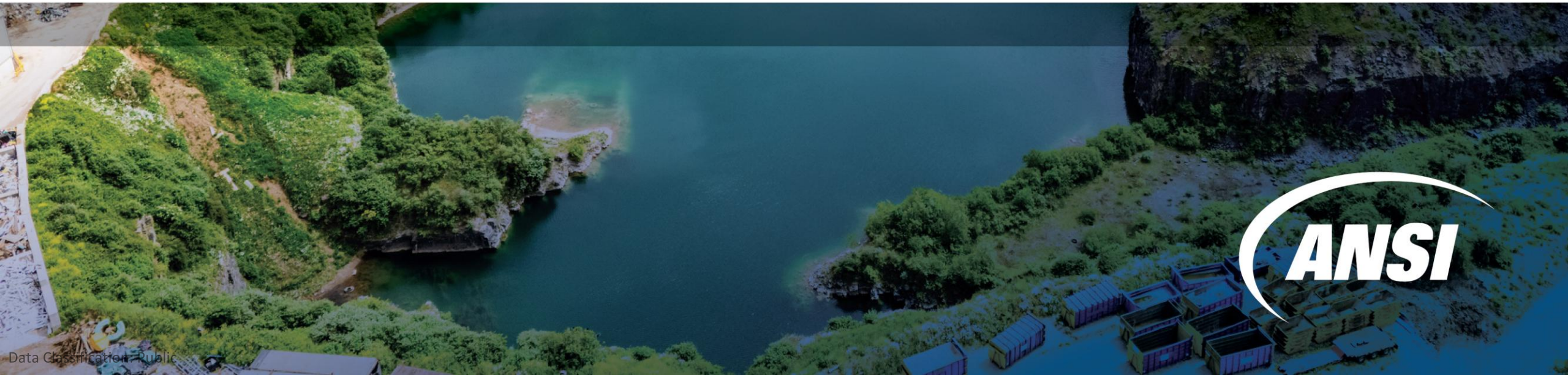




Information presented on these slides were compiled by ANSI staff based on registrant feedback and are provided to support workshop discussions only.

They are not positions or recommendations from session moderators or formal and final statements.



Upstream: Deep Dive Extraction & Mining

Moderated by:
Veronika Shime
National Mining Association





Upstream Deep-Dive Tasking

- **Examine** *upstream activities in critical minerals supply chains, including exploration, extraction, and initial handling of minerals and materials.*
- **Explore** *current practices, systems, and requirements related to resource development and early-stage production, including how they connect to midstream and downstream processing and manufacturing needs.*
- **Consider** *implementation challenges, lessons learned, and the role of standards in supporting material characterization, consistency, and alignment across the value chain.*

1 Goal Guiding Questions | Upstream

- *What outcomes are stakeholders seeking to achieve in upstream activities, including exploration, extraction, and initial processing?*
- *How do upstream requirements connect to midstream processing and downstream manufacturing needs?*
- *What capabilities are currently in place, and what additional capabilities are needed to support consistent implementation?*
- *What does U.S. leadership in the global market look like, and what are the indicators of success?*
 - *Leadership in standards? Are we there yet?*
 - *Leadership in the market? Are we there yet?*
- *What role do standards play in the desired end-state?*

1 **DRAFT** Overarching Goal | Upstream

Critical minerals are responsibly identified, characterized, extracted, processed, and verified through consistent practices that meet legal and stakeholder expectations, provide trusted inputs to downstream supply chains, and strengthen the global competitiveness of the U.S. mining sector.

Key Characteristics:

- **Reliable Resource Characterization:** Accurate, credible and consistent information on U.S. mineral resources and reserves
- **Responsible Mining Practices:** Strong environmental, safety, social and operational performance consistent with U.S. law
- **Consistent Material Data:** Reliable information that can be understood and used across domestic and global supply chains
- **Strong Stakeholder Confidence:** Transparency and credible assurance that build confidence among communities, customers, investors and policymakers
- **Connection to Downstream Requirements:** Ability to meet legitimate customer, supply-chain and market expectations
- **Global Competitiveness:** A standards framework that supports (rather than unnecessarily burdens) U.S. producers competing for investment, customers and market share globally

2 U.S. Mining Compliance Landscape | Upstream

A Multi-Layered System of Requirements & Expectations

1. LEGAL & REGULATORY

- Federal
- State
- Local

2. VOLUNTARY STANDARDS

- Industry
- Multi-stakeholder
- Commodity-specific

3. MARKET EXPECTATIONS

- Customers
- Investors
- Lenders
- OEMs
- Procurement

4. COMPANY COMMITMENTS

- ESG policies
- Sustainability targets
- Corporate standards

Key message: Voluntary standards are layered onto an already comprehensive U.S. legal and regulatory framework.

2 U.S. Mining Compliance Landscape | Upstream

U.S. MINING ALREADY OPERATES UNDER EXTENSIVE FEDERAL REGULATION

More Than Three Dozen Federal Environmental Laws & Regulations Can Apply to Mining

1. Environmental Review & Federal Lands

- National Environmental Policy Act (NEPA)
- Federal Land Policy and Management Act (FLPMA)

2. Air & Water

- Clean Air Act (CAA)
- Clean Water Act (CWA)
- Safe Drinking Water Act (SDWA)

3. Waste & Chemicals

- Resource Conservation and Recovery Act / Solid Waste Disposal Act (RCRA)
- Comprehensive Environmental Response, Compensation & Liability Act (CERCLA)
- Toxic Substances Control Act (TSCA)

4. Natural Resources

- Endangered Species Act (ESA)
- Migratory Bird Treaty Act (MBTA)
- Rivers and Harbors Act

5. Additional Mining-Related Requirements

- Surface Mining Control and Reclamation Act (SMCRA)
- Federal Mining Law
- National Historic Preservation Act (NHPA)
- Federal explosives requirements
- Federal Mine Safety and Health Act / MSHA

Plus: Extensive state and local laws, regulations and permitting requirements and disclosure requirements.

2

U.S. Mining Compliance Landscape | Upstream

Competing Compliance Expectations for Multi-Jurisdictional Operators

U.S. Regulatory Requirements vs. International Reporting Codes

MINERAL RESOURCE & RESERVE REPORTING (e.g.)

Framework	Regional Application
U.S. Securities and Exchange Commission (SEC) Regulation S-K 1300	U.S.
Joint Ore Reserves Committee (JORC) Code	Australia
National Instrument (NI) 43-101	Canada
CRIRSCO International Reporting Template	International
United Nations Framework Classification for Resources (UNFC)	United Nations
United Nations Resource Management System (UNRMS)	United Nations

Multi-jurisdictional operators may have competing compliance expectations.

2 U.S. Mining Compliance Landscape | Upstream

THE VOLUNTARY STANDARDS ECOSYSTEM

A Growing Number of Frameworks Address Responsible Mining & ESG Performance

ESG / Sustainability Reporting

- **GRI:** Global Reporting Initiative
- **ISSB:** International Sustainability Standards Board
- **IFRS S1/S2:** International Financial Reporting Standards, Sustainability & Climate
- **SASB:** Sustainability Accounting Standards Board
- **TCFD:** Task Force on Climate-related Financial Disclosures
- **TNFD:** Taskforce on Nature-related Financial Disclosures

Responsible Mining

- **ICMM:** International Council on Mining and Metals
- **IRMA:** Initiative for Responsible Mining Assurance
- **Copper Mark:** Responsible Production Framework
- **TSM:** Towards Sustainable Mining
- **RMI ESG Standard:** Responsible Minerals Initiative ESG Standard
- **GISTM:** Global Industry Standard on Tailings Management

Supply Chain / Due Diligence

- **OECD:** Organisation for Economic Co-operation and Development
- **RMI / RMAP:** Responsible Minerals Initiative / Responsible Minerals Assurance Process
- **CCCMC:** China Chamber of Commerce of Metals, Minerals & Chemicals Importers & Exporters
- **ITSCI:** International Tin Supply Chain Initiative
- **EITI:** Extractive Industries Transparency Initiative

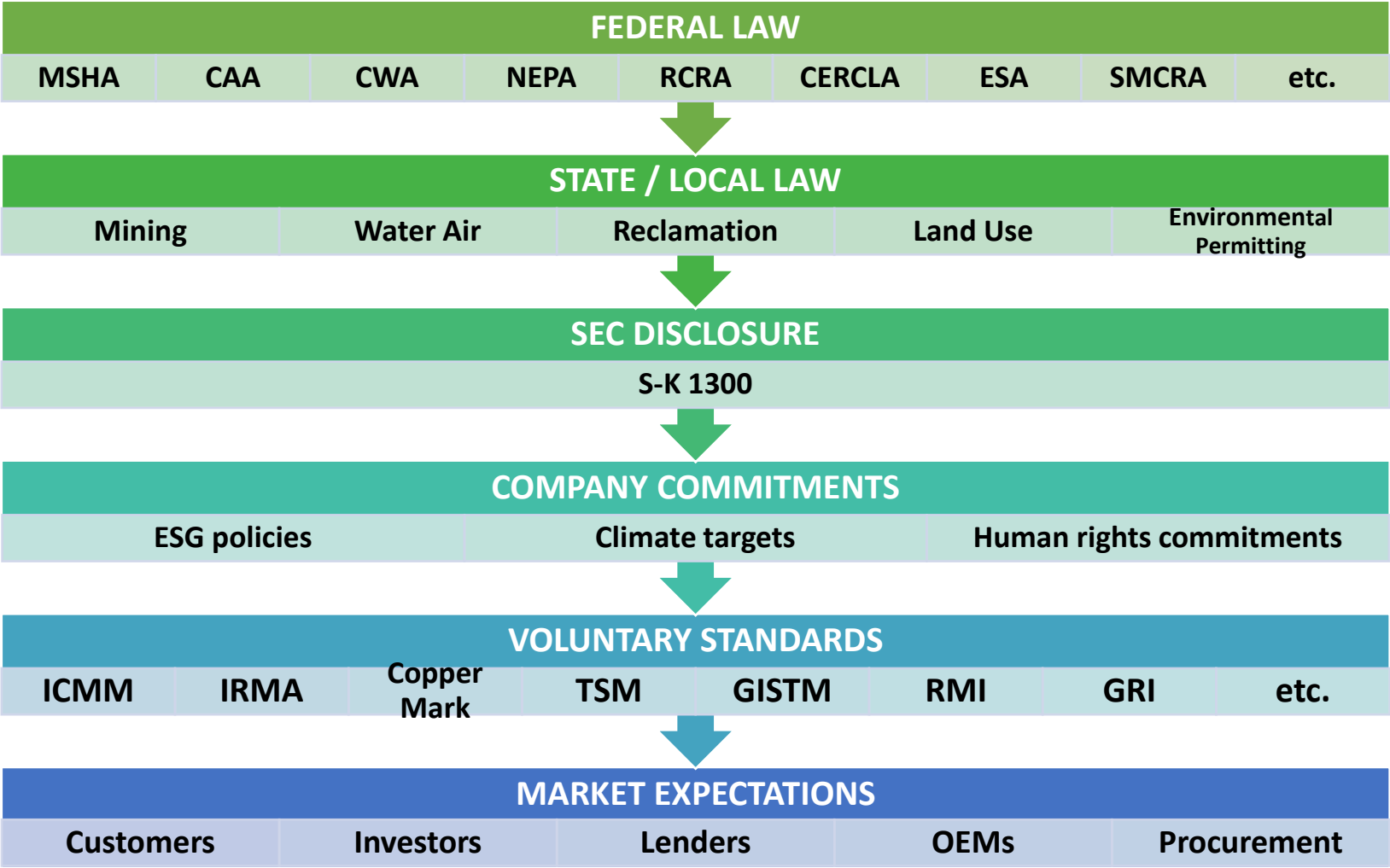
Commodity-Specific

- Responsible Gold Mining Principles
- **LBMA:** London Bullion Market Association
- **RJC:** Responsible Jewellery Council
- **ASI:** Aluminium Stewardship Initiative
- Responsible Steel
- International Cyanide Management Code
- Responsible Cobalt Initiative

The landscape is extensive—and often overlapping. Where do these frameworks provide meaningful incremental value beyond existing requirements?

2

U.S. Mining Compliance Landscape | Upstream



THE COMPLIANCE & STANDARDS "STACK"

One Mine Can Face Multiple Layers of Requirements

Potential Result
Multiple reporting, data, assurance and audit requests can converge on the same mine site.



- *What additional complexities are stakeholders balancing?*
- *How do regulatory frameworks, permitting processes, trade requirements, and conformity assessment approaches (e.g., testing, inspection, certification) affect upstream activities?*
 - *Where could standards recognize **equivalent approaches**?*
 - *Where do stakeholders encounter inconsistencies or challenges across jurisdictions or systems?*
- *Acknowledging the complex compliance environment, do gaps exist where revisions to or additional frameworks would advance stakeholder interests?*

Feedback Prior to Workshop:

1. Need reduced duplication in reporting and assurance
2. Requirements & standards should be proportionate and risk-based approaches
3. Interoperability and mutual recognition
4. Requirements must support responsible U.S. mining without creating unnecessary duplication
5. System needs to be more efficient

Workshop Whiteboard:

1. Discussion captured here
2. Discussion captured here

3

Implementation Experience & Barriers | Upstream

- In implementation, to demonstrate compliance, where are companies reporting the **same information multiple times**? Where are multiple audits, certifications, or assurance processes addressing the same **underlying performance**?
- What factors (e.g., technical, operational, or commercial) affect the ability to provide consistent inputs to midstream and downstream partners? To meet standards? What is needed to make this more efficient?

Feedback Prior to Workshop:

1. Need clear distinctions between legal requirements & voluntary standards
2. Requirements & standards should be proportionate and risk-based approaches
3. Recognition of existing regulatory compliance
4. Standards need to be more outcome-focused
5. Need to preserve flexibility for companies and commodities
6. Exploration data gaps
7. Sampling variability
8. Workforce limitations
9. Regulatory uncertainty

Workshop Whiteboard:

1. Discussion captured here
2. Discussion captured here

4

Standards Utilized & Gaps Considerations | Upstream

TOPIC	EXISTING COMPLIANCE REQUIREMENTS	POTENTIALLY OVERLAPPING FRAMEWORKS
Safety	MSHA	ICMM, IRMA, TSM
Water	CWA / state requirements	Copper Mark, GRI, ICMM, IRMA
Air / GHG	CAA	GRI, ISSB, TCFD, customer requests
Waste	RCRA / CERCLA	ICMM, IRMA, GRI
Wildlife	ESA / MBTA	IRMA, ICMM
Tailings	Law / permits	GISTM, ICMM, IRMA, TSM
Communities	Permitting requirements	Copper Mark, ICMM, IFC, IRMA
Mineral Reporting	S-K 1300	CRIRSCO, JORC, NI 43-101,
Supply Chain	Applicable law	LBMA, OECD, RMI, RJC

For illustrative purposes only

Where do existing ISO standards fit in?

- ISO 14001, Environmental management systems
- ISO 14002-2, Environmental management systems – Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area – Part 2: Water
- ISO 14002-4, Environmental management systems – Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area – Part 4: Resources and waste
- ISO 14046, Environmental management – water footprint - principles, requirements and guidelines
- ISO 26000, Guidance on social responsibility
- ISO 3740, Acoustics – determination of sound power levels of noise sources - guidelines for the use of basic standards
- ISO 45001, Occupational health and safety management systems – requirements with guidance for use
- ISO 21795-1, Mine closure and reclamation planning – Part 1: Requirements
- ISO 21795-2, Mine closure and reclamation planning – Part 2: Guidance
- ISO 26000, Guidance on social responsibility
- ISO 37000, Governance of organizations – Guidance
- ISO 37101, Sustainable development in communities – Management system for sustainable development – Requirements with guidance for use
- ISO 45001, Occupational health and safety management systems – Requirements with guidance for use
- ISO 53800, Guidelines for the promotion and implementation of gender equality and women's empowerment

4

Standards Utilized & Gaps | Upstream

- *What standards or frameworks currently support upstream activities, including material characterization and reporting?*
 - *Which voluntary standards are delivering meaningful / incremental value above U.S. regulatory compliance? Are the ISO standards being utilized?*
 - *What risks are companies using voluntary standards to manage?*
 - *What should be the threshold before a new mining-specific standard is developed?*
- *Where are gaps, overlaps, or inconsistencies observed, particularly in how upstream outputs align with downstream specifications?*

Standards Utilized:

1. Discussion captured here
2. Discussion captured here

Gaps :

1. Need for unconventional resource standards
2. Need for recovery-resource reporting
3. Discussion captured here
4. Discussion captured here

5

Coordination, Alignment & Interoperability | Upstream

- *Where is alignment needed between upstream, midstream, and downstream stakeholders to support continuity across the supply chain?*
 - *Where should the industry focus?*
- *What challenges arise in ensuring that materials, data, and specifications are compatible across stages?*

Feedback Prior to Workshop:

1. Consolidated Mining Standard Initiative (ICMM, Coppermark RRA, TSM, Responsible Gold Mining Principles)
2. Better handoff to midstream
3. Consistent resource definitions & metrics
4. Harmonized reporting methods
5. Improved traceability continuity

Workshop Whiteboard:

1. *Discussion captured here*
2. *Discussion captured here*

6 Data & Pre-standardization Needs | Upstream

- *What data, definitions, or technical inputs are needed to support upstream activities and their connection to later stages of the value chain?*
- *Are there areas where additional work is needed before standards can be developed or more widely implemented?*

Feedback Prior to Workshop:

1. Geological reference datasets
2. Resource characterization methods
3. Certified reference materials
4. Sampling standards
5. Exploration data interoperability

Workshop Whiteboard:

1. Discussion captured here
2. Discussion captured here