Accuracy of the System Management Action Flagging Methodology

Report Covering

May 2012 to April 2013 Inclusive

Executive Summary

The P217A – Revised Tagging Process and Calculation of Cash Out Prices methodology was implemented from November 2009 and aims to remove pollution from the imbalance price caused by actions taken to resolve transmission constraints. Under this methodology the System Operator determines which actions are taken to resolve constraints and flag these actions. These flags are then sent to the BSC Systems and used in the imbalance price calculation methodology.

To ensure that the flagging methodology is operating as intended, National Grid committed to make a report on an annual basis on the accuracy of the methodology and consider any materiality. This is the fourth of such reports, covering the 12 months between May 2012 – April 2013 inclusive.

The report finds that P217A flagging accuracy continues to be good, and slightly better than that of the previous year.

If you have any comments or queries on this report, please contact National Grid on: balancingservices@nationalgrid.com

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1 Reporting

1.1 Purpose of the Report

This report reviews the accuracy of the P217A flagging process that took place in the 12 months between 1st May 2012– 30th April 2013, in respect of P217A operation and National Grid's flagging of constraint actions in accordance with the SMAF Methodology Statement.

1.2 Outline of P217A SO Flagging

The underlying objective of P217A flagging is to remove distortive pollution from 'cash out' caused by Bid Offer Acceptances (BOAs) taken to resolve transmission constraints. This followed a P217A review in which it was agreed that from the 5th November 2009, under the Balancing Settlement Code (BSC) section Q5.3.1(d) and section Q6.3.2(b) National Grid shall assess whether an action is wholly or partly taken to resolve a transmission constraint; such actions would be 'SO-Flagged' for the purposes of the BSC Systems who then determine the cash prices using the P217A cash out price methodology.   In practice SO-Flagging of BOA actions occurs when National Grid identifies specific Balancing Mechanism Units (BMUs) that, in the event of an active transmission constraint, would be utilised by way of BOA instructions to resolve the constraint. Actions on these units are subsequently flagged by National Grid Control Room in real time for the duration required to resolve 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. The accuracy with which this flagging takes place is the subject of this report.

1.3 P217A Flagging Assessment Methodology

National Grid uses several processes to assess the accuracy of the Control Room Flagging process and identify potential periods where errors may have occurred. The three main processes are below.

Data Inquiry Report.

Used in the event of the Control Room becoming aware that the flagging of constraint BOAs has been incorrectly set in real time. The Control Room will raise a Data Inquiry report (DIR) to note the discrepancy.

Post Event Cross Check (Working Day +1)

This manual process cross-checks the units identified by P217A flags against other operational information for the purpose of allocating Constraint Costs under BSIS Reporting.   This takes place on a working-day +1 basis, in which BOA actions are analysed against various operational reports and if identified as taken

to resolve a constraint they are 'tagged' with a constraint cost marker ('BSIS SUPERBAAR Constraint Cost Tagging'). Apparent differences between the P217A flagging and SUPERBAAR tags are reviewed with the Control Room as necessary to better determine the correct P217A flags & BSIS SUPERBAAR tags.

A high correlation between the P217 Flagging and the SUPERBAAR Constraint Tagging is expected but it should be noted that differences between the two mechanisms do exist due to the different criteria that apply for flagging under SMAF and tagging under BSIS SUPERBAAR: - in particular relating to;

- Differences due to legitimate anomalies such as a BMU out of merit for Black Start security, such actions being neither an energy balancing issue nor a constraint issue and so would carry a P217A flag as a 'system' action but no BSIS SUPERBAAR tag.

- Differences due to the data precision of the two systems, P217A actions being BOA specific, whereas the BSIS SUPERBAAR is half-hour period based and not able to tag individual BOAs to the same precision. Therefore mismatches can arise and the beginning and end of a set of actions and where a P217 flagged BOA and a non-flagged BOA are present in the same period.

Post Event Cross Check (Week +1)

A further period-by-period check of P217A performance is done on a weekly basis at week +1, in which P217A flagging & SUPERBAAR tagging is cross-matched so as to give an indication of incorrect, under/ over-tagging and missing flagging/tagging issues. This picks up on any data which may have been missing or late at the time of the Cross Check 'Day+1' above. This review is written up and is shared with Control staff for any learning points that may arise.

2   STATISTICS

2.1   Overall Statistics

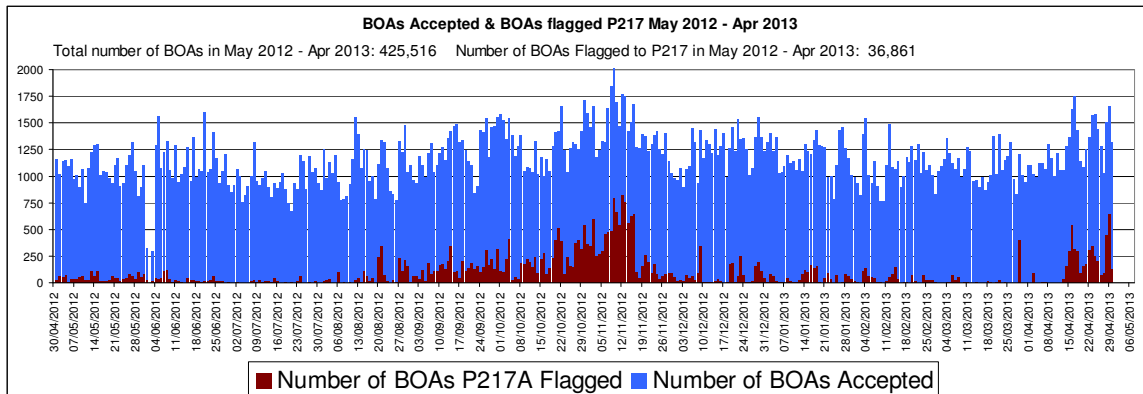**Period of Review 01 May 2012 - 30 Apr 2013**

Half Hour Periods	Current: May 2012 - Apr 2013 incl.	Previous: May 2011 - Apr 2012 incl.
Number of half hour periods	17,520	17,568
Number of periods with BOA actions with P217A flags	8,925	11,040
Percentage of periods with P217A actions	51%	63%
BOAs		
Number of BOAs accepted	425,516	403,528
Number of BOAs given P217A flags	36,861	41,176
Overall percentage given P217A flags	8.7%	10.2%

Compared to the previous reported period there has been an increase in the total number of BOAs issued, however the number of these which were system flagged has decreased.

For the current review period the distribution of these actions are tabulated and charted below:

Month	Total Number of BOAs Accepted	Number of BOAs P217A Flagged	% Flagged to P217
May - 2012	27,364	1,357	4.96%
Jun-12	31,429	918	2.92%
Jul-12	29,629	398	1.34%
Aug-12	33,742	2,023	6.00%
Sep-12	78,359	4,457	5.69%
Oct-12	40,165	7,191	17.90%
Nov-12	42,830	10,228	23.88%
Dec-12	38,618	2,206	5.71%
Jan-13	36,777	1,591	4.33%
Feb-13	30,282	1,073	3.54%
Mar-13	33,893	708	2.09%
Apr-13	38,033	4,711	12.39%
Number of BOAs Flagged to P217 in May 2012 - Apr 2013:		36,861	8.66%
All BOAs accepted	425,516		

The chart below illustrates days in which actions were P217A flagged. The flagged actions are shown in red with the overall count of actions shown in blue. It can be seen that constraint actions (red) generally occur across a number of days due to the constraint being active over an outage period or set of conditions which can last for a week or possibly longer.

BOAs Accepted & BOAs flagged P217 May 2012 - Apr 2013

Total number of BOAs in May 2012 - Apr 2013: 425,516   Number of BOAs Flagged to P217 in May 2012 - Apr 2013: 36,861

Legend: ■ Number of BOAs P217A Flagged ■ Number of BOAs Accepted

2.2 Flagging Errors Known in Real Time (DIRs)

As mentioned above, P217A flags are applied by Control staff in real time while balancing the system. This is a manual task and occasionally flags are misapplied, often reflecting higher levels of workload in Control at the time. When such an error is realised within Control timescales it is logged through a Data Inquiry Report (DIR). 66 DIRs were raised in the 12 months (table right). These reports may cover several BOA actions on one or more BMU generator units.

Month	Number of Data Inquiry reports raised due to P217 Errors
May- 12	6
Jun- 12	1
Jul- 12	0
Aug- 12	7
Sep- 12	9
Oct- 12	7
Nov- 12	13
Dec- 12	4
Jan- 13	7
Feb- 13	1
Mar- 13	2
Apr- 13	9
Total	66

2.3 Comparison of P217A Flagging Accuracy to SUPERBAAR Constraint Tagging

The primary indicator for assessing accuracy is by matching the P217A flagging against those actions tagged as a constraint cost under the BSIS SUPERBAAR process (1.3 above, 'Flagged' = P217A flagged, "Tagged" = tagged by BSIS as an action taken for system constraint reasons).

Some actions correctly assigned as by Control as to P217A are not for constraint management reasons and so legitimate differences arise when comparing the P217A and BSIS SUPERBAAR processes.

There were eight instances of legitimate differences occurred during this review period; these concerned running of plant for Black Start purposes at times during May-July and October 2012 and affected 89 Legitimate Adjustments half-hour periods in total.

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The methodology of BSIS constraint tagging takes a different format to that of the P217A flagging. As a result natural differences can emerge when trying to compare the two sets of data for the purposes of this report, and these differences can lead to false mismatches in the statistics which distort the picture. This is particularly notable in cases where Control has taken greater care to separate 'flagged' BOAs for 'system' reasons (e.g. constraints) from un-flagged BOAs for 'energy' when they take place on the same unit in the same half hour. The problem has been especially prevalent in this year's data because, for market reasons, certain generators have not self-dispatched overnight but instead have had to be bought on to resolve local voltage control constraints.   Once 'on the bars' they can also be used for energy balancing actions, whereby Control place P217 flags on those BOAs to resolve the constraint but not on those taken for 'energy'. It is difficult to filter out such distortions, except to say that while a statistical figure of potential inaccuracy can be given thought the method below the result overstates the measure.

Two methods are used to compare the matching of P217 Flags against BSIS Constraint Tags:

- BOA.Period Actions method (original method)
- BMU.Period method, which considers only if a Flag corresponds with a BSIS Constraint Tag for the same BMU in the same period and so avoids false mismatches where energy action also occur in that period.

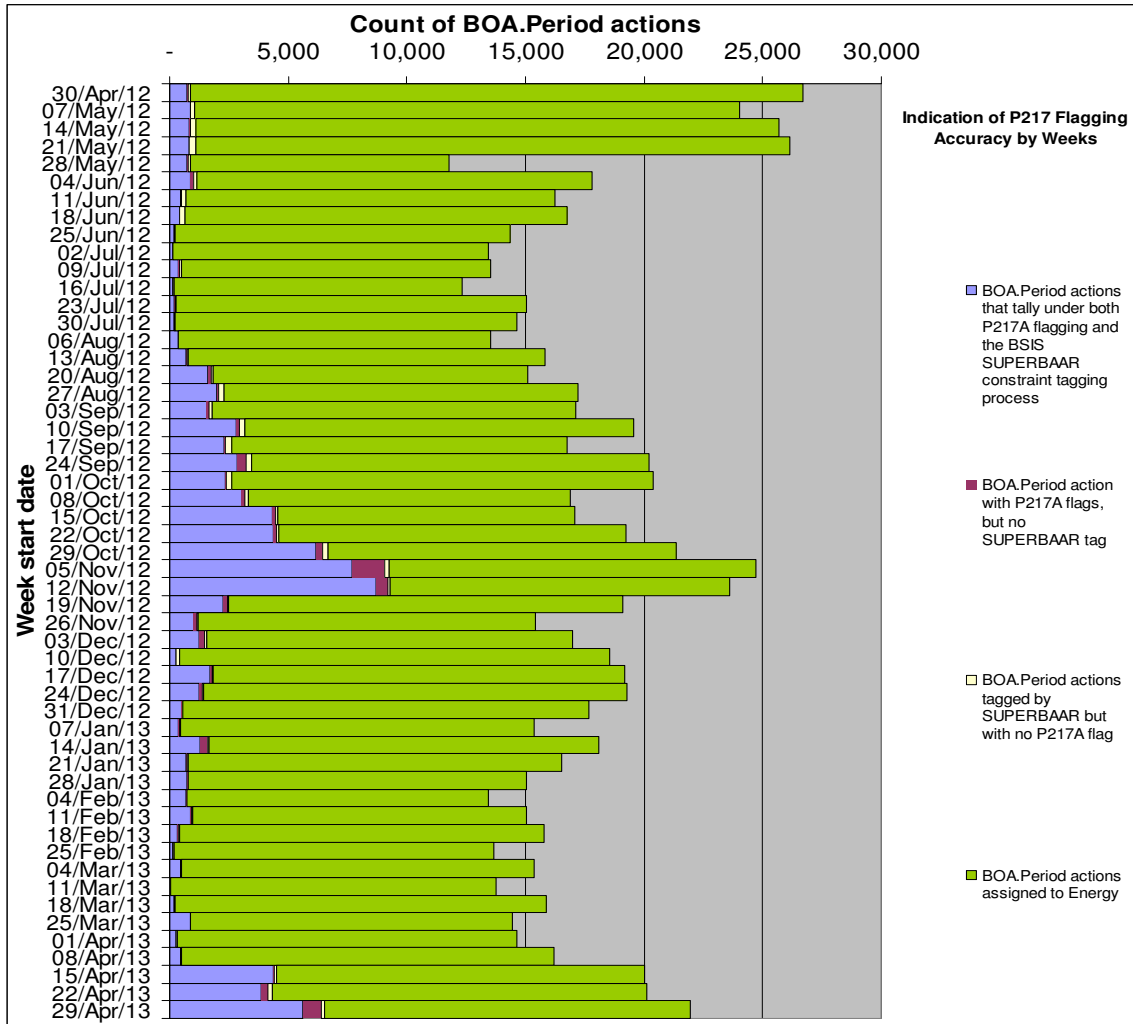### 2.3.1   'BOA.Period Actions' Potential Flagging Inaccuracy Assessment.

This considers individual BOAs spread across their respective half-hour periods; 'BOA.Period Actions' representing a BOA, which may spread over several half hour periods, and the periods that they affect. Statistics are presented after subtraction of legitimate differences. BOA.Period Actions can fall into one of four categories:

Match of BOA.Period actions after legitimate adjustments between P217A Flagging and SuperBaar Constraint Tagging	Current Review Period		Previous Review Period	
	Number	%	Number	%
Total Number of BOA.Period Actions	906,390	100.0%	1,377,854.00	100%
Energy Actions	812,545	89.65%	1,261,869	91.58%
Constraint Actions	82,906	9.15%	91,035	6.61%
Legitimate difference	250	0.03%	1,017	0.07%
P217A not SUPERBAAR mismatch	5,765	0.64%	6,412	0.47%
SUPERBAAR not P217 mismatch	5,108	0.56%	17,521	1.27%
Potential Inaccuracy		1.20%		1.74%
Overall Accuracy better than:		98.80%		98.26%

The table shows that of the 906,390 BOA.Period actions within the assessment period 93,907 had P217A flags (82,906 + 6,015, 10% of total).

From the table, the overall percentage of potential inaccuracy for the current period is 1.2% as a percentage of total actions processed (P217A not SUPERBAAR mismatch, SUPERBAAR not P217 mismatch) whereas that figure is 1.74% for the previous review period.

The statistics are charted below by whole week for information, and the pattern reflects the workload in the control room at the time. Occasions of greatest mismatch occur around early November 2012, where the figures are undermined by data failure, and late April 2013 during which time Control faced the challenge of balancing the system in the face of extreme weather conditions.

2.3.2 'BMU.Period Actions' Potential Flagging Inaccuracy Assessment.

The results of comparison by this method are tabulated below:

BMU.Periods	Match: P217A flags = BSIS Tags	No match: P217A flags only (after legitimate difference)		No match: BSIS SUPERBAAR tags only	
2011-2012	38,903	3,462	8.07%	517	1.21%
2012-2013	34,748	3,099	8.17%	89	0.23%

This shows a reduction in actions flagged to P217A and demonstrates that P217A actions which are not supported as BSIS constraint actions are of similar order to the previous year, but the number of BSIS constraint actions not matched by P217A flags has fallen substantially. The potential inaccuracy by this method is for 8.4% for the current period (8.17% + 0.23%) against 9.3% for the previous period, (and is an indicator of inaccuracy within the set of actions 'flagged' or 'tagged'; not as a percentage of all actions taken).

3   PERFORMANCE INTERPRETATION AND MATERIALITY OF ANY ERROR

Taking the assessment in 2.3.2 as the best guide, P217A Flagging performance has improved on that of the previous year despite a large increase in numbers of actions taken for system constraint reasons. The figures are 'worst case' because they also contain inevitable 'straggler' data mismatches between the discrete BOA-based P217A data flags and the discrete half-hour-based SUPERBAAR system tags, where an action fitting into a time pigeonhole in one system may fit a slightly different one in the other.

A review of incidents of P217A mis-flagging as reported by DIRs found that in most cases they concerned just one or two periods on the margins of a block of justified actions, and were unlikely to have any material effect on pricing. Other instances of mis-flagging concerned energy balancing BOAs for offers inadvertently caught in flags set for bids, or vice versa. Most were found to be inconsequential in terms of impact on pricing.

Across the year, 14 instances of mis-flagging were identified as having some small potential to influence pricing. Calculation of the materiality of this through the Elexon process was unavailable at the time of going to press.

4 YEAR-ON-YEAR & FLAGGING PERFORMANCE CONCLUSIONS

The key quantities for this and the previous year are summarised and compared in the table below.

Key Quantities	May 2011 - Apr 2012	May 2012 - Apr 2013
	In 12 months	In 12 months
Number of half-our periods in year	17,568	17,520
Number of Periods with P217 Flags	11,040	8,925
% periods with P217 flags	63%	50.94%
Number of DIRs raised	146	66
Number of BOAs accepted	403,528	425,516
Number of BOAs Flagged to P217	41,176	36,861
% flagged to P217A	10.20%	8.66%
Potential inacuracy . Method 1	1.74%	1.20%
Overall accuracy better than:	98.26%	98.80%
Potential inacuracy . Method 2	9.2%	8.4%
Overall potential inaccuracy over all BOAs processed	0.94%	0.73%
Overall accuracy better than:	99.06%	99.27%

This report finds further improvement in P217A flag setting, year on year, in the accuracy of P217A flagging as measured against BSIS tagging criteria, as well as a significant drop in the number known mis-flagging incidents by Control as recorded in Data Inquiry Reports.