South African Revenue Service

INTERPRETATION NOTE 138

DATE: 28 March 2025

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

Contents

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;[1]
- **"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; [2]
- **"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 and the guide referred to in this Note are the latest versions, unless otherwise indicated, which are available on the SARS website at **www.sars.gov.za** or via eFiling at **www.sarsefiling.co.za** (guides only).

1. Purpose

This Note clarifies whether AD or AR should be used to determine the condition specified for coal in Schedule 2 for calculating the royalty payable on the transfer of coal extracted from within the Republic.

The Note does not examine other aspects of the Act in detail.[3]

2. Background

Mineral and petroleum resources are the common heritage of all the people of South Africa, and the State serves as the custodian of these resources for the benefit of all South Africans.[4] As the custodian of the nation's mineral and petroleum resources, the State, through the Minister of Finance, may prescribe any levy payable under the MPRDA.[5] The state royalty must be determined and levied under an Act of Parliament, which led to the promulgation of the Act to provide for the levy of a royalty.[6]

---

1 **www.sciencedirect.com/topics/engineering/bomb-calorimeter** [Accessed 11 March 2025].
2 **www.sciencedirect.com/topics/engineering/calorific-value** [Accessed 11 March 2025].
3 See for more detail the *Guide on Mineral Royalties*.
4 Section 3(1) of the MPRDA.
5 Section 3(2)(*b*) of the MPRDA.
6 The Act commenced on 1 November 2009.

Section 2 provides that a person must pay a royalty for the transfer of a mineral resource extracted from within the Republic. The Act defines a "mineral resource" as a "mineral" or "petroleum" as defined in section 1 of the MPRDA, regardless of whether that mineral or petroleum undergoes "processing" (as defined in section 1 of that Act) or manufacturing.[7] Having regard to this definition, coal qualifies as a mineral resource and is therefore subject to the royalty under the Act.

The term "transfer" is defined in section 1 as the disposal of a mineral resource or the consumption, theft, destruction, or loss of a mineral resource, except in cases of flaring or other liberation into the atmosphere during exploration or production, provided that the mineral resource has not previously been disposed of, consumed, stolen, destroyed, or lost.

Mineral resources liable for the royalty can be transferred in either a refined[8] (Schedule 1) or unrefined[9] (Schedule 2) condition. Schedules 1 and 2 list mineral resources along with either a specified condition or a range for each particular mineral resource. The specified condition indicates the point at which the mineral is deemed acceptable for transfer and is crucial in determining the royalty payable under the Act. Consequently, the gross sales for a specific mineral resource are assessed once the mineral has reached the condition outlined in the Schedules.

Coal is classified in Schedule 2 as an "unrefined mineral resource", with the condition specified as a CV of 19.0 MJ/kg to 27.0 MJ/kg. The lack of specific rules for determining the CV of coal leads to inconsistencies. Some extractors use the AD condition, while others apply AR, resulting in the underpayment of royalties in certain cases.

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 payable in relation to –

- the transfer of a mineral resource,
- extracted,
- from within the Republic.[10]

---

7 Section 1.
8 Section 1.
9 Section 1.
10 Section 2.

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

Gross sales for unrefined mineral resources are determined under section 6(2). If an unrefined mineral resource is transferred under the specified conditions, no adjustments will be needed to the amount received or accrued from its disposal. However, if an unrefined mineral resource is transferred below or beyond those specified conditions, adjustments will be required to the amount received or accrued upon transfer. Section 6A provides for these adjustments and helps determine the arm's length price when an unrefined mineral resource is transferred under such circumstances. The application of section 6A is limited to unrefined mineral resources listed in Schedule 2.[16]

4.2. Beneficiation of a mineral resource

"Beneficiation", in relation to a mineral resource, is defined as follows:[17]

(a) Primary stage

This includes any process of winning, recovering, extracting, concentrating, refining, calcining, classifying, crushing, screening, washing, reduction, smelting, or gasification of the mineral resource.

(b) Secondary stage

This involves any action of converting a concentrate or mineral resource into an intermediate product.

(c) Tertiary stage

This includes any action of further converting that intermediate product into a refined product suitable for purchase by minerals-based industries and enterprises.

(c) Final stage

This is the action of producing properly processed, cut, polished, or manufactured products or articles from minerals that are acknowledged in the industry and trade as fully and finally processed or manufactured, thereby adding value.

Coal beneficiation specifically refers to the process of removing contaminants and lower-grade coal to achieve a product quality that is suitable for end-user applications, whether as an energy source or as a chemical agent or feedstock. Commonly, this process is referred to as coal "washing" or "cleaning".[18]

---

11 Section 3(2).
12 See definition in section 1.
13 See definition in section 1.
14 See definition in section 1.
15 See definition in section 1.
16 See Interpretation Note 108 "Meaning of 'bulk' in Schedule 2".
17 Section 1 of the MPRDA.
18 **www.coalmad/beneficiation.html, www.linkedin.com/pulse/basic-knowledge-coal-preparation-kira-zhang** [Accessed 11 March 2025].

The purpose of the royalty is not to tax beneficiation but to compensate the state for the extraction of mineral resources from the Republic.[19] The aim of the relevant legislation is to establish the value of the mineral extracted at the "first saleable point", as close as possible to the extraction point. The value of certain 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 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 occur under the Act.

4.3. Coal

4.3.1. General background

Coal is a heterogeneous substance utilised by the metallurgical industry, including power generation, reductant manufacturing, and gasification.[20] There are four major types of coal, namely, Lignite, Bituminous, Anthracite, and Subbituminous,[21] all of which is a product of time, pressure, and heat. In South Africa, the coal typically mined and supplied comprises Bituminous and Anthracite, with CVs ranging from 19 MJ/kg to 35 MJ/kg.

Coal contains both external and inherent moisture. Once "air-dried," it retains only inherent moisture (see **4.3.4**). The value and quality of coal are expressed in terms of its CV, which indicates the energy potential it possesses.

4.3.2. Calorific value

The CV of coal refers to the energy content it has and releases when burned. This value is generally determined using proximate analysis, which assesses the moisture content, volatile matter, ash, and fixed carbon in the coal sample. Proximate analysis is the simplest and most common method of coal evaluation and serves as the foundation for many coal purchasing and performance prediction indices used by utility operators.[22] This analysis is conducted in laboratories, employing various units of measurement and conditions.

---

19 See Interpretation Note 100 "Meaning of 'extracted' ".

20 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*. Volume115: 5. **www.scielo.org.za/pdf/jsaimm/v115n5/06.pdf** [Accessed 11 March 2025].

21 **www.usgs.gov/faqs/what-are-types-coal** [Accessed 11 March 2025].

22 **www.coursehero.com/file/173121882/042014-Coal-sampling-and-analysis-standards-ccc235pdf/** [Accessed 11 March 2025].

The CV is determined using calorimeters, which burn the coal in oxygen under pressure within a closed system. The "bomb calorimeter" is considered the most suitable and accurate apparatus for measuring CV and is internationally recognised as a valid measurement tool according to ISO 1928:2009.[23]

The CV is typically expressed as either the gross calorific value (GCV), which is the higher heating value, or the net calorific value (NCV), which is the lower heating value. The distinction between GCV and NCV lies in the latent heat of condensation of the water vapour produced during combustion. The GCV assumes that all vapour generated from coal moisture during combustion is fully condensed, whereas the NCV assumes that the water is expelled with the combustion products without complete condensation.[24]

Coal valuations, as previously mentioned, can be expressed in various conditions: "as-received (AR)", "air-dried (AD)", "dry", and "dry ash-free", depending on the method used to determine the CV. This Note focuses solely on the AR and AD conditions of coal because of the relevance of CV measurement to Schedule 2. Additionally, some extractors have determined the CV of coal in its AR condition, while others have done so in its AD condition.

The Act refers to "a condition specified for that mineral in Schedule 2" and "a condition different from the condition specified in Schedule 2". The same testing procedure is applied in the laboratory for all samples; the only variation is the condition of the coal when tested.

4.3.3. "As-received"

The AR condition refers to the state in which coal is delivered from the mine, with no significant beneficiation processes applied. Coal in the AR condition has not been dried, heated, or otherwise treated, representing its most basic form.[25] However, depending on specific client requirements, the coal may undergo washing, crushing, or both before reaching a saleable condition.

Stockpiles of coal at factories and power plants typically represent AR coal, containing both external and inherent moisture (that is, wet coal). Moisture directly affects the heat value of coal, as it absorbs heat during combustion, resulting in lower heat production from high-moisture coal.

Generally, coal is exported in an AR condition (wet), which is why most exports are tested while the coal is in this state. Consequently, foreign buyers of coal assess its quality based on the "as-received" properties as the basis for testing the CV.[26]

---

23 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.

24 **www.industrialchemicaltesting.com/proximate-analysis-of-coal-is-methods/** [Accessed 11 March 2025].

25 **www.trends.directindustry.com/ckic-changsha-kaiyuan-instruments-co-ltd/project-119469-169342.html** [Accessed 11 March 2025].

26 **www.brighthubengineering.com/power-plants/22202-burning-coal-in-power-plants-calorific-value-and-moisture/** [Accessed 11 March 2025].

4.3.4. "Air-dried"

The AD condition of coal refers to coal that has been spread thinly on a flat surface and dried naturally until it reaches equilibrium with the atmosphere at ambient temperatures.[27] Alternatively, it can be dried in an oven at 40 degrees Celsius to remove only the external moisture.

The AD condition does not pertain to coal that is actually fed into the furnace or stored in the stockpile. Instead, it refers to a coal sample taken from the supply from the mine, which is then dried for laboratory testing. As mentioned, the external moisture is removed, and this AD coal sample is used to determine its CV in that moisture-free condition.

Measuring the CV of coal in its AD condition yields a higher value compared to the AR method of measurement. In some instances, the CV may exceed the maximum limit specified for coal in Schedule 2. This could lead to a downward adjustment, resulting in a reduced royalty.

Although coal may also be supplied to South African clients in an AR condition, the results from AD samples are often referenced by clients in their contracts to define the quality of the coal to be supplied.

4.4. The condition specified for coal under Schedule 2

Before 1 March 2014, the specified condition for coal in Schedule 2 was set at 19.0 MJ/kg. This was amended by the Taxation Laws Amendment Act, 2013,[28] to provide a range of 19.0 MJ/kg to 27.0 MJ/kg.

The amendment to Schedule 2 is explained in the *Explanatory Memorandum* as follows:[29]

> "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."

---

[27] 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**. [Accessed 11 March 2025].

[28] Effective from 1 March 2014 and applicable in respect of any mineral resource transferred on or after that date.

[29] See paragraph 6.9 of the *Explanatory Memorandum on the Taxation Laws Amendment Bill, 2013*.

Due to the absence of explicit rules guiding the determination of the CV for coal, the determination has been left to the discretion of the extractor,[30] leading to inconsistencies. Some extractors have applied the CV of coal measured in its AR condition, while others have used the CV measured in its AD condition. Furthermore, references in the *Explanatory Memorandum* regarding the requirements for coal by Eskom and the typical CV of coal when exported have created the impression that the CV must be determined in its AD condition as mandated by Eskom.

Agreements for the supply of coal often specify the characteristics and quality of the coal, expressed as the CV measured in its AD condition.

Section 6A(1A) provides special rules for unrefined mineral resources that have a specified range in Schedule 2. Mineral resources that are transferred in a condition below the minimum of the range are treated as if they have been brought to the minimum, while those in a condition exceeding the maximum are treated as being transferred at the maximum of the range.[31]

As noted previously (see **4.3.4**), measuring the CV for coal in its AD condition results in a higher value compared to its AR condition. In some cases, the CV may even exceed the maximum of the specified range for coal. Determining the CV for coal in its AR condition would require an initial stage of beneficiation, including washing and crushing, to render the coal saleable.

The CV of coal, when transferred, must be determined according to the conditions outlined in Schedule 2 at the "first saleable point," as close as possible to the extraction point.

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

Facts:

Company A has an agreement with Company B for the supply of coal to its power station. The coal undergoes primary beneficiation, including crushing and washing, before being transported via a conveyor belt to Company A. The coal is delivered to Company A in its AR condition, with a CV of 23.0 MJ/kg. However, the agreement stipulates that Company B must supply coal with a CV of 28.0 MJ/kg, measured in its AD condition. To meet this requirement, a sample of the AR coal is prepared and tested in a laboratory to determine its CV in the AD condition. Company B subsequently invoices Company A based on the coal measured in its AD condition.

Result:

The royalty is triggered when Company B transfers the coal to Company A. This transfer is considered to occur as close as possible to the mine mouth, in its first saleable condition, which may include the primary stage of beneficiation necessary to achieve this state.

---

30 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.

31 See Interpretation Note 100 “Meaning of ‘extracted’ ”.

Typically, the first saleable point is reached after the coal has undergone primary beneficiation, whether through washing, crushing, or both, resulting in coal that contains both external and inherent moisture. Consequently, the CV of 23.0 MJ/kg applies to the condition specified for coal under Schedule 2. Although Company B receives payment for the coal based on a CV of 28.0 MJ/kg in its AD condition, the actual transfer of the coal occurs at a CV of 23.0 MJ/kg in its AR condition. This CV falls within the specified range in Schedule 2, which is 19.0 MJ/kg to 27.0 MJ/kg. Therefore, no adjustment to gross sales is necessary.

The CV of the extracted coal may differ from the conditions specified in the contract. If the CV of the coal falls within the range outlined in Schedule 2, there will be no adjustment to gross sales. However, if the actual CV exceeds the range, such as being 28.0 MJ/kg, a downward adjustment to 27.0 MJ/kg is necessary. The royalty is payable based on the value of the extracted coal, not the contractual agreement.

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

Facts:

Company C and Company D have entered into an agreement for the supply of coal, with Company C responsible for supplying coal to Company D. The CV of the coal at the point of extraction is 18.0MJ/kg. Company C performs primary beneficiation processes, including crushing and washing, to prepare the coal for sale. After these processes, the CV of the coal rises to 19.0 MJ/kg before it is transferred to Company D.

Result:

At the point of extraction, the CV of the coal is 18.0 MJ/kg, and since it is not in a saleable condition, the primary beneficiation processes of washing and crushing are conducted. Once these processes are complete, the CV increases to 19.0 MJ/kg, at which point the coal is transferred to Company D. As the CV at the time of transfer falls within the range of 19.0 MJ/kg to 27.0 MJ/kg, no adjustment to gross sales is required.

Example 3 – The CV of coal below the condition specified in Schedule 2 for the purposes of the royalty calculation

Facts:

Company E and Company F have entered into an agreement for the supply of coal to Company E. The extracted coal undergoes primary beneficiation processes, including crushing and washing, before being transferred via a conveyor belt to Company E. The supplied coal has a CV of 17.0 MJ/kg. A sample of this coal is subsequently prepared and measured in a laboratory using the AD method, resulting in a CV of 22.0 MJ/kg.

Result:

The royalty is triggered when Company F transfers the coal to Company E.

The first saleable point usually occurs when the coal has undergone some form of beneficiation, which may include washing, crushing, or both processes. The coal transferred to Company E has a CV of 17.0 MJ/kg, measured using the AR method. At the point of transfer, this value represents the condition that must be applied to the range specified for coal under Schedule 2. This is despite the fact that the same coal, when delivered, recorded a CV of 22.0 MJ/kg using the AD method. The CV of 17.0 MJ/kg falls below the minimum condition specified in Schedule 2, which ranges from 19.0 MJ/kg to 27 MJ/kg. Consequently, an upward adjustment to gross sales is necessary to bring the mineral resource up to the minimum requirement of 19.0 MJ/kg, as stipulated in Schedule 2.[32]

5. Conclusion

The Act imposes a royalty on the transfer of a mineral resource extracted within the Republic. The purpose of this royalty is to compensate the State for the extraction of mineral resources, rather than to tax the beneficiation of those resources. Therefore, it is crucial to establish the CV of the mineral extracted at the first saleable point as closely as possible to the point of extraction.

The first saleable point of coal following extraction involves processes such as washing or crushing, or both, which constitutes the primary stage of beneficiation. At this stage, the coal is in its raw and basic form, representing the AR condition. The CV of the coal for the purpose of levying the royalty must be determined with reference to the condition of the coal at the time of transfer.

Leveraged Legal Products
SOUTH AFRICAN REVENUE SERVICE

[32] Section 6A(1A)(*a*), read with section 6(2)(*b*). See for more detail paragraph 3.1.2 of the *Guide on Mineral Royalties*.

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

"beneficiation", 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, . . .;

"processing", 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 – <u>Unrefined Condition of</u> Mineral Resources

Mineral resource name	**Unrefined condition**
Aggregates	Bulk
Antimony	65% Sb content in the concentrate
Barite	Concentrates with 97% BaSO4
Beryllium	70% beryl concentrate
Chrome ore in lump, chips and fines	(i) 37% to 46% Cr_20_3 in concentrate; (ii) 4% to 10% SiO_2 and a (iii) Cr/Fe ratio of 1.25 to 1.45 (**<u>chip and lump</u>**) or (iv) 0.8% to 6% SiO_2 and (v) Cr/Fe ratio of 1.3 to 1.6 (**<u>fine < 1mm</u>**)
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 polymineralic matte
Copper	20% to 30% Cu
Diamond	Rough Diamonds
<u>Dimension stone:</u> 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% $CaCO_3$
Manganese	Manganese ore: Mn 37% to Mn 48% and Si + Al less than 11%
Mica	48% concentrate
Ilmenite	80% $FeTiO_3$
Rutile	70% TiO_2 concentrate
Zircon	90% ZrO_2 + SiO_2 + HfO_2
Nickel	1.4% Ni content

Niobium	45% Ni_2O_5 in concentrate
Platinum Group Metals (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 Wolram	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.