California Independent
System Operator Corporation

Competitive Path Assessment for Fall 2010

Department of Market Monitoring

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1 Executive summary

The competitive path designations resulting from the competitive path assessment (CPA) are used to establish the set of transmission paths applied in the two market passes where local market power mitigation (LMPM) is applied. A description of the complete CPA procedure is provided in the previous white paper for initial competitive path designations.[1] Starting in April 2010, path designations are applied seasonally, at least four times per year. This white paper provides updated information on the CPA procedure, and the set of competitive path designations that will be in effect during the 2010 fall season (October, November, and December).

This current release of CPA results evaluates path competitiveness across three load scenarios (high, medium, and low), three hydroelectric production scenarios (high, medium, and low), and combinations of the nine largest suppliers' internal generation withdrawn from the model. The general methodology remains the same, with updates on transmission network model, candidate path list, and input data.

Results show that all candidate paths pass the test and will be deemed as competitive for purposes of local market power mitigation procedures. Non-candidate paths are deemed uncompetitive except for "grandfathered" paths (existing branch groups).

Changes in the simulation condition relative to the prior study include:

- The full network model is based on the 2010 release congestion revenue rights (CRR) model for DB47, while previous results are based on the CRR model for DB45.
- The candidate path list is updated based on 12 months of operating data from July 2009 to June 2010.

2 Background

Local Market Power Mitigation and Reliability Requirement Determination (LMPM-RRD) under the new market requires prior designation of network constraints (or paths)[2] into two classes, "competitive" and "non-competitive." Under the LMPM-RRD procedures, generation bids that are dispatched up to relieve congestion on transmission paths pre-designated as "non-competitive" are subject to bid mitigation.[3] LMPM-RRD is applied in a two-step process to identify specific circumstances where local market power exists. This process occurs just prior to running the market (day-ahead or real-time) and applies mitigation to resources that have been identified as having local market power. All transmission facilities that are modeled in the FNM have a designation of "competitive" or "non-competitive." The first step of this process clears supply against forecast demand, with thermal limits enforced only on the set of competitive constraints (the Competitive Constraint Run (CCR)). This provides a benchmark dispatch that reflects competition among suppliers since only those transmission constraints deemed competitive are applied in the network model.

[1] http://www.caiso.com/2365/23659ca314f0.pdf

[2] The term path is used synonymously with transmission constraints in this context, and includes all transmission constraints that are enforced in Pass 1 and Pass 2 of Pre-IFM. A path is by definition directional.

[3] A detailed description of the LMPM-RRD procedures can be found in the tariff and Business Practice Manuals on the ISO web site at http://www.caiso.com/docs/2001/12/21/2001122108490719681.html.

The second step applies all constraints, competitive and non-competitive, and re-dispatches all resources to meet forecast load. In this second step, the All Constraint Run (ACR), some resources will be dispatched further up (compared to the CCR) to relieve congestion on the non-competitive constraints now that they have been applied in the market solution. Those resources that have been dispatched up in the ACR relative to the competitive benchmark dispatch from the CCR are deemed to have local market power since they were needed to relieve congestion on a non-competitive constraint and will have their bid curve mitigated to their Default Energy Bid from the CCR dispatch point to the full bid-in output for that resource.

2.1 Updated network model

The network model used for the competitive path assessment studies is the same as the congestion revenue rights full network model (CRR FNM). The network model used in the current CPA is the one released in late July, 2010 (DB47). This CRR FNM is a bus-branch oriented network model which is derived directly from FNM software using the CRR FNM exporting interface. This base PTI format bus-branch model was then imported into the PLEXOS simulation model for competitive path assessment effort.

2.2 System conditions

2.2.1 Demand forecast

The purpose of the studies is to assess the competitiveness of the candidate paths using a wide range of system supply and demand conditions. To do this, we construct three demand forecast scenarios as follows. First, actual historical load for Pacific Gas & Electric, Southern California Edison, and San Diego Gas & Electric transmission areas have been obtained from telemetry data. From this data, a seasonal ISO system-wide daily peak load duration curve is created to represent the peak load condition in that season. Four pairs of seasons/years are then selected based on seasonal peak load. Three load scenarios are then chosen for each season by selecting individual days within a season that corresponds to specific points on the daily peak hour load duration curve for that season. Currently, the high, medium, and low load scenarios are chosen based on the 95th percentile, 80th percentile, and 65th percentile, respectively, for the daily peak hour load duration curve for each season.

Table 1 shows the historical peak load for the study season since 2002. Based on the daily peak load, the season/year is selected as the representing season in the studies. Table 2 shows the three specific days selected for the high load, medium load, and low load scenarios. Table 3 shows the assumed ISO system daily peak load for various load scenarios.

Table 1. Historical seasonal peak load

OPR_YR	SEASON	DAILY_PEAK_LOAD
2009	FALL	33,541
2007	FALL	34,067
2006	FALL	34,218
2004	FALL	34,320
2002	FALL	35,168
2005	FALL	35,184
2003	FALL	36,480
2008	**FALL**	**41,597**

Table 2. Selection of typical day for seasonal load scenario

Load Scenario	Fall
High	12/17/2008
Medium	10/29/2008
Low	11/13/2008

Table 3. System daily peak load for three load scenarios (megawatts)

Load Scenario	Fall
High	34,191
Medium	32,449
Low	31,535

2.2.2 Hydroelectric generation

For purposes of determining bids for hydro units used in the analysis, three hydro scenarios (wet, medium, and dry) were simulated based on California's historical hydroelectric production data. Figure 1 shows the hydroelectric production level of hydroelectric resources within the ISO control area from 2002 through 2009. As shown, 2008 is a low hydroelectric production year, 2005 is a medium production year, and 2006 is a high production year.

After the low, medium and high hydro years are identified, a hydro daily production duration curve was constructed for each season and each year. The 95th percentile date was then determined in each season as the hydro scenario date for the actual 24-hour simulation. Table 4 summarizes the days identified for various load scenarios in each season.

Figure 1. Annual total ISO hydroelectric production

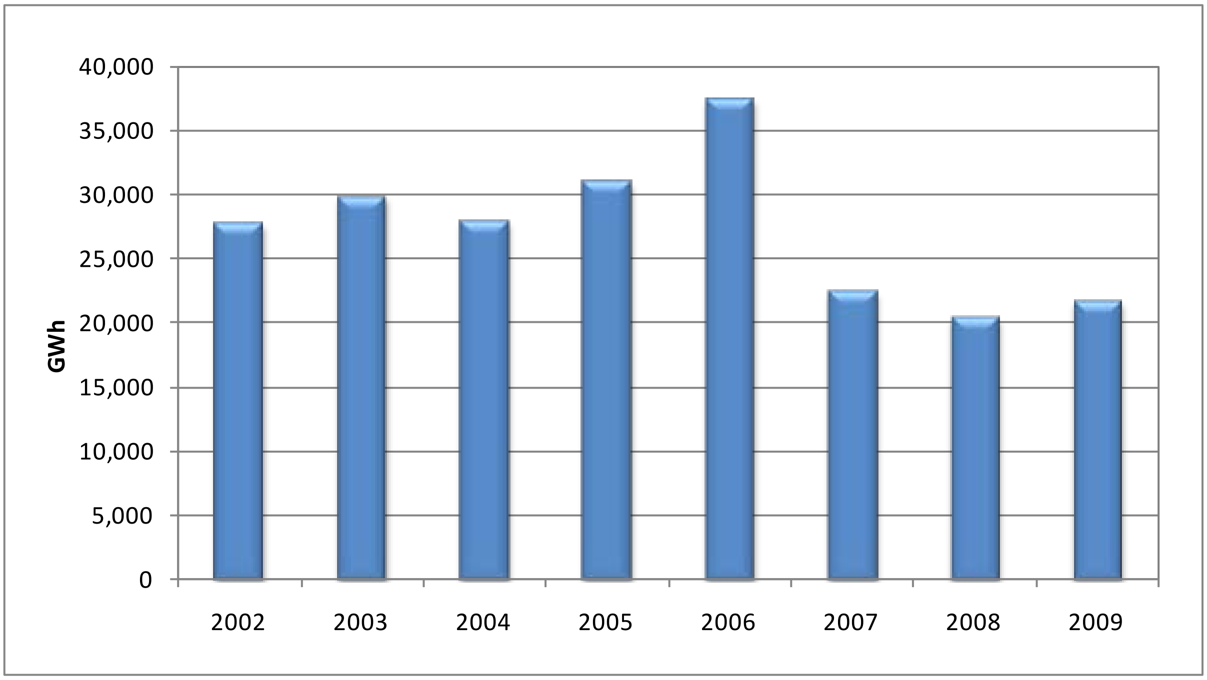

Table 4. Selection of typical day for seasonal hydro scenario

Hydro Scenario	Fall
High	11/30/2006
Medium	12/26/2005
Low	10/8/2008

2.3 Generation ownership and portfolios

Generation resources with a tolling agreement are excluded from the owners' portfolio. A new round of tolling agreement surveys has been done in December 2009 for large generation companies and load serving entities, for the survey period between January and December 2010.

This study focuses specifically on the impact of withdrawn capacity by the nine largest owners in the ISO control area who are net sellers and have an installed generator capacity over 500 MW after consideration of tolling agreement adjustments. The CPA considers only net sellers in the selection of potentially pivotal suppliers since net buyers are less likely to benefit from increasing prices through withholding supply. The 9 largest suppliers are the same as the largest suppliers in the previous CPA.

Table 5. Suppliers considered and their generation capacity concentration, adjusted for tolling agreements

Supplier	Capacity
S1	4,388
S2	2,582
S3	1,898
S4	1,892
S5	1,119
S6	1,036
S7	713
S8	625
S9	552

2.4 Identification of candidate competitive paths

In evaluating whether or not paths are competitive, the CPA focuses on the subset of all transmission paths for which this designation is most likely to impact market outcomes. The criteria for identifying candidate competitive paths (those that will be tested in this assessment), is based on the frequency of operational mitigation that has occurred in the most recent 12 months of operation.

For the fall 2010 designations, candidate paths were identified based on data for the 12 month period from July 2009 through June 2010. This represents the most recent 12 month period for which data were available at the time this study needed to be initiated.

Hours of congestion management were based on hours when congestion occurred in the day-ahead or real-time market, as well as when congestion may have been managed in real time through reliability must-run (RMR) dispatches or exceptional dispatches.

- To identify hours when congestion occurred in the ISO's markets, every hour where a constraint's market flow equaled or exceeded its limit was counted as an hour of managed congestion for the constraint. A constraint was counted as being congested if it was binding during any part of an hour in the day-ahead LMPM run, day-ahead market run, real-time LMPM run, or the real-time market run.

- To identify hours when congestion on a constraint may have been managed in real-time using RMR resources, data were collected reflecting resources that received real-time RMR dispatch instructions. For any hour where an RMR dispatch was made to a specific resource, that hour was counted toward all lines that are mitigated using that RMR resource as identified in the ISO Operating Procedures. The line/resource relationships identified in the ISO Operating Procedures were used to create the specific mapping to count each hour of real-time RMR dispatch of a specific resource as an hour of operational mitigation for a specific line or path.

- To identify hours when congestion on a constraint may have been managed in real-time using exceptional dispatches, operator log entries were used to identify the reason for individual exceptional dispatches for real-time energy. In cases where the reason did not include a specific line or lines, but cited a specific transmission operating procedures, these transmission operating procedures were used to map the resource to a specific set of transmission facilities. As with the real-time RMR dispatches, any hour where a resource was exceptionally dispatched for real-time energy was counted as an hour of operational mitigation for all lines for which that resource was identified as providing operational mitigation unless a specific subset of those lines was identified in the operator log for that particular exceptional dispatch.

Each hour during which this analysis indicated congestion occurred (a) in the market or may have been managed in real-time via (b) an RMR dispatch or (c) exceptional dispatch (or any combination of the three categories) was counted as one hour of congestion for the constraint.

Table 6 shows intra-zonal interfaces and individual transmission lines that had greater than 500 hours of congestions and consequently have been identified as candidate paths.

Table 6. Candidate path list

CONSTRAINT_NAME	HOUR
HUMBOLDT_BG	1730
31461_JESSTAP_115_31464_COTWDPGE_115_BR_1_1	1419
31452_TRINITY_115_31461_JESSTAP_115_BR_1_1	1419
31450_WILDWOOD_115_31464_COTWDPGE_115_BR_1_1	1389
31450_WILDWOOD_115_31011_FRSTGLEN_115_BR_1_1	1389
31010_LOWGAP1_115_31015_BRDGVLLE_115_BR_1_1	1389
31011_FRSTGLEN_115_31010_LOWGAP1_115_BR_1_1	1389
31580_CASCADE_60.0_31582_STLLWATR_60.0_BR_1_1	1377
31566_KESWICK_60.0_31582_STLLWATR_60.0_BR_1_1	1377
31092_MPLECRK_60.0_31093_HYMPOMJT_60.0_BR_1_1	1317
31556_TRINITY_60.0_31555_MSSTAP2_60.0_BR_1_1	1317
31555_MSSTAP2_60.0_31553_BIGBAR_60.0_BR_1_1	1317
31555_MSSTAP2_60.0_31557_MILSTSTA_60.0_BR_1_1	1317
31000_HUMBOLDT_115_31452_TRINITY_115_BR_1_1	1317
31093_HYMPOMJT_60.0_31553_BIGBAR_60.0_BR_1_1	1317
31000_HUMBOLDT_115_31001_HMBLTTM_1.0_XF_1	1309
31114_FRTSWRD_60.0_31116_GRBRVLLE_60.0_BR_1_1	1305
31112_FRUITLND_60.0_31114_FRTSWRD_60.0_BR_1_1	1305
31080_HUMBOLDT_60.0_31092_MPLECRK_60.0_BR_1_1	1305
31110_BRDGVLLE_60.0_31112_FRUITLND_60.0_BR_1_1	1305
31118_KEKAWAKA_60.0_31308_LYTNVLLE_60.0_BR_1_1	1305
31306_WILLITS_60.0_31308_LYTNVLLE_60.0_BR_1_1	1305
31080_HUMBOLDT_60.0_31001_HMBLTTM_1.0_XF_1	1305
31000_HUMBOLDT_115_31015_BRDGVLLE_115_BR_1_1	1305
31080_HUMBOLDT_60.0_31000_HUMBOLDT_115_XF_2	1305
31116_GRBRVLLE_60.0_31118_KEKAWAKA_60.0_BR_1_1	1305
33912_SPRNGGJ_115_33914_MI-WUK_115_BR_1_1	1216
30325_PALERMO_230_30327_COLGATE_230_BR_1_1	920
30325_PALERMO_230_30327_COLGATE_230_BR_1A_1	920
32308_COLGATE_60.0_30327_COLGATE_230_XF_3	879
30300_TABLMTN_230_30325_PALERMO_230_BR_1_1	813
31656_PALERMO_60.0_31658_BANGOR_60.0_BR_1_1	789
31658_BANGOR_60.0_32308_COLGATE_60.0_BR_1_1	789
30460_VACA-DIX_230_30478_LAMBIE_230_BR_1_1	785
38610_DELTAPMP_230_30580_ALTMMDW_230_BR_1_1	783
30460_VACA-DIX_230_30478_LAMBIE_230_BR_1A_1	783
30569_KELSO_230_30570_USWP-RLF_230_BR_1_1	783
30570_USWP-RLF_230_30625_TESLAD_230_BR_1_1	783
30580_ALTMMDW_230_30625_TESLAD_230_BR_1_1	783
SCE_PCT_IMP_BG	763
30472_PEABODY_230_30529_BRDSLDNG_230_BR_1A_1	740
30472_PEABODY_230_30529_BRDSLDNG_230_BR_1_1	740
IVALLYBANK_XFBG	709
33206_BAYSHOR1_115_33208_MARTINC_115_BR_1_1	686
33203_MISSON_115_33204_POTRERO_115_BR_1_1	659
32316_YUBAGOLD_60.0_32318_BRWNSVY_60.0_BR_1_1	633
32314_SMRTSVLE_60.0_32316_YUBAGOLD_60.0_BR_1_1	633
30300_TABLMTN_230_30066_TBMT1M_1.0_XF_1	633
32318_BRWNSVY_60.0_32320_MRYSVLLE_60.0_BR_1_1	633
99102_PIT-TES1_230_30567_TESJCT_230_BR_1_2	582
30567_TESJCT_230_30700_SANMATEO_230_BR_1_1	582
32212_E.NICOLS_115_32214_RIOOSO_115_BR_1_1	560

CONSTRAINT_NAME	HOUR
33204_POTRERO_115_33206_BAYSHOR1_115_BR_1_1	558
33207_BAYSHOR2_115_33208_MARTINC_115_BR_2_1	553
33310_SANMATEO_115_33315_RAVENSWD_115_BR_1_1	552
33200_LARKIN_115_33204_POTRERO_115_BR_2_1	552
33204_POTRERO_115_33207_BAYSHOR2_115_BR_2_1	552
SDGEIMP_BG	545
30703_RAVENSWD_230_30700_SANMATEO_230_BR_1_1	544
30705_MONTAVIS_230_30712_SLACTAP2_230_BR_2_1	544
30712_SLACTAP2_230_30715_JEFFERSN_230_BR_2_1	544
30703_RAVENSWD_230_30700_SANMATEO_230_BR_2_1	544
30705_MONTAVIS_230_30710_SLACTAP1_230_BR_1_1	544
30710_SLACTAP1_230_30715_JEFFERSN_230_BR_1_1	544
30875_MCCALL_230_30880_HENTAP2_230_BR_1_1	540
SDGE_CFEIMP_BG	534
33208_MARTINC_115_30695_MARTINC_230_XF_7	529
33205_HNTRSPT_115_33208_MARTINC_115_BR_1_1	528
30015_TABLEMT_500_30040_TESLA_500_BR_1_3	526
33310_SANMATEO_115_30700_SANMATEO_230_XF_7_S	524
33208_MARTINC_115_33310_SANMATEO_115_BR_3_1	523
99106_SAN-MAR1_230_99104_MAR-SAN1_230_BR_1_3	523
30685_EMBRCDR_230_99158_MAR-EMBD_230_BR_2_1	522
30685_EMBRCDR_230_99160_MAR-EMBE_230_BR_1_1	522
33200_LARKIN_115_33208_MARTINC_115_BR_1_1	522
33204_POTRERO_115_33205_HNTRSPT_115_BR_1_1	522
33205_HNTRSPT_115_33208_MARTINC_115_BR_3_1	522
33208_MARTINC_115_33303_ESTGRND_115_BR_2_1	522
33310_SANMATEO_115_33312_BELMONT_115_BR_1_1	522
33310_SANMATEO_115_30700_SANMATEO_230_XF_5_T	522
30560_E.SHORE_230_30700_SANMATEO_230_BR_1_1	522
33310_SANMATEO_115_30700_SANMATEO_230_XF_5_S	522
33208_MARTINC_115_33322_UALTAP_115_BR_5_1	522
33322_UALTAP_115_33306_SFIA_115_BR_5_1	522
33208_MARTINC_115_33356_BURLNGME_115_BR_4_1	522
33208_MARTINC_115_30695_MARTINC_230_XF_8	522
33307_MILLBRAE_115_33310_SANMATEO_115_BR_1_1	522
33310_SANMATEO_115_30700_SANMATEO_230_XF_5_P	522
33310_SANMATEO_115_30700_SANMATEO_230_XF_6_T	522
33208_MARTINC_115_33307_MILLBRAE_115_BR_1_1	522
30717_TRAN230B_230_99170_MAR-JEF1_230_BR_1_1	522
33310_SANMATEO_115_30700_SANMATEO_230_XF_6_S	522
33356_BURLNGME_115_33310_SANMATEO_115_BR_4_1	522
33310_SANMATEO_115_33305_SHAWROAD_115_BR_6_1	522
33305_SHAWROAD_115_33208_MARTINC_115_BR_6_1	522
33310_SANMATEO_115_30700_SANMATEO_230_XF_7_T	522
33203_MISSON_115_33205_HNTRSPT_115_BR_2_1	522
33306_SFIA_115_33310_SANMATEO_115_BR_5_1	522
33310_SANMATEO_115_33308_SFIA-MA_115_BR_2_1	522
33308_SFIA-MA_115_33303_ESTGRND_115_BR_2_1	522
33200_LARKIN_115_33203_MISSON_115_BR_1_1	522
33200_LARKIN_115_33204_POTRERO_115_BR_1_1	522
33203_MISSON_115_33205_HNTRSPT_115_BR_1_1	522
33310_SANMATEO_115_30700_SANMATEO_230_XF_6_P	522
33310_SANMATEO_115_30700_SANMATEO_230_XF_7_P	522
24074_LAFRESA_230_24065_HINSON_230_BR_1_1	500

3 Competitive path assessment

As described above, the CPA is based on typical days in the season being examined. For each typical day, various potentially pivotal supplier combinations are evaluated for each of the nine load and hydro scenarios. The following section presents the hourly system conditions for the base case, medium load, and medium hydro scenario in the spring without any suppliers' capacity removed.

3.1 2010 fall season results

3.1.1 Base case results

The base case results for fall are presented in Table 7 below for medium load, medium hydro, and no supplier capacity withdrawn. General simulation characteristics are presented, including load, total generation internal to the ISO, net import values,[4] and internal path flows (Path 15 and Path 26) for each of the 24 hours of the fall medium load medium hydro base case.

3.1.2 CPA results

All candidate paths pass under fall conditions, and are therefore deemed competitive for the 2010 fall season.

All of the candidate paths examined in the CPA passed under fall conditions, and are therefore deemed competitive for the 2010 fall season.

[4] The net imports into NP26 are calculated as the net intertie from Cascade and Malin. The net imports in the SP26 are calculated as the sum of NOB, BLYTHE, ELDORADO, Four Corner, .MCCLUG, MEAD, Palo Verde, Merchant, Parker, and TJUANA.

Table 7. Base case: Model output for fall, medium hydro, medium load, and no supply withdrawn

Hour	Load (MWh)		Generation (MWh)		Net Import (MWh)		Internal Path Flow (N->S)	
	NP26	SP26	NP26	SP26	NP26	SP26	Path 15	Path 26
1	10,131	12,089	11,437	7,706	-100	4,239	-2,482	682
2	10,138	11,552	11,455	7,756	-891	4,232	-3,206	4
3	9,995	11,279	11,419	6,979	-648	4,349	-2,783	365
4	10,046	11,243	11,573	7,720	-891	3,711	-2,948	225
5	10,327	11,647	11,969	7,857	-891	3,879	-2,859	325
6	11,237	12,666	13,218	7,789	-998	4,792	-2,658	499
7	12,413	14,062	14,227	9,191	-846	4,434	-2,692	711
8	12,818	14,336	14,598	9,238	-306	4,324	-2,338	1,153
9	13,030	15,292	14,858	9,647	-251	4,293	-2,788	1,430
10	12,904	16,252	15,022	9,880	-1	4,405	-2,253	2,020
11	12,758	17,146	15,099	10,010	399	4,826	-1,712	2,487
12	12,784	17,749	13,543	11,525	261	5,665	-3,644	811
13	13,161	18,320	13,981	12,240	-1	5,679	-3,794	652
14	13,278	18,907	13,934	12,368	494	5,905	-3,586	886
15	13,008	19,201	14,378	12,439	-106	5,961	-3,418	1,053
16	12,962	19,198	14,131	12,437	301	5,699	-3,185	1,288
17	12,899	18,608	15,934	10,793	340	4,745	-803	3,296
18	13,028	18,002	15,451	9,849	801	5,049	-949	3,055
19	13,870	18,579	14,840	10,858	1,446	5,415	-2,146	2,207
20	13,629	17,838	15,035	10,159	1,251	5,128	-1,417	2,465
21	13,011	16,859	14,378	9,772	695	5,196	-1,380	1,880
22	11,960	15,351	13,453	9,336	125	4,756	-1,873	1,436
23	11,223	13,823	12,134	8,352	-117	5,075	-2,018	573
24	10,639	12,760	11,340	7,886	-194	4,756	-2,303	296

Table 8. Competitive path list

CONSTRAINT_NAME	CONSTRAINT_NAME
24074_LAFRESA_230_24065_HINSON_230_BR_1_1	32308_COLGATE_60.0_30327_COLGATE_230_XF_3
30015_TABLEMT_500_30040_TESLA_500_BR_1_3	32314_SMRTSVLE_60.0_32316_YUBAGOLD_60.0_BR_1_1
30300_TABLMTN_230_30066_TBMT1M_1.0_XF_1	32316_YUBAGOLD_60.0_32318_BRWNSVY_60.0_BR_1_1
30300_TABLMTN_230_30325_PALERMO_230_BR_1_1	32318_BRWNSVY_60.0_32320_MRYSVLLE_60.0_BR_1_1
30325_PALERMO_230_30327_COLGATE_230_BR_1_1	33200_LARKIN_115_33203_MISSON_115_BR_1_1
30325_PALERMO_230_30327_COLGATE_230_BR_1A_1	33200_LARKIN_115_33204_POTRERO_115_BR_1_1
30460_VACA-DIX_230_30478_LAMBIE_230_BR_1_1	33200_LARKIN_115_33204_POTRERO_115_BR_2_1
30460_VACA-DIX_230_30478_LAMBIE_230_BR_1A_1	33200_LARKIN_115_33208_MARTINC_115_BR_1_1
30472_PEABODY_230_30529_BRDSLDNG_230_BR_1_1	33203_MISSON_115_33204_POTRERO_115_BR_1_1
30472_PEABODY_230_30529_BRDSLDNG_230_BR_1A_1	33203_MISSON_115_33205_HNTRSPT_115_BR_1_1
30560_E.SHORE_230_30700_SANMATEO_230_BR_1_1	33203_MISSON_115_33205_HNTRSPT_115_BR_2_1
30567_TESJCT_230_30700_SANMATEO_230_BR_1_1	33204_POTRERO_115_33205_HNTRSPT_115_BR_1_1
30569_KELSO_230_30570_USWP-RLF_230_BR_1_1	33204_POTRERO_115_33206_BAYSHOR1_115_BR_1_1
30570_USWP-RLF_230_30625_TESLAD_230_BR_1_1	33204_POTRERO_115_33207_BAYSHOR2_115_BR_2_1
30580_ALTMMDW_230_30625_TESLAD_230_BR_1_1	33205_HNTRSPT_115_33208_MARTINC_115_BR_1_1
30685_EMBRCDR_230_99158_MAR-EMBD_230_BR_2_1	33205_HNTRSPT_115_33208_MARTINC_115_BR_3_1
30685_EMBRCDR_230_99160_MAR-EMBE_230_BR_1_1	33206_BAYSHOR1_115_33208_MARTINC_115_BR_1_1
30703_RAVENSWD_230_30700_SANMATEO_230_BR_1_1	33207_BAYSHOR2_115_33208_MARTINC_115_BR_2_1
30703_RAVENSWD_230_30700_SANMATEO_230_BR_2_1	33208_MARTINC_115_30695_MARTINC_230_XF_7
30705_MONTAVIS_230_30710_SLACTAP1_230_BR_1_1	33208_MARTINC_115_30695_MARTINC_230_XF_8
30705_MONTAVIS_230_30712_SLACTAP2_230_BR_2_1	33208_MARTINC_115_33303_ESTGRND_115_BR_2_1
30710_SLACTAP1_230_30715_JEFFERSN_230_BR_1_1	33208_MARTINC_115_33307_MILLBRAE_115_BR_1_1
30712_SLACTAP2_230_30715_JEFFERSN_230_BR_2_1	33208_MARTINC_115_33310_SANMATEO_115_BR_3_1
30717_TRAN230B_230_99170_MAR-JEF1_230_BR_1_1	33208_MARTINC_115_33322_UALTAP_115_BR_5_1
30875_MCCALL_230_30880_HENTAP2_230_BR_1_1	33208_MARTINC_115_33356_BURLNGME_115_BR_4_1
31000_HUMBOLDT_115_31001_HMBLTTM_1.0_XF_1	33305_SHAWROAD_115_33208_MARTINC_115_BR_6_1
31000_HUMBOLDT_115_31015_BRDGVLLE_115_BR_1_1	33306_SFIA_115_33310_SANMATEO_115_BR_5_1
31000_HUMBOLDT_115_31452_TRINITY_115_BR_1_1	33307_MILLBRAE_115_33310_SANMATEO_115_BR_1_1
31010_LOWGAP1_115_31015_BRDGVLLE_115_BR_1_1	33308_SFIA-MA_115_33303_ESTGRND_115_BR_2_1
31011_FRSTGLEN_115_31010_LOWGAP1_115_BR_1_1	33310_SANMATEO_115_30700_SANMATEO_230_XF_5_P
31080_HUMBOLDT_60.0_31000_HUMBOLDT_115_XF_2	33310_SANMATEO_115_30700_SANMATEO_230_XF_5_S
31080_HUMBOLDT_60.0_31001_HMBLTTM_1.0_XF_1	33310_SANMATEO_115_30700_SANMATEO_230_XF_5_T
31080_HUMBOLDT_60.0_31092_MPLECRK_60.0_BR_1_1	33310_SANMATEO_115_30700_SANMATEO_230_XF_6_P
31092_MPLECRK_60.0_31093_HYMPOMJT_60.0_BR_1_1	33310_SANMATEO_115_30700_SANMATEO_230_XF_6_S
31093_HYMPOMJT_60.0_31553_BIGBAR_60.0_BR_1_1	33310_SANMATEO_115_30700_SANMATEO_230_XF_6_T
31110_BRDGVLLE_60.0_31112_FRUITLND_60.0_BR_1_1	33310_SANMATEO_115_30700_SANMATEO_230_XF_7_P
31112_FRUITLND_60.0_31114_FRTSWRD_60.0_BR_1_1	33310_SANMATEO_115_30700_SANMATEO_230_XF_7_S
31114_FRTSWRD_60.0_31116_GRBRVLLE_60.0_BR_1_1	33310_SANMATEO_115_30700_SANMATEO_230_XF_7_T
31116_GRBRVLLE_60.0_31118_KEKAWAKA_60.0_BR_1_1	33310_SANMATEO_115_33305_SHAWROAD_115_BR_6_1
31118_KEKAWAKA_60.0_31308_LYTNVLLE_60.0_BR_1_1	33310_SANMATEO_115_33308_SFIA-MA_115_BR_2_1
31306_WILLITS_60.0_31308_LYTNVLLE_60.0_BR_1_1	33310_SANMATEO_115_33312_BELMONT_115_BR_1_1
31450_WILDWOOD_115_31011_FRSTGLEN_115_BR_1_1	33310_SANMATEO_115_33315_RAVENSWD_115_BR_1_1
31450_WILDWOOD_115_31464_COTWDPGE_115_BR_1_1	33322_UALTAP_115_33306_SFIA_115_BR_5_1
31452_TRINITY_115_31461_JESSTAP_115_BR_1_1	33356_BURLNGME_115_33310_SANMATEO_115_BR_4_1
31461_JESSTAP_115_31464_COTWDPGE_115_BR_1_1	33912_SPRNGGJ_115_33914_MI-WUK_115_BR_1_1
31555_MSSTAP2_60.0_31553_BIGBAR_60.0_BR_1_1	38610_DELTAPMP_230_30580_ALTMMDW_230_BR_1_1
31555_MSSTAP2_60.0_31557_MILSTSTA_60.0_BR_1_1	99102_PIT-TES1_230_30567_TESJCT_230_BR_1_2
31556_TRINITY_60.0_31555_MSSTAP2_60.0_BR_1_1	99106_SAN-MAR1_230_99104_MAR-SAN1_230_BR_1_3
31566_KESWICK_60.0_31582_STLLWATR_60.0_BR_1_1	HUMBOLDT_BG
31580_CASCADE_60.0_31582_STLLWATR_60.0_BR_1_1	IVALLYBANK_XFBG
31656_PALERMO_60.0_31658_BANGOR_60.0_BR_1_1	SCE_PCT_IMP_BG
31658_BANGOR_60.0_32308_COLGATE_60.0_BR_1_1	SDGE_CFEIMP_BG
32212_E.NICOLS_115_32214_RIOOSO_115_BR_1_1	SDGEIMP_BG

4 Concluding comments

The simulation results and competitive test outcomes presented in this paper represent the competitive path designations that will be incorporated in the market software for fall 2010. These designations reflect updates introduced in the last version of the CPA, updated input data and network model, as well as adjustments to supplier portfolios to account for transfer of operational and bidding control of generation resources within the ISO control area.

Incorporating results from the season studied, all candidate paths passed the competitiveness test. Note that there are a total of roughly 4,800 individual line segments in the FNM and several aggregated constraints, and 106 of these were included in the testing as candidate paths.

There are still factors that may require periodic review and update of the CPA. Such factors include:

- **Update of full network model.** The FNM is updated periodically to reflect new transmission facilities, adjustments of major transmission limits, seasonal switching, and other factors. Temporary network changes such as outages may have a significant impact on market congestion.
- **Market clearing model and optimization**. Currently the CPA is done by a simulation tool different from the market software. To further align the simulations used for path designations with the actual market model and software, developing the CPA within a simulation tool that more closely reflects the market software will be reviewed.
- **Impact of relatively small generation owners.** The 3-pivotal supplier tests are computationally intensive, and there are an extremely large number of potential combinations of suppliers that could withdraw. It impractical to simulate all potential combinations for all suppliers. The reason for the threshold of 500 MW is to identify larger suppliers that can more easily influence market prices. However, there may be cases where, in a relatively small congested area, a small generation owner whose generation capacity is less than the selection threshold may be pivotal to relieve the constraint. While this analysis does not consider such cases, the Department of Market Monitoring has developed tools to analyze the effectiveness of LMPM in local areas and will monitor market outcomes for the purpose of detecting potentially uncompetitive circumstances in local areas. In cases where uncompetitive outcomes are observed and the competitive path designations for that area do not appear to be consistent with the market outcomes, DMM will evaluate both the path designations as well as the application of LMPM in that area.