

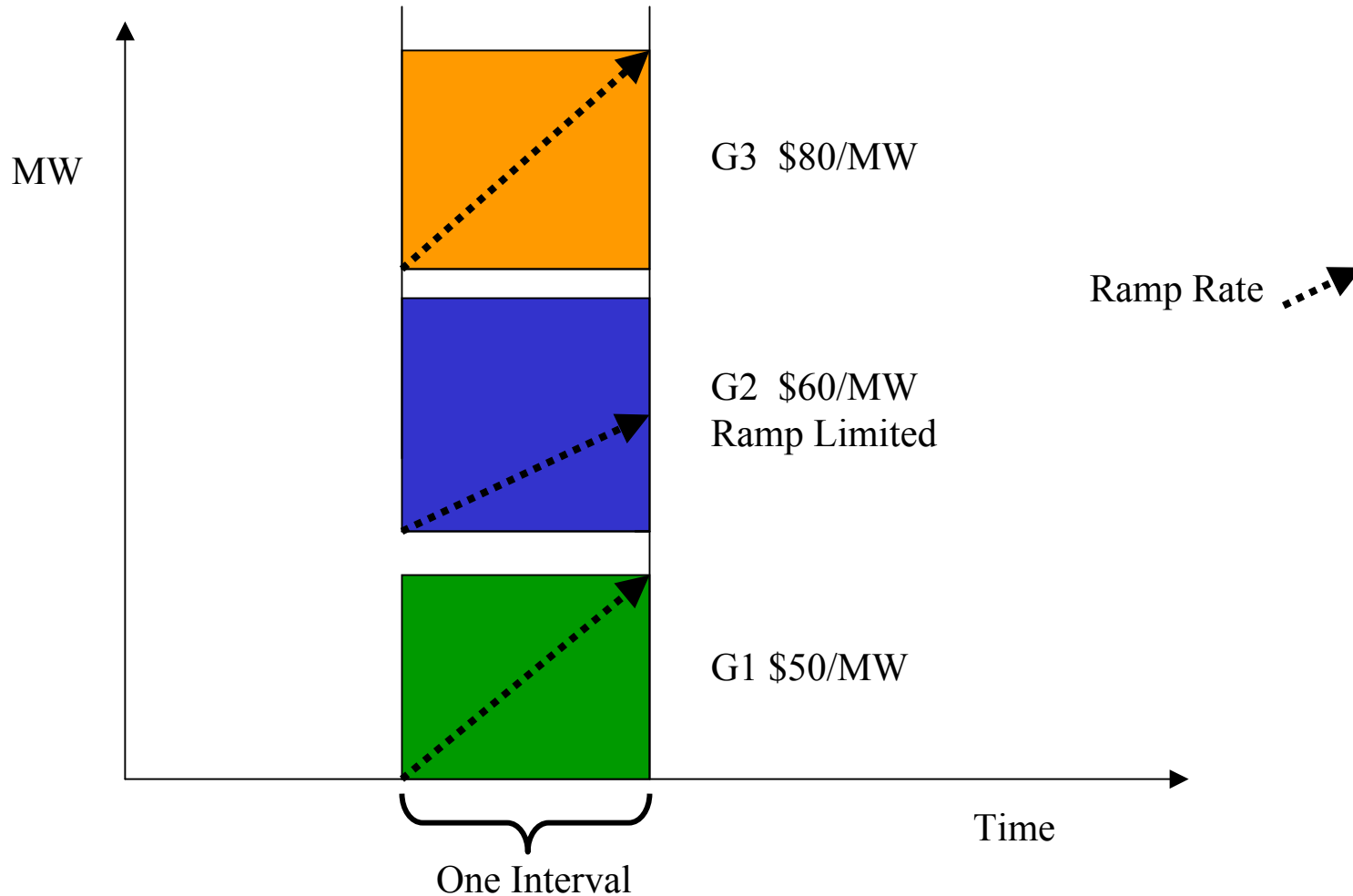
# Use of 12-Times Ramp Rate in the Dispatch Unconstrained Algorithm

Market Pricing Working Group

Meeting #3

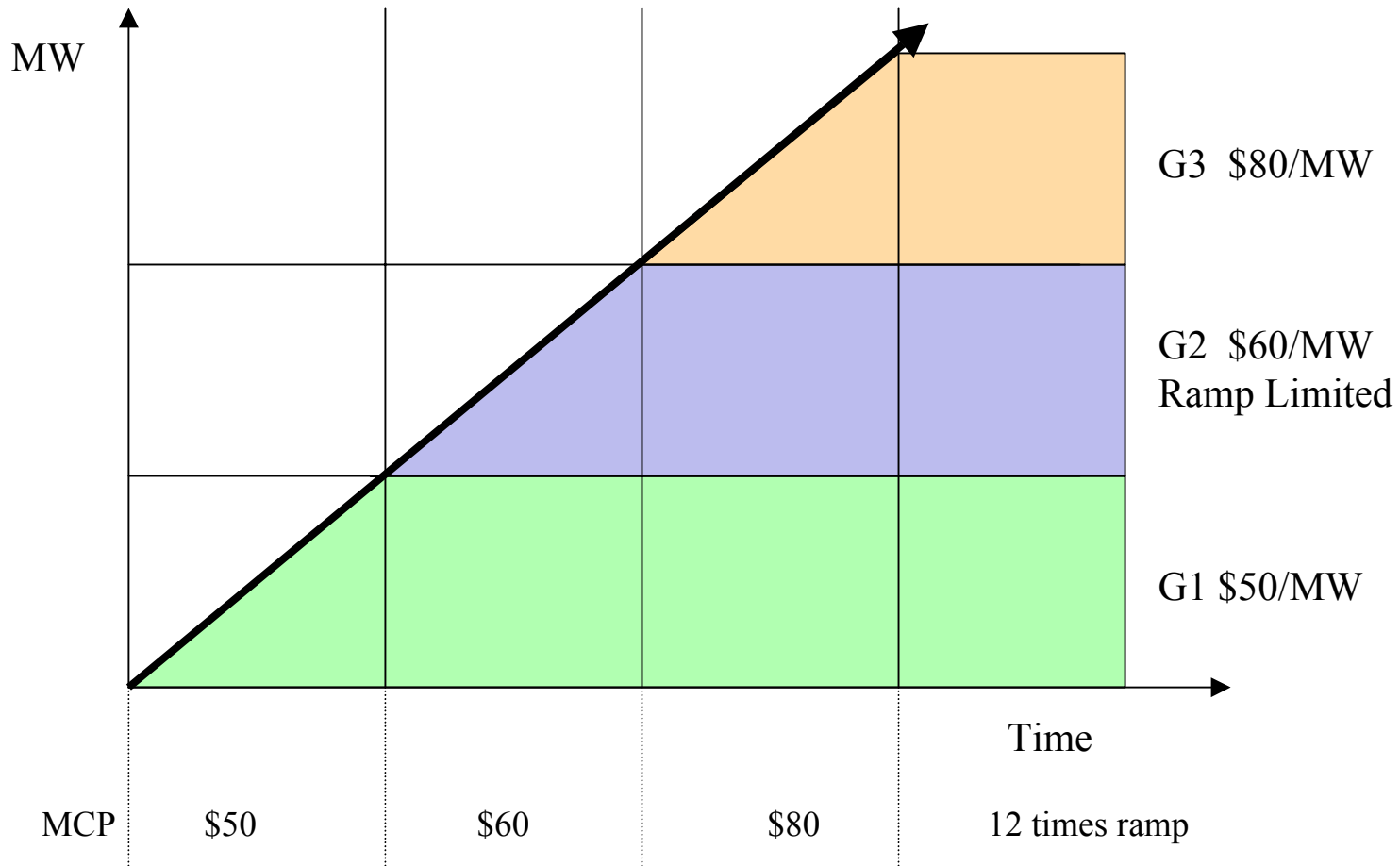
June 11, 2004

# Ramp Up Limits - Illustration



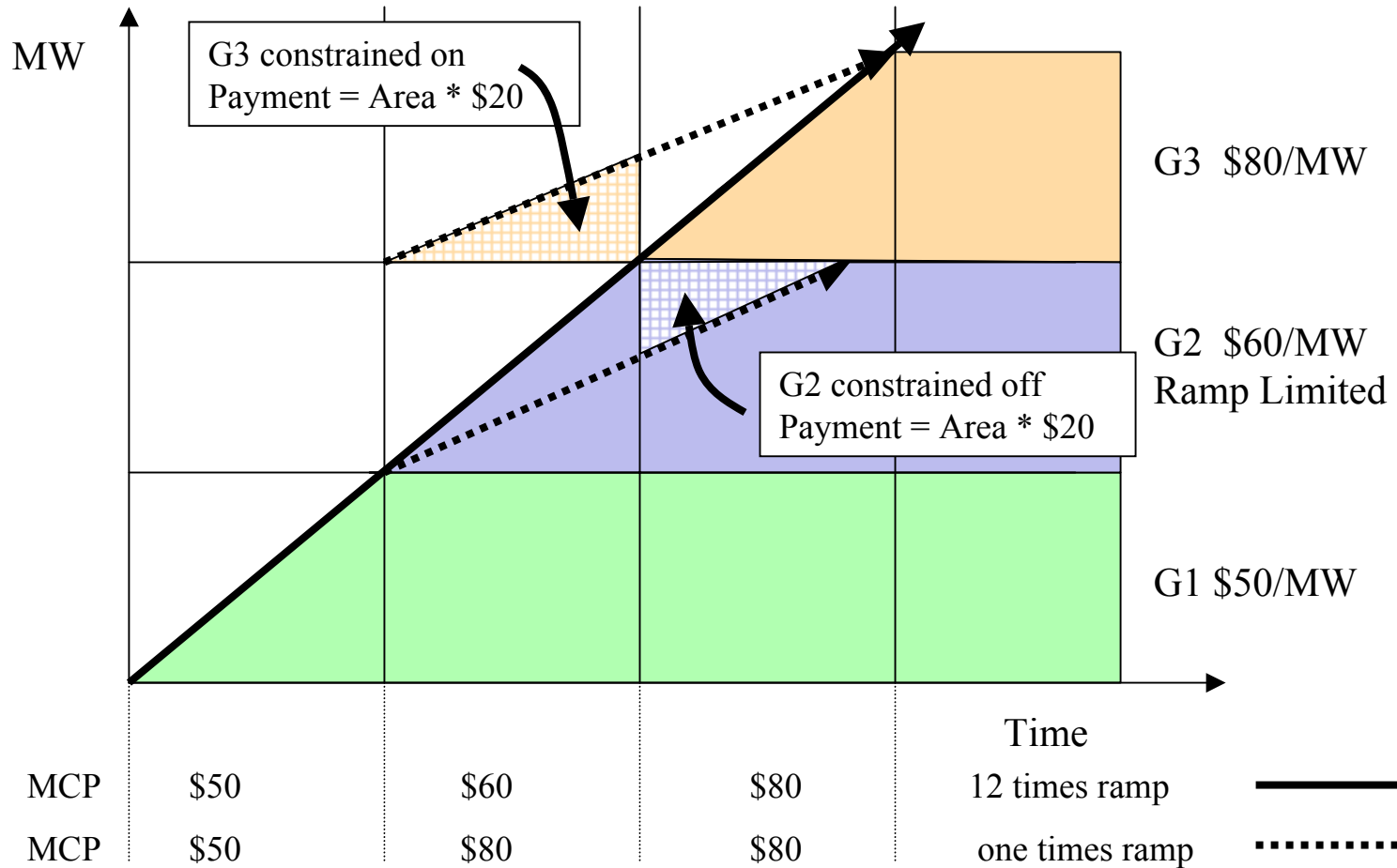
# Ramp Up Limits - Illustration

## 12x Ramp Assumed



# Ramp Up Limits - Illustration

## 1x vs 12x Ramp Assumed



# Ramp Up Comparison

The 1x ramp MCP for the second interval is \$20/MW higher than the 12x ramp MCP

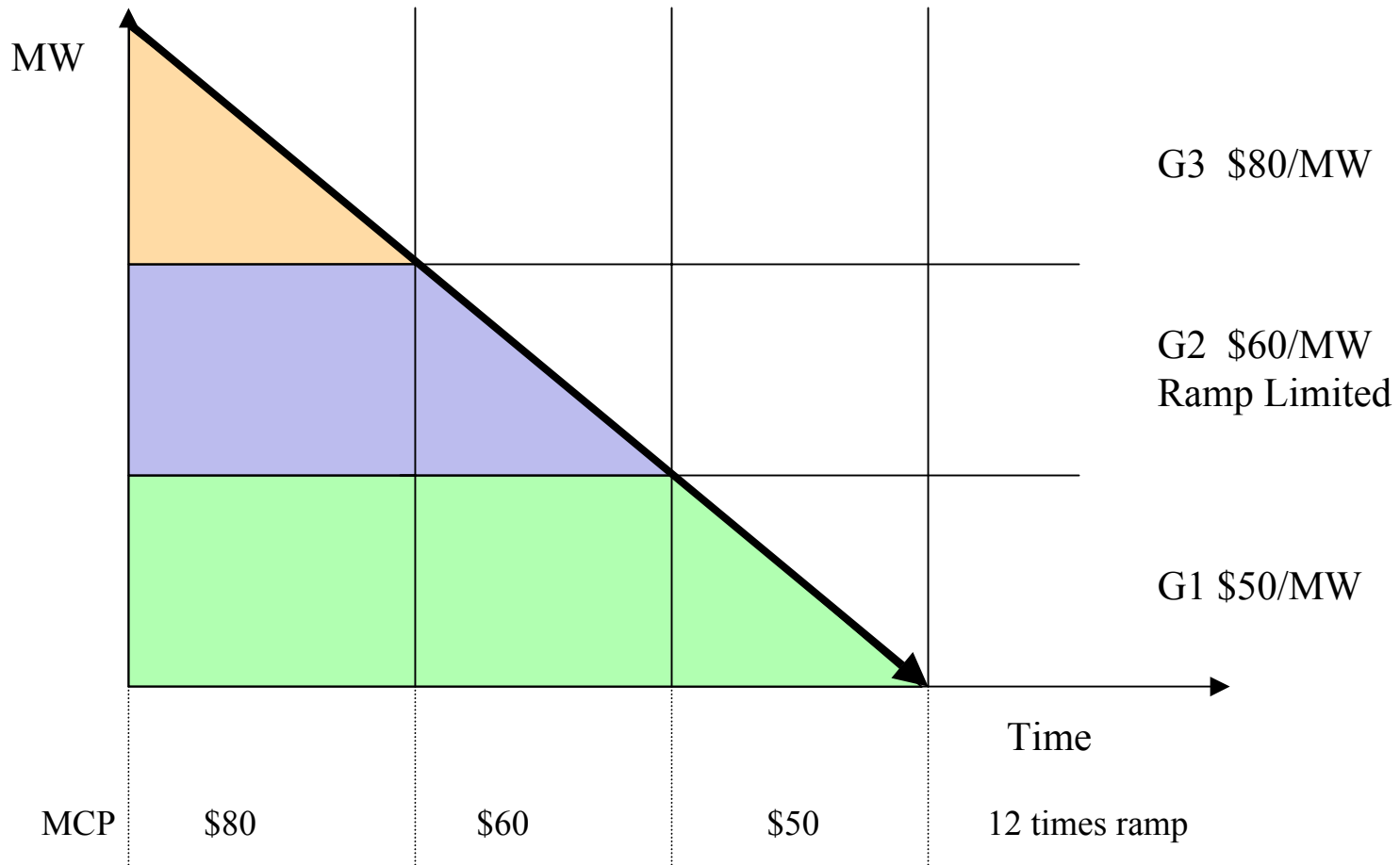
G1 will get an extra \$20/MW during the second interval

G2 will get an extra \$20/MW during the second interval and will lose the constrained off payment during the third interval

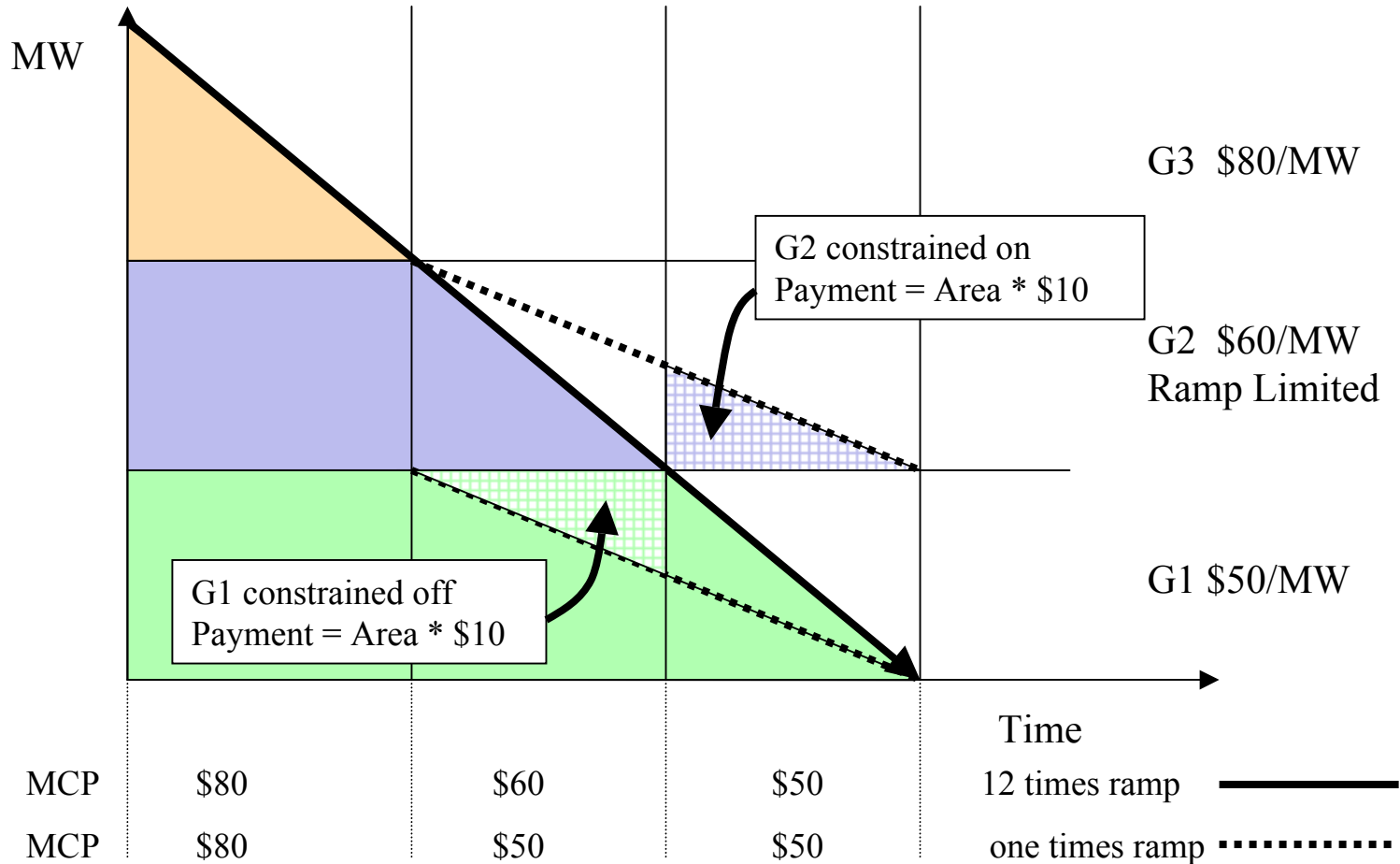
G3 gets the same payment

# Ramp Down Limits - Illustration

## 12x Ramp Assumed



# Ramp Down Limits - Illustration 1x vs 12x Ramp Assumed



# Ramp Down Comparison

The 1x ramp MCP for the second interval is \$10/MW lower than the 12x ramp MCP.

G2 will be paid less \$10/ MW in the second interval and will lose the constrained on payment

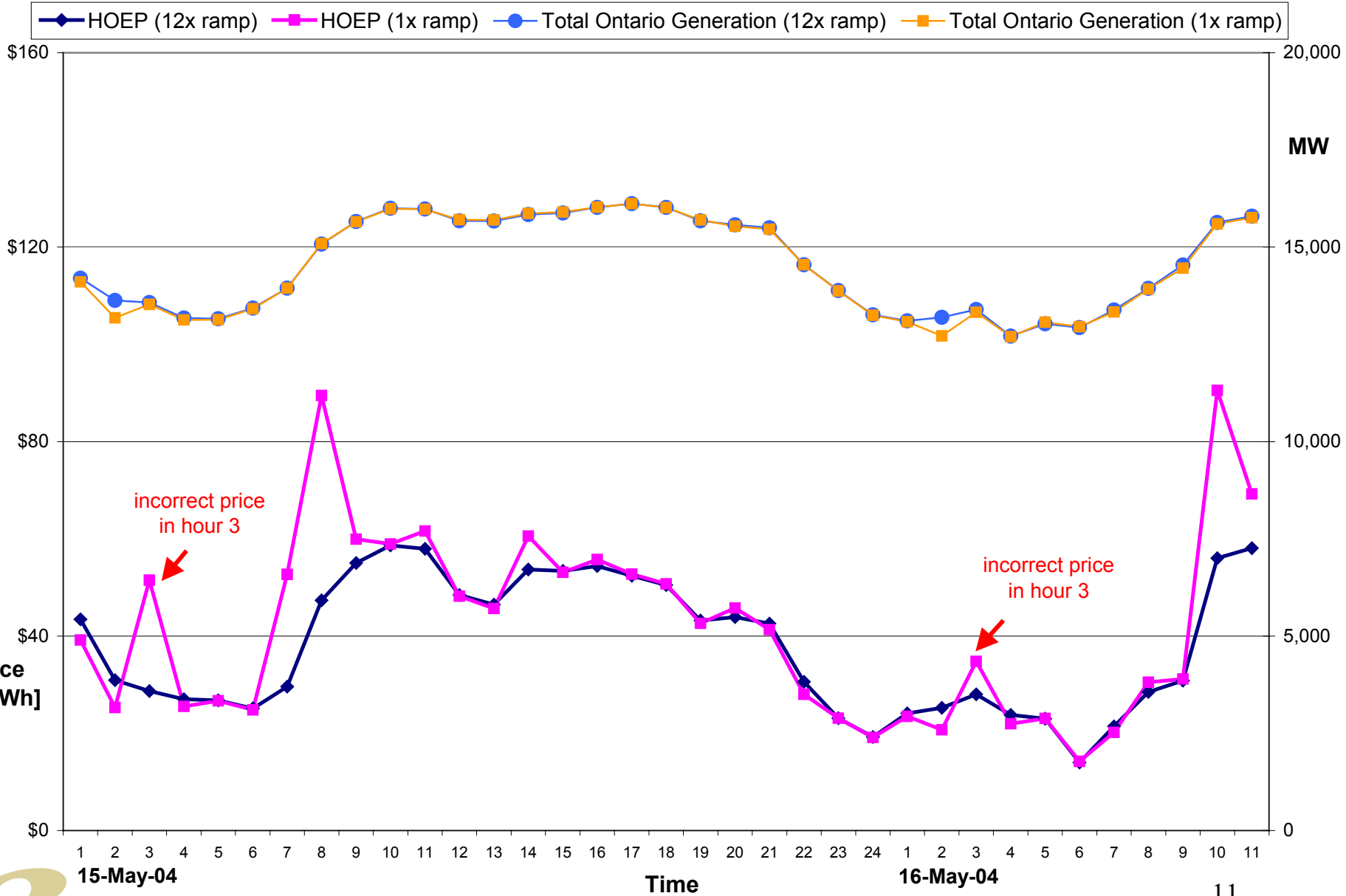
G1 will be paid less \$10/ MW in the second interval and will lose the constrained off payment

# Pricing Data Comparisons Between 12 Times and One Times Ramp Rate

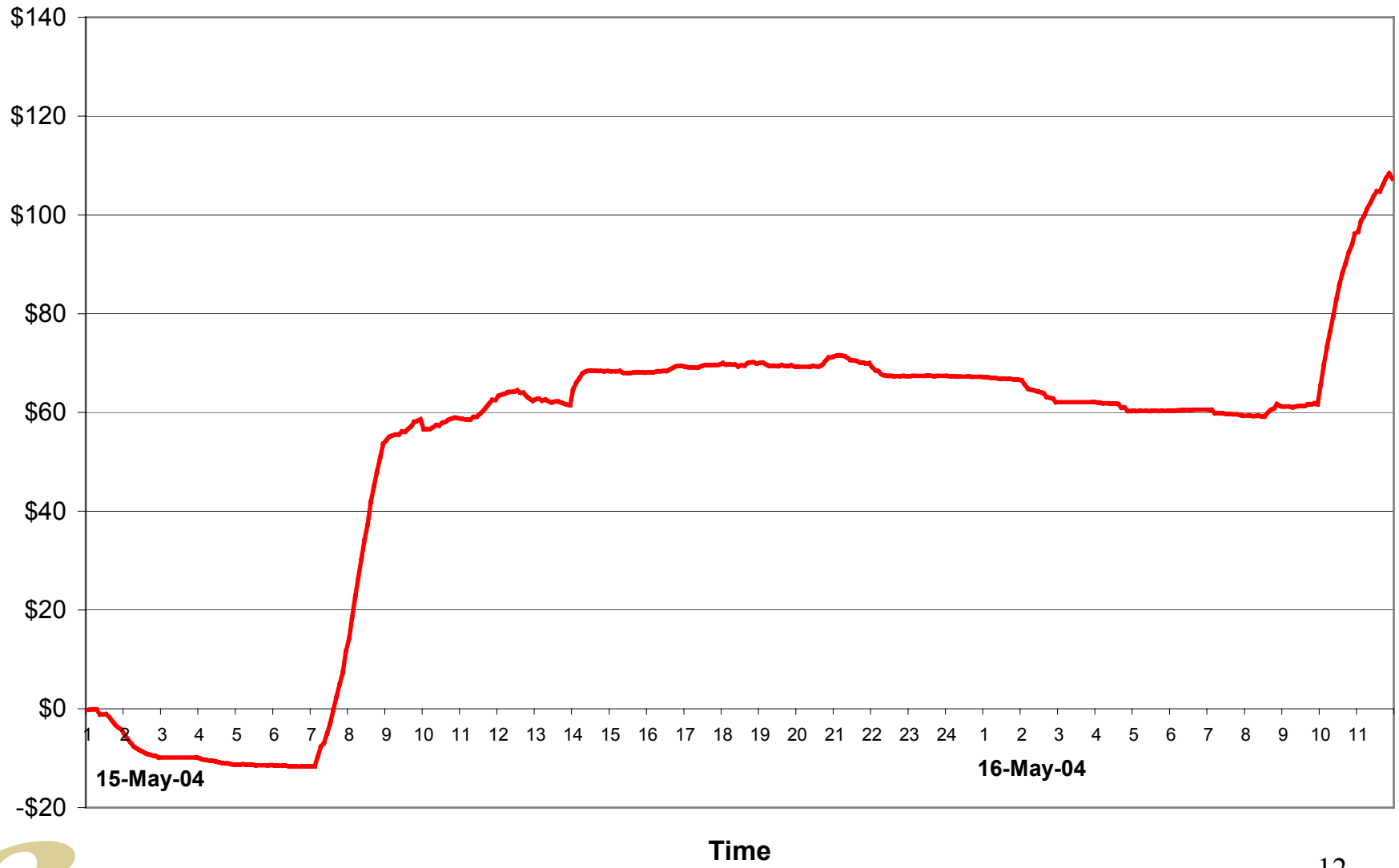
## May 15 - 16, 2004 Sandbox Data

- Sandbox data from all hours of May 15 and up to hour 11 of May 16 is presented.
- A problem with the Closed Loop simulation tool in the Sandbox system prevented the use of further hours.
- The prices for the 1x ramp for hour 3 on both days are incorrect. Demands for hour 2 on the Sandbox system were off by more than 400 MW, causing a demand jump of more than 700 MW at the start of hour 3. This caused the 1x ramp prices for hour 3 to jump.
- The data is for a weekend. The load ramp was not high and the peak demand was not high.

# Comparison of HOEP with 12x and 1x Ramp Rates for May 15 - 16, 2004



# Plot of the Cumulative Price Difference between 12x Ramp and 1x Ramp MCP for May 15 - 16, 2004

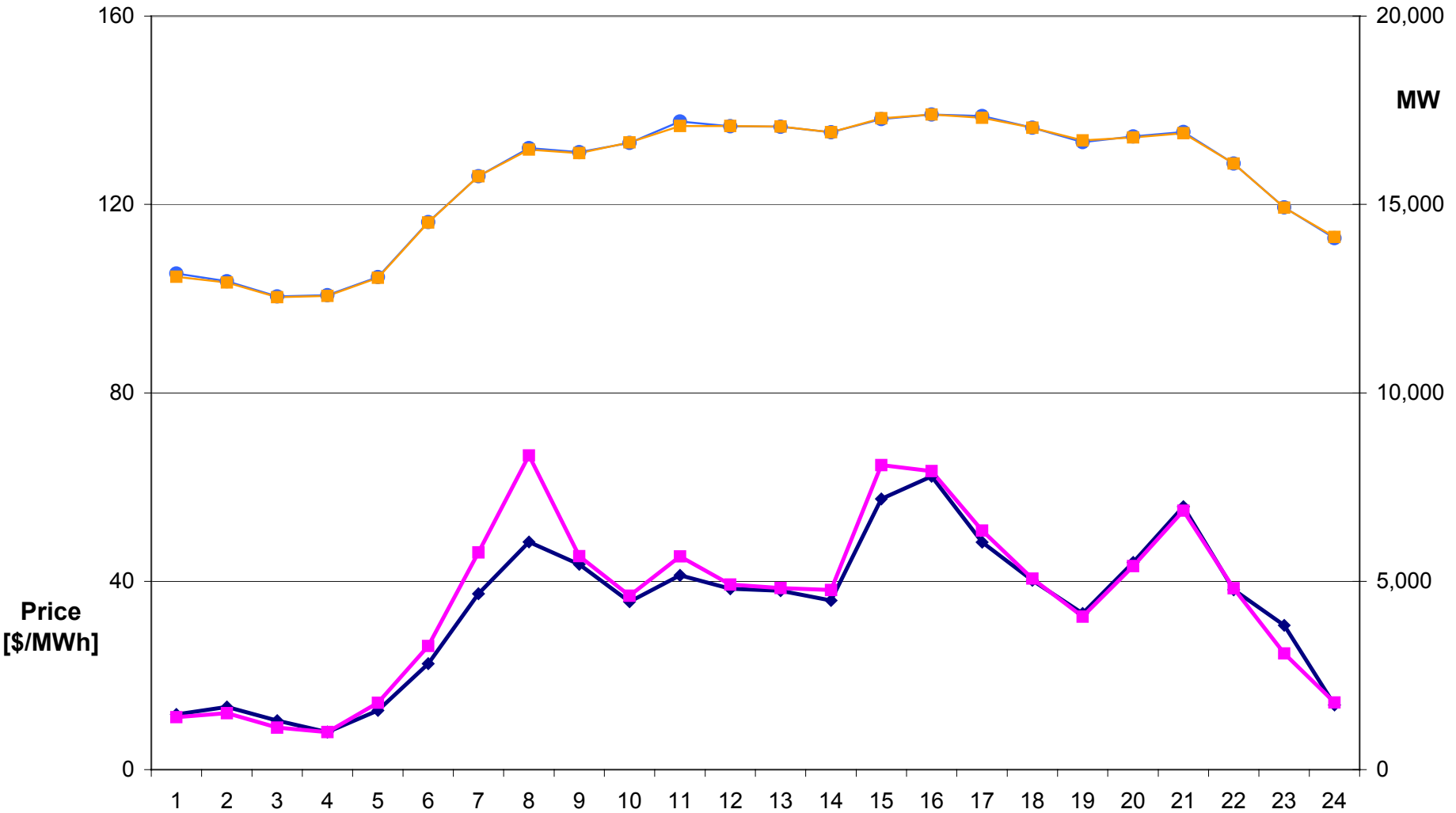


## June 2, 2004 Sandbox Data

- Closed Loop simulation was in place on the Sandbox system this day for MIO testing.
- There are no known problems with the simulation for all hours of this day.

# Comparison of HOEP with 12x and 1x Ramp Rates for June 2, 2004

◆ HOEP (12x ramp)   
 ■ HOEP (1x ramp)   
 ● Total Ontario Generation (12x ramp)   
 ■ Total Ontario Generation (1x ramp)



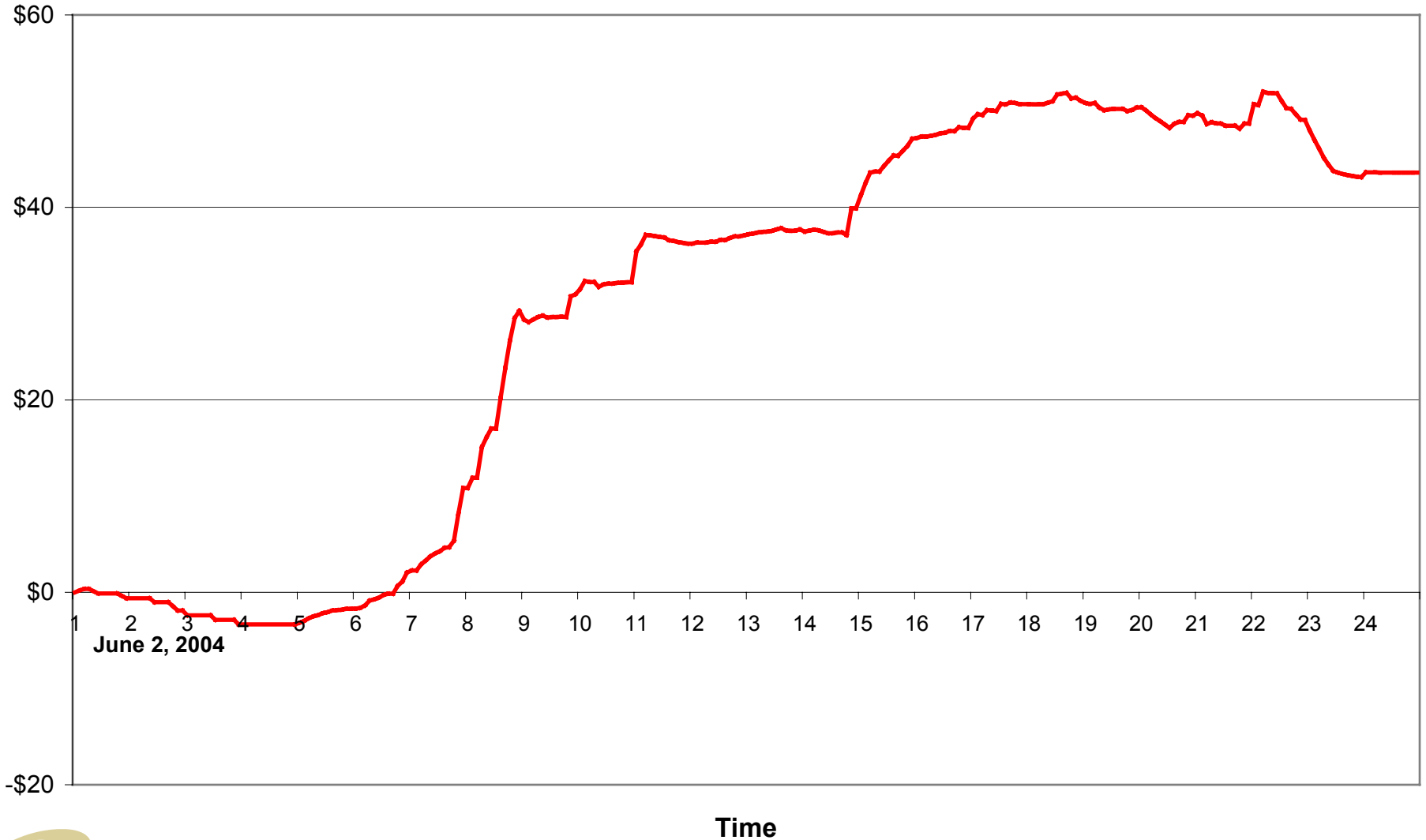
June 2, 2004

Time

14



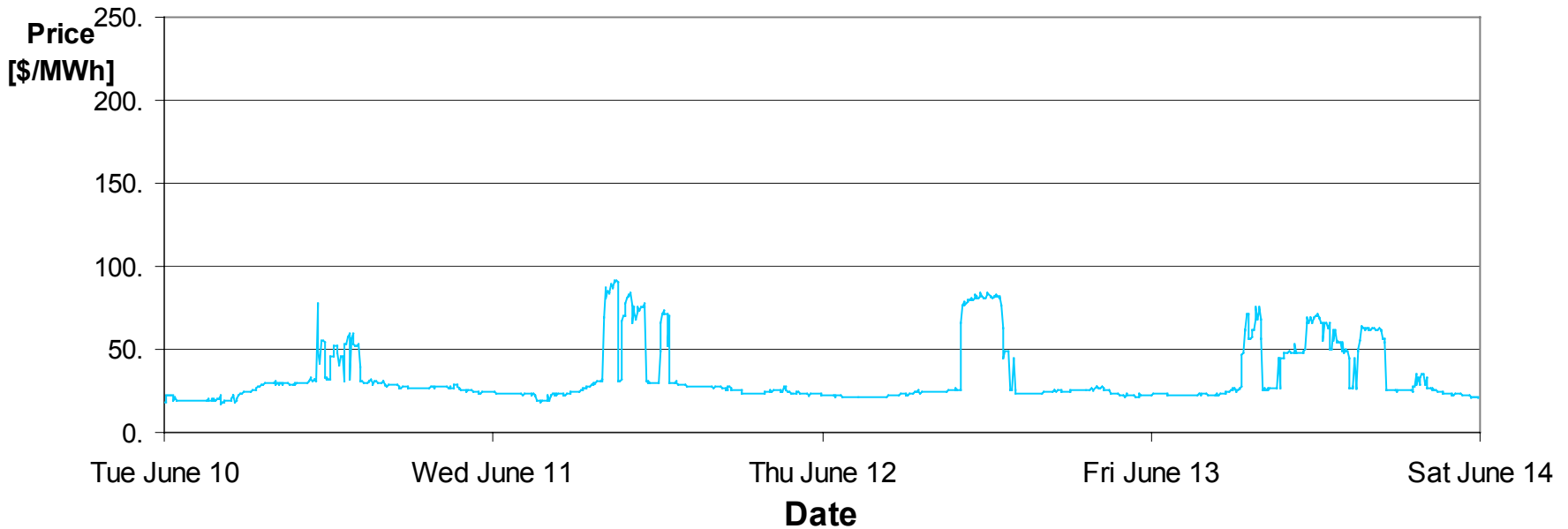
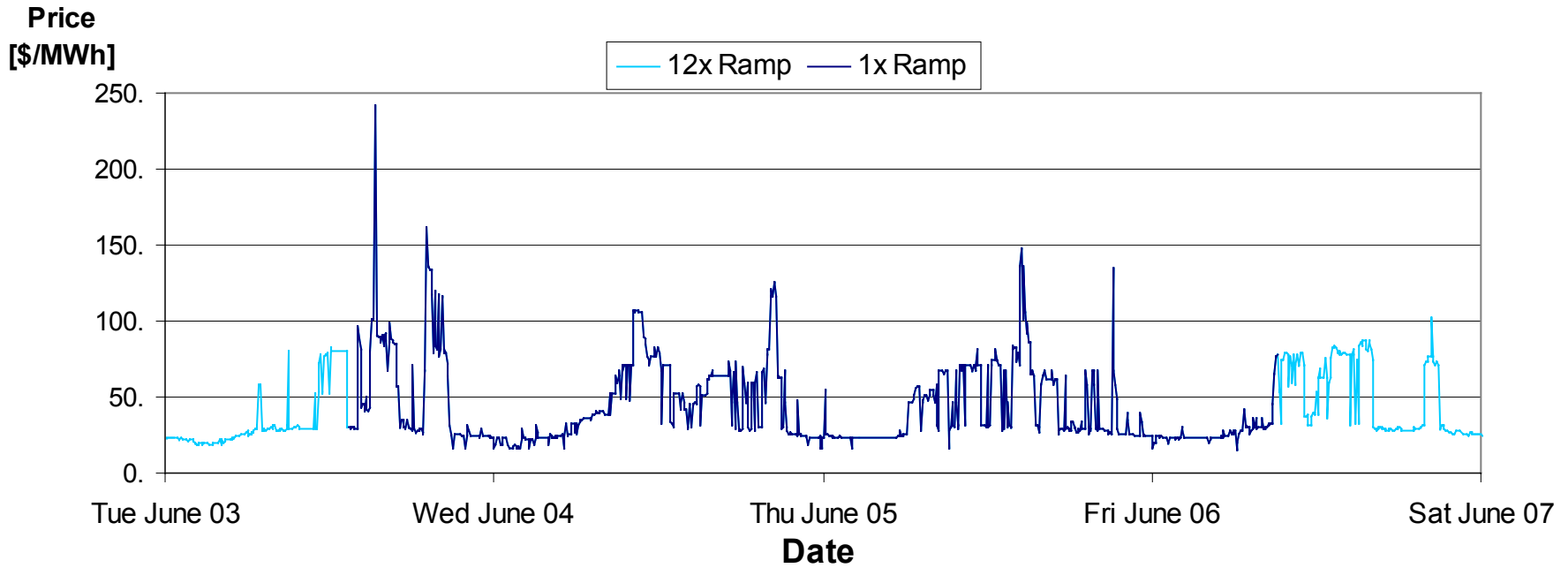
## Plot of the Cumulative Price Difference between 12x and 1x Ramp MCP for June 2, 2004



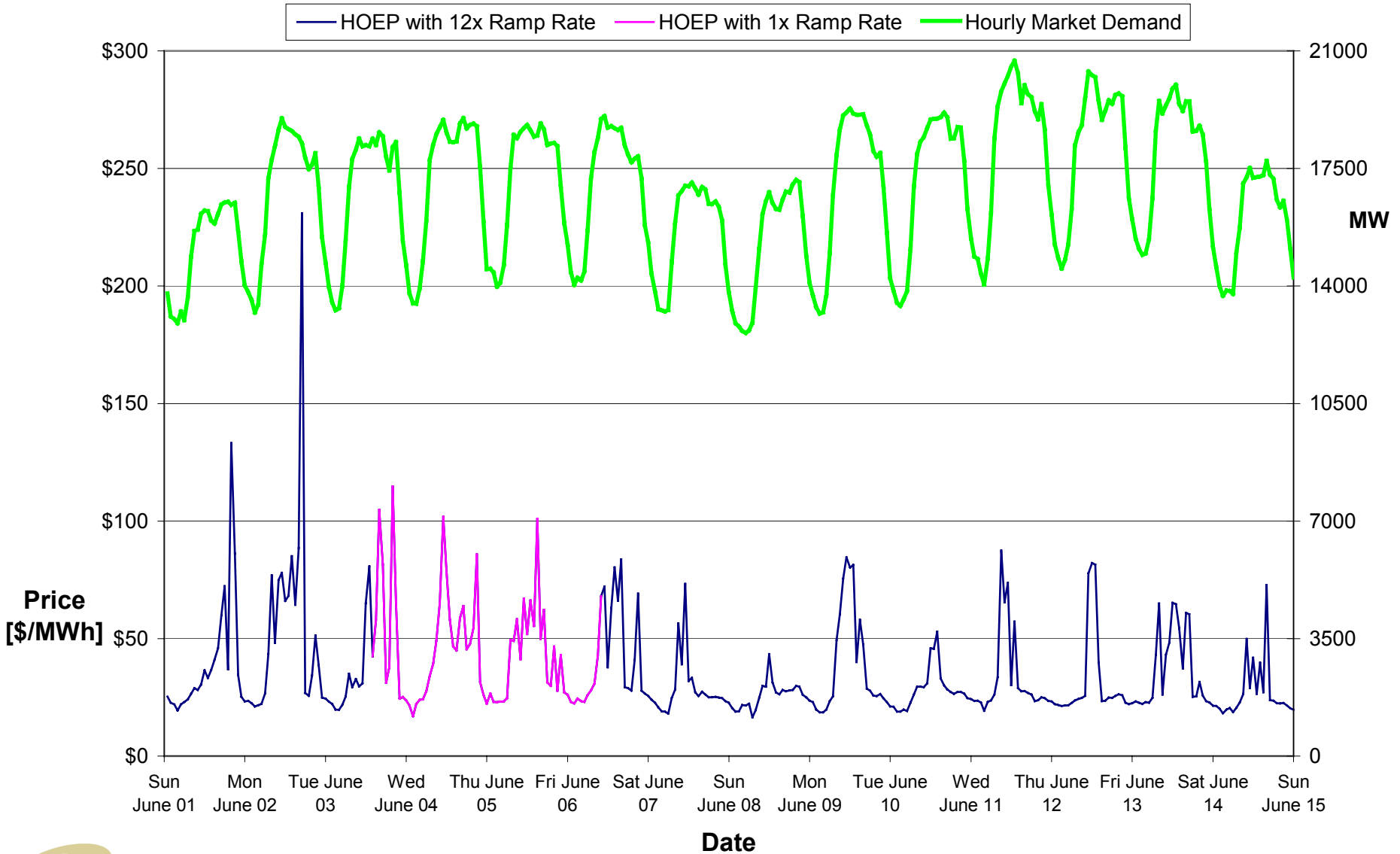
## June 3 - 6, 2003 Pricing Event

- During the Network Model update on June 3, 2003, the ramp rate in the unconstrained sequence was inadvertently set to 1 times, instead of 12 times.
- The error was not noticed until June 6, 2003.
- 1 times ramp rate was used to calculate market clearing prices from interval 5 of hour 14 on June 3rd until interval 1 of hour 10 on June 6th - about 68 hours.
- June 3 to 6, 2003 were Wednesday, Thursday and Friday.

# Comparison of MCP Trends for June 3 - 6, 2003 and June 10 - 13, 2003



# Plot of HOEP and Hourly Market Demand for June 1 - 14, 2003



## Plot of Market Clearing Price (MCP) and Hourly Market Demand for June 1 - 14, 2003

