

**DRAFT INTERPRETATION NOTE**

DATE:

**ACT : MINERAL AND PETROLEUM RESOURCES ROYALTY ACT 28 OF 2008**  
**SECTION : SECTION 4(2) AND SECOND SCHEDULE**  
**SUBJECT : DETERMINING THE CALORIFIC VALUE OF COAL FOR PURPOSES OF THE ROYALTY**

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### **Preamble**

In this Note unless the context indicates otherwise –

- “**AD**” means “air-dried”;
- “**AR**” means “as-received”;
- “**bomb calorimeter**” means an apparatus that can measure heats of combustion, used in various applications such as calculating the calorific value of foods and fuels;<sup>1</sup>
- “**calorific value**” or “**CV**” means the amount of calories generated when a unit amount of substance is completely oxidized and is determined using the bomb calorimeter; <sup>2</sup>
- “**MPRDA**” means the Mineral and Petroleum Resources Development Act 28 of 2002;
- “**royalty**” means a royalty imposed under the Act;
- “**Schedule 2**” means the Second Schedule to the Act;
- “**section**” means a section of the Act;
- “**the Act**” means the Mineral and Petroleum Resources Royalty Act 28 of 2008;
- “**transfer**” means transfer as defined in section 1; and
- any other word or expression bears the meaning ascribed to it in the Act.

All interpretation notes referred to in this Note are available on the SARS website at [www.sars.gov.za](http://www.sars.gov.za). Unless indicated otherwise, the latest issues of these documents should be consulted.

## **1. Purpose**

This Note clarifies at which stage, that is, AR or AD, the condition specified for coal in Schedule 2 must be determined for the calculation of the royalty.

## **2. Background**

Mineral and petroleum resources are the common heritage of all the people of South Africa, and the state is the custodian of said resources for the benefit of all South Africans.<sup>3</sup> As custodian of the nation’s mineral and petroleum resources the state, acting through the Minister of Finance, may prescribe any levy payable under the MPRDA.<sup>4</sup> The state royalty must be determined and levied under an Act of Parliament.<sup>5</sup> The Act was thus promulgated to provide for the levy of a royalty.<sup>6</sup>

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<sup>1</sup> [www.sciencedirect.com/topics/engineering/bomb-calorimeter](http://www.sciencedirect.com/topics/engineering/bomb-calorimeter) [Accessed 24 August 2023].

<sup>2</sup> [www.sciencedirect.com/topics/engineering/calorific-value](http://www.sciencedirect.com/topics/engineering/calorific-value) [Accessed 24 August 2023].

<sup>3</sup> Section 3(1) of the MPRDA.

<sup>4</sup> Section 3(2)(b) of the MPRDA.

<sup>5</sup> Section 3(4) of the MPRDA.

<sup>6</sup> The Act commenced on 1 November 2009.

Section 2 provides that a person must pay a royalty in respect of the transfer of a mineral resource extracted from within the Republic. A “mineral resource” is defined in the Act as a “mineral” or “petroleum” as defined in section 1 of the MRDA regardless of whether that mineral or petroleum undergoes processing (as defined in section 1 of that Act) or manufacturing.<sup>7</sup> Having regard to this definition, coal is a mineral source and subject to the royalty under the Act.

Mineral resources subject to the royalty are transferred in either a refined<sup>8</sup> (Schedule 1) or an unrefined<sup>9</sup> (Schedule 2) condition. Schedules 1 and 2 contain a list of mineral resources with either a specified condition or a range for a particular mineral resource. The condition specified represents the point at which the mineral is considered to be in an acceptable condition for transfer and is important in determining the royalty payable under the Act. The gross sales for a particular mineral resource will therefore be determined when that mineral has reached the condition specified in the Schedules.

Coal is listed as an “unrefined mineral resource” in Schedule 2 and its condition is specified as the CV of 19.0 MJ/kg to 27.0 MJ/kg. The range specified has resulted in inconsistent determination of the CV of coal and in some cases the underpayment of the royalty.

This Note considers the correct determination of the condition specified for coal in Schedule 2. The Note does not consider in detail other aspects of the Act.

### **3. The law**

The relevant sections of the Act, Schedule 2 and the MPRDA are quoted in the **Annexure**.

### **4. Application of the law**

#### **4.1 Determination of the royalty**

The royalty is paid in respect of –

- the transfer of a mineral resource,
- extracted,
- from within the Republic.<sup>10</sup>

The royalty chargeable under the Act is expressed as a percentage<sup>11</sup> of the gross sales<sup>12</sup> amount received by or accrued to the extractor<sup>13</sup> on the transfer<sup>14</sup> of the mineral resource.<sup>15</sup> The royalty is levied regardless of whether such mineral or petroleum has undergone processing or manufacturing.

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<sup>7</sup> Section 1.

<sup>8</sup> Section 1.

<sup>9</sup> Section 1.

<sup>10</sup> Section 2.

<sup>11</sup> Section 3(2).

<sup>12</sup> See definition in section 1.

<sup>13</sup> See definition in section 1.

<sup>14</sup> See definition in section 1.

<sup>15</sup> See definition in section 1.

Gross sales for unrefined mineral resources are determined under section 6(2). An unrefined mineral resource transferred at the condition specified will not require any adjustment to the amount received or accrued for the disposal of that unrefined mineral resource. Any unrefined mineral resource transferred below or beyond the condition specified will require an adjustment to the amount received or accrued upon transfer. Section 6A is an adjustment provision that assists in determining the arm's length price when an unrefined mineral resource is transferred below or beyond the condition specified. The application of section 6A is limited to unrefined mineral resources listed in Schedule 2.<sup>16</sup>

## 4.2 Beneficiation of a mineral resource

Beneficiation in relation to a mineral resource is defined as follows:<sup>17</sup>

- (a) Primary stage, which includes any process of the winning, recovering, extracting, concentrating, refining, calcining, classifying, crushing, screening, washing, reduction, smelting or gasification of the mineral resource.
- (b) Secondary stage, which includes any action of converting a concentrate or mineral resource into an intermediate product.
- (c) Tertiary stage, which includes any action of further converting that product into a refined product suitable for purchase by minerals-based industries and enterprises.
- (d) Final stage, which is the action of producing properly processed, cut, polished or manufactured products or articles from minerals accepted in the industry and trade as fully and finally processed or manufactured and value-added products or articles.

Coal beneficiation is the process of removal of the contaminants and the lower grade coal to achieve a product quality that is suitable to the application of the end user either as an energy source or as a chemical agent or feedstock. A common term for this process is coal "washing" or "cleaning".<sup>18</sup>

The purpose of the royalty is not to be a tax on beneficiation, but to compensate the state on a mineral resource extracted from the Republic.<sup>19</sup> The aim of the applicable legislation is to establish the value of the mineral extracted at the "first saleable point" as close as possible to the point of extraction. The value of some unrefined mineral resources listed in Schedule 2, such as coal, may be enhanced through processing (for example, crushing, washing and sorting) between the time of extraction and the time of transfer. The *Explanatory Memorandum on the Taxation Laws Amendment Bill, 2013* stated the following in this regard:

"The mineral royalty regime was designed recognising that beneficiation is beneficial to the South African economy. The ideal situation would be to impose a royalty on minerals at the mouth of the mine. This is impossible to do as all minerals have to go through some form of beneficiation (e.g. crushing, washing, etc.) before they can be

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<sup>16</sup> See Interpretation Note 108 "Meaning of 'bulk' in Schedule 2".

<sup>17</sup> Section 1 of the MPRDA.

<sup>18</sup> [www.coalmad/beneficiation.html](http://www.coalmad/beneficiation.html), [www.linkedin.com/pulse/basic-knowledge-coal-preparation-kira-zhang](https://www.linkedin.com/pulse/basic-knowledge-coal-preparation-kira-zhang) [Accessed 24 August 2023].

<sup>19</sup> See Interpretation Note 100 "Meaning of 'extracted'".

sold. As a result, the principle is to establish ‘the value’ at the ‘first saleable point’, which will naturally have an element of beneficiation.”

(Emphasis added.)

A mineral resource must be in a saleable condition before a “transfer” can take place for purposes of the Act.

### 4.3 Coal

#### 4.3.1 General background

Coal is a heterogeneous substance used by the metallurgical industry, including power generation, reductant manufacturing and gasification.<sup>20</sup> Coal has different states, varying from Peat, Lignite, Bituminous and Anthracite, all of which is a product of time, pressure and heat. Bituminous Coal and Anthracite are typically the coal mined and supplied in South Africa, having CVs of between 19MJ/kg and 35MJ/kg.

Coal has external moisture and inherent moisture. Once “air-dried” it contains inherent moisture only (see 4.3.4). The value and quality of coal is expressed with reference to its CV, meaning the energy potential it contains.

#### 4.3.2 Calorific value

Calorific value is known to be the energy content that coal possesses and releases when burnt. The CV of coal is generally determined using the proximate analysis. The proximate analysis of coal determines the moisture content, volatile matter (VM), ash and fixed carbon within the coal sample. It is the simplest and most common form of coal evaluation and constitutes the basis of many coal purchasing and performance prediction indices used by utility operators.<sup>21</sup> The analysis occurs in laboratories, applying different units of measurement and under different conditions.

Calorific value is determined by using Calorimeters and burning the coal in oxygen under pressure in a closed system. The “Bomb Calorimeter” provides the most suitable and accurate apparatus for determining CV, and is adopted internationally as a suitable measurement tool in ISO 1928:2009.<sup>22</sup>

The CV is usually expressed as the gross CV (the higher heating value) or the net CV (the lower heating value). The difference between the gross CV (GCV) and the net CV (NCV) is the latent heat of condensation of the water vapour inside the coal produced during the combustion process. The GCV assumes that all of the vapour produced from coal moisture during the combustion process is fully condensed. The NCV assumes that the water is removed with the combustion products without being fully condensed.

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<sup>20</sup> Theron, J.A. and Le Roux, E. (2015) Representation of Coal and Coal Derivatives in Process Modelling. *Journal of the Southern African Institute of Mining and Metallurgy*. Volume 115: 5. [www.scielo.org.za/pdf/jsaimm/v115n5/06.pdf](http://www.scielo.org.za/pdf/jsaimm/v115n5/06.pdf) [Accessed 24 August 2023].

<sup>21</sup> [www.coursehero.com/file/173121882/042014-Coal-sampling-and-analysis-standards-ccc235pdf/](http://www.coursehero.com/file/173121882/042014-Coal-sampling-and-analysis-standards-ccc235pdf/) [Accessed 24 August 2023].

<sup>22</sup> Note that the South African Bureau of Standards (SABS) is a member body of the International Standards Organisation (ISO), and has participated in the development of international standards. See *Coal Sampling and Analysis Standards*, by Qian Zhu of the IEA Clean Coal Centre, April 2014.

Coal valuations can be expressed on an “as-received” (AR) state or, “air-dried” (AD) state, “dry” state and a “dry ash-free” state. This Note only deals with the AR and AD state of coal.

In as much as the basis of measurement is described as a “method”, it is in fact a description of the “state” in which the coal is when its CV is measured in a laboratory. The Act, therefore, refers to “a condition specified for that mineral in Schedule 2” and “a condition different to the condition specified in Schedule 2”. The same test is applied in the laboratory in respect of all samples, the only difference is the state the coal will be in when tested.

#### 4.3.3 “As-received”

The AR state represents the coal in its delivered form from the mine where no significant beneficiation processes have been applied. Coal in the AR state has not been dried, heated or otherwise treated. It is in its most basic form or state, but for washing and crushing, that occurs before it is delivered.<sup>23</sup> Mines would wash the coal and perform basic crushing before it is in a saleable condition.

The coal stockpiles at factories and power plants would typically represent coal in its AR state, containing both external and inherent moisture (that is, wet coal). Moisture has a direct impact on the heat value of coal, seeing that moisture would absorb heat in the burning process and hence less heat is produced with high moisture coal.

All coal is exported in a wet state, and for that reason all exports are tested in an AR state, meaning the foreign buyers of coal agree on quality of the coal using the “as-received” state as basis for testing the CV.

#### 4.3.4 “Air-dried”

The AD state of coal is in essence a reference to coal that has been thinly spread on a flat surface and dried naturally so as to reach an equilibrium with the atmosphere at ambient temperatures.<sup>24</sup> Alternatively, it is dried in an oven at 40 degrees Celsius in order to remove all external moisture, but not the inherent moisture.

The AD state of coal is not a reference to that which is actually fed into the furnace or that which is on the stockpile. It is a reference to a sample of coal, taken from the coal supplied from the mine, and which is dried for laboratory testing. The external moisture is removed as previously mentioned and this AD coal sample is used to determine the CV it has, being in that state (free of external moisture). This laboratory process increases the purity of coal.<sup>25</sup>

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<sup>23</sup> [www.trends.directindustry.com/ckic-changsha-kaiyuan-instruments-co-ltd/project-119469-169342.html](http://www.trends.directindustry.com/ckic-changsha-kaiyuan-instruments-co-ltd/project-119469-169342.html) [Accessed 24 August 2023].

<sup>24</sup> Organisation for Economic Co-operation and Development (OECD). (2017) “Addressing the Information Gaps on Prices of Minerals Sold in an Intermediate Form”. Available online at [www.oecd.org/dev/Session-6B-Case-study-on-mineral-product-pricing-thermal-coal](http://www.oecd.org/dev/Session-6B-Case-study-on-mineral-product-pricing-thermal-coal).

<sup>25</sup> [www.brighthubengineering.com/power-plants/22202-burning-coal-in-power-plants-calorific-value-and-moisture](http://www.brighthubengineering.com/power-plants/22202-burning-coal-in-power-plants-calorific-value-and-moisture) [Accessed 24 August 2023].

Measuring the CV for coal in its AD state will result in a higher value when compared to the AR method of measurement. Due to the increased purity of the coal, a higher CV is obtained when measuring coal in its AD state. In some instances, the CV may exceed the maximum of the range for coal as specified in Schedule 2. The effect of this is that there will most probably result in a downward adjustment resulting in a reduced royalty.

The results from AD samples are mostly used by mines and companies in South Africa to define the quality of the coal to be supplied in their contracts. The payment for coal is therefore based on the analytical results of the coal sample.<sup>26</sup>

#### 4.4 The condition specified for coal under Schedule 2

The condition specified for coal in Schedule 2 before 1 March 2014 was at 19.0 MJ/kg. It was amended by the Taxation Laws Amendment Act, 2013<sup>27</sup> to provide for a range of 19.0 MJ/kg to 27 MJ/kg.

The amendment to Schedule 2 is explained in the *Explanatory Memorandum* as follows:<sup>28</sup>

“Certain minerals are given a range (as opposed to the standard condition) in recognition of the fact that certain minerals are both extracted and transferred at a variety of grades. If a mineral can be transferred in a variety of high-grade and low-grade conditions falling within the set range, no adjustment is required, i.e. the extractor can simply apply the condition upon transfer of the said mineral. One mineral that previously had such a range was coal. This range will be restored and, under the revised rules, the range for coal will be from 19.0 MJ/kg to 27.0 MJ/kg.

The weighted average calorific value of ‘low’ and ‘very low’ quality coal required by Eskom’s power stations 19.0 MJ/kg. New power plants require coal with calorific values of between 22 MJ/kg and 24 MJ/kg. Coal that is exported is typically at 23 MJ/kg and above. The lower contribution by the coal sector to mineral royalties, compared to its share of total mineral sales and the very low estimated effective royalty rate for the coal sector is an indication that the current point reference of 19.0 MJ/kg is not appropriate and that a range of 19 MJ/kg to 27.0 MJ/kg is justifiable.”

As no explicit rules were provided to guide the determination of the CV for coal, it has been subjected to the discretion of the extractor<sup>29</sup> and resulted in inconsistency in the determination of the CV of coal. Some extractors have applied the CV of coal determined in its AR state and others in its AD state. Further, reference in the *Explanatory Memorandum* to the requirements of coal by Eskom for its power plants and the CV for coal generally measured when exported, has created the impression that the CV for coal must be determined in its AD state as required by Eskom.

Agreements concluded for the supply of coal often stipulate the characteristics and quality of the coal, expressed as the CV for coal, measured in its AD state.

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<sup>26</sup> IEA Clean Coal Centre: *Coal Sampling and Analysis Standards*, April 2014. Available at [www.iea.org/reports/coal-2021](http://www.iea.org/reports/coal-2021),

<sup>27</sup> Effective from 1 March 2014 and applicable in respect of any mineral resource transferred on or after that date.

<sup>28</sup> See paragraph 6.9 of the *Explanatory Memorandum on the Taxation Laws Amendment Bill, 2013*.

<sup>29</sup> Section 1 defines an “extractor” as a person mentioned in section 2. Section 2 refers to an “extractor” as a person that wins or recovers a mineral resource within the Republic and subsequently transfers that mineral resource.

Section 6A(1A) provides special rules for unrefined mineral resources that have a range as their condition specified in Schedule 2. Mineral resources that are transferred in a condition below the minimum of the range are treated as having been brought to the minimum of the range, while mineral resources that are in a condition beyond the maximum of the range are treated as being transferred at the maximum of the range.<sup>30</sup>

As indicated above (see 4.2), measuring the CV for coal in its AD state will result in a higher value when compared to its AR state. In some instances, the CV may exceed the maximum of the range for coal as specified in Schedule 2. Determining the CV for coal in its AR state would entail a primary stage of beneficiation of washing and crushing to get the coal in a saleable condition.

Importantly, the CV of coal has to be determined with reference to the condition specified in Schedule 2 without having regard to the contractual agreement between the extractor and the purchaser of the coal.

**Example 1 – The condition of coal specified in Schedule 2 for the purpose of the royalty calculation**

*Facts:*

Company B enters into an agreement with Company A for the supply of coal to its power station. The coal undergoes a primary stage of beneficiation of crushing and washing before transferred via a conveyer belt to Company B. The coal is supplied to Company B in its AR state with a CV of 23 MJ/kg. As part of the agreement, Company A is required to supply coal with a CV of 28 MJ/kg, measured in its AD state. In order to comply with Company B's request, a sample of the AR coal is prepared and measured in a laboratory in its AD state to determine the CV. Company A invoices Company B for the supply of coal measured in its AD state.

*Result:*

The imposition of the royalty is triggered when Company A transfers the coal to Company B. The coal is deemed to be transferred as close as possible to the mouth of the mine in its first saleable condition that may include a primary stage of beneficiation to reach this condition.

The first saleable point occurs when the coal is in its AR state. The CV of 23 MJ/kg therefore applies to the condition specified for coal under Schedule 2. Although Company A receives payment for coal delivered based on a CV of 28 MJ/kg, measured in its AD state, the actual transfer of the coal takes place at a CV of 23 MJ/kg when the coal is in its AR state. This CV falls within the condition of the range under Schedule 2, that is, 19.0 MJ/kg to 27 MJ/kg. Therefore, no adjustment to gross sales is required.

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<sup>30</sup> See Interpretation Note 100 "Meaning of 'extracted'".



**Example 2 – The condition of coal for purposes of Schedule 2 at the point of extraction and at the time of transfer***Facts:*

Company X enters into an agreement with Company Y for the supply of coal. The CV for the coal is 18 MJ/kg at the point of extraction. Company X performs the primary beneficiation processes of crushing and washing the coal to be in a saleable condition before transfer to Company Y when the CV for the coal is 19.0 MJ/kg.

*Result:*

At the initial point of extraction, the CV of the coal is 18 MJ/kg and as it is not in a saleable condition, the primary beneficiation process of washing and crushing takes place. After the primary beneficiation processes take place the CV of coal increases to 19.0 MJ/kg at which point it is transferred. Since at the point of transfer the CV of the coal falls within the range of 19.0 MJ/kg to 27 MJ/kg an adjustment to gross sales is not required.

**5. Conclusion**

The Act imposes a royalty on the transfer of a mineral resource extracted in the Republic. The purpose of the royalty is to compensate the state for a mineral resource extracted from the Republic and not to tax beneficiation of the mineral resource. It is therefore important to establish the value of the mineral extracted at the first saleable point as close as possible to the point of extraction.

The first saleable point of coal after extraction includes washing and crushing thereof even though the latter is considered to be a primary stage of beneficiation the condition of coal at this stage is in its bare and basic form and represents the AR state that must be used to determine the CV of coal for purposes of levying the royalty.

## Annexure – The law

### Section 1(1)

“**mineral resource**” means a mineral or petroleum as defined in section 1 of the Mineral and Petroleum Resources Development Act, regardless of whether that mineral or petroleum undergoes processing (as defined in section 1 of that Act) or manufacturing;

“**unrefined mineral resource**” means a mineral resource –

- (a) listed solely in Schedule 2; or
- (b) listed in Schedule 1 and Schedule 2 that has not been refined to or beyond the condition specified in Schedule 1 for that mineral resource.

“**royalty**” means the royalty imposed by this Act;

“**transfer**” means –

- (a) the disposal of a mineral resource; or
- (b) . . . . .;
- (c) the consumption, theft, destruction or loss of a mineral resource, other than by way of flaring or other liberation into the atmosphere during exploration or production,

if that mineral resource has not previously been disposed of, consumed, stolen, destroyed or lost;

### Section 1 of the MPRDA

“**[B]eneficiation**”, in relation to any mineral resource, means the following –

- (a) primary stage, which includes any process of winning, recovering, extracting, concentrating, refining, calcining, classifying, crushing, screening, washing, reduction, smelting or gasification thereof;
- (b) secondary stage, . . . .;

“**[P]rocessing**”, in relation to any mineral, means the winning, extracting, concentrating, refining, calcining, classifying, crushing, screening, washing, reduction, smelting or gasification thereof;

### Section 6(1A)(b)

(1A) If any unrefined mineral resource with a range is transferred—

- (a).....;
- (b) at or within the range of conditions specified in Schedule 2, the mineral resource must be treated as having been transferred at that condition;

**Schedule 2 – Unrefined Condition of Mineral Resources**

<b>Mineral resource name</b>	<b>Unrefined condition</b>
Aggregates	Bulk
Antimony	65% Sb content in the concentrate
Barite	Concentrates with 97% BaSO <sub>4</sub>
Beryllium	70% beryl concentrate
Chrome ore in lump, chips and fines	(i) 37% to 46% Cr <sub>2</sub> O <sub>3</sub> in concentrate; (ii) 4% to 10% SiO <sub>2</sub> and a (iii) Cr/Fe ratio of 1.25 to 1.45 ( <b>chip and lump</b> ) or (iv) 0.8% to 6% SiO <sub>2</sub> and (v) Cr/Fe ratio of 1.3 to 1.6 ( <b><u>fine &lt; 1mm</u></b> )
Clay used for bricks Kaolinite clay used by paper and ceramic sectors	Bulk
Coal	Calorific value of 19.0MJ/kg to 27MJ/kg
Cobalt	7% Co in a polymineraleic matte
Copper	20% to 30% Cu
Diamond	Rough Diamonds
<b><u>Dimension stone:</u></b> Granite, Sandstone, Slate, Shale, Gneiss, Marble	Bulk
Fluorspar	80% concentrate
Graphite	86% carbon content
Iron ore	Plant feed of 61.5% Fe content
Lead	Concentrate of 50% Pb
Limestone	Concentrate of 54% CaCO <sub>3</sub>
Manganese	Manganese ore: Mn 37% to Mn 48% and Si + Al less than 11%
Mica	48% concentrate
Ilmenite	80% FeTiO <sub>3</sub>
Rutile	70% TiO <sub>2</sub> concentrate
Zircon	90% ZrO <sub>2</sub> + SiO <sub>2</sub> + HfO <sub>2</sub>
Nickel	1.4% Ni content

Niobium	45% $Ni_2O_5$ in concentrate
<b>Platinum Group Metals</b> (iridium, palladium, platinum, rhodium, ruthenium and osmium)	150 ppm in concentrate together with all other metals and minerals contained in the concentrate
Sand	Bulk
Silver	800g/t Ag in polymineralic base metal
Tantalum	In concentrate 30% $Ta_2O_5$ , Max 0.5% $U_3O_8$ and $ThO_2$ combined
Tin	80% cassiterite concentration
Tungsten ( $CaWO_4$ ) and Wolfram	65% $WO_3$ in concentrate
Uranium	80% Uranium Oxide in the uranium concentrate sold
Vanadium	Concentrate < 10% $V_2O_5$ equivalent and less than 2% calcium and silica bearing gangue minerals ( $SiO_2 + CaO$ )
Zinc (Base metal)	27% Zn in concentrate
Other Minerals not listed elsewhere	Concentrate or where the specific mineral is not rendered into a concentrate, bulk e.g. Phosphate Rock, Gypsum, Vermiculite, Semi-precious gemstones (like rose quartz, tiger's eye; corundum; etc). Precious gemstones (like sugilite), Feldspar, Garnet, Peat, Perlite, Rare Earth Elements, Silica, Soda Ash, Wollastonite, Zeolite etc.