Nodal Credit Monitoring and Management Overview



Topic Outline

- I. Key Differences from ERCOT's Zonal to Nodal Market
- II. ERCOT operational changes
- III. ERCOT daily timeline
- IV. Credit Monitoring and Management Reports
- V. Allocation of 90% Available Credit Limit
- VI. Alternative Means of Satisfying ERCOT Creditworthiness Requirements
- VII. Counter-Party CRR Credit Assignment
- VIII.DAM Bids & Offers (NPRR206)
- IX. Detailed Appendix of Formulas

Using the information in this presentation... ...you will be able to understand



An overview of the Nodal credit process.



Description of Credit

Key Credit Differences from Zonal to Nodal

 Establishes entire financial relationship between ERCOT and a Market Participant under one contract rather than *multiple contracts* Combine QSE, Sub-QSE and CRR activity under one contract

•Establishes the new concept of counter-party

Counter-Party is a single Entity that is a QSE and/or a **CRR Account Holder (CRRAH)**. A Counter-Party includes all registration as a QSE, all subordinate QSEs, and all CRR Account Holders by the same Entity.

- CRR Account Holder (CRRAH) is an Entity that is qualified to become the owner of record of CRRs and is registered as a CRR Account Holder with ERCOT.
- QSE is A Market Participant that is qualified by ERCOT in accordance with Section 16, Registration and Qualification of Market Participants, for communication with ERCOT for Resource Entities and LSEs and for settling payments and charges with ERCOT.

TPE Calculation Summary



Key Credit Differences from Zonal to Nodal

Term	How it is used	Notes
Total Credit Limit (TCL)	The TCL minus exposure (TPE) is used to determined the (ACL); subsequently it will be used in the CRR and DAM Auctions.	TCL = Unsecured Credit Limit + Collateral Posted
Total Potential Exposure (TPE)	Allows "pooling" of exposure and thus one collateral amount (rather than separate collateral for each type of activity)	TPE = CCE +FCE
Current Credit Exposure (CCE)	 Obligations as a result of the Adjustment Period operations and Real-Time operations; CRR auction invoice obligations. Known obligations in the DAM; 	TPE = CCE +FCE
Future Credit Exposure (FCE)	 Term to value forward CRRs in the new market design Valuations based on historical pricing 	TPE = CCE + FCE
Available Credit Limit (ACL)	Counter-Party determines amount allocated for CRR Auction and DAM (90% of ACL)	ACL = TCL – TPE

Key Credit Differences from Zonal to Nodal

Available Credit Limit Formula



Requires DAM and CRR auctions to work within a credit limit
ERCOT credit staff must provide credit limit to Counter-Party
Counter-Party allocates credit to CRR auction engine & Day Ahead Market (DAM) daily (business days only).

Note:

Credit Staff provides credit limit daily.

•CRR Auction is held annually/monthly.

• If no CRR Auction; the 90% of the ACL is allocated to DAM.

 Weekend DAM activities reduce ACL based on last business day update.

Key Credit Differences from Zonal to Nodal

- •ERCOT Operational Changes •Automated credit monitoring system
- •Exposure calculations performed on Business Days (and evaluation of collateral adequacy)
- •Counter-Party manages division of Credit Limit between CRR Auction and Day Ahead Market.



ERCOT Daily Timeline

ERCOT Daily Timeline



ERCOT will post (on the MIS – see next slide) the reports listed below **twice** each Business Day:

First Posting: A preliminary set for the day, will be made by 1200 Second Posting: The final reports will be made before midnight.

Reports

(available via MIS/WebServices 'GetReport'):

- ACL: Available Credit Limit Summary Report
- TPE: Total Potential Exposure Summary Report
- EAL: Estimate Aggregate Liability Summary Report Estimated Aggregate Liability Detail Report
- AIL: Aggregate Incremental Liability Detail Report

	The following reports will post (on the MIS) twice each Business Day by 1200 and before midnight:						
ECEOBL (O	bligations):	FCEOPT (Options):					
Future Crea Obligations	it Exposure for CRR PTP <i>Summary</i> Report	• Future Credit Exposure for CRR PT <i>Options Summary</i> Report					
Future Crea Obligations	it Exposure for CRR PTP <i>Detail</i> Report	• Future Credit Exposure for CRR PTR Options Detail Report					

Reports template will be posted by March 2010.

External reports provide a significant level of detail to aid Counter-Parties in understanding their TPE and ACL calculation.

Note: FCE will be an ongoing (daily) evaluation.

For Counter-Party Only: MIS – ERCOT Market Information List (EMIL) http://nodal.ercot.com/readiness/reports/index.html

les de cutt			Generating	om	AP	Э	Sec. 1
Index#		Product Name	Frequency			•	<u> </u>
			twice each business day				
			by 1200				
FNC-470-SG	ACL:	Available Credit Limit Summary Report	by 2350		Х		С
			twice each business day				
			by 1200				
NP16-664-SG	TPE:	Total Potential Exposure Summary Report	by 2350		Х		С
			twice each business day				
			by 1200				
NP16-665-SG	EAL:	Estimate Aggregate Liability Summary Report	by 2350		Х		С
			twice each business day				
			by 1200				
NP16-669-SG		Estimated Aggregate Liability Detail Report	by 2350		Х		С
			twice each business day				
			by 1200				
NP16-670-SG	AIL:	Aggregate Incremental Liability Detail Report	by 2350		Х		С
			twice each business day				
	FCEOBL	Future Credit Exposure for CRR PTP Obligations	by 1200				
NP16-666-SG	(Summary):	(FCEOBL) Summary Report	by 2350		Х		С
			twice each business day				
		Future Credit Exposure for CRR PTP Obligations	by 1200				
NP16-671-SG	FCEOBL (Detail):	(FCEOBL) detail Report	by 2350		Х		С
			twice each business day				
	FCEOPT	Future Credit Exposure for CRR PTP Options	by 1200				
NP16-667-SG	(Summary):	(FCEOPT) Summary Report	by 2350		Х		С
			twice each business day				
		Future Credit Exposure for CRR PTP Options	by 1200				
NP16-672-SG	FCEOPT (Details):	:(FCEOPT) detail Report	by 2350		Х		С

MIS – ERC	MIS – ERCOT Market Information List (EMIL) http://nodal.ercot.com/readiness/reports/index.html						
		Intended		MIS Landing			
	Product Name	Recipient	Product Description	Page	Portlet Name	Report Id	
			Publish available Credit Limit				
			amount for each Counter Party				
			for both CRR and DAM		Credit		
	Available Credit Limit		allocations twice on every		Monitoring		
ACL:	Summary Report	Counter Party	Business Day.	Services	Reports	11173	
					Credit		
	Total Potential Exposure		Publish TPE related		Monitoring		
TPE:	Summary Report	Counter Party	calculations	Services	Reports	11174	
					Credit		
	Estimate Aggregate Liability		Publish EAL related		Monitoring		
EAL:	Summary Report	Counter Party	calculations at a summary level	Services	Reports	13003	
					Credit		
	Estimated Aggregate		Publish EAL related		Monitoring		
	Liability Detail Report	Counter Party	calculations at a detail level	Services	Reports	11179	
					Credit		
	Aggregate Incremental		Publish AIL related calculations		Monitoring		
AIL:	Liability Detail Report	Counter Party	at a detail level	Services	Reports	11178	
	Future Credit Exposure for						
FCEOBL	CRR PTP Obligations		Publish FCEOBL related				
(Summary)	(FCEOBL) Summary Report	Counter Party	calculations at a summary level			13002	
	Future Credit Exposure for						
FCEOBL	CRR PTP Obligations		Publish FCEOBL related				
(Detail)	(FCEOBL) detail Report	Counter Party	calculations at a detail level			11177	
FCEOPT	Future Credit Exposure for						
Options -	CRR PTP Options (FCEOPT)		Publish FCEOPT related				
Summary)	Summary Report	Counter Party	calculations at a summary level			13001	
	Future Credit Exposure for						
FCEOPT	CRR PTP Options (FCEOPT)		Publish FCEOPT related				
(Details)	detail Report	Counter Party	calculations at a detail level			11176	

Slide 17



http://nodal.ercot.com/readiness/reports/r/index.html

Estimate Aggregate Liability (EAL) Summary Report

	Counterparty		Highest					
ERCOT ID	Market Participant	IEL	ADTE	OUT	PUL	DALE	Adjustments	EAL
1234567899999	ABC ELECTRIC CO							
1234567892000	ABC QSE 1	432,235	6,285,714	3,286,884	12,000	4,410,685	75,735	14,071,018
1234567895000	ABC CRRAH 1		-	833,000	-	434,286	-	1,267,286
	Counterparty Total			4,119,884	12,000	4,844,971	75,735	15,338,304

(596,659.68)

(629,599.83)

(500,000.00)

(1,129,599.83)

844,680.87

859,802.94

600.000.00

1,459,802.94

3,223.00

3,223.00

6,446.00



May 26, 2008

May 27, 2008

May 28, 2008

UDAA Total

http://nodal.ercot.com/readiness/reports/r/index.html Listed as "CMM" Reports

Estimated Aggregate Liability (EAL) Detail Report

Market Partcipant: ABC QSE 1	ERCOT ID: 123456789200	0 Type: QSE	Daily Av	verage Liability Extra	polation (DALE) Suppo	rting Details				
EAL Summary			Invoice	• Date	Invoice Numb	er Invoice <i>l</i>	Amount	Operating Date	Settlement Statement Number	Settlement Statement Amount
Highest ADTE		6.285.714	May 20,	2008	200009	98 172	2,839.39	May 16, 2008	5162008011	172,839.39
UFTA	355,333	-,,	May 20,	2008	2000009	99 160	,176.72	May 17, 2008	5172008011	160,176.72
OIA	2 282 036		May 20,	2008	2000010	00 275	5,317.73	May 18, 2008	5182008011	275,317.73
	649 514		May 21,	2008	2000010	01 271	,304.78	May 19, 2008	5192008011	271,304.78
OUT	049,014	2 206 004	May 22,	2008	2000010	02 232	2,829.32	May 20, 2008	5202008011	232,829.32
001		3,280,884	May 23,	2008	2000010	03 311	,608.97	May 21, 2008	5212008011	311,608.97
DALE		4,410,685	May 27,	2008	2000010	04 505	5,597.89	May 22, 2008	5222008011	505,597.89
PUL		12,000								
Total Calculated EAL		13,995,283	DALE (A	verage of Statement	s multiplied by 16)					4,410,685.26
Adjustments			Outsta	nding Invoice Amo	ount (OIA) Supporti	ng Details				
ADTE										
OIA	1,500		Invoic	e Date	Invoic	e Number	Ma	rket Type	OIA	Date
UFTA	5,788		May 22	, 2008	2	00001004		RTM	1,232,000.00	May 30, 2008
UDAA	68,447		May 22	, 2008	2	00001001		DAM	232,829.32	May 29, 2008
OUT		75,735	May 23	, 2008	2	00001002		DAM	311,608.97	May 30, 2008
Total Adjustments		75.735	May 27	, 2008	2	00001003		DAM	505,597.89	June 2, 2008
EAL		14,071,018	Total						2.282.036.18	
Unbilled Day Ahead Amount (UI	DAA) Supporting Details									
DAM Operating Day	DAM Energy Purchases	DAM Energy (Sales And	Dther illary	CRR Obligations	UDAA					
May 23, 2008	859,782.27	(624,396.08) 3,2	23.00	32,422.00	271,031.19					
May 24, 2008	824,884.48	(589,473.87) 3,2	23.00	32,422.00	271,055.61					
May 25, 2008	765,993.26	(551,736.13) 3,2	23.00	32,422.00	249,902.13					

32,422.00

32,422.00

64,844.00

283,666.19

265,848.11

100,000.00

649,514.30

When credit limits must be set for both CRR and DAM on the same day:

- Counter-Party will manage 90% of Available Credit Limit (ACL) to allocate to any upcoming CRR auction(s) no less than 3 business days in advance of the auction bid submission closing time
 - One limit per Counter-Party per CRR Auction
 - The CRR Auction engine will "roll up" bid activity to a single collateral constraint
 - Counter-Party sets credit limit in CRR Auction
 - CRRAH can further reduce credit limits within the CRR Auction credit limit constraint
 - Credit limit assigned to CRR Auction is locked out from 3 business days in advance of the auction until invoices are posted (CRR Auction Lock Period) (8 total days for monthly CRR Auction)

Counter-Party Available Credit Limit (ACL) Editor

ER	COT.com <u>MIS</u>	I <u>TML</u>			Welcome, user
View related inf	ormation regardi	ng locked and cur	rent auction marke	s ngest	ion Revenue Rights
Counterparty Av	e Credit Limit E	ditor			
Auction Market	Open Date	Close Date	Lock Date	Time Of Use	Counterparty Credit
Locked					
			Not Available		
Current					
Annual Auction July- August 2008	09/22/2007	10/29/2007	10/17/2007	PeakWeekEnd	111500000.00
				Off-peak	1500000.00
				PeakWeekDay	1500000.00
				Total Commitments	\$114,500,000.00
			ACL	Available Credit	\$122,000,020.00
			•	Remaining Credit	\$7,500,020.00
					Refresh Save
Note: Null = 0 (z he C-P Editor:	zero) in		1. Assign 2. Save	credit limits for each i	narket

CRR Account Holder Available Credit Limit (ACL) Editor

				_	_	
				Congesti	on Reven	ue Rights
tfolio	Nomination	Me Bilateral	ssages Market	Downloads	Credit Limit	
ailable Cred	dit Limit Editor					
Open Date	Close Date	Lock Date	Time Of Use	Counterparty C	redit Self	Imposed Credit
opon bako	cioro Duro	Loon Date		counterparty of		Inprocession of cam
		No	t Available			
09/22/2007	10/29/2007	10/17/2007	PeakWeekEnd	\$111,500,000	.00	540000.00
			Off-peak	\$1,500,000	.00	540000.00
			PeakWeekDay	\$1,500,000	.00	540000.00
		To	tal Commitments			\$1,620,000.00
	rtfolio /ailable Cred Open Date 09/22/2007	It folio Nomination vailable Credit Limit Editor Open Date 09/22/2007 10/29/2007	rtfolio Nomination Me Bilateral vailable Credit Limit Editor Open Date Close Date Lock Date 09/22/2007 10/29/2007 10/17/2007	Infolio Nomination Messages Bilateral Market vailable Credit Limit Editor Value Value vailable Credit Limit Editor Value Value value Lock Date Value Open Date Close Date Lock Date Time Of Use 09/22/2007 10/29/2007 10/17/2007 PeakWeekEnd 09/22/2007 10/29/2007 0ff-peak PeakWeekDay	Item Nomination Messages Bilateral Market Downloads vailable Credit Limit Editor Image: Counterparty	Congestion Reven Bilateral Market Nomination Messages Bilateral Market Downloads Credit Limit vailable Credit Limit Editor Image: Counterparty Credit Self Open Date Close Date Lock Date Time Of Use Counterparty Credit Self 09/22/2007 10/29/2007 10/17/2007 PeakWeekEnd \$111,500,000.00

Note: Null = no credit limitation has been entered in the CRRAH Editor

Example

During "CRR Auction Lock Period" – from 3 days before the Bid Window closes (known as "Lock" date) until Auction invoices generated TCL: \$10,000 (Total Credit Limit) TPE: \$6,000 (Total Potential Exposure = CCE + FCE); ACL: \$4,000 (ACL = TCL – TPE) 90% ACL: \$3,600 CRR Auction Lockdown: \$2,000



During the lockdown, the CRR Auction amount cannot increase or decrease.

Example: Scenario where TPE increases during lock period During "CRR Auction Lock Period" TCL: \$10,000 (Total Credit Limit) TPE: \$8,000 (Total Potential Exposure = CCE + FCE); ACL: \$2,000 (ACL = TCL – TPE) 90% ACL: \$1,800 CRR Auction Lockdown: \$2,000 DAM: \$0 CRR Auction \$2,000 CRR Auction \$2,000 CRR Auction \$2,000 CRR Auction \$2,000

Note:

•During the lockdown, the CRR auction credit limit amount cannot increase or decrease.

•If TPE goes up during the lockdown, then:

•Collateral Call will take place (for the minimum of \$200 in this example)

Nothing available for DAM

amount)

Example: Scenario where you are outside of CRR Auction Lock Period

TCL: \$10,000 (Total Credit Limit) TPE: \$6,000 (Total Potential Exposure = CCE + FCE) ACL: \$4,000 (ACL= TCL - TPE) 90% ACL: \$3,600

> 90% ACL - \$3,600 DAM \$3,600

 DAM (all credit goes to DAM)

Alternative Means of Satisfying ERCOT Creditworthiness Requirements

Alternative Means of Satisfying ERCOT Creditworthiness Requirements

Same as in Zonal Market

- Guarantee Agreement (standard ERCOT form)
- Letter of Credit (standard ERCOT form)
- Surety Bond (standard ERCOT form)
- Cash



Note:

- Cash can be held as a fund to pre-pay invoices (MP approval)
- Excess cash collateral can be used to pay invoices
- Cash will be posted the following day, if sent after 12 noon
- Contact <u>ERCOTCredit@ercot.com</u>

Counter-Party CRR Credit Assignment

Counter-Party CRR credit assignment

Counter-Party logs into the CRR system and assigns credit limit to the CRR auction(s)

- Anytime after the Auction Notice and 3 days before the Bid Window closes (known as "Lock" date)
- This assigned amount may be reduced by ERCOT, if it is above the ACL on the day of the "Lock" date
- From "Lock" date until Invoices issued, when credit consumed in auction is picked up in "Current Obligations"

Counter-Party assigns credit limit for any applicable CRR auctions and for time of use

Account Holder Available Credit Limit Editor									
Auction Market Open Date Close Date Lock Date Time Of Use Counterparty Credit Self-Imposed Cred									
Locked						•			
Not Available									
Current									
Annual Auction July-August 2008	09/22/2007	10/29/2007	10/17/2007	PeakWeekEnd	\$111,500,000.00	540000.00			
				Off-peak	\$1,500,000.00	540000.00			
				PeakWeekDay	\$1,500,000.00	540000.00			
			Tot	al Commitments		\$1,620,000.00			

CRR Account Holder Available Credit Limit (ACL) Editor

					goon		
Auction	Portfolio	Nomination	Me Bilateral	ssages Market	Downloads	Credit Limit	
Account Holder	Available Cre	dit Limit Editor					
Auction Market	Open Date	Close Date	Lock Date	Time Of Use	Counterparty Cro	edit Self-Impos	sed Credit
Locked							
			No	ot A∨ailable			
Current							
Annual Auction July-August 2008	09/22/2007	10/29/2007	10/17/2007	Peak/VeekEnd	\$111,500,000.	54	0000.00
				Off-peak	\$1,500,000.	00 54	0000.00
				PeakWeekDay	\$1,500,000.	54	0000.00
			Te	tal Commitmente		\$1.62	0 000 00

Note: Null = no credit limitation has been entered in the CRRAH Editor

Counter-Party CRR credit assignment

- CRR bids are not constrained by credit limit, unlike the DAM
 - CRRAH can submit bids in excess of credit limit
 - CRR Auction will not award in excess of credit limit
- Credit allocated to CRR market is just another constraint in the optimization
 - "Budget Constraint" see details in the appendix

DAM Bids and Offers

DAM submissions are limited by the 90% available credit

- Submissions above the credit limit are rejected.
- Phase 2 validation enforces credit check and reprocesses all the submissions at 7 am in the day-ahead to validate against the counterparty credit limit (see DAM outreach presentation for more information).
- Transactions submitted after 7:00 am until 10:00am subject to immediate credit validation
- Note that credit:
 - Cannot be divided up among sub-QSEs
 - Cannot be managed by a QSE to a lower credit line for DAM

Phase 1 only (prior to 7am in DAM)	Phase 1 & 2 (7- 10am)	
Initial validation of the format of submission, proper QSE permission to make the submission, offer caps, etc.	Credit exposure, ownership, AS Obligations, etc.	

DAM Bids & Offers

- A. Transaction affected by the credit validation:
 - Energy Bids
 - Energy-Only Offers (EOO)
 - Three-Part Supply Offers (TPO)
 - Self-Arranged Ancillary Services
 - PTP Obligation Bids



- B. At 0700, Phase 2 validation reprocesses all previous submission in the following order:
 - Self-Arranged AS (calculates the AS Obligation Self-Arranged AS = remaining amount of QSE AS Obligation to be purchased in the DAM)
 - 2. Offers (includes EOO and TPO; excludes CRR Offers for NOIEs only and AS Offers)
 - 3. Bids (includes Energy Bids and PTP Obligation Bids)
- C. After Phase 2/0700 Each transaction validate in order that QSE submits

DAM Bids & Offers

Exposure Calculations

Remaining AS Obligation that is not Self-Arranged:

 Product of the quantity of AS not self-arranged times the 95th percentile of the hourly Market Clearing Price for Capacity (MCPC) for that Ancillary Service over the previous 30 days for that hour

Energy Offers:

 Quantity of the offer multiplied by the 95th percentile of the hourly difference of Real-Time (Settlement Point Price) SPP and Day-Ahead SPP over the previous 30 days for the hour

Energy Bids:

• Quantity of the bid multiplied by the bid price (nonzero)

Both:

 Energy Bids and Offers at the same Settlement Point for the same hour, the exposure is the maximum of the exposure for either the Bid or the Offer (i.e., not netted)

Exposure Calculations-

PTP Obligation Bid:

- Sum of the quantity of bid multiplied by the bid price, if positive, plus 95th
 percentile of the hourly positive Real-Time price difference between the source
 and the sink over the previous 30 days for the hour
- Only positive price differences are used to determine the 95th percentile.

Note: The <u>Market Credit Working Group</u> is currently considering nodal protocol changes to adjust the DAM exposure calculations



Thanks for your attention!

Questions? Comments?



Appendix

DAM Credit Exposure Example

QSE A						
Sample Transactions						
Hour Ending 0700						
Self-Arranged AS	MW			AS Obliga	tion	MW
RegUp	5			RegUp		18
RegDn	5			RegDn		18
RRS	20			RRS		45
NonSpin	10			NonSpin		23
Energy Only Offer	MW	Price	Settlement Point			
E00 1	20	55	HB_North			
E00 2	25	65	HB_Houston			
Three Part Offer	MW (max)	Price (max)				
TPO 1	20	55				
TPO 2	25	65				
Bids	MW	Price	Settlement Point			
Bid 1	10	70	HB Houston			
Bid 2	20	60	LZ South			
Bid 3	15	50	HB West			
PTP Obligation Bid	MW	Price	Source	Sink		
PTP 1	50	8	LZ_South	LZ_Housto	n	
PTP 2	40	12	HB_West	HB_North		

DAM Credit Exposure Example – cont'd

Exposure Calculation:							
Remaining AS MW		MW	MCPC 95%	Exposure	Credit Limit = 4500		
	RegUp	13	15	195			
	RegDn	13	13	169			
	RRS	25	20	500			
	NonSpin	13	8	104			
				968			
					Credit Remaining		3532
Three Part	Offer	MW	RT/DA Diff	Exposure			
TPO 1		20	6	120			
TPO 2		25	6	150			
E00 1		20	6	120			
EOO 2		25	6	none	*		
				390	Credit Remaining		3142
<u>Bids</u>	Bid Price	MW		Exposure			
Bid 1	70	10		700	*		
Bid 2	60	20		1200			
Bid 3	50	15		750			
				2650	Credit Remaining		492
PTP	Bid Price	MW	Price Diff	Exposure			
PTP 1	8	50	10	. 410			
PTP 2	12	40	15	495			
				905			

CRR Auctions

Budget Constraint applied in auction

 $\sum_{j} \max(p_{ah,j}, 0) \cdot x_{ah,j} - \sum_{k} \min(p_{ah,k}, 0) \cdot (CRR_{ah,k} - x_{ah,k}) + \sum_{obl} (\phi \cdot |p_{ah,obl}| + \eta \cdot h_{ah,obl}) \cdot x_{ah,obl} \le SIBudget_{ah}$ **Three parts, Options, Offers, Obligations**

See "CRR Conceptual System Design B2 v2.0"

http://nodal.ercot.com/docs/pd/crr/index.html#des

FCEOBLo = Max (ACPEOBLo, - FMMOBLo) FMMOBLo is fair mark to market which is weighted avg of

- Auction Clearing Price
- Today's Value
- Five Day Value
- Last Month Value

Calculated for all unsettled Obligations

ACPEOBLo = MWhrs * X*Y/clearing price (if cp>\$Y/MWhr)

- = MWhrs * X (if 0 < cp < Y/MWhr)
- = MWhrs * (ABS(cp) + X) (if cp < MWhr)

Tentatively X = 1/MWhr, Y = 1.50/MWhr

Credit limit examples

				Limit set in				
	TPE	TCL	Diff	ACL (as diff)	90% ACL to CRR	CRR by CRRAH	CRR confirm to CMM	To DAM
Up to 2 days prior to a	CRR Auction							
Example 1	4,000	3,000	(1,000)	-	-	2,000	-	-
Example 2	4,000	5,000	1,000	1,000	900	2,000	900	-
Example 3	4,000	8,000	4,000	4,000	3,600	2,000	2,000	1,600

				"Locked down					Add'l
_	TPE	TCL	Diff	ACL (as diff)	90% ACL to CRR	CRR CL of 900"	CRR confirm to CMM	To DAM	collateral required
During "Lock Down Perio	od" - from 2 day	s prior until Au	ction invoices	generated		900	900		1 000
Example 4	4,000	3,000	(1,000)	500	450	900	500	-	1,500
Example 5	4,000	4,500	500	500	450	900	900	-	450
Example 6	4,000	8,000	4,000	4,000	3,600	900	900	2,700	-

Total Potential Exposure (TPE) Calculation

TPE determined as follows:

- Generally, if Counter-Party has granted ERCOT a first priority security interest* in receivables, formula is:
 » TPE = CCE + FCE
- Otherwise, formula is:
 - » TPE = max [0,CCE] + max [0,FCE]
- Where
 - CCE is current credit exposure
 - FCE if future credit exposure
- * or is an EC or an Entity created under Texas Water Code (TWC) 222.001

CCE = Max [(IEL for the first 60 days), EAL, AIL, (EAL+AIL)]

Where

IEL = Initial Estimated Liability (old TEL)

EAL = Estimated Aggregate Liability

AIL = Aggregate Incremental Liability (old NLRI - (Net Resource Imbalance Liability))

EAL = Estimated Aggregate Liability

Max [IEL during the first 60-day period, Max (ADTE during the previous 60-day period)] + OUT + PUL + DALE

Where

- ADTE = Average daily transaction extrapolated = 40 days times average daily amount from (typically)14 most recent initial settlement statements (includes approx 3 weeks forward)
- **OUT =** Outstanding unpaid transactions = outstanding invoices (all) + estimated final settlements + estimated true up settlements outstanding + ADR amounts + other
 - **PUL =** Potential uplifts from short payments
 - **DALE =** Average daily DAM liability extrapolated = 16 days times average daily amount from the seven most recent DAM settlement invoices

AIL = Aggregate Incremental Liability (old NLRI – Net Resource Imbalance Liability)

= $(RTLd) - Max[0, (ADTE / 40 \times N \times 0.9)]$

= Estimate of liability less collateral held for that liability

Where

RTL = Real-time liability

	Volume	Price
Completed and settled – not invoiced	From settlement statement	From settlement statement
Completed but not settled	Estimate based on LRS and known purch / sale activity	From Market system (actual, but not verified)
Forward – 7 operating days forward	Estimate based on recent historical activity	Estimate based on recent history x 150%

FCE = Future Credit Exposure (of CRRs) = FCEOBL + FCEOPT

Where

FCEOBL = FCE of PTP Obligations FCEOPT = FCE of PTP Options

FCEOBL = Max (ACPEOBL, - FMMOBL)

 Higher of auction clearing price exposure or FMM calculation

Where:

FMMOBL = Forward Mark to Market exposure for all obligations owned where price is determined based

- on a weighted average of
 - 1) Auction clearing price
 - 2) Today's most recent PTP obligation value

3) Most recent five day's average PTP obligation value

4) Previous month's PTP obligation value

FCE Calculation – FCEOPT

- Calculation for FCEOPT is based only on the Forward Mark to Market Exposure; the Auction Clearing Price exposure is not included in the calculation.
 - Calculation of Forward Mark to Market Exposure for FCEOPT is similar to FCEOBL.

Please note that the information provided in this presentation about the TPE calculation is at a high level and address the general case.

MPs should read the full Nodal Protocols regarding this calculation to understand their requirements in the Nodal market

 The Nodal Protocols can be found on the ERCOT website at: <u>http://nodal.ercot.com/protocols/index.html</u>.

Application of collateral when there is a default

- ERCOT's Protocols provides for a "pool" of collateral to be used for all activity of a defaulting entity (whether real time, day ahead market, or CRR activity)
 - When there is a default, collateral will be applied to invoices as they come due (e.g. earliest first).