

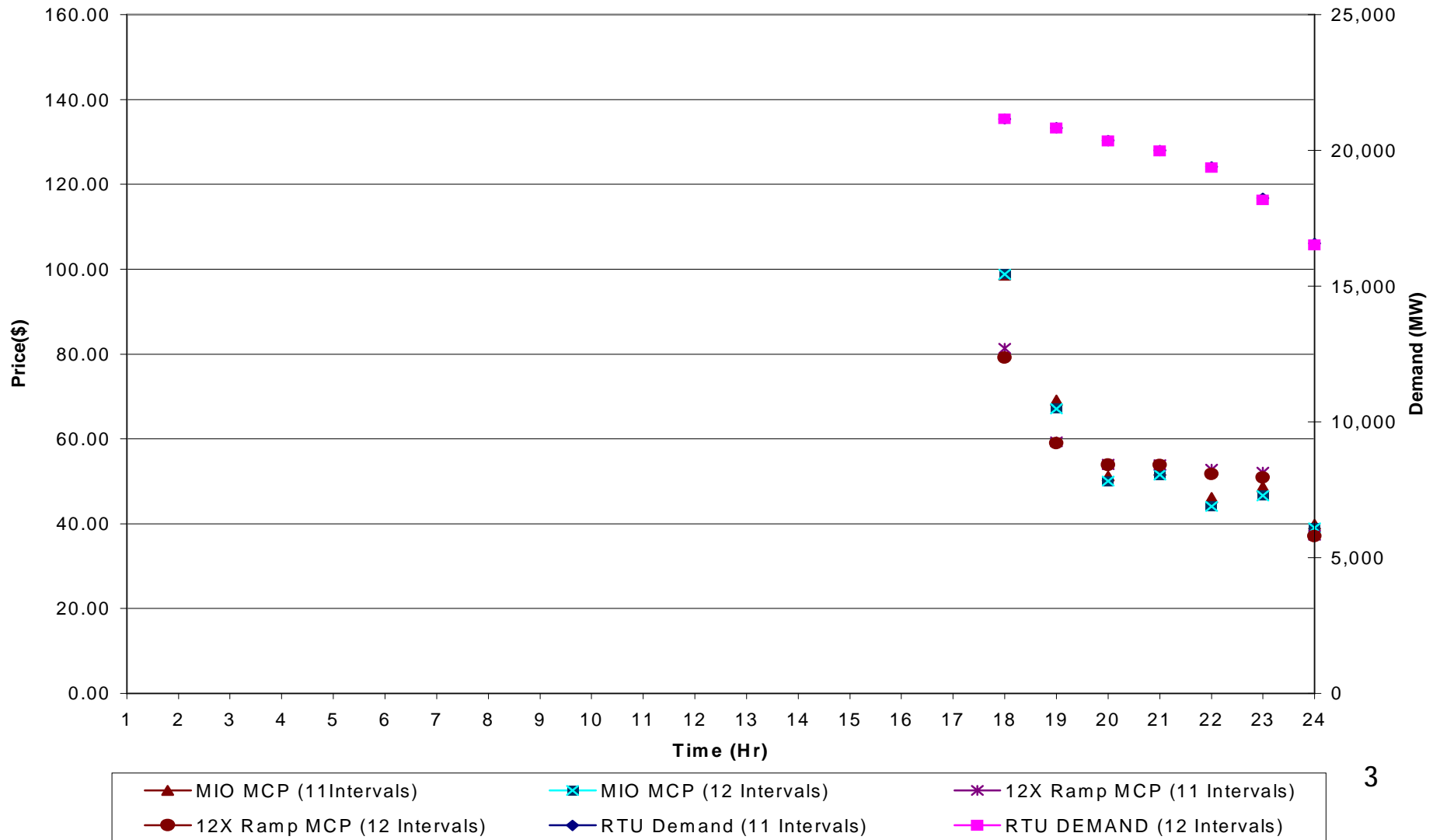
# Marketing Pricing Work Group

Possible Resolutions to Simulation Limitations  
February 2, 2005

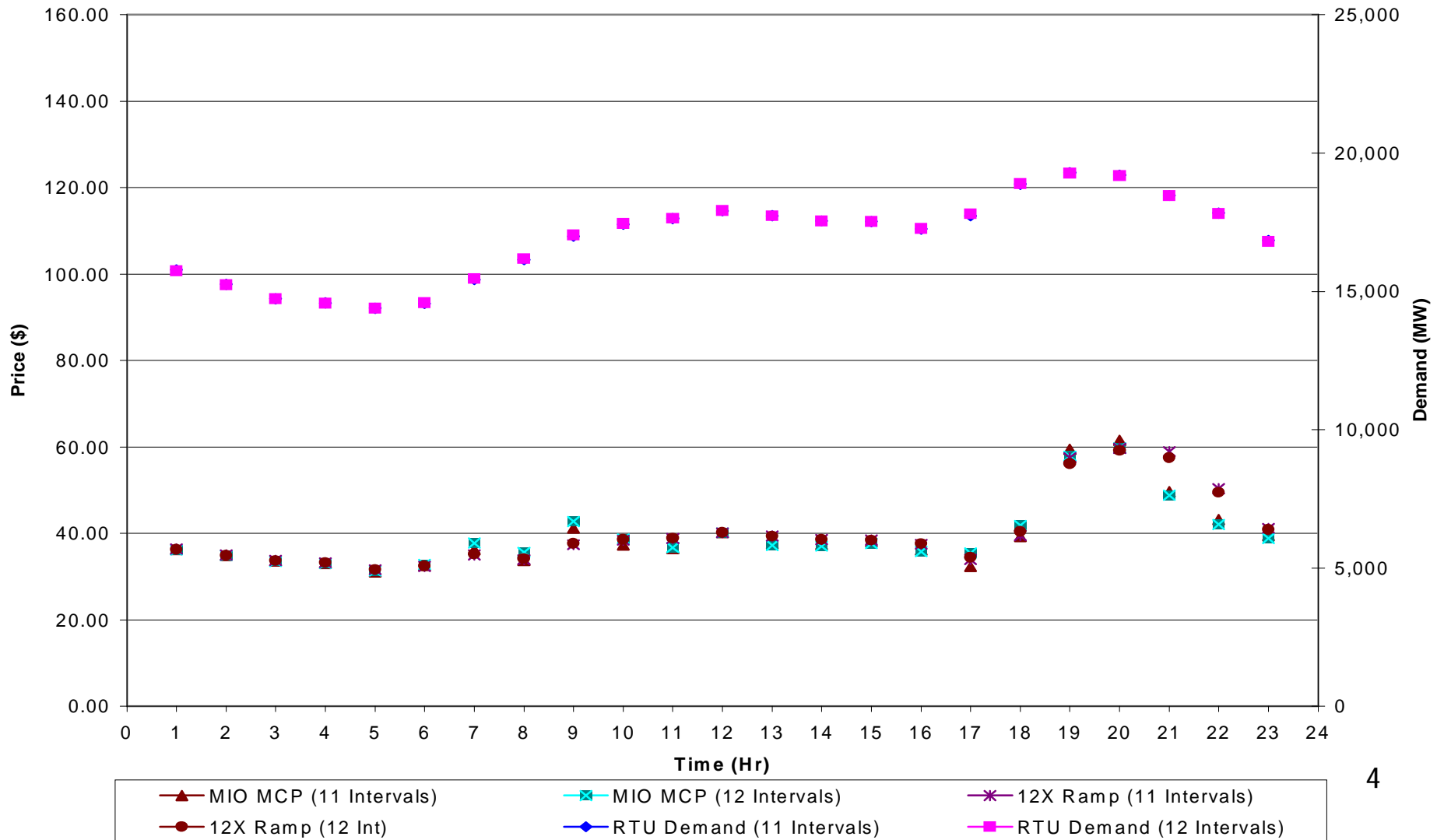


- » **Transactions (imports and exports) in the constrained and unconstrained sequences start ramping at different intervals.**
  - **Results in a demand difference of half the net import and export change on Ontario resources in interval 12.**
- » **Possible Resolutions:**
  - **Assume that the impact will cancel over time since changes should add up to zero**
  - **Ignore prices for interval 12 when calculating the average hourly price.**
  - **Manually calculate the impact of the differences and adjust the interval 12 prices.**

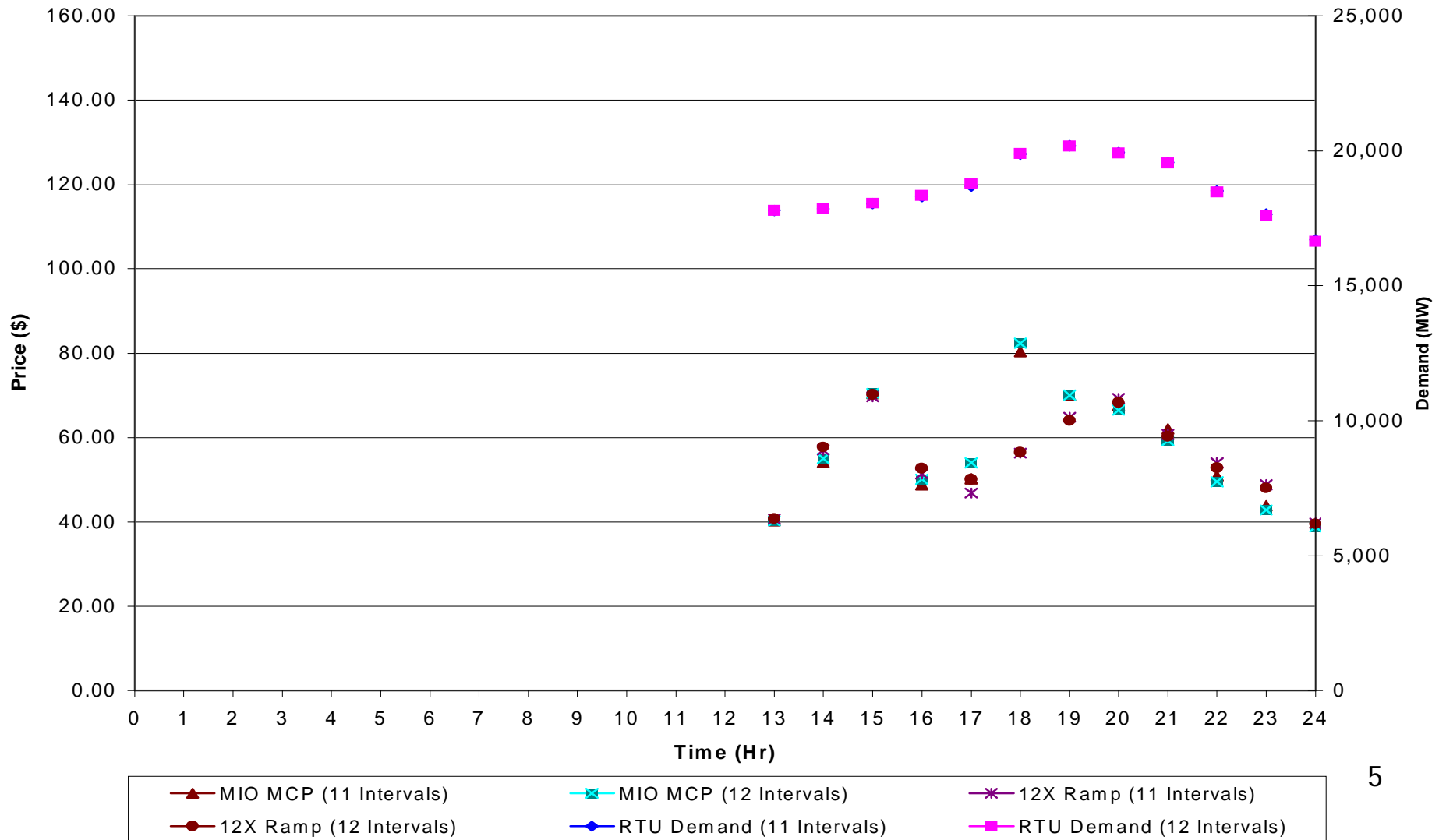
**Graph 1. 11 and 12 Interval Averages for Dec.10,2004**



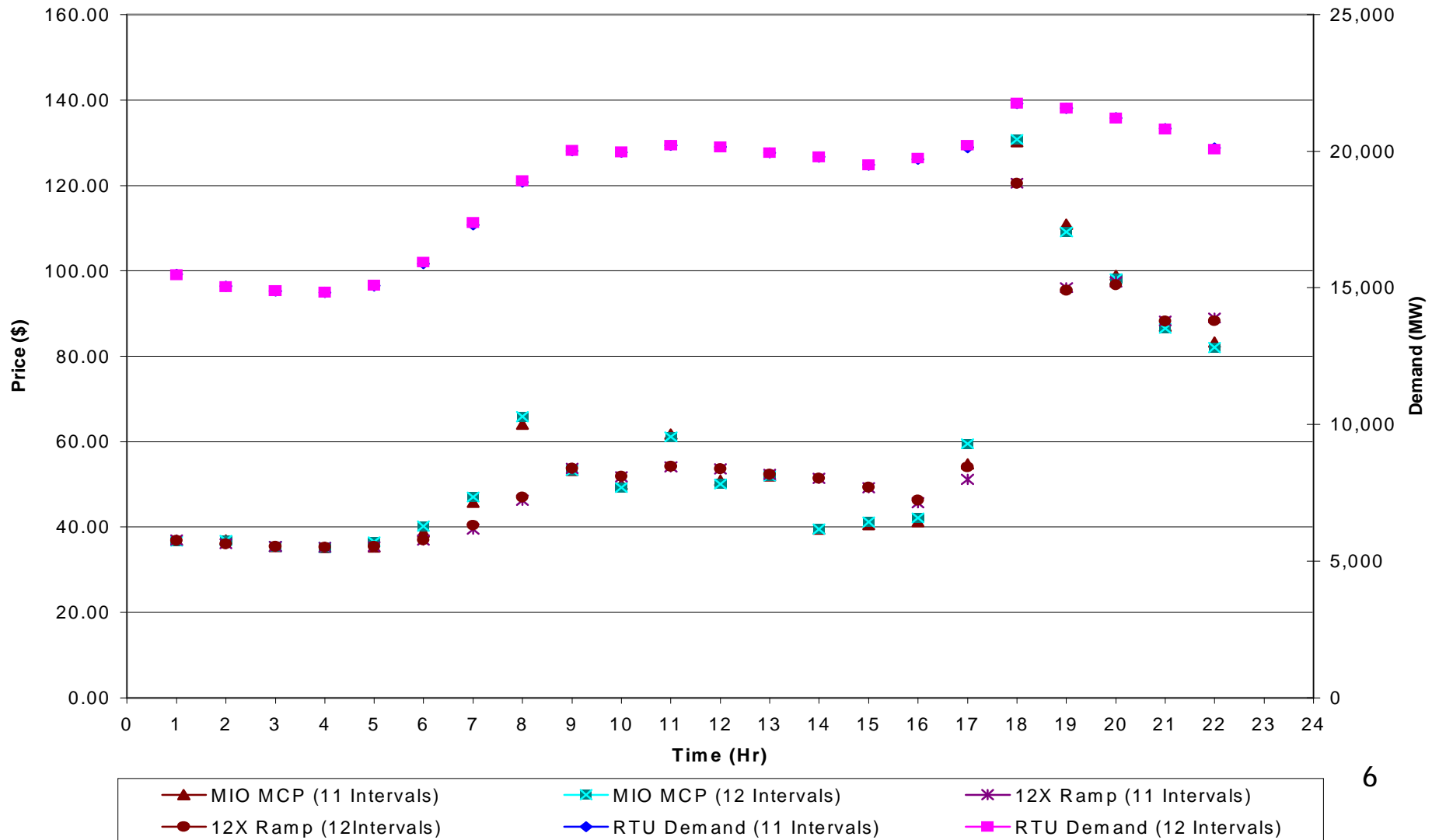
**Graph 2. 11 and 12 Interval Averages for Dec.11,2004**



**Graph 3. 11 and 12 Interval Averages for Dec.12,2004**



**Graph 4. 11 and 12 Interval Averages for Dec.13,2004**



***Table 1. Statistical Summary of Differences Between Using 11 and 12 Intervals to Compute Hourly Averages***

	Difference of Demand (MW)	Difference of MIO MCP (\$)	Difference of 12X Ramp MCP (\$)
<b>Average</b>	<b>0.40</b>	<b>-0.05</b>	<b>0.04</b>
<b>Standard Deviation</b>	<b>31.86</b>	<b>1.40</b>	<b>0.81</b>
<b>Absolute Max</b>	<b>66.52</b>	<b>2.80</b>	<b>2.14</b>

***The difference is the value obtained using 11 intervals less the value using 12 intervals.***

- » **The SCADA unit output is replaced by a calculated output.**
- » **A lag was introduced to approximate realistic generator operation by the equation:**

$$\text{unit output}(t) = 0.3 \times \text{dispatch}(t) + 0.5 \times \text{dispatch}(t - 5) + 0.2 \times \text{dispatch}(t - 10)$$

- » **In the constrained sequence, the dispatch at time T is limited by:**
  - **Unit dispatch (T-5)+5 minutes x offer ramp rate**
  - and**
  - **Unit output (T-10)+10 minutes x factor x maximum offer ramp rate.**

- » **Only the first constraint is respected in the unconstrained sequence**
- » **The factor was set to 1.4 in the production system.**
- » **If the factor <sup>3</sup> 1.45, the second constraint will never be binding.**
  - **Eliminates the unit output and the impact of the lag from the MIO calculation.**
  - **Both constrained and unconstrained sequences will be using the first constraint.**
- » **Proposed Resolution:**
  - **Set the factor to 1.45 for all future tests**

***Table 2. Unit Dispatch and Output With a Factor of 1.45***

<b>Time</b>	<b>Dispatch</b>	<b>Constraint 1</b>	<b>Output</b>	<b>Constraint 2</b>
0	0	5	0	14.5
5	5	5	1.5	14.5
10	10	10	5.5	14.5
15	15	15	10.5	16.0
20	20	20	15.5	20
25	25	25	20.5	25

- » **Transactions (imports and exports) produced by the pre-dispatch constrained and unconstrained sequences (used by the corresponding real time sequences) will be different in some hours.**
- » **Possible Resolutions:**
  - **Assume the differences will cancel over time since they are small and both negative and positive.**
  - **Ignore the data in the hours in which the differences occur.**
  - **Manually calculate the impact of the difference and adjust prices.**

- » **Changes in system conditions (unit outages and de-rating) that occur in the 10 minutes between the times that the two real time sequences run for the same interval will affect the calculated prices.**
- » **Possible Resolutions:**
  - **Assume the impact will cancel over time since the changes will impact the two sequences differently when applied and when removed.**
  - **Eliminate the hours where this occurs.**
  - **Manually calculate the impact of the changes and adjust the prices.**

- » **Scheduled MIO price testing on Sandbox.**
  - **February 11-14, 2005**
  - **March 10-16, 2005**
  - **April 4-10, 2005**