Accuracy of the System Management Action Flagging Methodology

Report Covering

May 2013 to April 2014 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 fifth such report, covering the 12 months between May 2013 – April 2014 inclusive.

The report finds that although a greater number of actions were flagged under P217A than the previous year, flagging accuracy continues to be good and on a par with the previous year. On those occasions of inaccuracy the errors are judged to have had no effect on materiality of pricing.

If you have any comments or queries on this report, please contact National Grid on:
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Contents

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 2013– 30th April 2014, 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 the 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 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 slightly 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 at 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. Queries arising are shared with Control staff for any learning points that may be gained.

4

2   STATISTICS

2.1   Overall Statistics

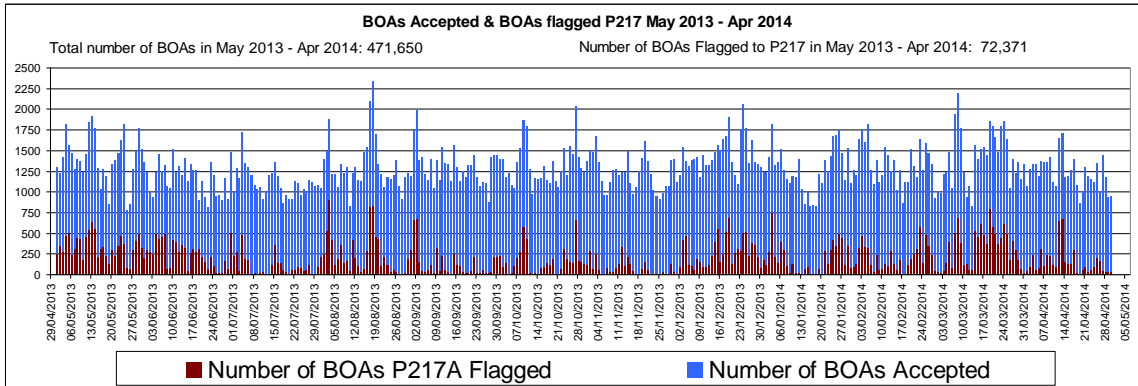| Half Hour Periods	Current: May 2013 - Apr 2014 incl.	Previous: May 2012 - Apr 2013 incl.
Number of half hour periods	17,520	17,520
Number of periods with BOA actions with P217A flags	12,856	8,925
Percentage of periods with P217A actions	73%	51%
BOAs		
Number of BOAs accepted	471,650	425,516
Number of BOAs given P217A flags	72,371	36,861
Overall percentage given P217A flags	15.3%	8.7%

From this we see that 15.3% of all BOAs were taken for system reasons, affecting 73% of periods in the year. Compared to the previous reported period there has been an increase in the total number of BOAs issued, as well as a significant increase in the number of these which were system flagged. This increase reflects a higher number of actions needed to manage system constraints during the year, which was largely due to the combination of growing renewable generation output and engineering outage works necessary to uprate the transmission system.

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 - 2013	37,487	9,068	24.19%
Jun-13	34,787	7,331	21.07%
Jul-13	34,379	3,160	9.19%
Aug-13	40,877	7,831	19.16%
Sep-13	39,299	3,835	9.76%
Oct-13	40,974	4,878	11.91%
Nov-13	36,522	2,329	6.38%
Dec-13	44,517	8,074	18.14%
Jan-14	39,207	5,795	14.78%
Feb-14	37,219	5,625	15.11%
Mar-14	43,885	9,976	22.73%
Apr-14	36,749	4,469	12.16%
Number of BOAs Flagged to P217 in May 2013 - Apr 2014:		72,371	15.34%
All BOAs accepted	471,650		

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 2013 - Apr 2014

Total number of BOAs in May 2013 - Apr 2014: 471,650   Number of BOAs Flagged to P217 in May 2013 - Apr 2014: 72,371

■ Number of BOAs P217A Flagged   ■ Number of BOAs Accepted

2.2   Flagging Errors Known in Real Time (DIRs)

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). 52 DIRs were raised in the 12 months (table right) against 66 DIRs in the previous report. DIRs may cover several BOA actions on one or more BMU generator units.

Most of the DIRs concerned BOAs which should have been 'System' flagged but went through as Energy. Five actions inadvertently flagged as 'System', which should have been 'Energy'. Most DIRs were for mis-flagging of fewer than four periods, likely at the beginning or end of constraint actions. See section Materiality for further discussion.

Month	Number of Data Inquiry reports raised due to P217 Errors
May- 13	13
Jun- 13	3
Jul- 13	7
Aug- 13	1
Sep- 13	3
Oct- 13	4
Nov- 13	3
Dec- 13	3
Jan- 14	2
Feb- 14	1
Mar- 14	11
Apr- 14	1
Total	52

6

2.3   Comparison of P217A Flagging Accuracy to SUPERBAAR Constraint Tagging

Assessment of Accuracy: 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).

Legitimate Differences: Some actions correctly assigned by Control to P217A are not for constraint management reasons and so legitimate differences arise when comparing the P217A flag process against the constraint-based BSIS SUPERBAAR process. In this review period several instances of legitimate difference occurred relating to issues of stability and inertia management, and for Black Start, these being neither energy nor constraint actions, as tabulated below;

Action	Dates	Number of periods affected	Number of boa.perods
Plant bought on for inertial management	05/05/2013	11	45
Plant bought on for inertial management	06/05/2013	17	60
Plant bought on for inertial management	28/05/2013	16	27
Plant bought on for inertial management	03/07/2013	15	34
Plant bought on for inertial management	04/07/2013	12	23
Ormonde windfarm taken off for harmonics management	24/08/2013	25	51
Ormonde windfarm taken off for harmonics management	25/08/2013	48	137
Ormonde windfarm taken off for harmonics management	26/08/2013	21	47
Plant bought on for inertial management	19/10/2013	10	66
Plant for strategic security in adverse weather	26/10/2013	15	58
Plant for strategic security in adverse weather	27/10/2013	18	56
Plant for strategic security in adverse weather	28/10/2013	15	58
Aberthaw run for Black start	23/12/2013	14	39
Plant bought on for inertial management	29/12/2013	28	94
Aberthaw run for Black start	31/12/2013	13	22
Plant bought on for inertial management	31/12/2013	8	59
Totals	16	286	876

Other Differences: 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. This factor was mentioned in the previous report and can be considered as 'noise' in the data, but it is also a function of the Control's growing precision in separating BOAs to resolve a constraint from those taken for 'energy'. It is difficult to remove this noise, which has the net effect of overstating the inaccuracy. Hence interpretation of the statistical accuracy should be taken as '*better than X %*'. Mismatches between the BSIS and P217 A sets can also occur if constraint cost assignment is missed by BSIS 'Tagging' which could be best described as a guided manual process.

Two methods are used to compare the matching of P217 Flags against BSIS Constraint Tags in order to give slightly different appraisals:

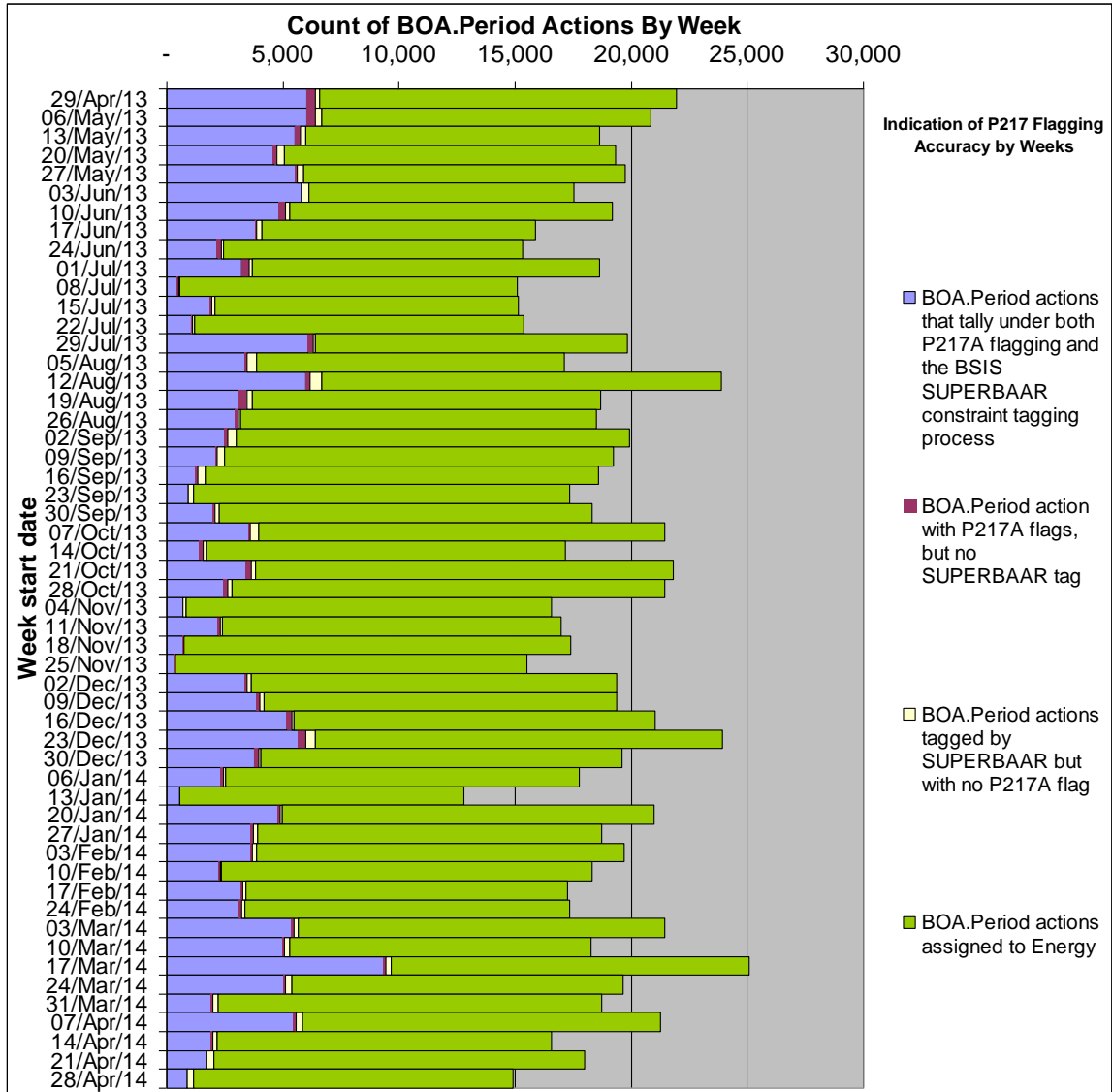- BOA.Period Actions method (original method).
- BMU.Period method.

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. These are compared to see if the respective P217A flags on them correspond to the BSIS tags. BOA.Period Action matching can fall into one of five categories:

Match of BOA.Period actions after legitimate adjustments between P217A Flagging and SuperBaar Costraint Tagging	Current Review Period		Previous Review Period	
	Number	%	Number	%
Total Number of BOA.Period Actions	977,313	100.0%	906,390	100.00%
Energy Actions	783,474	80.17%	812,545	89.65%
Constraint Actions	175,586	17.97%	82,906	9.15%
Legitimate difference	876	0.09%	250	0.03%
P217A not SUPERBAAR mismatch	5,252	0.54%	5,765	0.64%
SUPERBAAR not P217 mismatch	10,275	1.05%	5,108	0.56%
Potential Inaccuracy		1.59%		1.20%
Overall Accuracy better than:		98.41%		98.80%

The table shows that of the 977,313 BOA.Period actions within the assessment period 181,714 had P217A flags (175,586 + 876 + 5,252, 18.6% of total). The overall percentage of potential inaccuracy for the current period is 1.59% as a percentage of total actions processed (P217A not SUPERBAAR mismatch, SUPERBAAR not P217 mismatch) whereas that figure is 1.20% for the previous review period, however from inspection the main source of difference appears to be 'noise'.

The statistics are charted below by whole week for information, and the pattern reflects the seasonal nature of the demand profile and the workload in the control room at the time. Occasions of mismatch between BOA.Period actions of SUPERBAAR/P217A [yellow] are mostly due to periods which contain both actions of constraint and non-constraint BOAs on the same BMUs in the same periods (i.e. 'noise'). Occasions of greatest mismatch occurred in mid August when, between 24/8/13 and 26/8/13, actions were taken on Ormonde offshore windfarm for harmonic management – which is a legitimate difference and not a matter of inaccuracy.

8

Count of BOA.Period Actions By Week

Indication of P217 Flagging Accuracy by Weeks

- BOA.Period actions that tally under both P217A flagging and the BSIS SUPERBAAR constraint tagging process
- BOA.Period action with P217A flags, but no SUPERBAAR tag
- BOA.Period actions tagged by SUPERBAAR but with no P217A flag
- BOA.Period actions assigned to Energy

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

This cross matches only where a P217 Flag corresponds with a BSIS Constraint Tag for the same BMU in the same period and so avoids false mismatches where energy actions also occur in that period. 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		Sum Potential inacuracy
2012-2013	34,748	3,099	8.17%	89	0.23%	8.4%
2013-2014	76,790	3,801	4.70%	268	0.33%	5.0%

As in 2.3.1, a significant increase of P217A -flagged actions over the previous year is observed, whereas the numbers mismatched have seen a smaller increase. The potential inaccuracy by this method is 5.0 % for the current period against 8.4% for the

previous period (note - an indicator of inaccuracy just within the set of actions 'flagged' or 'tagged'; not as a percentage of all actions taken).

3   PERFORMANCE INTERPRETATION AND MATERIALITY OF ANY ERROR

From the assessments in 2.3.1 & 2.3.2, 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 indicative of 'worst case' because they also contain 'noise' mismatches. A review of incidents of P217A mis-flagging as reported by DIRs found that in most cases they concerned just a few periods on the margins of a block of justified actions, and were unlikely to have any material effect on pricing.

Inspection of notable the mismatches across the period identified the following instances:

Possible Misflag Action	Dates affected	Number of periods affected	DIR/Other
Offers on two north England plant in early morning should have been system	02/05/2013	11	DIR
Bids on one unit in Scotland in early morning should have been system	23/05/2013	10	DIR
Offers on northern unit periods 36-48 not flagged system but may have been missed by Control	01/09/2013	13	Other
Offers on unit in Wales overnight should have been system flagged	26/09/2013	13	DIR
Offers on unit in Wales periods 1-14 not flagged by Control but may have been system	26/09/2013	14	Other
Bids on two wind units overnight should have been system flagged	24/10/2013	8	DIR
Offers on various units in south periods 1-14 misflagged to system, should be energy	03/12/2013	14	Other
Bids on wind unit in afternoon should have been system flagged	04/03/2014	4	DIR
Morning bids on two generators in Scotland should have been system flagged	16/03/2014	4	DIR
Bids on wind unit around DP should have been system flagged	22/03/2014	8	DIR
Overnight bids on wind unit should have been system flagged	23/03/2014	8	DIR

At the times of the above occurrences there were similar actions taken which were not misflagged. Experience gained in previous reports from reworking System Buy and System Sell prices via Elexon suggest that the above instances are unlikely to be significant enough to cause a difference in the materiality of prices at the times.

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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 2013 - Apr 2014	May 2012 - Apr 2013
	In 12 months	In 12 months
Number of half-our periods in year	17,520	17,520
Number of Periods with P217 Flags	12,856	8,925
% periods with P217 flags	73.38%	51%
Number of DIRs raised	52	66
Number of BOAs accepted	471,650	425,516
Number of BOAs Flagged to P217	72,371	36,861
% flagged to P217A	15.34%	8.66%
Potential inacuracy . Method 1	1.59%	1.20%
Overall accuracy better than:	98.41%	98.80%
Potential inacuracy . Method 2	5.0%	8.4%
Overall potential inaccuracy over all BOAs processed	0.77%	0.73%
Overall accuracy better than:	99.23%	99.27%

This report finds that although both the number of BOAs accepted and the number of BOAs flagged to P217A have increased over the same period in the previous year the accuracy of P217A flagging has been maintained, while the number of known mis-flagging incidents by Control as recorded in Data Inquiry Reports has also fallen.

In terms of materiality of errors, none were noted to be of sufficient significance to have had likely impact on System Sell of System Buy prices.