

**Report Covering  
November 2009 to April 2010**

**Report on the Accuracy of  
the System  
Management Action  
Flagging Methodology**

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## Executive Summary

P217A – Revised Tagging Process and Calculation of Cash Out Prices was raised by RWE Npower in October 2007 and implemented in November 2009. The modification aims to remove pollution from the imbalance price caused by actions taken to resolve transmission constraints. Under this modification the System Operator would determine what actions were taken to resolve constraints and flag these actions. These flags would be sent to the BSC Systems and used in the imbalance price calculation methodology.

National Grid developed a System Management Action Flagging Methodology Statement (SMAF) that outlined the methodology used by the System Operator in determining what actions should be flagged as constraints.

To ensure that the flagging methodology is operating as intended, National Grid committed to produce a report after the first six months, and thereafter on an annual basis, looking at the accuracy of the methodology and considering any materiality. This is the first such report.

This report finds that under the current process the spirit of the Balancing Settlement Code (BSC) is being observed and in almost all cases the P217A flagging methodology is being correctly applied with less than 2.6% of overall actions potentially incorrectly flagged.

The report also finds that although the present Flagging Accuracy Review Process (cross-referencing with BSIS assessment) gives indicative result it is felt desirable to put in place a more robust assessment process.

The analysis performed indicates that while there may have been some inaccuracy on the flagging of constraint actions, these inaccuracies have a limited impact on imbalance prices.

If you have any comments or queries on this report, please contact National Grid using the email address below:

[balancingservices@uk.ngrid.com](mailto:balancingservices@uk.ngrid.com)

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*This section provides an introduction as to the rationale behind the development of this report.*

### **1.1. Purpose of the report**

Under the SMAF Methodology Statement, National Grid is required to report on the accuracy of the flagging methodology 6 months after implementation and thereafter, on an annual basis. This is the first report, spanning the first 6 months of P217A operation and National Grid's flagging of constraint actions (5<sup>th</sup> November 2009 – 30<sup>th</sup> April 2010).

This report considers the accuracy of the flagging methodology and the impact of inaccuracies on imbalance prices.

It is hoped that this report will provide confidence to the industry that the methodology employed by National Grid is fit for purpose, as the majority of pollution within the imbalance price calculation caused by transmission constraints has been removed.

This report does not consider the detailed workings of P217A imbalance price calculation and whether the P217A modification is operating as intended. The impact analysis performed in this report does not consider the impact on imbalance prices of actions flagged as resolving a constraint that are placed back into the imbalance price calculation stack (because they were cheaper than other actions taken that were not flagged as resolving a constraint), and actions that are flagged as resolving constraint and remain out of the price stack.

### **1.2. P217A**

P217A was raised by RWE in October 2007 and sought to remove pollution from cash out caused by Bid Offer Acceptances (BOAs) taken to resolve Transmission constraints. To achieve this, the modification required a methodology to identify those BOAs taken for transmission constraint management. National Grid subsequently developed and agreed with the industry through the P217A modification group, the methodology in principle, and also with the Authority through the approval of the P217A modification. The detailed methodology was later agreed with the Authority after development and consultation of the SMAF Methodology Statement.

In summary, P217A brought in the following changes;

- Introduction of a new stage – Classification, which is the assessment of SO-Flagged and Continuous Duration Acceptance Limit (CADL) flagged balancing service actions against the most expensive energy balancing service action in the settlement period
- Disaggregation of the Balancing Service Adjustment Data into the individual balancing services

- Introduction of Replacement Price Averaging Reference Price (RPAR), method for calculating a new price for an out of merit (classification phase determination) SO-Flagged balancing service from the in merit actions

The change in the imbalance price mechanism (together with National Grid's determination of SO-Flagged actions) is designed to ensure that expensive actions taken for reasons other than residual balancing do not contribute to the imbalance price calculation.

### **1.3. P217A Flagging**

From the 5<sup>th</sup> November, under the Balancing Settlement Code (BSC) section Q5.3.1(d) and section Q6.3.2(b) National Grid is required to assess whether balancing services taken, were at least in part due to reasons other than residual energy balancing. National Grid fulfils this obligation in accordance with paragraph 6A under Standard Condition C16 of National Grid's Transmission License. Any action National Grid identifies as being taken for any reason other than residual energy balancing is SO-Flagged.

This information is then sent to the BSC Systems who then determine the cash prices using the P217A cash out price methodology.

## Section 2

# Methodology for Analysing Flagging Accuracy

*This section provides an overview of the assessment methodology used in determining the accuracy of P217A flags.*

### **2.1. Outline of the Flagging Process**

As mentioned above National Grid was tasked with developing a methodology to identify actions taken to resolve transmission constraints. National Grid developed the SMAF methodology based on the following principles;

- A solution designed to integrate into National Grid existing processes
- A cost effective solution
- A solution that minimises the demands upon the National Grid Control Engineers - i.e; the methodology should not materially impact the Engineers in managing the integrity of the network and meeting the residual energy balancing needs
- A mechanistic solution that has limited subjectivity in its application
- A solution to capture actions that would have an impact upon the imbalance price

The full description of the flagging methodology is detailed within the SMAF Methodology Statement<sup>1</sup>.

In summary, in consideration of the principles set out above, National Grid identifies specific Balancing Mechanism Units (BMUs) that, in the event of an active transmission constraint, would be utilised to resolve a constraint. Those identified BMUs are flagged by the National Grid Control Room in real time and any subsequent actions taken (while the unit is flagged) will be flagged as being taken as resolving a constraint. When the Control Room is satisfied that the transmission constraint is no longer active, the BMUs are de-flagged and therefore, any actions taken thereafter are not flagged as resolving a constraint.

### **2.2. Post Event Accuracy Assessment Process**

To assess the accuracy of the Control Room Flagging process, National Grid uses a number of different processes to identify potential periods where errors may have occurred. Below we outline the 3 main processes used in determining the accuracy.

#### **2.2.1. Data Inquiry report**

P217A flags are set in real time by the Control Room. In the event that the Control Room become aware that the flagging of constraint BOAs is incorrect (either over

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<sup>1</sup> [http://www.nationalgrid.com/NR/ronlyres/4945D234-247E-4C56-B0C4-B552A047C1E9/38314/SMAF\\_Review1.pdf](http://www.nationalgrid.com/NR/ronlyres/4945D234-247E-4C56-B0C4-B552A047C1E9/38314/SMAF_Review1.pdf)

flagged i.e. too many actions are flagged as being taken for constraints or under flagged where not enough BOAs have been flagged as being taken for constraints) the Control Room can raise a Data Inquiry report (DIR) to note the discrepancy. 53 DIRs were raised by the Control Room over the review period.

#### 2.2.2. Post Event Cross Reference

Since the introduction of flagging in November 2009, a procedure has been in place to review the accuracy of flags. The current process works by cross-checking the units identified by P217A flags against the manual process for allocation of Constraint Costs undertaken for BSIS reporting ('SUPERBAAR Constraint Cost Tagging'). Any apparent differences are then reviewed.

The system of SUPERBAAR Constraint Cost Tagging has been in place for 4 years as a methodology used within the Balancing Services Incentive Scheme (BSIS) (as outlined in our mini consultation on constraints published on 9 September 2009<sup>2</sup>). This process keeps track of any additional costs associated with constraint actions above those for energy balancing. 'SUPERBAAR Constraint Cost Tagging' is a manually led process in which an operative uses pre-event planning data, management reports and system data to identify and assign BMU actions, trades etc. that are attributable to management of system constraints, on a half-hour period-by-period basis. It would be expected that a high correlation exists between the actions identified by P217A flagging methodology and those actions allocated using the 'SUPERBAAR Constraint Cost Tagging' process. The SUPERBAAR process is usually done on a day+1 basis (may be up to day +4 around public holidays). Any major differences in the BOA actions that have been flagged become apparent at that time. These differences are then discussed with the Control Room to better determine the correct flags.

It should also be noted that differences between the two mechanisms exist due to the different criteria that apply for flagging under SMAF and tagging under BSIS SUPERBAAR, in particular relating the treatment of actions that resolve both constraint and margin issues, these being flagged under P217A but not seen as an additional cost under BSIS as they were required for margin; in which case they would carry a P217A flag but no SUPERBAAR tag.

#### 2.2.3. Post Event Periodic Review

A period-by-period analysis of P217A performance is done on a regular basis in which P217A flagging & SUPERBAAR tagging is cross-matched so as to give an indication of incorrect, under/ over-tagging and missing tagging issues. This picks up on any data which may have been missing or late at the time of the Post Event Cross Reference 2.2.2 above.

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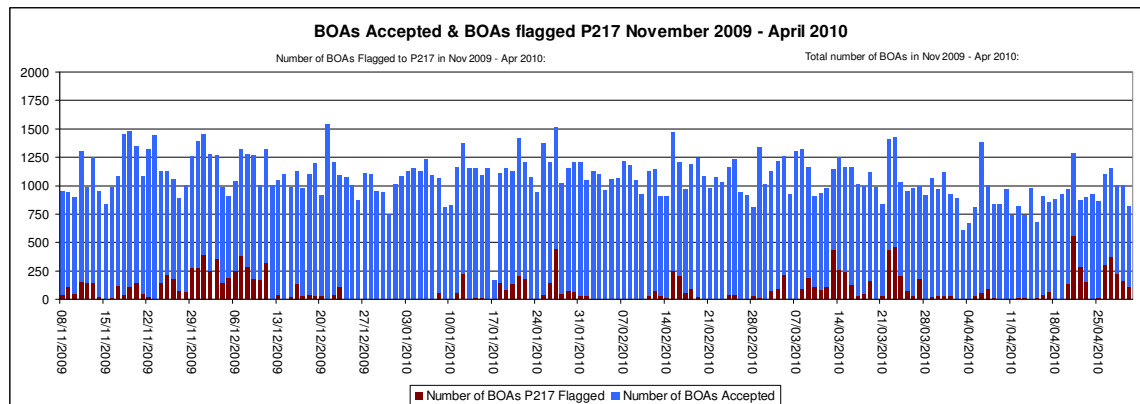
<sup>2</sup> <http://www.nationalgrid.com/NR/ronlyres/5BCE1A3B-D7BC-4F1B-8DFF-68B6162643DA/36862/NGETSystemOperatorIncentivesfor1April2010Consultat.pdf>

## Section 3 Flagging Accuracy

### 3.1 Overall Statistics

During the first six months of P217A flagging, 15,345 BOAs were flagged under the P217A criteria out of the total 188,459 BOAs accepted equating to approximately 8% of the total actions. The distribution of these actions are tabulated and charted below. The number of half-hour periods in the six-month review was 8,640, of which 3,249 periods had BOA actions that were P217A flagged (38%).

<b>Month</b>	<b>Number of BOAs P217A Flagged</b>	<b>Total Number of BOAs</b>	<b>% Flagged to P217</b>
Nov-09	2,463	28,201	8.73%
Dec-09	3,417	34,236	9.98%
Jan-10	1,997	34,519	5.79%
Feb-10	931	30,137	3.09%
Mar-10	3,819	34,016	11.23%
Apr-10	2,718	27,350	9.94%
Number of BOAs Flagged to P217 in Nov 2009 - Apr 2010:	15,345		8.14%
All BOAs accepted		188,459	



The above chart illustrates the days in which actions were P217A flagged. The flagged actions are shown in brown with the overall count of actions shown in blue. It can be seen that constraint actions generally occur across a number of days due to the constraint being active over an outage period that may last for a week or possibly longer. The small volume of BOAs seen on 17/01/2010 is due to data missing for this period.

### 3.2 Assessment of P217A Flagging Accuracy

Using the methodology of the Post Event Periodic Review that cross-references the P217A flagging against the BSIS SUPERBAAR constraint cost tagging process (see section 2 above), we have derived the following possible outcomes:

1. 'Energy' – Periods where there was no P217A flagging or actions tagged under the BSIS SUPERBAAR process.

2. BOA.Period actions that tally under both P217A flagging and the BSIS SUPERBAAR tagging process (Constraint actions)
3. BOA.Period action where P217A flags have no corresponding SUPERBAAR tag (legitimate system/margin actions with both P217A flags and SUPERBAAR tags correctly set, or possible P217A over-flagging of actions or SUPERBAAR under-tagging)
4. BOA.Period actions tagged by SUPERBAAR but with no P217A flag (Possible P217A under-flagging / SUPERBAAR over-tagging)

'BOA.Period actions' are defined as a BOA, which may spread over several half hour periods, and the periods that they affect. The cross-reference of these under the P217A mechanism and the BSIS constraint tagging mechanism over the six month review period gives the results tabulated below:

Summary of BOA.Period action Flagging Nov 2009 - Apr 2010	Totals	As % of all BOA.Period Actions	As % of BOA.Periods Flagged or Tagged
Number of BOA.Period Actions	377,574	100.00%	-
BOA.Period actions assigned to Energy (not P217A 'system' nor SUPERBAAR 'constraint')	335,376	88.82%	-
BOA.Period actions that tally under both P217A flagging and the BSIS SUPERBAAR tagging process (Constraint actions)	32,338	8.56%	76.63%
BOA.Period action with P217A flags, SUPERBAAR tag (legitimate system/margin/possible P217A over-flagging/SUPERBAAR under-tagging)	6,083	1.61%	14.42%
BOA.Period actions tagged by SUPERBAAR but with no P217A flag (Possible P217A under-flagging / SUPERBAAR over-tagging)	3,777	1.00%	8.95%
Total BOA.Periods with P217A Flag or SUPERBAAR tag (Flagged or Tagged)	42,198	12.58%	100.00%

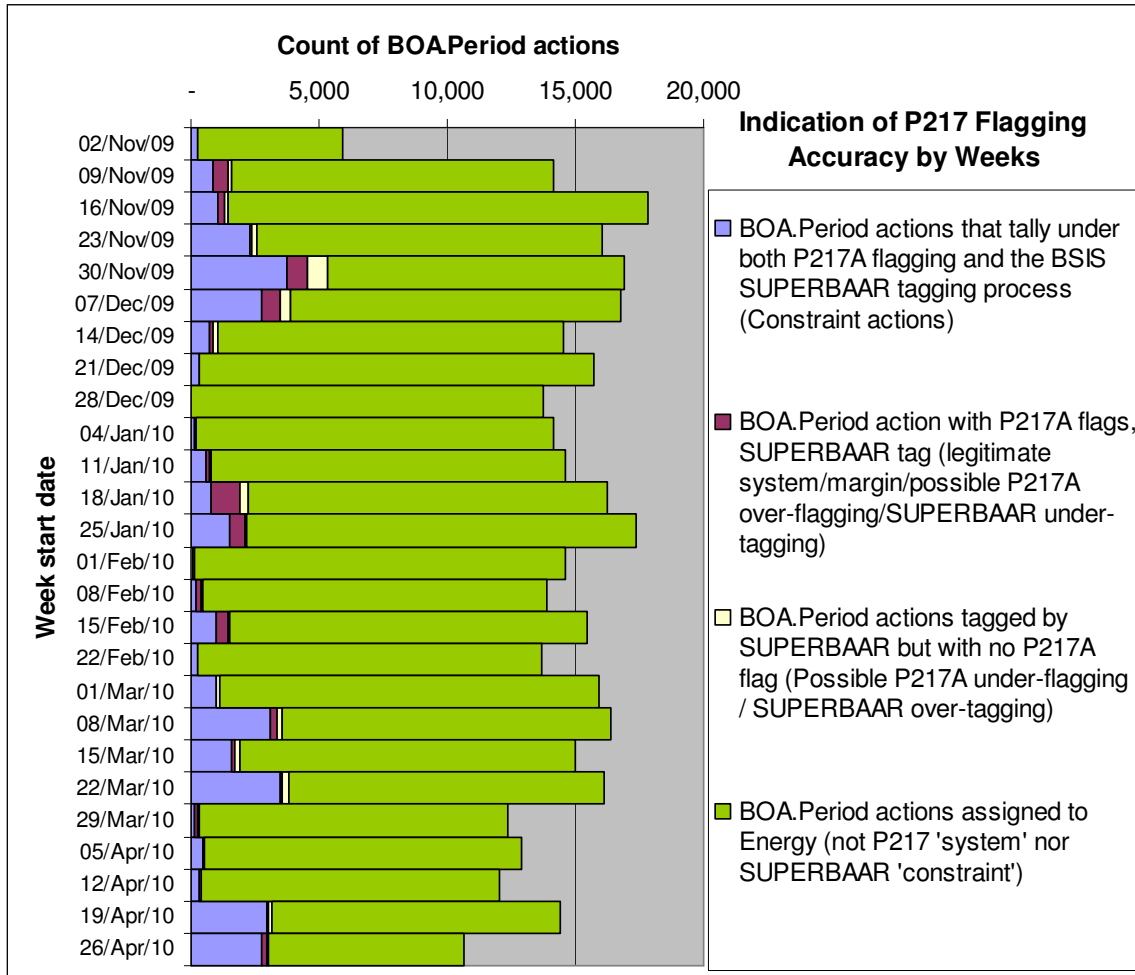
The table shows that of the 377,574 BOA.Period actions within the assessment period, of which 38,241 had P217A flags (32,338 + 6,083. 11.38%). Of the total number of BOAs taken in the period:

- 89% were correctly allocated as Energy actions
- 8.6% were allocated correctly as Constraint actions (assuming that when an action is flagged by both the P217A and SUPERBAAR processes, the action is deemed to be flagged correctly)
- 1.61% of all actions have a P217A flag but did not have a corresponding SUPERBAAR tag
- 1.00% of overall actions had a SUPERBAAR tag with no corresponding P217A flag
- Overall potential inaccuracy is a maximum of 2.6% of overall actions

Above is the accuracy of P217A actions as a percentage of overall actions. Considering the accuracy of the actions taken for constraints based on the set of 42,198 actions that could be considered appropriate system actions under either P217A or SUPERBAAR:

- 76% were in agreement as assigned to Constraint
- 14% had an element of difference due to treatment as Margin by SUPERBAAR, possible P217A over-flagging or SUPERBAAR under-tagging
- 9% had an element of difference due to possible P217A under-flagging, or SUPERBAAR over-tagging

A breakdown of the summary figures on a week by week basis is set out in the Indication of P217A Accuracy chart below. As can be seen, there is a limited amount of weeks where the discrepancies existed. The profiles are in rough agreement with the chart of BOAs Accepted & BOAs Flagged in 3.1.



A listing of mismatches and known omissions judged to be most likely to impact Cashout have been reviewed in greater depth. The impact of correcting these mismatches has been assessed by running the revised data through Elexon's processes. Section 4 covers this in more detail.

### **3.3 Rationale for Discrepancies**

There are a number of potential reasons for why there are discrepancies in the methodologies:

- the SUPERBAAR system tags are in the form of discrete half hour periods whereas the P217A data flags discrete BOA(s). This gives rise to 'straggler mismatches', where an action fits into one pigeonhole under one system and a different one under the other
- any BOA on a 'flagged' generator will be flagged as being for constraints regardless of what the action has actually been taken for

### **3.4 Flagging Accuracy Conclusion**

The level of discrepancies experienced in the first 6 months of operation of P217A is in line with expectations. The current method of assessing these discrepancies has in itself inherent inaccuracies due to the difference in the two methodologies used in allocating actions to constraints. The discrepancies between the P217A flag setting and the SUPERBAAR constraint tag setting does not mean that P217A flags are in error (there are several valid reasons why such discrepancies exist), but they do indicate the maximum potential inaccuracy. The errors in P217A flag setting are *less than* 14% for under-flagging and *less than* 9% for over-flagging of the appropriate system actions.

## 4.1 Assessment of Materiality of Flagging Discrepancies

Initial inspection of the discrepancies around P217A flag setting (Section 3 above) revealed that most occurred when there would have been limited or no impact on cash out prices. However, a number of incidents (comprising 195 periods) were found where marked inaccurate P217A flag setting may have had a material affect on system prices (e.g. not flagging an action on high priced generation as being for constraint resolution).

To assess the material impact of miss-flagging, the periods in question were re-run through the Elexon price calculation system with corrected flags. The results revealed that from the 195 periods assessed, only 8 periods had prices that would have been impacted had the flags been set differently.

Below is a table showing the 195 periods assessed in more detail. Periods with a “-“ indicate that there was no impact of a change in generator flags. The table shows the 8 periods that were impacted with changes in flags, the changes highlighted in yellow.

Date	Issue	Period number when Difference occurs	Original System Buy Price £/MWh	Revised System Buy Price £/MWh	Difference in System Buy Price £/MWh	Original System Sell Price £/MWh	Revised System Buy Price £/MWh	Difference in System Sell Price £/MWh
13/11/2009	Control late setting flags on plant run for constraint management, under-tagged GT plant. Periods 15-19	-	-	-	-	-	-	-
19/11/2009	Missing PEHE-1 flags Periods 31-35	-	-	-	-	-	-	-
25/11/2009	Missed flags for DIDCB6 periods 15-16	-	-	-	-	-	-	-
30/11/2009	SEIMP5/LOWFLWSTH flags missed periods 13-33	-	-	-	-	-	-	-
01/12/2009	SEIMP5/LOWFLOWSTH flags missing: DIDC1, 2, 3 periods 14-30	-	-	-	-	-	-	-
		24	42.25	39.88	- 2.37	42.25	39.88	- 2.37
07/12/2009	Missed P217 flags on DRAX units periods 20-31	-	-	-	-	-	-	-
08/12/2009	Missing flags for Grain GTs, and Fawl GT2 periods 34 - 37	-	-	-	-	-	-	-
09/12/2009	IRNPS for GM snow missing periods 18-43	-	-	-	-	-	-	-
11/01/2010	LTTD2 possibly missed periods 25-33	-	-	-	-	-	-	-
		26	191.51	164.25	- 27.26	69.09	69.09	-
		27	217.20	169.42	- 47.78	66.13	66.13	-
		28	243.06	202.90	- 40.16	65.01	65.01	-
		29	267.30	200.00	- 67.30	63.86	63.86	-
20/01/2010	Looks like FIDROCEX plant underflagged across day. FIDL units periods 15 - 42	-	-	-	-	-	-	-
21/01/2010	Looks like FIDROCEX plant underflagged across day. FIDL units 20 - 42	-	-	-	-	-	-	-
16/02/2010	KINO 2& 3 miss-flagged to system periods 33-38 (over-tagged)	-	-	-	-	-	-	-
02/03/2010	ABTH units missed across day periods 18-45	-	-	-	-	-	-	-
		28	38.73	38.73	-	28.08	29.01	0.93
		29	38.74	38.74	-	27.72	29.01	1.29
		30	39.10	39.10	-	27.53	28.70	1.17
12/03/2010	Missed flags on FIDL 2, 3 & 4 periods 38-46	-	-	-	-	-	-	-

Of the eight periods impacted, the greatest impact on system buy prices occurred on 11/01/2009; had LTTD2 (Littlebrook Unit 2) been flagged as ‘system’ the system buy price would have fallen by up to £67 due to its exclusion from the price stack. However, further analysis of the rationale behind these actions taken on Littlebrook generation found that there was limited volumes of generation available at the time, necessitating running of high priced units for energy; therefore although at first pass it looks like the

action is to resolve a constraint, the reason Littlebrook was selected to run was to provide energy. It concluded that the actions were indeed correctly flagged as 'energy' and so should have been included in the system buy price calculation.

Of the remaining actions, the general impact is of the order of £1 - £2, or 4% - 6% of the imbalance price.

#### **4.2 Default Price**

The cash out methodology developed by P217A uses a reference price for flagged volumes that are within the price stake. Where all actions within a period are flagged as being for system, this can result in the main imbalance price moving to the reference price leading to potential price spikes.

Such an occasion occurred in Period 25, 4<sup>th</sup> May 2010, the imbalance prices are shown below:

	<b>SSP</b>	<b>SBP</b>
24	£30.03	£54.32
<b>25</b>	<b>£52.62</b>	<b>£52.62</b>
26	£30.72	£53.86

As can be seen, SSP in period 25 is higher than in the periods either side. As all Bid actions in period 25 were flagged as being for system reasons, and therefore the main price i.e. SSP, moved to the default price, the same as the reverse price, SBP. Examination of the actions in this period showed that the flags were applied in accordance with our methodology statement. However, we recognise the impact such flagging can have and therefore will consider this when reviewing the flagging methodology.

#### **4.3 Materiality Conclusion**

The sample of 195 periods with marked discrepancies were considered to be those most likely within the whole review time frame to have had an impact on cash out prices. In the event only four of those periods would have resulted in changes to cash out (2%), with the materiality of the change of the order of 4%-6%. It indicates that the materiality of cash out figures is not being compromised as a result of discrepancies in flagging.

### 5.1 Flagging Performance Summary

Our analysis indicates that the P217A flagging methodology is performing as expected.

The present performance assessment model that cross-checks P217A against BSIS SUPERBAAR system has proved a valuable tool and shows that the inaccuracy of P217A flag setting do not exceed 14% for under-flagging and 9% for over-flagging of the appropriate system actions, and less than 2.6% of all system actions. However flagging performance may be better monitored by developing post-event systems that can better assess the occurrence of constraints and the corresponding action to resolve it. Work is underway to assess the potential for such a system to be developed.

In addition, the analysis indicates that the materiality of any discrepancies impacts a small amount of periods, and those that are impacted; the change in imbalance price would be less than 6%.

However, National Grid recognises that there needs to be improvements in the methodology to ensure that the number of periods and potential impact is minimised in the future.