

La **QUARTIS LIMITED** è una società di servizi indipendente che opera nel campo dei refrattari fornendo consulenze, ispezioni/supervisioni e Quality Control/Quality Assurance di refrattari per conto dei clienti, assicurando così che venga raggiunto l'ottimo nella qualità del rivestimento sia in occasione di nuovi lavori che di nuova manutenzione e fermate per manutenzione nell'industria petrolchimica.

Questi servizi specialistici sono stati e sono tuttora utilizzati dagli uffici tecnici, di commessa o collaudi/ispezioni del cliente sia quale complemento di strutture esistenti in occasione delle attività di cantiere che, cosa forse più importante, a rappresentare gli interessi del cliente presso le officine di costruttori.

I nostri servizi sono caratterizzati da una vasta gamma di prestazioni ed includono quanto segue:

PREINSTALLAZIONE DEL REFRATTARIO

Coordinare con il cliente la discussione ed il commento dei disegni, le specifiche e le procedure delle imprese, fornendo segnalazioni al riguardo di:

- Tecniche proposte e nuove idee di installazione.
- Refrattari, alla luce dei continui miglioramenti e specializzazioni di tipi specifici di materiali.
- Progetti di rivestimenti per aree con particolari problematiche.
- Coordinare ed effettuare un incontro di preispezione e preinstallazione per stabilire chiaramente con tutte le parti le rispettive responsabilità, prima che inizi qualsiasi lavoro, evidenziando qualsiasi contraddizione o incongruenza fra le procedure, i disegni e le specifiche.

Questo incontro serve inoltre per confermare lo stato dell'ingegneria e dei disegni, nonché ad evidenziare specifiche esclusioni (se fatte dai venditori) e a determinare il luogo in cui verrà eseguito il lavoro, nonché il relativo programma al fine di stabilire un sistema di comunicazioni e rapporti convogliati. Ciò è essenziale per assicurarsi che i dettagli di problemi di lavorazione e di programmazione siano trasmessi a tutte le parti interessate.

- Quando specificato, presenziare alle prove presso i laboratori del produttore dei materiali refrattari che devono essere forniti, per assicurarsi che le proprietà dei materiali siano in accordo con le specifiche e/o i dati del produttore.

Inoltre, qualificare gli operatori che useranno i vari macchinari, ecc. (usando le stesse tecniche di applicazione utilizzate in cantiere/officina).

Ciò è utile non solo per raffrontare i dati di laboratorio con quelli di cantiere, ma anche per assicurarsi che gli operatori abbiano la preparazione richiesta.

CONTROLLO DELL' APPLICAZIONE DEL REFRATTARIO

Quando tutta la pre-qualifica sia dei materiali che del personale ed attrezzature è stata effettuata, la fase successiva è quella di assicurarsi che le procedure convenute e precedentemente stabilite vengano osservate.

Ciò coinvolge una sequenza di punti importanti e precisamente:

- Prima che l'installazione abbia inizio, ispezionare tutto il sistema di ancoraggio e le superfici da rivestire e documentare il tutto di conseguenza. In alcuni casi, in funzione dell'esperienza del costruttore, dovrebbe essere fatta una visita presso l'officina del costruttore stesso per dare assistenza durante l'installazione del sistema di ancoraggio, particolarmente quando si tratta dell'Hexmesh'.

La nostra esperienza ha mostrato in molte occasioni che tale visita è molto determinante sia da un punto di vista di programmazione che di costi, dato che qualsiasi problema può essere risolto prima di iniziare il lavoro.

L'ispezione/supervisione effettuata prima che il lavoro abbia inizio riduce l'entità degli interventi da farsi alla fine e rimedia agli inconvenienti, risparmiando così sia tempo che denaro.

- Controllare la posa dei refrattari e tenere le registrazioni di Quality Control/Quality Assurance completandole con tutti i dettagli relativi alla campionatura ed all'installazione in accordo alle procedure approvate.

L'installazione del refrattario può essere effettuata mediante molteplici tecniche in funzione delle proprietà del materiale, dell'area di installazione e delle richieste specifiche del cliente. Le tecniche di installazione sono costantemente perfezionate


per adeguarsi alla crescente consapevolezza dell'importanza di un corretto rivestimento refrattario ed il solo mezzo per assicurarsi ciò consiste nell'effettivo controllo dell'installazione.

Le varie tecniche sono:

- | | | |
|---------------|---|---|
| Posa manuale | - | In corrispondenza dell'Hexmesh' |
| Gettata | - | Manuale su ancoraggi a V |
| | - | Dietro a casseri |
| | - | Con o senza fibre |
| Getto vibrato | - | Con l'uso di casseforme per il getto del refrattario fra il mantello e la cassaforma e con l'uso di vibratori esterni per vibrare il refrattario ed arrivare ad una compattazione |
| Gunitatura | - | Gettata refrattaria applicata pneumaticamente |
| Pestellatura | - | Utilizzata per plastici modellabili |
- Effettuare l'ispezione finale visiva e dimensionale nonchè la prova con martello del rivestimento installato sia prima che dopo l'essiccamento. L'ispezione finale può essere effettuata solo da personale esperto ed è fatta congiuntamente all'esame dei risultati delle prove fatte sui campioni prelevati durante l'installazione.
 - In caso di fermata di raffineria o di impianto, ispezionare i rivestimenti esistenti per analizzare e valutare qualsiasi mancanza/danneggiamento del refrattario nelle unità per stabilire delle procedure corrette di riparazione/sostituzione del rivestimento e per raccomandare future manutenzioni incluse.
 - Tutti i dati, le analisi, le procedure e le raccomandazioni di ciascun lavoro/progetto sono raccolti in un rapporto al quale ci si potrà riferire pienamente in occasione di futuri lavori.

La **QUARTIS LIMITED** ha accumulato le sue conoscenze e la sua esperienza attraverso un coinvolgimento quotidiano su base mondiale con le maggiori società petrolifere e con i complessi esperti in ingegneria ed i nostri clienti sono in grado di utilizzare questa esperienza per aumentare l'affidabilità e la vita delle varie unità dove i rivestimenti refrattari giocano un ruolo importante nell'insieme del processo.

Il nostro coinvolgimento è stato di grande beneficio a tutti i nostri clienti e qui allegato è un elenco di referenze di clienti e raffinerie che hanno con successo utilizzato i nostri servizi.

	REFRACTORY INSPECTION CRITERIA	QUARTIS LIMITED - REFRACTORY INSPECTION Tel: +44 1580 754747 fax: +44 1580 754949 e-mail: quartis@fccu.com
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Further to, and/or in addition to any specific Client requests, QUARTIS scope of refractory inspection services would include, but not be limited to, performing and/or verifying and/or reviewing the following activities:

1. Documentation/ Pre-turnaround activity

- 1.1 Contractor/Lining installer's procedures approval.
- 1.2 Drawing approval for construction/execution of modifications.
- 1.3 Proposed refractory materials approval.
- 1.4 Type of anchorage approval, and method for attachment.
- 1.5 Refractory dry-out approval.
- 1.6 Witness pre-shipment testing at manufacturer's works.
- 1.7 Resolution of outstanding clarifications, or action items resulting from Pre-inspection meeting.

2. Certification of Materials

- 2.1 Anchor/hexmesh, material type and dimension.
- 2.2 Base material in accordance with the specification.
- 2.3 Welding consumable approval.
- 2.4 Water analysis.
- 2.5 Stainless steel fibres of the correct type and dimension.
- 2.6 Pre-shipment laboratory testing of refractory materials.

3. Personnel/Procedure Qualification

- 3.1 Equipment in good condition and fit for purpose.
- 3.2 Type and number of vibrators sufficient for purpose.
- 3.3 Installer/mixer personnel qualified in accordance with procedure.
- 3.4 Refractory materials in accordance with the specification.
- 3.5 Mixing of refractory in accordance with the specification.
- 3.6 Contractors site supervisor experienced with current refractory practise.
- 3.7 Contractors site QA/QC understands the project requirements.
- 3.8 Mock-up/test panels in accordance with the agreed procedures.
- 3.9 Inspection of completed test panels/mock-up.
- 3.10 Refractory installation in accordance with the specification.
- 3.11 Test samples from the above operations forwarded for laboratory testing.
- 3.12 Inspection of the laboratory test results.

4. Inspection prior to Refractory Installation.

- 4.1 Surface preparation in accordance with the specification.
- 4.2 Anchor type, spacing, and attachment in accordance with the specification.
- 4.3 Approved electrode used.
- 4.4 Ceramic paper wrapped around nozzles as specified.
- 4.5 Formwork of the approved type.
- 4.6 Formwork tolerance within the limits of the specification.
- 4.7 Ambient temperature within the limits of the specification.
- 4.8 Personnel/equipment as previously qualified.
- 4.9 Refractory materials of the correct type, stored in accordance with the procedure.
- 4.10 Stainless steel fibres pre-weighted in the correct ratio, to the refractory.
- 4.11 Contractor in possession of refractory installation log.
- 4.12 Contractor in possession of the necessary equipment for maintaining log.
- 4.13 Contractor has appointed site QA/QC.
- 4.14 Mixing/water ratio in accordance with the approved procedures.

5. Inspection During Installation

- 5.1 Refractory material is of the correct type.
- 5.2 Confirm that the refractory material batch number has been approved.
- 5.3 Confirm that the ambient temperatures are within the specification.
- 5.4 Ensure that the anchorage, shell, or formwork is clean.
- 5.5 Ensure that the contractor's QA/QC is monitoring water additions.
- 5.6 Ensure that the contractor is maintaining the installation log.
- 5.7 Confirm that the refractory is being installed in the approved manner.
- 5.8 Ensure that the mixing equipment is cleaned in accordance with the procedure.
- 5.9 Ensure that the refractory is installed in the optimum time period.
- 5.10 Confirm that no waste/rejected material is incorporate in the work area.
- 5.11 Ensure that "as-installed" samples are prepared correctly.
- 5.12 Confirm that the "as-installed" samples are forwarded for testing promptly.
- 5.13 Where required, ensure that curing compound is applied/water-curing performed.
- 5.14 When required, ensure that overnight temperatures are monitored.

6. Post Installation Inspection

- 6.1 Visually inspect the surface, to ensure compliance with the specification.
- 6.2 Hammer test the lining, if specified.
- 6.3 Perform dimensional check for thickness, and concentricity.
- 6.4 When specified, check the radiography shots of the lining.
- 6.5 Ensure that the lining is prepared for heat cure in accordance with the procedure.
- 6.6 Issue release/rejection note.

7. Post Dry-out inspection

- 7.1 Visually check the lining for defects.
- 7.2 Hammer test the lining.
- 7.3 Review the thermograph print out from the dry-out.
- 7.4 Issue release/rejection note.

8. Final Inspection

- 8.1 Inspect the contractors installation records.
- 8.2 Ensure that any rejected items are repaired in accordance with the specifications.
- 8.3 Confirm that the laboratory test results, from the "as-installed" samples, are within the limits of the specification with no exceptions.
- 8.4 Issue of final release notice.
- 8.5 Issue of interim reports and/or final report.
- 8.6 Photographs of pre, during and post application.



REFRACTORY INSPECTION AND QUALITY CONTROL

Our specialist engineers have performed refractory inspection/Quality Control on the following FCC units and vessels:

CLIENT/LOCATION

DESCRIPTION

ESSO Fawley	Flue Gas Ducting 1979/80
BP Rotterdam	Grassroots FCC - Anchorage Inspection 1980
TEXACO Pembroke	Main Stack Lining Supervision 1980
ESSO Fawley	Regenerator Cyclones 1981
ESSO Fawley	Waste Heat Boiler 1981
BP Llandarcy	FCC T/A - Cyclones and Riser repairs 1981
SHELL Pernis	Regenerator Cyclones Inspection 1981
ELF Donges	FCC T/A 1981 Inspection and Supervision
ICI Wilhelmshaven	External Third Stage cyclones 1981
PO REFINERY Sannazzaro	FCCU T/A Inspection and Supervision 1981
PETROLIBER La Coruna	Grassroots FCC 1981/82 Inspection and Supervision
MOBIL OIL Coryton	Grassroots FCC 1981/82 - Core sampling of linings for analysis
ESSO Augusta	Reactor/Regenerator Cyclones and Transfer Lines 1981/82
ESSO Trecate	Flue Gas Cooler 1982
ESSO Trecate	Reactor Cyclones 1982
ESSO Augusta	Supervision of FCC complete T/A 1982
ESSO Pappas	Fired Heaters 1982
SIBP Antwerp	FCC T/A 1982 Reactor Cyclones
MOBIL OIL Yanbu	Grassroots Refinery 1982/83 Project Team Member responsible for all Refractory works
PETROMED Spain	Complete new Grassroots FCC 1982/83
MOTOR OIL HELLAS Corinth	FCC Dry-out 1983
SCANRAFF Lysekil	Grassroots FCC - Off-sites Inspection and Supervision 1983
AMOCO Milford Haven	FCC Ducting 1983
ANIC Gela	FCC Upgrading Project 1983
MOBIL OIL Coryton	FCC T/A 1983 Inspection and Supervision
SIBP Antwerp	Reactor Sub-units 1983
ELF Feyzin	On-site Slide Valve repairs Inspection 1984
PETROLIBER La Coruna	FCC T/A 1984 Inspection and Supervision
ESSO Dansk	Powerformer Reactor 1984
MOTOR OIL HELLAS Corinth	Expansion Joints 1984
ESSO Flexicoker, Rotterdam	Venturi Scrubber 1984
ESSO Flexicoker, Rotterdam	All Transfer Lines 1984
ESSO Flexicoker, Rotterdam	Heater Cyclones 1984
ESSO Flexicoker, Rotterdam	Venturi Separator 1984



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ESSO Flexicoker, Rotterdam
ESSO Flexicoker, Rotterdam
ESSO Flexicoker, Rotterdam
ESSO Flexicoker, Rotterdam
ESSO Flexicoker, Rotterdam
ESSO Fos
DKV Szazhalombatta
ERDOEL Neustadt

BP Llandarcy
ESSO Fawley
ESSO Antwerp
ELF Grandpuits
ESSO Rotterdam

MONTEDISON Priolo
VISHAKHAPATNAM India
ESSO Augusta

MOBIL OIL Coryton

CRD TOTAL Gonfreville
MOTOR OIL HELLAS Corinth
ANIC Gela
CRD TOTAL Gonfreville

ESSO Port Jerome
ESSO Fawley
ESSO Karlsruhe
ESSO Fawley
ESSO Port Jerome

MONTEDISON Priolo
OMV Vienna

SIBP Antwerp
ASPROFOS Athens
ASPROFOS Athens

NESTE OY Porvoo

ESSO Trecate
PETROMED Spain
EMP Puertollano

ESSO Port Jerome

VPS Liner 1984
Quench Vessel 1984
Sulphur Convertors 1984
Steam Reformer 1984
Fired Heaters 1984
Regenerator Cyclones 1984
Grassroots FCC - In-situ erosion testing 1984
FCC T/A 1984 Regenerator Cyclones and Reactor Wye Piece Inspection
FCC Slide Valves 1984
Main Riser and Standpipe 1984
Reactor/Transfer Lines 1984
Regenerator Cyclones 1984
Complete Inspection of Flexicoker/ Sulphur Facs/Hydrotreater Stacks 1984/85
Regenerator Cyclones 1985
Expansion Joints
Inspection and Consultancy of FCC/ ALKY/Sulphur Linings T/A 1985
FCC T/A 1985 Inspection and Consultancy
Reactor Cyclone System Inspection and Supervision
Regenerator Standpipes Lining Design/ Specification
Regenerator Cyclones 1985
FCC T/A 1985 Inspection and Supervision
FCC T/A 1985 Inspection/Supervision/ Consultancy
Inspection and Consultancy of FCC Refractory Linings T/A 1985
FCC T/A 1985
Tertiary Cyclones/Deflector Plate 1985
Cooler Rotors 1985
Regenerator Cyclones 1985
Complete Inspection of Refractory Lining in Regenerator Cyclones (in-situ) 1985
Orifice Chamber Inspection and Supervision 1985/86
Inspection and Supervision of Reactor Wye Piece Vibro-cast 1986
FCC T/A 1986 Inspection and Consultancy
Inspection and Consultancy of new Fired Heaters 1986
FCCU new construction 1986 - Inspection and Supervision of all Refractories
FCC T/A 1986 Refractory Consultancy on gunning techniques
Erosion Resistant Lining Consultancy 1986
FCC T/A 1986
Inspection and Consultancy of FCC Refractory linings T/A 1986
APS T/A 1986 - Inspection of Sprayable Ceramic Fibre in Heater



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CRD TOTAL La Mede	FCCU T/A 1986 - Inspection and Supervision of all Refractory repairs.
ESSO Port Jerome	Emergency Shutdown FCCU 1986 Inspection and Consultancy
ESSO Port Jerome	Inspection of Vibro-cast Refractory in new J-bend Riser and Flue Gas Lines 1986
ESSO Port Jerome	Inspection of Anti-acid Refractory in new Auxiliary Stack 1986
ESSO Port Jerome	FCCU T/A October-November 1986 - Inspection of all Refractory repairs
ESSO Port Jerome	Regenerator Cyclones 1986
ESSO Port Jerome	Guillotine Dampers and Auxiliary Stack 1986
SHELL UK Stanlow	Inspection of new FCC Regenerator 1986
SHELL UK Stanlow	Superheater 1986
SHELL UK Stanlow	CO Boiler 1986
SHELL UK Stanlow	Regenerator Cyclone 1986
SHELL UK Stanlow	Flue Gas Ducting and Spray Shields 1986
SHELL UK Stanlow	Catalyst Hoppers 1986
SHELL UK Stanlow	New FCC Reactor Riser, Stripper, Standpipe and Cyclone System 1986/87
KUWAIT NATIONAL PETROLEUM	Vibro-cast of Wye Piece and Gunnite of Regenerator 1986/87
SHELL UK Stanlow	Catalyst Coolers 1987
SHELL UK Stanlow	Auxiliary Burner 1987
SHELL UK Stanlow	Expansion Joints 1987
CRD TOTAL Dunkerque	Regenerator Cyclones 1987
CRD TOTAL Dunkerque	Reactor Cyclones 1987
CRD TOTAL Dunkerque	New Reactor Riser 1987
ELF Grandpuits	Rough Cut Cyclones 1987
ELF Grandpuits	New Flue Gas Line Vibro-cast 1987
MOBIL Coryton	Emergency FCCU Turnaround 1987
ELF Grandpuits	New Reactor Riser 1987
BP Lavera	FCC Turnaround 1987
ELF Grandpuits	FCCU Turnaround 1987
CRD TOTAL Gonfreville	Emergency Shutdown FCCU 1987 Inspection and Consultancy
MOBIL Worth	Reactor, Cyclones and Stripper 1987
BP Vohburg	Reactor Riser Vibro-cast 1987
STATOIL Mongstadt	CO Boiler 1987
STATOIL Mongstadt	Vibro-cast of Flue Gas System and Stack 1987
CRD TOTAL Dunkerque	Inspection and Consultancy of FCC Refractory Linings T/A 1987
ECOPETROL Columbia	FCCU Turnaround 1987
STATOIL Mongstadt	Auxiliary Burner 1987
STATOIL Mongstadt	Hot Wall & Cold Wall Expansion Joints 1987
MOBIL Worth	FCCU Turnaround 1987
ERDOEL Neustadt	Reactor Cyclone System 1987
ERDOEL Neustadt	Complete new Reactor and Stripper 1987
SIBP Antwerp	New Regenerator Grid 1987
SIBP Antwerp	New Reactor Riser and Vibro-cast Wye Piece 1987
ERDOEL Neustadt	New Regenerator Flue Gas Lines 1988



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SELM Priolo	Complete new Reactor, Riser, Stripper and Vibro-cast of Wye Piece 1988
ESSO Augusta	FCCU Turnaround 1988
SELM Priolo	New Reactor and Regenerator Cyclones 1988
SELM Priolo	Spent Catalyst Standpipe and Flue Gas Line Expansion Joints 1988
ENICHEM/ANIC Gela	Emergency FCCU Shutdown 1988
ENICHEM/ANIC Gela	Complete Turbo Expander/Third Stage Separator 1988
SIBP Antwerp	FCCU Turnaround 1988
HAR Athens	FCCU Consultancy 1988
CRD TOTAL Gonfreville	Regenerator and Third Stage Separator Cyclones 1988
CRD TOTAL Gonfreville	New Reactor Riser 1988
CRD TOTAL Gonfreville	New Regenerator Head 1988
ESSO Augusta	Reactor Cyclones and New Feed Injector 1988
PETROMED Castellon	Emergency FCCU shutdown 1988
MOBIL Coryton	New Reactor Riser and Regenerator Cone 1988
ESSO Augusta	MOGAS Project - New Powerformer, Reactor and Furnaces 1988
MOBIL Coryton	FCCU Turnaround 1988
MARAVEN Venezuela	Off-sites - Cyclones and Riser
MOBIL Yanbu	FCCU Turnaround 1988
ENICHEM/ANIC Gela	FCCU Turnaround 1988
CRD TOTAL Gonfreville	FCCU Turnaround 1988
ESSO Augusta	FCCU Turnaround 1988
SELM Priolo	FCCU Pre-turnaround 1989 - Regenerator Air Grid, Regenerator Head, Expansion Joints, Cyclones, New Reactor & Riser
ESSO Port Jerome	New Reactor Cyclones 1989
MARAVEN Venezuela	FCCU Turnaround 1989
SARAS Sardinia	FCCU Turnaround 1989
SELM Priolo	FCCU Turnaround 1989
SHELL Berre	FCCU Turnaround 1989
PETROMED Castellon	FCCU Turnaround 1989
CRD La Mede	FCCU Turnaround 1989
DKV Szazhalombatta	Vibro-cast of Wye Piece 1989
CRD Gonfreville	Vibro-cast of J-bend 1989
SELM Priolo	Expansion Joints and Vibro-cast of Wye Piece 1989
ESSO Port Jerome	New Reactor and Riser 1989
PETROMED Castellon	Sulphur Furnace and Stack 1989
ESSO Port Jerome	FCCU Turnaround 1989
MILAZZO Refinery	Regenerator Cyclones, Air Grid, Seal Pot, Expansion Joints and Slide Valves 1989
SHELL Berre	Emergency Turnaround - Re-line of Regenerator 1989
BP Lavera	Reactor Cyclones 1989
ENICHEM Gela	Vibro-cast Wye Piece 1989 Third Stage Separator
MOBIL Worth	Regenerator Cyclones, Third Stage Separator, Expansion Joints, Slide Valves Flue Ducting and CO Boiler 1990



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ELF Grandpuits

MOBIL Coryton

ESSO Fawley

ENICHEM Gela

MOBIL Yanbu

PETROMED Castellon

SHELL Reichstett

ELF Grandpuits

KNPC Mina Al-Ahmadi, Kuwait

NNPC Warri, Nigeria

BP Lavera

ECOPETROL Columbia

MARAVEN Curacao

CRD Dunkerque

MILAZZO Refinery

ABB Sweden

NNPC Warri, Nigeria

ESSO Port Jerome

ESSO Fawley

MOBIL Worth

CRD Dunkerque

CRD Gonfreville

BAPCO Bahrain

AGIP Sannazzaro

AGIP Sannazzaro

ERDOEL Neustadt

ESSO Fos

PRAOIL Gela

SHELL Berre

SHELL Berre

ESSO Port Jerome

AGIP Sannazzaro

ERTOIL Huelva

ERTOIL Huelva

ERTOIL Huelva

ERTOIL Huelva

ERTOIL Huelva

PETROMED Castellon

ESSO Augusta

FINA Antwerp

FINA Antwerp

FINA Antwerp

ESSO Sarpom

SHELL Berre

ESSO Augusta

ESSO Augusta

FINA Antwerp

MOBIL Yanbu

MOBIL Coryton

ESSO Sarpom

Regenerator Cyclones, Reactor Cyclones, Reactor Riser, Slide Valve Revamp and Air Grid 1990

Emergency Shutdown - repairs to Orifice Chamber 1989

Vibro-cast 42" Risers 1990

Third Stage Separator Vibro-cast Ducting 1989

Caustic Incinerator re-line 1990

New Powerformer Furnace and Reactor 1990

FCCU Turnaround and all associated Furnaces 1990

FCCU Turnaround 1990

FCCU Turnaround 1990

FCCU Turnaround 1990

FCCU Turnaround 1990

FCCU Turnaround 1990

FCCU Turnaround 1990

Tertiary Cyclones 1990

FCCU Turnaround 1990/91

Sinter Ash Cyclone System 1990

Carbon Black Reactors 1990

Emergency FCCU Turnaround 1990

FCCU Turnaround 1990

FCCU Turnaround 1990

FCCU Turnaround 1990

Emergency Turnaround 1990

Wye Piece Vibro-cast 1990

Reactor Cyclones 1991

Regenerator Cyclones 1991

New Third Stage Separator 1991

Reactor Cyclones 1991

FCCU T/A 1991

New Regenerator Cyclones 1991

Twin Drum Separator 1991

Powerformer Reactors 1991

FCCU T/A 1991

Reactor Cyclones 1991

Regenerator Cyclones 1991

Grassroots FCCU 1991/92

Expansion Joints 1991

Slide Valves 1991

Emergency FCCU Turnaround 1991

Regenerator Cyclones 1991

Vibro-cast Flue Gas Lines 1991

Regenerator Cyclones 1991

FCCU Turnaround - Unit 67 1991

Powerformer Reactors 1991

FCCU Turnaround 1991

Reactor Stripper 1992

FCCU Turnaround 1992

FCCU Turnaround - Unit 31 1992

FCCU Turnaround 1992

3rd Stage Ducting 1992

Reactor/Regenerator Cyclones 1992



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SASOL Sasolburg	Product Separator 1992
MOBIL Coryton	FCCU Turnaround 1992
ESSO Port Jerome	Regenerator Cyclones 1992
TRD Gonfreville	Reactor/Regenerator Cyclones 1992
TRD Gonfreville	Ballistic Separator & Riser 1992
NORTH SEA PETROCHEMICALS	Catofin Reactors 1992
PRAOIL Priolo	Regenerator Cyclones 1992
VEBA OEL	Reactor/Regenerator Cyclones 1992
ESSO Port Jerome	Regenerator Head 1992
PETROMIDIA Romania	Air Grid 1992
TRD La Mede	Regenerator & Reactor Cyclones 1992
SARPOM Trecate	New FCC Unit 1992
KRPC Nigeria	FCCU Turnaround 1992
PRAOIL Priolo	Flue Gas Line Ducting 1992
HOLBORN Hamburg	FCCU Refractory Reliability Study 1992
BP España Castellon	Powerformer Reactor 1992
FINA Antwerp	Emergency Shutdown - Unit 67 September 1992
FINA Antwerp	Emergency Shutdown - Unit 67 November 1992
TRD Gonfreville	FCCU Turnaround 1992
BP Lavera	FCCU Shutdown 1992
SARAS Sardinia	FCC Turnaround 1992
PRAOIL Priolo	Vibro-cast of Flue Gas Ducting 1992
PRAOIL Priolo	FCCU Turnaround 1993
TRD La Mede	Vibro-cast of new Riser 1993
TRD La Mede	Vibro-cast of Flue Gas Line 1993
TRD La Mede	Vibro-cast of Regenerated Catalyst Lift Pot Transfer Line 1993
PETROGAL Portugal	Inspection of Reactor Wye-piece Vibro-cast 1993
PETROMIDIA Romania	Vibro-cast of Wye-piece and FCCU Turnaround 1993
ELF Grandpuits	Vibro-cast of Riser Boot 1993
HOMS FERTILIZER PLANT Syria	Inspection of Furnaces 1993
IBN-ZAHR Saudi Arabia	MTBE Reactors 1993
SARPOM Trecate	Inspection of CO Boiler 1993
VEBA OEL Gelsenkirchen	FCCU Turnaround 1993
KRPC Kaduna, Nigeria	FCCU Turnaround 1993
BP España Castellon	Regenerator Cyclones 1993
BP España Castellon	Reactor Cyclones & Close Coupled Riser Transfer System 1993
BP España Castellon	Reactor Cold Wall Pump Cast 1993
ESSO Thailand	Regenerator Cyclones 1993
ESSO Thailand	Vibro-cast Transfer Lines 1993
ESSO Thailand	Pump Cast - Cold Wall Reactor & new Regenerator 1993
ESSO Port Jerome	Vibro-cast J-bend 1993
REFINERIA ISLA Curacao	FCCU Turnaround 1993
SHELL Berre	FCCU Turnaround 1993
SHELL Stanlow	Vibro-cast Wye-pieces 1993
SHELL Stanlow	Vibro-cast Slide Valves 1993
SHELL Stanlow	Vibro-cast Expansion Joints 1993
LENTEP Russia	Vibro-cast Riser 1993
ESSO Port Jerome	FCCU Turnaround 1993
BP España Castellon	FCCU Turnaround 1993



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TRD La Mede	FCCU Rebuild 1994
AGIP Sannazzaro	New FCCU Reactor 1994
ESSO Antwerp	New Regenerator Cyclones 1994
PRAOIL Gela	New Regenerator Cyclones 1994
PRAOIL Gela	New Regenerator Head Plenum
SHELL Reichstett	FCCU Turnaround 1994
PRAOIL Gela	FCCU Turnaround 1994
AGIP Sannazzaro	FCCU Turnaround 1994
ESSO THAILAND	Vibrocast, Flue Gas Line 1994
ESSO FAWLEY	FCC Shutdown 1994
ANCAP Uruguay	New FCC 1994
METHANOL 2000 Venezuela	Vibrocasting Ducting 1994
PEMREF MOBIL Yanbu	New Reactor Cyclones System 1994
PEMREF MOBIL Yanbu	New Expansion Joints 1994
PEMREF MOBIL Yanbu	Slide Valves 1994
PEMREF MOBIL Yanbu	Vibrocast Reactor Riser 1994
FINA Antwerp	FCC UNIT 31 Shutdown 1994
FINA Antwerp	FCC UNIT 67 New Regen Cyclones '94
TRD DUNKERQUE	New Reactor Cyclones 1994
BP LAVERA	New Regenerator Cyclones 1994
BP LAVERA	FCC T/A 1994
NNPC, WARRI	FCC T/A 1994
TRD DUNKERQUE	FCC T/A 1994
ESSO THAILAND, SRIRACHA	NEW FCC 1994
PEMREF MOBIL YANBU	New Regenerator Riser 1995
MOBIL OIL CORYTON	New Expansion Joints 1995
MOBIL OIL CORYTON	New Catalyst Cooler Vibrocast 1995
MOBIL OIL CORYTON	New Regenerator Riser 1995
MOBIL OIL CORYTON	New Atomax Riser Vibrocast 1995
AGIP PETROLI Milazzo	FCCU Shutdown 1995
PEMREF MOBIL YANBU	FCCU Shutdown 1995
ESSO Fawley	Reactor Cyclones 1995
ESSO Fawley	Regenerator Grid Supports 1995
ESSO Port Jerome	New Crude Furnace Ceramic Fibre 1995
HAR Athens - Greece	FCC T/A 1995
ERTOIL Huelva - Spain	STC RX Reactor Cyclones 1995
ESSO Singapore	Lining of Steam Generator 1995
FINA Antwerpen Belgium	FCC Unit 67 T/A 1995
BP Grangemouth GEC	Lining of Cyclones 1995
NATREF/SASTECH - South Africa	FCC re-line 1995
SAPPI - South Africa	Acid Tiles Aug 1995
SEFI/SOFREGAS - Algeria	Inspection/Supervision
TOTAL - Le Havre	Catalyst Cooler 1995
STATOIL - Norway	FCC T/A Sept - Oct 1995
FINA - Angola	Refinery T/A Sept 1995
FINA - Antwerp	FCC T/A Unit 31 Sept 1995
SHELL UK	Cold Collector Head 1996
FW - USA	ISLA, Curacao Cyclones 1996
ELF - Grandpuits - France	FCC T/A 1996
ESSO Fawley - UK	FCC T/A 1996
MOBIL OIL Coryton - UK	FCC T/A 1996
ESSO Augusta - Italy	FCC T/A 1996



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LEUNA 2000 - Germany
Thames - Water UK
NNPC - Warri - Nigeria
INDIAN OIL Co - Panipat
TOTAL - Le Havre
OIL Refineries Ltd - Haifa
AGIP PETROLI - Gela, Italy
FINA OLEFINS - Antwerp
CYPRUS PETROLEUM - Cyprus
BP OIL - Castellon, Spain
NATREF - Sassolburg, S Africa
SOFREGAS - Algeria
PETROMAR - Malongo, Algeria
TUPRAS IZMIT REFINERY - Turkey
AGIP PETROLI - Priolo, Italy
YORK LININGS LTD - UK
RESCO USA
TOTAL, La Mede
TOTAL, La Mede
TOTAL, La Mede
TOTAL, La Mede
TOTAL, Le Havre

TOTAL, Le Havre
ESSO Rotterdam
BP Grangemouth
BP Grangemouth
AGIP PETROLI, Priolo
BP, Castellon
KNPC Mina Al-Ahmadi, Kuwait
ESSO Augusta
ESSO Port Jerome
MOL, Hungary
FINA, Antwerp
HINDUSTAN PETROLEUM, India
ENGEN South Africa
BAPCO Bahrain
FORMOSA PETROLEUM Taiwan
RELIANCE Jamnagar, India
SOFREGAS -Skikda, Algeria
KVAERNER - Saudi Iron, Hadeed
TOTAL, La Mede
NATREF, South Africa
ESSO Fawley
ESSO Fawley
FINA, Angola
ESSO, Sriracha, Thailand
AGIP PETROLI, Gela
AGIP PETROLI, Gela
NORSK HYDRO, Norway
RELIANCE Jamnagar, India
STATOIL Kalundborg

Grassroots Refinery 1996
Sewerage Incinerators 1996
FCC T/A 1996
Sureflow in new external cyclones 1996
Emergency FCC shutdown 1996
Sureflow in FCC transfer lines 1996
FCC T/A 1996
Naptha Cracking Furnace 1996
Crude Furnaces (9) + ducting 1996
New Sulphur plant 1996
Reformer + FCCU t/a 1996
New gas plant boilers 1996
Topping plant furnace 1996
Crude heater 1996
FCC T/A 1997
Inspection of cow incinerator 1997
Furnaces at SSANG YONG Oil Refining Korea - 1997
New regenerator cyclones 1997
New orifice chamber 1997
New riser quarter turn separator 1997
New cold-wall riser 1997
New cold-wall riser, catalyst withdrawal
and riser separator 1997
FCCU shutdown 1997
RAP-X new furnace, breeching + stack 97
New riser for FCCU modernisation 1997
New Klaus combustor/stack sulphur recovery unit 1997
FCCU emergency shutdown 1997
Inspection of sulphur combustors post dry-out 1997
FCCU shutdown 1997
New sulphur combustor 1997
FCCU shutdown 1997
New FCCU riser 1997
FCCU unit 31 shutdown 1997
New regenerator cyclones 1997
New regenerator cyclones 1997-98
New reactor feed riser 1997
New tertiary cyclone vessels 1997-98
New grassroots FCCU 1997-99
Revamp of gas boilers 1997
New hydrogen reformer gas ducting 1997
FCC T/A 1998
New reactor/regenerator cyclones 1998
New sulphur combustors 1998
New heaters for sulphur plant 1998
Revamp of crude heaters 1998
New furnace air heaters 1998
New vibrocast wye-piece 1998
FCCU T/A 1998
New HP steam boiler 1998
New grassroots SRU 1998-99
New Visbreaker heater 1998



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IOCL , Mathura, India	Vibrocast of transfer lines 1998
HPCL , Visakapatnam, India	Vibrocast of transfer lines 1998
RUHR OEL , Gelsenkirchen	FCCU T/A 1998
NATREF , Sasolburg, S Africa	New air grid, riser, reactor/regen head 98
NATREF , Sasolburg, S Africa	FCCU T/A 1998
SOFREGAS -Skikda, Algeria	Revamp of gas boilers 1998
BP Chemicals , Grangemouth	New Ethylene Heaters
SAMREF , Yanbu Saudi Arabia	FCC T/A 1998
TOTAL , Le Havre	New regenerator cyclones 1998
BP OIL , Spain	FCC T/A 1998
ESSO FOS France	New regenerator cyclones 1998
KRPC , Kaduna	Refinery rebuild 1998/99
MIDER Germany	Emergency FCCU shutdown 1998
ELF GRANDPUITS , France	New regenerator cyclones 1998
PERTAMINA , Indonesia	FCC T/A 1998
ESSO INGOLSTADT	Satcon project 1998/99
VEBA OEL Holborn Germany	New reactor/regenerator cyclones 1998/99
ESSO FOS France	New FCCU Regenerator 1998
ESSO ROTTERDAM	New cyclones for Flexicoker 1998
ESSO TRECATE , Italy	FCCU T/A 1998
MOTOR OIL HELLAS , Greece	Pre-shutdown and FCCU T/A 1998-99
FORMOSA PETROLEUM , Taiwan	New RCCU regenerators 1999
TOTAL Dunkerque	New waste heat boiler 1999
ELF Grandpuits	New riser and standpipe 1999
ESSO FOS France	FCCU T/A 1999
KOA Refinery, Japan	FCCU reliability study 1999
HOLBORN Refinery, Germany	New regen/reactor cyclones 1999
ENGEN Durban South Africa	Emergency FCCU shutdown 1999
ELF Grandpuits	FCCU T/A 1999
TOTAL Dunkerque	FCCU T/A 1999
PT EXOR VI Indonesia	FCCU T/A 1999
BP Lavera France	FCCU T/A 1999
TURKMENBASI OIL Turkmenistan	New Grass-roots MSCC 1999
ESSO Ingolstadt	FCCU Satcon project 1999
TOTAL-FINA Vlissingen	New sulphur unit 1999
ICI POLYURETHANE UK	Repairs to Reducing Chamber/Cone 1999
KEMYA Thailand	Cracking Furnaces 1999
BAPCO UK	Single Stage Cyclone 1999
FOSTER WHEELER ITALIA Italy	New Stack Lomellina Energia Project 1999
IOCL GUJURAT India	Vibro Casting of New Transfer Lines 1999
IOCL GUJURAT India	Five New Expansion Joints 1999
OIL REFINERIES LIMITED Israel	New reactor cyclones 1999
MUNRO & MILLER/FLEXIDER	Expansion Joints EIL/IOCL India
CESKA Czech Republic	New Grass-roots FCC 1999-2000 at site
CESKA Czech Republic	New expansion joints 1999
CESKA Czech Republic	New reactor & regenerator cyclones 1999
CESKA Czech Republic	New reactor & regenerator vessels 1999-2000
CESKA Czech Republic	New catalyst cooler 1999-2000
NODCO Qatar	New grass-roots FCC 1999-2000
AGIP PETROLI Priolo Italy	Regenerator cyclones 1999
TOTAL-FINA Antwerp	New reactor riser/stripper 1999-2000
PETRONOR Spain	New reactor cyclones 2000



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ESSO AUGUSTA Italy	FCC T/A 2000
ESSO PT JEROME France	FCC T/A 2000
TOTALFINA Antwerp	New Flue Gas Line 2000
TOTALFINA Antwerp	New Quarter Turn Separator 2000
TOTALFINA Antwerp	New Expansion Joints 2000
TOTALFINA Antwerp	FCC T/A 2000
OIL REFINERIES Israel	New Reactor/Stripper 2000
KNPC Kuwait	FCC T/A 2000
CONOCO UK	New VSS Reactor 2000
CONOCO UK	New Reactor and Regenerator Cyclones 2000
TEMA OIL Ghana	New Grass Roots FCCU 2000/2001
IOCL BARAUNI India	New Grass Roots FCCU 2000/2001
BAPCO , Bahrain	Y and T Piece 2000
HUNTSMAN POLYURETHANE UK	Thermal Oxidiser 2000
ABB LUMUS CESKA Refinery Czech	New Sulphur Unit 2000
BP OIL Spain	FCCU emergency shutdown 2000
GOUDA VUURVAST Mississippi USA	QA/QC on 2 number CF Boilers 2000/2001
P.T. EXOR Indonesia	New Sulphur Stack 2000
ORL Haifa Israel	FCC Shutdown 2000
FINA Angola	Crude Furnace Shutdown 2000
BP OIL , Coryton, UK	FCCU Turnaround 2001
AGIP PETROLI , Priolo Sicily	FCCU Turnaround 2001
ALSTOM POWER BOILERS , Algeria	Supervision of Boiler 2001
SADAF Saudi Arabia	MTBE Reactor/Regenerator 2001
SCANRAFF Sweden	FCCU Shutdown 2001
CEPSA Heulva, Spain	FCCU Turnaround 2001
PT EXOR Indonesia	FCCU Shutdown 2001
AMOC Egypt	Consultancy for Lube Oil Expansion Project 2001
ENGEN South Africa	FCCU Shutdown 2001
AGIP PETROLI , Gela, Sicily	New FCCU VSS Reactor Vessel & Cyclones 2001
AGIP PETROLI , Gela, Sicily	New expansion joints 2001
RELIANCE PETROLEUM , India	Emergency Shutdown 2001
ESSO FAWLEY , UK	FCCU Shutdown 2001
TOTALFINAELF , Antwerp, Belgium	New Reactor & Stripper 2001
AGIP PETROLI , Gela, Sicily	FCCU Turnaround 2001
TOTALFINAELF , Feyzin, France	New riser + cyclones 2001
BP OIL , Lavera, France	Hydrocracker shutdown 2001
NODCO , Qatar	New FCCU dryout inspection 2001
TOTALFINAELF , Pt Arthur, USA	FCCU Shutdown 2001
IRVING OIL , St John, Canada	RFCCU Shutdown 2001
KRPC , Kaduna, Nigeria	FCCU Shutdown 2001
TOTALFINAELF , Grandpuits, France	FCCU/Reforming/Distillation Shutdown 2002
SAMREF , Yanbu, Saudi Arabia	FCCU Shutdown 2002 and furnaces
AGIP PETROLI , Gela, Sicily	FCCU Emergency Shutdown 2002
TOTALFINAELF , Donges, France	New RX/RG cyclones, stripper, riser 2002
TOTALFINAELF , Le Havre, France	New RX/RG cyclones 2002
TOTALFINAELF , Le Havre, France	FCCU Shutdown 2002
TOTALFINAELF , Leuna, Germany	New Regenerator cyclones 2002
TOTALFINAELF MIDER , Leuna Germany	Shutdown 2002 and furnaces
MARATHON ASHLAND PETROLEUM , USA	New VSS Reactor 2002
AGIP PETROLI , Sannazzaro, Italy	New Third Stage Separator 2002
AGIP PETROLI , Sannazzaro, Italy	FCCU Shutdown 2002



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ENGEN, Durban, South Africa
SCANRAFF, Sweden
TOTALFINAELF, Feyzin, France
TOTALFINAELF, Agriandre, France
TOTALFINAELF, Dunkerque, France
ALBA, Bahrain, India
TOTALFINAELF, Donges, USA
TOTALFINAELF, Donges, France
TOTALFINAELF, Donges, France
RESCO PRODUCTS, UK
FCP, Qatar
OIL REFINERIES, Ashdod
KBC, Petrobas, Brasil
TOTALFINAELF, Donges
TAMOIL, Switzerland
TAMOIL, Switzerland
TOTALFINAELF, La Mede, France
TAMOIL, Remosa Italy
VAN TONGEREN, UK
CONOCO, UK
DOW CORNING, UK
OIL REFINERIES, Ashdod
ENGEN, Durban, South Africa
SHELL, The Netherlands
TOTALFINAELF, Antwerp
TOTALFINAELF, Le Havre
TOTALFINAELF, Le Havre
VAN TONGEREN, Qualfab
FISHER-KLOSTERMAN, Donges
IRVING OIL, Canada
BP, Castellon
AGIP GELA, Italy
TOTALFINAELF, Dunkerque
TOTALFINAELF, Dunkerque
TAMOIL, Switzerland
TOTAL, Donges
FINA PETROLEOS, Angola
TOTAL, Flandres
FOSTER WHEELER, Italy
FOSTER WHEELER, Italy
STAR PETROLEUM
TOTAL, Normandy
TOTAL FRANCE, Le Havre
TOTAL FRANCE, Le Havre
BP, Castellon
FCP, Spain
TEXACO, UK
OIL REFINERIES, Haifa, Israel
BDT/Pertamina, Indonesia
ESSO, France
SARPOM, Italy
GOUDA VUURVAST, Netherlands
New Reactor cyclones 2002
Shutdown 2002 and furnaces
Reactor cyclones 2002
Riser Termination Device 2002
New Reactor Overhead Line 2002
Anode Baking Kiln 2002
New Regenerator Cyclones 2002
Reactor Riser, Stripper, Combustion Riser 2002
FCCU Shutdown 2002
Witnessing testing of Resco 17EC, 2002
New FCCU 2002
FCCU Emergency Shutdown 2002
FCCU turnaround 2002
Reactor Cyclones, Spent & Regen. cat standpipe 2002
TRC 2000 Goggle Valves 2002
TRC 2000 Internal & External Regen. Cycl. 2002
Regenerator Cyclones 2002
Slide Valves 2002
Mock up trial 2nd Stage Reg. Cyclones 2002
Coker Heater 2002
Repairs to Cyclones 2002
Reactor Cyclones 2002
Regenerator Cyclones 2002
FCCU Shutdown 2002 at Ecopetrol Columbia
FCCU Emergency Shutdown 2002
Quarter Turn Separator 2002
FCCU Shutdown Aug/Sept 2002
External Cyclones 2002
Hanger Welds 2002
RFCCU Inspection 2002
FCCU Shutdown 2002
Fire assessment of topping Furnace 2002
Cat.Standpipe spoolpiece 2003
Expansion Joint 2003
Tamoil TRC 2000 New SRU 2003
FCC shutdown December 2002
Heaters at Luanda Refinery 2003
Compensator and Transfer line 2003
Flue Gas Lines and SRU 2003
Collombey TRC 2000 project (2003)
Replacement Cyclones 2003
Emergency shutdown February 2003
Reactor Riser and Stripper 2003-12-01
Turnaround La Mede Refinery 2003
Turnaround 2003
Regenerator R-202 at Luk Oil Refinery Bulgaria
Reactor Cyclones 2003
New VSS Reactor 2003
Transfer lines and Waste Heat Boiler 2003
FCC2 shutdown Feb/Mar 2003
Furnace F-101 shutdown 2003
Supervision Refractory lining at Anglesey, UK



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KBC, UK
OIL REFINERIES, Haifa, Israel
ENTREPOSE, France
TOTAL FRANCE, Le Havre
OIL REFINERIES, Israel
IAG, USA
BAPCO, Bahrain
BAPCO, Bahrain
GLESER, France
ENGEN, South Africa
LURGI, UK
TAMOIL, Collombey - Switzerland
IHI, Japan – JGC Tonen Sekiyu project
TEXACO, UK
CONOCO, UK

REPSOL PETROLEOS, Spain
FOURE LAGADEC, France
ALFRAN, Spain
OIL REFINERIES, Israel
NORDON, France
TEXACO, UK
PT RUI/Pertamina, Indonesia
BP, Castellon
FOSTER WHEELER, Italy
HUNTSMAN POLYURETHANES, UK
SARPOM, Italy
RELIANCE, Jamnagar, India
PERTIMINA, Balongan, Indonesia
AIR LIQUIDE, Netherlands
CEPSA, Huelva, Spain
TOTAL Dunkerque
CHENNAI Petroleum, India
BP Grangemouth, Scotland
COQUANT, France
CONOCOPHILLIPS, UK
BAHRAIN PETROLEUM, UK
ALFRAN, Bulgaria
FOURE LAGADEC, France
FWI, Priolo, Italy
TAMOIL, Collombey, Switzerland
COQUANT, TOTAL, France
CONOCO, UK
LARSEN & TOUBRO, India
TOTAL France, Antwerp, Belgium
IAG, UK – BP Grangemouth
IAG, UK – BP Lavera
BP CORYTON, UK
FKI, UK & Spain
EXXONMOBIL, Poland
TOTAL FRANCE, France
IMB, Italy

TR1/TR2 Crude Furnace shutdown (WRG – Germany)
FCC Unit 2003
Turnaround Warri Refinery Nigeria 2003
CO Boiler and Regenerator (Normandy Refinery 2003)
1st & 2nd Stage Regenerator Cyclones 2003
Expansion Bellows 2003
Expansion Bellows 2003
RCSP 2003
Operator Qualification 2003
Shutdown at Durban Refinery May 2003
Incinerator 2003
FCC Construction Apr/June 2003
FCCU Regenerator Cyclones
Reactor 2003
Heaters, Radiant Boxes, Convection Boxes,
Transition Ducts and Collector Header Boxes 2003
Pre-shutdown works May/June 2003
Reactors 2003
FCCU Revamp 2003 at Luk Oil Refinery Bulgaria
FCC shutdown Aug/Sep 2003 at Ashdod Refinery
Expansion Joints 2003
Turnaround 2003 at Pembroke Refinery
Turnaround Sep/Oct 2003 Balongan Refinery
Furnace F-2901 Radiant Roof/Stack 2003
Bolt-on Panels to Main Body of Ground Flare System
Thermal Oxidiser Refractory Re-Line Oct 2003
Turnaround 2003 FCC Unit at Refinery in Trecate
FCCU Shutdown Oct/Nov 2003 at Jamnagar
Hydrocracker
ATR Reactor 2003
FCCU Shutdown Nov 2003
New 3rd stage separator and cyclones 2004
New FCCU reactor, riser, orifice chamber 2004
New FCCU air preheater and ducting 2004
TFE RN Tertiary Cyclones and Vessel 2004
Radiant Boxes H6001/2/3 2004
Regen. Catalyst Standpipe 2004
FCCU Turnaround 2004
Reactors R302 and R303 2004
Bolt on post protectors 2004
C.O. Boiler 2004
RN Tertiary Cyclones & Vessel 2004
Radiant Boxes H6001/2/3 2004
FCCU Revamp CPCL 2004
Radiant Wall panels heater B-830001 2004
Air Pre-heater & pre-heater lines
FCCU Revamp 2004
FCCU Swoopdown march 2004
Witness Mockup & sample testing 2004
Charge heater 2004
SRU Waste Heat Boiler 2004
Heat Exchanger 2004



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ESSO , Augusta, Italy	FCCU/ALKY/S1-S2/SWS 2004
EXXONMOBIL , Italy	Heater F-7001 2004
OIL REFINERIES LTD , Pittsburgh USA	Flue Gas Cooler 2004
OIL REFINERIES LTD , UK	Regenerator Cyclones 2004
SHAW – STONE & WEBSTER , Romania	RS2 Separator 2004
DOW CORNING , UK	Cyclone inspection & repair 2004
OIL REFINERIES LTD , UK	Cyclofines 2004
TOTAL FRANCE , Flandres, Dunkerque	Turnaround 2004
CONOCOPHILLIPS , UK	Cyclones for 3 rd stage separator 2004
CONOCOPHILLIPS , UK	3rd Stage Separator 2004
FINA PETROLEOS , Angola	Shutdown during September/October 2004
PETRONOR , Spain	Primary & Secondary Cyclones 2004
BP LAVERA , France	Turnaround 2004
CONOCOPHILLIPS , UK	Head & Plenum for 3 rd stage separator 2005
L&T , India	RR Revamp KRL project Kochi Refinery 2005
ENI , Gela Italy	Emergency SD 2005
PETROBRAS , Brasil	FCCU t/a review 2005
KOCHI REFINERY , India	FCCU + Cyclones 2005
WRG , Germany	Burner units 2005
KBC , Petrobras Brazil	RPBC RAM project 2005
ESSO FOS , France	Turnaround 2005
GOUDA , South Africa	Hillside Project 2005
POLIMERI , France	Hydro-cracker furnaces revamp 2005
QATAR PETROLEUM	FCCU t/a 2005
OIL REFINERIES LTD , Israel	3 rd Stage Separator, catalyst cooler 2005
OIL REFINERIES LTD , Israel	Riser, air grid 2005
BP , Grangemouth	New SRU 2005
OIL REFINERIES LTD , UK	Regenerator Cyclones 2005
TAMOIL , Switzerland	RCC unit 2005
ERG , Priolo Italy	CR27 FCC unit 2005
ENI , Gela Italy	Tertiary Cyclone Vessels, Regenerator Cyclones 2005
DOHA , Qatar	FCCU t/a 2005
FWI , Netherlands	Cement lines 2005
TOTAL FRANCE , Romania	Furnace 2005
JACOBS NL , Belgium	Stripper & Lift Pot 2005
JACOBS NL , France	Expansion Joints 2006
FWI / TOTAL ANTWERP , Belgium	FCCU Turnaround 2005
PREEM PETROLEUM , Sweden	FCC unit Turnaround 2005/2006
OIL REFINERIES LTD , Israel	Lower (Combustor) Head 2005
IRVING OIL , Canada	Technical issues on D42504 A/B
OIL REFINERIES LTD , Israel	FCCU Revamp 2005
BLACK & VEATCH , BP Grangemouth	Incinerator, Waste Heat Boiler, Reaction Furnace, Stack 2005
TOTAL FRANCE , Italy	New furnace F1 2006
OIL REFINERIES LTD , Israel	Slide Valves 2006
SOHAR REFINING , Oman	New grass-roots UOP FCCU 2005
NEREFCO , Holland	New reactor, cyclones, slide valves 2005
CEPSA , La Rabida, Spain	Preparation Turnaround 2006
TOTAL , Lindsey Oil, UK	Stage 3/4 T&I 2005
RELIANCE , Jamnagar, India	FCCU shut down 2005
ENI , Gela, Italy	FCCU shut down 2006
ENI , Gela, Italy	Regenerator Head 2006



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CEPSA, La Rabida, Spain
CEPSA, La Rabida, Spain
RABIGH, Saudi Arabia
ASESA, Taragona, Spain
ESSO, Port Jerome, France
TAMOIL, Collombey, Switzerland
IDESA, Aviles, Spain
SHELL, Holland
L&T, India
ESSO, Fawley UK
GOUDA, Anglesey UK
TOTAL, Flandres France
GOUDA, Lynemouth UK
CHEVRON, UK
CHEVRON, UK
TOTAL, La Mede, France
JGC, Belgium
JGC, Canada
DOW CORNING, UK
SAF Ouest, France
ORL, Haifa Israel
TAMOIL, Collombey Switzerland
BECHTEL, Jamnagar India
CHEVRON, UK
JACOBS, UK
PREEM PETROLEUM, Sweden
JGC, VRV Italy
TOTAL, Antwerp
ESSO PETROLEUM, Fawley UK
FWI, Italy
ESSO PETROLERA, Argentina
BECHTEL, Thailand
ESSAR OIL, India
SAF Ouest, France
TOTAL, Antwerp
TOTAL, Antwerp
L&T, India
JGC, Belgium
JGC, Saudi Arabia
ORL, Georgia, USA
CHEVRON, UK
CHEVRON, UK
CHEVRON, UK
TOTAL FRANCE, France
F&V, Portugal
DELFIN TUBES, Spain
TAMOIL, Collombey
TAMOIL, Italy
TOTAL, Antwerp
BP CASTELLON, Spain

FCCU shut down 2006
3rd Stage & Regenerator Cyclones 2006
New Regenerator Head 2006
FCC unit shut down 2006
New Grass Roots FCCU 2006
Anti Acid lining in new metal liner for stack
CDU Furnace shut down 2006
FCCU shut down 2006
Cat Coolers 2006
New Stripper Liftpot
FCCU Revamp HPCL Mumbai 2006
New Regenerator Head Project 2006
SD 2006
Emergency inspection to B-202 Tertiary Cyclone Vessel
Inspection services at Alcan Aluminium 2006
Boiler t/a 2006
Heaters t/a 2006
D4 Plant, F1 new Furnace 2006
Reactor/Regenerator for Rabigh Refinery 2006
Reactor/Regen.Cyclones for Rabigh Refinery 2006
Inspection & repair to Cyclones 2006
Operative Qualification 2006
Emergency SD FCCU 2006
R2R internals 2006
JERP Project 2006
Popton Fort Project 2006
SRU 6 Project at BP Grangemouth 2006
FCC Shut down 2006
Orifice Chamber for Rabigh Project 2006
Emergency FCC shutdown 2006
FCCU Turnaround 2006
Lomellina Energia Project 2006
FCCU t/a 2006
Convection sections Heaters for JERP Project 2006
FCCU Reactor Regenerator new construction 2006
Operative Qualification 2006
Seal pots & steam ring 2007
Shut down 2007
RPL-J project 2007
3rd Stage Separator & Mitre bends 2007
Rabigh Project, KSA New refinery construction 2007
Spent Catalyst Expansion Joint 2007
Vis Breaker Heater 2007
3rd Stage separator inlet nozzle 2007
HTU 1 & 2
Transfer lines 2007
Operative Qualification 2007
New VPS Heater 2007
FCCU Shut down 2007
New Riser 2007
FCCU Shut down 2007
FCCU Shut down 2007



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ENI, Italy
TOTAL FLANDRES, France
BECHTEL FRANCE
FOSTER WHEELER, UK
ERG, Priolo, Italy
POYRY ENERGY, UK
TOTAL ROME, Italy
DOW CORNING, UK
RHI DINARIS, Germany
YORK LININGS, UK
ORL, Haifa, Israel
TOTAL FLANDRES, France
FORES, Italy
RISKTEC/KRC, Sudan
TOTAL FRANCE, Normandy
TOTAL FRANCE, Normandy
TOTAL FRANCE, Normandy
PREEM PETROLEUM, Sweden
UOP, Spain
TOTAL UK, Lindsey Oil Refinery
PAZ, Ashdod, Israel
TOTAL FRANCE, Spain
ESSO AUGUSTA, Italy
TOTAL, Leuna, Germany
GROUPEMENT BERKINE, Algeria
L&T, HAZIRA, India
POYRY ENERGY, UK
SRC, Oman
RHI Dinaris, Germany
CONOCOPHILIPS, UK
MTC, Kuwait
PETROPLUS, UK
ESSO PETROLEUM, UK
FORES, Italy
ENI, Italy
QINETIQ, UK
TOTAL FRANCE, PROVINCE, Romania
Q-CHEM, Qatar
CHIMNEYS & REFR. INT, Italy
EXXONMOBIL, Asia
PERTAMINA, Indonesia
OIL REFINERIES, Haifa, Israel
BAPCO, Bahrain
INTERTEK, Abadan Oil Refinery, Iran
TOTAL, Angola
TOTAL, Grandpuits, France
ESSO Augusta, Italy
TOTAL Leuna, Germany
ESSO Trecate, Italy

FCCU Catalyst Circulation Project for INEOS 2007
FCCU Shutdown 2007
FCCU Shutdown 2007
New CPO Reactor 2007
New FCC Reactor Overhead Line 2007
Reliance, Jamnagar - new refinery construction 2007
INEOS Project FCCU Catalyst 2007
Reactor & Regenerator Cyclones 2007
Allington EfW Project 2007 - Incinerators
FCCU 31 Turnaround & Heater repairs 2007
Cyclone inspection & repair 2007
Consultancy RHI Techn. Centre, Austria 2007
Witness trial of refractory material 2007
Emergency shutdown 2007
Emergency shutdown FCC 2007
SCT-CPO Zero Regio project 2007
RFCCU reliability study 2007
Air rings & Spent Cat Line 2007
Slide valves at Tapco USA 2007
FCCU Turnaround 2007
FCC shutdown 2007
3rd Stage separator vessel for INA 2007
T&I 2007
FCC & Heaters t/a 2007
F2 furnace unit D4 2007
VPS,Lube Shutdown 2007
Leuna ADU/VDU Project – new ducting 2007
3 Fired Heater Units shutdown 2008
FCC Reactor Project, India 2008
K.E.S. Allington EfW Project (incinerator lines) 2008
RFCC Unit 2008
Refractory Presentation 2008
FCC Regenerator Cyclone Dustbowls 2008
FCC Unit #86 Mina Ahmadi Refinery 2008
2009 Turnaround preparation
PS/PV-3 T/A 2008
X-01 Quencher and R-02 Reactor 2008
Repairs to Reactor and Syngas Cooler 2008
Thermal Oxidiser 2008
New Furnace F303 2008
March furnaces Turnaround 2008
Pre-shipment surveillance UK 2008
New ethylene furnaces in Thailand 2008
FCCU shut down 2008
New Flue gas valves 2008
New regenerator cyclones 2008
New FCC unit 2008
Distillation shutdown 2008
FCCU, Distillation shutdown 2008
T5/VPS 2 shutdown 2008
FCCU shutdown 2008
FCCU shutdown 2008



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OIL REFINERIES LTD, Israel
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SHELL Harburg, France
LLOYD INSULATIONS, India
ISAB S.r.l (ERG), Italy
LARSON & TOUBRO LTD, India
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PERTIMINA, Indonesia
JGC, Saudi Arabia
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ESSO, PORT JEROME, France
BAPCO, Bahrain
SAMREF, Saudi Arabia
BECHTEL, India
OIL REFINERIES LTD, Israel
PETROPLUS, Coryton, UK
QP REFINERY, Macchi Italy
TOTAL LINDSEY OIL, UK
HPCL Vizag, India
TOTAL FLANDRES, France
EXXONMOBIL, Thermax India
PETROMIDA REFINERY, Romania
GURU GOBIND REF., Remosa Spain
LLOYD INSULATIONS, India
SHELL GREEN, UK
HYUNDAI, Korea

New regenerator cyclones 2008
Lining for the V 601 Cyclones for BAPCO 2008
Witness application of Actchem and Vibrocast 2008
Incinerator Refractory lining Shell Green 2008
FCCU thermography 2008
Inspection Services 2008 - 2010
Regenerated catalyst slide valve 2008
- Cyclones Hason Steel Canada 2009
- Upper Regenerator Head, Plenum Chamber,
- Combustion Riser and Expansion Joint at FL France
- Wye Distributor at FL France 2009
- Expansion bellows at SFZ France 2009
Shop Refractory Inspection Services 2009 of Cyclones,
Flue Gas items, Regenerator Head and Air Distributor
Refractory Installation of Head & Cyclones 2009
Refractory Inspection for Naftna Industrija 2009
Regenerator/Combustor 2009
Allington EFW project 2009
Regenerator head, riser and cyclones 2009
FCCU shutdown 2009
Inspection new regenerator Head & Cyclones 2009
FXK Heater Internals Replacement project for Esso
Rotterdam 2009
Quench Tee 2009
Reactor Cyclones 2009
Hot Wall Expansion Bellows and Operative Qualification
Vibro Casting/Guniting 2009
FCCU shut down 2009
HPCL (R R Package) Reactor Project 2009
FCCU Shut Down 2009
Convection sections 2009
RFCCU Shutdown 2009
Project E2935 2009
New expansion joints 2009
Inspection of refractory lining into compensator and
qualifications 2009
FCCU Shut Down 2009
Recirc. Catalyst Standpipe 2009
New Cyclones 2009
Inspection Services 2009
FCCU Shut down 2009
FCCU Shut down 2009
Boilers 2009
Inspection of refractory lining for the T&I 2009
New UOP FCCU 2009
Regenerator Cyclones 52 S202-R201 2009
Waste Heat Boiler for SAMREF 2009
Internal & External Riser 2009
Slide Valves 2009
Project FCCU for BHPV 2009
Incinerators 2009
Regenerator & Reactor Cyclones 2009



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TOTAL FLANDRES, France

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MURCO PETROLEUM, UK
HPCL, India
QATAR PETROLEUM, Qatar
GURU GOBIND REFINERY, India
SAF OUEST, France
SONANGOL, Luanda Refinery
HMEL Guru Gobind Refinery, India
HYUNDAI, Korea
TOTAL FLANDRES, France
TOTAL FLANDRES, France
BHPV/HPCL, India
ESSO FAWLEY, UK
ESSO FAWLEY, UK
TOTAL FLANDRES, France
POYRY ENERGY, UK
ESSO PORT JEROME, France
GURU GOBIND REFINERY, India
ESSO ITALIANA, August Refinery, Italy
BATON ROUGE REFINERY, USA
CHINESE PETROLEUM CORP., Taiwan

MRPL Mangalore Refinery, India
NESTE PORVOO Refinery, Helsinki Flue Gas Line & Expansion Joint 2010
ORPC, Sohar, Oman
ENI, Milazzo Refinery, Italy
BP Lavera, France
ENI, Gela Refinery, Italy
TATA PROJECTS, HPCL, India
EXXONMOBIL, Remosa, Italy
L&T, Mumbai, India
SHAW, Man Turbo, Germany
SHAW, Taiwan
TOTAL, France
NEOSTRUCTO, HPCL, India
BAPCO, Tulsa, USA

HELLENIC, Idesa, Spain
ESSO, Fawley, UK

Emergency SD 2009
Offshore – Arthit Production Platform – Absorber Vessel 2009
UOP Separex Membrane System CO2 Removal Project 2009
Inlet Duct of Flue Gas Cooler 2009
Jianfeng Project – Waste Heat Boiler and Superheater Steam Methan Reformers 2009
Air Grid 2009 at Ribatti France
Separator, Anti Coking Ring, pre-stripping New Reactor Tubes 2009 at CMP Arles
Cyclones, Plenum & Riser Tube at Granziero Italy
Cyclone Dustbowls 2009 at Coquant France
New regenerator cyclones 2009
New riser 2009
New FCCU 2009
FCCU shutdown 2009/2010
Slide Valves 2009
Operative Qualification 2009
Shutdown 2010
Cyclones 2010
Reactor & Regenerator Cyclones 2010
V-anchorage into Expansion Joints 2010
New Riser Separator and Steam Distributors 2010
New FCCU – II Visakhapatnam 2010
Witness Refractory Lining Mock-Up 2010
QA/QC Repairs in the reactor cone 2010
Expansion joint SXB8001 2010
Allington EfW Project 2010 - Incinerators
2010 STIG Turnaround
Shutdown 2010
Shutdown 2010
Regenerator Catalyst Slide Valves 2010
FCC Reactor and Orifice Chambers 2010
Catalyst Coolers 2010
Slide Valves 2010
FCCU and refinery shutdown 2009/2010
Shut down 2010 Furnace 92H01, 92H04 and 93H01
Cyclones, 2010
Cyclones, 2010
Duct Fabrication, 2010
PCLA-2 Slide Valves, 2010
FCC-RR, 2010
CPC Ta-Lin RFCC Propriety Equipment Supply, 2010
Catalyst Coolers, 2010
Revising TOTAL SPEC ISL 230, 2010
FCCU, 2010
Replacement of refractory lined transfer line for Hydrogen Reformer furnace, 2010
Elefsis Upgrade Project, 2010
Refractory Lining Repairs, 2011



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RELIANCE, Jamnagar, India
KH PETROTEC, Ulsan, Korea
FERBECK & FUMITHERM, France
ENI, Gela, Italy
ESSO, Fos, France
TOTAL ANTWERP, Gouda Vuurvast
ISAB S.r.l., Priolo Refinery
CEPSA, Huelva Spain
PARADIP REFINERY, India
FOSTER WHEELER, France
PERTAMINA, Balongan, Indonesia
HELLENIC, Elefsis, Greece
TOTAL LOR, Immingham, UK
PETROPLUS, Coryton Refinery , UK
PETORABIGH, Saudi Arabia
BP CASTELLON, Spain
ESSO CAMPANA, Argentina
VILLA & BONALDI, Italy
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EXTERRAN, Thailand
TECHNIP, Saudi Arabia
LURGI GmbH, La Porte,USA
SAF, Ruitz, France
I.A.G., AB ORLEN, Lietuva
TECNICAS REUNIDAS, Thailand
TOTAL ANTWERP
TECNICAS REUNIDAS, Portugal
VAN TONGEREN, UK, Gouda, Belgium
LARSEN & TOUBRO, Baroda, India
PETROFAC, Dubai
IRPC, DCC Plant, Thailand
VAN TONGEREN,UK, Ellimetal, Belgium
ZOHONGKE COAL GASIFICATION LTD,
China
ESSO PORTE JEROME, Gravenchon
CEPSA, La Rabida Refinery, Spain
IDESA, Gijon, Spain
LURGI, Kuala Lumpur, Malaysia
VAN TONGEREN, UK
RAS LAFFAN OLEFINS CO. LTD, Qatar
TOTAL, Leuna, Germany
IMPERIAL OIL, Strathcona, Canada
S.I.R., Abidgan, Ivory Coast
PETRON REFINERY, Phillipines
CEMEX, Rugby, UK

Orifice Chamber and Reactor, 2010
AAAR Project – Syngas Development, 2010
Shutdown, 2011
Refractory Inspection R2R, 2011/12
Cyclones for TOTAL, Antwerp, 2010
Riser, 2010
Shutdown, 2011
Turnaround, 2011
Reliance, Jamnagar, Spare Spools, 2011
Operative Qualification 2010
Turnaround, 2011
Shutdown, 2011
Riser and Air Ring, 2010
Shutdown 2010
FCC Unit T/A 2011
Slide Valves for Esso Campana 2011
Petroplus FCC 2011
RCC 2011
Shutdown 2011
Shutdown 2011
TAR 2012
T&I 2011
Shutdown 2012
FCC 2011
Heat exchangers 2011
Lining of nozzles 2011
Hot Oil Heaters 2011
FCC 2011-2012
WHRU 2011
Operator Qualifications 2011
FCC Reactor Internals Replacement 2011
Convection modules in fired heaters
Turnaround 2011
SRU Stack 2011
Lining of nozzles 2011
Flue gas pipe and Stack 2011
Molecular Sieve towers, 2011
Turnaround 2011
Cyclone Hanger Nozzles, 2011
Gasifier 2011
T/A 2012
Shutdown 2012
CCAD Coolers for Mississippi Power Company 2011
Waste Heat Recovery System – Al Yer Project 2011
Risiers for IOCL Paradip 2011
Thermal Oxidiser 2012
Cyclones for FCC Regenerator 2011
Slide Valves, 2012
Shutdown HSK3, 2012
Regenerator Cyclones 2012
Damage to Cyclones 2012



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ESSO AUGUSTA, Sicily, Italy
AXENS, France / Korea / Philippines
ALFRAN, Seville, Spain
HPCL, Mumbai, India
PAZ ASHDOD REFINERY, Israel
AOFP, Algeria
ORLEN LIETUVA, Lithuania
MURCO, Milford Haven, UK
ESSO AUGUSTA, Sicily, Italy
SHELL, Buzau, Romania
LAMPRELL (MIS), Dubai, UAE
LARSEN & TOUBRO, Mathura, India
VILLA & BONALDI, Crema, Italy
REPSOL-YPF, Spain
MAN-DWE, Deggendorf, Germany
TOELKE, Nuremberg, Germany
QATARGAS, Doha, Qatar
BETA HEURTEY, Romania
SFZ – BOA GROUP, Lyon, France
QATAR PETROLEUM, Qatar

ESSO PORTE JEROME, Gravenchon
ESSO NEDERLAND BV, Rotterdam
ISAB, Priolo, Italy
IOCL, Hazira works, India
ORPIC, Oman
VILLA & BONALDI, Italy
TOTAL RAFFINADERIJ, Antwerp
SINGLETON BIRCH, Somerset, UK
TECNICAS REUNIDAS, Saudi Arabia
AIR LIQUIDE, Saudi Arabia
ESSO AUGUSTA, Sicily, Italy
PETRON, Philippines
KHARTOUM REFINERY, Sudan
TOTAL ANTWERP
STIZO NUCLEAR, Romania
QATAR PETROLEUM, Qatar
MOTOR OIL HELLES, Greece
PCK REFINERY, Germany
REMOSA, Cagliari, Sardinia
PREEM PETROLEUM, Sweden
TAMOIL, Collombey, Switzerland
TAMOIL, Collombey, Switzerland
CESKA REFINERSKA, Kralupy
JACOBS NEDERLAND BV
AXENS, Bataan Refinery, Philippines
REMOSA, Cagliari, Sardinia

Petro Equador mock up 2012
2 No. Transition Pieces 2012
Turnaround 2012
Expansion joints for FPCC, Mailiao, Taiwan 2012
Turnaround 2012
Zolfa 2 inspection 2012
Installation UERL of RSS for PETRON FCC 2012
Operative Qualification 2012
Shutdown 2012
Turnaround 2012
Cold Collector 2012
FCCU Reactor R-201
Turnaround 2012
Repair works Sulphur 2 Plant WHB 2012
Expansion joints 2012
Petrofac project 2012
IOCL Revamp 2012
Vessels 2012
FCC Shutdown 2012
BP Bulwer – FCC Revamp 2012
Operative Qualifications for SAMREF, 2012
SRU Shutdown 2012
TGU Phase 2, 2012
Bellow Seal Units 2012
Maintenance of non shutdown sensitive static equipment for gas operations 2013
T/A 2013
Shutdown 2013
Turnaround 2013
Revamp 2012/13
Shutdown 2013
Exchangers 2013
Air Ring Distributor & Orifice Chamber 2013
Repair to Krauss Maffie Preheater 2013
Jerp Project – Heaters 2013
Hydrogen Generation Unit Project
Turnaround 2013
Process Block II Turnaround 2013
Shutdown 2013
Turnaround 2013
FCC TA at Refinery SC Petrotel Lukoil 2013
Shutdown 2013
Cyclone Flapper Valves & Waste Heat Boilers 2013
Reinstall Refractory in External Cat Chamber 2013
Operative Qualification for EXXON MONTANA 2013
Fired Heater Installations 2013
Slide Valves at Remosa 2013
Turnaround 2013
Turnaround 2013
Shell Turnaround 2014 Upgrade NL6318
RSS Modification 2013
Slide Valves for Exxon Billings project 2013



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SHELL NEDERLAND REFFINADERIJ

PETROINEOS, Lavera, France

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SFZ – BOA GROUP, Lyon, France

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TOTAL, Grandpuits, France

TOTAL MITTELDEUTSCHLAND

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IDESA, Spain

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REMOSA, Cagliari, Sardinia

SONATRACH REFINERY, Algeria

ESSO ITALIANA, Augusta, Italy

ESSO CAMPANA, Argentina

MILAZZO REFINERY, Sicily, Italy

FOSTER WHEELER, Cameroon

ATB RIVA CALZONI, Italy

TECNICAS REUNIDAS, Portugal

BPCL, Kochi Refinery, India

BAPETCO, Egypt

UOP, Spain

VILLA & BONALDI, Italy

REMOSA, Italy

SHAMS POWER CO., Abu Dhabi

ORPIC, Oman

REMOSA, Italy

MAN DIESEL, Mongstad, Norway

RHI REFRACTORIES, Agriande, France

RHI RADENSTEIN, Austria

MVV UMVELT, UK

ESSO NEDERLAND BV, Rotterdam

PT PERTAMINA, Java, Indonesia

SARPOM, Trecate, Italy

PT CABOT INDONESIA, Java, Indonesia

RHI REFRACTORIES, Germany

MAN DIESEL & TURBO, Germany

METHANEX Titan Methanol, Trinidad

ESSO PORTE JEROME, Gravenchon

VALERO ENERGY, Belgium

ORPIC, Sohar, Oman

REMOSA, Italy

VAN TONGEREN, Belgium

LARSEN & TOUBRO, Gujarat, India

AXENS, @ CMP, Arles, France

REMOSA, Italy

CC2 Upgrade Project 2014

Repair to Furnace 2013

Operative Qualification 2013

Expansion Joints for Formosa (FPCC) & QP 2013

Exchangers 2013

Shutdown, 2014

TRM 2014 Propylene Project

Shell TA Upgrade 2014

Unit D5, Furnace BA101 2014

Expansion Joints for BAYERNOIL 2014

LIMA F340 PCS Nitrogen KRES Revamp PEQ 2014

Shutdown DHC 2014

Orifice Chamber for STATOIL 2014

Flexicokers 2014

ESSO Augusta valve 2014

T&I 2014

Shutdown 2014

Turnaround 2014

Turnaround 2014

2014 Project Evolution Schema Raffinage EPC Phase 1

VEBA Combi Cracking unit. 1st and 2nd stage Hot LPH

Separators for TAIF-NK, Tatarstan, Russia.

Heaters for DL 7183 at SINES REFINERY, 2014

Integrated Refinery Expansion Project, 2014-2016

Gas Processing Expansion Project, 2014

Third Stage Separator, 2014

Exchanger, 2014

Slide Valves for MOTIVA, 2014

Shams 1 Solar Power Plant 2014

RFCC Hotspot repair 2014

Slide Valves for EXXON BATON ROUGE, 2014

STATOIL Shutdown 2014

Regenerator Cyclones, 2014

Brick inspection of Pierce Smith convertor 2014

Biomass Heater, 2014

Shutdown 2014

RFCCU Cilacap Project 2014

Shutdown, 2014

Steam Boiler Repair, 2014

Brick inspections - J3 Gasification Project for Reliance

Industries, 2014/15

FCCU Salavat, 2014

Brick inspection at RHI facilities, Germany, 2014 (for

Auto Thermal Reactor project 2016)

Shutdown 2015

Riser Section, 2014

Mina Al Falal Refinery Turnaround 2014

Slide Valves for EXXON TORRANCE, 2014

J Bend for GAZPROM, 2014

IOCL, Gujarat revamp, 2014

ATYRAU Deep conversion complex project, 2014/15

Slide Valves -EIL-BPCL-KOCHI Refinery, INDIA, 2014



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Z&J TECHNOLOGIES, Germany
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BAPCO, Bahrain
PETROINEOS, France
BAZAN OIL, Haifa, Israel
MAN DIESEL TURBO, Germany/India
THERMAX, India
HELLENIC PETROLEUM SA, Greece
KNPC, Kuwait
HELLENIC PETROLEUM SA, Greece
LARSEN & TOUBRO, India
FLEXIDER, Italy
PCK RAFFINERIE, Germany
LARSEN & TOUBRO, India
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AXENS, France
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BAPCO, Bahrain
EXXONMOBIL, Fawley, UK
PETROINEOS, France,Italy
REMOSA, Italy
FLEXIDER, Italy
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TECHNIP, Taiwan
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LARSEN & TOUBRO, Ranoli, India

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TECHNIP, Al Jubail, Saudi Arabia
PETROINEOS, Lavera, France
AXENS, France
BIN SONH REFINING, Vietnam
TECHNIP, Saudi Arabia
IDESA, Spain
RELIANCE, India
VAN TONGEREN, UK
PETROINEOS,Lavera,France
IDESA, Italy
VILLA & BONALDI, Italy
TECHNIP, South Korea

Brick Inspection, 2014
Shutdown Maintenance Works For NGL-3 Plant, 2015
Molsieve Vessel Fabrication, 2015
RFCC Regen Hotspot repair, 2015
BPCL Project – Goggle valves, 2015
Shutdown, 2015
Shutdown, 2015
Emergency SD, 2015
FCCU Shutdown, 2015
RFFC Revamp 2016 for ORPIC, Sohar, Oman
Flue Gas Cooler Package for BPCL, Kochi, India
Aspropyrgos Refinery Shutdown, 2015
Mina Al Ahmadi Refinery Shutdown, 2015
Flexicoker, Elefsina Refinery, 2015
IEPCC of RFCC Plant for Rapid Malaysia 2015/16
Expansion joint for BPCL Kochi, 2015
Ersatz FCC Regenerator, 2015
Regen Cyclones for ORPIC 2016 TAR , 2015
Expansion joints for QP refinery, 2015
4 x Reactor cyclones for QP refinery, 2015
Petrarabigh Shutdown, 2015
Operative Qualification for ORPIC 2016 TAR, 2015
Expansion joints for ORPIC 2016 TAR, 2015
RS2 Separators for Petronas Malaysia, 2015
Slide Valve SV-1501, 2015
Pre Shutdown work - Reforming Collectors, 2016
FCC Regenerator Combustor Air Grid, 2016
FCCU Cyclones, 2016
Pipestills Turnaround, 2016
FCC Reactor pre Shutdown works, 2016
Slide Valves - EXXON BATON ROUGE, 2016
Expansion joint for BPCL Kochi, 2016
Shutdown HSK3, 2016
CTCI Cat Cooler project, 2016
S-OIL project down flow Reactors and Separators,2016
Shutdown 2016
RS2 Separator for S-Oil Project, 2016
Regenerator & Disengager Cyclones for Rapid Malaysia, 2016
Emergency Shutdown, 2016
Jubail Export refinery, Shutdown, 2016
TAR Distillation 5, 2016
RS2 Separator for MNPZ, Russia
Inspection of fired equipment, 2016
Jubail Export refinery package 2A, 2016
Talara (PetroPeru) refinery expansion project, 2016 - 2017
FCCU Shutdown, 2016
Regen & Reactor Cyclones for Talara Refinery, 2016
FCCU Shutdown, 2016
ExxonMobil Flexicoker reactor cyclones/heaters, 2016
Heat Exchangers for PAU Indonesia, 2016
S-OIL RFCC Cat Cooler, 2016



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ESSAR, India
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BAPCO, Bahrain
MANOIR HT UK, UK
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IMI CRITICAL (REMOSA), Cagliari, Italy
PETROINEOS, Lavera, France

CMI GROUPE, Saudi Arabia
LARSEN & TOUBRO, Johor, Malaysia
PT PERTAMINA, Indonesia
PETRON, Bataan, Philippines
IRPC, Rayong, Thailand
HMEL, Bathinda, India
SABIC, Cartagena, Spain
FELGUERA, Spain
BP CASTELLON, Spain
JACOBS ENGINEERING, Poland
VILLA & BONALDI, Italy
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ORLEN LIETUVA Refinery, Lithuania
VAN TONGEREN, UK
CEPSA, La Rabida Refinery, Spain
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SCHWARTZ HAUTMONT, Spain

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REPSOL, La Coruna, Spain
BIN SONH REFINING, Vietnam
IMI CRITICAL (REMOSA), Italy
MACOGA, Spain
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TECHNIP, Abu Dhabi
BAPCO, Bahrain
SAMREF, Saudi Arabia
IMI CRITICAL (REMOSA), Italy
LUKOIL ISAB, Italy
BP CASTELLON, Spain
REPSOL, Puertollano, Spain
PETROINEOS, France

HAOR Refinery Modernisation, 2016
K-Cot converter project for Lotte Chemicals, Malaysia, 2016
Pre Shutdown works for FCCU SD, 2017
Repairs to Sulphur Unit, 2016-09-20
Shutdown, 2016
FCCU Riser FV 3, 2016
Transfer lines, 2016
HUB1 T&I, 2016
Afipsky Hydrocracker Complex project, 2017
IOCL Haldia Project, 2016
Slide Valves for ESSO FOS SUR MER, 2016
HP Steam Boilers, 2016/7

Heaters for Saudi Aramco project, 2017
K-Cot, Malaysia project, 2017
Balongan Refinery Pit Stop, 2017
FCC-1 and production furnaces SD, 2017
FCC Shutdown, 2017
FCCU, 2017
Gasifier, 2017
Reactor/Stripper/Wye Section /Stand Pipe for QP, 2017
FCCU Pre shutdown off site works, 2017
TAR 2017 FCCU Increase VDU Air Preheater, 2017
Waster Heat Boilers for Eurochem, 2017
Shutdown, 2017
Turnaround, 2017
FCC Units R-201 / R-202, 2017
Cyclones for CEPSA La Rabida Refinery, 2017
Flue Gas Cooler, 2017
Emtrol-Buell, Nigeria Project, 2017
FCC Shutdown, 2017
FCCU Revamp, 2017
CEPSA - Plenums, Heads and Cyclones for Reactor, TSS and Regen, 2017
Heat Exchangers for Kima Egypt, 2017
Emergency Shutdown, 2017
FCC Shutdown, 2017
Slide Valves for Dangote Oil, 2017
Expansion joints for Dangote Oil, 2017
Mozyr Refinery Spool Piece, 2017
Heat Exchangers for Gadepan, Rajasthan Project, 2017
IOCL FCC Bongaigaon Refinery Project, 2017/2018
CC2 –V5 Stripper: Cyclones & Plenum, 2017
FCCU Shutdown, 2017
GS- TAKREER FCC Catalyst Cooler PES
FCCU Shutdown, 2017
FCC/ SRU Shutdowns, 2018
Butterfly Valves for SUNCOR Edmonton, 2018
Shutdown CR-27, 2018
SRU Steam Generator, 2018
Shutdown, 2018
Shutdown - HCQ/HDS2/CTES, 2018



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SIR, Ivory Coast
AXENS, France
IMI CRITICAL (REMOSA), Italy
IMI CRITICAL (REMOSA), Italy
STATOIL, Norway
GALP ENERGIA, Portugal
PETRON REFINERY, Bataan
SCHWARTZ HAUTMONT, Spain
SONATRACH REFINERY, Italy
PT PERTAMINA, Balongan, Indonesia
SHELL PERNIS, Spain
BP GELSENKIRCHEN, Germany
VAN TONGEREN, Spain
CEPSA, Spain
POYRY ENGINEERING, UK
BP OIL ESPANA S.A.U, Spain
GALP ENERGIA, Portugal
IMI CRITICAL (REMOSA), Italy
IMI CRITICAL (REMOSA), Italy
CAPE (RB HILTON), Saudi Arabia
BAPCO, Bahrain
IMI CRITICAL (REMOSA), Italy
LARSEN & TOUBRO, India
LARSEN & TOUBRO, India
REPSOL LA CORUNA, Spain
REPSOL LA CORUNA, Spain
TAPCOENPRO, UK
PETROINEOS, France
EQUINOR, Norway
IRVING OIL, Canada
SONATRACH REFINERY, Italy
VAN TONGEREN, UK
SONATRACH, Italy
PAZ ASHDOD, Israel
MAN ENERGY, Germany
MEISA, Spain
PCK REFINERY, Germany
LUKOIL ISAB, Italy
TECHNIP, Taiwan
TECHNIP, Taiwan
TOTAL DONGES, France
AXENS, Tatarstan
VAN TONGEREN, UK
LARSEN & TOUBRO, India
IDESA, Spain
MOTOR OIL HELLAS, Greece
ORPIC, Oman
REPSOL/TECHNIP, Spain
JGC SINGAPORE, Taiwan
IMI CRITICAL (REMOSA), Italy
Shutdown - AEN HDS1, 2018
TAR 2019, FCC Revamping
Furnaces, 2018
RS2 Separator for TATNEFT (Tatarstan), 2018
Slide Valves for FCK Brunei, 2018
Butterfly Valves for EXXON Beaumont, USA, 2018
FCC Shutdown, 2018
EPCM FCC Revamping PG, 2018
FCC Regenerator combustion Air Grid, 2018
KBR PETRONOR Regen Air Distributor, 2018
Pre-shutdown 2019 works, 2018
FCC Shutdown, 2018
Components for SHELL CC2 TA 2019 Upgrade
New Regenerator Head, 2018
CEPSA San Roque, Plenum Chamber, 2018
La Rabida Refinery FCC Shutdown, 2018
TEESREP Biomass Project, 2018
BP Castellon SRU III, 2018
Sines Refinery FCC Shutdown, 2018
Slide Valves for Sarroch refinery, 2018
Slide Valves for Esso Augusta refinery, 2018
SADAF MTBE Transfer Line, 2018
1H2 and 2HDU CAT Change Shutdown, 2018
Slide Valves for EXXON Joliet refinery, 2018
ESSO FCC Unit, 2018
Orpic Refinery Project, 2019
Dustbowls, 2019
FCC Shutdown, 2019
Operative Qualifications, 2019
Pre-Shutdown works for TAR 2020
RFCC Reactor for Equinor Mongstad refinery, 2019
Rheniformer Reactors, 2019
Shutdown 2019
Cyclones for Bayern Oil, 2019
Augusta Refinery Shutdown, 2019
FCCU Catalyst Cooler Revamp Project, 2019
New Regenerator Head, 2019
Side Riser, Standpipe, Hopper for Repsol, 2019
Shutdown, 2019
Shutdown Sud, 2019
Catalyst Coolers for Singapore Refining (SRC), 2019
Chinese Petroleum Catalyst Cooler replacement, 2019
FCC Turnaround, 2019
RS2 Separator for Tatneft, 2019
External Cyclones for Mozyr Refinery, 2019
IOCL Mathura -Riser Replacement Project, 2019
Technip / Repsol Flue Gas Lines, 2019
FCC Shutdown, 2019
SRTA Shutdown, 2019
Flue Gas Lines, 2019
Bottom Cone/Standpipe for 2020 RCC Revamp , 2019
Slide Valves for SK Flexicoking, 2019



Quality Assurance in Refractory Technology and Inspection Services

Tel: +44 1580 754747
Email : quartis@fccu.com

IMI CRITICAL (REMOSA), Italy

Slide Valves for BSR Vietnam, 2019

1. SPECIAL NOTES FOR QUOTATIONS/CONTRACTS

1.1 QUARTIS refractory services include but are not limited to:

Inspection, supervision, Quality Control, Quality Assurance, training, testing and operator qualification of :-
Refractory linings and/or anchorage and/or the refractory lining installing contractor and/or refractory materials.

1.2 Prices and refractory services charges shown in the quotation are valid for the term of the contract as indicated under 'Prices valid thru'.

1.3 Unless otherwise specified or referred to as 'Travelling Time', the inspection charges shown will be applicable from the time of leaving the QUARTIS UK office.

1.4 Unless otherwise specified, in the case of continuous working, QUARTIS engineers will return home / to the UK every twelve weeks at the cost of the Client.

1.5 When contract expenses are reimbursable at Nett Vouchered Cost (NVC), these will be charged to the Client at NVC + 5%.

1.6 Expenses are defined as:

- transport to-and-from QUARTIS office-UK airport
- air fare
- car hire (including petrol) or local transportation
- clean, safe, heated/cooled accommodation of a reasonable standard
- all meals
- laundry
- telephone calls (all calls to QUARTIS UK office – personal calls to be no more than 40 minutes per week)

1.7 When required, country entry visas and/or necessary work permits and/or medical vaccinations etc. will be charged to the Client.

1.8 Air travel in excess of 8hrs will be made in Business Class and chargeable to the Client as per the quotation.
Depending on availability and advance notice, QUARTIS will endeavour to secure the cheapest air ticket at time of booking.

1.8.1 Costs for any excess baggage will be chargeable to the Client.

1.8.2 Any additional costs for alternative or re-scheduled flights due to change of contract duration, strikes, delays, technical malfunctions, bad weather etc will be chargeable to the Client.

1.9 UK Bank Holidays will be chargeable at 130% of the refractory services referred to in point 1.2.

1.10 Unless otherwise stated and/or agreed by QUARTIS, invoices shall be paid no later than 30 days from date of invoice.

1.11 QUARTIS charges include for:

- labour rate
- personal insurances
- public liability insurance
- issue of release / rejection notes
- compilation of interim / final reports (in excess of five (5) copies to be chargeable to the Client)
- PPE (Personal Protection Equipment such as safety boots, overalls, helmet, glasses, gloves, goggles, paper masks, ear protection)

1.12 The daily or hourly rate as per point 1.2 agreed in the contract will also be applicable for days not worked when working is not possible due to local conditions such as strikes, accidents, inclement weather, miscellaneous delays etc.

1.13 QUARTIS is a registered UK company (1890014) and therefore pays mandatory UK tax – all local/national taxes will be at Client cost.

1.14 Failure by the Client to pay QUARTIS any sum 15 days after due date of agreed payment terms, shall entitle QUARTIS to cease work but continue charging until payment is made.

1.15 Cancellation of the contract by the Client must be made no less than 10 working days before due date of commencement. If cancelled within 10 days of due start date, QUARTIS reserves the right to charge a cancellation fee – the greater of £2500.00 or 20% of contract value.

2. GUARANTEES

2.1 QUARTIS guarantees that the services provided will be performed in accordance with generally accepted industry standards, Client written requests and/or procedures, applicable specifications, requisitions and drawings.

2.2 Any verbal or written suggestions, recommendations, advice, procedures or reports made by QUARTIS shall only be employed, incorporated, adhered to, utilised or enforced at the express discretion and responsibility of the Client - QUARTIS waive all responsibility of failure, non-conformance or non-performance of such.

3. CONFIDENTIALITY

3.1 QUARTIS agrees not to disclose, nor make use of any proprietary and confidential information disclosed by the Client for the purpose beyond the scope of this contract. Upon the expiration or termination of this contract QUARTIS, upon request, shall return to the Client any information that QUARTIS may have acquired during the performance of the contract, whether or not of a proprietary nature.