FUEL RESEARCH INSTITUTE OF SOUTH AFRICA.

TECHNICAL MEMORANDUM NO.6 OF 1965.

ANTHRACITE GRADING.

By:

W. H. D. SAVAGE.

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INTRODUCTION:

During the past eighteen months discussions have been held with the Anthracite Producers Association on the desirability of altering the specifications of first grade anthracite and introducing a second and possibly a third grade. The current requirements for first grade anthracite are as follows:-

Ash content	: Maximum 11.3%
Calorific Value	: Minimum 13.4 lb/lb.
Ash Fusion Temperature	: Minimum 1350°C

any anthracite not complying with any or all the above criteria being classed as under first grade. (South African anthracite is defined in the regulations as having a volatile matter content on the dry ash-free basis not exceeding 12.5%).

Many individual samples have had ash contents below 7% and annual average ash contents of 7.0% have been obtained for cobbles from Alpha Anthracite and Natal Ammonium Collieries. There is thus a large range in quality between the best products exported and the upper limit for first grade anthracite, and the introduction of a premium grade appears justified.

ANTHRACITE EXPORTS IN 1964.

According to the Institute's records 71 shipments of anthracite amounting to 601,875 tons were made in 1964. The quantities of the different size grades with the number of shipments of each grade together with separate data for Vrisgewaagd and Gluck Auf Collieries are given in Table 1. The difference between the total shipment and that for the latter collieries is the contribution from A.P.A. Collieries and came from Natal Anthracite, Natal Ammonium, Alpha and Elandsberg Anthracite Collieries.

TABLE 1. .../

TABLE 1.

Anthracite Exports 1964.

Size of Coal	Total Shipment			Vrisgewaagd and Gluck Auf		
	Tons	cwt.	No. of Consignments	Tons	cwt.	No. of Consignments
Cobbles	18,622	15	4			
Cobbles & Large Nuts *	20,438	9	2			
Cobbles to Duff *	13,425	18	1			
Large Nuts	91,906	0	20	9,152	1	3
Small Nuts	81,106	11	29	5,427	3	3
Peas	101,456	11	27	3,014	9	1
Grains	111,621	19	19			
Duff	135,316	4	24	2,922	12	2
Run of Mine	23,980	19	3	23,980	19	3
TOTAL	601,875	2	71	44,497	4	5

* Composition not specified.

Apart from cobbles, for which exports were relatively low, and run-of-mine which is no longer being exported, the tonnages of the remaining size grades are of the same order, tending to be greater in the smaller sizes.

The export tonnage of the A.P.A. Collieries amounts to 50% or 55% of the total sales output of these collieries (it is not known whether export data are given in long or short tons).

Exports were mainly to Italy (192,000 tons), France (135,000 tons), Japan (131,000 tons) and Holland (99,000 tons), with from 15,000 to 6,000 tons to each of the following countries:- Congo, Spain, New Caledonia and Tasmania and less than 400 tons to Mauritius.

AVERAGE QUALITY ..../

AVERAGE QUALITY OF THE COAL.

As the ash content of anthracite is normally the property of overriding importance (apart from volatile matter which is not a grading specification, but the criterion for classification) most of the following discussion will be concerned only with the ash contents of the samples taken.

In Table 2 are given the average ash contents of sales products from all the anthracite collieries listed in the 1963 and 1964 F.R.I. Annual Reports. In addition, average data for the years 1958 to 1960 for Riversdale Anthracite are included. These have been included because this colliery (at present dormant) together with Vrisgewaagd and Gluck Auf Collieries, which form a continuous block of coal in the Thabankulu mountain, is included in the holdings of the new Riversdale Anthracite Colliery of Afrikaner Proprietary, Limited.

The samples included in the averages include both export and inland sales products. Virtually only export samples are included for the first four collieries in Table 2, no export samples are included for Brockwell and Amajuba, and only the 1963 duff data from Jackson's Anthracite include export samples, while for Vrisgewaagd and Gluck Auf both export and inland samples are included, except for the run-of-mine coal, which was all exported. However, normally there is no significant difference in the quality of coal supplied to the inland and export markets.

TABLE 2.

Average Ash Contents of Anthracite Products
1963 and 1964

Colliery	Cobbles		Large Nuts		Small Nuts		Peas		Grains		0-5mm Duff		Run-of-Mine (1)
Alpha	7.0	7.5	7.8	7.8	8.5	8.1	8.5	8.1	9.1	8.8	11.2	11.1	
Natal Anth.	7.4	7.8	7.5	7.8	8.0	8.1	8.3	8.4	8.5	8.4	10.2	10.2	
Natal Am.	7.0	7.4	7.2	7.7	7.8	7.9	8.2	8.5	8.5	8.4	11.7	11.6	
Elandsberg	9.2	10.0	9.3	9.6	9.7	9.8	9.7	9.8	9.0	9.4	9.7	9.7	
Jackson's			10.9	10.5	11.3	11.0	11.8	17.0 (2)			11.2	15.0 (2)	
Vrisgewaagd			9.7	8.9	10.5	11.2	10.9	11.9			10.8	11.0	9.8
Gluck Auf				8.6		10.7		10.9				11.5	9.4
Brockwell			15.2	13.0	17.8	12.1	14.7	12.0			21.9 (3)	16.1 (3)	
Amajuba	23.4		25.3	19.0	26.5	22.1	23.4	26.8			18.9	26.4	
Riversdale (4)			11.1		11.5		11.4				11.3		

1. 1964 only
2. Single samples, which may be abnormally high in ash content.
3. Mixed smalls.
4. Average 1958 to 1960.

From the control aspect, it is desirable that as few products as possible have an average ash content at or close to the limiting value of any grade. This is because coals show a greater or lesser fluctuation about the average value, and it is not desirable to make frequent changes in the grade of a particular product; the question also arises in borderline cases as to when such changes should be made.

If the values in Table 2 be arranged in ascending ash content, it can be seen that they form a virtually continuous series from 7.0% to 12.1%, with scattered higher values. In the continuous series the only gaps are 7.1, 7.3, 7.6, 8.7, 9.5, 9.9, 10.1, 10.3, 10.4 and 10.6. (If the Riversdale figures are excluded there is also a gap at 11.4). There is thus no natural break - except possibly in the range 10.0% to 10.7% which is not low enough for the upper limit for a premium grade nor high enough for the upper limit for second grade - in the average ash contents until a value of 12% is reached.

Of the actual values reported in Table 2, figures below 9% are virtually restricted to washed coal from the three Mount Ngwibi collieries with a general tendency for the smaller coal to give higher values. Figures between 9% and 10% are largely in respect of Elandsberg Anthracite - which is also washed - and higher values refer to unwashed duff from Mount Ngwibi and most of the products from the other collieries, which apart from the 1964 sized coals from Brockwell Anthracite are also not washed.

INDIVIDUAL EXPORT SAMPLES TAKEN SINCE 1962.

The basis of sampling export coal is to take one sample per product per month - normally from four trucks of coal - of coal arriving at the Bluff for export. If a coal goes undergrade, weekly check samples (if possible) are taken until the grade is regained or until it is decided to replace the certificate with a lower grade certificate, which normally occurs after four consecutive

undergrade .../

undergrade samples have been taken. Also if additional information is required, an enhanced sampling programme is instituted. There is thus no very close relationship between the number of samples taken and the amount of any particular coal shipped.

The distribution of values of the ash contents of individual samples of export coal for separate size grades for the various collieries for the period January 1963 to January 1965 inclusive has been studied, and these values are presented graphically in Figures 1 to 4, dealing with the coals sub-divided as follows:

Figure 1: Washed products from Mount Ngwibi collieries.

Figure 2: Elandsberg Anthracite products.

Figure 3: Unwashed duff from Mount Ngwibi collieries and Jackson's Anthracite duff*.

Figure 4: Vrisgewaagd and Gluck Auf products (excluding run-of-mine)

The run-of-mine coal from Vrisgewaagd and Gluck Auf Collieries has been excluded as it is unlikely that such coal will be exported in future. Further, the accurate sampling of such coal is very difficult, and the samples taken are not considered to be as representative as is normally the case.

In these graphs are presented the cumulative percentages of the samples with ash contents up to 8% and by 0.5% ash stages to 13%, and finally by 1% stages to 15% ash content. The separate columns on the right of the main graphs are based on the total number of samples taken, and have in fact limited application as different products have been rather unequally sampled. The number of samples taken is given above each product, and many products have values near 25, which is one sample per month. In the case of Elandsberg, and Vrisgewaagd and Gluck Auf (where par is 50 samples per product) coal has not arrived regularly at the Bluff each month, and fewer samples have been taken. Only for Alpha duff (47 samples) and Natal Anthracite duff (32 samples) has the figure of 25 samples been appreciably exceeded. Fourteen samples of 0-12mm duff have been included in the data, 8 coming from Alpha

Anthracite ..../

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* Thirteen samples taken between 1959 and 1963.

Anthracite, 3 from Elandsberg Anthracite, 2 from Natal Ammonium and one from Natal Anthracite, all the samples being taken in 1963.

Before discussing the graphs, it may be desirable to consider limiting ash contents for the new grades. It is felt that these should be limited to whole or half percentages of ash. Further it is felt that the new second grade should not have an ash limit lower than the existing first grade (11.3%), unless a third grade also with an upper limit to ash content is introduced. It does not seem, however, that a third grade is either necessary or desirable.

A study of Table 2 shows that only cobbles and large nuts from the three Mount Ngwibi collieries and Natal Ammonium small nuts gave average ash contents of not more than 8% in both years, and Natal Anthracite small nuts had 8.0% ash in 1963. This represents only a relatively small percentage of total exports, and many of the average ash contents are in any case close to 8%. At a limit of 8.5% ash, only Alpha grains of the Mount Ngwibi washed coals exceeds the limit. However, many of the average ash contents of the smaller sized coals are at or near this figure, which would lead to difficulty on the control side. At a limiting ash content of 9% this difficulty would largely fall away, and 9% ash appears to be a desirable limit for first grade anthracite. For second grade the choice rests between 11.5% and 12.0%, and there is not much to choose between these values from the control aspect, if Brockwell is considered to be a potential exporter. A limit of 12% would exclude no coals presently exported from the second grade, and would include at least some potential exporters. If three grades are required, the second grade limit may have of be reduced to 11% or the present first grade limit to 11.3%, as the limit for third grade should not be more than 13% or at most 13.5%.

Figure 1 shows that, apart from Alpha grains, all Mount Ngwibi washed products have less than 10% of samples exceeding 9% ash, so that no trouble would be expected in maintaining first grade at a 9% ash limit.

Alpha .../

Alpha grains have 37% of samples exceeding 9%, so that more than one in three samples would be undergrade. However, of the last eight samples only one (at 9.3% ash) exceeded this limit; if this standard of quality can be maintained, Alpha grains would also be satisfactorily placed in the first grade. If the first grade limit were reduced to 8.5% about one in four samples of small nuts and smaller sizes (excluding Alpha grains) would be undergrade, and there would probably be difficulty on the control side due to interchange between first and second grade quality. (In Table 2 one figure for small nuts was 8.5%, two values of 8.5% and one each of 8.4% and 8,3% apply to peas, and for grains two values each of 8.5% and 8.4% occur - the Alpha grains values both being over 8.5%). Thus for these coals 9% appears to be the best figure for the upper limit of first grade anthracite.

Elandsberg Anthracite samples (Figure 2) show that no difficulty would be experienced in maintaining second grade quality at a limiting ash content of 12% or 11.5%; even at 11% upper limit no size grades show more than 10% of samples exceeding the limit. As far as first grade coal with a limit of 9% ash in concerned, no first grade samples were taken of small nuts and peas, and for the other sizes the proportion of samples within first grade varies between 19% and 37%, also Table 2 shows that only grains in 1963 at 9.0% gave an average value within this limit. Of course with either an improvement in the quality of the coal mined, or by more drastic washing, first grade quality could be attained, when it is likely that average values would not be much below 9% so that control difficulties would occur,

Mount Ngwibi duff coals and Jackson's duff (13 export samples taken in the years 1959 to 1963) are presented in Figure 3. Both Natal Anthracite and Jackson's duff are very comfortably accommodated in the second grade with no samples below 9% and less than 10% of samples with ash contents above 11% and even less above 11.5% or 12% ash. Natal Ammonium duff also has no samples below 9%; only 35% of the samples have not more than 11.5% ash, and 66% of samples not more than 12% ash. Thus one third of

all samples .../

all samples would be below grade at a 12% limit making control difficult. However, the average ash contents (Table 2) for 1963 and 1964 are 11.7% and 11.6% so that the coal would have to be classed as second grade at a 12% ash limit, but may be liable to loss of grade due to a run of high ash samples. Alpha duff shows a very wide range of ash contents ranging from less than 8% to nearly 15%. The proportion of samples with less than 9% ash (11% of all samples) is so low that a first grade certificate would be out of the question. The average ash contents (Table 2) for the last two years are 11.2% and 11.1%, so that the coal should be second grade even at a limit of 11.5% ash. However, 38% of samples exceeded 11.5% ash and 22% exceeded 12% ash, so that much difficulty on the control side could be expected at a limiting ash content of 11.5% and some difficulty may occur at a limiting ash content of 12% for second grade anthracite. In fact there has been periodicity in the proportion of high ash samples with the number of samples exceeding 11.3% ash (the current limit for first grade) in the four six-month periods of 1963 and 1964 as follows:-

Period.	Total No. of Samples.	Samples Exceeding 11.3% of Ash.
January to June 1963	14	3
July to December 1963	15	8
January to June 1964	12	7
July to December 1964	5	2

Both samples taken in 1965 so far have been below 11.3% in ash. If the recent improvement in ash content is maintained, there should not be much difficulty even on the control side for second grade quality at a limit of 11.5% ash, as only one sample in the last six (including February) exceeded 11.5% ash content.

Figure 4 contains data on Vrisgewaagd and Gluck Auf products excluding run-of-mine coal. A second grade quality is easily met at a limiting ash content of 12%, all products having less than 10% of samples with higher ash contents; even at 11½% limiting ash, the maximum percentage of samples exceeding this value is 18% for small nuts, so that no great difficulty on the control side is

to be ..../

is to be anticipated. Only the large nuts had any samples with ash contents of 9% or less; for this size half the samples would be first grade, and on 1964 average ash contents (Table 2) the coal would qualify as first grade. It can be anticipated that there would be difficulty in control, with interchange of first and second grade certificates at fairly frequent intervals. The old Riversdale Anthracite Colliery, together with Vrisgewaagd and Gluck Auf Collieries, is included in the property of Afrikaner Props. Export samples from Riversdale were not included in Figure 4, but in all 43 samples were taken, 23 of them being samples of duff coal. None of these samples had less than 10% ash, and samples with ash contents over 11.5% were as follows:-

1 sample at 11.7%
3 samples at 12.0%
1 sample at 12.1%
1 sample at 12.4%

All but one of these high ash samples were in respect of duff coal. The future mining and preparation policy of Afrikaner Props. in regard to their property is not known, so that in fact, it is idle to speculate on the quality of coal to be produced in this area in the future.

The ash distribution of all samples included in Figures 1 to 4, and also similar data including Riversdale Anthracite export samples, are given in Table 3.

The differences between the sum of the individual percentages and the cumulative percentages are due to each being separately calculated.

The data under A below show a steadily decreasing number of samples with increasing ash content, with no natural break until the ash group 12.1 - 12.5% is reached. In fact all samples with ash contents above 12%, total less than those in the 11.6 - 12% ash group. The pattern under B is similar except for an increase in the 10.6 - 11.0% ash group. On these figures there is thus no natural break at a possible new first grade limit, but 12.0% would be a natural break for the limit for second grade. However, it has already been shown on the individual size grades that 9% ash would be a satisfactory limit for first grade; as regards second grade it may be felt that 12% is rather high as a limit. This point could be referred to the producers for their opinion.

POSSIBLE ..../

TABLE 3.

Distribution of Ash in Recent Anthracite Export Samples

Ash Group	A Data of Figures 1 to 4			B Including Riversdale		
	No. of Samples	Percent	Cumulative Percent	No. of Samples	Percent	Cumulative Percent
Up to 8.0	176	29.5	29.5	176	27.5	27.5
8.1- 8.5	97	16.2	45.7	97	15.2	42.7
8.6- 9.0	65	10.9	56.6	65	10.2	52.8
9.1- 9.5	55	9.2	65.8	55	8.5	61.4
9.6-10.0	51	8.5	74.4	51	8.0	69.4
10.1-10.5	42	7.0	81.4	46	7.2	76.6
10.6-11.0	36	6.0	87.4	60	9.4	85.9
11.1-11.5	27	4.5	92.0	36	5.6	91.6
11.6-12.0	25	4.2	96.1	29	4.5	96.1
12.1-12.5	10	1.7	97.8	12	1.9	98.0
12.6-13.0	6	1.0	98.8	6	0.9	98.9
13.1-13.5	3	0.5	99.3	3	0.5	99.4
13.6-14.0	1	0.2	99.5	1	0.2	99.5
14.1-14.5	2	0.3	99.8	2	0.3	99.8
14.6-15.0	1	0.2	100.0	1	0.2	100.0
TOTAL	597	99.9		640	100.1	

POSSIBLE POTENTIAL ANTRACITE EXPORTERS:

It is possible that other producers and potential producers, who do not now export may enter the export field.

Jackson's anthracite has been exported in the past, but apart from duff is unlikely to be exported in the future. In any case, the coal should be second grade whether 12% or 11.5% ash content is taken as the upper limit.

Brockwell Anthracite installed a washing plant more than a year ago, but has not entered the export market. The average of the ash contents of washed products

last .../

last year varied from 12% to 13%. Thus the coal would tend to be below second grade even if the limit were 12% ash, unless the coal was more drastically washed.

Amajuba Anthracite has very high ash contents. Washability tests have shown that even at 50% yield the washed product would be well above any second (or third) grade ash limit.

Enyati Anthracite is unlikely to enter the export market, at least, in the near future. We have very few data on this coal, but ash contents are likely to be within the range of 9% to 12%. The anthracite is washed.

Pofeni Anthracite is also unlikely to enter the export market. The coal is washed, but ash contents are probably normally in excess of 12%.

Boschkrans Anthracite - an associate of Natal Ammonium - is a potential large producer and exporter. Washability tests on a bulk sample gave 75% yield at 9% ash for large nuts, and over 90% yield at the same ash content for peas and duff. In an actual washing test, the product from the Drewboy washer had 10.2% ash at 87% yield, and that from the cyclone washer had 6.8% ash at 74% yield. Thus the smaller sized washed products would presumably be first grade at 9% ash limit, and the larger sizes either first or second grade depending on mine policy. Ash fusion temperatures may be about 1300°C.

Recent news reports have stated that a new company will be entering the export market this year, with overseas sales of 2½ million tons in the next ten years. The properties mentioned include the dormant Nooitgedacht Anthracite mine, Spa - apparently sited on the northern portion of Zuinguin mountain or on the farm Bloemendal - and Koudelager farm which lies immediately south-east of Alpha Anthracite. Average ash contents of samples taken by the Institute from the Nooitgedacht Colliery were 11.0% and 11.4% for cobbles and nuts, and 12.6% to 12.7% for peas and duff. Nothing is known about the Spa area. The seams that are most likely to be worked on Koudelager average 3 ft or slightly less in thickness, but the quality of the anthracite varies both vertically and laterally in the seams, and washing would

probably ..../

probably be necessary to ensure a good (second grade) product. At this stage it is impossible to predict the quality of the output of any of these properties, as it is not known whether the coal will be washed.

CALORIFIC VALUE:

The discussion so far has been concerned only with the ash content, which is generally regarded as the most important property of anthracite (apart from volatile matter which is not the subject of specification, but the basis of classification), and the Anthracite Producers Association would possibly be satisfied with ash as the sole specification.

In the current regulations limits for calorific value are also included. These were introduced to exclude abnormal - presumably weathered - anthracite that were high in moisture contents and low in ash-free calorific value. If calorific value is retained in the new specification the same principle should be applied.

The present specifications are 13.4 lb/lb minimum for calorific value and 11.3% maximum for ash. At 2% moisture (which is about average for air-dried anthracite of 5% to 6% volatile matter under Pretoria conditions) this works out at a dry ash-free calorific value of 15.46 lb/lb; it is felt that this value is rather high for anthracites of about 5% volatile matter (which have been and may in future be exported) and a dry ash-free value of 15.3 lb/lb is preferred. At 2% moisture this would give the following calorific values on the air-dry basis:-

TABLE 4.

Ash %	Corresponding Calculated Calorific Value lb/lb.	Rounded Calorific Value lb/lb.
9.0	13.62 (13.38)*	13.6
11.0	13.31 (13.07)*	13.3
11.3	13.27 (13.03)*	13.3
11.5	13.23 (13.00)*	13.2
12.0	13.16 (12.92)*	(say) 13.1
13.0	13.01 (12.77)*	13.0

*See later discussion below.

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If the above values were adopted, very few normal anthracites in the low volatile range would exceed the calorific value limits before exceeding the ash limits.

Since writing the above, the analysis of an Elandsberg 0-5mm duff export sample for February has come to hand. The analysis of this sample is as follows:-

Cal.Val. lb/lb.	Moisture %	Ash %	Volatiles %	Fixed Carbon %	Dry Ash-free Cal.Val.lb/lb.
13.20	2.8	10.6	3.8	82.8	15.24

This sample, although well below 11% in ash content, has a calorific value 0.1 lb/lb below the limit given for 11% ash in the table above. This is due to the very low volatile matter of the coal and the associated (normal) high moisture content of 2.8%. If similar low volatile anthracite from Elandsberg Anthracite Colliery is to be exported in the future, it will be automatically be degraded on grounds of low calorific value long before the limiting ash content of the grade is reached. Alternatively Table 4 would have to be modified say to an air-dry moisture content of 3% and a dry ash-free calorific value of 15.2 lb/lb, in order to retain such coals in the grade determined by the ash content. This would lead to the values in brackets in Table 4, which are considerably lower than the figures derived from 2.0% moisture and 15.3 lb/lb dry ash-free calorific value. As even these higher calorific values in the table are 0.4 to 0.5 lb/lb lower (at the given ash contents) than those of the normal high volatile anthracites comprising the bulk of the exports, the introduction of still lower limiting values would be altogether out of step with calorific values obtained from the bulk of the anthracite exported.

In view of the above, it may be better to drop the calorific value specification altogether.

ASH FUSION TEMPERATURE:

When specifications for anthracite were first introduced, the producers were keen on having the ash fusion temperature limit as high as possible and they suggested 1400°C. In fact a figure of 1350°C was adopted. Now

apparently .../

apparently the Anthracite Producers Association would be willing to see this specification deleted altogether.

In fact, of present exporters, Elandsberg Anthracite sometimes falls below the limit of 1350°C, and Carnarvon and Impati Anthracites in the past also had difficulty in meeting the specification. It appears possible that Boschkrans Anthracite may also have difficulty in meeting a specification of 1350°C.

It is not desirable to delete ash fusion temperature from the specifications, as clinkering trouble may occur even in domestic appliances if the coal is very low in ash fusion temperature. Such anthracite may conceivably be produced in the vicinity of Utrecht.

The current limit for bituminous coal is 1250°C, and this may be a satisfactory figure for anthracite.

SEMI-ANTHRACITE.

Semi-anthracite as such has not as yet been exported from South Africa. However, some semi-anthracite certificates have been issued in respect of coals that just exceeded the 12.5% dry ash-free volatile matter limit for anthracite, and some products for which anthracite certificates have been issued sometimes exceed this limit.

As it seems likely that any semi-anthracite actually exported will be exported with anthracite, it may be considered desirable to alter the semi-anthracite specifications in line with alterations made for anthracite.

If calorific value is deleted from the anthracite specifications, there would be no necessity for a calorific value specification for semi-anthracite. If it is decided to retain calorific value as a specification for anthracite the corresponding semi-anthracite calorific values should be based on a moisture content of 1.5% and a dry ash-free calorific value of 15.6 lb/lb.

SUMMARY AND CONCLUSIONS .../

SUMMARY AND CONCLUSIONS.

A study of recent data on export samples indicates that, if a premium grade is to be introduced, the best limit for ash content is 9 per cent. All washed coal from Natal Anthracite, Natal Ammonium and Alpha Anthracite would fall within such a grade, and only grains from Alpha are near the limit. Recent samples of this coal have nearly all been within the limit. Riversdale Anthracite (of Afrikaner Props) large nuts may qualify as first grade, but a fairly large proportion of samples taken may be undergrade at this limit. At least some of the products of Boschkrans Anthracite (a Natal Ammonium subsidiary) may fall within the new first grade, but no other coals are expected to be first grade unless there are improvements in quality.

If only first and second grades are specified, the ash content of second grade anthracite should not be less than the present limit for first grade, namely 11.3%. This figure could be raised to 11.5% or possibly 12%. The latter limit would include all but a small percentage of recent export samples, but the producers may prefer a lower value.

If a third grade is to be introduced - which does not appear to be necessary - the second grade limit could be placed at 11.0% or 11.3% ash and the third grade limit at 13.0% or 13.5% ash. The limit of 11%, and possibly at 11.3%, would probably introduce more administrative and analytical work that the higher figures of 11.5% or 12.0%, and frequent interchange of some products between second grade and third grade may be necessary. Also it is not known if there is a potential export market for anthracite with more than 12% ash.

Calorific value is at present a specification for first grade anthracite. The limit was set at a low value, so as to exclude on calorific value grounds only abnormal - presumably weathered - high moisture anthracite which would comply with the ash limit. However, a very recent sample of Elandsberg Anthracite with very low volatile matter content and fairly high (but normal) moisture content

has been .../

has been received. As future supplies of Elandsberg coal can be expected to continue to be low in volatile matter, this would imply setting the calorific value limits even lower than at present, if this coal is not to be penalised for calorific value while maintaining ash specifications. Also the known occurrences of abnormal weather anthracite appear to be limited in extent. As also the bulk of the anthracite exported is fairly high in volatile matter and of fairly high dry ash-free calorific value (15.6 lb/lb and higher) and reasonably low moisture content (about 1.5%), most of the coal exported will have calorific values well above any limits set for the corresponding grade. It thus appears desirable to exclude calorific value as a specification in the new specifications.

Ash fusion temperature should be retained as a specification but the requirements could be eased. A figure of 1250°C, similar to that applying to bituminous coal, is suggested. Some past, present and potential future exporters may not be able to attain values of 1350°C, or even 1300°C.

If new specifications are introduced for anthracite corresponding changes should be made in the semi-anthracite specifications.

Thus the new specifications recommended for both anthracite and semi-anthracite would be:-

First grade	:-	Ash 9.0% maximum. Ash fusion temperature 1250°C minimum.
Second grade	:-	Ash 11.5% or 12.0% ~~minimum~~ maximum. Ash fusion temperature 1250°C minimum.
Under second grade	:-	Not complying with the requirements of second grade in either or both respects.

The Anthracite Producers could be asked to indicate their preference as regards the limiting ash content for second grade.

There would be no calorific value specification.

(SIGNED) W. H. D. SAVAGE.
CHIEF OF SURVEY DIVISION.

PRETORIA.
5/3/65.

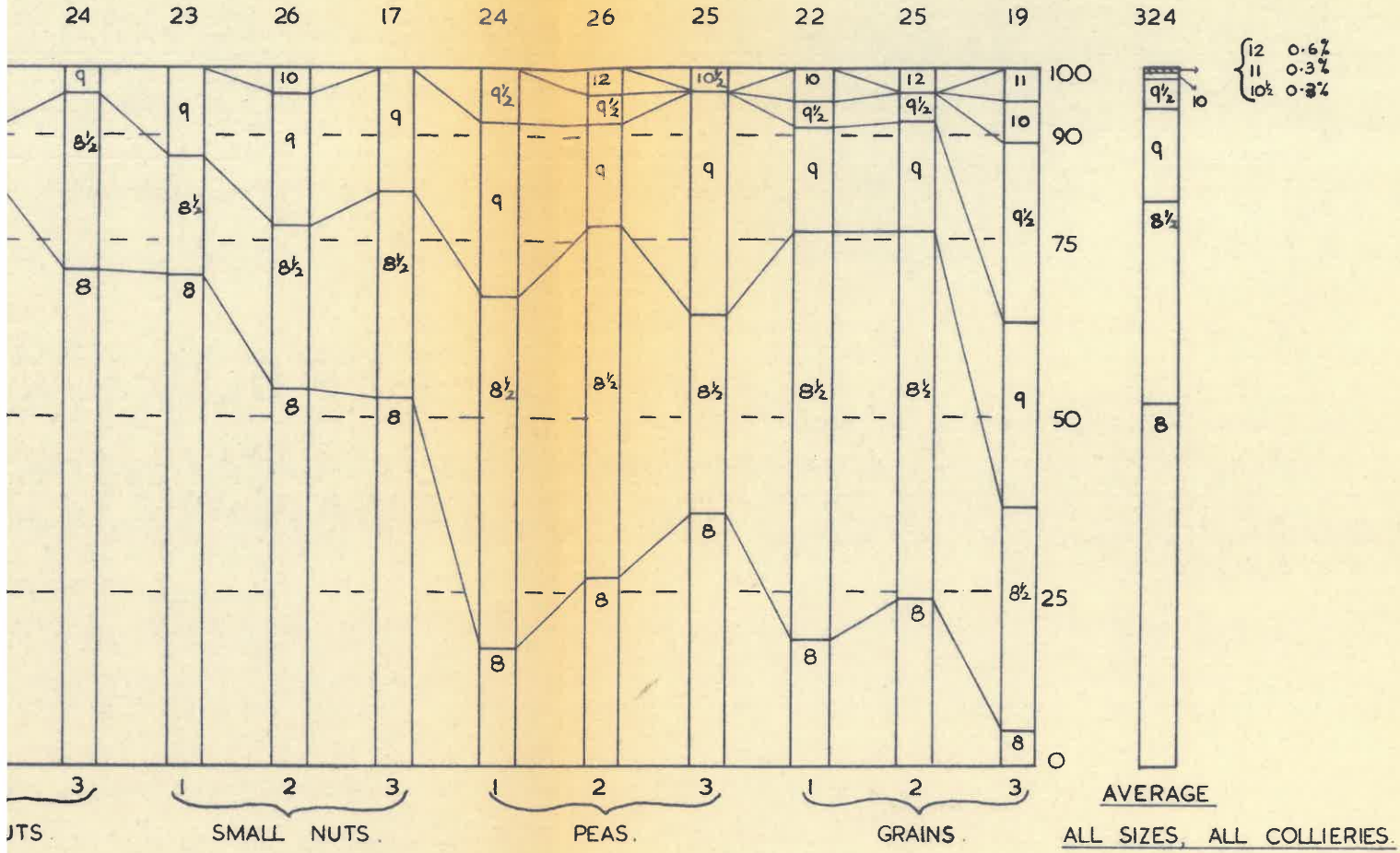

FIGURE 1

BUTION OF ASH CONTENTS OF SAMPLES.

RY :–

1) Natal Ammonium
2) Natal Anthracite
3) Alpha

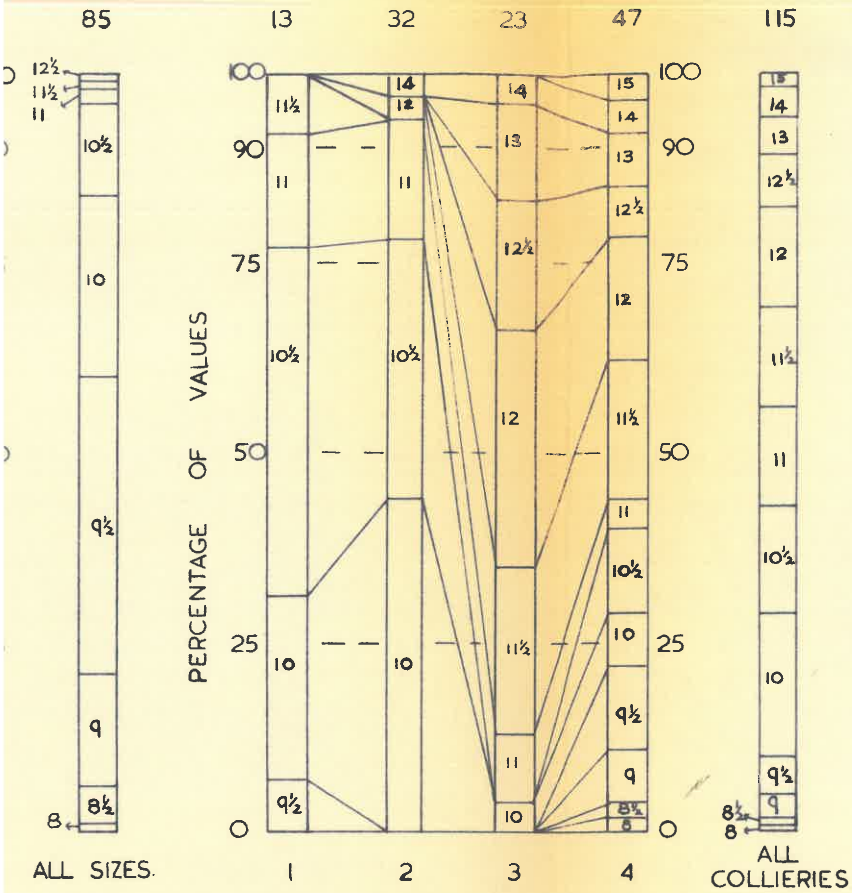

FIGURE 3.

ASH DISTRIBUTION OF SAMPLES

DUFF COAL FROM:—

1) Jacksons, (1959 to 1963.)
2) Natal Anthracite.
3) Natal Ammonium.
4) Alpha.

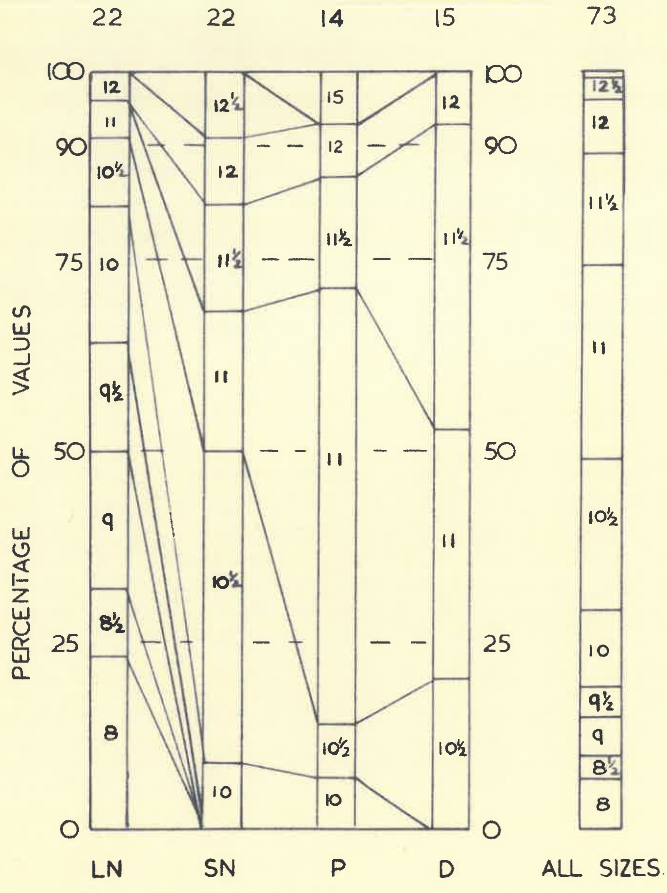

FIGURE 4.

ASH DISTRIBUTION OF SAMPLES,

VRISGEWAAGD AND GLUCK AUF.