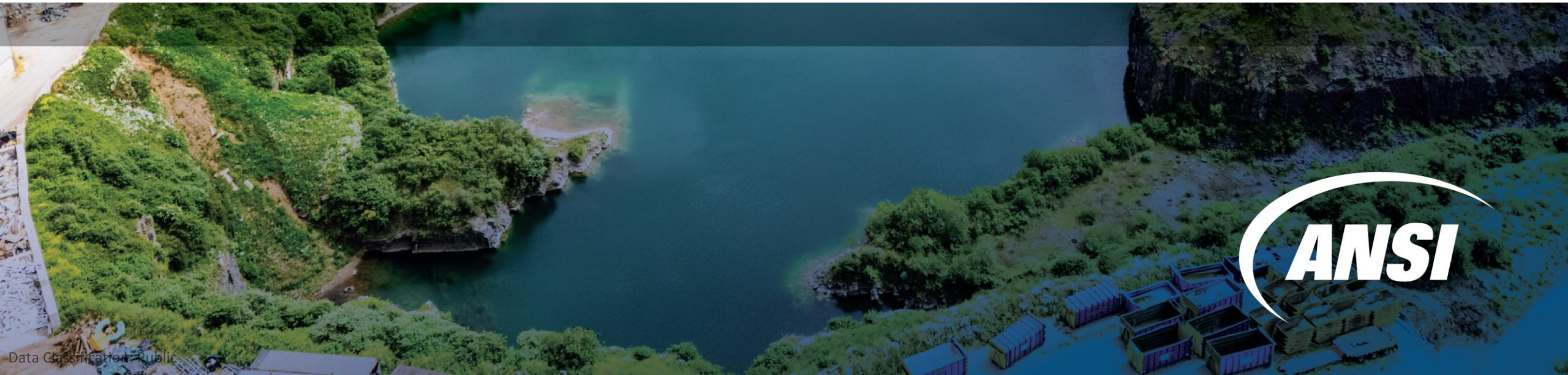




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Circular Economy Deep Dive

Moderated by:
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Circular Economy Deep-Dive Tasking

- **Examine** approaches to circular economy practices in critical minerals supply chains, including recycling, reuse, and material recovery.
- **Explore** current methods and systems, including how they are applied by various stakeholders.
- **Consider** implementation challenges, lessons learned, and the role of standards in supporting consistency, material recovery, and integration across the value chain.

1 Desired-End State

- *What are stakeholders seeking to achieve, and how do needs differ across upstream, midstream, and downstream activities?*
- *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?*
 - *How does an effective **circular economy** strengthen U.S. leadership in the global market?*
 - *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?*

Critical minerals remain in productive use for as long as possible through reuse, repair, remanufacturing, recycling, and recovery systems that preserve material value, reduce waste, and support resilient domestic supply chains.

Key Characteristics:

- Verified recycled content and recovered materials
- Standardized recovery and recycling methods
- Traceable material flows across multiple lifecycles
- Quality-equivalent secondary materials
- Economic and scalable recovery systems.

2 Compliance Expectations | Circular Economy

- *What regulatory frameworks, trade requirements, and conformity assessment approaches (e.g., testing, verification, inspection, certification, audit) apply?*
 - *Do these approaches leverage standards? Which?*
 - *How do these approaches affect (enable or hinder) standards implementation?*
 - *Where do stakeholders encounter inconsistencies or challenges across jurisdictions or systems?*
- *Where none exist, should they? Why type?*

Feedback Prior to Workshop:

1. EU Battery Regulation recycled-content requirements
2. Recycled-content verification frameworks
3. Product stewardship and EPR programs
4. Material recovery certification approaches
5. Cross-border movement of recycled materials
6. Other?

Workshop Whiteboard:

1. Discussion captured here
2. Discussion captured here

- *How are standards applied today? Is it effective implementation?*
- *What challenges have stakeholders encountered when implementing measures in practice?*
- *What factors (e.g., technical, operational, or commercial) limit adoption across different stages of the value chain?*

Feedback Prior to Workshop:

1. Lack of standardized recovered-material quality definitions
2. Inconsistent recycling terminology
3. Difficulty qualifying secondary materials
4. Limited end-of-life data visibility
5. High verification and compliance costs
6. Other?

Workshop Whiteboard:

1. Discussion captured here
2. Discussion captured here

4 Standards Utilized & Gaps | Circular Economy

- *What standards or frameworks currently support this area, and how are they applied?*
 - *Organization level feedback is a great start!*
- *Where are gaps or inconsistencies observed across existing standards or systems?*

Standards Utilized:

1. ISO 59004
2. SAE battery recycling standards
3. IEC battery standards
4. ReMA feedstock specifications

Gaps :

1. Recycled-content calculation methods
2. Mass-balance methodologies
3. Recovery-yield reporting
4. End-of-life material classifications
5. Design-for-recycling criteria

- *Where is alignment needed between standards, regulatory frameworks, and industry practices to support this area?*
- *What challenges exist in ensuring interoperability across systems, data formats, or supply chain participants?*

Feedback Prior to Workshop:

1. Align recycled-content definitions globally
2. Connect traceability with circularity systems
3. Harmonize recovery documentation
4. Improve compatibility across recycling systems
5. Link recovery data to manufacturing requirements
6. Other?

Workshop Whiteboard:

1. Discussion captured here
2. Discussion captured here

- *What data, definitions, or technical inputs are needed to support effective systems?*
- *Are there areas where additional work is needed before standards can be developed or more widely implemented?*

Feedback Prior to Workshop:

1. Reference datasets for recovered materials
2. Standard recycled-content terminology
3. Recovery performance metrics
4. Quality-equivalence benchmarks
5. Material recovery tracking methodologies
6. Other?

Workshop Whiteboard:

1. Discussion captured here
2. Discussion captured here