

# Policy Reforms to Unleash Domestic Critical Minerals Mining and Processing

Establishing Domestic Supply Chains in  
Support of American Economic and  
National Security

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MAY 2026

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# EXECUTIVE SUMMARY

## Strategic Context

The United States faces a growing strategic vulnerability in its supply chains for minerals essential to national defense, advanced manufacturing, energy infrastructure, and emerging technologies. Although the nation possesses significant geological endowment, domestic production and processing capacity have not kept pace with rapidly expanding demand. Long project timelines, fragmented regulatory structures, and global market conditions have resulted in substantial reliance on foreign processing—particularly within a single geopolitical competitor—which has demonstrated a willingness to use mineral supply chains for strategic leverage. These dependencies pose risks to economic competitiveness, military readiness, and long-term technological leadership.

Recent federal actions reflect an accelerated shift toward rebuilding U.S. mineral security. Major initiatives have been launched to stimulate investment, including Project Vault—a strategic stockpiling initiative backed by the Export-Import Bank of the United States that creates a U.S. Strategic Critical Minerals Reserve; new bilateral critical minerals frameworks or memoranda of understanding signed with 11 allied nations at the 2026 Critical Minerals Ministerial; the launch of the Forum on Resource Geostrategic Engagement (FORGE), a plurilateral coalition aimed at aligning trade, pricing mechanisms, and market access among trusted partners; and a public comment process by the Office of the U.S. Trade Representative to design a plurilateral Agreement on Trade in Critical Minerals. Most recently, the U.S. Department of Energy undertook a major structural reorganization formally establishing the Office of Critical Minerals and Energy Innovation (CMEI), consolidating programs across critical minerals, materials, manufacturing, energy technology, and federal codes and standards. These steps align with the Administration's four-part strategy to expand domestic mining and processing, strengthen allied supply chains, advance recycling and substitution, and improve permitting and regulatory predictability. These actions demonstrate momentum but also highlight the need for more comprehensive regulatory and permitting reform to convert federal objectives into on-the-ground project deployment.

## Key Barriers to Domestic Production

Despite renewed federal focus, several systemic barriers hinder development of domestic critical mineral supply chains. The U.S. mine permitting process remains significantly longer than that of peer nations with comparable environmental safeguards, often extending a decade or more due to sequential agency processes, duplicative reviews, inconsistent requirements, and limited mechanisms for coordination. Environmental reviews frequently exceed statutory limits and rely on repeated analysis of issues previously evaluated in earlier documents, slowing progress without improving environmental outcomes.

Legal uncertainty further constrains development. The Mining Law of 1872 provides insufficient clarity on issues such as waste disposal authority, mill site usage, and recovery of critical minerals from mine waste or legacy sites. Conflicting interpretations and litigation risks contribute to permitting delays and discourage investment.

The most significant structural gap is the absence of domestic processing and refining capacity for many critical minerals. Even where mining occurs domestically, ores and concentrates typically require export for separation, refining, or metallurgical conversion. Foreign state-subsidized overcapacity, price suppression, and market manipulation undermine the economic viability of U.S. midstream facilities. Regulatory barriers affecting naturally occurring radioactive materials (NORM) and technologically enhanced naturally occurring radioactive materials (TENORM) further limit domestic processing of mineral concentrates containing uranium- or thorium-bearing minerals, imposing requirements that are materially more restrictive than those applied to comparable industrial risks.

Workforce shortages compound these challenges. U.S. university programs in mining engineering, extractive metallurgy, materials processing, and economic geology have contracted over the past decade, and a significant portion of the current workforce is nearing retirement. Competing nations continue to expand academic capacity in critical minerals disciplines, intensifying long-term competitiveness concerns.

## Summary of Recommended Reforms

This report proposes 27 recommendations across six reform areas to modernize the U.S. regulatory environment and enable development of resilient, secure mineral supply chains:

1. **Federal Permitting Reforms** emphasize enforceable deadlines, milestone-based performance accountability, and establishment of a centralized federal permitting office for critical minerals to coordinate agency reviews, resolve disputes, and provide a single point of contact for project applicants. Automatic coverage under Title 41 of the Fixing America's Surface Transportation Act (FAST-41) provided to all major mining and processing projects would formalize milestone tracking and improve transparency.
2. **Environmental Review Reforms** focus on expanding programmatic environmental documents for common mining activities and geologic regions; establishing categorical exclusions for low-impact exploration; enforcing existing page and time limits; expanding the use of sponsor-prepared environmental documents under agency supervision; and requiring agencies to adopt existing analyses to avoid redundant work. These measures preserve environmental protections while enhancing efficiency and consistency.
3. **Mining Law Modernization** aims to clarify authority for mine waste and tailings disposal, streamline the mining claims process, enable recovery of critical minerals from mine waste and legacy sites, and improve the analytical and legal framework for major withdrawals and monument designations affecting critical mineral access. These recommendations seek to reduce legal uncertainty and establish predictable land management conditions for long-term project development.
4. **Interagency Coordination Reforms** include mandating concurrent reviews rather than sequential processes and establishing enforceable lead-agency authority to set schedules, coordinate data requirements, and resolve interagency disagreements. Improvements to tribal consultation processes are recommended to support meaningful engagement while ensuring predictable project timelines.
5. **Processing and Refining Capacity—The Critical Gap:** Building domestic processing and refining capacity remains the most urgent requirement for establishing resilient mineral supply chains. The report recommends creation of a coordinated federal processing initiative to integrate strategic planning, financial tools, and regulatory support. A dedicated processing pilot program authority is proposed to accelerate validation, demonstration, and commercial-scale deployment of emerging technologies, complementing existing research and pilot-scale efforts. Additional recommendations address permitting streamlining for processing facilities, incentives for utilization of nontraditional feedstocks such as mine waste, coal byproducts, geothermal brines, and produced waters, and comprehensive reform of NORM and TENORM regulation to align radiation standards with current scientific evidence and provide a uniform, risk-informed federal framework. These actions would address the primary supply chain bottleneck and enable U.S. upstream production to translate into usable materials for manufacturing and defense applications.
6. **Workforce, Financial Incentives, and Market Conditions:** The report recommends expanding education and workforce development programs in mining engineering, materials science, extractive metallurgy, and related disciplines; sustaining long-term tax incentives

necessary for projects with multi-decade life cycles, including reconsideration of the phasedown schedule for the Section 45X Advanced Manufacturing Production Credit enacted in the One Big Beautiful Bill Act; and fully utilizing Defense Production Act and Development Finance Corporation authorities to support domestic and allied critical minerals projects. These measures aim to address shortages in technical expertise, stabilize long-term investment environments, and enhance supply chain coordination with strategic partners.

## **Implementation Path and Expected Outcomes**

Each recommendation includes an implementation complexity rating—"Low Complexity," "Moderate Complexity," or "High Complexity"—reflecting the level of institutional effort, statutory authority, and procedural complexity required. Nine of the 27 recommendations require legislative action, including binding permitting timelines, mining law modernization, processing-initiative authorization, and workforce expansion. The remaining recommendations can be implemented through agency rulemaking or executive direction, including most environmental-review reforms, interagency coordination processes, and regulatory updates. Section 8 consolidates these ratings across all 27 recommendations in three summary tables organized by complexity level, and Section 9 presents the conclusions of the report.

Full implementation of these reforms would potentially reduce permitting timelines by 60%, align U.S. processes with international benchmarks, expand domestic processing capacity, modernize outdated regulatory frameworks, and strengthen global supply-chain resilience. U.S. federal mine permitting currently requires 7–10 years, compared to just 2–3 years in Canada and 1–2 years in Australia, highlighting the potential for a 60% reduction in timelines through aligned reforms. Achieving these outcomes requires sustained commitment across multiple administrations and agencies. The United States has the geological resources and technical expertise to secure its mineral future; the decisive factor will be whether policy modernization proceeds with the speed and coordination required by strategic demand.

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## ACRONYMS

ADVANCE	Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (Act)
AEA	Atomic Energy Act
ALARA	As Low As Reasonably Achievable
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BPC	Bipartisan Policy Center
BTI	Breakthrough Institute
CAA	Clean Air Act
CCP	Chinese Communist Party
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMEI	Office of Critical Minerals and Energy Innovation
CMETC	Critical Mineral Exploration Tax Credit
CMI	Critical Materials Innovation (Hub)
CSIS	Center for Strategic and International Studies
DFC	Development Finance Corporation
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
DOJ	Department of Justice
DOT	Department of Transportation
DPA	Defense Production Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EXIM	Export–Import Bank of the United States

FAST	Fixing America’s Surface Transportation (Act)
FAST-41	Title 41 of the Fixing America’s Surface Transportation Act
FLPMA	Federal Land Policy and Management Act
FORGE	Forum on Resource Geostrategic Engagement
FRA	Fiscal Responsibility Act
GAO	Government Accountability Office
IEA	International Energy Agency
IJA	Infrastructure Investment and Jobs Act
INL	Idaho National Laboratory
IRA	Inflation Reduction Act (Pub. L. 117-169)
ITSI	International Technology Security and Innovation
METALLIC	Minerals to Materials Supply Chain Research Facility
MOU / MOUs	Memorandum / Memoranda of Understanding
mrem	Millirem
MSHA	Mine Safety and Health Administration
MSP	Minerals Security Partnership
mSv	Millisievert
NEDC	National Energy Dominance Council
NEIMA	Nuclear Energy Innovation and Modernization Act (Pub. L. 115-439)
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NIW	National Interest Waiver
NORM	Naturally Occurring Radioactive Materials
NRC	Nuclear Regulatory Commission
OBBBA	One Big Beautiful Bill Act
OLC	Office of Legal Counsel
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act

REE	Rare-Earth Elements
SAFE	Securing America's Future Energy
SMCRA	Surface Mining Control and Reclamation Act
STEM	Science, Technology, Engineering, and Mathematics
TENORM	Technologically Enhanced Naturally Occurring Radioactive Materials
U.S.C.	United States Code
USFS	United States Forest Service
USGS	United States Geological Survey
USTR	United States Trade Representative

# Policy Reforms to Unleash Domestic Critical Minerals Mining and Processing

## 1. INTRODUCTION

### 1.1. The Strategic Problem

The United States faces a critical vulnerability in its supply chains for minerals essential to national defense, advanced manufacturing, energy infrastructure, and emerging technologies. The nation currently relies on imports for essentially 100% of 13 critical minerals and more than 50% for an additional 20 critical mineral commodities [USGS-MCS-2026]. China dominates global rare earth element processing, controlling 91% of the market share as of 2024 [REEEx-Margins].

This dependence creates direct national security risks. China has demonstrated willingness to weaponize mineral supply chains through export restrictions on gallium, germanium, antimony, tungsten, and other strategic materials critical to defense applications [IEA-2025]. The concentration of processing capacity in a single geopolitical rival—one that has explicitly stated its intention to use economic dependencies for strategic leverage—represents an unacceptable vulnerability for American economic competitiveness, military readiness, and energy independence and security.

Over the past year, the federal government has launched several major initiatives intended to reduce these risks and accelerate the development of secure, diversified supply chains. These include Project Vault—a strategic stockpiling initiative backed by the Export-Import Bank of the United States (EXIM) that creates a U.S. Strategic Critical Minerals Reserve to stabilize domestic demand for essential raw materials [EXIM-ProjectVault-2026; Brownstein-2026]; new bilateral critical-minerals frameworks or memoranda of understanding (MOUs) signed with 11 allied nations at the 2026 Critical Minerals Ministerial [State-Dept-Minerals-2026]; the launch of the Forum on Resource Geostrategic Engagement (FORGE), a plurilateral coalition aimed at aligning trade, pricing mechanisms, and market access among trusted partners [AtlanticCouncil-FORGE-2026; State-Dept-Minerals-2026]; and the Office of the U.S. Trade Representative (USTR) public comment process to design a plurilateral Agreement on Trade in Critical Minerals to implement price floors, border adjustments, and regulatory coordination among allied nations [USTR-Plurilateral-2026]. Most recently, the U.S. Department of Energy (DOE) undertook a major structural reorganization that formally established the Office of Critical Minerals & Energy Innovation (CMEI), consolidating programs across critical minerals, materials, manufacturing, energy technology, and federal codes and standards. DOE states that this realignment is intended to “fortify America’s critical mineral supply chains,” enable a more coordinated, mission-aligned response to surging demand for energy and mineral resources, and “more effectively direct its resources to meet an unprecedented surge in demand for energy and the critical minerals that underpin the modern economy” [DOE-CMEI-Realignment-2026; DOE-CMEI-OrgChart-2026].

These announcements complement the Administration’s four-part federal critical minerals strategy, outlined by Senior Director for Global Supply Chains David Copley at the State Department’s 2026 Critical Minerals Ministerial. The strategy emphasizes: (1) expanding responsible domestic mining and processing; (2) strengthening allied supply chains through trade, investment, and technology partnerships; (3) advancing recycling, substitution, and circular economy pathways; and (4) improving market transparency, permitting efficiency, and regulatory predictability [State-Dept-OpeningRemarks-2026]. These initiatives closely align with and reinforce the comprehensive reforms proposed in this report.

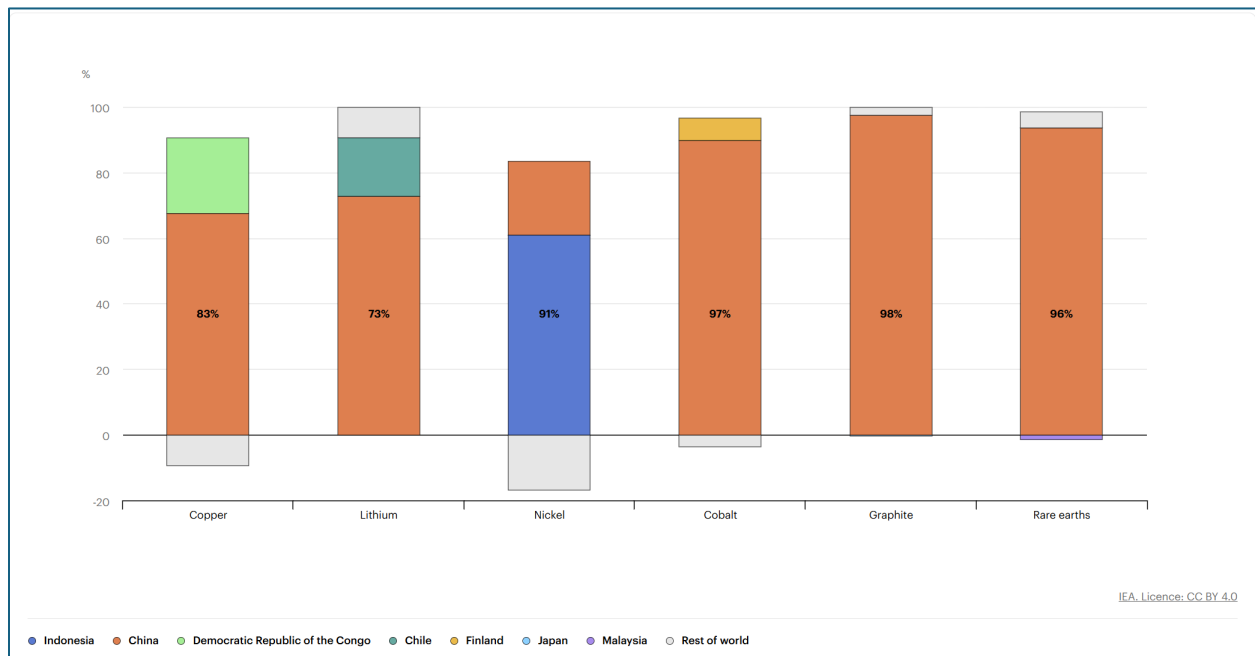
### 1.2. Root Causes: Key Barriers to Domestic Production

The United States possesses significant critical mineral resources, yet many of these deposits remain largely undeveloped. Regulatory barriers are among the key reasons that domestic production has become economically unviable. U.S. mine permitting timelines average 7–10 years, compared to just 2–3 years in

Canada and 1–2 years in Australia, nations with comparable environmental standards but more efficient regulatory processes [EM-Permitting, SME-Permitting]. Projects require approvals from a dozen or more federal agencies, each with independent timelines, duplicative information requirements, and sequential review processes. The Government Accountability Office (GAO) has found that ineffective interagency coordination alone can delay energy-related projects by up to 3 years [GAO-Permitting].

Beyond regulatory hurdles, price uncertainty and Chinese market manipulation present equally serious obstacles to private investment. In an economy that relies on the private sector to finance mineral development, investors face a dual risk: volatility from broader market forces and deliberate suppression of prices by Chinese state-backed producers. China’s dominant position in global refining—built through decades of subsidized capacity expansion—has created surplus refining infrastructure that drives down processing costs to levels that western facilities cannot match. This dynamic has contributed to what some analysts describe as "negative refining margins" for rare earth elements (REEs), a condition in which the market price of a refined REE metal falls below the cost of the mixed oxide concentrate from which it is derived. For instance, “China controls 91% of refined rare earth output, thanks in part to subsidies, its large scale, and state-controlled pricing. Companies like China Northern Rare Earth Group survived on a meager 5.6% margin...neodymium-praseodymium oxide has plummeted to \$65/kg, far below the \$140–150/kg price non-Chinese producers need to break even” [REEEx-Margins]. Under these conditions, investment in new western refining capacity is economically irrational without some form of policy intervention. Private investors have therefore remained on the sidelines, uncertain whether metal prices will remain high enough to justify long-term capital commitments and whether the federal government will establish trade or industrial policies that shield domestic producers from competing against artificially inexpensive Chinese supply.

Beyond mining, the most critical supply chain gap is the near-complete absence of domestic processing and refining capacity. Even domestically mined materials typically require foreign processing because the United States lacks the separation facilities, metallurgical infrastructure, and specialized workforce needed to convert raw ores into usable materials. As depicted in Figure 1, the average market share of the top three refining nations for key energy minerals rose from 82% in 2020 to 86% in 2024, with China capturing almost all supply growth for cobalt, graphite, and rare earths [IEA-2025].



**Figure 1.** Production changes among the top producers as a percentage of total net growth, compared with the rest of the world [IEA-2025].

Multiple regulatory frameworks create compounding barriers. The Mining Law of 1872 lacks clarity on mine waste treatment and tailings disposal, creating legal uncertainty that delays standard operations. Environmental review processes under the National Environmental Policy Act (NEPA) frequently exceed statutory page and time limits without accountability mechanisms. For rare earth processing—a critical gap in domestic capacity—naturally occurring radioactive materials (NORM) and technologically enhanced NORM (TENORM) regulations impose radiation dose limits significantly more conservative than scientific evidence supports, making domestic processing economically uncompetitive with foreign alternatives that face no comparable restrictions.

Workforce shortages also compound these regulatory barriers. All facets of the domestic critical minerals supply chain, including geology, materials science, and logistics, are strained as the U.S. workforce has significantly fallen behind global competitors. For example, geoscience and mineral engineering programs have contracted sharply: more than half the current U.S. mining workforce is poised to retire by 2029 [SME-Workforce] while degrees in mining and mineral engineering fell by 39% between 2016 and 2022—with only 327 degrees awarded in 2020—against a backdrop of shrinking academic capacity (from 25 programs in 1982 to just 15 in 2023) [CSIS-Workforce]. In contrast, China now operates over 44 mining engineering and 38 mineral processing programs, producing thousands of graduates annually [CSIS-Workforce]. Without a robust pipeline of skilled professionals in exploration geology, materials innovation, and supply chain logistics, U.S. efforts to build a resilient critical minerals ecosystem are at risk.

### 1.3. Recent Policy Foundations

Recent executive orders, legislative actions, and agency initiatives have established important foundations for reform, demonstrating bipartisan recognition that current approaches are inadequate.

- **Legislative Actions:** The Energy Act of 2020 (Pub. L. 116-260, Division Z) established the statutory definition of critical minerals and directed the United States Geological Survey (USGS) to maintain and periodically update the critical minerals list, assess U.S. import reliance for mineral commodities, provide authoritative data underpinning federal supply chain risk assessment and policy, and develop national assessments quantifying domestic critical mineral resources [EA-2020]. The import reliance statistics cited in Section 1.1 of this report—including 100% reliance on imports for 13 critical minerals and greater than 50% reliance for an additional 20—are drawn directly from USGS Mineral Commodity Summaries publications, reflecting the ongoing fulfillment of this mandate [USGS-MCS-2026]. The Infrastructure Investment and Jobs Act (IIJA, Pub. L. 117-58) provided over \$500 million for critical minerals research and expanded DOE loan authority for domestic mineral projects [IIJA-2021]. The Inflation Reduction Act (IRA, Pub. L. 117-169) established the Section 45X Advanced Manufacturing Production Credit and Section 30D sourcing requirements intended to incentivize domestic and allied production [IRA-2022]. The Fiscal Responsibility Act’s (FRA) NEPA reforms established page and time limits for environmental reviews although enforcement has been inconsistent [FRA-2023]. The Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (ADVANCE) Act of 2024 (Pub. L. 118-67) established binding milestone schedules and performance metrics for Nuclear Regulatory Commission (NRC) licensing decisions, providing a model for similar reforms in mine permitting [ADVANCE-Act]. The Good Samaritan Remediation of Abandoned Hardrock Mines Act of 2024 (Pub. L. 118-155) created a pilot program for cleanup of abandoned mines with liability protection although its scope remains limited to nonprofit remediation rather than commercial recovery operations [GoodSam-2024].
- **Executive Actions:** Executive Order (EO) 14241, “Immediate Measures to Increase American Mineral Production,” invoked Defense Production Act (DPA) authorities and directed comprehensive reviews of federal lands and permitting processes [EO-14241]. Executive Order 14300, “Ordering the Reform of the Nuclear Regulatory Commission,” directed reforms to radiation protection standards

based on current scientific evidence [EO-14300]. The One Big Beautiful Bill Act (OBBBA) included provisions affecting critical minerals tax incentives with phasedown schedules that undermine long-term investment certainty [One-Big-Beautiful-Bill-Act]. Interior Secretary Secretarial Order 3418, titled “Unleashing American Energy,” (Feb 3, 2025) directs the Department of the Interior to expeditiously identify and remove impediments on federal lands to accelerate energy and critical minerals development [SO-3418].

- **Policy Analysis:** These government actions have been complemented by substantial policy analysis from non-governmental organizations spanning the political spectrum. The Aspen Institute’s bipartisan task force concluded that “the country needs a clean energy policy that includes sustainable and equitable access to critical minerals” and presented consensus recommendations for supply chain resilience [Aspen-CritMin-2023]. The Center for Strategic and International Studies (CSIS) has emphasized that “the United States will need to strengthen both its mission clarity and its execution with a comprehensive strategy focused on domestic resource development, advanced processing and recycling technologies, international partnerships, and sustainable practices” [CSIS-CritMin-2025]. The Bipartisan Policy Center has identified investment challenges for midstream processing as a critical gap requiring policy intervention [BPC-Midstream-2024]. The Breakthrough Institute (BTI) has assessed mine permitting frameworks and recommended maximizing programmatic environmental reviews to reduce project-specific burdens [BTI-CritMin-2023]. The bipartisan Critical Mineral Policy Working Group of the House Select Committee on the Chinese Communist Party identified supply chain vulnerabilities requiring legislative action [HouseCCP-2024].

## 1.4. Document Scope and Approach

This report builds upon these recent policy developments and analyses while providing additional focus on implementation pathways, statutory mechanisms, and the regulatory barriers posed by NORM and TENORM in rare earth processing. The document presents 27 recommendations across six reform areas to address the regulatory and policy impediments to domestic critical minerals production, along with the implementation guidance and conclusions:

1. **Federal Permitting Reforms** (Section 2): Establish binding timelines, centralized coordination, and expanded Title 41 of the Fixing America’s Surface Transportation Act (FAST-41) coverage
2. **Environmental Review Streamlining** (Section 3): Develop programmatic reviews, establish categorical exclusions, enforce existing page and time limits, expand sponsor preparation, and maximize use of existing analyses
3. **Mining Law Modernization** (Section 4): Clarify waste disposal treatment, streamline claims processes, address mine waste recovery, and improve the analytical and legal framework for major withdrawals and monument designations affecting critical mineral access
4. **Interagency Coordination** (Section 5): Require concurrent reviews, establish lead agency authority, and improve tribal consultation
5. **Processing Capacity Development** (Section 6): Create a federal processing initiative, establish pilot programs, streamline facility permitting, incentivize nontraditional sources, and address radioactive materials barriers, including NORM/TENORM regulations
6. **Workforce and Financial Support** (Section 7): Expand education programs, maintain tax incentives, and utilize DPA authorities

Each recommendation includes an implementation complexity rating to assist policymakers in assessing feasibility and sequencing. These ratings reflect the level of institutional effort, statutory authority, and procedural complexity required to carry out each recommendation. A “Low Complexity” rating indicates the recommendation is implementable through agency action, guidance, or executive direction without rulemaking or legislation, and is generally achievable within 6–12 months. A “Moderate

Complexity” rating indicates that agency rulemaking, interagency coordination, or executive action supported by Congressional oversight or clarification is required, with implementation typically achievable within 12–30 months. A “High Complexity” rating indicates that new legislation, appropriations, or resolution of contested legal authority is required, and that implementation may take several years. Section 8 consolidates these ratings across all 27 recommendations in three summary tables organized by complexity level, providing an integrated framework for prioritization and sequencing of implementation actions and identifying the legislative, regulatory, and executive actions required to advance each recommendation. Full implementation of these measures can position the United States to achieve critical minerals security while maintaining robust environmental protections and meaningful community engagement. The path forward requires sustained commitment across administrations; mining projects with longer than 20-year life cycles cannot be developed based on policies that may reverse with each election cycle. Section 9 presents the conclusions of the report, summarizing the strategic case for reform and the expected outcomes of full implementation.

Although this report focuses on critical minerals as defined and maintained by the USGS, the regulatory and permitting reforms recommended here are broadly relevant to domestic mining and processing of all mineral commodities. The barriers described throughout this document—lengthy permitting timelines, fragmented interagency coordination, outdated statutory authorities, limited processing capacity, and workforce shortages—are systemic features of the U.S. regulatory environment that affect the mining sector as a whole. As the 2025 USGS critical minerals list demonstrates, the designation of a mineral as “critical” is dynamic; commodities move on and off the list as supply conditions, demand patterns, and geopolitical circumstances evolve [USGS-CritMin-2025]. A regulatory and permitting framework modernized in response to critical minerals priorities will therefore yield lasting benefits across the full spectrum of domestic mineral production, supporting technology innovation and industrial competitiveness well beyond the specific commodities that motivate the most urgent reforms.

For detailed background on the critical minerals challenge, see the International Energy Agency’s (IEA) *Global Critical Minerals Outlook 2025* [IEA-2025] and the USGS’s *Mineral Commodity Summaries 2026* [USGS-MCS-2026]. For analysis of the current regulatory framework and permitting process, see the Department of the Interior’s *Recommendations to Improve Mining on Public Lands* [DOI-IWG-2023] and Standard and Poor’s *Global Mine Development Times: The US in Perspective* [SPGlobal-Development].

## 2. REFORMS TO STREAMLINE FEDERAL PERMITTING

### 2.1. Establish Binding Timelines for Mining Permit Decisions

**Recommendation:** Establish enforceable deadlines for federal agency decisions on mining permits, with meaningful accountability mechanisms.

**Justification:** The GAO has found that ineffective interagency coordination can delay federal permitting for energy-related projects by up to 3 years [GAO-Permitting]. The Fiscal Responsibility Act of 2023 established nominal time limits for NEPA reviews—1 year for environmental assessments (EAs) and 2 years for environmental impact statements (EISs)—but enforcement has been inconsistent, and these limits do not cover the full permitting process. The permitting process in the United States averages 7–10 years, compared to just 2–3 years in Canada and 1–2 years in Australia [EM-Permitting]. The absence of enforceable deadlines allows even routine applications to languish indefinitely. While addressing underlying causes—incomplete applications, litigation delays, interagency coordination failures, and inadequate agency staffing—is essential, enforceable deadlines create the accountability structure needed to drive systematic improvement across all project types.

#### **Proposed Timelines:**

- Environmental Assessments: 6 months maximum from the date the lead agency determines the application is complete
- Environmental Impact Statements: 12 months maximum from the date of publication of the Notice of Intent or determination of a complete application, whichever is earlier
- Final permit decisions: 90 days following completion of NEPA (Environmental Assessment and Environmental Impact Statement, as required), with decisions framed as approval or approval with conditions rather than denial wherever a viable path to compliance exists
- Section 404 permits: 90 days from complete application when NEPA is complete
- Endangered Species Act consultations: 90 days (formal)/60 days (informal)

#### **Accountability Mechanisms:**

- Mandatory quarterly reporting to Congress on permitting timelines that include time for data acquisition and baseline studies
- Public dashboard tracking, at minimum, all critical minerals permits with milestone dates and optimally all mining permits
- Adequate agency resourcing at both the state and federal levels, tied to performance metrics and permitting timelines
- Escalation procedures when deadlines are at risk
- Deemed approval for permits pending beyond statutory deadlines, consistent with a decision framework oriented toward approval or approval with conditions rather than denial

**Implementation:** [High Complexity] Requires legislative change. The Nuclear Energy Innovation and Modernization Act (NEIMA, Pub. L. 115-439) first required NRC to develop performance metrics and milestone schedules for licensing activities [NEIMA-2019]. The ADVANCE Act strengthened these requirements by directing NRC to establish fixed deadlines rather than nonbinding guidelines. Similar provisions could be enacted for mining permits by adding a new section to NEPA (42 United States Code

[U.S.C.]<sup>1</sup> § 4321 et seq.) or the Federal Land Policy and Management Act of 1976 (FLPMA; 43 U.S.C. § 1701 et seq.), requiring the Secretary of the Interior to establish milestone schedules for plans of operations under 43 Code of Federal Regulations [CFR]<sup>2</sup> Part 3809, and requiring the Secretary of Agriculture to establish milestone schedules for U.S. Forest Service Plans of Operation under 36 CFR Part 228, with mandatory reporting to Congress on compliance.

Permits and licenses should remain valid for the life of the project, eliminating redundant renewal cycles that add cost and uncertainty without improving environmental or regulatory outcomes. Existing amendment processes, which address changes to approved actions and provide opportunities for public participation, are sufficient to manage project modifications. Financial assurance requirements, secured prior to the commencement of any permitted activities, provide additional protection to the government and public throughout the project lifecycle).

## 2.2. Create a Federal Permitting Office for Critical Minerals

**Recommendation:** Establish a centralized federal office to coordinate all permitting activities for critical minerals projects, modeled on successful approaches in Canada and Australia, such as Canada’s coordinated “concierge” navigation services and digital permitting tools and Australia’s accelerated approval frameworks with statutory timelines and integrated investment support mechanisms.

**Justification:** Mining projects may require approvals from a dozen or more federal agencies, each with independent timelines, information requirements, and decision processes. This fragmented system creates duplicative reviews, inconsistent requirements, and extended timelines even when individual agencies act efficiently. Canada and Australia maintain centralized coordination mechanisms that contribute to their significantly shorter approval timelines [SPGlobal-Development]. The United States previously had a Bureau of Mines, established by Congress in 1910 and legislatively abolished in 1996 by the Omnibus Consolidated Rescissions and Appropriations Act (Pub. L. 104-134, 110 Stat. 1321). Its functions were dispersed across DOE, USGS, Bureau of Land Management (BLM), and National Institute for Occupational Safety and Health (NIOSH) — a fragmentation that contributed to the coordination deficits that persist today.

The sheer size and complexity of the federal permitting landscape further amplify these challenges. As illustrated in the Critical Minerals Project Development Pathways map produced by the Cassidy & Associates team [Cassidy-2026], the U.S. permitting ecosystem spans an extensive array of statutory authorities, jurisdictional boundaries, and parallel review processes. Many of these pathways overlap or operate without a unified decision structure, forcing project developers to navigate a maze of sequential and sometimes circular approvals. This complexity makes even well-resourced projects vulnerable to procedural delays, particularly where cross-agency dependencies exist or where requirements diverge across environmental, land-use, cultural resource, and public-engagement statutes.

Taken together, the combination of multi-agency jurisdiction, fragmented authority, and high procedural complexity places the United States at a structural disadvantage in deploying new mineral and energy projects at the pace required for economic and national security priorities.

### Key Functions:

- Single point of contact for project proponents seeking federal approvals

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<sup>1</sup> Throughout this report, citations to the United States Code (U.S.C.) are provided in their full and proper form within the text. Because each U.S.C. citation independently constitutes a complete legal reference, the U.S.C. is included as a single consolidated entry in the References section rather than enumerating each cited title and section individually.

<sup>2</sup> Throughout this report, citations to the Code of Federal Regulations (CFR) are provided in their full and proper form within the text. Because each CFR citation independently constitutes a complete legal reference, the CFR is included as a single consolidated entry in the References section rather than enumerating each cited title and part individually.

- Coordination of all federal agency reviews with unified permitting schedules
- Technical expertise in mining engineering, mineral processing, reclamation, and environmental management
- Pre-application consultation to identify issues early
- Public dashboard tracking with binding milestones
- Authority to resolve interagency disputes and enforce schedule commitments
- Coordination with state agencies to minimize duplicative requirements

**Implementation:** [High Complexity] Requires new authorizing legislation; an executive order alone is insufficient to reconstitute a statutory agency abolished by Congress. A new office could be established by amending the FLPMA (43 U.S.C. § 1701 et seq.) or through standalone legislation similar to the Fixing America’s Surface Transportation Act (FAST Act, Pub. L. 114-94), which established the Federal Permitting Improvement Steering Council. The office would require authority to coordinate reviews under NEPA (42 U.S.C. § 4321 et seq.), the Mining Law of 1872 (30 U.S.C. § 22 et seq.), Clean Water Act, Section 404 (33 U.S.C. § 1344), Endangered Species Act, Section 7 (16 U.S.C. § 1536), Atomic Energy Act of 1954 (42 U.S.C. § 2011 et seq.), and the Uranium Mill Tailings Radiation Control Act of 1978 (42 U.S.C. § 7901 et seq.), which together govern licensing, tailings management, long-term custodial care, and any proposed reprocessing of uranium mill tailings at sites currently under federal long-term stewardship programs.

Complementing the central office, consideration should be given to establishing dedicated lean permitting teams within the specific agencies most frequently involved in mining reviews, including BLM, Forest Service, Army Corps of Engineers, Environmental Protection Agency (EPA), and Fish and Wildlife Service. These embedded units would provide agency-level expertise and accountability, ensuring that the central permitting office has empowered counterparts within each cooperating agency rather than routing all coordination through a single external body.

### 2.3. Expand FAST-41 for All Critical Minerals Projects

**Recommendation:** Automatically designate all critical minerals mining and processing projects meeting minimum thresholds as covered under FAST-41, rather than requiring individual applications for coverage.

**Justification:** The FAST-41 program provides valuable coordination benefits, including comprehensive permitting timetables, improved interagency coordination, public transparency through the Federal Permitting Dashboard, and executive-level accountability for delays [FAST-41-2015]. Mining was added as a FAST-41-eligible sector by Federal Permitting Improvement Steering Council rulemaking, effective January 2021 (86 FR 1281). However, coverage remains discretionary and requires individual project applications. The Department of Interior has begun adding critical minerals projects to FAST-41 coverage in response to Executive Order 14241, but coverage remains project specific.

**Proposed Changes:**

- Projects with total investment exceeding \$25 million automatically eligible
- Processing and refining facilities (not just mining) explicitly included
- Applications streamlined to simple notification process
- Agencies required to use the Permitting Dashboard for tracking all critical minerals authorizations

**Implementation:** [Low Complexity] Requires regulatory change by the Permitting Council; legislative confirmation beneficial. The Federal Permitting Improvement Steering Council has authority under 42 U.S.C. § 4370m-1 to add project categories to FAST-41 coverage. Automatic designation could be

accomplished through rulemaking amending 40 CFR Part 1900, or through legislative amendment to 42 U.S.C. § 4370m(6) expanding the definition of “covered project.”

Congress should also consider establishing a formal national interest designation for select critical mineral projects meeting defined strategic criteria, such as the type of mineral produced, project scale, geographic significance, or the ability to anchor hub-and-spoke supply chain models in which a central processing or smelting facility is supplied by multiple upstream mines. This designation, which has precedent in several allied nations including Australia and Canada, would ensure that unusually large or strategically important projects — particularly those that have been stalled for multiple years — receive prioritized attention, dedicated agency resources, and accelerated review within the FAST-41 framework. Criteria and designation authority could be vested in the proposed Federal Permitting Office for Critical Minerals in coordination with the National Energy Dominance Council.

### 3. REFORMS TO STREAMLINE ENVIRONMENTAL REVIEWS

#### 3.1. Develop Programmatic Environmental Reviews

**Recommendation:** Complete programmatic environmental reviews for common mining activities and prospective mining regions to reduce project-specific NEPA burden.

**Justification:** Programmatic EISs evaluate common impacts across multiple similar projects or geographic areas. Subsequent site-specific reviews can “tier” from the programmatic analysis, incorporating findings by reference rather than repeating analysis. Precedents include the BLM’s programmatic EIS for solar energy development and NRC’s Generic EIS for nuclear reactor licensing. The Breakthrough Institute has recommended maximizing “the effort expended on NEPA reviews and environmental studies at preemptive, programmatic levels to minimize the effort needed to complete equivalent requirements unique to specific projects” [BTI-CritMin-2023]. This approach addresses permitting timelines without compromising environmental review quality.

**Priority Areas:**

- Critical minerals exploration activities (nationwide programmatic EA)
- Regions with known mineral potential (e.g., Nevada for lithium, Wyoming for rare earths, and Arizona for copper), noting that many states contain Tribal lands and that some mineral resources in these regions are located on or adjacent to Tribal territories, which may require distinct consultation and review processes
- Common mining methods
- Processing facilities that meet defined criteria

**Implementation:** [Moderate Complexity] Agency action under NEPA, Section 108 (42 U.S.C. § 4336b), which authorizes programmatic environmental documents; legislative direction beneficial. BLM and Forest Service have existing authority under NEPA to prepare programmatic reviews.

#### 3.2. Establish Categorical Exclusions for Exploration Activities

**Recommendation:** Direct BLM and Forest Service to establish categorical exclusions under NEPA for critical minerals exploration activities meeting defined criteria.

**Justification:** Exploration activities—including temporary access roads, drill pads, and exploratory drilling—typically create limited and temporary disturbances that can be fully reclaimed. Current BLM regulations allow exploration projects creating less than 5 acres of surface disturbance to proceed under a notice without NEPA review, but more extensive exploration requires a plan of operations and typically an EA, adding months or years to timelines. Programmatic environmental reviews (Section 3.1) can provide the analytical foundation for categorical exclusions covering exploration in previously analyzed areas.

**Proposed Categorical Exclusions:**

- Exploration drilling programs of defined scope
- Temporary access roads with full reclamation commitment
- Geophysical surveys and sampling activities
- Modifications to existing exploration plans within defined parameters
- Exploration activities in areas previously analyzed under programmatic NEPA documents

**Implementation:** [Low Complexity] Agency action under NEPA, Section 109 (42 U.S.C. § 4336c), which establishes procedures for adopting categorical exclusions. BLM would amend its NEPA

procedures in the Departmental Manual (516 DM) and 43 CFR Part 46; Forest Service would amend 36 CFR Part 220.

Policymakers should also evaluate whether a confidential data-sharing framework could be established through which exploration results are reported to USGS or a designated federal agency to strengthen the national subsurface geological knowledge base. Several peer jurisdictions already require some version of this: Australia, Finland, and Greenland mandate submission of exploration data to government geological surveys, Chile requires reporting through its national geology and mining service, and Canada requires public technical reports from listed companies. A U.S. framework could provide equivalent benefit while protecting commercially sensitive data through defined confidentiality periods and restricted access protocols, improving the quality of federal mineral assessments without burdening the private sector.

### 3.3. Enforce Page and Time Limits for NEPA Reviews

**Recommendation:** Strictly enforce the page and time limits established by the Fiscal Responsibility Act, with consideration of further streamlining for priority critical mineral projects.

**Justification:** The Fiscal Responsibility Act of 2023 (Pub. L. 118-5, Section 321, “Builder Act”) established page limits (150 pages for standard EISs, 300 for complex projects, 75 for EAs) and time limits (2 years for EIS, 1 year for EA), codified at 42 U.S.C. § 4336a(e) and (g). Early evidence suggests that the impact of the new page and time limits may be more limited than intended, as agencies can rely on workarounds (e.g., shifting analysis to appendices), raising questions about their practical effectiveness and enforceability [ICF-NEPA].

#### Proposed Actions:

- Strict enforcement with high-level approval required for extensions or waivers
- Focus on significant issues proportionate to their relative importance and anticipated impact
- Use incorporation by reference for existing analyses
- For national security priority projects: 12-month EIS and 6-month EA timelines
- Judicial review provisions limiting injunctive relief for projects meeting expedited requirements

**Implementation:** [Moderate Complexity] Agency action with Congressional oversight. Enforcement could be strengthened by amending 42 U.S.C. § 4336a(g) to require mandatory reporting to Congress (similar to NEIMA Section 102(c) requirements for NRC) when deadlines are missed, and to establish consequences for noncompliance. Accelerated timelines for national security projects and performance-based compliance rewards could be established through new legislation or by amending 42 U.S.C. § 4336a.

### 3.4. Expand Sponsor Prepared Environmental Documents

**Recommendation:** Encourage project proponents to prepare NEPA documents under agency supervision, employing the authority confirmed by the Fiscal Responsibility Act.

**Justification:** The Fiscal Responsibility Act explicitly authorizes “sponsor preparation” of both EAs and EISs under agency supervision, codified at 42 U.S.C. § 4336a(f). Project proponents have detailed knowledge of their proposed operations, technical mining expertise that may exceed agency staff capabilities, and dedicated resources that can accelerate document preparation.

#### Needed Actions:

- Clear guidance on sponsor preparation procedures, including preparer qualifications, agency oversight requirements, and quality control standards

- Protocols ensuring agency independence in decision making
- Staff training on effective oversight of sponsor prepared documents
- Outcome tracking to evaluate effectiveness

**Implementation:** [Low Complexity] Agency guidance implementing 42 U.S.C. § 4336a(f) and practice changes. BLM and Forest Service should update their NEPA handbooks and procedures to establish clear protocols for sponsor preparation.

### **3.5. Maximize Use of Existing Environmental Analyses**

**Recommendation:** Require agencies to adopt existing EAs to the maximum extent possible, avoiding duplicative reviews of issues previously analyzed.

**Justification:** NEPA provides mechanisms for tiering (42 U.S.C. § 4336b), adoption of categorical exclusions (42 U.S.C. § 4336c), and incorporation by reference. Despite these authorities, agencies frequently require new analysis of issues adequately addressed in prior documents due to risk-averse culture, fear of litigation, and lack of clear direction.

**Proposed Actions:**

- Tier from programmatic EISs whenever available
- Adopt state environmental documents meeting NEPA standards
- Accept EAs from other federal agencies on the same project
- Evaluate and adopt applicable categorical exclusions established by other federal agencies
- Use determinations of NEPA adequacy when prior analysis covers proposed actions
- Decline to analyze speculative, remote, or previously addressed issues

**Implementation:** [Low Complexity] Agency guidance implementing 42 U.S.C. § 4336b, programmatic documents, and § 4336c, categorical exclusion adoption, and practice changes in agency NEPA procedures.

## 4. REFORMS TO MODERNIZE THE MINING LAW OF 1872

### 4.1. Clarify Mine Waste Treatment and Tailings Disposal

**Recommendation:** Provide clear statutory or regulatory guidance on the treatment of mine waste rock and tailings and on waste disposal facilities under the Mining Law of 1872.

**Justification:** Executive Order 14241 directed the National Energy Dominance Council to prepare recommendations for Congress to clarify treatment of waste rock, tailings, and mine waste disposal under the Mining Law. The Rosemont decision (Ninth Circuit, 2019) created uncertainty about whether lands used solely for waste disposal qualify as “valuable for mining,” complicating standard industry practices. The Energy Permitting Reform Act of 2024 (S. 4753), which passed the Senate Energy and Natural Resources Committee with bipartisan support, included provisions to address this issue by allowing mill sites on mineral lands for ancillary mining activities, providing a legislative template.

**Key Elements:**

- Confirm that mining claims and associated mill sites may be used for all activities reasonably incident to mining, including waste disposal
- Establish clear standards for size and location of waste disposal facilities relative to mining operations
- Provide certainty for existing operations that have relied on current interpretations
- Maintain environmental protections while eliminating legal uncertainty

**Implementation:** [High Complexity] Requires legislative clarification amending the Mining Law of 1872 (30 U.S.C. § 22 et seq.) and/or agency rulemaking under 43 CFR Part 3809, Surface Management, and 43 CFR Part 3830, Administration of Mining Claims and Sites. Clarification should address the relationship between 30 U.S.C. § 26, locators’ rights of possession, and 30 U.S.C. § 42, mill sites, confirming that waste disposal facilities are uses reasonably incident to mining.

### 4.2. Streamline the Mining Claims Process

**Recommendation:** Modernize the mining claims system to reduce administrative burden while preserving the self-initiation framework that enables mineral exploration.

**Justification:** The Mining Law’s self-initiation framework—allowing citizens to explore and claim minerals on federal lands without prior government approval—has driven American mineral discovery for over 150 years. This system should be preserved and improved, not replaced, with a leasing system that would require government approval before exploration. Although critics contend that the Mining Law of 1872 lacks modern environmental protections, Indigenous rights recognition, and reclamation requirements, these concerns are now addressed through a broad suite of federal, state, and local laws enacted since 1872. Domestic mining today is subject to NEPA, FLPMA, Clean Water Act, Endangered Species Act (ESA), National Historic Preservation Act (NHPA), tribal consultation requirements, and extensive state-level permitting and reclamation programs, making the United States one of the most highly regulated mining jurisdictions in the world. Accordingly, any modifications to the Mining Law should avoid duplicating existing regulatory obligations or creating new layers of uncertainty that could further discourage investment.

Any reform initiative should strengthen the competitiveness and sustainability of domestic mineral production rather than add procedural obstacles. The United States possesses significant reserves of critical minerals, yet attracts only a small share of global exploration investment in part due to regulatory uncertainty; reforms that impose excessive royalties, fees on materials moved, duplicative bonding, or new veto authorities would risk further eroding U.S. mineral security. Amendments to the Mining Law of 1872 should therefore be prospective in application, ensuring that valid existing rights and actions already recorded under current law remain fully protected.

### **Proposed Improvements:**

- Fully electronic claim recording systems with standardized forms
- Simplified maintenance requirements
- Clearer guidance on “valuable mineral deposit” standards including defined exploration milestones and work requirements that reduce speculative claim holding and accelerate critical mineral investment and development
- Revision of arbitrary 5-acre mill-site limitation to reflect operational needs
- Fee structures covering administrative costs without creating barriers to entry
- Reforms should be limited to administrative modernization and must not duplicate environmental, reclamation, tribal engagement, or bonding requirements already imposed under other federal or state laws
- Clarified claim-siting standards that reduce conflicts with existing surface uses, improve spatial data integrity, and discourage speculative or non-developable claim configurations while maintaining the self-initiation framework
- Enhanced disclosure requirements for foreign and beneficial ownership of mining claims, focused on transparency and national security relevant minerals, without imposing duplicative review processes that already exist under federal national security or foreign investment laws

Beyond federal electronic claim recording systems, Congress and BLM should consider funding the compilation of a comprehensive, U.S.-wide map of mineral titles and ownership records, drawing on data currently held in county clerk and recorder offices across the country. No such national map currently exists for locatable minerals outside of federal land records. A unified mineral title registry would reduce transaction costs for investors, improve due diligence for project development, support federal mineral assessments, and enhance interagency coordination on land-use decisions affecting mineral potential.

**Implementation:** [High Complexity] Requires legislative change amending 30 U.S.C. § 28, annual assessment work requirements, and 30 U.S.C. § 42, mill site limitations, and agency rulemaking under 43 CFR Parts 3830–3838, related to mining claims recording and maintenance. Any statutory amendments should be explicitly prospective and preserve all valid existing rights, recorded claims, and ongoing operations under the current Mining Law to avoid retroactive impacts on project viability or investment certainty.

### **4.3. Address Recovery of Critical Minerals from Mine Waste**

**Recommendation:** Clarify regulatory treatment of critical minerals recovery from existing mine waste, tailings, and abandoned mine lands to facilitate development of these resources.

**Justification:** Billions of tons of mine tailings containing significant quantities of critical minerals exist in known locations across the United States. Further, the environmental benefits of remediation through recovery are substantial and measurable [INL-MineTailings]. Secretarial Order 3436 directed the Department of the Interior to facilitate recovery of critical minerals from mine waste [SO-3436]. These sources offer faster development timelines, potential environmental co-benefits through site cleanup, and utilization of existing infrastructure. GAO has identified liability concerns, economic uncertainty, and regulatory complexity as key barriers [GAO-24-106395].

The Good Samaritan Remediation of Abandoned Hardrock Mines Act of 2024 (Pub. L. 118–155, signed December 17, 2024) established a pilot program allowing the EPA to issue up to 15 permits for cleanup projects with liability protection under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Clean Water Act. While an important step, this pilot program is limited in scope and does not address critical minerals recovery operations that generate

revenue beyond remediation costs. Broader protections for commercial recovery operations are still needed.

**Proposed Actions:**

- Extend liability protections beyond the Good Samaritan pilot program to cover commercial critical minerals recovery operations
- Clarify that critical mineral extraction from coal waste is excluded from Title V Surface Mining Control and Reclamation Act of 1977 (SMCRA) permitting, where appropriate [SMCRA-1977]
- Create financial incentives and liability protections for combining critical minerals recovery with reclamation
- Fund characterization studies to identify high-potential recovery sites
- Fund and accelerate the USGS National Mine Waste Inventory and associated federal/state/university partnerships that are evaluating the potential for recovery from mine waste
- Fund complementary investments and field demonstrations in exploration and reprocessing technology appropriate to mine waste.
- Streamline permits for processing facilities using waste feedstocks

**Implementation:** [Moderate Complexity] Agency action per Secretarial Order 3436 [SO-3436]; legislative expansion of the Good Samaritan framework beneficial. SMCRA clarifications would amend 30 U.S.C. § 1251 et seq.

#### **4.4. Improve the Analytical and Legal Framework for Large Withdrawals and Monument Designations Affecting Critical Mineral Access**

**Recommendation:** Congress should require that, before future large withdrawals from mineral entry or major monument designations affecting federal lands with known or inferred critical mineral potential, the Department of the Interior—supported by USGS, DOE, Department of Defense (DOD), and in consultation with affected Tribal Nations—prepare a public mineral resource and national security assessment. Congress should also require periodic reporting on existing withdrawn acreage with material critical mineral implications, clear implementation plans for valid existing rights, and legislative clarification of the legal framework governing modification of monument designations.

**Justification:** Large federal land withdrawals and monument proclamations can materially affect future mineral access, but their legal effects vary and should not be treated as interchangeable [CRS-R44886]. Secretarial withdrawals under FLPMA may be time-limited and may leave lands open to other public land laws depending on the order. For example, Public Land Order No. 7787 withdrew approximately 1,006,545 acres in the Grand Canyon watershed from location and entry under the Mining Law for 20 years, subject to valid existing rights, while leaving the lands open to mineral leasing, geothermal leasing, mineral materials, and other public land laws [PLO-7787]. By contrast, the 2023 Baaj Nwaavjo proclamation withdrew federal lands within the monument from mining entry and from mineral and geothermal leasing, also subject to valid existing rights [BaajNwaavjo-2023].

BLM’s interim management guidance confirms the practical effect of that distinction. No new mining claims may be located within the monument, and no new mineral or geothermal leases may be issued. Claims located before the withdrawal may proceed only if BLM determines that valid existing rights exist, and any such activity must be managed to mitigate impacts to monument objects [BLM-BaajNwaavjo-2024]. This is a significant future-access constraint, but it is not legally identical to extinguishing all preexisting rights.

The Grand Canyon region is the strongest current example of a monument or withdrawal with a direct critical minerals nexus because uranium was added to the final 2025 U.S. critical minerals list [USGS-CritMin-2025]. At the same time, policymakers will evaluate mineral-access concerns alongside other interests recognized in current law and policy, including Tribal cultural landscapes, sacred sites, water resources, and co-stewardship commitments. The Baaj Nwaavjo proclamation establishes a commission and directs the Secretaries to explore co-stewardship with Tribal Nations; the restored Bears Ears proclamation similarly reestablishes the Bears Ears Commission [BaajNwaavjo-2023; BearsEars-2021].

The legal durability of monument withdrawals is also less settled than the current draft suggests. FLPMA bars the Secretary of the Interior from modifying or revoking withdrawals creating national monuments [FLPMA-1714]. However, the Department of Justice's (DOJ) Office of Legal Counsel (OLC) concluded on May 27, 2025, that a President may alter or eliminate a prior monument designation under the Antiquities Act [CRS-R44687], reversing the executive branch's older 1938 position [DOJ-OLC-Monuments-2025]. Given that tension, it is more accurate to describe monument durability as legally contested rather than permanent.

For purposes of critical minerals policy, the better reform is prospective and process-oriented rather than a broad call to reopen existing monuments. Congress could require Department of the Interior (DOI) and USGS to report on acreage withdrawn from mineral entry, identify withdrawn areas with known or inferred critical mineral potential, require a valid existing rights implementation plan for future large withdrawals, and ensure that future monument designations and secretarial withdrawals explicitly analyze mineral supply and national security implications alongside Tribal, cultural, environmental, recreational, and water resource interests.

#### **Key Issues for Congressional Consideration:**

- Assess whether future large withdrawals require a pre-decisional mineral resource and national security assessment
- Consider if agencies should be required to distinguish between locatable minerals, leasable minerals, and other land use effects
- Determine whether agencies should publish valid existing rights implementation plans, including claim examination procedures, mitigation standards, and timelines
- Evaluate whether Congress should require periodic reporting on acreage withdrawn from mineral entry and associated critical mineral implications
- Clarify if the legal framework governing presidential modification or revocation of monument designations should be addressed legislatively rather than left to disputed executive branch interpretations and future litigation

**Implementation:** [High Complexity] Requires legislative action to amend the Antiquities Act (54 U.S.C. § 320301 et seq.) and/or FLPMA (43 U.S.C. § 1714), or to enact a separate withdrawal review and reporting statute. Because these issues involve competing interests including Tribal sovereignty, cultural resource protection, water resources, recreation, conservation, and mineral security, Congress is the most durable venue for setting prospective rules and reporting requirements.

## 5. REFORMS TO IMPROVE INTERAGENCY COORDINATION

### 5.1. Require Concurrent Agency Reviews

**Recommendation:** Mandate concurrent rather than sequential processing of federal permits and authorizations for critical mineral projects.

**Justification:** Mining projects typically require authorizations from BLM or Forest Service, Army Corps of Engineers, EPA, Fish and Wildlife Service, State Historic Preservation Office, and state agencies. When these processes run sequentially, total timelines extend far beyond what any individual review requires. The GAO found that ineffective coordination alone can add up to 3 years to energy-related infrastructure projects [GAO-Permitting]. Australia's efficient system features concurrent processing of state and federal responsibilities.

**Proposed Actions:**

- Lead agency establishes integrated permitting schedules at project initiation
- All cooperating agencies begin reviews upon project application
- Information requests are coordinated to avoid duplicative data collection
- Regular coordination meetings track progress and resolve issues
- FAST-41 timetables reflect concurrent processing as default

To improve applicant planning and reduce procedural uncertainty, agencies should develop a publicly accessible permitting timeline simulation tool that allows project proponents and other stakeholders to model expected permitting sequences, milestone dates, and potential bottlenecks based on project type, location, and applicable statutory requirements. This tool would complement the FAST-41 permitting dashboard by providing prospective guidance rather than only retrospective tracking, enabling developers to identify coordination needs and resource requirements before application submission.

**Implementation:** [Low Complexity] Executive direction and agency practice changes. Could be formalized through amendment to 42 U.S.C. § 4336a(a), lead and cooperating agency provisions, or through interagency MOUs. The FAST-41 framework (42 U.S.C. § 4370m et seq.) already provides a structure for concurrent review that could be mandated for all critical minerals projects.

### 5.2. Establish Lead Agency Authority with Dispute Resolution

**Recommendation:** Provide clear lead agency authority to establish schedules, resolve interagency disagreements, and ensure timely permitting decisions.

**Justification:** Interagency disagreements can stall decisions indefinitely. Agencies may have different risk tolerances, policy priorities, or interpretations of requirements. Current mechanisms, including FAST-41, provide coordination but limited enforcement authority.

**Proposed Authority:**

- Designate lead agencies and define cooperating agency roles
- Establish binding schedules with enforceable milestones
- Resolve technical and policy disputes between agencies with finality
- Require timely responses to information requests
- Elevate unresolved issues to National Energy Dominance Council
- Report to Congress on agency compliance

**Implementation:** [Moderate Complexity] Executive direction under existing NEPA authority at 42 U.S.C. § 4336a(a)(5), Council on Environmental Quality designation of lead agency; legislative authority beneficial to strengthen enforcement. New legislation could establish binding dispute resolution authority similar to the Federal Permitting Improvement Steering Council’s role under 42 U.S.C. § 4370m-1.

### **5.3. Improve Tribal Consultation While Maintaining Project Certainty**

**Recommendation:** Develop best practices for tribal consultation that ensure meaningful engagement while providing schedule certainty for project development.

**Justification:** Tribal consultation is required by multiple authorities, including National Historic Preservation Act, Section 106, NEPA, and Executive Order 13175. Effective consultation identifies cultural resources early, incorporates tribal knowledge, and builds relationships that reduce conflict. However, consultation can become a source of delay when initiated late, timelines are open-ended, multiple agencies conduct separate consultations, or resource constraints limit tribal capacity.

**Best Practices:**

- Early initiation before or concurrent with NEPA scoping
- Single lead agency for government-to-government consultation
- Defined schedules with flexibility for complex issues
- Capacity support, including funding for technical review and travel
- Programmatic agreements for areas with ongoing mineral activity
- Clear decision points and documentation of how tribal input influenced decisions

**Implementation:** [Low Complexity] Agency guidance and interagency coordination.

## 6. REFORMS TO BUILD PROCESSING AND REFINING CAPACITY

### 6.1. Create a Federal Critical Minerals Processing Initiative

**Recommendation:** Establish a coordinated federal initiative to build domestic critical minerals refining and processing capacity, addressing the most critical supply chain vulnerability.

**Justification:** While policy attention focuses on mining, the most critical U.S. vulnerability is near-complete absence of domestic processing capacity. The average market share of the top three refining nations for key energy minerals rose to 86% in 2024, with almost all supply growth coming from China for cobalt, graphite, and rare earths [IEA-2025]. Even domestically mined materials typically require foreign processing. The Bipartisan Policy Center’s analysis of investment challenges for processing projects identifies “midstream processing” as “a vital link in the value chain for critical minerals, because this is the step that adds significant value to the raw materials by enhancing their purity, functionality, and suitability for use in advanced technologies” [BPC-Midstream-2024]. Building domestic capacity faces challenges, including capital intensity, technology gaps, economic uncertainty from Chinese state-subsidized competition, permitting barriers, and workforce shortages [CSIS-CritMin-2025].

The processing initiative should also incorporate incentives for secondary metal production, including recovery of critical minerals from end-of-life electronics and spent battery systems. These secondary sources represent a growing domestic feedstock that can complement primary production, reduce import dependence, and accelerate circular economy pathways.

#### Initiative Components:

- Strategic planning identifying priority minerals, technologies, and optimal locations
- Financial support through DPA Title III loan guarantees, tax credits, and offtake agreements
- Regulatory streamlining for processing facilities
- Technology development for advanced separation and refining, supported by funding for research and development and activities to accelerate commercialization
- Workforce development for metallurgy and materials processing
- Assessment of opportunities to collocate processing facilities with or near military installations, where appropriate, to leverage existing infrastructure and support workforce development pathways for transitioning service members into critical minerals and materials-processing careers

**Implementation:** [High Complexity] Requires legislative authorization and appropriations.

### 6.2. Establish a Critical Minerals Processing Pilot Program

**Recommendation:** DOE should establish a Critical Minerals Processing Pilot Program, modeled on the Reactor Pilot Program and Fuel Line Pilot Program, to expedite demonstration of domestic rare earths and critical minerals processing technologies, and to provide authorities and flexibilities that extend beyond those currently available under DOE’s existing Minerals to Materials Supply Chain Research Facility (METALLIC) program [DOE-METALLIC] and the Critical Materials Innovation (CMI) Hub [DOE-CMI].

**Justification:** The United States once led the world in critical mineral processing, materials manufacturing, and nuclear fuel-cycle capabilities, but decades of economic, social, environmental, and policy factors contributed to a substantial decline in domestic capacity. For example, the United States previously produced all the uranium required to fuel its nuclear reactors—which supply roughly 20 percent of U.S. electricity—but now imports approximately 95 percent of its uranium needs. Reestablishing domestic processing, manufacturing, and fabrication infrastructure is therefore essential to

reducing dependence on foreign suppliers, strengthening supply-chain resilience, and ensuring that new facilities can qualify for the full set of incentives and authorities outlined in this report.

Executive Orders 14299 and 14301 established pilot programs with DOE authorizing nuclear reactor and fuel fabrication demonstrations outside NRC licensing, using streamlined NEPA review and other transaction agreements [EO-14299, EO-14301]. The Reactor Pilot Program aims to achieve criticality in at least three advanced reactors by July 4, 2026, with DOE using categorical exclusions and alternative NEPA procedures to expedite environmental review [DOE-ReactorPilot]. Similar authority could accelerate critical mineral processing demonstrations—the most critical supply chain gap.

DOE already funds critical mineral demonstration projects through the National Energy Technology Laboratory and the Rare Earth Elements Demonstration Facility program, authorized under Section 40205 of the Infrastructure Investment and Jobs Act, but these efforts rely on traditional grant mechanisms and full NEPA review. DOE has also launched the METALLIC program, which provides multi-laboratory testbeds and pilot-scale capabilities for validating critical-minerals and materials-processing technologies, as well as the CMI Hub, which advances early-stage research, separation science, and materials innovation across its national laboratory–university–industry consortium. However, neither METALLIC nor CMI includes the statutory or executive order-based flexibilities—such as streamlined NEPA pathways, special contracting authorities, or “under contract with and for the account of DOE” operational structures—that characterize DOE’s formal pilot programs. A dedicated pilot program authority would therefore provide the additional expedited pathways needed to demonstrate the commercial viability of domestic processing within competitive timeframes.

The Bipartisan Policy Center has proposed complementary mechanisms, including a “United States Reserve of Critical Mineral Commodities,” to deploy price support tools and provide greater certainty to domestic critical mineral processing investments [BPC-Reserve-2024]. Such market stabilization mechanisms could work alongside expedited demonstration programs to address both technology readiness and economic viability.

#### **Program Elements:**

- DOE authorization for processing demonstrations conducted “under contract with” DOE, similar to the Reactor Pilot Program structure
- Categorical exclusions or programmatic EAs for qualifying facilities meeting defined parameters
- Other transaction agreements providing flexibility and intellectual property protection
- Priority for rare earth separation and refining, battery materials processing, and TENORM-bearing feedstocks
- Colocation opportunities at DOE sites or national laboratories with existing infrastructure and NEPA coverage
- Explicit coordination with the METALLIC program and CMI to ensure complementary roles—METALLIC providing technical validation and pilot-scale testbed capability, CMI contributing early-stage research and materials innovation expertise, and the pilot program providing the regulatory and contracting flexibilities needed for accelerated demonstration
- Incentivize partnerships among national laboratories, industry, and research institutions to conduct research and development on new processing capabilities with an emphasis on reducing toxicity and scaling processing
- Goal of demonstrating commercial viability for 3–5 processing technologies within 3 years

**Implementation:** [Moderate Complexity] Executive action under existing DOE authority; legislative confirmation beneficial to clarify scope and provide appropriations. Statutory alignment with METALLIC and CMI is recommended to ensure clear division of roles and avoid duplication.

### 6.3. Streamline Permitting for Processing Facilities

**Recommendation:** Apply expedited permitting procedures to critical mineral processing and refining facilities, recognizing their essential role in supply chain security.

**Justification:** Processing facilities face significant permitting challenges, including Clean Air Act (CAA) permits (more than 18 months for major sources), Clean Water Act permits, Resource Conservation and Recovery Act permits, state environmental permits, and local approvals.

**Proposed Actions:**

- FAST-41 coverage for facilities that meet investment thresholds
- Categorical exclusions for facilities that use proven technologies with defined emission limits
- Coordinated federal and state permitting through programmatic agreements
- Pre-approved designs that streamline facility-specific review
- Accelerated CAA permit processing for national security projects
- Coordination with the Bureau of Land Management to identify suitable federal lands for siting critical mineral processing facilities, enabling efficient land-use planning and early-stage project screening

**Implementation:** [Moderate Complexity] Agency action and potential legislative direction.

### 6.4. Incentivize Recovery from Nontraditional Sources

**Recommendation:** Expand financial incentives and regulatory streamlining for recovery of critical minerals from mine waste, coal ash, acid mine drainage, geothermal brines, and other nontraditional sources.

**Justification:** GAO and DOE have identified significant potential for critical minerals recovery from nontraditional sources, including mine waste and tailings, coal and coal processing waste, acid mine drainage, geothermal brines, and produced waters from oil and gas operations [GAO-24-106395; INL-MineTailings]. Recovery operations could provide minerals while remediating environmental contamination. Current barriers include liability risk, economic uncertainty, regulatory complexity, and technology readiness.

The Good Samaritan Remediation of Abandoned Hardrock Mines Act of 2024 addresses liability for nonprofit cleanup efforts but does not cover commercial recovery operations. The Act's pilot program is limited to 15 permits over 7 years and requires that revenue from reprocessing be dedicated to cleanup activities [GoodSam-2024].

**Proposed Actions:**

- Extend liability protections to commercial critical minerals recovery operations
- Extend Section 45X tax credits to minerals recovered from secondary sources
- SMCRA exemptions for critical mineral recovery from coal waste
- Fund technology development and demonstration, including collaborative research and development efforts
- Streamline permits for processing facilities using waste feedstocks
- Provide grants for site characterization
- Fund and accelerate mine waste site characterization science and recovery potential assessments and associated federal/state/university partnerships to improve characterization of nontraditional sources

- Fund complementary investments and field demonstration projects in exploration, recovery potential, and reprocessing technologies for nontraditional sources of critical minerals

**Implementation:** [Moderate Complexity] Legislative change for financial incentives; agency action for regulatory streamlining.

## 6.5. Address Radioactive Materials Barriers to Processing

Many critical mineral deposits—particularly rare earth elements—naturally occur with uranium and thorium. When these minerals are processed, radioactive constituents concentrate in waste streams classified as Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM). The cost of handling, permitting, and disposing of this material is a primary impediment to domestic rare earth processing and a direct contributor to the near-absence of viable U.S. refining capacity. The U.S. regulatory framework for NORM/TENORM is fragmented across EPA, NRC, DOE, Occupational Safety and Health Administration (OSHA), Mine Safety and Health Administration (MSHA), and approximately 30 state programs, producing inconsistent standards, duplicative compliance obligations, and significant investment uncertainty. For detailed regulatory background, see INL/RPT-25-85463 [INL-RadProtection].

### 6.5.1. Reform Radiation Dose Limits for NORM/TENORM Operations

**Recommendation:** NRC, EPA, and DOE should revise radiation protection standards applicable to NORM/TENORM operations to align with current scientific evidence, and Congress should direct interagency harmonization of applicable standards across EPA, NRC, DOE, OSHA, and MSHA.

**Justification:** EPA's pathway-specific public dose limits under 40 CFR Parts 190 and 192—currently 10–25 mrem/year on key exposure pathways—are the binding economic constraint on domestic rare earth processing. These limits represent a small fraction of average U.S. background exposure (~310 mrem/year) and fall well below any dose level at which epidemiological studies have detected adverse health outcomes [HPS-Position; INL-RadProtection]. The current multi-agency framework was established decades ago and has not been updated to reflect the current scientific literature. Persistent jurisdictional fragmentation, in which the same material may face materially different dose limits depending solely on facility type or regulatory classification, imposes cost without improving safety outcomes.

#### Proposed Reforms:

- Revise EPA pathway-specific public dose limits under 40 CFR Parts 190 and 192 to reflect appropriate fractions of a harmonized 500 mrem/year all-pathways total public dose limit
- Revise the NRC general public dose limit (10 CFR Part 20) from 100 mrem/year to 500 mrem/year, consistent with the EPA framework revision
- Establish a *de minimis* occupational dose threshold of 500 mrem/year, below which As Low As Reasonably Achievable (ALARA) optimization requirements do not apply, while retaining the 5,000 mrem/year occupational whole-body dose limit
- Direct DOE to harmonize 10 CFR Part 835 and DOE O 458.1 TENORM provisions with revised NRC and EPA standards [DOE-O458.1]
- Direct EPA, NRC, DOE, OSHA, and MSHA to harmonize applicable radiation standards across all agency frameworks governing NORM/TENORM operations

An accelerated pathway available to the Administration is issuance of a new Presidential Federal Guidance Document on radiation protection, which could establish binding policy direction for agency rulemaking without awaiting each agency's independent rulemaking cycle.

**Implementation:** [Moderate Complexity] Agency rulemaking under existing authority (Atomic Energy Act; Clean Air Act; Safe Drinking Water Act). Presidential Federal Guidance Document as an accelerated interim vehicle. Congressional direction mandating rulemaking timelines and interagency harmonization would accelerate implementation and provide policy durability. [Low Complexity] DOE O 458.1 revision through internal directive. Consistent with Executive Order 14300.

### **6.5.2. Establish Federal NORM/TENORM Standards for Critical Minerals Processing**

**Recommendation:** Congress should direct EPA, in coordination with NRC, DOE, and MSHA, to promulgate uniform federal standards for TENORM management in critical mineral processing operations.

**Justification:** No comprehensive federal NORM statute exists. A prospective rare earth processor must navigate up to 50 different state regulatory regimes with inconsistent applicability thresholds, dose limits, and waste management requirements—a structural investment deterrent that foreign competitors face nowhere. An additional statutory ambiguity compounds this problem: rare earth processing waste streams containing incidental uranium and thorium concentrations occupy a regulatory gray zone under Atomic Energy Act (AEA) Section 11e.(2) that cannot be resolved through rulemaking alone and requires legislative clarification. A federal floor eliminates the state patchwork, resolves the AEA classification ambiguity, and reduces investor uncertainty.

#### **Proposed Legislative Elements:**

- A statutory definition of TENORM applicable to critical minerals processing, distinguishing it from NRC-regulated source material and byproduct material
- Explicit legislative resolution of the AEA Section 11e.(2) classification boundary for rare earth processing waste streams
- A directive to EPA to promulgate federal TENORM standards within a specified timeframe, with mandatory NRC, MSHA, and DOE coordination
- A state authorization framework analogous to the Resource Conservation and Recovery Act (RCRA) model, preserving state flexibility above a uniform federal floor

**Implementation:** [High Complexity] Requires new authorizing legislation; partial harmonization achievable through coordinated EPA/NRC rulemaking pending legislation.

### **6.5.3. Modernize NRC Exemption Thresholds for Rare Earth Processing**

**Recommendation:** NRC should update 10 CFR Part 40 exemptions to reflect the actual radiological risk profile of rare earth processing operations, applying exemption thresholds throughout the processing chain rather than solely to finished commercial products.

**Justification:** Under 10 CFR 40.13(c)(1)(vi), rare earth compounds containing not more than 0.25% by weight thorium or uranium are exempt from NRC licensing—but this exemption does not apply to incoming ore or intermediate waste streams. Full NRC licensing obligations are thereby imposed on facilities handling material that is chemically and radiologically identical to an exempt finished product. This distinction is one of commercial classification, not radiological risk, and places domestic processors at a structural disadvantage relative to foreign competitors.

**Proposed Reforms:** Clarify that the 0.25% exemption threshold applies throughout processing where engineering controls maintain radiological equivalence to the exempt finished product; establish streamlined licensing for facilities maintaining concentrations below specified thresholds; and create categorical exclusions for operations implementing approved best management practices.

**Implementation:** [Low Complexity] NRC rulemaking under existing Atomic Energy Act authority; no new legislation required.

#### **6.5.4. Designate Permitted TENORM Disposal Capacity as Critical Infrastructure**

**Recommendation:** DOE, in coordination with EPA and affected states, should inventory licensed TENORM disposal capacity, designate it as critical infrastructure, and develop regionally distributed disposal capacity adequate to support domestic critical mineral processing expansion.

**Justification:** Licensed commercial TENORM disposal capacity in the United States is limited to four facilities, geographically concentrated in Washington, Utah, and Texas. This distribution is mismatched with prospective rare earth processing regions in the Southeast, Southwest, and Mountain West. Processors lacking proximate licensed disposal must transport TENORM waste across state lines under Department of Transportation (DOT) Hazardous Materials Regulations (49 CFR Parts 171–180), adding cost and regulatory complexity that compounds the disposal capacity problem. Without adequate, regionally distributed disposal capacity, permitting streamlining and financial incentives elsewhere in this report cannot achieve their intended effect.

##### **Proposed Actions:**

- Conduct a national inventory of licensed TENORM disposal facilities documenting remaining capacity, accepted waste stream types, and geographic distribution relative to prospective processing locations
- Provide federal support for states to establish regional disposal facilities meeting uniform federal standards
- Pursue legislative CERCLA liability protections for commercial TENORM disposal facility development
- Streamline NEPA review for disposal facility expansions at existing licensed sites

**Implementation:** [Moderate Complexity] Core inventory and coordination actions achievable through existing DOE and EPA authority; legislative action required for CERCLA liability protections and formal critical infrastructure designation.

#### **6.5.5. Improve Risk Communication Regarding Radiation in Critical Minerals**

**Recommendation:** Federal agencies should implement coordinated risk communication strategies that accurately convey the scientific evidence on low-dose radiation risk in the context of critical mineral processing and disposal facilities.

**Justification:** NORM and TENORM are naturally occurring constituents of the Earth's crust present in soil, groundwater, building materials, and the human body. Public opposition to processing and disposal facility siting has been driven by risk perceptions that mischaracterize the nature of these materials and are inconsistent with current epidemiological evidence. Regulatory reforms in Sections 6.5.1 through 6.5.4 will have limited practical effect if inaccurate risk perceptions continue to obstruct facility siting. Accurate risk communication is an operational requirement for expanding domestic processing capacity.

##### **Communication Priorities:**

- Anchor agency communication in the naturally occurring, geologically ubiquitous nature of NORM and TENORM
- Place radiation exposures from processing and disposal operations in the context of natural background radiation and comparable occupational exposures in aviation and medical sectors

- Establish interagency coordination on radiation risk messaging across EPA, NRC, DOE, and MSHA to eliminate contradictory public signals
- Integrate accurate low-dose radiation science into workforce recruitment materials

**Implementation:** [Low Complexity] Achievable through agency guidance, public education materials, and interagency coordination under existing authority; no rulemaking or legislation required.

## 7. REFORMS TO DEVELOP WORKFORCE AND FINANCIAL INCENTIVES

### 7.1. Expand Workforce Development Programs

**Recommendation:** Significantly expand education and training programs for economic geology, mining, mineral processing, extractive metallurgy, and materials science to address critical workforce shortages.

**Justification:** Mining engineering graduates declined 39% between 2016 and 2022, with only 327 degrees awarded in mining and mineral engineering in 2020 [CSIS-Workforce]. University programs declined from 25 in 1982 to 15 in 2023 [CSIS-Workforce]. More than half of the current domestic mining workforce (approximately 221,000 workers) will retire by 2029 [SME-Workforce]. By comparison, China has over 44 mining engineering programs graduating thousands of students annually [CSIS-Workforce]. Congress has already recognized these gaps: the Energy Act of 2020 [EA-2020] directed the U.S. Geological Survey to strengthen university applied geoscience programs through a dedicated grant program and directed the DOE to expand support for technology development, materials engineering, and related academic capabilities. Building on these statutory provisions, additional investment and expansion are required to meet the scale of workforce need in critical minerals supply chains.

**Program Elements:**

- Expanded funding for geology, mining engineering, metallurgy, materials science, supply chain economics, and logistics programs
- Federal scholarships and loan forgiveness for students in critical mineral fields
- Community college and vocational training partnerships
- Apprenticeship program expansion
- Reskilling and retraining pathways for workers transitioning from other commodity sectors — including thermal coal, oil and gas, and heavy manufacturing — into critical minerals roles at any career stage, facilitating interdisciplinary knowledge transfer into the sector
- K-12 integration of critical minerals concepts into science, technology, engineering, and mathematics (STEM) curricula
- Immigration pathways, including national interest waivers for specialized engineers and scientists

**Implementation:** [High Complexity] Requires legislative action, policy changes, and appropriations.

### 7.2. Maintain and Enhance Tax Incentives for Domestic Production

**Recommendation:** Preserve the Section 45X advanced manufacturing production credit for critical minerals and reconsider the phasedown schedule enacted in the OBBBA [One-Big-Beautiful-Bill-Act].

**Justification:** The Section 45X credit (10% for domestic extraction, processing, and recycling of critical minerals) has attracted private investment. Treasury’s final 45X rule (November 2024) expanded eligibility to include mining costs, addressing earlier concerns that the credit excluded extraction activities. However, the OBBBA modified Section 45X to phase down credits to 7.5% in 2031, 5% in 2032, 2.5% in 2033, and full elimination thereafter—undermining this improvement [One-Big-Beautiful-Bill-Act]. Mining projects have greater than 20-year life cycles, requiring long-term policy certainty.

**Proposed Actions:**

- Reconsider or delay the 45X phasedown for critical minerals
- At minimum, extend the credit period through 2040

- Maintain percentage depletion deduction for mining operations
- Preserve bonus depreciation and Section 179 expenses for mining equipment
- Consider enhanced credits for processing facilities

Consider establishing a transferable tax incentive mechanism for investors in early-stage, pre-revenue critical mineral activities, including greenfield exploration, mineral technology development, and unconventional processing methods. Canada's flow-through share financing model provides a relevant template: it allows junior resource companies to raise equity capital by transferring exploration and development expenses to investors, who may then deduct those expenses on their own tax returns, effectively directing private capital into high-risk early-stage projects that would not otherwise attract institutional investment [PDAC-FlowThrough]. Canada's companion Critical Mineral Exploration Tax Credit (CMETC) provides an additional 30% tax credit for eligible exploration expenditures on designated critical minerals [NRCan-MiningTax-2025]. A similar U.S. mechanism could enlarge the pool of available investors in exploration and tailings assessment projects, filling a capital formation gap that the Section 45X production credit (which requires operational revenue) cannot address.

**Implementation:** [High Complexity] Legislative action to modify phasedown schedule.

### 7.3. Expand Defense Production Act and Development Finance Corporation Authorities

**Recommendation:** Fully utilize and expand DPA and Development Finance Corporation (DFC) authorities to support domestic and allied critical-mineral projects.

**Justification:** Executive Order 14241 invoked DPA authorities, including Title III loans, loan guarantees, and direct investments; defense priority ratings; Industrial Base Fund designation; and DFC authority for domestic mineral projects. These powerful tools should be fully implemented. Securing America's Future Energy's (SAFE's) Center for Critical Minerals Strategy has examined how "the United States can work with major allies... to generate new, globally distributed critical mineral supply chains that are not dependent on the Chinese Communist Party" [SAFE-RaceToTop-2023]. Allied coordination through mechanisms like the Minerals Security Partnership (MSP) complements domestic production initiatives.

**Priority Actions:**

- Accelerate DOD Industrial Base Analysis and Sustainment Program support
- Expand National Defense Stockpile acquisitions
- Increase direct investment in processing technology and domestic production capacity
- Use offtake agreements to provide demand certainty
- Prioritize critical minerals in DFC investment portfolio
- Support projects in allied nations diversifying supply from China
- Strengthen MSP coordination with allies
- Create an International Technology Security and Innovation (ITSI) Fund for critical minerals to align trade policy and incentives while also supporting workforce development within allies/partner countries

**Implementation:** [Low Complexity] Agency action within existing authorities; potential legislative expansion.

## 8. IMPLEMENTATION SUMMARY

The following three tables present a consolidated ranking of all 27 recommendations contained in this report, evaluated according to **implementation complexity** and expected **timeline** to the full effect. These rankings are intended to assist policymakers in prioritizing actions based on feasibility, sequencing, and contribution to national critical mineral security.

**Implementation complexity** reflects the level of institutional effort, statutory authority, and procedural complexity required to implement each recommendation:

- **Low** — Implementable through agency action, guidance, or executive direction without rulemaking or legislation; generally achievable within 6–12 months.
- **Moderate** — Requires agency rulemaking, interagency coordination, or executive action supported by Congressional oversight or clarification; typically achievable within 12–30 months.
- **High** — Requires new legislation, appropriations, or resolution of contested legal authority; implementation may require years.

**Timeline** reflects the expected period from enactment to full operational impact.

Together, these rankings provide an integrated framework for sequencing reforms in a manner that maximizes strategic benefit while aligning with institutional capacity and policy windows.

**Table 1.** Low implementation complexity with high return on investment. Agency action only. No legislation. Generally achievable within 6–12 months, with 18 months as the maximum anticipated timeline.

Section	Recommendation	Action Required	Why High Impact	Est. Timeline
2.3	Expand FAST-41 auto-coverage	Permitting Council rulemaking under 42 U.S.C. § 4370m-1	Immediately improves transparency and accountability for all projects over \$25M threshold	6–12 months
3.2	Categorical exclusions for exploration	BLM/Forest Service amend NEPA procedures (43 CFR Part 46; 36 CFR Part 220)	Immediately removes 6–18 months from early-stage project timelines; affects every project in the pipeline	6–9 months
3.4	Expand sponsor prepared environmental documents	BLM/Forest Service update NEPA handbooks— authority already exists at 42 U.S.C. § 4336a(f)	Shifts document preparation burden to applicants with more expertise; no cost to agency	3–6 months
3.5	Maximize use of existing environmental analyses	Agency guidance on tiering and adoption—42 U.S.C. § 4336b already authorizes	Eliminates duplicative analysis that is the single largest source of EIS bloat	3–6 months
5.1	Require concurrent agency reviews	Executive direction + interagency MOUs; FAST-41 framework already provides structure	GAO estimates sequential review adds 3 years alone— concurrent review recoverable immediately	6–12 months
5.3	Improve tribal consultation best practices	Agency guidance and Bureau of Indian Affairs coordination	Structures consultation to reduce litigation exposure on every high priority project	6–12 months
6.5.3	Modernize NRC exemption thresholds (0.25% rule)	NRC rulemaking under existing authority—10 CFR Part 40	Single most targeted action to reduce TENORM regulatory burden on rare earth processing	12–18 months

Section	Recommendation	Action Required	Why High Impact	Est. Timeline
6.5.5	Improve radiation risk communication	Agency action—no statutory change needed	Reduces public opposition to processing facility siting at essentially zero cost	3–6 months
7.3	Utilize existing DPA/DFC authorities	Agency action within existing statutory authority	DPA Title III and DFC authorities already exist—full utilization requires only prioritization decisions	3–6 months

**Table 2.** Moderate implementation complexity with high return on investment. Rulemaking or coordinated executive action required; Congressional support beneficial but not essential. Generally executable within 12–30 months.

Section	Recommendation	Action Required	Why High Impact	Blocking Factor
3.1	Programmatic environmental reviews	BLM/Forest Service initiate programmatic EIS for key regions (Nevada lithium, Wyoming REE, Arizona copper)	Creates tiering foundation that reduces every subsequent project-specific NEPA by 40–60%	Agency capacity and funding to complete programmatic EIS
3.3	Enforce NEPA page/time limits	Council on Environmental Quality (CEQ) strengthened guidance + agency compliance tracking; amend 42 U.S.C. § 4336a(g) for reporting	Existing law already sets limits—enforcement alone would capture significant time savings	Political will to impose consequences on agencies missing deadlines
4.3	Mine waste recovery regulatory clarity	Secretarial Order 3436 already directs Interior; Bureau of Indian Affairs (BIA)/BLM guidance [SO-3436]	Fastest mineral supply pathway with environmental co-benefits—but liability uncertainty suppresses investment	Commercial operations need legislative liability protection beyond Good Samaritan pilot
5.2	Lead-agency authority with dispute resolution	Executive direction under 42 U.S.C. § 4336a(a)(5); National Energy Dominance Council (NEDC) operationalized as enforcement body	Eliminates the indefinite stalling that interagency disagreement currently enables	NEDC needs dedicated staff and operational budget
6.2	Critical minerals processing pilot program	DOE action under existing authority modeled on Reactor Pilot Program (EO 14299/14301)	Demonstrates commercial processing viability within 3 years—fastest path to processing capacity	DOE appropriations and site selection; NEPA categorical exclusions needed
6.3	Streamline processing facility permitting	FAST-41 coverage expansion + CAA permit acceleration + programmatic federal-state agreements	Processing permitting is the second biggest barrier after mining permitting	State coordination complexity; CAA acceleration requires EPA action
6.4	Incentivize nontraditional source recovery	Partial agency action (SMCRA clarification); 45X credit extension by Treasury rule	Mine waste and coal ash recovery fastest-to-production pathway—no new mine permitting required	Full liability protection requires legislation; 45X extension requires coordinated executive action

<b>Section</b>	<b>Recommendation</b>	<b>Action Required</b>	<b>Why High Impact</b>	<b>Blocking Factor</b>
6.5.1	Reform radiation dose limits for NORM/TENORM operations	EPA revise 40 CFR Parts 190/192; NRC revise 10 CFR Part 20; DOE harmonize 10 CFR Part 835/DOE O 458.1; issue Presidential Federal Guidance to accelerate interagency rulemaking and harmonization	Aligns standards with current evidence, removes binding economic constraints on domestic REE processing, and reduces multi-agency inconsistency	Interagency coordination and rulemaking capacity; stakeholder debate on dose level changes
6.5.4	TENORM disposal capacity as critical infrastructure	DOE/state coordination; NEPA streamlining for expansions	Disposal pathway bottleneck blocks processing expansion regardless of all other reforms	State siting politics; requires federal financial support

**Table 3.** High implementation complexity with highest strategic return and long-term payoff. Requires legislation, appropriations, or resolution of contested legal questions. Generally executable within 2–6 years.

<b>Section</b>	<b>Recommendation</b>	<b>Legislative Vehicle</b>	<b>Why Worth the Lift</b>	<b>Key Political Dynamic</b>
2.1	Binding permitting timelines with enforcement	New section to NEPA (42 U.S.C. § 4336a) or FLPMA; modeled on ADVANCE Act structure	Without enforcement, all other timeline reforms remain aspirational—this is the structural fix	Bipartisan support exists (ADVANCE Act passed 88-2); industry and some environmental groups both want predictability
2.2	Federal permitting office for critical minerals	Amend FLPMA or standalone legislation modeled on FAST Act; needs enforcement authority over agencies	Permanent institutional home for permitting expertise survives administrations; Canada/Australia models demonstrate effectiveness	Agency turf battles; Office of Management and Budget (OMB) scoring of staffing costs; must avoid becoming another coordination layer without authority
4.1	Clarify mine waste/tailings under 1872 Law	Amend 30 U.S.C. §§ 26 and 42; or agency rulemaking if Rosemont decision interpreted narrowly	Rosemont uncertainty clouds every large mining project involving waste disposal on federal land	Ninth Circuit litigation pending; legislative fix must be carefully drafted to withstand legal challenge
4.2	Streamline mining-claims process	Amend 30 U.S.C. §§ 28 and 42; agency rulemaking 43 CFR Parts 3830–3838	Fully electronic system and revised maintenance requirements reduce friction for junior miners and explorers	Industry split on mill site limitation revision; royalty question politically adjacent
4.4	Prospective mineral security analysis and reporting for major withdrawals and monument designations	Amend the Amend Antiquities Act (54 U.S.C. § 320301) and/or FLPMA (43 U.S.C. § 1714), or enact a standalone withdrawal review/reporting statute	Improves decision quality and legal predictability without forcing Congress into case-by-case boundary fights; surfaces critical mineral implications, valid existing rights treatment, and mitigation options before future access is restricted	Still politically sensitive because Tribal, conservation, and local land use interests are central, but materially more defensible than a general call to reopen monuments because it focuses on prospective analysis, reporting, and legal clarity rather than rollback of specific designations
6.1	Federal critical minerals processing initiative	Standalone legislation with DOE authority and appropriations; DPA Title III supplemental	Single highest impact action—processing is the actual strategic vulnerability; mining-only policy leaves supply chain incomplete	Requires appropriations; competes with other priorities; no existing authorizing structure
6.5.2	Federal NORM/TENORM standards (legislative mandate)	Pursue statutory authority to establish a uniform federal NORM/TENORM framework with clear preemption provisions	Eliminates the state patchwork that forces processing operators to navigate 50 different regulatory regimes	Preemption of state authority politically difficult; EPA/NRC jurisdictional overlap requires careful drafting

<b>Section</b>	<b>Recommendation</b>	<b>Legislative Vehicle</b>	<b>Why Worth the Lift</b>	<b>Key Political Dynamic</b>
7.1	Workforce development programs	Appropriations for university programs, scholarships, apprenticeships; immigration statute amendments for National Interest Waivers (NIWs)	Without engineers, earth scientists, and metallurgists, permitted projects cannot be built or operated—workforce is the physical constraint	Long lead time—degree programs take 4–6 years to produce graduates; needs sustained multiyear appropriations
7.2	Maintain/extend Section 45X credits	Amend OBBBA phasedown; extend through 2040 minimum [One-Big-Beautiful-Bill-Act]	45X is the primary financial incentive attracting private capital—phasedown to zero after 2033 does not support 20-year project economics	Scored as revenue loss by Congressional Budget Office; competes with deficit reduction priorities; energy tax credit politics contentious

## 9. CONCLUSION

The United States faces a strategic imperative to strengthen its domestic critical minerals supply chains in support of national defense, advanced manufacturing, energy security, and economic competitiveness. Despite substantial geological endowment, the nation's current regulatory, permitting, and processing frameworks have not kept pace with the growing demand for secure and reliable mineral inputs. Long and unpredictable permitting timelines, fragmented interagency coordination, outdated statutory authorities, limited domestic processing capacity, and sustained workforce shortages collectively hinder investment and delay deployment of essential mining and processing projects.

This report outlines 27 recommendations across six reform areas to address these systemic barriers: federal permitting reform, environmental review streamlining, mining law modernization, interagency coordination, processing and refining capacity development, and workforce and financial support. The proposed measures emphasize the need for enforceable permitting timelines, streamlined environmental review processes, modernization of the Mining Law of 1872, strengthened interagency coordination, expansion of domestic processing and refining capacity, science-based reform of radioactive materials management, and revitalization of the mining and mineral-processing workforce. Together, these reforms form an integrated approach to modernizing the U.S. regulatory environment while maintaining substantive environmental protections, meaningful tribal engagement, and long-term community trust.

The strategic rationale for action has been articulated across the national security and policy communities. As the Center for Strategic and International Studies has concluded, "safeguarding the minerals supply chains for advanced technologies in strategic industries is an economic and national security imperative" [CSIS-CritMin-2025]. This assessment underscores the central finding of this report: without fundamental reform, the United States will remain vulnerable to supply disruptions, foreign market manipulation, and loss of industrial competitiveness.

Implementation will require coordinated action across all branches of government. Nine recommendations require Congressional authorization, including binding permitting schedules, Mining Law updates, workforce expansion, and statutory reforms to radiation protection standards. The remaining recommendations can be advanced through agency rulemaking or administrative action, including programmatic environmental reviews, expanded use of categorical exclusions, improved interagency procedures, and enhanced use of existing authorities under FAST-41, the Defense Production Act, and relevant departmental statutes. Implementation complexity ratings accompanying each recommendation—summarized in the three tables in Section 8—provide policymakers with an integrated framework for sequencing these actions based on feasibility, timeline, and strategic return.

If fully implemented, these reforms would reduce permitting timelines, restore regulatory predictability, enhance U.S. competitiveness, and catalyze domestic investment in both mining and processing. Building robust processing and refining capacity is particularly critical because it represents the most significant structural gap in the current supply chain and determines whether upstream extraction can translate into usable materials for high-value manufacturing, defense systems, and energy technologies. Reforming outdated NORM and TENORM regulations is equally critical—science-based standards would eliminate a persistent barrier that today prevents economically viable processing of mineral concentrates with naturally occurring radioactive content.

The challenges facing U.S. critical mineral supply chains are longstanding, and many proposed reforms require sustained commitment across multiple administrations. Mining and processing facilities typically operate on multidecade timelines; durable policy frameworks, predictable regulatory processes, and stable financial incentives are essential to provide investment certainty. The United States possesses the mineral resources, technical capability, and industrial base required to achieve supply-chain resilience. Realizing this potential will depend on the timely modernization of regulatory and permitting systems and a coordinated national effort to rebuild domestic capacity across the full value chain.

This report provides a practical, implementation-focused pathway to achieving these goals. Through deliberate, coordinated adoption of the recommended reforms, the United States can reduce strategic vulnerabilities, enhance national security, and establish a resilient and sustainable critical mineral supply chain capable of supporting the nation's long-term economic and technological leadership.

## 10. REFERENCES

- [**ADVANCE-Act**] Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act of 2024. Pub. L. 118-67. July 2024. <https://www.congress.gov/118/plaws/publ67/PLAW-118publ67.pdf>
- [**Aspen-CritMin-2023**] Aspen Institute Energy & Environment Program. “A Critical Minerals Policy for the United States.” June 2023. <https://www.aspeninstitute.org/publications/a-critical-minerals-strategy-united-states-energy/>
- [**AtlanticCouncil-FORGE-2026**] Blakemore, Reed, and Alexis Harmon. 2026. “U.S. Critical Minerals Policy Goes Collaborative with FORGE.” Atlantic Council. February 12, 2026. <https://www.atlanticcouncil.org/dispatches/us-critical-minerals-policy-goes-collaborative-with-forge/>
- [**BaajNwaavjo-2023**] The White House. “Establishment of the Baaj Nwaavjo I'tah Kukveni—Ancestral Footprints of the Grand Canyon National Monument.” Proclamation 10606. Federal Register. August 15, 2023. <https://www.federalregister.gov/documents/2023/08/15/2023-17628/establishment-of-the-baaj-nwaavjo-itah-kukveni-ancestral-footprints-of-the-grand-canyon-national>
- [**BearsEars-2021**] The White House. “Bears Ears National Monument.” Proclamation 10285. Federal Register. October 15, 2021. <https://www.federalregister.gov/documents/2021/10/15/2021-22672/bears-ears-national-monument>
- [**BLM-BaajNwaavjo-2024**] U.S. Department of the Interior, Bureau of Land Management. “Interim Management of the Baaj Nwaavjo I'tah Kukveni—Ancestral Footprints of the Grand Canyon National Monument 2024.” <https://www.blm.gov/arizona/public-room/technical-reference/interim-management-baaj-nwaavjo-itah-kukveni-national-monument>
- [**BPC-Midstream-2024**] Bipartisan Policy Center. “The Missing Midstream: Identifying Investment Challenges for American Critical Mineral Processing Projects.” September 2024. <https://bipartisanpolicy.org/report/the-missing-midstream-identifying-investment-challenges-for-american-critical-mineral-processing-projects/>
- [**BPC-Reserve-2024**] Bipartisan Policy Center. “Resilient Resource Reserve: A Plan to Catalyze the American Critical Mineral Processing Industry.” July 11, 2024. <https://bipartisanpolicy.org/report/critical-minerals-reserve/>
- [**Brownstein-2026**] Brownstein Hyatt Farber Schreck. 2026. “Project Vault and FORGE Signal Next Phase of U.S. Critical Minerals Policy.” February 5, 2026. <https://www.bhfs.com/insight/project-vault-and-forge-signal-next-phase-of-u-s-critical-minerals-policy/>
- [**BTI-CritMin-2023**] Breakthrough Institute. “Getting Critical Minerals Right.” June 29, 2023. <https://thebreakthrough.org/issues/energy/getting-critical-minerals-right>
- [**Cassidy-2026**] Cassidy & Associates. 2026. “CA Minerals Map 2.1.” February 2026. <https://cassidy.com/wp-content/uploads/2026/02/CA-Minerals-Map-2.1-February-2026.pdf>
- [**CFR**] Code of Federal Regulations (CFR). Various titles and parts as cited in the text of this report. U.S. Government Publishing Office. <https://www.govinfo.gov/app/collection/cfr>
- [**CRS-R44687**] Congressional Research Service. “Antiquities Act: Scope of Authority for Modification of National Monuments.” R44687. November 2016. <https://www.nps.history.com/publications/antiquities/crs-r44687.pdf>
- [**CRS-R44886**] Congressional Research Service. “Monument Proclamations Under Executive Order Review: Comparison of Selected Provisions.” R44886. July 2017. [https://www.everycrsreport.com/files/20170711\\_R44886\\_9c706184a5d5c1e227e0f4c3dad9f3c78e1ae7f6.pdf](https://www.everycrsreport.com/files/20170711_R44886_9c706184a5d5c1e227e0f4c3dad9f3c78e1ae7f6.pdf)

**[CSIS-CritMin-2025]** Baskaran, Gracelin and Duncan Wood, eds. “Critical Minerals and the Future of the U.S. Economy.” Center for Strategic and International Studies. February 2025.  
<https://www.csis.org/analysis/critical-minerals-and-future-us-economy>

**[CSIS-Workforce]** Center for Strategic and International Studies. “The United States Needs More than Mining Engineers to Solve Its Critical Mineral Challenges.” May 2023.  
<https://www.csis.org/analysis/united-states-needs-more-mining-engineers-solve-its-critical-mineral-challenges>

**[DOE-CMEI-OrgChart-2026]** U.S. Department of Energy. 2026. “Office of Critical Minerals and Energy Innovation (CMEI) Organizational Structure.” March 2026.  
<https://www.energy.gov/sites/default/files/2026-03/cmei-org-chart-march2026.pdf>

**[DOE-CMEI-Realignment-2026]** U.S. Department of Energy, Office of Critical Minerals and Energy Innovation. 2026. “Energy Department Announces Realignment of Critical Minerals and Energy Innovation Programs.” January 28, 2026. <https://www.energy.gov/cmei/articles/energy-department-announces-realignment-critical-minerals-and-energy-innovation>

**[DOE-CMI]** U.S. Department of Energy. 2026. “Critical Materials Innovation Hub (CMI).” Advanced Materials & Manufacturing Technologies Office, Department of Energy.  
<https://www.energy.gov/cmei/ammtto/critical-materials-innovation-hub-cmi>

**[DOE-METALLIC]** Department of Energy, National Energy Technology Laboratory, “METALLIC – Accelerating Critical Minerals and Material Technology Deployment & Innovation.” Accessed March 27, 2026. <https://netl.doe.gov/metalltic>

**[DOE-O458.1]** DOE Order 458.1, “Radiation Protection of the Public and the Environment.” February 11, 2011. <https://www.directives.doe.gov/directives-documents/400-series/0458.1-BOrder>

**[DOE-ReactorPilot]** U.S. Department of Energy. “Reactor Pilot Program.” June 2025.  
<https://www.energy.gov/ne/us-department-energy-reactor-pilot-program>

**[DOI-IWG-2023]** U.S. Department of the Interior, Interagency Working Group on Mining Regulations, Laws, and Permitting. “Recommendations to Improve Mining on Public Lands.” September 2023.  
<https://www.doi.gov/sites/doi.gov/files/mriwg-report-final-508.pdf>

**[DOJ-OLC-Monuments-2025]** U.S. Department of Justice, Office of Legal Counsel. “Revocation of Prior Monument Designations.” May 27, 2025. <https://www.justice.gov/olc/media/1403101/dl>

**[EA-2020]** Energy Act of 2020. Pub. L. 116-260, Division Z. December 2020.  
<https://www.govinfo.gov/content/pkg/PLAW-116publ260/pdf/PLAW-116publ260.pdf>

**[EM-Permitting]** Essential Minerals. “The Urgent Need for Federal Permitting Reform in U.S. Mining.” Blog. October 9, 2025. <https://www.essentialminerals.org/blog/federal-permitting-reform/>

**[EO-14241]** Executive Order 14241, “Immediate Measures to Increase American Mineral Production.” March 20, 2025. <https://www.presidency.ucsb.edu/documents/executive-order-14241-immediate-measures-increase-american-mineral-production>

**[EO-14299]** Executive Order 14299, “Deploying Advanced Nuclear Reactor Technologies for National Security.” May 23, 2025. <https://www.presidency.ucsb.edu/documents/executive-order-14299-deploying-advanced-nuclear-reactor-technologies-for-national>

**[EO-14300]** Executive Order 14300, “Ordering the Reform of the Nuclear Regulatory Commission.” May 23, 2025. <https://www.presidency.ucsb.edu/documents/executive-order-14300-ordering-the-reform-the-nuclear-regulatory-commission>

**[EO-14301]** Executive Order 14301, “Reforming Nuclear Reactor Testing at the Department of Energy.” May 23, 2025. <https://www.presidency.ucsb.edu/documents/executive-order-14301-reforming-nuclear-reactor-testing-the-department-energy>

**[EXIM-ProjectVault-2026]** EXIM. 2026. “EXIM Approves Project Vault Loan to Launch America’s Strategic Critical Minerals Reserve and Support Manufacturing Jobs.” February 2, 2026. <https://www.exim.gov/news/project-vault>

**[FAST-41-2015]** U.S. Congress. 2015. “Fixing America’s Surface Transportation Act (FAST Act), Title 41 – Federal Permitting Improvement.” December 4, 2015. <https://www.congress.gov/114/plaws/publ94/PLAW-114publ94.pdf>

**[FLPMA-1714]** U.S. Congress. “Federal Land Policy and Management Act of 1976, Section 204 (43 U.S.C. § 1714).” <https://www.law.cornell.edu/uscode/text/43/1714>

**[FRA-2023]** Fiscal Responsibility Act of 2023. Pub. L. 118-5. June 2023. <https://www.govinfo.gov/content/pkg/PLAW-118publ5/pdf/PLAW-118publ5.pdf>

**[GAO-24-106395]** U.S. Government Accountability Office. “Critical Minerals: Status, Challenges, and Policy Options for Recovery from Nontraditional Sources.” GAO-24-106395. July 2024. <https://www.gao.gov/products/gao-24-106395>

**[GAO-Permitting]** U.S. Government Accountability Office. “Energy Infrastructure Permitting: Factors Affecting Timeliness and Efficiency.” GAO-18-693T. September 2018. <https://www.gao.gov/products/gao-18-693t>

**[GoodSam-2024]** Good Samaritan Remediation of Abandoned Hardrock Mines Act of 2024. Pub. L. 118-155. December 2024. <https://www.congress.gov/118/plaws/publ155/PLAW-118publ155.pdf>

**[HouseCCP-2024]** House Select Committee on the Chinese Communist Party, Critical Mineral Policy Working Group. “Creating Resilient Critical Mineral Supply Chains.” December 2024. <https://selectcommitteeontheccp.house.gov/media/policy-recommendations/critical-minerals-policy-working-group-final-report>

**[HPS-Position]** Health Physics Society. 2019. “Radiation Risk in Perspective (PS010-4).” Position Statement of the Health Physics Society, Herndon, VA. <https://hps.org/wp-content/uploads/2024/12/radiationrisk.pdf>

**[ICF-NEPA]** ICF. 2023. “New Amendments to NEPA in the Fiscal Responsibility Act of 2023.” Insights, June 27, 2023. <https://www.icf.com/insights/environment/new-nepa-amendments-fiscal-responsibility-act-2023>

**[IEA-2025]** International Energy Agency. “Global Critical Minerals Outlook 2025.” May 2025. <https://www.iea.org/reports/global-critical-minerals-outlook-2025/executive-summary>

**[IIJA-2021]** Infrastructure Investment and Jobs Act. Pub. L. 117-58. November 2021. <https://www.govinfo.gov/content/pkg/PLAW-117publ58/pdf/PLAW-117publ58.pdf>

**[INL-MineTailings]** Idaho National Laboratory. “Critical Minerals Recovery from Mine Tailings: A Technical Review and Strategic Assessment.” INL/RPT-25-89279. December 2025. <https://inl.gov/content/uploads/2026/04/INL-RPT-25-89279.pdf>

**[INL-RadProtection]** Idaho National Laboratory. “Reevaluation of Radiation Protection Standards for Workers and the Public Based on Current Scientific Evidence.” INL/RPT-25-85463. July 2025. <https://www.osti.gov/biblio/2584359>

**[IRA-2022]** Inflation Reduction Act of 2022. Pub. L. 117-169. August 2022. <https://www.govinfo.gov/content/pkg/PLAW-117publ169/uslm/PLAW-117publ169.xml>

[**NEIMA-2019**] Nuclear Energy Innovation and Modernization Act. Pub. L. 115-439. January 2019. <https://www.congress.gov/bill/115th-congress/senate-bill/512/text>

[**NRCan-MiningTax-2025**] Natural Resources Canada. “Tax Incentives for Mining and Exploration.” Government of Canada. March 2025. <https://natural-resources.canada.ca/minerals-mining/mining-policy-taxation-industry/mining-taxation/mining-specific-tax-provisions#a10>

[**One-Big-Beautiful-Bill-Act**] One Big Beautiful Bill Act. Pub. L. 119-21. July 2025. <https://www.govinfo.gov/app/details/PLAW-119publ21>

[**PDAC-FlowThrough**] Prospectors & Developers Association of Canada. "Flow-through Shares." PDAC Advocacy. 2026. <https://pdac.ca/programs-and-advocacy/access-to-capital/flow-through-shares>

[**PLO-7787**] U.S. Department of the Interior, Bureau of Land Management. “Public Land Order No. 7787; Withdrawal of Public and National Forest System Lands in the Grand Canyon Watershed; Arizona.” Federal Register. January 18, 2012. <https://www.federalregister.gov/documents/2012/01/18/2012-849/public-land-order-no-7787-withdrawal-of-public-and-national-forest-system-lands-in-the-grand-canyon>

[**REEEx-Margins**] Rare Earth Exchanges. “China's Tightest Rare Earth Grip Isn't the Rock—It's the Refining Margin.” July 18, 2025. <https://rareearthexchanges.com/news/chinas-tightest-rare-earth-grip-isnt-the-rock-its-the-refining-margin/>

[**SAFE-RaceToTop-2023**] SAFE Center for Critical Minerals Strategy. “A Global Race to the Top: Using Transparency to Secure Critical Mineral Supply Chains.” March 2023. [https://safe2020.wpenginepowered.com/wp-content/uploads/2023/03/SAFE-CritMinReport\\_v06.3\\_Spreads\\_Final.pdf](https://safe2020.wpenginepowered.com/wp-content/uploads/2023/03/SAFE-CritMinReport_v06.3_Spreads_Final.pdf)

[**SMCRA-1977**] Surface Mining Control and Reclamation Act of 1977, Pub. L. No. 95-87, 91 Stat. 445 (1977). <https://www.govinfo.gov/content/pkg/STATUTE-91/pdf/STATUTE-91-Pg445.pdf>

[**SME-Permitting**] Society for Mining, Metallurgy & Exploration. “Improved Regulatory Coordination: To Ensure Responsible Mining and Environmental Protection.” Technical Briefing. <https://www.smenet.org/What-We-Do/Technical-Briefings/Improved-Regulatory-Coordination>

[**SME-Workforce**] Society for Mining, Metallurgy & Exploration. “Workforce Trends in the U.S. Mining Industry.” Technical Briefing. <https://www.smenet.org/What-We-Do/Technical-Briefings/Workforce-Trends-in-the-US-Mining-Industry>

[**SO-3418**] Secretarial Order 3418, “Unleashing American Energy.” February 3, 2025. <https://www.doi.gov/document-library/secretary-order/so-3418-unleashing-american-energy>

[**SO-3436**] Secretarial Order 3436, “Unlocking Critical and Strategic Minerals from Mine Waste, Cutting Red Tape, and Restoring American Dominance in Strategic Mineral Production.” July 23, 2025. <https://www.doi.gov/document-library/secretary-order/so-3436-unlocking-critical-and-strategic-minerals-mine-waste>

[**SPGlobal-Development**] S&P Global Market Intelligence. “Mine Development Times: The US in Perspective.” June 2024. [https://cdn.ihsmarkit.com/www/pdf/0724/SPGlobal\\_NMA\\_DevelopmentTimesUSinPerspective\\_June\\_2024.pdf](https://cdn.ihsmarkit.com/www/pdf/0724/SPGlobal_NMA_DevelopmentTimesUSinPerspective_June_2024.pdf)

[**State-Dept-Minerals-2026**] U.S. Department of State, Office of the Spokesperson. 2026. “2026 Critical Minerals Ministerial.” February 4, 2026. <https://www.state.gov/releases/office-of-the-spokesperson/2026/02/2026-critical-minerals-ministerial/>

[**State-Dept-OpeningRemarks-2026**] U.S. Department of State, Office of the Spokesperson. 2026. “Opening Remarks of the Critical Minerals Ministerial.” February 4, 2026.

<https://www.state.gov/releases/office-of-the-spokesperson/2026/02/opening-remarks-of-the-critical-minerals-ministerial/>

[U.S.C.] United States Code (U.S.C.). Various titles and sections as cited in the text of this report. U.S. Government Publishing Office. <https://www.govinfo.gov/app/collection/uscode>

[USGS-CritMin-2025] U.S. Geological Survey. “Final 2025 List of Critical Minerals.” Federal Register. November 7, 2025. <https://www.federalregister.gov/documents/2025/11/07/2025-19813/final-2025-list-of-critical-minerals>

[USGS-MCS-2026] U.S. Geological Survey. “Mineral Commodity Summaries 2026.” March 2026. <https://pubs.usgs.gov/publication/mcs2026>

[USTR-Plurilateral-2026] Office of the U.S. Trade Representative. 2026. “USTR Seeks Public Comment on the Design of a Plurilateral Agreement on Trade in Critical Minerals and Policy Actions to Strengthen the Resilience of Critical Mineral Supply Chains.” February 26, 2026. <https://ustr.gov/about/policy-offices/press-office/press-releases/2026/february/ustr-seeks-public-comment-design-plurilateral-agreement-trade-critical-minerals-and-policy-actions>