

Case 3: Mertainen, Kiruna, Iron Ore Mining Project



This good practice case responds to Minland Good Practice Stream Topics:

C) Assessment of whether minerals and other land uses have been introduced on equal footing

G) Assessment of integration of social aspects and civil society involvement
Permitting

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Part 1: Case Overview

1.1 Executive summary

This case deals with an iron ore project part of the LKAB companies iron ore mining operations in northern Sweden. Particularly, aspects of competing land uses and solutions to infringement of mining operation upon other land uses.

The project was successfully granted an environmental permit, the so-called final mining permit. As such this cases focuses upon the infringement of sensitive nature, solutions to competing land uses and stakeholder interactions.

1.2 Overview of Key Good Practice Aspects and suggestions

Good Practice Aspect 1: Weighting different land uses

- **Element 1:** Weighted the different land uses against each other in the final application for environmental permit.

- **Element 2:** The system of National Interests partly ensures the process of evaluating the different land uses against each other for optimal use.

Good Practice Aspect 2: Compensation measures for infringement upon areas of valuable nature

- **Element 1:** New practice for infringement upon areas of valuable land. An important aspect here is compensation plan which includes restoration, protection and management measures for forest land and wetlands.

Good Practice Aspect 3: Carefully planned and early interaction with stakeholders

- **Element 1:** Early involvement of stakeholders prevented conflict of land use.
- **Element 2:** Public documents within the permitting and land use process: Documents handed in to the environmental Court for the basis of EIA, in Sweden are public.

Good Practice Aspect 4: Well planned industrial and mining area

- **Element 1:** Careful planning of construction and industrial sites: Well planned areas for location of industrial construction and industrial sites within the mining area. This is necessary for approval of environmental permit. **Transferability:** Necessary for future well functioning and environmentally acceptable mining.
- **Element 2: High competence and capacity.** At all levels both on company scale as well on the authority side there is a high need for capacity and competence. Need for capacity and competence both within the company as well as the authorities. Coupled also to environmental performance of the mine established also with land owners and affected parties.

1.3 Mineral resource groups



Metals



Critical raw materials – Current list of EU CRM 2018; Critical Raw Materials (according to EU 2017 list of CRMs)¹; Iron Ore of apatite type. Byproduct apatite which also may contain small amounts of REE.

¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52017DC0490&from=EN>

Part 2: Case description

2.1 Case description

The Mertainen Iron Ore Mining project is about potential extraction of apatite type iron ore with the possibility of apatite as a byproduct. Mertainen is located in Kiruna municipality about 12 km northwest of the village Svappavaara, where LKAB has an existing mine and a pelletizing plant. The project covers an area of about 720 Ha and is owned and managed by the company LKAB that is also responsible for the Kiruna, Malmberget and Gruvberget mining sites. The LKAB iron ore production covers a lion share of the European iron ore extraction. LKAB holds three exploitation concessions concerning iron in Mertainen. An exploitation concession gives the holder the "ownership" of a proven, extractable mineral deposit for a period of 25 years, which may be prolonged.

The mineral deposit of magnetite in Mertainen was discovered in 1897. Mining concessions, according to elderly mining law, was granted in the early 1900's. In 1956-1958 about 400 000 tonnes of iron ore was mined in an open-pit. A major drilling programme was performed by the Swedish geological survey in 1959-1963. In year 2000 the old mining concessions were transformed into exploitation concessions (named Mertainen K nr 1-3) according to the Minerals Act (1991:45). Further exploration work has been done by LKAB since year 2000, including a test mining of 380 000 tonnes in 2011. The Geological Survey of Sweden (SGU) declared Mertainen as a mineral deposit of national interest in 2011. Having the deposit declared as an Area of National Interest strengthens the position of the project in the general land use process as well as the permitting processes. The environmental permit required for mineral extraction under the Swedish Environmental Code was issued by the regional Land and Environmental Court of Appeal in 2014. Mining activity in Mertainen is right now on standby due to metallurgical research to obtain a high-quality iron ore product.

The location of the mineral resource is geographically beneficial in relation to LKAB's already existing processing plants in Svappavaara. Ore occurrence is large and the mineral resource is easily accessible and located near existing road and rail infrastructure. There are no residential areas close to the planned mining site, which is also an advantage. Thus, the direct disturbance to people in the form of noise, dust and vibrations etc. is limited.

Mining operations will have impacts on reindeer husbandry since the area is important in terms of providing winter grazing for reindeers. Two Sami villages are affected by the mining site; Gabna and Laevas. Mining in Mertainen will also affect areas with high nature values (being considered as important from preservation of valuable nature) and recreational opportunities in the area, such as berry picking and hunting.

The mining operations at Mertainen will use approximately 720 hectares of land for an industrial area, storehouses and auxiliary operations, but also impact wetlands, coniferous forests and mixed forests in the surroundings. Following the Land and Environment Courts approval of LKAB's compensation

plan for its operations at the Mertainen mine, the company will be required to compensate for its impact on the nature values identified in an area located to the north of the mine. The ruling states that LKAB has signed an agreement to protect an area at least equal in size to the impacted area of 1220 hectares. The company's compensation plan includes restoration, protection and management measures for forest land and wetlands in an area which, without formal protection, risks being used for forestry purposes. The compensation proposal is based on the idea that the company will help create new nature values, rather than simply protecting a particular area. Among other steps, dead wood will be moved from the exploited area to the compensation area.

The Mertainen project was used as a case in a pilot project to develop a methodology for calculating losses and gains of biodiversity. More information can be found [here](#).

The project has impact on national, regional and local scale: On the national level the Mertainen area is indicated as an area of national interest regarding mineral resources and as such part of the comprehensive land use system in Sweden; Regional scale, Mertainen is important for retaining future mining industry in the Svappavaara region; Local scale, mining in Mertainen impacts other alternative land use like reindeer husbandry, high nature values, recreational opportunities and forestry.

Mertainen, like all mining projects are affected the system of areas of national Interest, which includes not only minerals but also other strategic important aspects like sensitive nature, infrastructure, reindeer husbandry etc. This is always included into the decisions by the environmental court where as a result after a positive or negative decision the final land uses will be established. Below follow a short description of the system excluding the exploration part. Observe that for Mertainen, concession was granted on older practice.

Land use - national interests

Well known deposit which are deemed important for Sweden can be achieved a status of protection in the system of National Interests which is described here below. This deposit is not necessarily exploited or under exploitation.

The Environmental Code contains special provisions on the management of land and water areas (Chapters 3 and 4). These provisions are designed to promote a reasonable use of natural resources in both the long and short-term from a comprehensive societal perspective. Accommodation of both preservation interests and exploitation opportunities is to be made possible. Large virgin areas of land and water, ecologically sensitive areas, and agriculture and forestry of national importance are always to be protected to the maximum extent possible. The same applies to areas of importance, e.g., for reindeer husbandry, natural beauty, cultural interest, outdoor recreation, valuable substances they contain or for purposes of national defence. These areas can also constitute national interests, in which case they must always be protected.

When an area is of national interest for several incompatible purposes, priority must be given to the purpose best conducive to long-term management of the land, except where defence interests of outstanding importance are involved. Various national governmental agencies are required to specify particulars of areas judged to be of national interest. The Geological Survey of Sweden, for example, is responsible for the assessment of national interests in areas containing valuable substances such as minerals (i.e. mineral deposits of national interest). In addition, the Environmental Code specifies certain geographical areas that come under direct protection and are regarded as national interests for purposes of tourism and outdoor recreation. These areas are designated along the coasts, rivers and in certain mountain regions. The area protection described above, national interests included, is safeguarded insofar as palpable damage can be prevented. Measures, e.g. mineral extraction, which palpably harm a national interest are an absolute impediment to mining operations, unless the deposit in itself also constitutes a major national interest. In summary, the management provisions in the Environmental Code can be seen as a planning instrument preceding decisions on changed land use. It is also implemented and used during the permitting stages for mining.

The instrument for National Interests is a tool so that the most appropriate land use can be achieved which in some instances is mining whereas in other cases denials have been the result of the application process. Several such denials are no up on the table of the government to decide upon as the final instance for decision after appeals.

Exploitation concession

Next step is an application for an **exploitation concession** which is granted by the Mining Inspectorate. An EIA is needed, but with focus on land-use issues. In the process the CAB is consulted and obliged to leave a statement whether the CAB approves of the application or not. The CAB must decide if mining is the best land use in the area. Central aspects of the judgement is if there are areas of national interest (NI:S) that are affected by mining practise. In the decision land use that promotes sustainable development should be given priority if there are NI:s that can't co-exist. The system with NI:s is regulated in the environmental code, (national legislation).

If the CAB and the Mining Inspectorate comes to different conclusions if an exploration concession should be granted or not the application must be handled by the government for final decision.

If an exploration concession is granted, the company can go on with an application for an environmental permit, either for full scale mining or for a test mine. A full EIA is needed. A test mine can be licensed before or after exploitation concession is granted. This is also the case for a full-scale mine, although the possibility is almost never used.

An application for a **test mine** is sent to and handled by the CAB. The Swedish name for the licensing authority that decides on the matter at the CAB is Miljöprövningsdelegationen (MPD). The MPD is composed of a chairman and a person with expert knowledge in the environmental matters. The

chairman is a legal expert with court experience and with a special experience from environmental matters and all issues related to the environmental code. The person with expert knowledge in environmental matters has an education in the field of technology and science, and has particularly good experience in matters related to damage and detriment to human health and the environment. The MPD is a licensing authority within the CAB and not part of the authority's ordinary chain of command.

A license for a test mine is restricted in terms of the purpose of the activity. The only allowed objective for a test mine is to more thoroughly examine the properties of the ore.

Environmental permit

Environmental permit for a full-scale mine is granted by the Land and Environmental court. In the whole process of opening a new mine legal practice states that an exploitation concession states that a mining operation is permissible. This means that the object of the environmental permit is to set the conditions for the mine in terms of levels of outlets, transportation, working hours etc. In the court process the CAB represents the state and public interest.

Designation of land (access to land)

The Chief Mining Inspector together with two trustees makes decisions on designation of land needed for a mining activity if not an agreement is reached between the concession holder and the landowners and the holders of special rights. If the concession holder agrees with the landowners and the holders of special rights, land or other space shall be designated in accordance with that agreement. Insofar as an agreement has not been reached, the land or space that is needed shall be designated.

Building permit

In the last step the a building permit according to the Swedish Planning and Building Act for facilities etc. is sought and usually granted since all aspects of the industrial area location has been overviewed and accepted from environmental perspective in the Environmental permit.

2.2 Responsible institutions

- Institution 1: The Swedish Mining Inspectorate – grants prospecting rights for concession minerals and concession for mining.
- Institution 2: The County Board of Norrbotten – responsible for nature protection and Sami land use issues.
- Institution 3: Swedish Environmental Protective Agency – responsible for nature protection.

- Institution 4: The Environmental Court – rules upon the environmental permit and as a consequence of the EIA in practice decides upon final land uses also
- Institution 5: Municipality of Kiruna – grants building permits, responsible for land use planning
- Institution 6: National Board of Housing, Building and Planning coordinates all areas of national interest
- Institution 7: Swedish Transport Administration – responsible for roads in the Areas of National Interest (the project is located next to a major highway).
- Institution 8: Geological Survey of Sweden – responsible for Minerals as Area of National Interest and expert authority on ground water.

2.3 Case stakeholders

- LKAB – Mining Company – the company responsible for the project.
- Local community- local people affected by the mining in the area.
- Naturskyddsföreningen i Kiruna- Environmental NGO focused upon conservation of nature and habitats.

2.4 Context

The Mertainen mining project can partly be seen as a case illustrating Swedish mining policy and practice. Particularly the part regarding the so-called final mining permit, i.e., the environmental permit. Here the land use aspects are one of the decisive factors so therefore the project directly couples to the system of National Interests, e.g., reindeer herding, valuable nature, infra structure (major highway E10), and valuable minerals. The different elements can be seen as separate but are in practice part of a system, a holistic system in fact. Wherefore, a change in the functionality of a single part of this complex system may interrupt the way from finding , prospecting, a mineral deposit, to exploration, to all necessary mining permits. Impacts from European Directives, e.g., habitats and species and Natura2000, could impact the system since land affected by these may have a stronger position the determination of which land aspects should be valued since the value these have are often higher than any other land uses. The Swedish system has two levels of land use.

- One the so-called comprehensive land use, is a strategic land use which is covers the Area of National Interests including minerals.
- The other is the detailed land use which is the final land use. The Natura2000 areas are often considered equal to the detailed land use planning whereas the minerals are not in the system

of national Interests. The mining can after being granted permits reach this level of land use.

The value of the minerals is raised in several stages, firstly with the prospecting license which gives the permit holder right to explore, secondly with the concession, which is the first stage toward a mining permit, which give the deposit an even stronger position, often with a an area of national interest, thirdly after the being granted the environmental permit, which in effect ensures the land use for mining and also will lead to being granted a building permit.

Value chain: The context of the value chain shows the importance of the LKAB iron ore mines. The current project covers a number of steps in the value Chain analysis:

1. Firstly, policy – how the mining permit is achieved.
2. Secondly if mining commence the mine will produce ore that will support both economical, from the profit, Sweden as country, large part of the turnover stays in Sweden from national to local level and part of the product is being used by companies at regional level. In all the mining supports a significant portion of the economy as well as employment of the local work force.
3. Thirdly, part of an ecosystem for mining: The Swedish mining companies have easy access to the mining industry equipment providers like Sandvik and Epiroc leading to use of equipment that can be used in extreme environments such as Kiruna which is situated at the edge of the tundra of northern Europe's Caledonian mountain chain with winters normally about seven months long with extreme cold at the surface. The Kiruna Iron ore products are today mostly sold abroad and part of the produce is sold to the local steel mill SSAB in Luleå. Part of the produce is also supplied to Europe. The Kiruna town is also one of the wealthiest northern cities in Sweden with the largest population of any municipality outside of the Baltic Coast in Norrbotten and Västerbotten Counties. A close connection to the local technical University of Luleå helps to keep a high level of education among the work force as well for development necessary covering diverse areas from technology to social acceptance.



Part 3: Case Evaluation

3.1 Impact achieved

- Impact 1: All necessary permits granted in order to start mining.
- Impact 2: **Mining activity weighted as the major land-use** since the mining activity as a form of land-use was weighted high in the final decision from Environmental Court in comparison to infrastructure (major road), valuable nature and areas for recreation. The area is also a reindeer herding area for which resolution was reached with the stakeholders before application to environmental court.
- Impact 2: Methodology for **compensation measures for infringement** upon sensitive areas. The case presents a new practice in **compensation of infringement upon areas of high nature values** and water protection areas. Areas are established to replace areas affected by the mining.
- Impact 3: **Prevention of stakeholder conflict**: Stakeholder conflicts avoided due to a strategy of early involvement.

3.2 Good Practice Aspects: Elements and their transferability

GOOD PRACTICE ASPECT 1: Weighting of different land-uses	
Key elements (of Good Practice Aspects)	Suggestions for Transferability (of Key Elements)
<p>Element 1: Weighted the different land uses in the permitting process. In decision for the final mining permit, the environmental permit. land uses such as infrastructure development, nature protection, forestry, reindeer herding, were evaluated according to all pillars of sustainability and optimal use. This decision forms the final land-use since the land use for mining was weighted higher than the other land uses though with some provisions, e.g., based on a holistic view of weighting different land uses.</p> <p>Element 2. The system of National Interests partly ensures the process of evaluating the different land uses against each other for optimal use. However, built into the system is that certain land uses such as Natura 2000, due to EU directives, have a very strong position. In order to weigh the different land uses a holistic approach to the use and consequences need to be taken. Here it is presented how impacts are minimised and compensated for. This is also heavily coupled to the stakeholder engagement (see Good Practice Aspect 3). The impacts of all land uses was considered and important was that impacts on other land uses were minimised to an acceptable level. See infringement upon sensitive nature and stakeholder interactions (Good Practice Aspect 2). In this view the whole planning of the industrial complex as well as remediation was considered.</p>	<p>A the decision process, here within the permitting, are including tools (the system of National Interest) and decisions (the granting or denial of the permits) on how to weight different land uses. The Swedish process is that the final permitting, the environmental permit, is decided at the environmental court as the formal part of last step of the process. As a supporting tool the system of National Interests is being used.</p>

GOOD PRACTICE ASPECT 2:

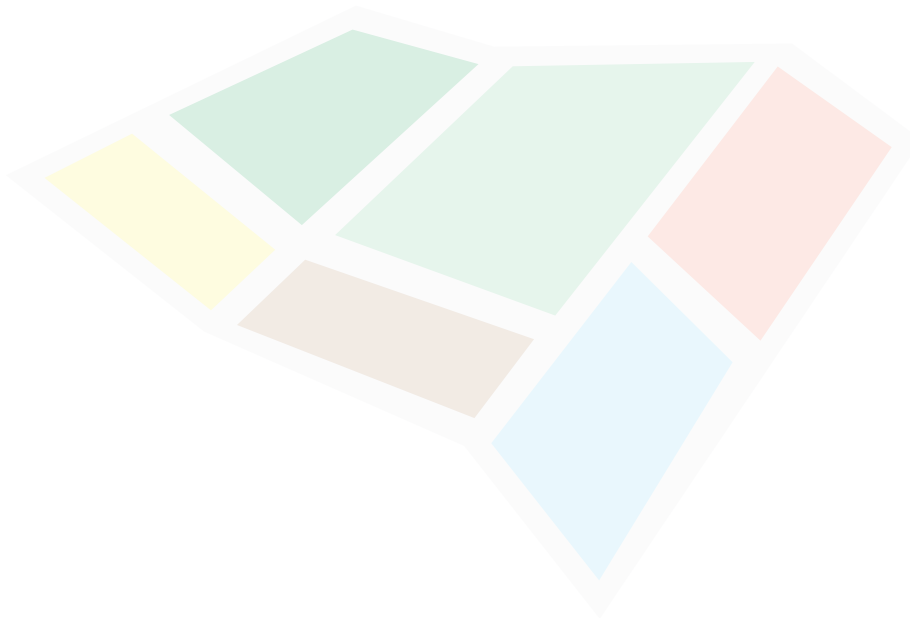
Compensation measures for infringement upon areas of valuable nature

Key elements (of Good Practice Aspects)

Element 1: New practice for infringement upon areas of valuable land: Compensation measures, within the economy of the future mining project, can be a solution for mining when impacting on other land uses such as sensitive nature. Particularly in this case other land that used by the mining operation has been supported and set aside for nature conservation purposes.

Suggestions for Transferability (of Key Elements)

In case of infringement upon other land uses or land aspects like sensitive nature, other land can be set aside as a compensation measure.



GOOD PRACTICE ASPECT 3: Carefully planned and early interaction with stakeholders	
Key elements (of Good Practice Aspects)	Suggestions for Transferability (of Key Elements)
<p>Element 1: Early involvement of stakeholders prevented conflict of land use: The stakeholder interactions should be started as early as possible with relevant information in order to minimise conflicts or solve conflicts as well as for building support. This also improves upon the final EIA since a solid stakeholder interaction used in the EIA as always positive. However, in current practice form the mining companies certain stakeholder interactions are done outside of the EIA and some stakeholders. Like the SAMI the mining companies are often in continuous contact also after granted mining permits since the operation of the mines may affect the stakeholders.</p> <p>The company worked preventive in seeking solutions with land use from reindeer herding leading to no conflict in the final application part at the environmental court. Impacts were carefully detailed and suggestions and solutions to these were a part of the work and contact. Early involvement with stakeholders in a well weighted procedure. There are two parts here:</p> <ol style="list-style-type: none"> 1. Stakeholder interaction necessary for the EIA. 2. Additional stakeholder contacts for building trust and acceptance. 	<p>Early in the project, stakeholder interactions should be initiated.</p>
<p>Element 2: Public documents within the permitting and land use process: Documents handed in to the environmental Court for the basis of EIA, in Sweden are public.</p>	<p>All documents pertaining to land use and permitting should be made public.</p>

GOOD PRACTICE ASPECT 4:
Well planned industrial and mining area

**Key elements
(of Good Practice Aspects)**

**Suggestions for Transferability
(of Key Elements)**

Element 1. Careful planning of construction and industrial sites: Well planned areas for location of industrial construction and industrial sites within the mining area . This is a necessary part in achieving a positive verdict is a very carefully planned mining area that is shown to minimise impact upon e.g., sensitive nature. Careful planning is essential in order to have acceptance for infringement and minimise impact and compensation measures upon other land uses, in this case sensitive nature. It is important for environmental perspective that the location of the industrial facilities, particularly the tailings pond, is constructed and put into the land so as to minimise environmental consequences.

Careful land-use planning of the industrial area leads to improved environmental performance and will lead to easier approval of the environmental permit.

Element 2: High competence and capacity. At all levels both on company scale as well on the authority side there is a high need for capacity and competence both within the company as well as the authorities. Coupled also to environmental performance of the mine.

Sufficient competence and capacity is necessary for qualified planning of the industrial area. This was also one part within the local WS where it was deemed equally important at authorities also.