



Cannon & Hancock, Biggs & Associates

Refractory Inspection, Advice and Third Party Q.A.

Reference List

CHB is a member of the **C & H Group** and was established specifically as the refractory inspection and on-site quality assurance division of the group.

Roles and Responsibilities on site include:

- FCCU Refractory Shutdown Planning & Co-ordination
- Consultation
- Design Review
- Lining Assessments
- Repair Procedures
- Third Party Quality Assurance
- Failure Analysis
- Pre-qualification of Materials & Personnel
- Quality Control Procedures
- Installation Procedures
- Rope Access Inspections
- Refractory Testing, Research & Development
- Supply of Competent Refractory Inspectors & Technicians
- **Infrared Inspections** – level 2 thermographer
 - Pre-shutdown and post shutdown
 - On-going monitoring of faulty linings to ensure plant reliability until a planned shutdown
 - Check furnace efficiency and design recommendations based on thermography

Qualified, experienced API certified inspectors are involved in lining assessments and recommendations on maintenance shutdowns as well as Third Party Quality Assurance on new projects. **Industrial Rope Access** trained inspectors means scaffolding is not necessary for routine statutory inspection.

Third party inspection clients include: **Chevron, Engen, TOTAL, Shell, PetroSA, Sasol, Qatar Petroleum, RASGAS (Qatar), ADGAS (UAE), Fertil (UAE), Stone & Webster (SHAW), PERTAMINA (Indonesia), SPRC (Thailand) and Industrial Services Singapore to name a few.**

CHB have on-going investigations into refractory failure analysis for installers and end users in almost every industry. Any samples from such failures are tested at our independent refractory testing laboratory in Sasolburg.

CHB INSPECTORS ARE CERTIFIED BY THE AMERICAN PETROLEUM INSTITUTE (API 936 CERTIFICATION)

CHB REFERENCES

PETROCHEMICAL

SASOL : Consultancy, Inspection and Third Party QA (2002 to current)

- Gasifiers
- Heaters
- Reformers
- Ash Sluices
- Arc Furnaces
- 2009 – KBR Project to Revamp Sasol FCCU



PETROSA (1995 to current)

- Design and Site QA : Arc Furnace
- Project Management Refractories : Synthol
- On-Going Consultancy, Inspection & Third Party QA on Three Trains for the Reformers and Synthol Reactors since 1991

FERTIL (UAE) 2006

- Consultation and Inspection on Reformers and Heaters

ADGAS (UAE) 2004 - current

- Failure analysis on refractories in SRU MCC
- Reline of 3 Main Combustion Chambers in SRU's.
- 2009 – SRU, MCC Project for new design and consultancy during construction.
- Ongoing annual consultancy for 3 SRU Trains.



REFINERIES

Caltex /Chevron (1998 to current)

- Fluor Project Consultancy and Site QA
- 1996 Shutdown - Maintenance QA - Fluor Daniel Project : # 2 FCCU Revamp including Riser Line, Regen Cyclones and Air Grid Repairs.
- 2000 Shutdown – Third Party QA for Foster Wheeler Project: # 1 FCCU Revamp including Riser Line, Cyclones and Air Grid Repairs.
- 2006 Shutdown – FCCU – major repairs to Regen Cyclones, Riser Line and Orifice Chamber
- 2009 – in-house refractory training course for Chevron Pembroke
- SRU, Main Combustion Chamber (67-F-1) - Revamp 2010
- Plant 63 - 2010 – Plant 63 FCCU shutdown – Extend Cyclone Lives and Maintenance QA of Refinery Heaters
- Ongoing Third Party Inspection during FCCU shutdowns 2010
- Plant 53 – FCC Revamp 2012- New Regen Dome, Cyclones and Airgrid



NATREF (TOTAL) - (1995 to current)

- On-going maintenance contracts for Third Party QA & Refractory Testing for FCCU & Heaters since 2003
- Badger-CBI Project : Site QA
- 2002 expansion project for Crude Heaters
- SRU, MCC revamp 2004
- 2007 – major repair to FCCU Airgrid, Regen Cyclones, Orifice Chamber
- SRU - Failure analysis for SRU in 2009
- SRU Revamp 2010
- 2011 – FCCU shutdown, extension of Regen Cyclone lives.



ENGEN REFINERY (PETRONAS)

- Fluor-Kellogg Project : Site QA and Consultancy
- Fluor-KTI Project : Site QA
- Fluor Daniel Project : FCCU - Fuel Pot Replacement and repair to Regen Cyclones
- 2008 – SRU Failure Analysis and Third Party QA for repair
- Infrared scanning for SAFOR and FCCU
- 2009- Reline of SAFOR Heaters
- 2010 – FCCU – Third Party Refractory Inspection for Repairs to Regen Cyclones
- 2011 – Third Party Inspection & QA on North, South and Central Refinery shutdown.



SAPREF (SHELL) – 1995 to current

- Fox project Site QA and Consultancy
- 2002 FCCU Shutdown – Major repairs to FCCU Cyclones, Riser, Air Grid and Orifice Chamber
- 2006 – In-house refractory training course
- 2009 – SRU, MCC Revamp
- On-Going Maintenance Inspections & Third Party QA for FCCU, all Heaters, SRU's and Reactors
- 2011 – Consultation and Inspection on New SRU 3 at Duiker and Bronswerk in Netherlands

QATAR PETROLEUM REFINERY

- 2006 - FCCU Shutdown – Third party Inspection and QA
- 2009 – FCCU Revamp – Third party inspection & QA
- Refinery 1&2 Heaters - 2009
- SRU, Main Combustion Chamber - 2009

BAPCO REFINERY (BAHRAIN)

- 2007 – In-house refractory Training Course
- FCCU Standpipe failure analysis -2009
- Refractory Training course 2007

SHAW – Stone and Webster - Houston

- ***2010 – RFCC Project***

Review all project documentation. Third Party Inspectorate for hexmesh work on New RCC

PERTAMINA – Indonesia

- 2011- Consultancy and Third Party Inspectorate for Sulphur Stack and FCCU
- 2012 - Third Party Inspection on FCCU pitstop

SPRC – Thailand

- 2014- 3rd Party Inspection for major revamp of RFCC and SRU & Heaters

Quartis / Causeway and Industrial Services

- Supply of 3rd party inspector's - current

Cement and Lime

- Rotary Kiln : Alpha Lime
- Vertical Lime Shaft Kiln : Trans Hex Mining
- New cement plant (Pre-heaters, Rotary Kiln, Cooler, Ducting etc.) : Ewekoro / Nigeria

Aluminium

- Hillside Pot Furnaces - Site QA for J.R. Dickinson
- On going consultancy

Platinum

- Consultancy - Impala Platinum
- Arc Furnace – Impala Platinum - Failure Analysis
- Arc Furnace – Lonmin Platinum – Failure Analysis



Iron and Steel

- Hoogovens Project - Blast Furnace & Stove Reline : Iscor Vanderbijlpark – Material Expeditior
- Roller Hearth Furnace : Saldanha Steel - QA
- DR Kiln - Scaw Metals

Glass

- Glass Tank - Nampak Glass - Failure Analysis
- PFG Glass - Material Recommendations

Other Clients include:

- Fluor Daniel
- Hatch Africa
- KBR
- Silicon Smelters
- Crawford & Co. (Insurance loss adjusters)
- **Tan Rajah & Cheah (Insurance loss adjusters Singapore)**

CHB are frequently involved in major revamps and expansion projects with engineering firms such as **FLUOR, FOSTER WHEELER, KBR.**

CHB frequently do **refractory failure analysis** on behalf of insurance companies and end users.



**Qatar Petroleum
Refinery**



مصفاة
قطر للبتروول

**REFINING DIRECTORATE
SITE SERVICES - FACILITIES DEPARTMENT**
P.O. Box: 50033, Mesaieed – Qatar, Tel.: 40144823 – Fax: 40139438

To : CHB – Third Party Inspectorate **Date :** 2nd December 2013
Attn : Mr Darrol Biggs **Pages :**
From : FMS/4 (R) **Ref. # :** FMS/4-TPI- 0112/13

Letter of Recognition

This is to recognize the services of CHB as a Third Party Refractory Inspectorate during plant shutdowns.

CHB have been contracted to QP Refinery over the past 4 shutdowns of Refinery 1 & 2 and RFCC; as TPI for refractory works. The services provided meet international standards and the knowledge and expertise of CHB's inspectors have been recognized.

Thank you for your contributions to shutdown maintenance.

Best Regards,

**Nadeem Shakir
Senior Project Engineer**



☆☆☆☆☆ **we are green** ☆☆☆☆☆





31 July 2013

Cannon Hancock Biggs and Associates.

Dear Mr. Darrol Biggs

This is to express our heartfelt thank you for your exceptional services during our 2013TA. We strongly believe that the continued involvement by CHB's Refractory Shutdown Manager, Alwyn Spencer and your inspection team, played a crucial role in ensuring the correct repair techniques were followed to ensure quality during the execution of our critical path activity which was the refractory replacement inside our FCCU Regenerator Cyclones.

We at SAPREF are proud and thankful that you and your team were part and parcel of our success in completing the total reline to the Secondary Cyclones and 70% reline to the Primary Cyclones (240 m2) in our FCCU Regenerator in record time. This was a first for Shell Globally and was achieved with the intensive input from all involved.

Thank you and your team for this dedication.

Kind Regards

 31/7/13
CHRIS KALABA



STAR PETROLEUM REFINING PUBLIC COMPANY LIMITED
บริษัท สตาร์ ปิโตรเลียม รีไฟน์นิ่ง จำกัด (มหาชน)

เลขทะเบียนนิติบุคคล 0107555000155

Our Ref.: SPRC-IR-OUT14-7

June 16, 2014

Attention: CHB Refractory Inspection Company

Subject: 2014 T&I - Supplier Performance Evaluation

We, Star Petroleum Refining Public Company Limited (hereinafter referred to as "COMPANY") have arranged the yearly Supplier Performance Evaluation based on product quality and on time delivery to support COMPANY business during Major Turnaround and Inspection (February 2014 to March 2014)

CHB has provided an excellent service and performance on their derivable such as technical skill, Refractory inspection, Repair and recommendation, quality control and reporting. After start up, SPRC did not find a major defect or detect any hot spot.

SPRC would like to take this opportunity to thank you for your excellent contribution and cooperation to the COMPANY during our recent T&I which contributed to a successful shutdown and RFCCU Revamp Project. We hope that you will continue to provide an excellent quality of product and all services to support the COMPANY in the future.

Yours Sincerely,

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Mr. Kittipong Nokdara
Integrity and Rotating Equipment Manager

recognition certificate

**The goal
is zero**



Presented to:
DARROL BIGGS
CHB

**Thank you for your
excellent behaviour in
living out our Value of
Excellence In All We Do
(positive recommendation
made for installing skin
couples on B26001)**

A handwritten signature in black ink, appearing to read "Las Van Wyk".

LAS VAN WYK
MANAGER, ENGINEERING DEPARTMENT

11 January 2007

DATE



SASOL
reaching new frontiers





CANNON & HANCOCK, BIGGS & ASSOCIATES C.C.

Refractory Inspection, Advice and Third Party Q. A.

CK 1998/036132/23

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References – Client Contact Details

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