Michael D. Cannata, Jr., P.E.| Senior Consultant, Accion Group, Inc.
244 North Main Street
Concord, NH 03301
(603) 229-1644
mcannata@acciongroup.com

As the former Chief Engineer of the New Hampshire Public Utilities Commission and a former managing engineer with the Public Service Company of New Hampshire in transmission and generation planning, energy management, and system operations, Mr. Cannata supports Accion's team with his expert knowledge of power system studies and planning and interconnection analysis. Before joining Accion Group, Mr. Cannata served as a technical advisor to the Maine Public Utilities Commission, the Vermont Public Service Board, the Kentucky Public Service Commission, and the District of Columbia Public Service Commission regarding the public necessity and convenience for a multitude of 345 kV, 230 kV, 161 kV, 138 kV, 115 kV, and 69 kV facilities. Additionally, Mr. Cannata has conducted management audits of major utility organizations, executed prudence reviews of major fossil and nuclear plant outages, and served as the prime architect for one state's heavily litigated electric utility restructuring settlement.

Experience

Chief Engineer, New Hampshire Public Utilities Commission
Director, Power Pool Operations, Public Service Company of New Hampshire
Manager, Computer Department and System Planning, Public Service Company of New Hampshire
Senior Consultant, The Liberty Consulting Group
Management audits of major utility organizations
Investigations of major system outages
State siting decision maker
State Office of Emergency management decision maker
Prudence reviews of major fossil and nuclear plant outages
Utility merger analyses
Prime architect for one state's heavily litigated electric utility restructuring settlement
Principal technical and analytical member of the Seabrook nuclear plant sale
Technical advisor for international DC interconnection facilities
Core participant in the resolution of a major utility bankruptcy

Major Clients

Alabama Power Company
Arizona Public Service Commission
Confidential Investment Bankers
D.C. Public Service Commission
Georgia Power Company
Illinois Commerce Commission
Kentucky Public Service Commission
Maine Public Utilities Commission
Maryland Public Service Commission
New York Public Service Commission
NH Public Utilities Commission
Nova Scotia Utility and Review Board
Ohio Public Utilities Commission
Reliant Energy Corporation
Vermont Public Service Board

Industry Specialization

Analysis of Utility Reliability, Safety, and Operating Practices
Economic Evaluations
Expert Testimony
Generation Planning
Generation Plant Siting
Mergers and Acquisitions
Non-Utility System Interconnections
Power System Operations
Risk Management
System Reliability Analyses
Transmission and Gas Line Siting
Transmission Planning
Utility Acquisitions
Vegetation Management

Education

MBA, Northeastern University
MSEE Power Systems, Northeastern University
BSEE Power Systems, Northeastern University
Professional Engineer – New Hampshire #5618

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Relevant Experience

Audit and Operations Review

Lead Consultant for Liberty Consulting Group's review of the transmission system of Nova Scotia Power for The Nova Scotia Utility and Review Board. Liberty's review examined (1) system maintenance, inspection, structural design, materials, staffing, and related matters, (2) system planning, operations, system design, lessons learned, and other matters, and (3) utility communications, call center operations, staffing, outage management system, lessons learned, and related matters after the collapse of multiple transmission lines in November 2004.

Lead investigator into the reliability of the Potomac Electric Power Company distribution system and the quality of service it provides to its customers for the Maryland Public Service Commission.

Lead Investigator in the management audit of Consolidated Edison Company of New York reviewing adequacy of multi-area transmission planning and resource adequacy within the multi-area system for the New York Public Service Commission, including review of the electric and gas system designs.

Lead Investigator monitoring Commonwealth Edison's implementation of T&D system reliability improvement recommendations resulting from major system outages for the Illinois Commerce Commission.

Lead Investigator in the prolonged outage of Ameren T&D facilities following severe wind and ice events in 2006 for the Illinois Commerce Commission.

Lead Investigator monitoring Ameren's implementation of T&D system reliability improvement recommendations resulting from major system outages for the Illinois Commerce Commission.

Lead Investigator in the investigation of transmission grid security in Illinois after the August 2003 blackout for the governor's blue ribbon committee.

Lead Investigator reviewing the operation and outage of the fossil power plants of Arizona Public Service Company for the Arizona Public Service Commission.

Lead Investigator reviewing the operation and outage of the fossil power plants of Duke Energy – Ohio for the Ohio Public Utilities commission.

Lead Investigator in the in-depth root cause analysis of a fire at a major Commonwealth Edison substation for the Illinois Commerce Commission.

Lead Investigator of the reliability of the T&D systems of four electric utilities in Maine.

Lead Investigator in the review of distribution and transmission practices at Alabama Power and Georgia Power Company.

Served as the principal technical member of the Seabrook nuclear unit sale team acting for the New Hampshire Public Utilities Commission.

Lead Investigator in prudence reviews of major fossil and nuclear plant outages for the New Hampshire Public Utilities Commission.

Investigated the causes of overlapping unit outages at a major Reliant generation facility.

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Relevant Experience (continued)

Dispute Resolution

Prime architect of the settlement between the State of New Hampshire and Public Service Company of New Hampshire (PSNH) that ended years of litigation and allowed state-wide competition in the electric industry to proceed.

Re-drafted the State of New Hampshire Bulk Power Siting Statute and facilitated resolution of widespread legislative tensions.

Renewable Energy Projects

Lead Investigator reviewing the adequacy of system interconnection requirements of a major renewable fuel resource for the Nova Scotia Utility and Review Board.

Restructuring

Advisor for the New Hampshire Public Utilities Commission in the merger of National Grid and Key Span and the sale of Verizon assets to Fair Point Communications.

Principal technical and analytical member in the Seabrook nuclear unit sale team acting for the New Hampshire Public Utilities Commission.

Core participant in the merger/acquisition team activities culminating in the corporate reorganization of PSNH. Recognized and developed a successful employee retention program used during the acquisition.

Strategic Energy Planning

Evaluated the appropriateness of the proposed Storm Fund Adjustment Factor and the Inspection and Maintenance Program Basis Service Adjustment Mechanism for Power Option, a load aggregator in Massachusetts Electric Company's first delivery rate case in 10 years.

Technical advisor to the Maine Public Utilities Commission, Vermont Public Service Board, Kentucky Public Service Commission, and the District of Columbia Public Service Commission regarding the public necessity and convenience for a multitude of 345 kV, 230 kV, 161 kV, 138 kV, 115 kV, and 69 kV facilities. Included in these many engagements was the Maine Power Reliability Project consisting of over 350 miles of 115 kV and 345 kV facilities.

Advisor to the Commission on utility system and operational issues including those of alternative energy generation.

Transmission and Distribution

Responsible for the operation and dispatch of PSNH transmission and generation facilities through the New Hampshire Electric System Control Center.

Developed real time integrated transmission system loading capabilities for the New Hampshire Electric System Control Center.

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Relevant Experience (continued)

Utility Planning and Management

Managed a professional staff of engineers and analysts engaged in investigations regarding safety, reliability, emergency planning, and the implementation of public policy in the electric, gas, telecommunications and water industries.

Decision-maker on the Site Evaluation Committee responsible for siting major electric and gas production and transmission facilities.

Sat as decision maker at the New Hampshire Office of Emergency Management's Emergency Operations Center.

Instrumental in achieving quality of service levels among the highest in Verizon's service territory.

Core Task Force Member for the DC electrical interconnection between Hydro Quebec and the New England Power Pool.

Director of Power Pool Operations and Planning for Public Service Company of New Hampshire (PSNH)

- Represented PSNH at all major relevant national and regional reliability organizations including:
  New England Power Pool - System planning Committee; System Operations Committee; Technical planning and operations task forces conducting regional and inter-regional studies and analyses
  Northeast Power Coordinating Council - Joint Coordinating Council
  Edison Electric Institute - System Planning Committee

Director of System Planning/Energy Management, PSNH

- Coordinated the company's capital planning requirements for generation and transmission. Integrated its load forecasting and energy management activities
- Lead Participant in the development and implementation of response strategies addressing the negative financial impacts associated with the proliferation of non-utility generation
- Ensured that the interconnections of non-utility generation met utility reliability requirements
- Re-designed the corporate budgeting system to allocate available resources by economic and need prioritization
- Driving force in re-directing corporate economic evaluations towards competitive business techniques

Manager of Computer Department and System Planning, PSNH

- Responsible for the Engineering Division's computer applications support and transmission system planning functions
- Principal in the development, design and implementation of the first-in-the-nation application of 345/34.5 kV distribution
- Resolved daytime corporate-wide computer throughput logjam
- Integrated the Engineering Department's computer applications into the corporate computer organization

2010 Capacity/Energy Transactions

Background

Public Service Company of New Hampshire (PSNH) retains load serving responsibility for customers who have not selected a competitive supplier. PSNH's monthly peak load for 2010 ranged from 755 MW in April, to 1,277 MW during July. On-peak monthly energy ranged from 225 GWh in May to 309 GWh in July, and off-peak monthly energy ranged from 188 GWh in April to 288 GWh in January, as highlighted below.

During 2010 PSNH met part of its system need through purchases from other suppliers. In 2010 these external supplies ranged from 10 percent of monthly on-peak energy requirements in March to 57 percent during October. Off-peak supplies from the market in 2010 ranged from 4 percent of system need in March and December to 53 percent in October. For the year, the market supplied a total of 27 percent of PSNH's on-peak energy requirements and 18 percent of its off-peak requirements as highlighted below.

Source of 2010 System Need*

Period	System Peak (MW)	System Need (GWh)		Market Supply (Percentage)	
		On-Peak	Off-Peak	On-Peak	Off-Peak
January	1,020	262	288	17	19
February	975	249	217	18	8
March	892	263	211	10	4
April	755	230	188	26	14
May	1,080	225	226	32	19
June	998	270	213	24	11
July	1,277	309	284	26	20
August	1,153	296	230	26	13
September	1,166	242	204	29	18
October	796	225	211	57	53
November	866	235	212	48	34
December	1,003	290	234	11	4
Total for 2010	**---**	**3,097 GWh**	**2,720 GWh**	**27%**	**18%**

* Totals may not equal 100% due to rounding.

PSNH Sources of 2010 Energy and Capacity

In 2010 and at summer ratings[1], PSNH owned approximately 546 MW of coal-fired generation with four units at two stations, 419 MW of oil-fired generation from two units, 58 MW of hydro-electric generation from nine stations, 43 MW of wood-fired generation from a single unit, and 83 MW of combustion turbine generation from five units at four locations. PSNH also purchased 20 MW of nuclear capability from a single unit, 42 MW from various PURPA-mandated purchases, and 10 MW (no capacity) from Independent Power Provider (IPP) buyout replacement contracts.[2] The PSNH portfolio totals approximately 1,221 MW of summer capability, and 1,282 MW of winter capability. [3, 4]

PSNH must meet its share of the Independent System Operator – New England (ISO-NE) monthly capacity requirements, which ranged from 1,437 MW in December to 1,780 MW in March. The difference between PSNH resources and the ISO-NE monthly capacity requirement, including reserve requirements, must be made met through supplemental capacity purchases. The market supplemental capacity requirement purchases varied from 80 MW during November to 460 MW in January 2010.[5] PSNH also received variable monthly capacity credits from the Hydro Quebec interconnection.

Load obligation requirements remained somewhat difficult to forecast in 2010. At the beginning of January, approximately 705 MW of PSNH's large customers (29 percent of PSNH's total load) obtained their power supply from the market or self-supplied their energy requirements. By the end of December, the load obligation loss was 689 MW (32 percent). The energy related to customer migration was 189 GWh in January and 228 GWh in December. For the 2010 calendar year, capacity associated with energy migration totaled 8,621 MW-months (31 percent) and energy associated with customer migration totaled 2,528 GWh (30 percent). Customer migration hovered between 700 MW and 800 MW on a monthly basis due to the relatively stable and low energy prices in the market. Accion Group notes that in its 2010 Energy Service filings, including the update, PSNH used the current level of migration existing at that time. This assumption turned out to be reasonable with stable and low market prices.

[1] In New England, generating units have winter and summer capability ratings. The summer ratings are generally lower to reflect higher ambient and cooling water temperatures.
[2] These figures do not include Lempster Wind or unit contingent contracts.
[3] These figures do not include any capability from the Bethlehem, Tamworth, or the Lempster Wind power purchase agreements.
[4] The units that are owned by PSNH, along with capacity under firm contract are, collectively, referred to as "PSNH Generation" in this Exhibit.
[5] In July 2010, the ISO-NE revised its capacity requirements so that only the capacity needed for reliability would be supported.

Allocation of Wholesale Marketing Department FTEs

	2005		2006		2007		2008		2009[2]		2010	
Bidding & Scheduling	2.00	1.75	2.00	1.75	2.00	1.75	**2005**	1.75	2.00	1.99	2.00	2.00
Resource Planning/Analysis	4.00	2.00	4.00	2.00	4.00	2.00	4.00	2.00	4.00	1.45	4.00	2.46
Energy & Capacity Purchasing	1.00	0.50	1.00	0.50	1.00	0.50	2.00	0.50	2.00	0.74	2.00	0.71
Standard Offer & Default Service Procurement	2.00	0.00	2.00	0.00	2.00	0.00	3.00	0.00	2.00	0.00	3.00	0.00
Contract Administration	3.00	0.00	3.00	0.00	3.00	0.00	3.00	0.00	3.00	0.00	3.00	0.00
Administrative Support	1.00	0.25	1.00	0.25	1.00	0.25	1.00	0.25	1.00	0.33	1.00	0.28
Management	1.00	0.25	1.00	0.25	1.00	0.25	1.00	0.25	1.00	0.11	1.00	0.13
Total	**14.00**	**4.75[1]**	**14.00**	**4.75**	**14.00**	**4.75**	**16.00**	**4.75**	**16.00**	**4.62**	**16.00**	**5.59**

1- In 2004, PSNH was allocated 5.75 FTEs.

2- In 2009, FTE allocation by function was by time sheet allocation.

PSNH Management of Procurements

PSNH's energy procurement is managed and coordinated by Northeast Utilities Service Company (NUSCO). During 2010 NUSCO had the equivalent of sixteen full time employees (FTEs) in the Wholesale Marketing Department, which remained the same as 2008 and 2009. In 2008, 4.75 FTEs were allocated to PSNH by estimation, and in 2009 4.62 FTEs were allocated to PSNH based on time sheet reporting. In 2010, 5.59 FTEs were allocated to PSNH, representing an increase of approximately one FTE due to the transitioning of a new manager.[6] PSNH stated that it expects the FTE allocation to PSNH to be more representative of historic values in the future (i.e., pre-2010) because the duplicative manpower required during the transition of the new manager in 2010 will not be required. The remaining FTEs were allocated to two other NU subsidiaries which do not have load-serving responsibilities.

[6] A new manager was brought into this area in late 2009 due to the then current manager accepting another position within the NU organization.

From an organizational viewpoint, the New Hampshire position reports to a Connecticut manager. The new manager is spending considerable time in the field at PSNH and, according to PSNH, the field time spent was comparable to historic levels.

PSNH's Reliance on Supplemental Supplies

To meet its load responsibility, PSNH requires supplemental on-peak and off-peak (defined by ISO-NE as weekends, holidays, and weekday hours from one to seven and hour twenty-four) energy purchases that change hourly. In 2010 and during on-peak periods, purchases varied from 0 MW during low load months to 650 MW in high load months. During off-peak periods, purchases varied from 0 MW to 450 MW in the overnight hours and from 0 MW to 650 MW during weekend days. The reason for such high purchases in off-peak periods is that Newington Station (Newington) is not generally economic to dispatch and economic reserve shutdowns are occurring at PSNH base load plants. These purchases are 50 MW block bilateral purchases (described in the following paragraph) that best fit PSNH's supplemental needs. Accion Group considers these requirements to be "fixed," as their requirement is based on the assumed absence of specific contingencies occurring, but does include planned unit maintenance. PSNH stated that the unit capacity value used by PSNH includes a reduction in unit capacity factor reflecting estimated unpredictable forced outages and estimated reserve shutdowns between the planned maintenance periods. The supplemental energy and capacity requirements increase if any part of PSNH's generation portfolio is unavailable when needed to serve load, or if loads are higher than planned due to variations in the weather or customer migration. Likewise, these requirements are reduced when loads are less than planned due to variation in the weather or customer migration. Accion Group considers this portion of the energy supply to be "variable."

In general, PSNH supplemented its generation with monthly, weekly, and daily bilateral purchases to meet the "fixed" portion of its supplemental on-peak requirements and used the ISO-NE spot market combined with daily bi-lateral purchases to meet the "variable" portion of its supplemental requirements. The table below shows how PSNH on-peak and off-peak energy requirements were supplied both historically and in 2010 by its own resources and the bilateral and ISO-NE spot markets. Notably, in 2010 PSNH relied less on market energy due to load migration and the relatively constant value of PSNH generation available throughout the year. Actual weather and major unit outages that do not occur every year can also alter these percentages.

Percent Historic and 2010 Supply of PSNH Energy Requirements from PSNH and Market Sources*

	PSNH Owned Generation (Percent)		Bilateral and Spot Energy (Percent)	
	On-Peak	Off-Peak	On-Peak	Off-Peak
2004	83	90	17	10
2005	74	85	26	15
2006	67	80	33	20
2007	66	80	34	20
2008	56	71	44	29
2009	63	73	37	27
2010	74	82	27	18

*Totals may not equal 100% due to rounding.

The following table shows how PSNH units supplied PSNH energy requirements for 2010.

Percent of PSNH 2010 On-Peak and Off-Peak Energy Requirements Supplied by PSNH*

Source	On-Peak (Percent)	Off-Peak (Percent)
Merrimack & Schiller (Coal)	54	58
Hydro	5	7
Vermont Yankee	2	3
IPP's	8	11
Buyout Contracts	1	2
Newington & Wyman (Oil)	3	2
Combustion Turbines	0	0
Bilateral Purchases	22	7
ISO-NE Spot Purchases	5	11
Total	100	101

*Totals may not equal 100% due to rounding.

The following table depicts PSNH's historical and 2010 market purchases and their source by percent.

Historical PSNH Supplemental Purchases and Source*

	Sup. Purchases (GWh)	LT Bilateral (%)	ST Bilateral (%)	ISO-NE Spot (%)
On-Peak				
2004	900	52	22	26
2005	1,424	83	4	13
2006	1,815	85	10	5
2007	1,642	78	9	13
2008	2,046	81	7	12
2009	1,703	90	3	7
2010	1,011	81	5	14
Off-Peak				
2004	431	0	33	67
2005	847	79	3	18
2006	1,106	79	6	15
2007	945	73	5	22
2008	1,210	64	5	31
2009	1,139	85	2	13
2010	564	41	7	52

* Amounts may not total to 100% due to rounding.

Historic and 2010 PSNH Supply Approach

Historic Energy Supply

PSNH has altered its approach to supply procurement each year to deal with changing conditions. In the summer of 2005, PSNH continued to cover its position and purchased blocks of bilateral power for 2006 to bring stability to pricing and to limit potential under-recoveries in each month, rather than just the peak months and months of unit outages as was done for 2004. In June 2006, PSNH supplemented its bilateral purchased for July and August. In addition, PSNH did more hedging in 2006 for both on-peak and off-peak load periods to better reflect the forced outage rates of the coal units. In 2007, PSNH intended to establish a fixed annual energy service rate subject to minimal under or over recovery. PSNH established its monthly purchase targets in the first quarter of the prior year and made a series of purchases of bi-lateral energy through November to cover these targets. In addition, PSNH purchased short-term bilateral energy to cover forced outages and the high load periods. All other energy was either procured from its own units or from the spot market. In 2008, PSNH followed the same purchase pattern that it used in 2007. In 2009, PSNH kept its general procurement strategy and made much

longer term commitments for 2009 as early as 2007, thus locking in its supplemental energy supply.

PSNH 2010 Energy Supply Approach

In 2010, PSNH altered its procurement strategy from that used in 2009. PSNH used a much shorter term market focus when making its purchases rather than locking in supplemental supply far in advance. In 2010, PSNH did not make any long-term purchases in advance of delivery except for the three annual 2010 energy purchases made in 2008, and the Bethlehem and Tamworth unit contingent contracts. PSNH energy resold into the market in 2010 was significantly reduced when compared with 2009.

Under the Forward Capacity Market (FCM) rules, PSNH was billed at the transition capacity rate of $4.10 per kW-month through May 2010, and $4.50 per KW-month from June through December 2010, for its 4.39 to 4.61 monthly percent share of the 32,727 MW to 39,720 MW of qualified unforced monthly capacity in ISO-NE or 1,437 MW to 1,780 MW per month, less the value of its own resources. The FCM price for the months of June through December of 2010 was reduced so that only ISO-NE required capacity was supported on a pro-rata basis. The ISO-NE transition rates as adjusted produced a bill for $77.2 million for capacity and PSNH unit capacity produced a $64.4 million credit, leaving PSNH with a net $12.8 million capacity cost for 2010. This was a reduction of $15.7 million from 2009.

PSNH conducts biweekly phone calls that include generating station, fuels, operations, and bidding/scheduling personnel. Plant personnel keep capacity/energy planning informed of impending developments at the plants. PSNH views Newington as the major unit on its system interacting with the market, as all other owned units are either hydro, coal, wood, or long-term resources which are almost always economic or must take contracts[7], or peaking units rarely expected to run. PSNH's net monthly on-peak energy requirements were 57 to 106 GWh of bilateral purchases and 0 to 34 GWh of spot market purchases. PSNH's monthly off-peak net energy requirements were 11 to 61 GWh of bilateral purchases and 4 to 56 GWh of spot market purchases. PSNH determines its incremental energy needs from the market based on the actual weather that occurred, rather than the forecasted average weather in the energy forecast and actual unit operation.

PSNH made purchases based on a monthly analysis. In those analyses, PSNH modeled hourly forecasts by month, including a hydro schedule, hourly load forecast, IPP forecast, and its own resources. PSNH modeled its own resources as follows. Combustion turbines and Wyman #4 were excluded because they have extremely low capacity factors, and the market price tends to mimic their cost when they do run. Coal units have planned outages specifically modeled and are derated to their annual forced outage rate for the periods in which they run. PSNH's modeling will reduce the unit forced outage rate if the unit is projected to be in reserve shut

[7] Although forecasted to be fully economic in 2010 at the time energy rates were set, all PSNH base-load units except Schiller-5 were placed on economic reserve shutdown for many hours in 2010.

down, but continues to apply historical forced outage rates to remaining generation. PSNH also discretely models the short planned reliability outages for each unit. Newington costs were modeled as the projected market cost of oil corrected for SO_X and NO_X calculations and at a full load dispatch rate. If the cost of Newington was lower than the blocks of power to be purchased, Newington was run as loaded for that block. The remainder of the energy requirements was assumed to be supplied by the spot market as recognition of the risk that PSNH may be wrong in making additional purchases.

PSNH purchased 865 GWh of on-peak bilateral energy for $72.7 million and 271 GWh of off-peak bilateral energy in 2010 for $13.1 million. In 2010, PSNH also spot-purchased 146 GWh of on-peak energy for $8.7 million, and 294 GWh of off-peak energy for $14.0 million. Energy purchases totaled $108.5 million.

PSNH made two types of spot sales into the ISO-NE spot market. It sold 79 GWh of on-peak energy for $6.3 million and 180 GWh of off-peak energy from surplus generation from owned units for $7.4 million with total sales resulting in a net loss of $3.3 million.

PSNH also sold unneeded bilateral and spot energy on the spot market because loads failed to materialize as expected, or when expected. PSNH resold 199 GWh of on-peak bilateral energy and 72 GWh of off-peak bilateral energy. These sales resulted in a loss on on-peak energy resale of $7.3 million and a loss on the sale of off-peak energy resale of $1.0 million, for a total net loss of $8.3 million.

Purchases are made in advance of expected energy needs. If loads are lower than expected, surplus energy may result on the system requiring its sale into the market. The market surplus energy is most often sold into is the spot market, or other short term markets. Very often when there is surplus energy available, the short term market prices are low because similar factors such as cool weather, etc. hits all market participants at the same time. Sales into the market very often result in unavoidable losses on the transaction.

Total PSNH on-peak sales activity of 278 GWh resulted in revenue of $16.5 million, and total PSNH off-peak sales activity of 252 GWh resulted in revenue of $10.2 million. Total PSNH energy purchases cost $108.5 million and total PSNH energy sales amounted to $26.7 million, resulting in a net cost of energy purchases of $81.8 million.

PSNH based the 2010 projected unit capacity factors by explicitly modeling planned annual maintenance and consultation with plant personnel. Short term planned reliability outages were also discretely modeled and are not included in the overall annualized forced outage factor between outages. The capacity factor table shows that PSNH base load units performed near or better than forecasted, except where reserve shutdowns became a factor due to the reduced price of energy in the ISO-NE market. PSNH modeled Merrimack and Schiller units as base load. PSNH personnel reported that their projections produced no reserve shutdowns for these units at

the time energy service rates were set. PSNH personnel also stated that in 2010, load forecasts and supplemental purchase needs were evaluated at the time of the December 2009 and July 2010 updates[8].

PSNH also modified the manner in which it conducts energy transactions during 2010 as it agreed to do in the Settlement Agreement of Docket No. DE 10-121. In that agreement there were six recommendations in Section III.B. Those items will be generally discussed here with a more detailed description provided in Exhibit MDC-9, which deals with the progress made in the satisfactory completion of items stipulated to in 2009 and 2010. See 2020 Settlement Agreement, Section III.B, items 1-6 as follows:

1. While market prices are depressed, Accion Group recommended that PSNH should focus more on shorter term arrangements and spot market prices during the two non-peak quarters. As noted above, PSNH made no additional long-term purchases in advance of delivery, except for the three annual 2010 energy purchases contracted for in 2008 and the Bethlehem and Tamworth unit contingent contracts.

2. To provide some hedge against market fluctuations during the two peak-period quarters and to reduce the possibility of large quantities of excess power, Accion Group recommended that PSNH should establish a percentage of its on-peak monthly needs that will be secured from supplemental sources with an established point of measurement, such as an approved load forecast. PSNH has developed an internal policy with executive approval that establishes a maximum daily percentage of supplemental peak energy which can be purchased in the spot market on a going forward basis. This policy applies to all days in the year. The wholesale power guidance document (see Exhibit MDC-9) also outlines percentage and MW boundaries for purchases and sales.

3. The Accion Group recommended that PSNH have a clearly defined basis for making short-term purchases or sales that fall outside projected needs. By establishing the policy described in item 2, above, which limits the peak supplemental energy that can be purchased from the ISO-NE spot market, PSNH also established the clear basis for purchases and sales in this recommendation. In 2010, and under this directive, PSNH made four longer term (much less than a year) purchases and one longer term sale.

4. The Accion Group recommended that PSNH review its supplemental needs each quarter as the new load forecast is produced. Because load forecasts are a lagging economic indicator, purchase amounts may not track with actual load experienced. Due to the timing of the approved stipulation and the rate setting process, quarterly analysis was not performed for the 2011 ES Rate. In 2011, PSNH will review its needs on a quarterly basis with the commencement of the development of the 2012 ES Rate. In addition, PSNH has set percentages of load that must be hedged. These values are supervised by absolute MW values.

[8] During a technical conference, PSNH indicated that it is now updating its load forecast on a quarterly basis.

5. The Accion Group recommended that PSNH explicitly and formally factor reserve shutdowns into its projection of operation of its units in determining supplemental energy needs, or confirm that it explicitly and formally does so. PSNH stated that it always factored economic reserve shutdowns into its short term purchases much like the unit being on forced outage. In 2011, PSNH will factor projected reserve shutdowns into the setting of the ES rate in accordance with Section I, C-1 of the PSNH 2010 Least Cost Plan and the wholesale power supplemental energy guidance document.
6. The Accion Group recommended that PSNH establish formal criteria governing the sales of purchased surplus supplemental energy into the spot market and that it analyze its purchases and make sales of surplus energy and capacity into markets other than the spot market as it deems appropriate. By establishing the policy described in item 2 above that limits the peak supplemental energy that can be purchased from the ISO-NE spot market, and setting percentages of load that must be hedged supervised by absolute MW values, PSNH also established the clear basis for sales of surplus purchased power.

Historic Capacity

In 2005, PSNH purchased 500 MW of its 2006 capacity requirement through an annual contract. The capacity market was scheduled to switch to the new FCM in October 2006; however, the switchover did not take place until December 2006. Uncertainty regarding the start date of the new FCM rules precluded further capacity contracts after June 1, 2006. When the FCM transition period rules took effect in December 2006, each load-serving entity was responsible for meeting its percentage of the total ISO-NE qualified capacity resources. ISO-NE qualified capacity resources are reduced by their individual forced outage rates. The seasonal capability of PSNH units is also discounted for their forced outage rate to meet its percentage of the ISO-NE supply obligation. The FCM took effect in December 2006 and was in full effect for 2007 and beyond, until 2010.

2010 PSNH Capacity Supply

Through May 2010, ISO-NE was in a surplus capacity situation. The FCM transition price of $4.10/kW-month was the clearing price. In June 2010, the FCM floor price was $4.50/kW-month which also became the clearing price. The $4.50/kW-month clearing price was adjusted downward so that only needed capacity is supported.

PSNH Generation Interaction with the 2010 Energy Market

Where much of PSNH generation is either base load or peaking generation and generally lower priced and more expensively priced than the market respectively, it is not expected that they will

have significant interaction with the market. This relationship changed in 2009 and 2010. Prices in the ISO-NE market fell to levels not previously experienced. PSNH base load units at Merrimack and Schiller Stations, except for Schiller-5, were placed into economic reserve status[9].

The remaining unit, Newington, is the unit most likely to interact with the market because of its dual-fuel capability and its resultant cost. The following paragraphs estimate the range of Newington's cost and the market prices produced for the price range of oil and gas by quarter. Our estimates below assume a 10,000 BTU/kWh heat rate which is approximately the full load heat rate of Newington. In this manner, we can approximate how the Newington unit might interact with the market.

In the first quarter of 2010, there was normal weather-related price volatility in the marketplace. Gas varied in price from $4 to $14 per MMBTU, or 4 cents to 14 cents per kWh. Number 6 oil remained high but stable at approximately $11 to $12 per MMBTU or 11 to 12 cents per kWh. These fuel prices produced an on-peak bilateral energy market in New England that varied from 4 to 10 cents per kWh during the same time period.

Stability returned to the market in the second quarter of 2010. During that period, gas remained at approximately $4 to $5 per MMBTU, or 4 to 5 cents per kWh and #6 oil remained at $11 to $12 per MMBTU, or 11 cents to 12 cents per kWh. These fuel prices produced an on-peak bilateral energy market in New England of approximately 4 to 7 cents per kWh during the same time period.

In the third quarter of 2010, there was little fuel price volatility, but the price volatility for energy in the market increased markedly. Gas ranged from $4 to $5 per MMBTU, or 4 cents to 5 cents per kWh and #6 oil remained in the $11 to $12 per MMBTU range, or 11 cents to 12 cents per kWh. These fuel prices produced an on-peak bilateral energy market in New England that generally ranged from 4 cents to 12 cents per kWh during the same time period.

In the fourth quarter of 2010, gas prices rose from $4 to $15 per MMBTU, or 4 cents to 15 cents per kWh and #6 oil remained at the $11 to $12 per MMBTU, or 11 to 12 cents per kWh. These fuel prices produced an on-peak bilateral energy market in New England that generally varied from 4 cents to 12 cents per kWh.

The above data is summarized in the following table.

[9] Accion is aware that economic reserve shutdowns of PSNH base loaded units are challenging this assumption, but Accion believes it does not impact the illustrative purpose here.

Newington Energy Price versus New England On-Peak Bilateral Market (Cents/kWh)[1]

	2010 – Q1	2010 – Q2	2010 – Q3	2010 – Q4
Newington on Gas	4 - 14	4 - 5	4 - 5	4 - 15
Newington on Oil	11 - 12	11 - 12	11 - 12	11 - 12
NE On-Peak Bilateral Market	4 - 10	4 - 7	4 - 12	4 - 12

1- Fuel per MMBTU converted at Newington full load heat rate of approximately 10,000 BTU/kWh.

In 2010, loads generally were as forecasted by PSNH, and PSNH continued to rely on the market for a significant portion of its energy requirements (including system planned maintenance outages), even though over 30 percent of monthly energy requirements of large customers met their needs from the market or self-supply, resulting in reduced supplemental purchase requirements. Although market prices were high during the beginning and end of the year, market prices were low between these periods. With low market energy prices, PSNH continued to be very susceptible to both low market price in relation to the cost of its base load units, and to fluctuations in the supplemental purchase volume created by changing economic conditions and the degree to which customers migrate to and from competitive supply options. Market prices edged lower in 2010; however, customer migration appeared steady indicating that those customers who could migrate have done so and that little, if any, customers returned to PSNH for energy service.

Financial transmission Rights

PSNH uses Financial Transmission Rights (FTRs) in all hours where it expects its units to run to protect against congestion pricing in the market. In essence, FTRs trade a potentially high and variable congestion price for a known price. These rights are limited by actual system capability, function much like a hedge, and bring certainty to the price of generation with regard to congestion. FTRs are purchased between the major PSNH generation sources (Vermont Yankee, Merrimack, Newington, Schiller, and the MA Hub) for the months they are expected to run or in which purchases are made from the market (collectively these are known as the source locations) and the New Hampshire load zone (referred to as the sink location). In 2010, PSNH purchased 3,143 MW-months of on-peak FTRs and 2,378 MW-months of off-peak FTRs. PSNH factored in known outages and expected load into their decision process. No FTR purchases were made for Newington in 2010. The table below shows PSNH's historical and 2010 FTR purchases, their value regarding avoided congestion costs, and their cost to PSNH customers.

PSNH Historical and 2010 FTR Costs and Savings

Year	Auction Cost (Thousands)	Avoided Congestion Costs (Thousands)	Net Cost (Thousands)
2003	414	488	(74)
2004	1,341	1,417	(76)
2005	777	896	(119)
2006	301	133	168
2007	973	1,133	(160)
2008	827	237	590
2009	10	122	(112)
2010	31	400	369

Historical and Actual Unit Performance

The historical performance of PSNH units is considered when determining when to procure supply from supplemental sources. Heat rates are also a useful tool in tracking the how efficiently a unit converts fuel to electrical energy. The table below depicts PSNH's historical average heat rates, and average heart rates for 2010 for its major units and the units' current full load heat rates.

PSNH Major Unit Historical and 2010 Unit Heat Rates [10]

Unit	Average Annual Heat Rate (BTU/kWh)						Full Load Heat Rate (BTU/kWh)
	2005	2006	2007	2008	2009	2010	2010
Merrimack-1	10,184	10,376	10,264	9,933	10,211	10,221	9,900
Merrimack-2	10,071	10,328	10,157	9,723	9,919	9,663	9,520
Newington	11,522	12,270	11,723	11,690	12,382	13,517	10,900
Schiller-4	12,558	12,832	13,405	12,244	13,019	13,073	12,900
Schiller-5	12,871	9,398(1)	15,565	16,689	17,122	17,131	15,800
Schiller-6	12,379	12,460	12,528	12,072	12,644	12,588	12,300

The above table shows a decline in the efficiency of Newington. The ISO-NE frequently starts, stops, or runs Newington at reduced load. This mode of operation negatively impacts unit efficiency.

[10] Coal to wood conversion took place in 2006.

Historic and 2010 Unit Capacity Factors

The table below shows the historical capacity factors and the projected capacity factors used for the 2009/2010 period.[11]

Historic Actual, 2010, and Projected Annual Capacity Factors for PSNH Major Units
(Annual Generation/Winter Rating/8760)

Unit	Actual Capacity Factor (Percent)										Forecasted
	2001	2002 [1]	2003 [2]	2004	2005	2006	2007	2008	2009	2010[7]	2010
Merrimack-1	81.6	74.7	93.3 [3]	86.8	90.6 [3]	80.6	95.7[3]	79.8	84.1 [3]	67.2[6]	79.6
Merrimack-2	72.7	75.7	73.9	80.3	79.1	84.1	82.9	72.8	56.1	67.5[6]	75.5
Schiller-4	66.5	65.4	73.9	73.7	76.5	71.1	84.2	78.5	59.5[6]	53.4[6]	68.8
Schiller-5	59.3	68.2	73.5	74.0 [4]	72.4 [4]	42.0[5]	76.7	79.8	79.6	79.0	75.1
Schiller-6	62.8	71.6	75.1	76.6	81.4	77.6	74.6	80.7	56.9[6]	51.0[6]	78.7
Newington	12.6	19.0	55.9	50.3	33.5	8.0	9.3	3.3	5.2	6.4	3.0

1- Seabrook removed from PSNH mix for November and December due to sale.
2- First full year Seabrook is not in PSNH mix.
3- No unit overhaul in this year.
4- Very minor outage this year due to wood conversion.
5- Coal to wood boiler conversion project.
6- Actuals reflect reserve shut down periods.
7- In 2010, economic reserve shutdowns reduced MK-1's capacity factor by 9.4%, MK-2's by 9.6%, SCH-4's by 10.8%, and SCH-6's by 20.2%.

Historical and 2010 Availabilities

Another important measure of the operation of a unit is the availability[12] of that unit to serve load. For base load units, the availability is a good proxy to answer the question "Was the unit generating energy economically for customers?" In a market environment, the availability figure degrades in usefulness as the capacity factor of the unit decreases. For example, a combustion turbine may have an availability of 100 percent, but may never operate for appreciable times during the year. Accion Group believes that a more useful measurement of unit and management performance in a market environment is to look at the highest market priced days during the year. The table below depicts unit and fleet historical availabilities during the thirty highest cost market days during the year.

[11] Calendar 2010 is in this period.
[12] Normally, availability figures do not show if a unit was at reduced capability while it was available. The industry uses the availability^{-1} metric for that purpose.

PSNH Major Unit Historical Availability on the 30 Highest Priced Days

Unit	Availability (Percent)						
	2004	2005	2006	2007	2008	2009	2010
MK-1	100.0	94.2	96.4	99.7	97.6	98.4	99.2
MK-2	96.7	91.6	98.6	99.9	99.8	100.0	90.7
NEW-1	99.4	99.0	97.1	99.7	99.2	99.0	95.2
SCH-4	87.4	79.5	94.8	99.9	99.9	92.6	97.4
SCH-5	100.0	88.1	99.2	94.4	99.4	83.8	80.5
SCH-6	98.2	94.0	97.8	99.9	97.3	100.0	98.6
FLEET	97.9	94.3	97.6	99.3	98.0	97.4	93.8

Load Migration

With regard to migration, The Accion Group concluded that it is difficult to do realistic forward looking market purchases when approximately 30 percent of the load to be served can come and go at will. This is due to customer response to pricing. Customers see higher costs when other customers migrate away from the system as the departing customers seek lower power costs. Any excess energy resulting from the outward migration is generally of little value when resold because the market price is low enough to have caused the migration. Likewise, customers remaining on the system also see higher costs when migration into the system occurs when migrating customers seek lower power costs. Any shortage of energy resulting from the inward migration is generally worth more when purchased, because the market price is higher and caused the migration. In addition, PSNH's lower cost generation is diluted over a larger MWH load. Because customers have such a flexible menu of choices regarding energy supply, customer migration can vary widely in both directions within the calendar year, making the forecast of supplemental energy needs difficult for PSNH. In 2010, energy prices were relatively stable and low throughout the year resulting in stable customer migration in the amount of approximately 30 percent of total customer load.

Price Volatility

Market price volatility would be expected to remain depressed in ISO-NE in the near term future, as loads remain depressed due to the slow recovery from depressed 2008 economic conditions. Also, it appears the lower demand for gas keeps downward pressure on the price of gas, except for the two quarters where peaks occur. This depressed demand can be expected to continue until load requirements and resources come more into balance, resulting in upward pressure on the price of gas. Accion Group also believes that the cost of gas in New England may remain depressed beyond the recovery of the current economic slowdown, due to the planned expansion of wind turbines and planned increased transmission capability from outside of ISO-NE into

New England. This development in new generation and expanded transmission can be expected to mainly replace gas-fired generation, because gas is on the margin much of the time in New England.

Accion Group does not see loads and generation coming into balance in the near future and expects gas prices to remain low and to remain on the margin. For these reasons Accion Group recommends that PSNH continue to focus on the shorter term energy market when procuring supplemental energy.

Evaluation

The Accion Group reviewed the capacity/energy planning testimony filed by PSNH, conducted an on-site interview with knowledgeable personnel responsible for the capacity/energy planning function at PSNH, submitted follow-up data requests, and reviewed detailed backup information of the summary results supplied by PSNH.

Accion Group concluded that the PSNH filing is an accurate representation of the process that took place in 2010. Accion Group believes that PSNH made sound management decisions with regard to capacity and energy purchases and sales in its market environment, and PSNH actions were consistent with its least cost plan as modified on March 28, 2008. Accion Group also concluded that the capacity factor projections used by PSNH in its purchase projections were reasonable at the time they were made.

Recommendation

Accion Group believes that average energy prices will remain low in the near future due to planned transmission interconnections both within ISO-NE and to other power markets, the addition of wind and other renewable projects as part of regional initiatives, prolonged economic downturn over what was forecasted in the last year, and an abundant supply of gas. ISO-NE uses gas on the margin across the majority of its load spectrum. Accion Group recommends that PSNH maintain its focus on the short term in its near term market analysis. Accion Group does caution that the lagging economic indicators that led to over purchase decisions in the decelerating economy, will lead to under purchase decisions in an accelerating economy. PSNH should be alert for such changes.

Merrimack Outages For 2010

Merrimack-1

The following outages occurred at Merrimack-1 during 2010. This unit is on a two-year overhaul schedule and had a scheduled overhaul in 2010. The major projects for this unit in 2010 were the replacement of the vertical reheat superheater pendants, replacement of the penthouse roof tubes, generator inspection, installation of electrical equipment allowing the Clean Air Project[1] to take station service from either unit, and replacement of the remaining 480V load center to satisfy changed OSHA flashover requirements.

A - (Outage Report OR-2010-03)
2/19 – 2.4 days
The unit had run for 79 days. PSNH scheduled this outage to perform maintenance activities. The outage was conducted over a weekend because of favorable economic conditions, and the unit returned to service Monday morning.

B
4/13 – 36.6 days
This outage was scheduled for 36.8 days. PSNH obtained an ISO-NE outage window of 40.7 days for the outage. The unit returned to service three hours earlier than the scheduled completion date. The outage critical path was and remained the replacement of the vertical reheat superheater pendants (VRSH) until Outage Day 36.

In the early days of the outage, minor gains in boiler inspection, vacuuming of the penthouse, and VRSH pendent removal resulted in an eighteen-hour gain in schedule. In outage Days 14 through 25, gains and losses due to the installation of the VRSH pendants and roof tube installation resulted in a net forty-five-hour gain to schedule. Ten hours of the schedule were lost at Outage Day 30 due to installation and welding of roof support angles and penthouse roof tube filler stubs necessitated by sagging of the roof tubes.

The unit outage proceeded approximately on schedule until unit start-up. On Outage Day 36, water was observed coming from the slag tank fill box in an area that was not visible for inspection. Weld repairs were required; however a twenty-four-hour loss in schedule resulted. The slag tank is routinely inspected when the unit is in operation and is not pressurized. PSNH believes that the leak most likely developed in the cool down cycle and is an isolated event.

[1] The installation of a scrubber at Merrimack Station for Unit 1 and Unit 2.

On Outage Day 37, a steam leak from the right side throttle valve leak off flange line was observed and required repair. An additional twenty hours of schedule were required to facilitate this repair.

The unit was released for service to the ISO-NE three hours earlier than scheduled.

C
5/28 – 1.1 days
Two days after starting up from the annual overhaul (Outage B, above), the economizer inlet valve developed a small steam leak. The leak became progressively larger, but PSNH was able to run the unit until the weekend. It was suspected that a small imperfection in the machining of the valve during the overhaul damaged the seal ring. The vendor paid for all labor and material to repair the valve over the weekend and the unit was available for Monday morning service.

D - (Outage Report OR-2010-05)
6/28 – 2.5 days
The unit was taken out of service due to excessive water usage. Three waterwall tube leaks were found and repaired. PSNH also performed an air heater wash during this outage. When the work was completed, the unit returned to service.

E – (Outage Report OR-2010-09)
9/28 – 3.4 days
The unit was taken out of service to perform an air heater wash. During the boiler inspection a small barrel tube leak was found in the 1B cyclone.

F - (Outage Report OR-2010-10)
10/2 – 4.5 days
The unit was taken out of service due to the failure of a secondary superheater inlet tube. The secondary superheater inlet tube bank was replaced in 2008. Inspection of the tube blowout indicated that overheating of the tube may have taken place. Overheating of a tube takes place when an obstruction impedes the flow of water through the tube, bad flow, or a thin wall. PSNH boroscoped the tube and found no signs of obstruction. Non-destructive examination (NDE) was also performed with no determination of cause. PSNH concluded that this was an isolated event with an unknown cause. Repairs were made and the unit returned to service.

PSNH determined that this tube may have failed due to overheat conditions from laboratory analysis.

G
11/8 – 0.2 days
When returning to service from Outage F, above, the unit did not start because it went into economic reserve. When starting the unit, only one of the three cyclones (B) is used. When load is picked up, fuel is switched to cyclones A and C. When requested to start on this date, the starting cyclone lost fuel and tripped the unit due to coal thin out. Coal thin out occurs when coal does not freely flow in the feed pipe and starves the cyclone. PSNH suspects this outage was caused by coal bridged in the feed pipe which sat for a month while the unit was in economic reserve shutdown. The unit was restarted without incident.

Merrimack-2

The following outages occurred at Merrimack-2 during 2010. The major projects at this unit in 2010 were the installation of electrical equipment allowing the Clean Air Project to take station service from either unit, refurbishment of the turbine throttle valves, replacement of the secondary superheater floor tubes and voltage regulator, and replacement of the 480V load centers to satisfy changed OSHA flashover requirements.

A - (Outage Report OR-2010-01)
1/1 – 3.5 days
The unit was removed from service due to excessive water usage. Upon inspection, PSNH found three small leaks in the cyclones, a leak in the front wall of the boiler, and a leak in the sidewall of the boiler. The sidewall leak was destructive, damaged four adjacent tubes, and most likely was the cause of the excessive water usage. Repairs were made and the unit returned to service.

B - (Outage Report OR-2010-02)
1/29 – 4.3 days
The unit was removed from service due to excessive water usage. Upon inspection, PSNH found six small leaks in the cyclones and a major leak in the primary superheater. Repairs were made and the unit returned to service.

C
2/3 – 0.7 days
Upon startup from Outage B above, a leak occurred in the first point heater-to-condenser pipe drain line. PSNH made a decision to make temporary repairs at this time and

permanent repairs at a later time. Temporary repairs were made and the unit returned to service.

D
3/14 – 0.1 days
The unit tripped when the operator was raising VAR output of the unit. PSNH investigation found that the Volt/Hertz relay had initiated the trip. PSNH made the decision to bring the unit back on line but to keep generator voltage below the point at which the trip occurred. The unit restarted without incident.

The next day, the Volt/Hertz relay was checked and found to be out of calibration on the low side. Eaton Electric had calibrated the relay during the 2009 annual overhaul. PSNH checked the relay one week after this outage and the relay was found to be in calibration. The relay was checked again during the annual overhaul (Outage H, below) and found to be out of calibration on the high side.

PSNH recently installed a voltage regulator on this unit and the voltage regulator afforded the same protection as the subject relay. Upon review, PSNH found that replacement of the Volt/Hertz relay could satisfy some of its transmission protection requirements and therefore, plans to replace the Volt/Hertz relay in 2011.

E - (Outage Report OR-2010-04)
5/20 – 4.1 days
The unit was taken off line due to excessive water usage. The boiler inspection identified a sidewall tube leak, a primary superheater leak, and fourteen cyclone leaks with eight being caused by one major leak in cyclone E. The primary cause of the outage was the accumulation of boiler leaks with the majority being in cyclone E. Repairs were made and the unit returned to service.

F
7/10 – 0.4 days
PSNH removed the unit from service when it could not get the governor to open at 100% due to insufficient turbine hydraulic control system oil pressure. The unit was removed from service on Saturday due to system economics and Siemens found one restricted orifice in the turbine governor hydraulic system. The orifice was cleaned and the unit returned to service. When the unit returned to service, the governor would open 100% but hydraulic oil pressure remained below desired levels.

Upon evaluation and discussion with Siemens, PSNH decided to replace the fixed orifice (just cleaned) with an adjustable orifice under the control of the unit operator. That replacement took place during Outage G, below.

G – (Outage Report OR-2010-07)
8/10 – 2.7 days
PSNH took a planned outage because water usage was increasing. A single cyclone leak developed, causing leaks in five adjacent tubes. The tube leaks were repaired and the unit returned to service.

During this outage, PSNH also installed a variable governor hydraulic oil orifice valve so that the operator can maintain proper hydraulic oil pressure in the governor oil control system. (see Outage F, above)

Subsequent to the outage, PSNH has also initiated a compressive evaluation of the integrity and serviceability of the seven cyclones at the unit in order to determine an optimum maintenance schedule for the equipment.

H
9/21 – 30.0 days
The annual outage was scheduled for 29.5 days to unit phase time. The ISO-NE outage window was for 33.7 days. Major work accomplished during this outage included the installation of electrical equipment allowing the Clean Air Project to take station service from either unit, refurbishment of the turbine throttle valves, replacement of the secondary superheater floor tubes, voltage regulator, and replacement of the 480V load centers to satisfy changed OSHA flashover requirements. The outage proceeded well during the early days of the outage with gains of approximately 2.5 days at Outage Day 9 with the secondary superheater floor tube bank replacement on critical path. Cyclone refractory work and refurbishment of the turbine throttle valves were also very close to critical path.

On Outage Day 17, and after extensive discussions with New Age Fastener (contractor responsible for cyclone stud installation) that began with day 9, PSNH concluded that New Age Fastener could not meet an earlier start date of its work scope to capture schedule gains because of other personnel and specialized equipment commitments. New Age did send as many workmen as possible to begin work early, and additionally, New Age was on site with a full crew complement and equipment by its contract date. Twenty-one hours of schedule were lost and the cyclone work became critical path.

On Outage day 23, the throttle valves refurbishment project became critical path when Siemens recommended additional machining be performed, which was not in the original work scope. In addition, three left side throttle valve studs had to be cut off because they could not be extracted and additional time was required to extract the cut off studs. Total schedule lost was twenty-seven hours. The throttle valve project remained on critical path for the remainder of the outage (left side). An additional twenty-five hours of schedule were lost at the back end of the outage because of the removal and refurbishment of three left side studs, removal of machining debris from inside the left side throttle valve, and in addition, the left side bonnet and valve reassembly took longer than expected. The unit phase time was eighteen hours behind schedule at the end of the outage.

I
10/25 – 0.2 days
PSNH had delayed startup of the unit from the annual overhaul (Outage H, above) to reduce costs because it was placed into economic reserve at the time it returned to service. This self-scheduled run was taken to prove the integrity of the unit after its annual overhaul. The start-up boiler feed pump breaker would not close when requested to do so. PSNH's investigation found that the breaker interlock arm was bent in the rear of the breaker. PSNH suspects that the damage occurred during racking of the breaker with the tight tolerances required to do so. PSNH investigation found that the interlock adjustment arm tolerance was on the high side as set by the manufacturer. Repairs to the breaker were made, along with adjustments to the interlock arm, and the unit returned to service. In addition, PSNH discussed this issue with station personnel who maintain these breakers.

Evaluation Except for Outage MK-1 G.

Accion Group reviewed the outages above and found them either to be reasonable and not unexpected for these units and their vintage, or necessary for proper operation of the unit. Accion Group concluded that PSNH conducted proper management oversight during these outages.

Evaluation of Outage MK-1 G

This outage occurred after the unit returned from its annual overhaul and went into a lengthy period of economic reserve shutdown due to the low market energy prices that placed PSNH base load units into that status. Economic reserve shutdowns have not been historically encountered by these units. Although the instant issue was related to coal blockage from staying idle for a long period of time, Accion Group recommends that PSNH review unit startup procedures for all its major units (Merrimack, Schiller, and Newington) to determine if

alterations need to be made to start-up procedures when coming on line after longer than historical downtimes.

Newington Outages For 2010

Newington-1

The major project for Newington Station in 2010 was the continued reassessment of the unit's operational, capital, and maintenance efforts to make the unit more economic and attractive to the market. No major capital projects occurred in 2010, as much of the unit's required capital projects were completed in prior years. Newington's overall availability was about 97 percent and in excess of 99 percent excluding planned maintenance. For 2010, Newington's capacity factor was approximately 7 percent. Historically, Newington's heat rate has been between 11,500 Btu/kWh and 12,300 Btu/kWh. In 2010, the unit heat rate was approximately 13,500 Btu/kWh. Newington's full load heat rate is approximately 10,800 Btu/kWh. The increase in heat rate is due to the manner in which the unit is operated. Unit operation has changed because PSNH now starts the unit on a regular basis in order to ensure that the unit is ready to run if called upon; the unit runs for short periods when call upon for economic operation; and the ISO-NE has called for operation as spinning reserve more frequently. The additional start-ups translate to a higher heat rate for the unit.

The following outages took place at Newington during 2010:

A
6/2 – 0.0 days
Since late 2009, the plant has been attempting to convert the start-up process to an all gas process. In addition to reducing start-up times, costs are also significantly reduced especially where Newington starts every two weeks to ensure it is in a market-ready condition when called to operate by ISO-NE. Newington is in a potential start-up dispatch almost daily during warm weather. An all gas start-up is expected to save approximately $5 thousand per start when the unit is in a hot stand-by condition and $40 thousand per start when it is in a cold start-up condition.

The unit was called to operate by the ISO-NE. Gas was introduced into the first burner of the first burner pair to light (done in opposite corners) with a valve opening of 15%. The first burner ignited and the second burner is programmed to ignite automatically 15 seconds later. The operator opened the gas valve to 30% to accommodate the firing of the second burner. When the second burner fired, a furnace pressure excursion occurred and low furnace pressure caused the induced draft and forced draft fans to trip, resulting in the trip of the unit. PSNH found that the initial pressure surge was positive, however, the induced draft fan control overcompensated for the pressure surge, resulting in negative boiler pressure and a low drum level, which tripped the unit.

Subsequent analysis by PSNH found that the 30% gas valve opening for ignition of the second burner (used in oil start-up mode) was too high. Reducing the gas valve setting to 25% has resulted in a much smoother start.

B
6/29 – 1.3 days
PSNH performed a routine clearing of debris out of the condenser box prior to scheduled tests the next day. When the condenser box was isolated and the hotwell was opened on the inlet end, chloride levels spiked indicating that there was salt water intrusion in the condenser. Such leaks happen at this time due to pressure changes and temperature changes when one-half of the water box is taken out of service. Although nothing definitive was found, PSNH plugged four suspected condenser tubes (out of 12,600 tubes) as a precautionary measure and the leak stopped. The condenser was not cleaned at this time.

The unit tests were completed the next day and the unit was then taken down to clean the condenser. Chloride levels again spiked. PSNH decided to take an outage and drained the boiler to flush out contamination and search for the leak. PSNH found a cracked rubber plug in one of the previously plugged condenser tubes. The plug was replaced and the leak stopped. The system was flushed and the unit returned to service. PSNH did not believe that the cracked plug was the source of the leak and made plans to investigate this issue during the annual inspection (Outage G below).

C
8/5 – 0.0 days
The normal starting practice for the unit on oil is to use gas to bring the turbine up to 3,500 rpm with no load on the unit. Oil is used to bring the unit up to 3,600 rpm and to pick up minimum load when phased (20 MW). Three burners are in service, with two opposite burners on oil and a third burner on gas. After the generator breaker is closed, additional load is picked up on oil and then switched back to gas. When picking up additional speed from 3,500 rpm to 3,600 rpm, one of the oil burners tripped due to a no flame condition. When the oil burner tripped, it left two adjacent burners (in adjacent corners of the boiler) in service. Although the burner management system allows for two burners to operate the unit, they cannot be adjacent to each other. The unit tripped due to the adjacent burner condition.

PSNH found nothing to indicate why the oil burner tripped on a no flame condition. PSNH suspects that it was caused by an intermittent flame scanner issue. The unit was restarted without incident.

D
8/22 – 0.0 days
During this start-up sequence, one gas burner was left in service at minimum rate and two oil burners were in service, all on automatic control. The idea was to pick up load on gas and have the oil burners automatically reduce their firing rate . Also, time would be saved since PSNH would not have to go back and initiate the gas firing process from the beginning of the sequence. When the generator breaker was closed, the gas burner responded with increased fuel flow due to the steam surge, causing the boiler to have a high furnace pressure, which then caused the unit to trip due to overcompensation of the induced draft fan control.

Since this trip occurred, PSNH has modified the gas fired start-up procedure so that the gas burner remains in the manual mode at phasing until the furnace pressure stabilizes. At that time, gas is placed in the automatic mode and oil is slowly removed from the fuel source.

E
9/19 – 0.0 days
The unit phased and operators were in the process of swapping fuel back to gas. Gas flow was operated in manual mode and the oil was in automatic back-out mode when the unit tripped due to a low drum level. Boiling had occurred in the economizer (which should not happen) because of a high gas to oil ratio at this stage of start-up. The unit was not designed for burning of gas, so when the gas ratio becomes too high, boiling can occur in the economizer. The boiling water and steam enters the drum at a level below that of the drum water level, which causes percolation. During such an event, either the high or low drum level sensors could initiate a trip due to the steam entering the drum and causing random air gaps.

PSNH found that the manual increase of the increment of gas flow by a few percent during each adjustment was too high. In order to eliminate boiling in the economizer, PSNH decreased the increment of gas flow increase, and increased the level of water in the drum during start-up, and PSNH now force feeds water to the drum keeping its level higher, thus preventing boiling in the economizer because there is water flow in the economizer. The revised process has resolved the issue. This was the last major issue to allow a full start of the unit on gas.

F
9/30 – 0.0 days

During the start-up of the unit the first pair of oil burner guns in opposite sides of the boiler is brought into service with an automatic 15 second firing delay of the second burner. It appears that the first burner was slow to respond to its firing command creating a surge of heat and tripping the unit on low furnace pressure. Again, the initial furnace pressure was positive and the induced draft fan control overcompensated, resulting in the low furnace pressure trip.

PSNH inspected the fuel valve of the first burner, found nothing out of order, stroked the valve to ensure proper operation, and returned the unit to service. The start-up sequence did not experience similar difficulties after the valve was stroked.

G
10/30 – 7.5 days
This planned outage was the annual maintenance and inspection outage for the unit. The scheduled outage had an ISO-NE window of approximately 9.3 days. The outage was competed in 7.4 days. The critical path throughout the outage involved investigation into the significant condenser leaks occurring both on and off line. Only one chloride spike had occurred since 6/29 (Outage B above).

Investigation found that mechanical damage had occurred to the tube rolls on forty-eight tubes. The damage takes the form of small bumps at the far end of the tube (where it is rolled for sealing) on the outlet side of the condenser. PSNH believes that the damage occurred during one of the annual outages, in which tube cleaning was performed by contractors since the new condenser was installed in 2002. (PSNH performs debris cleaning from the inlet end). PSNH believes that the leaks are thermal related because testing (soaping) the tubes did not indicate any leaks. PSNH also stated that random eddy current testing of 10% to 20% of the tubes had not picked up the mechanical damage. PSNH believes that when eddy current testing is performed, since it is done from the inlet end, it is possible that the probe was stopped just short of the end of the tube to prevent the probe from "falling out" of the tube, and thus missed the damage.

After the tube damage occurred, PSNH evaluated alternative cleaning methods, which would perform the cleaning function more effectively and reduce the possibility of tube damage. PSNH found a better method and changed its procedure for condenser tube cleaning. The new procedure air blasts fiber brushes through the tubes. Each tube is then rinsed and checked to ensure that no blockage exists.

PSNH re-rolled the forty-eight tubes and all were placed back in service. In addition, a 100% eddy testing of the condenser showed that nineteen of the fifty-nine tubes that had been plugged since 2002 as a precaution to leaks could also be returned to service. Since

the tubes were re-rolled, there have not been any condenser issues at Newington. PSNH also removed all rubber plugs from the condenser and replaced them with solid titanium plugs. PSNH also discussed the issue with other plant managers and found no damage at the other plants.

During this outage, the last of the condensate pump motors was replaced. The outgoing motor was to be repaired and used as a spare, but upon inspection, PSNH purchased a new motor for the spare. This motor work completed the refurbishment and spare purchases for all large motors at the plant. The last two (out of three) auxiliary boiler feed pumps were all replaced as availability of parts was an issue.

H
11/10 – 1.0 days
While in reserve status, a leak was found in the #3 corner (southeast) of the boiler in one 90^{o} tube going into the header and seal box. The leak was determined to be stress related. The header and all twenty 90^{o} tubes were replaced in 2000, and the seal box was modified in 2004 by Alstom to address leaks at the seal. The seal at the seal box is to prevent air from entering the boiler at this location. Alstom had redesigned its rigid welded seal.

The leak was repaired and the unit returned to service.

I
12/12 – 1.4 days
A leak similar to that in Outage H above developed in the #2 corner (northeast) of the boiler in the same general location. A contractor was brought in to conduct non-destructive examination of all four corners of the boiler. Corner #1 (northwest) and corner #4 (southwest) tested normal. No other issues were found in corner #2, but an additional crack was found in corner #3, but it was not leaking.

Repairs were made and the unit returned to service.

J
12/15 – 0.9 days
A similar waterwall leak again developed in corner #2 on the same tube that failed in Outage I above, but inside the seal case. PSNH determined that the stress cracks occurring in this area of the boiler were related to the rigid redesign of the seal box performed by Alstom. PSNH decided to replace the rigid welded air seal in all four corners with refractory.

Repairs were made and the unit returned to service.

K
12/27 – 0.9 days
A stress crack leak developed at the waterwall tube attachment point in corner #4. The tube was repaired and the unit returned to service.

PSNH bought two tubes to have on hand for this issue. Note: One additional failure of a waterwall tube occurred in 2011 and all twenty tubes were replaced during the 2011 annual inspection.

Evaluation for Newington

Accion Group reviewed these outages and found them either to be reasonable and not unexpected for this unit and its vintage, or necessary for proper operation of the unit. Accion Group concluded that PSNH conducted proper management oversight during these outages.

Schiller Unit Outages For 2010

The major projects at Schiller Station in 2010 were the eighteen-month overhaul of Unit-4 that included the five-year inspection of the HP turbine, replacement of the 480V switchgear to meet new flashover requirements, and a chemical cleaning of the boiler. Unit-5 also completed its annual overhaul, including major refractory repairs and the installation of a stack silencer.

Schiller-4

The following outages occurred at Schiller-4 during 2010.

A
2/26 – 34.2 days
This outage was the eighteen-month planned maintenance outage for the unit. The outage had an ISO-NE window of 39 days from February 26, 2010 through April 5, 2010. The original PSNH schedule was contemplated to be 36 days ending on April 2, 2010. The unit returned to service on April 1, 2010, one day earlier than projected. The critical path of the outage involved the inspection of, along with work on the HP turbine. The extension shaft was required to be shipped to North Carolina because the on-site inspection revealed cracking in the main oil pump impeller, which was not part of original work scope. Siemens had a contracted date to return the HP turbine to the site and met that date with the additional scope of work. All other activities were centered on the return of the HP turbine. PSNH closely monitored the progress of the HP turbine work at Siemens to ensure it was able to take advantage of any gains in Siemens' schedule.

Critical path remained unchanged until day 27 of the outage when chemical cleaning of the boiler and the HP turbine reassembly were both close to, or on critical path. Minor critical path changes were made between chemical cleaning of the boiler and the HP turbine installation. Unit start-up went smoothly with a gain of eighteen hours on critical path. However, when condenser vacuum was established, an air injection gasket was found to be leaking and start-up was aborted until the gasket could be replaced. Eleven hours of schedule was lost due to these start-up issues.

B
6/5 – 0.4 days
The unit was operating at 20 MW when it tripped. PSNH investigation found a failed circuit board in the Burner Management System (BMS) programmable recorder. The board was replaced and the unit returned to service.

C
8/29 – 0.2 days
PSNH missed the scheduled start-up time because the boiler feed pump was not up to required temperature. Standard operating procedure calls for opening the warm-up line to the boiler feed pump when the unit is shut down. The operator failed to open the warm-up line the night before when the unit was taken off line. This item was discussed with the operator in question.

D – (Outage Report OR 2010-11)
11/13 – 5.4 days
Schiller 4 has one traveling intake screen while all other major PSNH units have two. The screen is driven by a chain driven sprocket. Leaves piled up against the intake screen and the resulting pressure from the leaves snapped the drive sprocket. The unit was then taken off line. The drive sprocket is protected with a "shear pin" and is designed such that the shear pin will mechanically fail before equipment damage occurs. In this case, the shear pin had shifted its position enough so the designed failure point was inside the sprocket casing, thus requiring the shearing of the full pin which turned out to be stronger than the sprocket. Failure of the shear pin is common enough that PSNH stocks spare shear pins.

PSNH contacted a third party supplier and its generation maintenance shop and determined that the quickest repair time was to have a new sprocket fabricated. The new sprocket was installed and PSNH also installed a set screw to lock the shear pin in its proper position.

Schiller-5

The following outages occurred at Schiller-5 during 2010.

A
4/9 – 19.6 days
This outage was the twelve-month planned maintenance outage for the unit. The outage had an ISO-NE window of 24 days from April 9, 2010 through May 3, 2010. The original PSNH schedule was contemplated to be 21 days ending on April 30, 2010. The unit

returned to service on April 29, 2010, one day ahead of schedule. The critical path of the outage involved the repair of the cyclone refractory.

Because of gains in cyclone refractory repairs, critical path switched to the stack silencer modification project. Critical path further improved with gains in the stack silencer modification project to the point where the air heater ceramic coating project became critical path.

During the outage, changes had been made to the auxiliary steam system so that the unit could start without the coal units being on line. The changes were made as a result of decreased energy prices which could result in the coal units being in economic reserve and unavailable to produce auxiliary steam. During startup of the unit after its overhaul, it became apparent that there was insufficient auxiliary steam to start the unit with both coal units in economic reserve shutdown with the modifications made to the auxiliary steam system. A coal unit was immediately put into startup mode to supply auxiliary steam however, this action delayed start-up by eight hours.

B
5/1 – 0.9 days
The unit tripped due to the short circuit failure of the new forced draft fan. The original forced draft fan had previously failed and was rebuilt with the proper insulation level and reinstalled. PSNH decided to purchase a new forced draft fan motor as a spare and installed it during the planned outage of the unit to ensure the integrity of the motor. (Outage A, above)

PSNH reinstalled the rebuilt forced draft fan motor and returned the unit to service. The motor manufacturer determined that the new motor was defective, redesigned the motor, and supplied PSNH with another motor at no cost.

C – (Outage Report OR 2010-06)
7/3 – 12.5 days
The unit tripped due to a leak in a boiler tube. This is the first tube leak Unit-5 has experienced. Standard operating procedure for this unit (Developed by Alstom) when encountering boiler problems is to remove the bed material to save the bed, as seasoned bed material performs better than new bed material . The bed consists of one hundred to one hundred and fifty tons of material. It is also standard operating procedure (also developed by Alstom) to keep the boiler feed pump operating in order to ensure there is water in the tubes that run through the bed. The reason for this that the bed continues to generate heat after the unit is taken off line. PSNH followed these procedures.

The leak was in a bed tube that had a small thin spot which PSNH believes was a manufacturing defect. The tube failure damaged four adjacent tubes. A small leak in a waterwall tube was also found and all were subsequently repaired. (Note: All one hundred sixty-eight of these outer tubes were replaced earlier. PSNH also measured the thickness of each tube along its length during the 2011 maintenance outage and no other defects were found.)

PSNH was transferring the bed material back into the boiler when the transfer stopped due to pluggage, with fifteen tons of bed material transferred. Prior to beginning the transfer of bed material, PSNH had checked the bed material for moisture. Bed material can only be checked from the top of the silo, and the material appeared to be dry. (Note: The material is checked by lowering and dragging a rod across the bed to examine the bed material consistency). The visible bed material was the last material put into the silo, was from the bottom of the bed, and was evidently drier than the bed material above it. The pluggage was determined to be caused by wet bed material.

It took the operator about two hours into the event to determine that water was going into the bed material from a tube leak. The makeup water indicator is the original one installed for the plant, is very coarse, and shows total makeup water for all three units. Since the incident, PSNH installed a very accurate sonic makeup water indicator for Unit 5 so that boiler leaks can be readily determined, and it has changed its procedures so that bed material is not transferred to the silo in a tube leak event.

During startup, bed temperatures were not increasing as rapidly as they should and the pressure across the tuyeres (fifty five thousand .030 inch slotted air nozzles) was higher than normal, indicating pluggage of the tuyeres. Startup of the unit was halted and upon inspection of the tuyeres, pluggage due to the wet bed material was found. The bed material had become crusty due to latent heat. PSNH had removed the wet bed material and as a standard process, blew out all tuyere openings with compressed air prior to startup, but in this case the process did not remove all the material from the tuyeres due to moisture in the bed material. The remaining bed material was not readily visible due to the slanted opening of the tuyeres. PSNH used wire brushes to ensure that the tuyere openings were clear and restarted the unit without incident.

PSNH changed its procedures to require wire brushing of the tuyere openings for water leaks in the boiler and additionally changed its procedures to require that the tuyere openings be checked for obstruction every time they are blown out.

D – (Outage Report OR 2010-08)
9/25 – 6.2 days
One of the two wood chip feeders tripped due to failure of one of the two gear boxes driving the blower that controls the flow of wood chips into the furnace. After several hours of operation at reduced load, the unit tripped due to high cyclone temperatures and low bed temperatures.

The gear box failure was from loss of lubricant due to a seal leak. The failed gear box was replaced and the other three were inspected. One of the other three gear boxes was replaced and the other two had new seals installed. The remaining two were replaced at a later date. All six cyclones were cleared, the bed material was replaced, and the unit returned to service.

PSNH states that gear box lubricant checks are performed as part of a periodic inspection check list. It also states that the gear boxes are in a location that is very difficult to access, and that plugs have to be removed in order to check the lubricant level. PSNH, itself, questions whether the boxes were being checked as frequently as required. To ensure checking of lubricant levels, PSNH installed sight glasses on all four gear boxes and placed "checking lubricant levels" on the operator's check list when making inspection rounds.

E
11/28 – 0.6 days
During the wood chip blower gear box outage (Outage D, above), PSNH installed the new replacement forced draft fan motor to ensure its integrity. A high forced draft fan motor bearing temperature was indicated. While instrument and control personnel were en route, the unit tripped due to a high forced draft bearing temperature. PSNH's investigation found that the bearing condition was normal. Further investigation found that the remote temperature device had a loose connection at the motor. This connection was made at the factory. Repairs were made and the unit returned to service.

F
11/30 – 0.1 days
The unit tripped due to high boiler pressure. The bag house for the unit has eight compartments. Each compartment has a poppet valve that isolates each bag house section from the flue gases. The poppet valves sequentially close and air is injected to clean the bags. In this instance, all eight valves closed at once causing the unit to trip. This the same outage sequence that occurred in 2009 (Outage L) that remained unexplained.

In the instant case, PSNH was working on one of the eight modules and an event occurred that should have blown the local fuse and closed the poppet valve on that one module. PSNH found a blown main fuse to all modules which explained the outage. Investigation found that the local fuses at the module detectors were 5A fuses (added by PSNH after baghouse installation) and that the main fuse was also a 5A fuse. The main fuse would be subject to a larger energy draw and would open first.

To correct this situation, PSNH replaced all the local detector fuses with 3A fuses. In addition, the baghouse manufacturer told PSNH that the logic it installed was incorrect as the poppet valves should have all been opened for a main fuse event. PSNH changed the control logic to have the poppet valves open instead of close so that the unit would not trip for a module specific or main fuse event. Although PSNH installed incorrectly sized fuses, the root cause of the outage was the incorrect logic.

G - (Outage Report OR-2010-12)
12/11 – 4.5 days
Load was reduced on the unit due to cyclone pluggage. A hot spot developed in one of the cyclones due to the pluggage. PSNH decided to take the unit off line at this time so that repairs could be completed prior to Christmas week when personnel availability could be problematic. Repairs were made and the unit returned to service.

H
12/22 – 0.3 days
The unit tripped when one of the drum level sight glasses was isolated for repairs. The unit has two sight glasses which have high and low drum levels, with their trip points indicated. One of the sight glasses was leaking. When the sight glass was isolated to repair the leak, the unit tripped on an improper drum level event. A similar repair had been made to the sight glass at the other end of the boiler drum without incident. Upon investigation, PSNH found that Alstom wired the valves differently and that one sight glass (the one that had been previously repaired) was for indication only and will not initiate a trip. PSNH installed valving so that the sight glass could be isolated without impacting unit operations.

Schiller-6

The following outages took place at Schiller-6 during 2010.

A
1/26 – 0.0 days

The unit was running at reduced load and tripped when the coal pulverizer tripped upon command of the BMS for loss of flame. At reduced load, only one pulverizer is required for operation. In addition, at reduced load the BMS logic is changed. At full load, the pulverizer is tripped when two out of three losses of flame signals are received. At reduced load, the pulverizer is tripped for any loss of flame signal. Loss of flame can be caused by wet coal or misalignment of the flame scanners. The actual cause was inconclusive at the time of the event. PSNH now believes the problem was scanner-related given the subsequent issues with the scanners (See Outage G, below).

B
2/23 – 0.9 days
While at reduced load, the unit was taken out of service to repair a leak in the boiler feed pump. Repairs were made and the unit was returned to service.

C
3/1 – 0.0 days
The unit was running at reduced load with one pulverizer in operation. The pulverizer motor failed casing the pulverizer to trip which resulted in a trip of the unit. Repairs were made and the unit returned to service.

D
3/13 – 0.0 days
The unit was operating at reduced load with only one coal mill in service. The unit operator was changing out one of the flame scanner blower filters when a unit trip occurred. PSNH believes that coal dust was disturbed during the change out and caused the loss of flame signal. Again, the unit tripped when it lost the single pulverizer. The unit was restarted without incident.

PSNH initiated an ongoing effort to review its operating practices and procedures for changes when at 1-mill load level as a result of this event. Newington and Merrimack have also instituted similar efforts.

E
3/30 – 0.0 days
PSNH was working in the area of the flame scanner blower that was in operation with the unit at its 1-mill load level. The scanner blower was bumped which in turn disturbed dust that caused the scanner to sense loss of flame resulting in the loss of the unit. The unit was restarted without incident.

F
4/27 – 2.0 days
The unit was in reserve shutdown and was cool. PSNH decided to take a scheduled maintenance outage to resolve coal barrel wear issues in the coal nozzles. The coal barrels were repaired and the unit was returned to service.

G
5/20 – 0.0 days
The unit was at low load and tripped due to loss of flame. Loss of the single pulverizer tripped the unit. The unit was restarted without incident. (Note: PSNH made plans to accurately realign the flame scanners during the 2011 maintenance outage, as only a rough alignment can be made without being inside the boiler.)

H
6/1 – 2.5 days
The unit was in reserve shutdown when water was observed dripping from the boiler. PSNH took an outage to repair the leak. One generator tube and eight reheater tube leaks were found and repaired. In addition, reinforcement was made to other tubes and two attemperator valves (regulates steam temperature flowing into the turbine) were replaced. The unit was returned to service when the work was completed.

I
10/20 – 0.3 days
The unit was in reserve shutdown. PSNH took an outage to replace an attemperator control valve. The valve was replaced and the unit returned to service.

J
11/2 – 1.6 days
While starting the unit, PSNH had problems establishing fires in the burners. Investigation revealed that one igniter had broken off. PSNH attributes the broken igniter to excessive wear from coal leakage from holes in the coal barrels which were repaired in Outage F, above. PSNH took all six igniters apart, cleaned them all, replaced igniters as required, and returned the unit to service.

K
12/24 – 0.0 days
While acknowledging multiple alarms for the BMS, the operator tripped the unit when the pulverizer trip button was pushed in error. The BMS acknowledgment button is a

flush mounted button and resides next to the pulverizer trip button which is a raised button with a side guard. The operator immediately notified station management of his error and was counseled.

Evaluation Except for Outage 4-C

Accion Group reviewed the outages at Schiller and found them either to be reasonable and not unexpected for these units and their vintage, or found them necessary for proper operation of the units. Accion Group concluded that PSNH conducted proper management oversight for these outages.

Evaluation of Outage 4-C

Startup and shutdown activities follow formal procedures which generally are written sequenced checklists. In addition, startups and shutdowns are routinely performed, especially on units that often cycle. To miss a step on a formal procedure checklist suggests either gross inattention, filling in the checklist after rounds are made, or not using the checklist at all. None of these possibilities are acceptable.

Accion Group recommends that the replacement power cost associated with this outage not be recovered from customers.

Recommendation

When any contractor or company personnel suspects that gasket installations are problematic, PSNH management should be notified to evaluate the need for rework at that time within the confines of the existing outage schedule. This recommendation should be implemented at all plants.

Hydroelectric Unit Outages For 2010

The following sections describe the outages at PSNH's hydroelectric ("hydro") units during 2010. The outage durations listed have been stated as the actual duration of the total outage regardless whether there was water to run the unit. Accion Group, Inc. ("Accion" or "Accion Group") indicates water availability during any portion of the outage by a "Y" or "N" next to the outage designation. In order to simplify the outage descriptions, a separate outage description appears as "M" where multiple units were out of service for the same reason. If the multiple unit outages are not returned to service within an hour of each outage, the outages are separated into single unit outages.

In 2010, due to the increased rainfall during the autumn season, the PSNH hydro fleet generated 338,300 MWh of energy, which is slightly less than the 343,500 MWh in an average water year. The increase in water flow came during a seasonal period that otherwise would have been a dry water year. Fall maintenance schedules were revised to accommodate additional flow wherever possible.
In 2010, there were twenty-three hydro unit outages and no gas turbine outages caused by distribution disturbances. There were no independent transmission disturbances that resulted in generation outages in 2010.

Amoskeag Station

Major planned projects at this station in 2010 included the completion of the G-2 generator rewind, a rewind of G-3, and a refurbishment of the overhead crane controls.

Multiple Unit Outages

M-A

4/2 – 0.0 days – Y (Related to a T&D event)
Units #1 and #3

Units G-1 and G-3 tripped on undervoltage simultaneously as the distribution switchgear failed at 200 Bedford Street, causing the 331 and 364 34.5kV lines to trip at Canal Street. The units did not need to trip for system protection requirements. PSNH has set its undervoltage relays to the nominal time delay position of 1.2 seconds. This fault was approximately 2 seconds in duration because of the catastrophic nature of the disturbance. Due to the duration of the disturbance and the fact that it was a multiple contingency event (not a design criterion), the units at Amoskeag may be subjected to tripping.

M-B
12/1 – 0.0 days – Y
Units #1, #2, and #3

This outage was required to conduct the annual ISO-NE required black start testing requirements.

Amoskeag - 1

A
6/13 – 0.1 days – N
The unit tripped due to a high bearing temperature on the lower guide bearing. PSNH found the bearing temperature to be 45°C (versus a normal temperature of 30°C), along with a low oil reservoir level in the lower guide bearing oil reservoir. Investigation found that the oil reservoir pump had overheated and stopped running due to a broken winding (broken winding not known at this time). The low oil reservoir resulted in the high bearing temperature and subsequent trip for that condition. The start/stop Mercoid switch (and all other Mercoid switches) was cleaned. Once cooled, the motor operated properly and the unit returned to service. No cause for the outage was found at this time (See Outage B, directly below).

B
6/17 – 0.0 days – N
The unit tripped due to low oil in the lower guide-bearing reservoir. The lower guide-bearing oil pump was again hot and was not turning. All Mercoid switches were found to be operating properly. Suction lines were checked and were not obstructed. The mechanic tapped the motor shaft and it immediately started and cycled properly. The motor was changed out with a spare. PSNH later found that the motor had an open winding which would explain the erratic starting incidents. The motor had also passed dialectic testing performed during the previous annual inspection in January 2009.

Amoskeag – 2

A
1/1 – 132.6 days – Y (38.7 days in 2009 and 93.9 days in 2010)
It has been historical convention to analyze an outage over lapping two-calendar years in the year where the majority of this outage occurs. Where the majority of the outage occurs in 2010, it will be analyzed as part of this 2010 SCRC review. (Note: This outage was Outage 2-C in the 2009 SCRC review.)

The generator was found to be very dirty during the February 2009 annual inspection. A five-week 2009 fall outage was planned to thoroughly clean the unit. When the unit was disassembled and inspected, it was determined that a generator rewind and core restacking was required and that the unit could not return to service.

Cleaning of the insulation entails using CO_2 to stiffen oil and grime residues on the insulation, which is then brushed off. When PSNH began the cleaning process, the insulation was in such bad condition that pieces of the insulation were falling off with the frozen oil and grime

residue. PSNH had to start planning the rewind and restacking of the generator at this time which caused the outage to be much longer in duration (133 days versus 87 days for the same project for Unit 3). The length of the outage was also extended as the price of electricity was depressed and PSNH did not use overtime or expedited delivery to shorten the outage time.

Once materials were received, the outage proceeded smoothly. Modern grade insulation was used, allowing the unit to run cooler and increasing its capability from 5.5 MVA to 6.6 MVA. The increased generator capability cannot be captured in a significant way at this time due to turbine wheel and step up transformer rating limitations.

The scheduled annual inspection of the unit was also performed during this outage. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected. The total outage was 3 days longer than expected.

B
9/11 – 0.1 days
The pond level control system directed the unit to come on line, however, the unit failed to do so. The pond control system sequenced to the next available unit (Unit #1) and it successively phased. Investigation found the 52LC switch in the "trip free" position due to a failure (lockup) in the open position. The trip free position prevents the generator breaker from closing. PSNH states that the switch was lightly cleaned and lubricated during the rewind outage. The switch was cleaned and lubed, and the unit returned to service.

PSNH also stated that due to the increased operation of the generator breakers resulting from the installation of the pond control system, changes to the breaker maintenance procedures are being investigated.

Amoskeag – 3

A
2/11 – 0.3 – Y
This outage was planned and taken to assess and evaluate the condition of the insulation and windings. The assessment determined that the winding insulation was deteriorating and that a rewind and restacking of the core was necessary. The assessment also determined that the unit was capable for operation until the job could be planned (See Outage 3-C, below).

B
3/12 – 0.0 days – N
The unit tripped due to a pond level control malfunction. Only the Merrimack River units are on a pond level control system that starts and stops units automatically. Automatic unit operation is required due to the tight flow band required. All other units are manually controlled.

The operator placed the system in manual mode and reset the pulse counter in accordance with procedure. When returned to supervisory mode, the controller tripped the unit. Investigation found a logic flaw in the programmable controller. Since its inception, and unknown to PSNH, the controller saved unresolved stop commands when in the manual mode. Once returned to the supervisory mode, unresolved commands were executed.

PSNH has reprogrammed this controller and others that were found to have the same logic flaw to no longer save commands when in the manual mode.

C
6/28 – 87.2 days – N
This outage was taken to rewind and restack the generator, and it proceeded smoothly. A modern grade insulation was used allowing the unit to run cooler and to increase its capability from 5.5 MVA to 6.6 MVA. The increased generator capability cannot be captured in a significant way at this time due to turbine wheel and step-up transformer rating limitations. The timing of the outage was such that no water was lost during the outage.

The scheduled annual inspection of the unit was also performed during this outage. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected. The total outage was 16 days shorter than expected.

D
11/30 – 0.3 days – Y
Divers were working near the inlet of the unit to replace the headwater gauge standpipe. The unit was taken out of service for safety considerations and returned to service after the work was completed.

Ayers Island

Major planned projects at Ayer's Island for 2010 included the ultrasonic testing of the three penstocks and preparation for dam reinforcement in 2011 to meet FERC's changed earthquake remediation measures.

Multiple Unit Outages

There were no multiple unit outage at Ayer's Island in 2010

Ayers Island – 1

A
2/1 – 4.3 days – N

This planned 4-day outage was taken to perform the scheduled annual inspection of the unit. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected.

B
2/5 – 4.0 days – N
The unit failed to come on line when requested to do so by the Electric System Control Center (E-SCC) dispatcher. Both the remote and automatic modes were tried, but the breaker would not close. PSNH found that the generator breaker was hung up in the trip free mode due to worn parts in the breaker. The breaker was thoroughly inspected, lubed, and linkages were adjusted. Once numerous manual operations were consistently successful, the breaker was released for service.

PSNH is purchasing a spare breaker to allow these aged breakers to be totally rebuilt without incurring long outages.

C – (Related to a T&D event)
6/5 – 0.1 days – Y
The unit tripped during a storm when the 0338 recloser at Straits Road tripped and reclosed on the 338 34.5kV radial circuit fed from that station. The unit is not required to trip for system protection requirements for this event. There are two line sections between Straits Road and Jackman Hydro and system instability is suspected.

D – (Related to a T&D event)
11/3 – 0.0 days – Y
Units G-1 and G-2 tripped on overspeed when a squirrel contacted the 337 34.5kV line between Webster and Laconia substations (G-2 is reported as a separate event below because the unit was delayed in returning to service). The fault resulted in a polymer insulator flashing over to the J-125 115kV line between Webster and Laconia substations. These two circuits are on the same structures and at this location, the 34.5kV insulators were on the 115kV davit arm. In addition, when the J-125 line opened and reclosed, the units tripped. The units should not have tripped for this event.

Because certain 115kV operations can result in islanding sections of the 34.5kV system in the central part of New Hampshire, a transfer trip scheme sends a trip signal to trip Ayers Island generation (and others) for some events to ensure de-energization. The transfer trip signal is not initiated for other events.

PSNH investigation found that the directional carrier blocking protection system transceiver had failed at Pemigewasset Substation resulting in an overtrip because the line relay did not receive a blocking signal. That equipment was replaced.

With regard to the original fault on the 337 34.5kV line, PSNH conducted a review because of the occurrence of multiple polymer insulator failures. PSNH determined that the insulators require replacement and will do so with higher rated insulators in 2011. The PSNH review also found that some of the 34.5kV insulators were mistakenly mounted on the wrong side of the pole, placing the center phase of the 34.5kV under the lower 115kV rather than the center 115kV phase wire, which reduced the insulation between the two circuits. Additionally, PSNH used the polymer insulators designed for the wood pole 34.5kV system (200kV BIL). The poles for this double circuited line are steel which requires a higher rated insulator.

Ayers Island – 2

A
2/4 – 0.0 – Y
The unit tripped on electronic overspeed. The cause of the overspeed trip was determined to be testing on Unit #1 during its annual inspection. While removing a neutral on a motor to perform meggaring, the motor neutral touched a grounded surface and tripped Unit #2. The motor neutral was found to be hot (energized). The overspeed power circuit is common to several circuits for all three units, and this wiring error appears to be part of the original overspeed circuit installation. PSNH corrected the motor wiring immediately and is searching for similarly mis-wired circuits at all stations as the opportunity arises. In addition, PSNH has run dedicated electronic overspeed circuits to each of the units. The circuits are not yet operational as all three units need to be out of service in order to finish separation of the circuits and to complete the installation. Connection of the circuits is expected to occur late in 2011 in connection with outages for the earthquake remediation project.

PSNH has also altered its test procedures to require the testing of grounds.

B
8/9 – 10.3 days – N
This planned 4-day outage was taken to perform the scheduled annual inspection of the unit. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected. A shaft seal leak on the exciter was also found and repaired doing this outage.

The outage was extended to 10 days to perform additional maintenance work. There was no water available to run the unit.

C – (Related to a T&D event)
11/3 – 0.2 – Y
This discussion is the same as that for Outage 1-D, above. The separate outage report was made because the unit was delayed in returning to service due to sticking relay contacts, and therefore had a longer outage time.

Ayers Island – 3

A
11/15 – 4.4 days – Y
This planned 4-day outage was taken to perform the scheduled annual inspection of the unit. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected.

Canaan

Major projects completed at Canaan in 2010 included concrete and brick repair at the power house and at the surge tank.

Canaan – 1

A
2/8 – 0.4 days – Y
The unit tripped due to operation of the loss of field relay. When investigated, PSNH found the relay setting had "drifted," meaning that the trip point changes due to changing R, C, and L values over time. PSNH states that the loss of field relay was checked during the annual inspection and this is the first known operation because of drift. Necessary adjustments were made to the relay and the unit returned to service.

B
2/10 – 0.2 days – Y
The unit tripped on overspeed. Investigation found that the slip rings in the mechanical overspeed device were dirty and that the dust from them fouled the electronic overspeed device. Both the slip rings and electronic overspeed device were cleaned and the unit returned to service.

(Note: During this outage, the generator field relay (See Outage A, above) was also replaced.) The mechanical overspeed device was replaced during the annual inspection in Outage I, below.

C – (Related to a T&D event)
2/26 – 0.1 days – Y
The unit tripped off line for a fault on the 355 34.5kV circuit. During high winds, a tree branch fell past the line causing the 0355 circuit breaker to trip and reclose Lost Nation. The unit was returned to service after being checked. The unit is expected to trip for this correct operation. The 355 34.5kV line was last trimmed in 2008.

Note: The 355 34.5kV is a radial line that runs between Lost Nation substation and West Stewartstown and then at 12.47kV to Pittsburg. Some of the 355 34.5kV line is in right-of-way

and some of the line is in distribution configuration that follows Route 3. Recloser 355X10 is a main line recloser in the 34.5kV circuit south of Canaan at Colebrook and the circuit is numbered as the 355X10 at that point northerly.

D – (Related to a T&D event)
2/26 – 0.1 days – Y
The unit tripped for a main line fault caused by a tree outside of the trim zone in North Stratford. The 0355 circuit breaker tripped and reclosed at Lost Nation. The unit was checked and returned to service. The unit is expected to trip for this correct operation. As mentioned in Outage C above, the 355 34.5kV line was last trimmed in 2008.

E – (Related to a T&D event)
5/6 – 0.1 days – Y
The unit tripped on overspeed during a thunderstorm that caused numerous voltage excursions on the 355 34.5kV line, but no mainline trips were recorded. The voltage at the Lost Nation 34.5kV bus indicated a voltage dip to about 0.88 per unit at the approximate time of the unit trip. The transient stability issue is expected to be either resolved or accepted as an incurable system event once the overspeed analysis is completed. The unit was returned to service.

Note: In Exhibit MDC-9, which discusses the progress on system studies, Accion Group recommends that PSNH perform transient stability analysis as part of its investigation.

F – (Related to a T&D event)
5/6 – 0.0 days – Y
The unit tripped on overspeed during a second thunderstorm that occurred on May 6, 2010. There were no system operations and no operations of the Lost Nation voltage monitor. The outage appears to be caused by system instability. The unit was returned to service.

Note: In Exhibit MDC-9, which discusses the progress on system studies, Accion Group recommends that PSNH perform transient stability analysis as part of its investigation.

G – (Related to a T&D event)
5/7 – 0.1 days – Y
The unit tripped on overspeed for a main line fault caused by a tree outside of the trim zone. The 355X10 recloser tripped and reclosed at Colebrook. The unit is expected to trip for this correct operation. The 355X10 34.5kV line was last trimmed in 2007.

H
6/24 – 0.2 days – Y
The auto phasing device was disabled when the penstock was rebuilt in 2009 and enabled when the job was completed. Difficulties were encountered in remote phasing of the unit so the system was again disabled requiring manual phasing of the unit. This outage was taken to test

the auto phasing function of the unit. Testing revealed that the speed controller of the unit was bad. The unit was returned to service with the requirement of manual phasing.

Note: PSNH ordered a replacement motor, but due to age, none were available. The motor was sent out to be rewound and the system was reinstalled, as seen in Outage L, below.

I
7/19 – 6.8 days – Y
This planned 4-day outage was taken to perform the scheduled annual inspection of the unit. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected. The old mechanical overspeed switch was also replaced with an enclosed shaft driven switch during this outage (see Outage B, above). The outage was extended due to more time than estimated to perform epoxy sealing between the wickets and the penstock.

J – (Related to a T&D event)
8/2 – 0.1 days – Y
The unit tripped when a vehicle hit the 355X10 34.5kV main line circuit, knocking down a pole. Repairs were made and the unit returned to service.

K – (Related to a T&D event)
8/23 – 0.0 days – Y
The unit tripped on overspeed for a main line fault caused by a tree outside of the trim zone. The 355X10 recloser tripped and reclosed at Colebrook, but the 357 breaker also tripped at Canaan due to mis-coordination. The unit is expected to trip for this operation and correct coordination would not change the result. As mentioned in Outage G above, the 355X10 34.5kV line was last trimmed in 2007.

L
11/10 – 0.2 days – Y
This outage was taken to reinstall the rebuilt motor in the auto phasing unit. (see Outage H, above) During this outage the electronic speed sensor system for the exciter was also disconnected from the mechanical switch. PSNH believes that the mechanical switch may have also been contributing to loss of field indications because the breaker was closing before the unit was up to speed.

M – (Related to a T&D event)
12/1 – 0.1 days – Y

The unit tripped on overspeed for a main line fault caused by a tree outside of the trim zone. The 355X10 recloser tripped and reclosed at Colebrook. The unit is expected to trip for this correct operation. As mentioned in Outage G above, the 355X10 34.5kV line was last trimmed in 2007.

N – (Related to a T&D event)
12/28 – 0.0 days – Y
The unit tripped when a tractor trailer hit the 355X10 34.5kV main line circuit knocking down a pole. Repairs were made and the unit returned to service.

Eastman Falls

The major project completed at Eastman Falls in 2010 was the design and installation of a coalescing oil/water separator for G-2.

Multiple Unit Outages

There were no multiple unit outages at Eastman Falls in 2010.

Eastman Falls-1

A
1/30 – 0.1 days – N
The unit tripped when its output was remotely lowered to 1 MW by the dispatcher. Investigation found a stuck relay in the lower pulse function of the programmable controller. The relay was replaced and the unit returned to service.

B
7/12 – 4.3 days – N
This planned 4-day outage was taken to perform the scheduled annual inspection of the unit. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected. The packing on the lower generator guide bearing was also changed during this outage.

Eastman Falls – 2

A
1/15 – 0.1 days – Y
The unit tripped due to a high reservoir hydraulic level due to water intrusion from the Bestobell seal. The balancing seal water pressure on the Bestobell seal was adjusted to help seal off the intrusion of water from the river's head pressure. Contaminated oil was removed, the system was refilled with clean oil, and the unit returned to service.

Note: This has been a recurring problem with this unit and is the reason the oil/water separator was installed on December 16, 2010 (See Outages 2B, 2C, and 2E below).

B

1/30 – 0.0 days – Y

G1 tripped and G2 was started but tripped due to a high hydraulic reservoir condition. The hydraulic oil filters were found to be contaminated with water. The filters were changed and the unit was returned to service.

C

4/11 – 0.1 days – Y

The unit tripped because of a high reservoir hydraulic level due to water intrusion from the Bestobell seal. The balancing seal water pressure on the Bestobell seal was adjusted to help seal off the intrusion of water from the river's head pressure. Contaminated oil was removed, the system was refilled with clean oil, and the unit returned to service.

D

4/14 – 0.1 days – Y

The unit was removed from service to repair the fish louver line. The anchoring chain had recently broken loose and required replacement. The anchoring point was repaired, the broken cable was spliced, the louver line was attached, and the unit was returned to service. (Note: during this outage, the hydraulic filters were also replaced.)

E

7/13 – 0.1 days – N

The unit tripped because of a high reservoir hydraulic level due to water intrusion from the Bestobell seal. The balancing seal water pressure on the Bestobell seal was adjusted to help seal off the intrusion of water from the river's head pressure. Contaminated oil was removed, the system was refilled with clean oil, and the unit returned to service.

F

9/27 – 7.4 days – Y

This planned 4-day outage was taken to perform the scheduled annual inspection of the unit. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected.

The annual inspection was extended due to one of the headgate motor brakes sticking. PSNH waited until Monday to make the necessary repairs as no water would be lost by doing so.

G

10/4 – 0.1 days – Y

The unit tripped due to a high generator bearing temperature. Investigation found that the temperature trip point was set at 135°F instead of 194°F. PSNH stated that the bearing temperature switch face plate was removed during the annual outage (Outage F, above) to verify wiring. The operator remembers setting the temperature switch to the correct position; the set point was somehow inadvertently changed.

H

12/13 – 1.2 days – Y

The unit was taken out of service to address an unusual noise that occurred whenever the headgate operated. The noise had been noticed for years. An investigation determined that the motor brake had normal wear and tear . In addition, the drive shaft broke due to operation of the gate with the motor brake dragging, while fixing an additional brake problem during the annual inspection. The head gate motor, brake, gearbox, second half of the drive shaft, bearings, and couplings were removed and repaired or replaced as necessary. After repairs were made, the unit was returned to service.

Note: While the unit was out of service, the hydraulic reservoir was drained and new valves were installed to facilitate the installation of the coalescing oil/water filter on December 16, 2011, so that an outage would not be required. The hydraulic filters were also changed.

Garvins Falls

Major work at Garvins Falls in 2010 included the replacement of the G-3 headgates, concrete repair to the tail race side of the station, bearing repairs on G-4, and extensive repairs to the fish louvers.

Multiple Unit Outages

M-A - (Related to a T&D event)
2/25 – 0.1 days – Y
The unit tripped on overspeed at about the same time that a fault occurred on the Unitil 374 34.5kV line between Garvins Falls and Unitil's Bridge Street Substation due to a tree falling onto the line. The outage occurred at approximately thirty-five minutes prior to an outage that occurred on the 335/332 34.5kV line between Garvins and Rimmon substations (See Outage Hooksett 1-A, below). This is an overtrip condition related to the overspeed set points. The matter will be resolved when the overspeed setting issue is finalized.

M-B
Units #1 and #2

2/26 – 3.2 days – Y
High winds had caused damage to the substation building windows. The windows are located directly above Units #1 and #2. Those units were taken off line so that the windows could be

safely braced and the area weather proofed. Repairs were made and the units returned to service.

M-C
Units #1, #2, #3 and #4

3/11 - 0.1 days – Y
The units were taken off line so that divers could safely retrieve a broken fish louver line cell from the bottom of the canal. The unit returned to service when the work was completed.

M-D
5/5 – 0.3 days – Y
Units #1, #2, #3, and #4

The units were taken off line so that new fish louver line cells could be safely installed. The units returned to service when the work was complete.

M-E
Units #1 and #2

5/17 – 2.4 days – Y
The units were taken off line to replace the damaged windows directly above the step-up transformer, TB-21 (See Outage A, above). The units returned to service when the work was completed.

M-F
E
Units #3 and #4

5/19 – 0.5 days – Y
The units were taken off line to replace the damaged window directly above the step-up transformer, TB-36. (See Outage A, above). The units returned to service when the work was completed.

M-G
Units #2 and #3

12/1 – 0.1 days – Y
The units were taken out of service so that fish line louver line equipment could be removed from the canal. The fish line louver got hung up during removal. Because of the rapid current in the intake canal, for safety considerations, the units were required to be shut down prior to retrieval (fish line louver equipment is annually installed in the canal prior to April 15, 2010 and removed before ice builds up in the canal). When the work was completed, the units returned to service.

M-H
Units #2 and #3

12/8 – 0.0 days – Y
This outage was required to conduct the annual ISO-NE required black start testing requirements.

Garvins Falls-1

A - (Related to a T&D event)
7/26 – 0.1 days – Y
The unit tripped on overspeed at approximately the same time that a fault occurred on the 335/332 34.5kV line between Garvins Falls and Rimmon. This was due to a logging operation leaving an unsupported tree which fell into the line (See Outage Hooksett 1-C, below). This is an overtrip condition related to the overspeed set points. The matter will be resolved when the overspeed setting issue is finalized.

B
10/11 – 0.1 days – N
Both G-1 and G-2 were at minimum load when the pond control system called for a controlled stop pulse to G-1, and a controlled stop pulse to G-2 ten seconds later. G-1 tripped. Investigation did not reveal the cause of this trip and the trip could not be duplicated. PSNH did expand the timer setting between control pulse stops to different units and the event has not reoccurred.

C
11/29 – 22.4 days – N
This planned 4-day outage was taken to perform the scheduled annual inspection of the units. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected. The turbine shaft bearing seals, generator shaft insulation, generator bearings, and floating couplings were also replaced during this outage. The outage was extended to 22 days to perform additional maintenance work. There was no water available to run the unit.

D
12/31 – 0.1 days – N
The unit failed to phase when requested to do so by the E-SCC. Investigation found that due to a stuck valve, the hydraulic governor actuator did not go to the proper position during start-up. The operator made repairs, manually started the unit to ensure proper operation, and returned the unit to service.

Garvins Falls – 2

A
6/14 – 88.3 days – N
This planned 4 day outage was taken to perform the scheduled annual inspection of the unit. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected. The turbine was completely disassembled and overhauled during this outage to replace the turbine blade seals found to be leaking oil during the inspection.

B
11/29 – 0.2 days – Y
The unit was removed from service for diver safety during the installation of the G-1 tailrace stop panels during the annual inspection of G-1 (See Outage 1-D, above).

Garvins Falls – 3

A
6/7 – 4.2 days – N
This planned outage was taken to perform the scheduled annual inspection of the unit and was planned for 18 days. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected. After the outage was scheduled with the ISO-NE, a decision was made to move the replacement of the G3 synchronizer into the 2011 outage. This change in work scope allowed the scheduled outage to be shortened to 5 days.

B
9/2 – 0.1 days – N
The unit was removed from service for diver safety during the installation of new fish louver equipment. The unit returned to service when the work was completed and was the only unit in service at the time.

Garvins – 4

A
1/15 – 0.1 days – N
The unit was taken out of service to remove a section of the fish louver line that had broken earlier in the fall, prior to line removal. The broken line was removed and the unit returned to service.

B
6/7 – 0.0 days – N
The unit was taken off line to facilitate the sealing of the G-3 headgates during the G-3 annual inspection. G-4 was causing too much turbulence in the G-3 headgate area. (see Outage 3-A, above) The unit returned to service when the G-3 headgates were sealed.

C
7/26 – 73.2 days – N
This planned 18-day outage was taken to perform the scheduled annual inspection of the unit. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected. Electrical testing of the exciter indicated that failure was pending and therefore, an immediate rebuild was required. The unplanned work on the exciter

required additional time to specify, order, and receive needed exciter coils, commutator bars, and other materials. The unit returned to service on October 7th.

D
10/15 – 110.2 days – Y
Upon arriving at the site for other business, the foreman saw smoke and flames rising from the exciter and manually tripped the unit. The fire detection system had activated and sent alarms to the E-SCC and the Bow Fire Department. The Bow Fire Department extinguished the fire. (Note: This was the second time the unit operated since returning from its annual inspection on October 7th .)

The working foreman saw no alarms, although the bearing temperature devices were off scale. Initially, the incident was thought to be caused by electrical failure of the new exciter, however, investigation revealed that the fire was caused by failure of all bearings, causing misalignment of the shaft which, in turn, caused the exciter rotor to rub its stator and ultimately fail.

Further investigation found a flaw in the original trip circuitry of the Edwards annunciator panel, an alarm panel showing specific alarms. The annunciator was designed so that when a sensor device contact in the start chain opens, a voltage is impressed across the coil of that annunciator causing its target to drop, which is a visual target showing the reason for the shutdown. Once the target drops, the coil is disconnected from the circuit and the shut-down and lock-out of the unit continues. The flaw is that some of the annunciator coils are wired in parallel with the contacts of the event start chain. The coil failure prevented the annunciator drop from occurring and the shut-down to proceed.

Similar circuitry was found and isolated at Garvins G-3, Amoskeag, Ayers Island, and Jackman. New annunciators have been installed at Garvins G-4, Smith, Amoskeag G-2 and G-3, Eastman Falls G-1, Ayers Island G-1, Hooksett, Canaan, and Jackman. Internal connections will be made during the next available outage of sufficient duration to perform the required internal re-work. To protect the units until the annunciators are installed, PSNH has isolated the annunciator circuits.

The cause for the original high bearing temperature trip signal could not be determined. The oil pump, lube lines, and bearings were disassembled, inspected, and found to be in proper order. When oil was supplied to the bearing from an external pump, no oil was visible in the sight glass to the bridge bearing. When a fine adjustment was made to the orifice valve for that bearing, oil began to flow. PSNH concluded that the melted bearing had contaminated the system with a small piece of debris because the unit could not have operated since October 7th without adequate lubrication.

Gorham

Major projects at Gorham in 2010 included the replacement of brown glass insulators in the station, replacement of station windows, and installation of a guard rail along the intake canal.

Multiple Unit Outages

M-A
Units #1 and #2

6/14 – 9.1 days – Y
The station was taken out of service to replace all brown glass insulators on the 2.4 kV system, and to install animal protection. During this time, the annual inspections for G-1 and G-2 were also completed. This planned 9-day outage was taken to perform the scheduled annual inspection of the units. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected. The annual inspections for G-3 and G-4 were not completed at this time due to manpower shortages resulting from other annual inspections going on at the same time. The annual inspection for G-3 was performed in the summer and the G-4 annual inspection was planned to be performed in the fall. High flows in the fall period prevented the G-4 annual inspection from being performed in 2010 so that additional output could be captured from the additional fall water flow. The inspection was deferred until 2011.

M-B- (Related to a T&D event)
Units #1 through #4

6/19 - 0.0 days – Y

The units tripped off when a fault occurred and cleared on the 352 34.5kV line between Gorham and Berlin substations. This is a generator overtrip condition related to the overspeed set points. The matter will be resolved when the overspeed setting issue is finalized.

M-C- (Related to a T&D event)
7/16 – 0.4 days – Y
Units #1 through #4

The units tripped off on undervoltage when a fault occurred on the Berlin Waste Treatment Plant (tapped on the 352 34.5kV line between Gorham and Berlin substations). This is an overtrip condition related to the overspeed set points. The matter will be resolved when the overspeed setting issue is finalized.

Gorham – 1

A
2/24 – 0.1 days – Y

The E-SCC dispatcher removed the unit from service because the E-SCC received a low oil flow alarm. PSNH found a broken oil pump drive belt. The belt was replaced and the unit returned to service.

Gorham – 2

There were no single unit outages of Unit 2 in 2010.

Gorham – 3

A
8/24 – 0.0 days – Y
The unit was taken out of service to provide flows in the bypass area so that the USGS bypass flow river monitor could be calibrated. Once the calibration was complete, the unit returned to service.

B
8/30 – 3.1 days – N
This planned 4-day outage was taken to perform the scheduled annual inspection of the unit. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected.

Gorham – 4

A
3/12 – 0.0 days – Y
The unit tripped due to a low oil flow indication. While cleaning the exciter bridge in preparation for painting, the operator bumped the oil flow meter causing a false low oil flow indication. The operator was cautioned to exercise due care when working around relays, controls, and switches. Accion Group views this outage as the result of operator error.

B
8/18 – 0.3 days – N
The unit tripped due to low actuator oil pressure. PSNH found that the actuator oil pump was not cycling due to a blown fuse on the motor disconnect. PSNH verified that the blown fuse was not because of motor overload, replaced the fuse, and returned the unit to service. (Note: Since that time, PSNH believes the blown fuse resulted from increased cycling caused by a seal leak, and will assess the system during the 2011 annual inspection.)

Hooksett

The major projects completed at Hooksett in 2010 included paving the driveway and concrete repairs on the waste gate supports and tail race wall.

Hooksett – 1

A- (Related to a T&D event)
2/25 – 0.4 days – Y
The unit tripped on undervoltage when a tree came in contact with the 335/332 34.5kV line between Garvins Falls and Rimmon substations during a high wind event. The Hooksett plant is tapped onto this line. Repairs were made and the unit returned to service. The system operated correctly as this event is expected to trip the unit. (Also see Outage Garvins 1-A, above). Trimming and identification of danger trees on the 335/332 34.5kV line was completed on April 24, 2010.

B- (Related to a T&D event)
4/29 – 0.1 days – Y
The unit tripped on overcurrent when a tree from outside the right-of-way came in contact with the 335/332 34.5kV line between Garvins Falls and Rimmon substations and broke a pole. The Hooksett plant is tapped onto this line. Repairs were made and the unit returned to service. The system operated correctly and this event is expected to trip the unit. Trimming on the 335/332 34.5kV line was completed on April 24, 2010.

C- (Related to a T&D event)
7/26 – 0.1 days – Y
The unit tripped on overcurrent and overvoltage when a tree from outside the right-of-way came in contact with the 335/332 34.5kV line between Garvins Falls and Rimmon substations. The Hooksett plant is tapped onto this line. Repairs were made and the unit returned to service. Trimming on the 335/332 34.5kV line was completed on April 24, 2010. The system operated correctly and this event is expected to trip the unit.

D
8/2 – 4.3 days – Y
This planned 4-day outage was taken to perform the scheduled annual inspection of the unit. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected.

E- (Related to a T&D event)
11/10 – 0.1 days – Y
The 32DX3 disconnect on the 335/332 34.5kV line was out of service for construction purposes. Hooksett was therefore fed radialy out of the Rimmon substation at the time. Vandals

damaged the 359 34.5kV circuit breaker at Rimmon causing the entire 34.5kV bus at Rimmon to lock out. When this event happened, the unit tripped. This is a correct operation of the system protection.

Jackman

The major projects completed at Jackman in 2010 included repair of the surge tank, evaluation of the remaining original underground penstock, and the replacement of the 2400 V cable between the unit and the substation.

Jackman-1

A – (Related to a T&D event)
3/11 – 0.1 days – N
The unit tripped on overspeed when a conductor on the radial 3173 34.5kV line fell onto a crossarm. (Note: All circuits fed from Jackman are radial in nature.) The 3173 circuit breaker at Jackman correctly operated, but the unit also tripped. This is an overtrip condition related to the overspeed set points. The matter will be resolved when the overspeed setting issue is finalized.

B – (Related to a T&D event)
4/3 – 0.0 days – N
The unit tripped on overspeed when a tree was dropped onto the radial 3173 34.5kV line by a homeowner. The 73 recloser correctly operated, but the unit also tripped. This is an overtrip condition related to the overspeed set points. The matter will be resolved when the overspeed setting issue is finalized. The homeowner was billed and has paid for the damages.

C
8/16 – 88.1 days – Y
This planned 4-day outage was taken to perform the scheduled annual inspection of the unit. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected. During the sandblasting of the surge tank in preparation for painting, PSNH found from ultrasound testing that extensive repairs were required to preserve the structural integrity of the surge tank. The outage was extended as the job had to be planned, prepared, and materials ordered without the benefit of preplanning the project.

After this event, PSNH ultrasound tested the Jackman penstock from the surge tank to the plant (this section was not replaced), the Smith penstock and surge tank, Ayer's Island intakes, and the Canaan penstock.

D
11/20 – 3.1 days – N

The unit was taken out of service to replace the through-wall conduit for the generator leads. The new generator leads were installed in Outage C, above, from the new transformer that had been recently replaced to the 115kV switchyard. Thermograph inspection of the conduit penetration area (part of the as-built inspection) showed that excessive heat was present. PSNH found that the conduit was fabricated with steel instead of PVC as required by specification. The contractor had made an unauthorized substitution of materials and therefore, performed all re-work at no charge to PSNH.

The PSNH as-built inspection found no other specification violations. On PSNH jobs such as this, the contractor has a specification, is required to follow the specification, and conduct his own quality control. PSNH makes a final as-built inspection as part of the final payment process.

Smith

Major projects at Smith in 2010 included painting of the surge tank at the request of the City of Berlin and inspection of the penstock.

Smith-1

A
9/12 – 10.3 days – Y
This planned 11-day outage was taken to perform the scheduled annual inspection of the unit. A visual inspection, general cleaning, and equipment tests were performed. Both the turbine and generator were inspected. During this outage a complete ultrasound of the penstock was accomplished. In addition, a large portion of the surge tank interior was painted.

B
10/26 – 0.6 days – Y
The City of Berlin requested that the head pond be lowered so that a city water main that runs through the head pond could have emergency repairs performed. The unit cannot run at the level the head pond was lowered to in order to accomplish the pipe repair. After repairs were complete, the unit returned to service.

Evaluation for Hydro Units Except for Ayers Island, Outage 1-D, 2-A, and 2-C
Accion Group reviewed these outages and found them either to be reasonable and expected for these units and their vintage, or necessary for proper operation of the units. Accion Group concluded that PSNH conducted proper management oversight.

Evaluation for Hydro Units Ayers Island, Outage 1-D and 2-C

During discussions with PSNH regarding the previous failures during the last five years on the 337 34.5kV line and J-125 115kV line that are double-circuited between Webster and Laconia substations, Liberty Consulting Group (NHPUC consultant at that time) suggested checking the adequacy of the line's grounding system. To our knowledge, such investigation was not performed. We recommend PSNH do so at this time as part of its overall attempt to correct the lines' deficiencies.

In the design of the line, inadequate insulation was specified for the 34.5kV circuit. Some insulators were mounted on the wrong side of the pole, reducing the flashover level between the two circuits and resulting in 34.5kV faults enveloping the 115kV circuit. Neither deficiency was detected by PSNH either during design, construction, or final line inspection. The 34.5kV polymer suspension insulators turned out to be defective; they required replacement, and the quality control was out of PSNH's control. Accion Group recommends that replacement power costs for these two outages be disallowed. Accion Group also recommends that the costs of the capital replacements to correct insulation deficiencies be collected through the rate making process.

Evaluation for Ayers Island Outage 2-A

Accion Group singles out this outage because it views its evaluation as important in order for the Commission to fully understand the results of Accion Group's review. The circuitry at Ayers Island was installed many decades ago. From our investigation, we determine that using annunciator trip coils in this manner was an acceptable (and therefore good) utility practice. Accion Group also notes that circuits of this design would not "pass muster" today. PSNH also recognizes the deficiencies of the annunciator circuit design and has conducted significant system redesign to remove these problem circuits from their system. Accion Group also notes that other utility codes, such as the National Electrical Safety Code, recognizes that designs become outdated and that designing a power system to the acceptable codes at the time of installation is not a violation of existing code.

Accion Group concludes that although the annunciator circuit design would be poor utility practice in 2010, such designs were deemed reasonable and prudent at the time of installation (early 1900s).

Accion Group Recommendations

1 - In outages at Canaan, Outage 1-C, 1-D, 1-E, 1-F, 1-G, 1-K, and 1-M are tree related with most of the offending trees located outside of the trim zone. The 355 circuit was trimmed in 2008 and the 355X10 circuit was trimmed in 2007. Reliability significantly deteriorating within two to three years after trimming suggests that either danger trees were not identified and removed, or that deadwood above the conductors was not removed. Such abnormalities should be identified during the circuits' quality control inspection. Accion Group recommends that a vegetation inspection of the 355 and 355X10 main line 34.5kV circuits be performed, and that the results be filed with the 2011 ES/SCRC reconciliation filing. Accion Group also recommends that a final determination of recoupment of costs be deferred to the .

2 - In Garvins Falls Outage M-A and Hooksett Outages 1-A, 1-B, 1-C, trees located outside the right-of-way were the cause. The trimming of the line was completed on April 24, 2010, prior to most if not all of the incidents. For reliability to significantly deteriorate after trimming suggests that danger trees were not identified and removed. Such abnormalities should be identified during the circuits' quality control inspection. Accion Group recommends that a vegetation inspection of the 335/332 main line 34.5kV circuits (including the tap to Hooksett Hydro) be performed, and that the results be filed with the 2011 ES/SCRC reconciliation filing. Additionally, Accion Group recommends that a final determination of recoupment of costs be deferred to the 2011 ES/SCRC reconciliation filing.

3 - Many of the outages at PSNH's smaller hydro units are suspected of being related to instability caused by long coordination times as protective equipment is layered onto the system. In addition, as PSNH pushes for efficiency in its distribution operations, the system operates more closely to its stability limits. PSNH states that it has the ability to contract stability analysis resources, and has done so for interconnection analysis of independent power producers. To Accion Group's knowledge, no such analysis has been done for the PSNH units. Accion Group recommends that PSNH obtain the in-house ability to perform transient stability analysis to aid in the resolution of inadvertent generator overtrips caused by faults on the distribution system, and to aid in the determination of proper time delays of undervoltage relays to maintain stability for properly cleared faults. (also see discussion in Exhibit MDC-9)

4 - There has been an increase in the number of routine outages with emergent issues that turned out to dramatically extend what were thought to be relatively short outages. The resultant outages generally results in increased costs to customers.

Although PSNH does generally budget for system repairs in its budget, Accion Group finds that the process requires redirection in order to provide maximum benefit to customers. While PSNH's process generally manages major station repair issues among its stations, Accion Group believes that PSNH could improve its processes and add benefits to customers through a more formalized process. PSNH's repair process is currently typical for power systems that maintain a fleet of hydro generators up to one hundred years old. In fact, from the PSNH management standpoint, it is better than most. However, there is one area where improvement can and should be made. The area of improvement that Accion Group identified is that of timely recognizing emerging major repair issues to fleet operations before they present a problem to outage management processes. There is no doubt that PSNH made appropriate management decisions to address the emergent issues at hand, however, Accion Group focuses here on process improvements.

Accion Group therefore recommends that PSNH focus its non-destructive examinations on major hydro components (runners, draft tubes, etc.), and develop a comprehensive plan to address the results of the NDE examinations. To be more specific, Accion Group expects that items such as exciters, runners, step-up transformers, rotors, stators, and draft tubes be explicity addressed.

Combustion Turbine Outages For 2010

The following outages took place at PSNH's combustion turbine units during 2010:

Lost Nation

Major work that was completed at Lost Nation during 2010 included the replacement of the septic system.

Lost Nation – CT-1

A
5/10 – 10.2 days
This scheduled 11-day outage was taken to perform the annual inspection. The work performed included a visual inspection, general cleaning, annual equipment tests and servicing the diesel starter engine. Testing and inspections revealed no abnormalities.

White Lake

There was no major work that was completed at White Lake during 2010.

White Lake – CT-1

A
2/12 – 0.0 days
The unit failed to start when requested. "No flame" and fuel problems were indicated. PSNH brought in the original equipment manufacturer who determined that there was an issue with the timing of engine warm-up to 350^{o} F when the temperature was below zero. The logic was changed to prevent a time-out and trip of the unit providing that both engine temperature and speed were increasing. With changes made, the unit returned to service. (Note: This is a new piece of equipment installed in 2009 because of service issues with the original equipment.)

B
4/12 – 11.3 days
This scheduled 11-day outage was taken to perform the annual inspection. The work performed included a visual inspection, general cleaning, annual equipment tests and servicing the diesel starter engine. Testing and inspections revealed no abnormalities. An ISO-NE black start test was also performed.

C

5/26 – 0.1 days

The unit tripped because it failed to phase in the allotted time after start-up. PSNH found that the breaker remained open for five minutes after start-up without synchronizing to the system. Investigation found that the new synchronizing relay (installed in 2008) was hunting above and below 60 Hertz indicating that the frequency window for phasing was too narrow. In 2008, the phasing window was set to manufacturer's recommendations. During the instant outage, a PSNH employee noticed that the synchronizing relay was hunting. Upon further PSNH investigation, it was determined that the phasing window was too narrow and should be adjusted wider. The window was widened, the issue was resolved, and the unit returned to service. Similar conditions have not recurred.

Schiller

Major work that was completed at Schiller during 2010 included the addition of a roof cap on the generator cooling exhaust system, recoating the stator and rotor, installation of dampered louvers on the cooling air inlet and outlet hoods, and the addition of a thermostatically controlled electric heater in the generator enclosure.

Schiller - CT-1

A

3/2 – 54.1 days

A high wind and heavy rain event occurred just prior to this outage. Plant personnel called on the unit to start for the purpose of conducting emission testing, and the field breaker tripped when closed. Investigation found that the exciter had a poor megger reading. PSNH suspected moisture was the cause, and that the moisture had blown through the building inlet and outlet vents. The manufacturer (Electric Machine) suggested that portable heaters be used to eliminate the moisture, which is industry standard to dry moisture laden equipment. After days of drying, meggar readings improved, but not enough to return the unit to service. Significant excessive moisture was suspected. Dehumidifiers were brought in as a further attempt to improve meggar readings. After more than a week of dehumidifier operation, meggar readings did not improve.

PSNH found a company specializing in drying electrical equipment by passing current through the device and heating it to 200^{o} F. The drying process began on April 1st, and by April 17th satisfactory meggar readings were obtained. This drying process is considered aggressive and not the first choice in drying electrical equipment. PSNH recoated the stator and rotor while the unit was apart. PSNH installed heaters and returned the unit to service. PSNH also ordered dampered louvers for the building. Those louvers were installed during Outage E and Outage F, below.

PSNH also performed the unit's annual maintenance during this outage.

B
5/26 – 0.6 days
The unit failed to phase when called for by the ISO-NE. An under voltage target was indicated. PSNH checked the potential transformer fuse and it was found to be okay. Eaton Electric was called and their investigation found that, in contrast to the general industry practice of a single fuse on the high side, this potential transformer also had a fuse on the secondary side which was also not readily accessible. The fuse was replaced and the unit returned to service. Because this unit has three sister units, PSNH made other plants aware of this unusual fuse application.

C
8/10 – 0.0 days
The unit was in operation for approximately twenty minutes when the unit tripped due to a high bearing vibration. PSNH checked the vibration probe and it was working properly. Pratt and Whitney had experienced a similar issue at a different location and suggested that the vibration might be attributed to a loose mount of the probe. The probe mount was replaced, additional ties were added to the probe cable, and the issue was resolved. The unit was returned to service.

D
8/14 – 0.3 days
This outage was scheduled over the weekend to retest the exciter for moisture as a follow-up action to Outage A, above. No moisture was indicated. Other issues were addressed while out of service.

E
12/29 – 0.3 days
PSNH determined that the dampered louvers (see Outage A, above) could not be installed with the unit in service for safety considerations. This outage was taken to install one set of louvers on straight time.

F
12/30 – 0.2 days
PSNH determined that the dampered louvers (see Outage A, above) could not be installed with the unit in service for safety considerations. This outage was taken to install one set of louvers on straight time.

Merrimack

Major work that was completed at Merrimack during 2010 included the inspection and testing of the common MT-3 step-up transformer and the replacement of the first row of stationary turbine vanes.

Merrimack CT-1

A
2/9 – 0.1 days
Both units were being run to perform their seasonal claimed capability test when CT-1 tripped. Investigation found the problem was intermittent and in the automatic portion of the generator voltage regulator. The unit was placed in manual mode and restarted. The unit was left in the automatic mode and if it fails to start, the operator will intervene and start the unit in manual mode.

PSNH determined that the generator voltage regulator needs to be replaced. The generator voltage regulator was received earlier this year and will be replaced in fall of 2011 pending ISO-NE approval.

B
5/3 – 4.6 days
This scheduled 4-day outage was taken to perform the annual inspection in conjunction with unit CT-2 (common step-up transformer). The work performed included a visual inspection, general cleaning, and annual equipment tests. Testing and inspections revealed no abnormalities. Please also see Outage 2-A, below.

C
5/24 – 0.1 days
The unit was taken out of service in order to safely drill holes in the stack to accommodate changes in the New Hampshire Department of Environmental Services NOx emission testing requirements. The work was completed and the unit returned to service.

D
11/4 – 0.1 days
PSNH earlier requested a claimed 10 audit be performed for this unit. ISO-NE calls without notice and the unit must be at 90% load within nine minutes. The unit started but tripped during the audit due to mechanical overspeed. PSNH cleared the alarm and returned the unit to service.

E
11/19 – 0.3 days
Due to the equipment problems in Outage D, above, PSNH took this outage to replace a transducer on the mechanical overspeed device and the three cables to it in an attempt to correct the problem. These items were the suspected cause of Outage D. No definitive conclusion could be drawn as to whether this equipment was the cause of Outage D, however, the problem has not reoccurred.

Merrimack CT-2

A
5/3 – 22.5 days
This scheduled 4-day outage was taken to perform the annual inspection in conjunction with unit CT-1. The work performed included a visual inspection, general cleaning, and annual equipment tests. During this outage, PSNH was going to replace the first row of stationary vanes (blades). The outage was extended when inspection revealed that a piece of the retaining ring was missing. The damage to the retaining ring required returning the complete vane assembly to the factory for the replacement of the entire retaining ring. Repairs were completed and the unit returned to service. Please also see Outage 1-B, above.

B
6/24 – 0.1 days
ISO-NE called for both units to start. CT-2 started and immediately tripped. The unit was placed in manual mode and restarted. The unit was left in the automatic mode and if it fails to start, the operator will intervene and start the unit in manual mode.

The generator voltage regulator is identical to that in CT-1 and also needed to be replaced.

PSNH determined that the generator voltage regulator for CT-2 was in worse condition than CT-1 and will be replaced first. The generator voltage regulator for CT-2 was received in early 2011 and PSNH is still awaiting approval from the ISO-NE to install the equipment. The voltage regulator for CT-1 is currently on order, and will also need ISO-NE approval prior to installation.

C
12/7 – 0.0 days
PSNH initiated the start of the unit when ISO-NE requested that PSNH perform its claimed 10 audit. The unit tripped on incomplete starting sequence. PSNH investigation found nothing and the unit restarted without incident.

D
12/10 – 0.1 days
PSNH was again requested to perform its claimed 10 audit by ISO-NE. The unit tripped right after passing its claimed 10 audit requirements. PSNH traced the problem to the generator voltage regulator.

Evaluation for Combustion Turbine Outages

Accion Group reviewed the outages, above, and found them either to be reasonable and not unexpected for these units and their vintage, or necessary for proper operation of the unit. Accion Group concluded that PSNH conducted proper management oversight during these outages.

W. F. Wyman 4 Outages For 2010

W. F. Wyman Station

The W. F. Wyman Station was sold in the 1990's to a competitive power supplier and competes in the New England competitive market to sell its power. PSNH is a minority owner (approximately 3 percent) of Unit #4 at the station. Nextera Energy Resources (Nextera) owns the majority of the unit and is responsible for day-to-day operations. As a minority owner, PSNH is aware of how the plant conducts business. However, PSNH has little influence over day-to-day operations of the plant provided those operations are within wide operating bounds. This unit is a high cost oil unit operating under tight environmental restrictions. The unit operates at an annual capacity factor of approximately 5 percent. Accion Group makes this distinction because it believes the extent of outside ownership makes the measurement of prudence different than the measurement used for PSNH's wholly-owned and controlled units providing energy at cost to PSNH customers.

The major projects performed at Wyman 4 this year were relay testing for NERC compliance requirements, dovetail pin repair on the LP turbine, and a complete boiler inspection performed during the annual overhaul in Outage F, below.

W. F. Wyman 4

A
1/10– 0.1 days
NERC has adopted a "Bright Line" approach to reliability where power systems down to 100kV must be designed to the same standards that originally only applied to the 230kV and above transmission system.

Central Maine Power Company is the owner of the transmission system at Wyman 4. It required an outage to perform some upgrade work on the transmission system to work towards compliance with the NERC initiative. Similar circumstances were the cause for Outages C, D, and E, below.

B
2/1 – 0.0 days
While operating at 190 MW, the unit tripped. Investigation found the programmable logic controller associated with the stator cooling system monitor failed. The logic controller was replaced and the unit returned to service. Station personnel are redesigning

the monitor system in order to eliminate the logic controller; to bring the information back to the control room and under operator control.

C
2/4 – 0.2 days
Please see Outage A, above.

D
3/7 – 0.1 days
Please see Outage A, above.

E
3/8 – 0.1 days
Please see Outage A, above.

F
4/3 – 31.6 days
The outage was taken to perform the annual overhaul of the unit. The outage had an ISO-NE window of thirty-six days and was internally scheduled for completion in thirty-six days. The critical path throughout the outage was the work associated with repair of the dovetail joints on the LP turbine. Other major work during the outage was a complete inspection of the boiler.

G
5/4 – 0.7 days
Upon startup from the annual overhaul in Outage F, above, the LP turbine was outside of balance vibration range and needed to be rebalanced. Balance adjustments were made and the unit was turned over to operations for restart.

Turbine balancing is an iterative process that is accomplished by trial and error. Although computer aids are very helpful, the analysis of weight distribution along the LP shaft from external to internal adjustment points is complex and generally requires a "homing in" approach to fine-tune the final balance parameters.

H
5/5 – 0.0 days
When restarting the unit, the generator breaker was intentionally tripped to perform generator breaker trip testing. The test was successful and the unit proceeded through startup.

I
5/5 – 1.2 days
Please see Outage G, above.

J
5/6 – 1.0 days
Please see Outage G, above.

K
5/7 – 0.6 days
Please see Outage G, above.

Balancing was brought within required parameters and the unit returned to service.

L
6/24 – 0.1 days
While in its initial operation since balancing was performed on May 7th, the unit developed a high LP shaft bearing vibration and was taken off line. Investigation found that the shaft seal steam attemperator valve (that reduces main auxiliary steam from 890^{o}F at 2 psi to 650^{o}F at 2 psi by water injection) was not operating. The reduced temperature steam is introduced into the LP shaft bearing to seal the bearing with the application of back pressure. The increased temperature resulted in the seal swelling which caused a rub on the shaft and resulted in excess vibration. The attemperator valve was replaced and the unit returned to service.

Subsequent to this outage, changes have been made to the system where the plant operator tunes into required steam values from the control room.

M
7/24 – 1.8 days
The unit was taken out of service to investigate a high vibration in the ID fans. The ID fan blades were cleaned, an air heater wash was performed, and the unit returned to service.

N
8/10 – 0.1 days
When called to run, the unit tripped on lockout during startup. Investigation found that the lockouts were not reset at end of the previous shutdown as required by procedure.

O
9/2 – 0.0 days
The unit was in operation at 500MW and tripped on low drum level. The station had been experiencing an alarm indicating the steam entering the turbine was outside of the required temperature range. The steam temperature is controlled by an attemperator valve positioned between the superheat sections prior to the main steam outlet. The alarms were oscillating in that they were recurring every fifteen to twenty seconds and caused by the control system that requires the attemperator valve to be open nearly 100 percent at this operating level. The operator contacted the shift supervisor. After analysis, the shift supervisor determined that other plant data did not support a problem with the superheater attemperator valve and ordered that the temperature point be taken out of scan.

When the temperature point was taken out of scan, the unit tripped on low drum level. Investigation found that this temperature point is also inputted into the Unit Controller feedwater flow calculations. When the point was taken out of scan, the Unit Controller viewed the loss of the temperature point as a loss of boiler feedwater which generated a low drum level mathematically, and tripped the unit. After-the-fact analysis determined that the valve settings were adequate. Accion Group classifies this outage as caused by operator error.

P
12/10 – 1.0 days
This outage was taken as a planned maintenance outage to perform work on the superheater outlet valve. When in operation the previous weekend, a problem developed with the superheater outlet valve. This outage was scheduled to attend to that problem. The work was performed and the unit returned to service.

Evaluation Except for Outage N

Accion Group reviewed the outages above and found them either to be reasonable and not unexpected for this unit and its vintage, or necessary for proper operation of the unit. Accion Group concluded that PSNH conducted proper management oversight.

Evaluation for Outage N

Startup and shutdown activities follow formal procedures which are generally written with sequenced checklists. In addition, startups and shutdowns are routinely performed, especially on units that often cycle. To miss a step on a formal procedure checklist suggests either gross inattention, filling in the checklist after rounds are made, or not using the checklist at all, none of which is acceptable.

Accion Group recommends that the replacement power cost associated with this outage not be recovered from customers.

Open Stipulation Items from Prior Years

Stipulation Items from the 2008 Energy Service/Stranded Cost Recovery Review (Docket No. DE 09-091) (Labeled as 2009-XX)

During the 2008 Energy Service/Stranded Cost Recovery Charge reconciliation (ES/SCRC) conducted in 2009 in Docket No. DE 09-091, PSNH and the parties stipulated to a number of items to resolve outstanding issues in the case (2009 Stipulation). The 2009 Stipulation was filed on November 20, 2009 and approved in Order No. 25,060 (December 31, 2009). The stipulated items were reviewed in 2010 as part of the 2009 ES/SCRC reconciliation in No. DE 10-121. Many items were closed at that time. Accion Group, Inc. ("Accion Group" or "Accion") reviewed the actions taken by PSNH on each remaining 2008 and new 2009 open stipulated items from the 2010 ES/SCRC review in No. DE 10-121 in the instant docket. Accion's comments follow and a summary of Accion's recommendations appear at the conclusion of this Exhibit.

2009-1 - Mitigation of Customer Costs during MK-2 Turbine Outage

In the 2009 Stipulation Section III-B of the 2009 Stipulation, PSNH agreed to provide a showing of its efforts to mitigate customer costs related to certain 2008 generating unit outages: Outage MK-2 E, Outage NEW 1-C, and Outage NEW 1-D. Only the Outage of MK-2E remained open to capture the final settlement of insurance reimbursement. PSNH agreed to report on this issue part of its filing for the 2010 SCRC review on May 1, 2011 (DE 10-121 Stipulation, Item III.E.1).

Outage MK-2E

At the end of 2010, PSNH submitted claims totaling $13,871,020 for replacement power costs incurred from July 2008 through December 2009; $8,058,859 has been received, and $5,812,161 is outstanding. Also, to date, PSNH submitted $21,016,085 in boiler and machinery claims, with no additional claims to be submitted, and $20,016,085 has been received from the insurance company and applied to the Energy Service charge with the remaining $1,000,000 representing the policy's deductible.

PSNH stated that the insurance company is being very thorough in its review of replacement power costs. PSNH also stated that there are no known issues related to the amount claimed, and expects resolution in 2011.

According to PSNH, its insurance carrier performed an independent analysis regarding the root cause of the foreign material that damaged the MK-2 turbine. The insurance carrier believes it has sufficient documentation to show that Babcock & Wilcox (B&W) was the source of the foreign material and has initiated legal action against B&W to try to recoup its loss. PSNH stated that it has joined in the suit. If recovery is made, PSNH would receive the first $1,000,000 of recovery representing its deductible. Any recovery made by PSNH would be credited to customers.

2009-2 – Schiller Warranty Items

In Section III-D of the 2009 Stipulation, PSNH agreed to submit a report by February 1, 2010, regarding the issues of Alstom's warranty (and performance) issues relating to the outages at Schiller-5 and to continue to file such reports until all issues are resolved.

PSNH files its first report on February 1, 2010 as required. The stipulated items were reviewed in 2010 as part of the 2009 ES/SCRC review in No. DE 10-121. Many items were closed at that time. The only items remaining open at that time were issues involving the forced and induced draft fan capabilities under soft start conditions and the air heater design. Negotiations were continuing to attempt to bring those issues to final resolution. PSNH agreed to report on this issue as part of its filing for the 2010 ES/SCRC review on May 1, 2011 (DE 10-121 Stipulation Item III.E.2).

Forced Draft and Induced Draft Fan Capabilities under Soft Start Conditions

During a start-up in February 2008, the forced draft fan motor faulted. The repair used a higher class of insulation (type H versus installed type F) to endure soft start conditions. PSNH discovered that the induced draft fan motor had the same issue as the forced draft fan motor. PSNH ordered new forced and induced draft fan motors capable of soft start capability. PSNH will rewind the existing motors to original specifications and retain them as spares. Soft start capability had been requested by PSNH in its original design specifications.

Air Heater Design

The air heater experienced excessive leakage due to air heater corrosion and tube failures. The air heater leaks resulted in the unit operating at reduced loads and in difficulty in controlling the bed materials. PSNH retubed a portion of the air heater in 2009 and installed new sleeves in 2010.

PSNH reports that both these issues were successfully resolved with PSNH reaching settlement for a payment of $1,500,000 from Alstom. PSNH received $750,000 in January 2011 and $750,000 in June 2011. Of the funds received, $1,000,000 was credited to capital accounts and $500,000 was credited to O&M accounts.

2009-5 - Interconnection of PSNH Generating Units to the PSNH Distribution System

In Section III-D of the 2009 Stipulation, PSNH agreed to perform an interconnection analysis of all its units connected to its lower voltage distribution system. Over the years, many incorrect unit trips occurred as a result of unrelated system outages. This analysis is an effort to determine if protection coordination is part of the problem. PSNH additionally committed to file a report on its progress on this matter along with an estimated completion schedule with the Commission in the 2009 ES/SCRC review (No. DE 10-121).

PSNH filed a progress report with the Commission on May 7, 2010. The studies were reviewed in 2010 as part of the 2009 ES/SCRC review in Docket No. DE 10-121. At that time, only the undervoltage studies had been completed and implemented. The remaining studies remained open. PSNH agreed to report on this issue part of its filing for the 2010 ES/SCRC review on May 1, 2011 (DE 10-121 Stipulation [2010 Stipulation] Section III.E.5).

In its filing in the instant docket (Docket No. DE 11-094) for review of the 2010 ES/SCRC, PSNH reported that:

1. The NPCC relay test program is in place;
2. The undervoltage relay study is complete;
3. Relay setting letters for the undervoltage relays have been issued;
4. Relay settings have been field verified;
5. NPCC relay testing is complete;
6. Other critical relay testing is complete; and
7. The comprehensive relay testing program is in place.

During its analysis, PSNH found issues relating to coordination in the areas near the hydro units; however, solutions were not identified and implemented until late 2010, so inadvertent trips still appear in quantity in the 2010 ES/SCRC review. PSNH states that the coordination review will be completed in 2011.

PSNH has determined that application of overspeed devices at 120% of speed for vertical units and 110% of speed for horizontal units is appropriate. PSNH found that all undervoltage relays were set at speeds faster than the factory nominal setting of 1.2 seconds. PSNH reset the undervoltage relays to 1.2 seconds. PSNH stated that the undervoltage relay analysis will be completed in 2011. PSNH also stated that it is investigating alternative methods to correct undervoltage deficiencies that could increase the undervoltage time delay to 2.0 seconds. Additionally, PSNH stated that such a solution may not be implemented throughout the fleet since it would be based on need and cost.

2009-8 - Hold Manufacturers Responsible for Unreasonable Delays of Shipments of Major Components and Have Shipment Plans in Place

In Section III-D of the 2009 Stipulation, PSNH agreed to ensure that contractual arrangements with the manufacturer will hold the manufacturer (Siemens) responsible for unreasonable shipping delays and that the manufacturer has plans in place for shipping major components. PSNH contractually burdens the vendor and trucking company with the obligation to "carry safely" and "arrive timely."

Accion Group believes that the process worked well and that both PSNH and Siemens were well in tune with what the other party was doing. Due to the critical nature and financial consequences to customers from transportation mishaps, Accion Group recommended that PSNH evaluate if additional tools such as GPS, speed and shock recorders, or other devices or methods should be employed to further augment its "carry safely" and "arrive timely" goals. This item was conditionally closed upon acceptance. The 2010 Stipulation provided that this item would be reviewed as part of the 2010 ES/SCRC review conducted in 2011 (2010 Stipulation Section III.E.8).

In its 2011 review of the 2010 ES/SCRC reconciliation filing, Accion Group found that PSNH met with Siemens to determine if improvements to the shipping process could be made. Siemens indicated that it was in virtual constant contact with the drivers via cell phone; Siemens also indicated that it uses professional heavy haul drivers, and that the equipment is fully inspected by PSNH upon receipt. PSNH stated that even if PSNH accepts shipment, that acceptance does not void warranties.

PSNH stated that Siemens has been very responsive to its schedule requests. Siemens has added additional personnel to improve schedule at PSNH's request and PSNH regularly participates in discussion with Siemens regarding Siemens' schedule. For the above reasons, PSNH believes that GPS or recorders are not warranted at this time.

Stipulation Items from the 2009 Energy Service/Stranded Cost Recovery Review (Docket No. DE 10-121) (Labeled as 2010-XX)

2010-1 – Siemens' Workmanship Issues (MK-2 Annual maintenance Overhaul – Outage 2-H)

In Section III.D.1 of the 2010 Stipulation, PSNH agreed to submit a report describing the efforts taken, and results achieved in addressing Siemens' workmanship issues as part of its filing for the 2010 ES/SCRC review on May 1, 2011.

In its filing, PSNH stated that it reviewed the Siemens' last five-year supplier evaluations. Those evaluations scored from 97 to 100 (out of 100) indicating that Siemens consistently performs and delivers high quality work.

PSNH also performed a follow-up with Siemens' on this issue and found that Siemens addressed the workmanship issue on its own and took action on its own. After analysis of the incident, Siemens' removed the field engineer from field work assignments. Siemens also performed the necessary rework at no cost to PSNH. For these reasons, and the fact that subsequent work has been performed by Siemens without incident, PSNH believes that the issue has been addressed.

2010-2 – Policy and Practices Review of Overtime Expenditures versus Reserve Shutdown

In Section III.D.2 of the 2010 Stipulation, PSNH agreed to review its policy and practices regarding overtime expenditures and reserve shutdown, on a unit-by-unit basis and between units at all its major stations, to ensure that units are in an operational state that maximizes customer benefits as part of the 2010 ES/SCRC review in 2011.

PSNH considers safety, successful completion of the outage work list, the energy market, different overtime scenarios, fuel inventory levels and deliveries, multi-unit station operating needs, and expected market conditions including weather and regional availability of generation when managing unit outages. To manage these factors, PSNH has initiated conference calls for all its major units modeled after the routine calls that were instituted for Newington Station with the plant operation staff, administrative staff, fuels, and wholesale marketing at a minimum of three times a week. Topics discussed include expected loads, energy prices, status of each unit, potential outages, unit operating constraints, and fuel issues.

2010-3 – Policies and Practices Regarding Early Start of Planned Outages

In Section III.D.3 of the 2010 Stipulation, PSNH agreed to review its policies and practices concerning its ability to start planned outages early on a unit-by-unit basis to ensure that it maximizes the ability to take an outage early while minimizing potential increases in outage duration.

Unit planned outages typically occur in the spring and fall, in parallel with other unit outages in the region. The fact that maintenance work is concentrated in two general time periods limits the flexibility to reschedule labor resources, specialized technical services, and repair facility shop space.

PSNH stated that on major budgeted projects, orders are placed well in advance of outage planning to ensure materials are received on-site in advance to the outage start date. All other materials are requested to be received on-site prior to the outage start date. Vendor services are scheduled based on the outage start date. As the outage start date approaches, discussions take place to discuss starting the outage earlier if a forced outage were to occur. The type of forced

outage, its duration, time to the planned outage, status of scheduled contractors including constraints on an early response, in-house work force availability, and market conditions play a key role in these discussions. As a result, there is a risk that if a forced outage occurs more than a few days prior to the planned outage, contractors and shop facilities may not be available due to commitments at other unit locations. PSNH concluded that further expansion of starting outages early would be cost prohibitive.

2010-4 – Coordination Studies in the Area of the Merrimack Combustion Turbines

In Section III.D.4 of the 2010 Stipulation, PSNH agreed to perform fuse coordination analysis, protection device placement, and lightning protection analysis in this area of the system to ensure that optimum equipment protection is in place, allowing the most reliable operation of these units as part of the 2010 ES/SCRC review in 2011.

PSNH developed a more rigorous testing program for the lightning arrestors on the two combustion turbines and the common main power transformer. As a result of the testing, all lightning arrestors and capacitors associated with the combustion turbines have been changed out. In addition, the lightning arrestors on the main power transformer will be changed out in fall 2011. PSNH stated that it is also in discussions with the Transmission group regarding the installation of a high side breaker on the main power transformer in order to create operational flexibility and simplify protection for the two combustion turbines.

PSNH also performed a fuse and relay coordination study as recommended. No mis-coordination was found.

2010-5 – Valve Position Irregularity

In Section III.D.5 of the 2010 Stipulation, PSNH agreed to establish a procedure that expands its review process of valve position irregularity to include non-safety incidents at all PSNH generating facilities as part of the 2010 Energy Service Stranded Cost Recovery Review in 2011.

PSNH has established an enhanced and formal practice to review/investigate valving incidents. Valving events are reviewed by the Operations Manager to determine if the event warrants an investigation. If an investigation is warranted, the Operations Manager is responsible to author written communications to Shift Supervisors and others as necessary in order to prevent a recurrence of the event.

2010-6 – GenIS Outage Data Base Refinements

In Section III.F of the 2010 Stipulation, PSNH agreed to review its GenIS system capabilities so that the outage data system is useful in performing market based equipment evaluations in the variety of plants that it operates. Such review would include a review of the entire GenIS system along with appropriate changes that might include a different information system such as the GADS system.

Upon the review of the GenIS unit outage tracking system, PSNH determined that the GADS NxI system would provide an improved tool to report GADS data to the ISO-NE, NERC, and the Commission. PSNH stated that the new system will also assist with internal monitoring and management. The GenIS tracking system was replaced with the GADS NxI system as of March 1, 2011.

2010-7 – Focus Purchases on the Shorter Term in Non-Peak Quarters

In Section III.B.1 of the 2010 Stipulation, PSNH agreed to focus more of its supplemental energy purchases on shorter term arrangements and spot market prices during the two non-peak quarters. Such review was requested due to the depressed market energy prices that are expected to continue in the short-term. PSNH's efforts will be reviewed as part of the 2010 ES/SCRC review in 2011.

In 2010, PSNH's purchase strategy envisioned a high migration level and low energy prices. When coupled with PSNH's unit availability, PSNH's supplemental energy needs were met with shorter term bilateral arrangements and ISO-NE administered energy markets. In 2010, PSNH entered into no additional long-term (one year or longer) energy arrangements beyond the three annual 2010 energy purchases contracted for in 2008 and the Bethlehem and Tamworth unit contingent contracts.

2010-8 – Establish Percentage of Supplemental Energy Purchased in Two Peak Quarters

In Section III.B.2 of the 2010 Stipulation, to provide some hedge against market fluctuations during the two peak quarters, PSNH agreed to establish a percentage of its on-peak monthly needs that will be procured from supplemental sources using an established point of reference, such as an approved load forecast. This item will be reviewed as part of the 2010 ES/SCRC review in 2011.

In response to Accion Group's recommendations, PSNH established its "Wholesale Marketing Policy – PSNH Load Asset Management" and attained executive approval for its use. That policy established a directive that no more than a fixed small percentage (confidential) of the positive difference between the adjusted load forecast and the available generation resources, by volume per day during peak hours, shall be purchases through the ISO-NE spot energy markets. With this policy, PSNH does not place an over reliance on potentially fluctuating spot energy markets. In addition to the two peak quarters, PSNH applies this policy during all months of the year.

2010-9 – Establish Formal Basis for Non-Hedge Short-Term Purchases and Sales

In Section III.B.3 of the 2010 Stipulation, PSNH agreed to establish a formal basis from which it would make purchases and sales of supplemental energy that fall outside of projected needs. PSNH's results will as part of the 2010 ES/SCRC review in 2011.

By establishing the percentage of energy that can be obtained from spot markets for peak hours of all days of the year as noted above in section 2010-8, PSNH also established the basis from which additional purchases or sales were required from the amounts originally contracted. Under this policy in 2010, PSNH made four longer term energy purchases and one longer term energy sale, each of which was much less than a year in duration.

2010-10 – Quarterly Review of Supplemental Energy Needs

In Section III.B.4 of the 2010 Stipulation, PSNH agreed to establish a quarterly review of its supplemental energy purchase requirements due to the lagging nature of econometric inputs into its load forecasting methodology. PSNH's process will be reviewed as part of the 2010 ES/SCRC review in 2011.

PSNH did not perform any quarterly reviews of its supplemental energy purchases during 2010 due to the timing of the settlement approval and filing dates for 2010 ES rates and update. PSNH did establish its quarterly review process in 2011 that will be used in the establishment of 2012 ES rates. PSNH will review its supplemental energy supply quarterly to determine if there is a need for supplemental energy purchases or sales. The review will take into account economic utilization of owned generation, existing bilateral arrangements, and IPP energy in the determination of the PSNH ES energy portfolio net position.

In the establishment of quarterly supplemental energy purchases or sales, PSNH has set a minimum percentage (confidential) of supplemental needs that must be met for both the peak and non-peak quarters. PSNH set MW values above which sales must be made, set MW values below which limited exposure is acceptable, and established the exception that PSNH will not sell forward from the expected output of owned generation.

2010-11 – Formally Factor Economic Reserve Shutdowns into Supplemental Energy Purchase Process

In Section III.B.5 of the 2010 Stipulation, agreed to formally and explicity model economic reserve shutdown of its units in the initial determination of supplemental energy needs. Modeling could be done in a manner similar to the modeling done for the short planned unit reliability outages. PSNH modeling would be reviewed as part of the 2010 ES/SCRC review in 2011.

PSNH stated that it always factored economic reserve shutdown of its units into the determination of supplemental energy needs. PSNH also stated that through 2010, and with the data available at the time supplemental energy needs were determined, that only Newington was identified as in economic reserve shutdown. Actual dispatch in 2010 showed that all PSNH base load units experienced economic reserve shutdowns except for Schiller 5. In 2011, PSNH will explicitly factor economic reserve shutdowns into its dispatch for initial supplemental energy determinations.

2010-12 – Establish Formal Criteria for the Sale of Supplemental Energy Purchases that Become Surplus

In Section III.B.6 of the 2010 Stipulation, agreed to establish formal criteria for the sale of purchased surplus supplemental energy into the spot market and to analyze its purchases and formulate sales of surplus energy and capacity into markets other than the spot market. PSNH's criteria would be reviewed as part of the review of 2010 ES/SCRC review in 2011.

By establishing the percentage of energy that can be obtained from spot markets for peak hours of all days of the year, as noted above in section 2010-8, PSNH can also establish the basis from which sales of surplus purchased energy and capacity can be made into other than the spot market. Under this policy in 2010, PSNH made four longer term energy purchases and one longer term energy sale each of which was much less than a year in duration.

Accion Group's Recommendation Summary

2009-1 – Mitigation of Customer Costs related to Certain 2008 Generating Unit Outages

- Close when PSNH files a complete accounting of proceeds and credits with the Commission.
- Open new stipulated item to track PSNH's success in the recovery of its $1,000,000 insurance deductible.

2009-2 – Schiller Warranty Items

- Close when PSNH files a complete accounting of proceeds and credits with the Commission.

2009-5 – Interconnection of PSNH Generating Units to the PSNH Distribution System

- Leave open – Analysis and implementation incomplete. PSNH to include transient stability analysis as part of its effort. File an additional report with the Commission prior to the 2011 ES/SCRC reconciliation review.

2009-8 – Hold Manufacturers Responsible for Unreasonable Delays of Shipments of Major Components and Have Shipment Plans in Place

- Close – Commitment satisfied.

2010-1 – Siemens' Workmanship Issues (MK-2 Annual maintenance Overhaul – Outage 2-H)

- Close – Commitment satisfied.

2010-2 – Policies and Practices Review of Overtime Expenditures versus Reserve Shutdown

- Close – Commitment satisfied.

2010-3 – Policy and Practices Regarding Early Start of Planned Outages

- Close – Commitment satisfied.

2010-4 – Coordination Studies in the Area of the Merrimack Combustion Turbines

- Close – Commitment satisfied.

2010-5 – Valve Position Irregularity

- Close – Commitment satisfied.

2010-6 – GenIS Outage Data Base Refinements

- Close – Commitment satisfied.

2010-7 – Focus Purchases on the Shorter Term in Non-Peak Quarters

- Close – Commitment satisfied.

2010-8 – Establish Percentage of Supplemental Energy Purchased in Two Peak Quarters

- Close – Commitment satisfied.

2010-9 – Establish Formal Basis for Non-Hedge Short-Term Purchases and Sales

- Close – Commitment satisfied.

2010-10 – Quarterly Review of Supplemental Energy Needs

- Close – Commitment satisfied.

2010-11 – Formally Factor Economic Reserve Shutdowns into Supplemental Energy Purchase Process

- Close – Commitment satisfied.

2010-12 – Establish Formal Criteria for the Sale of Supplemental Energy Purchases that Become Surplus

- Close – Commitment satisfied.

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Mr. Cannata's testimony in Docket DE 10-121, Exhibit MDC-2, and page 43. Please update the two tables with 2010 information.

Response:

Please see two tables in the attached document. The 2010 data are from Attachment FBW-2 of White testimony.

Percent of PSNH Energy Requirements Supplied from PSNH and Market Sources

	PSNH Owned Generation		Bilateral and Spot Energy	
Year	Peak	Off-Peak	Peak	Off-Peak
2004	83%	90%	17%	10%
2005	74%	85%	26%	15%
2006	67%	80%	33%	20%
2007	66%	80%	34%	20%
2008	56%	71%	44%	29%
2009	63%	73%	37%	27%
2010	74%	82%	26%	18%

2010 - Percent of PSNH Peak and Off-Peak Energy Requirements Supplied by PSNH and the Markets (1)

Source	Peak	Off-Peak
Merrimack & Schiller	54%	58%
Hydro	5%	7%
Vermont Yankee	2%	3%
IPP's	8%	11%
Buyout Contracts	1%	2%
Newington & Wyman	3%	2%
Combustion Turbines	0%	0%
Bilateral Purchases	22%	7%
ISO-NE Spot Purchases	5%	11%
Total	100%	101%

(1) Percent figures may not add to 100 due to rounding

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Mr. Cannata's testimony in Docket DE 10-121, Exhibit MDC-2, and page 45. Please update the table with 2010 information.

Response:

Please see the attached table.

PSNH Historical FTR Costs and Savings

$(000)

Year	Auction Cost	Avoided Congestion Cost	Net Cost
2003	414	488	(74)
2004	1,341	1,417	(76)
2005	777	896	(119)
2006	301	133	168
2007	973	1,133	(160)
2008	827	237	590
2009	10	122	(112)
2010	31	400	(369)

Public Service Company of New Hampshire
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Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-004
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Witness: **Frederick White,William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Mr. Cannata's testimony in Docket DE 10-121, Exhibit MDC-2, and page 46. Please update the upper table with 2010 information and the lower table with forecasted and actual 2010 information.

Response:
Below is a table of the average annual heat rates for Generation's six steam units updated to include 2010 information.

Units	Average Annual Heat Rate (BTU/kWh)					
	2005	2006	2007	2008	2009	2010
MK1	10,184	10,376	10,264	9,933	10,211	10,221
MK2	10,071	10,328	10,157	9,723	9,919	9,663
NT	11,522	12,270	11,723	11,690	12,382	13,517
SR4	12,558	12,832	13,405	12,244	13,019	13,073
SR5	12,871	9,398	15,565	16,689	17,122	17,131
SR6	12,379	12,460	12,528	12,072	12,644	12,588

Note: Newington Station's heat rate includes warming fuel for equipment and #6 oil, as necessary.

Please see the attached table for 2010 actual and projected capacity factor information (consistent with the lower table in Exhibit MDC-2, page 46) for PSNH's major units.

2010 - Actual and Projected Annual Capacity Factors for PSNH's Major Units
(Annual Generation/Winter Rating/8760)

Unit	Capacity Factor	
	Actual	Projected
Merrimack 1	67.2%	79.6%
Merrimack 2	67.5%	75.5%
Schiller 4	53.4%	68.8%
Schiller 5	79.0%	75.1%
Schiller 6	51.0%	78.7%
Newington	6.4%	3.0%

Public Service Company of New Hampshire
Docket No. 11-094

Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-005
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Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Settlement Agreement reached in Docket DE 10-121, dated January 11, 2011, page 3, Section III.B.1. Please have available for inspection at PSNH offices in Manchester, NH a detailed write-up of PSNH's approach to supplemental energy purchases in 2010 incorporating this recommendation.

Response:

PSNH will have available for inspection a write-up of PSNH's approach to supplemental energy purchases for 2010. The subject settlement agreement dated January 11, 2011 was approved by NHPUC Order No. 25,216 on April 29, 2011. PSNH's 2010 activities may not necessarily match up with the timing of the Commission Order with all of the 2010 activity.

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Settlement Agreement reached in Docket DE 10-121, dated January 11, 2011, page 3, Section III.B.2. Please have available for inspection at PSNH offices in Manchester, NH a detailed write-up of PSNH's method used to establish the purchase percentages in this recommendation and the final values arrived at. In addition, please supply any contemplated changes in the approach used.

Response:

PSNH will have available for inspection a write-up of PSNH's approach to establishing percentage based peak period energy purchases for 2010. The subject settlement agreement dated January 11, 2011 was approved by NHPUC Order No. 25,216 on April 29, 2011. PSNH's 2010 activities may not necessarily match up with the timing of the Commission Order with all of the 2010 activity.

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Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-007
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Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Settlement Agreement reached in Docket DE 10-121, dated January 11, 2011, page 3, Section III.B.3. Please have available for inspection at PSNH offices in Manchester, NH a detailed write-up of PSNH's approach to short term supplemental energy purchases and sales.

Response:

PSNH will have available for inspection a write-up of PSNH's approach to supplemental short term energy purchases and sales for 2010. The subject settlement agreement dated January 11, 2011 was approved by NHPUC Order No. 25,216 on April 29, 2011. PSNH's 2010 activities may not necessarily match up with the timing of the Commission Order with all of the 2010 activity.

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Settlement Agreement reached in Docket DE 10-121, dated January 11, 2011, page 3, Section III.B.4. Please supply PSNH's actions adjusting its supplemental purchases as a result of changing 2010 load forecasts. In addition, please supply the quarterly 2010 load forecasts plus any 2010 load forecast (and vintage) used to make 2010 supplemental energy purchases.

Response:

PSNH's 2010 energy forecast in September, 2009 was 8,324 GWh. The forecast was updated, and in December, 2009 was 8,238 GWh, a 1% decrease. In June, 2010; for the June to December forecast period, there was a further 0.7% decrease. In December, 2010; for December, there was a 0.6% increase in the forecast. As can be seen from the above figures, the "base" load forecast did not significantly change through time over the planning horizon and delivery period. However, customer migration to 3rd party suppliers changed from as low as 10% in early 2009, to 32% by 2010 year-end. The NUSCO wholesale power contracts department analyzes the most current available actual load data for the purposes of evaluating customer migration and to evaluate prior migration adjusted forecasts versus actual loads, whereby any significant lagging impacts due to econometric inputs would be revealed. PSNH's purchase strategy was to evaluate energy needs with due consideration of migration and high generating unit availability when considering supplemental energy purchases prior to the start of the delivery period, and managing any remaining purchase needs through bilateral and ISO-New England administered energy markets during the delivery period. Given the uncertainty of migration and the continuing sluggish economy during 2010, PSNH did not make any purchases more than a week in advance of delivery, other than three 2010 annual energy purchases transacted in 2008, and the Bethlehem and Tamworth unit contingent contracts.

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Dated: 06/23/2011
Q-STAFF-009
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Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Settlement Agreement reached in Docket DE 10-121, dated January 11, 2011, page 3, Section III.B.6. Please have available for inspection at PSNH offices in Manchester, NH a detailed write-up of PSNH's formal criteria approach to short term supplemental energy purchases and sales to other than the spot market.

Response:

PSNH will have available for inspection a write-up of PSNH's approach to supplemental short term energy purchases and sales for 2010. The subject settlement agreement dated January 11, 2011 was approved by NHPUC Order No. 25,216 on April 29, 2011. PSNH's 2010 activities may not necessarily match up with the timing of the Commission Order with all of the 2010 activity.

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Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-010
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Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Settlement Agreement reached in Docket DE 10-121, dated January 11, 2011, page 3, Section F. Please have available for inspection at PSNH offices in Manchester, NH a detailed write-up of PSNH's efforts to replace or make changes to its GenIS unit outage tracking system.

Response:
Consistent with the Docket DE 10-121 settlement agreement dated January 11, 2011 and approved by NHPUC Order No. 25,216 on April 29, 2011, PSNH will be prepared to review the status of replacing the the GenIS unit outage tracking system.

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, page 2 (Bates 50), lines 23-28. By unit and by month, please show MW modeled as on economic reserve shutdown. Please repeat the request for actual reserve shutdown conditions.

Response:

Please see the attached table for the requested information for the Merrimack, Schiller, and Newington units. The information is limited to these units to avoid unduly burdensome analysis or because the information on other units is not available.

2010 - Economic Reserve Shutdown Hours

	Merrimack 1			Merrimack 2			Schiller 4			Schiller 5			Schiller 6			Newington		
		Economic Reserve Shutdown Hours			Economic Reserve Shutdown Hours			Economic Reserve Shutdown Hours			Economic Reserve Shutdown Hours			Economic Reserve Shutdown Hours			Economic Reserve Shutdown Hours	
2010	MWh/Hr	Modeled *	Actual	MWh/Hr	Modeled *	Actual	MWh/Hr	Modeled *	Actual	MWh/Hr	Modeled	Actual	MWh/Hr	Modeled *	Actual	MWh/Hr	Modeled	Actual
Jan	114.0	0	0	338.4	0	0	48.0	0	0	45.8	0	0	48.6	0	0	400.2	665	686
Feb	114.0	0	1	338.4	0	0	48.0	0	0	45.8	0	0	48.6	0	0	400.2	612	586
Mar	114.0	0	0	338.4	0	0	48.0	0	0	45.8	0	0	48.6	0	0	400.2	600	715
Apr	114.0	0	0	338.4	0	0	48.0	0	506	45.8	0	0	48.6	0	478	400.2	618	720
May	114.0	0	5	338.4	0	0	48.0	0	83	45.8	0	0	48.6	0	426	400.2	744	644
Jun	112.5	0	0	337.2	0	0	47.5	0	1	43.1	0	0	47.9	0	316	400.2	720	519
Jul	112.5	0	24	337.2	0	4	47.5	0	60	43.1	0	0	47.9	0	0	400.2	621	459
Aug	112.5	0	0	337.2	0	13	47.5	0	33	43.1	0	0	47.9	0	0	400.2	736	570
Sep	112.5	0	0	337.2	0	0	47.5	0	243	43.1	0	1	47.9	0	0	400.2	720	541
Oct	114.0	0	604	338.4	0	144	48.0	0	8	45.8	0	0	48.6	0	521	400.2	744	538
Nov	114.0	0	186	338.4	0	682	48.0	0	10	45.8	0	2	48.6	0	32	400.2	720	316
Dec	114.0	0	0	338.4	0	0	48.0	0	0	45.8	0	2	48.6	0	0	400.2	728	573
Total	113.5	0	820	338.0	0	843	47.8	0	944	44.9	0	5	48.4	0	1,773	400.2	8,228	6,867

* During the forecast work done in Fall, 2009 for the full year rate setting and in Spring, 2010 for the mid-year rate review, the forward energy markets indicated the coal units to be economic to dispatch. In actual there were periods during the months where economic reserving the units made economic sense.

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Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-012
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Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
By unit and by month, please show the resultant reduction in unit capacity factors and availabilities with planned maintenance outages excluded due to economic reserve shutdown conditions. Also include before and after values in your response.

Response:

Please see the attached table for the requested information for the Merrimack, Schiller, and Newington units. The information is limited to these units to avoid unduly burdensome analysis or because the information is not available. The figures represent the reductions in each unit's capacity factors due to the hours in economic reserve shutdown status. Reference Staff-01, Q-Staff-004 and 011, for capacity factor and economic reserve shutdown information, respectively. If PSNH understands the question properly, before and after values refer to forward looking modeling and actual values, respectively.

2010 - Reductions in Capacity Factors Due to Economic Reserve Shutdown Status

	Merrimack 1		Merrimack 2		Schiller 4		Schiller 5		Schiller 6		Newington	
	Economic Reserve Shutdown Equivalent CFs											
2010	Modeled *	Actual	Modeled *	Actual	Modeled *	Actual	Modeled	Actual	Modeled *	Actual	Modeled	Actual
Jan	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	89.4%	92.2%
Feb	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	91.1%	87.2%
Mar	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	80.6%	96.1%
Apr	0.0%	0.0%	0.0%	0.0%	0.0%	70.3%	0.0%	0.0%	0.0%	66.4%	85.8%	100.0%
May	0.0%	0.7%	0.0%	0.0%	0.0%	11.2%	0.0%	0.0%	0.0%	57.3%	100.0%	86.6%
Jun	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	43.9%	100.0%	72.1%
Jul	0.0%	3.2%	0.0%	0.5%	0.0%	8.1%	0.0%	0.0%	0.0%	0.0%	83.5%	61.7%
Aug	0.0%	0.0%	0.0%	1.7%	0.0%	4.4%	0.0%	0.0%	0.0%	0.0%	98.9%	76.6%
Sep	0.0%	0.0%	0.0%	0.0%	0.0%	33.8%	0.0%	0.1%	0.0%	0.0%	100.0%	75.1%
Oct	0.0%	81.2%	0.0%	19.4%	0.0%	1.1%	0.0%	0.0%	0.0%	70.0%	100.0%	72.3%
Nov	0.0%	25.8%	0.0%	94.7%	0.0%	1.4%	0.0%	0.3%	0.0%	4.4%	100.0%	43.9%
Dec	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	97.8%	77.0%
Total	0.0%	9.4%	0.0%	9.6%	0.0%	10.8%	0.0%	0.1%	0.0%	20.2%	93.9%	78.4%

* During the forecast work done in Fall, 2009 for the full year rate setting and in Spring, 2010 for the mid-year rate review, the forward energy markets indicated the coal units to be economic to dispatch. In actual there were periods during the months where economic reserving the units made economic sense.

Witness: Frederick White
Request from: New Hampshire Public Utilities Commission Staff

Question:
By unit, please supply the dates and times when the unit was in economic reserve shutdown condition according to the ISO-NE.

Response:

ISO-NE does not explicitly identify periods of economic reserve shutdowns. PSNH has identified such periods based on a review of available data; i.e. - periods when a unit was not generating and was not on a planned or unplanned outage. Please refer to Staff-01, Q-Staff-011 and 012.

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Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-014
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Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
For each instance where a unit was in economic reserve shutdown supplied directly above, please indicate if the unit was actually taken off line. If not taken off line, please indicate the reasoning to remain on line.

Response:

Please refer to the information provided in Staff-01, Q-Staff-011 and 012. For the periods identified therein the unit(s) was taken off-line, and available for dispatch. If the unit was not off-line then it was not on "economic reserve shutdown." A unit may be on-line and dispatched at less than full load for a variety of reasons; such as for economics, being used for reserves, to avoid shutdown and start-up costs, and operational or system constraints.

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, page 2 (Bates 50), lines 27-28. Please explain by facility how PSNH used Bethlehem, Tamworth, and Lempster as unit contingency power purchases in its energy supply. As part of your response, please include a table which shows the on-peak and off-peak energy purchased from each facility and the average price paid per month. Please also show how each was treated from a capacity viewpoint.

Response:
PSNH and the NUSCO Bidding and Scheduling group (B&S) receive from each of the three units on a daily basis a forecast of expected hourly generation for the next operating day, including derate or outage information. In turn, B&S interacts on the units' behalf with ISO-NE to schedule the forecasted hourly energy amounts. In this way a proper amount of energy is accounted for in the PSNH ES portfolio for purposes of serving load. Attached is a table showing the requested data including PSNH's capacity MW credit from each unit.

** A portion of this response is proprietary and confidential and is available only to signatories of the nondisclosure agreement.

2010 Capacity and Energy Amounts

		Bethlehem					Tamworth					Lempster				
Year	Month	Capacity MW	Peak	MWh Off-Peak	Total	Ave. Price Paid $/MWh	Capacity MW	Peak	MWh Off-Peak	Total	Ave. Price Paid $/MWh	Capacity MW	Peak	MWh Off-Peak	Total	** Ave. Price Paid $/MWh
2010	1	15.3	4,859	6,571	11,430	84.3	18.2	6,127	8,004	14,131	85.0	6.4	3,169	4,181	7,350	[redacted]
	2	15.2	4,928	5,371	10,299	78.6	18.4	6,276	6,703	12,980	78.4	6.6	3,703	4,151	7,854	
	3	15.1	5,729	5,859	11,588	53.0	18.7	6,907	7,225	14,132	65.4	6.8	2,979	3,466	6,445	
	4	15.1	4,704	5,355	10,059	65.9	18.8	4,868	5,420	10,288	46.1	6.9	2,707	2,515	5,222	
	5	15.1	4,376	5,505	9,881	65.6	19.0	4,588	5,053	9,641	67.7	6.8	1,672	2,879	4,551	
	6	14.8	5,415	5,673	11,088	65.7	20.0	6,435	6,157	12,592	60.8	4.0	1,791	1,977	3,768	
	7	14.8	5,128	6,385	11,513	72.9	20.0	6,672	7,862	14,534	66.3	4.0	1,560	1,889	3,449	
	8	14.8	5,487	6,151	11,637	77.8	20.0	7,076	7,798	14,875	79.4	4.0	1,622	2,061	3,683	
	9	14.8	5,178	5,938	11,115	65.3	20.0	6,725	7,727	14,451	65.5	4.0	2,464	2,906	5,370	
	10	14.7	5,229	6,193	11,422	65.2	20.0	6,214	7,787	14,001	67.8	4.0	3,146	4,010	7,155	
	11	14.7	5,093	5,842	10,936	65.1	20.0	6,084	6,177	12,261	66.6	4.0	2,373	3,239	5,612	
	12	14.7	5,602	5,761	11,362	62.8	20.0	6,809	7,052	13,860	65.8	4.0	4,131	3,608	7,739	
	Total	179.2	61,728	70,603	132,330	68.5	233.0	74,781	82,965	157,747	68.5	61.3	31,316	36,883	68,199	

Public Service Company of New Hampshire
Docket No. 11-094

Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-016
Page 1 of 1

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, page 2 (Bates 50), line 31 through page 3, line 5. Please describe the PSNH 2010 strategies to a) procure each energy product from the market to supplement PSNH resources, b) procure capacity to supplement PSNH resources, and c) acquire FTR's for each unit to manage congestion. If those strategies have changed from 2009, please explain the changes and reasoning for those changes.

Response:

The supplemental capacity and FTR purchase strategies for 2010 were not materially different from what was done for 2009. Regarding supplemental energy purchase strategies, in previous years the strongest motive was to minimize over/under recoveries by locking in volumes and prices. However, the recession and migration impacted predictability about the volumes needed and the price of energy; and not knowing a certain volume and/or price imparts some risk to Energy Service (ES) customers, as does locking in firm supply at a fixed price. This dynamic necessitates a balance between forward and contemporaneous procurements.

a. Fundamentally, the starting point for determining how much supplemental energy was needed to meet ES energy requirements was to compare the expected economic operation of resources owned or contracted to PSNH, including IPP purchases, to its forecasted ES needs. PSNH's purchase strategy was to evaluate energy needs with due consideration of migration and high generating unit availability when considering supplemental energy purchases prior to the start of the delivery period, and managing any remaining energy purchase needs through bilateral and ISO-New England administered energy markets during the delivery period. Given the uncertainty of migration and the continuing sluggish economy during 2010, PSNH did not make any energy purchases more than a week in advance of delivery, other than three 2010 annual energy purchases transacted in 2008, and the Bethlehem and Tamworth unit contingent contracts. Ultimately in 2010, PSNH's energy purchase strategy resulted in near term purchases made for short durations.

b. PSNH does not have to hold in its name the amount of capacity needed to serve energy service customer requirements. PSNH is paid for the capacity it holds and pays for its share of ISO-NE capacity market costs resulting from serving energy service customer load. Because any shortfall would be handled automatically in the ISO-NE capacity market settlement system at prices that were known for 2010 since early 2008, PSNH did not procure capacity other than through the ISO-NE capacity market system. Additionally, had it desired to do so, it would have been difficult to know the quantity to procure due to the migration of customers to 3rd party suppliers.

c. PSNH procures FTRs to hedge the potential for congestion between significant supply resources (Merrimack, Schiller, Newington, delivery location for bilateral purchases (e.g. - Mass. Hub) and the New Hampshire load zone. See responses to Staff-1, Q-Staff-24 & 25, for additional information on 2010 FTR activity.

Witness: Frederick White
Request from: New Hampshire Public Utilities Commission Staff

Question:
Reference White testimony, page 3 (Bates 51), lines 7-12. Please supply the customer migration assumptions (MW and MWH) used by PSNH by month in its model for 2010 capacity and energy purchases. As part of your response, please also supply the actual customer migration MW and MWH by month.

Response:

Please see the attached table. PSNH does not forecast migration and uses in its model the most recent migration information available at the time of the filing.

2010 Capacity and Energy Obligations

	Actual						Model Assumptions	
	Total PSNH		ES		3rd Party Supply		ES	
2010	MW-Mnths	MWh	MW-Mnths	MWh	MW-Mnths	MWh	MW-Mnths	MWh
Jan	2,444	738,971	1,739	550,374	705	188,598	1,705	553,872
Feb	2,464	637,101	1,730	466,310	734	170,791	1,705	494,461
Mar	2,573	665,178	1,780	473,793	793	191,386	1,762	492,546
Apr	2,550	603,468	1,753	418,592	797	184,876	1,728	440,396
May	2,459	652,526	1,677	450,635	782	201,892	1,728	446,291
Jun	2,197	703,200	1,537	482,800	660	220,400	1,479	452,337
Jul	2,197	838,003	1,525	592,941	673	245,063	1,479	517,821
Aug	2,197	767,700	1,518	525,734	679	241,966	1,479	515,835
Sep	2,197	675,053	1,505	446,926	693	228,128	1,505	455,731
Oct	2,207	641,940	1,506	427,083	701	214,857	1,505	448,852
Nov	2,207	650,243	1,491	437,490	716	212,753	1,505	444,799
Dec	2,126	741,222	1,437	513,569	689	227,653	1,420	494,697
	27,819	8,314,608	19,198	5,786,247	8,621	2,528,361	19,003	5,757,638

Public Service Company of New Hampshire
Docket No. 11-094

Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-018
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Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, page 3 (Bates 51), lines 20-21. Please provide a schedule, by month, supporting how the 865 GWH of on-peak bilateral purchased energy breaks down into the components listed with an average price for each and total.

Response:

Please see the attached table.

2010 - Peak Bilateral Energy Purchases

	Monthly		Unit-Contingent		Short-Term		Total	
2010	MWh	Avg $/MWh	MWh	Avg $/MWh	MWh	Avg $/MWh	MWh	Avg $/MWh
Jan	48,000	93.8	10,986	80.4	0	0.0	58,986	91.3
Feb	48,000	93.8	11,204	80.4	4,800	60.9	64,004	89.0
Mar	55,200	93.8	12,636	69.4	0	0.0	67,836	89.2
Apr	52,800	93.8	9,572	69.4	0	0.0	62,372	90.0
May	48,000	93.8	8,964	69.4	0	0.0	56,964	89.9
Jun	52,800	93.8	11,850	69.4	0	0.0	64,650	89.3
Jul	50,400	93.8	11,800	80.4	0	0.0	62,200	91.2
Aug	52,800	93.8	12,563	80.4	9,600	68.9	74,963	88.3
Sep	50,400	93.8	11,903	69.4	11,200	49.5	73,503	83.1
Oct	50,400	93.8	11,443	69.4	44,000	42.8	105,843	70.0
Nov	117,600	62.3	11,177	69.4	(22,400)	40.9	106,377	67.6
Dec	55,200	93.8	12,410	69.4	0	0.0	67,610	89.3
Total	681,600	88.3	136,509	73.2	47,200	52.5	865,309	84.0

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, page 3 (Bates 51), lines 31-32. Please provide a schedule, by month, supporting how the 271 GWH of off-peak bilateral purchased energy breaks down into the components listed with an average price for each and total.

Response:

Please see the attached table.

2010 - Off-Peak Bilateral Energy Purchases

2010	Monthly		Unit-Contingent		Short-Term		Total	
	MWh	Avg $/MWh	MWh	Avg $/MWh	MWh	Avg $/MWh	MWh	Avg $/MWh
Jan	0	0.0	14,575	59.5	6,400	66.0	20,975	61.5
Feb	0	0.0	12,074	59.5	0	0.0	12,074	59.5
Mar	0	0.0	13,084	52.2	0	0.0	13,084	52.2
Apr	0	0.0	10,775	52.2	0	0.0	10,775	52.2
May	0	0.0	10,558	52.2	6,400	45.0	16,958	49.5
Jun	0	0.0	11,830	52.2	0	0.0	11,830	52.2
Jul	0	0.0	14,247	59.5	7,200	58.8	21,447	59.2
Aug	0	0.0	13,949	59.5	0	0.0	13,949	59.5
Sep	0	0.0	13,664	52.2	6,400	46.8	20,064	50.5
Oct	0	0.0	13,981	52.2	41,600	36.9	55,581	40.7
Nov	77,000	34.7	12,019	53.0	(28,000)	40.9	61,019	35.5
Dec	0	0.0	12,812	52.2	0	0.0	12,812	52.2
Total	77,000	34.7	153,568	54.9	40,000	45.6	270,568	47.8

Notes:
The September MWh value includes a correction from the value in FBW-3 (40 MWh decrease in Short-Term).
The October $/MWh value includes a correction from the value in FBW-3 ($3.9 & $2.9 per MWh decrease in Short-Term & Total, resp.)

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, page 4 (Bates 52), lines 9-12. Were all off-peak and on-peak energy sales made to the ISO-NE spot market? If so, please supply a list by date and hours when 50 MW or greater was sold to the spot market. Please duplicate the response for 100 MW.

Response:

No, all peak and off-peak energy sales were not made to the ISO-NE spot market. In November, 2010 PSNH sold 100 MW of 7x24 energy in the bilateral market. Nevertheless, the attached tables provide a list of energy sales to the ISO-NE spot market, per the request. In the tables a "1" indicates an hour when either 50 MW or more (pg 2), or 100 MW or more (pg3), of energy was sold to the ISO-NE spot market.

"1" indicates an hour when 50 MW or more of energy was sold to the ISO-NE spot market.

	Hour																							
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Grand Total
01/01/2010	1	1	1	1	1	1	1	1	1													1	1	1	9
01/05/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17
01/06/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
01/07/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
01/08/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
01/09/2010	1	1	1	1	1	1	1																	1	8
01/10/2010	1	1	1	1	1	1	1																	1	8
01/11/2010	1	1	1	1	1	1							1	1	1	1						1	1	1	13
01/12/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1							1	1	17
01/13/2010	1	1	1	1	1																		1	1	7
01/14/2010	1	1	1	1	1	1					1	1	1	1	1	1						1	1	1	15
01/15/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1			1	1	1	1	1	21
01/16/2010	1	1	1	1	1	1	1	1															1	1	10
01/17/2010	1	1	1	1	1	1	1	1															1	1	10
01/18/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	23
01/19/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
01/20/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
01/21/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
01/22/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
01/23/2010	1	1	1	1	1	1	1																	1	8
01/24/2010	1	1	1	1	1	1	1	1															1	1	10
01/25/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
01/26/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	21
01/27/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1				1	1	1	1	20
01/28/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
01/29/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1									15
02/01/2010																							1		1
02/04/2010		1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	18
02/05/2010	1		1	1	1			1	1	1	1	1	1	1	1	1	1				1	1	1	1	18
02/06/2010	1	1	1	1	1	1																		1	7
02/07/2010	1	1	1	1	1	1	1																	1	8
02/08/2010	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1					1	1	1	18
02/09/2010	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1					1	1	1	18
02/10/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
02/11/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
02/12/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1				1	1	1	1	20
02/13/2010	1	1	1	1	1	1	1																1	1	9
02/14/2010	1	1	1	1	1	1	1	1															1	1	10
02/15/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	21
02/16/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
02/17/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	22
02/18/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21
02/19/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
02/20/2010	1	1	1	1	1																				5
02/21/2010		1	1	1	1	1																			5
02/22/2010		1	1	1	1	1		1	1	1	1	1	1	1	1	1	1				1	1	1	1	20
02/23/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1				1	1	1	1	20
02/24/2010	1	1	1	1	1	1		1	1						1							1	1	1	12
02/25/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1			1	1		1	1	1	1	1	21
02/26/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
02/27/2010	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1					1	1	1	19
02/28/2010	1	1	1	1	1	1	1	1	1	1													1	1	12
03/01/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
03/02/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
03/03/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
03/04/2010	1		1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	18
03/05/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	22
03/06/2010	1	1	1	1	1	1	1	1							1	1							1	1	12
03/07/2010	1	1	1	1	1	1	1	1	1					1	1	1							1	1	14
03/08/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	21
03/09/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	21
03/10/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	21
03/11/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	20
03/12/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	22
03/13/2010	1	1	1	1	1	1	1	1				1	1	1	1	1	1	1	1	1	1		1	1	20
03/14/2010	1		1	1	1	1	1	1	1																8
03/15/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
03/16/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21
03/17/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
03/18/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
03/19/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
03/20/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18
03/21/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11
03/22/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21
03/23/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18
03/24/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	22
03/25/2010	1		1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	22
03/26/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
03/27/2010	1	1	1	1	1	1	1																	1	8
03/28/2010	1	1	1	1	1	1	1	1																1	9
03/29/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1				1	1	1	19
03/30/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1				1	1	1	18
03/31/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	20

"1" indicates an hour when 50 MW or more of energy was sold to the ISO-NE spot market.

	Hour																							
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Grand Total
04/01/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
04/02/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
04/03/2010	1	1	1	1	1	1	1	1																1	9
04/04/2010	1	1	1	1	1	1	1	1								1							1	1	11
04/05/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	22
04/06/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
04/07/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	21
04/08/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	21
04/09/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1		18
04/10/2010	1	1	1	1	1	1	1																		7
04/11/2010		1	1	1	1	1	1	1																1	8
04/12/2010	1	1	1	1	1	1								1	1	1	1						1	1	12
04/13/2010	1	1	1	1	1																				5
04/21/2010																							1		1
04/22/2010			1	1																			1		3
04/23/2010			1	1																					2
05/06/2010				1																					1
05/07/2010			1	1																					2
05/09/2010			1	1	1	1																			4
05/10/2010		1	1	1					1	1	1	1	1	1	1	1	1	1			1	1	1	1	17
05/11/2010	1																								1
05/12/2010			1	1																			1		3
05/13/2010			1	1																					2
05/14/2010		1	1	1	1																				4
05/15/2010			1	1	1																				3
05/16/2010				1	1	1																			3
05/17/2010		1	1	1																					3
05/18/2010			1	1																					2
05/19/2010			1	1																					2
05/20/2010		1	1	1	1			1	1	1	1	1	1	1											11
05/22/2010								1																	1
05/23/2010								1					1	1											3
05/24/2010									1	1	1												1		4
05/25/2010	1	1	1	1	1	1		1															1		8
05/26/2010	1	1	1	1	1	1		1							1	1	1	1			1	1	1	1	15
05/27/2010	1	1	1	1	1	1		1	1	1	1	1	1	1									1		14
05/28/2010		1	1	1	1																				4
05/30/2010			1	1	1	1	1																		5
05/31/2010	1	1	1	1	1	1	1																		7
06/01/2010	1	1	1	1	1	1											1						1		8
06/02/2010		1	1	1	1									1	1	1									7
06/03/2010			1	1	1										1		1								5
06/04/2010			1	1	1									1	1	1	1	1	1	1					10
06/05/2010	1	1	1	1	1	1	1																	1	8
06/06/2010	1	1	1	1	1	1	1	1	1	1	1			1	1	1	1						1	1	17
06/07/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
06/08/2010	1	1	1	1	1	1		1	1	1	1			1	1	1							1	1	15
06/09/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							1	1	18
06/10/2010	1	1	1	1	1	1		1	1														1	1	10
06/11/2010	1	1	1	1	1	1		1	1	1									1	1		1	1		13
06/12/2010	1	1	1	1	1	1	1																	1	8
06/13/2010	1	1	1	1	1	1	1	1																1	9
06/14/2010	1	1	1	1	1	1		1	1														1		9
06/15/2010	1	1	1	1	1	1		1															1		8
06/16/2010	1	1	1	1	1	1		1	1	1													1	1	11
06/17/2010	1	1	1	1	1	1		1	1														1		9
06/18/2010	1	1	1	1	1	1		1	1	1															9
06/19/2010		1	1	1	1	1	1																		6
06/20/2010			1	1	1	1	1																		5
06/21/2010			1	1	1	1		1	1	1	1	1	1	1	1	1	1	1							15
06/22/2010		1	1	1	1	1		1															1		7
06/23/2010		1	1	1	1								1	1	1	1	1	1	1	1	1	1			14
06/24/2010			1	1	1					1	1	1	1	1	1	1	1	1	1	1	1				15
06/25/2010			1	1	1	1		1															1		6
06/26/2010		1	1	1	1	1	1																		6
06/27/2010		1	1	1	1	1	1																		6
06/28/2010			1	1	1			1	1	1	1	1			1	1	1	1							12

"1" indicates an hour when 50 MW or more of energy was sold to the ISO-NE spot market.

	Hour																							
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Grand Total
07/01/2010		1	1	1	1																				4
07/02/2010			1	1				1	1	1	1	1	1	1	1	1	1	1					1		14
07/03/2010	1	1	1	1	1	1	1	1	1																9
07/04/2010								1																	1
07/05/2010								1																	1
07/14/2010								1	1	1															3
07/15/2010								1	1																2
07/16/2010								1	1	1	1	1	1	1	1	1	1	1							11
07/20/2010								1		1	1	1	1	1	1	1									8
07/21/2010				1										1	1	1	1	1							6
07/22/2010			1	1	1			1	1	1		1	1	1	1	1	1	1							13
07/23/2010		1	1	1	1	1		1	1	1													1		9
07/24/2010	1	1	1	1	1	1	1																		7
07/26/2010		1	1	1	1	1		1	1	1													1		9
07/27/2010		1	1	1	1	1		1					1	1	1	1	1	1	1			1	1		15
07/28/2010			1	1	1			1	1	1			1	1	1	1	1	1							12
07/29/2010									1		1	1	1	1	1	1	1	1							9
07/30/2010			1	1	1	1		1						1	1	1			1	1	1		1		12
07/31/2010	1	1	1	1	1	1	1																		7
08/01/2010	1	1	1	1	1	1	1	1																	8
08/02/2010	1	1	1	1	1	1		1																	7
08/03/2010			1	1	1								1	1	1	1	1	1							9
08/04/2010													1	1	1	1			1	1					6
08/05/2010													1	1	1										3
08/06/2010											1	1	1	1		1	1						1		7
08/07/2010	1	1	1	1	1	1	1																		7
08/08/2010	1	1	1	1	1	1	1	1														1	1		10
08/09/2010	1	1	1	1	1			1					1	1	1	1	1	1	1	1	1	1			16
08/10/2010												1	1												2
08/11/2010											1	1	1	1	1	1	1	1	1	1	1	1	1		13
08/13/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
08/14/2010	1	1	1	1	1	1	1																		7
08/15/2010	1	1	1	1	1	1	1	1																	8
08/16/2010		1	1	1	1	1		1															1		7
08/17/2010			1	1	1			1	1														1		6
08/18/2010								1	1																2
08/19/2010			1	1				1	1	1				1	1	1	1	1	1			1	1		13
08/20/2010				1							1	1	1	1	1	1	1	1	1				1		11
08/21/2010	1	1	1	1	1	1	1																		7
08/22/2010	1	1	1	1	1	1	1	1							1	1	1							1	12
08/23/2010	1	1	1	1	1	1		1	1	1													1	1	11
08/24/2010	1	1	1	1	1	1		1	1	1												1	1	1	12
08/25/2010	1	1	1	1	1	1		1	1														1	1	10
08/26/2010	1	1	1	1	1	1		1	1										1	1	1		1		12
08/27/2010	1	1	1	1	1	1	1	1	1														1		10
08/28/2010	1	1	1	1	1	1	1																		7
08/29/2010	1	1	1	1	1	1	1																		7
08/30/2010		1	1	1	1			1	1	1				1	1	1	1	1							12
08/31/2010				1								1	1	1	1	1									6
09/01/2010													1	1	1										3
09/02/2010														1	1										2
09/03/2010								1																	1
09/04/2010				1																					1
09/05/2010	1	1	1	1	1	1	1	1																1	9
09/06/2010	1	1	1	1	1	1	1	1																1	9
09/07/2010	1	1	1	1	1	1		1	1																8
09/08/2010		1	1	1	1			1	1	1	1	1	1	1	1	1							1		14
09/09/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
09/10/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	22
09/11/2010	1	1	1	1	1	1	1	1																1	9
09/12/2010	1	1	1	1	1	1	1	1																1	9
09/13/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
09/14/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
09/15/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	21
09/16/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
09/17/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	22
09/18/2010	1	1	1	1	1	1	1			1			1	1	1	1	1							1	14
09/19/2010	1	1	1	1	1	1	1	1									1	1	1	1			1	1	14
09/20/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	21
09/21/2010	1	1	1	1	1	1		1	1	1	1														10
09/22/2010											1	1	1	1	1	1		1							7
09/25/2010								1					1			1	1	1							5
09/30/2010																				1	1	1	1		4

"1" indicates an hour when 50 MW or more of energy was sold to the ISO-NE spot market.

	Hour																							
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Grand Total
10/01/2010														1	1	1							1		4
10/02/2010								1																	1
10/19/2010																							1		1
10/20/2010																							1		1
10/25/2010																							1		1
10/26/2010																						1	1		2
10/27/2010					1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19
10/28/2010	1	1	1					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
10/29/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1						1		17
11/01/2010				1																					1
11/04/2010																							1		1
11/05/2010		1	1	1	1																		1		5
11/06/2010		1	1	1	1	1																			5
11/07/2010			1	1	1	1																			4
11/08/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
11/09/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
11/10/2010		1	1	1																			1		4
11/11/2010		1	1	1																					3
11/12/2010								1	1	1	1	1	1	1	1	1	1	1			1		1		13
11/14/2010					1																				1
11/15/2010			1	1																		1	1		4
11/16/2010																	1	1							2
11/19/2010																						1	1		2
11/20/2010			1	1	1																				3
11/21/2010		1	1	1																					3
11/22/2010														1	1	1							1		4
11/23/2010			1	1	1	1		1	1	1	1	1	1	1	1	1						1	1		15
11/24/2010	1	1	1	1	1									1	1	1		1							9
11/25/2010			1																						1
11/26/2010		1	1	1	1			1																	5
11/27/2010			1	1	1																				3
11/29/2010	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	22
11/30/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
12/01/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	22
12/02/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	22
12/03/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
12/04/2010	1	1	1	1	1	1	1	1										1				1	1	1	12
12/05/2010	1	1	1	1	1	1	1	1																1	9
12/06/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
12/07/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
12/08/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
12/09/2010	1	1	1	1	1	1		1			1	1	1	1	1	1						1	1	1	16
12/10/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1							1	1	17
12/11/2010	1	1	1	1	1	1	1	1															1	1	10
12/12/2010	1	1	1	1	1	1	1	1								1	1	1					1	1	13
12/13/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
12/14/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
12/15/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1							1	1	17
12/16/2010	1	1		1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	17
12/17/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
12/18/2010	1	1	1	1	1	1	1								1	1		1				1	1	1	13
12/19/2010	1	1	1	1	1	1	1	1	1						1	1	1	1	1	1	1		1	1	18
12/20/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
12/21/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	21
12/22/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
12/23/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	21
12/24/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
12/25/2010	1	1	1	1	1	1	1	1															1	1	10
12/26/2010	1	1	1	1	1	1	1	1															1	1	10
12/27/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						1	1	1	19
12/28/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
12/29/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	21
12/30/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					1	1	1	20
12/31/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
Grand Total	183	206	239	245	226	195	84	192	149	133	125	125	135	149	153	152	121	85	55	48	68	119	180	153	3,520

"1" indicates an hour when 100 MW or more of energy was sold to the ISO-NE spot market.

	Hour																								
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Grand Total
01/01/2010	1	1	1	1	1	1	1	1																	8
01/05/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17
01/06/2010	1	1	1	1	1	1							1	1	1	1							1	1	12
01/07/2010	1	1	1	1	1	1				1	1	1	1	1	1	1						1	1	1	16
01/08/2010	1	1	1	1	1																	1	1	1	8
01/09/2010	1	1	1	1	1	1																			6
01/10/2010		1	1	1	1	1																			5
01/11/2010	1	1	1	1	1																		1	1	7
01/12/2010	1	1	1	1	1										1								1		7
01/13/2010	1	1	1	1	1																		1		6
01/14/2010	1	1	1	1	1										1								1	1	8
01/15/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
01/16/2010	1	1	1	1	1	1	1																	1	8
01/17/2010	1	1	1	1	1	1	1	1																1	9
01/18/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1				1	1	1	1	20
01/19/2010	1	1	1	1	1	1			1						1							1	1	1	11
01/20/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
01/21/2010	1	1	1	1	1	1						1	1	1	1	1							1	1	13
01/22/2010	1	1	1	1	1	1							1	1	1	1							1		11
01/23/2010	1	1	1	1	1	1																			6
01/24/2010	1	1	1	1	1	1	1																	1	8
01/25/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
01/26/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
01/27/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
01/28/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1							1	1	17
01/29/2010	1	1	1	1	1																				5
02/04/2010		1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	18
02/05/2010					1						1	1	1	1	1	1	1					1	1		10
02/06/2010	1	1	1	1	1	1																			6
02/07/2010	1	1	1	1	1																			1	6
02/08/2010	1	1	1	1	1									1	1	1							1		9
02/09/2010	1	1	1	1	1						1	1	1	1	1	1						1	1	1	14
02/10/2010	1	1	1	1	1			1	1	1												1	1	1	11
02/11/2010	1	1	1	1	1				1	1	1	1	1	1	1	1	1					1	1	1	17
02/12/2010	1	1	1	1	1				1	1	1	1	1	1	1	1	1					1	1		16
02/13/2010	1	1	1	1	1	1																			6
02/14/2010	1	1	1	1	1	1	1																	1	8
02/15/2010	1	1	1	1	1	1		1	1				1	1	1	1	1	1	1				1	1	17
02/16/2010	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1			1	1	1	1	1	20
02/17/2010	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	20
02/18/2010	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1	1				1	1	1	19
02/19/2010	1	1	1	1	1			1	1	1	1	1	1	1	1	1	1				1	1	1	1	20
02/22/2010								1	1	1	1	1	1	1	1	1						1	1	1	13
02/23/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1							1	1	1	18
02/24/2010	1	1	1	1	1			1														1	1	1	9
02/25/2010	1	1	1	1	1	1		1	1	1	1	1	1	1							1	1	1	1	17
02/26/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		23
02/27/2010	1	1	1	1	1	1	1	1	1	1															10
02/28/2010	1	1	1	1	1	1	1	1	1															1	10
03/01/2010	1	1	1	1	1	1		1	1	1	1		1	1	1	1						1	1	1	17
03/02/2010	1	1	1	1	1	1		1				1	1	1	1	1	1					1	1	1	16
03/03/2010	1	1	1	1	1	1																	1	1	8
03/04/2010			1	1	1	1						1	1	1	1	1	1					1	1	1	13
03/05/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
03/06/2010	1	1	1	1	1	1	1																	1	8
03/07/2010	1	1	1	1	1	1	1	1															1	1	10
03/08/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
03/09/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
03/10/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
03/11/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
03/12/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1				1	1	1	1	20
03/13/2010	1	1	1	1	1	1	1						1	1	1	1	1	1	1	1				1	16
03/14/2010	1		1	1	1	1	1	1																	7
03/15/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
03/16/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	21
03/17/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	22
03/18/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	21
03/19/2010	1	1	1	1	1	1		1	1			1	1	1	1	1	1	1	1	1	1	1	1	1	21
03/20/2010	1	1	1	1	1	1	1	1															1	1	10
03/21/2010	1	1	1	1	1	1	1	1																1	9
03/22/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
03/23/2010	1	1	1	1	1	1		1	1	1	1					1						1	1	1	14
03/24/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1				1	1	1	20
03/25/2010	1		1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	20
03/26/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	21
03/27/2010	1	1	1	1	1	1																		1	7
03/28/2010			1	1	1	1	1																	1	6
03/29/2010	1	1	1	1	1	1		1	1	1				1	1	1							1	1	14
03/30/2010	1	1	1	1	1	1		1	1	1				1	1								1	1	13
03/31/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1							1	1	17

"1" indicates an hour when 100 MW or more of energy was sold to the ISO-NE spot market.

	Hour																							
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Grand Total
04/01/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1					1	1	19
04/02/2010			1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	20
04/03/2010	1	1	1	1	1	1	1																	1	8
04/04/2010	1	1	1	1	1	1	1																	1	8
04/05/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
04/06/2010	1	1	1	1	1	1		1	1	1					1							1	1	1	13
04/07/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1							1		16
04/08/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
04/09/2010	1	1	1	1	1	1		1															1		8
04/10/2010		1	1	1	1	1																			5
04/11/2010			1	1	1	1	1																1		6
04/12/2010	1	1	1	1	1																				4
04/13/2010		1	1	1	1					1	1	1	1	1	1	1					1	1	1		10
05/10/2010																									1
05/20/2010									1																1
05/23/2010													1												3
05/25/2010				1	1	1																			9
05/26/2010			1	1	1										1	1	1					1	1	1	10
05/27/2010	1		1	1	1			1	1	1	1	1	1												2
05/30/2010					1	1																			4
05/31/2010			1	1	1	1																			4
06/01/2010		1	1	1	1										1										1
06/02/2010																	1								1
06/03/2010														1	1	1	1	1	1					1	6
06/04/2010						1																		1	2
06/05/2010														1	1	1							1		13
06/06/2010	1	1	1	1	1	1	1	1		1				1	1	1	1	1	1	1			1		18
06/07/2010	1	1	1	1	1	1		1			1	1	1	1	1	1	1	1	1				1		8
06/08/2010	1	1	1	1	1	1		1															1		14
06/09/2010	1	1	1	1	1			1	1	1	1	1	1	1	1								1		6
06/10/2010	1	1	1	1	1																		1		7
06/11/2010	1	1	1	1	1	1																			7
06/12/2010	1	1	1	1	1	1	1																		7
06/13/2010	1	1	1	1	1	1	1																		5
06/14/2010	1	1	1	1	1																				4
06/15/2010		1	1	1	1																		1		5
06/16/2010		1	1	1	1																				5
06/17/2010	1	1	1	1	1																				5
06/18/2010		1	1	1	1			1																	4
06/19/2010			1	1	1	1																			4
06/21/2010								1				1	1	1	1	1	1	1							8
06/22/2010				1	1								1	1	1	1	1	1	1	1	1	1			2
06/23/2010													1	1	1	1	1	1	1	1					10
06/24/2010										1	1	1	1	1	1	1	1	1	1	1					11
06/26/2010			1	1	1	1																			4
06/27/2010			1	1	1	1																			4
06/28/2010											1				1	1	1								4
07/02/2010									1	1	1	1	1	1	1	1	1	1							10
07/03/2010			1	1	1	1		1	1																6
07/04/2010								1																	1
07/16/2010								1	1	1	1	1	1			1									7
07/20/2010												1	1												2
07/21/2010														1	1	1	1								4
07/22/2010								1					1	1	1	1	1								6
07/23/2010				1																					1
07/24/2010			1	1	1																				3
07/26/2010			1	1	1			1	1																5
07/27/2010			1	1	1									1	1	1	1	1					1		9
07/28/2010													1	1	1	1	1	1							6
07/29/2010												1	1	1	1	1	1								6
07/31/2010		1	1	1	1	1	1																		6

"1" indicates an hour when 100 MW or more of energy was sold to the ISO-NE spot market.

	Hour																								
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Grand Total
08/01/2010		1	1	1	1	1	1																		6
08/02/2010		1	1	1	1																				4
08/03/2010															1										1
08/04/2010													1	1	1										3
08/05/2010													1	1	1										3
08/07/2010			1	1	1	1																			4
08/08/2010	1	1	1	1	1	1	1															1			8
08/09/2010		1						1						1	1	1	1				1				7
08/11/2010											1	1	1	1	1	1	1	1	1	1	1	1			12
08/13/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
08/14/2010		1	1	1	1	1																			5
08/15/2010			1	1	1	1	1																		5
08/16/2010			1	1																					2
08/17/2010								1																	1
08/19/2010														1	1	1	1	1	1						6
08/20/2010														1	1	1	1	1					1		6
08/21/2010		1	1	1	1	1	1																		6
08/22/2010		1	1	1	1	1	1																		6
08/23/2010	1	1	1	1	1	1		1	1														1		9
08/24/2010	1	1	1	1	1			1															1		7
08/25/2010	1	1	1	1	1	1		1															1		8
08/26/2010	1	1	1	1	1	1		1																	7
08/27/2010	1	1	1	1	1	1		1															1		8
08/28/2010		1	1	1	1	1																			5
08/29/2010			1	1	1	1																			4
08/30/2010								1							1	1	1								4
08/31/2010													1	1											2
09/02/2010														1											1
09/04/2010				1																					1
09/05/2010		1	1	1	1	1	1																		6
09/06/2010	1	1	1	1	1	1	1																		7
09/07/2010	1	1	1	1	1																				5
09/08/2010									1	1													1		3
09/09/2010		1	1	1	1			1	1														1		7
09/10/2010	1	1	1	1	1			1	1	1	1	1			1	1							1		13
09/11/2010		1	1	1	1	1	1																		6
09/12/2010	1	1	1	1	1	1	1																		7
09/13/2010	1	1	1	1	1			1				1	1	1	1	1		1					1		13
09/14/2010	1	1	1	1	1											1	1						1		8
09/15/2010	1	1	1	1	1								1	1	1	1	1	1					1		12
09/16/2010	1	1	1	1	1			1	1	1	1		1	1	1	1	1	1				1	1		17
09/17/2010	1	1	1	1	1	1		1	1	1	1	1		1	1	1	1					1	1		17
09/18/2010	1	1	1	1	1	1	1																		7
09/19/2010	1	1	1	1	1	1	1											1		1	1			1	11
09/20/2010	1	1	1	1	1						1	1	1	1	1	1	1						1		13
09/21/2010	1	1	1	1	1																				5
09/25/2010																1	1	1							3
09/30/2010																					1	1	1		3
10/19/2010																							1		1
10/20/2010																							1		1
10/26/2010																							1		1
10/27/2010					1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19
10/28/2010	1	1	1					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		19
10/29/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1									15
11/08/2010								1	1						1	1		1			1	1	1	1	9
11/09/2010	1	1	1	1	1																		1		6
11/12/2010								1	1	1	1	1	1	1	1	1									10
11/19/2010																							1		1
11/23/2010					1			1	1																3
11/24/2010															1										1
11/29/2010	1	1	1									1	1	1	1	1	1	1	1	1	1	1	1	1	16
11/30/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24

"1" indicates an hour when 100 MW or more of energy was sold to the ISO-NE spot market.

	Hour																								
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Grand Total
12/01/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					1	1	1	20
12/02/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1				1	1	1	1	20
12/03/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
12/04/2010	1	1	1	1	1	1	1											1					1	1	10
12/05/2010	1	1	1	1	1	1	1																	1	8
12/06/2010			1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		20
12/07/2010	1	1	1	1	1			1		1	1	1	1	1	1	1							1		14
12/08/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	22
12/09/2010	1	1	1	1	1	1					1	1	1	1	1	1							1	1	14
12/10/2010	1	1	1	1	1								1	1	1	1							1	1	11
12/11/2010	1	1	1	1	1	1	1																	1	8
12/12/2010	1	1	1	1	1	1	1										1	1						1	10
12/13/2010	1	1	1	1	1			1	1	1	1	1	1	1	1								1		14
12/14/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1								1		15
12/15/2010	1	1	1	1	1																		1		6
12/16/2010	1			1	1								1	1	1	1							1	1	9
12/17/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1							1	1	17
12/18/2010	1	1	1	1	1	1	1								1	1								1	10
12/19/2010	1	1	1	1	1	1	1	1								1		1	1	1				1	13
12/20/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23
12/21/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
12/22/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
12/23/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
12/24/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			1	1	1	1	1	22
12/25/2010	1	1	1	1	1	1	1																	1	8
12/26/2010	1	1	1	1	1	1	1	1																1	9
12/27/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1								1		18
12/28/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	16
12/29/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
12/30/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1					1	1	1	19
12/31/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	23
Grand Total	147	162	182	185	186	135	47	110	89	83	83	88	102	110	120	111	78	48	30	24	31	75	127	104	2,457

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, page 4 (Bates 52), lines 9-12. Please supply a list by date and hours when 50 MW or more of purchased power was resold to the ISO-NE spot market. Please duplicate the response for 100 MW.

Response:

Please see the attached tables. In the tables a "1" indicates an hour when either 50 MW or more (pg 2), or 100 MW or more (pg3), of purchased energy was resold to the ISO-NE spot market.

"1" indicates an hour when 50 MW or more of purchased energy was resold to the ISO-NE spot market.

	Hour																							
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Grand Total
01/05/2010													1	1	1	1						1	1		6
01/06/2010								1	1	1	1	1	1	1	1	1						1	1		11
01/07/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
01/08/2010								1	1	1	1	1	1	1	1	1						1	1		11
01/11/2010													1	1	1	1						1	1		6
01/12/2010								1	1	1	1	1	1	1	1	1							1		10
01/13/2010																							1		1
01/14/2010											1	1	1	1	1	1						1	1		8
01/15/2010								1	1	1	1	1	1	1	1	1	1			1	1	1	1		14
01/18/2010								1	1	1	1			1	1	1						1	1		9
01/19/2010								1	1	1	1	1	1	1	1	1						1	1		11
01/20/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
01/21/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
01/22/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
01/25/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
01/26/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
01/27/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
01/28/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
01/29/2010								1	1	1	1	1	1	1	1	1									9
02/04/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
02/05/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
02/08/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
02/09/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
02/10/2010								1	1	1	1	1	1	1	1	1						1	1		11
02/11/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
02/12/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
02/15/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
02/16/2010								1	1	1	1	1	1	1	1	1						1	1		11
02/17/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
02/18/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
02/19/2010								1	1	1	1	1	1	1	1	1	1						1		11
02/22/2010								1	1	1	1	1	1	1	1	1	1	1			1	1	1		14
02/23/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
02/24/2010								1	1						1							1	1		5
02/25/2010								1	1	1	1	1	1	1			1	1		1	1	1	1		13
02/26/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
03/01/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
03/02/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
03/03/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
03/04/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
03/05/2010								1	1	1	1	1	1	1	1	1	1	1		1	1	1	1		15
03/08/2010								1	1	1	1	1	1	1	1	1	1	1			1	1	1		14
03/09/2010								1	1	1	1	1	1	1	1	1	1	1			1	1	1		14
03/10/2010								1	1	1	1	1	1	1	1	1	1	1			1	1	1		14
03/11/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
03/12/2010								1	1	1	1	1	1	1	1	1	1	1		1	1	1	1		15
03/15/2010								1	1	1	1	1	1	1	1	1	1	1			1	1	1		14
03/16/2010								1	1	1	1	1	1	1	1	1	1	1	1			1	1		14
03/17/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
03/18/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
03/19/2010								1	1	1		1	1	1	1	1	1	1	1	1	1	1	1		15
03/22/2010								1	1	1	1	1	1	1	1	1	1	1			1	1	1		14
03/23/2010								1	1	1	1				1	1	1	1			1	1	1		11
03/24/2010								1	1	1	1	1	1	1	1	1	1	1	1		1	1	1		15
03/25/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
03/26/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
03/29/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
03/30/2010								1	1	1	1	1	1	1	1	1						1	1		11
03/31/2010								1	1	1	1	1	1	1	1	1	1	1				1	1		13

"1" indicates an hour when 50 MW or more of purchased energy was resold to the ISO-NE spot market.

	Hour																							
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Grand Total
04/01/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
04/02/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
04/05/2010								1	1	1	1	1	1	1	1	1	1	1	1		1	1	1		15
04/06/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
04/07/2010								1	1	1	1	1	1	1	1	1	1	1	1			1	1		14
04/08/2010								1	1	1	1	1	1	1	1	1	1	1	1			1	1		14
04/09/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
04/12/2010														1	1	1	1						1		5
04/21/2010																							1		1
04/22/2010																							1		1
05/12/2010																							1		1
05/20/2010								1	1	1	1	1		1											6
05/22/2010								1																	1
05/23/2010								1																	1
05/24/2010																							1		1
05/25/2010								1															1		2
05/26/2010								1															1		2
05/27/2010								1	1	1	1	1											1		6
06/07/2010								1	1	1	1	1	1	1	1	1	1	1	1	1		1	1		15
06/08/2010								1	1	1	1			1	1	1							1		8
06/09/2010								1	1	1	1	1	1	1	1	1							1		10
06/10/2010								1	1														1		3
06/11/2010								1	1	1									1	1		1	1		7
06/14/2010								1	1														1		3
06/15/2010								1															1		2
06/16/2010								1	1	1													1		4
06/17/2010								1	1														1		3
06/18/2010								1	1	1															3
06/22/2010								1															1		2
06/25/2010								1															1		2
07/02/2010																							1		1
07/03/2010								1	1																2
07/04/2010								1																	1
07/05/2010								1																	1
07/20/2010								1																	1
07/22/2010								1	1	1															3
07/23/2010								1	1	1													1		4
07/26/2010								1	1	1													1		4
07/27/2010								1																	1
07/28/2010								1	1																2
07/30/2010								1						1	1	1			1	1	1		1		8
08/02/2010								1																	1
08/06/2010																							1		1
08/09/2010								1																	1
08/13/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
08/16/2010								1															1		2
08/17/2010								1	1														1		3
08/18/2010								1	1																2
08/19/2010								1																	1
08/20/2010																			1				1		2
08/23/2010								1	1	1													1		4
08/24/2010								1	1	1												1	1		5
08/25/2010								1	1														1		3
08/26/2010								1	1										1	1	1		1		6
08/27/2010								1	1														1		3
08/30/2010								1																	1
09/03/2010								1																	1
09/07/2010								1	1																2
09/08/2010								1	1	1	1	1	1	1	1	1							1		10
09/09/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
09/10/2010								1	1	1	1	1	1	1	1	1	1	1	1		1	1	1		15
09/13/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
09/14/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
09/15/2010								1	1	1	1	1	1	1	1	1	1	1	1			1	1		14
09/16/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
09/17/2010								1	1	1	1	1	1	1	1	1	1	1	1		1	1	1		15
09/20/2010								1	1	1	1	1	1	1	1	1	1	1	1			1	1		14
09/21/2010								1	1	1	1														4
10/01/2010																							1		1
10/02/2010								1																	1
10/26/2010																						1	1		2
10/27/2010					1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	19
10/28/2010	1	1	1					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20
10/29/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1						1		17

"1" indicates an hour when 50 MW or more of purchased energy was resold to the ISO-NE spot market.

	Hour																							
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Grand Total
11/01/2010				1																					1
11/04/2010																							1		1
11/05/2010		1	1	1	1																		1		5
11/06/2010		1	1	1	1	1																			5
11/07/2010			1	1	1	1																			4
11/08/2010	1	1	1	1																		1	1	1	7
11/09/2010	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1						1	1	1	18
11/10/2010		1	1	1																			1		4
11/11/2010		1	1	1																					3
11/12/2010																							1		1
11/14/2010					1																				1
11/15/2010			1	1																					2
11/20/2010			1	1	1																				3
11/21/2010		1	1	1																					3
11/22/2010																							1		1
11/23/2010			1	1																			1		3
11/24/2010	1	1	1	1	1																				5
11/25/2010			1																						1
11/26/2010		1	1	1	1			1																	5
11/27/2010			1	1	1																				3
11/29/2010													1	1	1	1	1	1	1	1	1	1	1	1	12
11/30/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
12/01/2010								1	1	1	1	1	1	1	1	1	1	1			1	1	1		14
12/02/2010								1	1	1	1	1	1	1	1	1	1	1		1	1	1	1		15
12/03/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
12/06/2010								1	1	1	1	1	1	1	1	1						1	1		11
12/07/2010								1	1	1	1	1	1	1	1	1						1	1		11
12/08/2010								1	1	1	1	1	1	1	1	1						1	1		11
12/09/2010								1			1	1	1	1	1	1						1	1		9
12/10/2010								1	1	1	1	1	1	1	1	1							1		10
12/13/2010								1	1	1	1	1	1	1	1	1						1	1		11
12/14/2010								1	1	1	1	1	1	1	1	1							1		10
12/15/2010								1	1	1	1	1		1	1	1							1		9
12/16/2010								1	1	1	1	1	1	1	1	1						1	1		11
12/17/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
12/20/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
12/21/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
12/22/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
12/23/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
12/24/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
12/27/2010								1	1	1	1	1	1	1	1	1						1	1		11
12/28/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
12/29/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
12/30/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
12/31/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
Grand Total	6	12	18	17	12	6	1	145	124	112	105	102	102	108	108	107	81	40	31	26	48	101	145	6	1,563

"1" indicates an hour when 100 MW or more of purchased energy was resold to the ISO-NE spot market.

	Hour																							
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Grand Total
01/05/2010															1	1							1		3
01/06/2010													1	1	1	1							1		5
01/07/2010										1	1	1	1	1	1	1						1	1		9
01/08/2010																						1	1		2
01/11/2010																							1		1
01/12/2010																							1		1
01/13/2010																							1		1
01/14/2010															1								1		2
01/15/2010								1	1	1	1	1	1	1	1	1						1	1		11
01/18/2010								1	1													1	1		4
01/19/2010									1						1							1	1		4
01/20/2010								1	1	1	1	1	1	1	1	1						1	1		11
01/21/2010												1	1	1	1	1							1		6
01/22/2010													1	1	1	1							1		5
01/25/2010								1	1	1	1	1	1		1	1						1	1		10
01/26/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
01/27/2010								1	1	1	1	1	1	1	1	1						1	1		11
01/28/2010								1	1	1	1	1	1	1	1	1							1		10
02/04/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
02/05/2010											1	1	1	1	1	1	1					1	1		9
02/08/2010														1	1	1							1		4
02/09/2010											1	1	1	1	1	1						1	1		8
02/10/2010								1	1	1												1	1		5
02/11/2010									1	1	1	1	1	1	1	1	1					1	1		11
02/12/2010									1	1	1	1	1	1	1	1	1					1	1		11
02/15/2010								1	1				1	1	1	1							1		7
02/16/2010								1	1													1	1		4
02/17/2010									1	1	1	1	1	1	1	1						1	1		10
02/18/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
02/19/2010								1	1	1	1	1	1	1	1	1	1						1		11
02/22/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
02/23/2010								1	1	1	1	1	1	1	1	1						1	1		11
02/24/2010								1														1	1		3
02/25/2010								1	1	1	1	1	1	1							1	1	1		10
02/26/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
03/01/2010								1	1	1	1		1	1	1	1						1	1		10
03/02/2010								1				1	1	1	1	1	1					1	1		9
03/03/2010																							1		1
03/04/2010												1	1	1	1	1	1					1	1		8
03/05/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
03/08/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
03/09/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
03/10/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
03/11/2010								1	1	1	1	1	1	1	1	1						1	1		11
03/12/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
03/15/2010								1	1	1						1						1	1		6
03/16/2010								1	1	1	1	1	1	1	1	1	1	1	1			1	1		14
03/17/2010								1	1	1	1	1	1	1	1	1	1	1	1		1	1	1		15
03/18/2010								1	1	1	1	1	1	1	1	1	1	1	1			1	1		14
03/19/2010								1	1			1	1	1	1	1	1	1	1	1	1	1	1		14
03/22/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
03/23/2010								1	1	1	1					1						1	1		7
03/24/2010								1	1	1	1	1	1	1	1	1	1	1				1	1		13
03/25/2010								1	1	1	1	1	1	1	1	1	1	1	1			1	1		14
03/26/2010								1	1	1	1	1	1	1	1	1	1	1	1			1	1		14
03/29/2010								1	1	1				1	1	1							1		7
03/30/2010								1	1	1				1	1								1		6
03/31/2010								1	1	1	1	1	1	1	1	1							1		10
04/01/2010								1	1	1	1	1	1	1	1	1	1	1					1		12
04/02/2010								1	1	1	1	1	1	1	1	1	1	1	1		1	1	1		15
04/05/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
04/06/2010								1	1	1					1							1	1		6
04/07/2010								1	1	1	1	1	1	1	1	1							1		10
04/08/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
04/09/2010								1															1		2
04/12/2010																							1		1
05/20/2010									1																1

"1" indicates an hour when 100 MW or more of purchased energy was resold to the ISO-NE spot market.

	Hour																								
Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Grand Total
06/07/2010								1			1	1	1	1	1	1	1	1	1				1		11
06/08/2010								1															1		2
06/09/2010								1	1														1		3
06/10/2010																							1		1
06/11/2010																							1		1
06/16/2010																							1		1
06/18/2010								1																	1
07/03/2010								1	1																2
07/04/2010								1																	1
07/22/2010								1																	1
07/26/2010								1	1																2
08/09/2010								1																	1
08/13/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
08/17/2010								1																	1
08/20/2010																							1		1
08/23/2010								1	1														1		3
08/24/2010								1															1		2
08/25/2010								1															1		2
08/26/2010								1																	1
08/27/2010								1															1		2
09/08/2010									1	1													1		3
09/09/2010								1	1														1		3
09/10/2010								1	1	1	1	1			1	1							1		8
09/13/2010								1				1	1	1	1	1		1					1		6
09/14/2010																1	1						1		3
09/15/2010													1	1	1	1	1	1					1		7
09/16/2010								1	1	1	1		1	1	1	1	1	1				1	1		12
09/17/2010								1	1	1	1	1		1	1	1	1					1	1		11
09/20/2010											1	1	1	1	1	1	1						1		6
10/26/2010																							1		1
10/27/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
10/28/2010								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		16
10/29/2010								1	1	1	1	1	1	1	1	1									9
11/08/2010																							1		1
11/09/2010	1	1	1	1	1																		1		6
11/29/2010													1	1	1	1	1	1	1	1	1	1	1	1	12
11/30/2010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
12/01/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
12/02/2010								1	1	1	1	1	1	1	1	1	1				1	1	1		13
12/03/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
12/06/2010								1	1	1	1	1	1	1	1								1		9
12/07/2010								1		1	1	1	1	1	1	1							1		9
12/08/2010								1	1	1	1	1	1	1	1	1							1		10
12/09/2010											1	1	1	1	1	1							1		7
12/10/2010													1	1	1	1							1		5
12/13/2010								1	1	1	1	1	1	1	1								1		9
12/14/2010								1	1	1	1	1	1	1	1								1		9
12/15/2010																							1		1
12/16/2010													1	1	1	1							1		5
12/17/2010								1	1	1	1	1	1	1	1	1							1		10
12/20/2010								1	1	1	1	1	1	1	1	1						1	1		11
12/21/2010								1	1	1	1	1	1	1	1	1						1	1		11
12/22/2010								1	1	1	1	1	1	1	1	1						1	1		11
12/23/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
12/24/2010								1	1	1	1	1	1	1	1	1	1			1	1	1	1		14
12/27/2010								1	1	1	1	1	1	1	1								1		9
12/28/2010								1	1	1	1	1	1	1	1	1						1	1		11
12/29/2010								1	1	1	1	1	1	1	1	1						1	1		11
12/30/2010								1	1	1	1	1	1	1	1	1	1					1	1		12
12/31/2010								1	1	1	1	1	1	1	1	1	1	1		1	1	1	1		15
Grand Total	2	2	2	2	2	1	1	90	80	71	70	72	79	82	87	82	46	20	14	9	14	65	117	2	1,012

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, page 5 (Bates 53), line 14 and Attachment FBW-5. According to the table, the transitional price for capacity was $4.10/kW-month through May 31, 2010 and those values appear to be reflected in Attachment FBW-5. Please explain how the value of capacity was determined by month for the months of June through December of 2010. As part of your response please also explain why the value of capacity revenue from PSNH capacity resources is consistently less than the value of the capacity expense required to meet ISO-NE obligations for the June to December period.

Response:

Capacity value for June through December, 2010 was established in the Forward Capacity Auction conducted in February, 2008. The auction clearing price was $4.50/kW-month (for all months), which was the floor price established prior to conduct of the auction. Ultimately the floor price established the clearing price because ISO-NE is in a surplus capacity position. The clearing price was then adjusted on a monthly basis by Peak Energy Rent adjustments. This is the primary adjustment to the rate paid by load and calculates to a rate within 1% of the rate implied in FBW-5. Additional minor adjustments result from ISO-NE load balancing. ** See table attached below, page 2 of 3.

There are two other adjustments, in addition to PER adjustments, which impact the rate paid to resources. The first results from ISO-NE being in a surplus capacity position. In those circumstances only a percentage of resources' total capability (MW) is required to meet the ISO-NE Installed Capacity Requirement, and resources are paid the clearing price for only the MW needed. This reduces the rate when revenues are spread over resources' full MW capability. It also "frees up" MW which resources can sell at a later date into Reconfiguration Auctions for additional revenue, which PSNH did, but at the lower reconfiguration auction clearing price of $1.50/kW-month. These adjustments impact the overall weighted average rate paid to PSNH's resources and calculate to a rate within 1% of the rate implied in FBW-5. ** See table attached below, page 3 of 3.

Since ISO-NE is in a surplus capacity position some MW are sold at the FCA clearing price and some are sold at a lower rate in reconfiguration auctions, resulting in a lower average rate over total MW.

From a dollars perspective, PSNH's capacity revenue is less than its capacity expense because PSNH's MW load obligation exceeds its resource MW.

2010 - Analysis of Capacity Expense Rate

2010	Expense Rate from FBW-5 $/kW-mo	Clearing Price $/kW-mo	PER $/kW-mo	Net Rate $/kW-mo	Delta
Jun	4.159	4.500	(0.288)	4.212	1.3%
Jul	4.116	4.500	(0.345)	4.155	0.9%
Aug	3.988	4.500	(0.486)	4.014	0.6%
Sep	3.908	4.500	(0.571)	3.929	0.5%
Oct	3.832	4.500	(0.650)	3.850	0.5%
Nov	3.856	4.500	(0.623)	3.877	0.5%
Dec	3.853	4.500	(0.610)	3.891	1.0%

Note: The July rate includes a data correction to the PSNH revenues in FBW-5.

2010 - Analysis of Capacity Revenue Rate

2010	Revenue Rate from FBW-5 $/kW-mo	Clearing Price $/kW-mo	Capacity Surplus Adjustment	Adj. Rate $/kW-mo	PER $/kW-mo	Adj. Rate $/kW-mo	Reconfig. Revenue $/kW-mo	Net Rate $/kW-mo	Delta
Jun	4.039	4.500	94.4%	4.250	(0.288)	3.962	0.083	4.045	0.1%
Jul	3.984	4.500	94.4%	4.250	(0.345)	3.905	0.083	3.987	0.1%
Aug	3.844	4.500	94.4%	4.250	(0.486)	3.764	0.083	3.847	0.1%
Sep	3.762	4.500	94.4%	4.250	(0.571)	3.679	0.082	3.761	0.0%
Oct	3.685	4.500	94.4%	4.250	(0.650)	3.600	0.081	3.681	-0.1%
Nov	3.712	4.500	94.4%	4.250	(0.623)	3.627	0.081	3.708	-0.1%
Dec	3.707	4.500	94.4%	4.250	(0.610)	3.641	0.090	3.731	0.6%

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Docket No. 11-094

Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-023
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Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, page 6 (Bates 54), lines 9-17. Please reconcile the capacity value in MW-months at the reference to the 12,870 MW-months stated in Attachment FBW-5.

Response:

The 12,870 figure from FBW-5 is in $(000), or $12,870k, not MW-months. The 2,761 MW-months of net capacity obligation from line16 on page 6 of White testimony is the net of columns 4 (19,198 MW-months) and 6 (16,437 MW-months) from FBW-5.

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, page 7 (Bates 55), lines 26-27. Please individually list by month the FTR amounts procured for Merrimack, Schiller, and Newington stations, their cost, and the congestion savings generated.

Response:

Please see the attached table.

2010 FTR Activity and Valuation for Merrimack, Schiller and Newington

Source	Month	FTR MW Quantity Peak	FTR MW Quantity Off-Peak	Coresponding Cost and Value of FTRs (Expense) / Revenue FTR Auction $	FTR Value $	Net FTR $
Merrimack	Jan - Dec	0	0			
	Jan	325	315	(8,976)	(2,940)	(11,915)
	Feb	325	315	(7,625)	664	(6,962)
	Mar	275	170	(8,368)	258,488	250,120
	Apr	0	0	0	0	0
	May	0	24	(600)	2,695	2,095
	Jun	0	78	(1,723)	23	(1,699)
	Jul	175	175	(15,360)	154	(15,206)
	Aug	175	175	(14,238)	1,209	(13,029)
	Sep	0	0	0	0	0
	Oct	0	0	0	0	0
	Nov	188	167	(8,405)	(397)	(8,802)
	Dec	150	151	(9,646)	176,480	166,834
				Total (74,940)	436,377	361,437
Schiller	Jan - Dec	30	30			
	Jan	120	70	(1,312)	298	(1,014)
	Feb	120	70	(943)	(294)	(1,237)
	Mar	60	30	(416)	2,232	1,815
	Apr	0	0	7	1,524	1,531
	May	40	20	(564)	20,717	20,154
	Jun	40	20	(768)	(44)	(812)
	Jul	50	20	(1,191)	(413)	(1,604)
	Aug	90	50	40	288	328
	Sep	0	0	7	(20)	(13)
	Oct	26	0	(770)	177	(593)
	Nov	40	35	(237)	(103)	(340)
	Dec	120	60	1,222	(6,791)	(5,569)
				Total (4,925)	17,570	12,645
Newington	Jan - Dec	0	0			
	Jan	0	0	0	0	0
	Feb	0	0	0	0	0
	Mar	0	0	0	0	0
	Apr	0	0	0	0	0
	May	0	0	0	0	0
	Jun	0	0	0	0	0
	Jul	0	0	0	0	0
	Aug	0	0	0	0	0
	Sep	0	0	0	0	0
	Oct	0	0	0	0	0
	Nov	0	0	0	0	0
	Dec	0	0	0	0	0
				Total 0	0	0
				Total Above (79,865)	453,947	374,082

Notes:
Jan.-Dec. FTR cost and value are allocated monthly as per ISO-NE Billing methodology.
FTR Auction $ - this is the amount paid to (-) or received from (+) ISO based on the auction clearing price of awarded FTRs.
FTR Value $ - this is the amount paid to (-) or received from (+) ISO based on the realized value of the awarded FTRs.
Net FTR $ - the sum of the auction dollars and market value of the awarded FTRs.
[FTR Value includes refund of under-funded target allocations via the ISO-NE Congestion Revenue Fund.]

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, page 7 (Bates 55), lines 27-29. From the above response, please show that the net FTR savings decreased the energy expense by $400 thousand.

Response:

Please note: Per the testimony referenced, ES energy expense was decreased $369 thousand. $400 thousand is the gross value of the FTRs procured. As discussed in testimony, PSNH acquires FTRs for resources it expects to operate during the applicable period. PSNH's strategy is to convert a variable congestion value into a fixed value via the FTR auction. Put another way, PSNH procures FTRs primarily to provide cost certainty and thus reduce risk, rather than to achieve savings. The variable congestion value is what PSNH avoided or gave up in exchange for a fixed value. The $369 thousand is the difference between what the variable congestion cost would have been ($400 thousand), and the fixed cost from the FTR auction ($31 thousand). The attached table below builds on the information provided in Staff-1, Q-Staff-24 to show the derivation of the $369 thousand.

2010 Total FTR Activity and Valuation

Source	Month	FTR MW Quantity Peak	FTR MW Quantity Off-Peak	Coresponding Cost and Value of FTRs (Expense) / Revenue FTR Auction $	FTR Value $	Net FTR $
2010 Total of Merrimack, Schiller & Newington				(79,865)	453,947	374,082
Other	Jan - Dec	0	0			
	Jan	10	0	(280)	(47)	(327)
	Feb	0	10	(11)	(2)	(13)
	Mar	0	10	(22)	59	37
	Apr	18	18	2,525	(7,271)	(4,746)
	May	50	0	4,960	(30,401)	(25,441)
	Jun	0	0	0	0	0
	Jul	50	0	2,539	(419)	2,119
	Aug	50	0	2,595	(498)	2,097
	Sep	168	18	20,142	(13,634)	6,509
	Oct	118	18	15,964	(1,554)	14,410
	Nov	0	0	0	0	0
	Dec	0	0	0	0	0
			Total	48,411	(53,767)	(5,356)
			Total All Above	(31,454)	400,180	368,726

Notes:
Other FTR MWs include those that were purchased to address bilateral and Vermont Yankee purchases.
Jan.-Dec. FTR Auction and Value dollars are allocated monthly as per ISO-NE Billing methodology.
FTR Auction $ - this is the amount paid to (-) or received from (+) ISO based on the auction clearing price of awarded FTRs.
FTR Value $ - this is the amount paid to (-) or received from (+) ISO based on the realized value of the awarded FTRs.
Net FTR $ - the sum of the auction dollars and market value of the awarded FTRs.
[FTR Value includes refund of under-funded target allocations via the ISO-NE Congestion Revenue Fund.]

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, Attachment FBW-1 (Bates 57). Please explain and reconcile why the winter entitlement for Merrimack 2 is lower than the summer entitlement.

Response:

Generation resources in ISO-NE are required to verify their seasonal claimed capability MW rating through a performance audit during each capability period (winter and summer). As of December, 2010 (reference FBW testimony, page 2, lines 15-16), Merrimack 2 had verified a winter rating of 337.2 MW on 12/21/09, and a summer rating of 338.375 on 6/7/10. The 1.175 MW difference represents operational variations between the two distinct audit runs performed approximately six months apart.

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, Attachment FBW-2 and FBW-3 (Bates 58 and 59). Please provide by month for on-peak, off-peak, and total values and in the form provided in previous dockets:

a. Information on bilateral purchases and costs, spot purchases and costs, and sales on surplus purchases
b. Actual bilateral and spot purchase quantities compared to those in the rate request in both tabular and graphic form.
c. Total supplemental purchases and percent breakdown by monthly bilateral, short term bilateral and spot purchases.
d. Spot sale energy and value to ISO-NE from PSNH units and bilateral surplus sales.

Response:

Please see the attached tables for the requested information.

2010 - Summary of PSNH Bilateral Purchases and ISO-NE Spot Purchases & Sales

Peak

2010	Total Bilateral Purchases MWh	Total Bilateral Purchases $000	Avg Price $/MWh	Sales of Surplus Purchases MWh	Percent (%) Sold as Surplus	Profit / (Loss) on Sales $000	Total ISO-NE Spot Purchases MWh	Total ISO-NE Spot Purchases $000	Avg Price $/MWh
Jan	58,986	5,383	91.26	22,799	39%	(726)	8,453	744	88.02
Feb	64,004	5,693	88.95	27,207	43%	(955)	7,075	347	49.02
Mar	67,836	6,052	89.21	42,761	63%	(2,073)	449	23	52.10
Apr	62,372	5,614	90.01	13,187	21%	(631)	11,025	498	45.16
May	56,964	5,122	89.92	2,105	4%	(99)	18,609	991	53.27
Jun	64,650	5,772	89.29	7,283	11%	(328)	7,985	496	62.05
Jul	62,200	5,674	91.22	2,946	5%	(174)	21,848	1,982	90.73
Aug	74,963	6,621	88.32	8,076	11%	(308)	9,143	701	76.66
Sep	73,503	6,106	83.07	14,643	20%	(586)	13,012	664	51.04
Oct	105,843	7,404	69.95	10,472	10%	(293)	33,637	1,426	42.40
Nov	106,377	7,188	67.57	8,027	8%	(162)	12,946	658	50.83
Dec	67,610	6,036	89.28	39,804	59%	(946)	1,880	207	110.14
Totals	865,309	72,666	83.98	199,311	23%	(7,283)	146,061	8,737	59.82

Off-Peak

2010	Total Bilateral Purchases MWh	Total Bilateral Purchases $000	Avg Price $/MWh	Sales of Surplus Purchases MWh	Percent (%) Sold as Surplus	Profit / (Loss) on Sales $000	Total ISO-NE Spot Purchases MWh	Total ISO-NE Spot Purchases $000	Avg Price $/MWh
Jan	20,975	1,290	61.48	6,940	33%	(93)	40,543	2,796	68.97
Feb	12,074	718	59.50	7,250	60%	(123)	12,803	712	55.60
Mar	13,084	683	52.20	9,853	75%	(207)	4,437	225	50.63
Apr	10,775	562	52.20	4,990	46%	(118)	20,568	762	37.03
May	16,958	839	49.48	3,671	22%	(64)	29,197	1,298	44.46
Jun	11,830	618	52.20	6,248	53%	(100)	17,844	860	48.21
Jul	21,447	1,271	59.25	3,510	16%	(83)	40,758	2,174	53.33
Aug	13,949	830	59.50	6,102	44%	(137)	22,716	1,128	49.67
Sep	20,064	1,012	50.46	4,924	25%	(102)	21,478	858	39.94
Oct	55,581	2,263	40.72	1,312	2%	(16)	56,228	1,872	33.30
Nov	61,019	2,167	35.51	7,787	13%	21	22,119	1,042	47.09
Dec	12,812	669	52.20	9,146	71%	20	5,022	304	60.54
Totals	270,568	12,922	47.76	71,733	27%	(1,003)	293,713	14,031	47.77

Total

2010	Total Bilateral Purchases MWh	Total Bilateral Purchases $000	Avg Price $/MWh	Sales of Surplus Purchases MWh	Percent (%) Sold as Surplus	Profit / (Loss) on Sales $000	Total ISO-NE Spot Purchases MWh	Total ISO-NE Spot Purchases $000	Avg Price $/MWh
Jan	79,960	6,673	83.45	29,739	37%	(819)	48,996	3,540	72.26
Feb	76,078	6,412	84.28	34,457	45%	(1,078)	19,878	1,059	53.26
Mar	80,921	6,735	83.23	52,613	65%	(2,280)	4,885	248	50.76
Apr	73,147	6,177	84.44	18,177	25%	(749)	31,593	1,260	39.87
May	73,922	5,961	80.64	5,777	8%	(163)	47,806	2,290	47.89
Jun	76,479	6,390	83.55	13,531	18%	(427)	25,829	1,356	52.49
Jul	83,647	6,944	83.02	6,456	8%	(258)	62,606	4,156	66.38
Aug	88,912	7,451	83.80	14,179	16%	(446)	31,858	1,829	57.41
Sep	93,567	7,118	76.08	19,568	21%	(689)	34,489	1,522	44.13
Oct	161,424	9,667	59.89	11,784	7%	(309)	89,865	3,299	36.71
Nov	167,396	9,355	55.88	15,814	9%	(141)	35,065	1,700	48.47
Dec	80,423	6,705	83.37	48,951	61%	(927)	6,902	511	74.04
Totals	1,135,877	85,588	75.35	271,045	24%	(8,286)	439,774	22,768	51.77

2010 - Summary of PSNH Bilateral and Spot Purchases

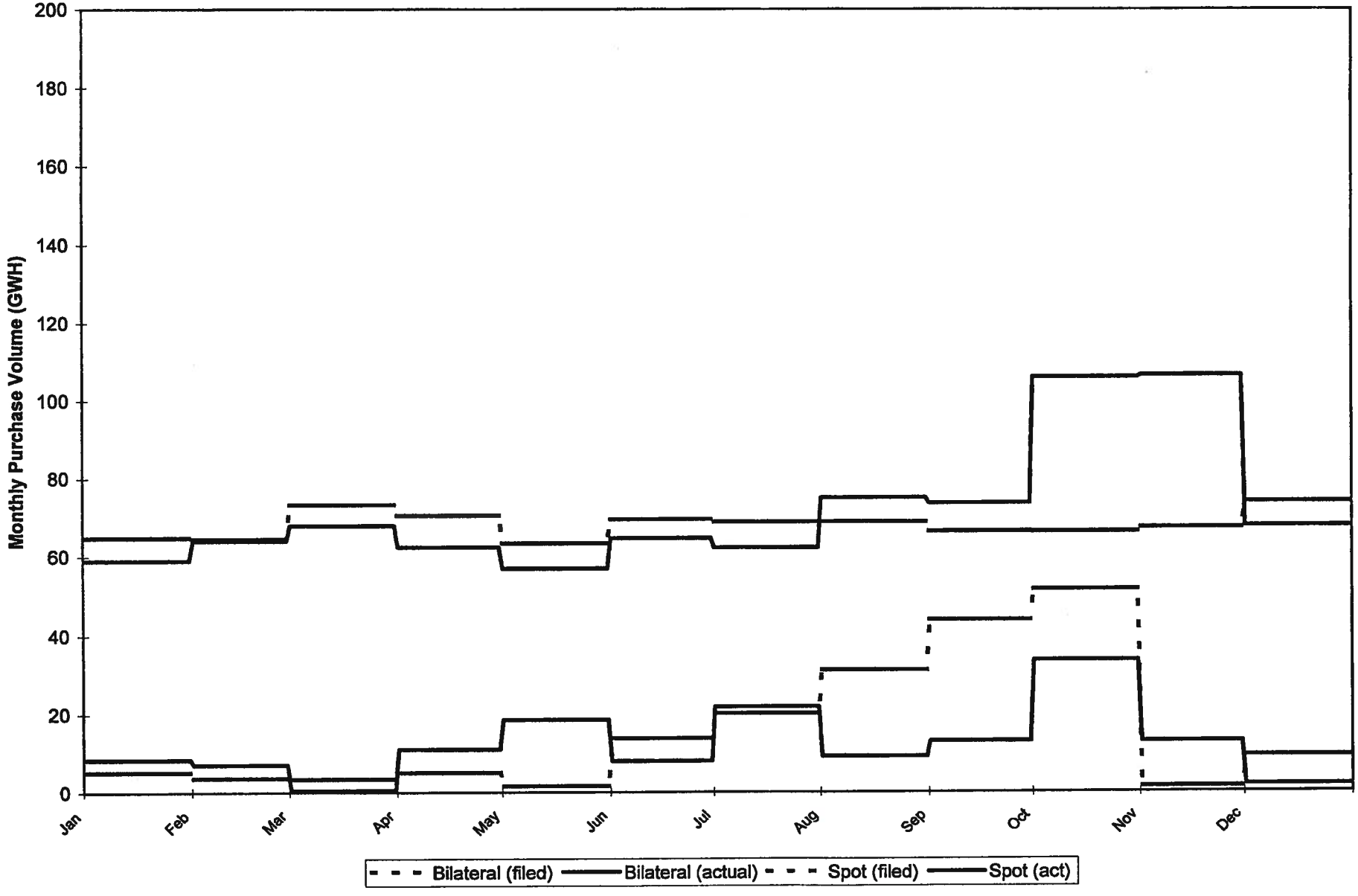
Peak

	Actual 2010 Purchase Quantities		Purchase Quantities Filed with Rate Request	
2010	Total Bilateral Purchases MWh	Total ISO-NE Spot Purchases MWh	Total Bilateral Purchases MWh	Total ISO-NE Spot Purchases MWh
1	58,986	8,453	64,805	5,170
2	64,004	7,075	64,520	3,694
3	67,836	449	73,201	3,449
4	62,372	11,025	70,434	5,069
5	56,964	18,609	63,365	1,601
6	64,650	7,985	69,484	13,829
7	62,200	21,848	68,751	20,160
8	74,963	9,143	68,751	31,210
9	73,503	13,012	66,326	43,911
10	105,843	33,637	66,231	51,613
11	106,377	12,946	67,233	1,375
12	67,610	1,880	73,863	9,281
Totals	865,309	146,061	816,964	190,362

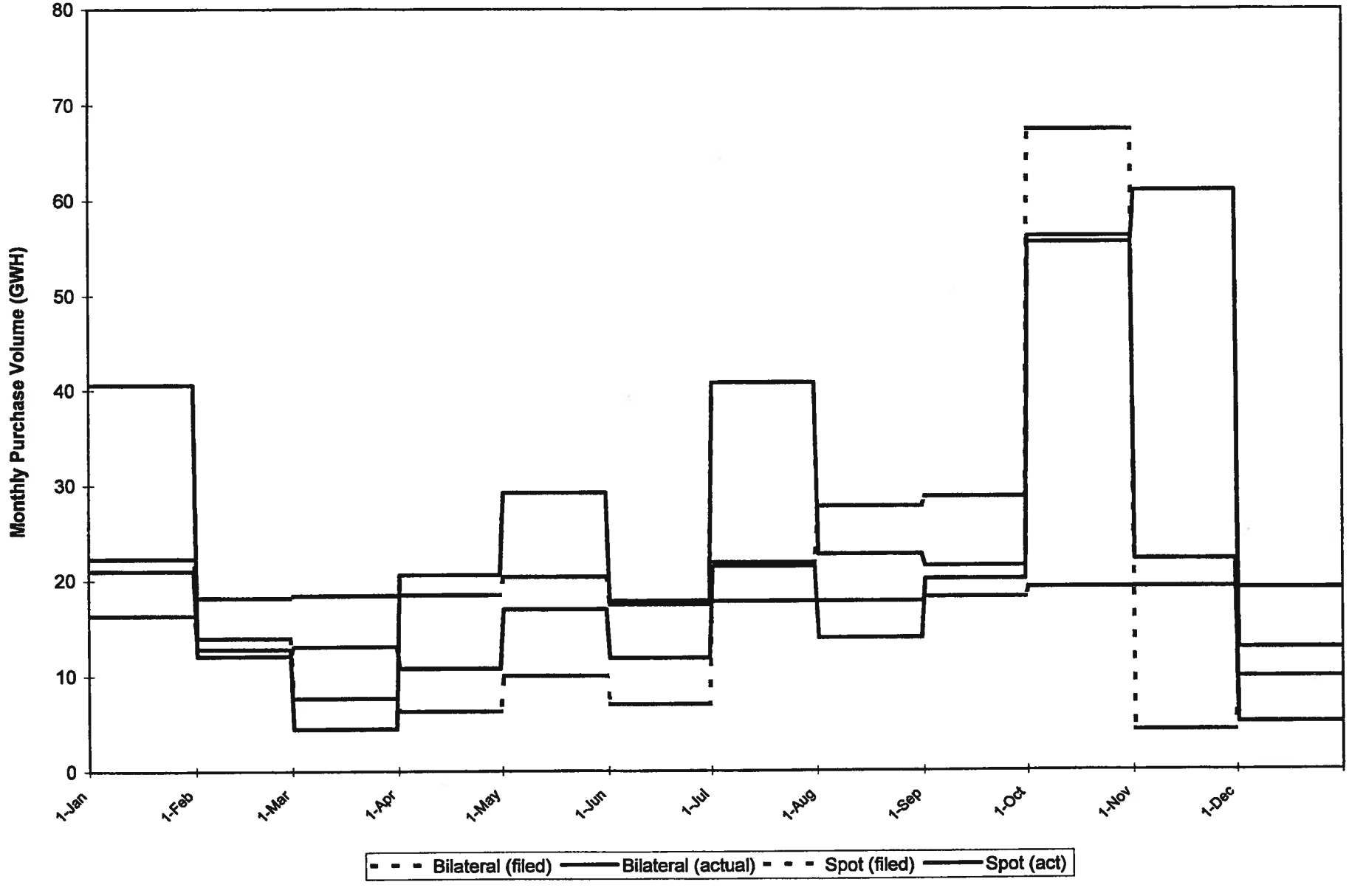
Off-Peak

	Actual 2010 Purchase Quantities		Purchase Quantities Filed with Rate Request	
2010	Total Bilateral Purchases MWh	Total ISO-NE Spot Purchases MWh	Total Bilateral Purchases MWh	Total ISO-NE Spot Purchases MWh
1	20,975	40,543	22,266	16,314
2	12,074	12,803	18,172	13,969
3	13,084	4,437	18,392	7,660
4	10,775	20,568	18,436	6,286
5	16,958	29,197	20,358	10,001
6	11,830	17,844	17,442	7,002
7	21,447	40,758	17,763	21,835
8	13,949	22,716	17,763	27,740
9	20,064	21,478	18,201	28,724
10	55,581	56,228	19,223	67,441
11	61,019	22,119	19,238	4,212
12	12,812	5,022	19,069	9,818
Totals	270,568	293,713	226,323	221,002

2010 - Peak Bilateral and Spot Purchase Activity (Actual vs Originally Filed)



2010 - Off-Peak Bilateral and Spot Purchase Activity (Actual vs Originally Filed)



Summary of PSNH Supplemental Purchases

	Peak Power				Off-Peak Power			
Month	Total Supplemental Purchases MWh	% Monthly Bilateral Purchases	% Short-Term Bilateral Purchases	% ISO-NE Spot Market Purchases	Total Supplemental Purchases MWh	% Monthly Bilateral Purchases	% Short-Term Bilateral Purchases	% ISO-NE Spot Market Purchases
Jan-06	57,045	94.2%	0.0%	5.8%	57,578	81.4%	0.0%	18.6%
Feb-06	130,771	36.7%	58.1%	5.2%	79,510	0.0%	58.4%	41.6%
Mar-06	147,864	99.8%	0.0%	0.4%	47,472	80.9%	0.0%	19.1%
Apr-06	176,562	99.7%	0.0%	0.3%	126,109	95.2%	-0.2%	5.0%
May-06	221,370	95.4%	1.1%	3.5%	129,281	67.8%	3.1%	29.1%
Jun-06	156,009	90.3%	4.8%	5.1%	75,531	91.1%	0.0%	8.9%
Jul-06	121,246	52.8%	30.4%	16.9%	121,814	88.5%	6.6%	4.9%
Aug-06	149,314	49.3%	28.1%	22.6%	92,702	95.4%	0.0%	4.8%
Sep-06	187,516	93.9%	3.8%	2.3%	104,375	57.5%	7.7%	34.9%
Oct-06	158,657	99.8%	0.0%	0.2%	70,888	96.0%	0.1%	3.9%
Nov-06	151,815	99.7%	0.0%	0.3%	87,183	99.1%	0.0%	0.9%
Dec-06	157,354	91.5%	3.6%	4.9%	114,077	88.6%	0.0%	13.4%
Jan-07	73,910	54.9%	22.7%	22.3%	75,838	89.9%	0.0%	10.1%
Feb-07	50,642	73.0%	11.1%	16.0%	70,540	88.7%	4.5%	8.8%
Mar-07	115,478	65.8%	25.6%	8.7%	58,315	80.9%	0.0%	19.1%
Apr-07	157,269	88.5%	1.0%	10.5%	78,215	58.6%	4.1%	37.3%
May-07	194,828	74.6%	6.4%	19.1%	112,347	78.2%	0.0%	23.8%
Jun-07	148,246	82.8%	9.2%	8.1%	72,858	64.0%	8.8%	27.2%
Jul-07	181,284	77.0%	14.1%	8.9%	89,081	79.4%	0.0%	20.6%
Aug-07	193,398	88.8%	2.1%	9.4%	92,608	67.5%	13.8%	18.7%
Sep-07	152,442	72.9%	16.8%	10.3%	103,988	51.4%	21.5%	27.0%
Oct-07	133,175	73.4%	10.2%	16.4%	57,284	75.4%	0.0%	24.6%
Nov-07	107,760	82.7%	0.0%	17.3%	54,579	85.7%	0.0%	14.3%
Dec-07	133,305	87.7%	0.0%	12.3%	79,321	68.3%	0.0%	31.7%
Jan-08	148,687	62.8%	23.7%	13.5%	71,454	56.0%	1.1%	42.9%
Feb-08	134,171	78.9%	6.0%	15.1%	75,806	47.3%	12.7%	40.0%
Mar-08	146,361	82.7%	9.8%	7.5%	78,824	71.1%	2.5%	26.3%
Apr-08	238,479	99.6%	0.0%	0.4%	150,309	84.3%	0.0%	15.7%
May-08	214,361	99.2%	0.0%	0.8%	153,132	95.1%	0.0%	4.9%
Jun-08	201,567	80.7%	14.3%	5.0%	118,042	50.1%	14.9%	35.0%
Jul-08	215,916	70.6%	12.6%	16.8%	151,912	39.4%	16.3%	44.3%
Aug-08	164,809	87.6%	2.4%	10.0%	84,180	77.7%	0.0%	22.3%
Sep-08	180,327	80.6%	0.0%	19.4%	111,527	41.8%	0.0%	58.2%
Oct-08	157,982	68.1%	0.0%	33.9%	78,611	58.0%	0.0%	44.0%
Nov-08	121,363	70.4%	7.9%	21.8%	74,481	68.5%	0.0%	31.5%
Dec-08	122,458	80.5%	3.3%	16.3%	82,054	73.4%	0.0%	26.6%
Jan-09	101,908	76.5%	9.4%	14.1%	78,400	89.3%	2.0%	8.6%
Feb-09	118,667	60.8%	21.3%	18.0%	93,777	67.6%	9.4%	23.1%
Mar-09	97,466	97.5%	0.0%	2.5%	53,158	94.7%	0.0%	5.3%
Apr-09	153,880	97.9%	0.0%	2.1%	85,719	91.0%	0.0%	9.0%
May-09	102,878	87.7%	0.0%	12.3%	63,863	81.5%	0.0%	18.5%
Jun-09	139,494	96.7%	2.3%	1.0%	59,754	73.8%	18.1%	10.1%
Jul-09	138,618	88.8%	3.5%	7.7%	55,855	80.4%	0.0%	19.6%
Aug-09	208,363	82.4%	2.3%	15.3%	181,439	77.8%	2.8%	19.8%
Sep-09	197,340	99.8%	0.0%	0.4%	138,060	91.1%	0.0%	8.9%
Oct-09	175,107	97.5%	0.0%	2.5%	134,834	93.6%	0.0%	8.4%
Nov-09	156,225	99.2%	0.0%	0.8%	133,936	96.0%	0.0%	4.0%
Dec-09	115,172	86.6%	4.9%	8.5%	62,484	75.5%	0.0%	24.5%
Jan-10	67,439	87.5%	0.0%	12.5%	61,517	23.7%	10.4%	85.9%
Feb-10	71,079	83.3%	6.8%	10.0%	24,877	48.5%	0.0%	51.5%
Mar-10	68,285	99.3%	0.0%	0.7%	17,521	74.7%	0.0%	25.3%
Apr-10	73,397	85.0%	0.0%	15.0%	31,343	34.4%	0.0%	65.8%
May-10	75,573	75.4%	0.0%	24.6%	46,155	22.9%	13.9%	83.3%
Jun-10	72,635	89.0%	0.0%	11.0%	29,674	39.9%	0.0%	80.1%
Jul-10	84,048	74.0%	0.0%	28.0%	62,204	22.9%	11.6%	65.5%
Aug-10	64,106	77.7%	11.4%	10.9%	38,665	38.0%	0.0%	82.0%
Sep-10	88,514	72.0%	12.9%	15.0%	41,542	32.9%	15.4%	51.7%
Oct-10	139,480	44.3%	31.5%	24.1%	111,809	12.5%	37.2%	50.3%
Nov-10	119,323	107.9%	-18.8%	10.8%	83,138	107.1%	-33.7%	28.8%
Dec-10	69,490	97.3%	0.0%	2.7%	17,835	71.8%	0.0%	28.2%
2006	1,815,322	85.1%	9.8%	5.2%	1,106,280	78.7%	6.0%	15.3%
2007	1,641,733	78.3%	9.0%	12.6%	944,774	72.5%	5.1%	22.4%
2008	2,046,482	81.3%	8.4%	12.3%	1,210,332	64.1%	4.5%	31.4%
2009	1,703,118	90.2%	3.1%	8.7%	1,139,279	85.1%	2.2%	12.7%
2010	1,011,370	80.9%	4.7%	14.4%	564,281	40.9%	7.1%	52.1%

2010 - Summary of PSNH Spot Sales

Peak

2010	Total ISO-NE Spot Sales MWh	Surplus Sales from Generation MWh	Surplus Sales from Bilateral MWh	Total ISO-NE Spot Sales $000	Avg Sale $/MWh
Jan	30,504	7,705	22,799	1,968	64.53
Feb	38,585	11,378	27,207	2,164	56.08
Mar	47,515	4,755	42,761	2,088	43.95
Apr	13,294	107	13,187	553	41.58
May	5,307	3,202	2,105	382	72.00
Jun	18,296	11,013	7,283	1,452	79.35
Jul	11,766	8,820	2,946	1,066	90.57
Aug	16,936	8,859	8,076	1,371	80.93
Sep	17,179	2,536	14,643	954	55.54
Oct	11,427	955	10,472	414	36.20
Nov	17,710	9,683	8,027	841	47.49
Dec	49,343	9,539	39,804	3,231	65.48
Totals	277,863	78,552	199,311	16,483	59.32

Off-Peak

2010	Total ISO-NE Spot Sales MWh	Surplus Sales from Generation MWh	Surplus Sales from Bilateral MWh	Total ISO-NE Spot Sales $000	Avg Sale $/MWh
Jan	31,392	24,452	6,940	1,399	44.58
Feb	28,316	21,067	7,250	1,140	40.25
Mar	47,628	37,776	9,853	1,503	31.56
Apr	15,817	10,827	4,990	445	28.11
May	8,270	4,598	3,671	294	35.55
Jun	21,046	14,799	6,248	829	39.40
Jul	6,587	3,077	3,510	231	35.13
Aug	16,702	10,599	6,102	648	38.82
Sep	18,177	13,253	4,924	743	40.88
Oct	2,117	805	1,312	57	26.76
Nov	10,153	2,366	7,787	422	41.61
Dec	45,922	36,776	9,146	2,483	54.06
Totals	252,127	180,394	71,733	10,195	40.44

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Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Baumann testimony, Attachment RAB-2. Please provide a schedule in the same format as the response to STAFF-01, Q-STAFF-002 in DE 10-121 detailing the calculation of replacement power costs. Please specifically detail any changes in the calculation method as compared to prior years.

Response:

Please see the attached table for the requested information.

There were no differences in calculation methodology as compared to previous submittals.

The replacement power costs were calculated hourly. For each hour, all supply resources (owned units, IPPs, bilateral purchases and ISO-NE spot purchases) were ordered based on their estimated dispatch prices from lowest cost to highest cost. The hour's actual energy expense was estimated by adding up the expenses of the resources whose output added up to the load. In a subsequent analysis, the unit out of service was placed back into the supply stack at an assumed availability and at the appropriate place in the dispatch order. The hour's energy expense was then recalculated as if the unit had been available. The replacement power cost was the difference in the cost to serve load between the two analyses.

The attached table summarizes by day the replacement power cost for each outage reported in RAB-2. The table lists each day's total replacement power costs, replacement power costs attributable to ISO-NE spot market purchases, replacement power costs attributable to bilateral purchases, replacement power costs attributable to PSNH generation and the avoided fuel expense attributable to the unit out of service.

Merrimack 1

Date	Total RPC ($)	Spot Purchases ($)	Bilateral Purchases ($)	PSNH Gen ($)	Avoided Fuel ($)
02/19/2010	16,692	0	0	16,696	(4)
02/20/2010	15,480	64,830	0	2,569	(51,919)
02/21/2010	14,808	62,739	0	2,178	(50,110)
02/22/2010	(3)	0	0	0	(3)
Total	46,977	127,570	0	21,443	(102,036)
06/28/2010	5,551	23,405	0	0	(17,854)
06/29/2010	70,467	72,866	0	35,655	(38,055)
06/30/2010	24,306	44,158	0	4,608	(24,460)
07/01/2010	1,768	1,549	0	835	(616)
Total	102,091	141,979	0	41,098	(80,986)
09/28/2010	5,439	34,551	1,954	0	(31,067)
09/29/2010	13,078	104,932	13,089	0	(104,944)
09/30/2010	7,188	37,152	66,198	0	(96,162)
10/01/2010	4,641	46,000	62,913	0	(104,271)
10/02/2010	(471)	3,844	0	0	(4,315)
Total	29,875	226,479	144,154	0	(340,758)
10/02/2010	3,058	63,336	4,023	0	(64,300)
10/03/2010	(15,781)	75,757	11,650	0	(103,188)
10/04/2010	(2,900)	85,050	15,254	0	(103,203)
10/05/2010	(5,319)	57,923	37,602	0	(100,844)
10/06/2010	2,968	44,971	45,069	0	(87,073)
Total	(17,974)	327,036	113,597	0	(458,607)

Merrimack 2

Date	Total RPC ($)	Spot Purchases ($)	Bilateral Purchases ($)	PSNH Gen ($)	Avoided Fuel ($)
01/01/2010	71,755	183,178	0	0	(111,422)
01/02/2010	130,155	379,270	0	0	(249,115)
01/03/2010	203,254	453,726	0	0	(250,472)
01/04/2010	290,612	491,138	0	0	(200,526)
01/05/2010	15,933	26,495	0	0	(10,562)
Total	711,710	1,533,807	0	0	(822,097)
01/29/2010	35,009	107,220	0	0	(72,211)
01/30/2010	149,013	369,481	0	0	(220,468)
01/31/2010	146,959	259,620	0	11,589	(124,250)
02/01/2010	146,439	143,128	0	53,243	(49,931)
02/02/2010	69,369	150,548	0	6,945	(88,123)
02/03/2010	922	14,292	0	0	(13,370)
Total	547,713	1,044,288	0	71,777	(568,352)
05/20/2010	25,234	96,962	0	0	(71,728)
05/21/2010	62,125	137,061	0	1,078	(76,014)
05/22/2010	40,971	63,302	140,794	4,871	(167,995)
05/23/2010	46,154	47,355	124,831	1,381	(127,413)
05/24/2010	55,384	87,691	0	23,810	(56,116)
Total	229,869	432,371	265,625	31,140	(499,267)
08/10/2010	187,863	269,521	0	0	(81,657)
08/11/2010	248,501	121,236	87,561	155,067	(115,363)
08/12/2010	143,211	114,945	211,320	0	(183,055)
08/13/2010	1,987	41,395	0	0	(39,407)
Total	581,562	547,097	298,881	155,067	(419,483)

Schiller 4

Date	Total RPC ($)	Spot Purchases ($)	Bilateral Purchases ($)	PSNH Gen ($)	Avoided Fuel ($)
11/13/2010	(14,169)	23,377	0	0	(37,547)
11/14/2010	(18,175)	28,637	0	0	(46,812)
11/15/2010	(9,717)	30,778	0	1,032	(41,527)
11/16/2010	(8,723)	27,128	0	1,271	(37,122)
11/17/2010	(20,455)	37,280	0	0	(57,735)
11/18/2010	(17,452)	32,314	0	0	(49,766)
Total	(88,691)	179,514	0	2,303	(270,509)

Schiller 5

Date	Total RPC ($)	Spot Purchases ($)	Bilateral Purchases ($)	PSNH Gen ($)	Avoided Fuel ($)
07/04/2010	13,002	35,354	4,605	1,295	(28,252)
07/05/2010	27,625	47,014	0	5,116	(24,506)
07/06/2010	65,617	89,317	0	5,975	(29,674)
07/07/2010	56,584	87,695	0	2,095	(33,206)
07/08/2010	41,279	68,773	0	3,229	(30,724)
07/09/2010	27,155	63,575	0	0	(36,420)
07/10/2010	14,079	50,897	0	0	(36,818)
07/11/2010	5,557	42,416	0	0	(36,859)
07/12/2010	32,857	67,011	0	0	(34,154)
07/13/2010	27,059	62,883	0	0	(35,825)
07/14/2010	23,403	43,650	0	4,107	(24,354)
07/15/2010	41,197	33,776	0	20,878	(13,457)
07/16/2010	11,270	7,707	0	10,730	(7,167)
Total	386,683	700,069	4,605	53,425	(371,416)
09/25/2010	966	5,386	1,832	0	(6,252)
09/26/2010	1,834	35,094	3,843	0	(37,103)
09/27/2010	4,107	27,581	13,317	0	(36,790)
09/28/2010	6,136	25,870	17,136	0	(36,870)
09/29/2010	6,632	20,834	22,710	0	(36,912)
09/30/2010	6,383	10,680	25,604	2,553	(32,454)
10/01/2010	4,411	11,175	29,972	0	(36,736)
10/02/2010	(102)	1,400	0	0	(1,502)
Total	30,367	138,019	114,413	2,553	(224,618)
12/12/2010	13,560	18,170	0	5,292	(9,902)
12/13/2010	10,135	5,615	0	6,200	(1,680)
12/14/2010	57,120	19,560	0	41,939	(4,379)
12/15/2010	41,351	31,328	0	17,299	(7,276)
12/16/2010	5,569	2,126	0	3,990	(547)
Total	127,735	76,800	0	74,720	(23,784)

Total All Units 2010

Total RPC ($)	Spot Purchases ($)	Bilateral Purchases ($)	PSNH Gen ($)	Avoided Fuel ($)
2,687,915	5,475,027	941,275	453,526	(4,181,913)

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Bauman testimony, Attachment RAB-2 (Bates 10). Please supply the replacement power costs calculated in the same manner as used in RAB-2 associated with the planned outages at:

a. Merrimack-1 from 4/13/10 to 5/20/10
b. Merrimack-2 from 9/21/10 to 10/21/10
c. Newington from 10/30/10 to 11/6/10
d. Schiller-4 from 2/26/10 to 4/2/10
e. Schiller-5 from 4/9/10 to 4/29/10.

Response:

Below is the requested information:

Replacement Power Costs (RPC)

Unit	Start Date	End Date	PSNH RPC
Merrimack 1	04/13/2010	05/20/2010	$167,548
Merrimack 2	09/21/2010	10/21/2010	$1,328,777
Newington	10/30/2010	11/06/2010	$0
Schiller 4	02/26/2010	04/02/2010	$0
Schiller 5	04/09/2010	04/29/2010	$54,260
Total			$1,550,584

RPC less than or equal to the cost of running the unit are shown as $0.

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Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-031
Page 1 of 2

Witness: **Robert A. Baumann**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Baumann testimony, Attachment RAB-4, page 8, line 4. Please break down the monthly energy costs for Newington Station into oil and natural gas costs. Please also provide the monthly per unit costs of each fuel, explain how those per unit costs were determined, and explain whether the costs are based on inventory prices, market prices, include delivery, etc.

Response:
Please see page 2 for the breakdown of the monthly energy costs between oil and gas for Newington Station, including the monthly price per unit. The oil costs were based on the weighted cost of oil taken out of the inventory which reflect both the cost of oil (#2 and #6) and the delivery cost to the station. The #2 oil is use for start up as well as plant warming. The natural gas is not inventoried and thus reflects the monthly purchased cost for the commodity and transportation of that gas to the station.

Newington Station
2010 Monthly Energy Costs

	1	2	3	4	5	6	7	8
		#6 & #2 Oil			Natural Gas			
	Barrels	Cost	Cost/BBL (col.2/col.1)	MCF	Cost	Cost/MCF (col.5/col.4)	Other (1)	Total (cols.2+5+7)
January	13,545	$ 699,798	$ 51.66	45,187	$ 331,661	$ 7.34	$ 10,801	$ 1,042,260
February	12,156	734,074	60.39	61,272	432,574	7.06	63,832	1,230,480
March (2)	1,645	(183,812)	(111.74)	69,158	420,332	6.08	40,943	277,463
April	644	58,480	90.81	-	(10,990)	-	4,764	52,254
May	1,415	127,377	90.02	152,516	842,053	5.52	6,493	975,923
June	6,177	430,512	69.70	306,820	1,813,032	5.91	17,300	2,260,844
July	28,187	1,736,616	61.61	384,605	2,320,872	6.03	23,138	4,080,626
August	16,245	841,650	51.81	277,193	1,569,211	5.66	8,710	2,419,570
September	5,805	345,145	59.46	298,918	1,681,593	5.63	58,619	2,085,356
October (3)	(3,749)	(91,443)	(24.39)	197,893	993,659	5.02	76,572	978,788
November	4,152	285,645	68.80	391,760	2,377,186	6.07	158,833	2,821,663
December	12,650	750,273	59.31	100,565	717,460	7.13	79,982	1,547,714
Total	98,872	$ 5,734,315	58.00	2,285,887	$ 13,488,642	5.90	$ 549,985	$ 19,772,941

Notes:
1. Other includes Handling, Additives and Residual costs.
2. March oil costs reflect a credit of $306,952 for insurance reimbursement for the replacement power costs related to the Exciter claim.
3. The October oil costs reflect an adjustment of ($188,667) and (4,747) barrels, a correction of the August 2010 reported costs and barrels.

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Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-037
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Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Baumann testimony, Attachment RAB-4, page 13, foot note #1. Please provide an up-to-date accounting of the status of insurance issues/proceeds associated with the Merrimack-2 turbine.

Response:
The status of the insurance reimbursements associated with the Merrimack Unit 2 turbine damage claim is summarized below.

	Boiler and Machinery Property Damage ($M)	Replacement Power Costs (RPC)	Total Claimed Amount (excludes deductible)
Total Claimed	$20,031,690	$13,871,020	$33,902,710
Total Received to date	$20,031,690	$8,058,859	$28,090,549
Outstanding Balance	$0	$5,812,161	$5,812,161

Footnote#1 on Attachment RAB-4, page 13, reflects the December 2010 final property damage payment of $6.582M. Additional information is being exchanged with the Insurers specific to the remaining replacement power claim. Please also see Staff Set 1, Q-Staff-048.

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Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-038
Page 1 of 1

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference White testimony, page 4, lines 15-19 and Attachment FBW-4. Please explain how the given daily prices for residual oil (New York Harbor), natural gas (Algonquin Gate) and bilateral energy(Mass. HUB) relate to prices paid/costs incurred by PSNH. Are any adjustments to those prices necessary to have direct comparison to PSNH's costs?

Response:

Algonquin natural gas is related to gas burned as fuel at Newington station and at other gas fired electic generating units in New England. Algonquin is a gas pipeline which runs through Connecticut, Rhode Island, and Massachusetts. As can be seen from the chart, New England energy prices (Mass. Hub) are well correlated to natural gas prices. New York Harbor residual fuel oil is related to oil burned as fuel or in inventory at Newington station, and at other oil fired electric generating units in the region. Fuel oil influences energy prices during peak periods during the year. For both gas and oil, prices at specific locations throughout the region will differ from the prices shown due to transportation costs. Mass. Hub peak prices are an indication of the general price level for energy in New England, and are based on an average of approximately 30 pricing points in central Massachusetts. Generally, New Hampshire energy prices are slightly lower than Mass. Hub prices. These prices are representative of transaction prices for supplemental energy purchases and surplus energy sales made by PSNH.

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Please make the 5-year and 10-year capital and O&M budgets for Merrimack, Schiller, and Newington stations and the hydro units and combustion turbines available for review at PSNH offices in Manchester, NH.

Response:
The 5-year and 10-year capital and O&M budgets for Merrimack, Schiller and Newington stations and the hydro units and the combustion turbines, will be made available for review by the Staff's consultant.

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Docket No. 11-094

Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-040
Page 1 of 1

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Please make the 2010 budgeted and actual capital and O&M expenditures for Merrimack, Schiller, and Newington stations and the hydro units and combustion turbines as a group available for review at PSNH offices in Manchester, NH.

Response:
The 2010 budgeted and actual capital and O&M expenditures for the steam facilities, the hydro units and the combustion turbines will be available for review by the Staff consultant .

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Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-041
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Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Please supply detailed outage summaries of the scheduled maintenance outages that took place for Merrimack, Schiller, and Newington stations in 2010 (Outage books).

Response:
The 2010 scheduled maintenance outage summaries for Merrimack, Schiller and Newington stations,will be available for review by the Staff consultant.

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Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-042
Page 1 of 1

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
For 2010, please list the events caused by PSNH/NU distribution and/or transmission personnel or their contractors which caused a trip of any generator whether replacement power was required or not, the date ofoccurrence, and the party responsible. Please also indicate if PSNH supervision was present if contractor caused. Do not list as part of your response events caused by equipment failure, faults, lightning, etc.

Response:
In 2010 there were no events caused by PSNH/NU distribution and/or transmission personnel, or their contractors, which caused a trip of any PSNH generator.

Public Service Company of New Hampshire
Docket No. 11-094

Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-043
Page 1 of 1

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Smagula testimony, page 3, (Bates 64) lines 5-6. Please provide in tabular form the PSNH fleet generation in MWH from 2004 through 2010 calculated consistently with data supplied in Docket DE 10-121.

Response:
Below is the PSNH fleet net generation from 2004 through 2010 consistent with data supplied in Docket DE 10-121.

	2004	2005	2006	2007	2008	2009	2010
Net Generation (mwhrs)	6,197,017	5,637,286	4,579,261	4,890,326	4,366,468	3,788,627	3,982,584

Public Service Company of New Hampshire
Docket No. 11-094

Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-044
Page 1 of 1

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Smagula testimony, page 3, (Bates 64) lines 5-6. Please provide in tabular form the availability of the units in PSNH's fleet generation by unit during the 30 highest priced days from 2004 through 2010 calculated consistently with data supplied in Docket DE 10-121 and with and without planned maintenance outages.

Response:
Below is the PSNH fleet availability for the 30 days of highest market prices for 2004 - 2010.

	2004	2005	2006	2007	2008	2009	2010
Availability (%)	97.9	94.3	97.6	99.1	98.0	97.4	93.8

None of the planned maintenance outages in 2010 occurred during the 30 highest market priced days. Below is the associated availability by unit.

Unit	EAF
MK1	99.2%
MK2	90.7%
NT1	95.2%
SR4	97.4%
SR5	80.5%
SR6	98.6%

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Smagula testimony, page 3 (Bates 64), 5-6. Please provide in tabular form the PSNH generation fleet overall availability from 2004 through 2010 calculated consistently with data supplied in Docket DE 10-121 and with and without planned maintenance outages.

Response:
Below is a table of the overall PSNH fleet availability from 2004 through 2010 calculated both with planned maintenance outages and without planned maintenance outages.

Fleet availability with planned maintenance outages included

Year	2004	2005	2006	2007	2008	2009	2010
Fleet Availability (%)	88.4	84.2	87.9	91.0	83.0	82.1	91.0

Fleet availability with planned maintenance outages omitted

Year	2004	2005	2006	2007	2008	2009	2010
Fleet Availability (%)	93.7	90.8	93.6	94.7	88.9	91.1	94.7

Public Service Company of New Hampshire
Docket No. 11-094

Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-046
Page 1 of 1

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Smagula testimony, pages 6-11 (Bates 67-72). Please have condition reports for the cyclones on units 1 and 2 at Merrimack available for review at PSNH offices in Manchester, NH.

Response:
Specific to Smagula testimony, pages 6 -11, PSNH will be prepared to review the the condition of the cyclones on units 1 and 2 at Merrimack Station during the Merrimack Station 2010 outage review with the Staff's consultant.

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Smagula testimony, pages 6-11 (Bates 67-72). Please have procedures for Schiller-5 cyclone cleaning available for review at PSNH offices in Manchester, NH.

Response:
Specific to Smagula testimony, pages 6 -11, PSNH will be prepared to review the process used to clean the Schiller 5 cyclones during the Schiller Station 2010 outage review with the Staff's consultant.

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Smagula testimony, Appendix A, Stipulation Agreement Item III.E.1 in Docket DE 10-121(Bates 76). Please detail why the $5.8 million payment for replacement power costs is being delayed. As part of your response, please indicate if the insurance carrier is disputing PSNH's claim and if so, the basis they use to do so.

Response:
As discussed in Smagula testimony, Appendix A, and reiterated in these responses in Q-Staff-037 the property damage portion of the claim was fully paid with a December 2010 payment. There is a remaining claim of $5.8 million associated with the replacement power cost portion of the total claim of $33.9 million. The company is working with the insurers to provide additional information as the insurers consider any appropriate adjustments to the claimed replacement power costs reflecting the nuances of a regulated utility with a requirement to serve load, appropriate use of day ahead and real time market prices, any avoided costs associated with the lost generation, and appropriate capacity market treatment. Final resolution is still expected in 2011.

Public Service Company of New Hampshire
Docket No. 11-094

Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-049
Page 1 of 1

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Smagula testimony, Appendix A, Stipulation Agreement Item III.E.2 in Docket DE 10-121(Bates 77-78). Please describe the monetary settlement reached with Alstom.

Response:
In the monetary settlement discussed in Smagula testimony, Appendix A, Stipulation Agreement Item III.E.2 in Docket DE 10-121, Alstom agreed to pay PSNH a sum of $1,500,000.00. Payment of that sum was made in two installments of $750,000.00: one on or before January 31, 2011, and the second on or before June 30, 2011.

Public Service Company of New Hampshire
Docket No. 11-094

Data Request STAFF-01

Dated: 06/23/2011
Q-STAFF-050
Page 1 of 1

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Smagula testimony, Attachment WHS-3 (Bates 127) Steam Unit Availability. Please explain the increase in Newington's heat rate in 2009 and 2010.

Response:
WHS 3 "Newington Unit 1 Historic Performance Data" shows the annualized heat rate from the period of 1993 to 2010. Heat rate is a function of heat input and generation. Because NT1 is a dual fuel unit, heat rate will vary depending on the fuel being combusted, the unit's operating load, and the number of startups and shutdowns.

In 2009, the NT1 heat rate was consistent with 2001, 2002, and 2006 when in each year the natural gas usage was similar in percentage ranging from 9.5% to 22% of total annual heat input. In contrast, in 2010, NT1's heat rate was comparatively higher for the following reasons: 1) natural gas contributed to approximately 83% of total annual heat input; 2) the number of unit startups (129) in 2010 was greater; 3) the unit startup process was varied allowing the unit start-up to occur exclusively combusting gas; and 4) in 2010, NT1 was dispatched by the ISO NE to maintain energy reserve with an associated dispatch at approximately 100 MW. This low load operation has a higher heat rate than full load operation.

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Reference Smagula testimony, Attachment WHS-3 (Bates 127-128) Steam Unit Availability. Please recalculate the availability table as shown without the five 2010 planned maintenance outages. As part of your response, please also include annual figures for the units listed in the availability table.

Response:
Please see Attachment WHS-3, pages 129-130, which provides information similar to pages 127-128 with the five 2010 planned maintenance outages omitted.

The annual availability figures for the units are as follows:

Unit	2010 Annual Unit Availability w/o planned maintenance outages
Merrimack 1	95.4
Merrimack 2	95.0
Newington 1	98.2
Schiller 4	96.0
Schiller 5	92.7
Schiller 6	97.0

Witness: **Robert A. Baumann,William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Please indicate the amount credited to O&M and capital for the Alston $1.5 monetary settlement.

Response:
The Alston settlement credits were booked in January and June 2011 when received, and have been reflected in the cost reconciliation for Energy Service. PSNH received two payments of $750,000, one in January 2011 and the other in June 2011. These credits were booked 1/3 to O&M and 2/3 to capital resulting in a total O&M credit of $500,000 and a credit to capital of $1,000,000.

Witness: **Frederick White**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Please provide the PSNH write up of PSNH's approach to supplemental energy purchases and sales noted in these responses.

Response:

DE 11-094 Staff-1, Questions 5, 6, 7, & 9 requested that write-ups be made available addressing settlement agreement recommendations from DE 10-121. Redacted write-ups and "Guidance for PSNH ES Rate Supplemental Energy Needs" are in the attached documents.

** The material in the attachments to this response is commercially sensitive, proprietary and confidential. The attachments are being filed in redacted version. Unredacted versions are being filed under a Motion for Protective Order dated September 13, 2011.

August 19, 2011

Preamble: This guidance document addresses settlement agreement recommendations reached in Docket DE 10-121, dated January 11, 2011, page 3, Section III.B.1, regarding supplemental purchases and sales; and per discussions with NH PUC Staff's consultant on July 28, 2011 augments write-ups prepared in response to DE 11-094, Staff-1, Questions 5, 6, 7, & 9.

Guidance for PSNH ES Rate Supplemental Energy Needs

Beginning with commencement of the development of the ES rate and thru September of the ES rate year - PSNH to perform on a quarterly basis an analysis of loads based on the latest actual load data available and the current PSNH load forecast.

PSNH to review quarterly in order to determine if there is a need for supplemental energy purchases or sales. This review will take into account the economic utilization of owned generation, existing bilaterals, and IPPs in determining the ES energy portfolio net position (the Supplemental Needs). Purchases and/or sales recommendations will be developed based on the following:

As part of PSNH ES Rate Hedge Plan (Prior to Rate Setting):

Summer / Winter supplemental purchases should be made to meet **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** of Supplemental Needs. However, if supplemental needs are **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL]** or less this minimal exposure may remain un-hedged. If it is forecast that existing purchases and economic generation will meet **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL]** of needs, PSNH will attempt to sell any excess to reduce supply to **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL]**-coverage of load. If the excess is within **[BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** of needs this minimal exposure may remain. However, PSNH will not **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL]**.

Spring / Fall supplemental purchases should be made to meet **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL]** of Supplemental Needs. However, if supplemental needs are **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL]** or less this minimal exposure may remain un-hedged. If it is forecast that existing purchases and economic generation will meet **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL]** of needs, PSNH will attempt to sell any excess to reduce supply to **[Redacted]** coverage of load. If the excess is within **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL]** of needs this minimal exposure may remain. However, PSNH will not **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL]**.

During ES Rate Year (Quarterly Review):

If it is forecast that existing purchases and economic generation will meet **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL]** of needs, PSNH will attempt to sell any excess so as to maintain **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL]** coverage of load. If the excess is within **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL]** of needs this minimal

exposure may remain. However, PSNH will not **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL]**.

During ES Rate Year (Short Term – One Month or Less):

If during the PSNH weekly assessment of ES load needs and generation resources it is determined that a condition of oversupply **[BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** will occur due to owned generation and supplemental energy purchases and such condition is reasonably expected to be of a **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** duration, PSNH will evaluate market opportunities to 1) reduce generation output (if economically viable) and /or 2) sell supplemental energy. In this event of a sale into the bilateral energy market, such sale opportunity will consider risks associated with customer load (weather driven demand) as well as any potential for an unplanned generation resource loss.

Reference DE 11-094 Staff1, Q-005

DE 10-121 Settlement Agreement III.B.1

While market prices are depressed due to the factors enumerated on pages 5 and 6 of its testimony, Accion recommends that PSNH should focus more on shorter term arrangements and spot market prices during the two non-peak quarters.

Write-Up:

Fundamentally, the starting point for determining how much supplemental energy was needed to meet Energy Service (ES) requirements was to compare the expected economic operation of resources owned or contracted to PSNH, including IPP purchases, to its forecasted ES needs. In 2010 PSNH was not bound to any particular type of purchase arrangement(s) and recognized a need to maintain flexibility in this regard.

The general energy market paradigm that existed in non-peak quarters of 2010 was one of low gas and energy prices. Under these market conditions PSNH's purchase strategy envisioned looking at energy needs under a plausible high migration level and generating unit availability when considering supplemental energy purchases prior to the start of a delivery period, and managing any remaining energy purchase needs through bilateral and ISO-New England administered energy markets during the delivery period. In fact, for 2010 PSNH did not make any energy purchases more than **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**, other than three 2010 annual purchases transacted in 2008 (614 GWh), and the Bethlehem and Tamworth unit contingent contracts (290 GWh). Excluding those legacy transactions, only four energy purchase transactions (during October and November) were for **[BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**. Additionally, PSNH utilized ISO-NE spot markets to procure 440 GWh of supplemental energy needs, 61% of total 2010 energy purchases excluding the legacy deals. So ultimately in 2010, PSNH's purchase strategy resulted in near term purchases made for short durations.

Reference DE 11-094 Staff1, Q-006

10-121 Settlement Agreement III.B.2

PSNH should establish a percentage of its on-peak monthly needs that will be procured from supplemental sources with an established point of measurement, such as an approved load forecast, to provide some hedge against market fluctuations during the two peak period quarters and to reduce the possibly of large quantities of excess power.

Write-Up:

Fundamentally, the starting point for determining how much supplemental energy is needed (peak or off-peak) to meet Energy Service (ES) requirements is to compare the expected economic operation of resources owned or contracted to PSNH, including IPP purchases, to its forecasted ES needs. PSNH utilizes load forecasts jointly developed by its Performance Analysis and Facilities, and NUSCO's Economic and Load Forecasting departments; as adjusted based on a current analysis of migration to 3rd party suppliers. As contemplated in the subject recommendation, PSNH has established in its Wholesale Marketing Policy - PSNH Load Asset Management, approved by the President – PSNH, a directive that no more than **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** of the positive difference between the adjusted load forecast and available energy resources, by volume per day during peak hours, shall be purchased through ISO-NE spot energy markets. i.e. - Supplemental energy purchases must be arranged to prevent an over-reliance on potentially fluctuating spot energy markets (e.g. - when PSNH generation is in an outage). This policy is in affect during all months of the year, not only during peak period quarters as recommended in the settlement agreement.

Reference DE 11-094 Staff1, Q-007

DE 10-121 Settlement Agreement III.B.3

PSNH should have a clearly defined basis for making short-term purchases or sales that fall outside projected needs.

Write-Up:

Fundamentally, the starting point for determining how much supplemental energy is needed to meet Energy Service (ES) requirements is to compare the expected economic operation of resources owned or contracted to PSNH, including IPP purchases, to its forecasted ES needs.

This analysis would also indicate any energy resources surplus to ES requirements and therefore any ability to enter into energy sales arrangements. PSNH has established in its Wholesale Marketing Policy - PSNH Load Asset Management, approved by the President – PSNH, a directive that no more than **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** of the positive difference between the adjusted load forecast (i.e. - the ES energy requirement taking into account migration) and available energy resources, by volume per day during peak hours, shall be purchased through ISO-NE spot energy markets. PSNH is in the process of updating its policies on energy transactions in part to formalize its criteria regarding sales of surplus energy. Forward sales of forecasted surplus energy will not be made if a reasonable possibility exists that the resources would be needed to serve ES load; given possible economic shutdowns, outages, or changes to load. It should be noted that Wholesale Marketing Policies strictly prohibit speculative transactions.

For 2010 PSNH did not make any energy purchases or energy sales more than **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**, other than three 2010 annual energy purchases transacted in 2008 (614 GWh), and the Bethlehem and Tamworth unit contingent contracts (290 GWh). Excluding those legacy transactions, only four energy purchase transactions (during October and November), and one energy sale transaction (during November), were for a **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**. Three of the four energy purchase transactions were for the month of November, 2010 (144 GWh) to replace Merrimack 2 which was forecast to be on economic reserve shutdown. Subsequently, based on an increase in energy market prices and the dispatch of Merrimack 2, an energy sale for November 10th thru the end of the month was arranged (the one energy sale transaction, 50 GWh). PSNH utilized ISO-NE spot energy markets to procure 440 GWh of supplemental energy needs, 61% of total 2010 energy purchases excluding the legacy deals; and utilized ISO-NE spot energy markets to sell 530 GWh of surplus energy, 91% of total 2010 energy sales.

Reference DE 11-094 Staff1, Q-009

DE 10-121 Settlement Agreement III.B.6

PSNH should establish formal criteria governing the sale of purchased surplus supplemental energy into the spot market and should analyze its purchases and make sales of surplus energy and capacity into markets other than the spot market as it deems appropriate.

Write-Up:

Fundamentally, the starting point for determining how much supplemental energy is needed to meet Energy Service (ES) requirements is to compare the expected economic operation of resources owned or contracted to PSNH, including IPP purchases, to its forecasted ES needs. This analysis would also indicate any energy resources surplus to ES requirements and therefore any ability to enter into energy sales arrangements. PSNH has established in its Wholesale Marketing Policy - PSNH Load Asset Management, approved by the President – PSNH, a directive that no more than **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** of the positive difference between the adjusted load forecast (i.e. - the ES energy requirement taking into account migration) and available energy resources, by volume per day during peak hours, shall be purchased through ISO-NE spot energy markets. PSNH is in the process of updating its policies on energy transactions in part to formalize its criteria regarding sales of surplus energy. Forward sales of forecasted surplus energy will not be made if a reasonable possibility exists that the resources would be needed to serve ES load; given possible economic shutdowns, outages, or changes to load. It should be noted that Wholesale Marketing Policies strictly prohibit speculative transactions.

For 2010 PSNH did not make any energy purchases or energy sales more than **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**, other than three 2010 annual energy purchases transacted in 2008 (614 GWh), and the Bethlehem and Tamworth unit contingent contracts (290 GWh). Excluding those legacy transactions, only four energy purchase transactions (during October and November), and one energy sale transaction (during November), were for a **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**. Three of the four energy purchase transactions were for the month of November, 2010 (144 GWh) to replace Merrimack 2 which was forecast to be on economic reserve shutdown. Subsequently, based on an increase in energy market prices and the dispatch of Merrimack 2, an energy sale for November 10th thru the end of the month was arranged (the one energy sale transaction, 50 GWh). PSNH utilized ISO-NE spot energy markets to procure 440 GWh of supplemental energy needs, 61% of total 2010 energy purchases excluding the legacy deals; and utilized ISO-NE spot energy markets to sell 530 GWh of surplus energy, 91% of total 2010 energy sales.

Public Service Company of New Hampshire
Docket No. 11-094

Technical Session TECH-01

Dated: 09/06/2011
Q-TECH-003
Page 1 of 1

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Please provide the status of replacing the GenIS unit outage tracking system.

Response:
The replacement of the previous GenIS unit outage tracking system is complete. GenIS has been replaced with the GADS Nxl system. GADS Nxl has been utilized since March 1, 2011. This new GADS Nxl system is an enhancement to the GenIS system, particularly in the reporting area. It is a product that will provide PSNH an improved tool to report GADS data to ISO-NE, NERC and the Commission and will assist with internal monitoring and management.

Public Service Company of New Hampshire
Docket No. 11-094

Technical Session TECH-01

Dated: 09/06/2011
Q-TECH-004
Page 1 of 1

Witness: **William H. Smagula**
Request from: **New Hampshire Public Utilities Commission Staff**

Question:
Please provide any new developments beyond the claim for Replacement Power Costs (RPC) and when PSNH expects to receive the final RPC payments from the insurance companies.

Response:
Northeast Utilities' property insurers have paid claims to PSNH in excess of $28 million for the Merrimack Unit 2 foreign material incident that damaged the newly installed HP-IP turbine replacement during the 2008 scheduled outage. The insurers have now brought action as subrogees of Northeast Utilities to the extent of those payments. In this subrogation action, the insurers have alleged that during the installation of the new HP-IP turbine, Babcock & Wilcox supplied secondary superheater inlet pendant tubes which were contaminated with foreign object debris. The insurers allege that, during startup of the steam turbine, the foreign object debris damaged the turbine and other components in the system. If successful, this subrogation action could result in additional reimbursement to PSNH for the deductibles paid.

PSNH expects the final RPC claim payment to be received before the end of the year.

Witness: William H. Smagula
Request from: New Hampshire Public Utilities Commission Staff

Question:
Please provide the availability percents by unit for the 30 highest market priced days for 2004-2010 period or for as many years as available.

Response:
Below are the availability percents by unit for the period 2004 - 2010.

Availability (%)	2004	2005	2006	2007	2008	2009	2010
PSNH Fleet	97.9	94.3	97.6	99.3	98.0	97.4	93.8
MK1	100.0	94.2	96.4	99.7	97.6	98.4	99.2
MK2	96.7	91.6	98.6	99.9	99.8	100.0	90.7
NT1	99.4	99.0	97.1	99.7	99.2	99.0	95.2
SR4	87.4	79.5	94.8	99.9	99.9	92.6	97.4
SR5	100.0	88.1	99.2	94.4	99.4	83.8	80.5
SR6	98.2	94.0	97.8	99.9	97.3	100.0	98.6