The Fen REE Deposit, South Norway
Resources, metallurgy & OPEX/CAPEX

REE MINERALS

Claus Østergaard, Geologist, Executive Partner – 21st NORTH
THE FEN REE COMPLEX

I. Cambrian carbonatite complex related to rifting of the Oslo graben (539 +/- 14 Ma).

II. Dominated by ankerite-dolomite carbonatite (rauhaugite) and secondary hematite-rich carbonatite (rodbergite).

III. High relative distribution of CREO’s (Pr, Nd, Dy, Eu, Tb and Y oxide) of 24.8%.

IV. The total contained REO content in the presently drilled resource includes >900,000 tons including 180,000 tons of critical REO’s with considerable up-side tonnage potential. This makes the Fen carbonatite complex the largest in-situ source of REE’s in Europe and one of the largest carbonatite resources in the World.
THE FEN REE COMPLEX

I. Large bulk tonnage compared to other REE deposits in the world. Possibility of both open pit and block-caving underground mining operation with low opex/capex.

II. Low stripping ratio – deposit is exposed at surface or covered by 1-10 meters of marine clays.

III. Infrastructure is second to none with a regional highway cross-cutting the deposit area and near-by industrial sites for processing and separation of RE oxides. Only one hour of transportation to nearest port facilities and airport by highway.

IV. Industrial facilities nearby for further processing and treatment of ore.

V. Low power costs in Norway

VI. Mining friendly and supportive local community. Stable political climate.
MINERALOGY

I. Favorable REE mineralogy comprising synchysite-parisite-(bastnaesite) and low-thorium monazite (>99% of total REE contribution).

II. REE-bearing phases occur as coarse mm-cm sized scattered grains and veins, which can be observed over anything from 0.5 to 20m intersections in the drill core.

III. Locally observed as intergrown aggregates and clusters with sizes up to 10cm in carbonatite matrix.

IV. High-grade drill sections return up to 5% REO over >10 meters

V. Average thorium and uranium content of c. 290 ppm and 11 ppm, respectively.
HISTORIC WORK BY 21st NORTH IN FOCUS AREA

I. Desk top study/Basic geological prospecting [2011]
II. Ground radiometric survey [2011]
III. Ground magnetic survey [2011]
IV. MMI sampling programme [2011]
V. Surface and channel profile sampling [2011-2012]
VI. MEP geophysical profiles in areas with extensive overburden [2012]
VII. Microscope and microprobe work on surface and drill samples [2011-2012]
VIII. 1472 m exploration diamond drill program [2012]
IX. Metallurgical test work at Wardell Armstrong – 2 stages [2012-2013]
X. 1001 m exploration diamond drill program [2014]
XI. OPEX/CAPEX scoping level study [2015]
XII. Continued OPEX/CAPEX estimates – screening of new REE separation methods [2016]
Current deposit area

150 meters
DIAMOND DRILLING

2472m in 14 drill holes
43-101 inferred resource estimate

Tonnage and Grade (inferred)
- Threshold from: 8,000 to 92,419 ppm TREO
- Threshold volume: 27,901,936 m³
- Threshold tonnage: 83,705,808 T
- Threshold mean: 10,785 ppm TREO
DIAMOND DRILLING
2472m in 14 drill holes
43-101 inferred resource estimate

Tonnage and Grade (inferred)
- Threshold from: 10,000 to 92,419 ppm TREO
- Threshold volume: 10,512,488 m³
- Threshold tonnage: 31,537,464 T
- Threshold mean: 13,992 ppm TREO
DIAMOND DRILLING
2472m in 14 drill holes
43-101 inferred resource estimate

Tonnage and Grade (inferred)
- Threshold from: 12,000 to 92,419 ppm TREO
- Threshold volume: 6,092,608 m³
- Threshold tonnage: 18,277,824 T
- Threshold mean: 16,281 ppm TREO
Basket price

The Fen deposit has a favourable mix of REE with relative high concentration of elements with high prices such as Neodymium, Praseodymium, Europium and Dysprosium.

Current basket price of approximately USD 25.7 per kg TREO.

Note that there are no efficient spot markets for REOs and prices are set by bilateral agreements between suppliers and customers.

There is no single REE market, the dynamics are different for each element and volume differs significantly.

Strongest demand growth going forward expected from the critical REE, while the most common elements such as Cerium and Lanthanum are expected to continue to be in oversupply over the next years with remaining low prices.

* Prices as of May 2015. Source: www.mineralprices.com

<table>
<thead>
<tr>
<th>Element</th>
<th>Share</th>
<th>Oxide price (USD/kg)</th>
<th>Value (USD/kg TREO)</th>
<th>% of basket price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neodymium</td>
<td>17.7%</td>
<td>59</td>
<td>10.44</td>
<td>41%</td>
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<tr>
<td>Praseodymium</td>
<td>5.1%</td>
<td>105</td>
<td>5.40</td>
<td>21%</td>
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<tr>
<td>Europium</td>
<td>0.5%</td>
<td>680</td>
<td>3.33</td>
<td>13%</td>
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<tr>
<td>Dysprosium</td>
<td>0.3%</td>
<td>340</td>
<td>1.02</td>
<td>4%</td>
</tr>
<tr>
<td>Terbium</td>
<td>0.1%</td>
<td>600</td>
<td>0.48</td>
<td>2%</td>
</tr>
<tr>
<td>Yttrium</td>
<td>1.1%</td>
<td>15</td>
<td>0.17</td>
<td>1%</td>
</tr>
<tr>
<td>Cerium</td>
<td>46.6%</td>
<td>4.40</td>
<td>2.05</td>
<td>8%</td>
</tr>
<tr>
<td>Lanthanum</td>
<td>25.2%</td>
<td>4.80</td>
<td>1.21</td>
<td>5%</td>
</tr>
<tr>
<td>Scandium</td>
<td>0.0%</td>
<td>7 200</td>
<td>0.72</td>
<td>3%</td>
</tr>
<tr>
<td>Samarium</td>
<td>2.2%</td>
<td>20</td>
<td>0.44</td>
<td>2%</td>
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<tr>
<td>Gadolinium</td>
<td>1.0%</td>
<td>39</td>
<td>0.39</td>
<td>2%</td>
</tr>
<tr>
<td>Erbium</td>
<td>0.1%</td>
<td>77</td>
<td>0.08</td>
<td>0%</td>
</tr>
<tr>
<td>Others</td>
<td>0.0%</td>
<td>n.a.</td>
<td>0.00</td>
<td>0%</td>
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Note: Basket price as of May 2015

Critical REE (“CREOs”) compromise 81% (USD 20.8) of the basket value.
A low-cost and economically feasible pre-concentrate of >4% average TREO was produced only by X-RAY-sorting and gravitational methods such as Salter-cyclones and Tri-Flo separators with a recovery of 65% TREO and a mass pull of 20-25%.

Flotation studies on raw ore feed was able to further concentrate the REO grade by 3.5-6 times using a mass pull of 12-24% and a recovery of 80%.

Current test work has indicated that it is possible to create a concentrate with 15-20% REO using very low mass pull (5%) at acceptable recoveries (55%). Further test work is expected to increase recovery to 65-80% (Wardell Armstrong, 2014)
**Metallurgical flow sheet**

Scoping level beneficiation from ore feed to >99% REO concentrate

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<tr>
<th></th>
<th>Raw ore feed</th>
<th>Pre-concentrate</th>
<th>Final concentrate</th>
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<tbody>
<tr>
<td>REO grade %</td>
<td>1.4</td>
<td>1.9</td>
<td>15-20</td>
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<tr>
<td>Acc. Recovery %</td>
<td>100</td>
<td>92</td>
<td>74</td>
</tr>
<tr>
<td>Thorium in ore (ppm)</td>
<td>350</td>
<td>485</td>
<td>1,200</td>
</tr>
<tr>
<td>Thorium in tailings (ppm)</td>
<td>n.a.</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Mass pull %</td>
<td>100</td>
<td>65</td>
<td>24</td>
</tr>
<tr>
<td></td>
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<td>5</td>
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Tailings = 94%

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Scoping level OPEX for an underground mine at Fen

- Estimates based on:
  - Mine life time of 11 years (Sherpa model)
  - 1,020,000 tonnes ore processed per year
  - 10,000 tonnes of TREO per year
  - REO recovery of 70%

- Preliminary metallurgical and mineralogical studies has demonstrated that a combination of low-cost optical ore sorting and gravitational methods on the REE ore from Fen is able to concentrate the raw ore feed by a factor of 4-5 prior to flotation.

- Expected other costs in the lower part compared to other mines due to well-established infrastructure.

- A project with mine life time of 40-50 years will invariably have lower operating costs per ton milled.

- Both excavation and tailings handling cost assume 1.5x higher than a corresponding open pit mine (probably conservative for tailings handling)

Cost of excavation and pre-processing to 15-20% REO of USD 2.6 per/kg REO
Scoping level CAPEX estimate of USD 275-325m for an annual production of 10,000 tons REO

- Total capex estimate of USD 275 – 325m* based on following investments:
  - **Mine**: Construction of an underground mining operation
  - "**Pre-processing**": Crushing equipment, optical sorting lines, multi-G separation and flotation cells to match a production of 10,000 t/yr TREO
  - **Processing**: Chemical processing plant
  - **Separation**: Chemical separation plant

- Superior infrastructure and logistics, low power costs, nearby industrial facilities and gentle deposit physiography suggest low capex costs compared to other REE projects

- Capex of only USD 75m for mining and pre-processing up to a grade of 15%, thus capital costs could be considerable lower if possible to ship pre-concentrate abroad and utilize existing processing and separation plants

* Mining and pre-processing based on Sherpa Mining costs, and quotations from Outotec. Acid and separation plant based on comparison with known REE deposit analogues in the western world
Environmental issues

Overview of environmental issues

- REE Minerals’ Fen project exploits low-grade thorium and uranium ankerite-dolomite carbonatite rocks (rauhaugite) compared to other parts of the Fen complex dominated by hematite-carbonatite (rodbergite).

- Radioactivity from thorium in the drilled area is on average c. 290 ppm. Uranium levels are very low at c. 11 ppm.

- Radioactivity in tailings, rocks that requires crushing and handling, use of acid and process water during operations, are critical areas where appropriate and legally accepted solutions must be addressed.

- Tailings will require special attention to design of accepted deposit dams and using the option of backfill. Several areas are being explored.
  - Ongoing process with Nome municipality.

- REE Minerals will be proactive in order to implement and fulfill all aspects of environmental compliance.

- Close cooperation with authorities and expertise in the respective areas will be the base for the solutions to be developed.

- REE Minerals will strive for long term sustainable solutions and a high level of Corporate Governance.