Change Proposal – (Page 1 of 1)	**CP No: 897** *(mandatory by BSCCo)*
Title *(mandatory by originator)* Clarifications to BMRA URS and SAA URS arising from the implementation of P18A and P72.	
Description of Change *(mandatory by originator)* Clarifications are required to changes made to the BMRA URS and the SAA URS when implementing P18A and P72.	
Proposed Solution(s) ***(****mandatory by originator)* Amend the BMRA URS and SAA URS to add the clarifications specified in Appendix 1.	
Justification for Change *(mandatory by originator)* Ensures that the changes to the BMRA URS and the SAA URS for P18A and P72 are clear and fully understood.	
Other Configurable Items Potentially Affected by Proposed Solution(s) *(optional by BSCCo)* None	
Impact on Core Industry Documents *(optional by originator)* None	
Related Changes and/or Projects *(mandatory by BSCCo)* CVA Programme Feb-03 Release, P71, P18A	
Originator's Details: ***BCA Name: Andy Holland*** ***Organisation: ELEXON*** ***Email Address:*** andrew.holland@elexon.co.uk ***Date: 11 Dec 2002***	
Attachments: Y (No. of Pages attached: 7)	

Appendix 1 – Clarifications to BMRA URS and SAA URS

Amend the BMRA URS and SAA URS to add the clarifications specified below.

Note that the changes below are described in the February Release URS DCRs already included in the February 03 Release Document Change Records. The text is change marked to highlight the changes. The footnotes are to clarify the reason for the changes, and will not be included in the full documents.

07-21060102 BMRA URS updates for P78 (draft 1_4)

BMRA-F004

4: For each settlement period, all accepted offers and bids for all BM units are listed in order of offer price (PO^n_{ij}) and bid price (PB^n_{ij}) respectively, as illustrated in the following example:

	Offers			Bids	
BM unit (PB^n_{ij})	Vol ($QAPO^n_{ij}$)	Price (PO^n_{ij})	BM unit	Vol ($QAPB^n_{ij}$)	Price
1	12	50	6	10	25
2	24	45	7	15	8
3	15	43	8	5	7
4	50	40	9	5	4
5	20	10	10	10	2

BMRA-F004

5: Starting from the most expensive bid and least expensive offer, each offer and bid is inspected for arbitrage, i.e. where the bid price exceeds or is equal to the offer price. Any arbitrage volume (whole or part) is removed, with the following changes to the example:

	Offers			Bids	
BM unit (PB^n_{ij})	Vol ($QAPO^n_{ij}$)	Price (PO^n_{ij})	BM unit	Vol ($QAPB^n_{ij}$)	Price
1	12	50	~~6~~	~~10~~	~~25~~
2	24	45	7	15	8
3	15	43	8	5	7
4	~~50~~	40	9	5	4
5	~~20~~**10**	10	10	10	2

If, for a particular price, only a subset of the entire set of Bids (or Offers) can be matched, then every Bid (or Offer) in that price is tagged to the same degree (a fraction equal to amount matched, for that price, over the total volume available, for that price), rather than tagging some of the Bids (or Offers) entirely, and others not at all[1].

The removal (or not) of arbitrage offer and bid volumes shall be controlled by the Arbitrage Flag, a system parameter.

BMRA-F004a

Functional Requirements[2]:

1: Referencing the remaining offers and bids, and starting from the least expensive bid and most expensive offer, bids and offers are tagged until the Notional Reserve Limit (also known as Balancing Reserve Limit) is reached for either total remaining bid volume or total remaining offer volume.

In the example, the Notional Reserve Limit (NRL_j) is set to 21 MWh and has been reached for total remaining bid volume. Bids and offers removed before NRL_j is reached are referred to as ~~constraint related~~ trade tagged offers and bids.

Offers	Bids

[1] Clarification (explicitly highlights functionality as introduced into BSC by P72)

[2] Clarifications (NRL here known as Balancing Reserve Limit in the BSC. Replaced "constraint related" with "trade tagged"; Correction missed from P18a updates to trade tagging - QAPO/QAPB not QAO/QAB)

BM unit	Vol($QAPO^n_{ij}$)	Price(PO^n_{ij})	BM unit	Vol($QAPB^n_{ij}$)	Price (PB^n_{ij})	
1	~~12~~ ~~2~~	50				
2	~~24~~ 22	45		7	15	8
3	15	43		8	5	7
4	50	40		9	~~5~~1	4
5	10	10		~~10~~	~~10~~	~~2~~

The removal (or not) of trade tagged offer and bid volumes shall be controlled by NRL_j , a system parameter. NRL_j may be set to "a very large number" in order to prevent any trade tagged offer or bid volume from being removed.

If, for a particular price, only a subset of the entire set of Bids (or Offers) can be matched, then every Bid (or Offer) in that price is tagged to the same degree (a fraction equal to amount matched, for that price, over the total volume available, for that price), rather than tagging some of the Bids (or Offers) entirely, and others not at all[3]

BMRA-F004a

2: The remaining offer and bid volumes in the example are as follows:

	Offers			Bids	
BM unit	Vol($QAPO^n_{ij}$)	Price(PO^n_{ij})	BM unit	Vol($QAPB^n_{ij}$)	Price (PB^n_{ij})
2	22	45	7	15	8
3	15	43	8	5	7
4	50	40	9	1	4
5	10	10			

The energy imbalance prices - estimated System Buy Price and estimated System Sell Price are then calculated as the weighted average of the accepted offers and bids, respectively, excluding the final set of tagged offers and bids derived as described above.

BMRA-F004a

3. The remaining offers and bid volumes shall be used in the calculation of the estimated System Buy Price (SBP_j) as follows[4]:

In respect of each Settlement Period, if $\{\Sigma i \Sigma^n \{QAPO^n ij * ETLMij\} + BVAj\}$ is not equal to zero then the estimated System Buy Price will be determined as follows:

$$SBP_j = \{\Sigma_i \Sigma^n \{QAPO^n_{ij} * PO^n_{ij} * ETLM_{ij}\} + BCA_j\} / \{\Sigma_i \Sigma^n \{QAPO^n_{ij} * ETLM_{ij}\} + BVA_j\} + \{BPA_j\}$$

where

Σ_i represents the sum over all BM Units;

Σ^n represents the sum over those accepted Offers that are ~~not short Duration Volumes, and~~ not De Minimis Acceptance volumes and not Arbitrage Accepted Offers and not Trade Tagged Offers;

[3] Clarification (explicitly highlights functionality as introduced into BSC by P72)

[4] Clarification to align with P78 NIV (use QAP in place of "not short")

PO^n_{ij} is the Offer Price for the Offer acceptance n, BM Unit i and Settlement Period j;

BCA_j is the Buy-Price Cost Adjustment;
BVA_j is the Buy-Price Volume Adjustment; and
BPA_j is the Buy-Price Price Adjustment.

If for any Settlement Period $\{\Sigma_i\Sigma^n \{QAPO^n_{ij} * ETLM_{ij}\}+BVA_j\}$ is equal to zero, then:

(a) if for that Settlement Period $\{\Sigma_i\Sigma^n \{QAPB^n_{ij} * ETLM_{ij}\}+ SVA_j\}$ is equal to zero, the estimated System Buy Price for that Settlement Period will be equal to zero;

(b) otherwise, the estimated System Buy Price will be determined as the maximum of estimated System Sell Price and:
   (i) the Offer Price of the cheapest Offer available in that Settlement Period:
      (1) which has a positive Bid-Offer Pair Number; and
      (2) which has an Offer Price greater than the Offer Price of any Offer which is an Arbitrage Accepted Offer in respect of that Settlement Period; and
      (3) for which the value of Bid-Offer Volume ($qBO^n_{ij}(t)$) is greater than zero for all spot times t in that Settlement Period;
   (i) or, if no such Offer exists, zero.

BMRA-F004a

4. The remaining offers and bid volumes shall be used in the calculation of the estimated System Sell Price (SSP_j) as follows[5]:

In respect of each Settlement Period, if $\{\Sigma_i\Sigma^n \{QAPB^n_{ij} * ETLM_{ij}\}+ SVA_j\}$ is not equal to zero then the estimated System Sell Price will be determined as follows:

$$SSP_j = \{\Sigma_i\Sigma^n\{QAPB^n_{ij} * PB^n_{ij} * ETLM_{ij}\} + SCA_j\} / \{\Sigma_i\Sigma^n \{QAPB^n_{ij} * ETLM_{ij}\} + SVA_j\} +\{SPA_j\}$$

where
Σ_i represents the sum over all BM Units;
Σ^n represents the sum over those accepted Bids that are ~~not Short Duration volumes and~~ not De Minimis Acceptance volumes and not Arbitrage Accepted Bids and not Trade Tagged Bids;
PB^n_{ij} is the Bid Price for the Bid acceptance n, BM Unit I and Settlement Period j:
SCA_j is the Sell-Price Cost Adjustment:
SVA_j is the Sell-Price Volume Adjustment; and
SPA_j is the Sell-Price Price Adjustment

If for any Settlement Period $\{\Sigma_i\Sigma^n \{QAPB^n_{ij} * ETLM_{ij}\}+ SVA_j\}$ is equal to zero, then:

(a) if for that Settlement Period $\{\Sigma_i\Sigma^n \{QAPO^n_{ij} * ETLM_{ij}\} + BVA_j\}$ is equal to zero, the estimated System Sell Price for that Settlement Period will be equal to zero;

(b) otherwise, the estimated System Sell Price will be determined as the minimum of estimated System Buy Price and:
   (i) the Bid Price of the most expensive Bid available in that Settlement Period:
      (1) which has a negative Bid-Offer Pair Number; and

[5] Clarification to align with P78 NIV (use QAP in place of "not short")

(2) which has a Bid Price less than the Bid Price of any Bid which is an Arbitrage Accepted Bid in respect of that Settlement Period; and

(3) for which the value of Bid-Offer Volume ($qBO^n_{ij}(t)$) is less than zero for all spot times t in that Settlement Period;

(i) or, if no such Bid exists, zero.

SAA-F009

Functional Requirements[6]:

4: For each settlement period, all accepted offers and bids for all BM units are listed in order of offer price (PO^n_{ij}) and bid price (PB^n_{ij}) respectively, as illustrated in the following example:

	Offers			Bids	
BM unit	Vol($QAPO^n_{ij}$)	Price(PO^n_{ij})	BM unit	Vol($QAPB^n_{ij}$)	Price(PB^n_{ij})
1	12	50	6	10	25
2	24	45	7	15	8
3	15	43	8	5	7
4	50	40	9	5	4
5	20	10	10	10	2

07-21060502 SAA URS updates for P78 (draft 1_4)
SAA-F009

5: Starting from the most expensive bid and least expensive offer, each offer and bid is inspected for arbitrage, i.e. where the bid price exceeds or is equal to the offer price. Any arbitrage volume (whole or part) is removed, with the following changes to the example:

	Offers			Bids	
BM unit	Vol($QAPO^n_{ij}$)	Price(PO^n_{ij})	BM unit	Vol($QAPB^n_{ij}$)	Price (PB^n_{ij})
1	12	50	~~6~~	~~10~~	~~25~~
2	24	45	7	15	8
3	15	43	8	5	7
4	50	40	9	5	4
5	~~20~~10	10	10	10	2

[6] Clarifications (NRL here known as Balancing Reserve Limit in the BSC. Correction missed from P18a updates to arbitrage - QAPO/QAPB not QAO/QAB)

If, for a particular price, only a subset of the entire set of Bids (or Offers) can be matched, then every Bid (or Offer) in that price is tagged to the same degree (a fraction equal to amount matched, for that price, over the total volume available, for that price), rather than tagging some of the Bids (or Offers) entirely, and others not at all[7].

The removal (or not) of arbitrage offer and bid volumes shall be controlled by the Arbitrage Flag, a system parameter.

SAA-F009a

Functional Requirements[8]:

1: Referencing the remaining offers and bids, and starting from the least expensive bid and most expensive offer, bids and offers are tagged until the Notional Reserve Limit (also known as Balancing Reserve Limit) is reached for either total remaining bid volume or total remaining offer volume.

In the example, the Notional Reserve Limit (NRL_j) is set to 21 MWh and has been reached for total remaining bid volume. Bids and offers removed before NRL_j is reached are referred to as trade tagged offers and bids.

	Offers			Bids	
BM unit	Vol($QAPO^n_{ij}$)	Price(PO^n_{ij})	BM unit	Vol($QAPB^n_{ij}$)	Price (PB^n_{ij})
1	~~12~~ ~~2~~	50			
2	~~24~~ 22	45	7	15	8
3	15	43	8	5	7
4	50	40	9	~~5~~1	4
5	10	10	~~10~~	~~10~~	~~2~~

The removal (or not) of trade tagged offer and bid volumes shall be controlled by NRL_j , a system parameter. NRL_j may be set to "a very large number" in order to prevent any trade tagged offer or bid volume from being removed.

If, for a particular price, only a subset of the entire set of Bids (or Offers) can be matched, then every Bid (or Offer) in that price is tagged to the same degree (a fraction equal to amount matched, for that price, over the total volume available, for that price), rather than tagging some of the Bids (or Offers) entirely, and others not at all[9].

[7] Clarification (explicitly highlights functionality as introduced into BSC by P72)

[8] Clarifications (NRL here known as Balancing Reserve Limit in the BSC. Replaced "constraint related" with "trade tagged"; Correction missed from P18a updates to trade tagging - QAPO/QAPB not QAO/QAB)

[9] Clarification (explicitly highlights functionality as introduced into BSC by P72)

SAA-F009a

2: The remaining offer and bid volumes in the example are as follows:

	Offers			Bids	
BM unit	Vol($QAPO^n_{ij}$)	Price(PO^n_{ij})	BM unit	Vol($QAPB^n_{ij}$)	Price (PB^n_{ij})
2	22	45	7	15	8
3	15	43	8	5	7
4	50	40	9	1	4
5	10	10			

The energy imbalance prices - System Buy Price and System Sell Price are then calculated as the weighted average of the accepted offers and bids, respectively, excluding the final set of tagged offers and bids derived as described above.

SAA-F009a

3. The remaining offers and bid volumes shall be used in the calculation of the System Buy Price (SBP_j) as follows[10]:

In respect of each Settlement Period, if $\{\Sigma i\Sigma^n \{QAPO^n ij * TLMij\} + BVAj\}$ is not equal to zero then the System Buy Price will be determined as follows:

$$SBP_j = \{\Sigma_i\Sigma^n\{QAPO^n_{ij} * PO^n_{ij} * TLM_{ij}\} + BCA_j\} / \{\Sigma_i\Sigma^n \{QAPO^n_{ij} * TLM_{ij}\} + BVA_j\} + \{BPA_j\}$$

where

Σ_i represents the sum over all BM Units;

Σ^n represents the sum over those accepted Offers that are not De Minimis Acceptance volumes and not Arbitrage Accepted Offers and not Trade Tagged Offers;

PO^n_{ij} is the Offer Price for the Offer acceptance n, BM Unit i and Settlement Period j;

BCA_j is the Buy-Price Cost Adjustment;

BVA_j is the Buy-Price Volume Adjustment; and

BPA_j is the Buy-Price Price Adjustment.

If for any Settlement Period $\{\Sigma_i\Sigma^n \{QAPPO^n_{ij} * TLM_{ij}\}+BVA_j\}$ is equal to zero, then:

(c) if for that Settlement Period $\{\Sigma_i\Sigma^n \{QAPPB^n_{ij} * TLM_{ij}\}+ SVA_j\}$ is equal to zero, the System Buy Price for that Settlement Period will be equal to zero;

(d) otherwise, the System Buy Price will be determined as the maximum of System Sell Price and:

(ii) the Offer Price of the cheapest Offer available in that Settlement Period:

(4) which has a positive Bid-Offer Pair Number; and

[10] Clarification to align with P78 NIV (use QAP in place of "not short")

(5) which has an Offer Price greater than the Offer Price of any Offer which is an Arbitrage Accepted Offer in respect of that Settlement Period; and

(6) for which the value of Bid-Offer Volume ($qBO^n_{ij}(t)$) is greater than zero for all spot times t in that Settlement Period;

(ii) or, if no such Offer exists, zero.

SAA-F009a

4. The remaining offers and bid volumes shall be used in the calculation of the System Sell Price (SSP_j) as follows[11]:

In respect of each Settlement Period, if $\{\Sigma_i\Sigma^n \{QAPB^n_{ij} * TLM_{ij}\}+ SVA_j\}$ is not equal to zero then the System Sell Price will be determined as follows:

$$SSP_j = \{\Sigma_i\Sigma^n\{QAPB^n_{ij} * PB^n_{ij} * TLM_{ij}\} + SCA_j\} / \{\Sigma_i\Sigma^n \{QAPB^n_{ij} * TLM_{ij}\} + SVA_j\} +\{SPA_j\}$$

where
Σ_i represents the sum over all BM Units;
Σ^n represents the sum over those accepted Bids that are not De Minimis Acceptance volumes and not Arbitrage Accepted Bids and not Trade Tagged Bids;
PB^n_{ij} is the Bid Price for the Bid acceptance n, BM Unit I and Settlement Period j:
SCA_j is the Sell-Price Cost Adjustment:
SVA_j is the Sell-Price Volume Adjustment; and
SPA_j is the Sell-Price Price Adjustment

If for any Settlement Period $\{\Sigma_i\Sigma^n \{QAPB^n_{ij} * TLM_{ij}\}+ SVA_j\}$ is equal to zero, then:

(c) if for that Settlement Period $\{\Sigma_i\Sigma^n \{QAPO^n_{ij} * TLM_{ij}\} + BVA_j\}$ is equal to zero, the System Sell Price for that Settlement Period will be equal to zero;

(d) otherwise, the System Sell Price will be determined as the minimum of System Buy Price and:

(ii) the Bid Price of the most expensive Bid available in that Settlement Period:

(4) which has a negative Bid-Offer Pair Number; and

(5) which has a Bid Price less than the Bid Price of any Bid which is an Arbitrage Accepted Bid in respect of that Settlement Period; and

(6) for which the value of Bid-Offer Volume ($qBO^n_{ij}(t)$) is less than zero for all spot times t in that Settlement Period;

(ii) or, if no such Bid exists, zero.

[11] Clarification to align with P78 NIV (use QAP in place of "not short")