CleanBC Industrial Incentive Program

Metal Mining Sector Guidance

This guidance applies to reporting operations with primary NAICS codes as follows:

- NAICS – 212233: Copper-Zinc Ore Mining
- NAICS – 212220: Gold and Silver Ore Mining

<table>
<thead>
<tr>
<th>Sub-Sector</th>
<th>CIIP Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Copper mining – Open Pit</td>
<td>Mining - copper equivalent, open pit</td>
</tr>
<tr>
<td>Primary Copper mining – Underground</td>
<td>Mining - copper equivalent, underground</td>
</tr>
<tr>
<td>Primary Gold Mining</td>
<td>Mining - gold equivalent</td>
</tr>
<tr>
<td>Primary Silver Mining</td>
<td>Mining - silver equivalent</td>
</tr>
</tbody>
</table>

NOTE: For any one reporting operation, only one CIIP product would apply depending on the type of the mine and its primary metal, as determined below.

Quantification and Reporting of Emissions and Related Information

Unless explicitly stated otherwise in the CleanBC Industrial Incentive Program (CIIP) guidance, quantification and reporting of greenhouse gas emissions and related information under CIIP must comply with the Greenhouse Gas Industrial Reporting and Control Act (GGIRCA) and the Greenhouse Gas Emission Reporting Regulation (GGERR), including with the referenced in GGERR Western Climate Initiative (WCI) quantification methodologies.

The WCI methodologies typically applicable to metal mining reporting operations include, but may not be limited to, the following:

- WCI.020 General Stationary Combustion
- WCI.040 Electricity Generation
- WCI.200 (203 (f)) Petroleum Storage Tanks
- WCI.200 (203 (g)) Industrial Wastewater Processing
- WCI.280 Mobile Equipment at Facilities

In addition to the information required in the GGERR, applicants to CIIP must also report the GHG emissions associated with purchased grid electricity and heat.
Purchased electricity and heat are reported under the ‘Production’ tab in the CIIP application. From the ‘Product or Service’ dropdown menu, select ‘Purchased Electricity’ or ‘Purchased Heat’ as applicable. Enter the amount of electricity purchased (in gigawatt hours) or heat purchased (in gigajoules) and the emissions associated with the purchased electricity or heat.

- Grid electricity emissions are quantified by multiplying the published electricity emission intensity factor for grid-connected entities $E_{EIF}^{grid Electr.}$ for the applicable reporting year by the amount of purchased grid electricity $Q_{Purchased}^{Electr.}$ in GWh:

$$E_{Electr.}^{Grid} = E_{EIF}^{grid Electr.} * Q_{Purchased}^{Electr.}$$

- Purchased heat emissions are quantified by multiplying a BC-specific industrial heat emission intensity factor $E_{EIF}^{Heat BC}$ by the amount of purchased heat $Q_{Purchased}^{Heat}$ in GJ:

$$E_{Purchased}^{Heat} = E_{EIF}^{Heat BC} * Q_{Purchased}^{Heat}$$

where $E_{EIF}^{Heat BC}$ is 0.063 tCO2e/GJ.

Therefore, the emissions for CIIP purposes are (where $E_{onsite}$ is the reporting operation’s emissions total as required to be reported under GGIRCA and submitted in the Single Window Reporting System):

$$E_{CIIP} = E_{onsite} + E_{Electr.}^{Grid} + E_{Purchased}^{Heat}$$

The emissions associated with purchased electricity and/or heat will be automatically added to the product’s emissions totals. The applicant must not allocate emissions from purchased electricity and/or heat to the products.

**Quantification of Production**

Applicants to the CIIP must report salable primary metal production, in tonnes of the applicable metal equivalent. This includes all salable metal produced during the reporting year, regardless of whether it is sold during the year or added to inventory. It does not include salable metal sold from a previous year’s production.

Production must not include any waste products.

Metals currently mined in B.C. include, but may not be limited to, copper, gold, silver, molybdenum, lead, and zinc.

Three steps are involved in calculating the tonnes of metal equivalent to report:
• Determine the average metal prices for the reporting year;
• Determine the mine’s primary metal, which becomes the metal equivalent to report production in;
• Calculate total metal production for the reporting year in tonnes of metal equivalent.

In addition to this guidance document, the ministry provides a spreadsheet with the below calculation formulas built in, to assist in calculating inputs for the CIIP application process (available via e-mail and webpage).

1) Determining Metal Prices

To align with BC Hydro’s Mining Customer Payment Plan, the metal prices for each metal must be the annual average of the daily settlement prices per unit of metal, over the period from January 1 to December 31 of the reporting year, as reported by the London Metals Exchange (LME). The LME Official Settlement Price is the last cash offer price.

The LME reports copper, lead, zinc, and molybdenum metal prices in United States Dollars per pound (USD/lb), Gold and silver are reported in United States Dollars per troy ounce (USD/toz). Since the prices are only used as a scaling factor, the USD value must not be converted to Canadian Dollar (CAD) value.

2) Determining Primary Metal

The primary metal is the metal which yields the highest revenue in the first year of a reporting operation’s application to the CIIP using the metal prices established in the previous step and data about the amount of each salable metal produced. If copper is the primary metal, it is also necessary to identify whether the mine primarily uses open pit or underground mining methods. The metal equivalent determined by this process must be used for all subsequent years, until at least 2025.

EXAMPLE: Determining Primary Metal

XYZ mine is an open pit mine that produces gold, silver, and copper. Using the average annual price of each metal as determined in the previous step and production data from audited financial statements, the following table shows the estimated revenue for each metal:

<table>
<thead>
<tr>
<th>Metal Mined at XYZ:</th>
<th>Gold</th>
<th>Silver</th>
<th>Copper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Annual Price</td>
<td>$1,269.43/toz</td>
<td>$15.71/toz</td>
<td>$2.96/lb</td>
</tr>
<tr>
<td>Annual Production</td>
<td>25,123 toz</td>
<td>300,123 toz</td>
<td>110,000,123 lbs</td>
</tr>
<tr>
<td>Revenue Estimate</td>
<td>$31,891,890</td>
<td>$4,714,932</td>
<td>$325,600,364</td>
</tr>
</tbody>
</table>

The metal which yields the highest revenue ($325,600,364) is copper. Therefore, XYZ mine must report total metal production in units of tonnes Copper equivalent and the applicable benchmark and threshold are the ones for Primary Copper mining – Open Pit.
3) **Calculating Total Production in Metal Equivalent**

Non-primary metal amounts are converted into equivalent primary metal based on the annual prices of metals, therefore:

\[
P_{\text{Metal, eq}} = \sum_{i=1}^{N} \left( \frac{P_{\text{Metal}_i} \times \text{Price}_{\text{Metal}_i}}{\text{Price}_{\text{Primary Metal}}} \right)
\]

Where:

- \( N \) is the number of different salable metals produced at the operation within the reporting year
- \( P_{\text{Metal}_i} \) is the produced amount of Metal\(_i\) in the same mass units as its price
- \( \text{Price}_{\text{Metal}_i} \) is the price of Metal\(_i\) per mass unit metal, in the same mass units as \( P_{\text{Metal}_i} \)
- \( P_{\text{Metal, eq}} \) is the total production in primary metal equivalents, in the same mass units of the primary metal as its price
- \( \text{Price}_{\text{Primary Metal}} \) is the price of the primary metal per mass unit primary metal, in the same mass units as \( P_{\text{Metal, eq}} \)

The total amount of primary metal equivalent must be converted from pounds, in the case of copper equivalents, or troy ounces, in the case of gold or silver equivalents, to tonnes:

- To convert pounds\(^1\) of copper-equivalent production into tonnes, multiply imperial production by \((0.45359237/1,000)\).
- To convert troy ounces\(^2\) of silver- or gold-equivalent production into tonnes, multiply imperial production by \((31.1034768/1,000,000)\).

**EXAMPLE: Calculating Total Production in Metal Equivalent**

Continuing with XYZ mine from the previous example, the total annual mine production in Copper equivalent is:

\[
= \left( \text{Copper(lbs) \times Copper($/lbs)} + \text{Gold(toz) \times Gold($/toz)} + \text{Silver(toz) \times Silver($/toz)} \right) / \text{Copper($/lbs)}
\]

\(^1\) One pound is exactly 0.45359237 kilograms.
\(^2\) One troy ounce is exactly 31.1034768 grams.
\[
\text{Emission Intensity}
\]

For the purposes of CIIP, the Emission Intensity of metal mining \( E_{MM} \) will be calculated as:

\[
E_{MM} = \frac{E_{CIIP}}{P_{\text{Metal_eq}}}
\]