

Answer to a difficult problem: Blackhawk down the well

Mike Deed from Geoquip Water Solutions explains how the top-head-drive piston pump could make a real difference to landfill management practices.

Best practice in modern landfill management requires the efficient collection, extraction, pumping, and disposal of leachate. Pumping methods are central to effective management as non-compliant leachate levels are a major source of breaches of environmental permitting regulations. Environmentally, these breaches are significant. Raised leachate levels can impair the operation of the gas extraction and allow unacceptable leachate emission into groundwater – which can take years to recover, compromising the integrity of landfill as a waste disposal method.

One of the biggest issues facing landfill site managers, as with any contractor dealing with hazardous, chemically reactive or explosive situations, is maintaining continuous pumping operation. When borehole pumps fail and removing or repairing them becomes a problem, breaches can quickly occur, compromising safety and often proving costly.

One solution to this problem has recently been introduced to the UK market by Geoquip. Top-head-drive piston pumps, developed by Blackhawk in the United States, have been successfully used for a broad range of critical and non-compliant well-based applications, including gas-well dewatering, condensate-recovery sump, landfill leachate, petrochemical, refinery, manufactured gas and groundwater remediation.

One of the key benefits of a top-head-drive pump is that it is above the wellhead, making it easy to service and repair. It also improves safety levels as there is no need to pull the pump. The pumps promise continuous operation and will pump any liquid, in any environment, at any depth or at any angle. Importantly, even the electric models are explosion proof.

High environmental standards

The pumps are particularly effective for landfill sites that have to meet high environmental standards, enhance clean methane gas production and stand up to extremes in weather and downhole conditions.

Recent case studies in the UK highlight how effective top-head-drive piston pumps can be in critical situations. A landfill site in Hertfordshire with a vertical well had been struggling to control



its leachate levels for some time and was heading towards non-compliance. A diesel-fuelled hydraulic pump had been used that failed to cope with the flow as refuelling outside normal working hours wasn't possible. Since the pump was not always able to run continuously, attempts were made to increase the pump flow during operating hours causing further inefficiencies as the well was not capable of increasing its yield.

Other submersible pumps had also been tried. A pneumatic vector top head drive piston pump has now been installed, allowing the pump to run continuously. Leachate levels are now maintained within the acceptable limits.

A more complex problem arose for a landfill site in South-east England that was having problems removing leachate from inclined side-riser extraction wells. The wells had electric borehole pumps installed that had failed and the well walls had partially collapsed resulting in the pumps becoming stuck in-situ. Attempts had

Blackhawk's Vector pneumatic top-head-drive, positive-displacement piston pump is designed for efficient and reliable landfill leachate pumping and gas-well dewatering

been made to remove them and install new electric ones at a higher level, both of which were unsuccessful.

As a consequence, leachate levels had risen within the site and were in danger of breaching the intercell bund. The wells are 80-100m long with a vertical head of 35-40m. The cell was still operational making re-drilling a new extraction well difficult and costly. The Blackhawk pumps were identified as a viable option to complete the installation.

Pointed nose cone

A 63mm OD MDPE pipe was installed to the base of the well with the pump assembly attached to the bottom. The pump had a pointed nose cone fitted to ease the installation and the pipe was installed in one complete



length at the first attempt. The driver rod with foot valve was installed and the piston connected to the site air supply. The pump is now reducing leachate levels in the cell and additional pumps have been ordered for other problem wells within the site.

Blackhawk designed their pumps to meet the exacting conditions of potentially hazardous and explosive environments such as refineries, petrochemical and chemical facilities. The inlet is at the bottom of the pump, so it works like a syringe, creating a powerful suction to pull the liquid into the pump, which is then lifted by the piston with every stroke. This allows it to draw to the bottom of the well for reliable results and maximum product recovery. The positive displacement action resists slowdown or stoppage, even when pumping viscous, sticky or oily liquids.

Serious gasoline incident

The pumps were used in a serious gasoline incident in the United States in 2003 when over 50,000 gallons of fuel contaminated soil and groundwater as a result of a break in the fuel pipeline. Initially, air-lift pumps were used and, while they were able to recover liquid from the

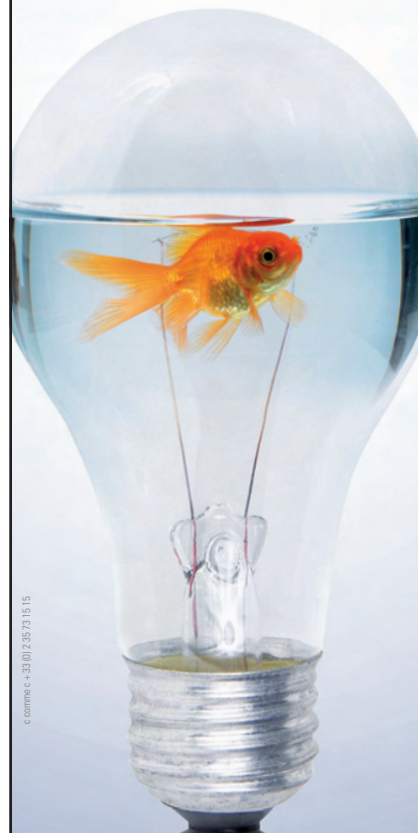
Blackhawk's heavy-duty Anchor Electric top-head-drive, positive-displacement piston pump is ideal for gas/oil recovery, hazardous, and extreme hot or cold working conditions

43m depth where the free product plume was created, they also extracted groundwater. The Blackhawk pumps were able to reach the depth, pump the product without disturbing the emulsification and provide controlled drawdown and pump rate.

In England and Wales, with the introduction of the Environmental Permitting Regulations (EPR) in April 2008, the Waste Operator Competence Scheme in December 2008 and the increased onus on waste management companies to report incidents of non-compliance, the Environment Agency will be looking more closely at the way landfill sites are operated.

Only last year, a waste management company in the South-west was made to pay almost £50,000 in fines and costs after failing to keep leachate down to permitted levels at one of its landfill sites. The more enlightened waste management companies are already considering the methods they use to extract leachate – and how they can enhance best practice. 
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