



Job File No.: 181202/184340-1807\_p/M-NK-2018

## INSPECTION REPORT

Инспекционный отчет

## INSPECTION PLACE

Место инспекции

: TSOE, Kemerovo region, Russia

ЦОФ, Кемеровская область, Россия

## COMMODITY

Груз

: HV HCC from mine (as declared)

L HV HCC с шахты (как заявлено)

## DATE SAMPLING OF STOCKPILE : 18 July 2018

Дата отбора проб штабеля

18 июля 2018

## QUANTITY

Количество

: 3.000 kg (as declared)

3.000 кг (как заявлено)

**WE HEREBY REPORT** that, in accordance with instruction received from our Principal, **ООО "Premium Element"**, we have performed sampling and analysis of the above mentioned product.

**Настоящим информируем**, что в соответствии с инструкциями, полученными от нашего Заказчика, **ООО "Премиум Элемент"**, нами были проведены отбор проб и анализ вышеуказанного продукта.

**MANUAL SAMPLING FROM A STATIC STOCKPILE** - A. SGS, performed as per GOST 10742-71. Manual sampling was performed under protocols stipulated in GOST Standards. Due to access limitations at the sampling location, increments were collected from freshly exposed static surface of a stockpile of coal in bulk, on a random time interval basis, of random estimated mass interval, with fixed increment mass. The samples collected have an indicative value, but cannot be deemed representative of the total Lot. Sampling from a static stockpile is inherently dangerous. Increments were collected from the safest accessible point in accordance with the Stockpile Operator's rules and regulations.

Manual Sampling method was agreed to with the SGS Principal, as sampling by more reliable methods that provide probability samples was not possible or was not selected by the SGS Principal. The Holder of this document is cautioned that collected MANUAL samples of this type satisfy the minimum requirements for probability sampling, but as such cannot be used to draw statistical inferences such as precision, standard error, or bias. The suitability of this sampling method is defined by the sampling standard.

**РУЧНОЙ ПРОБООТБОР ИЗ НЕПОДВИЖНОГО ШТАБЕЛЯ** - произведен SGS в соответствии с ГОСТ 10742-71. Ручной отбор проб был произведен в соответствии с требованиями стандарта ГОСТ. В связи с ограничениями на проход к месту отбора точечные пробы были отобраны со свежесформированной неподвижной поверхности штабеля, через произвольно установленные временные интервалы с произвольно определенных объемных частей штабеля, с фиксированной массой инкремента. Отобранные пробы носят индикативный характер и не могут считаться представительными для всей партии груза. Отбор проб из неподвижного штабеля является опасным по определению. Отбор точечных проб произведен из безопасных доступных точек в соответствии со складскими Правилами и требованиями.

Ручной метод отбора проб был согласован с Клиентом SGS, поскольку отбор проб более надежными методами, которые обеспечивают представительность проб, был невозможен или не был выбран Клиентом SGS. Держатель настоящего документа предупрежден о том, что отбор проб РУЧНЫМ способом удовлетворяет минимальным требованиям представительного пробоотбора, но не может быть использован для установления статистической погрешности, такой, как точность, стандартная ошибка или отклонение результата. Соответствие применения данного метода определено стандартом отбора проб.



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**ANALYSES WERE PERFORMED IN SGS LABORATORY:**

Анализы были проведены в лаборатории SGS:

**ANALYSES:** Analysis of sample № 1807 was performed in SGS laboratory with results as follows:

Анализы: Анализ пробы № 1807 был проведен в лаборатории SGS. Результаты анализа следующие:

<b>Basis reported</b> Базовое состояние	<b>Moisture %</b> Массовая доля влаги, % ГОСТ Р 52911-2013	<b>Ash %</b> Зольность, % ГОСТ Р 55661-2013	<b>Yield of volatile matter %</b> Выход летучих веществ, % ГОСТ Р 55660-2013	<b>Total sulphur %</b> Содержание общей серы, % ГОСТ 32465-2013 (ISO 19579:2006)	<b>Gross calorific value, kcal/kg</b> Высшая теплота сгорания, ккал/кг ГОСТ 147-2013 (ISO 1928:2009)
<b>As Received</b> Рабочее	8.7	7.8	31.9	0.51	7022
<b>Dry Basis</b> Сухое		8.6	34.9	0.56	7691
<b>Dry Ash Free</b> Сухое беззольное			38.2		8413

**Net Calorific Value (as received) was calculated in accordance with ГОСТ 147-2013 (ISO 1928:2009): 6711 kcal/kg**

Низшая теплота сгорания (рабочее состояние) рассчитана в соответствии с ГОСТ 147-2013 (ISO 1928:2009)

**Screen test** was performed in accordance with ISO 1953 with results as follows:

Ситовый анализ был проведен в соответствии с ISO 1953. Результаты анализа следующие:

<b>Nominal Top Size (mm)</b> Класс	<b>Yield (%)</b> Выход
<b>+70</b>	0.1
<b>50-70</b>	0.3
<b>35.5-50</b>	0.6
<b>20-35.5</b>	2.6
<b>10-20</b>	8.1
<b>6.3-10</b>	12.6
<b>3.15-6.3</b>	26.0
<b>2.8-3.15</b>	0.3
<b>2-2.8</b>	1.9
<b>1-2</b>	9.0
<b>0.5-1</b>	18.3
<b>0.2-0.5</b>	15.8
<b>0.-15-0.2</b>	2.8
<b>0-0.15</b>	1.6

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**Determination of characteristics of plastic layer with results as follows:**

Показатели пластометрических характеристик. Результаты анализа следующие:

Attribute Показатели	Unit Единица измерения	Value Величина	Test method Метод испытания
X	mm	30	ГОСТ 1186-2014
Y	mm	21	

**Ultimate analysis was performed with results are as follows:**

Определение элементного состава органической массы угля. Результаты анализа следующие:

Element Элемент	Unit Единицы измерения	Content Содержание				Test methods Методы испытаний
		As-Received Basis Рабочее	Air-Dry Basis Воздушно-Сухое	Dry Basis Сухое	Dry-Ash Free Basis Сухое беззольное	
<b>Carbon</b> Массовая доля углерода	%	70.33	76.26	77.03	84.27	ГОСТ 32979-2014 (ISO 29541:2010)
<b>Hydrogen</b> Массовая доля водорода	%	4.99	5.41	5.46	5.98	ГОСТ 32979-2014 (ISO 29541:2010)
<b>Nitrogen</b> Массовая доля азота	%	2.08	2.26	2.28	2.50	ГОСТ 32979-2014 (ISO 29541:2010)
<b>Oxygen (by difference)</b> Массовая доля кислорода (по разнице)	%	5.55	6.02	6.08	6.65	ГОСТ 2408.3-95 (ИСО 1994-76)

**Determination of elements content was performed with results as follows:**

Определение содержания элементов. Результаты анализа следующие:

Elements Элементы	Unit Единицы измерения	Content of elements Содержание			Test methods Методы испытаний
		As-Received Рабочее	Air-Dry Basis Воздушно-сухое	Dry Basis Сухое	
<b>Flourine</b> Массовая доля фтора	ppm	110	119	120	ASTM D 3761-10
<b>Chlorine</b> Массовая доля хлора	ppm	<220	<220	<220	ASTM D 4208-13
<b>Arsenic</b> Массовая доля мышьяка	ppm	3.58	3.88	3.92	ASTM D 6357-11
<b>Phosphorous</b> Массовая доля фосфора	%	0.053	0.057	0.058	ГОСТ 1932-93 (ИСО 622-81)

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Determination of **chemical composition of ash** was performed with results as follows:

Определение **химического состава золы**. Результаты анализа следующие:

Components Компоненты	Content, % Содержание	Test methods Методы испытаний
<b>Silicon oxide</b> Оксид кремния	55.73	ASTM D 3682-13
<b>Aluminum oxide</b> Оксид алюминия	25.62	
<b>Iron oxide</b> Оксид железа	4.53	
<b>Titanium oxide</b> Оксид титана	1.27	
<b>Calcium oxide</b> Оксид кальция	3.00	
<b>Magnesium oxide</b> Оксид магния	1.37	
<b>Potassium oxide</b> Оксид калия	2.37	
<b>Sodium oxide</b> Оксид натрия	0.69	ASTM D 5016-16
<b>Sulphur oxide</b> Оксид серы	2.55	
<b>Phosphorus oxide</b> Оксид фосфора	1.544	ГОСТ 10538-87
<b>Manganese oxide</b> Оксид марганца	0.056	ASTM 3683-11
<b>Undetermined</b> Неопределенные	1.269	-

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Determination of **free swelling Index** was performed with results as follows:

Определение **индекса свободного вспучивания**. Результаты анализа следующие:

Attribute Показатель	Unit Единица измерения	Value Величина	Test method Метод испытания
<b>FSI</b>	-	8.5	ГОСТ 20330-91 (ИСО 501-81)

Determination of **Grey-King coke type** was performed with results as follows:

Определение **типа кокса по Грей-Кингу**. Результаты анализа следующие:

Attribute Показатель	Unit Единица измерения	Value Величина	Test method Метод испытания
<b>GK</b>	-	G10	ГОСТ 16126-91 (ИСО 502-82)

Determination of **Roga Index** was performed with results as follows:

Определение **индекса Рора**. Результаты анализа следующие:

Attribute Показатель	Unit Единица измерения	Value Величина	Test method Метод испытания
<b>RI</b>	-	86(1:5)	ГОСТ 9318-91 (ИСО 335-74)

Determination of **Caking Index** was performed with results as follows:

Определение **индекса спекаемости**. Результаты анализа следующие:

Attribute Показатель	Unit Единица измерения	Value Величина	Test method Метод испытания
<b>G</b>	-	96(1:5)	ГОСТ ISO 15585-2013

Determination of **plasticity according to Gieseler** was performed with results as follows:

Определение **пластичности по Гизелеру**. Результаты анализа следующие:

Attribute Показатель	Unit Единица измерения	Value Величина	Test methods Методы испытаний
<b>Initial softening Temperature</b> Исходная температура размягчения	°C	391	ГОСТ 32561-2013 (ISO 10329:2009)
<b>Max. Fluidity Temperature</b> Максимальная температура текучести	°C	430	
<b>Resolidification Temperature</b> Температура затвердевания	°C	465	
<b>Max. fluidity</b> Максимальная текучесть	ddpm	22000	



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Determination of **Audiber-Arnu Dilatometer** test was performed with results as follows:

Определение **дилатометрических показателей в приборе Одибера-Арну**. Результаты анализа следующие:

Attribute Показатель	Unit Единицы измерения	Value Величина	Test method Метод испытания
<b>Softening temperature</b> Температура размягчения	°C	360	ГОСТ 13324-94 (ISO 349-75)
<b>Max. contraction temperature</b> Температура максимального сокращения	°C	405	
<b>Max. dilatation temperature</b> Температура максимального расширения	°C	455	
<b>Contraction</b> Контракция (a)	%	33	
<b>Dilatation</b> Дилатация (b)	%	100	

Determination of **Hardgrove Index** was performed with results as follows:

Определение **коэффициента размоловоспособности по Хардгроу**. Результаты анализа следующие:

Attribute Показатель	Unit Единица измерения	Value Величина	Test method Метод испытания
<b>HGI</b>	-	66	ГОСТ 15489.2-93 (ISO 5074-80)

Determination of **actual density** was performed with results as follows:

Определение **действительной плотности**. Результаты анализа следующие:

Attribute Показатель	Unit Единица измерения	Value Величина	Test method Метод испытания
<b>d<sub>r</sub><sup>d</sup></b>	g/cm <sup>3</sup>	1.32	ГОСТ 2160-2015

Determination of **moisture-holding capacity** was performed with results as follows:

Определение **максимальной влагоемкости**. Результаты анализа следующие:

Attribute Показатель	Unit Единица измерения	Value Величина	Test method Метод испытания
<b>w<sup>max</sup></b>	-	2.94	ГОСТ 8858-93 (ISO 1018-75)

Gross calorific value on moist, ash-free basis (calculated parameter). Results as follows:

Высшая теплота сгорания влажного беззольного топлива. Результаты анализа следующие:

Attribute Показатель	Unit Единица измерения	Value Величина	Test method Метод испытания
<b>Q<sup>af</sup><sub>s,v</sub></b>	kcal/kg	8144	ГОСТ 27313-2015

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Determination of **ash fusibility** was performed with results as follows:

Определение **плавкости золы**. Результаты анализа следующие:

Attribute Показатель	Unit Единица измерения	Value / atmosphere Величина / Атмосфера		Test method Метод испытания
		Oxidizing окислительная	Reducing восстановительная	
<b>Deformation temperature</b> Температура деформации	°C	1460	1390	ГОСТ 32978-2014 (ISO 540:2008)
<b>Sphere temperature</b> Температура сферы	°C	1480	1420	
<b>Hemispherical temperature</b> Температура полусферы	°C	1490	1450	
<b>Flow temperature</b> Температура растекания	°C	1510	1490	

Determination of **sulfur forms** with the following results:

Определение форм серы. Результаты анализа следующие:

Compounds Компоненты	Unit Единица измерения	Percentage Содержание			Test method Метод испытания
		As Received Рабочее	Air Dry Basis Воздушно-Сухое	Dry Basis Сухое	
<b>Sulphate sulphur</b> Массовая доля сульфатной серы	%	0.02	0.02	0.02	ГОСТ 30404-2013 (ISO157:1996)
<b>Pyrite sulphur</b> Массовая доля пиритной серы	%	0.05	0.05	0.05	
<b>Organic sulphur (by difference)</b> Массовая доля органической серы (по разности)	%	0.44	0.48	0.49	

Determination of **trace elements content in coal** was performed with results as follows:

Определение **микроэлементов** в угле. Результаты анализа следующие:

Elements Элементы	Unit Единица измерения	Content Содержание	Unit Единица измерения	Content Содержание	Test methods Методы испытания
		Dry Basis Сухое		Dry Basis Сухое	
Ba (Барий)	%	0.002088	ppm	20.88	ASTM D6357-11
Cu (Медь)	%	0.0001	ppm	1	ASTM D3683-11
Ni (Никель)	%	0.000302	ppm	3.02	ASTM D6357-11
Pb (Свинец)	%	0.000042	ppm	0.42	
V (Ванадий)	%	0.000196	ppm	1.96	
Zn (Цинк)	%	0.003937	ppm	39.37	

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**Determination of petrographic composition and metamorphism stage with results as follows:**

Определение петрографических показателей и стадии метаморфизма. Результаты анализа следующие:

**Reflectance indices R0:**

Показатели отражения:

Attribute Показатель	Symbol Обозначение	Unit Единица измерения	Value Величина	Test method Метод испытания
<b>Random reflectance</b> Произвольный показатель отражения витринита	Ro <sub>average</sub>	%	0.80	ГОСТ Р 55659-2013 (ИСО 7404-5:2009)
<b>Minimum random reflectance</b> Минимальный произвольный показатель отражения витринита	Ro <sub>min</sub>	%	0.65	
<b>Maximum random reflectance</b> Максимальный произвольный показатель отражения витринита	Ro <sub>max</sub>	%	0.95	
<b>Standard deviation</b> Стандартное отклонение	σ <sub>R</sub>	-	0.05	
<b>Rank of coal</b> Стадия метаморфизма	-	-	II	
<b>Number of gaps</b> Количество разрывов	-	-	0	

**Determination of maceral components with results as follows:**

Определение мацерального состава. Результаты анализа следующие:

Attribute Показатель	Symbol Обозначение	Unit Единица измерения	Value Величина	Test method Метод испытания
<b>Exinite</b> Липтинит	L	%	3	ГОСТ Р 55662-2013 (ИСО 7404-3:2009)
<b>Vitrinite</b> Витринит	Vt	%	86	
<b>Semivitrinite</b> Семивитринит	SV	%	1	
<b>Inertinite</b> Инертинит	I	%	10	
<b>Total inerts</b> Содержание отошающих компонентов	ΣOK	%	11	
<b>Organic mass</b> Органическая масса	OM	%	95	
<b>Mineral Matter</b> Минеральные включения	MM	%	5	

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**Determination of mineral components with results as follows:**

Определение минеральных включений. Результаты анализа следующие:

Attribute Показатель	Symbol Обозначение	Unit Единица измерения	Value Величина	Test method Метод испытания
<b>Clay</b> Глина	Mgl	%	5	ГОСТ Р 55662-2013 (ISO 7404-3:2009)
<b>Sulfides</b> Сульфиды	Ms	%	0	
<b>Carbonates</b> Карбонаты	Mk	%	0	
<b>Quartz</b> Кварц	Mkr	%	0	
<b>Other</b> Прочие	Mpr	%	0	

**Determination of vitrinite reflectance was performed with results as follows:**

Определение показателя отражения витринита. Результаты анализа следующие:

Reflectance Показатель отражения		Frequency Частота	Test method Метод испытания
0.65	0.69	2	ГОСТ Р 55659-2013 (ISO 7404-5:2009)
0.70	0.74	17	
0.75	0.79	32	
0.80	0.84	32	
0.85	0.89	16	
0.90	0.94	1	

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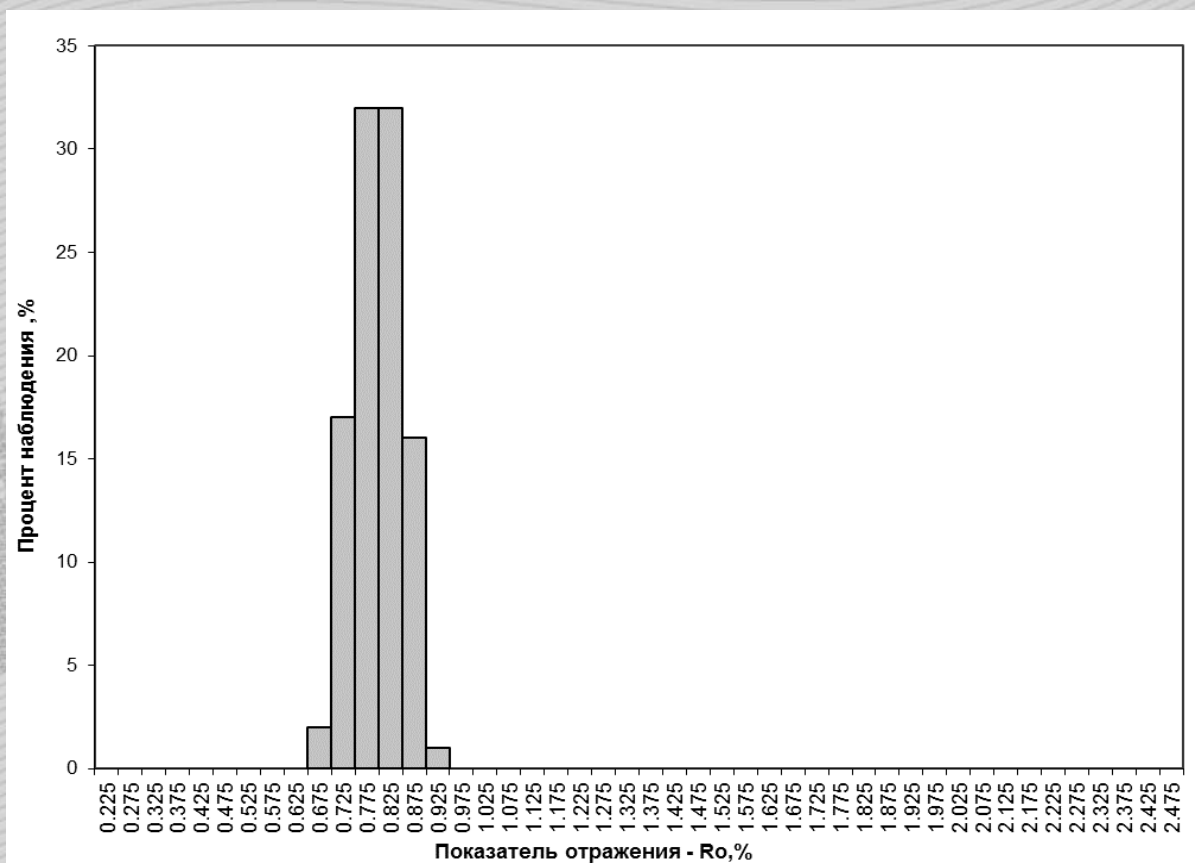
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The coke was resulted from the coal sample by method of box coking accordance with ГОСТ 9521-74 in laboratory OAO "Altaj-Koks". This sample was analyzed at the SGS laboratory in Novokuznetsk, Russia and the findings were as follows:

Методом ящичного коксования по ГОСТ 9521-74 в лаборатории ОАО "Алтай-Кокс" из угольного образца был получен кокс. Данная проба кокса была проанализирована в лаборатории SGS Новокузнецка, Россия, результаты следующие:

**CRI and CSR tests with results as follows:**

Определение реакционной способности (CRI) и прочности кокса после реакции (CSR). Результаты анализа следующие:

Attribute Показатель	Unit единицы измерения	Value Величина	Test method Метод испытания
Average Coke Strength Index (CSR) Прочность кокса после реакции	%	60.7	ISO 18894:2006
Average Coke Reactivity Index (CRI) Реакционная способность кокса	%	25.3	



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The coke was resulted from the coal sample by method of coking in coke oven "CARBOTEST" accordance with ГОСТ 9521-74 in laboratory OAO "Altaj-Koks". This sample was analyzed at the SGS laboratory in Novokuznetsk, Russia and the findings were as follows:

Методом коксования в печи "КАРБОТЕСТ" по ГОСТ 9521-74 в лаборатории ОАО "Алтай-Кокс" из угольного образца был получен кокс. Данная проба кокса была проанализирована в лаборатории SGS Новокузнецка, Россия, результаты следующие:

#### CRI and CSR tests with results as follows:

Определение реакционной способности (CRI) и прочности кокса после реакции (CSR). Результаты анализа следующие:

Attribute Показатель	Unit единицы измерения	Value Величина	Test method Метод испытания
Average Coke Strength Index (CSR) Прочность кокса после реакции	%	52.5	ISO 18894:2006
Average Coke Reactivity Index (CRI) Реакционная способность кокса	%	26.4	

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Signed and dated in  
Novokuznetsk / ES  
06 September 2018



For and on behalf of  
SGS Vostok Limited



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