



Job File No.: 181202/65647-0422/M-NK-2015

**INSPECTION REPORT**

In pursuance of an order for inspection given to us

**BY** : " CARBO ONE LIMITED "  
**TO INSPECT** : Coal 13-50 mm, grade "Washed SS - coal" (Kedrovsky SSOM) (as declared) in rail cars  
**BY** : Sampling and Analysis  
**AT** : Kedrovsky open cut, Kemerovo region, Russia  
**ON** : 3 January 2015

**WE HEREBY REPORT** that we have performed sampling and analysis of the above mentioned commodity.

**SAMPLING:** Manual sampling as per ISO 18283 5.3. from the tops of the rail cars: Sampling material in motion, on systematic known mass intervals basis. Increments were collected from freshly exposed surface, on a mass interval basis, with fixed increment mass. Manual Sampling method was agreed with the SGS Principal, as sampling by other methods was not possible.

**I. ANALYSES WERE PERFORMED IN SGS LABORATORY:**

1. **Proximate analysis** was performed in SGS laboratory (Accreditation Certificate No. POCRU.0001.21TY38, valid till 22.09.2016) according to ISO Methods with results as follows:

Basis reported	Total moisture, % ISO 589-2003, ISO 5068-1- 2007	Ash, % ISO 1171-97	Yield of volatile matter, % ISO 562-98	Total sulphur, % ISO 19579-92	Gross calorific value, kcal/kg ISO 1928-76
As Received	5.4	7.5	20.9	0.28	7295
Air Dry Basis	1.1	7.8	21.8	0.29	7624
Dry Basis		7.9	22.1	0.29	7708
Dry Ash Free			24.0	0.32	8370

**Net Calorific Value (as received) was calculated in accordance with ISO 1928:2009 (Pt. 12.2.2.1 и Pt E.3.3): 7070 kcal/kg**

2. **Screen test** were performed in accordance with ISO 1953 with results as follows:

Nominal Top Size (mm)	+50	25-50	13-25	6-13	3-6	1-3	0.5- 1	0- 0.5
Yield (%)	20.4	44.8	22.2	7.6	0.9	2.1	0.7	1.3

**SGS Vostok Limited**

312-24, Ordzhonikidze Street, 654005 Novokuznetsk

Russian Federation

t : +7 3843 39 16 81, 39 16 82, 39 16 83 f : +7 3843 39 12 42

e: ru.novokuznetsk@sgs.com

www.ru.sgs.com

Member of SGS Group

This document is issued by the Company subject to its General Conditions of Service ([www.sgs.com/en/Terms-and-Conditions.aspx](http://www.sgs.com/en/Terms-and-Conditions.aspx)). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues established therein.

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



**3. Determination of characteristics of hygroscopic moisture** was performed in accordance with GOST 8719-90 with results as follows:

**Hygroscopic moisture: 1.75**

**4. Determination of characteristics of plastic layer** was performed in accordance with GOST 1186-87 with results as follows:

Attribute	Unit	Value
X	mm	<b>37.0</b>
Y	mm	<b>8.0</b>

**5. Ultimate analysis** was performed in accordance with ISO methods with results as follows:

Element	Percentage, %	Test's methods
	Dry Ash Free basis	
Carbon	87.07	ISO 625-96 (GOST 2408.1-95),
Hydrogen	5.67	ISO 609-96 (GOST 2408.4-98)
Nitrogen	2.23	ISO 333-83 (GOST 28743-95)
Oxygen	4.71	ISO 1994-76 (GOST 2408.3-95)

**6. Determination of chemical composition of ash** was performed in accordance with ASTM D 3682-87 (GOST 10538-87) methods with results as follows:

Compounds	Percentage, %
Silicon dioxide	38.09
Alumina	29.12
Iron trioxide	10.06
Titanium dioxide	0.92
Calcium oxide	10.36
Magnesium oxide	3.78
Potassium oxide	1.264
Sodium oxide	0.279
Sulphur trioxide	5.509
Phosphorus oxide	0.378
Manganese oxide	0.237

### SGS Vostok Limited

312-24, Ordzhonikidze Street, 654005 Novokuznetsk

Russian Federation

t : +7 3843 39 16 81, 39 16 82, 39 16 83 f : +7 3843 39 12 42

e: ru.novokuznetsk@sgs.com

www.ru.sgs.com

Member of SGS Group

This document is issued by the Company subject to its General Conditions of Service ([www.sgs.com/en/Terms-and-Conditions.aspx](http://www.sgs.com/en/Terms-and-Conditions.aspx)). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues established therein.

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



**7. Determination of elements' content** was performed in accordance with ISO and ASTM methods with results as follows:

Compounds	Percentage, %	Test's methods
Fluorine	0.0010	ASTM D 3761-96
Chlorine	0.011	ISO 587-97 (GOST 9326-2002)
Arsenic	< 0.0005	ISO 601-81, ISO 2590-73 (GOST 10478-93)
Phosphorous	0.013	ISO 662-81 (GOST 1932-93)

**8. Determination of free swelling Index** was performed in accordance with ISO 501-81 (GOST 20330-91) with results as follows:

**FSI 1.0**

**9. Determination of Grey-King coke type** was performed in accordance with ISO 502-82 (GOST 16126-91) with results as follows:

**GREY-KING COKE TYPE D**

**10. Determination of Roga Index** was performed in accordance with ISO 335-74 (GOST 9318-91) with results as follows:

**RI 16(1:5)**

**11. Determination of plasticity according to Gieseler** was performed in accordance with ASTM D 2639-98 with results as follows:

Attribute	Unit	Value
Initial softening Temperature	°C	421
Max. Fluidity Temperature	°C	451
Resolidification Temperature	°C	471
Max. fluidity	ddpm	3

### SGS Vostok Limited

312-24, Ordzhonikidze Street, 654005 Novokuznetsk

**Russian Federation**

t : +7 3843 39 16 81, 39 16 82, 39 16 83 f : +7 3843 39 12 42

e: ru.novokuznetsk@sgs.com

www.ru.sgs.com

Member of SGS Group

This document is issued by the Company subject to its General Conditions of Service ([www.sgs.com/en/Terms-and-Conditions.aspx](http://www.sgs.com/en/Terms-and-Conditions.aspx)). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues established therein.

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



**12. Audiber-Arnu Dilatometer test** was performed in accordance with ISO 349-75 (GOST 13324-94) with results as follows:

Attribute	Unit	Value
Softening Temperature	°C	439
Max. Contraction Temperature	°C	465
Max. Dilatation Temperature	°C	-
Contraction	%	-5.6
Dilatation	%	-

**13. Determination of Hardgrove Index** was performed in accordance with ISO 5074-80 (GOST 15489.2-93) with results as follows:

**HGI 67**

**14. Determination of actual density** was performed in accordance with GOST 2160-92 with results as follows:

**AD 1.30 g/cm<sup>3</sup>**

**15. Determination of ash fusibility** was performed in accordance with ASTM D1857-87. The reported results are as follows:

Attribute	Unit	Value	
		Oxidizing	Reducing
Initial deformation temperature	°C	1304	1256
Softening temperature	°C	1313	1264
Hemispherical temperature	°C	1334	1284
Fluid temperature	°C	1367	1311

### SGS Vostok Limited

312-24, Ordzhonikidze Street, 654005 Novokuznetsk

Russian Federation

t : +7 3843 39 16 81, 39 16 82, 39 16 83 f : +7 3843 39 12 42

e: ru.novokuznetsk@sgs.com

www.ru.sgs.com

Member of SGS Group

This document is issued by the Company subject to its General Conditions of Service ([www.sgs.com/en/Terms-and-Conditions.aspx](http://www.sgs.com/en/Terms-and-Conditions.aspx)). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues established therein.

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



## II. ANALYSES WERE PERFORMED IN SUBCONTRACTED LABORATORY:

The sample was sent to subcontracted laboratory OAO "Zapadno-Sibirski Ispytatelny Centr" (Accreditation Certificate No. POCC RU.0001.21 AY 07) for analysis, and the findings reported by OAO "Zapadno-Sibirski Ispytatelny Centr" were as follows:

1. Determination of elements' content was performed in accordance with GOST methods with results as follows:

Compounds	Percentage, %
Germanium	0.0001
Selenium	0.35*10 <sup>-4</sup>
Gallium	0.0003
Mercury	0.04*10 <sup>-4</sup>

2. Determination of elements' content was performed in accordance with GOST methods with results as follows:

Element	Content, %	Element	Content, %	Element	Content, %
Ba	0.1	Cd	<0.001	Pb	<0.0002
Be	0.0003	Co	0.0002	Ag	<0.00001
B	0.004	Li	<0.001	Sc	0.0008
Bi	<0.0002	La	<0.001	Sr	0.08
V	0.001	Mn	0.04	Sb	<0.002
W	<0.002	Cu	0.0004	Ti	0.2
Yb	0.0002	Mo	0.0004	P	<0.1
Y	0.001	As	<0.01	Cr	<0.001
Nb	<0.001	Ni	0.002	Ce	<0.02
Sn	0.0002	Zr	0.02		
Zn	<0.003				

### SGS Vostok Limited

312-24, Ordzhonikidze Street, 654005 Novokuznetsk

Russian Federation

t : +7 3843 39 16 81, 39 16 82, 39 16 83 f : +7 3843 39 12 42

e: ru.novokuznetsk@sgs.com

www.ru.sgs.com

Member of SGS Group

This document is issued by the Company subject to its General Conditions of Service ([www.sgs.com/en/Terms-and-Conditions.aspx](http://www.sgs.com/en/Terms-and-Conditions.aspx)). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues established therein.

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.




**3. Determination of ash fusibility** was performed in accordance with ISO 540-81(GOST 2057-94) with results as follows:

Attribute	Unit	Value / atmosphere
		Semireducing
Initial deformation temperature	°C	1290
Softening temperature	°C	1300
Hemispherical temperature	°C	1310
Fluid temperature	°C	1330

**4. Determination of petrographic composition and metamorphism stage** was performed in accordance with ISO 7404 with results as follows:

Composition		Percentage, %
Coal		93.5
Mineral inclusions	Clay	5.0
	Quartz	1.0
	Sulphide	-
	Carbonate	0.5



### SGS Vostok Limited

312-24, Ordzhonikidze Street, 654005 Novokuznetsk

Russian Federation

t : +7 3843 39 16 81, 39 16 82, 39 16 83 f : +7 3843 39 12 42

e: ru.novokuznetsk@sgs.com

www.ru.sgs.com

Member of SGS Group

This document is issued by the Company subject to its General Conditions of Service ([www.sgs.com/en/Terms-and-Conditions.aspx](http://www.sgs.com/en/Terms-and-Conditions.aspx)). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues established therein.

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



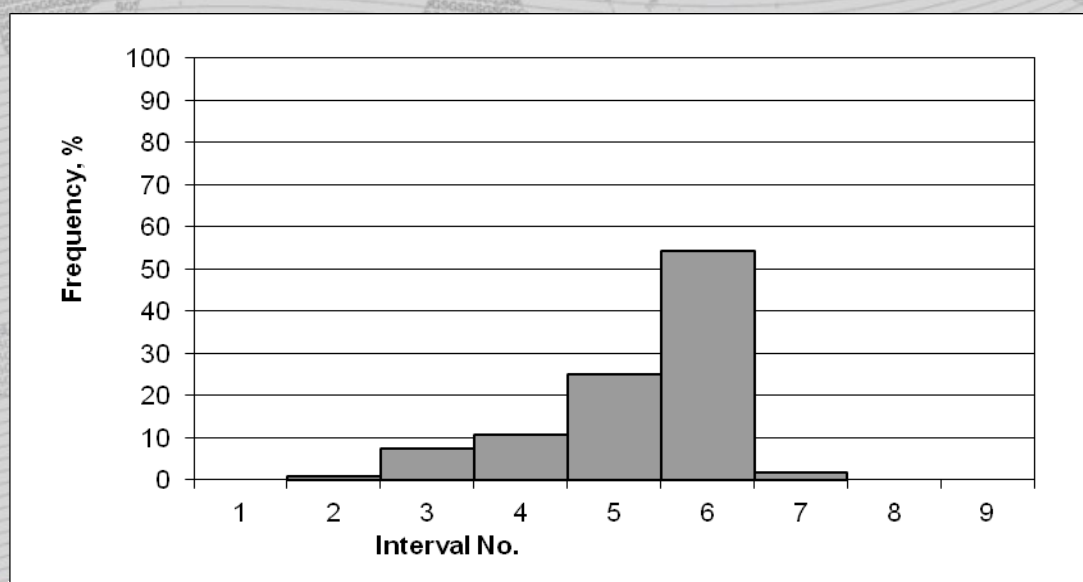
## 5. Microlythotype:

Microconstituent	Percentage, %
Vitrinite	16.5
Semivitrinite	6.5
Inertinite	75.0
Liptinite	2.0

## Sum of the fusainized components

ΣOK 79.3 %

Interval No.	Ro min	Ro max	Frequency, %
1	0.00	0.49	-
2	0.50	0.64	1
3	0.65	0.74	8
4	0.75	0.84	11
5	0.85	0.99	25
6	1.00	1.14	54
7	1.15	1.29	2
8	1.30	1.44	-
9	1.45	1.49	-



## SGS Vostok Limited

312-24, Ordzhonikidze Street, 654005 Novokuznetsk

Russian Federation

t : +7 3843 39 16 81, 39 16 82, 39 16 83 f : +7 3843 39 12 42

e: ru.novokuznetsk@sgs.com

www.ru.sgs.com

Member of SGS Group

This document is issued by the Company subject to its General Conditions of Service ([www.sgs.com/en/Terms-and-Conditions.aspx](http://www.sgs.com/en/Terms-and-Conditions.aspx)). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues established therein.

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Certificate N°: 1501200067



SGS

Page N°: 8/ 8

**Reflectance indices R<sub>0</sub>:**

Average	0.983
Minimum	0.63
Maximum	1.22
Standard deviation	0.130
Quantity of scissions	0

*This document is a witness of services in collection and processing of information rendering.*

Signed and dated  
in Novokuznetsk / ES  
20 January 2015



For and on behalf of  
SGS Vostok Limited

SGS

**SGS Vostok Limited**

312-24, Ordzhonikidze Street, 654005 Novokuznetsk

**Russian Federation**

t : +7 3843 39 16 81, 39 16 82, 39 16 83 f : +7 3843 39 12 42

e: ru.novokuznetsk@sgs.com

www.ru.sgs.com

Member of SGS Group

This document is issued by the Company subject to its General Conditions of Service ([www.sgs.com/en/Terms-and-Conditions.aspx](http://www.sgs.com/en/Terms-and-Conditions.aspx)). Attention is drawn to the limitations of liability, indemnification and jurisdictional issues established therein.

This document is to be treated as an original within the meaning of UCP 600. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.