Issue Paper for
Circular Scheduling Market Rule

Provided in Support of 2011 Stakeholder Process to Consider
Refinement of ISO Market Requirements

June 30, 2011
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This Issue Paper initiates discussions with stakeholders to provide greater clarity in the ISO’s new market design on a practice known as “circular scheduling.” In general, circular scheduling is the delivery of market import and export schedules that, possibly in combination with segments in multiple balancing authority areas (BAAs), have the source and sink in the same BAA. This is commonly implemented by submitting a single electronic “tag” (e-tag) for the pair of import and export schedules that lists the same BAA as the source and sink.

Following stakeholder discussion and comments on this Issue Paper, the ISO will formulate a straw proposal, which will then be the subject of additional stakeholder discussion and comments. The questions to be considered in formulating the straw proposal will include determining the scope of potential tariff revisions that may be necessary to obtain greater clarity of the ISO’s market rules. The initial steps in this stakeholder process are as follows:

June 30, 2011 Issue Paper published
July 11, 2011 Stakeholder conference call on Issue Paper
July 18, 2011 Stakeholder comments received on Issue Paper
August __, 2011 Straw Proposal published
August __, 2011 Stakeholder meeting on Straw Proposal
August __, 2011 Stakeholder comments received on Straw Proposal

Additional steps in the stakeholder process will be determined after the straw proposal is formulated and discussed with stakeholders.

This Issue Paper first presents a background explanation of the characteristics of circular scheduling and an example of circular scheduling that shows the concerns that may require a market rule to be clarified, then details the policy issues that would affect the formulation of a market rule in the context of this example, and concludes with examples of potential issues beyond those posed by this example.

Background

The example of circular scheduling in Figure 1 illustrates the practice that is of concern in this paper. This example consists of a market schedule to import power to the ISO using one intertie and export this power at another intertie, which in this case are an import at Moenkopi and then an export at Palo Verde. These could be accomplished through separate import and export bids or through a Wheeling Through bid. The actual circular nature of the combined import and export schedules submitted
in the ISO markets is not apparent based only on review of the schedules submitted in the ISO markets, and is only apparent if matched with the corresponding e-tags that confirm the market schedules. The e-tags would show energy exported from the ISO actually being scheduled on transmission outside the ISO, through the Salt River Project (SRP) and Arizona Public Service Company (APS) BAAs, back to its origin in the ISO. (Circular e-tags could also have a source and sink outside of the ISO.)

**Figure 1: Circular Scheduling of Exports through Palo Verde and Moenkopi**

Because the power scheduled for export from the ISO would be returned on transmission outside the ISO back to the point where the import was originally scheduled into the ISO, no power would actually flow as a result of these circular schedules. However, a market participant could profit from the circular schedule by earning the price difference between the points at which the energy was scheduled to be imported and exported from the ISO.\(^1\) If the Palo Verde intertie is congested for imports into the ISO, the export schedule from the ISO would be paid for providing counter-flow in the opposite direction. If there is no congestion for imports on the ISO’s intertie from Moenkopi, and only nominal costs for the external transmission from Palo Verde to Moenkopi, the market participant would profit even though there is no actual

\(^1\) A market participant can submit schedules and receive financial settlements only through a scheduling coordinator, which may be the market participant or a separate company that provides services to the market participant. The discussion in this section focuses on the market participant as the entity that conducts market trading.
delivery of energy and no physical change in flows. By submitting the import and export as a Wheeling Through schedule, rather than separate unlinked imports and exports, the market participant can ensure that both the import and export legs would clear the market together at equal MW quantities, and only clear at a specified price difference to ensure that its costs of scheduling transmission through the ISO and adjacent BAAs will be covered.

The tariff governing the ISO’s prior market design (section 30.3.5A) prohibited circular scheduling, which was defined as:

“A Schedule or set of Schedules that creates a closed loop of Energy Schedules between the ISO Controlled Grid and one or more other Control Areas that do not have a source and sink in separate Control Areas, which includes Energy scheduled in a counter direction over a Congested Inter-Zonal Interface through two or more Scheduling Points. A closed loop of Energy Schedules that includes a transmission segment on the Pacific DC Intertie shall not be a Circular Schedule because such a Schedule directly changes power flows on the network and can mitigate Congestion between SP15 and NP15. This definition of a Circular Schedule does not apply to the circumstance in which a Scheduling Coordinator submits a Schedule that is an amalgam of different Market Participants’ separate but simultaneously submitted Schedules.”

This definition is not in the current tariff, which was substantially modified to incorporate the new ISO market design. In the new nodal market design, a market participant (through its scheduling coordinator) may submit import and export bids at various tie points. The market could award an import on one tie point and an export on another tie point, creating a set of market schedules that could appear to be “circular” under this definition. A market participant may give rise to such a result by submitting either a “wheeling out” or a “wheeling through” transaction, which are defined in the ISO’s current tariff as follows:

- Wheeling Out: Except for Existing Rights exercised under an Existing Contract in accordance with Section 16.1, the use of the CAISO Controlled Grid for the transmission of Energy from a Generating Unit located within the CAISO Controlled Grid to serve a Load located outside the transmission and Distribution System of a Participating TO.

- Wheeling Through: Except for Existing Rights exercised under an Existing Contract in accordance with Section 16.1, the use of the CAISO Controlled Grid for the transmission of Energy from a resource located outside the CAISO Controlled Grid to serve a Load located outside the transmission and Distribution System of a Participating TO.²

² As discussed further in section 2.5.2.2 of the Business Practice Manual for Market Operations, a Wheeling Through transaction consists of an export bid and a corresponding import bid, which may be self-schedules and/or economic bids. The Wheeling Through transaction can be specified between any two intertie scheduling points. The schedules of the import and export resources in a Wheeling Through transaction are kept balanced in the market optimization process (total export MW schedule = total import MW schedule). Wheeling Through bids are accepted based on the difference in the bid prices for the import and export components of the Wheeling Through bids compared to the
These two definitions have the effect of prohibiting exports and wheeling transactions that are tagged with a source and sink in the same BAA. By the ISO tariff’s definitions, both Wheeling Through and Wheeling Out are intended to serve loads outside the ISO controlled grid. When the ultimate sink is an import back to the ISO controlled grid, the export schedule arguably is non-compliant with the tariff definition, and its submission can potentially be seen as submission of false or misleading information to the ISO in violation of section 35.41(b) of FERC’s regulations, 18 C.F.R. § 35.41(b).

In addition to the ISO tariff provisions addressing circular schedules, FERC has determined that in at least some instances circular schedules can violate FERC rules prohibiting market manipulation, such as when circular schedules are used to profit by ostensibly relieving congestion.³

Despite the provisions defining Wheeling Out and Wheeling Through transactions as having sinks outside the ISO, as well as FERC’s past determinations that circular schedules can constitute market manipulation, the ISO believes it would be useful to provide additional clarity in the tariff regarding circular scheduling. In particular, the ISO believes it may be useful to define the types of e-tags that would be considered “circular” and consequently potentially prohibited. Any consideration of this issue may also necessitate consideration of how the ISO’s implementation of convergence bidding relates to circular scheduling.

In addition, experience in the new market design has shown that the Wheeling Out and Wheeling Through tariff definitions do not provide clear guidance for all situations. One such situation, which has been addressed through recent Business Practice Manual revisions, is scheduling to provide service to stranded loads that are disconnected from the ISO BAA due to an outage adjacent to an intertie, and therefore are served by wheeling through an adjacent BAA.⁴ A contrasting situation that would more clearly not fit within the definitions of “wheeling out” or “wheeling through” was shown in Figure 1. There can be a range of other situations between these two contrasting ones. Examples are listed in later sections for purposes of obtaining


⁴ As described in section 8.2.2 of the Business Practice Manual for Market Instruments, an “isolated intertie” condition is similar to an “open intertie” condition in which a transmission path is out-of-service and thus is rated at an Operating Transfer Capability (OTC) of zero in both directions of the intertie or path. In an “isolated intertie” condition, the OTC is non-zero in one direction, but that OTC is reserved for resources registered as stranded load in the ISO’s master file. Under an isolated intertie condition, resource bids associated with the intertie are inadmissible during the hours where the condition exists, except resources registered as serving load in the direction of the non-zero OTC that would otherwise be stranded. Schedules to serve stranded ISO load use wheeling through adjacent BAAs, but are not wheeling through the ISO’s BAA. Schedules to serve load in an adjacent BAA that would otherwise be stranded by outages in the adjacent BAA fit within the definition of serving load outside the transmission and distribution systems of the ISO’s Participating Transmission Owners.
stakeholder input on how the ISO should clarify the allowable transactions in the ISO’s new market design, i.e., the extent to which circular scheduling should be either permitted in the ISO’s new market design, prohibited as defined in the ISO’s original market design (with any needed changes in wording), or subject to other considerations.

**Issues To Be Considered Based on This Example**

The ISO is considering the adoption of market rules that would more explicitly define the treatment of practices that appear to involve circular scheduling. Given the ISO’s new market design, the ISO also recognizes that there are several factors to consider before simply re-adopting the prior tariff’s more explicit prohibition on circular scheduling. These factors include:

1. Circular scheduling can have operational impacts that detrimentally impact system operations in two ways. First, such schedules have the potential to exacerbate unscheduled flows on the ISO’s interties by introducing market schedules across the interties that will not produce any actual flow of energy. Second, circular schedules could make it more difficult for ISO operators to manually manage congestion if needed in real time since the ISO may not get congestion relief (or a reduction in actual flows) if it has to curtail one or both parts of a circular schedule. If the ISO’s operators need to curtail intertie schedules to relieve real-time congestion of energy flows, their actions can be ineffective if the market schedules that would be adjusted do not represent actual flows of energy.

2. On the other hand, the ISO also recognizes that the “contract path” scheduling method that is commonly used between BAAs has imperfections in representing actual physical flows across interties, when applied to the ISO’s new market design. As discussed in section 2.1.1.2 of the Business Practice Manual for Managing Full Network Model, the ISO must enforce two separate types of constraints for scheduling and dispatching intertie resources: a flow limit and a scheduling limit. Scheduling limits have been agreed to by the ISO and the neighboring Balancing Authority as the net MW amount that can be scheduled at each scheduling point, in each direction, as if the schedules were physical injections or withdrawals at that point. In contrast, the ISO markets primarily use flow-based congestion management. Enforcement of both the flow-based and the scheduling limits in the day-ahead market is likely to be inaccurate because data on market schedules outside the ISO are unavailable for use in the ISO’s market model. If the ISO were to enforce both the flow limits and the scheduling limits on the interties, phantom flow-based congestion may arise on the inter-ties, which in turn would excessively limit intertie schedules and impact prices based

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5 In real-time, the ISO can reduce this impact by introducing injections or withdrawals in its market model at intertie scheduling points to reflect the difference between scheduled and actual flows. But this mechanism is not available in the day-ahead market. The day-ahead market results include unit commitment of generation that has start-up times exceeding the time horizon of the real-time market. The incorrect modeling of flows on the ISO’s interties, resulting from day-ahead schedules that do not match physical flows, may produce a sub-optimal unit commitment.
on apparent congestion that would not materialize in real-time. The ISO therefore only enforces the scheduling limits for day-ahead congestion management. However, the ISO does enforce flow limits on interties in the real-time when actual flows are observed to approach the flow limits. The issue that arises with circular schedules is that while the individual intertie schedules appear to affect the contract-path based scheduled use of an intertie, the circular schedule provides no actual flow relief.

Before clarifying the market rules that should apply to circular scheduling in the ISO’s new market design, the ISO wishes to understand any other factors that the ISO should consider, and to understand stakeholder viewpoints on the tradeoffs among the factors listed above. The ISO invites stakeholder comments regarding these issues for use in formulating its straw proposal.

**Additional Scheduling Patterns for Consideration**

An additional issue the ISO will consider in developing any potential market rules on circular schedules is how to treat bilateral transactions that have the effect of creating a circular schedule. When market participants arrange trades with other market participants, they may be unaware of each others’ sources of the energy that is being traded, and each others’ plans for final use or further trading of the energy. Nevertheless, their combined schedules may constitute a circular schedule. One market participant may purchase energy from the ISO market that it exports from the ISO BAA and then sells the energy to another market participant, who plans to sell energy back as an import to the ISO. These market participants may be represented by the same or different scheduling coordinators who submit their transactions to the ISO’s scheduling systems.

Each individual market participant’s knowledge level of the combined schedules may vary from knowing only that another market participant is offering to buy or sell energy at a commonly used “hub” such as Palo Verde or Mid-Columbia, or being generally aware of the other market participant’s typical market activity, to having somewhat specific knowledge of the other market participant’s plans. This knowledge of other market participants’ market activity may depend on whether the market participants are represented by the same scheduling coordinator.

The ISO invites stakeholder comments regarding how such bilateral transactions should be treated and what obligations, if any, a market participant has when it sells exported energy at an intertie and it knows or suspects that its trading partner will re-import that energy back into the ISO.