

South African bentonite

Midden Mining discovers bentonite in South Africa's Western Cape

- Mossel bay purities range from 50-90% smectite
- Further drilling required to establish continuity
- Discovery coincides with Karoo shale exploration

Andrew Scogings*

Midden Mining Pty Ltd has identified a new bentonite prospect in South Africa's Western Cape Province at Matjesfontein farm, near Mossel Bay.

Laurence Matthews, consulting geologist for Midden Mining, told **IM** that "preliminary auger drilling has confirmed the presence of shallow-dipping sodium-magnesium (Na-Mg) bentonite beds and that X-Ray Diffraction (XRD) tests indicate a range of purities between 50% and 90% smectite."

"Cation exchange capacities of ~50 to 90 meq/100g are believed to be typical," he added.

Matthews further noted that "treatment with soda ash and extending polymer has delivered promising results for a range of drilling products with possible yields from 90 to more than >150 barrels. Fluid loss values in lab-prepared samples are encouraging and, for the 90 barrel product, are in the range of 13 to 14ml and accompanied by yield point/plastic viscosity (YP/PV) ratios that are comfortably below 3."

Midden is the holder of the prospecting right (number WC30/5/1/1/2/10032PR) in the Mossel Bay



Dave Bezaire

Bentonite has been discovered near Mossel Bay on South Africa's Western Cape.

area. The prospecting right covers an area approximately 3,098.2 ha (31km²) in extent and is situated over the farms Melkboom 209, Matjesfontein 210, a portion of the farm Matjesdrift 329, a portion of the farm 323 and a portion of the farm 372.

Geology

The Matjesfontein bentonite occurrence lies within the Cretaceous Kirkwood formation, which also hosts bentonite and zeolite deposits in the associated Heidelberg-Riversdale and Plettenberg Bay basins. These basins are fault-controlled and run parallel to the Cape coast.

The prospecting right is underlain by Cretaceous rocks of the Uitenhage

group, which includes bentonitic horizons and interlayered tuffs of the Kirkwood Formation. The strata dip gently to the north and are underlain in the south by conglomerates of the Enon Formation and sandstones and shales of the Cape System.

Geological exploration and field mapping conducted to date has located a bentonite outcrop estimated to be ~0.5-1 metre thick. Subsequent limited hand augering was undertaken during 2014 to recover samples for testwork and initial results have been encouraging.

Results from tests showed that the primary exchangeable ions were sodium and magnesium, while the ~44µm grit content was low at less than 2%.

Cation exchange capacity (CEC) values of ~50 to 90 (meq/100g) were obtained and lab activation with 1-2% soda ash yielded plate water absorption in the range ~400-750% and free swell in the range ~18-26ml.

A mineralogical study of the bentonite showed that it consists of smectite and interstratified-smectite clay, with a relatively small amount of quartz. The clay is plastic and "smooth", due to its low quartz content (around 10%, according to the X-ray diffraction analysis).

The general macroscopic features of the clay, as well as the mineralogical compositions, is considered typical of young (cretaceous-aged) bentonite of the Southern Cape coast, that has formed under slightly diluted or undiluted marine-water conditions.

Planned work

Due to limited outcrop and subdued topography, a drilling programme will be necessary to trace the bentonite from the original discovery site to establish lateral continuity, thickness, quality and whether additional bentonite beds are present.

The discovery coincides with interest in shale gas exploration in the Karoo – a semi-desert region of southern South Africa. If the country's government grants approval for gas prospecting rights in the area, borehole drilling will probably require significant quantities of bentonite. The recent discoveries of oil in central African countries such as Uganda, Tanzania and the Democratic Republic of Congo have led to a surge in drilling and the need for good quality bentonite.

**Andrew Scogings, Industrial Minerals Magazine consultant and principal consultant at CSA Global Pty Ltd*

