

## **Ex Ante Review Findings**

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

<b>IOU</b>	PG&E
<b>Application ID</b>	2K12078819
<b>Application Date</b>	1/30/2012
<b>Program ID</b>	PGE2225 – Refinery Energy Efficiency Program
<b>Program Name</b>	Customized Retrofit
<b>Program Year</b>	2012
<b>Project ID</b>	2K12078819
<b>IOU Ex Ante Savings Date</b>	2/28/2912
<b>ED Measure Name</b>	Preheat BFW with HCO Pump-around in FCC Unit
<b>Project Description</b>	The project adds two heat exchangers on the Heavy Cycle Oil (HCO) loop to pre-heat boiler feed water (BFW). The recovered heat reduces the load on the 250 psig steam loop fed by the feed water system.
<b>Date of ED Review(s)</b>	10/10/12
<b>Primary Reviewer and Firm</b>	John Hill/Energy Division
<b>Review Supervisor and Firm</b>	Nikhil Gandhi/Energy Division
<b>Type of Review (Desk, On-site, Full M&amp;V, Tool)</b>	Desk Review
<b>ED Recommendation</b>	Energy savings estimates are not approved at this time, pending additional estimates of impact of measure on pumping power. Historical plant production rates concurrent with ex-ante savings estimates to be provided.

## **Measure Description**

The proposed project adds heat exchangers (E-2XA/B) in the Heavy Cycle Oil (HCO) pump-around loop in an oil refinery. The heat exchangers are used to pre-heat boiler feed water (BFW) to heat recovery steam drums supplying steam to the 250 psig steam header. The higher temperature feed water allows for increased production of 250 psig steam from the heat recovery steam drums. This reduces the need for 600 psig steam through the 600 psig to 250 psig let down, thereby reducing the 600 psig steam produced via Boiler #6. Gas savings are produced since there is continuous supplemental natural gas firing in this boiler.

## **Summary of Review**

The following documents were reviewed by the ED: project proposal, program review form and project cost report.

The project documentation provided information on the proposed effort, expected changes in the process flows at the refinery, documentation of the heat exchanger installation, post evaluation of process flows as monitored and their impacts on initial ex-ante savings estimates and final project costs.

The IOU via its project reviewer provided live energy savings calculation workbook to support the energy savings claim. The workbook identified areas where post installation data differed from those used to produce initial savings estimates. Saving estimates were revised based on those data. The post-installation calculation spreadsheet claims annual energy savings of 2,186,555 therms. The approved contract incentive for the project is \$1,850,694 based on an initial project cost estimate of \$5,400,000. Documentation supporting project cost of \$6,080,280 was provided for ED review.

Not included in the program evaluation was any potential impact on pumping loads on either the HCO pump-around loop or BFW loops associated with pressure drops through the new heat exchangers. Savings estimates were not adjusted to reflect pre- and post-installation production.

## **Review Conclusion**

The ex-ante energy savings are not approved at this time pending evaluation of potential increased in electric energy and demand associated with revised pumping energy and potential adjustment of savings for changes in production. Increased pumping usage would have a secondary fuel impact that should be reported though it may not impact the gas savings or approved incentives. Potential impact of production adjustments would reflect in estimated savings and perhaps incentive payable.

**Summary of ED Requested Action by the IOU**

In order to complete an ex ante review the ED recommends that the IOU submit the following documentation due as soon as possible, but not later than *October 25, 2012 (or 14 days after receipt of this EAR)*:

1. Provide data on increased pressure drops on the HCO and BFW loops associated with the new heat exchangers. This data is to be combined with information on loop flows along with existing pumps to provide estimates of the increase in pumping power associated with this measure.
2. Provide historical HCO and plant production rates.

**Table 1-2: Project Overview**

Description	IOU Proposed Ex Ante Data	ED Recommendations
<b>Project Baseline Type (Early Replacement, Normal Replacement, Capacity Expansion, New Construction, System Optimization, Add-on Measures)</b>	Project described as Customized Retrofit	Baseline types of System Optimization or Add-on Measure would be appropriate
<b>Project Cost Basis (Full Cost, Incremental Cost)</b>	Original estimate of \$5,400,000	Acceptable. Documented final project cost was \$6,080,280.
<b>RUL (Early retirement projects only, otherwise N/A (not applicable))</b>	N/A	N/A
<b>EUL</b>	Not provided	14 years for heat recovery equipment
<b>First Year kWh Savings</b>	none	TBD; ED requests that estimates be made on potential electricity increases associated with increased pumping energy.
<b>First Year Peak kW Savings</b>	none	TBD; ED requests that estimates be made on potential electric demand increases associated with

Description	IOU Proposed Ex Ante Data	ED Recommendations
		increased pumping energy.
<b>First Year Therms Savings</b>	2,186,555	TBD
<b>kWh Savings (RUL Period)</b>	N/A	N/A
<b>Peak kW Savings (RUL Period)</b>	N/A	N/A
<b>Therms Impact (RUL Period)</b>	N/A	N/A
<b>kWh Savings (EUL thru RUL Period)</b>	N/A	TBD
<b>Peak kW Savings (EUL thru RUL Period)</b>	N/A	TBD
<b>Therms Savings (EUL thru RUL Period)</b>	N/A	TBD
<b>Annual Non-IOU Fuel Impact (RUL Period)</b>	N/A	N/A
<b>Annual Non-IOU Fuel Impact (EUL thru RUL Period)</b>	N/A	N/A
<b>Net-to-Gross Ratio</b>	Not provided	TBD

**Table 1-3: Detailed Review Findings**

<b>Reviewed Parameter</b>	<b>Analysis</b>
<b>Project Gross Savings Baseline</b> (for early retirement projects only, include RUL through EUL baseline)	IOU Proposal: none.
	ED Assessment: Project is Add-on.
	ED Recommendation: none.
<b>Project Cost Basis</b> (for early retirement projects only, include RUL through EUL cost basis treatment)	IOU Proposal: Full cost provided in the IOU post installation report.
	ED Assessment: Cost details are provided and reviewed by IOU internal review.
	ED recommendation: none.
<b>RUL</b> (required for early retirement projects only, otherwise n/a)	IOU Proposal: N/A
	ED Assessment: N/A.
	ED Recommendation: N/A
<b>EUL</b>	IOU Proposal: None provided
	ED Assessment: EUL not identified in the documentation received.
	ED Recommendation: 14 years
<b>Savings Assumptions</b>	IOU Proposal: Live energy savings calculation spreadsheet was provided
	ED Assessment: Process details provided based on spot readings. No annual production data or HCO flows were provided to allow savings to be normalized based on plant production.
	ED Recommendation: Provide annual representative pre- and post-installation production and HCO flow data.
<b>Calculation</b>	IOU Proposal: Live energy savings calculation spreadsheet was provided

<b>Reviewed Parameter</b>	<b>Analysis</b>
<b>Methods/Tool review</b>	ED Assessment: The Calculation method is appropriate for therm savings. No data or analyses are provided on potential increased in electric energy or demand associated with revisions to pumping systems.
	ED Recommendation: Expand calculations to include potential impacts of electric usage of pumping systems.
<b>Pre- or Post-Installation M&amp;V Plan</b>	IOU Proposal: Not provided
	ED Assessment: M&V effort should provide data on plant production rates and long-term flow through the HCO loop to confirm savings estimates.
	ED Recommendation: Conduct full M&V per program rules. Submit M&V plan to ED for review as required by the program rules.
<b>Net-to-Gross Review</b>	IOU Proposal: None
	ED Assessment: A NTG interview may be warranted.
	ED Recommendation: Conduct NTG interview.