



ENERGY QUEST

We leave no rock unturned



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- **Commitment to Training and Technology Transfer**

- **Customizable, Project Specific Team Structure**

- **Team Members (CVs are available upon request)**

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.



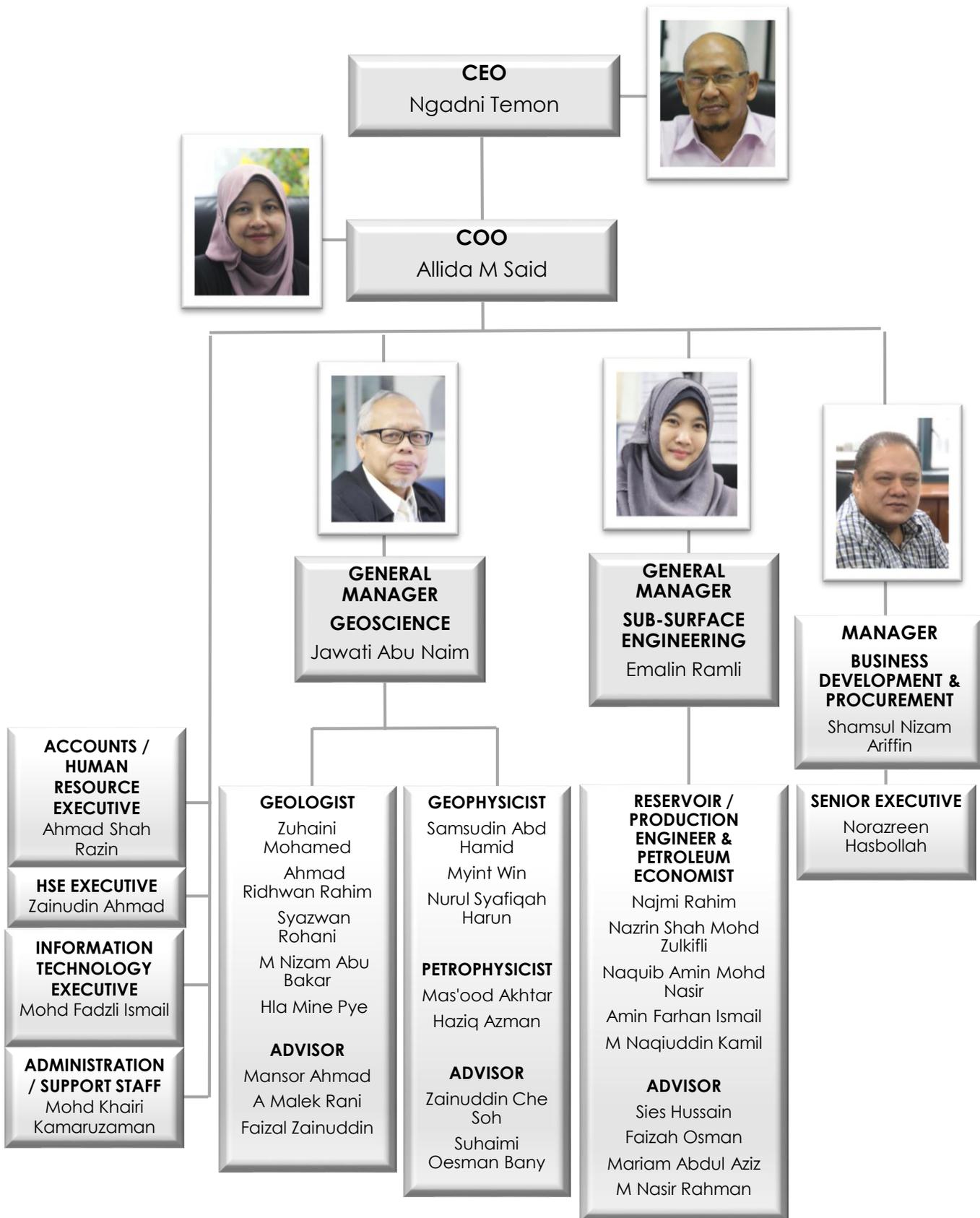
Vision

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

Organization Chart



EQ Provision of Technical Services

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.

geology

Shale Gas Study
Basin Modeling
Structural Analysis
Core Facies
Volumetric Assessment
Stratigraphic Correlation
Sedimentology
Reservoir Mapping
3D Geological Modeling
Laboratory Services
Static Modeling
Sensitivity and Risk Analysis
Basin Evaluation
Facies Mapping

geophysics

Exploration Geophysics
Impedance
Seismic Data Processing
Integrated Seismic Interpretation
3D Seismic Interpretation
2D Seismic Interpretation
Amplitude Versus Offset (AVO) Analysis
Production Geophysics
Seismic Attribute

petrophysics

Thin Bed Analysis
Fluid Contact
Saturation Height Function
Saturation Estimation
Core Analysis
Mineralogy Analysis
Logging Program Design
Cased Hole Analysis
Open Hole Analysis
Low Resistivity Low Contrast (LRLC)
Shaly Sand Model
Pressure Analysis

reservoir engineering

Decline Curve Analysis
Water Injection
Gas Injection
Well Testing and Analysis
Reservoir Operating Strategies
Pressure & Compartment Analysis
Reservoir Management Plan
Reservoir Surveillance Plan
Production Forecasting
Dynamic Reservoir Simulation
Fluid Characterization
Enhanced Oil Recovery
Rock Properties Analysis
Conceptual Drainage Plan

production engineering

Artificial Lift Analysis
Idle Well Reactivation
Workover Evaluations
Material Selection Study
Well Completion Design / Operations
Gas Lift Optimization
Field Network Enhancement
Completion Technology
Nodal Analysis
Sand Control Evaluation
Well Completion Reviews

economic analysis

Risk Analysis
Petroleum Arrangement Model
Company and Asset Evaluation
Decision Tree Analysis
Fiscal Model

subsurface technical team and specialized services

technical training

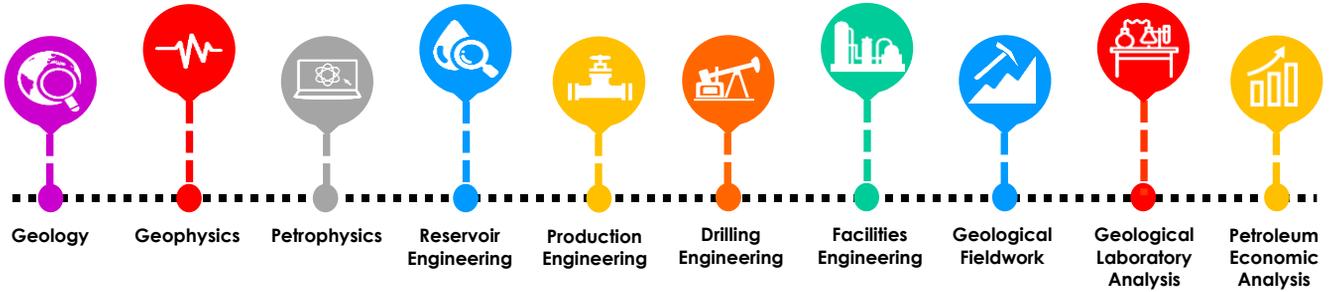
Upstream Project Economics Modelling
Overview of Petroleum Arrangement
Sedimentology Geological Fieldtrip
Advanced Formation Evaluation
Introduction to Biostratigraphy
Field Techniques in the Study of Structures in Hard Rock
Structural Geology Geological Fieldtrip
Geology for Petroleum Engineers
Fundamentals of Petroleum Geology
Structural Geology in Hydrocarbon Exploration
Reservoir Engineering for Geoscientist
Overview of Rock & Fluid Analysis
Laboratory Optimization
Special Core Analyses
Plate Tectonics & Regional Geology of SEA

data management

Rock database
Fluid database
Well/Field/Asset database
Production database
Due Diligence
Data Screening
Data room review
Well datasheet
Well log database

Core Services

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.



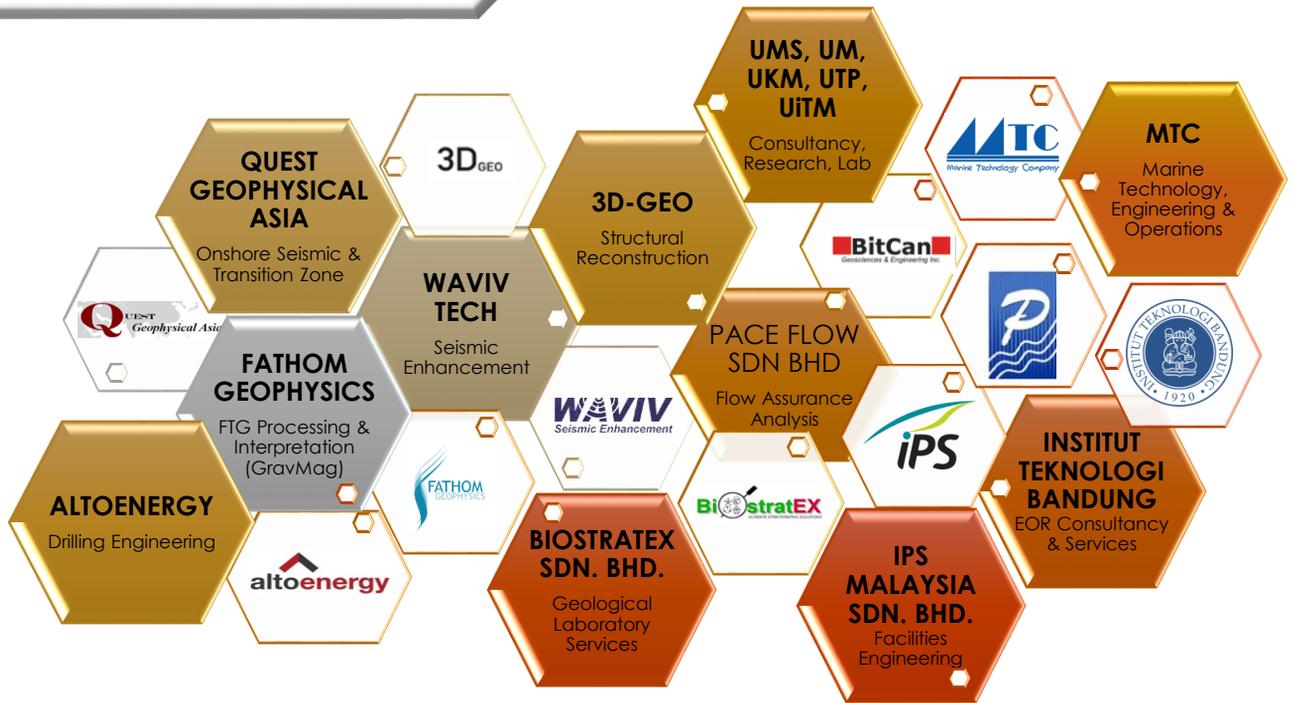
Clientele



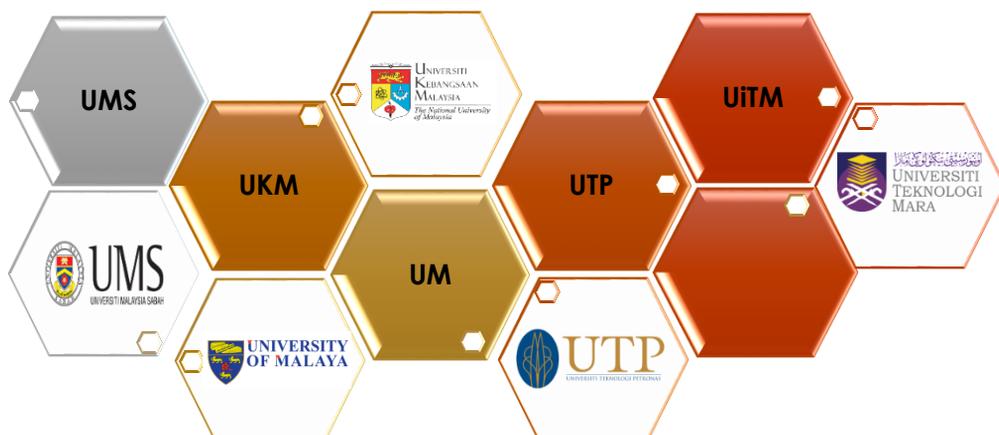
EQ Strategic Alliance

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.

Technical Alliance



Academic Alliance



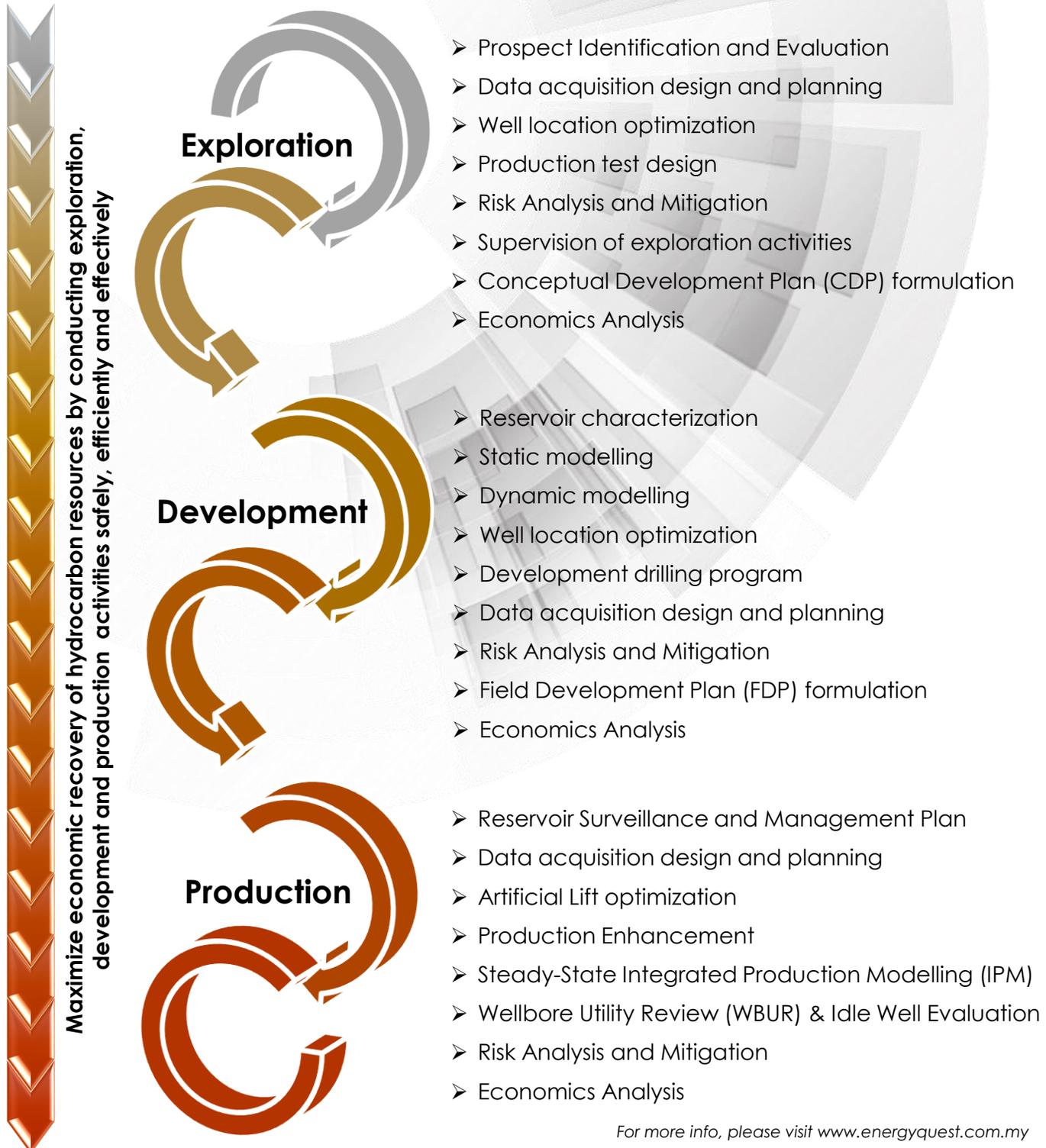
Subsurface Technical Services

- 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 requirement.

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.



Highlights of Our Track Record

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., Guntong 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.

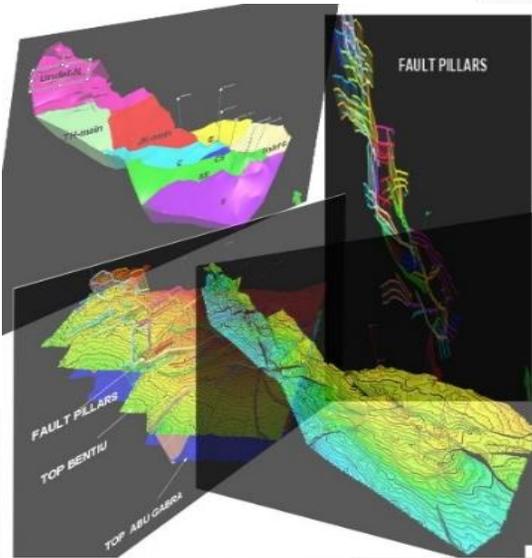
Year	HIGHLIGHTS OF OUR TRACK RECORD	Project Management	Geophysics	Geology/Geomodelling	Petrophysics	Reservoir Engineering	Production Engineering	Drilling Engineering	Facilities Engineering	Economics	Flow Assurance	Laboratory Services	Data Management	On-The-Job Training
Current	Asset Evaluation - Various 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	●	●	●	●	●	●	○	○	●	○	○	●	●
2018	Full Field Review (FFR) - Berantai (brown gas field), offshore Peninsular Malaysia	○	●	○	○	●	●	○	○	○	○	○	○	○
2017	System Application/Software Development - Subsurface Technical Experts for the development of Intelligent Gas Forecasting and Optimization (IGFO) System for PCSB, Sarawak Gas (SKG)	○	○	○	○	●	●	○	○	○	○	○	●	○
2016	Resource Certification - Independent Fairness Opinion report of Emir-Oil concession block, onshore Kazakhstan for Ferrier Hodgson	●	●	●	●	●	●	○	○	●	○	○	●	○
2016	Specialized Services - Seismic interpretation and Geomodelling (Malay Basin)	○	●	●	○	○	○	○	○	○	○	○	○	○
2016	Specialized Services - Petrophysical analysis for Block evaluation (offshore Sarawak)	○	○	○	●	○	○	○	○	○	○	○	○	○
2016	Guidelines Development - Reservoir Management & Surveillance (RMS) Framework, Water Injection management guidelines and Technical Potential (TP) guidelines for PETRONAS	●	○	○	○	●	●	○	○	○	○	○	●	●
2015	Production Enhancement - Integrated Production Network Modelling (IPM) study of Angsi field (offshore Peninsular Malaysia) for PETRONAS	●	○	○	○	○	●	○	○	○	○	○	●	●
2015	Specialized Services - Prospect evaluation, Regional geology & Structural analysis, Petroleum System analysis, Fieldwork Analysis of Limbang-Klias & Kudat Peninsula, Sabah	●	●	●	●	○	○	○	○	○	○	○	○	●
2015	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	●	●	●	●	○	○	○	○	○	○	○	○	●
2014	Reservoir Studies - Reservoir Management Plan (RMP) studies of D35, J4 and Baram fields (offshore Sarawak) and St. Joseph (offshore Sabah) for PETRONAS	●	○	○	○	●	●	○	○	○	○	○	●	●
2014	Reservoir Studies & Production Enhancement - Water injection dynamic modelling and IPM modelling production optimization / backpressure solution study of Kikeh field (offshore Sabah) for PETRONAS	●	○	○	○	●	●	○	○	○	○	○	○	●
2014	Production Enhancement - Integrated Production Network Modelling (IPM) study of Baronia and Betty fields (offshore Sarawak) for PETRONAS	●	○	○	○	○	●	○	○	○	○	○	●	●
2014	Data Management - Well and production data management and performance analysis of Dulang field (offshore Peninsular Malaysia) for PETRONAS	●	○	○	○	●	●	○	○	○	○	○	●	●
2014	Specialized Services - Petrophysics and Geomodelling of Dulang EOR and Baram Delta Regional Studies	○	○	●	●	○	○	○	○	○	○	○	○	○
2014	Specialized Services - Geological Evaluation of the Prospectivity of Tinjar Province for PETRONAS	●	●	●	●	○	○	○	○	○	○	○	○	●
2014	Field Development Plan (FDP) - Bubu & Diwangsa (offshore green oil fields), Peninsular Malaysia	●	●	●	●	●	●	○	○	○	○	○	○	○
2013	Resource Certification - Newfield (M) Asset for Sapura Kencana Petroleum	●	●	●	●	●	●	○	○	●	○	○	○	●
2013	Specialized Services - Basin modelling and Petrophysical evaluation for INPEX	○	●	●	○	○	○	○	○	○	○	○	○	○
2013	Laboratory Services - Well Sample Analysis For Kerupang Field (Sabah Basin)	○	○	○	○	○	○	○	○	○	○	○	●	○
2013	Specialized Services - Regional Geological Mapping of Block CA1 Brunei Deep Water for PETRONAS	○	●	●	○	○	○	○	○	○	○	○	○	○
2013	Field Development Plan (FDP) - Sepat (offshore green gas field), Peninsular Malaysia	●	●	●	●	●	●	●	○	○	○	○	●	●
2013	Field Development Plan (FDP) - Nosong & Bongawan (offshore green gas field), Sabah	●	●	●	●	●	●	●	○	○	○	○	●	●
2013	Field Development Plan (FDP) - Tanjung Baram (offshore green oil field), Peninsular Malaysia	●	●	●	●	●	●	○	○	○	○	○	●	●
2012	Full Field Review (FFR)/Field Development Plan (FDP)/Enhanced Oil Recovery (EOR) - D35 (offshore brown oil field), Sarawak	●	●	●	●	●	●	●	●	●	●	●	●	●

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

GEOSCIENCE STUDIES



GEOPHYSICAL STUDY

- Structural Interpretation
- Attribute Analysis
- Seismic Inversion



GEOLOGICAL STUDY

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



PETROPHYSICAL STUDY

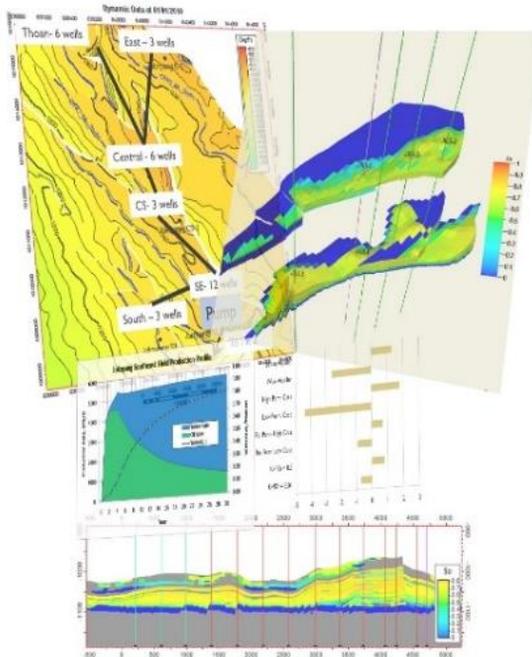
- Formation Evaluation
- Fluid Contacts



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

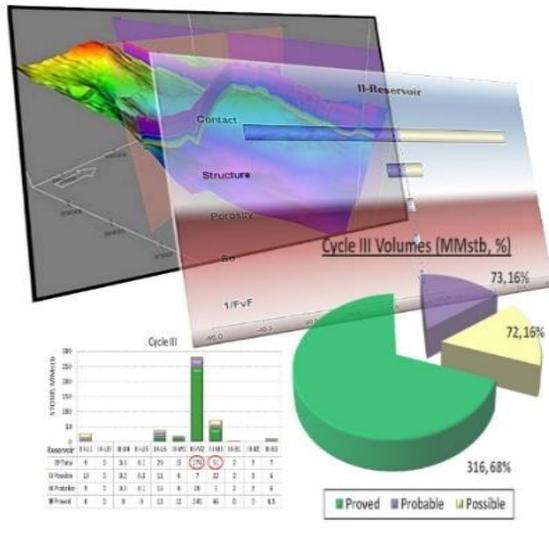
- Development Options (Horizontal Well, Water Injection, Waterflooding)
- Reservoir Management Strategies
- Sensitivity Analysis

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



GEOPHYSICAL STUDY

- Structural Interpretation
- Attribute Analysis



GEOLOGICAL STUDY

- Core Study
- Regional Geology
- Integrated Stratigraphic Framework



PETROPHYSICAL STUDY

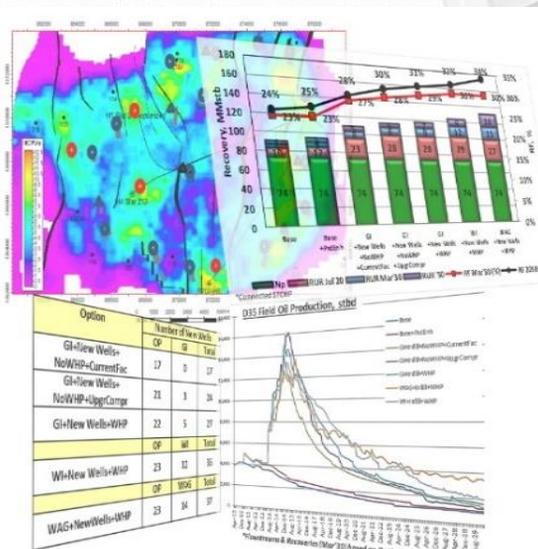
- Formation Evaluation
- Fluid Contacts



GEOMODELLING

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

ENGINEERING STUDIES

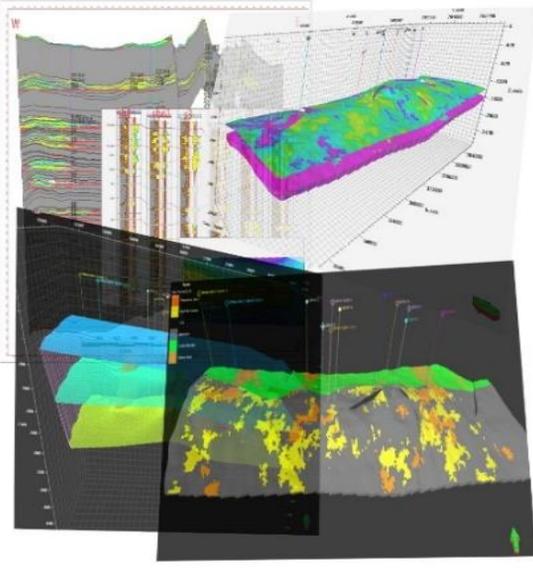


Field Development Plan (FDP) for Gas Field Development - Case Study Example

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

GEOSCIENCE STUDIES



GEOPHYSICAL STUDY

- Structural Interpretation
- Attribute Analysis



GEOLOGICAL STUDY

- Wells Correlation
- Environment of Deposition
- Facies Description



PETROPHYSICAL STUDY

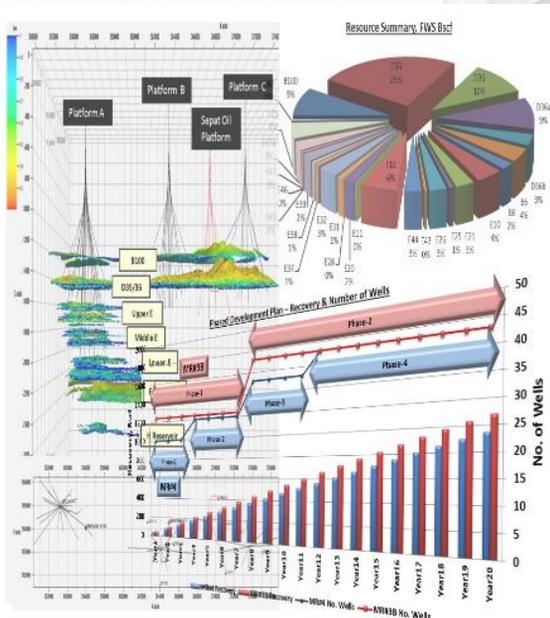
- Formation Evaluation
- Fluid Contacts



GEOMODELLING

- Volumetric & Uncertainty Analysis

ENGINEERING STUDIES



ENGINEERING STUDY

- Pressure Transient Analysis
- Fluid Properties
- Rock Properties



WELL & RESERVOIR MODELLING

- Well modelling
- Material Balance
- Dynamic modelling



FIELD DEVELOPMENT STRATEGIES

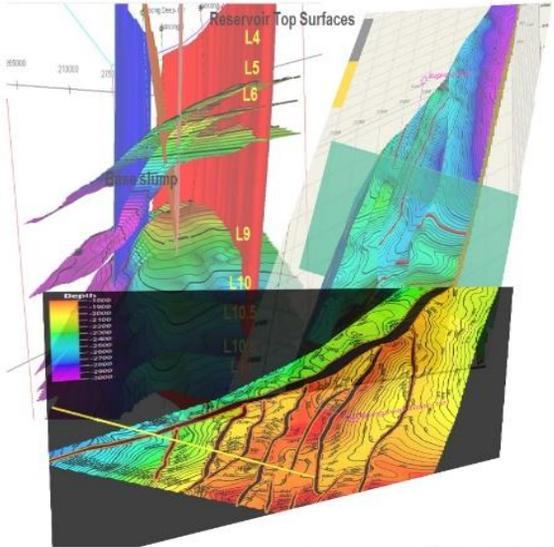
- Reservoir Management Strategies
- Conceptual Well Completion Design
- Drilling Well Design
- Facilities Design
- Economics

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

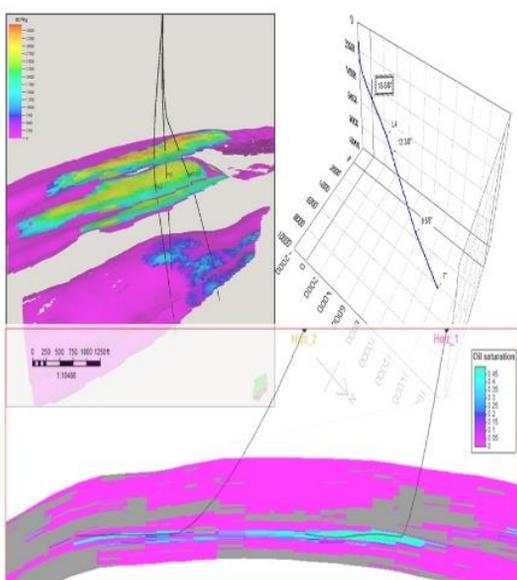
- Formation Evaluation
- Fluid Contacts



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

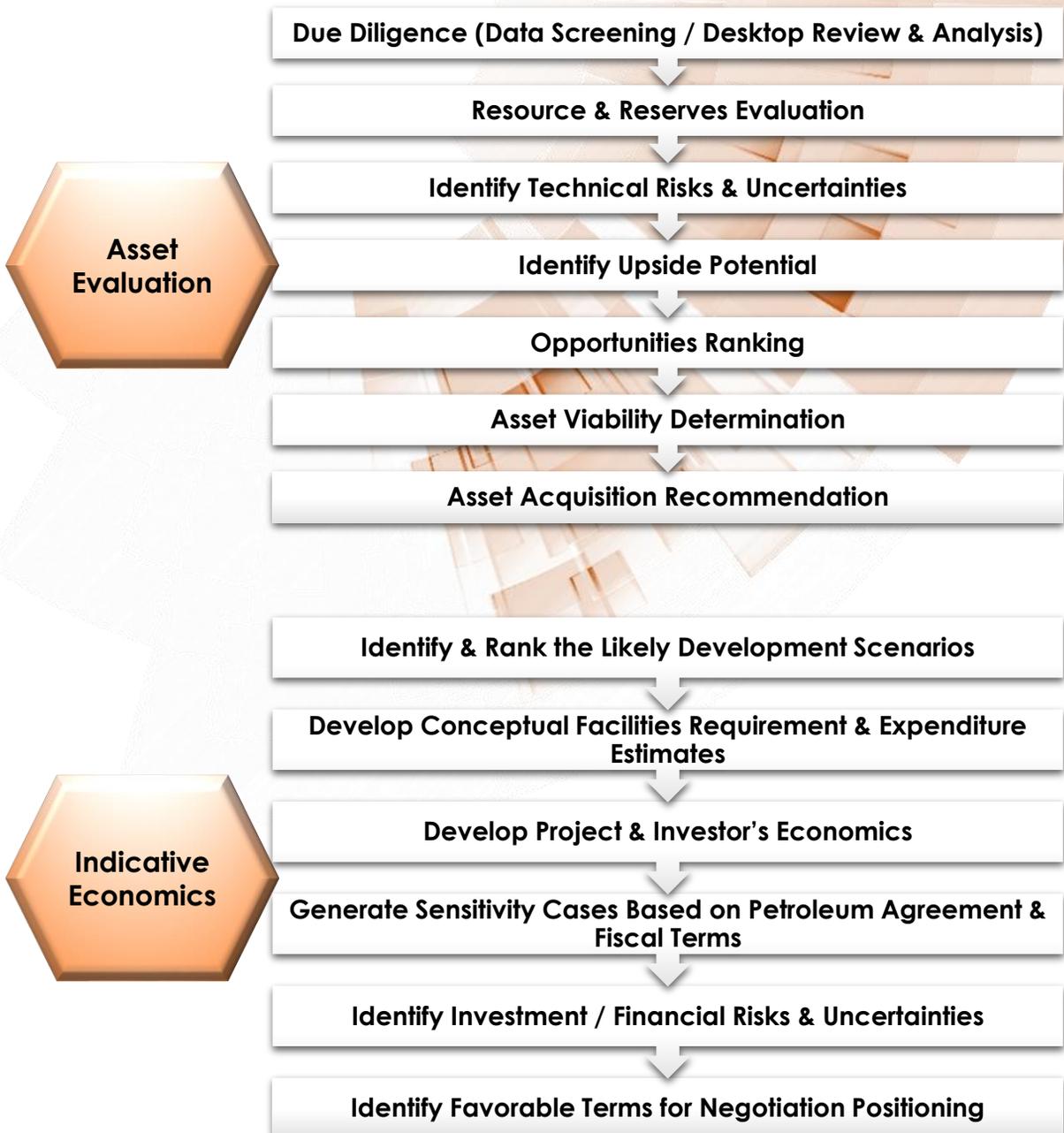
Asset Evaluation (Technical and Commercial)

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.



EQ Asset Evaluation (Technical and Commercial) - Case Study Examples

Case Study examples :

Asset Evaluation for Block A located in Russia



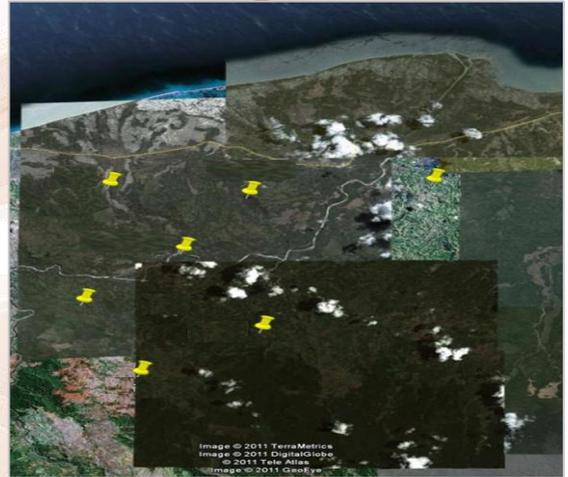
The asset evaluation for Block A involved data review and due diligence work conducted in view of Client's potential participation in the asset.



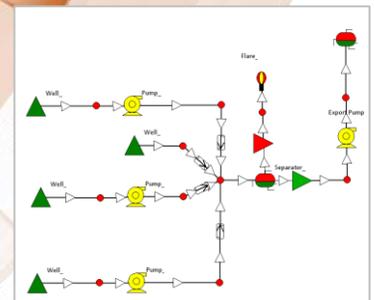
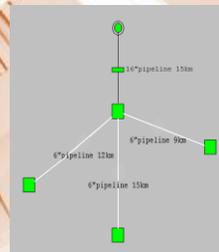
EQ's team of Geoscientist, Petrophysicist, Reservoir Engineer and Economist conducted due diligence and technical assessment which included:

- 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.

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.

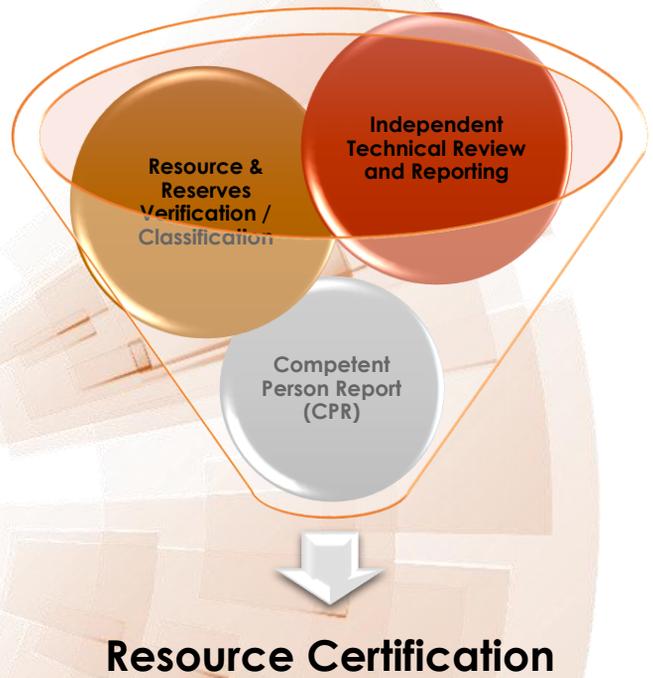


Based on the screening economics, four of the seven prospects were evaluated to be viable. In the ADP proposed, the location of one primary prospect is recommended to be the central processing facilities (CPF) to cater for oil processing and storage and also serve as the export facilities. Oil production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

EQ Resource Certification - Case Study Examples

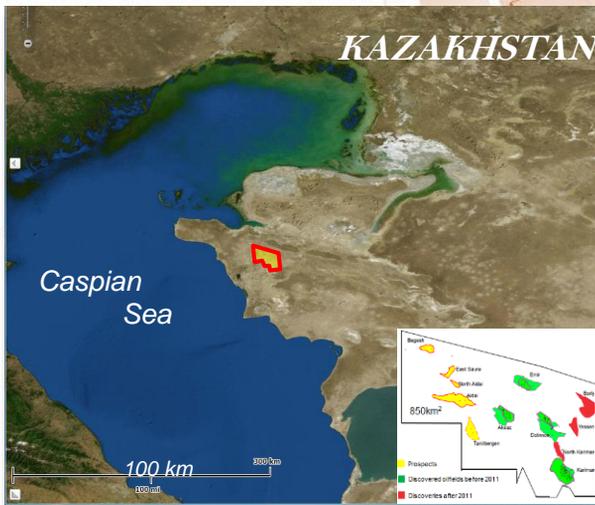
EQ strives to ensure that our Resource Certification are in compliance with the definitions and guidelines set out in the 2007 Petroleum Resources Management System (PRMS) prepared by the Oil and Gas Reserves Committee of the Society of Petroleum Engineers (SPE) and reviewed and jointly sponsored by 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

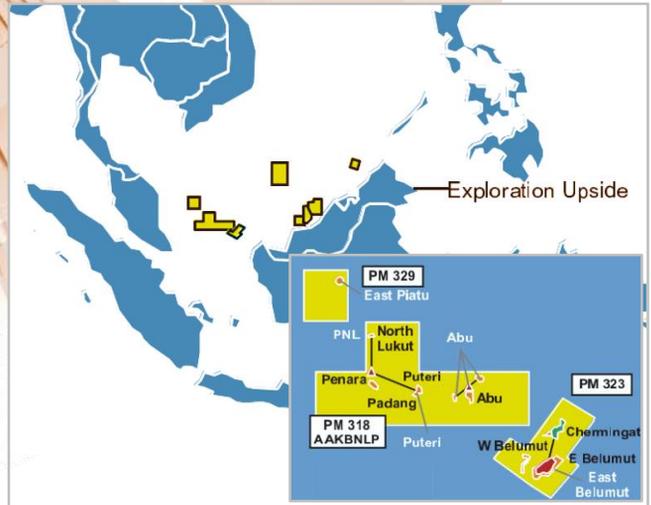


Independent review, evaluation and verification of the Petroleum Initially In-Place (PIIP) and recoverable hydrocarbons resource potential volumes and production forecasts of the Asset comprises three oil fields and one gas condensate field which have been put on production and also two discoveries under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

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

For more info, please visit www.energyquest.com.my

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



Detailed review and due diligence work of Newfield Exploration Company (NFX) Assets in Malaysia, which comprise oil fields with ongoing development and exploration activities, gas discoveries and also potential exploration prospects.

Delivered an independent evaluation of recoverable hydrocarbons for Sapura Kencana Petroleum Bhd. asset acquisition exercise and produced a Bursa-accepted report for submission to Bursa Malaysia.

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

Wellbore Utility Review (WBUR) & Idle Well Evaluation - Case Study Example

Case Study example :

WBUR & Idle Well Evaluation for Field D (Brown Field, Offshore Sarawak)

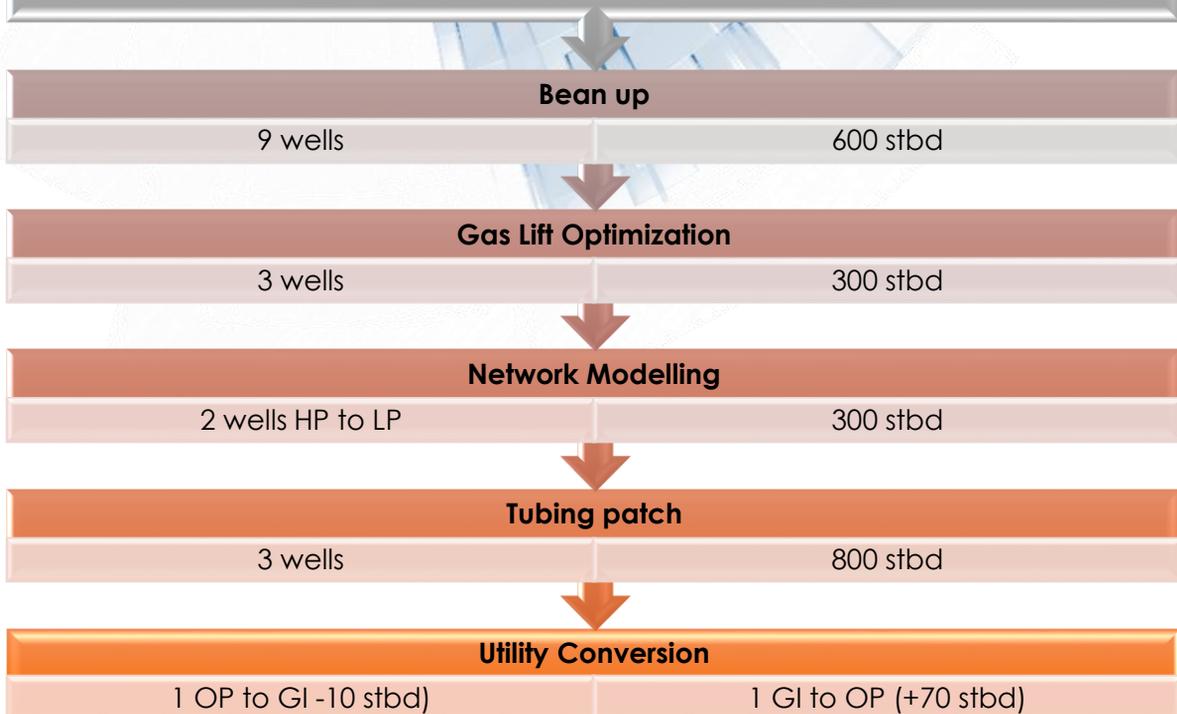
SHORT TERM (QUICK GAINS)

- 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



EQ Production Enhancement - Geological Evaluation of Behind Casing Opportunities - Untapped Reservoirs

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

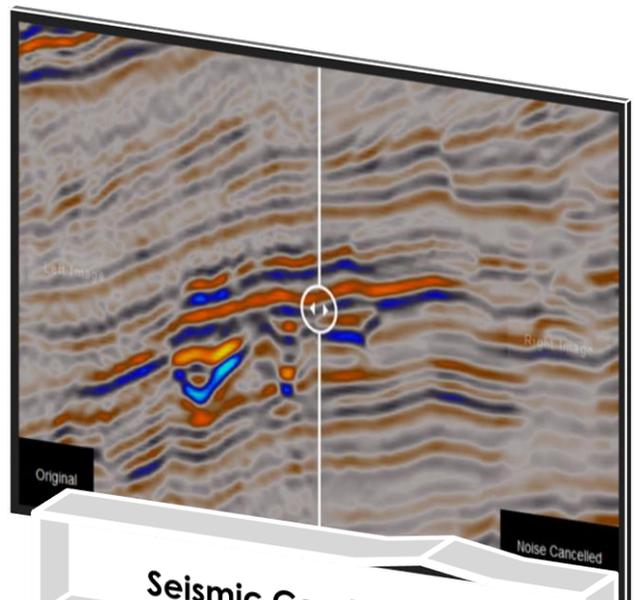
Real-time Attribute Analysis

- Real time Attribute Analysis Computation
- Multi-Attribute analysis

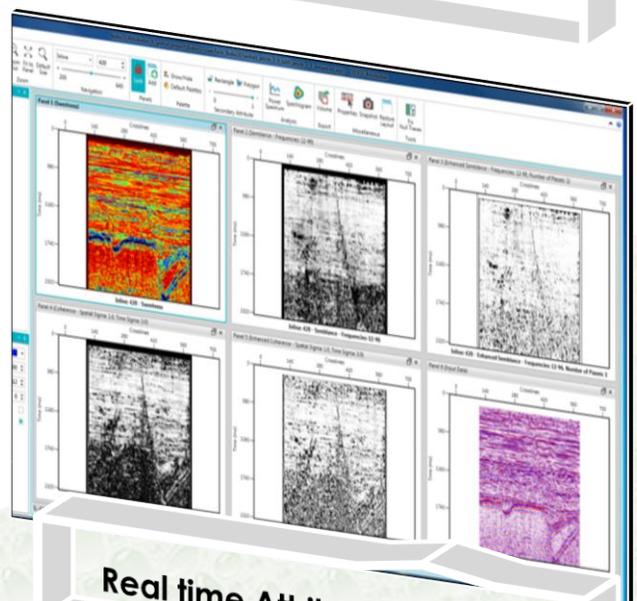
Real-time Visualization

- Structural Imaging
- Stratigraphic Imaging

HC Anomaly Delineation



Seismic Conditioning



Real time Attribute Analysis

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

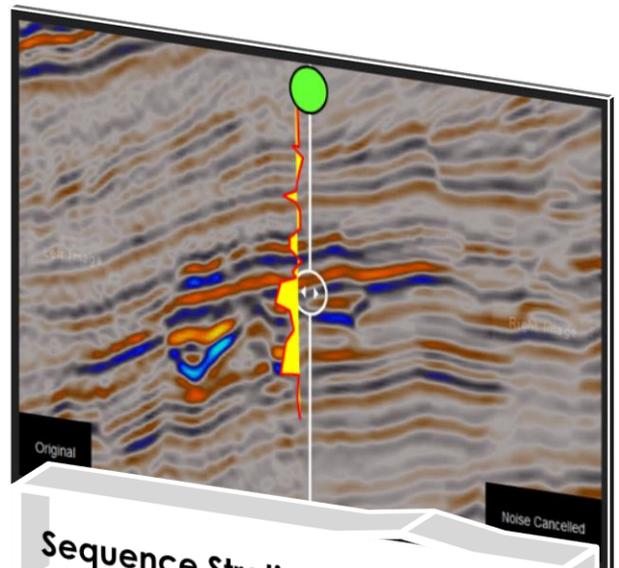
- Electric Logs, Core data, facies tagging and modelling

Structural Understanding & Integration

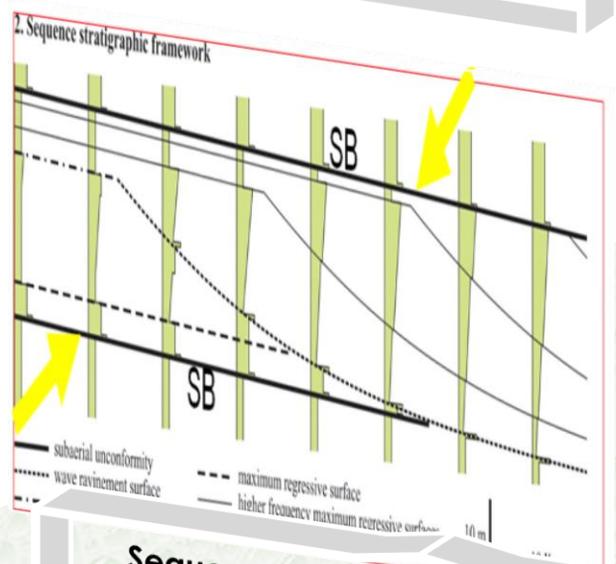
Seismic Stratigraphy Integration

Reservoir and Production Data Integration

New Identified Opportunities



Sequence Stratigraphic Analysis



Sequence Stratigraphic Framework

Production Enhancement - Steady-State Integrated Production Modelling (IPM)

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

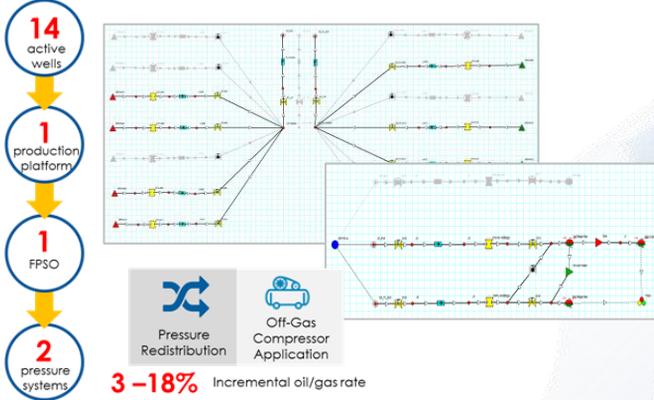


**Formulate Technical Recommendations For
Implementation**

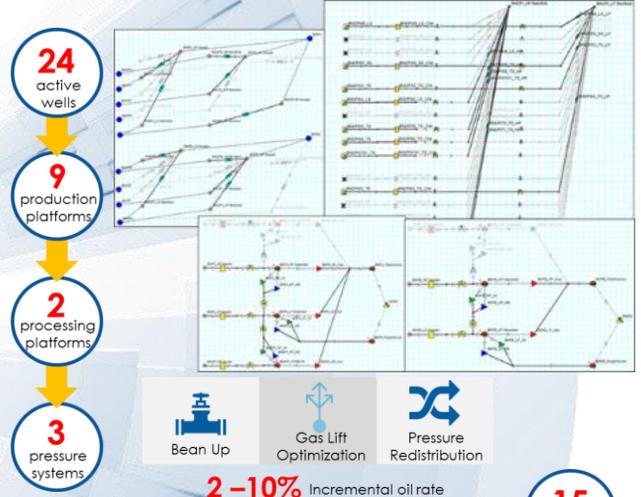
Steady-State Integrated Production Modelling (IPM) - Case Study Examples

Case Study examples :

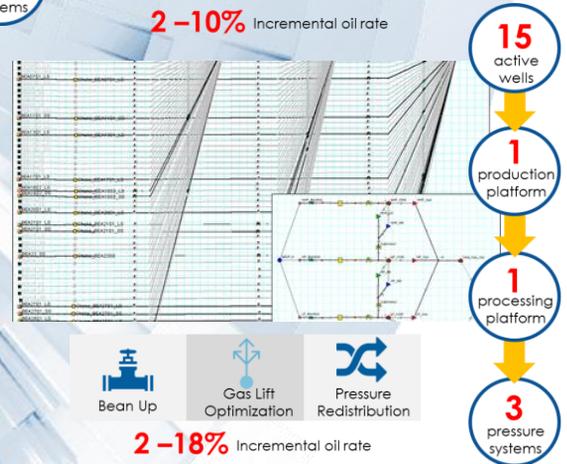
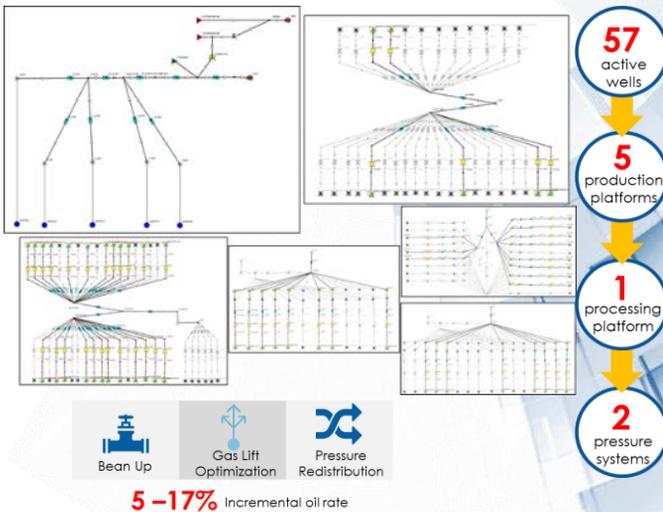
Integrated Production Modelling (IPM) Study for Field B3 (Brown Field, Offshore Peninsular Malaysia).



IPM Study for B1 and B2 Fields (Brown Fields, Offshore Sarawak).

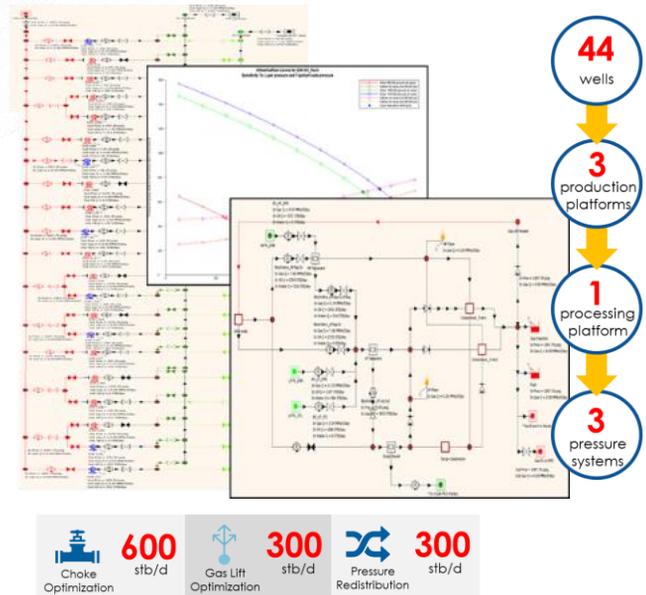
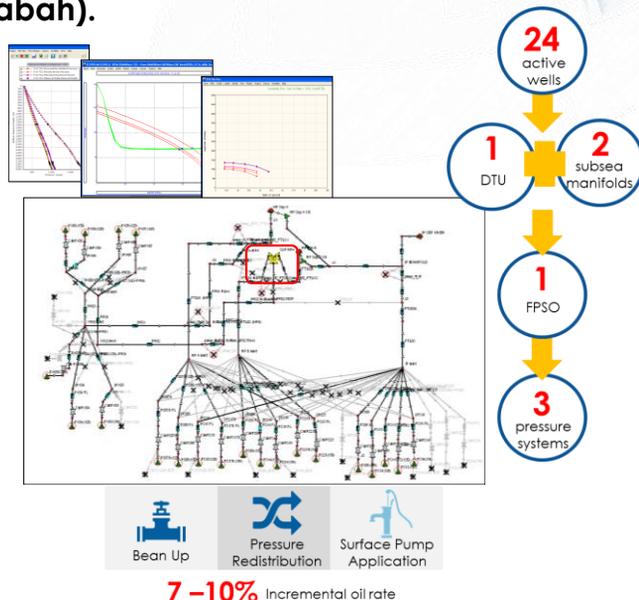


IPM Study for Field A (Brown Field, Offshore Peninsular Malaysia).



Network Modelling Study for Field D (Brown Field, Offshore Sarawak).

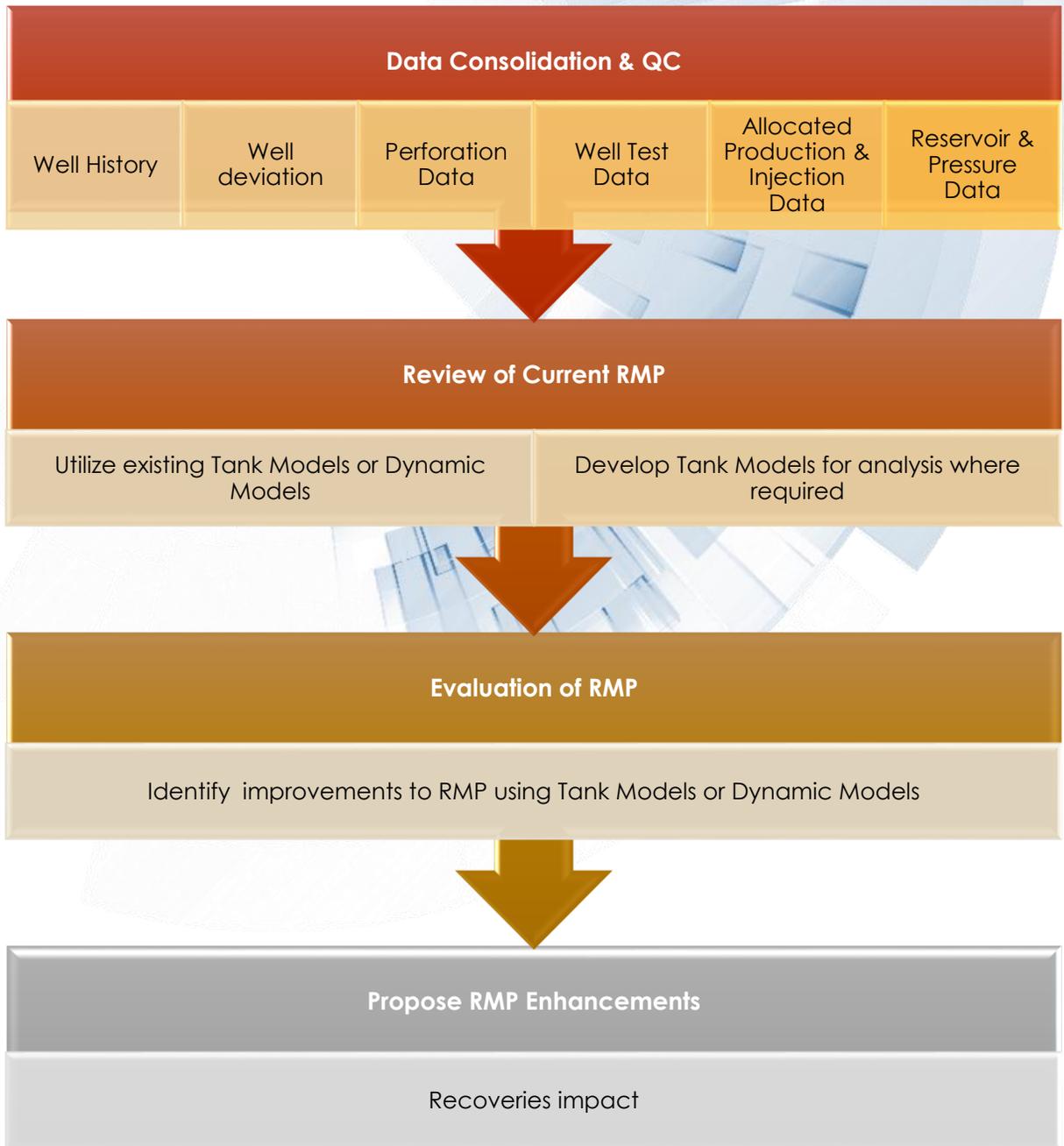
IPM Study for Field K (Brown Field, Offshore Sabah).



Reservoir Management Plan (RMP) Studies

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:

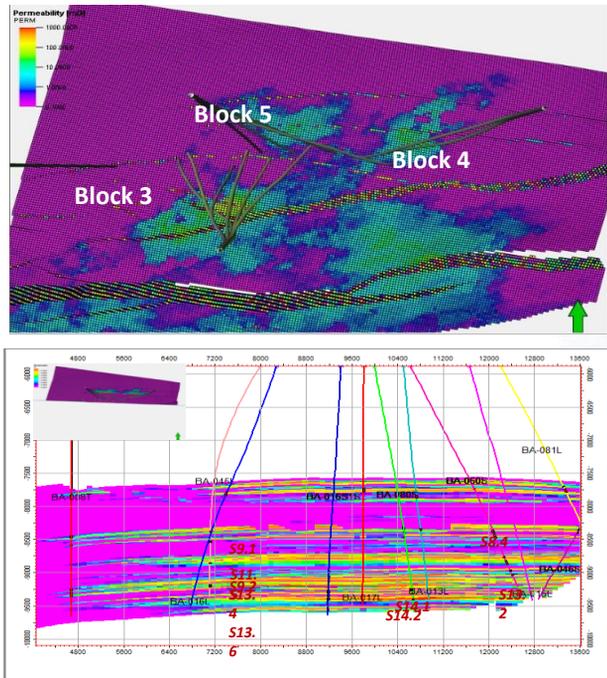
- Developing Reservoir Monitoring strategies for new reservoirs / fields
- Evaluating current Reservoir Management Strategies and propose improvements where required
- Studying the impact of a change in Operating Strategy on recoveries



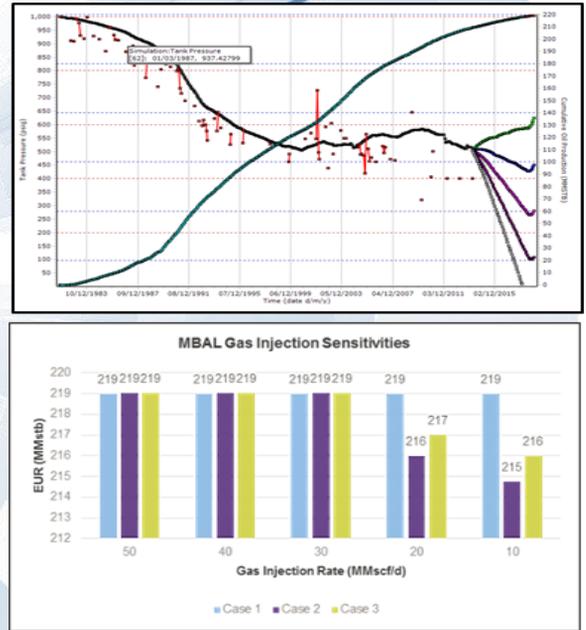
Reservoir Management Plan (RMP) Studies - Case Study Examples

Case Study examples :

RMP Evaluation - Studying the impact of GOR relaxation on recoveries

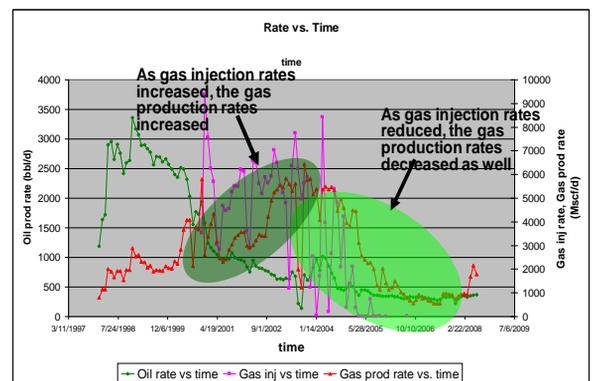
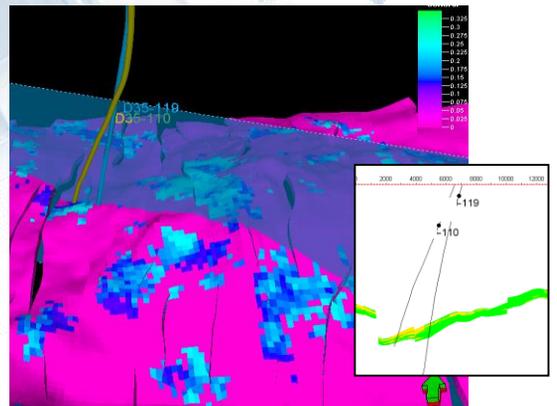
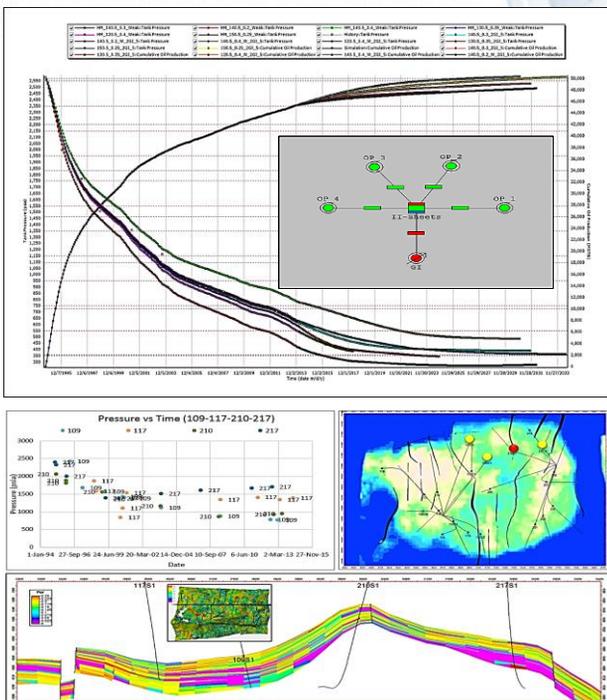


Gas Injection Evaluation - Evaluating the impact of reduced gas injection on field recoveries



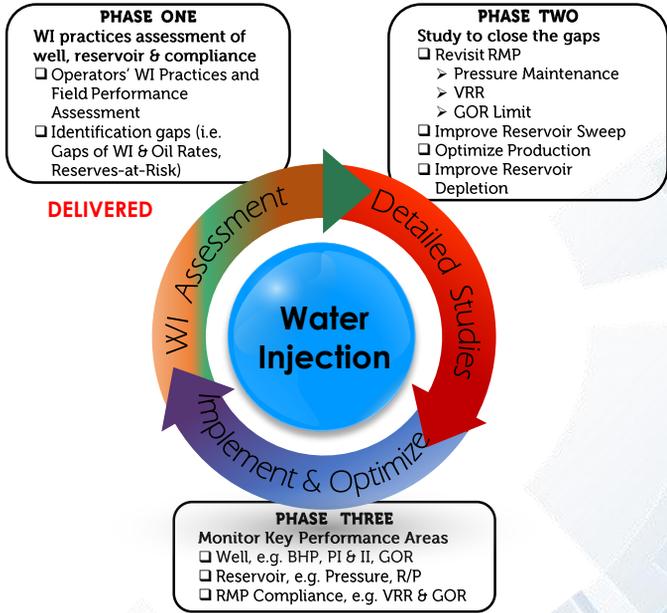
RMP Evaluation - Evaluating the existing RMP and recommending improvements; Gas Injection optimization by identifying potential well conversions to enhance distribution

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



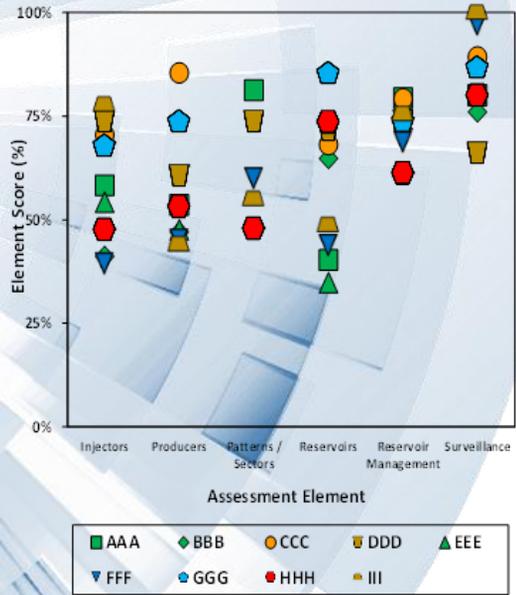
EQ Subsurface Water Injection Optimization

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.



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.



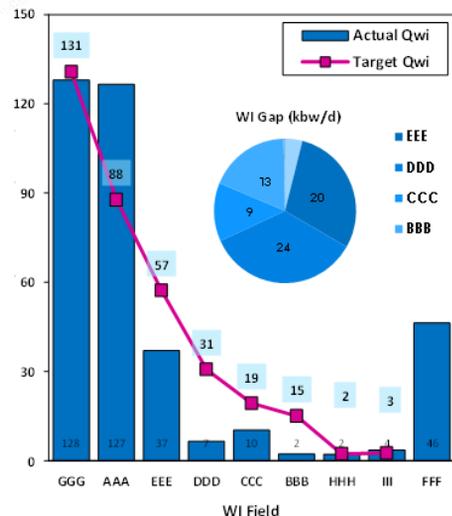
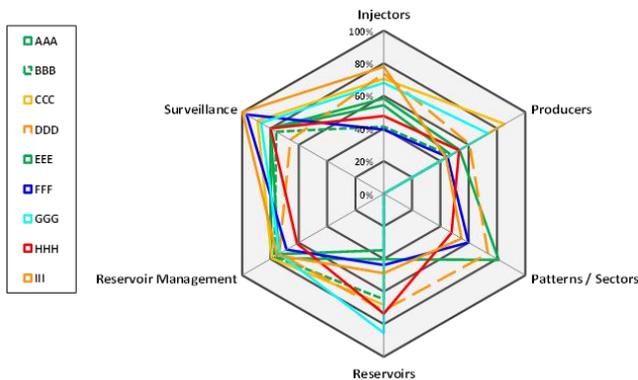
Our established workflow includes meticulously assessing the Operators' WI practices and surveillance data to identify gaps in WI and oil production rates; formulation of actionable plans to address these gaps are then designed to restore and optimize production, thus reducing the potential reserves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

Case Study example :

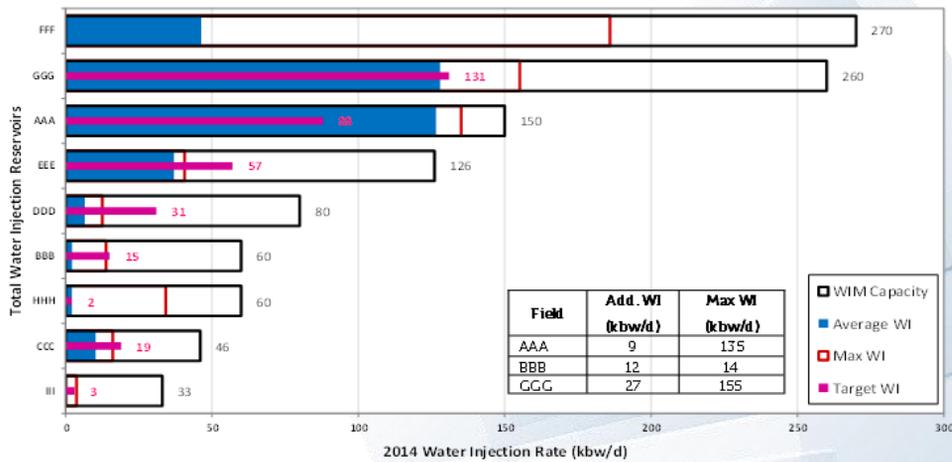
EQ's recent accomplishment involved the Phase One Subsurface WI assessment of nine major WI fields in Malaysia, which resulted in developing prudent WI practices for the "PETRONAS Water Injection Reservoir Management Guideline", the first for the country.

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;

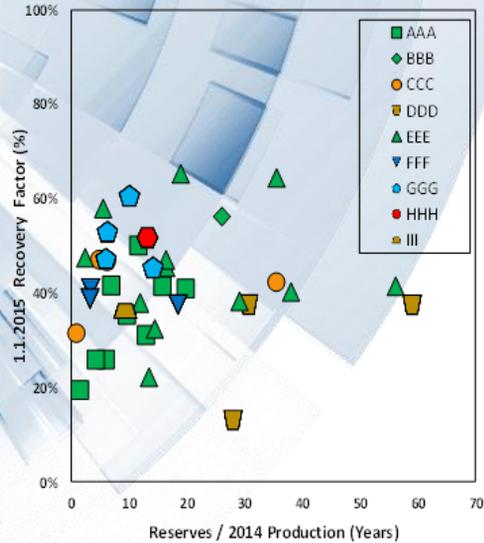
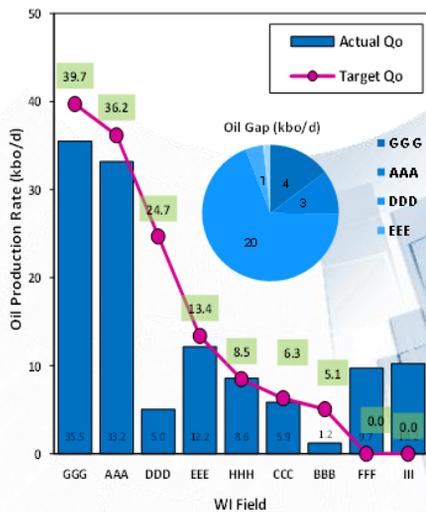


Subsurface Water Injection Optimization (cont'd)



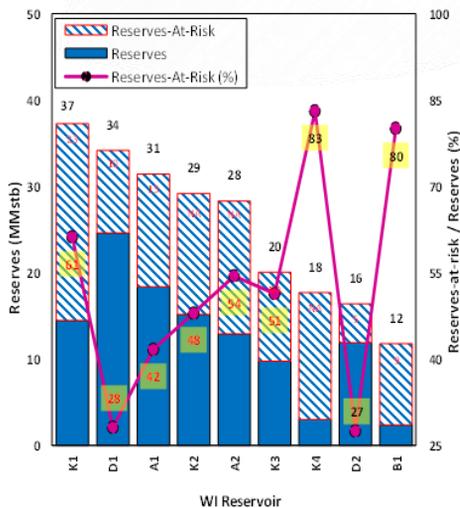
- 2014 WIM capacity utilization (actual maximum WI against WIM capacity) ranged from 11% to 90%; when combining with average WI utilization, the possible additional WI rate/volume are in the range of 3% to 19%;

- The total 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;



- 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;

- 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.

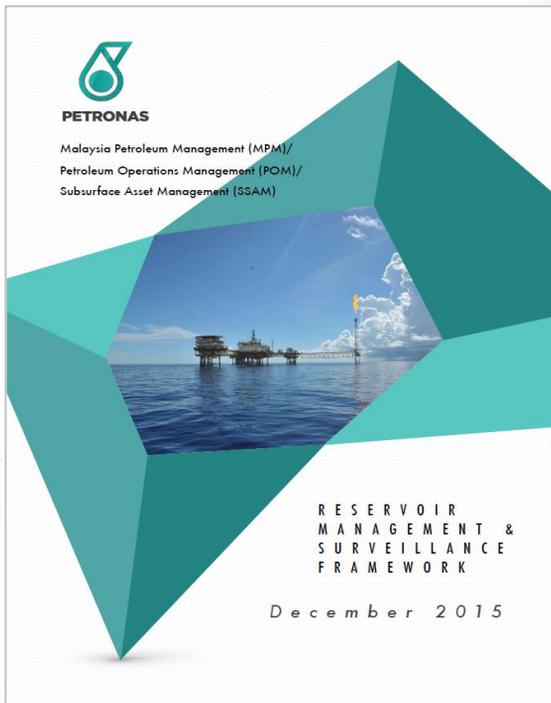
Guideline Formulation for National Oil Company

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 co-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



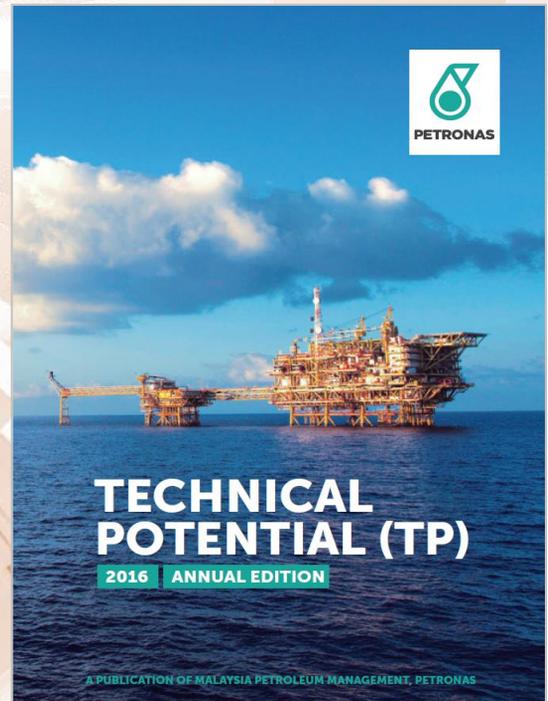
EQ co-develop the Reservoir Management and Surveillance (RMS) Framework for the Publication Of Malaysia Petroleum Management, PETRONAS.

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.

For more info, please visit www.energyquest.com.my

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.

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

STUDY	KEY AREA						Fieldwork
	Field Development Plan (FDP)	Full Field Review (FFR)	Data Review / Block Evaluation	Resource Assessment (RA)	Evaluation of HC Prospectivity : Conventional	Evaluation of HC Prospectivity : Unconventional	
Geological Evaluation of Hydrocarbon Prospectivity in Limbang-Klias and Kudat Peninsula	○	○	○	○	●	○	●
Provision of Geological Study for CBM Prospectivity	○	○	○	○	○	●	●
FFR & RA for Kruh TAC	○	●	○	●	○	○	○
Data review & resource/reserves calculation for NewField's Malaysia Asset	○	○	●	○	○	○	○
Sepat Full Field Review and Field Development Plan	●	●	○	○	○	○	○
Geological Evaluation of Prospectivity on Tinjar Province	○	○	○	○	●	○	●
Fractured Basement Analysis on Onshore East Coast Peninsular Malaysia	○	○	○	○	●	○	●
KL - Langkawi Geological Fieldtrip	○	○	○	○	○	○	●
SB303 Sabah Fieldtrip	○	○	○	○	○	○	●
Pulau Redang Carbonate / Fractured Basement Fieldtrip	○	○	○	○	○	○	●
Bintulu - Miri Fieldtrip	○	○	○	○	○	○	●
Basement Study Fieldtrip for Block SK305 Sarawak	○	○	○	○	○	○	●
India Nelp-V Blocks Evaluation And Resource Assessment (5 Blocks)	○	○	○	●	○	○	○
J5 Field Resource Assessment	○	○	○	●	○	○	○
Benrines Field Resource Assessment	○	○	○	●	○	○	○
K5 Field Resource Assessment	○	○	○	●	○	○	○
Lokan Field Resource Assessment	○	○	○	●	○	○	○
SE Collins Field Resource Assessment	○	○	○	●	○	○	○
Nosong and Bongawan North Field Development Plan	●	○	○	○	○	○	○
D35 Full Field Review and Field Development Plan	●	●	○	○	○	○	○
Piatu – East Piatu FDP	●	○	○	○	○	○	○
Laba-Laba Barat Resource Assessment	○	○	○	●	○	○	○
Serok Field Resource Assessment	○	○	○	●	○	○	○
Semboja Area, Indonesia Geological Study & Block Assessment	○	○	●	○	○	○	○
Yemen Block Review & Assessment	○	○	●	○	○	○	○

Geoscience Services - (cont'd)

- 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
 - Traps sealing capacity
- Fractured reservoir (basement rocks, clastics and carbonates)

- 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)

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

- Leads, Prospect & Play Assessment
- Play recognition –classification and subdivision
 - Play maps and grading/risking
- Play assessment – estimating possible numbers, sizes and associated risk for prospects and distribution versus listing all the risk
- Hydrocarbon charging assessment (source rock volume calculation).
 - Leads and Prospect inventory
 - Volumetric & Ranking and Risking
- Risk factors and Probability of success.
 - Prospect Ranking

Regional Geology

- Regional geological cross-sections and outcrop sedimentary logging
- Remote sensing data interpretation (e.g., Synthetic Aperture Radar, Radarsat images)
- Palaeogeographic maps for key reservoir, source and seal horizons
- Basin history, configuration, classification of basin types
- Petroleum habitat & hydrocarbon potential
- Elements of Petroleum System (Source Rock, Traps, Reservoirs and timing)

Structural Geology

Sedimentology and Sequence stratigraphy

- Clastic and Carbonate reservoirs
- Environment of depositions : Present day process comparison on environment of deposition applied to ancient record
- Sequence stratigraphic concepts and elements using seismic and well log data, core pictures and images
- Reservoir rock characteristics and reservoir quality distributions : porosity, permeability

Geochemistry

Geomodelling

- Structural Model
- Facies Model
- Petrophysical properties Model

Formation Evaluation

- Synthetic seismograms and well ties
- Data type : 2D, 3D
- Seismic stratigraphic interpretation on regional lines
- Prospect level interpretation
- Time-structure maps
- Time depth conversion and velocity modeling
- Fullstack attribute extraction and analysis.
- AVO and Inversion concepts, attribute

Geophysics

Prospect Evaluation

EQ Geological Evaluation of Hydrocarbon in Place

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 or 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.

Conventional 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

- Petrography
- Palynology
- Foraminifera
- Nannofossil

Source Rock Potential & Hydrocarbon Generation Analysis

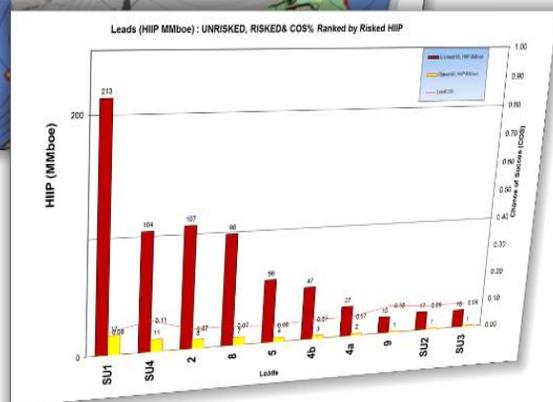
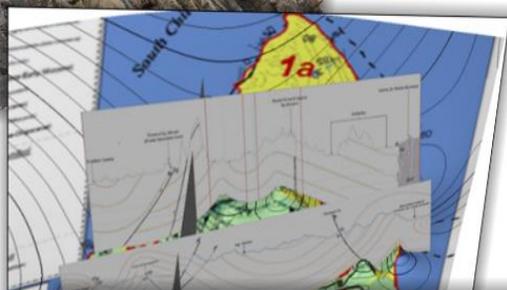
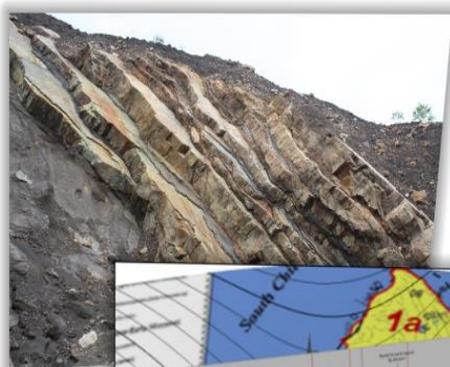
- Geochemical Analysis
- Basin Modelling

Play Elements Analysis

Prospect Identification

Volumetric Assessment

Prospect Risking & Ranking



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

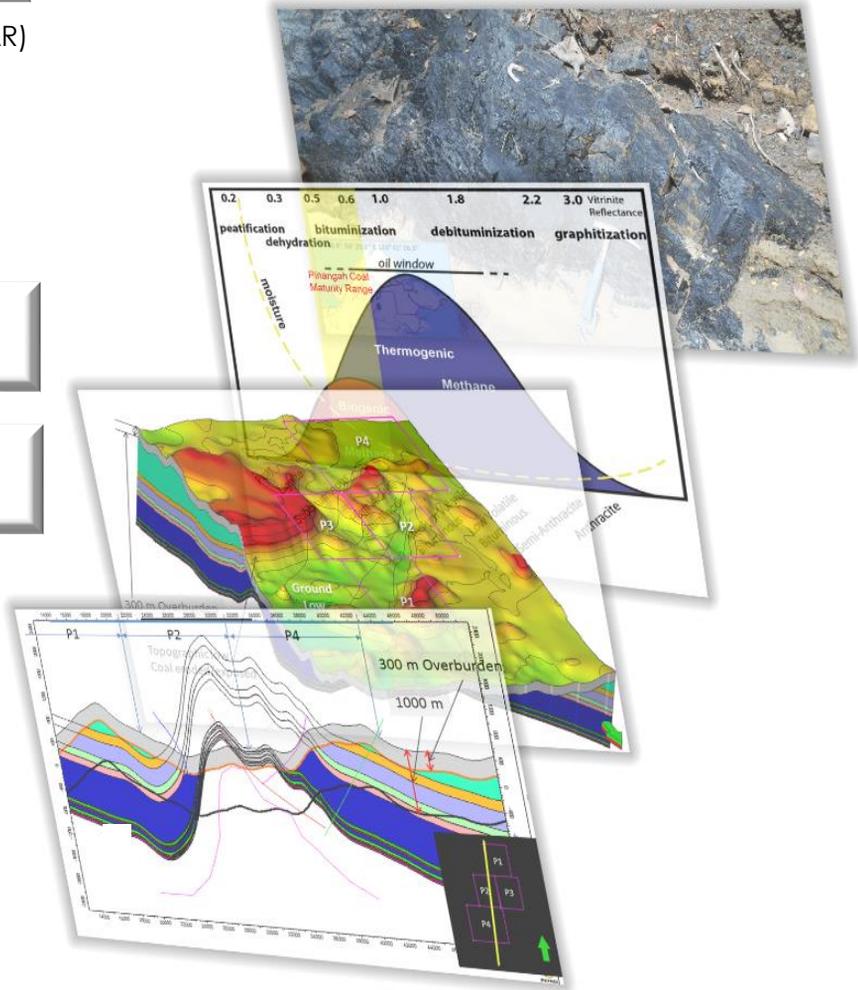
- Maceral Analysis
- Vitrinite Reflectance
- Total Organic Carbon (TOC)
- Coal Petrology
- Coal Cleat Orientation & Development Analysis
- Proximate Analysis
- Ultimate Analysis
- Gas Composition
- Bulk/Relative Density
- Palynology
- Foraminifera
- Nannofossil

Geochemical and Coal Properties Analysis

Play Element Analysis

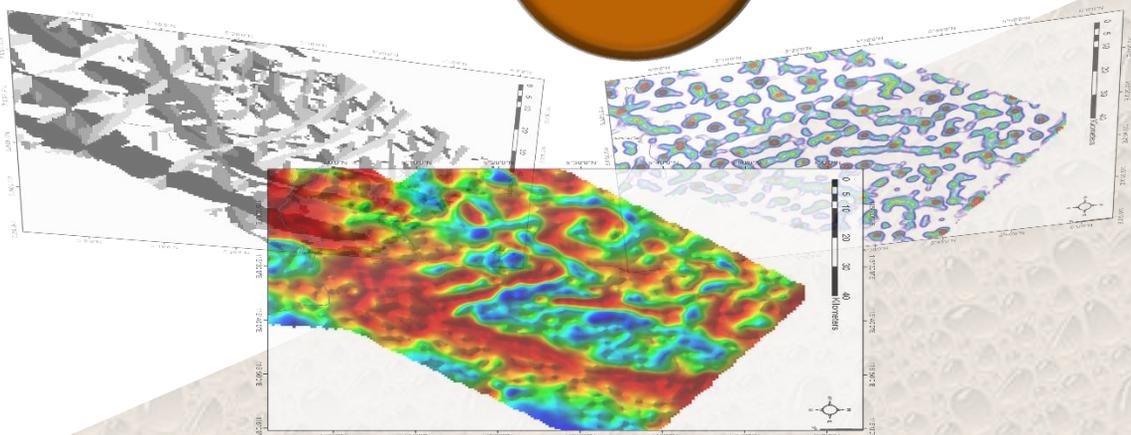
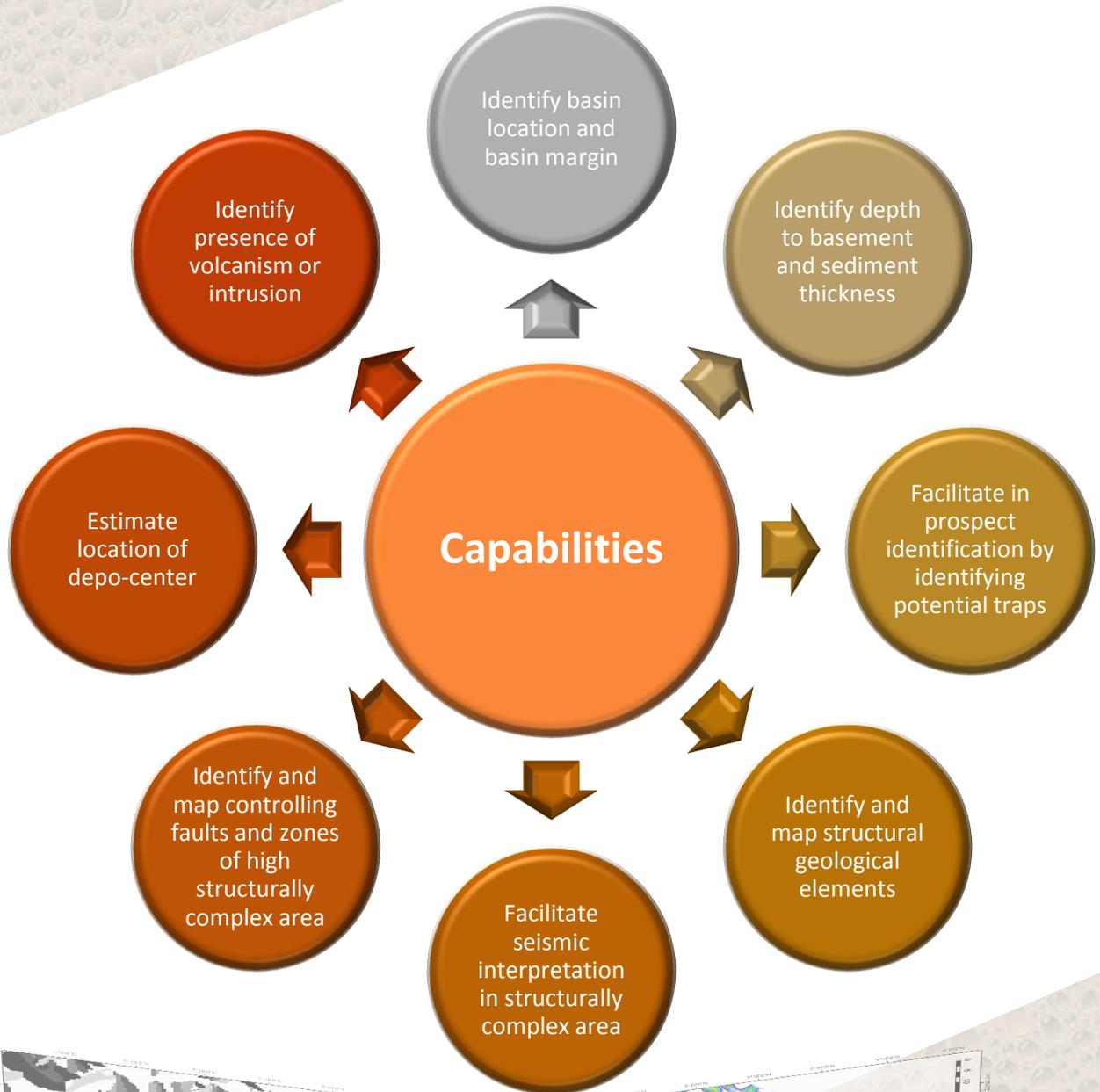
Volumetric Assessment

Prospect Risking & Ranking



Airborne Full Tensor Gravity (FTG) & Magnetic Data Analyses

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.



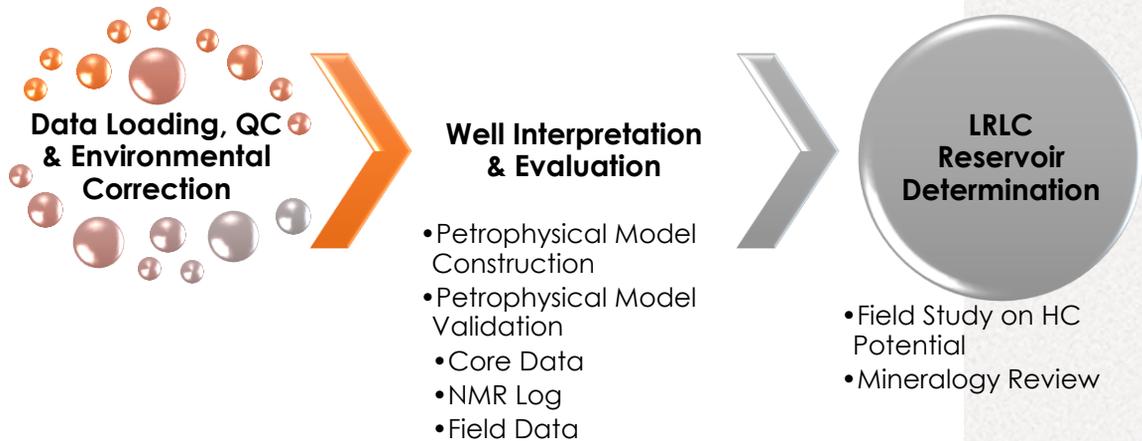
EQ Specialized Service

- LRLC (Low Resistivity Low Contrast)

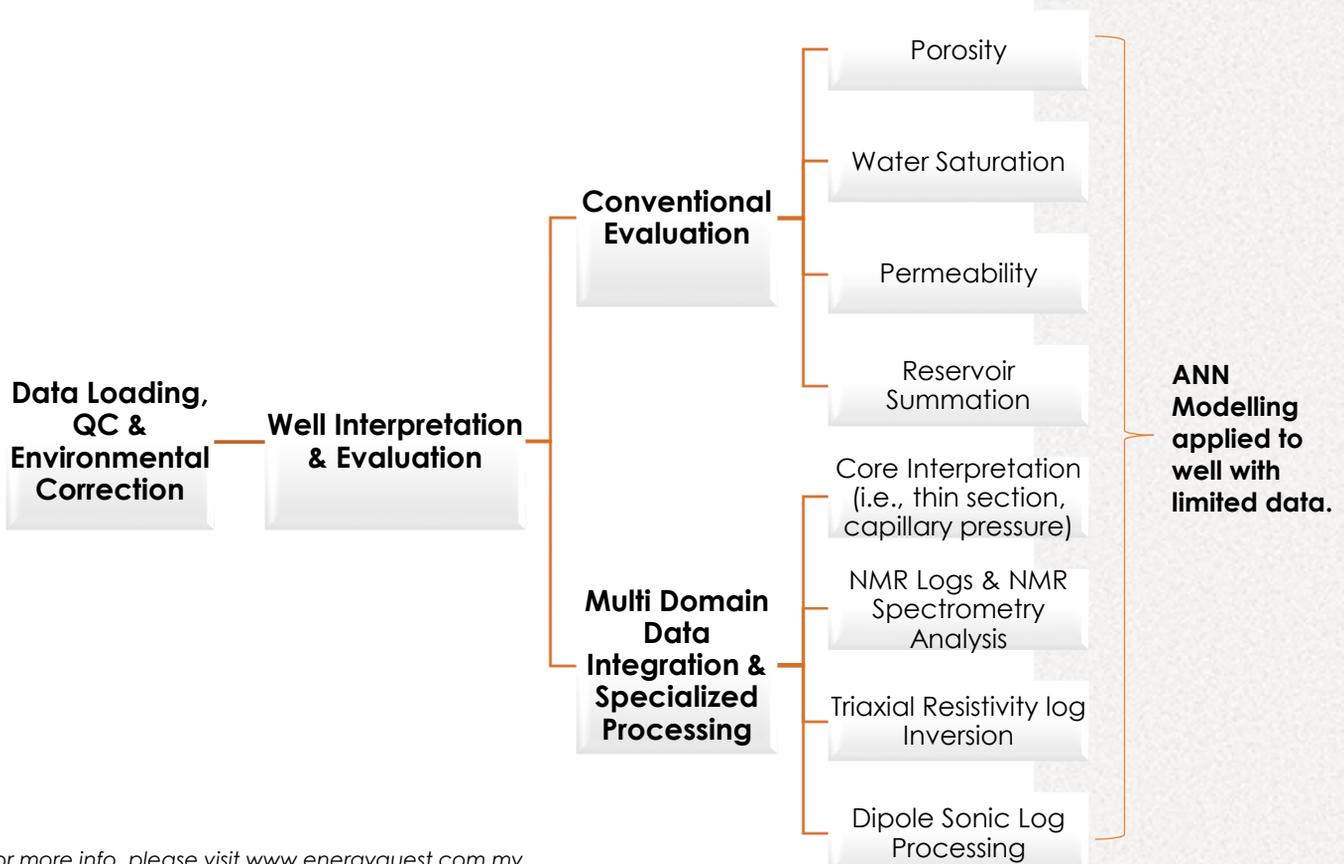
The primary objective of an LRLC Project is to investigate and recognize the underlying factors culminating in a particular LRLC type behavior manifestation and then to mitigate the impacts on R_t estimation and the subsequent improvement of S_w profile.

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



Specialized Service

- LRLC (Low Resistivity Low Contrast) – (cont'd)

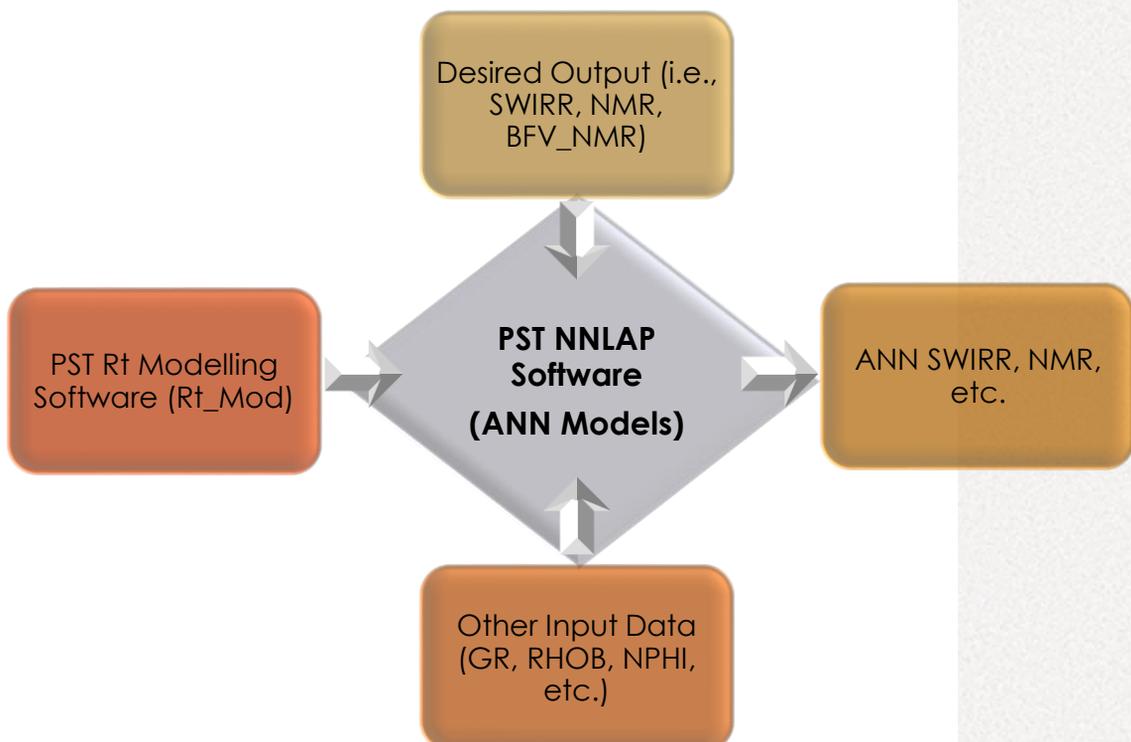
EQ's involvement in LRLC include:

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



Data Management

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

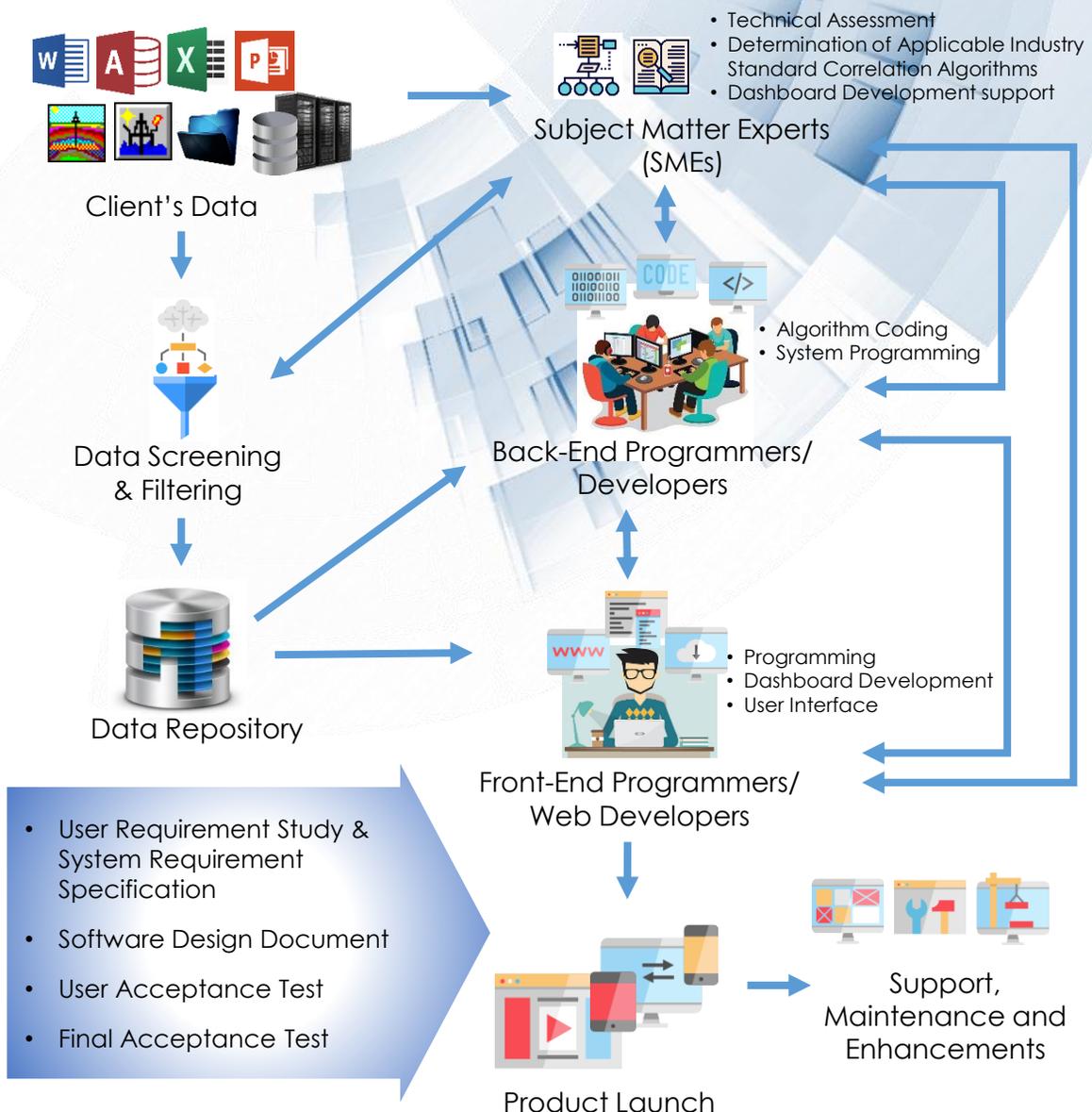
System & Application Software Development

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.



System & Application Software Development - Case Study Example

Case Study example :

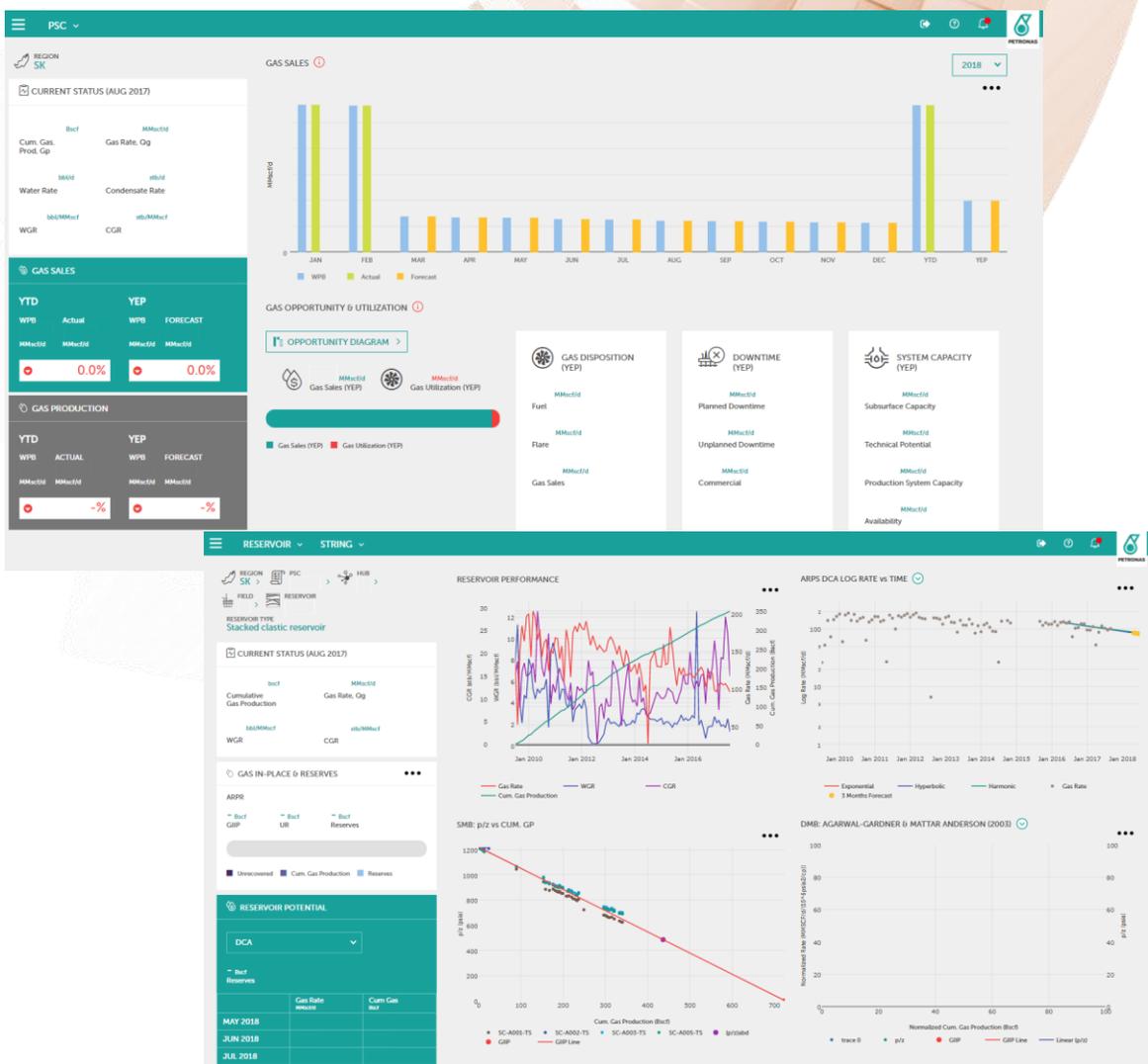
Phase 1 Development of the Intelligent Gas Forecasting and Optimization (IGFO) System for Petronas Carigali Sdn Bhd (PCSB) Sarawak Gas (SKG) fields

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.



Asset Integrated Monetization System (AIMS)

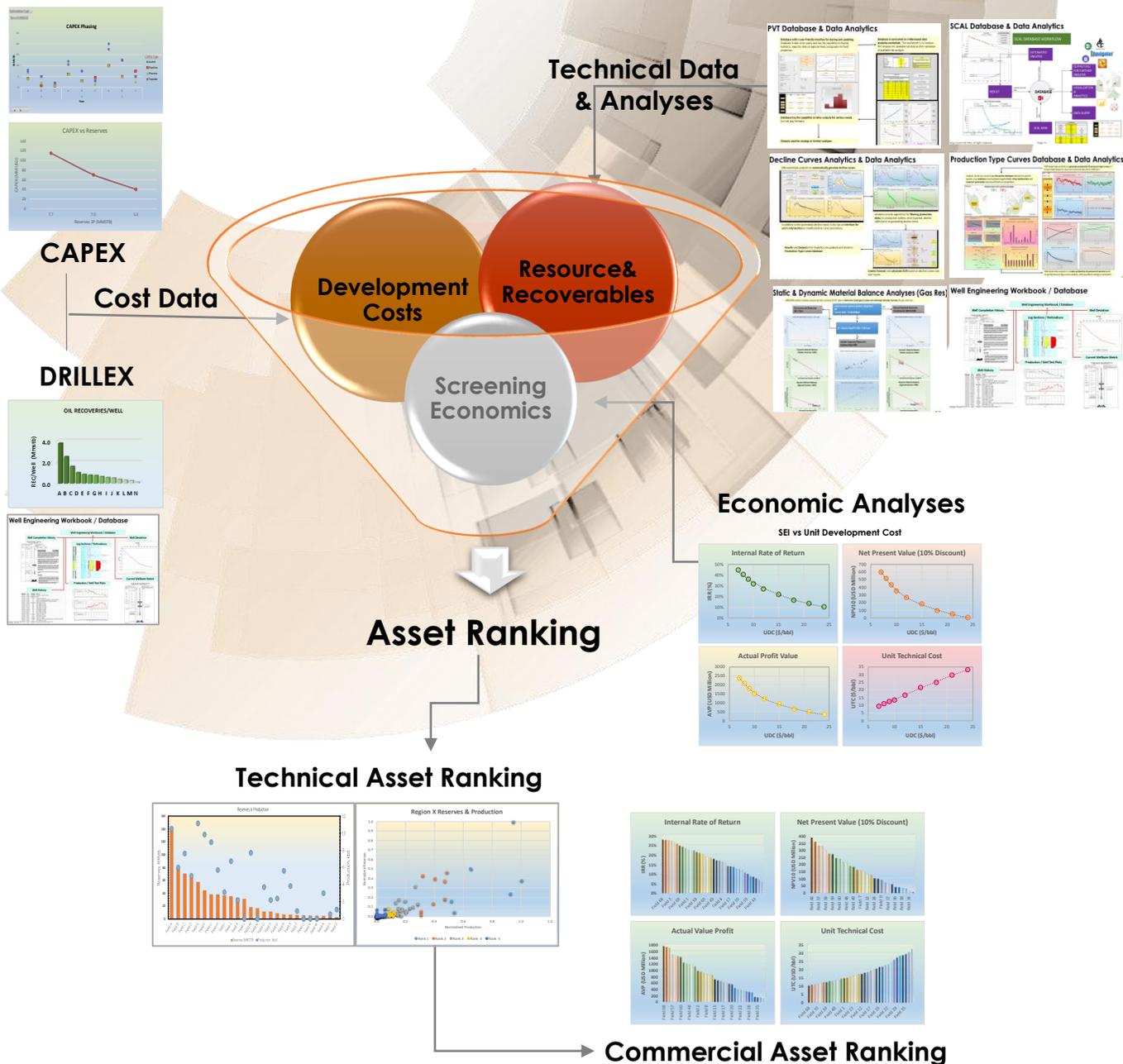
What is AIMS?

A "womb-to-tomb" system encompassing technical and commercial elements to assess asset value for resource ranking, fundamental in the formulation of Client Asset Monetization Plan

What are the elements of AIMS?

- Data Management & Quality Control
- Database Modules
 - Construct new and/or streamline existing
 - Data Validation with built-in methodologies
- Predictive Analytics aided by Visualization tool
 - Technical & commercial
 - Customizable based on Client's needs
- Development of Resource Migration Plan and Asset Monetization Plan

How does AIMS act like a funnel to rank asset?



Asset Integrated Monetization System (AIMS) - cont'd

Why AIMS?

- Preserved data quality with structured data sourcing and storage
- Provides regional range of key reservoir parameters useful for Contractor technical review
- Aids in the formulation of Client strategic Resource Migration plan and budget planning
- Provides deeper insight for guided stewardship of Asset Monetization Plan

Who uses AIMS?

- Technical team who reviews Contractors' work
- Planner who does annual budgeting
- Commercial team who forecasts company revenue streams
- Management who has to consider both technical and commercial uncertainties in decision making

What are included in AIMS Modules?

- PVT Database & Data Analytics
- SCAL Database & Data Analytics
- Well Data
- Decline Curves Analytics & Data Analytics
- Production Type Curves Database & Data Analytics
- Static & Dynamic Material Balance Analyses (Gas Res)

AIMS Interface



Asset Integrated Monetization System (AIMS) - cont'd

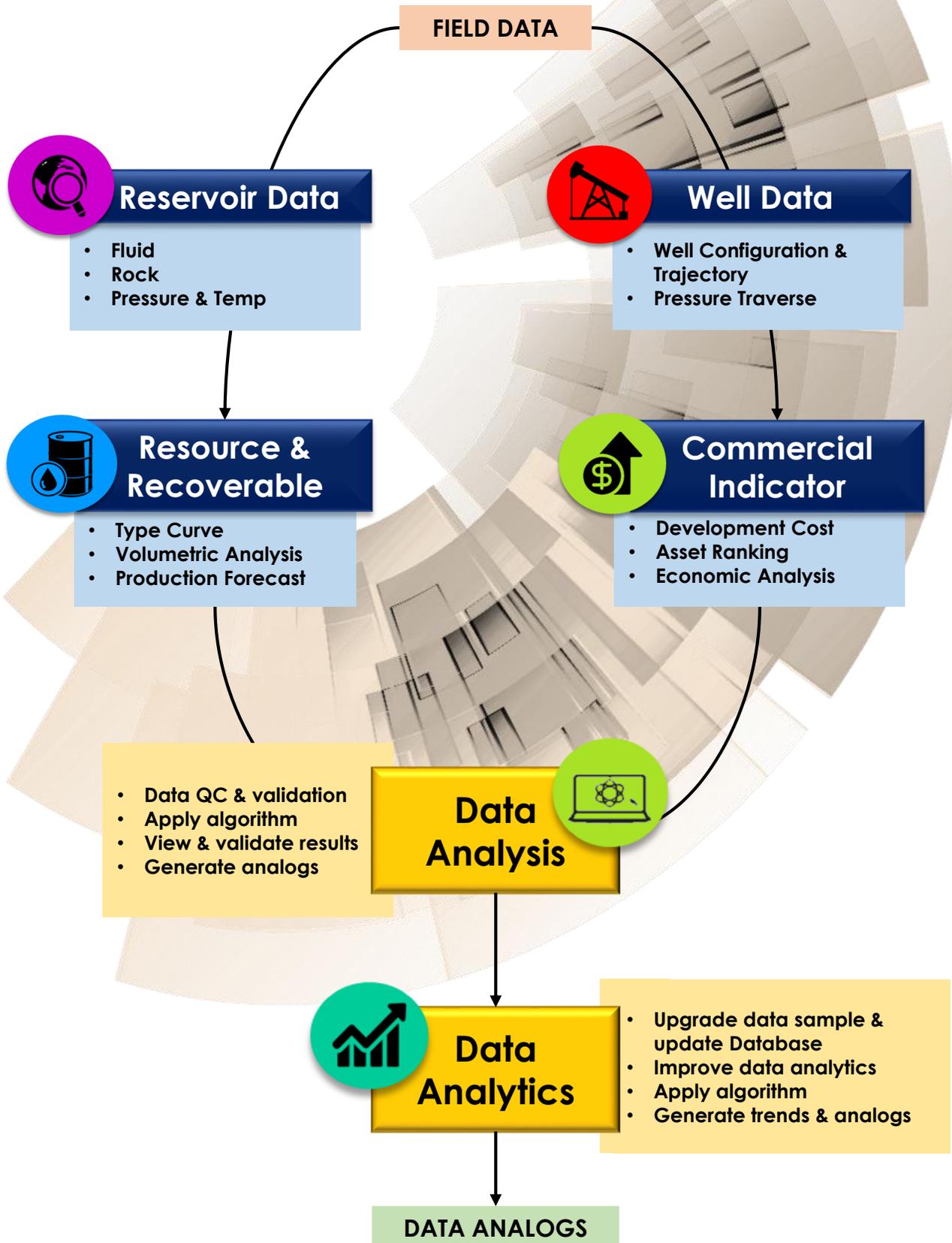
AIMS has the capability of:

- Combining engineering skills with machine automation in order to ensure data validity.
- Creating an integrated system between modules.
- Conducting analysis at various levels (standalone and/or integrated) using the applicable system modules.



Asset Integrated Monetization System (AIMS) - cont'd

A typical workflow of using AIMS for Mature Fields include:



EQ Asset Integrated Monetization System (AIMS) - Case Study Example

Case Study example :

EQ Proprietary PVT Database

Development of EQ PVT database involves consolidating fluid data from lab reports and PVT studies, and conducting independent review and analysis. Validation of fluid properties with geoscience data are also performed in the overall workflow.

The PVT database capabilities include:

- Data gathering, screening & consolidation
- Data review & validation
- Fluid analysis and integration with other field data (geological description)
- Plot visualization for raw and analysed data
- Database queries
- Map display for data at regional level, and graphs for fluid properties.
- Statistical Analysis of fluid properties e.g. in a Histogram display by region
- PVT data preparation for well and reservoir modelling

PVT Database & Data Analytics

Input Parameters

Oil Gravity	API	38.6	*
Gas Gravity	γ_g	0.8502	SG
Res Temperature	T_{res}	257.9	F
Solution GOR	R_{sb}	596	scf/stb
Water Salinity		15000	ppm
Oil Gravity	γ_o	0.8319	SG
Bubble Point Pressure	P_b	2708	psia

Reservoir

Correlations Used (Drop down menu)

Select Bo and Rs Correlation (post-matching)
Standing
Select Viscosity Correlation (post-matching)
Beggs-Robinson

PVT Match Data
Rs, Bo, viscosity below the bubble point

	P (psia)	Rs (scf/STB)	Bo (bb/STB)	μ_o (cp)
Bubble Point	2708	596	1.39	0.48
	2400	523	1.356	0.492
	2100	454	1.325	0.508
	1800	387	1.294	0.528
	1500	321	1.265	0.552
	1200	257	1.236	0.584
	900	193	1.208	0.629
	600	130	1.179	0.696
	300	66	1.149	0.807
	135	29	1.131	0.909
	0	0	1.11	1.085

Histogram: Gas Oil Ratio

Maps: PM, SK, SB

Plots: Gas Oil Ratio, Oil Formation Volume Factor, Oil Gravity, Oil Viscosity, Oil Density

Main Menu: MAIN MENU, NEW ENTRY, VIEW/EDIT DATABASE, VIEW STATISTICS, ANALYSIS

Search Type: Well, Reservoir, API at 60 C, Gas Oil Ratio (scf/stb), Bubble Point (psia), H2S and CO2, Reservoir Depth (m), Reservoir Temperature (F)

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



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



EQ 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



EQ Commitment to Training and Technology Transfer (cont'd)

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

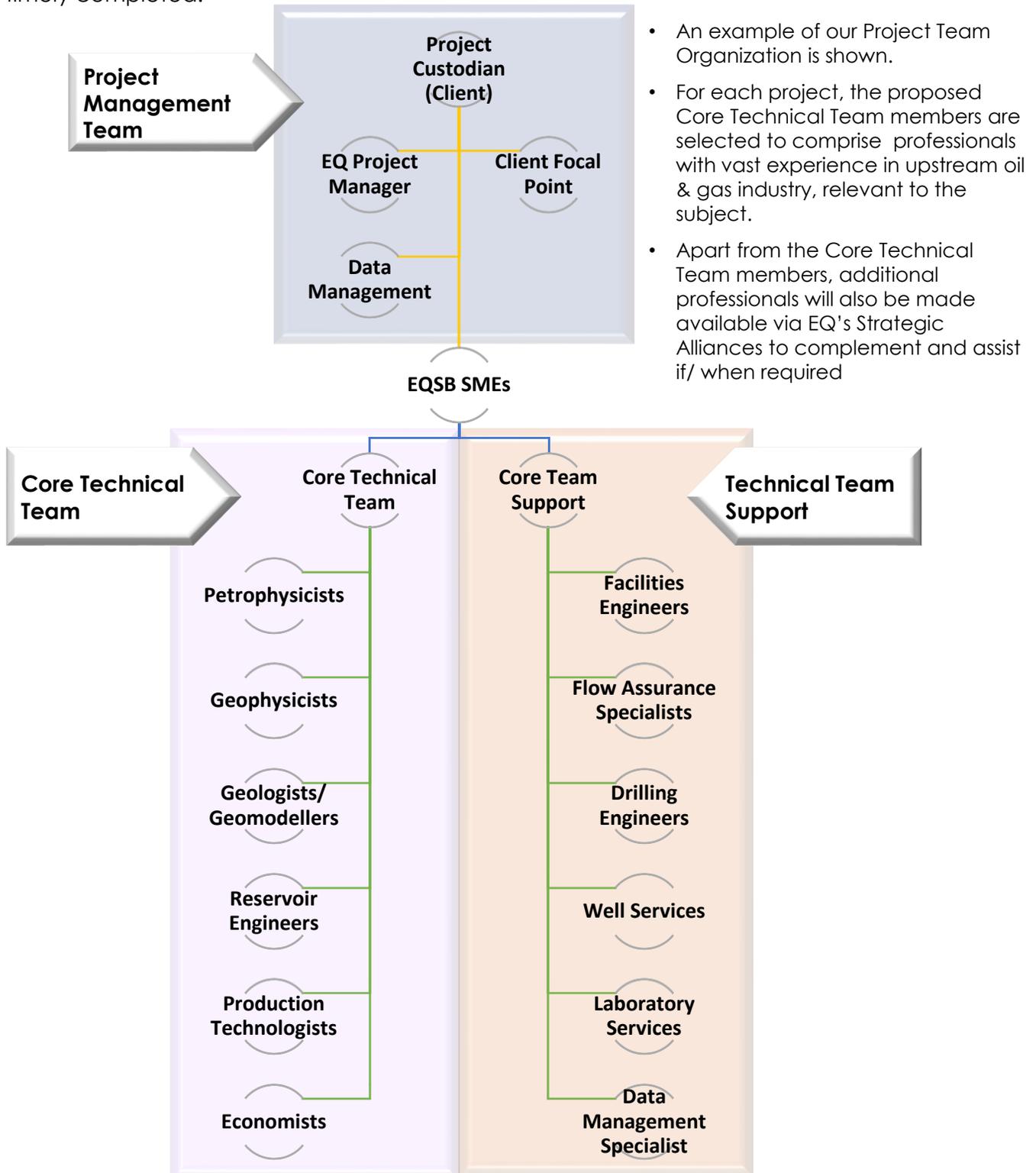
- Fundamentals of Petroleum Geology, Pahang
- Geology for Petroleum Engineers, Kuala Lumpur
- Field Techniques of Structures in "Hard-Rock": Pahang-Terengganu
- Geology of Western Belt of Peninsular Malaysia: Kuala Lumpur-Langkawi
- Fractured Basement, Pahang-Terengganu-Johor
- Fractured Basement, Redang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



EQ Customizable, Project Specific Team Structure

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.



Team Members (CVs are available upon request)

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.

Engineering



Allida Muhammad Said

Chief Operating Officer (COO) / Principal Consultant (Reservoir Engineering / Petroleum Economics)

Holds BSc. Civil Engineering (Northwestern U., Illinois, USA); 29 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.



Faizah Osman

Principal Technical Advisor (Petroleum Economics)

Holds BSc Chemical Engineering (Oregon State University, USA); 33 years experience in the oil & gas industry, including corporate planning, and as the commercial analyst & company advisor for local and international assets

- **Expert in Corporate Planning** - Subject-matter-expert (SME) in Production Sharing Contract (PSC) economics; commercial analyst & advisor for company annual Planning and Budget cycles, collaborated with teams of multi-faceted departmental functions throughout all stages of large-scale project planning, development of company strategy and new contract negotiations, from inception to completion.
- **Proficient in Commercial Advisory Roles** - company commercial advisor for economic evaluation of assets and opportunities worldwide.
- **Proficient in Managing & Leading Technical Teams** - project management, reserves certification, asset evaluation, commercial assessment and contract negotiation.
- **Proficient in Upstream Planning** - responsible for gas sales forecast and analysis, including performing gas economics and gas & condensate reserves estimation
- **Expert Trainer** - develop training modules and conduct training programs on subjects related to PSC Economics and Project Economics Evaluation.

Team Members – cont'd (CVs are available upon request)



Mohd Nasir Abdul Rahman

Principal Technical Advisor (Reservoir / Production Engineering)

Holds BEng. Petroleum & Natural Gas (University Technology Malaysia); 39 years experience in the oil & gas industry, onshore & offshore, for Malaysia (PM, SB and SK) and international assets

- **Expert in Reservoir Management & Surveillance** - experience in field surveillance & production forecasting, promoting applications of documented best practices to achieve prudent reservoir management.
- **Expert in Database Management & Data Analytics** - experience as Data Custodian; ensure data quality & integrity in production database system management, ensure application of consistent production & injection allocation methodology, maintain efficient use of an integrated global database (technical, operational & project data management) that is utilized by various user groups.
- **Proficient in Reservoir Studies** - block evaluation, well & reservoir performance analyses, formulating field development plans for Malaysia (PM and SK) and international assets.
- **Experience in Upstream Planning** - field performance reviews, co-ordinate and prepare hydrocarbon monetization plans, applications systems budget & contracts management & optimization, technical data & applications governance.
- **Expert Trainer** - skilled in mentoring new Engineers; develop training modules and conduct training programs on subjects related to reservoir surveillance & management, field development & planning, and production system applications for technical and non-technical staff. Published author of several technical papers on the topics of field development and production optimization applications.



Emalin Ramli

General Manager / Senior Consultant (Production / Reservoir Engineering)

Holds 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 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 & tNAV), formulating field development plans & infill 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 & Data Analytics** - production database management and well engineering database development



Najmi Rahim

Senior Consultant (Reservoir Engineering / Petroleum Economics)

Holds BEng. Chemical Engineering (U. Malaya, Malaysia); 17 years experience including field operations, FFR/FDP/EOR & resource assessment studies for oil & gas fields offshore Malaysia (PM, SB and SK) and international assets

- **Expert in Reservoir Studies and Simulation** - reservoir simulation studies for history matching & prediction (MBAL, PETREL/Eclipse & tNAV), formulating field development plans & infill development concepts (FFR/FDP, IOR - WI & GI), integrating rock & fluid properties, fluid contacts analysis, well test analysis, DCA and reservoir-to-facilities optimisation
- **Proficient in Production Enhancement Work** - well & reservoir modelling, performance analyses for well & reservoir surveillance and optimisation.
- **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 Reservoir Surveillance** - provide operations support in aspects of well completion design proposals
- **Experience in Database Management & Data Analytics** - production database development & management, production forecasting data analytics
- **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); 40 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.



Faizal Zainudin

Principal Technical Advisor (Geology)

Holds Bsc. Geology (Illinois State U., Illinois, USA); 32 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; wellsite 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 (turbidities 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)



Mansor Ahmad
Principal Technical Advisor (Geology)

Holds BSc. Geology (U. Malaya, Malaysia); renowned Fieldwork Expert with 36 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.



Zuhaini Mohamed
Senior Geologist

Holds BSc. Geology (U. Malaya, Malaysia); 22 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); 10 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

Team Members – cont'd (CVs are available upon request)

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); 40 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.



Samsudin Abd Hamid

Principal Technical Advisor / Principal Consultant (Geophysics & Geology)

Holds BSc. Geology (U. Malaya, Malaysia); 36 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.



Nurul Syafiqah Harun

Geophysicist

Holds MSc. Structural Geology with Geophysics (U. Leeds, UK), BSc. Geology (Cardiff University, Wales); 4 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)

Team Members – cont'd (CVs are available upon request)

Petrophysics

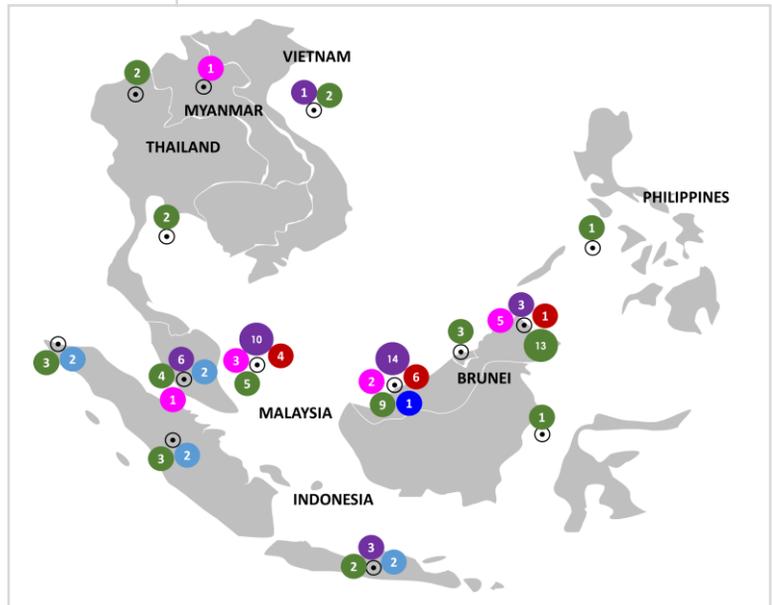


Mohammad Masood Akhtar
Senior Consultant (Petrophysics)

Holds Post Graduate Diploma in Digital Technique (Philips International Institute Eindhoven, Holland) & Bsc. in Engineering (U. Engineering and Technology Lahore, Pakistan); 44 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 (International Conference on 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

Worldwide Experience



Contact us:

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