1 Actual cost savings case – *name withheld*

1.1 Pump Station – Upstate NY "WD"

On May 8, 2006 PhoenixSentry on request of the local Water & Waste Department (WD) installed a PhoenixSentry unit at Pump Station X in western NY. This location was chosen because this pumping station's operation was problematic, causing excessive alarms and maintenance calls. This installation consisted of a single PhoenixSentry Monitor.

The monitor was configured to collect data for five of the pumping station's operating parameters:

1. Water Level – Reports depth of water in holding tank
2. High Temperature Alarm – Reports status of pump controller's temperature alarm output
3. High Water Alarm Status – Reports status of pump controller's high water alarm output
4. Lead Pump ON/OFF – Reports if Lead (Primary) pump is active
5. Lag Pump ON/OFF – Reports if Lag (Secondary) pump is active

After the installation was completed and correct operation was verified, it was decided that the installation would be evaluated after thirty days to access its performance. During the thirty-day review, the Water Department indicated that they were pleased with the units operation and that it was an improvement over competitive systems that were currently installed at other locations in the district. The two major benefits indicated by WD were the PhoenixSentry's customization options along with responsive customer support. The WD purchased the monitor and permanently installed it at the pumping station. Along with this purchase, WD made a commitment to upgrade the remainder of their pumping locations as their budget would allow.

1.1.1 Efficiency Problem

During the spring season of 2007, we were performing a review of the data for the WD installation at which point pump problems were identified. This station uses a combination Lead Pump/Lag Pump pair. During normal operation of the pumping station, the lead pump is performs the bulk of the pumping duties while the lag pump only on when the incoming water volume exceeds the lead's capacity. In reality, both pumps were operating for 20-22 (twenty to twenty-two) hours a day with idle periods only between the hours of 4 and 6 am!

These excessive runtimes are shown in the 24-hour graphs in *Figures 1-2 and 1-3*.

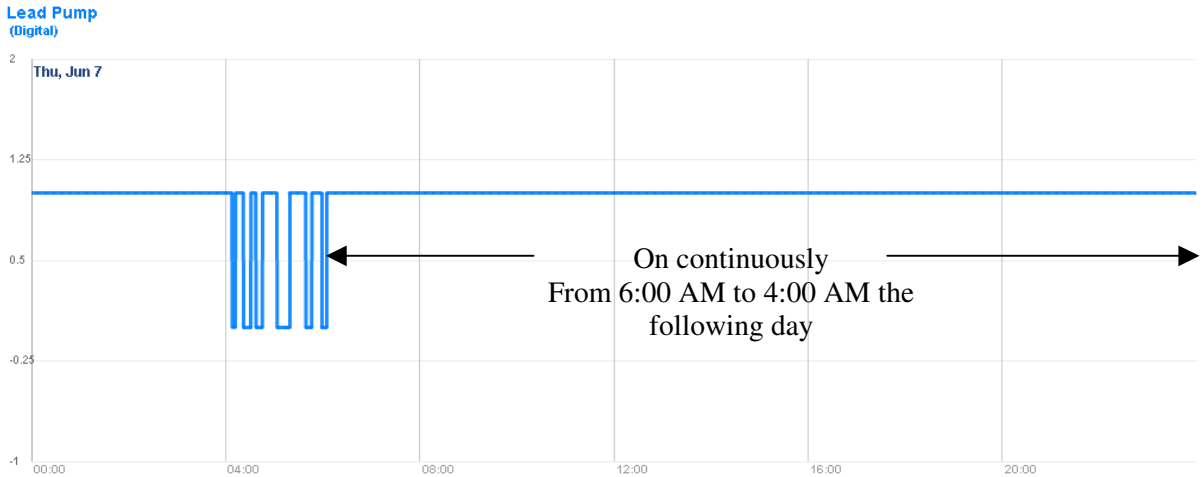

Figure 1-2 WD's Pump Station Lead Pump

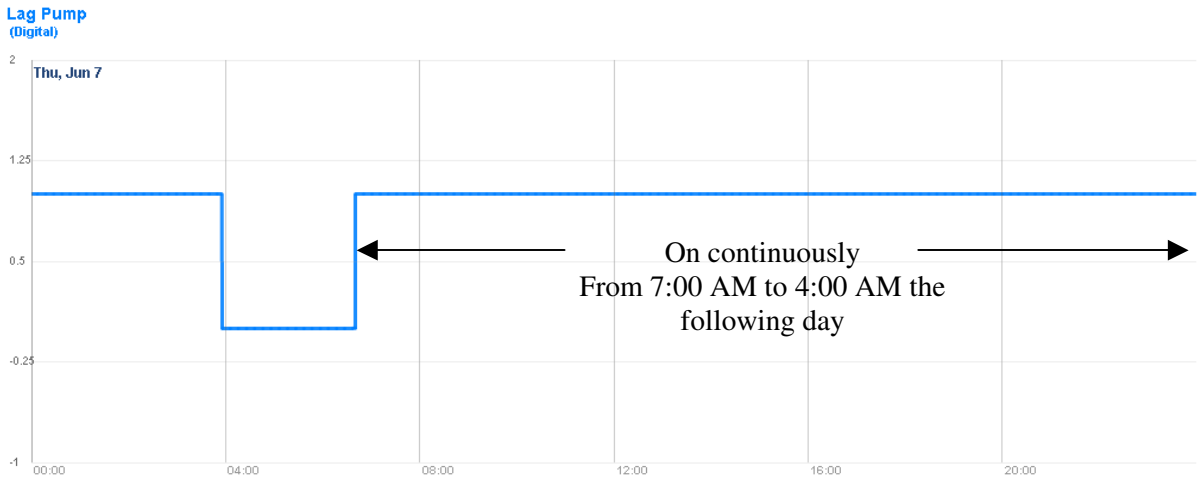

Figure 1-3 WD's Pump Station Lag Pump

After contacting the WD with this data, they performed an internal review and came to the conclusion that the system was operating excessively. The performance data was then relayed to the original designers of the pumping station and their engineers concluded that the pumps were equipped with incorrectly sized impellers that were dramatically reducing the systems total efficiency.

The pump impellers were replaced on June 10th, 2007 and a dramatic change was immediately apparent. Figures 1-4 and 1-5 show the lead and lag pump runtimes following the impeller change (these graphs only show the hours of 8am to 4pm for clarity).

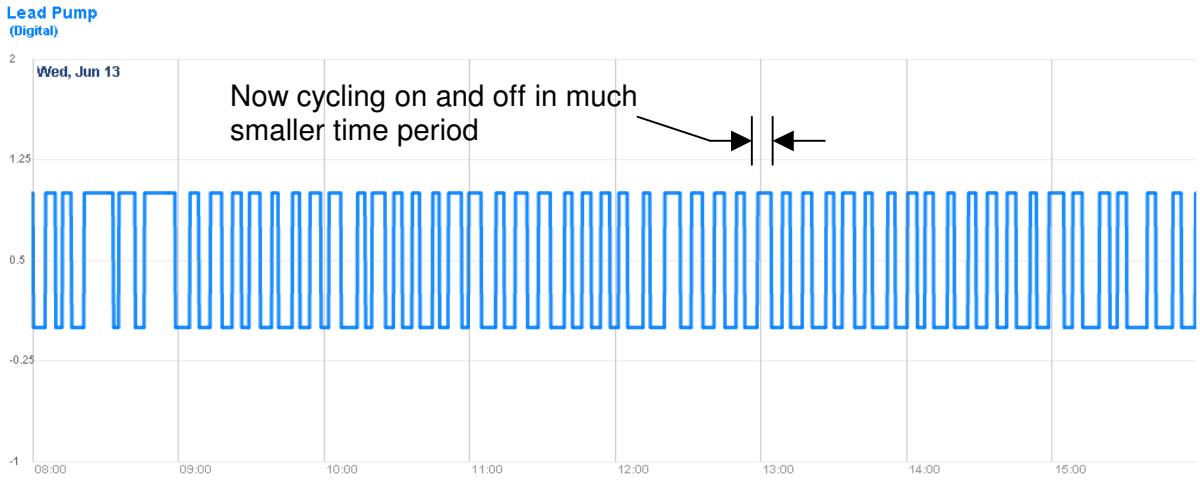

Figure 1-4 WD's Pump Station – (After Pump Modified) Lead Pump

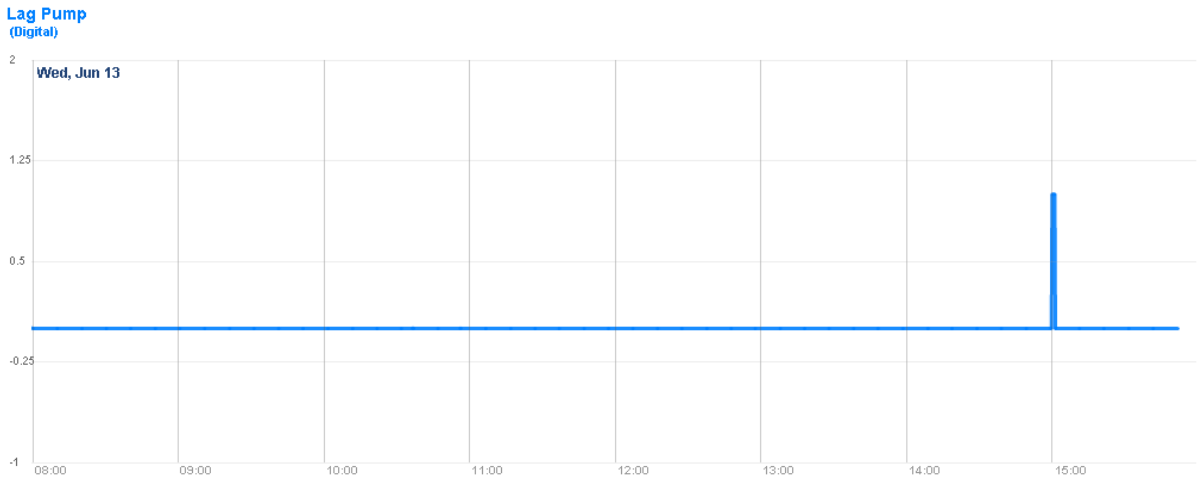

Figure 1-5 WD's Pump Station - (After Pump Modified) Lag Pump

These graphs clearly show the considerable reduction in energy usage as the lead pump demand has dropped from 71% to 32% and the lag pump demand has dropped from 25% to less than ½ %!

1.1.2 Savings

To calculate the savings that were attributable to the pumping station modification, data from the eight months directly following the modifications were compared to the same eight month period from the previous year as show in *Figures 1-6 & 1-7* (Power usage is based on readings that were available at time of report). In addition, the pump station was built and put on line somewhere around April of 2004. Assuming the system had not changed since installation, this represents a time period of 3 ¼ years (April 2004-July 2007) of wasted electrical demand. We have correlated this data with actual data taken from WD's utility bill records.

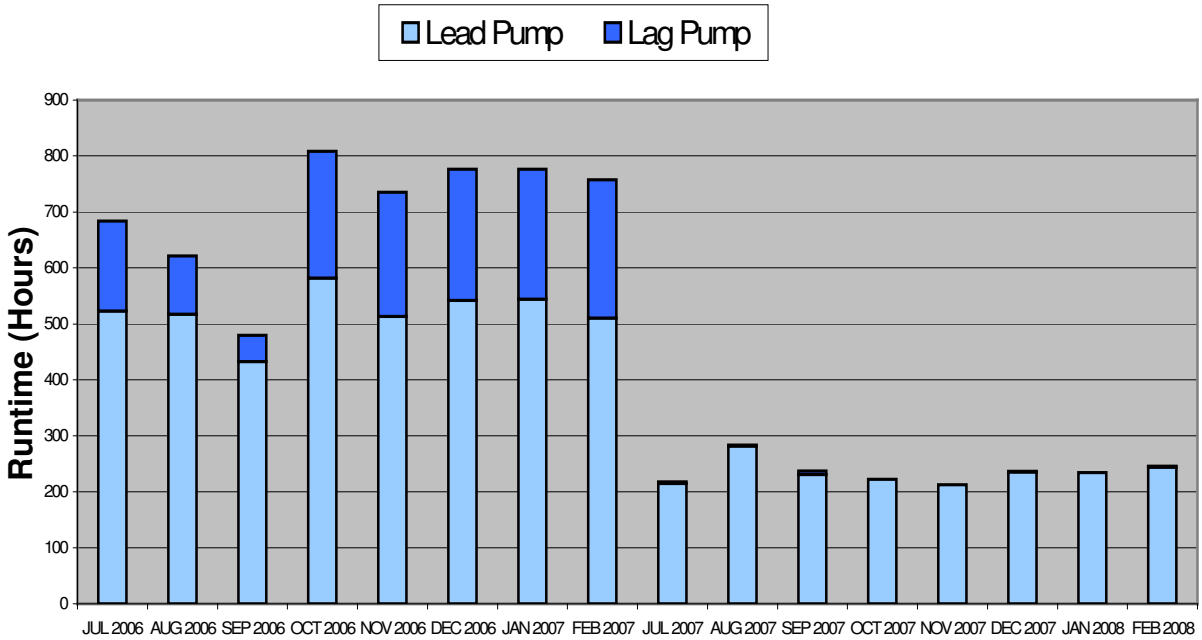

Figure 1-6: Lead/Lag Pump Runtimes

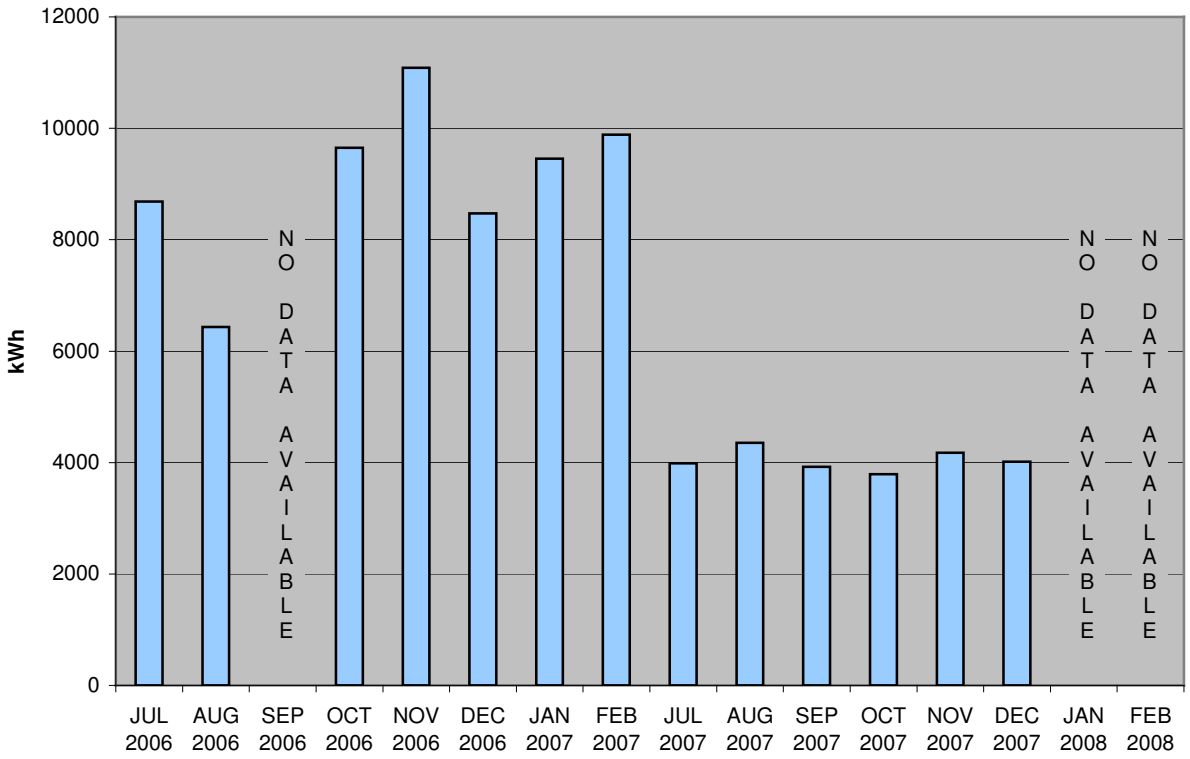

Figure 1-7: Pump Power Usage

The results were an average decrease of 66% in electrical operating costs as shown in Table 1-1.

	Total Runtime (Hours)	Motor Power (HP)	Motor Power (watts)	KW/HP	KWh	$/kWh	$
Before	5638.70	25	18650	0.746	79890.77	$0.09029	$7,213.34
After	1890.84	25	18650	0.746	26789.96	$0.09029	$2,418.87
Reduction	3737.86	N/A	N/A	N/A	53100.81	N/A	N/A
% Reduction	66.29			**Savings**	53100.80		$4,794.47
				Savings %	66%		

Table 1-1 Operating costs – WD's pump station western NY
8 month period shown (equipment was installed in June 2007)