



# Chinco Fireside Treatment

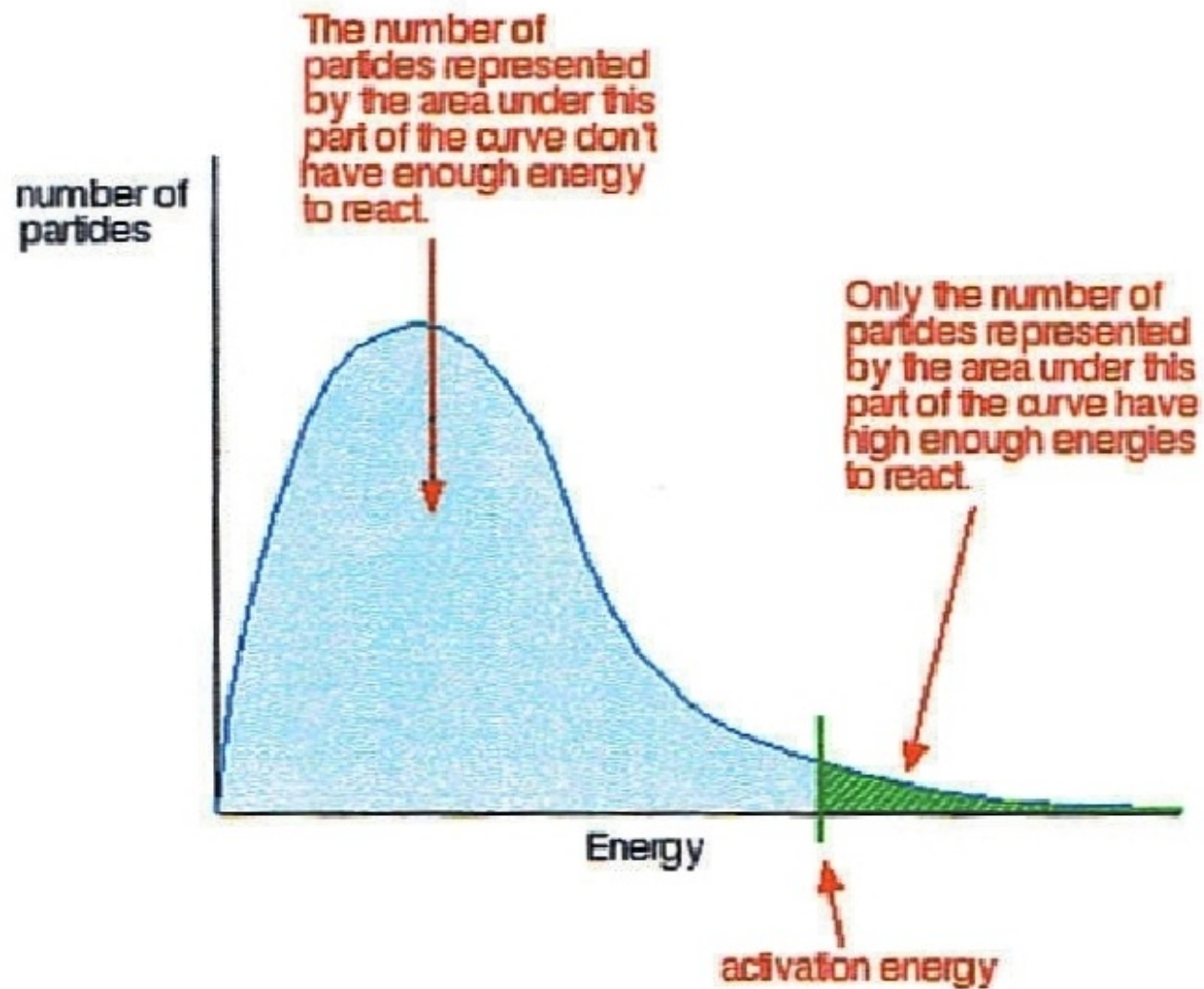
What we can do for your company

## *CHINCO COAL COMBUSTION CATALYST.*

Chinco has been used by Coal Power Houses for the past 20 years with huge success saving Companies millions of dollars on coal, maintenance, and reducing poisonous and black emissions.

The product consists of only safe harmless and environment friendly natural substances. Chinco is non-explosive, non-poisonous, and non-toxic catalyst, with zero chemicals added. The main ingredient is natural occurring manganese ore that has not been heat treated. Other ingredients in small quantities are magnesium, copper, and iron etc.

- First and foremost, Chinco is *a catalyst ,and improves the combustion of coal immediately* through the catalytic reactions.
- **Catalyst**, in chemistry, is any substance that increases the rate of a reaction without itself being consumed.

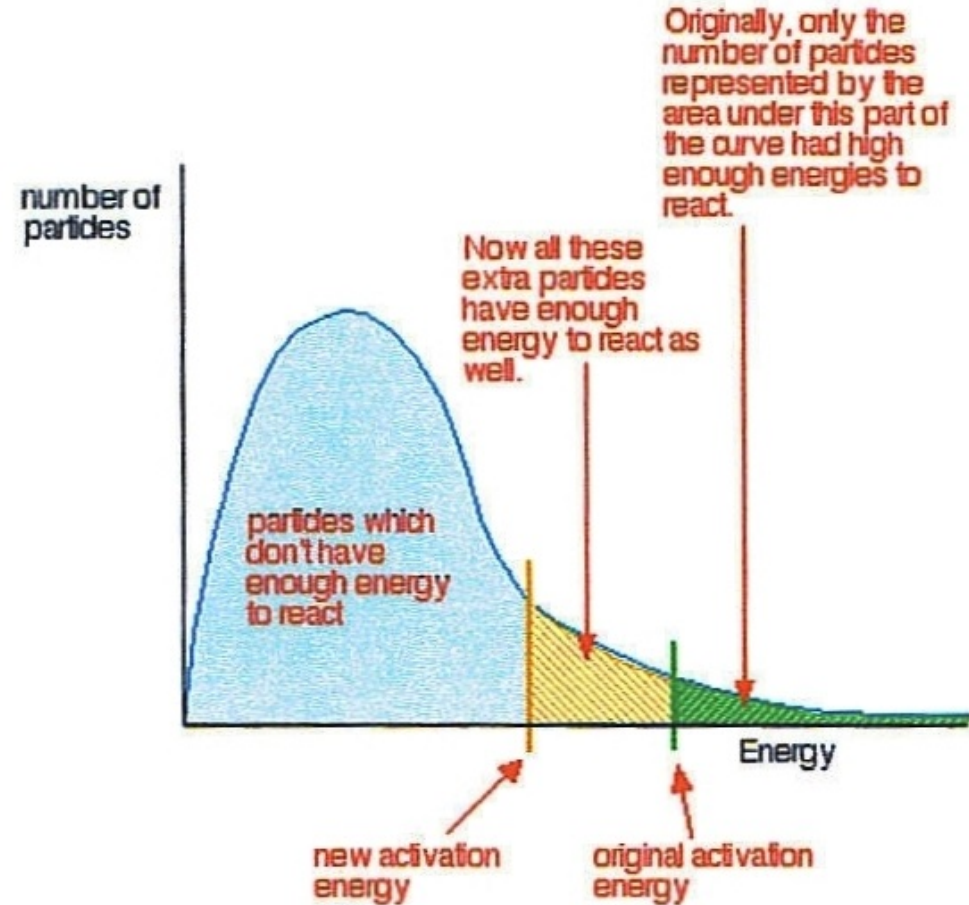


Only those particles represented by the area to the right of the activation energy will react when they collide. The great majority don't have enough energy, and will simply bounce apart.

## Catalysts and activation energy

To increase the rate of a reaction you need to increase the number of successful collisions. One possible way of doing this is to provide an alternative way for the reaction to happen which has a lower activation energy.

In other words, to move the activation energy on the graph like this:



Adding a catalyst has exactly this effect on activation energy. A catalyst provides an alternative route for the reaction. That alternative route has a lower activation energy.

- A catalyst has the ability to activate more reactions in the combustion process of coal. In other words, a larger portion of each coal particle is made to burn rather than that portion just bypassing the ignition/combustion process and falling out into the bottom ash pile, unburnt.
- A very small amount of Catalyst is required to speed up a reaction. We use a mere 200 grams of Chinco catalyst to treat one ton of coal successfully!
- The major benefit of a Catalyst is; whilst creating a faster reaction *it does not get consumed (burnt out) by this combustion reaction.* In other words, it can repeat its function/reaction over and over, even in the gas stream, again without being 'burnt' out itself.

This instant improvement of the Combustion process creates a chain reaction with many other changes inside the gas stream and interior of the Boiler.

- Wasted carbon in ash CIA is reduced immediately and can be seen to drop by a large percentage of 10%-50% less waste.

P.O. Box 82124,  
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 South Africa.  
 TEL.: (011) 496-2228  
 FAX: (011) 496-2239



**INSPECTORATE**

**INSPECTORATE M&L (PTY) LTD.**  
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 Consulting Industrial Chemists, Analysts & Samplers Issued at: Durban  
**CONFIDENTIAL** Date: 16/02/2005  
**Certificate / Report** Sheet: 1 of 1

COMPANY NAME : CHINCO IMPORTS  
 SUBJECT : Analysis of 2 ASH samples  
 MARKED : as below  
 INSTRUCTED BY : Tom Roberts  
 SAMPLES : Submitted  
 LAB NO(S) : C6520 - 6521  
 ORDER NO : 9

**TOTAL CARBON, C % (IN ASH)**

	<u>CORRUSEAL</u> 07/02/2005 <u>BEFORE TREATMENT</u>	<u>CORRUSEAL</u> 10/02/2005 <u>AFTER TREATMENT</u>
Total Carbon, %	23.76	13.05

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COMPANY NAME : CHINCO IMPORTS  
 SUBJECT : Analysis of 2 ASH samples  
 MARKED : as below  
 INSTRUCTED BY : Tom Roberts  
 SAMPLES : Submitted  
 LAB NO(S) : C6572 - 6573  
 ORDER NO : 10

**TOTAL CARBON, C % (IN ASH)**

	<u>DUNLOP</u> <u>BOILER 1</u> <u>BEFORE TREATMENT</u>	<u>DUNLOP</u> <u>BOILER 1</u> <u>AFTER TREATMENT</u>
Total Carbon, %	28.3	10.9

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 Ref. No.: 05/1766M  
 Issued at: Durban  
 Date : 05/11/2004  
 Sheet: 1 of 1

COMPANY NAME : CHINCO IMPORTS  
 SUBJECT : Analysis of 4 ASH samples  
 MARKED : as below  
 INSTRUCTED BY : Tom Roberts  
 SAMPLE : Submitted  
 LAB NO(S) : C5844 - 5847

WITHOUT TREATMENT

SAPPI KRAFT  
25/10/2004  
WITHOUT  
TREATMENT

TOTAL CARBON, % 21.89

WITH TREATMENT

<u>SAPPI KRAFT</u>	<u>SAPPI KRAFT</u>	<u>SAPPI KRAFT</u>
<u>27/10/2004</u>	<u>28/10/2004</u>	<u>29/10/2004</u>
<u>WITH</u>	<u>WITH</u>	<u>WITH</u>
<u>TREATMENT</u>	<u>TREATMENT</u>	<u>TREATMENT</u>

TOTAL CARBON, % 5.96 6.03 5.58

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 Ref. No.: 05/4596M  
 Issued at: Durban  
 Date : 26/05/2005  
 Sheet: 1 of 1

COMPANY NAME : CHINCO IMPORTS  
 SUBJECT : Analysis of 3 ash samples  
 MARKED : MONDI MEREBANK  
 INSTRUCTED BY : Mr. Tom Roberts  
 SAMPLE : Submitted  
 LAB NO(S) : C7393 - 7395

TOTAL CARBON, C % (IN ASH)

	<u>BEFORE</u> <u>TREATMENT</u> <u>5/11/05</u>	<u>DURING</u> <u>TREATMENT</u> <u>5/17/05</u>	<u>DURING</u> <u>TREATMENT</u> <u>5/19/05</u>
Total Carbon, %	46.08	18.85	28.34

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s or reports, invoices or other

- The dumped ash is grey in color instead of the normally black ash due to less wasted coal being dumped with the ash.



- The combustion is more complete in that the wet tars and hydrocarbons in the coal are burnt out and dry before leaving the fireball.
- This means the wet substances that normally stick to the interior surfaces of the boiler walls and tubes are drier/friable and more easily dusted off the boiler interior when cleaning.
- This not only saves time and money when shut downs occur, but these shutdowns will not happen so often any more due the heat transfer through the tubes being maintained at higher percentages for longer periods.



Before using Chinco



After using Chinco


**From:** Pretorius DP, Dawid P [mailto:Dawid.P.Pretorius@kcc.com]  
**Sent:** 12 July 2016 09:50 AM  
**To:** troberts@chinco.co.za  
**Cc:** wappelcryn@chinco.co.za; Kleintjie Coetsee (kcoetsee@chinco.co.za)  
**Subject:** Boiler 1 Photo's

Hi Tom

This picture was taken on Boiler 1 after 14 months of commissioning.  
Thanks for a great product.

Regards


**Dawie Pretorius**


 **Kimberly-Clark** of South Africa (Pty) Limited

*Utilities Team Leader*

*Springs mill*

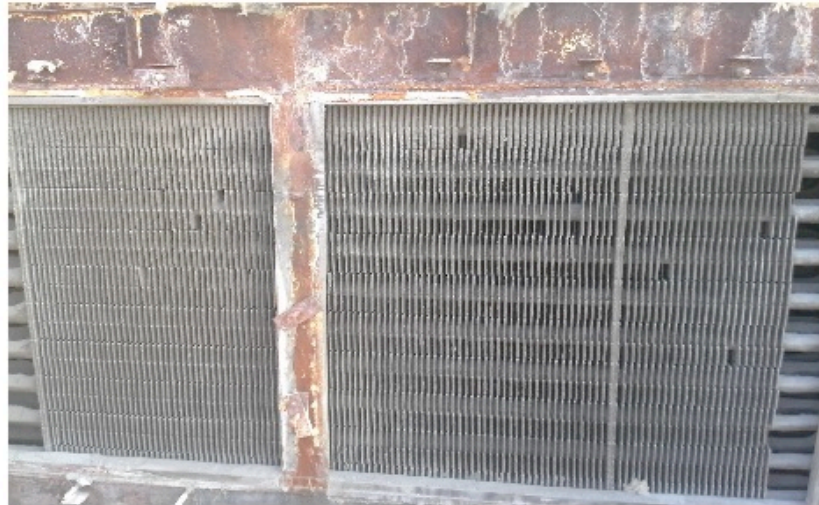
*Private Bag X57, Springs 1560*

 **landline** 0027 113607140

 **mobile** 083 320 7055

 **dawie.pretorius@kcc.com**

 **fax** 0027 113607003

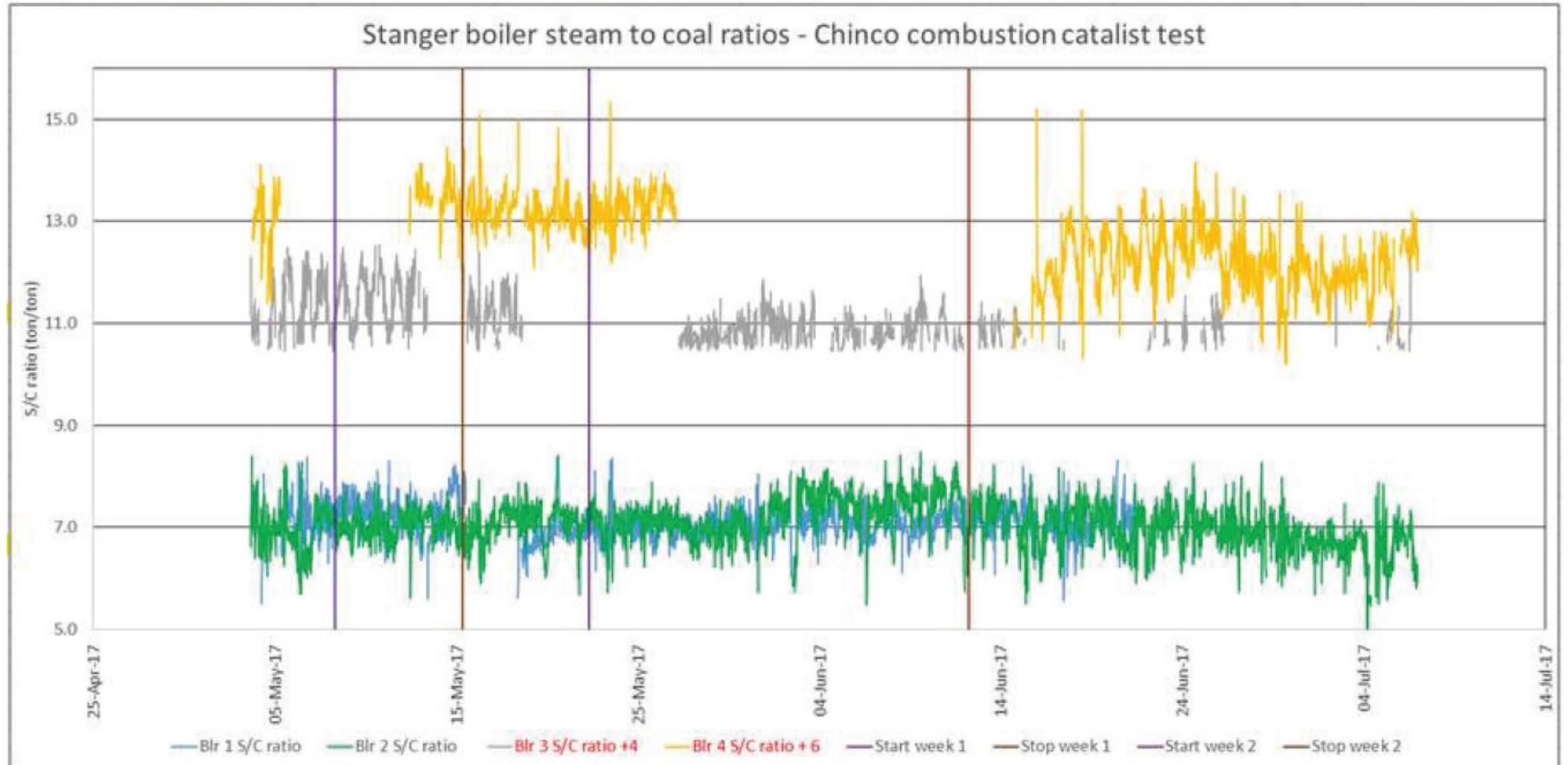


- This improved combustion efficiency results in less dumped 'unburnt' coal in the ash (CIA) and the coal consumption will thus be improved accordingly.

Hi Nazeer,

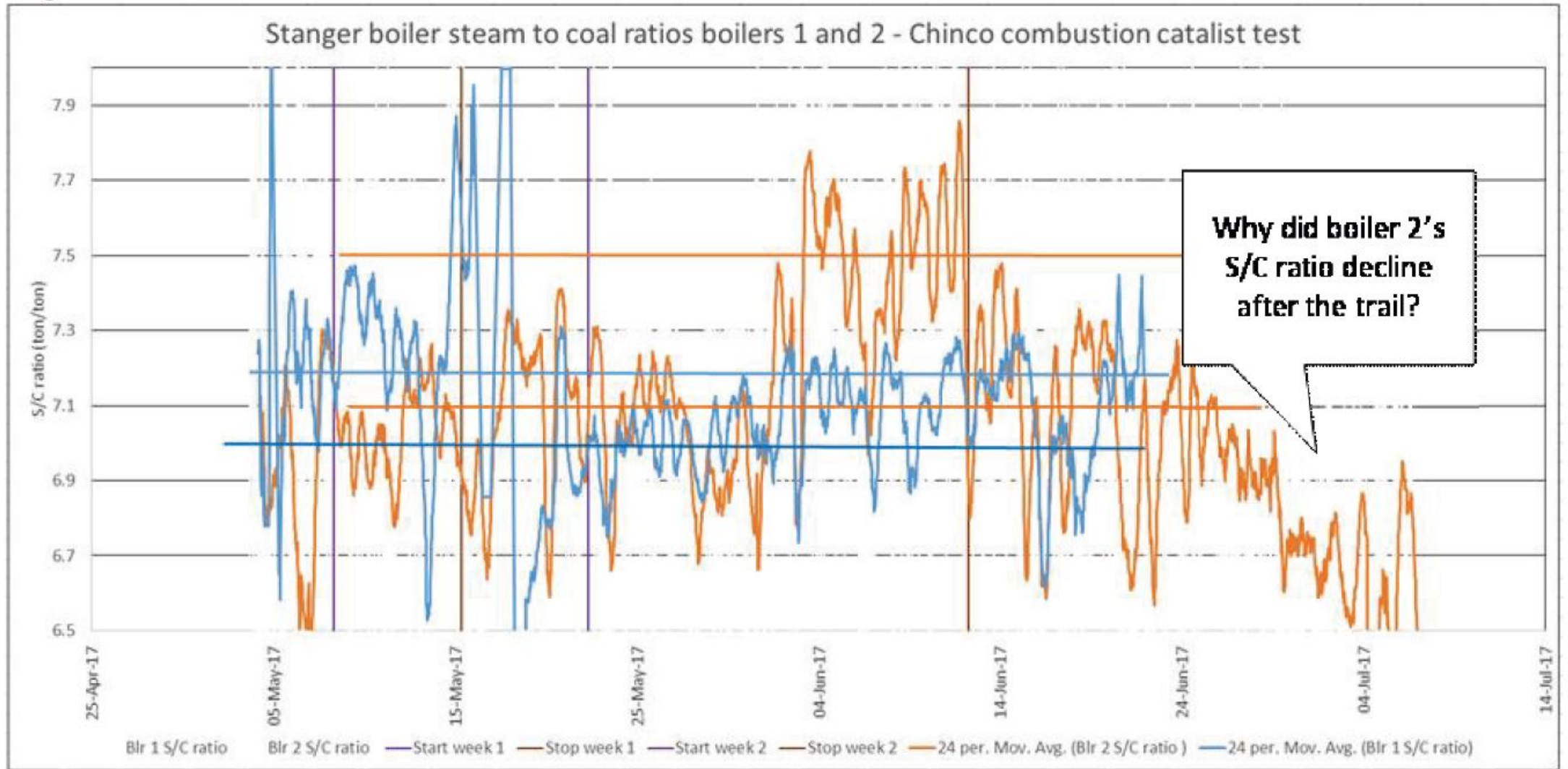
Below what I could see from the utilisation of the Chinco product: (added to Boiler 2 only.)

1. I have evaluated the product run on all the boilers to try and eliminate changes in coal properties:



I've moved the trends apart by adding 2 to the S/C ratio of boiler 2, 4 to boiler 3 and 6 to boiler 4. In the end I ignored boilers 3 and 4 since they were up and down too much during the time interval and I've moved boiler 2 back to the same scale as boiler 1. Judging on eye sight, some movement in both boiler 1 and boiler 2 S/C ratios took place when the Chinco product was added into boiler 2.

2. Changes in boiler efficiencies:



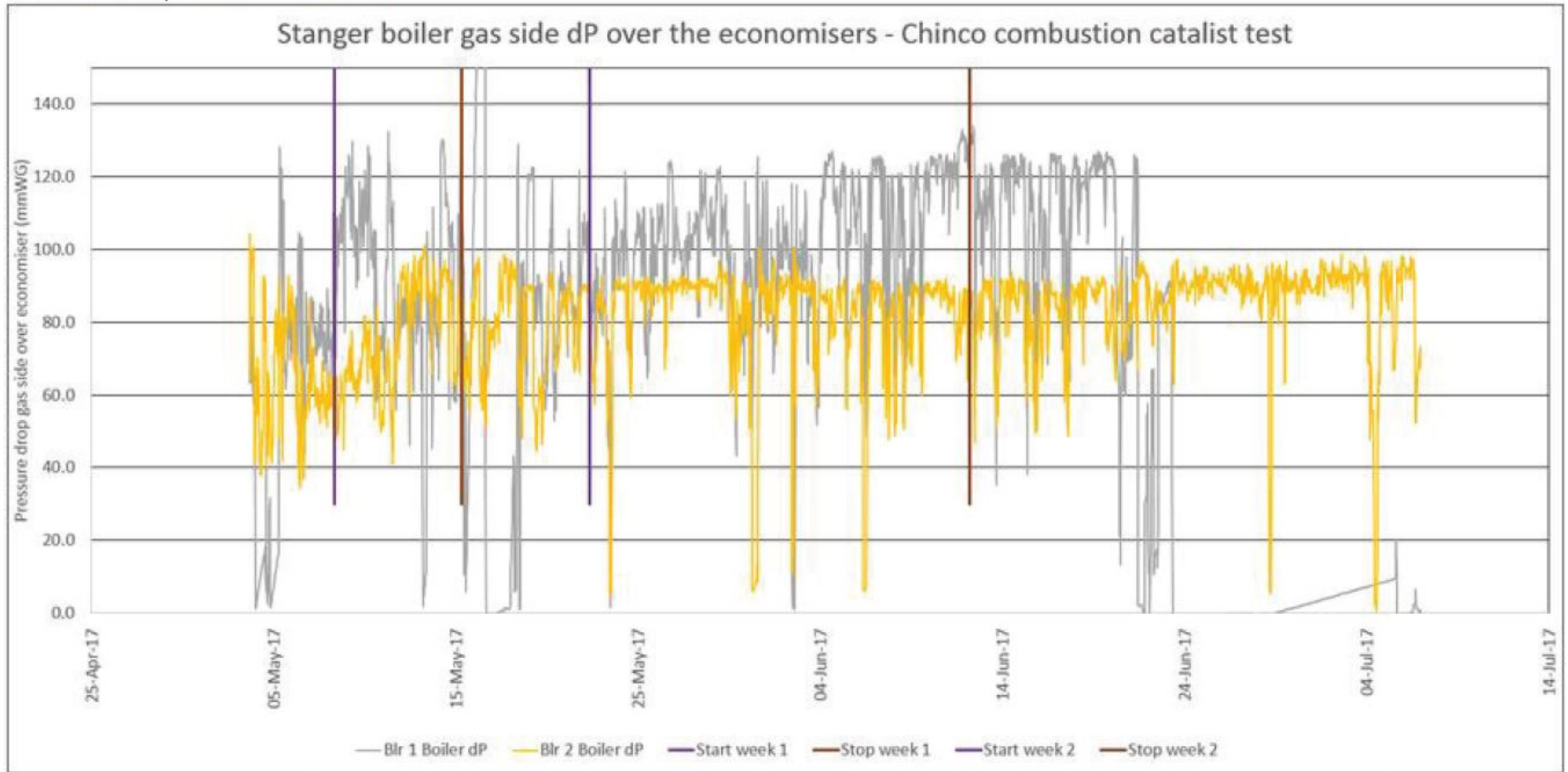
In this trend I used a 24 hr moving average to reduce some of the noise. About 7 days after the introduction of the catalyst, the S/C ratios on both boilers 1 and 2 increased, boiler 1 from 7 t/t to 7.2 t/t. This 0.2 t/t increase in S/C ratio is most probably a result of coal properties that changed. The S/C ratio on boiler 2 however increased from about 7.1 t/t to 7.5 t/t, a change of 0.4 t/t as result of the catalyst and the changes in coal properties (/combustion?). If one deduct the latter, the increase in S/C ratio with the catalyst is 0.2 t/t

More work will be done to try and understand why boiler 2's efficiency reduced to the extend it did after the trail.

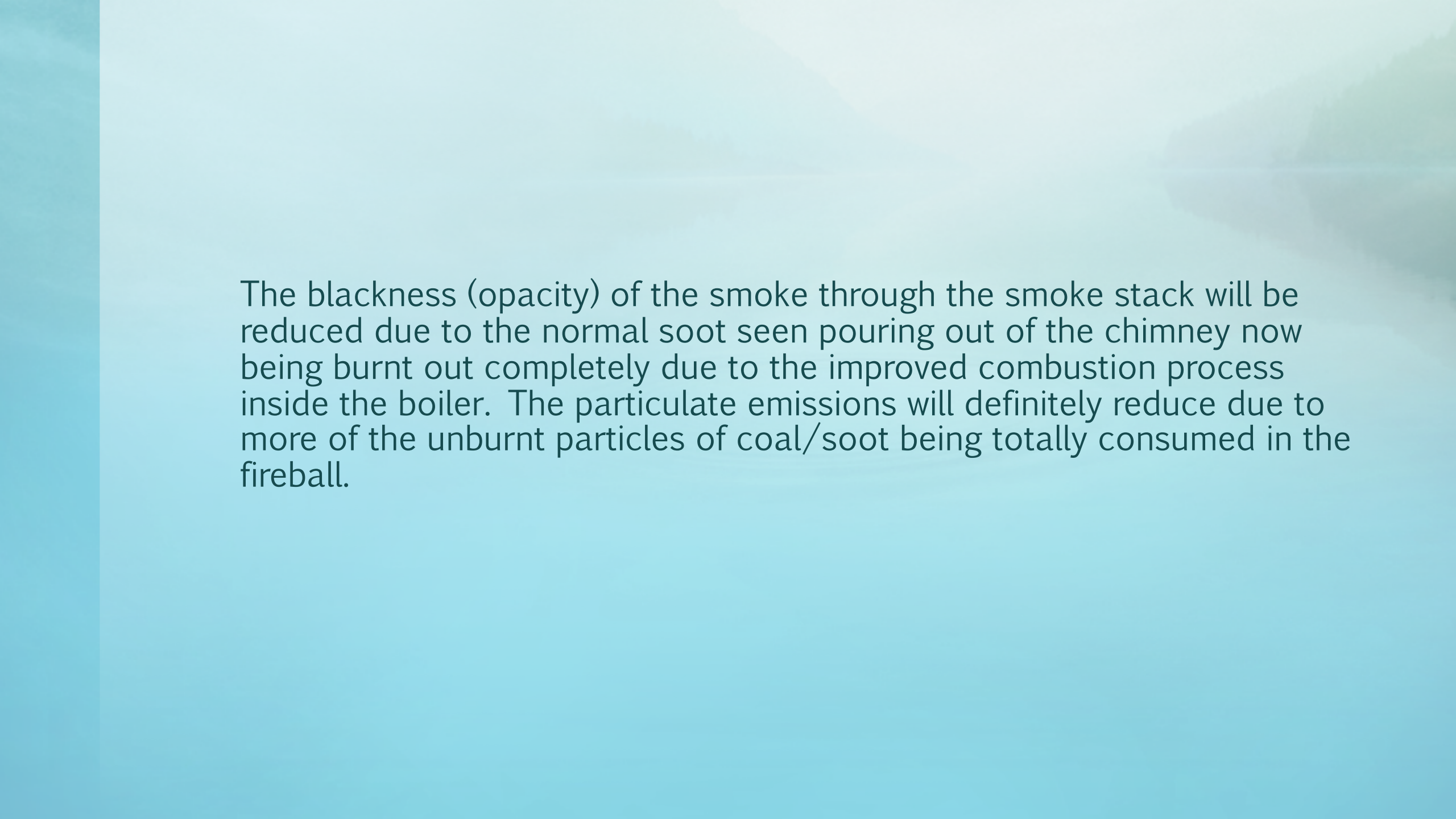
Cost calculations - full time benefit		
Chinco dosing	R 3.70	/ton of coal
S/C ratio	7.2	t/t
S/C ratio improvement	0.2	t/t
Steam demand	65	t/hr
Coal feed without dosing	9.03	t/hr
Coal feed with dosing	8.78	t/hr
Coal saving	0.24	t/hr
Coal cost	R 1,100.00	/ton
Saving on coal	R 268.39	/hr
Dosing cost	R 32.50	/hr
Nett saving	R 235.89	/hr
<b>Nett saving</b>	<b>R 1,981,504.50</b>	<b>/year</b>

From the last trend it is clear that the benefit from the dosing kicked in halfway through the trial and the benefit for halve the time has been calculated as well, it seems as if some gain can be realised by using the combustion catalyst.

#### 4. Pressure drop over the economisers:



The pressure drop over boiler #1's economiser increased slightly which might be some fouling, but the pressure drop of the economiser of **boiler 2** stayed constant.

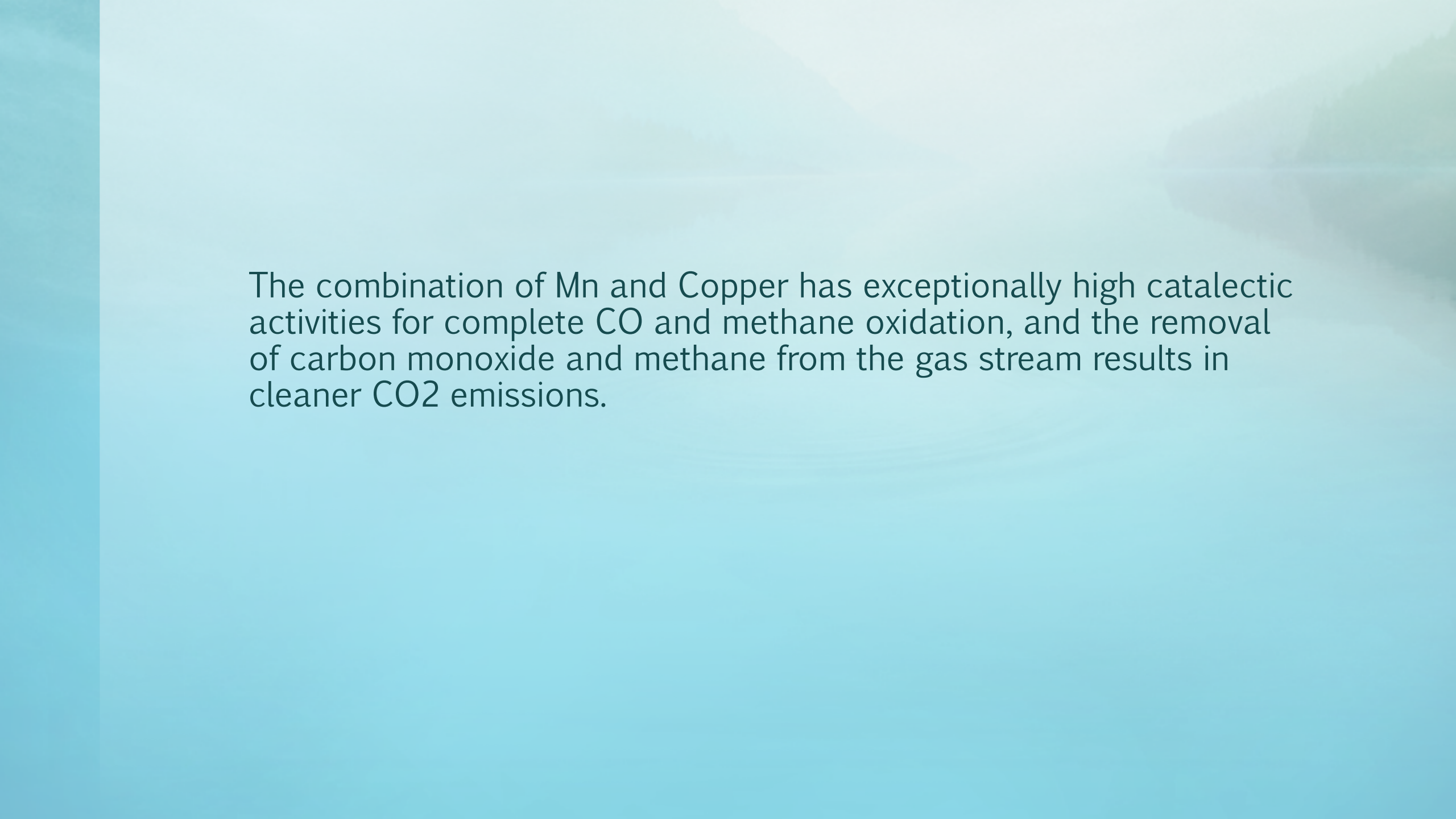
The background of the slide is a soft, out-of-focus photograph of a natural landscape. It shows a calm body of water in the foreground, with rolling hills or mountains in the distance under a hazy sky. The colors are muted greens, blues, and greys, creating a serene and clean aesthetic.

The blackness (opacity) of the smoke through the smoke stack will be reduced due to the normal soot seen pouring out of the chimney now being burnt out completely due to the improved combustion process inside the boiler. The particulate emissions will definitely reduce due to more of the unburnt particles of coal/soot being totally consumed in the fireball.

Table 3.1: Boiler Stack; Stack Conditions and Particulate Emissions

DESCRIPTION	UNIT	Test 1	Test 2	Test 3
Date	-	Before Chinco	Control Readings	WITH CHINCO
Time of Day	-	11h46	12h56	14h08
Test Duration	min	60	60	60
Barometric Pressure	kPa	84.56	84.43	84.37
Duct Static Pressure	kPa	-0.038	-0.046	-0.031
Gas Temperature (Average)	°C	148	148	149
Gas Velocity	m.s <sup>-1</sup>	4.69	5.51	5.64
Stack Diameter	m	1.50		
Volumetric Flow Rate (Actual)	m <sup>3</sup> .h <sup>-1</sup>	29 700	34 800	35 600
Volumetric Flow Rate (NTP, wet)	Nm <sup>3</sup> .h <sup>-1</sup>	16 000	18 800	19 200
Volumetric Flow Rate (NTP, dry)	Nm <sup>3</sup> .h <sup>-1</sup>	15 700	18 500	18 800
Particulate Concentration (Actual)	mg.m <sup>-3</sup>	129	133	99.0
Particulate Concentration (NTP, wet)	mg.Nm <sup>-3</sup>	239	246	184
Particulate Concentration (NTP, dry)	mg.Nm <sup>-3</sup>	244	251	188
Particulate Emission Rate	kg.h <sup>-1</sup>	3.83	4.63	3.53
Water Concentration	% (V/V)	2.01	2.02	2.00
Total Isokinetic Volume Sampled (NTP, wet)	Nm <sup>3</sup>	1.34	1.55	1.57
Total Isokinetic Volume Sampled (NTP, dry)	Nm <sup>3</sup>	1.31	1.51	1.54
Isokinetic Efficiency	%	-5.16	-6.77	-6.94

Kimberley Clarke  
Particulate Testing



The combination of Mn and Copper has exceptionally high catalytic activities for complete CO and methane oxidation, and the removal of carbon monoxide and methane from the gas stream results in cleaner CO<sub>2</sub> emissions.

*In published articles, it is confirmed that Mn, Mg, Fe combination reduces SO<sub>x</sub> and NO<sub>x</sub> emissions during coal combustion. Chinco catalyst consists of a formulated mix of a number of components, of which manganese is the main constituent.*

*Small doses of the catalyst are periodically injected into the combustion chamber where it drives reactions of the gaseous pollutants (ex.: SO<sub>x</sub>) with metallic components of the ash to form particulate sulphates.*

*Thus the gaseous SO<sub>x</sub> will leave the boiler as sulphate particles within the ash instead of as a toxic gas through the smoke stack. During a Government required Test at a power station in Pretoria [(7) Rooiwal] plus other individual tests carried out at Kimberly Clark, and British American Tobacco, the reduction in SO<sub>x</sub> and NO<sub>x</sub> was reduced substantially*



Public Works and Infrastructure Development  
Department

Energy and Electricity Division

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My ref:	E7/1/1/1/12	Tel:	(012) 358 - 2801
Your ref:		Fax:	(012) 545 - 9327
Contact person:	M Speek	Email:	martins@tshwane.gov.za
Division/Section/Unit:	Rooiwal Power Station		

25 January 2010

Chinco Fireside Treatment  
Thembaletu Coal (Pty) Ltd  
PO Box 1664  
Inetown  
3610

(Attention: Mr T Roberts)

Dear Sirs,

**CHINCO FIRESIDE CONDITIONING AGENT: ROOIWAL POWER STATION**

We have been operating our Boiler 4 using your additive since July 2009.

On recently removing the boiler from service our routine inspections revealed a reduced slag build –up on furnace and convection section tubes, as well as significantly reduced ash blockage within our finned tube economiser banks.

This was achieved with a reduction in sootblowing frequency. The results of our stack emission monitoring have revealed significant reductions in SO<sub>x</sub> and NO<sub>x</sub> concentrations.

Based on our findings with boiler 4 we are intending introducing similar fireside conditioning to the balance of our boilers.

Accordingly we have no hesitation in recommending your product.

Regards

M SPEEK  
CHIEF ENGINEER MECHANICAL MAINTENANCE  
ROOIWAL

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FILE  
DALY FILE

On request, this document can be provided in another official language.

NOx emission is directly heat/combustion/air related as you know. By using Chinco and obtaining peak combustion situation (not with automated boiler controls that do it for you) one can reduce the coal intake due to reduced coal usage requirements for the same heat build-up, and then also reduce excess air requirement to bring down the NOx formation. (The more air the more NOx). This will reduce the NOx emissions substantially.

The test at Rooiwal where 80% reduction was obtained the automated setting did these adjustments itself and showed this remarkable reduction. At grate boilers, one has to carefully adjust the guillotine settings to reduce coal and reduce excess air gradually until maximum benefit is obtained.

*In closing we repeat the benefits of Chinco Coal Combustion Catalyst:*

- 1. Chinco is non-explosive, non-poisonous, and non-toxic catalyst, with zero chemicals added.*
- 2. Chinco is a catalyst and improves the combustion of coal immediately.*
- 3. Chinco as catalyst has the ability to activate more reactions in the combustion process of coal.*
- 4. Chinco allows a larger portion of each coal particle to burn rather than that same portion just bypassing the ignition/combustion process.*
- 5. We use a mere 200 grams of Chinco catalyst to treat one ton of coal successfully!*
- 6. The major benefit of a Catalyst is; whilst creating a faster reaction it does not get consumed (burnt out) by this combustion reaction.*
- 7. Improvement of the Combustion process creates a chain reaction with many other changes inside the gas stream and interior of the Boiler.*
- 8. Wasted carbon in ash CIA is reduced immediately and can be seen to drop by a large percentage of 10%-50%*
- 9. Dumped ash is grey in color instead of the normally black ash due to less wasted coal being dumped with the ash.*
- 10. The normal wet substances that normally stick to the interior surfaces of the boiler walls and tubes are drier/friable and more easily dusted off.*
- 11. The heat transfer through the tubes being maintained at higher percentages for longer periods.*
- 12. Less dumped 'unburnt' coal in the ash (CIA) and the coal consumption will thus be improved accordingly.*
- 13. The blackness (opacity) of the smoke through the smoke stack will be reduced.*
- 14. The particulate emissions will definitely reduce due to more of the unburnt particles of coal/soot being totally consumed in the fireball.*
- 15. With the total oxidation/removal of carbon monoxide and methane from the gas stream results in 'cleaner' CO2 emissions.*
- 16. Mn, Mg, Fe catalyst combination reduces SOx and NOx emissions during coal combustion.*
- 17. By using Chinco and obtaining peak combustion situation one can reduce the coal intake due to reduced coal usage requirements for the same heat build-up, and reduce excess air requirement, to bring down the NOx formation dramatically.*

# Safety Data Sheet

## **SAFETY DATA SHEET** **CHINCO FIRESIDE TREATMENT**

### 1. IDENTIFICATION OF SUBSTANCE AND COMPANY:

**Product name:** Manganese based coal catalyst

**Manufacturer:** Chinco Fireside Treatment  
PO Box 1664, Pinetown KZN 3600

**Supplier:** Chinco Fireside Treatment cc  
PO Box 1664, Pinetown KZN 3600

**Emergency contact numbers:** Tel: +27 31 7055404 Fax: +27 86 5144016  
Cell: 0833245404 : 0716099888.

### 2. COMPOSITION:

Manganese, Iron, Silica, Alumina, Calcium Oxide, Magnesium Oxide, Rare earth metals. [No Chemicals]

### 3. HAZARD IDENTIFICATION:

This product is not classified as dangerous/ hazardous. Not a fire or spill hazard.

**Classification:** : Not classified.  
**Physical/chemical hazards:** : No known significant effects or critical hazards.  
**Human health hazards:** : No known significant effects or critical hazards.  
**Environmental hazards:** : No known significant effects or critical hazards.  
**Main hazard:** : Powders or dust can enter eyes.

### 4. FIRST AID MEASURES:

**Eye contact:** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation continues.

**Skin contact:** : Wash with water.

**Ingestion:** : Wash out mouth with water. Remove dentures if any. If material is swallowed and person is conscious, give small quantities of water to drink. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as collar, tie, belt or waistband.

**Inhalation:** : Move affected person to fresh air.

### 5. FIRE FIGHTING MEASURES:

**Flammability of the product:** : Non-flammable

**Auto-ignition temperature:** : Not applicable

**Fire hazard with other substances:** : Non-flammable

**Fire fighting media requirements:** : Non-flammable.

### 6. ACCIDENTAL RELEASE MEASURES:

**Spill handling/cleanup:** : Vacuum or sweep up spillage and place in designated waste container.

**Environmental precautions:** : Avoid dispersal of excessive spilled material and runoff with soil, waterways, drains and sewers. Advise relevant authorities if product has caused major environmental pollution to avoid blockage of sewers or waterways.

### 7. HANDLING AND STORAGE:

**Handling:** : Minimise dust generation and accumulation. Avoid breathing and contact with eyes in dust.

**Storage:** : Manganese is locked into other mineral compounds in the ore and the only possible cause for concern is dust.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

**Exposure controls:** : Use only in manufacturer designed applicator machine to avoid airborne dust.

**Hand protection:** : Use Impervious gloves when handling product out of applicator/container.

**Eye protection:** : Use safety goggles if high dust concentration outside container is produced.

**Skin protection:** : Personal protective clothing/equipment for the body should be selected based on task to be performed if product is taken out of container/applicator machine.

**Hygiene measures:** : Wash hands, forearms and face after handling product before eating, smoking and using toilet at the end of working period.

**Environmental Controls:** : Check manufacturers' applicator machine for dust leaks. Inform technician if leaking noticed so that he may fit new lid seal to avoid dust escaping.

### 9. PHYSICAL AND CHEMICAL PROPERTIES:

**Physical state and appearance:** : Fine powder.

**Colour:** : Light Grey to black.

**Odor:** : Odorless

**Melting point:** : 1244°C.

**Specific Gravity:** : 4.5 (water = 1)

**Flash point:** : non-flammable

**Solubility:** : insoluble in water.

### 10. STABILITY AND REACTIVITY:

**Stability:** : Product is stable

**Conditions to avoid:** : Dusty conditions and avoid wind dispersal

**Materials to avoid:** : No specific data. No hazardous decomposition products

### 11. TOXICOLOGICAL INFORMATION:

**POTENTIAL ACUTE HEALTH EFFECTS:**

**Inhalation:** : Exposure to airborne concentrations outside applicator/container and above statutory limits may cause irritation of the nose, throat and lungs.

**Ingestion:** : No known significant effects or critical hazards.

**Skin contact:** : No known significant effects or critical hazards.

**Eye contact:** : Exposure to airborne concentrations above limits may cause irritation of the eyes.

**POTENTIAL CHRONIC HEALTH EFFECTS:**

**Chronic effects:** : Highly unlikely repeated prolonged inhalation of dust outside the manufacturers sealed container/applicator may lead to chronic respiratory irritation.

**Carcinogenicity:** : No known significant effects or critical hazards.

**Mutagenicity:** : No known significant effects or critical hazards.

**Teratogenicity:** : No known significant effects or critical hazards.

**Development effects:** : No known significant effects or critical hazards.

**Fertility effects:** : No known significant effects or critical hazards.

### 12. ECOLOGICAL INFORMATION:

**Environmental effects:** : No known significant effects or critical hazards.

**Other adverse effects:** : No known significant effects or critical hazards.

**AELs:** : The product does not contain organically bound halogens.

### 13. DISPOSAL CONSIDERATIONS:

**Methods of disposal:** : Recycle if possible. Dispose of surplus or spilled product via a waste disposal contractor in accordance with normal regional local authority requirements.

**Hazardous waste:** : This product is not regarded as hazardous waste.

### 14. TRANSPORT INFORMATION:

**International transport regulations:** : Not a controlled material.

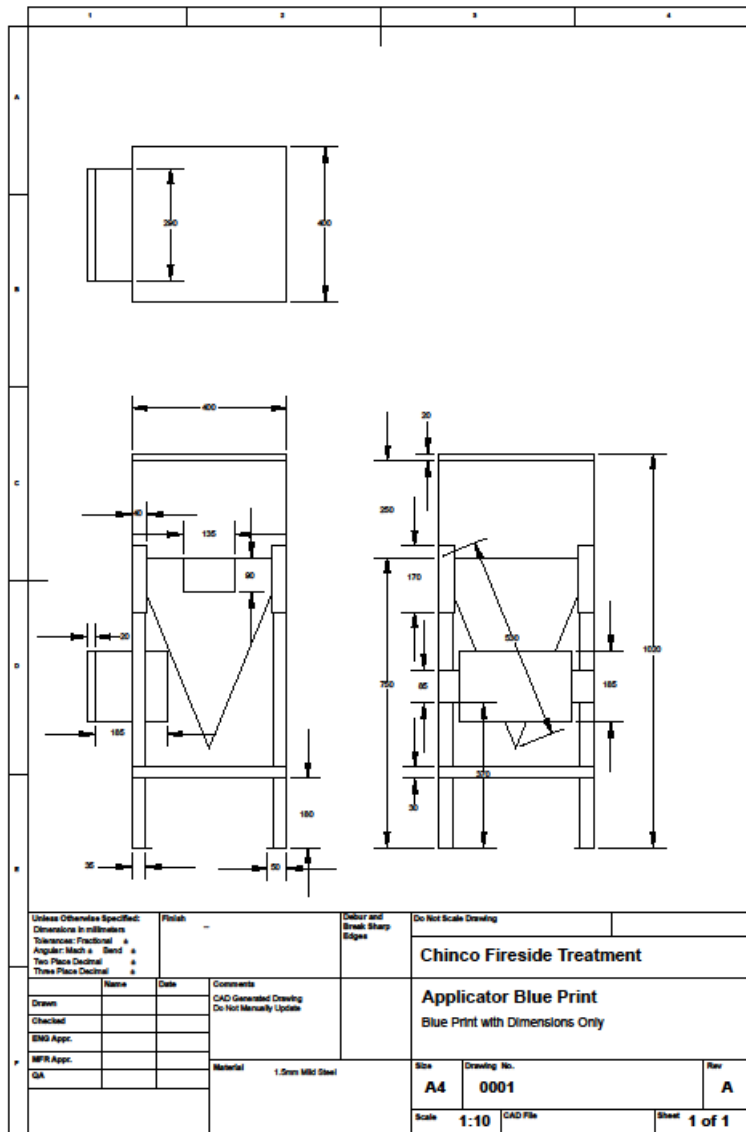
**Other adverse effects:** : No known significant effects or critical hazards.

### 15. REGULATORY INFORMATION:

**15. REGULATORY INFORMATION:** This Product is not classified as an Hazardous Material

**16. OTHER INFORMATION:** Date of printing: 05.09.2007 CHINCO FIRESIDE TREATMENT CC.

# Catalyst Applicator Machine





# TRIED AND TESTED!

Chinco Coal Catalyst contains only natural environmentally friendly additives which result in a highly effective combustion catalyst.

Tried and tested in the South African industrial market over many years.



ZULULAND STEAM (AFRICA)

SUMITOMO

