

Drilling Tools
Product Line
&
Engineering &
Machine Shop
Capabilities
Presentation



JA Oilfield Manufacturing Inc. History



- ❑ Founded in 1981
- ❑ Headquartered in OKLAHOMA CITY
 - Sales Offices and Machine Shops
 - ❑ Oklahoma City
 - ❑ Odessa, Texas
 - ❑ Pittsburgh, Pennsylvania
 - ❑ Houston, Texas
 - Over 100 employees

Strategic Direction

- ❑ Vision
- ❑ Health, Safety and Environment
- ❑ Business Development Excellence
- ❑ Strong Portfolio of Drilling Products
- ❑ Organizational Value Development
- ❑ Market and Customer Knowledge



Mission, Vision and Values



□ Mission

Satisfy customers while consistently earning a reasonable profit

□ Vision

To be the leading manufacturer and provider of key drilling bottom hole assembly tools essential to achieving superior drilling performance by our customers.

□ Values

- Integrity
- Safety
- Customer Satisfaction
- Performance through Valued People

Health, Safety & Environment Culture



JA Oilfield Manufacturing, Inc. maintains a healthy workplace for employees, seeks the safest operation and conduct of ALL activities, and uncompromising on efforts to protect the environment,

James Acquaye - President

- Employee Health and Safety
 - Leadership
 - Management
 - Training and Awareness
 - Performance

- Reduction of OSHA Reportables Year On Year
 - JA HS&E Scorecard
 - Total Recordable Incident Rate (TRIR)
 - ▣ Number of Incidents Per 200,000 man-hours (<1)

 - Days Away From Work Case Rate (DAFWCR)
 - ▣ Number of Incidents Per 200,000 man-hours (<0.3)

Product Line & Services

- ❑ Drilling Performance Equipment and Tools
 - Downhole Drilling Motors
 - Shock Subs
 - Drilling Jars
 - Stabilizers

- ❑ Hole Quality Enhancement Tools
 - Near Bit Reamers (Bit Sub)
 - Hole Openers
 - Roller Reamers
 - Key Seat Wipers

- ❑ Bottom Hole Assembly/Work String Components
 - Steel Drill Collars
 - Non-Mag Stainless Steel Drill Collars
 - Heavy Weight Drill Pipe
 - Tri-collars

- ❑ Machine Shop/Services
 - Tool Design and Manufacturing
 - Drill String Component Repairs
 - NDT Inspection (DS-1 Standards)

Downhole Drilling Motors and Directional Well Services



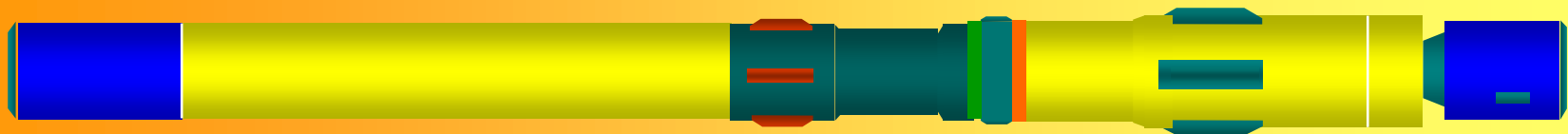
- ❑ Provides one of the most powerful drilling motors in the market
 - Conventional and Even wall Power Sections
 - Adjustable Kick-off (AKO) with Reinforced Thread Design and Wear pads
 - Fixed bend housing available
 - Titanium drive-shafts
 - *JA Oilfield developed an 8" Power Section with a 9-1/2" Bearing Section*
 - *High penetration rates*
 - *Longer drilling runs*

4.3/4" - 6.3/4" - 7-7/8" - 8" - 9-1/2" Motor Sizes

Top sub with float valve
and/or mud screen

Bearing assembly with diamond bearings
or advanced ball bearings

Rugged drive train



Stator/Rotor Configuration
for application specific torque
and speed requirements

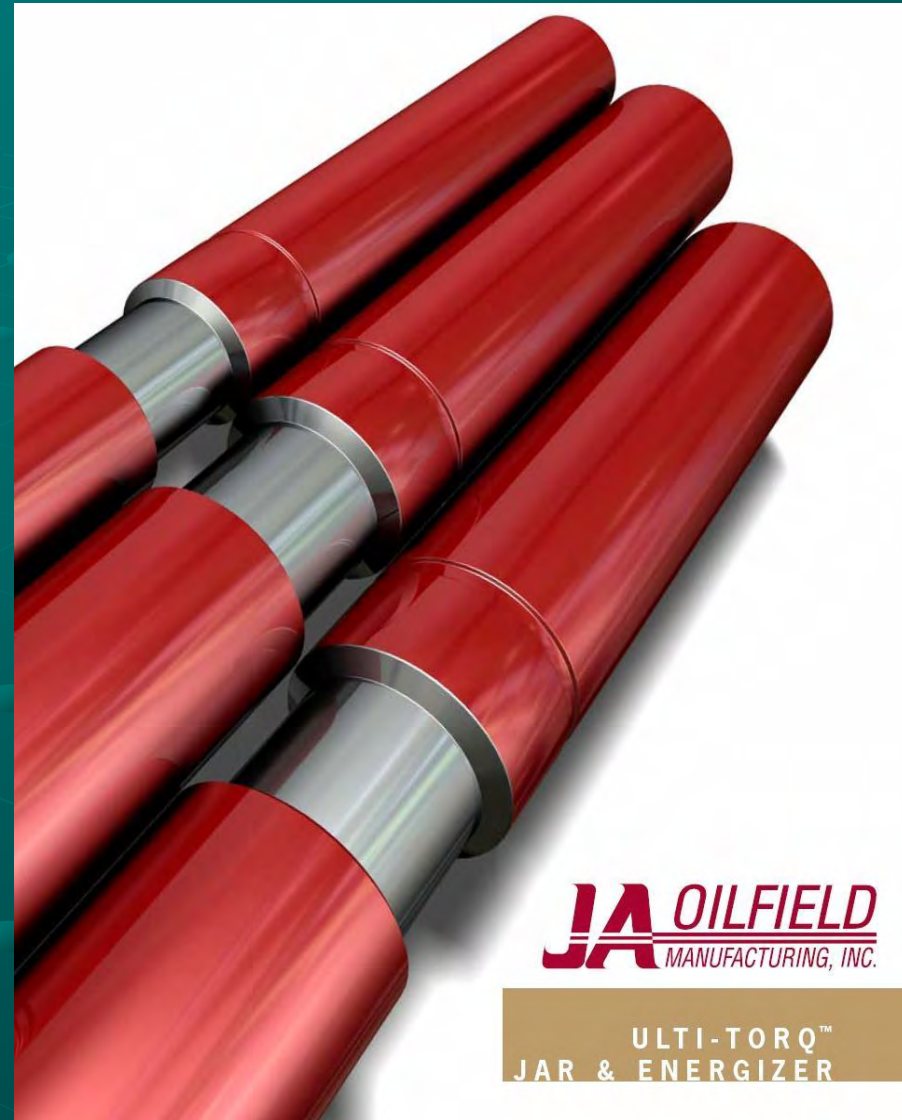
AKO, Straight Housing or Fixed Bend

Drilling Performance

- Drilling Jar & Energizer
 - Hy-Powr™ Series
 - ▣ Double-Acting Hydraulic Only
 - Proven performance and reliability to demanding US drilling requirements

- Performance Features
 - Unique metering process and large capacity reservoir compensates for the decrease in oil viscosity as the jar is fired repeatedly, ensuring consistent impact
 - Jarring direction, duration and impact intensity controlled from the rig floor
 - Full bore design minimizes pressure losses and provides wireline tool bore access
 - Jar may be run in compression or tension, providing optimized placement in the string

- Application Note
 - Drilling conditions where the risk of differential sticking, hole sloughing or other potential stuck-in-hole problems exists
 - When downhole tools, directional and MWD / LWD equipment are utilized in the BHA. Extended long reach directional and horizontal applications may require multiple jars for maximum effectiveness



Drilling Performance

□ Shock Sub

■ Tympanum™ Series

- ▣ Incorporates design enhancements from peer offerings
- ▣ Industry leading shock response performance over extended dynamic range
- ▣ Offers heavy load and light load spring configurations

■ Performance Features

- ▣ Progressive Shock Damping and shock load dissipation system
- ▣ Reduces bit bounce; extends bit life
- ▣ Absorbs destructive axial shocks from causing MWD/LWD failures
- ▣ Improves penetration rates
- ▣ Optimal short sub length; neutral effect on BHA directional attitude



Hole Quality Enhancement

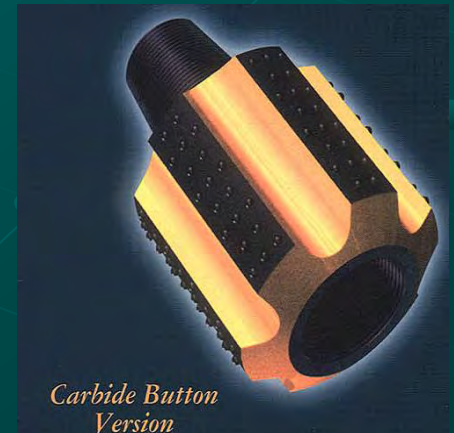
Customer's
Most Popular

□ Bit Sub

- Designed to run between the bit and the mud motor enabling you to ream directly behind the bit on any directional job
- No moving parts to fail or lose in the hole
- Reaming at the bit offers gauge hole and reduces torque at bit
- Improves motor orientation with reduction of torque
- Short-body design – bias neutral and will not affect ability of directional motor to build or drop
- *Also doubles as a bit gauge indicator when torque increase detected on surface*

□ Application Note

- Run behind the bit to ream while drilling
- 3-rows of tungsten-carbide inserts/synthetic diamond for abrasive formations or smooth PTA hardfacing for hard formations
- Can be run in Packed-Hole Assembly as a near-bit reamer



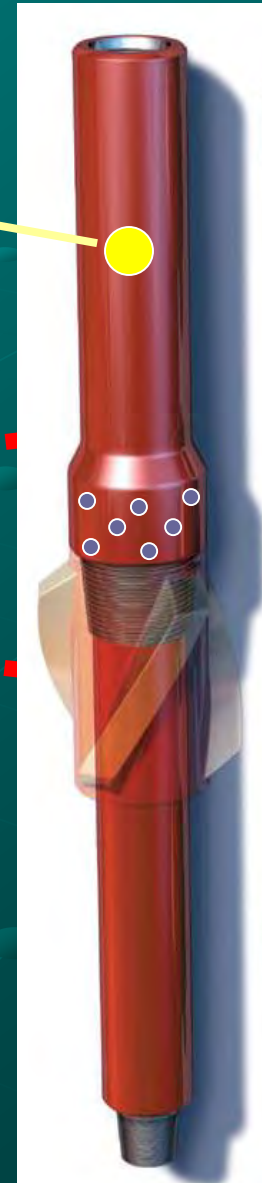
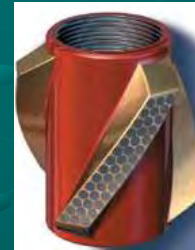
Rig Replaceable Sleeve Stab

□ RapiDSwap™ Features

- One piece “armored” mandrel manufactured from high strength heat treated alloy steel
- By design feature ample tong space for recutting connections
- To offer greater versatility Sleeve and Mandrel designs made to be interchangeable with similar brands of rig replaceable stabilizers
- Stabilizer sleeve blades can be dressed with:
 - Smooth PTA - **recommended**
 - Tungsten Carbide Inserts

□ Application Note

- Versatile and economic in remote locations
- Complements Directional Motor Three Point Contact





Integral Blade Stabilizer

□ Stabilizer Features

- Chassis made from one-piece 4145H high strength alloy steel OR Non-Mag Stainless Steel
- Near bit or String Stabilizer design
- Offer ample tong space for recutting connections
- Three or Four blades CNC-machined either full-wrap or half wrap
- Choice of hard facing include:
 1. Plasma Transfer Arc (PTA)
 2. Tungsten Carbide Inserts or Compacts
 3. Lasercarb or Cladding
- Optimized fluid passages for cuttings removal
- *Rotary Steerable Design Option offered with relaxed spiral design and extended taper*

□ Application Note

- Improve directional BHA dynamics
- Packed hole arrangement – NSTB-STRB-STRB



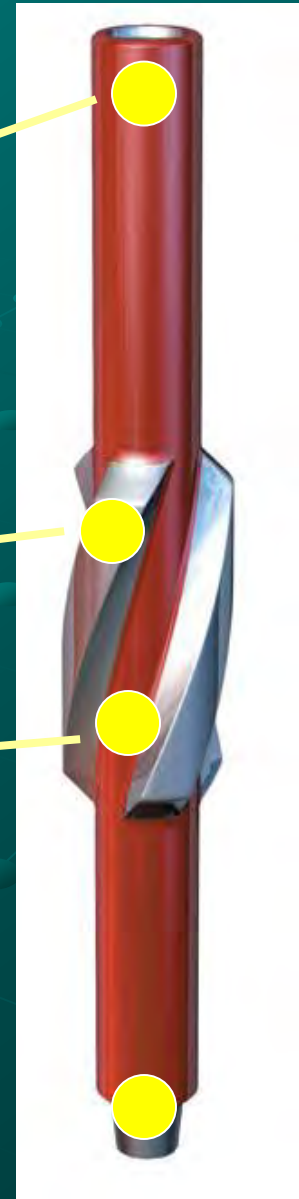
Welded Blade Stabilizer

□ Stabilizer Features

- Chassis made from one-piece 4145H high strength alloy steel OR Non-mag Stainless Steel
- Welded precision-formed blades
- Three or Four blades CNC-machined either full-wrap or half wrap
- Hardfacing Options
 - Plasma Transfer Arc (PTA)
 - Tungsten Carbide Inserts or Compacts
 - Lasercarb or Cladding
- Optimized fluid passages for cuttings removal
- Available from 4-1/8 in. to 24 in. sizes

□ Application Note

- Soft to Medium-hard formation
- Mostly top-hole sections



Reamers

□ Reamer Features:

- Offer the three-point 3RXC and 6RXC mud-lubricated roller reamers
- Easy rig floor replacement of cutters and parts
- Formation-matched reamer models
 - Type “VHM” – soft formations – soft lime and shale
 - Type “QHM” – medium to hard formations - chert
 - Type “KHM” – aka Knobby are for hard formations

□ Application Note

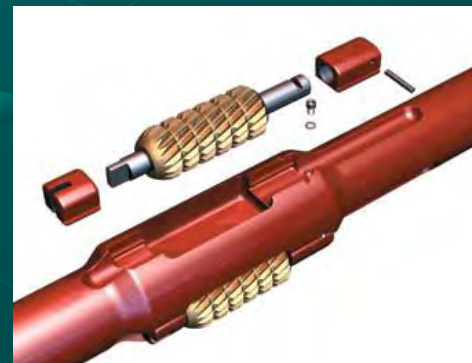
- Three point 3RXC configurable for near-bit placement
- Six point 6RXC offer greater stabilization and reaming
- Run between drill collars to augment stiffness
- Most effective in reducing torque by converting sliding contact friction into much less rolling contact friction.

□ Changing Cutters

- Drive out spring pin and cutter pin
- Replace cutters
- Safety glasses, Hammer and Drive Bar only tools needed at rig site



VHM QHM KHM



Bottom Hole Assembly/ Workstrings

- Steel Drill Collars
- Non-mag Stainless Steel Drill Collars
- Heavy Weight Drill Collars
- Tri-Collars and Square Drill Collars

Steel Drill Collars

❑ Steel Drill Collars

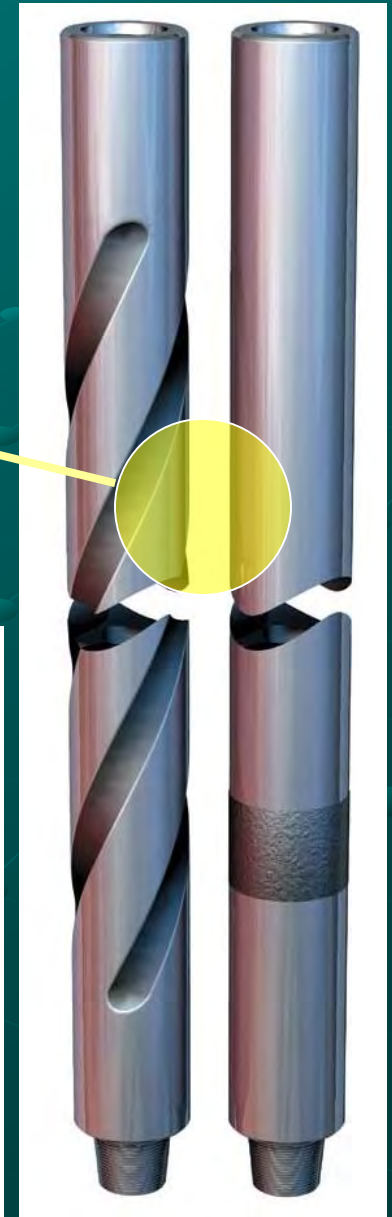
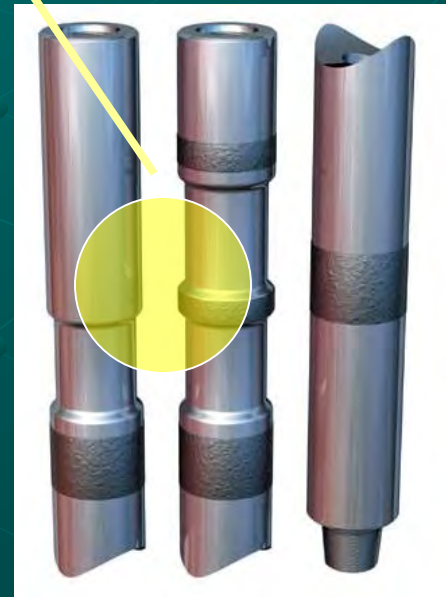
- Manufactured from 4145H Modified, Quenched and Tempered Steel
- Bores are held to close tolerances by Computer Numerical Controlled (CNC) Trepanning process and drifted to API specifications
- Connections are kemptled to prevent galling
- Thread roots are cold rolled to provide longer fatigue life
- Offered in both slick and spiraled O.D.

➤ Special Drill Collar Features

- Incorporate API relief groove on pin: Bore-back on Box
- Machine Slip and Elevator Recesses to reduce drill collar handling time
- Carefully applied hard-banding material flush to 1/32" above collar O.D.

❑ Application Note

- In formations where differential sticking risks are high, spiral drill collars reduce wall contact



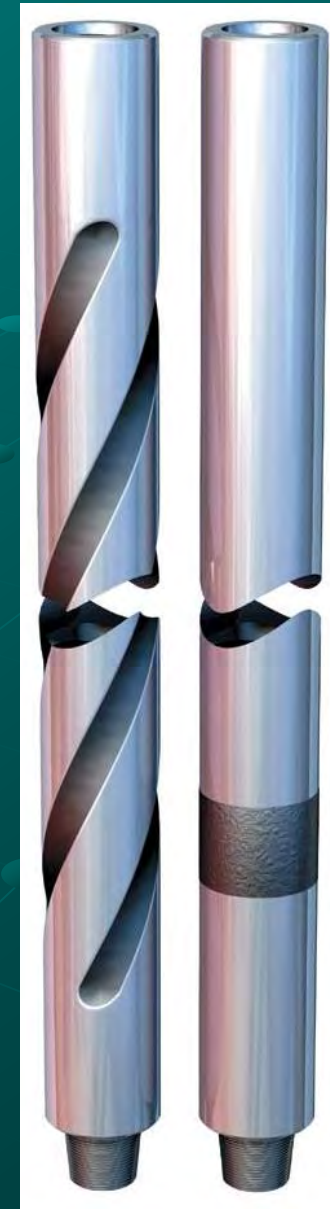
Non-Mag Stainless Steel Drill Collars

□ Non-mag Stainless Steel Features

- Made from specially configured Non-mag stainless steel alloys developed for oil-field application from:
 - Scholler-Bleckmann :- P Series 550 - 580
 - Jorgensen Forge :- NMS-100 - 140
 - Carpenter Materials :- 1515HS
 - Thyssen Krupp :- AMAGNIT 501
- Magnetic permeability no greater than 1.009
- Shot-peened ID to prevent stress corrosion cracking in H₂S and high Chloride well-bores

□ Application Note

- See JA Oilfield Manufacturing Inc. catalog for guide to Non-mag selection and placement



Heavy Weight Drill Pipe

□ Heavy Weight Drill Pipe Features

- Intermediate weight drill-string member with drill-pipe dimensions for handling
- Long tool joints provided with hard-banding provide extended space to recut the connections
- The center upset protects the tube from OD wear by providing stand-off for tube from the hole wall, while reducing the risk of differential sticking
- The API Bore Back Box feature is standard for the box connection
- Cold rolled thread roots on all Hevi-Wate drill pipe connections to increase connection's ability to resist fatigue cracking
- Hevi-Wate drill pipe can be picked up with the drill pipe elevators, for fast efficient handling on the rig floor



Crossover Subs – Steel & Non-Mag

□ Features

- Available in Reduced OD, Straight OD, Lift and Saver designs
- Can be manufactured using 4145H Mod steel and Non-Mag Stainless steel
- Rotary subs are available with **box x pin**, **box x box** or **pin x pin** in preferred connections.
- Connections are protected by a phosphate surface coating that minimizes galling on initial make-up.

□ Application Note

- **Straight OD Sub** is used to connect drill stem members that have a similar outside diameter.
- **Reduced OD Sub** is used to connect drill stem members that have different diameters such as to crossover large OD drilling tools or to achieve a tapered drill collar string.
- **Saver Sub** is used to extend the life of the kelly connection. The saver sub can be equipped with a *rubber* or *brass* protector to reduce BOP equipment and casing wear resulting from contact damage with the lower kelly connection.
- **Lift Subs** enable the safe, efficient handling of straight OD tubulars such as drill collars, shock tools, jars, directional equipment and other tools by using the drill pipe elevators.

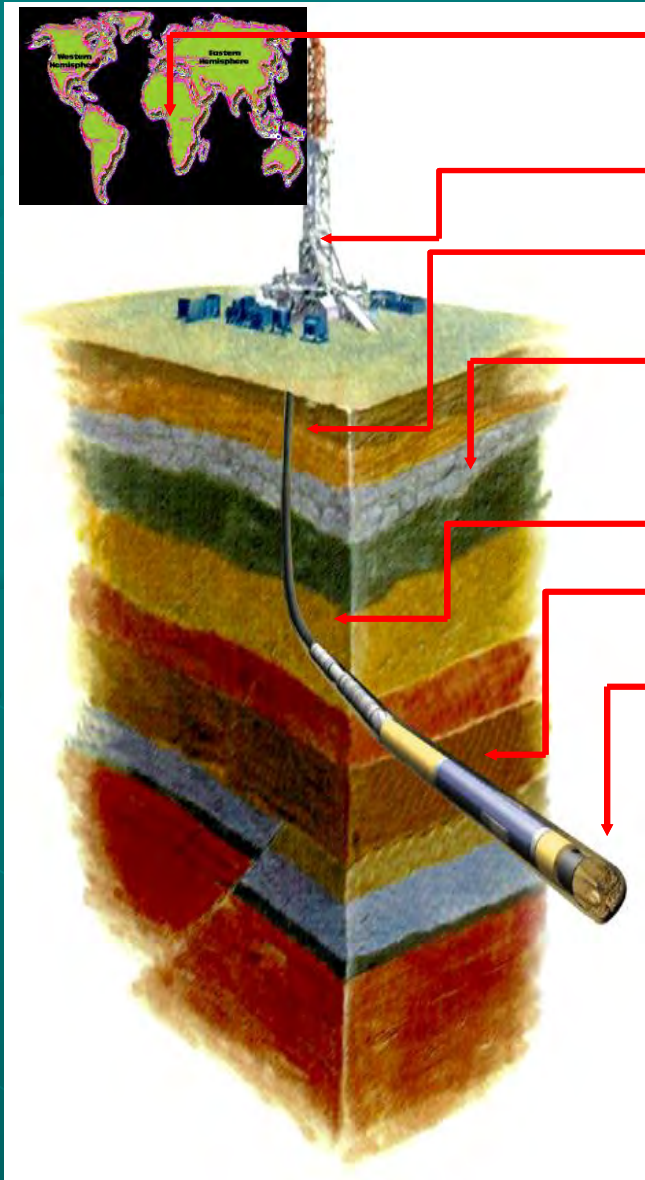


How Are We Organized?



- Market and Customer Knowledge
- Business and Machine Shop
- Sales and Manufacturing Operations

Market Knowledge



- Location - Region/Country
- Client Details
- Rig Class
- Well Class
- Stratigraphy
- Drilling Environment
 - Mud System
 - BHA & Components
 - Directional Objectives
 - Bit Selection
- Drilling Guidelines
 - Problems
 - Planning
 - Operating Practices
- Performance
- Local Best Practice

Technical lessons learned

"Training Technical Lessons"

Project name: 0400-DIG Training
 Project ID: 000000001

Region: Europe
 District: UK
 Field: Singapore

Well class: Directional
 Well class: Directional
 Directional measurement: Conventional

Rig class: Type: Landrig 1000 - 2000HP
 Features: Toolbars

Mud system: Drilling fluid
 Well type: Directional

Client: MCC
 Client contact: David Curran
 Lead engineer: P. Harvey
 Start date: 20/06/2007
 End date: 20/06/2007

Drilling environment:

| From | To | Depth | Mud weight | Pore pressure | Over balance | Indicative |
|------|------|--------|------------|---------------|--------------|------------|
| 0.00 | 1.00 | 10.00m | 1.20 spg | 1.80 spg | 1.40 spg | 0.20" |
| 1.00 | 1.00 | 1.00m | 1.40 spg | 1.70 spg | 1.40 spg | 0.20" |

Stratigraphy:

| Stratigraphy | Type | Major / minor | Avg. thickness | UCS | Interface severity | Bulking tendency | RF | RF (R) |
|--------------------|--------------|---------------|----------------|------|--------------------|------------------|-----|--------|
| Drilling Formation | Consolidated | 100% | --- | 1000 | Low | Non-Bulking | 500 | 10 |
| Drilling Formation | Consolidated | 100% | --- | --- | --- | --- | --- | --- |

Comments: Training Formation: This formation has been identified as a key area for training in the DGS Training Course.

Drilling systems:

| Mud type | Mud system | Water | Drilling fluid |
|-----------------------------|-------------|-------------|----------------|
| Water | Water | Water | Water |
| Supplementary BHA equipment | Directional | Directional | Directional |
| 2 | --- | --- | --- |
| 3 | --- | --- | --- |

Directional objectives:

| Course change rate | Rate | Rate |
|--------------------|------|------|
| 2.50" | --- | --- |
| 3.00" | --- | --- |
| 3.50" | --- | --- |

Well class: ROLLER CONE Series 3.0-1
 Bit type: Fuller's Chiselbit

Objective: An example of a Technical Lesson.

Potential problems:

| Problem | Severity | Frequency |
|---------|----------|-----------|
| 1 | High | High |
| 2 | Medium | Medium |
| 3 | Low | Low |

Planning action:

| Action | Priority | Frequency |
|--------|----------|-----------|
| 1 | High | High |
| 2 | Medium | Medium |
| 3 | Low | Low |

Operating practices:

| Practice | Priority | Frequency |
|----------|----------|-----------|
| 1 | High | High |
| 2 | Medium | Medium |
| 3 | Low | Low |

Performance: Training Performance

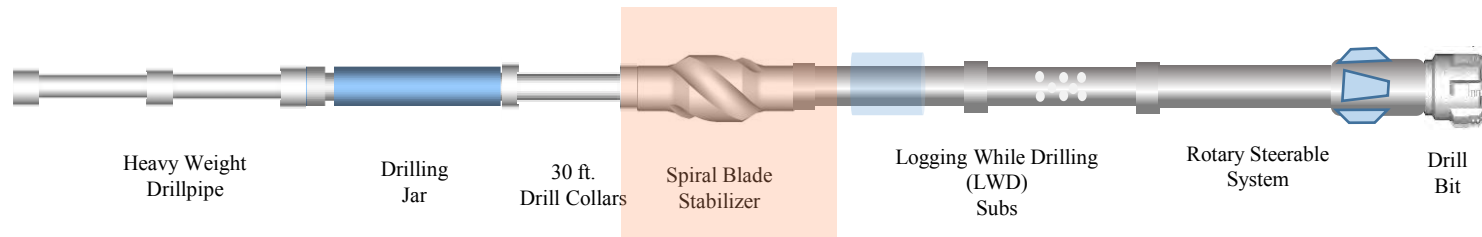
Local best practice: Training Best Practice

Service Value – Performance Proposition

- Reduce Cost/Foot
 - Improve Penetration Rate
 - Increase drilling efficiency and overall progress rate
 - Extend tool service life – min. tool count per hole section
 - Reduce trips
- Risk Management
 - Minimize drilling related problems through:
 - specialized tool design
 - superior materials used in tool manufacture
 - detailed planning and risk analysis
 - share best practice and proven local tool application scenarios

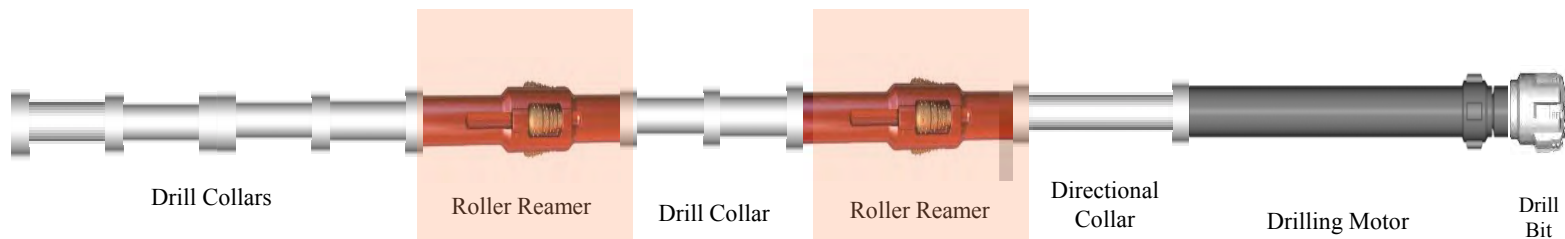


Typical drilling Bottom Hole Assemblies (BHA) - Rotary Steerable System (RSS)



Rotary Steerable System

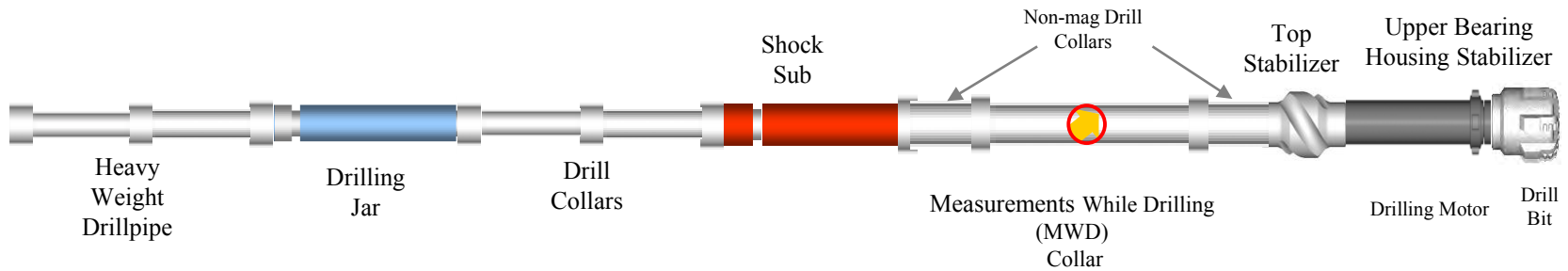
- Kick-off and curve section (Build-up rate up to 7 degs/100)
- Angle hold tangent section
- Geosteer lateral section



Hole reaming and conditioning BHA

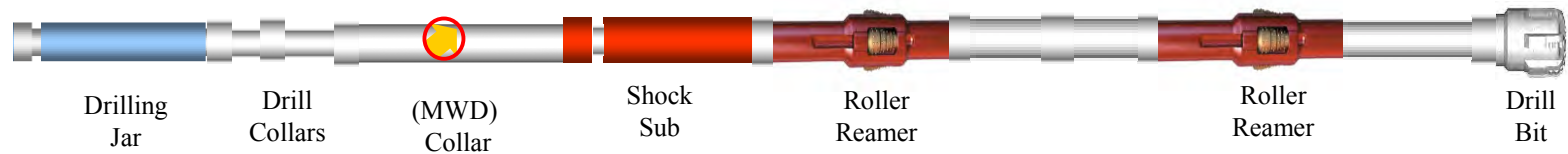
Typical drilling Bottom Hole Assemblies (BHA)

- Downhole Motor System - Stabilized



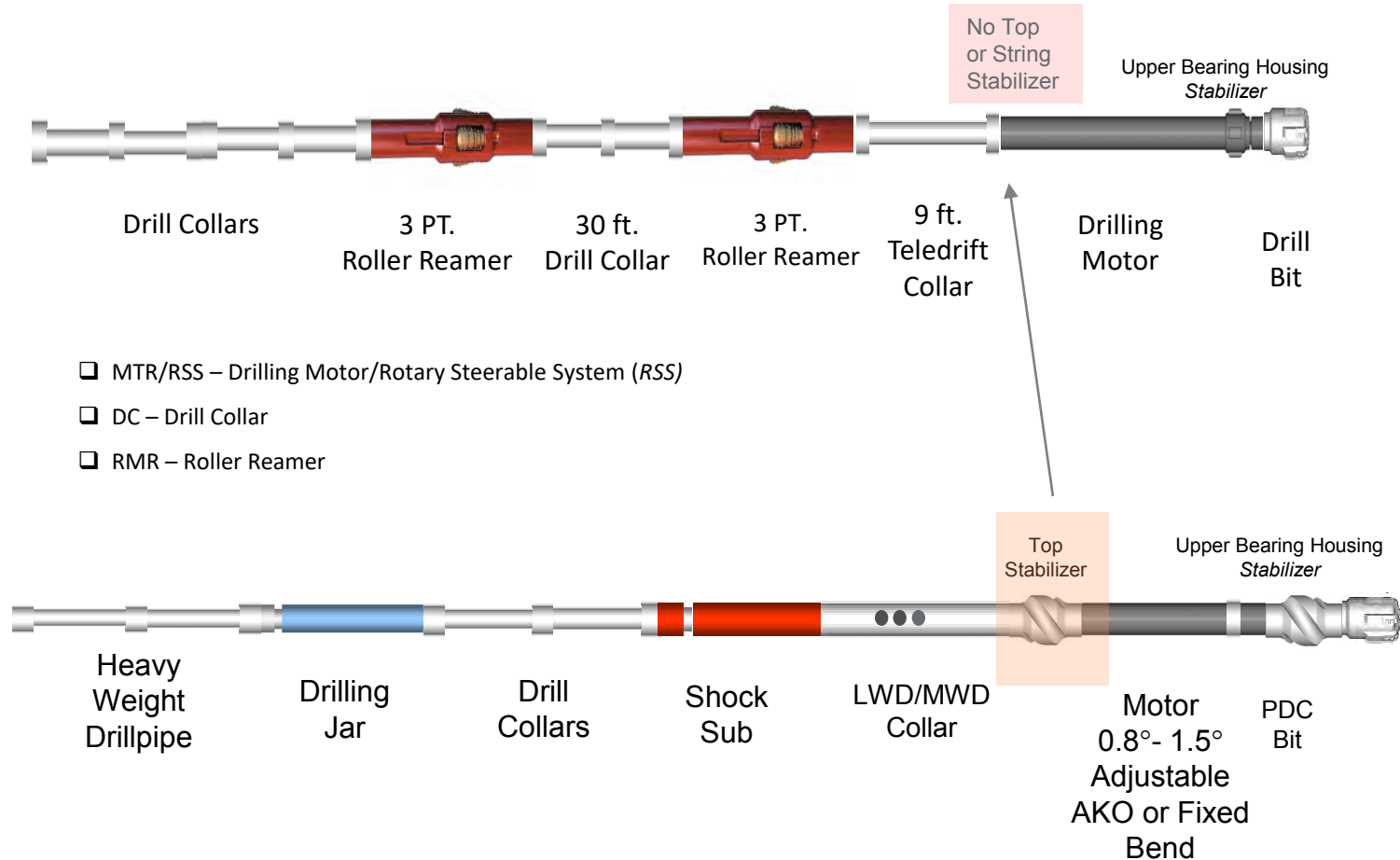
Features

- Top Stabilizer



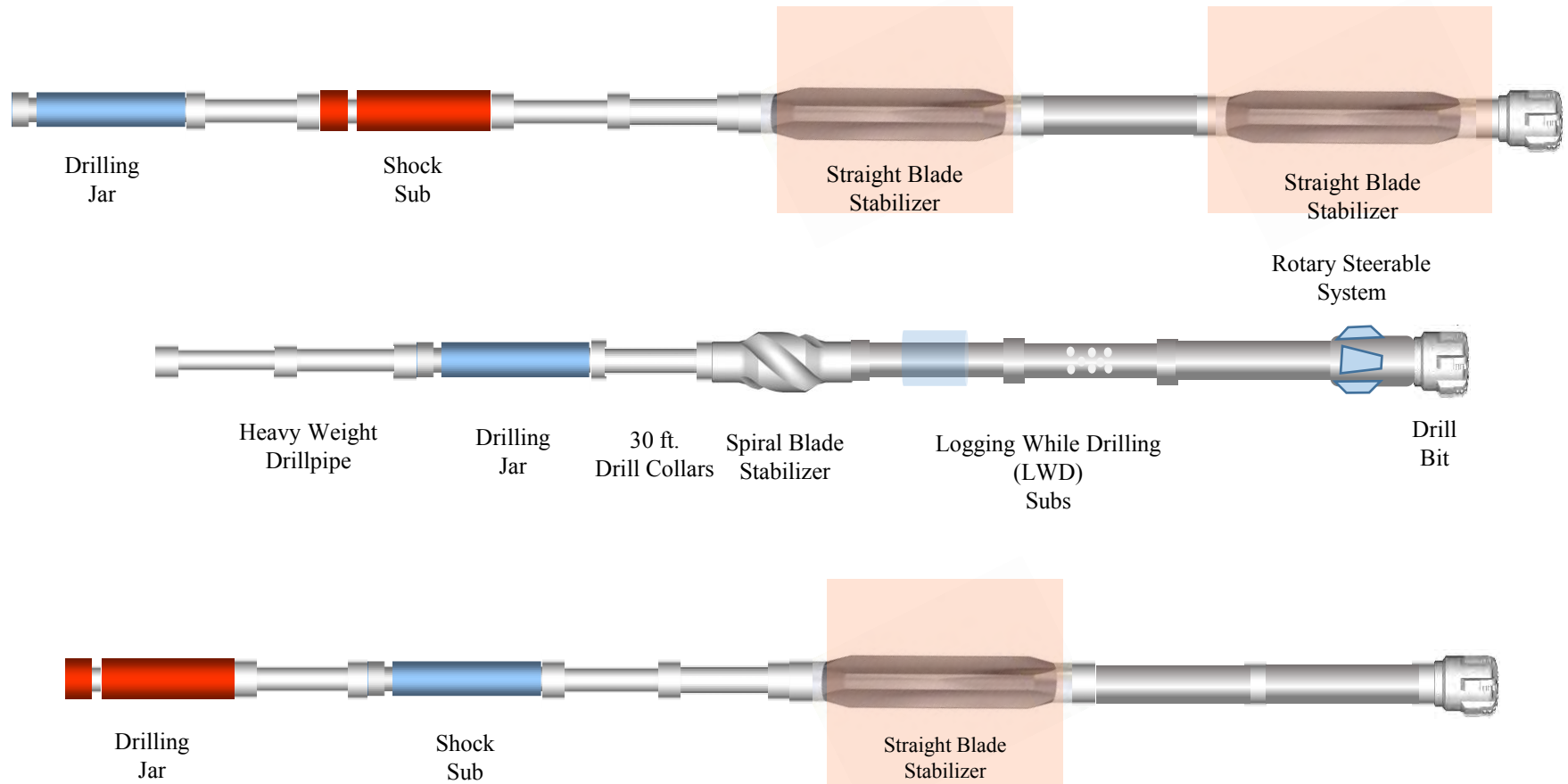
Typical drilling Bottom Hole Assemblies (BHA)

- Downhole Motor System - Slick



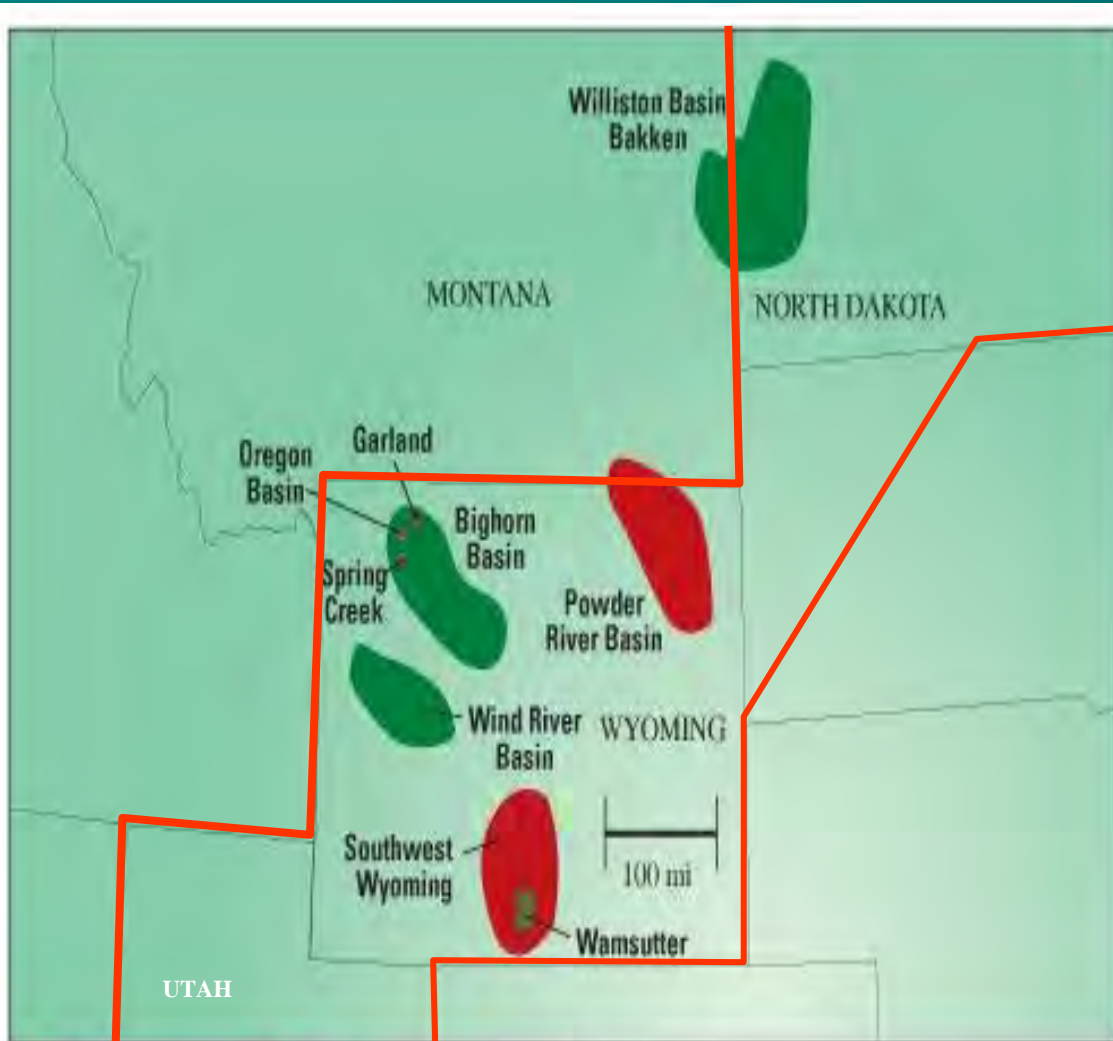
Typical drilling Bottom Hole Assemblies (BHA)

- Surface Hole and Hard Rock Drilling



Region A

- EOG
- Questar
- Gasco
- Anadarko
- Dominion
- Newfield
- Marathon Oil
- Ultra
- Questar
- Shell
- Encana
- BP
- Devon
- Wexpro



Region A – Market Attributes



□ Geology/Formation

- Wyoming
 - Jonaa Field, Mesa, Wamsutter & Baggs

□ Drilling Challenges

- Hole Drift/BHA Walk
- Premature Bit failure from bit bounce
- Poor ROP

□ BHA Preferences

- Wyoming – Most companies in Jonaa Field & Mesa Areas constantly experimenting with Drilling Procedures with varying BHA configurations.
 - Several companies have started using Tri-Collars and assessing effectiveness
 - In Wamsutter, Baggs and Riverton areas occasional use of stabilizers and reamers.
- Utah – companies drill with directional and vertical BHA and some slick. Some stabilizers, reamers and shock-sub application
- North Dakota – Slick BHA preferred because of salt in the Bakken Shale. Tri-collars offer stabilization and stiffness with less connections. Stabilizers and Flex-collars used in laterals.

Region B



- Marathon Oil
- Chevron
- Apache
- Chesapeake
- Cimarex
- Samson
- Devon
- ConocoPhillips/BR
- Anadarko/KerrMcGee
- Unit Petroleum
- Williams
- Berry
- Antero
- Bill Barrett
- Oxy
- ExxonMobil
- Forest Resources

Region B – Market Attributes



□ Geology/Formation

Western Oklahoma

- Dolomite
- Douglas Fork
- Hog Shooter
- Red Fork
- Atoka
- Granite wash

South Central

- Upper Atoka
- Wapanucka
- Jefferson
- Woodford
- Sylvan
- Viola

Eastern Oklahoma/Arkansas

- Woodford Shale
- Jackfork

Colorado Rockies

□ Drilling Challenges

- Hard rock drilling – ROP difficulties
- Abrasive Formations
- Vibration – Axial (Bit Bounce) – Lateral (Shoulder Wear)
- Maintaining Vertical Hole Angle
- Stuckpipe

□ BHA Preferences

Western Oklahoma

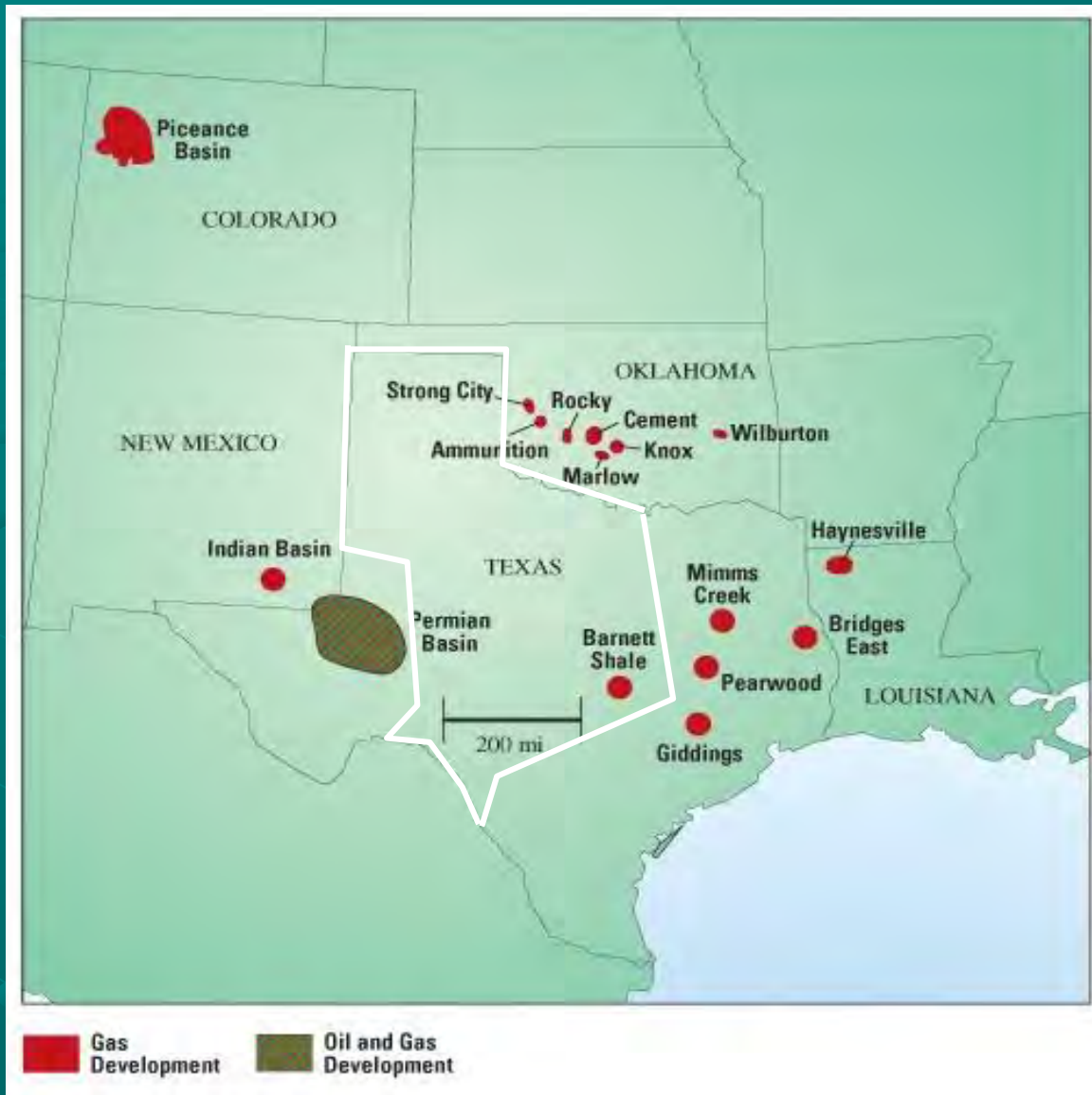
- IBS – String Stabilizer
- Roller Reamers
- Drilling Jar
- Bit Sub

Eastern Oklahoma/Arkansas

- IBS – String Stabilizers – x2 (note premium pricing on stabilizers)
- Roller Reamers – when drilling fluid changed to mud with air drilling
- Drilling Jar
- **Turbo Tool/DOG Sub/Torque Sub?**

Colorado Rockies

- IBS – String Stabilizers – x2 (note premium pricing on stabilizers)
- Roller Reamers – when drilling fluid changed to mud with air drilling



Region C

- Marathon Oil
- Devon Energy
- Four Seven/Denbury
- Republic
- Encana
- EOG
- Quicksilver
- XTO
- Williams
- Denbury
- Tema
- Chesapeake
- Chief

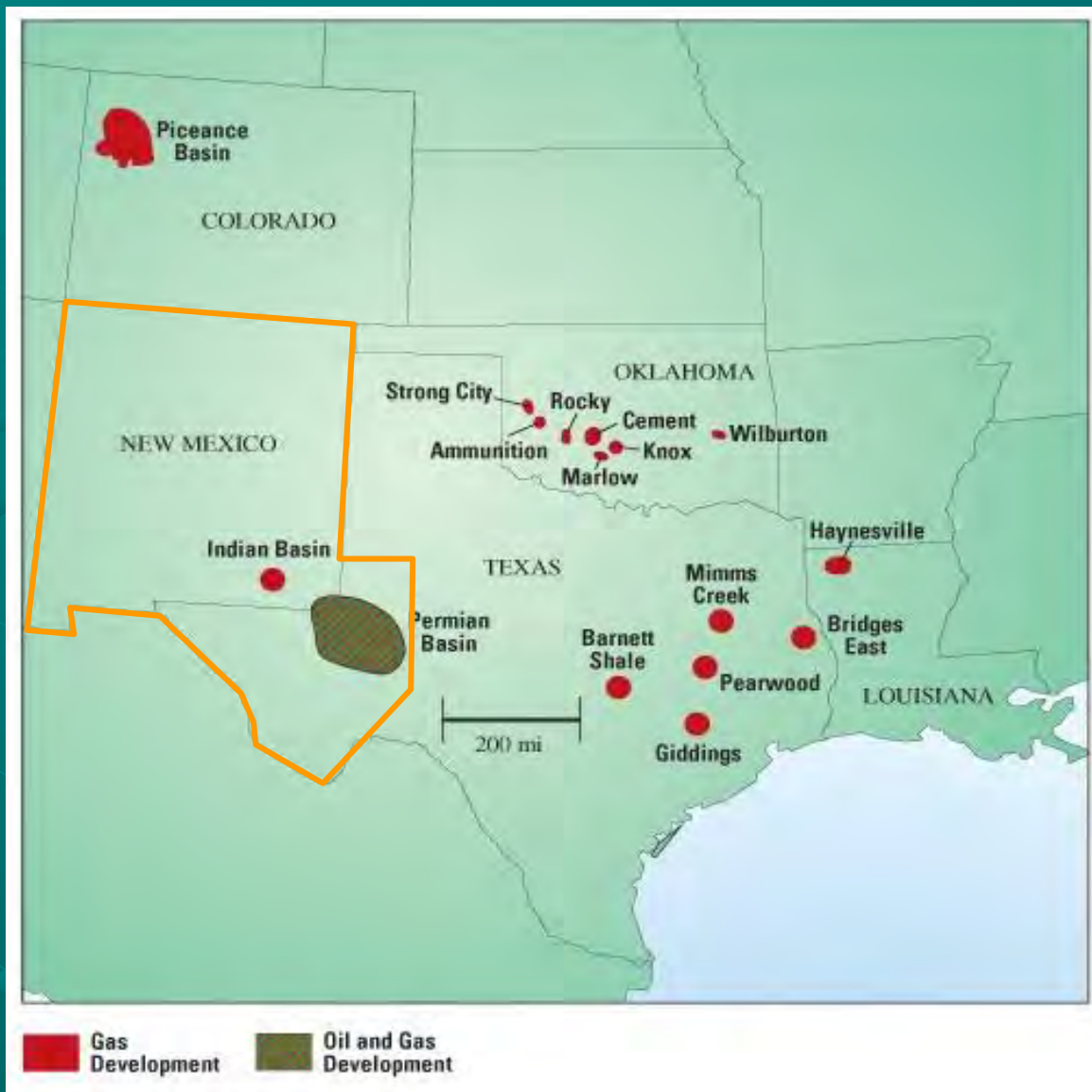
Region C – Market Attributes

- ❑ Geology/Formation
 - Upper Barnett/Atoka/Strawn/Lower Barnett
 - Viola Eastward/ Ellenburger Westward

- ❑ Drilling Challenges
 - Lost Circulation
 - Tight Formations
 - Most Issues are bit problems

- ❑ BHA Preferences
 - Directional/Horizontal
 - **Turbo Tool**
 - Stabilizers
 - Nortrak Style Stabilizers
 - Shock Sub
 - Reamers
 - Non Mags

New Mexico/Southwest Texas



Region D

- Devon
- Marathon Oil
- EOG
- XTO
- Chesapeake
- Encana
- Quicksilver
- Range
- Williams
- COP/BR
- Tema

□ Geology/Formation

- San Juan - Mesa Verde
 - ▣ Point Lookout/Menefee/Cliff House formation & Dakota
- Permian Basin

□ Drilling Challenges

- Low pressure gradient / air drilling techniques
- Limestone & Sandstone formations
- Hard Abrasive even for PDC

□ BHA Preferences



Region E

- ConocoPhillips/BR
- Anadarko
- Goodrich
- Chevron
- Leor
- Marathon Oil
- Newfield
- XTO
- EOG
- Devon
- Quicksilver
- Samson Lonestar

Region E – Market Attributes



□ Geology/Formation

- Travis Peak/Cotton Valley Shale
- Highly Abrasive

□ Drilling Challenges

- Excessive Wear – Stabilizer Blades

□ BHA Preferences

- Stiff Assemblies for Top Hole/Directional for Intermediate Hole
- Welded Blade Stabilizers
- Stabilizers – IBS with Premium Hard Facing
- Turbo Tool

Operations Management



- Organizational Structure

- Machine Shops and Business Offices
 - Headquarters and Manufacturing Plant
 - Oklahoma
 - Machine Shops
 - Odessa - Gardendale, Texas
 - Pittsburgh, Pennsylvania
 - Business Office
 - Houston

- Service
 - API Q1/ISO 9001 Certification
 - Electronic Order and Invoice Processing

Service Logistics



Legend:

- ★ Machine Shop (◆) planned
- Stock Points
- 🏢 Business Office

□ Machine Shop Services

- Bore Back Box and Pin Stress-relief Features
- Spiraling of drill collars
- Turning drill collar OD
- Manufacture and repair of crossover subs, pup joints and saver subs
- Downhole tool repair
- Stabilizer redress and repair
- Custom repairs

All drill-string work and services performed to API Standards wherever applicable



OKLAHOMA CITY

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405-672-2299



ODESSA, TEXAS

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PITTSBURGH, PA

3800 Neville Road
Pittsburgh, PA 15225
412-771-2800