U.S. Government Accountability Office

Critical Materials: Action Needed to Implement Requirements That Reduce Supply Chain Risks

GAO-24-107176 (Accessible Version)
Q&A Report to Congressional Committees

September 10, 2024

Why This Matters

The White House and the Department of Defense (DOD) have reported that rare earth elements and other critical materials, such as tantalum and tungsten, are essential to national security. Since 2018, DOD's defense industrial base assessments have found that rare earths and other critical materials are essential building blocks in many DOD weapon systems and enable unique, high-performance combat capabilities. However, DOD has also assessed that it faces significant risks in its supply chains for these materials and that there would be a high potential for harm to national security in the event of supply chain disruptions. Of particular concern, most of these materials are mined and processed in China, which makes DOD's weapon system programs vulnerable to supply chain disruptions by an adversary nation.

The James M. Inhofe National Defense Authorization Act (NDAA) for Fiscal Year 2023 included requirements for us to assess DOD's efforts to implement three procurement requirements for rare earths and critical materials, and one requirement governing sales from the National Defense Stockpile to certain adversary nations (Section 857 of Public Law 117-263). This is the first in a series of assessments that Congress asked us to provide on DOD's ongoing efforts to implement these statutory requirements. This report describes DOD's efforts to implement the statutory procurement requirements in its defense acquisition regulations. It also includes an assessment of the steps DOD has taken to ensure that material from the National Defense Stockpile is not sold to certain adversary nations—China, Russia, North Korea, and Iran—or entities acting on their behalf if such sales are not in the interest of the United States.

Key Takeaways

- Critical materials, such as rare earths, are materials needed to supply U.S. military, industry, and essential civilian needs during a national emergency and are not found or produced in sufficient quantities in the U.S.
- Rare earths and certain other critical materials, such as tantalum and tungsten, are overwhelmingly mined and processed abroad, making the U.S. reliant on foreign suppliers—particularly China. Foreign dependence is especially challenging for DOD, which has limited ability to influence the supply chains since its purchases represent less than 0.1 percent of the global demand for these materials.

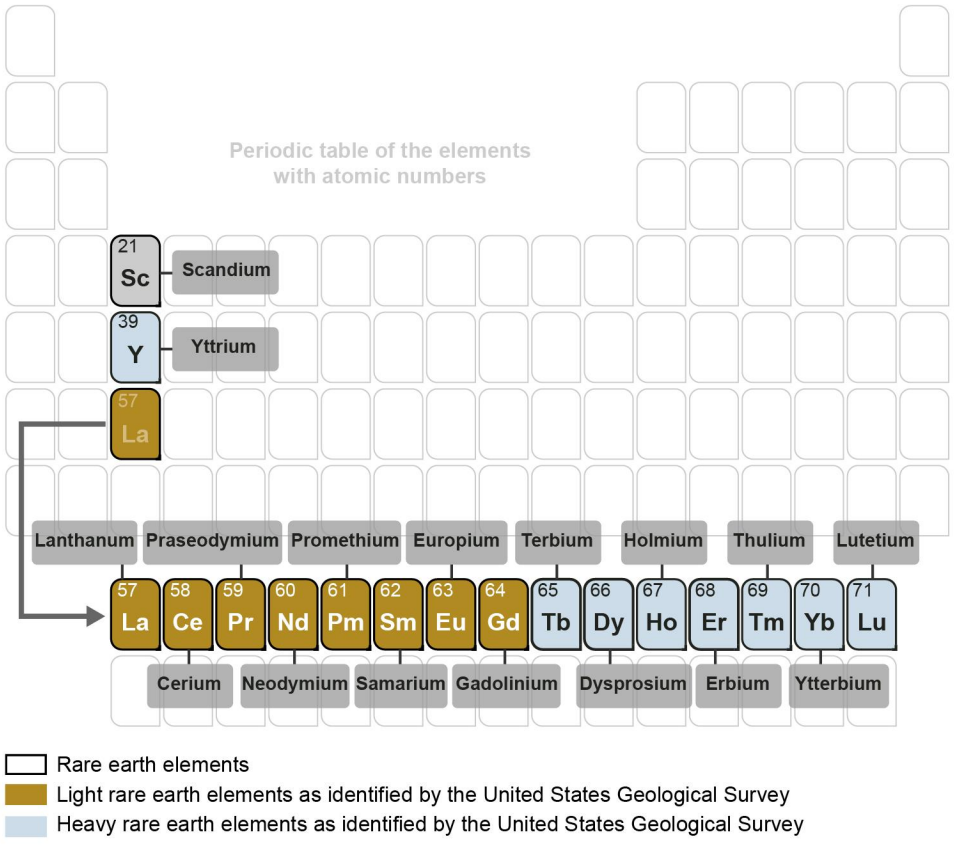
- DOD is currently updating its acquisition regulations to implement new or revised statutory requirements for the procurement of rare earths and other critical materials. For example, based on a new statutory requirement, DOD will have to require that contractors disclose the source of certain rare earth permanent magnets used in DOD systems, among other things. These requirements should start going into effect sometime between 2025 and 2027.
- DOD has not yet established policies and guidance to determine whether materials from the National Defense Stockpile are potentially being sold to certain adversary nations or entities acting on their behalf, or whether such sales are in the national interest.
- We recommend that DOD takes steps to prevent the sale of materials from the National Defense Stockpile to certain adversary nations, including any third-party entities representing those nations, when it is not in the national interest to do so. DOD concurred with the recommendation.

What are critical materials and rare earths?

Critical materials are materials needed to supply U.S. military, industry, and essential civilian needs during a national emergency and are not found or produced in sufficient quantities in the U.S.[1]

Rare earths are a category of critical materials comprised of 17 different elements that share similar chemical properties (see fig. 1).[2]

Figure 1: Rare Earth Elements in the Periodic Table



Source: GAO presentation of the rare earth elements in the periodic table. | GAO-24-107176

Rare earths are a relatively abundant group of elements commonly found in Earth's crust, but concentrated deposits are limited and they are difficult and expensive to mine and process. Rare earths are often classified as either heavy or light, based in part on their atomic weight.[3] In general, the light rare earths are cheaper, produced in greater quantities, and are more extensively used than the heavy rare earths.[4] All rare earths have unique magnetic and heat resistant properties, unlike any other elements. The elemental forms of rare earths are metals that are typically soft and can be manipulated into multiple forms.

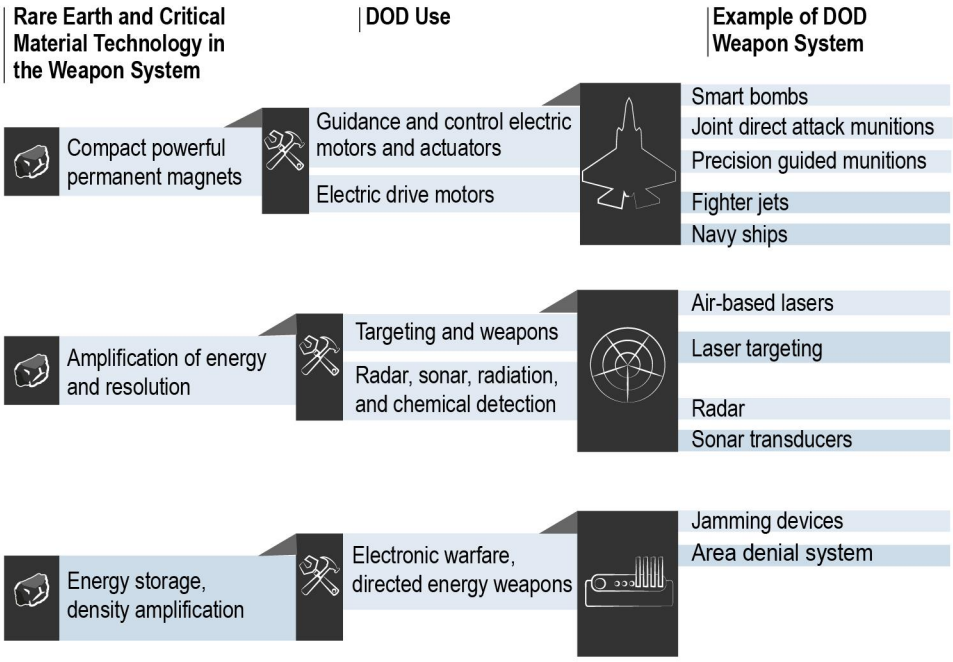
Other critical materials include metals such as tantalum and tungsten, which have some similar properties to rare earths. For example, tantalum has a high melting point and is a good conductor of heat and electricity. Tungsten is an extremely strong and hard metal with a high melting and boiling point.

Why are rare earths and other critical materials important to DOD?

Rare earths and other critical materials are important to DOD because they have unique properties relative to other materials used to produce weapon systems. For example, neodymium-iron-boron magnets and other rare earth permanent magnets are extremely strong, can retain magnetic strength at elevated temperatures, and operate under demanding conditions—characteristics that are vital for DOD weapon systems. Other critical materials, such as tantalum, also have unique properties, such as being highly resistant to corrosion and having a high melting point. This makes tantalum a valuable material for DOD weapon systems that operate in harsh conditions. For example, tantalum can be used in the liners of missile warheads.

DOD uses rare earths and other critical materials for a variety of purposes in its weapon systems, such as in radar, guidance systems, precision-guided munitions, lasers, satellites, and equipment like night vision goggles. Figure 2 provides examples of notional uses of rare earths and other critical materials in DOD weapon systems.

Figure 2: Notional Uses of Rare Earths and Other Critical Materials in Department of Defense (DOD) Weapon Systems

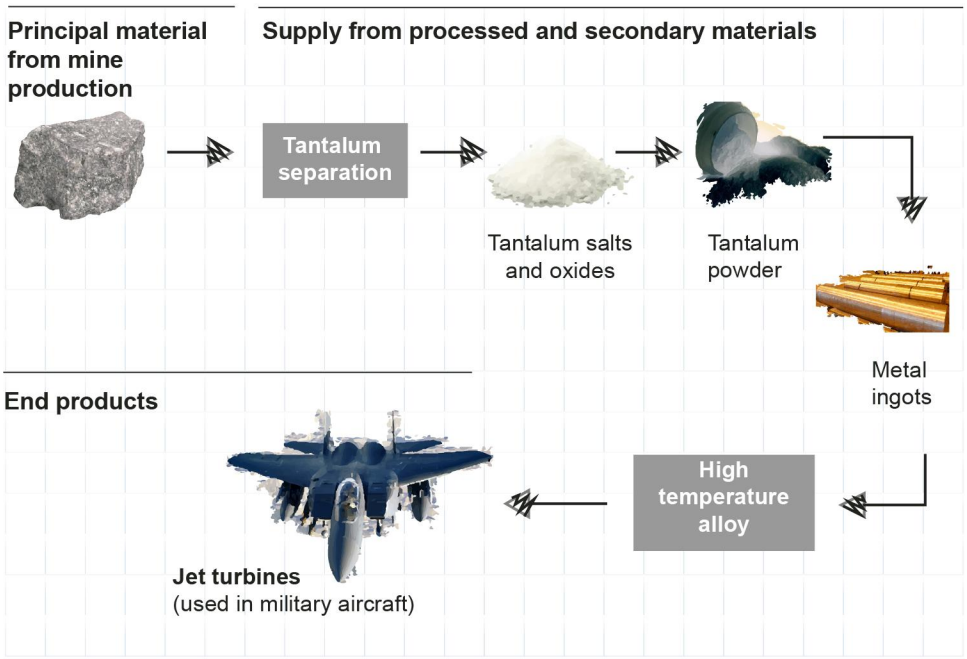


Source: GAO summary of Congressional Research Service information; GAO (icons). | GAO-24-107176

What is the typical supply chain for rare earths and other critical materials that are in DOD weapon systems?

The typical supply chain from the ground where rare earths and other critical materials are found to a DOD weapon is a complex and global process that generally involves many different tiers of suppliers. Rare earths and certain other critical materials, like tantalum and tungsten, are generally found in mined ore.[5] For example, rare earths are often found as a byproduct of mining other elements, such as iron. During processing, they are separated from the mined ore, and the separated materials are chemically treated to produce high purity oxides, salts, and powders. To complete processing, the high purity oxides, salts, and powders are refined into metals and the metals are applied as coating onto materials. The processing step of the supply chain is essential to convert the raw material into a semi-finished material that can be used in a DOD weapon system. After processing, rare earths and other critical materials can then be combined with other materials to form a metal alloy. These alloys are then incorporated into an end product, which may be a component of the weapon system or the weapon system itself. Figure 3 provides a notional DOD supply chain for the critical material tantalum.

Figure 3: Notional Supply Chain for Tantalum



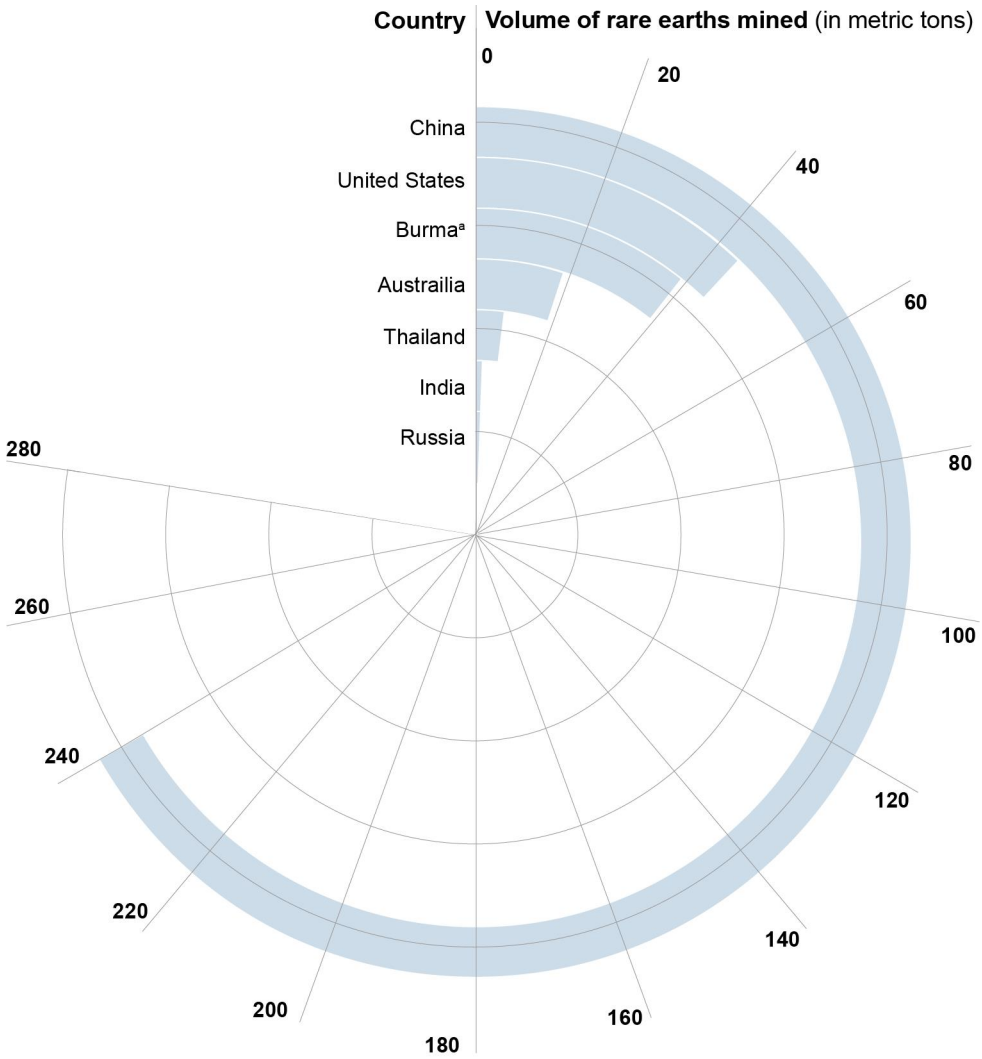
Source: GAO analysis of United States Geological Survey and industry data (data). Global Advanced Metals USA, Inc. (images: tantalum ore, tantalum salts and oxides, tantalum powder, and metal ingots); © AVX 2016 (image: tantalum capacitors); United States Air Force (image: jet turbines). | GAO-24-107176

Where are rare earths and other critical materials mined and processed?

The supply chain for rare earths and other critical materials is spread across the globe, but China dominates the mining and processing stages. For example, we and other federal agencies have reported that China is the global leader in rare earth mining, processing, and component manufacturing.[6] U.S. rare earth mining capacity has waned over the last 40 years. This decrease is due to the emergence of lower-cost suppliers in other nations, such as China.[7] In addition, mining operations pose significant effects to the environment, including habitat destruction, air and water pollution, hazardous waste generation, and other issues.[8] According to DOD officials, the U.S. has more rigorous environmental regulations than China, which allows China to mine and process rare earths and certain other critical materials at a lower cost.

The United States Geological Survey (USGS) estimated that China mined 240,000 metric tons of rare earths in 2023.[9] By comparison, the U.S. mined 43,000 metric tons during the same period. Figure 4 shows the top countries involved in the mining of rare earths globally, as estimated by USGS.

Figure 4: Top Countries Involved in the Mining of Rare Earth Elements, 2023



Source: GAO analysis of United States Geological Survey 2024 Annual Commodity Summary Estimates. | GAO-24-107176

Accessible Data for Figure 4: Top Countries Involved in the Mining of Rare Earth Elements, 2023

Country	Volume of rare earths (in tons)
China	240,000
United States	43,000
Burma	38,000
Australia	18,000
Thailand	7,100
India	2,900
Russia	2,600

Source: GAO analysis of United States Geological Survey 2024 Annual Commodity Summary Estimates. I GAO-24-107176

Note: Countries that mined less than 1,000 metric tons are not included in the figure.

[a]The U.S. Department of State officially recognizes the country of Burma, rather than Myanmar.

China is also the global leader in the mining of other critical materials. For example, USGS estimated that in 2023, China mined 81 percent of the global

supply of tungsten. Additionally, neither tungsten nor tantalum is currently mined in the U.S.

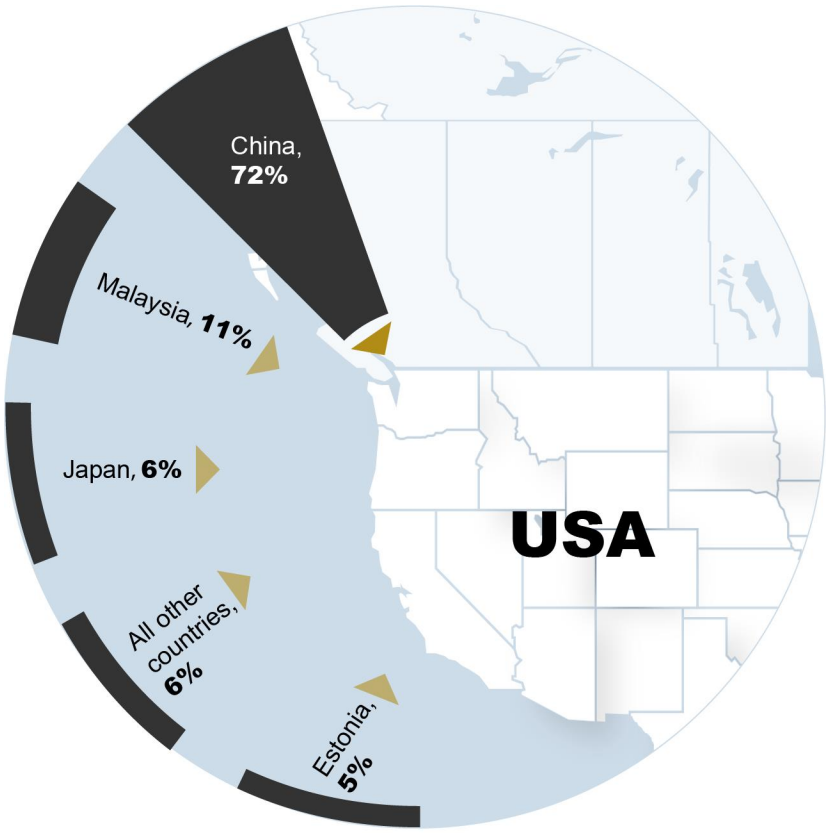
The U.S. is also dependent on foreign sources for processed rare earths and other critical materials. Currently, the U.S. has minimal capacity for the processing of certain critical materials, such as rare earths, tantalum, and tungsten, although steps to develop U.S. processing capabilities are underway. We previously reported that most rare earth processing is performed in China.[10] In addition, DOD reported that China is the only country that has processing capabilities for each stage of the supply chain for neodymium-iron-boron permanent magnets.[11]

What risks does DOD face in procuring rare earths and other critical materials?

DOD faces significant risks in procuring rare earths and other critical materials, such as U.S. reliance on Chinese imports, lack of equivalent substitutes, and DOD's limited ability to influence the markets for these materials.

Reliance on China. According to USGS estimates, the U.S. market—including DOD and its industrial base—remains heavily reliant on imports of rare earths, particularly from China. Although the U.S. has some domestic resources and mining capability for rare earths, USGS identified in its 2024 Mineral Commodity Summaries report that the U.S. imported more than 95 percent of the total rare earths that it consumed.[12] USGS's report also noted that, from 2019 through 2022, most of the total rare earths imported into the U.S. came from China, leaving DOD weapon systems vulnerable to supply chain disruptions by an adversarial nation (see fig. 5).

Figure 5: Sources of U.S. Imports of Rare Earth Compounds and Metals, 2019–2022



Source: GAO analysis of United States Geological Survey 2024 Annual Commodity Summary Estimates; (map) switchpipi/stock.adobe.com | GAO-24-107176

Accessible Data for Figure 5: Sources of U.S. Imports of Rare Earth Compounds and Metals, 2019–2022

Country	Percentage
China	72
Malaysia	11
Japan	6
Estonia	5
All other countries	6

Source: GAO analysis of United States Geological Survey 2024 Annual Commodity Summary Estimates; (map) switchpipi/stock.adobe.com I GAO-24-107176

The U.S. is also reliant on imports for critical materials like tantalum and tungsten. USGS estimated in its 2024 Mineral Commodity Summaries report that the U.S. imported 100 percent of the tantalum it consumed. In its 2024 summaries, USGS estimated that from 2019 through 2022, most of these imports came from China, Germany, Australia, and Indonesia.[13] Further, the USGS 2024 report stated that the U.S. imported more than 50 percent of the tungsten that it consumed, and, from 2019 through 2022, most of these imports came from China, Germany, Bolivia, and Vietnam.[14]

Lack of equivalent substitutes. Rare earths and other critical materials lack equivalent substitutes that perform at the same level. For example, USGS reported that some materials can be substituted for rare earths or other critical materials, but these substitutes do not always perform as well or cost more to produce.

Limited market influence. DOD uses large quantities of rare earths and other critical materials in its weapon systems. DOD has limited ability to influence the markets for these materials, however, because its demand is low relative to the broader global commercial market. We previously reported that the U.S. is a major consumer of defense and commercial end products containing rare earths and other critical materials.[15] DOD, for example, requires about 9,200 pounds of rare earths for each SSN-774 *Virginia*-class submarine. However, the total DOD demand for rare earths is less than 0.1 percent of the global demand.[16] Additionally, a March 2023 DOD report stated that the commercial market drives the development cycles and production capabilities for some commodity items such as rare earths and other critical materials.[17] As a result, DOD's influence over the rare earth and other critical materials supply chain is limited.

What provisions has Congress included in recent NDAAs about DOD's procurement of rare earths and other critical materials?

Congress included provisions in recent NDAAs that created new statutory procurement requirements for rare earths and other critical materials and expanded the scope of certain existing requirements. When implemented, these requirements could help DOD reduce its reliance on adversary nations for these critical materials. For example, one expanded requirement restricts DOD's procurement from certain Chinese sources of certain goods that contain rare earths and other critical materials. Table 1 summarizes three relevant statutory procurement requirements that Congress created or revised through the NDAA since fiscal year 2019.

Table 1: Summary of Relevant New or Revised Requirements for Department of Defense (DOD) Procurement of Rare Earths and Other Critical Materials (Fiscal Years 2019–2024)

Summary of requirement	New or revised requirement	Effective date of requirement	Relevant NDAA provision(s)
Prohibits DOD from procuring certain sensitive materials (e.g., rare earth permanent magnets, tantalum, and tungsten) that are mined, refined, separated, melted, or manufactured in China, Iran, North Korea, or Russia.	Revised requirement – expanded the restriction to cover additional stages of the supply chain	January 2027	Section 871 of the John S. McCain NDAA for FY 2019, modified by section 849 of the NDAA for FY 2020, section 844 of the William M. (Mac) Thornberry NDAA for FY 2021, and section 854 of the NDAA for FY 2024
DOD to require contractors providing a system with a permanent magnet containing rare earths or strategic and critical materials to DOD to disclose the provenance of the magnet. If a contractor cannot make such a disclosure, it will be required to establish a supply chain tracking system to make the disclosure to the fullest extent possible.	New requirement	Not earlier than June 2025	Section 857(a) of the James M. Inhofe NDAA for FY 2023
Prohibits DOD from procuring certain goods and services (e.g., containing rare earths and other critical materials, energetic materials used in missiles, and certain munitions) from Chinese military companies.	Revised requirement – expanded the list of goods, services, and companies covered by the prohibition	180 days after the Secretary of Defense certification[a]	Section 1211 of the NDAA for FY 2006, modified by section 857(b) of the James M. Inhofe NDAA for FY 2023

Source: GAO analysis of provisions in the National Defense Authorization Acts (NDAA) for Fiscal Years (FY) 2006, 2019, 2020, 2021, 2023, and 2024. | GAO-24-107176

[a]For goods and services containing rare earths, critical materials, and energetic materials, this requirement is to take effect 180 days after the Secretary of Defense certifies that a sufficient number of viable providers exist outside of China that collectively can meet DOD demand with satisfactory quality and sufficient quantity when needed at U.S. market prices.

What is the status of DOD's efforts to implement these statutory procurement requirements?

DOD has ongoing efforts to implement these new or revised statutory procurement requirements for rare earths and other critical materials, but full implementation is not expected for a few years. According to DOD officials, DOD determined that it will be necessary to update the Defense Federal Acquisition Regulation Supplement (DFARS) to implement these requirements. The DFARS is a regulation that contains DOD-specific requirements and contract clauses, among other things.[18]

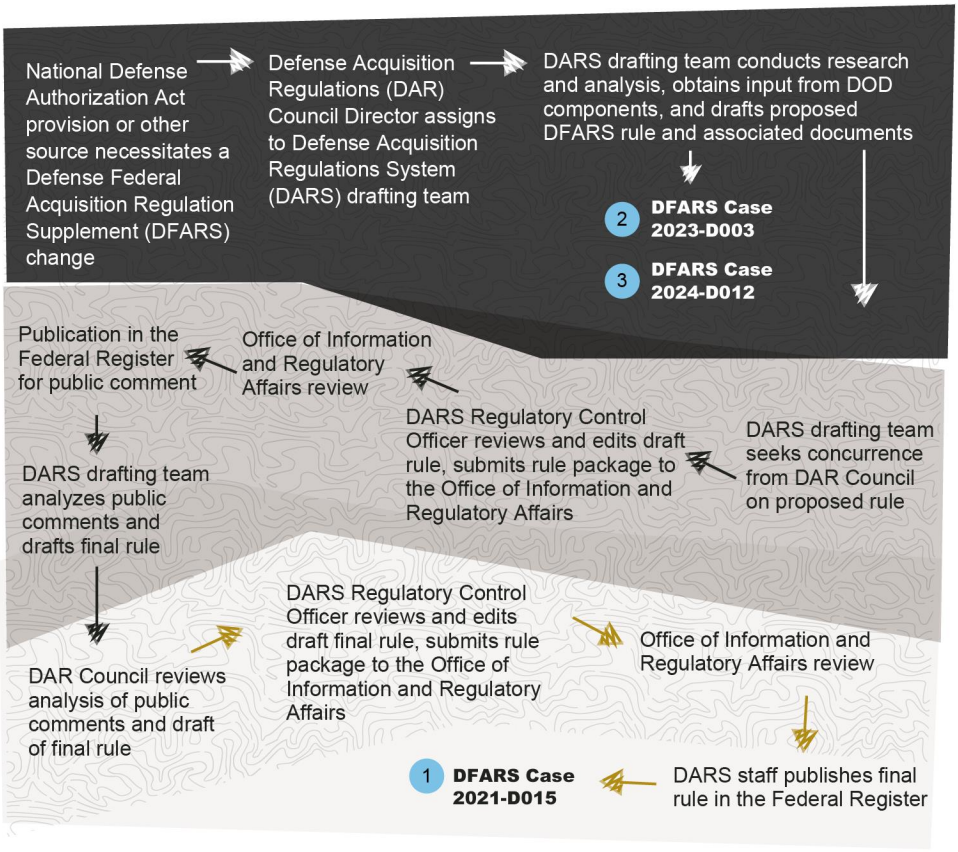
DOD initiated three efforts—called DFARS cases—to amend the DFARS and implement these procurement requirements.

- **DFARS Case 2021-D015:** to address the revised prohibition on procuring sensitive materials from China, Iran, North Korea, or Russia.
- **DFARS Case 2023-D003:** to address the new provenance disclosure requirement for permanent magnets.
- **DFARS Case 2024-D012:** to address the revised prohibition on procuring certain goods and services from Chinese military companies.

Updating the DFARS is a lengthy rulemaking process that can take a year or longer to carry out. This process involves numerous stakeholders in DOD, other federal agencies, and the public. DOD's Defense Acquisition Regulations (DAR) Council—comprised of policy officials for DOD's Defense Acquisition Regulations System and policy and legal representatives from the Air Force, Army, Navy, Defense Logistics Agency (DLA), and Defense Contract Management Agency—is responsible for coordinating changes to the DFARS.[19]

Figure 6 depicts the notional rulemaking process that DOD follows to translate a requirement established by Congress into a new DFARS rule, along with the current status of implementation for the procurement requirements for rare earths and other critical materials.

Figure 6: Status of Department of Defense (DOD) Rulemaking Efforts for New or Revised Procurement Requirements for Rare Earths and Other Critical Materials (as of August 2024)



1 Revised prohibition on procuring sensitive materials from China, Iran, North Korea, or Russia

2 New provenance disclosure requirement for permanent magnets

3 Revised prohibition on procuring certain goods and services from Chinese military companies

Source: GAO analysis of DOD documents and interviews with DOD officials; GAO (illustration). | GAO-24-107176

As depicted in figure 6, the three DFARS cases noted above were at different stages of this rulemaking process as of August 2024.[20]

- **DFARS Case 2021-D015:** DOD completed the rulemaking process for the revised prohibition on procuring sensitive materials from China, Iran, North Korea, or Russia in May 2024. DOD initially published a proposed DFARS rule for the revised requirement in April 2023, and then spent the following year adjudicating public comments and finalizing the rule.[21] The final rule expanded the scope of the prohibition to cover all stages of the supply chain for the materials covered under the requirement, among other things.[22] The expanded prohibition will go into effect on January 1, 2027.

- **DFARS Case 2023-D003:** DOD is in the early stages of the rulemaking process for the new provenance disclosure requirement for permanent magnets. DOD officials are currently developing a proposed DFARS rule for this requirement, which they expect to publish for public comment in October 2024.

- **DFARS Case 2024-D012:** DOD is in the early stages of the rulemaking process for the revised prohibition on procuring certain goods and services

from Chinese military companies. DOD officials are currently developing a proposed DFARS rule for this revised requirement, which they expect to publish for public comment in October 2024.

What other steps has DOD taken to reduce the U.S. defense industrial base's reliance on foreign suppliers of rare earths and other critical materials?

In addition to implementing the statutory procurement requirements, DOD is taking steps to reduce the U.S. defense industrial base's reliance on foreign suppliers of rare earths and other critical materials by: (a) creating domestic mining and processing capacity, (b) developing strategies to mitigate risks, and (c) managing the National Defense Stockpile.

Creating domestic mining and processing capacity. DOD is funding projects to create domestic rare earth mining and processing capacity. According to DOD officials, the department has awarded approximately $439 million to vendors since 2020 to reestablish domestic rare earth supply chains. DOD's Industrial Base Policy office has developed a rare earth investment strategy to help coordinate supply chain projects and build domestic capacity in all parts of the supply chain including sourcing, separation, processing, and manufacturing. For example, DOD reported awarding approximately $45 million to help establish the only integrated rare earth mine and oxide production facility in the U.S.[23]

According to Industrial Base Policy officials, DOD's overall goal with these projects is to ensure there is a domestic alternative to foreign suppliers, but it has not yet determined how much total domestic capacity it needs to create in the long term to meet defense-related demand. In April 2024, DOD published a request for information to identify additional potential sources and to gather market research to help it make decisions regarding future projects to expand domestic capabilities for rare earth processing. DOD's domestic capacity projects are still in their early stages, and DOD assessed that it can take a decade or longer to establish new domestic sources for rare earths.

Developing strategies to mitigate risks. In 2021, DOD led an assessment of the risks in the critical materials supply chain.[24] This assessment also identified actions to address these risks, such as developing new industry sustainability standards, expanding domestic production and processing capacity, and working with allies and partners. In addition, DOD published its first National Defense Industrial Strategy in January 2024, which will guide its efforts to increase resiliency in defense supply chains, including the critical materials supply chain. Among other things, the strategy identifies actions DOD can take, such as investing in extra capacity, expanding domestic production, diversifying its supplier base, and engaging allied countries. DOD is in the process of developing an implementation plan for this strategy, which will include an assessment framework and metrics to track progress in achieving industrial base goals. DOD officials said that the implementation plan will be issued in 2024.

Managing the National Defense Stockpile. DOD also manages the National Defense Stockpile of strategic and critical materials, which is a reserve of materials owned by the U.S. government that can be used during times of national emergency.[25] The National Defense Stockpile was established as part of efforts to decrease and preclude, when possible, U.S. dependence on foreign sources or a single point of failure for materials, such as rare earths and other critical materials.[26] Since its inception, stockpiled materials have included ores, base metals, precious metals, and minerals.

How does DOD manage the National Defense Stockpile?

The National Defense Stockpile is managed by DOD, with the Under Secretary of Defense for Acquisition and Sustainment acting as the Stockpile Manager.[27] DOD officials stated that DOD's Industrial Base Policy office—within the office of the Under Secretary of Defense for Acquisition and Sustainment—advises the Stockpile Manager on stockpile policy. DLA Strategic Materials carries out the day-to-day operations of the stockpile on behalf of the Stockpile Manager, such as acquiring, retaining, and selling stockpile materials.

Each year, DOD develops an Annual Materials Plan, which provides DOD with ceilings for both the acquisition of new materials for and disposal of excess materials from the National Defense Stockpile, including through sales. Within the Annual Materials Plan, DOD details the type and quantity of each material available for potential sale or disposal, among other things. In fiscal year 2024, Congress appropriated $50 million for stockpile activities.

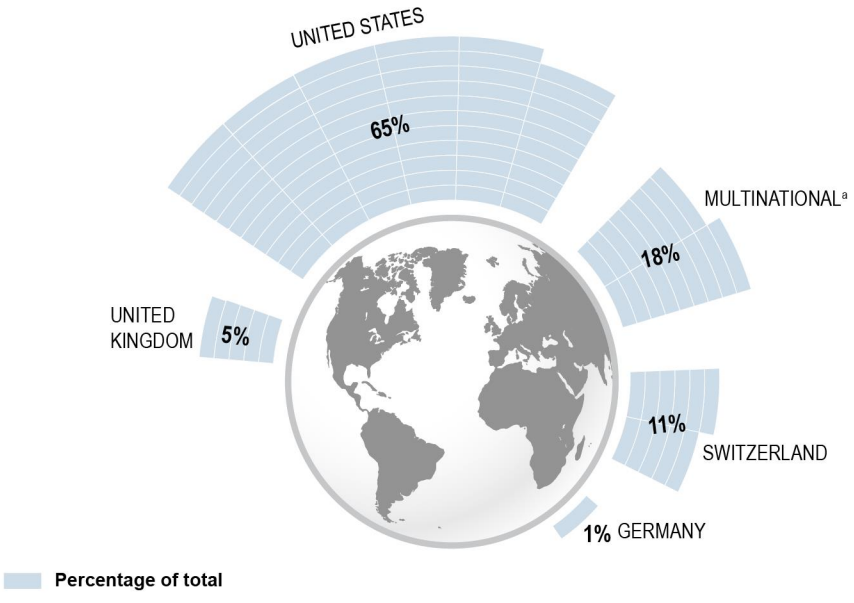
How does federal law address the sale of materials from the National Defense Stockpile to adversary nations?

Federal law prohibits DOD from selling any material from the National Defense Stockpile to four adversary nations—China, Iran, North Korea, and Russia—or any third party reasonably believed to be acting on behalf of an adversary nation, if the National Defense Stockpile Manager determines the sale is not in the national interest of the United States.[28] When the original prohibition was created in 2018, it only applied to the sale of certain materials to these nations: samarium-cobalt magnets, neodymium-iron-born magnets, tungsten metal powder, and tungsten heavy alloy (or any finished or semi-finished component containing tungsten heavy alloy).[29] In 2019, Congress expanded the prohibition so that it would apply to any material sold from the National Defense Stockpile.[30]

In which countries were buyers of National Defense Stockpile material located?

Since the expanded sales prohibition went into effect, most of the buyers of material from the National Defense Stockpile reported that they were located in the United States. DLA data indicated that for fiscal years 2019 through 2023, 21 of the 22 buyers for 184 stockpile sales reported that they were located in the United States. The one exception was a buyer located in the United Kingdom. According to our analysis of publicly available information about these buyers, however, four buyers that made 65 of the total 184 purchases were companies reported as being headquartered outside the United States (see fig. 7).

Figure 7: National Defense Stockpile Sales by Nation of Buyer's Reported Headquarters, Fiscal Years 2019–2023



Source: GAO analysis of National Defense Stockpile sales data and publicly available company information; (map) FourLeafLover/stock.adobe.com. | GAO-24-107176

Accessible Data for Figure 7: National Defense Stockpile Sales by Nation of Buyer's Reported Headquarters, Fiscal Years 2019–2023

Nation	Percentage
United States	65
Multinational	18
Switzerland	11
United Kingdom	5
Germany	1

Source: GAO analysis of National Defense Stockpile sales data and publicly available company information; (map) FourLeafLover/stock.adobe.com. I GAO-24-107176

[a]This buyer was a company with headquarters in the United States, Luxembourg, Czech Republic, and Finland.

These data do not suggest that DOD sold any materials directly to an adversary nation or to a company reported to be headquartered in an adversary nation. However, a company's reported headquarters does not provide insight into whether any buyers may have been acting as a third-party broker or an agent on behalf of an adversary nation. The differences in the data we and DLA collected, and the limitations of the publicly available information, underscore the complexities associated with determining whether a third party may be acting on behalf of an adversary nation.

How has DOD implemented the restriction on selling National Defense Stockpile materials to adversary nations?

DOD has not taken steps to implement the 2019 restriction on selling material from the National Defense Stockpile to adversary nations or third parties acting on their behalf, when such sales are not in the national interest. According to Industrial Base Policy and DLA officials responsible for stockpile activities, the Stockpile Manager has not yet created a policy or provided guidance to

implement this statutory requirement. According to an Industrial Base Policy official, the officials who work on critical materials issues for Industrial Base Policy were not in their positions when this requirement went into effect. As a result, they could not identify with certainty why DOD has been delayed in implementing the sales restriction.

Industrial Base Policy officials said, however, that they and other DOD officials are now starting to discuss how to implement the sales requirement, including potential criteria for determining if a sale would not be in the national interest. Industrial Base Policy officials said that they were in the early stages of this effort and could not estimate when it would be completed.

Although Industrial Base Policy and DLA officials recognize the need to implement this statutory requirement, they said that there was limited risk that DOD would sell stockpile materials of national interest to entities associated with adversary nations. According to these officials, the material DOD sells from the stockpile is generally in excess to need or no longer strategically important. Additionally, they noted that, even though they are not currently implementing the statutory requirement governing stockpile sales to adversary nations, DLA's existing general sales procedures help identify whether a buyer is located in or acting on behalf of an adversary nation.

We found, however, that DLA has limited insight into a buyer's affiliation with an adversary nation under its existing sales procedures. According to DLA officials, they rely on a buyer's self-attestation for the company's location and, in certain cases, the eventual end use for the material being sold. We previously reported on the risks of relying on companies to self-certify their information, such as registration data, without verifying key information.[31] We have also reported on the risks of opaque ownership structures that may conceal the beneficial owner of an entity from DOD, including when an adversary nation actually controls the entity.[32]

DLA Strategic Materials' stockpile officials said that DLA's Trade Security and Intelligence offices sometimes help them verify certain company information, but their purview is limited. For example, Trade Security officials stated that they only research a potential buyer of stockpile material if the material is listed on the U.S. Munitions List or the Commerce Control List.[33] According to Trade Security officials, in the past 10 years, Trade Security has helped Strategic Materials' stockpile officials verify buyer information for one type of material on these lists—beryllium—which was sold to one buyer. In our analysis of National Defense Stockpile sales from fiscal years 2019 through 2023, we found that four of the total 184 sales (or 2 percent) were for this material. Therefore, few sales were reviewed by DLA Trade Security to ascertain more information about the potential buyer.

Industrial Base Policy and DLA officials said that because the Under Secretary of Defense for Acquisition and Sustainment, acting as the Stockpile Manager, has not yet provided policy or guidance to implement the requirement on sales involving certain adversary nations, DOD has not taken action beyond these existing limited efforts. For example, they said that DOD has not created standard national interest criteria and the Stockpile Manager has never determined that a proposed sale was not in the national interest. Furthermore, DLA officials who handle the day-to-day operations of the stockpile said they are not in a position to develop specific procedures to ensure that sales comply with the restriction on selling material to certain adversary nations. According to DOD

policy, DLA's role in operating the stockpile is limited to executing the Stockpile Manager's direction.[34] As such, DLA officials said that they do not have the authority to restrict sales to certain adversary nations or third parties acting on their behalf without direction and guidance from the Stockpile Manager. Officials also stated that Trade Security officials cannot research the affiliations of buyers for other types of stockpile materials that are not on the U.S. Munitions List or Commerce Control List without direction from the Stockpile Manger to do so.

Until the Stockpile Manager takes steps to implement the statutory requirement governing the sale of materials from the National Defense Stockpile, DOD will continue to have limited insight into whether it is selling stockpile material to adversary nations. The Stockpile Manager will also continue missing opportunities to manage potential risks associated with these sales, such as by creating criteria for a national interest determination or providing direction on how to use the Trade Security office or other means to assess the affiliations of potential buyers with adversary nations, as appropriate.

Conclusions

Congress and DOD have started taking action to reduce the defense industrial base's reliance on adversary nations for the rare earths and other critical materials used in weapon systems. However, DOD has yet to establish policy and guidance to implement the 2019 statutory requirement to determine whether material sold from the National Defense Stockpile is being purchased by adversary nations or third parties acting on their behalf, or whether such sales are in the national interest. For example, DLA is relying on buyers' self-reported information about their location and end use of the material, since the Stockpile Manager has not provided direction on how to assess buyers' affiliations with adversary nations. Until DOD fully implements the statutory requirement related to the sale of critical materials from the National Defense Stockpile, it will continue to be at risk of selling these materials to buyers affiliated with adversary nations.

Recommendation for Executive Action

The Secretary of Defense should ensure that the Under Secretary of Defense for Acquisition and Sustainment, as the Stockpile Manager, takes steps to implement the requirement to prevent sales of material from the National Defense Stockpile to China, Iran, North Korea, and Russia or third-party entities acting on their behalf when such sales are not in the national interest of the United States, including steps to consider buyers' affiliations with these nations. (Recommendation 1)

Agency Comments and Our Evaluation

We provided a draft of this report to DOD for review and comment in May 2024. DOD provided its comments—which are included in appendix I—in August 2024. DOD concurred with the recommendation and described the department's plans to address it. DOD also provided a technical comment, which we incorporated as appropriate.

How GAO Did This Study

To determine DOD's efforts to implement new or revised procurement requirements for rare earths and other critical materials, we reviewed relevant

legislation for the three requirements in our scope and DOD reports on the status of potential changes to the DFARS to implement these requirements. Where available, we also reviewed DOD's proposed and final DFARS rules for the requirements and public comments on the proposed rules. To further our understanding of these efforts, we interviewed agency officials involved in the rulemaking process, including from Defense Pricing, Contracting, and Acquisition Policy; Industrial Base Policy; the Army, Navy, and Air Force; DLA; and the Defense Contract Management Agency.

To assess DOD's implementation of statutory requirements governing the sale of National Defense Stockpile materials to certain adversary nations, we reviewed DOD policy and guidance, such as DLA's stockpile sales guidance, to determine the extent to which such statutory requirements were included. We interviewed officials from DOD's Industrial Base Policy office and DLA's Strategic Materials office to obtain information about the actions DOD has taken or plans to take to implement this requirement. We analyzed DLA's stockpile sales data from the 5 most recent years—fiscal years 2019 through 2023—along with publicly available company information, to determine what materials were sold, to whom, and in what country the buyers were located. To assess the reliability of these data, we compared DLA's internal sales data with public reporting on National Defense Stockpile sales. We also reviewed DLA business system guidance and interviewed DLA officials to understand what internal controls were in place to ensure officials accurately and reliably recorded stockpile sales data. We determined these data were sufficiently reliable for our purposes of reporting on National Defense Stockpile sales made in fiscal years 2019 through 2023.

We conducted this performance audit from November 2023 to September 2024 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

List of Addressees

The Honorable Jack Reed
Chairman
The Honorable Roger Wicker
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Mike Rogers
Chairman
The Honorable Adam Smith
Ranking Member
Committee on Armed Services
House of Representatives

We are sending copies of this report to the appropriate congressional committees and the Secretary of Defense. In addition, the report is available at no charge on the GAO website at https://www.gao.gov.

GAO Contact Information

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A. Nicole Clowers, Managing Director, Congressional Relations, ClowersA@gao.gov, (202) 512-4400.

Staff Acknowledgments: Justin Jaynes (Assistant Director), Jillian Schofield (Analyst-in-Charge), Seto Bagdoyan, Breanne Cave, Cassidy Cramton, Heather Dunahoo, Kimberly Gianopoulos, Edward Harmon, Shelby Johnston, Diana Maurer, Sally Newman, Mark Oppel, Richard Skinner, Pamela Snedden, Alyssa Weir, Christina Werth, Robin Wilson, and Tatiana Winger.

Appendix I: Comments from the Department of Defense

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

INDUSTRIAL BASE POLICY

AUG 0 2 2024

Mr. William Russell
Director, Contracting and National Security Acquisitions
U.S. Government Accountability Office
441 G Street, NW
Washington, DC, 20548

Dear Mr. William Russell

This is the Department of Defense (DoD) response to the GAO Draft Report GAO-24-107176, "CRITICAL MATERIALS: Action Needed to Implement Requirements that Reduce Supply Chain Risks" dated May 31, 2024 (GAO Code 107176).

Attached is DoD's response to the subject report. My point of contact is Mr. Adam Burstein, at adam.c.burstein.civ@mail.mil and phone (703) 697-1065.

Sincerely,

Vic S. Ramdass, PhD
Principal Deputy Assistant Secretary of Defense
for Industrial Base Policy

Attachment:
As stated

GAO DRAFT REPORT (GAO CODE 107176) "CRITICAL MATERIALS: ACTION NEEDED TO IMPLEMENT REQUIREMENTS THAT REDUCE SUPPLY CHAIN RISKS"

DOD COMMENTS TO THE GAO RECOMMENDATIONS

- **RECOMMENDATION 1**: The GAO recommends that the Secretary of Defense should ensure that the Under Secretary of Defense for Acquisition and Sustainment, as the Stockpile Manager, takes steps to implement the requirement to prevent sales of material from the National Defense Stockpile to China, Iran, North Korea, and Russia and third-party entities acting on their behalf when such sales are not in the national interest of the United States, including steps to consider buyers' affiliations with these nations.

  DOD RESPONSE: DOD concurs with this recommendation. DOD will evaluate methods to implement the requirement to prevent sales of material from the National Defense Stockpile to China, Iran, North Korea, and Russia and third-party entities, including assessing buyers' potential affiliations with these countries, including end-use restrictions as applicable.

- **TECHNICAL AMENDMENT:** The DOD recommends the GAO make a technical amendment to the report reflecting the publication of the DFARS Final Rule (DFARS Case 2021-D015) on 30 May 2024. TAB D is a line in line out (LILO) of the DFARS Final Rule (TAB E).

Accessible Text for Appendix I: Comments from the Department of Defense

AUG 02 2024

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Director, Contracting and National Security Acquisitions
U.S. Government Accountability Office
441 G Street, NW
Washington, DC, 20548

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Vic S. Ramdass, PhD
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Endnotes

[1]50 U.S.C. § 98h-3 defines strategic and critical materials as materials that (A) would be needed to supply the military, industrial, and essential civilian needs of the United States during a national emergency, and (B) are not found or produced in the United States in sufficient quantities to meet such need. Rare earth elements are a subset of critical materials. For the purposes of this report, strategic and critical materials and rare earth elements will be referred to as rare earths and other critical materials.

[2]Rare earths consist of the following elements in the periodic table: the lanthanides that begin with lanthanum (atomic number 57) through lutetium (atomic number 71), and two non-lanthanides that have similar properties—yttrium and scandium. GAO*, Rare Earth Materials: Developing a Comprehensive Approach Could Help DOD Manage National Security Risks in the Supply Chain,* GAO-16-161 (Washington, D.C.: Feb. 11, 2016).

[3]Scandium is chemically similar to and sometimes included with rare earths. However, scandium does not commonly occur in significant quantities in the same mineral deposits with the lanthanides and yttrium, and is therefore not classified as a light or heavy rare earth element. Department of the Interior, U.S. Geological Survey, *Rare Earth Element Mineral Deposits in the United States,* Version 1.1 (Washington, D.C.: April 2019).

[4]According to the U.S. Geological Survey, the light rare earth elements include lanthanum, cerium, praseodymium, neodymium, samarium, europium, and gadolinium. Department of the Interior, U.S. Geological Survey, *Rare Earth Elements: Criterial Mineral Resources of the United States—Economic and Environmental Geology and Prospects for Future Supply, 2017* (Reston, Va.: 2017).

[5]There are ongoing efforts to explore additional, nontraditional sources for critical minerals, like rare earths. For more information and policy options, see GAO, *Critical Minerals: Status, Challenges, and Policy Options for Recovery from Nontraditional Sources*, GAO-24-106395 (Washington, D.C.: July 31, 2024).

[6]GAO-16-161. Congressional Research Service, *An Overview of Rare Earth Elements and Related Issues for Congress,* R46618 (Washington, D.C.: Nov. 24, 2020).

[7]Congressional Research Service, *Rare Earth Elements: The Global Supply Chain*, R41347 (Washington, DC.: Dec. 16, 2013).

[8]White House, *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth* (Washington, D.C.: June 2021).

[9]Department of the Interior, U.S. Geological Survey, *Mineral Commodity Summaries 2024* (Reston, Va.: Jan. 31, 2024).

[10]GAO-16-161; and *Critical Defense Materials: Government Collected Data Are Sufficiently Reliable to Assess Tantalum Availability*, GAO-16-335 (Washington, D.C.: Mar. 17, 2016).

[11]White House, *Building Resilient Supply Chains*.

[12]U.S. Geological Survey, *Mineral Commodity Summaries 2024*.

[13]USGS estimated that from 2019 through 2022, the top imports of tantalum to the U.S. came from China (24 percent), Germany (13 percent), Australia (11 percent), and Indonesia (9 percent).

[14]USGS estimated that from 2019 through 2022, the top imports of tungsten to the U.S. came from China (27 percent), Germany (12 percent), Bolivia (9 percent), and Vietnam (8 percent).

[15]GAO-16-161.

[16]GAO-16-161.

[17]Department of Defense, *Fiscal Year 2021 Industrial Capabilities Report to Congress* (Washington, D.C.: March 2023).

[18]The DFARS is DOD's implementation of and supplement to the Federal Acquisition Regulation (FAR), which guides government purchases of products and services. It contains additional requirements of law, DOD-wide policies, delegations of FAR authorities, deviations from FAR requirements, and policies or procedures that have a significant effect beyond the internal operating procedures of DOD, or a significant cost or administrative effect on contractors or offerors.

[19]The DAR Council is supported by Defense Acquisition Regulations System case managers who are responsible for managing DFARS case files. The Defense Acquisition Regulations System office also has DFARS committees or drafting teams (comprised of representatives from the DOD components) that research and draft rule language for potential DFARS changes and for the DAR Council's review. The drafting teams obtain expert and functional advice as needed. For more information, see Department of Defense, *Defense Acquisition Regulation System*, Instruction 5000.35 (August 31, 2018).

[20]The status of DFARS cases can change frequently as DOD officials move the cases through the rulemaking process. DOD regularly provides updates on all open DFARS cases, which are available on the DFARS Case Status webpage at https://www.acq.osd.mil/dpap/dars/case_status.html.

[21]DOD published the proposed rule in the Federal Register at 88 Fed. Reg. 25609 (Apr. 27, 2023). The full text of the proposed rule, DOD's discussion and analysis of the proposed changes, and public comments that were submitted by industry can be found at https://www.regulations.gov/document/DARS-2023-0018-0001.

[22]DOD published the final rule in the Federal Register at 89 Fed. Reg. 46816 (May 30, 2024). The Federal Register notice contained the DFARS changes made by the final rule, DOD's response to public comments provided on the rule, and DOD's analysis of the expected impact of the rule.

[23]This funding is for projects at the domestic Mountain Pass mining facility in California. Operations were suspended in 2002 and the mine reopened in 2018 to produce rare earth oxides.

[24]White House, *Building Resilient Supply Chains*.

[25]Strategic and Critical Materials Stock Piling Act of 1939, 50 U.S.C. §§ 98 et seq.

[26]50 U.S.C. § 98a.

[27]The President delegated National Defense Stockpile Manager responsibilities to the Secretary of Defense in Executive Order 12626, 53 Fed. Reg. 6114 (Feb. 25, 1988). The Secretary of Defense further delegated Stockpile Manager responsibilities to the Under Secretary of Defense for Acquisition and Sustainment in Department of Defense Directive 5134.01, and tasked DLA with day-to-day operation of the stockpile in Department of Defense Directive 5105.22. For more information about DOD's management of the National Defense Stockpile, see GAO, *National Defense Stockpile: Actions Needed to Improve DOD's Efforts to Prepare for Emergencies*, GAO-24-106959 (Washington, D.C.: Sept. 10, 2024).

[28]10 U.S.C. § 4872.

[29]John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. No. 115-232, § 871 (2018).

[30]National Defense Authorization Act for Fiscal Year 2020, Pub. L. No 116-92, § 849 (2019).

[31]GAO, *Aircraft Registrations: Risks Remain from Efforts to Obscure Ownership,* GAO-24-107495 (Washington, D.C.: Apr. 9, 2024); and *Aviation: FAA Needs to Better Prevent, Detect, and Respond to Fraud and Abuse Risks in Aircraft Registration,* GAO-20-164 (Washington, D.C.: Mar. 25, 2020).

[32]GAO, *Defense Procurement: Ongoing DOD Fraud Risk Assessment Efforts Should Include Contractor Ownership,* GAO-20-106 (Washington, D.C.: Nov. 25, 2019).

[33]22 C.F.R. § 121.1: The United States Munitions List is composed of military-oriented material that usually requires a license from the U.S. Department of State to be exported. 15 C.F.R. Part 774: The Commerce Control List is composed of dual-use material that may require a license from the U.S. Department of Commerce to be exported.

[34]See Department of Defense, *Defense Logistics Agency (DLA)*, Directive 5105.22 (June 29, 2017).