The Critical Minerals List is Becoming More Critical

In a funky group of office buildings in Reston, Virginia sits the US Geological Survey (USGS), a bureau of the Department of the Interior that “provides science about the natural hazards that threaten lives and livelihoods; the water, energy, minerals, and other natural resources we rely on; the health of our ecosystems and environment; and the impacts of climate and land-use change.”

While it’s not clear from this cryptic mission statement, one of the important jobs of the USGS is the creation, every 3 years, of the US Critical Minerals list. The Energy Act of 2020 defines a critical mineral as “a non-fuel mineral or mineral material, essential to the economic or national security of the U.S., which has a supply chain vulnerable to disruption.” The current Critical Minerals list can be found here. It now lists 50 critical minerals critical to the U.S. economy and national security – 15 more commodities than the U.S.’s first list of critical minerals created in 2018. A large part of the increase in the new list of 50 is the result of splitting rare earth elements and platinum group elements into individual entries. Significantly, the USGS has added nickel and zinc to the list.

The list is compiled from research by USGS staff and a review of at least a thousand public comments. Having minerals on the list is supposed to be a good thing for mining companies, but the benefits are not obvious or quantifiable. Some argue that being on the list confers “soft” benefits, but permitting authorities like the EPA and Forest Service state explicitly that their process is the same whether the project involves critical minerals or not.

This might suddenly be changing, however. In February of this year, within a day or two of Russia's invasion of Ukraine, the Biden administration issued an executive order requiring US agencies to "prioritize production and processing of certain critical minerals." While we don't yet have case studies on what this will look like, it may be a sea change. And if you're shocked it came from a Democratic administration, you're in good company!

It now seems a reasonable bet that projects involving critical minerals may see expedited permitting and at least some relief from red tape. It's also probable that the critical minerals list will expand, since as US relations with Russia and China deteriorate, US vulnerability to supply chain disruptions is growing. According to Forbes, if we break down the 90 minerals tracked by the USGS, the US is 50% import-dependent for 50 of them, and 100% import-dependent for 20. This is truly an Achilles' heel of the US economy and military.

The threat posed by US reliance on foreign minerals is not abstract. In February of this year, in retaliation for US support of Taiwan, China banned rare earth exports to Raytheon and Lockheed Martin, forcing the latter to temporarily suspend production of the F-35 fighter jet. While some of those rare earth elements are now being re-sourced from other countries, it's a process that can take months or years – which would be a real problem in wartime.

This example illustrates the gravity of the issue, and explains why politicians are taking note; it also explains why the process of designating critical minerals needs to become more dynamic.

A case in point is potash, 40% of which comes from Russia and Belarus, and all of which is now subject to sanctions. Potash was on the critical mineral list in 2018, came off the list in 2022 (because supply chain risk was deemed benign), and now should arguably go back on the list tomorrow. If the US is serious about the risk of foreign mineral dependence, the USGS may need to start working overtime.

Although it's an imperfect document, the critical minerals list is carefully considered and may now become a bigger factor in the mining industry. The recent executive order looks like one of the few issues in Washington that can enjoy bipartisan support, and if the federal government follows through on pledges to "prioritize production and processing of….critical minerals," expect the designation of critical minerals to become more politicized. Miners might want to start shopping for lobbyists, since the critical minerals list looks likely to become more….well…. critical.

The List:

1. **Aluminum**, used in almost all sectors of the economy
2. **Antimony**, used in lead-acid batteries and flame retardants
3. **Arsenic**, used in semi-conductors
4. **Barite**, used in hydrocarbon production.
5. **Beryllium**, used as an alloying agent in aerospace and defense industries
6. **Bismuth**, used in medical and atomic research
7. **Cerium**, used in catalytic converters, ceramics, glass, metallurgy, and polishing compounds
8. **Cesium**, used in research and development
9. **Chromium**, used primarily in stainless steel and other alloys
10. **Cobalt**, used in rechargeable batteries and superalloys
11. **Dysprosium**, used in permanent magnets, data storage devices, and lasers
12. **Erbium**, used in fiber optics, optical amplifiers, lasers, and glass colorants
13. **Europium**, used in phosphors and nuclear control rods
14. **Fluorspar**, used in the manufacture of aluminum, cement, steel, gasoline, and fluorine chemicals
15. **Gadolinium**, used in medical imaging, permanent magnets,

and steelmaking

16. **Gallium**, used for integrated circuits and optical devices like LEDs
17. **Germanium**, used for fiber optics and night vision applications
18. **Graphite** , used for lubricants, batteries, and fuel cells
19. **Hafnium**, used for nuclear control rods, alloys, and high-temperature ceramics
20. **Holmium**, used in permanent magnets, nuclear control rods, and lasers
21. **Indium**, used in liquid crystal display screens
22. **Iridium**, used as coating of anodes for electrochemical processes and as a chemical catalyst
23. **Lanthanum**, used to produce catalysts, ceramics, glass, polishing compounds, metallurgy, and batteries
24. **Lithium**, used for rechargeable batteries
25. **Lutetium**, used in scintillators for medical imaging, electronics, and some cancer therapies
26. **Magnesium**, used as an alloy and for reducing metals
27. **Manganese**, used in steelmaking and batteries
28. **Neodymium**, used in permanent magnets, rubber catalysts, and in medical and industrial lasers
29. **Nickel**, used to make stainless steel, superalloys, and rechargeable batteries
30. **Niobium**, used mostly in steel and superalloys
31. **Palladium**, used in catalytic converters and as a catalyst agent
32. **Platinum**, used in catalytic converters
33. **Praseodymium**, used in permanent magnets, batteries, aerospace alloys, ceramics, and colorants
34. **Rhodium**, used in catalytic converters, electrical components, and as a catalyst
35. **Rubidium**, used for research and development in electronics
36. **Ruthenium**, used as catalysts, as well as electrical contacts and chip resistors in computers

37. **Samarium**, used in permanent magnets, as an absorber in nuclear reactors, and in cancer treatments
38. **Scandium**, used for alloys, ceramics, and fuel cells
39. **Tantalum**, used in electronic components, mostly capacitors and in superalloys
40. **Tellurium**, used in solar cells, thermoelectric devices, and as alloying additive
41. **Terbium**, used in permanent magnets, fiber optics, lasers, and solid-state devices
42. **Thulium**, used in various metal alloys and in lasers
43. **Tin**, used as protective coatings and alloys for steel
44. **Titanium**, used as a white pigment or metal alloys
45. **Tungsten**, primarily used to make wear-resistant metals
46. **Vanadium**, primarily used as alloying agent for iron and steel
47. **Ytterbium**, used for catalysts, scintillometers, lasers, and metallurgy
48. **Yttrium**, used for ceramic, catalysts, lasers, metallurgy, and phosphors
49. **Zinc**, primarily used in metallurgy to produce galvanized steel
50. **Zirconium**, used in the high-temperature ceramics and corrosion-resistant alloys

Source: United States Geological Survey.