

Witness: Richard L. Levitan  
Request from: New Hampshire Public Utilities Commission Staff

|                         |           |
|-------------------------|-----------|
| N.H.P.U.C. Case No.     | DE 10-261 |
| Exhibit No.             | PSNH-19   |
| Witness                 | Panel 9   |
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**Question:**

Provide the 2010 backcast analysis and results performed by Levitan and Associates at the request of NHPUC Staff for the scenario using 2010 forward prices, with and without the change in start fuel costs identified by Levitan.

**Response:**

For the 2010 backcast analysis requested by NHPUC Staff using the averages of November and December 2009 forward price curves as the 2010 expected monthly prices, LAI used the same procedures for developing Newington node DA and RT energy prices based on MassHub on-peak and off-peak forward prices, and for developing Dracut gas prices based on Henry Hub futures, and developing RFO and 2FO prices based on WTI futures. The price simulation start date was set to December 1, 2009 and the dispatch simulation start and end dates were set to January 1, 2010 and December 31, 2010. All other data were kept the same as for the ten-year study period. Results of the 2010 backcast analysis are shown in Attachment 1. For comparison, 2010 actual performance of Newington Station is also reported with data sources.

LAI observed that while differences in the number of starts and average loads may be explained by the ISO-NE calling upon Newington Station to provide operating reserves during much of 2010, that 2FO use per start appeared low. After consultation with PSNH, LAI learned that the previous data for cold and hot start fuel use did not include fuel for ramping between 20 MW and 60 MW, and that the share of 2FO use is higher than previously modeled. Results of the 2010 backcast analysis with revised start fuel usage are shown in Attachment 2. However, no generation or energy revenue credit was given for the small amount of generation between the 20 MW level when the unit goes online and the 60 MW minimum stable operating level.

Neither of these two backcast cases includes the 2FO fuel use or cost for plant warming.

**Attachments:**

1. 2010 backcast results for case with average Nov.-Dec. 2009 forward prices as forecast
2. 2010 backcast results for case with average Nov.-Dec. 2009 forward prices as forecast, and revised start fuel use

**Attachment 1**  
**Newington Station 2010 Backcast Analysis**  
**Case: Average Nov.-Dec. 2009 Forwards as Forecast**

| Staff Item | Measure                      | Source | Actual  | EV      | P5      | P25     | P50     | P75     | P95     |
|------------|------------------------------|--------|---------|---------|---------|---------|---------|---------|---------|
| c          | Dispatch Hours               | [1]    | 1,609   | 935     | 532     | 805     | 868     | 1,039   | 1,568   |
| d          | Generation [GWh]             | [2]    | 224.667 | 272.478 | 167.567 | 231.552 | 255.969 | 295.791 | 457.925 |
| e          | Number of Starts             | [3]    | 123     | 37      | 25      | 35      | 22      | 58      | 62      |
| f          | 2FO Consumption [BBtu]       | [4]    | 134     | 10      | 6       | 10      | 6       | 12      | 16      |
| f          | RFO Consumption [BBtu]       | [4]    | 489     | 47      | 132     | 10      | 3       | 28      | 91      |
| f          | Gas Consumption [BBtu]       | [4]    | 2,398   | 3,002   | 1,727   | 2,589   | 2,847   | 3,290   | 5,044   |
| g          | CO2 Emitted [1000 ton]       | [1]    | 217     | 180     | 113     | 153     | 167     | 196     | 304     |
| g          | SO2 Emitted [ton]            | [1]    | 325     | 38      | 76      | 17      | 9       | 32      | 71      |
| g          | NOx Emitted [ton]            | [1]    | 187     | 182     | 118     | 152     | 169     | 195     | 308     |
| h          | Capacity Factor [%]          | [3]    | 6.4%    | 7.8%    | 4.8%    | 6.6%    | 7.3%    | 8.4%    | 13.1%   |
| i          | Service Factor [%]           | [3]    | 17.5%   | 10.7%   | 6.1%    | 9.2%    | 9.9%    | 11.9%   | 17.9%   |
|            | Availability                 | [3]    | 96.2%   | 94.0%   | 91.3%   | 96.2%   | 96.2%   | 93.2%   | 93.2%   |
| b          | Energy Revenue [\$1000]      | [2]    | 21,459  | 24,502  | 12,537  | 19,178  | 21,548  | 27,725  | 44,150  |
| a          | Energy Cost [\$1000]         |        | 19,963  | 19,144  | 10,502  | 15,515  | 16,359  | 21,021  | 35,084  |
| a          | Fuel Cost [\$1000]           | [2]    | 19,787  | 18,787  | 10,279  | 15,213  | 16,030  | 20,635  | 34,484  |
| a          | Emission Allow Cost [\$1000] | [5]    | 176     | 356     | 224     | 302     | 330     | 386     | 601     |
|            | Net Revenue [\$1000]         |        | 1,496   | 5,358   | 2,035   | 3,663   | 5,189   | 6,704   | 9,066   |
|            | Ave. Energy Revenue [\$/MWh] |        | 95.51   | 89.92   | 74.82   | 82.82   | 84.18   | 93.73   | 96.41   |
|            | Ave. Fuel Cost [\$/MWh]      |        | 88.07   | 68.95   | 61.34   | 65.70   | 62.62   | 69.76   | 75.30   |
|            | Ave. Energy Cost [\$/MWh]    |        | 88.86   | 70.26   | 62.68   | 67.00   | 63.91   | 71.07   | 76.62   |
|            | Ave. Energy Margin [\$/MWh]  |        | 6.66    | 19.67   | 12.14   | 15.82   | 20.27   | 22.67   | 19.80   |
|            | Ave. Generation [MW]         |        | 140     | 291     | 315     | 288     | 295     | 285     | 292     |
|            | Ave. Start 2FO Use [Bbtu]    |        | 1.09    | 0.28    | 0.26    | 0.27    | 0.28    | 0.20    | 0.26    |
|            | Natural Gas Use Share        |        | 79.4%   | 98.1%   | 92.6%   | 99.3%   | 99.7%   | 98.8%   | 97.9%   |
|            | Ave. Heat Rate [MMBtu/MWh]   |        | 13.45   | 11.23   | 11.13   | 11.26   | 11.16   | 11.26   | 11.25   |
|            | Ave. Energy Cost [\$/MMBtu]  |        | 6.61    | 6.26    | 5.63    | 5.95    | 5.73    | 6.31    | 6.81    |

Sources of 2010 actuals:

- [1] PSNH supplied data
- [2] OCA-02-033, OCA-02-033-SP01
- [3] STAFF-01-068
- [4] STAFF-03-001
- [5] STAFF-01-061-SP01

Notes re differences between actual and backcast expected value (EV) results:

- 1 Actual 2FO use and cost includes fuel for plant warming. The model did not include warming fuel use or cost.
- 2 Actual energy revenue includes NCPD payments. Actual costs and average heat rate reflect lower part-load efficiency.

**Attachment 2**

**Newington Station 2010 Backcast Analysis**

**Case: Average Nov.-Dec. 2009 Forwards as Forecast; Revised Start Fuel Data**

| Staff Item | Measure                      | Source | Actual  | EV      | P5     | P25     | P50     | P75     | P95     |
|------------|------------------------------|--------|---------|---------|--------|---------|---------|---------|---------|
| c          | Dispatch Hours               | [1]    | 1,609   | 844     | 341    | 675     | 974     | 1,063   | 1,227   |
| d          | Generation [GWh]             | [2]    | 224.667 | 247.539 | 98.040 | 197.276 | 281.922 | 316.903 | 359.736 |
| e          | Number of Starts             | [3]    | 123     | 32      | 14     | 25      | 38      | 45      | 34      |
| f          | 2FO Consumption [BBtu]       | [4]    | 134     | 21      | 11     | 17      | 25      | 27      | 26      |
| f          | RFO Consumption [BBtu]       | [4]    | 489     | 46      | 0      | 10      | 18      | 181     | 85      |
| f          | Gas Consumption [BBtu]       | [4]    | 2,398   | 2,741   | 1,116  | 2,218   | 3,166   | 3,351   | 3,963   |
| g          | CO2 Emitted [1000 ton]       | [1]    | 217     | 166     | 66     | 132     | 189     | 214     | 241     |
| g          | SO2 Emitted [ton]            | [1]    | 325     | 45      | 10     | 21      | 36      | 126     | 74      |
| g          | NOx Emitted [ton]            | [1]    | 187     | 168     | 66     | 132     | 189     | 221     | 246     |
| h          | Capacity Factor [%]          | [3]    | 6.4%    | 7.1%    | 2.8%   | 5.6%    | 8.0%    | 9.0%    | 10.3%   |
| i          | Service Factor [%]           | [3]    | 17.5%   | 9.6%    | 3.9%   | 7.7%    | 11.1%   | 12.1%   | 14.0%   |
|            | Availability                 | [3]    | 96.2%   | 93.8%   | 96.2%  | 96.2%   | 96.2%   | 93.0%   | 94.5%   |
| b          | Energy Revenue [\$1000]      | [2]    | 21,459  | 22,640  | 8,361  | 16,650  | 23,545  | 30,423  | 31,917  |
| a          | Energy Cost [\$1000]         |        | 19,963  | 17,666  | 6,548  | 13,327  | 18,738  | 24,068  | 23,371  |
| a          | Fuel Cost [\$1000]           | [2]    | 19,787  | 17,338  | 6,417  | 13,066  | 18,366  | 23,645  | 22,895  |
| a          | Emission Allow Cost [\$1000] | [5]    | 176     | 328     | 131    | 260     | 372     | 423     | 477     |
|            | Net Revenue [\$1000]         |        | 1,496   | 4,974   | 1,813  | 3,324   | 4,807   | 6,355   | 8,546   |
|            | Ave. Energy Revenue [\$/MWh] |        | 95.51   | 91.46   | 85.28  | 84.40   | 83.52   | 96.00   | 88.72   |
|            | Ave. Fuel Cost [\$/MWh]      |        | 88.07   | 70.04   | 65.46  | 66.23   | 65.15   | 74.61   | 63.64   |
|            | Ave. Energy Cost [\$/MWh]    |        | 88.86   | 71.37   | 66.79  | 67.55   | 66.47   | 75.95   | 64.97   |
|            | Ave. Energy Margin [\$/MWh]  |        | 6.66    | 20.09   | 18.49  | 16.85   | 17.05   | 20.05   | 23.76   |
|            | Ave. Generation [MW]         |        | 140     | 293     | 288    | 292     | 289     | 298     | 293     |
|            | Ave. Start 2FO Use [Bbtu]    |        | 1.09    | 0.65    | 0.77   | 0.69    | 0.67    | 0.59    | 0.77    |
|            | Natural Gas Use Share        |        | 79.4%   | 97.6%   | 99.0%  | 98.8%   | 98.7%   | 94.2%   | 97.3%   |
|            | Ave. Heat Rate [MMBtu/MWh]   |        | 13.45   | 11.34   | 11.50  | 11.38   | 11.38   | 11.23   | 11.33   |
|            | Ave. Energy Cost [\$/MMBtu]  |        | 6.61    | 6.29    | 5.81   | 5.94    | 5.84    | 6.76    | 5.74    |

Sources of 2010 actuals:

- [1] PSNH supplied data
- [2] OCA-02-033, OCA-02-033-SP01
- [3] STAFF-01-068
- [4] STAFF-03-001
- [5] STAFF-01-061-SP01

Notes re differences between actual and backcast expected value (EV) results:

- 1 Actual 2FO use and cost includes fuel for plant warming. The model did not include warming fuel use or cost.
- 2 Actual energy revenue includes NCPC payments. Actual costs and average heat rate reflect lower part-load efficiency.