



**Pacific Gas and
Electric Company®**



Power Plant Avoids Cost of Motor Replacement

The expense of replacing a key motor is staggering. Not only considering the ticket price of the item, but often more importantly the opportunity cost of downtime in production can cripple a plant if the problem is not managed efficiently and correctly. Pacific Gas and Electric Company, of California recently faced just such a dilemma.



Recognized as one of the top nuclear power facilities in the United States, the Diablo Canyon Power Plant offers a major source of safe, clean energy that helps ensure reliable electric service to over 2 million Californians every day.

In December 2004 a 125hp Screen Refuse Pump was found to be running hot and drawing excessive current. A first thought was to replace the motor with the spare from the warehouse. But what could be causing the excessive current draw?

There were no indications of bearing problems, voltage problems or current unbalance, excessive harmonics, voltage or current distortion, or rotor bar problems. Electrician Jim Steele wanted to see what the recently acquired Baker Explorer could tell about the motor condition.



PG&E Electrician Jim Steele

Explorer Diagnoses Condition

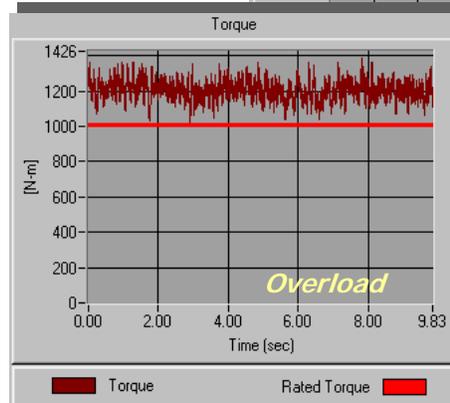
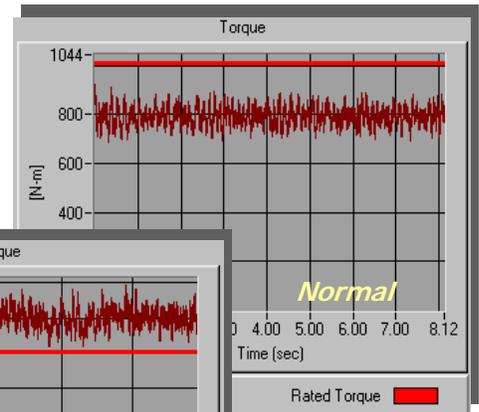
The load profile showed higher than rated values. Maintenance history research revealed that the impellor had been replaced in October 2004. It was discovered that a 17 inch impellor had been installed instead of the required 15.75 inch one. A properly sized impellor was installed, lowering the torque to the expected values.

The Explorer testing played a major role in ruling out a motor problem and going after the pump. Without the Explorer data it would have been likely that the motor would have been replaced at a cost of over \$23,000, and the condition would have continued to exist.

Torque Ripple

The Instantaneous Torque graph displayed that the torque level requested by the load exceeded the rated torque for this motor.

The torque levels returned to normal after replacing the incorrect sized impellor.



"Replacing the motor would have been a costly mistake as the problem would have still existed, overloading the replacement motor."

**- Russ Leatham,
M.Engr, P.E., PG&E**

Phasor Diagrams:

The Phasor diagram of the Refuse pump showed all currents exceeding the motor's full load currents – represented by the outer circle.

