



Near-shore and offshore

When PT. Punj Lloyd Indonesia completed the EPC project of connecting the Indonesian islands of Panaran and Pulau Pemping by a 31 km 28" dia gas pipeline for PT. Perusahaan Gas Negara in 2003, it catapulted the company into the league of international offshore contractors. Our wide experience in South East Asia has encompassed pipeline projects in swamps, tidal flats, shallow waters and offshore.



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Challenges included
inaccessibility of islands,
due to swamp and
mangrove forests

update 

**constructing two terminal
stations on hilltops
involving 500,000 m³
of earthwork**



The pipeline which was completed in 12 months was one of the links of the Grissik – Sakaran – Batam – Singapore pipeline, transporting natural gas from south Sumatra to Singapore. It was known as the “Hopping Island Project”. Challenges included inaccessibility of islands, environmentally sensitive mangrove forests, undulating terrain, a rocky seabed with live coral reefs and granite rock. Working in the busiest shipping route connecting Singapore and Indonesia, crossing a river through difficult terrain by horizontal directional drilling and constructing two terminal stations on hilltops involving 500,000 m³ of earthwork sums up our list of challenges.

✉ V P Sharma

SCOPE OF WORK

- Detailed engineering and design for pipeline, OFC, two stations
- Procurement of all project material
- Fabrication, installation, testing and pre-commissioning of pipeline, fibre optic system, launcher and receiver stations
- Offshore pipeline 10 km
- Swamp pipeline 9.5 km
- Onshore pipeline 11.5 km spread over five islands





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international offshore
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Indonesia over a decade

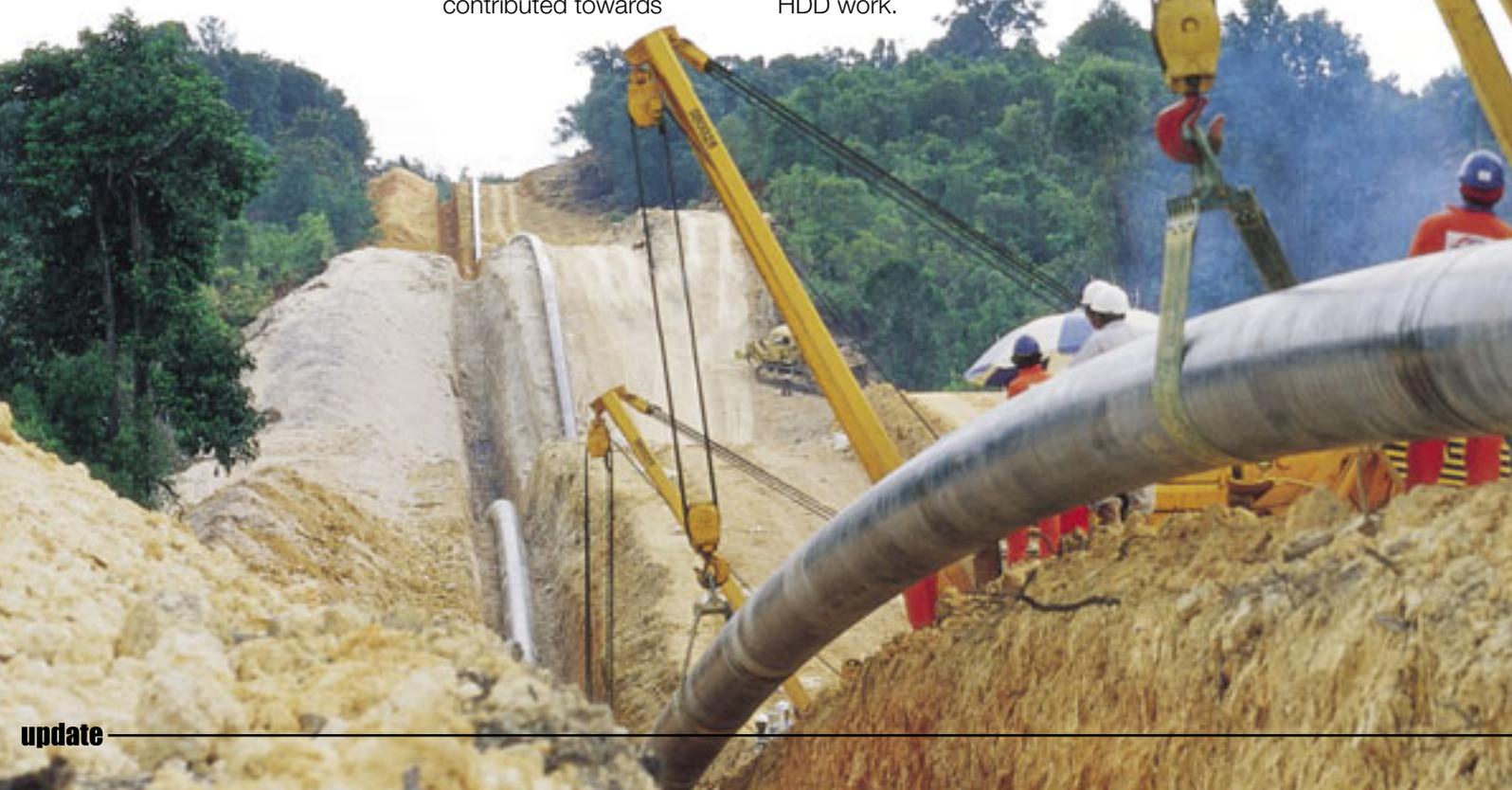
Punj Lloyd Limited

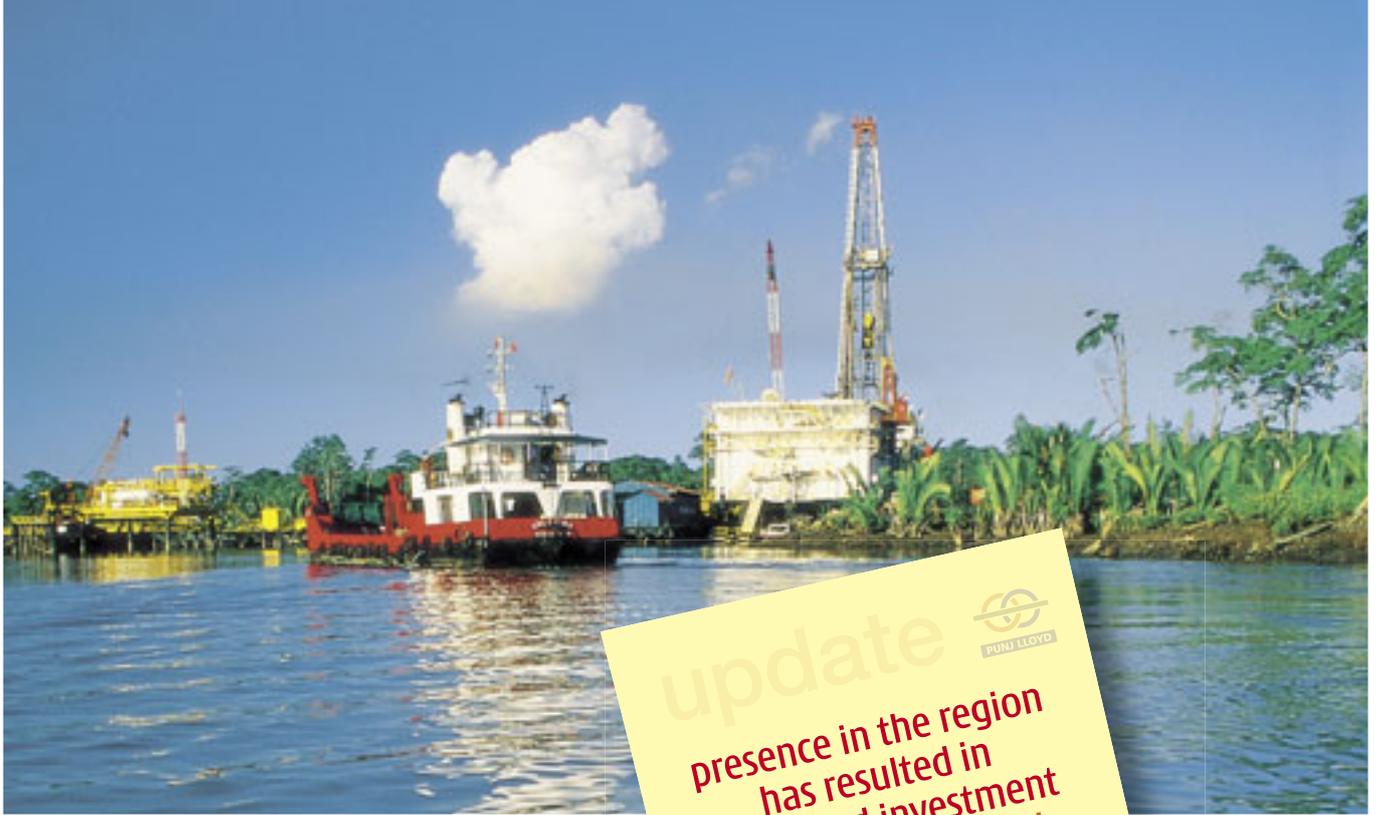
started its operations in Indonesia in 1993 with a contract to lay the 16" dia 210 km multi product Balongan Jakarta pipeline. At the time Punj Lloyd was the only Indian company in the hydrocarbon sector in Indonesia. Work commenced in April 1993 and we completed the pipeline in 12 months, against a completion schedule of 16 months. Pertamina, the state-owned oil and gas company of Indonesia, commended Punj Lloyd for its early project completion.

Some of the challenges faced in the execution of the project were the

language barrier and cultural differences, which we overcame by hiring and training local staff at the office and site levels. Interacting and working with the locals also gave us a valuable insight into the Indonesian work culture. We created a permanent bank of trained local personnel who continue to work on all our subsequent projects in Indonesia. The pipeline route passed through the island of Java which has the highest density of population in the world. Working through the populated villages and towns was a logistical challenge, both for our men and machines. We contributed towards

community development by helping the locals build a mosque and a school in a densely populated area along the pipeline route. Indonesia being a tropical country, is traversed by several rivers across which the pipeline passed. These we crossed by open cut method, augur boring and by horizontal directional drilling, a technology which was rarely used those days. HDD as it is commonly known, is an environment protective technology, favoured universally. Punj Lloyd has its own rig and has a subsidiary company, PLN Construction Pvt Ltd, which undertakes HDD work.





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presence in the region
has resulted in
continued investment
in construction and
amphibian equipment

In 1996 Punj Lloyd was awarded two prestigious EPC projects, the Kertapati Jambi pipeline and Satellite 'A' Tegal Gede-Tangerang pipeline by Pertamina. However,

the economic crisis struck the country and all state owned projects were suspended. At a time when many international companies relocated themselves, Punj Lloyd





was committed to continue its operations in Indonesia. The years during the crisis were not easy ones, however, we pride ourselves in meeting challenges head-on.

In 1997 PT. Punj Lloyd Indonesia was incorporated to establish a regional presence in South East Asia.

We soon bagged a swamp and near shore pipeline project from Pt. Bouygues Offshore (now known as Saipem) for the owner, TOTAL E&P Indonesia. Our work for

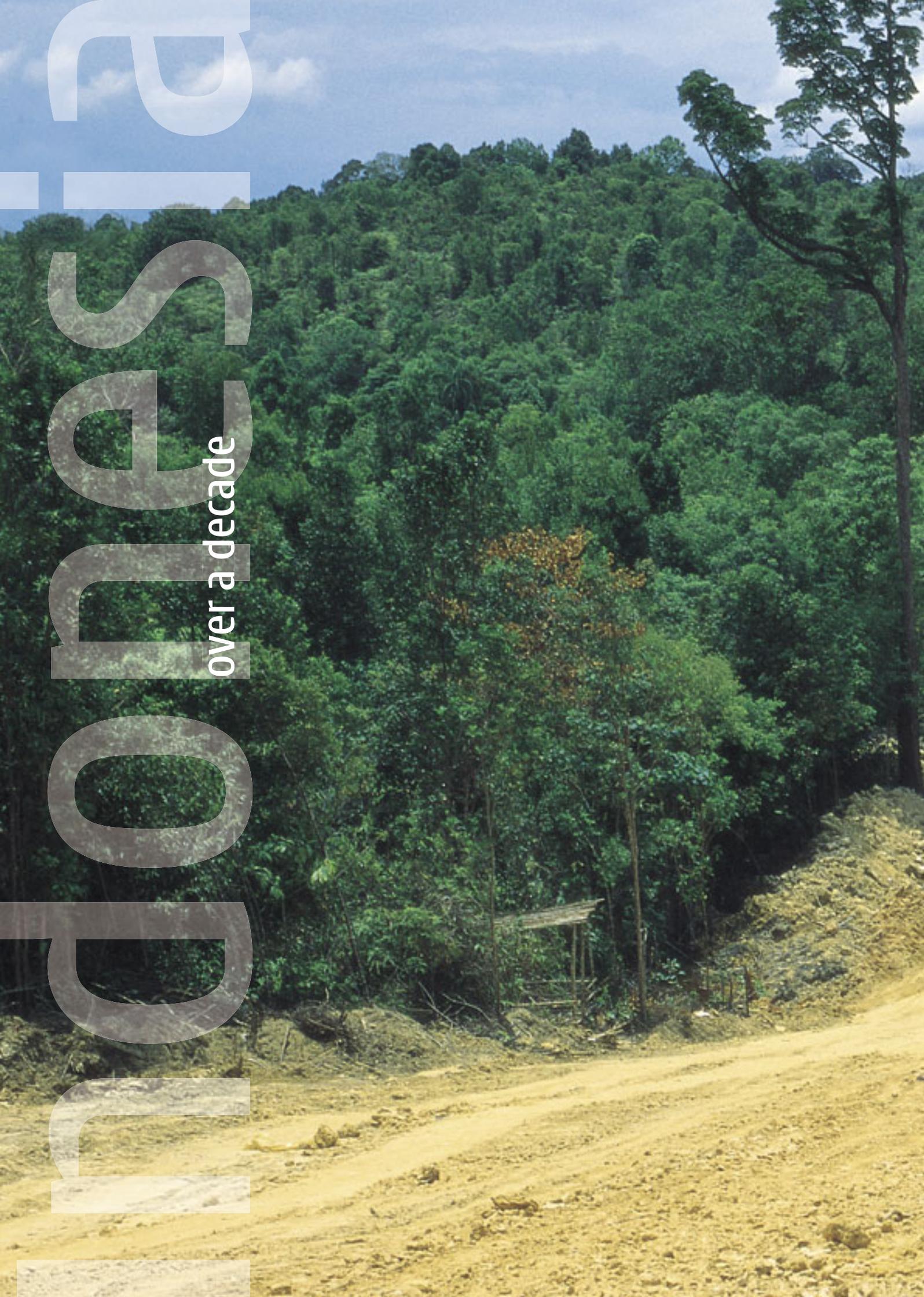
this project has resulted in our continued presence in Kalimantan, with TOTAL E&P Indonesia as our client.

Our commitment to establish a presence in the region has resulted in continued investment in construction and amphibian equipment. Our equipment yard includes a jetty for small ships and barges.

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TOTAL awarded an EPC swamp and shallow water pipeline project



Reborn over a decade







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Safe Manhours in Indonesia

- 1.89 million Panaran Pemping
- 1.32 million Tunu 9
- 1.31 million Tunu 7
- 1.25 million Caltex
- 1.12 million Tunu 8
- 0.85 million Tunu 4&5



We also undertook field development work in Duri Sumatra for PT. Caltex.

In 2002 Punj Lloyd was awarded an EPC onshore, swamp and shallow water pipeline project by Perusahaan Gas Negara. Perusahaan Gas Negara owns most of the gas pipelines in Indonesia. The pipeline was part of the Sumatra Singapore pipeline and our section included hopping islands of Panaran and Pemping. This project truly launched our offshore division, as until then we were acknowledged leaders in swamp, tidal flats and near shore pipeline laying.

Also in 2002, Total awarded us an EPC pipeline project, that of Tunu Field Development Phase 9. And as a confirmation of their continued confidence in our project management capabilities, Total awarded us, on competitive basis, an EPC project- Peciko gas processing facilities at Senipah.

Punj Lloyd Limited and Pt. Punj Lloyd Indonesia over the last decade have built on its reputation to provide international standards of quality construction and HSE practices, completing projects on time for oil and gas majors of the hydrocarbon and infrastructure sectors in the Far East.

The Peciko EPC Project takes off

The PECIKO Phase IV

project in Senipah, East Kalimantan, Indonesia will soon be completed by PT. Punj Lloyd Indonesia for TOTAL E&P Indonesia. The project comprises two trains of 550 MMSCFD medium pressure gas compression facility. Work scope includes detailed engineering, procurement and supply, construction, pre-commissioning and assistance for commissioning.

PECIKO is a gas and condensate field located offshore East Kalimantan, south of Mahakam river delta, 25 km from TOTAL E&P Indonesia's Senipah terminal. The work is a part of the overall development programme of TOTAL in this gas field region.

The onshore facilities will receive, treat, compress and export the medium pressure production flows from PECIKO Phase IV offshore fields.

To overcome low pressure of 30 barg. at the offshore fields, the new facilities will compress the inlet gas to 40 barg. medium pressure for supply to the export gas pipeline, terminating at Bontang LNG plant.

The award of the project by TOTAL E&P Indonesia was against international competitive bidding. The team includes Indian engineers and Indonesian supervisors and workmen. While sourcing of material was carried out worldwide, maximum local resources were utilised. Challenges included development of site and housing facilities amid dense tropical forest, setting up an effective communication system and an elaborate amphibian transport system to overcome inaccessibility of the site.

The achievement of



transporting and installing two turbo compressors, each weighing 300 MT with dimensions of 27 M length, 15.50 M height and 7.15 M width, was due to meticulous planning and stringent safety precautions and procedures.

The compressors were unloaded at the Senipah jetty and were erected at a distance of 1.5 km on their respective foundations. Inland transportation was by means of a self propelled modular trailer with 118 axle lines and

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maximum local resources were utilised

216 tyres. The entire erection was carried out without the use of any crane. Four hydraulic jacks of 150 MT capacity were used.

This feat was accomplished inspite of heavy rains and was executed in 11 days.

AK Gupta



New Horizons, **New Aspirations...**

TUNU, a gas and condensate field located East of Kalimantan (Indonesia) on the outer margin of the Mahakam delta, is partially onshore in swamp areas and partially offshore in shallow waters.

Tunu Phase 9 development allows TOTAL to meet its production requirements by constructing trunklines to connect new Gathering Testing Satellite Stations to the existing pipeline network. Punj Lloyd was awarded the EPC contract for Tunu Field Development Project – Phase 9 /EPSC 2.

The offshore pipelaying operation had to contend with currents exceeding 8.5 knots. The 20" dia pipeline had to be laid from the shoreline (KP 2100) to the offshore platform, Gathering Testing Satellite Station

at KP0. The pipestring was fabricated in two sections of 1300 m and 900 m. Lateral guide piles were driven in two rows, 3 m apart along the entire length, to arrest the lateral movement of the pipestring at high tide. Custom built poly buoys were attached to the pipestring during the pulling operation.

A cutter suction dredger was deployed for pre-trenching due to the presence of clusters of sand dunes in the offshore sea.

A work barge with a four point mooring system was positioned to pull the string. The barge was equipped with a 75 T crane, a dual RTK GPS positioning system and a 7 T winch with 22 mm wire rope.

The wire rope was laid by a push boat between the two lateral guide

Scope of Work

Engineering and procurement of all material

- 20" dia 19.05 mm CC API 5L Grade X 65 15.7 km
- 8" dia 18.6 mm API 5L Grade X 65 with a 2" dia piggy back line 1.7 km

Pipeline construction

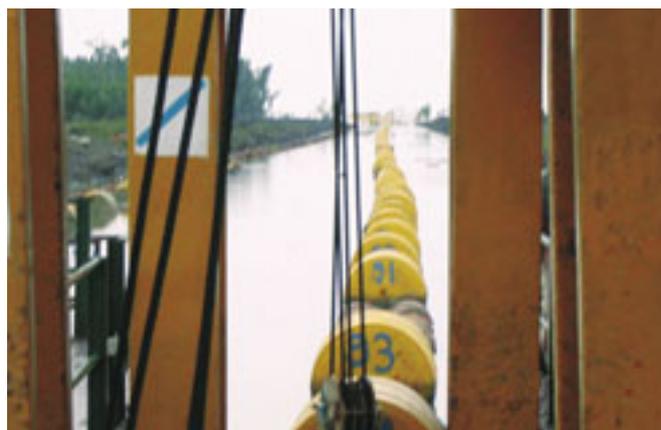
- Offshore by conventional method 3.2 km in shallow water
- Offshore by Push Pull method 2.3 km
- Swamp Push Pull 5.8 km
- HDD in swamp with Rig mounted on Barge 4.1 km
- Bottom Pull Shore Approach 2 km

piles. The first string of 900 m was successfully pulled offshore. The tie-in of the two strings was completed in a swamp trench, using four flexi-yoke barges with two swamp excavators. As tie-ins, radiography and field joint coating on flexi-yoke barges are high tide dependent, timing is very critical.

Pulling operations resumed at the Gathering Testing Satellite platform (KP0) in spite of currents of 3 knots and the pipeline was successfully pulled

with design calculations, sketches, assessment, constant monitoring, using underwater divers' expertise.

Installation of risers and dogleg at five platforms of 8" with 2" piggy back line and 20" dia was successfully completed. This was the first time that the installation of risers and dogleg assembly was handled by us. Pipe laying on an existing pipe rack is a very critical activity as it is parallel to a live pipeline within a very congested area.



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**laying of the longest
pipeline length
of 2000 m by Horizontal
Directional Drilling**



The offshore pipelines are laid with accuracy of ± 5 m while the platform position is fixed. A comprehensive metrology is performed by divers to finalize the length of the dogleg based on the actual position of the laid pipeline. The dogleg spool is fabricated on the barge itself. The final tie-in is done in 2G position at the location above the riser clamp.

PT. Punj Lloyd Indonesia acquired a 230 ft barge with a deck loading capacity of 10 T/m². The barge is fitted with four davits each for SWL (a safe working load) of 35 T and is supported on four point mooring system. The mooring winches have a capacity of 35 T with a drum capacity of 900 mtr. Two cranes of 150 T and 50 T are mounted on this barge in order to

carry out the installation of riser and dogleg assemblies. The barge is fitted with dual RTK GPS Positioning System. Prior to mobilisation at site the positioning systems are calibrated for accuracy.

Another milestone successfully met was the laying of the longest length of 2000 m pipeline by Horizontal Directional Drilling. The pipestring had to be prepared and wet stored in the open sea, with currents of three knots. This was the longest HDD length undertaken by Punj Lloyd.

✉ A Rajendra

update 
**pulled with design
calculations, sketches,
assessment, constant
monitoring, using
underwater divers'
expertise**



It is an example of meticulous planning, to give a spurt to new business lines, as also to meet the needs of existing projects - Tunu Phase 9 and Peciko.

The Sungaipuran base camp of PT. Punj Lloyd Indonesia exemplifies all this and more. Sprawling over an area of 45,000 m², it is located by the Mahakam river in East Kalimantan. Built in a record ten months, the base camp is accessible by both river and road, the nearest airport being Balikpapan, 140 km away and the nearest city, Samarinda, about 20 km away.

The camp houses the PT. Punj Lloyd Indonesia office, residential accommodation, messing and recreational facilities of Punj Lloyd and TOTAL E&P Indonesia personnel, covering an area of 8,000 m².

The recently built fabrication shop is spread over 1,200 m² with a 10 T monorail gantry certified by Migas. Pre-fabricated piping amounting to 48,000 inch dia for the Peciko project is being fabricated at the shop.

The storage area for stacking pipes and fittings for pre-fabrication is 4,500 m². After completion of radiography, pipe spools are stacked in an area of 5,000 m² near the sandblasting yard. The yard has two sandblasting sheds with two working nozzles. Post sand blasting and



Sungaipuran Base Camp catalysing new business





painting, the pipe spools are stacked in an area close to the loading jetty, ready for sea transportation to the project site.

The workshop, extending over 3,000 m² is capable of undertaking maintenance of heavy swamp equipment like marsh buggies, swamp cranes, swamp excavators, pontoons and construction equipment like crawler cranes, welding machines, power generators and compressors.

An area of 6,500 m² has been earmarked for storage of line pipes required in pipeline projects. This is built over well-compacted ground accessible by crane on both sides. This storage area caters to the need of Tunu Phase 9 project, with 2,000 pipes ranging from 8" to 20" dia.

The warehouse includes a covered area of 640 m² in addition to the open storage area. Inventory is maintained and updated on an ORACLE based ERP system.

Future plans include construction of a skid way with a capacity of 1,000 T for fabrication and launch of offshore platforms and expansion of the area by 6,000 m². The construction of the skid way is expected to commence soon.

PT. Punj Lloyd Indonesia, with an excellent logistics base in East Kalimantan, is poised for execution of any project in South East Asia.

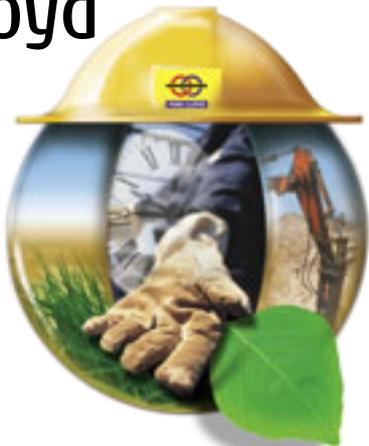
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**Sprawling over
 an area of 45,000 m²
 located by the Mahakam
 river in East Kalimantan**





TOTAL Audit

PT Punj Lloyd Indonesia HSE rating 86%



TOTAL E&P Indonesia conducts an HSE audit annually

on all its contractors, based on their area of operations. PT. Punj Lloyd Indonesia was audited under the Very High Risk category for the Tunu Phase 9 project.

A high level audit team led by Mr John Martin of Development

Department:
Methods &
Procedures TOTAL
conducted the
audit based on
15 criteria.

It was a proud
moment for
PT. Punj Lloyd
Indonesia at Tunu
Phase 9 when
the rating of 86%
was awarded.

15 criteria of HSE audit

- Policy Statement
- Emergency Response Procedure
- Safety Rules - Safety Manual
- New Employee Orientation Program
- HSE Meeting Program
- HSE Training Program
- Equipment and Materials Management
- Personal Protective Equipment
- HSE Inspection Program
- Accident Reporting Procedure
- Professional HSE Support
- Industrial Hygiene
- Environment
- Statistical Injury & Illness Data
- Incident Investigation

Safety first, Safety always

At all the sites of PT. Punj Lloyd Indonesia, safety induction, environment training and first aid programmes are conducted for all employees, from site management to subcontractors' personnel. On completion of the programme an undertaking is taken from the work crew to abide by the HSE rules in the course of construction. Safety and first aid programmes are regularly repeated as an ongoing exercise.

Daily toolbox talks are held prior to construction activity. The toolbox talk topic is prepared by the HSE department and conducted by the supervisor. Contents include day to day problems faced and hazards at site. Project Safety Committee meetings are held weekly with contractors and subcontractors. Inspections and audits are constantly carried out. Management walks are conducted and hazard observation reports are inculcated at all levels.

The HSE objectives achieved in 2003 encompass major explosion, fatality and lost time incident, fire incident, accident frequency, accident severity, near miss ratio, environmental incidents, vehicle incidents and hazard observation, with most equalling zero.

As part of emergency preparedness, there is always a medical professional on site. The Rumah Sakit Umum hospital is contracted to attend to major injury cases. In addition, emergency evacuation drill is conducted regularly to create awareness among the crew about emergency systems and action to be taken by them.

✉ P Kolwalkar

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ISO 14001 : 1996 EMS
OHSAS 18001 : 1999 OHSMS

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