

# RISK COMMUNIQUÉ

## ***Submersible vs. Line Shaft Water Pumps and Motors Failure and Replacement***

*Recent loss experience has shown that electrical line disturbances can cause water pumps and motors to fail. To manage this risk, there are several steps authorities can take when designing, installing or replacing a water pump and motor system. These can help to reduce the potential for a pump failure and avoid the costs associated with replacing a failed water pump system.*

**Pump Location: When possible, install the water pump and motor system (such as a line shaft turbine pump) at ground level, which significantly reduces the cost of installing, repairing, inspecting and replacing the motor and pump.** Submersible pump motors have both the motor and pump submerged at the groundwater well level. In some instances the well can be over 1,000 feet deep, and the costs of pulling a motor from this depth are significantly higher than when working at ground level. Both costs and downtime are appreciably lower when replacing or repairing a line shaft turbine pump motor located at ground level.

**Operating Environment: When using submersible motors, make sure protection from the surrounding environmental conditions is built into the design.** Submersible pump motors are more appropriate for urban areas where noise and aesthetics are a consideration. Since the submersible motor, pump and equipment are primarily located underground, the community noise is substantially less than that of a line shaft system with the motor and electrical-mechanical equipment located at grade level. A submersible pump system will have a smaller footprint at grade level, thus making it more aesthetically pleasing to locate in a neighborhood or urban area.

However, some manufacturers indicate that pump motor failure rates are higher for submersible pumps since they operate in a harsher environment. The motor is immersed in groundwater, which is an excellent conductor of electricity, and the groundwater can contain minerals, sand and grit that are abrasive. The motor design should be such that it provides protection from these elements.

**Installation and Maintenance: Submersible pump motors, by nature of their underground location, are not as easy to monitor for changing conditions as motors located at ground level.** As the age of any pump motor increases so does the failure rate. As motors age the seals can leak, electrical cables can be subject to abrasion, and electrical connections and splices may become corroded or loose. When installing a submersible pump motor, take care not to damage the insulation on the power cable, as this can lead to conditions that cause failure. Physical inspection of a submerged pump motor system requires pulling the equipment out of the well, and this process is time-consuming.

**Electrical Hazards: Choose a qualified electrical contractor who is familiar with the National Electrical Code and local regulations to design, select and install any water pump and motor system.** Proper design, selection and installation can help minimize the effects of lightning strikes, electrical line surges and power disruptions, which are some of the hazards associated with water pump and motor claims. The installation should be done in accordance with the manufacturer's instructions, and special consideration should be given to surge protection systems, motor circuit insulation, grounding, and secure installation.

*This is a sample guideline furnished to you by Glatfelter Public Practice. Your organization should review it and make the necessary modifications to meet the needs of your organization. The intent of this guideline is to assist you in reducing risk exposure to the public, personnel and property. For additional information on this topic, you may contact your GPP Risk Control Representative. [www.glatfelterpublicpractice.com](http://www.glatfelterpublicpractice.com)*