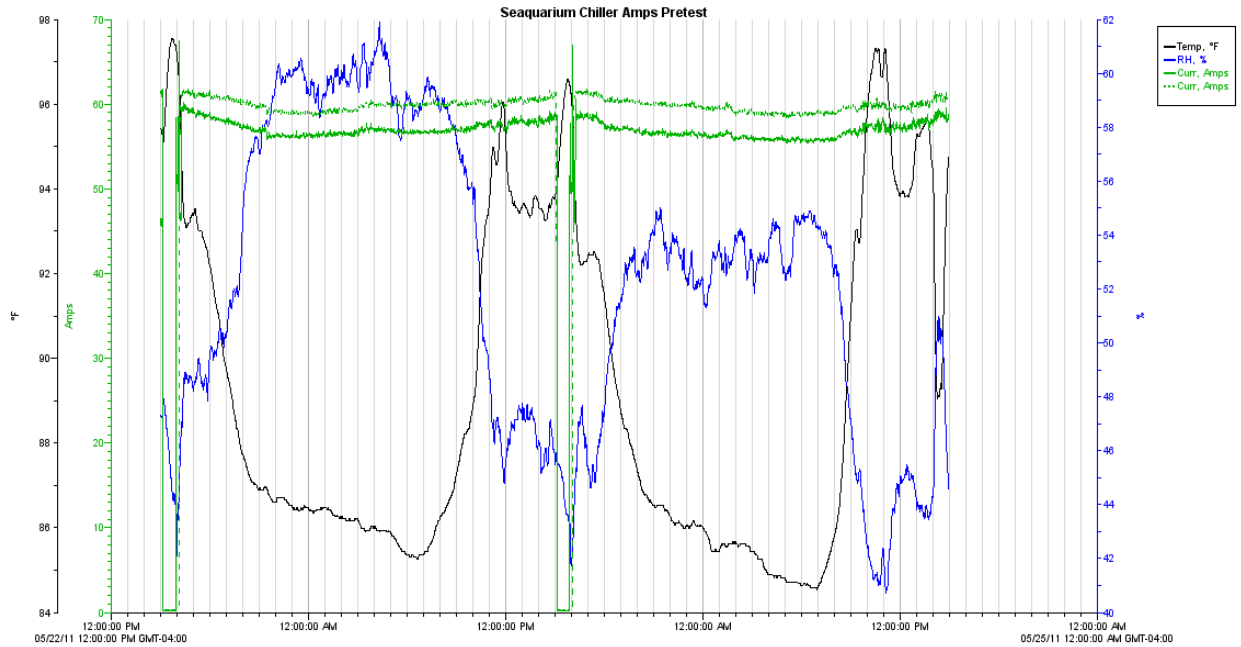
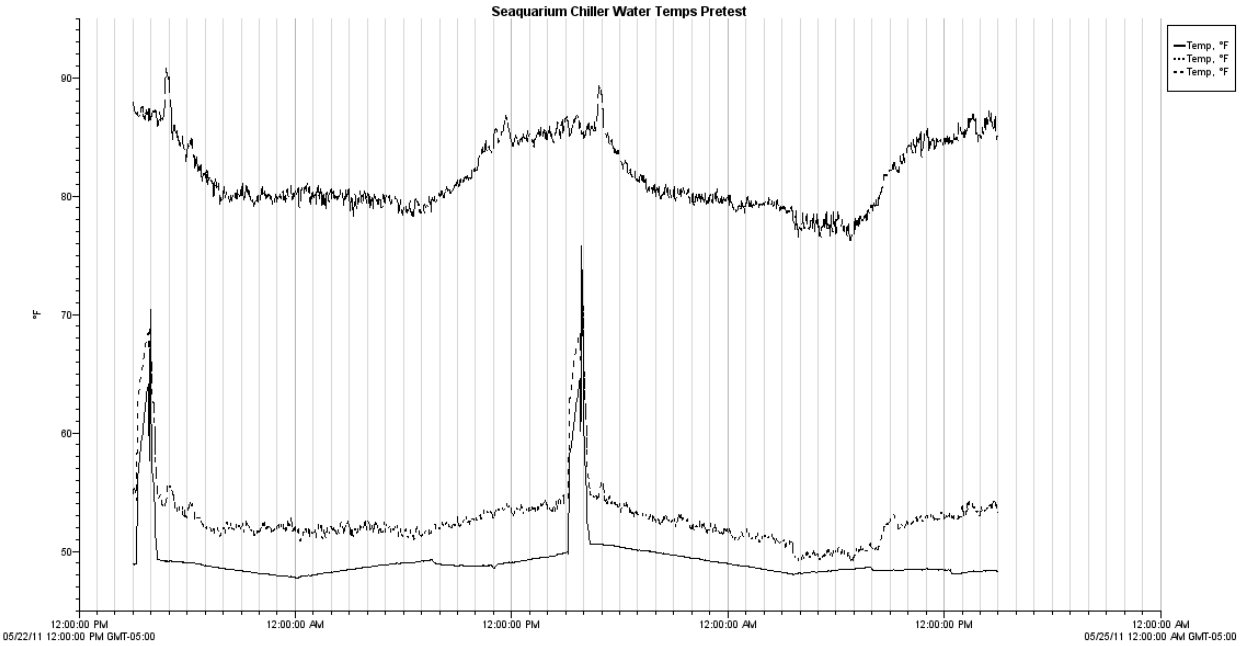
Seaquarium Chiller Test Results

This test was conducted at the Miami Seaquarium from May 20th to June 16th, 2011. The chiller tested was a Carrier 30GTN070-E631KA that is used as one of a series of chillers used to chill the water in a salt water pool. Because of the configuration the logging was confined to amp draw and inlet and outlet temperatures as well as the circulating water from the salt water pool.

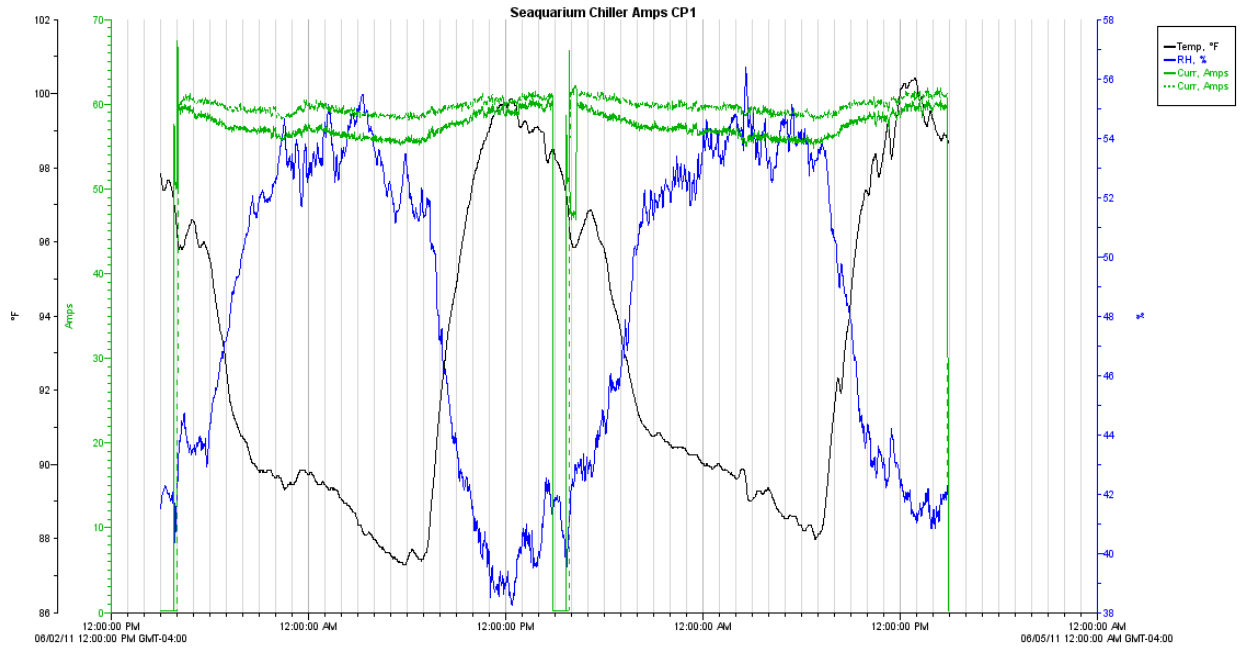
The following chart shows the amps for the pretest period (baseline) followed by the corresponding chart with water temperatures.

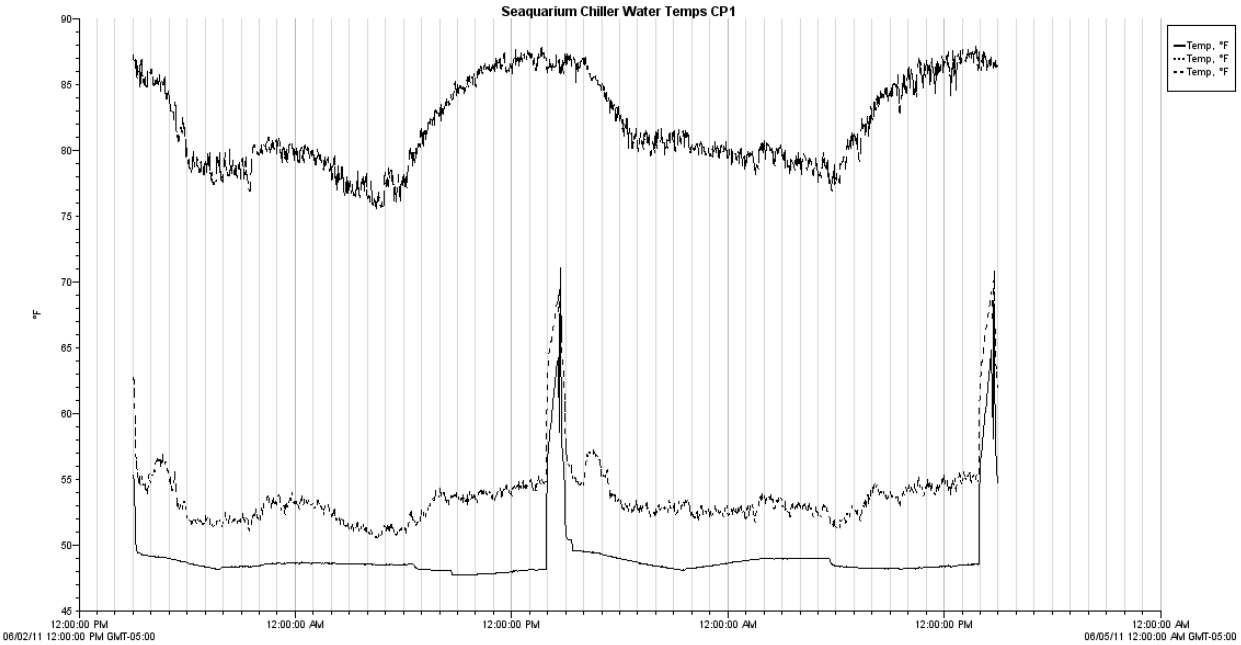




The charts begin with a shutdown period to facilitate the replacement of salt water in the pool with fresh salt water in order to keep the water chemistry correct. This is done on a daily basis. If you follow the chart you will see the beginning shutdown followed by continuous run time until the next shutdown and then continuous run until the last shutdown. All of the comparison charts cover the same operational conditions. The bottom chart corresponds with the one above and shows water temperatures. The bottom two lines show the inlet and outlet temperatures of the chiller. The difference in F° is the ΔT and is the measure of the output of the chiller. The higher the ΔT the higher the output of the chiller.

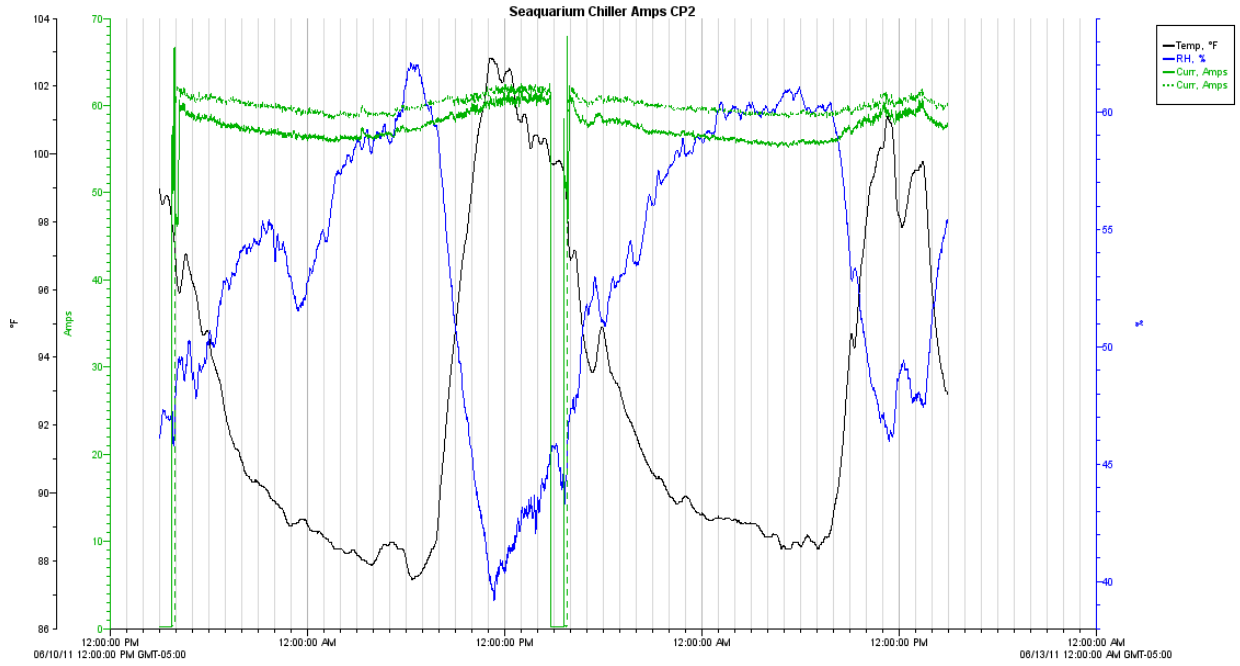
On May 31st, 2011 Cold-Plus™ was injected into both of the compressors in the chiller and the first comparison data was taken on June 2nd-4th.

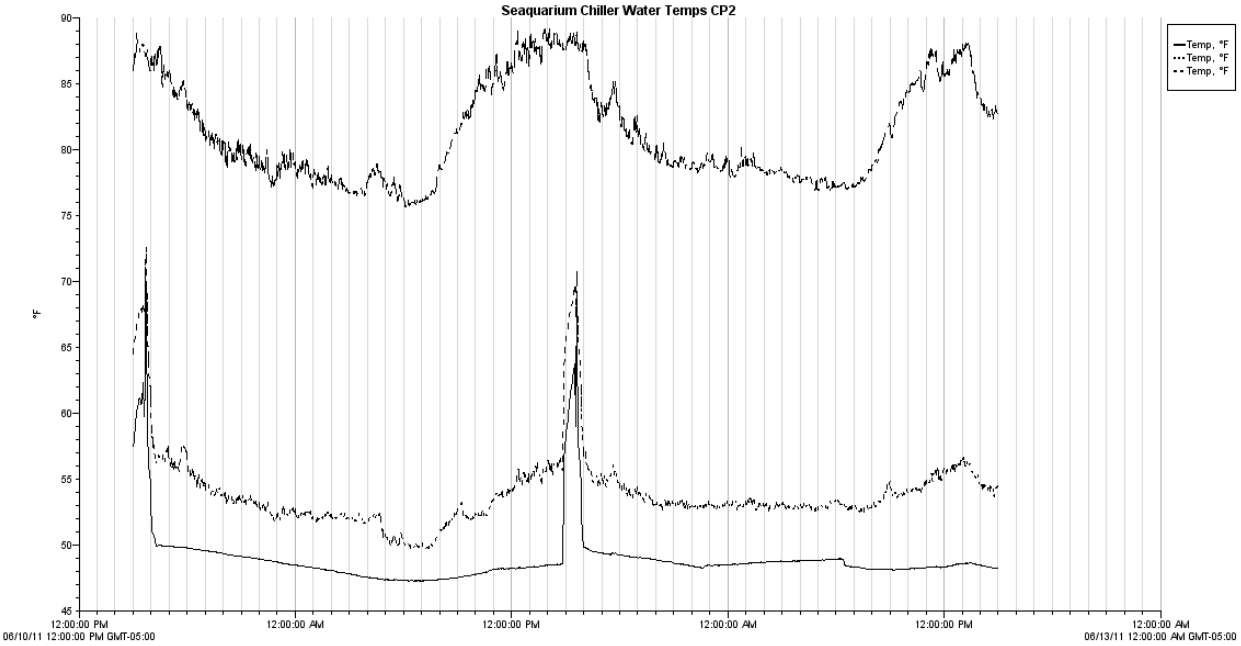




What you see here is basically the same pattern in the amps and a higher ΔT represented by the space between the lower two lines on the graph above.

This set of charts represents the final data period of June 10th-12th.





This chart shows an even greater ΔT indicative of increased efficiency.

Analysis of Data

Carrier 30GTN070-E631KA

Capacity in Tons	73
Flow Rate gpm	2.4
Voltage	460
Phase	3
Power Factor	0.85

Baseline		**4 Days After Install**		**12 Days After Install**	
Avg Ambient Temp °F	81.33	Avg Ambient Temp °F	81.67	Avg Ambient Temp °F	82.00
Inlet Water °F	52.82	Inlet Water °F	53.76	Inlet Water °F	53.96
Outlet Water °F	49.32	Outlet Water °F	49.03	Outlet Water °F	48.97
Chilled Water Δ T°	3.50	Chilled Water Δ T°	4.73	Chilled Water Δ T°	4.99
GPM	175.20	GPM	175.20	GPM	175.20
Avg Amps	56.20	Avg Amps	56.19	Avg Amps	56.65
Avg KW	38.02	Avg KW	38.01	Avg KW	38.32
Work BTU/Hour	306600	Work BTU/Hour	414348	Work BTU/Hour	437124
Work Tons	25.55	Work Tons	34.53	Work Tons	36.43
Efficiency KW/Ton	1.49	Efficiency KW/Ton	1.10	Efficiency KW/Ton	1.05
EER	8.06	EER	10.90	EER	11.41
		EER Improvement	**35%**	EER Improvement	**41%**
		Efficiency Inc. KW/Ton	**26%**	Efficiency Inc. KW/Ton	**29%**

This data shows that the output gain in the chiller was increased significantly after the addition of Cold-Plus™. You will also note that the average amps changed very little and were most likely a reflection of decreased condenser efficiency with the heat rise from the pretest measurements.