

SUPPLY CHAIN

Stockpiles of Critical Mineral Needed for High-End Magnets Begin to Dwindle

BY JAN TEGLER

The U.S. defense industry is down to a two-to-three-year supply of samarium, a rare earth element integral to high-performance magnets that are needed for several vital defense systems, an industry executive said.

High-temperature samarium-cobalt magnets — or SmCo magnets for short — are used in missiles, fighter aircraft, guidance systems, radar arrays, satellites and other defense technologies, according to Joseph Stupfel, CEO of Illinois-based Permag, which is the only U.S. producer of samarium-cobalt magnets and one of only a handful of manufacturers outside of China.

“Last summer, we saw the Chinese lock down exports of samarium, gadolinium, terbium, dysprosium and other rare earths used in magnet production,” Stupfel said.

China cut off exports in April 2025 as part of a response to U.S. tariffs. By August, the Chinese were “sitting on their stockpiles, not releasing them outside of China,” Stupfel added.

The restrictions are colliding with urgent demand from the Pentagon to increase defense production, prioritizing munitions, ships, drones and aircraft — including the F-35, which uses up to 50 pounds of samarium-cobalt magnets in each jet to help cool sophisticated electronics and other systems.

A spokesperson for the

Defense Logistics Agency, which maintains stockpiles of critical minerals for emergency use, said that it “does not publicly disclose specific information regarding the National Defense Stockpile’s inventory levels, the exact material compositions held or specific supply chain vulnerabilities for distinct defense platforms.”

However, the spokesperson added that Pentagon funding can be used to qualify substitutions for critical materials, including rare earth elements. The Defense Department is “interested in expanding the availability of these substitutes and ensuring that the industrial base has several potential methods to mitigate the risks associated with these materials.”

Defense spending advanced in last year’s One Big Beautiful Bill Act set aside \$7.5 billion for critical minerals and included \$2 billion to expand the National Defense Stockpile. DLA in mid-2025 issued multi-year indefinite delivery, indefinite quantity contracts to accelerate delivery of critical minerals.

Asked whether a shortage of magnets could impact production of the F-35, Lockheed Martin declined to comment, referring questions to the U.S. government. Similar

queries to the F-35 Joint Program Office and RTX, the maker of missiles incorporating the magnets — including the Tomahawk and Standard Missile — went unanswered.

China mines roughly 60 percent of the world’s rare earths and processes nearly 90 percent of the material used in rare earth magnets, Stupfel said, effectively dominating magnet production for defense and commercial markets.

The United States and its European allies led the world in magnet production until the late 1980s when U.S. and European environmental regulations on rare earths processing came into force, he said.

Simultaneously, China entered the market, heavily subsidizing rare earth mining and processing, squeezing out American and European processors and magnet producers with cheaper labor and production costs, seizing strategic control of the market.

The two-to-three-year supply of samarium Permag secured last year is a decades-old cache stockpiled by chemical company Solvay in La Rochelle, France, Stupfel said.

Working with Solvay, Arnold Magnetic Technologies in Rochester, New York, and U.K.-based Less

Common Metals, Permag managed to get hold of the material, the only readily available stockpile of size among U.S. allies.

Sources for samarium in the United States are limited, Stupfel noted. MP Materials’ Mountain Pass mine in California holds one of the richest deposits of rare earth elements in the world, including samarium, and is the only site of its scale in the Western Hemisphere. But MP doesn’t have the capability to separate or process samarium from ore.

“They’re stockpiling that until they get to the ability to separate that material,” Stupfel said, adding that the limited Western supply of samarium “is causing inflationary pressure on the price of SmCo magnets. We’re talking between 30 and 100 times more than the Asia metal price was two years ago.”

Permag has had conversations with the Pentagon on the criticality of samarium, and “they understand it,” he added.

Meanwhile, new Defense Federal Acquisition Regulation Supplement rules which come into effect in 2027 stipulate that magnets for use in national security applications be China-free from mine to magnet with traceability.

A few mines outside

China — including three in Australia — may be able to fill gaps for samarium at some point, but for now, Permag’s stockpile is the only short-term source.

“Our French stockpile has entered the supply chain, so we are making our first magnets with this material as we speak,” Stupfel said. “What we need for the long term is sources outside of China to put samarium into the marketplace.” **ND**



Samarium-cobalt rare earth magnets