"NIZHNEKAMSK POWER PLANT"
BRANCH OF "TERRITORIAL GENERATING COMPANY-4" OJSC
Nizhnekamsk, Tatarstan republic, Russia
Tel.: (8555) 32-13-59 fax (8555) 32-13-10

April 18, 2014

«Northern Interindustry Company
«The Alternative» Ltd
For the attention of
Deputy Director General for Development
A.E. Lebedev

About the results of operation

Dear Mr.Lebedev,

In accordance with your request, with the purpose of production quality monitoring, we forward you the lists of main indexes of boiler functioning at Nizhnekamsk power plant, where the installation of CMKA® heat exchange elements took place.

Enclosure: lists of main indexes of boiler functioning at Nizhnekamsk power plant (boilers No.7, 10, 12, 15).

Sincerely yours,

Chief Engineer A.I. Murtazin

List of main indexes of boiler functioning at Nizhnekamsk power plant (84Б boiler No.7)

No	Parameter	Dimension	Data	
			Before repair	After repair June 20, 2012
1	Type of RAH		РВП-54	РВП-54
2	Steam production	tons/hour	315	420
3	Type of fuel	gas/mazut	gas	gas
	Fuel consumption	m^3/hour	7.08	9.53
	Calorie content of fuel	kcal/ nm^3	8044	8077
4	Air inleakage into furnace	%	7	3.8
	Excess air coefficient at furnace outlet	-	1.05	1.05
	Excess air coefficient before air heater	-	1.18	1.14
	Excess air coefficient behind air heater	-	1.66	1.24
5	Gas temperature at air heater inlet	°C	290	304
	Air temperature at air heater inlet	°C	28.5	36.5
	Gas temperature at air heater outlet	°C	thermocouple is absent	
	Air temperature at air heater outlet	°C	217	232
6	Air heater resistance by gas	mm of w.c.	instruments were out of operation	70
	Air heater resistance by air	mm of w.c	135	135
7	Temperature of flue gases	°C	126	135
	Heat loss with flue gases, q_2	%	6.45	5.63
	Boiler gross efficiency	%	92.62	93.67

Note: 100% elements replacement, gate of gas-circulating fan is closed.

List of main indexes of boiler functioning at Nizhnekamsk power plant (84Б boiler No.10)

No	Parameter	Dimension	Data	
			Before repair June 19, 2013	After repair Nov.14, 2013
1	Type of RAH		РВП-54	РВП-54
2	Steam production	tons/hour	420	420
3	Type of fuel	gas/mazut	gas	gas
	Fuel consumption	m^3/hour	9.72	9.17
	Calorie content of fuel	kcal/ nm^3	8103	8103
4	Air inleakage into furnace	%	4.1	3.1
	Excess air coefficient at furnace outlet	-	1.05	1.05
	Excess air coefficient before air heater	-	1.135	1.1
	Excess air coefficient behind air heater	-	1.24	1.24
5	Gas temperature at air heater inlet	°C	300	300
	Air temperature at air heater inlet	°C	48.5	26
	Gas temperature at air heater outlet	°C	thermocouple is absent	
	Air temperature at air heater outlet	°C	214	250
6	Air heater resistance by gas	mm of w.c.	50	104
	Air heater resistance by air	mm of w.c	85	95
7	Temperature of flue gases	°C	160	133
	Heat loss with flue gases, q_2	%	6.91	5.47
	Boiler gross efficiency	%	92.7	94.13

Note: 100% elements replacement, gate of gas-circulating fan is closed.

List of main indexes of boiler functioning at Nizhnekamsk power plant (96Б boiler No.12)

No	Parameter	Dimension	Data	
			Before repair March 25, 2013	After repair Aug.07, 2013
1	Type of RAH		РВП-68М	РВП-68М
2	Steam production	tons/hour	401	480
3	Type of fuel	gas/mazut	gas	gas
	Fuel consumption	m^3/hour	8,69	10,36
	Calorie content of fuel	kcal/ nm^3	8034	8080
4	Air inleakage into furnace	%	4.1	3
	Excess air coefficient at furnace outlet	-	1.05	1.05
	Excess air coefficient before air heater	-	1.09	1.09
	Excess air coefficient behind air heater	-	1.24	1.235
5	Gas temperature at air heater inlet	°C	277	295
	Air temperature at air heater inlet	°C	7	28
	Gas temperature at air heater outlet	°C	thermocouple is absent	
	Air temperature at air heater outlet	°C	211	235
6	Air heater resistance by gas	mm of w.c.	85	83
	Air heater resistance by air	mm of w.c	75	80
7	Temperature of flue gases	°C	135	130
	Heat loss with flue gases, q_2	%	5.7	5.28
	Boiler gross efficiency	%	93.82	94.33

Note: 100% elements replacement, gate of gas-circulating fan is closed.

List of main indexes of boiler functioning at Nizhnekamsk power plant (96Б boiler No.15)

No	Parameter	Dimension	Data	
			Before repair Aug 19, 2013	After repair Jan.15, 2014
1	Type of RAH		РВП-68М	РВП-68М
2	Steam production	tons/hour	480	480
3	Type of fuel	gas/mazut	gas	gas
	Fuel consumption	m^3/hour	10.56	10.56
	Calorie content of fuel	kcal/ nm^3	8099	8102
4	Air inleakage into furnace	%	3	3
	Excess air coefficient at furnace outlet	-	1.05	1.05
	Excess air coefficient before air heater	-	1.09	1.09
	Excess air coefficient behind air heater	-	1.25	1.25
5	Gas temperature at air heater inlet	°C	323	302
	Air temperature at air heater inlet	°C	50	25
	Gas temperature at air heater outlet	°C	thermocouple is absent	
	Air temperature at air heater outlet	°C	248	235
6	Air heater resistance by gas	mm of w.c.	73	53
	Air heater resistance by air	mm of w.c	185	98
7	Temperature of flue gases	°C	132	130
	Heat loss with flue gases, q_2	%	5.47	5.33
	Boiler gross efficiency	%	94.11	94.27

Note: 50% elements replacement, gate of gas-circulating fan is closed.