# Weaponization of the Periodic Table: Strategic Risk to U.S. Critical Mineral Supply Chains

The situation: China's <u>export restrictions of critical minerals</u> could halt the production and operation of systems and industries vital to U.S. national security, including defense, energy, health, and technology. The U.S. must act now to build alternate sources while taking actions to establish strategic reserves of these vital resources.

U.S. Geological Survey data cites that the U.S. is 100% reliant on imports for 10 critical minerals and over 50% dependent on 30 more, including antimony, gallium, germanium, and graphite. These minerals are essential to military systems, energy storage, and advanced manufacturing — and our dependency has created fragility.

| Mineral |            | Date of Restriction          | % China Controls <sup>1</sup> | Common Uses  |
|---------|------------|------------------------------|-------------------------------|--|
|         | Gallium    | August 2023                  | 98%                           | Semiconductors, microelectronics, thermal imaging sensors, guidance systems, transistors for RF amplifiers, LEDs and laser diodes                |
|         | Geranium   | August 2023                  | 54%                           | Lenses for night vision and thermal optics, Fiber optics, transistors and diodes for high-speed, high-frequency circuits, solar cells and panels |
|         | Graphite   | December 2023                | 77%                           | Carbon-based, radar absorbent materials, high-temperature aerospace<br>lubricants, solid-state and lithium-ion batteries,                        |
|         | Antimony   | September 2024               | 48%                           | Flame retardants, lead-acid batteries, bearings, ammunition primer, electronic warfare and radar systems   |
| Ŷ       | Tungsten   | February 2025                | 81%                           | Artillery shells, armor plating, cutting tools, engine parts, airplane balancing weights   |
|         | Tellurium  | February 2025                | 67%                           | Solar panels, thermoelectric devices, infrared optics, steel alloys, and rechargeable batteries  |
|         | Bismuth    | February 2025                | 80%                           | Medical treatments, lead-free solder, cosmetics, flame retardants, and ammunition  |
|         | Indium     | February 2025                | 66%                           | Phone screens, TV displays, fiber-optic technology, semiconductors, and solar panels   |
|         | Molybdenum | February 2025                | 71%                           | Missile components, nuclear reactors, steel alloys, lubricants, and high-<br>temperature electronics   |
| ?       | )          | Be prepared for what's next. | ???                           | ???  |

1: According to Mineral Commodity Summaries 2024 by U.S. Geological Survey: https://pubs.usgs.gov/publication/mcs2024

China's recent imposition of additional export restrictions highlights a strategic vulnerability that could disrupt defense and industrial supply chains. For example, antimony is designated as a critical mineral by the USGS due to its criticality to numerous national security technologies. Exiger data shows that half of all global antimony production in 2023 took place in China, which announced export restrictions in late 2024.

Exiger analyzed the global antimony market, identifying downstream industries, current restrictions, alternative sourcing, and connections to antimony-laden parts. In just one defense agency, Exiger's illumination showed more than 400 National Item Identification Numbers (NIINs) explicitly state that they contain antimony. Exiger's AI examined nested specifications and standards to reveal an additional 11,000 NIINs that likely contain the mineral. The ability to infer the presence of critical minerals from engineering specifications and standards expands the aperture to reflect a more complete picture of critical mineral exposure. Further analysis can be performed to not only identify the presence but also the weights of critical minerals across programs.

Unfortunately, the technical data about these minerals are often buried in PDFs and other technical documents and drawings. They're full of mission-critical data like parts, materials, and process requirements, test methods, references, and more. Modern engineering applications and machines need this data but can't easily access it from PDFs. Despite government and industry reliance on imported critical minerals and lack of referenceable data of where and how those minerals are employed, there is a clear path forward to protect our supply chains.

### Steps to Build Resilient Supply Chains and Mitigate Critical Mineral Dependencies



### 1 Illuminate Supply Chains:

- Material Input Analysis: Evaluate critical mineral usage across systems down to specific products (e.g., NIINs, WSDCs, part numbers) to pinpoint vulnerable areas.
- **Comprehensive Risk Mapping**: Map supply chains from end products (NIINS/WSDCs) back to the mines.



### 3 Mitigate Vulnerabilities:

### Diversify Sources:

-Friend-shoring: Partner with allied or friendly nations to establish secure and cost-effective supply chains.

-*Alternative Sourcing*: Identify additional suppliers to reduce concentration risk.

- Maintain Supply: Stockpile critical components and consolidate procurement across programs to ensure availability during disruptions.
- Alternate Sourcing: Identify alternative suppliers and parts to mitigate vulnerabilities.
- **Refine Sourcing Strategies**: Leverage price forecasting insights to manage cost volatility, negotiate better contracts, and secure protected supply chains.



### 2 Identify Vulnerabilities & Quantify Financial Impact:

- **Geopolitical and Supplier Risk:** Identify vulnerabilities tied to China and other high-risk countries or producers (informed by comprehensive risk mapping).
- Single-Source & Critical Components: Track parts or materials that come from a single supplier to highlight potential chokepoints. Apply a "criticality lens" to evaluate each part based on its function, the potential impact if disrupted, and the difficulty of finding alternatives.
- Supplier Concentration Risk: Assess the degree of supplier concentration within regions or specific facilities to expose significant risks if a single node fails.
- **Price Volatility Risk:** Use Exiger price trend and forecasting data to detect potential spikes or supply disruptions, signaling underlying vulnerabilities.



### 4 Continuous Monitoring:

- **Predictive Tools:** Continuously monitor risks at the part and supplier level, anticipate disruptions, and implement proactive contingency plans.
- **Price Forecasts:** Improve sourcing strategy with more accurate price forecasts, ensuring better margins and cash flow on an ongoing basis.
- Scenario Analysis: Conduct impact scenario analyses based on potential risk events (tariffs, export restrictions, natural/man-made disasters).

## Arm Yourself for the Periodic Table Battle

With Exiger's rapid supply chain illumination, you can identify vulnerabilities in hours — not weeks — ensuring mission-critical systems remain operational.

Our comprehensive analysis extends beyond surface-level data and part descriptions, identifying critical minerals content even when references are buried in PDFs, engineering diagrams, and other specifications or not directly called out in the product description.

# Exiger is the only company capable of identifying the holistic supply chain impacts of critical minerals from technical data packages.

Other providers are only able to identify a fifth of the parts impacted by antimony that Exiger can, less than half of the germanium parts, and 55% of gallium parts.

Our FedRAMP authorized platform rapidly maps BOMs down to every NIIN and WSDC, identifying dependencies on exportrestricted minerals and finding alternative suppliers. It conducts due diligence and onboarding, enables directed buy programs, and continuously monitors for emerging risks, providing a complete solution in one platform.



### Why Choose Exiger?



### **Critical Minerals Pricing/Forecast Models**

Leverage the leading Exiger and MetalMiner technology selected by DARPA to improve transparency in critical commodity pricing and supply, demand, and capacity forecasting.



### Speed and Scale

Identify systems, parts, and components across tens of thousands of suppliers and millions of parts containing restricted minerals down to specific NIINs (National Item Identification Numbers), WSDCs (Weapon System Designator Codes), or part numbers <u>in a matter of hours</u>.



### Works with All Your Data

Works with a range of data formats, from Excel sheets, to catalogs, to technical data packages in PDFs (engineering drawings, BOMs) to identify critical mineral exposure.



### FedRAMP Authorized

Government-wide FedRAMP Moderate authorization ensures complete coverage and participation for all agencies and contractors with controlled unclassified information (CUI).

## **About Exiger**

Exiger is revolutionizing the way corporations, government agencies and banks navigate risk and compliance in their thirdparties, supply chains and customers through its software and tech-enabled solutions. Exiger's mission is to make the world a safer and more transparent place to succeed.

Get in touch with us at contact@exiger.com or by calling 212-455-9400.

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