

## Mining in Bavaria – Exploration, exploitation and usage by Bernhard Ratzke

### Bergbau in Bayern – Exploration, Gewinnung und Anwendung

In the introduction Mr. Ratzke stated that bentonite - named after Fort Benton - is a wrongly labeled, industrial mineral which composition is mainly of montmorillonite, kaolinite, feldspar, mica, calcite, quartz, illite and cristobalite and can be found in the regions between Ulm, Augsburg and Passau and in the triangle made up by Moosburg, Mainburg and Landshut, in which the Clariant Produkte GmbH is mining their bentonite. Following the introduction it was explained, that there are two types of bentonite: the Na-rich and the Ca-rich ,bavarian type‘, which is less reactive than the previously mentioned Na-bentonite and therefore usually chemically activated. This activation is either done acetous by hydrochloric acid and used for the food industry afterwards, or alkaline by sodium bicarbonate and then used for the casting or drilling industry. The speaker then talked in detail about the steps necessary to open a new mine. At first the Bergamt Süd-Bayern (Mining authority of southern Bavaria) has to issue a drilling license, after which the landowner has to give his permission for drilling on his property before exploration itself can start. For exploration sampling-holes are drilled by a vehicle-mounted drilling rig to the upper boundary of the bentonite, out of which samples are taken by a twist drill. These sampling-holes are drilled in a distance of approximately 80-100 m and when Bentonit is found the distance is lowered to create a more accurate representation of the deposit, the so called „Lagerstättenplan“, which is the next step on the way to a new mine. According to this „Lagerstättenplan“ the area of mining is determined, followed by the acquisition of the needed land. Before mining can begin, an operating-plan has to be established, in which size and position of the mining area, the thickness of the bentonitelayer, overburden, recultivation, biology, archaeology and many more topics have to be detailed. After mining has ended the area is recultivated and given back to the previous owner. At the end Mr. Ratzke stated that on average there are 11 m of overburden and only 1.5 m of bentonite in the six active mines the Werk Bergbau Clariant Produkte GmbH currently operates, which produce 340‘000 tonnes of bentonite each year. Also there are currently two mines in preparation and six in recultivation. On our field trip to the Werk Bergbau Clariant Produkte GmbH on the 9th of June 2017 we were able to attend the drilling process during the last few meters of drilling and the taking of the samples, of which we were allowed to take some with us. During drilling it was stated that the well trained drilling rig operator is able to notice the upper boundary of the bentonite due to a slight rise in pressure needed to pierce the bentonite, in comparison to the pressure needed to drill through sand and gravel. Right after that we visited one of the six active mines, where Mr. Ratzke gave a short overview over the different qualities of the bentonite and the process of its mining. After that we had some time to take a look around the mine, which luckily was not operating this day.