

NEWS AND VIEWS FROM THE UK'S No.1 WATER WELL DRILLING COMPANY

EXCELLENT NEWS FOR BOREHOLE USERS...

Act makes for simpler licensing

THE WATER ACT 2003 is largely good news for borehole users, especially the 23,000 who will no longer need a licence, says WB+AD Morgan's Brian Morgan. But, he warns, ignoring the new responsibilities could lead to heavy fines. Professional advice has become more essential than ever before.

Last November, the new Water Act 2003 was passed—making major changes to regulations governing water abstraction and storage.

The Act was a response to the droughts of the 1990s, which showed that we simply didn't have legislation to help us manage water resources well enough or to protect the environment.

For anyone using boreholes or considering boreholes, the Act relieves some of the legislative burden, but also introduces new responsibilities. Its changes—some introduced this April and others expected to come into play during 2005/6—affect people taking small amounts of water, dewatering operations for mining and quarrying, transfers into internal drainage districts and farmers abstracting small quantities or using trickle irrigation.

All small abstractions—generally under 20 cubic metres a day—won't need a licence. However, local exemption thresholds will apply. In some areas they'll be higher than 20 cubic metres and in some areas lower—depending on the needs of the local environment.

Licences that haven't been used for four years from April 2004 (rather than the previous seven) could be revoked without compensation. This rule, though, won't apply where licences are needed for emergency supplies or for when irrigation isn't required.

NEW RIGHTS

People will have new rights to claim compensation from someone abstracting water if that abstraction causes them loss or damage. And, from 2012, the Environment Agency will be able to amend or take away someone's permanent licence without compensation if they cause serious damage to the environment.

'This is one area where expert guidance really becomes essential,' says Brian Morgan. 'Magistrates' fines

for unlawful abstraction or impounding of water have increased from £5,000 to £20,000 for each offence. Companies or contractors who are happy to drill for water without thorough geological surveys and without advising their clients on any potential impacts are irresponsible and unprofessional.'

LICENSING MATTERS

Administration for making applications and for transferring and renewing licences will be made simpler. And there will be three main types:

Temporary licences can be granted for water abstraction for any purpose for a period of less than 28 days.

Transfer licences apply to transferring water from one supply to another—such as into internal drainage districts—and transferring within the same sources—such as for dewatering for mining, quarrying or engineering.

Full licences—the only ones to have protected rights status—apply to abstraction for any other use. Trickle irrigation will require a full licence.

People with **existing licences** need do nothing until they hear from the Environment Agency and anyone applying for new licences will be given full information. Those who do need to act, though, are people who abstract small quantities and may not need a licence, but may still need to register a protected right, and those who need to apply for licences for activities that are exempt from control—mining, quarrying, construction, navigation, harbour and conservancy authorities, internal drainage boards and trickle irrigators.

There are also alterations to renewals for time-limited licences and to exemptions. You can get more information from WB+AD Morgan or from the Environment Agency at www.environment-agency.gov.uk

...expert guidance really becomes essential...

INSIDE:

SPRINGING TO SUCCESS

IN THE SECOND FEATURE in our series, *Drilltalk* looks at another successful water bottling company. Read how Montgomeryshire Spring Water Company bring water

to the nation, from their state-of-the-art production facility in mid Wales. [M](#)



Keeping the nation

The Montgomeryshire Spring Water Company is based in a custom-built factory in the village of Churchstoke in Mid-Wales, close to the Shropshire border. Located in picturesque countryside, Churchstoke itself is framed by the gentle Montgomeryshire hills which are the source of the company's product. But the origins were small—first bottled as the Pentre Nant Spring Water brand, it was literally a cottage industry working from a small factory unit, until bought in 1996 by Roy Delves, owner of the successful Harry Tuffin supermarket group.

DELVES' INVESTMENT WAS TIMELY for the burgeoning bottled water market, and in 1998, the firm drilled for water near the present site adjacent to Harry Tuffin's head office.

Based on the positive outcome of the first boreholes, the first phase of the present bottling factory was built.



State-of-the-art bottling equipment in the bottling hall is the newest in the UK



MEETING DEMAND

Since then, growth of the UK bottle waters business has been explosive—the fastest growing market in Western Europe—and Montgomeryshire Spring has claimed its stake in this success. In a few short years, bottling facilities have been developed as demand soared, and a third production unit is now on stream.

This latest bottling line was commissioned a year ago, and at the time of Drilltalk's visit, was just coming into production. The impressive bottling hall is, says production director Joe Watson, state-of-the-art—it is the newest in the UK.

Beyond bottling their own Celtic Spring brands for the NISA supermarket consortium, they produce private label products for a number of retailers, each with its own unique source.

MAINTAINING THE QUALITY STANDARD

Located in an ancient fissured volcanic region of high geological interest, the company owns the surrounding land. 'Keeping control of the catchment area is vital' says Watson, 'as it enables us to guard our resource.' The application of fertilisers and grazing levels are kept under strict control.

'Our standards are high, and in choosing a

company to drill our boreholes, we were extremely fussy.'

Contracts were awarded to WB&AD Morgan, whose head office is located just 25 miles away.

There are now 12 boreholes, three at Pentre Nant 5 miles away, and the rest on the ridges around Churchstoke.

'For us, consistency is important, and each borehole that Morgan have drilled have been to the same high standard. 'Our experience with WB & AD Morgan has been good—their drilling operations are conducted with high awareness of environmental considerations, and for us this is a key factor. The drilling lubricants they use are biodegradable, and their working methods stress cleanliness. This standard is not something to be taken for granted.'



MAKING THE GRADE

Each new borehole coming on line has had to conform to strict Environmental Health requirements to attain the formal recognition that allows it to be labelled as 'mineral water'—although bottling as 'spring water' is not a problem.

This demands a documented two year history to verify that there is stability in respect of chemical and physical composition, microbial levels, and that water is free from pollutants—and that water quality has been consistent over this period.

The outcome for Montgomeryshire Spring Water, needless to say, was positive.

ENVIRONMENT AND NEIGHBOURS

'Our relationship with our neighbours is very important to us,' says Watson. 'We take care to manage our resource properly and not to over-abstract—boreholes are sized to our needs.'

The owners are very positive about wider environmental issues—excess water from bottling operations is fed into the large wildlife pools that adjoin the supermarket, and teem with carp and wildfowl.

WATER? CHEERS

'Today, bottled water is an established part of the shopping list' says Watson, 'and I believe that we are well placed to develop our sector of the business.' Clearly, Montgomeryshire Spring is on a rising trend, and by wisely investing in resources and systems, is keeping ahead of demand. **M**

refreshed



Joe Watson: 'Consistency is important'

Mongomeryshire Spring Water Company's impressive modern facility. Adjacent wildlife pools utilise excess water from bottling operations



Drilltalk's contributing hydrogeologist James Dodds answers your questions.

THE KNOWLEDGE

We have an old borehole that runs dirty after heavy rain. Why? *M. Jones, Caerphilly*

Problems with boreholes during or immediately after heavy rain are usually due to the way they have been constructed.

There are three sources for the dirty water.

Easiest to check is where surface water runs directly into the top of the borehole: common where boreholes are completed in a manhole.

The second is the poor installation of a sanitary seal—this should prevent shallow groundwater and surface water from entering the annulus between the borehole casing and the borehole wall. This commonly occurs in old boreholes, and poorly constructed new ones. If this seal is missing or badly installed, it usually means drilling a new borehole and sealing up the old one.

The third case is rare and associated with water being carried deeper into the borehole via natural fissures in the ground. These are the same fissures that supply water to the borehole, but may connect through to near the surface and be large enough to allow clay to be carried into the supply. Very difficult indeed to rectify.

The presence of dirty water after rainfall is an important indication that the borehole could become contaminated. If it happens, the water should be boiled and cooled before use and the cause investigated and rectified as soon as possible.

Will I get water anywhere? Surely it is only a case of drilling deep enough? *D. Reynolds, Kent*

As we have discussed previously, the occurrence of water in the ground is dependent on the geology. In order to get the required yield the borehole must intersect an aquifer.

In the UK there are many widespread aquifers, but it is sometimes important to intersect specific structures or formations to maximise the yield. It is possible that a site on one side of a farm or factory would intersect very different geology from the other.

Groundwater movement decreases with depth, as the weight of overlying rocks gets larger and can squeeze fractures together. In most circumstances drilling beyond 100 metres or so does not increase the chance of obtaining water. It's not a hard and fast rule though, and

in some types of geology, holes of much greater depth are required.

We have a spring on our land that always produces lovely water even in a dry summer. Can we bottle it? *K. Parry, Gwynedd*

Yes, but be aware: Abstraction of water for bottling requires an abstraction licence unless you are in a licence exempt area. Check with the Environment Agency.

Water bottled as spring or mineral water must meet stringent water quality criteria with little or no treatment. Depending on the source of the water from your spring, it may be susceptible to contamination, particularly in wet weather.

Abstraction of water for bottling is best achieved using a properly constructed borehole. Before deciding whether to drill a borehole, the source of water to the spring should be confirmed. It would also be sensible to get the water tested for the determinands specified in the Natural Mineral Water, Spring Water and Bottled Water (amendment) Regulations 2004.

Are you a dowser? Do I need to get one to site the borehole? *M. Johnson, Evesham*

This must be the commonest question that a professional Chartered Hydrogeologist is asked.

We often come across boreholes successfully sited by dowsers—and also are asked to solve problems after a great deal of money has been spent on a dowser's advice.

The hydrogeologist and the dowser approach the search for water from very different directions. I would want to understand the geology relating to the site and how and where the water will occur.

No one should ever guarantee a water supply, and I am very sceptical of anyone that does. Hydrogeologists try and understand the risks associated with obtaining a supply at a particular site, and explain these clearly to the developer.

We do far more than site boreholes—whether it is assessing the borehole for the available resource, designing special screen and filter medium combinations, or undertaking environmental impact assessments. These and related issues usually fall outside the scope of a dowser's work.

Any questions for James? Email drilltalk@findingwater.co.uk

The driller's tale

The specification for constructing a spring water borehole is extremely rigorous. But a borehole? Just a matter of drilling a hole until you hit water, isn't it? Brian Morgan of WB&AD Morgan Limited sets the record straight.

MANY PEOPLE ARE SURPRISED to hear that a borehole is not a single neat hole from top to bottom. In fact, it is more likely to resemble an extended telescope, with the smallest diameter at its base.

The reason for this is that, when we are drilling, we must defeat the enemy—friction caused by loose unconsolidated ground.

Sooner or later, the drag of the subsoil or overburden that we are penetrating will overcome the turning power of our drilling rig. The more drill casings we add, the higher the resistance they will meet. At a certain point, we stop and then drop down to a smaller casing and drill size.

We ignore this at our peril—the risk is that our powerful rig is quite capable of snapping the drilling tools. The thought of leaving a few hundred metres of casing or drilling rod forever below ground, and starting the job over again is not an attractive one!



'ENVIRONMENT FIRST'
BRIAN MORGAN, WB+AD MORGAN

TOUCHING BASE

We can drill holes of up to 600mm, but in abstraction for water bottling, the initial borehole diameter is usually around 400mm.

Sometimes boreholes are drilled with tri-cone rollers, but when drilling into hard-rock conditions a pneumatic down-the-hole hammer is used that rotates and 'hammers' at the same time.

Our initial challenge is to cut through the 'overburden' materials to reach solid rock. This might be sands and gravels, or clay with boulders. In drilling boreholes for Ty Nant water, we often have to cope with some massive boulders, some the size of a car.

When we are confident that sound rockhead has been reached, we line the hole between that and ground level with a sleeve—for bottled water

abstraction, this will probably be a stainless steel tube. The space between the liner and the surrounding ground (the annulus) is then fully pressure grouted

with OPC (Ordinary Portland Cement), which forms an impervious seal around the casing right from the rockhead to the surface. This will close any fissures that may exist, and ensures that no surface ingress can slide along the casing down to the water supply.

Once this is achieved we drop to a smaller sized drill that will pass down the liner, and continue drilling until we reach water.

GLORIOUS MUD

Drilling requires the use of a flushing medium: compressed air, liquids, and liquids with solids in suspension are all used—forced down through the drill string to the bit face. This brings the waste material to the surface, and prevents the drill bit from clogging. The particular medium and method we select depends on the nature of the ground.

The most versatile fluid is known as 'mud'—the type we use is a biodegradable polymer, mixed with clean, potable water, and this is pumped into the well, via the drill string, during drilling.

It flushes rock cuttings from the bottom of the bore up to the surface. By maintaining pressure at the bottom of the borehole, and by caking the uncased well wall to prevent fluid loss to the formation, it provides pressure to help stability and protect against cave-ins.

Importantly, it also helps keep the drill tip cool, and maintaining a constant up-hole velocity of the drill arisings enables us to withdraw rods from the hole when required.

Where compressed air is the main medium used, it can attain an up-hole velocity of up to 3500 feet a minute to keep the hole clear.

We keep a careful eye on what is coming out the hole—the 'arisings'—to understand and control drilling methods, which are likely to vary from stage to stage in the course of a single borehole.

When do we stop drilling? When we are confident that we have an adequate penetration into the aquifer to maintain the supply, and this is confirmed by test pumping.

KEEPING IT CLEAN

It is obviously essential that we do not introduce any contaminants into the aquifers that hold the water.

For this reason, we work to the highest standards of environmental care.

Procedures include disinfecting the drill tools before use, and our drilling fluids and muds are biodegradable. Even the fuel we use to power our large compressors and drilling rigs is stored on site in a banded (double skinned) bowser, or held in a protected enclosure.

Depending on requirements, we can use a special mud cleaning and mud recovery device, which separates the drill arisings from the mud down to an 18-micron particle size, and the mud is recycled and reused for drilling.

Finally, the borehole itself may be disinfected according to the customer's requirements.

SMALL

Looking at the finished result—viewing a borehole from the surface—gives little clue as to the complexity involved in creating it.

Yet it is the quality of our equipment and materials, and stringent procedures, along with the skill and attention to detail of our expert drilling team that creates a dependable water supply—one that can allow pumping of up to 4 tonnes of water a minute to meet the exacting demands of the bottled water industry. **M**

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