



THE FEN CARBONATITE COMPLEX, ULEFOSS, SOUTH NORWAY

HIGHLIGHTS OF EXPLORATION DRILLING, MARCH 2012

Compiled and prepared by 21st NORTH, Svendborg 01 May 2012 in commission for REE Minerals, Norway

Anders Lie M.Sc. Geology
21st NORTH

Claus Østergaard M.Sc. Geology
21st NORTH

ACTIVITIES

- In March 2012, a 1472 m drill program was completed in the Water Tower – Fensmyra area. The aim was to get a first impression of the size and geometry of REE mineralised carbonatite as indicated by surface sampling in 2011
- The program included 10 diamond drill holes (BQTK) with maximum lengths up to 221 m and all drilled at -45°
- A MEP geophysical survey by the Danish contractor Rambøll revealed that the Fensmyra is characterised by an extensive cover of marine clays up to 100 m depth in the central parts and that a steep gully follows the historic path of the Bolladalen creek towards the southeast. In the western part of the Fensmyra the clay cover is less significant with thicknesses of 15-25 m
- A 400-500 kg micro bulk sample of ankerite-sodalite-dolomite-carbonatite (Rauhaugite) was collected south of the Riksvejen area where the local municipality had blasted >10 tons of bedrock in order to insert new waterlines in the ground

RESULTS

- Geochemical results are expected from ALS Minerals ultimo May, and are obviously essential for any evaluation of grade and REE composition in the carbonatite
- Handheld XRF readings were collected systematically and unbiased for every 2 meter of core in order to identify stratigraphy with enriched REEs and to supplement logging of the core. In addition, the XRF was used to test the composition of selected REE minerals

- XRF results were calibrated daily with historic pulp material and grades were converted to a preliminary indication of total rare earth oxides values (REO) in the core.
- The average REO content of the drill holes varies between 0.4 and 1.0% REOs over the entire length of the hole (up to 221 m)
- Higher grade sections include: 48 m @ 1,65% REO, 18 m @ 1,96%, and 10 m @ 2,83% REO. Individual readings return up to 40% REO from coarse REE minerals in the core. The statistical validity of these readings are obviously highly unreliable as just a single high-grade reading may affect the total average of the entire core, nevertheless, the XRF readings demonstrated that the carbonatites in the investigated area comprise a very large and consistent REE target
- Based on the intersected stratigraphy and preliminary XRF results it is believed that a huge volume of low-grade REE carbonatites (~100 Mt at 0.4-1.0% REO) exists in the area between Gruveåsen and the Water Tower. It is also considered very likely that mineable higher-grade sections (1.5-2.0% REO) exist within this stratigraphy. Obviously, these indications will be more meaningful when geochemical results from ALS Minerals are obtained.
- The majority of intersected bedrock comprised massive and continuous (open ended) sections of ankerite-(calcite)-dolomite carbonatite (Rauhaugite) and hematite-calcite-dolomite carbonatite (Rodbergite) with rare units of hematite iron ore. Fenitised basement rocks were intersected along the southern rim of the complex and as local sheets in more central parts of the area
- In the central area around Riksvegen, the stratigraphy is dipping shallowly to the west (c. 20°), exposing Rodbergite as a relatively thin (5-20 m wide) sheet overlying massive Rauhaugite
- Historic MMI sampling had indicated that a potential REE-mineralised carbonatite occurred below surface in the Fensmyra area. However, limited drilling in the northwestern part of the area only intersected strongly fenitised basement rocks and a short section with carbonatised (calcite-rich) fenite. The area is characterised by severe faulting along the Bolladalen creek and thick cover of marine clays, which resulted in much less drilling than original planned. More distal parts of the Fensmyra are thus still untested and may warrant additional drilling
- A coarse aggregate of brown/yellowish REE-Th-rich mineral(s) was discovered in some parts of the Rauhaugite core. This mineral aggregate may attain sizes up to almost 10 centimetres and return grades between 5 and 40% REE using a hand held XRF
- The coarse REE aggregate locally comprises 10-15% of the core (up to 1-2 meter sections) and is otherwise distributed throughout the core as disseminated grains. The nature and composition of this aggregate is considered important in relation to upcoming metallurgical test work
- Fenitised bedrock in the Fensmyra area appears to be separated from the carbonatite by a series of N-S and E-W trending block faults. Additional drilling will definitely increase knowledge on the exact orientation and displacement of these structures



Diamantboring Nord with tracked mounted drill rig.