ENERGY QUEST

We leave no rock unturned
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For more info, please visit www.energyquest.com.my
Founded in March 2004 and operating in the heart of the commercial hub of Kuala Lumpur, Energy Quest is one of Malaysia’s leading oil and gas consultancy service providers. Energy Quest offers excellent services and total solutions to the upstream oil and gas clients worldwide.

**Vision**
To be a recognized Malaysian company in the global petroleum industry by 2020

**Mission**
To be among the leading companies with recognized world-class expertise providing exploration and production technology and business solution

For more info, please visit www.energyquest.com.my
At Energy Quest (EQ), our team of specialists work hand in hand to deliver exceptional integrated services to our Clients.

EQ offers a broad array of consulting and analytical services to meet the needs of a diverse clientele, which include regional and international Exploration & Production companies of various sizes, Independent Oil companies, other upstream and downstream Oil & Gas service companies, governments, financial institutions and also regulatory and rating agencies. Our integrated services include:

- Block / Basin / Asset Evaluation and Acquisition
- Resource Assessment (RA)
- Core & Fluid Data Acquisition, QC and Database Management
- Integrated Reservoir Studies
- Reservoir Management and Production Optimization Studies
- Improved Oil Recovery (IOR) Studies
- Enhanced Oil Recovery (EOR) Studies
- Reserves / Resource Classification and Certification
- Field Development Plan (FDP)
- Full Field Review (FFR)
- Field Rejuvenation Study

EQ provides consulting and/or analytical services that cover the entire subsurface study cycle, and may also be customized to address a specific requirement.

To ensure successful implementation of the study, which may often involve resource-intensive investments, EQ recommends a variety of fit-for-purpose solutions customized to suit the Client’s particular needs, by leveraging on technology and proven integrated work processes.

The hallmark of EQ’s exemplary service record is an integrated approach to our work, where a good understanding of the reservoir architecture and petroleum system are established to better understand the reservoir behaviour and field performance.

For more info, please visit www.energyquest.com.my
In pursuit of excellence, EQ has developed strong technical and academic alliances worldwide comprising software, technology and laboratory service providers, other consulting companies and also renowned universities. This strategically positions EQ with access to services such as seismic data acquisition, geological and engineering laboratory services, flow assurance and also EOR consultancy services.

For more info, please visit www.energyquest.com.my
Centralizing our core business to the upstream sector of the oil and gas industry, Energy Quest specializes in providing consultancy services in these key areas of expertise.

For more info, please visit www.energyquest.com.my
Our vast experience in the Exploration, Development and Production of Oil & Gas fields include Full Field Review/Field Development Plan/Enhanced Oil Recovery (FFR/FDP/EOR) studies, Resource Assessments (RA), Production Enhancement studies such as quantification of incremental production from Wellbore Utility Reviews (WBUR), Idle Well Evaluation and Integrated Production Modelling (IPM), Economic Analysis and Commercial Evaluations, and also our Consultants’ prior field surveillance experience in the Malay Basin (i.e., Gunting Complex, Seligi Complex, PM8 marginal fields, Tapis, Irong Barat and Semangkok), Sabah and Sarawak Basins (i.e., D35, Samarang and Sumandak), as well as international experience in onshore fields in Indonesia and viscous oil fields in Sudan.

### HIGHLIGHTS OF OUR TRACK RECORD

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<th>Year</th>
<th>Project Management</th>
<th>Geophysics</th>
<th>Petrophysics</th>
<th>Reservoir Engineering</th>
<th>Production Engineering</th>
<th>Facilities Engineering</th>
<th>Economics</th>
<th>Flow Assurance</th>
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<td>2018</td>
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<td>Asset Evaluation - Various Prospect/Block/Field evaluation for assets located in Malaysia (PM, SB and SK), Brunei, Indonesia, Thailand, Vietnam, Philippines, China, Australia, Nigeria, Kazakhstan, Russia, North Sea, USA and Canada for Confidential clients</td>
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<td>Full Field Review (FFR) - Berantai (brown gas field), offshore Peninsular Malaysia</td>
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<td>System Application/Software Development - Subsurface Technical Experts for the development of Intelligent Gas Forecasting and Optimization (IGFO) System for PCSB, Sarawak Gas (SKG)</td>
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<td>Resource Certification - Independent Fairness Opinion report of Emir-Oil concession block, onshore Kazakhstan for Ferrier Hodgson</td>
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<td>Specialized Services - Seismic interpretation and Geomodelling (Malay Basin)</td>
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<td>Specialized Services - Petrophysical analysis for Block evaluation (offshore Sarawak)</td>
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<td>Production Enhancement - Integrated Production Network Modelling (IPM) study of Ansi field (offshore Peninsular Malaysia) for PETRONAS</td>
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<td>Specialized Services - Prospect evaluation, Regional geology &amp; Structural analysis, Petroleum System analysis, Fieldwork Analysis of Limbang-Klias &amp; Kudat Peninsulas, Sabah</td>
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<td>Specialized Services - Basin Study, Regional structural framework analysis, regional petroleum system analysis in relation to Coalbed Methane (CBM) Resources, Regional Geology Mapping, Coal Sampling of North Tarakan Basin, Sabah</td>
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<td>Reservoir Studies - Reservoir Management Plan (RMP) studies of D35, J4 and Baram fields (offshore Sarawak) and St. Joseph (offshore Sabah) for PETRONAS</td>
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<td>Reservoir Studies &amp; Production Enhancement - Water injection dynamic modelling and IPM modelling production optimization / backpressure solution study of Kikeh field [offshore Sabah] for PETRONAS</td>
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<td>Production Enhancement - Integrated Production Network Modelling (IPM) study of Baronia and Betty fields (offshore Sarawak) for PETRONAS</td>
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<td>Data Management - Well and production data management and performance analysis of Dulang field (offshore Peninsular Malaysia) for PETRONAS</td>
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<td>Specialized Services - Petrophysics and Geomodelling of Dulang EOR and Baram Delta Regional Studies</td>
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<td>Specialized Services - Geological Evaluation of the Prospectivity of Tinjar Province for PETRONAS</td>
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<td>Field Development Plan (FDP) - Bubu &amp; Diwangsa (offshore green oil fields), Peninsular Malaysia</td>
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<td>Resource Certification - Newfield (M) Asset for Sapura Kencana Petroleum</td>
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<td>Specialized Services - Basin modelling and Petrophysical evaluation for INPEX</td>
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<td>Laboratory Services - Well Sample Analysis For Kerupang Field (Sabah Basin)</td>
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<td>Specialized Services - Regional Geological Mapping of Block CA1 Brunei Deep Water for PETRONAS</td>
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<td>Field Development Plan (FDP) - Sepat (offshore green gas field), Peninsular Malaysia</td>
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<td>Field Development Plan (FDP) – Nosong &amp; Bongawan (offshore green gas field), Sabah</td>
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<td>Full Field Review (FFR)/Field Development Plan (FDP)/Enhanced Oil Recovery (EOR) – D35 (offshore brown oil field), Sarawak</td>
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For more info, please visit www.energyquest.com.my
EQ's dedicated team of highly experienced and industry recognized Technical Professionals are committed to offer a wide range of services from Specialized services to Integrated field solutions, tailored to address unique project needs and value drivers.

For more info, please visit www.energyquest.com.my
Subsurface Technical Services - Exploration, Development and Production

EQ provides consulting and/or analytical services that cover the entire subsurface study cycle, and may also be customized to address a specific area of study.

The proposed Team members for each project shall comprise professionals with a vast experience in the upstream oil & gas industry, strategically selected to meet the desired objectives of the project, from Exploration-to-Development-to-Production.

Equipped with EQ’s unique experience and capabilities, we offer proficient technical expertise in assessing relevant and pertinent technical and commercial information extracted from value propositions and proposals that are presented to the Client, enabling the Client to strategize and formulate informed decisions ahead of an investment participation and decision making.

For more info, please visit www.energyquest.com.my
Field Development Plan (FDP) for Oil Field Development - Case Study Example

Oil Field (Viscous Oil)
- Low API oil (20 degrees)
- Multiple compartments and faults
- Uncertainty in Aquifer definition and strength
- Limited well data in some areas

GEOSCIENTIFIC STUDIES

GEOPHYSICAL STUDY
- Structural Interpretation
- Attribute Analysis
- Seismic Inversion

GEOLOGICAL STUDY
- Regional Geology
- Wells Correlation
- Environment of Deposition
- Facies Description

PETROPHYSICAL STUDY
- Formation Evaluation
- Fluid Contacts

GEOMODELLING
- Structural Modelling
- Facies Modelling
- Property Modelling
- Volumetric Calculation

ENGINEERING STUDIES

ENGINEERING STUDY
- Pressure & Compartment Analysis
- Fluid Characterization
- Rock Properties
- Pressure Transient Analysis

RESERVOIR MODELLING
- Initialization
- Aquifer Assumptions
- Prediction Limits & Parameters

FIELD DEVELOPMENT STRATEGIES
- Development Options (Horizontal Well, Water Injection, Waterflooding)
- Reservoir Management Strategies
- Sensitivity Analysis

For more info, please visit www.energyquest.com.my
Field Development Plan (FDP) for Mature Oil Field Development - Case Study Example

Complex Oil Field
- Structurally & stratigraphically compartmentalized
- Rapid reservoir decline; production commingled with minor sands
- Uncertainty in Aquifer definition and strength
- Limited well data in some areas

GEOSCIENCE STUDIES
- Structural Interpretation
- Attribute Analysis

GEOLOGICAL STUDY
- Core Study
- Regional Geology
- Integrated Stratigraphic Framework

PETROPHYSICAL STUDY
- Formation Evaluation
- Fluid Contacts

GEOMODELLING
- Structural Modelling
- Facies modelling
- Property Modelling
- Volumetric & Uncertainty Analysis

ENGINEERING STUDIES
- Pressure & Compartment Analysis
- Fluid Characterization
- Rock Properties
- Pressure Transient Analysis

WELL & RESERVOIR MODELLING
- Well & Integrated Network Modelling
- Material Balance
- Dynamic Modelling
- Upscaling & initialization
- History Matching
- Prediction

FIELD DEVELOPMENT STRATEGIES
- Reservoir Management Strategies
- Conceptual Well Completion Design
- Drilling Well Design
- Facilities Design
- Economics

For more info, please visit www.energyquest.com.my
Field Development Plan (FDP) for Gas Field Development - Case Study Example

Complex Gas Field (Fast Track FDP)
- Specific requirements or swing production & gas sales rate, with maximum CO2 blending of 40%
- Multiple stacked reservoirs with varying CO2 mix areally and vertically
- Compartmentalization & limited well data in some areas
- Uncertainty in Aquifer definition and strength

GEOLOGY
- Structural Interpretation
- Attribute Analysis

WELL & RESERVOIR MODELLING
- Well modelling
- Material Balance
- Dynamic modelling

FIELD DEVELOPMENT STRATEGIES
- Reservoir Management Strategies
- Conceptual Well Completion Design
- Drilling Well Design
- Facilities Design
- Economics

For more info, please visit www.energyquest.com.my
Field Development Plan (FDP) for Oil & Gas Field Development - Case Study Example

Gas Field with Oil Rim (Fast Track FDP)
- Uncertainty in Aquifer definition and strength
- Limited well data in some areas

GEOSCIENCE STUDIES

GEOPHYSICAL STUDY
- Structural Interpretation
- Attribute Analysis

GEOLOGICAL STUDY
- Wells Correlation
- Environment of Deposition
- Facies Description

PETROPHYSICAL STUDY
- Formation Evaluation
- Fluid Contacts

GEOMODELLING
- Volumetric & Uncertainty Analysis

ENGINEERING STUDIES

ENGINEERING STUDY
- Fluid Properties
- Rock Properties

WELL & RESERVOIR MODELLING
- Well modelling
- Material Balance
- Dynamic modelling

FIELD DEVELOPMENT STRATEGIES
- Reservoir Management Strategies
- Conceptual Well Completion Design
- Drilling Well Design
- Facilities Design
- Economics

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Sound investment decisions are based on proficient technical and business analysis, which cover the project costs, benefits and risks.

EQ’s Team of Professionals are equipped with the experience to conduct the Technical and Commercial Assessment required to quantify Asset value and also provide Key Economic Indicators for the Client to make informed decisions ahead of the investment.

Appropriate resources (Geoscientists, Petrophysicists, Engineers, Economist) are allocated based on the level of study designed to meet Client’s needs, to extract all relevant and pertinent technical and commercial information.

Fit-for-purpose economic models are then designed to appreciate the geological and engineering components, constructed to reflect the diverse petroleum arrangement and fiscal terms in order to assess the key economic parameters used in investment decision making.

For more info, please visit www.energyquest.com.my
Case Study examples:

Asset Evaluation for Block A located in Russia

The asset evaluation for Block A involved data review and due diligence work conducted in view of Client’s potential participation in the asset.

Asset Evaluation for Block B located in Aceh, Indonesia

The asset evaluation for Block B in Aceh focused on the Area Development Plan (ADP) for the area, which comprises seven prospects.

The asset evaluation for Block B in Aceh focused on the Area Development Plan (ADP) for the area, which comprises seven prospects.

EQ’s team of Geoscientist, Petrophysicist, Reservoir Engineer and Economist conducted due diligence and technical assessment which included:

- Data screening, review & analysis to determine asset viability.
- Field site visit.
- Geological, Petrophysical, Reservoir engineering and Commercial evaluation.
- Resource & reserves assessment and verification.
- Identifying the likely development scenarios & generating sensitivity cases based on key economics parameters.
- Identifying technical & investment/financial risks & uncertainties.

Based on the screening economics, four of the seven prospects were evaluated to be viable. In the ADP proposed, the location of one primary prospect is recommended to be the central processing facilities (CPF) to cater for oil processing and storage and also serve as the export facilities. Oil production from the other prospects are connected to the CPF via pipelines.

For more info, please visit www.energyquest.com.my
EQ strives to ensure that our Resource Certification are in compliance with the definitions and guidelines set out in the 2007 Petroleum Resources Management System (PRMS) prepared by the Oil and Gas Reserves Committee of the Society of Petroleum Engineers (SPE) and reviewed and jointly sponsored by the World Petroleum Council (WPC), the American Association of Petroleum Geologists (AAPG) and the Society of Petroleum Evaluation Engineers (SPEE).

Our notable past achievements include producing resource evaluation reports that are accepted by Bursa Malaysia, where the assessment of critical aspects of the interpretation, and the resulting conclusions and recommendations presented are in accordance with good industry practices and EQ’s own quality management procedures.

**Case Study examples:**

Independent Technical Review of the Valuation Report on Emir-Oil Concession Block, located onshore Mangyshlak Basin of Western Kazakhstan

Resource and Reserves Certification of Assets located Offshore Peninsular Malaysia and Offshore Sabah and Sarawak (East Malaysia)

Independent review, evaluation and verification of the Petroleum Initially In-Place (PIIP) and recoverable hydrocarbons resource potential volumes and production forecasts of the Asset comprises three oil fields and one gas condensate field which have been put on production and also two discoveries under exploration contract.

Produced an Independent Technical Review report for submission to Bursa Malaysia.

For more info, please visit www.energyquest.com.my
Production Enhancement - Wellbore Utility Review (WBUR) & Idle Well Evaluation

Production Enhancement opportunities are identified from a methodical approach which hinges on critical engineering and geoscientific analyses and are ascertained utilizing proven workflows to identify and quantify incremental production gains.

The objective of Idle Well Evaluation and Restoration studies is to enhance Asset value, where the focus is to increase the economic reserves recovery via maximizing production rates from the existing wells and infrastructure.

A good understanding of the available data from historical and current performance of the production system is essential to ensure overall optimization of the Asset value. The Scope of Work may include the following simplified workflow.

Field Screening & Selection

Data Gathering & QC / Validation

Project Framing

Technical Assessment
- Evaluate Potential Production Enhancement Opportunities
  - Well by well review
  - Performance Analysis
  - Behind Casing Opportunities
    – Untapped Reservoirs
  - Behind Casing Opportunities
    – LRLC
  - Production Allocation
  - Reservoir Management Plan (RMP) Enhancements
  - Well Modelling (PROSPER/Wellflo)
  - Integrated Production Network Modelling (IPM-GAP/ReO)
  - Artificial Lift - Gas Lift Optimization

Develop Inventory of Production Enhancement Opportunities

Formulate Technical & Commercial Recommendations for Implementation

For more info, please visit www.energyquest.com.my
Case Study example:
WBUR & Idle Well Evaluation for Field D (Brown Field, Offshore Sarawak)

SHORT TERM (QUICK GAINS)
- Bean Up
- Gas Lift Optimization
- Tubing Patch
- Network Optimization
- Utility Conversion
- Sand Bailing

MEDIUM / LONG TERM
- Add Perforation
- Stimulation
- Nearby Infill/re-drill/sidetrack
- Well reactivation (e.g. flow HGOR wells for gas sales)
- Well deactivation (e.g. wells with gas recycling)
- Slot re-utilization

ACTUAL INCREMENTAL FROM QUICK GAINS

- **Bean up**
  - 9 wells
  - 600 stbd
- **Gas Lift Optimization**
  - 3 wells
  - 300 stbd
- **Network Modelling**
  - 2 wells HP to LP
  - 300 stbd
- **Tubing patch**
  - 3 wells
  - 800 stbd
- **Utility Conversion**
  - 1 OP to GL (-10 stbd)
  - 1 GL to OP (+70 stbd)

For more info, please visit www.energyquest.com.my
EQ has the best track record in evaluation of untapped reservoir potential behind casing. Detailed investigation in the well / field / area if interest is required to gain better understanding of the reservoir complexity and structural setting.

**Seismic Attribute Analysis**

Seismic Attribute Analysis helps to improve the existing dataset, enhance thin layers of reservoirs / stratigraphic features and also maximize geological analysis and interpretation.

**Data Conditioning**
- Noise Cancellation

**Spectral Enhancement**
- Resolution improvement for thin reservoirs

**Real-time Attribute Analysis**
- Real time Attribute Analysis Computation
- Multi-Attribute analysis

**Real-time Visualization**
- Structural Imaging
- Stratigraphic Imaging

**HC Anomaly Delineation**

For more info, please visit www.energyquest.com.my
Production Enhancement - Geological Evaluation of Behind Casing Opportunities - Untapped Reservoirs (cont’d)

A detailed Structural and Geologic model is constructed to best represent facies re-classification / re-interpretation and improve understanding of the reservoir complexity in relation to structural setting.

Integrated Sequence Stratigraphic Analysis

Sequence Stratigraphic Analysis is conducted to fine-tune well data, where the approach integrates seismic stratigraphy, structural understanding and log data, and also incorporates reservoir engineering and production data.

Well Data
- Electric Logs, Core data, facies tagging and modelling

Structural Understanding & Integration

Seismic Stratigraphy Integration

Reservoir and Production Data Integration

New Identified Opportunities

For more info, please visit www.energyquest.com.my
EQ's accomplishment in IPM studies involved applying a proven methodology and workflow which resulted in production enhancement identification and quantification of incremental production gains.

The Steady-State Integrated Production Network model is constructed, calibrated and validated to match actual field production to simulate the field production network. Potential network optimization scenarios are then generated to analyze the possibility of increasing overall production for the field by simulating the effects of changing operating variables such as artificial lift volumes and distribution, producing well mix and also changes in production system pressures.

Field Screening and Selection

Data Gathering and QC / Validation

Project Framing

Well Modelling (PROSPER / Wellflo)

Integrated Production Network Modelling (IPM-GAP/ ReO)

IPM Optimization

Formulate Technical Recommendations For Implementation

For more info, please visit www.energyquest.com.my
Steady-State Integrated Production Modelling (IPM) - Case Study Examples

Case Study examples:

- Integrated Production Modelling (IPM) Study for Field B3 (Brown Field, Offshore Peninsular Malaysia).
  - 14 active wells
  - 1 production platform
  - 1 FPSO
  - 2 pressure systems
  - 3–18% incremental oil rate

- IPM Study for B1 and B2 Fields (Brown Fields, Offshore Sarawak).
  - 24 active wells
  - 9 production platforms
  - 3 processing platforms
  - 3 pressure systems
  - 2–10% incremental oil rate

- Network Modelling Study for Field D (Brown Field, Offshore Sarawak).
  - 15 active wells
  - 1 production platform
  - 1 processing platform
  - 3 pressure systems
  - 2–18% incremental oil rate

- IPM Study for Field A (Brown Field, Offshore Peninsular Malaysia).
  - 57 active wells
  - 5 production platforms
  - 1 processing platform
  - 2 pressure systems
  - 5–17% incremental oil rate

- IPM Study for Field K (Brown Field, Offshore Sabah).
  - 24 active wells
  - 2 subsea manifolds
  - 1 DTU
  - 1 FPSO
  - 3 pressure systems
  - 7–10% incremental oil rate

For more info, please visit www.energyquest.com.my
EQ's team of technical professionals are also equipped to conduct a range of Reservoir Studies customized to suit a particular objective i.e. Reservoir Management Plan (RMP), Reservoir Surveillance Plan (RSP) and Operating Strategies evaluations which may include:

- Developing Reservoir Monitoring strategies for new reservoirs / fields
- Evaluating current Reservoir Management Strategies and propose improvements where required
- Studying the impact of a change in Operating Strategy on recoveries

For more info, please visit www.energyquest.com.my
Reservoir Management Plan (RMP) Studies - Case Study Examples

Case Study examples:

RMP Evaluation - Studying the impact of GOR relaxation on recoveries

Gas Injection Evaluation - Evaluating the impact of reduced gas injection on field recoveries

RMP Evaluation - Evaluating the existing RMP and recommending improvements;
Gas Injection optimization by identifying potential well conversions to enhance distribution

GI, WAG, IWAG Evaluation - Reservoir compartment analysis; Identifying GI, WAG, IWAG benefits

For more info, please visit www.energyquest.com.my
EQ’s services for Subsurface Water Injection Optimization can be in the form of consulting and/or analytical services addressing entire or any part of the phase as shown below.

**PHASE ONE**
- WI practices assessment of well, reservoir & compliance
- Operators’ WI Practices and Field Performance Assessment
- Identification gaps (i.e. Caps of WI & Oil Rates, Reserves-at-Risk)

**PHASE TWO**
- Study to close the gaps
  - Revist RMP
  - Pressure Maintenance
  - VRR
  - GOR Limit
  - Improve Reservoir Sweep
  - Optimize Production
  - Improve Reservoir Depletion

**PHASE THREE**
- Monitor Key Performance Areas
  - Well, e.g. BHP, PI & II, GOR
  - Reservoir, e.g. Pressure, ROP
  - RMP Compliance, e.g. VRR & GOR

The assessment focused on the WI management practices of well performance, reservoir performance and reservoir management compliance.

The assessment of six key elements on 44 WI reservoirs from the nine fields has successfully identified some of good practices in WI management. The fields were then ranked based on the elements’ assessment results.

Our established workflow includes meticulously assessing the Operators’ WI practices and surveillance data to identify gaps in WI and oil production rates; formulation of actionable plans to address these gaps are then designed to restore and optimize production, thus reducing the potential reserves loss.

**Case Study example:**

EQ’s recent accomplishment involved the Phase One Subsurface WI assessment of nine major WI fields in Malaysia, which resulted in developing prudent WI practices for the “PETRONAS Water Injection Reservoir Management Guideline”, the first for the country.

The tangible findings for these fields include:

- The total 2014 WI rate gap (actual against target) was 69 kbw/d; further WI practices improvements in meeting injection targets are required in most of the fields.
Subsurface Water Injection Optimization (cont’d)

- **2014 WIM capacity utilization** (actual maximum WI against WIM capacity) ranged from 11% to 90%; when combining with average WI utilization, the possible additional WI rate/volume are in the range of 3% to 19%;

- The total 2014 oil rate gap (actual against target) was 32 kbo/d; further WI practices improvements in meeting oil production targets are required in most of the fields;

- **The total reserves-at-risk estimated for 19 WI reservoirs was 163 MMstb (32% of total assessed reserves, i.e. 516 MMstb), from which 90% were from Angsi, Baronia, Dulang and Kikeh reservoirs;**

- **About 60% of the assessed reservoirs had reserves/production (R/P) of more than 10 years indicating inefficient depletion;**

- **About 60% of the assessed reservoirs had recovery factor (RF) of less than 45% indicating inadequate reservoir sweep.**

In year 2014, the remaining Malaysia WI Fields that are not yet assessed account for 148 MMstb of oil reserves and 43 kbo/d of oil production (5% and 8% of the Malaysian totals, respectively); a similar WI Assessment (Phase One) with improved workflow shall be conducted to identify opportunities and specific areas of improvement.

For more info, please visit www.energyquest.com.my
EQ’s experience include formulating guidelines and best practices for PETRONAS, Malaysia’s National Oil Company, and also project management for newly formed oil and gas operating companies.

Case study examples are shown below, in which EQ successfully developed and rolled out guidelines for the determination of Technical Potential for oil producing fields, and also materialized the framework for Reservoir Management and Surveillance guidelines and best practices for Malaysia’s National Oil Company, PETRONAS.

**Case Study examples:**

**RMS Framework**

EQ co-developed the Reservoir Management and Surveillance (RMS) Framework for the Publication Of Malaysia Petroleum Management, PETRONAS.

The framework serves as a guide to both the multi-disciplinary technical team and management. It captures the current best-practices in the formulation and execution of a Reservoir Management Plan, which include monitoring and benchmarking asset performance. It also provides as a quick referral on the available guidelines and review processes for RMS activities.

The scoring and benchmarking of assets outlined in the framework provides for quick identification of areas of improvement in implementing RMS activities as well as bases for work prioritization.

**Technical Potential (TP) Guidelines**

EQ successfully co-produced the 2016 Annual Edition Technical Potential (TP) for the Publication Of Malaysia Petroleum Management, PETRONAS.

The document presents a structured and systematic presentation of TP and its components. It demonstrates the discipline to continuously improve forecasting ability and in turn, aids alignment in the decision making process and formulates strategic initiatives to unearth hidden TP.

The TP book also formed an integral part of Subsurface Asset Management, as a communication tool to equip the stakeholders in driving priorities to unlock and realize TP to Production.

For more info, please visit www.energyquest.com.my
EQ’s dedicated team of highly experienced and industry recognized Geoscientists comprising Geologists, Geophysicists and Petrophysicists are committed to offer a wide range of services from Specialized services to Integrated field solutions, tailored to address unique project needs and value drivers.

Utilizing industry standard software, methodical approach and proven workflows, the highlights of our track record is shown below, which include basement studies, resource assessments and the geological evaluation of hydrocarbon prospectivity in Tinjar Province, Limbang-Klias and Kudat Peninsula.

**Geoscience Track Record**

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Regional Geology
- Theories on rock deformation: stress and strain.
- Regional and local tectonic: identify structural types.
- Compressional and transpressional structures.
  - Structures for hydrocarbon accumulation: strike slip, wrenching, normal and reverse faulting.
- Different types of folding and fault type identification and impacts on hydrocarbon.
- Structural and stratigraphic traps.
- Fractured reservoir (basement rocks, clastics and carbonates).

Structural Geology
- Source Rocks.
- Generation Capacity - Source Rock Volume assessments.
- Maturation and Migration.
- Migration Timing.
- Source rock maturity prediction.
- Prediction of regional variation in organic facies.
- Migration pathways – efficiency and direction.
- Gas/oil ratio.
- Petroleum system chart.
- Hydrocarbon windows (Oil and Gas windows).

Geochemistry
- Full formation evaluation analysis.
- Low Resistivity Low Contrast (LRLC).

Sedimentology and Sequence Stratigraphy
- Formation Evaluation.
- Geophysics.
- Geomodelling.
- Prospect Evaluation.

For more info, please visit www.energyquest.com.my
EQ has the best track record in evaluation of the hydrocarbon existence in the unexplored or underexplored area. When the area of interest in close proximity to the productive onshore of offshore hydrocarbon fields, a detailed investigation is needed to evaluate the structural and geological continuity and prospectivity. To date, EQ has successfully evaluate hydrocarbon existence potential in few locations onshore Sabah and Sarawak area.

For more info, please visit www.energyquest.com.my
Geological Evaluation of Hydrocarbon in Place (cont’d)

Unconventional Hydrocarbon Prospect Evaluation

Desktop Study

• Synthetic Aperture Radar (SAR) Interpretation
• Seismic Interpretation
• Well Correlation
• Full Tensor Gravity (FTG) Interpretation
• Literature Review

Fieldwork, Mapping & Ground Truthing

Sampling & Laboratory Analysis

• Maceral Analysis
• Vitrinite Reflectance
• Total Organic Carbon (TOC)
• Coal Petrology
• Coal Cleat Orientation & Development Analysis
• Proximate Analysis
• Ultimate Analysis
• Gas Composition
• Bulk/Relative Density
• Palynology
• Foraminifera
• Nannofossil

Geochemical and Coal Properties Analysis

Play Element Analysis

Volumetric Assessment

Prospect Risking & Ranking

For more info, please visit www.energyquest.com.my
With our partners, EQ have conducted few projects dealing with Airborne survey data and FTG, purposely to identify sedimentary basins and help in the development of a structural framework for an area, both onshore and offshore. FTG data analyses is the study of magnetic and gravity data to provide topographic information of any subsurface interface based on density contrast and magnetism anomaly.
Specialized Service
- LRLC (Low Resistivity Low Contrast)

The primary objective of an LRLC Project is to investigate and recognize the underlying factors culminating in a particular LRLC type behavior manifestation and then to mitigate the impacts on $R_t$ estimation and the subsequent improvement of $S_w$ profile.

E&P industry general perception that most of the LRLC type reservoirs; in particular from the old fields; are still lying unidentified/undetected (as bypassed intervals) and do hold an enormous upside potential for improved/enhanced hydrocarbon reserves.

EQ’s team of Petrophysicists are equipped with the niche experience to embark on LRLC evaluation, with established and proven workflow and techniques.

Artificial Neural Network (ANN) based modelling is conducted to transform old suites of logs into synthetic modern suites of logs such as NMR Logs etc. These synthetic modern logs are then subsequently deployed to resolve the issues related to LRLC type of Reservoirs.

For more info, please visit www.energyquest.com.my
Specialized Service
- LRLC (Low Resistivity Low Contrast) – (cont’d)

EQ’s involvement in LRLC include:

**LRLC Study for PETRONAS Research Sdn. Bhd. (PRSB)**

- The development of Artificial Intelligence Neural Networks (ANN) Models for the Malay, Sarawak and Sabah Basins.
- Reconciling results of studies of:
  - Core measured properties (i.e., RCAL, SCAL, capillary pressure, pore throat, electrical measurements)
  - Petrography (i.e., thin Section, XRD, SEM) for grains size distribution, mineralogy, morphology)
  - Image logs for thickness
- Resistivity Improvement Modelling
- Integration of Petrophysical Analysis from Conventional Logs and $S_{wir}$ from NMR Spectrometry/Logs.
- The application of ANN Models on more than 20 Fields
  - To investigate behaviour patterns of suspected LRLC Type Reservoirs
  - To perform predictive studies targeting enhanced hydrocarbon recoveries.

**LRLC Study of Balai Field for ROC Oil & Dialog**

- The development of ANN modelling techniques for LRLC/EOR applications

For more info, please visit www.energyquest.com.my
In order to fully realize the true value of an Asset, an organized database which comprise all available reservoir and field data is vital to ensure a good understanding of the Asset. The database would serve as a good and reliable field surveillance tool and also as a reference for future studies. EQ’s team of professionals have completed a number of Data Management projects, especially in developing fit-for-purpose, technical databases for fluid, rock, production and reserves data. We strive to formulate recommendations to improve the existing data management practices of our clients, to further improve the efficiency in understanding a given field and also assist in developing standardized production analysis and reporting requirements.

Ideally, the database is designed for different levels (e.g., by well, reservoir, field or asset) to suit its unique Data Management objectives. Examples of databases developed include the following:

- Well/Field analysis database (for each field)
- Asset Management database (for multiple assets)
- Fluid & Rock Database (for each reservoir)

The Scope of Work may include the following simplified workflow.

**Data Gathering, Screening & Consolidation**
- Well History
- Wellbore data
- Production & Injection Data
- Reservoir Data
- Hydrocarbon Resources & Reserves Data
- Fluid & Rock Data

**Data Review, QC & Validation**

**Data Loading & Database Development**
- Industry standard database e.g., OFM
- Well datasheet
- MS Access and VBA database

**Database Review, QC & Validation**

**Database Utilization**

**Database Update and Maintenance**

For more info, please visit www.energyquest.com.my
Data Management in Full Field Review (FFR) - Case Study Example

Case Study example:

Full Field Review (FFR) for a Mature Oil Field located Offshore Sarawak, Malaysia

The FFR involved meticulous consolidation, review and validation of well history and production & injection data for 44 wells. EQ’s team of Reservoir and Production Engineers combed through voluminous well history and production data to produce a systematic well datasheet and production database that enabled detailed technical assessment to be conducted (i.e., production allocation and field/reservoir/well analysis using OFM).

The Data Management activities included:

- Data gathering, screening & consolidation
- Data review & validation
- Update & enhancement to the client’s existing OFM database
- Developing a well by well datasheet which comprise the updated well schematic, deviation & perforation data, verified active zone(s), a summarized well history of completion & intervention activities, production and pressure data.

Example of Well Datasheet

OfM Development, QC and Update

Production Allocation QC and Correction

Wellbore Diagram in OFM

Field/Reservoir/Well Analysis Using OFM

For more info, please visit www.energyquest.com.my
Our team of Subject Matter Experts (SMEs) & Engineers adopt an integrated approach when working with Programmers (back-end and front-end), Analysts and Web Developers in System & Application Software Development.

In generating accurate well and reservoir production forecasts, managing our client’s data and providing recommendations to improve the existing data management practices of our clients proved critical.

The team successfully delivered an automated short term production forecasting tool which incorporates industry standard correlation algorithms into an intelligent system complete with data acquisition module and web interface (open source software).

A typical workflow for System & Application Software Development is shown in the simplified workflow below.

For more info, please visit www.energyquest.com.my
Case Study Example:

Phase 1 Development of the Intelligent Gas Forecasting and Optimization (IGFO) System for Petronas Carigali Sdn Bhd (PCSB) Sarawak Gas (SKG) fields

Phase 1 development of the IGFO system for PCSB-SKG involves creating a system which connects to available data sources to acquire updated data, and automatically extracting the identified data to populate a performance web dashboard for the purpose of analysis and forecast of individual wells and reservoirs for 18 PCSB gas fields.

Industry standard correlation algorithms were incorporated in the IGFO system to produce models for short term production forecasting on a well and reservoir basis, and also prediction of volumes and recoveries.

A defined data interface was then utilized to import SKG data and connect to the data management system. The data acquisition module was developed to acquire data automatically, and made customizable to include data cleansing capabilities & data quality control and the flexibility to accommodate new data sources in the future.

The end product was a web based, user friendly IGFO system, customized based on PCSB-SKG requirements for Phase 1. The tool also provides visualization of Key Performance Indices (KPIs) for each field, hub and PSC.

For more info, please visit www.energyquest.com.my
Commitment to Training and Technology Transfer

EQ is committed to inspire and guide our people, our partners and clients, and is especially passionate in imparting knowledge to the young professionals.

**On-The-Job Training**

- Proven Training & Technology Transfer Program
- Key skills to be developed include:
  - Understanding subject matter
  - Integrating work processes
  - Software & communication skills
- Trained more than 50 young professionals via On-The-Job (OJT), Internship Programs and Project Secondment
- Offered scholarships to almost ten graduate students in Oil & Gas

**Client Secondment**

- Laboratory Visit
- Offshore Visit

For more info, please visit www.energyquest.com.my
Commitment to Training and Technology Transfer (cont’d)

**Internship Programs**

- Student Internships from Local Universities
  - UTP
  - UiTM
  - UTM
  - UMS
  - UM
  - UKM
  - Lim Kok Wing

- Student Internships from Overseas Universities
  - UNSW, Australia
  - Melbourne University, Australia
  - University of Adelaide, Australia
  - Wisconsin-Madison University, USA
  - Myanmar University

For more info, please visit www.energyquest.com.my
Commitment to Training and Technology Transfer (cont’d)

Over the years, EQ has successfully delivered customized training solutions either in-house or as public courses.

Training Courses & Talks

- Training and Mentoring by experienced professionals, primarily in the practical approach to E&P Upstream solutions
- Short Training Courses / Talks:
  - Technical Talk with PETRONAS
  - Adjunct Lecturing at UTP
  - Upstream Oil & Gas Overview for Bankers
  - Petrosains Talk on Oil Field Overview

Conferences and Exhibitions

- Represented one of Malaysian Oil & Gas companies in Offshore Technology Conference (OTC) in Houston (2016)
- Poster Presentation for PETRONAS Reservoir Management & Surveillance (RMS) Summit in Kota Kinabalu (2015)

Customized Training Programs

- IOOC-OEOC (Iranian Offshore Oil Company - Oil Exploration Operations Company) Collaboration and Risk Analysis & Prospect Evaluation Training
- TTS (Training Technology & Sponsorship), SOC (South Oil Company) Iraq Advanced Reservoir Engineering and Oil & Gas Exploration Training

For more info, please visit www.energyquest.com.my
EQ also provides an extensive range of geoscience training courses. This includes field trips and visits to selected locations with some of the best outcrops around Malaysia. Participants gain a deeper understanding of the wide range of geological processes first-hand.

### Geology Classes

- Fundamentals of Petroleum Geology
- Structural Geology in Hydrocarbon Exploration
- Mapping Techniques, Volumetric Assessment and Risks & Uncertainties
- Introduction to Biostratigraphy
- Oil & Gas Exploration Tools
- Fundamentals of Sequence Stratigraphy
- Plate Tectonics & Regional Geology of Southeast Asia

### Geophysics Classes

- Seismic Acquisition & Processing
- Seismic Inversion
- Seismic Interpretation
- Plate Tectonics & Regional Geology of South East Asia

### Field Trips

- Fundamentals of Petroleum Geology, Pahang
- Geology for Petroleum Engineers, Kuala Lumpur
- Field Techniques of Structures in “Hard-Rock”: Pahang-Terengganu
- Geology of Western Belt of Peninsular Malaysia: Kuala Lumpur-Langkawi
- Fractured Basement, Pahang-Terengganu-Johor
- Fractured Basement, Redang Island
- Geology of Northern Sabah, Sabah
- Geology of Tinjar Province, Sarawak
- Sedimentology Field Trip: Pahang
- Structural Geology: Selangor-Pahang-Negeri Sembilan-Southwest Kelantan

For more info, please visit [www.energyquest.com.my](http://www.energyquest.com.my)
EQ’s accomplishments in Subsurface Projects and Studies involve allocating appropriate resources – a Core Technical Team of Reservoir and Production Engineers, Geoscientists (Geologists, Geophysicists, Petrophysicists) and Economists, and utilizing fit-for-purpose industry standard software based on the level of study designed to meet our Client’s needs.

Our Core Technical Team are equipped with experience and know-how in subsurface to surface integration, dedicated to provide solutions in optimizing oil and gas production, and maximizing hydrocarbon recoveries. We strive to ensure that the management, evaluation, planning and execution of production enhancement efforts are efficiently conducted and timely completed.

• An example of our Project Team Organization is shown.
• For each project, the proposed Core Technical Team members are selected to comprise professionals with vast experience in upstream oil & gas industry, relevant to the subject.
• Apart from the Core Technical Team members, additional professionals will also be made available via EQ’s Strategic Alliances to complement and assist if/when required.

For more info, please visit www.energyquest.com.my
Some of our Core Team members are shown below, and additional professionals will also be made available to complement and assist if/when required. The proposed team members for each project shall comprise professionals with a vast experience in the upstream oil & gas industry, strategically selected to meet the desired objectives of the project.

### Team Members (CVs are available upon request)

Allida Muhammad Said
Chief Operating Officer (COO) / Principal Consultant (Reservoir Engineering)
Holds BSc. Civil Engineering (Northwestern U., Illinois, USA); 28 years experience in the oil & gas industry, including field operations, corporate planning, FFR/FDP/EOR & resource assessment studies for oil & gas fields onshore & offshore, for Malaysia (PM, SB and SK) and international assets

- **Proficient in Managing & Leading Technical Teams** - project management, reserves certifications, asset evaluations, gas & oil FFR and FDPs and technical assessment for gas PSC negotiation
- **Experience in Field Operations & Management** - development drilling campaign, infill drilling, production enhancement efforts, IOR & EOR opportunities, field & reservoir surveillance
- **Experience in Reservoir Management Advisory Roles** - authoring RMS framework & WI RMP guidelines, asset evaluation, fluid PVT analysis, PBU analysis, resource assessment and reporting
- **Proficient in Reservoir Simulation** - history matching & prediction, infill development, WI, GI & WAG, gas cap blowdown, FDPs & FFR for gas & oil
- **Proficient in Petroleum Economics** - exploration & appraisal economics assessment, scorecard economics and detailed OPEX forecast
- **Expert Trainer** - skilled in mentoring new Engineers and has conducted trainings (classroom & field) for technical and non-technical clients. Adjunct Lecturer for the Engineering Department at Universiti Teknologi PETRONAS (UTP)

Sies Hussain
Principal Technical Advisor (Subsurface / Production Engineering)
Holds BSc. Eng. Chemical Engineering (Imperial College, UK); renowned Gas Lift Expert with 36 years experience in studies and operations of oil fields onshore & offshore, for Malaysia (PM, SB and SK) and international assets

- **Industry Expert in Production & Well technical evaluation and operations** - field development formulation & implementation, field rejuvenation and IOR assessments; facilitate & lead Asset teams in Wellbore Utility Reviews (WBUR) and strategizing IOR opportunities
- **Vast Experience in Well & Completions Operations** - field & reservoir surveillance, production strategy, sand control planning & implementation and well workover operations, well diagnostics, & gas lift troubleshooting and optimization, and asset evaluations (including field & site visits and development concepts)
- **Experience in Production Enhancement Advisory Roles** - Subsurface Engineering Advisor; Integrated Production Modelling (IPM) studies, FDPs and FFR/EOR studies;
- **Gas Lift Expert** - gas lift Expert advising EMEPMI (PM fields). Published author in the subject of Gas Lift Optimization & Sand Management; co-developed ExxonMobil’s Global Gas lift Best Practices
- **Expert Trainer** - skilled in mentoring new Engineers and has conducted trainings (classroom & field) for technical and non-technical clients.

Mohd Bahrumizam Hj Musa
General Manager / Senior Consultant (Petroleum Engineering / Economics)
Holds MEng, Petroleum Engineering (Imperial College, UK); 20 years experience including operating and studying oil & gas fields offshore Malaysia (PM, SB and SK) and international assets

- **Proficient in Well Production Enhancement (natural flow, GL, ESP & PCP assisted)** - PLT analysis, production allocation, well diagnostics, well rejuvenation, BCO candidate, design PBU, PLT & CTU jobs, RFT/MDT, infill well and workover (WSO, cement squeeze and re-perforation) jobs; ESP & PCP operations
- **Experience in Exploration & Development Drilling Operations** - open hole & cased hole loggings, well drilling & completion, coring, downhole and surface fluid samplings, well clean ups, oil and gas well & field start ups
- **Proficient in Network Modelling (IPM)** - MBAL/PROSPER/GAP analysis and optimization
- **Experience in Reservoir Management Advisory Roles** - formulate frameworks and methodologies for performance gap analyses (reservoir-to-onshore terminal) and Water Injection (WI) assessment & RMP guidelines
- **Reservoir Simulation Expert** - studies for history matching & prediction, FDPs and FFRs for oil & gas reservoirs, IOR (WI, GI, WAG) & EOR (miscible gas) evaluations and RMP revisions; integrating core analysis, pressure transient analysis and PVT analyses results into the studies
- **Proficient in Petroleum Economics** - project costing, fiscal terms, economics and sensitivity analyses for FDP, business and operational decisions & asset acquisition recommendation
- **Expert Trainer** - coach & mentoring new Engineers & clients’ secondees, conducted classroom trainings and adjunct lecturer & industry examiner at local universities
Emalin Ramli
Senior Consultant (Production / Reservoir Engineering)
Hold BEng, Chemical Engineering with Management (Loughborough U., UK); 20 years experience in the oil & gas industry, including field operations, corporate planning, FFR/FDP/EOR & resource assessment studies for oil & gas fields offshore Malaysia (PM, SB and SK) and international assets

- **Expert in Well & Integrated Production Network Modelling (IPM)** - production network (PROSPER/GAP & WellFlo/ReO) analysis & optimization
- **Proficient in Production Enhancement Work** - well production & injection optimization, devising production strategies, facilities de-bottlenecking & idle well restoration efforts, conceptual well completion design, sand control management & prediction and formulating production enhancement & IOR proposals
- **Proficient in Reservoir Surveillance** - operations experience in offshore field surveillance, well test & MPFM data verification, developing RMP & operating strategies, production & injection allocation, field target setting and shutdown planning.
- **Proficient in Reservoir Studies & Simulation** - well & reservoir performance analyses, reservoir simulation studies for history matching & prediction (MBAL & PETREL/Eclipse), formulating field development plans & in-fill development concepts (FFR/FDP, IOR - WI & GI), integrating rock & fluid properties, fluid contacts analysis, well test analysis, DCA and reservoir-to-facilities optimisation
- **Experience in Upstream Planning** - field performance reviews, reserves reporting & coordination, WPB submission, data review for reserves certification & asset acquisition recommendation
- **Experience in Database Management** - production database management and well engineering database development

Najmi Rahim
Senior Consultant (Reservoir Engineering)
Hold BEng, Chemical Engineering (U. Malaya, Malaysia); 16 years experience including field operations, FFR/FDP/EOR & resource assessment studies for oil & gas fields offshore Malaysia (PM, SB and SK) and international assets

- **Proficient in Production Enhancement Work** - well and reservoir modelling & performance analyses for well & reservoir surveillance and optimisation, integrating well petrophysical evaluations, DCA and well test analysis.
- **Proficient in Network Modelling (IPM)** - MBAL/PROSPER/GAP analysis and optimization
- **Proficient in Petroleum Economics** - project costing, fiscal terms, economics and sensitivity analyses for business and operational decisions & asset acquisition recommendation using EQ in-house Proprietary economic models
- **Experience in Field Operations** - operational experience in well completion design, well drilling operations, mudlogging and formulate wireline logging, acidization & zonal isolation proposals
- **Proficient in Reservoir Studies and Simulation** - reservoir simulation studies for history matching & prediction, FFR/FDP, IOR (WI, GI & WAG)
- **Experience in Core Laboratory Work** - SCAL scoping work
Team Members – cont’d (CVs are available upon request)

Geology / Geomodelling

Jawati Abu Naim
General Manager / Principal Consultant (Geology)
Holds BSc. Geology (U. Malaya, Malaysia); 38 years of diversified experience in the oil & gas industry, including FFR/FDP and resource assessment studies for oil & gas fields onshore & offshore, for Malaysia (PM, SB and SK) and international assets; life member Geological Society of Malaysia (GSM); member of American Association of Petroleum Geologist (AAPG) and Institute Geology Malaysia (IGM), Malaysian Oil and Gas Engineering Council (MOGEC) curriculum panel member and a recognized Pakar Industri (PIND) – Minyak & Gas (Kementerian Sumber Manusia)

- Proficient in Managing & Leading Technical Teams - manage & lead technical teams in completing technical assessment, reserves certifications and asset evaluations
- Expert in Geological Exploration & Development - skilled in conventional and unconventional resources; integration of multiple geoscience and engineering data, regional analyses, detailed assessments and evaluation of well database; qualitative interpretation projects on depositional systems and reservoir characterization. Published author on the subject of Geology and Block Evaluation
- Experience in Prospect Maturation & Asset Acquisition - acreage evaluation, data review for resource assessment and block acquisition
- Experience in Research - basin regional study (primarily on clastic & reef carbonate plays), screening of hydrocarbon potential and the application of ArcGIS interactive mapping approach in hydrocarbon resource assessment.
- Expert Trainer - skilled in mentoring new Geologists and has conducted trainings (classroom & field) for technical and non-technical clients.

Mansor Ahmad
Principal Technical Advisor (Geology)
Holds BSc. Geology (U. Malaya, Malaysia); renowned Fieldwork Expert with 35 years’ experience in the oil & gas industry, including field operations, block evaluation and geological studies for oil & gas fields offshore Malaysia (PM, SB and SK) and international assets; member of Geological Society of Malaysia (GSM)

- Industry Expert in Geological Fieldwork - expert in the study of sedimentology, stratigraphy (including sequence stratigraphy), paleoenvironment, paleontology and geochemistry; geological evaluation of hydrocarbon prospectively & exploration potential in Sabah, Sarawak, Peninsular Malaysia and also international assets; experience in evaluation of Coalbed Methane (CBM) potential and assessment of mining potential.
- Expert Trainer - skilled in mentoring new Geologists & Explorationists, and has conducted trainings (classroom & field) for technical and non-technical clients; a visiting lecturer with a number of local institutions including Universiti Institut Teknologi MARA (UiTM) and Universiti Teknologi Petronas (UTP), guest speaker at the CCOP-DANIDA (Coordinating Committee for Geoscience Programmes - Danish International Development Agency) in East and Southern Asia Conference (in Ho Chi Minh City, Vietnam) in March 2007 to present the topic on Low CO2 Play Exploration, working on the concepts of Low CO2 Play Evaluation in other Tertiary Basin in Asia. Published author of several technical papers on the topics of geology and basin study.
- Proficient in Field Operations & Management - experience as Wellsite Geologist in drilling operations and post-drilling evaluation; experience as Petronas Resource Assessment and Marketing (PRAM) Manager for basin study; managed and supervised PSC operators in block exploration.
- Expert in Geological Exploration & Development - skilled in conventional and unconventional resources; field development planning, data acquisition program & well planning, field mapping, geological evaluation for well proposals, regional analyses & basin evaluation; qualitative interpretation projects on depositional systems and reservoir characterization.
- Expert in Prospect Maturation & Asset Acquisition - data review for exploration studies, resource assessment, prospect maturation and prospect/lead/block evaluation; evaluated the prospectivity of Sarawak Basins to identify new plays and strategically rank the prospects to be drilled; evaluation of basement prospectivity; highly capable in conducting geological evaluations in determining asset value, specializing in block exploration, prospect ranking & risking and asset acquisition.
Team Members – cont’d (CVs are available upon request)

Samsudin Abd Hamid  
Principal Technical Advisor / Principal Consultant (Geology)  
Holds BSc. Geology (U. Malaya, Malaysia); 35 years’ experience in the oil & gas industry, including field operations, FFR/FDP and resource assessment studies for oil & gas fields onshore & offshore, for Malaysia (PM, SB and SK) and international assets; member of Institut Geologi Malaysia (IGM) & the Geological Society of Malaysia (GSM)

- **Experience in Field Operations & Management** - managed and supervised drilling of exploration wells, including side-wall coring and RFT interval sampling; prepared well completion reports, composite logs and mud logs; field geologist for surface geological survey, air photo interpretation, geochemical and biostratigraphic sampling & evaluation [maturation, migration and timing]
- **Expert in Geological Exploration & Development** - skilled in conventional and unconventional resources; field development planning, data acquisition program & well planning, stratigraphic correlation & facies interpretation, fault & structural model construction, integration of multiple geoscience and engineering data, regional analyses, detailed assessments and evaluation of well database; qualitative interpretation projects on depositional systems and reservoir characterization. Published author on the subject of Petroleum Geology.
- **Proficient in Seismic Interpretation** - 2D/3D seismic acquisition planning and interpretation for regional & specialized studies
- **Expert in Prospect Maturation & Asset Acquisition** - data review for exploration studies, resource assessment, prospect maturation and prospect/lead/block evaluation; highly capable in conducting geological and geophysical evaluations in determining asset value, specializing in block exploration and asset acquisition.
- **Expert Trainer** - skilled in mentoring new explorationists and has conducted trainings (classroom & field) for international clients.

Faizal Zainudin  
Principal Technical Advisor (Geology)  
Holds Bsc. Geology (Illinois State U., Illinois, USA); 31 years’ experience in the oil & gas industry, including field operations, FFR/FDP and resource assessment studies for oil & gas fields onshore & offshore, for Malaysia (PM and SK) and international assets; associate member of American Association of Petroleum Geologists (AAPG) and member of Geological Society of Malaysia (GSM)

- **Experience in Field Operations & Management** - managed exploration & development team, coordinated exploration operations; surveillance and implementation of geological & subsurface operations; experience as mudlogger and Wellsite Geologist responsible for onsite evaluation and monitoring of geological cuttings, gas & fluid analysis and drilling parameters
- **Expert in Geological Exploration & Development** - field development planning, data acquisition program & well planning and implementation in drilling campaign, stratigraphic correlation & facies interpretation and fault & structural model construction
- **Expert in Prospect Maturation & Asset Acquisition** - data review for resource assessment and block acquisition; knowledgeable in contractual & commercial terms of various regions (i.e., PSC/PSA, CA, RSC/ SC, JOB, TAC and Old Wells Rehabilitation Contract)

Hla Mine Pye  
Principal Technical Advisor / Principal Consultant (Geology)  
Holds Bsc. Geology & Post Graduate Diploma in Applied Geology (Science University, Rangoon, Burma); 43 years’ experience in the oil & gas industry, including field operations, log analysis, FFR/FDP and resource assessment studies for oil & gas fields onshore & offshore, for Malaysia (PM and SK) and international assets

- **Experience in Field Operations** - as Field Development (FDS) and Field Operation (FDO) senior geologist, planned, monitored and selected core points for field development studies; monitored drilling operations & reviewed well prognoses; wellsight geologist for formation evaluation and log interpretation for appraisal and exploration drilling.
- **Expert in Geological Exploration & Development** - production [development] geologist with extensive experience in oil & gas field development and reservoir characterization studies; field development planning, data acquisition and well planning & design, development drilling monitoring for onshore & offshore fields; reservoir monitoring & management; experience in Ultra-deep water, High Pressure High Temperature (HPHT) oil field development in the Gulf of Mexico, USA (turbidites reservoirs).
- **Expert in Geomodelling** - experienced geo-modeller; 3D geological reservoir modelling and volumetric assessment for FFR/FDPs; core-log integration & analysis, stratigraphic correlation & facies association, depositional environment & reservoir properties mapping, prospect evaluation
- **Proficient in Formation Evaluation** - log analysis & petrophysical interpretation; open & cased hole logs and dip meter interpretation; formation & reservoir evaluation.
- **Experience in Training and Teaching** - taught Post Graduate Diploma in Applied Geology at Yangon University, lecturing on the subjects of Formation evaluation, Well log interpretation and Reservoir geology / engineering for post-graduate students, majoring in Petroleum Geology; skilled in mentoring new geoscientists in the subjects of Reservoir and Production geology.
Team Members – cont’d (CVs are available upon request)

Zuhaini Mohamed
Senior Geologist
Holds BSc. Geology (U. Malaya, Malaysia); 21 years’ experience as a Geoscientist, 8 of which are in the oil & gas industry, including prospect evaluation and resource assessment studies for oil & gas fields onshore & offshore Malaysia (PM, SB and SK) and international assets; member of Institut Geologi Malaysia (IGM) & the Geological Society of Malaysia (GSM)

• Experience in Managing & Leading Technical Teams - worked in a multi-disciplinary team to conduct technical assessment and asset evaluations of hydrocarbon prospectivity for an onshore Asset; project manager / site supervisor during installation & monitoring of geotechnical instrumentation, earthworks & ground improvement works, laboratory supervisor during lab tests
• Proficient in Prospect Maturation & Asset Acquisition - data review for resource assessment, prospect maturation and prospect/lead/block evaluation; capable in conducting geological and geophysical evaluations in determining asset value, specializing in block exploration and asset acquisition.
• Proficient in Geological Exploration & Development - skilled in conventional and unconventional resources; regional analyses and field trip planning & execution; qualitative interpretation projects on depositional systems and reservoir characterization.
• Experience in Database Management - application of ArcGIS interactive mapping approach in hydrocarbon resource assessment.

Ahmad Ridhwan Abd. Rahim
Senior Geologist
Holds Bsc. Geology (University Malaysia Sabah); 9 years’ experience in the oil & gas industry, including prospect evaluation and resource assessment studies for oil & gas fields onshore & offshore Malaysia (PM, SB and SK) and international assets; member of Institut Geologi Malaysia (IGM) & the Geological Society of Malaysia (GSM)

• Proficient in Prospect Maturation & Asset Acquisition - data review for resource assessment, prospect maturation and prospect/lead/block evaluation; capable in conducting geological and geophysical evaluations in determining asset value, specializing in block exploration and asset acquisition.
• Proficient in Geological Exploration & Development - skilled in conventional and unconventional resources; regional analyses and field trip planning & execution; qualitative interpretation projects on depositional systems and reservoir characterization. Published author on the subject of fractured basement study.
• Proficient in Seismic Interpretation - 2D/3D seismic interpretation for regional & specialized studies.
Geophysics

Zainuddin Che Soh @ Yusoff
Principal Technical Advisor / Principal Consultant (Geophysics)
Holds BSc. Pure / Applied Geology (U. Malaya, Malaysia) and Diploma in Soil Engineering (Cranfield Institute of Technology, UK); 39 years experience in the oil & gas industry, including field operations, FFR/FDP and resource assessment studies for oil & gas fields onshore & offshore, for Malaysia (PM, SB and SK) and international assets.

- Proficient in Managing & Leading Technical Teams - lead a multi-disciplinary team of technical professionals to conduct technical assessment and asset evaluations of onshore & offshore assets; technical supervision of geophysical and petrophysical elements in resource assessments; gas & oil FFR and FDPs
- Experience in Field Operations - wellsite geophysical and geological operations for data acquisition and processing of 2D Seismic & check shots.
- Expert in Seismic Analysis - 2D/3D seismic interpretation and shallow hazards assessment; well sequencing, platform positioning & field development, fault interpretation, horizon mapping & seismic attributes analysis and well proposal formulation.
- Expert in Geological Exploration & Development - highly experienced in exploration and development aspects of geoscience in numerous basins around the world, including East and West Malaysia, Gulf of Mexico, Middle East and Russia; field development planning, core description, well log correlation using sequence stratigraphic concept, petrophysical log analysis, reservoir characterization & modelling and reserves assessment, regional geology.
- Experience in Prospect Maturation & Asset Acquisition - data review for resource assessment and block acquisition
- Expert Trainer - skilled in mentoring new Geologists and Geophysicists and has conducted trainings (classroom) for technical and non-technical clients.

Nurul Syafiqah Harun
Geophysicist
Holds Msc. Structural Geology with Geophysics (U. Leeds, UK), BSc. Geology (Cardiff University, Wales); 3 years work experience in industry and academia, including lecturer role in Universiti Teknologi PETRONAS; member of Geological Society of Malaysia (GSM), member of Institut Geologi Malaysia (IGM)

- Experience in Prospect Maturation & Asset Acquisition - data review for resource assessment and block acquisition
- Experience in Research - fieldwork based project involving structural studies on regions in Peninsular Malaysia
- Experience in Teaching - taught fundamental Geology subjects including Structural Geology at Universiti Teknologi PETRONAS (UTP)
Mohammad Masood Akhtar
Senior Consultant (Petrophysics)

Holds Post Graduate Diploma in Digital Technique (Philips International Institute Eindhoven, Holland) & B.Sc. in Engineering (U. Engineering and Technology Lahore, Pakistan); 43 years of experience in the oil & gas industry, including field operations, FFR/FDP/EOR and resource assessment studies for oil & gas fields offshore Malaysia (PM, SB and SK) and international assets (13 years of international work experience with Schlumberger);

- **Experience in Well Logging Operations & Well Log Interpretation** - field operational and base management experience, open hole & cased hole geophysical/logging field operations & management, well site petrophysical analysis
- **Expert in Formation Evaluation** - log analysis & petrophysical interpretation, specialist in LRLC (Low Resistivity Low Contrast), integrating production log interpretation & petrophysical analysis, facies determination, pressure & fluid contact analysis and RCAL & SCAL in EOR/FDP covering compartmentalized fields involving multi-domain datasets. Published author in the subject of Nuclear Magnetic Resonance Microscopy (ICMRM), 2011, Beijing, China
- **Experience in Prospect Maturation & Asset Acquisition** - data review for resource assessment and block acquisition
- **Experience in Research** - development & application of Artificial Intelligence Neural Networks (ANN) models to investigate behaviour patterns possible LRLC Type Reservoirs and perform predictive studies targeting enhanced hydrocarbon recoveries
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