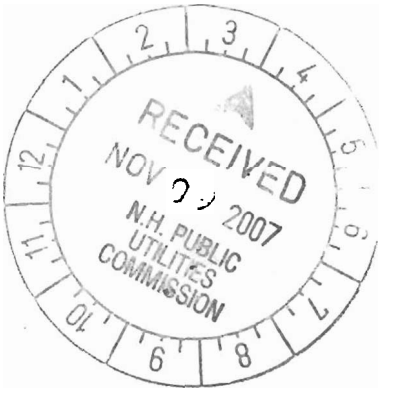
STATE OF NEW HAMPSHIRE

PUBLIC UTILITIES COMMISSION

DOCKET NO. DE 07-096



IN THE MATTER OF:
PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE, INC.
PROPOSED DEFAULT ENERGY SERVICE RATE FOR 2008

DIRECT TESTIMONY

OF

MICHAEL D. CANNATA, JR., P. E.
SENIOR CONSULTANT

NOVEMBER 9, 2007

Q. Mr. Cannata, please state your full name.

A. My name is Michael D. Cannata, Jr.

Q. Please state your employer and your business address?

A. I am employed by The Liberty Consulting Group (Liberty). My business address is 65A Ridge Road, Deerfield, New Hampshire 03037.

Q. In what capacity are you employed?

A. I am a Senior Consultant. In that role I am generally responsible for the review of energy utility engineering and operations management, practices, and procedures.

Q. Please describe your educational background, work experience, and major accomplishments of your professional career?

A. My educational background, work experience and major career accomplishments are contained in Attachment MDC-1.

Q. To what professional organizations or industry groups do you belong or have you belonged?

A. I am a member of the Institute of Electrical and Electronic Engineers and its Power Engineering Society, and am a Registered Professional Engineer in the State of New Hampshire (#5618). I served as a member of virtually all of the former New England Power Pool (NEPOOL) Task Forces and Committees except for their Executive Committee where my role was supportive to an Executive Committee member. I also

served as a member of the New England/Hydro Quebec DC Interconnection Task Force and the Hydro Quebec Phase Two Advisory Committee. These two groups designed the Hydro Quebec Phase One and Phase Two 450kV DC interconnections with New England. The various committees and groups that I have served on existed to address the functions now being performed by the Independent System Operator – New England (ISO-NE).

On national issues, I represented Public Service Company of New Hampshire (PSNH) at the Northeast Power Coordinating Council as its Joint Coordinating Committee member, at the Edison Electric Institute as its System Planning Committee member, and at the Electric Power Research Institute as a member of the Power Systems Planning and Operations Task Force.

While employed by the State of New Hampshire as the Chief Engineer at the Public Utilities Commission, I sat as a full member of the New Hampshire Site Evaluation Committee responsible for siting major energy facilities. At the request of the New Hampshire Public Utilities Commission's (NHPUC or Commission) Chairman, I sat on the State Emergency Response Commission. I was also a member of the former Staff Subcommittee on Engineering of the National Association of Regulatory Utility Commissioners.

Q. Have you testified before regulatory bodies before?

A. I testified before the NHPUC in rate-case, condemnation, least-cost-planning, fuel-adjustment, electric industry restructuring, unit outage reviews, and other proceedings. I testified before the Kentucky Public Service Commission in transmission siting proceedings. I submitted testimony at proceedings at the Federal Energy Regulatory Commission (FERC). I also testified at the request of the New Hampshire Commission before committees of the New Hampshire Legislature on a variety of matters concerning regulated utilities.

Q. Please describe the areas that your testimony addresses today.

A. My testimony addresses the testimony of Mr. Richard C. Labrecque filed in this proceeding regarding Liberty's three recommendations pertaining to power supply issues agreed to by PSNH via stipulation in Docket DE 06-068, the 2005 Stranded Cost Recovery Charge reconciliation docket.

Q. Please discuss the first issue.

A. Liberty recommended that PSNH model monthly forced outages for its base load units rather than use the same average annual forced outage rate in each month. PSNH states that, based on its review, there is no observable monthly or seasonal pattern for forced outages that provides more accurate estimates of unit outages compared to an average annual outage rate. Furthermore, PSNH states that it buys monthly bilateral energy from the market, assuming full operation of its units for that month if they are not scheduled to be out of service. Should a forced outage occur, each outage is evaluated at that time as to whether short term bilateral energy or spot

energy should be purchased. PSNH also states that even if there was a high degree of confidence that an outage would occur, there is no way to determine on which days of the month the outage will occur, making it impractical to purchase power in advance of a forced outage.

Q. Do you agree with their conclusion?

A. Liberty agrees with PSNH's logic regarding the purchase of power specifically to cover a unit outage in advance. However, PSNH missed the point of Liberty's recommendation. PSNH supplies some of its energy requirements with its own units and buys the shortfall from the market. In smaller net energy requirement months, a small percentage shift in the capacity factor of even one unit may affect the energy purchase requirements for that month. The table below builds on Attachment RCL-1 and illustrates what can happen to PSNH's monthly energy requirements as a result of the monthly variation in forced outage rates[1]. Also, bear in mind that a one percent variation in monthly availability[2] would change the output by 800 MWH per month for Merrimack-1; 2,300 MWH per month for Merrimack-2; and 350 MWH per month for either Schiller-4 or Schiller-6.

[1] Liberty realizes that it is using 5-year average availabilities from 2002-2006 and comparing them to 2006 energy requirements and that such a comparison is not technically correct. The table is for illustrative purposes.
[2] For base load coal units, availability is approximately equal to capacity factor.

Monthly Unit Output Energy Variations Compared to 5-Year Average

Impact on Market Energy Requirements

Month	MK-1 Availability Shift From 5-Year Average(a)	GWH (b)	MK-2 Availability Shift From 5-Year Average(a)	GWH (b)	SCH-4 Availability Shift From 5-Year Average(a)	GWH (b)	SCH-6 Availability Shift From 5-Year Average(a)	GWH (b)	Total GWH Shift	PSNH 2006 Base Market Energy Requirements GWH(c)
Jan	2%	1.6	2%	4.6	-2%	-0.7	2%	0.7	6.2	77
Feb	0%	0.0	-8%	-18.4	2%	0.7	6%	2.1	-15.6	181
Mar	-1%	-0.8	8%	18.4	0%	0.0	4%	1.4	19.0	134
Apr	-3%	-2.4	10%	23.0	-9%	-3.15	-10%	-3.5	13.95	171
May	-1%	-0.8	(d)	(d)	4%	1.4	3%	1.05	1.65(d)	284
Jun	1%	0.8	6%	13.8	5%	1.75	1%	0.35	16.7	168
Jul	2%	1.6	-2%	-4.6	3%	1.05	0%	0.0	-1.95	200
Aug	-2%	-1.6	6%	13.8	-4%	-1.4	-1%	-0.35	10.45	203
Sep	5%	4.0	-2%	-4.6	-4%	-1.4	-2%	-0.7	2.7	256
Oct	-2%	-1.6	-2%	-4.6	5%	1.75	-1%	-0.35	-4.8	130
Nov	-2%	-1.6	6%	13.8	-4%	-1.4	-5%	-1.75	9.05	123
Dec	3%	2.4	-1%	-2.3	1%	0.35	-1%	-0.35	0.1	191

(a) – Data from instant docket, Attachment RCL-1.
(b) – (Generating unit capacity x 8760 hours x % availability shift)/ 12.
(c) – Data from 2006 SCRC docket, Attachment RCL-2, Docket DE 07-057 (included as Attachment MDC-2). Values in the column are calculated as the amount of on-peak and off-peak energy not supplied by PSNH resources in the respective months.
(d) - Data included only one data point for MK-2 and was dropped in this analysis.

The table shows that variations in the monthly unit output using 5-year monthly availabilities can change PSNH's monthly market energy requirements by up to

almost 15 percent (e.g., March: 19 GWH output shift / March 2006 134 GWH market energy requirements = 14.2%). The questions to be asked are:

- Would such a variation make a difference in PSNH's purchase decisions for on-peak energy for that month?
- If so, how, and if not, why not?
- Would such a variation make a difference in PSNH's purchase decisions for off-peak energy for that month?
- If so, how, and if not, why not?

Liberty recommends that the Commission direct PSNH to file answers to these questions with the Commission.

Q. What does the second issue entail?

A. Liberty recommended that PSNH model the short, planned reliability outages of its base load units within its monthly forecasts. PSNH identified three upcoming planned reliability outages that could be expected to occur within the monthly maintenance schedules. PSNH did not state whether it would model those future outages as recommended, but did state on lines 16-17 of page 3 of Mr. Labrecque's testimony that the outages were factored into the ES expense forecast. Liberty agrees with the PSNH analysis, and if PSNH's testimony is a commitment to model those outages and similar outages in the future, Liberty considers this issue resolved.

Q. What is the third issue?

A. The third issue related to using a 90/10 weather-based load forecast versus a 50/50 weather-based load forecast in the determination of market purchases of energy and capacity.[3] Liberty recommended that PSNH analyze the difference in energy and capacity purchases that would be required as a result of using the different forecasts. Since the time that Liberty made its recommendation, the new Forward Capacity Market (FCM) rules for capacity purchases have been finalized. PSNH, therefore, has performed no analysis on what effect a 50/50 weather-based load forecast would have on its capacity purchases compared to a 90/10 weather-based load forecast. Liberty agrees that the 90/10 weather-based load forecast question is now moot with the adoption of the FCM rules. Because PSNH's capacity is always lower than monthly requirements in the FCM, PSNH cannot alter, vary or otherwise control customer costs in that regard.

With regard to its energy forecasts, PSNH is still using a 50/50 weather-based load forecast. This is consistent with industry energy procurement practices.

Q. Does this resolve the third issue?

A. No, not completely. Liberty's original recommendation was based on the premise that the current weather warming trend was relatively new. PSNH's data (Attachment RCL-3) shows conclusively that this phenomenon has been occurring for some time and that the use of a 30-year weather database compared to a 10-year weather

[3] "90/10" refers to weather extremes that are likely to occur once every ten years; "50/50" refers to weather extremes that have a 50 percent chance of occurring in any year.

database does not show the marked increase in temperature that Liberty had expected because some of the temperature change was already included in the 30-year weather base data used by PSNH in its load forecast. The end result is that the difference in energy requirements is not as dramatic as Liberty had expected. Nevertheless, when compared to PSNH's market energy requirements, Liberty believes that the effect can be significant. The table below shows the differential monthly energy requirements between a 10-year weather-based load forecast compared to PSNH's 2006 market energy requirements based on a 30-year weather based load forecast.

10-Year Weather-Based Monthly Energy Requirements versus PSNH's 2006 30-Year Weather-Based Monthly Energy Requirements

Month	Total Sales Impact (GWH)(1)	PSNH 2006 Base Market Energy Requirements GWH(2)
Jan	-4	77
Feb	-5	181
Mar	0	134
Apr	-1	171
May	-3	284
Jun	18	168
Jul	-3	200
Aug	18	203
Sep	1	256
Oct	-1	130
Nov	-3	123
Dec	-6	191

(1) – Data from instant docket, Attachment RCL-6.

(2) – Data from 2006 SCRC docket, Attachment RCL-2, Docket DE 07-057 (included as Attachment MDC-2). Values in the column are calculated as the amount of on-peak and off-peak energy not supplied by PSNH resources in the respective months.

The table shows that variations in the monthly energy load requirements using a 10-year weather-based load forecast compared to PSNH's 2006 30-year weather-based load forecast can change PSNH's monthly market energy requirements by up to 11 percent (e.g., see June in the table above). The questions to be asked are:

- Would such a variation make a difference in PSNH's purchase decisions for on-peak energy for that month?
- If so, how, and if not, why not?
- Would such a variation make a difference in PSNH purchase decisions for off-peak energy for that month?
- If so, how, and if not, why not?

Liberty recommends that the Commission direct PSNH to file answers to these questions with the Commission.

Liberty also recommends that PSNH monitor the difference between the 30-year load forecasts and the 10-year load forecasts and report to the Commission in its annual filings in a similar form of Attachments RCL-6 and RCL-7. In this manner, a proper determination can be made regarding whether to switch to a shorter weather-based load forecast.

Q. Does that conclude your testimony?

A. Yes, it does.

RESUME OF MICHAEL D. CANNATA, JR., P. E.

Michael D. Cannata, Jr., P. E.

Areas of Specialization

Investigations of safety, reliability, and implementation of public policy in the electric and gas industries; electric utility operations and planning; bulk power system planning; transmission system design.

Relevant Experience

The Liberty Consulting Group

- Lead consultant for Liberty'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 reviewing the operation and outage of the fossil power plants of Arizona Public Service Company for the Arizona Public Service Commission.

  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 345 kV, 230 kV, 161 kV, 138 kV, 115 kV, and 69 kV facilities.
- 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.

  A lead investigator monitoring Commonwealth Edison's implementation of T&D system reliability improvement recommendations resulting from major system outages for the Illinois Commerce Commission.
- A lead investigator in the investigation of transmission grid security in Illinois after the August 2003 blackout for the governor's blue ribbon committee.

  A 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.

- Served as a lead investigator in the review of distribution and transmission practices at Alabama Power and Georgia Power Company.
- Served as lead investigator in prudence reviews of major fossil and nuclear plant outages for the New Hampshire Public Utilities Commission.
- Served as the principal technical and analytical member in the Seabrook nuclear unit sale team acting for the New Hampshire Public Utilities Commission.
- Investigated the causes of overlapping unit outages at a major Reliant generation facility.

New Hampshire Public Utilities Commission - Chief Engineer

- 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.
- 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.
- Advisor to the Commission on utility system and operational issues.
- 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.
- Re-drafted the state's Bulk Power Siting Statute and facilitated resolution of widespread legislative tensions.
- Instrumental in achieving quality of service levels among the highest in Verizon's service territory.

Public Service Company of New Hampshire (PSNH)

- As Director - Power Pool Operations and Planning, PSNH
    - Responsible for the operation and dispatch of PSNH transmission and generation facilities through the New Hampshire Electric System Control Center.
    - 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.
    - Core Task Force Member for the DC electrical interconnection between Hydro Quebec and the New England Power Pool.
    - Developed real time integrated transmission system loading capabilities for the New Hampshire Electric System Control Center.
    - Represented PSNH at all major relevant national and regional reliability organizations including:

        New England Power Pool

        - System planning Committee
        - System Operations Committee

        - All 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

- As Director - System Planning/Energy Management, PSNH
    - Coordinated the company's capital planning requirements for generation and transmission. Integrated its load forecasting and energy management activities.
    - A lead participant in the development and implementation of response strategies addressing the negative financial impacts associated with the proliferation of non-utility generation.
    - 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.

- As Manager - 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.

Education

M.B.A., Northeastern University - 1975
M.S.E.E., Power System Major, Northeastern University - 1970
B.S.E.E., Power System Major, Northeastern University - 1969

Registration

Registered Professional Engineer - New Hampshire #5618

Exhibit 2 Attachment RCL-2
PSNH Supply Resources Used to Serve Energy Requirement (2006)

On-Peak

	Energy Requirement	PSNH Resource Subtotal	Portion of Requirement Served by...								
			IPP	Buyout Contracts	Vermont Yankee	Hydro	Merrimack and Schiller	Newington and Wyman	Bilateral Purchase	ISO-NE Spot Purchases	Combustion Turbines
Jan	378,161	90%	11%	2%	2%	5%	47%	23%	9%	1%	0.00%
Feb	351,359	69%	11%	2%	2%	5%	43%	7%	29%	2%	0.02%
Mar	382,713	73%	11%	2%	2%	4%	54%	0%	27%	0%	0.00%
Apr	295,470	64%	12%	1%	3%	6%	39%	4%	36%	0%	0.00%
May	332,438	47%	12%	0%	2%	5%	25%	3%	51%	2%	0.01%
Jun	380,125	67%	11%	1%	2%	5%	45%	3%	31%	2%	0.05%
Jul	388,685	70%	9%	1%	2%	3%	42%	14%	24%	5%	0.12%
Aug	411,647	65%	9%	1%	2%	1%	43%	8%	27%	8%	0.04%
Sep	308,811	49%	9%	0%	2%	1%	36%	0%	50%	1%	0.00%
Oct	324,639	69%	12%	1%	2%	3%	51%	0%	31%	0%	0.01%
Nov	325,793	71%	13%	1%	2%	4%	50%	0%	29%	0%	0.00%
Dec	344,598	65%	11%	1%	2%	4%	43%	4%	32%	2%	0.00%
Totals	4,224,439	67%	11%	1%	2%	4%	43%	6%	31%	2%	0.02%

Off-Peak

	Energy Requirement	PSNH Resource Subtotal	Portion of Requirement Served by...								
			IPP	Buyout Contracts	Vermont Yankee	Hydro	Merrimack and Schiller	Newington and Wyman	Bilateral Purchase	ISO-NE Spot Purchases	Combustion Turbines
Jan	358,490	89%	14%	3%	2%	6%	59%	4%	8%	3%	0.02%
Feb	312,068	77%	13%	3%	2%	6%	53%	0%	12%	11%	0.01%
Mar	306,604	90%	14%	3%	3%	5%	65%	0%	7%	3%	0.00%
Apr	280,789	77%	15%	1%	3%	7%	49%	0%	21%	2%	0.02%
May	277,135	61%	16%	0%	3%	7%	33%	0%	26%	14%	0.00%
Jun	284,287	85%	15%	1%	3%	7%	58%	0%	13%	2%	0.00%
Jul	377,185	78%	13%	1%	3%	5%	55%	1%	21%	2%	0.00%
Aug	296,328	80%	12%	1%	3%	2%	60%	1%	19%	1%	0.00%
Sep	289,040	66%	12%	1%	3%	1%	49%	0%	21%	13%	0.01%
Oct	268,828	89%	16%	1%	3%	4%	65%	0%	10%	1%	0.00%
Nov	280,721	90%	16%	1%	3%	6%	63%	0%	10%	0%	0.00%
Dec	350,132	80%		1%	3%	5%	56%	0%	16%	4%	0.00%
Totals	3,681,609	80%	14%	2%	3%	5%	56%	1%	15%	5%	0.01%

Note: "Buyout Contracts" refers to IPP Replacement Purchases (BioEnergy & Whitefield).
Note: "PSNH Resource Subtotal" is the sum of all columns except Bilateral and Spot purchases.