Joint Due Diligence Standard for Copper, Lead, Nickel and Zinc

2020

1 Overview

The joint Due Diligence Standard for Copper, Lead, Nickel and Zinc (the Standard) was established by The Copper Mark, the International Lead Association (ILA), the Nickel Institute (NI), the International Zinc Association (IZA), and the Responsible Minerals Initiative (RMI) to enable responsible global supply chain management in the copper, lead, nickel, and zinc industries.

The development of the Standard was made possible by the financial and in-kind support provided by the International Copper Association (ICA).

1.1 Standard Objectives

The Standard was developed to:

1. Enable the implementation of the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas (OECD Guidance) for producers and/or traders of copper, lead, nickel and zinc.
2. Enable compliance with market entry requirements, specifically, the responsible sourcing policy requirement for Brand Compliance, Track A, Recognised Alignment-Assessed Standard Track, defined by the London Metal Exchange (LME) for LME Brands.
3. Enable conformance with Criterion 31, Responsible Supply Chains, of The Copper Mark Criteria. The Copper Mark uses the criteria defined by the Risk Readiness Assessment (RRA) developed and maintained by the RMI.
4. Encourage companies to source responsibly from *Conflict-Affected and High-Risk Areas (CAHRA)* and to not categorically exclude suppliers.
5. Allow for the recognition of other standards that have been found to be OECD-aligned.

1.2 Principles

The Standard requires companies to implement the five-step *due diligence process* defined in the OECD Guidance (*due diligence process*) and is built on the following principles:

- **Continual process**: The *due diligence process* is on-going and implemented by *companies* proactively and in reaction to *changes of circumstances* and to *risks of adverse impacts* and *actual adverse impacts* as they emerge in the supply chain.
- **Good faith**: *Companies* make good faith and *reasonable efforts* in their implementation of the *due diligence process*, recognising and making accommodation for the differing size, complexity, circumstances, capacity, location, sectors and the nature of products or services.

- **Risk-based**: *Companies* are guided by their own risk assessments covering, at a minimum, the *risks of adverse impacts* and *actual adverse impacts* listed in the OECD Guidance Annex II: serious human rights abuses, direct or indirect support to non-state armed groups, risks associated with the contracting of public or private security forces, bribery and fraudulent misrepresentation of the *origin* of minerals, money laundering, non-payment of taxes, fees and royalties due to governments. *Companies* are not precluded from including additional social, environmental, and governance risks in their *due diligence process*.
- **Proportionality**: *Companies* implement the *due diligence process* through measures that are commensurate to the severity and likelihood of the identified *risks of adverse impacts* and *actual adverse impacts* and their ability to manage, mitigate and remedy such risks and impacts.
- **Continual improvement**: The *due diligence process* is dynamic and *companies* progressively improve their due diligence activities and risk management performance over time, including through constructive engagement with *suppliers*.
- **Accountability**: *Companies* retain ultimate responsibility for the scope and quality of their due diligence activities, for the actions taken to respond to identified *risks of adverse impacts* and *actual adverse impacts*, and for reporting on the *due diligence process* undertaken in their supply chains.
- **Engagement:** Where *risks of adverse impacts* and/or *actual adverse impacts* are identified, *companies* are encouraged to engage with *suppliers* where consistent with the appropriate risk mitigation strategy, and exercise their influence over the *companies* that can most effectively and directly mitigate risks in their supply chains, as a way to catalyse positive change.
- **Inclusivity:** The *due diligence process* is global and implemented internationally by *companies* throughout their supply chains.
- **Transparency:** *Companies* publicly report on the *due diligence process* undertaken in their supply chains, with due regard to *business confidentiality and other competitive concerns*.

2 Disclaimers

Assurance of this Standard does not result in a certification of the *material* assessed nor does it determine that the *material* is free of association with any risks listed in the OECD Guidance Annex II.

The Standard adopts general terms relevant to the mining and metals industry. Please refer to the Glossary for the definitions and the Annexes for the specific industry terms in the copper, lead, nickel and zinc industries.

The Standard encourages collaboration between *companies* where doing so can reduce risk, improve due diligence practices and increase efficiency. It is the responsibility of *companies* when working together to ensure compliance with all relevant antitrust and competition laws at all times.

The Standard's requirements stipulated in section *5.1.6. System of Control and Transparency* do not preclude *companies* from establishing additional types of control and transparency systems or approaches, including *chain of custody* or *traceability systems*. In doing so, *companies* should take due consideration for the burden of implementation on all suppliers and ensure such systems do not exclude smaller suppliers from the supply chain.

3 Applicability / Scope

3.1 Companies within the scope of the Standard

The Standard applies to all companies producing and/or trading copper, lead, nickel or zinc (the *principal covered metals*) *metal products* from mine sites to, and including, producers of refined metal, which are generally referred to as the *refiner*.

The Standard also applies to producers of nickel chemical compounds and all nickel raw intermediates (iron-nickel, nickel pig iron, nickel oxide sinter, and other nickel intermediates) entering production of stainless steel, alloys, batteries, plating, where refining is not part of the *transformation* process.

Conformance with this Standard is determined at the *site* level.

All *company* activities, policies, procedures and processes used to implement the *due diligence process*, including management systems, identification and management of *risks of adverse impacts* and *actual adverse impacts*, and reporting are in scope for the *assessment*.

3.2 Materials within the scope of the Standard

The Standard covers all *materials* physically received, held, and/or processed at an in-scope *company site* during the *assessment period*, intended for the production of *metal products*.

For the avoidance of doubt, where the *site* receives, holds, and/or processes *materials* intended for the production of *metal products* other than *metal products* of *principal covered metals*, these *materials* are also covered by the Standard and can be included in the scope of the *assessment*.

For *materials* that contain multiple metals, only those metals that are in sufficient amounts to have market value attributable to them are included in the scope of the *assessment*.

Other inputs used at the *site*, such as chemicals, electrodes, energy inputs, industrial gases, lubricants, oils, are not included in the scope of the *assessment*.

The final determination of the *materials* included in the *assessment* scope will be agreed between the owner of the assurance process, the *company* and the assessor. The scope applied for the *assessment* shall be clearly stated in the assessment report and any other communication on the *assessment* scope and results.

3.3. Geographical scope of the Standard

The Standard is global in scope.

4 Collaboration

4.1. Collaboration for the implementation of this Standard

Where appropriate, *companies* may collaborate to implement the Standard. Collaboration may include, but is not limited to:

- Establishment of a grievance mechanism through collaboration with other *companies* or a *joint initiative* (Step 1).
- Implementation of systems of control and transparency, including by facilitating the flow of information between *companies* along the supply chain (Step 1).
- Desk research to identify and assess *risks of adverse impacts* and *actual adverse impacts* within specific red-flagged locations and/or the due diligence practices of any red-flagged suppliers (Step 2).
- On-the-ground assessments, where deemed necessary, to collect, generate and retain information on the circumstances of minerals extraction, transport, trade, handling, processing, and export, where two or more *companies* may source from, or operate in, the same area and/or *site(s)* (Step 2).
- Implementation of a management plan to respond to *risks of adverse impacts* and *actual adverse impacts*, including the monitoring of mitigation measures (Step 3).
- Independent third-party *assessments* at *identified points* in the supply chain (Step 4).

Companies' ways of collaborating on one or more of the activities listed above may include, but are not limited to, the following:

- Direct collaboration between two or more *companies* through the creation of joint teams of the *companies*' representatives.
- Collaboration through the joint appointment of a third party entity. And/or
- Engagement in, or support to, industry programmes or *joint initiatives*, including the Copper Mark and/or other third party assurance programmes recognised as meeting the principles and requirements set out in this Standard.

Companies involved in any collaborative activity remain responsible for the scope and quality of their *due diligence process* and should ensure that all joint work duly takes into consideration circumstances specific to the individual *company*. It is the responsibility of *companies* when working together to ensure compliance with all relevant antitrust and competition laws at all times.

4.2. Recognition of other schemes

Other third party assurance programmes may be recognised as meeting the principles and requirements set out in this Standard. Information and criteria on recognised programs can be found here: [*Insert link*].

Where a *company*'s *due diligence process* has already been assessed by another recognised third party assurance programme, the *assessment* will verify that the other assessment included the *materials* in scope as agreed in section 3.2 Materials within the scope of the Standard

Where the *materials* have been included in the other assessment, the results of the other assessment will be recognised. Where the *materials* have not been included, however, further assessment activities will be necessary to determine the full implementation of the due diligence management system. For the avoidance of doubt, any area that has been assessed and is *equivalent* will be recognised. Any area that has been assessed but is not *equivalent* will need to be re-assessed.

5 Conformance Criteria

The requirements defined in this Standard form the basis for an independent third-party *assessment* to determine the *company*'s conformance with Criterion 31 of the RRA and the OECD Guidance, in accordance with the Copper Mark Assurance Process.

Conformance criteria for *recycling companies*:

Companies that receive, hold and/or process 100% *recycled material* inputs in the *assessment period* shall:

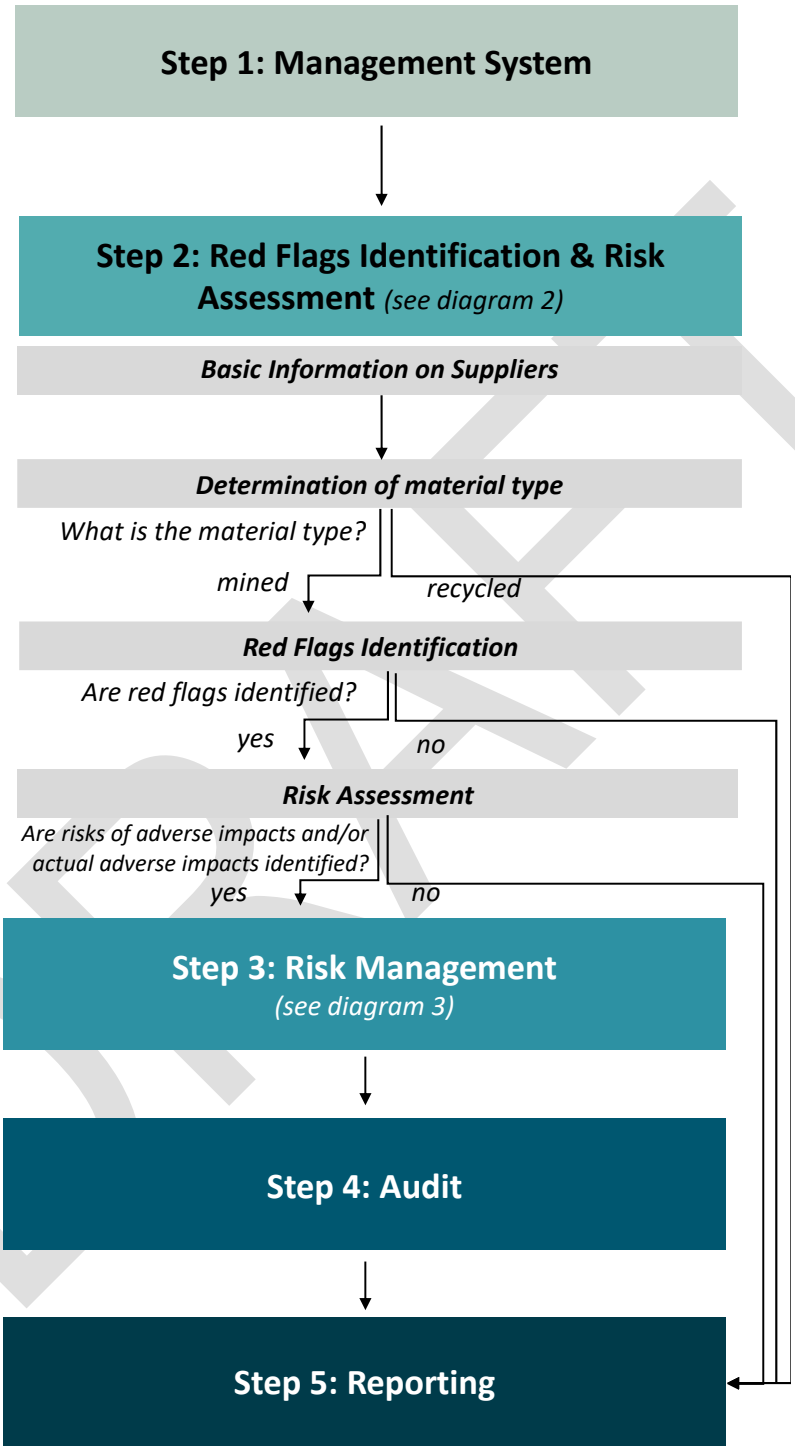
- Obtain and retain information to demonstrate that the *material* is recycled. And,
- Obtain and retain information to determine the identity, nature, and legality of the *immediate suppliers*' business operations. Such information may be obtained through the company's *Know Your Counterparty (KYC)* process.

Such *companies* are encouraged to also implement a due diligence management system (*see 5.1 Step 1 Criteria: Management System*) and to publicly report on their *due diligence process* (*see 5.5 Step 5 Criteria: Reporting*).

Conformance criteria for all other *companies*:

Companies that receive, hold, and/or process any combination of *mined* and *recycled material* or 100% *mined material* inputs in the *assessment* period shall conform with all criteria covered by section *5 Conformance Criteria*.

Diagram 1 The Due Diligence Process



5.1 Step 1 Criteria: Management System

Guidance on Step 1 of the *due diligence process*: Management System

Objective: To maintain a strong management system to support supply chain due diligence.

Explanation: A management system is a set of documented policies, processes, and procedures that set out the tasks required by a company to achieve its objectives and improve performance over time by carrying out repeatable steps to be implemented by management and staff. The level of complexity of the system varies depending on each company's specific context. Key features of an effective management system include:

- **Leadership**, which is key to establishing unity of purpose and direction through clear commitments and accountability.
- People engagement, to ensure that people at all levels contribute to their company's objectives through their abilities and clear **roles, responsibilities and accountabilities**.
- A process approach to activities and **resources management**.
- A continuous cycle of **evaluation and improvement** of operations and processes.
- Evidence-based decision-making through the analysis of data and information collected through a **system of control and transparency**.
- Relationship management with stakeholders, and in particular, **supplier engagement**, to enhance the ability of both companies and suppliers to achieve shared objectives.

The *company* shall design and implement a management system to govern their *due diligence process* undertaken on *mineral supply chains*. The management system shall include, at a minimum, the core elements described in this section. It may be established as a stand-alone system or integrated into the *company*'s existing management systems.

5.1.1. Leadership

The *company*'s *senior management* shall commit to the effectiveness of the management system by:

- Assuming accountability for its implementation, maintenance and achievement of intended results.
- Ensuring its requirements are integrated into the *company*'s business processes.
- Building and maintaining internal capacity to implement the management system.
- Ensuring continual improvement of the management system.

The *company*'s *senior management* shall adopt a policy or policies on responsible *mineral supply chains* (hereafter, *policy*) that is:

- Appropriate to the nature, scale and operational context of the *company*.
- Retained as documented information.
- Communicated, understood and applied within the *company*.
- Publicly available.
- Stand alone or incorporated into operational policies such as a human rights policy, a community engagement policy, or other policies on corporate social responsibility and sustainability; supplier standards or code of conduct; or other appropriate documents.

The *company*'s *policy* shall include, at a minimum:

- A commitment of the *company* to implement the five-step due diligence process defined in the OECD Guidance Annex I.
- A commitment to identify, assess, and respond to *risks of adverse impacts* and *actual adverse impacts* in *mineral supply chains* including, at a minimum, those listed in the OECD Guidance Annex II.
- A description of a clear and coherent management process for managing r*isks of adverse impacts* and *actual adverse impacts*.
- The date when the *policy* became effective.

The *company* shall assess its own activities and the activities of its *suppliers* against the *policy*, using its management system.

5.1.2. Organisational Roles, Responsibilities and Accountabilities

The *company* shall assign the responsibility and accountability to *senior management* with the necessary competence, knowledge and experience to:

- Oversee the management system.
- Make decisions for its successful implementation, including for responding to *risks of adverse impacts* and *actual adverse impacts* identified through the *due diligence process*
- Regularly review the effectiveness and the performance of the management system, and take necessary action for its improvement.

5.1.3. Resources Management

The *company* shall:

- Determine the resources needed to support the implementation, maintenance and continual improvement of the management system, taking into account *company* size, location and circumstances.

- Provide the resources needed, ensure staff managing and implementing the management system are competent on the basis of education, training and/or experience.
- Ensure that adequate subject matter expertise is available to ensure the effectiveness of the *due diligence process*.
- Provide training on the *company*'s due diligence management system and process to relevant employees, and maintain training records.

5.1.4. Performance Evaluation and Improvement

The *company* shall evaluate the effectiveness of the management system at planned intervals and determine:

- The scope of the evaluation.
- The methodology of the evaluation.
- The timing of the evaluation.

The *company* shall use the results from the evaluation to plan for continuous improvement of the management system.

5.1.5. Grievance mechanism

The *company* shall design and implement a grievance mechanism. The grievance mechanism shall:

- Allow internal and external stakeholders, including *affected stakeholders* or whistle-blowers, to anonymously voice concerns without fear of retaliation regarding the circumstances of mineral extraction, transport, trade, handling, processing, and export of minerals, including in *CAHRA*.
- Cover the *risks of adverse impacts* and *actual adverse impacts* listed in the *policy*.
- Include a process to investigate any concerns or grievances received and determine and implement an appropriate and effective remedy.

The *company* may use an already established grievance mechanism that covers the requirements in this section. The grievance mechanism may be provided by the *company* directly or through collaboration with other *companies* or through a *joint initiative*.

5.1.6. System of Control and Transparency

The *company* shall design and implement a system of control and transparency to:

- Maintain control of the *materials* in its possession. Mining *companies* that do not source *external material inputs* during the *assessment* period shall identify the risk of and prevent the actual entry of *external material inputs* into the *company*'s operations. The *company* shall be able to demonstrate the implementation of the material control system.

- Identify *suppliers* in the *mineral supply chain*.
- Collect and retain information necessary to implement all applicable steps of the *due diligence process*, as described throughout the following sections for each step of the *due diligence process*.
- Investigate and address any discrepancies or inconsistencies identified in the information collected.

Information necessary to implement all applicable steps of the *due diligence process* may be collected through different methods, including, but not limited to:

- *Supplier* engagement, for example, through consultation or negotiation processes, through questionnaires and/or in-person meetings or remote interviews.
- Desk research conducted by the *company*, including, but not limited to, through a review of the information available on the Internet and/or through relevant reports issued by international bodies and civil society; by media and activist organisations.
- Reports issued by external parties or institutions, external experts, governmental agencies or research organisations.
- Information collected through the *company*'s grievance mechanism.
- Information generated through the *company*'s system of internal control.
- For *companies* that do not source *external material inputs* during the *assessment period*, information collected or generated under the activities of their operational *policy* and procedures for managing *risks of adverse impacts* and *actual adverse impacts* listed in the OECD Guidance Annex II.

The *company* shall collect and retain information, including documents and records, required by the management system for at least five years.

5.1.7. *Supplier* Engagement

The *company* shall engage *immediate suppliers* to:

- Communicate its *policy* and its expectation that *suppliers* implement a *due diligence process* in conformance with the Principles and Criteria of this Standard.
- Incorporate the requirement to comply with the *company*'s *policy* into contracts and/or agreements with *immediate suppliers* in a way that can be readily applied and monitored.
- Collect the necessary information to implement the *company's due diligence process*.
- Assist *immediate suppliers* in building due diligence capacities and providing training as appropriate on the *company*'s *policy* and its practical application.
- Where *risks of adverse impacts* and/or *actual adverse impacts* are identified, engage *suppliers* on the implementation of the risk management plan.

Such requirements for *supplier* engagement do not apply to *companies* that do not source *external material inputs* during the *assessment period*.

The *company* shall make relevant information available to downstream *companies,* assessors, and to any *joint initiative* with the mandate to collect and process information for on-the-ground (*see 5.2.4.1. On-the-ground Assessments*) and/or third-party assessments (*see 5.4 Step 4 Criteria: Independent Third-Party Assessment at Identified Points in the Supply Chain*), with due regard to *business confidentiality and other competitive concerns*.

5.2 Step 2 Criteria: Red Flags Identification and Risk Assessment

Guidance on Step 2 of the *due diligence process*: Red Flags Identification and Risk Assessment

Objective: To identify *risks of potential adverse impacts* and *actual adverse impacts* covered by a company's *policy* along the supply chains for the *materials* in scope of the assessment.

Explanation: Companies involved in the extraction, transport, trade, handling, processing, and export of minerals and metals generate income for workers, economic growth of communities, sustain livelihoods and foster local development. However, companies operating in *CAHRAs* may be at a higher risk of contributing to or being associated with significant *adverse impacts*, including serious human rights abuses and conflict.

The goal of this step is to gather information so that companies can be alerted to *risks of potential adverse impacts* or *actual adverse impacts* in their supply chain. This is achieved by first using *reasonable efforts* to identify any 'red flags'. 'Red flags' are risk warnings linked to the location of a *material*'s *origin* and its transit route, for example, whether the *material* comes from or passes through a *CAHRA*. 'Red flags' can also be associated with a *supplier's* sourcing practices where that *supplier* is known to, or potentially may, have sourced *materials* in scope of the assessment from a *CAHRA* or with a *supplier's shareholder interest* or *other interests* in *companies* that supply *materials* from or operate in a *CAHRA*.

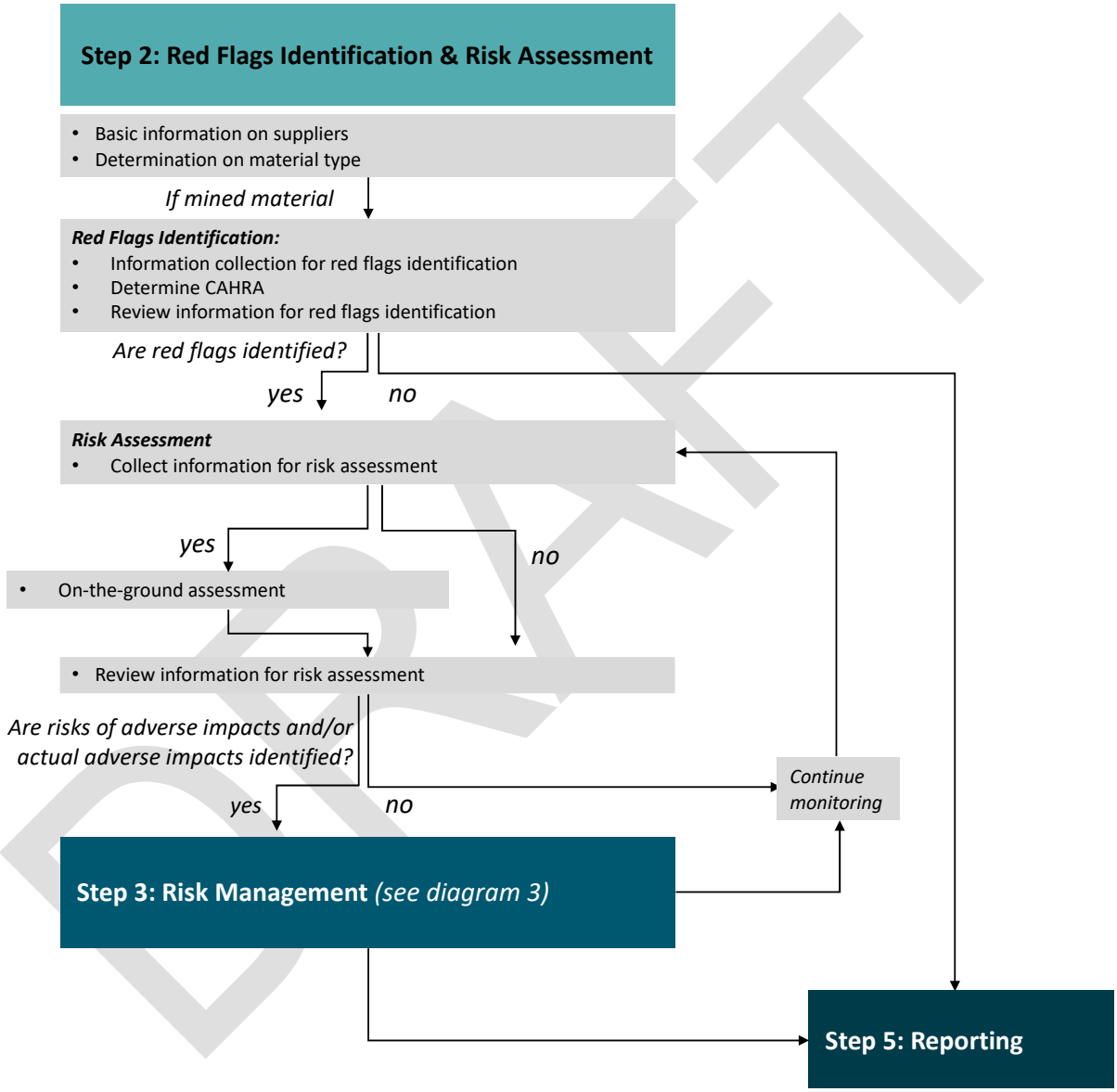
Where companies identify anomalies, unusual circumstances or other risks that give rise to a reasonable suspicion that there are any of the risks covered in the OECD Guidance Annex II in their supply chains, companies should gather further information to confirm the presence of such risks.

A 'red flag' **does not automatically confirm** that there is an *actual adverse impact*, rather, it alerts companies that there is a higher likelihood of such impacts along the supply chain. The next activity, therefore, is to carry out a risk assessment to ascertain the risk of potential or actual adverse impacts through desk research, supplier engagement, and, where necessary, an on-the-ground assessment.

On-the-ground assessments can help a company collect and/or generate information on the factual circumstances of mineral extraction, transport, trade, handling, processing, and export where relevant data gaps need to be addressed.

On-the-ground assessments may also be a useful tool to strengthen engagement with *suppliers*, providing an opportunity to share relevant information, promote responsible sourcing practices and build capacity for the successful implementation of the *due diligence process*.

Diagram 2 Red Flags Identification and Risk Assessment



5.2.1. Basic Supplier Information

For each *supplier,* the *company* shall collect and retain information to determine the identity, nature, and legality of the *suppliers*' business operations. Such information may be collected through the *company*'s existing *KYC* process.

The *company* is responsible for collecting such information when entering into a business relationship with a *supplier* and for updating such information and monitoring changes throughout the business relationship.

5.2.2. Determination of *Material* Type

The *company* shall document the type of *material* received, whether it is *mined material* or *recycled*.

For incoming *recycled material* in the scope of the *assessment*, the *company* shall collect and retain information to demonstrate that *material* is recycled.

***Recycled material* is excluded from further due diligence. The following criteria apply to *mined material*.**

5.2.3. Red Flags Identification

The *company* shall make *reasonable efforts* to identify potential red flag locations of mineral *origin* and *transit* and/or *supplier* red flags. The red flags are:

- Red flag locations of mineral *origin* and *transit* prior to delivery to the *company*:
  - The minerals originate from or have been transported via a *CAHRA*.
  - The minerals are claimed to originate from a country that has limited known reserves, likely resources or expected production levels of the mineral in question (i.e. the declared volumes of mineral from the country are out of keeping with its known reserves or expected production levels).
  - The minerals are claimed to originate from a country in which minerals from *CAHRAs* are known to *transit*.

- *Supplier* red flags:
  - The *company*'s *suppliers* have *shareholder interest* or *other interests* in *known suppliers* that supply minerals from or operate in one of the above-mentioned red flags locations of mineral *origin* and *transit*.
  - The *company*'s *suppliers* are known to have sourced minerals from a red flag location of mineral *origin* and *transit* in the last 12 months.

The *company* shall determine and report to *senior management* whether red flags have been identified in its supply chains. As part of its red flags identification process, the *company* shall also determine and report to *senior management* whether the operating *site* is located in a *CAHRA* or is associated with any other red flags.

To determine the presence of red flags, the *company* shall make reasonable efforts to collect *sufficient* and *credible* information for all *mined material* received in scope of the *assessment*, including, at a minimum:

- Country of *origin* of the *material*.
- Countries through which the *material* has been *transported* or *transited* prior to delivery to the *company*.
- Quantities, expressed in volume or weight of *materials* received.
- The *suppliers*' sourcing practices and forms of control, meaning:
    - Whether they have a *shareholder interest* or *other interests* in *known suppliers* that supply *materials* within the scope of the *assessment* from or operate in a CAHRA.
    - Whether they have sourced *materials* within the scope of the *assessment* from a CAHRA over the last 12 months.
    - Whether they have sourced *materials* within the scope of the *assessment* from *artisanal* and/or *small-scale mining* (ASM) operators over the last 12 months.

Where ASM operators are present in the supply chain, the *company* is encouraged to engage with the operators for the purpose of building capacity and mitigating potential *risks of adverse impacts* and *actual adverse impacts* covered by the *policy*.

5.2.3.1. *CAHRA* Determination

To identify red flags, the *company* shall design and implement a reasonable process to determine *CAHRAs*. As part of the *CAHRA* determination process, the *company* shall:

- Adopt a consistent methodology or procedure to make the CAHRA determination, including establishing the frequency at which the CAHRA determination is reviewed and updated.
- Adopt and record credible sources of information and resources used to make the *CAHRA* determination. The *company* may refer to resources provided by a *joint initiative* or indicative list of CAHRAs issued by governments.
- Ensure that findings are *plausible*.

Where red flags are identified, the company shall proceed with carrying out the risk assessment. *(see 5.2.4 Risk Assessment)*

Where no red flags are identified, the company shall proceed with reporting on its due diligence *(see 5.5 Reporting).*

5.2.4. Risk Assessment

Where red flags are raised during the red flags identification process, the *company* shall take additional steps to generate, collect and retain detailed information on the factual circumstances of extraction, transport, trade, handling, processing, and export of the red-flagged supply chains. This includes records of payments made by *red-flagged suppliers*.

The *company* shall determine and report to *senior management* whether there are *risks of adverse impacts* and *actual adverse impacts* covered by the *policy* and as listed in the OECD Guidance Annex II. The *risks of adverse impacts* and *actual adverse impacts* are summarised below:

- Serious human rights abuses including:
  - Any forms of torture, cruel, inhuman and degrading treatment.
  - Any forms of forced or compulsory labour.
  - The worst forms of child labour.
  - Other gross human rights violations and abuses such as widespread sexual violence.
  - War crimes or other serious violations of international humanitarian law, crimes against humanity or genocide.
- Direct or indirect support to non-state armed groups.
- Risks associated with the contracting of public or private security forces.
- Bribery and fraudulent misrepresentation of the *origin* of materials.
- Money laundering.
- Non-Payment of taxes, fees and royalties due to governments.

The *company* shall make reasonable efforts to collect *sufficient* and *credible* information to determine the presence of *risks of adverse impacts* and/or *actual adverse impacts.* The information depends on the type of red flag raised and may include:

- Information for red flag locations of mineral *origin* and *transit:*
  - The exact location of *origin* of the *material*, up to the mine site, and the in-country *transportation* routes.

- The *suppliers* and the location where the *materials* were processed, consolidated, blended, upgraded and exported prior to delivery to the company.
- The context of the area (local or regional) of *material origin*, *transit* and/or export, including:
    - The local governance and rule of law.
    - The potential presence of human rights issues, including grievances voiced by interested parties on the ground and mediation action.
    - The potential association of the area with illicit trade.
    - The potential association of the area and/or *site* with armed conflict.
- The disclosure of payments at points of access to mine sites, along transportation routes or at points where the *materials* are traded.

- Information for *supplier* red flags:
    - The supplier's adherence to, and/or participation in international frameworks and multi-stakeholder initiatives with the mission to promote human rights, business integrity, and transparency, including, but not limited to:
        - The United Nations Global Compact.
        - The United Nations Guiding Principles for Business and Human Rights.
    - The policies and procedures adopted by the *red-flagged suppliers* to identify, assess and respond to *risks of adverse impacts* and *actual adverse impacts* listed in the OECD Guidance Annex II. Relevant supplier's policies may include, but are not limited to, policies on:
        - Responsible supply chains of minerals.
        - Business integrity, including but not limited to anti-bribery, anti-corruption, and anti-money laundering.
        - Human rights.
    - Evidence of the implementation of the *supplier's* policies. Such evidence may include:
        - Documents submitted by the supplier.
        - Second-party or third-party certification or assessment reports.
        - Allegations and adverse media reports on relevant *risks of adverse impacts* or *actual adverse impacts*, which the *company* determines to be factual.

- Where the *red-flagged supplier* is a mining *company* employing public and/or private security forces, whether it commits to and implements the Voluntary Principles on Security and Human Rights.
- The supplier's social, environmental, and governance reporting practices.
- The supplier's disclosure of the ownership, including beneficial ownership and of the corporate structure;
- The supplier's disclosure of payments made to government or governmental officials including taxes fees or royalties; and of the payments made to public or private security forces or other armed groups.
- Where the *red-flagged supplier* is a mining *company* operating in an Extractive Industries Transparency Initiative (EITI) implementing country, whether it commits to and implements the EITI Principles and Criteria.
- Where *artisanal* and/or *small-scale mining* operators are present, their level of control and formalisation.

Such information may be collected through on-the-ground assessments where necessary (*see 5.2.4.1. On-the-ground Assessments)*.

If the *company* is located in a *CAHRA,* the *company* shall:

- Take steps to map the factual circumstances of its own red-flagged operations (*see Information for red flag locations of mineral origin and transit*). This information may be generated, for example, through a combination of the following activities:
  - As part of the *company*'s own social impact assessment, security and human rights risk assessment, or other risk assessments relevant to the scope of this Standard.
  - By reviewing research reports, which the *company* determines to be factual.
  - By consulting with local and central governments and civil society organisations.
  - Through an on-the-ground assessment (*see 5.2.4.1. On-the-ground Assessments*).
- Effectively implement the policies and procedures adopted to identify, assess and respond to *risks of adverse impacts* and *actual adverse impacts* covered by the *company*'s *policy*.

5.2.4.1. On-the-ground Assessments

The *company* shall seek to gather information through on-the-ground assessments where data gaps result in a lack of *sufficient* and *credible* information necessary to determine the presence of *risks of adverse impacts* and *actual adverse impacts* covered by the *policy.*

The *company* may consider the following factors when determining the need for an on-the-ground assessment and, where needed, when prioritising the on-the-ground assessments that are carried out during the *assessment period:*

- The lack of adherence to, and/or participation in international frameworks and multi-stakeholder initiatives; the lack of policies and/or management systems at the supplier; and/ or a lack of evidence of their effective implementation by the *red-flagged supplier*.
- The presence of allegations or adverse media reports which the *company* determines to be factual, or for which an on-the-ground assessment is required to determine whether they are factual, and which may raise concerns over the ability by the supplier to respond to risks. The *company* shall engage the *red-flagged supplier* to provide an opportunity to respond to allegations before determining the need for an on-the-ground assessment.
- Whether a *change in circumstances* occurred in relation to the *red-flagged supplier*, including, for example, changes to a supplier's business nature or ownership structure, or to the local context or supply chain, which may result in data gaps.
- Whether the *red-flagged supplier* and/or the information shared by the supplier has not been independently assessed or validated.
- Where the *red-flagged supplier* has been assessed by an independent third party against this Standard or a recognised third party assurance programme, the assessment shall be accepted by companies downstream in lieu of instead of undertaking another third party assessment or on-the-ground assessment.

Where an on-the-ground assessment is necessary, the *company* shall:[1]

- Define the scope of the assessment and capacities of the assessment team, based on the stated objectives for the assessment.
- Use an evidence-based approach, through the collection of verifiable, reliable, up-to-date evidence.
- Preserve the reliability and quality of the on-the-ground assessment, through ensuring that company assessors are independent from the activity being assessed and free from conflict of interests.

[1] Adapted from the OECD Guidance Appendix - Guiding Note for Upstream Company Risk Assessment

Company assessors shall commit to reporting truthfully and accurately and upholding the highest professional ethical standards and exercise due professional care.

- Ensure the appropriate level of competence, through employing experts with knowledge and skill in the following areas: the operational contexts assessed, the substance of risks covered by the *policy*, the nature and form of the *mineral supply chain* (e.g. mineral procurement), the OECD Guidance, this Standard and *assessment* principles, procedures and techniques.
- Facilitate the work of the assessment team, by allowing access to information gained by the *company* throughout the *due diligence process*.
- Ensure that the assessment team consults with relevant, including affected, stakeholders.

The *company* may share information collected, generated and retained by the *assessment team* with the *supplier(s)* that are subject of the *assessment* as a way to strengthen engagement and build capacity for supply chain due diligence. Information may be shared as well as with downstream companies and *affected stakeholders* with due regard to *business confidentiality and other competitive concerns*.

5.2.4.2. Continuous Monitoring

The *company* shall maintain ongoing risk monitoring at planned intervals and to account for *change in circumstances* in relation to the red-flagged supply chain.

Where the presence of risks of adverse impacts or actual adverse impacts is identified, the company shall proceed with the design and implementation of a strategy to respond to such risks *(see 5.3. Risk Management).*

5.3 Step 3 Criteria: Risk Management

Guidance on Step 3 of the *due diligence process*: Risk Management

Objective: To design a strategy and implement a risk management plan to respond to *risks of adverse impacts* and *actual adverse impacts* identified during the risk assessment.

Explanation: Companies have a responsibility to respond to *risks of adverse impacts* and *actual adverse impacts* by designing a strategy and implementing a risk management strategy plan.

A risk management plan is intended as a procedural framework that companies implement to take actions to *mitigate risks of adverse impacts* and *actual adverse impacts* identified during the risk assessment process in accordance with their strategy.

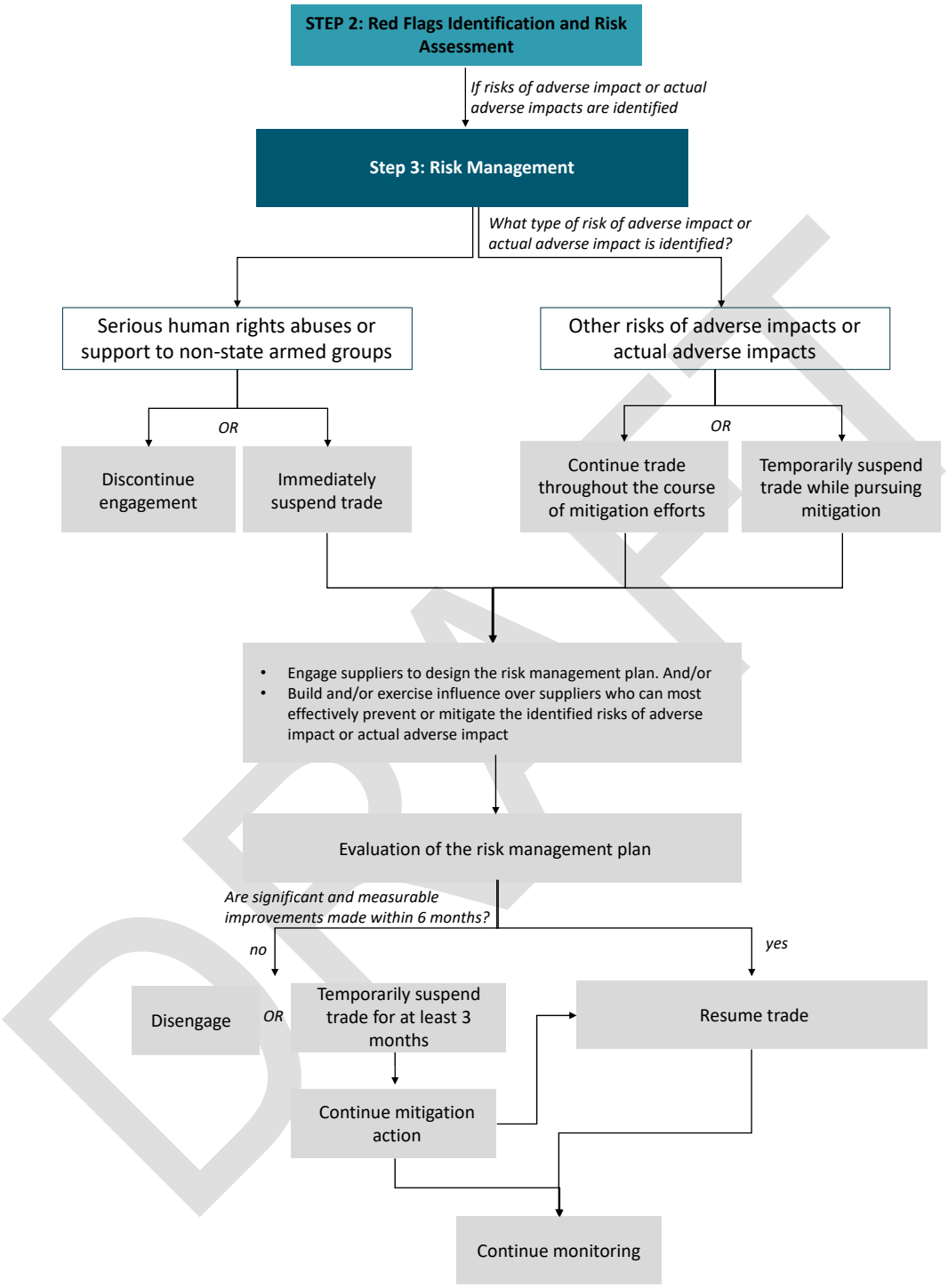
To implement the risk management plan successfully, it is important that the companies engage constructively with *suppliers* and other relevant stakeholders. Depending on the *risks of adverse impacts* or *actual adverse impacts* identified, relevant stakeholders may include: *affected stakeholders,* local authorities and/or civil society.

Companies may manage risks directly or by exercising their *influence*, through:

- Engaging with *immediate suppliers*, as a way to consequently affect the supply chain further upstream.
- Business associations and multi-stakeholder initiatives.
- Engaging with the local or central government.

A successful risk management plan is one that leads to *significant improvem*ents and whose effectiveness can be tracked through appropriate qualitative and quantitative indicators and/or by drawing on feedback from *stakeholders*.

Diagram 3 Risk Management



5.3.1. Design a Strategy and Implement a Risk Management Plan

The *company* shall review the information collected during Step 2 in order to design a strategy in response to identified *risks of adverse impacts* and *actual adverse impacts* and implement a risk management plan that is:

- Consistent with the *policy* and appropriate to the type and scale of the impacts and the *company's* position along the supply chain:
    - Where the *risk of adverse impact* or *actual adverse impact* sits within a *company*'s own operations, the *company* shall implement effective measures to mitigate the *risk of adverse impact* or *actual adverse impact* identified. *Companies* are encouraged to adopt internationally recognised frameworks, such as the United Nations Guiding Principles on Business and Human Rights.
    - Where the *risk of adverse impact* or *actual adverse impact* sits with the *immediate supplier:*
        - Disengage or immediately suspend trade with the *supplier* where the *company* identifies a reasonable *risk of adverse impact* or *actual adverse impact* that is deemed too severe (serious human rights abuses and support to non-state armed groups). Or
        - Continue trade or temporarily suspend trade while pursuing ongoing mitigation of the risk.
    - Where the *risk of adverse impact* or *actual adverse impact* sits further upstream of the *immediate suppliers*, the *company* shall, as appropriate, take steps to build and/or exercise *influence* over *suppliers* who can most effectively prevent or mitigate the identified *risks of adverse impacts* or *actual adverse impacts*.
- Complete with *mitigation* actions including clear performance objectives and qualitative and/or quantitative indicators to measure and promote *significant* improvements within reasonable timescales.
- Developed in consultation with *suppliers* and *affected stakeholders*, to agree on the strategy for measurable mitigation actions as part of the risk management plan.
- Retained as documented information.

5.3.2. Evaluation of the Risk Management Plan

The *company* shall evaluate the effective implementation of the risk management plan at planned intervals and report findings to *senior management*.

If there is no significant measurable improvement within six months the *company* shall review the risk management plan and consider the option of suspending or discontinuing trade with a supplier for a minimum of three months after failed attempts at mitigation.

Where appropriate, the *company* should remain engaged to continue to exercise its *influence* to effectively prevent or mitigate the identified *risks of adverse impacts* or *actual adverse impacts*.

The determination of the appropriate risk mitigation strategy should take into consideration the impacts on the community.

The company shall undertake additional fact and risk assessments *(see 5.2.2. Risk Assessment)* ***for risks requiring mitigation or after a change in circumstances.***

5.4 Step 4 Criteria: Independent Third-Party *Assessment* at *Identified Points* in the Supply Chain

Guidance on Step 4 of the *due diligence process:* Independent Third-Party *Assessments* at *Identified Points*

Mineral supply chains can be long, highly complex and characterised by low visibility. For companies, this can make it difficult to determine which suppliers to assess and conducting multiple suppliers' *assessments* of their *due diligence process* can be a costly endeavour.

For this reason, undertaking *assessments* at strategic points in the supply chain may help to avoid assessment fatigue and increase efficiency. Such strategic points are referred to as *identified points,* meaning, points in the supply chain meeting the following criteria:

- Key points of *transformation* in the supply chain.
- Stages in the supply chain that generally include relatively few actors that process a majority of the commodity.
- Stages in the supply chain with visibility and control over the circumstances of production and trade upstream.
- Greatest points of leverage of downstream enterprises.

By definition, a company downstream of the *identified point* shares some of the same upstream suppliers as the supplier operating at the *identified point* in its supply chain. However, the company operating at the *identified point* likely holds greater visibility or *influence* over those upstream suppliers. If a company can reasonably determine that the suppliers operating at the *identified point* in its supply chain are conducting due diligence on their upstream suppliers, then the company can likewise reasonably determine that *risks of adverse impacts* and/or *actual adverse impacts* linked to its own upstream suppliers have been identified, prevented and mitigated.

In complex supply chains characterised by a high level of dis-integration, more than one point in the supply chain may constitute an *identified point* known as additional *identified points*. Companies that are additional *identified points* are encouraged to undergo an assessment. Companies downstream of the additional *identified points* are encouraged to exercise their *influence* to have suppliers at additional *identified points* in their supply chains undergo an assessment.

Companies at *identified points* in the supply chain shall have their due diligence management systems and practices assessed against this Standard by an approved assessor.

For the *principal covered metals*, the *refiner* is an *identified point*. For this reason, the *refiner* shall have its due diligence management system and practices assessed by the owner of the assurance process or a recognised programme.

Additional *identified points*:

It is acknowledged that in specific circumstances the *principal covered metals*' supply chain may consist of more than one *identified point*. In such a case, the *refiner* may request the additional *identified point* to have their due diligence management systems and practices assessed by an independent third party to demonstrate conformance with this Standard.

Specifically, in the *principal covered metals* supply chains, stand-alone copper, lead, nickel, or zinc concentrate *blending companies* and/or stand-alone *smelters* can be an additional *identified point*.

Alternative *identified points*:

It is also acknowledged that, in specific supply chains, a *material* can follow an alternative production route that does not include a company meeting the definition of a *refiner*. In such cases, an alternative *identified point* may be determined. The alternative *identified point* shall have their due diligence management systems and practices assessed by an independent third party in order to demonstrate conformance with this Standard.

Specifically, producers of nickel chemical compounds and all nickel raw intermediates (iron-nickel, nickel pig iron, nickel oxide sinter, and other nickel intermediaries) entering production of stainless steel, alloys, batteries, plating, where refining is not part of the transformation process, are alternative *identified points*.

***Companies* located in a *CAHRA*:**

Companies located in a *CAHRA* are encouraged to have their due diligence management systems and practices assessed against this Standard or a recognised third party assurance programme (*see 4.2. Recognition of other schemes*). Where *companies* have been assessed by an independent third party against this Standard or a recognised third party assurance programme, the assessment shall be accepted by *companies* downstream instead of undertaking another third party assessment or on-the-ground assessment (*see 5.2.4.1. On-the-ground Assessments*).

5.5 Step 5 Criteria: Reporting

Guidance on Step 5 of the *due diligence process:* Reporting

Objective: To report on supply chain due diligence policies and practices.

Explanation: Reporting is a fundamental step in the *due diligence process*, as it promotes transparency and accountability. Reporting allows stakeholders to understand the steps taken by companies in respect of responsible sourcing. As a consequence, reporting is intended to motivate companies to improve their due diligence practices and risk management performance over time and to generate public confidence in the supply chains of the *principal covered metals.*

Through reporting, companies provide a description of their *due diligence process,* and the *risks of adverse impacts* and *actual adverse impacts* identified.

To this end, it is recommended that reporting is undertaken in line with internationally recognised principles for reporting, including:

- **Accuracy**: The reported information is sufficiently accurate and detailed for stakeholders to assess a company's due diligence performance.
- **Clarity**: Companies make information available in a manner that is understandable and accessible to stakeholders.
- **Comparability**: Companies select, compile, review and report information consistently, in a manner that enables stakeholders to analyse performance trends over time.
- **Reliability**: Companies collect, retain, compile, review and report information and processes used in the preparation of the report in a way that can be subject to examination.
- **Timeliness**: Companies report on a regular schedule.

All *companies* shall annually report information on supply chain due diligence, with due regard *for business confidentiality and other competitive concerns*.

The *company* report shall include, at a minimum:

- A reference to the *company*'s *policy.*
- A description of the management system designed and implemented for implementing the *company*'s *policy*.

- The system of control and transparency designed and implemented to collect and retain information necessary for red flags identification and for the following steps of the *due diligence process*, where relevant (*see 5.1.6 System of Control and Transparency*), and how this system has strengthened the *company*'s due diligence efforts.
- A summary of the methodology adopted and the results of the red flags identification process obtained during the assessment period.

Where red flags are raised during the red flags identification process, the *company* report shall describe the methodology adopted and the results of the risk assessment obtained in the *assessment* reporting period.

Where *risks of adverse impacts* and/or *actual adverse impacts* are identified during the risk assessment, the *company* report shall describe the strategy adopted to respond to such risks, including:

- A summary of the risk management plan and of the actions taken during the *assessment period* to mitigate *risks of adverse impacts* and/or *actual adverse impacts* identified, including, where relevant, the involvement of stakeholders.
- A summary of the methodology for monitoring and evaluating the risk management plan.
- Whether improvement was made towards eliminating the *risks of adverse impacts* and/or *actual adverse impacts*.

If the *company* is a mining company operating in an EITI implementing country, the *company* shall describe how it meets the expectations for EITI supporting companies as set out by the EITI.

Such information may be integrated into sustainability, corporate social responsibility, or other annual reports.

6 Glossary

Actual adverse impact(s): An *adverse impact* that has already occurred or is occurring.[2]

Adverse impact(s): These may include harm to people (i.e. external impacts), or reputational damage or legal liability for the *company* (i.e. internal impacts), or both. Such internal and external impacts are often interdependent, with external harm coupled with reputational damage or exposure to legal liability.[3]

Affected stakeholder(s): An individual or group of people or organisation whose rights have been negatively affected by a *company*'s operations, products and/or services.

Artisanal mining: Artisanal mining operations include operations run by men and/or women working on an individual basis as well as those working in family groups. Artisanal operations may also include operations organized in varying degrees of formality as partnerships, associations, or cooperatives. Artisanal operations do not rely on permanent hired labour. They utilize simplified forms of extraction, processing and transportation with little mechanization.[4]

Assessment: An evaluation of the performance of a *site* against the Standard. For the purpose of this Standard, the term is used to indicate both an assessment or audit.

Assessment period: The period of time covered by the *assessment*, typically one year.

Assessment team: The on-the-ground assessment team which may be established by a *company*, where needed, as part of the risk assessment process.

Blending company: A *company* performing blending activities with the purpose to blend different materials, such as mineral ore or concentrate, without altering the chemical or metallurgical composition.

Business confidentiality and other competitive concerns: Price information and supplier relationships without prejudice to subsequent evolving interpretation. [5]

[2] United Nations Human Rights Office of the High Commissioner (2012), The Corporate Responsibility to Respect Human Rights – An Interpretative Guide, United Nations, New York and Geneva. Pag. 5.
[3] OECD (2016), OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas: Third Edition, OECD Publishing, Paris. Pag. 13.
[4] Working definition as of date of publication from Responsible Minerals Initiative (RMI) Artisanal and Small-Scale Mining (ASM) Risk-Readiness Assessment (RRA) Methodology.
[5] OECD (2016), OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas: Third Edition, OECD Publishing, Paris. Pag. 40.

Confidential information could include, for example, information on the *company* suppliers, customers, contract terms, tonnage and capacity.

By-product: *Mined material* resulting from the processing of another metal ore which would not have otherwise been obtained without processing of that other ore. For example, in the lead supply chain, lead may be produced as a by-product of zinc and copper–zinc bearing ore deposits. The origin of the by-product is the point of separation from the other metal ore.[6]

Chain of custody: A system of control and transparency, specifically, the documented record of the sequence of *companies* and individuals that have custody of minerals as they move through a supply chain.[7]

Change in circumstances: A modification, usually substantial, unanticipated, and/or involuntary, related, for example, to a *supplier*'s business nature or ownership structure, or to a local context or supply chain.

Company: A legal entity formed by a group of individuals or companies to engage in and operate a business. For the purpose of this Standard, the term is used to indicate a business of any business and ownership structure including a partnership, proprietorship, or corporation, or co-operative.

Conflict-Affected and High-Risk Area (CAHRA): Areas identified by the presence of armed conflict, widespread violence, including violence generated by criminal networks, or other risks of serious and widespread harm to people. Armed conflict may take a variety of forms, such as a conflict of international or non-international character, which may involve two or more states, or may consist of wars of liberation, or insurgencies, civil wars. High-risk areas are those where there is a high risk of conflict or of widespread or serious abuses as defined in paragraph 1 of Annex II of the OECD Guidance. Such areas are often characterized by political instability or repression, institutional weakness, insecurity, the collapse of civil infrastructure, widespread violence and violations of national or international law.[8]

[6] Adapted from International Tin Association (ITA) and Responsible Minerals Initiative (RMI) (2019), Assessment Criteria for Tin Smelting Companies. Pag. 28.
[7] Adapted from OECD (2016), OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas: Third Edition, OECD Publishing, Paris. Pag. 65.
[8] OECD (2016), OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas: Third Edition, OECD Publishing, Paris. Pag. 66.

Collaborating company(ies): The other company(ies) sourcing from, or operating in, the same areas and/or *site*(s), with whom the *company* collaborates for due diligence purposes.

Credible information: Information for which the *company* has no reason to doubt the source and/or which does not provide conflicting accounts where different sources on the same topic are available.

Due diligence process: For the purpose of this Standard, the five-step due diligence process defined in the OECD Guidance Annex I.

Equivalent: For the purpose of this Standard, materially comparable in scope and intent.

External material input(s): *Material* received from a supplier in the *assessment period*.

Identified point: Point in the supply chain meeting the following criteria:[9]

- key points of *transformation* in the supply chain;
- stages in the supply chain that generally include relatively few actors that process a majority of the commodity;
- stages in the supply chain with visibility and control over the circumstances of production and trade upstream;
- greatest points of leverage of downstream enterprises.

Companies at such points are subject to third -party assessment of their due diligence practices

Immediate supplier(s): The supplier which has a contract with and supplies *material* to the *company* and is immediately before the company in the supply chain.[10]

Influence: For the purpose of this Standard, the ability of a *company* to effect change in, and/or prevent the wrongful practices of, another *company* that is or may be causing or contributing to an *adverse impact.*

Intermediate (*material*): A substance in unalloyed, alloyed or chemical form resulting from processing and that requires further processing prior to sale by a *refiner* to downstream customers.

[9] Adapted from OECD (2018), OECD Due Diligence Guidance for Responsible Supply Chains in the Garment and Footwear Sector, OECD Publishing, Paris. Pag. 13 and OECD/FAO (2016), OECD-FAO Guidance for Responsible Agricultural Supply Chains, OECD Publishing, Paris. Pag. 38.
[10] Adapted from Adapted from International Tin Association (ITA) and Responsible Minerals Initiative (RMI) (2019), Assessment Criteria for Tin Smelting Companies. Pag.29.

Joint initiative(s): An initiative enabling cooperation between companies on responsible supply chain management, to meet the due diligence principles, standards and processes of the OECD Guidance. For the purpose of this Standard, a joint initiative may include an institutionalised mechanism (an organisation created by and composed of representatives of governments, industries and civil society with a mandate to support and advance some or all of the recommendations of the OECD Guidance)[11], or other forms of collaboration established with the purpose to support the implementation of the *due diligence process*.

Known supplier(s): A supplier further up the supply chain that is known through general business dealings or for which information can reasonably be acquired through public sources.

Know Your Counterparty (KYC): A process to collect, verify and monitor the identity of a counterparty and to establish the facts to have a clear understanding of the nature and legality of the business.

Material(s): For the purpose of this Standard, the term is used to indicate all *mined*, *intermediate* and/or *recycled material* received, held, and/or processed during the *assessment* period, and intended for the production of *metal products*. The term includes *minerals* and metals.

Metal product(s): Metals in any unalloyed, alloyed or chemical form which may be used as a semi-finished or finished good.[12]

Mined material(s): Copper, nickel, lead, or zinc bearing ore or primary processed *material* which has never been previously refined.

Mineral(s): *principal covered metals*-containing ore in any physical form, extracted through mining of geological deposits, processed to higher grade mineral concentrate, and used in a primary smelter to undergo smelting.[13]

Mineral supply chain(s): For the purpose of this Standard, copper, nickel, lead, or zinc supply chains from mine sites to, and including, production of *metal products*.

[11] OECD (2016), OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas: Third Edition, OECD Publishing, Paris. Pag. 69.
[12] International Tin Association (ITA) and Responsible Minerals Initiative (RMI) (2019), Assessment Criteria for Tin Smelting Companies, p.30.
[13] Adapted from International Tin Association (ITA) and Responsible Minerals Initiative (RMI) (2019), Assessment Criteria for Tin Smelting Companies. Pag.30.

Mitigation: The mitigation of an adverse human rights impact refers to actions taken to reduce its extent, with any residual impact then requiring remediation. The mitigation of human rights risks refers to actions taken to reduce the likelihood of a certain adverse impact occurring.[14]

Origin: The country, or regional mining area within a country, from which the *mined material* was extracted from the ground.[15] For *by-products*, the origin is the point of separation from the other metal ore.[16] For *recycled material,* the origin is the point in the supply chain where the *recycled material* is returned to the *refiner* or other intermediate processor or *recycling company.*[17]

Other inputs: Inputs other than *materials* used for the production of *metal products,* such as chemicals, electrodes, energy inputs, industrial gases, lubricants, oils.

Other interests: Controlling interests achieved through a route other than a *shareholding interest* including, but not limited to: ownership of voting rights, contractual associations, management control (right to appoint or remove directors), other ability to exert significant influence on the company (e.g. veto rights, decision rights, right to profit, etc.).

Plausible: Seeming likely to be true, or able to be believed.[18]

Policy: The policy on responsible *mineral supply chains.* The *policy* may be stand-alone or incorporated into existing operational policies such as a human rights policy, a community engagement policy, or other policies on corporate social responsibility and sustainability; supplier standards or code of conduct; or other appropriate documents.

Principal covered metals: Copper, lead, nickel, and zinc.

Reasonable effort(s): Effort that is rational, sensible, and fair, while considering relevant limitations.

Recycling company(ies): For the purpose of this Standard, a company that uses 100% *recycled material* inputs in the assessment period.

[14] United Nations Human Rights Office of the High Commissioner (2012), The Corporate Responsibility to Respect Human Rights – An Interpretative Guide, United Nations, New York and Geneva. Pag. 7.
[15] International Tin Association (ITA) and Responsible Minerals Initiative (RMI) (2019), Assessment Criteria for Tin Smelting Companies, Pag.30.
[16] Ibid, Pag. 28
[17] Adapted from OECD (2016), OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas: Third Edition, OECD Publishing, Paris. Pag. 68.
[18] Cambridge Dictionary. Accessed online Aug. 2020. https://dictionary.cambridge.org/dictionary/english/plausible

Recycled material(s): Recycled materials are reclaimed end-user or post-consumer products, or scrap processed metals created during product manufacturing. Recycled metal includes excess, obsolete, defective, and scrap metal materials which contain refined or processed metals that are appropriate to recycle in the production of copper, lead, nickel, and zinc. Minerals partially processed, unprocessed or a *by-product* from another ore are not recycled metals.

Red-flagged supplier(s): For the purpose of this Standard, a supplier whose sourcing practices, operations and/or shareholder interests or *other interests* have raised a red flag of potential *risk of adverse impact* or *actual adverse impact* during the red flags assessment.

Refiner(s): For the purpose of this Standard, a company performing a process of purification to produce refined copper, lead, nickel and zinc metal. In these industries, such metals would be:

- Grade A copper cathode;
- 99.97% refined lead;
- Nickel metal class 1;
- Special High Grade (SHG) zinc.

Risk(s) of adverse impacts(s): For the purpose of this Standard, risks are defined in relation to the potentially *adverse impacts* of a company's operations, which result from a company's own activities or its relationships with third parties, including *suppliers* and other entities in the supply chain.

Senior management: The person or group of people within the *company* with the authority to allocate resources and make decisions on behalf of the company, including its *due diligence process*.

Shareholder interest(s): The shareholder's rights to a share of the profits and losses of the *company*, to receive distributions (liquidating or otherwise), to obtain information and to consent to or approve actions by the *company*.

Significant improvement(s): Substantial ongoing positive change that lead to the prevention, mitigation or remedy of adverse impacts.

Site: Operations involved in the mining, refining, or other intermediary steps for copper, lead, nickel, or zinc production, including, but not limited to, mining, solvent extraction and electrowinning (SX/EW), concentration, blending, washing, roasting, smelting, alloying or

refining. A site may comprise several activities in different locations in the same geographic area (e.g. mines, wastewater treatment facilities, refineries, ports and associated infrastructure), and under the same management control. Integrated sites, where the point of extraction and transformation or processing are critical operations to the output of the site, will generally be treated as one site.[19]

Small-Scale Mining: Small-scale mining operations may be run by partnerships or members of cooperatives or other types of associations and enterprises with more formal organizational structures than *artisanal mining*. Small-scale operations may rely on permanent or temporary hired labour and may use some sophisticated equipment and/or partial mechanization for extraction, processing, or transportation.[20]

Smelter: A company treating minerals or slags in order to produce metal for refining.

Stakeholder(s): An individual, a group of individuals, a *company*, an organisation or instititution that is directly or indirectly affected by the *company*'s activities, products and/or services, or whose actions can reasonably be expected to affect the ability of the company to implement its strategies and achieve its objectives.[21] These include, and are not limited to employees, other workers such as contractors, suppliers, local communities and civil society organisations.

Sufficient information: Information that includes all information needed to carry out the relevant step of the *due diligence process* as listed by this Standard.

Supplier(s): *Immediate suppliers* and other *known suppliers*, unless otherwise specified, from whom the *company* received *materials* during the *assessment period*.

The Copper Mark Criteria: The Copper Mark Criteria for Responsible Sourcing. The Copper Mark uses the Risk Readiness Assessment (RRA), developed and maintained by the RMI, as the basis for evaluating Copper Producers' performance against the Copper Mark Criteria. The RRA condenses over 50 international standards and guidelines into 32 issue areas covering environmental, social and governance aspects of mining, smelting and refining operations.

[19] Adapted from The Copper Mark (2020). The Copper Mark Assurance Process. Pag. 26.
[20] Responsible Minerals Initiative (RMI) Artisanal and Small-Scale Mining (ASM) Risk-Readiness Assessment (RRA) Methodology.
[21] Adapted from the Global Reporting Initiative (2020) GRI Sustainability Reporting Standards Glossary 2020. Pag. 20.

Traceability: A system of control and transparency, specifically, the physical tracking of minerals at all points of the supply chain, from their mine of *origin* to their point of export.[22]

Transformation: A point in the supply chain where the physical or chemical properties of a *material* are changed, in order to produce something else.

Transit: Shipping of *materials* between origin and final destination (prior to delivery to the *company)*, including through countries and across international borders, without discharging the cargo.[23]

Transport: The movement of *materials* from one location to another.[24]

7 Revision History

The first version of the Standard is published for consultation on 27 August 2020.

[22] Adapted from OECD Due Diligence Guidance: towards conflict-free mineral supply chains. Pag. 4.
[23] International Tin Association (ITA) and Responsible Minerals Initiative (RMI) (2019), Assessment Criteria for Tin Smelting Companies. Pag.32.
[24] Ibid.

8 Annexes

The following Annexes have been developed by The Copper Mark, the International Lead Association (ILA), the Nickel Institute (NI), and the International Zinc Association (IZA), to provide further information on the *principal covered metals*' supply chains.

Annex I: Copper Industry Key Facts and Supply Chain

Copper Industry Key Facts

- World identified copper resources are predominantly distributed in the Americas, which accounts for 64% of world resources, followed by Asia, with over 20%, and with comparatively small deposits in Africa and the Middle East, Europe and Oceania.

- A range of copper-bearing products, from various stages of production, are traded domestically and internationally. These include copper concentrate, copper blister, copper anode, copper cathode and copper scrap. Trade volumes (measured by the total content of pure copper traded as different types of material), are approximately 5-6 times greater for concentrate and cathode than for anode and blister forms of copper.[25]

- Copper mine production is dominated by South America, in particular, Chile (which accounts for about one third of world copper mine production) and Peru (over 10%), followed by China and the United States.[26]

- Copper smelter production is dominated by Asia, specifically, China (which accounts for over 40%) and Japan, followed by Chile and Russia. Copper is purchased by smelters in concentrate form, so China is a major importer of copper concentrate.[27]

- Refined copper production is also dominated by Asia, specifically, China (which accounts for approximately 40%) followed by Chile, Japan, and the United States.

- Approximately 99% of world copper is produced through large scale mining (LSM) and, in some regions, *small-scale mining* operators. Research conducted for the development of this Standard referred to the Democratic Republic of the Congo (DRC) as a producer of *artisanally mined* copper.

[25] International Copper Study Group, The Wold Copper Factbook 2019, pag. 31 (Visual estimate)
[26] Ibid., pag. 12
[27] Ibid., pag. 19

In the DRC, the production share of artisanal copper remains extremely low in comparison to the total annual Congolese production of industrially mined copper, slightly more than 1%.[28] Overall, the DRC accounts for 5-6% of world copper mine production.[29] Most of this copper is refined locally through the solvent extraction and electrowinning (SX-EW) process, and a small proportion is exported as concentrate for processing abroad.[30]

While the artisanal share of total copper production is very low and concentrated in the DRC, its importance for the livelihood of artisanal miners is significant. Although there are no studies to indicate the number of people involved in *artisanal mining* of copper specifically, an estimated 140,000 to 200,000 miners in the Lualaba and Haut-Katanga provinces of the DRC generate livelihoods from the extraction of copper and cobalt, where the two minerals are frequently co-located. Although it is unlikely that a significant proportion of these recover copper, it can be assumed that several thousand are involved in copper production.[31]

Copper Industry Supply Chain

The copper industry is characterised by two key routes to production: the pyrometallurgy and the hydrometallurgy (also referred to as SX-EW) production routes. The route employed to process copper ore is determined by the ore type. Sulphide copper ores (which account for approximately 72% of copper processing worldwide) are generally processed using pyrometallurgy, while oxide ores (account for approximately 15%) are processed through SX-EW. The remaining 13% of production input is from recycled scrap.[32]

The end product of both pyrometallurgy and hydrometallurgy processes is copper cathode, a 99.99% pure form of copper also referred to as Grade A. For the purpose of this Standard, copper cathode producers are referred to as the *refiner* and they are the *identified point.*

[28] The Federal Institute for Geosciences and Natural Resources, Mapping of the Artisanal Copper-Cobalt Mining Sector in the Provinces of Haut-Katanga and Lualaba in the Democratic Republic of the Congo, Hannover, 2019, p. 25.
[29] Ibid. (Visual estimate) pag. 12-14.
[30] C. Radford, A. Hunter, and J. Luck, 'DRC U-turns on cobalt, copper concentrate export ban; says could reimpose', *Fastmarket MB,* 21 March 2019, Accessed 27 April 2020.
[31] https://mneguidelines.oecd.org/Interconnected-supply-chains-a-comprehensive-look-at-due-diligence-challenges-and-opportunities-sourcing-cobalt-and-copper-from-the-DRC.pdf
[32] Figures from Wood Mackenzie Global Copper Long Term Outlook, Q4 2019, and various industry sources.

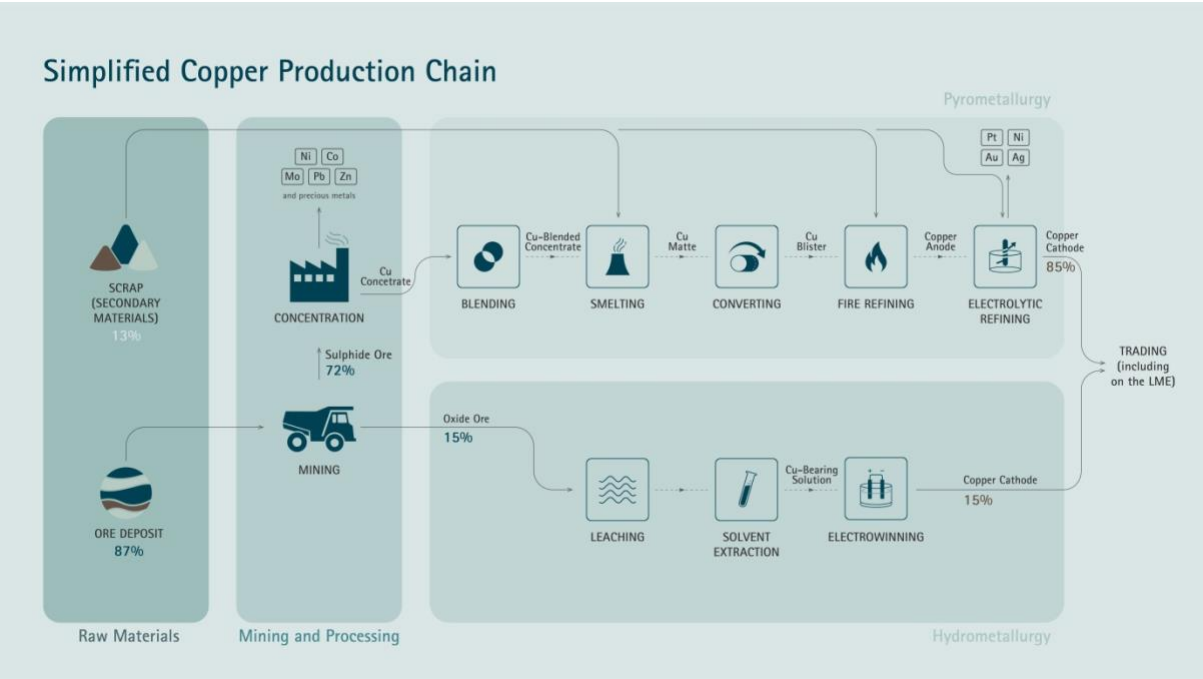


Figure 1 Pyrometallurgical and hydrometallurgical routes to copper refining

In the hydrometallurgical (SX-EW) process, production is vertically integrated. Copper cathode is produced at facilities attached to mine sites, through leaching, solvent extraction and electrowinning.

In the pyrometallurgical process, production can be fully or partially vertically integrated, or consist of multiple stand-alone steps. Fully vertically integrated production incorporates all stages of transformation, from mining to cathode manufacture, in a single location owned by one *company*. When the supply chain is not vertically integrated, the stages of transformation can be geographically separate and/or owned by different companies. In such a supply chain, intermediate forms of copper are transported between sites, and traded domestically and internationally.

The first stage in the pyrometallurgical transformation of copper ore is the production of copper concentrate. This happens at mine sites[33], or sometimes at nearby facilities, and the concentrate produced generally contains around 30% copper.[34]

[33] Excerpt from Ullmann's Encyclopaedia of Industrial Chemistry. 2001. Available from https://svn.eeni.tbm.tudelft.nl/Education/ta3290/assignments/Copper_Economics.pdf

[34] https://www.researchgate.net/publication/285175189_Production_of_Cu_Concentrate_from_Finely_Ground_Cu_Ore

Copper concentrates from multiple mine sites are typically blended together prior to smelting, for a number of reasons, such as to ensure that impurity levels within the blend fall within an acceptable range, or to meet legal requirements.[35]

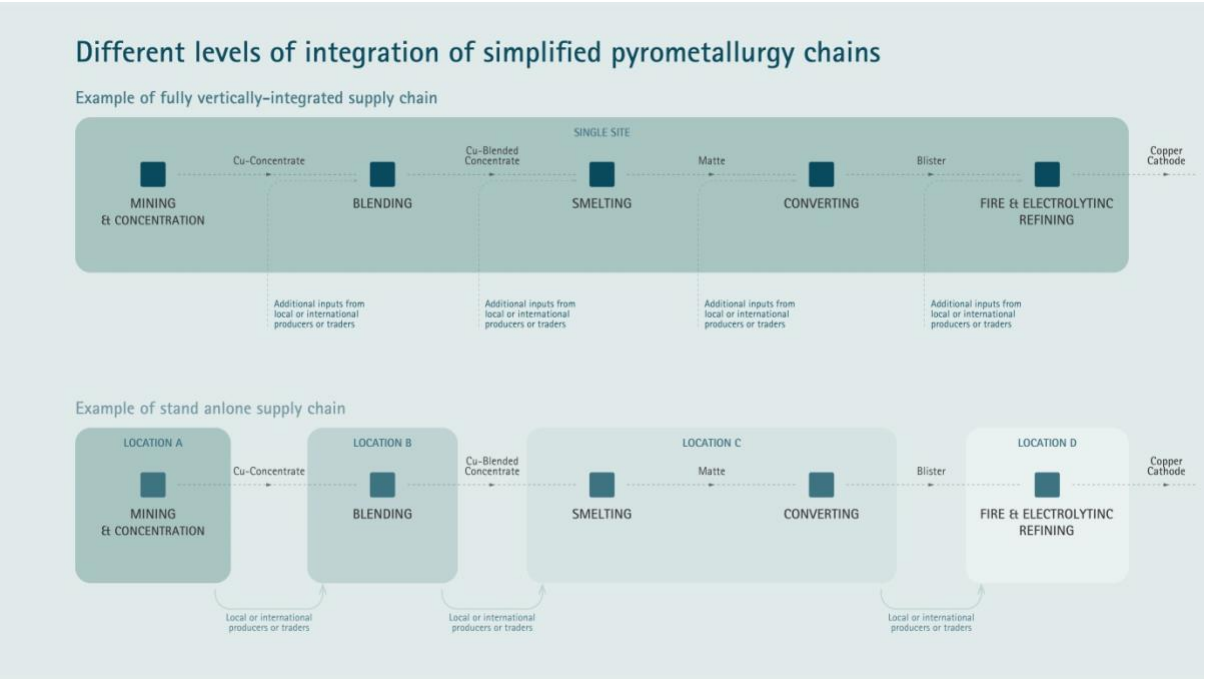


Figure 1 Examples of different levels of integration in the pyrometallurgy chain

Stand-alone *smelters*, or combined smelting and refining plants that do not have integrated copper mines, will typically source their concentrate from a diverse range of mines, traders and blending facilities around the world. A *smelter* that does not have an integrated mine will generally have relationships with between 10 and 30 concentrate suppliers of these types.[36]

Vertically integrated smelting and refining plants that have integrated copper mines may still source concentrate externally, for example in order to make up for production shortfalls at a smelter's integrated mine site.

Concentrate supplies can be obtained by a *smelter* through spot purchases, or medium- or long-term supply contracts, depending on the needs of the smelter.

Blending facilities are not always co-located at the sites where copper is mined, concentrated or smelted.

[35] See, for example: https://www.reuters.com/article/us-copper-glencore-blending-idUSKCN1UL19L
[36] Estimates from industry

Some international mineral trading companies operate stand-alone blending plants, which can be in copper-producing countries, in countries where smelters are located, or in third countries for logistical or legislative reasons, with the purpose to blend copper concentrate to ensure it meets the specific requirements of certain legislations.[37] It should be noted that blending may also take place along other copper intermediate forms.

Stand-alone copper concentrate *blending companies* and/or stand-alone *smelters* can be an **additional** *identified point*.

[37] See for example: https://www.metalbulletin.com/Article/3890079/Trafigura-blends-copper-concentrates-in-temporary-Malaysian-operation.html; https://www.reuters.com/article/us-copper-glencore-blending/glencore-starts-copper-concentrates-blending-facility-in-taiwan-idUSKCN1UL19L

Annex II: Lead Industry Key Facts and Supply Chain

Lead Industry Key Facts

- Lead is usually found in ore with zinc, silver and copper and is extracted together with these metals. Galena (PbS) is the main ore of lead along with cerussite ($PbCO_3$) and lead sulfate ($PbSO_4$). According to the International Lead and Zinc Study Group (ILZSG), lead ores are mined at a rate close to 5 million tonnes (calculation based on lead contained in concentrate) a year.[38]

- The world´s lead resources are mainly distributed in: Siberia, Russia; the central and western regions of China; Queensland, New South Wales in Australia; the southeastern area of Missouri and the Mississippi River valley area in the United States; Zacatecas and San Luis Potosi in Mexico; Cerro de Pasco and Morococha in Peru.

- Lead mine production is carried out in over 40 countries and is dominated by Asia (which accounts for approximately half of world lead mine production), followed by the Americas (20%), and, in minor quantities, Oceania, Europe and Africa. [39]

- According to industry sources, up to 3% of the lead mined globally may be mined in *artisanal* and *small-scale mining* operations.[40] This is particularly relevant for South American sourced ores.

- Lead concentrate import trade is dominated by Asia and Europe (which together account for over 90% of the world concentrate import trade volume). In particular, key importers are China (which accounts for over 40% of world trade volumes), followed by South Korea (over 20%) and Japan. In Europe, key importers are Germany, Bulgaria, Spain and Belgium[41].

- Lead concentrate export trade is dominated by the Americas, Europe and Oceania (Australia). Peru is the world's largest exporter (approximately 18% of world lead concentrate export trade), followed by the USA (approximately 16%) and the Russian Federation (approximately 15%)[42].

[38] International Lead Zinc Study Group (ILZSG). The World Lead Factbook 2019.
[39] Ibid
[40] Ulrike Dorner, et al.: "Artisanal and Small-Scale Mining (ASM)" POLINARES working paper n.19, March 2012
[41] International Lead Zinc Study Group (ILZSG). The World Lead Factbook 2019.
[42] Ibid. pag.41 (visual estimates).

- Primary lead represents approximately 40% of refined metal production with over 60% being sourced from recycled or secondary material (mainly used lead batteries and other lead containing scrap). Lead is also recovered from residues or as a *by-product* resulting from other metal ore processing operations (such as copper production drosses, flue dust and zinc plant residues) and is generally recovered by the primary smelter. In some primary lead smelters, zinc plant residues may make up as much as 25% of their input feed.

- Refined lead production is dominated by China (accounting for approximately 47% of world production), followed by the United States (11%), South Korea (8%) and India (6%).[43]

- Informal lead battery recycling is recognised as being a significant issue in low and middle income countries leading to substantial environmental pollution and adverse impacts on human health.[44]

- Over 85% of refined lead is used in production of automotive and industrial batteries, 7% in rolled and extruded products, 5% in production of lead compounds (most for use in batteries), 1% in ammunition and remainder in alloys and solders. World refined lead import is dominated by seven countries which account for 60% of total imports; USA (approximately 25%), Germany (7%), China (6.5%), India (5.7%), Turkey (5.4%), South Korea (5%) and Spain (4.6%).

Lead Industry Supply Chain

The most important mineable lead ore is galena (lead sulfide), which occurs chiefly in association with other minerals, but particularly zinc in the form of sphalerite. Other lead containing ores are cerussite (lead carbonate) and anglesite (lead sulfate).

In world mining output, mixed lead–zinc ore deposits are important and account for approximately 70% of total production of both metals. In second place are deposits that contain predominantly lead ores (approximately 20% of total production) and the remainder (approximately 10%) is obtained as a *by-product* from zinc, copper–zinc, and other deposits.

Common impurities in lead minerals are zinc, copper, arsenic, tin, antimony, silver, gold, and bismuth.

[43] Ibid. pag. 16 (estimate based on Refined Lead Metal Producing Countries With Output Above 100,000 Tonnes in 2018)
[44] World Health Organization. Recycling used lead-acid batteries: health considerations. 2017

An important *by-product* of primary lead production is silver, which is incorporated into the lattice of galena, and is recovered in the lead bullion in the smelting process. Some 70% of the world's silver production comes from the smelting of lead concentrates.

The first step in lead mining is the separation of lead-rich ore from the other elements and materials. The most common method of ore/element concentration is the process of flotation, which allows lead to be separated from other materials. In a typical lead-zinc mining operation, the individual metals/compounds are usually separated in a two-stage process. First, the lead sulfide floats and is removed and then second, the zinc sulfide, which was prevented (or depressed) is then allowed to float and be collected. Each of the individual "froths" are then broken down by water sprays and then filtered to remove the water. The resulting material, termed "concentrate", is typically a sulfidic lead product containing an average of 50–60% lead.

The basic concept of primary lead smelting involves removing sulfur from the lead ore by roasting it in air (sintering). The second stage involves reducing the lead oxide formed by roasting to lead metal by using carbon (coke) as the reducing agent. There are two basic pyrometallurgical processes utilized across the world to produce lead bullion from lead sulfide, or from mixed lead and zinc sulfide concentrates:

- Direct smelting, which is by far the dominant technology
- Sintering/smelting in a blast furnace or Imperial Smelting Furnace (ISF)

In each of the processes, the smelting operation produces a lead bullion that must be further refined. This is typically conducted on the same site as the primary smelter, although there are a few stand-alone refineries in operation.

During refining, both valuable and deleterious impurities are removed so as to produce a pure commercial lead metal that is suitable for the end user. Typically, refining produces a commercial quality lead that can be up to 99.99% pure (4 nines Pb). The Electro-refining method or the Betts Process, is the dominant primary refining process (>80%) to achieve "99.994 lead". For the purpose of this Standard, producers of minimum 99.97% grade refined lead are referred to as the *refiner* and they are the *identified point*.

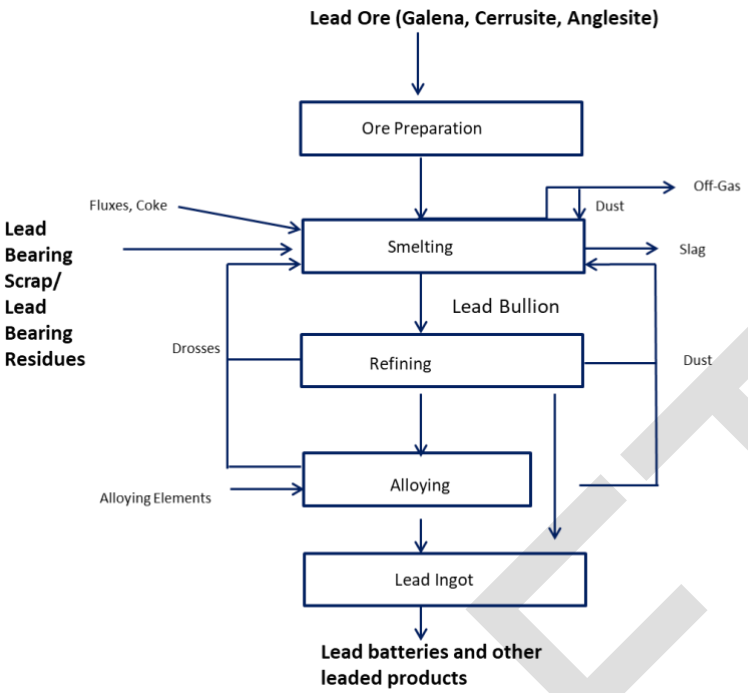


Figure 2 Routes of Lead Production

In primary lead supply chains, material generally comes directly from mines, but there are supply chains where it may come from several blenders that accumulate concentrates from different mines often too small to sell directly to the smelter.

Stand-alone lead concentrate *blending companies* and/or stand-alone *smelters* can be an **additional** *identified point*.

Annex III: Nickel Supply Chain

Nickel Industry Key Facts

- A range of nickel products are produced by the nickel industry and used to satisfy the nickel demand globally. They comprise high purity nickel to LME grade nickel metal, non-LME grade nickel metal, ferronickel, nickel oxide sinter, nickel pig iron, and nickel chemicals. These raw materials mainly differ in their metal content. While nickel metal class 1 is defined to have a nickel content of at least 99%, the nickel content of nickel pig iron can be as low as 3%.

- The nickel industry is characterized by sizeable trade flows of ore, concentrates, and intermediates including hydroxides, sulphides, oxides and mattes, as well as recycled streams.

- Stainless steel is the major first use of nickel, accounting for 70% of all nickel uses. Nickel metal, nickel pig iron, ferronickel and nickel oxide sinter are all used in stainless steel production, whereas nickel metal and nickel chemicals are also used for a broader range of first uses, including alloy steel and non-ferrous alloys, plating and batteries.

- Nickel mine production is dominated by South-East Asia (which accounts for over 40% of world nickel mine production), in particular, Indonesia and the Philippines, followed by Russia and New Caledonia.[45]

- The volume of nickel occurring as *by-product* of precious metals and copper production are relatively small.

- Primary nickel production is also dominated by Asia, in particular, China (which accounts for approximately 30% of primary nickel production), followed by Indonesia (13%), Japan (9%) and Russia (7%). China is a major importer of nickel intermediates in different forms.[46]

- According to a literature review conducted for the purpose of this Standard, there are no cases of ASM reported in nickel production.

[45] International Nickel Study Group. World Nickel Statistics Yearbook. Vol. XXVIII November 2019. ISSN 1022-2561. www.insg.org
[46] International Nickel Study Group. World Nickel Statistics Yearbook. Vol. XXVIII November 2019. ISSN 1022-2561. www.insg.org

In general, mining and production of nickel is capital intensive as requiring significant mining and metallurgical equipment. Moreover, the concentrations of nickel and its *by-products* in the ores are at low levels. The combination of both factors prevents ASM in nickel to take place.

- Given the high economic value, nickel is recycled at high efficiency levels. Only 15% of nickel from end of life products is not recycled. Approximately 33% of the nickel demand is satisfied by recycled nickel. Different than in other metals industries, the vast majority of nickel recycling takes place downstream in stainless steel mills, where nickel-containing stainless steel and nickel-containing alloy steel scraps are used as input into stainless steel production. In the future, more recycling is expected to take place within the nickel industry with increasing use of nickel in emerging markets such as batteries. Primary and recycled nickel production are in some cases blended, either within the nickel industry or in stainless steel production.

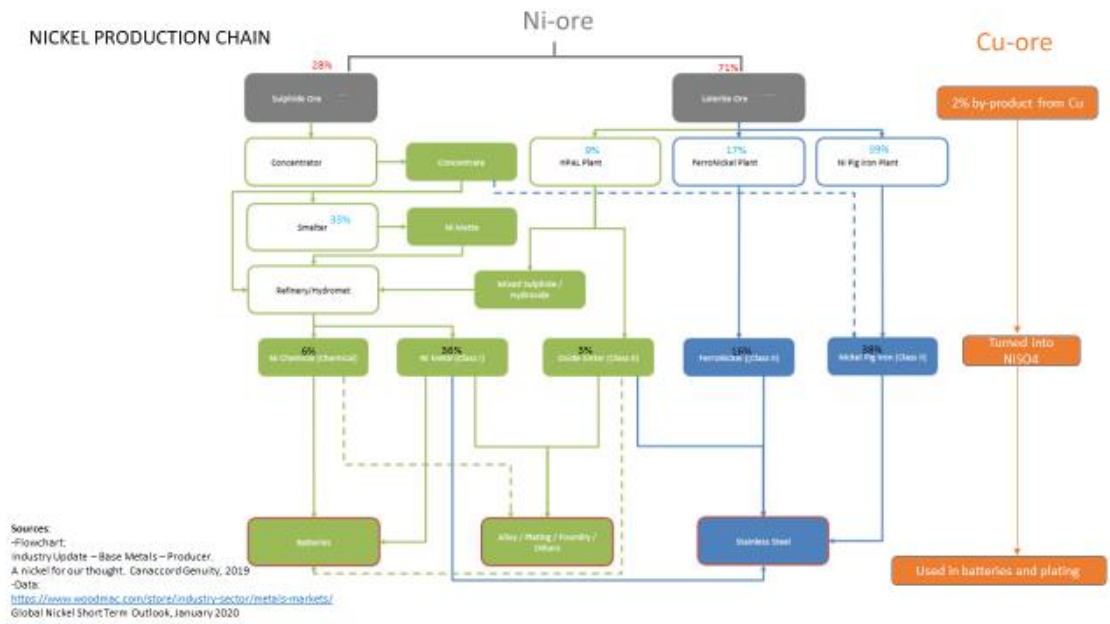
Nickel Industry Supply Chain

Nickel is produced from lateritic and sulphidic ores. Lateritic ores are normally found in tropical climates where weathering, with time, extracts and deposits the ore in layers at varying depths below the surface. Lateritic ores are excavated using large earth-moving equipment and are screened to remove boulders. The metal bearing minerals derived from lateritic ores are usually of oxidic nature. Sulphidic ores are mostly mined from underground. The metal bearing minerals derived from sulphidic ores are usually of sulphidic nature.

The nickel mining stage of nickel production includes all processes to extract nickel ore up to the point of delivery to beneficiation or ore preparation.

After it has been mined, the ore passes through ore preparation or beneficiation. The ore is then either crushed, screened and dried (ore preparation), or it undergoes beneficiation, where the ore is crushed, ground and undergoes flotation or magnetic separation to obtain a nickel concentrate.

Sulphidic ores usually undergo beneficiation, while lateritic ores usually undergo the so-called ore preparation. As lateritic ore generally has a high moisture content, the principal component of the ore preparation processes is therefore drying of ore. In specific cases, however, lateritic ore can undergo further processing resulting in an increased concentration of nickel in the ore and higher than the concentration obtainable only through drying. These processes are very distinct from the processes that occur during the beneficiation of sulphidic ore.



Prepared ore and nickel concentrate are then converted into nickel matte, nickel oxide, ferronickel, nickel intermediates, and other nickel and non-nickel co-products. There are two extraction processes, hydrometallurgical and pyrometallurgical, and both are used with lateritic and sulphidic ores.

Sulphidic ores have been typically processed using pyrometallurgy, though, in recent years, hydrometallurgical processing has become mainstream; whereas lateritic ores are typically processed using hydrometallurgy based on ammonia or sulphuric acid leaching such as High Pressure Acid Leaching (HPAL) which represents around 20% of nickel supply and is typically the solution for the lower grade lateritic ores. Typically, in this case a mixed nickel sulphide or a mixed nickel hydroxide intermediate product is produced for further refining.

Various processes are then used to refine nickel mattes, nickel mixed sulphides, nickel mixed hydroxides and nickel oxides into nickel metal or nickel salts. Use of electrical cells equipped with inert cathodes is the most common technology for nickel refining. Electrowinning, in which nickel is removed from solution in cells equipped with inert anodes, is also common. Refining often involves the separation of nickel and cobalt, which occurs as a *by-product*. An alternative process of nickel refining is the carbonyl process. In this process, nickel oxides are converted into nickel metal.

For the purpose of this Standard, producers of nickel metal class 1 are referred to as the *refiner.* These producers are an *identified point.*
Producers of nickel metal class 1, maybe:

- Vertically integrated to the mine sites.

- Partially vertically integrated companies, which process material from their own mines and material from external sources,

Stand-alone nickel concentrate *blending companies* and/or stand-alone *smelters* can be an **additional** *identified point*.

Producers of nickel chemical compounds and all nickel raw intermediates (iron-nickel, nickel pig iron, nickel oxide sinter, and other nickel intermediaries) entering production of stainless steel, alloys, batteries, plating, where refining is not part of the transformation process, are **alternative** *identified points*.

Annex IV: Zinc Supply Chain

Zinc Industry Key Facts

- Zinc bearing products involved in primary zinc production (Special High Grade (SHG) zinc) that are traded domestically and internationally are:[47]
    - Zinc concentrates.
    - Secondary zinc oxide bearing raw materials, mostly waelz oxide and electric arc furnace dust (EAF dust) originating from the recycling of galvanized steel scrap.
    - SHG zinc in various formats and tonnages.
    - An additional ca. 4 million tonnes are recycled from zinc metal scrap, brass and zinc containing wastes and by-products annually without passing through zinc smelters. Technologies applied are re-melting and other metallurgical processes.

- Zinc mine production is dominated by Asia, specifically, China (which accounts for approximately one third of world zinc mine production) followed by Peru, Australia and the United States.[48]

- Zinc refined production is also dominated by Asia, specifically, China (which accounts for over 45% of world zinc refined production), followed by South Korea, India, Spain, Australia and Japan.[49]

- It is estimated that approximately 1% of zinc mined globally is mined in *artisanal* and *small-scale mining operations* (ASM). This leaves about 99% of the zinc mined globally coming from large-scale mining operations.[50] The International Lead and Zinc Study Group (ILZSG) lists about 1000 tonnes of zinc being mined in DRC.[51]

Zinc Industry Supply Chain

Zinc is usually found in zinc sulfide ores, and it is typically associated with lead, silver, copper, and/or cadmium.

[47] Monthly Bulletin of the International Lead and Zinc Study Group, Vol 60 No 2, February 2020
[48] Ibid.
[49] Ibid.
[50] Ulrike Dorner, et al.: "Artisanal and Small-Scale Mining (ASM)" POLINARES working paper n.19, March 2012
[51] 2019 data. Ibid. and International Lead and Zinc Study Group, Lead and Zinc Statistics, http://www.ilzsg.org/static/statistics.aspx?from=1

These metals are separated from zinc during the smelting process, enriched in concentrates or *by-products* and sent to their respective industries for recovery. Zinc is also found together with indium, germanium and cobalt. These elements are concentrated and recovered during zinc smelting if their concentration in the zinc concentrate and their price are sufficiently high.

Zinc oxide bearing ores do exist and are used for SHG zinc production, but the majority of the ores mined today are sulfide ores.

The first stage in the transformation of zinc ore is the production of zinc concentrate. This happens at mine sites, or sometimes at nearby facilities, and the concentrate produced generally contains around 50-60% zinc.

Zinc concentrates usually are processed for zinc recovery together with oxidic secondary raw materials. Mostly these are waelz oxide, which is enriched electric arc furnace dust (EAF dust) originating from the recycling of galvanized steel scrap. The global average of SHG zinc being recovered from secondary raw materials is 10-15%. In extreme cases, the recycled content in primary zinc (SHG quality) can rise to 30% or even 100%.

Concentrate supplies can be obtained by a smelter through spot purchases, or medium- or long-term supply contracts, depending on the needs of the smelter. Zinc concentrates can be traded directly between mines and smelters or via traders. Traders may blend concentrates in stand-alone blending facilities to adjust their composition.

Zinc concentrates from multiple mine sites or traders are typically blended (again) prior to smelting.

There are two general routes of zinc production: the Roast-Leach-Electron Process (RLE) and the Pyrometallurgical Process.

For well over 95% of the zinc produced from ores the roast-leach-electrowin process (RLE) in technical variations is applied, which reacts very sensitive on changes in the chemical composition of the feed materials. Very small variations in feed composition can result in disturbances of the process lowering its efficiency. Receiving concentrates from various sources requires a sophisticated blending process to assure the feed composition is kept within strict and tight limits.

The remainder is produced via pyrometallurgical processes such as the Imperial Smelting process. Often, zinc and lead refiners and in some cases also copper refiners are operated by one company, thus maximizing efficiency and recycling potentials of metals from *by-products* and wastes.

The end product of both pyrometallurgy and the RLE processes is Special High-Grade (SHG) zinc, a 99.995% pure form of zinc.

For the purpose of this Standard, producers of SHG zinc are referred to as the *refiner.*

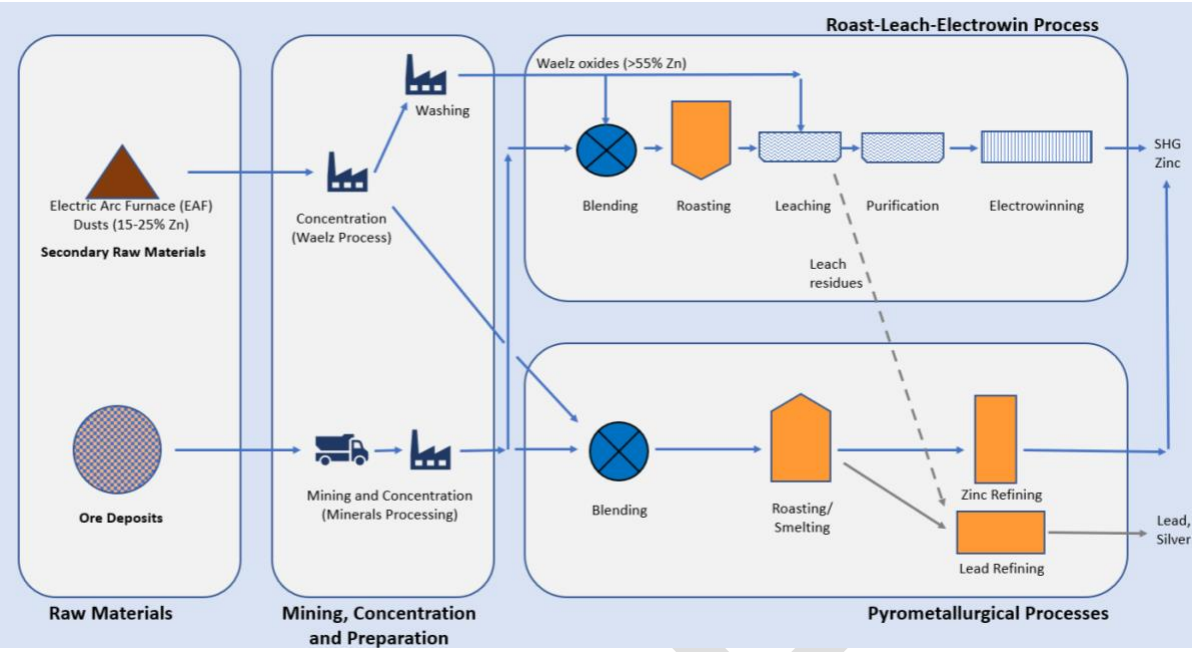


Figure 3 Simplified and generalized routes of zinc production (SHG)

Zinc production can be fully vertically integrated, meaning that SHG zinc is produced by refiners integrated to the mine site. Larger, internationally acting entities may operate mine sites and refineries in different countries. At the same time, SHG zinc production can consist of stand-alone operations, such as mining/concentrating and smelting/refining. Preparation of secondary raw material feed can be a stand-alone operation, or it can be integrated in the smelting/refining process. When the supply chain is not vertically integrated, the stages of transformation can be geographically separate and owned by different companies, with diverse operating practices. In such a supply chain, intermediate forms of zinc are transported between sites, and traded domestically and internationally.

Stand-alone smelters, or combined smelting and refining plants, that do not have integrated zinc mines, will typically source their concentrate from a diverse range of mines, traders and blending facilities around the world. A smelter that does not have an integrated mine will generally have relationships with between 10 and 30 concentrate suppliers of these types.

Stand-alone zinc concentrate *blending companies* and/or stand-alone *smelters* can be an **additional** *identified point*.