	19,731	0	0	0	0	0
	1,964	76,866	0	0	0	0	0

ACCT: 36971							
CHERRY ST: INSTALL TRANSFORMER# 4							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	8,903	0	0	0	0	0	0
M&S	-467	0	0	0	0	0	0
A/P	386,843	29,075	0	0	0	0	0
OTHER	-270,000	0	0	0	0	0	0
INDIRECTS	44,299	10,058	0	0	0	0	0
	169,578	39,133	0	0	0	0	0

TOTAL							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	1,335,184	134,389	45,149	0	0	0	0
M&S	120,997	0	1,229	0	56	56	0
A/P	4,951,236	521,088	16,716	2,700	8,310	11,010	0
OTHER	-1,535,758	-814,990	954,295	-9,500	5,310	-4,190	0
INDIRECTS	1,763,569	24,422	444,944	-3,350	3,896	546	0
	6,635,228	-135,091	1,462,333	-10,150	17,572	7,422	0

ACCT: 33243							
DUNWOODIE: N1 AUTOTRANSFORMER REPLACEMENT							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	0	73,407	1,370,950	0	292,328	292,328	0
M&S	0	67	156,816	0	12,670	12,670	0
A/P	163,500	4,765,737	3,415,917	221,501	689	222,190	0
OTHER	654,000	1,611,558	-2,221,081	-42,918	5,064	-37,854	0
INDIRECTS	226,221	2,687,240	2,111,644	98,079	373,147	471,226	0
	1,043,721	9,138,009	4,834,246	276,662	683,898	960,560	0

TOTAL							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	0	73,407	1,370,950	0	292,328	292,328	0
M&S	0	67	156,816	0	12,670	12,670	0
A/P	163,500	4,765,737	3,415,917	221,501	689	222,190	0
OTHER	654,000	1,611,558	-2,221,081	-42,918	5,064	-37,854	0
INDIRECTS	226,221	2,687,240	2,111,644	98,079	373,147	471,226	0
	1,043,721	9,138,009	4,834,246	276,662	683,898	960,560	0

ACCT: 35050							
ELMSFORD: REPLACEMENT OF ELMSFORD 2							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	16,911	1,134	0	0	0	0	0
M&S	0	0	-552	0	0	0	0
A/P	1,150,839	33,319	0	0	0	0	0
OTHER	595,504	0	897	0	0	0	0
INDIRECTS	591,468	15,416	0	0	0	0	0
	2,354,722	49,869	345	0	0	0	0

TOTAL							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	16,911	1,134	0	0	0	0	0
M&S	0	0	-552	0	0	0	0
A/P	1,150,839	33,319	0	0	0	0	0
OTHER	595,504	0	897	0	0	0	0
INDIRECTS	591,468	15,416	0	0	0	0	0
	2,354,722	49,869	345	0	0	0	0

ACCT: 35097							
WASHINGTON ST: TRANSFORMER# 4 REPLACEMENT							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	27,336	762,496	0	0	0	0	0
M&S	20,819	54,887	0	0	0	0	0
A/P	18,158	1,341,184	71,907	509,561	-53,251	456,310	0
OTHER	5,597	466,746	-106,070	29,203	50,200	79,403	0
INDIRECTS	30,882	1,325,714	-13,611	285,823	-1,421	284,402	0
	102,792	3,951,027	-47,774	824,587	-4,472	820,115	0

TOTAL							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	27,336	762,496	0	0	0	0	0
M&S	20,819	54,887	0	0	0	0	0
A/P	18,158	1,341,184	71,907	509,561	-53,251	456,310	0
OTHER	5,597	466,746	-106,070	29,203	50,200	79,403	0
INDIRECTS	30,882	1,325,714	-13,611	285,823	-1,421	284,402	0
	102,792	3,951,027	-47,774	824,587	-4,472	820,115	0

ACCT: 35114							
E 179TH ST: REPLACEMENT OF TRANSFORMER# 4							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	0	82,645	1,525,548	176,420	54,784	231,204	11,869
M&S	0	10,883	128,467	858	12,615	13,473	2,873
A/P	0	47,615	4,187,695	634,978	-74,396	560,582	0
OTHER	0	42,045	234,310	-487,570	104,532	-383,038	0
INDIRECTS	0	105,682	3,433,359	330,078	113,214	443,292	14,840
	0	288,870	9,509,379	654,764	210,749	865,513	29,582

TOTAL							
	ACTUALS						ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	0	82,645	1,525,548	176,420	54,784	231,204	11,869
M&S	0	10,883	128,467	858	12,615	13,473	2,873
A/P	0	47,615	4,187,695	634,978	-74,396	560,582	0
OTHER	0	42,045	234,310	-487,570	104,532	-383,038	0
INDIRECTS	0	105,682	3,433,359	330,078	113,214	443,292	14,840
	0	288,870	9,509,379	654,764	210,749	865,513	29,582

ACCT: 30280							
DUNWOODIE: REPLACEMENT OF PAR N1							
							ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	0	0	0	22,699	203,793	226,492	297,822
M&S	0	0	0	0	42,391	42,391	40,067
A/P	0	0	0	10,095	231,119	241,214	12,014
OTHER	0	0	0	162	15,239	15,401	7,845
INDIRECTS	0	0	0	34,998	373,403	408,401	348,738
	0	0	0	67,954	865,945	933,899	706,486

TOTAL							
							ACTUALS THRU JAN
	2009	2010	2011	2012 (CARE)	2012 (BI)	2012 TOTAL	2013
LABOR	0	0	0	22,699	203,793	226,492	297,822
M&S	0	0	0	0	42,391	42,391	40,067
A/P	0	0	0	10,095	231,119	241,214	12,014
OTHER	0	0	0	162	15,239	15,401	7,845
INDIRECTS	0	0	0	34,998	373,403	408,401	348,738
	0	0	0	67,954	865,945	933,899	706,486

PROGRAM	YEAR TO DATE - DEC 2009			YEAR TO DATE VARIATION EXPLANATIONS
	EXPENDED	ORIGINAL BUDGET	VARIANCE	
TRANSFORMER REPLACEMENT PROGRAM	10,953	13,000	(2,047)	Three of the four Elmsford Transformers were transferred into this program in 2008, the fourth transferred in 2009 (lower level than originally planned), coupled with an accounting adjustment (moving Cherry Street Reliability Equipment to the Reliability Program).

PROGRAM	YEAR TO DATE - DEC 2010			YEAR TO DATE VARIATION EXPLANATION
	EXPENDED	ORIGINAL BUDGET	VARIANCE	
TRANSFORMER REPLACEMENT PROGRAM	13,293	16,000	(2,707)	Later start than originally forecasted for Washington Street Transformer #4 moat work (deferred due to Dunwoodie) and East 179th Street Transformer #4 Replacement and Washington Street Transformer #2 (later Engineering than forecasted)

PROGRAM	YEAR TO DATE - DEC 2011			YEAR TO DATE VARIATION EXPLANATIONS
	EXPENDED	ORIGINAL BUDGET	VARIANCE	
TRANSFORMER REPLACEMENT PROGRAM	21,117	33,000	(11,883)	Dunwoodie S1/S2: Lower amount of progress payments (for 2012 installation) than originally forecasted; Dunwoodie N1 - Lower cost than forecasted (AFUDC estimated, but not applied); East 179th Street Transformer #4 (engineering re-design) pending L&P supply for new pump house and deluge house.

PROGRAM	YEAR TO DATE - DEC 2012			YEAR TO DATE VARIATION EXPLANATION
	EXPENDED	ORIGINAL BUDGET	VARIANCE	
TRANSFORMER REPLACEMENT PROGRAM	\$13,834,129.53	\$24,000,000.00	-\$10,165,870.47	Later than originally forecasted progress payments for replacement Transformers (issuance of PO), coupled with later progress payment for Dunwoodie PAR S1/S2 than originally forecasted, coupled with later start on Dunwoodie N1 Moat & Pad work.

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-10
Date of Response: 03/12/2013
Responding Witness: Electric Infrastructure Panel

Question No. :E0062

Subject: Electric and Common Capital Expenditures - In reference to IR DPS-1, Question E-056, provide the actual and budgeted electric and common capital expenditure amounts for years 2007 – 2012 by specific project, similar to the detail presented in Exhibit___(IIP-3) – Exhibit___(IIP-15).

Response:

The requested information can be found in the attached file “DPS10-E0062 2007-2012 Historic Spending Budget vs Actual.pdf.” This attachment shows the 2007-2012 budget and actual expenditures by program or project line, in the same general format as we presented in Exhibit___(IIP-3) through Exhibit___(IIP-15). We have presented each organization’s (Electric Operations, Substation Operations, System and Transmission Operations) overall budget in this format, similar to the summary information found in Exhibit___(IIP-15). The first column of each table contains the project or program’s funding category code (ie. New Business, Replacement, Reliability, etc.). This can be used to determine which exhibit would contain the related white paper, if additional details are required.

The cross reference is as follows:

New Business – IIP-3

System Expansion – IIP-3

Reliability – IIP-6

Replacement – IIP-9

Equipment Purchases – IIP-10

Environmental – IIP-11

Facility Renovations – IIP-12

Information Technology – IIP-13

Municipal Infrastructure Support – IIP-14

For Shared Services Panel Common Capital projects see file “Shared Services Panel Common Capital Projects 2007-2012 Budgets.pdf” for capital budgets for period 2007-2012.

Capital Expense (CWIP) by Function-Project Report
Consolidated Edison Of New York Inc.
Electric Operations - Capital

Category Code	Organization/Department/Description	Year Total Previous 5 Year Version: Final Total Dollars (\$000)										Year Total	Year Total
												Actual	Budget
												2012	2012
												Total Dollars (\$000)	Total Dollars (\$000)
		FY07 - Actual	FY07 - Budget	FY08 - Actual	FY08 - Budget	FY09 - Actual	FY09 - Budget	FY10 - Actual	FY10 - Budget	FY11 - Actual	FY11 - Budget	FY12	FY12
	New Business												
New Business	New Business Capital	144,241	102,092	178,739	137,000	176,521	157,001	188,333	154,000	135,028	169,500	154,296	154,714
New Business	Meter Installation	19,412	14,621	19,028	19,564	16,494	17,724	15,770	16,771	15,467	18,271	14,092	17,364
	Total	\$ 163,652	\$ 116,713	\$ 197,767	\$ 156,564	\$ 193,015	\$ 174,725	\$ 204,103	\$ 170,771	\$ 150,496	\$ 187,771	\$ 168,388	\$ 172,078
	Emergency Response - Emergency Replacement												
Replacement	Primary Cable Replacement (OA's)	56,929	37,920	58,203	57,713	53,614	59,368	60,507	61,056	69,132	61,056	62,443	59,275
Replacement	Overhead	15,587	7,197	17,891	15,195	21,141	15,546	36,968	18,267	31,366	18,267	62,804	18,190
Replacement	Temporary Services (incl. conduit)	21,668	15,748	21,940	20,108	27,090	20,195	33,432	21,053	34,142	27,053	34,161	33,645
Replacement	Street Lights (incl. conduit)	15,215	14,669	18,044	16,185	22,315	19,289	21,356	20,935	17,913	20,935	23,742	24,651
Replacement	Transformer Installation	25,040	21,545	24,711	25,172	24,915	24,127	35,851	32,146	32,980	27,146	60,305	24,613
	Total	\$ 134,439	\$ 97,079	\$ 140,789	\$ 134,373	\$ 149,075	\$ 138,525	\$ 188,113	\$ 153,457	\$ 185,533	\$ 154,457	\$ 243,455	\$ 160,374
	Distribution Substation												
System Expansion	Load Relief	10,042	8,425	7,685	8,130	3,559	4,569	(245)	0	141			
Environmental	Environmental	518		59	0	(552)	(618)	(78)	0	0			
Reliability	Modernization and Other	669	3,375	3,564	5,810	5,518	5,244	2,907	3,452	1,835	3,452	3,380	3,592
Environmental	USS Site Improvement for SPCC Plans			0	0								
	Total	\$ 11,229	\$ 11,800	\$ 11,308	\$ 13,940	\$ 8,524	\$ 9,195	\$ 2,584	\$ 3,452	\$ 1,976	\$ 3,452	\$ 3,380	\$ 3,592
	System Reinforcement												
System Expansion	Area SS Overloads	58,762	48,708	63,931	68,133	\$29,591	\$29,827	\$6,872	\$14,700	\$20,728	\$21,850		
System Expansion	Radial (13 MW) - Parkchester 2 to 1											0	250
	Cable Crossing (XW Riverdale & BQ												
System Expansion	Flushing)											2,259	4,995
System Expansion	59th Street Bridge Crossing											0	1,000
	Buchanan New Feeder (alternate to												
System Expansion	Mohansic)											8	
System Expansion	Elmsford Refurbishment 2008											558	2,001
System Expansion	Advance Relief											482	
	Total	\$ 58,762	\$ 48,708	\$ 63,931	\$ 68,133	\$ 29,591	\$ 29,827	\$ 6,872	\$ 14,700	\$ 20,728	\$ 21,850	\$ 3,307	\$ 8,246
	Base Growth / Relief												
System Expansion	Primary Feeder Relief	51,344	39,194	47,693	43,494	32,934	35,318	9,530	15,049	11,798	8,000	7,915	8,918
System Expansion	Network Transformer Relief	38,321	17,133	57,379	33,200	36,513	52,150	28,229	36,120	31,466	28,123	27,029	30,939
System Expansion	NonNetwork Fdr Relief (Open Wire)	1,277	1,110	9,457	8,302	10,192	6,339	5,854	11,105	9,426	6,809	6,865	6,898
System Expansion	4 kV Feeder & Wire Relief	20,217	11,595	16,283	7,339	4,808	4,507			4			
System Expansion	Overhead Transformer Relief	380	129	356	1,321	121	2,041	884	1,642	2,182	1,158	4,504	945
System Expansion	Secondary Main Relief	1,587	2,943	2,221	1,153	(144)	454	372		409		669	0
System Expansion	Other Advance Relief	114	0	67	0	209	18	385		1,226		766	0
	Total	\$ 113,240	\$ 72,104	\$ 133,456	\$ 94,809	\$ 84,634	\$ 100,827	\$ 45,254	\$ 63,916	\$ 56,510	\$ 44,090	\$ 47,748	\$ 47,700
	Reliability												
Reliability	Osmoste (C Truss)	972	1,417	1,443	1,400	1,326	1,028	1,058	1,252	1,402	2,252	819	2,115
Reliability	Anderson Switches	12	50	0	63		50	8	0				
Reliability	Autoloop Reliability (27kV Inc'l.)	880	3,945	4,447	4,978	4,230	3,094	4,069	3,859	3,781	2,807	977	3,671
Reliability	Aerial Cable Replacement	44	1,850	539	501	1,412	2,529	1,401	1,009	283	1,270	162	1,160
Reliability	#4,#6 Self Supporting Wire	1,207	2,656	1,921	2,298	2,337	3,166	594	1,669	661	1,600	995	1,469
Reliability	ESCO Switch Replacement	485	1,368	3,090	2,003	2,231	2,311	55	0	1			
Reliability	3 Phase Gang Switch Replacement					0	177						
Reliability	4 kV Feeder Sectionalizing/ Add'l Kyle			102	306	596	18	374	0			8	
Reliability	Additional 13 kV Feeder Sectionalizing			125	0	1,224	547	465	0			(17)	384
Reliability	Automated Emergency Ties					0		0	750			0	756
Reliability	Overhead Feeder Reliability/VRS			19	307	3		1	750	3,463	3,550	1,914	1,108

Capital Expense (CWIP) by Function-Project Report
Consolidated Edison Of New York Inc.
Electric Operations - Capital

Category Code	Organization/Department/Description	Project/Program Description	Year Total Previous 5 Year Version: Final Total Dollars (\$000)								Year Total	Year Total	
											Actual	Budget	
											2012	2012	
											Total Dollars (\$000)	Total Dollars (\$000)	
			FY07 - Actual	FY07 - Budget	FY08 - Actual	FY08 - Budget	FY09 - Actual	FY09 - Budget	FY10 - Actual	FY10 - Budget	FY11 - Actual	FY11 - Budget	FY12
Reliability	SSM/4KV Feeder Breakers					150							
Reliability	OH Conductor Clearance					150							
Reliability	Rear-Lot Pole Elimination			633	1,541	525	437	585	655	836	750		
Reliability	Overhead Conductor Clearance					0		399	1,130	151	500	61	498
Reliability	Overhead Feeder Sectionalizing Program								1,500	117	0	30	
Environmental	Oil Minders	484	400	254	600	1,037	600	1,565	600	2,338	600	1,294	520
Replacement	Secondary Open Mains	142,876		137,516	123,331	140,583	148,972	155,222	140,595	154,163	137,413	121,546	144,746
Reliability	HiPot	4,221	6,835	3,549	3,295	2,594	3,299	3,143	2,400	3,298	3,625	5,032	3,144
Reliability	PILC	19,743	23,010	32,376	33,001	21,961	27,088	17,168	18,085	18,033	20,085	16,161	20,971
Reliability	Vented Manhole Cover	3,081	8,000	6,605	3,001	4,210	6,800	304	0	(1)			
Reliability	Vented Service Box Covers	757		6,307	9,997	11,033	4,375	7,280	8,375	8,409	10,000	8,041	11,697
Reliability	4 kV Substations - Reliability	277	857	122	112	238	3	0		162	0		
Reliability	4 kV UG Reliability	59	978	745	500	1,227	1,040	23	111	1,491	700	726	2,074
Reliability	Underground Secondary Reliability	42,534	144,819	33,614	23,307	27,594	24,322	40,048	40,956	42,481	34,292	41,708	30,491
Reliability	Transformer Vault Modernization											4,355	4,947
Reliability	Overhead Secondary Reliability Program	0				0	496	19	2,500	244	300	332	206
Reliability	Remote Monitoring System 3rd	15,117	23,743	15,275	17,852	13,302	6,008	6,335	7,850	2,657	4,000	2,199	5,447
Reliability	Intelligent OH DAS Autoloop System					34	34						
Reliability	Pressure, Temperature and Oil Sensors							1,570	2,559	704	2,559	715	1,895
Reliability	UG Sectionalizing Switches	2,057	1,297	1,662	3,210	2,502	3,562	991	3,562	853	2,966	27	2,834
Reliability	Grounding transformers	241	0	60	1,228	521	1,516	1,091	550	196	550	275	630
Reliability	Shunt reactors	404	1,267	141	227	917	310	1,760	1,761	1,080	1,569	1,416	1,573
Reliability	4kV Cable		201										
Reliability	Known Point Splice	907	798	0		89	0	0					
Reliability	Targeted Primary DBC Replacement	2,468	3,258	2,409	2,589	310	0	992	0	1,280	0	101	524
Reliability	Coastal Storm Risk Mitigation	21	501	74	3,000	112	446	39	1,000	1	0	1	
Reliability	Network Reliability			4,963	18,444	14,230	11,896	12,389	16,323	25,389	29,097	18,735	30,425
Reliability	URD Cable Rejuvenation/Fault Indicator						798		368		368	68	315
Reliability	ATS Installation USS Reliability XW			150	1,050	1,106	1,450	484	1,450	891	0	240	210
Reliability	Street Lights Service Reliability Program			2,516	4,100	5,311	4,814	5,224	4,809	2,478	2,500	444	3,600
Reliability	Network transformer replacements	21,819	30,156	18,627	30,826								
Reliability	Network Transformer Replacements	(19)	0	1,022	1								
Reliability	Other reliability	548				(34)	1	1,606	0	1,517	0	1,915	
	Total Reliability	\$ 261,194	\$ 257,406	\$ 280,305	\$ 293,068	\$ 262,759	\$ 261,487	\$ 266,262	\$ 266,428	\$ 278,359	\$ 263,353	\$ 230,280	\$ 277,410
Information Technology	System Reinforcement IT Projects	9,849	12,290	16,333	24,744	19,818	25,117	\$ 31,486	\$ 5,868	\$ 12,719	\$ 17,348	16,793	23,964
Information Technology	Work Mangement System	-								\$ 25,417	\$ 35,200	\$ 24,612	\$ 39,800
	Total System Reinforcement	\$ 443,044	\$ 390,508	\$ 494,026	\$ 480,754	\$ 396,802	\$ 417,258	\$ 349,874	\$ 350,912	\$ 393,733	\$ 381,841	\$ 322,740	\$ 397,120
	Emergency Response - Emergency												
	Repairs	134,439	97,079	140,789	134,373	149,075	138,525	188,113	153,457	185,533	154,457	243,455	160,374
	System Relief and Reliability	443,044	390,508	494,026	480,754	396,802	417,258	349,874	350,912	393,733	381,841	322,740	397,120
	New Business	144,241	102,092	178,739	137,000	176,521	157,001	188,333	154,000	135,028	169,500	154,296	154,714
	Meter Installation	19,412	14,621	19,028	19,564	16,494	17,724	15,770	16,771	15,467	18,271	14,092	17,364
Equipment Purchases	Meter Purchase	11,737	12,000	11,025	11,967	9,381	12,349	8,328	9,552	6,376	9,552	11,170	9,551
Equipment Purchases	Transformer Purchase	134,628	94,000	166,658	125,592	134,008	129,518	109,458	130,106	116,147	115,106	126,942	125,000
General Equipment	Telecom	89	0			81	88						
	Sub-Total	\$ 887,591	\$ 710,300	\$ 1,010,264	\$ 909,250	\$ 882,362	\$ 872,463	\$ 859,876	\$ 814,798	\$ 852,284	\$ 848,727	\$ 872,695	\$ 864,123
	Unit Substation Load Relief	10,042	8,425	7,685	8,130	3,559	4,569	(245)	-	141	-	-	
	Environmental	518	-	59	-	(552)	(618)	(78)	-	-	-	-	
	MODERNIZATION & OTHER	669	3,375	3,564	5,810	5,518	5,244	2,907	3,452	1,835	3,452	3,380	3,592

Capital Expense (CWIP) by Function-Project Report
Consolidated Edison Of New York Inc.
Electric Operations - Capital

Category Code	Organization/Department/Description	Year Total Previous 5 Year Version: Final Total Dollars (\$000)										Year Total	Year Total
												Actual	Budget
												2012	2012
												Total Dollars (\$000)	Total Dollars (\$000)
		FY07 - Actual	FY07 - Budget	FY08 - Actual	FY08 - Budget	FY09 - Actual	FY09 - Budget	FY10 - Actual	FY10 - Budget	FY11 - Actual	FY11 - Budget	FY12	FY12
Municipal Infrastructure Support	Project/Program Description												
	USS Site Improvement for SPCC Plans												
	Distribution Substations	\$ 11,229	\$ 11,800	\$ 11,308	\$ 13,940	\$ 8,524	\$ 9,195	\$ 2,584	\$ 3,452	\$ 1,976	\$ 3,452	\$ 3,380	\$ 3,592
	Total Distribution	\$ 898,820	\$ 722,100	\$ 1,021,572	\$ 923,190	\$ 890,887	\$ 881,658	\$ 862,460	\$ 818,250	\$ 854,261	\$ 852,179	\$ 876,075	\$ 867,715
	Interference	26,173	31,300	36,697	43,500	33,816	45,725	34,526	38,000	57,103	38,000	77,292	59,342
	Grand Total	\$ 924,992	\$ 753,400	\$ 1,058,269	\$ 966,690	\$ 924,703	\$ 927,383	\$ 896,986	\$ 856,250	\$ 911,364	\$ 890,179	\$ 953,367	\$ 927,057

Capital Expense (CWIP) by Function-Project Report
Company.
Substation Operations (EN.ORG-00773)

			Year Total Previous 5 Years Total Dollars (\$000)										Year Total	Year Total
													2012	2012
													Total Dollars (\$000)	Total Dollars (\$000)
			FY07		FY08		FY09		FY10		FY11		FY12	
Category Code	Function	Project/Program Description	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
Reliability	ESU 09	Small Capital Equipment Program	4000	3,260	6,000	2,486	4,000	5,177	1,995	2,796	2,590	3,127	2,670	4,567
Reliability	ESU 11	CIP - Security Upgrades		-		-		-		-		-		-
Reliability	ESU 11	Security Enhancements (Includes Other)		11	4,100	3,557	3,100	1,297	3,200	3,199	4,300	3,620	9,000	5,892
Reliability	ESU 11	Substation Loss Contingency	500	-	2,000	182	1,000	323	1,100	457	-	153	-	74
		Total - Security	500	11	6,100	3,739	4,100	1,620	4,300	3,656	4,300	3,773	9,000	5,966
System Expansion	ESU 12	Astor: Establish 5 Bank 138/13kv Substation	59000	55,926	33,000	36,271	1,000	5,477						-
System Expansion	ESU 12	Astor: Install 5th Bank And Associated Feeder		-		-		-		-		-		-
System Expansion	ESU 12	Avenue A: Replace Overloaded Syn Bus Sections		-		-		-		-		-		-
System Expansion	ESU 12	Bensonhurst #2 : Install Transformer #10	5000	1,244										-
System Expansion	ESU 12	Bensonhurst: Install Fifth Transformer, 138kv Fdr And Cooling Plant	500	515	1,500	2,177								-
System Expansion	ESU 12	Buchanan : Install New 13kv Swgr & Fdr Positions	2200	4,984										-
System Expansion	ESU 12	Cancelled Project - Load Relief - Bensonhurst Transformer #10		-		1,613		182						-
System Expansion	ESU 12	Carryover - Load Relief		982		890		2,058						
System Expansion	ESU 12	Cedar Street: Third Transformer And 138kv Feeder	25100	27,429	2,400	1,033								-
System Expansion	ESU 12	Completed Projects - Load Relief		(493)		744		1,137		405		(1,358)		1,920
System Expansion	ESU 12	East 75th Street: Install Transformer Cooling On Trransformers 1 & 3		-		-		-		-		-		-
System Expansion	ESU 12	East 179th Street: Switchgear And Bus Replacement											15,000	11,105
System Expansion	ESU 12	East 179th Street: Install Water Spray For 43mva Transformers		-		-		-		-		-		-
System Expansion	ESU 12	East 179th Street: Install Fans For Limiting Bus, Breakers & Reactors		-		-		-		-		-		-
System Expansion	ESU 12	Emergent Load Relief Program	8000	1,288	3,000	881		660	1,400	235		-	1,924	1,214
System Expansion	ESU 12	Fox Hills: Install Two New Feeder Positions	2500	747	3,000	2,393		-		-		-		-
System Expansion	ESU12	Fresh Kills: Install 30 Mvar Cap Bank		-	2,000	-								-
System Expansion	ESU 12	Fresh Kills: Replace Limiting Feeders Associated With Transformer 21w		-		-		-		-		-	1,000	-
System Expansion	ESU 12	Greenwood: Install Breaker 3n & Switch Feeder Connections		-		-		-		-		-		-
System Expansion	ESU 12	Greenwood: Replaced Overloaded Equipment		-		-		-		-	1,500	951	4,000	524
System Expansion	ESU 12	Land Acquisitions For Future Substations	12400	7,450	5,000	-		2,660						-
System Expansion	ESU 12	Mott Haven: Establish Transmission And Area Stations	66000	55,206	8,000	5,541								-
System Expansion	ESU 12	Murray Hill: Install 2nd Cap Bank		-		-		-		-		-		-
System Expansion	ESU 12	Nevins: Establish New Station		-	3,000	1,124								-
System Expansion	ESU 12	Newtown: Establish New Substation		8,850	59,000	59,375	92,780	81,990	46,000	14,855				-
System Expansion	ESU 12	Park View: Establish New Area Station	105000	106,198	93,750	73,832								-
System Expansion	ESU 12	Parkchester: Limiting Bus									2,000	-		-
System Expansion	ESU 12	Rockview : Establish New Area Substation (Yonkers)	47000	55,327	18,000	18,704								-
System Expansion	ESU 12	Transformer Cooling	1700	560	1,000	865	1,389	874			1,400	271		-
System Expansion	ESU 12	Water Street: Fourth Transformer	6000	6,285										-
System Expansion	ESU 12	Woodrow : Install Fifth Transformer And 138kv Feeder	15000	7,898	16,500	7,283	25,000	28,536	13,600	4,833				-
System Expansion	ESU 12	Woodrow: Install New Cap Banks									1,000	-		-
System Expansion	ESU 12	York: Establish New Area Station	8000	5,250	79,000	23,348	40,000	11,882		(1,546)		757		327

Capital Expense (CWIP) by Function-Project Report
Company.
Substation Operations (EN.ORG-00773)

			Year Total Previous 5 Years Total Dollars (\$000)										Year Total	Year Total
													2012	2012
													Total Dollars (\$000)	Total Dollars (\$000)
			FY07		FY08		FY09		FY10		FY11		FY12	
Category Code	Function	Project/Program Description	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
		Total - Load Relief	363,400	345,646	328,150	236,074	160,169	135,456	61,000	18,782	5,900	621	21,924	15,090
Reliability	ESU 13	138kv Circuit Breaker Upgrade Program	7400	5,279	7,700	8,936	11,700	14,275	7,000	7,551	5,000	6,747	6,000	3,340
Reliability	ESU 13	345kv Circuit Breaker Capital Upgrade Program	8830	10,309	7,000	8,878	5,000	6,837	2,400	2,007	4,000	1,743	4,000	1,847
Reliability	ESU 13	Additional G&T Devices	1000	408										-
Reliability	ESU 13	Area Substation Reliability And Auto Ground Circuit Switchers	6500	7,959	8,500	5,321	5,200	6,346	8,000	8,514	4,000	6,665	10,500	12,582
Reliability	ESU 13	Analog To Digital Upgrade		-	2,000	1,615	2,000	2,776	2,000	1,137		684		-
Reliability	ESU 13	Audiotone Replacement Program	1000	195										-
Reliability	ESU 13	Cancelled Projects - Reliability						(10)		(44)		(19)		-
Reliability	ESU 13	Capacitor Cable Upgrade Program	1000	1,246	3,000	1,295	3,000	1,886	1,300	717				185
Reliability	ESU 13	Carryover - Reliability		5,191		3,130		631		1,904		785		-
Reliability	ESU 13	Category Alarms		-	2,250	479	2,250	904	3,000	1,256	2,500	1,360	2,500	1,342
Reliability	ESU 13	Completed Projects - Reliability		5		632		(4,492)		132		723		164
Reliability	ESU 13	Condition Based Monitoring Equipment	500	137	250	516	250	493	300	1,605	300	968	300	163
Reliability	ESU 13	Control Cable Upgrade Program		-	1,000	1,074	1,000	(236)		-	600	230	1,000	525
Reliability	ESU 13	Stabilization of Pothead Stand Supports		-	1,000	46	500	2	500	684	1,000	2	1,000	369
Reliability	ESU 13	Corona: New 138kv Breakers (6s And 8x)					3,000	4,350	3,000	1,298				-
Reliability	ESU 13	Dc System Upgrade Program	2500	1,557	3,500	2,336	3,500	1,790	3,000	1,911	2,100	1,181	3,000	907
Reliability	ESU 13	Diesel Upgrade		-	600	202	1,000	472						-
Reliability	ESU 13	Disconnect Swtich Program	1500	3,680	2,900	6,378	4,600	3,700	1,400	2,194	2,500	1,945	3,000	1,283
Reliability	ESU 13	Disturbance Monitoring Equipment - 138kv		-		-		-		-		-		-
Reliability	ESU 13	Disturbance Monitoring Equipment - 345kv		-		-		-		-	3,500	-	8,000	2,963
Reliability	ESU13	East 13th Street Alarm Panel and Control Systems Enhancements											2,000	-
Reliability	ESU 13	East 179th Street: Bus Section Upgrade							3,200	600	18,000	155		-
Reliability	ESU 13	East 36th St: Install Feeder Position	630	375										-
Reliability	ESU 13	East 63rd Street: Station Upgrade		-	2,500	-								-
Reliability	ESU 13	East River: Station Upgrade	3000	5,275	3,000	3,394	3,500	3,854	3,000	6,183	4,000	4,038	2,500	4,749
Reliability	ESU 13	Elmsford: Install New Substation	9000	8,112	20,000	(5,973)	25,000	12,756	37,000	26,250	28,000	27,797	4,400	2,832
Reliability	ESU 13	Enhanced Reliability (Installation Of Test Systems)		40										-
Facilities Renovations	ESU 13	Facility Improvement Program	1000	3,025	6,000	3,391	8,000	4,327	4,200	4,605	6,600	4,199	6,600	5,017
Reliability	ESU13	Fire Suppression (Also See Fire Protection Under Other Esu 17)					4,500	2,299	5,000	4,228	6,500	8,781	9,000	7,506
Reliability	ESU 13	Fresh Kills - Upgrade 13kv L&P Transformer	2500	(1)	600	-								-
Reliability	ESU13	GIC Monitoring												1,121
Reliability	ESU 13	G&T Devices		-	1,000	190	500	159			200	-		-
Reliability	ESU 13	High Voltage Test Sets		-	6,500	1,541	5,000	6,345	1,500	1,945	2,000	3,273	3,000	1,228
Reliability	ESU 13	Hudson Avenue: L&P Transformers		-		-		-		-		-		-
Reliability	ESU 13	Install Underfrequency Relays	1500	2,682		-		-		-		-		-
Reliability	ESU 13	Jamaica - Install 138kv Breakers 7 & 8 And Third Cap Bank	5000	5,549	3,000	2,971		-		-		-		-
Reliability	ESU 13	Jamica - Install Switchgear Fall Protection											1,000	
Reliability	ESU 13	Rapid Restore Enhancements (Also See Under Other In Later Years)	200	316										-
Reliability	ESU 13	Reduce Fault Clearing Time Program	7500	5,201	5,200	2,041								-
Reliability	ESU 13	Reinforced Ground Grid	1000	310	500	719	700	487	800	1,614	800	901	800	1,039
Reliability	ESU 13	Relay House Enclosures		-	1,500	31	750	1,466		-		-	500	37
Reliability	ESU 13	Relay Modifications Program	1500	3,724	2,500	4,432	5,500	4,377	5,500	5,859	7,500	9,735	8,000	6,840

Capital Expense (CWIP) by Function-Project Report
Company.
Substation Operations (EN.ORG-00773)

			Year Total Previous 5 Years Total Dollars (\$000)										Year Total	Year Total
													2012	2012
													Total Dollars (\$000)	Total Dollars (\$000)
			FY07		FY08		FY09		FY10		FY11		FY12	
Category Code	Function	Project/Program Description	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
Reliability	ESU 13	Relay Protection Sytem Redundancy - Single Point Of Failure		-		-		-		-		-	3,000	-
Reliability	ESU 13	Replace/Retrofit Overdutied 13/27kv Circuit Breakers		-	8,800	11,076	10,800	15,803	11,000	10,488	10,000	9,866	10,500	4,565
Reliability	ESU 13	Retrofit Overdutied 13kv Circuit Breakers	5940	3,849										
Reliability	ESU 13	Retrofit Overdutied 27kv Circuit Breakers	2650	5,634										-
Reliability	ESU 13	Revenue Metering Upgrade	500	77	500	35	250	96	600	48				-
Reliability	ESU 13	Roof Replacement Program	3500	759	3,000	1,172	3,000	641	1,100	2,701	1,800	1,229	1,800	1,704
Reliability	ESU 13	Sikap Equipment								2,940				-
Reliability	ESU 13	Substation Automation (Target Information System)		-	2,000	1,224	1,000	2,786						-
Reliability	ESU 13	Substation Control Room Betterment Program	500	628										-
Reliability	ESU 13	Switchgear Enclosure Upgrade		-	500	19		86		123	1,000	794	1,000	253
Reliability	ESU 13	Transformer Replacement Program		-	17,200	24,932	13,000	10,953	16,000	13,293	33,000	21,117	24,000	13,834
Reliability	ESU 13	Transformer Replacement Program - West 19th Street	5500	8,036										-
Reliability	ESU 13	Transformer Replacement Program - Cherry Street	4800	4,703										-
Reliability	ESU 13	Underfrequency Load Shedding Relays		-	1,385	242								-
Reliability	ESU 13	Upgrade Analog Circuits To Digital Fiber	2000	1,837										-
Reliability	ESU 13	White Plains - Substation Continuance					550	580						-
		Total - Reliability	88,450	96,097	125,385	92,275	125,050	106,739	120,800	111,743	144,900	114,899	117,400	76,395
Environmental	ESU 15	SPCC Plan For Transmission Cable System	1000	1,098	500	735								-
Environmental	ESU 15	Environmental Program (SPCC)	600	616										-
Environmental	ESU 15	Purs Supervisory Control & Data Acquisition	2000	-	1,000	2,876	4,224	3,229	3,200	1,164	2,200	131	2,500	765
Environmental	ESU 15	59th Street - Cable Cooling Civil	2000	33										-
Environmental	ESU 15	Pumping Plant Improvement	3400	3,362	8,500	5,821	5,500	3,500	4,000	2,307	6,500	4,582	6,500	4,748
Environmental	ESU 15	EH&S Risk Mitigation (OWS, Moats)	2500	3,898	3,500	1,292	3,837	1,660	1,600	5,491	9,000	7,699	10,000	16,826
Environmental	ESU 15	59th St - Cable Cooling Upgrades		13										-
Environmental	ESU 15	Carryover - Environmental		64		240		42						-
Environmental	ESU 15	Charges To Completed Projects - Environmental		103		257		201		210		(39)		-
		Total - Environmental	11,500	9,187	13,500	11,221	13,561	8,632	8,800	9,172	17,700	12,373	19,000	22,339
Replacement	ESU 16	Failed Transformer Program	5000	16,784	21,200	22,756	29,300	27,842	25,000	31,208	27,000	18,362	24,000	8,408
Replacement	ESU 16	Various - Failed Equipment Other Than Transformer Program	1500	1,649	1,500	5,615	2,500	3,055	2,000	9,536	3,000	8,561	5,000	5,923
Replacement	ESU 16	Buchanan Wood Pole Bypass		-		-		-		-		-		
Replacement		Carryover - Failures		-		764		1,697		502				-
Replacement	ESU 16	Charges To Completed Projects - Failures		384		255		2,450		(224)		1,637		
		Total Failures	6,500	18,817	22,700	29,390	31,800	35,044	27,000	41,022	30,000	28,560	29,000	14,331.0
Reliability	ESU 17	Circuit Switcher Replacement Program		-	500	367	500	470	600	-	600	-	1,000	-
Reliability	ESU 17	Fire Protection Program	2000	4,481	500	131	500	192						-
Information Technology	ESU 17	Maximo Upgrade		-	400	310	650	590						-
Information Technology	ESU 17	Rapid Restore Enhancements		-	200	137	200	-	200	210				-
Information Technology	ESU 17	SOCCS - RTU Replacement	1000	1,252	3,000	1,278	3,000	4,213	2,200	2,134	1,700	519	1,000	214
Information Technology	ESU 17	Technology Improvements		-	310	129	905	1,154	400	343	600	776	1,000	239
Information Technology	ESU 17	Work Permit Processing	300	125		28								-
Other	ESU 17	Carryover - Other		101						519				-
Other	ESU 17	Charges To Completed Projects - Other		(19)				14		(30)		194		-
		Total Other	3,300	5,940	4,910	2,380	5,755	6,633	3,400	3,176	2,900	1,489	3,000	453

Capital Expense (CWIP) by Function-Project Report
Company.
Substation Operations (EN.ORG-00773)

			Year Total Previous 5 Years Total Dollars (\$000)										Year Total	Year Total
													2012	2012
													Total Dollars (\$000)	Total Dollars (\$000)
			FY07		FY08		FY09		FY10		FY11		FY12	
Category Code	Function	Project/Program Description	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
System Expansion	ESU 18	Generation Interconnection		(2,872)	5,000	2,690		(7)		-		-		-
System Expansion	ESU 18	VFT Interconnection												1,949
		Total - Generation Interconnection	-	(2,872)	5,000	2,690	-	(7)	-	-	-	-	-	1,949
Other		Other (Rounding)		18		(9)		(16)		3		2		
		Total	477,650	476,104	511,745	380,246	344,435	299,278	227,295	190,350	208,290	164,844	201,994	141,090

Category Code

Information Technology
Information Technology
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Capital Expense (CWIP) by Function-Project Report
Consolidated Edison Of New York Inc.
System & Transmission Ops (EN.ORG-00738)

Category Code

Information Technology

Facilities renovations
Facilities renovations
Facilities renovations
Facilities renovations
Reliability
Reliability
Reliability
Facilities renovations
Reliability
Facilities renovations

Reliability

Replacement

Reliability
Reliability
System expansion
Reliability
Reliability
Reliability

Environmental
Environmental
Environmental
Environmental
Environmental

Organization/Department	Year Total										Year Total	
	Previous 5 Year Actual											
	Version: Final											
	Total Dollars (\$000)										Total Dollars (\$000)	
	FY07		FY08		FY09		FY010		FY11		FY12	
Organization/Department	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget
ETR07 - Sys Ops - Bulk Power Improvements												
PR.4ET9707 - ECC SOCCS Visualization	0	0	0	0	629	500	(84)	500	3	0	0	0
Total ETR07 - Sys Ops - Bulk Power Improvement	0	0	0	0	629	500	(84)	500	3	0	0	0
ETR08 - Sys Ops - Facilities/utilities Impr												
PR.6ET9708 - New Lighting DO Room	(1)	0	89	1,500	2,785	3,000	(55)	0	0	0	0	0
PR.4ET9710 - New Lighting - West Control Room	899	1,000	1,456	1,000	47	0	2	0	0	0	0	0
PR.2XC1236 - Entry Improvements	529	0	623	100	98	0	33	0	0	0	0	0
PR.5ET9705 - HVAC Upgrade - East Computer Room	0	0	3	0	0	500	0	0	0	0	0	0
PR.9ET9801 - Add Diesel Generator	0	0	0	500	0	0	0	0	0	0	0	0
PR.1ET1000 - ECC Ups Battery Replacement	0	0	0	0	0	0	0	0	0	0	0	500
PR.7ET9704 - ECC/AECC Facility Security	0	0	0	0	268	0	80	0	85	100	34	0
PR.FET7005 - Training Area Expansion	0	0	0	0	0	750	0	0	0	0	0	0
PR.FET7006 - ECC/AECC Facility Security Enhancement	0	0	0	0	0	300	0	300	0	0	0	0
PR.7ET9805 - Operator Console Replacement	0	0	952	0	36	1,600	30	0	(32)	0	0	0
Total ETR08 - Sys Ops - Facilities/utilities Impr	1,427	1,000	3,123	3,100	3,234	6,150	90	300	53	100	34	500
ETR15 - Sys Ops - Alternate Energy Control Center												
PR.6ET9801 - Establish New Alternate Energy Control Center	1,238	400	10	0	10	0	0	0	0	0	0	0
Total ETR15 - Sys Ops - Alternate Energy Control Center	1,238	400	10	0	10	0	0	0	0	0	0	0
Sub-Total System Operations	13,232	16,250	12,757	14,900	8,039	12,300	2,620	3,350	2,107	2,250	5,142	6,950
Transmission Operations												
ETR09 - Failures												
PR.1ET0800 - Transmission Feeder Failures	1,818	4,000	362	5,000	5	5,000	(10)	5,300	(4)	5,300	11,799	5,300
ETR09 - Failures	1,818	4,000	362	5,000	5	5,000	(10)	5,300	(4)	5,300	11,799	5,300
ETR10 - Load Relief												
PR.8ET9802 - 38M72 Upgrade Vernon-West 49th Street	0	0	1,318	4,200	11,781	20,144	17,323	19,800	4,410	7,200	4,847	3,300
PR.5ET0900 - M29	16,888	86,000	109,593	143,000	173,063	160,000	97,746	107,000	34,279	32,000	1,413	0
PR.9ET1100 - Dynamic Feeder Rating System	997	1,000	670	1,000	1,515	1,000	2,131	1,100	1,323	1,250	752	4,500
PR.2ET9708 - Re-conductor 69M65	0	0	(2)	0	0	0	0	0	0	0	0	0
PR.3ET1501 - Re-conductor 38B01 - 38B04	3,670	4,200	0	0	0	0	0	0	0	0	0	0
PR.4ET0600 - Rainey - 75th Street Cooling Plant	21	0	0	0	0	0	0	0	0	0	0	0
Total ETR10 - Load Relief	21,576	91,200	111,579	148,200	186,359	181,144	117,200	127,900	40,012	40,450	7,012	7,800
ETR11 - Environmental												
PR.5ET9801 - Install Stop Joints	953	1,750	854	1,750	990	1,230	1,109	875	908	875	0	0
PR.5ET0802 - Install Impressed Current Rectifiers	177	0	44	0	0	0	0	0	0	0	0	0
PR.1ET3001 - Pipe Enhancement Program	0	0	0	0	0	0	0	0	603	0	5,593	5,000
PR.9ET0900 - Environmental Enhancements	0	0	0	0	0	0	0	450	0	850	2,071	900
Other	(1)	0	0	0	0	0	0	0	0	0	0	0
Total ETR11 - Environmental	1,129	1,750	898	1,750	990	1,230	1,109	1,325	1,511	1,725	7,664	5,900

Capital Expense (CWIP) by Function-Project Report
Consolidated Edison Of New York Inc.
System & Transmission Ops (EN.ORG-00738)

Category Code

Reliability
Reliability
Reliability
Reliability
Reliability
Reliability
System expansion
Reliability
Reliability
Reliability
Reliability
System expansion

Facilities renovations
Facilities renovations
Reliability
Reliability

Municipal infrastructure support
Municipal infrastructure support
Municipal infrastructure support

Organization/Department	Year Total										Year Total	
	Previous 5 Year Actual											
	Version: Final											
	Total Dollars (\$000)										Total Dollars (\$000)	
	FY07		FY08		FY09		FY010		FY11		FY12	
Organization/Department	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget
ETR12 - Reliability & Feeder Replacement												
PR.8ET0500 - Emergent Transmission Reliability	0		1,790	5,000	3,973	4,000	8,358	10,000	5,072	9,000	2,838	11,000
PR.3ES2901 - Replace 38W02, 38W13 and 38W14	135		0	0	0	0	0	0	0	0	0	0
PR.3ET9714 - Replace Wood Poles with Steel Poles	5,663	4,150	3,429	4,000	120	0	17	0	0	0	0	0
PR.4ET0201 - Pothead Alarms	268	500	483	500	308	1,200	17	0	0	0	5	0
PR.4ET0500 - Replace 99032	(17)		0	0	0	0	0	0	0	0	0	0
PR.5ET1101 - Install Phasor Devices	52		7	0	96	0	189	250	16	0	0	0
PR.5ET1201 - Replace 69M43/44 with 38M53/54	10,679	8,500	2,806	3,700	1,659	3,000	(36)	0	4	0	0	0
PR.6ES3501 - Install Circuit Breakers - Bay 6	2,682	4,000	161	0	(48)	0	0	0	0	0	0	0
PR.0ET9803 - Replace 138kV Feeder 95891 L&M	0		(25)	0	0	0	0	0	0	0	0	0
PR.8ET9803 - Feeder M51	0		1,973	6,700	(2)	0	0	0	0	0	0	0
PR.9ET0500 - Replace 183kV Feeders 18001 and 18002	0		0	5,000	3,701	8,000	1,879	2,380	131	0	(2)	0
PR.8ET9804 - Reinforce Crossing Tower Hudson River	0		0	2,400	2,536	3,000	1,829	2,050	1,644	1,250	1,168	850
PR.8ET9805 - Re-Conductor Dunwoodie - Sprain Brook Co	0		0	2,000	0	0	0	0	0	0	0	0
PR.2ES6301 - Astoria Interconnect for Feeder 34091	0		0	0	0	0	0	0	0	0	21,684	0
Total ETR12 - Reliability & Feeder Replacement	19,462	17,150	10,624	29,300	12,343	19,200	12,253	14,680	6,867	10,250	25,693	11,850
ETR14 - Other												
PR.VARIOUS - Demolition of Structures	0	0	739	0	214	0	(8)	0	(2)	0	0	0
PR.2ET9808 - New TO Operating Center	4	0	0	0	0	0	0	0	0	0	0	0
PR.7ET0800 - Upgrade Overhead 345kv Transmission Structures	0	2,000	0	2,100	568	2,100	1,759	1,900	1,291	2,500	1,747	2,700
PR.2ET0400 - Promenade - Relocate Feeder 46/48	0	0	0	0	0	0	0	0	0	0	6	0
Total ETR14 - Other	4	2,000	739	2,100	782	2,100	1,751	1,900	1,289	2,500	1,753	2,700
ETR15 - Interference												
PR.5ET1302 - Frederick Douglass Circle Relocate 38M35	2,521	1,400	60	0	0	0	0	0	0	0	0	0
PR.7ET1000 - M Line Relocation	0	3,000	0	1,500	0	1,500	0	0	0	0	0	0
PR.5ET9802 - Relocate 38R51 and 38R52	(18)	0	1	0	0	0	0	0	0	0	0	0
Total ETR15 - Interference	2,503	4,400	61	1,500	0	1,500	0	0	0	0	0	0
Sub-Total Transmission Operations	46,492	120,500	124,263	187,850	200,479	210,174	132,303	151,105	49,675	60,225	53,921	33,550
Grand Total - System and Transmission Operations	\$ 59,724	\$ 136,750	\$ 137,020	\$ 202,750	\$ 208,518	\$ 222,474	\$ 134,923	\$ 154,455	\$ 51,782	\$ 62,475	\$ 59,063	\$ 40,500

Capital Expense (CWIP) by Function-Project Report
Company.
Substation Operations (EN.ORG-00773)

			Year Total Previous 5 Years Total Dollars (\$000)										Year Total	Year Total
													2012	2012
													Total Dollars (\$000)	Total Dollars (\$000)
			FY07		FY08		FY09		FY10		FY11		FY12	
Category Code	Function	Project/Program Description	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
Reliability	ESU 13	Relay Protection Sytem Redundancy - Single Point Of Failure		-		-		-		-		-	3,000	-
Reliability	ESU 13	Replace/Retrofit Overdutied 13/27kv Circuit Breakers		-	8,800	11,076	10,800	15,803	11,000	10,488	10,000	9,866	10,500	4,565
Reliability	ESU 13	Retrofit Overdutied 13kv Circuit Breakers	5940	3,849										
Reliability	ESU 13	Retrofit Overdutied 27kv Circuit Breakers	2650	5,634										-
Reliability	ESU 13	Revenue Metering Upgrade	500	77	500	35	250	96	600	48				-
Reliability	ESU 13	Roof Replacement Program	3500	759	3,000	1,172	3,000	641	1,100	2,701	1,800	1,229	1,800	1,704
Reliability	ESU 13	Sikap Equipment								2,940				-
Reliability	ESU 13	Substation Automation (Target Information System)		-	2,000	1,224	1,000	2,786						-
Reliability	ESU 13	Substation Control Room Betterment Program	500	628										-
Reliability	ESU 13	Switchgear Enclosure Upgrade		-	500	19		86		123	1,000	794	1,000	253
Reliability	ESU 13	Transformer Replacement Program		-	17,200	24,932	13,000	10,953	16,000	13,293	33,000	21,117	24,000	13,834
Reliability	ESU 13	Transformer Replacement Program - West 19th Street	5500	8,036										-
Reliability	ESU 13	Transformer Replacement Program - Cherry Street	4800	4,703										-
Reliability	ESU 13	Underfrequency Load Shedding Relays		-	1,385	242								-
Reliability	ESU 13	Upgrade Analog Circuits To Digital Fiber	2000	1,837										-
Reliability	ESU 13	White Plains - Substation Continuance					550	580						-
		Total - Reliability	88,450	96,097	125,385	92,275	125,050	106,739	120,800	111,743	144,900	114,899	117,400	76,395
Environmental	ESU 15	SPCC Plan For Transmission Cable System	1000	1,098	500	735								-
Environmental	ESU 15	Environmental Program (SPCC)	600	616										-
Environmental	ESU 15	Purs Supervisory Control & Data Acquisition	2000	-	1,000	2,876	4,224	3,229	3,200	1,164	2,200	131	2,500	765
Environmental	ESU 15	59th Street - Cable Cooling Civil	2000	33										-
Environmental	ESU 15	Pumping Plant Improvement	3400	3,362	8,500	5,821	5,500	3,500	4,000	2,307	6,500	4,582	6,500	4,748
Environmental	ESU 15	EH&S Risk Mitigation (OWS, Moats)	2500	3,898	3,500	1,292	3,837	1,660	1,600	5,491	9,000	7,699	10,000	16,826
Environmental	ESU 15	59th St - Cable Cooling Upgrades		13										-
Environmental	ESU 15	Carryover - Environmental		64		240		42						-
Environmental	ESU 15	Charges To Completed Projects - Environmental		103		257		201		210		(39)		-
		Total - Environmental	11,500	9,187	13,500	11,221	13,561	8,632	8,800	9,172	17,700	12,373	19,000	22,339
Replacement	ESU 16	Failed Transformer Program	5000	16,784	21,200	22,756	29,300	27,842	25,000	31,208	27,000	18,362	24,000	8,408
Replacement	ESU 16	Various - Failed Equipment Other Than Transformer Program	1500	1,649	1,500	5,615	2,500	3,055	2,000	9,536	3,000	8,561	5,000	5,923
Replacement	ESU 16	Buchanan Wood Pole Bypass		-		-		-		-		-		
Replacement		Carryover - Failures		-		764		1,697		502				-
Replacement	ESU 16	Charges To Completed Projects - Failures		384		255		2,450		(224)		1,637		
		Total Failures	6,500	18,817	22,700	29,390	31,800	35,044	27,000	41,022	30,000	28,560	29,000	14,331.0
Reliability	ESU 17	Circuit Switcher Replacement Program		-	500	367	500	470	600	-	600	-	1,000	-
Reliability	ESU 17	Fire Protection Program	2000	4,481	500	131	500	192						-
Information Technology	ESU 17	Maximo Upgrade		-	400	310	650	590						-
Information Technology	ESU 17	Rapid Restore Enhancements		-	200	137	200	-	200	210				-
Information Technology	ESU 17	SOCCS - RTU Replacement	1000	1,252	3,000	1,278	3,000	4,213	2,200	2,134	1,700	519	1,000	214
Information Technology	ESU 17	Technology Improvements		-	310	129	905	1,154	400	343	600	776	1,000	239
Information Technology	ESU 17	Work Permit Processing	300	125		28								-
Other	ESU 17	Carryover - Other		101						519				-
Other	ESU 17	Charges To Completed Projects - Other		(19)				14		(30)		194		-
		Total Other	3,300	5,940	4,910	2,380	5,755	6,633	3,400	3,176	2,900	1,489	3,000	453

Capital Expense (CWIP) by Function-Project Report
Company.
Substation Operations (EN.ORG-00773)

			Year Total Previous 5 Years Total Dollars (\$000)										Year Total	Year Total
													2012	2012
													Total Dollars (\$000)	Total Dollars (\$000)
			FY07		FY08		FY09		FY10		FY11		FY12	
Category Code	Function	Project/Program Description	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
System Expansion	ESU 18	Generation Interconnection		(2,872)	5,000	2,690		(7)		-		-		-
System Expansion	ESU 18	VFT Interconnection												1,949
		Total - Generation Interconnection	-	(2,872)	5,000	2,690	-	(7)	-	-	-	-	-	1,949
Other		Other (Rounding)		18		(9)		(16)		3		2		
		Total	477,650	476,104	511,745	380,246	344,435	299,278	227,295	190,350	208,290	164,844	201,994	141,090

Capital Expense (CWIP) by Function-Project Report
Consolidated Edison Of New York Inc.
System & Transmission Ops (EN.ORG-00738)

Category Code

Information Technology
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Information Technology
Information Technology
Information Technology

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Information Technology
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Information Technology

Information Technology
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Organization/Department	Year Total										Year Total	
	Previous 5 Year Actual											
	Version: Final											
	Total Dollars (\$000)										Total Dollars (\$000)	
	FY07		FY08		FY09		FY010		FY11		FY12	
Organization/Department	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget
ETR02 - Sys Ops - New EMS												
PR.5ET0401 - Replacement Program SOCCS Energy Management System	7,787	9,000	1,871	2,000	191	0	0	0	0	0	0	0
PR.5ET0403 - SOCCS RTU Modification for New EMS	60	0	2	0	0	0	0	0	5	0	7	0
PR.5ET0406 - Communication Network for ACC	(117)	0	(53)	0	0	0	0	0	0	0	0	0
PR.5ET0402 - Replacement Program SOCCS-X Energy Management System	583	2,000	5,000	5,000	1,568	2,000	272	0	0	0	0	0
PR.5ET0408 - SOCCS-X RTU Conversion	990	800	1,360	1,200	139	0	4	0	0	0	0	0
Total ETR02 - Sys Ops - New EMS	9,303	11,800	8,180	8,200	1,898	2,000	276	0	5	0	7	0
ETR03 - Sys Ops - Work Mgmt Systems												
PR.0ET9804 - Feeder Management System	0	0	0	0	0	0	0	0	0	0	0	0
PR.2ET9801 - Ecc - Distribution Orders Automation Enhancements	149	150	151	150	149	250	219	250	245	300	252	350
PR.5ET9706 - Computerized Notification System	6	0	0	0	0	0	0	0	0	0	0	0
PR.6ET9704 - Steam Management System	151	150	51	150	1	0	0	0	0	0	0	0
PR.6ET9804 - Outage Scheduling System	0	400	245	400	760	1,000	1	0	0	0	0	0
PR.9ET9712 - FMS - Feeder Management System	0	0	0	0	1	0	0	0	0	0	0	0
Total ETR03 - Sys Ops - Work Mgmt Systems	306	700	447	700	911	1,250	220	250	245	300	252	350
ETR04 - Sys Ops - Continuance												
PR.9ET9802 - SOCCSX Continuance	1	100	0	0	0	0	0	0	0	0	0	0
PR.FET7001 - EMS Continuance AECC and ECC	0	0	0	0	0	0	0	500	0	0	0	0
PR.0ET9801 - Ems Continuance Ecc	0	0	0	0	0	0	386	0	506	500	2,144	2,500
PR.6ES2000 - SOCCS Continuance											5	0
Total ETR04 - Sys Ops - Continuance	1	100	0	0	0	0	386	500	506	500	2,149	2,500
ETR05 - Sys Ops - Operations Requirements												
PR.4ET9703 - Dynamic Steam Model	49	575	45	400	0	0	0	0	0	0	0	0
PR.4ET9706 - GT Remote Start System	138	300	0	300	(8)	600	0	0	0	0	0	0
PR.6ET9706 - Max Generation	0	300	0	300	0	400	0	0	0	0	0	0
PR.6ET9707 - Steam Back Up System	139	200	0	0	13	0	0	0	0	0	0	0
PR.7ET9803 - Steam EMS	77	0	253	500	8	0	0	0	0	0	0	0
PR.1ET0900 - District Oper Direct - System Replacement	0	0	0	0	0	0	0	0	0	0	1,231	1,900
PR.1ET9705 - Plant Information System	1	75	0	150	0	0	0	0	0	0	119	200
PR.1ET9701 - CNS Replacement	0	0	0	0	0	0	0	0	152	0	4	0
PR.4ET9704 - Cyber Security And Nerc Compliance	0	100	0	200	438	200	524	300	102	200	378	300
PR.8ET0103 - Interface with NYISO	0	50	0	50	0	100	0	100	0	0	0	0
PR.9ET9708 - Operations Network For Ems	0	100	5	100	230	100	284	200	199	200	196	200
Total ETR05 - Sys Ops - Operations Requirements	404	1,700	303	2,000	681	1,400	808	600	453	400	1,928	2,600
ETR06 - Sys Ops - District Operations Impro												
PR.4ET9702 - Disaster Recovery - FMS Replication	136	150	1	0	37	0	0	0	0	0	0	0
PR.1ET9808 - System Operation Enhancements	432	250	98	250	172	250	380	400	257	300	262	300
PR.3ET9805 - District Operator Task Managing	(15)	150	297	150	33	250	330	400	287	250	214	300
PR.7ET9804 - Operation Management System At Energy Control Center	0	0	298	500	434	500	214	0	298	400	296	400
PR.FET7003 - Operation Management System Enhancements							0	400	0	0	0	0
Total ETR06 - Sys Ops - District Operations Impro	553	550	694	900	676	1,000	924	1,200	842	950	772	1,000

Capital Expense (CWIP) by Function-Project Report
Consolidated Edison Of New York Inc.
System & Transmission Ops (EN.ORG-00738)

Category Code

Information Technology

Facilities renovations
Facilities renovations
Facilities renovations
Facilities renovations
Reliability
Reliability
Reliability
Facilities renovations
Reliability
Facilities renovations

Reliability

Replacement

Reliability
Reliability
System expansion
Reliability
Reliability
Reliability

Environmental
Environmental
Environmental
Environmental
Environmental

Organization/Department	Year Total										Year Total	
	Previous 5 Year Actual											
	Version: Final											
	Total Dollars (\$000)										Total Dollars (\$000)	
	FY07		FY08		FY09		FY010		FY11		FY12	
Organization/Department	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget
ETR07 - Sys Ops - Bulk Power Improvements												
PR.4ET9707 - ECC SOCCS Visualization	0	0	0	0	629	500	(84)	500	3	0	0	0
Total ETR07 - Sys Ops - Bulk Power Improvement	0	0	0	0	629	500	(84)	500	3	0	0	0
ETR08 - Sys Ops - Facilities/utilities Impr												
PR.6ET9708 - New Lighting DO Room	(1)	0	89	1,500	2,785	3,000	(55)	0	0	0	0	0
PR.4ET9710 - New Lighting - West Control Room	899	1,000	1,456	1,000	47	0	2	0	0	0	0	0
PR.2XC1236 - Entry Improvements	529	0	623	100	98	0	33	0	0	0	0	0
PR.5ET9705 - HVAC Upgrade - East Computer Room	0	0	3	0	0	500	0	0	0	0	0	0
PR.9ET9801 - Add Diesel Generator	0	0	0	500	0	0	0	0	0	0	0	0
PR.1ET1000 - ECC Ups Battery Replacement	0	0	0	0	0	0	0	0	0	0	0	500
PR.7ET9704 - ECC/AECC Facility Security	0	0	0	0	268	0	80	0	85	100	34	0
PR.FET7005 - Training Area Expansion	0	0	0	0	0	750	0	0	0	0	0	0
PR.FET7006 - ECC/AECC Facility Security Enhancement	0	0	0	0	0	300	0	300	0	0	0	0
PR.7ET9805 - Operator Console Replacement	0	0	952	0	36	1,600	30	0	(32)	0	0	0
Total ETR08 - Sys Ops - Facilities/utilities Impr	1,427	1,000	3,123	3,100	3,234	6,150	90	300	53	100	34	500
ETR15 - Sys Ops - Alternate Energy Control Center												
PR.6ET9801 - Establish New Alternate Energy Control Center	1,238	400	10	0	10	0	0	0	0	0	0	0
Total ETR15 - Sys Ops - Alternate Energy Control Center	1,238	400	10	0	10	0	0	0	0	0	0	0
Sub-Total System Operations	13,232	16,250	12,757	14,900	8,039	12,300	2,620	3,350	2,107	2,250	5,142	6,950
Transmission Operations												
ETR09 - Failures												
PR.1ET0800 - Transmission Feeder Failures	1,818	4,000	362	5,000	5	5,000	(10)	5,300	(4)	5,300	11,799	5,300
ETR09 - Failures	1,818	4,000	362	5,000	5	5,000	(10)	5,300	(4)	5,300	11,799	5,300
ETR10 - Load Relief												
PR.8ET9802 - 38M72 Upgrade Vernon-West 49th Street	0	0	1,318	4,200	11,781	20,144	17,323	19,800	4,410	7,200	4,847	3,300
PR.5ET0900 - M29	16,888	86,000	109,593	143,000	173,063	160,000	97,746	107,000	34,279	32,000	1,413	0
PR.9ET1100 - Dynamic Feeder Rating System	997	1,000	670	1,000	1,515	1,000	2,131	1,100	1,323	1,250	752	4,500
PR.2ET9708 - Re-conductor 69M65	0	0	(2)	0	0	0	0	0	0	0	0	0
PR.3ET1501 - Re-conductor 38B01 - 38B04	3,670	4,200	0	0	0	0	0	0	0	0	0	0
PR.4ET0600 - Rainey - 75th Street Cooling Plant	21	0	0	0	0	0	0	0	0	0	0	0
Total ETR10 - Load Relief	21,576	91,200	111,579	148,200	186,359	181,144	117,200	127,900	40,012	40,450	7,012	7,800
ETR11 - Environmental												
PR.5ET9801 - Install Stop Joints	953	1,750	854	1,750	990	1,230	1,109	875	908	875	0	0
PR.5ET0802 - Install Impressed Current Rectifiers	177	0	44	0	0	0	0	0	0	0	0	0
PR.1ET3001 - Pipe Enhancement Program	0	0	0	0	0	0	0	0	603	0	5,593	5,000
PR.9ET0900 - Environmental Enhancements	0	0	0	0	0	0	0	450	0	850	2,071	900
Other	(1)	0	0	0	0	0	0	0	0	0	0	0
Total ETR11 - Environmental	1,129	1,750	898	1,750	990	1,230	1,109	1,325	1,511	1,725	7,664	5,900

Capital Expense (CWIP) by Function-Project Report
Consolidated Edison Of New York Inc.
System & Transmission Ops (EN.ORG-00738)

Category Code

Reliability
Reliability
Reliability
Reliability
Reliability
Reliability
System expansion
Reliability
Reliability
Reliability
Reliability
System expansion

Facilities renovations
Facilities renovations
Reliability
Reliability

Municipal infrastructure support
Municipal infrastructure support
Municipal infrastructure support

Organization/Department	Year Total										Year Total	
	Previous 5 Year Actual											
	Version: Final											
	Total Dollars (\$000)										Total Dollars (\$000)	
	FY07		FY08		FY09		FY010		FY11		FY12	
Organization/Department	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget
ETR12 - Reliability & Feeder Replacement												
PR.8ET0500 - Emergent Transmission Reliability	0		1,790	5,000	3,973	4,000	8,358	10,000	5,072	9,000	2,838	11,000
PR.3ES2901 - Replace 38W02, 38W13 and 38W14	135		0	0	0	0	0	0	0	0	0	0
PR.3ET9714 - Replace Wood Poles with Steel Poles	5,663	4,150	3,429	4,000	120	0	17	0	0	0	0	0
PR.4ET0201 - Pothead Alarms	268	500	483	500	308	1,200	17	0	0	0	5	0
PR.4ET0500 - Replace 99032	(17)		0	0	0	0	0	0	0	0	0	0
PR.5ET1101 - Install Phasor Devices	52		7	0	96	0	189	250	16	0	0	0
PR.5ET1201 - Replace 69M43/44 with 38M53/54	10,679	8,500	2,806	3,700	1,659	3,000	(36)	0	4	0	0	0
PR.6ES3501 - Install Circuit Breakers - Bay 6	2,682	4,000	161	0	(48)	0	0	0	0	0	0	0
PR.0ET9803 - Replace 138kV Feeder 95891 L&M	0		(25)	0	0	0	0	0	0	0	0	0
PR.8ET9803 - Feeder M51	0		1,973	6,700	(2)	0	0	0	0	0	0	0
PR.9ET0500 - Replace 183kV Feeders 18001 and 18002	0		0	5,000	3,701	8,000	1,879	2,380	131	0	(2)	0
PR.8ET9804 - Reinforce Crossing Tower Hudson River	0		0	2,400	2,536	3,000	1,829	2,050	1,644	1,250	1,168	850
PR.8ET9805 - Re-Conductor Dunwoodie - Sprain Brook Co	0		0	2,000	0	0	0	0	0	0	0	0
PR.2ES6301 - Astoria Interconnect for Feeder 34091	0		0	0	0	0	0	0	0	0	21,684	0
Total ETR12 - Reliability & Feeder Replacement	19,462	17,150	10,624	29,300	12,343	19,200	12,253	14,680	6,867	10,250	25,693	11,850
ETR14 - Other												
PR.VARIOUS - Demolition of Structures	0	0	739	0	214	0	(8)	0	(2)	0	0	0
PR.2ET9808 - New TO Operating Center	4	0	0	0	0	0	0	0	0	0	0	0
PR.7ET0800 - Upgrade Overhead 345kv Transmission Structures	0	2,000	0	2,100	568	2,100	1,759	1,900	1,291	2,500	1,747	2,700
PR.2ET0400 - Promenade - Relocate Feeder 46/48	0	0	0	0	0	0	0	0	0	0	6	0
Total ETR14 - Other	4	2,000	739	2,100	782	2,100	1,751	1,900	1,289	2,500	1,753	2,700
ETR15 - Interference												
PR.5ET1302 - Frederick Douglass Circle Relocate 38M35	2,521	1,400	60	0	0	0	0	0	0	0	0	0
PR.7ET1000 - M Line Relocation	0	3,000	0	1,500	0	1,500	0	0	0	0	0	0
PR.5ET9802 - Relocate 38R51 and 38R52	(18)	0	1	0	0	0	0	0	0	0	0	0
Total ETR15 - Interference	2,503	4,400	61	1,500	0	1,500	0	0	0	0	0	0
Sub-Total Transmission Operations	46,492	120,500	124,263	187,850	200,479	210,174	132,303	151,105	49,675	60,225	53,921	33,550
Grand Total - System and Transmission Operations	\$ 59,724	\$ 136,750	\$ 137,020	\$ 202,750	\$ 208,518	\$ 222,474	\$ 134,923	\$ 154,455	\$ 51,782	\$ 62,475	\$ 59,063	\$ 40,500

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-11
Date of Response: 03/22/2013
Responding Witness: Electric Infrastructure Panel

Question No. :E0070

Subject: Network Transformer Relief - 1. Provide an updated copy of specification EO-2002. 2. Regarding the actual program cost for 2009 to 2012 and the forecasted cost for 2013 to 2017, provide the: a. number of network transformer reliefs by priority level (1, 2, 3, and 4); and b. number of installed cable, conduit, and vaults.

Response:

1. For updated copy of EO-2002 refer to PDF attachment titled: “DPS11 – 70 EO-2002”.
2. A. Regarding actual and forecasted costs for 2013 to 2017, the number of network transformers relieved by priority is shown in the table below:

	Priorities			
Year	1	2	3	4
2009	44	36	2	15
2010	18	13	2	2
2011	28	7	8	2
2012	20	10	8	3
Total	110	66	20	22

NOTE: The White Paper for Network Transformer Relief has been revised to correct two grammatical errors and is attached as a PDF titled: “DPS11 E0070 Network Transformer Relief”.

B. The amount of installed cable, conduit, and vaults is included in the PDF attachment:
“DPS11 E0070 Network Transformer Relief EO Total”.



**CONSOLIDATED EDISON CO. OF NEW YORK INC.
4 IRVING PLACE
NEW YORK, NY 10003**

**DISTRIBUTION ENGINEERING DEPARTMENT
DISTRIBUTION EQUIPMENT**

**SPECIFICATION EO-2002
REVISION 18
JULY 2011**

**LOADING LIMITS FOR NETWORK TRANSFORMERS
AND ASSOCIATED PROTECTORS**

**FILE: APPLICATION AND DESIGN MANUAL NO. 4, SECTION 3
FIELD MANUAL NO. 20**

TARGET AUDIENCE	DISTRIBUTION ENGINEERING REGIONAL ENGINEERING
NESC REFERENCE	ALL SECTIONS

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1.0 SCOPE

This specification provides the design load limits only for those submersible and non-submersible network transformer and protector installations that meet the standard natural ventilated vault installations and design operating criteria as described herein.

2.0 DISTRICTS APPLICABLE

All districts

3.0 GENERAL

- 3.1 There are four basic equipment components associated with network vault installations which determine the design loading limit of the complete installation. These are the transformer, network protector, protector fuses and the tie cables with associated limiters. This specification only addresses the load limits associated with the transformer and protector. For fuse criteria, refer to specifications [EO-5400](#) and [EO-5410](#).
- 3.2 The individual design loading limits for either transformers or protectors are dependent upon many factors and their respective limits are generally not the same for any given operating condition. Therefore, the lower load limit of the two shall always be used as the limit of the combination. Examples of this coordination are furnished in Appendix E herein.
- 3.3 All load limits shown herein for transformers and network protectors are in percent of nominal rated current (not kVA) of their associated transformer. Where transformers have dual ratings (e.g. 55/65°C – 500/560 kVA), the 55°C – 500 kVA rating will be used. At no time will the 65°C rating be used. An example is shown below for some transformers.

Typical Transformer Nominal 55°C Ratings		
kVA	Secondary Voltage (Ø-Ø)	Secondary Current
500 - 3Ø	216	1337
1000 - 3Ø	216	2673
1000 - 3Ø	480	1203
2000 - 3Ø	480	2406
2500 - 3Ø	480	3007

- 3.4 Liquid Filled transformer ratings are for both Silicone and Oil (Mineral and Ester) type, provided the transformers are designed specifically for the designated fluid (not retro-fills).

4.0 TRANSFORMERS

4.1 Factors which affect the load limits of a network transformer are:

- Design Top Oil and Hot Spot limits (limits not to be exceeded).
- Transformers certified data (e.g. rated losses, thermal gradients and weights.)
- Vault conditions and design criteria.
- Daily load factor (shape of load curve).
- Modes of operation (normal or contingencies).
- Operating ambient temperature.

The top oil and hot spot temperature reached by a given transformer is a function of the ambient temperature, vault rise, rated top oil rise and hot spot rise and the given load (peak and cycle). These factors are discussed below and incorporated in the Liquid Filled and Dry Type transformer loading limits as shown in the tables of Appendix B and C respectively.

- 4.2 The maximum allowable load limit is defined as the maximum peak load that can be safely applied to a given transformer that will insure that neither the calculated Hot Spot nor Top Oil (as required) temperatures will ever exceed their respective maximum allowable temperature limits for any given hour in the load cycle. But, the calculated temperatures of either or both could be equal to their respective maximum temperature limits. Therefore, the primary load limit factors are the maximum allowable Hot Spot and Top Oil (Liquid Filled only) temperatures. These maximum allowable temperature limits must never be exceeded for any design condition.

Maximum Allowable Hot Spot Temperature limits					
Transformer Type	Appendix	Table	Modes of Operation		
			Normal	1st Cont.	2nd Cont.
Mineral Oil / Silicone	B	1,2	95°C	115°C	135°C
	B	3-7	105°C	125°C	150°C
Ester Oil	B	5-7	110°C	130°C	155°C
Dry	C	1	200°C	240°C	285°C
	C	2	180°C	220°C	240°C

Maximum Allowable Top Oil Limit for all Modes of Operation is 125°C (Mineral Oil) or 130°C (Ester Oil)

All of the other factors noted above in section 4.1 either create the heat, obstruct the flow of heat or is the limiting heat sink temperature as with the ambient.

- 4.3 The basic algorithms used to calculate the load limits are primarily those shown in IEEE C57.91-1995, section 7.2 (liquid) and C57.96-1989, section 6.2 (dry) and modified to incorporate a vault factor. These algorithms employ the required data as noted in sections 4.1 and 4.2 above. The maximum temperature limits, transformer parameters and vault constraints for any given transformer size are considered to be constant and can not be varied. But the remaining operating conditions (e.g. load peak, load cycle and ambient) can be varied to derive maximum load limits for these applied conditions provided the maximum allowable temperature limits (Top Oil and Hot Spot) as noted above are not exceeded.

In addition, the calculated load limits do not take into account any limitations associated with loss of life, voltage drop at the maximum load condition or load limitation on any associated equipment (e.g. cables, protectors, fuses, etc.).

- 4.4 There are three components associated with the transformer certified data. These are the Rated Losses (No load and Full load), the transformer Rated Rises (Hot Spot / Top Oil, as required), and the design transformer weights. Transformer values used to perform the rating calculations are not the actual data for the specific transformer under evaluation. Instead the certified data of the prototype (guaranteed maximum values) is used to insure that the design of each installation will meet the load limits noted here in.

The heat developed at any hour in the load cycle is based on the losses developed for the given loading. These total losses are the combined rated No Load losses which is considered to be constant and the load losses that are dependent upon the square of the magnitude of the load current (Modes of Operation) and the daily shape of the load current cycle.

These total load losses are factored in to the ANSI algorithms along with the rated rises to determine the transformer temperature rise for the given loading. In addition, these losses are also used to determine the rise in the vault temperature which is added to the overall rise in temperature.

As losses are developed in the transformer, some are absorbed by the mass of the transformer (Coils, Core, Tank and Fluid) and the remainder is released to the ambient through the vault. For constant load or loads that have a fairly long constant duration, the rate of absorbed losses decreases over time until all the losses are released through the vault. The time to stabilize is related to the combined transformer and vault Thermal Time Constant. Therefore, the mass of the transformer and the vault tend to allow for greater loading for load cycles that have short time peaks.

- 4.5 The losses released through the vault to ambient create a temperature rise which is dependent upon the vaults ability to release heat to the ambient and is called the vault thermal constant. This constant is based on vault design conditions that are limited to standard concrete types with a minimum natural air ventilation surface of 2.0 sq.ft. per 100 kVA of the transformer nominal nameplate rating only. The constants used are based on the nominal kVA rating of the transformers and are as shown.

Vault Thermal Constants				
Nominal kVA	500	1000	2000	2500
Vault Constant (°C/kW)	4	3	2.5	2

Installations that do not meet the minimum natural air ventilation requirements or require special transformer cooling (e.g. forced air, spraying or flooding) are considered non standard and are not addressed in this specification.

- 4.6 There are three design Modes of Operation which are designated Normal, 1st Contingency and 2nd Contingency. Although two modes are classified as Contingencies (1st and 2nd), they are part of the design of the transformer. In each case, the maximum allowable load is limited by the associated maximum temperature limit (Top Oil and or Hot Spot). The same load cycle is assumed for each contingency.

a. 2nd Contingency Systems Design

1. Normal: Daily loading for indefinite periods of time.
2. 1st Contingency:
An increased loading for a 24 hour period directly after a Normal load period. The transformers are designed to allow for one 1st contingency occurrence only per month.
3. 2nd Contingency:
An increase in loading over the first Contingency for an additional 24 hours which immediately follows a first contingency (only once per year).

b. 1st Contingency Systems Design:

Increased loading above Normal for a 24 hour period, once a year.

- 4.7 The Con Edison transformers are designed to meet five types of load cycles. The design curves and their associated hourly values for four of the five standard cycles are illustrated in Appendix A. The fifth curve is the Constant Load Curve (100%), and no graph is required. If required, load limits can be calculated for installations where the actual load cycles vary markedly from the standard.

- 4.8 The design ambient temperatures are based on a 24 hour average summer and winter ambient of 26°C (79°F) and 12°C (54°F) respectively and are assumed to be constant over the 24 hour period.

5.0 NETWORK PROTECTORS

- 5.1 All network protector design ratings shown herein (Appendix D, Tables 1 and 2) are in percent rated current of their associated nominal transformer rating. In addition, they are based on a design vault ambient temperature of 60°C and 40°C for 125/216V and 277/480 vaults respectively.
- 5.2 In terms of load ability they can be divided into three groups (Pre 70, Pre 70H and Post 69). The Pre 70 protectors (Table 1) are those whose designs are from the 1920's to the late 1960's. Their load limitation was based, in part, on the thermal limits of the ancillary equipment (CT's, coils, etc.) and wiring used (Class A).

In the mid to late 1950's, the protector wiring and current transformer were upgraded from Class A to Class H. This modification increased the thermal capabilities of the protector design and in turn increased the protector rating. To differentiate between the two, all Pre 70 design protectors that are either manufactured or reconditioned with the improvements have an "H" in their Company Class designation characters beyond the second character and are designated as Pre 70H units.

Per Table 1, both the Pre 70 and Pre 70H protectors have a maximum twelve hour transient loading as well as a maximum continuous loading. The period of the increased loading is limited to only several times a year and never in succession. This maximum transient loading can be applied to all Standard Load Cycles except for the 100% Continuous Cycle.

- 5.3 The Post 69 protectors ratings shown in Table 2 are the maximum allowable continuous loading for the maximum ambient noted above.

6.0 REFERENCES AND APPENDICES

- Appendix A - Standard Load Cycles A to D.
- Appendix B - Liquid Filled Transformer Load Limits, Tables 1 to 7.
- Appendix C - Dry Type Transformer Load Limits, Tables 1 and 2
- Appendix D - Network Protector Load Limits, Tables 1 to 2
- Appendix E - Load Limit Coordination Examples (1 to 3)

Kevin Oehlmann (Signature on File)

Kevin Oehlmann

Equipment Section Manager

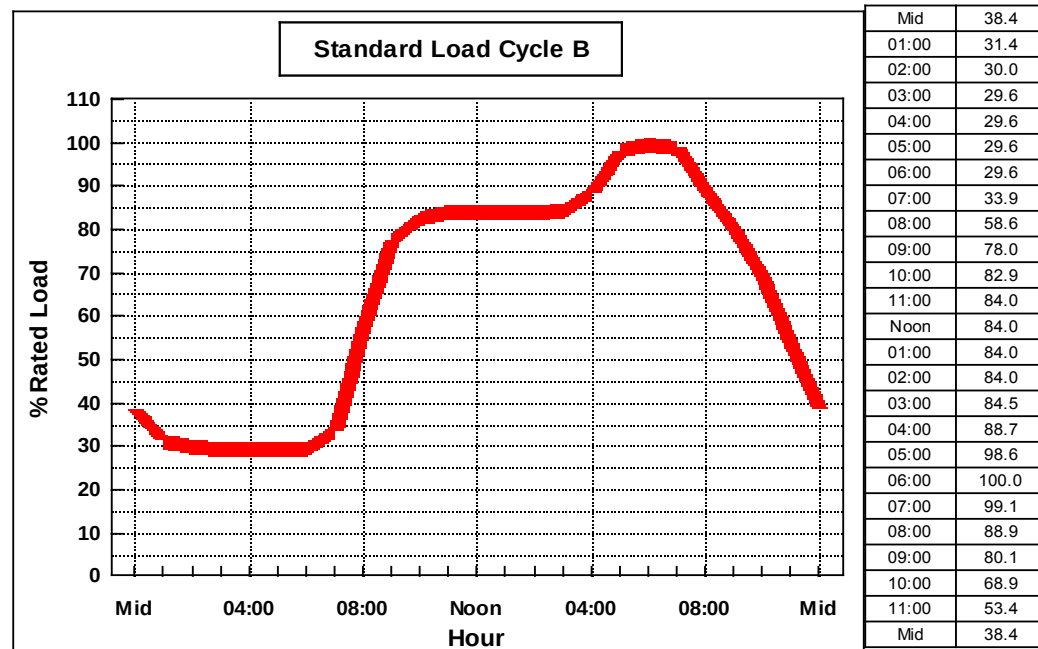
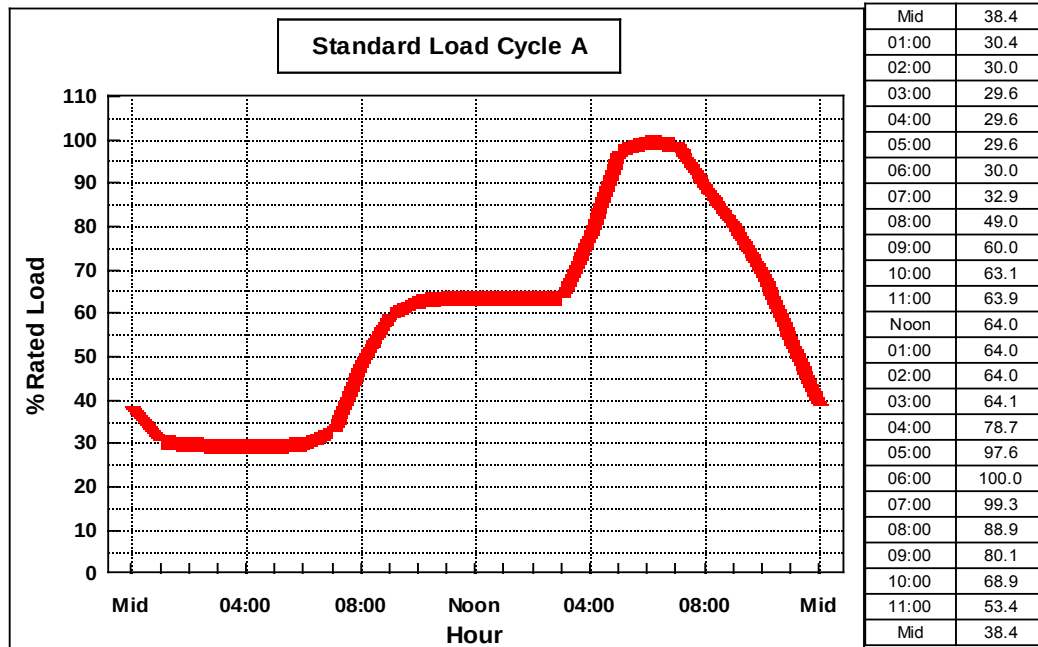
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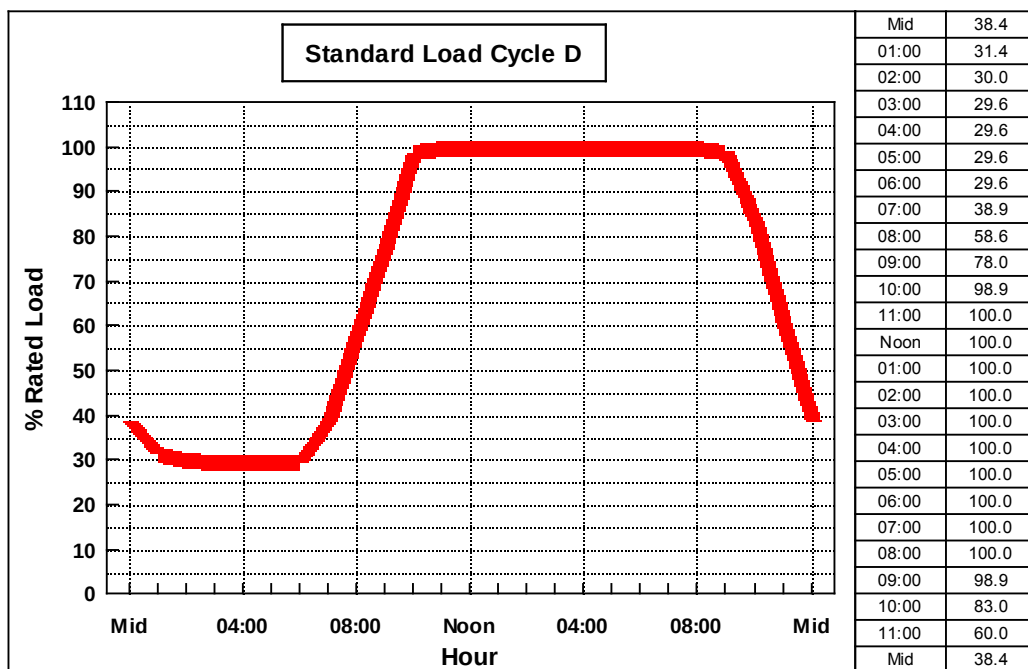
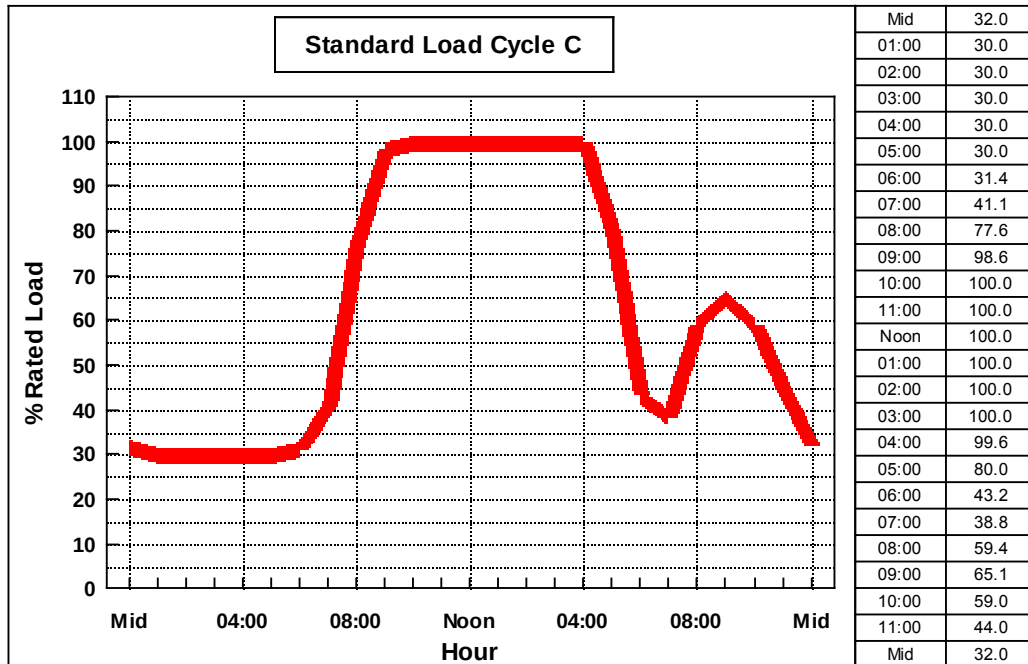
Distribution Engineering Department

J. Cultrera

K. Patel

<u>REVISION 18</u>	<u>FILE</u>
• Updated Section 3.4 to clarify Oil types and removed line for Retrofills • Updated maximum Hot Spot and Top Oil temperatures for Ester oil filled transformers • Corrected Appendix B, Table 1 • Updated Appendix B, Tables 5-6 for Ester oil filled transformers and high fault energy tanks • Corrected Appendix C, Table 1 • Updated Appendix D, Table 2 for new network protector classes • Provided examples of class codes in Appendix B and Appendix C • Clarification of loading limits in Appendix E • Updated format as per EO-1070	Application and Design Manual No.4, Field Manual No.20 Service Determination - Section 3, Underground

Appendix A - Standard Normalized Load Cycles

Appendix A - Standard Normalized Load Cycles

Appendix B - Liquid Filled Transformer Maximum Allowable Loading LimitsTable 1

For all transformers manufactured before 1970 with a 55°C rise only. These units have Company Class letters and Supplemental numbering that are not already listed in Tables 2 to 6 and as specifically noted per note b) in Tables 3 and 4.

Table 1: Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
All 1Ø Sizes	A	100	120	130
	B, C	100	115	130
	D	90	105	125
	Continuous	75	95	110
125/216V, 3Ø 150 kVA 300 kVA 450 kVA	A	105	115	125
	B, C	100	110	120
	D	95	110	120
	Continuous	85	100	110
125/216V, 3Ø 500 kVA	A	110	135	155
	B	105	125	145
	C	100	125	140
	D	95	120	135
	Continuous	90	115	130
125/216V, 3Ø 1000 kVA	A	115	140	160
	B	105	125	145
	C	100	125	140
	D	95	115	135
	Continuous	90	110	125
277/480V, 3Ø 1000 kVA	A	115	140	160
	B	105	125	145
	C	100	125	140
	D	95	115	135
	Continuous	90	110	125
277/480V, 3Ø 2000 kVA	A	115	140	155
	B	105	125	140
	C	100	125	140
	D	95	115	130
	Continuous	85	105	120
277/480V, 3Ø 2500 kVA	A	115	140	155
	B	105	125	140
	C	100	125	140
	D	95	115	130
	Continuous	90	105	120

Appendix B - Liquid Filled Transformer Maximum Allowable Loading LimitsTable 2

Summer loading limits for 300 kVA, 13 kV, three phase, oil filled, submersible type transformers installed in a full grating transformer manhole. These transformers have Company Class letters of BC, BL, BT, DO, DQ, and PP (all Supplement Class numbering included).

Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.			
Load Cycle	Mode of Operation		
	Normal	1st	2nd
A	100	120	130
B, C	100	115	130
D	90	105	125
Continuous	75	95	110

Appendix B - Liquid Filled Transformer Maximum Allowable Loading LimitsTable 3

Table 3: Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
All 1Ø Sizes	A	135	160	185
	B,C	125	145	170
	D	120	135	155
	Continuous	110	130	145
125/216V, 3Ø 500 kVA	A	140	160	185
	B	130	150	170
	C	125	145	170
	D	120	140	155
	Continuous	110	130	145
125/216V, 3Ø 1000 kVA	A	140	160	185
	B	130	150	175
	C	125	150	170
	D	120	140	160
	Continuous	115	135	150

For transformers with 125/216 volt secondary as noted below:

- a. All units manufactured between 1970 and 1991 (inclusive). These units have class letter designations as follows:

A/S -- I/O/X

A or S in the Fourth Letter position and I, O or X in the Fifth Letter position.
An example would be a unit with class code HIGAIT.

- b. All units manufactured prior to 1970 having the first two Company Class Letters and Supplemental Company Class Numbers as shown below and a nameplate rise of 55/65°C. See Table for similarly classified units with a 55°C rise only.

Class	Supplemental Number	Class	Supplemental Number
FB	8, 11	GC	8,11,33,36
FC	8,11	GD	All
FD	8,11	GR	All
FP	8,9,11	GS	8

FT	8	GT	All
FU	8,8N	GU	8,8N
FV	8,8N	GV	8,8N
FW	8	GX	8,8N,8S
GA	8,11,33,,36	PT	8,8N,8S
GB	8,9,11,33	PR	8,8N

Appendix B - Liquid Filled Transformer Maximum Allowable Loading LimitsTable 4

Table 4: Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
1000 kVA, 3Ø	A	130	155	175
	B	125	140	165
	C	120	140	160
	D	115	130	150
	Continuous	110	125	140
2000 kVA, 3Ø	A	130	155	175
	B	120	140	160
	C	115	140	160
	D	110	130	145
	Continuous	100	120	135
2500 kVA, 3Ø	A	130	150	175
	B	120	140	160
	C	120	140	160
	D	110	130	145
	Continuous	105	120	135

For transformers with 277/480 volt secondary as noted below:

- a. All units manufactured between 1970 and 1991 (inclusive). These units have class letter designations as follows:

O/T -- I/O/X

O or T in the Fourth Letter position and I, O or X in the Fifth Letter position.
An example would be a unit with class code VEGOIT.

- b. All units manufactured prior to 1970 having the first two Company Class Letters and Supplemental Company Class Numbers as shown below and a nameplate rise of 55/65°C. See Table for similarly classified units with a 55°C rise only.

Class	Supplemental Number	Class	Supplemental Number
FU	28 and above	GV	46 and above
FV	26	GW	46 and above

Appendix B - Liquid Filled Transformer Maximum Allowable Loading LimitsTable 5

Table 5: Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
All 1 ϕ Sizes 150 kVA, 3 ϕ	A	145	170	195
	B,C	135	155	180
	D	125	145	170
	Continuous	120	140	160
125/216V, 3 ϕ 500 kVA	A	150	175	200
	B	140	160	185
	C	135	155	180
	D	130	150	170
	Continuous	120	140	160
125/216V, 3 ϕ 1000 kVA	A	150	170	195
	B	140	160	185
	C	135	155	180
	D	130	150	170
	Continuous	120	140	160

For transformers with 125/216 volt secondary manufactured after 1991 with the class letter designations as noted below:

A/S/B/C/D/F -- I/Z A/K

A or S or B or C or D or F in the Fourth Letter position and I or Z in the Fifth Letter position and A or K in the Sixth Letter position. An example would be a unit with class code PEGAZK.

Appendix B - Liquid Filled Transformer Maximum Allowable Loading LimitsTable 6

Table 6: Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
1000 kVA, 3Ø	A	140	160	185
	B	130	150	170
	C	125	145	165
	D	120	140	160
	Continuous	115	135	150
2500 kVA, 3Ø	A	140	165	190
	B	130	155	175
	C	130	150	170
	D	120	140	160
	Continuous	110	130	145

For transformers with 277/480 volt secondary manufactured after 1991 with the class letter designations as noted below:

O/T/P/Q/R/U -- I/Z A/K

O or T or P or Q or R or U in the Fourth Letter position and I or Z in the Fifth Letter position and A or K in the Sixth Letter position. An example would be a unit with class code VEW OZA.

Table 7

Table 7: Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
500 kVA, 3Ø	A	170	195	215
	B	155	185	200
	C	155	180	195
	D	145	170	180
	Continuous	135	160	175

For transformers with 125/216 volt secondary manufactured after 1997 with the class letter designations as noted below:

H I G A -- Z B

Appendix C – Dry Type Transformer Maximum Allowable Loading LimitsTable 1

Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
50 kVA, 1Ø - 75 kVA, 1Ø - 100 kVA, 1Ø 167 kVA, 1Ø - 333 kVA, 1Ø 500 kVA, 3Ø - 1000 kVA, 3Ø 2000 kVA, 3Ø - 2500 kVA, 3Ø	A	105	130	145
	B,C	100	125	140
	D	100	115	130
	Continuous	90	105	115

For all transformers with either 125/216 or 277/480 volt secondary which were manufactured before 1994 as noted below.

- a. All units manufactured between 1970 and 1993 with class letter designations as follows:

I/E -- I

I or E in the Fourth Letter position and I in the Fifth Letter position. An example would be a unit with class code DEWIIA.

- b. All units manufactured prior to 1970 with a nameplate rise of 80°C with the first two Company Class Letters and Supplemental Company Class Numbers as shown below.

Class	Supplemental Number
CZ	All
FN	4 and above
FZ	4 and above

Appendix C – Dry Type Transformer Maximum Allowable Loading LimitsTable 2

Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
167 kVA, 1Ø - 333 kVA, 1Ø	A	105	130	145
	B,C	100	125	140
500 kVA, 3Ø - 1000 kVA, 3Ø 2000 kVA, 3Ø - 2500 kVA, 3Ø	D	100	115	130
	Continuous	90	105	115

For all transformers with either 125/216 or 277/480 volt secondary which were manufactured after 1993 with class letter designations as follows:

I/E
 --
 Z
 A

I or E in the Fourth Letter position and Z in the Fifth Letter position and A in the Sixth Letter position.

Appendix D - Network Protector Maximum Allowable Loading Limits

Table 1: Pre 70 and Pre 70H Protectors									
Protector Rating			Associated Transformer			Protector Allowable %Loading			
Class	Current		55°C Name Plate Rating			Pre 70		Pre 70H	
	Pre 70	Pre 70H	kVA	Voltage	Current	Cont.	12 Hr	Cont.	12 Hr
AA	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
AA	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AC	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AC	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
AD	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AE	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AF	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AG	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AH	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AI	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AI	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
AJ	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AJ	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
AK	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AL	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AO	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AP	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AQ	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AR	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
AR	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
AS	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AT	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AU	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AU	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
AV	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AW	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
AY	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AZ	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
BD	800	NA	300	125/216	800	100.0	125.0	NA	NA
BE	800	NA	300	125/216	800	100.0	125.0	NA	NA
BF	800	NA	300	125/216	800	100.0	125.0	NA	NA
BG	800	NA	300	125/216	800	100.0	125.0	NA	NA
BH	800	NA	300	125/216	800	100.0	125.0	NA	NA
BM	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
BN	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
BO	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
BP	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
BQ	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
BR	1600	NA	500	125/216	1333	120.0	150.0	NA	NA

Appendix D - Network Protector Maximum Allowable Loading Limits

Table 1: Pre 70 and Pre 70H Protectors									
Protector Rating			Associated Transformer 55°C Name Plate Rating			Protector Allowable %Loading			
Class	Current		kVA	Voltage	Current	Pre 70		Pre 70H	
	Pre 70	Pre 70H				Cont.	12 Hr	Cont.	12 Hr
BV	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
BY	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
BZ	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
CB	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
CC	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
CD	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
CE	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
CG	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
CK	800	NA	300	125/216	800	100.0	125.0	NA	NA
CP	800	NA	300	125/216	800	100.0	125.0	NA	NA
CU	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
CV	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
CW	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
CX	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
CY	800	NA	300	125/216	800	100.0	125.0	NA	NA
D	800	NA	300	125/216	800	100.0	125.0	NA	NA
DB	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
DC	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
DD	800	NA	300	125/216	800	100.0	125.0	NA	NA
DH	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
DJ	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
DK	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
DL	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
DM	800	NA	300	125/216	800	100.0	125.0	NA	NA
DN	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
DO	800	NA	300	125/216	800	100.0	125.0	NA	NA
DP	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
DU	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
DV	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
DW	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
DX	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
DY	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
DZ	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
EA	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
EB	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
EC	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
ED	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
EE	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0

Appendix D - Network Protector Maximum Allowable Loading Limits

Table 1: Pre 70 and Pre 70H Protectors									
Protector Rating			Associated Transformer			Protector Allowable %Loading			
Class	Current		55°C Name Plate Rating			Pre 70		Pre 70H	
	Pre 70	Pre 70H	kVA	Voltage	Current	Cont.	12 Hr	Cont.	12 Hr
EF	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EG	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
EJ	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EK	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EL	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EM	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
EO	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EP	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EQ	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
ER	3000	3500	2000	277/480	2407	125.0	155.0	145.0	185.0
ER	3000	3500	2500	277/480	3008	100.0	125.0	115.0	150.0
ES	1600	1875	1000	277/480	1203	135.0	170.0	155.0	190.0
ET	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
EU	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
EU	3000	3500	2000	277/480	2407	125.0	155.0	145.0	185.0
EU	3000	3500	2500	277/480	3008	100.0	125.0	115.0	150.0
EV	3000	3500	2000	277/480	2407	125.0	155.0	145.0	185.0
EW	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
EX	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EY	1600	1875	1000	277/480	1203	135.0	170.0	155.0	190.0
EZ	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
F	500	NA	167	125/216	445	115.0	140.0	NA	NA
FA	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
FB	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
FC	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
FC	3000	3500	2000	277/480	2407	125.0	155.0	145.0	185.0
FC	3000	3500	2500	277/480	3008	100.0	125.0	115.0	150.0
FD	1600	1875	1000	277/480	1203	135.0	170.0	155.0	190.0
FE	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
FF	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
FG	3000	3500	2000	277/480	2407	125.0	155.0	145.0	185.0
FG	3000	3500	2500	277/480	3008	100.0	125.0	115.0	150.0
FH	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
FI	1600	1875	1000	277/480	1203	135.0	170.0	155.0	190.0
FJ	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
FK	3000	3500	2000	277/480	2407	125.0	155.0	145.0	185.0
FK	3000	3500	2500	277/480	3008	100.0	125.0	115.0	150.0
FL	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
FN	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0

Appendix D - Network Protector Maximum Allowable Loading Limits

Table 1: Pre 70 and Pre 70H Protectors									
Protector Rating			Associated Transformer 55°C Name Plate Rating			Protector Allowable %Loading			
Class	Current		kVA	Voltage	Current	Pre 70		Pre 70H	
	Pre 70	Pre 70H				Cont.	12 Hr	Cont.	12 Hr
FO	NA	3500	1000	125/216	2667	NA	NA	130.0	170.0
FP	NA	3500	2000	277/480	2407	NA	NA	145.0	185.0
FP	NA	3500	2500	277/480	3008	NA	NA	115.0	150.0
FQ	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
G	800	NA	300	125/216	800	100.0	125.0	NA	NA
G	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
G	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
H	500	NA	167	125/216	445	110.0	140.0	NA	NA
K	800	NA	300	125/216	800	100.0	125.0	NA	NA
M	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
N	800	NA	300	125/216	800	100.0	125.0	NA	NA
NB	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
NBA	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
NBAEC	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
NBC	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
NBD	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
NBEC	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
NBW	1600	1875	450	125/216	1200	135.0	170.0	155.0	190.0
NBWA	1600	1875	450	125/216	1200	135.0	170.0	155.0	190.0
NBWB	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
P	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
R	1600	1875	450	125/216	1200	135.0	170.0	155.0	190.0
T	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
T	3000	NA	1000	125/216	2667	110.0	140.0	NA	NA
U	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
V	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
W	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
W	3000	NA	1000	125/216	2667	110.0	140.0	NA	NA
X	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
Y	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
Z	1600	NA	500	125/216	1333	120.0	150.0	NA	NA

Appendix D - Network Protector Maximum Allowable Loading Limits

Table 2: Post 69 Protector					
Protector Rating		Associated Transformer 55°C Name Plate Rating			Protector Allowable %Loading
Class	Current	kVA	Voltage	Current	
GA	5100	2000	277/480	2407	210
GA	5100	2500	277/480	3008	170
GB	4500	1000	125/216	2667	170
GC	2250	1000	277/480	1203	185
GD	2250	500	125/216	1333	170
GF	2250	1000	277/480	1203	185
GN	4500	1000	125/216	2667	170
GP	4500	1000	125/216	2667	170
WA	5100	2000	277/480	2407	210
WA	5100	2500	277/480	3008	170
WB	4500	1000	125/216	2667	170
WC	2250	1000	277/480	1203	185
WD	2250	500	125/216	1333	170
XA	5100	2000	277/480	2407	210
XA	5100	2500	277/480	3008	170
XB	4500	1000	125/216	2667	170
XD	2250	500	125/216	1333	170

Table 2: Special Protector Ratings For Installation In Ventilated Cabinets Only					
Protector Rating		Associated Transformer 55°C Name Plate Rating			Protector Allowable %Loading
Class	Current	kVA	Voltage	Current	
FOX	4500	1000	125/216	2667	170
ED3R	4500	1000	125/216	2667	170

Appendix E - Transformer and Network Protector Coordination

These examples illustrate how the individual load limits of the transformer and network protector are to be used to derive the combined load limits.

All allowable loading limits are listed as a percentage of rated current. For instance, if a network transformer is rated for 500kVA at 55°C, a 125% loading limit on first contingency allows the transformer to be rated for 1671 Amperes (625 kVA) in that mode of operation.

Example 1:

Given a pre 1970, 500 kVA, 125/216V, 3Ø, 55°C only, Liquid Filled (Class GB) transformer (Appendix B, Table 1). The protector is a type FA (Pre 70) (Appendix D, Table 1). The load cycle is the standard "C" load cycle.

	Class or Type	Appendix Table	% Allowable Load Limit		
			Normal	1st Cont.	2nd Cont.
Transformer	GB	B-1	100	125	140
Protector	FA	D-1	150	150	150
Combination	****	****	100	125	140

All the maximum allowable load limits are based on the limits of the transformer.

Example 2:

Assume the same conditions of Example 1 except that the transformer is a 55°/65°C (Class GB-8) unit. Then the transformer load limits must be selected from Appendix B, Table 3.

	Class or Type	Appendix Table	% Allowable Load Limit		
			Normal	1st Cont.	2nd Cont.
Transformer	GB-8	B-3	125	145	170
Protector	FA	D-1	150	150	150
Combination	****	****	125	145	150

The Normal and 1st Contingency load limits are based on those of the transformer as in Example 1. But, the 2nd Contingency load limit of the combination is limited by protector.

Example 3:

In this example, assume all the conditions of Example 2 except that the protector has been upgraded to a Pre 70H type.

	Class or Type	Appendix Table	% Allowable Load Limit		
			Normal	1st Cont.	2nd Cont.
Transformer	GB-8	B-3	125	145	170
Protector	FA-H	D-1	175	175	175
Combination	****	****	125	145	170

The combined load limits for all Modes of Operation are based on the transformer load limits as in Example 1.

Electric Distribution
Network Transformer Relief 2009 - 2017 Work Plan - Units

		Actual Units				Budget Units				
Program / Project	Activity	2009	2010	2011	2012	2013	2014	2015	2016	2017
Network Transformer Relief	INSTALL REPLACE UG PRI COND CONV SECTION LEG	194	249	204	122	112	115	107	106	100
	INSTALL REPLACE UG SEC COND CONV SECTION LEG	943	515	560	513	330	442	407	404	378
	INSTALL REPLACE UG CONDUIT	35,077	22,991	21,635	12,036	13,073	19,289	17,436	16,963	15,600
	INSTALL REPLACE UG MANHOLE VAULT / STRUCTURES	168	132	136	56	131	127	114	110	100

2013 Capital – Electric Operations

Project/Program Title	Network Transformer Relief
Project Manager	Kevin Oehlmann
Project Engineer	Kishan Patel
Status	Ongoing
Estimated Service Date	
Work Plan Category	Increased Customer Demand

Work Description (Includes units per Year and a high level schedule):

This program is for the installation costs associated with providing relief for network transformers that are projected to operate greater than 100% of their normal (all equipment in service) ratings and 100% of their contingency (N-2) ratings. The costs include the installation of new cable, conduit and vaults. Relief projects include replacing the overloaded transformer with a new transformer that has a higher rating, a larger transformer with a greater capacity, or introducing a new transformer to the system with associated secondary reinforcement which will diversify the area load effectively lowering the loads of all the nearby transformers. The program will consist of addressing the projected overload transformer in priority order.

The program is tiered into 4 priorities:

Priority 1 – Transformer loads that are 25 percent of loading above second contingency rating.

Priority 2 – Transformer loads that are 15 to 25 percent of loading above second contingency rating and manufactured prior to 1992.

Priority 3 – Transformer loads that are 5 percent or more of loading above normal rating ~~or~~ and 15 to 25 percentage of loading above second contingency rating and are manufactured after 1991.

Priority 4 – Transformer loads that are 15 to 25 percent of loading above second contingency rating and manufactured after 1991 ~~or~~ and Transformer loads that are 0 to 5 percent of normal rating.

Justification (Technical Evaluation/Analysis):

In order to increase the reliability of the secondary network, it is necessary to lower the average network transformer loading on the system both during normal and contingency conditions and thus reduce the likelihood of overloads and possible equipment failures. The objective of this program is to de-load the program transformers as detailed in our design specification EO-2002 Loading Limits for Network Transformers and Associated Protectors. This project will improve the secondary network distribution system reliability, quality of service and extend the operating life of this equipment.

Alternatives:

The main alternative for load relief is demand side management. In parallel to the Network Transformer Load Relief program, Con Edison is actively engaging in demand side management initiatives. However, the decreased demand due to the demand side management program will not be high enough to compensate for projected transformer overloads.

Risk of No Action:

Transformers that operate at or over their design temperature for extended periods of time are susceptible to degradation of the internal components as per manufacture specification. This degradation can lead to premature failure. An in service unit that fails causes the feeder breaker to open automatically. This

creates an N-1 in the network and places additional burden on the connecting secondary mains and nearby transformers for all transformers associated with the failed feeder. Network transformers used by Con Edison are installed underground vaults and manholes in public areas. When a network transformer fails, there is a chance that it may rupture and oil may escape from the vault. This can result to public injury and or property damage.

When a feeder breaker opens automatically due to a transformer failure, the process of locating, repairing or dropping and returning a feeder to service can take from 12 to 14 hours. This additional load on the secondary system for this period of time could cause other failures in weak spots in the secondary network. This can further lead to loss of supply to customers, additional feeder interruptions, smoking manholes, manhole explosions, and secondary burnouts, all of which can directly affect public and employee safety. For example, secondary burnouts can generate combustible gases that can ignite into major fires under certain scenarios. The buildup of gases can also result in exploding manhole covers that can severely damage surrounding property. Relieving overloaded network transformers will reduce the chances for secondary system events which can cause injuries to the public and company personnel.

Furthermore, relieving network transformers that are projected to be above 100% normal rating and their contingency rating will maintain feeder stability as well as adequate supply during peak summer conditions.

Summary of Benefits (financial and non-financial):

This program is expected to cost \$30.9 million in 2012. Based on engineering analysis and pending overloads identified, the funding in the rate case years is estimated to be lower than the 2009 base year.

In order to increase the reliability of the secondary network, it is necessary to lower the average network transformer loading on the system both during normal and contingency conditions and thus reduce the likelihood of overloads and possible equipment failures. The objective of this program is to de-load the program transformers as detailed in our design specification EO-2002 Loading Limits for Network Transformers and Associated Protectors. These projects will improve the secondary network distribution system reliability, quality of service, and extend the operating life of this equipment.

Project Relationships (if applicable):

This project is impacted by the Transformer Purchase program, since new equipment is required in conjunction with each unit targeted for relief.

EH&S Overview:

Transformers that operate at or over their design temperature for extended periods of time are susceptible to degradation of the internal components as per manufacture specification. This degradation can lead to premature failure. An in service unit that fails causes the feeder to open automatically. This creates an N-1 in the network and places additional burden on the connecting secondary mains and nearby transformers for all transformers associated with the failed feeder.

Historically finding, repairing or dropping and returning a feeder to service can take from 12 to 14 hours. This additional load on the secondary system for this period of time could cause other failures in weak spots in the secondary which can lead to smoking manholes, manhole explosions, and secondary burnouts, all of which can directly affect public and employee safety. For example, secondary burnouts can generate combustible gases that can ignite into major fires under certain scenarios. The buildup of gases can also result in exploding manhole covers that can severely damage surrounding property.

Relieving overloaded network transformers will reduce the chances for secondary system events which can cause injuries to the public and company personnel.

Analysis of Prior Year Funding Request Versus Actual:

Compare last year's funding request versus actual and provide explanation for variance.

Data Reports Issued that Support Program: (Include date report was issued and date of next report)**Specifications & Procedures Pertaining to Program/Project:**

EO-2002: Loading Limits for Network Transformers and Associated Protectors

Is this a mandated program? If yes, include verbiage associated with mandate:**Funding Forecast (Capital or O&M):**

Actual 2009	Actual 2010	Actual 2011
36,513	28,229	31,466

	2012 Budget	2013 Request	2014 Request	2015 Request	2016 Request	2017 Request	5 yr (13-17)
Funding (\$000s)	30,944	22,500	29,501	27,326	26,477	24,585	130,389

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-13
Date of Response: 03/22/2013
Responding Witness: Electric Infrastructure and Operations Panel

Question No. :E0099

Subject: Storm Hardening – Prioritization of Projects - 1. Page 32 of your testimony, references a process that the Company used to prioritize electric infrastructure and operations storm hardening projects and programs. Provide copies of all internal Company documents that defined and describe this process. 2. In order of priority from highest importance to lowest, list in an excel spreadsheet the electric infrastructure and operations storm hardening capital programs and projects, operational strategies, and procedural modifications. Include in the spreadsheet for each program/project the funding for RY1, RY2, and RY3. Indicate for each project, operational strategy and procedural modification, whether it is short, near, or long term initiatives.

Response:

- 1. Page 32 of your testimony, references a process that the Company used to prioritize electric infrastructure and operations storm hardening projects and programs. Provide copies of all internal Company documents that defined and describe this process.**

The storm hardening prioritization process referred to in testimony is a long horizon decision aid that allows for a common means to rank proposed storm hardening projects across the company's transmission, substation, and distribution assets. The description provided reflects the current state of a continuing effort that is still undergoing further refinement. The features of this process are described in detail on attachment "A" and the various data inputs and outputs are displayed in attachment "B".

The prioritization process quantifies the anticipated relative potential storm risks (flooding and wind damage) to the overall electric system and was in the early stages of development at the time the Company's initial storm hardening plans were established. In some cases, most notably for the Substation Storm Hardening Program, those initial plans focused directly on assets that experienced an impact due to hurricane Sandy and therefore represent a sub-set of the broader long range prioritization targets indicated by the prioritization process.

Because of this, the Company's initial work targets will not be in complete alignment with the proposed risk rankings laid out by this methodology. However, as we expect this to be a long term effort, it is anticipated that this tool will support the maximization of the Company's spending efficiencies as we progress with the overall hardening effort.

NOTE: To view all supplementary material relevant to the prioritization provided please see the following attachments:

DPS13 99 Infrastructure Definitions

DPS 13 99 NYC Map – All Categories

DPS 13 99 Station Outages List

- 2. In order of priority from highest importance to lowest, list in an excel spreadsheet the electric infrastructure and operations storm hardening capital programs and projects, operational strategies, and procedural modifications. Include in the spreadsheet for each program/project the funding for RY1, RY2, and RY3. Indicate for each project, operational strategy and procedural modification, whether it is short, near, or long term initiatives.**

The prioritized listing the process generates can be found on page 2 of Attachment "B" as referred to above. However, the listing that is generated does not rank items based on the programs and projects, but rather prioritizes work based on geographic regions or load areas. The priority listing will be used to determine to which region or load areas the Company will direct the funding established for the storm hardening initiatives (as discussed in the applicable white papers). The Company has not run all potential work candidates through this prioritization process to develop final region by region, load area by load area work plans. As a result, the cash flow and project funding details related to this process are not available.

Attachment “A”

The storm hardening prioritization methodology estimates the vulnerability of electric system assets based upon: 1) the likelihood of a significant storm occurring; 2) the probability of assets being affected by either flooding or wind damage based on their location in the 2010 SLOSH Model; 3) and the ultimate impact of that electric system damage to population and supporting critical infrastructure.

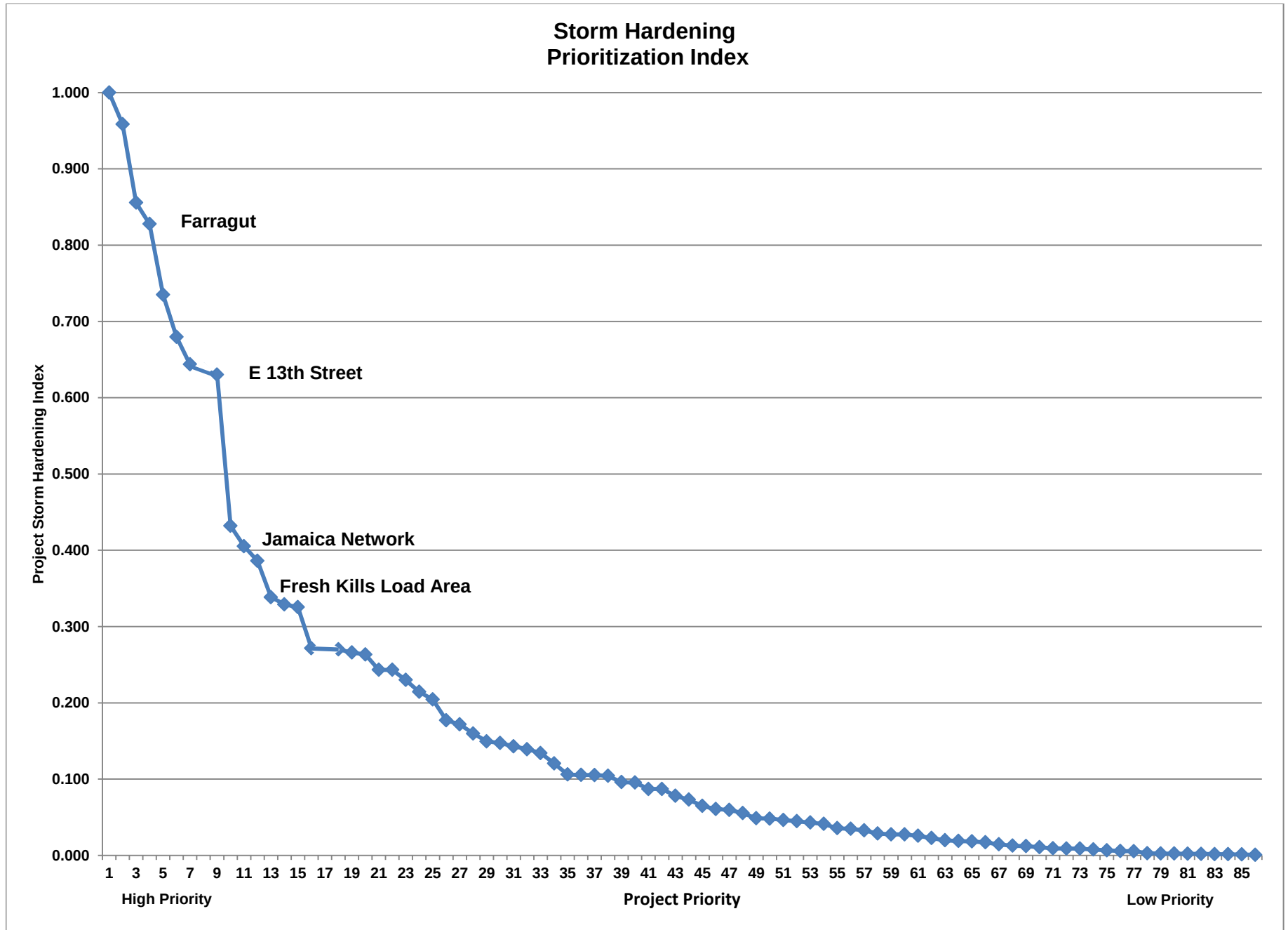
So for example, a transmission station supplying power to multiple distribution networks having a large aggregate population and expansive critical infrastructure that also happens to be located in a more flood prone (category 1 or 2) zone would be ranked high on the storm prioritization risk scale. At the other extreme, an asset that supplies energy to a relatively small population and would only be impacted by a storm under a more extreme (category 3 or 4) less likely condition would be ranked low on the risk scale.

The likelihood of a significant storm occurring was based on historical information provide by Emergency Management. That data indicated the chance of a category 1 or 2 storm was once in every 19 years (.053) and a comparable frequency for category 3, 4, and 5 storms was once in every 74 years (.014). Thus an asset located in SLOSH zone “3” would be assigned the 1 in every 74 probability as it would not be impacted from flooding by a category 1 or 2 event based on location. For the overhead systems it was assumed that wind impact due to a category 1 storm was sufficient to cause some degree of damage to those systems and a storm occurrence likelihood of 1 in 19 years was selected.

For the transmission and distribution network systems susceptible to storm surge flooding estimates of the likelihood of specific surge level impacts on those systems were derived from historical New York City surge data. For distribution network underground assets it was assumed that any storm surge greater than 8 feet would begin to impact one or more networks. For transmission assets a 14.2 foot surge threshold was selected beyond which those assets would also be impacted. These two thresholds were chosen based upon the recent experience of hurricanes Irene and Sandy. The estimated flooding probabilities for an 8 foot or greater surge and a 14.2 foot or greater surge were .00593 and .0008 respectively.

For Overhead distribution assets storm damages are essentially driven by wind. Probability estimates of this damage based across a range of wind speeds were calculated and applied as impact likelihoods for the OH system assets. These calculations indicate that for the sustained winds experienced during hurricane Sandy (a category 1 event) there is around an 11% chance of system damage.

Combining the likelihood of a storm event, the probability of that event resulting in flooding or wind damage, and the population and infrastructure potentially impacted by those occurrences results in an estimate of the total relative risk for the specific asset under consideration. The detail computations linking these causal factors and impacted assets appear on the attachment “B” EXCEL worksheet normalized to a 0 to 1 scale.



Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm Hardening		Asset		Storm Return Frequency		Storm		Storm 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<u>Surge (m)</u>	<u>Surge (ft)</u>	<u>Storm</u>	<u>Surge (ft)</u>	<u>CL</u>	<u>Probability</u> <u>>= Surge</u>
1.01	3.31	Irene	8.00	0.994070	0.5930%
1.01	3.31	Sandy	14.20	0.999200	0.0800%
1.01	3.31		∞	1.000000	
1.01	3.31				
1.01	3.31				
1.01	3.31				
1.01	3.31				
1.01	3.31				
1.02	3.35				
1.03	3.38				
1.05	3.44				
1.07	3.51				
1.08	3.54				
1.08	3.54				
1.08	3.54				
1.09	3.58				
1.10	3.61				
1.10	3.61				
1.11	3.64				
1.11	3.64				
1.11	3.64				
1.12	3.67				
1.12	3.67				
1.12	3.67				
1.13	3.71				
1.13	3.71				
1.14	3.74				
1.16	3.81				
1.17	3.84				
1.18	3.87				
1.19	3.90				
1.22	4.00				
1.24	4.07				
1.25	4.10				
1.33	4.36				
1.33	4.36				
1.35	4.43				
1.37	4.49				
1.38	4.53				
1.39	4.56				
1.40	4.59				
1.46	4.79				
1.57	5.15				
1.73	5.68				
1.75	5.74				
2.00	6.56				
2.44	8.00				
2.44	8.00	Irene			
3.05	10.02	Donna			
4.33	14.20	Sandy			

Assumptions:

- 1) Distribution Network Assets impact by surges >= 8'
- 2) Transmission Assets impacted by surges >= 14.2'
- 3) Surge height distribution not modeled by known PDFs
- 4) Chebyshev UCL used to calculate surge probabilities for asset classes

Upper limit <u>miles/hr</u>	Upper limit <u>m/sec</u>	Wind pressure (N/m ²) <u>Upper limit</u>	Wind Damage <u>Probability</u>
0.45	0.20	0.03	0.00
3.35	1.50	1.41	0.00
7.38	3.30	6.81	0.00
12.07	5.40	18.23	0.01
17.66	7.90	39.01	0.01
23.92	10.70	71.56	0.02
30.85	13.80	119.03	0.04
38.23	17.10	182.76	0.06
46.28	20.70	267.81	0.08
54.55	24.40	372.10	0.11
63.49	28.40	504.10	0.15
72.66	32.50	660.16	0.20
81.60	36.50	832.66	0.25
90.54	40.50	1025.16	0.31
99.48	44.50	1237.66	0.38
108.43	48.50	1470.16	0.45
117.37	52.50	1722.66	0.52
126.31	56.50	1995.16	0.61
135.25	60.50	2287.66	0.70
144.20	64.50	2600.16	0.79
153.14	68.50	2932.66	0.89
162.08	72.50	3285.16	1.00

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-13
Date of Response: 03/22/2013
Responding Witness: Electric Infrastructure and Operations Panel

Question No. :E0101

Subject: Storm Hardening – Flood Water Levels - 1. Describe the flood water levels being considered and anticipated by the Company for design purposes as related to the storm hardening projects and programs. 2. To which level, or levels, in the response to 1, above, is the Company designing its electric system storm hardening structures? 3. The Company states that it plans to perform initial storm hardening work this summer. To what degree is the Company expecting to perform rework on storm hardening structures designed to a level that might not be finalized?

Response:

1. Describe the flood water levels being considered and anticipated by the Company for design purposes as related to the storm hardening projects and programs.

The flood levels currently considered and anticipated by the Company are:

- (1) Observed Sandy Level at each of the facilities, which line up closely to a Flood Zone 2 of the SLOSH Maps,
- (2) The 2010 Category 1 levels as predicted by the National Weather Service's SLOSH Maps, and
- (3) The 2007 FEMA Maps.

2. To which level, or levels, in the response to 1, above, is the Company designing its electric system storm hardening structures?

We are currently designing the electric system storm hardening structures to the highest of the three levels referenced.

3. The Company states that it plans to perform initial storm hardening work this summer. To what degree is the Company expecting to perform rework on storm hardening structures designed to a level that might not be finalized?

New "initial" or preliminary FEMA maps were recently released in late February, which identify various areas within the City which could be impacted by flood waters. It is expected that these maps will be adopted in the NYC building code within 2 years. Changes or refinements to these maps are also expected by FEMA sometime this year. The before-mentioned SLOSH maps have consistently been revised since the 1990's to ever increasing levels. It is the Company's position that a consistent design basis needs to be established for all affected utilities, agencies and other organizations which have a direct impact on the steam and electric infrastructure. The Company is open to this consensus approach.

The Company cannot reasonably predict when changes to these design levels may change or whether a new design basis flooding elevation will be established across all commodities. Therefore, the Company cannot estimate the extent to which storm hardening performed this summer will require re-work. However, recognizing that the design levels may change, the Company is proceeding with its work for this summer in a manner designed to minimize the amount of rework required. For example, new flood walls are being designed in a manner that will enable the height of the floodwall to be raised rather than needing to replace the floodwall constructed this summer.

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-13
Date of Response: 03/26/2013
Responding Witness: Electric Infrastructure and Operations Panel

Question No. :E0102

Subject: Storm Hardening – 2013 Project Deferrals - 1. Identify all electric infrastructure and operations projects that were deferred in 2013 to instead perform storm hardening projects. 2. Describe the safety and reliability implications of each deferred project or program.

Response:

Please see PDF attachment for answers to parts 1 and 2.

Project/Program	Original 2013	Reprioritized 2013	Reduction	Impact
Part of Pennsylvania (74MW) to create	\$2,000,000	\$0	\$2,000,000	This reduction reflects a revised estimate of the required capital funds needed for the project. There will be no reliability impact.
Primary Feeder Relief	\$7,844,000	\$6,944,000	\$900,000	Could potentially create temporary low level overloads under localized emergency conditions. These overloads would not occur under normal loadings and would not result in any residual damage to primary feeders.
Network Transformer Relief	\$28,000,000	\$22,500,000	\$5,500,000	Relief of some lower priority network transformers estimated at being greater than 100% of normal rating would be postponed until 2014. Transformers operating at or over their design criteria during limited emergency load periods could exhibit a degradation of their internal components with a resulting reduction in their service life.
Secondary Open Mains	\$142,000,000	\$129,300,000	\$12,700,000	The current targeted prioritized reduction in the scope of this program should have minimal impact on secondary overloads and secondary system events. Specific secondary mains determined as not needing replacement have been classified as being redundant from a load support perspective.
Network Reliability	\$21,320,000	\$14,320,000	\$7,000,000	This reduction would preclude the establishment of two additional primary feeders during 2013. The additional work being carried out under the remaining 2013 program budget should provide for an acceptable near term reliability enhancement.
HV Breaker Replacement	\$9,500,000	\$5,178,000	\$4,322,000	Will defer 3-4 breaker replacements by 1 year. We do not expect to encounter safety or reliability impacts due to this short term deferral.
Transformer Replacement	\$25,651,000	\$20,651,000	\$5,000,000	Will push a progress payment planned for 2013 to 2014, on a bank being installed in 2015. There will be no reliability/safety impact.
Construct Relay House Enclosures	\$1,078,000	\$0	\$1,078,000	Deferral of the work planned in this program for 2013 by one year offers potential for a slight impact on reliability--primarily in the form of an increased likelihood of a trip out event due to water intrusion. Typically, these events have a short term impact, as affected equipment can be isolated and repaired quickly.
Control Cable Upgrade Program	\$2,000,000	\$0	\$2,000,000	Our near term hardening efforts include initiatives planned to improve our control cable systems ability to withstand water intrusion. The net impact of deferring the other work originally planned for this program in 2013 is minimal, so we do not expect a negative reliability impact from these deferrals.
Switchgear Enclosure Program	\$1,000,000	\$0	\$1,000,000	Deferral of the work planned in this program for 2013 by one year offers potential for a slight impact on reliability--primarily in the form of an increased likelihood of a trip out event due to water intrusion. Typically, these events have a short term impact, as affected equipment can be isolated and repaired quickly.
Failed Transformers	\$24,282,000	\$16,782,000	\$7,500,000	We are expecting to obtain the cash flow savings in this program due to a decreased 2013 cash liability for the 2 failed transformers that were associated with Superstorm Sandy. We will still replace any and all failed area and substation transformer failures that are encountered in 2013.
E13th St. Alarm Panel	\$1,500,000	\$0	\$1,500,000	This project will be wrapped into the E13th Street storm hardening effort, which includes relocating the control room and replacing/upgrading much of the control and monitoring equipment in the station.
13/27 kV Breaker Retrofits	\$11,278,000	\$10,278,000	\$1,000,000	This will defer 4-8 breaker retrofits by approximately 1 year. We do not expect to encounter safety or reliability impacts due to this short term deferral.
Facility Improvement	\$6,600,000	\$4,500,000	\$2,100,000	This will defer several facility upgrade projects by approximately 1 year. We do not expect to encounter safety or reliability impacts due to this short term deferral.
Circuit Switcher Replacements	\$1,000,000	\$0	\$1,000,000	Will defer a circuit switcher replacement by 1 year. We do not expect to encounter safety or reliability impacts due to this short term deferral.
Jamaica Fall Protection	\$1,000,000	\$0	\$1,000,000	Due to recent roof repair work in Jamaica, the underlying need to provide extensive fall protection at this station has been eliminated.
Pumping Plant Program	\$5,500,000	\$3,000,000	\$2,500,000	A component of this program was the upgrade and relocation of pumping plant control panels. Portions of that work are being shifted over to the storm hardening program line, as part of our near term storm hardening efforts. Pumping plants are also being fitted with back-up nitrogen driven pumps as part of those efforts, so we do not expect pumping plant reliability to be adversely impacts by this funding reduction.

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-13
Date of Response: 03/25/2013
Responding Witness: Electric Infrastructure and Operations Panel

Question No. :E0103

Subject: Undergrounding - Provide a copy of the consultant's report on undergrounding that is referenced in your testimony.

Response:

See pdf attachment titled “Feasibility Report Underground Electric Utilities”

FEASIBILITY REPORT: UNDERGROUND ELECTRIC UTILITIES

**CONEDISON
WESTCHESTER COUNTY, BRONX & STATEN ISLAND
OVERHEAD FEEDER CONVERSIONS**

RYE, NEW YORK

December 2007

**Prepared for:
Consolidated Edison Company of New York, Inc.
511 Theodore Fremd Avenue
Rye, New York 10580**

**Prepared by:
CLOUGH HARBOUR & ASSOCIATES LLP
III Winners Circle
Albany, New York 12205**

CHA Project No. 16596

I. EXECUTIVE SUMMARY

Clough Harbour & Associates LLP (CHA) was retained by Consolidated Edison Company of New York, Inc. (ConEd) to provide professional engineering services to evaluate the feasibility of converting their existing overhead electric distribution system in Westchester County, Bronx, and Staten Island to underground distribution systems. The primary basis of this evaluation was the result of field evaluation of several representative feeders identified by ConEd, including the following:

Feeder Designation	Feeder Type	Feeder Location
17W42	13kV Express	Westchester County
Bowman Loop	13kV Auto-Loop	Westchester County
13U1 and 36U4	4kV Primary Grid	Westchester County
5R10 and 5R29	13 kV Express / Auto Loop	Staten Island
272	4kV Primary Grid	Staten Island
33R08	33 kV Express	Staten Island

Based on a review of feeder designations with ConEd engineering personnel, CHA recognizes that ConEd categorizes their overhead distribution feeders into the following feeder types:

- **13kV Open Wire Loop:** A predominantly overhead radial system consisting of open wire distribution to residential and small commercial loads. A loop is supplied by either two or three 13kV supply feeders with an arrangement of automatic switches called vacuum reclosers that provide fault isolation and redundant supply sources.
- **Automatic Transfer Switch (ATS):** A pad-mounted device which automatically switches between two 13kV supply feeders and supplies large residential or commercial loads with pad-mounted transformers or residential developments with an underground residential distribution (URD) system.
- **Isolated Networks:** An underground system consisting of two or more vault type transformers that have their secondary paralleled through automatic switches called network protectors. These systems are used to supply large commercial or residential buildings.
- **4kV Distribution:** This system consists of a group of unit substations supplied by 13kV feeders. The unit substations supply between two to five 4kV distribution

feeders. These 4kV feeders, which are tied to other unit substations forming a network type system, supply residential and small commercial customers from either overhead, underground, or pad-mounted transformers.

- **Secondary Network:** Essentially an underground secondary grid supplied by underground vault type transformers through automatic switches called network protectors. These transformers are supplied by various 13kV distribution feeders which provide redundancy while one or more of the feeders are out of service. Residential and small commercial customers are supplied by this secondary grid.

The perceived advantages of placing an existing overhead system underground are believed to primarily reduce the frequency of customer outages. Based on our study of the sample feeders in both Westchester County and Staten Island, the projected cost for converting the existing overhead system to an underground system are on average \$6.34M per mile for Westchester County / Bronx and \$5.96M per mile for Staten Island. These per mile costs translate to a total cost of \$20.6B for Westchester County / Bronx and \$5.2B for Staten Island to convert all overhead feeders to underground feeder systems.

As indicated in the above table, the feeders that were used for the basis of this feasibility study were located throughout Westchester County and Staten Island. The costs per mile for overhead to underground conversion that were calculated as the basis of this study did not include feeders in the Bronx. Based on the construction requirements in the Bronx, however, the costs per mile are anticipated to be greater than those presented in this report. Not only would restoration work in the Bronx be greater than that in Westchester County and Staten Island, but finding a suitable "lane" to install new underground facilities would be extremely difficult. Once this "lane" is found and the underground facilities were designed and installed, a more complete roadway restoration would be required than in Westchester County or Staten Island.

While the above costs represent those associated with converting the electric system only, the same estimating procedures were applied to the remaining overhead facilities on the existing pole line structures. The true improvement to the aesthetic and visual impacts of the existing pole line structures can only be fully realized when the entire overhead utility system is placed underground. With the vast number of cable television (CATV) and private fiber companies that currently occupy

the existing pole lines, the additional costs to underground these networks and thus allow the removal of the existing pole lines from the streets would range from \$19.3B for Westchester County / Bronx and \$2.9B for Staten Island.

In summary, the costs presented in this report are considered by CHA to be realistic for a system that could be built to replicate the operational flexibility of the existing overhead system. This flexibility is required to allow ConEd the operational flexibility (i.e., switching) to allow quick response to outages. Likewise, the costs are based on an evaluation of study feeders in Westchester County and Staten Island. The Bronx is considered to be a more complicated and costly installation and restoration environment than Westchester County and Staten Island. Thus, if anything, the costs presented in this report are lower than what would be actually expected in the Bronx.

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Attachment R	Conversion Estimates: Westchester County & Bronx
Attachment S	Conversion Estimates: Staten Island
Attachment T	Conversion Estimate: Unit Rates & Average Per Mile Cost
Attachment U	Conversion Summary by Municipality & Feeder: Westchester & Bronx
Attachment V	Conversion Summary by Municipality & Feeder: Staten Island
Attachment W	Revenue Requirement & Rate Impact of Underground Conversion

1.0 INTRODUCTION

The following report summarizes the results of a field investigation and overall system-wide feasibility for the conversion of existing overhead electrical distribution systems throughout Westchester County, Bronx and Staten Island, New York. Clough Harbour & Associates LLP (CHA) was retained to complete an extensive field investigation of several representative feeders identified by ConEd, including the following:

Feeder Designation	Feeder Type	Feeder Location
17W42	13kV Express	Westchester County
Bowman Loop	13kV Auto-Loop	Westchester County
13U1 and 36U4	4kV Primary Grid	Westchester County
5R10 and 5R29	13 kV Express / Auto-Loop	Staten Island
272	4kV Primary Grid	Staten Island
33R08	33kV Express	Staten Island

Throughout Westchester County, Bronx, and Staten Island, New York, the majority of the electric distribution lines are constructed overhead on wooden pole lines to facilitate economical construction and maintenance practices. Based on recent weather patterns and the perceived increase in customer outages due to wind storms and other severe weather-related outages, customers tend to become increasingly aware of the overhead distribution system and its perceived lack of reliability. In light of these types of circumstances and issues, customers tend to request that the overhead systems be converted to underground to increase the reliability of the system, and at the same time increase the aesthetics of the area and eliminate the visual impact of the overhead facilities.

According to the recent EEI Study “Out of Sight, Out of Mind?”, capital expenditures by US investor-owned utilities during the years 1993 to 2002 were approximately evenly split between overhead and underground systems whereas 49% of capital expenditures were directed towards underground systems and 51% of capital was directed towards overhead systems. These numbers represent expenditures on both distribution and transmission systems. As indicated in this report, approximately 80% of the nation’s electrical grid, however, has been built with overhead power lines. Would reliability be improved if more of the existing overhead lines were placed

underground as well? This report will examine the major issues associated with undergrounding existing overhead power lines (i.e., design parameters, reliability issues, costs, etc.).

2.0 SYSTEM DESIGN PARAMETERS

CHA extensively reviewed the study feeders in the field to determine the optimum method for conversion to underground construction. Potential options for underground systems include the following:

1. Direct burial primary cable with pad-mounted switchgear and transformers and pullboxes for splicing, where required.
2. Primary cable installed in PVC conduits with pad-mounted switchgear and pullboxes for splicing, where required.
3. Primary cable installed in concrete encased conduits with pad-mounted switchgear and pad-mounted transformers and pullboxes for splicing, where required.
4. Primary cable installed in concrete encased conduits with submersible transformers and switches located in manholes/pullboxes.
5. A hybrid of items 3 and 4 above (i.e., pad-mount installations where right-of-way may be reasonably obtained).
6. A complete network system.

Based on our extensive field review, direct burial primary cable and direct burial primary cable in PVC conduit were regarded as infeasible. The representative study feeders are located in a largely urban environment which precludes these options. Based on the field review it was also determined that the installation of a largely pad-mounted system was highly problematic. Due to the narrowness of the public right-of-way and also the lack of space on private right-of-way for pad-mounted equipment, it was decided that the design would utilize vault type equipment (i.e. submersible transformers, switches, etc.). The added complication with the lack of space on private right-of-way is the ability to obtain the private right-of-way from the current landowners in the area. Indeed, in many areas facilities (i.e., manholes and vaults) will need to be installed in the streets, rather than utilizing sidewalk installations for these structures. All transformer vaults required would be in strict compliance with Con Ed specifications for transformer vaults.

Several assumptions were required by CHA to develop realistic cost estimates for the study feeders that could then be applied to all other feeders within the study area. The pertinent assumptions that were required for this study with respect to each feeder are provided in the following table:

Table 1

Feeder Number and Relevant Design Assumptions (Westchester County)

Design Criteria	Feeder Numbers					
	17W42 Express	17W33	17W42	Bowman Loop	13U1	36U4 ^a
1-Phase Vacuum Switches		12	6		4	2
Feeder Tie Switches (210)	1		1	1	2	2
Feeder Switches (422) (PMH-9)		29	3	10	3	6
Feeder Switches (431) (PMH-11)	3	14	6	9	3	5
Feeder Switches (440)		1	1	2		
Vacuum Recloser		2	3	3		
Service Entrances (Feet Private / Feet Public) ^b		250' / 100'	250' / 100'	250' / 100'	100' / 100'	100' / 100'
Percent of Services Requiring Service Boxes (%)		25%	25%	25%		
Maximum Manhole Spacing (Feet)	500'				450'	450'

Superscript Notes:

- a 3-phase padmount transformers could potentially be utilized on this feeder.
- b Service entrance lengths were based on field review and an estimate of the lengths required on both the public and private rights of way.

Table 2

Feeder Number and Relevant Design Assumptions (Staten Island)

Design Criteria	Feeder Numbers			
	5R10	5R29	272 ^a	33R08 ^b
1-Phase Vacuum Switches	8	3		
Feeder Tie Switches (210)	3	3	6	
Feeder Switches (422) (PMH-9)	18	3	4	
Feeder Switches (431) (PMH-11)	4	3	12	3
Vacuum Recloser	3	3		
Service Entrances (Feet Private / Feet Public) ^c	100' / 100'	100' / 100'	100' / 100'	
Maximum Manhole Spacing (Feet)	450'		450'	500'

Superscript Notes:

- a Automatic single phase sectionalizing devices on a three-phase system.
- b West Service Road could be a direct burial system.
- c Service entrance lengths were based on field review and an estimate of the lengths required on both the public and private rights of way.

As previously discussed, the proposed underground installation would utilize vault-type equipment. CHA would propose to utilize single phase submersible transformers similar to existing ConEd standards and three phase underground commercial transformers installed in vaults similar to ABB UCT types. The three phase underground commercial transformers are designed for either loop feed or radial deadfront applications. Transformer protection is provided by bayonet fusing. These units could be installed in ConEd vaults and would offer switching flexibility and easy accessibility coupled with the pre-requisite level of safety to operating personnel. These units would be utilized in lieu of pad-mounted transformers (See Attachment G for a manufacturer's cut sheet for this equipment). This state of the art underground switching equipment is available in a maximum short circuit rating of 25,000 amperes symmetrical. For applications in excess of this rating, current limiting reactors at the affected stations or other fault limiting techniques would need to be employed to limit the available fault current level.

The installation of series reactors on some of the Westchester County feeders would add a small percentage (on the order of a percent or two) to the overall electric conversion costs for Westchester County. These reactors would be required on all four bank substations to limit the fault current to a 25,000 ampere design level.

For three phase switching and protection of the system, vault style SF6 switch and interrupter units would be utilized similar to S&C Vista equipment rather than pad mounted switch and fuse equipment. The Vista equipment, Model 211 with one load break switch and one fault interrupter, could be utilized as an intermediate feeder recloser, as a midpoint tie recloser or a tie recloser to an adjacent feeder. Additional units (322, 422, etc.) would provide additional sectionalizing points, but also provide overcurrent protection for three phase transformers and three phase loops that feed single phase loops.

The 600 or 900 ampere three phase fault interrupter is controlled by a microprocessor-based overcurrent control. The gear may be setup as a vault installation and operated from above. Additionally, large windows provide a clear view of the open gap and grounded positions (See Attachment H for a manufacturer's cut sheet for this type of application). For single phase switching and protection of single phase transformers or single phase URD loops, vault style fault interrupters may be utilized similar to Elastimold type MVT (See Attachment I for a manufacturer's

cut sheet). It is our understanding that ConEd presently utilizes equipment very similar to these units. Alternatively, the Vista switchgear may incorporate a single phase protection feature to protect the single phase loops. The microprocessor-based overcurrent control features special customizable coordinating speed time current curves that provide complete coordination with upstream relays and downstream fuses. Conventional E and K speed curves are available.

The interconnecting cable system would consist of primarily 15kV EPR insulated cables installed in the duct system. The cable system would utilize 600 ampere dead break separable connectors similar to Elastimold (See Attachment I for typical cut sheets). Disconnectable splices would be utilized in the mainline in conjunction with junction points to allow for sectionalizing and testing during fault conditions. Additionally, test point mounted fault indicators will be utilized in the manhole system to provide fault location information. Equipment mounted fault indicators at the switchgear and transformers would also be provided. For the URD system, 200 ampere loadbreak separable connectors and fault indicators would be utilized. Installation of these components would aid fault location, isolation, and restoration.

See Figure 1, 2, 3, and 4 which are schematic outlining typical system one-line diagrams. The aforementioned switch with a circuit configuration of 211 would be utilized as the typical sectionalizing device. This unit has 2 bays, one with a 600 amp or 900 amp load interrupter switch and the other with the aforementioned microprocessor-controlled vacuum interrupter. Additional units (322, 422) provide additional sectionalizing points and also provide overcurrent protection for the transformers.

The above equipment in conjunction with an appropriate control methodology similar to S&C Intelli TEAM could replicate Con Ed's standardized automatic loop schemes. IntelliTEAM automatic restoration system uses distributed intelligence and peer to peer communications to dynamically track system conditions on the underground system to detect and isolate a fault anywhere on the loop and restore service to unaffected sections (See Attachment J for a manufacturer's cut sheet for this application). Attachment K provides product literature related to communication devices utilized for the S&C IntelliTEAM product. Attachment L provides product literature related to the universal interface module for the IntelliTEAM product.

The IntelliTEAM works with S&C Automatic Switch Controls to improve service reliability for the distribution system. The IntelliTEAM can be utilized to serve the entire Westchester County, Bronx, and Staten Island systems. No central monitoring or SCADA control is required although SCADA is fully supported.

IntelliTEAM proceeds without delays inherent in a dispatcher operated or centrally controlled system. Real time currents and voltages are monitored throughout the system and this information is used to make smart switching decisions before breaker or recloser lockout. Unlike time coordinated restoration systems, IntelliTEAM's logic can automatically restore service under multiple configurations. Depending on the number of automated switches utilized, the feeder may be broken up into several sections, typically 4 or 5, to restore power to the unaffected sections during a fault condition in a section. Providing automated functionality at the additional units by adding fault interrupter bays would allow for restoration of service to the entire feeder thru feeder ties with only a cable section or transformer left out of service.

There are many operational and safety features inherent in this proposed system. All routine operating tasks (i.e. switching, voltage testing, and grounding) can be accomplished by a single person. The three position (closed-open-ground) load interrupter switches are manually operated and provide three pole live switching of 600 or 900 ampere three phase circuits. These switches also provide a visible gap when open and internal grounding without exposure to medium voltage or the need to manipulate elbows.

The 600 amp or 900 amp fault interrupter features vacuum interrupters in series with the manually operated three position (closed-open-ground) disconnection for isolation and internal grounding of each phase.

Large windows provide a clear view of the open gap, ground position and ground bus allowing the operator to easily confirm the position of the load interrupter switch and disconnect of the fault interrupter. Additionally a potential indication with test feature can be utilized. This feature includes an LCD display to indicate presence of voltage on each phase with provisions for low voltage phasing.

Cable testing for faults can be performed through the back of an elbow or a feed-through insert thus eliminating the need for different cable handling parking stands.

In short, although the new proposed switching equipment represents a major change from existing operating procedures, a transition to new operating procedures should easily be made given the capabilities and safety features provided with this equipment.

Secondary systems in older residential areas would be fed from submersible URD transformers that would feed secondary manholes. Multiple secondary home services would be served from these manholes. Additionally, secondary conduits crossing the street would feed service boxes with manhole covers which would serve multiple services on the opposite side of the street. In newer residential areas below grade transformers would feed secondary service boxes on the same side of the street with interconnecting cable and conduit runs to the opposite side of the street where service boxes would feed two services.

For the light commercial areas (i.e., non network), a commercial subsurface transformer vault would serve a large services' manhole on the near side of the street which would be interconnected with a service manhole on the opposite side of the street. A three phase crab system is proposed for installation in these manholes, typically a 11-15 way crab to provide capability for future loads. The crab system would also allow for connecting multiple secondary cables rated at 600V and would also provide disconnect capability. Additional interconnecting manholes with crab systems could be interconnected for loads located several hundred feet or more from the first secondary manhole.

As noted above, the proposed underground installation would utilize vault-type equipment rather than pad-mounted installations. CHA proposes to utilize single phase submersible transformers per existing ConEd standards and three phase underground subsurface transformers installed in vaults similar to the ABB UCT types. These three phase underground commercial transformers are designed for loopfeed dead-front applications. Transformer protection is provided by bayonet fusing. These units could be installed in ConEd vaults and will offer the switching flexibility and easy accessibility coupled with a pre-requisite level of safety to operating personnel. These installations would be utilized in lieu of pad-mounted switches and pad-mounted transformers (see Attachment G for a manufacturer's cut-sheet for this type of application).

CHA reviewed the study feeders for a potential network application, but concluded that the load density did not support this type of application. Additionally, the study feeders did not have a heavy concentration of three phase customers.

3.0 SYSTEM RELIABILITY

The recent Edison Electric Institute (EEI) Study entitled “Out of Sight, Out of Mind” concludes that “When compared to overhead power systems, underground power systems tend to have fewer power outages, but the duration of these outages tends to be much longer. The bottomline – reliability benefits associated with burying existing overhead power lines are uncertain and in most instances do not appear to be sufficient to justify the high price tag that undergrounding carries” The report further states that “on average, underground circuits in Virginia and Long Island experience only 20 percent to 25 percent of the outages that overhead circuits experience”. Further, however, “data suggest underground outages in Virginia take approximately 2.5 times longer to repair than overhead outages”.

A further study from North Carolina indicates “that the frequency of outages on underground systems was 50 percent less than for overhead systems but the average duration of an underground outage was 58 percent longer than for an overhead outage”. A recent KeySpan report concludes that “at the end of a 40 year program Keyspan estimated the LIPA system SAIFI would be approximately 0.24 (240 customers interrupted per 1,000 customers served per year), almost a 70% improvement. Conversely, KeySpan reports that the transition from overhead to underground circuits results in an approximate 2% annual worsening in CAIDI. At the end of the 40 year program, the LIPA CAIDI would be approximately 170 minutes, almost a 160% deterioration” (Navigant Consulting, A Review of Electric Utility Undergrounding Policies and Practices).

The consensus therefore is that although the underground system would experience fewer interruptions, these interruptions could last longer than those experienced on an overhead system. The key to the reliability of the new system however, would be proper selection of individual reliable equipment components (i.e., cable, transformers, switches, etc.). ConEd would need to evaluate available technologies and specify the required equipment based on extensive engineering and operating evaluations. Even then failure rates would not be available but would be determined over the installed life of the equipment.

With respect to estimates of the impact on ConEd's SAIFI and CAIDI rates, the effect on the indices would also largely be determined by the level of automation employed. Without automation of switchgear, it is expected that the indices would experience the typical decrease in SAIFI yet experience an increase in CAIDI due to the longer durations for cable fault locating and repair and also the longer times for switchgear and transformer failures.

However, with automation of the switchgear, marked improvements in both SAIFI and CAIDI could be experienced. Feeders could be sectionalized into four or more primary sections such that for a failure to a section, the remaining sections could be restored quickly. Attachment M provides case study data relative to reliability indices with the installation of IntelliTEAM. Preliminary pricing provided by S&C for the IntelliTEAM option on these types of feeder configurations are provided in Attachment N. Utilizing automation at all transformer tap points could minimize outages further such that the system would only experience a prolonged outage due to transformer or secondary cable failures. Primary three phase cable failures would ideally be isolated through automatic switching and single phase cable failures could be loop sectionalized thus optimizing both the SAIFI and CAIDI indices. Equipment and material used for the system would need to be engineered to provide long life cycles. Failure rates of the three phase switches and transformers contemplated for the system are unknown at this time and failure rates will be determined unfortunately over the life of the installation. Cable and accessory failure modes can be controlled by strict adherence to specifications for cable and accessory equipment. Con Ed should be able to capitalize on various existing cable system failure rates in determining the requirements of the new system. A stringent specification development should provide for an expected cable life in excess of *forty* years.

Construction of the new underground system would also pose reliability issues during construction. Extensive interruptions would be incurred as individual customers are "cutover" to the new system. Large groups of customers may be affected as sections of new underground circuitry are energized and overhead sections are retired out.

Unlike hybrid systems with some portions remaining overhead, the new system would be immune to tree and vehicular accidents and should also offer superior lightning protection. These benefits, however, are not realized without some potential downsides and potential equipment failures due to

other environmental conditions. These environmental conditions include, among others, exposure to wet and humid conditions within vaults and manholes and road salt and sand during winter conditions. These environmental conditions can shorten the life expectancy of the electrical distribution equipment.

4.0 ENVIRONMENTAL HEALTH AND SAFETY CONCERNS

Construction of the new underground systems will require a highly trained and skilled workforce knowledgeable in all current OSHA and ConEd Health and Safety rules. This large of an undertaking will require rigid adherence to all electric operating procedures. All required switching, tagging, and grounding provisions are paramount to the safety and welfare of personnel. The ongoing requirement of cutovers from the new underground system will require strict observance of all Lockout/Tagout Markup Rules.

During construction, extensive trenching will be required for installation of the new ductline and service conduits. Large excavations will be required for manholes and transformer vaults. All OSHA rules will need to be rigidly adhered to in order to protect both the public and the workers during this construction.

Upon the construction of a completed underground system, an on-going maintenance issues could be the pumping of manhole water with the potential presence of transformer oil.

5.0 GEOTECHNICAL CONCERNS

CHA geotechnical engineers reviewed the existing feeder routes for each of the study feeders in both Westchester County and Staten Island to complete a review of each feeder from a geotechnical perspective and potential exposure to rock during excavation of the proposed underground feeder installations.

For the Westchester County feeder routes, CHA evaluated the four subject feeder routes versus the Surficial Geologic Map of New York State – Lower Hudson Sheet (Caldwell 1989). Areas mapped as bedrock stipple were considered as full bedrock areas. An estimate of 20% bedrock was assigned to areas mapped as till to account for the potential for the presence of shallow bedrock or boulders in the glacial till areas. Based on this review, the following approximate percentages have been applied to the study feeders, then these percentages were applied to total ductbank length to develop a total length of ductbank that is in soil versus rock.

Table 3

Rock Percentage as a Function of Length by Feeder Number (Westchester County)

Feeder Name / Number	Feeder Location	Approximate Breakdown of Surficial Materials Mapped Along Feeder Routes		Estimated Percentage of Total Feeder Length to Encounter Rock
		Rock Type	Percent	
Bowman Loop	Town of Harrison	Till	80%	31%
		Till w/ Bedrock Stipple	15%	
		Kame	5%	
17W42	Town of Harrison	Till	80%	31%
		Till w/ Bedrock Stipple	15%	
		Kame	5%	
13U1	City of Yonkers	Till	100%	20%
36U4	City of Yonkers	Till	80%	36%
		Bedrock	20%	

For the Staten Island feeder routes, CHA evaluated the four subject feeder routes versus the Surficial Geologic Map of New York State – Lower Hudson Sheet (Caldwell 1989) and the Geologic Map of New York – Lower Hudson Sheet (Fisher, et al 1970). An estimate of 20% bedrock was assigned to areas mapped as till or till moraine over bedrock formations to account for the presence of shallow bedrock or boulders in these areas. An estimate of 2% bedrock was

assigned to areas mapped as till, till moraine, or artificial fill over coastal deposits to account for the potential for the presence of boulders in these soil deposits. The chance of encountering bedrock in the coastal deposit areas was considered very low.

Table 4
Rock Percentage as a Function of Length by Feeder Number (Staten Island)

Feeder Name / Number	Feeder Location	Approximate Breakdown of Surficial Materials Mapped Along Feeder Routes		Estimated Percentage of Total Feeder Length to Encounter Rock
		Rock Type	Percent	
5R10	Staten Island	Till or Till Moraine Underlain by Raritan Coastal Deposits	100%	2%
5R29	Staten Island	Till or Till Moraine Underlain by Raritan Coastal Deposits	100%	2%
33R08	Staten Island	Till or Till Moraine Underlain by Raritan Coastal Deposits	70%	2%
		Artificial Fill over Raritan Coastal Deposits or Stockton Formation	30%	
272	Staten Island	Till or Till Moraine Underlain by Stockton Formation or Serpentine	100%	20%

Depending on the competency of the bedrock encountered during excavation for the ductbank construction, specialized equipment may be required for the installation work. The competency of the bedrock will determine the excavation methods required for each particular feeder and this will only be able to be determined during the ductbank design process. Should competent bedrock be encountered, more expensive construction methods would have to be implemented to remove the bedrock.

MUNICIPALITY CONCERNS

All existing municipal street lighting systems will need to be converted to underground ornamental systems. Existing street lighting contracts would need to be reviewed, however municipalities would obviously resist the large required increase in their rates for the new systems. Due to the purchase of ornamental standards, conduit installation, and cable installation, costs per new ornamental light could exceed \$10,000 and necessitate huge rate increases for the municipalities. Some municipalities when faced with these increases could opt for retirement of their street lighting system or pursue customer owned systems.

7.0 DOT CONCERNS

As previously mentioned, much of the construction will unfortunately be required to be installed within the street limits. This construction causes long term disturbances to traffic flow, pedestrian traffic, and general public access. The required construction will be governed by Part 131 of the NYSDOT Rules and Regulations, Accommodation of Utilities Within State Highway Right of Way. Attachment O provides a copy of the NYSDOT Part 131. Attachment P provides a copy of the Highway Design Manual: Chapter 13 – Utilities (Revision 41). For purposes of this study, CHA has not been in direct contact with NYSDOT, but the following contacts would be made should any of the projects proceed into further evaluation and/or design:

- Mr. Joseph Schiraldi, PE
NYSDOT Resident Engineer
Southern Westchester County
Saw Mill River Road
Valhalla, NY 10595
Phone: (914) 592-6557
- Mr. Michael McBride, PE
NYSDOT Resident Engineer
Northern Westchester County
85 Route 100
Katonah, NY 10536
Phone: (914) 232-3060

ConEd will be required to submit an appropriate permit application for all work required within the public right-of-way. Construction procedures requiring maintenance of traffic flow will be extremely difficult due to locations of the proposed work within the road right-of-way. Because of the street location of the new facilities, conflicts with other utilities (i.e., gas, water, sewer etc.) will be a major concern. Based on the magnitude of the existing utilities that currently exist within the right-of-way, extensive efforts will be required to locate these existing utilities prior to design of any new ductbank facilities for the electric system. This would require extensive involvement by underground utility locating companies as well as ConEd's existing survey resources. The additional work required by ConEd's survey and engineering departments will be extensive and likely require additional in-house resources to meet this demand. The Maintenance & Protection of

Traffic Plans (MPT Plans) required by this type of construction will be much more involved than the traditional MPT Plans that ConEd prepares for their existing overhead facility construction.

Extensive work will be conducted in the road shoulder areas provided these utility conflicts can be avoided. Alternatively, construction may be required in the middle of the existing roadways. Sheeting will be required in many areas due to the depth of the facilities. Pavement cuts, concrete base cut back and pavement replacement will be required (See Attachment Q for a typical trench installation within existing asphalt pavement). Due to the open-cut nature of most of the construction work for this project, traffic disturbances will be unavoidable. The impact to traffic patterns will be on the order of those experienced with any major road work in the area. Depending on the ability to locate a new ductbank within the road right-of-way, traffic could be interrupted in both travel directions, or only a single direction. Full road closures would need to be avoided as much as possible, but there may be instances where this would be unavoidable.

8.0 HISTORIC SITES / LANDMARK AREAS

As outlined in our proposal, CHA utilized geographic information system (GIS) mapping techniques to evaluate the study feeders with regards to the presence of several geographic based features within the study areas. The features that were summarized and presented on the GIS mapping include the following:

- Toxic Chemical Storage or Release Point
- RCRA Regulated Facilities
- SPDES Discharge Locations
- Tax Parcel Lines
- Historic Sites
- NYSDEC Wetland Areas
- Federal Wetland Areas
- Presence / Absence of Bedrock

Relative to the presence of Historic Sites and Landmark Areas, the following table summarizes the presence of these sites near the study feeders.

Table 5
Historic Sites / Landmark Areas

Feeder Name / Number	Feeder Location	Number of Historic Sites / Landmark Areas in Relative Proximity of Feeder	General Location of Historic Site
Bowman Loop	Town of Harrison	2	North of I-95, south of existing feeder South of Boston Post Road, south of existing feeder
17W42	Town of Harrison	0	N/A
13U1	City of Yonkers	2	West of existing feeder East of existing feeder
36U4	City of Yonkers	1	West of existing feeder
5R10	Staten Island	0	N/A
5R29	Staten Island	1	East of existing feeder, along Amboy Rd
33R08	Staten Island	0	N/A
272	Staten Island	1	Along Watchogue Road, south of feeder

As summarized in the above table, there are not many historic or landmark features that are in close proximity to the study feeders. Although the number of historic sites / landmark areas in relative proximity to the study feeders are not great, there are several of these sites within the overall land mass of Westchester County, the Bronx, and Staten Island as follows:

- Westchester County 186 Sites
- Bronx 48 Sites.
- Staten Island 45 Sites

Based on the ability to permit disturbances to these features, however, every effort would need to be made during the design process to avoid impacts to these areas. On a feeder by feeder basis, the requirement to avoid impacts to historic and landmark features could add to the actual conversion cost for individual feeders.

9.0 IMPACTS TO OTHER UTILITIES

Construction will rigidly adhere to Industrial Code Rule 53 (13NYCRR Part 53). All existing underground facilities shall be maintained and protected by and at the expense of ConEd. These utility conflicts with the proposed alignment of the new underground installation will be extensive and significantly add to the construction costs.

Also, ConEd's program to underground existing overhead facilities would "strand other utilities (i.e., cable and telephone companies) which would then have to assume 100% of pole costs if electric lines are undergrounded, per the EEI report "Out of Sight, Out of Mind?". EEI also reports in their recent report that costs of undergrounding these other utilities can add approximately 25% to total undergrounding costs. The most likely scenario is that ConEd would sell its pole plant interest to the phone company joint owners and retire out the primary and secondary on the poles. The telephone, cable television (CATV), and private fiber would remain on the pole line. Thus, the truly aesthetic benefit of undergrounding the electric lines would be substantially negated. If these communication facilities relocated underground, they would need to construct their own ductline to relocate underground in that their facilities would not be allowed to jointly occupy the electrical ductline constructed for ConEd's facilities.

As described above, there are several utilities that would be affected by the conversion of the overhead feeder system to an underground feeder system. These utilities include, but are not limited to the ones listed in the following table.

Table 6
Cable & Fiber Companies Potentially Impacted

Company Name	Company Type	Company Address	Company Contact
Cable Vision	CATV	111 Stewart Avenue Bethpage, NY 11714	Sasraz Ali (516) 803-2300
Time Warner	CATV	701-717 MacQuesten Park North Mount Vernon, NY 10552	Brian Kelley General Manager (914) 699-3630 ext. 600
Westchester County Dept. of Transportation	Private Fiber	Liberty Line Buses 100 East 1 st Street Mount Vernon, NY 10550	John Demila (914) 813-7770 (914) 813-7776

IBM Research Center	Private Fiber	P.O. Box 218 Yorktown Heights, NY 10598	George DeSimone (914) 945-1145
MCI Telecommunications	Private Fiber	2400 North Glenville (MT 2314) Richardson, TX 75082	Judy Miller (972) 729-7844
MCI-Metro	Private Fiber	6929 North Lakewood Avenue Mail Drop 2-1 Tulsa, OK 74117	Christine Wilkinson (918) 590-2809
Town of Greenburgh-DPW	Private Fiber	P.O. Box 205 Elmsford, NY 10523	Albert Regula (914) 993-1573
Iona College	Private Fiber	715 North Avenue New Rochelle, NY 10801	George Fountaine (914) 633-2458
Tuckahoe Housing Auth.	Private Fiber	4 Union Place Tuckahoe, NY 10707	Eric DeEsso (914) 961-3373
Westchester ARC	Private Fiber	121 Westmoreland Avenue White Plains, NY 10601	Lisa Dinapoli (914) 428-8330
Village of Croton Public Works	Private Fiber	One Van Wyck Street Croton-on-Hudson, NY 10520	Fred Sorenson (914) 271-3775
Mamaroneck Union Free School District	Private Fiber	1000 West Boston Post Road Mamaroneck, NY 10543	Bill Koulouris (914) 220-3000
Engelhard Corporation	Private Fiber	1057 Lower South Street Peekskill, NY 10566	Chris Magerhans (914) 737-2554
AboveNet Communications, Inc.	Private Fiber	360 Hamilton Avenue White Plains, NY 10601	Laura Srancomano (914) 421-6749
Elantic Telecom	Private Fiber	2134 West Laburnum Avenue Richmond, VA 23227	Karl Dawson (804) 422-4354
Neon Communications, Inc.	Private Fiber	2200 West Park Drive Westborough, MA 01581	Maureen Borinski (508) 616-7800
Consolidated Edison Communications, Inc.	Private Fiber	29-76 Northern Boulevard Long Island City, NY 11101	Paul Corona (718) 752-7509
Bayer Diagnostics	Private Fiber	511 Benedict Avenue Tarrytown, NY 10591	Louis Malaver (914) 631-8000
Entergy Nuclear Indian Point 2, LLC.	Private Fiber	440 Hamilton Avenue White Plains, NY 10601	Michael Slobodien (914) 272-3352
FiberTech Networks, LLC.	Private Fiber	140 Allens Creek Road Rochester, NY 14618	James Baase (585) 697-5103
AT&T Local Service	Private Fiber	33 Thompson Street, 9 th Floor New York, NY 10007	Joyce Newman (212) 513-2055
NYSDOT Hudson Valley, Inc.	Private Fiber	244 Westchester Avenue White Plains, NY 10604	John LiMazi (914) 949-6384
Hudson Valley Data Network	Private Fiber	263 Route 17K Suite 2003 Newburgh, NY 12550	Jack Weishaupt (845) 567-6367
Tarrytown Union Free School District	Private Fiber	200 North Broadway Sleepy Hollow, NY 10591	Andrew Labella (914) 332-8620
Elmsford Union Free School District	Private Fiber	98 South Goodwin Avenue Elmsford, NY 10523	Mark Barone (914) 592-8550

10.0 URBAN AREAS

As previously noted, construction in urban areas is extremely problematic due to the required concrete ductbank construction largely within the road right-of-way, conflicts with other utilities, and the requirement to maintain traffic flow. These urban areas require concrete encased ductline and manhole and vault installation. Pad-mount design and construction is precluded except where there may be existing installations. This work will be very capital intensive requiring a large manpower contingent coupled with many pieces of construction equipment (i.e., excavating equipment, cranes, concrete trucks, etc.). Significant disruption to traffic patterns and local business and residences are to be expected.

11.0 CONSTRUCTION ACCESS

Access to customer rights-of-way is expected to be very difficult necessitating the installation of facilities largely on the public right-of-way. Where required, however, easements will need to be obtained from customers for locations of equipment on private property. Negotiations of these easements will slow the engineering and construction of the system, thus delaying the conversion project.

Access to NYSDOT roadways is governed by Part 131. At locations of the Metro North Railroad crossings, jack and bore techniques would typically be employed to provide the required conduit and cable system. Horizontal directional drilling would also be reviewed for application on a case by case basis. ConEd would need to abide by all required municipality permitting and would need to provide proposed construction drawings to the appropriate authorities for required permitting in advance of all construction.

12.0 WORK PRACTICES

CHA reviewed ConEd's "General Instructions Governing Work on System Electrical Equipment" and "General Instructions Governing Work on Overhead and Underground Residential Distribution Equipment". Construction of the new proposed underground system would require some work practice modifications for ConEd. The use of subsurface transformers with loadbreak elbows and switch and fuse provisions and subsurface SF6 switches would necessitate new operating procedures and instructions. Extensive employee training would also be required. A transition would need to be made to splicer / mechanic type classifications in the Westchester County, Bronx, and Staten Island districts from a largely line person classification that constructs, operates, and maintains these systems presently. Over time these districts' crew makeup would need to be more like those that work on the Manhattan underground system.

13.0 MATERIAL AND EQUIPMENT ACQUISITION

Material and equipment specifications and acquisition are vital to the new underground system design. ConEd would need to ensure that appropriate quality measures are specified for the new cable, transformers, switchgear, etc. to ensure adequate reliability, serviceability, and life expectancy of the equipment. Given the large quantities of these types of equipment required, it would be necessary to qualify multiple manufacturers, and thus competition should be ensured. Manageable lead times for manufacture and delivery hopefully will be a byproduct of the process. Because of the large demand and scheduling issues inherent with a project of this magnitude, purchase costs are expected to increase significantly for these items over the period of installation.

14.0 DISPOSAL OF EQUIPMENT

Con Ed will need to comply with all regulations for the disposal of existing overhead oil-filled equipment. Given ConEd's prior change-out of these equipments to non-PCB classification, it is not anticipated that disposal will be overly burdensome. All transformers will be evaluated and many depending on age and physical condition could be potentially reused. Disposal of oil filled transformers will be in compliance with "Environmental Specification for the Disposal of Oil filled Pole Transformers from Service Centers ES-083", "Management of Drained or Oil Filled Non PCB and PCB- Contaminated Equipment Other than Transformers ES-022", and "Removal and Disposal of PCB and PCB – Contaminated Transformers Other than Pole Transformers ES-046".

Retirement of pole plant will need to conform to ConEd's policies and procedures for disposal of treated wood products (i.e. "Disposal of Non Hazardous Solid Waste ES-035A"). This would also include excavation materials from the new construction.

15.0 MANPOWER

Estimates for construction of one mile of underground conversion are estimated at approximately 30,000 manhours, or 15 full-time equivalents (FTE's) per year per mile of converted line. Based on a total mileage of approximately 4,000 miles for the Westchester County, Bronx, and Staten Island districts, a workforce of 6,000 FTE's would be required per year for 10 years to completely underground these areas. In addition to the field workforce, additional supervision and administrative support personnel will be required to direct this large workforce. The additional supervision and administrative support could be on the order of an additional 10% to 15% of the workforce (i.e., 600 to 900 FTE's).

This level of required manpower per year is additionally problematic given the current availability of skilled labor resources in the metro New York area and the Northeast in general. Highly trained and skilled electrical contractors are required to meet this manpower need. This demand on available construction resources could drive up prices considerably. This includes engineering personnel to design and coordinate the project and labor and equipment for construction, etc.

Additionally, upon completion of the installed system it is expected that a contingent of mechanics and splicers will be required to provide additional construction, operation, and maintenance for the new system on an on-going basis.

16.0 PROJECT COSTS

Extrapolating the data from the study feeders to all Westchester County, Bronx, and Staten Island feeders, the total estimated cost of the electric underground conversion is \$25.8B.

Several previous studies have been completed by other New York State utilities to evaluate the potential costs associated with converting overhead distribution systems to underground distribution systems. Based on a report produced by Navigant Consulting in March 2005, entitled "A Review of Electric Utility Undergrounding Policies and Practices", the following observations were reported:

- Almost all jurisdictions investigating undergrounding existing overhead systems have concluded that the cost to underground all existing overhead distribution facilities is prohibitive. Cost estimates for underground construction are estimated at ten times the cost of overhead construction varying from \$0.5M to several million dollars per mile.
- A preliminary study performed for the Long Island Power Authority (LIPA) by KeySpan Energy (Keyspan) estimates the cost to underground the Long Island distribution system, primary main, primary branch and secondary lines at \$24.8B. These estimated costs exclude the cost to convert services and third party attachments and are based on an estimated average per mile cost of \$5.4M for a typical mile of primary main and \$1.7M per mile for a typical primary branch line. This cost per mile is greater than the industry average due to a decision to employ a looped, rather than radial, distribution system design. The looped system is standard for the LIPA system and avoids some of exceptionally long restoration times for faults occurring on the underground system.
- There are substantial additional costs to convert homes and businesses to underground service.
- The primary driver for undergrounding existing overhead power lines continues to be aesthetic considerations, not reliability or economic benefits.
- The New York State Public Service Commission (PSC) has detailed undergrounding regulations that mainly apply to new construction in residential subdivisions.
- While underground systems are more reliable than overhead systems under normal weather conditions they are not impervious to damage. In general, it is believed that underground

systems suffer only about half the number of outages as an overhead system. The repair time, however, for underground systems can be from 60% longer to three to four times longer than for overhead systems when damage does occur.

- Underground lines have proven to have a shorter useful life than overhead lines and they are more susceptible to corrosion than overhead lines and can be damaged by flooding, tree root infiltration, rodents, and other companies excavating and tearing up the lines.
- Underground lines connecting to overhead lines are still vulnerable to lightning strikes. Unless the entire line is underground, the overhead portions are still susceptible to the weather conditions previously discussed that affect the overhead lines.
- Burying existing overhead power lines does not completely protect consumers from storm-related power outages. During storms, conditions such as flooding, falling objects onto surface-mounted equipment, and over-voltages caused by lightning can cause the loss of power on underground systems. This is not to mention the potential impact from long-term system outages associated with major storms that allow moisture to seep into the system which can ultimately cause cable failures upon system re-energization.

As outlined above, the perceived advantages of placing an existing overhead system underground are believed to be primarily reducing the frequency of customer outages, but those outages when they do occur tend to be for a longer duration than the overhead system outages. Based on our study of the sample feeders in Westchester County, Bronx, and Staten Island, the projected cost for converting the existing overhead system to an underground system are on average \$6.34M per mile for Westchester County and Bronx, and \$5.96M per mile for Staten Island. Attachments R and S provide feeder estimates for the following Westchester County and Staten Island feeders respectively:

- Westchester County: 13U1, 17W31, 17W33, 17W42, 17W42 Express, Bowman Loop and 36U4
- Staten Island: 272, 33R08, 5R10, and 5R29

The development of the conversion costs for each of these feeders was based upon the Unit Rates table provided in Attachment T to ascertain the average costs per mile for each feeder type that is also included in this attachment.

These per mile costs translate to a total electric cost of \$20.6B for Westchester County / Bronx, and \$5.2B for Staten Island to convert all overhead feeders to underground feeder systems. Attachment U is a summary by municipality and by feeder for all conversion feeders in Westchester County and the Bronx. Attachment V is a summary by substation and by feeder for all conversion feeders in Staten Island.

An alternate method to review these costs is to consider the breakdown of these costs on a per item or per material type basis. The EEI report compared the costs based on seven (7) different criteria, but the following table represents a consolidation of these criteria as follows:

Table 7
Cost Component Relative Percentages

Cost Component	EEI Study (%)	Westchester County / Bronx (%)	Staten Island (%)
Excavation, Installation & Material	51	70	66
Service Connections	14	9	13
Reinstatement	12	6	6
Transformers	12	11	10
Street Lights	7	3	4
Dismantling	4	1	1

Another method to compare the data and cost estimates that we have developed to date is to consider the cost per mile for converting the overhead systems to underground systems. This cost per mile data appears to be becoming an industry standard comparison that most utilities are developing as the basis of the request for undergrounding evaluations. The following table outlines these costs.

Table 8
Reported Underground Conversion Costs by Utility

Utility Company	Year Reported	Reported Average (\$/Mile)	2007 Average (\$/Mile)¹
Allegheny Power	2000	\$765,000	\$1,010,000
Baltimore Gas & Electric	2000	\$952,000	\$1,250,000
PEPCO	2000	\$1,800,000	\$2,370,000
Conectiv	2000	\$728,000	\$960,000
Virginia Power	2000	\$950,000	\$1,250,000
California	2001	\$500,000	\$630,000
FPL	2001	\$840,000	\$1,060,000
Georgia Power	2001	\$950,000	\$1,200,000
Puget Sound Energy	2001	\$1,100,000	\$1,390,000

Note: ¹ Cost escalation assumes a 4.0% escalation factor per year.

While the above costs represent those associated with converting the electric system only, the same estimating procedures were applied to the remaining overhead facilities on the existing pole line structures. The true improvement to the aesthetic and visual impacts of the existing pole line structures can only be fully realized when the entire overhead utility system is placed underground. With the vast number of cable television (CATV) and private fiber companies that currently occupy the existing pole lines, the additional costs to underground these networks and be able to remove the existing pole lines from the streets would range from \$19.3B for Westchester County / Bronx, and \$2.9B for Staten Island.

Additionally, sources indicate that O&M costs for a manhole and duct system can be 4 times the costs of maintaining an overhead system (North Carolina Natural Disaster Preparedness Task Force Report). These costs are largely related to cable failure response, repair and installation. Failures of switchgear and transformer equipment and their subsequent replacement would also be more costly than failure repair on an overhead system. The new system would require the incremental expense associated with stray voltage monitoring.

17.0 CUSTOMER COSTS / IMPACTS

The ConEd "Requirements for Electric Service Installations" specification booklet requires that the customer is responsible for service conduit and cable costs on private property. For the purposes of this conversion estimate, the total cost of the overhead to underground conversion has been included in our estimates. Based on ConEd's specifications, however, these costs on private property are a customer responsibility and this cost would thus need to be negotiated between ConEd, the municipality requesting the underground conversion, and the private property owners. The impact to customers would not only be to existing customers, but would also impact new customer business. Since the new customers would be served from an underground system instead of overhead, the cost and time associated with getting new customers connected to the system could change dramatically.

In these cases, contractors will need to be retained to install the service conduits in private property and ConEd's contractors would then install the new service cables from ConEd's facilities in the street to the customer's service equipment. Costs for these service cable installations have been approximated at \$7,500 for residential services and \$20,000 for large commercial services. However, individual service costs would vary depending upon size, distances, topography, etc. Directional boring techniques may have to be utilized for service installations in several locations which could greatly increase the costs of these service installations.

Additionally, it should be noted that in some residential areas customers may be required to convert from 120/240 volt service to 120/208 single phase service which would likely require appliance changeouts. It should be further noted that because of the utilization of large three phase underground transformers, service entrance switchgear changeouts may also be required to meet increased interrupting ratings. Customer costs are very difficult to quantify for these necessary conversions but will add significant costs to the project. These costs are shown within the total conversion costs of the project.

Customer cost impacts are not the only issue that customers will face as a result of the conversion process. Although costs may be of the utmost concern to the customers, they will also be impacted

by customer outages. The outages will likely be on the order of hours versus days, but there will likely be multiple outages for each customer throughout the overall construction process.

18.0 CUSTOMER RATE INCREASES

The greatest obstacle to converting the existing Westchester County, Bronx and Staten Island overhead electric distribution systems to underground systems is cost. CHA has estimated that the total capital cost, in 2007 dollars, of converting approximately 4,000 miles of existing distribution to underground is \$25.8 billion dollars. By comparison, ConEd's existing transmission and distribution (T&D) rate base, as reflected in its pending rate case, is \$12.7 billion. Therefore, a complete underground conversion would triple the Company's rate base and create the need for massive rate increases.

The ultimate impact on the Company's annual distribution revenue requirement of just the additional capital investment is estimated to be \$4.43 billion dollars, or 148% higher than the \$2.99 billion annual T&D revenues at currently effective rates. In addition to capital costs, there would be some effect on rates of increase in other costs such as operations & maintenance and property taxes. However, in relative terms those costs are not significant when compared with the effect of the capital costs. Therefore, this section focuses on the effect on rates resulting from the capital investment required for the contemplated conversion.

CHA estimates that converting the approximate 4,000 miles of existing distribution facilities to underground in Westchester County, the Bronx, and Staten Island will cost approximately \$25.8 billion based on 2007 dollars. Such an investment in plant would substantially increase the Company's rate base and correspondingly the revenue requirements for rate of return and depreciation. Although the conversion to underground could affect O&M expense, it would be insignificant in comparison with the rate base effect. Therefore, the rate impact analysis focuses on the capital cost and the impact it will have on rate base.

The calculation of the rate base impact and the corresponding increases in revenue requirements are shown in Attachment W. If ConEd decides to go forward with the conversion, it would require multiple years to complete. As shown on line 2, for this analysis the \$25.8 billion expenditure has been spread equally over ten years and has been adjusted for inflation at a rate of 5% per year. Therefore, the total capital expenditure over the 10 year period would be \$33.7 billion in nominal

dollars. The \$200 million book value of the existing overhead system is subtracted to reflect its retirement. The annual additions to plant in service are shown on line 4. The Cumulative additions to rate base are shown on lines 7 through 9. Annual depreciation expense calculated at 3% per year is accumulated on line 10 and subtracted from the net additions to produce the cumulative changes in net utility plant and rate base on a year by year basis. As shown, the conversion would add \$31.8 billion to net utility plant by the 10th year. By comparison, ConEd's 2008 projected T&D rate base as filed in Case No. 07-E-0523 is \$12.7 billion.

The annual revenue requirement associated with the capital investment is the sum of the rate of return requirement and depreciation expense. A pre-tax rate of return of 10.91% (7.82% after tax return as proposed in Case No. 7-E-0523 grossed up for income taxes) is used for the return requirement. Depreciation expense is based on a 3% depreciation rate.

For comparison purposes, the additional revenues to support the underground conversion are measured against the Company's T&D revenues from all retail classes based on the T&D rates in effect as of April 1, 2007. The following table shows the annual additions to the revenue requirement and both the year over year and cumulative percentage increases in T&D revenues:

Table 9
Additional Revenue Requirements (\$ x 1,000)

Year	Year by Year Additional Revenue (\$)	Cumulative Additional Revenue (\$)	Total Company T&D Revenues (\$)	Year Over Year Percent	Cumulative % vs. Present
Present			\$2,994,744		
1	\$346,121	\$346,121	\$3,340,865	11.56	11.56
2	\$373,778	\$719,899	\$3,714,643	11.19	24.04
3	\$388,243	\$1,108,142	\$4,102,886	10.45	37.00
4	\$407,788	\$1,515,930	\$4,510,674	9.94	50.62
5	\$428,310	\$1,944,240	\$4,938,984	9.50	64.92
6	\$449,858	\$2,394,098	\$5,388,842	9.11	79.94
7	\$472,483	\$2,866,581	\$5,861,325	8.77	95.72
8	\$496,240	\$3,362,821	\$6,357,565	8.47	112.29
9	\$521,185	\$3,884,006	\$6,878,750	8.20	129.69
10	\$547,376	\$4,431,383	\$7,426,127	7.96	147.97

Assuming the increases would be applied equally across all customer classes, the average monthly residential T&D bill would increase from \$36.74 to \$91.10.

Since the revenue and rate impacts are primarily driven by the capital costs, the extent to which funding is provided by local, state or federal governments would directly affect the rate increases. For example, if 50% of the capital was contributed, the cumulative increase would be 73.99%.

Background Information:

The Company serves slightly more than 3 million retail customers in the Bronx, Brooklyn, Manhattan, Queens, Staten Island, and Westchester County. A breakdown of customers, MWH sales and revenues at April 1, 2007 prevailing rates is as follows.

Table 10
ConEd Summary Background Data (\$ x 1,000)

Class	2005 Customers (3)	2005 Adjusted Sales kWhs (1)	2005 Projected Total Revenue @ 4/1/2007 Rate Level (3)	2005 Projected T&D Revenue @ 4/1/2007 Rate Level (2)
SC1	2,587,522	14,058,112,347	\$3,098,296,371	\$1,140,920,658
SC2	319,649	2,189,472,540	\$496,934,370	\$191,655,893
SC4 Rate I	1,677	1,636,828,062	\$317,049,845	\$90,446,544
SC4 Rate II	353	4,969,037,039	\$891,647,983	\$205,839,432
SC4 Rate III	9	18,814,506	\$3,359,179	\$762,973
SC5 Rate I	11	819,155	\$143,620	\$30,663
SC5 Rate II	5	128,124,000	\$21,471,977	\$3,781,550
SC6	3,292	10,735,692	\$2,696,311	\$1,191,707
SC7	16,262	209,843,934	\$41,172,448	\$12,105,896
SC8 Rate I	1,767	1,845,466,781	\$335,991,948	\$81,143,309
SC8 Rate II	17	180,169,700	\$31,560,280	\$6,716,800
SC8 Rate III	9	11,901,626	\$2,102,963	\$461,315
SC9 Rate I	114,746	15,617,565,622	\$2,928,960,107	\$769,716,037
SC9 Rate II	328	4,141,743,942	\$722,985,724	\$151,958,449
SC9 Rate III	714	482,347,912	\$83,262,969	\$16,788,920
SC12 Rate I	447	208,491,484	\$35,175,538	\$6,466,823
SC12 Rate II	28	277,547,600	\$47,520,203	\$9,334,398
SC12 Rate III	--	--	--	--
SC13	1	28,592,359	\$4,522,025	\$593,916
Full Service & Retail Access	3,046,836	46,015,614,301	\$9,064,853,861	\$2,689,915,283
CONED		46,015,614,301		\$2,689,915,283
NYPA & EDDS		11,125,696,784		\$304,829,196
Total		57,141,311,085		\$2,994,744,479

A substantial portion of the distribution system serving these customers is underground. All of the distribution system in Manhattan is underground and a portion of the Brooklyn and Queens distribution is underground. However, relatively most of Staten Island and Westchester County are served from overhead facilities where the Company serves approximately 515,000 customers. A break down of the miles of line by area is as follows:

Table 11
ConEd Miles of Wire by Area

Area	Underground Cable (Miles)	Overhead Cable (Miles)
Bronx	10,570	2,667
Brooklyn	26,578	3,538
Manhattan	20,408	0
Queens	24,292	6,968
Staten Island	2,754	7,140
Westchester	6,570	15,195
Total:	91,172	35,508

By any measure, the conversion of overhead distribution to underground is cost prohibitive. Spread over the entire system, the \$25.8 billion is \$8,468 per customer. By comparison, the Company's projected 2008 T&D rate base as filed in Case No. 07-E-0523 is \$4,238 per customer. The \$25.8 billion is \$50,097 per customer when averaged over the 515,000 customers of Staten Island and Westchester County / Bronx. The installed cost of the plant alone would require \$4.4 billion dollars in additional annual T&D revenues by the 10th year of a ten year conversion plan.

19.0 IMPLEMENTATION SCHEDULE

A detailed implementation schedule would need to be determined for this large project. It is recommended that those feeders exhibiting the poorer reliability statistics and /or feeders with aged infrastructure be the first candidates for conversion. Based on our manpower estimates, a timetable of 10 years or more would be required for completion of the entire conversion project. Difficulties would be initially encountered in obtaining the necessary skilled contractor labor to complete the required work on an annual basis.

REFERENCES

1. Edison Electric Institute (Brad Johnson). January 2004. "Out of Sight, Out of Mind?: A study on the costs and benefits of undergrounding overhead power lines".
2. Edison Electric Institute (Brad Johnson). February 2005. "After the Disaster: Utility Restoration Cost Recovery".
3. Navigant Consulting Prepared for Long Island Power Authority (LIPA). March 2005. "A Review of Electric Utility Undergrounding Policies and Practices".
4. Infrasource Technology Prepared for Florida Electric Utilities. February 2007. "Undergrounding Assessment Phase I Final Report: Literature Review and Analysis of Electric Distribution Overhead to Underground Conversion".
5. North Carolina Public Service Commission. November 2003. "Report of the Public Staff To The North Carolina Natural Disaster Preparedness Task Force: The Feasibility of Placing Electric Distribution Facilities Underground".

March 27, 2013

VIA ELECTRONIC MAIL

Hon. Paul Agresta
Administrative Law Judge
New York State Department
of Public Service
Three Empire State Plaza
Albany, NY 12223

Hon. Julia Bielawski
Administrative Law Judge
New York State Department
of Public Service
Three Empire State Plaza
Albany, NY 12223

**RE: Cases 13-E-0030, 13-G-0031, 13-S-0032
In the Matter of Consolidated Edison
Company of New York, Inc – Electric,
Gas and Steam Rates
Request for Confidential Status (DPS-17 E0208, Part 4)**

Dear Judge Agresta and Judge Bielawski:

Pursuant to the Ruling Establishing Revised Discovery Procedures and Adopting Protective Order (the “Ruling” or “Protective Order”) issued by you on March 22, 2013, Consolidated Edison Company of New York, Inc. (“Con Edison” or the “Company”) hereby requests confidential status for certain information and/or documents (herein referred to as “records”) provided by the Company in response to a discovery request issued by Staff of the Department of Public Service (“Staff”) in the above-referenced proceedings. As Con Edison demonstrates below, these records contain confidential commercial information that is entitled

to protection from disclosure pursuant to the Public Service Commission's (the "PSC") rules and regulations.¹

Information request ("IR") DPS-17 E0208, Part 4, requests copies of contracts that the Con Edison has entered into with vendors to conduct periodic inspections and stray voltage testing of the Company's overhead and underground facilities in compliance with the Commission's Electric Safety Standards issued in Case 04-M-0159, *Proceeding on Motion of the Commission to Examine the Safety of Electric Transmission and Distribution Systems*.

Confidential Commercial (Market Sensitive) Information²

The Freedom of Information Law ("FOIL") permits the exemption from public disclosure of records that contain confidential commercial information.³ Pursuant to Commission regulations, to be exempted from disclosure as confidential commercial information, there must be a demonstration that disclosure of the information would cause substantial injury to the competitive position of the subject commercial enterprise.⁴ The non-exclusive factors to be considered in determining whether substantial injury would result from disclosure include:

- (i) the extent to which the disclosure would cause unfair economic or competitive damage;
- (ii) the extent to which the information is known by others and can involve similar activities;
- (iii) the worth or value of the information to the person and the person's competitors;
- (iv) the degree of difficulty and cost of developing the information;
- (v) the ease or difficulty associated with obtaining or duplicating the

¹ 16 NYCRR §§ 6-1.3 & 6-1.4.

² The Ruling (at 3) identifies several categories of information warranting confidential treatment. The term "market sensitive information" is used in place of the term "confidential commercial information" provided in the DPS regulations. For purposes of this request, the Company will refer to "confidential commercial information."

³ Public Officers Law §§ 87 (2) (d) & 89 (5) (a).

⁴ 16 NYCRR § 6-1.3(b)(2).

information by others without the person's consent; and
(vi) other statute(s) or regulations specifically excepting the
information from disclosure.⁵

Applying these criteria, the contracts that the Company is seeking to protect from disclosure warrant confidential status as they contain confidential commercial information that, if disclosed, would cause substantial injury to the competitive position of the Company.

As described above, the records requested by Staff are contracts that Con Edison has entered into with vendors to conduct testing and inspection of the Company's overhead and underground facilities. Con Edison enters into these contracts pursuant to a "sealed bid," process, and the terms of these contracts are not generally known by others and would not, in the absence of disclosure, be generally known to others. Such information regarding the Company's contracting practices has long been considered the type of information whose disclosure would cause substantial injury to the Company's competitive position and, therefore, should be entitled to protection.

Disclosure of the prices that the Company has paid winning bidders for these services could distort the competitive process. These records would be extremely valuable to competing bidders by providing insight into the Company's purchasing practices and allowing bidders to tailor their bids to "just beat" the competition on similar future procurements, thereby depriving the Company of its ability to obtain the most advantageous prices and terms available in the market for the benefit of its customers.

⁵*Id.* The New York State Court of Appeals has recognized that where disclosure under FOIL is the sole means by which parties, including potential competitors, can obtain the requested records, protection from disclosure is warranted. *Encore Coll. Bookstores, Inc. v. Auxiliary Serv. Corp. of State Univ. of N.Y. at Farmingdale*, 87 N.Y.2d 410, 639 N.Y.S.2d 990 (1995). Where the information is available from other sources but at "considerable costs of private reproduction," competitors could receive a "potential windfall" under FOIL, to the competitive disadvantage of the submitting entity. *Id.* at 995.

Such disclosure would cause substantial injury to the Company's competitive position and, therefore, these contracts should be afforded confidential status in accordance with the Commission's rules and regulations.

Conclusion

The records requested in DPS-17 E0208, Part 4, contain confidential commercial information and should be protected from public disclosure, as well as from disclosure to all parties to this case except for Staff, the Utility Intervention Unit, the Attorney General and parties who have executed a Protective Agreement, as specified in the March 22, 2013 Ruling. For these reasons, the Company respectfully requests that these records be granted confidential status and be afforded adequate protection from disclosure.

Sincerely,

/s/ Lisa Mann

c: All Active Parties (without attachments)

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Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/27/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0209

Subject: Structure (Inspections & Repairs) Programs - Pages 12 and 13 of ‘DPS1 E-060 Electric Ops Program Changes’ - Regarding pages 12 and 13 of ‘DPS1 E-060 Electric Ops Program Changes’: 1. For the Manual and Mobile Stray Voltage program, provide the number of contact voltage detected in 2010, 2011, and 2012. 2. For the Mobile Stray Voltage program, provide the mileage and routine surveys completed in 2010. 3. Why were targeted inspections not done during the first two years (2010 and 2011) of the current inspection cycle?

Response:

1. See following chart:

Method of Detection	2010	2011	2012
Manual Testing + Other	447	379	390
Mobile Testing	9106	8181	6481

2. In 2010, the Mobile Stray Voltage Program completed 13 scans or 70,594 miles.
3. In order to cost effectively meet the requirement that all underground distribution facilities be inspected during a five-year inspection cycle, Company field forces conduct a facility inspection at every underground distribution structure (manholes, service boxes, and transformer vaults) whenever the Company is performing routine work (an “*ad hoc* inspection”). During the third, fourth and fifth years of the inspection cycle , the Company schedules “targeted” inspections conducted largely by contractor resources for structures that have not yet had an *ad hoc* inspection. This approach better controls program costs by leveraging no-cost, ad hoc inspections generated through association with other required work as a significant percentage of the total 280,000 inspections.

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.1

Subject: Structure (Inspections & Repairs) Programs - Page 26 of 'DPS1 E-060 Electric Ops Program Changes' - Explain the reasoning behind the -\$188,000 actual spending shown for 2012 for the Overhead 5 yr Inspection program.

Response:

The table supplied on page 26 of "DPS E-060 Electric Ops Program Changes" tracks completed program cost, but only tracks units performed by company forces. It does not reflect units completed by contractor forces. For 2012, due to the change in the Company's accounting system (Project One), the table reflects a \$188,000 reversal in error between the two systems.

The cost for both the Manual Stray Voltage Testing and Overhead 5 yr Inspection Programs are charged to a single account. Units and costs are listed below:

Overhead	2012
Units Tested	279,782
Units Inspected	80,610
Total Cost (000's)	\$1,509

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.2

Subject: Structure (Inspections & Repairs) Programs - Page 26 of 'DPS1 E-060 Electric Ops Program Changes' - There are no units listed to be completed in each of the forecasted year for the Overhead 5 yr Inspection program. Provide a breakdown of how the budget for this program was calculated, including number of circuits or structures to be completed each of the forecasted years.

Response:

The table supplied on page 26 of "DPS E-060 Electric Ops Program Changes" tracks completed program cost, but only tracks units performed by company forces. It does not reflect units completed by contractor forces.

A visual inspection is conducted on all Con Edison owned or joint use wooden poles, approximately 282,000, in the five boroughs of New York City (less Manhattan) and Westchester once every five years.

Items identified for the inspections are: Pole Condition, Oil Leak, Primary Hardware or Riser Damage, Secondary Hardware or Riser Damage, Insulator Damage, Tie Wire Damage, Ground Rod or Wire Damage, Guy Wire Damage, Wire Down, Surge Arrestor Damage, Insufficient Wire Clearance.

Upon discovery of certain higher priority inspection defects (i.e., Oil Leaks, Con Edison Wire Down and Pole damaged), contractors are required to make immediately notification to Con Edison – the Call Center. The area must then be safeguarded until relieved by Con Edison personnel. Other inspection findings are to be recorded and submitted to Con Edison on a regular delivery. Contractors are required to meet all the quality control requirements for the program.

We plan to inspect 20% of the system per year in order to inspect all of our overhead facilities once every five years. The unit cost of inspection per pole is estimated to be Ten dollars; this cost includes inspections and support. Repairs are funded by the 5 Year Overhead Repair Program.

	Unit Cost Per Pole (2011)
Contractor Inspections	\$4.79
Support	\$5.09
Total	\$9.88

Units per Year (approx): 60,000

	2013 Request	2014 Request	2015 Request	2016 Request	2017 Request	5 yr (13-17)
Funding (\$000s)	617	616	617	616	617	3,083

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.3

Subject: Structure (Inspections & Repairs) Programs - Page 26 of 'DPS1 E-060 Electric Ops Program Changes' - Provide the number of ad hoc and targeted overhead inspections completed in 2010, 2011, and 2012.

Response:

The table supplied on page 26 of "DPS E-060 Electric Ops Program Changes" tracks completed program cost, but only tracks units performed by company forces. It does not reflect units completed by contractor forces.

All 5 year safety inspections performed on the overhead system are performed via contractor and are targeted (ad-hoc inspections by Company forces are not performed).

	2010	2011	2012
Target via Contractor	85,124	86,548	80,610
Ad-Hoc	0	0	0
Total	85,124	86,548	80,610

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.4

Subject: Structure (Inspections & Repairs) Programs - Page 26 of 'DPS1 E-060 Electric Ops Program Changes' - Provide the number of ad hoc and targeted underground inspections completed in 2010, 2011, and 2012.

Response:

2010 and 2011 are all Ad-Hoc.

2012 Targeted = 32,843; 2012 Ad-Hoc = 15,877.

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.5

Subject: Structure (Inspections & Repairs) Programs - Page 26 of 'DPS1 E-060 Electric Ops Program Changes' - Provide a breakdown of the cost and an explanation of how the budget for the overhead and underground inspection program is determined by the required number and hours of manpower, work responsibilities, and equipment/resources needed.

Response:

The table supplied on page 26 of "DPS E-060 Electric Ops Program Changes" tracks completed program cost, but only tracks units performed by company forces. It does not reflect units completed by contractor forces.

All contractor work is based off unit cost negotiated and listed in the contracts supplied in response to question DPS 17 208. We forecast to complete approximately 56,000 units per year within a current cycle, with 55% of those units being completed by contractor forces.

Distribution Engineering lays out a 5 year plan for the underground inspection cycle which gets revised every year based on the number of inspections completed in the previous year. Targeted inspections increase further into the cycle as the number of unique ad-hoc inspections decrease. As part of the overall budget plan, company resources are identified as part of overall capability to conduct a number of targeted inspections from Distribution Engineering's plan. Contractors are used to in conjunction with company resources to meet the overall yearly goal.

A contractor is used for the overhead inspection program.

Level 1 repairs are derived from a one to one ratio for the number of inspections completed. The budget reflects the number of level 2 repairs that will be due for completion. As part of the overall budget plan, company resources are identified as part of overall capability to perform the

level 1 repairs and the level 2 repairs that are due. Contractors are used to perform level 3 repairs.

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.6

Subject: Structure (Inspections & Repairs) Programs - Page 26 of 'DPS1 E-060 Electric Ops Program Changes' - Provide the number of Level I, II, III, and IV repair work received and the number completed in 2010, 2011, and 2012 under the overhead and underground repair program.

Response:

Year	Priority Level	Deficiencies Found (Total)	*Repaired in the specified year
2010	I	20,364	20,390
	II	10,328	6,799
	III	17,136	4,273
	IV	61,026	6,324
2011	I	15,619	15,608
	II	7,610	8,927
	III	10,685	3,465
	IV	40,560	6,548
2012	I	39,477	39,468
	II	6,676	5,361
	III	12,762	6,045
	IV	53,405	5,146

*Some of the repairs made in the specified year may have been found in past years.

Year	Priority Level / Repair Expected	Deficiencies Found (UG)	*Repaired in the specified year
2010	I	20,301	20,332
	II	8,200	6,168
	III	5,177	3,061
	IV	61,026	6,269
2011	I	15,594	15,580
	II	6,704	7,482
	III	3,281	2,405
	IV	40,560	6,424
2012	I	39,450	39,439
	II	6,131	4,895
	III	4,030	3,788
	IV	53,405	5,085

Year	Priority Level / Repair Expected	Deficiencies Found (OH)	*Repaired in the specified year
2010	I	63	58
	II	2,128	631
	III	11,959	1,212
	IV	61,026	55
2011	I	25	28
	II	906	1,445

	III	7,404	1,060
	IV	40,560	124
2012			
	I	27	29
	II	545	466
	III	8,732	2,257
	IV	53,405	61

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.7

Subject: Structure (Inspections & Repairs) Programs - Page 26 of 'DPS1 E-060 Electric Ops Program Changes' - For the forecasted years, provide a breakdown of the number of projected Level I, II, III, and IV repair work to be completed under the overhead and underground repair program and provide an explanation of how these numbers were derived.

Response:

To forecast for 2013 and 2014, we used 2012 as our base year seeing that 2012 is the first year for the cycle that we have both Ad-hoc and Targeted inspections being completed. We found the percentages of defects found per unique inspection and the percentage of defects repaired per unique inspection. To project the number of defects that will be found and the number of defects that will be completed, we then used the number of unique inspections needed to complete the cycle times the percentages calculated.

2013/2014	Priority Level	Defects found / Unique inspections	Defects repaired / Unique inspections
	I	81%	81%
	II	13%	10%
	III	8%	8%
	IV	110%	10%

2012/2014	Priority Level	Defects found / Unique inspections	Defects repaired / Unique inspections
	I	64109	64091
	II	9963	7955
	III	6549	6156

	IV	86786	8263

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.8

Subject: Structure (Inspections & Repairs) Programs - Page 26 of 'DPS1 E-060 Electric Ops Program Changes' - Provide the number of Level I, II, III, and IV repair work received and the number completed in 2010, 2011, and 2012 under the Sarnoff underground and streetlight repair program.

Response:

For the number of inspection Level I, II, III, and IV defects received and repaired please see below:

Year	Priority Level	Deficiencies Found (Total)	*Repaired in the specified year
2010	I	20,364	20,390
	II	10,328	6,799
	III	17,136	4,273
	IV	61,026	6,324
2011	I	15,619	15,608
	II	7,610	8,927
	III	10,685	3,465
	IV	40,560	6,548
2012	I	39,477	39,468
	II	6,676	5,361
	III	12,762	6,045

	IV	53,405	5,146

Year	Priority Level / Repair Expected	Deficiencies Found (UG)	*Repaired in the specified year
2010	I	20,301	20,332
	II	8,200	6,168
	III	5,177	3,061
	IV	61,026	6,269
2011	I	15,594	15,580
	II	6,704	7,482
	III	3,281	2,405
	IV	40,560	6,424
2012	I	39,450	39,439
	II	6,131	4,895
	III	4,030	3,788
	IV	53,405	5,085

Year	Priority Level / Repair Expected	Deficiencies Found (OH)	*Repaired in the specified year
2010	I	63	58
	II	2,128	631
	III	11,959	1,212
	IV	61,026	55
2011	I	25	28

	II	906	1,445
	III	7,404	1,060
	IV	40,560	124
2012			
	I	27	29
	II	545	466
	III	8,732	2,257
	IV	53,405	61

The Sarnoff (Mobile Testing Program) and Streetlight program are not measured in Level I, II, III, and IV type defects. Energized Equipment numbers are given in below:

Method of Detection	2010	2011	2012
Mobile Testing	9106	8181	6481

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.9

For the forecasted years, provide a breakdown of the number of projected Level I, II, III, and IV repair work to be completed under the Sarnoff underground and streetlight repair program and provide an explanation of how these numbers were derived.

Response:

For the number of inspection Level I, II, III, and IV defects received and repaired please see below:

Year	Priority Level	Deficiencies Found (Total)	*Repaired in the specified year
2010	I	20,364	20,390
	II	10,328	6,799
	III	17,136	4,273
	IV	61,026	6,324
2011	I	15,619	15,608
	II	7,610	8,927
	III	10,685	3,465
	IV	40,560	6,548
2012	I	39,477	39,468
	II	6,676	5,361

	III	12,762	6,045
	IV	53,405	5,146

Year	Priority Level / Repair Expected	Deficiencies Found (UG)	*Repaired in the specified year
2010	I	20,301	20,332
	II	8,200	6,168
	III	5,177	3,061
	IV	61,026	6,269
2011	I	15,594	15,580
	II	6,704	7,482
	III	3,281	2,405
	IV	40,560	6,424
2012	I	39,450	39,439
	II	6,131	4,895
	III	4,030	3,788
	IV	53,405	5,085

Year	Priority Level / Repair Expected	Deficiencies Found (OH)	*Repaired in the specified year
2010	I	63	58
	II	2,128	631
	III	11,959	1,212
	IV	61,026	55
2011			

	I	25	28
	II	906	1,445
	III	7,404	1,060
	IV	40,560	124
2012			
	I	27	29
	II	545	466
	III	8,732	2,257
	IV	53,405	61

The Sarnoff (Mobile Testing Program) and Streetlight program are not measured in Level I, II, III, and IV type defects. Energized Equipment numbers are given in below:

Method of Detection	2010	2011	2012
Mobile Testing	9106	8181	6481

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.10

Provide a breakdown of the cost and an explanation of how the cost for Level I, II, III, and IV repair work was derived for each of the forecasted years, including average cost to fix the various types of repairs.

Response:

We do not segregate repair types into separate accounts. The average cost per repair was \$294, \$303, and \$355 in 2010, 2011, and 2012 respectively. See table below.

Year	Priority Level	Deficiencies Found (Total)	*Repaired in the specified year	Cost Per Repair (\$000's)
2010	I	20,364	20,390	5,995
	II	10,328	6,799	1,999
	III	17,136	4,273	1,256
	IV	61,026	6,324	1,859
2011	I	15,619	15,608	4,729
	II	7,610	8,927	2,705
	III	10,685	3,465	1,050
	IV	40,560	6,548	1,984
2012	I	39,477	39,468	14,011

	II	6,676	5,361	1,903
	III	12,762	6,045	2,146
	IV	53,405	5,146	1,827

Based on historic average costs and repair types, the forecasted average costs are \$375, \$377, \$330, \$331, and \$309; 2013-2017 respectively.

Repair Due Date	2013	2014	2015	2016	2017
Level I	20,000	20,000	20,000	20,000	20,000
Level II	6,000	6,000	6,000	7,551	6,000
Level III	13,974	3,131	7,466	7,466	7,466

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/25/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.11

Explain the reasoning behind the difference in the number of inspections that is shown to be completed in 2010 and 2011 on page 13 and what is listed on page 26 of 'DPS1 E-060 Electric Ops Program Changes'.

Response:

In the first two years of the five year UG inspection program, the company takes advantage of opportunities to perform inspections during routine scheduled work. The inspections shown on page 13 are "ad-hoc" inspections, which are inspections performed associated with normal scheduled work. The inspections listed on page 26 of 'DPS1 E-060 Electric Ops Program Changes' are targeted inspections in which crews are sent to structures specifically to perform such inspections. The combination of 'ad-hoc' and targeted inspections amount to the total number of inspections.

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.12

There are no units listed to be completed each year for the Manual and Mobile Stray Voltage program. Provide a breakdown of the cost, the number of mileage and routine surveys included for the Mobile Stray Voltage program, and an explanation of how the budget for both programs were determined for each of the forecasted years.

Response:

The table supplied on page 26 of “DPS E-060 Electric Ops Program Changes” tracks completed program cost, but only tracks units performed by company forces. It does not reflect units completed by contractor forces

Manual Stray Voltage Program

The Program consists of the annual testing of approximately 561,000 utility owned electric facilities and municipality owned street and traffic lights. The program is performed by contractors, while oversight and program management is performed by company forces. Work is completed by 12/31 of each year. Pricing for each contract (underground, overhead and streetlights) is unit based.

Mobile Stray Voltage Program

The Program consists of twelve complete mobile scans of the underground distribution system of New York City each rate year beginning April 1st and ending March 31st at a rate of approximately 1 scan per month. In addition, cities with a population of 50,000 or greater in Westchester County will be scanned once, annually. A routine survey consists of approximately 5,000 miles. Contact voltages found are safe-guarded until repair crews mitigate the contact voltage conditions. The program is performed by contractors, while over sight and program management is performed by company forces. Pricing for the mobile scans are unit based (price per scan).

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.13

What was done with the budgeted funding not used under this program for 2010 and 2011? If funding was allocated to another program/project, provide the name of the other program/project, the amount that was shifted to the other program/project each year, and the reason why it was deemed necessary to shift funding from each of the programs under Structure (Inspections & Repairs) to the other program/project.

Response:

In 2010 and 2011, capability was shifted to Emergency Response to respond to underground weather related incidents. In 2010, underground Emergency Response required expenditures of \$13.3 million in addition to the budgeted amount. In 2011, underground Emergency Response required expenditures of \$14.3 million in addition to the budgeted amount.

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-17
Date of Response: 03/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0210.14

If applicable, what is the reason for cost increase or decrease per inspection and repair for the forecasted years when compared to inspections and repairs done during the first five-year inspection cycle that ended in 2009?

Response:

The first cycle covers years 2005 – 2009. Only years 2008 and 2009, the last two years of the cycle are shown. During the last two years of the cycle, a larger portion of the inspections are targeted inspections that are conducted by contractors rather than by company crews during routine work, which increases the cost per inspection. In addition, inspections during the last two years of the cycle include structures that are the harder to get to and / or would require a flush. These factors would inflate the unit cost. The unit cost is lower in the forecasted years, which span the first three years of the cycle of the third cycle, due to the anticipation that the majority of inspections will be conducted by company crews during routine work.

The unit cost for repairs has increased in the forecasted years due to the Level 2 and Level 3 repairs becoming due from the second cycle of repairs. In last 2 years of the first cycle, the contractor performed the majority of repairs resulting in a lower unit cost. The forecasted years reflect company forces performing inspections.

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-27
Date of Response:
Responding Witness:

Question No. E0378

Subject - Smart Grid. For all the projects that Con Edison is receiving funding for through the Smart Grid Investment Grants ("SGIG") and Smart Grid Demonstration Grants ("SGDG") from the United States Department of Energy ("DOE"), provide the following information:

1. Summary of the scope, timeline, quantity, and funding in the original proposal approved by DOE.
2. Summary of current and future expected changes in the overall scope, timeline, quantity, and funding of each project when compared to the original proposal approved by DOE. Provide the reason for any change.
3. For each project, what is the actual and forecasted amount of units installed and funding spent on a quarterly basis from the inception of the program to the end of March 31, 2013? Include a description of what measurement the units represent such as if it is a representation of number of circuits, feet, or devices installed.
4. For each project that will require continued cost recovery through the customer surcharge, provide the following:
 - a. Name of project;
 - b. An accounting of costs incurred between 6/30/2012 and March 31, 2013;
 - c. An estimation of costs anticipated after March 31, 2013; and
 - d. An expected timetable for when cost after March 31, 2013 will occur.

RESPONSE:

Question 1. Summary of the scope, timeline, quantity, and funding in the original proposal approved by DOE.

Question 2. Summary of current and future expected changes in the overall scope, timeline, quantity, and funding of each project when compared to the original proposal approved by DOE. Provide the reason for any change.

Response: In response to questions 1 and 2, Table 1 below summarizes the following for the nine projects approved under the DOE Smart Grid Investment Grant DE-OE000217:

- initial scope approved by the DOE at the onset of the Grant in April 2010,
- revised scope approved by the DOE in October 2012 including planned future changes for April 2014 and,
- reasons for project scope changes.

Several of the projects are under their original budget allocation due to implementation of cost effective alternatives. In October 2012, Con Edison received DOE's approval to reallocate the individual project funding to expand the scope to complete additional work without exceeding the total budget for the Grant at \$251M and extend the project implementation period by one year until April 9, 2014. Con Edison is planning additional changes to the project scope in order to prioritize work needed to support storm hardening objectives post Hurricane Sandy. Con Edison will be submitting these changes to the DOE for approval in April 2014. These planned future changes will not impact the total budget of the Grant or extend the project implementation period.

Table 1: Smart Grid Investment Grant DE-OE000217

Project Name	Initial Scope	Revised Scope	Reasons for Change
Underground Sectionalizing Switches	• Through switch operation, reduce the amount of load shifted to other distribution feeders due to partial restoration of the healthy portion of the feeder. This will reduce the failure rate for adjacent feeders that pick up the load of the faulted feeder section. • Improving feeder restoration time by isolating faulted segments of primary	DOE Approved Rebaselined Plan as of October 2012 • Increase in switch installations from 90 to 150 - 66% increase • Project completion date changed from March 2013 to December 2013 to account for time needed for SCADA commissioning • Revised budget \$36.2M – 9.5% decrease	• Increase in switch installations due to lower unit cost • Planned scope expansion by 20 switches to support storm hardening objectives post

	feeders. This allows the healthy portion to be re-energized quickly, thereby reducing the amount of load shifted to other distribution feeders and reducing the failure rates for adjacent feeders that pick up the load of the faulted feeder section. • Reduces the stress on the secondary distribution grid, and the probability of cascading failure events is also diminished. • Project completion date 3/2013 • Project budget-\$40M	over initial \$40M budget Planned Scope Change – April 2014 (Pending DOE approval) • Increase in switch installation from 150 to 170 – 13% increase • Switch installations targeted for storm hardening and network reliability benefits • Revised budget \$37.7M – 4% increase over \$36.2M budget for scope expansion • Project completion date – March 2014	Hurricane Sandy • Implementation of cost effective alternatives leading to reduced SCADA commissioning costs per switch
Overhead Sectionalizing Switches	• Installation of approximately 490 switches • Improve reliability by significantly reducing the number of customers that experience outages due to permanent faults on the main feeder run or on the branches (spurs) of a feeder that are not fuse-protected. • Provide a cost-effective method of reducing the frequency of customer interruptions as measured by SAIFI and also provide for sensitive detection and isolation of downed conductors, reducing public and utility worker safety risk. • The manual switches also reduce customer outage durations as measured by CAIDI during major overhead system emergencies, such as storms. • Project completion date 3/2013 • Project budget-\$23.5M	DOE Approved Rebaselined Plan as of October 2012 • Increase in switch installations from 450 to 500 - 11% increase • Project completion date changed from March 2013 to Dec 2013 to account for time needed for SCADA commissioning • New budget \$26.1M – 16% increase over initial \$22.5M budget Planned Scope Change – April 2014 (Pending DOE approval) • Increase in switch installation from 500 to 555 – 11% increase • Switch installations targeted for storm hardening and non network reliability benefits • Revised budget \$29M – 11% increase over the \$26.1M budget for scope expansion	• Increased project budget to expand scope and absorb underrun from other SGIG projects • Increase in switch installations due to lower unit cost • Planned scope expansion by 50 switches to support storm hardening objectives post Hurricane Sandy

		• Project completion date – March 2014	
Enhanced SCADA System	• Add seven master radio sites for communication to overhead and underground SCADA switches. • Add a redundant IGIN Manager to each of the three company control centers. • Reducing momentary outages on targeted overhead autoloops by developing and installing a logic controller • Reducing sustained outages on targeted autoloops by installing multiple SCADA-controlled switches and incorporating them into central logic controller. • Project completion date 3/2013 • Project budget-\$22.5M	DOE Approved Rebaselined Plan as of October 2012 • Upgrade 300 lower controllers • Implement new development lab environment for training and testing • Implement disaster recovery sites • Reduce the number of master radio sites from 34 to 14 due to lease of 220 MHz spectrum that provides service territory wide wireless coverage • Project completion date changed from March 2013 to March 2014 to account for additional time needed for field deployment • New budget \$24.2M – 7% increase Planned Scope Change – April 2014 (Pending DOE approval) • Upgrade 339 Form 3A and 4C lower controllers to Form 6 controllers. • Upgrade 113 legacy upper controllers to support Form 6 lower controller upgrade • Reduce OH switch SCADA commissioning on the new IGIN platform by 200 switches. • Revised budget \$28.4M – 17% increase over \$24.2M budget for scope expansion • Project completion date – March 2014	• Increased project budget to expand scope and absorb underrun from other SGIG projects • Scope expansion to include additional field device upgrades and additional testing and integration • Scope expansion to include 113 legacy upper controller replacements needed for Form 6 lower controller upgrades • System wide Form 6 lower controller upgrade to support storm hardening objectives by enabling rapid radialization of non network circuits prior to major storms
Intelligent Underground Autoloop	• Allow for manual operation of underground switches to manually segregate sub networks and manually operate the loops. • Allow for remote operation of underground	DOE Approved Rebaselined Plan as of October 2012 • Increase in switch installations from 28 to 30 – 8% increase	• Scope expansion to include additional microprocessor relays, feeder breakers and

	switches to remotely segregate sub networks and remotely operate the loops • Allow for remote synchronized operation of underground switches to automatically segregate the sub networks and automatically operate the loops. • Perform primary cable and secondary cable and transformer reinforcement to support the sub- network isolation. • Project completion date 3/2013 • Project budget-\$72M	• Set-up a laboratory environment to develop and test a multi- way 27 kV vacuum switch and time synchronized operation of switches that will allow for sub-network isolation. • Installation of four new breakers to establish two underground autoloops • Upgrade 24 feeder breakers with microprocessor relays at North Corona Substation. • Project completion date changed from March 2013 to Dec 2013 to account for time needed for SCADA commissioning • New budget \$64.7M – 10% decrease Planned Scope Change – April 2014 (Pending DOE approval) • Revised budget \$55.3M – 15% decrease over the \$64.7M budget due to reduced SCADA commissioning costs for UG switches • Project completion date – March 2014	test environment. • Reduced project budget due to lower unit cost, lower construction costs and reduced trenching scope • Implementation of cost effective alternatives leading to reduced SCADA commissioning costs per switch
High Tension Monitoring	• The replacement of existing meters with Smart Kv2c meters • Developing a communication infrastructure for all high tension installations • Develop device and user management application • Perform rigorous testing to ensure that this new technology meets our reporting and operational requirements • Incorporate data obtained from HTMDAS to improve the company's PVL (Poly Voltage	DOE Approved Rebaselined Plan as of October 2012 • New vendor Ambient Corporation selected through competitive bidding process • Initiate limited pilot implementation prior to full deployment • Replace 500 existing communication devices and install additional 500 smart meters and communication devices • Implement a new data collection software • Project completion date changed from	• Increased unit costs as the initial vendor Smartsynch discontinued product during the initial implementation leading to need for development of alternate technology • Delayed pilot implementation due

	Load-flow) analysis. Historical data will be used for trend analysis, load flow analysis, internal and external studies. • Project completion date 3/2013 • Project budget-\$2M	March 2013 to Dec 2013 to account for delays due to the need for a new vendor • New budget \$5.1M – 143% increase Planned Scope Change – April 2014 (Pending DOE approval) • The initial pilot deployment was delayed by 3 months due to Hurricane Sandy that caused flooding at MTA facilities targeted for the pilot • Reduce the scope of the full scale deployment to 150 devices to prioritize above surface high tension locations • Revised project budget \$2.9M – 76% reduction over the \$5.1M project budget due to reduced project scope • Project completion date – March 2014	to Hurricane Sandy requires a reduction in the overall project scope
DG Interconnection / Vault Data Acquisition System	• Establish two-way cyber secure communication between approximately 180 network protectors in Staten Island and the regional control center. • Install approximately 200 pole top repeaters and establish seven fully redundant master radio sites. • Develop and deploy HMI control applications for data monitoring and control. • Establish fully redundant Disaster Recovery site. • Project completion date 3/2013 • Project budget-\$4M	DOE Approved Rebaselined Plan as of October 2012 • Discontinued DG integration in Staten Island • Increase in communication infrastructure required for underground vault communication • Implement redundancy at seven master sites to increase reliability • Implement development lab for testing and training • Implement disaster recovery site • Project completion date changed from March 2013 to June 2013 • New budget \$6.5M – 63% increase	• Scope expansion to include additional infrastructure with no schedule impact

		Planned Scope Change – April 2014 (Pending DOE approval) - No change in project budget or scope. - Project completion date to change from June 2013 to March 2014 due to delays associated with Hurricane Sandy.	
4kV Grid Modernization	- Electrical loss reduction and power factor improvement through the installation of over 400 fixed and VAR controlled switchable capacitor banks. - Optimize distribution grid performance using Volt VAR Control remote automated unit station secondary bus voltage regulation. - Enhance power system sensing, measurement, and analysis by deploying PQ & Battery Monitoring technology at 17 unit stations. - Improve control methods on unit station load tap changing transformers by replacing over 100 existing electromechanical controllers with digital SCADA controllers - Develop 4kV grid models that include single phase unbalanced and three phase balanced loads. - Project completion date 3/2013 - Project budget-\$21M	DOE Approved Rebaselined Plan as of October 2012 - Installation of 30 additional 13 kV capacitors - Increase in LTC controller upgrades from 90 to 110 - Expansion of GE XA21 VVC application to include HMI development for distribution overhead system - Implementation of Resistance-To-Fault (RTF) application for overhead 4kV feeders utilizing PQ data - XA21 expansion requires project completion date to change from March 2013 to Dec 2013 - New budget \$20.3M – 3% decrease Planned Scope Change – April 2014 (Pending DOE approval) - No change in project scope - Revised project budget at \$18.4M – 9% decrease over the \$20.3M project budget due to lower costs associated with RTF development and 4kV model development.	Scope expansion to include additional 30 13kV capacitors due to lower unit costs associated with capacitor installations

		Project completion date to change from June 2013 to December 2013 due to delays associated with Hurricane Sandy.	
Remote Monitoring System	- Installation of approximately 6,900 RMS 3rd generation transmitters - Installation of approximately 8,100 PTO sensors - Through the upgrade of RMS transmitters and the addition of PTO sensors, critical information on the health of the underground transformer will be provided to the system operators and engineers. - Project completion date 3/2013 - Project budget-\$48m	DOE Approved Rebaselined Plan as of October 2012 - Increase in RMS transmitters installations from 6800 to 6900 – less than one percent increase - Increase in PTO installations from 6800 to 8100 – 20% increase - Decrease in total projected transformer replacements from 103 to 85 – 17% reduction - No schedule impact - New budget \$51M – 8% increase Planned Scope Change – April 2014 (Pending DOE approval) - Increase in PTO installations from 8100 to 9000 – 11% increase to support expanded system monitoring capability under storm hardening initiatives - Increase in RMS transmitters installations from 6900 to 7800 – 13% increase to expand reliable system monitoring capability - Revised project budget at \$58.5M – 13% increase over the \$51M project budget to support scope expansion - Project completion date change from March 2013 to March 2014	Scope expansion to include additional sensors due to lower unit cost for transformer replacements and to absorb the budget under run across additional SGIG projects

Dynamic Modeling & Simulation	• Install 1,000 smart meters in the Borden Network and the needed communication infrastructure to support these smart meters • Create a usable database for in-house applications to access near real time smart meter information for use in system modeling, load forecasting, visualization, and simulation • Determine and implement needed integration of smart meter data into in-house applications • Create an application based simulator to mimic the underground distribution system such that operators and engineering can train for various contingencies. • Create a task based 3-D simulator to allow the various control center operators to train on core functions of their positions. • Project completion date 3/2013 • Project budget-\$19M	DOE Approved Rebaselined Plan as of October 2012 • Increase in the smart meter installations from 1000 to 1500 – 50% increase • Expanded data archiving scope to include dedicated PI Historian deployment for electric distribution • Installation and deployment of High Availability PI system: 2 production systems and 1 development system. • Interface with overhead distribution GE XA/21 system for non-network data. • Interface with underground distribution GE XA/21 system for network data. • Provide training to targeted users. • Project completion date changed from March 2013 to December 2013 • New budget \$16.7M – 12% decrease Planned Scope Change – April 2014 (Pending DOE approval) • No change in project scope • Revised project budget at \$14.4M – 16% decrease over the \$16.7M budget due to lower costs associated with distribution simulator development. • Project completion date to change from December 2013 to March 2014	• Scope expansion to include additional smart meters for model validation and PI historian implementation for electric distribution due to lower costs associated with the distribution simulator application development

Also in response to questions 1 and 2, Table 2 below summarizes the following for the NYISO PMU project:

- initial scope approved by the DOE at the onset of the Grant in June 2010,
- revised scope approved by the NYISO and,
- reason for project scope changes.

Table 2: NYISO State Wide PMU DOE Grant

Project Name	Initial Scope	Revised Scope	Reasons for Change
Phasor Measurement Units	• Install 14 PMU's • Install data concentrators at West End Avenue and the Alternate Control Center • Upgrade fiber communications • Project completion date 6/2013 • Project budget-\$6.5M	• Scope expansion to include visualization platform for system operators • Revised budget \$6.2M – 5% decrease over initial \$6.5M budget due to lower construction costs • No change in planned completion date of June 2013	• Scope expansion to include visualization platform for PMU data in order to absorb the project underrun and provide operators system wide monitoring capability

Also, in response to questions 1 and 2, Table 3 below summarizes the following for the Smart Grid Demonstration project:

- initial scope partially approved by the DOE at the onset of the Grant in September 2010,
- revised scope approved by the DOE in July 2011,
- planned scope pending DOE approval in April 2013 and,
- reasons for project scope changes.

Table 3: Smart Grid Demonstration Grant

SGDG Awardee Name	Initial Scope - Partially approved by DOE in September 2010	Revised Scope – approved by DOE in July 2011	Planned Scope – pending DOE approval in April 2013	Reasons for Change
Con Edison (Prime Recipient)	• Con Edison was responsible for project management, data integration, IT equipment and support • Partnership with NYU Poly to develop graduate level smart grid curriculum • Initial Grant budgeted at \$92.4 M including \$45.4M DOE cost share and \$47M prime recipient and sub awardee cost share	• Scope expansion to include Target Indicating System (TIS) sensor installation at Farragut substation • Added Siemens/TIBCO as vendors to Con Edison to provide middleware and system integration services as well as visualization platform. • Con Edison to discontinue the partnership with NYU Poly to develop graduate level smart grid curriculum	• Scope Expansion to include Siemens Demand Response Management System (DRMS) software development and licenses • Scope expansion to include Siemens Visualization platform for all remaining underground networks and DLRP sites • Scope expansion to include solar installation at Con Edison 4 Irving Place Headquarters • Con Edison to independently initiate public outreach on smart grid technologies • Additional sensor development to support storm hardening initiative through additional DOE cost share • Integration of Think Eco modlets at no additional cost to project	• Scope expansion to absorb project underrun and meet DOE cost share requirements • After Boeing's middleware platform was disapproved by the DOE, Con Edison retained Siemens/TIBCO through a competitive bidding process. These vendors also contributed cost share towards the project. • Planned scope expansion in April 2013 includes DRMS platform from Siemens that will integrate metering data and expedite demand response settlements

			• Con Edison project investment funded through rate recovery remains unchanged at \$16.4M • SGD Grant budget for planned work reduced to \$79.95 M including 39.75 DOE cost share and \$40.2M prime recipient and sub awardee/vendor cost share. Increased DOE cost share percentage from 49.3% to 50% with potential for further scope expansion to exhaust unutilized DOE cost share estimated at \$6 million • Project implementation date extended from April 30, 2013 to March 31st 2014	
Boeing (Sub Awardee)	• Initially selected for Middleware & System Integration software platform • Developed initial system requirements	No change	No change	• Boeing's middleware platform was not commercially available and DOE did not approve of them as a sub awardee in December 2010.

Green Charge Networks a.k.a The Prosser Group (Sub Awardee)	• Development of Smart Storage Generating Units (SSGU) to demonstrate the integration of battery storage and photovoltaic technology for electric vehicle charging infrastructure • Development of software platforms that included Business Knowledge Rules Engine (BRKE) and Energy Delivery Network (EDN)	• Scope expansion to include additional GCN and DOE cost share for deployment of mobile Smart Storage and Generation Units (SSGU)	• Reduce the number of permanent SSGU installations to three sites and discontinue BRKE software development	• Scope reduction to account for increased SSGU unit costs associated with increased overheads and administrative costs • The initial SSGU deployment demonstrated limited opportunity for commercial expansion based on the initial costs • The scope expansion associated with mobile SSGU deployments was discontinued due to prohibitive DOT permitting guidelines
NYCEDC (Sub Awardee)	• 500 kW photovoltaic installation and 2 MWh battery storage unit installation at Brooklyn Army Terminal facility • Building Management System (BMS) installation at Brooklyn meat market and Brooklyn Cruise terminal		• Reduce the size of the photovoltaic installation to 100 kW and battery storage unit to 720 kWh	• Reduction in project scope due to NYCEDC's ability to provide the adequate cost share

Viridity Energy (Sub Awardee)	Building Management System (BMS) integration and building energy model using VPower technology	Scope expansion to include additional DOE and Viridity cost share to include additional Rudin Management buildings	Planned scope expansion to include additional Paramount and Rudin Management buildings to provide increased demand response capability via their VPower platform	Scope expansion to increase demand response capability
Columbia University (Sub Awardee)	Development of Dynamic Treatment Controller (DTC) and Load and Source Optimization Controller (LSOC)	Reduced the project scope to discontinue completion of Dynamic Treatment Controller	No change	Scope reduction in May of 2011 was undertaken to balance DOE cost share due to replacement of Boeing's middleware platform from Siemens/TIBCO
CALM Energy (Sub Awardee)	- Development of transmission decision engine and TIS sensor waveform analysis - Development of behavioral analytics study at NYCEDC facilities	- Reduced the project scope to eliminated TIS sensor waveform analysis and transmission decision engine. - Project scope modified to include Integrate System Model (ISM) and load forecasting tool	Project scope modified to discontinue behavioral analytics study	- Scope modification to eliminate duplication of work previously completed by Softstuff - Behavioral analytics study discontinued due to delay of BMS deployment at Brooklyn Army Terminal by NYCEDC
Orange & Rockland Utilities (Sub	Initial scope included engineering and system integration and battery storage unit deployment	Scope modification to discontinue battery storage due to non recovery of matching	Scope expansion to include additional system integration support required as a result of	Successful demonstration of the middleware software platform will provide utility wide benefit of integration of

Awardee)		cost share from NJBPU • Project scope modified to support middleware software integration at the ORU Control Center and develop storm prediction model	replacement of Boeing with Siemens/TIBCO	engineering tools with control systems

Question 3. For each project, what is the actual and forecasted amount of units installed and funding spent on a quarterly basis from the inception of the program to the end of March 31, 2013? Include a description of what measurement the units represent such as if it is a representation of number of circuits, feet, or devices installed.

Response: In response to the first part of question 3, table 4 below provides the breakdown of the actual and forecasted units.

Table 4: Actual & Forecasted Amount of Units Installed for each Smart Grid Investment Grant Project

	Installed as of March 2013	DOE Approved Rebaselined Goal as of October 2012	Planned Rebaselined Goal pending DOE Approval in April 2014
Pressure Temperature Oil Sensors	8031	8100	9000
Third Generation Transmitters (RMS)	6440	6900	7800
Smart Meters	1362	1362	No change
Overhead Sectionalizing Switches	482	505	555
4kV Capacitors	450	450	No change

Form 6 Lower controller upgrades	142	300	339
Underground Sectionalizing Switches	166	186	201
Network Protector Controller	101	180	No change
Upper controllers replacement	7	0	113
Distribution Transformers	73	98	No change
Load Flow Models (software)	18	18	No change
Master Radio Sites (SCADA)	12	14	No change
Phasor Measurement Units	14	14	No change

In response to the second part of Question 3, Tables 5 and 6 below outlines the quarterly investment for Smart Grid Investment Grant projects and Smart Grid Demonstration Grant through February 2013.

Table 5: SGIG investments by quarter

Project	1Q 2010	2Q 2010	3Q 2010	4Q 2010	1Q 2011	2Q 2011	3Q 2011
1. Underground Sectionalizing Switches	\$ 163,525	\$ 616,800	\$ 2,043,439	\$ 4,495,356	\$ 4,130,215	\$ 2,504,691	\$ 2,432,478
2. Overhead Sectionalizing Switches	\$ 157,813	\$ 669,564	\$ 1,262,036	\$ 5,352,559	\$ 2,710,773	\$ 4,239,603	\$ 2,114,223
3. Enhanced SCADA Project	\$ 52,921	\$ 105,416	\$ 1,098,043	\$ 416,837	\$ 1,813,474	\$ 1,601,218	\$ 1,306,561
4. Remote Monitoring Program	\$ 2,625,783	\$ 2,635,109	\$ 4,187,605	\$11,187,053	\$ 2,751,054	\$ 3,802,084	\$ 3,451,083
5. Dynamic Secondary Network Modeling & Visualization	\$ 718,903	\$ 284,132	\$ 356,180	\$ 1,083,281	\$ 364,570	\$ 484,747	\$ 616,899
6. High Tension Monitoring	\$ 11,297	\$ 47,535	\$ 345,678	\$ 620,622	\$ 435,396	\$ 86,356	\$ 36,596
7. Distributed Generator Interconnection	\$ 11,066	\$ 26,225	\$ 61,816	\$ 309,222	\$ 849,750	\$ 716,962	\$ 493,655
8. 4KV Grid Modernization	\$ 69,806	\$ 339,568	\$ 1,140,674	\$ 3,428,816	\$ 1,798,034	\$ 1,169,688	\$ 896,477
9. Intelligent Underground Automatic Loop	\$ 573,853	\$ 737,804	\$ 2,347,880	\$ 8,091,274	\$ 6,350,770	\$ 8,803,767	\$ 5,246,975
Total Con Edison Project Costs (Prime Recipient)	\$ 4,384,967	\$ 5,462,152	\$ 12,843,350	\$34,985,020	\$21,204,036	\$ 23,409,115	\$ 16,594,947

Project	4Q 2011	1Q 2012	2Q 2012	3Q 2012	4Q 2012	JAN & FEB 2013	TOTAL
1. Underground Sectionalizing Switches	\$ 1,603,170	\$ 3,047,013	\$ 4,012,723	\$ 2,692,668	\$ 1,038,908	\$ 1,310,127	\$ 13,704,609
2. Overhead Sectionalizing Switches	\$ 2,414,240	\$ 1,735,506	\$ 1,647,119	\$ 1,559,017	\$ 143,615	\$ 1,240,461	\$ 8,739,957
3. Enhanced SCADA Project	\$ 2,636,734	\$ 1,966,341	\$ 2,117,638	\$ 1,100,551	\$ 578,663	\$ 1,032,043	\$ 9,431,969
4. Remote Monitoring Program	\$ 3,669,576	\$ 2,135,005	\$ 2,611,991	\$ 3,390,854	\$ 4,777,767	\$ 1,317,806	\$ 17,902,999
5. Dynamic Secondary Network Modeling & Visualization	\$ 1,413,677	\$ 1,114,341	\$ 1,219,258	\$ 438,561	\$ 283,863	\$ 832,065	\$ 5,301,766
6. High Tension Monitoring	\$ 31,218	\$ 39,261	\$ 68,373	\$ 78,920	\$ 120,248	\$ 103,808	\$ 441,828
7. Distributed Generator Interconnection	\$ 1,031,525	\$ 437,690	\$ 753,552	\$ 510,015	\$ 420,847	\$ 219,554	\$ 3,373,183
8. 4KV Grid Modernization	\$ 2,399,907	\$ 1,483,342	\$ 1,561,714	\$ 1,357,265	\$ 32,635	\$ 224,862	\$ 7,059,725
9. Intelligent Underground Automatic Loop	\$ 5,843,971	\$ 7,853,977	\$ 4,638,135	\$ 1,704,182	\$ 461,266	\$ 634,875	\$ 21,136,405
Total Con Edison Project Costs (Prime Recipient)	\$ 21,044,017	\$ 19,812,474	\$ 18,630,504	\$ 12,832,033	\$ 7,857,813	\$ 6,915,601	\$ 87,092,442

Table 6: SGD investment by quarter

	2010	2010	2011	2011	2011	2011	2012	2012	2012	2012	2013	Total
	Thd Qtr	Fourth Qtr	First Qtr	Second Qtr	Thd Qtr	Fourth Qtr	First Qtr	Second Qtr	Thd Qtr	Fourth Qtr	First Qtr	
Con Edison	\$ 1,269,953.02	\$ 1,103,053.51	\$ 675,323.01	\$ 2,336,982.64	\$ 1,084,871.15	\$ 803,035.43	\$ 625,874.67	\$ 373,174.35	\$ 1,266,557.01	\$ 805,979.52	\$ 772,881.67	\$ 11,117,685.98
Siemens	\$ -	\$ -	\$ -	\$ -	\$ 1,854,000.00	\$ (770,820.00)	\$ -	\$ 1,321,950.01	\$ 273,622.80	\$ 893,799.07	\$ 174,127.50	\$ 3,746,679.38
TIBCO	\$ -	\$ -	\$ -	\$ -	\$ 3,159,000.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,159,000.00
Softstuf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 149,200.00	\$ -	\$ 150,000.00	\$ -	\$ 299,200.00
Con Edison/ORU	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 494,941.50	\$ -	\$ 304,306.75	\$ -	\$ 465,190.67	\$ 1,264,438.92
The Boeing Company	\$ 610,051.10	\$ -	\$ -	\$ -	\$ 732,866.17	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,342,917.27
CALM Energy	\$ -	\$ -	\$ 128,798.15	\$ 21,885.50	\$ 18,181.80	\$ -	\$ 26,407.64	\$ 69,744.55	\$ -	\$ -	\$ -	\$ 265,017.64
Columbia University	\$ 52,423.37	\$ 182,318.36	\$ 34,170.91	\$ -	\$ -	\$ 34,457.55	\$ 630,563.74	\$ -	\$ -	\$ -	\$ -	\$ 933,933.93
The Prosser Group	\$ -	\$ -	\$ -	\$ 64,050.00	\$ 295,080.68	\$ 83,085.63	\$ 77,317.69	\$ 1,296,050.28	\$ 134,246.33	\$ 644,475.02	\$ 262,407.11	\$ 2,856,712.74
New York City Economic Development Corporation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 50,016.54	\$ 198,723.14	\$ 95,529.19	\$ 104,532.07	\$ 56,288.15	\$ 505,089.09
Viridity Energy	\$ 278,999.48	\$ 158,196.13	\$ 132,036.01	\$ 182,982.04	\$ -	\$ 1,154,966.24	\$ 147,841.89	\$ 314,494.71	\$ 1,335,649.08	\$ 472,373.18	\$ 83,692.07	\$ 4,261,230.83
Total Partners Contribution	\$ 2,211,426.97	\$ 1,443,568.00	\$ 970,328.08	\$ 2,605,900.18	\$ 7,143,999.80	\$ 1,304,724.85	\$ 2,052,963.67	\$ 3,723,337.04	\$ 3,409,911.16	\$ 3,071,158.86	\$ 1,814,587.17	\$ 29,751,905.78
Total DOE Contribution	\$ 3,778,345.17	\$ 1,902,798.88	\$ 1,992,097.71	\$ 1,619,181.35	\$ 5,914,313.73	\$ 5,919,635.23	\$ 2,487,080.42	\$ 3,080,943.33	\$ 3,089,041.46	\$ 2,765,336.30	\$ 427,994.53	\$ 32,976,768.11
Total SGD Investment	\$ 5,989,772.14	\$ 3,346,366.88	\$ 2,962,425.79	\$ 4,225,081.53	\$ 13,058,313.53	\$ 7,224,360.08	\$ 4,540,044.09	\$ 6,804,280.36	\$ 6,498,952.62	\$ 5,836,495.16	\$ 2,242,581.70	\$ 62,728,673.88

Question 4. For each project that will require continued cost recovery through the customer surcharge, provide the following:

- Name of project;
- An accounting of costs incurred between 6/30/2012 and March 31, 2013;
- An estimation of costs anticipated after March 31, 2013; and
- An expected timetable for when cost after March 31, 2013 will occur.

Response: In response to question 4 parts a through d, please see Table 7 below.

Table 7 – DOE Grants cost breakdown

DOE Grant	Time Period	Capital	Retirement	O&M	PSC Cost Share	Total Budget
SGIG	Total through June 2012	\$ 85,117,435.47	\$ 1,798,347.55	\$ 2,264,194.27	\$ 89,179,977.29	\$ 178,359,954.57
	July 2012 - March 2013	\$ 15,327,740.99	\$ 444,854.08	\$ 271,062.36	\$ 16,043,657.43	\$ 32,087,314.86
	April 2013 - March 2014	\$ 19,250,563.36	\$ 188,408.48	\$ 937,346.56	\$ 20,376,318.40	\$ 40,752,636.79
Total SGIG		\$ 119,695,739.81	\$ 2,431,610.11	\$ 3,472,603.19	\$ 125,599,953.11	\$ 251,199,906.22
PMU	Total through June 2012	\$ 1,904,102.85	None	None	\$ 1,904,102.85	\$ 3,808,205.70
	July 2012 - June 2013	\$ 1,195,897.15	None	None	\$ 1,195,897.15	\$ 2,391,794.29
	April 2013 - March 2014	None	None	None	None	None
Total PMU		\$ 3,100,000.00			\$ 3,100,000.00	\$ 6,199,999.99
SGDG	Total through June 2012	None	None	\$ 7,814,770.51	\$ 7,814,770.51	\$ 7,814,770.51
	July 2012 - March 2013	None	None	\$ 3,656,938.73	\$ 3,656,938.73	\$ 3,656,938.73
	April 2013 - March 2014	None	None	\$ 4,928,290.76	\$ 4,928,290.76	\$ 4,928,290.76
Total SGDG				\$ 16,400,000.00	\$ 16,400,000.00	\$ 16,400,000.00

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-27
Date of Response: 04/04/2013
Responding Witness:

Question No. :E0378 Supp

Subject - Smart Grid. For all the projects that Con Edison is receiving funding for through the Smart Grid Investment Grants ("SGIG") and Smart Grid Demonstration Grants ("SGDG") from the United States Department of Energy ("DOE"), provide the following information: 1. Summary of the scope, timeline, quantity, and funding in the original proposal approved by DOE. 2. Summary of current and future expected changes in the overall scope, timeline, quantity, and funding of each project when compared to the original proposal approved by DOE. Provide the reason for any change. 3. For each project, what is the actual and forecasted amount of units installed and funding spent on a quarterly basis from the inception of the program to the end of March 31, 2013? Include a description of what measurement the units represent such as if it is a representation of number of circuits, feet, or devices installed. 4. For each project that will require continued cost recovery through the customer surcharge, provide the following: a. Name of project; b. An accounting of costs incurred between 6/30/2012 and March 31, 2013; c. An estimation of costs anticipated after March 31, 2013; and d. An expected timetable for when cost after March 31, 2013 will occur.

Response:

Please substitute the response below for the response sent on April 3, 2013. The response below reflects the following changes:

- Updated Table 3 that includes response to questions 1 and 2 for the Smart Grid Demonstration project to correctly reflect all scope changes that occurred under this Grant since it was initially awarded by the DOE in September 2010
- Added a new Table 6 in response to question 3 to provide the actual quarterly investments for the NYISO PMU Grant. We omitted to include this information in the initial response.
- Updated Table 7 (was Table 6 in previous response) to correct the actual quarterly investments for the Smart Grid Demonstration Grant. There was a formula error in the prior version that misrepresented the total project to date investment for the sub awardees on the project.

1. Summary of the scope, timeline, quantity, and funding in the original proposal approved by DOE.

2. Summary of current and future expected changes in the overall scope, timeline, quantity, and funding of each project when compared to the original proposal approved by DOE. Provide the reason for any change.

In response to questions 1 and 2, Table 1 below summarizes the following for the nine projects approved under the DOE Smart Grid Investment Grant DE-OE000217:

- initial scope approved by the DOE at the onset of the Grant in April 2010,
- revised scope approved by the DOE in October 2012 including planned future changes for April 2014 and,
- reasons for project scope changes.

Several of the projects are under their original budget allocation due to implementation of cost effective alternatives. In October 2012, Con Edison received DOE's approval to reallocate the individual project funding to expand the scope to complete additional work without exceeding the total budget for the Grant at \$251M and extend the project implementation period by one year until April 9, 2014. Con Edison is planning additional changes to the project scope in order to prioritize work needed to support storm hardening objectives post Hurricane Sandy. Con Edison will be submitting these changes to the DOE for approval in April 2014. These planned future changes will not impact the total budget of the Grant or extend the project implementation period.

Table 1: Smart Grid Investment Grant DE-OE000217

Project Name	Initial Scope	Revised Scope	Reasons for Change
Underground Sectionalizing Switches	• Through switch operation, reduce the amount of load shifted to other distribution feeders due to partial restoration of the healthy portion of the feeder. This will reduce the failure rate for adjacent feeders that pick up the load of the faulted feeder section. • Improving feeder restoration time by isolating faulted segments of primary feeders. This allows the healthy portion to be re-energized quickly, thereby reducing the amount of load shifted to other distribution feeders and reducing the failure rates for adjacent feeders that	DOE Approved Rebaselined Plan as of October 2012 • Increase in switch installations from 90 to 150 - 66% increase • Project completion date changed from March 2013 to December 2013 to account for time needed for SCADA commissioning • Revised budget \$36.2M – 9.5% decrease over initial \$40M budget Planned Scope Change – April 2014 (Pending DOE approval) • Increase in switch installation from 150 to 170 – 13% increase • Switch installations	• Increase in switch installations due to lower unit cost • Planned scope expansion by 20 switches to support storm hardening objectives post Hurricane Sandy • Implementation of cost effective alternatives leading to reduced SCADA commissioning costs per switch

	pick up the load of the faulted feeder section. • Reduces the stress on the secondary distribution grid, and the probability of cascading failure events is also diminished. • Project completion date 3/2013 • Project budget-\$40M	targeted for storm hardening and network reliability benefits • Revised budget \$37.7M – 4% increase over \$36.2M budget for scope expansion • Project completion date – March 2014	
Overhead Sectionalizing Switches	• Installation of approximately 490 switches • Improve reliability by significantly reducing the number of customers that experience outages due to permanent faults on the main feeder run or on the branches (spurs) of a feeder that are not fuse-protected. • Provide a cost-effective method of reducing the frequency of customer interruptions as measured by SAIFI and also provide for sensitive detection and isolation of downed conductors, reducing public and utility worker safety risk. • The manual switches also reduce customer outage durations as measured by CAIDI during major overhead system emergencies, such as storms. • Project completion date 3/2013 • Project budget-\$23.5M	DOE Approved Rebaselined Plan as of October 2012 • Increase in switch installations from 450 to 500 - 11% increase • Project completion date changed from March 2013 to Dec 2013 to account for time needed for SCADA commissioning • New budget \$26.1M – 16% increase over initial \$22.5M budget Planned Scope Change – April 2014 (Pending DOE approval) • Increase in switch installation from 500 to 555 – 11% increase • Switch installations targeted for storm hardening and non network reliability benefits • Revised budget \$29M – 11% increase over the \$26.1M budget for scope expansion • Project completion date – March 2014	• Increased project budget to expand scope and absorb underrun from other SGIG projects • Increase in switch installations due to lower unit cost • Planned scope expansion by 50 switches to support storm hardening objectives post Hurricane Sandy
Enhanced SCADA System	• Add seven master radio sites for communication to overhead and	DOE Approved Rebaselined Plan as of October 2012 • Upgrade 300 lower	• Increased project budget to expand

	underground SCADA switches. • Add a redundant IGIN Manager to each of the three company control centers. • Reducing momentary outages on targeted overhead autoloops by developing and installing a logic controller • Reducing sustained outages on targeted autoloops by installing multiple SCADA-controlled switches and incorporating them into central logic controller. • Project completion date 3/2013 • Project budget-\$22.5M	controllers • Implement new development lab environment for training and testing • Implement disaster recovery sites • Reduce the number of master radio sites from 34 to 14 due to lease of 220 MHz spectrum that provides service territory wide wireless coverage • Project completion date changed from March 2013 to March 2014 to account for additional time needed for field deployment • New budget \$24.2M – 7% increase Planned Scope Change – April 2014 (Pending DOE approval) • Upgrade 339 Form 3A and 4C lower controllers to Form 6 controllers. • Upgrade 113 legacy upper controllers to support Form 6 lower controller upgrade • Reduce OH switch SCADA commissioning on the new IGIN platform by 200 switches. • Revised budget \$28.4M – 17% increase over \$24.2M budget for scope expansion • Project completion date – March 2014	scope and absorb underrun from other SGIG projects • Scope expansion to include additional field device upgrades and additional testing and integration • Scope expansion to include 113 legacy upper controller replacements needed for Form 6 lower controller upgrades • System wide Form 6 lower controller upgrade to support storm hardening objectives by enabling rapid radialization of non network circuits prior to major storms
Intelligent Underground Autoloop	• Allow for manual operation of underground switches to manually segregate sub networks and manually operate the	DOE Approved Rebaselined Plan as of October 2012 • Increase in switch installations from 28 to 30 – 8% increase	• Scope expansion to include additional microprocessor

	loops. • Allow for remote operation of underground switches to remotely segregate sub networks and remotely operate the loops • Allow for remote synchronized operation of underground switches to automatically segregate the sub networks and automatically operate the loops. • Perform primary cable and secondary cable and transformer reinforcement to support the sub- network isolation. • Project completion date 3/2013 • Project budget-\$72M	• Set-up a laboratory environment to develop and test a multi- way 27 kV vacuum switch and time synchronized operation of switches that will allow for sub-network isolation. • Installation of four new breakers to establish two underground autoloops • Upgrade 24 feeder breakers with microprocessor relays at North Corona Substation. • Project completion date changed from March 2013 to Dec 2013 to account for time needed for SCADA commissioning • New budget \$64.7M – 10% decrease Planned Scope Change – April 2014 (Pending DOE approval) • Revised budget \$55.3M – 15% decrease over the \$64.7M budget due to reduced SCADA commissioning costs for UG switches • Project completion date – March 2014	relays, feeder breakers and test environment. • Reduced project budget due to lower unit cost, lower construction costs and reduced trenching scope • Implementation of cost effective alternatives leading to reduced SCADA commissioning costs per switch
High Tension Monitoring	• The replacement of existing meters with Smart Kv2c meters • Developing a communication infrastructure for all high tension installations • Develop device and user management application • Perform rigorous testing to ensure that this new technology meets our	DOE Approved Rebaselined Plan as of October 2012 • New vendor Ambient Corporation selected through competitive bidding process • Initiate limited pilot implementation prior to full deployment • Replace 500 existing communication devices and install additional 500	• Increased unit costs as the initial vendor Smartsynch discontinued product during the initial implementation leading to need for development of alternate

	reporting and operational requirements • Incorporate data obtained from HTMDAS to improve the company's PVL (Poly Voltage Load-flow) analysis. Historical data will be used for trend analysis, load flow analysis, internal and external studies. • Project completion date 3/2013 • Project budget-\$2M	smart meters and communication devices • Implement a new data collection software • Project completion date changed from March 2013 to Dec 2013 to account for delays due to the need for a new vendor • New budget \$5.1M – 143% increase Planned Scope Change – April 2014 (Pending DOE approval) • The initial pilot deployment was delayed by 3 months due to Hurricane Sandy that caused flooding at MTA facilities targeted for the pilot • Reduce the scope of the full scale deployment to 150 devices to prioritize above surface high tension locations • Revised project budget \$2.9M – 76% reduction over the \$5.1M project budget due to reduced project scope • Project completion date – March 2014	technology • Delayed pilot implementation due to Hurricane Sandy requires a reduction in the overall project scope
DG Interconnection/Vault Data Acquisition System	• Establish two-way cyber secure communication between approximately 180 network protectors in Staten Island and the regional control center. • Install approximately 200 pole top repeaters and establish seven fully redundant master radio sites. • Develop and deploy HMI	DOE Approved Rebaselined Plan as of October 2012 • Discontinued DG integration in Staten Island • Increase in communication infrastructure required for underground vault communication • Implement redundancy at seven master sites to	• Scope expansion to include additional infrastructure with no schedule impact

	control applications for data monitoring and control. • Establish fully redundant Disaster Recovery site. • Project completion date 3/2013 • Project budget-\$4M	increase reliability • Implement development lab for testing and training • Implement disaster recovery site • Project completion date changed from March 2013 to June 2013 • New budget \$6.5M – 63% increase Planned Scope Change – April 2014 (Pending DOE approval) • No change in project budget or scope. • Project completion date to change from June 2013 to March 2014 due to delays associated with Hurricane Sandy.	
4kV Grid Modernization	• Electrical loss reduction and power factor improvement through the installation of over 400 fixed and VAR controlled switchable capacitor banks. • Optimize distribution grid performance using Volt VAR Control remote automated unit station secondary bus voltage regulation. • Enhance power system sensing, measurement, and analysis by deploying PQ & Battery Monitoring technology at 17 unit stations. • Improve control methods on unit station load tap changing transformers by replacing over 100 existing	DOE Approved Rebaselined Plan as of October 2012 • Installation of 30 additional 13 kV capacitors • Increase in LTC controller upgrades from 90 to 110 • Expansion of GE XA21 VVC application to include HMI development for distribution overhead system • Implementation of Resistance-To-Fault (RTF) application for overhead 4kV feeders utilizing PQ data • XA21 expansion requires project completion date to change from March 2013 to Dec 2013 • New budget \$20.3M – 3% decrease	• Scope expansion to include additional 30 13kV capacitors due to lower unit costs associated with capacitor installations

	electromechanical controllers with digital SCADA controllers • Develop 4kV grid models that include single phase unbalanced and three phase balanced loads. • Project completion date 3/2013 • Project budget-\$21M	Planned Scope Change – April 2014 (Pending DOE approval) • No change in project scope • Revised project budget at \$18.4M – 9% decrease over the \$20.3M project budget due to lower costs associated with RTF development and 4kV model development. • Project completion date to change from June 2013 to December 2013 due to delays associated with Hurricane Sandy.	
Remote Monitoring System	• Installation of approximately 6,900 RMS 3rd generation transmitters • Installation of approximately 8,100 PTO sensors • Through the upgrade of RMS transmitters and the addition of PTO sensors, critical information on the health of the underground transformer will be provided to the system operators and engineers. • Project completion date 3/2013 • Project budget-\$48m	DOE Approved Rebaselined Plan as of October 2012 • Increase in RMS transmitters installations from 6800 to 6900 – less than one percent increase • Increase in PTO installations from 6800 to 8100 – 20% increase • Decrease in total projected transformer replacements from 103 to 85 – 17% reduction • No schedule impact • New budget \$51M – 8% increase Planned Scope Change – April 2014 (Pending DOE approval) • Increase in PTO installations from 8100 to 9000 – 11% increase to support expanded system monitoring capability under storm hardening initiatives	• Scope expansion to include additional sensors due to lower unit cost for transformer replacements and to absorb the budget under run across additional SGIG projects

		• Increase in RMS transmitters installations from 6900 to 7800 – 13% increase to expand reliable system monitoring capability • Revised project budget at \$58.5M – 13% increase over the \$51M project budget to support scope expansion • Project completion date change from March 2013 to March 2014	
Dynamic Modeling & Simulation	• Install 1,000 smart meters in the Borden Network and the needed communication infrastructure to support these smart meters • Create a usable database for in-house applications to access near real time smart meter information for use in system modeling, load forecasting, visualization, and simulation • Determine and implement needed integration of smart meter data into in-house applications • Create an application based simulator to mimic the underground distribution system such that operators and engineering can train for various contingencies. • Create a task based 3-D simulator to allow the various control center operators to train on core functions of their positions. • Project completion date	DOE Approved Rebaselined Plan as of October 2012 • Increase in the smart meter installations from 1000 to 1500 – 50% increase • Expanded data archiving scope to include dedicated PI Historian deployment for electric distribution • Installation and deployment of High Availability PI system: 2 production systems and 1 development system. • Interface with overhead distribution GE XA/21 system for non-network data. • Interface with underground distribution GE XA/21 system for network data. • Provide training to targeted users. • Project completion date changed from March 2013 to December 2013 • New budget \$16.7M – 12% decrease Planned Scope Change –	• Scope expansion to include additional smart meters for model validation and PI historian implementation for electric distribution due to lower costs associated with the distribution simulator application development

	3/2013 Project budget-\$19M	April 2014 (Pending DOE approval) - No change in project scope - Revised project budget at \$14.4M – 16% decrease over the \$16.7M budget due to lower costs associated with distribution simulator development. - Project completion date to change from December 2013 to March 2014	

In response to questions 1 and 2, Table 2 below summarizes the following for the NYISO PMU project:

- initial scope approved by the DOE at the onset of the Grant in June 2010,
- revised scope approved by the NYISO and,
- reason for project scope changes.

Table 2: NYISO State Wide PMU DOE Grant

Project Name	Initial Scope	Revised Scope	Reasons for Change
Phasor Measurement Units	- Install 14 PMU's - Install data concentrators at West End Avenue and the Alternate Control Center - Upgrade fiber communications - Project completion date 6/2013 - Project budget-\$6.5M	- Scope expansion to include visualization platform for system operators - Revised budget \$6.2M – 5% decrease over initial \$6.5M budget due to lower construction costs - No change in planned completion date of June 2013	Scope expansion to include visualization platform for PMU data in order to absorb the project underrun and provide operators system wide monitoring capability

In response to questions 1 and 2, Table 3 below summarizes the following for the Smart Grid Demonstration project:

- initial scope partially approved by the DOE at the onset of the Grant in September 2010,
- revised scope approved by the DOE in July 2011,
- planned scope pending DOE approval in April 2013 and,
- reasons for project scope changes.

Table 3: Smart Grid Demonstration Grant

SGDG Awardee Name	Initial Scope - Partially approved by DOE in September 2010	Revised Scope – approved by DOE in July 2011	Planned Scope – pending DOE approval in April 2013	Reasons for Change
Con Edison (Prime Recipient)	• Con Edison was responsible for project management, data integration, IT equipment and support • Partnership with educational institution to develop graduate level smart grid curriculum • Initial Grant budgeted at \$92.4 M including \$45.4M DOE cost share and \$47M prime recipient and sub awardee cost share	• Scope expansion to include Disturbance Monitor system for Target Indicating System (TIS) sensor installation at Farragut substation • Removal of TIS sensor installations at E. 13th Street & two other feeders • Added Siemens/TIBCO as vendors to Con Edison to provide middleware and system integration services as well as visualization	• Scope Expansion to include Siemens Demand Response Management System (DRMS) software development and licenses • Scope expansion to include Siemens Visualization platform for all remaining underground networks and DLRP sites • Scope expansion to include solar installation at Con Edison 4 Irving Place Headquarters • Con Edison to no longer to work with vendor to	• Scope expansion to absorb project underrun and meet DOE cost share requirements • After Boeing's middleware platform was disapproved by the DOE, Con Edison retained Siemens/TIBCO through a competitive bidding process. These vendors also contributed cost share towards the project. • Planned scope expansion in April 2013 includes DRMS platform from Siemens that will integrate metering data and expedite demand

		platform • Scope modification to eliminate effort to develop graduate level smart grid curriculum with educational institution	develop courses for smart grid professionals • Additional sensor development to support storm hardening initiative through additional DOE cost share • Integration of Think Eco modlets at no additional cost to project • Con Edison project investment funded through rate recovery remains unchanged at \$16.4M • SGD Grant budget for planned work reduced to \$79.95 M including 39.75 DOE cost share and \$40.2M prime recipient and sub awardee/vendor cost share. Increased DOE cost share percentage from 49.3% to 50% with potential for further scope expansion to exhaust unutilized DOE cost share estimated at \$6 million	response settlements

			Project implementation date extended from April 30, 2013 to March 31st 2014	
Boeing (Sub Awardee)	- Initially proposed for Middleware & System Integration software platform - Developed initial system requirements	Boeing' Middleware & System Integration software platform was not approved by the DOE	No change	Boeing's middleware platform was not commercially available and DOE did not approve of them as a sub awardee in December 2010
Green Charge Networks a.k.a _The Prosser Group (Sub Awardee)	- Development of Smart Storage Generating Units (SSGU) to demonstrate the integration of battery storage and photovoltaic technology for electric vehicle charging infrastructure - Development of Business Knowledge Rules Engine (BRKE) software platform - Development of Energy Delivery Network (EDN)	Scope expansion to include additional GCN and DOE cost share for deployment of mobile Smart Storage and Generation Units (SSGU)	- Reduce the number of SSGU installations to three sites - Reduce the number of mobile SSGU units to one	- Scope reduction to account for increased SSGU unit costs associated with grant compliance administration costs and unanticipated technical installation requirements - The initial SSGU deployment demonstrated limited opportunity for commercial expansion based on the initial costs - The scope expansion associated with mobile SSGU deployments was discontinued due to prohibitive DOT permitting guidelines
NYCEDC	500 kW		Reduce the size	Reduction in

(Sub Awardee)	photovoltaic installation and 2 MWh battery storage unit installation at Brooklyn Army Terminal facility • Building Management System (BMS) installation at Brooklyn Meat Market and Brooklyn Cruise Terminal		of the photovoltaic installation to 100 kW and battery storage unit to 720 kWh	project scope due to NYCEDC's ability to provide the adequate cost share
Viridity Energy (Sub Awardee)	• Building Management System (BMS) integration and building energy model using VPower technology	• Scope expansion to include additional DOE and Viridity cost share to include integration of additional buildings	• Planned scope expansion to include additional buildings to provide increased demand response capability via their VPower platform	• Scope expansion to increase demand response capability
Columbia University (Sub Awardee)	• Development of Dynamic Treatment Controller (DTC) and Load and Source Optimization Controller (LSOC)	• Reduced the project scope to discontinue development of Dynamic Treatment Controller	• No change	• Scope reduction in May of 2011 was undertaken to balance DOE cost share due to replacement of Boeing's middleware platform with Siemens/TIBCO
CALM Energy (Sub Awardee)	• Development of Transmission Decision Engine and TIS sensor waveform analysis • Development of behavioral analytics study	• Reduced the project scope to eliminate TIS sensor waveform analysis and Transmission Decision Engine.	• Project scope modified to discontinue behavioral analytics study	• Scope modification to eliminate duplication of work previously completed by Softstuf • Behavioral analytics study discontinued due

	at NYCEDC facilities	Project scope modified to include Integrated System Model (ISM) and load forecasting tool		to delay of BMS deployment at Brooklyn Army Terminal by NYCEDC
Orange & Rockland Utilities (Sub Awardee)	Initial scope included engineering and system integration to develop storm prediction model and battery storage unit deployment	Scope modification to discontinue battery storage due to non recovery of matching cost share from NJBPU	Scope expansion to include additional system integration support required as a result of replacement of Boeing with Siemens/TIBCO	The cost share for battery installation was not approved by NJBPU and budget modification was required for additional system integration support

3. For each project, what is the actual and forecasted amount of units installed and funding spent on a quarterly basis from the inception of the program to the end of March 31, 2013? Include a description of what measurement the units represent such as if it is a representation of number of circuits, feet, or devices installed.

In response to first part of question 3, table 4 below provides the breakdown of the actual and forecasted units.

Table 4: Actual & Forecasted Amount of Units Installed for each Smart Grid Investment Grant Project

	Installed as of March 2013	DOE Approved Rebaselined Goal as of October 2012	Planned Rebaselined Goal pending DOE Approval in April 2014

Pressure Temperature Oil Sensors	8031	8100	9000
Third Generation Transmitters (RMS)	6440	6900	7800
Smart Meters	1362	1362	No change
Overhead Sectionalizing Switches	482	505	555
4kV Capacitors	450	450	No change
Form 6 Lower controller upgrades	142	300	339
Underground Sectionalizing Switches	166	186	201
Network Protector Controller	101	180	No change
Upper controllers replacement	7	0	113
Distribution Transformers	73	98	No change
Load Flow Models (software)	18	18	No change
Master Radio Sites (SCADA)	12	14	No change
Phasor Measurement Units	14	14	No change

In response to second part of Question 3, Tables 5 and 6 below outlines the quarterly investment for Smart Grid Investment Grant projects and Smart Grid Demonstration Grant through February 2013.

Table 5: SGIG investments by quarter

Project	1Q 2010	2Q 2010	3Q 2010	4Q 2010	1Q 2011	2Q 2011	3Q 2011
1. Underground Sectionalizing Switches	\$ 163,525	\$ 616,800	\$ 2,043,439	\$ 4,495,356	\$ 4,130,215	\$ 2,504,691	\$ 2,432,478
2. Overhead Sectionalizing Switches	\$ 157,813	\$ 669,564	\$ 1,262,036	\$ 5,352,559	\$ 2,710,773	\$ 4,239,603	\$ 2,114,223
3. Enhanced SCADA Project	\$ 52,921	\$ 105,416	\$ 1,098,043	\$ 416,837	\$ 1,813,474	\$ 1,601,218	\$ 1,306,561
4. Remote Monitoring Program	\$ 2,625,783	\$ 2,635,109	\$ 4,187,605	\$11,187,053	\$ 2,751,054	\$ 3,802,084	\$ 3,451,083
5. Dynamic Secondary Network Modeling & Visualization	\$ 718,903	\$ 284,132	\$ 356,180	\$ 1,083,281	\$ 364,570	\$ 484,747	\$ 616,899
6. High Tension Monitoring	\$ 11,297	\$ 47,535	\$ 345,678	\$ 620,622	\$ 435,396	\$ 86,356	\$ 36,596
7. Distributed Generator Interconnection	\$ 11,066	\$ 26,225	\$ 61,816	\$ 309,222	\$ 849,750	\$ 716,962	\$ 493,655
8. 4KV Grid Modernization	\$ 69,806	\$ 339,568	\$ 1,140,674	\$ 3,428,816	\$ 1,798,034	\$ 1,169,688	\$ 896,477
9. Intelligent Underground Automatic Loop	\$ 573,853	\$ 737,804	\$ 2,347,880	\$ 8,091,274	\$ 6,350,770	\$ 8,803,767	\$ 5,246,975
Total Con Edison Project Costs (Prime Recipient)	\$ 4,384,967	\$ 5,462,152	\$ 12,843,350	\$34,985,020	\$21,204,036	\$ 23,409,115	\$ 16,594,947

Project	4Q 2011	1Q 2012	2Q 2012	3Q 2012	4Q 2012	JAN & FEB 2013	TOTAL
1. Underground Sectionalizing Switches	\$ 1,603,170	\$ 3,047,013	\$ 4,012,723	\$ 2,692,668	\$ 1,038,908	\$ 1,310,127	\$ 13,704,609
2. Overhead Sectionalizing Switches	\$ 2,414,240	\$ 1,735,506	\$ 1,647,119	\$ 1,559,017	\$ 143,615	\$ 1,240,461	\$ 8,739,957
3. Enhanced SCADA Project	\$ 2,636,734	\$ 1,966,341	\$ 2,117,638	\$ 1,100,551	\$ 578,663	\$ 1,032,043	\$ 9,431,969
4. Remote Monitoring Program	\$ 3,669,576	\$ 2,135,005	\$ 2,611,991	\$ 3,390,854	\$ 4,777,767	\$ 1,317,806	\$ 17,902,999
5. Dynamic Secondary Network Modeling & Visualization	\$ 1,413,677	\$ 1,114,341	\$ 1,219,258	\$ 438,561	\$ 283,863	\$ 832,065	\$ 5,301,766
6. High Tension Monitoring	\$ 31,218	\$ 39,261	\$ 68,373	\$ 78,920	\$ 120,248	\$ 103,808	\$ 441,828
7. Distributed Generator Interconnection	\$ 1,031,525	\$ 437,690	\$ 753,552	\$ 510,015	\$ 420,847	\$ 219,554	\$ 3,373,183
8. 4KV Grid Modernization	\$ 2,399,907	\$ 1,483,342	\$ 1,561,714	\$ 1,357,265	\$ 32,635	\$ 224,862	\$ 7,059,725
9. Intelligent Underground Automatic Loop	\$ 5,843,971	\$ 7,853,977	\$ 4,638,135	\$ 1,704,182	\$ 461,266	\$ 634,875	\$ 21,136,405
Total Con Edison Project Costs (Prime Recipient)	\$ 21,044,017	\$ 19,812,474	\$ 18,630,504	\$ 12,832,033	\$ 7,857,813	\$ 6,915,601	\$ 87,092,442

Table 6: NYISO PMU Grant investments by quarter

	Third	Fourth	First	Second	Third	Fourth	First	Second	Third	Fourth	First
	2010	2010	2011	2011	2011	2011	2012	2012	2012	2012	2013
PMU	\$ 10,971.63	\$ 24,229.65	\$ 30,081.75	\$ 373,902.24	\$ 580,056.41	\$ 1,179,298.50	\$ 1,197,233.50	\$ 459,655.24	\$ 26,017.50	\$ 303,512.72	\$ 122,829.30
Total	\$ 10,971.63	\$ 35,201.28	\$ 65,283.03	\$ 439,185.27	\$ 1,019,241.68	\$ 2,198,540.18	\$ 3,395,773.68	\$ 3,855,428.92	\$ 3,881,446.42	\$ 4,184,959.14	\$ 4,307,788.44

Table 7: SGDG investments by quarter

	2010	2010	2011	2011	2011	2011	2012	2012	2012	2012	2013	
	Thd Qtr	Fourth Qtr	First Qtr	Second Qtr	Thd Qtr	Fourth Qtr	First Qtr	Second Qtr	Thd Qtr	Fourth Qtr	First Qtr	Total
Con Edison	\$ 1,371,071.89	\$ 1,190,009.90	\$ 728,503.79	\$ 2,521,016.87	\$ 1,170,303.29	\$ 866,273.39	\$ 675,161.47	\$ 402,561.33	\$ 1,266,557.01	\$ 805,979.52	\$ 772,881.67	\$ 11,770,320.13
Siemens	\$ -	\$ -	\$ -	\$ -	\$ 2,000,000.00	\$ 2,118,180.00	\$ 517,500.00	\$ 2,408,082.32	\$ 775,222.80	\$ 2,533,797.36	\$ 493,627.50	\$ 10,846,409.98
TIBCO	\$ -	\$ -	\$ -	\$ -	\$ 6,021,800.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 6,021,800.00
Softstuf	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 149,200.00	\$ -	\$ 150,000.00	\$ -	\$ 299,200.00
Orange & Rockland	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 494,941.50	\$ -	\$ 304,306.75	\$ -	\$ 465,190.67	\$ 1,264,438.92
The Boeing Company	\$ 1,220,102.20	\$ -	\$ -	\$ -	\$ 1,465,732.34	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,685,834.54
CALM Energy	\$ 113,009.28	\$ 308,529.58	\$ 520,952.17	\$ 181,157.61	\$ 169,757.23	\$ 95,187.83	\$ 71,363.43	\$ 175,977.18	\$ -	\$ -	\$ -	\$ 1,635,934.31
Columbia University	\$ 745,447.69	\$ 623,307.91	\$ 810,982.87	\$ -	\$ -	\$ 540,458.74	\$ 1,259,655.51	\$ -	\$ -	\$ -	\$ -	\$ 3,979,852.72
TPG (Prosser Group)	\$ 1,296,342.12	\$ 960,859.30	\$ 681,926.94	\$ 1,217,937.00	\$ 2,230,720.67	\$ 1,696,114.84	\$ 1,140,770.25	\$ 2,661,896.16	\$ 1,679,144.62	\$ 1,545,962.96	\$ 448,305.24	\$ 15,559,980.10
New York City Economic Development Corporation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 95,031.42	\$ 377,573.96	\$ 181,505.46	\$ 198,637.03	\$ 106,947.49	\$ 959,695.36
Viridity Energy	\$ 1,243,798.96	\$ 263,660.19	\$ 220,060.02	\$ 304,970.05	\$ -	\$ 1,908,145.28	\$ 285,620.51	\$ 628,989.41	\$ 2,292,215.98	\$ 602,118.29	\$ (44,370.87)	\$ 7,705,207.82
Total	\$ 5,989,772.14	\$ 3,346,366.88	\$ 2,962,425.79	\$ 4,225,081.53	\$ 13,058,313.53	\$ 7,224,360.08	\$ 4,540,044.09	\$ 6,804,280.36	\$ 6,498,952.62	\$ 5,836,495.16	\$ 2,242,581.70	\$ 62,728,673.88

4. For each project that will require continued cost recovery through the customer surcharge, provide the following:
- Name of project;
 - An accounting of costs incurred between 6/30/2012 and March 31, 2013;
 - An estimation of costs anticipated after March 31, 2013; and

d. An expected timetable for when cost after March 31, 2013 will occur.

In response to question 4 parts a through d, please note Table 8 below.

Table 8 – DOE Grants cost breakdown

DOE Grant	Time Period	Capital	Retirement	O&M	PSC Cost Share	Total Budget
SGIG	Total through June 2012	\$ 85,117,435.47	\$ 1,798,347.55	\$ 2,264,194.27	\$ 89,179,977.29	\$ 178,359,954.57
	July 2012 - March 2013	\$ 15,327,740.99	\$ 444,854.08	\$ 271,062.36	\$ 16,043,657.43	\$ 32,087,314.86
	April 2013 - March 2014	\$ 19,250,563.36	\$ 188,408.48	\$ 937,346.56	\$ 20,376,318.40	\$ 40,752,636.79
Total SGIG		\$ 119,695,739.81	\$ 2,431,610.11	\$ 3,472,603.19	\$ 125,599,953.11	\$ 251,199,906.22
PMU	Total through June 2012	\$ 1,904,102.85	None	None	\$ 1,904,102.85	\$ 3,808,205.70
	July 2012 - June 2013	\$ 1,195,897.15	None	None	\$ 1,195,897.15	\$ 2,391,794.29
	April 2013 - March 2014	None	None	None	None	None
Total PMU		\$ 3,100,000.00			\$ 3,100,000.00	\$ 6,199,999.99
SGDG	Total through June 2012	None	None	\$ 7,814,770.51	\$ 7,814,770.51	\$ 7,814,770.51
	July 2012 - March 2013	None	None	\$ 3,656,938.73	\$ 3,656,938.73	\$ 3,656,938.73
	April 2013 - March 2014	None	None	\$ 4,928,290.76	\$ 4,928,290.76	\$ 4,928,290.76
Total SGD				\$ 16,400,000.00	\$ 16,400,000.00	\$ 16,400,000.00

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-28
Date of Response: 04/05/2013
Responding Witness: Electric Infrastructure and Operations Panel

Question No. :E0392

Subject: Structure (Inspections & Repairs) Programs - 1. Regarding the recently issued order under Case 04-M-0159, Proceeding on Motion of the Commission to Examine the Safety of Electric Transmission and Distribution Systems, Order Granting Petition in Part and Modifying Electric Safety Standards (issued and effective March 22, 2013): a. Provide a revision to page 26 of 'DPS1 E-060 Electric Ops Program Changes' based on this order. b. Provide a breakdown of the change in contractors, Con Edison crews, and supplies and equipment now needed and how this is used to determine the revised annual cost of the programs. 2. On page 13 of 'DPS1 E-060 Electric Ops Program Changes', Con Edison states that inspections that occur during normally scheduled work are ad hoc inspections and that "ad hoc inspections generated through association with other required work require no incremental cost to perform the inspection". In 2010 and 2011, Con Edison shows that only ad-hoc inspections were done. If there are no incremental cost when ad hoc inspections are done, explain the basis for the inspection cost shown on page 26 of the same document. 3. Explain how the cost and amount of ad hoc inspections are determined for all the forecasted years on page 26 of 'DPS1 E-060 Electric Ops Program Changes'.

Response:

1.

a) DPS1 E-060 Electric Ops Program Changes document updated. Please see attached PDF titled: "DPS28 E0392 Q E-60 – Revised".

b) Both the Overhead and URD Stray Voltage Testing Program are performed by contractor forces at a unit cost per test performed. The change in the order will result in approximately 224,000 overhead and 9,000 URD tests not being performed annually by the contractor, currently at an annual savings of approximately \$845,000 dollars. The savings can be affected by future contractor contract prices. The URD Safety Inspection Program is currently tracked as a component of the Underground Safety Inspection Program. The change in the Safety Order will result in approximately 6,700 units being inspected visually by contractor forces instead of an internal inspection performed by Company forces over the remaining two years of the current cycle. This should result in a savings of approximately \$1.9 million dollars over the two year period. These savings can also be affected by future contractor contract prices.

2. While the majority of underground inspections in 2010 and 2011 were performed by Company crews during “routine work” (ad hoc inspections where the time to conduct the inspection was charged to the job), Company crews also conducted targeted inspections as working conditions warranted, for example, when crews encounter no access conditions that prevent performance of the dispatched “routine” work but can still perform an inspection, or when there is not enough time left in the work shift to start a new job but sufficient time to conduct an inspection.

In 2010, the \$1,738,000 UG inspection cost included about \$600,000 of contractor flush costs. These flush costs could have been from 2009 and paid in 2010 or Company crews went to a structure to conduct an inspection and it needed a flush. The rest of the costs are for Company crews performing targeted inspections.

In 2011, the \$5,049,000 UG Inspection cost included about \$112,000 of contractor flush costs. The rest of the costs are for Company crews performing targeted inspections.

3. The forecast units of ad hoc inspections are based on historic performance during the first two years of the 2010-2014 inspection cycle. Based on historic performance, we forecast approximately 44,000 and 27,000 ad hoc underground inspections to be captured in the first 2 years, respectively, of the third cycle. When an ad hoc inspection is performed during routine work, the inspection is considered part of the routine work and the time to conduct the inspection is charged to the job. The forecast for targeted inspections reflects the average of targeted inspections by Company crews during 2010 and 2011 plus an expectation of additional targeted inspections as short interval tasks resulting from the implementation of the work management system. The forecasted cost of a targeted inspection by a Company crew reflects a historical 3 year average cost per unit.

DPS Interrogatory DPS-1
Response to Question E-60 Part C

	2008	2008	2008	2008	2009	2009	2009	2009	2010	2010	2010	2010	2011	2011	2011	2011	2012	2012	2012	2012	2013	2013	2014	2014	2015	2015	2016	2016	2017	2017
	Actual	Budget	Actual	Planned	Actual	Budget	Actual	Planned	Actual	Budget	Actual	Planned	Actual	Budget	Actual	Planned	Actual	Budget	Actual	Planned	Budget	Planned	Budget	Planned	Budget	Planned	Budget	Planned	Budget	Planned
	Dollars (\$000's)		Units		Dollars (\$000's)		Units		Dollars (\$000's)		Units		Dollars (\$000's)		Units		Dollars (\$000's)		Units		Dollars (\$000's)	Units	Dollars (\$000's)	Units	Dollars (\$000's)	Units	Dollars (\$000's)	Units	Dollars (\$000's)	Units
001 EMERGENCY RESPONSE																														
Burnouts/"b" tickets - overhead	4,562	5,951	10,930	13,901	4,474	5,538	9,566	14,332	5,117	4,992	11,038	11,644	4,856	4,853	10,468	9,961	8,296	10,521	9,703	20,775	6,657	16,586	6,669	16,139	7,719	18,211	7,895	18,528	7,898	18,153
Burnouts/"b" tickets - underground	12,053	12,769	18,860	18,349	14,735	12,198	16,023	23,656	15,693	12,401	15,044	16,655	15,906	11,738	14,117	14,070	13,342	14,442	13,908	17,431	12,911	13,746	13,253	13,356	17,231	14,737	17,452	14,597	14,741	15,846
Burnouts - urd	2,806	2,334	1,208	1,171	3,075	3,014	1,444	1,334	3,220	2,658	1,267	1,327	3,317	2,817	1,517	1,196	3,430	4,870	778	1,608	4,055	2,820	3,321	2,358	4,120	2,952	4,167	2,948	3,996	2,874
Burnouts/flush	7,291	6,302	0	0	6,472	7,546	0	0	6,370	6,406	0	0	6,761	5,595	0	0	5,910	4,109	0	2,463	8,089	5,751	8,071	5,742	9,067	6,160	9,026	5,972	9,346	6,016
Burnout/emergency related	43,517	41,357	112,189	115,558	46,437	49,201	113,324	126,792	54,847	44,809	120,970	112,925	59,393	49,194	117,997	110,313	47,498	45,541	91,932	96,888	44,700	97,625	44,479	95,572	49,961	105,049	52,329	53,442	113,614	
Emergency diesel generators	2,311	3,599	0	2,625	2,135	2,472	0	0	4,059	2,086	0	0	3,297	2,389	0	0	3,595	1,993	0	92	1,881	2,063	0	1,843	0	1,987	0	2,025	0	0
Obstructed ducts	723	504	9,540	6,238	850	621	9,101	2,011	839	907	6,979	6,072	863	755	3,913	8,480	801	733	6,300	8,177	658	5,488	664	5,453	704	6,469	1,024	6,640	1,567	7,098
Overhead storm emergency	1,581	0	383	0	1,285	621	138	0	6,267	800	142	0	7,082	5,054	194	0	12,896	800	503	0	0	0	0	0	0	0	0	0	0	0
Customer investigation	3,937	3,252	9,865	8,750	3,688	3,873	9,183	9,414	4,346	3,453	9,782	8,924	4,554	3,643	10,131	8,479	9,889	4,415	8,808	9,008	4,063	8,319	3,926	8,126	4,291	8,788	4,705	9,520	4,611	9,520
Contingency	0	5,000	0	0	0	5,000	0	0	450	5,000	0	0	(450)	0	0	0	0	5,000	0	0	4,200	0	5,000	0	5,000	0	5,000	0	5,000	0
Storm Reserve	4,200	4,200	0	0	5,600	5,600	0	0	5,600	5,600	0	0	5,600	5,600	0	0	5,600	5,600	0	0	5,600	0	5,600	0	5,600	0	5,600	0	5,600	0
Total Fcat 001	82,981	85,268	162,975	166,592	88,751	95,684	158,779	177,539	106,808	89,112	165,222	157,547	111,179	91,638	158,337	152,499	111,257	98,024	131,932	156,442	92,814	150,335	93,046	146,746	105,536	162,366	109,185	169,161	108,226	173,121
002 MAINTENANCE ASSOCIATED WITH CAPITAL																														
Mac - overhead	9,179	7,860	33,324	28,971	8,746	7,397	30,334	31,747	5,854	8,661	25,006	31,883	5,648	7,773	20,158	27,543	6,000	8,771	20,916	24,997	6,033	22,769	6,064	22,767	6,514	24,353	6,528	24,340	6,419	24,903
Mac - underground	3,995	4,542	22,312	22,467	3,305	3,483	14,769	18,422	4,741	3,737	14,827	14,835	7,308	3,316	12,889	16,689	6,516	3,850	10,562	13,760	7,113	11,127	6,547	10,201	7,094	12,200	6,938	12,189	6,993	12,554
Total Fcat 002	13,174	12,402	55,636	51,438	12,051	10,880	45,103	50,169	10,596	12,398	39,833	46,718	12,956	11,089	33,047	44,232	12,516	12,621	31,478	38,757	13,146	33,896	12,611	32,968	13,608	36,553	13,466	36,529	13,412	37,457
003 TRANSFORMERS (INSP & REPAIRS)																														
Cinde	15,983	17,675	17,123	18,575	14,727	16,174	17,128	16,997	16,285	13,961	18,884	17,229	17,518	14,872	19,619	18,754	14,098	11,670	16,211	16,921	11,525	12,261	11,525	12,392	13,877	14,842	14,688	15,557	14,088	15,489
Remote monitoring	495	67	365	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rms expense activity	1,920	1,869	2,404	1,460	1,157	2,371	1,742	1,356	1,147	963	1,865	862	1,364	1,086	1,524	1,699	1,553	873	1,671	1,745	1,160	1,760	1,179	1,783	1,320	2,159	1,357	2,255	1,363	2,293
Transf. install. (refurbish)	295	272	24	146	207	92	11	23	15	96	11	18	77	89	15	30	(11)	66	3	24	31	28	37	35	54	69	58	76	58	77
Transf. (other than cinde)	4,263	5,466	2,370	4,882	3,706	4,112	2,275	3,232	5,596	4,388	1,439	2,418	9,177	4,719	1,564	1,975	4,165	5,643	1,442	2,533	4,273	1,974	4,055	2,029	4,365	2,179	4,480	2,238	4,855	2,229
Transformer & meter expense	4,383	3,961	21,841	21,602	4,400	4,356	19,670	21,891	4,868	4,389	21,838	21,185	4,757	3,898	22,834	20,328	5,153	5,207	17,846	19,818	4,202	16,729	4,222	17,132	5,115	20,075	5,292	20,352	5,922	22,047
#9 investigation	5,305	4,766	8,644	9,824	4,661	5,340	7,445	9,526	5,784	5,397	7,570	8,805	6,149	4,481	9,369	6,106	5,640	4,587	7,368	6,435	4,916	7,056	4,381	6,519	5,424	7,794	6,229	9,059	6,839	10,210
Total Fcat 003																														

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-37
Date of Response: 04/19/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0471

Subject: Electric Distribution – System Expansion – 59th Street Bridge Crossing - 1. What is the Company's final plan for the replacement of the six feeders that are routed over the 59th Street Bridge that supply Roosevelt Island? Explain the Company's reason for picking this alternative and the current status? 2. Provide an update to the forecasted budget based on the final plan discussed in response to question 1, above. Provide a detailed breakdown by unit cost of the labor, material & supply, accounts payable, indirect, overhead, contingency, and any other related costs for work completed in 2013 to date and the annual forecasted amounts. 3. Provide a Gant chart for the planned work.

Response:

1. A feasibility report was completed and it was determined that the most reliable and cost effective plan is to place the six new feeders in a conduit system utilizing the current feeder location, along the outer trusses of the bridge. In addition, we feel this approach have the least impact to the 59th Street Bridge and is the most likely to meet with NYCDOT Bridges approval. Currently, we are working with an engineering firm to complete a detail engineering design of the final plan.
2. The forecasted budget remains the same for this project. We will be able to refine the budget forecast once the detail engineering design is completed. To date the only cost on this project is the feasibility study for a sum cost of \$160,000.
3. A more detailed analysis of the scope of work, schedule of work and cost will be available upon the completion of the engineering design and DOT approval.

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-40
Date of Response: 05/01/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0503

Subject: Electric Operations – System Expansion – Network Transformer Relief - 1. Provide the element of expenses for the Network Transformer Relief work for each year from 2007 to 2012. Separate the element of expenses by region. 2. Provide the same information requested in question 1 for work completed in 2013 to date and for the forecasted years, 2013 to 2017. 3. What were the manufacturer date; priority level; measurement and type of installed cable, conduit and vault; the projected and actual normal load, rating, percent overload; and the projected and actual emergency load, rating, and percent overload for each transformer relieved from 2007 to 2012. Provide the data in a sortable Excel spreadsheet and group the data by year and region. 4. Provide the same information requested in question 3 for the transformers relieved in 2013 to date. 5. What are the manufacturer date; priority level; measurement and type of cable, conduit and vault to be installed; and the projected normal and emergency load, rating, and percent overload for each transformer to be relieved in 2013 to 2017. Provide the data in a sortable Excel spreadsheet and group the data by year and region. 6. Identify for each transformer in the spreadsheets in questions 3, 4, and 5 whether the transformer was or will be replaced by a new transformer that has a higher rating, a larger transformer with a greater capacity, or a new transformer to the system with associated secondary reinforcement. 7. What was the average labor and material costs for conduits, vaults, and cables installed by type for each of the historical five years? Provide this information for each of the five forecasted years. 8. Provide the current specification EO-2002. 9. Why are network transformers manufactured prior to 1992, considered a higher priority for replacement? 10. ‘DPS10-E0062 2007-2012 Historical Spending Budget vs. Actual’ shows that over the five historical years, on average, there is a difference of over \$14 million between budgeted and actual. Provide an explanation of the major causes for over or under spending during the historical years, what information was used to determine the historical budgets, and what if any changes have been put into place to allow for better budget forecasting for 2013 to 2017.

Response:

1 & 2. Please see page 1 of attachment titled: “DPS40 503 Cost Management Response 1,2,10”.

3. Please see attachment titled: “DPS40 E0503 rate case interrogatories 4-25-2013”.

Please note that the information for Manhattan will be forthcoming. The company uses standard cable, conduit, and vault types for new transformer installations. Cable, conduit, and vault types for replacements are job dependent.

4. Please see attachment titled: “DPS40 E0503 rate case load relief 2013 final”.

The company uses standard cable, conduit, and vault types for new transformer installations. Cable, conduit, and vault types for replacements are job dependent.

5. Transformers to be relieved in a specific year are determined based on the previous year summer peak load. Therefore, the load relief projects for 2014 to 2017 are not currently available.
6. This information can be found in the “DPS40 E0503 rate case load relief 2013 final” spreadsheet, where the type of load relief job is described.

8. Provide the current specification EO-2002.

Please refer to PDF attachment titled: “DPS40 E0503 EO-2002 (2)”.

9. In the past, network transformers predominately experienced load curves affiliated with residential customers (Load Cycle 'C' in EO-2002) and were designed to meet these demands. In 1991, it was determined the typical load cycle was flattening out, meaning the peak loads lasted longer. The decision was made to design all transformers to Load Cycle 'D' with increased rating. Thus, network transformers manufactured prior to 1992 have lower loadability limits than newer units.

10. Please see page 2 of attachment titled: “DPS40 503 Cost Management Response 1,2,10”.

2007 - 2017 Network Transformer Relief by EOE (\$000) - All Regions
Answering Question No. E0503 - #1 and #2

		Actual (\$000)							Budget (\$000)				
Program	EOE Formatted	2007	2008	2009	2010	2011	2012	2013 Mar YTD	2013	2014	2015	2016	2017
Bronx/Westchester													
Network Transformer Relief	01-Labor	331	597	680	405	414	767	65	164	155	142	157	159
	02-M&S	588	1,197	906	565	621	857	33	317	320	281	300	294
	03-Contract Services	1,249	1,719	1,653	1,039	1,574	990	145	555	616	571	537	479
	04-Other	129	(172)	(460)	172	(540)	27	-	89	94	86	87	80
	05-Charged in / Allocations	-	-	-	-	-	17	0	73	69	63	68	70
	06-Capital Burdens	738	1,164	1,285	1,226	1,283	2,224	220	929	989	934	864	787
Total		3,035	4,505	4,064	3,407	3,352	4,882	463	2,129	2,243	2,077	2,013	1,869
Brooklyn/Queens													
Network Transformer Relief	01-Labor	3,595	5,587	3,751	2,973	2,586	2,775	359	997	1,045	983	967	879
	02-M&S	6,540	9,233	5,185	2,786	2,660	2,090	388	2,292	2,427	2,235	2,208	2,069
	03-Contract Services	5,116	8,375	4,554	2,675	3,543	1,817	368	2,135	2,261	2,085	2,062	1,935
	04-Other	603	976	(87)	146	(152)	(201)	(4)	458	485	442	439	406
	05-Charged in / Allocations	-	-	-	-	-	-	-	436	470	416	420	378
	06-Capital Burdens	5,698	9,089	6,477	5,539	5,852	5,451	1,143	4,745	4,969	4,636	4,365	4,046
Total		21,552	33,260	19,879	14,120	14,488	11,932	2,254	11,063	11,657	10,797	10,461	9,713
Manhattan													
Network Transformer Relief	01-Labor	2,014	3,532	3,100	2,757	2,807	2,042	617	972	1,141	1,105	1,121	2,646
	02-M&S	2,226	3,434	1,668	1,443	1,147	1,086	11	892	1,794	1,659	1,675	1,488
	03-Contract Services	4,707	5,561	2,902	3,219	3,807	2,026	530	2,974	4,787	4,355	4,267	3,742
	04-Other	1,171	1,443	395	(1,044)	349	250	86	361	750	693	686	506
	05-Charged in / Allocations	-	-	-	-	-	-	-	-	325	291	260	206
	06-Capital Burdens	3,396	5,156	3,831	4,321	5,516	4,810	1,177	4,110	6,808	6,349	5,994	4,360
Total		13,514	19,126	11,896	10,696	13,626	10,214	2,421	9,309	15,605	14,452	14,003	13,002
Staten Island													
Network Transformer Relief	01-Labor	68	176	255	5	-	-	-	-	-	-	-	-
	02-M&S	36	100	106	-	-	-	-	-	-	-	-	-
	03-Contract Services	50	97	61	-	-	-	-	-	-	-	-	-
	04-Other	3	(20)	5	-	-	-	-	-	-	-	-	-
	05-Charged in / Allocations	-	-	-	-	-	-	-	-	-	-	-	-
	06-Capital Burdens	63	135	246	-	-	-	-	-	-	-	-	-
Total		220	488	673	5	-	-	-	-	-	-	-	-

Electric Distribution

2007 - 2017 Network Transformer Relief

Answering Question No. E0503 - #10

Below is a breakdown by year of the major drivers for the variances. Generally, variances in this program are caused by revisions to the work-plan after the budgets are set. Timing of the budget process is a factor in that engineering analysis is generally done after summer experience which is also subsequent to the preparation of the budget. Mostly, the budgets are created based on historical trend information and load growth. This continues to be the case moving forward into the 2013-2017 budget.

2007

Over budget mostly due to carry-over work from 2006 along with the classificaion of the Transformer Relief budgets at the time in which work was listed in a different program line item

2008

Over budget due to an increased work plan resulting in additional sections of cable, feet of conduit and structures

2009

Under-run due to the deferral of mid-priority banks which resulted in fewer transformers, feet of conduit and sections of cable installed

2010

Under-run due to revised work scope after engineering analysis

2011

Over budget due to an increased work plan resulting in additional primary sections and related secondary cable support and re-alignment in structures

2012

Under budget due to advanced load relief in the Fall delayed as a result of Superstorm Sandy response



**CONSOLIDATED EDISON CO. OF NEW YORK INC.
4 IRVING PLACE
NEW YORK, NY 10003**

**DISTRIBUTION ENGINEERING DEPARTMENT
DISTRIBUTION EQUIPMENT**

**SPECIFICATION EO-2002
REVISION 18
JULY 2011**

**LOADING LIMITS FOR NETWORK TRANSFORMERS
AND ASSOCIATED PROTECTORS**

**FILE: APPLICATION AND DESIGN MANUAL NO. 4, SECTION 3
FIELD MANUAL NO. 20**

TARGET AUDIENCE	DISTRIBUTION ENGINEERING REGIONAL ENGINEERING
NESC REFERENCE	ALL SECTIONS

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1.0 SCOPE

This specification provides the design load limits only for those submersible and non-submersible network transformer and protector installations that meet the standard natural ventilated vault installations and design operating criteria as described herein.

2.0 DISTRICTS APPLICABLE

All districts

3.0 GENERAL

- 3.1 There are four basic equipment components associated with network vault installations which determine the design loading limit of the complete installation. These are the transformer, network protector, protector fuses and the tie cables with associated limiters. This specification only addresses the load limits associated with the transformer and protector. For fuse criteria, refer to specifications [EO-5400](#) and [EO-5410](#).
- 3.2 The individual design loading limits for either transformers or protectors are dependent upon many factors and their respective limits are generally not the same for any given operating condition. Therefore, the lower load limit of the two shall always be used as the limit of the combination. Examples of this coordination are furnished in Appendix E herein.
- 3.3 All load limits shown herein for transformers and network protectors are in percent of nominal rated current (not kVA) of their associated transformer. Where transformers have dual ratings (e.g. 55/65°C – 500/560 kVA), the 55°C – 500 kVA rating will be used. At no time will the 65°C rating be used. An example is shown below for some transformers.

Typical Transformer Nominal 55°C Ratings		
kVA	Secondary Voltage (Ø-Ø)	Secondary Current
500 - 3Ø	216	1337
1000 - 3Ø	216	2673
1000 - 3Ø	480	1203
2000 - 3Ø	480	2406
2500 - 3Ø	480	3007

- 3.4 Liquid Filled transformer ratings are for both Silicone and Oil (Mineral and Ester) type, provided the transformers are designed specifically for the designated fluid (not retro-fills).

4.0 TRANSFORMERS

4.1 Factors which affect the load limits of a network transformer are:

- Design Top Oil and Hot Spot limits (limits not to be exceeded).
- Transformers certified data (e.g. rated losses, thermal gradients and weights.)
- Vault conditions and design criteria.
- Daily load factor (shape of load curve).
- Modes of operation (normal or contingencies).
- Operating ambient temperature.

The top oil and hot spot temperature reached by a given transformer is a function of the ambient temperature, vault rise, rated top oil rise and hot spot rise and the given load (peak and cycle). These factors are discussed below and incorporated in the Liquid Filled and Dry Type transformer loading limits as shown in the tables of Appendix B and C respectively.

- 4.2 The maximum allowable load limit is defined as the maximum peak load that can be safely applied to a given transformer that will insure that neither the calculated Hot Spot nor Top Oil (as required) temperatures will ever exceed their respective maximum allowable temperature limits for any given hour in the load cycle. But, the calculated temperatures of either or both could be equal to their respective maximum temperature limits. Therefore, the primary load limit factors are the maximum allowable Hot Spot and Top Oil (Liquid Filled only) temperatures. These maximum allowable temperature limits must never be exceeded for any design condition.

Maximum Allowable Hot Spot Temperature limits					
Transformer Type	Appendix	Table	Modes of Operation		
			Normal	1st Cont.	2nd Cont.
Mineral Oil / Silicone	B	1,2	95°C	115°C	135°C
	B	3-7	105°C	125°C	150°C
Ester Oil	B	5-7	110°C	130°C	155°C
Dry	C	1	200°C	240°C	285°C
	C	2	180°C	220°C	240°C

Maximum Allowable Top Oil Limit for all Modes of Operation is 125°C (Mineral Oil) or 130°C (Ester Oil)

All of the other factors noted above in section 4.1 either create the heat, obstruct the flow of heat or is the limiting heat sink temperature as with the ambient.

- 4.3 The basic algorithms used to calculate the load limits are primarily those shown in IEEE C57.91-1995, section 7.2 (liquid) and C57.96-1989, section 6.2 (dry) and modified to incorporate a vault factor. These algorithms employ the required data as noted in sections 4.1 and 4.2 above. The maximum temperature limits, transformer parameters and vault constraints for any given transformer size are considered to be constant and can not be varied. But the remaining operating conditions (e.g. load peak, load cycle and ambient) can be varied to derive maximum load limits for these applied conditions provided the maximum allowable temperature limits (Top Oil and Hot Spot) as noted above are not exceeded.

In addition, the calculated load limits do not take into account any limitations associated with loss of life, voltage drop at the maximum load condition or load limitation on any associated equipment (e.g. cables, protectors, fuses, etc.).

- 4.4 There are three components associated with the transformer certified data. These are the Rated Losses (No load and Full load), the transformer Rated Rises (Hot Spot / Top Oil, as required), and the design transformer weights. Transformer values used to perform the rating calculations are not the actual data for the specific transformer under evaluation. Instead the certified data of the prototype (guaranteed maximum values) is used to insure that the design of each installation will meet the load limits noted here in.

The heat developed at any hour in the load cycle is based on the losses developed for the given loading. These total losses are the combined rated No Load losses which is considered to be constant and the load losses that are dependent upon the square of the magnitude of the load current (Modes of Operation) and the daily shape of the load current cycle.

These total load losses are factored in to the ANSI algorithms along with the rated rises to determine the transformer temperature rise for the given loading. In addition, these losses are also used to determine the rise in the vault temperature which is added to the overall rise in temperature.

As losses are developed in the transformer, some are absorbed by the mass of the transformer (Coils, Core, Tank and Fluid) and the remainder is released to the ambient through the vault. For constant load or loads that have a fairly long constant duration, the rate of absorbed losses decreases over time until all the losses are released through the vault. The time to stabilize is related to the combined transformer and vault Thermal Time Constant. Therefore, the mass of the transformer and the vault tend to allow for greater loading for load cycles that have short time peaks.

- 4.5 The losses released through the vault to ambient create a temperature rise which is dependent upon the vaults ability to release heat to the ambient and is called the vault thermal constant. This constant is based on vault design conditions that are limited to standard concrete types with a minimum natural air ventilation surface of 2.0 sq.ft. per 100 kVA of the transformer nominal nameplate rating only. The constants used are based on the nominal kVA rating of the transformers and are as shown.

Vault Thermal Constants				
Nominal kVA	500	1000	2000	2500
Vault Constant (°C/kW)	4	3	2.5	2

Installations that do not meet the minimum natural air ventilation requirements or require special transformer cooling (e.g. forced air, spraying or flooding) are considered non standard and are not addressed in this specification.

- 4.6 There are three design Modes of Operation which are designated Normal, 1st Contingency and 2nd Contingency. Although two modes are classified as Contingencies (1st and 2nd), they are part of the design of the transformer. In each case, the maximum allowable load is limited by the associated maximum temperature limit (Top Oil and or Hot Spot). The same load cycle is assumed for each contingency.

a. 2nd Contingency Systems Design

1. Normal: Daily loading for indefinite periods of time.
2. 1st Contingency:
An increased loading for a 24 hour period directly after a Normal load period. The transformers are designed to allow for one 1st contingency occurrence only per month.
3. 2nd Contingency:
An increase in loading over the first Contingency for an additional 24 hours which immediately follows a first contingency (only once per year).

b. 1st Contingency Systems Design:

Increased loading above Normal for a 24 hour period, once a year.

- 4.7 The Con Edison transformers are designed to meet five types of load cycles. The design curves and their associated hourly values for four of the five standard cycles are illustrated in Appendix A. The fifth curve is the Constant Load Curve (100%), and no graph is required. If required, load limits can be calculated for installations where the actual load cycles vary markedly from the standard.

- 4.8 The design ambient temperatures are based on a 24 hour average summer and winter ambient of 26°C (79°F) and 12°C (54°F) respectively and are assumed to be constant over the 24 hour period.

5.0 NETWORK PROTECTORS

- 5.1 All network protector design ratings shown herein (Appendix D, Tables 1 and 2) are in percent rated current of their associated nominal transformer rating. In addition, they are based on a design vault ambient temperature of 60°C and 40°C for 125/216V and 277/480 vaults respectively.
- 5.2 In terms of load ability they can be divided into three groups (Pre 70, Pre 70H and Post 69). The Pre 70 protectors (Table 1) are those whose designs are from the 1920's to the late 1960's. Their load limitation was based, in part, on the thermal limits of the ancillary equipment (CT's, coils, etc.) and wiring used (Class A).

In the mid to late 1950's, the protector wiring and current transformer were upgraded from Class A to Class H. This modification increased the thermal capabilities of the protector design and in turn increased the protector rating. To differentiate between the two, all Pre 70 design protectors that are either manufactured or reconditioned with the improvements have an "H" in their Company Class designation characters beyond the second character and are designated as Pre 70H units.

Per Table 1, both the Pre 70 and Pre 70H protectors have a maximum twelve hour transient loading as well as a maximum continuous loading. The period of the increased loading is limited to only several times a year and never in succession. This maximum transient loading can be applied to all Standard Load Cycles except for the 100% Continuous Cycle.

- 5.3 The Post 69 protectors ratings shown in Table 2 are the maximum allowable continuous loading for the maximum ambient noted above.

6.0 REFERENCES AND APPENDICES

- Appendix A - Standard Load Cycles A to D.
- Appendix B - Liquid Filled Transformer Load Limits, Tables 1 to 7.
- Appendix C - Dry Type Transformer Load Limits, Tables 1 and 2
- Appendix D - Network Protector Load Limits, Tables 1 to 2
- Appendix E - Load Limit Coordination Examples (1 to 3)

Kevin Oehlmann (Signature on File)

Kevin Oehlmann

Equipment Section Manager

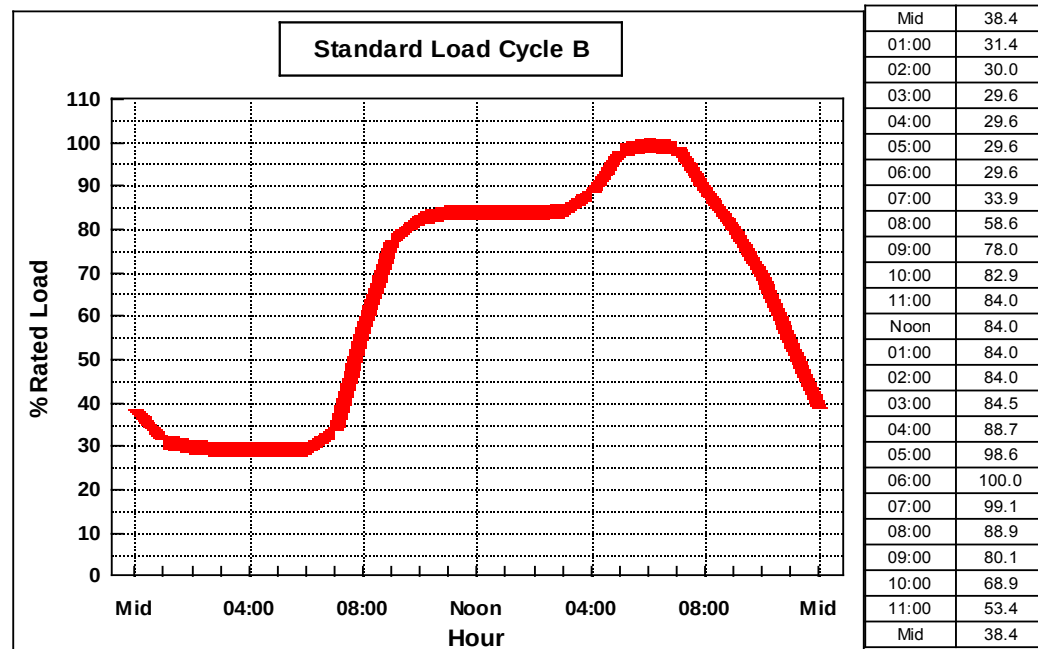
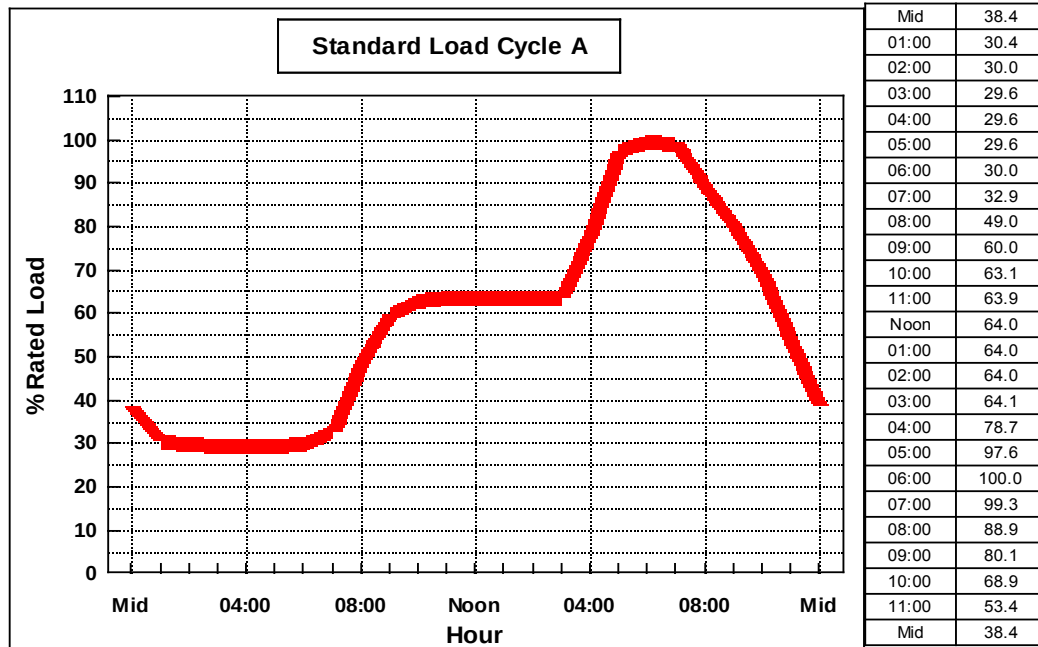
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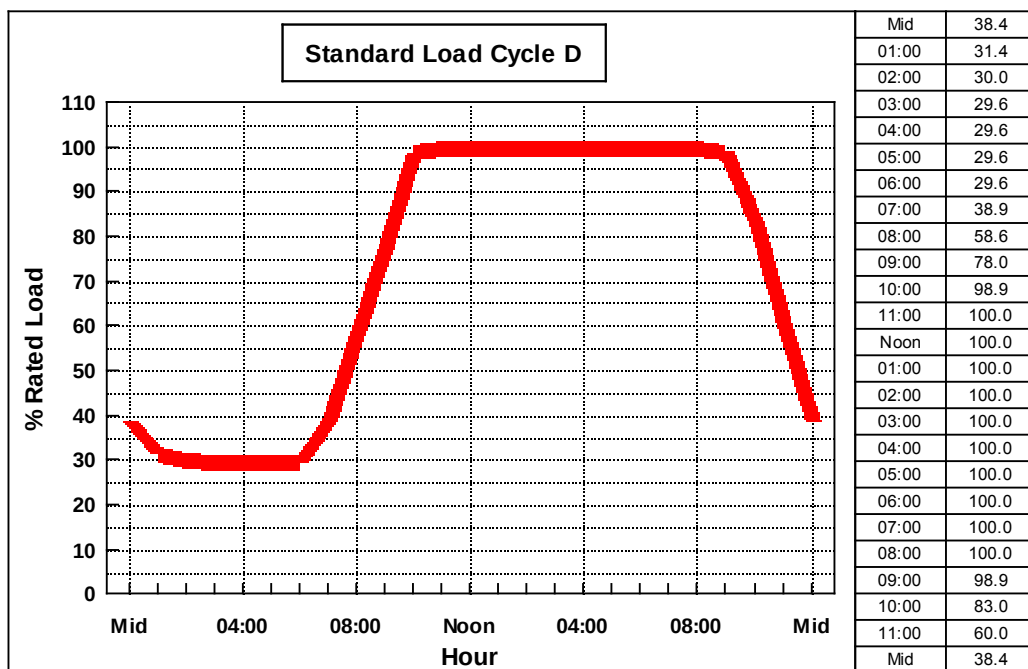
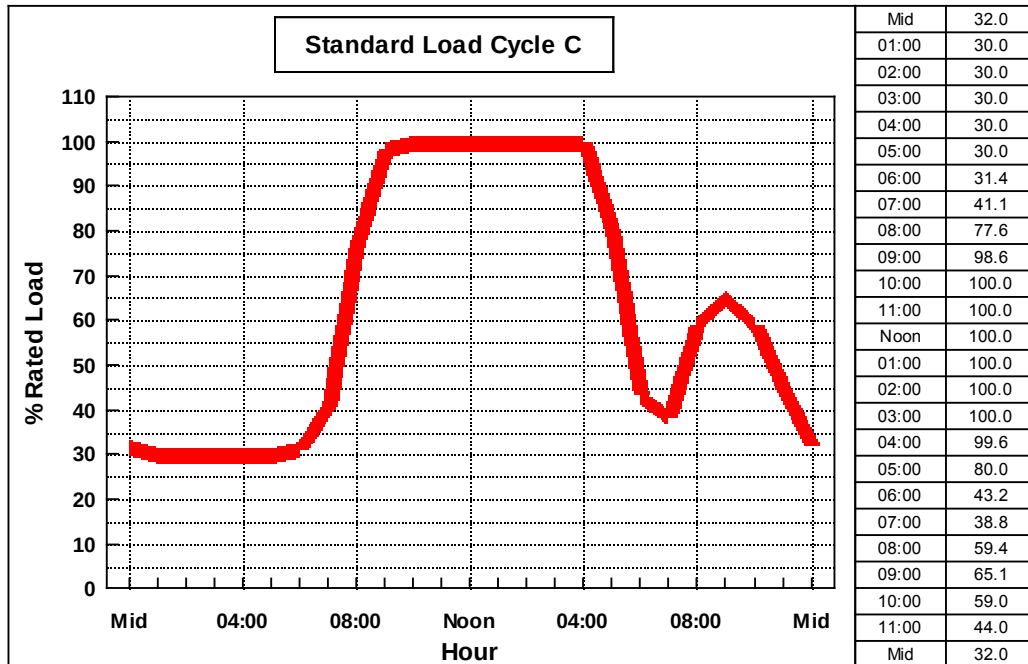
Distribution Engineering Department

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<u>REVISION 18</u>	<u>FILE</u>
• Updated Section 3.4 to clarify Oil types and removed line for Retrofills • Updated maximum Hot Spot and Top Oil temperatures for Ester oil filled transformers • Corrected Appendix B, Table 1 • Updated Appendix B, Tables 5-6 for Ester oil filled transformers and high fault energy tanks • Corrected Appendix C, Table 1 • Updated Appendix D, Table 2 for new network protector classes • Provided examples of class codes in Appendix B and Appendix C • Clarification of loading limits in Appendix E • Updated format as per EO-1070	Application and Design Manual No.4, Field Manual No.20 Service Determination - Section 3, Underground

Appendix A - Standard Normalized Load Cycles

Appendix A - Standard Normalized Load Cycles

Appendix B - Liquid Filled Transformer Maximum Allowable Loading LimitsTable 1

For all transformers manufactured before 1970 with a 55°C rise only. These units have Company Class letters and Supplemental numbering that are not already listed in Tables 2 to 6 and as specifically noted per note b) in Tables 3 and 4.

Table 1: Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
All 1Ø Sizes	A	100	120	130
	B, C	100	115	130
	D	90	105	125
	Continuous	75	95	110
125/216V, 3Ø 150 kVA 300 kVA 450 kVA	A	105	115	125
	B, C	100	110	120
	D	95	110	120
	Continuous	85	100	110
125/216V, 3Ø 500 kVA	A	110	135	155
	B	105	125	145
	C	100	125	140
	D	95	120	135
	Continuous	90	115	130
125/216V, 3Ø 1000 kVA	A	115	140	160
	B	105	125	145
	C	100	125	140
	D	95	115	135
	Continuous	90	110	125
277/480V, 3Ø 1000 kVA	A	115	140	160
	B	105	125	145
	C	100	125	140
	D	95	115	135
	Continuous	90	110	125
277/480V, 3Ø 2000 kVA	A	115	140	155
	B	105	125	140
	C	100	125	140
	D	95	115	130
	Continuous	85	105	120
277/480V, 3Ø 2500 kVA	A	115	140	155
	B	105	125	140
	C	100	125	140
	D	95	115	130
	Continuous	90	105	120

Appendix B - Liquid Filled Transformer Maximum Allowable Loading LimitsTable 2

Summer loading limits for 300 kVA, 13 kV, three phase, oil filled, submersible type transformers installed in a full grating transformer manhole. These transformers have Company Class letters of BC, BL, BT, DO, DQ, and PP (all Supplement Class numbering included).

Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.			
Load Cycle	Mode of Operation		
	Normal	1st	2nd
A	100	120	130
B, C	100	115	130
D	90	105	125
Continuous	75	95	110

Appendix B - Liquid Filled Transformer Maximum Allowable Loading LimitsTable 3

Table 3: Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
All 1Ø Sizes	A	135	160	185
	B,C	125	145	170
	D	120	135	155
	Continuous	110	130	145
125/216V, 3Ø 500 kVA	A	140	160	185
	B	130	150	170
	C	125	145	170
	D	120	140	155
	Continuous	110	130	145
125/216V, 3Ø 1000 kVA	A	140	160	185
	B	130	150	175
	C	125	150	170
	D	120	140	160
	Continuous	115	135	150

For transformers with 125/216 volt secondary as noted below:

- a. All units manufactured between 1970 and 1991 (inclusive). These units have class letter designations as follows:

A/S -- I/O/X

A or S in the Fourth Letter position and I, O or X in the Fifth Letter position.
An example would be a unit with class code HIGAIT.

- b. All units manufactured prior to 1970 having the first two Company Class Letters and Supplemental Company Class Numbers as shown below and a nameplate rise of 55/65°C. See Table for similarly classified units with a 55°C rise only.

Class	Supplemental Number	Class	Supplemental Number
FB	8, 11	GC	8,11,33,36
FC	8,11	GD	All
FD	8,11	GR	All
FP	8,9,11	GS	8

FT	8	GT	All
FU	8,8N	GU	8,8N
FV	8,8N	GV	8,8N
FW	8	GX	8,8N,8S
GA	8,11,33,,36	PT	8,8N,8S
GB	8,9,11,33	PR	8,8N

Appendix B - Liquid Filled Transformer Maximum Allowable Loading LimitsTable 4

Table 4: Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
1000 kVA, 3Ø	A	130	155	175
	B	125	140	165
	C	120	140	160
	D	115	130	150
	Continuous	110	125	140
2000 kVA, 3Ø	A	130	155	175
	B	120	140	160
	C	115	140	160
	D	110	130	145
	Continuous	100	120	135
2500 kVA, 3Ø	A	130	150	175
	B	120	140	160
	C	120	140	160
	D	110	130	145
	Continuous	105	120	135

For transformers with 277/480 volt secondary as noted below:

- a. All units manufactured between 1970 and 1991 (inclusive). These units have class letter designations as follows:

O/T -- I/O/X

O or T in the Fourth Letter position and I, O or X in the Fifth Letter position.
An example would be a unit with class code VEGOIT.

- b. All units manufactured prior to 1970 having the first two Company Class Letters and Supplemental Company Class Numbers as shown below and a nameplate rise of 55/65°C. See Table for similarly classified units with a 55°C rise only.

Class	Supplemental Number	Class	Supplemental Number
FU	28 and above	GV	46 and above
FV	26	GW	46 and above

Appendix B - Liquid Filled Transformer Maximum Allowable Loading LimitsTable 5

Table 5: Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
All 1 ϕ Sizes 150 kVA, 3 ϕ	A	145	170	195
	B,C	135	155	180
	D	125	145	170
	Continuous	120	140	160
125/216V, 3 ϕ 500 kVA	A	150	175	200
	B	140	160	185
	C	135	155	180
	D	130	150	170
	Continuous	120	140	160
125/216V, 3 ϕ 1000 kVA	A	150	170	195
	B	140	160	185
	C	135	155	180
	D	130	150	170
	Continuous	120	140	160

For transformers with 125/216 volt secondary manufactured after 1991 with the class letter designations as noted below:

A/S/B/C/D/F -- I/Z A/K

A or S or B or C or D or F in the Fourth Letter position and I or Z in the Fifth Letter position and A or K in the Sixth Letter position. An example would be a unit with class code PEGAZK.

Appendix B - Liquid Filled Transformer Maximum Allowable Loading LimitsTable 6

Table 6: Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
1000 kVA, 3Ø	A	140	160	185
	B	130	150	170
	C	125	145	165
	D	120	140	160
	Continuous	115	135	150
2500 kVA, 3Ø	A	140	165	190
	B	130	155	175
	C	130	150	170
	D	120	140	160
	Continuous	110	130	145

For transformers with 277/480 volt secondary manufactured after 1991 with the class letter designations as noted below:

O/T/P/Q/R/U -- I/Z A/K

O or T or P or Q or R or U in the Fourth Letter position and I or Z in the Fifth Letter position and A or K in the Sixth Letter position. An example would be a unit with class code VEWOZA.

Table 7

Table 7: Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
500 kVA, 3Ø	A	170	195	215
	B	155	185	200
	C	155	180	195
	D	145	170	180
	Continuous	135	160	175

For transformers with 125/216 volt secondary manufactured after 1997 with the class letter designations as noted below:

H I G A -- Z B

Appendix C – Dry Type Transformer Maximum Allowable Loading LimitsTable 1

Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
50 kVA, 1Ø - 75 kVA, 1Ø - 100 kVA, 1Ø 167 kVA, 1Ø - 333 kVA, 1Ø 500 kVA, 3Ø - 1000 kVA, 3Ø 2000 kVA, 3Ø - 2500 kVA, 3Ø	A	105	130	145
	B,C	100	125	140
	D	100	115	130
	Continuous	90	105	115

For all transformers with either 125/216 or 277/480 volt secondary which were manufactured before 1994 as noted below.

- a. All units manufactured between 1970 and 1993 with class letter designations as follows:

I/E -- I

I or E in the Fourth Letter position and I in the Fifth Letter position. An example would be a unit with class code DEWIIA.

- b. All units manufactured prior to 1970 with a nameplate rise of 80°C with the first two Company Class Letters and Supplemental Company Class Numbers as shown below.

Class	Supplemental Number
CZ	All
FN	4 and above
FZ	4 and above

Appendix C – Dry Type Transformer Maximum Allowable Loading LimitsTable 2

Summer Loading Limits in Percent of Rated Current Add 10 percent of the rated value for Winter loading limits.				
Size	Load Cycle	Mode of Operation		
		Normal	1st	2nd
167 kVA, 1Ø - 333 kVA, 1Ø	A	105	130	145
	B,C	100	125	140
500 kVA, 3Ø - 1000 kVA, 3Ø 2000 kVA, 3Ø - 2500 kVA, 3Ø	D	100	115	130
	Continuous	90	105	115

For all transformers with either 125/216 or 277/480 volt secondary which were manufactured after 1993 with class letter designations as follows:

I/E
 --
 Z
 A

I or E in the Fourth Letter position and Z in the Fifth Letter position and A in the Sixth Letter position.

Appendix D - Network Protector Maximum Allowable Loading Limits

Table 1: Pre 70 and Pre 70H Protectors									
Protector Rating			Associated Transformer			Protector Allowable %Loading			
Class	Current		55°C Name Plate Rating			Pre 70		Pre 70H	
	Pre 70	Pre 70H	kVA	Voltage	Current	Cont.	12 Hr	Cont.	12 Hr
AA	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
AA	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AC	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AC	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
AD	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AE	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AF	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AG	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AH	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AI	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AI	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
AJ	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AJ	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
AK	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AL	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AO	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AP	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AQ	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AR	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
AR	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
AS	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AT	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AU	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AU	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
AV	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AW	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
AY	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
AZ	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
BD	800	NA	300	125/216	800	100.0	125.0	NA	NA
BE	800	NA	300	125/216	800	100.0	125.0	NA	NA
BF	800	NA	300	125/216	800	100.0	125.0	NA	NA
BG	800	NA	300	125/216	800	100.0	125.0	NA	NA
BH	800	NA	300	125/216	800	100.0	125.0	NA	NA
BM	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
BN	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
BO	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
BP	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
BQ	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
BR	1600	NA	500	125/216	1333	120.0	150.0	NA	NA

Appendix D - Network Protector Maximum Allowable Loading Limits

Table 1: Pre 70 and Pre 70H Protectors									
Protector Rating			Associated Transformer 55°C Name Plate Rating			Protector Allowable %Loading			
Class	Current		kVA	Voltage	Current	Pre 70		Pre 70H	
	Pre 70	Pre 70H				Cont.	12 Hr	Cont.	12 Hr
BV	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
BY	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
BZ	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
CB	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
CC	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
CD	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
CE	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
CG	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
CK	800	NA	300	125/216	800	100.0	125.0	NA	NA
CP	800	NA	300	125/216	800	100.0	125.0	NA	NA
CU	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
CV	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
CW	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
CX	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
CY	800	NA	300	125/216	800	100.0	125.0	NA	NA
D	800	NA	300	125/216	800	100.0	125.0	NA	NA
DB	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
DC	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
DD	800	NA	300	125/216	800	100.0	125.0	NA	NA
DH	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
DJ	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
DK	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
DL	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
DM	800	NA	300	125/216	800	100.0	125.0	NA	NA
DN	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
DO	800	NA	300	125/216	800	100.0	125.0	NA	NA
DP	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
DU	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
DV	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
DW	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
DX	3000	NA	1000	125/216	2667	115.0	140.0	NA	NA
DY	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
DZ	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
EA	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
EB	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
EC	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
ED	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
EE	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0

Appendix D - Network Protector Maximum Allowable Loading Limits

Table 1: Pre 70 and Pre 70H Protectors									
Protector Rating			Associated Transformer			Protector Allowable %Loading			
Class	Current		55°C Name Plate Rating			Pre 70		Pre 70H	
	Pre 70	Pre 70H	kVA	Voltage	Current	Cont.	12 Hr	Cont.	12 Hr
EF	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EG	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
EJ	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EK	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EL	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EM	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
EO	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EP	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EQ	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
ER	3000	3500	2000	277/480	2407	125.0	155.0	145.0	185.0
ER	3000	3500	2500	277/480	3008	100.0	125.0	115.0	150.0
ES	1600	1875	1000	277/480	1203	135.0	170.0	155.0	190.0
ET	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
EU	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
EU	3000	3500	2000	277/480	2407	125.0	155.0	145.0	185.0
EU	3000	3500	2500	277/480	3008	100.0	125.0	115.0	150.0
EV	3000	3500	2000	277/480	2407	125.0	155.0	145.0	185.0
EW	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
EX	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
EY	1600	1875	1000	277/480	1203	135.0	170.0	155.0	190.0
EZ	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
F	500	NA	167	125/216	445	115.0	140.0	NA	NA
FA	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
FB	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
FC	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
FC	3000	3500	2000	277/480	2407	125.0	155.0	145.0	185.0
FC	3000	3500	2500	277/480	3008	100.0	125.0	115.0	150.0
FD	1600	1875	1000	277/480	1203	135.0	170.0	155.0	190.0
FE	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
FF	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
FG	3000	3500	2000	277/480	2407	125.0	155.0	145.0	185.0
FG	3000	3500	2500	277/480	3008	100.0	125.0	115.0	150.0
FH	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
FI	1600	1875	1000	277/480	1203	135.0	170.0	155.0	190.0
FJ	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
FK	3000	3500	2000	277/480	2407	125.0	155.0	145.0	185.0
FK	3000	3500	2500	277/480	3008	100.0	125.0	115.0	150.0
FL	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
FN	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0

Appendix D - Network Protector Maximum Allowable Loading Limits

Table 1: Pre 70 and Pre 70H Protectors									
Protector Rating			Associated Transformer 55°C Name Plate Rating			Protector Allowable %Loading			
Class	Current		kVA	Voltage	Current	Pre 70		Pre 70H	
	Pre 70	Pre 70H				Cont.	12 Hr	Cont.	12 Hr
FO	NA	3500	1000	125/216	2667	NA	NA	130.0	170.0
FP	NA	3500	2000	277/480	2407	NA	NA	145.0	185.0
FP	NA	3500	2500	277/480	3008	NA	NA	115.0	150.0
FQ	3000	3500	1000	125/216	2667	115.0	140.0	130.0	170.0
G	800	NA	300	125/216	800	100.0	125.0	NA	NA
G	1200	NA	450	125/216	1200	100.0	125.0	NA	NA
G	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
H	500	NA	167	125/216	445	110.0	140.0	NA	NA
K	800	NA	300	125/216	800	100.0	125.0	NA	NA
M	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
N	800	NA	300	125/216	800	100.0	125.0	NA	NA
NB	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
NBA	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
NBAEC	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
NBC	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
NBD	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
NBEC	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
NBW	1600	1875	450	125/216	1200	135.0	170.0	155.0	190.0
NBWA	1600	1875	450	125/216	1200	135.0	170.0	155.0	190.0
NBWB	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
P	1600	1875	500	125/216	1333	120.0	150.0	140.0	170.0
R	1600	1875	450	125/216	1200	135.0	170.0	155.0	190.0
T	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
T	3000	NA	1000	125/216	2667	110.0	140.0	NA	NA
U	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
V	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
W	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
W	3000	NA	1000	125/216	2667	110.0	140.0	NA	NA
X	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
Y	1600	NA	500	125/216	1333	120.0	150.0	NA	NA
Z	1600	NA	500	125/216	1333	120.0	150.0	NA	NA

Appendix D - Network Protector Maximum Allowable Loading Limits

Table 2: Post 69 Protector					
Protector Rating		Associated Transformer 55°C Name Plate Rating			Protector Allowable %Loading
Class	Current	kVA	Voltage	Current	
GA	5100	2000	277/480	2407	210
GA	5100	2500	277/480	3008	170
GB	4500	1000	125/216	2667	170
GC	2250	1000	277/480	1203	185
GD	2250	500	125/216	1333	170
GF	2250	1000	277/480	1203	185
GN	4500	1000	125/216	2667	170
GP	4500	1000	125/216	2667	170
WA	5100	2000	277/480	2407	210
WA	5100	2500	277/480	3008	170
WB	4500	1000	125/216	2667	170
WC	2250	1000	277/480	1203	185
WD	2250	500	125/216	1333	170
XA	5100	2000	277/480	2407	210
XA	5100	2500	277/480	3008	170
XB	4500	1000	125/216	2667	170
XD	2250	500	125/216	1333	170

Table 2: Special Protector Ratings For Installation In Ventilated Cabinets Only					
Protector Rating		Associated Transformer 55°C Name Plate Rating			Protector Allowable %Loading
Class	Current	kVA	Voltage	Current	
FOX	4500	1000	125/216	2667	170
ED3R	4500	1000	125/216	2667	170

Appendix E - Transformer and Network Protector Coordination

These examples illustrate how the individual load limits of the transformer and network protector are to be used to derive the combined load limits.

All allowable loading limits are listed as a percentage of rated current. For instance, if a network transformer is rated for 500kVA at 55°C, a 125% loading limit on first contingency allows the transformer to be rated for 1671 Amperes (625 kVA) in that mode of operation.

Example 1:

Given a pre 1970, 500 kVA, 125/216V, 3Ø, 55°C only, Liquid Filled (Class GB) transformer (Appendix B, Table 1). The protector is a type FA (Pre 70) (Appendix D, Table 1). The load cycle is the standard "C" load cycle.

	Class or Type	Appendix Table	% Allowable Load Limit		
			Normal	1st Cont.	2nd Cont.
Transformer	GB	B-1	100	125	140
Protector	FA	D-1	150	150	150
Combination	****	****	100	125	140

All the maximum allowable load limits are based on the limits of the transformer.

Example 2:

Assume the same conditions of Example 1 except that the transformer is a 55°/65°C (Class GB-8) unit. Then the transformer load limits must be selected from Appendix B, Table 3.

	Class or Type	Appendix Table	% Allowable Load Limit		
			Normal	1st Cont.	2nd Cont.
Transformer	GB-8	B-3	125	145	170
Protector	FA	D-1	150	150	150
Combination	****	****	125	145	150

The Normal and 1st Contingency load limits are based on those of the transformer as in Example 1. But, the 2nd Contingency load limit of the combination is limited by protector.

Example 3:

In this example, assume all the conditions of Example 2 except that the protector has been upgraded to a Pre 70H type.

	Class or Type	Appendix Table	% Allowable Load Limit		
			Normal	1st Cont.	2nd Cont.
Transformer	GB-8	B-3	125	145	170
Protector	FA-H	D-1	175	175	175
Combination	****	****	125	145	170

The combined load limits for all Modes of Operation are based on the transformer load limits as in Example 1.

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-42
Date of Response: 04/29/2013
Responding Witness: Electric Infrastructure and Operations Panel

Question No. :E0523C

Subject: Storm Hardening – Con Edison Response to DPS-100 - Re-configure Fulton and Bowling Green Networks - 4. Provide a list of the locations and its associated feeder(s) for the isolation switches in the Fulton and Bowling Green networks scheduled to be installed in 2014.

Response:

See attachment “DPS-42 E0523C Fulton Green Switches.”

4) Provide a list of the locations and its associated feeder(s) for the isolation switches in the Fulton and Bowling Green networks scheduled to be installed in 2014?

The locations listed below are the locations Engineering plans to install isolation switches. Currently, these locations are being verified to determine if either existing structures can accommodate the isolation switches or if the proposed locations for new structures are feasible.

Fulton Network - Isolation Switches

Feeder	Planned Location	Number of Switches
27M06	John Street between Cliff Street and Pearl Street	1
27M08	Wall Street and Pearl Street	1
27M09	Maiden Lane and William Street	1
27M09	Pearl Street and Peck Slip	1
27M10	Maiden Lane and William Street	1
27M10	Dover Street between Water Street and Front Street	1
27M11	Wall Street and Pearl Street	1
27M20	John Street and Gold Street	1
Subtotal		8

Bowling Green Network - Isolation Switches

Feeder	Planned Location	Number of Switches
40M30	Broadway and Exchange Place	1
40M31	Broadway and Morris Street	1
40M32 (L&M)	Broadway and Beaver Street	2
40M33 (L&M)	Broadway and Morris Street	2
40M34 (L&M)	Water Street and Wall Street	2
40M37 (M)	Dover Street between Water Street and Front Street	1
40M40(M)	Wall Street and Hanover Street	1
40M41(L)	Wall Street and Hanover Street	1
40M46	New Street between Beaver Street and Exchange Place	1
40M47	Beaver Street between Broad Street and New Street	1
Subtotal		13
Total		21

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-42
Date of Response: 04/29/2013
Responding Witness: Electric Infrastructure and Operations Panel

Question No. :E0523G

Subject: Storm Hardening – Con Edison Response to DPS-100 - Selective Undergrounding of Overhead Infrastructure - 15. Provide a list of the locations where and when the undergrounding of the overhead system will be performed. Separate the list by year, include the town or village location, and the circuit number. 16. Breakdown the \$6 million per mile of work and include the labor cost, materials and supplies, incidentals, contract services, capital burdens, etc... 17. Provide the specific materials and supplies that would be use to underground the overhead system? (e.g. type of underground feeders, switches, transformers, etc..) 18. What are the definition of incidentals, contract services, and capital burdens specific to this project? 19. Provide the actual expenditures for 2013 to date and indicate the type of work that has been performed.

Response:

15. The list of proposed sites for selective undergrounding of the overhead system has not yet been developed. Please see revised Exhibit__IIP-6, pp. 174-176, for a description of the establishment of the criteria and evaluation process.

16. Please see the Company's response to DPS13 E0103. The attachment to DPS13 E0103 (the 2007 undergrounding study) contains the cost justification. The Company is currently updating the 2007 study for cost escalation and expects completion of this update by the end of April 2013.

17. Please see the Company's response to DPS13 E0103 (the 2007 undergrounding study).

18. Capital burdens are corporate overheads such as payroll tax and pension costs (labor fringe rate). Contract Services are funds paid to contractors to execute work on capital projects. "Incidentals" are not a standard element of expense for the company.

19. There is no budgeted funding for this activity until 2015.

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-44
Date of Response: 04/29/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0539

Subject: PJM OATT Service 1,000 MW Contract - 1. With respect to the supplemental testimony submitted by the Electric Infrastructure and Operations Panel on 3/29/2013, provide a ten year projected summer load and capacity table (including the projected locational installed reserve margin) beginning in 2013 for NYC (Zone J) using assumptions made in 2007 with and without the 1,000 MW PJM OATT service; and again using assumptions as currently updated (with and without the 1,000 MW PJM OATT service). Also provide the underlying relevant load, capacity and installed reserve margin assumptions in each case. 2. Given the proxy bus arrangement between the PJM and NY control areas, provide a comparison example of a PJM OATT service transaction from PJM to NYC over the A, B, C lines verses a transaction via an AC transmission project to illustrate the differences.

Response:

1. *With respect to the supplemental testimony submitted by the Electric Infrastructure and Operations Panel on 3/29/2013, provide a ten year projected summer load and capacity table (including the projected locational installed reserve margin) beginning in 2013 for NYC (Zone J) using assumptions made in 2007 with and without the 1,000 MW PJM OATT service; and again using assumptions as currently updated (with and without the 1,000 MW PJM OATT service). Also provide the underlying relevant load, capacity and installed reserve margin assumptions in each case.*

Response

Attached are tables showing (1) Con Edison's "Summer Load Forecast, Resources, and Reserve" as of November 19, 2007 and (2) Con Edison's "Summer Load Forecast, Resources, and Reserve" as of January 29, 2013. Both tables assume the existence of the PJM OATT service. Con Edison is providing the 2013 table despite the fact that it is irrelevant to Con Edison's decision to contract for the PJM OATT service, which was necessarily based on the information available at the time of the decision.

The 2007 table reflects the locational capacity requirement (“LCR”) (then 80%), forecasted loads, and existing and planned resources as of the time when Con Edison contracted for the PJM OATT service. The 2013 table reflects the current LCR (86%), and forecasted loads and resources based on current information. The assumptions on which the tables are based are stated on the tables.

The Supplemental Testimony of the Electric Infrastructure and Operations Panel stated (at page 5) that, when Con Edison contracted for the PJM OATT service in 2008, it anticipated a marginal balance between its system resources and requirements commencing in 2010. The 2007 table is the basis for that anticipation. The table forecasted “Resources Less Requirement” (assuming in-city DSM and the 1000 MW PJM OATT service) ranging from negative 25 MW to positive 384 MW over the five years of the PJM OATT service (*i.e.*, 2012-2016). Thus, even with the PJM OATT service, there was a forecasted deficiency of in-City capacity in one year of the period; and, during the other four years, the resources in excess of the in-City requirement were negligible compared to the forecasted in-City loads, which ranged from 12,455 MW to 12,825 MW over the same period. A small increase in actual load or the loss of a resource would have resulted in further deficiencies of in-City capacity. In addition, the Company’s decision to contract for the PJM OATT service was supported by the diversification of resources and related reliability benefits, time constraints, and the cost of the service relative to the cost of alternative arrangements.

Con Edison is not able to respond to Staff’s request for the load and capacity tables and associated reserve margins without the 1000 MW PJM OATT service. Con Edison has not done the analyses necessary to determine the LCR without the PJM OATT service and lacks modeling data required for the analyses. But it is clear that the absence of the 1000 MW service would increase the LCR underlying the 2007 table and reduce the reserve/requirements balances indicated by the table. The implications of such changes would be significant. As a general proposition, a one-percent increase in the LCR increases the capacity costs borne by New York City consumers by upwards of \$100 million per year over the near term. Moreover, a shortage of in-City capacity would render Con Edison and/or other LSEs incapable of satisfying, and in violation of, the locational capacity requirement under the NYISO tariff.

2. *Given the proxy bus arrangement between the PJM and NY control areas, provide a comparison example of a PJM OATT service transaction from PJM to NYC over the A, B, C lines [“Transaction 1”] versus a transaction via an AC transmission project to illustrate the differences [“Transaction 2”].*

Response

As we understand the hypothetical transactions, neither could be scheduled over the assumed paths because of the PJM/NYISO proxy bus practice. Both transactions involve a purchase from a generator in PJM (say New Jersey) for a load in New York City. Transaction 1 assumes that the energy would flow over the A, B, C Feeders. Transaction 2 assumes that the energy would flow over a newly constructed AC transmission line between New Jersey and New York City. But neither transaction would occur in that fashion because, pursuant to the proxy bus arrangement, PJM and the NYISO do not schedule transactions over AC ties between the control areas. Rather, they schedule inter-area transactions via the upstate proxy buses.

Because both transactions would be scheduled and priced relative to the proxy buses, each would be subject to the following transmission charges (based on March 2013 data):

- PJM TUC from PSEG to PJM/NYISO border: (\$0.12 /MWh)
- NYISO TUC from PJM/NYISO border to NYC: \$5.60 /MWh
- PJM OATT (firm) \$3.02 /MWh
- Total \$8.50 /MWh

Power purchase costs would be additive to these costs for both transactions. Both transactions would also be subject to system expansion charges under PJM's RTEP program and possibly to interconnection costs in PJM. Transaction 2 would also be responsible for the cost of the newly constructed AC line between New Jersey and New York City and possibly for interconnection costs in New York.

As discussed in the Supplemental Testimony of the Electric Infrastructure and Operations Panel, transactions under the 1000 MW PJM OATT service are the only transactions that PJM and the NYISO schedule over the A,B,C Feeders. See also the attached testimony of Robert Stoddard in FERC Docket No. ER08-858-000. In comparison to the hypothetical transaction costs above, the transaction costs for PJM OATT service are as follows (again based on March 2013 data):

- Congestion and losses in PJM: \$0.80 /MWh
- PJM OATT (firm point to point) \$2.16 /MWh
- Total \$2.96 /MWh

Con Edison paid an additional RTEP charge of \$1.00 /MWh (which was omitted from the listing for comparability with the hypothetical transactions). Con Edison is not liable, under the PJM OATT service, for interconnection charges in PJM or New York or for the cost of new transmission facilities to deliver the transmitted energy.

Con Edison would note that the RTEP charges are likely to increase in the future. The total RTEP charges during the first year of the PJM OATT service are estimated to be \$7.5 million (based on 11 months of actuals). Given the abandonment of certain RTEP projects and the substitution of others, the RTEP costs allocated to Con Edison could increase significantly over the next several years. Any such increase would apply equally to alternative Transactions 1 and 2 posed in Staff's question. But because of the five-year term of the PJM OATT service, Con Edison is better positioned to respond to any cost increases that might render the service less desirable than available alternatives. Under the Settlement in FERC Docket No. ER08-858-000, Con Edison could, after five years, terminate the PJM service and all liability for RTEP costs. On the other hand, Transactions 1 and 2 would have continuing RTEP liability.

Update File	11/19/07 In-City CLR Distribution	Summer Load Forecast, Resources, and Reserve (Megawatts)										NOTES:
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
Forecasted Peak Loads												
Service Area Forecasted Load (net Con Edison DSM)												
		13,550	13,775	13,975	14,075	14,200	14,350	14,500	14,575	14,675	14,750	Adjusted System Peak Load Forecast (10/15/07)
NYC Forecasted Load (net Con Edison In-city DSM)												
		11,755	11,955	12,135	12,215	12,320	12,455	12,590	12,660	12,755	12,825	Adjusted System Peak Load Forecast (10/15/07)
NYC Requirement (Net 80% NYC load)												
		9,404	9,564	9,708	9,772	9,856	9,964	10,072	10,128	10,204	10,260	
NYC Existing Resources												
Con Edison Resources												
		2,141	2,141	2,141	2,141	2,141	2,141	2,141	2,141	2,141	2,141	Poletti Retirement
		1,916	1,916	1,916	1,025	1,025	1,025	1,025	1,025	1,025	1,025	Refinement of Astoria NRG GTs 5,7,8, 10-13
		5,963	5,963	5,963	5,963	5,963	5,963	5,850	5,850	5,850	5,850	Resource ratings based on summer 2006
Total Existing Resources												
		10,020	10,020	10,020	9,129	9,129	9,129	9,016	9,016	9,016	9,016	SCRs are estimated by NYISO for current year registration
Special Case Resources												
		481										
Total Existing Resources (plus SCR's)												
		10,501	10,020	10,020	9,129	9,129	9,129	9,016	9,016	9,016	9,016	
Resources less Requirement												
		1,097	456	312	(643)	(727)	(835)	(1,036)	(1,112)	(1,188)	(1,244)	Including existing resources, SCR's and Con Edison DSM
Planned Resources												
NYPA RFP												
					500	500	500	500	500	500	500	Hudson Trans. Partners Project
NYPA RFP II												
						500	500	500	500	500	500	11/8/07 NYPA's announcement RFP LTS #5
NYU Co-gen												
		13	13	13	13	13	13	13	13	13	13	
Co-Op City												
		45	45	45	45	45	45	45	45	45	45	Commercial Operation Fall 2007
Total Planned Resources												
		0	58	58	558	558	1,058	1,058	1,058	1,058	1,058	
Resources less Requirement												
		1,097	514	370	(85)	(169)	223	2	(54)	(130)	(186)	Including existing and planned resources, SCR's and CECONY DSM
Other DSM Programs (NYC only)												
NYSERDA DSM Programs												
		9	61	109	155	185	202	202	202	202	202	NYSERDA permanent DSM programs targeting in-city load reduction
NYPA DSM Programs												
		0	0	0	0	0	0	0	0	0	0	
NYC Programs												
		0	0	0	0	0	0	0	0	0	0	
Total Additional DSM												
		9	61	109	155	185	202	202	202	202	202	
Total Additional DSM (80%)												
		7	49	87	124	148	161	161	161	161	161	
Resources less Requirement (Total In-city DSM)												
		1,104	563	457	39	(21)	384	163	107	31	(25)	Total DSM includes Con Edison programs and NYSEERDA, NYPA, and NYSERDA

Acronyms:

SCR's Special Case Resources is a program designed to reduce power usage through the shutting down of businesses and large power users.
Companies, mostly industrial and commercial, sign up to become SCR's and must, as part of their agreement, curtail power usage, usually by shutting down when asked by the NYISO. .
In exchange, they are paid in advance for agreeing to cut power usage upon request

DSM Demand Side Management (load reduction programs)

NYSERDA New York State Energy Research and Development Authority

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-44
Date of Response: 04/22/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0554

Subject: Electric – Replacement Programs - 1. Regarding the testimony on page 272 of the Electric Infrastructure and Operations Panel direct testimony, explain how by pooling the funding for the Failed Transformer Program, the Failures other than Transformers Program, and the Transmission Feeder Failures Program the total combined funding for all three programs was reduced by \$5 million.

Response:

The table below shows a comparison of the Central Operations funding requests for failure related programs in our prior 5 year plan (2012-2016) versus our current plan (2013-2017). You can see that the aggregate total of these requests has been reduced by a minimum of \$5 million for each of the years in the current plan (with the 2017 request being compared to the prior plans 2016 request).

Prior 5 Year Plan (2012-2016)						
(\$000)						
Org.	Program	2013	2014	2015	2016	
SSO	Failed Equip. Other Than Transformers	5,276	5,350	5,355	5,315	
SSO	Failed Transformer Program	27,282	27,642	27,661	27,464	
S&TO	Transmission Feeder Failures	5,500	5,500	5,500	5,500	
	Totals	38,058	38,492	38,516	38,279	
Current 5 Year Plan (2013-2017)						
(\$000)						
Org.	Program	2013	2014	2015	2016	2017
SSO	Failed Equip. Other Than Transformers	5,227	5,278	5,355	5,315	5,400
SSO	Failed Transformer Program	16,782	24,642	24,661	24,464	24,500
S&TO	Transmission Feeder Failures	3,000	3,000	3,000	3,000	3,000
	Totals	25,009	32,920	33,016	32,779	32,900
Variance - Current 5 year plan vs. prior		(13,049)	(5,572)	(5,500)	(5,500)	(5,379)
						(vs. 2016)

When we evaluated our actual historic spend on the failure lines in the years 2008-2012, we determined that average actual spend was approximately \$30.7 million. Based on this, we combined the overall funding request to line up more with our actual expenditures – the average request for 2013-2017 is approximately \$31.3 million.

Since we have less margin in our funding for an anomalous amount of failures in a given year, there is the possibility that we could experience failures that will exhaust our funding. Should

this happen, we will use our capital optimization process to determine the right reductions to make to other program/project lines in order to fund all of the required replacement work.

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-49
Date of Response: 05/10/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0614

Subject: Electric Distribution – System Expansion - Radial (13 MW) – Parkchester 2 to 1 - 1. Provide a detailed breakdown by unit cost of the labor, material & supply, accounts payable, indirect, overhead, contingency, and any other related costs for 2013. 2. What information was used to determine the cost provided in question 1? 3. Provide the information requested in question 1 for work completed in 2013 to date. 4. Provide a Gant chart for this project. 5. What is the current status of this project? 6. On page 57 of Exhibit_(IIP-3), it states that this project was scheduled to begin in 2012, however, no money is shown to be spent in 2012. Explain what was done in 2012 and the reason for any delays. 7. Based on the 2013-2023 Ten Year Load Forecast, what is the estimated peak load at the Parkchester 2 substation in each year, 2013 to 2017? 8. Have Con Edison looked into any demand response measures to reduce load at the Parkchester 2 substation? What efforts were made? If none, explain why? 9. Have the Con Edison staff handling 3G designs, reviewed this project to see how it can maximize or better use the existing infrastructure to minimize cost? What efforts were made? If none, explain why? 10. Provide the current specification for EOP-5314?

Response:

This project has been cancelled as reflected in the Preliminary 2013-2022 Area Substation and Sub-Transmission Feeder Ten Year Load Relief Program. For EOP-5314, see attached file titled DPS 49 – 614 EOP-5314.



**CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
4 IRVING PLACE
NEW YORK, NY 10003**

**DISTRIBUTION ENGINEERING
PERFORMANCE OPERATIONAL ENGINEERING SECTION**

**SPECIFICATION EOP - 5314
REVISION 4
JANUARY, 2008**

**EFFECTIVE DATE
JUNE, 2008**

**ELECTRIC OPERATIONS--ENGINEERING AND DESIGN:
ED-1 BUDGET PRIORITIZATION**

**FILE: ELECTRIC OPERATIONS GUIDELINES
MANUAL NO. 9**

TARGET AUDIENCE	DISTRIBUTION ENGINEERING REGIONAL ENGINEERING
NESC REFERENCE	ALL SECTIONS

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1.0 PURPOSE

To achieve the company's distribution system improvement program objectives, assign responsibility for prioritizing ED-1 projects and specify the annual work prioritization process.

2.0 POLICY

Distribution system capital projects will be prioritized based on the annual ED-1 budgeted funds on a system-wide basis. ED-1 Program funding based upon approved rate case amounts shall be completed to meet the commitments of the rate case. System reinforcement projects will be prioritized based on the greatest impact on system performance improvement that can be obtained for the funds expended.

3.0 ED-1 BUDGET CATEGORIES

ED-1 budget includes the following business categories based upon the company's mission and the strategic business plan that support this mission. The annual and the five year budget process provide the funding required achieving this mission. The ED – 1 business activities are:

- Public and Employee safety programs
- Customer demand and Emergency response
- Regulatory and Environmental excellence programs
- System reliability programs
- Strategic IT initiatives

4.0 DEFINITIIONS

4.1 Funding. Monies budgeted for specific projects or programs.

4.2 Overload. Load condition that is most likely to result in system component failure.

4.3 Undervoltage. Voltage condition threshold that will render customer equipment inoperable.

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5.0 FUNDING PRIORITIZATION

5.1 Priority Levels. The Chief Distribution Engineer (CDE) will review proposed programs/projects to determine prioritization for funding projects in the ED-1 capital budget. Funding shall be determined based on meeting program objectives, risk assessment and availability of human resources.

The ED-1 budget priorities shall be as follows:

5.1.1 PRIORITY 1: Public and Employee Safety Programs

Public and Employee safety programs developed to mitigate public and employee safety risks, such as: Vented Manhole Cover replacement, Transformer failure mitigation and Overhead Pole Inspection (Osmose Pole treatment) programs.

5.1.2 PRIORITY 2: Customer Demand and Emergency Response

These include system reinforcement and new equipment installed to meet forecasted system electric load growth and customer expectations including emergency response. Area substation load relief projects and Primary feeder relief shall be within this priority. Exhibit A provides further guidance on prioritizing the various programs within this business category.

5.1.3 PRIORITY 3: Regulatory / Environmental Excellence Programs

Public improvement projects requiring relocation of company facilities and environmental programs, such as Oil Minder equipment installation and other such programs.

5.1.4 PRIORITY 4: System Reliability

This category includes all programs that are identified for distribution system reliability improvements such as Paper Cable removal, 4kV unit substation reliability, annual Hi-pot program, the ten-year network and non-network system improvement plans etc.

5.1.5 PRIORITY 5: Strategic Information Technology Initiatives

Includes those projects that enhance efficiency and process improvements through use of technology in electric operations such as Mobile dispatch system, Electric distribution Information

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systems, work management systems, Outage management system etc.

- 5.2 Process.** The annual and five year funding allocation process shall strive to meet the program objectives of each individual program and allocate available funds in the priority order discussed above. In order to maximize the benefits of available funds and resources, the annual feeder and transformer relief shall be priorities based on highest to lowest overloads and associated individual risk evaluation of each component. It is permissible to defer low level minor impact overloads if total funding will be exceeded in a given year. Table II provides further guidance on prioritizing of load relief projects.

Programs that have been adequately funded must be completed to meet the targeted units.

- 5.3 ED-1 Budgeting.** Each region shall prepare their five-year request for capital funding of system reinforcement projects, by the date established for the annual budget process and submit them electronically to Cable, Network and Equipment sections of the Distribution Engineering (DE) department for their review using the shared database established by Planning & Analysis for that purpose.

For load relief projects each region shall provide a list indicating the magnitude of the overload or undervoltage, estimated cost, percent loading compared to current component rating and expected improvement after relief is completed.

For reliability programs and projects, each region shall provide a description of each project or program indicating the cost and expected improvement in system performance. Networks with the lowest reliability index should receive priority in funding the project. Non-network programs or projects will be prioritized based on maximum system performance impact for the dollars to be expended. Each reliability project submittal the following information shall be provided:

- Description of the project
- Type of improved impact to the system
- Magnitude of the expected improvement
- Number of units associated with each program
- Estimated cost

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Reliability projects shall be identified with one of the reliability programs listed in Table III. Programs may be added to or deleted from the list as required.

A five year system reinforcement request shall be submitted to Cable, Network and Equipment sections of DE via the C-39 form which lists the five year request of programs and projects.

Funding and units shall be shown for each program and/or project listed.

The Cable, Network and Equipment sections of DE will review the submission and provide initial priority recommendations for system reinforcement projects. The review will focus on ensuring the submittal is aligned with meeting program objectives and any company obligations, optimization of system performance enhancement within the funding request and recommending alternatives. The focus of the analysis will be on the following:

- Impact on SAIFI
- Impact on CAIDI
- Impact on “network reliability index”
- Impact on customer satisfaction
- Cost benefit analysis

The Cable, Network and Equipment sections of DE will meet with the regional General Managers and regional Engineering Managers to discuss the program, alternatives and priorities for the reliability projects, and develop consensus regarding order of priorities for reliability projects.

6.0 AUTHOR

Section Manager, Performance and Operational Engineering, Distribution Engineering, is the author of this procedure.

7.0 PROCEDURAL RESPONSIBILITY

The Chief Engineer, Distribution Engineering, has responsibility for this procedure.

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8.0 EXHIBITS

EXHIBIT A Customer Demand and Emergency Response Relief Guidelines

EXHIBIT B System Reinforcement Programs

Jyotin N. Thaker (Signature on File)

 Jyotin N. Thaker
 Chief Distribution Engineer,
 Distribution Engineering Department

Author: Maria Rodriguez

REVISION 1: Rescind CSP 5-3-14 and
 rename to EOP-5314.

FILE:
 Electric Operation Guidelines
 Manual No. 9

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EXHIBIT A**CUSTOMER DEMAND AND EMERGENCY RESPONSE RELIEF GUIDELINES**
Funding Priority 2

PRIORITY NUMBER	DESCRIPTION	RELIEF CRITERIA
1.	Area substation overload	Normal load > normal rating and/or Emergency load > emergency rating.
2.	Primary network feeder	Normal load > 100% Normal Rating, 1st contingency and 2nd contingency > 105% emergency rating.
3.	4kv substation overload	Normal >100% and/or emergency ≥ 115%
4.	Primary non-network feeder overload 13kv and above	Normal > 105% 1st contingency: ≥ 115% of emergency rating
5.	Secondary network transformer/mains overload	>100% of normal rating ≥ 115% of 1st or 2nd contingency rating depending on design
6.	4kv feeder overload	>100% of normal rating emergency ≥ 130% of emergency rating for Underground and Overhead
7.	Primary non-network feeder overload 13kv and above	1st contingency cable on main run of feeder >105% & <115% of emergency rating. Other cable and open wire >105% & < 115% of emergency rating.

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EXHIBIT A (Cont.)**CUSTOMER DEMAND AND EMERGENCY RESPONSE RELIEF GUIDELINES
Funding Priority 2**

PRIORITY NUMBER	DESCRIPTION	RELIEF CRITERIA
8.	Primary network feeder overload	1st cont.: >100% & <105% 2nd cont.: >100% & <105% of emergency rating
9.	4kv feeder overload	≥ 120% & <130% for Overhead ≥ 110% & <130% for UG cable of emergency rating
10.	All other 4kv substations	>100% & <115% of emergency rating
11.	Secondary network transformer/mains overload	≥ 110% & <115% of 1st or 2nd contingency rating depending on design
12.	Primary non-network feeder overload 13kv and above	1st contingency: >100% & <105% of emergency rating
13.	Secondary network transformer/mains overload	>100% & <110% of 1st or 2nd contingency rating depending on Design
14.	4kv feeder overload	>100% & <120% Overhead >100% & < 110% UG Cable of emergency rating

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EXHIBIT B**SYSTEM REINFORCEMENT PROGRAMS****RELIEF**

Area Substations
 Primary Feeders
 4kv Substations
 4kv Feeders
 Transformers & Secondary
 <\$100K Load Relief
 27kV and 33kV Shunt Reactors

RELIABILITY

Paper Cable Replacement (including targeted stop joints)
 Galleries Retirement
 Remote Monitoring NWP
 #4 #6 Wire & 4kv S.S. Cable
 Multibank Retirement
 Obsolete Network Protectors
 Special Projects
 Simplification
 Isolation Devices (SF-6 Switches)
 Fiver Year Inspection Program
 4kv Obsolescence & Substation Retirement
 Defective Aerial Cable
 Jumbo Transformers
 Hi-Pot Program (Spring Program and After O/A)
 General Improvements
 Vented Manhole Cover Program
 Oil Minders
 Grounding Transformers
 VRS Replacement / Automation
 Auto Loop Reliability
 4KV Sectionalizing (ECSO & Anderson Switch Replacement)
 Osmose Pole Treatment
 Defective DBC Replacement
 Tempo Relay Replacement
 4KV Reliability
 Facilities Relocation
 Grounding
 27kV and 33kV Shunt Reactors
 <\$100K Reliability

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Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-49
Date of Response: 05/03/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0615

Subject: Electric Distribution – System Expansion - Radial (13 MW) – Parkchester 2 to 1 - 1. Provide a detailed breakdown by unit cost of the labor, material & supply, accounts payable, indirect, overhead, contingency, and any other related costs for 2013. 2. What information was used to determine the cost provided in question 1? 3. Provide the information requested in question 1 for work completed in 2013 to date. 4. Provide a Gant chart for this project. 5. What is the current status of this project? 6. On page 57 of Exhibit_(IIP-3), it states that this project was scheduled to begin in 2012, however, no money is shown to be spent in 2012. Explain what was done in 2012 and the reason for any delays. 7. Based on the 2013-2023 Ten Year Load Forecast, what is the estimated peak load at the Parkchester 2 substation in each year, 2013 to 2017? 8. Have Con Edison looked into any demand response measures to reduce load at the Parkchester 2 substation? What efforts were made? If none, explain why? 9. Have the Con Edison staff handling 3G designs, reviewed this project to see how it can maximize or better use the existing infrastructure to minimize cost? What efforts were made? If none, explain why? 10. Provide the current specification for EOP-5314?

Response:

1. Provide a detailed breakdown by unit cost of the labor, material & supply, accounts payable, indirect, overhead, contingency, and any other related costs on an annual basis for 2013 to 2015.

Since the project was deferred to 2017 no money has been spent year to date. See answer 11 for projected cost from 2015 to 2017.

2. What information was used to determine the cost provided in question 1?

Since the project was deferred to 2017 no money has been spent year to date. See answer 11 for projected cost from 2015 to 2017.

3. Provide the information requested in question 1 for work completed in 2013 to date.

No money has been spent year to date

4. Provide a Gant chart for this project.

We currently don't have a detail Gant chart for this project but work on the Penn/Clinton intermesh is expected to be spread as follows:

2015 - field surveys, engineering, and sub-surface work

2016 – continue sub-surface work, cable, and splicing

2017 – cable, splicing and final intermesh

5. What is the current status of this project?

This project has been deferred to 2017

6. What will be the name of the new network, Waterside or Clinton?

The name of the network will be Clinton Network

7. Based on the 2013-2023 Ten Year Load Forecast, what is the estimated peak load at the West 42nd Street No. 1 substation for each year, 2013 to 2017?

West 42nd Street No. 1	2013	2014	2015	2016	2017
Pennsylvania Network	240 MW	247 MW	255 MW	262 MW	267 MW (192 MW after load transfer)

8. Will there be a transfer of 74 MW or 68 MW to the new network? Explain the reasoning for the change in the amount of MW to be transferred.

The amount of load to be transferred in this Load Relief Plan is currently at 75 MW. This is needed because the net load in 2017 is 267 MW which would cause an overload at West 42nd Street. Because of increase of the Forecasted Load (if we were to transfer 68 MW only, we would have an overload towards the end of the 10yr Load Relief Program), the amount of load to be transferred increased from 68 MW (based on the load forecast of October 27, 2011) to 75 MW (based on the load forecast of November 30, 2011).

9. Have Con Edison looked into any demand response measures to reduce load at the West 42nd Street No. 1 substation? What efforts were made? If none, explain why?

The loads above on Question 7 are the Net Load and already take into consideration load reductions due to Demand Side Management (DSM) and Demand Response (DR)

10. Have the Con Edison staff handling 3G designs, reviewed this project to see how it can maximize or better use the existing infrastructure to minimize cost? What efforts were made? If none, explain why?

The 3G Group analyzed establishing a transferrable feeder group (TFG) in order to defer the creation of the new Clinton network (formerly, Waterside) and have determined that the TFG is not a cost beneficial.

11. Is the current working estimate for this project \$9 million or \$11 million? If it is \$11 million, how much is expected to be spent each year?

Current working estimate is \$11M

2015 - \$2M

2016 – \$6M

2017 - \$3M

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-51
Date of Response: 05/17/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0626 Supp

Subject: Storm Hardening – Project CWE - 1. Provide the current working estimates (CWE) for each of the following Transmission and Substation projects from 2013 to 2017: a. Y94 Bypass b. Overhead Transmission Line Upgrades c. L-Line Splices d. DW/SB Feeder Reconductoring e. East River f. E 13 St. g. E 16 St. PURS Plant h. Gowanus i. Goethals j. Fresh Kills k. E 36 St. l. Seaport m. WTC n. W 49 St o. 59 St Pier p. Hellgate /Bruckner q. Sherman Creek r. Academy 2. Provide the current working estimates (CWE) for each of the following Electric Operations projects from 2013 to 2017: a. Non Submersible 120/208 Volt Transformers/NWP b. 460 Volt NWP c. Re-configure Fulton and Bowling Green Networks d. Switches to Isolate Customer Equipment in Nine Manhattan Networks e. Reduce Circuit Segment Size f. Isolation of Open Wire Spurs from Feeder Main Runs g. Selective Undergrounding of Overhead Infrastructure

Response:

1. Provide the current working estimates (CWE) for each of the following Transmission and Substation projects from 2013 to 2017: a. Y94 Bypass b. Overhead Transmission Line Upgrades c. L-Line Splices d. DW/SB Feeder Reconductoring e. East River f. E 13 St. g. E 16 St. PURS Plant h. Gowanus i. Goethals j. Fresh Kills k. E 36 St. l. Seaport m. WTC n. W 49 St o. 59 St Pier p. Hellgate /Bruckner q. Sherman Creek r. Academy

There are currently no revised estimates for the projects noted, and the current working estimates are consistent with the amounts provided in our initial submission and our preliminary update. For reference, we have provided those amounts below.

- a. Y94 Bypass - \$3.5M
- b. Overhead Transmission Line Upgrades - \$9.5M
- c. L-Line Splices - \$2.9M
- d. DW/SB Feeder Reconductoring - \$2.4M
- e. East River - \$10.349M
- f. E 13 St. - \$116.879M
- g. E 16 St. PURS Plant - \$10.602M
- h. Gowanus - \$16.37M
- i. Goethals - \$29.94M
- j. Fresh Kills - \$19.645M
- k. E 36 St. - \$4.913M
- l. Seaport - \$6.167M

- m. WTC - \$3.885M
- n. W 49 St. - \$2.15M
- o. 59 St. Pier - \$5.7M
- p. Hellgate /Bruckner - \$6.35M
- q. Sherman Creek - \$6.05M
- r. Academy - \$1M

2. Provide the current working estimates (CWE) for each of the following Electric Operations projects from 2013 to 2017: a. Non Submersible 120/208 Volt Transformers/NWP b. 460 Volt NWP c. Re-configure Fulton and Bowling Green Networks d. Switches to Isolate Customer Equipment in Nine Manhattan Networks e. Reduce Circuit Segment Size f. Isolation of Open Wire Spurs from Feeder Main Runs g. Selective Undergrounding of Overhead Infrastructure

There are currently no revised estimates for the projects noted, and the current working estimates are consistent with the amounts provided in our initial submission and our preliminary update. For reference, we have provided those amounts below.

- a. Non submersible 120/208 Volt Transformers/NWP - \$50 million (2013-2016)
- b. 460 Volt NWP - \$40 million (2013-2016)
- c. Re-configure Fulton and Bowling Green Networks – \$21 million (2014)
- d. Switches to Isolate Customer Equipment in Nine Manhattan Networks - \$70 million (2013-2016)
- e. Reduce Circuit Segment Size – \$23.15 million (2013-2016)
- f. Isolation of Open Wire Spurs from Feeder Main Runs - \$12 million (2013-2014)
- g. Selective Undergrounding of Overhead Infrastructure - \$200 million (2015-2016)

Note also the following project for Storm Hardening of the Overhead System: Improvement of Auto-loop Reliability - \$20 million (2014-2016)

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-51
Date of Response: 05/15/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0627

Subject: Structure (Inspections & Repairs) and Emergency Response - The following question refers to the Company's response to DPS-210 question 13 that states, "In 2010 and 2011, capability was shifted to Emergency Response to respond to underground weather related incidents. In 2010, underground Emergency Response required expenditures of \$13.3 million in addition to the budgeted amount. In 2011, underground Emergency Response required expenditures of \$14.3 million in addition to the budgeted amount." 1. For each underground weather related incident in 2010 and 2011, provide: a. The date of each event. b. If the event was related to heat, winter snow/ice, or major storm. c. Type of work included such as contingency, obstructed ducts, burnouts, or emergency diesel generation.

Response:

1a. Please see the table below for the underground weather related incidents in 2010 and 2011.

<u>2010</u>	<u>Event Type</u>
March 12th - 19th	Nor'easter
July 5th - 9th	Heat Wave
July 24th - 25th	Heat Wave
December 26th - 27th	Snow Storm
<u>2011</u>	<u>Event Type</u>
June 8th - 9th	Heat Wave
July 21st - 23rd	Heat Wave
August 27th	Hurricane Irene
October 29th	Snow Storm

1b. Please see the table above.

1c. The type of work performed to respond to the weather-caused impacts of these events is not readily available. In advance of an anticipated underground weather related event, Con Edison will mobilize crews to be prepared to perform any repair and service restoration and support activity that may be required. These activities would include obstructed ducts, burnouts, and emergency diesel generation.

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-53
Date of Response: 05/10/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0656

Subject: Residential Rights and Responsibilities Pamphlet - Describe all current practices to disseminate electronically the Residential Rights and Responsibilities Pamphlet to Consumers. Is it an opt-in or opt-out process?

Response:

The requested information can be found in the attached file “DPS53-E0656 Xfmer Replacement Program Detail.pdf.”

2. What was the average annual maintenance and/or repair cost for each of the transformers listed in question 1 prior to replacement?

Equipment	Average Annual Cost
Washington St - TR 2	\$5,500
Washington St - TR 4	\$22,700
Cherry St - TR 3	\$9,200
Cherry St - TR 4	\$5,500
W. 19th St - TR 1	\$11,400
W. 19th St - TR 2	\$28,000
W. 19th St - TR 3	\$18,600
W. 19th St - TR 4	\$14,900
W. 19th St - TR 5	\$13,400
Dunwoodie - TR N1	\$94,000*
Dunwoodie - PAR N1	\$22,800
Dunwoodie - PAR S1	\$20,700
Dunwoodie - PAR S2	\$22,700
E. 179th St - TR 4	\$15,900

*note: 2 major leak repairs (approx \$150,000 each)

3. For each of the transformer purchased listed below and shown in the Company's response to DPS-37, file "DPS8-E0037 Transformer Replacement EOE Detail 2009-2012.pdf", provide the payment start and completion dates, and their associated costs. If the transformer payments extended beyond the year it was started, separate the costs for each year. a. Account 34352 - Cherry St: Purchase Transformer# 3 b. Account 34375 - Cherry St: Purchase Transformer# 4

Transformer Payment Info - PO 7-27851

Transformer #3 (Account #34352)

- Payments Made Sept 2007 (\$205k); August 2008 (\$1,230k); November 2008 (\$615k)

Transformer #4 (Account #34375)

- Payments Made Sept 2007 (\$205k); August 2008 (\$1,230k); November 2008 (\$615k)

4. Explain the reason for the increased funding for 2013 to 2016 versus the historical spending?

In the timeframe 2007-2012 we completed a total of 9 bank replacements, or an average of 1.5/year. In the timeframe 2013-2016, we have a total of 8 replacements planned, or an average of 2/year. This increased rate of replacement is one of the main drivers of the increased funding in this program. It should also be noted that, of the 9 banks replaced in the historic period, only one of these was a transmission unit (345kV), versus 3 of the units in the 2013-2016 timeframe. These units carry a significantly higher installed cost than the area station banks.

5. Provide the detailed transformer work completed in 2013 to date? Include engineering design, procurement, labor, and construction.

Year to date in 2013, we have completed the physical installation of the Dunwoodie PAR N1. We have also performed work associated with the East 179th Street Transformer 4 replacement project. While that bank went into service in 2011, there was some work associated with the unit's deluge system that was deferred so that it could be coordinated with aspects of the East 179th Street Bus Section Upgrade project.

Purchase orders are in place and we are overseeing the vendor design and fabrication of Dunwoodie PAR S1/S2 and four 138/13kV banks to be installed in the near future at Avenue A, Cherry Street, and/or East 63rd Street. Engineering activities are continuing as well, to finalize work packages for the PAR S1/S2 and Avenue A Transformer installations planned to begin in the fall. Engineering work is also continuing on the installations planned to begin in 2014—Avenue A Transformer 1, Cherry Street Transformer 1, and/or East 63rd Street Transformer 3.

An element of expense breakdown of our 2013 YTD expenditures is attached in file "DPS53-E0656 Xfmer Replacement 2013 YTD by EOE.pdf."

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-53
Date of Response: 05/10/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0657

Subject: Substation Operations – Reliability – High Voltage Test Sets- Company response to DPS-38 - 1. The following table was taken from the Company’s response to DPS-38, file “DPS 8-f-8 answer-DPS8 E38.pdf”, page 2 of 4. Identify the condition of the test sets (e.g. working, defective, damaged) for each of the test sets listed in the table. 2. In your Exhibit_(IIP-6), page 67, a scoring matrix was developed to determine the AC test sets for replacement. Provide a copy of this matrix. 3. Does a “worst” fleet score in the matrix necessarily mean that a test set is damaged or unusable? 4. What is the average cost (include all element of expenses) to purchase and replace one DC High Pot test set? 5. What is the average cost (include all element of expenses) to purchase one mobile AC VLF High Pot test set? 6. What is the average cost (include all element of expenses) to purchase and install one AC VLF High Pot test set in a fixed location? 7. Of the 113 DC test sets in Substation Operations, how many have been replaced to date? 8. Would there be a need to purchase additional mobile and fixed AC VLF test sets given that the Company can utilize the existing mobile units to any locations? If yes, please elaborate further. 9. Provide the engineering development and cost benefit study for the dual AC/DC High Pot test set. 10. What is the cost (include all element of expenses) for the development of the dual AC/DC High Pot prototype? When does the Company expect the delivery of the prototype? What is the cost for each additional dual test sets if proven successful?

Response:

1. Identify the condition of the Test Sets (e.g. working, defective, damaged) for each of the test sets listed in the table
 - a. The majority of these 18 sets listed are still in service (working) with the exception of 4: Harrison Hipotronics CF70 (1985) 28 years, Hellgate SS Phenix C60 (1991) 22 years, Gold St. Phenix C100 (1993) 20 years ,Elmsford SS Phenix C100 (1993) 20 years). The remainder of the aged sets on occasion do require repairs and should be considered for replacement due to their age and service life. Replacing these sets should be done in order to maintain feeder restoration capabilities in their respective stations and therefore maintain reliable electric service to our customers;
2. Provide a copy of the Scoring Matrix

- a. For a copy of the scoring matrix, please see PDF attachment: “DPS53-E0657 HVTS Ranking Tool.pdf”.
3. Does a worst fleet score in the matrix necessarily mean that a test set is damaged or unusable?
 - a. No, having a worst fleet score does not necessarily mean that a test set is unusable. In order to maintain reliability the sets that are unusable are either repaired or replaced if damaged beyond repair. It would be cost prohibitive to replace at the same time all of the aged sets which should be replaced. Therefore the matrix was created to prioritize which sets should be replaced and in what order. Continuing to use these test sets that have high fleet score could impact reliability in the future do to the fact that these sets are more likely to fail while being used for feeder processing activities.
4. What is the average cost (include all element of expenses) to purchase and replace one DC High Pot test set?
 - a. The average cost to replace a DC Test Set is \$137,663 which is based on the costs associated with the purchase of 16 sets in 2009.
 - b. The average elements of expense are broken down as follows

Purchase Equipment	\$109,704
Construction Contracts	\$0
Company Labor	\$11,864
Materials and Supplies	\$35
Other Direct Costs	\$6,319
Indirect Costs	\$9,741

5. What is the average cost (include all element of expenses) to purchase one mobile AC VLF High Pot Test Set?
 - a. The average cost to purchase one mobile AC VLF High Pot Test Set is \$455,453.00
 - b. The average elements of expense are broken down as follows

Purchase Equipment	\$372,925
Construction Contracts	\$0
Company Labor	\$0
Materials and Supplies	\$0
Other Direct Costs	\$0
Indirect Costs	\$82,528

6. What is the average cost (include all element of expenses) to purchase and install one AC VLF High Pot Test Set in a fixed location?

- a. The average cost to purchase and install one AC VLF High Pot Test Set in a fixed location \$733,152.00
- b. The average elements of expense are broken down as follows

Purchase Equipment	\$397,628
Construction Contracts	\$6,040
Company Labor	\$116,409
Materials and Supplies	\$9,784
Other Direct Costs	\$9,103
Indirect Costs	\$194,021

7. Of the 113 DC test sets in Substation Operations, how many have been replaced to date?

- a. Of all the test sets noted above (excluding relatively new substations, 10 years or newer - White Plains, Trade Center, Murray Hill, Grasslands, Mott Haven, Parkview, Rockview, Elmsford 2) there are only a handful of test sets that are original station equipment, these are the 28 year old test sets which are well beyond their useful life.

8. Would there be a need to purchase additional mobile and fixed AC VLF test sets given that the company can utilize the existing mobile units to any locations? If yes please elaborate further.

- a. There is a need for each Area Substation to have AC VLF Testing capability. We intend to continue to purchase and install fixed locations. The use of Mobile Test Sets provides an alternate method of performing tests. However they require drivers to ferry the equipment from station to station depending on where a test set is needed. Fixed locations provide the ability of our work force to respond immediately to feeder outages rather than wait for the arrival of the mobile set. Fixed location installations provide a higher level of safety for our personnel. Installing the High Voltage test cables in conduit reduces tripping hazards and minimizes the potential for contact with energized cables during testing. Our fixed installations also incorporate a keying sequence that reduces human error in selecting the wrong feeder for testing. Fixed locations provide the ability to respond quickly and safely ensuring continuity of service to our customers and safety to our employees. This is not to say we will not buy additional mobile sets. Mobile sets have a place in our system. We have locations that require enclosures to house a fixed set. In those instances we would rely on a mobile set if an enclosure installation becomes cost prohibitive. To date we have not discounted any location from receiving a fixed set.

9. Provide the engineering development and cost benefit study for the dual AC/DC High Pot test set.
- The problem we identified is Very Low Frequency (VLF) AC Hi Pot Test Sets are being installed as part of an initiative to phase out testing with DC Hi-Pots on solid dielectric cables. Currently, we need to use DC test sets to condition feeder faults in order to locate them expeditiously, since AC test sets cannot perform this function. Maintaining both AC and DC test sets in the stations will be difficult in many facilities, as there is insufficient space to house these units. The addition of the VLF AC Hi-Pots Test Sets has proven to be expensive since it requires the installation of a separate test bus and in many instances requires an enclosure or test room. Our solution is to design a dual function test set that will give us the capability to perform AC hi-pots and DC fault locating in one unit. These units would allow us to perform all feeder processing activities with a single test set. Testing and fault locating can utilize a common bus providing uninterrupted Test to Fault location. Our analysis is an AC/DC combo set could be installed in current DC Set positions thereby eliminating the need to purchase additional DC Sets as the fleet ages, installing separate Test Buses and minimizing the need for additional test rooms or enclosures.

<u>Equipment Costs</u>	
AC Test Sets have a direct cost of	\$283,000
DC Test Sets have a direct cost of	\$110,000
AC/DC Combo Test Set estimated direct cost	\$400,000 to \$450,000
<u>Offset Savings</u>	
Cost to install a separate Test Bus	\$300,000 to 400,000
Cost to build a Test facility	\$550,000 to
\$1,000,000	
Cost of Maintaining an additional 62 AC Test Set annually	\$ 75,000
<u>Combo Set Design Costs</u>	
Prototype	\$650,000

10. What is the cost for the development of the dual AC/DC High Pot prototype? When does the company expect delivery of the prototype? What is the cost for each additional dual test set if proven successful?

- a. We believe the cost for the prototype is approximately \$650,000.00. We expect delivery of a prototype 12 months following award of the Purchase Order. We just recently completed the technical evaluations for 2 potential manufacturers and will be pursuing contracts with both to foster a competitive market for the AC/DC dual set. We expect to begin testing a prototype in the fall of 2014. We estimate the price of a dual function AC VLF / DC test set to be \$400,000.00 to \$450,000.00

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-53
Date of Response: 05/03/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0658

Subject: Substation Operations – Reliability – Roof Replacement Program - 1. Exhibit_(IIP-6), page 86, list the roof replacement work for 2012 and 2013. Provide the following information for the roof repair or replacement work at each location: a. Identify the rating for each roof as described in Exhibit_(IIP-6), page 85. b. The cost (include all element of expenses) to repair or replace each roof. c. The start and completion date of the work. 2. What is the rationale for increasing the funding levels to \$3 million for 2013-2015?

Response:

1A. The rating of each roof is listed next to the roof identified on page 86 and is repeated here:

Roof	Rating
Hudson Ave East Pump house	8
W132nd St. M52S PURS R2	6
W132nd St. M52N PURS R4	7
Jamaica Switchgear House	8
Jamaica Pump House 6A	8
Jamaica Pump House 6B	8
Jamaica Pump House 3	8
Vernon Pump House 6	7
Fresh Kills Oil Pump House 1	8
Fresh Kills 34kV Relay House 2	7

Goethals Oil Pump House 1	7
Fox Hills 138kV Relay House	7
Fox Hills 34kV Relay House A&B	7
Fox Hills Fire Pump House	7
Parkchester 1&2 Control Bldg	7
Greenwood Pump House 1	8
E179st. Control Bldg & Penthouse	8
Hell Gate Report Ctr Stair Twr	8
Glendale BR & Battery Rm Add.	8
Astoria East Oil Pump House 3	8
North Queens Pump House 6	7
W49th St. Pump House 6	7
Ramapo Fire Pump House	7
Sprain Brook M2 PURS R2	7
McLean Ave M52N PURS R2	5
McLean Ave M2S PURS R4	7

1B. The cost to repair or replace each roof is provided in the following attachments:

The CWE's or appropriation estimate of each of the roofs is attached in the following attachments:

DPS53 E0658 Astoria East Oil Pump House 3

DPS53 E0658 Copy of C22459C - Various roofing – AW1

DPS53 E0658 Copy of C23510C – Jamaica Switchgear Roof 1

DPS53 E0658 Copy of C23511C – FK Relay House Roof 1

DPS53 E0658 Copy of C23514C – Fox Hills Roof Upgrade 1

DPS53 E0658 Copy of C23515C – Goethal Roof Upgrade 1

DPS53 E0658 Copy of C23516C – Vernon Roof Upgrade 1

DPS53 E0658 Copy of C23739C – Parkchester Roof Upgrade 1

DPS53 E0658 Copy of C23743C – Jamaica PH3 6AB Roof Upgrade 1

DPS53 E0658 Copy of C23746C – W49th PH6 Roof 1

DPS53 E0658 Copy of C23750C – 132nd PURS Roof Upgrade 1

DPS53 E0658 E179th St Control Bldg and Penthouse

DPS53 E0658 Glendale Bathroom and Battery Room

DPS53 E0658 Hell Gate Reporting Center

DPS53 E0658 McLain Ave M52N PURS R2 M52S PURS R4

DPS53 E0658 North Queens Pump House 1

DPS53 E0658 Ramapo Fire Pump House

DPS53 E0658 Sprain Brook M52 PURS R2

1C. Here is the start and completion of each work:

Roof	Start	Completion
Hudson Ave East Pump house	4/6/13	4/11/13
W132nd St. M52S PURS R2	Dec 2011	Jan 2012
W132nd St. M52N PURS R4	Dec 2011	Jan 2012
Jamaica Switchgear House	1/3/12	11/15/12
Jamaica Pump House 6A	4/9/12	4/12/12
Jamaica Pump House 6B	4/9/12	4/12/12
Jamaica Pump House 3	10/4/12	10/9/12
Vernon Pump House 6	2/15/12	2/21/12

Fresh Kills Oil Pump House 1	Fall 2013	Fall 2013
Fresh Kills 34kV Relay House 2	Fall 2013	Fall 2013
Goethals Oil Pump House 1	Oct 2011	Oct 2011
Fox Hills 138kV Relay House	Sept 2011	Feb 2012
Fox Hills 34kV Relay House A&B	Sept 2011	Feb 2012
Fox Hills Fire Pump House	Sept 2011	Feb 2012
Parkchester 1&2 Control Bldg	Nov 2011	Jan 2012
Greenwood Pump House 1	Fall 2013	Fall 2013
E179st. Control Bldg & Penthouse	Fall 2013	Fall 2013
Hell Gate Report Ctr Stair Twr	Fall 2013	Fall 2013
Glendale BR & Battery Rm Add.	Fall 2013	Fall 2013
Astoria East Oil Pump House 3	Fall 2013	Fall 2013
North Queens Pump House 6	Fall 2013	Fall 2013
W49th St. Pump House 6	Fall 2013	Fall 2013
Ramapo Fire Pump House	Fall 2013	Fall 2013
Sprain Brook M2 PURS R2	Fall 2013	Fall 2013
McLean Ave M52N PURS R2	Fall 2013	Fall 2013
McLean Ave M2S PURS R4	Fall 2013	Fall 2013

2. Engineering packages have been issued and appropriations approved for \$2.7M worth of roof replacements planned to be completed in 2013. An additional \$500k has been approved for other required roof replacements, with the required Engineering packages expected to be issued by May 17th. In total, this represents over \$3M worth of work expected to be completed in 2013.

We have also identified ~63 additional roofs that need to be replaced, costing approximately \$5.1M. This work is expected to be designed in 2013, with construction starting in 2014 and completed in 2015. Additionally, on an annual basis, we inspect ~20% of our roofs (~100 roofs). Based on past experience of periodic roof inspections, a portion of the inspected roofs will need replacement. These will be designed in 2014 and replaced in 2015.

PROJECT NO : 23742-10
 BUDGET NO : 8ES2900
 ESTIMATE NO : 23742-10-A409-10001
 EST. DATE : 06/16/2010
 PROJ ENG : P. Medina
 PROJ EST : I. Nazareno *IN BH*
 LOCATION : Astoria East Substation
 DESCRIPTION : Install New Roofing at Pump House #3

CENTRAL ENGINEERING
APPROPRIATION ESTIMATE

Exhibit SEIIP-1
 APPROP: 03/05/2010 07/09/2010
 ENG / DES: 03/05/2010 05/28/2010
 PROCUR: 07/09/2010 10/08/2010
 CONSTR: 10/08/2010 06/04/2011
 IN SERVICE DATE: 06/04/2011
 OUTAGE: NOT REQUIRED

ITEM	MHRS	COMPANY LABOR \$	EQ / MAT \$	MHRS	CONTRACT LABOR \$	EQ / MAT \$	TOTAL DIRECT	3.00% ESCAL	OVERHEADS & AFDC	VAR CONTING	TOTAL
CONSTRUCTION CONTRACTS				215	22,992	8,955	31,946	1,000	9,500	20.00 %	50,946
General Conditions				93	9,752	2,002	11,753	400	3,500	20.00 %	18,753
New EPDM Roofing				58	6,676	5,892	12,568	400	3,800	20.00 %	20,168
Repair and Miscellaneous Works				64	6,564	1,061	7,626	200	2,200	20.00 %	12,026
COMPANY LABOR	86	6,536					6,536	200	5,100	15.00%	13,536
P. M. & I.	46	3,496					3,496	100	2,700	15.00 %	7,196
SSO	40	3,040					3,040	100	2,400	15.00 %	6,340
	86	6,536		215	22,992	8,955	38,482	1,200	14,600	10,200	64,482

SAY \$ 65,000

CAPITAL ESTIMATE TOTAL:	\$	65,000	ASSOCIATED RETIREMENT:	NONE	ASSOCIATED EXPENSE:	NONE
OVERHEADS	CENTRAL ENG:	17.00%	A & S:	3.10%	P'ROLL TAX & PENS:	48.50%
	\$	6,700	\$	1,400	\$	6,500
					0.00%	TOTAL OH'S: \$ 14,600
						AFDC: \$ -

REMARKS:

CENTRAL ENGINEERING	PROJECT MANAGER OR USER ORGANIZATION	CONSTRUCTION MANAGER
APPROVED: P. Medina	APPROVED: J. P. McCoy	APPROVED: J. Floryshak
E-MAIL ON FILE	E-MAIL ON FILE	E-MAIL ON FILE
DATE 07/07/10	DATE 06/18/10	DATE 07/07/10

PROJECT NO : 23737-10
 BUDGET NO : 8ES2900
 ESTIMATE NO : 23737-10-A409-1001
 EST. DATE : 03/05/2010
 PROJ ENG : P. Medina
 PROJ EST : I. Nazareno
 LOCATION : E179th Street
 DESCRIPTION : Replace Roofing @ Control Building

CENTRAL ENGINEERING
APPROPRIATION ESTIMATE

Exhibit SEIIP-1
 APPROP: 03/05/2010 04/05/2010
 ENG / DES: 03/05/2010 03/05/2010
 PROCUR: 03/05/2010 06/04/2010
 CONSTR: 06/04/2010 06/04/2011
 IN SERVICE DATE: 06/04/2011
 OUTAGE: NOT REQUIRED

ITEM	MHRS	COMPANY LABOR \$	EQ / MAT \$	MHRS	CONTRACT LABOR \$	EQ / MAT \$	TOTAL DIRECT	2.00% ESCAL	OVERHEADS & AFDC	VAR CONTING	TOTAL
CONSTRUCTION CONTRACTS				1,284	140,891	50,476	191,367	3,800	55,700	20.00 %	301,067
General Conditions				284	31,239	3,215	34,453	700	10,000	20.00 %	54,153
New EPDM Roof				555	67,190	21,106	88,297	1,800	25,700	20.00 %	138,997
New Kemperol Materials & Applications				314	27,892	23,723	51,615	1,000	15,000	20.00 %	81,115
Miscellaneous Works				131	14,570	2,432	17,003	300	5,000	20.00 %	26,803
COMPANY LABOR	344	26,144					26,144	500	21,000	15.00 %	54,744
P. M. & I.	184	13,984					13,984	300	11,300	15.00 %	29,384
SSO	160	12,160					12,160	200	9,700	15.00 %	25,360
OTHER DIRECT COSTS						1,089	1,089		300		1,689
Independent Testing & Inspection						1,089	1,089		300	20.00 %	1,689
	344	26,144		1,284	140,891	51,565	218,600	4,300	77,000	57,600	357,500

SAY \$ 358,000

CAPITAL ESTIMATE TOTAL:	\$	358,000	ASSOCIATED RETIREMENT:	\$	85,700	ASSOCIATED EXPENSE:	NONE
OVERHEADS	CENTRAL ENG:	16.50%	A & S:	3.10%	P 'ROLL TAX & PENS:	50.35%	TOTAL OH'S: \$ 77,000
	\$	36,900	\$	8,000	\$	32,100	0.00% AFDC: \$ -

REMARKS:

CENTRAL ENGINEERING	PROJECT MANAGER OR USER ORGANIZATION	CONSTRUCTION MANAGER
APPROVED: P. Medina	APPROVED: J. P. McCoy	APPROVED: J. Floryshak
LETTER ON FILE DATE 06/10/10	LETTER ON FILE DATE 06/10/10	LETTER ON FILE DATE 08/10/10

PROJECT NO : 23737-10
 BUDGET NO : 8ES2900
 ESTIMATE NO : 23737-10-R409-1001
 EST. DATE : 03/04/2010
 PROJ ENG : P. Medina
 PROJ EST : I. Nazareno
 LOCATION : E179th Street
 DESCRIPTION : Replace Roofing @ Control Building

CENTRAL ENGINEERING
RETIREMENT ESTIMATE

Exhibit SEIIP-1
 APPROP: 03/05/2010 04/05/2010
 ENG / DES: 03/05/2010 03/05/2010
 PROCUR: 03/05/2010 06/04/2010
 CONSTR: 06/04/2010 06/04/2011
 IN SERVICE DATE: 06/04/2011
 OUTAGE: NOT REQUIRED

ITEM	MHRS	COMPANY LABOR \$	EQ / MAT \$	MHRS	CONTRACT LABOR \$	EQ / MAT \$	TOTAL DIRECT	2.00% ESCAL	OVERHEADS & AFDC	VAR CONTING	TOTAL
CONSTRUCTION CONTRACTS				233	24,981	3,277	28,258	600	4,800	20.00%	40,458
General Conditions				77	8,004	598	8,601	200	1,500	20.00 %	12,401
Existing EPDM Removal				156	16,978	2,679	19,657	400	3,300	20.00 %	28,057
COMPANY LABOR	86	6,536					6,536	200	1,100	15.00%	8,936
P. M. & I.	46	3,496					3,496	100	600	15.00 %	4,796
SSO	40	3,040					3,040	100	500	15.00 %	4,140
OTHER DIRECT COSTS			1,943				1,943		400		2,843
Independent Testing & Inspection			1,633				1,633		300	20.00 %	2,333
Permits			310				310		100	20.00 %	510
	86	6,536	1,943	233	24,981	3,277	36,738	800	6,300	8,400	52,238

SAY \$ 53,000
 Removal Cost \$ 53,000
 Original Cost \$ 32,700
 (Salvage Cost) \$ -
 Retirement Cos 85,700

CAPITAL ESTIMATE TOTAL:	\$ 358,000	ASSOCIATED RETIREMENT:	85,700	ASSOCIATED EXPENSE:	NONE
OVERHEADS	CENTRAL ENG: 16.50%	A & S: 0.00%	P 'ROLL TAX & PENS: 0.00%	TOTAL OH'S: \$	6,300
	\$ 6,300	\$ -	\$ -	0.00% AFDC: \$	-

REMARKS:

CENTRAL ENGINEERING	PROJECT MANAGER OR USER ORGANIZATION	CONSTRUCTION MANAGER
APPROVED: P. Medina	APPROVED: J. P. McCoy	APPROVED: J. Floryshak
LETTER ON FILE	LETTER ON FILE	LETTER ON FILE
DATE 06/10/10	DATE 06/10/10	DATE 06/10/10

PROJECT NO : 23741-10
 BUDGET NO : 8ES2800
 ESTIMATE NO : 23741-10-A409-1001

EST. DATE : 06/17/2010
 PROJ ENG : P. Medina
 PROJ EST : R. Tianco

LOCATION : Glendale Substation

DESCRIPTION : Replace Roofing @ Bathroom & Battery Room Addition

CENTRAL ENGINEERING
APPROPRIATION ESTIMATE

Exhibit SEIIP-1
 APPROP: 03/05/2010 07/09/2010
 ENG / DES: 03/05/2010 05/28/2010
 PROCUR: 07/09/2010 10/08/2010
 CONSTR: 10/08/2010 06/04/2011
 IN SERVICE DATE: 06/04/2011
 OUTAGE: NOT REQUIRED

ITEM	MHRS	COMPANY LABOR \$	EQ / MAT \$	MHRS	CONTRACT LABOR \$	EQ / MAT \$	TOTAL DIRECT	3.00% ESCAL	OVERHEADS & AFDC	VAR CONTING	TOTAL
CONSTRUCTION CONTRACTS				657	70,047	18,575	88,622	2,600	26,500	20.00 %	141,222
General Conditions				155	17,045	3,959	21,004	600	6,400	20.00 %	33,604
REMOVAL WORK				242	21,239	5,248	26,487	800	7,900	20.00 %	42,187
New EPDM Roof				101	11,921	4,919	16,840	500	5,000	20.00 %	26,840
MISCELLANEOUS WORK				160	19,843	4,449	24,291	700	7,200	20.00 %	38,591
COMPANY LABOR	120	9,120					9,120	300	7,400	15.00 %	19,320
P. M. & I.	80	6,080					6,080	200	5,000	15.00 %	12,980
SSO	40	3,040					3,040	100	2,400	15.00 %	6,340
OTHER DIRECT COSTS						2,536	2,536		700	20.00 %	3,936
Independent Testing & Inspection						1,089	1,089		300	20.00 %	1,689
PERMITS						1,447	1,447		400	20.00 %	2,247
	120	9,120		657	70,047	21,111	100,278	2,900	34,600	26,700	164,478

SAY \$ 165,000

CAPITAL ESTIMATE TOTAL:	\$	165,000	ASSOCIATED RETIREMENT:	NONE	ASSOCIATED EXPENSE:	NONE
OVERHEADS	CENTRAL ENG:	17.00%	A & S:	3.10%	P 'ROLL TAX & PENS:	50.35%
	\$	17,400	\$	3,700	\$	13,500
					0.00%	TOTAL OH'S: \$ 34,600
						AFDC: \$ -

REMARKS:

CENTRAL ENGINEERING	PROJECT MANAGER OR USER ORGANIZATION	CONSTRUCTION MANAGER
APPROVED: P. MEDINA	APPROVED: J. MCCOY	APPROVED: J. FLORYSHAK
LETTER ON FILE	LETTER ON FILE	LETTER ON FILE
DATE 07/08/10	DATE 06/18/10	DATE 07/08/10

PROJECT NO : PN23740-10
 BUDGET NO : 8ES2900
 ESTIMATE NO : 23740-10-A409-10001
 EST. DATE : 06/08/2010
 PROJ ENG : P. Medina
 PROJ EST : I. Nazareno
 LOCATION : HELLGATE SUBSTATION
 DESCRIPTION : Reporting Center Stair Tower

CENTRAL ENGINEERING
APPROPRIATION ESTIMATE

Exhibit 2
 APPROP: 03/05/2010 07/09/2010
 ENG / DES: 03/05/2010 05/28/2010
 PROCUR: 07/09/2010 10/08/2010
 CONSTR: 10/08/2010 06/04/2011
 IN SERVICE DATE: 06/04/2011
 OUTAGE: NOT REQUIRED

ITEM	MHRS	COMPANY LABOR \$	EQ / MAT \$	MHRS	CONTRACT LABOR \$	EQ / MAT \$	TOTAL DIRECT	3.00% ESCAL	OVERHEADS & AFDC	VAR CONTING	TOTAL
CONSTRUCTION CONTRACTS				1,693	191,189	80,436	271,625	8,100	78,600	20.00 %	429,925
General Conditions				300	32,645	4,488	37,134	1,100	10,800	20.00 %	58,834
New EPDM Roof				650	74,485	52,047	126,532	3,800	36,600	20.00 %	200,332
Repair Parapet Wall, Eave & Edge Termination				328	39,048	14,024	53,073	1,600	15,400	20.00 %	84,073
Miscellaneous Repairworks				69	7,731	3,426	11,157	300	3,200	20.00 %	17,557
Remove and Reinstall				249	26,083	5,367	31,450	900	9,100	20.00 %	49,750
Miscellaneous Works and Hauling Materials				66	7,257	1,082	8,340	300	2,400	20.00 %	13,240
Minor Electrical Works				32	3,939		3,939	100	1,100	20.00 %	6,139
COMPANY LABOR	344	26,144					26,144	800	20,700	15.00 %	54,744
P. M. & I.	184	13,984					13,984	400	11,000	15.00 %	29,184
SSO	160	12,160					12,160	400	9,700	15.00 %	25,560
OTHER DIRECT COSTS						3,501	3,501	100	900	20.00 %	5,401
Independent Testing and Inspection						544	544		100	20.00 %	744
Permits						2,957	2,957	100	800	20.00 %	4,657
	344	26,144		1,693	191,189	83,937	301,270	9,000	100,200	79,600	490,070

SAY \$ 491,000

CAPITAL ESTIMATE TOTAL:	\$	491,000	ASSOCIATED RETIREMENT:	NONE	ASSOCIATED EXPENSE:	NONE
OVERHEADS	CENTRAL ENG:	16.50%	A & S:	3.10%	P 'ROLL TAX & PENS:	48.50%
	\$	51,200	\$	11,200	\$	37,800
					0.00%	TOTAL OH'S: \$ 100,200
						AFDC: \$ -

REMARKS:

CENTRAL ENGINEERING
 APPROVED: P. Medina
 LETTER ON FILE DATE 06/14/10

PROJECT MANAGER OR USER ORGANIZATION
 APPROVED: J. P. McCoy
 LETTER ON FILE DATE 06/10/10

CONSTRUCTION MANAGER
 APPROVED: J. Floryshak
 LETTER ON FILE DATE 06/14/10

PROJECT NO : 23972-10
 BUDGET NO : 8ES2900
 ESTIMATE NO : 23972-10-A409-10001
 EST. DATE : 07/01/2010
 PROJ ENG : P. Medina
 PROJ EST : I. Nazareno *INBA*
 LOCATION : McLean Avenue Cooling Plant
 DESCRIPTION : FDR M52N PURS R2, FDR M52S PURS R4

CENTRAL ENGINEERING
APPROPRIATION ESTIMATE

Exhibit SEIIP-1
 APPROP: 03/05/2010 07/09/2010
 ENG / DES: 03/05/2010 05/28/2010
 PROCUR: 07/09/2010 10/08/2010
 CONSTR: 10/08/2010 06/04/2011
 IN SERVICE DATE: 06/04/2011
 OUTAGE: NOT REQUIRED

ITEM	MHRS	COMPANY LABOR \$	EQ / MAT \$	MHRS	CONTRACT LABOR \$	EQ / MAT \$	TOTAL DIRECT	3.00% ESCAL	OVERHEADS & AFDC	VAR CONTING	TOTAL
CONSTRUCTION CONTRACTS				459	52,259	7,947	60,206	1,700	18,600	20.00 %	96,506
General Conditions				134	14,821	1,392	16,213	500	4,900	20.00 %	25,913
Removal and Prep M52N R2				95	10,750	476	11,226	300	3,500	20.00 %	18,026
Removal and Prep M52S R4				95	10,750	476	11,226	300	3,500	20.00 %	18,026
New EPDM Roof M52M R2				39	4,884	2,325	7,209	200	2,300	20.00 %	11,609
New EPDM Roof M52S R4				39	4,884	2,325	7,209	200	2,300	20.00 %	11,609
Material Handling and Hauling				56	6,170	952	7,121	200	2,100	20.00 %	11,321
COMPANY LABOR	172	13,072					13,072	400	11,000	15.00 %	28,072
P. M. & I.	92	6,992					6,992	200	5,800	15.00 %	14,892
SSO	80	6,080					6,080	200	5,200	15.00 %	13,180
	172	13,072		459	52,259	7,947	73,278	2,100	29,600	19,600	124,578

SAY \$ 125,000

CAPITAL ESTIMATE TOTAL:	\$	125,000	ASSOCIATED RETIREMENT:	NONE	ASSOCIATED EXPENSE:	NONE
OVERHEADS	CENTRAL ENG:	17.00%	A & S:	3.63%	P 'ROLL TAX & PENS:	51.77%
	\$	12,900	\$	3,200	\$	13,500
					0.00%	TOTAL OH'S: \$ 29,600
						AFDC: \$ -

REMARKS:

CENTRAL ENGINEERING

APPROVED: P. Medina

LETTER ON FILE DATE 08/23/10

PROJECT MANAGER OR USER ORGANIZATION

APPROVED: J. P. McCoy

LETTER ON FILE DATE 08/19/10

CONSTRUCTION MANAGER

APPROVED: J. Floryshak

LETTER ON FILE DATE 08/23/10

PROJECT NO : 23745-10
 BUDGET NO : 8ES2900
 ESTIMATE NO : 23745-10-A409-10001
 EST. DATE : 06/23/2010
 PROJ ENG : P. Medina
 PROJ EST : I. Nazareno
 LOCATION : North Queens S/S
 DESCRIPTION : Pump House #1 Roof Repair

CENTRAL ENGINEERING
APPROPRIATION ESTIMATE

Exhibit SEIIP-1
 START COMPLETION
 APPROP: 03/05/2010 07/09/2010
 ENG / DES: 03/05/2010 05/28/2010
 PROCUR: 07/09/2010 10/08/2010
 CONSTR: 10/08/2010 06/04/2011
 IN SERVICE DATE: 06/04/2011
 OUTAGE: NOT REQUIRED

ITEM	MHRS	COMPANY LABOR \$	EQ / MAT \$	MHRS	CONTRACT LABOR \$	EQ / MAT \$	TOTAL DIRECT	3.00% ESCAL	OVERHEADS & AFDC	VAR CONTING	TOTAL
CONSTRUCTION CONTRACTS				268	28,379	12,691	41,070	1,300	12,600	20.00 %	65,970
General Conditions				93	9,752	2,002	11,753	400	3,700	20.00 %	19,053
Remove Existing Roofing Membrane				40	3,783	1,372	5,155	200	1,600	20.00 %	8,355
New EPDM Roof				71	8,222	8,028	16,250	500	4,900	20.00 %	25,950
Repair and Miscellaneous Works				65	6,621	1,290	7,911	200	2,400	20.00 %	12,611
COMPANY LABOR	114	8,664					8,664	300	7,200	15.00 %	18,564
P. M. & I.	74	5,624					5,624	200	4,700	15.00 %	12,124
SSO	40	3,040					3,040	100	2,500	15.00 %	6,440
	114	8,664		268	28,379	12,691	49,734	1,600	19,800	13.400	84,534

SAY \$ 85,000

CAPITAL ESTIMATE TOTAL:	\$	85,000	ASSOCIATED RETIREMENT:	NONE	ASSOCIATED EXPENSE:	NONE	TOTAL OH'S:	\$	19,800
OVERHEADS	CENTRAL ENG:	17.00%	A & S:	3.63%	P ROLL TAX & PENS:	51.77%	AFDC:	\$	-
	\$	8,700	\$	2,000	\$	9,100	0.00%		

REMARKS:

CENTRAL ENGINEERING	PROJECT MANAGER OR USER ORGANIZATION	CONSTRUCTION MANAGER
APPROVED: P. Medina	APPROVED: J. P. McCoy	APPROVED: J. Floryshak
LETTER ON FILE DATE 08/24/10	LETTER ON FILE DATE 08/23/10	LETTER ON FILE DATE 08/24/10

PROJECT NO : 23747-10
 BUDGET NO : 8ES2900
 ESTIMATE NO : 23747-10-A409-10001
 EST. DATE : 06/30/2010
 PROJ ENG : P. Medina
 PROJ EST : I. Nazareno
 LOCATION : Ramapo S/S
 DESCRIPTION : Fire Pump House Roof Repair

CENTRAL ENGINEERING
APPROPRIATION ESTIMATE

Exhibit SEIIP-1
 APPROP: 03/05/2010 07/09/2010
 ENG / DES: 03/05/2010 05/28/2010
 PROCUR: 07/09/2010 10/08/2010
 CONSTR: 10/08/2010 06/04/2011
 IN SERVICE DATE: 06/04/2011
 OUTAGE: NOT REQUIRED

ITEM	MHRS	COMPANY LABOR \$	EQ / MAT \$	MHRS	CONTRACT LABOR \$	EQ / MAT \$	TOTAL DIRECT	3.00% ESCAL	OVERHEADS & AFDC	VAR CONTING	TOTAL
CONSTRUCTION CONTRACTS				471	43,425	25,302	68,728	2,100	21,400	20.00 %	110,628
General Conditions				118	12,794	303	13,097	400	4,100	20.00 %	21,097
Kemperol Materials and Applications				329	28,154	24,850	53,004	1,600	16,400	20.00 %	85,204
Miscellaneous works				24	2,477	149	2,627	100	900	20.00 %	4,327
COMPANY LABOR	138	10,488					10,488	300	8,700	15.00 %	22,388
P. M. & I.	74	5,624					5,624	200	4,700	15.00 %	12,124
SSO	64	4,864					4,864	100	4,000	15.00 %	10,264
OTHER DIRECT COSTS						2,541	2,541		700	20.00 %	3,941
Independent Testing and Inspection						1,089	1,089		300	20.00 %	1,689
Permits						1,452	1,452		400	20.00 %	2,252
	138	10,488		471	43,425	27,843	81,757	2,400	30,800	22,000	136,957

SAY \$ 137,000

CAPITAL ESTIMATE TOTAL:	\$	137,000	ASSOCIATED RETIREMENT:	NONE	ASSOCIATED EXPENSE:	NONE
OVERHEADS	CENTRAL ENG:	17.00%	A & S :	3.63%	P 'ROLL TAX & PENS:	51.77%
	\$	14,300	\$	3,500	\$	13,000
					0.00%	TOTAL OH'S: \$ 30,800
						AFDC: \$ -

REMARKS:

CENTRAL ENGINEERING

APPROVED: P. Medina

LETTER ON FILE DATE 08/23/10

PROJECT MANAGER OR USER ORGANIZATION

APPROVED: J. P. Mccoy

LETTER ON FILE DATE 08/19/10

CONSTRUCTION MANAGER

APPROVED: J. Floryshak

LETTER ON FILE DATE 08/23/10

PROJECT NO : 23752-10
 BUDGET NO : 8ES2900
 ESTIMATE NO : 23752-10-A409-10001
 EST. DATE : 06/30/2010
 PROJ ENG : P. Medina
 PROJ EST : I. Nazareno
 LOCATION : Sprainbrook S/S
 DESCRIPTION : PURS FDR M52, Unit R2

CENTRAL ENGINEERING
APPROPRIATION ESTIMATE

START COMPLETION
 Exhibit SEIP-1
 APPROP: 03/05/2010 07/09/2010
 ENG / DES: 03/05/2010 05/28/2010
 PROCUR: 07/09/2010 10/08/2010
 CONSTR: 10/08/2010 06/04/2011
 IN SERVICE DATE: 06/04/2011
 OUTAGE: NOT REQUIRED

ITEM	MHRS	COMPANY LABOR \$	EQ / MAT \$	MHRS	CONTRACT LABOR \$	EQ / MAT \$	TOTAL DIRECT	3.00% ESCAL	OVERHEADS & AFDC	VAR CONTING	TOTAL
CONSTRUCTION CONTRACTS				255	28,471	4,125	32,595	900	10,300	20.00 %	52,595
General Conditions				93	9,752	848	10,599	300	3,400	20.00 %	17,199
Removal and Prep				95	10,750	476	11,226	300	3,500	20.00 %	18,026
New EPDM Roof				39	4,884	2,325	7,209	200	2,300	20.00 %	11,809
Material hauling and Handling				28	3,085	476	3,561	100	1,100	20.00 %	5,761
COMPANY LABOR	86	6,536					6,536	200	5,500	15.00 %	14,036
P. M. & I.	46	3,496					3,496	100	3,000	15.00 %	7,596
SSO	40	3,040					3,040	100	2,500	15.00 %	6,440
	86	6,536		255	28,471	4,125	39,131	1,100	15,800	10,600	66,631

SAY \$ 67,000

CAPITAL ESTIMATE TOTAL:	\$	67,000	ASSOCIATED RETIREMENT:	NONE	ASSOCIATED EXPENSE:	NONE
OVERHEADS	CENTRAL ENG:	17.00%	A & S :	3.83%	P 'ROLL TAX & PENS:	51.77%
	\$	6,900	\$	1,800	\$	7,100
					0.00%	TOTAL OH'S: \$ 15,800
						AFDC: \$ -

REMARKS:

CENTRAL ENGINEERING	PROJECT MANAGER OR USER ORGANIZATION	CONSTRUCTION MANAGER
APPROVED: P. Medina	APPROVED: J. P. McCoy	APPROVED: J. Floryshak
LETTER ON FILE	LETTER ON FILE	LETTER ON FILE
DATE 08/23/10	DATE 08/19/10	DATE 08/23/10

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-60
Date of Response: 05/24/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0689

Subject: Ten Year Load Relief Report - Provide all the 2012-2021 and 2013-2022 Area Substation and Sub-transmission Feeder Ten-Year Load Relief Program reports.

Response:

Attached in PDF files titled DPS 60 E0689_LRAS12 (final) and DPS 60 E0689LRP 2013-2022 (2013-05-06).

Please note that the 2013-2022 Area Substation and Subtransmission Feeder Ten-Year Load Relief Program is still preliminary; the final program will be issued at the end of May, 2013.

Response to IR DPS-689 has been redacted as
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Response to IR DPS-689 has been redacted as
CONFIDENTIAL

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-60
Date of Response: 05/24/2013
Responding Witness: Electric Infrastructure & Operations Panel

Question No. :E0690

Subject: Storm Hardening – Response to DPS-523 - Prioritize the list included in the Company's response to DPS-523, DPS-42 E0523B and DPS42- E0523D Customer Isolation Switches.pdf., and include the following: 1. Indicate whether the Isolation Switch or Transformer/Network Protector is a Priority 1, Priority 2, Priority 3, Priority 4, Priority 5, or Priority 6. 2. The criteria to which the Isolation Switch or Transformer/Network Protector would be impacted (i.e., Flood Zone 1, Affected by Sandy, Flood Zone 2, etc.). 3. A total count of the number of locations for each priority grouping.

Response:

1. Attached in PDF titled DPS 60 E-0690 Storm Hardening Priorities and PDF titled DPS 60 690 Response Part 1.
- 2,3. Attached in DPS 60 690 Response Parts 2, 3.

DPS 60 690 Response

Prioritize the lists included in the Company's response to DPS-523, DPS-42 E0523B and DPS-42 E0523D Customer Isolation Switches, and include the following:

- 1. Indicate whether the Isolation Switch or Transformer/Network Protector is a Priority 1, Priority 2, Priority 3, Priority 4, Priority 5, or Priority 6.*
- 2. The criteria to which the Isolation Switch or Transformer/Network Protector would be impacted (i.e., Flood Zone 1, Affected by Sandy, Flood Zone 2, etc.).*
- 3. A total count of the number of locations for each priority grouping.*

Non-Submersible Transformers, 120/208V		
Priority	Criteria	Count
1	Zone 1, Affected by Sandy	85
2	Zone 2, Affected by Sandy	61
3	Zone 1, Not affected by Sandy	45
4	Zone 2, Not affected by Sandy	321
Totals		512

460V Network Protectors in Flood Zones 1 & 2		
Priority	Criteria	Count
1	Zone 1, Affected by Sandy, Backbone feeders & Customers Relocating Switchgear	47
2	Zone 1, Affected by Sandy & Backbone feeders	38
3	Zone 1, Affected by Sandy	39
4	Zone 2, Affected by Sandy	15
5	Zone 1, Not affected by Sandy	56
6	Zone 2, Not affected by Sandy	196
Totals		391

Isolation Switches for High Tension Vaults		
Priority	Criteria	Count
1	Zone 1, Installations affected by Sandy	10
2	Zone 1, Not affected by Sandy	20
3	Zone 2, Not affected by Sandy	40
Totals		70

DPS 60 690 Response

Prioritize the lists included in the Company's response to DPS-523, DPS-42 E0523B and DPS-42 E0523D Customer Isolation Switches, and include the following:

- 1. Indicate whether the Isolation Switch or Transformer/Network Protector is a Priority 1, Priority 2, Priority 3, Priority 4, Priority 5, or Priority 6.*
- 2. The criteria to which the Isolation Switch or Transformer/Network Protector would be impacted (i.e., Flood Zone 1, Affected by Sandy, Flood Zone 2, etc.).*
- 3. A total count of the number of locations for each priority grouping.*

120/208V Transformer/Network Protector Units – Installed in 2013 to date

Priority	Borough	Structure	Feeder	Address
1	Manhattan	V9142	43M50	FDR DR E--OPP E 25 ST BLDG G
1	Manhattan	V9337	43M51	FDR DR E__OPP E 25 ST WLY
1	Manhattan	V9074	43M52	FDR DR E__OPP E 25 ST ELY
1	Manhattan	V9015	43M50	FDR DR E__OPP E 25 ST (U.N.SCH)(WALK-IN)
1	Manhattan	V9045	43M52	FDR DR E__OPP E 25 ST (U.N.SCH) (WALK-IN)
1	Manhattan	V6254	43M51	FDR DR E__OPP E 25 ST (U.N.) (WALK-IN)
1	Manhattan	V8978	43M57	FDR DR E__OPP E 25 ST (U.N.) (WALK-IN)
1	Manhattan	V8820	43M57	FDR DR E__N E 25 ST BLDG G
1	Manhattan	V9721	43M52	FDR DR E__N E 25 ST BLDG A
2	Manhattan	V8952	31M09	RSVLT ISL COLER VLT I S/SLY
4	Manhattan	V1392	6M36	E 22 ST 134
4	Manhattan	V1590	3M42	E 110 ST SWC EAST RIVER DR
1	Brooklyn	V4487	11B05	Coney Island Ave E41S Ave Z
1	Queens	V9223	2Q04	50 Ave N286W 5 St
4	Brooklyn	V4655	4B15	Ralph Ave E190S Glenwood Rd
2	Queens	V8801	2Q12	46 Rd S160E 5 St
2	Brooklyn	V4146	6B43	N 13 St N192E Kent Ave
4	Brooklyn	V4748	4B15	St Jude Pl E45N Skidmore Ave
2	Bronx	V1367	2X08	198-88 EXTERIOR W102N PARK AV

2	Bronx	V5137	2X12	198=88 EXTERIOR W149N PARK
2	Bronx	V3088	2X25	198-88 EXTERIOR ST W74N PARK AV

120/208V Transformer/Network Protector Units – Remaining to be Installed from 2013 - 2016

Priority	Borough	Structure	Feeder	Vault Location
1	Manhattan	V106	27M19	PLATT ST 1 ELY
1	Manhattan	V1330	34M40	BARCLAY ST 125 BASE
1	Manhattan	V139	27M17	MAIDEN LA 113 2 WLY
1	Manhattan	V1664	15M06	RECTOR ST 13 WLY
1	Manhattan	V176	10M07	WEST ST 330 SLY
1	Manhattan	V1845	40M34	BROAD ST 78 NLY
1	Manhattan	V1975	27M04	MAIDEN LA 113 ELY
1	Manhattan	V20	40M32	BROAD ST 102 BASE NYT
1	Manhattan	V201	10M08	WEST ST 330 CTR
1	Manhattan	V2170	15M05	RECTOR ST 13 2 WLY
1	Manhattan	V2187	27M03	WALL ST 114 WLY ELY
1	Manhattan	V2670	40M33	WHITEHALL ST 39
1	Manhattan	V312	27M19	PLATT ST 1 WLY
1	Manhattan	V3155	27M08	WALL ST 114 ELY
1	Manhattan	V3164	10M02	W HOUSTON ST 240 WLY
1	Manhattan	V3198	15M01	RECTOR ST 30 ELY
1	Manhattan	V3267	15M11	WASHINGTON ST 63
1	Manhattan	V329	10M07	WEST ST 340 SLY
1	Manhattan	V3399	40M34	BRIDGE ST 31 CTR
1	Manhattan	V36	27M13	WALL ST 114 BASE
1	Manhattan	V3770	40M37	BROAD ST 78 SLY
1	Manhattan	V3771	15M06	ALBANY ST 21 ELY
1	Manhattan	V3843	10M07	W HOUSTON ST WO MARGINAL ST(WAIK IN)/Pier 40
1	Manhattan	V3919	7M26	E 13 ST 735 CTR
1	Manhattan	V3990	15M11	WASHINGTON ST E87S MORRIS ST SLY
1	Manhattan	V4039	15M05	WASHINGTON ST E87S MORRIS ST NLY

1	Manhattan	V4110	40M38	S WILLIAM ST 28 3 ELY
1	Manhattan	V4263	15M11	RECTOR ST 13 ELY
1	Manhattan	V4264	27M01	CLIFF ST 2 SLY
1	Manhattan	V4269	7M29	E 13 ST 735 WLY
1	Manhattan	V4427	40M35	BRIDGE ST 31 ELY
1	Manhattan	V4847	10M08	W HOUSTON ST WO MARGINAL ST(WAIK IN)/Pier 40
1	Manhattan	V5019	10M08	WEST ST 344 CTR
1	Manhattan	V5022	10M04	WEST ST 340 CTR
1	Manhattan	V5208	40M36	S WILLIAM ST 28 2 WLY
1	Manhattan	V5348	27M01	FULTON ST S27W PEARL ST
1	Manhattan	V550	40M35	S WILLIAM ST 28 ELY
1	Manhattan	V5714	40M39	S WILLIAM ST 28 2 ELY
1	Manhattan	V5722	16M61	W 40 ST 616 CTR
1	Manhattan	V5754	10M06	CHRISTOPHER ST N16W WASHINGTON ST
1	Manhattan	V6257	40M41	BEAVER ST 35 ELY ELY
1	Manhattan	V627	10M04	W HOUSTON ST WO MARGINAL ST/ Pier 40
1	Manhattan	V6560	40M37	BROAD ST 102
1	Manhattan	V663	34M35	BARCLAY ST 125 BASE
1	Manhattan	V7030	27M14	WALL ST 120
1	Manhattan	V8012	27M04	FULTON ST 40 SLY
1	Manhattan	V8708	15M11	WASHINGTON ST E83N BATTERY PL
1	Manhattan	V8716	40M38	BEAVER ST 35 ELY WLY
1	Manhattan	V8828	43M50	FDR DR E__OPP E 25 ST SLY
1	Manhattan	V8837	15M06	WASHINGTON ST E__N BATTERY P
1	Manhattan	V8947	15M05	WASHINGTON ST E95N BATTERY PL
1	Manhattan	V9209	43M51	FDR DR E__OPP E 25 ST BLDG G
1	Manhattan	V9716	43M52	FDR DR E__OPP E 25 ST BLDG G
1	Manhattan	V9868	40M39	BROAD ST 78 SUB BASE
2	Manhattan	V1067	40M31	BATTERY PARK WO STATE ST
2	Manhattan	V1075	27M05	MAIDEN LA 96
2	Manhattan	V1275	13M60	11 AV 46 2 SLY
2	Manhattan	V1276	43M51	E 34 ST 401 ELY

2	Manhattan	V1512	13M61	11 AV 46 NLY
2	Manhattan	V1688	31M51	RSVLT ISL COLER VLT I S/CTR
2	Manhattan	V1995	6M36	E 20 ST 540 (EO 1 AV) WLY
2	Manhattan	V2673	6M36	E 14 ST NS OPP WBL AV B ELY
2	Manhattan	V2751	6M22	E 20 ST 540 (EO 1 AV) ELY
2	Manhattan	V277	40M32	BROAD ST 102 BASE NYT
2	Manhattan	V2774	43M57	E 35 ST 402 ELY
2	Manhattan	V2921	13M54	11 AV 46 2 NLY
2	Manhattan	V3654	27M06	MAIDEN LA 80 ELY
2	Manhattan	V3666	27M11	WALL ST 114
2	Manhattan	V3747	27M19	MAIDEN LA 80 WLY
2	Manhattan	V5479	40M44	WATER ST 92
2	Manhattan	V586	31M09	RSVLT ISL COLER VLT J/ NLY (Hospital)
2	Manhattan	V848	31M51	RSVLT ISL COLER VLT J N/CTR (Hospital)
2	Manhattan	V9107	31M58	RSVLT ISL COLER VLT J N/NLY (Hospital)
2	Manhattan	V974	31M57	RSVLT ISL COLER VLT J N/SLY (Hospital)
2	Manhattan	V9766	6M28	1 AV 370 BLDG 4-14
3	Manhattan	V1557	40M37	BEAVER ST 32 2 ELY
3	Manhattan	V1587	15M10	GREENWICH ST 110 NLY
3	Manhattan	V231	40M39	BEAVER ST 32 WLY
3	Manhattan	V254	43M55	1 AV ES OPP 32 ST CTR
3	Manhattan	V2739	44M02	PARK AV E_S E 135 ST NLY
3	Manhattan	V2864	44M04	PARK AV E_S E 135 ST 2 SLY
3	Manhattan	V305	15M06	BATTERY PL 5 VENT WLY
3	Manhattan	V3145	15M12	WASHINGTON ST 28 (OPP)
3	Manhattan	V3647	43M51	1 AV ES OPP 32 ST 2 NLY
3	Manhattan	V3677	40M38	BEAVER ST 32 ELY
3	Manhattan	V418	43M52	1 AV ES OPP 32 ST NLY
3	Manhattan	V422	43M52	E 33 ST S110W 1 AV
3	Manhattan	V4475	27M04	PINE ST 79
3	Manhattan	V4489	13M54	10 AV 230
3	Manhattan	V4491	15M09	ALBANY ST 2
3	Manhattan	V4492	40M32	BEAVER ST 1 2 WLY

3	Manhattan	V514	15M08	BATTERY PL 5 VENT 2 ELY
3	Manhattan	V5816	40M45	WATER ST E__S WALL ST
3	Manhattan	V5825	10M12	W HOUSTON ST 240 2 ELY
3	Manhattan	V5832	10M02	W HOUSTON ST 209 2 ELY
3	Manhattan	V5846	16M80	W 40 ST 616 ELY
3	Manhattan	V6038	16M64	W 42 ST 267
3	Manhattan	V8330	43M50	1 AV ES OPP 32 ST 2 SLY
3	Manhattan	V8345	40M33	PEARL ST 2 ELY
3	Manhattan	V8449	22M66	WASHINGTON ST W18N VESTRY ST
3	Manhattan	V8460	15M11	GREENWICH ST 110 SLY
3	Manhattan	V8469	7M37	E 6 ST S27E AV D
3	Manhattan	V8670	40M37	BRIDGE ST S90W BROAD ST
3	Manhattan	V8813	43M52	WATERSIDE PLZ 25 BLDG D SLY
3	Manhattan	V920	13M61	W 28 ST 632 ELY
3	Manhattan	V9276	43M50	E 36 ST 410 *SUBSTA LP1*
3	Manhattan	V9315	43M57	WATERSIDE PLZ 25 BLDG D NLY
3	Manhattan	V9410	43M57	FDR DR E__OPP E 25 ST NLY
3	Manhattan	V9418	43M51	FDR DR E_N E 25 ST BLDG A (WALK IN)
3	Manhattan	V9604	43M51	WATERSIDE PLZ 25 BLDG D CTR
4	Manhattan	V1044	22M62	HUDSON ST 60 3 SLY
4	Manhattan	V110	6M22	E 14 ST NS OPP WBL AV B WLY
4	Manhattan	V1142	40M30	BATTERY PL WO STATE ST UNDER
4	Manhattan	V1146	7M57	AVE C W23N E 4 ST
4	Manhattan	V1167	3M49	E 94 ST 340 CTR
4	Manhattan	V1190	31M57	RSVLT ISL COLER VLT I S/NLY
4	Manhattan	V1293	22M69	WORTH ST 2 2 WLY
4	Manhattan	V1436	13M42	11 AV 46 SLY
4	Manhattan	V1475	39M53	W 47 ST 625 ELY
4	Manhattan	V151	40M36	BROAD ST 102 BASE NYT
4	Manhattan	V1510	8M54	WHITE ST 101 WLY
4	Manhattan	V15223	23M64	W 63 ST 400 WLY
4	Manhattan	V1591	22M69	DESBROSSES ST 2 WLY
4	Manhattan	V1604	10M04	LEROY ST 130

4	Manhattan	V1734	1M01	9 AV E40N W 205 ST
4	Manhattan	V178	22M70	WORTH ST 2 3 WLY
4	Manhattan	V1823	43M60	1 AV ES OPP 32 ST SLY
4	Manhattan	V1825	44M09	PARK AV E_S E 135 ST
4	Manhattan	V186	22M62	HUDSON ST 195
4	Manhattan	V1861	23M65	W 66 ST 433 ELY
4	Manhattan	V1943	43M55	E 37 ST 400
4	Manhattan	V1946	16M61	W 42 ST 653 CTR
4	Manhattan	V2025	40M36	BRIDGE ST 31 WLY
4	Manhattan	V2071	16M82	W 40 ST 616 WLY
4	Manhattan	V2108	8M56	WHITE ST 101 2 WLY
4	Manhattan	V2255	10M01	SPRING ST 279 ELY
4	Manhattan	V2308	10M07	BARROW ST 125 CTR
4	Manhattan	V2389	10M11	VAN DAM ST 78 WLY
4	Manhattan	V244	27M15	MAIDEN LA 113 2 ELY
4	Manhattan	V2488	10M02	W HOUSTON ST 284 2 ELY
4	Manhattan	V2531	10M06	BANK ST 140 ELY
4	Manhattan	V2542	10M07	WASHINGTON ST 641 NLY
4	Manhattan	V2544	10M01	W HOUSTON ST 284 ELY
4	Manhattan	V2581	10M03	VAN DAM ST 87 ELY
4	Manhattan	V2596	40M39	BEAVER ST 79 WLY
4	Manhattan	V2697	2M26	8 AV W592N W 155 ST 2 ELY
4	Manhattan	V2718	43M52	E 37 ST 400 ELY
4	Manhattan	V2741	2M19	8 AV W592N W 155 ST 3 ELY
4	Manhattan	V28	3M58	E 94 ST 340 WLY
4	Manhattan	V2823	43M51	E 35 ST 412 WLY
4	Manhattan	V2829	2M43	8 AV W592N W 155 ST ELY
4	Manhattan	V2853	7M37	CHERRY ST 275
4	Manhattan	V2860	34M37	CHAMBERS ST 157
4	Manhattan	V2979	13M42	W 26 ST 508
4	Manhattan	V3002	10M06	WASHINGTON ST 617
4	Manhattan	V3011	15M07	BATTERY PL 5 VENT ELY
4	Manhattan	V3012	7M38	CHERRY ST 265 WLY

4	Manhattan	V3014	22M70	LISPENARD ST 4 ELY
4	Manhattan	V3024	31M58	RSVLT ISL COLER VLT I SLY
4	Manhattan	V3216	10M04	VAN DAM ST 87 WLY
4	Manhattan	V3243	15M10	RECTOR ST 13 2 ELY
4	Manhattan	V32810	23M65	W 63 ST 400 2 WLY
4	Manhattan	V3291	34M35	HUDSON ST 21 NLY
4	Manhattan	V3312	34M36	HUDSON ST 21 WLY
4	Manhattan	V3328	44M19	W 142 ST 2 ELY
4	Manhattan	V3379	34M39	BARCLAY ST 125 BASE
4	Manhattan	V3569	27M10	MAIDEN LA 80 2 ELY
4	Manhattan	V3576	40M36	BEAVER ST 32 2 WLY
4	Manhattan	V3635	27M20	CLIFF ST 2 CTR
4	Manhattan	V3732	15M07	GREENWICH ST 109 WALK IN
4	Manhattan	V3849	22M70	WALKER ST 60 ELY
4	Manhattan	V3852	15M12	WASHINGTON ST 123
4	Manhattan	V4025	6M37	1 AV E24N E 21 ST
4	Manhattan	V4252	22M65	LISPENARD ST 4 3 WLY
4	Manhattan	V426	10M04	WEST ST 344 NLY
4	Manhattan	V4278	10M03	CHARLTON ST 90
4	Manhattan	V428	34M36	BARCLAY ST 125 BASE
4	Manhattan	V4322	7M52	E 13 ST 735 ELY
4	Manhattan	V4330	40M43	BEAVER ST 89 ELY
4	Manhattan	V4343	22M72	HUDSON ST 182 SLY CURB
4	Manhattan	V4534	10M02	W 13 ST S29E 9 AV
4	Manhattan	V4578	15M05	TRINITY PL 56 SLY
4	Manhattan	V4584	8M48	WHITE ST 101 2 ELY
4	Manhattan	V4602	10M07	HORATIO ST S64W WASHINGTON
4	Manhattan	V4605	8M53	WHITE ST 101 ELY
4	Manhattan	V4632	15M06	TRINITY PL 56 NLY
4	Manhattan	V464	15M05	BATTERY PL 5 VENT 2 WLY
4	Manhattan	V4647	43M51	E 37 ST 400 2 ELY
4	Manhattan	V4727	22M69	LISPENARD ST 4 2 WLY
4	Manhattan	V4749	13M50	W 23 ST 435

4	Manhattan	V4767	22M68	ST JOHNS LA 6 (WALK IN) SLY
4	Manhattan	V4872	40M36	BEAVER ST 38
4	Manhattan	V4895	40M35	BROAD ST 102 NYT BASE A
4	Manhattan	V4936	40M34	BROAD ST 102 NYT BASE A
4	Manhattan	V4946	8M62	CHERRY ST 130
4	Manhattan	V4949	3M50	1 AV W26N E 107 ST
4	Manhattan	V4967	13M50	W 26 ST N21W 10 AV
4	Manhattan	V4979	22M69	HUDSON ST 60 NLY
4	Manhattan	V4991	40M43	WALL ST 99
4	Manhattan	V5008	16M72	W 42 ST 653 ELY
4	Manhattan	V5024	10M03	MORTON ST 75 WLY
4	Manhattan	V5029	39M50	W 43 ST 601 WLY
4	Manhattan	V5042	40M37	S WILLIAM ST 28 3 WLY
4	Manhattan	V51	27M18	MAIDEN LA 113 WLY
4	Manhattan	V5147	22M72	HUDSON ST 60 2 NLY
4	Manhattan	V5188	22M61	LISPENARD ST 4 WLY
4	Manhattan	V5214	10M12	HUDSON ST 346
4	Manhattan	V5229	43M50	E 34 ST 332
4	Manhattan	V5249	10M08	WEST ST 340 NLY
4	Manhattan	V5367	8M52	MONROE ST 2
4	Manhattan	V5383	13M61	MARGINAL ST W__N W 20 ST (INSIDE)
4	Manhattan	V5389	13M63	W 18 ST N200W 9 AV
4	Manhattan	V5452	13M50	MARGINAL ST W__N W 20 ST (INSIDE)
4	Manhattan	V5529	13M60	MARGINAL ST W__N W 20 ST (INSIDE)
4	Manhattan	V5532	8M55	MONROE ST 40
4	Manhattan	V5545	34M39	READE ST S__E GREENWICH ST
4	Manhattan	V5546	27M02	SOUTH ST 59
4	Manhattan	V56190	44M20	W 143 ST N169E LENOX AV
4	Manhattan	V5630	10M02	HUDSON ST 623
4	Manhattan	V5631	10M01	VAN DAM ST 78 CTR
4	Manhattan	V5648	22M61	HUDSON ST 182 NLY
4	Manhattan	V5709	7M31	COLUMBIA ST W__N RIVINGTON ST
4	Manhattan	V5713	10M03	W HOUSTON ST 240 2 WLY

4	Manhattan	V5815	10M02	VAN DAM ST 78 CTR
4	Manhattan	V5864	3M63	2 AV W20N E 103 ST
4	Manhattan	V5917	13M60	W 23 ST 524
4	Manhattan	V5931	10M08	BARROW ST 125 ELY
4	Manhattan	V5958	22M72	WALKER ST 60 WLY
4	Manhattan	V5968	16M74	W 42 ST 267 ELY
4	Manhattan	V6	40M36	BROAD ST 102 BASE NYT
4	Manhattan	V6028	40M40	BEAVER ST 35 CTR ELY
4	Manhattan	V6036	22M71	HUDSON ST 181
4	Manhattan	V6041	22M67	WORTH ST 2 WLY
4	Manhattan	V6188	40M41	PEARL ST 113 WLY ELY
4	Manhattan	V6234	22M68	WORTH ST 2 ELY
4	Manhattan	V6304	39M51	W 43 ST 601 2ND WLY
4	Manhattan	V6344	7M34	AVE B W37S E 14 ST
4	Manhattan	V6360	10M04	MORTON ST 75 ELY
4	Manhattan	V6383	10M03	JANE ST N22W GREENWICH ST
4	Manhattan	V6416	10M08	WASHINGTON ST 641 CTR
4	Manhattan	V643	10M09	W HOUSTON ST 209 WLY
4	Manhattan	V6447	10M03	KING ST 100 2 WLY ELY
4	Manhattan	V6499	23M61	FREEDOM PL 9 NLY
4	Manhattan	V6527	43M57	E 34 ST 401 CTR
4	Manhattan	V6559	34M39	MURRAY ST S100W W BROADWAY
4	Manhattan	V6654	10M04	VAN DAM ST S150W HUDSON ST
4	Manhattan	V6746	13M59	W 15 ST S150E 10 AV ELY
4	Manhattan	V6757	13M62	W 15 ST 419 ELY CTR
4	Manhattan	V6771	23M61	W 71 ST 400 CTR
4	Manhattan	V6824	31M56	RSVLT ISL G-WATER BLDG D NLY
4	Manhattan	V6850	13M53	W 15 ST S150E 10 AV CTR
4	Manhattan	V6915	13M54	W 15 ST S150E 10 AV WLY
4	Manhattan	V6935	31M09	RSVLT ISL G-WATER BLDG D SWL
4	Manhattan	V6974	23M67	W 68 ST 444 CTR
4	Manhattan	V6987	44M11	1 AV W232S E 124 ST
4	Manhattan	V6996	23M64	W 66 ST 433 WLY

4	Manhattan	V7053	23M69	FREEDOM PL 9 2 NLY
4	Manhattan	V7057	27M03	FULTON ST 40 NLY
4	Manhattan	V7062	10M01	LEROY ST 126
4	Manhattan	V7090	22M67	W BROADWAY N12E SPRING ST
4	Manhattan	V7145	40M44	PEARL ST 113 ELY ELY
4	Manhattan	V7152	10M05	WASHINGTON ST 641 SLY
4	Manhattan	V7169	31M55	E 61 ST 511
4	Manhattan	V7183	39M55	W 43 ST 601 2ND ELY
4	Manhattan	V7231	23M69	W 71 ST 400 ELY
4	Manhattan	V7368	10M05	LEROY ST 130
4	Manhattan	V7376	23M67	W 71 ST 401
4	Manhattan	V7462	22M62	HUDSON ST E58N LAIGHT ST
4	Manhattan	V7551	43M56	E 34 ST 401
4	Manhattan	V7552	10M12	HUDSON ST 435
4	Manhattan	V7572	23M67	RIVERSIDE BLVD 80 CTR_W 64 ST
4	Manhattan	V7646	23M65	RIVERSIDE BLVD 80 WLY_W 64 ST
4	Manhattan	V7693	16M80	W 42 ST N123E 11 AV
4	Manhattan	V7704	23M62	RIVERSIDE BLVD 100 WLY_W 64 ST
4	Manhattan	V7789	10M14	7 AV W41S COMMERCE ST
4	Manhattan	V7823	23M61	RIVERSIDE BLVD 100 ELY_W 64 ST
4	Manhattan	V787	15M12	WASHINGTON ST E73N BATTERY PL
4	Manhattan	V7890	3M48	E 107 ST N74E PARK AV
4	Manhattan	V7931	23M60	RIVERSIDE BLVD 80 ELY_W 64 ST
4	Manhattan	V7963	23M65	W 68 ST 444 WLY
4	Manhattan	V80784	23M67	W 63 ST 400 3 WLY
4	Manhattan	V8079	23M60	W 71 ST 400 WLY
4	Manhattan	V8110	39M54	W 43 ST 601 ELY
4	Manhattan	V8151	10M04	HUDSON ST 366 3 NLY US IMMIGRATION & NATURALIZATION SVS. 201 VARICK ST
4	Manhattan	V8188	44M02	5 AV 2289 BLDG E F G
4	Manhattan	V8261	13M59	W 15 ST 419 WLY CTR
4	Manhattan	V8277	44M02	MADISON AV W30S E 135 ST
4	Manhattan	V8281	40M39	S WILLIAM ST 1 SLY

4	Manhattan	V8285	22M71	WORTH ST 2 3 ELY
4	Manhattan	V829	40M32	BRIDGE ST WO STATE STUNDERP
4	Manhattan	V8325	22M70	DESBROSSES ST 2 ELY
4	Manhattan	V8360	23M67	FREEDOM PL 9 2 SLY
4	Manhattan	V8362	23M69	W 68 ST 455 ELY
4	Manhattan	V8365	23M61	W 68 ST 455 CTR
4	Manhattan	V8368	23M64	W 68 ST 455 WLY
4	Manhattan	V8387	23M60	W 68 ST 444 ELY
4	Manhattan	V8432	8M56	WALKER ST S81E LAFAYETTE ST
4	Manhattan	V8487	22M70	HUDSON ST 56 BASE
4	Manhattan	V8514	10M04	KING ST 100 WLY ELY
4	Manhattan	V853	13M61	W 28 ST 628 WLY
4	Manhattan	V8536	22M61	BROADWAY 401
4	Manhattan	V8548	10M11	W HOUSTON ST 240 ELY
4	Manhattan	V8560	40M34	S WILLIAM ST 28 WLY
4	Manhattan	V8622	22M72	WORTH ST 2 2 ELY
4	Manhattan	V8639	27M11	PEARL ST 157 SLY SLY
4	Manhattan	V8686	10M09	7 AV W37N S.APEX BEDFORD ST
4	Manhattan	V872	16M70	W 42 ST 551
4	Manhattan	V8734	44M09	E 135 ST S25E MADISON AV
4	Manhattan	V8750	22M69	WOOSTER ST E27S BROOME ST
4	Manhattan	V876	43M54	E 37 ST 400 LIGHT POWER
4	Manhattan	V8793	1M11	NAGLE AV W26N DYCKMAN ST
4	Manhattan	V8798	43M51	FDR DR E__N E 25 ST SLY (WALK-IN)
4	Manhattan	V8801	43M57	FDR DR E__N E 25 ST BLDG C
4	Manhattan	V8862	27M20	MAIDEN LA 73 ELY
4	Manhattan	V8873	40M41	BEAVER ST 89 WLY
4	Manhattan	V891	16M82	W 42 ST 653 WLY
4	Manhattan	V8963	15M08	BROADWAY 1 NLY
4	Manhattan	V8979	22M65	N MOORE ST 74 CTR
4	Manhattan	V8998	3M51	E 106 ST S45W 2 AV
4	Manhattan	V9069	43M50	FDR DR E__OPP E 25 ST BLDG C (WALK-IN)
4	Manhattan	V9075	43M57	FDR DR E_N E 25 ST BLDG A (WALK IN)

4	Manhattan	V9095	34M39	GREENWICH ST 328 SLY
4	Manhattan	V9105	22M70	HARRISON ST 32 CTR
4	Manhattan	V9126	22M66	N MOORE ST 74 WLY
4	Manhattan	V9130	10M02	MORTON ST 72 ELY
4	Manhattan	V9219	7M23	COLUMBIA ST E206N RIVINGTON
4	Manhattan	V9232	10M06	BARROW ST 125 WLY
4	Manhattan	V9246	10M08	BANK ST 140 CTR
4	Manhattan	V9249	13M54	10 AV E47N W 26 ST
4	Manhattan	V925	27M20	MAIDEN LA 80 2 WLY
4	Manhattan	V9252	43M52	FDR DR E__N E 25 ST BLDG C(WALK IN)
4	Manhattan	V9259	10M06	CHARLES ST N20W WASHINGTON
4	Manhattan	V9271	3M50	E 94 ST 340 ELY
4	Manhattan	V9297	43M50	FDR DR E__N E 25 ST BLDG A(WALK IN)
4	Manhattan	V9338	44M11	E 116 ST N36E 1 AV
4	Manhattan	V9354	13M61	W 19 ST N576W 9 AV
4	Manhattan	V9357	7M52	RIVINGTON ST 283
4	Manhattan	V9361	7M22	CHERRY ST 265 ELY
4	Manhattan	V9400	22M69	N MOORE ST 74 ELY
4	Manhattan	V9435	22M65	HARRISON ST 32 WLY
4	Manhattan	V9480	34M35	GREENWICH ST 328 CTR
4	Manhattan	V95147	10M12	W HOUSTON ST 209 3 ELY
4	Manhattan	V9562	22M71	HUDSON ST 60 3 NLY
4	Manhattan	V9652	34M36	GREENWICH ST 328 NLY
4	Manhattan	V9827	23M60	FREEDOM PL 9 SLY
4	Manhattan	V985	43M52	E 35 ST 402 CTR
4	Manhattan	V9901	8M56	WALKER ST S88E CORTLANDT ALLEY
4	Manhattan	V9916	13M59	W 23 ST N33W 9 AV
4	Manhattan	V9968	16M72	W 42 ST N38E 11 AV
1	Brooklyn	V2805	11B01	2601 Ocean Pkwy
1	Brooklyn	V1570	11B03	2601 Ocean Pkwy
1	Brooklyn	V2758	11B05	2601 Ocean Pkwy
1	Brooklyn	V1563	11B06	2601 Ocean Pkwy
1	Brooklyn	V6742	11B08	2601 Ocean Pkwy

1	Brooklyn	V6609	11B10	2601 Ocean Pkwy
1	Brooklyn	V6016	11B09	W 33 St W564N Neptune Ave
1	Brooklyn	V5964	11B07	W 33 St W574N Neptune Ave
1	Brooklyn	V6005	11B03	W 33 St W583N Neptune Ave
1	Brooklyn	V6304	11B09	Surf Ave S341E West 8 St
1	Brooklyn	V6527	11B05	Surf Ave S488E West 8 St
1	Brooklyn	V4584	11B03	2001 Oriental Blvd
1	Brooklyn	V4579	11B07	2001 Oriental Blvd
1	Brooklyn	V4631	11B10	2001 Oriental Blvd
1	Brooklyn	V4516	11B06	E 13 St W143S Ave Z
1	Queens	V4000	2Q07	Borden Ave N/S W/O 5 St
1	Queens	V4300	2Q08	Borden Ave N/S W/O 5 St
1	Queens	V7985	2Q11	Borden Ave N/S W/O 5 St
1	Queens	V2102	2Q12	Borden Ave N/S W/O 5 St
1	Brooklyn	V5261	1B52	Hamilton Ave E137S Van Brunt St
2	Brooklyn	V5237	1B53	Hamilton Ave E137S Van Brunt St
2	Brooklyn	V5104	1B63	Hamilton Ave W137S Van Brunt St
2	Brooklyn	V5324	1B64	Hamilton Ave W137S Van Brunt St
2	Brooklyn	V4370	1B92	Hudson St N100W Marshall St
2	Brooklyn	V4336	1B93	Hudson St N100W Marshall St
2	Brooklyn	V5214	10B68	Ocean Ave E30N Ave Y
2	Brooklyn	V5222	10B63	Ocean Ave E40N Ave Y
2	Brooklyn	V2045	8B88	4014 1 Ave W120S 39 St
3	Brooklyn	V1514	6B51	38 Ash St S20W McGuinness Blvd
3	Brooklyn	V1535	6B52	38 Ash St S20W McGuinness Blvd
3	Brooklyn	V7211	1B70	Amity St N110E Hicks St
3	Brooklyn	V7537	1B66	Amity St N134E Hicks St
3	Brooklyn	V6725	1B63	Amity St N150E Hicks St
3	Brooklyn	V6615	1B54	Amity St N75E Hicks St
4	Brooklyn	V6888	1B53	Amity St N85E Hicks St
4	Brooklyn	V3231	10B68	Nostrand Ave E240N Ave Z
4	Brooklyn	V1578	10B66	Nostrand Ave E275N Ave Z
4	Brooklyn	V1733	10B67	Nostrand Ave E271N Ave Z

4	Queens	V7368	2Q11	46 Rd N200W Vernon Blvd
4	Queens	V2169	2Q12	46 Rd N200W Vernon Blvd
4	Queens	V1685	2Q16	Thompson Ave S48W 44 Dr
4	Queens	V8111	2Q12	Vernon Blvd W227S 45 Ave
4	Queens	V8344	2Q04	Vernon Blvd W312S 45 Ave
4	Queens	V8183	2Q15	Pearson St E223S Jackson Ave
4	Queens	V8008	1Q12	Vernon Blvd W10S 41 Ave
4	Queens	V7683	1Q13	Vernon Blvd W13S 41 Ave
4	Queens	V8545	1Q04	Vernon Blvd W24N 41 Ave
4	Queens	V9151	2Q01	Review Ave W108S Greenpoint Ave
4	Queens	V3724	2Q13	Review Ave W131S Greenpoint Ave
4	Queens	V5290	2Q14	Review Ave W92S Greenpoint Ave
4	Queens	V1169	2Q01	Hunters Point Ave N263W 30 St
4	Brooklyn	V7651	1B70	45 Washington St E30S Water St
4	Brooklyn	V7903	1B71	45 Washington St E50S Water St
4	Brooklyn	V8372	1B67	45 Washington St E60S Water St
4	Brooklyn	V8191	1B66	Washington St E40S Water St
4	Brooklyn	V3389	8B88	35 St S150W 4 Ave
4	Brooklyn	V4873	4B06	Ave L N559E Ralph Ave
4	Brooklyn	V4929	4B09	Ave L N575E Ralph Ave
4	Brooklyn	V5011	4B08	Ave L N635E Ralph Ave
4	Brooklyn	V4634	4B01	Ralph Ave E190S Glenwood Rd
4	Brooklyn	V4713	4B08	Ralph Ave E190S Glenwood Rd
4	Brooklyn	V7920	6B43	Kent Ave W120N S 9 St
4	Brooklyn	V8192	6B57	Kent Ave W130N S 9 St
4	Brooklyn	V7958	6B41	Kent Ave W140N S 9 St
4	Brooklyn	V8454	6B44	110 Green St
4	Brooklyn	V9543	6B51	110 Green St
4	Brooklyn	V7018	6B43	110 Green St
4	Brooklyn	V5524	3B88	Foster Ave S345E E 99 St
4	Brooklyn	V5114	3B87	Foster Ave S380E E 99 St
4	Brooklyn	V5319	3B85	Foster Ave S395E E 99 St
2	Brooklyn	V4719	3B85	Farragut Rd N108E E 105 St

2	Brooklyn	V5459	3B85	Foster Ave S315W E 105 St
2	Brooklyn	V5194	3B86	Foster Ave S315W E 105 St
2	Brooklyn	V5213	3B87	Foster Ave S315W E 105 St
2	Brooklyn	V5972	3B87	E 104 St W12S Farragut Rd
2	Brooklyn	V5994	3B85	E104 St W12S Farragut Rd
2	Brooklyn	V5957	3B88	E 104 St W12S Farragut Rd
2	Brooklyn	V2188	8B81	39 St S142W 2 Ave
2	Brooklyn	V4986	10B68	Batchelder St E300N Ave Z
2	Brooklyn	V5516	10B65	Batchelder St E320N Ave Z
2	Brooklyn	V5543	10B68	Ave Z N310E Haring St
2	Queens	V9192	1Q22	40 Ave S22W 10 St
2	Queens	V9992	2Q08	31 St W50S 47 Ave
2	Queens	V9661	2Q07	31 St W80S 47 Ave
3	Queens	V1499	2Q13	47 Ave S75W 31 St
3	Queens	V8457	2Q09	Jackson Ave S106E 44 Dr
3	Queens	V1345	2Q10	Jackson Ave S106E 44 Dr
3	Queens	V7040	2Q15	Jackson Ave S106E 44 Dr
4	Queens	V8047	2Q13	Hunters Point Ave S256W 30 St
4	Queens	V8505	2Q02	Hunters Pt Ave S256W 30 St
4	Queens	V8261	2Q09	Pearson St E40S Jackson Ave
4	Queens	V8416	2Q04	45 Ave N30W 11St
4	Brooklyn	V5999	6B43	Keap St N220W Wythe Ave
4	Brooklyn	V5979	6B41	Keap St S220W Wythe Ave
4	Brooklyn	V4951	6B43	Noble St S121W Franklin St
4	Brooklyn	V4736	6B42	Nassau Ave S28E Newell St
4	Brooklyn	V4890	7B43	85 St S30E 23 Ave
4	Brooklyn	V4804	4B02	E 59 St E37N Paerdgat Ave
4	Bronx	V1337	1X25	TENNISSEN W230S TERRACE VIEW
4	Bronx	V6532	1X26	TEUNISSEN PL W129S TERR VIEW
4	Bronx	V8567	1X31	TEUNISSEN W129S TERRACE VIEW
4	Bronx	V1221	2X01	939 E 138ST N300E LOCUST
4	Bronx	V2483	2X08	RIDER W25N E 138ST
4	Bronx	V3236	3X62	RIVER TOWER N90E MACCRACKEN

4	Bronx	V6011	3X68	RIVER TOWER N90E MACCRACKEN
4	Bronx	V4162	3X71	RIVER TOWER N90E MACRACKEN
4	Bronx	V7628	4X59	1040 149ST N800E BRUCKNER
4	Bronx	V7807	4X61	1040 149ST S800E BRUCKNER
4	Bronx	V7749	4X58	1040 149ST S800E BRUCKNER
4	Bronx	V2831	1X21	TIBBETT W300S 230 ST JHS
4	Bronx	V1379	1X24	5625 BWAY W120S 232ST
4	Bronx	V1338	1X25	3001-11 KINGSBRIDGE W30N 230ST
4	Bronx	V2665	1X25	EWEN E1000S 230ST(JFK H.S.)
4	Bronx	V2975	1X25	TIBBETT W300S 230ST JHS
4	Bronx	V2692	1X26	TIBBETT AV W300S 230ST JHS
4	Bronx	V3003	1X26	EWEN E1000S 230 ST JFK HS
4	Bronx	V328	1X27	EWEN E1000S W230 ST JFK HS
4	Bronx	V2644	2X03	150 BRUCKNER BLVD S125E ST ANNS
4	Bronx	V2422	2X08	150 BRUCKNER BLVD S100E ST ANNS
4	Bronx	V2510	2X10	803 E 138ST S370E BRUCKNER BLVD
4	Westchester	V4221	13W82	THE MEARL CORP. 1057 LOWER SOUTH ST.
4	Westchester	V7123	13W82	1057 LOWER SOUTH ST.
4	Westchester	V9690	13W82	THE MEARL CORP. 1057 LOWER SOUTH ST
4	Westchester	V3190	13W83	THE MEARL CORP. 1057 LOWER SOUTH ST.
4	Westchester	V5302	13W83	THE MEARL CORP. 1057 LOWER SOUTH ST.
4	Westchester	V7407	13W83	THE MEARL CORP. 1057 LOWER SOUTH ST
4	Westchester	V9405	13W83	THE MEARL CORP. 1057 LOWER SOUTH ST
4	Westchester	V2502	15W03	WELLS AVE & DOCK ST (HENRY HUDSON PKWY YONKERS)
4	Westchester	V2451	15W06	WELLS AVE & DOCK ST (HENRY HUDSON PKWY YONKERS)
4	Westchester	V2453	15W10	WELLS AVE W/O ALEXANDER -YONKERS

460V submersible network protector Units – Remaining to be Installed from 2013 - 2016

Priority	Borough	Structure	Feeder	Address
1	Manhattan	V1564	15M05	WASHINGTON ST 2
1	Manhattan	V3247	15M12	WASHINGTON ST 2

1	Manhattan	V6406	40M30	BRIDGE ST 2 WLY
1	Manhattan	V4136	27M04	MAIDEN LA 110 2 ELY *2000KVA*
1	Manhattan	V1970	27M16	MAIDEN LA 110 CTR
1	Manhattan	V4814	27M15	MAIDEN LA 110 ELY *2000KVA*
1	Manhattan	V2369	27M15	MAIDEN LA 180 ELY
1	Manhattan	V6210	40M33	NEW YORK PLAZA 1 SLY
1	Manhattan	V4354	27M17	OLD SLIP 32 2 NLY
1	Manhattan	V449	27M15	OLD SLIP 32 3 SLY
1	Manhattan	V1318	40M30	SOUTH ST N181E BROAD ST
1	Manhattan	V6453	40M30	STATE ST 17
1	Manhattan	V6522	27M04	WALL ST 96 SLY
1	Manhattan	V576	27M17	WATER ST 199
1	Manhattan	V1651	27M16	WATER ST 199 2ND WLY
1	Manhattan	V3675	27M01	WATER ST 199 ELY
1	Manhattan	V306	40M32	WATER ST 55 2 SLY
1	Manhattan	V1568	40M33	WATER ST 55 3 SLY
1	Manhattan	V2643	40M43	WATER ST 55 ELY
1	Manhattan	V3991	40M42	WATER ST 55 WLY
1	Manhattan	V6542	15M01	WEST ST 51 SLY
1	Manhattan	V6532	27M14	MAIDEN LA 180 2 ELY
1	Manhattan	V6531	40M32	SOUTH ST N195E BROAD ST CTR
1	Manhattan	V6629	40M38	WATER ST 55 4 SLY
1	Manhattan	V6713	40M39	WATER ST 55 CTR
1	Manhattan	V7314	18M24	BATTERY PL 15 2 ELY
1	Manhattan	V7482	40M43	NEW YORK PLAZA 1 NLY
1	Manhattan	V7034	27M11	WALL ST 96
1	Manhattan	V6909	27M15	WALL ST 96 CTR
1	Manhattan	V6903	40M42	WATER ST 55 4 NLY
1	Manhattan	V8074	18M22	BATTERY PL 15 WLY
1	Manhattan	V8835	15M05	WEST ST 57 / 40 RECTOR ST
1	Manhattan	V8489	27M17	FRONT ST 96
1	Manhattan	V971	27M11	MAIDEN LA 180 2 WLY
1	Manhattan	V8279	40M30	NEW YORK PLAZA 1 2 NLY

1	Manhattan	V8224	40M32	NEW YORK PLAZA 1 2 SLY
1	Manhattan	V950	27M01	OLD SLIP 32 2 SLY
1	Manhattan	V8566	40M33	SOUTH ST N207E BROAD ST ELY
1	Manhattan	V8400	27M14	WALL ST 96 NLY
1	Manhattan	V995	27M04	WATER ST 199 WLY
1	Manhattan	V8367	40M32	WATER ST 55 2 NLY
1	Manhattan	V8665	40M43	WATER ST 55 3 NLY
1	Manhattan	V8996	40M33	WATER ST 55 NLY
2	Manhattan	V2889	13M61	W 26 ST 630 CTR
2	Manhattan	V6076	40M32	PEARL ST 27
2	Manhattan	V2180	40M33	PEARL ST 27
2	Manhattan	V4276	40M38	SO WILLIAM ST 25 2 ELY
2	Manhattan	V2490	40M34	SO WILLIAM ST 25 2 WLY
2	Manhattan	V1710	40M37	SO WILLIAM ST 25 WLY
2	Manhattan	V59245	40M32	STATE ST 1 ELY
2	Manhattan	V1285	13M53	W 26 ST 630 WLY
2	Manhattan	V6832	15M07	WASHINGTON ST 2
2	Manhattan	V6726	15M07	WASHINGTON ST 4
2	Manhattan	V6638	15M11	WASHINGTON ST 4
2	Manhattan	V6530	27M06	PEARL ST 214 SLY
2	Manhattan	V6631	40M33	STATE ST 1 2 WLY
2	Manhattan	V6802	40M43	STATE ST 1 CTR
2	Manhattan	V6901	15M11	WASHINGTON ST 4
2	Manhattan	V6889	43M50	1 AV 560 (REAR OF BLDG), NYU MEDICAL CENTER
2	Manhattan	V7382	43M51	1 AV 560 (REAR OF BLDG), NYU MEDICAL CENTER
2	Manhattan	V7546	43M52	1 AV 560 (REAR OF BLDG), NYU MEDICAL CENTER
2	Manhattan	V7012	40M37	PEARL ST 27
2	Manhattan	V715	27M21	WATER ST 23 2 WLY
2	Manhattan	V9040	13M60	W 26 ST 630 ELY
2	Manhattan	V8059	43M57	1 AV 560 (REAR OF BLDG), NYU MEDICAL CENTER
2	Manhattan	V8557	40M38	FRONT ST 78 SLY
2	Manhattan	V8171	27M14	GOUVERNEUR LA 10 CTR

2	Manhattan	V8940	27M16	MAIDEN LA 138 CTR
2	Manhattan	V9048	27M15	MAIDEN LA 138 ELY
2	Manhattan	V8777	27M04	MAIDEN LA 138 WLY
2	Manhattan	V9833	40M39	SO WILLIAM ST 25 ELY
2	Manhattan	V8654	40M42	STATE ST 1 2ELY
2	Manhattan	V8175	27M23	WATER ST 23 ELY
3	Manhattan	V6449	40M44	FRONT ST 78 CTR
3	Manhattan	V360	27M08	GOUVERNEUR LA 10 2 ELY
3	Manhattan	V1835	27M18	MAIDEN LA 110 2 WLY
3	Manhattan	V287	27M05	MAIDEN LA 110 WLY
3	Manhattan	V403	27M13	MAIDEN LA 180 WLY
3	Manhattan	V3237	27M13	OLD SLIP 32 NLY
3	Manhattan	V1882	27M03	OLD SLIP 32 SLY
3	Manhattan	V3274	40M36	SO WILLIAM ST 25 3 ELY
3	Manhattan	V2561	40M35	SO WILLIAM ST 25 3 WLY
3	Manhattan	V438	40M31	STATE ST 1 WLY
3	Manhattan	V2602	27M02	WATER ST 199 2ND ELY
3	Manhattan	V6209	27M24	WATER ST 23 WLY
3	Manhattan	V1997	40M44	WATER ST 55 2 ELY
3	Manhattan	V4357	40M45	WATER ST 55 2 WLY
3	Manhattan	V6611	15M02	WEST ST 51 CTR
3	Manhattan	V6580	27M18	FRONT ST 160 NLY
3	Manhattan	V6536	40M45	FRONT ST 78 NLY
3	Manhattan	V664	27M13	GOUVERNEUR LA 10 WLY
3	Manhattan	V1253	27M05	FRONT ST 160 SLY
3	Manhattan	V156	27M03	GOUVERNEUR LA 10 2 WLY
3	Manhattan	V136	40M39	WATER ST 55 SLY
3	Manhattan	V7004	15M06	WASHINGTON ST 2
3	Manhattan	V7045	40M36	PEARL ST 27
3	Manhattan	V8435	15M06	WEST ST 51 NLY
3	Manhattan	V8209	27M02	GOUVERNEUR LA 10 ELY
3	Manhattan	V8266	40M31	NEW YORK PLAZA 1 CTR
3	Manhattan	V8205	27M08	OLD SLIP 32 3 NLY

3	Manhattan	V8564	27M05	PEARL ST 214 NLY
3	Manhattan	V8459	27M19	PEARL ST 222 AKA 180 WATER ST
3	Manhattan	V8212	27M22	WATER ST 23 2 ELY
4	Manhattan	V6490	18M25	BATTERY PL 15 ELY
4	Manhattan	V6190	40M47	BEAVER ST 15 2 ELY
4	Manhattan	V355	40M35	BEAVER ST 15 2 WLY
4	Manhattan	V5018	40M38	BEAVER ST 15 CTR
4	Manhattan	V5205	40M39	BEAVER ST 15 ELY
4	Manhattan	V1986	40M34	BEAVER ST 15 WLY
4	Manhattan	V2482	27M23	PEARL ST 84 2 SLY
4	Manhattan	V1655	27M24	PEARL ST 84 NLY
4	Manhattan	V2110	27M22	PEARL ST 84 SLY
4	Manhattan	V1169	27M21	PEARL ST 84 2 NLY
4	Manhattan	V9940	18M23	BATTERY PL 15 2 WLY
4	Manhattan	V8977	6M37	1 AV 460 2 ELY BLDG F (WALK-IN) BELLVUE HOSP.
4	Manhattan	V8682	6M28	1 AV 460 2 WLY BLDG F (WALK-IN) BELLVUE HOSP.
4	Manhattan	V9529	6M26	1 AV 460 ELY BLDG F (WALK-IN) BELLVUE HOSP.
4	Manhattan	V9103	6M25	1 AV 460 WLY BLDG F (WALK-IN) BELLVUE HOSP.
5	Manhattan	V6489	34M38	GREENWICH ST 270
5	Manhattan	V2118	34M40	GREENWICH ST 270
5	Manhattan	V1836	18M21	VESEY ST_NORTH END AV (WALK IN)
5	Manhattan	V6292	18M26	VESEY ST_NORTH END AV (WALK IN)
5	Manhattan	V4854	18M30	VESEY ST_NORTH END AV (WALK IN)
5	Manhattan	V6782	34M37	BARCLAY ST 110 ELY
5	Manhattan	V6843	34M38	BARCLAY ST 110 2 ELY
5	Manhattan	V7346	34M39	BARCLAY ST 110 2 WLY
5	Manhattan	V6908	34M40	BARCLAY ST 110 CTR
5	Manhattan	V7578	34M35	BARCLAY ST 110 WLY
5	Manhattan	V1149	34M37	GREENWICH ST 270
5	Manhattan	V7450	40M42	WATER ST 76 NLY
5	Manhattan	V9305	10M04	CLARKSON ST 62 (WALK-IN)
5	Manhattan	V9046	10M05	CLARKSON ST 62 (WALK-IN)

5	Manhattan	V9233	10M06	CLARKSON ST 62 (WALK-IN)
5	Manhattan	V8912	10M07	CLARKSON ST 62 (WALK-IN)
5	Manhattan	V9115	10M08	CLARKSON ST 62 (WALK-IN)
5	Manhattan	V9814	34M39	GREENWICH ST 270
5	Manhattan	V9318	18M27	VESEY ST_NORTH END AV (WALK IN)
5	Manhattan	V9707	6M21	E 15 ST & AV C *CON ED*
5	Manhattan	V9330	6M28	E 15 ST & AV C *CON ED*
5	Manhattan	V9728	6M28	E 15 ST & AV C *CON ED*
5	Manhattan	V9659	7M29	E 15 ST & AV C *CON ED*
5	Manhattan	V9333	6M39	E 16 ST & AV C *CON ED*
5	Manhattan	V9670	7M29	E 16 ST & AV C *CON ED*
5	Manhattan	V8763	40M43	WATER ST 76 SLY
6	Manhattan	V6485	13M60	10 AV 85 (WALK IN ON W 16 ST)
6	Manhattan	V3641	13M50	11 AV 245 2 NLY WALK IN
6	Manhattan	V2609	13M51	11 AV 245 NLY WALK IN
6	Manhattan	V1571	22M63	6 AV 101 ELY
6	Manhattan	V49	22M71	6 AV 101 WLY
6	Manhattan	V2601	34M35	GREENWICH ST SO NEW MURRAY
6	Manhattan	V416	34M37	GREENWICH ST SO NEW MURRAY
6	Manhattan	V321	34M40	GREENWICH ST SO NEW MURRAY
6	Manhattan	V6461	10M03	HUDSON ST 375 WLY
6	Manhattan	V248	13M42	MARGINAL W_S W 20 ST PIERS 59-62 1 FL
6	Manhattan	V5637	13M50	MARGINAL W_S W 20 ST PIERS 59-62 1 FL
6	Manhattan	V2299	13M60	MARGINAL W_S W 20 ST PIERS 59-62 1 FL
6	Manhattan	V2463	22M66	NO MOORE ST 81 2 ELY
6	Manhattan	V1584	22M69	NO MOORE ST 81 2WLY
6	Manhattan	V2034	22M70	NO MOORE ST 81 CTR
6	Manhattan	V3186	22M65	NO MOORE ST 81 ELY
6	Manhattan	V3	34M35	PARK PL 75
6	Manhattan	V2538	34M38	PARK PL 75
6	Manhattan	V1751	22M63	WALKER ST 14
6	Manhattan	V6476	22M64	WALKER ST 26 ELY
6	Manhattan	V2496	22M61	WATTS ST 75 2 ELY

6	Manhattan	V3416	22M62	WATTS ST 75 ELY
6	Manhattan	V44	34M40	WEST ST E122N HARRISON ST (Walk In)
6	Manhattan	V640	34M36	WEST ST E86N HARRISON ST (Walk In)
6	Manhattan	V369	34M35	WEST ST E98N HARRISON ST (Walk In)
6	Manhattan	V5111	40M32	BROADWAY 2 2ND NLY
6	Manhattan	V4730	40M34	BROADWAY 2 2ND SLY
6	Manhattan	V6123	40M46	BROADWAY 2 NLY
6	Manhattan	V4684	40M37	BROADWAY 2 SLY
6	Manhattan	V64807	6M25	E 29 ST 450 ELY (WALK IN)
6	Manhattan	V4121	27M22	PEARL ST 140 AKA 85 WALL ST
6	Manhattan	V5234	40M33	STONE ST 2
6	Manhattan	V2734	3M49	1 AV 2122 2 NLY
6	Manhattan	V214	3M58	1 AV 2122 SLY
6	Manhattan	V386	43M60	522-50 FIRST AVE., N.Y.U. MEDICAL CENTER
6	Manhattan	V439	43M50	522-50 FIRST AVE., N.Y.U. MEDICAL CENTER
6	Manhattan	V599	43M51	522-50 FIRST AVE., N.Y.U. MEDICAL CENTER
6	Manhattan	V6581	22M61	CHURCH ST 306 2 NLY
6	Manhattan	V6575	22M67	WALKER ST 26 WLY
6	Manhattan	V6700	40M31	BRIDGE ST 2 2 WLY
6	Manhattan	V6805	27M18	PEARL ST 299 SLY
6	Manhattan	V6660	31M09	RSVLT ISL BLDG 1-5 ELY
6	Manhattan	V6967	13M53	10 AV 85 (WALK IN ON W 16 ST)
6	Manhattan	V7228	13M54	10 AV 85 (WALK IN ON W 16 ST)
6	Manhattan	V7236	13M61	11 AV 245 2 SLY WALK IN
6	Manhattan	V7416	22M70	CHURCH ST 306 2 SLY
6	Manhattan	V771	34M38	GREENWICH ST SO NEW MURRAY
6	Manhattan	V7565	10M11	HUDSON ST 375 2 ELY
6	Manhattan	V6853	10M01	HUDSON ST 375 2 WLY
6	Manhattan	V7504	18M32	LIBERTY ST S_W SOUTH END AV
6	Manhattan	V7706	18M22	LIBERTY ST WO SOUTH END AV
6	Manhattan	V7603	18M23	LIBERTY ST WO SOUTH END AV
6	Manhattan	V7566	13M61	MARGINAL W_S W 20 ST PIERS 59-62 1 FL

6	Manhattan	V7444	18M29	MURRAY ST S63E NORTH END AV
6	Manhattan	V7259	34M37	PARK PL 75
6	Manhattan	V7622	22M66	WALKER ST 26 ELY
6	Manhattan	V6911	40M32	BRIDGE ST 2 2 ELY
6	Manhattan	V733	27M21	PEARL ST 140 AKA 85 WALL ST
6	Manhattan	V7009	27M23	PEARL ST 140 AKA 85 WALL ST
6	Manhattan	V6919	27M09	PEARL ST 299 CTR
6	Manhattan	V7617	31M58	RSVLT ISL BLDG 1-5 WLY
6	Manhattan	V7302	43M52	550 FIRST AVE., N.Y.U. MEDICAL CENTER
6	Manhattan	V7505	43M51	550 FIRST AVE., N.Y.U. MEDICAL CENTER
6	Manhattan	V7700	43M60	550 FIRST AVE., N.Y.U. MEDICAL CENTER
6	Manhattan	V8026	13M61	10 AV 85 (WALK IN ON W 16 ST)
6	Manhattan	V9686	13M64	10 AV 85 (WALK IN ON W 16 ST)
6	Manhattan	V8931	13M60	11 AV 245 SLY WALK IN
6	Manhattan	V1231	22M64	6 AV 101 CTR
6	Manhattan	V9813	22M62	CHURCH ST 306 NLY
6	Manhattan	V9691	22M69	CHURCH ST 306 SLY
6	Manhattan	V916	34M36	GREENWICH ST SO NEW MURRAY
6	Manhattan	V8011	10M12	HUDSON ST 375 ELY
6	Manhattan	V7902	18M24	LIBERTY ST WO SOUTH END AV
6	Manhattan	V7809	18M25	LIBERTY ST WO SOUTH END AV
6	Manhattan	V7786	18M28	MURRAY ST AND NORTH END AV
6	Manhattan	V8929	18M27	MURRAY ST S50E NORTH END AV
6	Manhattan	V9392	18M30	MURRAY ST S50E NORTH END AV
6	Manhattan	V1393	22M67	NO MOORE ST 81 WLY
6	Manhattan	V1095	34M36	PARK PL 75
6	Manhattan	V8582	22M65	WALKER ST 14 3RD WLY
6	Manhattan	V9682	22M68	WALKER ST 26
6	Manhattan	V1226	22M64	WATTS ST 75 2 WLY
6	Manhattan	V1313	22M69	WATTS ST 75 WLY
6	Manhattan	V1173	34M39	WEST ST E110N HARRISON ST (Walk In)
6	Manhattan	V8278	40M33	BRIDGE ST 2 ELY
6	Manhattan	V9504	40M36	BROADWAY 2 SLY

6	Manhattan	V96436	6M33	E 29 ST 450 CTR (WALK-IN)
6	Manhattan	V10599	6M21	E 29 ST 450 ELY (WALK IN)
6	Manhattan	V1248	27M24	PEARL ST 140 AKA 85 WALL ST
6	Manhattan	V8596	27M04	PEARL ST 299 NLY
6	Manhattan	V9278	3M60	1 AV 2122 2 SLY
6	Manhattan	V9582	3M50	1 AV 2122 NLY
6	Manhattan	V855	43M52	522-50 FIRST AVE., N.Y.U. MEDICAL CENTER
6	Manhattan	V8008	43M50	550 FIRST AVE., N.Y.U. MEDICAL CENTER
2	Brooklyn	V8238	1B57	Farragut Sub Station
2	Brooklyn	V6357	1B93	Farragut Sub Station
2	Brooklyn	V7005	1B92	Farragut Sub Station
2	Brooklyn	V5437	8B81	25 St S200W 3 Ave Gowanus Sub Station
2	Brooklyn	V5049	8B82	25 St S200W 3 Ave Gowanus Sub Station
2	Brooklyn	V4408	7B50	Bay Pkwy E586S Shore Pkwy
3	Brooklyn	V4363	7B51	Bay Pkwy E586S Shore Pkwy
3	Brooklyn	V4344	7B52	Bay Pkwy E586S Shore Pkwy
3	Brooklyn	V5376	8B88	52 St W650N 1 Ave
3	Brooklyn	V5442	8B89	52 St W650N 1 Ave
3	Brooklyn	V5568	8B81	25 St S1000W 3 Ave Gowanus Sub Station
3	Brooklyn	V5476	8B82	25 St S1000W 3 Ave Gowanus Sub Station
3	Brooklyn	V5369	8B81	25 St S200W 3 Ave
3	Brooklyn	V5157	8B82	25 St S200W 3 Ave
3	Brooklyn	V3026	1B53	1 Beard St (IKEA)
5	Brooklyn	V9049	1B64	1 Beard St (IKEA)
5	Brooklyn	V2000	1B66	1 Beard St (IKEA)
5	Brooklyn	V5484	11B04	Surf Ave N53W W 27 St
5	Brooklyn	V5373	11B05	Surf Ave N53W W 27 St
5	Brooklyn	V5258	11B09	Surf Ave N53W W 27 St
5	Brooklyn	V3066	11B04	W 8 St E100S Surf Ave
5	Brooklyn	V4081	11B05	W 8 St E100S Surf Ave
5	Brooklyn	V1196	11B06	W 8 St E100S Surf Ave
5	Brooklyn	V2094	11B09	W 8 St E100S Surf Ave

5	Brooklyn	V6266	11B03	2001 Oriental Blvd
5	Brooklyn	V6302	11B03	2001 Oriental Blvd
5	Brooklyn	V6305	11B03	2001 Oriental Blvd
5	Brooklyn	V6259	11B05	2001 Oriental Blvd
5	Brooklyn	V6283	11B07	2001 Oriental Blvd
5	Brooklyn	V6297	11B07	2001 Oriental Blvd
5	Brooklyn	V6318	11B07	2001 Oriental Blvd
5	Brooklyn	V6299	11B10	2001 Oriental Blvd
5	Brooklyn	V6311	11B10	2001 Oriental Blvd
5	Brooklyn	V6380	11B10	2001 Oriental Blvd
5	Brooklyn	V8495	1B52	King St S20W Ferris St Pier 12
5	Brooklyn	V8411	1B63	King St S20W Ferris St Pier 12
5	Brooklyn	V8439	1B64	King St S20W Ferris St Pier 12
5	Brooklyn	V8391	11B09	Surf Ave S100E W 19 St
5	Brooklyn	V8063	11B05	Surf Ave S65E W 19 St
5	Brooklyn	V7585	11B04	Surf Ave S80E W 19 St
5	Brooklyn	V5815	11B09	W 33 St W58N Neptune Ave
6	Brooklyn	V5740	11B07	W 33 St W71N Neptune Ave
6	Brooklyn	V5689	11B03	W 33 St W84N Neptune Ave
6	Brooklyn	V5807	11B03	W 37 St E120S Neptune Ave
6	Brooklyn	V5746	11B07	W 37 St E130S Canal Ave
6	Brooklyn	V5694	11B09	W 37 St E140S Canal Ave
6	Brooklyn	V8599	7B40	W 11 St E193S Ave V
6	Brooklyn	V7975	7B51	W 11 St E193S Ave V
6	Brooklyn	V8204	7B52	W 11 St E193S Ave V
6	Brooklyn	V7787	4B06	Ralph Ave E115N Bergen Ave
6	Brooklyn	V8150	4B08	Ralph Ave E115N Bergen Ave
6	Brooklyn	V7698	4B15	Ralph Ave E115N Bergen Ave
6	Brooklyn	V4671	3B86	Ave D N215E E 101 St
6	Brooklyn	V4763	3B88	Ave D N400E Rockaway Ave
6	Brooklyn	V4722	3B85	Ave D N683E Rockaway Ave
6	Brooklyn	V4659	3B87	Ave D N683E Rockaway Ave
6	Brooklyn	V7927	9B02	888 Fountain Ave

6	Brooklyn	V8214	9B05	888 Fountain Ave
6	Brooklyn	V8617	9B17	888 Fountain Ave
6	Brooklyn	V4750	9B20	Sheridan Ave W520S Flatlands Ave
6	Brooklyn	V4807	9B17	Sheridan Ave W530S Flatlands Ave
6	Brooklyn	V4853	9B12	Sheridan Ave W541S Flatlands Ave
6	Brooklyn	V8029	8B80	BROOKLYN ARMY TERMINAL
6	Brooklyn	V8240	8B80	BROOKLYN ARMY TERMINAL
6	Brooklyn	V6751	8B81	BROOKLYN ARMY TERMINAL
6	Brooklyn	V6962	8B81	BROOKLYN ARMY TERMINAL
6	Brooklyn	V7057	8B82	BROOKLYN ARMY TERMINAL
6	Brooklyn	V7383	8B82	BROOKLYN ARMY TERMINAL
6	Brooklyn	V8047	8B80	BROOKLYN ARMY TERMINAL COMPLEX
6	Brooklyn	V7836	8B81	BROOKLYN ARMY TERMINAL COMPLEX
6	Brooklyn	V7949	8B82	BROOKLYN ARMY TERMINAL COMPLEX
6	Brooklyn	V7911	8B80	DEPOSITORY TRUST COMPANY
6	Brooklyn	V8006	8B81	DEPOSITORY TRUST COMPANY
6	Brooklyn	V7375	8B82	DEPOSITORY TRUST COMPANY
6	Brooklyn	V5674	8B80	1 Ave W200N 56 St
6	Brooklyn	V5716	8B89	1 Ave W215N 56 St
6	Brooklyn	V5905	8B81	1 Ave W225N 56 St Brooklyn Co-op
6	Brooklyn	V5811	8B88	1 Ave W230N 56 St Brooklyn CO-OP
6	Brooklyn	V7159	8B80	BROOKLYN NAVY YARD
6	Brooklyn	V7302	8B81	BROOKLYN NAVY YARD
6	Brooklyn	V7417	8B82	BROOKLYN NAVY YARD
6	Brooklyn	V7544	8B83	BROOKLYN NAVY YARD
6	Brooklyn	V7954	6B42	Washington Ave W720N Flushing Ave
6	Brooklyn	V8477	6B43	Washington Ave W720N Flushing Ave
6	Brooklyn	V7862	6B44	Washington Ave W720N Flushing Ave
6	Brooklyn	V7838	6B45	Flushing Ave S20E Marcy Ave
6	Brooklyn	V8057	6B46	Flushing Ave S40E Marcy Ave
6	Brooklyn	V8588	6B42	Flushing Ave S50E Marcy Ave
6	Brooklyn	V7951	6B58	Flushing Ave S60E Marcy Ave
6	Brooklyn	V3784	5Q30	NYCTA Jamaica Yard

6	Brooklyn	V5288	5Q42	NYCTA Jamaica Yard
6	Brooklyn	V9772	5Q43	NYCTA Jamaica Yard
6	Brooklyn	V5086	1B92	Marshall St N140E Gold St
6	Brooklyn	V8190	5B25	161 Varick Ave
6	Brooklyn	V7879	5B27	161 Varick Ave
6	Brooklyn	V8457	5B33	161 Varick Ave
6	Brooklyn	V4360	5B27	Gardner Ave E100S Metropolitan Ave
6	Brooklyn	V4327	5B32	Gardner Ave E100S Metropolitan Ave
6	Brooklyn	V4346	5B33	Gardner Ave E100S Metropolitan Ave
6	Brooklyn	V4550	5B27	Gardner Ave W114S Grand St
6	Brooklyn	V4540	5B33	Gardner Ave W145S Grand St
6	Brooklyn	V4535	5B32	Gardner Ave W161S Grand St
6	Brooklyn	V5180	5B27	221 Varick Ave
6	Brooklyn	V4967	5B32	221 Varick Ave
6	Brooklyn	V5045	5B33	221 Varick Ave
6	Queens	V1783	6Q28	48-05 Grand Ave
6	Queens	V1677	6Q30	48-05 Grand Ave
6	Queens	V2127	6Q35	48-05 Grand Ave
6	Queens	V1990	6Q40	48-05 Grand Ave
6	Queens	V5485	7Q67	USTA Tennis Stadium
6	Queens	V9677	7Q68	USTA Tennis Stadium
6	Queens	V9782	7Q81	USTA Tennis Stadium
6	Queens	V5650	7Q82	USTA Tennis Stadium
6	Queens	V2305	7Q65	126 ST/ROOSEVELT AVE
6	Queens	V1735	7Q78	126 ST/ROOSEVELT AVE
6	Queens	V1606	7Q85	126 ST/ROOSEVELT AVE
6	Queens	V1372	7Q77	40-01 College Point Blvd
6	Queens	V2060	7Q78	40-01 College Point Blvd
6	Queens	V3023	7Q81	40-01 College Point Blvd
6	Queens	V4171	7Q86	40-01 College Point Blvd
6	Queens	V1556	7Q77	40-01 College Point Blvd
6	Queens	V1541	7Q78	40-01 College Point Blvd
6	Queens	V3008	7Q81	40-01 College Point Blvd

6	Queens	V4037	7Q82	40-01 College Point Blvd
6	Queens	V1782	2Q03	Arch St W150S Jackson Ave
6	Queens	V1746	2Q05	Arch St W150S Jackson Ave
6	Queens	V1731	2Q06	Arch St W150S Jackson Ave
2	Bronx	V3137	3X62	HARLEM RIVER E200S TREMONT
2	Bronx	V4028	3X66	HARLEM RV W800S TREMONT 460V
5	Bronx	V5006	3X68	HARLEM RI W800S TREMONT 460V
5	Bronx	V5009	3X68	HARLEM RI W800S TREMONT 460V
5	Bronx	V4103	3X71	HARLEM RV W800S TREMONT 460v
5	Bronx	V4105	3X71	HARLEM RV W800S TREMONT 460V
6	Bronx	V3867	2X15	700 EXTERIOR MALL 460V BK BLDG
6	Bronx	V5591	2X19	700 EXTERIOR MALL 460V BK BLDG
6	Bronx	V6101	2X21	700 EXTERIOR MALL 460V BK BLDG
6	Bronx	V9913	2X28	700 EXTERIOR ST MALL 460V BK BLDG
6	Bronx	V5071	2X39	920 E132ST S65'E LOCUST 460V
6	Bronx	V3132	3X62	HARLEM RV W800S TREMONT AV
6	Bronx	V4004	3X66	HARLEM RV W800S TREMONT 460V
6	Bronx	V2827	4X58	500 FOOD CENTER DR BEER DIST 460V
6	Bronx	V7696	4X58	BEACON N375E FD CTR DR 460V
6	Bronx	V2612	4X59	500 FOOD CENTER DR BEER DIST 460V
6	Bronx	V2586	4X62	500 FOOD CENTER DR BEER DIST 460V
6	Bronx	V7582	4X62	BEACON N375E FD CTR DR 460V
6	Bronx	V7757	4X59	BEACON N350E FD CTR DR 460V
6	Westchester	V530	13W84	P.A.S.N.Y. INDIAN PT3 (POWER&LIGHT)
6	Westchester	V5402	15W06	PORT AUTHORITY OF N.Y. & N.J.44 WELLS AV.
6	Westchester	V5367	15W10	44 WELLS AV. OTIS ELEVATOR

STATEN ISLAND LOCATIONS**120/ 208 Volt Flood Zone Vault Locations: 12 – 1000kVA units**

Priority	Borough	Structure	Feeder	Address
2	Staten Island	V7368	33R14	Tysens Lane c/o Mill Road
2	Staten Island	V7206	33R14	265 Mill Road
2	Staten Island	V2201	33R14	Ebbitts Street c/o Hylan Blvd.
2	Staten Island	V7559	33R14	608 Tysens Lane
2	Staten Island	V7134	33R28	265 Mill Road
2	Staten Island	V7460	33R28	608 Tysens Lane
2	Staten Island	V7509	33R28	Tysens Lane c/o Mill Road
2	Staten Island	V7366	33R28	Ebbitts Street c/o Hylan Blvd.
2	Staten Island	V7176	33R13	Shop Rite @ Hylan Blvd. c/o Locust Avenue
2	Staten Island	V7407	33R15	Shop Rite @ Hylan Blvd. c/o Locust Avenue
2	Staten Island	V7633	33R02	Shop Rite @ 965 Richmond Avenue
2	Staten Island	V7406	33R03	Shop Rite @ 965 Richmond Avenue

265/ 460 Volt Flood Zone Vault Locations: 4 – 1000kVA Units

Priority	Borough	Structure	Feeder	Address
3	Staten Island	V7766	33R37	1801 Meredith Avenue
3	Staten Island	V2001	33R37	1745 Chelsea Road
3	Staten Island	V7771	33R01	1801 Meredith Road
3	Staten Island	V7748	33R01	1745 Chelsea Road

Customer Isolation Switches

Priority	Network	Address of Customer Equipment	Feeders	Number of Isolation Switches
1	39M - Hudson	U.S.S. Intrepid Museum Pier 86 West of West Street, opposite of West 46 th Street	39M50 38M51 39M53	3
		Port Authority of New York Pier 90 West of West Street, opposite of West 50 th Street	39M50 39M51 39M52	3
1	31M - Roosevelt	NYCTA Substation Roosevelt Island Middle of South End, 50 feet West of East Channel Road	31M08 31M51	2
1	4M - Grand Central	L.I.R.R. Substation. First Ave, South of East 34 th Street	4M75 4M78	2
2	41M - Freedom	Port Authority of NY & NJ 67 Vesey St	41M80 41M81 41M82 41M83	4
2	43M - Kips Bay	Veterans Administration Hospital 423 East 23 rd Street.	43M50 43M51 43M52 43M56 43M57	5
2	7M - Cooper Square	N.Y.C. D.E.P. Pumping Station 184 Avenue D	7M26 7M28 7M29 7M34 7M37 7M52	6
2	18M - Battery Park City	C B Richard Ellis 200 Vesey Street	18M21 18M22 18M23 18M24 18M25	5
3	18M - Battery Park City	Merrill Lynch 225 Liberty Street	18M22 18M23 18M24 18M25 18M31 18M32	6
		World Financial Property 250 Vesey Street	18M21 18M25 18M26 18M27 18M28 18M30	6
		WFP Tower Opposite of 393 South End Ave	18M22 18M25 18M31 18M32	4
3	14M - Randall's Island	New York Post 900 East 132nd Street	14M80 14M82 14M84 14M85	4
		Randall's Island Sports Complex 20 Randall's Island Park	14M80 14M82 14M84 14M85	4

3	16M - Pennsylvania	Long Island Railroad West 33 rd Street and 10 th Avenue.	16M61 16M72 16M80	3
		Jacob Javits Convention Center West 39 th Street and 12 th Avenue (655 West 34 th Street)	16M61 16M72 16M76 16M79 16M80 16M82	6
		L.I.R.R. Westside West 33 rd Street and 10 th Avenue	16M61 16M72 16M76 16M77 16M79 16M80 16M82	7
		Total		70

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-61
Date of Response: 05/24/2013
Responding Witness:

Question No. :E0691

Subject: Electric Distribution – Replacement – Secondary Open Mains - 1. Provide the number of secondary open mains identified and completed, by priority levels, for each year from 2010 to 2012. Provide the same information for 2013 to date. 2. Provide the forecasted number of secondary open mains that the Company plans to complete, by priority levels, from 2013 to 2016. 3. Explain the reason(s) for the variation between budget and actual amount spent for each year from 2009 to 2012. For example, in 2011 the Company spent approximately \$154.1 million and the amount budgeted was approximately \$137.4 million. 4. Explain the reason(s) for the fluctuation in spending over the five historical years. For example, in 2009 the company spent approximately \$140.6 million compare to approximately \$155 million in 2010. 5. Explain the reason(s) for the variations or changes in the budget from 2012 to 2013, from 2013 to 2014, and from 2014 to 2015.

Response:

1. We do not have a count of open mains by priority; the table below shows the total numbers of open mains received and completed. With the deployment of Work Management in the coming years, prioritization counts should become extractable.

Open Mains	2010	2011	2012	2013 YTD
Received	5368	5687	3858	1690
Completed	5298	5244	4662	1653

The Regions' goal is to complete their priority 1 open mains before the summer load period starts.

2. The number of open mains we plan to complete in 2013 through 2016 will vary with the number of burn outs each year; but, the three year average of completed mains 2010 through 2012, or about 5,000 mains/yr, would be a reasonable estimate with a possible small reduction as the new specification is implemented.

3. The secondary open mains program provides funding for emergency repair work on the secondary network to address cable failures. These failures are driven primarily by high loading, which contributes to failure of components and by roadway salt which corrodes components causing failure. Both high loading and salting are dependent on weather which varies seasonally

and cannot be forecast. The variation between the budget and actual amount spent is a result of that unpredictability.

4. See answer to 3.

5. Budget reductions from 2015 to 2017 reflect the expectation that a number of initiatives addressing secondary network burnouts will be successful in reducing costs in this program. These initiatives include the continued deployment of dual layer cable which is more resilient to failure, the development of arc detection technology which may allow the removal of compromised components before failure, and the reprioritization of secondary main reinforcement which will reduce the number mains that are replaced or repaired.

STAFF ELECTRIC INFRASTRUCTURE INVESTMENT PANEL
2013 - 2016 Transmission and Distribution Capital Budget Adjustments
Case 13-E-0030

Category	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
System and Transmission Operations	45,050	45,050	-	36,950	32,950	(4,000)	113,600	109,600	(4,000)	119,200	115,200	(4,000)
Substation Operations	177,858	177,858	-	212,651	197,422	(15,229)	206,703	191,941	(14,762)	199,482	184,319	(15,163)
Electric Operations	921,198	920,948	(250)	871,834	849,632	(22,202)	822,392	822,392	-	803,791	803,791	-
Storm Hardening	69,500	69,500	-	148,350	151,850	3,500	235,000	235,000	-	246,000	245,000	(1,000)
Total	\$ 1,213,606	\$ 1,213,356	\$ (250)	\$ 1,269,785	\$ 1,231,854	\$ (37,931)	\$ 1,377,695	\$ 1,358,933	\$ (18,762)	\$ 1,368,473	\$ 1,348,310	\$ (20,163)

STAFF ELECTRIC INFRASTRUCTURE INVESTMENT PANEL
2013 - 2016 Transmission and Distribution Capital Budget Adjustments
Case 13-E-0030

System and Transmission Operations Project/Program Description	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
System Operations												
PR.2ET9801 - Ecc - Distribution Orders Automation Enhancements	250	250	-	400	400	-	300	300	-	300	300	-
Total ETR03 - Sys Ops - Work Mgmt Systems	250	250	-	400	400	-	300	300	-	300	300	-
PR.0ET9801 - Ems Continuance Ecc	3,050	3,050	-	300	300	-	200	200	-	-	-	-
Total ETR04 - Sys Ops - Continuance	3,050	3,050	-	300	300	-	200	200	-	-	-	-
PR.1ET9705 - Plant Information System	-	-	-	200	200	-	-	-	-	-	-	-
PR.4ET9704 - Cyber Security And Nerc Compliance	300	300	-	300	300	-	400	400	-	300	300	-
PR.9ET9708 - Operations Network For Ems	200	200	-	250	250	-	400	400	-	600	600	-
Total ETR05 - Sys Ops - Operations Requirements	500	500	-	750	750	-	800	800	-	900	900	-
PR.1ET9808 - System Operation Enhancements	250	250	-	300	300	-	300	300	-	300	300	-
PR.3ET9805 - District Operator Task Managing	250	250	-	300	300	-	300	300	-	300	300	-
PR.7ET9804 - Operation Management System At Energy Control Center	150	150	-	400	400	-	400	400	-	400	400	-
Total ETR06 - Sys Ops - District Operations Impro	650	650	-	1,000	1,000	-	1,000	1,000	-	1,000	1,000	-
PR.1ET1000 - ECC Ups Battery Replacement	200	200	-	-	-	-	-	-	-	250	250	-
PR.7ET9704 - ECC/AECC Facility Security	-	-	-	250	250	-	600	600	-	200	200	-
PR.7ET9805 - Operator Console Replacement	-	-	-	-	-	-	-	-	-	-	-	-
PR.8ET9807 - Computer Room Renovation	-	-	-	1,000	1,000	-	1,500	1,500	-	500	500	-
Total ETR08 - Sys Ops - Facilities/utilities Impr	200	200	-	1,250	1,250	-	2,100	2,100	-	950	950	-
Sub-Total System Operations	4,650	4,650	-	3,700	3,700	-	4,400	4,400	-	3,150	3,150	-
	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
Transmission Operations	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
PR.1ET0800 - Transmission Feeder Failures	3,000	3,000	-	3,000	3,000	-	3,000	3,000	-	3,000	3,000	-
ETR09 - Failures	3,000	3,000	-	3,000	3,000	-	3,000	3,000	-	3,000	3,000	-
PR.9ET1100 - Dynamic Feeder Rating System	1,500	1,500	-	1,500	1,500	-	1,500	1,500	-	1,500	1,500	-
Total ETR10 - Load Relief	1,500	1,500	-	1,500	1,500	-	1,500	1,500	-	1,500	1,500	-
PR.1ET3001 - Pipe Enhancement Program	7,300	7,300	-	8,000	8,000	-	8,000	8,000	-	8,000	8,000	-
PR.9ET0900 - Environmental Enhancements	1,000	1,000	-	1,650	1,650	-	1,700	1,700	-	1,750	1,750	-
Total ETR11 - Environmental	8,300	8,300	-	9,650	9,650	-	9,700	9,700	-	9,750	9,750	-
PR.8ET0500 - Emergent Transmission Reliability	10,000	10,000	-	9,500	5,500	(4,000)	9,500	5,500	(4,000)	9,500	5,500	(4,000)
PR.3ET0100 - Transmission Fdr. Pipe Support at Queensboro Bridge	3,600	3,600	-	3,600	3,600	-	3,500	3,500	-	-	-	-
PR.2ES6301 - Astoria Interconnect for Feeder 34091	14,000	14,000	-	6,000	6,000	-	15,000	15,000	-	19,300	19,300	-
PR.20220155 - New Rainey to Corona Feeder (Result of Mothballing Astoria No. 4)	-	-	-	-	-	-	67,000	67,000	-	73,000	73,000	-
Total ETR12 - Reliability & Feeder Replacement	27,600	27,600	-	19,100	15,100	(4,000)	95,000	91,000	(4,000)	101,800	97,800	(4,000)
Sub-Total Transmission Operations	40,400	40,400	-	33,250	29,250	(4,000)	109,200	105,200	(4,000)	116,050	112,050	(4,000)
Grand Total - System and Transmission Operations	45,050	45,050	-	36,950	32,950	(4,000)	113,600	109,600	(4,000)	119,200	115,200	(4,000)

STAFF ELECTRIC INFRASTRUCTURE INVESTMENT PANEL
2013 - 2016 Transmission and Distribution Capital Budget Adjustments
Case 13-E-0030

Substation Operations	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
Project/Program Description	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
Small Capital Equipment Program	3,000	3,000	-	3,000	3,000	-	3,000	3,000	-	4,000	4,000	-
CIP - Security Upgrades	1,000	1,000	-	1,000	1,000	-	1,000	1,000	-	-	-	-
Security Enhancements (Includes Other)	9,085	9,085	-	6,495	6,495	-	6,699	6,699	-	4,353	4,353	-
Total - Security	10,085	10,085	-	7,495	7,495	-	7,699	7,699	-	4,353	4,353	-
Astor: Install 5th Bank And Associated Feeder	-	-	-	-	-	-	-	-	-	2,000	2,000	-
Avenue A: Replace Overloaded Syn Bus Sections	500	500	-	-	-	-	-	-	-	-	-	-
East 179th Street: Switchgear And Bus Replacement	19,000	19,000	-	15,000	15,000	-	12,000	12,000	-	10,000	10,000	-
East 179th Street: Install Water Spray For 43mva Transformers	-	-	-	-	-	-	500	500	-	500	500	-
East 179th Street: Install Fans For Limiting Bus, Breakers & Reactors	-	-	-	-	-	-	750	750	-	750	750	-
Emergent Load Relief Program	-	-	-	-	-	-	-	-	-	1,100	1,100	-
Fresh Kills: Replace Limiting Feeders Associated With Transformer 21w	-	-	-	-	-	-	-	-	-	750	750	-
Greenwood: Install Breaker 3n & Switch Feeder Connections	-	-	-	5,000	5,000	-	6,000	6,000	-	-	-	-
Greenwood: Replaced Overloaded Equipment	4,275	4,275	-	2,706	2,706	-	-	-	-	-	-	-
Parkchester: Install 4th Transformer	-	-	-	-	-	-	-	-	-	8,791	8,791	-
Plymouth Street: Replace Limiting Bus Section	-	-	-	-	-	-	-	-	-	2,974	2,974	-
Queensbridge: Replace Overdutied Disconnect Switches	-	-	-	3,000	3,000	-	4,000	4,000	-	4,000	4,000	-
West 19th Street: Replace Overloaded Syn Bus Sections	500	500	-	-	-	-	-	-	-	-	-	-
Total - Load Relief	24,275	24,275	-	25,706	25,706	-	23,250	23,250	-	30,865	30,865	-
Breaker - Capital Upgrade Program	5,178	5,178	-	9,500	9,500	-	9,500	9,500	-	9,500	9,500	-
Area Substation Reliability And Auto Ground Circuit Switchers	11,222	11,222	-	11,366	8,500	(2,866)	11,346	8,500	(2,846)	11,427	8,500	(2,927)
Category Alarms	1,500	1,500	-	1,500	1,500	-	1,500	1,500	-	1,500	1,500	-
Condition Based Monitoring Equipment	250	250	-	250	250	-	250	250	-	300	300	-
Control Cable Upgrade Program	-	-	-	1,000	1,000	-	1,000	1,000	-	1,100	1,100	-
Stabilization of Pothead Stand Supports	1,000	1,000	-	1,000	1,000	-	1,000	1,000	-	1,100	1,100	-
Dc System Upgrade Program	3,206	3,206	-	3,789	3,789	-	3,782	3,782	-	3,265	3,265	-
Disconnect Switch Program	3,000	3,000	-	3,000	3,000	-	3,000	3,000	-	3,300	3,300	-
Disturbance Monitoring Equipment - 138kv	-	-	-	5,000	5,000	-	5,000	5,000	-	6,000	6,000	-
Disturbance Monitoring Equipment - 345kv	8,600	8,600	-	8,800	8,800	-	8,800	8,800	-	-	-	-
East River: Station Upgrade	6,000	6,000	-	5,000	5,000	-	6,000	6,000	-	-	-	-
Elmsford: Install New Substation	1,000	1,000	-	-	-	-	-	-	-	-	-	-
Facility Improvement Program	4,500	4,500	-	6,600	5,000	(1,600)	6,600	5,000	(1,600)	6,600	5,000	(1,600)
Fire Suppression (Also See Fire Protection Under Other Esu 17)	8,016	8,016	-	7,036	7,036	-	5,402	5,402	-	6,530	6,530	-
High Voltage Test Sets	5,000	5,000	-	5,000	3,000	(2,000)	5,000	3,000	(2,000)	5,000	3,000	(2,000)
Reinforced Ground Grid	800	800	-	1,600	1,600	-	1,600	1,600	-	1,750	1,750	-
Relay House Enclosures	-	-	-	1,096	1,096	-	1,097	1,097	-	1,088	1,088	-
Relay Modifications Program	8,550	8,550	-	8,660	8,660	-	8,644	8,644	-	8,706	8,706	-
Relay Protection Sytem Redundancy - Single Point Of Failure	-	-	-	5,000	5,000	-	5,000	5,000	-	5,000	5,000	-
Replace/Retrofit Overdutied 13/27kv Circuit Breakers	10,278	10,278	-	11,301	11,301	-	10,501	10,501	-	10,000	10,000	-
Roof Replacement Program	3,000	3,000	-	3,000	1,500	(1,500)	3,000	1,500	(1,500)	3,300	1,500	(1,800)
Switchgear Enclosure Upgrade	-	-	-	1,000	1,000	-	1,000	1,000	-	1,100	1,100	-
Transformer Replacement Program	20,651	20,651	-	25,863	20,000	(5,863)	25,417	20,000	(5,417)	25,336	20,000	(5,336)
Total - Reliability	101,751	101,751	-	126,360	112,531	(13,829)	124,438	111,075	(13,362)	111,902	98,239	(13,663)
Purs Supervisory Control & Data Acquisition	1,050	1,050	-	1,045	1,045	-	-	-	-	-	-	-
Pumping Plant Improvement	3,000	3,000	-	5,500	5,500	-	5,500	5,500	-	5,500	5,500	-
EH&S Risk Mitigation (OWS, Moats)	10,688	10,688	-	10,825	10,825	-	10,800	10,800	-	10,883	10,883	-
Total - Environmental	14,738	14,738	-	17,370	17,370	-	16,300	16,300	-	16,383	16,383	-
Failed Transformer Program	16,782	16,782	-	24,642	23,642	(1,000)	24,661	23,661	(1,000)	24,464	23,464	(1,000)
Various - Failed Equipment Other Than Transformer Program	5,227	5,227	-	5,278	5,278	-	5,355	5,355	-	5,315	5,315	-
Total Failures	22,009	22,009	-	29,920	28,920	(1,000)	30,016	29,016	(1,000)	29,779	28,779	(1,000)
Circuit Switcher Replacement Program	-	-	-	1,000	1,000	-	1,000	1,000	-	1,100	1,100	-
Technology Improvements	1,000	1,000	-	1,000	600	(400)	1,000	600	(400)	1,100	600	(500)
Total Other	1,000	1,000	-	2,000	1,600	(400)	2,000	1,600	(400)	2,200	1,700	(500)
VFT Interconnection	1,000	1,000	-	800	800	-	-	-	-	-	-	-
Total - Generation Interconnection	1,000	1,000	-	800	800	-	-	-	-	-	-	-
Total	177,858	177,858	-	212,651	197,422	(15,229)	206,703	191,941	(14,762)	199,482	184,319	(15,163)

STAFF ELECTRIC INFRASTRUCTURE INVESTMENT PANEL
2013 - 2016 Transmission and Distribution Capital Budget Adjustments
Case 13-E-0030

Electric Operations	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
Project/Program Description												
New Business Capital	155,000	155,000	-	160,000	160,000	-	160,000	160,000	-	165,000	165,000	-
Meter Installation	17,420	17,420	-	16,760	16,760	-	15,105	15,105	-	14,635	14,635	-
Total - New Business	172,420	172,420	-	176,760	176,760	-	175,105	175,105	-	179,635	179,635	-
Primary Cable Replacement (OA's)	58,215	58,215	-	56,500	56,500	-	52,336	52,336	-	50,710	50,710	-
Overhead	27,383	27,383	-	17,400	17,400	-	16,118	16,118	-	15,617	15,617	-
Temporary Services (incl. conduit)	35,590	35,590	-	32,052	32,052	-	30,850	30,850	-	29,899	29,899	-
Street Lights (incl. conduit)	22,724	22,724	-	23,501	23,501	-	21,769	21,769	-	21,091	21,091	-
Transformer Installation	32,416	32,416	-	23,500	23,500	-	21,768	21,768	-	21,091	21,091	-
Total - Emergency Response - Emergency Replacement	176,328	176,328	-	152,953	152,953	-	142,841	142,841	-	138,408	138,408	-
Load Relief	200	200	-	-	-	-	-	-	-	-	-	-
Modernization and Other	3,300	3,300	-	3,500	3,500	-	3,500	3,500	-	3,500	3,500	-
USS Site Improvement for SPCC Plans	4,800	4,800	-	3,200	3,200	-	-	-	-	-	-	-
Total - Distribution Substation	8,300	8,300	-	6,700	6,700	-	3,500	3,500	-	3,500	3,500	-
Radial (13 MW) - Parkchester 2 to 1	250	-	(250)	-	-	-	-	-	-	-	-	-
Part of Pennsylvania (74 MW) to create Waterside network				3,000	-	(3,000)	6,000	6,000	-	-	-	-
Cable Crossing (XW Riverdale & BQ Flushing)	2,900	2,900	-	3,000	3,000	-	3,000	3,000	-	3,000	3,000	-
59th Street Bridge Crossing	2,000	2,000	-	1,000	1,000	-	-	-	-	-	-	-
Total - System Reinforcement - Area SS Overloads	5,150	4,900	(250)	7,000	4,000	(3,000)	9,000	9,000	-	3,000	3,000	-
Primary Feeder Relief	6,944	6,944	-	10,501	7,000	(3,501)	9,726	9,726	-	8,976	8,976	-
Network Transformer Relief	22,500	22,500	-	29,501	22,500	(7,001)	27,326	27,326	-	26,477	26,477	-
NonNetwork Fdr Relief (Open Wire)	6,656	6,656	-	6,500	6,500	-	6,020	6,020	-	5,833	5,833	-
Overhead Transformer Relief	1,936	1,936	-	1,900	1,900	-	1,834	1,834	-	1,807	1,807	-
Total - Base Growth / Relief	38,036	38,036	-	48,402	37,900	(10,502)	44,906	44,906	-	43,093	43,093	-
Osmose (C Truss)	1,779	1,779	-	1,700	1,700	-	1,552	1,552	-	1,495	1,495	-
Autoloop Reliability (27kV Inc'l)	3,738	3,738	-	3,500	3,500	-	3,242	3,242	-	3,141	3,141	-
Aerial Cable Replacement	1,243	1,243	-	1,100	1,100	-	1,019	1,019	-	987	987	-
#4,#6 Self Supporting Wire	2,655	2,655	-	1,400	1,400	-	1,297	1,297	-	1,256	1,256	-
Automated Emergency Ties	728	728	-	700	700	-	648	648	-	-	-	-
Overhead Feeder Reliability/VRS Replacement	2,759	2,759	-	1,500	1,500	-	463	463	-	449	449	-
Overhead Conductor Clearance	620	620	-	500	500	-	463	463	-	-	-	-
Overhead Feeder Sectionalizing Program	1,679	1,679	-	1,600	1,600	-	1,453	1,453	-	1,395	1,395	-
Oil Minders	520	520	-	500	500	-	463	463	-	448	448	-
Secondary Open Mains	129,300	129,300	-	138,000	129,300	(8,700)	127,830	127,830	-	123,857	123,857	-
HiPot	2,078	2,078	-	2,000	2,000	-	1,852	1,852	-	1,796	1,796	-
PILC	20,786	20,786	-	17,000	17,000	-	16,674	16,674	-	16,156	16,156	-
Vented Service Box Covers	6,700	6,700	-	11,700	11,700	-	11,700	11,700	-	11,700	11,700	-
4 kV UG Reliability	2,278	2,278	-	2,000	2,000	-	1,853	1,853	-	1,795	1,795	-
Underground Secondary Reliability Program	32,538	32,538	-	36,200	36,200	-	32,679	32,679	-	31,498	31,498	-
Transformer Vault Modernization	6,500	6,500	-	5,000	5,000	-	5,000	5,000	-	5,000	5,000	-
Overhead Secondary Reliability Program	208	208	-	199	199	-	186	186	-	179	179	-
Remote Monitoring System 3rd Generation	3,118	3,118	-	1,500	1,500	-	1,390	1,390	-	1,346	1,346	-
Pressure, Temperature and Oil Sensors	3,118	3,118	-	3,000	3,000	-	2,780	2,780	-	2,693	2,693	-
UG Sectionalizing Switches	2,111	2,111	-	2,993	2,993	-	2,773	2,773	-	2,687	2,687	-
Grounding transformers	624	624	-	600	600	-	556	556	-	539	539	-
Shunt reactors	1,767	1,767	-	1,700	1,700	-	1,575	1,575	-	1,526	1,526	-

STAFF ELECTRIC INFRASTRUCTURE INVESTMENT PANEL
2013 - 2016 Transmission and Distribution Capital Budget Adjustments
Case 13-E-0030

Electric Operations (Continued)	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
Project/Program Description												
Targeted Primary DBC Replacement	520	520	-	500	500	-	463	463	-	449	449	-
Network Reliability	14,320	14,320	-	20,513	20,513	-	15,043	15,043	-	14,575	14,575	-
ATS Installation USS Reliability XW	208	208	-	200	200	-	185	185	-	180	180	-
Street Lights Service Reliability Program	500	500	-	500	500	-	500	500	-	500	500	-
Total - Reliability	242,395	242,395	-	256,105	247,405	(8,700)	233,639	233,639	-	225,647	225,647	-
System Reinforcement IT Projects	22,070	22,070	-	8,112	8,112	-	12,666	12,666	-	12,947	12,947	-
Work Mangement System	49,100	49,100	-	10,000	10,000	-	-	-	-	-	-	-
Total System Reinforcement	356,751	356,501	(250)	329,619	307,417	(22,202)	300,211	300,211	-	284,687	284,687	-
Emergency Response - Emergency Repairs	176,328	176,328	-	152,953	152,953	-	142,841	142,841	-	138,408	138,408	-
System Relief and Reliability	356,751	356,501	(250)	329,619	307,417	(22,202)	300,211	300,211	-	284,687	284,687	-
New Business	155,000	155,000	-	160,000	160,000	-	160,000	160,000	-	165,000	165,000	-
Meter Installation	17,420	17,420	-	16,760	16,760	-	15,105	15,105	-	14,635	14,635	-
Meter Purchase	9,500	9,500	-	9,500	9,500	-	10,000	10,000	-	10,000	10,000	-
Transformer Purchase	127,000	127,000	-	127,000	127,000	-	127,000	127,000	-	127,000	127,000	-
Sub-Total	841,999	841,749	(250)	795,832	773,630	(22,202)	755,157	755,157	-	739,730	739,730	-
Unit Substation Load Relief	200	200	-	-	-	-	-	-	-	-	-	-
MODERNIZATION & OTHER	3,300	3,300	-	3,500	3,500	-	3,500	3,500	-	3,500	3,500	-
USS Site Improvement for SPCC Plans	4,800	4,800	-	3,200	3,200	-	-	-	-	-	-	-
Distribution Substations	8,300	8,300	-	6,700	6,700	-	3,500	3,500	-	3,500	3,500	-
Total Distribution	850,299	850,049	(250)	802,532	780,330	(22,202)	758,657	758,657	-	743,230	743,230	-
Interference	70,899	70,899	-	69,302	69,302	-	63,735	63,735	-	60,561	60,561	-
Grand Total	921,198	920,948	(250)	871,834	849,632	(22,202)	822,392	822,392	-	803,791	803,791	-

STAFF ELECTRIC INFRASTRUCTURE INVESTMENT PANEL
2013 - 2016 Transmission and Distribution Capital Budget Adjustments
Case 13-E-0030

Storm Hardening												
Transmission Projects												
Project/Program Description	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
Upgrade Overhead 345kV Transmission Line: 2 feeders, reinforce 11 towers.	1,500	1,500	-	2,000	2,000	-	2,000	2,000	-	2,000	2,000	-
L-Line Splice and Dead End Assembly: the reinforcement of the in-line and dead end assemblies on the overhead 138kV feeder 398 on the L-Line between Pleasant Valley Substation and the Connecticut Border.	-	-	-	2,900	2,900	-	-	-	-	-	-	-
Buchanan Y94 Bypass: reinforce the Feeder Y94 bypass at 10 Buchanan substation will harden the existing wooden bypass on Y94, making this critical infrastructure feeder 12 much less susceptible to failure during wind events.	-	-	-	3,500	3,500	-	-	-	-	-	-	-
Reconductor Dunwoodie Sprainbrook: strengthen these feeders and make them less prone to failure in high wind events	2,400	2,400	-	-	-	-	-	-	-	-	-	-
Transmission Total	3,900	3,900	-	8,400	8,400	-	2,000	2,000	-	2,000	2,000	-
Sub-Transmission/Substation Projects												
Project/Program Description	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
E13 St. 345kV Yard	8,210	8,210	-	6,750	6,750	-	6,000	6,000	-	7,000	7,000	-
Relay Houses: 370 LF 12 Flood Gates (Immediate)	2,000	2,000	-	-	-	-	-	-	-	-	-	-
Pump Houses: 8 Cabinets (Immediate)	2,200	2,200	-	-	-	-	-	-	-	-	-	-
Pump Houses/Cooling Plants: 200 LF, beam for stackable barriers (Immediate)	510	510	-	-	-	-	-	-	-	-	-	-
Control Panels and Relay Cabinets: 61 Cabinets, 8 Trenches (Immediate)	200	200	-	-	-	-	-	-	-	-	-	-
Station Perimeter: 580 LF (Immediate)	1,500	1,500	-	-	-	-	-	-	-	-	-	-
Sump Pumps: 10 (Immediate)	300	300	-	-	-	-	-	-	-	-	-	-
Catch Basin: 1 sluice gate (Immediate)	500	500	-	-	-	-	-	-	-	-	-	-
Relay Houses: 38 new panels, 33,000 ft of copper, 60,000 of fiber (Final)	500	500	-	4,000	4,000	-	4,000	4,000	-	4,500	4,500	-
Millhouse Transformers: 7 transformers (Final)	500	500	-	1,000	1,000	-	1,000	1,000	-	1,000	1,000	-
Pumphouses: 2 panels (Final)	-	-	-	750	750	-	-	-	-	-	-	-
Cooling Plants: 3 panels, 9 pumps (Final)	-	-	-	500	500	-	500	500	-	500	500	-
Diesel Generator: 1 diesel (Final)	-	-	-	500	500	-	500	500	-	1,000	1,000	-
E13 St. 138kV Yard	3,569	3,569	-	25,250	25,250	-	28,000	28,000	-	32,100	32,100	-
Control Room: 180 seal penetrations, 17 flood Barriers (Immediate)	1,000	1,000	-	-	-	-	-	-	-	-	-	-
E 13 St. Transformers: reinforce baffle plates at 8 locations (Immediate)	500	500	-	-	-	-	-	-	-	-	-	-
Control Room: Relocate Control Room to the existing SSO work space on the second floor (100s of inputs (<1000)) (Final)	650	650	-	11,000	11,000	-	12,000	12,000	-	13,000	13,000	-
Control Room: ~100,000 of feet of fiber optics (Final)	700	700	-	11,000	11,000	-	12,000	12,000	-	13,000	13,000	-
Control Room: Relocate 2 Light & Power transformers (Final)	-	-	-	-	-	-	-	-	-	1,000	1,000	-
Control Room: 2 AC load boards (Final)	-	-	-	-	-	-	-	-	-	500	500	-
Pumphouses: 6 panels (Final)	-	-	-	250	250	-	1,000	1,000	-	1,000	1,000	-
Cooling Plants: Elevate 4 panels, 12 pumps (Final)	-	-	-	1,000	1,000	-	500	500	-	-	-	-
E13th Street Transformers: 8 transformers (Final)	500	500	-	1,000	1,000	-	1,000	1,000	-	500	500	-
Relay Cabinets for Transformers: 8 new panels, 21,000 ft of copper, 10,000 of fiber (Final)	219	219	-	1,000	1,000	-	1,500	1,500	-	2,000	2,000	-
Overall Station Storm Hardening: additional funds to potentially raise equipment higher, reinforce walls to increase height, modify flood doors to protect to igher elevations, etc. (Final)	-	-	-	-	-	-	-	-	-	1,100	1,100	-
East River	3,049	3,049	-	1,350	1,350	-	2,800	2,800	-	3,150	3,150	-
Station Perimeter: 12 flood barriers/ doors, 650 LF of wall (Immediate)	1,750	1,750	-	-	-	-	-	-	-	-	-	-
Pumphouses: 1 pump (Immediate)	400	400	-	-	-	-	-	-	-	-	-	-
Control and Relay Cabinets / Manholes :278 conduits (Immediate)	249	249	-	-	-	-	-	-	-	-	-	-
Existing Flood Pumps: 3 pumps (Immediate)	50	50	-	-	-	-	-	-	-	-	-	-
Relay Houses: (Final)	N/A		N/A	Funded Separately by ER Automation Project		N/A						
Pumphouses: Elevation of 1 panel (Final)	-	-	-	350	350	-	-	-	-	-	-	-
Cooling Plants: Elevate 1 panel, 3 pumps (Final)	-	-	-	350	350	-	150	150	-	-	-	-
Transformers: 2 transformers (Final)	300	300	-	150	150	-	150	150	-	150	150	-
Flood Pump: 1 pump (Final)	-	300	300	-	-	-	1,000	1,000	-	1,000	1,000	-
Relay Cabinets for Transformers: 12 new panels, 13,000 ft of copper, 28,000 of fiber (Final)	300		(300)	500	500	-	500	500	-	500	500	-
Overall Station Storm Hardening: additional funds to potentially raise equipment higher, reinforce walls to increase height, modify flood doors to protect to higher elevations, etc. (Final)	-	-	-	-	-	-	1,000	1,000	-	1,500	1,500	-
E15 St. Cooling Plant	1,602	1,602	-	2,750	2,750	-	3,250	3,250	-	3,000	3,000	-
Station Perimeter (Immediate)	900	900	-	-	-	-	-	-	-	-	-	-
Pumps (Immediate)	200	200	-	-	-	-	-	-	-	-	-	-
Control and Relay Cabinets / Manholes (Immediate)	202	202	-	-	-	-	-	-	-	-	-	-
Pumphouses: Elevate 3 panels (Final)	-	-	-	500	500	-	500	500	-	-	-	-
Cooling Plants: 3 panels, 9 pumps (Final)	-	-	-	500	500	-	1,000	1,000	-	-	-	-
L&P Transformers, Switchgear, Load Boards: 3 transformers, 3 switchgear cubicles, 2 load boards(Final)	300	300	-	1,000	1,000	-	750	750	-	1,000	1,000	-
Diesel Generator: Elevate 1 diesel (Final)	-	-	-	250	250	-	250	250	-	500	500	-

STAFF ELECTRIC INFRASTRUCTURE INVESTMENT PANEL
2013 - 2016 Transmission and Distribution Capital Budget Adjustments
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Sub-Transmission/Substation Projects (Continued)	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
Project/Program Description	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
Diesel Generator: Install and elevate 1 diesel (Final)	-	-	-	500	500	-	750	750	-	250	250	-
Overall Station Storm Hardening (Final)	-	-	-	-	-	-	-	-	-	1,250	1,250	-
E36 St.	1,413	1,413	-	1,000	1,000	-	1,500	1,500	-	1,000	1,000	-
Station Perimeter: 11 flood doors/barriers (Immediate)	400	400	-	-	-	-	-	-	-	-	-	-
Transformer Vaults: 5 locations (Immediate)	100	100	-	-	-	-	-	-	-	-	-	-
Transformer Vaults and Driveway: 12 pumps (Immediate)	713	713	-	-	-	-	-	-	-	-	-	-
Control and Relay Cabinets / Manholes: 180 conduits (Immediate)	200	200	-	-	-	-	-	-	-	-	-	-
Relays and Switchgear: 8 switchgear sections (Final)	-	-	-	500	500	-	500	500	-	-	-	-
Diesel Generator: 1 diesel (Final)	-	-	-	500	500	-	1,000	1,000	-	-	-	-
Overall Station Storm Hardening: allow for additional funds to potentially raise equipment higher, reinforce walls to increase height, modify flood doors to protect to higher elevations, etc. (Final)	-	-	-	-	-	-	-	-	-	1,000	1,000	-
World Trade Center	985	985	-	1,200	1,200	-	700	700	-	1,000	1,000	-
Station Perimeter: Seal wall 50 penetrations (125 sf) (Immediate)	150	150	-	-	-	-	-	-	-	-	-	-
Gorund Floor Level: 50 Penetrations	150	150	-	-	-	-	-	-	-	-	-	-
Station cellar: 9 Flood Doors/Barriers	325	325	-	-	-	-	-	-	-	-	-	-
Flood Pumps: 2 Pumps and 50 Ft. of Pipe	180	180	-	-	-	-	-	-	-	-	-	-
Oil Water Separator: 1 Valve	150	150	-	-	-	-	-	-	-	-	-	-
Control and Relay Cabinets/Manholes: 180 Conduits	30	30	-	-	-	-	-	-	-	-	-	-
Transformer Vaults: 5 Vaults (Final)	-	-	-	700	700	-	200	200	-	-	-	-
Station Cellar: 2 Pumps (Final)	-	-	-	500	500	-	500	500	-	-	-	-
Overall Station Storm Hardening: allow for additional funds to potentially raise equipment higher, reinforce walls to increase height, modify flood doors to protect to higher elevations, etc. (Final)	-	-	-	-	-	-	-	-	-	1,000	1,000	-
Seaport	1,567	1,567	-	1,050	1,050	-	1,300	1,300	-	2,250	2,250	-
Station Perimeter: 5 flood doors / barriers (Immediate)	500	500	-	-	-	-	-	-	-	-	-	-
Transformer Vaults: 10 vaults (880 sf of panel) (Immediate)	300	300	-	-	-	-	-	-	-	-	-	-
Transformer Vaults: 20 pumps (Immediate)	600	600	-	-	-	-	-	-	-	-	-	-
Transformer Vault #3: 33 LF of wall (Immediate)	50	50	-	-	-	-	-	-	-	-	-	-
L&P Transformer Room: 29 LF of wall (Immediate)	50	50	-	-	-	-	-	-	-	-	-	-
Control and Relay Cabinets / Manholes: 180 conduits (Immediate)	67	67	-	-	-	-	-	-	-	-	-	-
Switchgear Room: 13 flood barriers (Final)	-	-	-	300	300	-	300	300	-	-	-	-
Diesel Generator: 1 diesel (Final)	-	-	-	500	500	-	750	750	-	250	250	-
Transformer Vaults: 10 vaults (Final)	-	-	-	250	250	-	250	250	-	-	-	-
Overall Station Storm Hardening: allow for additional funds to potentially raise equipment higher, reinforce walls to increase height, modify flood doors to protect to higher elevations, etc. (Final)	-	-	-	-	-	-	-	-	-	2,000	2,000	-
Goethals	4,340	4,340	-	9,650	9,650	-	7,200	7,200	-	8,750	8,750	-
PAR No. 1 and Relay House 1, Control Bldg, Fiber Optic Bldg, Oil Pumphouse, Relay House 2, Circuit Breakers 6 & 8 (Immediate)	2,540	2,540	-	-	-	-	-	-	-	-	-	-
Pumps: 16 pumps (Immediate)	1,000	1,000	-	-	-	-	-	-	-	-	-	-
Control Cabinets and Relay Panels: 256 conduits, 18 troughs (Immediate)	300	300	-	-	-	-	-	-	-	-	-	-
Station Perimeter: 2,500 LF of sheet pile wall, 3 flood gates (Final)	500	500	-	9,150	9,150	-	5,850	5,850	-	6,500	6,500	-
Pumphouses: 4 cabinets (Final)	-	-	-	-	-	-	600	600	-	500	500	-
Diesel Generator: 1 diesel (Final)	-	-	-	500	500	-	750	750	-	250	250	-
Overall Station Storm Hardening: allow for additional funds to potentially raise equipment higher, reinforce walls to increase height, modify flood doors to protect to higher elevations, etc. (Final)	-	-	-	-	-	-	-	-	-	1,500	1,500	-
Fresh Kills	1,645	1,645	-	7,000	7,000	-	6,250	6,250	-	4,750	4,750	-
345kV Control Unit #1, 345kV Control Unit #2: 255 LF of wall, 4 flood barriers, 2 stairways (Immediate)	550	550	-	-	-	-	-	-	-	-	-	-
Pumps: 8 pumps (Immediate)	350	350	-	-	-	-	-	-	-	-	-	-
Control Cabinets and Relay Panels: 187 conduits, 12 troughs (Immediate)	245	245	-	-	-	-	-	-	-	-	-	-
Station Perimeter: 2,300 LF of sheet pile wall (Final)	500	500	-	6,500	6,500	-	5,500	5,500	-	3,000	3,000	-
Diesel Generator: 1 diesel (Final)	-	-	-	500	500	-	750	750	-	250	250	-
Overall Station Storm Hardening: allow for additional funds to potentially raise equipment higher, reinforce walls to increase height, modify flood doors to protect to higher elevations, etc. (Final)	-	-	-	-	-	-	-	-	-	1,500	1,500	-
Gowanus	3,370	3,370	-	2,500	2,500	-	6,250	6,250	-	4,250	3,250	(1,000)
Relay House #1, Fiber Optic Room and Fire Pump Room, Relay House #2: 765 LF of wall, 9 flood barriers, 2 stairways (Immediate)	1,450	1,450	-	-	-	-	-	-	-	-	-	-
Pumps: 11 pumps (Immediate)	450	450	-	-	-	-	-	-	-	-	-	-
Control Bldg: 200 penetrations (Immediate)	220	220	-	-	-	-	-	-	-	-	-	-
Control Cabinets and Relay Panels: 500 conduits, 48 troughs (Immediate)	750	750	-	-	-	-	-	-	-	-	-	-
Station Perimeter: 1,300 LF of sheet pile wall (Final)	500	500	-	2,000	2,000	-	5,500	5,500	-	3,000	3,000	-
Diesel Generator: 1 diesel (Final)	-	-	-	500	500	-	750	750	-	250	250	-
Overall Station Storm Hardening: allow for additional funds to potentially raise equipment higher, reinforce walls to increase height, modify flood doors to protect to higher elevations, etc. (Final)	-	-	-	-	-	-	-	-	-	1,000	-	(1,000)
59St (Pier 9B)	250	250	-	1,500	1,500	-	1,500	1,500	-	2,450	2,450	-
FeederWaterCoolingPumps, CondensationTankBldg: 600LF of wall, 8 flood barriers (Final)	250	250	-	500	500	-	200	200	-	500	500	-

STAFF ELECTRIC INFRASTRUCTURE INVESTMENT PANEL
2013 - 2016 Transmission and Distribution Capital Budget Adjustments
Case 13-E-0030

Sub-Transmission/Substation Projects (Continued)	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
Project/Program Description	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
Pumps: 4 pumps (Final)	-	-	-	200	200	-	-	-	-	-	-	-
Control Cabinets and Relay Panels: 200 conduits (Final)	-	-	-	300	300	-	100	100	-	-	-	-
Motor Control Cabinet (MCC) for Salt water Pumps: 1 Cabinet (Final)	-	-	-	-	-	-	500	500	-	500	500	-
MCC for Fire Pumps: 1 Cabinet (Final)	-	-	-	500	500	-	700	700	-	450	450	-
Overall Station Storm Hardening: allow for additional funds to potentially raise equipment higher, reinforce walls to increase height, modify flood doors to protect to higher elevations, etc. (Final)	-	-	-	-	-	-	-	-	-	1,000	1,000	-
West 49th Street	-	-	-	-	-	-	1,150	1,150	-	1,000	1,000	-
Station Perimeter: 100 penetrations (Final)	-	-	-	-	-	-	150	150	-	-	-	-
Station Perimeter: 5 flood doors (Final)	-	-	-	-	-	-	500	500	-	-	-	-
Water Return Line: 1 water line (Final)	-	-	-	-	-	-	500	500	-	-	-	-
Overall Station Storm Hardening: allow for additional funds to potentially raise equipment higher, reinforce walls to increase height, modify flood doors to protect to higher elevations, etc. (Final)	-	-	-	-	-	-	-	-	-	1,000	1,000	-
Heligate	-	-	-	-	-	-	1,900	1,900	-	4,450	4,450	-
Critical Equipment including Relay Houses and Pumphouses: 400 LF of wall, 3 flood barriers (Final)	-	-	-	-	-	-	650	650	-	650	650	-
Battery Room: 2 Flood doors (Final)	-	-	-	-	-	-	100	100	-	-	-	-
Pumps: 8 pumps (Final)	-	-	-	-	-	-	400	400	-	400	400	-
Pumphouses: 4 cabinets (Final)	-	-	-	-	-	-	600	600	-	500	500	-
Control Cabinets and Relay Panels: 200 conduits (Final)	-	-	-	-	-	-	150	150	-	150	150	-
Overall Station Storm Hardening: allow for additional funds to potentially raise equipment higher, reinforce walls to increase height, modify flood doors to protect to higher elevations, etc. (Final)	-	-	-	-	-	-	-	-	-	2,750	2,750	-
Sherman Creek	-	-	-	-	-	-	1,700	1,700	-	4,350	4,350	-
Critical Equipment including Relay Houses, Capacitor Bank, Switchgear: 500 LF of wall, 2 flood barriers (Final)	-	-	-	-	-	-	750	750	-	750	750	-
Pumps: 4 pumps (Final)	-	-	-	-	-	-	200	200	-	200	200	-
Pumphouses: 4 cabinets (Final)	-	-	-	-	-	-	600	600	-	500	500	-
Control Cabinets and Relay Panels: 200 conduits (Final)	-	-	-	-	-	-	150	150	-	150	150	-
Overall Station Storm Hardening: allow for additional funds to potentially raise equipment higher, reinforce walls to increase height, modify flood doors to protect to higher elevations, etc. (Final)	-	-	-	-	-	-	-	-	-	2,750	2,750	-
Academy	-	-	-	-	-	-	500	500	-	500	500	-
Oil Water Separator: 1 valve (Final)	-	-	-	-	-	-	50	50	-	-	-	-
Driveway and Roll-up Door: 1 flood barrier, 20 ft curb (Final)	-	-	-	-	-	-	450	450	-	-	-	-
Overall Station Storm Hardening: allow for additional funds to potentially raise equipment higher, reinforce walls to increase height, modify flood doors to protect to higher elevations, etc. (Final)	-	-	-	-	-	-	-	-	-	500	500	-
Sub-Transmission/Substation Projects Total	30,000	30,000	-	60,000	60,000	-	70,000	70,000	-	80,000	79,000	(1,000)
Electric Distribution	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
Project/Program Description	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
Coastal Storm Hardening - Underground Projects												
Reconfigure Bowling Green and Fulton Network Boundaries: 21 switches at a cost of \$1M/switch, Isolate flood zones from non-flood zones for each of the two networks.	-	-	-	21,000	21,000	-	-	-	-	-	-	-
265/460 Submersible NWP: 390 units at a cost of \$100,000/unit to be installed in flood zones 1 and 2 in 2014-2016.	1,000	1,000	-	10,000	13,900	3,900	15,000	15,000	-	14,000	14,000	-
120/208 Submersible Transformer / NWP: 400 units at a cost of \$100,000/unit to be installed in flood zones 1 and 2 in 2014-2016.	10,000	10,000	-	15,000	14,600	(400)	10,000	10,000	-	15,000	15,000	-
Isolate Customer Equipment in Nine Manhattan Networks: 70 switches at a cost of \$1,000,000/switch, 5 switches in 2013, 19 switches in 2014.	5,000	5,000	-	19,000	19,000	-	23,000	23,000	-	23,000	23,000	-
Underground Projects Total	16,000	16,000	-	65,000	68,500	3,500	48,000	48,000	-	52,000	52,000	-
Overhead Projects	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
Reduce Circuit Segment Size - deploy automatic vacuum recloser switches 57 switches at a cost of \$50,000/switch 30 switches in 2013, 27 switches in 2014.	1,500	1,500	-	1,350	1,350	-	1,800	1,800	-	1,000	1,000	-
Deploy automatic SCADA-ready gang switches 130 switches at a cost of \$50,000/switch, 50 switches in 2013, 80 switches in 2014.	2,500	2,500	-	4,000	4,000	-	6,600	6,600	-	4,400	4,400	-
Isolation of Open Wire Spurs from Feeder Main Runs - 4,000 units at a cost of \$3,000/unit 3,000 units in 2013 1,000 units in 2014.	9,000	9,000	-	3,000	3,000	-	-	-	-	-	-	-
Improvement of Auto-loop Reliability - large autoloops into several smaller loops, Upgrading wire and pole sizes Sacrificial components	6,600	6,600	-	6,600	6,600	-	6,600	6,600	-	6,600	6,600	-
Selective undergrounding of overhead lines - Based on 2007 study of \$6.2M per mile Total estimate at \$255M	-	-	-	-	-	-	100,000	100,000	-	100,000	100,000	-
Overhead Projects Total	19,600	19,600	-	14,950	14,950	-	115,000	115,000	-	112,000	112,000	-
Electric Distribution Grand Total	35,600	35,600	-	79,950	83,450	3,500	163,000	163,000	-	164,000	164,000	-
Total Storm Hardening T&D	69,500	69,500	-	148,350	151,850	3,500	235,000	235,000	-	246,000	245,000	(1,000)

STAFF ELECTRIC INFRASTRUCTURE INVESTMENT PANEL
2013 - 2016 Transmission and Distribution O&M Expenditures Adjustments
Case 13-E-0030

Category	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
System and Transmission Operations	50,900	50,900	-	51,664	51,664	-	52,439	52,439	-	53,226	53,226	-
Substation Operations	91,685	91,685	-	93,100	93,100	-	94,500	94,500	-	95,900	95,900	-
Electric Operations	280,309	280,309	-	283,440	269,223	(14,217)	282,771	281,471	(1,300)	291,259	289,959	(1,300)
Total	\$ 422,894	\$ 422,894	\$ -	\$ 428,204	\$ 413,987	\$ (14,217)	\$ 429,710	\$ 428,410	\$ (1,300)	\$ 440,385	\$ 439,085	\$ (1,300)

O&M Adjustments to Electric Operations	2013 (\$000)			2014 (\$000)			2015 (\$000)			2016 (\$000)		
Category: Structure (Inspections & Repairs):												
Sub Project/Program Description	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment	Con Ed	Staff	Adjustment
Ug 5 yr facility inspect prog	36,296	36,296	-	36,978	24,023	(12,955)	4,136	4,136	-	4,122	4,122	-
Ug 5 yr facility insp related repairs	5,793	5,793	-	6,586	6,586	-	8,598	8,598	-	9,124	9,124	-
Manual stray voltage program	3,200	3,200	-	3,200	2,353	(847)	3,500	3,500	-	3,500	3,500	-
Sarnoff related repairs/ug	4,281	4,281	-	5,291	5,291	-	6,225	6,225	-	6,601	6,601	-
Sarnoff related repairs-st lights	1,496	1,496	-	989	989	-	1,041	1,041	-	1,053	1,053	-
Oh 5 yr inspection program	617	617	-	616	616	-	617	617	-	617	617	-
Oh 5 yr repair program	1,651	1,651	-	1,644	1,644	-	2,238	2,238	-	2,244	2,244	-
Mobile Stray Voltage Testing	7,842	7,842	-	7,842	7,842	-	9,142	7,842	(1,300)	9,142	7,842	(1,300)
Total	\$ 61,176	\$ 61,176	\$ -	\$ 63,146	\$ 49,344	\$ (13,802)	\$ 35,497	\$ 34,197	\$ (1,300)	\$ 36,403	\$ 35,103	\$ (1,300)

STAFF ELECTRIC INFRASTRUCTURE INVESTMENT PANEL

Staff's Estimated Electric Net Plant **

Twelve Month Average Ending December 31, 2014

Case 13-E-0030

(\$000)

	<u>BOOK COST</u> <u>OF PLANT</u>	<u>ACCRUED</u> <u>DEPRECIATION</u>	<u>NET</u> <u>PLANT</u>
DECEMBER 31, 2013 *	\$ 11,986,832	\$ 2,646,435	\$ 9,340,397
JANUARY 31, 2014	24,071,583	5,333,824	18,737,758
FEBRUARY 28, 2014	24,159,273	5,365,360	18,793,912
MARCH 31, 2014	24,307,536	5,402,651	18,904,885
APRIL 30, 2014	24,409,488	5,438,135	18,971,352
MAY 31, 2014	24,494,805	5,461,035	19,033,770
JUNE 30, 2014	24,587,608	5,497,116	19,090,493
JULY 31, 2013	24,676,491	5,536,606	19,139,885
AUGUST 31, 2014	24,756,968	5,571,314	19,185,654
SEPTEMBER 30, 2014	24,845,753	5,602,813	19,242,940
OCTOBER 31, 2014	24,943,463	5,637,089	19,306,375
NOVEMBER 31, 2014	25,033,678	5,673,893	19,359,786
DECMBER 31, 2014 *	12,581,022	2,850,136	9,730,885
TOTAL	294,854,500	66,016,408	228,838,092
AVERAGE	\$ 24,571,208	\$ 5,501,367	\$ 19,069,841

* ONE HALF OF ENDING BALANCE

** INCLUDES COMMON ALLOCATED

STAFF ELECTRIC INFRASTRUCTURE INVESTMENT PANEL

Staff's Forecasted Plant-in-Service Additions

Case 13-E-0030

(\$000)

Rate Year Ending December 31, 2014			
Plant	Company	Staff	Adjustment
Total Common Plant	232,024	226,914	(5,111)
Transmission & Distribution	1,200,711	1,136,071	(64,641)
Production	32,687	32,907	220
Total Plant Additions	1,465,423	1,395,891	(69,531)

STAFF ELECTRIC INFRASTRUCTURE INVESTMENT PANEL

Failed Equipment Programs

Case 13-E-0030

Budget and Capital Expenditures (\$000)

		2008		2009		2010		2011		2012	
		Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual	Budget	Actual
STO	Transmission Feeder Failures Program	\$ 5,000	\$ 362	\$ 5,000	\$ 5	\$ 5,300	\$ (10)	\$ 5,300	\$ (4)	\$ 5,300	\$ 11,799
SSO	Failed Transformer Program	\$ 21,200	\$ 22,756	\$ 29,300	\$ 27,842	\$ 25,000	\$ 31,208	\$ 27,000	\$ 18,362	\$ 24,000	\$ 8,408
SSO	Failed Equipment Other Than Transformers Program	\$ 1,500	\$ 5,615	\$ 2,500	\$ 3,055	\$ 2,000	\$ 9,536	\$ 3,000	\$ 8,561	\$ 5,000	\$ 5,923
	Total	\$ 27,700	\$ 28,733	\$ 36,800	\$ 30,902	\$ 32,300	\$ 40,734	\$ 35,300	\$ 26,919	\$ 34,300	\$ 26,130

Source: Con Edison Response to DPS-62

Avg. Budget Request - 2008-2012: \$ 33,280

Avg. Actual Spend - 2008-2012: \$ 30,684

Company Proposed Capital Expenditures

		2014	2015	2016
		Co. Proposed Capex		
STO	Transmission Feeder Failures Program	\$ 3,000	\$ 3,000	\$ 3,000
SSO	Failed Transformer Program	\$ 24,642	\$ 24,661	\$ 24,464
SSO	Failed Equipment Other Than Transformers Program	\$ 5,278	\$ 5,355	\$ 5,315
	Total	\$ 32,920	\$ 33,016	\$ 32,779

Source: Con Edison's Exhibit_(IIP-9), page 1 of 21

Avg. Co. Proposed Capex - 2014-2016: \$ 32,905

Staff Adjustments

		2014	2015	2016
		Staff Adjustment		
STO	Transmission Feeder Failures Program	\$0	\$0	\$0
SSO	Failed Transformer Program	\$ (1,000)	\$ (1,000)	\$ (1,000)
SSO	Failed Equipment Other Than Transformers Program	\$0	\$0	\$0
	Total	\$ (1,000)	\$ (1,000)	\$ (1,000)

Staff Recommended Capex

		2014	2015	2016
		Staff Adjustment		
STO	Transmission Feeder Failures Program	\$ 3,000	\$ 3,000	\$ 3,000
SSO	Failed Transformer Program	\$ 23,642	\$ 23,661	\$ 23,464
SSO	Failed Equipment Other Than Transformers Program	\$ 5,278	\$ 5,355	\$ 5,315
	Total	\$ 31,920	\$ 32,016	\$ 31,779

Avg. Staff Recommended Capex - 2014-2016: \$ 31,905