STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DOCKET NO. DE 10-121

In The Matter of

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
2009 ENERGY SERVICE AND STRANDED COST RECOVERY CHARGE RECONCILIATION

DIRECT TESTIMONY

of

Michael D. Cannata, Jr., P. E.
Senior Consultant
ACCION GROUP, INC.

November 23, 2010

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. For this engagement, I am engaged by The Accion Group (Accion) to address the issues raised in this proceeding. My business address is 65A Ridge Road, Deerfield, New Hampshire 03037.

Q. In what capacity are you employed?

A. 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 presented in Exhibit 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 of the State of New Hampshire, I managed a professional staff engaged in investigations regarding safety, operations, reliability, emergency planning, and the implementation of public policy in the electric, gas, telecommunications, and water industries. I also sat as a full member of the New Hampshire Site Evaluation Committee responsible for siting major energy facilities (Generating stations, gas transmission lines, electric transmission lines, and gas storage facilities). At the request of the New Hampshire Public Utilities Commission's (NHPUC or Commission) Chairman, I sat on the State Emergency

Response Commission as a designated member. 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 have testified before the NHPUC in rate case, condemnation, least cost planning, fuel adjustment, electric industry restructuring, unit outage reviews. I have testified before the Kentucky Public Service Commission and the Maine Public Utilities Commission in transmission siting proceedings, and have submitted testimony at proceedings at the Federal Energy Regulatory Commission (FERC). I have also testified at the request of the 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 three main areas and other lesser issues. Accion was requested to review (1) the market-based capacity/energy transactions performed by PSNH that augmented its own generation to supply 2009 Energy Service to PSNH customers, (2) the outages that occurred at all PSNH generating units during 2009, and (3) the review of PSNH's efforts to address the twelve additional recommendations contained in the Stipulation and Settlement Agreement in Docket 09-091 in Sections IIA and IIID. I also present my views regarding the adequacy of the PSNH computerized information system data base used to track generation outage and cause data, the availability and capacity factors, heat rates of PSNH generating

units for 2009, and the adequacy of future capital and O&M expenditures for reliable and efficient plant operations.

This testimony addresses the review areas either through the questions and answers presented below, or through a series of individual reports, which are attached as exhibits to my testimony and are organized as follows.

Capacity/Energy Transactions:

Exhibit MDC-2, 2009 Capacity/Energy Transactions

Generating Unit Outages:

Exhibit MDC-3, Merrimack Outages for 2009 (Without MK-2 Turbine Repair Outage)

Exhibit MDC-3A – Merrimack Turbine Repair Outage

Exhibit MDC-4, Newington Outages For 2009

Exhibit MDC-5, Schiller Unit Outages For 2009

Exhibit MDC-6, Hydroelectric Unit Outages For 2009

Exhibit MDC-7, Combustion Turbine Outages For 2009

Exhibit MDC-8, W. F. Wyman Outages for 2009

Exhibit MDC-9, Stipulation Items from the 2008 Energy Service/Stranded Cost recovery Review (Docket DE 09-091)

Q. Please summarize your capacity and energy transaction testimony.

A. With regard to capacity and energy transactions, Accion concluded that the PSNH filing is an accurate representation of the capacity and energy purchasing process that

took place in 2009, and that PSNH made sound and prudent management decisions with regard to its capacity and energy purchases in its market environment consistent with its Least Cost Plan as modified on March 28, 2008. However, Accion believes that improvements can be made in the supplemental energy and capacity purchase process. PSNH made little or no sales of excess energy and capacity once energy or capacity was purchased, except into the spot market. Accion reviewed the capacity and energy testimony filed by PSNH, conducted an on-site interview with knowledgeable personnel responsible for the capacity and energy transaction function at PSNH, requested follow-up information, and reviewed detailed, backup information of the summary results supplied by PSNH. Accion also concluded that the capacity factor projections for PSNH units used for 2009 market purchases were reasonable and included ongoing discussions with generating plant personnel. In addition, Accion concluded that the volume of customer migration in 2009 introduced volatility and difficulty into supplying future PSNH customer energy service needs, because of the inability to adjust purchases in a timely manner for unknown customer decisions.

Q. Do you have recommendations regarding capacity and energy transaction issues?

A. Yes. PSNH used a longer forward-looking supplemental energy purchase philosophy in 2009 when it saw forward-looking energy prices rising for 2009, and purchased much of its energy and capacity needs by July 2008. As a result of the financial crisis in the fall of 2008, energy prices tumbled, stayed very low through 2009, triggering

an extensive migration of load from the PSNH system. These longer term purchases resulted in substantial costs to customers because of circumstances beyond PSNH's control. Energy prices remain low at this time and Accion believes that they will remain low in the near-term, absent major world events.

Accion recommends that while market prices are depressed due to the factors enumerated above, PSNH focus more on shorter term arrangements and spot market prices during the two non-peak quarters. 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 recommends 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. Also, Accion recommends that PSNH have a clearly defined basis for making short-term purchases or sales that fall outside projected needs.

The PSNH load forecasting model, as all load forecasting models do, uses lagging economic data. Lagging economic data can result in over prediction of load in deteriorating economic conditions and under prediction of load in improving economic conditions. Accion believes both economic trends can disadvantage customers. Accion recommends that, in its quarterly review, PSNH should formally factor the lagging impact of the econometric input on the load forecast into its supplemental energy purchase decision making process.

Accion recommends that PSNH explicitly and formally factor reserve shut-downs into its projection of operation of its units in determining supplemental energy needs, or confirm that it explicitly and formally does so[1]. If reserve shut-downs are projected for its base load units, the between planned outage capacity factor should be adjusted to reflect those reductions, similar to the manner done for the short reliability unit outages.

PSNH generally only sells its purchased surplus supplemental energy into the spot market, as opposed to longer term markets to avoid the risk of making incorrect decisions. Accion sees that action as inconsistent with how PSNH deals with its purchases. PSNH buys energy it believes is required to meet its load serving obligations and is subject to a prudence review after-the-fact. Accion believes the selling of surplus supplemental energy is the same process that would also be subject to a prudence review. Accion recommends that PSNH analyze its purchases and make sales of surplus energy and capacity into markets other than the spot market as it deems appropriate. PSNH would be subject to a prudence review of its sales and/or its decision not to enter into such sales.

Q. Please state the results of your review of the PSNH unit outages that occurred during 2009.

A. With regard to planned and forced unit outages, Accion found that the base load units on the PSNH system ran well in 2009. In fact, PSNH units generally performed as

[1] Accion recommends this item as it is not sure from its review that NU performs this task as NU stated that it treated all base load units as running all the time.

well or better than forecasted. Such output is of note because, over time, unit operation has become more complicated, or unit output has been reduced, by factors such as (1) increased safety requirements dealing with confined spaces; (2) the addition of spray modules in the outlet canal at Merrimack; (3) the self-imposed reduction of the operating level of Unit 2 at Merrimack to reduce the likelihood of full load trips to maintain the unit's reliability; (4) the installation of supplemental electrostatic precipitators and SCRs on both units at Merrimack; and (5) the use of low sulfur coal to comply with state and federal environmental regulations.

Accion reviewed outage information, conducted on-site interviews, and submitted follow-up requests for information as necessary. In each instance, except those noted below, Accion found the outages to be reasonable and not unexpected for the particular unit, its vintage, or that the outage was necessary for proper operation of the unit. Accion also concluded that PSNH conducted proper planning and management oversight regarding these planned and forced unit outages. Additionally, from its review of unit outages, Accion has recommendations it believes will support and elevate PSNH efforts in achieving additional improvement in unit operation.

Q. Which outages did you find unreasonable?

A. Accion found some PSNH unit outages to be unreasonable and they are noted below. Accion also lists outages below which it found reasonable, but where circumstances

presented an opportunity for PSNH to improve its processes. Accion will first present its findings with regard to unreasonable outages.

The first outage Accion believes to be unreasonable is associated with Jackman Outage 1-A on 3/27/09, as identified in Exhibit MDC–6. This planned outage was taken to verify wiring and contact arrangement information for the design of protection circuits for the installation of the replacement TB-9 step-up transformer. This outage would not have been required but for the failure of TB-9 in 2008, due to contractor action where the NHPUC declined to allow PSNH to recover costs. Accion recommends replacement power costs related to this outage is not recovered.

The next outage Accion believes to be unreasonable also relates to Jackman. It is the planned outage taken on 12/1/09 for 9.29 days to install the new TB-9 step-up transformer, identified as Jackman Outage 1-C in Exhibit MDC-6. This outage would not have been required but for the failure of TB-9 in 2008, due to contractor action where the NHPUC declined to allow PSNH to recover costs. Accion recommends replacement power costs related to this outage is not recovered.

PSNH performed its annual inspection of this unit during Outage 1-C and the annual inspection outage would have been taken regardless of the TB-9 transformer replacement. Accion further recommends that the normal inspection outage time of approximately four days is deducted from the length of Outage-C in determination of the replacement power costs.

The next outage Accion finds to be unreasonable was an 115kV line trip that resulted in the trip of all three units at Ayers Island. The outage occurred on 6/19/09 and the unit outages are identified as Ayers Island Outage 1-C, Ayers Island Outage 2-B, and Ayers Island Outage 3-C in Exhibit MDC-6. This outage took place due to multiple breakdowns of PSNH's vegetation management process when dealing with line sections dealing with wetland areas. The section of the line where the contact occurred was related to wetlands and became deferred work in 2007, when the remainder of the line had vegetation management performed. The deferred work was supposed to be done in the winter of 2007/2008 when the ground was frozen. The deferred work was not performed in the winter of 2007/2008, was still assumed to be deferred work in the 2008 patrol, and not reported to PSNH in the 2009 patrol by the PSNH contractor just prior to the incident. PSNH foresters are responsible for the integration and coordination of all vegetation maintenance requirements on a prescribed schedule for each line. PSNH has a coordinated vegetation management plan to ensure that the entire right-of-way for a line is completed on schedule, and to follow up on uncompleted work. Such oversight was not exercised here. Accion recommends replacement power costs associated with these outages is not recovered from customers.

The next outage that Accion finds unreasonable occurred on 10/14/09, and is identified as Gorham Outage 3-F in Exhibit MDC-6. The hydro operator called the Electric-System Control Center (E-SCC) at least fifteen minutes prior to the start of work and informed them that false by-pass flow indications might be received. The

E-SCC did not pass this information on in a timely manner to the remaining dispatchers and, as a result, incorrect action was taken by the dispatcher after a false alarm was received by the dispatcher. Accion believes insufficient dispatcher attention was given to this situation and that replacement power costs should not be recovered from customers.

The next outages Accion believes are unreasonable occurred at W. F. Wyman #4 station on 1/24/09, 2/6/09, and 8/11/09, and are identified as Wyman Outage 4-B, Wyman Outage 4-D, and Wyman Outage 4-I, respectively in Exhibit MDC-8. Nextera[2] classified all these outages as operator error. Outage 4-B occurred when the operator did not follow established procedure by skipping a step in the procedure. Outage 4-D occurred when the operator did not follow procedure and mispositioned valves. Outage 4-I occurred when, against procedure, the operator attempted repeated starts of a burner pair. Although operator error was stated as the direct cause, Accion finds that operator attention, operator awareness, operator understanding of procedures, and operator lack of understanding that procedures must be followed, all contributed to the causes of these outages. Nextera also rotates its operators throughout its system between the hydro and fossil facilities. Accion believes Nextera does so to familiarize its operators with all units for purpose of manpower flexibility. Accion believes all of these issues relate to training adequacy of the operators involved during the rotation process. Accion recommends the replacement power costs associated with these outages not be passed on to customers.

Q. Is that the extent of the outages that you find to be unreasonable?

A. Yes, it is.

Q. How should the replacement power costs of the outages you believe to be unreasonable be quantified?

A. PSNH has consistently used a method to quantify replacement power costs in recent Energy Service/Stranded Cost Recovery Charge reviews. I recommend they continue to use that methodology for these outages.

Q. In addition to your recommendations regarding the recovery of outage costs, you mentioned that you have recommendations that you believe will support and elevate PSNH's efforts in achieving additional improvement in unit operation. Please present those recommendations.

A. Certainly. First, let me clarify that while Accion found all the following referenced outages reasonable and recommends the recovery of all costs related to those outages, they do present circumstances from which PSNH may be able to improve operating proficiency and, thus, lower costs to customers. The first additional recommendation relates to the outage for the repair of the Merrimack 2 HP/IP turbine, and is described in detail in Exhibit MDC-3A. There were three repairs performed on the start-up boiler feed pump. Two of those repairs were the result of Siemens workmanship issues. PSNH was reimbursed for time and material costs related to two out of the three repairs to the start-up boiler feed pump because one repair was unrelated to Siemens workmanship issues. PSNH's insurance policy covered the replacement

[2] Nextera purchased the majority share of W. F. Wyman from Florida Power and Light, the previous owner.

power costs for any extension of the HP/IP repair outage resulting from the problems with the start-up boiler feed pump.

Accion understands that discussions have taken place between PSNH and Siemens regarding Siemens' workmanship issues. Accion recommends that PSNH file a report with the Commission within one month after the issuance of a final order in this docket describing the efforts taken, and results achieved in addressing Siemens' workmanship issues, so similar issues can be avoided going forward.

The next outages that suggest performance can be improved involved outages identified as Schiller Outage 4-D, Schiller Outage 5-D, and Schiller Outage 6-F in Exhibit MDC-5, and occurred from 7/18/09 through 7/21/09. These outages are at a multi-unit station and are interrelated by the overall market energy price and PSNH actions. With low market energy prices, PSNH manages overtime and tries to perform all work on a straight time basis to reduce costs. The process is complicated by some units which traditionally operated as base load units that are now, at times, operating in a reserve shut-down status. When viewed from a single unit basis, impacts which may be financially beneficial from the one unit viewpoint may present economic challenges from the viewpoint of another unit in the station. Accion believes these events created that tension because the required repair of one unit was different from the straight time repair of another unit. Accion recommends that PSNH review its policy and practices regarding overtime expenditures versus reserve

shutdown, on a unit-by-unit basis and between units at all of its major stations, to ensure that units are in an operational state that maximizes customer benefits.

The next outage suggesting performance can be improved relates to Schiller Outage 6-H in Exhibit MDC-5, occurring on 6/18/09. In this outage, a tube leak tripped the unit ten days prior to its eighteen-month scheduled overhaul. PSNH made an abbreviated repair because it was not ready to begin the overhaul that far in advance. While Accion believes that PSNH made the correct decision in this case, Accion also believes that there are many considerations that must be made in order to make the decision to start a planned outage early. Some of these considerations are; (1) contractor availability; (2) material availability; (3) market price; (4)cause of the outage; (5) time between the outage and the planned outage; (6) status of other economical units; (7) day of the week the outage occurs; and (8) the ability to gain ISO-NE approval for the schedule change. In addition, each unit has its own characteristics that can influence how early a planned outage can be started, such as start-up and shut-down times. Once a decision is made to start an outage early, PSNH should be in a position that maximizes its ability to start an outage early if that is the correct decision for the conditions presented in that outage. If not, outage time may be increased and, therefore, costs increased to customers. Because of unit differences, Accion believes that the amount of time that a planned outage could be started early varies by unit. Accion recommends PSNH review its existing practices and policies concerning its ability to start planned outages early, on a unit-by-unit

basis, to ensure that it economically maximizes the ability to take an outage early while minimizing potential increases in outage duration.

The next outage that suggests performance can be improved is related to Merrimack Combustion Turbine Outage CT 1-B on 9/12/09, in Exhibit MDC-7. Lightning strikes and blown fuses have occurred at this location, and have been noted in prior Energy Service/Stranded Cost Recovery Reviews. The repetitiveness of such occurrences suggests potential design deficiencies in the distribution system adjacent to the Merrimack Combustion Turbines[3]. In this regard, Accion recommends that fuse coordination, protection device placement, and lightning protection at this and surrounding locations be checked to ensure optimum equipment protection is in place, allowing the most reliable operation of these units.

The last item suggesting performance improvement involves the outage identified as Merrimack Turbine Outage CT 2-D, in Exhibit MDC-7 on 10/19/09. This outage resulted from a valve position irregularity. While work had been performed on the unit prior to this event and after its last successful operation, the work did not involve repositioning of this valve and did not involve tagging[4] of any equipment. No other work was performed on the unit. Accion recommends that PSNH establish a procedure that expands its review process for safety related incidents to include non-safety related incidents. PSNH should also save its used tags or other pertinent information for internal investigative purposes when any abnormal switching,

[3] Accion notes that the distribution system is that of the Concord Electric Company.

valving, or operation event takes place. This recommendation applies to all PSNH generation facilities.

The next outage is Amoskeag Outage 2-C that occurred on 11/23/09. The majority of this outage occurred in 2010 and as such, prudence will be considered in the year in which the majority of the outage occurs as historically performed. It is mentioned here only as a bookmark for the evaluation of the 2010 Energy Service/Stranded Cost Recovery Charge review.

Q. Commission Staff also requested that you review PSNH's efforts with regard to the twelve stipulation items agreed to in Docket DE 09-091. Please present the results of your review.

A. Certainly. The details of my review are contained in Exhibit MDC-9. Exhibit MDC-9 describes the issue in each stipulated item, PSNH's actions, Accion's view regarding whether the PSNH effort was appropriate and complete, and Accion's recommendation as to the disposition of the item. A summary appears directly below.

1 - Mitigation of Customer Costs regarding certain 2008 generation unit outages

From Section II-A of the Stipulation, PSNH was to provide its efforts to mitigate customer costs related to the HP/IP turbine outage (Outage MK-2 E), and the exciter outage at Newington (Outages NEW 1-C, and Outage NEW 1-D).

[4] Tagging is a command and control procedure used when switching electrical elements or repositioning valves to ensure equipment integrity and personnel safety.

PSNH bundled all the issues in the Merrimack and Newington outages because they believed that they had more leverage with Siemens in doing so. The details of the individual mitigation issues are presented in Item 1 of Exhibit MDC-9. Noteworthy is that PSNH was able to surmount Siemens' efforts to treat the HP/IP turbine as used equipment because of the equipment failure, and further claim that the performance guarantees given for the "new" HP/IP turbine were no longer valid. PSNH secured new performance guarantees from Siemens for the damaged turbine as part of its settlement. Accion believes PSNH made the correct judgment in its global approach for two reasons. PSNH protected its customers against future damage claims that may result from future HP/IP problems and assured the preservation of the economics of the project as originally envisioned for customers. PSNH received significant concessions from Siemens, although some of them are subjective in nature because of their future application. The economic transactions of the settlement are not complete.

Accion accepts PSNH's approach as reasonable and recommends that the Commission:

- Leave Outage MK-2E open – Financial mitigation reporting incomplete.
- Close Outage NEW 1-C – Commitment satisfied.
- Close Outage NEW 1-D – Commitment satisfied.
- Require PSNH to file a report that captures the final monetary resolution with the Commission prior to the next Energy Service/Stranded Cost Recovery Review.

2 – Schiller Warranty Items

From Section II-A of the 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 Schuiller-5, and to continue to file such reports until all issues are resolved.

PSNH filed its first report with the Commission on February 1, 2010. Specific discussion on each Alstom issue appears in Item 2 of Exhibit MDC-9. Alstom made many repairs at its cost, and others out of warranty. Accion considers these issues resolved as PSNH can take no further action. There are two design issues that remain in negotiations.

Accion believes that PSNH has mitigated the effects of the issues not in negotiations to the extent that it can, with no further PSNH action available.

Accion recommends that the Commission:

- Close the Air Damper Shaft Linkage Workmanship Issue – Issue resolved.
- Close the Inlet Header Economizer Tube Stress Crack Issue – Issue resolved.
- Leave open the Forced Draft and Induced Draft Fan Capabilities Under Soft Start Conditions Issue – Negotiations still in progress.
- Close the Alarm Point Mis-set Issue – Issue resolved.
- Close the Inlet Duct Design Issue – Issue resolved.

- Close the Induced Draft Fan Circuit Board Failure Issue – Issue resolved.
- Close the Vortex Finder Issue – Issue resolved.
- Leave open the Air Heater Design Issue – Negotiations still in progress.
- Require PSNH to file a report with the Commission on the two remaining open items prior to the 2010 Energy Service/Stranded Cost Recovery Charge review.

3 - Review of Isophase Bus Duct at Merrimack and Schiller Stations

From Section II-A of the Stipulation, PSNH agreed to perform an evaluation of the need for isophase bus duct heaters at Merrimack and Schiller stations.

PSNH hired Eaton Electric to perform the evaluation. A full description of the Eaton report appears as Item 3 in Exhibit MDC-9. Eaton was the electrical contractor who made the repairs on the isophase bus duct heaters at W. F. Wyman 4, which was the precipitating event that led to the recommendation for this evaluation. Eaton concluded that PSNH units at Merrimack, Newington, and Schiller stations are constructed in a different manner than W. F. Wyman 4. This significantly reduces exposure, similar failures are not expected, and heaters were not required.

Accion agrees with the Eaton report and recommends that the Commission:

- Close this item – Commitment satisfied.

4 - Review of Low Oil Alarm Procedures

From Section II-A of the Stipulation, PSNH agreed to review its procedures when a low oil alarm for hydro unit bearings is received at the E-SCC.

A full description of the PSNH review appears as Item 4 in Exhibit MDC-9. PSNH performed the investigation in-house, and concluded its procedure is adequate as written. PSNH based its conclusion on the fact that the existing procedure requires that an operator is dispatched to a station when a low oil alarm is received. Existing trip settings protect the bearing from damage if there is loss of oil and upgraded bearing protection systems are being installed on all hydro units by the end of 2010.

Accion agrees with the PSNH conclusion and timetable for the upgraded protection systems. Accion notes that the existing low oil alarm procedure was not clearly understood by Accion at the time of the Stipulation, in that an operator would be dispatched to the station prior to re-starting the unit.

Accion recommends that the Commission:

- Close this item – Commitment satisfied.

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

From Section IIA of the Stipulation, PSNH agreed to perform an interconnection analysis of all its units connected to its lower voltage distribution system in an effort to prevent improper tripping of units for unrelated system disturbances. PSNH

additionally committed to file a report documenting progress on this matter to date, along with an estimated completion schedule with the Commission for review in the 2009 Energy Service/Stranded Cost Recovery Review.

PSNH filed a progress report with the Commission on May 7, 2010. A full description of the PSNH review to date appears as Item 5 in Exhibit MDC-9. In summary, PSNH completed its under voltage relay study and found that most under voltage relays were set higher than they believed they should be. Under voltage relays should all be reset by the end of 2010. PSNH did not include the Schiller CT in its analysis because of its normal system configuration to the 115kV system, but has agreed to do so because the unit can be connected to the PSNH lower voltage system. PSNH is just starting its review of over speed relays. PSNH is performing 2 or 3 coordination studies per year of its stations, many of which are required with the installation of new equipment.

Accion believes good progress is being made in both understanding and addressing the issues caused by the poor distribution coordination.

Accion recommends that the Commission:

- Leave this item open – Analysis and implementation incomplete.
- Require PSNH to file an additional report with the Commission prior to the 2010 Energy Service/Stranded Cost Recovery Charge review,

including progress on its analysis of the Schiller CT and unit over speed relays.

6 - Establish a Relay Test Program

In Section II-A of the Stipulation, PSNH agreed to establish a formal relay test program for all its units connected to the lower voltage distribution system. Previously, no formal program existed. PSNH additionally committed to file a report on its progress on this matter, to date, along with an estimated completion schedule with the Commission for review in the 2009 Energy Service/Stranded Cost Recovery Review.

PSNH filed a progress report with the Commission on May 7, 2010. PSNH created the PSNH Hydro Protective Relay Procedure and has integrated it into its Northeast Power Coordinating Council (NPCC) testing procedures, as required. The larger generating stations fall under direct NPCC relay testing requirements.

Accion believes that PSNH's efforts address the issue and recommends that the Commission:

- Close this item – Commitment satisfied.

7 - Evaluate Procurement of Critical Spare Generator and Turbine Components, Physically or Contractually

In Section II-A of the Stipulation, PSNH agreed to perform an evaluation of procuring spare critical generator and turbine components, or entering into arrangements with vendors, manufacturers, and others to reduce the risk of catastrophic component failures.

PSNH made the determination that spare parts for critical components should be procured on a case-by-case basis. The main basis for their determination was that PSNH does business in a deregulated market environment and that a business case should be made for each application. In addition, PSNH stated the industry was responding to the market conditions with "seed" programs for unit components and efficiency upgrades for components which render spare components less useful or totally useless. Additionally, utilities have lost cooperation among themselves in the market environment, requiring a single utility to bear all costs of spare components.

Accion agrees with the PSNH assessment and recommends that the Commission:

- Close this item – Commitment satisfied.

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

In Section II-A of the Stipulation, PSNH agreed to ensure that contractual arrangements with the manufacturer will hold the manufacturer responsible for

unreasonable (shipping) delay of major components, and that the manufacturer has plans in place for shipping major components.

A detailed description of PSNH's efforts appears as Item 8 in Exhibit MDC-9. PSNH holds the manufacturer and the trucking company responsible to "carry safely" and "arrive timely". PSNH discussed shipping issues with Siemens and developed a "living" transportation schedule that would be adjusted for changes in ship dates throughout the outage. Updates of the transportation schedules are done in conjunction with the trucking company with the goal to minimize transportation delays considering potential contingencies. No contractual agreements were included in this review, except the usual guaranteed ship date with the manufacturers. PSNH stated that the new transportation understanding was implemented during the Merrimack 2 HP/IP turbine outage repair.

Accion believes that the process worked well and that both PSNH and Siemens were well in tune with what the other party was doing. However, further review is also required due to the critical nature and financial consequences to customers from transportation mishaps.

Accion recommends that the Commission:

- Require PSNH to 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.

- Close this item upon agreement by PSNH to Accion's recommendation.

9 - Perform Own Review of Maintenance Outage Cycle Extensions

In Section II-A of the Stipulation, PSNH agreed to perform its own analysis of outage maintenance cycle extension, rather than rely solely on the manufacturer's recommendation associated with major components.

A detailed description of how PSNH will determine the maintenance cycles of its units is contained in Item 9 of Exhibit MDC-9. PSNH commits to factor into its maintenance cycle determination many of the issues that manufacturer's general recommendations only address on a fleet basis.

Accion accepts PSNH's approach to maintenance cycle planning. Accion recommends that the Commission:

- Close this item – Commitment satisfied.

10 - Protocol for Transmission and Distribution Personnel Working in Substations Containing PSNH Generating Units

In Section III-D of the Stipulation, PSNH agreed to establish a protocol for transmission and distribution workers performing activities in substations containing PSNH generating units.

PSNH established and implemented a protocol for NU and contact transmission and distribution workers performing activities in substations containing PSNH generating units. The protocol is described in Item 10 of Exhibit MDC-9. The PSNH protocol requires that non-employees cannot have unescorted access in PSNH generating facilities. Employees are granted access within a substation according to their skill level; no employee can escort a worker above their skill level.

Accion accepts PSNH protocol for work activity inside substations containing PSNH generation. Accion recommends that the Commission:

- Close this item – Commitment satisfied.

11 – Other Agreements

In Section II-A of the Stipulation, PSNH accepted the recommendation that National Electrical Safety Code patrols be performed on all distribution facilities on a four-year schedule.

In Section II-A of the Stipulation, PSNH accepted the recommendation that PSNH address danger trees outside of the 34.5kV right-of-way and determine where PSNH does and does not have rights to remove such danger trees.

Accion has no analysis or recommendations with regard to these items. Efforts to address NESC inspection frequency and danger trees outside of the right-of-way were considered as part of Docket DE 09-035.

Q. Are there any other items you wish to discuss?

A. Yes, there is one. As part of its review of 2009 generation plant outages, Accion reviewed the PSNH GenIS (Generation Information System)[5] report for 2009. This data base is a take-off of the more common data base used in the industry on a national basis called Generating Availability Data System (GADS). While the data base generally mimics the GADS data base, Accion believes that additional refinement with regard to outage causes could be beneficial to PSNH in the operation of its units. Other refinements may also be beneficial.

Q. How would additional refinement be beneficial?

A. Accion believes that additional refinement of the GenIS data would be beneficial to PSNH for two reasons. The most important is the age of the units. As units age, specific components may become problematic. Systematic review of outage causes may enable PSNH to specifically identify problem components. For example, let us assume that a unit is having boiler trips due to tube leaks. While PSNH may establish that the leaks are in the economizer section of the boiler, a more refined codification of the GenIS data may lead one to specific tubes or tube sections that were replaced in 1986 versus other tubes in the boiler. The second reason is that PSNH operates in a market environment. It needs specific data to perform business cases with regard to repairs relating to operation of its units. Such capability will allow PSNH to make better and more informed business decisions.

[5] The PSNH GenIS system is an in-house generation information system designed to track generation information such as outage time, cause, etc. which NU adopted in 2000.

Q. How should PSNH refine its GenIS data?

A. Accion makes no specific recommendation in this regard. What Accion does recommend is that PSNH should determine what additional information it may need in its GenIS system to perform market based equipment evaluations in the wide variety of plants it operates; take an objective look at its GenIS system capabilities; perform a review of its entire GenIS system; and make appropriate changes which might include a different information system, such as the GADS system. Accion believes that such a review will result in better operation of the units and greater efficiencies to customers.

Q. What was the result of your review of the unit availability factors, capacity factors and heat rates of the PSNH units?

A. As stated above, the base load units have run near or better than expected, considering that many factors have tended to reduce unit output and lower performance metrics, and excluding the impacts that reserve shut-down status has had on the operation of the units. Over the last number of years, PSNH has been extending the period in which major maintenance outages are performed on some of its units. Major overhauls are now conducted on different cycles, depending on the unit and its maintenance requirements.

Accion made the following observations regarding 2009 availability factors, capacity factors (with planned outages removed from the calculations so that the different maintenance schedules do not skew the data) and heat rates for the major PSNH units.

Schiller 4 and Schiller 6 availabilities have historically been about 95 percent with capacity factors of over 80 percent. In 2009, reserve shutdowns required by the ISO-NE due to depressed energy prices reduced the capacity factors of these units to approximately 60 percent. Without reserve shut downs, the unit's capacity factors would have been much closer to historic values.

Unit 5 at Schiller had its boiler replaced in late 2006 with a wood fired fluidized bed boiler. This unit has different operating characteristics than the old coal fired boiler, so Accion makes no comparisons with historic operation. Accion does note that in 2007, the first full year of commercial operation of the unit had numerous startup and warranty issues which impacted the availability and capacity factors for the unit. In spite of new unit difficulties, Schiller 5 had an approximate 85 percent availability and an approximate 80 percent capacity factor for 2007. In 2008, further improvement was noted, in that unit availability was proximally 90 percent and unit capacity factor was about 80 percent. In 2009, unit availability exceeded 90 percent and its capacity factor increased to 85 percent. Accion believes that the improvement in unit operation is due to the resolution of start-up problems and the increased proficiency of PSNH personnel as they learn how to operate this high technology wood-fired boiler.

Newington maintained an availability of over 95 percent in 2009. Its capacity factor has fallen from 60 percent in 2003 to 40 percent in 2005, to 10 percent in 2006 and

2007, and to 3 percent in 2008. In 2009, its capacity factor increased to about 7 percent, with times of operation at other than what would be expected from an economic viewpoint, and at a reduced load as shown in its heat rate data. Accion attributes the cost of the unit in relation to the market price for the recent reduced capacity factor. What Accion cannot definitively explain is the increased requirement by ISO-NE for Newington to operate in a market where one would not expect it to do so. Accion believes that there are changes developing in the ISO-NE market that places value on the fast response capability of the unit.

Historically, capacity and availability factors for Merrimack-1 have been approximately 90 to 95 percent since it went to its two-year maintenance schedule in 2002. In 2009, the availability factor for this unit was about 95 percent. In 2009, there was no overhaul on this unit, but its capacity factor dropped to about 85 percent due to reduced operation during shoulder load periods.

The availability factor for Merrinack-2 has historically been approximately 90 to 95 percent. The historical capacity factor is about 85 to 90 percent. In 2009, the unit availability factor was approximately 95 percent and the capacity factor was approximately 85 percent, excluding the impact of the extended overhaul to correct problems with the HP/IP turbine.

Q. Are there other observations you made with regard to the availabilities and capacity factors of PSNH generating units?

A. There is one; the capacity factor of Newington was approximately 7 percent in 2009. Information supplied by PSNH states that Newington cost millions more than it earned for customers in 2009, which cost is approximately the same as similar information supplied in the 2008 review. Such costs bring into question the continued operation of the unit from an economic viewpoint, which should be addressed. It is my understanding that PSNH was required to conduct a Continued Unit Operation study as part of its recently-filed Least Cost Integrated Resource Plan, therefore, I suggest that this issue be further explored in that proceeding.

Q. What are your observations regarding the heat rates of the PSNH major generating units?

A. The full load heat rates of the PSNH units have remained relatively constant over the last six years, indicating capital and maintenance expenditures are adequate. With unit reductions required by ISO-NE dispatch requirements, PSNH has maintained as high a heat rate as can be maintained for its fossil units in the market environment it operates in.

Q. What did you form as a conclusion when you reviewed the projected spending for capital projects and O&M at PSNH generating stations?

A. Accion reviewed the five-year capital and O&M budgets (business plans) for Merrimack Station, Newington Station, and Schiller Station. Accion also reviewed

the five-year business plan for the Hydro group as well as its ten-year conceptual budget plan. Accion made the following general observations, and drew the following conclusions.

Capital

PSNH capital expenditures remain relatively constant at present levels into the future when adjusted for major unit overhauls and other large planned capital expenditures[6]. PSNH has included FERC licensing requirements, dam repairs, and general capital project replacements in its budget projections at all stations.

Accion observes that the PSNH five-year business plan calls for continued minor and major equipment replacement as required for reliable and efficient unit operations.

O&M

PSNH O&M expenditures remain relatively constant at present levels into the future, when adjusted for major unit overhauls and other large planned capital expenditures[7]. PSNH has included FERC licensing requirements, dam repairs, and general capital project replacements in their budget projections at all stations.

[6] With regard to Newington Station, the budgets reviewed by Accion do not reflect the ongoing re-evaluation of Newington budgets relative to its recent reduced operation in the market environment.
[7] With regard to Newington Station, the budgets reviewed by Accion do not reflect the ongoing re-evaluation of Newington budgets relative to its recent reduced operation in the market environment.

Accion observes that the PSNH five-year business plan calls for continued maintenance of equipment as required for reliable and efficient unit operations.

Accion concluded that PSNH is currently spending and plans to spend sufficient funds for capital replacement/improvement projects and sufficient money for adequate maintenance to assure continued operation of its units consistent with good utility practice and with recognition of unit age and operational duty cycle. Such expenditures should result in reliable and efficient unit operation.

Q. Are there any other items you wish to discuss?

A. I only wish to list the data responses relied upon by Accion in preparation of its testimony in addition to the materials filed by PSNH so they may be officially admitted into the record. Those data responses are:

Staff Set 01

Data Responses 2 through 3, 7 through 21, and 22 through 59.

Staff Set 02

Data Responses 2 through 5, and 7 through 18.

OCA Set 01

Data Responses 4 through 5, 8, and 10 through 14.

OCA Set 02

Data Responses 1, 6 through 8, and 10 through 13.

TECH Set 01

Data Responses 1 through 4 and 6 through 8.

CLF Set 01

Data Responses 1 through 11 and 13.

CLF Set 02

Data Responses 1 through 6.

SCNH Set 01

Data Responses 5 and 12.

SCNH Set 02

Data Responses 1 through 5.

TC Set 01

Data Responses 1 through 2, 5, 7 through 9, 13 through 14, and 16 through 19.

TC Set 02

Data Responses 1 through 3.

Q. Does that conclude your testimony?

A. Yes, it does.