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Modification P36: 'The generation of Bid - Offer Acceptances relating to energy delivered as a result of providing Applicable Balancing Services' Requirements Specification

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b Distribution

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c Change History

Version 0.1 issued for initial internal and Modification Group review.

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Version 1.0 issued for industry Impact Assessment.

d Changes Forecast

None

e Related Documents

Reference 1	P36 Modification Proposal (10 September 2001)
Reference 2	P36 Modification Proposal Initial Written Assessment (IWA036) (20 September 2001)
Reference 3	P34 Modification Proposal 'Transfer of Imbalances caused by Balancing Services to the Transmission Company Energy Account' (14 August 2001)
Reference 4	P34 Modification Proposal Initial Written Assessment (IWA034) (21 August 2001)
Reference 5	Modification P34: 'Transfer of Imbalances caused by Balancing Services to the Transmission Company Energy Account' Requirements Specification (027AAR) (13 November 2001)

f Intellectual Property Rights and Copyright

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1 INTRODUCTION

1.1 Background and Scope

This Requirements Specification for Modification P36 'The generation of Bid – Offer Acceptances relating to energy delivered as a result of providing Applicable Balancing Services' (Reference 1) forms the basis for an impact assessment of the implementation and associated issues should this Modification or the Alternative Modification be adopted. This Requirements Specification defines the requirements for implementation of the Modification and the Alternative Modification without any evaluation or assessment of the Modification / Alternative itself. This accords with the Code Section F 2.6.6.

Modification Proposal P36 was raised by Innogy on 10 September 2001, and the Initial Written Assessment for Modification P36 (Reference 2) was presented to the Panel Meeting of 20 September 2001.

Modification Proposal P36 seeks to create Bid – Offer Acceptances for the energy attributable to the provision of Applicable Balancing Services, thus removing it from the consequence of exposure to Imbalance Charges (Energy Imbalance, Information Imbalance and Non Delivery charges).

Modification Proposal P36 requires that the definition of the Applicable Balancing Services and the associated methodology for calculating the volumes attributable to the provision of such balancing services be defined under the Code. The Modification also proposes a prospective implementation date.

The Modification Group, at their meeting of 6 November 2001, determined that an Alternative Modification should be considered which they believe better facilitates the Applicable BSC Objectives, as defined in Transmission Licence Condition 7A Paragraph 3. The Modification Group recognised that the original Modification Proposal, which proposed calculating and notifying energy volumes associated with the provision of balancing services as Bid – Offer Acceptances was suitable / an option only where the Lead Party of the BM Unit is:

1. The balancing service provider; and

2. An active participant in the Balancing mechanism.

Therefore, the Modification Group defined an Alternative Modification which utilises the mechanism proposed for the original Modification, but requires additional functionality to determine an energy volume to be transferred to the Transmission Company Energy Account, in the same way as defined in Modification Proposal P34.

This additional functionality enables balancing services providers who are not Lead Parties and / or not active participants in the Balancing Mechanism, to opt to have energy volumes associated with the provision of balancing services to be transferred to the Energy Account of the Transmission Company and therefore removed from the consequences of imbalance.

The Modification Group, including representation from the Connection and Use of System Code (CUSC) Working Group met on the 16 October 2001, and again on the 6 November 2001, to discuss the requirements of the Modification and the Alternative Modification. This Requirements Specification represents the outcome of those meetings.

1.2 Interaction with Modification Proposal P34

Modification Proposal P34 'Transfer of Imbalances caused by Balancing Services to the Transmission Company Energy Account' (Reference 3) was raised by the National Grid Company (the Transmission Company) on 14 August 2001.

Modification Proposal P34 seeks to amend the settlement calculations such that any imbalance caused by the delivery of certain balancing (Ancillary) services is transferred from the provider's Energy Account to the Transmission Company's Energy Account, thus removing it from the consequence of exposure to Imbalance Charges (Energy Imbalance, Information Imbalance and Non Delivery charges).

The Modification Proposal requires that the definition of the (certain) balancing services and the associated methodology for calculating the volumes attributable to the provision of such balancing services, be defined by the Transmission Company, approved by the Authority with governance falling outside of the Code (proposed to fall under the Connection and Use of System Code (CUSC) and consequently, the Transmission Licence). The Modification Proposal also requires a retrospective implementation date (23 August 2001).

Given that Modification P34 and P36 provide differing mechanism for achieving similar objectives, the Panel, at their meeting of 20 September 2001, requested that both of the Modifications be considered in conjunction.

The Modification Group, at their meeting of 16 October 2001 determined that Requirements Specifications for both Modifications should be drafted and put forward for impact assessment, as a consequence of the conclusion that both mechanisms may be suitable for a differing set of balancing services. To this end a Requirements Specification has been drafted for Modification P34 (Reference 5) and is to be considered in conjunction with this specification. Thus the interaction is noted here for information, but it is not applicable to discuss, in detail, the nature of any interaction in this Requirements Specification.

1.3 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 and the Alternative Modification .

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 and associated industry changes required to support the changes to BMRA for the original Modification Proposal.
- Section 5 specifies the additional functionality and amendments required to support the Alternative Modification.
- Section 6 specifies the associated industry changes to support the functionality defined in Section 5.
- Section 7 specifies the required functionality and associated industry changes required to support the changes to BMRA for the Alternative Modification.
- Section 8 specifies ELEXON's requirements for involvement in the design and testing process.

1.4 Glossary

The following acronyms have been used throughout this document:

BM	Balancing Mechanism
BMRA	Balancing Mechanism reporting Agent
BSAD	Balancing Services Adjustment Data
BSC	Balancing and Settlement Code
CUSC	Connection and Use of System Code
ESE	Expected Service Energy
IEA	Interconnector Error Administrator
PIMG	Pricing Issues Modification Group
QAS	BM Unit Ancillary and Other Service Energy Volume
QASB	BM Unit Ancillary and Other Service Bid Acceptance
QASO	BM Unit Ancillary and Other Service Offer Acceptance
SAA	Settlement Administration Agent
SF	Service Flag
TQAS	Total Period Ancillary and Other Service Energy Volume
URS	User Requirements Specification

1.5 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
2.0	The Code, Section Q 'Balancing Mechanism Activities'
3.0	The Code, Section T 'Settlement and Trading Charges'
3.0	The Code, Section V 'Reporting'
3.0	The Code, Section X, ANNEX X-2 'Technical Glossary'
2.0	The Reporting Catalogue
1.0	Part C – Service Description for Balancing Mechanism Reporting
1.0	Part A – Service Description for Settlement Administration

2 REQUIREMENTS SPECIFICATION FOR THE ORIGINAL MODIFICATION PROPOSAL – THE GENERATION OF BID – OFFER ACCEPTANCES RELATING TO THE ENERGY DELIVERED AS A RESULT OF PROVIDING APPLICABLE BALANCING SERVICES

2.1 Requirements Specification Overview

At a high level, Modification Proposal P36 requires that (after the event, but within two working days, i.e. in time for the Interim Initial Information Run) the Transmission Company determine the energy volume associated with the provision of balancing services for a BM Unit and Settlement Period, according to a methodology defined within the Code. These energy volumes will be treated as Bid – Offer Acceptances, but will be explicitly excluded from Energy Imbalance Price calculations as a consequence of such Bid – Offer Acceptances resulting from system balancing. Therefore the Service Provider gets the energy associated with the provision of the balancing service cashed out at the Bid – Offer price and is protected from the exposure to the consequences of imbalance, as a result of the Bid – Offer Acceptance.

The energy volumes associated with the provision of balancing services will be reported into the Settlement Administration Agent for use in the settlement calculations. However, consideration should be given as to whether it is desirable / reasonable to publish these volumes on the BMRA against the affected BM Units when they are received from the Transmission Company. Therefore the functionality and documentation amendments required to support this are detailed separately so that development costs and timescales can be provided separately by the BSC Central Service Agent.

Modification Proposal P36 requires that the methodology for determining the energy volumes associated with the provision of balancing services, and the list of balancing services that this Modification is to apply to, be held under the provisions of the Code. As a consequence of this approach, all payments are made for the provision of balancing services via the Balancing Mechanism, this will require an associated amendment to the Connection and Use of System Code (CUSC) to reflect this change in governance.

It should also be noted that balancing services providers can 'opt out' of this process. Where the providers do not wish to have energy volumes attributable to the provision of balancing services notified into the Balancing Mechanism under the process defined in this Requirements Specification, the service provider can notify the Transmission Company that this is the case. The Transmission Company will not notify energy volumes (as 'additional' Bid - Offer Acceptances) attributable to the provision of balancing services into the Balancing Mechanism, for those Parties who have opted out of this process.

2.2 Requirements for the Generation of Bid – Offer Acceptances relating to energy delivered as a result of providing Applicable Balancing Services

2.2.1 Transmission Company Methodology

The methodology proposed by the Transmission Company for the calculation and provision of the Bid - Offer Acceptances associated with the provision of Applicable Balancing Services results in a Bid - Offer Acceptance volume for a Bid - Offer pair, BM Unit and Settlement Period. The provision of the Bid - Offer Acceptance in this way effectively means that the Transmission Company undertake the determination of the Bid - Offer Acceptance volume against the relevant Bid - Offer pair (n), 'bypassing' the Settlement Administration Agent (SAA) determination of such volumes.

It has been assumed, for the purposes of this Requirements Specification, that the Transmission Company will provide the relevant volume against each Bid - Offer pair, i.e. undertaking a similar integration to that which SAA performs, in order to provide an acceptance volume against each (relevant) Bid - Offer pair to ensure that the correct Bid - Offer Price is applied to the relevant volumes.

2.2.2 Definitions Required to Support Modification Proposal P36

The Modification Proposal requires new definitions to support the implementation of the provision of a new type of Bid – Offer Acceptance to the Settlement Administration Agent (SAA), and the associated amendment to the settlement calculations.

Therefore Section X ANNEX X-2 Table X-2 'Technical Glossary' requires amendment to include the requisite new and amended definitions, as follows:

Defined Term	Acronym	Units	Definition / Explanatory Text
Applicable Balancing Services			**Those balancing services listed in Section T ANNEX T-2.**
BM Unit Ancillary and Other Service Offer Acceptance	$QASO^{n}_{ij}$	**MWh**	**The amount determined in accordance with Section T ANNEX T-2** ***The BM Unit Ancillary and Other Service Offer Acceptance is the additional quantity of Offer n, accepted by the Transmission Company in respect of BM Unit i, in Settlement Period j, and is the volume determined to have been delivered as a consequence of the provision of Applicable Balancing Services.***
BM Unit Ancillary and Other Service Bid Acceptance	$QASB^{n}_{ij}$	**MWh**	**The amount determined in accordance with Section T ANNEX T-2** ***The BM Unit Ancillary and Other Service Bid Acceptance is the additional quantity of Bid n, accepted by the Transmission Company in respect of BM Unit i, in Settlement Period j, and is the***

Defined Term	Acronym	Units	Definition / Explanatory Text
			volume determined to have been delivered as a consequence of the provision of Applicable Balancing Services.
Expected Service Energy	**ESE_{sj}**	**MWh**	**The amount determined in accordance with Section T ANNEX T-2** ***Is the Expected Service Energy from service s in Settlement Period j.***
Service Flag	**SF_{sj}**		**Is the Service Flag for site s in Settlement Periodj.** ***The Service Flag takes the value of 1 if the Lead Party for the BM Unit which incorporates service s has indicated that they wish the energy volume for the BM Unit to be adjusted for that site Ancillary and Other Service Volume, other wise it has the value of 0.***
Service - Site Pair	***s***		***The Service Site Pair providing Ancillary and Other Service for the Transmission Company***

Section X ANNEX X-2 Table X-3 'Glossary of Acronyms Applying Except in Relation to Section S' requires amendment to include the requisite new and amended definitions, as follows:

Acronym	Units	Corresponding Defined Term or Expression
ESE_{sj}	**MWh**	**Expected Service Energy**
$QASO^{n}_{ij}$	**MWh**	**BM Unit Ancillary and Other Service Offer Acceptance**
$QASB^{n}_{ij}$	**MWh**	**BM Unit Ancillary and Other Service Bid Acceptance**
SF_{sj}		**Service Flag**
s		**Service - Site Pair**

The Code, Section Q 'Balancing Mechanism Activities', paragraph 5.1 Bid – Offer Acceptances requires an additional clause to specifically define the Bid – Offer Acceptances made under this Modification, as the current definition does not include Acceptances made after the event for the purposes of accounting for energy volumes associated with the provision of Applicable Balancing Services.

Therefore the following amendments to Section Q are required to support the implementation of Modification P36:

5.1 Bid - Offer Acceptances

5.1.2 The Transmission Company may accept Bid(s) and / or Offer(s) by issuing a communication under the Grid Code of a type which, for the purposes of the Code, is

classed as an Acceptance pursuant to paragraph 5.1.3 **(a) and (b), and by issuing a BM Unit Ancillary and Other Service Bid - Offer Acceptance pursuant to paragraph 5.1.3 (c)**.

5.1.3 …

(c) **An Acceptance Volume (BM Unit Ancillary and Other Service Bid Acceptance / BM Unit Ancillary and Other Service Offer Acceptance) issued in respect of a BM Unit in accordance with an Ancillary or Other Service Contract with the Transmission Company and which is calculated in accordance with Section T ANNEX T-2.**

Where 5.1.3 is subsequently referred to in Section Q, this should be amended to read **'5.1.3 (a) and (b)'**, namely in sections 5.1.6, 5.1.7, 5.1.11 and 5.1.13.

The following amendments are also required to Section Q:

5.3 Acceptance Data

5.3.1 Acceptance Data for a BM Unit**, for Acceptances made pursuant to Section Q 5.1.3 (a) and (b),** shall comprise the following data items: …

5.3.1A **Acceptance Data for a BM Unit, for Acceptances made pursuant to Section Q 5.1.3 (c) shall comprise a Bid - Offer Acceptance volume for each (relevant) value of 'n'.**

2.2.3 Determination of the Accepted Ancillary and Other Service Bid - Offer Volumes

The Transmission Company is required to determine the energy volume associated with the provision of Applicable Balancing Services at BM Unit level, in the form of additional Bid – Offer Acceptances against a BM Unit. Therefore a methodology for such determination is required to be included in the Code. To this end, a new ANNEX to Section T is required, as follows:

ANNEX T-2: Methodology to be utilised by the Transmission Company to determine Accepted Ancillary and Other Service Bid – Offer Volumes

1. The transmission company will determine the expected variation of power output, $ESE_{sj}(t)$ from the delivery of ancillary service-site pair, s, as follows time t from the start of settlement period j:

1.1 In the event that service-site pair s is a response service (either mandatory or commercial) delivered by free governor action:

$ESE_{st}(t)$ will be the expected change in power output as a result of variation in system frequency. This will be derived from the relevant table set out in the relevant services agreement (as such table is interpreted in accordance with Paragraph 4.1.3.11of CUSC) by reference to the level of De-Load of the site concerned at the end of minute and the mean

Frequency Deviation over the minute, m, where minute m contains spot time t, and starts an integer multiple of 60 seconds from the start of the settlement period j.

for this purpose:

1.1.1 For a positive Frequency Deviation at time t, the expected change in active power output of site s shall be derived from the high frequency response capability table set out in the relevant services agreement; and

1.1.2 For a negative Frequency Deviation at time t, the expected change in active power output of site s shall be derived from

(i) the primary frequency response capability set out in the relevant services agreement when the unit is instructed to provide primary response without secondary response;
(ii) the mean of the primary and secondary response capability set out in the relevant services agreement when the unit is instructed to provide primary response with secondary response.

1.2 In the event that service-site pair s is a response service delivered on initiation by a low or high frequency relay:

$ESE_{sj}(t)$ shall be calculated in with reference to the actual system frequency and the contracted initiation.

1.2.1 For the period immediately following an initiation in accordance with the contract (or where the service would have been obliged to initiate in accordance with the contract) and prior to a cease or deemed cease instruction, the expected change in active power as derived from the contracted secondary or high frequency response (as the case may be).

1.2.2 For the period immediately following a cease (or deemed cease) instruction the agreed restoration profile.

1.2.3 For all other periods, 0 MW.

1.3 In the event that service-site pair s is a reserve service:

$ESE_{sj}(t)$ shall be the instructed (excluding Bid Offer Acceptances) Reserve delivery, from service-site pair *s*, time *t* from the start of settlement period *j*, taking account of contracted run-up and run down profiles.

1.4 In the event that service-site pair s is any other service:

$$ESE_{sj}(t) = 0$$

2. The Transmission Company will determine the expected change in the production or consumption power of BM Unit i resulting from the delivery of Ancillary or Other Services using the following formula

$$qAS_{ij}(t) = \sum_{s \in i} \left(SF_{sj} \times ESE_{sj}(t) \right)$$

where:

SF_{sj} **Is the Service Flag for service-site pair *s* in settlement period *j*.**

Takes the value 1, if the Lead Party for the BM Unit that incorporates service *s* has indicated (in accordance with the notification procedure) that they wish the BM volume to be adjusted for that site Ancillary and Other Service volume.

Otherwise 0.

$\sum_{s \in i}$ **Is the summation across all service-site pairs, s, that form part of BMU i.**

3. The Transmission Company will determine the instantaneous Offer Acceptance thus:

$$qASO_{ij}(t) = \max\left(qAS_{ij}(t), 0\right)$$

and the instantaneous Bid Acceptance thus:

$$qASB_{ij}(t) = \min\left(qAS_{ij}(t), 0\right)$$

4. The Transmission Company will determine the expected variation of output of BM Unit i at time t from the start of settlement period j as a result of bid offer acceptances thus:

$$qD_{ij}(t) = \sum_{k} \sum_{n} \left(qAB_{ij}^{kn}(t) + qAO_{ij}^{kn}(t) \right)$$

where $\sum_{k}$ means the summation across all bid offer acceptances and $\sum_{n}$ means the summation across all bid offer pairs.

5. The Transmission Company will determine the change in production or consumption resulting from ancillary or other service delivery as an offer acceptance in range n, of BM Unit i, time t from the start of settlement period j thus:

For n ? 1

$$qASO_{ij}^{n}(t) = \max\left(\min\left(qD_{ij}(t) + qASO_{ij}(t), \sum_{n'=0}^{n} qBO_{ij}^{n'}(t) \right), \sum_{n'=0}^{n-1} qBO_{ij}^{n'}(t) \right) - \max\left(\min\left(qD_{ij}(t), \sum_{n'=0}^{n} qBO_{ij}^{n'}(t) \right), \sum_{n'=0}^{n-1} qBO_{ij}^{n'}(t) \right)$$

for n ? -1

$$qASO_{ij}^{n}(t) = \min\left(\max\left(qD_{ij}(t) + qASO_{ij}(t), \sum_{n'=n}^{0} qBO_{ij}^{n'}(t) \right), \sum_{n'=n+1}^{0} qBO_{ij}^{n'}(t) \right) - \min\left(\max\left(qD_{ij}(t), \sum_{n'=n}^{0} qBO_{ij}^{n'}(t) \right), \sum_{n'=n+1}^{0} qBO_{ij}^{n'}(t) \right)$$

and as a bid acceptance, thus:

For n ? 1

$$qASB_{ij}^{n}(t) = \max\left(\min\left(qD_{ij}(t) + qASB_{ij}(t), \sum_{n'=0}^{n} qBO_{ij}^{n'}(t) \right), \sum_{n'=0}^{n-1} qBO_{ij}^{n'}(t) \right) - \max\left(\min\left(qD_{ij}(t), \sum_{n'=0}^{n} qBO_{ij}^{n'}(t) \right), \sum_{n'=0}^{n-1} qBO_{ij}^{n'}(t) \right)$$

for n ? -1

$$qASB_{ij}^{n}(t) = \min\left(\max\left(qD_{ij}(t) + qASB_{ij}(t), \sum_{n'=n}^{0} qBO_{ij}^{n'}(t) \right), \sum_{n'=n+1}^{0} qBO_{ij}^{n'}(t) \right) - \min\left(\max\left(qD_{ij}(t), \sum_{n'=n}^{0} qBO_{ij}^{n'}(t) \right), \sum_{n'=n+1}^{0} qBO_{ij}^{n'}(t) \right)$$

where it is assumed that

i. $qBO_{ij}^{0}(t) = 0$;
ii. $qBO_{ij}^{5}(t)$ is arbitrarily large and positive; and
iii. $qBO_{ij}^{-5}(t)$ is assumed to be arbitrarily large and negative such that the bid offer range is extended to accommodate any value of $qAS_{ij}(t)$.

6. The Transmission Company will determine the offer acceptance volume resulting from ancillary or other service delivery falling within bid offer range n, of BM Unit i, time t from the start of settlement period j thus:

$$QASO_{ij}^{n} = \int_{0}^{SPD} qASO_{ij}^{n}(t)dt$$

and the bid acceptance volume resulting from ancillary or other service delivery falling within bid offer range n, of BM Unit i, time t from the start of settlement period j thus:

$$QASB_{ij}^{n} = \int_{0}^{SPD} qASB_{ij}^{n}(t)dt$$

2.2.4 Provision of the BM Unit Ancillary and Other Service Bid - Offer Acceptances

The Transmission Company is required to determine the energy volume associated with the provision of Applicable Balancing Services at Bid - Offer pair (n) and BM Unit level and provide such volumes, in the form of 'additional' Bid – Offer Acceptances to the Settlement Administration Agent by the end of the second working day from the Settlement Day to which the energy volumes pertain.

The existing interface for provision of Bid - Offer Acceptances into the Settlement Administration Agent and Balancing Mechanism Reporting Agent is not suitable for use to provide this information, as the Transmission Company is providing volumes against the BM Unit and not Acceptance spot points. Therefore a new interface is required between the Transmission Company and the BSC Central Service Agent.

The format of such interface should be agreed between the BSC Central Service Agent and the Transmission Company, however, it is expected that the interface be automated. The following provides an example of the format of this interface for the purposes of this Requirements Specification only:

From: *Transmission Company* ***To:*** *SAA*

Settlement Date

Settlement Period

BM Unit

n *

BM Unit Ancillary and Other Service Bid Acceptance ($QABO^{n}_{ij}$)

BM Unit Ancillary and Other Service Offer Acceptance ($QASO^{n}_{ij}$)

* It is expected that a BM Unit Ancillary and Other Service Bid - Offer Acceptance volume be provided for each relevant value of 'n'.

No Bid - Offer Acceptance number (k) is utilised. This is a consequence of:

- The irrelevance of including a Bid - Offer Acceptance Number at this level, as there is no 'real' acceptance made, only a notified Acceptance volume after the event; and
- The requirements of the Settlement Administration Agent (SAA) (and BMRA) with regards to Bid - Offer Acceptance numbering; the Acceptance numbers are treated very similarly to File Sequence Numbers to enable 'missing' Bid - Offer Acceptances to be identified by the Central Services. Therefore, for these 'additional' acceptances, the Acceptance number would not be contiguous with those in the same / preceding / subsequent Settlement Period, potentially causing a significant problem in processing for the Central Service Agent.

Code Amendments

Amendment to the Code, Section Q 'Balancing Mechanism Activities' is required to support the provision of the 'BM Unit Ancillary and Other Service Energy Volume' to the Settlement Administration Agent from the Transmission Company, as follows.

A new clause in Section Q 6, arbitrarily named Q 6.3A here, is required:

6.3A BM Unit Ancillary and Other Service Bid - Offer Acceptances

6.3A.1 In relation to each Settlement Period and each BM Unit, not later than the end of the second business day following the Settlement Day, the Transmission Company shall determine (in accordance with the Code, Section T ANNEX T-2), and notify the SAA the additional Bid - Offer Acceptances made by the Transmission Company (pursuant to Section Q 5.1.3 (c)) with regards to the volume of energy related to the provision of Ancillary Services and Other Services expected in relationship to Transmission Company Contracts, by provision of the volumes associated with 'BM Unit Ancillary and Other Service Bid Acceptances' ($QASB^{n}_{ij}$) and 'BM Unit Ancillary and Other Service Offer Acceptances' ($QASO^{n}_{ij}$).

6.3A.2 The Transmission Company may resubmit to the SAA the volumes associated with the 'BM Unit Ancillary and Other Service Bid Acceptance' and the 'BM Unit Ancillary and Other Service Offer Acceptance' in respect of any BM Unit and Settlement Period within a Settlement Day at any time prior to the Final Reconciliation Settlement Run for such Settlement Day and the SAA shall correct such data in the Settlement Run following such resubmission.

2.2.5 Inclusion of the BM Unit Ancillary and Other Service Bid - Offer Acceptances in Settlement Calculations

The intent of the Modification is that the energy volumes directly associated with the provision of Applicable Balancing Services are excluded from the consequence of imbalance charges (Energy Imbalance, Information Imbalance and Non Delivery charges), by accounting for this energy via Bid – Offer Acceptances.

Therefore, in order to support the intent of the Modification, settlement calculations, as defined in Section T of the Code, will have to be amended as follows, for all Settlement Runs:

The determination of the Period BM Unit Total Accepted Offer Volume (QAO^{n}_{ij}) and Period BM Unit Total Accepted Bid – Volume (QAB^{n}_{ij}) (Section T 3.9) are required to be amended as follows:

3.9.1 In respect of each Settlement Period, for each BM Unit, the total MWh volume of the Offer accepted from all Acceptances shall be the Period BM Unit Total Accepted Offer Volume and shall be established as follows:

$$QAO^{n}_{ij} = \Sigma^{k} QAO^{kn}_{ij} \; \underline{\mathbf{+ QASO^{n}_{ij}}}$$

Where Σ^{k} represents the sum over all Acceptances within the Settlement Period.

3.9.2 In respect of each Settlement Period, for each BM Unit, the total MWh volume of the Bid accepted from all Acceptances shall be the Period BM Unit Total Accepted Bid Volume and shall be established as follows:

$QAB^{n}_{ij} = \Sigma^{k} QAB^{kn}_{ij}$ **+ $QASB^{n}_{ij}$**

Where Σ^{k} represents the sum over all Acceptances within the Settlement Period.

Placing the Accepted Ancillary and Other Service Bid – Offer Volumes in this equation at Section T 3.9 means that the energy volumes associated with the provision of balancing services is treated like any other Bid – Offer Acceptance, with the exception that these Bid – Offer Acceptances are excluded from the Energy Imbalance Price calculation.

2.2.6 Settlement Report (SAA-I014) Amendments

The Settlement Report (SAA-I014), all sub flows, requires amendment to reflect the application of the new functionality in the report, so that BSC Parties, the Transmission Company and ELEXON can replicate the settlement calculations, if required.

It should be noted that there is potential to utilise parallel reporting functionality, i.e. recipients determine the version of the Settlement Report they wish to receive. Therefore any Impact Assessment should provide a view on the appropriateness and cost / timescale implications of utilising this approach.

Therefore the following amendments are required:

SAA-I014 Subflow 1 - to BSC Parties:

Group **BOD** 'BMU Period Bid – Offer Data'

Include new data items 'BM Unit Ancillary and Other Service Bid Volume' ($QASB^{n}_{ij}$) (MWh) and 'BM Unit Ancillary and Other Service Offer Volume' ($QASO^{n}_{ij}$) (MWh).

SAA-I014 Subflow 2 - to Transmission Company:

Group **BO4** 'BMU Period Bid – Offer Data'

Include new data items 'BM Unit Ancillary and Other Service Bid Volume' ($QASB^{n}_{ij}$) (MWh) and 'BM Unit Ancillary and Other Service Offer Volume' ($QASO^{n}_{ij}$) (MWh).

SAA-I014 Subflow 3 - to ELEXON:

No amendment required (as Bid – Offer Acceptance data is not reported out).

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. However, it may be possible to utilise the parallel implementation approach defined under Modification P8 to delay the impact.

Modification P8 proposes that flow version numbering be implemented within the BSC Central Service Agent. Namely, when a report such as the Settlement Report (SAA-I014) changes and the changes are implemented, 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, 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 URSs) 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. The amendments required are described as follows:

3.1.1 Report sent to the Transmission Company (TC)

(m) BM Unit Period Bid - Offer Information …

- Bid - Offer Data:
  - Period BM Unit Total Accepted Offer Volume (QAO^{n}_{ij})
  - **BM Unit Ancillary and Other Service Bid Acceptance ($QABO^{n}_{ij}$) (MWh)**
  - **BM Unit Ancillary and Other Service Offer Acceptance ($QASO^{n}_{ij}$) (MWh)**

3.1.3 Reports sent to Parties

(g) BM Unit Period Bid - Offer Information …

- Bid - Offer Data:
  - Period BM Unit Total Accepted Offer Volume (QAO^{n}_{ij})
  - **BM Unit Ancillary and Other Service Bid Acceptance ($QABO^{n}_{ij}$) (MWh)**
  - **BM Unit Ancillary and Other Service Offer Acceptance ($QASO^{n}_{ij}$) (MWh)**

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

3.2.3 Service Description for the Settlement Administration Agent

The following amendments are required to support the implementation of Modification P34.

3.12 Calculation of Period BM Unit Total Accepted Offer Volume and Period BM Unit Total Accepted Bid Volume

3.12.1 The Period BM Unit Total Accepted Offer Volume (QAO^{n}_{ij}) is the total MW volume of Offer n accepted from all Bid - Offer Acceptances. It shall be determined by the SAA as follows:

$$QAO^{n}_{ij} = \Sigma^{k}(QAO^{kn}_{ij}) \mathbf{+ QASO^{n}_{ij}}$$

3.12.2 The Period BM Unit Total Accepted Bid Volume (QAB^{n}_{ij}) is the total MW volume of Bid n accepted from all Bid - Offer Acceptances. It shall be determined by the SAA as follows:

$$QAB^{n}_{ij} = \Sigma^{k}(QAB^{kn}_{ij}) \mathbf{+ QASB^{n}_{ij}}$$

The SAA Service Description, Appendix A 'Inputs and Outputs' requires amendment, as follows, to reflect the receipt of information from the Transmission Company relating to the provision of the BM Unit Ancillary and Other Service Energy Volumes:

1. SAA Inputs

Input Flow Description	**Flow Received From**
BM Unit Ancillary and Other Service Bid - Offer Acceptances	**SO**

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

3.2.4 NETA Data File Catalogue

The NETA Data File Catalogue requires amendment to include the new and amended reports, as defined in Sections 2.2.4 (Transmission Company to SAA) and 2.2.6 (amendments to the Settlement Report) of this Requirements Specification.

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

4 BALANCING MECHANISM REPORTING AGENT FUNCTIONALITY

If it is determined to be appropriate for the Balancing Mechanism Reporting Agent (BMRA) to publish the BM Unit Ancillary and Other Service Bid - Offer Acceptances against the associated BM Unit, then the BMRA and supporting documentation will require amendment, as defined in the following sections.

4.1 Amendments to BMRA

Section 2.2.4 of this Requirements Specification defines the (example) interface from the Transmission Company for the provision of the 'BM Unit Ancillary and Other Service Energy Volumes'. It is expected that the interface be provided only once to the BSC Central Service Agent from the Transmission Company (in accordance with the Code Section Q, 1.3.1 which states "*Where … the Transmission Company is required to send particular data to both the BMRA and SAA, for so long as the same person acts as BMRA and SAA, the Transmission Company shall be treated as having sent such data to both of them if it has sent the data to one of them.*").

The Code, Section V 2.6 covers the calculation by BMRA of indicative data, which is required to be calculated and published on a half hourly basis.

For two of these calculations, the implementation of this Modification would mean that there would be insufficient information at the time the calculation was undertaken for the results to be entirely accurate, as the results would be calculated without consideration of the BM Unit Ancillary and Other Service Bid - Offer Acceptances.

The two affected calculations are:

- **BSC Section V 2.6.4** - the calculation of Indicative Period BM Unit Total Accepted Bid Volume ($IQAB^{n}_{ij}$) and Indicative Period BM Unit Total Accepted Offer Volume ($IQAO^{n}_{ij}$); and
- **BSC Section V 2.6.6** - the calculation of Indicative Period BM Unit Bid Cashflow (ICB^{n}_{ij}) and Indicative Period BM Unit Offer Cashflow (ICO^{n}_{ij}).

It should be noted that the implementation of the Modification will not affect the Indicative Energy Imbalance Price calculations and publishing.

BMRA Publishing Requirements

The BM Unit Ancillary and Other Service Bid - Offer Acceptances ($QASB^{n}_{ij}$ and $QASO^{n}_{ij}$) should be published on the BMRA against the associated BM Unit and Settlement Period for a specific Settlement Date, within [x] minutes of receipt[1].

Code Amendments

The new clause, as provided in Section 2.2.4 of this Requirements Specification, for inclusion in the Code, Section Q 'Balancing Mechanism Activities', arbitrarily named Q 6.3A,

[1] There is no precedent for the timescales for publishing this information on BMRA, therefore this can be determined in discussion with the BSC Central Service Agent, for incorporation into the Service Description and associated Service Levels.

requires additional mention of the provision of these volumes to the BMRA, as well as the SAA.

A new entry in Section V 'Reporting', ANNEX V-1: 'Tables of Reports', is required:

Table 1 - BMRS

DATA AND RELEVANT SETTLEMENT PERIODS	FREQUENCY	FORMAT	DEFAULT
…			
BM Unit Ancillary and Other Service Bid Acceptances ($QASB^{n}_{ij}$)	**Daily (published for all days on operational days only)**	**Tabular**	**None**
BM Unit Ancillary and Other Service Offer Acceptances ($QASO^{n}_{ij}$)	**Daily (published for all days on operational days only)**	**Tabular**	**None**

Amendments to the BMRA Service Description

The following amendments to the BMRA Service Description are required to support the publishing of this data on BMRA.

8 RECEIVE BM DATA

…

8.2A Publish the BM Unit Ancillary and Other Service Bid - Offer Acceptances on line within [x] minutes of receipt.

If the [x] minutes is determined to be the same as other BM data, which is required to be published within 5 minutes of receipt, then there is no requirement to add this additional paragraph, as the requirement / obligation will be covered by the existing paragraph 8.2.

A new entry in Appendix A 'Input Output Flows', is required:

Balancing Mechanism Reporting Inputs

Input Flow Description	Flow Received From
BM Unit Ancillary and Other Service Bid Acceptances	**SO**
BM Unit Ancillary and Other Service Offer Acceptances	**SO**

5 ALTERNATIVE MODIFICATION P36

5.1 Alternative Modification Overview

At a high level, Alternative Modification Proposal P36 requires that (after the event, but within two working days, i.e. in time for the Interim Initial Information Run) the Transmission Company determine the energy volume associated with the provision of balancing services for a BM Unit and Settlement Period, according to a methodology defined within the Code. These balancing services energy volumes will be notified as:

- BM Unit Ancillary and Other Service Bid - Offer Acceptances. These will be explicitly excluded from Energy Imbalance Price calculations as a consequence of such Bid – Offer Acceptances being attributable to system balancing. Therefore the Service Provider gets the energy associated with the provision of the balancing service cashed out at the Bid – Offer price and is protected from the exposure to the consequences of imbalance; and / or
- BM Unit Ancillary and Other Service Energy Volumes. These will be removed from the Energy Account of the balancing service provider, thus removing them from exposure to the consequences of imbalance, and transferred to the Energy Account of the Transmission Company.

It should be noted that both types of balancing service energy volumes can be determined and notified for one BM Unit, where the energy volumes so notified are attributable to the provision of separate balancing services, for example, BM Unit Ancillary and Other Service Bid - Offer Acceptances for mandatory frequency response, and BM Unit Ancillary and Other Service Energy Volumes for standing reserve provision.

The energy volumes associated with the provision of balancing services will be reported into the Settlement Administration Agent for use in the settlement calculations. However, consideration should be given as to whether it is desirable / reasonable to publish these volumes on the BMRA against the affected BM Units when they are received from the Transmission Company. Therefore the functionality and documentation amendments required to support this are detailed separately so that development costs and timescales can be provided separately by the BSC Central Service Agent.

Alternative Modification Proposal P36 requires that the methodology for determining the energy volumes associated with the provision of balancing services, and the list of balancing services that this Modification is to apply to, be held under the provisions of the Code. As a consequence of this approach:

- BM Unit Ancillary and Other Service Bid - Offer Acceptances - payments are made for the energy associated with the provision of balancing services via the Balancing Mechanism and this will require a consequential amendment to the Connection and Use of System Code (CUSC) to reflect this change in governance; and
- BM Unit Ancillary and Other Service Energy Volumes – payments are made for the provision of balancing services outside of the Balancing Mechanism, under the Connection and Use of System Code (CUSC). However, it should be noted that this will require a consequential amendment to the Connection and Use of System Code (CUSC) to reflect the removal of the imbalance compensation payment.

It should also be noted that balancing services providers can 'opt out' of this process. Where the providers do not wish to have energy volumes attributable to the provision of balancing services notified into the Balancing Mechanism under the process defined in this Requirements Specification, the service provider can notify the Transmission Company that this is the case. The Transmission Company will not notify energy attributable to the provision of balancing services into the Balancing Mechanism, for those Parties who have opted out of this process.

5.2 Requirements to Support Alternative Modification P36

The Alternative Modification requires new and amended definitions to support the implementation of the provision of a new energy volume and a new type of Bid – offer Acceptance volume to the Settlement Administration Agent (SAA), and the associated amendment to the settlement calculations.

Therefore Section X ANNEX X-2 Table X-2 'Technical Glossary' requires amendment to include the requisite new and amended definitions, as follows:

Defined Term	Acronym	Units	Definition / Explanatory Text
Account Period ~~Bid – Offer~~ Balancing Services Volume	$QABO_{aj}$	MWh	The quantity determined in accordance with section T 4.6.2 *The Account Period ~~Bid – Offer~~ Balancing Services Volume is the sum of the quantity of Balancing Services energy, consisting of accepted Bids and Offers, and energy associated with Ancillary and Other services from all BM Units for which Energy Account a is the Lead Energy Account in Settlement Period j.*
Applicable Balancing Services			**Those balancing services listed in Section T ANNEX T-2.**
Applicable Balancing Services Provider			**The provider of the Applicable Balancing Service.**
BM Unit Ancillary and Other Service Bid Acceptance	**$QASB^{n}_{ij}$**	**MWh**	**The amount determined in accordance with Section T ANNEX t-2, 3.** ***The BM Unit Ancillary and Other Service Bid Acceptance is the additional quantity of Bid n, accepted by the Transmission Company in respect of BM Unit i, in Settlement Period j, and is the volume determined to have been delivered as a consequence of the provision of Applicable Balancing Services.***
BM Unit Ancillary and Other Service Offer Acceptance	**$QASO^{n}_{ij}$**	**MWh**	**The amount determined in accordance with Section T ANNEX t-2, 3.** ***The BM Unit Ancillary and Other Service Offer Acceptance is the additional quantity of Offer n, accepted by the Transmission Company in respect of BM Unit i, in Settlement Period j, and is the***

Defined Term	Acronym	Units	Definition / Explanatory Text
			volume determined to have been delivered as a consequence of the provision of Applicable Balancing Services.
BM Unit Ancillary and Other Service Energy Volume	**QAS_{ij}**	**MWh**	**The amount determined in accordance with Section Q 6.3A.1.** ***The volume of energy expected to be delivered by BM Unit i in Settlement Period j to meet Ancillary or Other Contracts with the Transmission Company.***
Expected Response Power	**FR^{μ}_{ms}**	**MW**	**The amount determined in accordance with Section T ANNEX T-2.** ***Is the Expected Response Power for site s in response mode μ.***
Expected Service Energy	**ESE_{sj}**	**MWh**	**The amount determined in accordance with Section T ANNEX T-2** ***Is the Expected Service Energy from service s in Settlement Period j.***
Instructed Reserve Delivery	**$I_{sj}(t)$**	**MW**	***Is the Instructed (excluding Bid – Offer Acceptances) Reserve delivery, from site s, time t from the start of the Settlement Period j, taking account of contracted run-up and run down profiles.***
Period BM Unit ~~Bid – Offer~~ Balancing Services Volume	QBO_{ij}	MWh	The quantity determined in accordance with section T 4.3.2 *The Period BM Unit ~~Bid – Offer~~ Balancing Services Volume is the net quantity of Balancing Services energy, consisting of accepted Bids and Offers, and energy associated with Ancillary and Other services from BM Unit i in Settlement Period j.*
Service Flag	**SF_{sj}**		**Is the Service Flag for site s in Settlement Periodj.** ***The Service Flag takes the value of 1 if the Lead Party for the BM Unit which incorporates service s has indicated that they wish the energy volume for the BM Unit to be adjusted for that site Ancillary and Other Service Volume, other wise it has the value of 0.***
Service Site Pair	**s**		**The Service Site Pair s, providing Ancillary and Other Services for the Transmission Company.**
Total Period Ancillary and Other Service Energy Volume	**$TQAS_j$**	**MWh**	**The amount determined in accordance with Section T 4.6.5.** ***The Total Period Ancillary and Other Service***

Defined Term	Acronym	Units	Definition / Explanatory Text
			Energy Volume is the net quantity of energy determined to be delivered by all BM Units in Settlement Period j to meet Ancillary or Other Contracts with the Transmission Company.

Section X ANNEX X-2 Table X-3 'Glossary of Acronyms Applying Except in Relation to Section S' requires amendment to include the requisite new and amended definitions, as follows:

Acronym	Units	Corresponding Defined Term or Expression
FR^{μ}_{ms}	**MW**	**Expected Response Power**
ESE_{sj}	**MWh**	**Expected Service Energy**
$I_{sj}(t)$	**MW**	**Instructed Reserve Delivery**
$QABO_{aj}$	MWh	Account Period ~~Bid – Offer~~ Balancing Services Volume
QAS_{ij}	**MWh**	**BM Unit Ancillary and Other Service Energy Volume**
$QASO^{n}_{ij}$	**MWh**	**BM Unit Ancillary and Other Service Offer Acceptance**
$QASB^{n}_{ij}$	**MWh**	**BM Unit Ancillary and Other Service Bid Acceptance**
QBO_{ij}	MWh	Period BM Unit ~~Bid – Offer~~ Balancing Services Volume
SF_{sj}		**Service Flag**
$TQAS_{j}$	**MWh**	**Total Period Ancillary and Other Service Energy Volume**

The Code, Section Q 'Balancing Mechanism Activities', paragraph 5.1 Bid – Offer Acceptances requires an additional clause to specifically define the Bid – Offer Acceptances made under this Modification, as the current definition does not include Acceptances made after the event for the purposes of accounting for energy volumes associated with the provision of Applicable Balancing Services.

Therefore the following amendments to Section Q are required to support the implementation of the Alternative Modification:

5.1 Bid - Offer Acceptances

5.1.2 The Transmission Company may accept Bid(s) and / or Offer(s) by issuing a communication under the Grid Code of a type which, for the purposes of the Code, is classed as an Acceptance pursuant to paragraph 5.1.3 **(a) and (b), and by issuing a BM Unit Ancillary and Other Service Bid - Offer Acceptance pursuant to paragraph 5.1.3 (c)**.

5.1.3 …

(c) An Acceptance Volume (BM Unit Ancillary and Other Service Bid Acceptance / BM Unit Ancillary and Other Service Offer Acceptance) issued in respect of a BM Unit in accordance with an Ancillary or Other

Service Contract with the Transmission Company and which is calculated in accordance with Section T ANNEX T-2.

Where 5.1.3 is subsequently referred to in Section Q, this should be amended to read **'5.1.3 (a) and (b)'**, namely in sections 5.1.6, 5.1.7, 5.1.11 and 5.1.13.

The following amendments are also required to Section Q:

5.3 Acceptance Data

5.3.1 Acceptance Data for a BM Unit**, for Acceptances made pursuant to Section Q 5.1.3 (a) and (b),** shall comprise the following data items: …

5.3.1A Acceptance Data for a BM Unit, for Acceptances made pursuant to Section Q 5.1.3 (c) shall comprise a Bid - Offer Acceptance volume for each (relevant) value of 'n'.

5.2.1 Determination of the Accepted Ancillary and Other Service Bid - Offer Volumes

The Transmission Company is required to determine the energy volume associated with the provision of Applicable Balancing Services at BM Unit level, in the form of an energy volume against a BM Unit and Settlement Period and also in the form of additional Bid – Offer Acceptances against a BM Unit. Therefore a methodology for such determination is required to be included in the Code. To this end, a new ANNEX to Section T is required, as follows:

ANNEX T-2: Methodology to be utilised by the Transmission Company to determine BM Unit Ancillary and Other Service Volumes and BM UNit Ancillary and Other Service Bid – Offer Acceptances

1. Applicable Balancing Services

1.1 The methodology defined in this ANNEX T-2, pertains to the following Applicable Balancing Services:

(a) Mandatory Frequency Response;

(b) Commercial Response;

(c) Fast Reserve; and

(d) Standing Reserve.

Where the Lead Party has notified the Transmission Company to set the Service Flag to 1 for the BM Unit incorporating the site that provides the Applicable Balancing Service.

The following methodology in paragraph 2 is a proposed view of the potential calculation for the purposes of this Requirements Specification only. This methodology is based upon the current methodology proposed for inclusion in the Connection Use of System Code, and may be amended. Therefore this section of the Code may reference to the CUSC, or some other arrangement may be required in order to maintain the consistency and correctness of this methodology.

2. Determination of BM Unit Ancillary and Other Service Energy Volumes

2.1 The Expected Response Power for site s when in response mode μ is determined as follows:

(i) For response modes delivered by free governor action, this will be derived from the relevant table set out in the relevant services agreement (as such table in interpreted in accordance with Paragraph 4.1.3.11 of the Connection and Use of System Code) by reference to the level of De-Load of the site concerned at the end of minute m and the mean Frequency Deviation over that minute. For this purpose:

(a) for a positive Frequency Deviation in minute m, the expected change in active power output of site s shall be derived from the high frequency response capability table set out in the relevant services agreement; and

(b) for a negative Frequency Deviation in minute m, the expected change in active power output of site s shall be (where the Applicable Balancing Services Provider is instructed to provide Primary Response together with Secondary Response) the mean average value of the Primary Response capability and Secondary Response capability, or (where the Applicable Balancing Services Provider is instructed to provide Primary Response without Secondary Response) Primary Response capability, in each case derived from the low frequency response table set out in the relevant services agreement.

(ii) For response delivered by low or high frequency relay initiation shall be calculated with reference to the actual system frequency and the contracted initiation:

(a) For the period immediately following an initiation in accordance with the contract (or where the service would have been obliged to initiate in accordance with the contract) and prior to a cease or deemed cease instruction, the expected change in active power as derived from the contracted secondary or high frequency response (as the case may be);

(b) For the period immediately following a cease, or deemed cease, instruction the agreed restoration profile; and

(c) For all other periods, 0 MW.

2.2 Where the Applicable Balancing Service is Response, then the Expected Service Energy for a BM Unit and Settlement Period is determined as follows:

$$ESE_{sj} = \sum_{\mu} \sum_{m \in j} \left(\frac{FR_{ms}^{\mu}}{60} \right)$$

where $\Sigma_{m \in j}$ is the sum over all minutes in the Settlement Period and Σ_{μ} is the sum over all response modes, μ.

2.3 Where the Applicable Balancing Service is Reserve, then the Expected Service Energy for a BM Unit and Settlement Period is determined as follows:

$$ESE_{sj} = \int_{0}^{SPD} I_{sj}(t)dt$$

2.4 Where the Applicable Balancing Service is not listed in this Section T ANNEX T-2, 1.1, then the Expected Service Energy for a BM Unit and Settlement Period is 0 MWh.

2.5 The BM Unit Ancillary and Other Service Volume for a BM Unit and Settlement Period (QAS_{ij}) is determined as follows:

$QAS_{ij} = \Sigma_{s \in i} (SF_{sj} \times ESE_{sj})$

where $\Sigma_{s \in i}$ is the sum across all sites, s, forming all, or part of, BM Unit i.

3. Determination of BM Unit Ancillary and Other Service Bid – Offer Acceptances

3.1 The transmission company will determine the expected variation of power output, $ESE_{sj}(t)$ from the delivery of ancillary service-site pair, s, as follows time t from the start of settlement period j:

3.1.1 In the event that service-site pair s is a response service (either mandatory or commercial) delivered by free governor action:

$ESE_{st}(t)$ will be the expected change in power output as a result of variation in system frequency. This will be derived from the relevant table set out in the relevant services agreement (as such table is interpreted in accordance with Paragraph 4.1.3.11of CUSC) by reference to the level of De-Load of the site concerned at the end of minute and the mean Frequency Deviation over the minute, m, where minute m contains spot time t, and starts an integer multiple of 60 seconds from the start of the settlement period j.

for this purpose:

(a) For a positive Frequency Deviation at time t, the expected change in active power output of site s shall be derived from the high frequency response capability table set out in the relevant services agreement; and

(b) For a negative Frequency Deviation at time t, the expected change in active power output of site s shall be derived from

(i) the primary frequency response capability set out in the relevant services agreement when the unit is instructed to provide primary response without secondary response;

(ii) the mean of the primary and secondary response capability set out in the relevant services agreement when the unit is instructed to provide primary response with secondary response.

3.1.2 In the event that service-site pair s is a response service delivered on initiation by a low or high frequency relay:

$ESE_{sj}(t)$ shall be calculated in with reference to the actual system frequency and the contracted initiation.

(a) For the period immediately following an initiation in accordance with the contract (or where the service would have been obliged to initiate in accordance with the contract) and prior to a cease or deemed cease instruction, the expected change in active power as derived from the contracted secondary or high frequency response (as the case may be).

(b) For the period immediately following a cease (or deemed cease) instruction the agreed restoration profile.

(c) For all other periods, 0 MW.

3.1.3 In the event that service-site pair s is a reserve service:

$ESE_{sj}(t)$ shall be the instructed (excluding Bid Offer Acceptances) Reserve delivery, from service-site pair *s*, time *t* from the start of settlement period *j*, taking account of contracted run-up and run down profiles.

3.1.4 In the event that service-site pair s is any other service:

$$ESE_{sj}(t) = 0$$

3.2 The Transmission Company will determine the expected change in the production or consumption power of BM Unit i resulting from the delivery of Ancillary or Other Services using the following formula

$$qAS_{ij}(t) = \sum_{s \in i} \left(SF_{sj} \times ESE_{sj}(t) \right)$$

where:

SF_{sj} **Is the Service Flag for service-site pair *s* in settlement period *j*.**

Takes the value 1, if the Lead Party for the BM Unit that incorporates service *s* has indicated (in accordance with the notification procedure) that they wish the BM volume to be adjusted for that site Ancillary and Other Service volume.

Otherwise 0.

$\sum_{s \in i}$ **Is the summation across all service-site pairs, s, that form part of BMU i.**

3.3 The Transmission Company will determine the instantaneous Offer Acceptance thus:

$$qASO_{ij}(t) = \max(qAS_{ij}(t), 0)$$

and the instantaneous Bid Acceptance thus:

$$qASB_{ij}(t) = \min(qAS_{ij}(t), 0)$$

3.4 The Transmission Company will determine the expected variation of output of BM Unit i at time t from the start of settlement period j as a result of bid offer acceptances thus:

$$qD_{ij}(t) = \sum_k \sum_n \left(qAB_{ij}^{kn}(t) + qAO_{ij}^{kn}(t)\right)$$

where $\sum_k$ means the summation across all bid offer acceptances and $\sum_n$ means the summation across all bid offer pairs.

3.5 The Transmission Company will determine the change in production or consumption resulting from ancillary or other service delivery as an offer acceptance in range n, of BM Unit i, time t from the start of settlement period j thus:

For n ? 1

$$qASO_{ij}^{n}(t) = \max\left(\min\left(qD_{ij}(t) + qASO_{ij}(t), \sum_{n'=0}^{n} qBO_{ij}^{n'}(t)\right), \sum_{n'=0}^{n-1} qBO_{ij}^{n'}(t)\right) - \max\left(\min\left(qD_{ij}(t), \sum_{n'=0}^{n} qBO_{ij}^{n'}(t)\right), \sum_{n'=0}^{n-1} qBO_{ij}^{n'}(t)\right)$$

for n ? -1

$$qASO_{ij}^{n}(t) = \min\left(\max\left(qD_{ij}(t) + qASO_{ij}(t), \sum_{n'=n}^{0} qBO_{ij}^{n'}(t) \right), \sum_{n'=n+1}^{0} qBO_{ij}^{n'}(t) \right) - \min\left(\max\left(qD_{ij}(t), \sum_{n'=n}^{0} qBO_{ij}^{n'}(t) \right), \sum_{n'=n+1}^{0} qBO_{ij}^{n'}(t) \right)$$

and as a bid acceptance, thus:

For n ? 1

$$qASB_{ij}^{n}(t) = \max\left(\min\left(qD_{ij}(t) + qASB_{ij}(t), \sum_{n'=0}^{n} qBO_{ij}^{n'}(t) \right), \sum_{n'=0}^{n-1} qBO_{ij}^{n'}(t) \right) - \max\left(\min\left(qD_{ij}(t), \sum_{n'=0}^{n} qBO_{ij}^{n'}(t) \right), \sum_{n'=0}^{n-1} qBO_{ij}^{n'}(t) \right)$$

for n ? -1

$$qASB_{ij}^{n}(t) = \min\left(\max\left(qD_{ij}(t) + qASB_{ij}(t), \sum_{n'=n}^{0} qBO_{ij}^{n'}(t) \right), \sum_{n'=n+1}^{0} qBO_{ij}^{n'}(t) \right) - \min\left(\max\left(qD_{ij}(t), \sum_{n'=n}^{0} qBO_{ij}^{n'}(t) \right), \sum_{n'=n+1}^{0} qBO_{ij}^{n'}(t) \right)$$

where it is assumed that

iv. $qBO^{0}_{ij}(t) = 0$;
v. $qBO^{5}_{ij}(t)$ is arbitrarily large and positive; and
vi. $qBO^{-5}_{ij}(t)$ is assumed to be arbitrarily large and negative such that the bid offer range is extended to accommodate any value of $qAS_{ij}(t)$.

3.6 The Transmission Company will determine the offer acceptance volume resulting from ancillary or other service delivery falling within bid offer range n, of BM Unit i, time t from the start of settlement period j thus:

$$QASO_{ij}^{n} = \int_{0}^{SPD} qASO_{ij}^{n}(t)dt$$

and the bid acceptance volume resulting from ancillary or other service delivery falling within bid offer range n, of BM Unit i, time t from the start of settlement period j thus:

$$QASB_{ij}^{n} = \int_{0}^{SPD} qASB_{ij}^{n}(t)dt$$

5.2.2 Provision of the BM Unit Ancillary and Other Service Bid - Offer Acceptances

The Transmission Company is required to determine the energy volume associated with the provision of Applicable Balancing Services at Bid - Offer pair (n) and BM Unit level and provide such volumes, in the form of 'additional' Bid – Offer Acceptances to the Settlement Administration Agent by the end of the second working day from the Settlement Day to which the energy volumes pertain.

The existing interface for provision of Bid - Offer Acceptances into the Settlement Administration Agent and Balancing Mechanism Reporting Agent is not suitable for use to provide this information, as the Transmission Company is providing volumes against the BM Unit and not Acceptance spot points. Therefore a new interface is required between the Transmission Company and the BSC Central Service Agent.

The format of such interface should be agreed between the BSC Central Service Agent and the Transmission Company, however, it is expected that the interface be automated. The following provides an example of the format of this interface for the purposes of this Requirements Specification only:

From: Transmission Company To: SAA

Settlement Date

Settlement Period

BM Unit

n *

BM Unit Ancillary and Other Service Bid Acceptance ($QABO^{n}_{ij}$)

BM Unit Ancillary and Other Service Offer Acceptance ($QASO^{n}_{ij}$)

* It is expected that a BM Unit Ancillary and Other Service Bid - Offer Acceptance volume be provided for each relevant value of 'n'.

No Bid - Offer Acceptance number (k) is utilised. This is a consequence of:

- The irrelevance of including a Bid - Offer Acceptance Number at this level, as there is no 'real' acceptance made, only a notified Acceptance volume after the event; and
- The requirements of the Settlement Administration Agent (SAA) (and BMRA) with regards to Bid - Offer Acceptance numbering; the Acceptance numbers are treated very similarly to File Sequence Numbers to enable 'missing' Bid - Offer Acceptances to be identified by the Central Services. Therefore, for these 'additional' acceptances, the Acceptance number would not be contiguous with those in the same / preceding / subsequent Settlement Period, potentially causing a significant problem in processing for the Central Service Agent.

5.2.3 Provision of the 'BM Unit Ancillary and Other Service Energy Volume'

The Transmission Company is required to determine the energy volume associated with the provision of Applicable Balancing Services, at Settlement Period and BM Unit level and

provide such volumes to the Settlement Administration Agent by the end of the second working day from the Settlement Day to which the energy volumes pertain.

The notified volumes relate to the specified BM Unit in a Settlement Period on a Settlement Date only and it is not intended that they be defaulted.

The Transmission Company will provide a cumulative / total volume for each BM Unit and Settlement Period, i.e. there will not be multiple within Settlement Period volumes notified for a BM Unit at any one time.

The Transmission Company will be able to resubmit an amended 'BM Unit Ancillary and Other Service Energy Volume' to the Settlement Administration Agent at any time after initial notification up to the Final Reconciliation Run (in a similar manner to that utilised for amending Balancing Services Adjustment Data (BSAD)). Where the Transmission Company wishes to amend the data, they will resubmit the interface with the requisite data at any time.

It is expected that the interface providing such volumes to the SAA be fully automated and the format be agreed between the Transmission Company and the SAA. However, for the purposes of this Requirements Specification, an example format of the interface is provided:

To: SAA **From:** Transmission Company (System Operator)

Settlement Date (dd/mm/yyyy)

Settlement Period (1-50)

BM Unit Id

BM Unit Ancillary and Other Service Energy Volume (MWh)

Code Amendments

Amendment to the Code, Section Q 'Balancing Mechanism Activities' is required to support the provision of the 'BM Unit Ancillary and Other Service Energy Volume' to the Settlement Administration Agent from the Transmission Company, as follows.

A new clause in Section Q 6, arbitrarily named Q 6.3A here, is required:

6.3A Ancillary and Other Service Energy Volumes

6.3A.1 In relation to each Settlement Period and each BM Unit, not later than the end of the second business day following the Settlement Day, the Transmission Company shall determine (on a basis approved in writing by the Authority for the purposes of this paragraph 6.3A.1), and notify the SAA the volume of Ancillary Services and Other Service Energy expected in relationship to Transmission Company Contracts. The variable 'BM Unit Ancillary and Other Service Energy Volume' (QAS_{ij}) will take the notified value. For the avoidance of doubt, in the event that no approval exists from the Authority, this term shall be 0 MWh.

6.3A.2 The Transmission Company may resubmit to the SAA the 'BM Unit Ancillary and Other Service Energy Volume' in respect of any BM Unit and Settlement Period within a Settlement Day at any time prior to the Final Reconciliation Settlement Run

for such Settlement Day and the SAA shall correct such data in the Settlement Run following such resubmission.

Amendment to the Code, Section Q 'Balancing Mechanism Activities' is also required to support the provision of the 'BM Unit Ancillary and Other Service Bid – Offer Acceptances' to the Settlement Administration Agent from the Transmission Company, as follows.

A new clause in Section Q 6, arbitrarily named Q 6.3B here, is required:

6.3B BM Unit Ancillary and Other Service Bid - Offer Acceptances

6.3B.1 In relation to each Settlement Period and each BM Unit, not later than the end of the second business day following the Settlement Day, the Transmission Company shall determine (in accordance with the Code, Section T ANNEX T-2), and notify the SAA the additional Bid - Offer Acceptances made by the Transmission Company (pursuant to Section Q 5.1.3 (c)) with regards to the volume of energy related to the provision of Ancillary Services and Other Services expected in relationship to Transmission Company Contracts, by provision of the volumes associated with 'BM Unit Ancillary and Other Service Bid Acceptances' ($QASB^{n}_{ij}$) and 'BM Unit Ancillary and Other Service Offer Acceptances' ($QASO^{n}_{ij}$).

6.3B.2 The Transmission Company may resubmit to the SAA the volumes associated with the 'BM Unit Ancillary and Other Service Bid Acceptance' and the 'BM Unit Ancillary and Other Service Offer Acceptance' in respect of any BM Unit and Settlement Period within a Settlement Day at any time prior to the Final Reconciliation Settlement Run for such Settlement Day and the SAA shall correct such data in the Settlement Run following such resubmission.

5.2.4 Inclusion of the BM Unit Ancillary and Other Service Bid - Offer Acceptances in Settlement Calculations

The intent of the Alternative Modification is that the energy volumes directly associated with the provision of Applicable Balancing Services are excluded from the consequence of imbalance charges (Energy Imbalance, Information Imbalance and Non Delivery charges), by accounting for this energy via Bid – Offer Acceptances.

Therefore, in order to support the intent of the Alternative Modification, settlement calculations, as defined in Section T of the Code, will have to be amended as follows, for all Settlement Runs:

The determination of the Period BM Unit Total Accepted Offer Volume (QAO^{n}_{ij}) and Period BM Unit Total Accepted Bid – Volume (QAB^{n}_{ij}) (Section T 3.9) is required to be amended as follows:

3.9.1 In respect of each Settlement Period, for each BM Unit, the total MWh volume of the Offer accepted from all Acceptances shall be the Period BM Unit Total Accepted Offer Volume and shall be established as follows:

$$QAO^{n}_{ij} = \Sigma^{k} QAO^{kn}_{ij} \; \mathbf{+ QASO^{n}_{ij}}$$

Where Σ^{k} represents the sum over all Acceptances within the Settlement Period.

3.9.2 In respect of each Settlement Period, for each BM Unit, the total MWh volume of the Bid accepted from all Acceptances shall be the Period BM Unit Total Accepted Bid Volume and shall be established as follows:

$QAB^{n}_{ij} = \Sigma^{k} QAB^{kn}_{ij}$ **+ $QASB^{n}_{ij}$**

Where Σ^{k} represents the sum over all Acceptances within the Settlement Period.

Placing the Accepted Ancillary and Other Service Bid – Offer Volumes in this equation at Section T 3.9 means that the energy volumes associated with the provision of balancing services is treated like any other Bid – Offer Acceptance, with the exception that these Bid – Offer Acceptances are excluded from the Energy Imbalance Price calculation.

5.2.5 Inclusion of the 'BM Unit Ancillary and Other Service Energy Volumes' in Settlement Calculations

The intent of the Alternative Modification is that the energy volumes directly associated with the provision of Applicable Balancing Services are excluded from the consequence of imbalance charges (Energy Imbalance, Information Imbalance and Non Delivery charges), by removing this energy from the Energy Account of the Service Provider (via adjustment of the energy associated with the BM Unit providing the balancing service) and transferring it to the Energy Account (non IEA) of the Transmission Company. The Transmission Company (non IEA) Energy Accounts are exempt from imbalance charging.

Therefore, in order to support the intent of the Alternative Modification, settlement calculations, as defined in Section T of the Code, will have to be amended as follows, for all Settlement Runs:

The determination of the Period BM Unit Balancing Services Volume (the name has been amended from the 'Period BM Unit Bid – Offer Volume', see section 2.2.1) (Section T 4.3.2) is required to be amended as follows:

4.3.2 In respect of each Settlement Period, for each BM Unit, the Period BM Unit ~~Bid – Offer~~ Balancing Services Volume, will be determined as follows:

$QBO_{ij} = \Sigma^{n}(QAO^{n}_{ij} + QAB^{n}_{ij})$ **+ QAS_{ij}**

Where Σ^{n} represents the sum over all Bid – Offer Pair numbers for the BM Unit.

Placing the QAS_{ij} variable in this equation at 4.3.2 means that the:

- Calculation of expected metered volumes (Section 4.3.3) is adjusted for 'BM Unit Ancillary and Other Service Energy Volume'; and
  - This excludes the 'BM Unit Ancillary and Other Service Energy Volume' from the calculation of Information Imbalance volume calculation (Section T 4.3.4), the calculation of Energy Imbalance Prices (Section T 4.4) and the calculation of Account Credited Energy Volumes (Section T 4.6.2) and consequently the calculation of Energy Imbalance Volume (Section T 4.6.3).

This amendment effectively adjusts the Energy Account of the Service Provider to account for the 'BM Unit Ancillary and Other Service Energy Volume'.

The calculation at Section T, 4.6.2 requires amendment to the name of the variable being calculated as a consequence of the amendment to the definition. It should be noted that no amendment to the variables or the calculation is required, as follows:

4.6.2 In respect of each Settlement Period, for each Energy Account, the Account Period ~~Bid - Offer~~ Balancing Services Volume will be determined as follows:

No change to the calculation.

For consistency with the calculation and reporting of other variables under the Code, one further calculation is required in order to determine the Total Period Ancillary and Other Service Energy Volume transferred to the Transmission Company.

This will be added into the end of Section T 4.6, as follows:

4.6.5 In respect of each Settlement Period, the Total Period Ancillary and Other Service Energy Volume will be determined as follows:

$$TQAS_j = \Sigma_i QAS_{ij}$$

Where Σ_i represents the sum over all BM Units.

5.2.6 Settlement Report (SAA-I014) Amendments

The Settlement Report (SAA-I014), all sub flows, requires amendment to reflect the application of the new functionality in the report, so that BSC Parties, the Transmission Company and ELEXON can replicate the settlement calculations, if required.

It should be noted that there is potential to utilise parallel reporting functionality, i.e. recipients determine the version of the Settlement Report they wish to receive. Therefore any Impact Assessment should provide a view on the appropriateness and cost / timescale implications of utilising this approach.

Therefore the following amendments are required:

SAA-I014 Subflow 1 - to BSC Parties:

Group **SSD** 'System Period Data'

Include new data item 'Total Period Ancillary and Other Service Volume' ($TQAS_j$) (MWh).

Group **BPD** 'BM Unit Period Data'

Include new data item 'BM Unit Ancillary and Other Service Volume' (QAS_{ij}) (MWh) and rename existing data item 'Period BM Unit ~~Bid-Offer~~ Balancing Services Volume' (N0164).

Group **BOD** 'BMU Period Bid – Offer Data'

Include new data items 'BM Unit Ancillary and Other Service Bid Volume' ($QASB^n_{ij}$) (MWh) and 'BM Unit Ancillary and Other Service Offer Volume' ($QASO^n_{ij}$) (MWh).

SAA-I014 Subflow 2 - to Transmission Company:

Group **SPI** 'Settlement Period Information'

Include new data item 'Total Period Ancillary and Other Service Volume' ($TQAS_j$) (MWh).

Group **BPI** 'BM Unit Period Data'

Include new data item 'BM Unit Ancillary and Other Service Volume' (QAS_{ij}) (MWh).

Group **SSD** 'System Period Data'

Include new data item 'Total Period Ancillary and Other Service Volume' ($TQAS_j$) (MWh)oup.

Group **BP7** 'BM Unit Period Data'

Include new data item 'BM Unit Ancillary and Other Service Volume' (QAS_{ij}) (MWh) and rename existing data item 'Period BM Unit ~~Bid-Offer~~ Balancing Services Volume' (N0164).

Group **BO4** 'BMU Period Bid – Offer Data'

Include new data items 'BM Unit Ancillary and Other Service Bid Volume' ($QASB^n_{ij}$) (MWh) and 'BM Unit Ancillary and Other Service Offer Volume' ($QASO^n_{ij}$) (MWh).

SAA-I014 Subflow 3 - to ELEXON:

Group **SSD** 'System Period Data'

Include new data item 'Total Period Ancillary and Other Service Volume' ($TQAS_j$) (MWh).

Group **BUI** 'BM Unit Period Data'

Include new data item 'BM Unit Ancillary and Other Service Volume' (QAS_{ij}) (MWh) and rename existing data item 'Period BM Unit ~~Bid-Offer~~ Balancing Services Volume' (N0164).

6 OTHER CHANGES REQUIRED

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. However, it may be possible to utilise the parallel implementation approach defined under Modification P8 to delay the impact.

Modification P8 proposes that flow version numbering be implemented within the BSC Central Service Agent. Namely, when a report such as the Settlement Report (SAA-I014) changes and the changes are implemented, 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, 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.

6.1 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 URSs) that requires amendment as a result of the implementation of the Alternative 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.

6.1.1 The Code

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

6.1.2 Code Subsidiary Documents - The Reporting Catalogue

The Reporting Catalogue (v2.0) requires amendment to reflect the amendments to the Settlement Report. The amendments required are described as follows:

3.1.1 Report sent to the Transmission Company (TC)

(b) Settlement Period Information …

- …
- **Total Period Ancillary and Other Service Energy Volume ($TQAS_i$) (MWh)**

(d) BM Unit Period Information

- …
- **BM Unit Ancillary and Other Service Energy Volume (QAS_{ij}) (MWh)**

(h) Settlement Period Information:

- System Period Data

- …
- **Total Period Ancillary and Other Service Energy Volume ($TQAS_i$) (MWh)**

(k) BM Unit Period Information

- BM Unit Period Data:
  - …
  - **BM Unit Ancillary and Other Service Energy Volume (QAS_{ij}) (MWh)**

(m) BM Unit Period Bid - Offer Information …

- Bid - Offer Data:
  - …
  - **BM Unit Ancillary and Other Service Bid Acceptance ($QABO^n_{ij}$) (MWh)**
  - **BM Unit Ancillary and Other Service Offer Acceptance ($QASO^n_{ij}$) (MWh)**

3.1.2 Report sent to BSCCo

(c) Settlement Period Information …

- … System Period Data
  - …
  - **Total Period Ancillary and Other Service Energy Volume ($TQAS_i$) (MWh)**

(d) BM Unit Period Information

- …
- **BM Unit Ancillary and Other Service Energy Volume (QAS_{ij}) (MWh)**

3.1.3 Reports sent to Parties

(b) Settlement Period Information …

- …
- **Total Period Ancillary and Other Service Energy Volume ($TQAS_i$) (MWh)**

(e) BM Unit Period Information

- …
- **BM Unit Ancillary and Other Service Energy Volume (QAS_{ij}) (MWh)**

(g) BM Unit Period Bid - Offer Information …

- Bid - Offer Data:
  - …
  - **BM Unit Ancillary and Other Service Bid Acceptance ($QABO^n_{ij}$) (MWh)**
  - **BM Unit Ancillary and Other Service Offer Acceptance ($QASO^n_{ij}$) (MWh)**

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

6.1.3 Settlement Administration Agent Service Description

The following amendments are required to support the implementation of Modification P34.

Section 1.4 …

ii) For each Settlement Run:

a. Receive BM Data from the SO including:

- …
- **BM Unit Ancillary and Other Service Energy Volumes**

Section 2.1 System Operator …

2.1.1 …

- …
- **BM Unit Ancillary and Other Service Energy Volumes**

3.12 Calculation of Period BM Unit Total Accepted Offer Volume and Period BM Unit Total Accepted Bid Volume

3.12.1 The Period BM Unit Total Accepted Offer Volume (QAO^n_{ij}) is the total MW volume of Offer n accepted from all Bid - Offer Acceptances. It shall be determined by the SAA as follows:

$QAO^n_{ij} = \Sigma^k(QAO^{kn}_{ij})$ **+ $QASO^n_{ij}$**

3.12.2 The Period BM Unit Total Accepted Bid Volume (QAB^n_{ij}) is the total MW volume of Bid n accepted from all Bid - Offer Acceptances. It shall be determined by the SAA as follows:

$QAB^n_{ij} = \Sigma^k(QAB^{kn}_{ij})$ **+ $QASB^n_{ij}$**

3.18 Calculation of Period BM Unit ~~Bid – Offer~~ Balancing Services Volume

3.18.1 The SAA shall ensure that the Period BM Unit ~~Bid – Offer~~ Balancing Services Volume (QBO_{ij}) represents the net quantity of Balancing Services energy, consisting of accepted Bids and Offers, and energy associated with Ancillary and Other services from BM Unit i in Settlement Period j. It is determined as follows:

$QBO_{ij} = \Sigma^n(QAO^n_{ij} + QAB^n_{ij})$ **+ QAS_{ij}**

3.33 Calculation of Account Period ~~Bid – Offer~~ Balancing Services Volume

3.33.1 The SAA shall ensure that the Account Period ~~Bid – Offer~~ Balancing Services Volume ($QABO_{aj}$) represents the net volume of Balancing Services energy, consisting of accepted Bids and Offers, and energy associated with Ancillary and Other services attributable to each Energy Account a, in Settlement Period j.

3.33A Calculation of Total Period Ancillary and Other Service Energy Volume

3.33A.1 In respect of each Settlement Period, the Total Period Ancillary and Other Service Energy Volume will be determined as follows:

$$TQAS_j = \Sigma_i QAS_{ij}$$

Where Σ_i represents the sum over all BM Units.

The SAA Service Description, Appendix A 'Inputs and Outputs' requires amendment, as follows, to reflect the receipt of information from the Transmission Company relating to the provision of the BM Unit Ancillary and Other Service Energy Volumes:

1. SAA Inputs

Input Flow Description	Flow Received From
BM Unit Ancillary and Other Service Bid - Offer Acceptances	**SO**
BM Unit Ancillary and Other Service Energy Volume	**SO**

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

6.1.4 NETA Data File Catalogue

The NETA Data File Catalogue requires amendment to include the new and amended reports, as defined in Sections 5.2.2 and 5.2.3 (Transmission Company to SAA) and 5.2.6 (amendments to the Settlement Report) of this Requirements Specification.

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

7 BALANCING MECHANISM REPORTING AGENT FUNCTIONALITY

If it is determined to be appropriate for the Balancing Mechanism Reporting Agent (BMRA) to publish the BM Unit Ancillary and Other Service Bid - Offer Acceptances against the associated BM Unit, then the BMRA and supporting documentation will require amendment, as defined in the following sections.

7.1 Amendments to BMRA

Section 5.2.2 and 5.2.3 of this Requirements Specification defines the (example) interface from the Transmission Company for the provision of the 'BM Unit Ancillary and Other Service Energy Volumes'. It is expected that the interface be provided only once to the BSC Central Service Agent from the Transmission Company (in accordance with the Code Section Q, 1.3.1 which states "*Where … the Transmission Company is required to send particular data to both the BMRA and SAA, for so long as the same person acts as BMRA and SAA, the Transmission Company shall be treated as having sent such data to both of them if it has sent the data to one of them.*").

The Code, Section V 2.6 covers the calculation by BMRA of indicative data, which is required to be calculated and published on a half hourly basis.

For two of these calculations, the implementation of this Modification would mean that there would be insufficient information at the time the calculation was undertaken for the results to be entirely accurate, as the results would be calculated without consideration of the BM Unit Ancillary and Other Service Bid - Offer Acceptances.

The two affected calculations are:

- **BSC Section V 2.6.4** - the calculation of Indicative Period BM Unit Total Accepted Bid Volume ($IQAB^{n}_{ij}$) and Indicative Period BM Unit Total Accepted Offer Volume ($IQAO^{n}_{ij}$); and
- **BSC Section V 2.6.6** - the calculation of Indicative Period BM Unit Bid Cashflow (ICB^{n}_{ij}) and Indicative Period BM Unit Offer Cashflow (ICO^{n}_{ij}).

It should be noted that the implementation of the Modification will not affect the Indicative Energy Imbalance Price calculations and publishing.

BMRA Publishing Requirements

The BM Unit Ancillary and Other Service Bid - Offer Acceptances ($QASB^{n}_{ij}$ and $QASO^{n}_{ij}$) should be published on the BMRA against the associated BM Unit and Settlement Period for a specific Settlement Date, within [x] minutes of receipt[2].

The 'BM Unit Ancillary and Other Service Energy Volumes' (QAS_{ij}) should be published on the BMRA against the associated BM Unit and Settlement Period for a specific Settlement Date, within [x] minutes of receipt.

There is no requirement to calculate and publish the Total Period Ancillary and Other Service Energy Volumes.

[2] There is no precedent for the timescales for publishing this information on BMRA, therefore this can be determined in discussion with the BSC Central Service Agent, for incorporation into the Service Description and associated Service Levels.

Code Amendments

The new clause, as provided in Section 4.2.3 of this Requirements Specification, for inclusion in the Code, Section Q 'Balancing Mechanism Activities', arbitrarily named Q 6.3A and Q 6.3B, require additional mention of the provision of these volumes to the BMRA, as well as the SAA.

A new entry in Section V 'Reporting', ANNEX V-1: 'Tables of Reports', is required:

Table 1 - BMRS

DATA AND RELEVANT SETTLEMENT PERIODS	FREQUENCY	FORMAT	DEFAULT
…			
BM Unit Ancillary and Other Service Bid Acceptances ($QASB^{n}_{ij}$)	**Daily (published for all days on operational days only)**	**Tabular**	**None**
BM Unit Ancillary and Other Service Offer Acceptances ($QASO^{n}_{ij}$)	**Daily (published for all days on operational days only)**	**Tabular**	**None**
BM Unit Ancillary and Other Service Energy Volumes (QAS_{ij})	**Daily (published for all days on operational days only)**	**Tabular**	**None**

Amendments to the BMRA Service Description

The following amendments to the BMRA Service Description are required to support the publishing of this data on BMRA.

8 RECEIVE BM DATA

…

… **f.** **BM Unit Ancillary and Other Service Energy Volumes**

…

8.2A **Publish the BM Unit Ancillary and Other Service Energy Volumes on line within [x] minutes of receipt.**

8.2B **Publish the BM Unit Ancillary and Other Service Bid - Offer Acceptances on line within [x] minutes of receipt.**

If the [x] minutes is determined to be the same as other BM data, which is required to be published within 5 minutes of receipt, then there is no requirement to add this additional paragraph, as the requirement / obligation will be covered by the existing paragraph 8.2.

A new entry in Appendix A 'Input Output Flows', is required:

Balancing Mechanism Reporting Inputs

Input Flow Description	Flow Received From
BM Unit Ancillary and Other Service Bid Acceptances	**SO**
BM Unit Ancillary and Other Service Offer Acceptances	**SO**
BM Unit Ancillary and Other Service Energy Volumes	**SO**

Code Subsidiary Documents - The Reporting Catalogue

The Reporting Catalogue (v2.0) requires amendment to reflect the obligation to publish the BM Unit Ancillary and Other Service Energy Volumes, as follows:

2.1 Data Posted on the BMRS …

… (w) BM Unit Ancillary and Other Service Energy Volumes (QAS_{ij}), daily.

8 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 ECVAA system 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.

8.1 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.

8.2 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.

8.3 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.