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**Modification P90: 'Improving the
Representation of Energy Balancing
Actions in Cashout Prices' Requirements
Specification**

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d Changes Forecast

None.

e Related Documents

Reference 1	Modification Proposal P90 'Improving the Representation of Energy Balancing Actions in Cashout Prices' (8 July 2002)
Reference 2	Initial Written Assessment of Modification Proposal P90 'Improving the Representation of Energy Balancing Actions in Cashout Prices' (P090IR V1.0, 18 July 2002)
Reference 3	Draft Modification Report for Modification Proposal P78 'Revised Definition of System Buy Price and System Sell Price' (P078RR V0.3, 9 August 2002)

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1 INTRODUCTION

1.1 Background and Scope

This Requirements Specification for Modification P90 'Improving the Representation of Energy Balancing Actions in Cashout Prices' (Reference 1) forms the basis for an impact assessment of the implementation and associated issues should this Modification be adopted. This Requirements Specification defines the requirements for implementation of the Modification without any evaluation or assessment of the Modification / Alternative itself. This accords with the Code Section F 2.6.6.

Modification Proposal P90 was raised by First Hydro Company on 8 July 2002, and the Initial Written Assessment for Modification P90 (Reference 2) was considered by the Panel at its meeting of 18 July 2002, where the Panel agreed to submit Modification Proposal P90 to the Assessment Procedure.

The Modification seeks to calculate Energy Imbalance Prices from price ordered stacks of all Bid Acceptances and all Transmission Company forward trade sales and all Offer Acceptances and Transmission Company forward trade purchases. After Arbitrage Tagging, the volume on the smaller stack is tagged off of the bigger stack to the level of the Balancing Reserve Limit (BRL).

The main Energy Imbalance Price is then a weighted average of the balancing actions (Bid – Offer Acceptances and Transmission Company forward trades) that comprise the Remaining Imbalance Volume (RIV). The BRL concept is retained for the reverse price at the level determined from time to time by the Authority.

The Pricing Issues Modification Group met on 24 July 2002 and 7 August 2002, during which time the requirements of the Modification were determined and agreed. This Requirements Specification represents the outcome of those meetings.

1.2 Purpose and Structure of Document

The primary purpose of this document is to specify the requirements for the requisite changes to Central Services, BSC Parties and Party Agents and to the Code, Subsidiary and Industry documentation, in sufficient detail to enable all impacted BSC Agents, Parties, Party Agents and documentation owners to provide an impact assessment of the changes required to support this Modification Proposal.

In particular the main purpose of this document is to specify ELEXON's (representing the Modification Group) requirements for the requisite change to Central Services functionality in sufficient detail to allow the BSC Central Service Agent to provide an initial detailed assessment of the following:

- An assessment of the cost of any changes to the contractual baseline.
- An assessment of the elapsed time required to implement the changes.
- A proposed testing strategy for the changes.
- A proposed release and acceptance strategy (e.g. whether to phase the implementation to provide a quick solution to urgent operational issues).

For the purposes of this assessment, the BSC Central Service Agent should assume that the changes will be implemented as a standalone development project managed by ELEXON.

The document is structured as follows:

- Section 2 specifies the required functionality for the changes defined within the Modification Proposal.
- Section 3 specifies the associated industry changes to support the functionality defined in Section 2.
- Section 4 specifies the required functionality for the changes defined within the options for Alternatives to Modification Proposal P90.
- Section 5 specifies ELEXON's requirements for involvement in the design and testing process.

1.3 Glossary

The following acronyms have been used throughout this document (excluding acronyms used in the Technical Glossary):

BM	Balancing Mechanism
BMRA	Balancing Mechanism reporting Agent
BOA	Bid – Offer Acceptance
BRL	Balancing Reserve Limit
BSAD	Balancing Services Adjustment Data
BSC	Balancing and Settlement Code
CADL	Continuous Acceptance Duration Limit
NIV	Net Imbalance Volume
PIMG	Pricing Issues Modification Group
RIV	Remaining Imbalance Volume
SAA	Settlement Administration Agent
SBP	System Buy Price
SSP	System Sell Price
URS	User Requirements Specification

All other acronyms are Code defined terms and as such are defined in Section X of the Code.

1.4 Documentation References

There are number of pending amendments to the Code, and associated industry documentation, which are not reflected in the current baseline, and are consequently not represented in this Specification. Therefore it is appropriate to provide the references and associated version number of the documents used in the preparation of this Requirements Specification.

V	Document
6.0	The Code, Section Q 'Balancing Mechanism Activities'
4.0	The Code, Section T 'Settlement and Trading Charges'
7.0	The Code, Section X, ANNEX X-2 'Technical Glossary'
2.0	The Reporting Catalogue
2.0	Part C – Service Description for Balancing Mechanism Reporting
3.0	Part A – Service Description for Settlement Administration

2 REQUIREMENTS SPECIFICATION FOR MODIFICATION PROPOSAL P90 'IMPROVING THE REPRESENTATION OF ENERGY BALANCING ACTIONS IN CASHOUT PRICES'

2.1 Requirements Specification Overview

Modification Proposal P90 requires amendment to the mechanism for formulating and reporting BSAD trades and to the calculation of the Energy Imbalance Prices.

Currently, the energy proportion of forwards trades undertaken by the Transmission Company is reported (on a gross basis) as Balancing Services Adjustment Data (BSAD), for use in the Energy Imbalance Price calculation. BSAD values are used in the Energy Imbalance Price calculation after the Bid – Offer Acceptances for the Settlement Period have had CADL applied, and De Minimis Tagging, Arbitrage Tagging and Trade Tagging performed.

Modification P90 proposes that all forwards energy and system trades undertaken by the Transmission Company are reported individually into the BSC Central Service Agent and then used in the Energy Imbalance Price calculation as if they are Bid – Offer Acceptances for the purposes of Trade Tagging, i.e. stacked and then tagged out where appropriate (Figure 2.1 below).

Modification P90 proposes that all Bid – Offer Acceptances (after Arbitrage and De Minimis tagging has been applied) are stacked in price order (as shown in Figure 2.1 below) with individual (system and energy) BSAD trades included in the relevant points in the stack. The stacks then have Trade Tagging applied to the level of the Balancing Reserve Level. For the avoidance of doubt, this mechanism removes the requirement for the application of the Continuous Acceptance Duration Limit (CADL) to Bid – Offer Acceptances.

The proposed mechanism stacks all energy and system balancing actions, i.e. all Bid – Offer Acceptances and all system and energy (individual) BSAD trades, and then uses the existing Trade Tagging mechanism (i.e. tagging to the level of the Balancing Reserve Level (BRL)) to derive the Remaining Imbalance Volume (on the larger stack), and balancing actions to the level of BRL on the smaller stack.

The balancing actions taken to alleviate the Remaining Imbalance Volume are then used to calculate the main Energy Imbalance Price, and the balancing actions (to BRL) on the smaller (reverse) stack set the reverse Energy Imbalance Price. Where the Remaining Imbalance Volume is zero, or there is no volume on the smaller stack, then the current Energy Imbalance Pricing default rules are invoked.

For the avoidance of doubt:

- Where the system is long, the Bid (and Transmission Company forward sales) stack will be the main stack, and the main price will be the System Sell Price. The reverse stack will be the Offer (and Transmission Company forward purchase) stack and the reverse price will be the System Buy Price; and
- Where the system is short, the Offer (and Transmission Company forward purchase) stack will be the main stack, and the main price will be the System Buy Price. The reverse stack will be the Bid (and Transmission Company forward sale) stack and the reverse price will be the System Sell Price.

The Balancing Mechanism Reporting Agent (BMRA) will calculate and publish the Indicative Energy Imbalance Prices as defined above, to the currently defined schedule.

The Energy Imbalance Prices are calculated as defined above by the Settlement Administration Agent (SAA) and then applied to Energy Imbalance Volumes as currently defined.

It should be noted that the mechanism proposed by Modification Proposal P90 is based on the principle proposed by Modification Proposal P78 (Reference 3), where all (system and energy) balancing actions taken by the Transmission Company for a Settlement Period are netted off to leave a net energy imbalance (the Net Imbalance Volume (NIV)), which is deemed to be the energy imbalance of the system. This mechanism necessarily removes all of the smaller stack for the Settlement Period, deeming it to be for system balancing purposes.

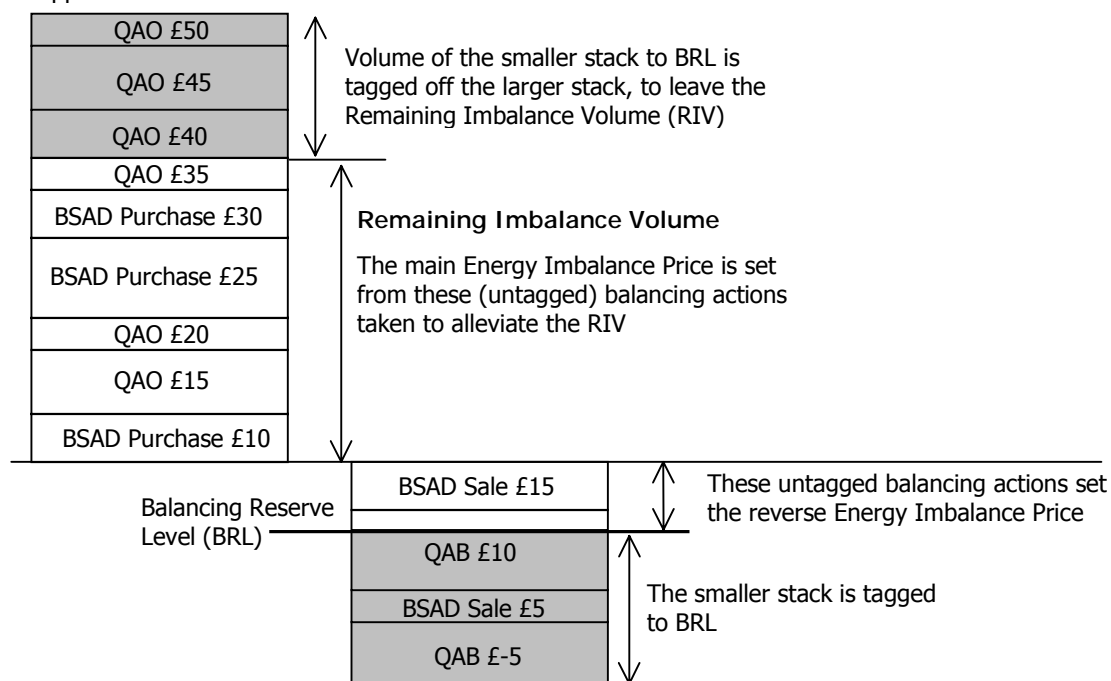
Modification Proposal P90 uses a similar mechanism in terms of stacking all system and energy balancing actions (although the treatment of BSAD is different between the two Modifications), and undertaking some netting. However, the key feature of Modification Proposal P90 is that it assumes that some balancing actions taken in the opposite direction to the overall system imbalance were taken for energy balancing purposes, and that these should set the Energy Imbalance Price for application to imbalance volumes in the opposite direction to the overall system imbalance. The volume of balancing actions deemed to have been taken for energy balancing purposes is set by the Balancing Reserve Level (BRL).

Therefore Modification P90 deems that:

- Smaller (reverse) stack: Balancing actions to the level of BRL on the smaller (reverse) stack were taken for the purposes of energy balancing, with all other balancing actions in that direction being taken for system purposes; and
- Larger (main) stack: The volume of system actions on the smaller stack is netted off the larger (main) stack (see Figure 2.1 below) to leave the Remaining Imbalance Volume. Balancing actions taken to alleviate the Remaining Imbalance Volume are deemed to have been taken for the purposes of energy balancing. All other balancing actions (i.e. those netted off) in that direction are deemed to have been taken for the purposes of system balancing.

Thus Modification Proposal P90 implements a new differentiation between energy and system balancing actions for a Settlement Period. For the avoidance of doubt, this mechanism removes the requirement for (arbitrary) system balancing action differentiation via application of the CADL variable, as it undertakes the system / energy differentiation via Trade Tagging.

ALL (system and energy) Offer Acceptances are stacked in price order (as reflected below) after Arbitrage and De-minimis Tagging is applied (i.e. no CADL'ing is undertaken). Individual (system and energy) BSAD Purchases are slotted into the stack in price order. Trade Tagging is then applied to the stack to the level of BRL.



ALL (system and energy) Bid Acceptances are stacked in price order (as reflected above) after Arbitrage and De-minimis Tagging is applied (i.e. no CADL'ing is undertaken). Individual (system and energy) BSAD Sales are slotted into the stack in price order. Trade Tagging is then applied to the stack to the level of BRL.

Figure 2.1: High Level Schematic of Proposed Mechanism under Modification P90.

2.2 Balancing Services Adjustment Data Amendments

2.2.1 Balancing Services Adjustment Data Amendments

Currently Balancing Services Adjustment Data (BSAD) is reported daily and comprises six data items, as defined in the BSC Section Q, 6.3, summarised as follows:

- Sell Price Cost Adjustment (SCA_j);
- Sell Price Volume Adjustment (SVA_j);
- Buy Price Cost Adjustment (BCA_j);
- Buy Price Volume Adjustment (BVA_j);
- Buy Price Price Adjustment (BPA_j); and
- Sell Price Price Adjustment (SPA_j).

This composition of BSAD includes all Transmission Company trades made for energy balancing purposes prior to Gate Closure, i.e. reporting on a gross basis.

However, in order to support Modification Proposal P90, all individual trades would have to be reported. The exact amendments to BSAD are yet to be defined / agreed by the Transmission Company, and are

beyond the scope of this Requirements Specification. However, for the purposes of assessing the impact on the BSC Central Services and on other Parties, the following example of how BSAD could be reported is proposed.

It is expected that every trade relevant to a Settlement Period will be reported by the Transmission Company. It may be deemed appropriate to place a time constraint on the trades to be reported for a Settlement Period (for example, only trades made within two weeks prior to a specific Settlement Period are eligible for reporting and inclusion in the Energy Imbalance Price calculations), however, this is beyond the scope of this requirements specification (and does not materially affect the impact of this Modification on the BSC Central Service Agent and Parties other than the Transmission Company).

Each trade would be required to have a reference / trade number for audit / verification purposes. It is expected that the Transmission Company would report all the trades for a Settlement Period at Gate Closure for the relevant Settlement Period in a single report. The report can be utilised to report amendments to BSAD up to Final Reconciliation (as is the case currently).

The BSAD could be reported as follows (noting that this will require the existing interface between the Transmission Company and BMRA / SAA to be amended (or replaced with a new report)):

For the purposes of the following report:

- BC_j is the price (in £/MWh) of an individual BSAD forward purchase trade;
- BV_j is the is the volume (in MWh) of an individual BSAD forward purchase trade;
- SC_j is the price (in £/MWh) of an individual BSAD forward sale trade; and
- SV_j is the is the volume (in MWh) of an individual BSAD forward sale trade.

AMENDED BSAD VARIABLE REPORT (SAA-1023)

```

1-* Settlement Date
1-* Settlement Period
    0-* Forward Sales
        Trade Number
        Sale Price ( $SC_j$ ) (£/MWh)
        Sale Volume ( $SV_j$ ) (MWh)
    0-* Forward Purchases
        Trade Number
        Purchase Price ( $BC_j$ ) (£/MWh)
        Purchase Volume ( $BV_j$ ) (MWh)
        Buy Price Price Adjustment ( $BPA_j$ )
        Sell Price Price Adjustment ( $SPA_j$ )

```

This structure allows all trades for a Settlement Period to be reported into the BSC Central Service Agent. It should be noted that the Buy Price Price Adjustment (BPA) and Sell Price Price Adjustment (SPA) variables are retained as currently defined (and will be applied within the Energy Imbalance Price calculations as currently specified).

It should be noted that the BMRA will require amendment to report the BSAD in this revised format (to the same reporting schedules and service levels as currently in place). Amendments are also required to the Settlement Report (SAA-I014, all sub flows) to report the BSAD in this revised format (explored in section 2.3.5 of this Requirements Specification).

This mechanism for reporting means that the naming and definition of the SCA, SVA, BCA and BVA variables changes from the current definition and there is potential for the variable name, acronym and definition to be amended to support the proposed reporting and utilisation. This will require changes to Section Q 6.3 of the BSC (and Section X), the exact nature of which cannot be determined until the BSAD changes and associated consultation is released by the Transmission Company.

It should be noted that the definition set out above has been adopted throughout this requirements specification for the purposes of obtaining an impact assessment.

2.3 Amendments to the Calculation of Energy Imbalance Prices

It should be noted that this section applies to the calculation of the Indicative Energy Imbalance Prices by the BMRA and to the calculation of the Energy Imbalance Prices by the SAA. The mechanisms and calculations undertaken by both BSC Systems is the same, and therefore the following section applies to both BSC Systems, unless specifically stated otherwise.

2.3.1 Calculation of the Remaining Imbalance Volume

Modification Proposal P90 requires that the Remaining Imbalance Volume of the overall system be determined and the main Energy Imbalance Price calculated from the balancing actions taken to alleviate the Remaining Imbalance Volume.

The Remaining Imbalance Volume, for a Settlement Period, is determined as follows:

- Acceptances are stacked, Offers on one stack and Bids on another, ordered according to price (as is done currently);
- De Minimis tagging will be undertaken on both stacks, as currently defined;
- Arbitrage Tagging will be undertaken on both stacks, as currently defined;
- Individual BSAD trades are added into the relevant stack – sales into the Bid stack and purchases into the Offer stack, placed within the stack in order of price by its £/MWh price i.e. as if each trade were a Bid – Offer Acceptance;
- Trade Tagging is then undertaken to the level of BRL.

The Energy Imbalance Prices are derived from the balancing actions remaining once the Trade Tagging has been undertaken, as shown in Figure 2.1.

Where there are no balancing actions on the reverse stack, then the current default rules for derivation of an Energy Imbalance Price are applied.

Where the Remaining Imbalance Volume is zero, then the current default rules for derivation of an Energy Imbalance Price are applied.

2.3.2 Calculation of the Energy Imbalance Prices

Once the Remaining Imbalance Volume has been determined, as defined in section 2.3.1, the Energy Imbalance Prices can be calculated for the Settlement Period.

All Bid – Offer Acceptances which have been Trade Tagged are disregarded for the purposes of setting the Energy Imbalance Prices.

All BSAD forward sales and purchases which have been Trade Tagged are disregarded for the purposes of setting the Energy Imbalance Prices.

For the purposes of the following calculations:

- BC_j is the price (in £/MWh) of an individual BSAD forward purchase trade;
- BV_j is the is the volume (in MWh) of an individual BSAD forward purchase trade;
- SC_j is the price (in £/MWh) of an individual BSAD forward sale trade; and
- SV_j is the is the volume (in MWh) of an individual BSAD forward sale trade.

Therefore, for each Settlement Period:

In respect of each Settlement Period, if $\{\sum_i \sum^n \{QAO_{ij}^n * TLM_{ij}\} + \sum^t BV_j\}$ is not equal to zero then the System Buy Price will be determined as follows:

$$SBP_j = \{ \{ \sum_i \sum^n \{ QAO_{ij}^n * PO_{ij}^n * TLM_{ij} \} + \sum^t (BV_j * BC_j) \} / \{ \sum_i \sum^n \{ QAO_{ij}^n * TLM_{ij} \} + \sum^t BV_j \} \} + \{ BPA_j \}$$

where \sum_i represents the sum over all BM Units, \sum^n represents the sum over those accepted Offers that are not De Minimis Accepted Offers and not Arbitrage Accepted Offers and not Trade Tagged Offers and \sum^t represents the sum over all Forward Purchases that are not Trade Tagged Forward Purchases.

If for any Settlement Period $\{\sum_i \sum^n \{QAO_{ij}^n * TLM_{ij}\} + \sum^t BV_j\}$ is equal to zero, then:

- If for that Settlement Period $\{\sum_i \sum^n \{QAB_{ij}^n * TLM_{ij}\} + \sum^t SV_j\}$ is equal to zero, the System Buy Price for that Settlement Period will be equal to zero;
- Otherwise, the System Buy Price will be determined as the maximum of System Sell Price and:
 - The Offer Price of the cheapest Offer available in that Settlement Period, which has a positive Bid-Offer Pair Number and which has an Offer Price greater than the Offer Price of any Offer which is an Arbitrage Accepted Offer in respect of that Settlement Period and for which the value of Bid-Offer Volume ($qBO_{ij}^n(t)$) is greater than zero for all spot times t in that Settlement Period;
 - Or, if no such Offer exists, zero.

In respect of each Settlement Period, if $\{\sum_i \sum^n \{QAB_{ij}^n * TLM_{ij}\} + \sum^t SV_j\}$ is not equal to zero then the System Sell Price will be determined as follows:

$$SSP_j = \{ \{ \sum_i \sum^n \{ QAB_{ij}^n * PB_{ij}^n * TLM_{ij} \} + \sum^t (SV_j * SC_j) \} / \{ \sum_i \sum^n \{ QAB_{ij}^n * TLM_{ij} \} + \sum^t SV_j \} \} + \{ SPA_j \}$$

where \sum_i represents the sum over all BM Units and \sum^n represents the sum over those accepted Bids that are not De Minimis Accepted Bids and not Arbitrage Accepted Bids and not Trade Tagged Bids and \sum^t represents the sum over all Forward Sales that are not Trade Tagged Forward Sales.

If for any Settlement Period $\{\sum_i \sum^n \{QAB_{ij}^n * TLM_{ij}\} + \sum^t SV_j\}$ is equal to zero, then:

- If for that Settlement Period $\{\sum_i \sum^n \{QAO_{ij}^n * TLM_{ij}\} + \sum^t BV_j\}$ is equal to zero, the System Sell Price for that Settlement Period will be equal to zero;
- Otherwise, the System Sell Price will be determined as the minimum of System Buy Price and:
 - The Bid Price of the most expensive Bid available in that Settlement Period which has a negative Bid-Offer Pair Number and which has a Bid Price less than the Bid Price of any Bid which is an Arbitrage Accepted Bid in respect of that Settlement Period, for which the value of Bid-Offer Volume ($qBO_{ij}^n(t)$) is less than zero for all spot times t in that Settlement Period;
 - Or, if no such Bid exists, zero.

2.3.3 Other Amendments Required to Support Modification Proposal P90

The amendments to the mechanism for calculating Energy Imbalance Prices have implications on other areas of the Settlement Calculations, specifically with reference to the removal of the requirement to apply the Continuous Acceptance Duration Limit (CADL) and the amendments to BSAD reporting and utilisation. The following reflects additional amendments required to support Modification P90.

- References to the Continuous Acceptance Duration Limit should be removed. This applies to Section T 3.1A and 3.1B of the Balancing and Settlement Code.
- Removal of the Continuous Acceptance Duration Limit means that the concept of Priced and Un-priced Bid – Offer Acceptances is no longer required. Therefore:
 - Determination of the Period Priced Bid – Offer Volume (Section T 3.8A) is no longer required (it is, in effect, replaced by T 3.8 which calculates the Period Accepted Bid – Offer Volume);
 - Determination of the Period BM Unit Total Priced Accepted Bid – Offer Volume (Section T 3.9A) is no longer required (it is, in effect, replaced by T 3.9 which calculates the Period BM Unit Total Accepted Bid – Offer Volume);
 - Determination of the System Total Un-priced Accepted Offer Volume (Section T 4.4.2B) is no longer required (it is, in effect, replaced by T 4.4.1 which calculates the System Total Accepted Offer Volume);
 - Determination of the System Total Un-priced Accepted Bid Volume (Section T 4.4.2C) is no longer required (it is, in effect, replaced by T 4.4.2 which calculates the System Total Accepted Bid Volume);
 - The determination of the Energy Imbalance Prices will no longer utilise Priced Acceptances (as set out in section 2.3.2 of this Requirements Specification);
 - In respect of each Settlement Period, the Total Accepted Priced Offer Volume, derived at T 4.4.7 will be amended as follows:

The Total Accepted Untagged Offer Volume (i.e. the volume of Offers that are not Trade Tagged, (and therefore by implication not De Minimis Tagged, nor Arbitrage Tagged) is:

$$TUQAO_j = \sum_i \sum^n QAO_{ij}^n$$

where \sum_i represents the sum over all BM Units and \sum^n represents the sum over those accepted Offers that are not De Minimis Accepted Offers and not Arbitrage Accepted Offers and not Trade Tagged Offers.

- In respect of each Settlement Period, the Total Accepted Priced Bid Volume, derived at T 4.4.8 will be amended as follows:

The Total Accepted Untagged Bid Volume (i.e. the volume of Bids that are not Trade Tagged, (and therefore by implication not De Minimis Tagged, nor Arbitrage Tagged) is:

$$TUQAB_j = \sum_i \sum^n QAB_{ij}^n$$

where \sum_i represents the sum over all BM Units and \sum^n represents the sum over those accepted Bids that are not De Minimis Accepted Bids and not Arbitrage Accepted Bids and not Trade Tagged Bids.

- In respect of each Settlement Period, the Total Arbitrage Volume (T 4.4.9) will be determined as follows:

$$TAQ_j = \sum_i (\sum^{n'} QAB_{ij}^{n'} - \sum^{n*} QAO_{ij}^{n*}) / 2$$

where \sum_i represents the sum over all BM Units and $\sum^{n'}$ represents the sum over those accepted Bids that are Arbitrage Accepted Bids and \sum^{n*} represents the sum over those accepted Offers that are Arbitrage Accepted Offers.

- Section T Annex T-1 requires amendment to Paragraph 1, 'Interpretation' to reflect that there is no longer the concept of Priced and Un-priced Bid – Offer Acceptances, as follows:

Paragraph 1.1 should be deleted and flagged as [NOT USED], and 1.2 amended to read:

For the purposes of this Annex T-1, and paragraph 4.4, in relation to a BM Unit and Settlement Period, an "accepted Offer" means the Period BM Unit Total Accepted Offer Volume (QAO_{ij}^n), and an "accepted Bid" means the Period BM Unit Total Accepted Bid Volume (QAB_{ij}^n) but excluding Offers and Bids where the value of Period BM Unit Total Accepted Offer Volume or Period BM Unit Total Accepted Bid Volume (as the case may be) is zero.

- Section T Annex T-1 requires amendment to Paragraph 1A, 'De Minimis Volumes' to reflect that there is no longer the concept of Priced and Un-priced Bid – Offer Acceptances, as follows:

1A.1 In respect of each Settlement Period, De Minimis Accepted Offers and De Minimis Accepted Bids will be defined in the following way.

- (a) All accepted Bids for which $|QAB_{ij}^n| < DMAT_d$ shall be tagged as De Minimis Accepted Bids.
- (b) All accepted Offers for which $QAO_{ij}^n < DMAT_d$ shall be tagged as De Minimis Accepted Offers.

1A.2 All accepted Bids and accepted Offers which are not De Minimis Accepted Bids and De Minimis Accepted Offers will be defined as Non-De Minimis Bids and Non-De Minimis Offers respectively.

- Section T Annex T-1 requires amendment to Paragraph 2, 'Arbitrage' to reflect that there is no longer the concept of Priced and Un-priced Bid – Offer Acceptances, as follows:

2.1 In respect of each Settlement Period, Arbitrage Accepted Offers and Arbitrage Accepted Bids will be defined in the following way.

2.2 If, for the highest priced accepted non-De Minimis Bid, QAB_{ij}^g (if any) which is not an Arbitrage Accepted Bid, there exists any accepted non-De Minimis Offer which is not an Arbitrage Accepted Offer QAO_{ij}^n for which it is true that $PO_{ij}^n \leq PB_{ij}^g$, then the following procedure will be carried out:

(a) All accepted Non-De Minimis Offers for which $PO_{ij}^n \leq PB_{ij}^g$ will be ranked in price order, cheapest first.

(b) The set of accepted Non-De Minimis Offers $\{QAO_{ij}^{n1}, QAO_{ij}^{n2}, \dots, QAO_{ij}^{nw}\}$ is then a ranked set of accepted Offers for all of which it is true that $PO_{ij}^{nw} \leq PB_{ij}^g$.

(c) Then for all v such that

$$\sum^v QAO_{ij}^{nv} \leq -QAB_{ij}^g$$

where \sum^v is the sum over all ranked accepted Non-De Minimis Offers up to v ,

the QAO_{ij}^{nv} will be defined as Arbitrage Accepted Offers and the fraction ϕ of QAB_{ij}^g which is equal to $\sum^v (-QAO_{ij}^{nv})$ will be defined as an Arbitrage Accepted Bid (this fraction may be one (1)).

(d) If:

$$\sum^v QAO_{ij}^{nv} < -QAB_{ij}^g$$

where \sum^v is the sum over all ranked accepted Non-De Minimis Offers up to v ,

then, if a ranked accepted Non-De Minimis Offer, $v+1$ exists, the fraction γ of QAO_{ij}^{nv+1} which satisfies

$$\sum^v QAO_{ij}^{nv} + \gamma * QAO_{ij}^{nv+1} = -QAB_{ij}^g$$

will also be defined as an Arbitrage Accepted Offer and QAB_{ij}^g will be defined as an Arbitrage Accepted Bid. All accepted Bids and accepted Offers which are not Arbitrage Accepted Bids and Arbitrage Accepted Offers will be defined as Non-arbitrage Bids and Non-arbitrage Offers respectively.

2.3 The process in paragraphs 2.1 and 2.2 will then be repeated for the highest priced accepted Non-De Minimis Bid (if any) that remains a Non-arbitrage Bid.

2.4 If, for the purposes of carrying out the procedure in paragraphs 2.1 and 2.2:

(a) there are two or more accepted Non-De Minimis Bids that are Non-arbitrage Bids, that have the same highest Bid Price, or

(b) there are two or more ranked accepted Non-De Minimis Offers that have the same Offer Price

then one of the accepted Bids or (as the case may be) ranked accepted Offers will be selected at random.

2.5 If the completed application of paragraphs 2.1 to 2.4 inclusive (the 'initial calculation') would result in there being any accepted Non-De Minimis Bid or ranked accepted Non-De Minimis Offer which:

(1) is not an Arbitrage Accepted Bid or (as the case may be) Arbitrage Accepted Offer, but

- (2) has the same price (other than merely by virtue of being a fraction $(1 - \gamma)$ or $(1 - \phi)$ pursuant to the initial calculation) as an accepted Non-De Minimis Bid which is an Arbitrage Accepted Bid or (as the case may be) ranked accepted Non-De Minimis Offer which is an Arbitrage Accepted Offer,

then:

- (i) all such accepted Non-De Minimis Bids QAB^{nr}_{ij} or ranked accepted Non-De Minimis Offers QAO^{nr}_{ij} (whether or not Arbitrage Accepted Bids or Arbitrage Accepted Offers on the basis of the initial calculation) which have the same price are "threshold Bids" or "threshold Offers";
- (ii) no threshold Bid or threshold Offer shall be defined as an Arbitrage Accepted Bid or Arbitrage Accepted Offer pursuant to the relevant provision, but instead the fraction δ of each threshold Bid QAB^{nr}_{ij} or threshold Offer QAO^{nr}_{ij} which satisfies the following shall be defined as a Arbitrage Accepted Bid or (as the case may be) Arbitrage Accepted Offer:

$$\delta * \sum^{nr} QAB^{nr}_{ij} = \sum^{nr'} QAB^{nr'}_{ij}$$

or (as the case may be)

$$\delta * \sum^{nr} QAO^{nr}_{ij} = \sum^{nr'} QAO^{nr'}_{ij}$$

where

\sum^{nr} is the sum over all threshold Bids or (as the case may be) threshold Offers, and

$\sum^{nr'}$ is the sum over all threshold Bids or (as the case may be) threshold Offers (including a fraction γ or ϕ) which, on the basis of the initial calculation would have been defined as Arbitrage Accepted Bids or Arbitrage Accepted Offers.

- New paragraphs are required (in Section T of the Code) to support the amendments to BSAD utilisation and associated amendment to reporting requirements (in order to verify Settlement Calculations), as follows:

- New clause at T 4.4.2D – In respect of Settlement Period, the Total Forward Purchase Volume (i.e. the total volume of BSAD Forward Purchases) is:

$$TBV_j = \sum^t BV_j$$

where \sum^t represents the sum over all Transmission Company Forward Purchases.

- New clause at T 4.4.2E – In respect of Settlement Period, the Total Forward Sale Volume (i.e. the total volume of BSAD Forward Sales) is:

$$TSV_j = \sum^t SV_j$$

where \sum^t represents the sum over all Transmission Company Forward Sales.

- New clause at T 4.4.7A – In respect of each Settlement Period, the Total Untagged Forward Purchase Volume (i.e. the volume of BSAD Forward Purchases that are not Trade Tagged, and are therefore going forward to set the Energy Imbalance Price) is:

$$TUBV_j = \sum^t BV_j$$

where \sum^t represents the sum over all Transmission Company Forward Purchases that are not Trade Tagged Forward Purchases.

- New clause at T 4.4.8A – In respect of each Settlement Period, the Total Untagged Forward Sale Volume (i.e. the volume of BSAD Forward Sales that are not Trade Tagged, and are therefore going forward to set the Energy Imbalance Price) is:

$$TUSV_j = \sum^t SV_j$$

where \sum^t represents the sum over all Transmission Company Forward Sales that are not Trade Tagged Forward Sales.

- In respect of each Settlement Period, the Total Trade Tagged Volume (T 4.4.10) will be determined as follows:

$$TCQ_j = (\sum_i \sum^{n'} QAB_{ij}^{n'} + (TSV_j - TUSV_j)) - (\sum_i \sum^{n*} QAPO_{ij}^{n*} + (TBV_j - TUBV_j))/2$$

where \sum_i represents the sum over all BM Units and $\sum^{n'}$ represents the sum over those accepted Bids that are Trade Tagged Bids and \sum^{n*} represents the sum over those accepted Offers that are Trade Tagged Offers.

- A new variable to report the Remaining Imbalance Volume is required. In respect of each Settlement Period, the Remaining Imbalance Volume is determined as follows:

Where $TQAO_j + TBV_j > (-TQAB_j) + (-TSV_j)$ then the Remaining Imbalance Volume (RIV_j) is:

$$RIV_j = TUQAO_j + TUBV_j$$

Where $TQAO_j + TBV_j < (-TQAB_j) + (-TSV_j)$ then the Remaining Imbalance Volume (RIV_j) is:

$$RIV_j = TUQAB_j + TUSV_j$$

- The Trade Tagging process is required to be amended to include the stacked individual BSAD trades in the tagging process. This will require the following amendments to Section T, Annex T-1, 3 'Trade Tagging':

3.1 In respect of each Settlement Period, Trade Tagged Offers, Trade Tagged Forward Purchases, Trade Tagged Bids and Trade Tagged Forward Sales will be defined in the following way.

- (a) If:

$$\sum^{n'} (-QAB_{ij}^{n'}) + \sum^t (-SV_j) \leq BRL_j$$

where $\sum^{n'}$ is the sum over those accepted Bids that are both Non-De Minimis Bids and Non-arbitrage Bids and where \sum^t is the sum over all Transmission Company Forward Sales; or

$$\sum^{n*} QAO_{ij}^{n*} + \sum^t BV_j \leq BRL_j$$

where \sum^{n*} is the sum over those accepted Offers that are both Non-De Minimis Offers and Non-arbitrage Offers and where \sum^t is the sum over all Transmission Company Forward Purchases

then no Bids or Offers will be Trade Tagged.

- (b) Otherwise, the following procedure will be carried out. The set of all accepted Bids, which are neither De Minimis Bids nor Arbitrage Bids, will be ranked in price order, cheapest first. In any case where such Bids have the same price as each other, the

ordering of such Bids will be random, subject to paragraph (g). The set of Non-De Minimis and Non-arbitrage Bids $\{QAB^{n1}_{ij}, QAB^{n2}_{ij}, \dots, QAB^{nw}_{ij}\}$ is then a set of "Ranked Bids".

For the set of all Transmission Company Forward Sales, each will be included in the set of Ranked Bids, in price order, and, for the purposes of Trade Tagging only, each Forward Sale will be assigned an n' value and the n' values of the Ranked Bids will be adjusted accordingly¹. The set of Ranked Bids, including the (individual) Forward Sales (SV_j) will then be a set of "Ranked Bid Volumes", as follows:

$$(-QAB^{n'}_{ij} \dots), (-SV^{n'}_j \dots)$$

The set of all accepted Offers, which are neither De Minimis Offers nor Arbitrage Offers will be ranked in price order, most expensive first. In any case where such Offers have the same price as each other, the ordering of such Offers will be random, subject to paragraph (g). The set of Non-De Minimis and Non-arbitrage Offers $\{QAO^{n1}_{ij}, QAO^{n2}_{ij}, \dots, QAO^{nx}_{ij}\}$ is then a set of "Ranked Offers".

For the set of all Transmission Company Forward Purchases, each will be included in the set of Ranked Offers, in price order, and, for the purposes of Trade Tagging only, each Forward Purchase will be assigned an n^* value and the n^* values of the Ranked Offers will be adjusted accordingly². The set of Ranked Offers, including the (individual) Forward Sales (BV_j) will then be a set of "Ranked Offer Volumes", as follows:

$$(QAO^{n^*}_{ij} \dots), (BV^{n^*}_j \dots)$$

(c) If:

$$\sum^{n'}((-QAB^{n'}_{ij}) + (-SV^{n'}_j)) \leq \sum^{n^*}(QAO^{n^*}_{ij} + BV^{n^*}_j)$$

where $\sum^{n'}$ is the sum over all Ranked Bid Volumes and \sum^{n^*} is the sum over all Ranked Offer Volumes.

then for the smallest value of q such that

$$\sum^{n^{v>q}}((-QAB^{n^v}_{ij}) + (-SV^{n^v}_j)) \leq BRL_j$$

where $\sum^{n^{v>q}}$ is the sum over those Ranked Bid Volumes for which v is greater than q

then, subject to paragraph (g):

(A) for all $q \geq 1$ the Ranked Bid Volumes numbered n'_1 to n'_{q-1} will be defined as Trade Tagged Bids, or Trade Tagged Forward Sales, as the case may be, and

(B) if

$$\sum^{n^{v>q}}((-QAB^{n^v}_{ij}) + (-SV^{n^v}_j)) = BRL_j$$

then the Ranked Bid Volume numbered n'_q will be defined as a Trade Tagged Bid, or Trade Tagged Forward Sale, as the case may be; or if

$$\sum^{n^{v>q}}((-QAB^{n^v}_{ij}) + (-SV^{n^v}_j)) < BRL_j$$

then the fraction γ of $QAB^{n^q}_{ij}$, or $SV^{n^q}_j$ as the case may be, which satisfies

$$-(\sum^{n^{v>q}}((QAB^{n^v}_{ij}), (-SV^{n^v}_j)) + (1 - \gamma) * ((QAB^{n^q}_{ij}), (-SV^{n^q}_j))) = BRL_j$$

¹ see Figure 2.2 below.

² see Figure 2.2 below.

will also be defined as a Trade Tagged Bid, or Trade Tagged Forward Sale, as the case may be.

- (d) Since $\sum^{n'}((-QAB^{n'}_{ij}) + (-SV^{n'}_j)) \leq \sum^{n^*}(QAO^{n^*}_{ij} + BV^{n^*}_j)$ there must exist a number e and a number φ (which may be a fraction or zero) for which

$$-(\sum^{n^v < q}((QAB^{n^v}_{ij}), (-SV^{n^v}_j))) + \gamma * ((QAB^{n^q}_{ij}), (-SV^{n^q}_j)) = \sum^{n^*v < e}((QAO^{n^*v}_{ij}), (BV^{n^*v}_j)) + \varphi * ((QAO^{n^*e}_{ij}), (BV^{n^*e}_j))$$

where $\sum^{n^v < q}$ is the sum over those Ranked Bid Volumes for which v is less than q and $\sum^{n^*v < e}$ is the sum over those Ranked Offer Volumes for which v is less than e .

Subject to paragraph (g), the Ranked Offer Volumes numbered 1 to $e-1$ for which this is true will be defined as Trade Tagged Offers, and Trade Tagged Forward Purchases, as the case may be. If φ is a fraction rather than 0, then the fraction φ of the Ranked Offer Volume numbered e will be defined as a Trade Tagged Offer, or a Trade Tagged Forward Purchase, as the case may be.

- (e) If

$$\sum^{n'}((-QAB^{n'}_{ij}) + (-SV^{n'}_j)) > \sum^{n^*}(QAO^{n^*}_{ij} + BV^{n^*}_j)$$

where $\sum^{n'}$ is the sum over all Ranked Bid Volumes and \sum^{n^*} is the sum over all Ranked Offer Volumes,

then for the smallest value of q such that

$$\sum^{n^*v > q}(QAO^{n^*v}_{ij}) + (BV^{n^*v}_j) \leq BRL_j$$

where $\sum^{n^*v > q}$ is the sum over those Ranked Offer Volumes for which v is greater than q

then, subject to paragraph (g):

- (A) for all $q \geq 1$ the Ranked Offer Volumes numbered n^*_1 to n^*_{q-1} will be defined as Trade Tagged Offers, or Trade Tagged Forward Purchases, as the case may be, and

- (B) if

$$\sum^{n^*v > q}(QAO^{n^*v}_{ij} + BV^{n^*v}_j) = BRL_j$$

then the Ranked Offer Volume numbered n^*_q will be defined as a Trade Tagged Offer, or Trade Tagged Forward Purchase, as the case may be; or if

$$\sum^{n^*v > q}(QAO^{n^*v}_{ij} + BV^{n^*v}_j) < BRL_j$$

then the fraction γ of $QAO^{n^*q}_{ij}$, or $BV^{n^*q}_j$ as the case may be, which satisfies

$$\sum^{n^*v > q}(QAO^{n^*v}_{ij}), (BV^{n^*v}_j) + (1 - \gamma) * (QAO^{n^*q}_{ij}), (BV^{n^*q}_j) = BRL_j$$

will also be defined as a Trade Tagged Offer, or Trade Tagged Forward Purchase, as the case may be.

- (f) Since $\sum^{n'}((-QAB^{n'}_{ij}) + (-SV^{n'}_j)) > \sum^{n^*}(QAO^{n^*}_{ij} + BV^{n^*}_j)$ there must exist a number e and a number φ (which may be a fraction or zero) for which

$$-(\sum^{n^v < e}((QAB^{n^v}_{ij}), (-SV^{n^v}_j))) + \gamma * ((QAB^{n^e}_{ij}), (-SV^{n^e}_j)) = \sum^{n^*v < q}((QAO^{n^*v}_{ij}), (BV^{n^*v}_j)) + \varphi * ((QAO^{n^*q}_{ij}), (BV^{n^*q}_j))$$

where $\sum^{n^v>e}$ is the sum over those Ranked Bid Volumes for which v is less than e and $\sum^{n^v<q}$ is the sum over those Ranked Offer Volumes for which v is less than q .

Subject to paragraph (g), the Ranked Bid Volumes numbered 1 to $e-1$ for which this is true will be defined as Trade Tagged Bids, and Trade Tagged Forward Sales, as the case may be. If ϕ is not equal to zero, then the fraction ϕ of the Ranked Bid Volume numbered e will be defined as a Trade Tagged Bid, or a Trade Tagged Forward Sale, as the case may be.

(g) However, for each of paragraphs (c), (d), (e) and (f) (each a "relevant provision") separately, if the application of the relevant provision (the 'initial calculation') would result in there being any Ranked Bid Volume or Ranked Offer Volume which:

- (1) is not a Trade Tagged Bid or Trade Tagged Forward Sale or (as the case may be) Trade Tagged Offer or Trade Tagged Forward Purchase, but
- (2) has the same price (other than merely by virtue of being a fraction $(1 - \gamma)$ or $(1 - \phi)$ pursuant to the initial calculation) as a Ranked Bid Volume which is a Trade Tagged Bid or Trade Tagged Forward Sale or (as the case may be) Ranked Offer Volume which is a Trade Tagged Offer or Trade Tagged Forward Purchase,

then:

- (i) all such Ranked Bid Volumes ($QAB^{n^r_{ij}}$), ($SV^{n^r_j}$) or Ranked Offer Volumes ($QAO^{n^r_{ij}}$), ($BV^{n^r_j}$) (whether or not Trade Tagged Bids or Trade Tagged Forward Sales or Trade Tagged Offers or Trade Tagged Forward Purchases on the basis of the initial calculation) which have the same price are "threshold Bid Volumes" or "threshold Offer Volumes";
- (ii) no threshold Bid Volume or threshold Offer Volume shall be defined as a Trade Tagged Bid or Trade Tagged Forward Sale, or Trade Tagged Offer or Trade Tagged Forward Purchase pursuant to the relevant provision, but instead the fraction δ of each threshold Bid Volume ($QAB^{n^r_{ij}}$), ($SV^{n^r_j}$) or threshold Offer Volume ($QAO^{n^r_{ij}}$), ($BV^{n^r_j}$) which satisfies the following shall be defined as a Trade Tagged Bid or Trade Tagged Forward Sale or (as the case may be) Trade Tagged Offer or Trade Tagged Forward Purchase:

$$\delta * \sum^{n^r} (QAB^{n^r_{ij}}, (SV^{n^r_j})) = \sum^{n^r} (QAB^{n^r_{ij}}, (SV^{n^r_j}))$$

or (as the case may be)

$$\delta * \sum^{n^r} (QAO^{n^r_{ij}}, (BV^{n^r_j})) = \sum^{n^r} (QAO^{n^r_{ij}}, (BV^{n^r_j}))$$

where

\sum^{n^r} is the sum over all threshold Bid Volumes or (as the case may be) threshold Offer Volumes, and

\sum^{n^r} is the sum over all threshold Bid Volumes or (as the case may be) threshold Offer Volumes (including a fraction γ or ϕ thereof) which, on the basis of the initial calculation would have been defined as Trade Tagged Bids, Trade Tagged Forward Sales, or Trade Tagged Offers or Trade Tagged Forward Purchases.

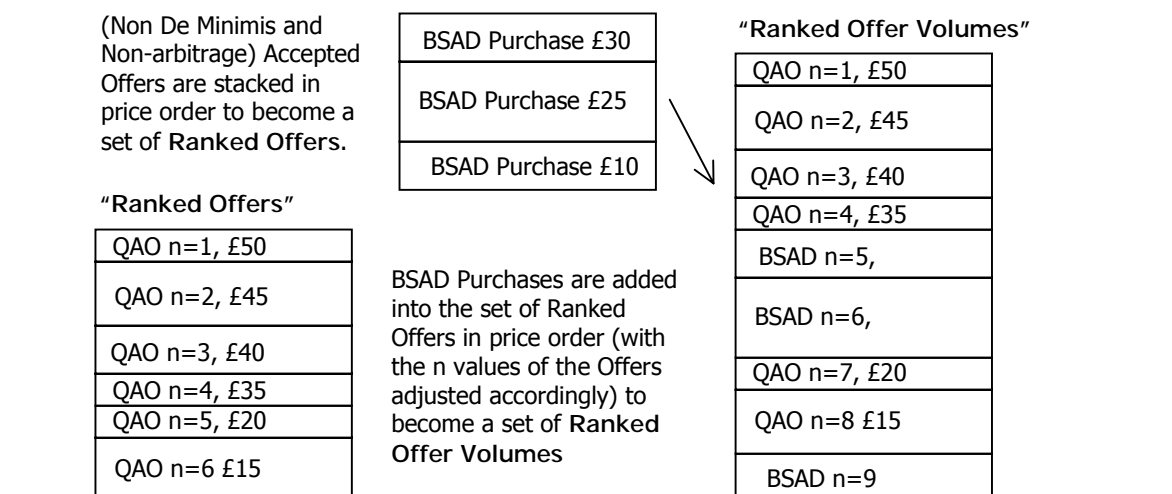


Figure 2.2: Example of Ranking of Offer and Forward Purchase Volumes to form a set of Ranked Offer Volumes.

This completes the requisite amendments to the Settlement Calculations to support Modification P90.

2.3.4 Amendments to Code Definitions to Support Proposed Modification P90

The amendments to the Settlement Calculations require amendments to existing definitions, addition of new definitions and removal of definitions no longer required. The following represents a high level summary of the amendments required:

2.3.4.1 Amendments to Existing Definitions

- BCA_j Buy Price Cost Adjustment (£) should be replaced with BC_j Forward Purchase Price (£/MWh);
- BVA_j Buy Price Volume Adjustment (MWh) should be replaced with BV_j Forward Purchase Volume (MWh);
- SCA_j Sell Price Cost Adjustment (£) should be replaced with SC_j Forward Sale Price (£/MWh);
- SCA_j Sell Price Volume Adjustment (MWh) should be replaced with SV_j Forward Sale Price (MWh);
- $TQAPO_j$ Total Accepted Priced Offer Volume should be replaced with $TUQAO_j$ Total Accepted Untagged Offer Volume; and
- $TQAPB_j$ Total Accepted Priced Bid Volume should be replaced with $TUQAB_j$ Total Accepted Untagged Bid Volume.

2.3.4.2 New Definitions

- New superscript 't' – Transmission Company Forward Trades;
- RIV_j Remaining Imbalance Volume – for each Settlement Period this is the volume of balancing actions on the main stack remaining after Trade Tagging;
- TBV_j Total Forward Purchase Volume – for each Settlement Period, this is the total volume of Forward Purchases taken by the Transmission Company;

- TSV_j Total Forward Sale Volume – for each Settlement Period, this is the total volume of Forward Sales taken by the Transmission Company;
- TUBV_j Total Untagged Forward Purchase Volume – for each Settlement Period, this is the total volume of Forward Purchases taken by the Transmission Company, which are untagged after Trade Tagging has been applied;
- TUSV_j Total Untagged Forward Sale Volume – for each Settlement Period, this is the total volume of Forward Sales taken by the Transmission Company, which are untagged after Trade Tagging has been applied;
- Trade Tagged Forward Purchases – for each Settlement Period these are the BASD Forward Purchases that have been tagged out by the Trade Tagging process; and
- Trade Tagged Forward Sales – for each Settlement Period these are the BASD Forward Sales that have been tagged out by the Trade Tagging process.

2.3.4.3 Definitions to be Deleted

- Continuous Acceptance Duration Limit;
- Period Priced Bid Volume;
- Period Priced Offer Volume;
- Period BM Unit Total Priced Accepted Bid Volume;
- Period BM Unit Total Priced Accepted Offer Volume;
- System Total Un-priced Accepted Offer Volume; and
- System Total Un-priced Accepted Bid Volume.

2.3.5 Amendments to the Settlement Report (SAA-I014)

The following details the potential amendments required to the relevant sub-flows of the Settlement Report (SAA-I014 / S0141, S0142 and S0143) as a consequence of the amendments to the Energy Imbalance Price calculation.

The following reporting requirements / amendments have been identified against the Interface Design Definition (IDD) document, in order to provide clarity for the BSC Central Service Provider.

2.3.5.1 Amendments to the Transmission Company subflow (S0142)

The Transmission Company sub-flow of the Settlement Report (S0142) requires amendment as follows:

Group SPI 'Settlement Period Information':

- Amend the report to include a group for reporting each of the individual BSAD trades (expected that the format would be similar to that set out in section 2.2.1);
- New variables, and therefore new data items, should be included and reported in this group, as follows:
 - Remaining Imbalance Volume (RIV) (MWh);
 - Total Forward Purchase Volume (TBV) (MWh);
 - Total Forward Sale Volume (TSV) (MWh);

- Total Untagged Forward Purchase Volume (TUBV) (MWh); and
- Total Untagged Forward Sale Volume (TUSV) (MWh).

Group SSD 'System Period Data':

The same amendments as those listed for the group 'Settlement Period Information' (SPI) would need to be included in the 'System Period Data' group.

2.3.5.2 *Amendments to the BSC Party subflow (S0141)*

Group SSD 'System Period Data':

The same amendments as those listed for the group 'Settlement Period Information' (SPI) under the Transmission Company sub-flow (S0142) would need to be included in the 'System Period Data' group in this subflow.

2.3.5.3 *Amendments to the ELEXON subflow (S0143)*

Group SSD 'System Period Data':

The same amendments as those listed for the group 'Settlement Period Information' (SPI) under the Transmission Company sub-flow (S0142) would need to be included in the 'System Period Data' group in this subflow.

3 OTHER CHANGES REQUIRED

This section defines amendments to industry systems, processes and documentation not already identified in the previous sections.

3.1 Potential Changes to External Systems

All Parties, the Transmission Company and ELEXON (as they also receive the Transmission Company variant of the Settlement Report) are impacted by the amendments to the Settlement Report, as set out in section 2.3.5.

However, it should be noted that Parties can determine whether they wish to continue receiving the old version of the report (i.e. without the amendments and therefore reducing the ability to accurately verify their trading charges), or the new report, with the amendments. This enables them to determine the timeframes for implementation of an amended interface independently of its development within the Central Services (unlike a 'big bang' approach). However, the impact from the implementation of amendments to the Settlement Report is still likely to be significant.

3.2 Potential Changes to Industry Documentation

The following lists the documentation (other than the documentation specific to the BSC Central Service Agent and therefore 'owned' by the Central Services, such as the URSSs) that requires amendment as a result of the implementation of the Modification with a brief summary of the potential change. The documentation listed is believed to represent the full set of impacted documents at this time.

3.2.1 The Code

No amendments to the Code, other than those previously defined, are identified at this time.

3.2.2 Code Subsidiary Documents - The Reporting Catalogue

The Reporting Catalogue (v2.0) requires amendment to reflect the amendments to the Settlement Report, as detailed in section 2.3.5.

Section 3.1 Interim Information Settlement Report

3.1.1 Report sent to the Transmission Company (TC)

- (b) Settlement Period Information ...
- (h) Settlement Period Information
 - System Period Data

The amendments listed in section 2.3.5 should be applied to these sections of the Reporting Catalogue.

3.1.2 Report sent to BSCCo

- (c) Settlement Period Information
 - System Period Data

The amendments listed in section 2.3.5 should be applied to this section of the Reporting Catalogue.

3.1.3 Reports sent to Parties

- (b) Settlement Period Information
 - System Period Data

The amendments listed in section 2.3.5 should be applied to this section of the Reporting Catalogue.

No other amendments to the Code Subsidiary Documents, other than those defined above, are identified at this time.

3.2.3 Service Description for the Balancing Mechanism Reporting Agent

It should be noted that the Service Description for the BMRA, Section 9.21 Calculation of Energy Imbalance Prices, refers to the calculation undertaken by the SAA. Therefore no amendments to the Service Description for the BMRA are required for the implementation of this option for Modification P90.

3.2.4 Service Description for the Settlement Administration Agent

The following amendments are required to support the implementation of Modification P90:

- The list of BSAD variables at 2.1.2 requires amendment to reflect the receipt of individual BSAD trades for each Settlement Period (reflecting the amendments defined in section 2.2.1 of this requirements specification);
- Remove clause 2.6.4, as this relates to CADL (either flag as NOT USED, or renumber the rest of the section accordingly);
- Remove clause 3.10, as this relates to CADL (either flag as NOT USED, or renumber the rest of the section accordingly);

- Remove clause 3.14, as this relates to CADL (either flag as NOT USED, or renumber the rest of the section accordingly);
- Clause 3.26.1 requires amendment to:
 - Remove the first bullet, as this relates to CADL;
 - Add in a new bullet between bullets 3 and 4 to reflect the addition of individual BSAD trades into the stacks;
 - Remove bullet point 8, as this refers to CADL;
 - Add in a new bullet point between bullet 10 and 11, to reflect the addition of individual BSAD trades into the Bid – Offer stacks prior to Trade Tagging; and
 - Amend the eleventh bullet to reflect that Trade Tagging is applied to Bid – Offer Acceptances and individual BSAD trades.
- Remove clause 3.29, as this relates to CADL (either flag as NOT USED, or renumber the rest of the section accordingly);
- Remove clause 3.30, as this relates to CADL (either flag as NOT USED, or renumber the rest of the section accordingly);
- Section 3.31 of the service description should be amended to reflect the new Energy Imbalance Price calculations, as defined in section 2.3 of this requirements specification;
- Section 3.32 of the service description should be amended to reflect the new Energy Imbalance Price calculations, as defined in section 2.3 of this requirements specification;
- Remove clause 3.33, as this relates to CADL (either flag as NOT USED, or renumber the rest of the section accordingly); and
- Remove clause 3.34, as this relates to CADL (either flag as NOT USED, or renumber the rest of the section accordingly).

No other amendments to the Service Descriptions, other than those defined above, are identified at this time.

3.2.5 NETA Data File Catalogue

The NETA Data File Catalogue requires amendment to include the new and amended reports, as defined in Sections 2.3.5 of this Requirements Specification.

No other amendments to the NETA Data File Catalogue are identified at this time.

4 OPTIONS FOR AN ALTERNATIVE MODIFICATION

There are currently five options under consideration for an Alternative Modification to Modification Proposal P90. This section describes each option at a sufficient level to enable an impact assessment to be performed.

4.1 Option 1: Dynamic Balancing Reserve Level (Real Time)

Option 1 proposes the same mechanism as that described for the Proposed Modification (as set out in sections 2 and 3 of this requirements specification), with the following amendments:

- A definition of what constitutes regulating reserve will be derived (for example, those trades taken for warming contracts, standing reserve, regulating reserve and frequency response), such that the Transmission Company can identify ahead of Gate Closure which of their trades for that Settlement Period have been taken for regulating reserve purposes;
- The Transmission Company provide a MWh volume into the BSC Central Service Agent (BMRA and SAA) deemed to have been the amount of regulating reserve required for the Settlement Period (where this changes after the Settlement Period, then the Transmission Company will provide amended values into BMRA and SAA, in the same way as amended BSAD is provided).

It is expected that the BSAD interface, as set out in section 2.2.1 of this requirements specification, would be amended to include (at Settlement Period level) the regulating reserve level to be applied for the Settlement Period.

- BMRA and SAA will utilise the regulating reserve volume so notified as the Balancing Reserve Level for the Settlement Period. This therefore requires that the BRL can be set automatically from the volume notified by the Transmission Company and that it can be varied dynamically between Settlement Periods, and that the value can change retrospectively for a Settlement Period where amendments are identified and notified.
- A default rule is required for this mechanism to cover circumstances where there have been no trades identifiable as regulating reserve, or there is a failure to notify the volume associated with such trades. Therefore it is proposed that a default value of the Authority approved value for BRL be used. Therefore given the current determination that BRL should be set to 5 MWh, this would become the default value for Settlement Periods where the regulating reserve value notified by the Transmission Company is zero, or where there is a failure to notify a value.

This mechanism requires amendment to Section T 1.5 of the Code to reflect the definition of what constitutes regulating reserve, and the service levels and obligations surrounding provision of the BRL dynamically.

This will also require consequential amendments to Transmission Company documentation, systems and processes.

4.2 Option 2: Dynamic Balancing Reserve Level (Average)

Option 2 proposes the same mechanism as that described for the Proposed Modification (as set out in sections 2 and 3 of this requirements specification), with the following amendments:

- A definition of what constitutes regulating reserve will be derived (for example, those trades taken for warming contracts, standing reserve, regulating reserve and frequency response), such that the Transmission Company can identify ahead of Gate Closure which of their trades have been taken

for regulating reserve purposes. For this mechanism, it is proposed that the Transmission Company base the value for a Settlement Period on an average of the regulating reserve required over a preceding number of Settlement Days, such that the notified value represents a rolling average of the previously required reserve;

- The Transmission Company provide a MWh volume into the BSC Central Service Agent (BMRA and SAA) deemed to have been the amount of regulating reserve required for the Settlement Period (where this changes after the Settlement Period, then the Transmission Company will provide amended values into BMRA and SAA, in the same way as amended BSAD is provided).

It is expected that the BSAD interface, as set out in section 2.2.1 of this requirements specification, would be amended to include (at Settlement Period level) the regulating reserve level to be applied for the Settlement Period.

- BMRA and SAA will utilise the regulating reserve volume so notified as the Balancing Reserve Level for the Settlement Period. This therefore requires that the BRL can be set automatically from the volume notified by the Transmission Company and that it can be varied dynamically between Settlement Periods, and that the value can change retrospectively for a Settlement Period where amendments are identified and notified.
- A default rule is required for this mechanism to cover circumstances where there have been no trades identifiable as regulating reserve, or there is a failure to notify the volume associated with such trades. Therefore it is proposed that a default value of the Authority approved value for BRL be used. Therefore given the current determination that BRL should be set to 5 MWh, this would become the default value for Settlement Periods where the regulating reserve value notified by the Transmission Company is zero, or where there is a failure to notify a value.

This mechanism requires amendment to Section T 1.5 of the Code to reflect the definition of what constitutes regulating reserve, the time period over which such reserve is calculated, and the service levels and obligations surrounding provision of the BRL for a Settlement Period.

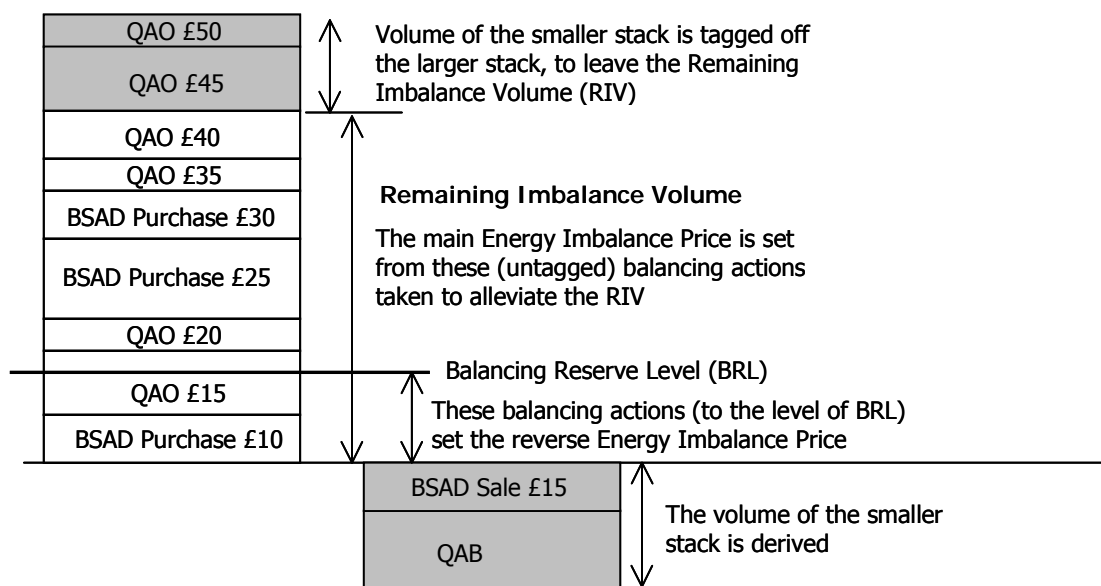
This will also require consequential amendments to Transmission Company documentation, systems and processes.

4.3 Option 3: Reverse Price Set from Main (Larger) Stack

Option 3 proposes the same mechanism as that described for the Proposed Modification (as set out in sections 2 and 3 of this requirements specification), with the following amendments:

- Bid – Offer Acceptances and Transmission Company forward trades (BSAD) will be stacked as defined in section 2 of this requirements specification;
- The Remaining Imbalance Volume will be derived by netting the entire volume of the smaller stack from the larger stack.
- The main Energy Imbalance Price will be set from those balancing actions taken to alleviate the Remaining Imbalance Volume;
- The reverse Energy Imbalance Price will be set from balancing actions on the main stack to the level of BRL, see Figure 4.1 below.

ALL (system and energy) Offer Acceptances are stacked in price order (as reflected below) after Arbitrage and Deminimis Tagging is applied (i.e. no CADL'ing is undertaken). Individual (system and energy) BSAD Purchases are slotted into the stack in price order. The volume of the smaller stack is tagged off the larger stack to leave the RIV (setting the main price). Trade Tagging is then applied to the stack to the level of BRL to derive the reverse price.



ALL (system and energy) Bid Acceptances are stacked in price order (as reflected above) after Arbitrage and Deminimis Tagging is applied (i.e. no CADL'ing is undertaken). Individual (system and energy) BSAD Sales are slotted into the stack in price order.

Figure 4.1: Option 3 Proposed Mechanism for Deriving the Energy Imbalance Prices

This mechanism requires further amendments to the Trade Tagging methodology to support the derivation of the reverse price from the main stack.

4.4 Option 4: Reverse Price set from Main and Reverse Stack

Option 4 proposes the same mechanism as that described for the Proposed Modification (as set out in sections 2 and 3 of this requirements specification), with the following amendments:

- Bid – Offer Acceptances and Transmission Company forward trades (BSAD) will be stacked as defined in section 2 of this requirements specification;
- The Remaining Imbalance Volume will be derived by netting the entire volume of the smaller stack from the larger stack.
- The main Energy Imbalance Price will be set from those balancing actions taken to alleviate the Remaining Imbalance Volume;
- The reverse Energy Imbalance Price will be set by:
 - Deriving a price from balancing actions on the main stack to the level of BRL;
 - Deriving a price from balancing actions on the reverse stack to the level of BRL; and
 - Averaging them to derive a reverse Energy Imbalance Price.

Figure 4.2 below provides a high level schematic to illustrate the proposed mechanism.

This mechanism requires further amendments to the Trade Tagging methodology and to the Energy Imbalance Price calculations to support the derivation of the reverse price from an average of balancing actions to BRL on both the main and reverse stack.

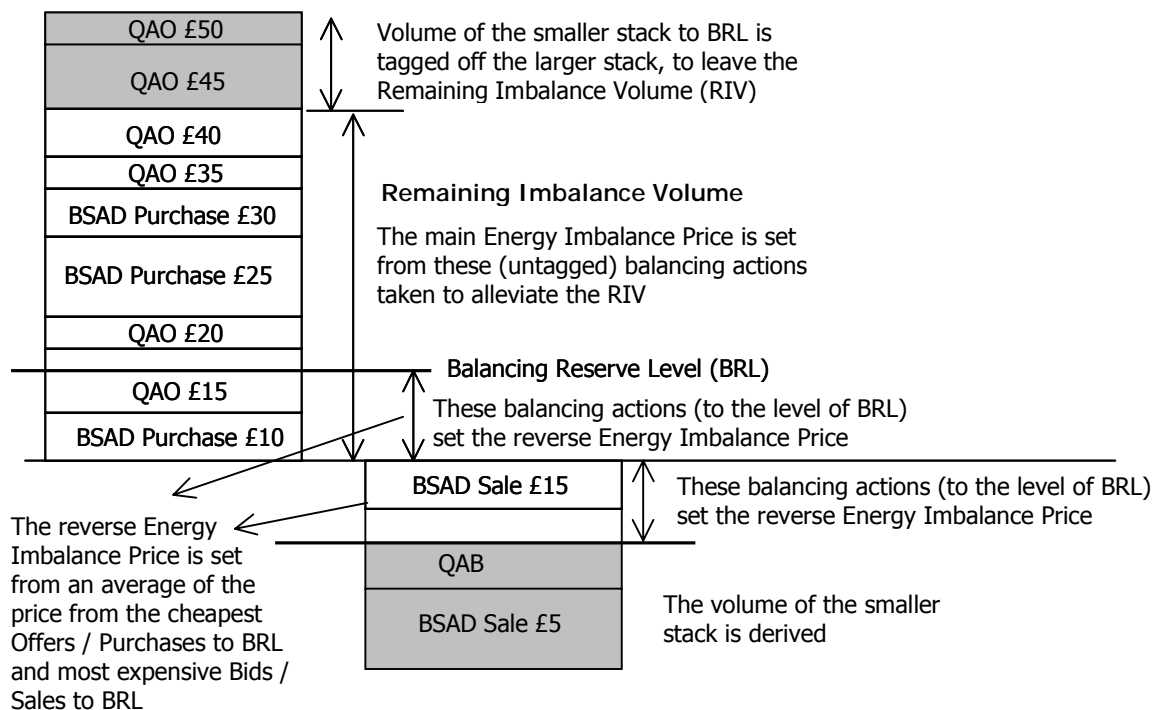


Figure 4.2: Option 4 Proposed Mechanism for Deriving the Energy Imbalance Prices

4.5 Option 5: Reverse Price Set from First Bid – Offer Acceptance on Main Stack

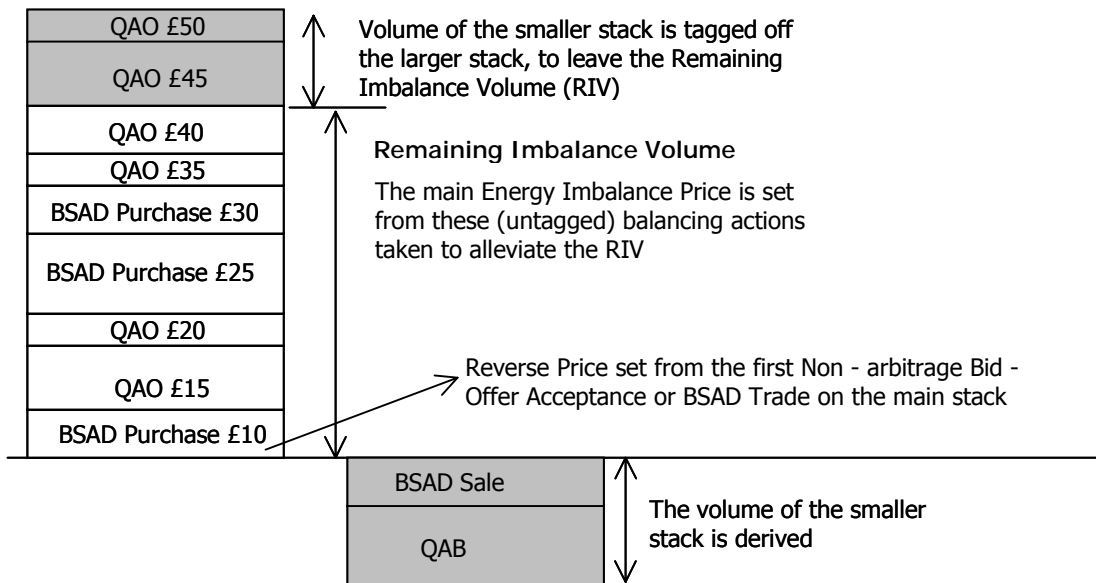
Option 5 proposes the same mechanism as that described for the Proposed Modification (as set out in sections 2 and 3 of this requirements specification), with the following amendments:

- Bid – Offer Acceptances and Transmission Company forward trades (BSAD) will be stacked as defined in section 2 of this requirements specification;
- The Remaining Imbalance Volume will be derived by netting the entire volume of the smaller stack from the larger stack.
- The main Energy Imbalance Price will be set from those balancing actions taken to alleviate the Remaining Imbalance Volume;
- The reverse Energy Imbalance Price will be set from the first Non-arbitrage Bid – Offer Acceptance or BSAD purchase on the main stack, see Figure 4.3 below.

This mechanism requires further amendments to the Trade Tagging methodology and to the Energy Imbalance Price calculations to support the derivation of the reverse price from a single balancing action on the main stack.

This mechanism also negates the requirement for Balancing Reserve Level, and therefore references to BRL should be removed from the Code.

ALL (system and energy) Offer Acceptances are stacked in price order (as reflected below) after Arbitrage and Deminimis Tagging is applied (i.e. no CADL'ing is undertaken). Individual (system and energy) BSAD Purchases are slotted into the stack in price order. The volume of the smaller stack is tagged off the larger stack to leave the RIV (setting the main price).



ALL (system and energy) Bid Acceptances are stacked in price order (as reflected above) after Arbitrage and Deminimis Tagging is applied (i.e. no CADL'ing is undertaken). Individual (system and energy) BSAD Sales are slotted into the stack in price order.

Figure 4.3: Option 5 Proposed Mechanism for Deriving the Energy Imbalance Prices

5 DEVELOPMENT PROCESS

For the purposes of this assessment, the BSC Central Service Agent should assume that the changes will be implemented as a standalone development project managed by ELEXON.

Notwithstanding, ELEXON recognise that responsibility for design, testing and implementation of the BSC Systems lies with the BSC Central Service Agent, and in order to gain assurance that changes made are consistent with the requirements, ELEXON requires visibility of these processes. The following sections give an indication of the control points required during design, testing and implementation and are supplied to provide a basis on which the BSC Central Service Agent can estimate.

5.1 Design

ELEXON intend that responsibility for the correctness of the design should remain with the BSC Central Service Agent, but that ELEXON should have the opportunity to review it, and identify apparent inconsistencies with the requirements. The following processes are proposed to achieve this:

- ELEXON will review changes to the User Requirement Specifications (URS), and sign the document off once review comments have been addressed.
- ELEXON will review changes to the System Specification and Design Specification, and identify any evident inconsistencies with the URS, but will not sign off the documents.

5.2 Testing

ELEXON intend that responsibility for software testing should remain with the BSC Central Service Agent, but that ELEXON should have some visibility of the process, in order to gain assurance that the integrity of Trading and Settlement is maintained. The following processes are proposed to achieve this:

- As part of the response to this document, the BSC Central Service Agent will provide a statement of their proposed testing strategy. This statement will be reviewed by ELEXON, and should explain how the BSC Central Service Agent will demonstrate that the changes are ready for live operation, and that there is no unplanned impact on pre-existing facilities.
- ELEXON will be provided for information with test plans, test scripts and other test documentation that they may request. ELEXON will review these documents, and identify any evident inconsistencies with the agreed testing strategy, but will not sign them off.
- ELEXON will have the option of witnessing appropriate elements of the BSC Central Service Agent's testing.
- The BSC Central Service Agent will provide ELEXON with a test report, summarising the testing carried out, and the results of those tests. The report will also describe any defects found during testing, and the steps taken to resolve them.

5.3 Implementation

ELEXON anticipate the following interaction with the BSC Central Service Agent's implementation process:

- As part of the impact assessment of this document, the BSC Central Service Agent will provide a high-level statement of their proposed implementation approach (describing, for example, whether

a phased approach is proposed). ELEXON will review and sign off this high-level implementation strategy.

- Implementation date(s) for the changes described in this document will be agreed in advance by ELEXON and the BSC Central Service Agent.