Briefing on

PROPOSED MINING AND BENEFICIATION OF LANTHANIDE ELEMENT ION-ADSORPTION DEPOSIT IN MUKIM KENERING, DAERAH HULU PERAK

27 August 2022

SAHABAT ALAM MALAYSIA
Background information based on the EIA

PROPOSED MINING AND BENEFICIATION OF LANTHANIDE ELEMENT ION-ADSORPTION DEPOSIT ON A TOTAL AREA OF ABOUT 5,339 ACRES (2,161 HA) IN MUKIM KENERING, DAERAH HULU PERAK, PERAK DARUL RIDZUAN

- There were objections from environmental organisations to the Department of Environment (DOE), when the EIA for the project was first made public.
- The EIA was approved on May 11, 2022 despite its serious flaws.
- The status of the EIA was first shown “rejected” in the DOE’s website.
- The DOE Director-General in media reports, claimed that there was a “technical glitch” regarding the website information.

- The project is proposing in-situ leaching mining and beneficiation of ion-adsorption lanthanide deposit.
- The project will involve 2,161 hectares and is made up of 11 parcels.
- The project is located within Environmentally Sensitive Area (ESA) Rank 1 under the National Physical Plan (NPP), drawn up under the Town and Country Planning Act 1976.
- The project site is also part of Central Forest Spine 1 - Primary Linkage 8 (CFS1-PL8), which links Kenderong Forest Reserve, Bintang Hijau (Hulu Perak) Forest Reserve and Belukar Semang Forest Reserve.
- In terms of land use, the project is located on a mix of agricultural land and forest land.
- The EIA also revealed that active logging activities were carried out by different contractors on previously surveyed sites in January 2021.

Project location

The project site is located along the Federal Route 4 (East-West Highway) segment of Jalan Baling – Gerik.

Figure 2: Project location
Source: Extracted from the EIA report, Chapter 1 Figure 1.4.1a & 1.4.1b
Land use types of land parcels

![Map showing land use types](image)

Figure 3: The project site is located on land designated for agricultural and forest land

Source: Extracted from the EIA report, Chapter 1, Figure 1.4.2 and Page C6-163

**Project developers and sub-operator**

- Aras Kuasa Sdn Bhd (AKSB), Tulus Mentari Holdings Sdn Bhd (TMSB) and Aras Kuasa Geological Sdn Bhd (AKG) are the project developers appointed by the Perak State Agricultural Development Corporation (PPPNP) and Menteri Besar Incorporated (MB Inc) respectively.

- The project proponent **MCRE Resources Sdn Bhd**, a joint venture company incorporated on 3rd April 2020, is appointed as the sub-operator to undertake all mining operations.

- Dato’ Sri Pek Kok Sam is the director of MCRE, AKSB, TMSB, and AKG.

Dato’ Sri Pek Kok Sam is also the CEO and Executive Director of Southern Alliance Mining Ltd listed on Singapore Exchange (SGX).

Source: Southern Alliance Mining, About Us [https://southernalliancemining.com/about-us/](https://southernalliancemining.com/about-us/)

**Project site**

![Mining area and hydrometallurgical plant](image)

Figure 5: Mining area and hydrometallurgical plant

**Figure 6:** Pilot project site

Source: Extracted from the EIA report, Chapter 1, Page C1-3
Project concept

• The project is proposing **in-situ leaching** mining and beneficiation of ion-adsorption lanthanide deposit.

• The process initially involves the drilling of holes into the ore deposit. Leaching solution is then pumped into the deposit where it makes contact with the ore. The solution containing dissolved ore content (known as Pregnant Solution) is then collected for further processing in the hydrometallurgical plant.

**Figure 11:** Methodology of in-situ leaching mining for the ion-adsorption lanthanide deposit
Source: Extracted from the EIA report, Chapter 5, Figure 5.1.1

**Injection of leaching solution**

The image is taken from other site in China to illustrate the injection of leaching solution

**Collection of pregnant solution**

**Figure 13:** Preparation of diversion hole to install pregnant solution collection pipelines
Source: Extracted from the EIA report, Chapter 5, Figure 5.3.1

(Photos taken on 13 August 2022)
In-situ leaching (ISL) & ore processing process flowchart

Source: Extracted from the EIA report, Chapter 5, Figure 5.4.3
Response from the Minister of Energy and Natural Resources (KeTSA) during the Parliament Q&A on 1 August 2022

- The Minister of Energy and Natural Resources (Kementerian Tenaga dan Sumber Asli - KeTSA) gave the following response to a question raised by YB Nurul Izzah on the action of the Ministry with regard to the Project which will bring destruction to an area of 2,161 hectares that includes ESA Rank 1 and CFS1-PL8.

- The key points are examined and highlighted further in the next section.

Response from the Minister of KeTSA - as translated by SAM

1. Based on the application for approval of the Environmental Impact Assessment (EIA) report submitted to the Department of Environment (JAS), the area involved is 2,161 hectares. This application was approved on May 11, 2022, covering a number of private lands under the ownership of the Perak State Agricultural Development Corporation (PPPNP), Gerik District Council, FELCRA Berhad and Perak Menteri Besar Incorporated (MB Inc).

2. Based on the details of the approved EIA Report, of this **2,161 hectares**, only land under the ownership of PPPNP and FELCRA Berhad with the status of agricultural land which covers only **1,546 hectares** is approved for use in mining areas and a mineral processing centre for rare earth elements (REE). The land under the ownership of the Gerik District Council covering an area of 36 hectares has been approved for the purpose of infrastructure development, such as office and store.

3. Meanwhile, the remaining area of **579 hectares** under the status of forest land under the ownership of MB Inc. has been approved for research use for the EIA only because it is located in the Permanent Reserved Forest (PRF) area. From areas that have received EIA approval for mining and the processing purposes; at the moment, only an area of **87.45 hectares** under PPPNP ownership has been agreed by the Perak State Government as a pilot project site for mining of Non-Radioactive Rare Earth Elements – NR-REE.

![Figure 16: Response from Minister of KeTSA on 1 Aug 2022](image)

![Figure 17: Land use approval and pilot project](image)
4. Next, the records of the Department of Minerals and Geoscience Malaysia (JMG) shows that no mineral tenement approval (Mining Lease or Proprietary Mining Licence) in the State of Perak is issued in Environmentally Sensitive Areas (KSAS) Rank I.

5. For the next step in ensuring the mining project has minimal impact on the environment, the Ministry strongly emphasizes the principles of responsible and sustainable mining. This matter was also stated during the winding up session, debate on the 12th Malaysia Plan (RMKe-12) in the Dewan Rakyat last October 6, 2021, where the Ministry stated that it will not support and issue any Operational Mining Scheme (OMS) Approval letter in case there is application for mining on land with PRF status or protected reserve and area which is gazetted as ESA. This applies to all types of mining, including NR-REE mining. Therefore, only land areas with agricultural status under the ownership of PPPNP are approved for NR-REE mining activities.

6. Although this mining activity has received related approvals such as EIA, OMS, and Planning Permission (PM), the Ministry will still control this mining activity through the preparation of Standard Operating Procedures (SOP) for NR-REE Mining in State of Perak. This SOP has come into effect beginning April 15, 2022 and will be adopted as a guide to regulate the implementation of the NR-REE Mining Pilot Project in the State of Perak. This SOP has been comprehensively developed with consideration of all related acts and legislation such as the Mineral Development Act 1994, Perak Minerals Enactment 2003, Environmental Quality Act 1974, and Town and Country Planning Act 1976.

7. In addition, the Ministry has determined that only the mining method by in-situ leaching from Ion Adsorption Clay (IAC) deposits is allowed for the purpose of mining in this pilot project. This method is believed to be safer compared to the open-cast mining method that will result in more forest clearing as a result of the tree felling. The in-situ leaching method only involves minimal land clearing as it only involves injection of ammonium sulphate solution into the ore body through the solution injection hole below a certain pressure head to extract this mineral in the form of ions.

8. Considering the status of this project is a pilot project, the Ministry will ensure strict monitoring is conducted with the establishment of a monitoring committee and appoint an independent assessor to conduct periodic monitoring and make an impact assessment on the implementation of the pilot project activities. This assessment involves factors such as the safety of using the in-situ leaching method, assessment of groundwater and surface water resources, assessment of soil and plant conditions, mineral production costs, local economy spillover impact and community health around the project area.
Why the project should be halted...

1. Approving such mining activity in an ESA Rank 1 ecosystem is in violation of the federal government’s own planning policy and can in no way be viewed as a sustainable activity.

   • According to the EIA, based on the National Physical Plan (NPP), the entire Project site is located within ESA Rank 1.
   
   • No development, agriculture or logging activities are allowed in an ESA Rank 1 site, except for low-impact nature tourism activities, research and education purposes.
   
   • Our view is that ESAs including forest reserves and biodiversity-rich areas should be NO-GO zones and protected from any incursions from mining and other extractive activities.

![Figure 18: The entire project site is located within Environmentally Sensitive Area Rank 1 based on the National Physical Plan 4.](image)

Minister’s response to the question regarding the project site in ESA Rank 1 during the Parliament Q&A

FACT #1: The entire Project site is within ESA Rank 1

“(2)... of this 2,161 hectares, only land under the ownership PPPNP and FELCRA Berhad with the status of agricultural land which covers only 1,546 hectares is approved for use in mining areas and a mineral processing centre for rare earth elements (Rare Earth Elements - REE). The land under the ownership of the Gerik District Council covering an area of 36 hectares has been approved for the purpose of infrastructure development, such as office and store.

FACT#1
The entire Project site is located within ESA Rank 1, including the agricultural land.

The EIA states that the project site is located within ESA Rank 1 based on Rancangan Fizikal Negara ke-3. A check with the 4th National Physical Plan as shown in the previous slide and also the Perak Structure Plan 2040, confirms that the entire project site is located within the ESA Rank 1, including the agricultural land under the ownership of PPPNP and FELCRA Berhad. Why agriculture is allowed in an area within ESA 1 is of course an important question.
“(4) Next, the records of the Department of Minerals and Geoscience Malaysia (JMG) shows no mineral tenement approval (Mining Lease or Proprietary Mining Licence) in the State of Perak is issued in Environmentally Sensitive Areas (ESA) Rank I.”

“(5)... The Ministry stated that it will not support and issue any Operational Mining Scheme (OMS) Approval letter in case there is application for mining on land with permanent forest reserve status or protected reserve and area which is gazetted as ESA. This applies to all types of mining, including NR-REE mining. Therefore, only land areas with agricultural status under the ownership of PPPNP are approved for NR-REE mining activities.”

FACT #1
Given that the entire project site (including the agricultural land) falls within ESA Rank 1, the Minister’s statement that it will not support and issue any Operational Mining Scheme (OMS) approval letter in case there is application for mining on land with protected reserve and area which is an ESA rank 1 is questionable.

This applies to all types of mining, including NR-REE mining. Therefore, only land areas with agricultural status under the ownership of PPPNP are approved for NR-REE mining activities is contradictory and misleading.

FACT #2: The in-situ method may be safer compared to the open-cast mining; but the project should not proceed in the first place given that entire site is an ESA Rank 1

“(7)...This method is believed to be safer compared to the open-cast mining method that will result in more forest clearing as a result of the tree felling.

The in-situ leaching method only involves minimal land clearing as it only involves injection of ammonium sulphate solution into the ore body through the solution injection hole below a certain pressure head to extract this mineral in the form of ions.”

FACT #2:
Compared to the open-cast mining method, in-situ mining may be better off but there are still serious environmental risks such as groundwater contamination, destruction of wildlife habitat, landslides and slips as demonstrated in a report based on China’s experience.

In any case, the fact that the project site is an ESA rank 1 should mean that it is a NO-GO zone and be protected from any incursions from mining and other extractive activities.
2. The project site is part of Central Forest Spine Primary Linkage (CFS1-PL8), linking Kenderong Forest Reserve, Bintang Hijau (Hulu Perak) Forest Reserve and Belukar Semang Forest Reserve. The area has 5 viaducts for wildlife movement between the forest reserves.

- Under the National Forestry Policy and the National Biodiversity Policy, the forests involving the CFS are to be protected.
- According to the Master Plan for Ecological Linkages released in 2009, the implementation strategy for PL8 include:
  1) gazettement of areas along roads and viaducts as forest reserve under the National Forestry Act 1984, and carry out reforestation where necessary, around viaducts.
  2) It also recommended the creation of a riparian reserve along Sg. Rui.

The project on the contrary proposed trenches and electric fences to restrict the movement of elephants in the wildlife corridor.

Central Forest Spine 1 Primary Linkage 8 (CFS1-PL8)

The area has 5 viaducts for wildlife movement between the forest reserves.

Figure 19: Location of Project site within CFS1-PL8
Source: Extracted from the EIA report, Chapter 6, Figure 6.4.3

Figure 20: Viaducts for wildlife movements
3. The project will cause permanent habitat loss and total loss of salt licks for wildlife, which will lead to increase in human-wildlife conflicts and illegal poaching.

- Endangered, vulnerable, and near threatened species found at the project area include the Malayan tiger, leopard, elephant, tapir and sun bear.

- In summary, the EIA found that 15 species are Totally Protected, 11 species are categorized as Protected under the Wildlife Conservation Act (Act 716). Another 194 bird species were listed as totally protected and 11 bird species were protected under the Wildlife Conservation Act 2010 (Act 716).

Figure 21: Endangered, vulnerable and and near threatened species

- **Salt licks** are primary sources of mineral supplements for many animals, and this should not be disturbed at all cost. Salt licks were reported in just about 500m south from the proposed project site.

- Section 85 of the Wildlife Conservation Act 2010 (Act 716), clearly states no salt licks or the land in the immediate vicinity of any salt lick should be disturbed. According to EIA, there are clear signs of visiting by wild animals to these salt licks like elephants and tapirs.

Figure 22: Salt links near project site
4. Claims have been made about the likelihood of the project generating billions of RM, but these have not taken into account the environment and social impacts that can result and the costly clean-up involved as reported in China. The EIA estimated a loss of only RM $4,473,566^*$ for the environmental and social impacts, which does not reflect the true costs that will be unfairly borne by the local community, indigenous peoples and the society.

- Stakeholders who will have to bear the losses are the local communities, estate workers/planters living and working in the vicinity of the project. Majority of the local communities and indigenous people are self-employed, either doing any forest collecting, hunting, gardening jobs, house construction/repairing or short contract jobs. They comprise 47.8% from Kg. Pong, and 71.1% from KOA Bukit Asu and 23.1% from PPMS Tanah Hitam.

- The proposed site is part of the territory of the indigenous communities who reside close to the project site and this area provides them with their sources of livelihoods/forest products as confirmed by the Tok Batin of KOA Bukit Asu.

*at discount rate 3%

Figure 25: Settlements near project site
5. The justification given in the EIA that “the areas will remain green” and “no changes of land use from green to mining is needed” is grossly misleading and baseless.

- The justification that no changes in land use is misleading because:

  (a) A total of 40.7 ha will still be cleared for the construction of 7 hydrometallurgical plants.

  (b) Ammonium sulphate, the main chemical used for leaching, risks contaminating soil and bring detrimental impact to the existing plantation. FELCRA warned that the rubber tree species currently planted on site are sensitive to ammonium. The EIA confirms that excess residual of ammonium sulphate in the soil can be detrimental to rubber trees. The groundwater modelling result already showed high risk of ammonium and sulphate contamination in Well 2 and 3 used by PPPNP and FELCRA plantations within the proposed mining area.

- According to a study on the China’s Ion-adsorption Clay Rare Earth Resources, although in-situ leaching does not require clearing of vegetation and forests or the removal of topsoil, about one-third of the vegetation is still cleared and significant amount of drilling slurry is produced.

  (Source: https://www.sciencedirect.com/science/article/abs/pii/S2211464513000316)

- Compared to conventional method, in-situ leaching may have less impact in terms of land clearing, but it poses a more serious risk to groundwater and degradation of soils, acidification and undermine the crop yield and soil quality of the agricultural land.

<table>
<thead>
<tr>
<th>Environmental impact type</th>
<th>Pool leaching</th>
<th>Heap leaching</th>
<th>In-situ leaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetation damage</td>
<td>Serious</td>
<td>Serious</td>
<td>Minor</td>
</tr>
<tr>
<td>Soil erosion</td>
<td>Serious</td>
<td>Serious</td>
<td>Minor</td>
</tr>
<tr>
<td>Soil acidification</td>
<td>Serious</td>
<td>Serious</td>
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<tr>
<td>Tailings accumulation</td>
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<td>Minor</td>
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<td>Surface water</td>
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<tr>
<td></td>
<td>Groundwater</td>
<td>Minor</td>
<td>Serious risk</td>
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<tr>
<td>Geological disaster</td>
<td>Serious</td>
<td>Serious</td>
<td>Minor</td>
</tr>
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Figure 26: Land clearing at project site
6. The Perak government approved part of the mining project as “Non-Radioactive Rare Earth Elements (NR-REE) Pilot Project” without rigorous assessment of its radiological risk.

- Perak Menteri Besar Saarani Mohamad was reported to have said that the mineral could be another source of revenue for the state and that the “pilot project” on state land will determine if there will be harmful radioactivity from mining.

- According to the EIA,
  
  (a) In an area of 2,161 hectares, only 16 locations were tested for radioactivity.
  
  (b) Already the naturally occurring radioactive thorium (Th-228) from the land owned by PPPNP (land parcel PT1764) and FELCRA (land parcel FELCRA 01) were reported to be above the regulated 1Bq/g, at 1.02 Bq/g and 1.34 Bq/g respectively – which is up to 34% above the prescribed level.

  (c) The average thorium (Th-232) content from the Project site soil samples is 3.8 times higher than the national average (0.063 - 0.110 Bg/g) based on a United Nations Scientific Committee on the Effects of Atomic Radiation report. This fact alone should have raised alarm bells.

- The practice of in-situ leaching and recycling of process water as leaching solution imposes a high risk of increasing the concentrations of radionuclides and enhances the exposure from natural radiation sources.

- For example, unlike what was claimed in the EIA, another research on ion-adsorption clay rare earth mining sites in China shows activity concentration of the sludge may go above the regulated 1 Bq/g. The EIA has not done a proper characterisation of the sludge.

It was written in the Standard Operating Procedures (SOP) for NR-REE Mining that Radiological Impact Assessment (RIA) is not required because the natural radioactivity of known ion-adsorption clay deposits at various locations in Malaysia exhibit radioactivity concentrations lower than the permitted prescribed level. However, the EIA showed that 2 out of 16 samples had radioactivity levels above the regulated level of 1Bq/g, as indicated in item (b) above.

Figure 27: 16 Radioactivity soil sample locations
Source: Extracted from the EIA report, Chapter 6, Figure 6.2.53
7. The project is located in the headwaters of Sg. Rui, a tributary of Sg. Perak. Any degradation of the surface water or groundwater resulting from the proposed mining could affect the whole or a very large portion of these watersheds and their ecosystems.

- The rivers are an important water source for the local communities at nearby settlements from Kg. Pong and Kampung Orang Asli Bukit Asu who also fish and carry out recreation activities. This will directly affect the local communities and their access to drinking water. Arsenic pollution in Sg. Rui due to mining is a major health concern for the communities. Incidences of skin cancer were reported in 2019.

- The groundwater modelling in the EIA did not include heavy metals and radionuclides. The baseline study however has shown contamination of groundwater with elevated levels of lead, arsenic, iron and manganese. Flow directions and mitigation measures are also not shown in the event of the collapse or leakage of pregnant solution ponds.

- Likewise, the water quality modelling contains a number of key weaknesses and the proposed pollution control measure and monitoring programme are deemed inadequate. For further details, please refer to SAM’s EIA comment.

- In addition, the Pong Micro-hydroelectric Dam on Sg. Rui, located 3.5 kilometers downstream of the Project site, is the oldest hydroelectric dam in Malaysia built around 1924. The historical dam which is still in operation should be preserved, rather than becoming a receiver of wastewater discharge from the Project site.

- In-situ leaching was first used in Wyoming, US in the 1950s. According to Earthworks, an NGO who has been monitoring the mining industry in the US and globally, most of the in-situ leaching project has had numerous spills, contaminated underground aquifers, and have failed to reclaim non-operating on site wells. While the US has strict regulations that require complete restoration of groundwater conditions after mining operations, Earthworks found that the mining industry has never fully cleaned up an aquifer pollution by in-situ leaching.

(Source: https://www.earthworks.org/issues/in_situ_leach_uranium_mining/)

Figure 28: Downstream of Sg. Rui

Sg. Rui downstream of the project site flows through settlements such as Kg. Pong (left) and Kg. Pahit (middle and right).

According to a local villager, Sg. Rui already suffered from heavy sedimentation and siltation especially during heavy rain from upstream activities.
Three of the wells are recommended to be discontinued as source for raw potable water to give way to mining based on the Groundwater Quality Impact Assessment in Chapter 7.

Ayer Ganda Water Treatment Plant was shut down on Apr 9, 2019 due to arsenic pollution.

According to the EIA, Sg. Rui is a major river that intersects the project site and adjoins Sg. Perak 51 km downstream from the project site. There are no known operating potable water intake points up to Kenering Reservoir.
8. Checks on Google Maps and ground truthing (as shown in the drone images) confirmed that a hydrometallurgical plant was erected before the EIA was approved.

- Publicly available satellite imagery found signs of land clearing on the site as early as December 2019. Apparent structures started showing up in satellite imagery of the site in December 2020, before the approval of the EIA on May 11, 2022. The satellite imagery was made available by Malaysiakini.

- The satellite imagery from Google Earth (see Figure 35) matches the design of the metallurgical plant for PT1761 as shown in Figure 8.4.1 (see Figure 37) and Appendix 5.8 of the EIA report.

- This was also confirmed via ground truthing on 13 August 2022 (3 months after the EIA approval) that a full scale hydrometallurgical plant has already been built (see Figure 36) and was seen in operation before the Perak MB announced that the pilot project will start in September 2022 pending Environmental Management Plan (EMP) and Social Impact Assessment (SIA).

9. The impacts of climate change have not been described/assessed in the EIA. This is particularly important for a region with high precipitation (approximately 1.9 m average annual precipitation).

- The compounding effect of climate change, with more extreme events expected, both in intensity and frequency, are not accounted for and modeled in the EIA.

- As presently designed, the risk of encountering extreme rainfall events that will completely overload the system (e.g., overload and spill of interception ditches, pools, dams, etc.), resulting in the uncontrolled discharge of harmful liquids to surface water, is high. These will have detrimental consequences on ecosystems and populations along Sg. Rui and Sg. Perak.
10. Just adding the words ‘non-radioactive’ to rare-earth exploration and mining does not make the activity safe. Naturally occurring radioactive materials such as thorium which are present in the soils in the area will be disturbed and technologically enhanced, making the radioactive components more bioavailable to the environment. The lanthanide ore itself may not be radioactive, but the in-situ mining process may not be free of radionuclides or hazards.

• Mining activities burden us with the generation of dangerous toxic, hazardous, and chemical wastes for generations to come.

• The Perak state government and the DOE have not learnt the tragic lessons of the Asian Rare Earth (ARE) plant that resulted in serious radioactive poisoning in the Bukit Merah community, with high incidences of deaths among children who suffered from leukemia and cancer, children with elevated levels of lead in their blood, and above normal rates of miscarriages among pregnant women.

• The ARE case is indeed different from the proposed in-situ mining, but reference is made here for the purpose of showing that history must not repeat itself, with the Perak government ignoring the impact of making radioactive material bioavailable.

Key legal issues over the project

1. Checks on Google Maps and ground truthing (as shown in the drone images), confirm that a hydrometallurgical plant was erected before the EIA was approved. Given that the project is a prescribed activity, the project proponent should not have started any works until EIA has been approved. It is an offence under section 34A of the Environmental Quality Act 1974 to do so otherwise.

What action will be taken against the company in this regard?

2. The justification given in the EIA that “the areas will remain green” and therefore “no changes of land use to mining is needed” is unacceptable, as this is without basis.

3. Also in issue is the legality of land use zoning in an ESA Rank 1 area -

• The project is located in what is classified as forest and agricultural land. However, the whole project site is categorised as ESA Rank 1 under the NPP.

• As pointed out earlier, a site with an ESA 1 ranking under the NPP is not permitted for use for activities such as development, agriculture or logging except for low-impact nature tourism, research and education purposes.

• If the entire area is categorised as ESA Rank 1, how then was it allowed for agriculture, and also for mining?

• In addition, how can mining be allowed in an area zoned for agriculture?
Key lessons from China’s in-situ leaching rare earth mining

- The Chinese central government enforced a ban on surface mining and tank/heap leaching, while implementing in-situ leaching for ion-adsorption rare earths since June 2011.

- However, the implementation of in-situ leaching associated with rare earth mining is highly problematic as it is also environmentally damaging.

- The practice of in-situ leaching has revealed serious environmental problems including (1) groundwater contamination, (2) mine collapses and landslides.

- More than 100 landslides reported in Ganzhou region were attributed to in-situ mining and leaching practices, at significant human costs and losses of ion-adsorption rare earth resources.


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Other environmental impacts from China’s in-situ leaching rare earth mining

- In-situ leaching has long-term implications. A Chinese [research](https://www.sciencedirect.com/science/article/abs/pii/S0269749120361376) published in 2020 shows that, “twelve years after the mining process was completed, the mean pH values of the tailings in the mining area were 3.90 and 4.87 in its lower reaches. Due to the presence of chemical residues, the ammonia nitrogen (AN) concentration was 12–40 times higher than that of the raw ore soil before it was mined.”

- Another [study](https://www.sciencedirect.com/science/article/abs/pii/S2211464513000316) shows that:

  1) Sulphate pollution persists long after mining ceases through exacerbated nutrient pollution of downstream rivers and reservoirs and increasing microbial production of hydrogen sulfide, an extremely toxic substance for many aquatic organisms and plants.

  2) Water contamination owing to total suspended solids, sulphate and other pollutants can cause environmental degradation and stream biodiversity decline.

  3) Rehabilitation is difficult because the high concentrations of leaching solution can be attracted back to topsoil layer and destroy surface vegetation and plants (due to the capillary forces surrounding the leaching holes).
On the impacts of abandoned rare earth mines on local residents

- According to the Fan, et al. (2004), as quoted in the Consultant’s Report prepared for Asian Development Bank (February 2020) on People’s Republic of China: Improving Ecological Protection and Poverty Alleviation in the Mining Area in Ganzhou, Jiangxi, long-term exposure to rare earth mining areas will negatively affect child development:

  a) There is obvious accumulation of rare earth in the blood of children in rare earth mines, which is likely to have a negative impact on their health. Specifically, 15 kinds of rare earth elements in children’s blood samples could be detected, and the total rare earth content of children in rare earth exposed areas is 1.73 times higher than that of the control group.

  b) The vital capacity and blood pressure of children exposed to rare earth were lower than those of the control group. The humeral immunity of children exposed to rare earths changed; the IQ score of children in rare earth exposed areas was significantly lower than that of the control group; the proportion of children with high intelligence decreased, and the proportion of children with low intelligence increased.

- Long-term low-dose intake of rare earth elements has toxicological effects on the brain, liver, bone and immune function of residents, and also promotes the incidence of diseases such as leukemia; ammonia-nitrogen, nitrate-nitrogen, nitrite-nitrogen and sulfate have carcinogenic and non-carcinogenic effects on residents.

- Long-term exposure to rare earth mining areas not only affects the health of residents, but also negatively affect child development.

- Two other studies cited in the Consultant’s Report prepared for Asian Development Bank (February 2020) also have similar conclusions: fifteen kinds of rare earth elements can be detected in the hair of 0-3 year’s old infants in the rare earth mining area. The total amount of rare earth and 15 rare earth elements in the hair of the children in the mining area are all significantly higher than the control group.


Conclusion

There are many issues of serious environmental and health concerns which have been raised above.

This project should be halted and not be allowed to proceed.

The company responsible should stop all works, restore and rehabilitate the area to its previous state.

The government must not put profit before the health and well-being of human-beings as well as the environmentally sensitive ecosystem, which must be protected and not destroyed.
Do not allow proposed mining of Lanthanide in Mukim Kenering, Hulu Perak

Link: https://foe-malaysia.org/articles/do-not-allow-proposed-mining-of-lanthanide-in-mukim-kenering-hulu-perak/

Acknowledgement

We would like to thank Feini Tuang who helped us with the research, contributed the photos and drone images, and also supported us in the preparation of this booklet.

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