

Flow Solutions at ExxonMobil

ExxonMobil's Research & Engineering Group (EMR&E) was founded in 1919 as one of the Nation's first industrial research organizations. Worldwide, they employ over 1,100 scientists, engineers, and support personnel developing process, product and engineering technology related to petroleum refining, transportation and marketing. A division of EMR&E is located in Paulsboro, NJ, approximately 11 miles from Philadelphia, PA. This facility consists of 33 buildings and is home to approximately 600 employees. A 950-acre refinery located next to the EMR&E facility was once owned by Mobil but was sold to Valero Energy in 1998. However, ExxonMobil continues to own and operate the Paulsboro research facility.

Luke Pritchard, Utility Operations Engineer with EMR&E's Facilities Management Group, was faced with a dilemma when it came to accurately and efficiently monitoring and controlling the flow of condenser water going to the facilities central chiller plant. Venturi type flowmeters were installed but were found to be both inaccurate and unreliable. The Venturi meter tubes would consistently clog with dirt and provide inaccurate flow readings. According to Pritchard, "It is



critical that the flowmeters be accurate since we also rely on them to control the variable frequency drives on the our three staging pumps. Not only were the meters providing erroneous readings due to dirt clogged the tubes but the faulty readings would in turn trigger the cycling of the other facilities pumps." The unnecessary use of the additional pumps resulted in escalated energy costs and needless wear and tear on the pumps. Since the meters were consistently inaccurate, the entire system would often be operating at 100% capacity. He recalls that the situation "became a control nightmare."

On the advice of local Marsh-McBirney sales representative, JD Instruments, Pritchard contacted a nearby Multi-Mag user, Wally Ratai, to discuss his experiences with the 25 Multi-Mag's he had purchased. Ratai is the Manager of Asset Engineering for Connectiv Operating Services Company (COSC). COSC provides third-party operations and maintenance services for over fifteen cogeneration and thermal facilities located in New Jersey, New York, Delaware, California and Pennsylvania. He related his positive experience with the Multi-Mag to Pritchard.

It was quickly realized that there were many similarities in the two applications, including restricted piping configurations that made the installation of most flowmeters difficult. Accuracy was a critical requirement they both shared as well. The EMR&E application would rely on accurate flow data for signaling other equipment in the plant's process and control system. Pritchard explains, "The main uses of the Multi-Mag's would be in controlling the pumps, staging the chillers, and using the 4-20 mA signal to control water flow at each chiller machine."

The Multi-Mag was designed to be quickly and easily installed through a standard hot tap without the need for system shutdown. Flow accuracy can be maintained close to bends and elbows unlike most flowmeters that require multiple straight pipe run distances away from difficult piping arrangements. The magmeters 1% accuracy specification has been verified worldwide by renowned independent flow laboratories including the National Institute of Standards and Technology (NIST) and the Water Research Center (WRc), just to name a few.

Eight Multi-Mag's, ranging in size from 4 to 13 inches, were installed in the spring of 2002. Pritchard cites accuracy, repeatability and installation convenience among his chief reasons for his decision to buy. He is also "thrilled" with the instantaneous readout of the meter allowing him to quickly view his flow readings without having to go into the main computer system. This feature, not available on the previously installed Venturis, has proven to be a big time saver.

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"Approximately \$50,000 savings
in energy costs alone."
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Pritchard figures the Multi-Mag's have saved the Paulsboro, NJ plant approximately \$50,000 in energy costs since this past spring by maximizing pump efficiencies. He also points to "a huge improvement in the efficiency of the entire system" since the Multi-Mag installation as further proof that he made the right decision.



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