Europe's largest deposit of rare earth elements now 25 percent larger – today marks the first step in critical review

LKAB is today submitting an application for a processing concession for the Per Geijer deposit in Kiruna. Since the discovery was reported as Europe's largest known rare earth oxide deposit earlier this year, further investigations have been carried out. "This means, among other things, that we can now write up the mineral resources for rare earth oxides by 25% to over 1.3 million tonnes in situ," says Jan Moström, President and CEO of LKAB.

Per Geijer is basically an iron ore deposit with high levels of both phosphorus and rare earth oxides. The grade of rare earth elements is ten times higher than in the Kiruna ore where we mine today.

"Since the turn of the year alone, we have succeeded in significantly increasing mineral resources for iron, phosphorus and rare earth elements. And we haven't seen the end of the discovery," says Jan Moström.

If the processing concession is approved, we will continue to develop the deposit and prepare an environmental permit application.

"However, this does not mean that we get permission to start a mine. The processing concession is also only one part of the complex Swedish review system. The permit process is beginning and having worked in the area for more than 130 years we are now seeking the first permit for Per Geijer, to give LKAB the exclusive right to continue investigating this fantastic mineralisation," says Jan Moström.

"Without mines, there will be no electric cars, and also a growing and more risky dependence on large commodity countries such as China and Russia. In the coming decades, the need for a number of minerals such as those containing rare earth elements will increase many times over as a result of electrification. We see that we want to and that we can be part of the solution, to enable the climate transition, and also for Europe's security and competitiveness," says Jan Moström.

Can potentially extend the operation of the Kiruna mine for at least 20 to 30 years. LKAB today reports that the discovery contains Mineral Resources of 734 million tonnes of iron ore, with high iron content and more than 1.3 million tonnes of in situ rare earth oxides.

The discovery was already the largest reported rare earth deposit of its kind in Europe when it was announced in January 2023. Today, Europe is heavily dependent on imports of rare earth elements, mainly from China.

"The fact that it is a complex deposit, with iron ore as the base, makes it extra interesting. Without the iron ore, it would not be viable to mine phosphorus and rare earth elements here. With what we see today, a future mining operation could provide an increase in service life of at least 20 to 30 years, it will be crucial to be able to continue operating in Kiruna," says Jan Moström.
"This shows the fantastic opportunities we have in Kiruna and gives us the conditions to create faith in the future and continue to develop the municipality and attract more residents. Kiruna is already important for Sweden and for Europe, and that position is now being strengthened. We look forward to the process where LKAB creates a sustainable and efficient mining of the deposit," says Mats Taaveniku, municipal commissioner in Kiruna.

The deposit also contains high levels of phosphorus, a necessary nutrient in mineral fertilizers that as an element enables half of global food production. Even for the critical raw material phosphorus, Europe is currently dependent on imports to about 80 percent.

"If we can break this, we could significantly strengthen Europe's self-sufficiency in phosphorus. It is not only an economic issue for us, but ultimately also a preparedness issue," says Jan Moström.

The EU expects permit processes to take a maximum of two years
At the same time, LKAB is early in the process. If the processing concession is approved, it will give LKAB the conditions to invest in the extensive studies required as a basis for decisions on possible future mining. In order to open a mine, a permit is also required in accordance with the Environmental Code from the Land and Environment Court.

"We are experiencing an increased awareness of the need for metals and minerals for electrification and the green transition. At the same time, Europe's high dependence on imports is a cause for concern both in industry and politics. In Europe, there is now talk of two years for permits for strategically important minerals such as those for the rare earth metals, but our experience is that it can take between 10 and 15 years to get through the complex Swedish trial system. The processing concession is only one part of this. So this will be an important test if the permit system manages to meet the expectations of the outside world," says Jan Moström.

The issue of lengthy and unpredictable permit examinations has been widely debated in recent years, and current and previous governments have promised reforms so that a critical climate transition does not fall on bureaucratic formal requirements without significance for the environment.

"We have a positive attitude towards strict environmental requirements and will take great responsibility for the impact that our operations cause. For example, there is concern about how reindeer husbandry will be affected by a new mine in the area, and we understand that. In addition, popular outdoor recreation areas are affected. We are still early in the process and there is a long way to go. We are responsive and have the ambition to solve the issues along the way. But we also need commitment from stakeholders and authorities in the process to move forward in a fast, efficient and legally secure way," says Jan Moström.

Mineral Resource Update
The Fe and P results for the deposit are shown in Table 1 in accordance with the reporting standard PERC 2021, which is the prevailing international standard. Table 2 shows the in-situ TREO Mineral Resource Statement for the Per Geijer Project.

An updated Per Geijer Summary Technical Report will be made available through the LKAB website in the coming weeks. A link to the existing Report is made here.

Table 1: Per Geijer Mineral Resource Statement for Fe and P.

<table>
<thead>
<tr>
<th>Material</th>
<th>Resource Category</th>
<th>Mass Mt</th>
<th>Fe %</th>
<th>P %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetite</td>
<td>Measured</td>
<td>230</td>
<td>50.5</td>
<td>2.6</td>
</tr>
<tr>
<td></td>
<td>Indicated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Measured and Indicated</td>
<td>230</td>
<td>50.5</td>
<td>2.6</td>
</tr>
<tr>
<td></td>
<td>Inferred</td>
<td>328</td>
<td>45.4</td>
<td>1.9</td>
</tr>
</tbody>
</table>
Table 2: Per Geijer Mineral Resource Statement for TREO (in-situ grade and reported within optimised stopes).

<table>
<thead>
<tr>
<th>Material - TREO</th>
<th>Resource Category</th>
<th>MassMt</th>
<th>TREO (in-situ)%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnetite</td>
<td>Measured</td>
<td>557</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>Indicated</td>
<td>50</td>
<td>0.06</td>
</tr>
<tr>
<td>Mixed</td>
<td>Measured</td>
<td>50</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>Indicated</td>
<td>71</td>
<td>0.17</td>
</tr>
<tr>
<td>Hematite</td>
<td>Measured</td>
<td>27</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>Indicated</td>
<td>22</td>
<td>0.17</td>
</tr>
<tr>
<td>Must Take</td>
<td>Measured</td>
<td>7</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>Indicated</td>
<td>421</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>734</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Notes:

1. Mineral Resources, which are not Mineral Reserves, have no demonstrated economic viability but are considered to have reasonable prospects for eventual economic extraction.
2. The effective date of the Mineral Resource is 9th June 2023.
3. Input data used is from exploration drilling completed since 2010 with valid assay data up until May 2023. In total, the Mineral Resource Estimate used 75 drillholes for 81000 meters of drilling. Mineral Resources have been constrained within optimised stopes based on the mining and production of magnetite pellets and hematite concentrate.
4. The optimisation uses a cut-off grade of 26% Fe for the magnetite dominant material, 35% Fe for the mixed magnetite / hematite material and 53% Fe for the hematite dominant material.
5. For each material type, the optimisation is based upon appropriate processing Fe recovery rates (95.6% magnetite domain, 81.3% mixed domain, 67% hematite domain) and long-term metal prices for the produced pellets and concentrate (1000 SEK/t magnetite pellets, 600 SEK/t hematite concentrate, 800 SEK/t average value used for the mixed domain products).
6. Waste material captured within the stopes is reported as “Must Take” material. This is considered material that will be captured by the mining method employed and cannot be separated out as waste material, therefore forming part of the feed to the plant.
7. No additional cut-off grade has been applied to the final Resource statement.
8. Tonnages are reported in metric units and grades in weight percent (%) for Fe and P.
9. Tonnages and grade are rounded appropriately.
10. Rounding, as required by reporting guidelines, may result in apparent summation differences between tonnes, grade and contained metal content. Where these occur, LKAB does not consider these to be material.
11. Mineral Resources have been classified according to the PERC Standards 2021, by and with the permission of Howard Baker (FAusIMM(CP)), an independent Competent Person as defined in the PERC Standard 2021. Mr Baker has relied upon LKAB technical staff in updating the Per Geijer Mineral Resources.

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12. Mineral Resources, which are not Mineral Reserves, have no demonstrated economic viability but are considered to have reasonable prospects for eventual economic extraction.
14. This Mineral Resource is contained in the same body as the Fe and P Mineral Resources which have been constrained within optimised stopes based on the mining and production of magnetite pellets and hematite concentrate which provide the primary source of revenue.
In total, LKAB has now estimated an Indicated Mineral Resource of 307 Mt grading 50.2% Fe and 2.6% P and an Inferred Mineral Resource of approximately 421 Mt at 45.5% Fe and 2.0% P.

Key changes to the Resources which were earlier reported and dated 31st December 2022, include modifications to the mineralised domains along with an update to the classification due to the increase of available data.

The update has resulted in an increase in the Indicated Mineral Resources of 106 Mt (from 201 Mt to 307 Mt) and an increase in the Inferred Mineral Resources of 37 Mt (from 384 Mt to 421 Mt).

For TREO, LKAB has now estimated an Inferred Mineral Resource of approximately 734 Mt grading 0.18% TREO which is wholly contained in the Fe Mineral Resource.

Magnetite Resources increased whilst the mixed and hematite material decreased from the previous update, because of the updated model and the optimisation carried out. Fe and P grades decreased slightly due to the additional drilling with the contained TREO grade remaining the same.

Inferred Resources are uncertain in nature and it is not definite that further exploration will result in an upgrading to Indicated or Measured Mineral Resource categories.

For more information please contact:
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anders.lindberg@lkab.com

A tour of the area at the drilling rig, a visit to the mine and an interview with Magnus Backe, General Manager Kiruna, and Laura Lauri, Field Exploration is offered:
Date: 27 June
Time: 08.30

Please register participation to:
Ulrika Huhtaniska, communications officer
+4670-268 39 92
ulrika.huhtaniska@lkab.com

Facts about Mineral Resources and Reserves

- Mineral Resources include deposits where exploration has shown the presence and content of mineralisation. A Mineral Resource is an estimate of mineralisation, which,
under assumed and justifiable technical, economic and ESG conditions, may, in whole or in part, become economically extractable. However, a deeper technical and economic analysis has yet to be carried out and once this has been done, a deposit may be classified as a Mineral Reserve if it is deemed to be worth mining.

- Mineral Resources and Mineral Reserves form the basis of a mining company's operations and require successful and continuous exploration. LKAB reports its Mineral Resources and Mineral Reserves in accordance with the PERC 2021 reporting standard.

About LKAB and critical raw materials

- LKAB produces 85 percent of iron ore in the EU and is leading the transformation of the iron and steel industry with the strategy of producing carbon-dioxide-free sponge iron using hydrogen technology. Since the 80s, the company has also been involved in the mineral industry, through the Special Products business area, where it produces and refines more than 30 minerals.

- Since the 1960s, LKAB has reduced its emissions of carbon dioxide per tonne of finished product by 84 percent and is investing heavily in research and development to further develop sustainable mining from a world-leading position. Priority areas for further strengthening our sustainability performance are methodology for creating biological added value, establishment of circular business models and continued efforts and measures for increased climate efficiency.

- Phosphorus is one of three essential nutrients supplied in the form of mineral fertilizers in agriculture. About half of the world's food production depends on this. Europe is about 80% dependent on imports of phosphorus and Russia has accounted for a significant share of production.

- With Russia's invasion of Ukraine, the availability and prices of mineral fertilizers have become a major problem, which can have consequences with high food prices globally and food shortages in poor countries. Phosphorus is on the EU's list of 30 critical raw materials. Common to these raw materials is that they are important for Europe's industry and economy, that the EU is dependent on imports and that there is a high risk of supply disruptions, for example related to geopolitical risks.

- Rare earth elements are also on the list of critical raw materials. Europe does not have its own mining of these. China dominates both mining and refinement, while Europe is highly dependent on earth elements for the permanent magnets required for electric motors for the electric cars and wind turbines needed for the green transition.

- The EU is currently almost entirely dependent on imports of permanent magnets with earth elements, of which more than 90% are produced in China. From 2035, it will also be forbidden to sell new petrol and diesel cars, while an electric car requires six times more minerals than a conventional car. With Per Geijer, LKAB has great potential to contribute to the EU's increased self-sufficiency and to Europe's continued competitiveness in the automotive industry.

- The powerful permanent magnets used in electric vehicles mainly include the rare earth elements Neodymium and Praseodymium, from 0.5 to a few kilograms per vehicle depending on the size of the motor and permanent magnets.

- The extraction and processing of phosphorus, rare earth elements and fluorine is part of LKAB's ReeMAP project. In the project, LKAB is developing technology for the extraction of phosphorus and rare earth elements as by-products from today's iron ore production and is planning a circular industrial park in Luleå. In this part of the processing, LKAB plans to produce a concentrate that then needs to be separated.

- In order to meet the need for both extraction of raw materials and at the same time increase Europe's processing capacity LKAB has recently become the main owner of
and entered into a cooperation with Norwegian REEtec. They have developed an innovative and sustainable technology for the separation of rare earth elements that can compete with the dominant Chinese production.

**Contact:** Anders Lindberg, Group Media Relations Manager at LKAB, Tel: 46 (0)980 783 55. E-mail: anders.lindberg@lkab.com

LKAB is an international mining and minerals group that offers sustainable iron ore, minerals and special products. We are committed to developing carbon-free processes and products by 2045, leading the transformation of the iron and steel industry. Since 1890 we have developed through unique innovations and technological solutions and are driven forward by more than 4,500 employees in 12 countries. In 2021, the LKAB group had sales of about SEK 47 billion. [www.lkab.com](http://www.lkab.com)