



# **WELL INTERVENTION OPERATIONS AND COMPLIANCE ISSUES**

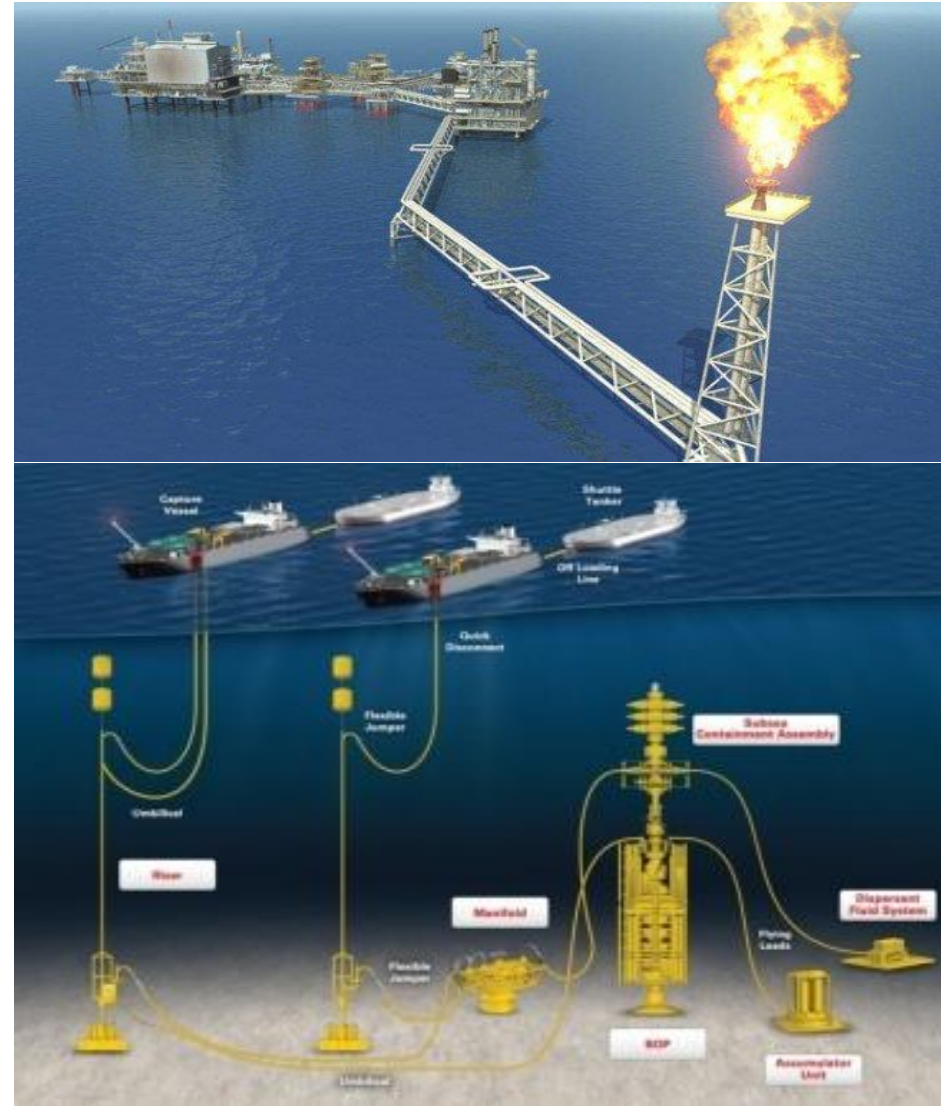
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# Role of the Department of Petroleum Resources



- **Regulate and Monitor all oil and gas activities in Nigeria.**
- **Optimize government revenue earnings and stakeholder value creation**
- **Ensure efficient recovery and conservation of hydrocarbon resources**
- **Administer and provide accurate and reliable data for investors, strategic planning and national development purposes.**
- **Promote and ensure a safe, secured and environmentally sustainable friendly oil and gas sector in Nigeria**
- **Ensure sustainable development of the industry through effective regulation and implementation of government policies on oil and gas matters.**
- **Ensure efficient development, operation and maintenance of oil and gas facilities in accordance with the provisions of the law.**
- **Conservation of the nation's rich Hydrocarbon Resources.**

# Legal framework for Resources Development, Production and Optimization in Nigeria



## Field Development Plan (FDP)

- Section 37 of Drilling & Production Regulations 1969
- Resources/Reserves
- Wells Count
- Production profiles
- Well Test/ Production Accounting
- New Technologies
- Flow Assurance
- Gas Utilization
- Economics

## Rig and Vessel Operations

- Section 34 of Drilling & Production Regulations 1969
- Expires 31<sup>st</sup> December
- Not transferable
- Pre Shipment Inspection
- ACS
- Pre License Inspection

## Drilling Activity

- Section 32 of Drilling & Production Regulations 1969
- Exploratory, Appraisal & Development drilling
- Sidetrack
- Redrill
- Well Deepening
- Change of Trajectory

## Re-entry Operations

- Section 32 of Drilling & Production Regulations 1969
- Initial Completion
- Well Clean Up
- Injectivity Test
- Workover
- Well Stimulation
- Recompletion

## Well Abandonment

- Section 35 of Drilling & Production Regulations 1969
- Well Suspension
- Well Plug back
- Well Abandonment

**Petroleum act 1969 and amendments and other principal legislations**

# Global Dynamics of Industry Developments



Production

Exploration

Capital  
Investment

Reserve



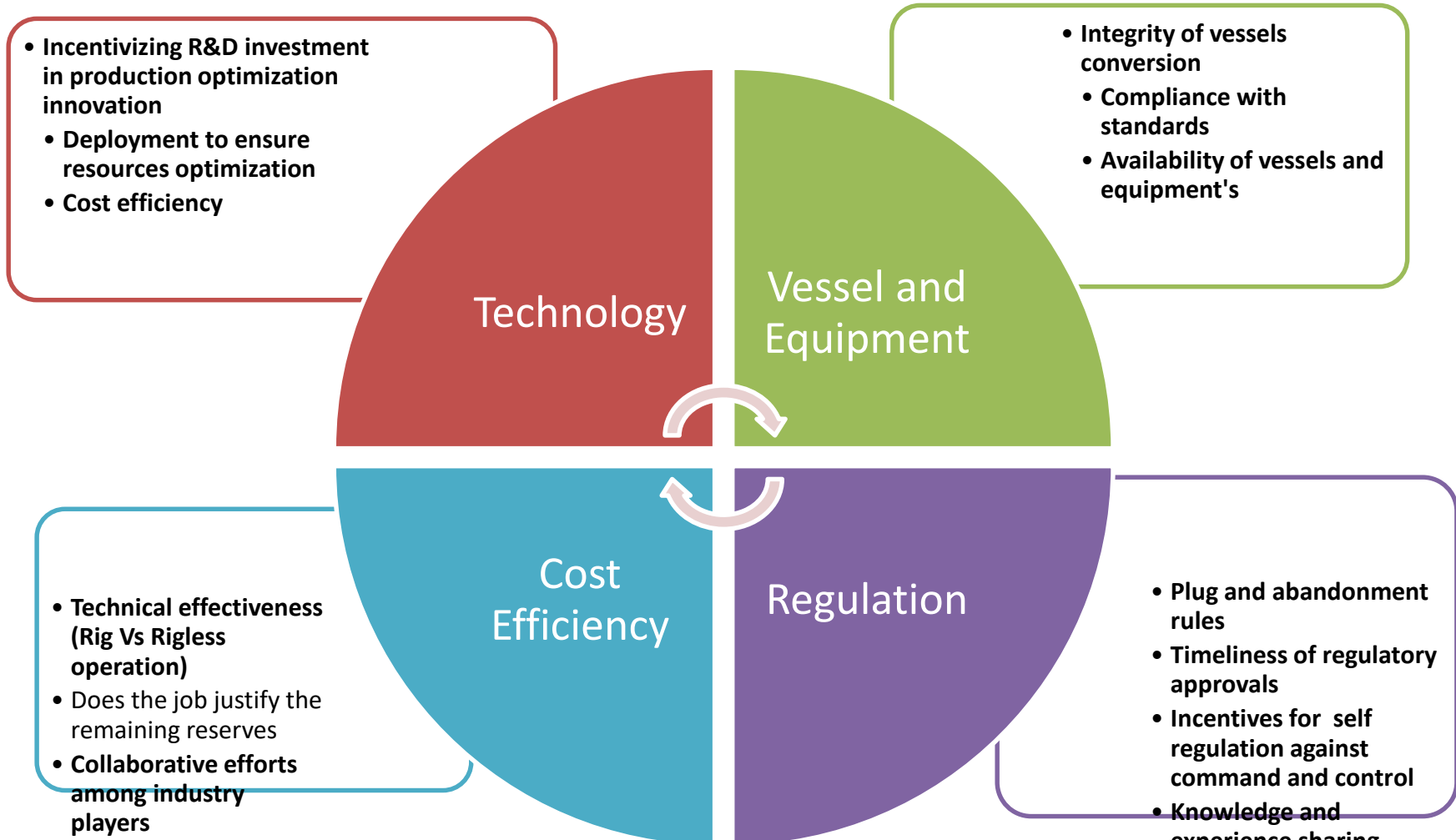
- Imbalance in oil demand and supply
- Oil price not dictated by demand/supply alone.
- Bust and Boom: cyclical investment pattern.
- Strong Production growth outside OPEC particularly USA.
- Nigeria is a Price Taker!
- **A Regulators Dilemma?**

Tough Time for a  
**REGULATOR!**



**Regional competition on investing upstream capital exploration and development spend reinforces the need for robust regulatory framework on resource optimization**

# Regulatory Value Proposition for Optimal Well Intervention Practices



Commitment by Industry and dynamic regulation by government are critical to optimal intervention practices in oil and gas production and management

# Intervention Operations in Nigeria



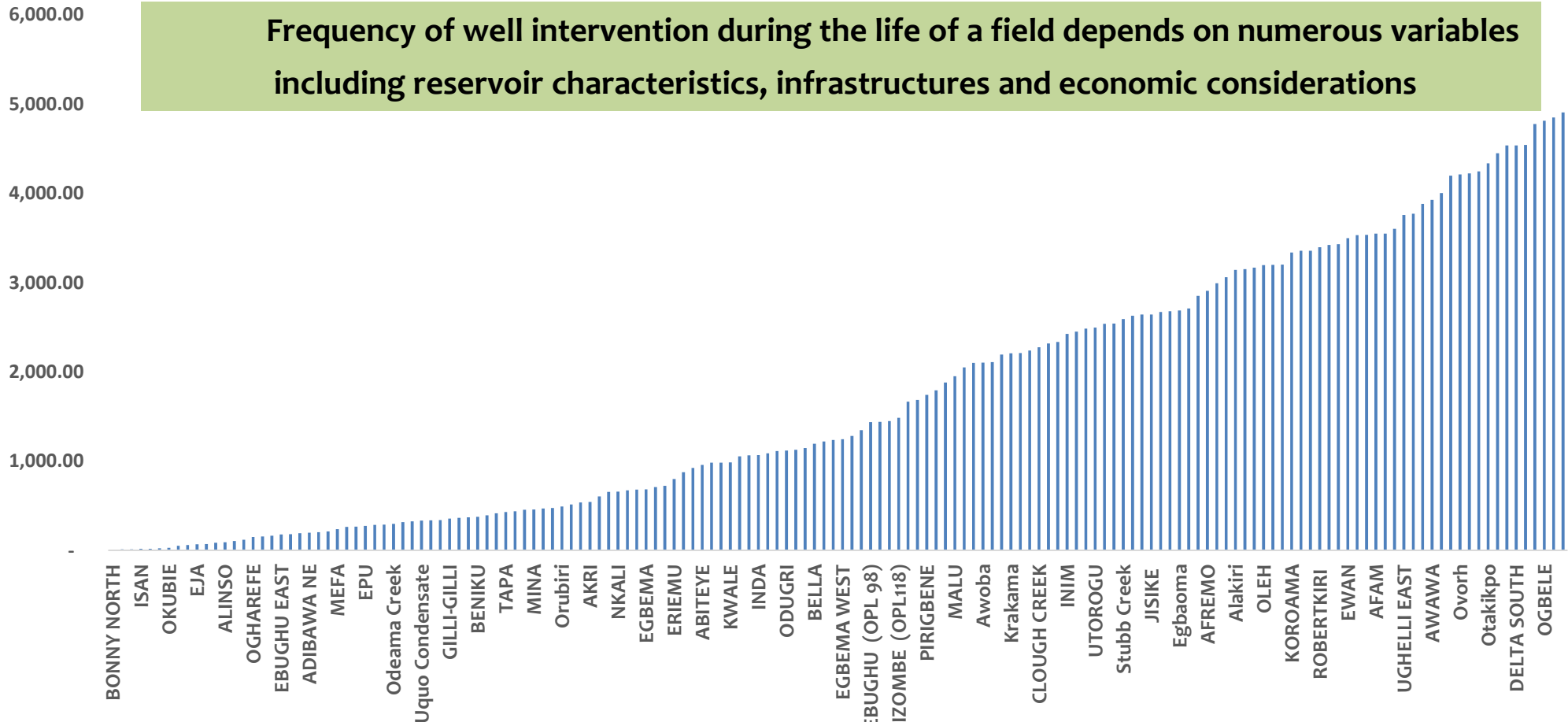
- Well intervention is a necessary option to optimize resource recovery and accelerate revenue generation to fund national plans and stakeholder sustainable value proposition
- Frequency of well intervention during the life of a field depends on numerous variables including reservoir characteristics, infrastructures and economic considerations
- Choice of technique and equipment to be deployed for intervention depends on subsurface condition which determines the mechanical and economic success of the job.
- Deepwater fields notably Bonga, Agbami, Erha etc are cutting edge developments that have leverage on technology developments to enhance production through efficient well intervention techniques.
- There is huge intervention requirement in onshore fields to shore up production and enhance recovery.
- Equipment and vessel integrity and compliance is key to achieving value creation in intervention programs.



# Distribution of fields Performance (1-5KBOPD)

1KOPD - 5KOPD

Frequency of well intervention during the life of a field depends on numerous variables including reservoir characteristics, infrastructures and economic considerations



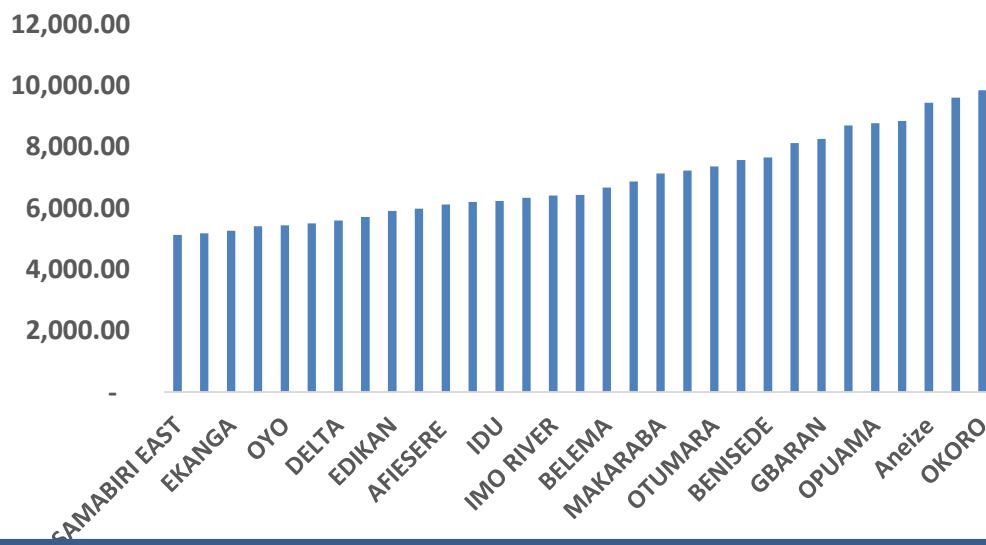
Large number of producing fields rely on intervention programmes to accelerate recovery and enhance performance



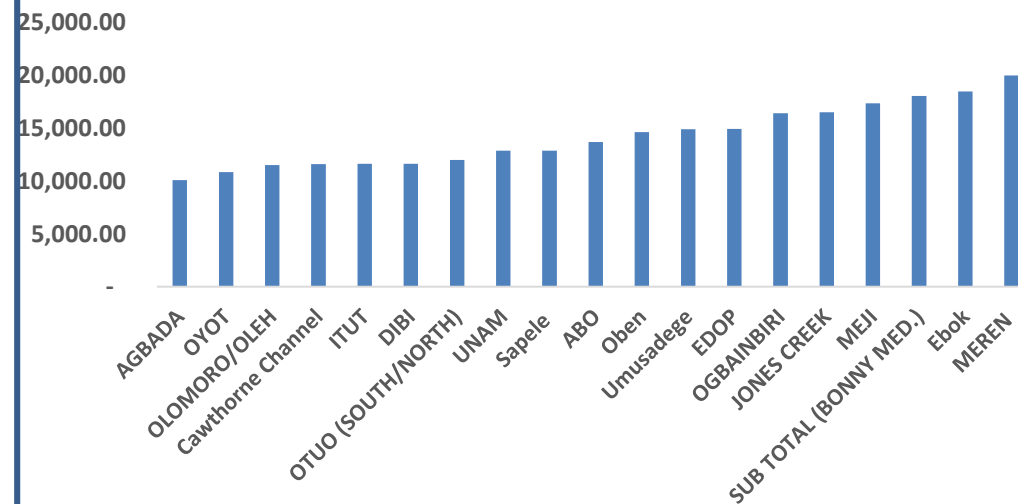


# Distribution of Fields Production Performance

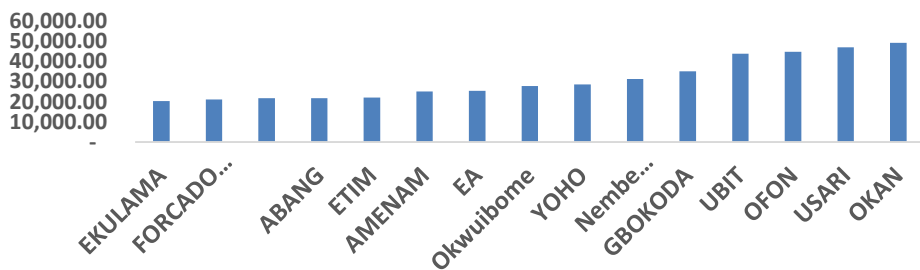
### 5KOPD - 10KOPD



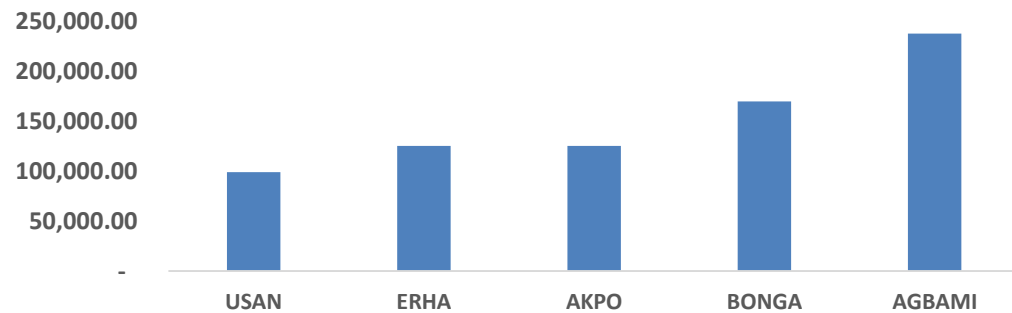
### 10kOPD - 20KOPD



### 20KOPD - 50KOPD



### >50KOPD



Intervention optimization techniques facilitate production optimization

# Intervention Cost and Duration – Case Study



YEAR	WELL A		METHOD DE PLOYED	COMMENT
	DURATION	COST		
1	7 days	8 M\$	Rig	Acid stimulation with rig
2	7 days	9.5 M\$	Rig	Stimulation with Rig
3	8 days	10 M\$	Rig	Stimulation with rig
4	8 days	4.5 M\$	Vessel	Rigless stimulation with Vessel
5	7 days	2.6 m\$	Vessel	Rigless Stimulation with Vessel

YEAR	WELL B		METHOD D EPLOYED	COMMENT
	DURATION	COST		
1	7 days	9 M\$	Rig	Stimulation with rig
2	8days	9.5 M\$	Rig	Stimulation with Rig
3	7 days	2.2 M\$	Vessel	Rigless stimulation with Vessel

## From the studies carried out:

- Required duration of rig per well – 65 days
- Required cost per well using rig - 70 M\$

- Required duration of Vessel per well – 68 days
- Required cost of Vessel – 35 M\$

## Conclusion

**For remaining reserves of 6 Mbbls and 16 Mbbls respectively,** Cost effective solution developed for managing the PI decline in Wells A and B wells is deployment of OIMR Vessel with significant cost reduction compared to rig operations. Pay out is in about a month.

Cost showed a significant capital outlay of 140 M\$ (excluding rig mobilization cost)



# Compliance Requirement For Re-entry (Well Intervention) Operations in Nigeria

## RE-ENTRY PROPOSAL to include:

- Structural maps
- Well Correlations
- Re-entry plan
- Well Schematics
- Hydrocarbon Distribution Chart (Saturation Chart, Logs)
- Resource accounting (Reserves, production)
- Data gathering plan (Press, Zonal Vol., Temp., Formation Isolation)
- Valid licensed Rig / Intervention vessel
- Re-entry cost and Schedule (Dev. Cost/Operating Cost/Tangibles)



Payment of statutory fees

Re-entry approval prior to actual re-entry

Monitoring of re-entry operations

# Well Intervention Value Addition



- **Scope of work identified in well intervention includes: well logging, perforating, well cleaning, fishing, fluid displacement, thru tubing sand control, remedial cementing, selective stimulation, thru tubing completions artificial lift services, re-entry drilling and surface controlled subsurface safety valve repairs**
- **In 2017, estimate of oil gain from the above intervention operations in Offshore is about 20,000 bopd with about 65,000 bopd in other terrain.**
- **In 2018, estimate of oil gain from the above intervention operations in offshore increased to 50,000 bopd with about 80,000 bopd in other terrain**
- **This was achieved with reduced cost, time and production deferment.**
- **In Quarter 1, 2019, we have licensed 7 Intervention Vessels in Nigeria as against 3 and 4 for the previous years**
- **However, more can be achieved with enhanced engagement with the regulator by the industry**

# Key Intervention Challenges in the Nigerian Oil & Gas Industry



- **Dwindling Exploration activities reinforces further intervention to recovery of remaining hydrocarbon**
- **Erosion of Value assurance to all stakeholders due to high operational cost**
- **Minimal intervention due to robust FDP**
- **Growing spate of non-compliance in terms of licensing of intervention vessels and well intervention operations permit**

# The Way forward



- **Robust Field Development Plan**
- **Smart well Technologies for ease of intervention operations**
- **Timely engagement and effective interface management**
- **Regulatory compliance by industry players**
- **Statutory reporting of Oil and Gas Operations**
- **Automation of regulatory processes to ease business and enhance reporting and monitoring of intervention operations.**

# Conclusion



- **Compliance in Well Re-entry Operations will promote the optimization of hydrocarbon resources recovery and value proposition to stakeholders**
- **Emerging industry dynamics are reinforcing the importance of well intervention**
- **Technology is a key enabler to cost efficiency and production optimization.**
- **Regulatory compliance by well intervention vessel operators must be pursued to ensure hitch free and safe operations**
- **We are committed to optimizing the regulatory environment in Nigeria to enhance our competitiveness and ensure ease of doing business and regulatory compliance.**

# DPR Website



- For additional information on the mandate/roles of the DPR and the legislative instruments & regulatory tools employed by the Department, please visit the DPR corporate website:

[www.dpr.gov.ng](http://www.dpr.gov.ng)





*Thank you for listening*

