

**APPENDIX E**

**CAISO PRELIMINARY INTERCONNECTION APPROVAL AND OTHER COMMUNICATION  
REGARDING TSE**

## **APPENDIX E1**

"Donald Deberry"  
<DDeberr@smud.org>  
10/12/05 09:07 AM

"Donald Deberry" <DDeberr@CORPORATE.smud.org>,  
To "Monte Meredith" <MMeredith@NavigantConsulting.com>,  
<cmisca@caiso.com>, <mirzadeh@wapa.gov>  
cc <dlarsen@NavigantConsulting.com>  
Subject RE: CPV Colusa Project case comments

Attached are change files that include preliminary proposed projects that can eliminate the Elverta-Hurley and Carmichael-Hurley overloads. I also included a change file that inserts the Roseville Energy Park. I have not validated REP data. Can you please check and send back if there are any changes?

Thanks!

-----Original Message-----

**From:** Donald Deberry  
**Sent:** Monday, October 10, 2005 2:21 PM  
**To:** 'Monte Meredith'; 'cmisca@caiso.com'  
**Cc:** Donald Deberry  
**Subject:** CPV Colusa Project case comments

I have a couple of comments that will impact flows on Elverta-Hurley and Carmichael-Hurley. These comments are for the summer peak case.

- 1) The Roseville Energy Park is not modeled in the case. Should model REP at 160 MW.
- 2) The Roseville CT's should be on-line for a total of 45 MW (sensitivity - don't know what Roseville CT's will be doing in 2010)
- 3) McClellan peaker should be off-line
- 4) Procter peaker should be off-line
- 5) Carson Ice peaker should be off-line

With the above modeled and an Elverta bus tie outage, Elverta-Hurley exceeds emergency

## **APPENDIX E2**

Dave Larsen/NCI  
10/19/2005 10:14 AM

To DDeberr@smud.org, mirzadeh@wapa.gov,  
CMicsa@caiso.com  
cc Monte Meredith/NCI, Awelch@cpv.com, KxCj@pge.com  
bcc  
Subject Info for October 19 Meeting to Discuss CPV Colusa Project  
SIS

Mariam-  
Don-  
Catalin-

Attached is a version of the impact summary table that was in the Colusa Project SIS which has been expanded to show the impacts which the addition of the projects outlined by Don in his e-mail of October 12 would have on both the pre- and post-Project overloads. As noted on the attached these projects include:

- The O'Bannion-Elverta/Natomas Project,
- The Folsom Loop Project, and
- The Roseville Energy Project's (REP) 160 MW of generation

The study results summarized on the attached don't reflect the other changes Don had suggested (i.e., putting the Roseville CT's on-line, and taking the McClellan, Procter, and Carson Ice peakers off). We've run some sensitivity studies with these changes and will have the results available for our meeting this afternoon.

As shown on the attached Table 1 the addition of the above projects had the following impacts on the Category A and B overloads:

- They mitigated both the pre- and post-Project overloads previously noted on the O'Bannion-Elverta lines and the Hurley-Carmichael line
- They tended to reduce both the pre- and post-Project overloads previously noted on the various ISO-controlled facilities
- They had little impact on the pre- and post-Project overloads noted on the Olinda transformer during the spring off-peak studies
- They had little impact on the pre- and post-Project overloads noted on the Flanagan-Shasta and Flanagan-Keswick lines during the summer peak studies (which modeled 100% generation at Shasta)

As shown on the attached Table 2 the addition of the above projects had the following impacts on the Category C overloads:

- They mitigated both the pre- and post-Project overloads previously noted on the Hurley-Carmichael line and the WAPA-SMUD tie at Elverta
- They tended to reduce both the pre- and post-Project overloads previously noted on the various ISO-controlled facilities
- They tended to slightly increase the pre- and post-Project overloads noted on the Olinda transformer during the summer off-peak studies
- They tended to slightly increase the pre- and post-Project overloads noted on the Flanagan-Shasta, Flanagan-Keswick, and Olinda-Keswick lines during the summer peak studies

We look forward to discussing the attached with you this afternoon.

Dave Larsen  
Director  
Navigant Consulting  
(916) 631-3247



CPV\_Colusa\_Impact\_of SMUD\_Changes.doc

Overloaded Component	Rating <sup>1</sup> (Amps/ MVA)	Critical Case	Worst Case		Worst Case w/ SMUD Changes <sup>2</sup>		Proposed Mitigation
			Loadings		Loadings		
			Pre-Project	Post-Project	Pre-Project	Post-Project	
<b>ISO-Controlled Facilities</b>							
CPV Colusa-Cortina 230 kV Line	954 (Emergency)	Summer Peak	N/A	100%	N/a	99%	None required
Lambie-Birds Landing 230 kV Line	954 (Emergency)	Summer Peak	85%	100%	84%	99%	None required
Palermo 230/115 kV Transformer	168 (Emergency)	Summer Peak	109%	111%	106%	108%	Install second transformer (PG&E Project #T686B) <sup>3</sup>
Palermo-E. Marysville Jct 2 115 kV Line	357 (Normal)	Summer Peak	102%	103%	100%	101%	Reconductor Palermo-Bouge and Palermo-East Nicolaus 115 kV lines (PG&E Project #T686) <sup>2</sup>
	412 (Emergency)	Summer Peak	104%	106%	102%	104%	
<b>Non-ISO Facilities</b>							
Olinda 500/230 kV Transformer	1,041 (Emergency)	Spring Off-Peak	90%	106%	90%	106%	Install a second transformer at Olinda or use remedial action schemes (RAS) to drop the Project generation for the critical 500 kV contingency <sup>4</sup>
O'Bannion-Elverta W 230 kV Lines <sup>5</sup>	1,054 (Normal) <sup>6</sup>	Summer Peak	100%	103%	53%	55%	New O'Bannion-Elverta 230 kV lines that have been proposed by Western <sup>7</sup>
	1,054 (Emergency)		115%	120%	61%	63%	
Flanagan-Shasta 230 kV Line	800 (Emergency) <sup>6</sup>	Summer Peak	123%	126%	123%	127%	Initiate discussions with Western to identify required modifications and/or upgrades
Flanagan-Keswick 230 kV Line	800 (Emergency) <sup>6</sup>	Summer Peak	109%	113%	110%	114%	
Hurley S-Carmichael 230 kV Line	880 (Emergency)	Summer Peak	107%	109%	50%	49%	Initiate discussions with SMUD to identify required modifications and/or upgrades

Table 1: Summary of Proposed Mitigation Options for Category A and Category B Overloads

<sup>1</sup> Ratings in Table 1-1 and subsequent Tables are in MVA for transformers and amps for lines

<sup>2</sup> SMUD Changes implemented include the O'Bannion-Elverta/Natomas Project, Folsom Loop Project, and REP 160 MW Generation.

<sup>3</sup> Project has not yet been approved by PG&E management and, in the event it is not completed by the in-service date of the CPV Colusa Project, the Project would have to mitigate any Project-related impacts

<sup>4</sup> Final mitigation plan is subject to the approval of PG&E, the ISO, and the owners of the Olinda transformer

<sup>5</sup> With the Sutter Project operating at 500 MW. With SMUD System changes Sutter was increased to max output (525MW)

<sup>6</sup> The emergency ratings for Western's 230 kV lines in the powerflow data sets are the same as the normal ratings

<sup>7</sup> In the event these lines are not completed by the in-service date of the CPV Colusa Project, the Project would have to mitigate any Project-related impacts on the existing lines

Overloaded Component	Critical Case	Emergency Rating (Amps/ MVA)	Worst Case Loadings		Worst Case w/ SMUD Changes <sup>8</sup> Loading	
			Pre-Project	Post-Project	Pre-Project	Post-Project
<b>ISO-Controlled Facilities</b>						
CPV Colusa-Cortina 230 kV Line	Summer Peak/ Spring Off-Peak	954		104%/ 104%		103%/ 104%
Palermo 230/115 kV Transformer	Summer Peak	168	133%	136%	131%	134%
Palermo-Rio Oso Area 115 kV Lines	Summer Peak	Various	131%	133%	129%	132%
Palermo-Bangor	Summer Peak	327	114%	116%	111%	113%
Bangor-Colgate 60 kV Line	Summer Peak	282	113%	115%	110%	112%
<b>Non-ISO Facilities</b>						
Olinda 500/230 kV Transformer	Summer Off-Peak	1,041	106%	119%	107%	121%
Flanagan-Shasta 230 kV Line	Summer Peak	800	126%	131%	127%	132%
Flanagan-Keswick 230 kV Line	Summer Peak	800	113%	118%	114%	119%
Olinda-Keswick 230 kV Line	Summer Peak	1,054	81%	103%	81%	104%
Hurley-Carmichael 230 kV Line	Summer Peak	880	111%	114%	66%	66%
Elverta S-Elverta W 230 kV Line	Summer Peak	2,240	97%	102%	36%	37%

Table 2: Summary of Worst Case Category C Overloads

<sup>8</sup> SMUD Changes implemented include the O'Bannion-Elverta/Natomas Project, Folsom Loop Project, and REP 160 MW Generation.

## **APPENDIX E3**



January 11, 2006

Mr. David Ore  
PG&E Generation Interconnection Services  
245 Market Street, Room 775, Mail Code N7L  
San Francisco, CA 94105

**Subject: CPV Colusa Project  
Preliminary Interconnection Approval**

Dear Mr. Ore:

The California ISO (CAISO) has reviewed the System Impact Study (SIS) for the CPV Colusa Project, a combined cycle plant with a maximum net output of 700 MW, which proposes to loop the Cottonwood-Cortina, Logan Creek-Vaca Dixon, Cottonwood-Vaca Dixon, and Glenn-Vaca Dixon 230 kV lines into the Project 230 kV switchyard. The SIS, dated September 19, 2005, was conducted by Navigant Consulting, Inc (NCI) with input from Pacific Gas and Electric Company (PG&E) and CAISO, as requested by the generation developer, E&L Westcoast, LLC.

Based on the information provided in the SIS, the CAISO is granting preliminary approval to interconnect the CPV Colusa Project to the CAISO Grid. Final approval will be granted upon the satisfactory completion of the Facility Study, and after an agreement regarding all system mitigation measures (including those outside CAISO's controlled grid affecting TANC, SMUD and WAPA) is reached among all involved parties. The Facility Study should be sent to the CAISO for review upon its completion. Please refer to the attachment to this letter for further information.

If you have questions about the CAISO review of this study, please contact Catalin Micsa at (916) 608-5704 (<mailto:cmicsa@caiso.com>) or myself at (916) 608-5880 (<mailto:gdeshazo@caiso.com>).

Sincerely,

*(original signed by G. DeShazo)*

Gary DeShazo  
Director of Regional Transmission – North

Mr. David Ore  
January 11, 2006  
Page 2 of 4

cc: Peter Pawlowski (E&L Westcoast, LLC via e-mail <mailto:ppawlowski@cpv.com>)  
Andrew Welch (E&L Westcoast, LLC via e-mail <mailto:awelch@cpv.com>)

Dave Larsen (Navigant Consulting via e-mail, <mailto:dlarsen@navigantconsulting.com>)  
Monte Meredith (Navigant Consulting via e-mail, <mailto:MMeredith@NavigantConsulting.com>)

Miriam Mirzadeh (WAPA via e-mail, <mailto:mirzadeh@wapa.gov>)  
Sabet Morteza (WAPA via e-mail, <mailto:sabet@wapa.gov>)

James Leigh-Kendall (SMUD via e-mail, <mailto:JLeighK@CORPORATE.smud.org>)  
Donald DeBerry (SMUD via e-mail, <mailto:DDeberr@smud.org>)  
Craig Cameron (SMUD via e-mail, <mailto:CCamero@CORPORATE.smud.org>)

Karen Grosse (PG&E via e-mail, <mailto:KRG6@pge.com>)  
Chen Kaicheng (PG&E via e-mail, <mailto:KxCj@pge.com>)  
Ore David (PG&E via e-mail, <mailto:DEO1@pge.com>)  
Albert Wong (PG&E via e-mail, <mailto:AYW1@pge.com>)  
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Daniels Douglas (PG&E via e-mail, <mailto:DGD4@pge.com>)

Armando Perez (ISO)  
Dariush Shirmohammadi (ISO)  
Catalin Micsa (ISO via e-mail)  
Judy Nickel (ISO via e-mail)  
Gary Brown (ISO via e-mail)  
Tom French (ISO via e-mail)  
Donna Jordan (ISO via e-mail)  
Regional Transmission - North (ISO via e-mail)

## **Attachment 1. CAISO Recommendations**

### **ISO controlled facilities**

#### **Palermo-Rio Oso corridor:**

Regardless of reliability category (A, B or C) the Project has a very low effectiveness factor, and the increase in loading is very small (less than 3%) as such it is not envisioned that the CAISO will be using CPV Colusa to mitigate real-time problems on this corridor. Further more all problems encountered will be fixed by PG&E expansion projects already approved by the CAISO whose in service dates are before the date that this power plant will become operational:

- T314: Colgate 230/60 kV Transformer Capacity Increase
- T815: Second Pease-Marysville 60 kV Line
- T686B: Palermo 230/115 kV Transformer
- T686: Palermo-Rio Oso 115 kV Reconductoring

#### **South of CPV Colusa corridor:**

Regardless of reliability category (A, B or C) the Project has a high effectiveness factor (>5%), and the increase in loading is significant and as such it is envisioned that the CAISO will be using CPV Colusa to mitigate real-time problems on this corridor, if needed.

The Project is asked to participate in a new operating procedure by curtailing its output or to participate in a new Special Protection Scheme (SPS) in order to protect for a double circuit tower line outage and maintain the new CPV Colusa-Cortina 230 kV line within its emergency rating.

Given that not all possible generation dispatch scenarios can be studied, the Project may be required to take part in system readjustments and be responsible for the costs of future operating procedures and/or SPS that are needed in order to maintain all transmission equipment within their applicable ratings before, during and after any given contingency in this corridor, including but not limited to the equipment mentioned in this report: CPV Colusa-Cortina and Lambie-Contra Costa 230 kV lines.

It cannot be guaranteed that the CPV Colusa Project can operate at maximum rated output 24 hours a day, year round, without system impacts, nor can it be guaranteed that the CPV Colusa Project would not have system impacts during the times and seasons not studied in the SIS.

#### **Breaker Replacement:**

Based on PG&E's current policy of allocating breaker replacement responsibility to projects, CAISO concurs with PG&E's recommendation for the CPV Colusa Project to be responsible for the following 230 kV breaker replacements: Cottonwood CBs 412, 522, 542 and CB 412 at Vaca-Dixon Substation.

**Non-ISO controlled facilities**

CAISO was part of the October 19 meeting organized by the developer's representative (Navigant Consulting, Inc.) in order to discuss mitigation measures with the owners and operators of the affected systems outside of the CAISO controlled facilities. The following preliminary conclusions have been reached:

**Potential overload of the Olinda 500/230 kV transformer, owned by TANC:**

This is a new problem for Category B conditions and an existing problem for Category C conditions. The CPV Colusa Project will increase the magnitude of potential overloads by about 13%. The developer prefers the installation of a new remote SPS in order to mitigate this problem vs. the installation of a new 500/230 kV bank. CAISO agrees with this solution provided that any new SPS complies with the existing CAISO guideline, part of the CAISO Planning Standards: <http://www1.caiso.com/docs/09003a6080/14/37/09003a608014374a.pdf>

**All potential overloads on SMUD's owned system:**

These are a combination of existing problems for Category B and new problems as well as existing problems for Category C conditions. The CPV Colusa Project will increase the magnitude of potential overloads by about 2-5%. We expect that the new Folsom Loop Project will eliminate these problems.

**Potential overload of the O'Bannion-Elverta W 230 kV line owned by WAPA:**

This is a new problem for normal conditions and an existing problem for Category B and C conditions, addressed by an existing SPS on Sutter Power Plant. The CPV Colusa Project will increase the magnitude of potential overloads by about 3-6%. We expect that the new O'Bannion-Elverta/Natomas 230 kV Line Project will eliminate these problems.

**All potential overloads on the Flanagan-Shasta-Keswick-Olinda area owned by WAPA:**

These are a combination of new problems as well as existing problems for Category B and C conditions. The CPV Colusa Project will increase the magnitude of potential overloads by different amounts ranging from 1 to 22%. Additional studies are required in order to propose a best overall solution to these problems.

It is envisioned that, during the Facility Study (FS), all these problems will be identified to be addressed and that an agreement will have to be reached among all affected parties regarding which project to build and how the costs will be allocated.

## **APPENDIX E4**



California Independent  
System Operator

Gary L. DeShazo  
Director of Regional Transmission – North  
(916) 608-5880

July 10, 2006

Mr. Doug Daniels  
PG&E Generation Interconnection Services  
245 Market Street, Room 775, Mail Code N7L  
San Francisco, CA 94105-1814

**Subject: CPV Colusa Project  
PG&E Facilities Study Review Letter**

Dear Mr. Daniels:

The California ISO (CAISO) has reviewed the System Impact Study (SIS) and the Facility Study (FS) for the CPV Colusa Project, a combined cycle plant with a maximum net output of 700 MW, which proposes to loop the Cottonwood-Cortina, Logan Creek-Vaca Dixon, Cottonwood-Vaca Dixon, and Glenn-Vaca Dixon 230 kV lines into the Project 230 kV switchyard. The SIS, dated September 19, 2005, was conducted by Navigant Consulting, Inc (NCI) with input from Pacific Gas and Electric Company (PG&E) and CAISO, as requested by the generation developer, E&L Westcoast, LLC. The FS, dated February 28, 2006 was conducted by PG&E. The CPV Colusa Project has requested a COD of January 2010.

Based on the information provided in the SIS, the CAISO has previously granted preliminary approval to interconnect the CPV Colusa Project to the CAISO Grid. The CAISO agrees with the information and recommendations provided in the FS in regards to the PG&E owned system, however final approval will only be granted after all system mitigation measures (including those outside CAISO's controlled grid affecting TANC, SMUD and WAPA) have been identified. The Affected Systems may have the right to require additional upgrades on both the Affected Systems and the PG&E system not identified in the SIS and/or FS in their current form. CAISO will not interconnect a generator to the CAISO controlled grid in a manner that causes adverse impacts on other Affected Systems. In accordance with LGIP Section 3.4.4, the Interconnection Customer has to enter into an agreement with each one of the owners of the Affected Systems. The agreement(s) shall specify the terms governing payments to be made by the Interconnecting Customer to the owner(s) of the Affected Systems as well as the repayment by the owner(s) of the Affected Systems. The developer must submit to the CAISO evidence from the Affected System owner(s) (outside CAISO controlled grid) to this effect. If E&L Westcoast, LLC requests that the CAISO coordinate communications with the Affected Systems, please contact Judy Nickel at 916-608-7062 or <mailto:jnickel@caiso.com>.

Please note that any future letter approving the interconnection of the project will allow the project to connect to the CAISO Controlled Grid and to be eligible to deliver the project's output using available transmission. However, it will not establish the generation project's level of deliverability for purposes of determining its Net Qualifying Capacity under the CAISO Tariff and in accordance with CPUC-adopted Resource Adequacy Rules. Therefore, E&L Westcoast, LLC should not rely on any statements, regarding the ability, or amount, of the output of the project being eligible to sell Resource Adequacy Capacity. We

encourage you to follow the baseline deliverability studies ongoing at the CAISO. For more information on generation deliverability, please reference the web link provided in the attachment to this letter.

If you have questions about the CAISO review of the studies, please contact Catalin Micsa at (916) 608-5704 (<mailto:cmicsa@caiso.com>) or myself at (916) 608-5880 (<mailto:gdeshazo@caiso>).

Sincerely,

*(Original signed by Gary L. DeShazo)*

Gary L. DeShazo  
Director of Regional Transmission - North

GLD/CM:pjp

cc: Peter Pawlowski (E&L Westcoast, LLC via e-mail <mailto:ppawlowski@cpv.com>)  
Andrew Welch (E&L Westcoast, LLC via e-mail <mailto:awelch@cpv.com>)

Dave Larsen (Navigant Consulting via e-mail, <mailto:dlarsen@navigantconsulting.com>)  
Monte Meredith (Navigant Consulting via e-mail, <mailto:MMeredith@NavigantConsulting.com>)

Miriam Mirzadeh (WAPA via e-mail, <mailto:mirzadeh@wapa.gov>)  
Sabet Morteza (WAPA via e-mail, <mailto:sabet@wapa.gov>)

James Leigh-Kendall (SMUD via e-mail, <mailto:JLeighK@CORPORATE.smud.org>)  
Donald DeBerry (SMUD via e-mail, <mailto:DDeberr@smud.org>)  
Craig Cameron (SMUD via e-mail, <mailto:CCamero@CORPORATE.smud.org>)

Karen Grosse (PG&E via e-mail, <mailto:KRG6@pge.com>)  
Chen Kaicheng (PG&E via e-mail, <mailto:KxCj@pge.com>)  
Ore David (PG&E via e-mail, <mailto:DEO1@pge.com>)  
Albert Wong (PG&E via e-mail, <mailto:AYW1@pge.com>)  
Mark Esguerra (PG&E via e-mail, <mailto:PME8@pge.com>)  
Daniels Douglas (PG&E via e-mail, <mailto:DGD4@pge.com>)

Armando Perez (ISO)  
Dariush Shirmohammadi (ISO)  
Judy Nickel (ISO via e-mail)  
Mike Dozier (ISO via e-mail)  
Tom French (ISO via e-mail)  
Donna Jordan (ISO via e-mail)  
Regional Transmission - North (ISO via e-mail)

## Attachment

This attachment provides a summary of the project, along with CAISO comments.

### Project Overview:

E&L Westcoast, LLC (E&L) proposes to interconnect the 700 MW (net) CPV Colusa Project (Project) with the four Cottonwood-Vaca Dixon 230 kV lines owned by Pacific Gas & Electric (PG&E) at a site near Colusa, California. The Project will consist of two GE combustion turbine generators (each rated at 199 MW) and one GE steam turbine generator (rated at 317 MW) with a combined total rating of 715 MW. The generator auxiliary load will be 15 MW resulting in a maximum net total output of 700 MW. The 18/242 kV step-up transformers for the combustion turbine generating units and for the steam turbine generating unit will be rated at, 205 MVA and 410 MVA, respectively. The planned commercial operational date of the proposed Project is January 2010.

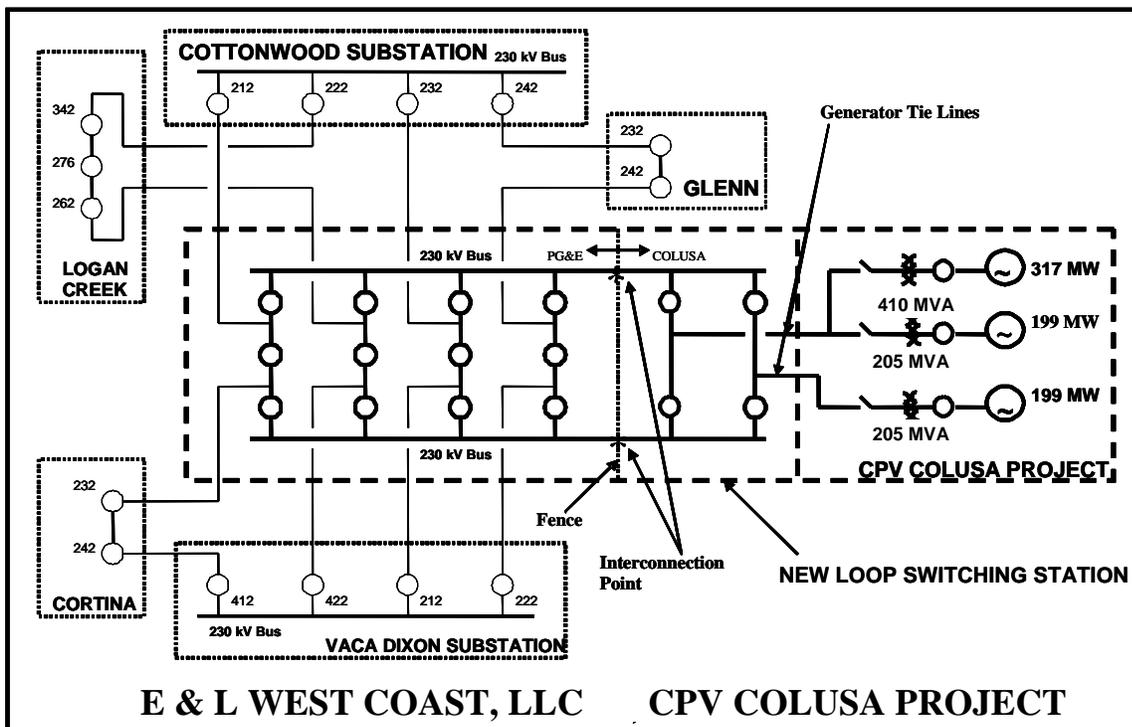


Figure 1: Conceptual One-Line Diagram

**Summary of the System Impact Study (SIS) Results**

Overloaded Component	Critical Case	Rating <sup>1</sup> (Amps/ MVA)	Worst Case Loadings		Proposed Mitigation
			Pre-Project	Post-Project	
<b>ISO-Controlled Facilities</b>					
CPV Colusa-Cortina 230 kV Line	Summer Peak	954 (Emergency)	N/A	100%	None required
Lambie-Birds Landing 230 kV Line	Summer Peak	954 (Emergency)	85%	100%	None required
Palermo 230/115 kV Transformer	Summer Peak	168 (Emergency)	109%	111%	Install second transformer (PG&E Project #T686B) <sup>2</sup>
Palermo-E. Marysville Jct 2 115 kV Line	Summer Peak	357 (Normal) 412 (Emergency)	102% 104%	103% 106%	Reconductor Palermo-Bouge and Palermo-East Nicolaus 115 kV lines (PG&E Project #T686) <sup>2</sup>
<b>Non-ISO Facilities</b>					
Olinda 500/230 kV Transformer	Spring Off-Peak	1,041 (Emergency)	90%	106%	Install a second transformer at Olinda or use remedial action schemes (RAS) to drop the Project generation for the critical 500 kV contingency (Captain Jack-Olinda) <sup>3</sup>
O'Bannion-Elverta 230 kV Lines <sup>4</sup>	Summer Peak	1,054 (Normal) <sup>5</sup> 1,054 (Emergency)	100% 115%	103% 120%	New O'Bannion-Elverta 230 kV lines that have been proposed by Western <sup>6</sup>
Flanagan-Shasta 230 kV Line	Summer Peak	800 (Emergency) <sup>5</sup>	123%	126%	Initiate discussions with Western to identify required modifications and/or upgrades
Flanagan-Keswick 230 kV Line	Summer Peak	800 (Emergency) <sup>5</sup>	109%	113%	
Hurley S-Carmichael 230 kV Line	Summer Peak	880 (Emergency)	107%	109%	Initiate discussions with SMUD to identify required modifications and/or upgrades

Table 1: Summary of Proposed Mitigation Options for Category A and Category B Overloads

Most of the facilities listed in Table 1 experience Category C Contingency overloads that are greater than the worst-case overloads presented in Table 1. In addition, there are four other facilities which are not overloaded for Category A or B Contingency conditions but which experience overloads after Category C Contingencies. These facilities and the associated worst-case overloads are listed in Table 2. As discussed in Section 12 of the SIS these increased or additional overloads could potentially be mitigated by load or generator dropping schemes, without any specifics related to implementation.

<sup>1</sup> Ratings in Table 1 and subsequent Tables are in MVA for transformers and amps for lines.

<sup>2</sup> Project has not yet been approved by PG&E management and, in the event it is not completed by the in-service date of the CPV Colusa Project, the Project would have to mitigate any Project-related impacts.

<sup>3</sup> Final mitigation plan is subject to the approval of PG&E, the ISO, and the owners of the Olinda transformer.

<sup>4</sup> With the Sutter Project operating at 500 MW.

<sup>5</sup> The emergency ratings for Western's 230 kV lines in the powerflow data sets are the same as the normal ratings.

<sup>6</sup> In the event these lines are not completed by the in-service date of the CPV Colusa Project, the Project would have to mitigate any Project-related impacts on the existing lines.

Overloaded Component	Critical Case	Emergency Rating (Amps/MVA)	Worst Case Loadings	
			Pre-Project	Post-Project
<b>ISO-Controlled Facilities</b>				
CPV Colusa-Cortina 230 kV Line	Summer Peak/ Spring Off-Peak	954		104%
Palermo 230/115 kV Transformer	Summer Peak	168	133%	136%
Palermo-Rio Oso Area 115 kV Lines	Summer Peak	Various	131%	133%
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Olinda 500/230 kV Transformer	Summer Off-Peak	1,041	106%	119%
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Olinda-Keswick 230 kV Line	Summer Peak	1,054	81%	103%
Hurley-Carmichael 230 kV Line	Summer Peak	880	111%	114%
Elverta S-Elverta W 230 kV Line	Summer Peak	2,240	97%	102%

Table 2: Summary of Worst Case Category C Overloads

The short circuit, system protection and substation evaluation identified the equipment that would become overstressed due to the addition of the project. Based on the "close-in fault" analysis, and PG&E's replacement policy, the following breaker replacements would be the responsibility of the Project:

Cottonwood 230kV Substation: Breakers 412, 522, & 542  
 Vaca-Dixon 230kV Substation: Breakers 412

The dynamic stability study results determined that the transmission system would perform within the WECC disturbance performance criteria following selected disturbances, and that the project would have no adverse impact on the stable operation of the grid.

**CAISO Recommendations to the SIS**

**ISO controlled facilities**

**Palermo-Rio Oso corridor:**

Regardless of reliability category (A, B or C) the Project has a very low effectiveness factor, and the increase in loading is very small (less than 3%) as such it is not envisioned that the CAISO will be using CPV Colusa to mitigate real-time problems on this corridor. Further more all problems encountered will be

fixed by PG&E expansion projects already approved by the CAISO whose in service dates are before the date that this power plant will become operational:

- T314: Colgate 230/60 kV Transformer Capacity Increase
- T815: Second Pease-Marysville 60 kV Line
- T686B: Palermo 230/115 kV Transformer
- T686: Palermo-Rio Oso 115 kV Reconductoring

South of CPV Colusa corridor:

Regardless of reliability category (A, B or C) the Project has a high effectiveness factor (>5%), and the increase in loading is significant and as such it is envisioned that the CAISO will be using CPV Colusa to mitigate real-time problems on this corridor, if needed.

The Project is asked to participate in a new operating procedure by curtailing its output or to participate in a new Special Protection Scheme (SPS) in order to protect for a double circuit tower line outage and maintain the new CPV Colusa-Cortina 230 kV line within its emergency rating.

Given that not all possible generation dispatch scenarios can be studied, the Project may be required to take part in system readjustments and be responsible for the costs of future operating procedures and/or SPS that are needed in order to maintain all transmission equipment within their applicable ratings before, during and after any given contingency in this corridor, including but not limited to the equipment mentioned in this report: CPV Colusa-Cortina and Lambie-Contra Costa 230 kV lines.

It cannot be guaranteed that the CPV Colusa Project can operate at maximum rated output 24 hours a day, year round, without system impacts, nor can it be guaranteed that the CPV Colusa Project would not have system impacts during the times and seasons not studied in the SIS.

Breaker Replacement:

Based on PG&E's current policy of allocating breaker replacement responsibility to projects, CAISO concurs with PG&E's recommendation for the CPV Colusa Project to be responsible for the following 230 kV breaker replacements: Cottonwood CBs 412, 522, 542 and CB 412 at Vaca-Dixon Substation.

Non-ISO controlled facilities

CAISO was part of the October 19 meeting organized by the developer's representative (Navigant Consulting, Inc.) in order to discuss mitigation measures with the owners and operators of the Affected Systems outside of the CAISO controlled facilities. The following preliminary conclusions have been reached:

Potential overload of the Olinda 500/230 kV transformer, owned by TANC:

This is a new problem for Category B conditions and an existing problem for Category C conditions. The CPV Colusa Project will increase the magnitude of potential overloads by about 13%. The developer prefers the installation of a new remote SPS in order to mitigate this problem vs. the installation of a new 500/230 kV bank. CAISO agrees with this solution provided that any new SPS complies with the existing

CAISO guideline, part of the CAISO Planning Standards:

<http://www1.caiso.com/docs/09003a6080/14/37/09003a608014374a.pdf>

*All potential overloads on SMUD's owned system:*

These are a combination of existing problems for Category B and new problems as well as existing problems for Category C conditions. The CPV Colusa Project will increase the magnitude of potential overloads by about 2-5%. We expect that the new Folsom Loop Project will eliminate these problems.

*Potential overload of the O'Bannion-Elverta W 230 kV line owned by WAPA:*

This is a new problem for normal conditions and an existing problem for Category B and C conditions, addressed by an existing SPS on Sutter Power Plant. The CPV Colusa Project will increase the magnitude of potential overloads by about 3-6%. We expect that the new O'Bannion-Elverta/Natomas 230 kV Line Project will eliminate these problems.

*All potential overloads on the Flanagan-Shasta-Keswick-Olinda area owned by WAPA:*

These are a combination of new problems as well as existing problems for Category B and C conditions. The CPV Colusa Project will increase the magnitude of potential overloads by different amounts ranging from 1 to 22%. Additional studies are required in order to propose a best overall solution to these problems.

## Summary of the Facilities Study Results

In the FS, PG&E provided cost estimates, the work scope, and the estimated time to construct the interconnection facilities and network upgrades required to interconnect the Project to PG&E owned grid only. The interconnection facilities were estimated at \$440,000, exclusive of ITCC.<sup>7</sup> The network upgrades were estimated at \$21.84 million and include \$19.56 million of substation work, \$0.28 million for land services work, and \$2 million of transmission line work. The tentative schedule to construct the Direct Assignment and Network Upgrade facilities based on the work scope outlined in this FS is approximately 18 to 36 months from the execution of the Large Generator Interconnection Agreement (LGIA) and payment of the estimated Direct Assignment and Network Upgrade costs. This schedule reflects only the time PG&E requires to engineer, design, schedule, procure materials and construct the necessary facilities.

## CAISO Recommendations to the FS

### *ISO controlled facilities*

*South of CPV Colusa corridor:*

The Project was asked to participate in a new operating procedure by curtailing its output or to participate in a new Special Protection Scheme (SPS) in order to protect for a double circuit tower line outage and maintain the new CPV Colusa-Cortina 230 kV line within its emergency rating. Please be advised that since this FS does not include a SPS, it is assumed that the Project's output will be curtailed (pre-contingency) through a new operating procedure needed in order to maintain all transmission equipment within their applicable ratings before, during and after any credible contingency (including double circuit tower line

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<sup>7</sup> ITCC = Income Tax Component of Contribution

outage or two lines in the same right-of-way). This decision may also impact the Project's deliverability for purposes of determining the Net Qualifying Capacity under the CAISO Tariff and in accordance with CPUC-adopted Resource Adequacy Rules.

**Non-ISO controlled facilities**

CAISO will not interconnect a generator to the CAISO controlled grid in a manner that causes adverse impacts on other Affected Systems. In accordance with LGIP Section 3.4.4, the Interconnection Customer has to enter into an agreement with each one of the owners of the Affected Systems. The agreement(s) shall specify the terms governing payments to be made by the Interconnecting Customer to the owner(s) of the Affected Systems as well as the repayment by the owner(s) of the Affected Systems. The developer must submit to the CAISO evidence from the Affected System owner(s) (outside CAISO controlled grid) to this effect.

**Other**

We encourage you to follow the baseline deliverability studies ongoing at the CAISO. For more information on generation deliverability, please reference the following web link:

<http://www.caiso.com/181c/181c902120c80.html>