

Index Supplemental Exhibits

NSTAR Electric Company
Service Year 2008

1. Exhibit A – "CWIP Work Order/Project Reference Aid" or "Reference Aid" that is prepared on a project-by-project basis. The Reference Aid (i) tags a project as "new" or "pre-existing," (ii) provides project-related ISO-NE and NSTAR information, and (iii) uses a format to correlate the ISO and NSTAR information related to a project.
2. Exhibit B – the Company's most recent annual construction forecast (labeled as Critical Energy Infrastructure Information – Do Not Release).

(Please note the ISO-NE Regional Plan may be accessed through the ISO-NE website: <http://www.iso-ne.com/trans/rsp/index.html>)

3. Exhibit C - detailed CWIP accounting information including detail of AFUDC Regulatory Liability recorded during the Service Year for each project included in rate base showing the actual amounts of CWIP for each project by category, and the related accounts
4. Exhibit D - a demonstration of the effect of including CWIP and AFUDC in rate base on the Company's revenue requirement in Service Year 2008.
5. Exhibit E - a description of any CWIP or AFUDC accounting changes in order to ensure that any such changes do not erode the protections against accrual of AFUDC on CWIP balances included in rate base (there were no such accounting changes affecting the Service Year data).
6. Exhibit F - Information for "new projects," *i.e.*, projects estimated for inclusion in rate base for the first time during the Service Year.
7. Exhibit G – Information updated for "pre-existing projects," *i.e.*, projects previously included in rate base.

NSTAR Electric Company

Exhibit A

CWIP Work Order/Project Reference Aid

NSTAR Electric Company
CWIP Work Order / Project Reference Aid
2009 CWIP Supplement Applicable to 2008 Service Year

ISO-NE Year	ISO-NE Major Project Description	ISO-NE Project Identifier	NSTAR Plan	NSTAR Plan Page	NSTAR Project Authorization	NSTAR Project Description per Form 1 p.216.2	Work Order Number	NSTAR Work Order Description	CWIP \$ by WO Col. J	CWIP \$ per Form 1 Col. K
Col. A	Col. B	Col. C	Col. D	Col. E	Col. F	Col. G	Col. H	Col. I		
Pre-Existing Projects										
2005	Boston Area 115 kV Enhancements	302	2005	Page 12	04394	Relocate 433-507	01331105	TLCONS NATICK, LINE 433-507, R/W 8	\$ 1,388,159	\$ 1,388,159
2007	Short Term Lower SEMA Upgrades	694	2008	Page 12	07319	Brook Street Station Upgrade	01576686	STTIMPRVSTA 727 PURCHASE AND DELIVE	\$ 171,921	\$ 171,921
2007	Short Term Lower SEMA Upgrades	830	2008	Page 12	07388	Carver 345kV Expansion - Transmission Line	01585480	LINE 134, NEW CONSTRUCTION, CARVER	\$ 3,257,940	\$ 3,257,940
2007	Short Term Lower SEMA Upgrades	830	2008	Page 12	07388	Carver 345kV Expansion - Transmission Line	01641018	TLCONS TRANSMISSION FOR CARVER STA	803,192	803,192
2007	Short Term Lower SEMA Upgrades	830	2008	Page 12	07388	Carver 345kV Expansion - Transmission Line	01668836	TLCONS LINE 116, RELOCATE TERMINAL	3,374	3,374
2007	Short Term Lower SEMA Upgrades	830	2008	Page 12	07388	Carver 345kV Expansion - Transmission Line	01669698	TLCONS CVR LINE 355 - CARVER STAT	3,508	3,508
2007	Short Term Lower SEMA Upgrades	830	2008	Page 12	07388	Carver 345kV Expansion - Transmission Line	01669702	TLCONS CVR LINE 322 - CARVER STAT	186,793	186,793
	Subtotal: ST Lower SEMA Upgrades (Carver 345kV Expansion - Transmission Line)								\$ 4,254,809	\$ 4,254,809
2007	Short Term Lower SEMA Upgrades	831	2008	Page 12	07318	Carver 345kV Exp. -Trans Station	01550000	STAIMPRVSTA 726 MAIN ST CARVER STAT	\$ 8,943,806	\$ 8,943,806
2007	Short Term Lower SEMA Upgrades	831	2008	Page 12	07318	Carver 345kV Exp. -Trans Station	01562403	STTIMPRVSTA 726 CARVER STA 345KV CI	17,891,484	17,891,484
2007	Short Term Lower SEMA Upgrades	831	2008	Page 12	07318	Carver 345kV Exp. -Trans Station	01580583	STTIMPRVSTA 726 CARVER STATION	1,072,470	1,072,470
2007	Short Term Lower SEMA Upgrades	831	2008	Page 12	07318	Carver 345kV Exp. -Trans Station	01651699	STAIMPRVSTA 713 CARVER RD., WAREHAM	190,611	190,611
	Subtotal: ST Lower SEMA Upgrades (Carver 345kV Expansion - Transmission Station)								\$ 28,098,371	\$ 28,098,371
2007	Short Term Lower SEMA Upgrades	832	2008	Page 12	08239	Barnstable Statcon	01640490	STAIMPRVSTA 958 BARNSTABLE SWITCHIN	\$ 464,252	\$ 464,252
2007	Short Term Lower SEMA Upgrades	832	2008	Page 12	08239	Barnstable Statcon	01654196	STTIMPRVSTA 958 BARNSTABLE TRANSMIS	10,746,805	10,746,805
2007	Short Term Lower SEMA Upgrades	832	2008	Page 12	08239	Barnstable Statcon	01685778	STTIMPRVSTA 940 BARNSTABLE SVC PROJ	14,302	14,302
	Subtotal: ST Lower SEMA Upgrades (Barnstable Statcon)								\$ 11,225,359	\$ 11,225,359
Total Pre-Existing Projects									\$ 45,138,618	\$ 45,138,618
New Projects										
2008	Install (1) 345kV 160 MVAR shunt reactor at Mystic Station	1064	2008	Page 12	08240	Installation of a 345 kV, 160 MVAR Shunt Reactor	01639833	STTCR STA 447 CCVT REPLACEMENT PR	\$ 3,273,248	\$ 3,273,248
2008	Install (1) 345kV 160 MVAR shunt reactor at Mystic Station	1064	2008	Page 12	08240	Installation of a 345 kV, 160 MVAR Shunt Reactor	01657693	STTCR STA 65 CCVT REPLACEMENT	1,414	1,414
Total New Projects									\$ 3,274,662	\$ 3,274,662
Total CWIP In Plan									\$ 48,413,281	\$ 48,413,281

Column Description

- Col. A Year project approved by ISO-NE (N/A if not in ISO-NE plan, or not yet approved)
- Col. B Description of project per ISO-NE plan
- Col. C Project identifier number per ISO-NE plan
- Col. D The most recent NSTAR Electric construction planning forecast in which the project appeared
- Col. E Page number where the project is described in NSTAR plan
- Col. F Project number assigned by NSTAR when construction starts
- Col. G Project description per Form 1 p. 216.2
- Col. H Work Order number assigned by NSTAR when task starts
- Col. I Work Order description assigned by NSTAR
- Col. J Amount by Work Order
- Col. K Amount per Form 1 page 216.2

NSTAR Electric Company

Exhibit B

NSTAR Electric Construction Forecast

NSTAR Electric Company

**CRITICAL ENERGY INFRASTRUCTURE
INFORMATION – DO NOT RELEASE**

2009 NSTAR T&D Operating Plan

Volume 4

Transmission System Assessment Ten Year Outlook Analysis

NSTAR System Planning
April 2009

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EXECUTIVE SUMMARY

Introduction:

This NSTAR Electric Transmission System Assessment, 2009 DPU Operating Study, Ten Year Outlook Analysis, presents the results of the long range analysis performed on the NSTAR Electric transmission system. This report is intended to document the expected performance of the NSTAR Electric transmission system over the next ten years. The analyses and studies completed to support this long range outlook primarily included summer peak load steady state contingency analysis for the upcoming summer as well as for the five year and ten year study horizons. All steady state contingency analyses have been completed using the updated 2009 load forecasts as detailed in the Peak Load Section below. The same additional stability testing for both the Northern and Southern portions of the system that was incorporated in the **2008 DPU Operating Study** has also been included in this report.

The focus of these studies is to identify the thermal capacity and voltage support needs of the NSTAR Electric transmission system based on forecasted load growth. Conceptual transmission system upgrades, or sets of alternative upgrades, are presented and discussed as appropriate to identify potential solutions to the operating issues uncovered in the analysis. Additional analyses are also included in this report that evaluated light load steady state analysis and dynamic stability analysis.

The reporting of most study modeling assumptions including forecasted load levels is covered in the section titled, Peak Load Analysis. Loadflow results and potential system enhancements are separated into two parts: Peak Load Analysis – Results and Light Load Analysis (steady state and dynamic stability).

Results:

Described throughout this document are areas of concern that were identified through powerflow analysis of three target periods (the upcoming summer of 2009, the five year horizon (2014) and the ten year horizon (2019)). This is the basis for a reliability analysis consistent with NERC Standards TPL-001-0 through TPL-003-0. Stuck breaker Extreme contingencies covered by TPL-004-0 have been investigated in this context as well. But other forms of extreme contingencies, described in TPL-004-0, are addressed through the Comprehensive Area Transmission Review (CATR) performed in collaboration with ISO New England and all other transmission owners. Those results are not presented here.

As issues were identified, potential solutions were developed and are described in the text. The most pressing issue is reduced dependence on local generation for reliability support. This issue is the primary factor driving the proposed transmission facilities to supply Lower Southeast Massachusetts (Lower SEMA). The proposed solution to that issue is the construction of a 345kV overhead transmission line from Carver Switching Station to the mid Cape Cod area (Sandwich bulk substation is the proposed termination). This project and its alternatives were presented to the Planning Advisory Committee in January 2009 and the project is under-going technical review by the Transmission Task Force and the Stability Task Force of ISO- New England. It is anticipated approval by the Reliability Committee and ISO- New England under tariff section I.3.9 will be received by late July 2009. Licensing preparation is underway.

EXISTING TRANSMISSION FACILITIES

Transmission Lines

The NSTAR Electric transmission system includes over 500 miles of right of way and approximately 700 miles of 115kV, 230kV and 345kV overhead circuits. A number of different designs including Wood H Frame, steel lattice and steel monopole structures are used to take the most cost effective advantage of the limited right of way space available in eastern Massachusetts. See Table 1.

NSTAR Electric’s underground transmission system is among the largest in the country with over 240 miles of 115kV and 345kV circuits. While the bulk of this system employs the proven and reliable high pressure fluid filled pipe type cable, the Company has installations with other technologies including: high pressure gas filled pipe type cable, solid dielectric cable and low pressure fluid filled cable. See Table 2.

TABLE 1 Overhead Lines

Transmission Line	Terminal A	Terminal B	Voltage	MVA Capacity Summer normal/LTE
107	Bourne	Falmouth Tap-Falmouth	115kV	380/407
108	Bourne	Tremont	115kV	227/246
109	High Hill	Cross Rd-Fisher Rd	115kV	96/104
111	Cross Rd	High Hill-Industrial Park	115kV	227/246
112	Tremont	Acushnet-Industrial Park	115kV	212/229
113	Bourne	Tremont	115kV	227/246
114	Acushnet	Tremont	115kV	250/289
115	Barnstable	Falmouth Tap-Falmouth	115kV	227/246
116	Brook St	Carver	115kV	418/463
117	Brook St	Kingston-Duxbury	115kV	132/142
118	Barnstable	Orleans	115kV	227/246
119	Barnstable	Orleans	115kV	227/246
120	Canal	Barnstable	115kV	428/463
121	Canal	Bourne	115kV	418/463
122	Bourne	Barnstable	115kV	428/463
123	Hyannis	Hyannis Tap	115kV	96/104

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124	Hyannis	Barnstable	115kV	227/246
125	Orleans	Wellfleet	115kV	96/104
126	Canal	Bourne	115kV	428/463
127	Carver	SE Mass Tap	115kV	418/463
128	Tremont	SE Mass Tap	115kV	428/463
129	SE Mass	SE Mass Tap	115kV	202/222
131	Barnstable	Merchants Way	115kV	151/154
132	Brook St	West Pond	115kV	96/104
133	Brook St	West Pond	115kV	227/246
134	Carver	Tremont	115kV	418/463
191	Auburn St	Kingston-Duxbury- Marshfield	115kV	132/165
194	Auburn St	Brook St	115kV	428/463
D21	Bell Rock	High Hill	115kV	227/246
110-522	W Roxbury- Baker St	Needham	115kV	277/331
128-518	Chelsea	Revere- NGRID	115kV	163/210
146-502	S Walpole	W Walpole	115kV	89/110
148-522	Needham	Dover	115kV	350/494
201-501	Medway	Millbury- NGRID	115kV	201/240
201-502	Medway	Millbury- NGRID	115kV	201/222
211-503	Woburn	Tewksbury- NGRID	115kV	226/293
211-504	Woburn	Tewksbury- NGRID	115kV	226/293
211-508	Woburn	Burlington	115kV	228/280
240-508	Framingham	Sherborn	115kV	230/290
240-510	Framingham - Leland St	Needham	115kV	338/400
240-601	Framingham - Leland St	W Medway	230kV	569/737
274-509	Sherborn	Framingham- Leland St	115kV	255/330
282-507	Waltham	Sudbury	115kV	338/361
282-602	Waltham	W Medway	230kV	502/578
320-507	Lexington	N Waltham	115kV	110/118
320-508	Lexington	N Waltham	115kV	110/118
342-507	Sudbury	Speen St	115kV	338/376
391-508	N Lexington	Burlington	115kV	279/279
398-537	Holbrook	East Holbrook- NGRID	115kV	154/154
423-515	Mystic	Everett-NGRID	115kV	140/189
433-507	Speen St	Framingham - Leland St	115kV	286/330
447-508	W Walpole	Holbrook	115kV	227/227
447-509	W Walpole	Holbrook	115kV	227/227
451-536	Holbrook	East Holbrook-	115kV	226/293

		NGRID		
455-509	Sherborn	W Framingham	115kV	227/281
456-522	Walpole	Dover	115kV	404/530
478-502	Holbrook	Edgar- Weymouth	115kV	200/257
478-503	Holbrook	Edgar- Weymouth	115kV	200/257
478-508	Holbrook	Edgar- Weymouth	115kV	161/161
478-509	Holbrook	Edgar- Weymouth	115kV	226/293
488-518	Mystic	Chelsea	115kV	288/374
513-507	W Framingham	Northboro NGRID	115kV	226/292
533-508	N Lexington	Lexington	115kV	279/279
65-502	Medway	W Walpole	115kV	240/291
65-507	Medway	Medway Jets	115kV	101/120
65-508	Medway	W Walpole	115kV	240/291
316	Stoughton	Holbrook	345kV	1147/1410
319	Lexington	Woburn	345kV	510/570
322	Carver Mass	Canal Switchyard	345kV	1139/1221
323	W Medway	Millbury-NGRID	345kV	1147/1319
325	W Walpole	W Medway	345kV	1147/1319
331	Carver Mass	W Walpole	345kV	1004/1156
335	Holbrook	Whitman- NGRID	345kV	1147/1410
336	W Medway	Blackstone Mass	345kV	1400/1400
338	Woburn	Tewksbury- NGRID	345kV	1315/1410
342	Whitman- NGRID	Pilgrim	345kV	1139/1221
344	W Medway	Bridgewater	345kV	1255/1410
355	Pilgrim	Bridgewater-NGRID	345kV	1315/1410
357	W Medway	Millbury-NGRID	345kV	1147/1319
3361	Blackstone Mass	Sherman Rd, RI- NGRID	345kV	1400/1400
3520	W Medway	ANP Bellingham - NGRID	345kV	1309/1565
3161	Stoughton	W Walpole	345kV	1315/1410

Table 2- Underground Lines

Transmission Line - underground	From	To	Voltage	MVA Capacity Summer normal/LTE
130	Acushnet	Pine St	115kV	120/160
110-510	W Roxbury- Baker St	Brighton	115kV	108/159
110-511	W Roxbury- Baker St	Brighton	115kV	108/159

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126-501	Hopkinton	Milford Tap	115kV	86/96
126-502	Hopkinton	Milford Tap	115kV	86/96
211-514	Woburn	Mystic	115kV	140/189
250-516	K St	Hawkins St	115kV	135/220
250-517	K St	Hawkins St	115kV	135/220
282-520	Waltham	Watertown	115kV	120/170
282-521	Waltham	Watertown	115kV	120/170
292-522	Newton Highlands	W Roxbury-Baker St	115kV	120/132
292-523	Newton Highlands	W Roxbury-Baker St	115kV	120/132
329-510	Brighton	Somerville	115kV	130/154
329-511	Brighton	Somerville	115kV	130/154
329-512	Brighton	Scotia St	115kV	157/191
329-513	Brighton	Scotia St	115kV	157/191
329-530	Brighton	North Cambridge	115kV	258/292
329-531	Brighton	North Cambridge	115kV	258/292
385-510	K St	Kingston Street	115kV	154/241
385-511	K St	Kingston Street	115kV	154/241
385-512	K St	Kingston Street	115kV	229/294
385-513	K St	Kingston Street	115kV	229/294
416-512	Maynard	Sudbury	115kV	107/144
416-513	Maynard	Sudbury	115kV	107/144
423-515	Mystic	Everett-NGRID	115kV	140/189
483-524	Dewar St	Andrew Sq	115kV	151/192
483-525	Dewar St	Andrew Sq	115kV	151/192
496-512	Hyde Park	W Roxbury-Baker St	115kV	190/258
496-513	Hyde Park	W Roxbury-Baker St	115kV	190/258
576-534	K St	MBTA	115kV	80/80
576-535	K St	MBTA	115kV	80/80
831-536	N Cambridge	Putnam	115kV	203/227
831-537	N Cambridge	Putnam	115kV	203/227
831-538	Putnam	East Cambridge	115kV	279/279
831-540	Putnam	East Cambridge	115kV	279/279
875-539	East Cambridge	Kendall	115kV	279/279
324	Mystic	Kingston Street	345kV	550/844

346	Woburn	N Cambridge	345kV	420/750
351	Mystic	N Cambridge	345kV	570/830
358	Mystic	N Cambridge	345kV	522/773
365	Woburn	N Cambridge	345kV	420/750
372	Mystic	Kingston Street	345kV	550/844
349XY	Mystic	Golden Hills-Saugus-NGRID	345kV	570/830
3162	Stoughton	K St	345kV	550/715
3163	Stoughton	K St	345kV	550/715
3164	Stoughton	Hyde Park	345kV	550/715

Transmission Substations

NSTAR Electric has 45 transmission substations with transmission line switching capability. 14 function as transmission switching facilities, some of which contain autotransformers to convert power from one transmission voltage to another. For those stations which transform voltage from the transmission level to distribution voltages of 24 or 14kV the transformer capacities are identified in the Table titled Equipment Ratings and Limits on page 13 of Volume 1.

Table 3 Transmission Substations

Station Name (only those with switching)	Voltages	Autotransformer capacity (MVA)	Reactor capacity (MVAr)	Capacitor capacity (MVAr)
Chatham St	115/14			
Kingston St T	345/115	2x450		
K Street T	345/115	2x550	2x160	2x80
Alewife/N Cambridge	345/115/14	2x450	2x160	
Putnam	115/14			
East Cambridge	115/14			
Carver	345/115	2x450		
Canal	345/115	3x450		
High Hill	115			
Industrial park	115/13			
Acushnet	115/13			
Tremont	115/24			
Kingston	115/24			
Brook St	115			

Bourne	115			
Falmouth Tap	115			
Barnstable	115			
Medway 65	115/14			
Medway 345	345/230	2x400		
Sherborn	115/14			
W Framingham	115/14			
Framingham	230/115/14	1x500		
Sudbury	115/14			
Waltham 282	230/115/14	1x500		
Lexington	345/115/14	1x400	1x160	
Woburn	345/115/14	1x400	3x80	
Mystic	345/115/14	1x400	1x160	2x63
Brighton	115/14			
Baker st 110	115/14			1x63
Newton Highlds	115/14			
Needham	115/14			
Dover	115/14			1x63
Hyde Park	345/115/14	1x550		
Andrew Sq	115/14			
Colburn St	115/14			
Stoughton	345		4x160	
West Walpole	345/115/14	1x550		
Holbrook	345/115	1x400		
SE Mass Tap	115			
Edgar	115			
Dewar St	115/14			
Canton	115/14			
South Walpole	115/14			
Pine St	115/13			
Orleans	115/24			

PEAK LOAD ANALYSIS

Common Base Case Modeling Assumptions

NEPOOL Load Levels

Transmission analysis recognizes the impacts of the entire New England network and therefore the basic load modeled in transmission simulations comes from base cases established by ISO-New England. Shown below in Table 4 is a listing of total forecasted New England summer peak load during extreme weather (90/10 probability) as reported in the ISO-NE 2009 CELT report.

2009 ISO Forecast MW	2014 ISO Forecast MW	2019* ISO Forecast MW
29,780	31,900	33,634

Table 4: Summer Extreme Weather (90/10) Load Forecasts

*The 2009 CELT report forecasts load only out to 2018. The 2019 load value shown was derived by increasing the 2018 forecasted load by the NEPOOL cumulative annual growth rate of 1.2% (provided in the 2009 CELT).

Loadflow base cases were created from the 2007 NPCC library cases for 2009, 2014 and 2019 by scaling New England load to match the values shown in Table 1.

In addition, a substation specific 2009 summer peak load forecast for NSTAR was transferred into the 2009 base case to represent the recent downturn in the economy and its resulting impact on forecasted loads.

2009 Transmission Topology

The following area transmission upgrades were included in the 2009 base cases.

- Short Term Lower SEMA Upgrades
- NSTAR 345kV Transmission Reliability Project
- 433-507 Line Separation Project
- NGRID North Shore / Ward Hill Upgrade Project
- NGRID Central MA Upgrade Project
- NGRID Auburn St. 345kV breaker addition
- New 160 MVAR 345kV shunt reactor at Mystic
- New 35.3 MVAR 115kV capacitor at Wing Lane
- New 22.5 MVAR 115kV capacitor at Harwich
- New 3rd 115-23 kV transformer at Falmouth
- Thermal Upgrade of 345kV Lines 389 and 325

2014 and 2019 Transmission Topology

In addition to those listed above for 2009, the following major system upgrades were modeled in the 2014 and 2019 base cases.

- NGRID Merrimack Valley / North Shore Area Upgrades (Wakefield Jct.)
- Southwest CT Project (Middletown to Norwalk)
- New England East – West Solution (NEEWS)
- Maine Power Reliability Program (MPRP)

NSTAR North Assumptions

Transmission Transfer Levels

A North Bias (NB) case was created to model the effects of power transfers into the Boston area from Maine and New Hampshire. A South Bias (SB) case was created to model the effects of power transfers into the Boston area from Southeast MA (SEMA)

and Rhode Island. See Table 5 below for a summary of transmission transfer levels in the north bias and south bias base cases.

Case	Interface Flows (MW)					
	Boston	N-S	SEMA/RI	E-W	Phase II	NY-NE
North Bias (NB)	3900	2880	35	305	2000	-1270
South Bias (SB)	3900	1740	2400	320	2000	-1660

Table 5: Transmission Transfer Levels

The Baker and Waltham phase shifting transformers (PARS) were set to typical values of Baker @ +4 (10.4 deg) and Waltham at + 4 (10.4 deg) in the North Bias cases and Baker @ +3 (7.8 deg) and Waltham at + 3 (7.8 deg) in the South Bias cases.

Generation Dispatch Scenarios

In all the base cases, Mystic 7 and Potter 2 were assumed OFF and the new Thomas Watson unit was assumed ON. In the interest of performing a conservative analysis, none of the other presently proposed generators in the Boston area were considered.

A series of generator contingency cases were created to stress specific areas of the transmission system. The following units were modeled OFF in the generator contingency cases in addition to Mystic 7 and Potter 2.

- Mystic 9 (Mystic 115kV tie breaker #7 closed)
- Kendall (steam turbines and gas turbine)
- Salem 4
- Fore River

These generator contingency cases were created for both the north bias and south bias cases.

Refer to Table 6 below for a summary of Boston area generation scenarios in the different study cases. The top row refers to the case name which describes the generator outage being studied. The generator ratings used correspond to the summer claimed capability values.

The presentation and discussion of the loadflow results will refer the case names shown in Table 6 followed by an underscore and the system bias abbreviation (NB: north bias or SB: south bias). For instance, the complete case name for Mystic 9 off with a north bias is M9_NB. Refer to Appendix H for a detailed case summary and loadflow plot of each study case.

Generators	Size	Case Name			
		FR	KEN	M9	S4

		(Fore River)	(Kendall)	(Mystic 9)	(Salem 4)
Mystic 7	565	0	0	0	0
Mystic Block 9	707	707	707	0	707
Mystic Block 8	707	707	707	707	707
New Boston 1	0	0	0	0	0
Salem Harbor 1	82	82	82	82	82
Salem Harbor 2	80	80	80	80	80
Salem Harbor 3	150	150	150	150	150
Salem Harbor 4	431	431	431	431	0
Kendall 4	206	206	0	206	206
Fore River	707	0	707	707	707
Braintree	116	116	116	116	116

Table 6: Generation Dispatch Scenarios

Contingencies

An extensive number of contingencies were tested. The following types of transmission contingencies were simulated:

- 1) - All single 345 kV lines in the NEMA/Boston area
- 2) - Select single 345 kV lines outside the NEMA/Boston area
- 3) - All single 115 kV lines in the NEMA/Boston area
- 4) - Select single 115 kV lines outside the NEMA/Boston area
- 5) - Select double circuit tower (DCT) contingencies
- 6) - Select stuck breaker contingencies at major 345 kV and 115kV stations
- 7) - Select 345 kV and 115 kV transformers and phase shifters

Refer to Appendix I for a detailed listing of the contingency file used in the analysis.

Additional contingency analysis was performed with combinations of two critical 345kV circuits or two critical 345-115kV autotransformers in the NEMA/Boston area out of service. For this line-out analysis, referred to as N-2 testing, one generation dispatch with a major generating unit in Boston out-of-service was used for the evaluation. The following N-2 line-out conditions were evaluated:

- 345-115kV autotransformers: Kingston 345A and Kingston 345B
- 345-115kV autotransformers: N. Cambridge 345A and N. Cambridge 345B
- 345-115kV autotransformers: Woburn 345A and Lexington 345A
- 345-115kV autotransformers: Holbrook 345A and W. Walpole 345A
- 345kV underground circuits: 324 and 372 (Mystic – Kingston)
- 345kV underground circuits: 351 and 358 (Mystic – N. Cambridge)
- 345kV underground circuits: 3162 and 3163 (Stoughton – K St)
- 345kV overhead circuits: 389 and 325 (W. Walpole – W. Medway)
- 345kV overhead circuits: 338 (Tewksbury – Woburn) and 339 (Tewksbury – Golden Hills)

- 345kV overhead circuits: 337 (Tewksbury – Sandy Pond) and 394 (Seabrook – Ward Hill)

NSTAR South Assumptions

Transmission Interface Transfer Levels

Because the NSTAR South system is geographically located at the southeast corner of the NEPOOL system, the various NEPOOL interface transfer levels have little impact on the loadings on the NSTAR South transmission lines.

Generation Dispatch Scenarios

The following generator out-of-service (O/S) scenarios were evaluated:

- Canal 1 O/S , Tiverton O/S
- Canal 1 O/S, Canal 2 O/S

In the interest of performing a conservative analysis, none of the presently proposed generators in the NSTAR South area were considered, such as Cape Wind. As a conservative assumption, the Canal 1 generator was selected as the out-of-service generator for the first case since it has significantly more reactive power output capability than Canal 2. The maximum reactive output capability of the Canal 1 generator is 250 MVAR. The maximum reactive power capability of the Canal 2 generator is 100 MVAR. Refer to Appendix H for a detailed case summary and loadflow plot of each study case.

Contingencies

An extensive number of contingencies were tested. The following types of transmission contingencies were simulated:

- 1) - All single 345 kV lines in the NSTAR South area
- 2) - Select single 345 kV lines outside the NSTAR South area
- 3) - All single 115 kV lines in the NSTAR South area
- 4) - Select single 115 kV lines outside the NSTAR South area
- 5) - All double circuit tower (DCT) contingencies in the NSTAR South area
- 6) - Select stuck breaker contingencies at major 345 kV and 115kV stations
- 7) – All 345/115 kV autotransformers in the NSTAR South area

Refer to Appendix J for a detailed listing of the contingency file used in the analysis.

Additional contingency analysis was performed with one of the lower SEMA 345kV lines out of service. For this line-out analysis, referred to as N-2 testing, one generation dispatch was evaluated with both Canal units out-of-service. The following 345 kV line-out conditions were evaluated:

- 322 (Canal – Carver)
- 342 (Canal – Pilgrim – Auburn)

PEAK LOAD ANALYSIS - RESULTS

A detailed listing of loadflow results is located in Appendix A thru Appendix G.

The thermal results tables contain post-contingency power flows measured in percent of the long term emergency (LTE) rating of the transmission element or line shown in each row or set of rows. The thermal tables only show loading of NSTAR elements greater than 100% of the LTE rating. Blank spaces in the tables are values <100% LTE and are not reported. Generally, values greater than 100% LTE but less than STE (short term emergency rating) represent overload conditions requiring mitigating actions, including: adjustments in generation dispatch, phase shifting transformer tap changes, transmission switching, load shedding, or a proposal to upgrade the transmission element or supply system. Loadings greater than STE are typically unacceptable and require a proposal to upgrade the transmission element or supply system.

The voltage results tables contain post-contingency voltages measured in per unit (pu) of the transmission bus or substation voltage rating. The voltage tables only show post-contingency voltage values at NSTAR substation buses that are less than 0.95pu. Blank spaces in the tables are representing values greater than 0.95pu and are not reported. Generally, values less than 0.95pu represent low voltage conditions requiring mitigating actions, including: adjustments in generation dispatch, phase shifting transformer tap changes, transmission switching, load shedding, or a proposal to upgrade the transmission voltage compensation or control systems.

NSTAR North - Discussion of Loadflow Results

Refer to Appendix A - E for load-flow thermal and voltage results tables. Data in the tables is listed in columns representing the generation dispatch case name.

N-1 Results: SUMMER 2009

There were no voltage violations for the 2009 cases. The following thermal loading conditions were found:

West Medway Area 345kV

Line #s 336 and 3520

For only the M9_SB case, the two 345kV Lines # 336 from West Medway to Blackstone and # 3520 from West Medway to Bellingham are shown to marginally exceed 100% LTE for loss of either line onto the other. This result is due to the high level of SEMA/RI

export and large amount of area generation on this case. A redispatch of area generation will mitigate this condition.

W. Walpole to Holbrook Area 115kV

Line # 447-508

For the FR cases, sections of this line between W. Walpole, Walpole and Norwood are shown to exceed 100% LTE for the Holbrook 115kV stuck breaker # 8 which removes from service the parallel line # 447-509 and the Holbrook autotransformer. The direction of power flow for this case is from W. Walpole to Holbrook.

Potential mitigation being considered for this condition:

- NSTAR is developing plans to install a new 115kV breaker # 11 in series with breaker # 8 at Holbrook. The new breaker will eliminate the possibility that the failure of Holbrook breaker # 8 will remove from service both parallel Line 447-509 and the Holbrook autotransformer. The net effect is that the overload condition would not occur. The new breaker is scheduled to be in-service in December 2009.

In addition, the section of line between Holbrook and S. Randolph is shown to reach 100% LTE in 2009 for the KEN_SB and M9_SB cases for the W. Walpole 115kV stuck breaker # 8. The W. Walpole 115kV stuck breaker # 8 removes from service the parallel line # 447-509 and the W. Walpole 345-115kV autotransformer. In this case, the direction of power flow is from Holbrook to Walpole. Plans are being developed to address this overload. See discussion below in *N-1 Results: 2014 – 2019*.

Waltham – Framingham Area 115kV

Line #s 320-507 and 320-508 (Waltham to Trapelo Rd section)

For only the S4_SB case, both Lines 320-507 and 320-508 reach 107% LTE for loss of the 345kV Line # 319. Plans are being developed to address this overload. See discussion below in *N-1 Results: 2014 – 2019*.

Mystic Area 115kV

Line #s 329-510 and 329-511

For only the KEN_SB case, either Line 329-510 or 329-511 (Mystic to Somerville / Brighton) is shown to exceed 100% LTE for contingencies involving loss of either

parallel circuit. Mitigation for this condition includes either a small back-down of Mystic 9 generation or an adjustment of the Waltham PARS will. See discussion below in *N-1 Results: 2014 – 2019*.

Line # 385-511

For only the M9_SB case, the Kingston to High St and High St to K St line sections of Line # 385-511 are shown to reach 117% LTE and 109.4% LTE for contingencies involving loss of 345kV Line # 3162 including the K St. 115kV stuck breaker # 16 contingency which removes from service 115kV line 250-517 (Mystic to K St) and the K St. 345A 345-115kV autotransformer. Line 385-511 is an underground 115kV pipe-type cable circuit from Kingston to High St and High St to K St.

Potential mitigation being considered for this condition:

- NSTAR will be implementing an Operating Procedure in 2009 that will direct system operators to open Kingston 115kV tie breaker #11 and adjust the Waltham and Baker PARS under limited summer peak load conditions when the Mystic 9 generation is offline. This will protect for contingencies associated with stuck breaker # 16. For case involving just loss of the K ST 345A autotransformer or Line # 3162, the K St 115kV tie breaker can be closed to mitigate this condition.
- NSTAR is developing plans to install a new 115kV bus breaker in the K St West Bus #2 between breakers # 16 and # 13 to remove the possibility that the K St. 345A autotransformer will be taken out of service for K St 115kV stuck breaker # 16. See discussion below in *N-1 Results: 2014 – 2019*.

Line # 250-516

For only the FR_NB case, the 250-516 underground circuit between Mystic and Hawkins St was shown to reach 108% LTE. Mitigation for this condition includes a small back-down of Mystic 9 generation along with an adjustment of the Baker St and Waltham PARS.

Line # 423-515

For every case, the 423-515 underground circuit between Mystic and Everett will reach 104% LTE for loss of the F-158N between Golden Hills and Maplewood. The upgrade of this line is currently planned as part of National Grid's Wakefield Junction station project (Merrimack Valley /North Shore project)

N-1 Results: 2014 - 2019

Hyde Park 345kV

The Hyde Park 345-115kV autotransformer is shown to overload up to 108% LTE in 2019 for most of the south bias cases after several contingencies including the 230kV DCT, 115kV Line 456-522 and a variety of stuck breaker contingencies. Overloads up to 112% LTE are also shown for north bias case with Mystic 9 offline for the 230kV DCT and 115kV Line 456-522 contingencies.

Potential mitigation being considered for this condition:

The LTE of the Hyde Park autotransformer is based on the rating of a 115kV disconnect switch in the gas insulated substation at Hyde Park. NSTAR will implement a rating upgrade of the disconnect switch in the 2015 time frame to eliminate this overload. The LTE rating of the autotransformer itself is sufficient for this condition.

In addition, the 345kV line #3164 that supplies the Hyde Park autotransformer is shown to exceed the normal line rating with all lines in-service for many of these same cases.

A slight adjustment of the Baker St Phase Shifting transformers will mitigate this condition.

W. Walpole to Holbrook Area 115kV

447-508 / 447-509 double circuit tower

These two lines are parallel 115kV overhead circuits that share a common double circuit tower line that supply distribution stations in Walpole, Norwood, Canton, AMTRAK and Randolph.

The fact that both lines 447-508 and 447-509 share a double circuit tower line means that there is therefore a possibility that both lines could trip out-of-service simultaneously as a single contingency. Although this event would not result in any transmission system overloads or voltage violations, the loads connected at Walpole, Norwood, Canton, AMTRAK and Randolph would also be removed from service. The amount of load that would be dropped is approximately 240 MW in the 2009 timeframe.

Potential mitigation is being considered for this condition in three phases:

- Phase 1: Install a third 115kV circuit between W. Walpole and Canton in 2011 that would be designed to connect into the distribution stations in the area to mitigate the potential loss of load if the 447-508 / 447-509 double circuit tower circuits were both tripped as a single contingency event. In addition, a new circuit

would also offset the overload conditions on either 447-508 or 447-509 described above. The new line would use the spare tower position on the 316 line lattice tower structures that also runs between Walpole and Stoughton / Holbrook and the existing 115kV line # 146-502.

- Phase 2: Extend the third 115kV circuit from Canton to Holbrook in 2012, also using the spare tower position on the 316 line lattice tower structures that runs between Walpole and Stoughton / Holbrook.
- Phase 3: Build a new 115kV switching station between Canton and Norwood in 2013 to sectionalize the three 115 kV circuits between W. Walpole and Holbrook (two existing circuits and the one new circuit).

Line # 447-508

As mentioned above in the *N-1 Results: SUMMER 2009*, sections of the 447-509 can overload for two different 115kV stuck breaker contingencies, as described below.

For the first scenario, sections of this line between W. Walpole, Walpole and Norwood are shown to exceed 100% LTE for the Holbrook 115kV stuck breaker # 8 when the Fore River generation is offline. The worst case condition shows the W. Walpole to Walpole line section reaching 144 % LTE in 2014 and 148% LTE in 2019. This contingency removes from service the parallel line # 447-509 and the Holbrook autotransformer. In this case, the direction of power flow is from Walpole to Holbrook.

Potential mitigation being considered for this condition:

- NSTAR is developing plans to install a new 115kV breaker # 11 in series with breaker # 8 at Holbrook. The new breaker will eliminate the possibility that the failure of Holbrook breaker # 8 will remove from service both parallel Line 447-509 and the Holbrook autotransformer. The net effect is that the overload condition would not occur. The new breaker is scheduled to be in-service in December 2009.

For the second scenario, the sections of line between Holbrook, S. Randolph and Canton are shown to reach 114 % LTE in 2014 and 129 % LTE in 2019 for the W. Walpole 115kV stuck breaker # 8. The W. Walpole 115kV stuck breaker # 8 removes from service the parallel line # 447-509 and the W. Walpole 345-115kV autotransformer. In this case, the direction of power flow is from Holbrook to Walpole.

Potential mitigation being considered for this condition:

- Previously, there were plans to add a new 115kV breaker in series with breaker # 8 at W. Walpole. Engineering reviews have found this option not to be feasible

due to construction constraints at the W.Walpole substation. in 2012 would eliminate the possibility of the worst case contingency (failure of W. Walpole breaker # 8) removing from service both parallel Line 447-509 and the W. Walpole 345-115kV autotransformer. The net effect is that the overload condition would not occur.

- NSTAR is developing new plans relocate the 115kV line terminals for lines 447-508, 447-509 and 146-502 that enter the W.Walpole 115kV. This re-arrangement will move the 146-502 line to share the common breaker position # 8 with the 345-115kV autotransformer which will in effect keep both 115kV lines 447-508 and 447-509 in-service for this contingency. As a result, the 447-508 line will not be overloaded. The projected in-service date for this project is 2011.

Woburn Area 115kV

Line #s 211-503 and 211-504 (North Woburn Tap to Reading section)

Lines 211-503 and 211-504 are parallel 115kV overhead wood circuits between Woburn and Tewksbury (NGRID). For all cases, loss of either circuit is shown to result in loading on the other section of line between the North Woburn tap and Reading to just reach 100% LTE in 2014. By 2019, the loading on this line section is shown to reach 110% LTE.

Potential mitigation being considered for this condition:

- Reconductor the North Woburn Tap to Reading line sections on both lines 211-503 and 211-504 in 2014.

Low Voltage Condition at North Woburn

Low transmission voltage of 0.94pu is shown at North Woburn and Reading for loss of either Line # 211-503 or 211-504 for all cases in 2019.

Potential mitigation being considered for this condition:

- Installation of a 115kV capacitor bank at North Woburn in 2018

Low Voltage Condition at Lexington and Burlington

Low transmission voltage of 0.94pu is shown at Hartwell and Burlington for loss of line 533-508 or loss of Mystic 8 and 9 in 2019.

Potential mitigation being considered for this condition:

- Installation of an 115kV capacitor bank at Hartwell in 2018.

Waltham – Framingham Area 115kV

Line #s 320-507 and 320-508 (Waltham to Trapelo Rd section)

As mentioned above in the *N-1 Results: SUMMER 2009*, sections of the 320-507 and 320-508 lines can overload for contingencies associated with the 345kV Line #319 when Salem 4 is off-line.

Lines 320-507 and 320-508 are parallel overhead wood circuits between Waltham to Trapelo Rd and Trapelo Rd to Lexington. Overloads are shown to be worst for the south bias cases when Salem 4 is off-line, but also can overload for many other cases. In 2014, the S4_SB case shows the Waltham to Trapelo Rd section of both lines reaching 128% LTE for loss of either parallel line onto the remaining line. Overloads on both lines reach 130% LTE in 2019 for loss of Line # 319. The 319 line is a radial 345kV circuit supplied from the Woburn 345kV station and its contingency also results in an outage of the Lexington 345-115kV autotransformer

Potential mitigation being considered for this condition:

- Reconductor the Waltham to Trapelo Rd line section on both lines 320-507 and 320-508 in 2011.

Line #s 282-520 and 282-521 (Brighton to Watertown section)

Lines 282-520 and 282-521 are parallel 115kV underground pipe-type cable circuits between Brighton to Watertown and Watertown to Waltham. In 2014, the Brighton to Watertown section of both lines is shown to exceed 100% LTE for many contingencies and reach 135% LTE / 100% STE for the S4_SB case after the 230kV DCT (double circuit tower) contingency. The 230kV DCT contingency represents a failure of the common steel structures that carry the 230kV overhead line # 240-601 from W. Medway to Framingham and the 230kV overhead line # 282-602 from W. Medway to Waltham and an outage of those two circuits.

In 2019, the Brighton to Watertown sections of the lines is shown to reach 140% LTE and exceed STE for the S4_SB case after the 230kV DCT. The Brighton to Watertown section of line 282-521 is shown to reach 127 % LTE in the case with all Boston generation running (and 124.9% LTE the base case) for the Waltham 115kV stuck breaker # 6 which removes from service the parallel line # 282-520 and overhead line # 320-507.

Power flows and overload conditions can be in either direction (ie: from Brighton to Watertown or from Waltham to Watertown) depending on system bias and generation dispatch in Boston.

Potential mitigation being considered for this condition:

- For many of the cases shown, post-contingency phase shifting transformer adjustments at Waltham and Baker St or adjustment of Mystic 9 generation can be used to reduce the loading condition to 100% LTE or lower. This is an acceptable practice in the short term. However, by 2014 the post-contingency conditions loadings for the worst cases reach the STE rating of the circuits and allowance on operator actions would be no longer acceptable.
- The Sudbury 230kV Option discussed below will help mitigate the worst overload conditions on these cables.

Line # 282-507

Line 282-507 is an overhead 115kV circuit between Waltham to Sudbury that share double circuit tower structures with the 230kV Line # 282-602. This line is shown to reach 114% LTE in 2019 for the loss of 115kV Line # 433-507. This contingency results in a radial condition after which all the loads at Sudbury, Maynard, Speen Street and Concord are supplied on the 282-507 line.

Potential mitigation being considered for this condition:

The Sudbury 230kV Supply project concept, described below, will mitigate this overload.

Line # 433-507

Line 433-507 is an overhead 115kV circuit between Framingham and Speen St Stations. This line is shown to reach 105% LTE in 2019 for the loss of 115kV Line #282-507. This contingency results in a radial condition after which all the loads at Sudbury, Maynard, Speen St and Concord are supplied on the 433-507 line.

Potential mitigation being considered for this condition:

The Sudbury 230kV Supply project concept, described below, will mitigate this overload.

Line #s 416-526 and 416-527

Lines 416-526 and 416-527 are parallel 115kV underground pipe-type cable circuits between Sudbury to Maynard. Either line is shown to exceed 100% LTE in 2014 and

2017 in all cases for loss of the other parallel line and one of the Maynard 115-14kV step-down transformers. Loss of either of these lines also trips one of the 115kV underground circuits between Maynard and Concord and one of the Concord 115-14kV step-down transformers. Transmission line loadings are adversely impacted by post-contingency 115-14kV transformer losses.

In addition, low transmission voltage of 0.89 pu at Maynard and Concord is shown to occur for loss of either line for all the cases.

Potential mitigation being considered for this condition:

- NSTAR relies on a 20MVA distribution load transfer from Maynard to Sudbury in the short term to mitigate this condition. Additional voltage support in the form of 14kV substation capacitor banks are needed by 2014 to help improve the transmission voltage and load power factor, reduce transformer losses and lower transmission line loading.

Low Voltage Conditions at Speen St, Sudbury, Maynard and Concord

Low 115kV voltage was shown in the Speen to Sudbury to Waltham area for loss of the 115kV overhead Line # 433-507 between Framingham and Speen St in 2014 for the Mystic 9 offline cases. Voltage was lowered to 0.94pu in the area for this contingency.

In 2019, voltage in this area was lowered to 0.89 – 0.91pu for several contingencies including 433-507, 282-507 and either 416-526/527. This condition was seen for all cases.

Potential mitigation being considered for this condition:

- Sudbury 230kV Supply: The most effective solution to this voltage problem is the addition of another 230kV source to supply the 115kV loads in this area in 2012. NSTAR has added an 115kV capacitor bank at Sudbury in 2006 as a short term solution, but adding more capacitors does not adequately provide the needed strengthening of the transmission supply to this area to offer a viable long term solution. NSTAR is investigating the option of installing a new 230-115kV autotransformer at Sudbury. As part of this option, a new 230kV circuit would be built from Lexington to Waltham along the same right-of-way as existing 115kV lines 320-507 and 320-508. This new line would tie into the existing 230kV Line # 282-602 at Waltham. To supply this new 230kV circuit, a new 345-230kV autotransformer would be installed at Lexington. In addition, 230kV breakers would be installed at Sudbury and Waltham to allow the 230kV line to be sectionalized which in effect will create a separate circuit from W. Medway to Sudbury and a separate circuit from Sudbury to Lexington (via Waltham).

This option also could provide other significant benefits, including:

- A new Lexington 345-230kV autotransformer provides a needed backup to the two W. Medway 345-230kV autotransformers
- A new source at Sudbury will provide a means to offset the loading problems on underground circuits 329-510, 329-511, 282-520, and 282-521 for the 230kV DCT as well as the 115kV stuck breaker contingencies at Brighton and Waltham.
- A new Sudbury autotransformer and associated sectionalizing breakers will improve system reliability by diversifying the supply to the important 230kV lines and remove the possibility of a single double circuit tower contingency removing from service the entire 230kV supply to Boston

Low Voltage Conditions at Sherborn and Framingham

Low 115kV voltage was shown at Sherborn and Framingham in 2019 for loss of the 230kV DCT 115kV for the Mystic 9 offline cases. Voltage was lowered to 0.92pu in the area for this contingency.

Potential mitigation being considered for this condition:

- Sudbury 230kV Supply concept, discussion above. This project would greatly improve voltage performance after the 230kV DCT and would mitigate this condition.

Low Voltage Condition at West Framingham

Low 115kV voltage was shown for loss of the 115kV overhead Line # 455-507 between Sherborn and West Framingham for all the cases in 2014 and 2019. Voltage was lowered to 0.92pu at West Framingham in 2014 and 0.88pu in 2019.

Potential mitigation being considered for this condition:

- NSTAR is planning to install an 115kV capacitor bank at West Framingham in 2010.

Cambridge Area 115kV

Line # 831-536 and 831-537

Lines 831-536 and 831-537 are parallel underground pipe-type cable circuits between North Cambridge and Putnam. Either line is shown to exceed 100% LTE in 2014 and 2019 in Kendall offline case for loss of the other parallel line. The post-contingency loading is shown to reach 110 % LTE in 2014 and 119 % LTE in 2019. In addition, these loadings also exceed the STE rating for this condition in 2014 and 2019.

Potential mitigation being considered for this condition:

- For the short term:
 - Install 12 MVAR 14kV capacitor banks at Putnam Station in 2010 as a short term solution. Adding a 14kV reactive source at Putnam lowers the 115kV MVA loading from North Cambridge on either circuit for this condition. It also reduces step-down transformer losses and provides power factor correction at Putnam.
- For the longer term, NSTAR is investigating the following solution for 2013:

Cambridge Transmission Supply Upgrade:

- Install two new 115kV circuits between Mystic and East Cambridge
- Or, install a new 115kV switching station at Putnam supplied from North Cambridge by either two high capacity 115kV circuits or a single 345kV circuit and 345-115kV autotransformer at the new Putnam station.

Mystic Area 115kV

Line #s 329-510 and 329-511

Lines 329-510 and 329-511 are parallel underground 115kV pipe-type cable circuits between Mystic to Somerville and Somerville to Brighton. In 2014, the Mystic to Somerville line section of 329-510 is shown to exceed 100% LTE for the Kendall offline case for loss of the parallel circuit 329-511. In addition, Brighton 115kV stuck breaker contingencies # 7 and Kingston stuck breaker contingencies # 8 are the worst cases with loadings reaching 111% LTE and 121% LTE in 2014 and 135 % LTE and 149% LTE in 2017 on 329-510 (Mystic to Somerville). The worst cases show loading that exceeds STE on this line section as well as on the Somerville to Brighton line section.

Potential mitigation being considered for this condition:

- For the short term:
 - The redispatch of Mystic 9 generation plus the post-contingency phase shifting transformer adjustments at Waltham and Baker St are effective to reduce the loading below 100% LTE on the Mystic to Somerville. Use of the 12 HR double contingency LTE rating on this circuit is required prior to the phase shifter adjustments.
- For the longer term, NSTAR is investigating the following solution for 2013:

- Cambridge Transmission Supply Upgrade concept, discussed above. This project option to install two new 115kV circuits between Mystic and East Cambridge as a longer term solution has the potential dual benefit of mitigating loading concerns on 115kV lines 329-510 and 329-511.

Line # 250-516 / 517

Lines 250-516 and 250-517 are parallel underground 115kV pipe-type cable circuits from Mystic to Hawkins, Hawkins to Chatham and Chatham to K St. For only the M9_SB cases, either line is shown to exceed LTE for contingencies involving loss of the other parallel circuit. In addition, both cables are also shown to exceed their normal ratings in 2014 and 2019 with all lines in for this case. The M9_SB case also was shown cause the normal ratings of the 345kV Line # 3164 and the Hyde Park auto-transformer to be exceeded. These results suggest that PAR and generation adjustments may be needed for these cases and that the simultaneous combination of high SEMA/RI export and high Boston Import levels may not always be achievable particularly after loss of Mystic 9.

Line # 385-511

Line 385-511 is an underground 115kV pipe-type cable circuit from Kingston to High St and High St to K St. The Kingston to High St line section can reach 133% LTE in 2014 and 137% LTE in 2019 for the south bias case with Mystic 9 off-line for contingencies involving loss of 345kV Line # 3162 including the K St. 115kV stuck breaker # 16 contingency which removes from service 115kV line 250-517 (Mystic to K St) and the K St. 345A 345-115kV autotransformer. Power flow direction for this case is from Kingston to High St to K St.

For the KEN_SB and S4_SB cases in 2019, the Kingston to High St section is shown to reach 113% LTE in 2109 for loss of 345kV Line # 3163 or the K St. 345B 345-115kV autotransformer. Power flow direction for this case is from K St to High St.

Potential mitigation being considered for this condition:

- As described above in the *N-1 Results: SUMMER 2009* section, NSTAR will be implementing an Operating Procedure in 2009 that will direct system operators to open Kingston 115kV tie breaker #11 and adjust the Waltham and Baker PARS under limited summer peak load conditions when the Mystic 9 generation is offline. This will protect for contingencies associated with stuck breaker # 16. For case involving just loss of the K St 345A autotransformer / Line # 3162, or K St 345B autotransformer / Line # 3163, the K St 115kV tie breaker can be closed to mitigate this condition.
- NSTAR is developing plans to install a new 115kV bus breaker in the K St West Bus #2 between breakers # 16 and # 13 to remove the possibility that the K St.

345A autotransformer will be taken out of service for K St 115kV stuck breaker # 16. The projected in-service date for this breaker is 2010.

Low Voltage at Chelsea

For only the M9_NB case, low 115kV voltage of 0.947 pu was shown for loss of the 115kV Line # 488-518 between Mystic and Chelsea in 2019

Potential mitigation being considered for this condition:

- Installation of an 115kV capacitor bank at Chelsea 2018.

Medway Area 115kV

Line # 201-501

Line 201-501 is a jointly owned overhead 115kV circuit between Medway and Millbury (NGRID). The line is shown to exceed 100% LTE in 2019 for the Fore River offline cases for several multiple element contingencies including the W. Medway 345kV stuck breaker #101 (107.6 % LTE) which removes from service 345kV line # 336 and 230kV line # 240-601. This result is considered an emerging issue. A solution will likely be developed with National Grid as part of the ongoing Greater Boston Needs Assessment.

Baker – Hyde Park Area 115kV

Low Voltage Conditions at Hyde Park, Baker St, Newton and Needham

Low 115kV voltage was shown in 2019 at Hyde Park, Baker St, Newton, Dover and Needham areas for 115kV stuck breaker contingencies # 1 and # 2 at Hyde Park. The Hyde Park 115kV stuck breaker contingencies #1 or #2 remove from service one of the parallel 115kV underground circuits between Hyde Park and Baker St (496-528 or 496-529), one of the 115-14kV step-down transformers at Hyde Park and the Hyde Park 345-115kV autotransformer.

Potential mitigation being considered for this condition:

- NSTAR is evaluating future reactive compensation to address this issue.

In addition, loss of the Hyde Park 345-115kV autotransformer was shown to produce low transmission voltage at Hyde Park, Baker St, Newton and Needham in 2019 for all the cases. This result is considered an emerging issue and would likely be mitigated by power factor correction and other proposed upgrades such as the West Framingham 115kV capacitor bank and the 230kV Sudbury autotransformer. Further analysis is

required to determine the impact of these options and therefore no additional mitigation is proposed at this time.

Other Issues

The 2019 analysis has revealed two contingencies for the North bias cases that don't converge properly in the loadflow simulations, including loss of 345kV NGRID Line 394 between Seabrook and Ward Hill / Amesbury, and sudden loss of Mystic 8 and 9 generation. This result suggests the need for additional 345kV transmission north of Boston, such as the 345kV Line from Scobie to Tewksbury 345kV and additional dynamic voltage compensation. The need for these upgrades or other suitable upgrades to solve this system problem is also being investigated by the Greater Boston Needs Assessment working group, of which NSTAR is a participant. NSTAR supports the proposals that are being investigated by ISO-NE as a regional system upgrade

N-2 Results for 2014

Line-out analysis was performed for the 2014 peak load cases (North and South bias cases) with Mystic 9 out-of service.

345kV underground circuits: 324 and 372 (Mystic – Kingston)
345kV underground circuits: 351 and 358 (Mystic – N.Cambridge)
345kV underground circuits: 3162 and 3163 (Stoughton – K-Street)
345kV overhead circuits: 389 and 325 (W. Walpole – W. Medway)
345-115kV autotransformers: Holbrook 345A and W. Walpole 345A

There were no overloads or voltage violations found for the cases listed above.

345-115kV autotransformers: Woburn 345A and Lexington 345A

Line #s 320-507 and 320-508 (Waltham to Trapelo Rd section)

Lines 320-507 and 320-508 are parallel overhead wood circuits between Waltham to Trapelo Rd and Trapelo Rd to Lexington. The Waltham to Trapelo Rd section of both circuits reaches 131 % of their LTE rating with both the Woburn and Lexington 345-115kV autotransformers out-of-service. This overload was found in both the North and South bias cases. For this condition, loads at Trapelo Road and north of Waltham are supplied from the Waltham 230-115kV autotransformer on these two circuits. To relieve this overload in the North bias case, approximately 55 MVA of load at Trapelo Rd and 35 MVA of load at Lexington could be manually disconnected, in addition to phase shifter adjustments at Waltham. In the South bias case approximately 80 MW of load at Trapelo Rd and 30 MW of load at Lexington could be manually disconnected along with system adjustments to mitigate the overload.

Also, as noted in the above section *N-1 Results, Waltham – Framingham Area 115kV*, NSTAR is proposing to upgrade the 320-507 and 320-508 circuits in 2011. This future upgrade will eliminate the potential for manual load disconnection in this area for loss of both the Woburn and Lexington 345-115kV autotransformers.

345-115kV autotransformers: Kingston 345A and Kingston 345B

With Mystic 9 out-of-service, it was found that the loss of both the Kingston 345kV autotransformers will result in the F-158N 115kV line between NGRID's Golden hills and Maplewood stations to be loaded to 119.6% of its LTE rating. Due to the loss of two 345kV autotransformers in the downtown Boston area, this contingency is resulting in a greater amount of load being drawn from the 115kV lines coming from the north into Boston. This overload was observed only in the North bias cases. Opening the Mystic tie breaker # 7 along with phase shifter adjustments at Waltham and Baker St will relieve this overload.

345-115kV autotransformers: N. Cambridge 345A and N. Cambridge 345B

Loss of the two 345kV auto-transformers at North Cambridge with Mystic 9 out of service results in the F-158N 115kV line between NGRID's Golden Hills and Maplewood stations to be loaded to 103% of its LTE rating. Opening the Mystic tie breaker # 7 will mitigate the overload. This overload was observed only in the North bias cases.

345kV overhead circuits: 338 (Tewksbury – Woburn) and 339 (Tewksbury – Golden Hills)

Line # 338 is jointly owned by NSTAR and NGRID and Line # 339 is entirely owned by NGRID. In the North bias case with Mystic 9 out-of-service, several North Shore 115kV lines owned by National Grid were shown to overload, including Line #'s S145, T146, G133, N140 (a.k.a. 211-503) and M139 (a.k.a. 211-504). To mitigate these problems, several system adjustments are required including adjusting the Baker and Waltham phase shifting transformers, dispatching ON fast-start jets in the NEMA/Boston area, and manual load disconnection. Approximately 330MW of manual load disconnection was required including 70MW of load at Burlington, 100 MW at North Woburn, 135 MW at Woburn and 25 MW at East Tewksbury. In the South bias case the overloads were less severe with only M139 line overloaded to about 109% of its LTE rating. Phase shifter adjustments at Waltham and Baker St along with shedding approximately 55 MW of load at Billerica would mitigate the overload.

For the case with Mystic 9 in-service, the results were much less problematic, and only the NGRID 115kV Line # M139 was shown to exceed LTE at 112%. System adjustments along with approximately 30 MW of manual load shedding at Billerica were found to be adequate to address overload.

345kV overhead circuits: 337 (Tewksbury – Sandy Pond) and 394 (Seabrook – Ward Hill)

Both of these circuits are owned by NGRID, but are reviewed by NSTAR in this analysis because they are known to have a major impact on the ability to reliably supply load in the Boston area, including NSTAR load. Loss of both of these circuits results in a severe overload of the two 115 kV lines (110-510 and 110-511) between Brighton and Washington St tap and from Washington St tap to Baker St to approximately 145% of their LTE rating along with the 345kV line #3161 between W. Walpole and Stoughton to be loaded to about 114% of its LTE rating. Maximizing the generation at Fore River and the BELD system helps to reduce the severity of the overload. Approximately 380 MW of load had to be manually disconnected including 160 MW at Brighton, 120 MW at Hyde Park, 80 MW at Needham and 20 MW at Colburn St. Also several system adjustments had to be made including adjusting the phase shifters at Waltham and Baker St and also dispatching ON the quick-start jets in the NEMA Boston area.

The severity of the overloads for this N-2 contingency may further confirm the need for additional 345kV transmission north of Boston, such as the proposed NGRID / Northeast Utilities 345kV Line from Scobie to Tewksbury 345kV. NSTAR endorses this proposal that is being investigated by ISO-NE as a regional system upgrade.

NSTAR South - Discussion of Loadflow Results

Refer to Appendix F-G for load flow thermal and voltage results tables. Data in the tables is listed in columns representing the generation dispatch case name.

N-1 Results: SUMMER 2009

There were no voltage violations for the 2009 cases. The following thermal loading conditions were found:

Cape Cod Area

Line #s 108 and 113

The loss of the 342/322 double circuit tower (DCT) (both 345kV lines across the Cape Cod Canal) results in overloading sections of the Tremont – Bourne 115 kV lines 108 and 113 for the Canal 1 and 2 out of service case. The Tremont to Wareham sections show the highest loading with the 108 reaching 125 % LTE and the 113 line reaching 113.8 % LTE.

Potential mitigation being considered for this condition:

- NSTAR is developing plans as part of the Long Term Lower SEMA Upgrades to relocate the two 345kV circuits on the Cape Cod Canal DCT onto separate structures to eliminate the potential of losing both circuits as part of a single contingency loss of a double circuit tower.
 - As an alternative to separation of the circuits, NSTAR may also seek an exclusion from NPCC to consideration of the single contingency failure of this DCT. This alternative would have the effect of granting NSTAR permission to ignore the contingency from planning studies and would therefore not prevent the possibility that the DCT failure could occur.

N-2 Results: SUMMER 2009

345kV overhead circuits: 342 (Pilgrim – Canal - Auburn) and 322 (Canal – Carver)

As expected based on the N-1 Results, line out-analysis for loss of 322 or 342 as the first contingency and any second contingency that involves loss of 342 or 322 would result in overloads on the 115 kV lines 108 and 113 between Tremont and Bourne.

For the 322 Line out case, the Tremont to Wareham section of Line 108 is shown to have a worst case flow of 126.9 % for 120/342 DCT. The Tremont to Wareham section of Line 113 is shown to have a worst case flow of 115.2 % for 120/342 DCT.

For the 342 Line out case, the Tremont to Wareham section of Line 108 is shown to have a worst case flow of 126.6 % for Carver 345 kV stuck breaker # 862 that involves loss of 345kV Lines 322 and 355. The Tremont to Wareham section of 113 line is shown to have a worst case overload of 115 % LTE for the 120/342 DCT.

Potential mitigation being considered for these conditions:

- The Long Term Lower SEMA Upgrades are being developed to mitigate this N-2 condition and eliminate reliance on the Canal units to provide local second contingency protection the Lower SEMA area, including:
 - Building a new overhead 345kV Line from Carver to Bourne across the Cape Cod Canal and connect into the existing 345kV line from Canal/Bourne to Sandwich (Line 120 that is currently operated at 115kV).
 - Expand the Sandwich Substation including addition of a new 345-115kV Auto-transformer

The projected in-service year of the Long Term Lower SEMA Upgrades project is 2012.

- In the near term the Lower SEMA / Tremont-East Operating Guide is being updated by ISO-NE to posture the system to drop customer load after the N-2

contingency occurs. The guide specifies that in the event that both Canal units are off-line and Cape Cod load levels are greater than the prescribed threshold, a system reconfiguration would be manually performed after the N-1 event occurred (loss of either 322 or 342). In the reconfigured state, Cape Cod loads would be placed in series with and directly connected to the remaining 345kV line such that if the remaining line failed than the directly connected Cape Cod loads would also be dropped.

- This post-first contingency posturing would only be used as a temporary means until the Long Term Lower SEMA Upgrades can be licensed and built.
- Must-Run Canal Generation as a last resort, in which case the Canal generation would be labeled as a special constrained resource (“SCR”) by ISO and in effect the cost of this action would be charged directly to NSTAR.

N-1 Results: 2014 - 2019

There were no voltage violations for the 2014 and 2019 cases. The following thermal loading conditions were found:

Cape Cod Area

Cape Cod Canal 342/322 DCT

The loadflow case is non-convergent in 2014 and 2019 for this contingency with both Canal units offline. This result suggests a potential voltage collapse condition on Cape Cod.

Potential mitigation being considered for this condition:

- Develop the Long Term Lower SEMA upgrades, as described above. Additional loadflow analysis was performed with the proposed Long Term upgrades in-service. The results showed that the potential 342/322 DCT voltage collapse condition was solved and no other violations were found.

N-2 Results: 2014 - 2019

345kV overhead circuits: 342 (Pilgrim – Canal - Auburn) and 322 (Canal – Carver)

There were many more non-convergent cases in 2014 and 2109 after the second contingency when either the 322 or 342 lines were already out as the first contingency. All the non-converged cases also involve loss of 342 or 322 as the second contingency.

For the 322 Line out case, the following contingencies would not converge, suggesting a voltage collapse condition on Cape Cod:

- 342
- 342 - 355 DCT
- 120 - 342 DCT
- Pilgrim 104 stuck breaker
- Canal 312 stuck breaker
- Canal 412 stuck breaker
- Auburn Street 2130 stuck breaker

For the 342 Line out case, the following contingencies would not converge, suggesting a voltage collapse condition on Cape Cod:

- 322
- Canal 112 stuck breaker
- Canal 212 stuck breaker
- Carver 862 stuck breaker

To investigate the non-convergent cases further, the maximum VAR output limits of the Barnstable SVC were increased to 300 MVAR. At this level of SVC output, the N-2 cases solved. As expected, overloads were seen on Line 108 (153% LTE in 2014 and 169% LTE in 2019) and on Line 113 (140% LTE in 2014 and 153% LTE in 2019). An additional overload was found on Line 111 between High Hill and Industrial Park of 131% LTE in 2014 and 142% LTE in 2019. Low transmission voltages of 0.94 pu in 2014 and 0.92 pu in 2019 were also seen on Cape Cod.

Potential mitigation being considered for this condition:

- Develop the Long Term Lower SEMA upgrades in 2012, as described above. Additional loadflow analysis was performed with the proposed Long Term upgrades in-service. The results showed that the Line 108 and 113 overloads are eliminated and the potential voltage collapse condition was removed. The overload on Line 111 was significantly lowered to 102% LTE in 2014 and 109% LTE in 2019 but not removed completely. Therefore, an upgrade of Line 111 may also be required in 2012.
- NSTAR is also investigating with ISO-NE the need for a new 115kV line between Bourne and Barnstable or Falmouth Tap. The need for this new 115kV line will be to protect for N-2 transmission events on Cape Cod, including loss of the proposed 345kV Line and 115kV line 122 between Bourne and Barnstable. Studies have shown that for this N-2 event at peak load, only one 115kV line would be left to serve Cape Cod (Line 107) and overloads and low voltage would occur resulting in loss of load to mitigate. The new 115kV line may provide an effective alternative.

Other Issues

The NSTAR South transmission system has been designed in several areas such that there is consequential loss of load following a single transmission line or step-down transformer contingency. A cost effective reliability improvement has been developed and is being implemented on the NSTAR South system to automatically sectionalize parts of the system using SCADA controlled 115kV motor-operated disconnect switches. These new switches serve to isolate only the faulted parts of the system and allow reclosing relays to operate and restore the unfaulted line section. As a result, customer outages are minimized and reliability is improved. NSTAR installed 8 of these sectionalizing switches in 2008 and is in the process of installing 15 more in 2009.

NSTAR has several other proposed transmission upgrades that are driven by distribution system expansion plans, including:

- Installation of a new 115 kV line (5.5 miles) from Cross Road to Fisher Substation in 2014. This alternative is being considered as all potential distribution load transfer options are being consumed.
- Installation of a new 115 kV line (13 miles) from Orleans to Wellfleet in 2014. The existing transmission line is backed up by the distribution system but available routes for distribution are being used up and ultimately transmission may be the most effective approach.

LIGHT LOAD ANALYSIS

Base Case Assumptions

The light load analysis was conducted using a New England load level of approximately 9,200 MW. The 9,200 MW basecase developed for this analysis represents the NEPOOL minimum load level seen in the last several years.

The 9,200 MW load level is used for Year 2009 as well as all future year light load analysis. This assumption is a worst case view and reflects the trend that load growth at minimum load levels has been stagnant. Therefore, the NEPOOL minimum load level is assumed to remain constant for the 10 year outlook.

The light load analysis focused mainly on the contingency loss of a shunt reactor with minimal area generation on-line. Additional cases also review the unavailability of a reactor.

For NSTAR North, one base case was developed to review all Mystic, Kendall, Salem and Fore River generation offline. For NSTAR South, a base case was developed to review all Fore River and Potter generation offline with minimal other generation dispatched in the Southeastern Massachusetts / Rhode Island area.

Discussion of LoadflowResults

N-1 Results

Holbrook to Edgar Area 115 kV

High voltages can occur under all-lines-in light load conditions in the Quincy-Weymouth-Holbrook-Braintree area when Fore River and Potter generation is off-line. Local area all-lines-in 115 kV voltages reach approximately 121 kV (1.052 per unit). The National Grid 115 kV Quincy cables and the Braintree Electric Light Department 115 kV cables are the major contributors to high voltage conditions in the area. There is no reactive compensation associated with these cables.

Mitigation underway for this condition:

- To address high voltages in this area without reliance on local generation, NSTAR will be installing two 40 MVAR, 115 kV shunt reactors at Edgar Station #150. Two reactors are needed to provide compensation in the event of an outage of one of the reactors. The scheduled in-service date for the Edgar reactors is December 2009.

Bourne Area 115 kV

Prior to 2009, high 115 kV voltages could occur in the Canal - Bourne area in the rare event when both Canal #1 and #2 generation units were off-line during the summer period (mid-June to mid-October) when the system loading was very light. During the summer period the Canal # 121 and # 126 345-115kV autotransformers were set to a no-load tap position to help support system voltage (2.6% boost) under heavy load. However, this tap position could cause high voltages when system load is light under all-lines-in conditions or in the case that Pilgrim is offline.

Analysis identified Bourne Area 115 kV voltages in the 1.049pu to 1.053pu range for the all-lines-in condition. For the Pilgrim offline case, the Canal 115 kV voltage reached 1.056pu, Bourne reached 1.053pu, and Otis reached 1.052pu.

Mitigation for this condition:

- With the implementation of the Short Term Lower SEMA upgrades and the Cape Cod 115 kV transmission capacitors, changing the Canal autotransformer no-load tap position 2.6% to boost voltage in the summer is no longer required. Therefore, NSTAR no longer changes the Canal auto no-load taps and the three Canal autotransformer tap positions remain at unity year round. As a result, prior plans to installed shunt reactors at Bourne have been cancelled.

N-2 Results

Boston Area

The N-2 analysis examined the long term loss of a 345 kV reactor followed by loss of a second 345 kV reactor with no Mystic generation running.

Combinations examined included:

- Lexington 345 kV reactor out; loss of the North Cambridge 345 kV reactor.

The basecase includes the Mystic 345 kV 160 MVAR reactor that was placed in-service in April 2009. The Mystic, Lexington, and North Cambridge 345 kV reactors have nearly equal effectiveness reducing Boston area voltages at light load. The Lexington and North Cambridge combination / contingency in effect represent all 345 kV reactor outage combinations.

Results for the Lexington 345 kV reactor out and loss of the North Cambridge 345 kV reactor:

- N. Cambridge 345 kV at 1.048pu
- Lexington 345 kV at 1.045pu

Woburn 345 kV at 1.046pu
Mystic 345 kV at 1.048pu
Kingston 345 kV at 1.048pu
All area 115 kV voltages below 1.05pu

As shown above, there are no high transmission voltages in the NSTAR North area.

Stoughton Area

Combinations examined included:

- Stoughton 345 kV reactor out; loss of another Stoughton 345 kV reactor.
- Stoughton 345 kV reactor out; loss of a K Street 345 kV reactor.

The basecase models the two Edgar 115 kV, 40 MVAR reactors that have a December 2009 in-service date.

Results for a Stoughton 345 kV reactor out and loss of an additional Stoughton 345 kV reactor:

Stoughton 345 kV at 1.052pu
Hyde Park 345 kV at 1.053pu
K Street 345 kV at 1.050pu
Holbrook 115 kV at 1.045pu
Weymouth – Edgar area 115 kV voltage below 1.05pu

Results for a Stoughton 345 kV reactor out and loss of a K Street 345 kV reactor:

Stoughton 345 kV at 1.052pu
Hyde Park 345 kV at 1.053pu
K Street 345 kV at 1.055pu
Holbrook 115 kV at 1.045pu
Weymouth – Edgar area 115 kV voltage below 1.05pu

As shown above, there are high transmission voltages in the Stoughton under these N-2 conditions.

Potential mitigation being considered for these conditions:

- Installation of a 345kV 160MVA shunt reactor at West Walpole Station in 2011.

Dynamic Stability Assumptions and Results

The dynamic stability study evaluated the stability performance of NSTAR transmission system upon application of normally cleared faults (single-phase, two-phase and three-Phase) and extreme contingencies (three-phase stuck breaker faults). The study was conducted for projected 2009 system conditions.

NEPOOL Load Level

The stability model and load flow base cases are based on the 45% of peak load level 2003 mid-year New England library cases. The November 2006 update of the 2003 mid-year New England library cases was used in this study. For light load conditions the 50% probability load forecast for year 2008 (27,900 MW) was scaled down to 12,555 MW in order to model 45% load level.

Transmission Topology

The NEPOOL transmission system model included the following modifications:

- NRI project
- Wakefield Junction
- Golden Hills Transformers
- NSTAR 345 kV Project – Phase II
- Lexington 345 kV Shunt Reactor
- North Cambridge 345 kV Shunt Reactor
- The Short Term Lower SEMA upgrades

Transmission Interface Transfer Levels

Two light load base cases were developed. Both cases modeled maximum transfers on the following northern New England interfaces:

- NB-NE: 1000 MW
- Orrington South: 1200 MW
- Surowiec South: 1120 MW
- Maine – New Hampshire: 1400 MW
- Northern NE –Scobie +394: 2500 MW

The East – West transfer was at 2400 MW in both dispatches.

Generation Dispatch Scenarios

Load flow base case Dispatch 1 was used for the stability analysis of the NSTAR substations located within the Boston area.

In Dispatch 1, the following Boston area generation was placed in-service:

- Mystic 7
- Mystic 8
- Mystic 9
- Kendal CT
- Kendal Steam 1, 2

The Salem generation was out of service. This resulted in a Boston Export of 50 MW.

Load flow base case Dispatch 2 was used for the stability analysis of the NSTAR substations located within the SEMA area.

In Dispatch 2, all of the existing SEMA area generation was placed in-service. This resulted in a SEMA Export of 2330 MW. The corresponding SEMA/RI Export was 1820 MW.

Refer to Appendix K for base case summary files for Dispatch 1 and Dispatch 2.

Contingencies

The following normal contingency (NC) and extreme contingency (EC) events were tested on the NSTAR system.

- 3 phase normally cleared faults (primary protection system out of service) – NC
- 2 phase to ground fault on a double circuit tower (primary protection out) – NC
- 1 phase stuck breaker faults (with primary protection system out of service) – NC
- 3 phase stuck breaker faults (with all protection systems in-service) - EC

Normal criteria faults were considered unacceptable for:

- Generator instability
- Undamped oscillations
- More than 1200 MW source loss

Extreme criteria faults are considered unacceptable for:

- Undamped oscillations
- More than 1400 MW of source loss

The NEPOOL Low Voltage Guideline was also observed. For normal contingencies, the guideline recommends that post-fault clearing voltages remain above 0.7 per unit and do not stay below 0.8 per unit for more than 0.25 seconds.

Dynamic Stability Results

The stability testing revealed that there were no generator instability problems or loss of source violations for all the scenarios tested. Refer to Appendix L for a table of NSTAR North stability results (Dispatch 1) and to Appendix M for a table of NSTAR South stability results (Dispatch 2).

CONCLUSIONS

The results of these analysis and the conclusions drawn from them has resulted in the development and incorporation of several projects with ISO-NE for inclusion in the 2009 ISO-NE Regional System Plan (RSP). In developing this analysis NSTAR Electric System Planning has worked closely with ISO – New England Planning Staff, with the adjacent transmission owner, National Grid and with input from NSTAR System Dispatchers. This coordination took the form of consultations to compare results and concerns and in the case of ISO and National Grid in formally convened working groups to assess area reliability in the context of a coordinated ten year plan. In specific NSTAR has teamed with these entities in evaluating the Southeast Mass area, the Lower Southeast Mass area and the Northeast Mass/ Boston area. The results of these reliability assessments have been presented to the area Stakeholder group- the New England Planning Advisory Committee in the Fall of 2008 and the Spring of 2009 in the context of the Regional Plan and through the same process the Local Network Plan.

<u>Type</u>	<u>Area</u>	<u>Major Project</u>	<u>First potential Yr</u>	<u>Justification basis</u>	<u>Plan Page #</u>
T	Holbrook to Edgar 115kV	Install 2 40 MVAR 115kV shunt reactors at Edgar Station #150	2009	System Reliability	37
T	W Walpole to Holbrook 115kV	Install 115kV Breaker #11 with Breaker #8 at Holbrook	2009	System Reliability	18, 21
T	Cambridge 115kV	Install 12 MVAR 14kV capacitor banks at Putnam Station	2010	System Reliability	27
T	Mystic 115kV	Install 115kV Bus Breaker K St West Bus #2 between breakers #16 and #13	2010	System Reliability	19, 28-29
T	Stoughton	Install 345kV 160MVA shunt reactor at W Walpole Station	2010	System Reliability	39
T	Waltham-Framingham 115kV	Install 115kV capacitor bank at W Framingham	2010	System Reliability	26
T	W Walpole to Holbrook 115kV	Install 3rd 115kV circuit between W Walpole & Canton (Phase 1)	2011	System Reliability	20
T	W Walpole to Holbrook 115kV	Relocate 115kV line terminals for lines 447-508, 447-509 & 146-502 enter W Walpole 115kV	2011	System Reliability	22
T	Waltham-Framingham 115kV	Reconductor Waltham to Trapelo Rd lines 320-507 and 320-508	2011	System Reliability	23
T	Cape Cod	Relocate 2 345kV circuits Cape Cod Canal (CCC) DCT onto separate structures	2012	System Reliability	33
T	Cape Cod	Build 345kV OH line from Carver to Bourne across CCC	2012	System Reliability	33
Sta	Cape Cod	Expand Sandwich Substation adding 345-115kV autotransformer	2012	System Reliability	33
T	W Walpole to Holbrook 115kV	Extend 3rd 115kV circuit from Canton to Holbrook (Phase 2)	2012	System Reliability	21
T	Cambridge 115kV	Install 2 115kV circuits between Mystic and E Cambridge	2013	System Reliability	27
Sta	Cambridge 115kV	Install 115kV switching station at Putnam	2013	System Reliability	27
T	Cape Cod	Install 115kV line between Bourne and Barnstable or Falmouth Tap	2013	System Reliability	35
Sta	W Walpole to Holbrook 115kV	Build 115kV switching station between Canton & Norwood (Phase 3)	2013	System Reliability	35
T	Cape Cod	Install 115kV line from Cross Road to Fisher Substation (5.5 miles)	2014	System Reliability	36
T	Cape Cod	Install 115kV line from Orleans to Wellfleet (13 miles)	2014	System Reliability	36
T	Waltham-Framingham 115kV	Install 230-115kV autotransformer at Sudbury	2014	System Reliability	25
T	Waltham-Framingham 115kV	Construct 230kV circuit from Lexington to Waltham	2014	System Reliability	25
T	Waltham-Framingham 115kV	Install 345-230kV autotransformer at Lexington	2014	System Reliability	25
T	Woburn 115kV	Reconductor N Woburn Tap to Reading line sections	2014	System Reliability	22
T	Mystic 115kV	Install 115kV capacitor bank at Chelsea	2018	System Reliability	29
T	Woburn 115kV	Install 115kV capacitor bank at N Woburn	2018	System Reliability	22
T	Woburn 115kV	Install 115kV capacitor bank at Hartwell	2018	System Reliability	23

NSTAR Electric Company

Exhibit C

Detail of Annual Transmission CWIP and AFUDC Regulatory Liability

NSTAR Electric Company													
Annual Transmission Construction Work in Progress (CWIP) Filing													
Detail of Annual Transmission CWIP													
Service Year: 2008													
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	Form 1
Line	WO #	Project #/Description	Work Order Description	Benefits	Invoice	Labor	Material	Other	AFUDC	Overheads	Overtime	Total CWIP	Reference
1	01331105	04394-Relocate 433-507	TLCONS NATICK, LINE 433-507, R/W 8	\$ 1,093	\$ 313,245	\$ 10,433	\$ 559,609	\$ 331,669	\$ 70,499	\$ 101,525	\$ 87	\$ 1,388,159	
2		04394-Relocate 433-507 Total		\$ 1,093	\$ 313,245	\$ 10,433	\$ 559,609	\$ 331,669	\$ 70,499	\$ 101,525	\$ 87	\$ 1,388,159	p.216.2 line 2
3	01585480	07388-Carver 345KV Expansion - Transmission Line	LINE 134, NEW CONSTRUCTION, CARVER	-	\$ 1,267,577	-	\$ 891,395	\$ 204,279	\$ 13,575	\$ 880,090	\$ 1,024	\$ 3,257,940	
4	01641018	07388-Carver 345KV Expansion - Transmission Line	TLCONS TRANSMISSION FOR CARVER STA	20,915	31,331	44,527	454,558	78,121	94	150,391	23,257	803,192	
5	01668836	07388-Carver 345KV Expansion - Transmission Line	TLCONS LINE 116, RELOCATE TERMINAL	-	120	-	2,809	-	40	406	-	3,374	
6	01669698	07388-Carver 345KV Expansion - Transmission Line	TLCONS CVR LINE 335 - CARVER STAT	215	(198)	461	-	-	10	1,368	1,651	3,508	
7	01669702	07388-Carver 345KV Expansion - Transmission Line	TLCONS CVR LINE 322 - CARVER STAT	8,221	50,861	17,506	-	-	1,199	99,633	6,374	186,793	
8		07388-Carver 345KV Expansion - Transmission Line Total		\$ 29,350	\$ 1,349,690	\$ 62,494	\$ 1,348,763	\$ 282,400	\$ 14,918	\$ 1,131,887	\$ 35,307	\$ 4,254,808	p.216.2 line 3
9	01628213	08236-Cape Lines 108, 112, 113, 114 upgrade and sectionalize	TLCONS BOU BOURNE REPLACE INS, LA	\$ 59,561	\$ 20,972	\$ 127,647	\$ 156,945	\$ -	\$ 6,935	\$ 222,226	\$ 75,052	\$ 669,237	
10	01628215	08236-Cape Lines 108, 112, 113, 114 upgrade and sectionalize	TLCONS BOU BOURNE REPLACE INS, LA	17,974	6,038	38,305	73,425	-	3,920	94,287	20,789	254,738	
11	01628217	08236-Cape Lines 108, 112, 113, 114 upgrade and sectionalize	TLCONS NEB REPLACE INS, LA'S & CO	8,801	(2,382)	19,499	-	-	677	25,740	10,677	63,012	
12	01628218	08236-Cape Lines 108, 112, 113, 114 upgrade and sectionalize	TLCONS NEB REPLACE INS, LA'S & CO	5,798	19,251	12,304	5,018	-	705	31,800	9,724	84,600	
13		08236-Cape Lines 108, 112, 113, 114 upgrade and sectionalize Total		\$ 92,134	\$ 43,879	\$ 197,754	\$ 235,388	\$ -	\$ 12,337	\$ 374,053	\$ 116,242	\$ 1,071,687	p.216.2 line 4
14	01582964	08288-115KV Auto Sectionalizing Switches	STAIMPRVSTA 916 SANDWICH SWITCH REP	\$ 673	\$ (263)	\$ 1,417	\$ -	\$ -	\$ 603	\$ 2,840	\$ 492	\$ 15,754	
15	01645069	08288-115KV Auto Sectionalizing Switches	TLMIPRV NEB LINE 109 SWITCH #10957	5,136	25,285	10,837	45,794	-	502	34,943	7,353	129,850	
16	01645177	08288-115KV Auto Sectionalizing Switches	TLMIPRV NEB LINE 111 SWITCH #11147	34	2,510	72	50,358	-	421	8,647	443	62,485	
17	01645180	08288-115KV Auto Sectionalizing Switches	TLMIPRV NEB LINE 112 SWITCH #11246	7,519	46,440	15,871	55,068	-	1,151	66,835	6,092	198,975	
18	01645183	08288-115KV Auto Sectionalizing Switches	STTIMPRV NEB LINE 114 SWITCH #11446	6,497	7,692	13,694	49,170	-	429	29,309	5,275	112,065	
19	01645187	08288-115KV Auto Sectionalizing Switches	TLMIPRV PLY LINE 108 SWITCH #10867	6,546	6,492	13,899	58,812	-	699	37,992	10,988	135,428	
20	01645189	08288-115KV Auto Sectionalizing Switches	TLMIPRV CAPE LINE 107 SWITCH #1072	4,946	1,487	10,940	49,587	-	389	21,090	5,369	93,809	
21	01645190	08288-115KV Auto Sectionalizing Switches	TLMIPRV CAPE LINE 118 SWITCH #118	493	1,226	1,057	57,851	-	290	9,350	676	70,943	
22		08288-115KV Auto Sectionalizing Switches Total		\$ 31,844	\$ 90,868	\$ 67,787	\$ 376,633	\$ -	\$ 4,484	\$ 211,006	\$ 36,689	\$ 819,309	p.216.2 line 5
23	01647125	08353-Static Wire 211-503/504	TLCONS LINE 211-503, R/W 14, REPLA	\$ 334	\$ 173,370	\$ 707	\$ 28,183	\$ 16,512	\$ 2,050	\$ 156,129	\$ 348	\$ 377,633	
24		08353-Static Wire 211-503/504 Total		\$ 334	\$ 173,370	\$ 707	\$ 28,183	\$ 16,512	\$ 2,050	\$ 156,129	\$ 348	\$ 377,633	p.216.2 line 6
25	01666939	99139-Fiber Work Between Plymouth & Carver Station	TLMIPRV FIBER INSTALL WORK BETWEEN	\$ 27,805	\$ 17,186	\$ 58,536	\$ 46,174	\$ -	\$ 700	\$ 84,180	\$ 3,832	\$ 238,414	
26		99139-Fiber Work Between Plymouth & Carver Station Total		\$ 27,805	\$ 17,186	\$ 58,536	\$ 46,174	\$ -	\$ 700	\$ 84,180	\$ 3,832	\$ 238,414	p.216.2 line 7
27	01628640	06952-Upgrade Newton Station #292	NEWTON STATION 292 TRANSMISSION WOR	\$ -	\$ -	\$ -	\$ -	\$ 1,284,961	\$ -	\$ -	\$ -	\$ 1,284,961	
28		06952-Upgrade Newton Station #292 Total		\$ -	\$ -	\$ -	\$ -	\$ 1,284,961	\$ -	\$ -	\$ -	\$ 1,284,961	p.216.2 line 8
29	01550000	07318-Carver 345KV Exp. -Trans Station	STAIMPRVSTA 726 MAIN ST CARVER STAT	\$ 43,187	\$ 6,393,773	\$ 90,884	\$ 550,480	\$ 157,718	\$ 62,908	\$ 1,520,784	\$ 124,072	\$ 8,943,806	
30	01562403	07318-Carver 345KV Exp. -Trans Station	STAIMPRVSTA 726 CARVER STA 345KV CI	68,056	8,389,842	143,886	4,578,902	403,004	156,425	4,079,942	71,628	17,891,484	
31	01580583	07318-Carver 345KV Exp. -Trans Station	STAIMPRVSTA 726 CARVER STATION	34,368	503,729	72,293	1,580	3,570	9,908	378,832	68,191	1,072,470	
32	01651699	07318-Carver 345KV Exp. -Trans Station	STAIMPRVSTA 713 CARVER RD., WAREHAM	889	118,944	1,873	1,201	-	197	67,608	-	190,611	
33		07318-Carver 345KV Exp. -Trans Station Total		\$ 146,500	\$ 15,406,167	\$ 308,736	\$ 5,132,163	\$ 564,291	\$ 229,438	\$ 6,047,165	\$ 263,891	\$ 28,099,371	p.216.2 line 9
34	01576686	07319-Brook Street Station Upgrade	STTIMPRVSTA 727 PURCHASE AND DELIVE	\$ -	\$ -	\$ -	\$ -	\$ 171,921	\$ -	\$ -	\$ -	\$ 171,921	
35		07319-Brook Street Station Upgrade Total		\$ -	\$ -	\$ -	\$ -	\$ 171,921	\$ -	\$ -	\$ -	\$ 171,921	p.216.2 line 10
36	01608724	07340-High speed relays with assets at STA 329, 282 and 250.	STAIMPRVSTA 329 HIGH SPEED RELAYING	\$ 29,344	\$ 16,736	\$ 60,327	\$ 16,656	\$ 132	\$ 3,733	\$ 28,961	\$ 10,626	\$ 166,514	
37		07340-High speed relays with assets at STA 329, 282 and 250. Total		\$ 29,344	\$ 16,736	\$ 60,327	\$ 16,656	\$ 132	\$ 3,733	\$ 28,961	\$ 10,626	\$ 166,514	p.216.2 line 11
38	01626636	08105-PTC Transmission Pressurization Plant Upgrades	TLMIPRV UPGRADE PTC PUMP PLANTS 385	-	-	-	-	\$ 75,029	-	-	-	\$ 75,029	
39	01650785	08105-PTC Transmission Pressurization Plant Upgrades	TLMIPRV 2008 PUMP PLANT UPGRADES AT	-	190,000	-	-	-	281	92,563	-	282,844	
40	01650788	08105-PTC Transmission Pressurization Plant Upgrades	TLMIPRV 2008 PUMP PLANT UPGRADES AT	154	190,000	381	-	-	285	95,197	-	286,016	
41	01663091	08105-PTC Transmission Pressurization Plant Upgrades	TLMIPRV UPGRADE HEAT EXCHANGER LINE	185	40,894	411	-	-	64	22,859	-	64,413	
42	01683876	08105-PTC Transmission Pressurization Plant Upgrades	TLMIPRV UPGRADE PUMP PLANT ELECTRIC	-	28,170	-	-	-	42	13,723	-	41,935	
43		08105-PTC Transmission Pressurization Plant Upgrades Total		\$ 338	\$ 449,064	\$ 792	\$ -	\$ 75,029	\$ 672	\$ 224,341	\$ -	\$ 750,236	p.216.2 line 12
44	01640490	08239-Barnstable Station	STAIMPRVSTA 958 BARNSTABLE SWITCHIN	\$ 2,208	\$ 65,353	\$ 4,648	\$ 113,596	\$ 189,737	\$ 1,487	\$ 85,288	\$ 1,934	\$ 464,252	
45	01654196	08239-Barnstable Station	STAIMPRVSTA 958 BARNSTABLE TRANSMIS	1,139	5,622,055	2,428	-	4,102,418	3,284	1,014,262	1,220	10,746,805	
46	01685778	08239-Barnstable Station	STTIMPRVSTA 940 BARNSTABLE SVC PROJ	-	9,821	-	-	-	42	4,439	-	14,302	
47		08239-Barnstable Station Total		\$ 3,347	\$ 5,697,230	\$ 7,076	\$ 113,596	\$ 4,292,155	\$ 4,812	\$ 1,103,988	\$ 3,154	\$ 11,225,359	p.216.2 line 13
48	01639833	08240-Installation of a 345 kv, 160 MVAR Shunt Reactor	STAIMPRVSTA 250 INSTALL 345KV REACT	\$ 5,712	\$ 22,923	\$ 12,043	\$ 65,240	\$ 3,065,000	\$ 1,153	\$ 99,474	\$ 1,704	\$ 3,273,248	
49	01657693	08240-Installation of a 345 kv, 160 MVAR Shunt Reactor	STAIMPRVSTA 250 MYSTIC REACTOR	214	-	450	-	-	4	746	-	1,414	
50		08240-Installation of a 345 kv, 160 MVAR Shunt Reactor Total		\$ 5,926	\$ 22,923	\$ 12,493	\$ 65,240	\$ 3,065,000	\$ 1,157	\$ 100,220	\$ 1,704	\$ 3,274,662	p.216.2 line 14
51	01684611	08283-Replace Brown Insulators, CCVTs Suburb	STTCR STA 447 CCVT REPLACEMENT PR	\$ 3,354	\$ (1,348)	\$ 7,078	\$ 180	\$ -	\$ 91	\$ 59,016	\$ 7,758	\$ 76,128	
52	01687019	08283-Replace Brown Insulators, CCVTs Suburb	STTCR STA 65 CCVT REPLACEMENT	1,305	(498)	2,749	-	-	33	26,753	2,657	32,999	
53		08283-Replace Brown Insulators, CCVTs Suburb Total		\$ 4,658	\$ (1,846)	\$ 9,827	\$ 180	\$ -	\$ 124	\$ 85,769	\$ 10,415	\$ 109,127	p.216.2 line 15
54	01680826	08284-Replace Brown Insulators, CCVTs, South	STTCR NSTAR SOUTH REPLACE OLD CCV	\$ -	\$ (16,860)	\$ -	\$ 141,495	\$ -	\$ 1,213	\$ 12,472	\$ -	\$ 138,320	
55		08284-Replace Brown Insulators, CCVTs, South Total		\$ -	\$ (16,860)	\$ -	\$ 141,495	\$ -	\$ 1,213	\$ 12,472	\$ -	\$ 138,320	p.216.2 line 16
56	01666910	99191-STA 385 CS 773 Failure 8/4/08 Replace	STTCR STA 385 CS 773 FAILURE 8/4/	\$ 10,289	\$ 12,757	\$ 22,180	\$ 482	\$ -	\$ 913	\$ 59,213	\$ 10,360	\$ 116,194	
57		99191-STA 385 CS 773 Failure 8/4/08 Replace Total		\$ 10,289	\$ 12,757	\$ 22,180	\$ 482	\$ -	\$ 913	\$ 59,213	\$ 10,360	\$ 116,194	p.216.2 line 17
58	01667987	99191-STA 478 Whitman to Holbrook Fiber Build Line 335	STTIMPRVSTA 478 WHITMAN TO HOLBROOK	\$ 530	\$ 7,310	\$ 1,122	\$ 102,672	\$ 362,849	\$ 291	\$ 26,490	\$ 798	\$ 502,062	
59		99191-STA 478 Whitman to Holbrook Fiber Build Line 335 Total		\$ 530	\$ 7,310	\$ 1,122	\$ 102,672	\$ 362,849	\$ 291	\$ 26,490	\$ 798	\$ 502,062	p.216.2 line 18
60	01681784	99191-STA 446 Line 325 Purchase Insulators for Replacement	STACR STA 446 LINE 325 PURCHASE	\$ 2,106	\$ 74,894	\$ 12,033	\$ 98,700	\$ -	\$ 394	\$ 155,127	\$ 16,165	\$ 359,418	
61		99191-STA 446 Line 325 Purchase Insulators for Replacement Total		\$ 2,106	\$ 74,894	\$ 12,033	\$ 98,700	\$ -	\$ 394	\$ 155,127	\$ 16,165	\$ 359,418	p.216.2 line 19
62	01685237	99191-STA 150 Replace Warehouse Roof	STTCR STA 150 REPLACE WAREHOUSE R	\$ -	\$ 116,800	\$ -	\$ -	\$ -	\$ 173	\$ 56,902	\$ -	\$ 173,875	
63		99191-STA 150 Replace Warehouse Roof Total		\$ -	\$ 116,800	\$ -	\$ -	\$ -	\$ 173	\$ 56,902	\$ -	\$ 173,875	p.216.2 line 20
64	01666224	99195-STA 211 Woburn Spare Auto Transformer Storage	STTIMPRVSTA 211 WOBURN SPARE AUTO T	\$ 3,088	\$ 36,671	\$ 6,532	\$ 5,264	\$ 14,400	\$ 212	\$ 44,336	\$ 12,087</		

CONSTRUCTION WORK IN PROGRESS - - ELECTRIC (Account 107)

1. Report below descriptions and balances at end of year of projects in process of construction (107)
2. Show items relating to "research, development, and demonstration" projects last, under a caption Research, Development, and Demonstrating (see Account 107 of the Uniform System of Accounts)
3. Minor projects (5% of the Balance End of the Year for Account 107 or \$100,000, whichever is less) may be grouped.

Line No.	Description of Project (a)	Construction work in progress - Electric (Account 107) (b)
1	TRANSMISSION PLANT	
2	Relocate 433-507	1,388,159
3	Carver 345KV Expansion - Transmission line	4,254,809
4	Cape Lines 108, 112, 113, 114 Upgrade and Sectionalize	1,071,687
5	115KV Auto Sectionalizing Switches	819,309
6	Static Wire 211-503/504	377,633
7	Fiber Work between Plymouth & Carver Station	238,414
8	Upgrade Newton Station #292	1,284,961
9	Carver 345KV Expansion - Trans Station	28,098,371
10	Brook Street Station Upgrade	171,921
11	High speed relays with assets at STA 329, 282 and 250	166,514
12	PTC Transmission Pressurization Plant Upgrades	750,236
13	Barnstable Statscon	11,225,359
14	Installation of a 345KV, 160 MVAR Shunt Reactor	3,274,662
15	Replace Brown Insulators, CCVTs Suburb	109,128
16	Replace Brown Insulators, CCVTs South	138,320
17	STA 385 CS 773 Failure 8/4/08 Replace	116,193
18	STA 478 Whitman to Holbrook Fiber Build Line 335	502,062
19	STA 446 Line 325 Purchase Insulators for Replacement	359,418
20	STA 150 Replace Warehouse Roof	173,875
21	STA 211 Woburn Spare Auto Transformer Storage	122,589
22	STA 514T Boston New Transmission Station	229,037
23	Individual Projects Under \$100,000	1,438,358
24	Subtotal Transmission Projects \$56,311,015	
25		
26	INTANGIBLE PLANT	
27	Software Edocs Electric Bill	160,412
28	Lestre Replacement Software	1,711,815
29	Software Teleforms Expansion	351,005
30	Microsoft License True up Electric Software	282,584
31	Individual Projects Under \$100,000	248,044
32	Subtotal Intangible Projects \$2,753,860	
33		
34	GENERAL PLANT	
35	Sonet Backbone Upgrade	154,019
36	Capital Tool Purchase	139,250
37	RM Lifecycle HW Replacement (Elec. Mobile Data)	292,297
38	Replace AVTEC Dispatch System at Mass Ave and Plymouth Service Centers	292,556
39	Individual Projects Under \$100,000	58,420
40	Subtotal General Projects \$936,542	
41		
42		
43	TOTAL	111,300,323

NSTAR Electric Company					
Annual Transmission Construction Work in Progress (CWIP) Filing					
Detail of AFUDC Regulatory Liability - Account 254090					
2008 Service Year - AFUDC Work Orders in CWIP					
	(A)	(B)	(C)	(D)	(E)
Line	WO #	Description	CWIP Balance at 12/31/08	2008 AFUDC	2008 AFUDC Regulatory Liability
1	1331105	TLCONS NATICK, LINE 433-507, R/W 8	\$ 1,388,159	\$ 70,499	\$ -
2	1347707	TLIMPRV CAM MEMORIAL DRIVE INSTALL	\$ (501)	\$ (501)	-
3	1421263	STTIMPRVSTA 478 HBK 345A U BUSHING	\$ 46,546	\$ -	-
4	1500492	TLCONS DED DEDHAM LINE 110-522 RE	\$ 28,409	\$ 2,391	-
5	1550000	STAIMPRVSTA 726 MAIN ST CARVER STAT	\$ 8,943,806	\$ 62,908	30,143
6	1561552	TLCONS 345KV LINE CONSTRUCTION / M	\$ 360	\$ -	194,046
7	1562403	STTIMPRVSTA 726 CARVER STA 345KV CI	\$ 17,891,484	\$ 156,425	62,095
8	1576686	STTIMPRVSTA 727 PURCHASE AND DELIVE	\$ 171,921	\$ -	-
9	1580583	STTIMPRVSTA 726 CARVER STATION	\$ 1,072,470	\$ 9,908	-
10	1582864	STAIMPRVSTA 916 SANDWICH SWITCH REP	\$ 15,754	\$ 603	-
11	1585480	LINE 134, NEW CONSTRUCTION, CARVER	\$ 3,257,940	\$ 13,575	5,613
12	1596700	STAIMPRVSTA 385 S-B ISO NE SPARE PR	\$ 52,661	\$ -	-
13	1608026	STTCR NSTAR SOUTH REPLACE OLD CCV	\$ 138,320	\$ 1,213	-
14	1608724	STAIMPRVSTA 329 HIGH SPEED RELAYING	\$ 166,514	\$ 3,733	1,770
15	1610140	TLCONS LINE 336, BELLINGHAM, REPLA	\$ 9,142	\$ 140	-
16	1620492	TLCONS LINE 3361, 2008 CM WORK	\$ 22,600	\$ 318	-
17	1626636	TLIMPRV UPGRADE PTC PUMP PLANTS 385	\$ 75,029	\$ -	-
18	1626797	STTIMPRVSTA 946 REPLACE 115KV SWITC	\$ 50,984	\$ 381	-
19	1628213	TLCONS BOU BOURNE REPLACE INS, LA	\$ 669,337	\$ 6,935	-
20	1628215	TLCONS BOU BOURNE REPLACE INS, LA	\$ 254,738	\$ 3,920	-
21	1628217	TLCONS NEB REPLACE INS, LA'S & CO	\$ 63,012	\$ 677	-
22	1628218	TLCONS NEB REPLACE INS, LA'S & CO	\$ 84,600	\$ 705	-
23	1628640	NEWTON STATION 292 TRANSMISSION WOR	\$ 1,284,961	\$ -	-
24	1634853	TLIMPRV EVT 250 WEST BUS DIFFERENTI	\$ (18,200)	\$ -	-
25	1639833	STAIMPRVSTA 250 INSTALL 345KV REACT	\$ 3,273,248	\$ 1,153	-
26	1640490	STAIMPRVSTA 958 BARNSTABLE SWITCHIN	\$ 464,252	\$ 1,487	-
27	1641018	TLCONS TRANSMISSION FOR CARVER STA	\$ 803,192	\$ 94	47
28	1642275	ESPEC SUD BOSTON POST RD NEW CIR	\$ 11,769	\$ -	-
29	1642709	TLCONS LINE 338, 2008 CURVED ARM R	\$ 57,416	\$ -	-
30	1642711	TLCONS LINE 319, 2008 CURVED ARM R	\$ 81,681	\$ -	-
31	1643731	TLCONS LINE 323, 2008 CORRECTIVE M	\$ 32,915	\$ 51	-
32	1643733	TLCONS LEX, LINE 319, REPLACE BOTH	\$ 8,095	\$ 22	-
33	1643851	TLCONS FRA FRAMINGHAM LINE TBD 20	\$ 2,300	\$ 6	-
34	1645069	TLIMPRV NEB LINE 109 SWITCH #10957	\$ 129,850	\$ 502	-
35	1645177	TLIMPRV NEB LINE 111 SWITCH #11147	\$ 62,485	\$ 421	-
36	1645180	TLIMPRV NEB LINE 112 SWITCH #11246	\$ 198,975	\$ 1,151	-
37	1645183	STTIMPRVNEB LINE 114 SWITCH #11446	\$ 112,065	\$ 429	-
38	1645187	TLIMPRV PLY LINE 108 SWITCH #10867	\$ 135,428	\$ 699	-
39	1645189	TLIMPRV CAPE LINE 107 SWITCH #1072	\$ 93,809	\$ 389	-
40	1645190	TLIMPRV CAPE LINE 118 SWITCH #118	\$ 70,943	\$ 290	-
41	1647125	TLCONS LINE 211-503, R/W 14, REPLA	\$ 377,633	\$ 2,050	-
42	1648018	TLIMPRV LINE 114 - REPAIR SPREADERH	\$ 12,093	\$ 140	-
43	1649071	STTCR STA 961 124CB4 REPLACE HYAN	\$ 71,757	\$ 646	-
44	1650785	TLIMPRV 2008 PUMP PLANT UPGRADES AT	\$ 282,844	\$ 281	-
45	1650788	TLIMPRV 2008 PUMP PLANT UPGRADES AT	\$ 286,016	\$ 285	-
46	1651699	STAIMPRVSTA 713 CARVER RD., WAREHAM	\$ 190,611	\$ 197	98
47	1654196	STTIMPRVSTA 958 BARNSTABLE TRANSMIS	\$ 10,746,805	\$ 3,284	1,642
48	1654552	STTCR STA 961 REPLACE CAPACITOR H	\$ 1,995	\$ 6	-
49	1657693	STAIMPRVSTA 250 MYSTIC REACTOR	\$ 1,414	\$ 4	2
50	1659470	TLCONS LINE 148-522, FALL 2008 COR	\$ 13,469	\$ 23	-
51	1659496	TLCONS HBK HOLBROOK LINE 398-537	\$ 3,544	\$ 8	-
52	1659665	TLCONS HBK HOLBROOK LINE 451-536	\$ 15,557	\$ 61	-
53	1662476	TLCONS BOURNE GATES FOR ROW'S 180	\$ 82,611	\$ 350	-
54	1663091	TLIMPRV UPGRADE HEAT EXCHANGER LINE	\$ 64,413	\$ 64	-
55	1666224	STTIMPRVSTA 211 WOBURN SPARE AUTO T	\$ 122,589	\$ 212	-
56	1666910	STTCR STA 385 CS 773 FAILURE 8/4/	\$ 116,194	\$ 913	-
57	1666939	TLIMPRV FIBER INSTALL WORK BETWEEN	\$ 238,414	\$ 700	-
58	1667987	STTIMPRVSTA 478 WHITMAN TO HOLBROOK	\$ 502,062	\$ 291	-
59	1668836	TLCONS LINE 116, RELOCATE TERMINAL	\$ 3,374	\$ 40	20
60	1669586	AUTO TRANSFORMER 345/115KV 338/412/	\$ 1,645	\$ 4	2
61	1669698	TLCONS CVR LINE 355 - CARVER STAT	\$ 3,508	\$ 10	5
62	1669702	TLCONS CVR LINE 322 - CARVER STAT	\$ 186,793	\$ 1,199	600

NSTAR Electric Company					
Annual Transmission Construction Work in Progress (CWIP) Filing					
Detail of AFUDC Regulatory Liability - Account 254090					
2008 Service Year - AFUDC Work Orders in CWIP					
	(A)	(B)	(C)	(D)	(E)
Line	WO #	Description	CWIP Balance at 12/31/08	2008 AFUDC	2008 AFUDC Regulatory Liability
63	1670753	STTIMPRVSTA 917 CAPE COD CANAL OPGW	\$ (223)	\$ 147	-
64	1674458	TLCONS BOU BOURNE SEECO SWITCH NO	\$ 50,269	\$ -	-
65	1674460	TLCONS DAR DARTMOUTH SEECO SWITCH	\$ 49,062	\$ 145	-
66	1674461	TLCONS PLY PLYMOUTH SEECO SWITCH	\$ 49,753	\$ 50	-
67	1674463	TLCONS PLY PLYMOUTH SEECO SWITCH	\$ 49,139	\$ 145	-
68	1674465	TLCONS MAS MASHPEE	\$ 49,476	\$ 146	-
69	1674467	TLCONS KIN KINGSTON SEECO SWITCH	\$ 48,663	\$ 145	-
70	1674470	TLCONS YAR YARMOUTH SEECO SWITCH	\$ 57,528	\$ 164	-
71	1674474	TLCONS KIN PLYMOUTH SEECO SWITCH	\$ 48,663	\$ 145	-
72	1676015	TLCONS SAN FORESTDALE RD INSTALL	\$ 14,915	\$ 15	-
73	1676967	TLIMPRV REPLACE PRESSURE SENSORS, L	\$ 50,918	\$ 87	-
74	1678556	TLCONS FRA COCHITUATE RD INSTALL	\$ 8,222	\$ 8	-
75	1681627	STTIMPRVSTA 282 BULK POWER SYSTEM U	\$ 1,358	\$ 4	-
76	1681784	STACR STA 446 LINE 325 PURCHASE	\$ 359,418	\$ 394	-
77	1682312	STTCR STA 446 325 MEDWAY REPLACE	\$ 11,341	\$ 19	-
78	1683566	TLCONS ACU ACUSHNET REPLACE POLES	\$ 13,908	\$ -	-
79	1683807	STTIMPRVSTA 250 MYSTIC LINE 349 REL	\$ 602	\$ 1	-
80	1683876	TLIMPRV UPGRADE PUMP PLANT ELECTRIC	\$ 41,935	\$ 42	-
81	1683890	TLCONS MEN ACCESS ROAD OFF BATES	\$ 24,458	\$ 24	-
82	1683906	TLCONS BLK ACCESS RD BLACKSTONE S	\$ 24,682	\$ 25	-
83	1684611	STTCR STA 447 CCVT REPLACEMENT PR	\$ 76,128	\$ 91	-
84	1685211	STTCONS STA 150 INSTALL NEW RTU	\$ 2,520	\$ 3	-
85	1685237	STTCR STA 150 REPLACE WAREHOUSE R	\$ 173,875	\$ 173	-
86	1685393	STTCR STA 342 REPLACE 115 CAP BAN	\$ 8,176	\$ 10	-
87	1685778	STTIMPRVSTA 940 BARNSTABLE SVC PROJ	\$ 14,302	\$ 42	21
88	1685829	TLCONS PLY PLYMOUTH SEECO SWITCH	\$ 54,129	\$ 54	-
89	1685852	TLCONS PLY PLYMOUTH SEECO SWITCH	\$ 48,997	\$ 49	-
90	1685855	TLCONS PLY PLYMOUTH SEECO SWITCH	\$ 50,029	\$ 50	-
91	1685858	TLCONS PLY PLYMOUTH SEECO SWITCH	\$ 50,345	\$ 50	-
92	1685865	TLCONS BOU BOURNE SEECO SWITCH 10	\$ 1,430	\$ 1	-
93	1685953	TLCONS NEB NEW BEDFORD SEECO SWIT	\$ 48,997	\$ 49	-
94	1685955	TLCONS NEB NEW BEDFORD SEECO SWIT	\$ 2,724	\$ 3	-
95	1687019	STTCR STA 65 CCVT REPLACEMENT	\$ 32,999	\$ 33	-
96	1687186	STTCR STA 385 REPLACE BKR 13	\$ 24,079	\$ 24	-
97	1687190	STTCR STA 385 REPLACE BKR 18	\$ 4,577	\$ 5	-
98	1687434	STTCR STA 150 REPLACE ROOF	\$ 773	\$ 1	-
99	1693851	STTIMPRVSTA 514T BOSTON NEW TRANSMI	\$ 229,037	\$ 1,409	-
100	Total	Transmission CWIP	\$ 56,311,015	\$ 355,041	\$ 296,105
101					
102		Transmission CWIP In Plan	\$ 48,413,281	\$ 320,825	\$ 100,287
103		Line 1 + Line 5 + Line 7 + Line 8 + Line 9 + Line 11 + Line 25 + Line 26 + Line 27 + Line 46 + Line 47 + Line 49 + Line 59 + Line 61 + Line 62 + Line 87			

NSTAR Electric Company					
Annual Transmission Construction Work in Progress (CWIP) Filing					
Detail of AFUDC Regulatory Liability - Account 254090					
2008 Service Year - AFUDC Work Orders in Plant in Service					
	(A)	(B)	(C)	(D)	(E)
Line	WO #	Description	CWIP Balance at 12/31/08	2008 AFUDC	2008 AFUDC Regulatory Liability
1	0324571	Reconduct line 240-510		\$ (806)	\$ -
2	1084508	BUR, ASSET STRATEGY TRANS LINES ENG		70	-
3	1084511	WAL, ASSET STRATEGY TRANS LINES ENG		287	-
4	1124277	TRAREPL SHR, TRANSFER POLES ,BROOK		(49)	-
5	1175721	TRACM NEWB, LINE #, R/W #, POLE A		(763)	-
6	1204582	ESPEC BAR LIGHTNING PROTECTION LI		(1)	-
7	1210427	DAR STA 651 CROSS RD ENGINEERING 10		(721)	-
8	1210702	STTNCONSDAR STA 651 CONSTRUCTION		(7,268)	-
9	1210784	STTNCONSDAR - CROSS ROAD STA 651 A		(18,061)	-
10	1216943	TRACM PLY, LINE 322, R/W180, STR		(612)	-
11	1244458	ESPEC NEB MAINT OH TRANS STRUCTUR		(801)	-
12	1244488	ESPEC BOU OH POLE REPLACEMENT--OH		(4,041)	-
13	1247825	TRANCONSCAPACITY UPGRADE #399 LINE		234	-
14	1263453	TRACM NORFOLK, R/W 4 INSTALL GAT		(666)	-
15	1264570	TRANCONSDIELECTRIC FLUID RETURN LIN		89	-
16	1283134	TRANCONSNAT, INSTALL GATE R/W 3, PL		(476)	-
17	1286437	OHPM LINE 338 CORRECTIVE MAINTEN		696	-
18	1286672	OHPM LINE 447-509 CORRECTIVE MAI		(4,391)	-
19	1286674	OHPM LINE 447-508 CORRECTIVE MAI		39	-
20	1286696	TLCM LINE 478-508 CORRECTIVE MAI		187	-
21	1286703	TLCM LINE 478-509 CORRECTIVE MAI		36	-
22	1286714	TLCM LINE 316 CORRECTIVE MAINTEN		10	-
23	1300952	TLCONS RELOCATE LINE 117 FOR SOUTH		(17)	-
24	1304778	TLCONS BOS NEW 115 KV LINE MYSTIC		13	-
25	1354107	TLCONS LINE 111 REPLACE 1 INSULATO		164	-
26	1354112	TLCONS LINE 112 IMPROVEMENTS		84	-
27	1354170	TLCONS LINE 114 IMPROVEMENTS		30	-
28	1354181	TLCONS LINE 115 IMPROVEMENTS		369	-
29	1354208	TLCONS LINE 119 IMPROVEMENTS		41	-
30	1354379	TLCONS LINE 116 CORRECTIVE MAINTEN		43	-
31	1354383	TLCONS LINE 117 CORRECTIVE MAINTEN		20	-
32	1354386	TLCONS LINE 191 CORRECTIVE MAINTEN		36	-
33	1354390	TLCONS LINE 331 CORRECTIVE MAINTEN		296	-
34	1354393	TLCONS LINE 123 CORRECTIVE MAINTEN		201	-
35	1354395	TLCONS LINE 124 CORRECTIVE MAINTEN		251	-
36	1354398	TLCONS LINE 355 CORRECTIVE MAINTEN		61	-
37	1354440	TLCONS LINE D21 CORRECTIVE MAINTEN		20	-
38	1354445	TLCONS LINE 120 CORRECTIVE MAINTEN		18	-
39	1354448	TLCONS LINE 122 CORRECTIVE MAINTEN		0	-
40	1354605	TLCONS LINE 331 CORRECTIVE MAINTEN		36	-
41	1354608	TLCONS LINE 322 CORRECTIVE MAINTEN		220	-
42	1354907	TLCONS LINE 342 CORRECTIVE MAINTEN		2	-
43	1355899	TLCONS MDW, LINE 389, 2004 CORRECT		97	-
44	1372326	TLIMPRV BOS 4 HARRISON AVE REPLACE		289	-
45	1383503	STTCONS STA 514 110-510 REPAIR TEST		220	-
46	1413446	TLCONS HOLBROOK, R/W 6, REPLACE CU		1,000	-
47	1421118	STTIMPRVSTA 478 345A HOL		16	-
48	1423586	STTCONS STA 916, 936, 613, 980		11,115	-
49	1423588	STTCONS STA 146 WALPOLE 115KV CIRCU		1,653	-
50	1428402	TLCONS LINE 211-508, BURLINGTON 20		78	-
51	1428882	STAIMPRVSTA 514 INSTALL CAPACITOR B		14,731	-
52	1431986	TLCONS BUR LINE 211-503		(107)	-
53	1431991	TLCONS BUR LINE 211-504		(447)	-
54	1431994	TLCONS BUR LINE 211-508 CORRECTIV		(268)	-
55	1432023	TLCONS HBK LINE 451-536 2005 CORR		9	-
56	1432063	TLCONS FRA LINE 455-507 2005 CORR		54	-
57	1432121	TLCONS HBK LINE 335 2005 CORRECTI		94	-
58	1432211	TLCONS MDW LINE 357 2005 CORRECTI		69	-
59	1437436	TLCONS PLY PLYMOUTH 2005 MAINTENA		(4,583)	-
60	1437437	TLCONS 2005 CAPE MAINTENANCE		(2,527)	-
61	1437439	TLCONS NEB 2005 MAINTENANCE NEW B		(3,905)	-
62	1443421	STTIMPRVSTA 250 EVERETT, MYSTIC STA		293	-

NSTAR Electric Company					
Annual Transmission Construction Work in Progress (CWIP) Filing					
Detail of AFUDC Regulatory Liability - Account 254090					
2008 Service Year - AFUDC Work Orders in Plant in Service					
	(A)	(B)	(C)	(D)	(E)
Line	WO #	Description	CWIP Balance at 12/31/08	2008 AFUDC	2008 AFUDC Regulatory Liability
63	1473364	STAIMPRVSTA 250 MYSTIC 345KV SHUNT		15	-
64	1478402	STACONS STA 292 & STA 110, NEWTON H		8,588	-
65	1479200	TLIMPRV PTC INSTALLATION OF DARYLAN		1,916	-
66	1481733	STTIMPRVREPLACE CCVT'S ON LINE 496-		1,379	-
67	1497123	STTIMPRVSTA 980 REPLACE BREAKER 112		4,090	-
68	1502990	TLCONS CAM CAMBRIDGE LINE 831-538		3	-
69	1502996	TLCONS WAL WALTHAM LINE 320-508 C		(175)	-
70	1503007	TLCONS SOM SOMERVILLE LINE 211-50		(2,215)	-
71	1503008	TLCONS SOM SOMERVILLE LINE 211-50		(71)	-
72	1503054	TLCONS SOM SOMERVILLE LINE 211-50		(13)	-
73	1503151	TLCONS HBK HOLBROOK LINE 451-536		(6)	-
74	1503173	TLCONS FRA FRAMINGHAM LINE 433-50		21	-
75	1505118	TLIMPRV ACU NEW PUMP PLANT LINE 114		46	-
76	1509794	STTIMPRVSTA 446 LINE 357 MDW 345KV		1,106	-
77	1514582	STTIMPRVBOS STATION 385 LINES 483-5		60	30
78	1514590	STTIMPRVBOS STATION 483 LINES 483-5		2,752	1,376
79	1514624	STTIMPRVSTA 106 483-524&525 BOSTON		12	6
80	1515836	TLCONS PLY PLYMOUTH SITE SURVEY B		1,926	-
81	1517356	STTCR STA 282 WAL REPLACE T770 /		1,108	-
82	1528412	TLCONS PLY LINE 322 STRUCTURE 97 R		(203)	-
83	1538902	STTCR LINE 132-538 STA 385 115KV		1,586	-
84	1546642	STTIMPRVSTA 385 CIR K-STREET		37,706	18,853
85	1552859	STTIMPRVSTA 447 INSTALL NEW WATER L		49	-
86	1553244	STTIMPRVSTA 968 270 LOTHROP AVE, IN		424	-
87	1555608	STTIMPRVSTA 329 BRI 115KV BREAKERS		(3,668)	-
88	1555638	STTIMPRVSTA 385T K ST., S-B 345 P		90,072	45,036
89	1555984	STTCR STA 391 CS770 REPLACE WITH		231	-
90	1556052	STTCR STA 450 REPLACE CS770 WITH		947	-
91	1560960	STTIMPRVSTA 330 STOUGHTON 345KV PRO		55,628	27,814
92	1561283	STTCR STA 727 BROOK ST PLYMPTON		1,757	878
93	1561878	TLIMPRV REPLACE FIRE PROTECTION SYS		35	-
94	1566421	STTIMPRVSTA 735 KINGSTON BROWN GLA		3,191	-
95	1567421	TLCONS LINE 513-507, 2007 CORRECTI		297	-
96	1567622	TLIMPRV REPLACE FIRE PROTECTION SYS		415	-
97	1568220	TLCONS LINE 391-508, STR 312A, REP		(736)	-
98	1568772	TLCONS LINE 211-503, 2007 CORRECTI		(932)	-
99	1569090	TLCONS LINE 240-510, SPRING, 2008		26	-
100	1569096	TLCONS LINE 342-507, 2007, REPLACE		(922)	-
101	1570773	TLCONS LINE 146-502, 2007 CORRECTI		322	-
102	1575646	STTCR NORTH EAST CCVT REPLACEMENT		12,279	-
103	1576862	STTIMPRVSTA 496 HYDE PARK MODIFY SP		99	50
104	1576869	STTIMPRVSTA 385D S-B 345KV PROJECT		16,246	8,123
105	1579143	TLCONS TRANSMISSION CORRECTIVE REP		5,548	-
106	1580583	STTIMPRVSTA 726 CARVER STATION		6,727	3,364
107	1582155	TLCONS LINE 342 / LINE 322, CANAL		2,346	-
108	1582236	STTIMPRVSTA 958 BARNSTABLE		1,619	-
109	1582769	STTIMPRVSTA 980 SANDWICH		782	-
110	1583904	TLCONS NEB NEW BEDFORD		121	-
111	1583908	TLCONS YAR YARMOUTH		39	-
112	1585801	STTIMPRVSCADA CENTER SYSTEM DIAGRAM		635	-
113	1587988	STTCONS PTC OIL LINE REPLACE ROOFS		423	-
114	1588102	STTIMPRVSTA 330 STOUGHTON - PHASE I		10,360	5,180
115	1588392	TLCONS WEYMOUTH REDO ALL 18 JUMPER		96	-
116	1588404	TLCONS WEYMOUTH LINE 478-509 FIX H		40	-
117	1588406	TLCONS WEYMOUTH REDO ALL 18 JUMPER		99	-
118	1590491	TLCONS CAN CANTON REPAIR HOT SPOT		126	-
119	1590493	TLCONS LINE 211-508 2007 FALL CORR		21	-
120	1591208	TLCONS LINE 3361 2007 FALL CORRECT		1,964	-
121	1591427	STTIMPRVCHANNEL BANKS ON THE CAPE T		140	-
122	1594102	TLCONS LINE 331, REPLACE INSULATOR		(496)	-
123	1595426	TLCONS LEX, RW8-3, 533-508 2007 C		358	-
124	1595500	TLCONS CVR, HALIFAX & MIDDLEBORO -		1,928	-

NSTAR Electric Company					
Annual Transmission Construction Work in Progress (CWIP) Filing					
Detail of AFUDC Regulatory Liability - Account 254090					
2008 Service Year - AFUDC Work Orders in Plant in Service					
	(A)	(B)	(C)	(D)	(E)
Line	WO #	Description	CWIP Balance at 12/31/08	2008 AFUDC	2008 AFUDC Regulatory Liability
125	1597572	STTCR STA 330 LINE 3164 REPLACE C		123	-
126	1598082	TLIMPRV SUD FARM LN PTC STA 416 AN		1,325	-
127	1600097	TLCONS WOB WOBURN		328	-
128	1600394	TLCONS R/W 16, RECONFIGURE PAGODA		(491)	(245)
129	1600814	TLCONS SAN BARRIER FOR ACCESS ROAD		350	-
130	1601099	TRACM REPLACE PUMP PLANT NEEDHAM		5,311	-
131	1601103	TLIMPRV REPLACE PUMP PLANT 250A AT		2,701	-
132	1601624	TLCONS LINE 455-507, FALL, 2007 CO		(20)	-
133	1601943	NCUSTMCUPLM 727 SUB BROOK ST COM		73	-
134	1602794	STAADMINSTA 391 SPECIAL PROJECT 200		293	-
135	1602829	TLCONS NEB NEW BEDFORD ROW 144 AC		5,161	-
136	1603898	TLCONS PLM PLYMPTON T LINE WORK F		17,215	8,608
137	1605051	STAIMPRVSTA 250 MYSTIC RELIABILITY		5,665	-
138	1605078	STAIMPRVSTA 385 "K" STREET RELIABIL		6,720	-
139	1605204	TLCONS LINE 65-508, FALL, 2007 COR		12	-
140	1606083	TLCONS PLY PLYMOUTH CM LINE 108		3,057	-
141	1606084	TLCONS PLY PLYMOUTH CM LINE 113		566	-
142	1606085	TLCONS PLY PLYMOUTH CM LINE 108 H		2,279	-
143	1606372	TLCONS PLY PLYMOUTH LINE 342 CM C		432	-
144	1608051	STACR STA 2 XFMR 110A REPLACE U B		49	-
145	1608958	STAIMPRVSTA 250 HIGH SPEED RELAYING		1,218	609
146	1609712	STTIMPRVH-P STA 496 345KV PHASE II		860	430
147	1611346	TLCONS LINE 322, REPLACE INSULATOR		3,437	-
148	1612373	TLCONS EAS EASTHAM - LINE 125 - F		61	-
149	1613997	STACR STA 148 REPLACE OCB 2		(263)	-
150	1614178	TLCONS SAN SANDWICH DRAINAGE IMPRO		362	-
151	1614334	TLCONS LINE 433-507, GUY WIRE AND		319	-
152	1614913	TLCONS NORFOLK, LINE 389, STR 202B		79	-
153	1614996	STACR STA 644 REPLACE 115KV POTEN		(69)	-
154	1616976	TLCONS INSTALL SEECO SWITCH ON LIN		2,237	-
155	1617637	STTIMPRVSTA 447 WALPOLE NEW TRANSM		1	-
156	1618958	TLCONS LINE 117, KINGSTON TO BROOK		969	484
157	1626119	TLCONS WHITMAN, RELOCATE LINE 191		18	9
158	1626121	TLCONS WHITMAN, INSTALL NEW LINE 1		1,476	738
159	1626634	TLIMPRV UPGRADE PTC PUMP PLANT-CARV		682	-
160	1626637	TLIMPRV UPGRADE PTC PUMP PLANT W		1,544	-
161	1626761	TLCONS LINE 331 AND LINE 322 - LON		2,291	-
162	1627005	TLCONS LINE 389 PHASE 3 UPGRADES		1,070	535
163	1627810	STTIMPRVSTATION 509 ALEWIFE SHUNT R		7,760	-
164	1627824	TLCONS WLF WELLFLEET REPLACE INS.		1,432	-
165	1627827	TLCONS FAL FALMOUTH REPLACE INS.		6,916	-
166	1627865	STTIMPRVSPARE 115 KV VOLTAGE TRANSF		37	-
167	1628641	WALPOLE STATION 146 TRANSMISSION WO		9,400	-
168	1633812	STTCR STA 350 DELUGE PIT HEATER		2	-
169	1634583	TLCONS LINE 240-601, REPLACE ARMS,		1,297	-
170	1637135	TLIMPRV MYSTIC REACTOR PROJECT		1,003	502
171	1637431	STAIMPRVSTA 735 KINGSTON MODIFICATI		721	360
172	1640342	TLCONS CVR CARVER ROW 280 ACCESS		469	-
173	1641200	TLIMPRV 2008 NSTAR UG TRANS PTC DGA		44	-
174	1641505	STTCR STA 446 POST INSULATOR		206	-
175	1642346	STTIMPRVSTA 250 BREAKER REPLACEMENT		7,495	-
176	1642453	STTCR STA 447 REPLACE T701 WLP		221	-
177	1642860	TLCONS LINE 391-508, 2008 SPRING C		383	-
178	1642922	TLCONS LINE 320-507, SPRING 2008 C		164	-
179	1643487	TLCONS PLY PLYMOUTH GATES		941	-
180	1643519	TLCONS LINE 117, KINGSTON TO BROOK		67	-
181	1645076	TLCONS EASTHAM LINE 125 REPLACE ST		295	-
182	1645188	TLIMPRV CAPE LINE 115 SWITCH #1152		539	-
183	1647126	TLCONS LINE 211-504, R/W 14, REPLA		23	-
184	1647559	STTCR STA 735 CCVT REPLACEMENT 11		37	-
185	1650082	TLCONS LEX LEXINGTON		157	-
186	1652987	TLCONS BOU BOURNE ACCESS ROAD IMP		454	-

NSTAR Electric Company					
Annual Transmission Construction Work in Progress (CWIP) Filing					
Detail of AFUDC Regulatory Liability - Account 254090					
2008 Service Year - AFUDC Work Orders in Plant in Service					
	(A)	(B)	(C)	(D)	(E)
Line	WO #	Description	CWIP Balance at 12/31/08	2008 AFUDC	2008 AFUDC Regulatory Liability
187	1653079	STTCR STA 385D 110B XFMR REPLACE		8	-
188	1653888	TLCONS HAL HALIFAX GATE AT ROW 16		89	-
189	1656527	TLCONS BARNSTABLE - GATE/BARRIER		298	-
190	1656528	TLCONS HOLBROOK - GATE/BARRIER PLY		84	-
191	1659213	TLCM BRI 329 110-510 PTC SUTHERL		2,960	-
192	1659682	TLCONS FRA FRAMINGHAM REPLACE ONE		168	-
193	1663337	TLCONS IMPROVE SERVICE ROAD AND PO		268	-
194	1665494	TLCONS PLY OFF ROUTE 3		88	-
195	1669700	TLCONS CVR LINE 127 - CARVER STAT		116	58
196	1671015	TLCONS PLY 975 975 BOURNE RD		219	-
197	1671422	TLCONS PLY R/W #244 - STR. 108/70		412	-
198	1671438	TLCONS BAR SHOOT-FLYING HILL RD		159	-
199	1675757	TLCONS SAN SR 130 -FORESTDALE RD		284	-
200	1676190	STTCONS STA 385 REPLACE BREAKER 10		439	-
201	1676192	STTCONS STA 385 REPLACE BREAKER 11		148	-
202	1676193	STTCONS STA 385 REPLACE BREAKER 12		230	-
203		Other		15,882	7,941
204	Total	Plant in Service		\$ 380,389	\$ 130,738
		Form 1 page 278 line 6 col.(e)		\$ 735,431	\$ 426,844
		Exhibit C Page 5 of 11 Line 100 + Exhibit C Page 9 of 11 Line 204			

OTHER REGULATORY LIABILITIES (Account 254)

1. Report below the particulars (details) called for concerning other regulatory liabilities, including rate order docket number, if applicable.
2. Minor items (5% of the Balance in Account 254 at end of period, or amounts less than \$50,000 which ever is less), may be grouped by classes.
3. For Regulatory Liabilities being amortized, show period of amortization.

Line No.	Description and Purpose of Other Regulatory Liabilities (a)	Balance at Beginning of Current Quarter/Year (b)	DEBITS		Credits (e)	Balance at End of Current Quarter/Year (f)
			Account Credited (c)	Amount (d)		
1						
2	FAS 109 regulatory liability	8,700,531	283	989,852		7,710,679
3						
4	Storm contingency fund	11,578,621	593	420,873	2,844,043	14,001,791
5						
6	AFUDC recorded on transmission	4,452,889	407	209,654	426,843	4,670,078
7	construction work in progress					
8						
9	Sale of generating assets	2,110,992	555	1,056,992		1,054,000
10	amortization period 3/1/98-12/31/09					
11						
12	Securitization cost adjustment true-up	119	182.3	119		
13						
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41	TOTAL	26,843,152		2,677,490	3,270,886	27,436,548

Name of Respondent NSTAR Electric Company	This Report is: (1) <input checked="" type="checkbox"/> An Original (2) <input type="checkbox"/> A Resubmission	Date of Report (Mo, Da, Yr) 12/31/2008	Date of Report 2008/Q4 Page 11 of 11
FOOTNOTE DATA			

Schedule Page: 278 Line No.: 6 Column: d

Amortization	\$103,600
Reversal for disallowed CWIP in rate base	<u>106,054</u>
Total	<u>\$209,654</u>

NSTAR Electric Company

Exhibit D

**ER09-1243-000 LNS Filing excluding CWIP and
AFUDC to demonstrate effect on Revenue Requirement**

NSTAR Electric Company
Annual Local Network Service Revenue Requirement
Service Year Ended December 31, 2008
Sheet 1

Line	(a) Description	(b) Section	(c) Amount	(d) Reference
1	Investment Base	II.A.1		
2	Transmission Plant	II.A.1.a	\$ 1,119,636,558	Sheet 3, Line 1, Col (f)
3	Transmission Related Intangible & General Plant	II.A.1.b	16,292,299	Sheet 3, Line 4, Col (f)
4	Transmission Plant Held for Future Use	II.A.1.c	601,465	Sheet 3, Line 5, Col (f)
5	Transmission Related Construction Work in Progress	II.A.1.d	-	Sheet 3, Line 6, Col (f)
6	Total Plant		<u>1,136,530,322</u>	Sum Lines 2 thru 5
7	Trans Related Depreciation and Amortization Reserve	II.A.1.e	(323,187,649)	Sheet 3, Line 12, Col (f)
8	Transmission Related Accumulated Deferred Taxes	II.A.1.f	(125,748,717)	Sheet 3, Line 20, Col (f)
9	AFUDC Regulatory Liability	II.A.1.g	-	Sheet 3, Line 21, Col (f)
10	Total Net Plant		<u>687,593,956</u>	Sum Lines 6 thru 9
11	Transmission Related Gain/Loss on Reacquired Debt	II.A.1.h	5,938,771	Sheet 3, Line 22, Col (f)
12	Other Trans Related Regulatory Assets/Liabilities	II.A.1.i	7,255,775	Sheet 3, Line 28, Col (f)
13	Transmission Prepayments	II.A.1.j	23,899,400	Sheet 3, Line 29, Col (f)
14	Transmission Materials & Supplies	II.A.1.k	2,142,459	Sheet 3, Line 30, Col (f)
15	Transmission Related Cash Working Capital	II.A.1.l	4,132,527	Sheet 3, Line 35, Col (f)
16	Total Investment Base		<u>\$ 730,962,888</u>	Sum Lines 10 thru 15
17	Revenue Requirement			
18	Investment Return and Income Taxes	II.A.2	\$ 93,287,238	Sheet 2, Line 39, Col (c)
19	Transmission Depreciation and Amortization Expense	II.B	24,890,098	Sheet 4, Line 7, Col (f)
20	Amortization of Gain/Loss on Reacquired Debt	II.C	575,671	Sheet 4, Line 8, Col (f)
21	Transmission Related Amort. of Investment Tax Credits	II.D	(334,613)	Sheet 4, Line 9, Col (f)
22	Transmission Related Municipal Tax Expense	II.E	16,859,768	Sheet 4, Line 10, Col (f)
23	Transmission Related Payroll Tax Expense	II.F	896,696	Sheet 4, Line 11, Col (f)
24	Transmission Operation & Maintenance Expense	II.G	20,410,128	Sheet 4, Line 30, Col (f)
25	Trans Related Administrative and General Expense	II.H	12,427,374	Sheet 4, Line 42, Col (f)
26	Transmission Related Integrated Facilities Charges	II.I	-	Sheet 5, Line 10, Col (e)
27	Transmission Support Revenues	II.J	(6,036,315)	Sheet 5, Line 64, Col (e)
28	Transmission Support Expense	II.K	222,711	Sheet 5, Line 69, Col (e)
29	Transmission Related Expense from Generators	II.L	-	Sheet 5, Line 72, Col (e)
30	Transmission Rents Received from Electric Property	II.M	-	Sheet 5, Line 76, Col (e)
31	Short-Term and Non-Firm P-T-P Service Revenues	II.N	-	Sheet 5, Line 79, Col (e)
32	Regional Network Services (RNS) Revenues	II.O	(112,500,587)	Sheet 5, Line 84, Col (e)
33	Through or Out Revenues	II.P	-	Sheet 5, Line 87, Col (e)
34	ISO-NE Scheduling and Dispatch Revenues	II.Q	(4,088,038)	Sheet 5, Line 91, Col (e)
35	Total LNS Revenue Requirement		<u>\$ 46,610,131</u>	Sum Lines 18 thru 34
36	Wholesale LNS Revenues Received:			
37	Concord Municipal Light LNS Transmission		18,755	Sheet 5, Line 59, Col (e)
38	Massport Local Network Service		24,407	Sheet 5, Line 61, Col (e)
39	Grid Nantucket Local Network Service		(69,094)	Sheet 5, Line 62, Col (e)
40	MBTA Local Network Service		138,872	Sheet 5, Line 56, Col (e)
41	Total Wholesale LNS Revenue		<u>\$ 112,940</u>	Sum Lines 37 thru 40
42	Total Retail LNS Revenue Requirement without CWIP		<u>\$ 46,723,071</u>	Line 35 - Line 41
43	Total Retail LNS Revenue Requirement with CWIP		<u>\$ 49,118,546</u>	per ER09-1243-000 filing
44	Effect of CWIP's inclusion in Rate Base		<u>\$ (2,395,475)</u>	Line 42 - Line 43
45	Average 12 CP			
46	Sum of Monthly Peaks (kw)		50,108,000	FF1: 400.17(b)
47	Average Peak		4,175,667	Line 46 / 12
48	Annual Rate per kw		\$ 11.1623	Line 35 / Line 47
49	Monthly Rate per kw		\$ 0.9302	Line 48 / 12
50	Daily Rate per kw		\$ 0.0306	Line 48 / 365

NSTAR Electric Company
Investment Return and Income Taxes
Service Year Ended December 31, 2008
Sheet 2

Line	(a) Description	(b) Tariff Section	(c) Balance	(d) Capitalization Ratio *	(e) Cost *	(f) Weighted Cost *	(g) Equity Cost	(h) Reference
1	Weighted Cost of Capital	II.A.2.a						
2	Long Term Debt	II.A.2.a.i	\$ 1,334,653,701		5.5881%	2.3864%		FF1: Page 112.24(c)
3	Preferred Stock	II.A.2.a.ii	43,000,000		4.5581%	0.0407%	0.0407%	FF1: Page 112.3(c)
4	Common Equity	II.A.2.a.iii	<u>1,994,462,219</u>		11.1400%	<u>6.2832%</u>	<u>6.2832%</u>	FF1: Page 112.16(c) - Line 3(c)
5	Total		<u>\$ 3,372,115,920</u>			<u>8.7103%</u>	<u>6.3239%</u>	Sum Lines 2 thru 4
6	Investment Return	II.A.2						
7	Total Investment Base		\$ 730,962,888					Sheet 1, Line 16, Col (c)
8	Weighted Cost of Capital		8.7103%					Line 5, Col (f)
9	Total Return on Investment		<u>\$ 63,668,876</u>					Line 7 * Line 8
10	Federal Income Tax	II.A.2.b						
11	A = Equity Cost		6.3239%					Line 5, Col (g)
12	B = Transmission Amortization of ITC		\$ (334,613)					Sheet 1, Line 21, Col (c)
13	C = Equity AFUDC		-					FF1: Page 117.38
14	Total B + C		(334,613)					Line 12 + Line 13
15	D = Investment Base		730,962,888					Line 7
16	(B + C) / D		-0.05%					Line 14 / Line 15
17	(A + [(C + B) / D])		6.28%					Line 11 + Line 16
18	FT = Federal Income Tax Rate		35.00%					Federal corporate tax rate
19	1 - FT		65.00%					1 - Line 18
20	Federal Tax Factor		3.38051%					Line 17 * Line 18 / Line 19
21	Total Federal Income Taxes		<u>\$ 24,710,284</u>					Line 15 * Line 20
22	State Income Tax	II.A.2.c						
23	A = Equity Cost		6.3239%					Line 5, Col (g)
24	B = Transmission Amortization of ITC		\$ (334,613)					Sheet 1, Line 21, Col (c)
25	C = Equity AFUDC		-					FF1: Page 117.38
26	Total B + C		(334,613)					Line 24 + Line 25
27	D = Investment Base		730,962,888					Line 7
28	(B + C) / D		-0.05%					Line 26 / Line 27
29	(A + [(C + B) / D])		6.28%					Line 23 + Line 28
30	ST = State Income Tax Rate		6.50%					Massachusetts corporate tax rate
31	1 - ST		93.50%					1 - Line 30
32	Federal Tax Factor		3.38051%					Line 23
33	State Tax Factor		0.67145%					(Line 29 + Line 32) * Line 30 / Line 31
34	Total State Income Taxes		<u>\$ 4,908,078</u>					Line 27 * Line 33
35	Investment Return and Income Taxes	II.A.2						
36	Return on Investment		\$ 63,668,876					Line 9
37	Federal Income Taxes		24,710,284					Line 21
38	State Income Taxes		<u>4,908,078</u>					Line 34
39	Total Return and Income Taxes		<u>\$ 93,287,238</u>					Sum Lines 36 thru 38

* Note that weighting and cost are determined on Sheet 7

NSTAR Electric Company
Investment Base
Service Year Ended December 31, 2008
Sheet 3

Line	(a) Description	(b) Tariff Section	(c) Total	(d) Allocator	(e) Factor	(f) Allocations		(g) Reference
						LNS Amount		
1	Transmission Plant	II.A.1.a	<u>\$ 1,119,636,558</u>	Direct	100.0000%	<u>\$ 1,119,636,558</u>		FF1: Page 207.58(g)
2	General Plant		176,148,709	W&S	8.0130%	14,114,751		FF1: Page 207.99(g)
3	Intangible Plant		<u>27,175,276</u>	W&S	8.0130%	<u>2,177,548</u>		FF1: Page 205.5(g)
4	Total Intangible & General Plant	II.A.1.b	203,323,985			<u>16,292,299</u>		Sum Lines 2 thru 3
5	Transmission Plant Held for Future Use	II.A.1.c	<u>601,465</u>	Direct	100.0000%	<u>601,465</u>		FF1: Page 214.12 & 13(d)
6	Transmission Related CWIP	II.A.1.d	<u>-</u>	CWIP	50.0000%	<u>-</u>		FF1: Page 216.2.24(b) Trans only
7	Transmission Related Dep & Amort Reserve	II.A.1.e						
8	Transmission Accumulated Depreciation		(317,154,742)	Direct	100.0000%	(317,154,742)		FF1: Page 219.25(b)
9	General Plant Accumulated Depreciation		(51,637,814)	W&S	8.0130%	(4,137,725)		FF1: Page 219.28(b)
10	General Plant Accumulated Amortization		(5,266,408)	W&S	8.0130%	(421,996)		FF1: Page 200.21(c) Footnote
11	Intangible Plant Accumulated Amortization		(18,385,007)	W&S	8.0130%	(1,473,186)		FF1: Page 200.21(c) Footnote
12	Total Transmission Related Depreciation Reserve		<u>(392,443,971)</u>			<u>(323,187,649)</u>		Sum Lines 8 thru 11
13	Transmission Accumulated Deferred Taxes	II.A.1.f						
14	Accumulated Deferred Taxes (190)		91,598,356		7.1810%	6,577,643		Sheet 8, Line 17, col (d)
15	Accumulated Deferred Income Taxes (281)		-			-		FF1: Page 113.62(c)
16	Accumulated Deferred Taxes - Property (282)		(492,908,214)					FF1: Page 275.9(k)
17	Less Transition Property		<u>32,510,281</u>					FF1: Page 275.4(k)
18	Net Acc. Def. Income Taxes - Other Property (282)		(460,397,933)	Plant	23.0742%	(106,233,277)		Sum Lines 16 thru 17
19	Accumulated Deferred Income Taxes - Other (283)		(673,622,592)		3.8735%	(26,093,083)		Sheet 8, Line 40, col (d)
20	Total					<u>(125,748,717)</u>		Sum Lines 17 thru 19
21	AFUDC Regulatory Liability	II.A.1.g	<u>-</u>	Direct	100.00%	<u>-</u>		FF1: Page 278.6(f)
22	Gain/Loss on Reacquired Debt	II.A.1.h	<u>25,737,677</u>	Plant	23.0742%	<u>5,938,771</u>		FF1: Page 111.81(c)+113.61(c)
23	Other Regulatory Assets	II.A.1.i						
24	FAS 106 (182.3 & 254)		3,093,033	W&S	8.0130%	247,844		FF1: Page 232.1.39(f)
25	FAS 109 (182.3 & 254)		38,081,925					FF1: Page 232.1.29(f)
26	Less FAS 109 - Liability (182.3 & 254)		<u>(7,710,679)</u>					FF1: Page 278.2(f)
27	Net FAS 109 (182.3 & 254)		<u>30,371,246</u>	Plant	23.0742%	<u>7,007,931</u>		Sum Lines 25 thru 26
28	Total Other Regulatory Assets		<u>33,464,279</u>			<u>7,255,775</u>		Line 24 + line 27
29	Prepayments	II.A.1.j	<u>298,258,782</u>	W&S	8.0130%	<u>23,899,400</u>		FF1: Page 111.57(c)+ 232.2.8(f)
30	Transmission Materials & Supplies	II.A.1.k	<u>2,142,459</u>	Direct	100.0000%	<u>2,142,459</u>		FF1: Page 227.8(c)+227.5(c) Trans
31	Cash Working Capital	II.A.1.l						
32	Operation & Maintenance Expense		20,410,128	WC	12.50%	2,551,266		Sheet 1, Line 24, col (c)
33	Administrative & General Expense		12,427,374	WC	12.50%	1,553,422		Sheet 1, Line 25, col (c)
34	Transmission Support Expenses		<u>222,711</u>	WC	12.50%	<u>27,839</u>		Sheet 1, Line 28, col (c)
35	Total Cash Working Capital		<u>33,060,213</u>			<u>4,132,527</u>		Sum Lines 32 thru 33

Allocation	Description	Factor	Reference
36			
37	Direct Allocation (Direct)	100.0000%	
38	Wages & Salary (W&S)	8.0130%	Sheet 6, Line 6(c)
39	Plant Allocation (Plant)	23.0742%	Sheet 6, Line 14(c)
40	Construction Work in Progress Allocation (CWIP)	50.0000%	Sheet 6, Line 15(c)
41	Cash Working Capital (WC)	12.50%	Tariff Section II.A.1.l

NSTAR Electric Company
Support Expense & Revenue Detail
Service Year Ended December 31, 2008
Sheet 5

Line	(a) Description	(b) Tariff Section	(c) Amount	(d) Includable Amount	(e) Reference
1	Transmission Rents (Account 567)	II.G			
2	Hydro Quebec DC Phase I Support		\$ 425,764	\$ -	FF1: Page 321.98 (b) Footnote
3	Hydro Quebec DC Phase II Support		6,395,739	-	FF1: Page 321.98 (b) Footnote
4	New England Power Support		1,670,648	1,670,648	FF1: Page 321.98 (b) Footnote
5	Hydro Quebec Phase II NEP AC, Chester SVC		1,406,240	1,406,240	FF1: Page 321.98 (b) Footnote
6	Transmission Line Rents		19,138	19,138	FF1: Page 321.98 (b) Footnote
7	Total Transmission Rents Received		<u>\$ 9,917,529</u>	<u>\$ 3,096,026</u>	Sum Lines 2 thru 6
8	Transmission Related Integrated Facilities Charges	II.I	\$ -	\$ -	
9	- none -		-	-	
10	Total Trans Related Integrated Facilities Charges		<u>\$ -</u>	<u>\$ -</u>	Sum Lines 9 thru 9
11	Transmission Support Revenues 456 & 456.1	II.J			
12	DSM Incentive		\$ (3,852,431)	\$ -	FF1: Page 300.21(b) Footnote
13	Load Response Program Revenues		(12,000)	-	FF1: Page 300.21(b) Footnote
14	MBTA Distribution Facilities		(2,031,285)	-	FF1: Page 300.21(b) Footnote
15	MATEP Distribution Facilities		(1,558,490)	-	FF1: Page 300.21(b) Footnote
16	DPU Safety & Reliability Programs		8,405,874	-	FF1: Page 300.21(b) Footnote
17	Circuit Performance Incentive Revenue		1,000,000	-	FF1: Page 300.21(b) Footnote
18	Referral Revenue		(51,850)	-	FF1: Page 300.21(b) Footnote
19	Customer Adjustments		(683,148)	-	FF1: Page 300.21(b) Footnote
20	Forward Capacity Market Proceeds		(2,782,915)	-	FF1: Page 300.21(b) Footnote
21	Massport Distribution Facilities		(1,914,675)	-	FF1: Page 300.21(b) Footnote
22	PAM return on prepaid & deferred		2,528,000	-	FF1: Page 300.21(b) Footnote
23	Power System Services Revenue		(3,316,411)	-	FF1: Page 300.21(b) Footnote
24	Hoping Brook Transmission		(220)	(220)	FF1: Page 300.21(b) Footnote
25	NEPOOL Scheduling & Dispatch Revenue		(4,124,988)	-	FF1: Page 300.21(b) Footnote - See line 90
26	Enhanced Billing & Metering Services for Suppliers		(487,982)	-	FF1: Page 300.21(b) Footnote
27	Associated Company Revenue		(849,750)	-	FF1: Page 300.21(b) Footnote
28	CIAC adder revenue		(1,498,808)	-	FF1: Page 300.21(b) Footnote
29	Account Reactivation Revenue		(184,675)	-	FF1: Page 300.21(b) Footnote
30	Guisti Drive Transmission		(15,083)	(15,083)	FF1: Page 300.21(b) Footnote
31	Polaroid Transmission		(49,022)	(49,022)	FF1: Page 300.21(b) Footnote
32	Mirant Kendall - Distribution		(143,215)	-	FF1: Page 300.21(b) Footnote
33	Belmont Support Revenues		(465,197)	-	FF1: Page 300.21(b) Footnote
34	Grid Support Revenues		(45,657)	-	FF1: Page 300.21(b) Footnote
35	Other		(300)	-	FF1: Page 300.21(b) Footnote
36	Hydro Quebec Energy Line Usage		(8,758,840)	-	FF1: Page 300.22(b) Footnote - Transition Charge
37	Belmont Support Revenues		(163,448)	(163,448)	FF1: Page 300.22(b) Footnote
38	Grid Support Revenues		(4,516)	(4,516)	FF1: Page 300.22(b) Footnote
39	Hydro Quebec Phase 2 Support		(374,202)	(374,202)	FF1: Page 300.22(b) Footnote
40	National Grid - Dewar St. Facilities		(1,002,988)	(1,002,988)	FF1: Page 300.22(b) Footnote
41	Montaup Canal 2 Jordan Road		(228,510)	(228,510)	FF1: Page 300.22(b) Footnote
42	EUA/NEP Station 342 Support		(175,354)	(175,354)	FF1: Page 300.22(b) Footnote
43	Montaup Canal 2 Walpole Station		(53,065)	(53,065)	FF1: Page 300.22(b) Footnote
44	Montaup Station 451 Support		(25,569)	(25,569)	FF1: Page 300.22(b) Footnote
45	NEP Line 201-502 Medway Support		(14,676)	(14,676)	FF1: Page 300.22(b) Footnote
46	Reading Lines 211-503/504 Support		(165,408)	(165,408)	FF1: Page 300.22(b) Footnote
47	C/W Subtrans Facilities Support		(110,819)	-	FF1: Page 300.22(b) Footnote
48	Wellesley Transmission Facilities Support		(80,875)	(80,875)	FF1: Page 300.22(b) Footnote
49	ANP Blackstone Energy Co		(845,518)	(845,518)	FF1: Page 300.22(b) Footnote
50	AES Londonderry Facilities		(18,101)	(18,101)	FF1: Page 300.22(b) Footnote
51	Merchants Way - Nantucket AFC		(93,860)	(93,860)	FF1: Page 300.22(b) Footnote
52	Millennium Power Partners		(30,355)	(30,355)	FF1: Page 300.22(b) Footnote
53	Sithe Mystic - Interconnection		(1,445,352)	(1,445,352)	FF1: Page 300.22(b) Footnote
54	Mirant Kendall - Facilities		(1,126,316)	(1,126,316)	FF1: Page 300.22(b) Footnote
55	NEA Interconnection Facilities Support		(42,972)	(42,972)	FF1: Page 300.22(b) Footnote
56	MBTA Local Network Service		138,872	-	FF1: Page 300.22(b) Footnote
57	Trans Support Miles Standish - Bridgewater		(47,040)	(47,040)	FF1: Page 300.22(b) Footnote
58	Entergy Off - Site Distribution		(160,740)	-	FF1: Page 300.22(b) Footnote
59	Concord Municipal Light LNS Transmission		18,755	-	FF1: Page 300.22(b) Footnote
60	RNS Transmission Revenue		(118,300,343)	-	FF1: Page 300.22(b) Footnote - See line 81
61	Massport Local Network Service		24,407	-	FF1: Page 300.22(b) Footnote
62	Grid Nantucket Local Network Service		(69,094)	-	FF1: Page 300.22(b) Footnote
63	Entergy Pilgrim Capacitor Bank Facilities		(33,865)	(33,865)	FF1: Page 300.22(b) Footnote
64	Total Short Term & Non-Firm PTP Revenues		<u>\$ (145,324,020)</u>	<u>\$ (6,036,315)</u>	Sum Lines 12 thru 63
65	Transmission Support Expense (565)	II.K			
66	New England Power Co		\$ 213,163	\$ 213,163	FF1: Page 332.1(h)
67	ISO-NE		134,106,562	-	FF1: Page 332.2(h)
68	Wellesley Municipal Lgt		9,548	9,548	FF1: Page 332.3(h)
69	Total Transmission Support Expense		<u>\$ 134,329,273</u>	<u>\$ 222,711</u>	Sum Lines 66 thru 68
70	Transmission Related Expense from Generators	II.L			N/A
71	- none -		-	-	
72	Total Trans Related Expense from Generators		<u>\$ -</u>	<u>\$ -</u>	Sum Lines 71 thru 71

NSTAR Electric Company
Support Expense & Revenue Detail
Service Year Ended December 31, 2008
Sheet 5

Line	(a) Description	(b) Tariff Section	(c) Amount	(d) Includable Amount	(e) Reference
73	Rents Received from Electric Property (454)	II.M			
74	Assoc Co. Rents		\$ (4,048,516)	\$ -	FF1: Page 300.19(b) Footnote
75	Pole Attachments - CATV		(1,786,391)	-	FF1: Page 300.19(b) Footnote
76	Total Rents Received		<u>\$ (5,834,907)</u>	<u>\$ -</u>	Sum Lines 74 thru 75
77	Short-Term and Non-Firm Point-to-Point Rev	II.N	\$ -	\$ -	N/A
78	- none -		-	-	
79	Total ST and Non-Firm Point-to-Point Revenues		<u>\$ -</u>	<u>\$ -</u>	Sum Lines 78 thru 78
80	Regional Network Service Revenues (456):	II.O			
81	RNS Transmission Revenue		\$ (118,300,343)	\$ (118,300,343)	Line 60
82	RNS PTF Post 2003 investment 1 % Adder		-	3,165,607	RNS Revenue Requirement
83	RNS PTF RTO Participation 0.5% Adder		-	2,634,150	RNS Revenue Requirement
84	Total Regional Network Services Revenues		<u>\$ (118,300,343)</u>	<u>\$ (112,500,587)</u>	Sum Lines 81 thru 83
85	Through or Out Revenues	II.P	\$ -	\$ -	N/A
86	- none -		-	-	
87	Total Through or Out Revenue		<u>\$ -</u>	<u>\$ -</u>	Sum Lines 86 thru 86
88	ISO-NE Scheduling & Dispatch Revenue	II.Q			
89	Nepool Scheduling & Dispatch Revenue		\$ (4,124,988)	\$ (4,124,988)	Line 25
90	RTO Participation 0.5% Adder		-	36,950	Regional Schedule 1 Revenue Requirement
91	Total ISO-NE Scheduling & Dispatch Revenue		<u>\$ (4,124,988)</u>	<u>\$ (4,088,038)</u>	Sum Lines 90 thru 90

**NSTAR Electric Company
Allocation Factors
Service Year Ended December 31, 2008
Sheet 6**

(a)	(b)	(c)	(d)	
<u>Line</u>	<u>Description</u>	<u>Tariff Section</u>	<u>Amount</u>	<u>Reference</u>
1	Transmission Wages & Salaries Allocation Factor	I.A.1		
2	Transmission Related Direct Wages & Salaries		\$ <u>9,779,163</u>	FF1: Page 354.21(b)
3	Total Direct Wages & Salaries		\$ 161,595,179	FF1: Page 354.28(b)
4	Administrative & General Wages & Salaries		<u>39,553,568</u>	FF1: Page 354.27(b)
5	Net Total Direct Wages & Salaries		\$ <u>122,041,611</u>	Line 3 less Line 4
6	Transmission Wages & Salaries Allocation Factor		8.0130%	Line 2 / Line 5
7	Plant Allocation Factor	I.A.2		
8	Transmission Plant Investment		\$ 1,119,636,558	FF1: Page 207.58(g)
9	HQ Leases		-	
10	Transmission Related General Plant		14,114,751	Sheet 3, Line 2, Col (f)
11	Transmission Related Intangible Plant		<u>2,177,548</u>	Sheet 3, Line 3, Col (f)
12	Total Transmission Plant Investment		\$ <u>1,135,928,857</u>	Sum Lines 8 thru 11
13	Total Plant in Service		\$ <u>4,922,932,932</u>	FF1: Page 207.104(g)
14	Plant Allocation Factor		23.0742%	Line 12 / Line 13
15	Construction Work in Progress Allocation Factor	II.A.1.d	50.0000%	

NSTAR Electric Company
Cost of Long Term Debt
Service Year Ended December 31, 2008
Sheet 7

Line	Series	Dated	Term (Years)	Coupon Rate	Original Issue	FF1:256(h) Principal Amount Outstanding	(g) Percent of Total	(h) FF1:256(c) Debt Disc & Exp	(i) Call Premium on Debt	(j) Net Proceeds	(k) Cost to Maturity	(l) Weighted Cost	(m) Reference
							Col f /			Col i			
							Col f Total						
1	MIFA Bonds	2/8/94	20	5.75%	\$ 15,000,000	\$ 15,000,000	1.12%	\$ 300,705	\$ -	\$ 14,699,295	5.8502%	0.0655%	FF1: Page 256 & 257
2	4.875% Debentures	4/13/04	10	4.875%	300,000,000	300,000,000	22.39%	5,186,973	-	294,813,027	5.0479%	1.1301%	FF1: Page 256 & 257
3	7.8% Debentures	5/10/95	15	7.80%	125,000,000	125,000,000	9.33%	1,231,787	-	123,768,213	7.8657%	0.7337%	FF1: Page 256 & 257
4	4.875 Debentures	10/9/02	10	4.875%	400,000,000	400,000,000	29.85%	6,512,790	-	393,487,210	5.0378%	1.5038%	FF1: Page 256 & 257
5	5.75% Debentures	3/13/06	30	5.750%	200,000,000	200,000,000	14.93%	4,178,615	-	195,821,385	5.8196%	0.8686%	FF1: Page 256 & 257
6	5.625% Debentures	11/19/07	10	5.625%	300,000,000	300,000,000	22.39%	3,611,666	-	296,388,334	5.7454%	1.2863%	FF1: Page 256 & 257
7	Total				<u>\$ 1,340,000,000</u>	<u>\$ 1,340,000,000</u>	<u>100.00%</u>	<u>\$ 21,022,536</u>	<u>\$ -</u>	<u>\$ 1,318,977,464</u>		<u>5.5881%</u>	Sum Lines 1 Thru 6

Cost of Preferred Stock

Line	Series	Dated	Term	Coupon Rate	Original Issue	FF1:250(f) Principal Amount Outstanding	Percent of Total	Weighted Cost	Reference
8	4.25%	6/13/1956	N/A	4.25%	\$ 18,000,000	\$ 18,000,000	41.86%	1.7791%	FF1: Page 250 & 251
9	4.78%	7/10/1958	N/A	4.78%	25,000,000	25,000,000	58.14%	2.7791%	FF1: Page 250 & 251
10	Total				<u>\$ 43,000,000</u>	<u>\$ 43,000,000</u>	<u>100.00%</u>	<u>4.5581%</u>	Sum Lines 8 Thru 9

Effective NSTAR ROI
Tariff Section II.A.2.a

Line	Description	(a) Common	(b) Preferred	(c) LTD	(d) Total	(e) Reference
11	Amount	\$ 1,994,462,219	\$ 43,000,000	\$ 1,334,653,701	\$ 3,372,115,920	Sheet 2, lines 2 thru 4
12	Cost	11.1400%	4.5581%	5.5881%		See Note
13	Actual Weighting	59.1457%	1.2752%	39.5791%	100.0000%	Line 11 / Total Line 11
14	Weighted Cost	6.5888%	0.0581%	2.2117%	8.8587%	Line 12 * Line 13
15	70% of Weighted Cost	4.6122%	0.0407%	1.5482%		Line 14 * 70%
16	Tariff Weighting	50.0000%	0.0000%	50.0000%	100.0000%	Tariff Section II.A.2.a
17	Weighted Cost	5.5700%	0.0000%	2.7940%	8.3640%	Line 12 * Line 16
18	30% of Weighted Cost	1.6710%	0.0000%	0.8382%		Line 17 * 30%
19	Blended Cost of Capital	6.2832%	0.0407%	2.3864%	8.7103%	Line 15 + Line 18
20	Lower of Blended or Actual	6.2832%	0.0407%	2.3864%	8.7103%	Tariff Section II.A.2.a

21 Note:

22 The Return on Equity component is specified in Tariff Section II.A.2.a.iii - 10.9%?

23 The Cost of Preferred Stock is calculated on line 10

24 The Cost of Long Term Debt is calculated on line 7

25 Lower of Blended or Actual on line 20 is based on Total NSTAR ROI col. (e)

NSTAR Electric Company
Annual Local Network Service Revenue Requirement
Service Year Ended December 31, 2008
Sheet 8

Transmission Related ADIT - Tariff Section II.A.1.f

Line	Description	(a) Amount	(b) Allocator	(c) Rate Base	(d) Notes
1	Account 190				
2	General & Administrative Costs	\$ 23,255,833	8.0130%	\$ 1,863,484	FF1: Page 234.2(c) Footnote
3	Provision for Rate Refund	12,249,183	23.0742%	2,826,405	FF1: Page 234.2(c) Footnote
4	Self Insurance Reserves	3,098,775	23.0742%	715,018	FF1: Page 234.2(c) Footnote
5	Sub-lease Expenses	316,906	8.0130%	25,394	FF1: Page 234.2(c) Footnote
6	Hazardous Waste Clean Up Reserve	302,426	23.0742%	69,782	FF1: Page 234.2(c) Footnote
7	Pension Adjustment Mechanism	10,600,053	8.0130%	849,380	FF1: Page 234.2(c) Footnote
8	Retail Adjuster Clause - Gain on Sale of Assets	6,823,986	0.0000%	-	FF1: Page 234.2(c) Footnote
9	Retail Adjuster Clause - Transition Charge Amortization	5,515,902	0.0000%	-	FF1: Page 234.2(c) Footnote
10	Reserve for uncollectible accounts	9,002,761	0.0000%	-	FF1: Page 234.2(c) Footnote
11	Retail Adjuster Clause - Securitization Costs	1,894,198	0.0000%	-	FF1: Page 234.2(c) Footnote
12	Storm Contingency Fund	5,492,202	0.0000%	-	FF1: Page 234.2(c) Footnote
13	Retail Adjuster Clause - Default Service	10,276,950	0.0000%	-	FF1: Page 234.2(c) Footnote
14	Retail Adjuster Clause - Transition Revenue Unbilled	1,221,074	0.0000%	-	FF1: Page 234.2(c) Footnote
15	Utility Congestion	559,208	0.0000%	-	FF1: Page 234.2(c) Footnote
16	Other Items	988,899	23.0742%	228,181	FF1: Page 234.2(c) Footnote
17	Total 190	<u>\$ 91,598,356</u>	<u>7.1810%</u>	<u>\$ 6,577,643</u>	Sum Lines 2 thru 16
18	Account 283				
19	AFUDC MDTE Method Reg Asset	\$ (2,257,102)	23.0742%	\$ (520,809)	FF1: Page 277.3(k) Footnote
20	Bond Redemption Call Premium	(10,303,718)	23.0742%	(2,377,504)	FF1: Page 277.3(k) Footnote
21	Debt Expense Amortization	(1,183,461)	23.0742%	(273,075)	FF1: Page 277.3(k) Footnote
22	Pension Expense	(110,028,244)	8.0130%	(8,816,535)	FF1: Page 277.3(k) Footnote
23	Post Employment Benefits Accrued	(5,170,048)	8.0130%	(414,275)	FF1: Page 277.3(k) Footnote
24	Property Tax Lien Date Accrual	(16,672,097)	23.0742%	(3,846,958)	FF1: Page 277.3(k) Footnote
25	Merger Cost to Achieve	(3,276,638)	0.0000%	-	FF1: Page 277.3(k) Footnote
26	Retail Adjustment Clause - Bad Debt	(5,994,047)	0.0000%	-	FF1: Page 277.3(k) Footnote
27	Retail Adjuster Clause - Basic Service Bad Debt	(4,385,157)	0.0000%	-	FF1: Page 277.3(k) Footnote
28	Retail Adjuster Clause - Deferred Exogenous Program Costs	(2,454,550)	0.0000%	-	FF1: Page 277.3(k) Footnote
29	Retail Adjuster Clause - Transition Revenues	(64,263,202)	0.0000%	-	FF1: Page 277.3(k) Footnote
30	Retail Adjuster Clause - Deferred Transmission Revenues	(33,660,558)	0.0000%	-	FF1: Page 277.3(k) Footnote
31	Retail Adjuster Clause - Fuel Litigation Costs	(1,955,495)	0.0000%	-	FF1: Page 277.3(k) Footnote
32	Interest on Potential Tax Liabilities	(7,259,763)	23.0742%	(1,675,134)	FF1: Page 277.3(k) Footnote
33	Retail Adjuster Clause - RAAC	(628,908)	0.0000%	-	FF1: Page 277.3(k) Footnote
34	Retail Adjuster Clause - Rate Design Adjustment	(5,773,528)	0.0000%	-	FF1: Page 277.3(k) Footnote
35	Retail Adjuster Clause - Sale of Generating Assets	(7,137,304)	0.0000%	-	FF1: Page 277.3(k) Footnote
36	FASB 109 Deferred Income Taxes	(30,371,246)	23.0742%	(7,007,931)	FF1: Page 277.3(k) Footnote
37	Merger Goodwill	(208,196,115)	0.0000%	-	FF1: Page 277.3(k) Footnote
38	Retail Adjuster Clause - Securitized Power Cost	(147,620,417)	0.0000%	-	FF1: Page 277.3(k) Footnote
39	Other Items	(5,030,994)	23.0742%	(1,160,863)	FF1: Page 277.3(k) Footnote
40	Total 283	<u>\$ (673,622,592)</u>	<u>3.8735%</u>	<u>\$ (26,093,083)</u>	Sum Lines 19 thru 39
41	Wages & Salary Allocator		8.0130%		Sheet 6, Line 6, Col (d)
42	Plant Allocator		23.0742%		Sheet 6, Line 14, Col (d)

NSTAR Electric Company

Exhibit E

CWIP Accounting Changes

Statement of Accounting Changes

During the 2008 Service Year, the Company made no accounting changes that affect the recording of Construction Work In Progress or the related AFUDC Regulatory Liability.