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Potential water resource for bottling of drinking water

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POTENTIAL WATER RESOURCE FOR BOTTLING OF DRINKING WATER

A bottling company has asked Orkustofnun (National Energy Authority of Iceland) to define the main characteristics of a potential water resource and a well drilled for collecting the water. The question asked is wether FDA would classify the water as spring or well water.

Characteristics of the groundwater reservoir.

The hydrological characteristics of the groundwater reservoir are outlined below.

Springs and catchment area.

The water resource lies within Iceland's rift zone. Copious springs (~ 1200 l/s) emerge near the shore of a lake. Their catchment area is on the order of 50 km^2, most of it lava covered. The precipitation increases across the catchment area from 1200 mm/y at about 100 m altitude to about 3000 mm/y at about 500 m. There is no surface runoff because the precipitation soaks into the permeable lavas. The springs emerge at their edge.

Thick and well mixed in water aquifer.

The aquifer which consists of rocks of basaltic composition has a good primary permeability along joint fractures and scoriaceous lava partings. There is also a good vertical permeability due to densly spaced extensional fissures. This provides for a well mixed, extensive and fairly deep (> 300 m) water reservoir.

Description of site proposed for collection of water for bottling

The source to be utilized is a 370 m deep borehole at an altitude of 170 m a.s.l. The groundwater level measured in the borehole is at about 115 m a.s.l. The distance from the borehole to the spring areas (~ 1200 l/s) is 2.5-3.0 km. There is a seasonal fluctuation of about 5 m in the groundwater level. The drilled rocks are basaltic in composition, unaltered and of good permeability. A section of the borehole is shown in Fig.1. Cemented casing reaches down to 250 m depth. The main water bearing zone is a fissure at 280-285 m. There are smaller producers at 330-340 m. A pumping test yielded ~ 25 l/s with a drawdown of less than 10 cm in the borehole.

The water temperature (Fig.1) increases by about 1.5°C from 100 m to 300 m. A chemical analysis is presented in Exhibit 1 together with an analysis from the springs downflow from the borehole. The waters are very similar. The deviations indicate a small hydrogeological difference, the deep borehole water suggesting a longer stay in the aquifer. (lower Mg).

The borehole is located in an uninhabited natural reserve including the entire catchment of the spring areas.

The distance from the well to the planned bottling plant is 2.8 km. Fig.2 shows the location of the springs, the borehole and the bottling plant site.

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