

**Volga Territorial Generating Company OJSC**  
**Samara Branch**  
**Syzran Power Plant**  
**1 Furmanova street, 446008 Syzran, Samara region,**  
**tel.: (846 4) 93-61-61, fax: (846) 93-62-35**

December 04, 2014

«Northern Interindustry Company  
«The Alternative» Ltd  
For the attention of  
Head of Production Contract Dpt.,  
O.A.Shumeyko

**About the results of operation**

Dear Mr. Shumeyko,

With reference to your letter No.08-01/3/321 dated November 20, 2014, we are sending you the comparative results of thermotechnical tests of TГME-464 boiler No.13 before and after the repair with installation of CMKA<sup>®</sup> heat exchange elements.

Enclosure: List of the main parameters of TГME-464 boiler operation in one sheet in one copy.

Director – Chief engineer

S.V. Buhtiyarov

A.V. Agafonov  
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**List of main indexes of TTME-464 boiler No.13 functioning at Syzran Power Plant,  
Samara Branch of Volga Territorial Generating Company OJSC**

No.	Parameter	Dimension	Data	
			Until repair Apr.04, 2011	After repair with the installation of CMKA® heat exchange elements into RAH Dec. 12, 2011
1.	Type of RAH		PBI-88H	
2.	Steam capacity	tons/hour	501	511
3.	Type of fuel	gas/ mazut	gas	gas
	Fuel consumption	m <sup>3</sup> /s	11.04	11.2
	Calorie content of fuel		8045	8061
4.	Air leakage into furnace	%	pressure-fired boiler with close-coupled screen	
	Coefficient of excess air at furnace outlet		couldn't be defined	
	Coefficient of excess air before RAH		1.04	1.05
	Coefficient of excess air after RAH		1.23	1.23
5.	Gas temperature at RAH inlet	°C	385	375
	Air temperature at RAH inlet	°C	38	37
	Gas temperature at RAH outlet	°C	145	117
	Air temperature at RAH outlet	°C	279	320
6.	RAH resistance by gas	mm of water column	185	85
	RAH resistance by air	mm of water column	77.5	72.5
7.	Temperature of flue gases	°C	142	117
	Heat loss with flue gases	%	5.79	4.47
	Boiler gross efficiency	%	94.09	95.2

During the boiler operation and as the result of its inspection before the overall repair in 2011, elements condition (air heater of boiler unit No. 13) was found out to be unsatisfactory.

In 2011 during overall repair at boiler unit No.13, the previous heat exchange elements were replaced by CMKA® ones. It should be noticed that the decision about the installation of CMKA® heat exchange elements was made after receiving positive results of the same elements operation at TTME-484 boiler unit No.12 in 2009.

As per the results of the tests before and after the overall repair at boiler unit No.13 it is stated that:

- boiler gross efficiency has increased by 1.11 % (from 94.09 to 95.2 %). Alongside with that:
- air excess in flue gases has remained at the same level (1.23-1.225);
- the temperature of flue gases has lowered by 25 °C (from 142 to 117°C);
- air temperature at air heater outlet has increased by 41 °C (from 279 to 320°C);
- total gas path resistance has lowered by 73 kgf/m (from 328 to 255 kgf/m);
- specific power consumption for blowing and flue gases recirculation has lowered by 0.47 kWh/Gcal (from 5.87 to 5.4 kWh/Gcal).

These results confirm the positive and effective operation of CMKA® heat exchange elements.

Chief Engineer

Agafonov A.V.