



**Punj Lloyd**  
GROUP

January - August 2010

The Punj Lloyd Magazine

# update

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# 25 years relationship with the Middle East and North Africa



# A Path of Partnership

The Middle East and North Africa, also known as the cradle of civilisations, represent a magnificent confluence of cultures and religions. This compelling and endlessly fascinating region conjures images of rich tradition in a unique backdrop of sandy deserts and abundant natural resources.

Yet, this living legacy of ancient history is also a land of opportunity. Attracting businesses from across the world, the region is focused on building a strong infrastructure to support a booming global business hub.

The Punj Lloyd Group has had the privilege of a 25 year partnership with this region. The journey that began years ago has grown on the foundation of commitment and responsibility to spread into diverse projects across various countries including Bahrain, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia, UAE and Yemen.

With each project, we have contributed to the region's growth by strengthening its infrastructure and building a relationship of trust. Beyond the bond of business, we have integrated with the local community, respecting their customs and regulations. Our workforce represents the ethnic mosaic of this multitude of societies as we meticulously uphold the responsibility of welfare, safety and environmental protection.

A silver anniversary calls for a celebration and this issue of Update is dedicated to commemorate a 25 year young relationship with the Middle East and Africa. In a region where 'your word is your honour', we are proud to reaffirm our commitment to walk the path of partnership in growth.

# Punj Lloyd in the Middle East

## Tracing the journey

### **Ravindra Kansal**

President & CEO – ME, Africa & CIS  
Punj Lloyd

### **Atul Jain**

President & CEO – ME, Africa & CIS  
Punj Lloyd

**Little did anyone know that a journey that started with a USD 3 million contract to construct a Desalter/Dehydration plant for Kuwait Oil Company in 1985 would mark the foundation of a growth story, establishing Punj Lloyd as a major EPC player in the Middle East, Africa and Caspian with revenues of over USD 1 billion in 2009.**

From laying pipelines to building aviation facilities, from civil infrastructure projects to offshore field development, Punj Lloyd has developed a rich tapestry of project experience in almost every country of the Middle East - its name today is synonymous with infrastructural development in the Middle East.

Middle East today plays an important strategic role in world economics and politics, while Africa and the Caspian are evolving as the new economic power centers with huge opportunities in Infrastructure and Oil & Gas.

The journey of building a business in the region was not easy. The competition in the EPC space has increased over the years, with most major EPC companies foraying into the region to capitalise on the economic potential that the region had to offer. In the midst of the stiff global competition, Punj Lloyd has not only grown with repeat and larger orders, it has also established itself as a preferred partner with major International and National Oil Companies.

This journey of evolution in the Middle East is a much celebrated relationship of two cultures successfully melded into one. There is great synergy between Punj Lloyd's growth in the region and in the Middle East's infrastructural development. The history of both are closely interwoven; Punj Lloyd has set foot in almost every country in this region and has fascinating anecdotes to share from the Middle East.

### **A proud association**

Punj Lloyd is proud to have been associated with some of the most complicated, prestigious and strategic projects of the region. A



dedicated, combined effort of the management, engineers and skilled labor has made this possible. In the process, we have learnt and built capabilities that distinguish us as a strategic player with a proven ability to execute EPC projects across various verticals in the region.

Today, after over two decades of its entry into the region, Punj Lloyd has a wide network of international offices, with operations spread across Bahrain, Iraq, Kuwait, Kazakhstan, Libya, Oman, Qatar, Saudi Arabia, Turkmenistan, UAE and Yemen.

## Challenges and achievements

Punj Lloyd's journey has been an evolution. That of meeting expectations of the local

governments and citizens, mobilising manpower, satisfying the stringent quality and safety requirements of clients and continuously scouting for new opportunities.

We took the right risks, evaluated profitable opportunities, considered venturing into new product categories and developed capabilities to take the leap in a competitive international market.

With our understanding of local laws and culture, we not only developed prosperous relations

with the local governments and our clients, but also delivered our commitments.

## A seamless blend

Be it Yemen or Oman, the integration of local communities in projects, has allowed a rich cultural exchange between people, while building a feeling of camaraderie among workers and staff. Teamwork in

### List of clients

- Abu Dhabi Company for Onshore Oil Operations (ADCO) • Abu Dhabi Gas Development Company
- Abu Dhabi Gas Industries Ltd (GASCO) • Abu Dhabi National Oil Company (ADNOC) • Abu Dhabi Oil Refining Company (Takreer) • Abu Dhabi Polymers Company (Borouge) • Abu Dhabi Water & Electricity Authority (ADWEA) • Dolphin Energy • Eastern Bechtel Co • Gulf Fluor • Kuwait Oil Company (KOC)
- Kuwait National Petroleum Co (KNPC) • New Doha International Airport (NDIA) • Oman Gas Company (OGC) • Petroleum Development Oman (PDO) • Qatar Petroleum (QP) • Ras Laffan Olefins Company (RLOC) • Saudi Kayan Petrochemical Company • Saudi Aramco / SATORP • Sirte Oil Company, Libya
- Tecnimont, Italy • Tecnicas Reunidas, Spain (TR) • Union Water & Electricity Company
- Yemen LNG Co/YemGas

Punj Lloyd Group

## A Snapshot - Middle East Presence

Punj Lloyd has been a key player in infrastructure development in almost every country in the Middle East. Culturally and geographical diverse, these countries testify Punj Lloyd's ability to adopt to the local environment, delivering a range of projects from pipeline, offsites, tankage and petrochemicals in Energy to buildings, hospitality, utilities and airports in Infrastructure.



## Projects in Middle East

### QATAR

- Strategic Gas Transmission Pipeline, Qatar Petroleum
- Multi Product Pipelines, Qatar Petroleum
- Ethylene – Butene Pipeline, RLOC
- Doha Urban Pipeline Relocation, Qatar Petroleum
- Fuel Systems for New Doha International Airport, NDIA
- Infrastructure & Services to Dukhan support services area, Qatar Petroleum

### UAE

- Shah Gas Gathering Project, Abu Dhabi Gas Development Co Ltd
- EPC of NGI, Gasco
- Mechanical work for Habshan 5 Utilities & Offsites Project, Gasco/Hyundai Engineering & Construction
- Mechanical work for Borouge 2 Offsites & Utilities Project, Borouge/Tecnicas Reunidas
- Mechanical work for Borouge 2 Polyolefins Project – PE, Extrusion & Common, Borouge/Tecnimont
- EGDS Upgrade EPC Works Civil & FOC, Dolphin Energy
- Onshore Gas Development III and Asab Gas Development II, Gasco/Bechtel
- Construction of Flowlines & Wellhead Installation in ADCO's Oilfields (Bab/Bu Hasa), ADCO
- Huwailah Flowline, Wellhead, Transferline Project, ADCO
- Central Environment Protection Facility (BeAAT), Takreer
- Desalinated water tanks at Sir Baniyas Island, ADWEA
- Water Storage Tanks for Fujairah Water and Power
- Jarn Yaphour Field Development, ADNOC/Snamprogetti

### OMAN

- EPC of Gas Export Line Capacity Increase Project, Petroleum Development Oman LLC
- EPC of OGC Pipeline, Oman Gas Co

### SAUDI ARABIA

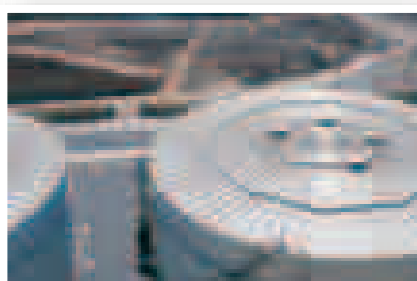
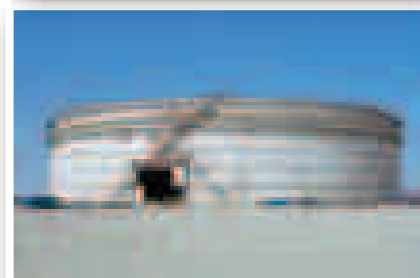
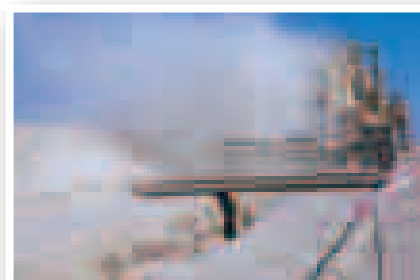
- Offsite Pipelines for Yanbu Export Refinery, Saudi Aramco
- Port Tank Farm at Jubail Export Refinery, Saudi Aramco/Satorp
- Early Needs Tank, Saudi Kayan Petrochemical Company
- 100 MTPD Sulphuric Acid Plant, BCNC
- Cristal Titanium Dioxide pigment expansion project, Cristal
- 40 TPD ACC Chlorine Plant, Arabian Chlorine Co

### KUWAIT

- Desalter/Dehydration Plant, Kuwait Oil Co (KOC)
- Tankage Refurbishing, Kuwait National Petroleum Co Ltd
- Chlor-Alkali for Al Kout Industrial Projects Co

### YEMEN

- Offsite and Utilities for LNG Project, Yemen LNG Co/Yemgas



**This journey  
of evolution  
in the Middle  
East is a much  
celebrated  
relationship of  
two cultures  
successfully  
melded into one**





a multicultural environment has been our success mantra. Multiple nationalities working towards a single goal, achieved major milestones. Take for instance, laying the gas pipeline in Oman where a total of 11 nationalities worked in the arid desert.

Timely and expert mobilisation of this rich multicultural manpower in geographies that were completely unfamiliar to us, was a great task. However, manpower mobilisation was achieved on a large scale to meet the project deadline across the region. Employment opportunities were provided through extensive training to the locals to acquire new skills, ensuring that we left behind a legacy of trained craftsmen. A case in point is our EPC project for PDO where Punj Lloyd employed local women as the Trench Patrol, along the pipeline route, providing employment opportunities to women.

The quality of human resources and its optimal use has been the hallmark of our successful projects, notwithstanding the diverse local legislations in the countries of operation and the harsh environment. We have nurtured our people, with the aim to be the preferred employer in the region. Besides introducing training programmes for people development and management, cutting edge technology like the

Oracle HRMS has been deployed to meet global benchmarks and standardise HR processes. HR Initiatives like the 'Super 65' resulted in improved skill sets of supervisors.

Worker welfare is always of paramount importance to Punj Lloyd. Facilities of the highest order are provided to ensure the comfort of the workers under the toughest conditions. To improve the quality of life of the workforce and to raise their morale and team spirit, various cultural and sports programmes are organised at the project sites. Working in extreme conditions of weather is very challenging but the team is committed to raise the bar with every project. Punj Lloyd today has experience of working in extreme temperatures of +50° to -50° C.

### Safety

Safety is of paramount importance in everything we do. To increase involvement and motivate employees, monthly safety awards are instituted for adopting best safety practices. Complex engineering activities are carried out with great precision and zero error at our sites, ensuring maximum number of safe man-hours. Libya was a great achievement for us as we achieved 7.5 million safe man-hours without any lost time injury, but the record

Our capability to customise our skill sets according to the project requirement helps us match international best practices



was soon broken with the LNG project in Yemen declaring 10 million safe man-hours!

### Environment

Environment is always of great concern. We minimise pollution, optimise fuel consumption and convert waste into resources. As a

## Our greatest showcase in the Middle East is the rich diversity of projects that we have undertaken

part of the community beautification initiative, trees were planted at the camps.

Sensitive to the cause of conserving the environment, Punj Lloyd took extreme caution to protect over thousand year old subterranean underground canals while executing the 265 km pipeline for PDO in Oman. Carrying potable water hundreds of miles away from their point of origin, these underground canals, called *falaj* in Oman were successfully crossed, using a unique methodology.

### Social Responsibility

At Punj Lloyd, our efforts to enhance the lives of the local community start at the project site itself. We involve the local community from the start, providing them employment opportunities and teaching them new skills, thereby becoming an asset to

their country. We have supported various other initiatives for community enrichment.

During the Gas Export Capacity increase pipeline project in Oman, Punj Lloyd provided the local community with business opportunities valued at approximately 4 million Omani rials. Water, which was a precious commodity in the deserts, was provided to the local community living near the site.

### Achievements and Landmark Projects

At Punj Lloyd, quality has always been at the heart of all we do. We owe our success to our belief of keeping excellence at the core of all our efforts, be it in executing an internationally prestigious project or a local CSR activity. Punj Lloyd's global expertise combined with local knowledge enables it to understand client needs and deliver projects successfully. Our capability to customise our skill sets according to the project requirement helps us match international best practices. All our projects have been completed on or before schedule, which highlights our strengths and skills in project management. We specialise in providing end-to-end services from concept to commissioning which makes us an EPC company of choice.



## OMAN

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### Oman Gas Pipeline for PDO

The 48" dia gas export capacity increase pipeline connecting Saih Nihayda to Al Kamil was 265 km long laid for Petroleum Development Oman in scorching 50° C. It was the first 48" dia pipeline laid by Punj Lloyd and it continues to hold a pride of place for every employee. The pipeline had to pass through the rough desert, rocky terrain and valleys interspersed with rivers. Pipeline history was made when 21 km of pipeline was lowered in a day of continuous operation in extremely harsh climatic conditions with 50° C. It was during this project for the first time Best Available Technology (BAT), mechanical trenching, vacuum lifting, automatic welding, and automatic ultrasonic testing were introduced. The project passed through different settlements and communities. Challenging terrain comprised sand dunes, small hills, ancient *falaj* -

underground water systems and Al Saleel reserve forest on either side of the 265 km route. Omani Community Relations Officers were employed to liaise with the local community.

## QATAR

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### Strategic Gas Transmission Project for QP

The Strategic Gas Transmission Project of Qatar comprises twin pipelines, which will transport 2,000 MMSCFD of sweet lean gas from Ras Laffan to different consumers via 36" dia pipeline and is of strategic importance for meeting the unprecedented requirement of power and water in Qatar. The project includes laying of 211 km of pipeline with associated stations and infrastructure. The pipeline route passes through rough desert and

rocky terrain. Approximately 5.5 km of pipeline is in the SABKHA area, where the ground water-table is high; the pipeline will be laid at an elevation of 0.5 km from the ground level and covered with sand and earth fill material. 3,400 people were mobilised at its peak. The project is expected to be commissioned by Jun 2011.

### New Doha International Airport

New Doha International Airport is a landmark project, where Punj Lloyd will build two ground service equipment fuelling stations along with parking facilities and a triturator unit. The contract also includes seventeen utility buildings with matching airport



# Awards and Certifications

## 2010

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Borouge 2 Polyolefins Project for Abu Dhabi Polymers Company (Borouge)/Tecnimont S.p.A.

- **Achievement of 7.7 million man-hours without Lost Time Injury, August (LTI)**

Borouge 2 Offsites & Utilities Project for Abu Dhabi Polymers Company (Borouge)/Tecnimas Reunidas (TR)

- **Achievement of 8 million safe man-hours**

## 2009

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32" Loop Line from BVS-01 to BVS-09 and 24" Barka Pipeline Project for Oman Gas Company

- **4.5 million man-hours without LTI (February)**

Borouge 2 Polyolefins Project for Abu Dhabi Polymers Company (Borouge)/Tecnimont S.p.A.

- **Contractor of the Month (March)**
- **Achievement of 5 million safe man-hours (November)**

Early Need Tanks Project for Saudi Kayan Petrochemical Project

- **Achievement of 3 million safe man-hours**

## 2008

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Onshore Gas Development – III Project for Abu Dhabi Gas Industries Ltd (Gasco)/Eastern Bechtel Co

- **Environmental, Health & Safety award for achieving 5 million man-hours without LTI (June)**

Utilities & Offsite for Yemen LNG Company/Yemgas

- **Achievement of 3 million man-hours without LTI (June)**
- **Crew of the Month (August)**

EP2 Pipeline Project for Ras Laffan Olefins Company

- **1 million safe man-hours (June)**

Construction of Flowlines and Wellhead Installations at ADCO's Oil Fields (Bab/Bu Hasa)

- **Project completed without LTI (October)**

Fuel Systems for New Doha International Airport Project

- **3 million man-hours without LTI (December)**



## 2007

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Construction of Flowlines and Wellhead Installations at ADCO's Oil Fields (Bab/Bu Hasa)

- **1 million manhours without LTI**

Fuel Systems for New Doha International Airport Project

- **Contractor of the month – outstanding ES&H performance**

## 2006

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Fuel Systems for New Doha International Airport Project

- **NDIA Housekeeping Award**

## 2005

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48" Gas Line Export Capacity Increase Project for PDO

- **1 million safe man-hours and 3 million safe kilometers driven**
- **Certificate of appreciation for accomplishment & professional management of Health, Environment, Community and Liaison Affairs**
- **Certificate of appreciation for completing of the Line Pipe transportation safely and saving 775,000 km of traveling by using four line pipes transportation method**

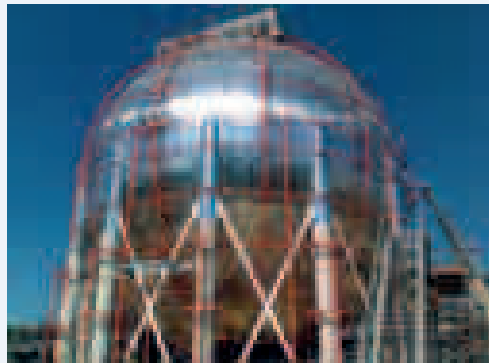




**Dayim Punj Lloyd, a joint venture of Punj Lloyd Ltd and His Royal Highness Prince Khalid Bin Bandar Bin Sultan (KBS), Kingdom of Saudi Arabia, is executing the Port Tank Farm at Jubail Export Refinery for Saudi Aramco TOTAL Refining**

**Petrochemical Company (SATORP), a JV of Saudi Aramco Total, France.**

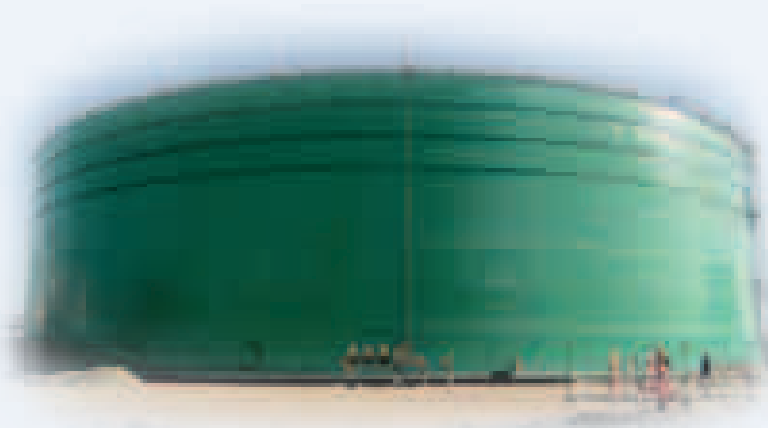
**The Engineering, Procurement and Construction package comprises the Tank Farm and Vapour Recovery System, Transfer pipelines, Air System, Sewer System, Emergency Diesel Generator, Port Operation Buildings, Marine Loading Facilities and Water OSBL. The total storage capacity to be constructed is 182,800**



**m<sup>3</sup> including External Floating Roof for Diesel and Gasoline Tanks, External Double Seal Floating Roof and Umbrella Roof Internal Floater for Paraxylene, and Cone Roof for Fuel Oil.**

**Dayim Punj Lloyd has to its credit the successful execution of the Early Need Tanks for Saudi Kayan Petrochemical Company (SABIC).**

**The scope of work included the engineering, procurement and construction of 8 tanks for DM Water, Fire/Service Water, MEG and Crude storage and 1 Sphere for Mixed Butane Storage for Offsite and Utility at Jubail Industrial city, KSA.**



architectural feature. The jet fuel hydrant is designed to ultimate phase (flow 3,500 m<sup>3</sup>/hr) through two 20" dia underground pipelines (30 km). The system will cater for refuelling of 10 aircraft simultaneously (expandable to 16). The project is unique because it not only requires our oil and gas, but also the civil expertise to meet the international norms.

## UAE

Punj Lloyd has enjoyed a wide presence in the UAE. From the Fujairah Water and Power project where Punj Lloyd constructed two tanks on hilltops and seven in desert terrain, to flowlines & wellheads in Abu Dhabi for ADCO and Huwailah Field Development to Central Environment Protection facility in Ruwais.

## ADCO Flowlines, Abu Dhabi

In March 2005, amidst stiff competition, Punj Lloyd aggressively bid and was awarded the ADCO contract for 400 km of flow lines. With a duration of three years, this was an on-call contract wherein Punj Lloyd was required to lay the flowlines as and when oil wells were drilled.

The skill and competence

of the project team won ADCO's appreciation. With a weld repair rate of only 0.3 per cent, the client reduced the radiography percentage from 20 to 10. This was achieved by close monitoring of welding parameters, typically heat input, welding speed, wind velocity and welding consumable control.

In spite of all odds, due to the sheer determination and proficiency of our team, we crossed all obstacles and delivered to all client and local requirements and successfully delivered the project.

### **Borouge-2 for Abu Dhabi Polymers Company**

Borouge-2 is said to be a key part of Borouge strategy for growth. Upon completion of the project, the new capacity will triplicate Borouge output. The plant will then be capable of producing 2,000,000 T of polyolefins.

Tecnimont, Italy was awarded the EPC of two Borstar polypropylene plants with a combined annual capacity of 80,000 T and a new

Borstar enhanced polyethylene plant with an annual capacity of 540,000 T to complement the existing 600,000 per year unit. Tecnicas Reunidas (TR), Spain was awarded the EPC contract for the offsite and utilities package, which includes off plot infrastructure, on plot instrumentation, installation of communication systems and associated facilities.

Punj Lloyd has executed the mechanical work associated with steel erection, piping fabrication and erection, equipment erection and painting. Punj Lloyd is the largest mechanical contractor at Borouge-2.

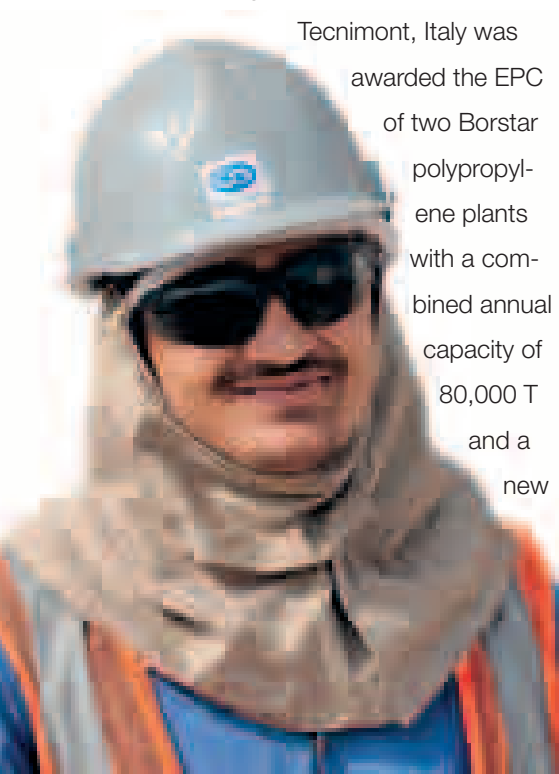
Another achievement has been the erection of the tallest flare in UAE. 176 m high, the flare structure weighs 870 MT, consisting of 31 modules.

It was lifted using 450, 600 and 1,250 MT cranes, in modular increments at increasing height. A total of six sets of sea water cooling pumps and motors weighing 45.2 T and 32.7 T each were installed over concrete foundations using a 200 T hydraulic cranes. A 20 T flare drum column was placed over the foundation which is close to the pipe rack by using a 100 T crane.

### **Gulf Fluor**

Gulf Fluor of Abu Dhabi is capitalising on the new Aluminium Fluoride plant in the industrial city of Abu Dhabi,

All our projects are completed to the client's satisfaction, highlighting our strengths and skills in project management





Punj Lloyd's global expertise combined with local knowledge gives it an edge

UAE. The Gulf Fluor complex, the first of its kind in the Arabian Gulf, will have a capacity of 60,000 TPA of aluminium fluoride and 10,000 TPA of hydro fluoric acid. Punj Lloyd Group has been involved in this project from its commencement, initially conducting the preliminary feasibility study for the Fluorides Complex in 2006 and went on to carry out the Front End Engineering and Design work. The final phase of this project will involve engineering, procurement and construction management carried out in conjunction with the Swiss company BUSS Chem Tech AG as well as local consultants and construction companies.

### Jumeirah Island Villas

Punj Lloyd company, Sembawang Engineers & Constructors has to its credit construction of 160 luxury villas in Jumeirah Islands, a waterfront community within the heart of the desert. The 'Oasis Style' villas were designed in clusters of ten, allowing activities and amenities at Jumeirah Islands to be integrated with trails, walkway bridges, a community club and a commercial area.

### Mediterranean Gardens, Dubai

Sembawang Engineers & Constructors has also built 2,700 residential apartments near Jumeirah Island,

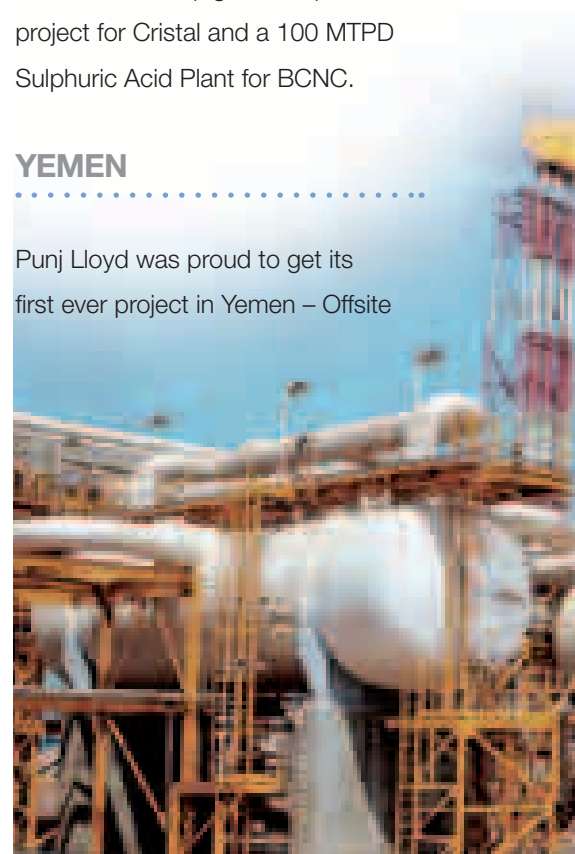
Dubai. Exquisitely designed, using marble and ceramic tiles with maple finishing and attractive lighting, Mediterranean Gardens provides spacious studio and one bedroom apartments. Sembawang captured the rich diversity of nature with inventive landscaping.

### SAUDI ARABIA

A Punj Lloyd Company, Simon Carves - leader in process engineering, has a diverse experience in Saudi Arabia. The company designed and built a 40 TPD ACC Chlorine Plant for Arabian Chlorine Co, a titanium dioxide pigment expansion project for Cristal and a 100 MTPD Sulphuric Acid Plant for BCNC.

### YEMEN

Punj Lloyd was proud to get its first ever project in Yemen – Offsite





**Punj Lloyd Pipelay Barge, Mahesh-I** Punj Lloyd owns key offshore vessels for the installation of pipelines, composite cables, flexibles, risers, hook-ups, SBM installation and other offshore construction activities. Punj Lloyd pipelay barge, Mahesh-I laid subsea pipelines in shallow waters for Saudi Aramco at the Safaniya Oilfields, off Dammam.

and Utilities for LNG, launched by the Government of Yemen. It is the country's largest ever industrial investment, and hence an immensely prestigious project for the company.

Offsite work included the erection of a 135 m high derrick flare stack with four flare tips, a knock-out drum, gas reception station, ground flare system, fire training grounds, the interconnecting pipe rack to the LNG production trains, marine flare system and fire fighting system.

At the utility facilities, the various packages include a power generation system, nitrogen generation & air separation unit, steam generation system, diesel storage system, desalination system, potable water system, four substations, Material Off-loading Facilities (MOF), a Boil-off Gas (BOG) compressor unit, LNG storage tank piping, a refrigeration unit, sea cooling water intake system and effluent treatment plant, an electro-chlorination unit, the main electrical substations and underground piping.

### Interwoven History

Punj Lloyd has played an intrinsic part in the region's economic growth, while the region has been an integral part of Punj Lloyd's growth story. Prospects of growth in the region remain buoyant. Punj Lloyd is committed to its clients and is confident of providing reliable, high quality and timely EPC services.

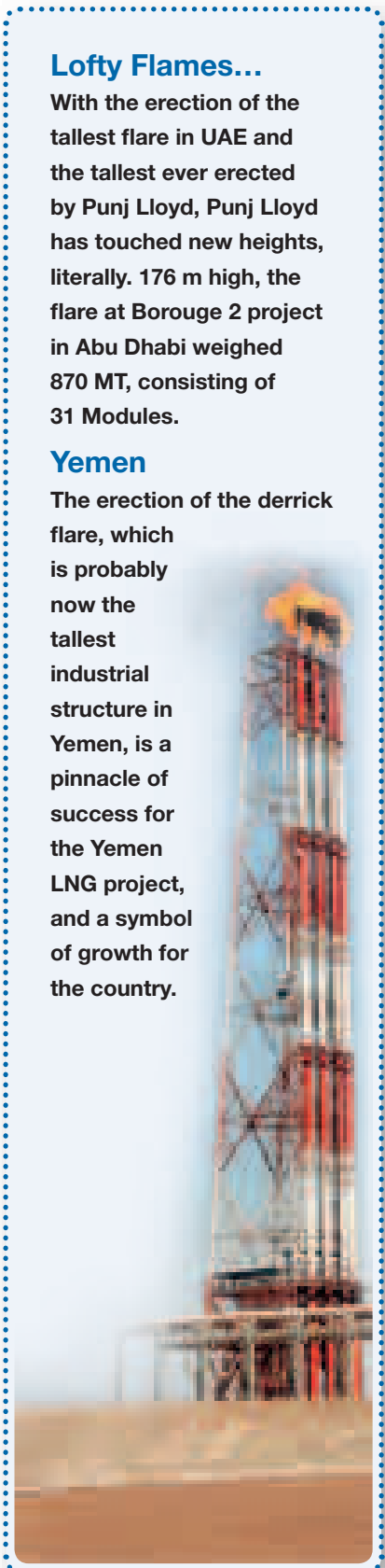
We owe our success to our belief in keeping excellence at the core of all our efforts, be it in executing an internationally prestigious project or a local Corporate Social Responsibility programme. Punj Lloyd has global expertise combined with local knowledge that gives it an edge in understanding client needs and delivering projects to their satisfaction. Our capability to customise our skill sets according to the project requirement helps us match international best practices. We specialise in providing end-to-end services from concept to commissioning which makes us an EPC Company of choice. ♦

### Lofty Flames...

**With the erection of the tallest flare in UAE and the tallest ever erected by Punj Lloyd, Punj Lloyd has touched new heights, literally. 176 m high, the flare at Borouge 2 project in Abu Dhabi weighed 870 MT, consisting of 31 Modules.**

### Yemen

**The erection of the derrick flare, which is probably now the tallest industrial structure in Yemen, is a pinnacle of success for the Yemen LNG project, and a symbol of growth for the country.**





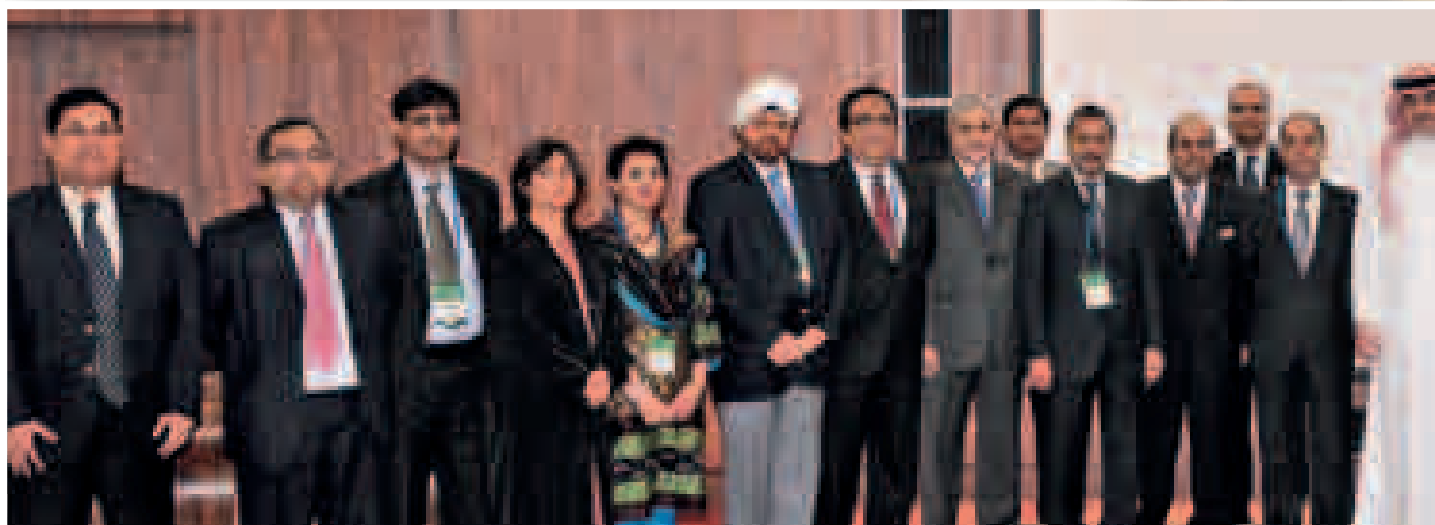
**Governor and Chairman SAGIA, Amr A Al-Dabbagh greeting Atul Punj, Chairman - Punj Lloyd Group**



**Deputy Prime Minister, Syria, Abdullah Al-Dardari, greeting Atul Punj**



**Hon'ble Prime Minister of India, Manmohan Singh, with Saudi and CII delegates**



**Indian CEOs delegation to Saudi Arabia**



Chairman of Kuwait Oil Company at the World National Oil Companies Congress



HRH Prince Khalid bin Bandar bin Sultan, Executive Chairman - Dayim Holdings with Atul Punj



L-R Atul Punj, H.H Shaikh Salman, Crown Prince of Kingdom of Bahrain and Shekhar Gupta, Editor-in-Chief, The Indian Express



Inauguration of Doha office by Chairman - Atul Punj



# Strategic Gas Transmission Project, Qatar

Punj Lloyd's mega EPC project

## Amit Kaura

Executive Vice President - Operations (MEA & CIS)  
Punj Lloyd

## Background

Considering the unprecedented acceleration and growth in the State of Qatar, the world's third largest gas producer, the local government has massive plans for expansion in the infrastructure and the oil & gas sectors. To meet its need for power and water production, it has planned to set up power generation stations, every two years, from 2009. Qatar Petroleum, Qatar's premium Oil and Gas company as a supplier of gas, will ensure a reliable gas supply to the growing industrial and power sectors. To satisfy the anticipated gas demand, AKG I & AKG II Sales Gas

are dedicated to cover the demands for industries and power generation facilities at Ras Laffan and the southern area. Volumes up to 1,000 million ft<sup>3</sup>/d from the AKG project will be transported to Mesaieed via the existing 36" dia RMSGP pipeline (designed for 860 million ft<sup>3</sup>/d).

Additionally, Qatar Petroleum has initiated the Barzan Gas Development Project. This will secure 1,500 million ft<sup>3</sup>/d of sales gas to satisfy the industries and power sector demands of the southern area. A supply of lean gas from the Barzan project is expected to commence by early



2012. The Barzan project will initially have two trains, to be expanded to a total of 10 trains.

It is of strategic importance for the pipeline to support the downstream industries and also ensure that the upstream industries operate without any impediment. The Strategic Gas Transmission Project (SGTP) therefore plays a very important role in the development of Qatar.

### Brief Scope

Two new 36" dia NPS pipelines (SGTP) are to be installed from

#### Technical Data

|                      |   |
|----------------------|---|
| Pipe diameter        | 914.4 mm (36")                            |
| Wall thickness       | 12.7 mm, 14.3 mm, 17.5 mm and 22.2 mm     |
| Pipe grade           | API 5L X65                                |
| Pipeline length      | 211 km                                    |
| External coating     | Fusions Bonded Epoxy 550 Microns          |
| Internal coating     | 2 pack epoxy flow coating 75 Microns      |
| Field joint coating  | FBE spray coating                         |
| Design pressure      | 74.5 barg                                 |
| Design temperature   | Above ground 84° C and below ground 60° C |
| Service              | Sour Gas                                  |
| Block valve stations | 6 for P1 pipeline, 4 for P2 pipeline      |



Station-V (Ras Laffan) with one pipeline, P1 to Station S (Mesaieed) and the second pipeline P2 to Station T3. Existing Station V will be extended to accommodate the two new 36" dia pipelines and Station S and SBV-41 will be extended to accommodate 36" dia pipeline P1. New block valve stations will be

made at 72-SBV-1, 2, 21, 32 and 4, 41 which will be located close to the corresponding existing block valve station. A new distribution station T3 is required to be built as a part of the project. Thus, the two pipelines P1 and P2 shall pass through new valve stations 72-SBV-1, 2, 21 and 32 with P2 diverting to Station T3. The 36" dia pipeline P1 continues through 72-SBV- 4 and 41 to Station S (Mesaieed). The length of the 36" dia pipeline P1 from pig trap at Station V to pig trap at Station S is approximately 124 km. The length of 36" dia pipeline P2 from pig trap at Station V to pig trap at Station T3 is approximately 87 km.

### **Terrain**

The pipeline route passes through rough desert and rocky terrain, all along the existing pipeline corridor. At some of the stretches along the route, very hard limestone is encountered. Approx. 5.5 km is in the SABKHA area, where the ground water-table is high. Here, the pipeline will be laid at an elevation of 0.5 m above ground level and covered with

sand and earthfill material. SABKHA requires special construction techniques. Firstly, filling, compacting the earth in the high water table area and making a pad, above which the pipeline is laid. A berm is then made to protect the laid pipeline.

## Challenges

Being one of the largest EPC pipeline projects in Punj Lloyd's history, the challenges consisted of novated orders, long lead item supplies from all over the world, subcontractors and massive resource management. Managing 3,400 people at the peak period was achieved by mobilising trained people from our craftsmen training institutes. The pipeline, being laid at a live refinery and ending at an industrial area, involved security passes and permits for each worker.

## Mobilisation of people

Timely execution of the project required first-mover advantage in terms of initial mobilisation of resources and the set-up of temporary facilities to kick-start the project. It was a Herculean task to get the best in quality and quantity. A multi-disciplined and dedicated team of professionals coordinated between the Regional Office at Abu Dhabi and the Corporate Head Office. A core team was put in place to identify, interview, select

and mobilise the team. Many firsts were implemented, such as loading a chart to forecast, fill and monitor the positions. Job descriptions were made for each discipline and interviews were conducted across Punj Lloyd's various regional offices in India, Middle East and the Far East to get the best resources for the project.

A total of 15 nationalities were working on this prestigious project, bringing their multicultural experience into play. A campsite accommodating 1,800 people with catering, recreation facilities, workshop and stores was set up near Doha City to cater for Punj Lloyd's multicultural manpower. Due to the high security involved, each person working on the pipeline route had to possess a Permission To Work pass (PTW). Engineering Diploma Holders and Graduate Engineers who were computer literate, were teamed up with experienced foremen; thereby creating a balance of technology and experience. To facilitate the quick rollout of qualified PTW workers, which was mandatory, a PTW training centre was opened at the Doha site office.

To encourage acceptance of ideas and advice between the young engineers and the veterans, a team building exercise was introduced, called 'Super 65.' This catapulted

A total of 15 nationalities are working on this prestigious project, bringing their multicultural experience into play

Due to the hard ground conditions in Qatar, pipeline trenching was the biggest challenge

the project team towards achieving their goals, as it improved workers' interpersonal relations. It had a dramatic effect on their efficiency and helped everyone to focus on and meet their targets. The competitive matches of cricket and badminton helped to bring teams together while competing for excellence.

### **Long lead orders**


Managing novation orders worth over US \$ 400 million was a challenge. Qatar Petroleum had placed orders for some of the major material directly on the vendors. Punj Lloyd, as the EPIC contractor managed and administered the novation orders. Material ranging from line pipes, coating of line pipes, motorised operated valves, ESDVs, SBVs, ball valves, plug valves, check valves and gate valves were sourced from Brazil, USA and Europe, involving varying time zones. With global recession affecting all countries, it was a monumental task to get the vendors

to commit to both price and delivery, and to ensure uninterrupted supply of material at originally quoted prices. The novated scope included the supply of 297 km of pipes of various sizes and thickness, and approx. 3,000 valves ranging from 36" dia down to 2". All the responsibilities such as drawing approvals through the Engineering Consultant and Qatar Petroleum; arrangement of third party inspection services at vendor's works; expediting manufacturing; establishment of LC; release of payment; custom clearance at Qatar border; and payment of customs duty, were part of Punj Lloyd's scope.

To manage the procurement related activities, dedicated vertical teams for novation and







long lead items were established. Each team was given dedicated QAQC, procurement engineers and expeditors to administer the orders. For long lead items, individual buyers were empowered to handle orders with a team of QAQC engineers.

Expeditors located in Europe, Saudi Arabia, Middle East and India tracked the orders. Goods from 15 countries were sourced to meet the requirement of this huge project.

A planning team located at the project office coordinated between the quality, procurement and execution teams to ensure a steady supply of material at the right time, for the entire duration of the project.

To encourage acceptance of ideas and advice between the young engineers and the veterans, a team building exercise 'Super 65' was introduced

### Engineering

Detailed engineering from FEED studies was one of the early responsibilities of this major EPIC contract. To take advantage of the FEED study, the same engineering sub-contractor was selected. To jump start the engineering, a core team of discipline engineers were placed alongside the engineering sub-contractor. A site engineering

team was also mobilised for the co-ordination of approvals from the client and to mitigate site engineering concerns. Due to the fact that the engineering was handled from Abu Dhabi, the supervisory team located in Doha, the approval cycle for engineering between the client and Punj Lloyd was swift, thereby saving further on time. Latest software such



## Five heavy duty trenchers of 150 T capacity were deployed to carry out the pipeline trenching

as HYSYS for process simulation; PIPEPHASE for comprehensive flow modelling; OLGA 2000/TG Net for dynamic simulation, TLNET for simulating steady state and transient hydraulic analysis; AUTOCAD; 3D modelling tools; STAADPRO for structural design, were used to do the detailing. FTP servers were used to upload and download data, drawings, documents for faster access and quicker turnaround time for the review and approval cycle.

Managing the construction of pipeline and civil/piping/E&I

work, spread across 10 stations along the 124 km pipeline route, was quite a challenge.

Pipe transportation from the Kingdom of Saudi Arabia (KSA) Port to the coating yard and then from the coating yard to the Doha site was one of major and critical safety hazards in terms of logistics and schedule.

Approximately 70 to 80 pipe trailers were deployed to transport the pipes from the Al-Qahtani Coating Terminal. This was to achieve an average transportation

of 1 km of line pipes every day to the Right of Way to feed the pipeline construction; keeping in mind the turnaround time for each trailer travelling between Dammam in KSA to the ROW in Qatar, and the return journey of four days. To keep up with best safety practices, vacuum lifts mounted on hydraulic excavators were used to minimise labour, thereby reducing safety hazards. This method has multiple advantages in comparison with the conventional sling or belt handling.

### Interface issues

There are a lot of interface activities with the statutory authorities such as the Supreme Council for Environment & Natural Reserves (SCENR) for environmental permits; KAHRAMAA for power corridor crossings and permanent power supply to gas stations; various pipeline owners such as Q-Chem, Qatex, QP Refinery, MIC (Messaid Industrial City), RLIC (Ras Laffan Industrial City); UPDA – (Urban Planning and Development Authorities) for building permits. Similarly, as several projects were ongoing simultaneously, there were several interface related issues with other projects. An interface co-ordination cell was formed with team members dedicated to individual authorities to facilitate timely approvals and issue of permits.

For the first time in the history of Qatar Petroleum, an NDT method has been implemented on an onshore pipeline

### **Pipeline trenching**

Due to the hard ground conditions in Qatar, pipeline trenching was the biggest challenge. The pipeline trenching activities were advanced ahead of delivery of the coated line pipes at site. Special approval was taken from the client to continue trenching on night shifts. Five heavy duty trenchers of 150 T capacity were deployed to carry out the pipeline trenching. Simultaneously, the excavator and rock-breaker crew were deployed for excavation near the crossings. All the required safety measures such as lighting, barricading, tool box talks, emergency vehicles were taken, while working at night. Safety precautions were demonstrated to Qatar Petroleum, prior to taking their approval. In the stretches where the ground was considerably softer, approximately 1,950 m of trenching was achieved in one day.

### **Mainline Welding/Non-destructive testing by AUT**

Considering the quantum of work, higher diameter pipeline and fast track nature of the project, mainline welding was used. This is the automatic welding process using automatic welding machines, technically known as mechanised gas metal arc welding (GMAW).

The quality of the weld is far superior to the manual welds and the defect rate is comparatively lower. 83 welds have been achieved in one day, including the production by manual welding crew.

AUT has been adopted in this project as the primary NDT technique used to evaluate the quality of the weld. For the first time in the history of Qatar Petroleum, an NDT method has been implemented on an onshore pipeline. This technique enables detection, recording, rapid interpretation and sizing of all relevant weld



discontinuities in almost all weld types, as well as compliance with prevailing codes and standards. This mechanised system can be used under harsh weather conditions. It is a cleaner and radiation hazard-free system, unlike conventional radiography where developing, storage and disposal of radiography films pose environmental hazards.

### Health Safety and Environment

With a firm corporate commitment in place, HSE is of prime importance at all Punj Lloyd sites. The company has achieved 2 million safe man-hours without loss time injury.

Safety audits and surprise checks were conducted to ascertain the implementation of all safety measures. Garbage, used

oil and metal scrap was carefully disposed off through approved vendors. The Construction Environmental Management Plan was prepared through the approved consultant of Supreme Council for Environment and Natural Reserves.

The Punj Lloyd project team has raised the bar of excellence in every aspect, to make it a show case project in the pipeline history of Punj Lloyd. Each team member is committed to the highest standards of Health, Safety, Environment and Community Relationship to deliver the best, safest project with the active participation of the management.

The project achieved its first milestone of gas in by March 31, 2010. ♦



# Punj Lloyd's First Order in Yemen

## **Bharat Kaul**

Head - Project Control, MEA & CIS, Punj Lloyd

**It is with great pride that Punj Lloyd commenced work on the Yemen LNG project. After all, it is not every day that a company gets the opportunity to work on a country's largest-ever industrial investment.**

Launched by the Government of Yemen and the Yemen LNG shareholders (Total, Hunt, Yemen Gas Company, SK Corporation,

Korea Gas Corporation, Hyundai Corporation and the General Authority for Social Security and Pensions of Yemen), the Yemen LNG project is of enormous importance to the country's economy, as a catalyst of development and modernisation.

The Republic of Yemen came into force in 1990 with the unification of North and South Yemen, after their independence from the Ottoman and British Empires,








**Punj Lloyd's project, a part of the LNG Terminal of capacity 6.7 MMTPA, is a major stepping stone for the economic growth and investment of Yemen**





A team of about 250 staff and 2800 workmen with the required skills, were mobilised at peak to undertake increased construction volume, which was key towards successful completion

respectively. After a period of civil war between 1990 to 1994, political stability provided a boost to the country's investment and economic activity.

#### **The Project**

The project consists of linking the existing gas processing facilities at Marib and transporting the natural gas through a 320 km, 38" dia pipeline to the LNG plant in Balhaf, south of the country.

Punj Lloyd was awarded the construction contract for the Offsite and Utilities of the LNG terminal.

Besides providing employment opportunities to Yemenis, this project has been viewed as a stepping stone to attract investors to the region, providing an impetus to economic growth and creating an identity for Yemen in the international markets.

#### **Scope of Work**

The main components of the contract included:

##### **Offsite**

The offsite comprised installation of a 135 m high derrick flare stack with four flare tips, a knock-out drum, gas reception station, ground flare system, interconnecting pipe rack to the LNG production trains, marine flare and fire fighting system.

##### **Utilities**

The utilities included construction of a power generation system – four Frame 5 gas turbines of 26 MW each, an emergency power system – four diesel engine driven generators of 1.75 MW, nitrogen generation & air separation unit (8500 kg/hr), steam



35-TR-0101A

generation system (60 T/hr, super-heated steam at six Barg 195° C), desalination system (3 x 446 T/day), air compressors (3 x 5232 N cum/hr), chilled water production system, potable water system, diesel storage system, five electrical substations, material off-loading facilities (MOF), boil-off gas (BOG) compressor unit, LNG storage tank piping, refrigeration unit, sea cooling water intake system (25 to 1,900 mm diameter GRP Pipes – 32 km), effluent treatment plant and an electro-chlorination unit.

### **Challenge**

The nearest town from Balhaf was about 200 km away. The remote location of the site meant logistical challenges both in terms of material and manpower. A majority of the material was imported from UAE & Saudi Arabia.

As the project was large and involved extensive dealing with the local authorities, there were associated procedural approvals required for licensing and other commercial work.

The scope of work met frequent changes. The magnitude and the intricacies of the project resulted in engineering alterations and changes in the procurement of material, resulting in substantial increase in the volume of work. Increased scope led to increased manpower, and consequent challenges in recruitment, mobilisation and retention of people.

### **Managing Challenges and People**

Punj Lloyd quickly adapted to meet the challenges presented before it. To enable smooth functioning at the site, Punj Lloyd maintained



cordial relations with the local government authorities and local tribal leaders, seeking their support and cooperation.

The most striking aspect of the project was the skill and expertise with which the manpower was mobilized. A chartered flight was arranged from Sana'a international airport directly to the site. A team of about 250 staff and 2,800 workmen with the required skills, were mobilised at peak to undertake the increased volume of construction. This was a key factor in the successful completion of the project. The workforce at Yemen LNG was representative of the cultural diversity so distinctive of most Punj Lloyd projects. The workforce comprised Yemeni, Indian, Pakistani, Indonesian, Filipino, Syrian, German and British nationals.

It is this team of highly motivated and dedicated people that continued to deliver, undeterred by the hindrances, bringing laurels to the company and reinforcing Punj Lloyd's strong core values of performance, teamwork, reliability and the 'Can Do' attitude.

#### **Equipment Mobilisation**

Owing to the rich equipment assets Punj Lloyd owns, mobilisation of equipment was another complex task made simple. For heavy and critical lifts of the Derrick Flare, a 1,250 MT crane was mobilised from Europe, while the radiographic source was mobilised from South Africa.

The site recorded 10 million manhours without lost time injury. Various measures were employed to ensure their safety





### **Corporate Social Responsibility**

In its projects globally, Punj Lloyd undertakes community development as an intrinsic element of its business. To empower the locals, Punj Lloyd trained and provided employment to local Yemenis. At the peak of construction, 20 Yemeni staff and 340 Yemeni workers were employed. Regular trainings on trade skills, safety and quality were provided to enhance the skills of the entire workforce.

Punj Lloyd also ensured that the

local economy benefitted, by hiring vehicles, machinery and awarding subcontracts to Yemeni vendors and subcontractors, providing local businesses the opportunity to gain experience and showcase their project execution capabilities.

### **Safety and Security**

Safety and security of Punj Lloyd personnel was paramount for the entire duration of the project. The site recorded 10 million manhours without lost time injury. Various

measures were employed to ensure their safety. Besides providing armed security escort during road travel, the entire site was also enclosed by a high security fence, and heavy guard, with the support of the client.

### **Highlights**

A remarkable achievement was the laying of 34 km of GRP underground and aboveground piping from 25 to 1,900 mm diameter.

To empower the locals, Punj Lloyd trained and provided employment to local Yemenis. At the peak of construction, 20 Yemeni staff and 340 Yemeni workers were employed









The erection of the derrick flare, which is the tallest industrial structure in Yemen, is a pinnacle of success for the Yemen LNG project and a symbol of growth for the country. With the successful completion of

its first project in Yemen, Punj Lloyd has carved a niche for itself, based on timely completion with high standards of quality and safety. ♦

# Rigs to Riches

Punj Lloyd Upstream deploys two onshore rigs in Libya

## **Vikram Walia**

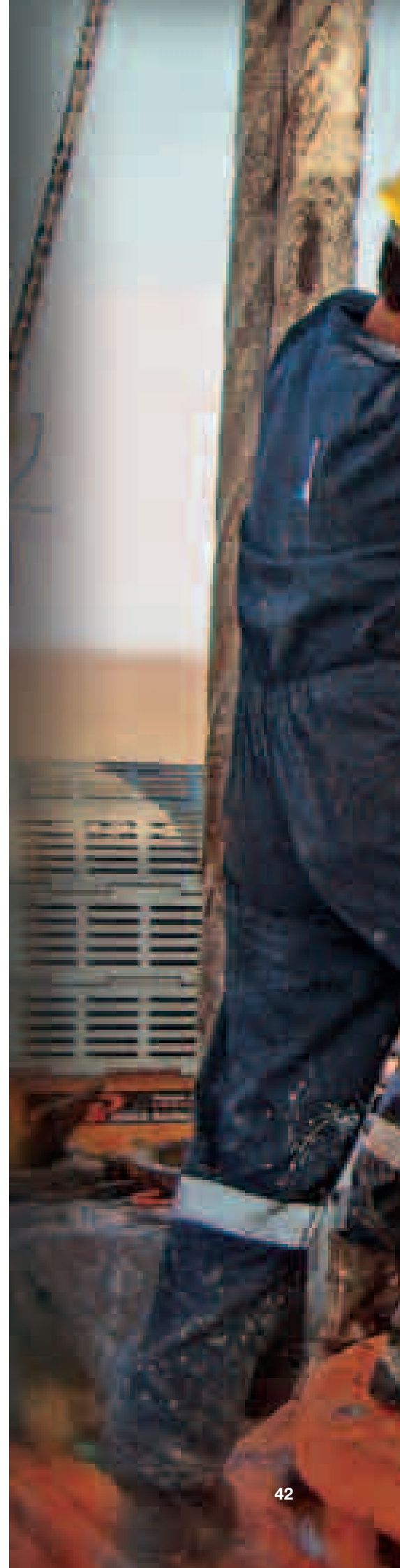
CEO, Punj Lloyd Upstream

## **Gurpreet S Sara**

Vice President – Operations  
Punj Lloyd Upstream

**It was in 2009 that Punj Lloyd Upstream, a subsidiary of Punj Lloyd Ltd, won its first contract for deploying two onshore rigs for Waha Oil Company in the prolific Sirte Basin, Libya.**

A proud moment for Punj Lloyd as the expansion into the upstream business further cemented Punj Lloyd as a complete service provider in the Oil & Gas sector. The Group is renowned for its core









competencies in the upstream, midstream and downstream services.

### History

Punj Lloyd Upstream Ltd was incorporated in August 2007 to capitalise on the opportunities in the oilfield drilling and services sector.

### Poised to flourish

The international oil & gas drilling sector is highly competitive and capital intensive. Demand for drilling services is based on general economic conditions, oil & gas prices, upstream capital budgets and oilfield activity.

Drillers such as Punj Lloyd Upstream Ltd facilitate E&P companies in achieving their goals in the most efficient and economical manner.

### Challenges in the industry

Despite continued high oil prices, problems range from insufficient drilling rig capacity, shortage of qualified personnel and escalating costs for drilling and development. Factors influencing the oil & gas drilling business include:

- Declining rig availability
- Advancement in drilling technology
- Long lead time to manufacture rigs
- Rise in drilling costs

### Current Operations Overview

#### *Contract with Waha Oil Company*

Punj Lloyd Upstream has invested in two brand new AC VFD 1500 HP Onshore Rigs with drilling capacity of 5,000 m from Le Tourneau

Punj Lloyd Upstream was conceived with the objective of creating a world-class drilling company using state-of-the-art technology, HSE systems, and quality as differentiators





In one year of operation, we have drilled a meterage of 75,000 feet without any major downtime. We pride ourselves in our experienced crew of well engineers

Libya has the largest proven oil reserves of any African country — equal to about 3 per cent of the global total



Technologies Drilling Systems  
International LTDSI, Houston, USA.

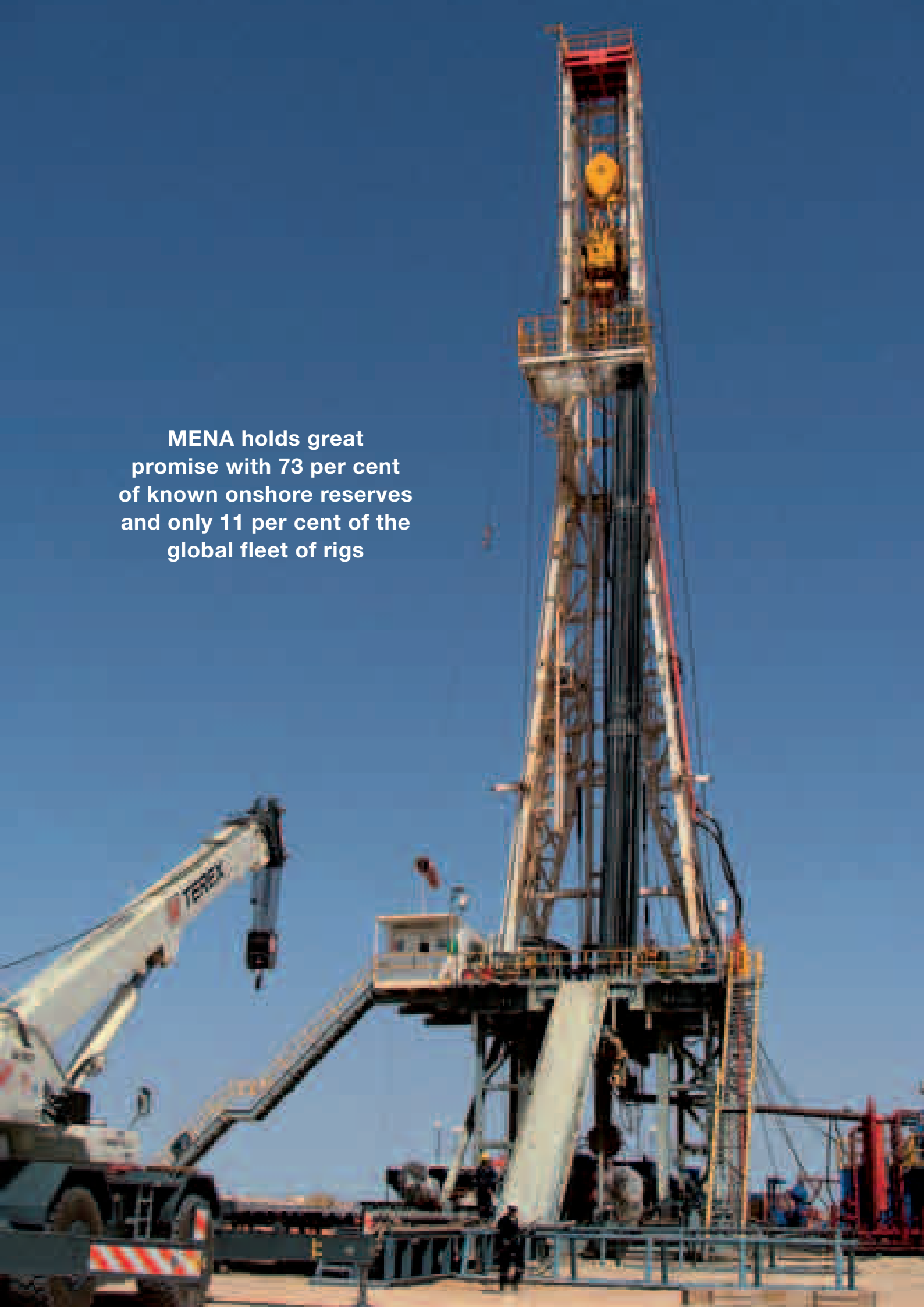
Punj Lloyd Upstream was contracted by Waha Oil Company to deploy both drilling rigs along with equipment and personnel in the Harash & Al Fareigh oilfields of the Sirte Basin oilfield for two years. The contract requires drilling of both exploratory and development of wells. Waha Oil Company is the second largest crude oil producer in the country, operating four large acreages, the largest being the Waha oil field. It is a joint venture between National Oil Company of Libya, and Marathon Oil, Conoco-Phillips, and Amerada Hess of the United States. Waha Oil Company manages oil export for several companies through its production lines running from the Sirte Basin to Essider terminal. Our first location for drilling was over 500 km into the Sahara Desert. The closest source of food, water or any form of infrastructure was a formidable distance away. Our hardy crew and their 'never say die' attitude however soon established a camp and started the rig building process at site. Moving the rig and auxiliary equipment took the team over 150 truckloads each. The crew stayed in the desert for long periods at a stretch, virtually cut off from outside world, with limited use of satellite phones being the only means of

- The closest village from the drilling location was 275 km away
- The moving of each rig and equipment was done by 150 truckloads, covering 1800 km over a period 10 days of driving
- Achieved 409632 LTI free man-hours in a year

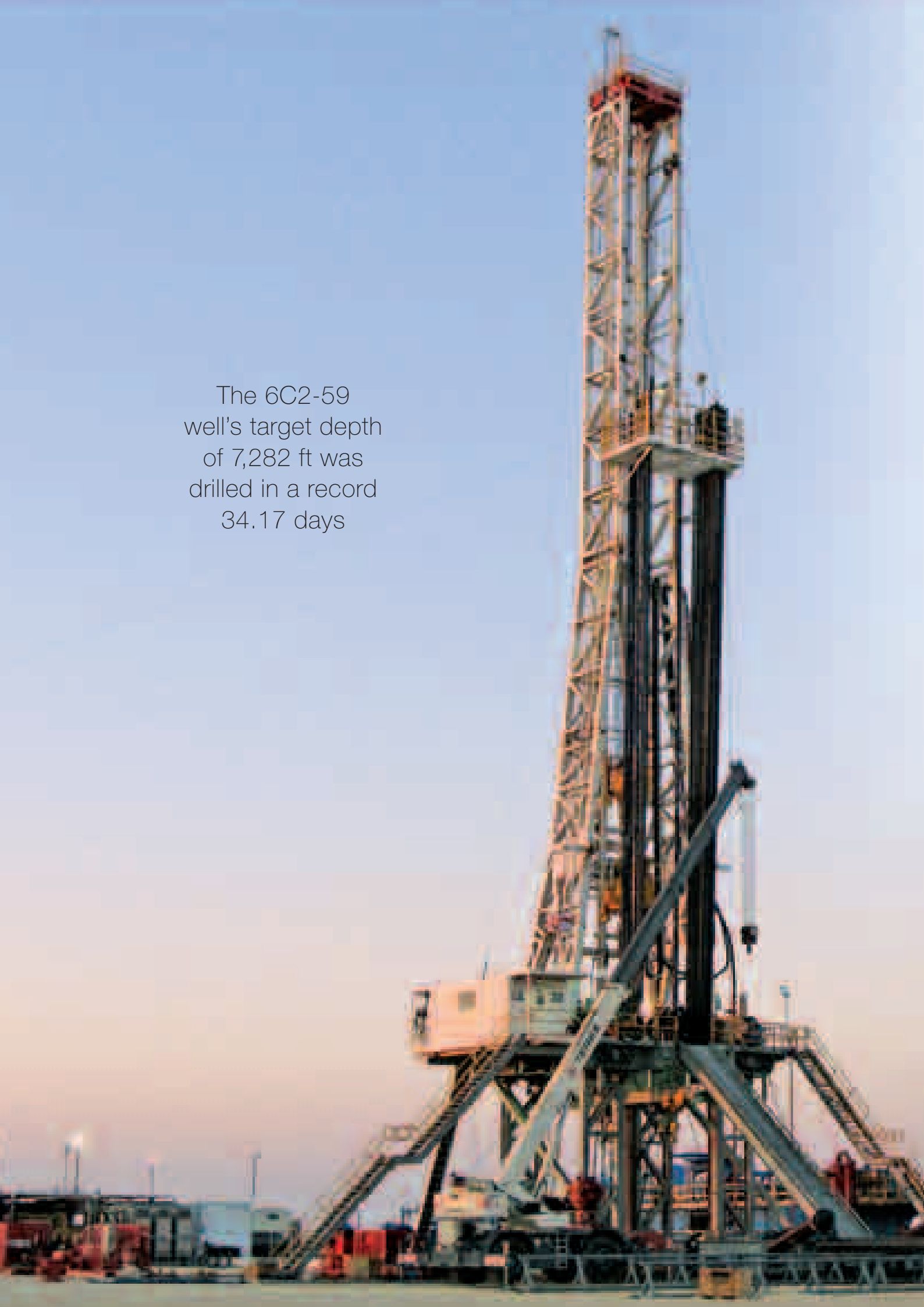
communication. Logistics was a huge challenge. In August 2009, five teams from Waha Oil came for the rig-up inspection and testing, preparatory to spudding the well. Apart from building the rig at site and integrating the critical rotating equipment to the mud system, VFD, and testing all the electronics, the acceptance test also involved preparation of drilling fluids, bottom hole assembly and stands according to the drilling program. When the rig is ready to drill; initial drilling is by an open hole, which requires a Bottom Hole Assembly and drill pipes. Upon reaching the desired depth, the drill pipes and bottom hole assembly are pulled out to insert the casing. Post casing, well control equipment is installed and the assembly and pipes are run in. Post running in, drilling resumes according to the drilling program. The complete well is drilled in three stages - top, intermediate and final section;



**MENA holds great  
promise with 73 per cent  
of known onshore reserves  
and only 11 per cent of the  
global fleet of rigs**



The 6C2-59  
well's target depth  
of 7,282 ft was  
drilled in a record  
34.17 days



each section is drilled, circulated, cased and involves installation of suitable well control equipment - diverter, rams, flow lines, nipples etc. Throughout the drilling process the drilling parameters are continuously monitored and varied as per formation pressure, temperature and cutting variations.

### Major achievements

Rig P127 is deployed in Harash Oilfield and drilling exploratory wells. A major discovery in Well 6P1-59 where a Drill Stem Test was conducted resulted in large new pay-zone being found in the Zeltan formation. This was an extremely challenging well but with the experience of the crew, the drilling gas was completed successfully. The find was reported by WAHA in the international media. Rig P128 is drilling development wells, both horizontal and highly deviated wells in the Al Fareigh field. Most of the wells are being drilled to carry gas to the Al Fareigh Phase I facility. Rig P128 has established good benchmarks in drilling

### Salient features

- 1,500 HP mobile rig with state-of-the-art equipment
- Driller's cabin with joy stick controls
- Variable frequency drive for optimum energy utilisation
- Direct drive – Top drive
- Mast raising and lowering with safe hydraulic jack system
- Mast dollies for transportation of mast in single section along with top drive, travelling block and drill-line

efficiency of development wells.

In one year of operation, we have drilled a meterage of 75,000 ft without any major downtime. We pride ourselves in our experienced crew of well engineers. HSE is integral to our working culture. Job planning, daily toolbox talks, hazard identification and mitigation by the crew have been appreciated by the client. Every crew member is empowered to stop work if he considers it unsafe or does not understand the job.

### Bringing Quality to the Oilfield

We don't have to be the biggest to be the best. Our primary mission is to bring quality to the oilfield. The Punj Lloyd Group has a strong foothold in the MEA market, with infrastructure and oil & gas projects. These markets are extremely competitive, with high weightage for quality and safety. With E&P companies inclined to award entire oilfields on a turnkey basis, Punj Lloyd Upstream offers a complete



suite of services in the oil & gas value chain. Punj Lloyd Group belongs to the rare league of contractors offering a wide spectrum of services from upstream to mid and downstream to a global market. With the drilling expertise firmly established, Punj Lloyd Group can boast of having the in-house ability to execute contracts related to the discovery and extraction of hydrocarbons, which vertically complements the suite of services past the wellhead and up the value chain. ♦

# The Road Less Travelled

Punj Lloyd starts its EPC journey in Africa with Libya's Melita-Tripoli pipeline

**K K Saha**

Country Head - Africa, Punj Lloyd

**True to its nature of exploring new markets and new opportunities, Punj Lloyd entered Libya in 2006, carving a place for itself in Africa's construction industry, poised to grow multifold in years to come.**

Punj Lloyd's foray into Africa started with The Great Socialist People's Libyan Arab Jamahiriya (GSPLAJ), popularly called Libya.

A culturally homogeneous country, Libya is referred to as a hydrocarbon state after the discovery of oil in 1958, when it was transformed from a poor agricultural country to a leading petroleum producing one. Arabic is the main language, while Berber is spoken in the southern part of Libya. The history of Libya is a checkered one with five distinct periods: Ancient period, the Islamic period, Ottoman rule, Italian rule, and the modern



era. It was in 2003 that the UN Security Council lifted sanctions, allowing the economy to open up and infrastructure to develop.

Doing business in emerging markets is a challenge for any company. However for Punj Lloyd, its can-do attitude and the ease with which it readily adapts itself to local environments, has enabled it to strengthen its foothold in the country. As a first step in this direction, Punj

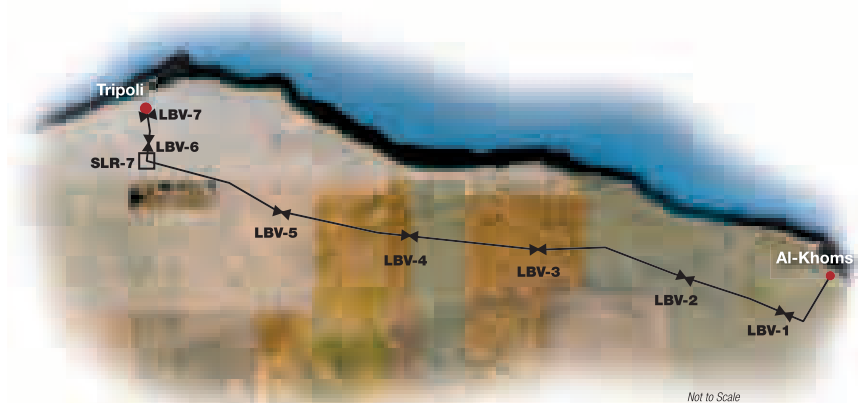
Lloyd signed two contracts with the state-owned Sirte Oil Company Marsa El-Brega for Engineering, Procurement & Construction of El Khoms-Tripoli Gas Pipeline Project with Compression Facilities at Sidra and Wachkah (KTGP) and Tripoli-Melita Gas Pipeline Project with Compression Facility at Melita on a turnkey basis. These are Punj Lloyd's first EPC pipeline projects in Libya and will cater to the energy demand of various industrial facilities like power, cement, desalination plants and other utility service providers; to replace currently utilised diesel

The only man I envy is the man who has not yet been to Africa - for he has so much to look forward to.

*Richard Mullin*



Punj Lloyd developed a bond with the local community by recruiting 500 Libyans, providing them training in various construction activities



with a cleaner, more economical and environment friendly natural gas.

### El Khoms-Tripoli Gas Pipeline

The natural gas will be supplied from west of Marsa El-Brega towards Misurata and Tripoli. The project is a part of upgradation and expansion of the existing 700 km 34" dia pipeline from Marsa El-Brega to El Khoms/Misurata by designing and constructing two new compressor stations; one at Sidra and other at Wachkah. The new line will increase the gas flow rate from the existing 86 MMSCFD (Million Metric Standard Cubic Feet per Day) at El Khoms to 346 MMSCFD.

The scope of work includes re-

designing, procurement, construction and commissioning of 150 km 34" dia and 7 km of 20" dia pipeline, two turbo compressor stations, three scraper launcher and receiver stations, one gas pressure reducing and metering station, 18 line block valve stations and upgradation and automation of the existing Misurata El Khoms section.

### Tripoli-Melita Gas Pipeline

This project will replace currently utilised diesel in Western Libya through ENI Gas B.V. Natural Gas from Wafa Production Field, near the Algerian border to Melita for further processing and subsequent distribution. While a substantial part of this gas will go to Italy, about 200 MMSCFD will be distributed to consumers through a new 34" dia pipeline with a new compressor station at Melita. The main consumer is state-owned Power Plant at Zawia where consumption is estimated to be of 120 to 170 MMSCFD.

The 200 MMSCFD of gas from Melita Compressor Station will be conveyed via 34" dia, 99 km pipeline towards Tripoli at the rate of 170 MMSCFD being supplied to Zawia



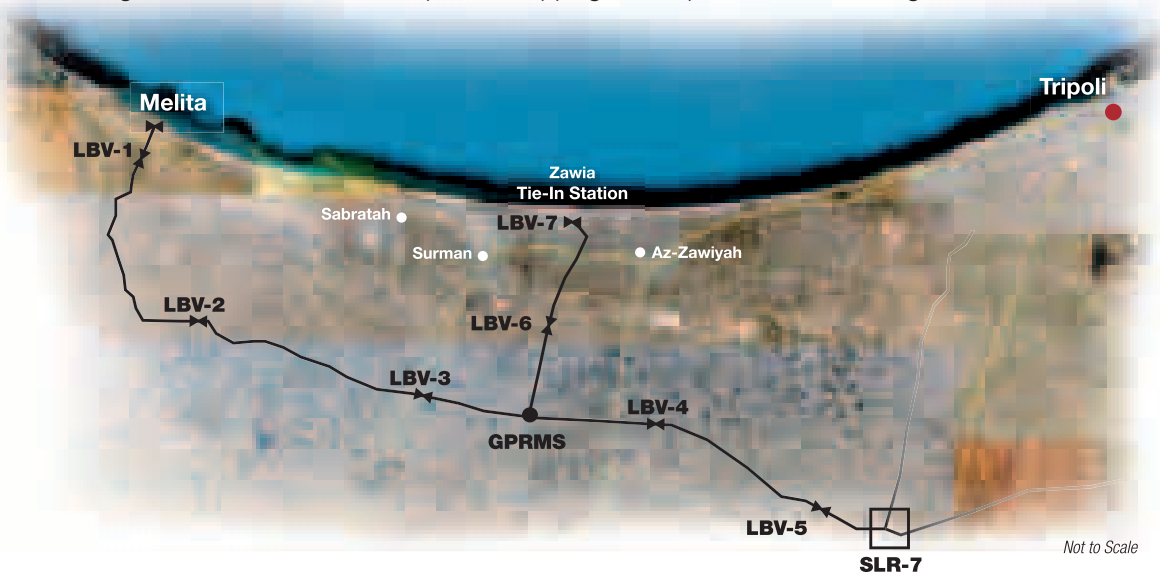


Power Plant via Zawia Gas Pressure Reducing and Metering Station and 24" dia, 22 km branch pipeline. The pipeline consists of seven line block valve stations and one gas pressure reducing and metering station.

Once the expansion is completed, the 34" dia, 1,100 km coastal transmission line, will extend from Benghazi to Melita via Marsa El-Brega, Misurata, El Khoms & Tripoli.

Both projects involve automation through state-of-the-art instrumentation & control systems, equipment for gas monitoring, SCADA and telecommunication systems, using fibre optic cables and micro wave technology; interfacing at Marsa El-Brega Muster Station for SCADA, fire and gas systems.

The scope also includes hot tapping, start-up and commissioning



Punj Lloyd has embarked on these gigantic tasks, deploying its resources in Africa, and is committed to establish itself as a reliable and credible EPC contractor



services required for the completion of El Khoms-Tripoli and Tripoli-Melita.

Punj Lloyd undertook the re-engineering of all process designs to incorporate cutting edge technology and new grassroots engineering for the project.

Health, safety and environment protection are paramount in all Punj Lloyd operations. Latest techniques of fire fighting are being used at the installations for preservative protection.

Punj Lloyd has installed two turbo compressors at Sidra, four at Wachkah and three at Melita Compressor Stations with other equipment for gas pressure control and processing facilities. All manual valves at existing stations at Misurata will be automated. A combination of microwave tower and fiber optical transmission system at 600 OTN rings was adopted for communication from Brega to Melita.

Currently working in 34 locations, spread across 900 km of coastal area, Punj Lloyd has over 1,600 employees with plant & equipment deployed at six major construction camps. Logistics for the projects are a real challenge, with large volumes of project equipment being imported from Europe, North America, Asia and delivered to the remote sites.

We have achieved substantial

progress for both projects, and are confident of completing them by the first half of 2011.

The Government had given a target to Punj Lloyd for early commissioning of Tripoli-Melita Pipeline by charging gas from Melita to Zawia Power Plant by March 2010. Punj Lloyd achieved this target which resulted in saving USD one billion per year for the Libyan Government due to the replacement of diesel with natural gas for running the power plant.

Overcoming challenges of extreme temperature, fluctuating from 51° C to 3° C, clouded sky due to sand storms in the desert, cultural and language barriers, Punj Lloyd slowly gained a foothold and proved that no challenge was impossible. Our workforce worked tirelessly to lay long pipelines, build huge turbo compressor stations, aside from 31 block valve and other stations. Lifting heavy equipment with cranes, during windy days, was a real challenge but owing to the company's stringent safety practices, it was achieved successfully. There are numerous anecdotes of the will and perseverance with which our people overcame various challenges.

Punj Lloyd built a bond with the local community by recruiting 500 Libyans and providing them training in various construction





## The entire workforce shares a feeling of camaraderie with the Libyan and Indian workers enjoying a stronger bond

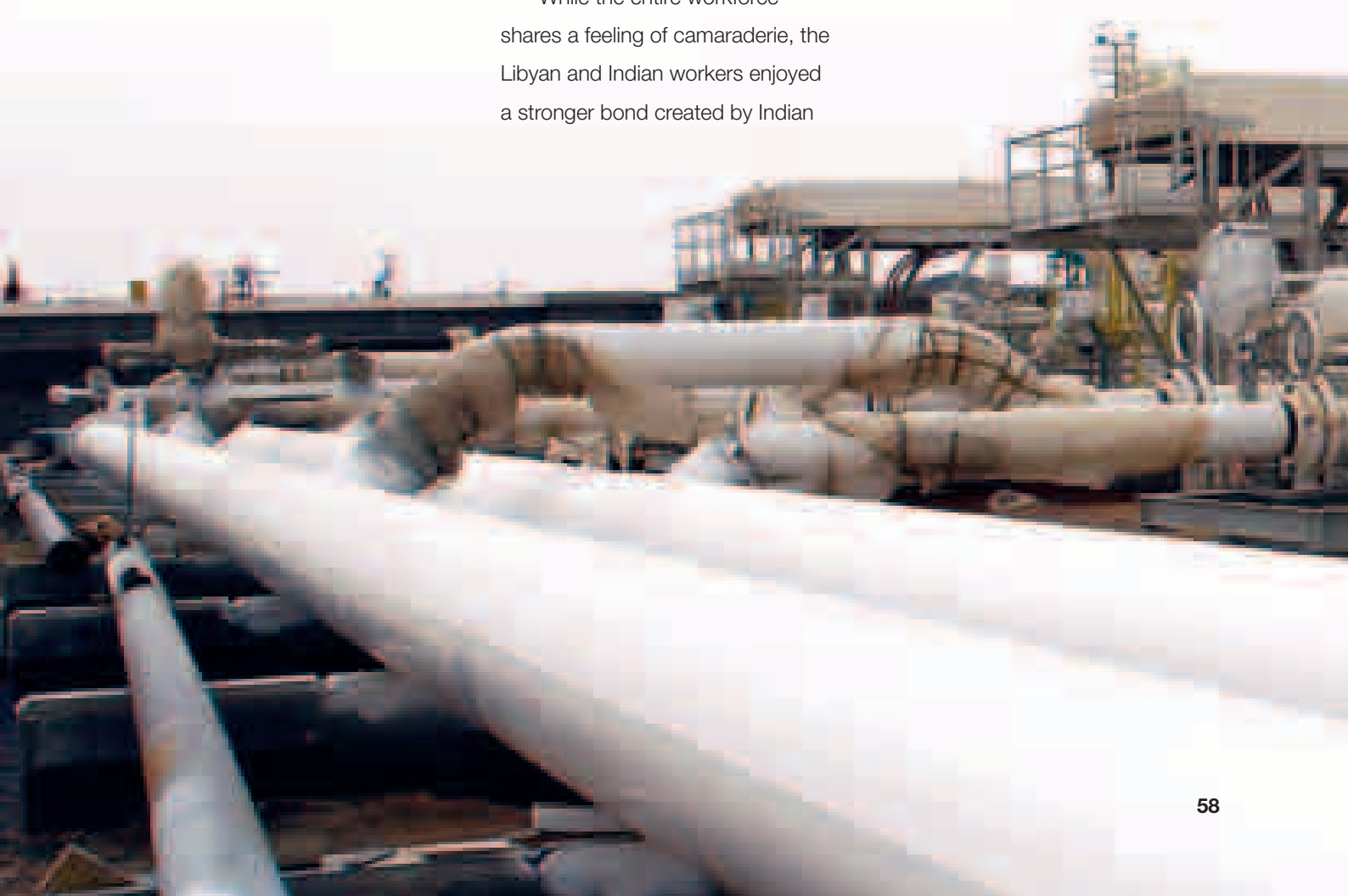
activities. Punj Lloyd provided opportunities for studying courses including English, computers and technical trade. Encouraging equal opportunities, Punj Lloyd recruited women in the offices, besides providing them training.

The world truly appears to come together at a Punj Lloyd site. Twenty one nationalities working collectively on a single project! Working for the first time with the Libyan Government, Punj Lloyd proved its mettle as an EPC contractor, capable of performing complex projects with its high-end equipment, manpower and expertise.

While the entire workforce shares a feeling of camaraderie, the Libyan and Indian workers enjoyed a stronger bond created by Indian

Bollywood films, and by celebrating Libyan and Indian festivals. This has resulted in a strong cultural bonding between the two.

After making an impact in the Oil & Gas sector, Punj Lloyd entered into the Infrastructure sector, bagging five prestigious contracts consecutively to develop the utilities of two areas of Tripoli and three complete towns of Libya. The scope of work encompassed design, procurement, construction and commissioning of complete drinking water systems, storm water systems, sewage water systems, electrical lines & stations,



telecommunication systems, city gas supply systems and all roads. The company has also entered real estate development in Libya through its subsidiary, Sembawang Libya. Libya also holds a special mention in Punj Lloyd's history as it brought us our first upstream contract, after the company's diversification in the sector, involving deployment of two onshore rigs for Waha Oil Company in the prolific Sirte basin.

Punj Lloyd has embarked on these gigantic tasks, deploying its

various resources in Africa, and is committed to establishing itself as a reliable and credible EPC contractor. The company looks forward to exploring more opportunities in the country given its promising infrastructure potential. It is poised to expand operations adding prestigious projects in the decades to come and playing an invaluable role in building Libya's infrastructure. ♦



# Everything Boils Down to a Blueprint

## Maneesh Pant

Senior General Manager, PL Engineering

**It is evident from the infrastructure around us – the millions of Skyscrapers, Oil & Gas installations and the long expressways – that their beginnings start with a dream and then a blueprint!**

That is where PL Engineering steps in. Oil & gas majors, Infrastructure & Power companies, Automotive and Aerospace giants see their concepts take shape as PL Engineering designs the foundations of their dream projects.

A design and consultancy company, accredited with ISO 9001

certification, PL Engineering provides services for plant, product and infrastructure sectors. Headquartered out of India, PL Engineering has seen a rapid ramp up of business and expansion in overseas locations to reach its global clients. With an aggressive start in the Oil & Gas and Petrochemical sectors, PL Engineering has diversified into engineering of Thermal & Nuclear

Power Plants, Renewable Energy and Product Design for Automotive & Aerospace. The company has



setup engineering establishments in UAE & Qatar and is setting up one in Netherlands as part of its global expansion strategy. Working closely with partner companies – Simon Carves in UK with high-end engineering expertise in polymers, chemicals and bio-fuels, and Technodyne in UK, with design and engineering expertise for cryogenic tanks, PL Engineering provides concept and feasibility studies, basic engineering, FEED (Front End Engineering Design), detail design engineering and project support services. PL Engineering has added edutainment including

content development and e-learning programs to its portfolio of services.

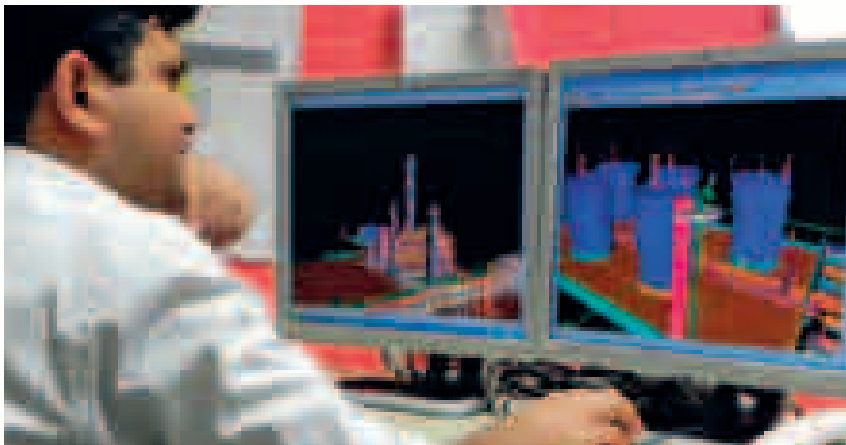
### **Middle East Operations**

The engineering staff based at Abu Dhabi and Doha is a dynamic mix of young and experienced professionals, driven by the single objective of making PL Engineering the company of choice for engineering services in the Middle East. It provides support to some of the most prestigious projects in the Middle East including Qatar Petroleum's Strategic Gas Transmission and Multiproduct Pipeline project, Oman Gas

Company's Gas Pipeline project, Qatar's New Doha International Airport project, Saudi Kayan's LDPE project and Gulf Fluor's 455 TPD Sulphuric Acid plant project. In a short span of time, PL Engineering has added Petrofac, Blackcat E&C, Kentz Qatar as its clients in the Middle East. These organisations stand testament to PL Engineering's growing recognition as a quality service provider. The engineering offices at Abu Dhabi and Doha have amenities and state-of-the-art IT infrastructure to support its business. The company is also seeing traction from sectors other than oil & gas and infrastructure, with the award of a project for a greenfield Polysilicon production facility in the Middle East by one of the major solar technology players.

Matching pace with PL Engineering's organic growth is its inorganic one, with Fidelity Growth Partners infusing private equity in the company. This investment demonstrates the confidence the industry has in PL Engineering's long term potential and will be significant in enabling the company to look at acquisitions and mergers in the future. ♦

PL Engineering provides concept and feasibility studies, basic engineering, FEED, detail design engineering and project support services



# Arabian Gulf's First Aluminium Fluoride Plant Takes Shape

**Simon J Callaway**

Project Manager, Simon Carves Ltd

**Simon Carves, a Punj Lloyd Company, is executing the Engineering, Procurement and Site Services for the Sulphuric Acid and Oleum Plant and Utilities for the Fluoride Complex for Gulf Fluor in Abu Dhabi.**

Gulf Fluor made a commitment in 2007 to build a new fluorides complex in the second phase of the industrial city of Abu Dhabi (ICADII), 30 km from the heart of Abu Dhabi. The new complex, which required an investment of USD 500 million (Dh2bn), will produce aluminium fluoride (AlF<sub>3</sub>) for the smelters, and anhydrous hydrogen fluoride (HF), an important raw material for polymers such as Teflon.

The plant will also include a new sulphuric acid/oleum production plant; this will make use of the sulphur recovered from production of low sulphur fuels. Simon Carves, with its experience of over 350 sulphuric acid plants, was contracted for the EP and site services for the Sulphuric acid and Oleum Plant. Hydrogen fluoride is manufactured on large scale by the reaction of sulphuric acid with mineral fluorspar (fluorite or calcium fluoride). This is the reason

that a dedicated sulphuric acid plant is required. The new fluoride complex is expected to start operations in the third quarter of 2011 and will be the first plant of this type in the Gulf.

## History

In this plant, the first in the region; a capacity of 60,000 MTPA of aluminium fluoride will be produced. In addition to the production of aluminium fluoride, an important additive in the production of aluminium, the plant will produce 10,000 MTPA of anhydrous hydrofluoric acid which is the raw material for a series of downstream fluorine chemical derivatives. The plant meets all standards required world-wide regarding environmental protection.

The by-product calcium sulphate (anhydrite) produced in the hydrogen fluoride reaction is neutralised and will be prepared for use in the building industry as raw material for floor screeding and making building blocks.

The aluminium industry in the Middle East is becoming increasingly important to the economy of the region. The demand for aluminium



Fluorite is an important mineral in the production of HF

## Capacity

### Products:

- 60,000 TPA Aluminium Fluoride ( $\text{AlF}_3$ )
- 10,000 TPA Anhydrous Hydrofluoric Acid (AHF)

### Intermediates:

- 53,400 TPA Anhydrous Hydrofluoric Acid (including above)
- 140,600 TPA Combined total Sulphuric Acid (98.5%) and Oleum (20% free  $\text{SO}_3$ )

is growing worldwide, particularly in the Middle East for construction projects and also for the manufacture of packaging products. Companies such as Aluminium Bahrain (ALBA) has the world's third largest smelter, producing 830,000 TPA, and is hoping to increase capacity to 1.2 million TPA.

The increase in all of this smelting capacity will require an additional source for aluminium fluoride, which is an important process component in the production of metallic aluminium.

## Methodology

The sulphuric acid/oleum plant is being designed, engineered and supplied by Simon Carves. Simon Carves has been involved in this project from its commencement, initially conducting the preliminary feasibility study for the Fluorides Complex in 2006. The company

went on to carry out the Front End Engineering and Design work for the project. The final phase of this project will involve engineering, procurement and construction management carried out in conjunction with the Swiss company BUSS Chem Tech AG as well as local consultants and construction companies.

Simon Carves is executing this project at three execution centers - in UK, Abu Dhabi and India, with worldwide procurement. In spite of the international locations and time zones, efficient communication and co-ordination along with the positive attitude of the project team has contributed immensely to overcome barriers.

## Technology

The technology for the production of the  $\text{AlF}_3$  and the anhydrous HF will be

provided by BUSS CHEM TECH AG of Switzerland, who will also supply the majority of the critical equipment.

The complex will have the capacity to produce 60,000 T of  $\text{AlF}_3$  per year and 10,000 T of anhydrous HF per year.

Aluminium fluoride is an important additive in the production of aluminium metal. The Arabian Gulf has become a major centre for aluminium production due to its attractive energy prices and vast energy resources.

Hydrofluoric acid is also used as an intermediate product in the manufacture of fluorinated polymers.

It is also used for petroleum alkylation, steel pickling, glass etching and production of nitrogen trifluoride. ♦



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