Phase I Ex Ante Review Findings

Table Error! No text of specified style in document.**-1: Project Information**

IOU	PG&E
Application ID	REEP-092
Application Date	10/3/2013
Program ID	PGE2225
Program Name	Refinery Energy Efficiency Program
Program Year	2013
Itron Project ID	X434
IOU Ex Ante Savings Date	10/3/2013
CPUC Staff Measure Name	Current Limiting Protector (CLiPs)
Project Description	Installation of CLiPs to bypass the existing line reactors on the high voltage bus between incoming PG&E lines and the plant as well as the refinery's cogeneration unit to reduce power losses (I^2R losses) during normal operations.
Date of CPUC Staff Review(s)	11/26/2013
Primary Reviewer / Firm	Phani Pagadala/ Itron
Review Supervisor / Firm	Joseph Ball/ Itron
CPUC Staff Project Manager	[redacted] / California Public Utilities Commission, Energy Division
CPUC Staff Policy Authorization (as needed)	
Type of Review (Desk, On-site, Full M&V, Tool)	Desk
CPUC Staff Recommendation	This project's ex ante savings are conditionally approved; pending the post-installation M&V and true-up of savings estimates.

Measure Description

As per the ex-ante documentation, the measure entails the installation of CLiPs to bypass the existing line reactors on the high voltage bus between incoming PG&E high voltage lines and the plant as well as the refinery's cogeneration unit to reduce line losses (I2R losses) during normal operations. The existing current limiting reactors (CLR) consist of inductor elements between the power source and the electrical load to oppose rapid changes in electrical current; they have significant impedances that create voltage drop and line losses.

The proposed CLiPs are anticipated to have lower impedances and the resistive component of the impedance is reported to drop the I^2R losses to an estimated 140W per line at rated conditions. During normal operations the CLiPs will bypass the existing reactors. However, in the case of rapid current changes on a line, the facility anticipates that the CLiP will switch over to the existing reactor in parallel to provide the high reactance necessary to limit the current changes and avoid damage to electrical equipment. The project will achieve energy savings from reduced I^2R losses during normal operations.

The estimated energy savings from this project 530,827 kWh and 61.1 kW of demand reduction. The project documentation indicates that these savings represent 0.44% of the electricity purchased by the refinery from PG&E and will not change the facility Cogen Unit's operations, but will only result in consuming less electricity from PG&E.

Summary of Review

The Investor-Owned-Utility (IOU) submitted an MS Word document on 11/13/2013, in response to the EAR team's parallel review data request (DR) on 10/31/2013 for this Phase I review. The original project documentation, submitted on 10/16/2013 included the following:

- Project Participation Agreement (PPA)
- Savings Calculations
- CLR Test and Trend Data
- Site Inspection Photos.

The IOU calculations are based on the estimated resistance and trended hourly current data of the existing CLRs collected for a period of about 2 months. The calculations and the assumptions utilized are appropriate and the projected savings estimates will need to be trued up based on the post-installation operation data.

The IOU included a post-installation M&V plan within the PPA document. The EAR team requests that the duration of the post-installation trend data collection be increased to 2 months from one month, in order to capture stable measure operating data.

It must be noted that the IOU calculations utilized old test data from 2002 for baseline reactor resistance values. Additionally, for one of the reactor lines RX 201, the impedance calculation is a function of trended current and an assumed average voltage drop across the remaining three reactor lines. This may not be entirely accurate, but in case of absent data, may be an acceptable approach.

Review Conclusion

The CPUC staff conditionally approves the savings for the proposed project and requests an opportunity to review the savings estimates after the post-installation M&V work is completed. The proposed post-installation M&V plan, included within the submitted PPA document, is approved, but with a slight modification as noted below.

Summary of CPUC Staff Requested Action by the IOU

CPUC Staff requests that the IOU submit the following once the measure installation and the post-installation measurements are completed:

1. Submit revised savings calculations for true-up, and
2. Provide supporting documentation on the project's actual measure cost estimates.

Table 1-2 Review Findings

Reviewed Parameter	Analysis
Project Baseline Type (Early Replacement, Normal Replacement, Capacity Expansion, New Construction, System Optimization, Add-on Measures, Major Renovation) Note: For early retirement projects only, include RUL through EUL baseline)	IOU Proposal: Add-on measure
	CPUC Staff Assessment: Add-on measure
	CPUC Staff Recommendation: None
Project Baseline Technology (in situ equipment, Title 24 (specify year), other code or other efficiency level (specify), industry standard practice - ISP)	IOU Proposal: In situ (existing CLRs)
	CPUC Staff Assessment: In situ CLRs are acceptable
	CPUC Staff Recommendation: Non
Project Cost Basis (Full Incremental, or Both.	IOU Proposal: Full

Reviewed Parameter	Analysis
Note: For early retirement projects, include RUL through EUL cost basis treatment)	CPUC Staff Assessment: Acceptable
	CPUC Staff Recommendation: None; upon completion of project provide supporting documentation on the project's actual measure cost estimates
RUL (required for early retirement projects only, otherwise N/A)	IOU Proposal: 14 years
	CPUC Staff Assessment: Acceptable
	CPUC Staff Recommendation: None
EUL (for each measure)	IOU Proposal: 25 years
	CPUC Staff Assessment: The CPUC policy limits EUL to 20 years
	CPUC Staff Recommendation: 20 years
Savings Assumptions	IOU Proposal: The IOU calculations utilized the existing CLR data sheet which documents the line reactor resistance, R and reactance, X; both values were tested under rated conditions (3000 Amps and 75°C). The R/X ratio from the data sheet together with general impedance, resistance and reactance relationships were used to calculate the true reactor resistances with supplemental current data obtained from trends. The proposed CLiPs' resistance values were taken from manufacturer specification data.
	CPUC Staff Assessment: Savings assumptions are valid.
	CPUC Staff Recommendation: Utilization of actual post-installation operating characteristics will ensure the accuracy of savings estimates.
Calculation Methods/Tool review	IOU Proposal: Spreadsheet based calculations
	CPUC Staff Assessment: Calculation methodology used is acceptable
	CPUC Staff Recommendation: The EAR team recommends the use of post-installation M&V data, as the IOU plans, but with a longer duration (2 months) of measure operating data.
Pre- or Post-Installation M&V Plan	IOU Proposal: The IOU included a post-installation M&V plan within the PPA document.
	CPUC Staff Assessment: The IOU M&V plan is approved with a slight modification identified below.
	CPUC Staff Recommendation: The EAR team requests that the duration of the post-installation trend data collection be increased to 2 months from one month, in order to capture stable measure operating data
Net-to-Gross Review	IOU Proposal: Not provided
	CPUC Staff Assessment: Not addressed
	CPUC Staff Recommendation: None at this time

Table 1-3 Energy Savings Summary, Project Costs & Incentive

Description	IOU Ex Ante Claim	CPUC Staff Recommendations
First Year kWh Savings	530,287	TBD
First Year Peak kW Savings	61.1	TBD
First Year Therms Savings		
kWh Savings (RUL Period)	530,287	TBD
Peak kW Savings (RUL Period)	61.1	TBD
Therms Impact (RUL Period)		
kWh Savings (RUL thru EUL Period)	Not provided	TBD; the EAR team believes that the as-installed measure will be the project technical baseline at the end of the RUL and thereby no savings for the RUL thru EUL period can be attached to the measure.
Peak kW Savings (RUL thru EUL Period)	Not provided	TBD; same as above
Therms Savings (RUL thru EUL Period)		
Annual Non-IOU Fuel Impact (RUL Period)		
Annual Non-IOU Fuel Impact (RUL thru EUL Period)		
Project Costs for Baseline #1 (RUL or EUL)	$944,000	CPUC Staff requests that the IOU provide supporting documentation on the project's actual measure cost estimates
Project Costs for Baseline #2 (EUL minus RUL period)	TBD	TBD
Project Incentive Amount	$53,836	TBD; based on ex-post M&V and savings true-up.