

## ZEE LATEST NEWS (2015)

### ZEEPod

ZEE completed the unique design of the braced monopod which is named ZEEPod. The existing braced monopod design limits the water depths up to 50 meters. The new design can accommodate operating deck weights of 800 tons and the water depths up to 90 meters. ZEEPod has been designed to be installed with minimum offshore spreads, hence very economical. It is suitable for Marginal and minimum facility field developments.

ZEEPod has been accessed by Petronas and has been given Technical Readiness Level 7 (maximum). The Patent for the ZEEPod is ongoing.

### ZEEPipe

The development of the pipeline detail design program to latest DNV codes has been completed and is currently undergoing field tests. This package has been in use in-house for a number of years. User friendly interfaces have been incorporated for global marketing. ZEE plans to commence marketing ZEEPipe package by the 1st quarter of 2016.

## RECENTLY SIGNIFICANT COMPLETED AND ONGOING PROJECTS

### ZEEPod

ZEEPod offers a very cost effective system for Marginal and Normal fields with minimum facility platforms. The high cost component in the development of an Offshore Platform is the Transportation & Installation (T&I) costs which amount to approximately 50% of total costs.

The ZEEPod consists of a Deck, Sub-Sea Template, Sleeve, Caisson, Raker Piles and components such as Boat Landing, Conductor guard etc. All these components are low weight items hence can be installed by a crane barge with a lift capacity of 500 Tons.

For further details please contact ZEE Engineering and or visit [www.zee-eng.com](http://www.zee-eng.com)

### HEEREMA MARINE CONTRACTORS NEDERLAND B.V



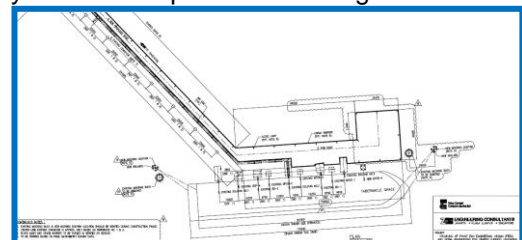
Over the recent years ZEE has been carrying out several T&I projects for platforms, Piles, jackets and PLEM for HMC. This year the ongoing general contract between HMC and ZEE has been renewed. The recent works carried out for HMC include the following;

- Dynamic Lift Analysis, using HMC in-house LIFTDIN Software
- Subsea Tower Launch Analysis
- Riser Support System Tower Transportation Analysis
- Mooring Analysis for SSCV Hermod and SSCV Thialf
- Tripod, Jacket and Piles Grillage and Seafastening Design
- Jacket and Piles Transport Analysis and bollard pull analysis for Jacket and Piles transport for several cases



### EXISTING JETTY MODIFICATION DESIGN FOR UNLOADING CLINKERS for Tokyo Cement Lanka PLC

The Jetty has been in operation since 1983 which was designed to berth max 26,000 DWT Bulk Carriers. Tokyo Cement Pte Ltd wishes to upgrade the jetty to enable the berthing of 32,000 DWT Bulk Carriers. ZEE was appointed to carry out the complete detail design.



**GG DEVELOPMENT for Pertamina Hulu Energy ONWJ**



GG New Field Development Project is a gas development strategically aimed at delivering gas to support PHE ONWJ Gas Sales and Purchase agreement to Customer.

ZEE scope of work includes detail design of jacket and 1500MT topside.



**STRUCTURE LOADOUT FOR SOUTH MAHAKAM 3 PROJECT for Total E&P Indonesia**



The South Mahakam field is located approximately 35 km to the south east of Balikpapan. The water depth ranges between 45 and 60 meters with 46.7 meters at location of Jumelai field. ZEE carried out loadout engineering for 2000MT jacket and 1800MT topside.

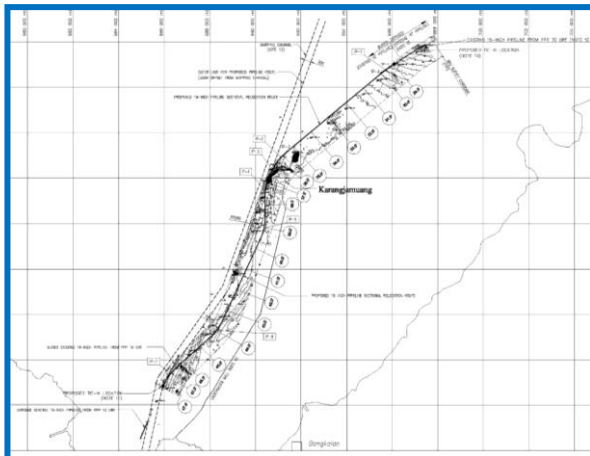


**POLENG PIPELINE RECTIFICATION PROJECT for Pertamina Hulu Energy WMO**



The submarine pipeline from Poleng Process Platform (PPP) to Onshore Receiving Facilities (ORF) crosses the shipping channel at two (2) locations. PT Pertamina Hulu Energi WMO intends to relocate the existing pipeline route due to its disruption toward shipping channel in APBS (Alur Pelayaran Barat Surabaya)

Hot tap installation method was chosen during the installation works. ZEE scope of works was detail and installation engineering design for the hot tapping and pipeline re-routing.



**KLA GAS LIFT PROJECT for Pertamina Hulu Energy WMO**



KLA flow station is one of the major gas producers in the PHE ONWJ area with a normal gas production of 40-60 MMSCFD and a normal crude oil production up to 4000 BOPD. The crude oil from KLA and KLB platforms are produced by using in-situ gas lift from gas source wells.

Currently, the gas lift pressure continues to decrease and it is predicted that its flow rate will be no longer sufficient. In order to maintain the pressure and flow rate, PHE ONWJ intends to install compressor at KLB for increasing the gas lift supply. Lastly, as gas lift system will be installed at KLC to anticipate the future need for gas lift injection in order to maintain KLC production.

ZEE was appointed by to carry installation engineering for the KLA topside.

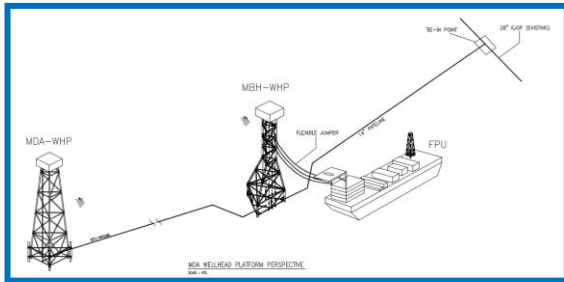


**MDA-MBH POST FEED STRUCTURE ENGINEERING for Husky-CNOOC Madura Limited**



Husky-CNOOC Madura Ltd. (HCML) plans to develop the Madura Strait Block MDA gas reserves for sales gas to buyers in Java Island through the existing 28" East Java Gas Pipeline (EJGP).

ZEE with associates Synergy carried out detail post FEED engineering for suitability of structures developed during FEED.



**FOXTROT DEVELOPMENT PROJECT for Pertamina Hulu Energi ONWJ**



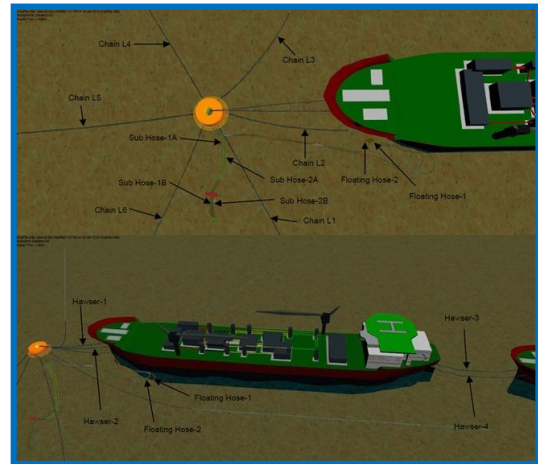
The FOXTROT ("F") flow station is one of PHE-ONWJ complexes, which consists of living quarter (FSER), production facility (FPRO) and wellhead platform (FC). The Foxtrot Area covers total of 21 (twenty one) Normally Unmanned Facilities (NU) Platforms, distributed in 3 (three) major areas (F-NORTH, F-MAIN, and F-SOUTH), categorized as a life (active) platform, an abandon (in-active) platform, and an abandon platform as junction. Currently the FOXTROT compress gas is 20 MMscfd and the liquid is 24000 BFPD with 22 wells string online. PHE ONWJ intends to increase the Foxtrot gas and oil production by conducting Foxtrot Redevelopment Project. ZEE scope includes FEED study for the project.



**FSO ABHERKA NAVAL GLOBAL DYNAMIC STUDY for Pertamina Hulu Energi ONWJ**



PT Pertamina Hulu Energi West Madura Offshore (PHE WMO) is the operator of the West Madura and Poleng asset located in offshore East Java. Floating Storage and Offloading (FSO) Abherka is connected to Single Point Mooring (SPM) as a final storage of the oil production from WMO Field. ZEE carried Detail Engineering for Naval Global Dynamic Analysis of the FSO.



**PHE NUNUKAN BADIK FIELD PRE-FEED PIPELINE SELECTION STUDY for PHE Nunukan**



PHE Nunukan intends to develop the Badik field under a PSC to achieve production by the end of 2017. ZEE scope of work includes Pre-FEED pipeline selection and routing study for the Development.

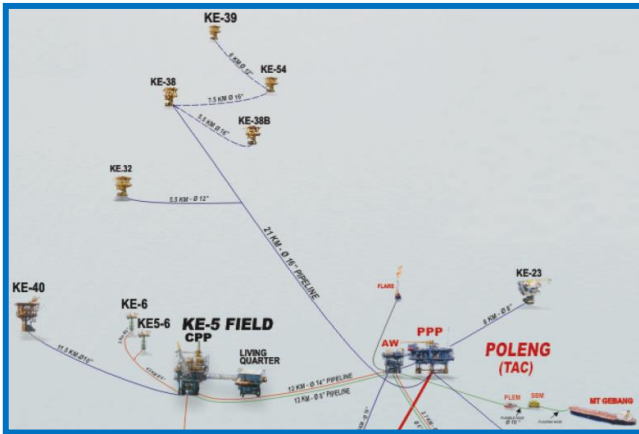




**KE 38 MOPU for PT Pertamina HE WMO**



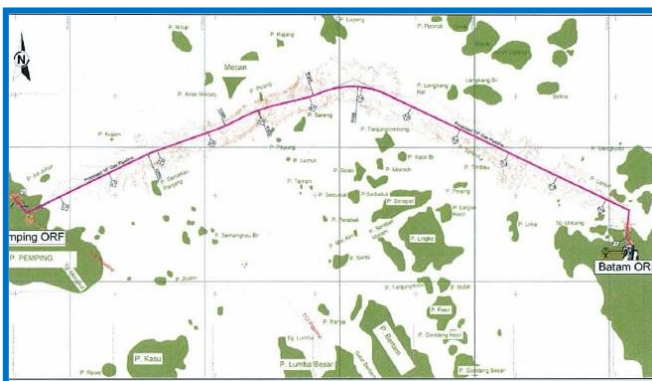
Pertamina Hulu Energi West Madura Offshore (PHE WMO) is planning to further develop KE field in the vicinity of KE-38. This comprises of the installation of several WHP platforms. In order to provide these facilities in a short period of time, a Temporary Production Facility (TPF) has been identified as being the best solution. ZEE engineering carried out the Detail Engineering including T&I for the TPF.



**PLNB UBE PIPELINE PEMPING TO TANJUNG UNCANG for PT PLN Batam - UBE**



Consortium PT. PLN Batam and PT. Universal Batam Energy intends to develop a pipeline transporting gas from Premier Oil 's field via existing WNTS which is operated by ConocoPhillips Indonesia (COPI). It is proposed to install a new 16-inch gas pipeline from Pemping Island (Pemping ORF) to Tanjung Uncang (Batam ORF) consisting of approximately 12.5 km offshore pipeline and 1 km onshore pipeline. ZEE carried Detail Engineering for project.



**STAR ENERGY KRA SOUTH FEED for PT Star Energy**



Star Energy (Kakap) Ltd is developing the KAKAP Field which consists of KG, KRA, KH and KF fields, located in West Natuna Sea, Indonesia. It is producing sales gas sold to Singapore through a 14" pipeline which is connected to the main West Natuna Transmission System (WNTS) pipeline. On his project ZEE carried out Detail Engineering.

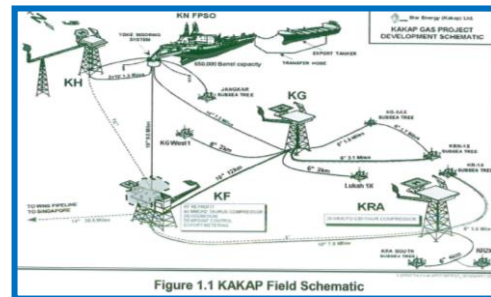


Figure 1.1 KAKAP Field Schematic

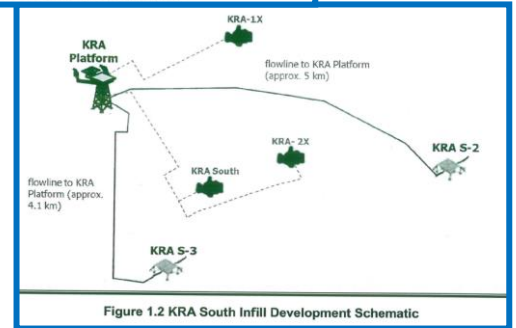
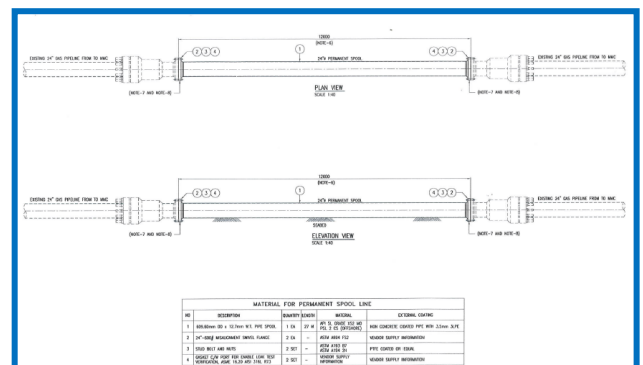


Figure 1.2 KRA South Infill Development Schematic

**APN MMC HOT TAP for PT Pertamina HE ONWJ**



PHE ONWJ intends to repair 24" MGL APNA-MMC gas production pipeline by using hot tap method cutting and installing 24" mechanical connectors. ZEE carried out Hot Tap detail design, pipeline tie-in methodology.



## WORK SHOPS & SEMINARS

ZEE had a very successful 2015 in marketing Orcaflex and Bentley software package. The sales were supported by a number of events such as user group meetings held in Singapore and in Malaysia. Open training was also conducted by Orcina to provide hands on experience in using the software. ZEE also conducted training to complement Orcina and Bentley courses.

### ORCAFLEX



A software package developed by Orcina Ltd in the UK, OrcaFlex is used to carry out large deflection, non-linear, dynamic simulations of slender structures, such as:

*Riser Systems, Installation & Decommissioning, Moorings & Global Performance, Pipelay & Pipelines, Renewables Wave power systems, Towed Systems, Bundles, TLPs, Fishfarms, etc.*

ZEE are Orcina's exclusive agent for marketing and supporting Orcina's products and services in Malaysia, Singapore and Indonesia. ZEE also uses the software in-house which enables to provide quality support.

Numerous trainings and open seminar was conducted by both Orcina and ZEE for the software.

ZEE also has assisted Orcina to enhance the pipeline installation capabilities of OrcaFlex, by providing OFFPIPE results for specified test cases. Subsequent comparisons show excellent agreement between the two programs. These results, taken together with OrcaFlex's new pipelay-specific UI, means that OrcaFlex has become the market leader for pipelay analysis.

But as well as pipelay, OrcaFlex is routinely used for the analysis of a wide range of other application, such as: All types of Riser Systems, Installation & Decommissioning, Mooring & Global Performances, Pipelay & Pipelines, Renewables Wave power systems, Towing, Bundles, Fish farms etc.

For further details please contact ZEE Engineering or visit Orcina.com.



ORCAFLEX Seminar and Training in KL and Singapore

### BENTLEY



ZEE has recently been appointed as a Channel Partner for Bentley Software house.

Bentley has been in service for 30 years carrying wide range of software's such as SACS, MOSES, AUTOPIPE, Project Wise, Maxsurf, Stad Pro and many more.

ZEE Engineering's tasks range from seeking potential clients, doing follow up with potential clients, and to provide support and training for Bentley software users.

Trainings are being provided by Zee engineers who are engaged in our consultancy work using these software's. ZEE has been renowned as a place for Training and Software not to mention its vast experience in Consultancy and Engineering works throughout the Oil and Gas industry.

For further details please contact ZEE Engineering or visit Bentley.com.



Bentley Seminar Kuala Lumpur and Indonesia