

Integrated Balancing Authority Areas

CAISO Response to Stakeholder Questions

Posted February 5, 2008

City of Redding California

- 1) If an import at Captain Jack results in a corresponding import into the CAISO system at Tracy of 25% for example, shouldn't the COTP distribution factor be weighted 25% at Tracy?

CAISO Response

The CAISO distribution factors associated with specific Aggregated System Resources are based on established/historic distribution factors of generation and load within the IBAs, use of a reduced network based on the WECC planning model, and are the result of CAISO analysis of power flows that are of significance to the CAISO's system using the WECC planning model and the CAISO's FNM.

The IBA model places injections and withdrawals at their representative physical locations, and the power flow model uses the injections and withdrawals to determine the actual flows at the CAISO boundary. When reviewing this information, selecting associated sources, and understanding power flows and impact on the CAISO Controlled Grid, it is important to distinguish between how an injection distributes to a set of transmission elements versus distribution of injections to a set of sources supporting a transaction. In Table 1, below, the listed distribution factors are associated with the distribution of sources. Actual flow distribution – i.e., how such injections flow on the system - will be dependent on the network topology and will determine the modeled impact on the CAISO Controlled Grid.

In Table 1 below, the listed distribution factors are from sources and effectively provide participants the opportunity to indicate to the CAISO the accurate location of the source of their transactions. For example, for a Tracy COTP schedule, it may be accurate to designate the source as CAPTJACK or, in some cases, it may be accurate to designate the source as the Western Hub. In this example, if the Tracy COTP transaction is sourced at CAPTJACK, then 100% of the injection associated with that transaction will be modeled at CAPTJACK. Alternatively, if the transaction is sourced from the Western Hub, then the CAISO will distribute the injections associated with the transaction to the 3 resource locations associated with the Western Hub, using the listed distribution factors.

Therefore, with respect to the stated question, based on its network analysis, the CAISO does not believe an import *sourced* at Captain Jack should be modeled as an *injection* in part (25%) sourced at Tracy. Alternatively, if the source of a transaction is deemed to be the Western Hub, then it is appropriate to model some portion of the *injection* as in part coming from

Tracy. With respect to modeling and assessing the impact of power flows, if the power flow solution that is part of the CAISO's network analysis shows that 25% of the flow from an injection at Captain Jack flows through Tracy, then the CAISO's market optimization will reflect that result in the prices that result from the market. This occurs as an inherent function of the CAISO's market software, and does not require inputs to the market software that place an injection at Tracy.

- 2) If CAISO wants to settle more closely on physical flows, why isn't the COTP modeled that way?

CAISO Response

The CAISO does propose to account for (model) power flows on the COTP as they impact flows on the CAISO Controlled Grid. Modeling imports that COTP at a location other than the interface to the Pacific Northwest would be a departure from modeling physical flows. However, the CAISO is not proposing to enforce or in any way manage flows on the COTP – since the COTP is not part of the CAISO Controlled Grid.

- 3) The proposal to settle imports to the CAISO grid from the COTP as radial seems to conflict with the hub logic. Like Tracy, there are no System Resources at Captain Jack, but the modeling is different. There is a price signal between Captain Jack and Tracy, but the CAISO prevents transmission owners of IBAs from using it.

CAISO Response

The CAISO is not modeling imports to the CAISO grid from the COTP as radial. The CAISO models and prices imports to the CAISO grid based on a realistic representation and valuation of the source of those imports (using the designated Aggregated or specific System Resource). As illustrated in Table 1 below, imports to the CAISO Controlled Grid at either Cottonwood, Rancho, Oakdale, or Tracy could be sourced from either Captain Jack or alternative sources (Aggregated System Resources). The impact (flows on the CAISO Controlled Grid) and value (price) of those imports will vary depending on the source. For example, imports at Tracy sourced from Captain Jack have a different impact/value on operating conditions within the CAISO system than imports at Tracy sourced from the Western Hub. In other words, scheduled imports at Tracy from Captain Jack (original source in the Northwest) will have a different impact on power flows on the CAISO Controlled Grid than imports sourced from Western generation located near Cottonwood. In this example, the "value" to the CAISO is materially different – increasing generation at Captain Jack would increase flows/congestion North-South whereas increasing generation at Cottonwood could potentially relieve North-South flows/congestion and create capacity for further imports from the Northwest. Each of these transactions should be modeled and valued differently.

Table 1: APNODE available for CRR Nomination and Auction

APNODE	Augmented Bus	AF	APTYPE	SeasonName	TimeOfUse
CTNWDC_2_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
CTNWDR_2_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
CTNWDW_2_CTTNWD_E	37545_COTWDWAP_230_B1	0.655	SP	ALL	All
CTNWDW_2_CTTNWD_E	37585_TRCY PMP_230_B3	0.345	SP	ALL	All
CTNWDW_2_CTTNWD_I	37548_FOLSOM_230_B1	0.138	SP	ALL	All
CTNWDW_2_CTTNWD_I	37545_COTWDWAP_230_B3	0.862	SP	ALL	All
CTNWDW_2_RNDMTN_E	37545_COTWDWAP_230_B1	0.655	SP	ALL	All
CTNWDW_2_RNDMTN_E	37585_TRCY PMP_230_B3	0.345	SP	ALL	All
CTNWDW_2_RNDMTN_I	37548_FOLSOM_230_B1	0.138	SP	ALL	All
CTNWDW_2_RNDMTN_I	37545_COTWDWAP_230_B3	0.862	SP	ALL	All
LAKE_2_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
LAKE_2_GOLDHL_E	37012_LAKE_230_B11	0.161	SP	ALL	All
LAKE_2_GOLDHL_E	37010_HURLEY S_230_B1	0.399	SP	ALL	All
LAKE_2_GOLDHL_E	37016_RNCHSECO_230_B2	0.23	SP	ALL	All
LAKE_2_GOLDHL_E	37005_ELVERTAS_230_B1	0.21	SP	ALL	All
LAKE_2_GOLDHL_I	37012_LAKE_230_B11	0.217	SP	ALL	All
LAKE_2_GOLDHL_I	37010_HURLEY S_230_B1	0.221	SP	ALL	All
LAKE_2_GOLDHL_I	37005_ELVERTAS_230_B1	0.067	SP	ALL	All
LAKE_2_GOLDHL_I	37016_RNCHSECO_230_B2	0.495	SP	ALL	All
LLNL_1_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
LLNL_1_TESLA_E	37585_TRCY PMP_230_B3	0.345	SP	ALL	All
LLNL_1_TESLA_E	37545_COTWDWAP_230_B1	0.655	SP	ALL	All
LLNL_1_TESLA_I	37548_FOLSOM_230_B1	0.138	SP	ALL	All
LLNL_1_TESLA_I	37545_COTWDWAP_230_B3	0.862	SP	ALL	All
OAKTID_1_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
OAKTID_1_OAKCSF	38400_WALNT_230_B1	1	SP	ALL	All
RANCHO_2_BELOTA_E	37005_ELVERTAS_230_B1	0.21	SP	ALL	All
RANCHO_2_BELOTA_E	37010_HURLEY S_230_B1	0.399	SP	ALL	All
RANCHO_2_BELOTA_E	37012_LAKE_230_B11	0.161	SP	ALL	All
RANCHO_2_BELOTA_E	37016_RNCHSECO_230_B2	0.23	SP	ALL	All
RANCHO_2_BELOTA_I	37016_RNCHSECO_230_B2	0.495	SP	ALL	All
RANCHO_2_BELOTA_I	37012_LAKE_230_B11	0.217	SP	ALL	All
RANCHO_2_BELOTA_I	37010_HURLEY S_230_B1	0.221	SP	ALL	All
RANCHO_2_BELOTA_I	37005_ELVERTAS_230_B1	0.067	SP	ALL	All
RANCHO_2_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
TRACY5_5_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
TRACY5_5_COTP	45035_CAPTJACK_500_998	1	SP	ALL	All
TRACY5_5_PGAE_E	37585_TRCY PMP_230_B3	0.345	SP	ALL	All
TRACY5_5_PGAE_E	37545_COTWDWAP_230_B1	0.655	SP	ALL	All
TRACY5_5_PGAE_I	37548_FOLSOM_230_B1	0.138	SP	ALL	All
TRACY5_5_PGAE_I	37545_COTWDWAP_230_B3	0.862	SP	ALL	All
TRACY5_5_ROSVIL	37567_ROSEVILL_230_B2	1	SP	ALL	All
TRCYPP_2_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
TRCYPP_2_TESLA_E	37585_TRCY PMP_230_B3	0.345	SP	ALL	All
TRCYPP_2_TESLA_E	37545_COTWDWAP_230_B1	0.655	SP	ALL	All
TRCYPP_2_TESLA_I	37548_FOLSOM_230_B1	0.138	SP	ALL	All
TRCYPP_2_TESLA_I	37545_COTWDWAP_230_B3	0.862	SP	ALL	All

Posted February 1, 2008

Modesto Irrigation District

Thank you for offering the opportunity to ask questions which may help us understand the rationale for the ISO IBAA Proposal and the Partial Loop Proposal as presented to Market Participants on January 8, 2008.

- 1) It appears that the ISO is offering two different solutions for what appears to be essentially the same problem: How to settle with neighboring Balancing Authority Areas when that BAA has more than one Scheduling Point with the ISO?

In one case, the ISO has proposed to implement a "hub" pricing methodology, but only to the SMUD/WAPA and TID BAAs. It appears that the rationale for this method (as opposed to modifying the Full Network Model as in the Partial Loop Proposal) was chosen due to the "High" "Data Sufficiency For Modeling IBAA". (Slide 23 of Mark Rothleder's "Modeling and Pricing of IBAA's" January 8, 2007 presentation.)

However, the ISO will maintain individual Scheduling Point LMPs and model transmission lines outside the ISO Grid in order to more closely approximate actual flows using the "Partial Loop" method with IBAA's which have "Medium" or "Low" "Data Sufficiency For Modeling [the] IBAA."

It appears that the ISO is implementing a hub pricing scheme in at first glance that would be the inverse solution to the level of the ISO's problem. Can the ISO explain the rationale for implementing "hub" pricing with the SMUD/WAPA and TID BAAs when the ISO has "high" data sufficiency for modeling, while using the "Partial Loop" method and pricing individual LMPs at other BAAs' Scheduling Points which the ISO has only medium or low data sufficiency for modeling?

CAISO Response

On a long-term basis, the CAISO is not proposing to employ differing methodologies across those Balancing Authority Areas (BAAs) with whom the CAISO is interconnected. For purposes of MRTU Release 1, the CAISO is only able to include the full detail of SMUD/Western and TID systems in its market and operational models and thus SMUD/Western and TID will be the only "IBAA's" upon MRTU start up. It is only as a result of that detailed modeling effort and assessment that the CAISO was able to conclude that the proposed "hub" or "sub-hub" based pricing was appropriate for the SMUD/Western and TID BAAs.

Consistent with the overarching objectives of its MRTU program, the CAISO strives to ensure the development of feasible forward market schedules and that market prices are aligned with those forward market schedules and related reliability criteria. The CAISO believes that establishing a sub-hub price for the SMUD system is fully consistent with the physical nature of, and appropriately values, the impact of flows from the SMUD system on the

CAISO Controlled Grid. Likewise, the CAISO believes that establishing a sub-hub prices for the Western sub-system of the SMUD BAA and the TID system is fully consistent with the nature of, and appropriately values, the impact of flows from the Western subsystem and the TID system on the CAISO Controlled Grid, and that such flows are distinguishable from the impact of flows from the SMUD system on the CAISO Controlled Grid.

Specifically, the CAISO has analyzed flows on the SMUD system and determined that for imports from/exports to the SMUD system to/from the CAISO Controlled Grid, power flows can be characterized as coming from an the SMUD hub, defined as an “Aggregated System Resource” comprised of the Elverta (230kV), Hurley (230kV), Lake (230kV) and Rancho Seco (230kV) buses, with power distributed to/from those points using the distribution factors listed in Table 1 on page 5 of the CAISO Discussion Paper (<http://www.caiso.com/1cb4/1cb4e0984a670.pdf>). By associating schedules to/from the SMUD system as coming to the SMUD hub/Aggregated System Resource, the CAISO will establish more realistic (feasible) day-ahead market schedules. Alternatively, should the CAISO assume, for example, that a 100 MW import schedule at Lake would result in a power flow of 100 MW at Lake when the CAISO knows in fact it will not, the CAISO would be forced to redispatch the system (and specific resources) in real time to adjust for actual power flows. As discussed below, this would result in potential bid cost under-recovery and associated uplift costs to the market.

While detailed and accurate modeling of an IBAA’s system and the impact of power flows on its system on the CAISO Controlled Grid are an essential aspect of the CAISO’s IBAA proposal, modeling alone is insufficient. The CAISO must also ensure that market prices are aligned with actual system conditions/operations. Toward that goal, and as further explained in the CAISO’s Discussion Paper on pp.7-8, “When the same aggregation of System Resources is mapped from multiple Scheduling Points, the value to the CAISO system due to injections from the aggregation of System Resources would be same, regardless of which intertie Scheduling Point is used, and the *CAISO’s price would be the same* [emphasis added]. In other words, rather than relying on the fiction that power will be delivered to/from a specific intertie point between the CAISO and the IBAA and establishing a price based on that fiction, the CAISO will instead establish prices (value to the CAISO) based on a realistic assessment of actual source of that power. With respect to the SMUD system, if, for example, the source of an import to the CAISO system from the SMUD system is identified as the “SMUD Hub”, the CAISO can reasonably assume that power will flow on the SMUD system (and impact the CAISO system) in accordance with the distribution factors associated with the Elverta, Hurley, Lake, and Rancho Seco buses that comprise the “SMUD Hub”. Therefore, regardless of the Scheduling Point at which the day-ahead schedule is scheduled/tagged (e.g., 100 MW import to the CAISO at Lake or 100 MW import to CAISO at Ranch Seco) the impact on the CAISO system will be the same because the designated source of that transaction is the “SMUD Hub” (in this case, the 100 MW will be deemed to

flow from the four identified buses in proportion to the distribution factors associated with the SMUD Hub identified in Table 1 of the CAISO's Discussion Paper). Similarly, regardless of whether scheduled/tagged at the Tracy or Lake Scheduling Points, if the source of a 100 MW import to the CAISO is identified as Captain Jack, the price (or value to the CAISO) is the same because the impact of the power flow from that transaction on the CAISO will be the same.

With respect to the CAISO's "partial loop" proposal regarding the modeling of the New PTOs (NPTOs) rights as part of the CAISO Controlled Grid, the CAISO has consistently represented that the partial loop proposal improves the modeling accuracy for this area/part of the CAISO Controlled Grid under MRTU Release 1 but that it is not an optimal long-term solution. As part of its ongoing plan to carefully assess all interconnected BAAs, the CAISO intends to consider further enhancements to both the modeling and, potentially, pricing of the NPTO network and the larger CAISO Controlled Grid. In parallel with that effort, the CAISO may also consider/advocate for the development of a more comprehensive regional approach to managing congestion through the sharing of day-ahead scheduling information. At this time, absent agreement on further modeling detail in this area, the CAISO does not feel confident that it could propose and construct pricing points (be they hub, sub-hub, or otherwise) that would accurately reflect/price the impact of power flows on the adjacent systems on the CAISO Controlled Grid.

With respect to MID's questions regarding why the CAISO proceeded to treat the SMUD/Western and TID systems as IBAs for MRTU release 1, the CAISO provided information in its presentation for the January 8, 2008, stakeholder meeting, as further supplemented and posted on the CAISO website at <http://www.caiso.com/1f50/1f50ae5b32340.html>. The CAISO has not established bright-line criteria to identify and determine which interconnected BAAs should become IBAs. That said, and as presented at the January 8, 2008, stakeholder meeting, indicative criteria include, among others:

- 1) number of interconnection points with CAISO (SMUD/Western and TID – 12, next highest – 4, see slide #23 of CAISO's presentation for January 8, 2008, meeting);
- 2) a BAA's system runs in parallel to major parts of the CAISO Controlled Grid (e.g., the BAA system represents a relatively large path for parallel flows);
- 3) frequency and magnitude of unscheduled flows at designated tie-points;
- 4) number of hours where actual direction of flows was reversed from scheduled direction; and
- 5) availability of information for modeling accuracy.
- 6) the lack of accurate modeling of the IBAA system affects the CAISO's ability to achieve a converged AC power flow solution

Based on this general set of criteria and the CAISO's subjective analysis of available data, the CAISO determined that it should and could model and treat the SMUD/Western and TID systems as IBAs for MRTU Release 1. The CAISO acknowledges that a significant factor in that determination was the availability of information regarding the SMUD/Western and TID systems to the CAISO; information and modeling detail obtained when the SMUD/Western and TID systems were still part of the CAISO BAA.

- 2) The ISO has stated that the SMUD/WAPA and TID IBAs, a combined total peak of approximately 5k MW, have a large impact on the ISO's operations, which has a peak of approximately 50k MW. It is MID's opinion that this is akin to "the tail wagging the dog." The ISO is even the path operator for one of the biggest transmission assets in the SMUD/WAPA BAA (the COTP). Can the ISO give MID examples of when SMUD/WAPA's or TID's daily operations severely impacted the ISO's operations more so than other IBAs?

CAISO Response:

With respect to MID's question regarding details on "when the SMUD/Western and TID daily operations severely impacted the ISO's operations more so than other IBAs?," the CAISO believes it has already explained its rationale for modeling the SMUD/Western and TID systems as IBAs for MRTU Release 1. Since the CAISO has the requisite information and capability to accurately model and price the SMUD/Western and TID systems as IBAs for MRTU Release 1, the CAISO believes that failure to do so would result in less accurate CAISO market and operational solutions and result in added costs to CAISO market participants.

The CAISO acknowledges that power flows on BAA' systems other than SMUD/Western and TID's do have an impact on CAISO operations. As explained above, the CAISO intends to undertake a review and evaluation of impact of power flows from all interconnected BAAs on the CAISO's system. The CAISO intends to review all available data and apply, at a minimum, the four criterion identified above to determine how and when to apply its IBAA methodology to other areas. As part of that process, the CAISO will work with all potentially affected BAAs and all stakeholders prior to proceeding with modeling and treating other entities as IBAs.

- 3) There is ISO generation east of the SMUD/WAPA and TID IBAs. The Bay Area is a load center which is located generally west of the IBAs. It is MID's opinion that IBAA hub prices would mask the impact of losses suffered on the IBAs' systems caused by ISO load and generation. Can the ISO give specific examples of why the above opinion may not be true?

CAISO Response:

The CAISO acknowledges that load and generation on the CAISO system, and resultant power flows on an IBAA's system, may affect power flows and thus losses on an IBAA's system. That said, the CAISO does not agree that "IBAA hub prices would mask the impact of losses suffered on the IBAA's systems caused by ISO load and generation." IBAA hub prices reflect the value/price of power flows on the IBAA system on the CAISO Controlled Grid, i.e., the cost of managing congestion on the CAISO Controlled Grid. As stated in the CAISO's Discussion Paper at p.6, "measures will be taken to exclude the marginal transmission losses within the IBAA from affecting prices within the IBAA and the CAISO." The CAISO presumes that IBAA establishes its own means to price and collect for losses (usually on an average system basis) on its system.

Posted January 29, 2008

Western Area Power Administration (Sierra Nevada Region)

Western has the following comments and questions resultant from the CAISO presentation put forth on January 8, 2008.

- 1) Regarding Slide # 18, depicting unscheduled flow on the SMUD, WAPA and MID interconnections:
 - a. What is the value of the instantaneous unscheduled MWs flowing at peak during the July through November period for each of the individual tie lines?
 - b. How many MWH are present "beneath the curve during the July through November period for each of the individual tie lines?"

Western believes the information requested in questions one and two above would add relevance to the issue of how the Western transmission system interacts with the CAISO from an MRTU perspective.

Further, Western maintains that some of the information in Slide # 18 is clearly irrelevant to this issue. Consider for instance unscheduled flow on the 69-kV Herdlyn Tie Line. On at least some days, the scheduled flow is zero MW. Therefore, any flow at all is unscheduled. Western maintains that the unscheduled flow recorded on this tie is always at or near a value of 1-MW, therefore irrelevant.

CAISO Response:

The CAISO has provided the raw data regarding actual and scheduled MW for the different interties. The graphs provided attempt to normalize quantity of unscheduled flow relative to the rating of the individual intertie. While the CAISO agrees that from an overall perspective interties that carry less quantity of MW may have less relevance, from a powerflow and congestion

management perspective, even interties that have small capacity may result in inaccurate congestion patterns and inefficient outcomes if the IBAA network model and transactions were not modeled correctly.

- 2) Regarding Slide # 24, depicting “phantom congestion” between buses 2 and 5 on the hypothetical full network model.
 - a. At what level of congestion would the CAISO assume that relying on parallel system flows is sensible as opposed to initiating a re-dispatch of available generation?
 - b. Does the CAISO propose that neighboring systems will need to provide additional information regarding internal dispatch or transmission outages?
 - c. At what level of congestion would the CAISO propose that upgrading existing transmission facilities is appropriate as opposed to relying on parallel system flows?

CAISO Response:

- a. The CAISO must maintain flows within the CAISO network within the established network constraints, at all times. The issue illustrated in this slide is that if the presence of the network of the IBAA were not recognized in the CAISO’s model, the CAISO would be mitigating congestion that would appear to be present in the Day-Ahead Market, but that would not be present in real-time conditions. Because the CAISO would manage congestion in the Real-Time Market based on actual flows, this would impact all CAISO market participants, including those with import and export schedules to or from the IBAA.
 - b. The approach that is currently proposed by the CAISO does not require additional information regarding internal dispatch in IBAA’s. Information regarding transmission outages is desirable to maintain accuracy of the CAISO’s congestion management, but the CAISO is not requesting outage data beyond what would otherwise be exchanged during operations of neighboring Balancing Authority Areas.
 - c. The CAISO is not proposing to change its existing transmission planning process due to the modeling of IBAA’s for congestion management.
- 3) Regarding Slide # 43, depicting “Aggregated System Resources” as they relate to the CAISO from an Import or Export perspective:
 - a. The Captain Jack Intertie appears on this list, the Tracy 500-kV interconnection does not . . . will scheduling of Captain Jack imports to the Western system be possible on the Tracy 500-kV Bus? (see question 7 below)

CAISO Response:

Slide 43 shows the Aggregated System Resources that will be modeled as the source of imports into the CAISO or exports from the CAISO. As discussed elsewhere (for example, slide 35), the CAISO will establish Resource IDs that associate schedules at Scheduling Points to one of these Aggregated System Resources. In the case of the Captain Jack System Resource and the Tracy 500 Scheduling Point, the CAISO will establish Resource IDs that associate this System Resource with this Scheduling Point.

- 4) Regarding Slide # 44, a graphical presentation of the SMUD/WAPA/TID IBAA . . . in this view Captain Jack is depicted as a System Resource with an explanation (upper right hand corner) that it is used to “distribute” schedules between the IBAA and CAISO.
 - a. Are the Western schedules at Captain Jack going to be integrated into the CAISO using the 76%, 17% and 7% Western Hub distribution factors?

CAISO Response:

As shown on slide 43, Captain Jack is a separate System Resource from the WAPA Hub. Schedules using Resource IDs associated with the Captain Jack System resource are mapped 100% to the Captain Jack System Resource.

- 5) Regarding Slide # 45, depicting SMUD/WAPA/TID LMP data for the months of January through April of 2005:
 - a. Is the CAISO planning to produce LMP data for the remaining months in 2005?
 - b. Specifically, can Western see LMP data for the month of August 2005?
 - c. The volume of Western’s CVP Generation was greater than average in 2006. Could the CAISO provide LMP data based on what occurred in August of 2006?

CAISO Response:

The CAISO’s most recently published LMP Study results go through April 2005. Because the CAISO staff is fully occupied with MRTU implementation, the schedule for publishing additional LMP Study reports has not been determined.

Department of Energy

The following questions are intended to follow up on information presented during the CAISO's meeting on Jan 8, as it relates to schedules into the CAISO system at the Tracy 500kV scheduling point, involving transactions transmitted via the COTP.

- 1) Information contained in Table 1 on page 43 of the CAISO's Jan 8 presentation (SMUD/WAPA/TID IBAA) indicates the WAPA Hub being comprised of three 230kV scheduling points (Cottonwood 230kV, Folsom 230kV and Tracy Pumps 230kV), thus one would conclude that transactions utilizing the COTP are not included as part of the Western Hub. Please confirm that the Western Hub price proposed by the CAISO would not include COTP transactions. If this is not the case please describe how COTP transactions would be weighted into the Western Hub price. The same table also refers to a single point for an "Aggregated System Resource" at Captain Jack 500kV. Presumably this is meant as a reference to schedules over the COTP. Please confirm or clarify the CAISO's intent. Why does the CAISO refer to Captain Jack and not Tracy 500kV? Please clearly state how the CAISO plans to price transactions at Tracy 500kV.

CAISO Response:

As shown in slide 43, the Western Hub consists of three buses, at Cottonwood, Folsom, and Tracy Pump. Schedules representing imports or exports at Captain Jack from outside the SMUD Balancing Authority Area are associated with a separate System Resource at Captain Jack. This is necessary to recognize the source of physical flows in the CAISO network, to maintain the integrity of the CAISO's congestion management as it affects all market participants. Therefore, to the extent a schedule that uses COTP is associated (sourced) via the Western Hub, such transactions would indeed be modeled using the same System Resources that make up the Western Hub (Cottonwood 230kV, Folsom 230kV and Tracy Pumps 230kV). However, the weights used for establishing the Western Hub price are not based on the individual transactions using the Western Hub but rather Intertie Distribution Factors established by the CAISO for the Western Hub.

- 2) During discussion with CAISO staff in the above meeting, staff stated that with respect to imports into the CAISO at the Tracy 500kV bus originating over the COTP, one could choose to have the transaction originate either at Captain Jack or the Western Hub, and such choice would have to be exercised in advance. This leads to the possibility of some COTP transactions being included and others excluded from the Western Hub. As requested above how would some COTP transaction be incorporated into the Western Hub price? If the transaction was not part of the Western Hub but a

separate schedule originating at Captain Jack, would the LMP at Tracy 500kV or the LMP at Captain Jack be the basis for settling a transaction at Tracy 500? The reference to Captain Jack and the exclusion of Tracy 500 in the table on pg 43 is confusing. Please clarify.

CAISO Response:

The designation of Captain Jack or the Western Hub as the source or sink of schedules depends on the actual source or sink of interchange transactions, and must be consistent with the Balancing Authority Area that appears in e-tags that support the market schedules. The designation of Captain Jack or the Western Hub as the source or sink of schedules establishes the price for the schedules, at Captain Jack or the Western Hub. The Tracy 500 kV bus does not appear in the table on slide 43 because it is not the location of generation or load in the SMUD Balancing Authority Area, or the Western and MID subsystems.

Northern California Power Agency

- 1) The CAISO discussion paper states that the “same System Resource pricing aggregation(s) will be used for future CRR Settlements as are used in the Day-Ahead Market, so CRR Settlement will be consistent with how the resource locations are ultimately established for the IBAAs’ Settlement of Congestion costs”. The language included within the discussion paper is not sufficiently clear to determine if the proposed pricing aggregation(s) will also be applied to a Load Serving Entity located within the CAISO control area that has acquired CRRs and a point proposed to be aggregated. For example, if an LSE that is not a IBAA has been allocated annual and long-term CRRs that are sourced at the Tracy Intertie point and sink at the PG&E default Load Aggregation Point (“LAP”), will the value of the CRR instrument be based on the differential between congestion cost computed between the LAP and the Tracy Intertie point or the LAP and the proposed WAPA hub.

Prior nominations of awarded CRRs were based on assumptions that took into consideration the specific mapping of the Tracy Intertie point. The proposed bus distribution factors included within the “WAPA Hub” are not consistent with the Tracy Intertie point mapping used during the CRR nomination process. If the statement mentioned above does not only apply to settlement of IBAA Congestion Costs, but applies to all CRR instruments sourced at the Tracy Intertie point, then the resulting settlement for energy delivered at the Tracy Intertie point (settled at the WAPA Hub price) and the associated CRR (settled at the WAPA Hub price) would be in alignment and the requested hedge would still be effective. If the statement mentioned above only applied to settlement of IBAA Congestion Costs, in which case the existing CRRs that have been selected at the Tracy Intertie point are settled at a different price than the WAPA Hub price, the CRR instruments selected by a Load Serving Entity could be devalued and will not reflect the requested hedge that was expected at the time CRRs were originally selected. Pending

clarification NCPA reserves the right to submit additional comments on this issue.

CAISO Response:

The CAISO clarifies that all CRRs sourced or sunk at the Tracy Intertie -- whether nominated/bid by an IBAA entity or a non-IBAA entity -- were mapped similarly and will be treated in the same manner as described in the CAISO's discussion paper. The mapping of the APNodes available for the CRR nomination and auction process are shown in Table 1 below. The distribution factors for these APNodes had separate values for imports vs. exports in cases where an APNode consists of multiple PNodes. As the CAISO completed its development of the IBAA model for MRTU Release 1, the CAISO determined that the same distribution factors should be used for both imports and exports, resulting in the values that ultimately appear in Table 1 of the Discussion Paper on "MRTU Release 1 Implementation of Preferred Integrated Balancing Authority Area Modeling and Pricing Options," at <http://www.caiso.com/1cb4/1cb4e0984a670.pdf>.

With respect to the referenced example, for a LSE that is not a IBAA that has been allocated annual and long-term CRRs with the source at the Tracy Intertie point and sink at the PG&E default Load Aggregation Point ("LAP"), the value of the CRR instrument will be based on the Marginal Cost of Congestion differential between the PG&E LAP and the applicable source PNode/APNode that has been selected during the allocation process (See Table 1). In the CRR allocation and auction process, and consistent with the CRR network model released to participants and used to support both the CRR allocation and auction processes, the Tracy 500kV Intertie was mapped to the following ultimate sources: WAPA Hub (CRR model nomenclature TRACY5_5_PGAE_E and TRACY5_5_PGAE_I), Captain Jack (CRR model nomenclature TRACY5_5_CAPJACK and TRACY5_5_COTP), Roseville (TRACY5_5_ROSVIL). Refer to Table 1 below for a complete list.

The CAISO notes that the Tracy Intertie is unique in that it is a high-capacity intertie in the middle of the CAISO Controlled Grid, serving multiple alternative sources and sinks that are not electrically near Tracy, as well as that there is neither generation located, nor load served, at that point. While other intertie locations also do not have physical generation or load similar to Tracy, Tracy is unique with respect to its network location and capacity in that the Node is located in the middle of the CAISO Controlled Grid as opposed to being located on the perimeter of the CAISO Controlled Grid. The network proximity and the resultant parallel transmission, as well as the multiple number of the alternative interties with the SMUD/WAPA Balancing Authority, creates more significant powerflow modeling and accuracy issues and potential for dispatch inefficiencies than other intertie locations with other Balancing Authorities. Therefore, in using the Tracy Intertie Scheduling Point it is necessary to recognize the source of physical flows in the CAISO network for CRR and LMP purposes.

Consequently, in the above example, if a CRR were sourced from TRACY5_5_CAPJACK and sunk at the PG&E LAP (LAP_PGAE), the Marginal Cost of Congestion differential would be based on the established price differential between the source Captain Jack and the sink PG&E LAP. Therefore, the LSE would receive a hedge applicable to transactions between Captain Jack and the PG&E LAP. As discussed in the CAISO IBAA Discussion Paper, the CAISO recognizes that the amount of congestion cost that will be charged in the Day-Ahead Market for schedules to or from an IBAA will need to be consistent with the proposed IBAA pricing approach and awarded CRRs. The CAISO provides the opportunity for an entity to procure the CRR that best reflects locational source / sink for Schedules to or from an IBAA, thus settlement of CRRs is done on a consistent basis as the settlement of congestion in the CAISO's Day-Ahead Market. Although the weights for the WAPA Hub and SMUD Hub ultimately differ from what was originally used in the CRR Nomination and Auction process, the fundamental principle is that the same weights will be used for CRR Settlement and Day-Ahead Market Settlement. These weights are shown in Table 1 of the Discussion Paper on "MRTU Release 1 Implementation of Preferred Integrated Balancing Authority Area Modeling and Pricing Options", as referenced above. As the CAISO previously indicated, the CAISO may update, on a periodic basis, the weights and factors used in the CRR auction for purposes of settling the Day-Ahead Market and for CRR Settlement.

In other words, the same "System Resource" pricing aggregation(s) will be used for future CRR settlements as are used in the Day-Ahead Market, to settle congestion costs. Using the above example, if a CRR were acquired for imports at Tracy to the PG&E LAP, and if the entity that nominated CRR had selected a Tracy CRR source point mapped back to Captain Jack, the CRR would be settled at the Captain Jack price. Therefore, the IBAA pricing approach should not impact CRRs acquired to offset congestion costs that occur in the CAISO's Day-Ahead Market. This treatment will apply to both IBAA entities and non-IBAA entities alike, i.e., all Scheduling Coordinators, scheduling at the applicable points.

Table 1: APNODE available for CRR Nomination and Auction

APNODE	Augmented Bus	AF	APTYPE	SeasonName	TimeOfUse
CTNWDC_2_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
CTNWDR_2_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
CTNWDW_2_CTTNWD_E	37545_COTWDWAP_230_B1	0.655	SP	ALL	All
CTNWDW_2_CTTNWD_E	37585_TRCY PMP_230_B3	0.345	SP	ALL	All
CTNWDW_2_CTTNWD_I	37548_FOLSOM_230_B1	0.138	SP	ALL	All
CTNWDW_2_CTTNWD_I	37545_COTWDWAP_230_B3	0.862	SP	ALL	All
CTNWDW_2_RNDMTN_E	37545_COTWDWAP_230_B1	0.655	SP	ALL	All
CTNWDW_2_RNDMTN_E	37585_TRCY PMP_230_B3	0.345	SP	ALL	All
CTNWDW_2_RNDMTN_I	37548_FOLSOM_230_B1	0.138	SP	ALL	All
CTNWDW_2_RNDMTN_I	37545_COTWDWAP_230_B3	0.862	SP	ALL	All
LAKE_2_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
LAKE_2_GOLDHL_E	37012_LAKE_230_B11	0.161	SP	ALL	All

LAKE_2_GOLDHL_E	37010_HURLEY S_230_B1	0.399	SP	ALL	All
LAKE_2_GOLDHL_E	37016_RNCHSECO_230_B2	0.23	SP	ALL	All
LAKE_2_GOLDHL_E	37005_ELVERTAS_230_B1	0.21	SP	ALL	All
LAKE_2_GOLDHL_I	37012_LAKE_230_B11	0.217	SP	ALL	All
LAKE_2_GOLDHL_I	37010_HURLEY S_230_B1	0.221	SP	ALL	All
LAKE_2_GOLDHL_I	37005_ELVERTAS_230_B1	0.067	SP	ALL	All
LAKE_2_GOLDHL_I	37016_RNCHSECO_230_B2	0.495	SP	ALL	All
LLNL_1_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
LLNL_1_TESLA_E	37585_TRCY PMP_230_B3	0.345	SP	ALL	All
LLNL_1_TESLA_E	37545_COTWDWAP_230_B1	0.655	SP	ALL	All
LLNL_1_TESLA_I	37548_FOLSOM_230_B1	0.138	SP	ALL	All
LLNL_1_TESLA_I	37545_COTWDWAP_230_B3	0.862	SP	ALL	All
OAKTID_1_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
OAKTID_1_OAKCSF	38400_WALNT_230_B1	1	SP	ALL	All
RANCHO_2_BELOTA_E	37005_ELVERTAS_230_B1	0.21	SP	ALL	All
RANCHO_2_BELOTA_E	37010_HURLEY S_230_B1	0.399	SP	ALL	All
RANCHO_2_BELOTA_E	37012_LAKE_230_B11	0.161	SP	ALL	All
RANCHO_2_BELOTA_E	37016_RNCHSECO_230_B2	0.23	SP	ALL	All
RANCHO_2_BELOTA_I	37016_RNCHSECO_230_B2	0.495	SP	ALL	All
RANCHO_2_BELOTA_I	37012_LAKE_230_B11	0.217	SP	ALL	All
RANCHO_2_BELOTA_I	37010_HURLEY S_230_B1	0.221	SP	ALL	All
RANCHO_2_BELOTA_I	37005_ELVERTAS_230_B1	0.067	SP	ALL	All
RANCHO_2_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
TRACY5_5_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
TRACY5_5_COTP	45035_CAPTJACK_500_998	1	SP	ALL	All
TRACY5_5_PGAE_E	37585_TRCY PMP_230_B3	0.345	SP	ALL	All
TRACY5_5_PGAE_E	37545_COTWDWAP_230_B1	0.655	SP	ALL	All
TRACY5_5_PGAE_I	37548_FOLSOM_230_B1	0.138	SP	ALL	All
TRACY5_5_PGAE_I	37545_COTWDWAP_230_B3	0.862	SP	ALL	All
TRACY5_5_ROSVIL	37567_ROSEVILL_230_B2	1	SP	ALL	All
TRCYPP_2_CAPJAK	45035_CAPTJACK_500_999	1	SP	ALL	All
TRCYPP_2_TESLA_E	37585_TRCY PMP_230_B3	0.345	SP	ALL	All
TRCYPP_2_TESLA_E	37545_COTWDWAP_230_B1	0.655	SP	ALL	All
TRCYPP_2_TESLA_I	37548_FOLSOM_230_B1	0.138	SP	ALL	All
TRCYPP_2_TESLA_I	37545_COTWDWAP_230_B3	0.862	SP	ALL	All

City and County of San Francisco

As requested during the December 20, 2007 IBAA conference call and January 8 Stakeholder Meeting, CCSF is submitting the following questions for further discussion.

1. Please explain how each of the IBAA modeling and pricing options considered would or would not affect the City's ability to schedule exports or imports at Oakdale and Standiford.

CAISO Response:

CCSF will be able to continue to schedule exports or imports at Oakdale and Standiford consistent with today's existing practice and arrangements between CCSF, TID and MID, established Balancing Authority Area (BAA) scheduling and check-out procedures between the CAISO BAA and the TID and SMUD BAAs, and the CAISO-CCSF Operating Agreement.

Export and import transactions between the TID and MID areas and the CAISO will be settled at, respectively, the TID and MID hub prices. The TID hub price will be based on the LMP established at the Walnut PNode (the single System Resource that will represent the TID Balancing Authority Area). That LMP PNode will be based on a combination of both the scheduling limit of Interchange Schedules from the TID Balancing Authority and flow based constraints within the CAISO as associated with injections at the Walnut CNode. Similarly, for MID, the MID hub price will be based on the LMP established at the Parker PNode and will be based on a combination of both the scheduling limit of Interchange Schedules between the CAISO and MID and flow based constraints within the CAISO associated with injection at that Parker CNode.

2. Please explain how, and why, each of the IBAA modeling and pricing options considered would or would not affect the Loss Component and the Congestion Component of the LMPs at CCSF's PNodes (HH Gen, Oakdale, Standiford, Newark and Warnerville).

CAISO Response:

The CAISO's IBAA modeling and pricing methodology will not affect the calculation of the Congestion and loss components of the LMPs at each of the CCSF PNodes internal to the CAISO Balancing Authority Area. Congestion components of the LMP will not be affected by the IBAA transmission because the CAISO will not be enforcing congestion within the IBAA. The Marginal Loss effects of losses within the IBAA are explicitly excluded from affecting the LMP loss components for all PNodes. The CAISO will continue to establish and maintain PNodes and publish LMPs at HH Gen, Oakdale, Standiford, Newark and Warnerville. As noted in response to Question 1, the CAISO will calculate separate loss and Congestion components for CCSF transactions that utilize the Oakdale and Standiford points (i.e., imports/exports to/from the CAISO BAA to the TID and SMUD BAAs) based on the TID and MID hub prices, respectively.

3. Please share the results of any modeling the CAISO has done of the alternative structures.

CAISO Response:

The CAISO is unclear as to what alternative structures CCSF is contemplating. The CAISO has not performed any modeling of the CCSF

PNodes based on a radial model of the SMUD/Western and TID systems. With respect to pricing, the CAISO has performed pricing analyses (see LMP Studies 3A and 3C and the CAISO's Discussion Paper) that provide prices at each of the aforementioned PNodes, including the SMUD, Western, TID, and MID hubs.

4. Please consider the following example:

Assume the seasonal Distribution Factors for the MID hub are 25% Standiford and 75% Westley and that MID is importing 400 MW combined between Standiford and Westley. Will the CAISO calculate the MID hub price using 25% of the Standiford LMP components and 75% of the Westley components? If CCSF is exporting 40 MW to MID at Standiford during this interval, would the export be priced as if 10 MW were at Standiford and 30 MW were at Westley? It seems like a reasonable alternative would be to price the 40 MW from CCSF (of the assumed 100 MW at Standiford), rather than 10 MW, given that CCSF's generation is directly connected to MID at Standiford via CCSF's owned transmission.

CAISO Response:

This hypothetical does not reflect how the CAISO would implement the IBAA modeling. The CAISO would model sources and sinks at the MID hub at a central point (Parker) CNode to reflect that physical injections and withdrawals in the MID subsystem occur (originate/terminate) within the MID subsystem, not at its boundary. Therefore the imports at both Standiford and Westley would be settled at the MID hub. Similarly, the CAISO models CCSF's generation at its physical location within the CAISO Balancing Authority Area, and recognizes CCSF's TORs as scheduling priorities and in financial Settlements.

5. If MID is simultaneously importing (exporting) at Standiford and exporting (importing) at Westley, how will the CAISO model and price transactions at Standiford?

CAISO Response:

Simultaneous imports and exports between the Balancing Authority Areas at these Scheduling Points would both be modeled at Parker. As a result, the import and export would net out at the same Parker CNode. An import / export Interchange Schedule at Standiford or Westley (TID) would be settled at the same Parker PNode.

6. Please explain how the use of the IBAA hubs is consistent with the CCSF/CAISO Operating Agreement Section 7.2, which states that "The CAISO will establish Scheduling Points and PNodes at the Oakdale Interconnection and the Standiford Interconnection, as well as PNodes at the CCSF-PG&E Interconnection, for post-MRTU transactions using CCSF's rights under this Agreement and operating limits identified in Schedule 2 of

this Agreement.” Keeping in mind that a PNode is “A single network Node or subset of network Nodes where a physical injection or withdrawal is modeled and for which a Locational Marginal Price is calculated and used for financial settlements.”

CAISO Response:

As stated in response to Question 2, above, the CAISO will establish and maintain and publish LMPs at the aforementioned locations. While CCSF will schedule to the Standiford and Oakdale Scheduling Points, for accurate modeling purposes the CAISO will associate (map) such Interchange Schedules to the Parker (MID) and Walnut (TID) points. In order to be consistent with such modeling, the pricing and ETC perfect hedge will be performed at the same location(s), providing the hedge that CCSF requires.

7. CCSF has ETC rights to import from Tracy (not tied to specific generation sources). Please explain what “Hub” those imports would be mapped to, assuming that the import used the Tracy 230 kV Intertie. Please explain what “Hub” those imports would be mapped to, assuming that the import used the Tracy 500 kV Intertie.

CAISO Response:

CCSF’s ETCs would establish scheduling priority and financial Settlement principles for the Scheduling Points as established in TRTC Instructions. The CAISO’s IBAA modeling requires mapping to specific generation sources or Interties to other BAAs in order to ensure effective Congestion Management within the CAISO BAA. The CAISO will establish Resource IDs to reflect CCSF’s scheduling rights, and ensure that Settlement of CCSF’s ETCs is consistent with how the ETCs are scheduled in the Day-Ahead Market.