APRIL 2025

OVERLOOKING VALUE?

AN OPTIMIZED APPROACH TO REVITALIZE MATURE FIELDS

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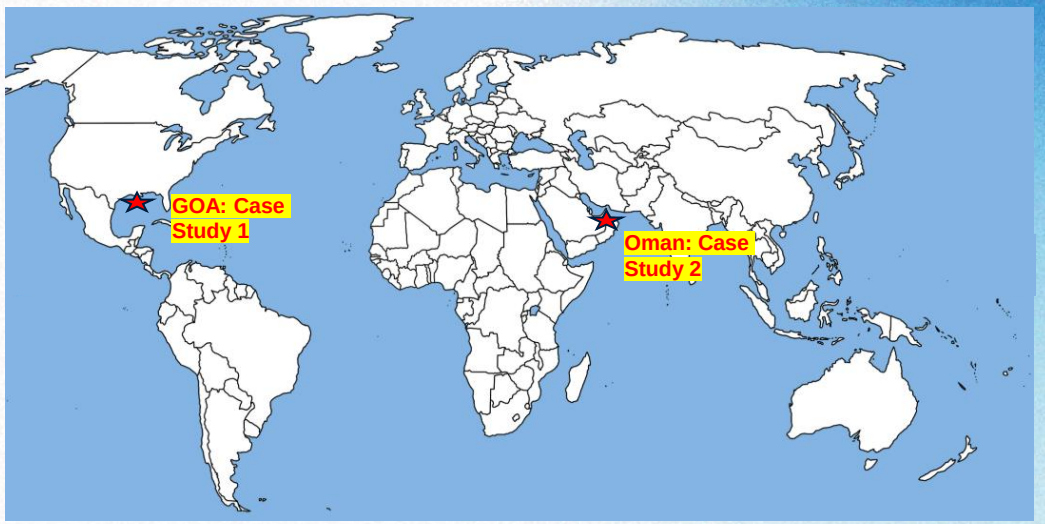
AGENDA



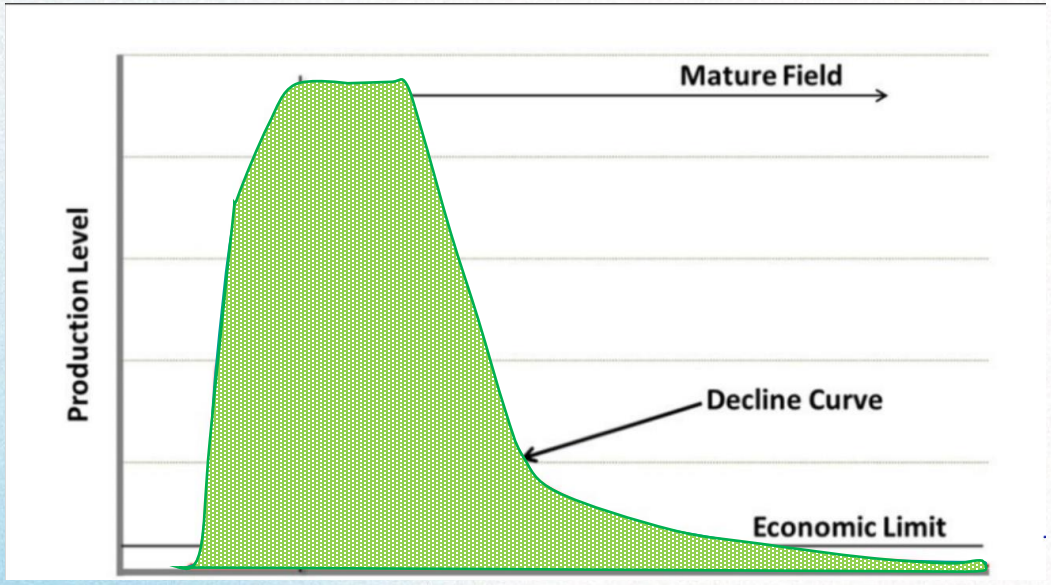
Mature fields

- Defining maturity
- Challenges
- Importance

Case studies: Onshore and Offshore fields

- Field background
- Examples of revitalizing activities
  - Increasing efficiencies
  - Using new technology
  - Managing risks
  - Continuously refining field planning

MATURE FIELDS - FIELDS PAST “PEAK” PRODUCTION



Criteria for mature field definition

- Reached production plateau
- Entered significant declining production phase
- Depleted primary and/or secondary reserves
- Reached end of economic life

Putting in context

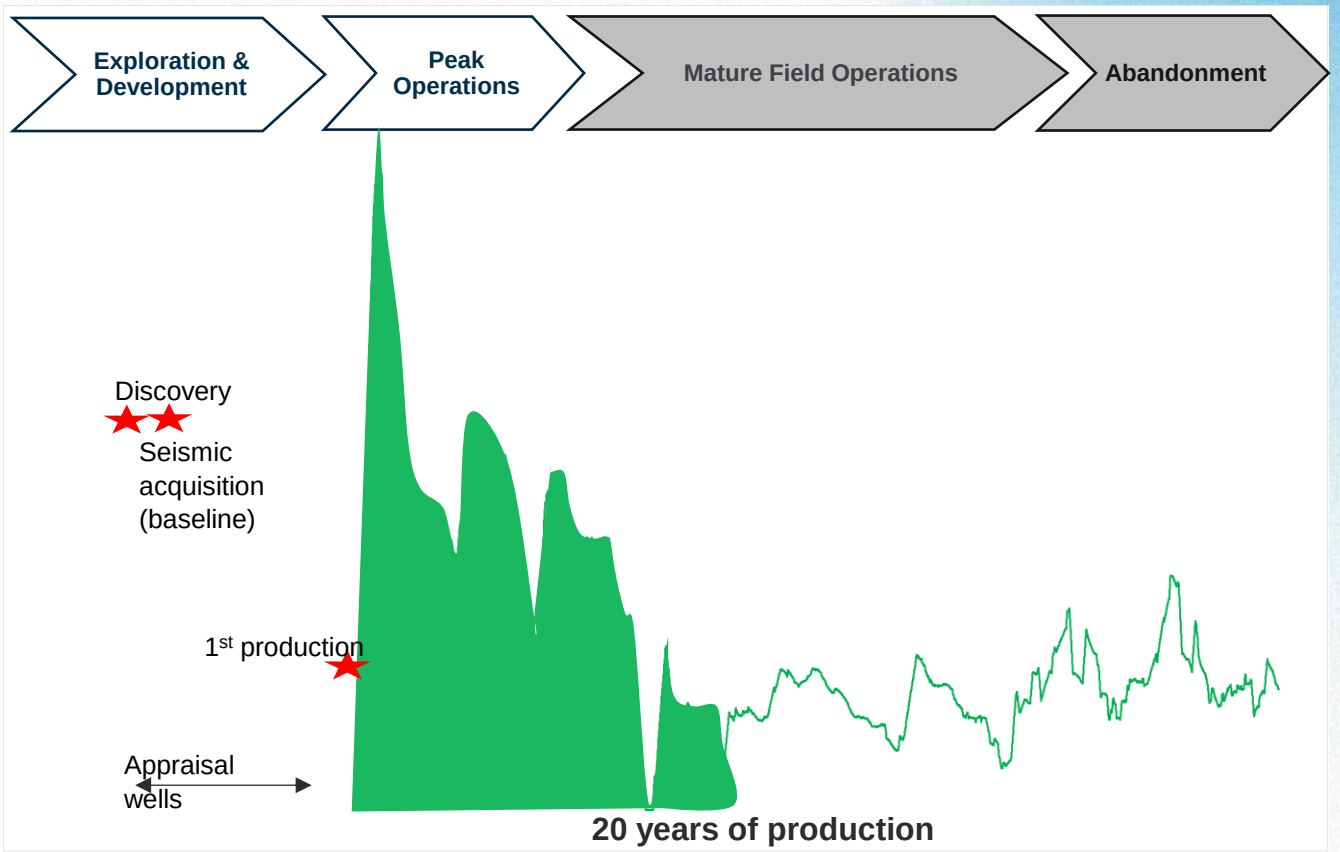
- Drive mechanism: Reached acceptable recovery factors
- Onshore vs. Offshore: Onshore fields have longer production life

Maturity is NOT a function of number of wells

Maturity ≠ Years of production

LIFE CYCLE OF MATURE FIELDS - EXPLORATION TO ABANDONMENT

- **Exploration phase**
  - Drill exploratory and appraisal wells
  - Seismic acquisition
- **Development phase**
  - Field development planning (FDP)
  - Engineering design & construction
- **Production phase**
  - Drill and complete wells
  - Continue field development planning
  - Mature/brownfield operations
  - Life extension activities
- **Abandonment**
  - Plug and abandon wells
  - Decommission facilities/platform*



FDP is an iterative process triggered by new data, operator transfers, oil price fluctuations

*Applies to offshore fields

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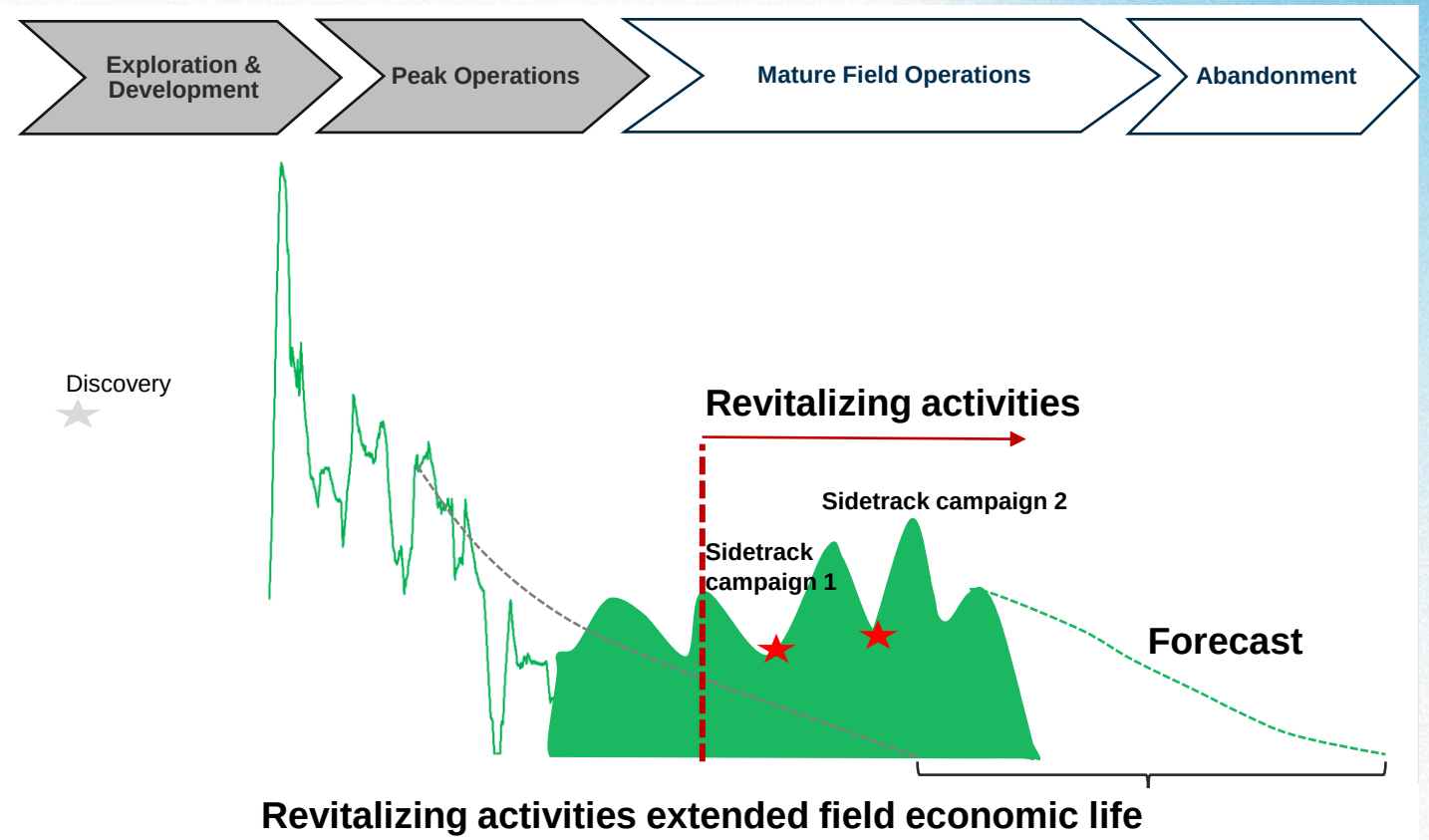


*Applies to offshore fields

OPERATIONAL CHALLENGES - ACT OF BALANCING

- “Easy oil” is gone
- Day-to-day operations run under constraints
- Upkeep of aging platform
- Data management
- Outdated infrastructure
- Higher carbon intensity

WHAT'S THE PRIZE?? $$$

Big share in the pie

Mature oil fields account for ~2/3rd of world's oil production*

Free cash flow

Projects are beyond breakeven point

Returns come at lower risk

Fewer uncertainties

Efficiencies established through repeatability

Free cash flow relies on optimization and innovation

IHS CAMBRIDGE ENERGY RESEARCH ASSOCIATES

CASE STUDY – GULF OF AMERICA (GOA) HIGHER MARGIN PRODUCTION

Field background

Example of revitalizing activities

- **Increasing efficiencies**
- **Using new technology**
- **Managing risks**

GOM FIELD OVERVIEW

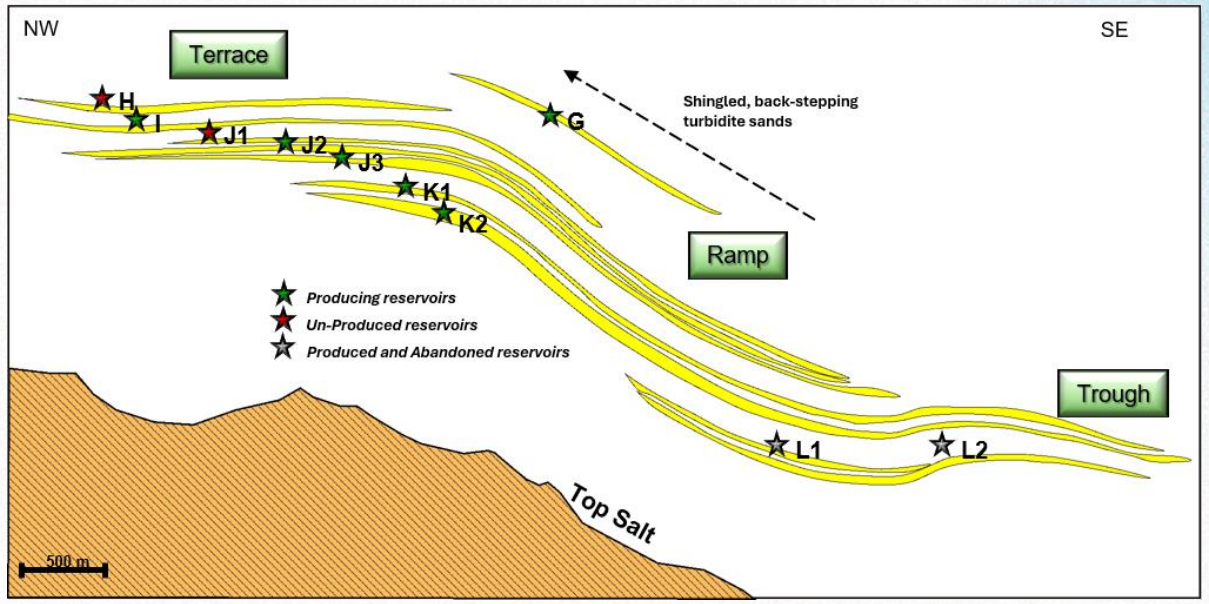
- 20 years of production and injection
- Water depth ~4,500’
- High-quality sands
- Compartmentalization within sands
- Dry tree wells
- Depleted reservoirs

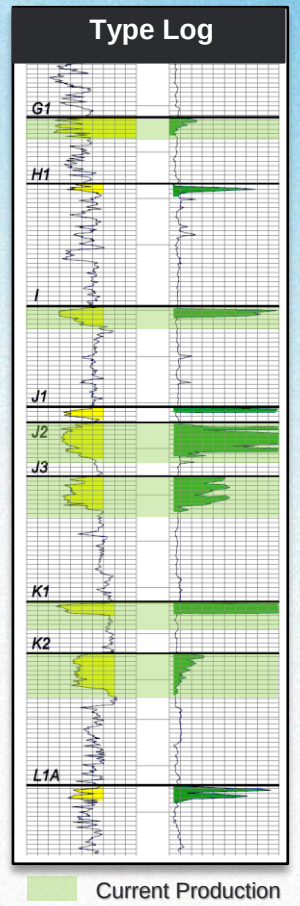
Field located in northern GOA

HIGH-QUALITY, STACKED SANDS

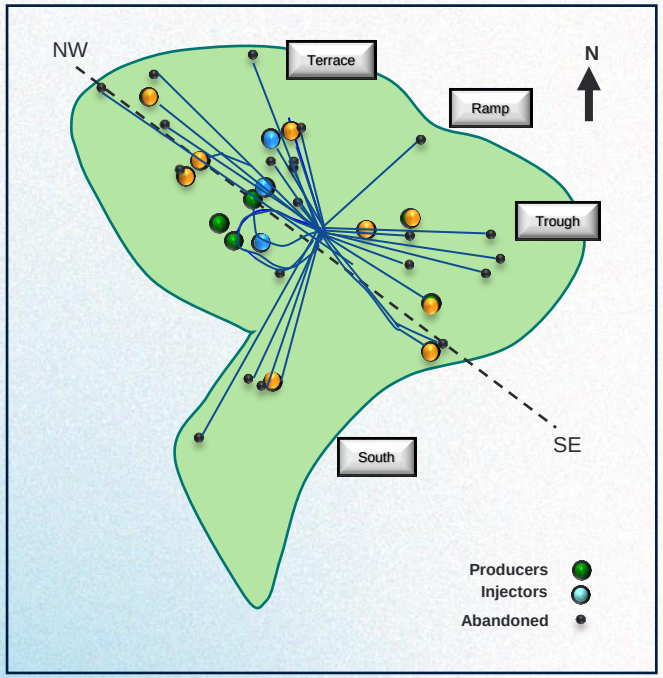
- Pliocene-aged, high-density turbidite sands
- Reservoirs above salt
- Varied drive mechanisms

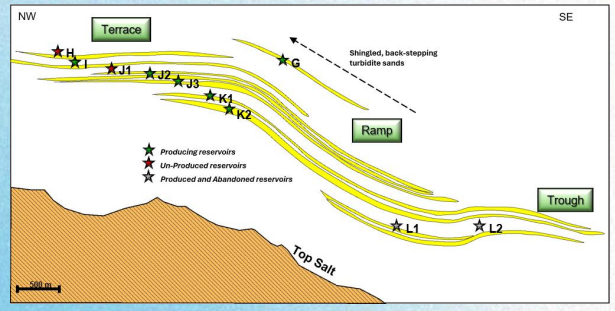
Location	Drive Mechanism	Recovery
Terrace/Ramp	Depletion with water injection	40-55%
Trough	Moderate aquifer	30-40%
South	Strong aquifer	>50%





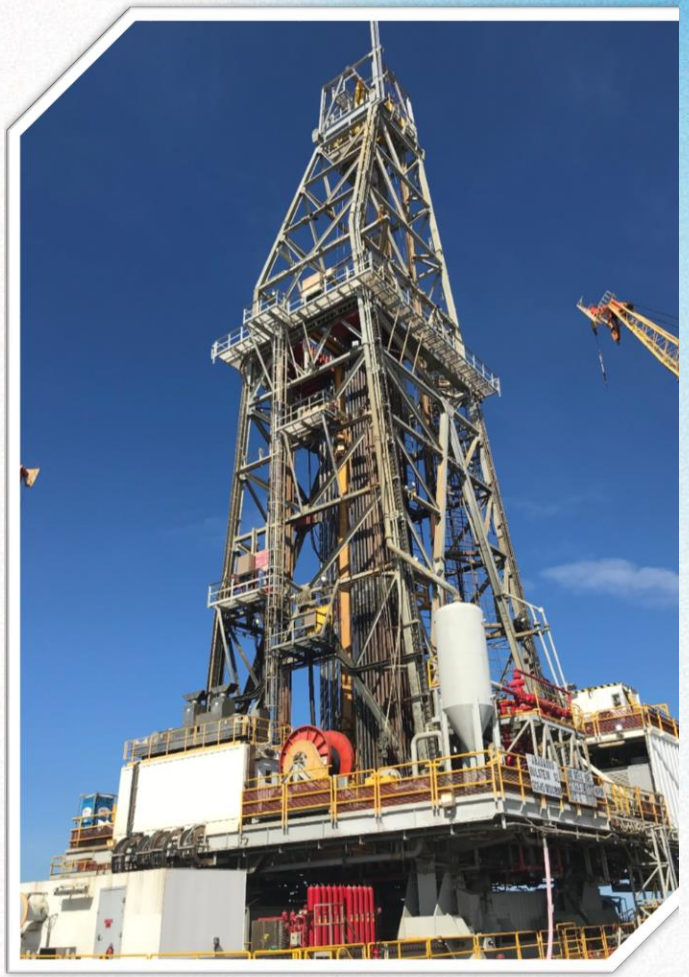
DRY TREE WELLS & PLATFORM DRILLING RIG - SUCCESSFUL MULTIYEAR DRILLING PROGRAM





Field Development History

- Multiple operators through time
- Dry tree wells
- Platform drilling rig
- Sidetrack using existing wellbore

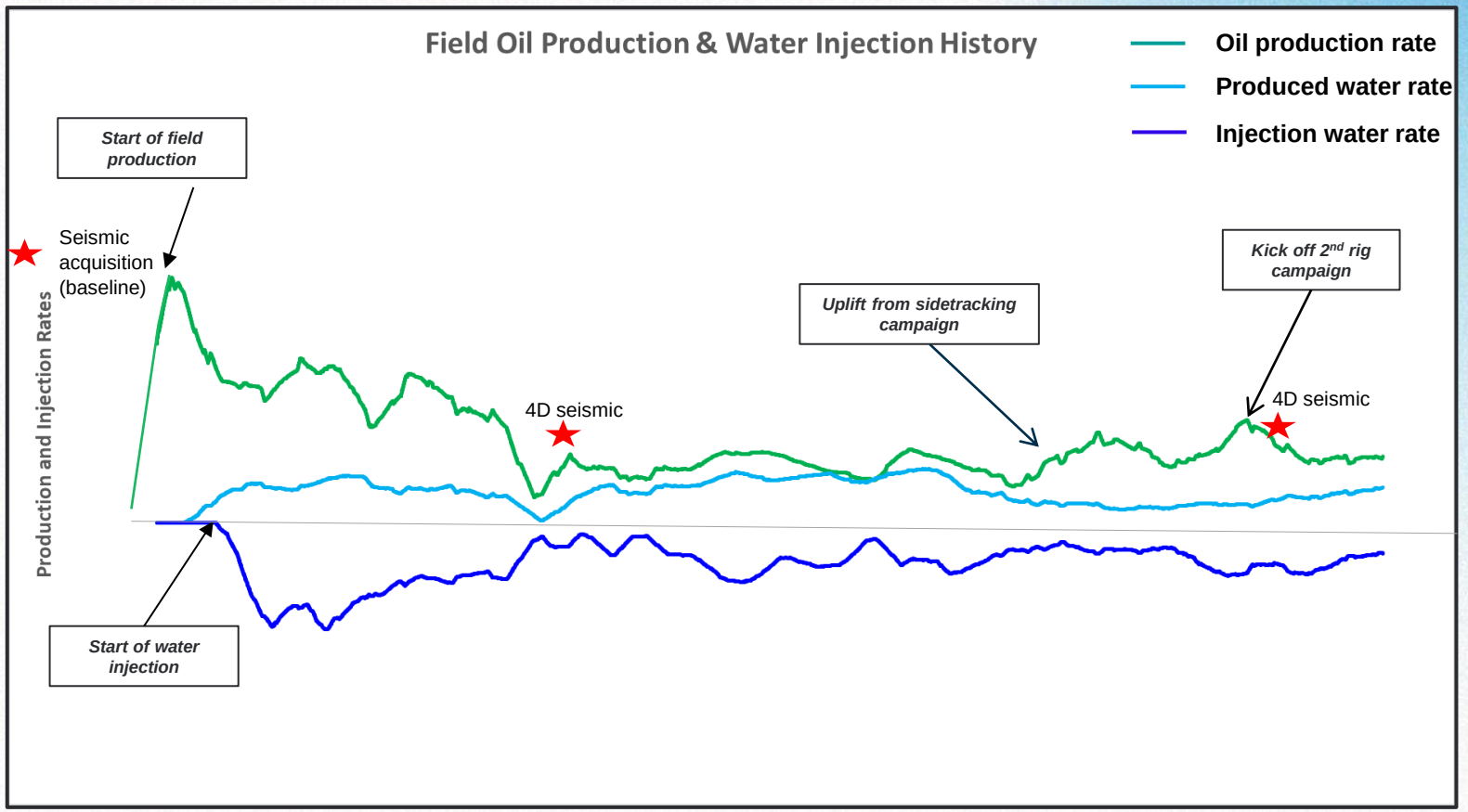


PLATFORM RIG USED TO DRILL DRY TREE WELLS

SUCCESSFULLY WATERFLOODED

Production History

- Production from 6 sands
- Injecting in 3 sands
- 40+ wells drilled
- Wells are on gas lift



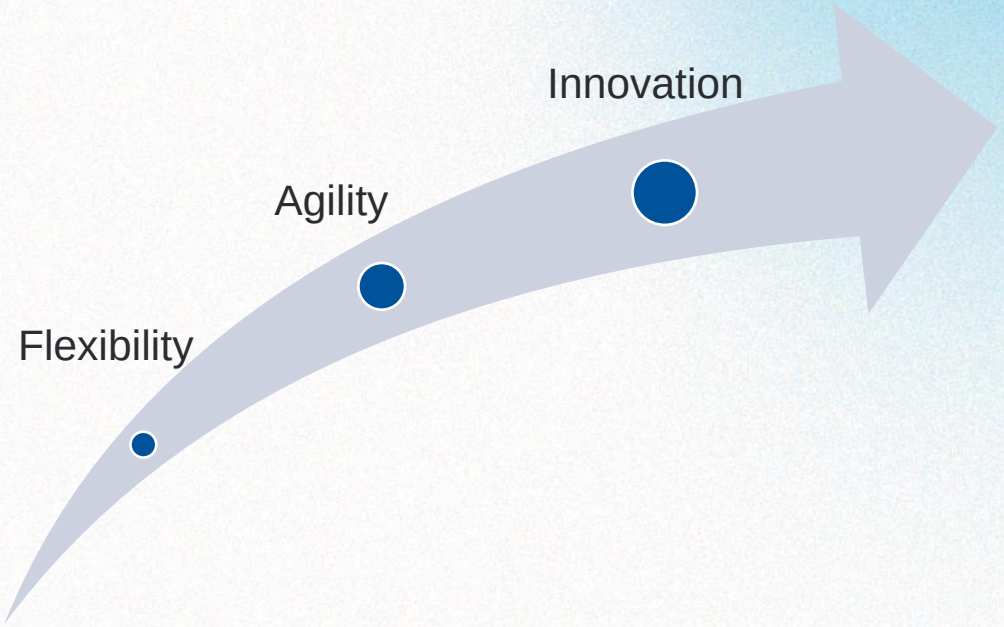
FIELD PRODUCTION AND INJECTION HISTORY

WHAT KEEPS IT INTERESTING - CHALLENGES

- Low productivity wells
- Depleted sands
- Compartmentalization
- Asphaltene, paraffin, and scale management
- Corrosion and mechanical integrity management
- Maxed out wellbore utilization

WHAT KEEPS IT INTERESTING – ENABLERS

- Dry trees and platform rig
- No top sides constraints on surface capacity
- Efficient waterflood
- Multiple 4D seismic monitors acquired
- Highly efficient multiyear infield exploration
- Pushing boundaries: Implementing innovative solutions



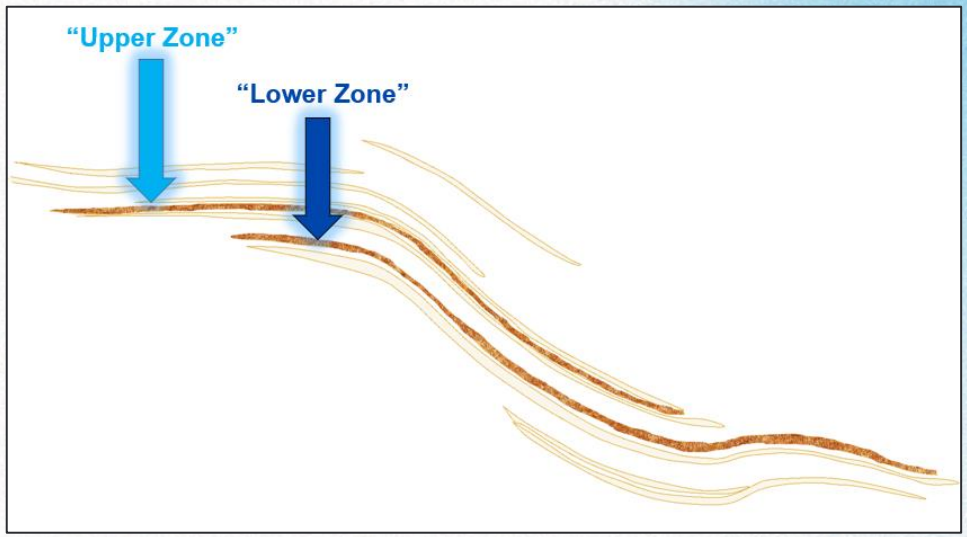
IMPLEMENTING INNOVATIVE SOLUTION DUAL ZONE INTELLIGENT COMPLETIONS

Upper Zone

- Sand waterflooded for 15+ years
- Reservoir pressure: 6,500 psi
- Estimated injectivity index: 9 bbl/psi
- Objective: pressure maintenance

Lower Zone

- Never waterflooded before
- Reservoir pressure: 5,400 psi
- Estimated injectivity index: 3 bbl/psi
- Objective: waterflood sweep, increasing pressure

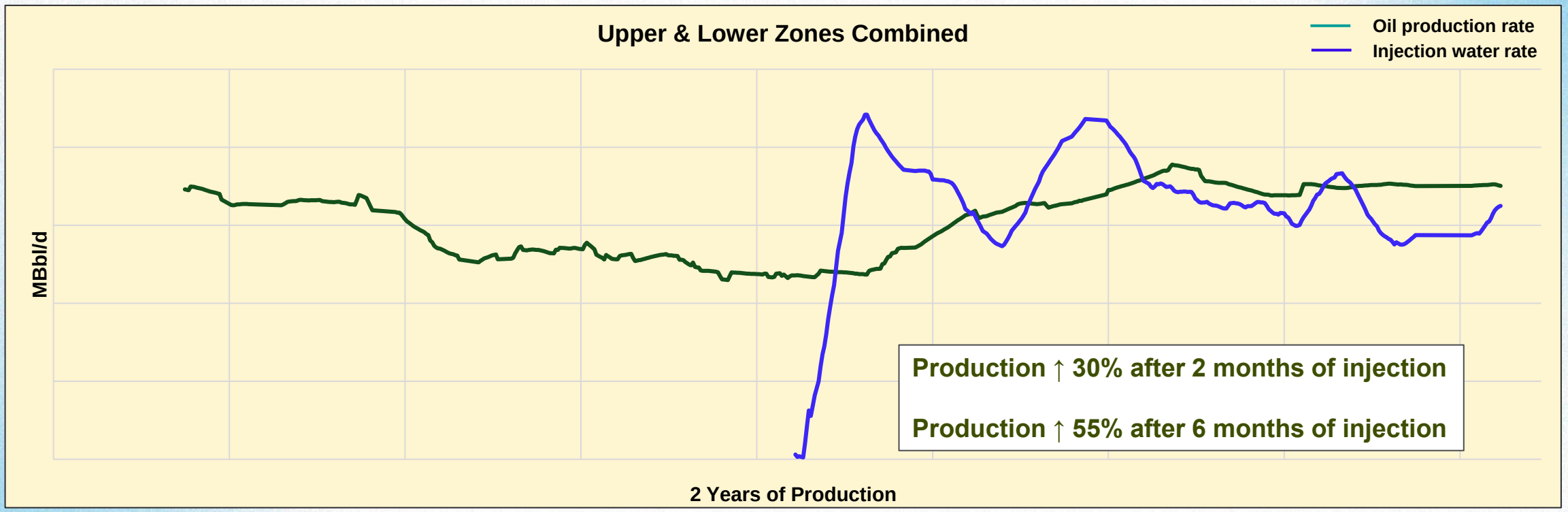


Why intelligent completions

- Optimize well placement in Upper Zone
- Initiate waterflood in Lower Zone
- Use only one wellbore slot

PROJECT RESULTS: SUCCESSFUL IMPLEMENTATION

1st smart injector in the field



GRAPH DEMONSTRATING PRODUCTION UPLIFT FROM INJECTION

DUAL ZONE SURVEILLANCE - KEY ENABLERS FOR SUCCESSFUL PROJECT

Triple downhole gauge*

Real-time surveillance

Ability to isolate each zone

Prevent crossflow

Directly test each zone

Targeted stimulations

Maximize usefulness of chemical tracers

*TRIPLE-GAUGE SYSTEM: GAUGES GIVE UPSTREAM-SIDE P/T OF THE TWO DOWNHOLE CONTROL VALVES AND THE P/T INSIDE TUBING OF THE COMMINGLED FLUID

CASE STUDY – THE OMAN STORY UNLOCKING HIDDEN POTENTIAL

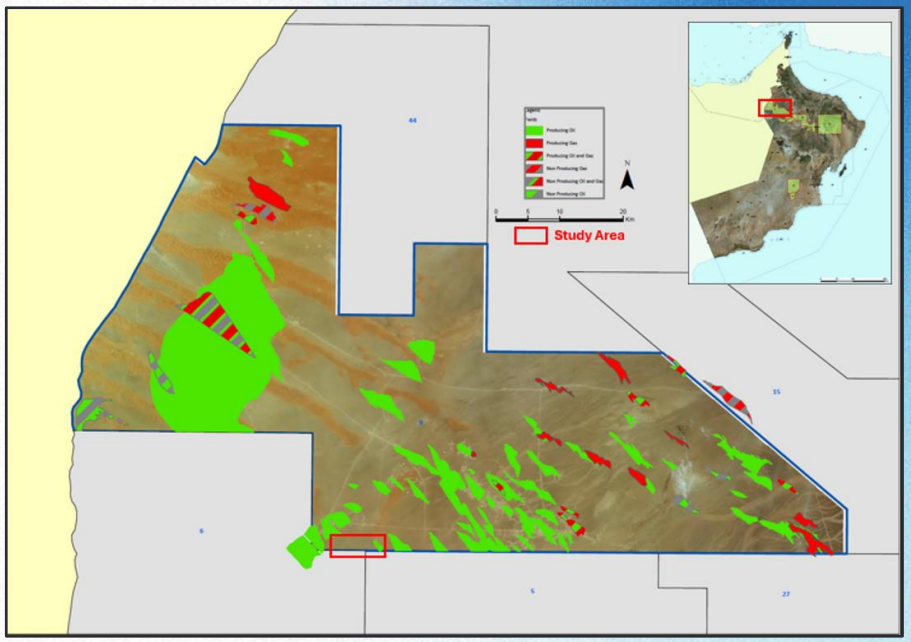
Field background

Example of revitalizing activity:

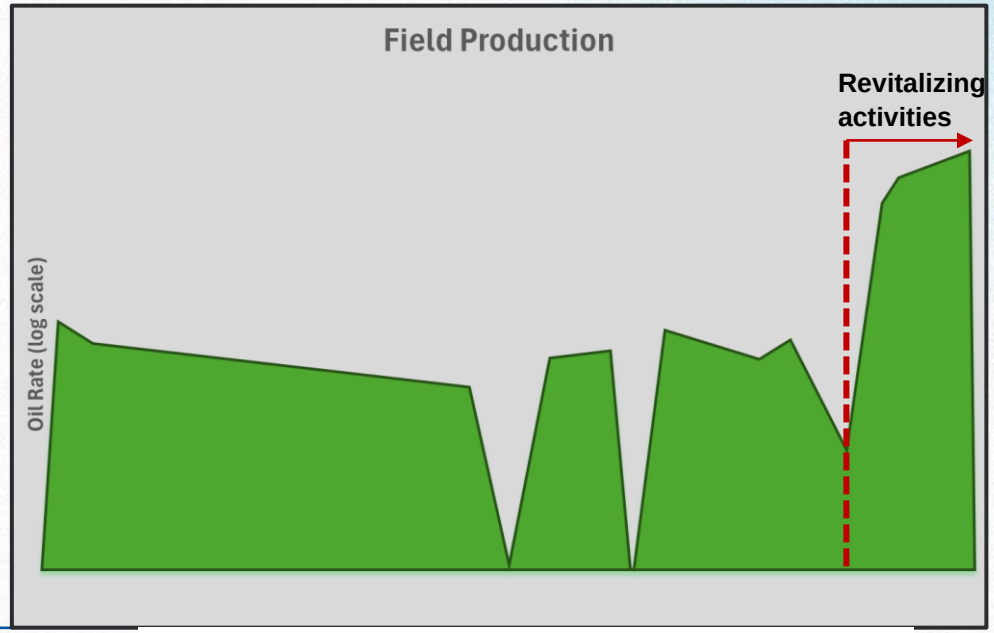
- **Using new technology**
- **Step-out drilling strategy**

OMAN FIELD OVERVIEW

- >10 years of production
- Water injection piloted in <5 years
- Highly faulted with multiple compartments
- Thin and patchy carbonate reservoir
  - Multiple pilots for appraisal
  - Field development using horizontal wells
  - Optimum spacing between injector and producer is ~250 m



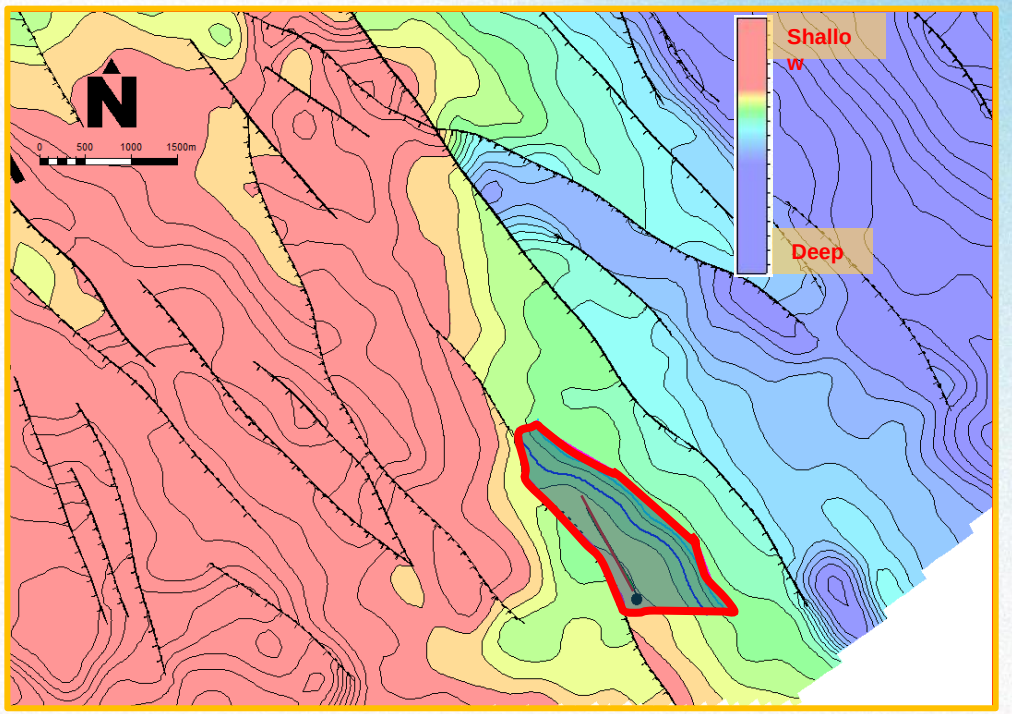
FIELD LOCATED IN NORTH OMAN



CARTOON SHOWING FIELD PRODUCTION PRE & POST REVITALIZING ACTIVITIES

KEY CHALLENGES: LOW PRODUCTION RATE - SMALL IN-PLACE VOLUME

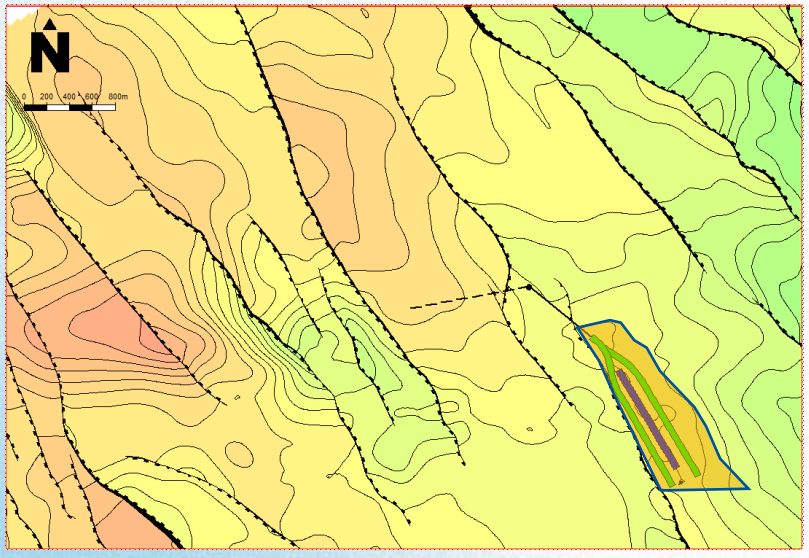
- Marginal well production
- Limited offsets
- Poor rock quality from appraisal wells
- Drilling challenges
- Thin reservoir and compartmentalization



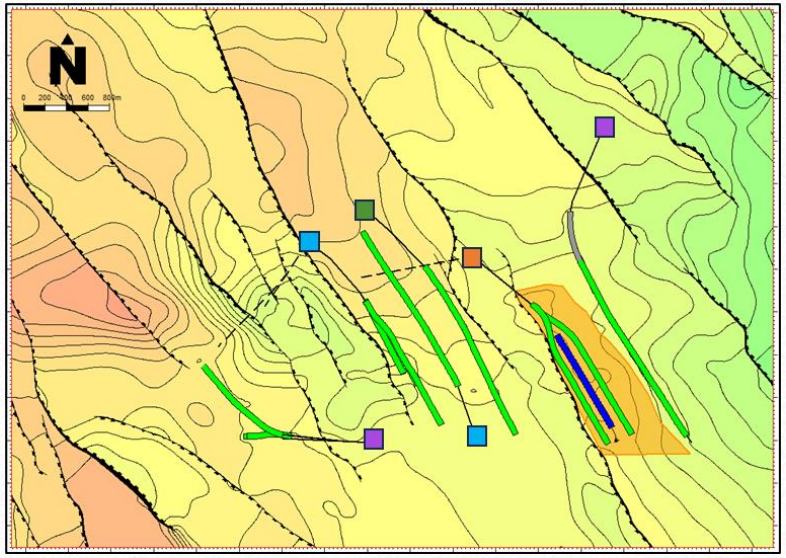
CARTOON OF STRUCTURE MAP SHOWING PERCEIVED RESERVOIR EXTENT PRE-REVITALIZING EFFORTS

STEP-OUT DRILLING: THINKING OUTSIDE THE "BOX"

Then (pre-revitalizing)



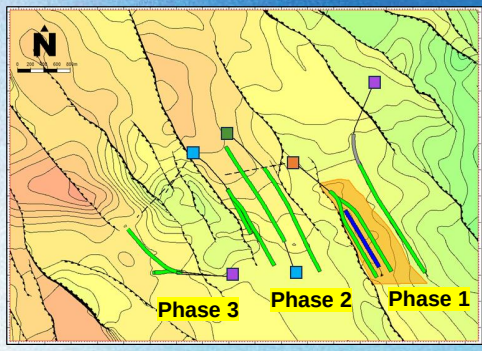
Start of revitalizing activities



Now

CARTOON SHOWING FIELD DEVELOPMENT EVOLUTION

KEY ENABLERS:
NEW TECHNOLOGY & SYSTEMATIC PLANNING

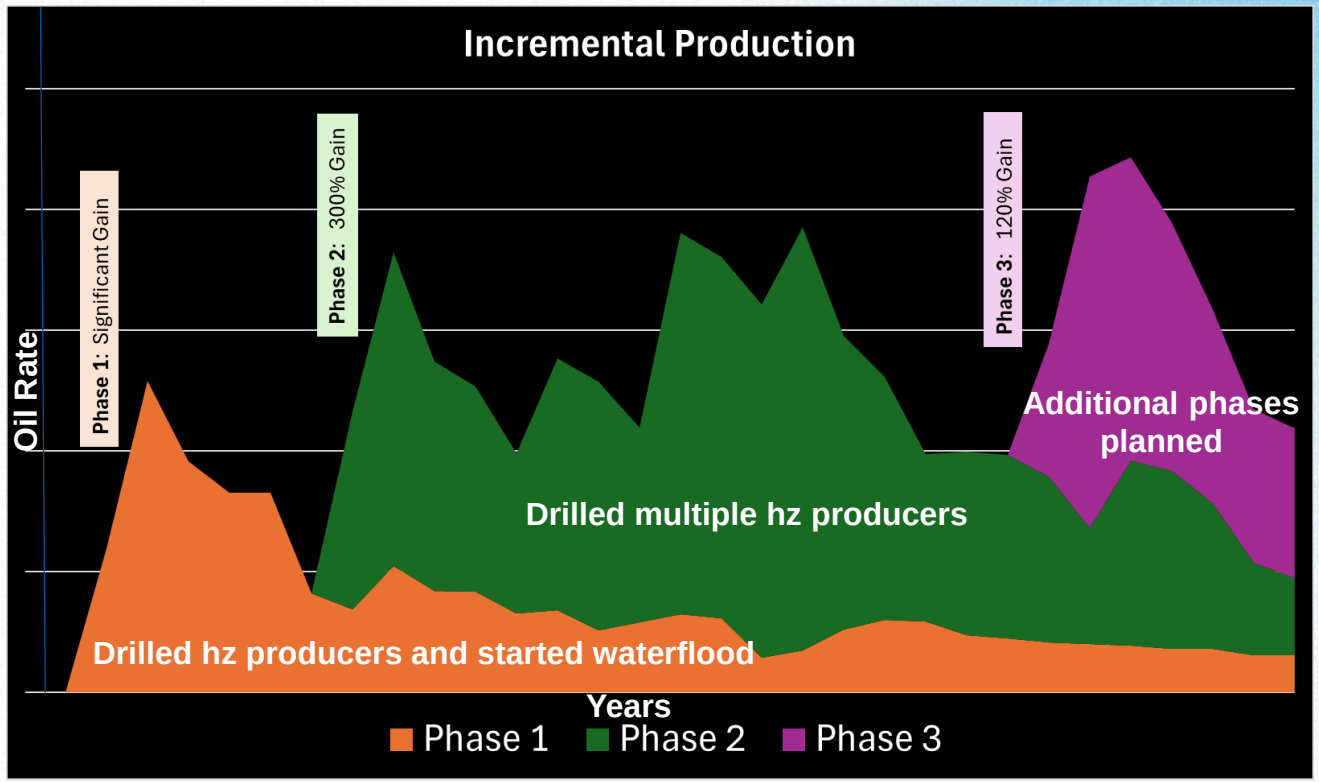


State-of-the-art Machine Learning technology for enhanced fault network

Right tools for geosteering and data acquisition

- Wireline tool carriers
- Geosteering tool with borehole imaging tool
- Side wall core plugs and thin sections

Continuous refinement of development plan



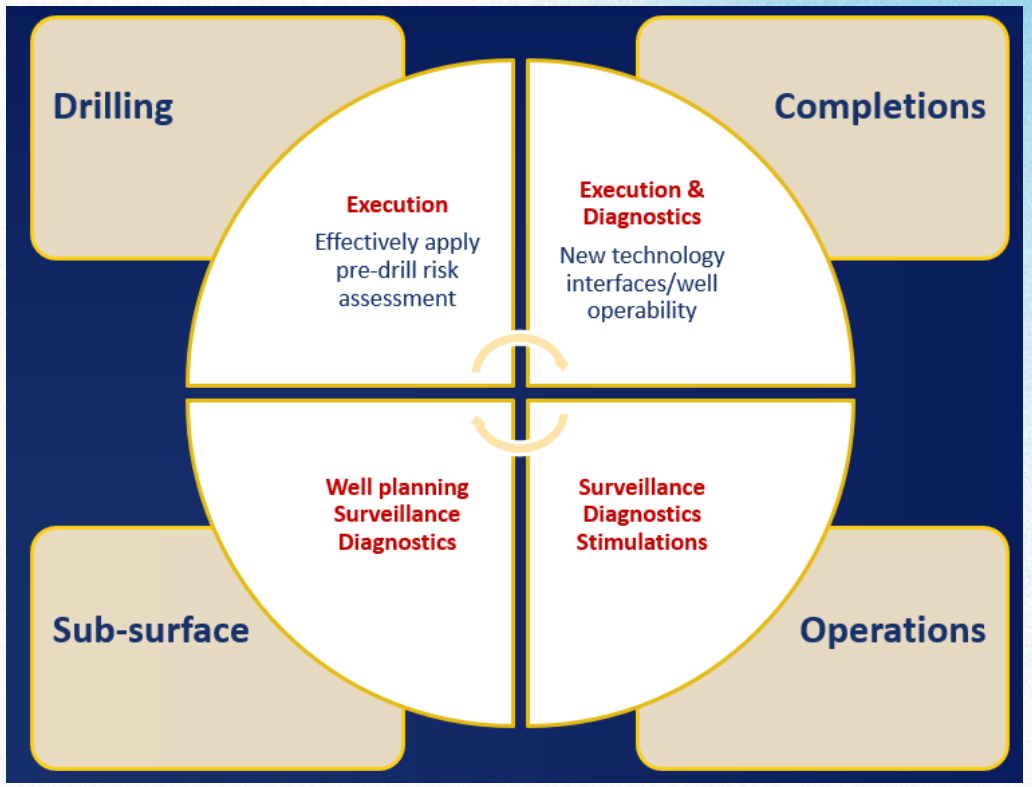
Drilled six prolific producers (100% success rate)

10X increase in field development area acreages & STOIIP

SUMMING IT UP: OPTIMIZED APPROACH THAT WORKS!

- Reducing costs through efficiencies
- Adapting to latest technologies
- Identifying and managing risks

Collaboration



Collaboration Quadrant

WHAT'S NEXT?
AI'S ROLE IN MATURE FIELDS

- Minimize downtime
- Enhanced reservoir characterization
- Production optimization using digital twins
- Smarter drilling

ACKNOWLEDGEMENTS

- I would like to thank Occidental for supporting and granting permission to present the case studies.
- I would also like to thank the asset and production teams that play a critical role in the success of these projects.
- I would like to extend special thanks to Neha Gupta, Ahmed Al Araimi, Hannah Bolingbroke for their contributions to the slides.

THANK YOU

BACKUP SLIDE –
INTELLIGENT COMPLETIONS SYSTEM

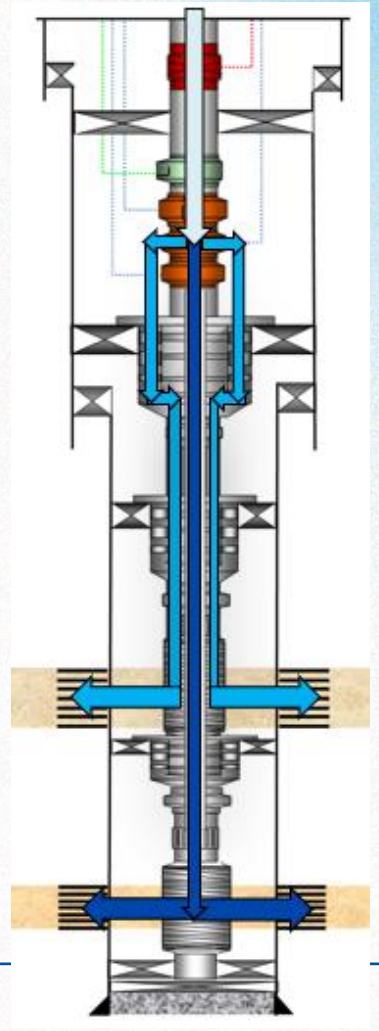
Upper Zone Water

- “Commingled” injection water reaches upper choke
- Portion of water splits off into A-annulus
- Flows through annular flow sub
- Remains isolated from Lower Zone water
- Injected into Upper Zone

Lower Zone Water

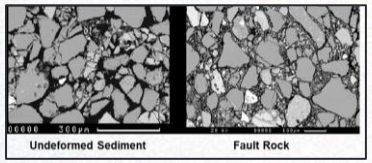
- Rest of the water continues past upper choke
- Flows through lower choke
- Remains inside tubing (via concentric strings)
- Injected into Lower Zone

Intelligent Well System: Flow Path

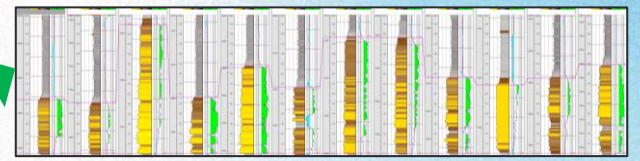


BACK UP SLIDE –
ROLE OF RESERVOIR MODELING: CORE TO DEFINING OPERATING ENVELOPE

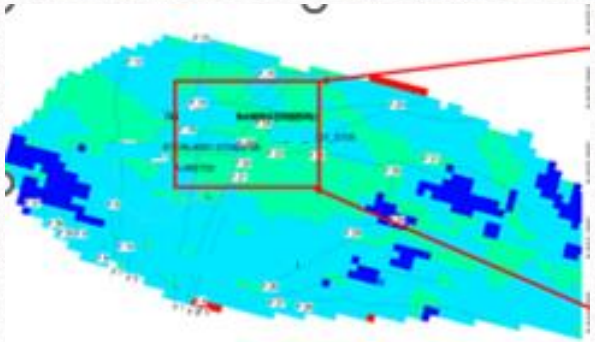
Rock properties characterization



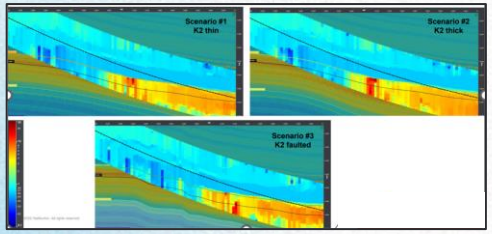
Well log correlations



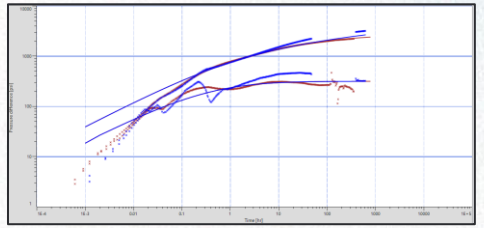
Simulation Model



Trajectory planning



Pressure Transient



Wellbore modeling & surveillance

- Short-term injector performance
- Mid-term injector-producer performance
- Long-term reservoir management