Wherever coal is produced or used, there is water – process water, wastewater seepage and runoff laden with coal fines, briquettes, dirt, rocks and other materials. Removing water from the places it collects is essential to the safe, efficient and compliant operation of coal mines, coal preparation facilities and coal-fired power plants. These tough dewatering applications are increasingly being handled by submersible pumps designed and hardened for the muddy and abrasive slurries unique to the coal industry.

Mike Bjorkman, BJM Pumps, US, describes how purpose-built coal slurry pumps are keeping operations moving in Kentucky.
Coal extractors, processors, transporters and power plants have typically used submersible dewatering pumps – many of them built for sewage – to manage water in their operations, usually with less than desirable results. Even the most rugged of these sewage or dewatering pumps are usually not satisfactory, requiring the manual removal of solids from sumps, wastewater pits and holding ponds. Moreover, the failure rate of these pumps in the coal industry’s tough conditions has been consistently high, requiring frequent repair, rebuilding and replacement. This has resulted in unacceptable rates of downtime, high labour costs, potentially unsafe working conditions and risks of regulatory noncompliance or environmental issues.

Within the coal industry, managing water is as critical upstream as it is down, and at all three major stages of coal production and use – extraction, processing and power generation – there are places where dedicated slurry pumps are raising efficiency, lowering life-cycle costs, improving safety, minimising environmental impact and preventing problems that could threaten a mine or plant’s operation. Some applications, such as cleanup sumps, runoff ponds and transportation, are common to all stages, but each stage has key areas where dedicated slurry pumps are paying off with significant benefits.

**Coal preparation**

As much as 50% of the material that comes out the ground during coal mining is waste: dirt, rocks and other impurities that must be washed from the coal before it can be processed and burned. This cleanup takes place in a sequence of dirty and water-intensive operations at a coal preparation plant. The coal is washed, crushed and sized according to the requirements of the plant’s customers. The average coal preparation plant may process as much as 4000 tph of coal, and unless the process and wastewater streams are well-managed, the facility can flood, become dangerous to work in or be forced to shut down altogether.

There are several locations at a coal preparation plant where pumps are required to handle collected water:

- In holding ponds fed by runoff from raw and clean coal stockpiles.
- In basement cleanup and conveyor belthead sumps.
- In truck-washdown sumps.

For reasons of cleanliness, safety and for reclamation of water and coal, a preparation plant’s floors, tunnels and equipment must be hosed down frequently. The water collects in various places throughout the plant and must be pumped out to keep the operation running smoothly and safely. Charles Emmerling of BJM Pumps said, “A coal preparation plant cannot afford a failure. If they start flooding because of an overflow, they will be waist-deep in water and slurry and will have to shut down the operation.”

**Case study**

A recent shutdown at a coal preparation plant in eastern Kentucky was caused by the failure of a self-priming centrifugal pump in the main floor cleanup sump. The pump’s suction attracted solids at the intake, but because its hydraulics were inadequate to pull in heavy solids, the pump only dewatered the sump and left the settled coal and plant waste in the bottom of the sump. Eventually the self-priming pump’s hose was choked by the buildup of solids; the pump starved and failed. The only way to remove the solids from the sump was to manually dig them out with a shovel. The plant replaced the self-priming pump with a 15 hp., high-head KZN™ 110H pump, whose strainer has 1.38 in. (3.49 cm) holes, allowing for passage of large materials. The pump’s agitator kept the slurry in suspension for complete sump dewatering. The KZN has run problem-free for more than a year, and the preparation plant’s sump is now consistently free of process debris.

Scott Smith, vice president of sales for Service Pump and Supply Inc. (SPS), a provider of mining equipment and a distributor of BJM Pumps, says his company has sold hundreds of KZN pumps for use in coal preparation plants because “they were designed to pump slurry – that is what they were meant to do.” He cites the example of a truck-wash site that SPS built for a preparation plant customer. The plant pulls clean water from a pond to wash loaded trucks before they set out on the road to deliver coal to customers. Used wash water – laden with coal dust, coal fines and other debris – is pumped into a settling pond for later reuse. Where previous pumps, overworked by the weight of the slurry and worn out by the abrasiveness of the material, often failed, a KZN has run reliably in the sump without breakdown or even repair.