SAJ ENERGY SERVICES (PRIVATE) LIMITED

- Geoscience & Petrophysics
- Reservoir Engineering
- Drilling & Well Engineering
- Production Engineering
- Well Intervention
- Surface Facilities
- Environmental Health & Safety

AN ISO 9001:2015 & ISO 14001:2015 CERTIFIED | PEC REGISTERED COMPANY
INTEGRATED SUBSURFACE & SURFACE SOLUTIONS
www.sajenergyservices.com

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01 Company Profile

About Us · Vision · Mission

SAJ Energy Services mission is to build capacity, capability and competencies through partnerships with world renowned technocrats. Deliver innovative solutions of subsurface & surface issues by using Industry Software and Technology that meet international standard.

SAJ Energy Services (Private) Limited is an Islamabad, Pakistan based engineering consultancy and technical services company delivering integrated subsurface and surface engineering solutions to oil and gas operators, service companies, and technology providers.

With a team of highly experienced professionals and international exposure across Pakistan, the Middle East, Iraq, the UAE, and South Africa, SAJ combines multidisciplinary engineering knowledge with practical field experience to deliver solutions that are technically robust, commercially viable, and aligned with our clients' operational objectives.

SAJ Energy Services is providing integrated technical solutions across the upstream oil and gas industry. Our multidisciplinary expertise covers the complete asset life cycle, from reservoir characterization and petrophysical evaluation to field development, drilling and well completion, production optimization & Integrated Production Modeling (IPM), Reservoir management to Static and Dynamic Reservoir Modeling, technical assessment & remedial solutions for inactive and underperforming wells and Surface Facility Design.

SAJ Energy Services supports operators in maximizing asset value through integrated reservoir-to-surface evaluation, production optimization, field development planning, and engineering studies, with a focus on technically sound, economically viable, and practical solutions.

We highly focus on effectively introducing and sustainably promoting the newest yet ingenious technological products & services to parts of the Eastern Hemisphere where they are lesser or not known — thus benefiting potential customers in overcoming previously unconquered problems while catalyzing business growth for technology owners and manufacturers.

OUR VISION

At the very heart of our business lies our Vision — to strategically and systematically evolve ourselves as a sterling partner, highly acclaimed for preeminent service and unsurpassable performance in challenging scenarios.

To be the subsurface-to-surface engineering partner of choice for operators across Pakistan and the wider region — trusted to turn complex reservoir, well and facility problems into decisions that add recoverable reserves, sustain production and extend field life, delivered to international technical and HSE standards and to a standard of independence our clients can put in front of their own boards, partners and regulators.

OUR MISSION

Our mission is to help our customers achieve their goals by evolving ourselves into industry's most dependable source for procurement of reliable materials and services.

We help operators realize the full value of their assets by combining deep technical expertise, proprietary technology and disciplined engineering practice — delivering integrated solutions from reservoir to export point, safely, on schedule and at optimum cost, while building lasting engineering capability in the countries where we work.

Certifications & Registrations

SAJ Energy Services (Private) Limited is an **ISO 9001:2015** (Quality Management System) and **ISO 14001:2015** (Environmental Management System) certified company, and is registered with the **Pakistan Engineering Council (PEC)**. These certifications reflect our unwavering commitment to delivering consistent quality, safeguarding the environment, and upholding the highest standards of professional engineering practice in every project we undertake.



Our Values

What we commit to

- **Technical Independence —** We follow the evidence and data, providing conclusions supported by sound engineering analysis rather than tailoring outcomes to predetermined expectations or project scope.
- **Auditability —** Our studies are built on documented assumptions, traceable data sources, transparent methodologies, and repeatable workflows, enabling results to be independently verified and reviewed.
- **Peer Review —** Every technical study undergoes independent internal peer review by experienced professionals before it leaves SAJ, ensuring technical quality, consistency, and reliability.

How we work

- **Integration** — We bring geoscience, petrophysics, reservoir engineering, drilling and completions, production, and surface facilities together as one integrated team, ensuring that decisions are aligned across the entire asset.
- **Knowledge Transfer —** We work alongside our clients' engineers, sharing expertise, methodologies, and practical experience throughout the engagement rather than simply delivering a report at the end.
- **Practical Solutions —** We focus on technically robust, economically viable, and field-proven solutions that can be effectively implemented in real operating environments.
- **Safety & Environmental Stewardship —** HSE considerations and environmental responsibility are embedded in our engineering approach and field activities, supporting safe, reliable, and sustainable

Our Approach

At SAJ, we recognize that sustainable production performance requires an integrated understanding of the reservoir, wellbore, production system, and surface infrastructure.

Our multidisciplinary approach connects subsurface engineering with well and facilities performance, enabling us to identify the root causes of production constraints and develop fit-for-purpose solutions.

We support clients in optimizing new and existing assets, overcoming reservoir and production challenges, extending asset life, improving recovery, reducing operating costs, and unlocking previously unrealized production potential.

Technology & Innovation

Connecting Proven Technology with Emerging Opportunities

Innovation is a fundamental component of SAJ's business model.

We actively identify and evaluate innovative, specialized, and field-proven technologies capable of addressing complex challenges across the upstream oil and gas industry. Our objective is not simply to introduce new technology, but to ensure that the technology is technically relevant, operationally practical, and commercially sustainable within the target market.

SAJ works with international technology owners, manufacturers, and specialized service providers to facilitate the technical introduction, market development, localization, demonstration, and deployment of their products and services.

Our technical understanding of operator requirements allows us to translate technology capabilities into application-specific solutions, creating a meaningful connection between technology developers and end users.

International Technology Partnership

Enabling Technology. Creating Markets. Delivering Value.

SAJ provides a regional platform for international technology companies seeking to establish or expand their presence across the globe and emerging energy markets.

We support technology owners and manufacturers through:

- Technical and commercial market assessment
- Identification of target applications and customers
- Technology positioning and value proposition development
- Technical presentations and workshops
- Operator engagement and technical discussions
- Field trials and technology demonstrations
- Application engineering and technical support
- Local market development
- Commercial representation and business development
- Long-term customer and technology-partner engagement

By combining engineering credibility with market knowledge and industry relationships, SAJ helps international technology providers navigate the transition from technology introduction to sustainable market adoption.

Field-Driven Engineering

Engineering Solutions Designed for the Real World

SAJ's engineering solutions are developed with a strong emphasis on field applicability and operational practicality.

Our professionals bring extensive experience from operating environments characterized by mature fields, challenging reservoirs, aging infrastructure, production constraints, water and gas management issues, artificial lift challenges, and complex surface systems.

This field-oriented perspective enables SAJ to move beyond theoretical studies and develop solutions that can be implemented, monitored, optimized, and sustained in actual operating environments.

Asset Performance & Revival

Unlocking Value from Existing Assets

Mature oil and gas assets often contain significant remaining value that can be unlocked through systematic engineering assessment and targeted interventions.

SAJ supports operators in identifying opportunities for production restoration, facility debottlenecking, artificial lift optimization, reservoir management, well intervention, water management, compression optimization, and infrastructure upgrades.

Our integrated approach enables individual wells, facilities, and reservoirs to be assessed as part of the wider production system, helping clients prioritize interventions based on technical feasibility, production impact, risk, and economic value.

Our International Experience

SAJ's professional team has accumulated extensive technical and operational exposure across Pakistan, South Africa, the Middle East, Iraq, and the UAE.

This international perspective provides an understanding of different reservoir environments, operating practices, regulatory frameworks, technology landscapes, and commercial requirements.

We leverage this experience to provide clients and technology partners with locally relevant solutions supported by international engineering practices.

Our Value Proposition

Engineering Expertise | Field Experience | Technology Access | Market Development

SAJ operates at the intersection of engineering consultancy, field services, technology, and business development. For operators, we provide access to multidisciplinary engineering expertise and innovative technologies capable of addressing complex operational challenges.

For international technology owners and manufacturers, we provide a technically credible platform for market entry, customer engagement, technology deployment, and sustainable business development.

Our objective is to establish long-term relationships based on technical credibility, transparency, performance, and mutual value creation.

02 Energy and Natural Resources

Engineering & Integrated Data Solutions

> *We help companies understand the interconnected, dynamic forces that shape the world's energy markets through our expertise in Chemicals, and energy dependent industries.*

Our experts and analytical tools enable clients to continuously improve their strategy and operations across the entire energy value chain. We ready to assist customers in oil and gas.

Engineering Solutions

As an integral part of our reservoir engineering and production engineering consulting work & services that are sold, supported and provides practical and advanced solutions for reservoir engineering and production optimization projects.

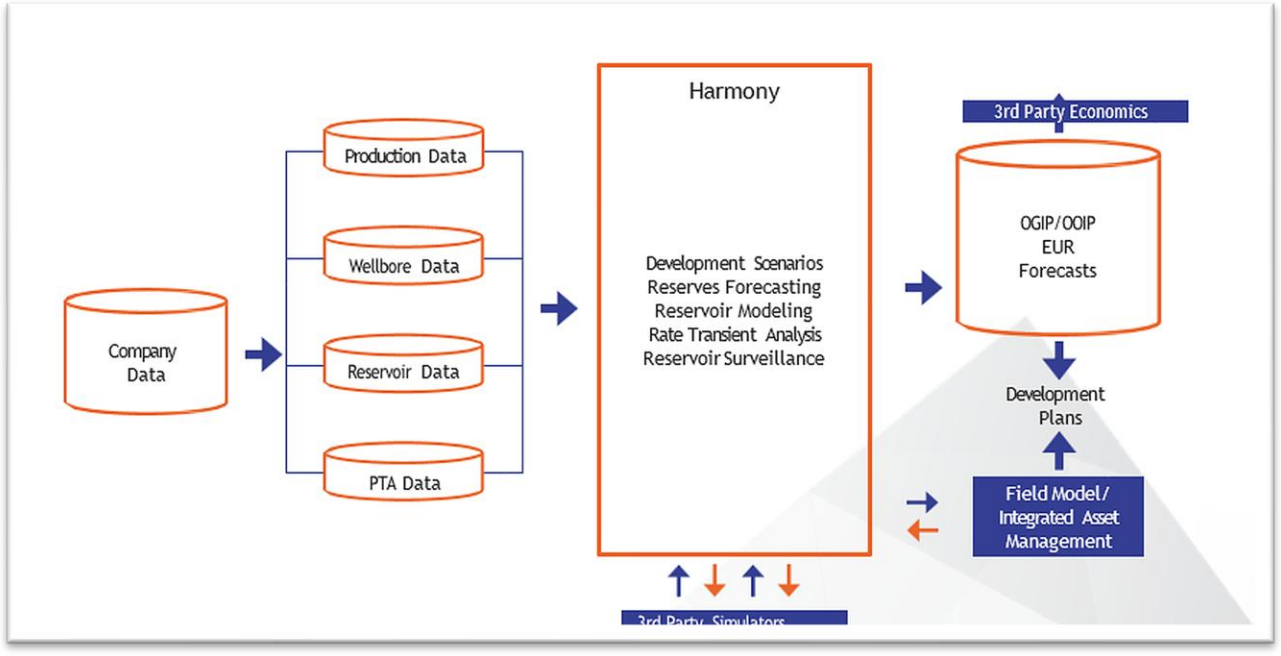
We offers strength of expertise in the interdisciplinary cooperation between our team of reservoir engineers, petrophysicists, production engineers, simulation engineers, and computer specialists, can provide both short-term and long-term consulting services to provide answers, analysis, and interpretation of drilling and operations results.

We Focus on Connecting Data

Our integrated reservoir and production engineering suite allows organizations to quickly determine how subsurface behavior will affect production and how surface infrastructure plans will affect reserves. Designed by engineers, the software is practical and easy to use.

Inputs — connecting every data stream

Production Data	**Wellbore Data**	**OGIP / OOIP · EUR**
Forecasts	**Reservoir Data**	**Development Plans**
PTA Data	**3rd-Party Simulators**	**Company Data**



03 Geoscience & Petrophysical Services

SAJ – Vizdom Joint Venture

Through its strategic joint venture with Vizdom Solutions (Pvt.) Ltd, SAJ Energy Services delivers advanced, technology-driven geoscience and petrophysical services supporting decisions across the upstream lifecycle. Our offering combines deep domain expertise with AI-augmented interpretation workflows to provide high-resolution reservoir Characterization, fracture analysis, unconventional resource evaluation and low-resistivity pay identification. Leveraging the proprietary VGS, VDS and VDA platforms and a multidisciplinary team of geoscientists and engineers, we convert subsurface data into decisions that reduce uncertainty, improve well placement and enhance production performance.

Joint Venture Capability & Technical Depth

The SAJ–Vizdom Joint Venture brings together a multidisciplinary team of industry experts with 25–35 years of international experience, having worked across diverse geological provinces including Libya (Ghadames Basin), Vietnam, Indonesia, and multiple onshore and offshore basins. Within Pakistan, the team has delivered extensive subsurface studies in Eocene, Paleocene, Chiltan (Middle Jurassic), and Dunghan formations, including detailed evaluations of more than 20 wells in the Kirthar Range.

This combination of global exposure and local geological knowledge enables the JV to design tailored, field-specific solutions that address the technical and operational challenges faced by national and international operators.



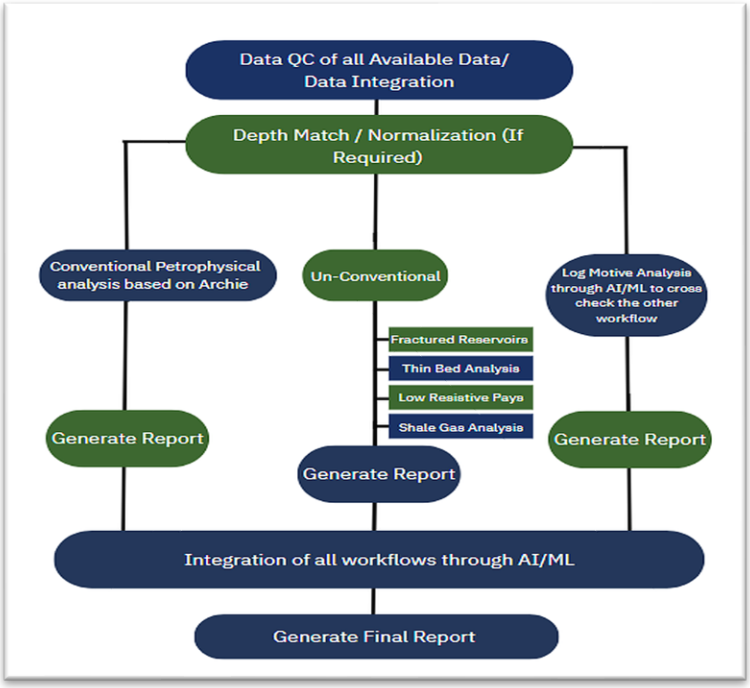
Technology–Driven Excellence

A defining strength of the SAJ–Vizdom JV is the integration of proprietary software platforms, advanced analytics, and data-driven workflows across the subsurface evaluation and engineering lifecycle. Vizdom Solutions has pioneered the commercial deployment of its in-house developed technology platforms:

- **Vizdom Geoscience Suite (VGS™) —** advanced geoscience data integration, interpretation, visualization, and subsurface analysis.
- **Vizdom Drilling Suite (VDS) —** data-driven drilling analysis, workflow optimization, and engineering support for improved drilling performance.
- **Vizdom Database Management & Access (VDA) —** secure, enterprise-level data management, integration, and controlled access to technical datasets**.**

Together, these platforms enable large-scale data management, automated and batch processing, advanced analytics, and AI/ML-supported interpretation, allowing multidisciplinary teams to efficiently process complex datasets and derive actionable technical insights.

The integration of these technologies into our consulting workflows promotes consistency, repeatability, traceability, and auditability, while reducing manual processing and enabling faster, data-driven decision-making across geoscience, drilling, reservoir, and production studies.



Proprietary Digital Platforms & Engineering Software

As part of its advanced Geoscience, Petrophysical and drilling capability, Vizdom Solutions Pvt. Ltd. has developed and commercialized a suite of proprietary digital platforms designed to support geoscience interpretation, drilling engineering, and secure data management. These platforms are actively used by oil & gas operators, service companies, and consultants to improve subsurface understanding, optimize well design, and enhance operational efficiency at an optimum cost.

VGS™ – Vizdom Geoscience Suite

Advanced Well Log Interpretation & Reservoir Evaluation Platform

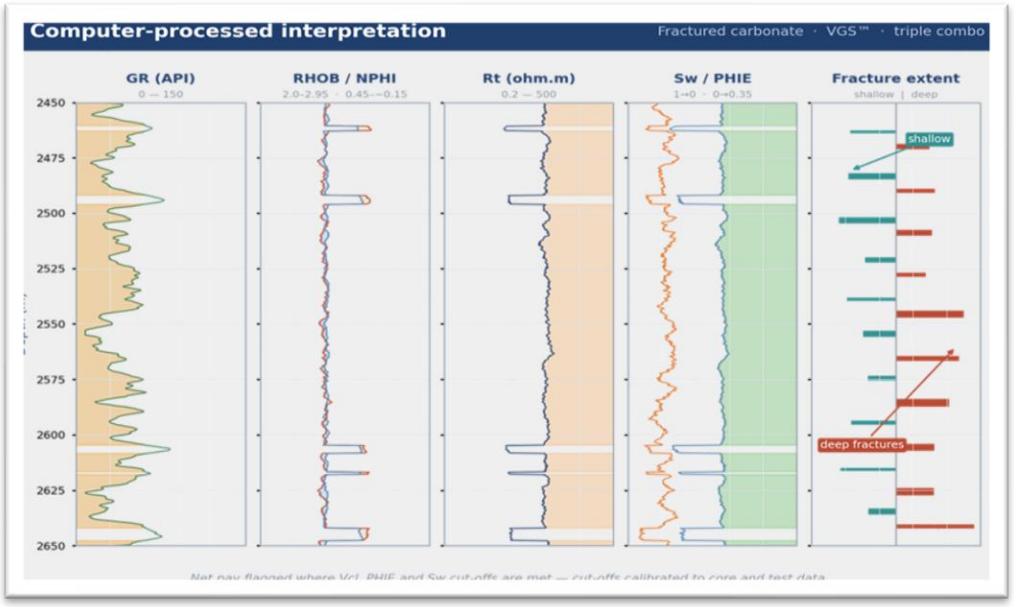
VGS™ is a powerful geoscience software platform developed by Vizdom Solutions for Petrophysicists, Geologists, and Reservoir Engineers to interpret well log data and perform comprehensive reservoir evaluations. The software is designed to handle large-scale fields and multi-well datasets, enabling full-spectrum interpretation workflows across a wide range of reservoir types.

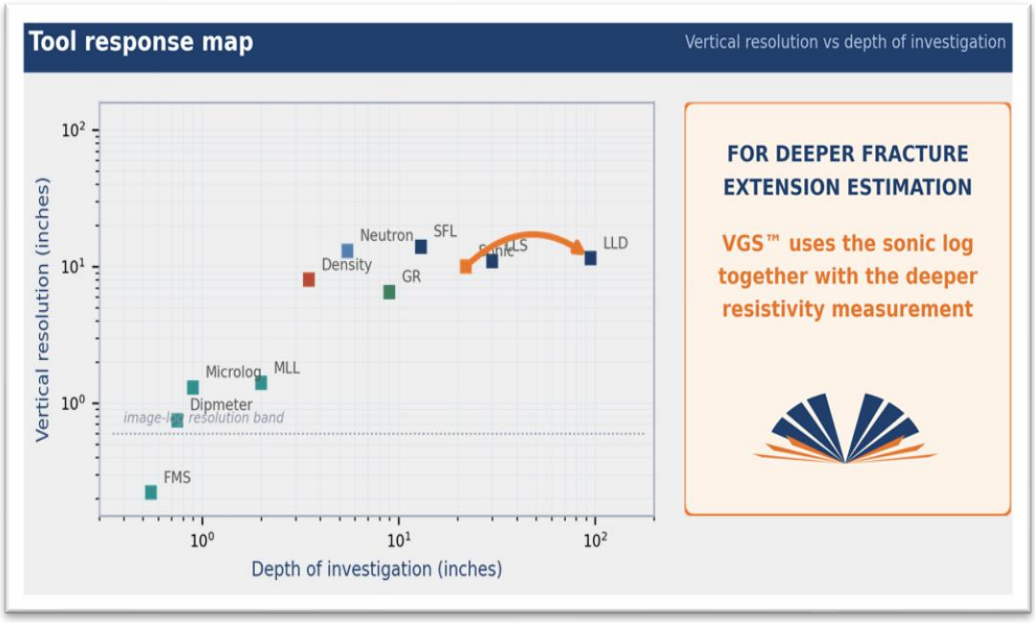
VGS™ offers high computational efficiency, batch processing capability, and full extensibility, making it suitable for both field-scale studies and detailed well-level analysis. The platform has been widely adopted by oil & gas operators, service companies, and independent consultants as a high-value, cost-effective alternative to traditional interpretation software.

Key Capabilities of VGS™

- Full-spectrum petrophysical interpretation for conventional and unconventional reservoirs
- Ability to process large datasets with consistent and repeatable workflows
- Advanced modules for fractured reservoir analysis, thin bed evaluation, and low-resistivity pay identification
- Integration of deterministic and probabilistic interpretation approaches
- AI- and Machine Learning–augmented workflows for improved data validation and interpretation accuracy
- Seamless integration of open-hole, cased-hole, and core data
- Designed to support field development planning, reserves estimation, and production optimization

VGS™ is continuously enhanced through R&D and field application, ensuring alignment with evolving reservoir challenges and industry best practices.





Core Geology & Geophysics Service Offerings

1. Log-Driven Reservoir Characterization

We deliver detailed reservoir characterization studies using deterministic and probabilistic petrophysical models, selected based on data availability and geological complexity. Key deliverables include:

- Volume of clay (Vcl) estimation
- Effective and total porosity
- Water saturation modelling
- Log-derived permeability estimation

These outputs form the foundation for accurate static and dynamic reservoir models, supporting development planning and production forecasting.

2. Fracture Porosity Estimation (Open-Hole Logs Only)

We offer specialized fracture porosity estimation services using open-hole triple combo logs, a capability supported by international technical publications. This workflow enables fracture identification and quantification even in the absence of image logs, with optional integration where available.

3. Thin Beds & Lithofacies Analysis

Our thin-bed analysis services focus on identifying pay zones that are often overlooked by conventional interpretation techniques. Using bulk volume approaches (RV/RH) and lithofacies-based sand counting, we delineate thin productive intervals using open-hole triple combo data only.

This service is particularly valuable in laminated reservoirs and mature fields where incremental reserves can significantly enhance field economics.

4. Low Resistivity Pay (LRP) Evaluation

Low resistivity pay remains a critical challenge in many Pakistani basins. Using Vizdom Geoscience Suite (VGS™) supported by AI and Machine Learning models, we identify and validate LRP zones with improved confidence.

Our workflows ensure:

- Cross-validation of petrophysical outputs
- Consistency across multiple wells
- Reduction of false positives and interpretation bias

This results in improved net pay estimation and more effective completion decisions.

5. Unconventional Formation Evaluation

We provide a complete suite of services for unconventional reservoirs, including:

- Total Organic Carbon (TOC) estimation
- Brittleness and frac gradient analysis
- Integration of petrophysical, geological, and mechanical properties

These studies support horizontal well planning, stimulation design, and development optimization for shale and tight reservoirs.

6. Cased-Hole & Integrated Log Analysis

Our services extend beyond open-hole evaluation to include cased-hole interpretation, integrated with open-hole data and offset well correlation. This approach supports:

- Re-evaluation of mature and shut-in wells
- Identification of bypassed pay
- Re-completion and workover candidate selection

7. Machine Learning & AI-Enabled Interpretation

The SAJ–Vizdom JV actively applies modern ML and AI techniques to enhance subsurface interpretation, including:

- Principal Component Analysis (PCA)
- Multilinear Regression Analysis (MLRA)
- Fuzzy logic modelling
- Neural network–based predictions

These methods are used for log synthesis, core-to-log calibration, and data-driven reservoir characterization, improving prediction accuracy and reducing uncertainty.

8. Planning, Quality Assurance & Log QC

We support operators from the planning stage through execution by providing:

- Logging program design and tool selection

- Speed optimization based on local stratigraphy
- Real-time quality control of field logs
- Repeat section selection and validation

This ensures that acquired data meets interpretation requirements and delivers maximum value.

Data Management & Security

Through VDA, we provide a secure, SQL-based enterprise data management platform that enables:

- Controlled user access and permissions
- Full traceability of data access and transfers
- Fast search, retrieval, and population of datasets

This ensures data integrity, confidentiality, and operational efficiency for operators managing large subsurface datasets.

Standard Petrophsical Evaluation workflow

#	Stage	Activity and output
01	**Data inventory and load**	Assemble LAS/DLIS logs, deviation surveys, mud logs, core, test and completion data into a VDA project. Output: data inventory and gap register.
02	**Log QC and editing**	Repeat-section checks, tool response validation, despiking, splicing, depth matching and normalization across the multi-well set. Output: QC'd, depth-consistent log suite.
03	**Environmental corrections**	Borehole size, mud weight and salinity, temperature, invasion and standoff corrections applied per tool vendor charts. Output: corrected curves.
04	**Lithology and clay volume**	GR, spectral GR, SP and neutron-density cross-plot methods; Thomas-Stieber analysis where lamination is indicated. Output: Vcl and lithology column.
05	**Porosity**	Density, neutron and sonic porosity with matrix and fluid parameters calibrated to routine core analysis. Output: PHIT and PHIE.
06	**Water saturation**	Saturation model selected from formation character (Archie, Indonesia, Simandoux, Dual-Water, Waxman-Smits); Rw, m and n from Pickett/Hingle plots and SCAL. Output: Sw profile with model justification.
07	**Permeability and rock typing**	Log-derived permeability calibrated to core; FZI / Winland rock typing to define flow units. Output: k profile and rock-type scheme for modelling.
08	**Special evaluations**	Fracture porosity from dual laterolog and sonic; thin-bed RV/RH; LRP validation; TOC and brittleness for unconventional intervals. Output: Specialized pay interpretation.
09	**Net pay definition**	Vcl, PHIE and Sw cut-offs derived from core, test and production calibration rather than defaults. Output: net-pay summary by zone and well.
10	**AI/ML cross-check**	PCA, MLRA, fuzzy logic and neural-network predictions run as an independent check on the deterministic result, with blind-well testing. Output: cross-validation record.
11	**Multi-well consistency and uncertainty**	Field-wide consistency review; deterministic case plus probabilistic (Monte Carlo) ranges on the key parameters. Output: P10 / P50 / P90 petrophysical inputs.
12	**Deliverables and handover**	CPI plots, zone summary tables, digital LAS, volumetric inputs and interpretive report; formal handover to static and dynamic modelling. Output: final petrophysical package.

04 Well Testing & Rate Transient Analysis

Pressure & Rate Transient Analysis

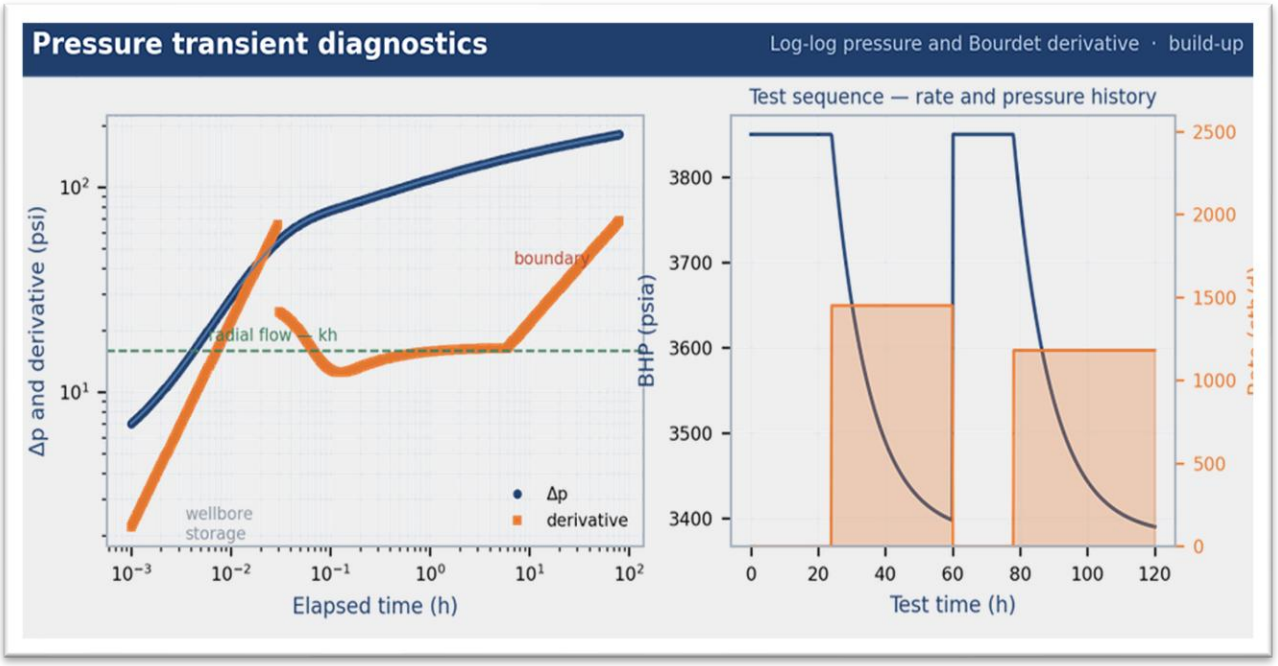
By combining our well test (pressure transient) and advanced decline (rate transient) analysis services, SAJ Energy Services provides a comprehensive understanding of reservoirs, completion efficiency, and optimization potential.

Well Testing (Pressure Transient Analysis)

- Design and analysis of multi/single point flow and buildup for conventional and multi-fractured horizontal wells, injection and falloff (including mini-frac analysis), DST and perforation inflow tests
- Determination of near wellbore reservoir parameters (permeability, skin, fracture parameters)
- Estimation of reservoir pressure, distances to reservoir boundaries and/or heterogeneities
- Prediction of deliverability potential at various flowing conditions
- Recommend potential stimulation (for damaged wells) or optimization candidates (utilizing tubing performance curves and liquid lift calculations)

Rate Transient Analysis

- Reservoir characterization (permeability, skin, fracture half-length)
- Diagnose changing skin or permeability conditions
- Monitor well performance in competitive drainage situations
- Monitor productivity to ensure proper production allocation
- Analytical and numerical production modeling – single zone vertical to multi-frac horizontal wells
- Determination of stimulated reservoir volume, optimal well spacing and EUR/well for unconventional reservoirs
- Proof of “tight gas” for government tax credits



05 PVT Validation & EOS Modelling

Fluid Characterization

The objective of fluid Characterization is an equation of state that correctly represents the laboratory PVT measurements, is thermodynamically consistent, reliably predicts reservoir and surface behavior through depletion and phase change, and can be relied on for reserves, forecasting, CGR, recovery and facilities design.

Fluid sampling and quality check

- Single-phase sampling verified — above dew point for gas condensate, above bubble point pressure for black oil
- No contamination from mud filtrate, air or separator bias
- GOR and CGR consistent with field measurement
- Sampling pressure/temperature and Lab Opening pressure/temperature

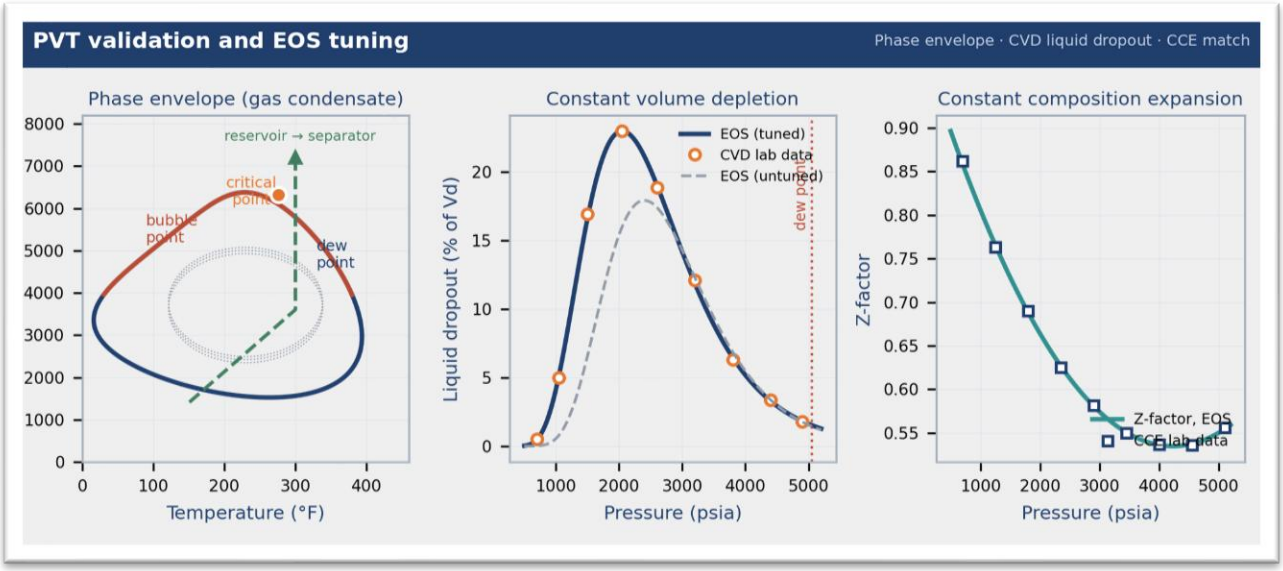
Composition validation

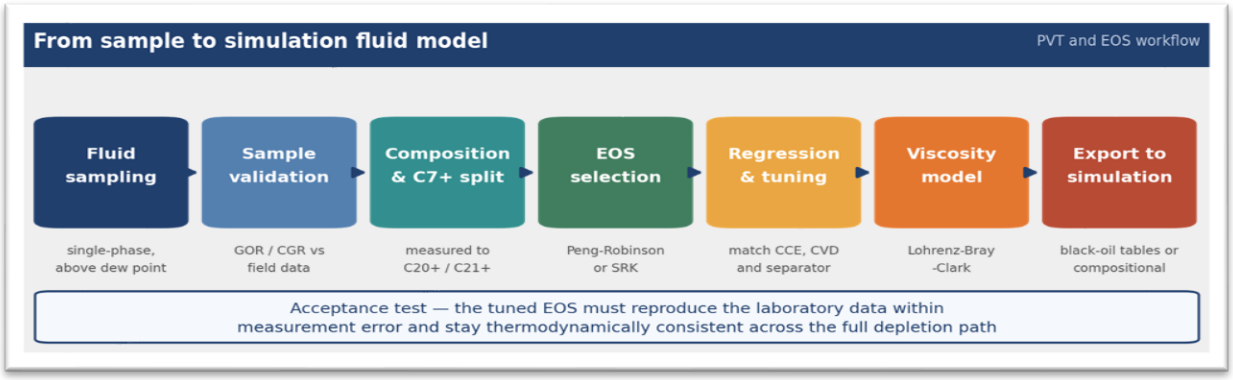
- Components measured to C20+ or C21+
- Appropriate lumping to C7+, C10+ or C12+ with plus-fraction Characterization
- Physically reasonable trends — molecular weight increasing with carbon number, specific gravity increasing smoothly without abnormal jumps

Laboratory PVT tests — minimum requirement

For a gas or gas-condensate reservoir at least three to four tests are required to tune a robust EOS:

Test	Purpose
Constant Composition Expansion (CCE)	Relative Volume, Dew-point/Bubble Point Pressure, Z-factor, Oil Density
Constant Volume Depletion (CVD)	Liquid dropout & CGR
Differential Liberation	Oil and Gas Formation Factors, Solution GOR & Oil Density
Separator Test	Surface yields & shrinkage
Gas composition vs pressure	Validation of compositional model





Standard Reservoir Fluid Characterization workflow

#	Stage	Activity and output
01	**Sampling review**	Assess how and where each sample was taken, the flowing conditions at the time, and whether bottomhole or recombined surface samples are representative. Output: sample validity assessment.
02	**Sample quality check**	Sampling pressure/Temperature and Lab opening Pressure/Temperature, saturation pressure at lab conditions, contamination screening for mud filtrate, air and separator bias. Output: accepted and rejected sample list.
03	**Composition validation**	Check the measured and recombined composition, plus-fraction trends and molecular weight and specific gravity consistency. Output: validated composition.
04	**Plus-fraction Characterization**	Splitting and lumping of the C7+ fraction, critical property correlation and pseudo-component definition. Output: component scheme for the EOS.
05	**EOS selection**	Peng-Robinson or Soave-Redlich-Kwong with volume-shift, selected for the fluid type and intended use. Output: base EOS model.
06	**Regression and tuning**	Regression on a limited, physically defensible set of parameters to match CCE, CVD, differential liberation and separator tests simultaneously. Output: tuned EOS with match quality report.
07	**Viscosity modelling**	Viscosity correlation tuned separately against measured data so that regression on it does not distort the phase behavior. Output: validated viscosity model.
08	**Consistency and quality control**	Material balance checks on the CVD, saturation pressure behavior and phase envelope tested through the full depletion and surface path. Output: thermodynamic consistency record.
09	**Export to application**	Black-oil tables for conventional simulation, or the compositional model for condensate, gas injection, CO2 and network studies. Output: fluid model handed to simulation and facilities.
10	**Surface and facility conditions**	Separator train optimization, CGR and shrinkage prediction at design conditions, feeding facility sizing in Section 09. Output: surface yield forecasts.

06 Material Balance and Decline Curve Analysis (DCA)

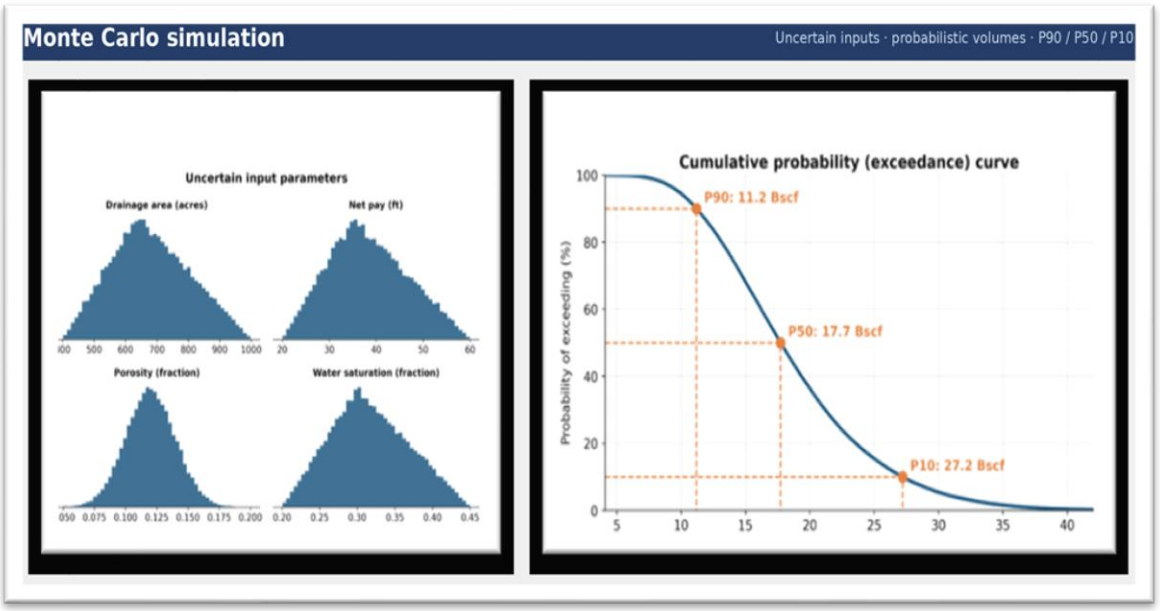
OOIP / OGIP & EUR Estimation

SAJ provides multiple independent techniques for estimating original oil and gas-in-place (OOIP/OGIP) and expected ultimate recovery (EUR) without the need for shutting in the well.

Monte Carlo Simulation

Monte Carlo simulation is a computational technique that uses random sampling to understand how uncertainty affects an outcome. Instead of relying on a single "best guess," it runs a model thousands of times, each with different randomly chosen inputs, and shows the full range of results and how likely each one is.

- Provide probabilistic justification to support the planned field development program
- Generate P90, P50 and P10 estimates of reservoir OGIP instead of a single deterministic value
- Quantify uncertainty in key inputs (porosity, water saturation, net pay, drainage area, recovery factor)
- Identify the parameters with the greatest impact on reserves through sensitivity analysis
- Deterministic volumetric analysis (single best-estimate inputs)
- Probabilistic volumetric analysis (input distributions sampled over thousands of trials)
- Estimate the probability of achieving minimum economic reserves
- Assess the range of production forecasts and project economics (NPV, IRR) for each development scenario
- Define low, base and high cases for drilling and investment decisions



The tank model

Material balance treats the reservoir as a single tank at one average pressure. Every barrel or standard cubic foot withdrawn must be accounted for by expansion of the oil, the gas cap, the connected rock and water, and by any influx from an aquifer or injected fluid. Written as an equation, that accounting is the most powerful independent check available on in-place volumes — it uses only pressure and production data, needs no grid, and will expose a static model whose volumes are wrong before a single simulation run is made.

- **Drive mechanism identification —** the relative contribution of depletion drive, gas-cap expansion, water drive, compaction and injection is quantified rather than assumed.

- **p/z analysis —** for gas reservoirs, the p/z versus cumulative plot gives OGIP directly; departure from the straight line is the signature of aquifer support or of pressure data that cannot be trusted.
- **Havlena–Odeh straight line —** underground withdrawal plotted against total expansion; the slope gives N, and curvature diagnoses the drive term that has been left out.
- **Aquifer modelling —** Van Everdingen-Hurst, Fetkovich and Carter-Tracy influx models fitted to the observed pressure response and carried into the dynamic model.
- **Multi-tank and compartment analysis —** where pressure data indicates partial communication, tanks are split and the transmissibility between them estimated.
- **Cross-check against volumetrics —** the material balance volume is reconciled with the static model volume; an unexplained gap is treated as a finding, not rounded away.

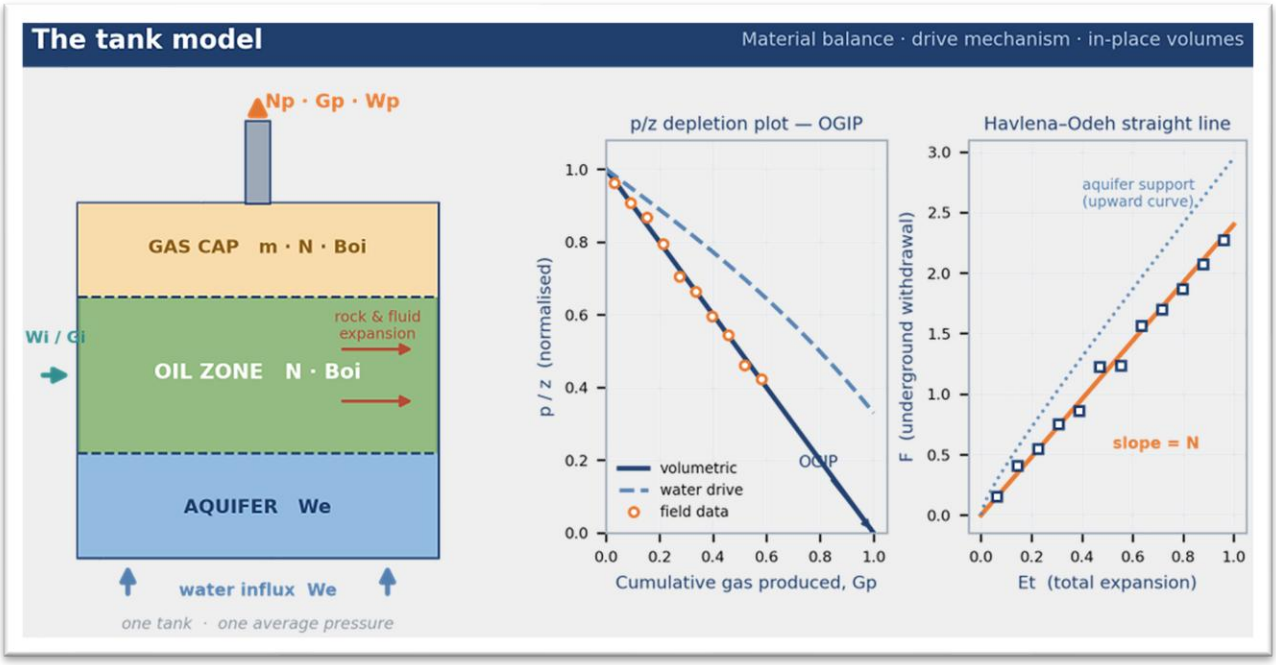


Figure · The tank model, the p/z depletion plot and the Havlena–Odeh straight line — three views of the same balance

Reservoir Characterization

Access the most comprehensive collection of production - based methods available for determining permeability, drainage area and stimulation effectiveness. Methods range from straight-line analytics and type curves to analytical and numerical models with history matching.

Industry-leading tools for analysis of unconventional reservoir performance that combine proven empirical and analytical techniques for quickly evaluating reserves and providing bulk reservoir characterization.

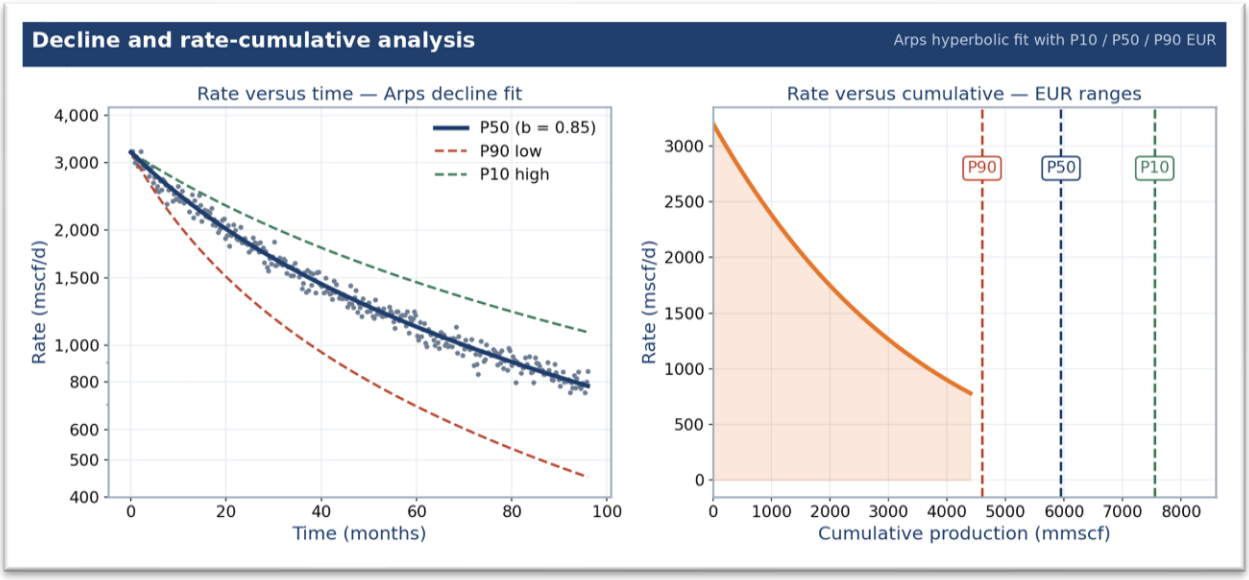
Reserves evaluation and reporting

Reserves and contingent resources are classified and reported under the SPE/WPC/AAPG/SPEE Petroleum Resources Management System, with deterministic and probabilistic cases where data supports them, and full documentation of the technical and commercial basis for each category.

Decline Curve Analysis

- Provide justification to support the planned infill drilling program
- Generate estimate of reservoir OGIP that was substantially higher than predicted by traditional decline analysis
- Identify optimal drilling location for new well
- Traditional decline analysis (rate data only)

- Advanced decline analysis methods (using flowing rate and pressure data)
- Estimation for minimum reservoir OGIP
- Confirm interference between the original producing well and the first offset well
- Define drainage area and boundaries for each well



Standard Reserves Estimation workflow

#	Workflow step	Material balance	Decline curve analysis	Monte Carlo simulation
01	Data input	Pressure history, PVT data and cumulative production by phase	Rate–time history and a record of well events	Ranges for area, thickness, porosity, saturation, formation volume factor and recovery factor
02	Quality control	Validate average reservoir pressures and check PVT consistency	Remove shut-ins and outliers; isolate stable, boundary-dominated flow	Assign a distribution to each input and define dependencies between them
03	Diagnostics	Identify the drive mechanism with Campbell / Cole plots and drive indices	Confirm the flow regime and select the Arps model: exponential, hyperbolic or harmonic	Set the sampling scheme and the number of realizations
04	Analysis	p/z plot and Havlena–Odeh straight line; fit aquifer model where needed	Fit qi, Di and b; cross-check on the rate–cumulative plot	Run thousands of realizations of the volumetric or forecast model
05	Validation	Match the pressure history and reconcile with volumetric estimates	Hindcast test and comparison with analogue wells	Check convergence and rank inputs with a tornado chart
06	Deliverables	In-place volumes (OOIP / OGIP), drive mechanism and aquifer strength	EUR, remaining reserves and production forecast	P90 / P50 / P10 volumes and ranked key uncertainties

07 Static & Dynamic Reservoir Modelling

Reservoir Engineering & Simulation

SAJ Energy Services possesses an integrated team of highly experienced geologist, petrophysicists, reservoir engineers, reservoir simulation engineers, production engineers, and specialists. Our results combine static and dynamic modeling into a comprehensive reservoir model that yields additional reserves and successful drilling locations.

The static model is the geological description of the reservoir; the dynamic model is how that description behaves under production. SAJ builds both, in sequence, with the same team and the same assumptions. That continuity matters: most disappointing history matches are not simulation problems at all but property models whose uncertainties were never carried forward.

Simulation projects begin with a detailed review of data quality and a scoping analysis of data uncertainty. Simulation proceeds only after the analysis determines that the model is representative of the reservoir, that it will generate dependable results, and that it is economically justified.

In addition to its specific suite of services, SAJ Energy Services is often engaged to investigate unique reservoir situations for which no precedent exists and the solution path is unclear — covering Eclipse (Black Oil and Thermal) and PETREL, waterflood design and optimization, infill drilling and pool-depletion strategies, gas storage, carbon sequestration, and gas hydrates.

Some clients choose specific SAJ Energy Services to augment their reservoir understanding. Alternatively, we are engaged to combine and coordinate all of SAJ's expertise in conducting integrated reservoir studies leading to master development plans for greenfield or brownfield developments.

Static model

- **Structural framework —** fault modelling, horizon interpretation, zonation and pillar or unstructured grid design at a resolution matched to the flow question being asked.
- **Facies modelling —** depositional concept first, then variogram analysis and sequential indicator or object-based simulation conditioned to well and, where available, seismic attributes.
- **Petrophysical property modelling —** Vcl, effective porosity, water saturation and permeability populated from the Section 03 interpretation, co-kriged or co-simulated with a secondary trend where justified.
- **Saturation-height modelling —** capillary pressure-based initialization using Leverett J-function or rock-type-specific functions calibrated to SCAL.
- **Volumetrics —** deterministic and stochastic OOIP and OGIP with a documented uncertainty range on each input, not a single number.

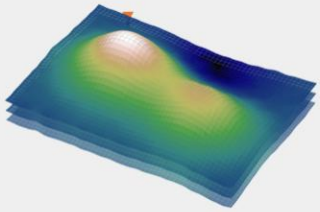
Dynamic model

- **Upscaling —** flow-based upscaling of permeability with the coarse grid tested against fine-grid response before it is accepted.
- **Initialization —** PVT and SCAL regions, equilibration, fluid contacts and transition-zone treatment verified against measured pressures and test results.
- **History matching —** field-level then well-level matching of pressure, rates, water cut and GOR, with changes made only to parameters whose uncertainty justifies them.
- **Prediction —** base case plus infill, recompletion, compression, injection and EOR scenarios, constrained by realistic facility limits.
- **Uncertainty —** experimental design, proxy modelling and Monte Carlo to produce P10, P50 and P90 profiles rather than a single deterministic forecast.

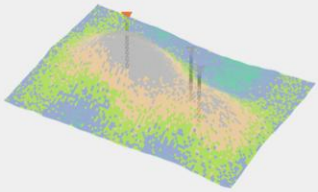
Static reservoir model

Structural framework · facies · petrophysical properties

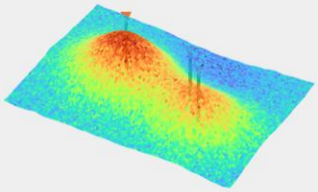
Structural framework & horizons



Facies model (sequential indicator)



Effective porosity model



Static to dynamic modelling

One continuous chain — no rebuild at the handover

Structural framework
Faults, horizons, zonation and grid design

Facies modelling
Depositional concept, variograms, SIS / object-based methods

Property modelling
Vcl, PHIE, Sw and permeability from Section 03, co-kriged to seismic

Volumetrics
Deterministic and stochastic OOIP / OGIP with uncertainty

STATIC ↓ DYNAMIC

Shared data model (VDA)

Shared petrophysical cut-offs

Shared rock typing scheme

Shared uncertainty register

Single audit trail end to end

peer reviewed at every handover

Upscaling
Flow-based upscaling of k; layer design tested against fine grid

Initialisation
PVT and SCAL regions, equilibration, saturation-height function

History matching
Field and well level pressure, rates and phase behaviour

Prediction & ranking
Infill, EOR, compression cases with P10 / P50 / P90 profiles

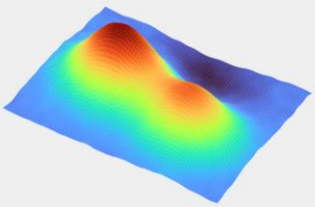
Static and dynamic models are built by one team against one set of assumptions.

The most common source of error is a property model the reservoir engineer never sees.

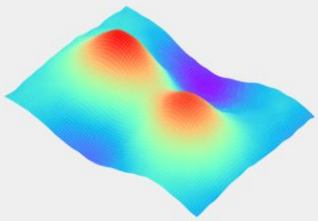
Dynamic model output

History-matched 3D simulation

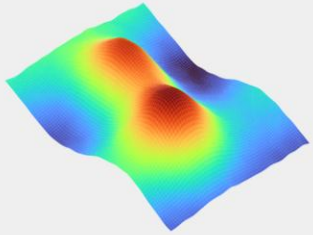
Structure — top reservoir



Pressure distribution (psia)



Gas saturation, 2035



Dynamic Model

- Fluid properties (PVT)
- Rock-fluid properties
- Static reservoir pressure
- Production data analysis
- Reservoir drive
- Material balance
- Populate 3D model

Numerical simulation

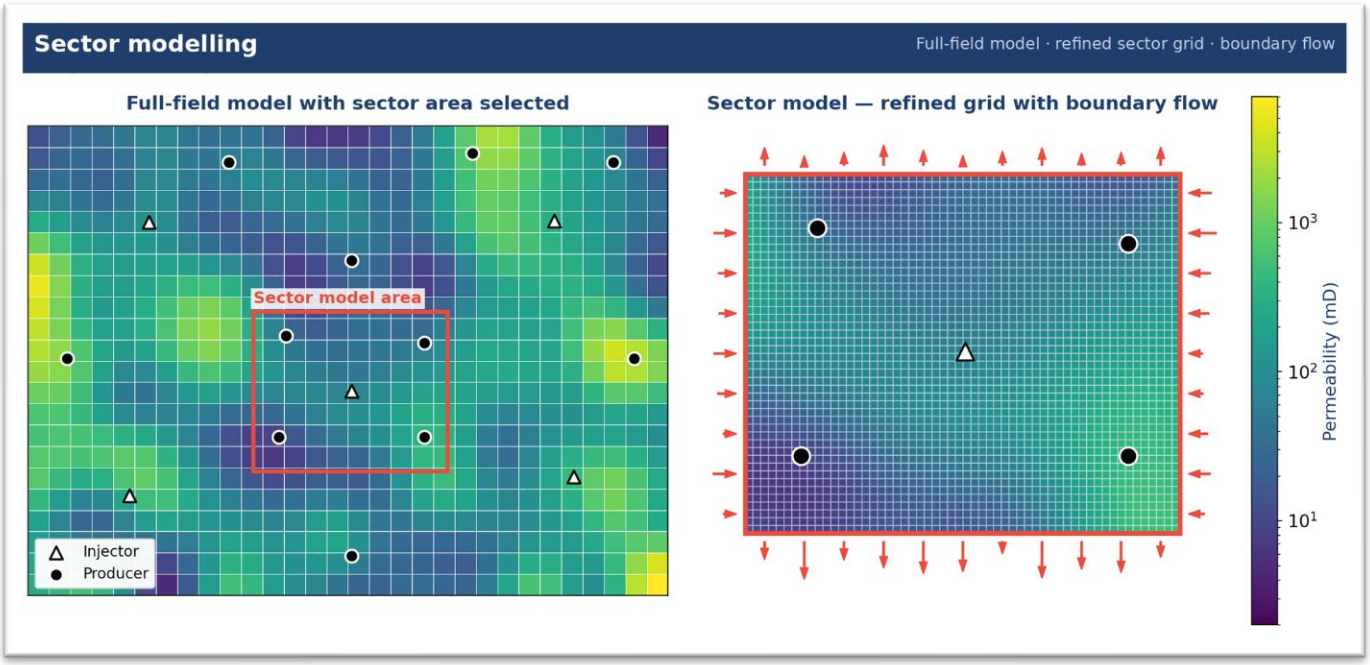
- Experimental design and sensitivity screening
- Gas, black-oil, thermal and compositional simulation
- Stochastic modelling and uncertainty quantification
- Eclipse (black oil and thermal), Petrel and equivalent platforms Streamline simulation for flow-path determination
- Production forecasting

Specialist applications

- Waterflood design, optimization and surveillance
- WAG, miscible and immiscible lean-gas injection
- Infill drilling and pool depletion strategies
- Gas storage, CO2 injection and carbon sequestration
- Gas hydrates and other unprecedented reservoir situations

Sector Modeling

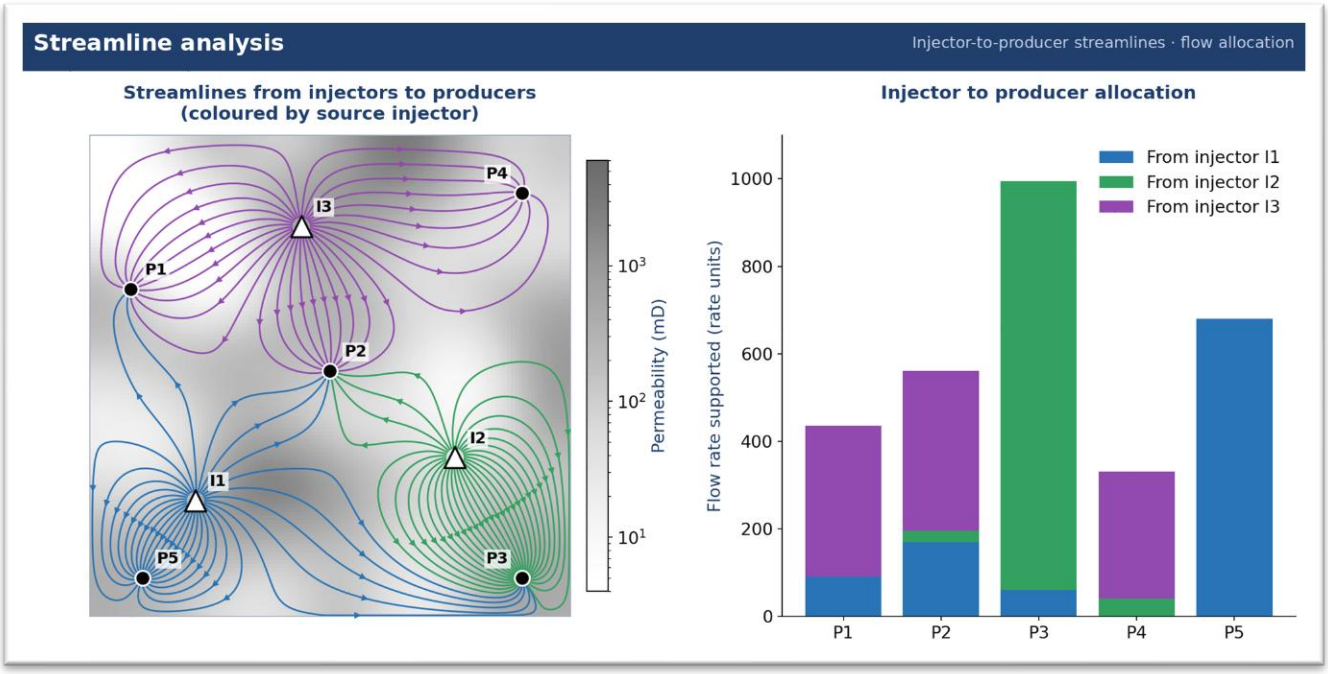
- Extract a selected area of the full-field model for detailed study
- Apply boundary conditions (flux or pressure) from the full-field model to honour flow across the sector edges
- Refine the grid within the sector to capture reservoir heterogeneity and fluid fronts in greater detail
- Reduce simulation run time compared with the full-field model, allowing more scenarios to be tested
- Evaluate infill drilling locations, well spacing and pattern performance
- Design and assess waterflood and EOR pilot projects
- Speed up history matching for a specific area of interest
- Study near-well effects such as coning and local sweep efficiency
- Results depend on accurate boundary conditions and may need checking against the full-field model



Streamline Simulation

- Trace fluid flow paths along the reservoir's velocity field
- Show how injected fluids, such as water, move through the rock toward producing wells
- Visualize injector–producer connections
- Identify fast-flow paths and poorly swept areas

- Assess waterflood performance
- Evaluate scenarios faster than conventional grid-based simulation by focusing computation along the main flow paths
- Requires a sound geological model and suitable reservoir assumptions
- Can be paired with conventional simulation for more detailed analysis
- Provide injector-to-producer allocation, quantifying the share of each producer's rate supported by each injector
- Identify well connectivity and inefficient injectors that cycle water without adding oil
- Guide rebalancing of injection rates to improve sweep and recovery.



Integrated Asset Modelling & Economics

SAJ engineers build a single model of the downhole and surface asset: reservoirs including sandstone and highly fractured limestone; wellbores with inflow and outflow curves and liquid-loading prediction; the surface gathering system with all pipelines and elevation changes displayed to scale; and facilities including compression, separation, dehydration and refrigeration. The model is tuned to existing conditions and then used to forecast production at any node in the system. **Questions the integrated model answers**

- How are bottlenecks in the gathering system affecting bottom-line production?
- Where is pipeline capacity available for new well production?
- What is the impact of additional compression at the sales point, and how much compression is needed?
- When will each well become subject to liquid loading?
- How much production can safely be hedged?
- Which area of the field has the greatest uplift potential from system optimization?

Economic analysis

- Economic evaluation of development cases
- Risk assessment and decision-tree analysis
- CAPEX and OPEX optimization and project ranking
- Fiscal modelling under Pakistani petroleum policy terms

Deliverables

- Reserves and resources report under PRMS
- Field development plan input and master development plan
- Editable static and dynamic models with full documentation
- Ranked opportunity register with expected value

Standard static and dynamic modelling workflow

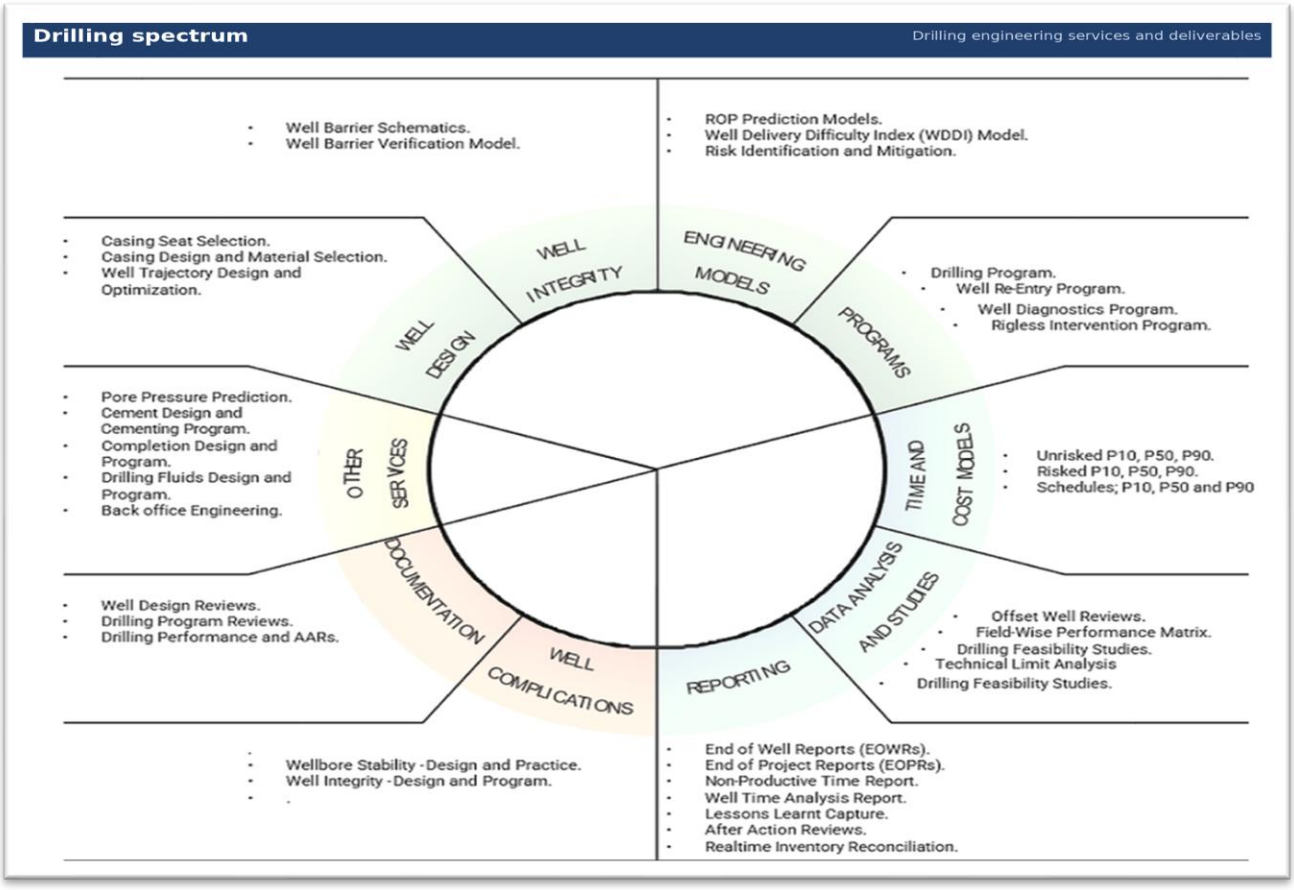
#	Stage	Activity and output
01	**Data audit and model objectives**	Agree what decision the model must support and at what resolution; inventory seismic, well, core, test and production data. Output: modelling basis of design.
02	**Structural framework**	Fault framework, horizon surfaces, zonation and grid design, with cell size justified against the flow question. Output: structural model and grid.
03	**Facies scheme and modelling**	Depositional concept, facies proportions, variography and stochastic facies simulation conditioned to wells. Output: facies realizations.
04	**Petrophysical property modelling**	Population of Vcl, PHIE and Sw from the petrophysical interpretation, honoring rock types and cut-offs. Develop porosity-permeability relationship for permeability population Output: property model.
05	**Saturation-height function**	Capillary-pressure-based saturation distribution calibrated to SCAL and log-derived saturation. Output: initialization function per rock type.
06	**Volumetrics and uncertainty**	Deterministic and stochastic in-place volumes with the contribution of each input to the range identified. Output: OOIP / OGIP with uncertainty tornado.
07	**Upscaling and grid coarsening**	Flow-based upscaling with fine versus coarse grid verification and layer-design testing. Output: simulation grid with upscaling record.
08	**Dynamic initialization**	PVT and SCAL regions, equilibration, contacts and aquifer definition; initial pressure and saturation checked against field data. Output: initialized model.
09	**History matching**	Staged matching of field then well performance within stated parameter uncertainty; changes documented and justified. Output: history-matched model and match quality report.
10	**VFP Tables**	Construct Vertical Flow performance curves to include in Prediction
10	**Prediction scenarios**	Development cases run against realistic well, facility and contractual constraints. Output: production forecasts by case. Devise the Field Development strategies with required no of wells, and water, gas and WAG injection and select the best strategy giving the maximum economic viable recovery.
11	**Uncertainty and ranking**	Experimental design and proxy modelling to generate low, mid and high outcomes and rank the development options. Output: P10 / P50 / P90 profiles.
12	**Economics, reporting and handover**	Case economics, reserves assignment under PRMS, and handover of the live model and documentation to the client team. Output: study report and editable models.

08 Drilling and Well Engineering

Project Management · Well Design · Completion Design

SAJ Energy Services (PVT) Ltd. is a leading oilfield-services provider. We deliver integrated services encompassing drilling design, well-completion design, and both rig and rigless workover solutions. Our commitment to excellence ensures that we meet the diverse needs of our clients while maintaining the highest industry standards.

The experts at SAJ Energy Services (PVT) Ltd. are well-versed in the entire Well Construction Spectrum, which encompasses the full lifecycle of well development—from initial planning and design through drilling, casing, cementing, and completion, to production and eventual abandonment. Each stage is meticulously engineered to ensure well integrity, safety, and regulatory compliance. This process includes critical activities such as directional drilling, cementing for zonal isolation, and well stimulation techniques like acidization & hydraulic fracturing to enhance production. The objective is to optimize reservoir performance while minimizing risks, ensuring efficient hydrocarbon recovery and long-term well productivity.



Drilling Project Management

Drilling an oil or gas well is a complex and high-stakes operation that requires meticulous planning and execution. Proper planning ensures the drilling process is efficient, safe, and cost-effective.

SAJ Energy Service utilizes state-of-the-art drilling design techniques to ensure oil and gas wells' safe and efficient production. At SAJ Energy Services, we are committed to excellence in drilling design, empowering our clients to achieve their production goals safely and efficiently.

SAJ offers a comprehensive range of services tailored for the exploration and production industry. Our portfolio includes a drilling plan and various support services essential for efficient drilling operations. Under a unified and reputable brand, we have assembled a team of highly qualified engineering and technical professionals with extensive expertise in specialized well services.

With our strong focus on quality and innovation, SAJ is committed to delivering reliable solutions that enhance operational efficiency and safety in the field.

- Well Planning
- Project Planning and Design
- Well design and optimization
- Risk assessment and mitigation planning
- Cost Estimation and Budgeting
- Technical Advisory
- Operational management and rig-site supervision
- Health, safety and environmental management
- Regulatory compliance and DGPC liaison
- Performance analysis and reporting
- Training and competence development

Well Design and Engineering

The well design must align with geological, operational and safety requirements. Each element below is engineered against the subsurface basis of design rather than carried forward from offset practice.

- **Casing design —** definition of the casing Program: sizes, grades, connections and setting depths selected for burst, collapse, axial and triaxial loads with documented design factors, to ensure wellbore stability and well integrity through life.
- **Pressure and mud-weight calculations —** formation pore pressure, fracture gradient and mud weight calculated to maintain well control, keep the mud window open and prevent losses, kicks and blowouts.
- **Hole size and trajectory —** well path planned as vertical, directional or horizontal according to reservoir characteristics and drilling objectives, with hole size determined by depth, expected pressure and the casing Program; torque and drag, BHA and anti-collision analysis included.
- **Mud Program —** mud weight is among the most important parameters in casing design. Our engineers calculate mud weights with precision, as the primary safeguard of wellbore integrity and casing safety through the drilling operation.

Hydraulics and fluid design

- Drilling fluid design: selection of mud system (OBM, WBM, SBM) based on formation properties, expected pressure, temperature and the need to maintain wellbore stability and transport cuttings
- Hydraulic calculations: optimization of the circulating system for cuttings transport, hole cleaning, equivalent circulating density, surge and swab, and well control

Bit selection

- Bit type selection (PDC, roller cone, hybrid) based on formation hardness, expected depth and drilling objectives to optimize rate of penetration
- Bit longevity: planning of bit trips and replacements against dull-grading history to minimize downtime

Wellbore stability and geomechanics

- Pore pressure and fracture gradient prediction from offset logs, seismic velocities and drilling events
- Definition of the safe mud-weight window and identification of unstable intervals, depleted sands and differential-sticking risk
- Recommendations on mud type, inhibition, wellbore strengthening and trajectory orientation relative to the in-situ stress field

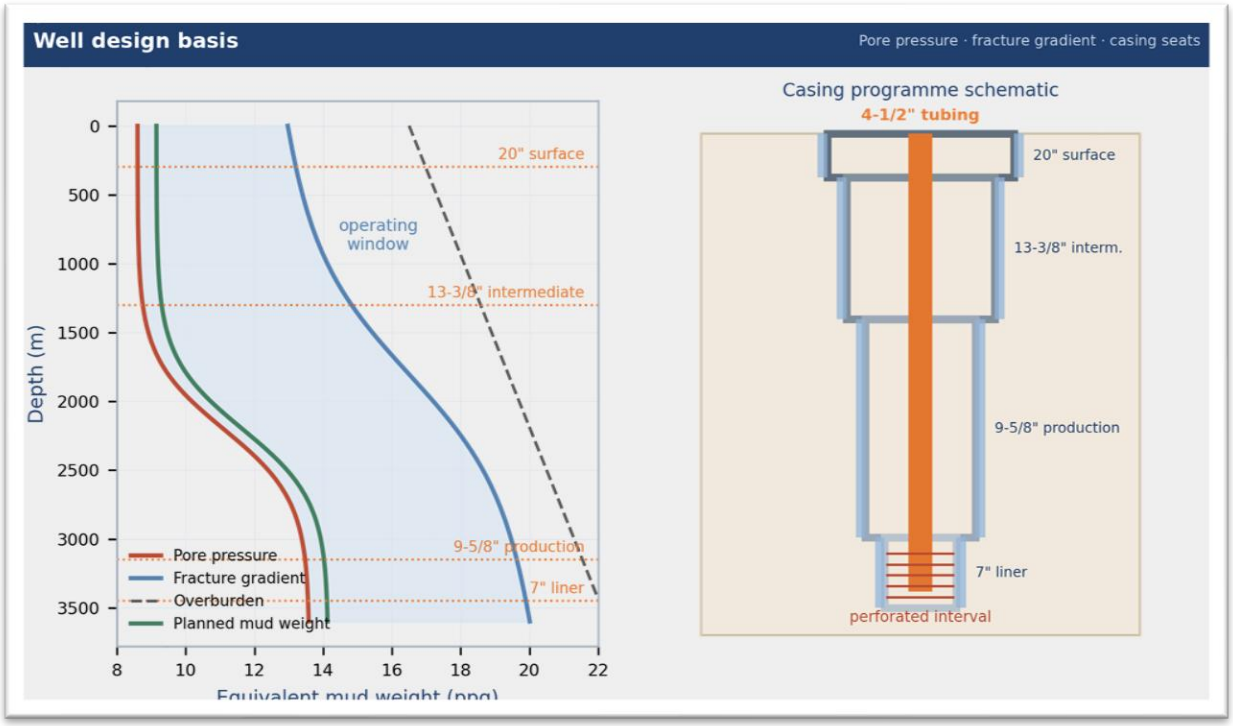


Figure · The mud window sets the casing seats; the casing Program follows from it

Torque, Drag and Hydraulics Modelling

Every well design is checked against the mechanical and hydraulic limits of the rig and drill string before it is approved. SAJ engineers model torque, drag and hydraulics for each hole section so that the planned trajectory can be drilled, cased and completed with the selected rig.

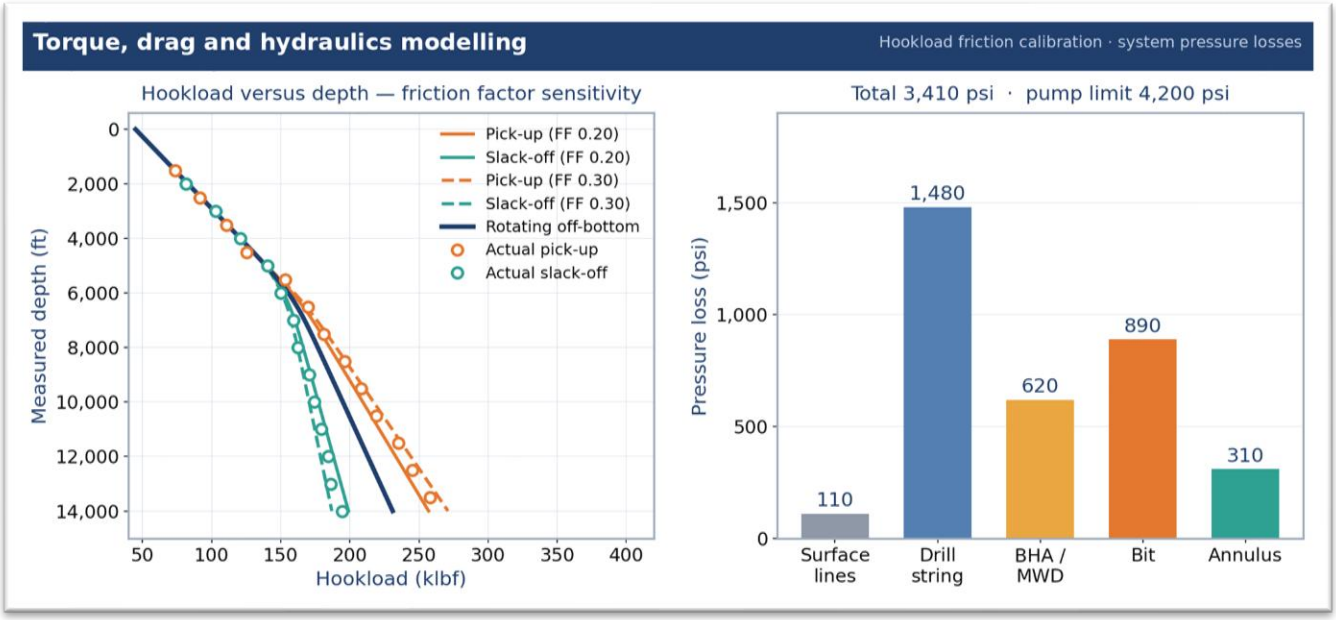


Figure · Hook load prediction calibrated to field measurements, and system pressure-loss breakdown (illustrative)

- **Torque and drag —** soft-string and stiff-string modelling of pick-up, slack-off and rotating loads; friction factors calibrated against offset wells; sinusoidal and helical buckling checks for drill pipe, casing and completion strings.

- **Hydraulics and ECD —** pressure losses calculated through surface lines, drill string, BHA, bit and annulus; equivalent circulating density kept inside the pore-pressure and fracture-gradient window; bit nozzle area (TFA) optimized for hydraulic horsepower or jet impact force.
- **Hole cleaning —** minimum flow rate and cuttings-transport checks by hole angle, with particular attention to the 30°–60° inclination range where cuttings beds are least stable.
- **Surge and swab —** tripping-speed limits for drill pipe and casing so that transient pressures stay inside the mud window.
- **Casing load verification —** burst, collapse, axial and triaxial (von Mises) load cases checked against design factors, with allowance for casing wear and temperature de-rating where relevant.

Drilling Performance and Time–Depth Planning

Well time and cost are built up from offset-well performance, phase by phase, and are tracked against the plan while the well is drilled.

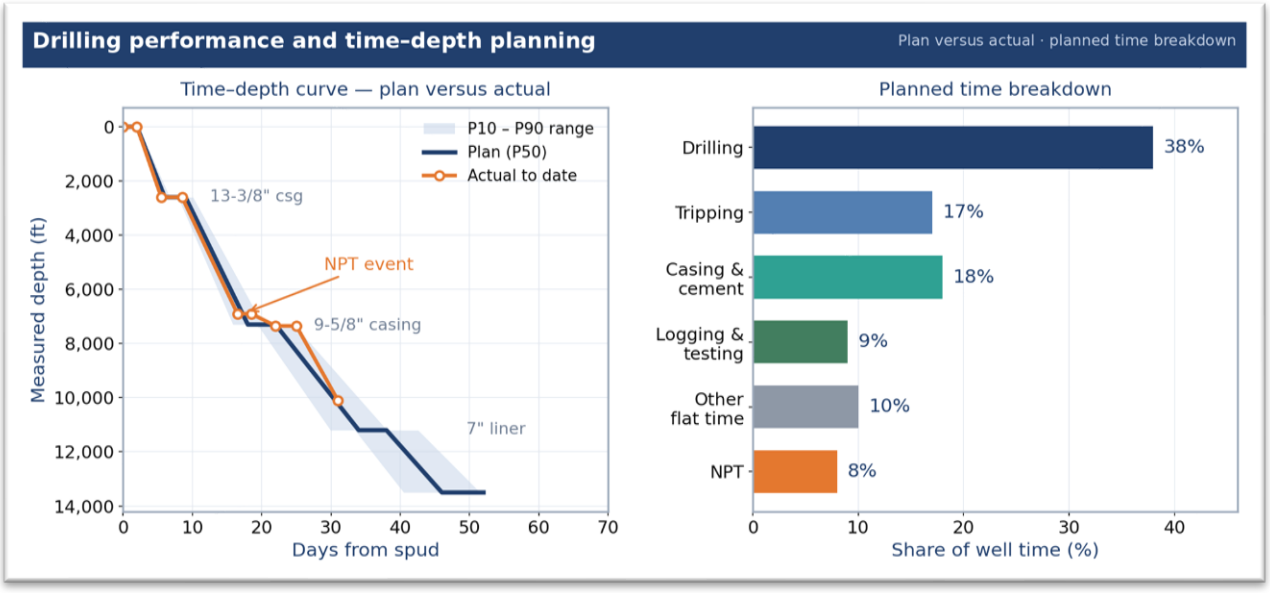


Figure · Time–depth plan with probabilistic range against actual progress, and planned time breakdown (illustrative)

- **Time–depth curve —** drilling, tripping, casing, cementing and logging times built up by hole section, with flat time and non-productive time (NPT) identified separately.
- **Probabilistic time and cost —** P10 / P50 / P90 well duration and AFE cost from Monte Carlo simulation of activity durations and risk events.
- **ROP and bit performance —** offset bit-record benchmarking; mechanical specific energy (MSE) monitoring to detect bit balling, vibration and inefficient drilling; drill-off tests to locate the founder point.
- **Technical limit —** best-composite-time analysis and drill-the-well-on-paper sessions to identify and remove invisible lost time.
- **Follow-up during operations —** daily comparison of actual progress against plan, look-ahead updates and a post-well close-out review that feeds the next well design.

Risk Assessment and Mitigation

A detailed risk assessment is central to the success and safety of the drilling operation.

- **Hazard identification —** blowouts, stuck pipe, wellbore instability, lost circulation, shallow hazards and equipment failure.
- **Contingency planning —** emergency response and blowout prevention procedures; prepared responses for loss of circulation, well kicks and contingency string requirements.

- **Environmental protection —** measures to mitigate environmental risk including spill prevention, cuttings and waste management, and emissions control.

Well Completion Design

Well completion is a critical phase in the life of a well, and the point at which drilling decisions either enable or constrain production for the rest of field life. Our completion design services entail:

Assessment and planning

Detailed plans tailored to the characteristics of each well, defining the completion architecture required for efficient production, including tubing sizing against the inflow performance and artificial-lift readiness.

Procedures and performance targets.

Coordination

Close collaboration with drilling, production and service teams so that all necessary resources are available and operations run without interruption.

Execution oversight

Supervision of completion operations in the field, with experienced personnel enforcing safety procedures and performance targets.

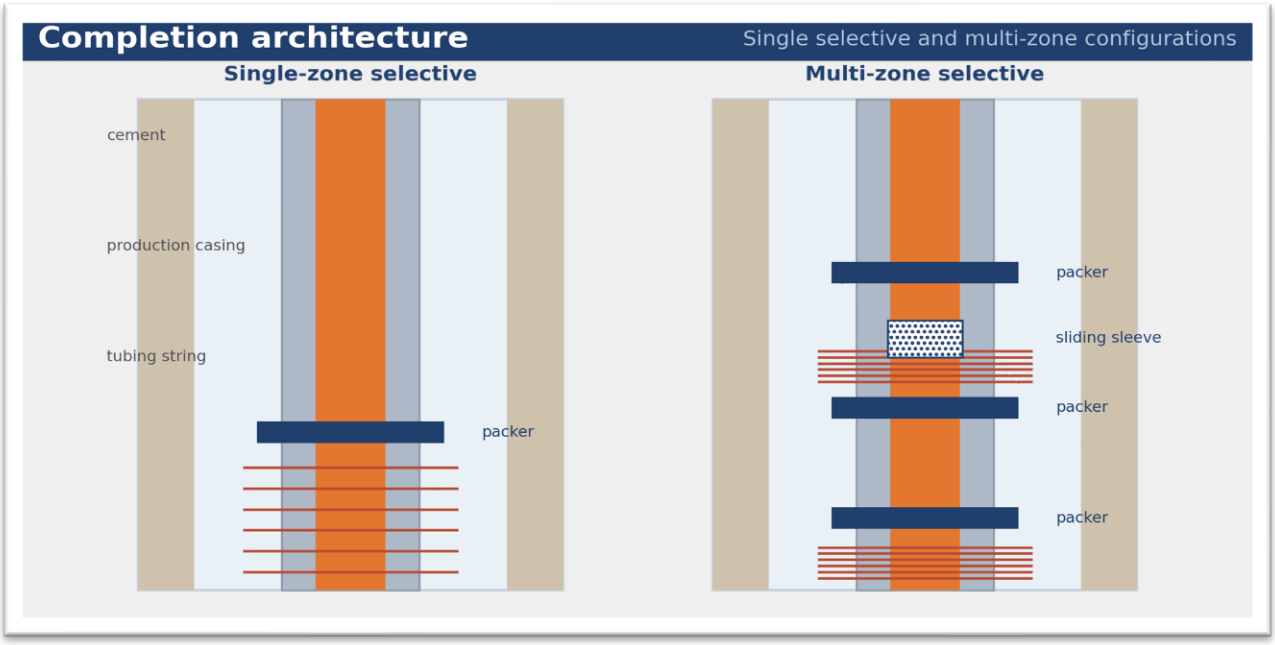


Figure · Single-zone and multi-zone selective completion architectures

Completion scope covered

Architecture

- Single, multilayer and selective completions
- Cased and perforated, open hole and liner completions
- Packers, sliding sleeves and flow control devices
- Sand control screening and design
- Wellhead and X-mas tree specification

Integrity and materials

- Tubular and elastomer material selection for sour service
- Annulus pressure management and barrier philosophy
- Corrosion and scale mitigation strategy
- Downhole gauges and surveillance provision
- Abandonment considerations designed in from the start

Program Development

A drilling, completion, and well-intervention program outlines:

- **Drilling Schedule —** a timeline for each phase: rig mobilization, spud-in, drilling to target depth, casing runs, and well completion.
- **Detailed Procedures —** operational procedures including drilling techniques, mud programs, casing running, cementing, and well-control procedures.
- **Completion and Well Intervention —** a timeline and procedures for each phase of completion and well-intervention operations.

Standard Well Engineering Workflow

#	Stage	Activity and output
01	**Well objectives and basis of design**	Agree targets, geological prognosis, required data acquisition, test and completion objectives, and well life expectancy. Output: subsurface and well basis of design.
02	**Offset well review**	Systematic review of offset wells for drilling events, NPT, losses, kicks, stuck pipe, cement quality and completion performance. Output: offset lessons register feeding Section 08.
03	**Geomechanical analysis**	Pore pressure, fracture gradient and wellbore stability model; definition of the safe mud-weight window by section. Output: geomechanical profile and mud-weight schedule.
04	**Casing seat selection and casing design**	Seat selection against the mud window; burst, collapse, axial and triaxial design with stated design factors and load cases. Output: casing schematic and design report.
05	**Trajectory, BHA and anti-collision**	Well path design, torque and drag, BHA modelling, survey Program and separation-factor analysis. Output: directional plan and BHA proposals.
06	**Drilling fluid and hydraulics design**	Mud system selection by section, rheology and hydraulics, ECD, surge and swab, hole cleaning strategy. Output: mud Program and hydraulics report.
07	**Cement and zonal isolation design**	Slurry design, volumes, centralization, displacement and contingency for losses; isolation objectives per API STD 65-2. Output: cementing Program.
08	**Bit and ROP optimization**	Bit selection by formation, ROP and MSE targets, trip planning. Output: bit Program and drilling parameter roadmap.
09	**Completion design**	Completion architecture, tubing sizing against IPR/VLP, materials, sand control, flow control and artificial-lift provision. Output: completion schematic and equipment specification.
10	**Risk assessment and contingency**	HAZID and drilling risk register; well control, lost circulation and stuck-pipe contingencies; contingency string decision. Output: risk register and mitigation plan.
11	**Time, cost and schedule modelling**	Unrisked and risked P10 / P50 / P90 time and cost, as described in Section 08. Output: AFE-quality estimate.
12	**Design review and approval**	Peer review, drill-the-well-on-paper workshop with the operating team and service providers, regulatory submission. Output: approved well design ready for Program development.

09 Production Engineering

Integrated Production Modelling (IPM)

SAJ's production engineering team combines engineering analysis with extensive hands-on field and operational experience. Our engineers have not only designed production optimization and well intervention programs but have also supervised and managed the field operations associated with their implementation.

This field exposure provides SAJ with a practical understanding of well behavior, operating constraints, intervention risks, equipment limitations, HSE requirements, and the realities of executing complex operations in both mature and challenging field. Our Production Engineering consulting services can be done independently or as a complement of geological and reservoir engineering studies by incorporating the practical aspects of field operations.

Our Services Include

Wellbore Nodal Analysis

- Natural flowing oil & gas & Artificial Lift wells
- Artificial List Design, Selection and Trouble Shooting
- Liquid Loading diagnostic and remediation
- Reservoir Inflow potential relationship (IPR) for conventional and unconventional reservoirs
- Vertical lift performance curves for vertical, slanted and horizontal wells
- Horizontal multi-frac well bore modelling
- Bottom hole choke sizing
- By-passed pay evaluation
- Workover candidate selection and program development
- Perforation design
- Acid stimulation design
- Pipe sizing & compression
- Artificial-lift uplift
- Multilayer completions

Wellbore injection modeling

- Gas storage schemes Water injection/disposal
- Acid/sour gas injection/disposal
- CO2 injection/ disposal/ storage/ sequestration
- Waterflood surveillance

Integrated Production Modelling

- Well & Network Performance Modelling
- Nodal Analysis & Integrated Production System Optimization
- Reservoir-to-Surface Production Modelling
- Dynamic Production Network Simulation & Optimization

Integrated Reservoir, Well & Facility Performance Modelling

Compositional wellbore modeling

- Phase envelope and fluids along the wellbore Compositional injection/production tubing
- Performance curves (TPCs also known as VFP or VLP curves) and nodal analysis VFP (VLP) tables
- Well-blowout and acid-gas release-rate estimates

Artificial lift systems

- Plunger lift, Gas lift, SRP/ESP/PCP, Jet Pump Custom Systems Design, Selection, Optimization and Troubleshooting

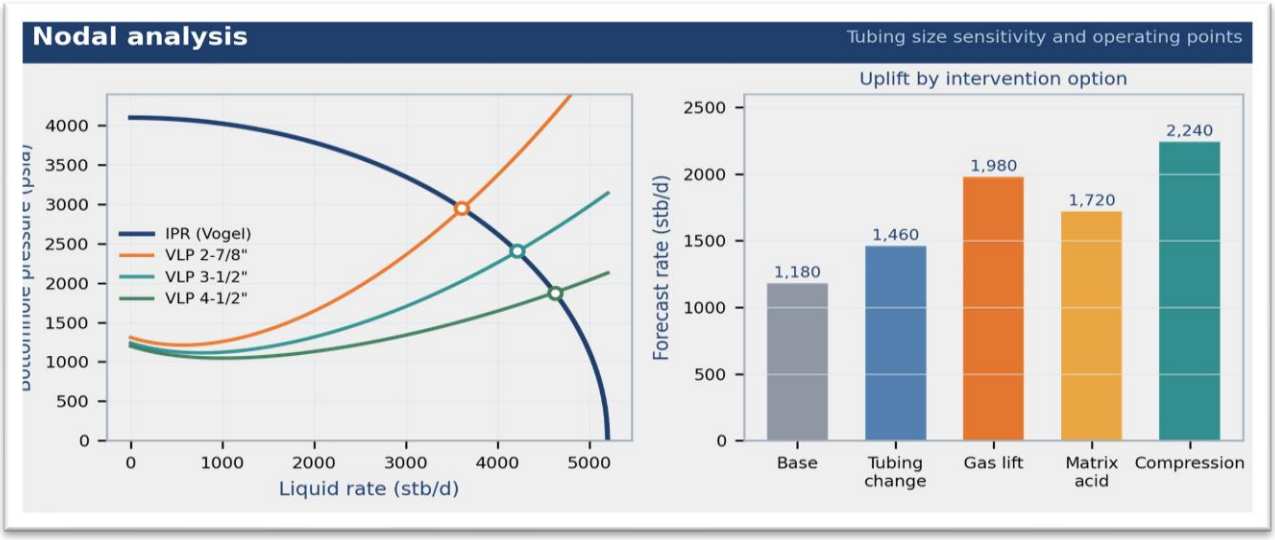
- Lift selection screening and life-cycle cost comparison

Acid Stimulation & Hydraulic Fracturing

- Screening of Oil and Well candidates for acid stimulation and hydraulic fractures
- Review of reservoir quality, geology, engineering data, production potential of perspective well
- Acid/Fracture stimulation optimization

Well intervention design and program development

- Rigless & Rig-Based Well Intervention Engineering
- Well Intervention Planning for Production Restoration
- Targeted Interventions. Optimized Well Performance.
- Engineering Interventions That Restore Well Potential



Gas Well Deliverability and Liquid Loading

As reservoir pressure declines, gas velocity in the tubing falls below the level needed to carry condensate and water to surface. Liquid accumulates, back-pressure on the formation rises, and the well produces erratically before it dies. SAJ diagnoses loading early and ranks the remedies.

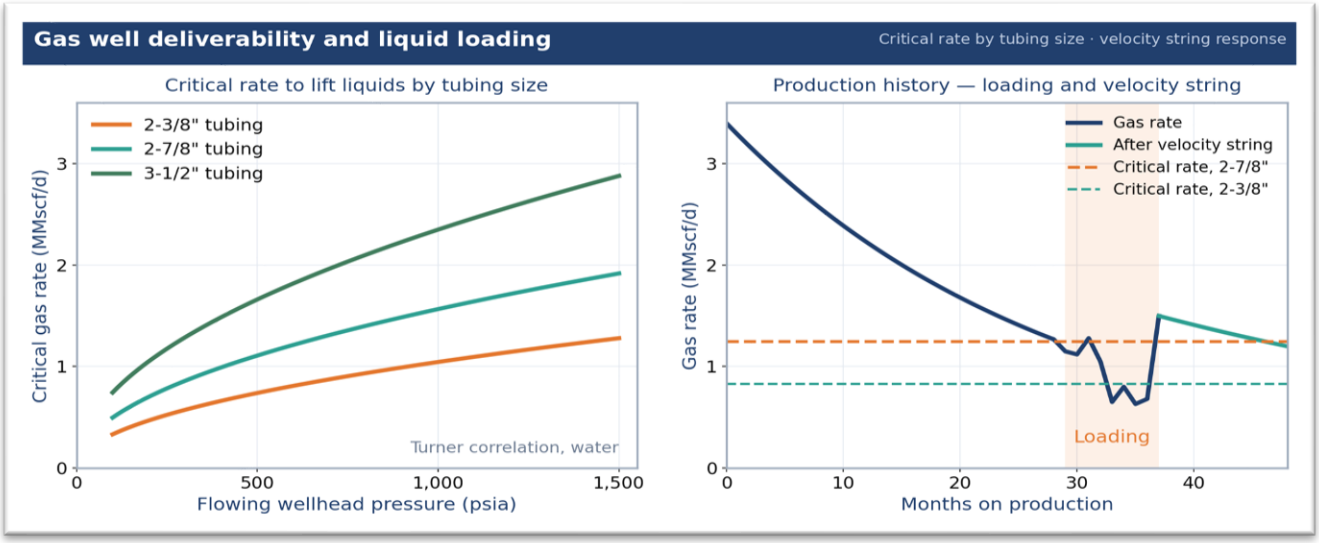


Figure · Critical unloading rate by tubing size, and a loaded well restored with a velocity string (illustrative)

- **Diagnosis —** critical (minimum unloading) rate from the Turner and Coleman correlations compared with the actual rate; supporting evidence from erratic rates, rising casing–tubing differential pressure and flowing gradient surveys.
- **Deliverability —** back-pressure (C and n) and laminar–inertial–turbulent (LIT) analysis of multi-rate tests to define absolute open flow (AOF) and inflow performance.
- **Remediation options —** velocity string or smaller tubing, wellhead compression, plunger lift, foamer (surfactant) injection, gas lift and intermittent production.
- **Selection —** each option modelled in the calibrated well model and ranked by incremental rate, reserves, cost and operability.

Artificial Lift Selection and Design

No single lift method suits every well. SAJ screens the candidates against reservoir, fluid, well and surface conditions, and then designs the selected system in detail.

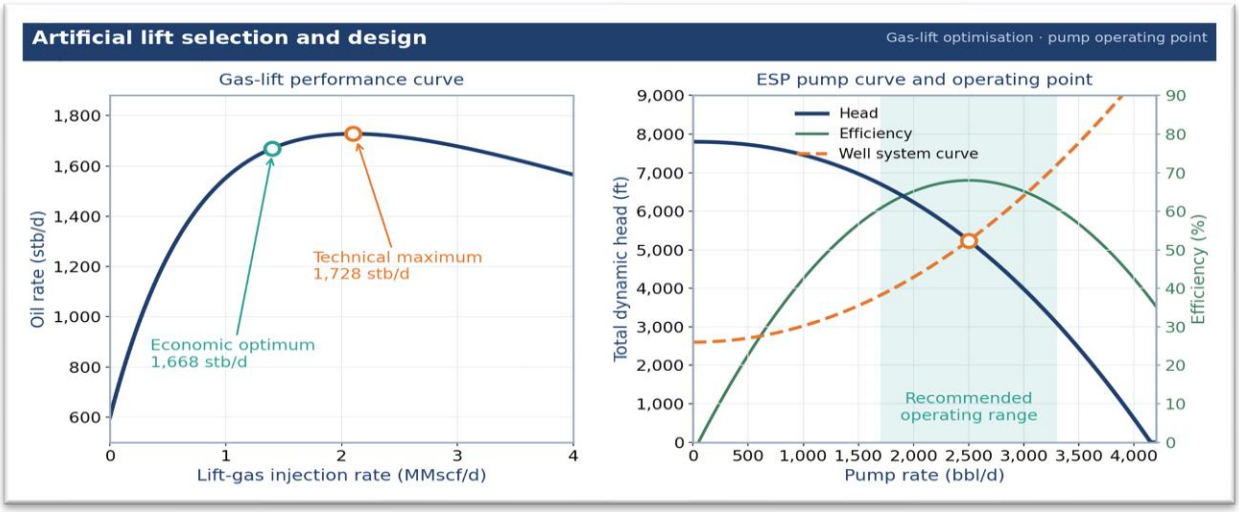


Figure · Gas-lift performance curve with economic optimum, and ESP pump curve with operating point (illustrative)

- **Screening —** rate, depth, gas–liquid ratio, water cut, solids, deviation, temperature, and power and gas availability; life-cycle cost comparison including expected workover frequency.
- **Gas lift —** valve spacing and unloading design, injection depth and rate; gas-lift performance curves and field-wide allocation of limited lift gas to the wells with the best incremental response.
- **ESP —** pump, motor, seal and cable sizing; stage selection to keep the pump inside its recommended operating range over the life of the well; gas handling and variable-speed-drive strategy.
- **Rod pump and PCP —** rod-string and pumping-unit design, dynamometer-card diagnostics and pump-off control.
- **Surveillance and troubleshooting —** review of operating data against design to find under-performing lift systems, with redesign or operating-point changes where justified.

Integrated Production Modelling (IPM)

We SAJ Energy Services (Pvt) Ltd provide end-to-end Integrated Production Modeling (IPM) solutions that connect reservoir, wellbore, surface network, and processing facilities into a single dynamic model to optimize hydrocarbon production and field performance. SAJ Energy Services engineers build an integrated model of downhole and surface assets including sandstones and highly fractured limestone reservoirs.

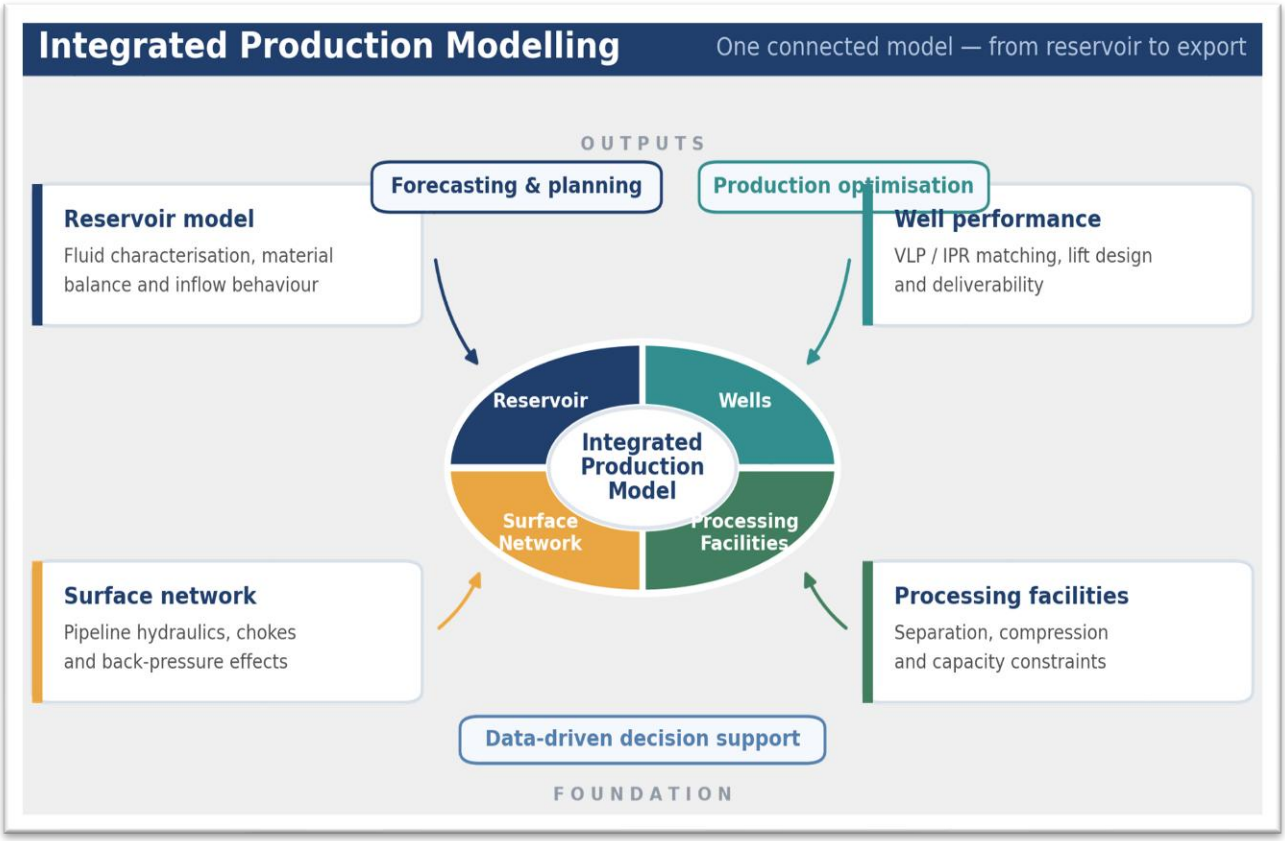
The model is tuned to existing conditions and then used to forecast production from individual wells or at any node in the system. Multiple production scenarios are evaluated to answer such questions as:

Key Capabilities

- **Reservoir–to–Facility Integration —** Seamless linkage of reservoir models with wells, flowlines, gathering systems, and surface processing facilities.
- **Production Optimization —** Identification of bottlenecks, pressure losses, and flow constraints to maximize oil & gas recovery.
- **Well Performance Analysis —** Accurate modelling of inflow performance (IPR), tubing performance (TPR), artificial lift impact, and well deliverability.
- **Surface Network & Facility Modelling —** Simulation of pipelines, manifolds, separators, compressors, pumps, and export systems under real operating conditions.
- **Scenario & Sensitivity Analysis —** Evaluation of different operating strategies such as choke optimization, compressor sizing, facility debottlenecking, and field expansion plans.
- **Forecasting & Development Planning —** Reliable production forecasting for short-term operations and long-term field development decisions.
- **Integrated Decision Support —** Data-driven insights for production engineers, reservoir engineers, and operations teams to improve asset value.

Business Value

Increased production efficiency and asset recovery	**Reduced operational risk and unplanned downtime**
Optimized CAPEX & OPEX decisions	**Improved coordination between subsurface and surface teams**



Standard Production Optimization Workflow

#	Stage	Activity and output
01	**Well and field data review**	Compile well tests, wellhead and bottomhole pressures, GOR and water cut trends, PLT and PSP surveys, completion and intervention history. Output: well data register and performance baseline.
02	**Fluid model**	PVT match and selection of black-oil or compositional description consistent with Section 04. Output: validated fluid model for well modelling.
03	**Well model build and match**	IPR and VLP construction; correlation selection and matching to measured gradient and test data. Output: calibrated well models.
04	**Diagnosis**	Separate reservoir, near-wellbore, completion and surface causes of underperformance: skin, liquid loading, scale, wax, corrosion, backpressure, lift failure. Output: diagnosis per well.
05	**Sensitivity analysis**	Tubing size, choke setting, wellhead pressure, lift gas rate, pump setting depth and separator pressure. Output: uplift potential per intervention type.
06	**Artificial-lift screening and design**	Technical and life-cycle-cost screening of lift methods; detailed design of the selected system. Output: lift selection report and design.
07	**Stimulation and frac candidate screening**	Ranking of stimulation candidates using skin, reservoir quality and mechanical property data. Output: candidate list with expected uplift.
08	**Surface network model**	Flowlines, manifolds, gathering system, compression and processing constraints built and matched to field data. Output: calibrated network model.
09	**Integrated model coupling**	Reservoir, wells, network and facility models coupled into a single IPM system. Output: integrated asset model.
10	**Optimization and scenario development**	Debottlenecking, compression timing, infill tie-in, allocation and hedging scenarios. Output: optimized operating strategy and production forecast.
11	**Economics and ranking**	Incremental economics for each opportunity, ranked by value, cost and risk. Output: prioritized opportunity register.
12	**Implementation and surveillance**	Field support for execution, definition of surveillance KPIs, and periodic model update as new data arrives. Output: living model and performance tracking.

10 Well Intervention

Coiled Tubing · Wireline · Slickline · Stimulation

Well intervention is essential to maintaining and enhancing well performance without the cost and schedule impact of a drilling rig. It is also where SAJ's operating background is most directly felt: our intervention engineering is led by people who have designed, supervised and troubleshot these operations at the wellsite. We specialize in the diagnosis and revival of inactive, shut-in and under-performing wells — a category that represents some of the cheapest barrels available to most operators in Pakistan.

Coiled tubing operations

- Wellbore clean-out and debris removal
- Nitrogen kick-off and unloading
- Perforation wash treatment
- Acid stimulation design and execution
- Fishing and milling operations
- Velcity string design and installation
- Through-tubing perforating and logging

Well cleanouts

- Diagnosis of debris accumulated during drilling, completion, workover or intervention
- Mitigation of reduced flow, blockage, corrosion, formation damage and equipment failure
- Fluid system and circulation design for effective solids transport
- Post-clean-out verification and production comparison

Swabbing operation

- Revival of gas wells due to liquid up
- Underbalance operations

Specialist Intervention Capability

- **Inactive and shut-in well revival —** systematic review of the inactive well stock, root-cause classification, and ranked revival Programs with expected uplift and cost.
- **Water shut-off and conformance —** diagnosis of water entry mechanism and design of mechanical or chemical shut-off, with post-job evaluation.
- **DE liquification of depleted gas wells —** velocity strings, foamers and capillary string soap injection, including field-trialled applications in Pakistani depleted gas wells.

Well integrity remediation

- Annulus pressure diagnosis.
- barrier verification and restoration of the two-barrier envelope.

Wireline services

- Perforating and re-perforating
- PLT and PSP surveys
- Completion services
- Well integrity evaluation (CBL / VDL, casing inspection)
- Tubing cutting
- Pressure and temperature logging
- Downhole fluid sampling

Slickline services

- Completion services and routine well work
- CIV and GLV installation and retrieval
- Tubing clearance and drift runs
- Plugs and flow-control device installation and retrieval
- Mechanical tubing cutting
- Fishing operations
- Artificial-lift pump retrieval and installation

Stimulation

- Acid stimulation design for carbonate reservoirs, including diversion strategy and acid system selection
- Acid stimulation design for sandstone reservoirs, including mud-acid formulation and precipitation control
- Nitrogen spiking and energized treatments for low-pressure and depleted reservoirs
- Matrix versus fracture treatment selection based on formation parting pressure
- Post-treatment evaluation against the pre-treatment skin and productivity index

Standard Well Intervention Workflow

#	Stage	Activity and output
01	**Candidate screening**	Review production history, well tests, completion and workover records, integrity status and inactive-well stock. Output: ranked candidate list.
02	**Diagnosis**	Nodal and transient analysis, production logging, integrity and corrosion logs, water-oil ratio diagnostics. Output: performance diagnosis per well.
03	**Root-cause definition**	Separate mechanical, formation-damage, water-influx, deposition and lift causes; confirm with independent evidence. Output: root-cause statement and confidence level.
04	**Option screening and value estimate**	Rigless versus rig options compared on expected uplift, cost, risk and duration; economic threshold applied. Output: selected intervention option with justification.
05	**Detailed intervention design**	Tool string, fluid systems, pumping schedule, force, depth and pressure calculations, tubing forces and fatigue for coiled tubing. Output: intervention design package.
06	**Well control and barrier design**	Two-barrier envelope defined per NORSOK D-010; pressure-control equipment specification and test criteria. Output: barrier schematic and well control plan.
07	**Risk assessment and contingency**	HAZID and job-specific risk assessment; contingencies for stuck tools, fish, losses and unexpected pressure. Output: risk register and contingency procedures.
08	**Program approval and mobilization**	Program issue, client and regulatory approval, service company selection and pre-job meeting. Output: approved Program and mobilized spread.
09	**Field execution and supervision**	Real-time supervision, adherence to pressure-control procedures, on-site decision support and management of change. Output: executed job and daily reports.
10	**Post-job evaluation**	Before-and-after rate and pressure comparison, skin improvement, cost per incremental barrel or mscf. Output: post-job evaluation report.
11	**Lessons learnt**	Capture of what worked and what did not, fed back into candidate screening and design standards. Output: lessons register entry.
12	**Surveillance plan**	Definition of monitoring frequency and trigger points for the next intervention. Output: well surveillance plan.

11 Integrated Oil, Gas & Energy Infrastructure Services

SAJ – Zishan Engineers Joint Venture

(Delivered Through SAJ Energy Services (Pvt.) Ltd & Zishan Engineers (Pvt.) Ltd Joint Venture (JV) Expertise)

SAJ Energy Services (Pvt.) Ltd, in JV partnership with Zishan Engineers (Pvt.) Ltd, deliver end-to-end engineering and project execution solutions across the Oil, Gas, and Energy sectors. Our combined strengths enable us to provide comprehensive capabilities in surface facilities and gas processing, pipeline and related infrastructure for oil, gas, and water systems, refinery support projects, and power plant engineering. Together, we offer complete lifecycle services—from conceptual studies, process engineering, and detailed design to procurement assistance, installation supervision, commissioning, and operational support. With strong technical expertise, field experience, and a commitment to quality and safety, the SAJ–ZEL JV ensures reliable, cost-effective, and high-performance infrastructure solutions tailored to the evolving needs of the energy industry

Surface Facilities & Gas Processing

- Process selection
- Optimization of process and utilities schemes
- Plant & equipment layout
- Development of process control & shutdown logic
- Development of operations and maintenance philosophy
- Produced water treatment & disposal study
- Design of relief, blowdown and venting/flaring/incineration systems
- Detailed engineering (piping, civil & structural, E&I)
- Flowlines and gathering systems.
- Facility upgrades and debottlenecking.
- Supervision and project management for installation works.
- HAZOP and SIL Studies.

Pipelines & Related Facilities (Oil, Gas, Water)

- System optimization and conceptual design for oil/gas/water pipelines and distribution networks
- Route reconnaissance
- Pipeline alignment drawings.
- Stress/surge analysis.
- Pipeline crossings design.
- Storage tanks and terminal design.
- Pumping stations design.
- Gas metering and pressure regulation stations.
- Supervision and project management for installation works.
- HAZOP and SIL Studies.



Power Plant

- Specification / data sheets, sizing & selection of gas turbines, generators, transformers, switchgears, heat recovery systems, compressors & other equipment.
- Development of system P&IDs.
- Design of power distribution network.
- Basic & detailed engineering for mechanical / piping, instrumentation & control & civil / structural works.
- Procurement assistance including formulation of procurement packages, bid evaluation, vendor list etc.
- Project Management.
- Construction Supervision.

Refineries

- Process studies
- Offsites and utility systems design.
- Equipment design (vessels, columns, exchangers, fixed and floating roof storage tanks).
- Detailed engineering design (piping, civil & structural, E&I)
- Piping stress analysis
- Inspection and refurbishment of equipment
- Supervision and project management for installation works.
- HAZOP and SIL Studies.



Procurement Assistance

- Procurement specifications and material requisitions.
- Bid evaluations
- Vendor documentation review
- Expediting
- Factory acceptance testing & inspections



12 Environmental Health & Safety

Environmental Protection & HSE Policy

Environmental Protection

SAJ Energy's operations are subject to various environmental, health, and safety regulations. These regulations govern the handling, generation, storage, and management of hazardous substances, including how these substances are released or discharged into the air, water, surface, and subsurface. These laws and regulations often require permits and approvals from management before our workforce can commence or modify its operations or facilities.

HSE Policy

The HSE Policy outlines SAJ Energy Services Pvt Ltd principles of environmental stewardship, maintaining safe and healthy workplaces for its employees, contractors/Stakeholders, and the Host.



13 Our Team

A Brief Introduction to our SAJ Team

SAJ Energy Services brings together an experienced, multidisciplinary team of petroleum, reservoir, geoscience, drilling, and finance professionals — combining decades of national and international expertise across the upstream value chain.



Abdul Sattar

CEO | Director Technical Services

Mr. Abdul Sattar holds the bachelor's degree in Petroleum Engineering with 25 years of diverse experience in oil and gas industry. Petroleum Engineering Executive and Technical Consultant with hands-on and leadership experience across Pakistan's upstream oil & gas sector. Currently serving as CEO / Director Technical Services at SAJ Energy Services (Pvt.) Ltd., providing strategic and technical consultancy to E&P companies, joint ventures, and service providers on reservoir management, production optimization, well interventions, and field development. Recognized for aligning engineering excellence with business objectives, delivering efficient, practical, and value driven solutions that enhance production performance and asset reliability.

Extensive experience of well planning and completion design, Artificial lift selection (Gas lift, Jet pump, PCP, ESP, Rod Pump), Rig/Rigless intervention design and production optimization. He worked with multidisciplinary team consisting of Reservoir engineers, Petro- physicists, Geologists, Drilling engineers, Operation engineers and Procurement officers for field development. Proven track record in revitalizing mature fields and improving asset performance through practical, results-oriented engineering solutions.

Extensive experience in delivering Integrated Asset Modelling (IAM) and Integrated Production Modelling (IPM) studies including reservoir performance analysis, surface network modelling and full-system integration, identifying production constraints and bottlenecks, optimizing operating envelopes, and evaluating production enhancement opportunities. Responsibilities have included identification and ranking of workover candidates, completion optimization, recompletion and stimulation opportunities, as well as review of stimulation designs and post-job performance assessment. Conducted surface-facility debottlenecking and capacity assessments to maximize throughput, improve production efficiency, and optimize field operating strategies.

Developed maximum and optimum production scenarios for the Qadirpur, Togh, Lashari, Zin Block and Rajian fields, supporting both short- and long-term field development and production planning. Developed integrated production forecasts and evaluated alternative operating and development scenarios to assess production potential, facility constraints, and optimization opportunities. Conducted technical and economic evaluations of development and production strategies to support JV budget planning, investment decisions, and budget approvals. Proficient in industry-standard software such as PROSPER, MBAL, GAP, PIPESIM, and SNAP, enabling data-driven decision-making and robust production system analysis.

He is author of three papers. These were presented in Annual Technical Conferences (ATCs) of PAPG/SPE Pakistan and published in respective proceedings.



Muhammad Jawad Ahmad

Director Business Development

Mr. Muhammad Jawad Ahmad holds a distinguished Master's degree in Petroleum Systems Engineering and boasts an accomplished career spanning 22 years in the oil and gas sector. His expertise extends across diverse roles, including Field Manager, Rigless Operations Manager, and Senior Petroleum Engineer, at renowned organizations like BP Pakistan and United Energy Pakistan Ltd.

His skill set covers rig and rigless intervention design, production optimization, shut-in well studies, completion design oversight, and strategic implementation of artificial lift systems including Gas lift, Jet pump, and Capillary string soap injection. With a solid academic foundation from the University of Engineering and Technology Lahore, Pakistan, and a Master's from the University of Regina, SK Canada, Mr. Ahmad combines theoretical knowledge with hands-on experience which spans spans the efficient delivery of proven reserves, handling shut-in well studies, designing and operating gas lift and jet pump systems, and overseeing rig and rigless operations, encompassing slickline, wireline, coiled tubing, swabbing, and surface well testing.

His competence extends to surface operations management as well. He led pioneering initiatives, successfully trialing Capillary String Soap injection for depleted gas wells in Pakistan. As a technical advisor for gas lift design and troubleshooting, he demonstrated global influence within Pakistan's Petroleum Engineering team. Mr. Ahmad's international impact is underscored by his presentations on water shut-off and cost-efficient well intervention strategies at esteemed international forums. His wealth of experience spans Petroleum Engineering, Well Interventions, innovative technology assessment, and the practical implementation of Artificial Lift systems.



Azfar Mahmood

Director Operations

M. Azfar Mahmood is a Graduate Petroleum Engineer from UET Lahore with a proven track record of 34 years of experience in Oil & Gas Upstream Operating (local, Multi-national and International) Companies. He is an expert in team building & managing for E&P upstream sector for drilling, workover, completion/intervention and production operations. During his 34 years of experience, he started as a petroleum engineer trainee and acquired a general manager level in an E&P operating company. He has extensive experience in oil & gas sub-surface operations in fractured limestone and sandstones from Northern Pakistan to upper & lower Indus basins as well as Middle East.

He worked with renowned multi-national companies like BP, Eni, COGAS etc. He is a versatile & highly accomplished professional in managing, planning & execution of oil & gas wells drilling, workover, completion, testing and interventions for onshore fields. He is an accomplished leader & expert in organizing, coordinating and managing well operations with the skills to improve the operations efficiency through innovatively using new technologies by implementing HSE policies. He is skilled to control the budget using effective economic techniques and better coordination among various teams. He is an excellent team player & leader as well as a good mentor for young engineers.



Sharven Kumar

Director Reservoir & Simulation

He holds a bachelor's degree in Petroleum Engineering from Middle East Technical University (METU), Türkiye, and has more than 35 years of experience in the oil and gas industry. His international career spans Pakistan, Libya, South Africa, and the UAE, with a focus on reservoir engineering, simulation, and management.

He has extensive experience leading multidisciplinary teams of reservoir engineers, Petrophysicists, geologists, drilling engineers, and operations engineers. His expertise includes developing field development plans, determining producer and injector well requirements, and evaluating depletion and pressure-maintenance strategies, including water injection, gas injection, and water-alternating-gas (WAG).

His reservoir engineering experience covers clastic and highly fractured carbonate reservoirs. He has built static and dynamic reservoir models for OGDCL and Orient Petroleum in Pakistan, Veba Oil Operations in Libya, Sasol Petroleum International in South Africa, and ADCO in the UAE. His responsibilities have included model quality assurance and quality control, initialization and validation, history matching, and forecasting field development scenarios. For challenging history matches, he has applied streamline simulation to assess fluid-flow paths and pressure distribution.

He has evaluated waterflooding, miscible and immiscible lean-gas injection, CO_2 injection, and WAG schemes. His work has included assessing different gas types and injection strategies, and optimizing WAG parameters such as injection ratio and rate to understand their impact on hydrocarbon recovery.

He also has experience in reservoir fluid characterization and modeling, including developing and tuning robust equations of state (EOS) to represent fluid phase behavior and PVT properties in compositional simulation, history matching, and field development forecasting. His EOR experience includes special PVT studies, slim-tube testing, and miscibility evaluation.

His well-test expertise includes pressure-transient and rate-transient analysis for vertical, deviated, and horizontal wells in sandstone and highly fractured carbonate reservoirs. He has interpreted more than 400 pressure-transient tests using software including Saphir, WellTest-100, WellTest-200, Interpret-2, Fekete, PanSystem, and Sapphire.

He is also experienced in routine and special core analysis, including preparing scopes of work, overseeing study implementation, and interpreting results. His work includes selecting appropriate methods for capillary-pressure measurement and flooding techniques for relative-permeability determination.



Tanuja

Senior Petroleum/Reservoir Engineer

She holds an MSc in Petroleum Engineering from Imperial College London and is a highly skilled and dynamic Production and Reservoir Engineer with over 28 years of experience in the industry. Her expertise spans both production and reservoir engineering, making her an invaluable asset to any team.

Extensive global experience of Well Modeling (Prosper), Material Balance Analysis (MBAL), and Network modeling (GAP) in major projects at the Pande and Tamane gas fields while with Sasol Petroleum International in Johannesburg, South Africa. Additionally, supported production initiatives and scoped options for well design and surface facilities in drilling campaigns.

Her experience includes a heavy oil reservoir project in Egypt, field development planning in the Niger Delta swamp, Nigeria, utilizing MBAL, Eclipse, and S3Graf for production data management and quality control. Also optimized wells and designed gas lift systems during testing for relatively heavy oil reservoirs. In Morocco, designed well tests for fissured reservoirs, interpreting test data and providing gas lift recommendations based on mud injectivity data.

Moreover, supported economic modeling by running scenarios against production profiles, conducting quick qualitative assessments for field development plans (FDP) in offshore Gabon, and evaluating in-place volumes for onshore Nigeria assets. Her expertise includes reviewing Petrel modeling and Eclipse models from 2014 for offshore projects in Nigeria and South Africa and also performed PVT modeling & well performance evaluations using Prosper to Interpret the wet gas and gas condensate offshore projects in South Africa, as well as stochastic modeling with Crystal Ball, integrating geophysics and reservoir engineering for oil and gas fields in Nigeria.



Arshad Majeed

Reservoir and Simulation Engineer

Mr. Arshad Majeed holds Master degree in Geology from University of the Punjab, Lahore, Pakistan and MPhil. (Petroleum Engineering) degree from Heriot-watt University, Edinburgh, U.K. He worked as a Manager (Reservoir Management) in OGDCL with 25 years of experience of E&P Sector. The key areas of interest of Mr. Arshad Majeed are Reservoir Monitoring, Reservoir Management, Well testing, Reservoir Characterization, Reserves Evaluation and Reservoir Simulation. He has been visiting instructor to OGTI during his service period with OGDCL and delivered courses. Mr. Arshad Majeed is author of seven papers. These were presented in Annual Technical Conferences (ATCs) of PAPG/SPE Pakistan and published in respective proceedings.



Abdul Azeem

Senior Reservoir Engineer

Highly accomplished Reservoir Engineering Consultant with over 18 years of extensive experience in upstream oil & gas operations, specializing in reservoir simulation, mature field management, production optimization, and reserves evaluation. Proven track record of delivering integrated reservoir driven solutions for well intervention, field rejuvenation, and development planning across complex oil and gas assets. Demonstrates strong expertise in dynamic reservoir modeling, assisted history matching, and uncertainty analysis, enabling identification of well intervention opportunities including recompletions, infill drilling, workovers, water shutoff, and stimulation strategies.

Adept at integrating subsurface data with production and operational constraints to maximize recovery and enhance asset value. Extensive experience working with leading operators and international service companies including United Energy Pakistan, OMV, ENI, Emerson Roxar (Saudi Arabia), with direct exposure to tight gas reservoirs, multi-layered systems, and late-life field challenges such as high water cut and declining pressure regimes. Proven leadership in managing multidisciplinary teams and delivering field development plans, reserves booking, and production enhancement initiatives, including successful execution of tight gas development programs, water injection schemes, and bypassed hydrocarbon recovery strategies. Instrumental in achieving significant production increases and reserves additions (MMBOE/Bcf scale) through data-driven reservoir management and intervention planning. Recognized for strong technical advisory capabilities, including simulation model validation, intervention candidate selection, and post-intervention performance evaluation, supporting both operational teams and management decision-making.

Experienced in conducting technical workshops with joint venture partners and regulatory stakeholders, ensuring alignment on development and intervention strategies. Proficient in industry-standard tools including Petrel, Eclipse, Tempest (ENABLE, MORE, VIEW), PVTx, Kappa Saphir, with strong analytical and programming skills for customized reservoir studies. A results-driven professional with a strong focus on maximizing recovery, extending field life, and delivering cost-effective well intervention solutions in challenging reservoir environments.



Muhammad Khalid

Reservoir and Simulation Consultant

Mr. Muhammad Khalid holds Bachelor degree in Petroleum Engineering and worked as reservoir engineer, with over 17 years of experience in the upstream exploration & production sector. During most of his career he has been involved in the development of major oil/gas fields of Pakistan using reservoir simulation models. He has marvelous expertise in well testing, planning, reservoir simulations of clastic and highly fractures limestone reservoirs field, development, economics and management of conventional and unconventional reservoirs.

He performed well test analysis that includes build up, fall off, draw down, interference and deliverability tests of more than 350 wells. Planned and designed flow after flow test of oil reservoirs on frequent basis for the estimation of productivity index to investigate the rate of depletion with time. Categorized the inactive wells after the thorough study of production behavior and recommended the optimum solution to revive the well production. He also worked as a Project Manager for exploration blocks.



Muhammad Salman

Reservoir / Petroleum Engineer

He holds a Bachelor's degree in Petroleum Engineering from the University of Engineering & Technology (UET), Pakistan. His Final Year Project, titled "Simulation-Based Analysis of Composite Layering Effects and Fracture Design in Tight Sandstone Formations," focused on numerical reservoir simulation and the evaluation of reservoir and stimulation performance.

Currently a key member of the SAJ technical team, contributing to integrated reservoir, production, and field development studies. His areas of expertise include reservoir simulation, history matching, streamline analysis, well performance evaluation, production forecasting, field development planning, artificial lift, production optimization, and technical and economic evaluation. He utilizes industry-standard software including ECLIPSE, Petrel, PIPESIM, PROSPER, GAP, and MBAL.

His reservoir simulation experience includes ECLIPSE history matching and streamline analysis to evaluate reservoir connectivity, inter-well communication, and reservoir performance. He develops and evaluates multiple simulation cases to identify optimum injector locations, assess injection performance, and determine the impact of injector wells on reservoir pressure and production. This work includes detailed simulation studies for the Kunnar Field, focusing on well connectivity and optimization of injection strategies.He is actively involved in developing maximum and optimum production scenarios for the Qadirpur, Togh, Lashari, Zin Block, and Rajian fields. His work integrates reservoir and production forecasts with well and facility constraints to evaluate alternative operating and development scenarios, supporting field development and production planning.

He also contributes to technical and economic evaluations of field development and production strategies, assessing alternative development scenarios, production potential, facility requirements, operating constraints, and optimization opportunities. His work emphasizes data-driven decision-making, utilizing simulation, sensitivity analysis, production forecasting, and performance diagnostics to support operational strategies and maximize hydrocarbon recovery, production efficiency, and asset value.



Bilal Shoukat

Senior Consultant Production Engineering

Highly accomplished Petroleum Engineer with over 18 years of extensive experience in Exploration & Production (E&P) operations, delivering advanced subsurface and production optimization solutions across complex oil and gas assets in the Middle East, North Sea, and South Asia. Proven expertise in well intervention planning and execution, integrated production system modeling (IPM), reservoir simulation, and field development planning, with a strong track record of enhancing hydrocarbon recovery and maximizing asset value. Demonstrates comprehensive technical proficiency in Integrated Production Modeling using MBAL, GAP, PROSPER, and PipeSim, enabling optimization of well, reservoir, and surface network performance through detailed nodal analysis and system integration. Highly skilled in developing and history matching dynamic reservoir simulation models using ECLIPSE and PETREL, supporting accurate forecasting, reserves estimation, and development strategy optimization. Possesses strong hands-on experience in designing and implementing well intervention programs, including water shut-off treatments (mechanical and chemical), re-perforation, matrix stimulation, and hydraulic fracturing, effectively addressing production challenges such as water breakthrough, declining reservoir pressure, and formation damage. Adept at identifying intervention opportunities through integrated analysis of production data, well performance, pressure transient analysis (PTA), and rate transient analysis (RTA). Extensive experience in conducting comprehensive reservoir studies, including material balance analysis, decline curve analysis, reservoir characterization, uncertainty assessment, and production forecasting, supporting data driven decision-making. Proven ability to deliver field development plans (FDPs) and optimize reservoir management strategies for both greenfield and mature assets, including tight gas, carbonate, and sour gas reservoirs. Strong background in multidisciplinary collaboration, working closely with drilling, production, and facilities teams to ensure seamless execution of well interventions and production optimization initiatives. Demonstrated success in managing complex reservoir challenges such as water influx, high water cut, production restarts, and voidage replacement strategies, delivering measurable improvements in production efficiency and recovery factors.



Hafiz Mateen

Consultant Production Engineering

Self-motivated and dynamic Petroleum, Production and Well Intervention Engineering professional with over 20 years of progressive experience in the Oil & Gas Exploration and Production (E&P) sector, specializing in well interventions, well completions, production optimization, and well integrity management. Extensive expertise in designing and executing rig-less operations including Slickline, electric line, and coiled tubing, together with well stimulation (acidizing, perforating, hydraulic fracturing, nitrogen lifting), scale cleanouts, logging, and well testing (DST and SWT) in both sweet and sour HP/HT environments. Highly proficient in well integrity management throughout the well life cycle, including SSSV and X-mas Tree inflow and pressure testing, MAASP and MAWOP calculations, well examination, and maintenance of the well operating envelope as per Well Integrity Management System requirements. Demonstrated expertise in well completions, including HP/HT completion design, metallurgy selection, tubing stress analysis, and packer selection, supported by hands-on use of industry-standard tools including WELLCAT, PIPESIM, and Maximo. Strong background in production optimization and artificial lift. Experienced in contracts and budgeting, including competitive bidding, cost analysis, and payback estimation. Adept at leading multidisciplinary teams and coordinating 50+ crew at well sites, presenting well operations proposals to JVPs and stakeholders, and driving safe, efficient, and cost-effective operations in compliance with Permit to Work, JSA, and QHS&E standards.



Syed Tariq Hasany

Senior Geological Consultant

With over 35 years of diversified experience in petroleum geology, subsurface evaluation, exploration management, and technical leadership, Syed Tariq Hasany brings exceptional expertise across both conventional and unconventional oil and gas domains. His competencies span 2D/3D seismic interpretation, 3D static modelling, shale oil and unconventional play assessment, basin and petroleum system modelling, prospect generation, risk and volumetric evaluation, field development planning (FDP), wellsite geology and drilling operations, and regional play fairway analysis.

He has contributed to major oil and gas discoveries, revitalization of mature fields, and large-scale exploration studies across diverse geological settings including carbonates, clastics, shales, and turbidite systems. Alongside his technical depth, he excels in team leadership, mentoring, business development, exploration strategy development, data room assessments, and evaluation of global bidding opportunities, consistently delivering high-value subsurface insights and exploration solutions.



Sadu Ur Rehman

Senior Geoscientist & Reservoir Characterization Specialist

With over 20 years of extensive experience in petroleum geoscience, petrophysics, reservoir characterization, and technology-driven hydrocarbon optimization, S. Rehman brings a strong blend of technical, operational, and strategic expertise to the energy sector. His capabilities include advanced petrophysical interpretation, time-based (RT) analysis approaches, integrated subsurface workflows, business analytics, process development, market positioning, team leadership, and client relationship management.

He has contributed to global geoscience operations by integrating an average of 100 wells per year, leading multidisciplinary teams, guiding reservoir behavior studies in both sand and carbonate formations, and driving innovative geoscience solutions powered by artificial intelligence and digital technologies. With more than 10 international publications covering low-resistivity hydrocarbon identification, residual oil saturation evaluation, risk reduction through look-ahead VSP, and advanced reservoir characterization techniques, he has established a solid track record of delivering high-value, technically sound insights. His expertise spans strategic planning, business development, global collaboration, and technology innovation, consistently advancing subsurface understanding and operational performance across diverse reservoir environments



Umair Saleem

Development Geologist Consultant

Highly accomplished Senior Exploration Geologist and Subsurface Consultant with over 35 years of extensive experience in upstream oil & gas exploration, reservoir characterization, field development, and mature field optimization across Pakistan and international basins including Yemen, Kazakhstan, Sudan, Oman, and Azerbaijan.

Demonstrates strong expertise in integrating geological, petrophysical, and reservoir engineering datasets to evaluate hydrocarbon potential, identify bypassed reserves, and support optimized recovery strategies. Proven ability to conduct well correlation, structural and stratigraphic mapping, facies analysis, and depositional modeling, enabling accurate reservoir characterization and field development planning. Extensive experience in prospect generation, well planning, formation evaluation, and post-drilling analysis, with a successful track record in contributing to major discoveries such as Pariwali, Minwal, and Turkwal fields, as well as revitalizing mature assets including Meyal, Balkassar, Dhulian, and Ratana fields.

Highly skilled in identifying thin pay zones, attic hydrocarbons, and compartmentalized reservoirs, and recommending well intervention strategies including recompletions, perforation optimization, workovers, and sidetrack drilling based on integrated subsurface analysis. Recognized for delivering high-quality technical input in Technical Committee Meetings (TCM), Operating Committee Meetings (OCM), and joint venture environments, ensuring alignment between subsurface understanding and development strategies. A strong advocate of multidisciplinary collaboration, bringing a field-driven, analytical, and results oriented approach to reservoir management, exploration success, and mature field revitalization initiatives.



Lukas Utojo Wihardjo

Principal Petrophysicist

is a highly accomplished Principal Petrophysicist with over 30 years of diversified experience in the Oil & Gas industry, covering petrophysical consulting, field engineering, formation evaluation, production logging, reservoir characterization, and academic instruction. He has held senior technical and managerial roles with globally recognized organizations including Schlumberger, OilsServ Middle East, RISC, and BWP Meruap, and has actively supported projects across Indonesia, the Middle East, and international markets.

Lukas is widely respected for his process-oriented, integrated interpretation philosophy and for developing the proprietary LISA (Lukas Interpretation Surpass Archie) approach, enabling enhanced hydrocarbon identification and reservoir understanding. A passionate mentor and lecturer, he has taught Basic and Advanced Petrophysics at Trisakti University and published numerous technical papers in international and regional conferences. He holds a Bachelor's degree in Electronics Engineering (Cum Laude) from Institute Technology Bandung and advanced Schlumberger certifications in wireline operations and log analysis.



Zia Haider Shah

Consultant Well Services

Zia Haider Shah holds a Bachelor's degree in Applied Sciences with a major in Chemistry. He has more than 42 years of experience working as a Mud Engineer with renowned multinational mud services companies, including MI SWACO (Schlumberger), Halliburton and Scomi Energy Services. His scope of work covers selecting the right DF (OBS, WBM, SBM) system and maintaining the same during a drilling operation. He has worked in Pakistan and overseas countries, including UAE, Yemen, Iran, and Egypt, covering major E&P local clients like OGDCL, OMV, Pakistan Oilfields, MOL, Mari Petroleum Company Limited, and Polish Oil And Gas.

Besides this he also holds experience in using workover and completion brines (both light and heavy- weight brine). In his career, troubleshooting was his main domain, which included wellbore strengthening, mud losses, hydrocarbon and water influx. He has complete command of testing the drilling fluids and adjusting parameters according to the well bore situation.



Eshan Sarwar

Drilling Engineer

Experienced and technically profound Drilling and Completions consultant having over 20 years' of experience serving global oil and gas NOC's and multinational client across Africa, Asia Pacific, Middle East, and Southeast Asia. Specialized in advanced casing and completions design for high-temperature, high-pressure (HTHP) wells, thermal simulations supporting both drilling and production operations, and complex Bottom Hole Assembly (BHA) design, including detailed torque and drag, hydraulics, and swab/surge analysis. Proven expertise in drilling and survey data management, certified in Digital Well Program (DWP), and recognized EDT Suite trainer.

Robust capability in collaborative well planning across subsurface, surface, and drilling disciplines, complemented by expert-level involvement in field development strategies. Commended for delivering innovative, data-driven solutions that enhance operational performance and reduce risk in both traditional and digitally integrated well environments. Skillful in team leadership and independent execution, with a strong focus on delivering results in project-driven and time-sensitive environments.



Azfar Gardezi

Drilling Engineer Consultant

A seasoned Well Engineer with over 19 years of experience in the oil and gas industry, specializing in drilling, workover, and completion operations. His professional experience includes positions at Qatargas as Senior Drilling Engineer, ARA Petroleum E&P as Drilling & Completions Contracts Manager, ADNOC Offshore as Senior Drilling Engineer (Contracts), PetroChina Dubai as Senior Drilling Engineer, Tullow Oil as Well Engineer and Performance Optimization Engineer, and Schlumberger as Directional Drilling Engineer and MWD Engineer. His career has spanned multiple countries, including Pakistan, Saudi Arabia, Oman, Iraq, Uganda, and the UAE, offering extensive exposure to both offshore and onshore drilling operations. Mr. Azfar is highly skilled in well engineering, contract management, directional drilling, well trajectory design, drill string design, wellbore positioning and BHA optimization, survey database management, and new drilling technologies with an extensive fieldwork as an on-site drilling engineer in various international locations. His ability to ensure optimum value through efficient procurement processes and contractor performance management has been a key asset throughout his career. He is also proficient in oilfield software tools, including EDM Landmark, Schlumberger software, and Maximo. With proven leadership, technical expertise, and international experience, he is an asset to any project in the oil and gas sector, capable of driving value and innovation in complex drilling operations.



Khizar A. Shaikh

Executive Business Development

A self-motivated, disciplined and adaptive engineering leader bringing 20 years of strong and diverse experience in the upstream energy business — including more than 10 years dedicated to crude oil processing and surface production facilities — together with gas processing plants, pipelines and compression, and the management of EPC / EPCC projects from concept through to handover. Backed by strong educational competence in both engineering and business, with a proven track record of working collaboratively across multicultural, multifunctional teams to achieve long-term goals. Experience spans operator-side project management with BP, United Energy Pakistan and Kuwait Energy, together with contractor-side delivery, giving a balanced command of engineering, procurement, construction, commissioning, cost and schedule control, contracts and stakeholder management.



Muhammad Shahzeb Amin

Lead Commercial Operations Specialist

Muhammad Shahzeb Amin is a business development and commercial professional with five (05) years of experience in Pakistan's upstream oil and gas sector at SAJ Energy Services, an EPC, production operations and well-intervention contractor to OGDCL, Mari Energies, PPL and UEP. He Source, screens and evaluates project/business opportunities for the company and builds the cost, CAPEX and pricing analysis behind its go / no-go decisions.

He leads meetings with E&P client teams on contract agreements and payment clearance, and manages LC handling for imported project scope. His work spans product supply, EPC and consultancy engagements, where he has supported SAJ's bids and delivery for the Heavy Oil Processing Facility at Rajian Field and the Surface Facility Optimization projects at Togh and Qadirpur Fields. He has also acted as the company's local counterpart to international partners on Engineering Consultancy Projects.

A Mechanical Engineer from the University of Engineering and Technology (UET), Lahore, Shahzeb assesses the technical and commercial fit of a project together. He coordinates Finance, Operations, Supply Chain and Engineering inputs into a single recommendation for management, giving SAJ's leadership a clear basis for each pursuit and its clients a consistent point of contact from proposal through to contract close-out.



Mirza Daud Mughal

Technical Service Engineer

He holds a bachelor's degree in Petroleum & Gas Engineering from University of Engineering & Technology, Pakistan and holds a qualification in discrete Accounting and Finance subjects. He has worked on comparison of viscoelastic surfactants and other fracturing fluids efficiency for Tight Gas Reservoir in his final year project. Currently he is working as Team Leader of the technical services and sales team responsible for organizational development and sales. Skilled communicator and Persuasive negotiator who uses integrity and professionalism in presenting joint ventures, assessing acquisition opportunities, and identifying new markets. Other major responsibilities and areas of expertise are; Development, performance and maintenance of the tender process activities. Process improvement, Project management, Operational logistics management, Supply chain solutions, Project-based logistics, Warehousing & Storage, Marketing, Cost reduction, international trade, Strategic planning, and Vendor management.



Muhammad Bilal

Finance Manager

Muhammad Bilal is an accomplished MBA Finance professional with over 10 years of extensive experience in the banking and financial services sector. Throughout his career, he has developed strong expertise in financial management, banking operations, credit analysis, risk management, corporate financing, and financial planning. Muhammad Bilal has successfully worked with leading banking institutions where he managed corporate and retail financial portfolios, conducted financial analysis, supervised credit facilities, and ensured compliance with regulatory and internal banking policies.

He possesses solid experience in budget planning, cash flow management, financial reporting, investment analysis, and strategic financial decision-making, enabling organizations to maintain strong financial health and operational efficiency. His professional strengths include financial forecasting, banking relationship management, trade finance operations, and cost control strategies.

Known for his analytical mindset and leadership capabilities, Muhammad Bilal has consistently demonstrated the ability to optimize financial processes, improve profitability, and support management in making data-driven financial decisions. With strong communication skills and a results-oriented approach, he plays a vital role in ensuring effective financial governance, risk mitigation, and sustainable business growth for the organization.



Muhammad Faizan

Tax Consultant

Mr. Muhammad Faizan is a Petroleum Engineer and he also holds certification of Chartered Accountancy from Institute of Chartered Accountant of Pakistan and worked as Finance Manager for multiple companies over past couple of years in different sectors. During most of his career his job responsibilities included managing the financial health of the organization in order to promote success and growth while maintaining legal financial practices. His duties typically include financial planning to determine how to pay off liabilities and grow the business, reviewing financial documents to ensure tax-compliance and collaboration with other departments to achieve monetary goals.

14 Our Partners

Global Technology & Service Partners

Why partner with us?

SAJ Energy Services Private Limited mission is to build capacity, capability and competencies through partnerships with world renowned technocrats. Deliver innovative solutions of subsurface & surface issues by using Industry Technology that meets international standard. To provide services which meet quality and safety of global oil and gas community.

OUR PARTNERS

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SAJ ENERGY SERVICES (PRIVATE) LIMITED

An Engineering & Consultancy Company

An ISO 9001:2015 & ISO 14001:2015 Certified | PEC Registered Company

PHONE +92 51 835 9901

EMAIL info@sajenergyservices.com

WEB www.sajenergyservices.com

ADDRESS Office # 201, Street # 73, Al-Safa Height-2, F-11/1, Islamabad, Pakistan

Scan to see SAJ in action
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