



Straw Proposal on CRR-Related Credit Issues

Near-term Enhancements to Congestion Revenue Rights (CRR)

September 1, 2009

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Near-term Enhancements to Congestion Revenue Rights (CRR)

1. Introduction

The Federal Energy Regulatory Commission's (FERC) approval of the February 2006 tariff filing in support of the California ISO's new market design, and several subsequent filings and associated orders, established the policy for Congestion Revenue Rights (CRRs) in the ISO's current market. The ISO has released short-term and long-term CRRs for the start of its new market design through the allocation and auction processes for CRRs that have been in effect since April 1, 2009. The ISO is now conducting both annual and monthly CRR allocation and auction processes for the release of prospective CRRs. This experience provides an opportunity to consider refinements in some details of CRR and related processes.

The ISO has identified the issues listed below as a subset of the candidates for further refinements, through publication of an Issue Paper on August 14, 2009, and discussion of the Issue Paper on August 21. This Straw Proposal is the next step in the ISO's stakeholder process to address the issues and develop appropriate solutions to them. This Straw Proposal will be discussed in a stakeholder meeting on September 8. The overall schedule is discussed in Section 2.¹

¹ The August 14 Issue Paper also identified several additional issues that will be addressed during the overall stakeholder process on CRR Enhancements. As discussed in the Issue Paper, the ISO will establish the schedule, including publication of Straw Proposals and Draft Final Proposals, and stakeholder meetings or conference calls, for addressing the non-credit issues following the September 8 stakeholder meeting. These issues include:

Non-Credit Policy Issues

- Revise load migration process: The current process for transferring CRRs due to load migration between LSEs requires the ISO to handle data on retail end-use customers, which the ISO is not otherwise responsible for handling and processing.
- Revise modeling and treatment of trading hubs in CRR allocation: The current CRR allocation process disaggregates a nominated trading hub CRR into separate CRRs for each constituent PNode of the trading hub, resulting in holdings of many small CRRs.
- Eliminate multi-point CRRs from CRR design: Market participants strongly desire the ability to sell CRRs in the auction, but multi-point CRRs make it difficult to implement the sale of CRRs, as well as complicating the implementation of other new features.
- Weighted least squares objective function: The current CRR allocation software maximizes the release of CRRs, but does not equitably distribute reductions from CRR allocation requests among participants.
- Move to single tier in monthly allocation: The current monthly CRR allocation uses two tiers even though the incremental amount of CRRs released after the annual CRR process is limited.

Non-Credit Business Process Issues

- Sale of CRRs in the CRR auctions: Currently, CRRs cannot be directly sold in the auction.
- Modeling approaches to reinforce CRR revenue adequacy: In the initial months of operation of the new ISO markets, lack of data regarding the impact of transmission outages on CRR revenue adequacy resulted in significant CRR revenue shortfalls in the CRR balancing account.
- Tracking of Long Term CRRs in CRR system: The ISO's current process involves manual work-arounds, which will be automated.

CRR Related Credit Issues

- CRR credit policy changes: The ISO proposes revisions to the current credit requirements for participation in CRR auctions to improve the ISO's credit coverage and efficiency of collateral usage.
- Process for re-selling CRRs of a defaulting CRR holder: The tariff currently allows the ISO to re-sell the CRRs of a defaulting CRR holder but does not specify the process for doing so. The ISO is now proposing to specify the details of the process to enable such CRRs to be re-sold expeditiously should the need arise.
- Re-evaluation of holding credit requirements for extraordinary circumstances: Circumstances such as extended outages can result in changes in holding credit requirements. A business process has been defined.

This initiative is to develop the principles for business processes that will implement the new or existing policies. Some issues involve software changes or tariff amendments, while others are process changes. The principles for business processes will then be documented in the CRR Business Practice Manual, and implemented in Market Operations software and business practices. The ISO's goal is to implement solutions to the CRR-related credit issues by late 2009. In cases where tariff amendments are needed, the implementation date will be subject to receiving approval by FERC.

2. Process and Proposed Timetable

The ISO's stakeholder process began with the publication of the Issue Paper on August 14, 2009, and discussion of the Issue Paper in a stakeholder conference call on August 21, for the purpose of identifying in collaboration with stakeholders the priority of the issues and to begin identifying and evaluating alternatives. The ISO has now received initial written comments from stakeholders, which the ISO has considered in formulating this Straw Proposal. The ISO will discuss the straw proposal in a stakeholder meeting on September 8, 2009, to further discuss the CRR-related credit issues that are the subject of this document. The September 8 meeting will also continue discussion of the non-credit issues at the level of the Issue Paper.

The schedule for issue identification on all issues, and resolution of CRR-related credit issues, is as follows:

Date	Activity or milestone
August 14	Publish Issue Paper
August 21	Stakeholder conference call on CRR-Related Credit Issues in Issue Paper, and preliminary questions on other issues
August 28	Stakeholder comments on Issue Paper
September 1	Straw Proposal on CRR-Related Credit Issues
September 8	Stakeholder meeting on CRR-Related Credit

	Issues Straw Proposal and on Issues Paper for other issues
September 15	Stakeholder comments on CRR-Related Credit Issues Straw Proposal and on Issues Paper for other issues
September 22	Draft Final Proposal on CRR-Related Credit Issues
Late September	Stakeholder Conference Call on Draft Final Proposal on CRR-Related Credit Issues
October	Board decision on CRR-Related Credit Issues
November	FERC Filing on CRR-Related Credit Issues
Schedule for non-credit topics will be determined after the preliminary meeting to discuss the issues and priorities based on initial stakeholder input.	
Implementation dates will vary depending on policy resolution and software development.	

3. Criteria for Evaluating Potential Solution Approaches

The ISO’s proposed resolution of all issues will be developed based on consideration of stakeholder inputs, sound market design, and evaluation of the ISO’s ability to implement alternative solutions in a timely manner. The specific factors to be considered will be identified separately for each topic area.

4. Issues to be Addressed

In the subsections below, this Straw Proposal describes the issues that need to be addressed concerning credit requirements and processes associated with CRRs, and the solutions that the ISO believes will resolve the issues. The ISO invites feedback from stakeholders regarding whether the ISO has appropriately identified solutions that resolve the issues that need to be addressed. The ISO will use this feedback to consider whether further revisions to the Straw Proposals are needed to advance to the publication of the ISO’s Draft Final Proposal and further discussion with stakeholders, before the ISO presents its recommendations to its Board of Governors.

In the discussion below, the ISO includes summaries and analyses of the stakeholder comments that were submitted on the Issue Paper. In general, the ISO has concluded that the preliminary solutions discussed in the Issue Paper have been workable and needed little if any change, but the ISO invites further feedback on them. Where possible, the ISO also identifies considerations that it will face in determining whether the proposed solutions are consistent with its current tariff provisions, or will require tariff amendments.

4.1. CRR-Related Credit Issues

4.1.1. CRR Credit Policy Changes

4.1.1.1. Revisions to CRR pre-auction credit requirements

The ISO's credit policy for Congestion Revenue Rights (CRR) is designed to protect the financial interests of market participants against risks associated with CRRs. On the other hand the credit policy must not create unnecessary barrier to entry for participating in the ISO's CRR market. To achieve that balance, the ISO continues to improve the existing CRR credit policy based on the outcomes of market operation and the feedback from stakeholders.

To resolve the issues in this area, the ISO is considering an enhancement to the existing CRR credit policy, specifically to the calculation of pre-auction credit requirement. The enhancement may reduce pre-auction credit requirements for some market participants. It will, however, not compromise the credit coverage for the CRR auction.

4.1.1.2. Existing Pre-auction Credit Requirement

The pre-auction credit requirement is designed such that the collateral required for participating in the auction should be sufficient to cover both the payments due to the ISO for winning the auction and the credit requirement for holding the winning CRRs. In other words, the auction winner should not need to post any additional collateral in order to hold the winning CRRs.

According to the existing ISO tariff, the credit requirement for participating in CRR auction is calculated as:

$$\begin{aligned} & \textit{Pre - Auction Credit Requirement} \\ & = \max[\$500,000, \sum_i (|bid_i| + \textit{Credit Margin}_i \times \overline{MW}_i)] \end{aligned}$$

where \overline{MW}_i is the maximum MW value of the bid for CRR_i .²

In the ISO's CRR Business Practice Manual, $|bid_i|$ is defined as the maximum bid credit exposure based on the bid curve for CRR_i .³ This definition ensures that the pre-auction credit requirement will be sufficient to cover both the auction payment due to the ISO (for positive-valued CRRs) and the holding credit requirement when the bidder wins the auction for CRR_i .

The maximum bid credit exposure, $|bid_i| = \max_{MW_i} |Bid Price_i \times MW_i|$ ($0 \leq MW_i \leq \overline{MW}_i$), is often found at MW_i that is different from \overline{MW}_i . Two different values of MW used in the calculation could result in an excessive pre-auction credit requirement.

The existing ISO tariff also requires auction winners of negative-valued CRRs to post sufficient collateral to meet the holding credit requirements before they are paid for winning the auction. This requirement is reflected in the calculation of pre-auction credit requirement. That is the bidder for a negative-valued CRR has to post collateral to cover both bid credit exposure and credit margin credit exposure. Based on this rule, there is money swap at the auction

² The ISO Tariff Section 12.6.2.

³ The ISO Business Practice Manual for Congestion Revenue Rights, Version 5, Attachment H.

settlement process that may not be necessary. For example, the auction winner of a -\$100,000 CRR needs to post a collateral of \$100,000 plus credit margin (say \$50,000) before he is paid the \$100,000 winning bid. The \$100,000 took a round trip between the winner and the ISO at the auction settlement. Changing $|bid_i|$ to $\max(0, bid_i)$ in the pre-auction credit requirement calculation could avoid the money swap and lower the credit requirement for bidding for negative-valued CRRs. The change will not weaken the credit coverage for the auction.

4.1.1.3. Proposed Enhancement

The ISO proposes to change the calculation of credit requirement for participating in CRR auction to:

Pre – Auction Credit Requirement

$$= \max[\$500,000, \sum_i \max(\max(0, BidPrice_i \times MW_i) + Credit\ Margin_i \times MW_i)]$$

where,

MW_i - the MW value within the range of the bid curve for CRR_i , i.e., $0 \leq MW_i \leq \overline{MW}_i$

$BidPrice_i$ - the bid price (\$/MW) corresponding to MW_i on the bid curve for CRR_i

$\max_{MW_i}(\max(0, BidPrice_i \times MW_i) + Credit\ Margin_i \times MW_i)$ finds the maximum credit exposure

of this bid for CRR_i by varying MW_i value within the range between 0 and \overline{MW}_i . The maximum credit exposure will be the pre-auction credit requirement for this bid. The pre-auction credit requirement for a bid portfolio submitted by a bidder will be the greater of \$500,000 and the sum of calculated pre-auction credit requirements for all bids in the portfolio.

The examples included in this proposal demonstrate that with the proposed method the pre-auction credit requirement could be lowered while still providing sufficient credit coverage for the CRR auction.

4.1.1.4. Numerical Examples

The following examples illustrate the differences between the existing and proposed methods in the calculation of pre-auction credit requirement. The sufficiency of the pre-auction credit requirement calculated based on the proposed method is also analyzed based on the examples.

Example 1: Pre-auction credit requirement for a positive-valued CRR bid

In this example, the bidder submits a bid curve for a positive-valued (monthly or seasonal) CRR. The bid curve has four segments, as shown in Table 1. The credit margin of the CRR in this example is assumed to be \$4/MW over the month or season. The total credit exposures calculated using the existing method and the proposed method are listed in Table 1.

Table 1. Comparison of Credit Exposures

Bid Curve		Existing Method			Proposed Method		
Bid Segment (MW)	Bid Price (\$/MW)	Bid Segment Credit Exposure (\$)	Credit Margin Credit Exposure (\$)	Total Credit Exposure (\$)	Bid Segment Credit Exposure (\$)	Credit Margin Credit Exposure (\$)	Total Credit Exposure (\$)
0~5	15	75	200	275	75	20	95
5~20	13	260	200	460	260	80	340
20~35	7	245	200	445	245	140	385
35~50	3	150	200	350	150	200	350

Both methods calculate bid segment credit exposure in the same way. It is the product of the maximum MW value and the bid price of each bid curve segment.

With the existing method, credit margin credit exposure is calculated as the product of the maximum MW value of the bid curve and credit margin (50x4). Total credit exposure is the sum of bid segment credit exposure and credit margin credit exposure. In this example, the maximum total credit exposure is \$460 that occurs at the 20 MW value on the bid curve. The pre-auction credit requirement for this bid curve is set to \$460 in order to cover the largest possible credit exposure of this bid curve.

The proposed method calculates credit margin credit exposure for each segment of the bid curve as the product of the maximum MW value of the segment and credit margin. Therefore, the bid segment credit exposure and credit margin credit exposure are calculated using the same MW value. The maximum total credit exposure is \$385 at the 35 MW value on the bid curve. It is also the pre-auction credit requirement for this bid. The proposed method produces a lower pre-auction credit requirement than the existing method does in this example.

Now we need to see if the \$385 pre-auction credit requirement is sufficient to cover both the auction payment due to the ISO and the holding credit requirement if the bidder wins the auction. The analysis is summarized in Table 2.

Table 2. Pre-auction Credit Requirement vs. Holding Credit Requirement

Bid Curve		Market Clearing Price (\$/MW)	Payment Due to the ISO (\$)	Holding Credit Requirement (\$)	Pre-Auction Credit Requirement (\$)	Additional Collateral Needed (\$)
Bid Segment (MW)	Bid Price (\$/MW)					
0~5	15	15	75	0	385	0
5~20	13	12	240	0	385	0
20~35	7	7	245	0	385	0
35~50	3	2	100	100	385	0

Assuming the auction market clearing price for the CRR is \$15/MW, this bid will clear 5 MW. The auction payment due to the ISO is \$75 and the credit requirement for holding this 5 MW

CRR is \$0.⁴ The total collateral required at the auction settlement is \$75. The \$385 pre-auction credit requirement is sufficient for that purpose.

If the market clearing price is \$2/MW, the auction payment due to the ISO is \$100 and the holding credit requirement is \$100. The total collateral required at the auction settlement is \$200, which is fully covered by the \$385 pre-auction credit requirement. There is no need for any additional collateral.

Example 2: Credit requirement for a negative-valued CRR bid

In this example, the bid curve has the same four segments as in Example 1, but with negative bid prices (see Table 3). The credit margin of the CRR in this example is \$4/MW, the same as in Example 1.

Table 3. Comparison of Credit Exposures

Bid Curve		Existing Method			Proposed Method		
Bid Segment (MW)	Bid Price (\$/MW)	Bid Segment Credit Exposure (\$)	Credit Margin Credit Exposure (\$)	Total Credit Exposure (\$)	Bid Segment Credit Exposure (\$)	Credit Margin Credit Exposure (\$)	Total Credit Exposure (\$)
0~5	-3	15	200	215	0	20	20
5~20	-7	140	200	340	0	80	80
20~35	-13	455	200	655	0	140	140
35~50	-15	750	200	950	0	200	200

The existing method calculates bid segment credit exposure as the absolute value of the product of the maximum MW value and the bid price of each bid curve segment. The proposed method has zero segment credit exposure because the auction winning value will be counted toward the holding credit requirement.

The calculation of credit margin credit exposure is the same as in Example 1 for both methods.

The maximum bid credit exposure is \$950 with the existing method and \$200 with the proposed method. They are also the pre-auction credit requirements determined by the two methods. The proposed method produces a lower pre-auction credit requirement than the existing method does.

⁴ Based on $Holding\ Credit\ Requirement = (-Auction\ Price + Credit\ Margin) \times MW$ and no negative credit requirement.

Table 4. Pre-auction Credit Requirement vs. Holding Credit Requirement

Bid Curve		Market Clearing Price (\$/MW)	Auction Wining Value (\$)	Holding Credit Requirement (\$)	Pre-Auction Credit Requirement (\$)	Additional Collateral Needed (\$)
Bid Segment (MW)	Bid Price (\$/MW)					
0~5	-3	-4	20	40	200	0
5~20	-7	-9	180	260	200	0
20~35	-13	-13	455	595	200	0
35~50	-15	-20	1000	1200	200	0

With the proposed method, the value the bidder won in the auction (market clearing price times the cleared MW value) will not be paid to the bidder. Instead it will be used to meet the credit requirement for holding the winning CRR. The analysis of the sufficiency of pre-auction credit requirement calculated based on the proposed method is summarized in Table 4.

If the auction market clearing price for the CRR is $-\$4/\text{MW}$, this bidder will clear 5 MW. The winning value the ISO will hold is $\$20$. The credit requirement for holding this 5 MW CRR is $\$40$. The total collateral required at the auction settlement is $\$20$ ($40-20$) that will be covered by the $\$385$ pre-auction credit requirement. The $\$365$ remaining collateral will be returned to the bidder.

If the auction price is $-\$20/\text{MW}$, the winning value by the bidder is $\$1000$. The holding credit requirement for the 50 MW winning CRR is $\$1200$. The total collateral required at the auction settlement is $\$200$ that will come from the $\$200$ pre-auction credit requirement. This is the only situation the pre-auction credit requirement will be fully used, in conjunction with the CRR revenues that will be withheld, to meet the holding credit requirement. In each of the cases above, under the proposed methodology, the CRR revenue that the bidder would have been paid plus the $\$200$ of posted collateral for the credit margin is sufficient to cover the holding credit requirement.

4.1.1.5. Summary of the Examples

In both examples, the pre-action credit requirements determined based on the proposed method are lower than that based on the existing method. The pre-auction credit requirements, together with the auction winning values, are sufficient to cover the credit requirement for holding the winning CRRs.

There are other situations where both methods will produce the same pre-action credit requirements and provide the same coverage for the auction.

4.1.1.6. Summary of Stakeholder Comments

After the August 21, 2009, conference call, the ISO received stakeholders written comments about the proposed enhancements to the CRR pre-auction credit requirement calculation. The enhancements received essentially unanimous support from the stakeholders submitted commented. In its comment, Southern California Edison also requested the ISO provide additional information on the settlement implication of using the negatively valued auction revenues as collateral. The ISO will provide the stakeholders with the information when it becomes available.

4.1.2. Process for liquidating the CRRs of a defaulting CRR holder

The ISO tariff section 12.5.1(e) provides authority for the ISO to resell to the market the CRRs that were held by a CRR Holder determined to be in default.⁵ The purpose of the present proposal is to try to specify an approach whereby such resale would be accomplished. As such the proposal does not discuss the provisions for determining that a CRR Holder is in default, but rather takes the fact of the default as a starting assumption and proceeds to the next step of reselling the defaulted party's CRR holdings. The objectives of reselling such CRRs are to mitigate as far as reasonably possible the financial risk to the rest of the market as a result of a default, and to discourage defaults by CRR holders while avoiding undue or unfair impacts to defaulting parties. The proposal described in this section is intended as a straw proposal for discussion purposes. The ISO welcomes suggestions as to how the approach may be improved.

A starting assumption of this proposal is that the CRR portfolio of the defaulting party has a net negative expected future value, although it may be comprised of both negative value and positive value individual CRRs. There is nothing in the proposal, however, that would prevent it being applied to a net positive value CRR portfolio. Ideally the ISO should be able to re-sell CRRs through the CRR auctions as well as bilaterally through the Secondary Registration System (SRS). At this time, however, the CRR software does not support the ability to offer to sell a pre-existing CRR, so the only option is to use the SRS. As discussed elsewhere in this paper, implementation of the CRR auction sell function is a high priority for the ISO, so the ISO expects that the need to rely exclusively on the SRS should be relatively short-lived. In any event, the approach described below could apply to auction sales in the future as well as SRS sales.

The ISO proposes to offer for resale all CRRs in the defaulting party's portfolio, not just the positive-value ones. Some CRR market participants may willingly take on negative-value CRRs if they expect the up-front price they receive for taking on the liability is greater than the stream of payments they will make to the ISO over the term of the CRR. If the price the ISO offers to pay a CRR holder is chosen prudently, such a sale could reduce the financial risk to the rest of the market as a result of the default. Alternatively, if the ISO attempts to re-sell only the positively valued CRRs, both the defaulting party and the net creditors may complain that the ISO has not sufficiently tried to stop or contain the harm to the market by selling the negatively valued CRRs. Also, positive or negative values are based on expectations of future streams of payments and charges, and expectations change as more market experience is gained. It would be inappropriate for the ISO to assume, ex ante, that it will not be possible to sell the negative value CRRs at a price that reduces the financial exposure of the rest of the market. Finally, if the ISO takes a somewhat risk-averse perspective with respect to protecting the interests of the market as a whole, there would be a benefit to realizing a known up-front payment from the re-sale of a CRR rather than waiting to realize the uncertain IFM settlement value of the CRR, as long as the up-front payment does not reflect an unduly large discount to the expected IFM value of the CRR. This would be true both for negative-value and positive-value CRRs. Accordingly, to minimize the risk to the market as a whole, the ISO believes it would be best to try to sell all the CRRs in a defaulting party's portfolio, recognizing it may not be possible to find qualified buyers willing to purchase all of the CRRs at acceptable prices.

⁵ Through a separate process, the ISO will document the rules and procedures for declaring a CRR holder in default and for allowing a CRR holder to cure a default.

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For sales through the auction, the ISO would offer the CRRs into the first available monthly auction for the full month by time of use. For sales through the SRS, the ISO would offer the CRRs for sale on a particular date and announce a definite period during which it will accept offers, at the end of which the ISO can accept the best offer if it meets the threshold price, or not sell the CRR if no offer meets the threshold price. If some CRRs remain unsold for lack of acceptable offers, this would not preclude the ISO from trying to sell them through the SRS again at a later date. The ISO would offer individual CRRs for sale, where an individual CRR is defined by source location, sink location, MW quantity, time-of-use (TOU), term (season or month). In a monthly auction the term would have to be the month, of course.

The ISO believes it is appropriate to establish a minimum sale price for each CRR, as a way to try to maximize the benefit of the re-sale to the rest of the market. If the ISO were to sell one of these CRRs at too deep a discount from its expected value, the market participants exposed to the impacts of the default could be worse off than if the ISO were to hold that CRR rather than resell it. Thus a minimum sale price for a CRR can be thought of as the price at which the parties exposed to the default would be financially indifferent between re-selling or not re-selling the CRR, based on the information available at the time of the sale and their tolerance for uncertainty.

The ISO proposes that the minimum price for each CRR should be a certain percentage of the most recent auction price of the CRR, adjusted to reflect the portion of its term that has already transpired. The ISO will seek stakeholder inputs on the percentage value and suggest a specific formulation of this approach to present at the upcoming stakeholder discussion.

Funds related to the re-sale of CRRs would be managed through a separate collateral fund based on the defaulting party's collateral held by the ISO. The ISO believes that the default of a CRR holder and the funds resulting from any resale of the CRR holder's CRRs should not affect the CRR balancing account. Because the CRR balancing account receives all net revenues from the CRR auctions, it has already received the auction payment for any positive value CRRs, and has made auction payments to CRR holders who were awarded negative value CRRs, which are held by the ISO as a part of the collateral. Thus the CRR balancing account is already "whole" with respect to the auction revenues associated with these CRRs. The funds associated with re-sale of these CRRs really reflect the transfer of ownership from one party to another, comparable to a bilateral SRS transaction between any two CRR holders, so there should be no impact on the CRR balancing account. Most importantly, the whole purpose of the ISO re-sale of the CRRs is to mitigate the impact of the default on the parties who bear the default allocation, so it is appropriate to manage these funds outside the CRR balancing account.

During the conference call on this topic and subsequently in written comments, some parties expressed the opinion that it would not be appropriate for the ISO to participate in the CRR market as a seller of existing CRRs and should instead simply hold the CRRs of a defaulting CRR holder. Some parties expressed the additional opinion that if the ISO were to re-sell these CRRs it would not be appropriate for the ISO to try to reflect the risk aversion of the market by introducing a risk premium into the minimum sale price. The ISO does not have a final position on either of these matters at this time, and intends to facilitate a full discussion of them at the upcoming stakeholder meeting.

4.1.3. Credit requirements for extraordinary circumstances

Each CRR Holder, whether it obtains CRRs through allocations, auctions, SRS trades or load migration, must maintain an Aggregate Credit Limit in excess of its Estimated Aggregate

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Liability including the credit requirement for holding the Congestion Revenue Right (CRR) portfolio determined as described in Section 12.6.3 of the Tariff. Credit requirements for holding CRRs are calculated on a portfolio level based on the corresponding CRR auction prices and the credit margin data and re-evaluated in a regular basis.

Extraordinary circumstances such as extended transmission outage or other abnormal grid conditions could dramatically increase (or decrease) the payment obligations for a CRR. Although, over time, the CAISO will be able to incorporate historical outage information in the calculations of historical expected values, that calculation may not adequately cover near-term anticipated prospective obligations associated with extraordinary events that could dramatically change the risk profile of a CRR portfolio. In a previous stakeholder process, CAISO suggested it might clarify its tariff authority so that the CAISO could impose additional credit requirements under extraordinary circumstances.

Stakeholders have favored the concept for adjusting CRR holding credit requirements due to extraordinary circumstances, but several commentators also recommended that the CAISO clearly establish in advance the methodology it would use to calculate the increased credit requirements. The requirement to have the CAISO develop in advance the methodology for such calculations was rejected by FERC. Under the tariff, CAISO may request additional security when warranted but we will have to provide the justification at that time. Although CAISO expects to develop these methodologies, CAISO will have the ability to request the security at any time if there are concerns to need it subject its justification even if it is different from one of the CAISO's pre-developed methodologies. Under the scenario where CRR holding credit requirements vary, CAISO through its Finance department and following its standard credit policy will determine if sufficient collateral exists to cover the additional liability, and if a collateral call will be made. CAISO believes that it has the authority to request additional security in the event it finds that existing credit coverage is not sufficient to cover the prospective liabilities. The methodology described in this straw proposal is [a business process refinement within the CAISO's existing tariff](#).

On March 2009, the ISO posted a proposal to reevaluate credit requirements under extraordinary circumstances. Afterwards, the ISO held a conference call with stakeholders to discuss the proposal, and stakeholders subsequently submitted comments on this. CAISO posted responses to these comments. All related documents are available at <http://www.caiso.com/1b8c/1b8cdf25138a0.html>.

Based on both the Issue paper dated as of August 14, 2009, and the CRR Enhancements presentation of August 21, 2009, CAISO received stakeholders' comments on the proposed approach. In general, stakeholders who provided comments supported the proposed methodology. Based on stakeholders' comments, CAISO has expanded the business process to

- i) Produce a public report with the details of the reevaluation of credit requirements which, among other things, will include the new set of prices used in the reevaluation process. However, the potential call for more collateral will not depend on the timing for posting of this report, as a collateral call is not subject to a priori approval from participants.
- ii) Specify that the re-evaluation of CRR holding credit requirements may be run more than once depending on the duration of the event, up to potentially having a daily reevaluation.

Regarding PG&E comments on the reevaluation of credit requirements for events of short duration and short lead time, there are some scenarios in section 4.1.3.2 which describe the timing and logic of the reevaluation process. As long as the event has an impact on the DA market, the reevaluation of credit requirements will apply, regardless of its duration or lead time. As described in the proposal, even when an extra-ordinary circumstance does occur, that does not necessarily mean that CAISO will then do a reevaluation of credit requirements, e.g. instances affecting only the real time market will not affect CRR holding credit requirements and, thus, there will be no need to reevaluate credit requirements.

4.1.3.1. Standard Evaluation of CRR Holding Credit Requirements

CRR holding credit requirements are computed systematically for each CRR holder based on its entire CRR portfolio within the CRR system. The goal of the credit requirement computation is to determine whether a CRR holder has sufficient credit to cover the potential financial risk from its CRR portfolio. Under normal conditions, CRR holding credit requirements will be re-evaluated once a week. This is to account for changes in both the CRR portfolios and the auction prices which in general will make the credit requirements vary over time even under normal conditions⁶.

For any CRR in the H -th CRR holder's portfolio, regardless of their origin (allocation, auction, load migration or SRS trades), the associated holding credit requirement is calculated as follows⁷:

$$CR_{i,p}^H = - \sum_{m=1}^{M_{i,p}} \sum_{d=1}^{D_{i,m,p}} \min(\Psi_{i,d,m,p}, \lambda_{i,d,m,p}) MW_{i,d,m,p}^H + \frac{\sum_{m=1}^{M_{i,p}} \sum_{d=1}^{D_{i,m,p}} CM_{i,d,m,p}^{Daily} \times MW_{i,d,m,p}^H}{\sqrt{\sum_{m=1}^{M_{i,p}} D_{i,m,p}^H}}, \quad \forall i, p, H \quad (1)$$

where the super-index H stands for H -th CRR holder; the sub-index i stands for the i -th CRR in the holder's CRR portfolio; the sub-index p is for TOU period; the set M_{ip} comprises the remaining months in the term of i -th CRR for TOU period p ; the set $D_{i,m,p}$ is the number of days the i -th CRR has in month m and TOU period p ; $MW_{i,d,m,p}$ is the volume (MW) of the i -th CRR on day d in month m and TOU period p ; $CM_{i,d,m,p}^{Daily}$ stands for the daily credit margin (\$/MW-Day) for the i -th CRR on day d in month m and TOU period p ; $\lambda_{i,d,m,p}$ is the daily auction price (\$/MW-Day) of the i -th CRR on day d in month m and TOU period p . $\Psi_{i,d,m,p}$ stands for the historical

⁶ Over time some CRRs will eventually expiry and new CRRs will be acquired through upcoming allocations, auctions, SRS trades or load migration. Also, a new set of monthly auction prices will become available after each auction process.

⁷ This formula represents the credit enhancement to account for historical expected value of CRRs that will apply after one year of actual MRTU operation. The formula as of today only relies in auction prices.

expected value of the i -th CRR for TOU p in month m and day d based on historical Day Ahead congestion prices from actual MRTU operation.

The summation through all CRRs for both TOUs in each CRR holder's portfolio is the Total CRR value (TCV) or net credit requirement; *i.e.*,

$$TCV^H = \max\left(0, \sum_{i,p} CR_{i,p}^H\right), \quad \forall H \quad (2)$$

If this value is negative, then the CRR holder's portfolio is expected to have an associated net positive congestion revenue stream and then the credit requirement for its holder is set to zero. These credit requirement values that will be passed on to CAISO's Finance.

4.1.3.2. Extraordinary Events

Given the complexity to define a priori what events can be defined as extraordinary, CAISO will communicate to market participants when an event is deemed to be extraordinary. CAISO will subsequently produce a report containing the details of the reevaluation of credit requirements, which, among other things, will include the new set of prices used in the reevaluation process. CAISO plans to develop the proposed methodology that will be used for outages of either transmission or generation facilities that may be systematically modeled. Thus, the discussion will refer only to extraordinary events that lead to planned or forced outages of elements of the system. Rather than describing the event per se, the goal is to define the events by their impact they may have on the system. The values of obligation-type CRRs are bidirectional entitlements for their holders and are based on the congestion component of LMPs from the Day-Ahead Market (DAM) only. The LMP congestion component reflects the value of scarce transmission. Therefore, congestion revenues will be affected by changes on the system congestion in the IFM market. Congestion is primarily driven by the economical bids and the condition of the transmission system, such as de-rates and outages. This confines the definition of an extraordinary circumstance as any event that alters the congestion of the system beyond typical patterns. For instance, a major outage due to fires can lead to atypical flow reversal or could dramatically exacerbate congestion in some areas of the system, which will alter the usual congestion pattern. In contrast, changes of flow patterns, such as flow reversal on Path 15 during winter time may not be considered a trigger for the reevaluation of credit. CRRs already accommodate seasonality. Neither may typical de-rates or outages on transmission elements due to scheduled or forced outages be a trigger for reevaluation as they are very frequent occurrence. Their inclusion would otherwise lead to a continuous re-evaluation of credit requirements, defeating the purpose of having the current credit requirement functionality.

Unexpected but time limited events that do not impact the IFM outcome will not trigger the re-evaluation of credit. Furthermore, as congestion revenues accrue on a monthly basis and credit requirements apply for CRRs valid over the subsequent 12 months, the unusual variation within a single day may not meaningfully distort the final cumulative result. For instance, if there is a sudden loss of Path 15 at 1400hrs on July 13th and it is expected to return to service by 2300hrs on the same day, by the time this forced outage happens, the IFM for Trade Date (TD) of July 13th was already run on July 12th, and indeed the IFM for TD of July 14th was already run by 1300hrs on July 13th. Hence, such an outage will not be reflected in either IFM for TD of July 13th or 14th, even though it was an extraordinary event and impacted system. This outage, however, will be accommodated in the RTM of July 13th. Consequently, such outage will not impact congestion revenues for those days, as CRRs are settled only on IFM congestion prices, which is the premise for reevaluating credit requirements.

For already-known extraordinary events that can be modeled by means of transmission outages the CRR team will rely on outage information. CAISO will model such outages with the set-up of the most current monthly auction available to determine the change of credit requirement under such conditions, if any. It is important to note that certain planned events will be already accounted for in the monthly release of CRRs under the umbrella of the 30-day rule. This rule allows the CAISO to know the outages at least 30 days prior to the start of the calendar month for which the outage will occur so that this can be reflected in the network model used in the monthly process to release CRRs. The purpose of this procedure is to ensure revenue adequacy by controlling the transmission capacity released through CRRs. However, if an outage reported under the 30-day rule is classified also as an extraordinary event, it will be automatically accommodated in the standard evaluation of credit requirements once the auction prices become available in the CRR system.

4.1.3.3. Reevaluation of Credit Requirements

With the extraordinary event identified and characterized as an outage, the most current available monthly CRR auction will be rerun with the outage now included. It is important to mention that the modeling of the outage will be the sole modification that will be done to the setup of the auction. All other set-ups such as bids from participants, de-rate factors, and fixed CRRs will remain unchanged. The clearing of the auction will provide a new set of auction prices. These prices will be converted into hourly prices ($\overline{\Psi}_{i,d,m,p}$), in the same fashion the prices for the standard evaluation are computed.

Such hourly prices will be used to compute the credit requirements for each CRR holder. Notice that the new hourly prices for all CRRs will be used only for the period of days, Δ , in which the extraordinary event occurs. For any other day outside this period, the original auction price and/or expected values will still be used, following the standard computation of the CRR system. This can be hard coded in the manual computation of the reevaluation process as follows:

$$\overline{CR}_{i,p}^H = - \sum_{m=1}^{M_{i,p}} \sum_{d=1}^{D_{i,m,p}} \min(\Psi_{i,d,m,p}, \Omega_{i,d,m,p}) MW_{i,d,m,p}^H + \frac{\sum_{m=1}^{M_{i,p}} \sum_{d=1}^{D_{i,m,p}} CM_{i,d,m,p}^{Daily} \times MW_{i,d,m,p}^H}{\sqrt{\sum_{m=1}^{M_{i,p}} D_{i,m,p}^H}} \quad (3)$$

where

$$\Omega_{i,d,m,p} = \begin{cases} \overline{\Psi}_{i,d,m,p} & \text{if } d \in \Delta \\ \lambda_{i,d,m,p} & \text{if } d \notin \Delta \end{cases} \quad (4)$$

This computation is equivalent to re-evaluating the credit requirement only for the period of time in which the extra-ordinary event occurs.

When the credit requirements exceed the current posted collateral there may be a need to call for more collateral; if the reevaluation actually decreases the credit requirement, then the

current credit requirement remains valid. The credit CRR holding requirement for each CRR holder is then defined as:

$$TCV^H = \max(0, \sum_{i,p} CR_{i,p}^H, \sum_{i,p} \overline{CR}_{i,p}^H), \quad \forall H \quad (5)$$

where CR^H is the most current system-based credit requirement as defined in Expression 1, and \overline{CR}^H is the most recent re-evaluation of credit requirements due to extraordinary circumstances as defined in Expression 3. Depending on the duration of the extra-ordinary event, the reevaluation of credit requirements may be run more than once (potentially up to having a daily reevaluation) in order to account for the changing profile of CRR holdings.

Given the inherent uncertainty on the data to compute credit requirements under extraordinary circumstances, the monitoring of congestion revenues for each CRR holder will be a companion measurement to any reevaluation as it is one indicator of the evolution over time of the financial position of CRR holders.