



California ISO
Your Link to Power

Draft Final Proposal

Data Release & Accessibility *Phase 1: Transmission Constraints*

January 6, 2010

Jan-08-2010: To correct for minor edits that were inadvertently omitted, this revised copy was posted.
See pages 3, 6, 8, 12, and 14. A Market Notice regarding these edits was issued on Jan-11-2010.

Data Release & Accessibility

Phase 1: Transmission Constraints

Draft Final Proposal

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Attachment A: Illustrative Daily Constraint & Contingency Lists

1. Executive Summary

Stakeholders have expressed a desire for the release of additional information that would enable them to better understand market results and to facilitate more effective participation in California Independent System Operator Corporation (the ISO) markets. This Draft Final Proposal is the culmination of Phase 1 of the Data Release & Accessibility Initiative on Transmission Constraints. This phase of the initiative addressed the question of what additional visibility can be provided to market participants regarding the ISO's management of transmission constraints, the impacts of network conditions, and the ISO's constraint management practices on market results.

As a result of this process, the ISO proposes to provide three new data release elements and several new advance notifications, and commit to the development of improved network terminology / nomenclature. For the first of these new data release elements, the ISO proposes to release constraints lists that would be published twice daily for information associated with the day-ahead market. The Post-Market Constraints List would be published daily simultaneous with the results of the day-ahead market. The Pre-Market Constraints List would be published daily after a preliminary market run that the ISO performs to review issues in preparing for the next day's day-ahead market (known as the D+2 process) at approximately 1800 hours. These lists would include definitions and information for all constraints, including contingencies and nomograms, and identification if the constraint is enforced in the ISO day-ahead market.

For the second data release element, the ISO proposes to provide additional information regarding the cause of a binding constraint, in addition to the shadow price information currently provided, on its OASIS website. The ISO proposes to provide the cause for each binding constraint by identifying whether the constraint was binding under the base case (base operating conditions relevant to the different markets) or due to contingency conditions. If the constraint was binding due to a contingency, the ISO would identify the associated contingency; otherwise the binding constraint would be attributable to base case (non-contingency) conditions. At this time, the ISO is conducting an impact assessment to evaluate the feasibility of alternative ways in which this information can be provided.

The third data release element the ISO proposes to provide is a periodic Conforming Constraint Report that would be issued on a monthly or weekly basis. The Conforming Constraint Report would provide information on activity in the real-time market (RTM) for real-time dispatch as was done in the DMM Report.¹ This report would provide market participants with insight on the number and degree of manual adjustments to transmission constraints within the ISO controlled grid.

To increase transparency and communication with stakeholders, the ISO proposes to institute several new advance notifications that will inform stakeholders of significant changes to the ISO's market model and/or constraints that have been enforced. It should be noted that the ISO

¹ Department of Market Monitoring (DMM) Quarterly Report on Market Issues and Performance, October 30, 2009, *Table 5.1 RTD Biased Flowgates and Frequency of Biasing with Additional Statistics*
<http://www.caiso.com/2457/2457987152ab0.pdf>

must also be responsive to unplanned outages and may need to enforce additional constraints when reacting to unplanned outages without advance notice. Finally, in response to stakeholders' requests that the ISO use more consistent and meaningful network terminology, the ISO is committed to the development and use of improved network terminology / nomenclature. The ISO is exploring the possibility of creating additional data mapping that would correlate the transmission facilities in outage reports with the proposed constraints list. The ISO proposes to strive to evolve the data and nomenclature to use consistent naming conventions and common data elements that could be eventually linked between outage information and other ISO data.

2. Plan for Stakeholder Engagement

The focus of Phase 1 of the Transmission Constraints initiative was to develop guidelines and determine information to provide market participants regarding the ISO's constraint management practices. This was due in large part to a FERC order² requiring the ISO to convene a stakeholder process to address concerns raised by parties in that proceeding regarding what additional transparency and visibility can be provided to market participants with respect to the ISO's transmission constraint enforcement practices. Specifically, FERC directed the ISO to consider in this stakeholder process ways in which the ISO can provide (1) the list of the constraints that are not enforced in ISO markets and (2) the list of contingencies that are enforced in ISO markets. Finally, FERC also directed the ISO, "through its stakeholder processes, to develop guidelines for its constraint management process, and, within 90 days of issuance of this order, submit tariff sheets setting forth those principles that significantly affect rates, terms or conditions."

With regard to the broader process, the ISO divided the Data Release & Accessibility Initiative into three phases: Phase 1 on Transmission Constraints; Phase 2 on Convergence Bidding Information Release, and Phase 3 regarding other types of market data to support well-functioning, competitive ISO spot markets, including Price Discovery and Outage Information. Phase 2 began with the posting of an issue paper on December 3, 2009. The plan is to conclude both Phases 1 and 2 at the same Board of Governors meeting. With regard to Phase 3, an issue paper was planned for December 2009, but put on hold to focus on resolution of Phases 1 & 2 at the February 2010 Board of Governors meeting.

Specific steps in the stakeholder engagement process are shown in the timeline in the next section of this paper.

² Federal Energy Regulatory Commission (FERC) Order, 129 FERC ¶ 61,009 (2009), October 2 Order in Docket No. ER09-1542-000,

3. Timeline

The following timetable is for the policy stakeholder and Board approval process for Phase 1. The milestones through the end of 2009 are complete. At this time the ISO anticipates completing this phase of the stakeholder process at the February Board Meeting.³

Phase 1 Timeline

DATE	MILESTONE
Nov. 5, 2009	Issue Paper, Phase 1 Transmission Constraints
Nov. 12, 2009	Conference Call Meeting
Nov. 23, 2009	Comments on Discussion Paper due
Dec. 3, 2009	Straw Proposal -- Proposed Procedures & Tariff Language
Dec. 10, 2009	On-Site Meeting
Dec. 16, 2009	Comments on Straw Proposal due
Dec. 31, 2009	FERC Filing
Jan. 6, 2010	ISO Draft Final Proposal
Jan. 13, 2010	Conference Call Meeting
Jan. 15, 2010	Comments on Draft Final Proposal due
Feb. 10 - 11, 2010	Board Meeting and Decision

For submitting comments on Phase 1 of the Data Release & Accessibility Initiative the project mailbox is Phase1TC@caiso.com.

³ Information on Phase 2 is available on the ISO website, <http://www.caiso.com/2479/2479df7147660.html>

4. Daily Constraint and Contingency Lists

The ISO proposes to release three new data elements consisting of: (1) Daily Constraint and Contingency List, (2) Binding Constraint Cause Data, and (3) a Conforming Constraint Report. For the first of these new data elements, the ISO proposes to release two constraint lists that would be published daily for information associated with the day-ahead market: the Post-Market Constraints List and the Pre-Market Constraints List. These lists will identify and include definitions for all constraints, including contingencies and nomograms and identification if the constraint is enforced in the ISO day-ahead market.

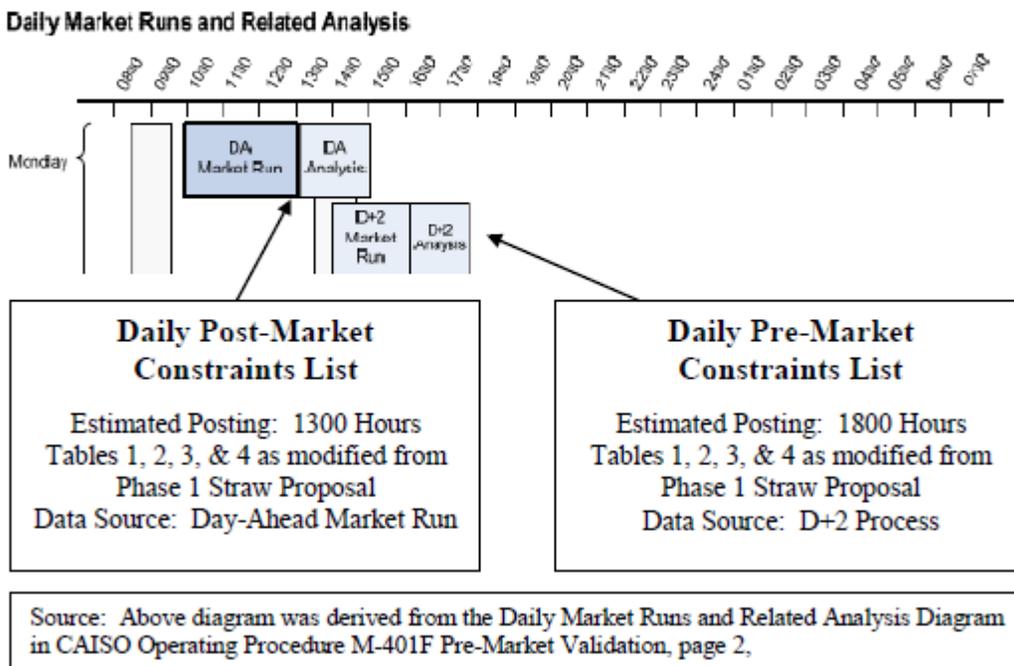
Both the Post-Market Constraints List and the Pre-Market Constraints List will each contain the same data elements set forth in the Attachment A to the Straw Proposal as Tables 1, 2, 3, and 4, as modified in this draft final proposal.⁴ However, there are two changes from the Straw Proposal. Table 2 was to be made available with each model build, but it was determined that it would be more efficient to provide this table on a daily basis, which would also provide flexibility for future use. In addition, several of the data fields in Table 4 have been modified to provide an equipment nomenclature designation that is consistent with the data used in Tables 1, 2, and 3.

- Table 1: Flowgate Constraints. Data fields: Name of the Flowgate, Type of Flowgate (e.g., Line, Transformer, Phase Shifter, Series Device (Capacitor Reactor), or Transmission Corridor), Enforcement Status, and Competitive constraint flags (yes/no).
- Table 2: Transmission Corridor Constraints. Data Fields: Name of the Branch Group, Equipment Type (e.g., Line or Transformer), Station Name, Voltage Level, and Equipment Name.
- Table 3: Nomogram Constraints. Data fields: Nomogram Name, Resource Name, Coefficient, Corridor Name, Flowgate, Station Name, Enforcement Status, and Competitive Constraint Flags (yes/no).
- Table 4 (Modified): List of Transmission Contingencies. Data fields: Contingency Title, Enforcement Status Flag (yes/no), TAC Area, Equipment Station, Equipment Voltage, Equipment Status, and Equipment Name. Note: the PTI data fields in Table 4 are replaced with an associated equipment name field similar to the field of the same name in Table 2

The Post-Market Constraints List would be published daily simultaneous with the results of the day-ahead market. **The Pre-Market Constraints List** would be published daily after a preliminary market run that the ISO performs to review issues in preparing for the next day's day-ahead market (known as the D+2 process) at approximately 1800 hours. This process is shown in the diagram below.

⁴ Straw Proposal, Attachment A: Illustrative Constraint and Contingency Lists, <http://www.caiso.com/247a/247a5bca6fad0.pdf>

Figure 1
Daily Constraint and Contingency Lists
 Posted to Secure Website, NDA Required



5. Binding Constraint Cause Data

The ISO proposes to provide Binding Constraint Cause Data in addition to the shadow price information currently provided on its OASIS website. The ISO proposes to provide the cause for each binding constraint by identifying whether the constraint was binding under the base case (base operating conditions relevant to the different markets) or due to contingency conditions. If the constraint was binding due to a contingency, the ISO proposes to identify the associated contingency; otherwise the binding constraint cause would be identified as base case (non-contingency) condition. Public access to this information would be provided through OASIS, similar to the binding constraints and shadow prices, but a revised format would be required to include a potential contingency or base case description field for each hour or interval in which a constraint actually binds. An implementation timeline for the provision of this additional information is being developed.

The issue paper presented binding constraints report information for other ISOs. A number of other ISOs provide data on monitored constraints, as well as the associated contingencies in the event that a constraint becomes binding under contingency conditions. The straw proposal noted that SCE proposes the format in Table 1 below for shadow prices of binding constraints. The data format of the monitored description and contingency description can be the same as the current format for binding constraints, for example:

33252_POTRERO3_20.0_33204_POTRERO_115_XF_G3:

Table 1: SCE Proposed Binding Constraint & Contingency Report Format

Constraint ID	Constraint Name	Monitored Description	Contingency ID	Contingency Description	HE1	HE2	HE3	...	HE24
999	Line 1 L/O Xfmr 4	Line 1	888	Xmfr 4			21		
1234	IPPDCADLN_BG	IPPDCADLN_BG		Base Case		5			

This format is similar to that provided by other ISOs. This type of information would be provided to market participants.

6. Conforming Constraint Report

The ISO proposes to provide a periodic Conforming Constraint Report that would be issued on a monthly basis. This report would be similar to the biased flowgate information provided in the DMM Q3 2009 Report.⁵ The Conforming Constraint Report would provide information on activity ~~for both in the day-ahead and real-time markets~~ ~~RTM for Real-Time Dispatch (RTD) as was done in the DMM Report.~~ The focus of ~~this the DMM~~ report ~~would be was~~ on RTM activity. ~~However, the ISO proposes to show adjustments in the day-ahead market, -although because there are~~ relatively ~~little few~~ conforming constraints ~~adjustments~~ in the day-ahead market. According to the DMM Report, the “biasing [conforming] of constraints in the day-ahead process was extremely limited and much lower than the frequency of biasing [conforming] in the real-time market ...” likely due to the fact that “... congestion doesn't consistently appear in day-ahead runs, [thus] there may be no need for biasing for these constraints in the IFM or RUC” (DMM Report, p.98). The Conforming Constraint Report will list all flowgates that had the limit adjusted in ~~a respective DAM and~~ RTM runs, along with the percentage of hours that each flowgates' limit was adjusted, and other related statistics (i.e., average, minimum, and maximum percent of actual limit adjustment).

Regarding Conforming Constraint Report, market participants and stakeholders have expressed concern over insufficient visibility to the ISO operators' practices for adjusting market transmission system limits. ISO operators make adjustments for (1) conforming transmission limits to achieve greater alignment between the energy flows calculated by the market software and those observed or predicted in real-time operation across various paths, and (2) setting prudent operating margins consistent with good utility practice to ensure reliable operation under conditions of unpredictable and uncontrollable flow volatility. With regard to the Conforming Constraints Report, the ISO would like to capture and differentiate these two types of adjustments (conforming and reliability) in the report, but the feasibility of this approach will require further investigation and assessment.

In conforming transmission limits the operators seek in part to compensate for the time lag, inherent in the structure of the five-minute real-time dispatch, between first detecting imminent congestion and the response of resources to dispatch instructions. In setting reliability margins,

⁵ Department of Market Monitoring (DMM) Quarterly Report on Market Issues and Performance, October 30, 2009, *Table 5.1 RTD Biased Flowgates and Frequency of Biasing with Additional Statistics*
<http://www.caiso.com/2457/2457987152ab0.pdf>

the operators seek to ensure that the market software produces a solution that is reliable and consistent with good utility practice within the general state of the system including potentially unpredictable flow variability and changing congestion patterns.

7. New Advance Notification Process

The ISO proposes to establish several new advance notifications that will inform stakeholders of any significant changes to the transmission constraints included in the ISO's market systems. These notifications are intended to inform the participants of the upcoming changes prior to actual implementation in the market systems. To the extent feasible, the ISO proposes to issue a notice ten (10) days prior to such an occurrence. However, in some instances, an event or operating condition that require the new constraint or contingency may not allow such lead time due to reliability issues. In the case where the ISO cannot provide ten days notice, the ISO proposes to provide notice to the participants as soon as possible outlining the new constraint or contingency.

The different notifications as part of this new process were set forth in the straw proposal and are summarized here:

1. To the extent feasible, the ISO proposes to issue a notice ten (10) days before implementation of a new FNM and/or Base Market Model (BMM) in the market systems, which generally occurs every 4 to 8 weeks.
2. If the list of model changes is different when a FNM and/or BMM is deployed, to the extent feasible, the ISO proposes to issue a notice on the Trade Day the model goes into effect.
3. If the deployment date changes after the notice has been issued, the ISO proposes to provide a new notice with the revised date. In some instances, the ISO has needed to modify the deployment date for various reasons, including but not limited to, a change required in the model, a software issue, or a new issue being raised in end-to-end testing or events on the real-time grid.
4. In some instances, primarily in response to operating issues, the ISO may need to add a new constraint or contingency into the market systems in between model builds. In these instances (where changes are likely to persist in future model builds) the ISO proposes to make every effort to provide participants with the ten (10) days advance notice prior to deployment into production.
5. If there are instances when an event or operating condition requires that a new constraint or contingency may not allow for a 10-day lead time due to reliability issues, the ISO proposes to provide notice to the participants as soon as possible outlining the new constraint or contingency.

The draft final proposal recommends that these notification changes be added to the appropriate Business Practice Manuals (BPMs), so that these requirements are clearly established.

8. Improved Network Terminology / Nomenclature

The ISO commits to the development and use of improved network terminology / nomenclature that provides a consistent reference to equipment. The ISO proposes to explore the possibility of creating additional data mapping that would correlate the transmission facilities in outage reports with the proposed constraints list. The ISO proposes to strive to evolve the data and nomenclature to use consistent naming conventions and common data elements that could be eventually linked between outage information and other data. Stakeholders have requested that the ISO use more consistent and meaningful network terminology. For example, in the NYISO market, facilities are provided with a unique identifier that is integrated across both outage and constraint management systems. If a facility is down for outage work, the outage file indicates that that facility is not available; if the same facility has an enforced limit element in the published constraint file, that same number is used in the outage posting. Terminology used to describe the status of each element of the network should be defined and consistently used, and the list of interfaces, branch groups, nomograms, and any other elements and constraints should make clear the relationship between model topology and market results.

Attachment A
Draft Final Proposal
Data Release & Accessibility
Phase 1: Transmission Constraints

Illustrative
Daily Constraint & Contingency
Lists

The California ISO proposes to provide the following daily constraint and contingency list information in the formats illustrated in the following tables, as described in the draft final proposal.

Table 1: Flowgate Constraints

Table 2: Transmission Corridor Constraints

Table 3: Nomogram Constraints

Table 4: List of Transmission Contingencies

**Table 1
Flowgate Constraints
To Be Published Daily at Close of the Day Ahead Market**

Name of Flowgate	Type	Enforce	Competitive
1XXX1_STATIONA_VL.X_ 1XXX2_STATIONB_VL.Y_BR_1_1	LINE	Yes	Yes
1XXX3_STATIONC_VL.X_ 1XXX4_STATIOND_VL.Y_BR_2_1	LINE	Yes	No
1XXX5_STATIONE_VL.X_ 1XXX6_STATIONF_VL.Y_BR_1_1	LINE	No	Yes
1XXX7_STATIONG_VL.X_ 1XXX8_STATIONH_VL.Y_BR_2_1	LINE	No	No
1XXX1_STATIONA_VL.X_ 1XX10_STATIONA _VLL_XF_1	XFMR	Yes	Yes
1XXX3_STATIONC_VL.X_ 1XX13_STATIONC _VLL_XF_1	XFMR	Yes	No
1XXX5_STATIONE_VL.X_ 1XX15_STATIONE _VLL_XF_1	XFMR	No	Yes
1XXX7_STATIONG_VL.X_ 1XX17_STATIONG _VLL_XF_1	XFMR	No	No
	PHSH	No	No

LEGEND	
LINE	Individual transmission line between two stations
XFMR	Transformer in station transforming from one voltage level to another
PHSH	Phase shifter controlling flow
SERD	Series device (capacity capacitor, reactor)
TCOR	Transmission Corridor

**Table 1
Flowgate Constraints
To Be Published Daily at Close of the Day Ahead Market**

Name of Flowgate	Type	Enforce	Competitive
11XX1_STATIONX 115_11XX2_STATIONX_115_PS_1			
99XX1_STA-STB_VLL_99XX2_STB-STA_VLL_BR_1 _1	SERD	Yes	No
MARKETSCHLIMITA_MSL	TCOR	Yes	Yes
MARKETSCHLIMITB_MSL	TCOR	Yes	No
MARKETSCHLIMITC_MSL	TCOR	No	Yes
MARKETSCHLIMITD_MSL	TCOR	No	No
BRANCHGRPA_BG	TCOR	Yes	Yes
BRANCHGRPB_BG	TCOR	Yes	No
BRANCHGRPC_BG	TCOR	No	Yes
BRANCHGRPD_BG	TCOR	No	No
BRANCHA_NG	TCOR	No	No

<p align="center">Table 2 Transmission Corridor Constraints <u>To Be Published Daily at Close of the Day Ahead Market</u> To Be Made Available with Each Model Build</p>				
Branch Group Name	Equipment Type	Station Name	Voltage Level	Equipment Name
MARKETSCHLIMITA_MSL	LINE	STATIONX	500	15XX1_STATIONX_500_1XX1_EXTSUBA_500_BR_1_1
MARKETSCHLIMITA_MSL	LINE	STATIONX	500	15XX1_STATIONX_500_1XX1_EXTSUBA_500_BR_2_1
MARKETSCHLIMITA_MSL	LINE	STATIONY	500	16XX2_STATIONY_500_2XXX1_EXTSUBB_500_BR_1_1
MARKETSCHLIMITA_MSL	XFMR	EXTSUBB	500	2XXX2_EXTSUBB_500_2XXX12_EXTSUBB_230_XF_1
MARKETSCHLIMITB_MSL	LINE	NOWHERE	500	15XX1_NOWHERE_500_16XX1_NOWHWST_500_BR_1_1
MARKETSCHLIMITB_MSL	LINE	NOWHERE	500	15XX1_NOWHERE_500_16XX1_NOWHWST_500_BR_2_1
MARKETSCHLIMITB_MSL	LINE	SMWHERE	230	24XX1_SMWHERE_230_19XX1_SMWHEAST_230_BR_1_1
MARKETSCHLIMITB_MSL	LINE	SMWHERE	230	24XX1_SMWHERE_230_19XX1_SMWHEAST_230_BR_2_1
MARKETSCHLIMITC_MSL	LINE	EASTSUB	500	34XX1_EASTSUB_500_34X11_NOEASTSB_500_BR_1_1
MARKETSCHLIMITC_MSL	LINE	EASTSUB	500	34XX1_EASTSUB_500_34X11_NOEASTSB_500_BR_2_1
MARKETSCHLIMITC_MSL	XFMR	EASTSUB	230	34XX1_EASTSUB_500_3XX1_EASTSUB_230_XF_1
MARKETSCHLIMITD_MSL	LINE	RADIALSB	230	4X10_RADIALSB_500_4X21_EXTSUBC_500_BR_1_1
BRANCHGRPA_BG	XFMR	INTERNSB	230	6XX4_INTERNSB_230_24XX7_INTERNSB_115_XF_1
BRANCHGRPA_BG	XFMR	INTERNSB	230	6XX4_INTERNSB_230_24XX7_INTERNSB_115_XF_2
BRANCHGRPA_BG	LINE	MTNSUB	230	18XX0_MTNSUB_230_6XX1_DSRTSB_230_BR_2_1
BRANCHGRPA_BG	LINE	MTNSUB	230	18XX0_MTNSUB_230_6XX1_DSRTSB_230_BR_2_1
BRANCHGRPB_BG	LINE	OCEANSB	230	9XX1_OCEANSB_230_9XX2_NRBYSB_230_BR_1_1
BRANCHGRPB_BG	LINE	SEASIDE	230	9XX3_SEASIDE_230_6XX6_LOSTSB_230_BR_1_1

<p align="center">Table 2 Transmission Corridor Constraints <u>To Be Published Daily at Close of the Day Ahead Market</u> To Be Made Available with Each Model Build</p>				
Branch Group Name	Equipment Type	Station Name	Voltage Level	Equipment Name
BRANCHGRPC_BG	LINE	VERTXSB	230	8XX8_VERTXSB_230_6XX6_GALAXYSB_230_BR_1_1
BRANCHGRPC_BG	LINE	ZENITHSB	230	8XX7_ZENITHSB_230_9XX7_UVERSSB_230_BR_1_1
BRANCHGRPD_BG	LINE	SLINESB	230	19XX9_SLINESB_230_19XX8_SLINESB_60_XF_1
BRANCHA_NG	XFMR	SMLTNLD	115	31XX8_SMLTNLD_115_31XX7_SMLTNLD_60_XF_3
BRANCHA_NG	XFMR	SMLTNLD	115	31XX6_SMLTNLD_115_31XX5_SMLTNLD_230_XF_4

**Table 3
Nomogram Constraints
To Be Published Daily at Close of the Day Ahead Market**

Nomogram Name	Resource Name	Coefficient	Corridor Name	Flowgate	Station Name	Enforced	Competitive
T-XXX SOL-XX_NG_SUM		0.3	CORRIDOR1_NG1	3XXX2_ESTTNSB_115_32XX0_DNTNSB_115_BR_1_1	ESTNSB	Yes	No
T-XXX SOL-XX_NG_SUM		1	CORRIDOR2_NG2	3XXX8_WSTNSB_115_32XX0_DNTNSB_115_BR_2_1	WSTNSB	Yes	No
G-XXX	STEAM_7_UNIT 1	1				No	No
G-XXX	STEAM_7_UNIT 2	1				No	No
G-XXX	HYDRO_7_UNIT 3	1				No	No

Table 4
List of Transmission Contingencies
To Be Published Daily at Close of the Day Ahead Market

Contingency Title	Enforced	TAC Area	Equipment Station	Equipment Voltage	Equipment Name
mTC1-SUNNY-CLOUDY	Yes	TAC-1	SUNNYSB	115	15XX1_ SUNNY_500_ 1XX1_ CLOUDY_500_BR_1_1
mTC1-SUNNY-CLOUDY	Yes	TAC-1	SUNNYSB	115	15XX1_ SUNNY_500_ 1XX1_EXTSUBA_500_BR_2_1
mTC1-SUNNY-CLOUDY	Yes	TAC-1	CLOUDYSB	115	16XX2_ SUNNY_500_2XXX1_EXTSUBB_500_BR_1_1
mTC1-SUNNY-CLOUDY	Yes	TAC-1	CLOUDYSB	115	2XXX2_ SUNNY_500_ 2XXX12_EXTSUBB_230_XF_1
mTC2-OUTAGE-SPECIAL	No	TAC-2	BRDGSB	115	15XX1_ BRDGSB_500_16XX1_NOWHWST_500_BR_1_1
mTC2-OUTAGE-SPECIAL	No	TAC-2	BRDGSB	60	15XX1_ BRDGSB_500_16XX1_NOWHWST_500_BR_2_1
mTC2-OUTAGE-SPECIAL	No	TAC-2	TRBWTR	115	24XX1_ TRBWTR_230_19XX1_SMWHEAST_230_BR_1_1
mTC2-OUTAGE-SPECIAL	No	TAC-2	TRBWTR	50	24XX1_ TRBWTR_230_19XX1_SMWHEAST_230_BR_2_1