

Case Study / Operational Analysis Report



EDC Technologies, Inc.
50 Executive Drive
Rohnert Park, CA 94928
949.388.2753

Date: November 9, 2010

Client: Macaroni Grill

Property: Aliso Viejo, CA

Purpose:

To observe, commission and tune the boiler environment for sustained energy savings. This test is for a single water heater environment. The objective of the test was to validate EDC technologies boiler control technology and methodologies in a restaurant environment with a recirculation loop and pump.

Process Summary:

Savings and optimization on this facility was performed in four phases. After each phase, the specific change in the systems operation was logged and measured to quantify the results. As a result of EDC's optimization process and methodologies, the facilities temperatures were optimized and reduced to the required (and safer) operational levels of 140° during business hours.

- Phase 1 Monitoring of Existing Temperatures and Operational Parameters
- Phase 2 Applying a controlled operational profile to the facilities boiler system
- Phase 3 Controlling the circulation pump in conjunction with the boiler operational profile
- Phase 4 Stabilizing the operational temperatures to 140° during business hours and sustaining the savings long term

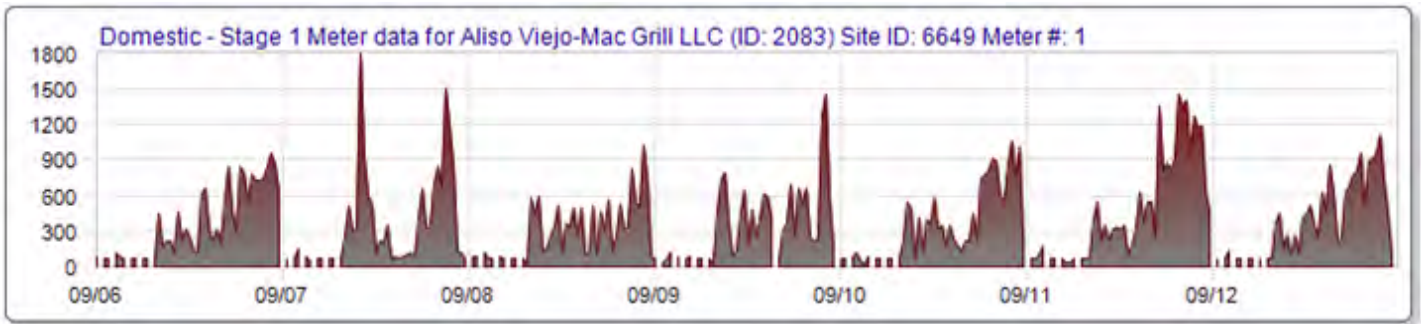
Economic and Operational Results to the facility:

- 25.4% Savings Sustained
- 135 Therms Saved per month
- 1640 Therms Saved per year
- \$1,230 Saved per year in reduced gas consumption

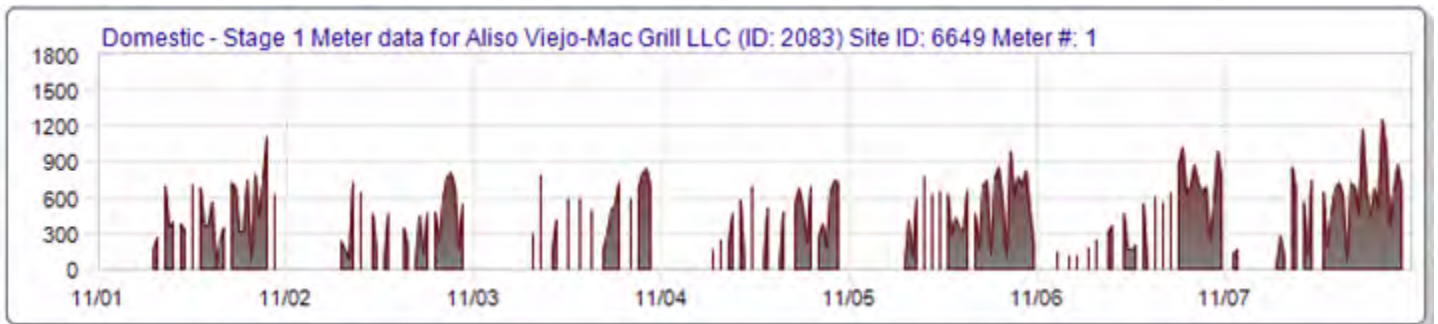
Note, during the test period the assumed cost of gas for this location is \$.75 per therm.

The following two charts compare gas consumption before and after tuning.

Gas Consumption Prior to EDC Control

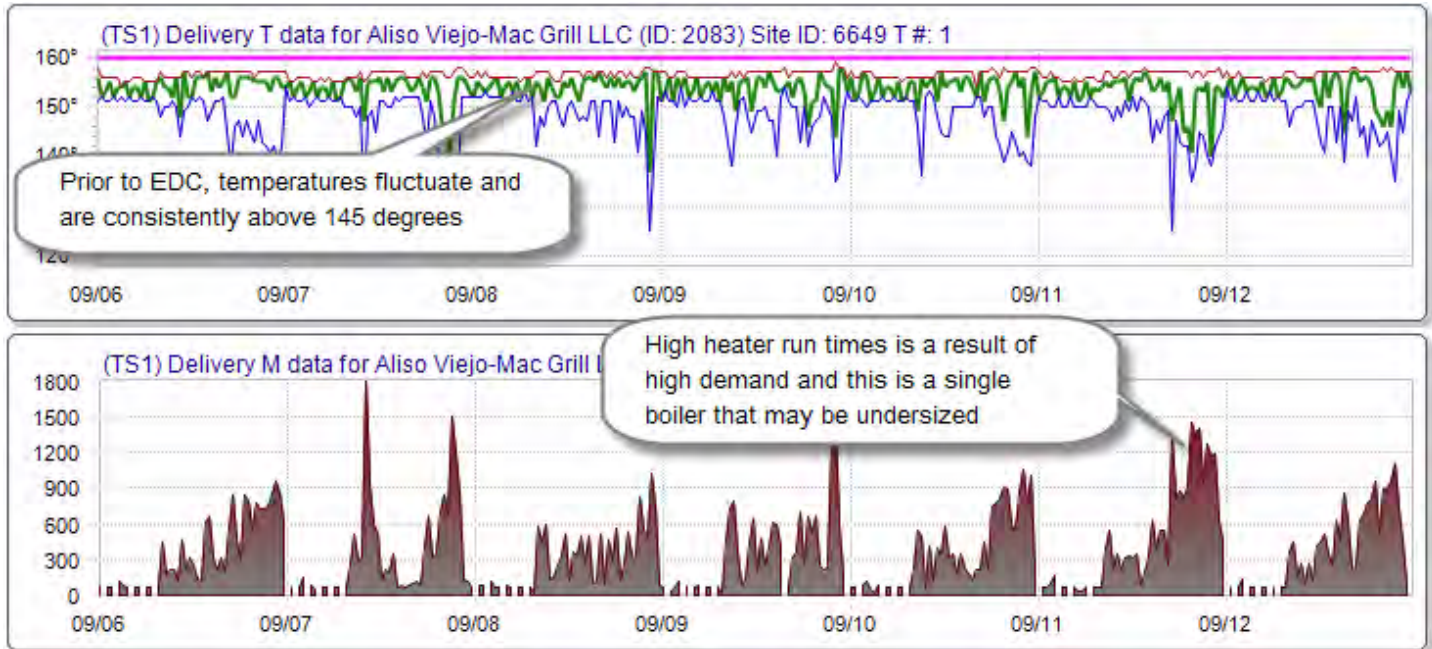


Reduced Gas Consumption Post EDC Control

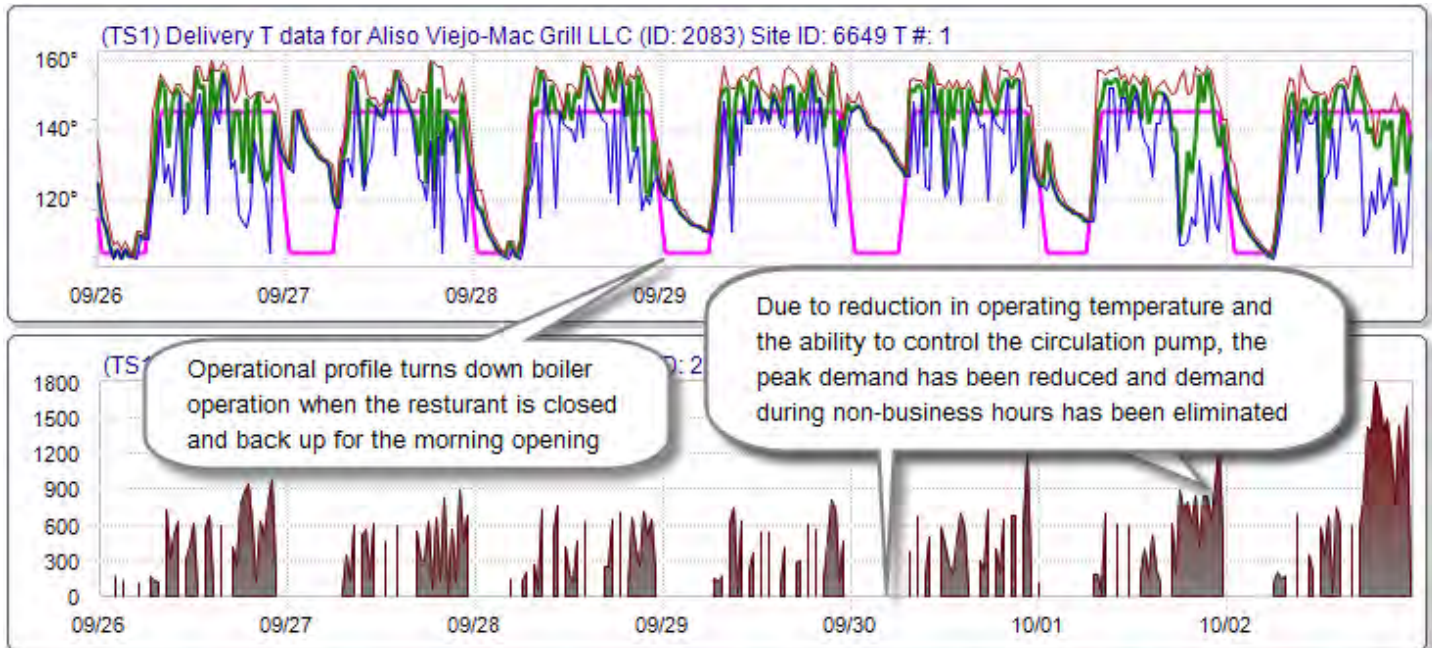


The following pages detail each of the four phases in which EDC "Commissioned and Tuned" the boiler systems for Macaroni Grill Aliso Viejo. In the following charts, the **Green** line is the true average temperature that occurred during the 1/2 hour in question, **Red** is absolute high that was triggered and **Blue** was absolute low within the same period.

Phase 1 - Monitoring of Existing Temperatures and Operational Parameters

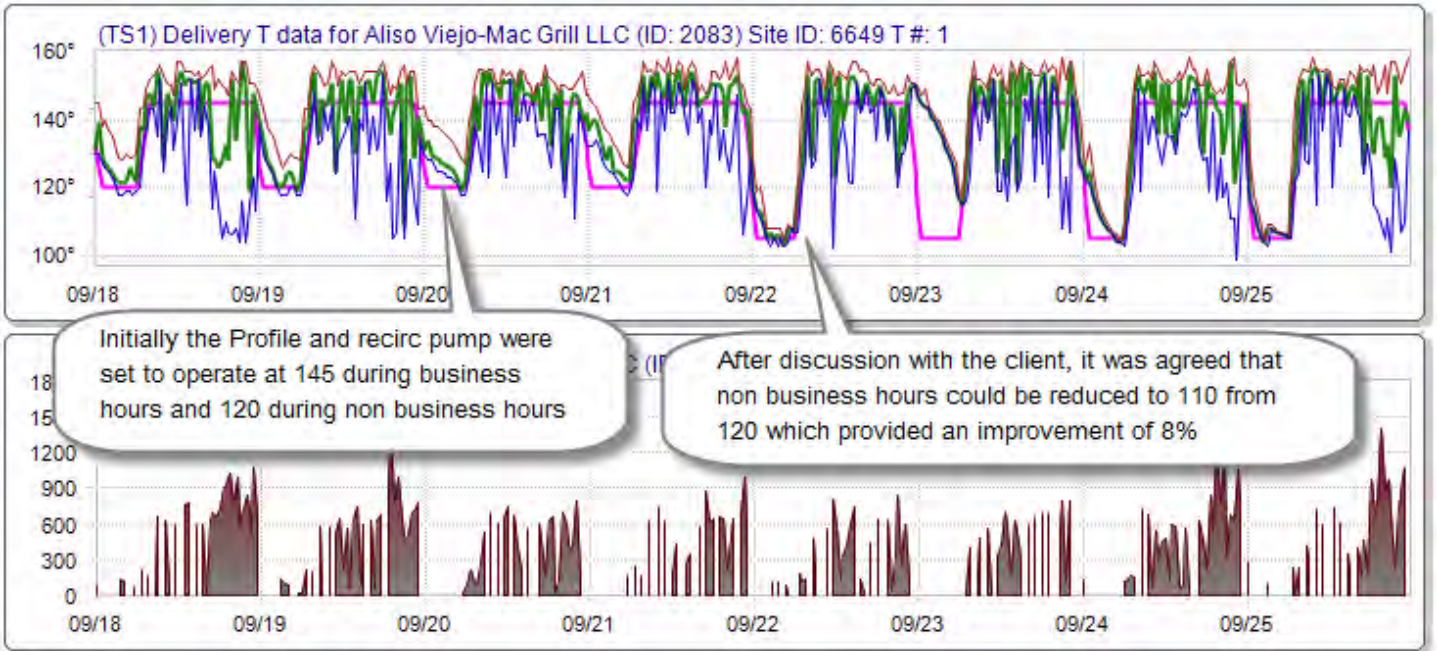


Phase 2 - Applying an operational profile to reflect hours of operation

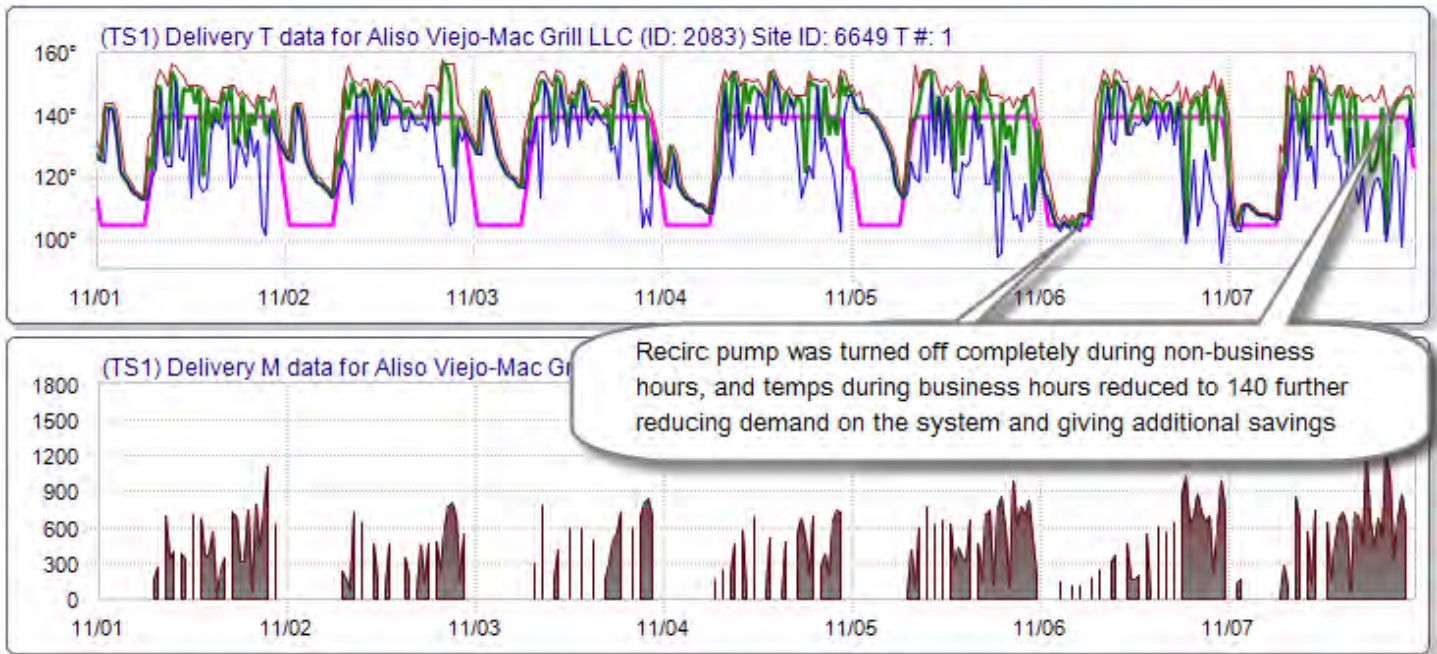


Comments: Once control is established, the temperature still fluctuates, however the temperatures are better kept in check on the high end.

Phase 3 - Applying an operational profile to reflect hours of operation



Phase 4 - Further fine tuning and reduction of temps during business hours from 145° to 140°



Final economics:

Manuf	Device Name	Name Plate BTUs	Therm Per Hr	Burn Ratio	Adj Therms Per Hr	Hrs Day DS1	Hrs Day DS2	% Saved	Therms Saved Mth	Therms Saved Yr	Dollars Saved Mth	Dollars Saved Yr
A.O. Smith	Domestic - Stage 1	390000	3.90	100 %	3.90	4.53	3.38	25.4 %	135	1,640	\$101.08	\$1,229.84
					Total	4.53	3.38	25.4 %	135	1640	101.08	1,229.84