What did the SmartSignal software find?
On January 28th, 2012, the Proficy SmartSignal solution identified a potential issue on a reciprocating compressor. The solution detected that discharge pressure values were spiking as high as 40 BARG, when they were expected to stay steady around 30 BARG. Over the next two weeks, fluctuations in discharge pressure were detected as high as 40 BARG and as low as 15 BARG. The Availability and Performance Center diagnosed an apparent cause of liquid being entrained in the system.

What was the underlying cause?
This compressor system is equipped with a gas discharge cooler and discharge cooler bypass TCV (Temperature Control Valve) that is used to control the temperature downstream of the cooler at a predetermined set point. It is believed that when the TCV is partially bypassing the discharge cooler (on colder days), liquid is forming in the cooler due to the predominant flow path bypassing the cooler. Over time this accumulating liquid decreases available flow area thru the coolers and, as the temperature starts to rise, the TCV will redirect the gas flow thru the cooler. This ultimately causes a surging effect as the pressure builds up before pushing the accumulated liquid out of the cooler.

What was the value to the client?
The surging effect that this reciprocating compressor is experiencing can be very detrimental to the condition of the compressor. Surging will significantly change the loading on the piston rod and crankshaft, and could lead to these components failing. This formation of liquid will also lead to rapid filling up of the suction knock out drum and increases the possibility of liquid entrainment in the gas to the compressor suction (if the recycle valve is open at that time). The client is currently experiencing high demand on natural gas production so the client and the Availability and Performance Center are closely monitoring this piece of equipment until the situation can be addressed during the next outage.

Who found it? Mike Roe and Jenn Khong
Screenshot depicting fluctuations in actual discharge pressure (blue) versus expected discharge pressure (green).