AquiSample

Fluid Sampling

Groundwater is an essential resource for agricultural, municipal, industrial, stock and domestic use. Careful management of groundwater resources is essential to optimising the quality of social, environmental and economic life. Most groundwater is stored within porous strata, referred to as aquifers. Development and production of unconventional hydrocarbon resources can potentially interfere with those aquifers and threaten local quality of life.

Qteq's AquiSample downhole sampling system employs a low-flow, shallow-set mircopurge bladder pump that is uniquely adapted to extract water samples from aquifers situated at any substantially greater depth. The ability to greatly extend sampling depth beyond the 300m maximum rated pump intake depth is accomplished through connection of an extended 'snorkel' – consisting of a drop tube with remote fluid intake – to the pump fluid intake port.

This innovation completely removes the need to impose an upper limit on sampling depth, with only sampling time being impacted by location of the remote fluid intake. Furthermore, a novel deployment and suspension system has been developed that enables the micropurge pump to be set at the desired location in the borehole, using a rig-less deployment technique. The use of a bladder pump suspended in the borehole also eliminates the need for any form of subsequent borehole intervention to capture water samples.

The combination of rig-less deployment and intervention-less sampling therefore greatly reduces operational expenditure associated with use of the (AquiSample) technology platform. AquiSample systems make use of the same innovative umbilical deployment architecture developed for its ResTraq suspended downhole pressure monitoring systems, with the bottom end of the snorkel terminated inside a weighted toolstring.

Special strain relief adapters are incorporated at both ends of the snorkel and at the top of the bladder pump to ensure the nitrogen and sample control lines are properly secured at all terminations. The dual nitrogen and sampling control line umbilical is reeled off a single spooling unit through a temporary PCE system placed above a special design wellhead adaptor.

Once the AquiSample is at the desired setting depth, the temporary PCE is removed and the dual-control line umbilical cut and anchored using a BOP split clamp arrangement inside the wellhead adapter. The umbilical is then routed through ports in a Bowen tree cap that is screwed onto the wellhead adapter to maintain complete well pressure integrity. Should the bladder pump size need to be changed, or even upgraded, the AquiSample system can be retrieved using the same spooling unit and temporary PCE system.

Applications

- Low flow fluid sampling compliant with regulatory requirements
- Low disturbance fluid retrieval
- Through tubing application from 2 3/8" tubing up
- In-situ long life application

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Key Components

BHA Assembly **TSS 020001**

Comprises a number of modules that can be freely configured to suit well depth and conditions, and a drop tube below. Wellbore fluid is channelled through a screen at the bottom of the drop tube and then flows up the tube towards the pump intake. Amount and size of weight bars in the BHA Assembly can be adjusted to suit the application and well depths.

Pump Assembly **TSS 020002**

Consists of a low-flow bladder style pump, custom built to suit capillary tube applications down to 1000m and beyond. The Pump Assembly also incorporates a proprietary capillary strain relief system, featuring a wireline fishing neck. Weight is distributed across the pump body from below to above the pump capillary tubes through a clever and proven clamping system.

BOP Assembly **TSS 020003**

Maintains well pressure control during installation and retrieval of the AquiSample system, and throughout its operating life. It is available in a range of pressure ratings, with flanged and threaded connection types available to suit every wellhead.

Capillary Tube **TSS 020004**

Employs a novel tube-in-tube configuration to deliver Nitrogen to the pump and return fluid samples back to surface. The Capillary Tube is deployed through a temporary pressure control system, allowing AquiSample systems to be installed under pressure.

Wellhead Sample Manifold **TSS 020005**

Incorporates two easily accessible valves to control Nitrogen supply and capture of fluid samples, without compromising wellhead pressure integrity.

Pump Controller **TSS 020006**

Provides means to operate the downhole bladder pump up to depths of 300m below ground level, and to lift fluid samples from depths beyond 1000m.