

BOILER INDUSTRIAL SYSTEMS CONSULTANTS

P.O. Box 392
Gillits
3603

10 January 2004

Mr. LEITH MCDONALD

CC. STEVEN HAYES

ATTENTION: MR LEITH MCDONALD

Dear Sir,

RE: CHINCO EVALUATION

This report is based purely on the conditions observed and measured during 2003.

- 1) CV of coal on the first test was **27.70** MJ/kg classifying the coal as 'A' grade.
CV of coal on the second test was **29.40** MJ/kg classifying the coal as 'A' grade.
Average CV of coal was **28.55** MJ/kg classifying the coal as an 'A' grade coal.
- 2) SO₂ related to coal consumption was **1.49%** for the first test.
SO₂ related to coal consumption was **1.98%** for the second test.
Average SO₂ related to coal consumption was **1.73%**
- 3) SO₂ ppm results on average **243** ppm.
- 4) Boiler net efficiency on average was **69.4%**.
- 5) Average steam to coal based on CV .NET efficiency.

Crafcor coal usage	240 tons of coal
First Test results reflect	6.88 tons of steam per ton of coal
Second Test results	7.00 tons of steam per ton of coal
- 6) Carbon in ash for the first test was **28.38%**
Carbon in ash for the second test was **24.24%**
Average **26.31%** carbon in ash for 2003.
- 7) **14.55** Tons of Sulphur emitted during 2003.
2.49 tons of SO₂ based on gas emissions of **243** ppm was emitted into the Atmosphere.
- 8) Average **115.76** Tons of ash in 440 tons of Coal based on inherent ash with an average of **26.31%**.

COAL SAMPLES TAKEN FOR CHINCO TEST 06/08/2003 AND 18/12/2004		
RESULTS	Test 1	Test 2
Gross CV Mj/kg	27.70(A)	29.40(A)
Volatiles%	24.8	28.1
Total Sulphur%	1.49	1.98
Total Moisture%	5.97	4.96
Inherent Moisture%	4.10	3.10
Ash%	13.8	10.4
Fixed carbon%	57.3	58.4
Carbon in Ash%	28.38	24.24
Ash Fusion Temp:		
Deformation °c	1370	1310
Softening °c	1400	1330
Hemisphere °c	1400	1350
Flow °c	1400	1380
P2O5%	0.21	0.035
CAO%	2.43	3.03
FE203%	9.71	13.60

CALCULATION SHEET FOR MASS OF SO₂ EMITTED

Mj.kg Energy Requirement for	440.00	tons
Calorific value	28.55	MJ/kg
Efficiency	69.40	%
Total energy value:	8718.03	GJ
Excess Air	163.70	%
Air needed for combustion:	4638.21	kg
Volume of air:	3582.62	m³
SO ₂ ppm	243.00	ppm
Volume of SO ₂	0.87	m ³
Mass of SO₂:	2.49	Tons

2003

AFTER FURNACE

Boiler 1	PRES.	TEMP °C	EX. AIR%	O ₂ %	CO PPM	NO PPM	SO ₂ PPM	EFF %
06/08/2003	810	188	225.0	14.5	348	85	271	71.9
	880	188	225.0	14.5	351	86	288	71.8
	900	188	220.0	14.4	364	89	307	72.0
	930	190	200.0	14.0	300	86	296	73.5
	930	190	196.2	13.9	307	89	307	73.8
	930	190	200.0	14.0	314	94	319	73.4
	920	185	184.8	13.6	155	80	355	75.2
	920	185	184.8	13.6	147	82	362	74.9

AVERAGE	903	188	204.5	14.1	286	86	313	73.3
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18/12/2003	700	184	235.0	14.7	310	117	2	72.6
	700	185	235.0	14.7	308	127	4	72.6
	720	185	235.0	14.7	300	128	10	72.7
	720	185	240.0	14.8	292	127	18	72.2
	720	185	240.0	14.8	283	126	22	72.0
	700	184	235.0	14.7	280	125	25	72.1
	710	185	235.0	14.7	286	127	26	72.1
	710	185	235.0	14.7	289	128	29	72.2

AVERAGE	710	185	236.3	14.7	294	126	17	72.3
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O₂ = Must be higher than 5.9% but lower than 8% after furnace.

Excess air = Readings higher than 61% Excess air is either poor bed coefficient or poor air distribution.

CO = Must not be higher than 500ppm.

SO₂= Must not be higher than 500ppm.

Sulphur ppm on average has decreased by **296** ppm which is against the trend of higher the sulphur in the coal the higher ppm emissions will be with the current levels of sulphur in coal from **1.49%** to **1.98%**.

AFTER FURNACE

Boiler 3	PREA.	TEMP °C	EX. AIR%	O ₂ %	CO PPM	NO PPM	SO ₂ PPM	EFF %
06/08/2003	910	262	57.7	7.7	15473	108	588	54.0
	910	262	57.7	7.7	15628	109	592	53.9
	910	262	57.7	7.7	15898	108	294	53.8
	940	264	57.7	7.7	15543	110	544	54.1
	940	265	57.7	7.7	15699	110	545	53.9
	940	265	57.7	7.7	15908	111	546	53.8
	950	266	58.8	7.8	15850	111	555	53.9
	950	266	58.8	7.8	15990	112	560	53.8

AVERAGE	931	264	58.0	7.7	15749	110	566	53.9
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18/12/2003	900	224	150.4	12.6	2880	94	34	64.8
	900	226	156.2	12.8	3717	91	62	60.3
	900	226	156.2	12.8	3819	78	89	60.3
	910	227	156.2	12.8	3900	95	72	60.1
	910	227	159.1	12.9	3958	100	86	60.0
	910	227	156.2	12.8	3924	101	88	60.1
	900	227	156.2	12.8	3988	105	89	60.1
	900	226	156.2	12.8	3985	102	92	60.1

AVERAGE	904	226	155.8	12.8	3771	96	77	60.7
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