



Directions: Read the following article about the status of the mining of rare-earth minerals in Mongolia from 2012 and answer the thought questions below.

Plentiful potential: The country is home to major deposits of rare-earth minerals

With Mongolia's mining sector suddenly drawing international attention, one frequently asked question is whether or not the country can provide a steady supply of rare-earth minerals – a list of 17 elements crucial to the large-scale manufacturing of a wide range of items. Ramping up exploration for this set of crucial raw materials is one of several priorities for Mongolia's mining sector. Although exploration efforts are currently under way, it will be at least two or three years before any one deposit reaches the production stage, according to government officials.

Reaching Further

Rare-earth minerals are relatively common worldwide, but it is hard to find a whole suite of them in one place and it is extremely difficult to extract them without damaging the environment. These challenges have resulted in China being the world's only major supplier, with a market share of about 95%. There had been little concern about this sole-supplier arrangement until late 2010, when China cut off Japan temporarily after an unrelated dispute over fishing rights. Diversification efforts have attracted increased interest since then. Consequently, within the global mining industry there is speculation that China will seek to enhance its monopoly position in the coming years. That said, production of rare-earth minerals was halted at three mines in China in September 2011, with the authorities citing environmental concerns. There was also a temporary hiatus to production by the country's largest exporter around the same period.

Among possible diversification plans is one by the US government to create a stockpile of rare-earth minerals, similar to its strategic petroleum reserve, a hold of up to 727m barrels of oil that was created in 1975, after the oil-supply shocks of the early 1970s. While the hydrocarbons shortage had a much greater impact than the decline in rare-earths supply since 2010, the fear of a shortage has remained.

Abundant Reserves

According to a 2009 survey by US government geologists, there are 31m tonnes of rare earth resources in Mongolia, which is equal to 16.8% of known reserves worldwide and makes Mongolia the second-biggest source globally after China.

Exploration efforts are ongoing, however, and more minerals are expected to be found. As of late 2011, 20 licenses had been awarded to mining companies to develop rare-earth deposits, according to data from the official mining sector regulator, the Mineral Resources Authority of Mongolia (MRAM). Of this total, 15 are exploration licenses and five are mining licenses, meaning that enough of the elements have been found to

Rare earth minerals

China's tightening control over mines could trigger price hikes

- ▶ Collection of 17 chemical elements
- ▶ Vital component in high-tech products
- ▶ China supplies at least 95 percent of world's rare earths

Some products that contain rare earth elements:

■ iPods
dysprosium, neodymium, praseodymium, samarium, terbium

■ Wind turbines
dysprosium, neodymium, praseodymium, terbium

■ Hybrid vehicles
dysprosium, lanthanum, neodymium, praseodymium

■ Fibre optics
erbium, europium, terbium, yttrium

■ Energy-efficient fluorescent light bulbs
europium, terbium, yttrium

Source: USGS

AFP

justify production at a number of sites. Exploration is still ongoing at all sites, however, and production will not begin until that process is complete.

Wide Distribution

As of the end of 2011 rare-earth minerals had been found in commercial quantities in four spots. The largest deposit is also the westernmost, at Khalzan Buregtei, where there is a known reserve of 49.2m tonnes of ore, which is expected to hold about 246 tonnes of pure mineral content. Boshgo Uul, a Mongolian mining company, is working the deposit.

The easternmost deposit, Lugiin Gol, is in the Gobi Desert near the border with China. Exploration initially began in the 1970s, but it was not until 2005, when the local firm REO began examining the territory, that a commercial deposit was confirmed. REO invested \$3.6m from 2005 to 2009, according to MRAM figures, and has found 500,000 tonnes of ore, of which 13,500 is expected to be pure minerals.

Another two deposits are concentrated in the south-central region of Mongolia, also in the Gobi Desert and close to the Oyu Tolgoi copper and gold mine and the Tavan Tolgoi coal deposit. At the Khotgor deposit, Canada-based mining company QGX has been exploring since 2005 and has thus far found 39.75m tonnes of ore, albeit at a lower grade of less than 2% pure minerals. An estimated 48,500 tonnes of pure minerals are expected to be extracted from that total. Next door at Mushgia Khudag, the Mongol Ghazar Company has so far reported to have found 16.4m tonnes of ore, which could hold around 232,000 tonnes of pure content.

"Plentiful Potential: The Country Is Home to Major Deposits of Rare-earth Minerals." Oxford Business Group. Mongolia Energy Analysis, 06 Mar. 2012. Web. 17 Jan. 2015.

Thought Questions:

1. What role might geographers and geologists have in the exploration and mining of rare earth minerals in Mongolia?
2. Use the description of Mongolia's rare-earth mineral deposits to determine if it is a bulk-gaining or bulk-reducing industry. Support your answer with information from the article. How will the fact that it is a bulk-gaining or bulk-reducing impact any mining company in terms of the placement of refining plants.
3. What are the potential Social, Political, Economic, and Natural implications of large scale mining of rare-earth minerals for the country of Mongolia?
4. What are the potential complications of the removal of rare-earth minerals from Mongolia to the United States? Keeping in mind the location of Mongolia in relation to competitors China and Russia. Provide a possible, and viable, solution to any problem.