



INTERNATIONAL & DOMESTIC  
PETROLEUM ENGINEERING  
PROJECT MANAGEMENT  
FIELD OPERATIONS

**SIGMA ENGINEERING CORP.**



## **CHARLES R. "RICK" STONE, P.E.**

**CHAIRMAN / CEO**

### **SUMMARY OF QUALIFICATIONS:**

- Thirty-plus years experience in Oil & Gas Operations, Domestic & International/Onshore & Offshore.
- Highly experienced in offshore operations including deepwater drilling.
- Presented with the *SPE Drilling Engineer of the Year Award for 2003*, the Society of Petroleum Engineers' most prestigious drilling honor.
- Recognized pioneer in horizontal, Managed Pressure Drilling, UnderBalanced and Casing Drilling technology and the application of project management techniques to unconventional drilling.
- Great ability to adapt technology to current problems.
- Confirmed Expert Witness Testimony/Consultant for drilling and completion operations.
- SPE Distinguished Lecturer, "Horizontal UnderBalanced Drilling," 1993-94.

### **PROFESSIONAL LICENSE:**

- Registered Professional Engineer in the State of Texas – No. 62319.

### **WORK HISTORY:**

Signa Engineering Corporation	Chairman and CEO	1992–Present
Petra Tex Resources	President and Partner	1990–1992
Oryx Energy Company	Senior Drilling Engineer	1988–1990
Sun Exploration and Production	Drilling Engineer	1984–1988
	Production Engineer	1981–1984
	Mechanical Engineer	1979–1981

### **PROFESSIONAL MEMBERSHIPS:**

- Member, Society of Petroleum Engineers
- Member, IADC and UB Advisor–IADC Wellcap Committee, Chairman MPD Subcommittee
- Member/Speaker, American Association of Drilling Engineers (AADE), Houston/Dallas
- Well Control Committee Member, Drilling Engineering Association
- Charter Member, Horizontal Drilling Engineers Association
- Founding Member, Board of Advisors, Sear Equipment, Inc. that controls wholly owned subsidiaries: Wellhead Systems, Inc., Houston Industrial Products, Inc. and Turbeco, Inc.

### **EDUCATION:**

- B.S. Mechanical Engineering, Texas A&M University, College Station, Texas – 1979
- U.S. Air Force – 1970-73



**PUBLICATIONS & PRESENTATIONS:**

- "What is the Future Direction of MPD? A Look at Dual Gradient Drilling Concepts," presented at the 2009 IADC/SPE MPD & UBO Conference in San Antonio, March 12-13.
- Co-author, "Sometimes Neglected Hydraulic Parameters of UnderBalanced and Managed Pressure Drilling," SPE #114667, presented at the 2008 SPE/IADC MPD & UBD Conference in Abu Dhabi, UAE, Jan 28-29.
- Co-author, "Air Drilling in the Presence of Hydrocarbons: A Time for Pause," SPE #108357, presented at the 2007 IADC MPD & UBO Conference & Exhibition, Galveston, Texas, March 28-29.
- Co-author, "Parametric Analysis of MPD Hydraulics," SPE #108354, presented at the 2007 IADC MPD & UBO Conference & Exhibition, Galveston, Texas, March 28-29.
- Co-author, "Blending technologies: MPD, casing drilling can eliminate intermediate casing string," Drilling Contractor, pp. 55-57, May/June 2006.
- Co-author, "The benefits of light annular mudcap drilling in naturally fractured formations," Offshore, pp. 30-33, Jul 2004.
- Co-author, "Closed Hole Circulation Drilling: Case Study of Drilling a High-Pressure Fractured Reservoir – Tengiz Field, Tengiz, Republic of Kazakhstan," SPE #79850, presented at the 2003 SPE/IADC Drilling Conference, Amsterdam, Netherlands, Feb 19-21.
- "Optimizing Circulation While Drilling UnderBalanced," presented at the 1999 IADC UnderBalanced Drilling Conference & Exhibition, The Hague, Netherlands, Oct 27-28.
- Co-author, "UnderBalanced Operations Manual," Signa Engineering Corp., 1998.
- "Blowout Preventer Testing for UnderBalanced Drilling," presented at the 1997 SPE Permian Basin Horizontal Conference, Midland, Texas, September.
- Co-Author, "UnderBalanced Drilling Manual," Gas Research Institute, 1997.
- "New Applications for UnderBalanced Drilling Equipment," SPE #37679, Dec 1996, presented at the 1997 SPE Conference, Amsterdam, Netherlands.
- "Potential for Horizontal Drilling in the Illinois Basin," Presented at 1996 IOGA Conference, Evanston, Indiana, March.
- SPE Distinguished Lecturer "Horizontal UnderBalanced Drilling," 1993-1994.
- "History and Development of a Rotating Blowout Preventer," SPE #23931, Feb 1992.
- "History and Development of UnderBalanced Drilling in the USA," presented at the 1988 World Oil/Gulf Publishing Sponsored Forum, San Antonio, Texas, February.



**DETAILED WORK HISTORY:**

**SIGNA ENGINEERING CORP., HOUSTON, TEXAS**

**1992 – PRESENT**

*Chairman and CEO*

**MAJOR OIL & MAJOR SERVICE COMPANY PROJECTS**

**2001 – Present**

- Deepwater Drilling engineering and BHA failure analysis in Gulf of Mexico for **Kerr McGee**.
- Engineering for **Kerr McGee** deepwater GOM project. East Breaks 602 & 646 Nansen Spar wells drilled to depths of  $\approx 19,000'$  in 4500' water depth.
- Engineering for **Kerr McGee** deepwater GOM project. Green Canyon 768 #2 well drilled in 5500' water depth to a TD of 26,000'.
- Engineering for **Kerr McGee** deepwater GOM project. Green Canyon 680 Constitution A-6 development well drilled to 24,000' total depth in 6,000' water depth.
- Engineering for **Kerr McGee** deepwater GOM project. Green Canyon 679 Constitution A-1, A-2 development wells drilled to a depth of 23,500' in 5800' water depth.
- Developed engineering plan, rig equipment specifications and secured regulatory approval for Managed Pressure Drilling application in deepwater GOM for semi submersible drilling rig.
- Engineering Managed Pressure Drilling program for **Shell** for extended reach, high pressure/high temperature deepwater directional well in Gulf of Mexico.
- Engineering UnderBalanced Drilling procedures for **Devon** for horizontal Austin Chalk wells in Polk County, Texas.
- Performing feasibility, planning and design for UnderBalanced Drilling in Big Escambia Creek for **Guggenheim**.
- Project Manager for expert witness case involving an oilfield fatality in the Appalachian Basin.
- Engineering horizontal drilling and casing drilling projects in the Buda formation (Houston County, Texas), for **Republic Energy Inc.** and **Navidad Resources, Inc.**
- Project Manager for UnderBalanced casing drilling, **ConocoPhillips** Lobo Field in South Texas.
- Project Manager for well design and field supervision of UnderBalanced Drilling Operations combined with Casing Drilling to eliminate a typically used intermediate string in the development of the South Texas Lobo Field for **ConocoPhillips**. Developed dynamic kill and cement procedure to make this possible.
- Application engineering and feasibility study for UnderBalanced Casing Drilling in **Kerr-McGee** TCB Field, Kleberg County, Texas.



- Provided review of Feasibility Study for Managed Pressure Operations for **AGIP KCO Kashagan** in sour, high-pressure wildcat wells in the Caspian Sea, Kashagan Field, Kazakhstan. Also provided operational and engineering support during drilling operations.
- Project Manager of Managed Pressure technology for **Tengizchevroil (TCO)**, Kazakhstan, in 25% H<sub>2</sub>S, >15,000 ft, abnormal pressure, highly fractured reservoir subject to total lost circulation. Provided feasibility study, design, engineering, and drilling and completion procedures. Provided operational management and equipment logistical support.
- Engineering Design for Rigolets Field Tuscaloosa well (S/L 6647 #4, St. Bernard Parish, LA), worked on MPD procedures and contingency plans for **Apache Corporation**.
- Program Chairman, IADC/SPE 2004 UnderBalanced Technology Conference and Exhibition.

## 2001–2002

- Provided support and technical advice for UnderBalanced operations for **Northstar Energy** on the Schultz #2, Waller County, Texas, a horizontal well drilled UnderBalanced to depth of 17,160 ft (TVD) and 19,000 ft + (MD).
- Provided technical support for **Avalon Exploration** for Beast Prospect, Comanche County, Oklahoma, a 22,000' directional well evaluated for UnderBalanced operations.
- UBD Feasibility Study for **Nortex Corporation** for Price Creek #1, West Danforth Prospect, Oil - Directional - UnderBalanced with Nitrogen/Diesel. Moffat County, Colorado. Provided technical support to evaluate potential fluids for UnderBalanced operations (well not drilled yet).
- Provided support and technical advice for **Northstar Energy** for the Schultz #1R in Waller County, Texas, for re-entry and sidetracking of vertical well.
- Reviewed Feasibility Study for **Texaco-COPI**, West Africa Malongo Area–UBD offshore.
- Provided technical and operational support for engineering, drilling and completion procedures for **Weatherford Asia Pacific**, and assisted on-site engineer from off-site for Tugu Barat and Pasicartang Fields in Indonesia for Pertamina (operator).
- Provided technical review and support for snub-drilling application for **Chevron San Jorge**. Sur Huantraico 1X, 8,000 ft, Horizontal, UBD Program, re-entry, high-pressure reservoir, Neuquen Basin, Western Argentina.
- Provided technical support for Engineering Analysis, UBD hydraulic simulations, HAZID-HAZOP program, UBD Program and operations for **Pluspetrol**. Ramos 1011, UBD in the Huamampampa and Santa Rosa Formations, Argentina. New drill – Gas/Condensate – Directional – Development.

## 2000

- UnderBalanced Drilling Well Control for **Chevron** for their Austin Chalk project in Austin County, Texas. Drafted a **FLOW DRILLING PROCEDURE WITH MUDCAP DRILLING CONTINGENCY**



plan for well control procedures. The Chevron Well Control Manual had to be supplemented due to the unconventional well control procedures necessary to drill UnderBalanced at extremely high pressures.

#### **1999**

- UnderBalanced Drilling Engineering for **Pluspetrol Argentina** for the Ambrosio project in Salta, Argentina. Provided preliminary engineering and feasibility study including UBD hydraulic simulation, estimation of pipeline gas injection requirements, and surface equipment specification for exploiting the Huamampampa formation. The micro fractured sandstone is subnormally pressured and has a productivity index of 0.25 MMscf/psi. Assignment included a visit to local office.
- Drilling Management for **Petroleum Ltd.** for shallow extended reach well in southern Spain. Managed drilling and completion planning and execution. Supervised the equipment services and equipment logistics.

#### **1998**

- Horizontal Drilling and Completions Engineering for **Pogo Producing Company**–Thailand for project in the Gulf of Thailand involving horizontal exploitation of unconsolidated sandstone. Engineering tasks included design and evaluation of various drilling fluid systems including OBM, Sized Salt, Mixed Metal Hydroxide, Perflow systems. Design and evaluation of various sand control methods including gravel packing, pre-packed screens, wire and rod-based screens and pre-perforated casing. Worked closely with laboratory to effectively design tests to quantify formation/skin damage of drilling fluids and completion techniques.

#### **1997**

- UnderBalanced Drilling Engineering for **Shell Venezuela** for the Cogollo Project, Lake Maracaibo, Venezuela. Assignment included several visits to local office as well as a rig site audit. I convinced Shell that the project required the use of fractured carbonate drilling techniques, particularly MCD. I generated the first version of the initial Mudcap Drilling Guidelines and assisted in an advisory capacity during completion of the Shell Mudcap Drilling Guidelines. Cogollo LS; MW =14 ppg OBM; 13,500 ft (TVD).
- UnderBalanced Drilling Engineering for **Schlumberger IPM Indonesia** for the KUFPEC Project; Jakarta, Indonesia; Seram Island; Manusela LS Formation; Heavy Oil / Sour / Subnormal Pore Pressure; 7,700 ft (TVD).
- Completion and Reservoir Engineering for **Harken International** for project in the State of Casanare, Colombia involving multiple formations in the Llanos Basin. Evaluated and recommended sand control techniques and ESP sizing. Part of team charged with engineering a development plan for the Alcaravan Block.

#### **1995–1996**

- **CMS Nomeco**, Equatorial Guinea, West Africa – Project management of Offshore Drilling Operations, Onshore Gas Separation Facility and LNG Plant.



- Short Radius Horizontal Drilling and Completions Engineering for **Amoco Production Company**; St. Blue Lake /E/ 1-18 and /G/ 14-17 Re-entries; Kalkaska County, Michigan; Niagaran LS; St. Blue Lake Field.
- Directional and Straight Hole Drilling Engineering for **Amoco Production Company**; North Cowden Unit #1473 and 1481; West Texas; Grayburg DOL.
- Horizontal Drilling and Completions Engineering for **Vastar Resources, Inc.**; Rooster Rock 1-36H; Converse County, Wyoming; Niobrara LS; Fort Fetterman Field; well planning and operations assistance.
- Horizontal Drilling Supervision for **Vastar Resources, Inc.**; Idarado #1-27H; Converse County, Wyoming; Niobrara LS; Fort Fetterman Field.

### 1992–1995

- Well planning and operations engineering for UnderBalanced drilling for **PEMEX**; Muspac 54; Tabasco/Chiapas Region, Mexico; Miocene carbonates and shale; subnormal sour condensate formation using N<sub>2</sub> injection and oil base mud.
- Well planning of re-entry and new drill for **Maxus** in Venezuela. Wells: QQ-679 and QQ-674A Re-entries; Quiriquire Field, Venezuela; Los Jabbilos and Caratas SS.
- Drilling, Completions and Production Engineering for **VF-Russia** – Project 111 and 112; Volga-Ural Basin, Russia; Famen LS and Pachinskoye SS; four adjacent fields. Well planning, Matrix Stimulation and Artificial Lift.
- Multiple-well Planning and Operations Engineering for **Avalon/Gasprom** (American/Russian) joint venture to drill overbalanced and UnderBalanced sour gas wells. Completion planning for multiple fracture and acid stimulation in horizontal wellbores. Duties included travel to Orenburg, Russia to evaluate Russian drilling equipment for horizontal sour gas drilling.
- Coordinated five-day technical seminar for **Russian group (Langepasneftegaz)** on extended reach drilling, and horizontal completions and workovers.
- Casing design for deep sour gas wells in the Swan Hills Field, Alberta, Canada for **Petrocorp**.
- Drilling, Completions, and Production Engineering for **NAPHTA**. Haqanaim #1 - Zohar LS and Gurim #1 - Gurim SD; Israel; Famen LS and Pachinskoye SS. Well planning and Artificial Lift.
- Drillstring buckling and fatigue analysis for drilling a pipeline crossing the Gauthami River in India for **Cherrington Asia Ltd.**

### PETRA TEX RESOURCES, INC.

1990 – 1992

#### President and Partner

- **Managed** office and field personnel.
- Designed and supervised the drilling of three **horizontal wells** in the Austin Chalk formation.
- Organized the marketing of consulting services on an **international basis**.
- Secured **horizontal engineering contract** with PEMEX in Mexico.
- Negotiated contracts in **Bolivia, Ecuador, Argentina, Indonesia, Iran and Russia**.



**ORYX ENERGY COMPANY, DALLAS, TEXAS**

**1988 – 1990**

*Senior Drilling Engineer*

- **Designed drilling and completion program** and supervised the drilling of three deepwater wells offshore California, Santa Barbara Channel.
- **Designed drilling and completion program** and supervised the first well in 3,000 ft of water in the Gulf of Mexico, Mississippi Canyon 401.
- **Designed and drilled** two Flores Field wells.
- Organized and designed **horizontal drilling** and completion programs.
- **Devised and implemented a method for flowdrilling** (producing while drilling) horizontal wells in the Austin Chalk formation in Texas.
- Designed and supervised the drilling of **60 horizontal wells** in the Pearsall Field, Texas.
- Designed and supervised the drilling of the Stroman Harris #1 well, setting a then current **world record for horizontal departure**.
- **Design consultant** for a new Rotating Blowout Preventer (RBOP).
- Designed or acted as design consultant in the drilling of **horizontal wells offshore** California, onshore California, North Dakota and Northwestern Colorado.

**SUN EXPLORATION AND PRODUCTION COMPANY**

**1979 – 1988**

*Drilling Engineer* (1984 - 1988)

*Production Engineer* (1981 - 1984)

*Mechanical Engineer* (1979 - 1981)



**AREAS OF EXPERIENCE:**

Alaska	Prudhoe Bay Alaska, North Slope	ARCO
Argentina	Huamampampa & Santa Rosa Basins	Pluspetrol Exploración y Producción
	Neuquen Basin	Chevron San Jorge SRL
Arkansas	Arkoma Basin	Arkla
California	Santa Barbara Channel	Oryx Energy Company
Central Texas	Giddings Field	Chesapeake Energy
		Clayton Williams Energy
Colombia	Llanos & Middle Magdalena Basins	Harken International
East Texas		Prairie Producing, Enserch
		Chesapeake Energy
Equatorial Guinea, W.A.	Onshore & Offshore	CMS Nomeco
Gulf Coast	S. Texas to Louisiana	Majors and Independents
Gulf of Mexico	Offshore	Majors and Independents
	Mississippi Canyon	Oryx Energy Company
Illinois	Illinois Basin	Altec Energy, Petro Union
		Equinox Oil Company
Indonesia	Seram Basin	Schlumberger IPM Indonesia
Kazakhstan	Tengiz Field	Tengizchevroil (TCO)
	Kashagan Field, Caspian Sea	AGIP KCO Kashagan
Mexico	Tabasco Campeche Basin	PEMEX
Michigan	Michigan Basin	Amoco
Middle East	Dead Sea Basin	NAPHTA
North Dakota	Williston Basin	Nerdlihc Inc.
Russia	Volga Ural Basin	Avalon Exploration
		VF-Russia
Spain	Guadalquivir Valley Basin	Petroleum Ltd.
Thailand	Gulf of Thailand	Thaipo Ltd.
Venezuela	Lake Maracaibo	Shell Venezuela
West Texas	Permian & Delaware Basins	Amoco
		Apache Corporation
		Damson Oil
		Premium Resources
		Apache Corporation
		Vastar Resources
Wyoming	Big Horn Basin	
	Powder River Basin	

**RIG TYPE EXPERIENCE:**

Land Rigs	Platform	Semi Submersibles	Drillships
Barges	Jackups	Submersibles	Arctic (Winterized)





**FORMATIONS WITH MPD / UBD / CASING DRILLING / HORIZONTAL EXPERIENCE:**

Notation: MPD = Managed Pressure Drilling

MCD = Mudcap Drilling

UBD = UnderBalanced Drilling

H2S = Hydrogen Sulfide

HTHP = High Pressure High Temp

<u>Formation</u>	<u>Area</u>	<u>Experience</u>
Artinsk LS	Orenburg, Russia	Medium Radius / MCD / 9.0 ppg Sour
Austin Chalk	Texas	Medium Radius / UBD / MCD / 7.0-17 ppg
Buda LS	Texas	Medium Radius / UBD / MCD / 7-13.0 ppg
Bailey DOL	Illinois	Medium Radius / Slim Hole
Cane Creek	Grand County, Utah	Medium Radius / UBD / 18.0 ppg OBM
Cotton Valley Lime	Freestone County, Texas	Dual Opposed Medium Radius
Cogollo LS	Lake Maracaibo, Venezuela	Directional MCD / 14.0 ppg / Sour
Cherry Canyon	Delaware Basin, West Texas	UBD / Foam
Edwards LS	Texas	Medium Radius
Fort Payne LS	White County, Illinois	Medium Radius
Grand Tower DOL	Jackson County, Illinois	Medium Radius
Glenn Rose LS	Walker County, Texas	UBD/CaCl <sub>2</sub> Medium Radius / 8,000' Lateral
Huamampampa SS	Argentina	Vertical UBD / 8.5 ppg with Natural Gas
Gurim Unconsolidated SD & Zohar LS	Middle East	Medium Radius
Georgetown LS	Texas	Medium Radius/UBD / MCD/7.0-13.0 ppg
Mission Canyon LS	Daniels County, Missouri	Med Radius / Slim Hole / MCD / 8.5 ppg / Sour
La Luna LS	Middle Magdalena Basin, Colombia	Medium Radius / UBD 8.5 ppg with N <sub>2</sub>
Miocine Carbonates LS	Tabasco/Chiapas, Mexico	Vertical Sour UBD 7.9 OBM with N <sub>2</sub>
MM - Unconsolidated SD	Acadia Parish, Louisiana	Medium Radius
Niagaran LS	Kalkaska County, Michigan	Short Radius
Niobrara LS & Frontier SD	Converse County, Wyoming	Medium Radius / UBD / 11.0-13.0 ppg
Pearsall LS	Maverick County, Texas	Medium Radius / Slim Hole
Santa Rosa LS	Middle Magdalena Basin, Colombia	Medium Radius / UBD 8.5 ppg with N <sub>2</sub>
Serpukhovian Carbonate	Western Kazakhstan	High Pressure MCD/ 16.0 ppg / 25% H <sub>2</sub> S
Strawn SD	Throckmorton County, Texas	Medium Radius / Slim Hole
Trenton LS	Illinois	Short Radius
Travis Peak	Robertson County, Texas	HTHP / MPD / H2S
Wilcox SD	Goliad County, Texas	Medium Radius / Slim Hole
Woodbine SD	Leon County, Texas	Medium Radius / Slim Hole