

MSI AFRICA  
DEVELOPMENT  
LIMITED

# Technical Capabilities

Exploration & Production Expertise in Nigeria



Nigerian Exploration & Production Excellence - MSI Africa Development Limited

MSI  ADL

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# Why MSI Africa Development Limited?

- ◆ MSI Africa Development Limited (“MSI”) offers a substantial range of capabilities including; project evaluations and acquisition support, planning, engineering, procurement, drilling related services, construction, installation, marine support, and end-to-end project management.
- ◆ Our comprehensive ‘one stop shop’ places us amongst Nigeria’s premier turn-key providers for oil & gas projects. To further distinguish us, we take absolute pride in being THE “no nonsense” field development company of choice. MSI’s unrivalled in-country experience, backed by available capabilities and equipment, delivers time-proven, practical and cost-effective solutions for best value at every stage of your project.
- ◆ Our ongoing mission is to continue growing MSI and a business reputation as the project developer of choice in the Nigerian market.
- ◆ MSI, as a 100% indigenous operator, strives to exceed best-in-class international standards. We seek to bring our expertise in oil & gas field development, and our history of successful project execution in Nigeria, to assist our Clients in achieving their project goals.



# The Local Content Provider

- ◆ MSI is one of the few companies who can adhere to local content expectations, as set out in the directives of the federal government. Our emphasis on local content makes MSI's capabilities all the more attractive to project developers seeking competitive advantage for regional developments. We are capable of assembling the best teams per local content requirements, and our team structures bring significant value to the overall project requirements of our Clients.



# How does MSI Field Development work?



# What is the scope of MSI's Project Management?

- ◆ It is our depth of planning capability & experience, focused and seasoned by our West African experience that enables MSI to confidently tender “turn-key” project packages, or lesser component parts thereof. MSI key staff hold enviable track records in onshore, swamp, coastal and offshore E&P project environments, supported by local experience to guide which technical approach is most likely to succeed in a particular circumstance.
- ◆ Our project management expertise further enhances our ability to drive project works from start to finish. Whether conceptual field planning, front-end (FEED), detail design, drilling, construction and installation engineering, field service or maintenance engineering; MSI has the people, contacts, equipment, commitment and corporate experience to get the job done.



# What are your G&G Capabilities?

- ◆ At MSI, we understand the significant impact G&G work can have on schedules, location selection and the drilling approach required for project execution. We assemble teams of professionals tailored to the project from pre-acquisition through production operations to mitigate these risks. Our G&G services include:

- ◆ Exploration Geophysics
- ◆ Seismic Acquisition and Survey Design
- ◆ Seismic Data Processing
- ◆ 1D and 2D Seismic Modelling
- ◆ 2D & 3D Seismic Reservoir Analysis
- ◆ Seismic Attribute and Image Interpretation
- ◆ Seismic Attributes and AVO Analysis
- ◆ Seismic Reservoir Characterization
- ◆ Seismic Stratigraphy & Attributes
- ◆ Reservoir Comparison
- ◆ Prospect Appraisal and Petroleum Economics
- ◆ Risk Assessment and Management
- ◆ Non-Seismic Methods
- ◆ Petroleum & Reservoir Geology
- ◆ Carbonate Sequence Stratigraphy
- ◆ Reservoir Characterization
- ◆ 3D Reservoir Modelling
- ◆ Borehole Geology: Dip and Image Interpretation
- ◆ Evaluation and Management of Fractured Reservoirs
- ◆ Geological Assessment of Reservoir Seals and Pay
- ◆ Geostatistical Reservoir Modelling:
- ◆ Operations and Wellsite Geology
- ◆ Cased Hole and Production Log Evaluation
- ◆ Wireline Formation Testing





# What are your Drilling Capabilities?

- ◆ Having long understood the dynamics of a successful drilling campaign over the range of Nigerian drilling environments, we hand pick our teams to bring the most adept, functional supervision of rig work to the fore. Working hand in hand with operators to deliver the most project value, the MSI team is well positioned to manage all aspects of E&P drilling worksopes. Our range of professional drilling management services includes organizing, contracting and managing the following:

## DRILLING

- ◆ Drilling Operations and Well Control
- ◆ Drilling Project Risk Management
- ◆ Directional Drilling and Surveying
- ◆ Horizontal, Extended Reach and Multilateral Drilling
- ◆ Cementing
- ◆ Fishing Operations
- ◆ Stuck Pipe & Hole Cleaning
- ◆ Well Control
- ◆ Tubing & Casing
- ◆ Drilling Fluids

## COMPLETION AND PRODUCTION OPERATIONS

- ◆ Advanced Completions
- ◆ Cased-Hole Evaluations
- ◆ Coiled Tubing Operations
- ◆ Heavy Oil Production Using Steam Injection
- ◆ Integrated Production Systems
- ◆ Sand Control
- ◆ Oilfield Water Management
- ◆ Problem Well Analysis
- ◆ Production Engineering and Operations
- ◆ Well Intervention projects



# What are your Financing Capabilities?

- ◆ MSI is focused on the evaluation of project opportunities within Nigeria. The experience of our personnel in the Nigerian market is a considerable value addition when compiling project economics. There are often unforeseen local complexities that are overlooked as part of cost estimates and general risk assessments, and MSI is capable of identifying both the potential pitfalls and risk mitigation measures in our Client's project planning. In addition, the extensive range of our local contact network allows for measurable time and cost savings during the asset acquisition process. MSI offers a distinct regional advantage to Clients who wish to avoid unforeseen pitfalls to cost and project schedule.
- ◆ MSI's capability to produce project planning economics that showcase its management teams innate knowledge of the Nigerian business landscape has attracted numerous financing partners. MSI has identified and executed partnership agreements with the financing partners that best reflect our commitment to value and schedule. Our partners share a long term development vision for MSI's work in Nigeria and have the financial resources to ensure development plans are kept to task.
- ◆ Ensuring MSI exceeds the requirements for project financing, MSI's financing partners can provide SWIFT confirmation of funds at notice.





# What are your Project Management Capabilities?

- ◆ MSI's "end-to-end" capabilities are enhanced by our project management expertise. The regional experience of our project management personnel allows us a complete picture of your project and the ability to recognize potential areas for concern before they happen.
- ◆ MSI's project management team is responsible for liaising with the client and the client's representatives. The team undertakes pre-planning, scheduling, budgeting, reporting, building community relationships and ensuring that appropriate health, safety and environmental measures and comprehensive QA/QC programs are adhered to. In addition, MSI's local knowledge of the areas we work in allows us to stay abreast of the issues taking place in the community, hire local workers and affords us intimate knowledge of the area and the working conditions.
- ◆ Our team has an extensive history of project execution in West Africa and are recognized locally as the safest option for completing projects on time and under budget. Undoubtedly there is a distinct learning curve to executing projects in Nigeria and improperly managed projects are quick to suffer the realities of the domestic market. MSI's project management experts keep the Client involved and aware of what is happening on the ground and what awaits ahead.



# Technical Vision Statement

- ◆ In order to fulfill our strategic mission of establishing production, we have identified four clear technical strategic priorities focused on conducting our business and delivering growth in a responsible way to all of our shareholders within the company, the community and the country. These goals/founding principles are:
  - ◆ Identify and Acquire Material Acquisitions
  - ◆ Reserve Growth
  - ◆ Establish and Grow Production
  - ◆ Provide Best in Class Operational Execution



# Identify and Acquire Material Acquisitions

Focus on areas where we are strategically and competitively advantaged.

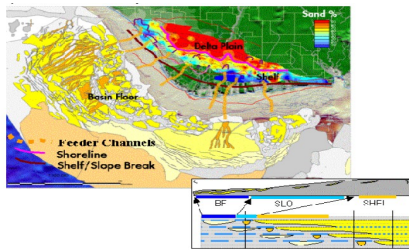
Focus on proven reserves with resource growth, the following are required:

- ◆ An established working hydrocarbon systems
- ◆ Opportunities that have been overlooked
  - ◆ under-developed due to operational
  - ◆ Community
  - ◆ accretive size for the larger companies
  - ◆ new technology has significantly derisked discovered resources
- ◆ Capitalize on our in-house knowledge
  - ◆ Subsurface
  - ◆ operational knowledge
  - ◆ synergy with our partner companies
  - ◆ key relationships
  - ◆ local structures we can leverage

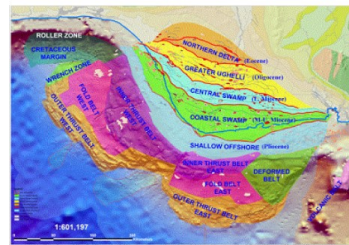


# Reserve Growth

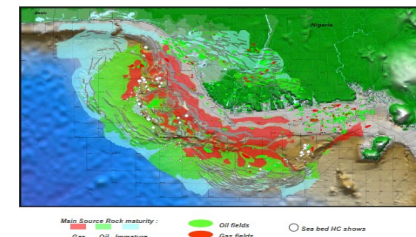
- ◆ Proven Hydrocarbon Systems:
- ◆ MSI's extensive experience in all aspects of the Upstream business is well documented we have worked in the entire hydrocarbon plays from the Anambra Basin to the southern deep water discoveries from Bobo to the Obo wells. Our focus is on understanding the overall petroleum system so that we may recognize undeveloped potential in the area. Our focus follows a standard procedure:
  - ◆ Basin and or Play Analyses
  - ◆ 2D and 3D seismic interpretation
  - ◆ Integrated basin studies



Stratigraphy



Structure



Basin Modelling Maturity



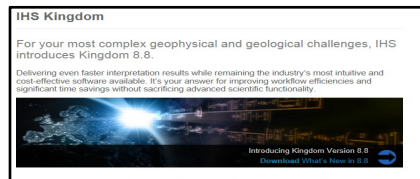
# Establish and Grow Production

- ◆ Proven Hydrocarbon Working Systems:
  - ◆ Integrated field studies to understand neighboring field and recovery efficiencies
  - ◆ Detailed sedimentological logging and interpretation of cores and adjacent field studies
  - ◆ Integration with wire line logs and borehole image logs to produce a sedimentological interpretation
  - ◆ Comparison with modern day analogues to suggest probable sand body dimensions
  - ◆ Assessment of controls on porosity and permeability of reservoir rocks

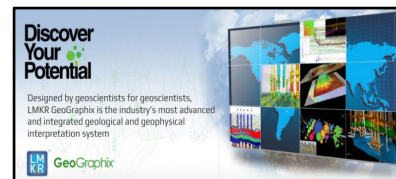


# Operational Execution

- ◆ MSI's focus is on understanding the asset, and utilizing the most appropriate tools available to unlock the potential of the asset being evaluated.
- ◆ We have the technological software, experience and relationship with local and international experts whom we may bring in to resolve any issue if we feel it is prudent and or justified.
- ◆ Our general procedures are an industry standard IOC approach with the ability due to our extensive experience and agile size to utilize what we require on any specific project.
- ◆ Our approach is not to waste money but to utilize the appropriate technology for every project.



IHS Kingdom Software



Landmark Geographix



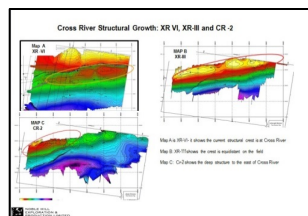
Drobo 7 Tb Storage



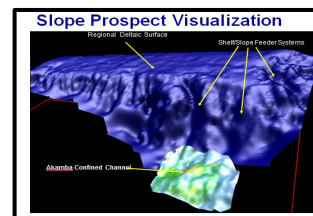


# Technical Analysis

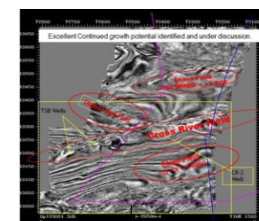
- ◆ Seismic Interpretation: A list of our standard procedure with examples from MSI Projects in developing an asset are described below:
  - ◆ Interpret 2D and 3D seismic data and produce detailed structural and stratigraphic models, incorporating attribute analysis, where appropriate
  - ◆ Utilize In-house technology and software
  - ◆ 3D visualization utilizing
    - ◆ Paradigm Global Geophysical 3D volume
    - ◆ Geoexpress 3D
    - ◆ LMKR 3DVis
    - ◆ Petrel
  - ◆ Prospect mapping and evaluation focusing on risk and uncertainty
  - ◆ Depth conversion analysis integrating well, check shot and or VSP Data



Time and Depth Structure Mapping



3D Visualization

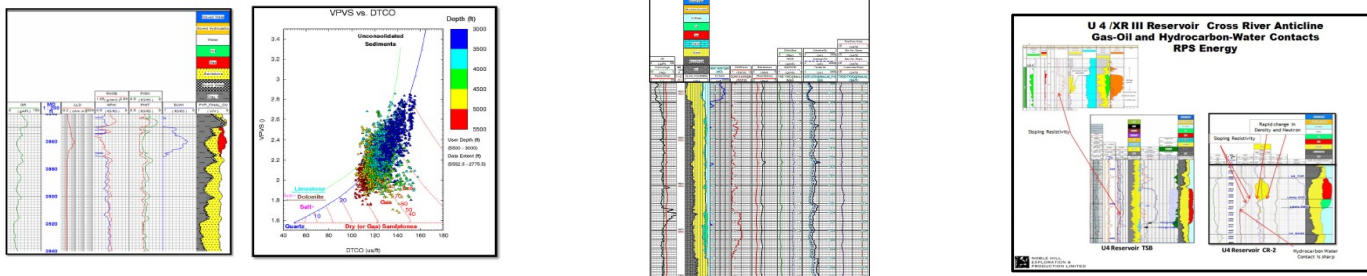


3D Visualization



# Petrophysics

- ◆ Petrophysics – integration of core samples and well log data with the structural analysis and modelling (structural interpretation of seismic data, cross-section restoration, structural history analysis, fault-seal analysis)
  - ◆ Rock Physics
  - ◆ Detailed petrophysical analysis, for reservoir property information
  - ◆ Log interpretation techniques to derive rock properties from logging data
  - ◆ Integration and modelling of core data to calculate benchmarks for validating and reducing uncertainty

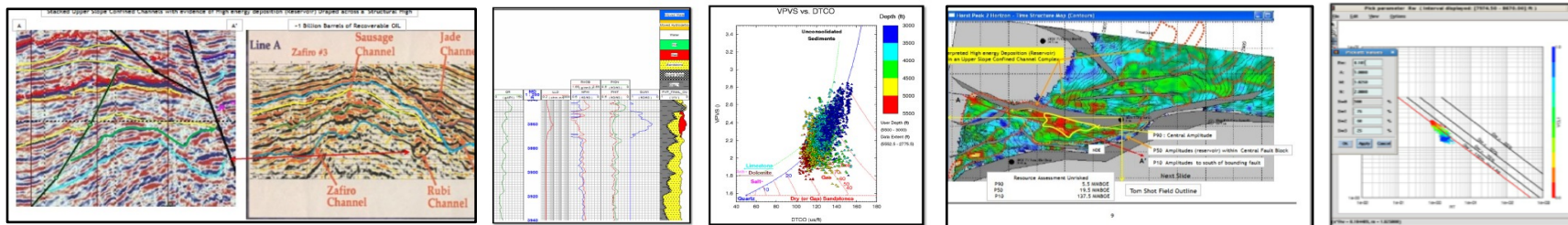


Compressional and Shear Analyses for phase determination and reservoir characterization



# Petrophysics

- ◆ Petrophysics – integration of core samples and well log data with the structural analysis and modelling (structural interpretation of seismic data, cross-section restoration, structural history analysis, fault-seal analysis)
  - ◆ Predictive, electrofacies models constrained to sedimentological descriptions
  - ◆ Develop if required, linear and non-linear, predictive permeability models for complex reservoirs and or resource plays
  - ◆ Experience for conditioning log data for seismic studies
  - ◆ Reservoir characterization
  - ◆ Volumetric calculations for hydrocarbon resource assessment

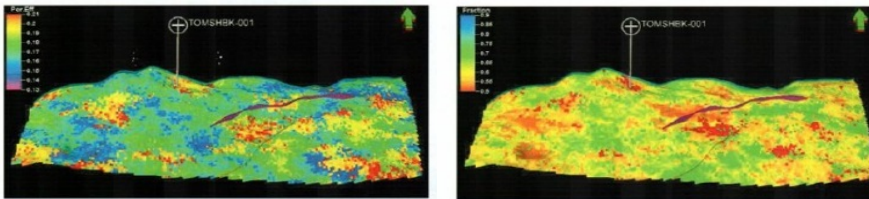


Reservoir Characterization and Extraction for Resource Assessment



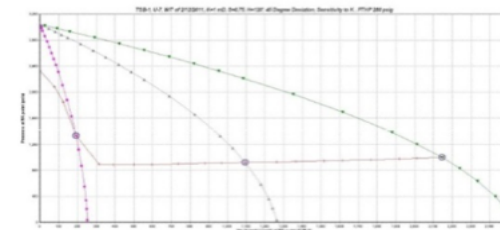
# Reservoir Planning and Management

- ◆ Following the Approval of the Field Appraisal Program further studies will be undertaken to ensure the optimum development is pursued. Key studies such as these are the next logical step:
  - ◆ Development planning
  - ◆ Depletion performance prediction
  - ◆ Reservoir simulation
  - ◆ Water flooding
  - ◆ Development of thin oil rims if applicable
  - ◆ Gas Reservoir Development
  - ◆ Gas Storage and or utilization plans



Full Field 3D Modelling

## Deviated Wellbore, 45° across Reservoir



Well Bore Direction Modeling for Maximum Recovery



# Reservoir Planning and Management

- ◆ Each field requires a specific field development appraisal. Dependent on the above resulting analyses and on the results of the initial drilling, its input into the 3D reservoir model a Field Appraisal Program will be designed. Dependent on the results and the study of the offsetting evacuation systems, the compatibility of the various crudes and the adjacent platform utilization, an appropriate evacuation system will be proposed for approval with the partners, adjacent operators and the Department of Petroleum Resources.
- ◆ MSI although has extensive experience in this subject will contract, under our direct supervision, this work to a Nigerian Engineering Firm. We have developed strong relationships with several Nigerian firms such as:
  - ◆ Degeconek Nigeria
  - ◆ Reighshore Energy Services Ltd
  - ◆ Ankorpointe
  - ◆ Advantage Resources
- ◆ If required we have used previously these International Engineering Consulting Firms:
  - ◆ RPS Group
  - ◆ NSAI
  - ◆ RockFlo
  - ◆ Xodus Group-Sunrise Advisory





# Reservoir Planning and Management

- ◆ MSI's staff has been conducting business within Nigeria for the last thirty years and as such as an extensive network of competent local Nigerian Firms who are all in capable to quickly and reliably complete any and all necessary work.
- ◆ MSI's understanding of the local infrastructure, pipeline and facility capacity is such that we firmly believe our network of affiliated and or long term relationships with Nigerian firms will quickly and cost effectively develop these field.
- ◆ Strategic partnership formulation at MSI is a high priority at each phase of the field development process. MSI has an unrivalled vertical network of partnerships that allow it to effect end to end field development and financing.
- ◆ MSI has a long-established partnerships with investment funds and EPIC Development contractors that provide us access to immediate financing and the resources to effect project mobilization and development

