

BOILER INDUSTRIAL SYSTEMS CONSULTANTS

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31 March 2004

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ATTENTION: MR ANDREW FRANCOIS

Dear Sir,

RE: CHINCO EVALUATION

This report is based purely on the conditions observed and measured during March 2004.

- 1) Average CV of coal was **27.68**MJ/kg classifying the coal as an 'A' grade coal.
- 2) SO₂ related to coal consumption was **1.62%** for the first test.
SO₂ related to coal consumption was **2.03%** for the second test.
Average SO₂ related to coal consumption was **1.83%**
- 3) SO₂ ppm results on average **490**ppm.
- 4) Boiler net efficiency on average was **72.73%**.
- 5) Average steam to coal based on CV .NET efficiency.
Test results reflect **7.27** tons of steam per ton of coal
- 6) Carbon in ash for the first test was **12.23%**
Carbon in ash for the second test was **11.06%**
Average **11.65%** carbon in ash for March 2004.
- 7) **47.6** Tons of Sulphur emitted during March 2004.
14.92 tons of SO₂ based on gas emissions of **490**ppm was emitted into the Atmosphere.
- 8) Average **159.5** Tons of ash in Coal based on inherent ash on average of **11.65%**

ALL THE DATA HIGHLIGHTED IN RED ARE PROBLEM AREAS IN NEED OF CORRECTION OR TREATMENT WITH A FIRE SIDE PRODUCT IN ORDER TO RESTRICT FOULING AND SLAGGING FROM TAKING PLACE.

COAL SAMPLES TAKEN FOR CHINCO TEST 05/03/2004 AND 19/03/2004		
RESULTS	Test 1 04/2929m	Test 2 04/2929m
Gross CV Mj/kg	27.58(A)	27.78(A)
Volatiles%	32.3	30.8
Total Sulphur%	1.62	2.03
Total Moisture%	3.41	2.65
Inherent Moisture%	3.4	3.4
Ash%	15.3	14.7
Fixed carbon%	49.0	51.1
Carbon in Ash%	12.23	11.06
Ash Fusion Temp:		
Deformation °c	1310	1290
Softening °c	1320	1300
Hemisphere °c	1330	1320
Flow °c	1350	1340
P2O5%	0.30	0.23
CAO%	4.95	4.32
FE2O3%	7.99	11.40

CALCULATION SHEET FOR MASS OF SO₂ EMITTED

Mj.kg Energy Requirement for	1369.00	tons
Calorific value	27.68	MJ/kg
Efficiency	72.73	%
Total energy value:	27560.25	GJ
Excess Air	154.00	%
Air needed for combustion:	13793.90	kg
Volume of air:	10654.60	m³
SO ₂ ppm	490.00	ppm
Volume of SO ₂	5.22	m ³
Mass of SO₂:	14.92	Tons

AFTER FURNACE

Boiler 3	LOAD T/H	TEMP °C	EX. AIR%	O₂ %	CO PPM	NO PPM	SO₂ PPM	EFF %
05/03/2004	27.8	324	110.0	11.0	102	228	624	63.6
		323	150.4	12.6	220	228	654	58.8
		324	162.0	13.0	123	224	540	55.2
	25.2	323	159.1	12.9	131	227	564	57.4
		324	162.0	13.0	136	229	508	54.6
		324	173.4	13.3	142	220	496	54.1

AVERAGE	26.5	324	152.8	12.6	142	226	564	57.3
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19/03/2004	27.23	328	128.4	11.8	164	200	358	61.4
		330	141.7	12.3	161	201	376	58.7
		322	141.7	12.3	115	173	379	59.4
	30.33	323	141.7	12.3	115	182	417	59.3
		322	128.4	11.8	99	171	370	62.0
		322	128.4	11.8	104	175	393	61.8

AVERAGE	28.78	325	135.1	12.1	126	184	382	60.4
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AFTER AIR HEATER

Boiler 3	LOAD T/H	TEMP °C	EX. AIR%	O ₂ %	CO PPM	NO PPM	SO ₂ PPM	EFF %
05/03/04	27.8	305	153.3	12.7	137	246	626	64.0
		305	156.2	12.8	123	246	624	63.8
		295	156.2	12.8	85	236	591	64.6
	25.2	300	138.8	12.2	87	242	608	64.7
		300	184.8	13.6	83	226	493	60.9
		301	177.2	13.4	87	233	511	61.1

AVERAGE	26.5	301	161.1	12.9	100	238	576	63.2
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19/03/04	27.23	305	153.3	12.7	113	192	389	64.2
		309	150.4	12.6	112	195	402	64.0
		298	144.6	12.4	96	187	455	65.8
	30.33	300	147.5	12.5	96	189	462	65.4
		296	169.6	13.2	87	169	386	62.4
		297	165.8	13.1	87	173	394	62.6

AVERAGE	28.78	301	155.2	12.8	99	184	415	64.1
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AFTER ECONOMIZER

Boiler 3	LOAD T/H	TEMP °C	EX. AIR%	O ₂ %	CO PPM	NO PPM	SO ₂ PPM	EFF %
05/03/04	27.8	220	153.3	12.7	107	256	606	71.4
		223	150.4	12.6	110	260	614	71.3
		216	150.4	12.6	88	253	616	72.0
	25.2	221	153.3	12.7	88	254	616	71.5
		227	169.6	13.2	98	259	565	68.6
		228	162.0	13.0	93	264	558	68.6

AVERAGE	26.5	223	157.0	12.8	97	258	596	70.6
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19/03/04	27.23	224	147.5	12.5	105	197	417	72.9
		226	147.5	12.5	106	196	410	72.9
		228	144.6	12.4	110	192	415	72.9
	30.33	228	147.5	12.5	104	195	411	72.5
		220	159.1	12.9	77	152	327	68.9
		223	159.1	12.9	77	152	321	68.9

AVERAGE	28.78	225	150.9	12.6	97	181	384	71.5
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CRAIG BOTHA
B.I.S. Consultants