



Beneficiation is a term that has many different meanings within the mining industry and beyond. From an economic perspective, beneficiation relates to adding value to a mined raw material, or the transformation of mined ore into a higher value product that can be consumed locally or exported. In the mining industry, beneficiation is mainly used to describe metallurgical processes that are utilized to upgrade the mined raw material or 'run-of-mine' (ROM) ore.

When describing metallurgical facilities one encounters all sorts of terms – plant, beneficiation plant, treatment plant, washing plant, preparation plant, reduction plant, mill, concentrator, smelter, refinery. Let's see how much sense all these terms make in the context of beneficiation.

A 'plant' could describe any metallurgical facility and thus is far too vague to be of any use. A 'beneficiation plant' is generally used to describe a facility incorporating comminution (crushing and milling) and physical beneficiation (DMS, gravity concentration, magnetic separation, flotation). Beneficiation is a term used to describe any metallurgical process that results in some form of upgrading. Therefore, any metallurgical facility that incorporates some form of upgrading, which is the vast majority, can be termed a 'beneficiation plant'. The general application of 'beneficiation plant' is thus far too narrow and should rather be avoided. 'Treatment plant', as with a 'plant', could be used to describe any metallurgical facility. So this term is also far too vague and should be avoided. 'Washing plant' is generally used to refer to either a wet screening facility or a facility for upgrading coal. Although wet screening could be approximated to washing, the upgrading of coal certainly requires far more than just washing. However, coal metallurgists do like to use the term 'coal washability' to describe the amenability of coal to upgrading. Therefore, the description of coal beneficiation as 'washing' is not ideal, but convincing coal metallurgists to use other terminology will not be easy. Staying on the subject of coal beneficiation, the terms 'coal preparation plant' or 'coal handling and preparation plant' (CHPP) are also commonly employed to describe facilities for coal beneficiation. This is also a strange usage – are we referring to preparing the coal to be used in power stations or blast furnaces? It seems that coal metallurgists do not like the term 'beneficiation'.

In the past, a metallurgical facility for the extraction of gold from ROM ore was called a reduction plant. I have always considered this to be an unusual description. Does 'reduction' refer to the chemical term? In most cases, no, because the gold generally occurs in the metallic form in the ROM ore and is recovered in the metallic form. Does 'reduction' refer to reducing one ton of ROM ore to a few grams of gold metal? This seems more plausible. These days, the metallurgical facility is more commonly referred to as a 'gold plant'. Given the wide array of metallurgical processes used to produce the gold, 'gold beneficiation plant' would provide a more representative description. A 'mill' is another one of those terms that is vague and misleading when used to describe a metallurgical facility. It is sometimes used to denote a facility that incorporates comminution and physical beneficiation. However, extractive metallurgists will normally refer to a comminution device as a 'mill', and physical metallurgists use the term for a facility where steel is fabricated into different forms. Therefore, rather avoid the term 'mill'.

The term 'concentrator' is generally used to describe a metallurgical facility where comminution and physical beneficiation are used to transform ROM ore into a concentrate. As such, this is an appropriate term. The term 'smelter' generally refers to a metallurgical facility utilizing mainly pyrometallurgical processes to produce a matte, an alloy, or a metal. This is also a suitable term. The term 'refinery' is generally used to indicate a metallurgical facility that employs mainly hydrometallurgical processes to produce pure metals – also appropriate usage. While concentrators, smelters, and refineries are all beneficiation plants, these terms do nevertheless provide a representative description of the metallurgical facilities in question.

I do hope that this short review has provided some clarity around the terminology used to describe metallurgical facilities.

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