

GAS SUPPLY HUB

- RULES METHODOLOGY

- SETTLEMENTS AND PRUDENTIAL METHODOLOGY

VERSION NO: 3.0

EFFECTIVE DATE: 1 June 2016

Approved for distribution and use



Peter Geers

Executive General Manager Markets

Date 9/5/2016.

VERSION CONTROL

VERSION NUMBER	EFFECTIVE DATE	AUTHORITY	REASON & CHANGES
1.0	2 January 2014	AEMO	Initial version at market start.
2.0	28 May 2015	AEMO	Monthly Product – s5.3.2
3.0	1 June 2016	AEMO	Treatment of negative order and transaction prices in the prudential calculations – s5.2

TABLE OF CONTENTS

1	PRELIMINARY	1
1.1	INTRODUCTION	1
1.2	THIS DOCUMENT	1
1.3	AMENDMENT	1
2	DEFINITIONS AND INTERPRETATION	2
2.1	GENERAL	2
2.2	ADDITIONAL DEFINED TERMS	2
2.3	SETTLEMENT EQUATION DEFINITIONS.....	3
3	RULES METHODOLOGY	10
3.1	DELIVERY VARIANCE AMOUNTS.....	10
3.2	CLOSE OUT AMOUNTS AND OFFSET AMOUNTS	11
4	SETTLEMENT AMOUNTS	13
4.1	SETTLEMENT OF PHYSICAL GAS TRANSACTIONS.....	13
4.2	MARKET FEES.....	14
4.3	REALLOCATION SETTLEMENT AMOUNTS	14
4.4	SETTLEMENT AMOUNTS (BILLING PERIOD SETTLEMENT AMOUNT)	15
4.5	REVISION OF SETTLEMENT AMOUNTS	15
5	PRUDENTIAL EXPOSURE	16
5.1	OUTSTANDING AMOUNTS.....	16
5.2	FORWARD EXPOSURE.....	18
5.3	FORWARD SETTLEMENT REALLOCATION EXPOSURE	19
5.4	PRUDENTIAL EXPOSURE	20

1 PRELIMINARY

1.1 Introduction

The Australian Energy Market Operator Limited (**AEMO**) has established a gas trading exchange known as the gas supply hub, in accordance with the National Gas Law and National Gas Rules. The gas supply hub takes the form of an electronic trading platform and related systems (**Exchange**), through which participants can trade physical gas and related Products in accordance with the gas trading exchange agreement (**Exchange Agreement**).

AEMO is the initial Operator of the Exchange.

1.2 This document

1.2.1 Content

This document comprises:

- (a) the methodology established by AEMO under rule [536(3)] of the National Gas Rules for the determination of amounts payable by or to gas trading exchange members in respect of:
 - (i) a failure to deliver, supply or accept natural gas in accordance with the Exchange Agreement; and
 - (ii) the closing out of obligations of a gas trading exchange member following a default under the Exchange Agreement, (Rules Methodology); and
- (b) the methodology established under clause 17 of the Exchange Agreement for the calculation of Settlement Amounts and Prudential Exposure (**Settlements and Prudential Methodology**).

1.2.2 Rules Methodology

The Rules Methodology comprises clause 2 (as applicable) and clause 3.

1.2.3 Settlements and Prudential Methodology

The Settlements and Prudential Methodology comprises clause 2 (as applicable) and clauses 4 and 5.

1.3 Amendment

This document may only be amended in accordance with the requirements for amending the Settlements and Prudential Methodology in the Exchange Agreement and any additional requirements in the National Gas Rules for the amendment of the Rules Methodology.

2 Definitions and interpretation

2.1 General

- (a) Terms defined in the National Gas Law, the National Gas Rules and the Exchange Agreement have the same meanings when used in this document unless otherwise stated.
- (b) The interpretation provisions in clauses 2.2, 2.3, 2.4(e), 2.5, 2.6, 2.7 and 2.8 of the Exchange Agreement apply to the interpretation of this document as if they were set out in full in this document, substituting references to 'this agreement' with 'the Rules Methodology' or 'the Settlements and Prudential Methodology', as the case may be.
- (c) All amounts determined under the Rules Methodology and the Settlements and Prudential Methodology are calculated exclusive of GST. Where applicable, GST on those amounts will be shown on Settlement Statements in accordance with clause 18.9 of the Exchange Agreement.

2.2 Additional defined terms

In this document:

Credit Participant has the meaning defined in the Reallocation Procedures.

Debit Participant has the meaning defined in the Reallocation Procedures.

Delivery Obligation means an obligation under the Exchange Agreement to deliver or accept a Delivery Quantity at a Delivery Point on a Gas Day.

Negative Value Transaction means any of the following:

- a Transaction where Member m is the Seller with a Transaction Price greater than or equal to \$0.00; and
- a Transaction where Member m is the Buyer with a Transaction Price less than \$0.00.

– see clauses 5.2.2 and 5.2.3

Positive Value Transaction or Order means any of the following:

- a Bid by Member m with a Price greater than (or equal to) \$0.00;
- a Transaction where Member m is the Buyer with a Transaction Price greater than (or equal to) \$0.00;
- an Offer by Member m with a Price less than \$0.00; and
- a Transaction where Member m is the Seller with a Transaction Price less than \$0.00.

– see clauses 5.2.2 and 5.2.3

Processing Day means the day on which a calculation is made or a matter is determined.

Product Delivery Period means the duration of the Delivery Period applicable to a Product, as set out in the Product Specification. For example, the Product Delivery Period of a Transaction could be Daily or Weekly.

Security Deposit the credit balance in the Operator's security deposit fund in respect of a particular Market Participant, under clause 9.3 of the Exchange Agreement.

2.3 Settlement Equation Definitions

2.3.1 Notations

Notation	Meaning
Σ , as in Σ_t	This is an example of the usage of the term "sum" (Σ). This indicates that any expression following this term is to be evaluated for, and the results summed over, all values of an index (in this example t).
ABS()	The absolute value of the term within the brackets, eg. ABS(-5) = 5, ABS(5) = 5.
MAX()	The maximum (or highest) of two or more values within the brackets, eg. MAX(3,6) = 6, MAX(-4,-7,5) = 5.
MIN()	The minimum (or lowest) of two or more values within the brackets, eg. MIN(3,6) = 3, MIN(-4,-7,5) = -7.

2.3.2 Terms

The following table defines the indices used to identify different terms in the Settlement equations.

Term	Definition
bp	Billing Period
c	Product Delivery Period
d	Gas Day
dt	Delivery Obligation
l	Trading Location
m	Member
p	Market Participant
pd	Processing Day

Term	Definition
r	Reallocation
s	Security Deposit
t	Physical Gas Transaction

2.3.3 Null values

Where no value is required to be set for a term in a Settlement equation, the result of the equation is to be calculated without that term.

2.3.4 Sign of Settlement amounts

Positive Settlement Amounts represent an amount payable by the Market Participant to the Operator. Negative Settlement Amounts represent an amount payable by the Operator to the Market Participant.

2.3.5 Equation terms

The variables explained below are calculated by, and/or used in, the equations set out in this document.

Term	Definition
ABP(m,d,l)	Average Buy Price for a Gas Day and Trading Location for a specific Member – see clause 5.2.2.
ADA(p,bp)	Amount of the adjustment between a Revision Statement Settlement Amount (RSA) and the Final Statement Settlement Amount (FSA) for a Billing Period, including any applicable interest amount, in accordance with clause 18.4(c)(ii) of the Exchange Agreement.
ADQ(p,dt,d)	Actual Delivered Quantity (in GJ) for a Gas Day, being the quantity of gas actually delivered, or taken to have been delivered, in respect of a Delivery Obligation, as notified and confirmed by the Receiving Participant and the Delivering Participant in accordance with clause 15 of the Exchange Agreement.
AE(p)	Adjustment estimate for Market Participant p, representing the estimated amount of ADA(p) for each Billing Period for which a Final Statement has been issued, but not a Revision Statement – see clause 5.1.2(f).
AHC(p,d)	Ad Hoc Charge for a Market Participant and Gas Day, which may refer to a Close Out Amount, an Offset Amount, an invoice adjustment or any other amount payable by the Market Participant to the Operator under the Exchange Agreement that is not specifically identified in the Settlements and Prudential Methodology

Term	Definition
AHP(p,d)	Ad Hoc Payment for a Market Participant and Gas Day, which may refer to a Close Out Amount, an Offset Amount, an invoice adjustment or any other amount payable by the Operator to the Market Participant under the Exchange Agreement that is not specifically identified in the Settlements and Prudential Methodology
ALF	Additional Licence Fee payable by a Market Participant for each additional user account, as specified in the Exchange Fees.
AP(d,l)	Average Price for a Gas Day and Trading Location, to be used for the Settlement of Delivery Variance Quantities for Transactions in Products for which Delivery Netting applies, and Reallocation Amounts.
ARF	Annual Reallocation Participant Fee payable by a Reallocation Participant, as specified in the Exchange Fees.
ASP(m,d,l)	Average Sell Price for a Gas Day and Trading Location for a Member – see clause 5.2.2.
ATF	Annual Trading Participant Fee payable by a Trading Participant, as specified in the Exchange Fees.
B(d)	Buyer Margin Rule applied to the value of trades in accordance with the Prudential Methodology to determine an estimate of the Prudential Exposure for Transactions for which a Member is the Buyer or the Receiving Participant – see clause 5.2.1.
BA(p)	Billed Amount is the aggregate of amounts previously billed to a Market Participant in relation to Final Statements – see clause 5.1.2(e) The Billed Amount is an input into the Adjustment estimate for a Market Participant.
cm	Multiplier applied to the Rolling Average Price (RAP) when determining the future Reallocation Amount for the Prudential Exposure calculation for a Credit Participant – see clause 5.3.2. The value of cm is 0.75.
COA(p,d)	Close Out Amount for a Gas Day payable by the Defaulting Participant to counterparties under ‘relevant Transactions’, as defined in clause 20.5.1(c) of the Exchange Agreement – see clause 3.2.2.
CTR	Close out Transaction Rate applicable for a relevant Transaction to be closed out under clause 20.5 of the Exchange Agreement. The value of CTR for all Physical Gas Products is 0.25.
DA(r,d)	Dollar Reallocation Amount for a Gas Day.

Term	Definition
dm	<p>Multiplier applied to the Rolling Average Price (RAP) when determining the future Reallocation Amount for the Prudential Exposure calculation for a Debit Participant – see clause 5.3.2.</p> <p>The value of dm is 1.25.</p>
DP(dt,d)	Price for a Gas Day for the Settlement of a Delivery Variance Quantity – see clause 3.1.3.
DQ(dt,d)	Delivery Quantity (in GJ) for a Gas Day under a Delivery Obligation.
DRC(p,r,d)	Dollar Reallocation Amount for a Market Participant as the Credit Participant for a Dollar Reallocation and a Gas Day – see clause 4.3.1.
DRD(p,r,d)	Dollar Reallocation Amount for a Market Participant as the Debit Participant for a Dollar Reallocation and Gas Day - see clause 4.3.1.
DSA(p,d)	Delivery Settlement Adjustment that reduces the Settlement Amount of the Delivering Participant for any Delivery Obligations where the gas delivery information has not been confirmed in accordance with clause 15 of the Exchange Agreement – see clause 5.1.2.
DVC(p,d)	Charge payable by a Trading Participant for a Delivery Variance Quantity for a Gas Day – see clause 3.1.5.
DVP(p,d)	Payment to a Trading Participant for a Delivery Variance Quantity for a Gas Day – see clause 3.1.4.
DVQ(p,dt,d)	<p>The Delivery Variance Quantity (in GJ) for a Market Participant for a Delivery Obligation and Gas Day is the difference between the Delivery Quantity and the Actual Delivery Quantity.</p> <p>The sign of DVQ for a Trading Participant depends on its role in the delivery of gas and actual quantity of gas relative to the gas delivery obligation.</p> <p>A positive value of DVQ represents a scenario where:</p> <ul style="list-style-type: none"> - for the Delivering Participant, the actual quantity of gas delivered is less than the Delivery Quantity under the Delivery Obligation ($ADQ < DQ$), and - For the Receiving Participant, the actual quantity of gas delivered is greater than the Delivery Quantity under the Delivery Obligation ($ADQ > DQ$) <p>A positive value of DVQ will result in a charge to the Trading Participant.</p>
EP(p,bp)	An early payment for a Billing Period made by a Market Participant

Term	Definition
	prior to the date on which it is payable.
EPA(p)	Early Payment Amount, being the total of early payments (EP) made by a Market Participant – see clause 5.1.1(b).
ERC(p,r,d)	Energy Reallocation Amount for a Market Participant as the Credit Participant for an Energy Reallocation and Gas Day – see clause 4.3.2.
ERD(p,r,d)	Energy Reallocation Amount for a Market Participant as the Debit Participant for an Energy Reallocation and Gas Day - see clause 4.3.2.
FDRC(p,r)	Forward estimate for Dollar Reallocations for the Credit Participant – see clause 5.3.2.
FDRD(p,r)	Forward estimate for Dollar Reallocations for the Debit Participant – see clause 5.3.2.
FERC(p,r)	Forward estimate for Energy Reallocations for the Credit Participant – see clause 5.3.2.
FERD(p,r)	Forward estimate for Energy Reallocations for the Debit Participant – see clause 5.3.2.
FRA(p)	Forward Reallocation Amount for a Market Participant – see clause 5.3.3.
FSA(p,bp)	Final Statement Settlement Amount for Market Participant p and Billing Period bp – see clause 4.4.
FTE(m)	Forward Trading Exposure for a Member – see clause 5.4.
GQ(r,d)	Energy Reallocation Quantity (in GJ) for a Gas Day.
GST(d)	GST rate expressed as a percentage for Gas Day d. (For example, 10%)
GSTBP(p,bp)	GST amount included in a Final Statement in accordance with clause 18.9 of the Exchange Agreement.
INE(p)	Initial Settlement Estimate for Gas Days that have not yet been included in a Final Statement – see clause 5.1.2(b).
MPF(p,d)	Market Participant Participation Fee calculated on a monthly basis and payable by a Market Participant in respect of the first Gas Day of each Billing Period – see clause 4.2.1.
NTQ(m,d,l)	Net Transaction Quantity for a Member, being the difference between its aggregate quantity of buy and sell Transactions for a Gas Day and Trading Location – see clause 5.2.3.
OA(p)	Outstanding Amount for a Market Participant is the aggregate of settlement amount billed or estimated for gas days in the past – see

Term	Definition
	5.1.3.
OFQ(m,d,l)	Offset Quantity for a Gas Day and Trading Location for a Member.
OPA(p,d)	Offset Purchase Amount for a Gas Day payable by a Defaulting Participant in respect of an Offset Quantity – see clause 3.2.1.
OSA(p,d)	Offset Sale Amount for a Gas Day payable to a Defaulting Participant in respect of an Offset Quantity – see clause 3.2.1.
OTF(p,dt,d)	Outside Tolerance Flag for a Trading Participant, Delivery Transaction and Gas Day, indicating whether a Trading Participant is responsible for a Delivery Variance Quantity outside the tolerance level (OTL) – see clause 3.1.2.
OTL	Outside Tolerance Level for the delivery or receipt of a Delivery Quantity. The Outside Tolerance Level for all Physical Gas Products is 0.05.
OTR	Outside Tolerance Rate for the delivery or receipt of a Delivery Quantity. The Outside Tolerance Rate for all Physical Gas Products is 0.25.
PE(m)	Prudential Exposure for a Member.
PGC(p,d)	Physical Gas Charge for a Gas Day for a Buyer for the Transaction Quantity under a Physical Gas Transaction – see clause 4.1.2.
PGP(p,d)	Physical Gas Payment for a Gas Day for a Seller for the Transaction Quantity under a Physical Gas Transaction – see clause 4.1.1.
RAP(pd,l)	Rolling Average Price determined on a processing day pd, being the average of the Average Prices (AP) for the most recent 30 Gas Days see clause 5.3.1.
RSA(p,bp)	Revised Statement Settlement Amount for a Market Participant and Billing Period – see clause 4.5.
RVE(p)	Revised Settlement Estimate for Market Participant p – see clause 5.1.2(d).
S(d)	Seller Margin Rule applied to the value of trades in accordance with the Prudential Methodology to determine an estimate of the Prudential Exposure for Transactions for which a Member is the Seller or the Delivering Participant - see clause 5.2.1.
SD(p,s,bp)	A Security Deposit s to be applied in respect of a Market Participant for a Billing Period, determined in accordance with the Exchange Agreement.

Term	Definition
SNP(p)	Settlement Amount not due for payment – see clause 5.1.1.
TF(c)	Transaction fee payable for a transaction with Product Delivery Period c as specified in the Exchange Fees.
TP(t)	Transaction Price (\$ / GJ) for Transaction t.
TQ(t,d,c,l)	Transaction Quantity (GJ / day) for Transaction t. Transaction Quantity is inclusive of any adjustment as a result of the application of clause 20.5 of the Exchange Agreement.
TQR(t,d)	Transaction Quantity Reduction (in GJ) resulting from the Close Out and Offset Procedure, being the value of 'TQR' as determined under clause 20.5.3 or 20.5.4 of the Exchange Agreement.
TRC(p,d)	Total Reallocation payment for a Market Participant and Gas Day for Reallocations where the Market Participant is the Credit Participant – see clause 4.3.3.
TRD(p,d)	Total Reallocation charge for a Market Participant and Gas Day for Reallocations where the Market Participant is the Debit Participant - – see clause 4.3.3.
TSDA(p)	The total amount of Security Deposit for a Market Participant that has not yet been applied to a Settlement Statement.
TTF(p,d)	The total Transaction fees (TF) payable by Trading Participant p for transactions entered into on Gas Day d.

3 Rules Methodology

3.1 Delivery Variance Amounts

3.1.1 Delivery Variance Quantity

- (a) The Delivery Variance Quantity for Trading Participant p, being the Delivering Participant, for Gas Day d and Delivery Obligation dt is calculated as:

$$DVQ(p,dt,d) = DQ(dt,d) - ADQ(dt,d).$$

- (b) The Delivery Variance Quantity for Trading Participant p, being the Receiving Participant, for Gas Day d and Delivery Obligation dt is calculated as:

$$DVQ(p,dt,d) = ADQ(dt,d) - DQ(dt,d).$$

3.1.2 Outside Tolerance Flag

A value for the Outside Tolerance Flag (OTF) will be defined in accordance with Table 1 for each Delivery Obligation, Gas Day and Trading Participant using gas delivery information submitted and confirmed by the Delivering Participant and Receiving Participant in accordance with clause 15 of the Exchange Agreement.

Table 1: Value of Outside Tolerance Flag

Variation from Delivery Quantity	Reason for variance	Receiving Participant (OTF(p,dt,d))	Delivering Participant (OTF(p,dt,d))
Within tolerance $ABS(DVQ(p,dt,d)) < (OTL \times DQ(dt,d))$	Delivery, Receipt and No Fault	0	0
Outside tolerance $ABS(DVQ(p,dt,d)) \geq (OTL \times DQ(dt,d))$	No fault	0	0
	Delivery	-1	1
	Receipt	1	-1

3.1.3 Delivery Variance Price

If Delivery Netting applies to a Transaction, then the Delivery Variance Price (DP) is equal to the Average Price (AP) for that Gas Day and Trading Location. If Delivery Netting does not apply to a Transaction, DP is equal to the Transaction Price (TP). For the purposes of Settlement, Delivery Netting is taken to apply to a Transaction if specified in the Product Specification, even if the Delivery Netting process could not be applied on a particular Gas Day.

- (a) Average Price for Gas Day d and Trading Location l includes all Physical Gas Transactions with a Delivery Period that includes (or is within) Gas Day d.

$$AP(d,l) = \frac{\sum_c \sum_{t^*} (TP(t^*) \times TQ(t^*,d,c,l))}{\sum_c \sum_t TQ(t^*,d,c,l)}$$

Where:

- (i) t^* is a variant of t that excludes Transactions formed as a Pre-matched Trade.
- (ii) If there are no Physical Gas Transactions for Gas Day d and Trading Location l then $AP(d,l)$ will equal the calculation for the nearest preceding Gas Day for which there were such Transactions.
- (iii) For each of the 30 Gas Days immediately preceding the Market Start Date, AP for all Trading Locations is equal to \$5.00.

Note: The Average Price will be an input into the Settlement of Energy Reallocations and as such a value is required for each Gas Day.

- (b) Delivery Variance Settlement Price for Delivery Obligation dt and Gas Day d :

$$DP(dt,d) = AP(d,l) \quad \text{If } dt \text{ formed as part of:}$$

- Delivery Netting Schedule, or
- the Close Out and Offset Procedure.

Else

$$TP(t) \quad \text{of the corresponding Transaction } (t)$$

3.1.4 Delivery Variance Payment

Delivery Variance Payment for Trading Participant p across for Gas Day d :

$$DVP(p,d) = \sum_{dt} \text{Min} (DVQ(p,dt,d) \times DP(dt,d) + \text{ABS}(DVQ(p,dt,d)) \times OTF(p,dt,d) \times DP(dt,t) \times OTR, 0).$$

3.1.5 Delivery Variance Charge

Delivery Variance Charge for Trading Participant p for a Gas Day d :

$$DVC(p,d) = \sum_{dt} \text{Max} (DVQ(p,dt,d) \times DP(dt,d) + \text{ABS}(DVQ(p,dt,d)) \times OTF(p,dt,d) \times DP(dt,d) \times OTR, 0).$$

3.2 Close Out Amounts and Offset Amounts

3.2.1 Offset Settlement Amounts

Offset Settlement Amounts are payable to or by a Defaulting Participant.

- (a) Offset Purchase Amount for Transactions where the Defaulting Participant p is the Buyer:

$$OPA(p,d) = \sum_c \sum_l \sum_t (TP(t) \times TQ(t,d,c,l)).$$

- (b) Offset Sale Amount for Transactions where the Defaulting Participant p is the Seller:

$$OSA(p,d) = \sum_c \sum_l \sum_t (TP(t) \times TQ(t,d,c,l) \times -1).$$

Offset Settlement Amounts will be invoiced as 'ad hoc' payments or charges in Settlement Statements.

3.2.2 Close Out Settlement Amounts

Calculated for the Defaulting Participant and any Trading Participants that are party to a relevant Transaction for Gas Day d.

- (a) Close Out Amount for Trading Participant p who is a Defaulting Participant for Gas Day d:

$$COA(p,d) = \sum_t (TQR(t,d) \times TP(t) \times CTR)$$

- (b) Close Out Amount for Trading Participant p who is not a Defaulting Participant for Gas Day d:

$$COA(p,d) = \sum_t (TQR(t,d) \times TP(t) \times CTR \times -1)$$

Close Out Amounts will be invoiced as 'ad hoc' payments or charges in Settlement Statements.

3.2.3 Worked example of Close Out and Offset Settlement Amounts

The worked example outlined in this section presents the settlement calculations associated with the close out and offset worked example in 20.5.7 of the Exchange Agreement.

- (a) M is in default. Gas Day D+2 is determined to be the Close Out Effective Date. For that Gas Day the Operator identifies the following transactions due for delivery at the QGP Trading Location:
- (i) Transaction 1: N as Seller to deliver 8 TJ to M as Buyer at \$5/GJ
 - (ii) Transaction 2: O as Seller to deliver 12 TJ to M as Buyer at \$6/GJ
 - (iii) Transaction 3: M as Seller deliver 4 TJ to P as Buyer at \$4/GJ
 - (iv) Transaction 4: M as Seller to deliver 6 TJ to Q Buyer at \$6/GJ.
- (b) Operator determines adjusted Transaction Quantities (clause 20.5.3 or 20.5.4 of the Exchange Agreement):
- (i) Transaction 1: N's Transaction Quantity is adjusted down to 4 TJ, leaving 4 TJ to be closed out (TQR).
 - (ii) Transaction 2: O's Transaction Quantity is adjusted down to 6 TJ, leaving 6 TJ to be closed out (TQR).
- (c) Close Out Amount for:
- (i) M as the Defaulting Participant:
 - Transaction 1: 4,000 GJ x \$5/GJ x 0.25 = \$5,000
 - Transaction 2: 6,000 GJ x \$6/GJ x 0.25 = \$9,000

- COA = \$14,000
- (ii) N as a non-Defaulting Participant:
 Transaction 1: 4,000 GJ x \$5/GJ x 0.25 x -1 = -\$5,000
 COA = -\$5,000
- (iii) O as a non-Defaulting Participant:
 Transaction 2: 6,000 GJ x \$6/GJ x 0.25 x -1 = -\$9,000
 COA = -\$9,000
- (d) Offset Settlement Amounts for M as the Defaulting Participant
- (i) Offset Purchase Amount:
 Transaction 1: 4,000 GJ x \$5/GJ = \$20,000
 Transaction 2: 6,000 GJ x \$6/GJ = \$36,000
 OPA = \$56,000
- (ii) Offset Sale Amount:
 Transaction 3: 4,000 GJ x \$4/GJ = -\$16,000
 Transaction 4: 6,000 GJ x \$6/GJ = -\$36,000
 OSA = -\$52,000
- (iii) The aggregate Offset Settlement Amount is \$4,000 representing a payment by M.

4 Settlement Amounts

4.1 Settlement of Physical Gas Transactions

The Transaction Quantity under a Physical Gas Transaction is settled at the Transaction Price. Physical Gas Settlement Amounts are aggregated across all Trading Locations for a Gas Day.

4.1.1 Physical Gas Payment

The Physical Gas Payment for Trading Participant p as a Seller under Physical Gas Transactions t for Gas Day d:

$$PGP(p,d) = \sum_c \sum_l \sum_t (TP(t) \times TQ(t,d,c,l) \times -1)$$

4.1.2 Physical Gas Charge

The Physical Gas Charge for Trading Participant p as a Buyer under Physical Gas Transactions t for Gas Day d:

$$PGC(p,d) = \sum_c \sum_l \sum_t (TP(t) \times TQ(t,d,c,l)).$$

4.2 Market Fees

4.2.1 Participation Fee

Market Participant Participation Fee for Market Participant p and Gas Day d:

$$\begin{aligned} MPF(p,d^*) &= ATF / 12 \\ &+ \text{Number of additional licences} \times ALF / 12 \\ &+ ARF / 12 \end{aligned}$$

Where d* is the first Gas Day of the relevant Billing Period.

Note: The participation fee for Viewing Participants will be invoiced annually and will not be part of Settlement under clause 18 of the Exchange Agreement.

4.2.2 Transaction Fee

The total transaction fee for Trading Participant p for Gas Day d:

$$TTF(p,d) = \sum_c (\sum_t \sum_l \sum_{d'} (TQ(p,d',c,l) \times TF(c)))$$

Where d' is a Gas Day included in Transactions executed on Gas Day d.

Note: Transaction fees are payable in respect of the day on which the Transaction was formed, not in respect of the Delivery Period for the Transaction.

For example, the fee for a Transaction for delivery on Gas Day 1 May 2014 that was transacted on 21 April 2014 is payable as part of Settlement for Gas Day 21 April 2014.

4.3 Reallocation Settlement Amounts

4.3.1 Dollar Reallocation Amount

Dollar Reallocations transfer the Settlement of a specified Dollar Reallocation Amount between the Debit Participant and the Credit Participant.

- (a) Dollar Reallocation Amount for Market Participant p as the Debit Participant for Dollar Reallocation r and Gas Day d:

$$DRD(p,r,d) = DA(r,d)$$

- (b) Dollar Reallocation Amount for Market Participant p as the Credit Participant for Dollar Reallocation r and Gas Day d:

$$DRC(p,r,d) = DA(r,d) \times -1$$

4.3.2 Energy Reallocation Amount

Energy Reallocations transfer the Settlement of an amount, based on a specified Energy Reallocation Quantity, between the Debit Participant and the Credit Participant.

- (a) Energy Reallocation Amount for Market Participant p as the Debit Participant for Energy Reallocation r and Gas Day d:

$$ERD(p,r,d) = GQ(r,d) \times AP(d,l)$$

- (b) Energy Reallocation Amount for Market Participant p as the Credit Participant for Energy Reallocation r and Gas Day d:

$$ERC(p,r,d) = GQ(r,d) \times AP(d,l) \times -1$$

4.3.3 Daily Settlement Reallocation Amounts

- (a) Reallocation charge for Market Participant p for Gas Day d for Reallocations where Market Participant p is the Debit Participant:

$$TRD(p,d) = \sum_r(DRD(p,r,d) + ERD(p,r,d))$$

- (b) Reallocation payment for Market Participant p for Gas Day d for Reallocations where Market Participant p is the Credit Participant:

$$TRC(p,d) = \sum_r(DRC(p,r,d) + ERC(p,r,d))$$

4.4 Settlement Amounts (Billing Period Settlement Amount)

The Settlement Amount for Market Participant p for Billing Period bp:

$$\begin{aligned} FSA(p,bp) = & \sum_d(PGP(p,d) + PGC(p,d) + DVP(p,d) + DVC(p,d) \\ & + MPF(p,d) + TTF(p,d) + TRD(p,d) + TRC(p,d) \\ & + AHP(p,d) + AHC(p,d)) \end{aligned}$$

Where d is a Gas Day within Billing Period bp to which a Final Statement relates.

4.5 Revision of Settlement Amounts

The revised Settlement Amount for Market Participant p for billing period bp:

$$\begin{aligned} RSA(p,bp) = & \sum_d(PGP(p,d) + PGC(p,d) + DVP(p,d) + DVC(p,d) \\ & + MPF(p,d) + TTF(p,d) + TRD(p,d) + TRC(p,d) \\ & + AHP(p,d) + AHC(p,d)) \end{aligned}$$

Where d is a Gas Day within Billing Period bp to which a Revised Statement relates.

Note: the revised Settlement Amount represents Settlement based on the latest revised information for a particular Billing Period. Payment of the Final Statement has already occurred for this period and as such the adjustment amount (ADA) is the difference between the Revised Statement and the Final Statement as well as any interest applicable in accordance with clause 18.4(c) of the Exchange Agreement.

5 Prudential Exposure

The Prudential Exposure equations in this section do not reference a specific gas day. Prudential Exposure is determined for the processing day using the latest input information.

5.1 Outstanding Amounts

5.1.1 Settlement Amount not due for payment

- (a) Settlement Amount not due for payment is the total amount that is to be paid to or by a Market Participant in respect of a Final Statement that has been issued to the Market Participant but for which the payment due date is in the future.

$$\text{SNP}(p) = \sum_{bp} \text{FSA}(p, bp) + \sum_{bp} \text{ADA}(p, bp) + \text{GSTBP}(p, bp) \\ - \sum_s \sum_{bp} \text{SD}(p, s, bp)$$

Where bp is a Billing Period for which the Operator has issued a Final Statement but for which the payment due date is in the future.

Note: The calculation includes Security Deposits that have been applied to a Final Statement.

- (b) Early Payment Amount is the aggregate of payments made by Market Participant p in respect of a Final Statement that is not yet due for payment:

$$\text{EPA}(p) = \sum_{bp} \text{EP}(p, bp)$$

Where bp is a Billing Period for which the Operator has issued a Final Statement but for which the payment due date is in the future.

5.1.2 Settlement amounts not invoiced

AEMO will determine an indicative Settlement Amount for Gas Days that have not yet been included in a Final Statement (Initial Settlement Estimate - INE) or a Revised Statement (Revised Settlement Estimate - RVE) based on the most recent Transaction information and notifications of delivered quantities provided to the Operator.

The Initial Settlement Estimate includes a Delivery Settlement Adjustment (DSA) that reduces the Settlement Amount of the Delivering Participant for any Delivery Obligations where the gas delivery information has not been confirmed in accordance with clause 15 of the Exchange Agreement.

- (a) Delivery Settlement Adjustment for Trading Participant p where it is the Delivering Participant of Delivery Obligation dt :

$$DSA(p,d) = \sum_{dt} (DQ(dt,d) \times DP(dt,d) \times S(d))$$

Where:

- (i) The Actual Delivered Quantity (ADQ(t,d)) for Delivery Obligation dt and Gas Day d has not been confirmed by the Receiving Participant and the Delivering Participant.
- (ii) DP is the Delivery Variance Settlement Price determined in accordance with 3.1.3(b) of the Settlements Methodology.

- (b) Initial Settlement Estimate for Market Participant p:

$$\begin{aligned} INE(p) = \sum_d [& (PGP(p,d) + PGC(p,d) + DVP(p,d) + DVC(p,d) \\ & + MPF(p,d) + TTF(p,d) + TRD(p,d) + TRC(p,d) \\ & + AHP(p,d) + AHC(p,d) \\ & + DSA(p,d)) \times (1 + GST(d))] \end{aligned}$$

Where Gas Day d occurs after the most recent Gas Day included in a Final Statement issued under the Exchange Agreement.

- (c) Total Security Deposit Amount is the aggregate Security Deposit balance of a Market Participant not yet applied to a Settlement Statement.

$$TSDA(p) = \sum_s \sum_{bp} SD(p,s,bp)$$

Where bp is a Billing Period for which the Operator has not yet issued a Final Statement.

Note: The calculation includes Security Deposits that have not been applied to a Final Statement.

Prior to the issue of a Revised Statement, the Prudential Exposure will include an estimate of the Adjustment amount based on the difference between the latest information for a particular gas day and the amount billed in the Final Statement for that period.

- (d) Revised Settlement Estimate is the recalculation of Settlement Amounts for Market Participant p based on latest the Settlement input information.

$$\begin{aligned} RVE(p) = \sum_d [& (PGP(p,d) + PGC(p,d) + DVP(p,d) + DVC(p,d) \\ & + MPF(p,d) + TTF(p,d) + TRD(p,d) + TRC(p,d) \\ & + AHP(p,d) + AHC(p,d) \\ & \times (1 + GST(d))] \end{aligned}$$

Where Gas Day d has been included in a Final Statement but has not been included in a Revised Statement issued under the Exchange Agreement.

- (e) Billed Amount is the aggregate of amounts previously billed to Market Participant p in Final Statements for relevant Billing Periods.

$$BA(p) = \sum_{bp} (FSA(p,bp) + GSTBP(p,bp))$$

Where bp is a Billing Period for which the Operator has issued a Final Statement, but not a Revised Statement.

- (f) Adjustment estimate for Market Participant p :

$$AE(p) = RVE(p) - BA(p).$$

5.1.3 Outstanding Amount

- (a) Outstanding Amount for Market Participant p :

$$OA(p) = SNP(p) - TSDA(p) - EPA(p) + INE(p) + AE(p)$$

5.2 Forward Exposure

5.2.1 Prudential Margin Rules

Prudential margin rules are applied to the face value of a Trading Participant's net portfolio position to estimate the potential Settlement exposure associated with its Physical Gas Transactions. The values of the Buyer Margin Rule ($B(d)$) and the Seller Margin Rule ($S(d)$) for different reference periods are defined below in Table 2.

Where d^* is the most recent Gas Day included in a Final Statement.

Table 2: Margin Values

Date Range	Buyer Margin Rule ($B(d)$)	Seller Margin Rule ($S(d)$)	
		Normal rule	Strict Seller Margin Rule*
$d^* < d < pd$	0	0.20	1.25
$pd \leq d \leq pd + 1$	1	0.80	-0.25
$pd + 1 < d \leq pd + 6$	1	-0.25	-0.25
$d > pd + 6$	0.25	-0.25	-0.25

* Strict Seller Margin Rule applies where either:

- the relevant Member is or has been subject to a Trading Halt in the 3 months before the Gas Day to which the rule is being applied; or
- a Suspension Event occurred in relation to the relevant Member in the 3 months before the Gas Day to which the rule is being applied and, in response to that Suspension Event, the Operator determined to apply the Strict Seller Margin Rule in lieu of a Trading Halt.

5.2.2 Average Buy and Sell Price

- (a) Average Buy Price for Member m , Gas Day d and Trading Location l :

$$ABP(m,d,l) = \frac{\sum_c \sum_{t'} (TP(t') \times TQ(t',d,c,l))}{\sum_c \sum_{t'} (TQ(t',d,c,l))}$$

Where t' is a Positive Value Transaction or Order traded or submitted by Member m .

- (b) Average Sell Price for Member m , Gas Day d and Trading Location l :

$$ASP(m,d,l) = \frac{\sum_c \sum_{t''} (TP(t'') \times TQ(t'',d,c,l))}{\sum_c \sum_{t''} (TQ(t'',d,c,l))}$$

Where t'' is a Negative Value Transaction traded by Member m .

5.2.3 Trading Position

- (a) Net Transaction Quantity for Member m for Gas Day d :

$$NTQ(m,d,l) = \sum_c \sum_{t'} TQ(t',d,c,l) - \sum_c \sum_{t''} TQ(t'',d,c,l)$$

Where:

- (i) t' is a Positive Value Transaction or Order traded or submitted by Member m .
- (ii) t'' is a Negative Value Transaction traded by Member m .

- (b) Offset Quantity for Member m for Gas Day d :

$$OFQ(m,d,l) = \text{MIN}(\sum_c \sum_{t'} (TQ(t',d,c,l)), \sum_c \sum_{t''} (TQ(t'',d,c,l)))$$

Where:

- (i) t' is a Positive Value Transaction or Order traded or submitted by Member m .
- (ii) t'' is a Negative Value Transaction traded by Member m .

5.2.4 Forward Trading Exposure

- (a) Forward Trading Exposure for Member m :

$$FTE(m) = \sum_d \sum_l [\text{If} \{ NTQ(m,d,l) > 0, \\ \text{Then } NTQ(m,d,l) \times ABP(m,d,l) \times B(d), \\ \text{Else } NTQ(m,d,l) \times ASP(m,d,l) \times S(d) \} \\ + OFQ(m,d,l) \times (ABP(m,d,l) - ASP(m,d,l)) \times (1+GST(d))]$$

Where Gas Day $d \geq$ processing day.

5.3 Forward Settlement Reallocation Exposure

5.3.1 Rolling average price

- (a) Rolling Average Price for Trading Location l :

$$RAP(pd,l) = \sum_d AP(d,l) / 30$$

Where $pd - 29 \text{ days} \leq d \leq pd$.

5.3.2 Forward amount per Reallocation

- (a) Forward estimate for Dollar Reallocation r where Market Participant p is the Debit Participant:

$$FDRD(p,r) = \sum_d (DA(r,d))$$

Where $pd \leq d \leq pd + 131$ days.

- (b) Forward estimate for Dollar Reallocation r where Market Participant p is the Credit Participant:

$$FDRC(p,r) = \sum_d (DA(r,d) \times -1)$$

Where $pd \leq d \leq pd + 124$ days.

- (c) Forward estimate for Energy Reallocation r where Market Participant p is the Debit Participant:

$$FERD(p,r) = \sum_d (GQ(r,d,l) \times RAP(pd-1,l) \times dm)$$

Where $pd \leq d \leq pd + 131$ days.

- (d) Forward estimate for Energy Reallocation r where Market Participant p is the Credit Participant:

$$FERC(p,r) = \sum_d (GQ(r,d,l) \times RAP(pd-1,l) \times cm \times -1)$$

Where $pd \leq d \leq pd + 124$ days.

Note: A Reallocation is considered over a longer potential period for the Debit Participant as it may take a period of time to deregister a Reallocation if a Default Event occurs.

5.3.3 Forward Reallocation Amount

Forward Reallocation Amount is the aggregate of forward reallocation estimates for Market Participant p :

$$FRA(p) = \sum_r (FDRD(p,r) + FDRC(p,r) + FERD(p,r) + FERC(p,r))$$

5.4 Prudential Exposure

For the purposes of the Exchange Agreement, the Prudential Exposure of Member m on the processing day is:

$$PE(m) = \sum_p (OA(p) + FRA(p)) + FTE(m)$$

Where Market Participant p is registered to Member m .