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ENVIRONMENT

A major deposit of rare earth elements sits just outside El Paso. Will anyone mine it?



by [Diego Mendoza-Moyers](#)

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Round Top Mountain sits near Interstate 10 just west of Sierra Blanca, about 85 miles east of El Paso County. The mountain, otherwise nondescript amid the vast surrounding desert, holds an estimated 80 million tons of rare earth elements that are essential to make advanced, high-tech electronics. (Diego Mendoza-Moyers / El Paso Matters)

In the desert expanse east of El Paso County, it's easy to speed past a small, nondescript mountain adjacent to Interstate 10 near Sierra Blanca.

However, the smooth, 1,250-foot monolith – called Round Top Mountain – holds hundreds of millions of metric tons of rare earth elements and other industrial minerals that are essential to develop the advanced electronics that power modern life, from batteries to cell phones.

Whether any rare earth elements are ever extracted from Round Top is an open question. But it could play a role in the country’s race to develop a supply chain where domestic companies mine and process rare earth metals into magnets that enable a wide range of technologies. Today, China has a near-monopoly on rare earth extraction and processing.

There are 17 rare earth elements, which are metals that have special magnetic and electrical properties that make them technologically useful. The metals aren’t actually rare, but they’re not highly concentrated and hard to separate from each other.

“There’s lots and lots of these materials, but they’re just dispersed at very low levels,” said Ron Cohen, an associate professor emeritus of civil and environmental engineering at the Colorado School of Mines.

The companies looking to mine Round Top estimate the deposits there are worth about \$1.56 billion. And the mountain holds not only 16 of the 17 rare earth elements, but also deposits of other minerals like lithium – a key ingredient for electric vehicle batteries. If Round Top enters production, the state comptroller has said the project could create a few hundred new jobs for the area.

“The project is in the preliminary engineering design phase of conducting tests, collecting and analyzing data, and generating engineering process design information for the pre-feasibility study,” USA Rare Earth, one of two companies in the joint venture that’s trying to develop Round Top, said in a statement to El Paso Matters.

The challenge now for USARE and its smaller partner firm, Texas Mineral Resources Corp., is figuring out how to profitably pull the rare earth metals from Round Top’s rock, process them and send them to a sophisticated factory to be converted into high-tech magnets.

“The USARE R&D team located in Denver, Colorado has developed and proven the separation process for several rare earth elements from the Round Top ore,” the company said. “USARE is currently working with Hatch Engineering and other multinational engineering and consulting companies for this phase of the project.”

The plan for Round Top

The Round Top deposit, which geologists and miners have been investigating since at least the mid-1980s, has

taken on new significance in recent years as demand for rare earth metals and other elements has skyrocketed because they are used in everything from clean energy technology to advanced military defense systems.

The Round Top joint venture has spent millions of dollars in recent years trying to bring a mine there into production. The goal is to eventually mine 20,000 tons of material from the site each day, process it on-site and ship it to a \$100 million factory that USA Rare Earth is building in Stillwater, Oklahoma. The facility will produce high-performance magnets to be used in military technology and electric vehicles, among other applications.



Round Top Mountain sits just off Interstate 10, behind a rest stop with distinct teepee structures. Round Top Mountain, pictured in the background, holds an estimated 80 million tons of rare earth elements, which are essential to make advanced, high-tech electronics. (Diego Mendoza-Moyers / El Paso Matters)

“Things kind of started about 1986. And that’s when people realized these hills were full of rare earth minerals,” said Phillip Goodell, a professor of environmental science and engineering at the University of Texas at El Paso who’s listed as an advisory board member of TMRC. “But then, at that point, the world wasn’t very interested in them.”

Today, China mines something like 60% of the world's rare earth supplies, and has established a near-monopoly on processing rare earth elements.



“It all comes down to money.”

– BRENT ELLIOT, UNIVERSITY OF TEXAS AT AUSTIN

“We get (rare earth elements) from foreign supply because they’re cheaper. That’s the bottom line,” said Brent Elliot, a research associate professor with the Bureau of Economic Geology at the University of Texas at Austin. “It all comes down to money.”

The U.S. government – mainly through the Department of Defense – has scrambled over the last couple of years to help U.S.-based companies establish a domestic supply chain to manufacture products from rare earth elements at a price competitive with producers in China.

At Round Top, an economic assessment from 2019 suggested the joint venture could generate \$113 million in annual revenue from rare earth elements – mostly dysprosium and lutetium – plus another \$200 million from selling lithium and industrial minerals such as aluminum sulfate.

TMRC estimated it would take \$350 million to get the mine up and running, plus another \$250 million in operating costs over 20 years, according to the study.

USARE has said it expects to begin mining Round Top in 2025.

“It’s a tremendous economic issue – rare earths – with this economic battle with China,” Cohen said.

“We’re desperate now. The military really took a big hand in this because of the needs they have in all their electronic equipment,” he said. “Their rocketry, their computers, all need rare earth metals. So we need to have some sort of capacity.”



Round Top Mountain sits near Interstate 10 just west of Sierra Blanca, about 85 miles east of El Paso. (Diego Mendoza-Moyers / El Paso Matters)

Back in 2018, privately-held USA Rare Earth paid \$13 million to purchase an 80% stake in the Round Top site from Texas Mineral Resources Corp., a small, publicly-traded mining firm that holds a 950-acre lease where Round Top is located that it acquired in 2010.

The Round Top joint venture expects to spend \$15 million to \$20 million this fiscal year to set up the mining site and refine the extraction process.

USA Rare Earth has taken the lead in developing the site; the chairman of TMRC referred questions to USARE. In late February, TMRC said it had two employees and just \$764,000 in cash – not enough to fund its own operations and its portion of this year’s mining budget. So TMRC has been gradually ceding some of its 20% stake in Round Top to USARE in lieu of contributing periodic cash payments to the project.

While USARE works through the pre-feasibility study at Round Top, the company signed agreements to receive rare earth elements at the Oklahoma plant from two other companies.

The plan for Round Top is to create an open pit mine to be operated by USARE.

“They propose to do a heap leach. Break all the rock up, you’re going to crush it up, they’re going to throw it in a big pile on a lined surface,” said Elliott, who has studied the Round Top project and other rare earth deposits in far West Texas. “Usually it’s a concrete bed with drainage channels, or something to that effect, where they soak it with acid.”

The acid separates the elements within the rock.

“The acid becomes a leachate,” Elliot said. “It drains off into a system that you collect, and then you process that leachate for whatever the commodity is.”

USARE plans to eventually develop an on-site processing facility. Until then, the company has been shipping material mined from Round Top – about 30,000 metric tons last year – for processing at its pilot plant near Denver.

In addition to sending the material to the Oklahoma plant, the company expects to have some leftover rare earth metals it plans to sell along with other metals mined from the site, such as gallium and hafnium.

“The government is an important customer for these metals which play an essential role in various high-tech applications, including defense, aerospace, and electronics,” USARE said in its statement.

Will mining Round Top be environmentally safe?

The company positioned the mine on the side of the mountain opposite I-10, so the operation isn’t as visible to passersby.

USARE said it has identified the air, water and waste permits it may need. Initial site work and surveys have shown “no indications of environmental concerns for advancing Round Top,” the company said.

“It will be environmentally safe,” said Goodell, the UTEP professor who’s been involved with the project. “Texas has good environmental laws. And so they’ll be kind of watched and controlled.”

Still, any mining operation creates big disturbances, said Cohen of the Colorado School of Mines. And there will inevitably be waste at the site – the material that’s left over after USARE yanks valuable commodities out of the rock.



***“You’re going to get surface disturbance.
There’s no doubt about it.
And there’s going to be waste material.”***

– SAID RON COHEN, COLORADO SCHOOL OF MINES.

“People normally don’t think about roadbuilding, the travel of giant trucks, transport of dump trucks to wherever they have to go and take the material. The noise, the dust,” Cohen said. “You’re going to get surface disturbance. There’s no doubt about it. And there’s going to be waste material.”

Since 2010, when TMRC acquired a mining lease, the company has racked up a deficit of over \$47 million, according to its quarterly filing.

Elliot of UT Austin said it was tough to estimate the likelihood that rare earth elements are ever mined from Round Top Mountain, though he said the nearby railroad line could be helpful to transport material away from the site.

“It’s going to take somebody with a lot of money, or federal support to get it to that point. And right now, that seems to be a possibility,” Elliot said. “A lot of companies right now are getting a lot of money to be able to do either exploration or to develop pilot projects that demonstrate the extraction technology.”

The U.S. Department of Defense in March said it has [awarded \\$439 million](#) since 2020 to companies to help establish domestic supplies of rare earth metals. That includes the Australian mining firm Lynas, which got \$288 million to develop a second rare earth production facility in the U.S. by 2026. Noveon Magnetics, based just outside of San Antonio, won nearly \$29 million for its rare earth manufacturing plant that produces magnets.

That also means the companies behind the Round Top project could face tough competition – and not just from other mining firms. The rare earth elements inside of Round Top are not highly concentrated, so it would probably require mining a big volume of rock to produce a worthwhile amount of commodities that the company can sell.

And there are numerous other emerging methods to produce rare earth elements that don't require establishing new mines, Elliot said.

The DoD said it has spent \$10 million to “explore the development of extraction technology and alternative sources of rare earth minerals from coal ash, acid mine drainage and other waste streams.”

Last fall, researchers at West Virginia University [won an \\$8 million federal grant](#) to explore further a method of retrieving rare earth metals from coal mine waste. A pilot facility they established can treat 500 gallons per minute of acid mine drainage – acidic water that's rich in heavy metals – and produce from that 2 tons of rare earths and other minerals per year.

Other researchers are exploring producing rare earth metals out of mine waste piles, as well [as coal fly ash](#), a waste byproduct of coal-fired power plants that utilities often place in mucky storage ponds.

“We are closing down coal mines. And so in order to try to maintain employment within those regions, they are looking at the extraction of rare earth elements from ... coal material,” Elliott said. “So can we turn around and change this coal mining into, basically, rare earth element mining?”

Plus, Elliot said, the permitting process to get a new mine approved can take at least a decade, even in a mining-friendly state like Texas.

“You have all these other sources that are almost to the point of extraction now. And if they prove out to be good technologies, and you can just reproduce that at other mine sites or other places around the country, that seems to make more sense than opening a new mine,” Elliott said.

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***“Globally, it is an important deposit.
They will mine the mountain away.”***

– PHILLIP GOODELL, UNIVERSITY OF TEXAS AT EL PASO

Goodell, however, had little doubt that Round Top will enter production someday soon. He said the government is more focused now on creating a domestic “mine to magnet” supply chain for rare earth metals,

and pointed to the hundreds of millions of dollars that the federal government has directed to different mining projects.

“Globally, it is an important deposit,” Goodell said of Round Top. “They will mine the mountain away.”

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