

## ATTACHMENT 1 – ANALYSIS FOR MODIFICATION P211

This attachment summarises the full set of analysis thus far undertaken by the P211 Modification Group to assess P211.

Please note that additional analysis reflecting prices calculated under the potential Alternative will be provided on Friday 17 August. The analysis for the Alternative displayed on pages 13 to 18 reflects the original Alternative solution with rule 2a, which was revised at the last meeting of the P211 Modification Group (see Section 2.3 of the Consultation). This new analysis will not have been assessed by the Group.

### PROPOSED MODIFICATION P211

#### 1. EPUS Margin over NIV

For the 13 month period from 1 March 2006 to 31 March 2007 the EPUS stack was compared to the level of NIV. This is intended to show the amount of DAOV and DABV that would have appeared in the EPUS stack historically. Figure 1 shows the MWh volumes of the NIV, total DAOV (EPUS offers) and total DABV (EPUS bids). Table 1 provides the average differences between NIV and total DAOV when the system is short and between NIV and DABV when the system is long.

**Figure 1. EPUS Margin vs NIV – 1 March 2006 to 31 March 2007**



**Table 1. EPUS Margin vs NIV – 1 March 2006 to 31 March 2007**

	All	When Short (NIV > 0)	When Long (NIV < 0)
Average	18,953 MWh	6,676 MWh	19,438 MWh
Minimum	1,249 MWh (18 July 06, SP33)	1,249 MWh	11,374 MWh
Maximum	29,523 MWh (25 Jan 07, SP 36)	15,507 MWh	29,523 MWh

## 2. Recalculated Energy Imbalance Prices

Prices for the P211 Proposed solution were modelled and recalculated for the 13 month period 1 March 2006 to 31 March 2007. The results of the recalculation are shown below in Figures 2 to 19. However, it should be noted that because PAR500 was introduced on 2 November 2006 comparison against the current baseline (and therefore current market behaviours) can only be made against those prices in the date range of 2 November to 31 March 2007.

Prices were recalculated for the system stress days and Cheviot constraint days, to include the PAR500 rule in order to compare to the current baseline (as these days preceded the PAR500 rules). These are shown in Figures 13 to 19.

Tables 2 and 3 provide some key price figures. From 2 November 2006 to 31 March 2007 the P211 Proposed solution produced a SBP that was on average 16% lower than the current arrangements and a SSP that was on average a 7% increase over the current arrangements. Note that the 'live' price in these tables refers to the price that existed at the time (i.e. Prior to 2 November 2006 this is a volume weighted average of the accepted bids or offers after tagging has been applied. From 2 November 2006 the 'live' price is a volume weighted average of the most expensive 500MWh of accepted bids or offers). Where it is used, 'new' prices refer to the P211 recalculated prices.

**Table 2. Energy Imbalance Prices – 1 March 2006 to 31 March 2007**

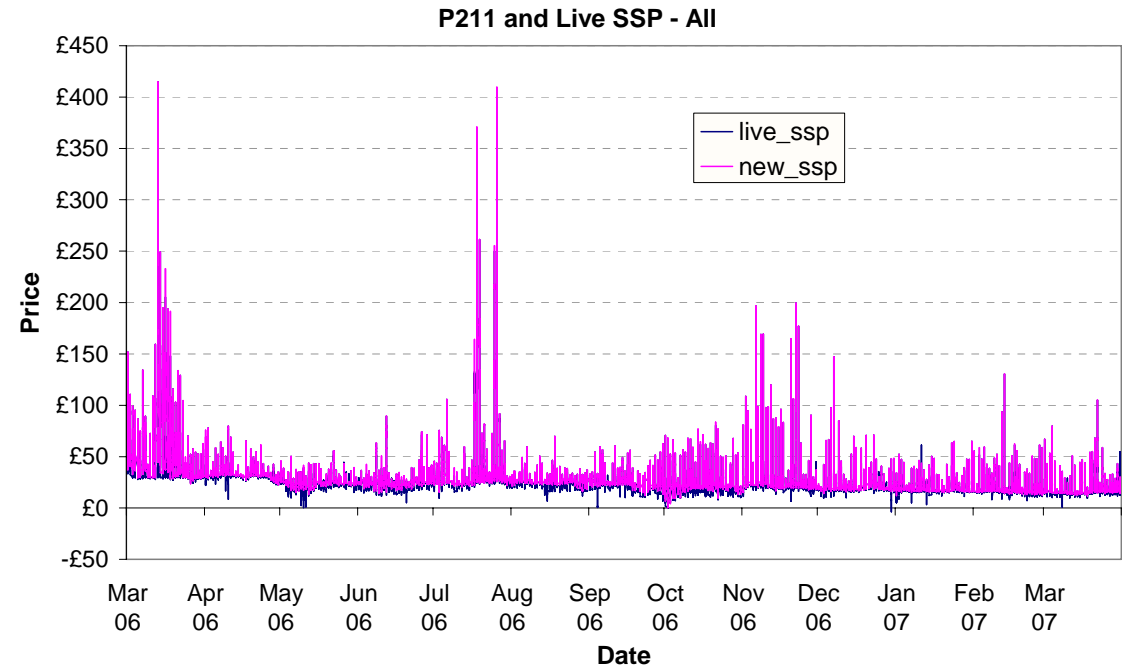
	<b>SBP</b>	<b>SSP</b>	<b>SBP when short</b>	<b>SSP when long</b>
<b>Live Average</b>	£41.76 / MWh	£27.31 / MWh	£72.89 / MWh	£21.72 / MWh
<b>P211 Average</b>	£39.25 / MWh	£28.69 / MWh	£65.54 / MWh	£23.48 / MWh
<b>Average Difference</b>	£2.51 / MWh	£1.38 / MWh	£9.34 / MWh	£1.75 / MWh
<b>% difference</b>	6% decrease	5% increase	12.8% decrease	8.2% increase
<b>Max difference</b>	£300 / MWh (P211 lower than Live)	£111 / MWh (P211 higher than Live)		
<b>Min difference</b>	£133 / MWh (P211 higher than Live)	£45 / MWh (P211 lower than Live)		

**Table 3. Energy Imbalance Prices – 2 November 2006 to 31 March 2007**

	<b>SBP</b>	<b>SSP</b>	<b>SBP when short</b>	<b>SSP when long</b>
<b>Live Average</b>	£35.81 / MWh	£21.20 / MWh	£64.13 / MWh	£17.54 / MWh
<b>P211 Average</b>	£32.92 / MWh	£22.06 / MWh	£53.88 / MWh	£18.74 / MWh
<b>Average Difference</b>	£2.89 / MWh	£0.86 / MWh	£10.25 / MWh	£1.2 / MWh
<b>% difference</b>	8% decrease	4% increase	16% decrease	7% increase
<b>Max difference</b>	£193 / MWh (P211 lower than Live)	£20.5 / MWh (P211 higher than Live)		
<b>Min difference</b>	£33 / MWh (P211 higher than Live)	£24.9 / MWh (P211 lower than Live)		

The P211 SBP and SSP prices are shown in Figures 2 and 3 (for when the system is short and long respectively).

**Figure 2. P211 and Live SSP – All Settlement Periods - 1 March 2006 to 31 March 2007**



**Figure 3. P211 and Live SBP – All Settlement Periods - 1 March 2006 to 31 March 2007**

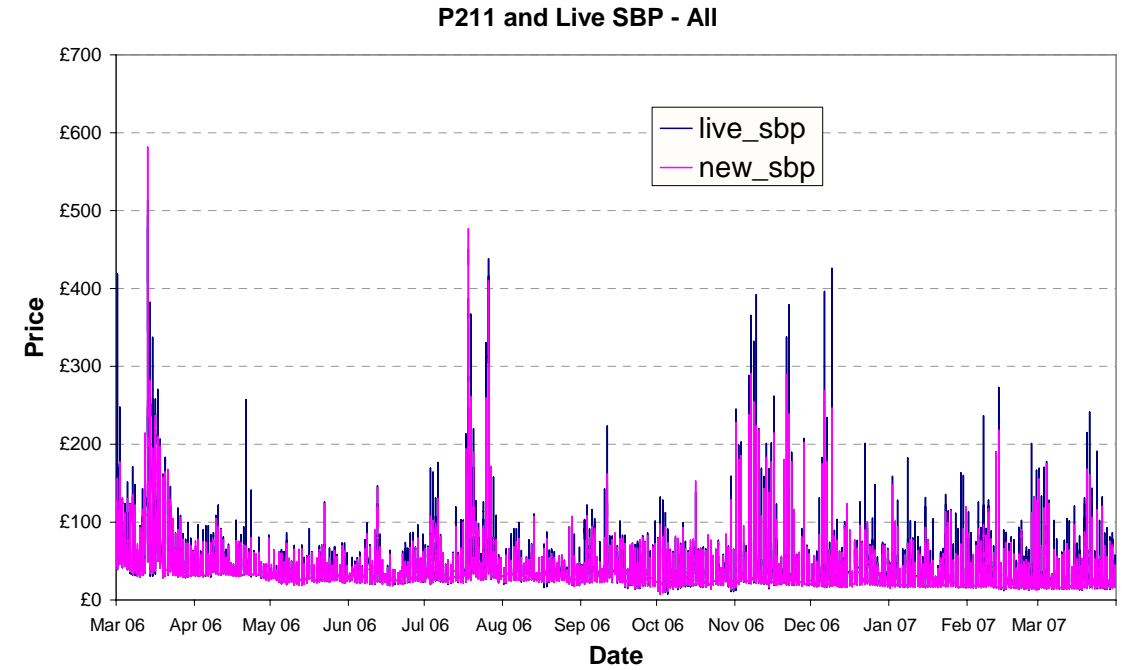
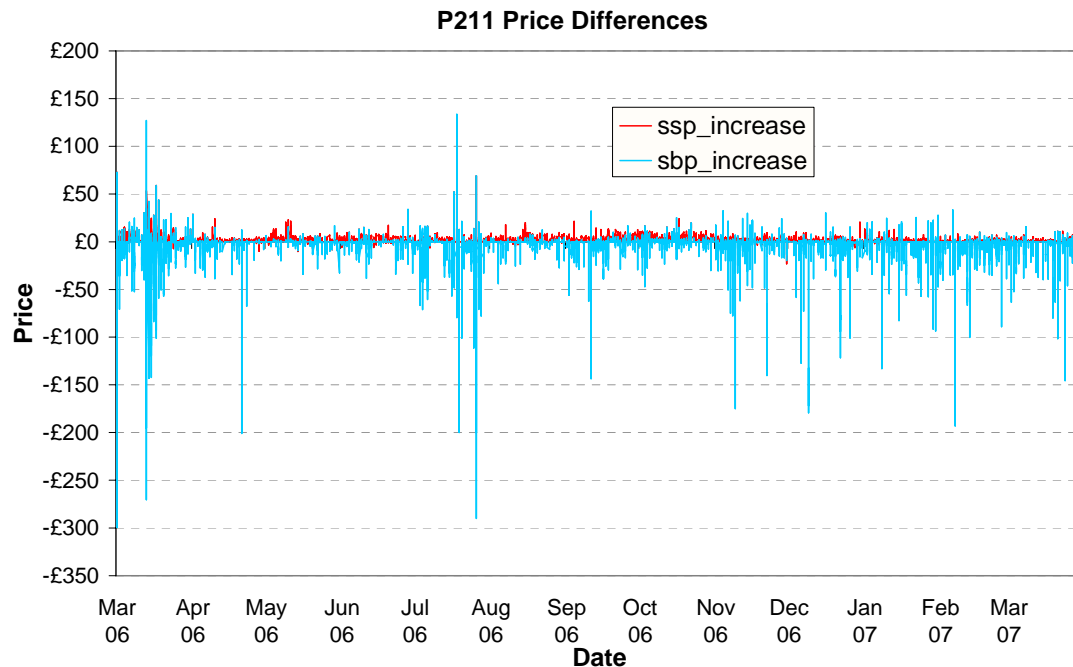


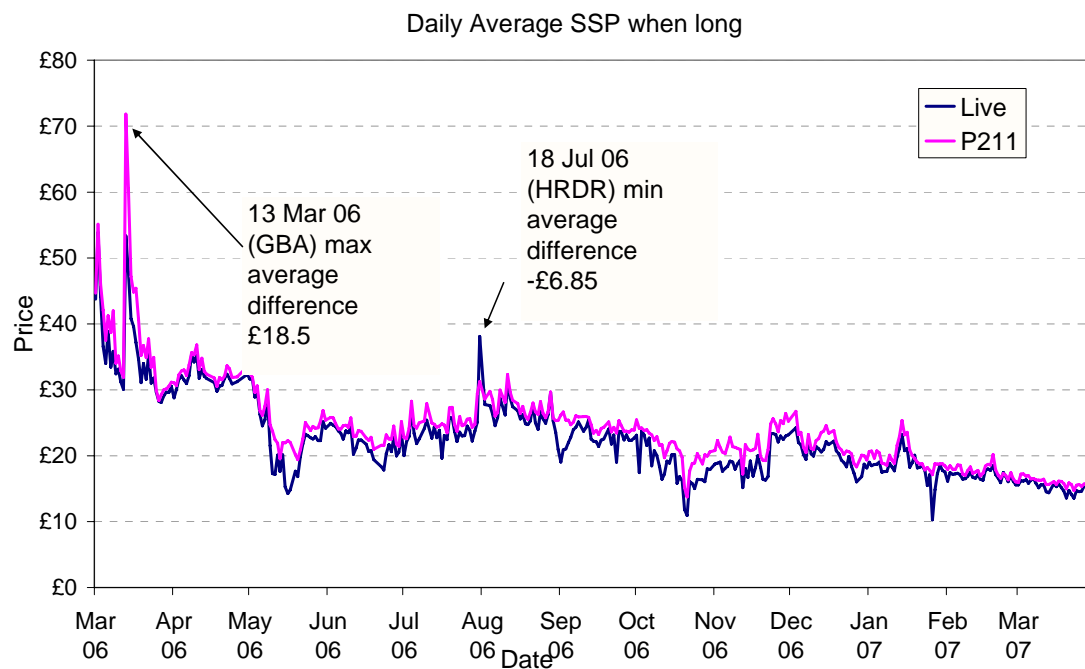
Figure 4 shows the price difference between the P211 price and the live price. The calculation is **P211** main Energy Imbalance Price less the **live** main Energy Imbalance Price.

**Figure 4. P211 and Live Price differences – All Settlement Periods - 1 March 2006 to 31 March 2007**

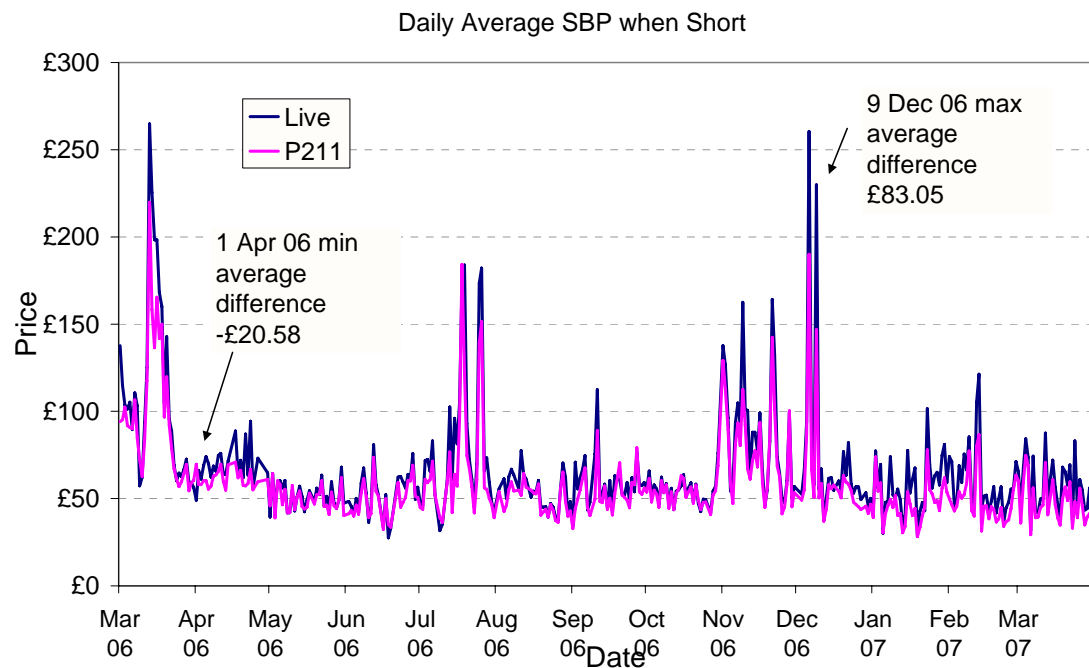


Daily average prices are presented in Figures 5 to 7.

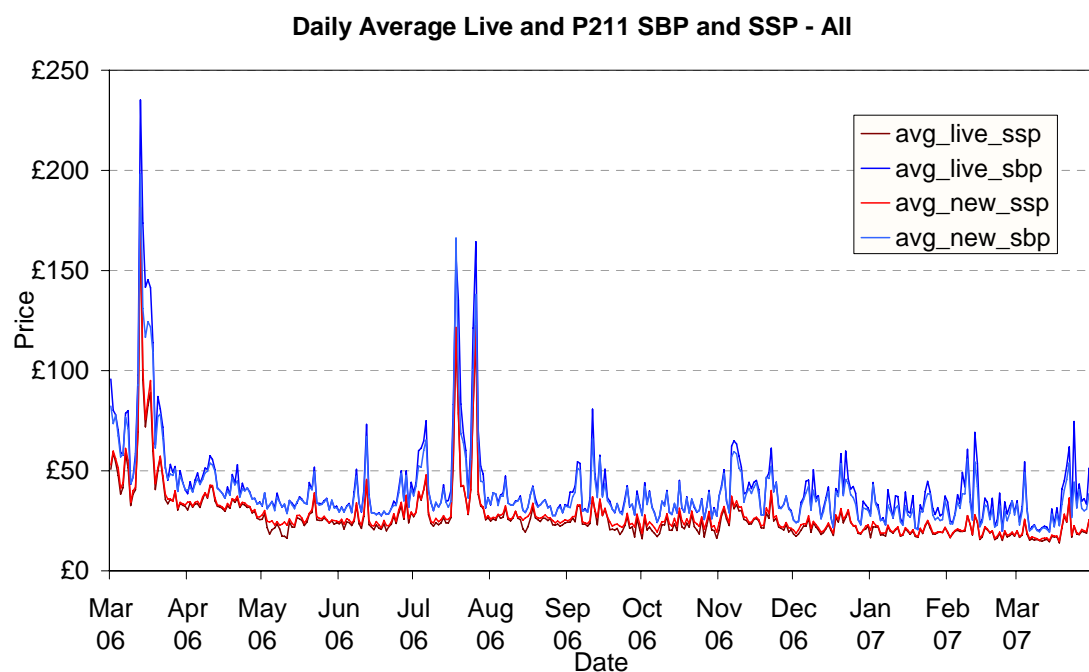
**Figure 5. Daily average SBP when short – 1 March 2006 to 31 March 2007**



**Figure 6. Daily average SSP when long – 1 March 2006 to 31 March 2007**

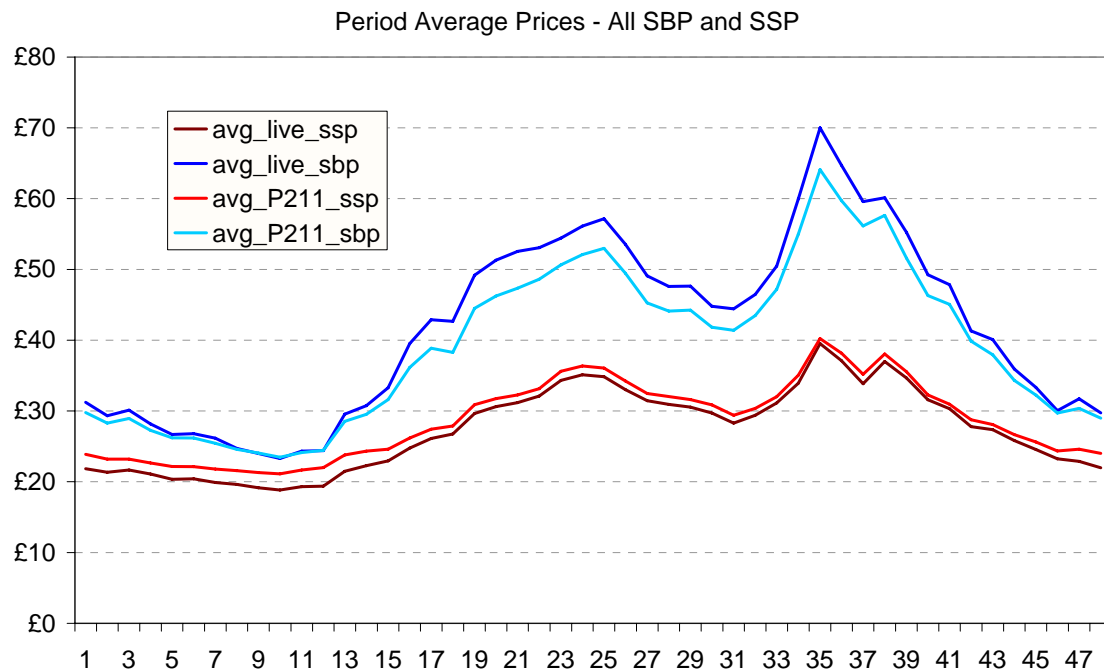


**Figure 7. Daily average – all prices - 1 March 2006 to 31 March 2007**

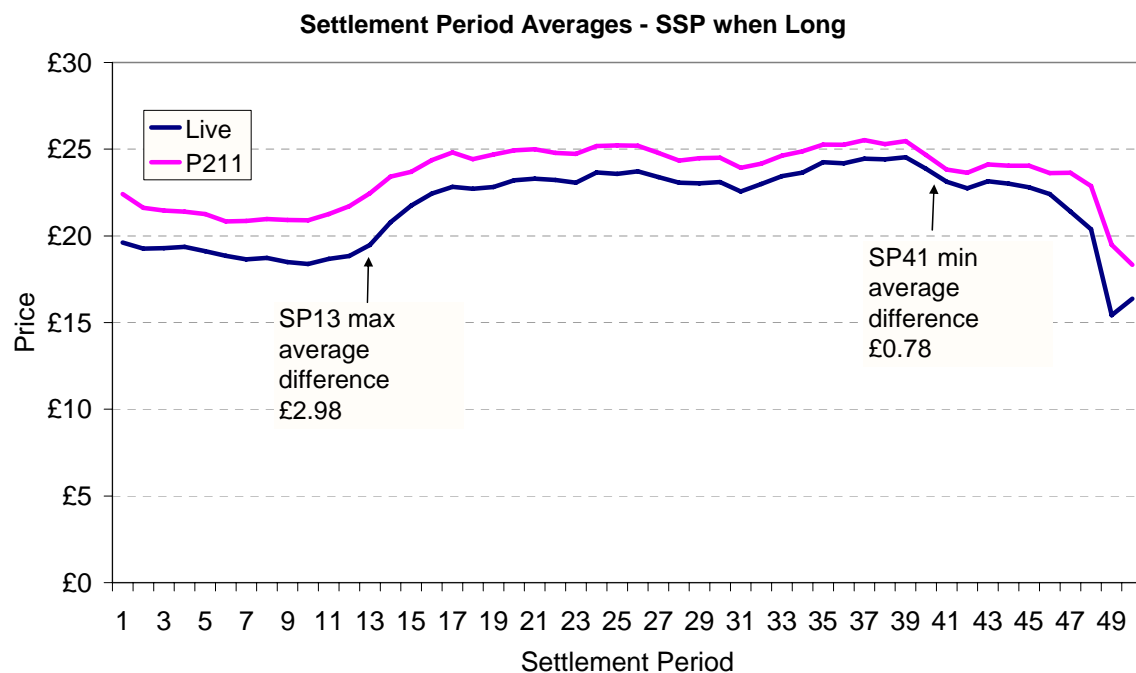


Figures 8 to 12 show the period averages, first for the full period 1 March 2006 to 31 March 2007 and then for the period 2 November 2006 to 31 March 2007 in which PAR500 was the live price.

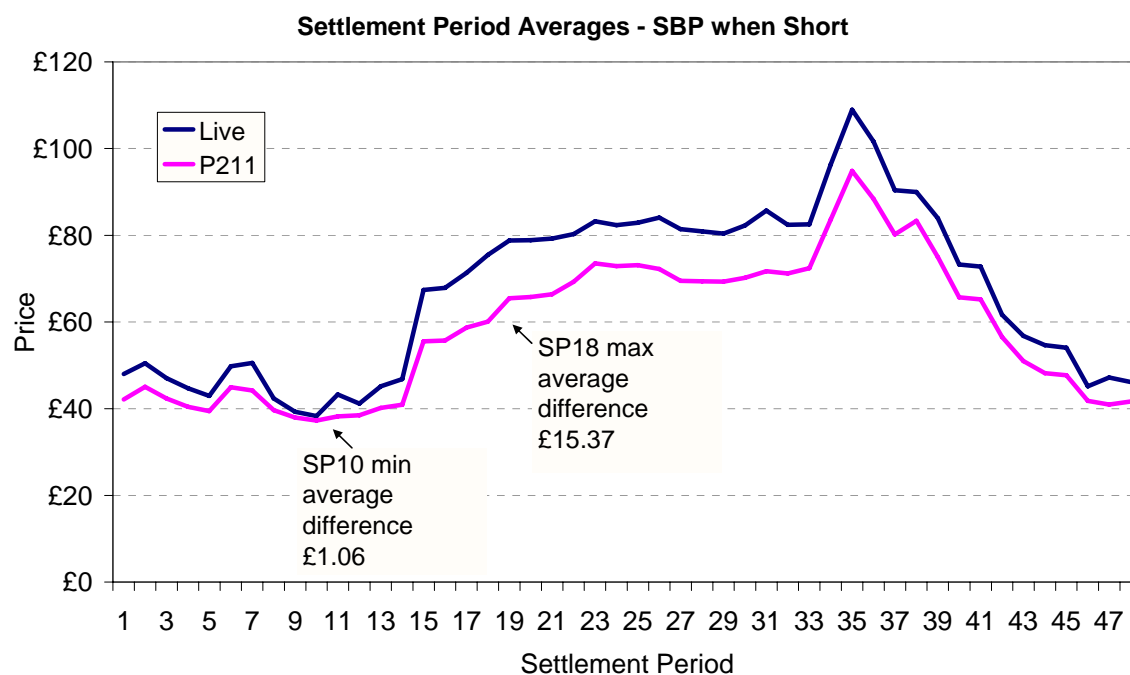
**Figure 8. Period average – all prices - 1 March 2006 to 31 March 2007**



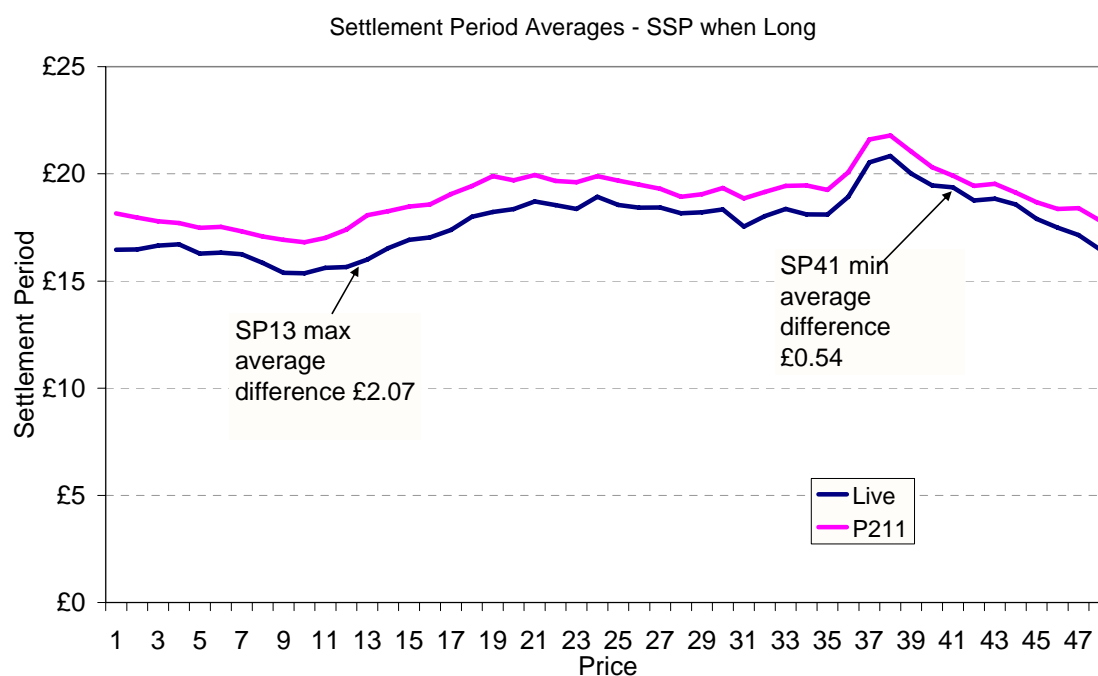
**Figure 9. Period average – SSP when long - 1 March 2006 to 31 March 2007**



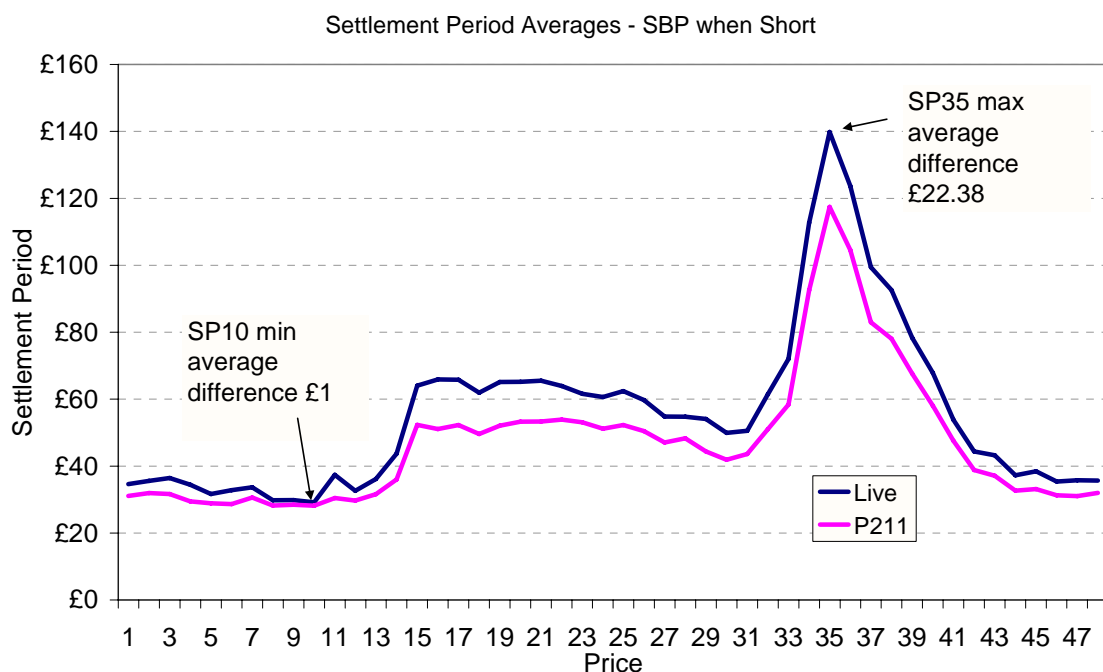
**Figure 10. Period average – SBP when short - 1 March 2006 to 31 March 2007**



**Figure 11. Period average – SSP when long – 2 November 2006 to 31 March 2007**



**Figure 12. Period average – SBP when short – 2 November 2006 to 31 March 2007**

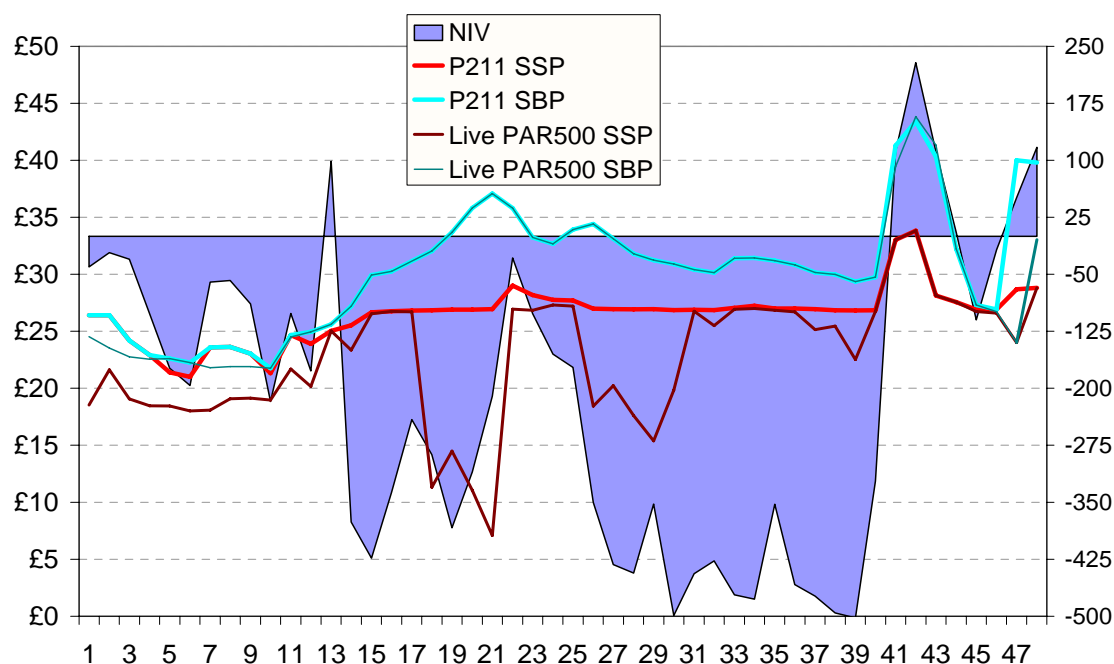


The Proposer notes that Figure 12 shows that the P211 proposed prices do rise over the system peak when the system is short.

Figures 13 to 19 look at individual days. First, 2 September 2005, and 18-20 October 2005 in which the Cheviot Constraint was binding. Then 29 December 2005, 13 March 2006 and 18 July 2006 which were days of system stress.

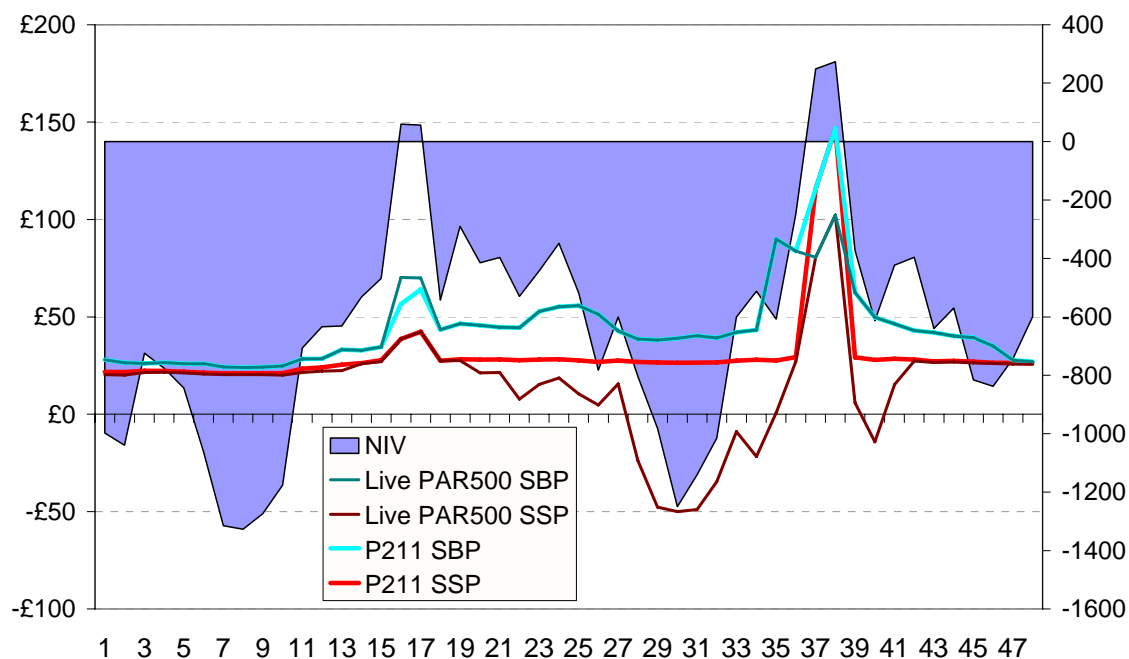
The graphs plot the P211 recalculated SBP and SSP against the live price adjusted to represent a PAR500 price. The level of NIV is also included on the graph to indicate the length of the system and therefore which of SBP or SSP is the main price.

**Figure 13. 2 September 2005 – Cheviot constraint**

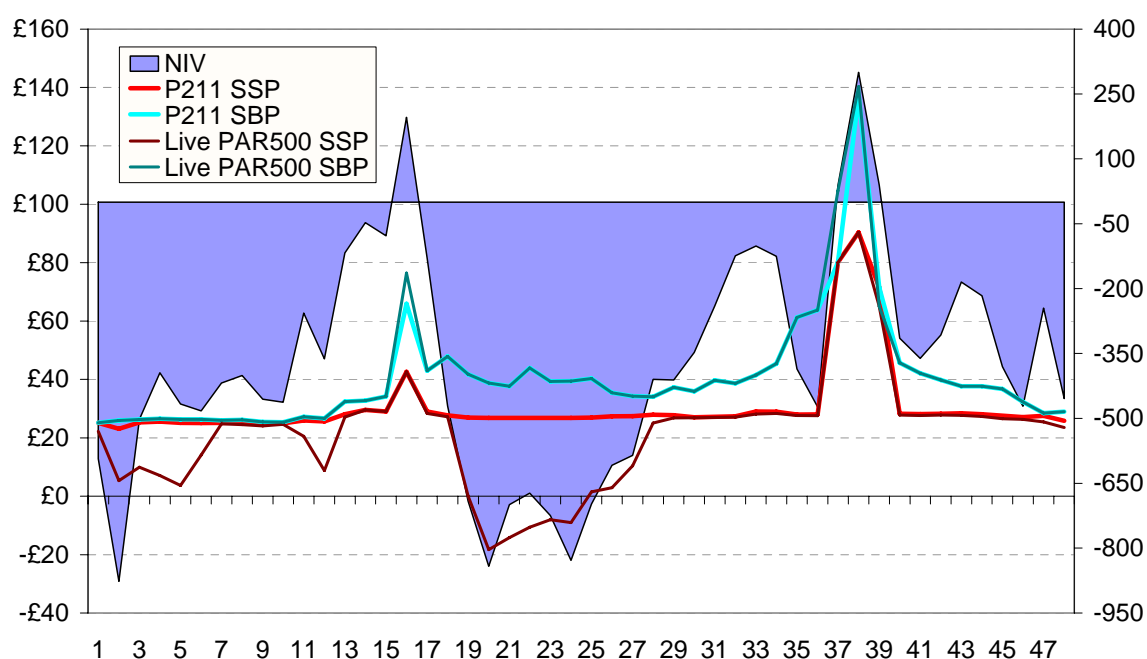




**Figure 14. 18 October 2005 – Cheviot constraint**

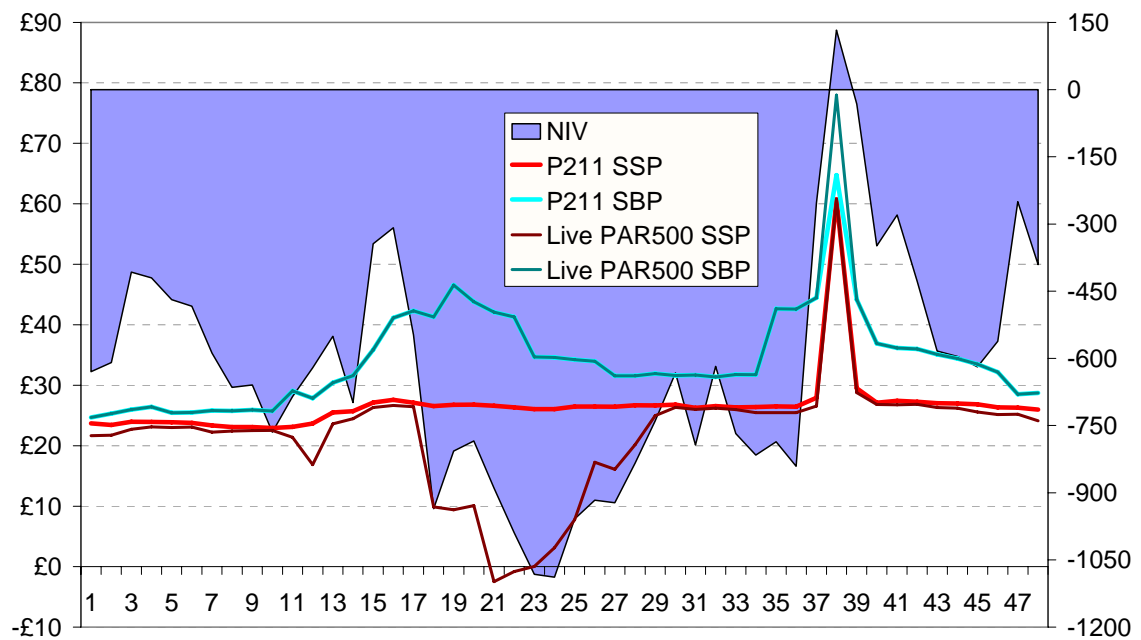


**Figure 15. 19 October 2005 – Cheviot constraint**

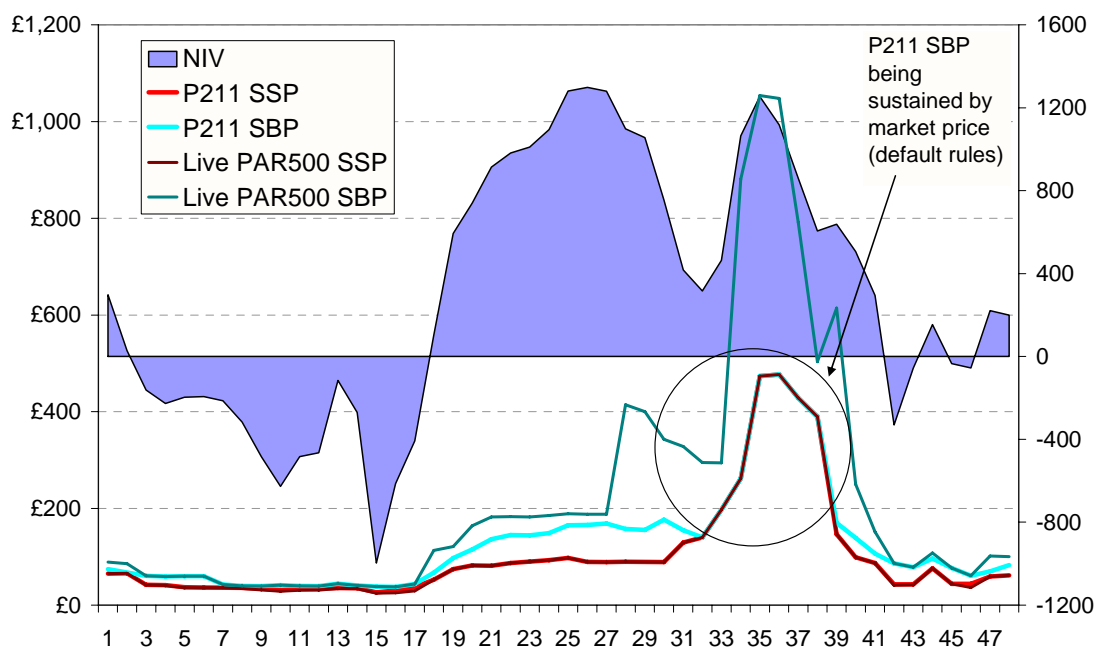


The Proposer notes that the EPUS clearly removes the impact of the Cheviot constraints and provides a more appropriate signal. Also prices in a number of periods on all four of the days with Cheviot constraints analysed are not that different from the live PAR500 price indicating that the inclusion of dynamics would not have a great impact on the EPUS price in those periods.

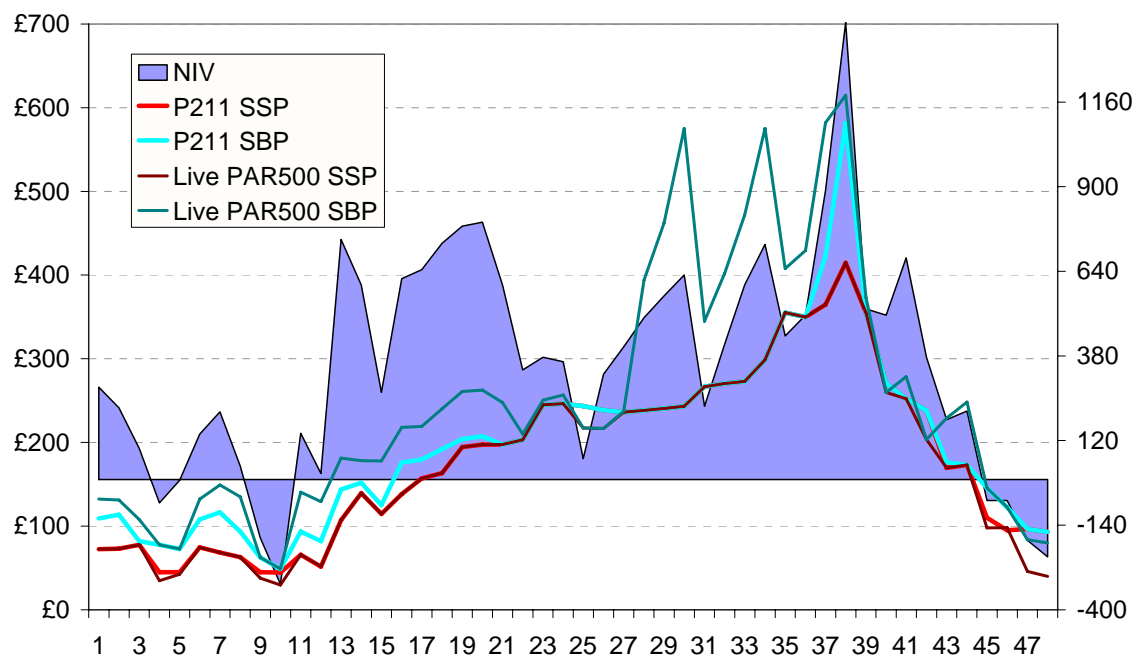
**Figure 16. 20 October 2005 – Cheviot constraint**



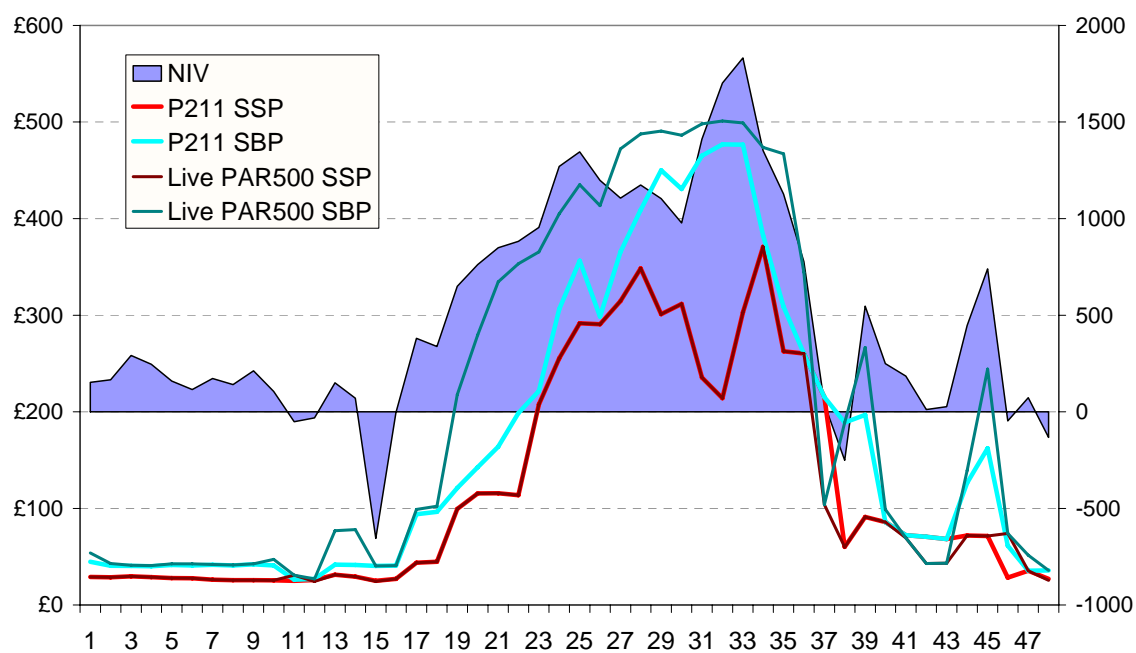
**Figure 17. 29 December 2005 – Notice of Inadequate System Margin (NISM)**



**Figure 18. 13 March 2006 – Gas Balancing Alert (GBA)**



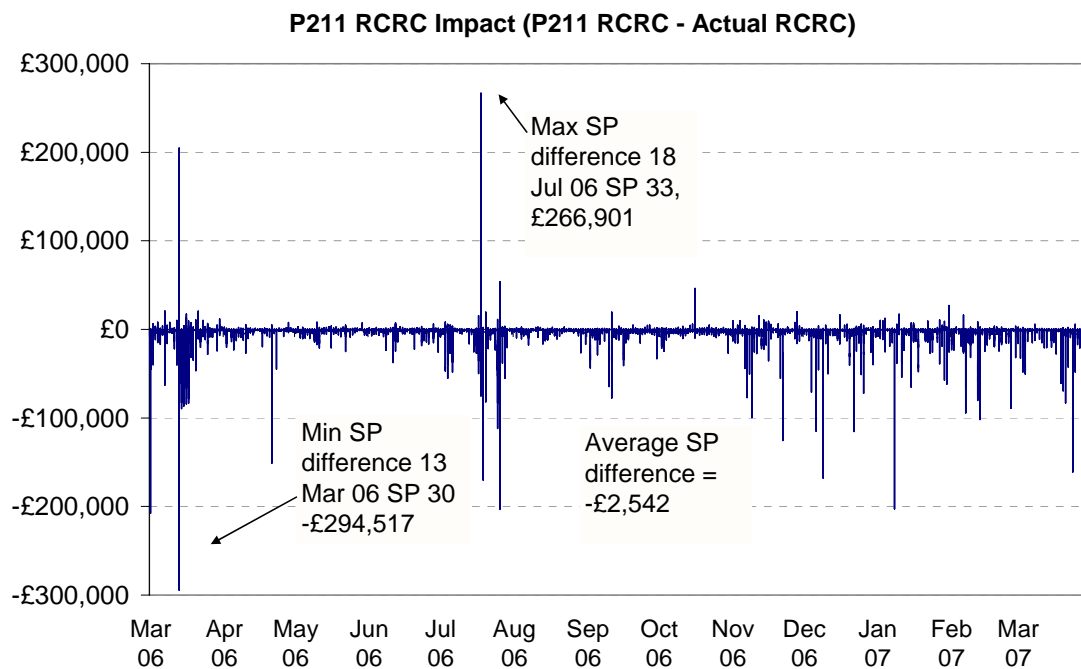
**Figure 19. 18 July 2006 – High Risk of Demand Reduction (HRDR)**



### 3. Residual Cashflow Reallocation Cashflow (RCRC)

RCRC was recalculated based on the P211 Proposed solution prices and these can be seen in Figure 20 below. The graph shows that RCRC under the P211 Proposed was, on average, significantly lower than the historic RCRC. For the entire period 1 March 2006 to 31 March 2007, the P211 recalculated RCRC would have been £48m less than the actual historic RCRC. The largest decrease in an individual Settlement Period was £295,000 (SP30 on 13 March 2006) with the largest increase being £267,000 (SP33 on 18 July 2006).

**Figure 20. RCRC impact – All Settlement Periods – 1 March 2006 to 31 March 2007**



### (FORMER) POTENTIAL ALTERNATIVE (i.e. with RULE 2a)

In the time available only a limited amount of analysis has been able to be performed based on the P211 Alternative Requirement Specification. The Requirement Specification contains only Rule 2a as described in the P211 Consultation document. As a result of the analysis below the Group agreed that the potential Alternative should be revised based on replacing Rule 2a with Rule 2b (section 2.3 of the consultation).

The results produced below have the following caveats:

- Rule 4 has not been applied;
- Rule 6 has not been applied (Latest period MEL available has been used); and
- The modelling has not been subject to thorough testing and verification.

Note that applying Rules 4 and 6 would exclude further volumes from the DAOV and DABV stacks and lead to either similar or higher SBP than those represented below (or similar or lower SSP than those represented below).

Figures 21 to 23 show the Cheviot constraint days whilst Figures 24 to 28 show the prices on the days of system stress. All graphs plot the P211 Alt prices against the P211 Proposed prices and the live PAR500 prices.

**Figure 21. 18 October 2005 –Cheviot constraint**

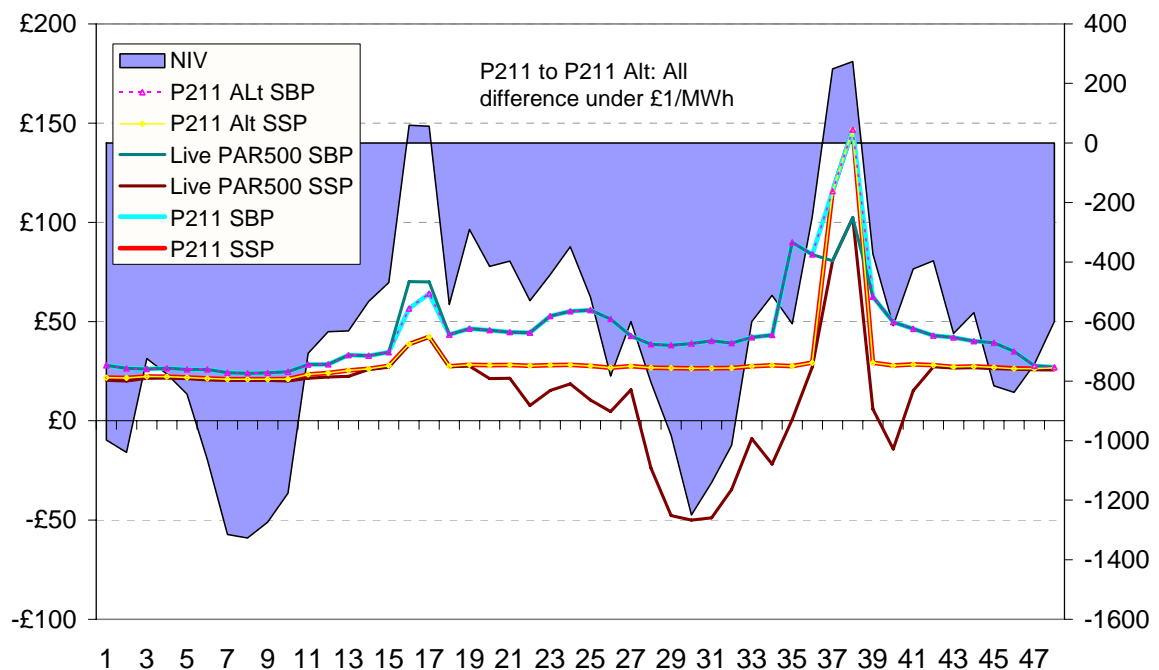


Figure 22. 19 October 2005 – Cheviot constraint

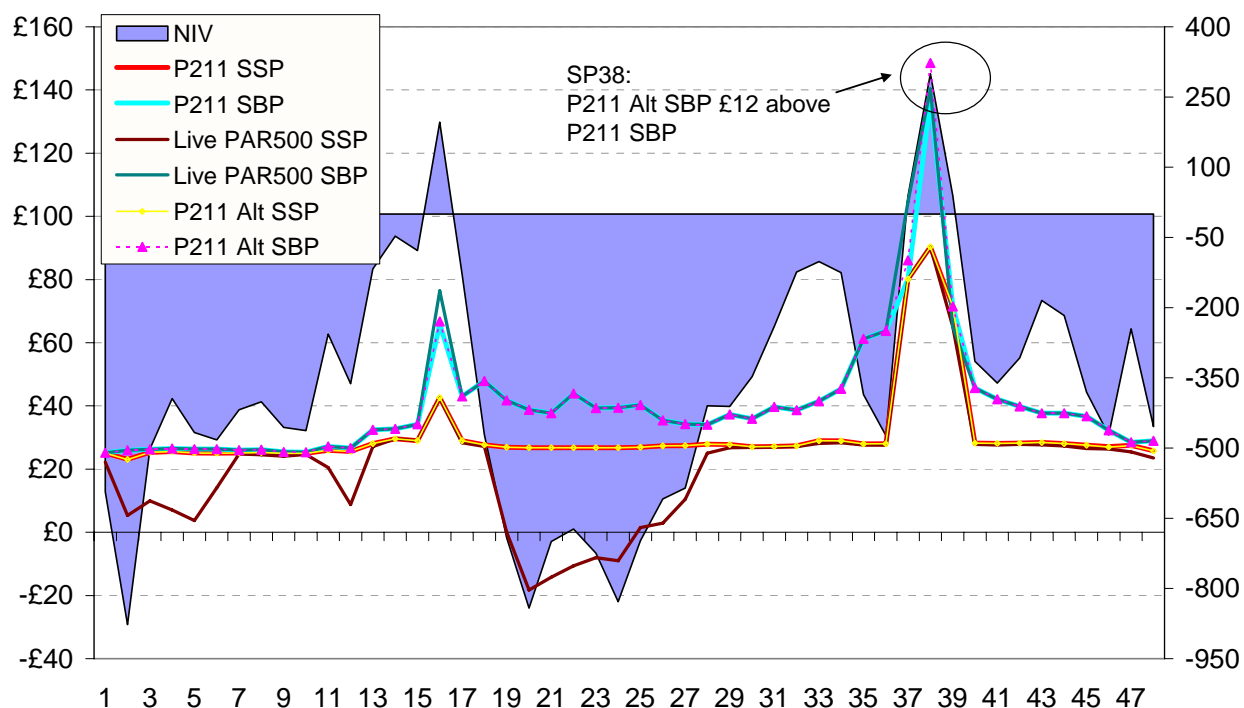


Figure 23. 20 October 2005 – Cheviot constraint

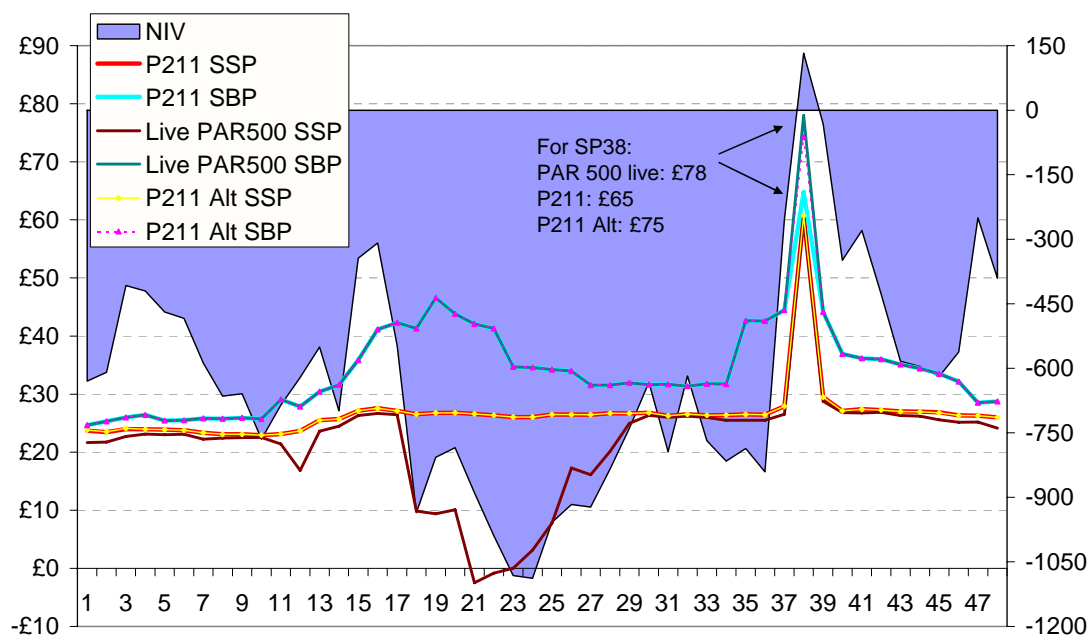


Figure 24. 29 December 2005 – NISM

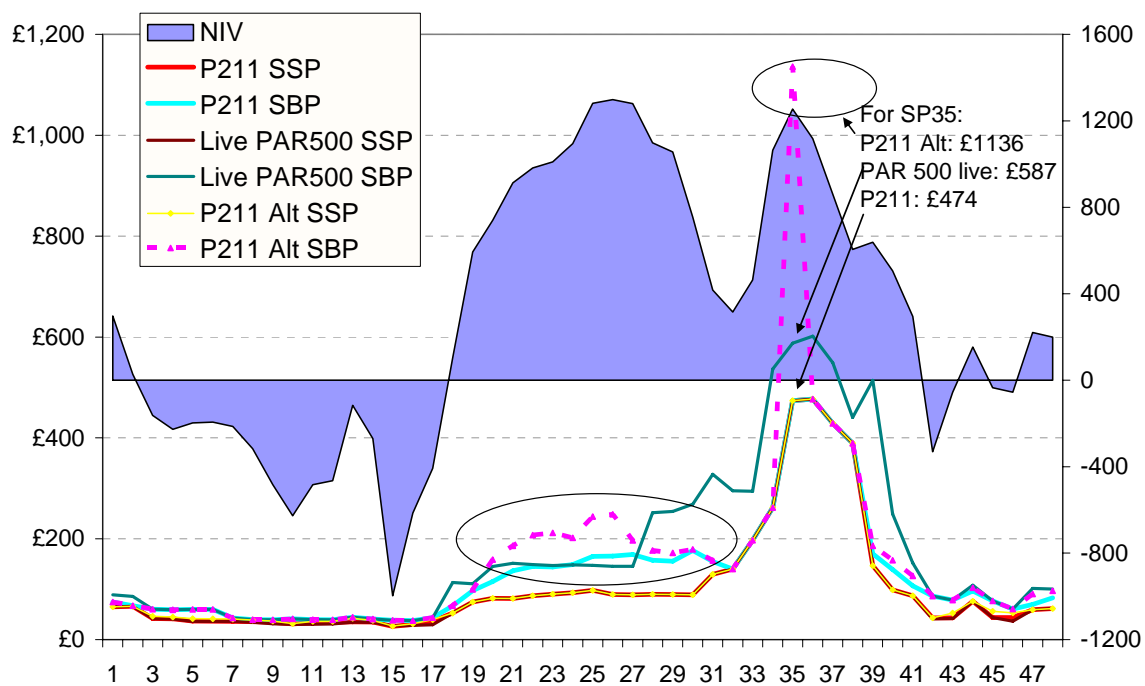
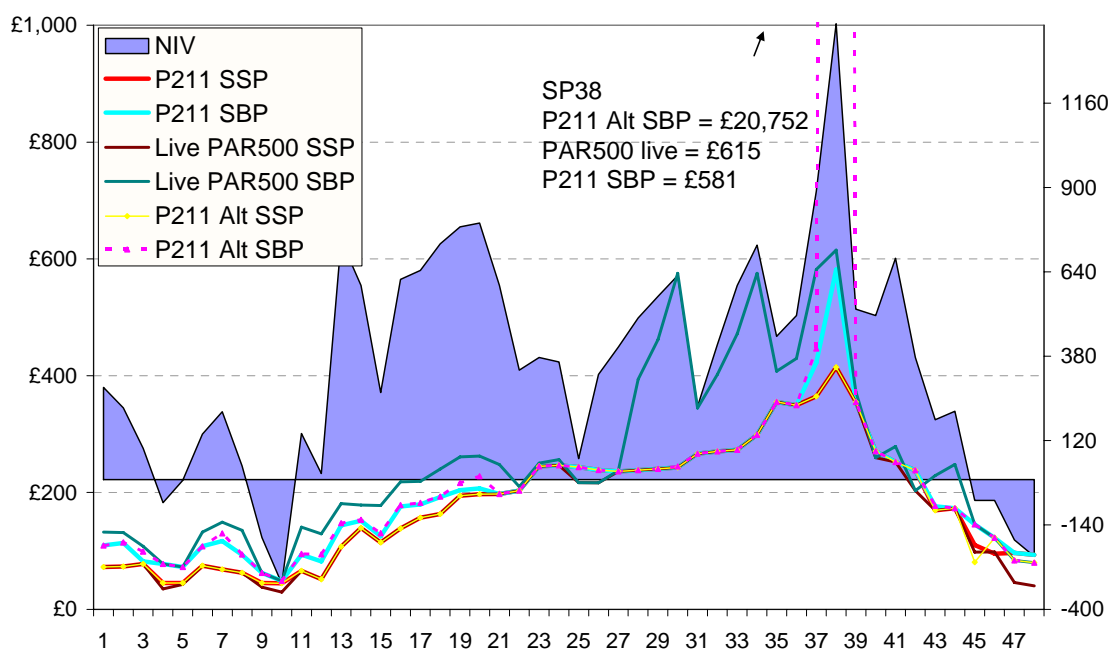
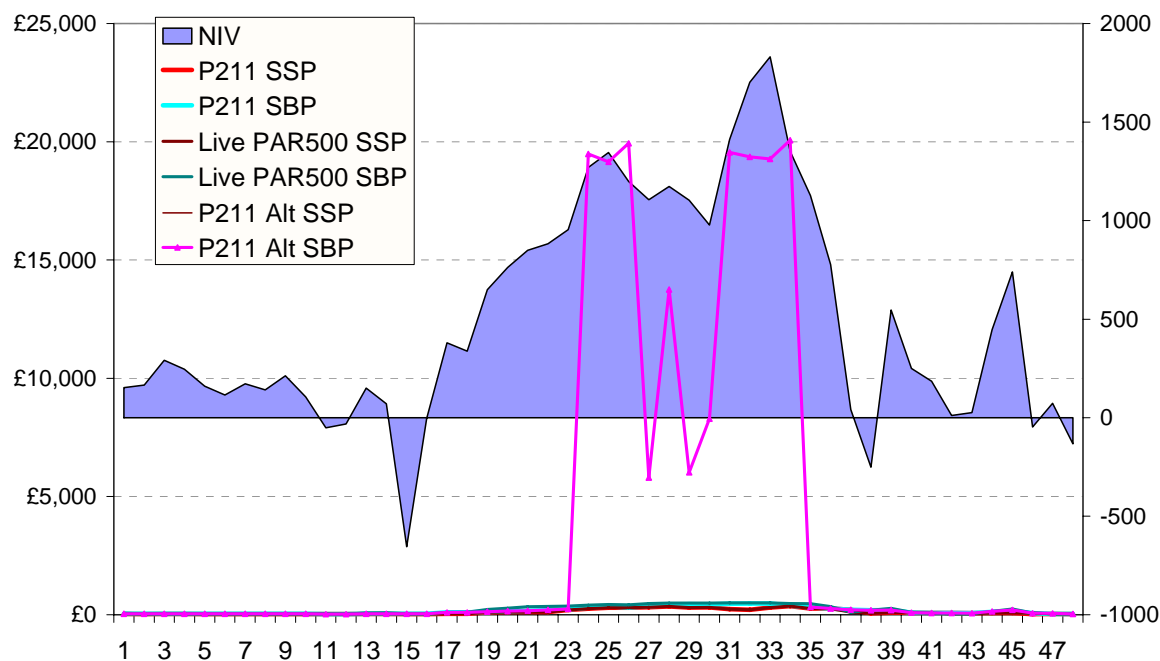


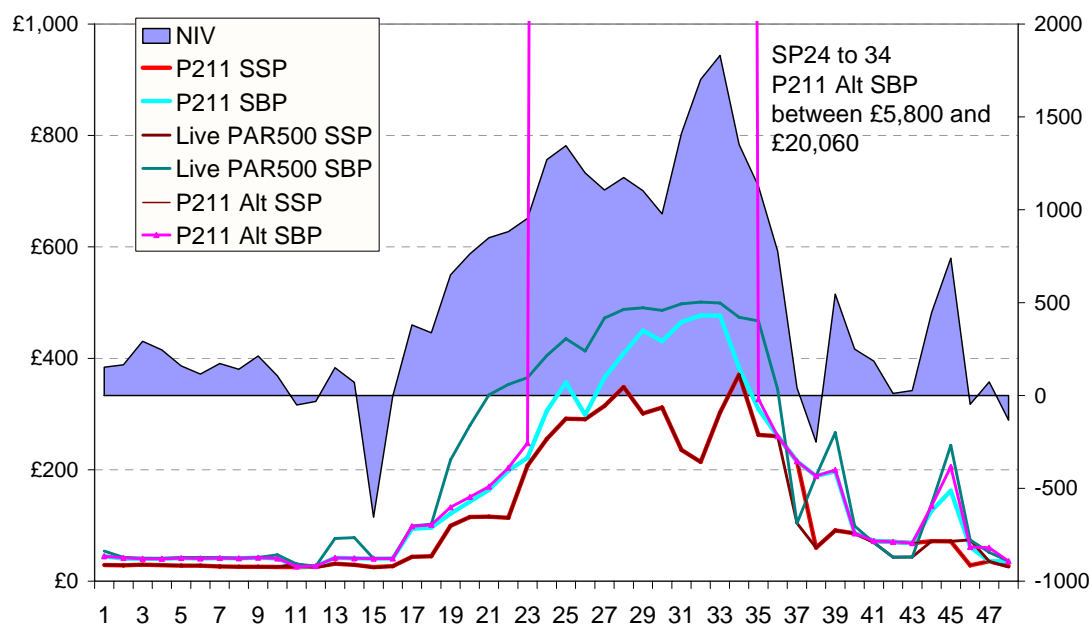
Figure 25. 13 March 2006 – GBA



**Figure 26. 18 July 2006 – HRDR**



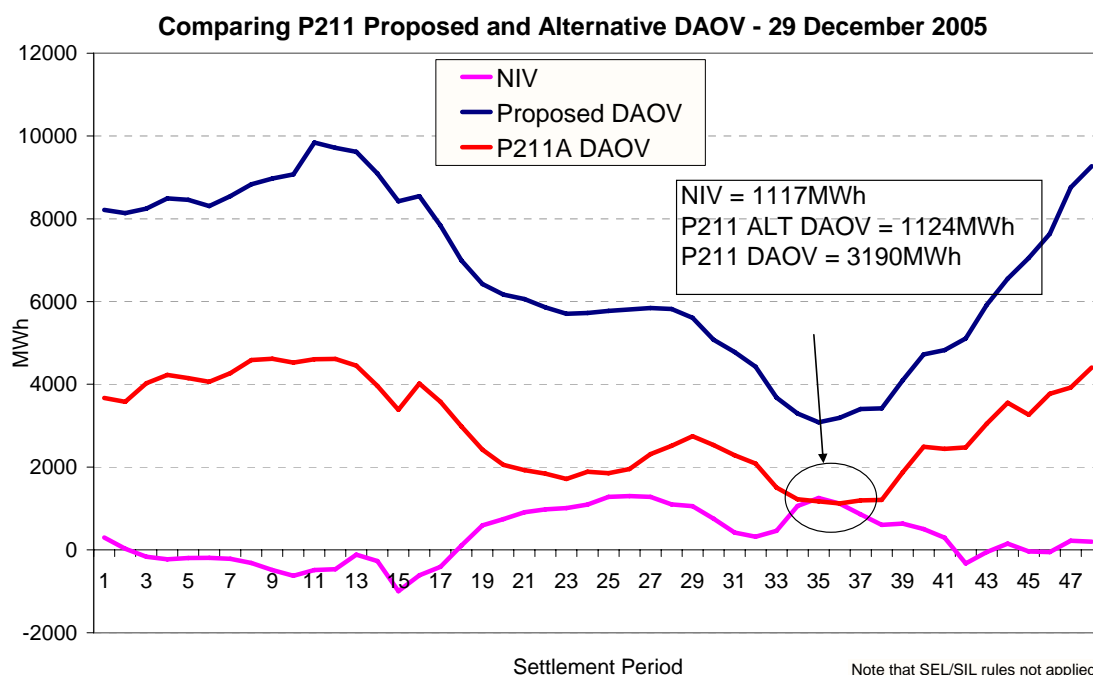
**Figure 27. 18 July 2006 – HRDR Zoomed**



The Group noted that such spurious results as in Settlement Period (SP) 35 on 29 December 2005, SP 38 on 13 March 2006 and SPs 24 to 34 on 18 July 2006 highlighted a flaw in the rules developed for the potential alternative (with Rule 2a). On investigation into the 29 December the Group noted that Rule 2a was removing too much from the DAOV stack. The DAOV stack plotted against NIV is shown in Figure 28 below (With DABV in Figure 29 for information).



**Figure 28. 29 December 2005 DAOV stack**



The Group noted that in SP 35 on 29 December 2005 the potential Alternative solution with rule 2a excluded too much volume from the DAOV stack and that this did not reflect the volumes available to the SO. Figure 28 shows that there was only 7MWh between NIV and the DAOV stack under this potential Alternative with Rule 2a.

For example, there was a BMU with an NDZ of 85 minutes and a FPN of zero. Therefore Rule 2a means that the potential Alternative solution would model this BMU as being at 0MWh until 5 minutes before the end of the Settlement Period (Gate closure plus the 85 minutes in the NDZ). At 5 minutes before the end of the Settlement Period this unit would be modelled as starting its ramp up thus only a small portion (1.5MWh) was included in the DAOV stack.

In reality the unit had already been accepted by the SO well in advance of 5 minutes before the end of the Settlement Period and had already ramped up to an acceptance of 127MWh. However as this was excluded from the DAOV stack by Rule 2a this resulted in the very high prices.

Although the Group was not presented with evidence, such an explanation was also assumed to be responsible for at least a portion of the high prices on 13 March and 18 July 2006.

As Rule 2a was too restrictive, the Group chose to relax this to that in Rule 2b. Price analysis for the Alternative with Rule 2b will be provided on 17 August 2007.

Figure 29. 29 December 2005 DABV stack

