

JACKETS & TOPSIDES

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|--------------------------|-----------------------------------|---------------|--|------------|-------|---------|
| Shell Brunei (Brunei) | S.E.P.M/Promet (Singapore) | | Detail design and engineering of two-storey accommodation module. As the jacket was already finalized the weight of the accommodation module was a critical factor. | Sept. 1985 | | |
| O. N. G. C (India) | Sembawang Engineering (Singapore) | | Design verification, and detail design of jacket for fabrication. | July, 1986 | | |
| TOTAL (Indonesia) | PT. Puma Bina (Indonesia) | | Detail engineering and analysis of three shallow water platform. Heligurf Wellhead GTS platform. In-place, fatigue, earthquake conditions were taken into consideration. Special attention was given to installation techniques of the deck for shallow water condition. | Aug. 1986 | | |
| Sarawak Shell (Malaysia) | Protek Engineering (Malaysia) | | Conceptual design of standardized jackets for multiwater depths. The study was to compile a database for platform configurations for various environmental conditions. The analytical module is to be extracted from the platform database to suit the environmental conditions and to carry out structural analysis with automated re-analysis to produce structural drawings for bidding purposes. | Feb. 1988 | | |
| Sarawak Shell (Malaysia) | Protek Engineering (Malaysia) | | Re-analysis and design verification of jacket (Tenama) and drilling rig (Boker). Analysis was carried out on revised structural models taking into consideration marine growth, damaged and missing members, etc. Complete in-place and fatigue analyses were carried out. | July, 1988 | | |

JACKETS & TOPSIDES (cont)

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|---------------------------|--|---------------|---|------------|-------|---------|
| Q.G.P.C (Qatar) | Sime Sembawang (Malaysia) | | Detail design and engineering of living quarters platform D3. Detail engineering included in-place fatigue and earthquake conditions. Tie-down, transportation and installations engineering was also carried out. The main EPC contractor was Sembawang Shipyard (Singapore). Fabrication was carried out at Sime Sembawang Shipyard (Malaysia), installation was done by Sembawang Maritime/Brown & Root. | Feb. 1989 | | |
| Hudbay Oil (Indonesia) | Ranhill Bersekutu (Malaysia) | | Detail engineering and design of MSM platform and two Tripods. In-place fatigue earthquake and installation conditions were considered. | Sept. 1990 | | |
| JAPEX (Indonesia) | PT. NISCONI (Indonesia) | | Detail engineering of shallow water 5 wellhead platforms and gathering platforms for ABS - Phase – 1project. In this project, conceptual, detail and installation engineering was undertaken. Installation to shallow water was a major problem in this project. | Jan. 1992 | | |
| KODECO (Indonesia) | PT. Gunanusa – Utama (Indonesia) | | CPP jacket has to be re-analyzed for certification as the grouting was effectively carried out only on one leg. Re-analysis was carried out for in-place, fatigue and earthquake conditions, and certification obtained. | Apr. 1992 | | |

JACKETS & TOPSIDES (cont)

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|--------------------------------|---------------------------------|---------------|--|-----------|-------|---------|
| Petronas – Carigali (Malaysia) | PT. NISCONI (Indonesia) | | Setting up database for 60 existing platforms. In this project a single program (SACS) based structural data base was implemented. The models were updated to the current statue i. e missing and damaged members, Marine Growth etc. The models were validated with previous analysis, which included in-place and Fatigue. | May 1992 | | |
| ARCO (Indonesia) | PT. Wira Matra-Guna (Indonesia) | | Detail design verification of SCA jacket, for in-place and installation condition. | Mar. 1993 | | |
| ARCO (Indonesia) | | | Detail engineering of KNA and BM jackets. The decks were salvaged from existing platforms MXA and MXB. The deck were refurbished and installed on KNA and BM jackets. Analysis included in-place, earthquake, Fatigue and installation conditions. | Dec. 1994 | | |
| ARCO (Indonesia) | Mannai Marine (Qatar) | | Deck extension of platform for NGLB – LIMA project. To carry out deck extension and carry out structural integrity study for jacket. | Mar. 1995 | | |
| ARCO (Qatar) | | | Detail engineering of early production system. This consisted of jack-up, rig with production facilities, SBM and offloading facilities. | Mar. 1996 | | |

JACKETS & TOPSIDES (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|----------------------|-----------|---------------|---|--------------------------------|-------|---------|
| MAXUS (Indonesia) | | | <p>Re-analysis of existing platforms for re-certification.</p> <p>Since commissioning the platforms has been subjected to additional loading in the form of deck extensions, additional risers conductors, sumps, etc. Hence these platforms need to be re-analyzed for re-certification.</p> <p>The scope of work included carry out elastic analysis for in-place, earthquake and fatigue conditions. For jackets that did not satisfy the elastic analysis, full plastic (Push Over) analysis was undertaken to arrive at the Reserve Strength Ratio (RSR).</p> <p>Remedial engineering was undertaken in case of member and or joint failure.</p> <p>The platform verified were:</p> <ul style="list-style-type: none"> - Widuri – P Indri-A Widuri-E - Widuri – D Sundari-A Gita - Karmila – A Cinta-B - Farida – B Selatan-B - Zelda – C Krishna-10 - Zelda – A Rama-E - Titi – A Farida-A - Widuri – B Farida-C - Intan – B Rama-F - Indri – A Widuri-A - Zelda – E Wanda-A - Zelda – D Yvonne-A | Aug. 1996 Thro' Dec 1999 | | |

JACKETS & TOPSIDES (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|-----------------------|--------------------------------------|---------------|---|------------|-------|---------|
| MAXUS (Indonesia) | | | <p>Detail engineering to relocate existing Selatan – C jacket to South Zelda – A (with lower water depth).</p> <p>Engineering was carried out include in-place, earthquake, and fatigue for existing and new location. Also included the determination of cut-off points, retrieval of piles and jacket refurbishing, strengthening, new mudmat design and installation engineering.</p> <p>Detail new deck design for South Zelda - A was also included.</p> | June, 1997 | | |
| ONGC (India) | MECON (India) | | <p>Conceptual engineering was carried out for 3 jackets for shallow waters, under the following constraints.</p> <ul style="list-style-type: none"> - Very weak soil. - Limited installation equipment. - Low budget. | Nov. 1997 | | |
| KODECO (Indonesia) | PT. Titis Sampurna (Indonesia) | | <p>Detail engineering of production facilities for Poleng re-activation project.</p> <p>To design subsea facilities such as PLEM, Flexi hose and loading facilities including mooring of SBM and associated tankers.</p> | Jan. 1998 | | |
| QGPC (Qatar) | Mannai Marine (Qatar) | | <p>Detail engineering of Flare Design and installation for Rig Muna.</p> | Feb. 1998 | | |

JACKETS & TOPSIDES (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|----------------------|-----------|---------------|--|--------------------------------|-------|---------|
| MAXUS (Indonesia) | | | <p>Re-analysis of platform for additional conductors and risers. Stress integrity studies were carried out on platforms for additional risers and production facilities. Optimization studies were carried out for additional conductors and their locations. The platforms investigated were:</p> <ol style="list-style-type: none"> 1. Widuri-A 2. Farida-A 3. Intan-A 4. Farida-C 5. Farida-B 6. Zelda-C 7. Intan-B 8. Widuri-B 9. Rama-F 10. Cinta-B 11. Sundari-A 12. Farida-A 13. Selatan-C 14. Karmila-A 15. Widuri-D 16. Krishna-10 17. Rama-E 18. Selatan-B | Feb. 1998 Thru' Dec 1999 | | |

JACKETS & TOPSIDES (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|-----------------------|-----------------------------------|---------------|---|-----------------------|-------|---------|
| MAXUS (Indonesia) | KODECO (Indonesia) | | <p>Re-analysis of existing platforms for re-certification.</p> <p>Scope of work included carry out elastic analysis for in-place, earthquake and fatigue conditions.</p> <p>Platforms as listed below:</p> <ul style="list-style-type: none"> - Kodeco Junction Platforms - Kodeco Satellite Platform | Jan 1999 | | |
| KODECO (Indonesia) | | | KE-5 & KE5-6 monopods vibration analysis and remedial modifications. | April '99 to July '99 | | |
| KODECO (Indonesia) | | | AW, BW and CPP platform deck extensions as a part of Poleng Modification project. | Sept. – Oct. 1999 | | |
| KODECO (Indonesia) | | | AW & BW platform Structural Integrity Study and feasibility of installing additional decks. | Dec. '99 to Feb. '00 | | |
| PETRONAS CARIGALI | SIME Engineering (Malaysia) | | Pulai-A platform structural engineering design review and structural integrity check with four additional conductors. In-place and natural frequency analysis for jacket, MSF and drilling module, deck and jacket modifications, conductor in-place, driveability and installation study. | Dec. 98 to June '99 | | |

LOAD OUT / SEA FASTENING / INSTALLATION

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|-------------------------------|--|---------------|--|-----------|-------|---------|
| QGPC (Qatar) | Sime Sembawang Engineering (Malaysia) | | Load out, sea fastening, transportation and installation of living-quarters jacket D3. | Apr. 1989 | | |
| ARCO (Indonesia) | PT. Satmarindo (Indonesia) | | Load out, sea fastening, transportation of BLQ topside. | July 1989 | | |
| ARCO (Indonesia) | PT. NISCONI (Indonesia) | | Load out, sea fastening, transportation and upending of jackets for EJ/BJ project. | Aug. 1989 | | |
| ARCO (Indonesia) | Shillelagh Ltd. (Indonesia) | | Load out, sea fastening, transportation of jacket and top sides for BZZA project. Also included jacket upending. | Aug. 1990 | | |
| ARCO (Indonesia) | PT. NISCONI (Indonesia) | | Load out, sea fastening, transportation and installation of BK deck. | May 1991 | | |
| JAPEX (Indonesia) | PT. NISCONI (Indonesia) | | Load out, sea fastening, transportation and installation of Shallow Water 5 Wellhead platforms and gathering platform for ABS Phase – 1. | Apr. 1992 | | |
| Sarawak – Shell (Malaysia) | Promet Fabricators (Malaysia) | | Fabrication engineering, load out, sea fastening of M3DRA jacket. The jacket is twelve piles and the weight was 4,800 Tons. | May 1994 | | |

LOAD OUT / SEA FASTENING / INSTALLATION (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|--------------------------------------|---|---------------|---|-----------|-------|---------|
| ARCO (Indonesia) | PT. Wira Matra – Guna (Indonesia) | | Load out, sea fastening, transportation and upending of KNA and BM jackets. Engineering for relocation of decks from MXA and MXB includes retrieval, load out, sea fastening, transportation and installation. | Dec. 1994 | | |
| ARCO (Indonesia) | PT. NISCONI (Indonesia) | | Load out, sea fastening, transportation and upending of SCA jacket. | Nov. 1995 | | |
| Mannai – Marine (Qatar) | | | Transportation study for relocation of Rig Muna. | Mar. 1998 | | |
| Petronas – Carigali (Malaysia) | SAIPEM (Malaysia) | | P. C. S. B. Ruby fields development in Vietnam. Sea fastening and transportation studies for Deck, Jacket, Pile and appurtenance | Apr. 1998 | | |

SUBSEA PIPELINES

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|------------------------------|----------------------------------|---------------|--|-----------|-------|---------|
| Jardine Offshore (Singapore) | | | Pipeline study in Shallow Waters (Hong Kong Harbour project). The study included pipeline stability, layability and protection. | May 1985 | | |
| IPCO Marine (Singapore) | PT. Satmarindo (Indonesia) | | Pipeline installation engineering. The project included the installation of risers at shore, start-up and conventional lay and tie-in for Labuan water pipeline project. The study also included the repair of damaged pipeline to be lifted above the water level. The lifting operation was very critical as the pipeline was thin walled and the steel grade was Grade B. | June 1986 | | |
| ESSO (Malaysia) | Protex Engineers. (Malaysia) | | Conceptual study of 20" dia. pipeline from shore to loading jetty at Port Dickson. The study included shore pull, on surface tow and lay-down, including tie-in to riser at jetty. | Mar. 1988 | | |
| KODECO (Indonesia) | PT. Tripatra (Indonesia) | | Conceptual study of pipelay operations including conventional start-up, lay, termination and tie-in. | Apr. 1988 | | |
| CONOCO (Indonesia) | Sembawang – Maritime (Singapore) | | Conceptual study of gas pipeline from Batam Island to Pulau Seraya, Singapore. The study involved line sizing, stability, routing, lay-methods protection at sea channels. Logistics estimated costs, etc. | Jan 1989 | | |
| ARCO (Indonesia) | PT. Satmarindo (Indonesia) | | Pipeline installation engineering for EJ/BJ project. Project included routing, start-up, lay, termination, contingency, riser installation and tie-down. | Jan. 1989 | | |

SUBSEA PIPELINES (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|------------------------------|--|---------------|--|------------|-------|---------|
| TOTAL (Indonesia) | COMEX (Singapore) | | Pipelay study for river crossings including pipe pull from barge to shore, tie-in, etc. a significant problem in this project was the strong cross currents. | Oct. 1989 | | |
| ARCO (Indonesia) | Shillelagh Limited (Indonesia) | | Detail pipeline installation engineering for three lines, BZZA project. | May 1990 | | |
| MAXUS (Indonesia) | Shillelagh Limited (Indonesia) | | Detail pipeline installation engineering for RAMA-E/NE project. | Aug. 1990 | | |
| ADMA-OPCO (Abu-Dhabi) | Protek Engineers. (Malaysia) | | Conceptual study of flow lines from 6 jackets and main gas line to Das Island. Routing was a major consideration in this project due to the congestion of subsea lines in the field. | Sept. 1990 | | |
| Carbon – Black (Malaysia) | Sembawang – Maritime Comprimo (Singapore) | | Detail engineering for the installation of subsea pipeline from shore to SBM at Port Dickson. the line was 20" inch diameter. The on-bottom tow methods were used to install the pipeline. | Apr. 1991 | | |
| Shell (Malaysia) | Sembawang – Maritime Comprimo (Singapore) | | Detail engineering for the installation of 20" inch pipeline from loading jetty to SBM at Port Dickson. For this project the off-bottom tow method was used. The pile make-up and launch was from barge. The study also involved the barge conversion and stinger design. | June 1991 | | |

SUBSEA PIPELINES (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|----------------------|---|---------------|--|------------|-------|---------|
| PLN (Indonesia) | PT. Satmarindo (Indonesia)q | | Detail in-place engineering and installation engineering of 20" inch pipeline for 20-inch line from jetty to SBM. | Sept. 1991 | | |
| JAPEX (Indonesia) | PT. NISCONI (Indonesia) | | ABS project Phase – 1. Detail engineering of flow lines and transportation line from 5 wellhead platforms and gathering platform to shore process station. The pipelines were to be installed in shallow water. Shore pull and surface tow methods were used. | Jan. 1992 | | |
| ARCO (Indonesia) | PT. NISCONI (Indonesia) | | Detail in-place engineering and installation engineering of pipelines for EC and EWW project. | Mar. 1992 | | |
| C. P. C (Taiwan) | IPCO Marine (Singapore) PT. Satmarindo (Indonesia) | | Detail engineering for two 32-inch lien from Talinpu Jetty to SPM 4 apart from traditional pipelay engineering, procedure was compiled for Typhon conditions. | Apr. 1992 | | |
| ARCO (Indonesia) | PT. Gema-Sembrown (Indonesia) | | Detail in-place and installation engineering for BK project. The project included the installation of seven pipelines. | July 1992 | | |
| MAXUS (Indonesia) | Shillelagh Limited (Indonesia) | | Detail in-place and installation engineering of 12 inch pipeline from Farida –A to Zelda – C. | Apr. 1993 | | |

SUBSEA PIPELINES (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|----------------------|---|---------------|--|-----------|-------|---------|
| ARCO (Indonesia) | PT. Wira Matra – Guna (Indonesia) | | Detail engineering and project management of the installation of pipeline bundle (6inch + 4 inch, 2 km. Long) for LL4A to LLB project. Here for the first time in Indonesia the Rentis (surface tow) method was used. The bundle was made-up on shore and towed 55 miles offshore for installation. | May 1994 | | |
| MAXUS (Indonesia) | PT. Wira Matra- Guna (Indonesia) | | Detail in-place and installation engineering of 20 inch pipeline from Intan-B to Widuri – P. Here a 0.5% Cr line pipe had to be used for Interval – corrosion. The design temperature of the pipeline was 200°F hence the thermal elongation was a major problem. Due to the Cr content of the line pipe, special welding procedure had to be adopted. | July 1994 | | |
| ARCO (Indonesia) | PT. Wira Matra –Guna (Indonesia) | | Detail in-place design and installation engineering of 4 pipelines KNA – BM project. Project management and supervision was also undertaken. | Jan. 1995 | | |
| ARCO (Indonesia) | PT. NISCONI (Indonesia) | | Detail in-place and installation engineering of 3 pipelines for ONWJ GAS 2 project. | Mar. 1995 | | |
| ARCO (Indonesia) | | | Feasibility study of using spirally welded line pipe for 24-inch gas line 30 km. Length from NGL – B to Lima – C. In this project a detail metallurgical study was also undertaken. Subsequently detail installation engineering and installation supervision was also carried out. | Apr. 1995 | | |

SUBSEA PIPELINES (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|-----------------------|--|---------------|--|------------|-------|---------|
| ARCO (Indonesia) | | | Feasibility study of using spirally welded line pipe for 24-inch gas line 30 km. Length from NL-B to Lima-C. In this project a detail metallurgical study was also undertaken. Subsequently detail installation engineering and installation supervision was also carried out. | Apr. 1995 | | |
| ARCO (Indonesia) | | | Detail-in place engineering of 4 pipelines for EQSA-EC-EB-EP-BC project. Detail in-place engineering of 4 pipelines for LLD-MMC, LLD-LLB, LLD-LLE and LLD-LLF project. Detail in-place engineering of pipeline for ESTA project. | Apr. 1997 | | |
| MAXUS (Indonesia) | | | Study of location for Rentis pipelines | Apr. 1997 | | |
| KONDUR (Indonesia) | | | Conceptual engineering of pipeline from shore to island. Detail study for stability and installation methods. | June 1997 | | |
| TOTAL (Indonesia) | PT. Istana Karang – Laut (Indonesia) | | Detail engineering in-place and installation for near shore pipeline in shallow water, includes, on-bottom stability, burial conversion of flat top barge for pipelay. | Oct. 1997 | | |
| MAXUS (Indonesia) | | | In-place design report for marginal field pipelines Vita "A" - Widuri "P", Kartini - Subsea tie-in, South Zelda "A" - Zelda"A", 10" flowlines, 8" flowlines. | Jan 1998 | | |
| MAXUS (Indonesia) | | | In-place design report for marginal field pipelines 6" ATTI-SZA, 6/8" Retno-Gita"A", 6" E-Rama - Rama "F" and replacement of 12" NE Intan - Intan"B" | March 1999 | | |

SUBSEA PIPELINES (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|----------------------------|-----------|---------------|--|----------|-------|---------|
| RANA/MANNAI Marine (Qatar) | QGPC | | Bull Hanine and Mydan Mahzan Field Development Installation Engineering including analysis and procedures of eleven (11) subsea pipelines, four (4) umbilical and flat packs, jacket and associated bridge. Includes initial analysis for jacket launching proposal | May 1996 | | |
| TOTAL (Indonesia) | | | Detailed engineering to develop pipeline specific emergency repair procedures for swamp and shallow water lines in Tunu field, East Kalimantan; includes procedures, equipment and manpower specification, design of installation aides, design / selection of repair devices and risk assessment. | Oct. '99 | | |

PROCESS / MECHANICAL / PIPING / E &

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|-----------------------------|---|---------------|--|------------|-------|---------|
| EPMI (Malaysia) | Malaysian Shipyards (Malaysia) | | Mechanical design of Dulong – B platform topside, including layout, flexibility design of topside piping and supports. | June 1995 | | |
| EPMI (Malaysia) | AGNP (Philippines) | | Seligi Project, Topside piping layout and flexibility design. | Sept. 1986 | | |
| AMOCO (U. S. A) | | | F. P. S. O System. Design of deck piping flexibility analysis including exhaust and super heated steam system. | Apr. 1987 | | |
| ESSO (Singapore) | Sembawang Engineering (Singapore) | | Piping layout and flexibility analysis for Refinery. | May 1987 | | |
| Carbon Black (Indonesia) | Sembawang Engineering (Singapore) | | Full piping design for a reactor plant, including flexibility analysis of piping and support design. | Jan. 1988 | | |
| Indorayon (Indonesia) | | | Medan paper pulp factory. Complete design of piping system. | Oct. 1988 | | |

PROCESS / MECHANICAL / PIPING / E & (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|----------------------|-----------|---------------|---|-----------|-------|---------|
| MAXUS (Indonesia) | | | <p>Zelda – A deck modification, installation of crude oil transfer pump and related deck modification. Work undertaken included:</p> <p>Preparation of PFD & P & Ids. Performing a Process Simulation and preparation of the Simulation Report, preparation of Block Diagrams, revision of inlet manifold, modification of V-300 (3 phase horizontal test separator). Preparation of Piping plan/elevation drawings. Preparation of MTO/BOM and modifications to the deck to support the new pumps.</p> | Jan. 1995 | | |
| MAXUS (Indonesia) | | | <p>Widuri – P platform. Design/engineering of modifications to the oil processing system. Work undertaken include the following:</p> <p>Process Simulation, Mechanical/Pigging Design, E & I Design, Proceduring safe chart, MTO/BOM/Data Sheet.</p> <p>Design of control panel to synchronise it with the new system. Design of skimmer pile. Compilation of piping layouts for existing and the modified/enhanced system.</p> | May 1995 | | |
| MAXUS (Indonesia) | | | <p>Design of topside facilities of monopods for marginal field development. Complete designing including:</p> <ul style="list-style-type: none"> - Process Simulation, Piping Design, E & I Design, Structural Design, Mechanical/equipment design verification, MTO/BOM/Data Sheets. | Feb. 1996 | | |

PROCESS / MECHANICAL / PIPING / E & (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|-----------------------|--|---------------|--|------------------|-------|---------|
| MAXUS (Indonesia) | | | Modification of Yvonne-B platform for an additional gas compressor. | July 1996 | | |
| MAXUS (Indonesia) | | | Intan-B, Widuri-D platforms Fire fighting system, complete redesign including piping/mechanical/equipment/ E & I etc. | Sept. 1996 | | |
| MAXUS (Indonesia) | | | Modification of CINTA-D and Zelda-E for additional flow lines from LITA-A, WANDA-A. Work undertaken included: Preparation of P & IDs (process), General Arrangement Drawings, topside modifications including Structural, piping, mechanical, preparation of Piping plans, Elevation, prepare 280 metrics, preparation of MTO/BOM. | June 1997 | | |
| KODECO (Indonesia) | PT. Titis Samporna (Indonesia) | | Deck modification for an additional pipeline and riser. Facilities modified included CPP, AW & BW platforms, SBM and FPSO. In this project complete engineering including process, mechanical, piping, E & I work. | Apr. 1997 | | |
| MAXUS (Indonesia) | | | Topside modifications. Design of Process, mechanical/piping, E & I for Vita-A and Widuri-P platforms. | Nov. 1997 | | |
| TOTAL (Indonesia) | PT. Citra Panji Manunggal (Indonesia) | | Detailed engineering – Handle Field Air Injection facilities including barge mounted compression, onshore / offshore pipelines and structures / well inerting systems, vibration analysis, remote control telemetry, hazid, hazan, material take off, grillage design, shimming design and barge sensitivity study to derive minimum supports requirement. | Sept. 98 ongoing | | |

PROCESS / MECHANICAL / PIPING / E & (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|---------------------------------------|-----------|---------------|---|-----------|-------|---------|
| KODECO Energy Co. Ltd. (Indonesia) | | | Re-design of topside facilities at Poleng field AW, BW platforms. | July '99 | | |
| KODECO Energy Co. Ltd. (Indonesia) | | | Revamp of existing loading / storage and additional separation facilities at onshore receiving station, Gresik – South Java. | Sept. '99 | | |
| KODECO Energy Co. Ltd. (Indonesia) | | | Topsides modifications at Poleng & KE5/6 fields AW, BW and CPP platforms including process/pipeline studies/cost evaluations, additional well flowlines/manifold/production facilities/platform extensions. | Dec. '99 | | |

MARINE RELATED

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|--|------------------------------------|---------------|---|------------|-------|---------|
| Vietsor Petro (U. S. S. R) | Pheonix Offshore (Singapore) | | Detail engineering and design of stringer for pipelay Barge 547. | Jan. 1988 | | |
| Hyundai Heavy Industries (Korea) | R. J. Brown (Singapore) | | Detail engineering of stringer for pipelay barge. Stringer design specifications including dynamics and wave response criteria. | June 1988 | | |
| Rockwater Offshore (Singapore) | | | Detail design and stress analysis of post trench plough. Here detail finite element analysis was undertaken. | Mar. 1992 | | |
| PT Kamari (Indonesia) | | | Detail engineering for hull and hitch repair for Barge Annette. | Apr. 1992 | | |
| JAPEX (Indonesia) | PT. PMM (Indonesia) | | ABS PHASE II Subsea pipeline installation. Conversion of flat top barge for pipelay model in low water condition. Design include firing line configuration, stringer design, spuds design for stability and other related items and facilities for laying 2 and 4 inch diameter pipelines simultaneously. | Dec. 1996 | | |
| TOTAL (Indonesia) | P. T. SKJ | | GTS – A TO TMP Subsea pipeline installation. Design of flat top barge for pipelay in shallow water and swamp conditions. Complete design of the barge was undertaken which included firing line, stringer, barge structural checks, stability, mooring system and dynamics. | June, 1997 | | |

MARINE RELATED (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|-------------------------------|-----------|---------------|--|------------|-------|---------|
| KODECO (Indonesia) | QGPC | | Poleng re-activation project. This included platform modification, installing pipeline, SPM, FPSO and related facilities. | Oct. 1997 | | |
| RANA/Mannai Marine (Qatar) | | | Bull Hanine and Maydan Mahzan Field Development. Complete design of lay barge PDS Marriner for installation of large diameter pipelines. Work undertaken included stringer design, mooring at gravity, anchor design for load seabed, barge structural check, etc. | May 1996 | | |
| MAXUS (Indonesia) | | | Design of hook-up for 6" LITA-CINTA "D", 6" SW WANDA "A" - WANDA "A", 12" SOUTH ZELDA "A" - ZELDA "A". | Aug. 1997 | | |
| MAXUS (Indonesia) | | | Design of monopod topsides (piping, equipment, electrical, instrumentation, pipelines) for North Wanda "B", Kartini, South Zelda "A" platforms. | Nov. 1997 | | |
| MAXUS (Indonesia) | | | Design of test separator for monopods and hook-up at monopods viz. Lita "A", Wanda "A", SW Wanda "A". | Jan. 1998 | | |
| MAXUS (Indonesia) | | | Design of bypass cooler, KO drums and associated modifications for supply of gas for turbines at MAXUS Widuri FSO. | May 1998 | | |
| MAXUS (Indonesia) | | | Design of monopods for locations at ATTI, RETNO, East RAMA, NE Intan. | March 1999 | | |

MARINE RELATED (cont)

| CLIENT | ASSOCIATE | PROJECT VALUE | DESCRIPTION | PERIOD | VALUE | CONTACT |
|---|-----------|---------------|---|-------------------------|-------|---------|
| Mannai Marine / Mansal Offshore (Qatar) | | | Self propelled Rig (Leen) conversion project management and design engineering of a 4000 dwt self propelled rig converted from a landing craft. Scope including submission for approved all documentations / analysis report to BV for certification. | August 1999 | | |
| South Pacific Viscose (Indonesia) | | | Extensions of existing steel flue stacks and related design of guy wires, anchor piles and foundations. | July '99 to Dec. '99 | | |