



Chevron-Schlumberger Business Partner Executive Meeting

Briefing Document

August 21, 2014

Welcome

Thank you for taking the time to participate and contribute to the 2014 annual Chevron–Schlumberger Business Partner Executive Meeting.

This meeting affords an opportunity to review the Chevron–Schlumberger relationship and recent performance in the core pillars of HES, Operational Excellence, Technology, and Value Creation. It also provides an open forum to discuss the business direction and agree on actions that will facilitate meaningful progress in the areas that are considered to be central to success.



Photo of drilling rig at Minas Field, Indonesia courtesy of Chevron.

Attendees



Schlumberger

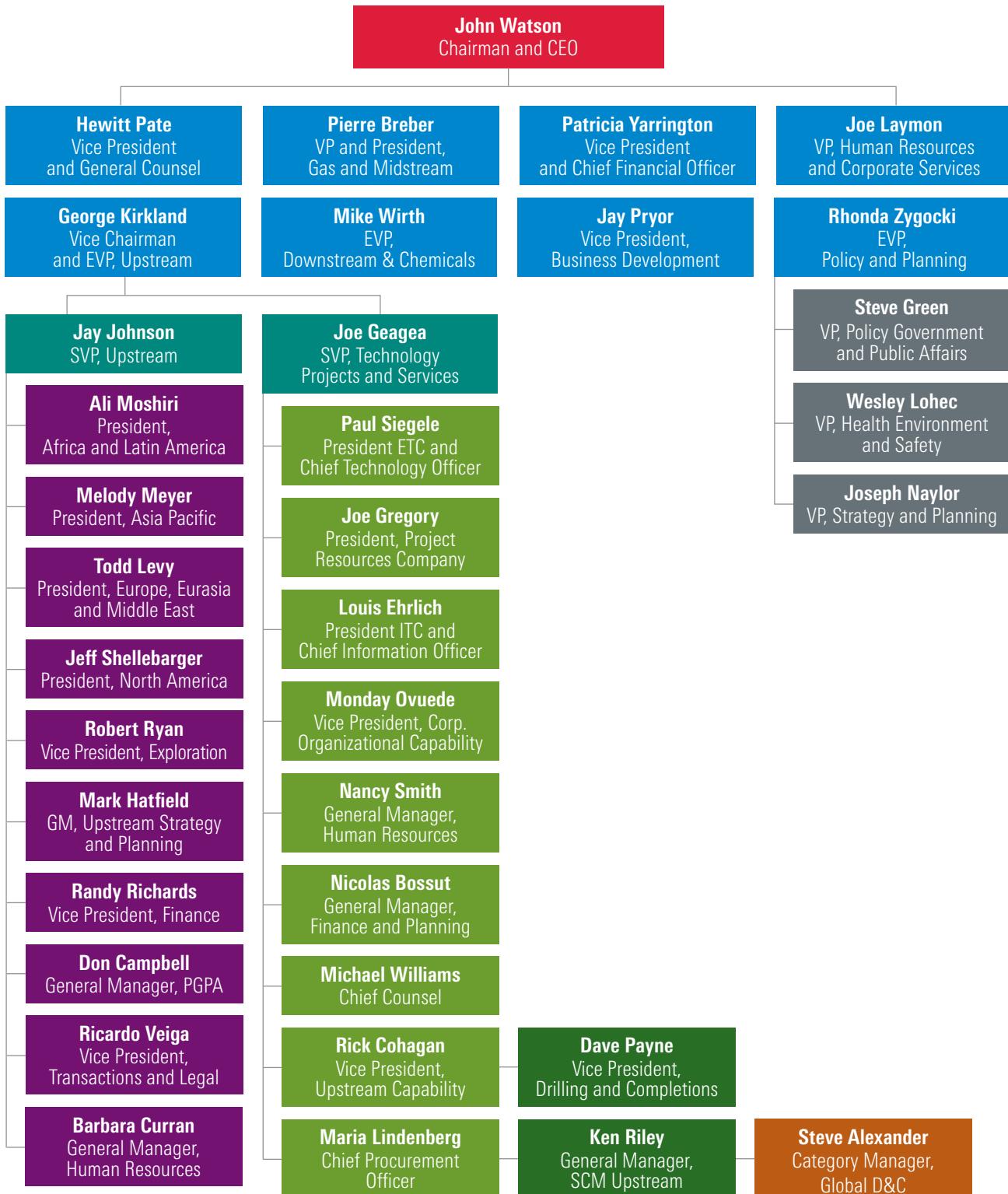
George Kirkland Vice Chairman and Executive VP, Upstream	Paal Kibsgaard Chief Executive Officer
Jay Johnson Senior VP, Upstream	Ashok Belani EVP, Technology
Joe Geagea Senior VP, Technology, Projects and Services	Patrick Schorn President, Operations & Integration
Pierre Breber VP and President, Gas and Midstream	Aaron Gatt Florida President, Reservoir Characterization Group
Ali Moshiri President, Africa and Latin America	Khaled Al Mogharbel President, Drilling Group
Melody Meyer President, Asia Pacific	Sherif Foda President, Production Group
Todd Levy President, Europe, Eurasia and Middle East	Stephanie Cox President, Asia
Jeff Shellebarger President, North America	Robert Drummond President, North America
Bobby Ryan VP, Exploration	Mark Corrigan VP, Operations Integrity
Paul Siegele Chief Technology Officer and President, Energy Technology	Bill Coates Senior VP, Sales & Marketing
Rick Cohagan VP, Upstream Capability	Curtis Jones VP, Global Account Director
Mark Hatfield GM, Upstream Strategy and Planning	
Steve Alexander Global D&C Category Manager	

Agenda

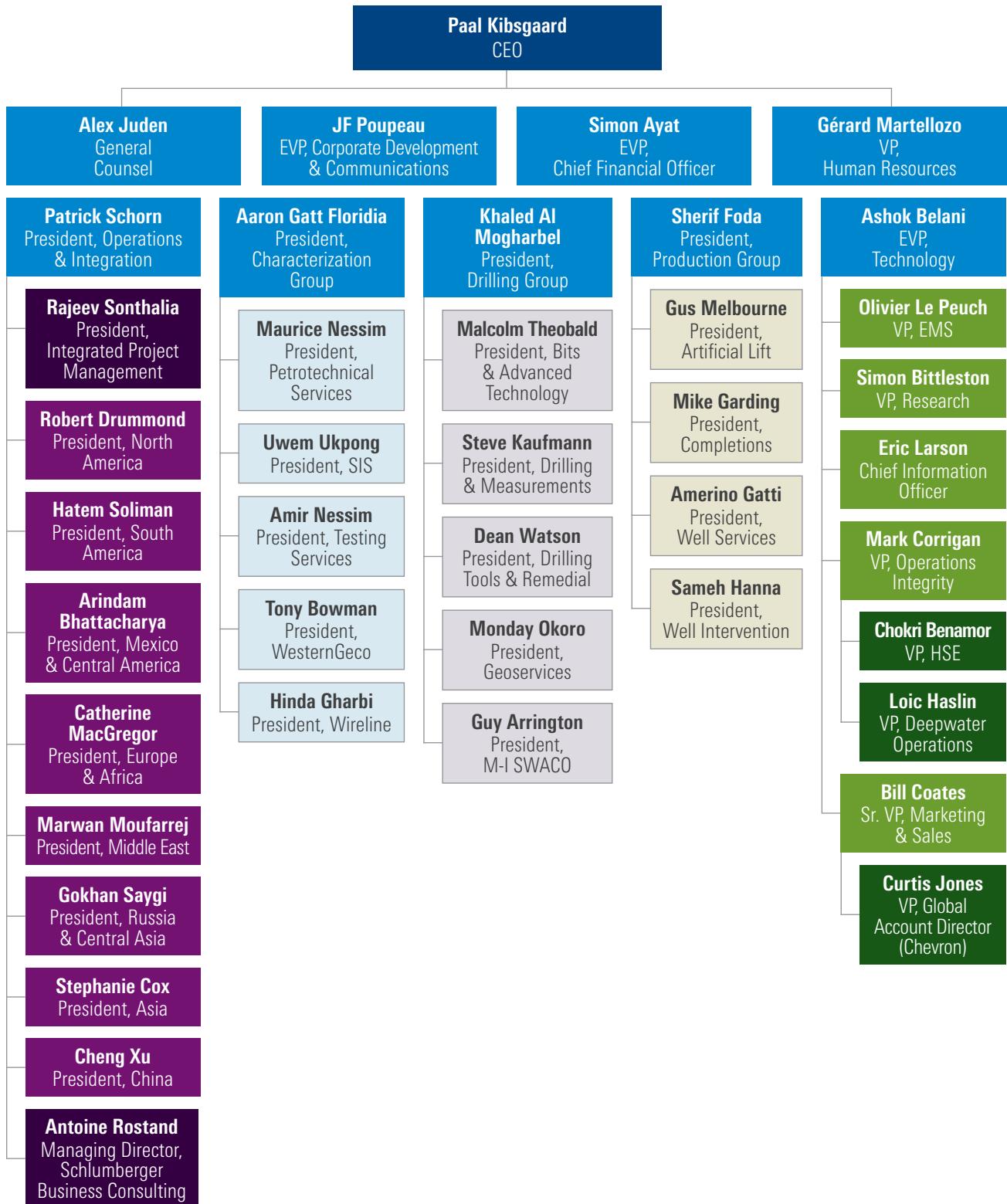
Thursday, 21 August

1:30 p.m.	Welcome	Ashok Belani and Paul Siegele
1:40 p.m.	Safety Briefing and OE Moment	Mark Corrigan
1:45 p.m.	Chevron Update	George Kirkland
2:30 p.m.	Schlumberger Update	Paal Kibsgaard and Patrick Schorn
3:15 p.m.	Break	
3:30 p.m.	Schlumberger Performance Overview (including H2-2014)	Curtis Jones
3:45 p.m.	Transforming Operational Reliability and Efficiency	Mark Corrigan
4:15 p.m.	Update on Joint Collaboration Initiatives	Paul Siegele and Curtis Jones
4:35 p.m.	Opportunities Discussions—Open White Space	Group Discussion
5:15 p.m.	Concluding Discussion and Remarks	
Evening	Refreshments and Dinner—Executive Level of 5599 San Felipe (catered)	

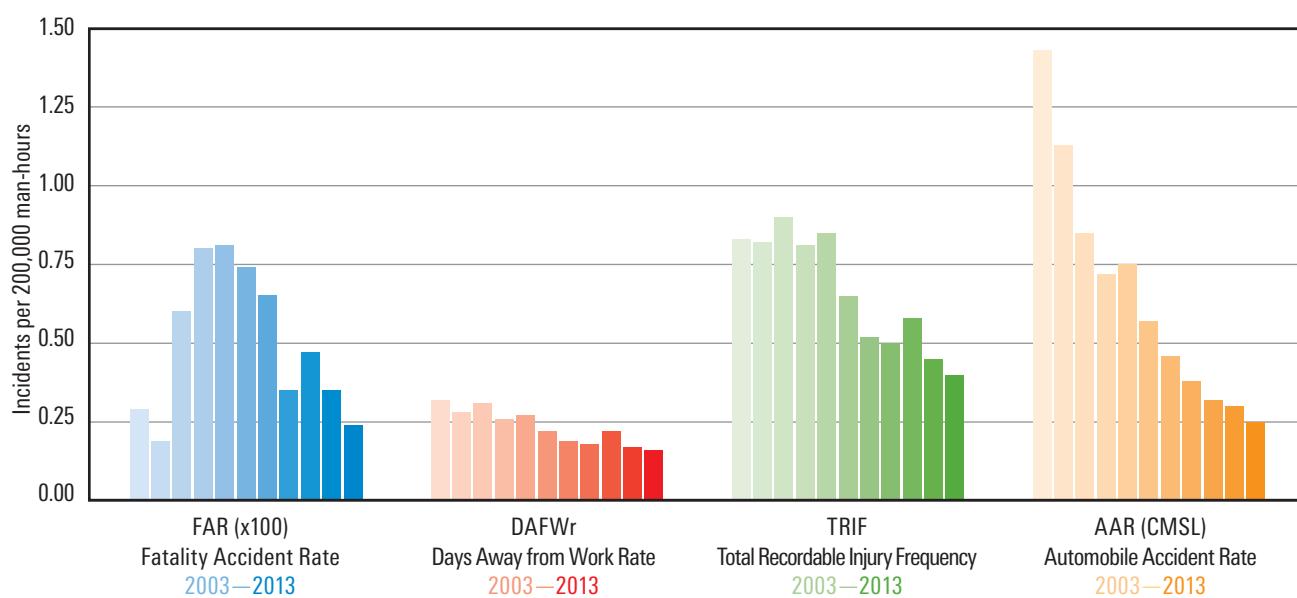
Organization Charts



Schlumberger



Schlumberger Industry-Recognized HES Performance, 2003–2013



Schlumberger's year-on-year HES performance improved across the board again in 2013. The declining trend in each of the key lagging rate indicators visually demonstrates the progress that has been made over the last decade. We are fully committed to all aspects of HES. Our goal is to be the recognized leader in every service and product delivered, including no harm to people or the environment.

Schlumberger has a robust and mature HES management system incorporating a business system that tracks all HES events, including remedial actions and closure status. Our focus on continuous improvement includes an active risk-based approach to the health, safety, and security of our people.

In 2014, Schlumberger has a specific focus on incident categories that occurred with the highest frequency in 2013. Hand and finger injuries continue to be a concern, including approximately 50% of our recordable injuries on Chevron operations, and we are reinforcing the implementation of our Five for Hands program. Driving remains our highest risk activity. In line with our long-term commitment to continuing to reduce automotive accidents, in 2014

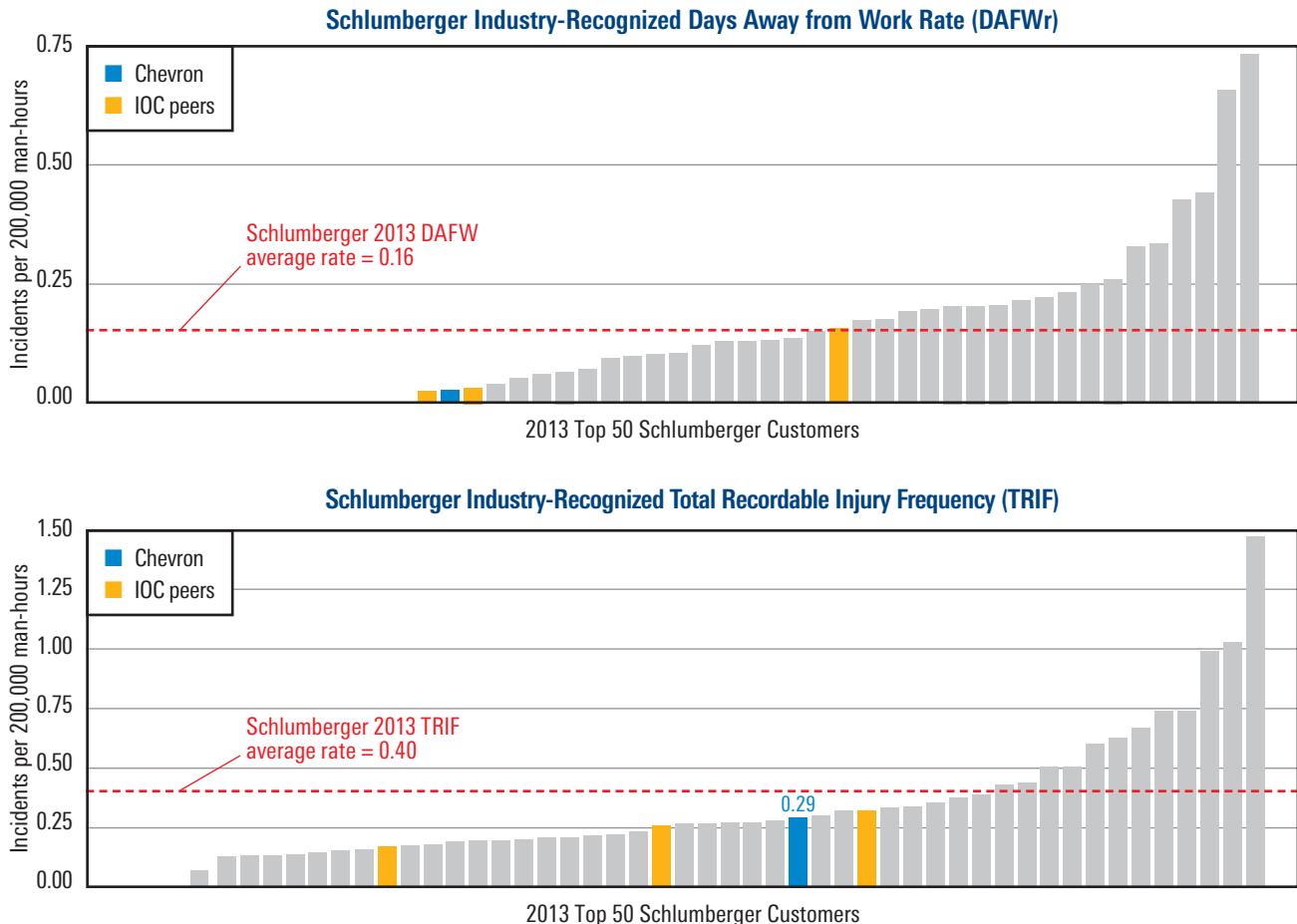
we will complete the worldwide deployment of Global Journey Management, a combination of centralized support centers and associated processes that are derived from a revamped risk-based Driving and Journey Management Standard.

In response to calls to address an industrywide concern about dropped objects, we will also be deploying a specific DROPS Standard with associated communications and training materials that are closely aligned with the industry DROPS Forum.

Improving global sharing of learning from incidents is an important common goal for both companies. Schlumberger has invested in behavioral research to better understand learning methods for improving retention, which will be incorporated in our updated Live & Learn Program later in 2014.

Source: Schlumberger Quest database, based on Occupational Safety and Health Administration (OSHA) guidelines; and quarterly HES report to Chevron.
CMSL: categories for HES incidents (Catastrophic, Major, Serious, and Light).

Schlumberger Industry-Recognized Incident Rates, 2013



Schlumberger worked 6.8 million man-hours for Chevron during 2013.

During that period, we incurred one Days Away From Work (DAFW) incident and nine other recordable medical treatment incidents.

The resulting Total Recordable Injury Frequency (TRIF) and DAFW rates were lower than those for Schlumberger as a whole, and generally in line with comparable results for the largest IOC peers. However, the 2013 TRIF result was not acceptable because it exceeded our target when working for Chevron.

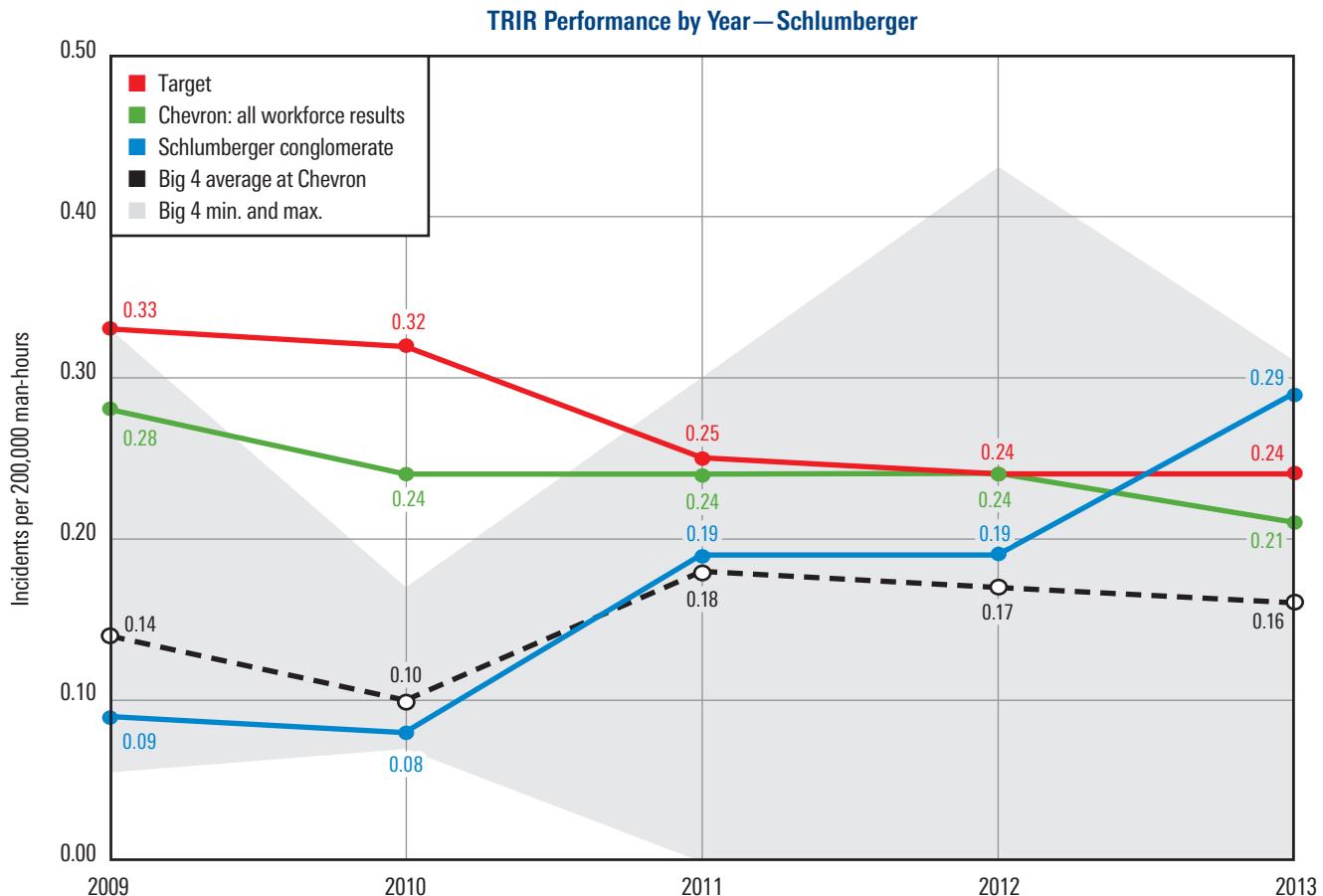
Half of the 2013 Chevron-related recordable incidents involved fingers and hands, an active focus area for Schlumberger (via our

Five for Hands program). We also incurred two incidents related to skin irritation following exposure to synthetic-base well fluids.

The single DAFW work incident of 2013 occurred in the Australia Business Unit. A Schlumberger Wireline employee was injured when his fingers were trapped while he was removing a gun clamp; a number of contributing factors were identified, including a rig air hoist that malfunctioned and slipped at exactly the wrong time.

Source: Schlumberger Quest database, based on Occupational Safety and Health Administration (OSHA) guidelines; and quarterly HES report to Chevron.

TRIR Performance by Year: Schlumberger vs. Chevron, Target, and Peer Group



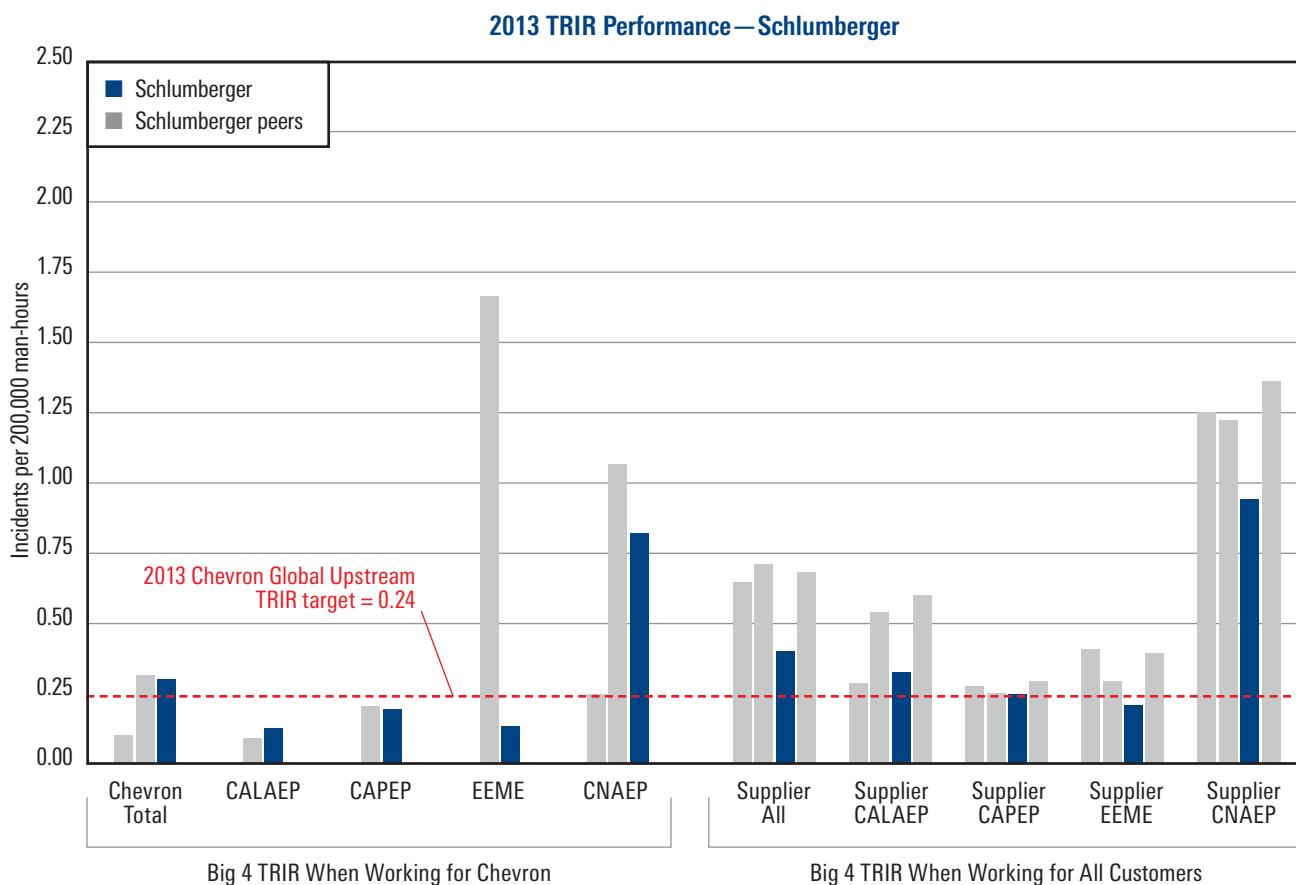
The chart shows the progression of the Total Recordable Incident Rate (TRIR) for Chevron and for Chevron's four largest well construction service (WCS) suppliers when working for Chevron.

The gray area of the chart depicts the minimum and maximum rates among this group of suppliers. Average HES performance, based on TRIR, of the Big 4 peer group improved nominally during 2013, whereas Schlumberger's 2013 results increased year-on-year.

Following 5 years of performing better than target and Big 4 peer groups, we are committed to reversing the spike seen in 2013 and the first half of 2014. Our auto accident record remained positive, with two minor auto incidents at Chevron locations.

Source: Chevron Drilling and Completions Category Management
(Big 4 Well Construction Suppliers, Chevron Worldwide).

Schlumberger TRIR for Chevron vs. Big 4



This chart shows TRIR by Chevron OPCO for the Big 4 when working for Chevron (left side) and when working for all customers in the comparable geographic area (right side).

When measured by the 2013 TRIR metric, Schlumberger performed better overall when working for Chevron vs. when working for Schlumberger's total customer base. The same held true in each of the four OPCOs, where Schlumberger's TRIR when working for Chevron was better than that achieved by Schlumberger across its total customer base in the comparable geographical area. Chevron's and Schlumberger's cultural alignment, leadership, and commitment are primary contributors to achieving superior results that lower exposure and reduce employee injuries.

Despite further TRIR performance deterioration during H1-2014, we remain confident that we have the fundamental components required to reverse the recent spike in medical treatment incidents.

CALAEP: Chevron Africa and Latin America

CAPEP: Chevron Asia Pacific

EEME: Europe, Eurasia, and Middle East

CNAEP: Chevron North America

OPCO: Operating Company

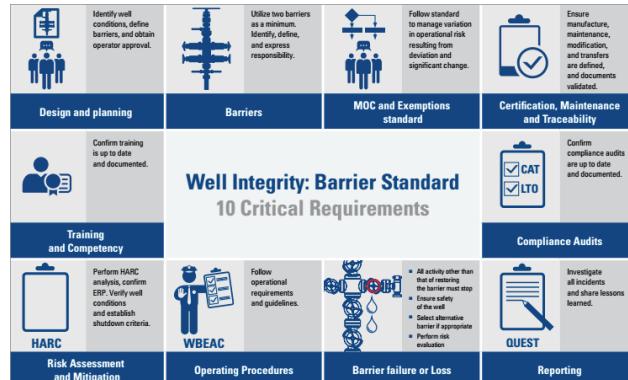
Source: Chevron Drilling and Completions Category Management (with data input from Big 4 Well Construction Suppliers).

Process Safety at the Forefront

A key component of the Schlumberger Well Integrity roadmap is engagement with customers. In 2010, an initiative was launched to better visualize Schlumberger management of well integrity issues.

The initiative began with a review of the Operational Integrity Project, followed by the rollout of a multiyear Well Integrity roadmap. This roadmap was developed to ensure consistency and full compliance across all Schlumberger segments, in addition to aligning the initiative with new process safety developments led by industry associations.

In 2013, the roadmap was updated. The revisions included modifications to the Well Integrity Certification requirements that are required globally to refresh training and further empower employees to stop operations that may risk well integrity. There are two levels of certification. Level 1 is a general awareness that is a common requirement for all personnel operating at a wellsite, irrespective of their Schlumberger Segment. Level 2 is tailored to the maintenance and operations of the well integrity barrier elements of a specific Segment. Aggressive certification targets were achieved with a particular emphasis on the segments new to Schlumberger.



Key Components of Well Integrity Roadmap: 2010–2015

People

- Competency assurance: Well Integrity Certification Compliance
 - Level 1: >95% (50,686 employees certified at end of H1-2014 = 95%)
 - Level 2: >85% (23,401 employees certified at end of H1-2014 = 87%)
 - Employees empowered to stop any operation that may risk well integrity
- Engagement with customers, including with Chevron on the WellSAFE initiative
- Revamped in line with Global Well Integrity Awareness campaign

Process

- Well Barrier Element traceability and auditing of third-party suppliers
- Well Integrity incident reporting and benchmarking

Technology

- Wellbore Integrated Solution
- Integrated Zonal Isolation Solution
- Customer Engagement on CT BOPs/WHE

Notes



Photo of Tahiti Platform, Gulf of Mexico, courtesy of Chevron.

2013 Schlumberger Rankings by Market Segment

Data from Spears and Associates, Inc./Chevron/Schlumberger

Market Segment		Total Market			Chevron Operations		
		Estimated Market Size, USD millions ¹	Estimated Schlumberger Revenue, USD millions ¹	Estimated Schlumberger Market Share, %	Overall Ranking of Schlumberger ¹	Schlumberger Spend Rank at Chevron ²	Chevron Revenue Rank at Schlumberger ³
Reservoir	Geophysical Equipment & Services	16,215	4,250	26	2	3 ↓	13 ↓
	Wireline Logging	13,809	6,200	45	1	1	2 ↓
	Well Testing	5,362	1,700	32	1	1	8 ↑
Drilling	Directional Drilling Services	14,558	4,600	32	1	1	3
	Logging While Drilling (LWD)	4,085	1,900	47	1	1	4 ↓
	Drilling & Completion Fluids	12,450	4,600	37	1	1	3 ↓
	Solids Control & Waste Management	4,020	1,325	33	1	1	5
	Rental & Fishing Services	8,273	700	8	4	3 ↑	1
	Drill Bits	5,100	1,515	30	1	1	4 ↑
	Surface Data Logging (Mud Logging)	1,371	425	31	1	1	7 ↑
Production	Pressure Pumping—Stimulation	33,279	6,800	20	2	2	19 ↓
	Pressure Pumping—Cementing	10,072	2,800	28	2	2	4 ↑
	Artificial Lift	13,180	2,100	16	2	2 ↑	7 ↓
	Completion Equipment & Services	12,727	1,700	13	4	3	9 ↑
	Coiled Tubing Services	5,435	1,200	22	1	1	6 ↓
Total for the Listed Segments		159,936	41,815	26	N/A	5 (overall)	

This table summarizes Schlumberger Market Segments, position in the global oilfield services market, and relative position at Chevron vs. peers.

In 2013, Schlumberger was the largest provider to Chevron in 9 of the 15 Market Segments listed above, and the largest provider overall. Position by Chevron spend was fairly stable, with only 3 of the 15 categories above changing by one position each. In Schlumberger's customer base, Chevron moved up from 7th to 4th in Drill Bits and 13th to 8th in Well Testing Services.

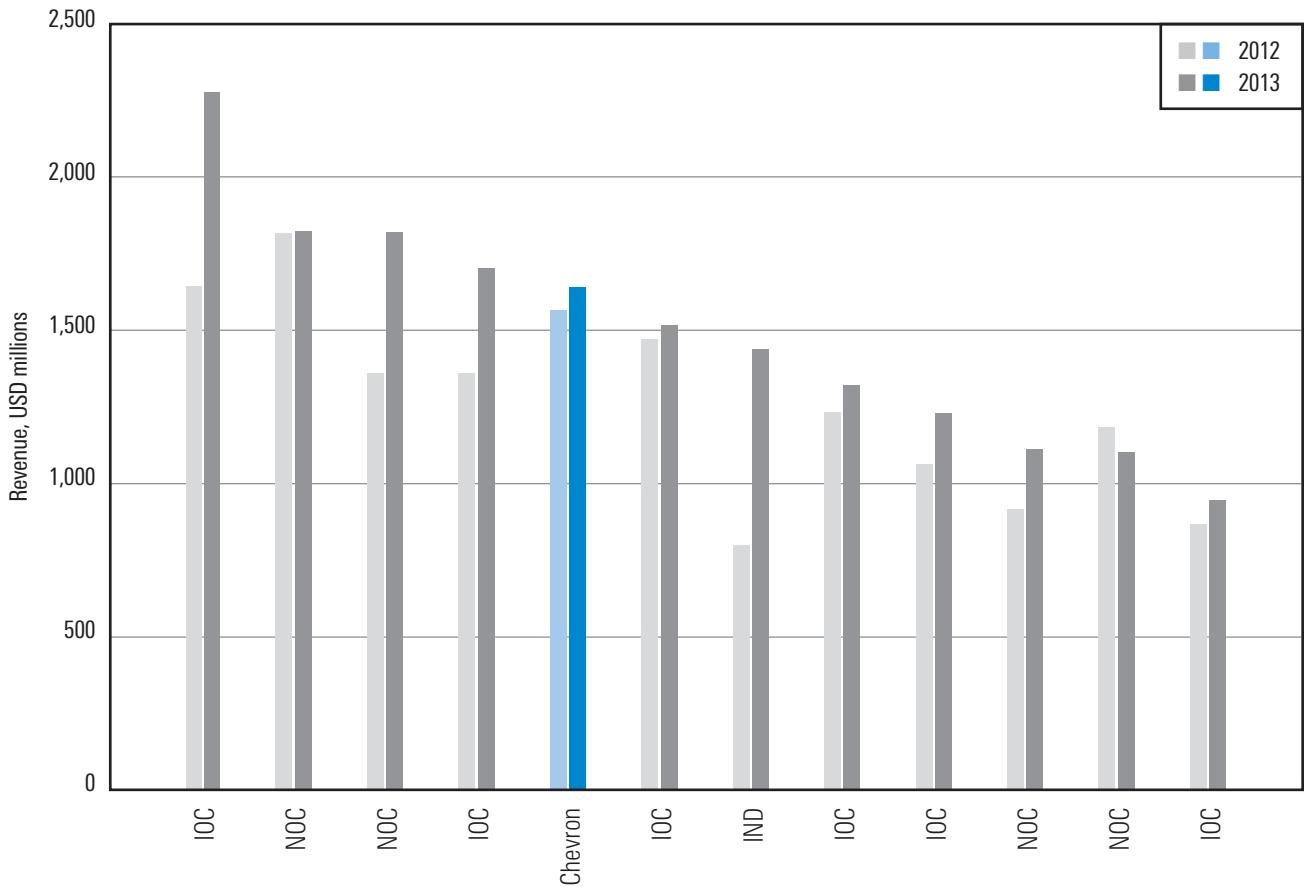
Significant declines during the period were Geophysical Services, which fell from 2nd to 13th; Logging While Drilling, dropping from 1st to 4th; and Artificial Lift, from 4th to 7th. There were minor position shifts in seven other Segments.

¹Estimates from Spears and Associates, Inc.; *Oilfield Market Report* issued April 2014.

²Schlumberger's spend rank at Chevron is based on Chevron's spend with Schlumberger compared with all providers; data from Chevron D&C Category Management.

³Chevron's revenue rank at Schlumberger is the position of Chevron compared with all customers of Schlumberger; data from Schlumberger *OFIS Reporter*.

Schlumberger Revenue—Top 12 Customers, 2012 vs. 2013



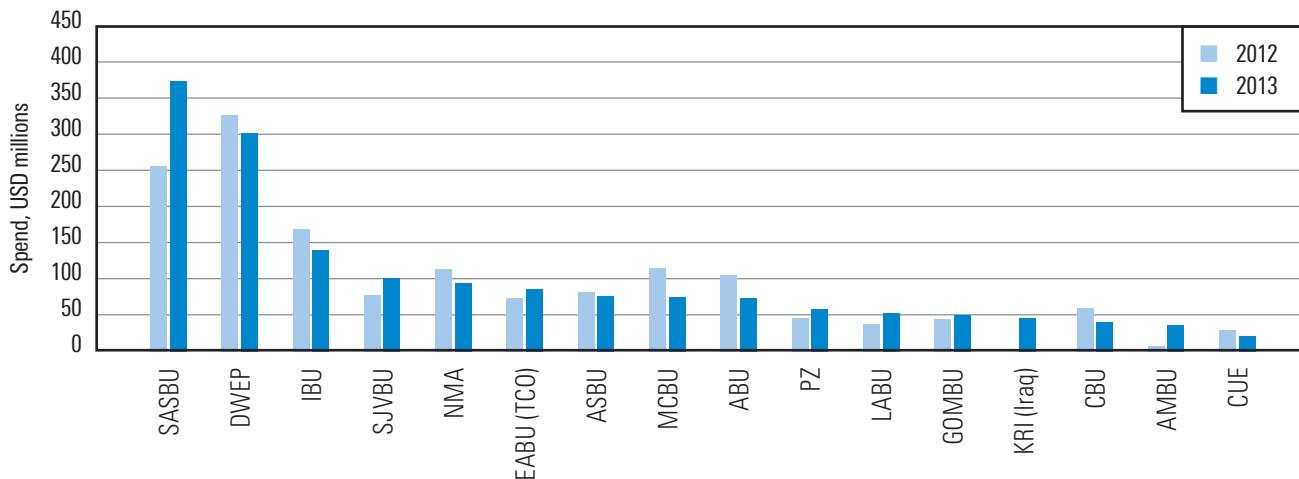
Total 2013 spend on Schlumberger services and products was USD 1.64 billion in 2013.

Chevron spend with Schlumberger increased 5% from 2012 to 2013, which made Chevron the 5th largest customer in terms of revenue. This compares with the 3rd position in 2012 and 4th in 2011. Revenue growth from Schlumberger's largest 12 customers averaged 17% year-on-year, with the fastest two growing at 79% and 39%, respectively. The mix of Schlumberger's top customers did not change significantly in 2013; it continued to include the largest IOCs, NOCs, and a global Independent.

Source: Schlumberger OFS Reporter.

Chevron Spend with Schlumberger by Business Unit

All Schlumberger Business Segments



Schlumberger works in all Chevron Business Units but with varying levels of participation. The top three Business Units account for 50% of Chevron's spend with Schlumberger. Business Units where we are currently under-represented are MCBU, GOMBU, CUE, and ASBU.

Year-on-year, SASBU had the largest increase in dollar terms, increasing USD 117 million on expanded activity. AMBU and KRI increased the most in percentage terms because both grew from a nominal baseline. Other BUs with notable percentage increases were LABU, SJVBU, and PZ. Areas where spend decreased the most were MCBU, ABU, IBU, DWEP, and CBU. Declines were related to market share (MCBU) and/or activity changes; the regressions in DWEP and CBU were related to year-on-year decreases in geophysical-related spend with Schlumberger.

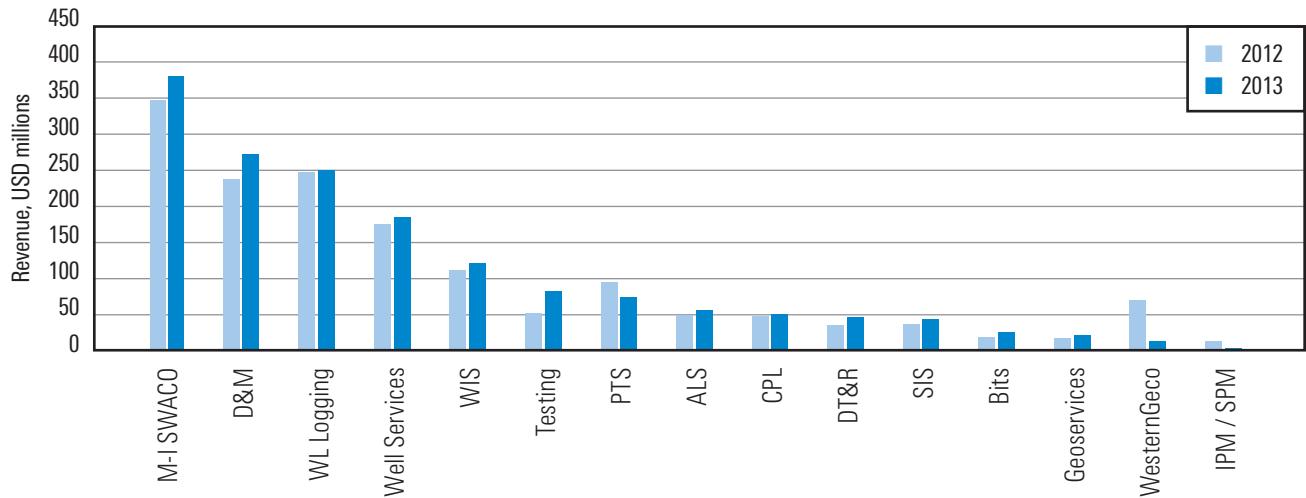
Chevron Strategic Business Units

ABU	Australasia Business Unit
AMBU	Appalachia/Michigan Business Unit
ASBU	Asia South Business Unit (Thailand, Vietnam, Cambodia, Bangladesh, China)
CBU	Canada Business Unit
CUE	Chevron Upstream Europe (North Sea, Continental Europe)
DWEP	Deepwater Exploration Projects, US Gulf of Mexico
EABU	Eurasia Business Unit (Kazakhstan)
GOMBU	Gulf of Mexico Business Unit, Producing Assets
IBU	Indoasia Business Unit (Indonesia, Philippines)
LABU	Latin America Business Unit
MCBU	Midcontinent Business Unit (Central USA)
NMA	Nigeria and Mid-Africa
PZ	Partitioned Zone (Saudi Arabia / Kuwait)
SASBU	South African Strategic Business Unit (Angola, Congo)
SJVBU	San Joaquin Valley Business Unit (California)
Other-KRI	Kurdistan Region of Iraq (KRI)

Source: Schlumberger *OfS Reporter* and Chevron spend data.

Schlumberger Revenue from Chevron

By Schlumberger Business Segment



Schlumberger currently consists of 16 primary Business Segments, 15 of which are actively engaged to some degree with Chevron.

The exception is SBC, but it did lead the recent LeanSTIM* continuous improvement consulting service effort in AMBU, with a goal of increasing overall efficiency of our Production Group operations. M-I SWACO and D&M grew the most in dollar value (USD 34 million each), while Testing grew the most in percentage (158%). Other notable growth areas were DT&R, Bits, and Geoservices. The only declining Business Segments were WesternGeco, PTS, and IPM. IPM's scope for Chevron has been limited to D&C services coordination for remote and/or short-duration exploration projects.

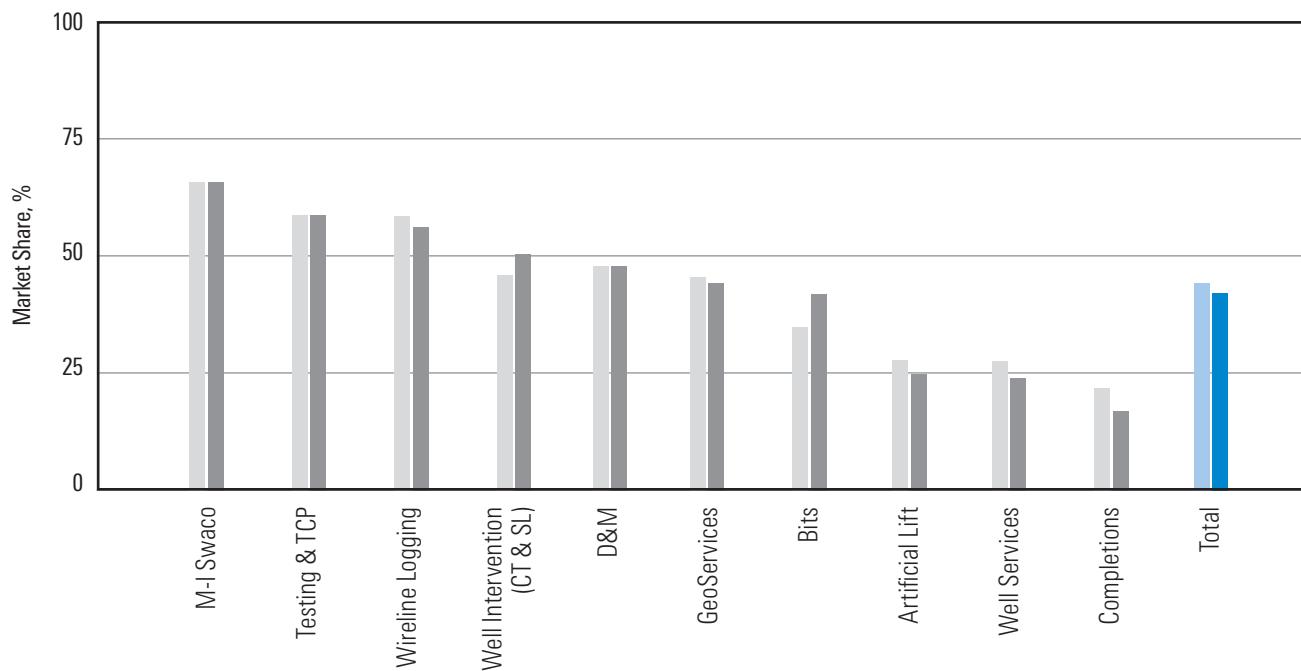
Note: A Schlumberger Business Segment is roughly what Chevron calls a "Category." Schlumberger Segments do not align perfectly with Chevron Categories because Schlumberger does not offer all Product and Service Lines (PSLs), and some PSLs are in different Categories. Three of the Segments fall outside of D&C (PTS, SIS, and WesternGeco).

Schlumberger Business Segments

ALS	Artificial Lift: electric submersible pumps and gas lift
Bits	Bits & Advanced Technology: drill bits and associated cutting technology
CPL	Completions: completions hardware, reservoir monitoring and control, sand control tools and screens, and liner hangers
D&M	Drilling & Measurements: directional drilling, measurement-while drilling, and logging while drilling
DT&R	Drilling Tools & Remedial: drilling tools and hardware, fishing and remedial services, and tubular products and services
Geoservices	Mud logging and related services
IPM / SPM	Integrated Project Management (IPM)/ Schlumberger Production Management (SPM)
M-I SWACO	Drilling fluids, completion fluids, solids control, and waste management
PTS	PetroTechnical Services: data services, geosciences, and petroleum engineering consulting
SBC	Schlumberger Business Consulting
SIS	Schlumberger Information Solutions: G&G, reservoir simulation and production software products
Testing	Surface well testing, drillstem testing, tubing conveyed perforating, and subsea test trees and landing systems
Well Services	Cementing and stimulation pumping services
WesternGeco	Seismic acquisition and processing
WL Logging	Reservoir Evaluation Wireline: cased and openhole electric line measurements
WIS	Well Intervention Services: coiled tubing and slickline globally; plus E&P cased hole wireline in USA

Market Share by Schlumberger Business Segment

Chevron's Global D&C Spend



Schlumberger's global market share for the Segments listed above decreased from 44% in 2012 to 42% in 2013.

The graph represents Schlumberger's global market share for Chevron in the Segments involved in D&C operations. Our DT&R Segment is excluded because Schlumberger's participation is a minor portion of Chevron's overall spend in that broad Rental/Services PSL. These market share values are calculated based on information provided by Chevron, but rationalized and restructured to reflect Schlumberger's Business Segment structure and core offering.

Half of these D&C Segments either increased market share (20%) or remained flat (30%), whereas the other half experienced a year-on-year decline in market share. The share variations were driven by a combination of geographical shifts in activity, change in activity type, contract awards/losses, and pricing.

Source: Chevron D&C Category Management (% share) and Schlumberger *DFS Reporter* (input revenues).

Contract Awards & Losses H2-2013 Through H1-2014 (Partial List)

Awards since May 2013

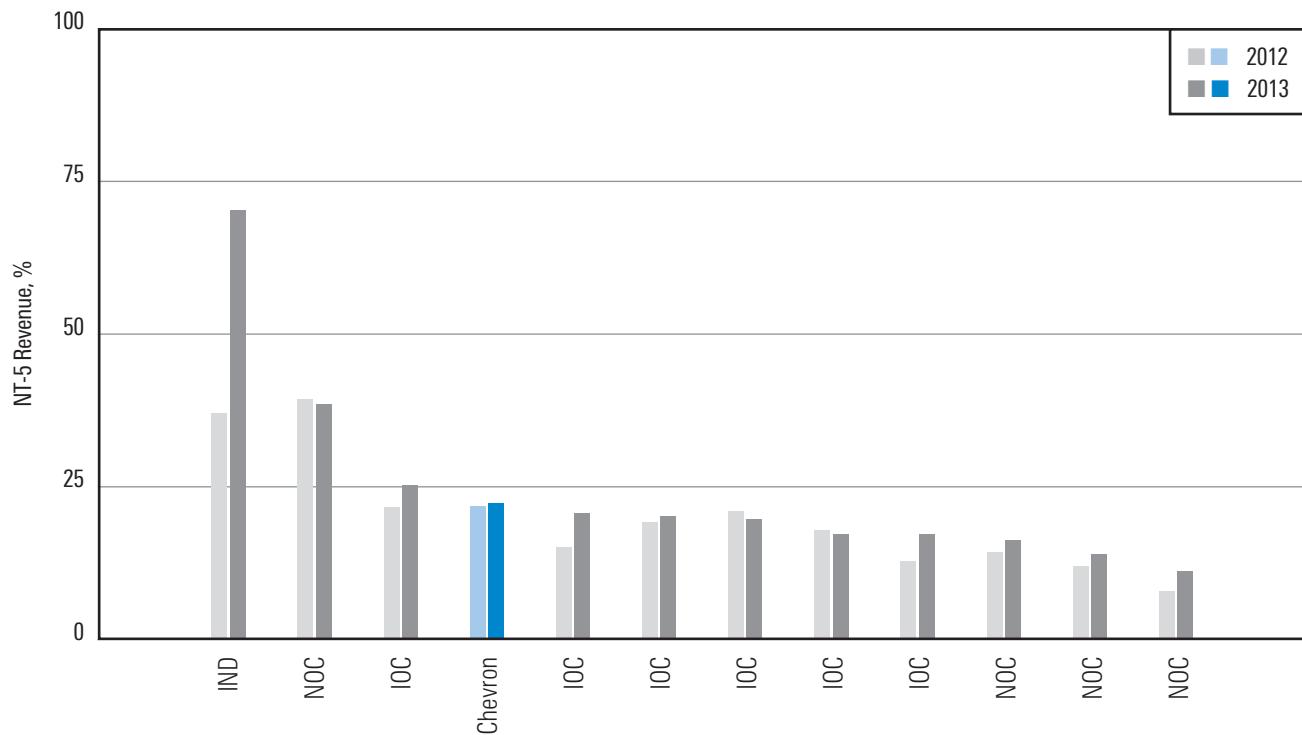
Australia	Wireline E&A Extension & Wheatstone Amendment; DD/MWD on Barrow Island; Coiled Tubing on Wheatstone (contingency).
Canada	Wireline, DD/LWD, Bits, Cementing, Fluids & Sampling Services on Orphan Basin well. Openhole Wireline, DD/LWD, Bits, DT&R, Cementing and TerraTek* coring analysis in the Kaybob Duvernay Phase II.
China	Wireline, DD/MWD, Mud Logging, Bits, Sampling Services, Fluids and Solids Control on Deepwater well in South China Sea (West Tellus); most services based on prior-contracts.
Congo	Directly assigned Maersk Deliverer work for Lianzi: WL, D&M, Testing, Fluids, SSSV, and Production Packers. Contracting based on existing SASBU contracts.
Indonesia	Cementing on Asgard (IDD); Sand control pumping, tools, screens & SSSV for IDD; M-I 5 year contract for Fluids and Solids Control on IDD; Bits contract.
Kazakhstan	Bits contract rolled over.
Kurdistan	Wireline, D&M and Testing/TCP on Sarta & Rovi Exploration wells.
Liberia	IPM (coordination), Wireline, DD/MLWD, Fluids, Geoservices, Bits, Cementing & Sampling services for Goshtern-1 exploration well; mostly based on prior contracts.
Nigeria	Geoservices extension for 1 year; Bits contract.
Thailand	3 well M/LWD trial offshore Thailand.
UK; CUE	Subsea Test Tree & SSSV for Alder; Geoservices contract extension for 5 yrs.
USA; AMBU	Stimulation, Coiled Tubing and CH Wireline (100%), Cementing (50%).
USA; MCBU	DT&R extended (fishing).
USA; SJVBU	Central Fluid Processing facilities & associated scope in several SVJBU fields.
USA; DWEP	Wireline, D&M, and Fluids 1 yr. extensions. Mud Logging on the Inspiration. Executed cementing extensions for Discoverer Clear Leader & India rigs.
USA; GOM	Geoservices mud logging services & MI Completion Fluids on Bigfoot project.
SIS	Petrel to JO/PZ; Reservoir Mgmt. / Data Mgmt. RFP; Real Time Services in Liberia & China.
WesternGeco	Land acquisition survey and processing for Joint Operations in PZ (appx. 4,600 km ²); Alba 4D Seismic Acquisition and processing work using Q-Marine* seismic system (North Sea). Great Australian Bight Phase 1 processing.

Losses since May 2013

Bangladesh	Drilling services scope (to WFT; incumbent).
Canada	Fluids (to Marquis Alliance), Flowback (to Weatherford).
China	Cementing on 2014 deepwater well (to BHI).
Indonesia	Wireline IDD (to HAL); Upper Completion on IDD (to HAL).
Kurdistan	Cementing / Stabilizations / Mud Logging (to OilSERV), Fluids (to Petrochem), Liner Hangers (to BHI), Surface Well Testing and other services (to a variety of providers) on Rovi & Sarta; lost fluids and solids control on Qara Dagh (to Petrochem).
Nigeria	Fluids on Agbami (Star Deep Water Petroleum Ltd; lost to Baker / Hamilton).
Thailand	Cementing on new build rigs (to HAL)
UK; CUE	Fluids and DD/LWD on Rosebank via roll over, but project deferred.
USA; AMBU	Cementing (50% to BHI).
USA; MCBU	Lost RFQ for Motors; also various drilling services that are directly selected periodically.
USA; DWEP	Stimulation Vessel RFP (to BHI); Cement Unit on new-build TOI Conqueror (to HAL).
USA; GOM	Bigfoot: Cementing, Drilling Fluids, Sand Control, Completions and MPD (to HAL); 2nd call provider for Wireline / D&M (to BHI; we had been primary when operated by DWEP). Lost MPD services on Petronius & Genesis (to WFT).
SIS	Wheatstone Production Surveillance; Well Reliability & Optimization RFP (ASBU, NMA & GOMBU).
WesternGeco	Great Australian Bight exploration streamer acquisition survey (to TGS). Did not pursue the initial 2D work in Morocco.

New Technology Usage by Top 12 Customers

Excluding Former Smith Entities (Bits, DT&R, and M-I SWACO)



NT-5% is a measure of the revenue generated from technologies commercialized within the last 5 years. Chevron's NT-5 was flat year-on-year at 22%. Chevron's use of NT-5 was slightly above the 20% average of its IOC peers and slightly below the 24% average of Schlumberger's largest 12 customers.

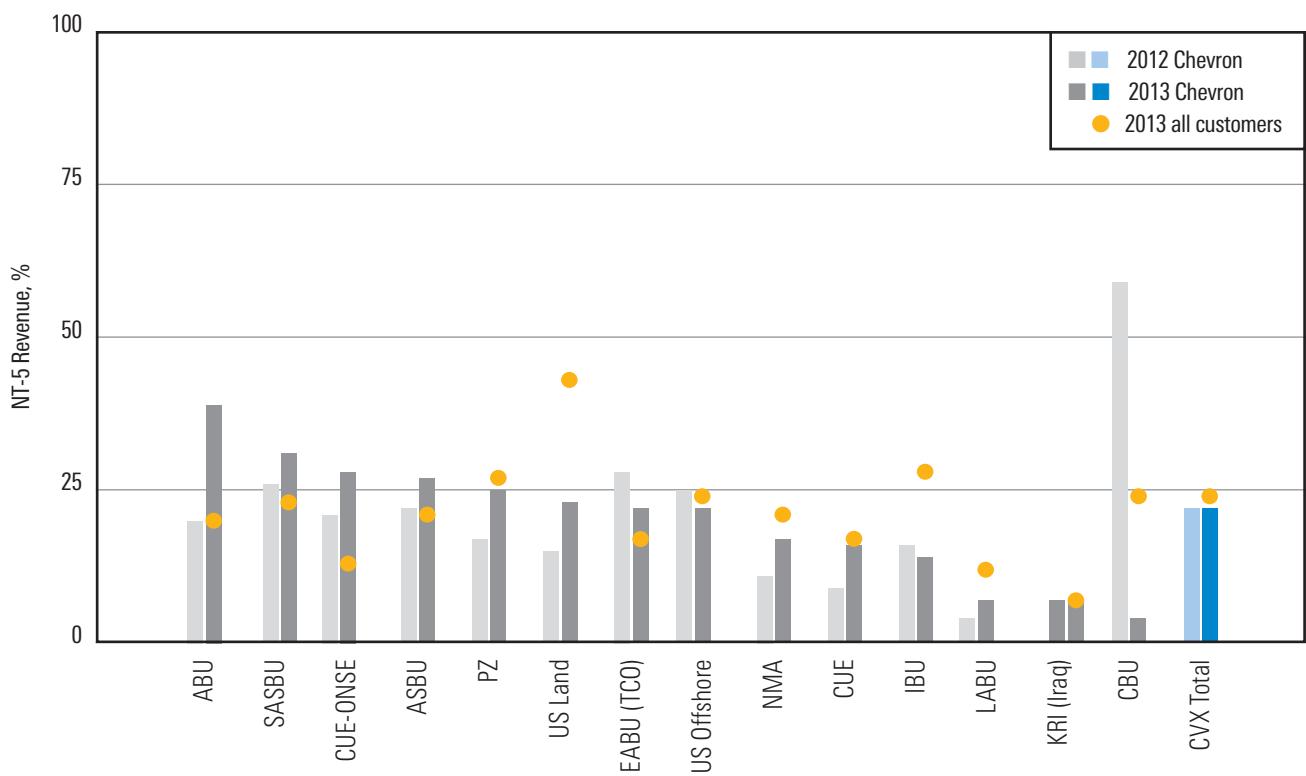
A diverse range of NT-5 technologies was used during 2013. The significant ones were X11 coil tubing system (SASBU & IBU), ACTive* family of live coiled tubing services (SASBU, PZ, & US Land), MaxCO₃* degradable diversion acid system (TCO & PZ), RIM SenTURIAN* subsea landing string system (ABU), HiWAY* flow-channel fracturing technique (SASBU), ClearFRAC* XT polymer-free fracturing fluid (TCO), OneSTEP* simplified sandstone stimulation system (NMA & SASBU), MUDPUSH Express* mud removal system (US Land), D&M's StethoScope* pressure-while-

drilling service and SonicScope* 475 multipole sonic-while-drilling service (SASBU, LABU, & DWEP), Thema* drilling operations support, and FLAIR* fluid logging and analysis via Geoservices (SASBU & DWEP), InSitu Fluid Analyzer* system (DWEP, ABU, & KRI), ReSOLVE* nonexplosive setting tool (NGC), MDT Forte* rugged modular formation dynamics tester (KRI), REDA Maximus* ESP (IBU & NMA), and Petrel* Geophysics software platform (various BUs).

Source: Schlumberger *DFS Reporter*.

Chevron New Technology Usage

By Business Unit or Geographical Area



This chart shows the geographical distribution of NT-5% as a percentage of revenue for 2012 and 2013, and the 2013 average for all customers by geography. ABU had the highest NT-5%, but in terms of NT-5 spend, it ranked 4th.

In terms of spend, the top three users of NT-5 were SASBU, US Offshore (DWEP), and US Land. CUE-ONSE ranked high in percentage terms, but its spend base was the lowest—this due to limited activity.

The significant year-on-year decline in CBU is the result of the Beaufort Sirluaq 3D acquisition in 2012, which was not repeated in 2013.

Source: Schlumberger *OFIS Reporter*.

Chevron Innovation and Value-Added Process

Value Created, Quantified from Joint Innovations

Overview

Working with Business Partners after the award of a contract, Chevron endeavors to reduce the total cost of ownership (TCO) in its operations.

Methodology

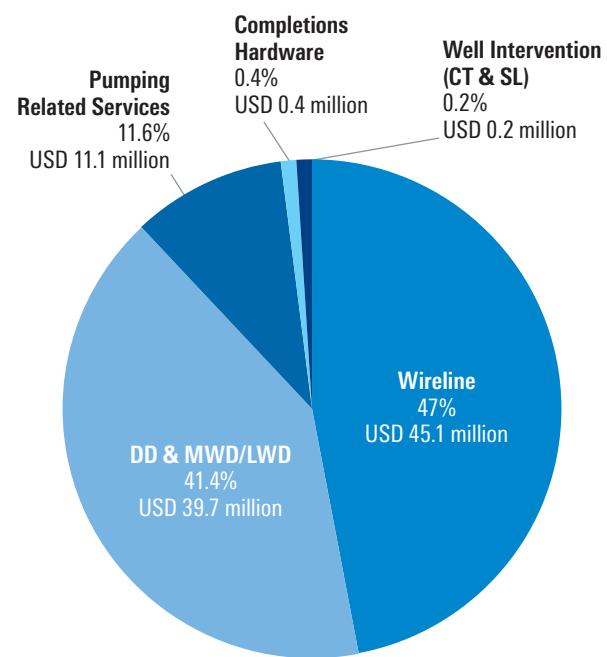
Through product substitutions, cycle time reductions, resource reductions, and production and efficiency enhancements, the value added in reducing the TCO can be quantified.

Results

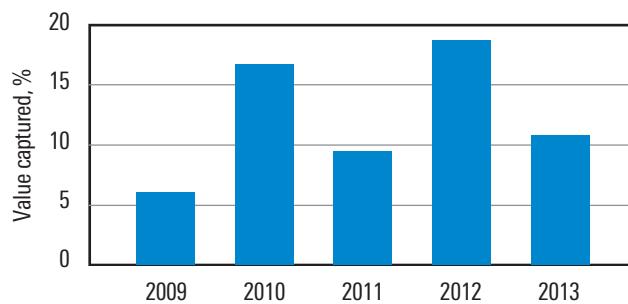
Jointly agreed TCO reductions in the PSLs included in the D&C Scorecard was USD 96 million, representing 10.8% of the cumulative spend in those PSLs. Additional TCO value was captured via other PSLs, but those amounts are not reflected here.

In 2013, Schlumberger and Chevron recognized a combined total of almost USD 100 million via the innovation and value-added TCO process. This value was attributed to process improvements and technology applications that led directly to a measurable reduction in total system cost. The case studies provided in this summary document some of the technologies that contributed to this value.

Value Captured by Segment



Value Captured as a Percentage of Revenue



Value Captured — 5-Year Trend

Year	Revenue, USD millions	Value Captured, USD millions	Value Captured, % of Total Revenue
2009	543	33	6.1
2010	602	101	16.8
2011	693	66	9.5
2012	829	156	18.8

2013 Performance Summary

By Chevron D&C Product Service Line

Product Service Lines	Spend, USD	No. of Tech or Process Improvement Innovations	Value Added Realized, USD	Value Added Spend %	Total Operating Time, Hours	Total Rig NPT, Hours	Operating Efficiency, %
Directional Drilling	58,229,000	2	15,237,000	26.2	10,911	80	99.3
Rotary Steerable Systems	65,064,000	3	3,330,000	5.1	28,863	220	99.2
MWD / LWD / Drilling Mechanics	148,185,000	5	21,145,661	14.3	103,100	256	99.8
Openhole Electric Wireline	153,776,290	11	28,267,738	18.4	31,485	531	98.3
Cased Hole Logging ¹	122,666,365	11	16,829,548	13.7	18,954	335	98.2
Cementing	105,437,456	34	5,652,115	5.4	57,226	155	99.7
Completions—Fracturing and Acidizing	64,758,000	4	2,853,700	4.4	38,384	25	99.9
Completions—Sand Control	18,619,500	2	2,585,904	13.9	1,944	0	100.0
Upper Completion Systems	23,653,612	1	102,000	0.4	25,238	32	99.9
Lower Completion Systems	26,725,500	2	294,370	1.1	3,839	20	99.5
Coiled Tubing	89,019,000	1	179,628	0.2	104,033	844	99.2
Tubing Conveyed Perforating (TCP)	10,057,087	0	0	0.0	26,304	67	99.7
Grand Total	886,190,810	76	96,477,664	10.9	450,281	2,565	99.4

This table captures key metrics for several of the Schlumberger PSLs working for Chevron D&C for spend, improvement innovations, value-added metrics as per Chevron's total cost of ownership (TCO) capture process, operating hours, total rig nonproductive time (NPT) attributed to Schlumberger, and the resulting operating efficiencies.

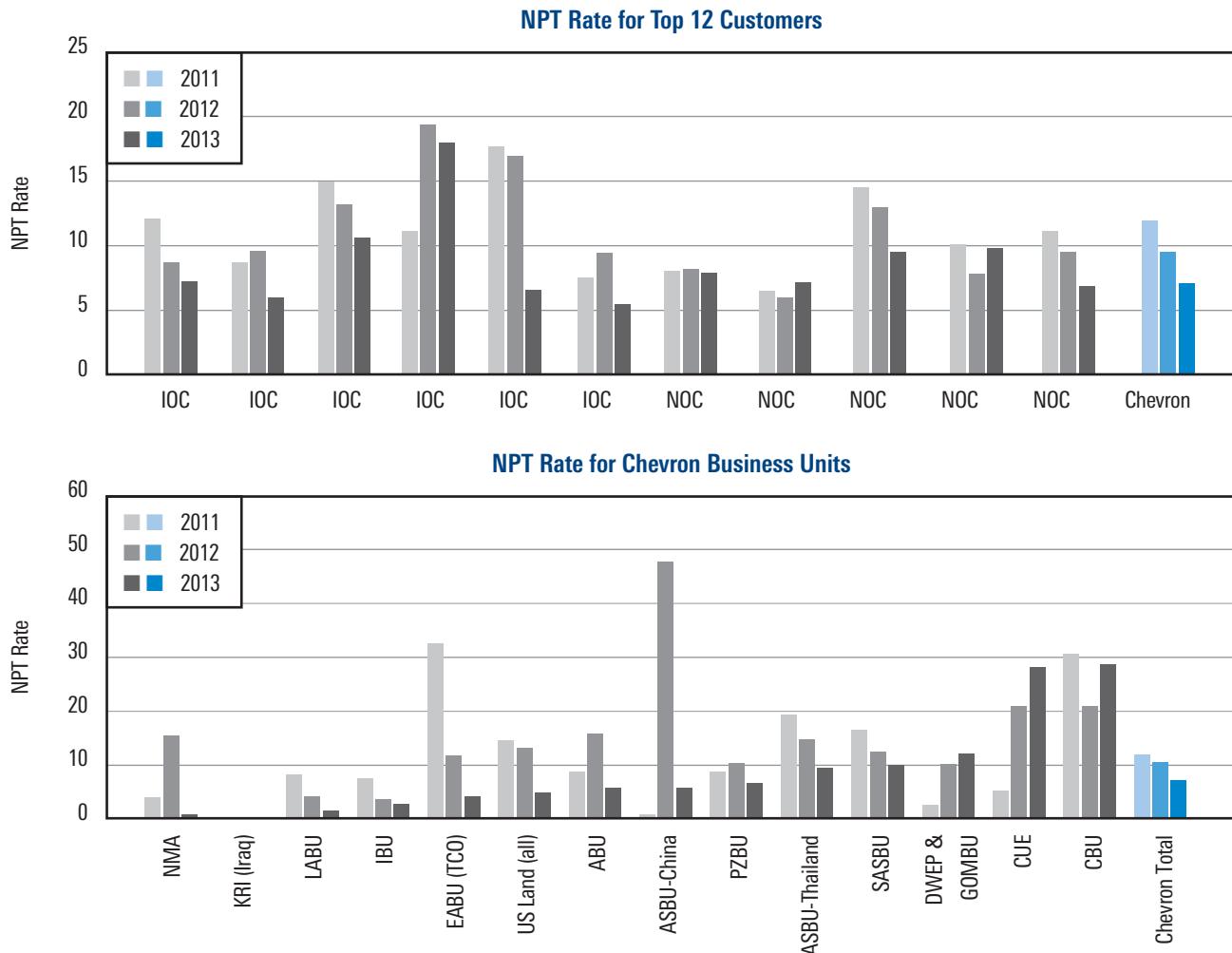
During 2013, Schlumberger performed more than 450,000 hours of operations via the listed PSLs for Chevron.

The consolidated operating efficiency for Chevron in these PSLs was 99.4% in 2013 vs. 99.1% in 2012.

Sources: Schlumberger *DFS Reporter*, Quest, and internal databases.

¹Cased Hole Logging statistics include E&P Wireline Services (Smith International acquisition); on page 17, E&P Wireline revenues are allocated to the WIS Business Segment.

Operational Performance: Nonproductive Time Rates



Overall in 2013, the NPT rate for our rig-related¹ services for Chevron improved 32% over 2012, another respectable year-on-year improvement.

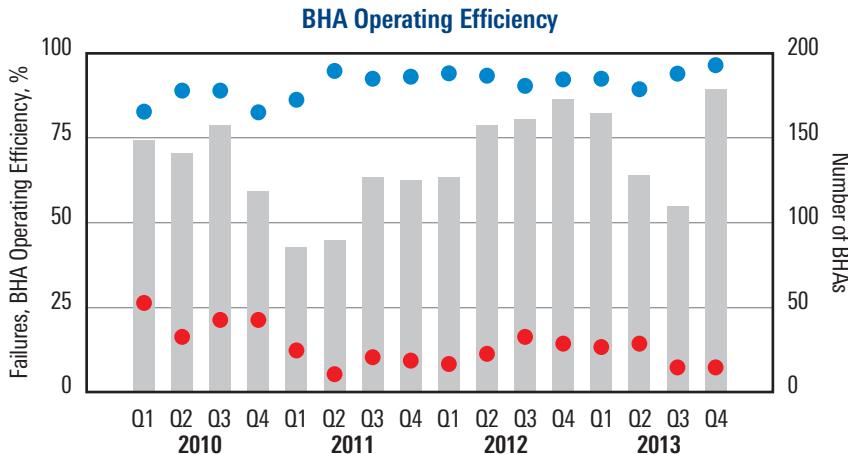
This compares very favorably with the overall 7% improvement for Schlumberger globally and represents a cumulative 72% improvement since 2009 in operations for Chevron (2009 was the first full year of implementation of the Excellence in Execution program). SASBU, a key geographical focal point, improved for the 5th consecutive year—including 33% since 2011.

¹Rig-related services include Drilling & Measurements, Wireline, Testing, Well Services, Completions, and Coiled Tubing services.

Source: Schlumberger Quality Navigator.

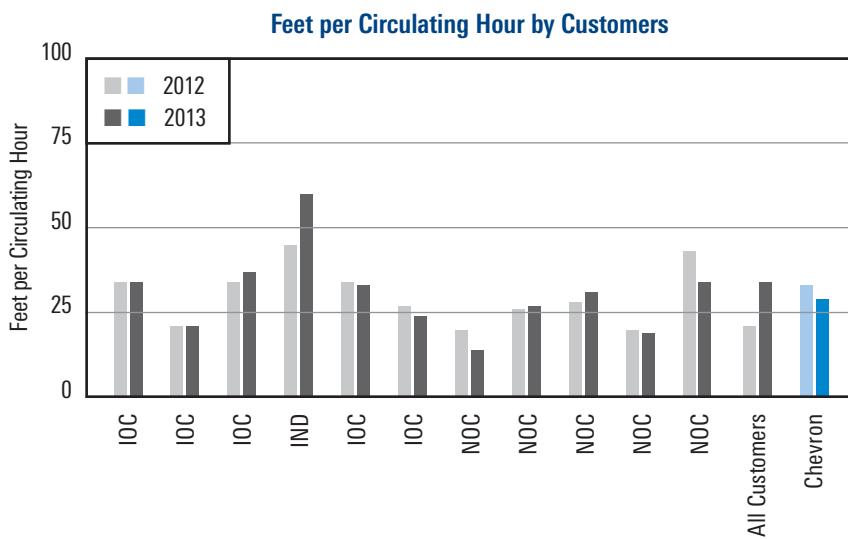
NPT rate is a measure of lost-time hours per 1,000 operating hours (e.g., An NPT rate of 20 means 20 hours are lost for 1,000 hours of operating time, equivalent to 98% uptime.).

Drilling Performance: Efficiency & Footage Rates



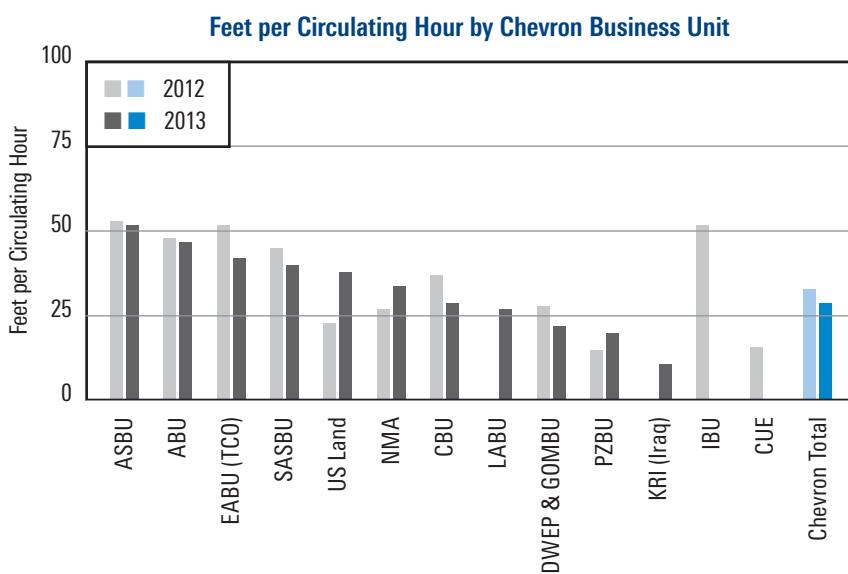
This chart represents the percentage of success for each DD/MLWD BHA run inhole for Chevron, based on number of BHAs/number of failed BHAs (CMS).

BHA operating efficiency has been above 90% since Q2-2011.



The Feet per Circulating Hour chart benchmarks drilling rate performance for Chevron vs. All Customers vs. Peer Group.

The rate performance with Chevron in 2013 was in line with the Peer Group average, but 14% below the All Customers comparison—this due to Schlumberger's increased activity in high-volume markets.



The Business Unit comparison chart depicts year-on-year rate performance by Chevron Business Unit and Chevron Total.

Of particular note is the US Land performance improvement, driven by MC BU and AM BU.

Source: Schlumberger Quality Navigator.

NPT rate is a measure of lost-time hours per 1,000 operating hours (e.g., an NPT rate of 20 means 20 hours are lost for 1,000 hours of operating time, equivalent to 98% uptime).

D&C Scorecard & Excellence in Execution Highlights

The Chevron Drilling and Completions Scorecard tracks the performance of D&C-focused suppliers and partners. Performance is measured in three main categories:

- Health, Environment, and Safety (HES)
- Innovation and Value-Added (via the TCO process)
- Efficiency, Quality, and Reliability

In 2013, Schlumberger improved in efficiency, quality, and reliability but deteriorated slightly in value-added and TRIR—resulting in a B+ rating vs. an A in 2012. The value-add process is a cost-focused initiative that deserves more joint focus going forward.

Our Integrated Services Project Management (ISPM) approach was recently applied in China (Q4-2013) and Liberia (H1-2014); the PRA-based planning process and ISPM oversight contributed to successful job executions.

Our Project Readiness Assessment (PRA) process was used broadly to ensure more rigor in the planning phase of key Chevron projects. Whereas there is still room to improve, we believe this adds significant value to the start-up of complex projects.

Although last year's overall global improvement in the areas of efficiency, quality, and reliability was respectable as measured by Schlumberger's NPT rate for all customers, it did not reach the level that we set out to achieve for the year. In 2012, we reported that we would continue our Excellence in Execution program, leveraging seven key drivers, with an ambition to deliver a step change in reliability. Schlumberger has since embarked on a transformation strategy that will change how the company performs (not limited to safety and quality). Our ambition of a 10-time reduction in failure rates has been adopted as one of the objectives of our Transformation programs, and the seven associated key drivers have been integrated into the Transformation programs.

In 2013, progress was made that allowed us to move toward deployment in 2014 and beyond:

- improving Procedural Adherence through Standard Work Instructions (SWI), checklists, and cultural change, leveraging learnings principally from the aviation industry
- defining Competency Systems for nine segments based on the framework developed in 2012
- evolving toward a total life cycle management model for equipment assurance
- broader adoption of reliability-centered maintenance techniques, leveraging aviation and automotive industry experience. The transformation of Engineering, Manufacturing, and Sustaining (EMS) began several years earlier. We are already seeing the first signs of technologies demonstrating a higher-than-benchmark reliability.

In H1-2014, as part of the focus on procedural adherence, we launched the Do It Right campaign across the entire organization.

Dave Payne, Chevron's D&C VP, has been very supportive of our efforts—including personal endorsement from a customer's perspective during the rollout. This long-term campaign is aimed at embedding a procedural adherence culture. We expect the effects of the campaign to become visible to Chevron as 2014 progresses and beyond.

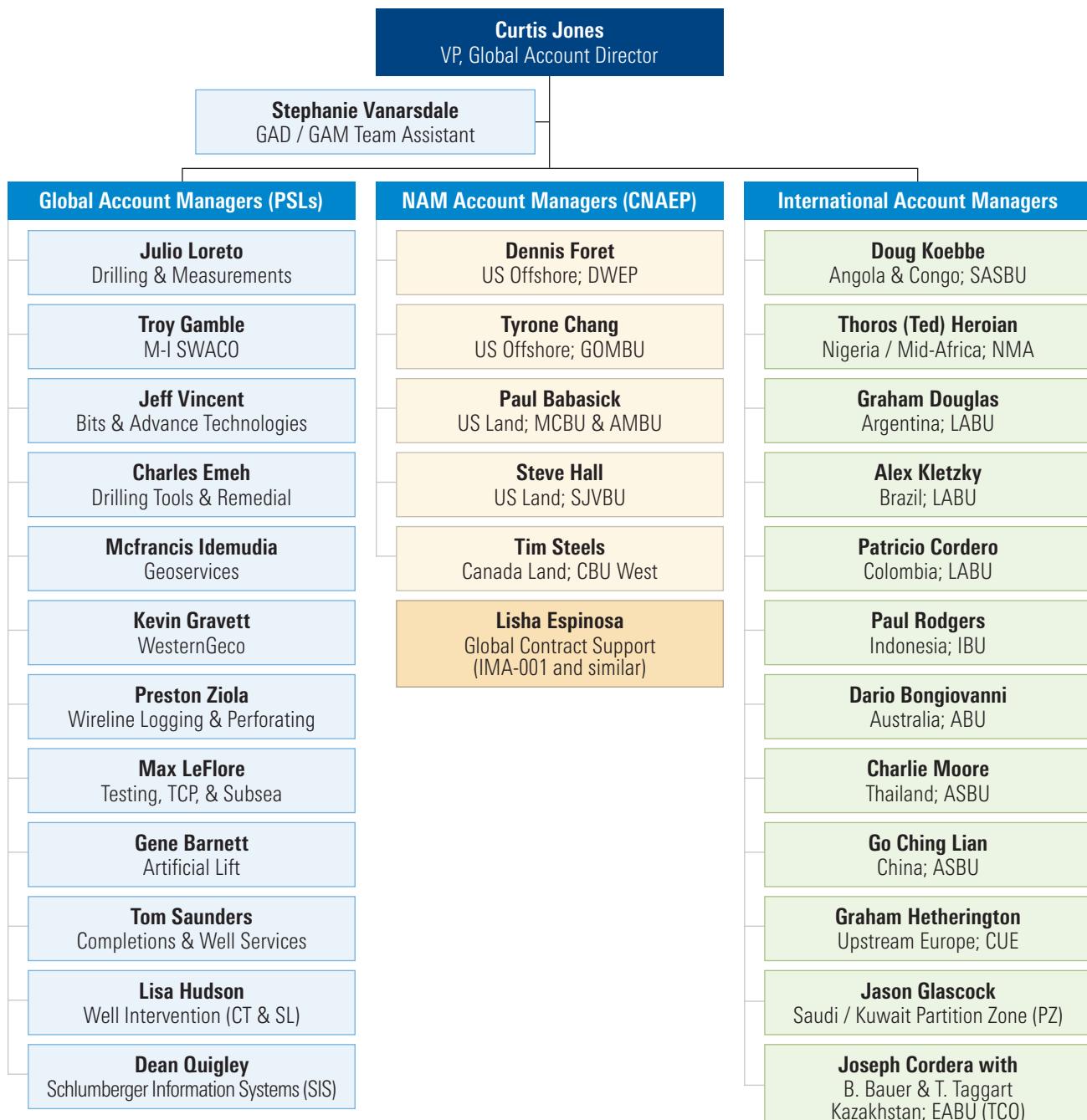
Drilling and Completions Scorecard

Supplier		Schlumberger				Overall Grade:		B+					
Input Provider		Supplier				Jobs:		20,247					
Score Timeframe (QTD or 4-Qtr Rolling)		Q4				Operating Hours:		450,281					
Category or Product/Service Line (PSL)		Directional Drilling, Rotary Steerable, MWD/LWD, Open and Casedhole Logging, Primary Cementing, Frac/Acid, Coiled Tubing, Sand Control, Pipe Conveyed Log/TCP, Upper and Lower Completion Systems				Spend:		\$886,190,810					
OPCO	SBU	ALL					ALL						
Health, Environment and Safety - OPCO/SBU Level Only (All PSLs)						Grade:		B+					
Metric	Weighting	C ¹	B ²	A ³	Supplier Actuals	Score	Weighted Score	Grade					
Total Recordable Incidents Rate (TRIR)	50%	>0.24	0.24	0.20	0.29	1	0.50	C					
Days Away from Work Rate (DAFWR)	50%	>0.054	0.054	0.048	0.03	3	1.50	A					
Health, Environment and Safety - OPCO/SBU Level Only (A)	100%						2.00						
Number of Fatalities	100%	If fatality occurs, automatic C Grade			0	3	3.00	A					
Total	100%						2.00						
Comments:													
Consolidated HES Results for all SLB PSLs: TRIR Ratio = 0.12 for Q4 & 0.29 for full-year 2013. DAFW Ratio = 0 for Q4 & 0.029 for full-year; Fatalities = 0. TRIR increased year-on-year as a result of two additional non-DAFW Recordable incidents on 21% fewer man hours. The single DAFW that Schlumberger incurred during 2013 was in ABU on Sep-2nd; the combination of an improper functioning rig-tugger and a tool clamp that was not equipped with handles resulted in a wireline operator's hand being trapped with resulting crushing damage and partial loss of a finger. On the recordable injury front we started out the year poorly with five incidents in Q1, but improved with a total of four during Q2-Q4. Five of the total ten injuries involved fingers and Schlumberger has active focus programs ongoing in this area; we also incurred two incidents of drilling fluid related rashes. No significant Chevron related auto incidents during 2013; this area is positive and on-track with two minor slow moving incidents in 2013.													
Innovation and Value-Added: Product/Service Line Specific (PSL)*						Grade:		B					
Metric	Spend	PSL Adj Spend Weighted	Number of Innovations	Value-Added Realized from Innovations (\$)	Savings % Spend	Combined PSL Score	PSL Weighted Score						
Directional Drilling	\$58,229,000	7%	2	\$15,237,000	26.2%	2.5	0.16	A					
Rotary Steerable Tools	\$65,064,000	7%	3	\$3,330,000	5.1%	2.0	0.15	B+					
MWD / LWD / Drilling Mechanics	\$148,185,000	17%	5	\$21,145,661	14.3%	2.0	0.33	B+					
Open Hole Electric Wireline	\$153,776,290	17%	11	\$28,267,738	18.4%	2.0	0.35	B+					
Cased Hole Logging	\$122,666,365	14%	11	\$18,829,548	13.7%	2.0	0.28	B+					
Cementing	\$105,437,456	12%	34	\$5,652,115	5.4%	2.0	0.24	B+					
Completions - Fracturing & Acidizing	\$64,758,000	7%	4	\$2,853,700	4.4%	2.0	0.15	B+					
Completions - Sand Control	\$18,619,500	2%	2	\$2,585,904	13.9%	1.5	0.03	B					
Upper Completion Systems	\$23,653,612	3%	1	\$102,000	0.4%	1.0	0.03	C					
Lower Completion Systems	\$28,725,500	3%	2	\$294,370	1.1%	2.5	0.08	A					
Coiled Tubing	\$89,019,000	10%	1	\$179,628	0.2%	1.0	0.10	C					
Pipe Conveyed Logging / TCP	\$10,057,087	1%	0	\$0	0.0%	1.0	0.01	C					
Total	\$886,190,810	100%	76	\$96,477,664	10.9%		1.90						
Efficiency, Quality and Reliability - Product/Service Line Specific (PSL)*						Grade:		A					
Metric	Spend	PSL Adj Spend Weighted	Product Service Line Success Rate (%)	Operating Efficiency	Combined PSL Score	PSL Weighted Score							
Directional Drilling	\$58,229,000	7%	96.7%	99.3%	2.4	0.16	B+						
Rotary Steerable Tools	\$65,064,000	7%	95.5%	99.2%	2.8	0.20	A						
MWD / LWD / Drilling Mechanics	\$148,185,000	17%	97.7%	99.8%	3.0	0.50	A						
Open Hole Electric Wireline	\$153,776,290	17%	100.0%	98.3%	2.8	0.48	A						
Cased Hole Logging	\$122,666,365	14%	100.0%	98.2%	2.8	0.38	A						
Cementing	\$105,437,456	12%	100.0%	99.7%	3.0	0.36	A						
Completions - Fracturing & Acidizing	\$64,758,000	7%	88.9%	99.9%	2.3	0.17	B+						
Completions - Sand Control	\$18,619,500	2%	100.0%	100.0%	3.0	0.06	A						
Upper Completion Systems	\$23,653,612	3%	97.1%	99.9%	2.5	0.07	A						
Lower Completion Systems	\$28,725,500	3%	97.5%	99.5%	1.9	0.06	B						
Coiled Tubing	\$89,019,000	10%	Not Applicable	99.2%	3.0	0.30	A						
Pipe Conveyed Logging / TCP	\$10,057,087	1%	98.6%	99.7%	3.0	0.03	A						
Total	\$886,190,810	100%	97.5%	99.4%		2.77							
Number of Major Operational Failures (Impacted well costs >10%):													
Average PSL Success Rate was 97.5% & Service Efficiency averaged 99.4% in 2013. No known incidents on Chevron Operated programs that impacted well costs by >10%. We review individual incidents on an ongoing basis at the SBU level, and significant incidents / issues are raised to the global level, including senior line management involvement as required.													
Major Highlights (Achievements, Disappointments, Issues, Suggestions for Improving Results):													
Due to the global extent & volume of our business, this level of detail is reported at the SBU level via ASRs, SQMs &/or Scorecards. Innovation & Value-Added is captured via the TCO process, however the focus varies across BUS / GeoMarkets.													
Grade Definitions													
Category				Aggregate Scoring									
Top Performer	A ¹	Safety	33%	Score	2.00	Weighted Score							
Acceptable	B ²	Innovation / Value-Added	33%	Score	1.90	0.63							
Unacceptable	C ³	Efficiency / Quality / Reliability	33%	Score	2.77	0.92							
Total				100%		2.22							
Additional Notes/Comments:													
Our overall score of B+ in 2013, vs. an A in 2012, was impacted by the number of Recordable HES incidents and a decline in TCO value capture in several PSLs. If we'd incurred two less recordable HES incidents our overall score would have been an A. Our HES results improved in Q2-Q4 & our goal is to carry the trend thru 2014. The TCO capture process is an area that requires additional focus by both SLB & CVX; it's important to capture the value metrics.													
Confidential - For Internal Use only between Chevron & Supplier													
Warning: This Scorecard document and file contains confidential information. If you are not the intended recipient internally within either Chevron or the Supplier, you hereby agree that any disclosure, copying, distribution or use of any of the information contained in this document or file is STRICTLY PROHIBITED . For questions about the Scorecard, updates, or suggested changes - please contact Mark Robicheaux at: MTUJ@chevron.com or +1 713 540 9486.													

Chevron Account Team Organizational Chart

Schlumberger's Chevron Account Team is structured to provide overall support at the Global and Business Unit levels in combination with specific Business Segment / Product Service Line (PSL) expertise at the global and operational interfaces.

This team is focused on ensuring our mutual success.



Technical Collaboration



Technical Collaborations

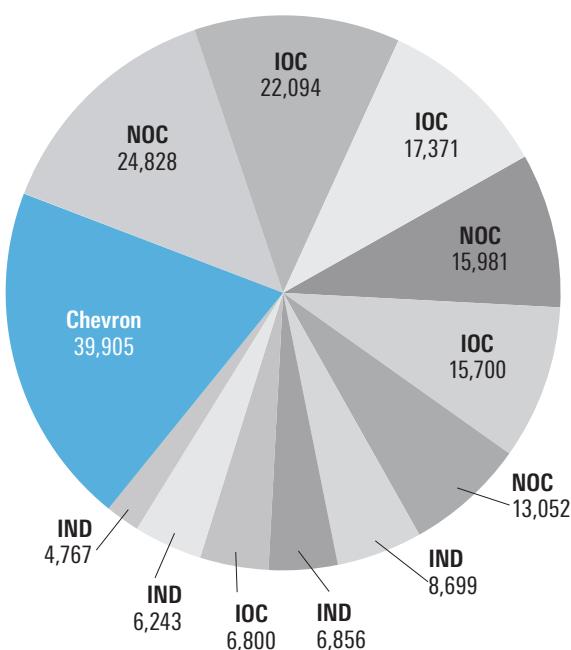
Chevron and Schlumberger have a number of active technical engagements. A few of the key ones are highlighted in this section. Additionally, we are progressing on a broad framework agreement with a view toward more collaboration.

- Chevron Portal Within slb.com
- Petrel Software Fills Gaps in Workflow Efficiency
- INTERSECT Simulation Software Deployed on 50 Projects to Improve Workflow Efficiencies
- Working Together to Build the Next Generation of Seismic Processing Platforms
- Chevron and Schlumberger Collaborate to Optimize Production and Recovery in Deepwater Gulf of Mexico
- Subsea Sampling Adding Value to the Lianzi Field Development
- Investigating Nonlinear Acoustics for Far-Field Imaging from the Wellbore

Chevron Portal Within slb.com

The screenshot shows the Schlumberger website homepage. At the top, there's a navigation bar with links for 'Services & Products', 'About Us', 'Investors', 'Newsroom', 'HSE', 'Careers', 'Alumni', and 'Resources'. Below the navigation is a search bar. The main content area features several sections: 'Chevron and Schlumberger' (with a thank you message), 'Product Line Contacts' (listing various contacts), 'Summer 2014' (mentioning the Oilfield Review journal), 'Gaining Exponential Benefits Through Integrated Drilling' (with a video thumbnail and three smaller video thumbnails below it), and 'Recent Chevron Case Studies' (listing several case studies with brief descriptions). On the left side, there's a sidebar with 'Related Resources' (Case Studies, Events, Industry Articles, Technical Papers, Videos, Technical Challenges, Curve Membrane Dictionary, Free Software Utilities, Technology Matrix by SBUs) and 'Restricted Access' (Chevron and Schlumberger).

2013 slb.com Visits



In 2013, Chevron employees continued to make up the largest group of users to the Schlumberger slb.com website.

In 2013, Chevron employee visits to slb.com exceeded 35,000.

When Chevron employees visit slb.com from inside the Chevron intranet, they have access to the Schlumberger public website as well as to private content visible only to Chevron. This Chevron portal allows Schlumberger to share knowledge and enhance communication across Chevron assets by including on this private site premium content that is specific to Chevron, such as case studies, best practices, and personal contacts. The top downloaded files of interest to Chevron employees continued to be Schlumberger-authored reference books; publications such as technical papers, industry articles, case studies; and the *Oilfield Review* journal.

Petrel Software Fills Gaps in Workflow Efficiency

Schlumberger and Chevron collaborate on software enhancements

In 2013, Chevron's Strategic Business Units (SBUs) expanded their use of the Petrel* E&P software platform, with 65 new core seats ordered for a total of 362 in place by year's end. Chevron was a driving force behind this Petrel 2013 release, which added subsalt imaging, multiuser collaboration, real-time geological and geophysical (G&G) operations, and drilling, data model, and property modeling workflow gaps.

51 enhancements to 2013 release

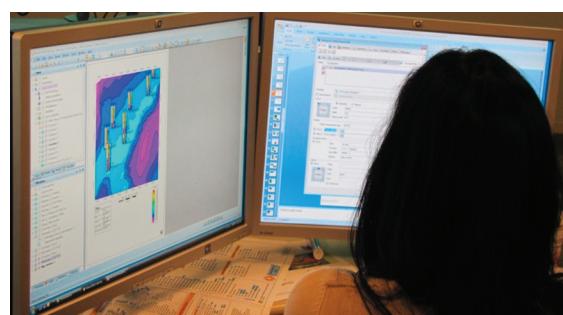
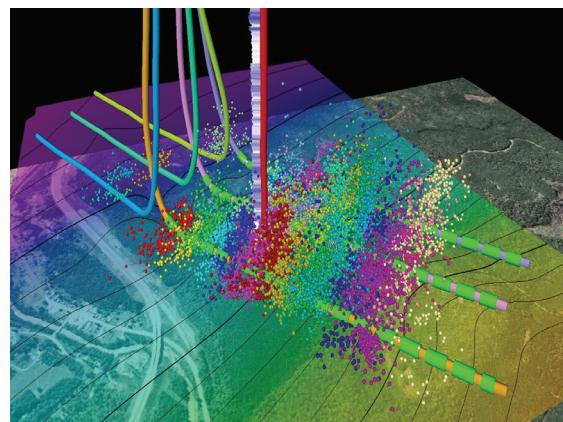
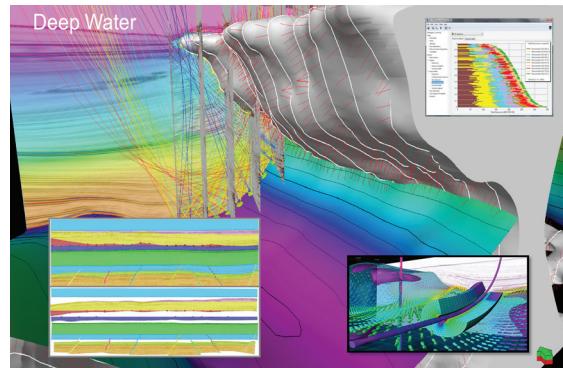
Chevron workflow experts from targeted SBUs collaborated with Schlumberger product champions and software developers throughout the 2013 version delivery cycle. Fifty-one major Chevron enhancements were included in the release. The collaboration team is now working on 42 additional large-scale requirements planned for Petrel 2014.

Expanded workflow scope

Chevron expanded the workflow scope by including modules for microseismic and prestack data analysis. Development discussions have also expanded to cover unstructured gridding in the Petrel platform.

Expanded use of software through pilot projects

Studio* E&P knowledge environment use has also grown, from the initial deployment in SJVBU to SASBU Houston and piloting in TCO. Other Petrel platform pilots are also being supported, such as G&G operations workflow pilots in DWEP and SASBU Houston (well planning and monitoring) and in AMBU (unconventional workflows). All of these projects are expanding the use of Petrel software platform tools to new audiences.



Reservoir Characterization

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INTERSECT Simulation Software Deployed on 50 Projects to Improve Workflow Efficiencies

Schlumberger and Chevron continue collaboration

At the end of 2013, the INTERSECT* high-resolution reservoir simulator was deployed on 50 key Chevron projects worldwide with the purpose of improving workflow efficiency across several business units. Each deployment went beyond the installation of the software: it also involved the use of integrated workflows, including those incorporating the Petrel* E&P software platform. The result of this endeavor was the development of a rigorous, structured approach to workflow deployment that included change management, business unit readiness, and comprehensive training to build organizational capability.

Enhancements to field management process

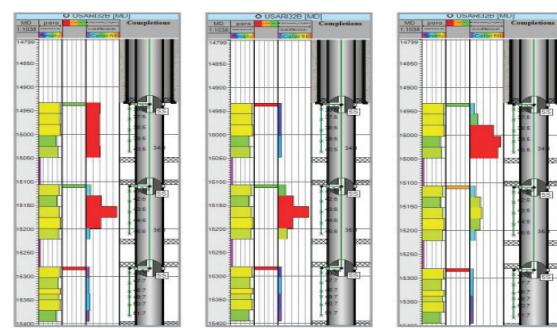
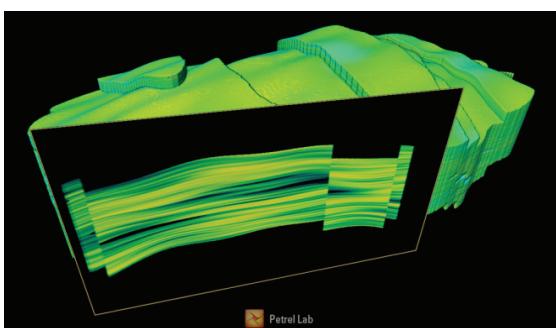
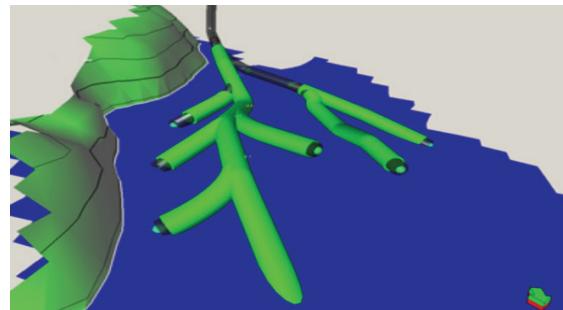
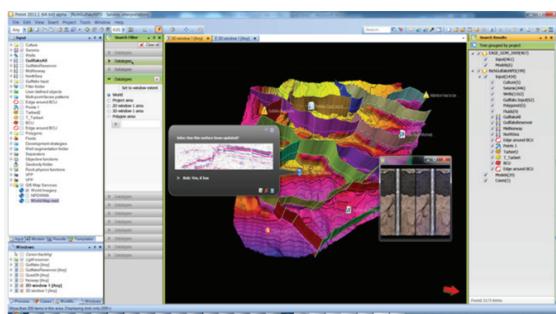
The Petrel 2013.1 release in June 2014 made several improvements in the field management process—namely, by creating INTERSECT field management strategies directly within the Petrel platform environment, modeling polymers in the chemical EOR process, and modeling non-Darcy flow using the Forchheimer correction.

Rewards to reservoir engineering requirements

A number of specific Chevron reservoir engineering requirements were developed that arose from the business units where the INTERSECT software has been deployed, including support for sliding sleeves in the Advanced Well Modeling module, the ability to link genOpt to Petrel uncertainty and optimization, customized run submissions, and performance improvements.

Continued collaboration to improve efficiencies

Chevron will continue the collaborative effort with Schlumberger Information Solutions (SIS) in 2014 to expand the use of the INTERSECT simulation software across Chevron's asset teams and continue improving usability and workflow efficiencies.



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Reservoir Characterization

Working Together to Build the Next Generation of Seismic Processing Platforms

Integrated Chevron and Schlumberger expertise accelerates and enhances the implementation of interpretive processing vision

Today's oil and gas industry strongly depends on software applications in every phase of activity. The software ecosystem has grown more intricate, and its development, maintenance, and utilization affects productivity as well as reliability in exploration, production, and drilling. Chevron and Schlumberger share the vision that integrating seismic processing, imaging, and inversion with geological interpretation and modeling is critical to solving the most complex challenges, and both companies have independently taken steps toward turning their vision into reality.

In 2013, Chevron and Schlumberger embarked on a nine-month project to evaluate if the Omega* geophysics data processing and Petrel® E&P software platforms—the two software platforms used by Schlumberger to provide state-of-the-art, geology-driven seismic processing, imaging, and characterization solutions—can sustain Chevron's interpretive processing and imaging needs and, moreover, be used as a continuously evolving software infrastructure for effectively deploying Chevron's growing and differentiating geophysical intellectual property.

To ensure a successful collaboration, Chevron and Schlumberger assigned dedicated teams and program managers that worked closely together to design and implement specific discovery sessions, tailored training, and special-topics presentations attended by a wide variety of experts from both companies. Very quickly, the evaluation project highlighted some key pillars that would support the shared vision of interpretive processing and imaging:

- the earth model-centric approach that links processing and imaging with interpretation and modeling
- the system scalability to big data
- the high-performance compute capabilities.

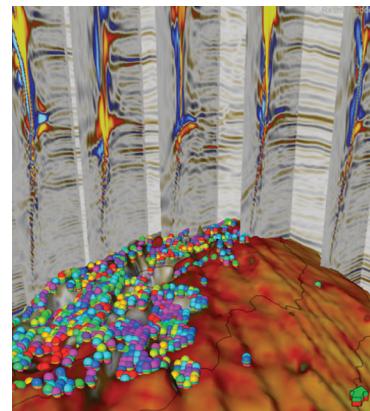
As a result of this evaluation, a list of features and improvements were defined and given to the Schlumberger software development team to take R&D actions toward elevating the platforms to next-level processing and imaging technologies. The features that are required and planned to be improved include

- user productivity, by minimizing data exchange, for example
- software usability, such as ergonomics, component integration, and parallel processing
- Omega platform–Petrel platform workflow integration, including speed of iterations between the two software platforms
- software infrastructure, installation, and configuration
- geologic drive of seismic processing and imaging workflows, such as increasing and generalizing geology-centric workflows.

Although Chevron is not ready to immediately adopt both platforms for production interpretive processing and imaging, Chevron and Schlumberger share a clear vision of the future direction of interpretive processing development. This collaborative software evaluation project has generated ideas that will greatly improve the ability of the Omega and Petrel platforms to realize that shared vision. With complementary competencies and expertise in scientific software development, the continued collaboration between Chevron and Schlumberger can optimize and accelerate the implementation of the interpretive processing and imaging vision and serve the industry as a model for advancing E&P upstream technology.



During the software evaluation project, Chevron developers successfully embedded geophysical algorithms into Omega platform, taking advantage of Omega platform's project and data structure and its highly specialized and productive cluster infrastructure for high-performance computing.



The integration of Omega and Petrel platforms supports the common interpretive processing and imaging vision shared by Chevron and Schlumberger.

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Reservoir Characterization

COLLABORATION

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Schlumberger

Chevron and Schlumberger Collaborate to Optimize Production and Recovery in Deepwater Gulf of Mexico

Project team to design 19 projects with enhanced reservoir contact, stimulation, monitoring, and control

Chevron has a robust portfolio of development prospects in the Gulf of Mexico deepwater Lower Tertiary Wilcox trend. These world-class reserves present significant technical challenges. These include water depths of 7,000 to 9,000 ft, total depths up to 29,000 ft, high pressure (30,000 psi), high temperature (300 degF), location (primarily subsalt), and challenging reservoir pressures. The reservoirs encountered in the center part of the trend are typically "hard," with lower permeabilities and higher mechanical properties than the "soft" rock found in the typical Miocene and shelf fields. Furthermore, there are numerous zones (up to five), and the net interval per well can be as high as 2,500 ft. Chevron has recognized for some time that to develop these reservoirs economically requires developing new fit-for-purpose technologies.

DWEP seeks partners to develop integrated technologies

Beginning in 2011, Chevron's Deep Water Exploration and Production Business Unit (DWEP) initiated a project to identify business partners interested in developing integrated technologies for the sandface completion that would provide reservoir surveillance and flow control over the entire interval to facilitate optimized production and recovery.

Schlumberger proposes three-part completion design

Schlumberger proposed a completion system having three components: zonal contact, stimulation, and monitoring and control.

Zonal contact. The zonal contact component includes a zonal contact valve integrated into the production liner using technology adapted from unconventional tight rock stimulation strategies. The ability to open specific zonal contact valves to selectively fracture individual zones is key to maximizing production. The zonal contact valve has three positions; closed, open and screen. Prior to production, the valve is shifted to the screen position to prevent proppant and formation sand flowback. Zonal contact valve manipulation is managed by shifting collets on the stimulation workstring.

Stimulation. The stimulation string consists of packer seals, shifting collets, and an anchoring tool run on a work string. It is used to open and close the zonal control valves, seal or contain the fracture pressure using the packer seals for the zone being treated, and hold the workstring in place with the anchor during the fracturing process.

Monitoring and control. After the stimulation process, an intermediate completion string is landed across the zonal contact valves. This assembly includes electrically controlled, hydraulically operated flow control valves,



The WellWatcher Flux system's inductive coupler, fully integrated into the completion hardware, allows electric control between zones, enabling sensors to be deployed across the reservoir interval of the lower completion and communication and power to be transmitted wirelessly between the upper and lower completions.

isolation seals between zones, and an inductive coupler that electrically connects the WellWatcher Flux* digital sensor array and PT gauge system. This system provides pressure and temperature monitoring over the entire sandface with an array of discrete temperature sensors mounted on the exterior of the production liner. Electrically controlled flow control valves allow remote control of the production from each zone. Key enablers of the system are the inductive couplers and hydraulic wet mates.

Collaboration is formalized

The Development Agreement was signed in Q4 2013, after which the Leadership and Governance organization was established. The Project Team consists of Chevron and Schlumberger individuals colocated in Chevron's offices. The Schlumberger Engineering Program Manager has 19 unique projects being designed and manufactured in eight locations by approximately 40 engineers.

Key milestones are set

Key project key milestones are as follows:

Field Trial 1	Q2/Q3 2015
Workshop SIT	December 2015–February 2016
Field Trial 2	June–September 2016
Project Closeout	December 2016

slb.com/sandcontrol

Completions

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COLLABORATION**Confidential to Chevron and Schlumberger**

Subsea Sampling Adding Value to the Lianzi Field Development

Schlumberger, in partnership with OneSubsea™ and Chevron, is currently executing the delivery of a subsea sampling system for the Lianzi Field development

Oil and gas exploration and production operators are increasingly moving into deep and ultradeep waters to explore and develop new fields. Increased water depths, longer tiebacks, complex reservoirs, and the continuous effort to reduce the cost of the subsea infrastructure while still ensuring the highest possible recovery rates raise new challenges in terms of reservoir and production management, flow assurance, and enhanced oil recovery.

In this scenario, subsea sampling is rapidly becoming a simple but effective way to gather representative samples of the produced fluids through the life of the field, enabling reliable measurements of their properties and of the changes that occur in these properties through the years.

In September 2010, the FEED for the Lianzi project started in order to explore the concept of a sampling system for Lianzi prior to awarding pre-FID.

Based on detailed Chevron company specifications, technical knowledge, and a need for subsea sampling on the Lianzi Field, Chevron awarded Schlumberger the Pre-FID project in May 2012 to develop an intelligent subsea liquid (water) sampling system for scale-squeeze optimization, as well as multiphase flow meter reverification, to be based on proven OneSubsea processing technology and Schlumberger sampling expertise.

In November 2012, the project transitioned from the Pre-FID engineering phase to full execution, and a project execution team was established. The team took full responsibility for the overall direction, coordination, implementation, execution, control, and completion of the specific project, ensuring consistency with the company strategy, commitments, and goals. In addition to the execution team, a Sponsor group was established using key personnel from Chevron, Schlumberger, and OneSubsea's Processing Systems division to provide oversight of the project, ensuring proper implementation of necessary resources and safe execution of the project and operations.

The project execution team comprises members from various locations in the US and Europe, which resulted in certain logistical challenges needing to be resolved early in the execution phase. Other objectives included qualification of a new coupler design and MQC (Multiple Quick Connect) system and redesign/qualification/change-out of the Sampling Interface relief valves. Despite these tasks, the professional and dedicated team of Schlumberger and OneSubsea experts who are collaborating on the design, technical specifications, delivery schedule, and procurement will soon deliver a fit-for-purpose sampling system to the Lianzi field.

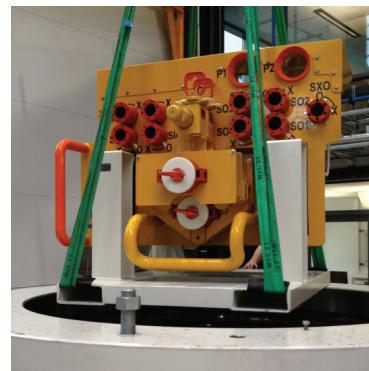
The Sampling System currently being developed is designed to interface with a subsea Christmas tree (GE Oil & Gas), an ROV (Oceaneering), and the MSV of Opportunity (Multipurpose Support Vessel, Maersk).

Samples will be collected from the flowing production Christmas trees, and the sampling system will therefore be able to operate under the same flowing and environmental conditions as the tree.

The sampling interface will be permanently mounted to the subsea Christmas tree at each wellsite to be sampled—four in total. After the sampling module has been lowered to the seabed in a dedicated deployment basket, it will be mechanically attached to a host ROV by a FLOT (Flying Lead Orientation Tool) arrangement. The sampling module will connect to the sampling interface MQC system prior to execution of the sampling operation.



Sampling interface.



Sampling module.

Deepwater

COLLABORATION: Subsea sampling adding value to the Lianzi Field development

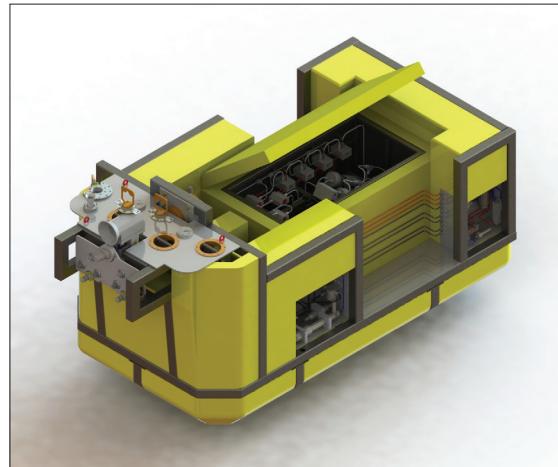
The sampling module will be capable of separating water (using a displacement pump and separator) from the liquid samples extracted from the sampling interface. The separated water will be stored in sampling bottles issued by Schlumberger and located inside the sampling module. Upon completion of the sampling operation, the ROV will undock the sampling module and return it to the deployment basket for transport to surface.

Currently, all sampling interfaces have been delivered to GE Oil & Gas in Aberdeen and are being unitized with the Christmas trees.

Scheduled project milestones moving forward:

- Sampling Module design freeze – 12 September 2014
- Sampling Module Basket design freeze – 7 October 2014
- Sampling System software commercial release – 10 November 2014
- Sampling Module assembly (two assemblies) – 30 June to 3 October 2014
- Sampling Module FAT, EFAT, and SIT testing – 6 October 2014 to 12 January 2015
- Ship-out from Norway to Angola – 13 January 2015
- Site Receive Test (SRT), two sampling modules – 24 February 2015

This will be the second sampling system delivered for Chevron (albeit for a different purpose) and a first for South Africa SBU. OneSubsea has also delivered a sampling system (also for a different purpose) for the JSM project, and other Chevron MCPs (Major Capital Projects) have also expressed an interest.



ROV with FLOT and sampling module in deployment basket



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Investigating Nonlinear Acoustics for Far-Field Imaging from the Wellbore

Schlumberger and Chevron draw up joint development agreement

Logging tools using conventional acoustic technology measure rock properties in the near-wellbore area. To investigate a larger reservoir diameter, Schlumberger and Chevron are entering a joint development agreement to assess applying nonlinear acoustic techniques to image the reservoir at a greater distance. Potential technology applications include the following:

- deep measurement of formation properties
- in situ properties imaging
- characterization of fractured reservoirs
- identification of compartments and connectivity
- improved cement evaluation.

Modeling nonlinear acoustic measurement

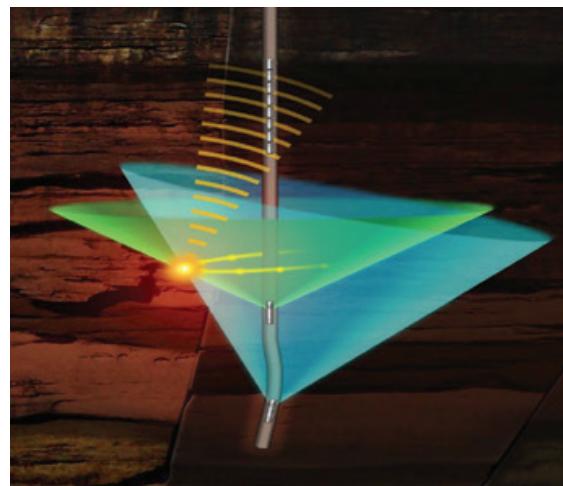
Collaboration among Chevron ETC, Los Alamos National Laboratory (LANL), and Schlumberger's Schlumberger-Doll Research Center (SDR) and Kabushiki Kaisha Technology Center (SKK) will leverage the participants' expertise in theoretical physics, modeling, and metrology. The initial three-year phase will use numerical simulation and experiments to demonstrate the capability to model nonlinear acoustic measurement for a borehole. Additional aspects of nonlinear acoustic measurement to be investigated are hardware, data conditioning and signal processing, and interpretation.

Collaborating further for a tool prototype

The results of the first phase of the collaboration will provide a technical and engineering evaluation of nonlinear acoustic measurement, with measurement requirements defined and a conceptual design developed. A second phase could then be initiated to develop a tool prototype and commercialize it.

Key activities to date

- Joint Development Program Term Sheet, executed December 2013
- Joint technical meetings and workshops in Houston; SDR—Cambridge, Massachusetts; LANL—Los Alamos, New Mexico; and SKK—Sagamihara, Japan
- Progression of a Joint Development Agreement, to be executed during Q3 2014



Emulated microseismic events are remotely imaged in 3D using a conical low-frequency broadcast.

Reservoir Characterization

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Case Studies



Case Studies

A few of the recent technical successes are highlighted in this section.

Chevron-derived case studies are often initiated via the Total Cost of Ownership (TCO) process.

Documenting and sharing successes across Business Units is beneficial and encouraged.

- Pressure Measurements and Fluid Sampling Find Low-Permeability Laminated Pay, Offshore Australia
- Rt Scanner Triaxial Induction Service Identifies Drilling-Induced Fractures, Deepwater Gulf of Mexico
- Chevron Optimizes Production and Recovery Offshore Angola by Using AIIFRAC Alternate Path Screens
- Chevron's Production from Extended-Reach Drilling Well Exceeds Expectations in Undeveloped Reserves
- Chevron Saves USD 4.6 Million in Total Cost of Ownership with Process Improvements
- Chevron Chooses TRC II Safety Valve for Its Future Deepwater Developments
- Single-BHA Design Eliminates Four Trips, Saving Chevron USD 8.3 Million
- Real-Time Dip Picking Reduces Uncertainty Enabling Chevron to Drill to TD in GOM
- Fluid Management Facility and Integrated Approach Gives Operator Major Reduction in Drilling Waste Disposal

Pressure Measurements and Fluid Sampling Find Low-Permeability Laminated Pay, Offshore Australia

Saturn 3D radial probe circumferentially extracts fluid from deepwater reservoir where conventional probes were ineffective

CHALLENGE

Measure pore pressure to quantify permeability and extract reservoir fluid for identification from marginal, thinly laminated sands where conventional probe-type tools have been unsuccessful.

SOLUTION

Deploy the Saturn* 3D radial probe with its large, circumferential surface flow area that makes it possible to induce and sustain flow in low-mobility formations for pressure testing and fluid acquisition.

RESULTS

Obtained valid pressure measurements in submillidarcy formations and collected samples for fluid identification from zones down to 0.36-mD permeability to add to the well's net pay.



Offshore exploration well with thinly laminated sands

An operator's practice was to identify areas for investigation from borehole images obtained with the OBMI* oil-based microimager. However, conventional probe tools were unsuccessful at evaluating a number of thinly laminated sands of interest in a deepwater exploration well drilled offshore Northwest Australia. Pressure measurements were ineffective, indicating very low permeabilities, and flow could not be established through a single probe for fluid sampling.

Fluid extraction even in low permeability

The Saturn 3D radial probe creates true 3D circumferential flow around the borehole even in very low-permeability formations. The four self-sealing elliptical probes have the industry's largest surface flow area, which quickly establishes and maintains flow from the entire circumference of the wellbore instead of funneling fluid from the reservoir to a single access point. The design of the Saturn probe also minimizes storage volume effects. The result is quicker cleanup times and the efficient performance of pressure measurements, especially in low-mobility formations where conventional probes cannot function.

More net pay identified from pressure and fluid results

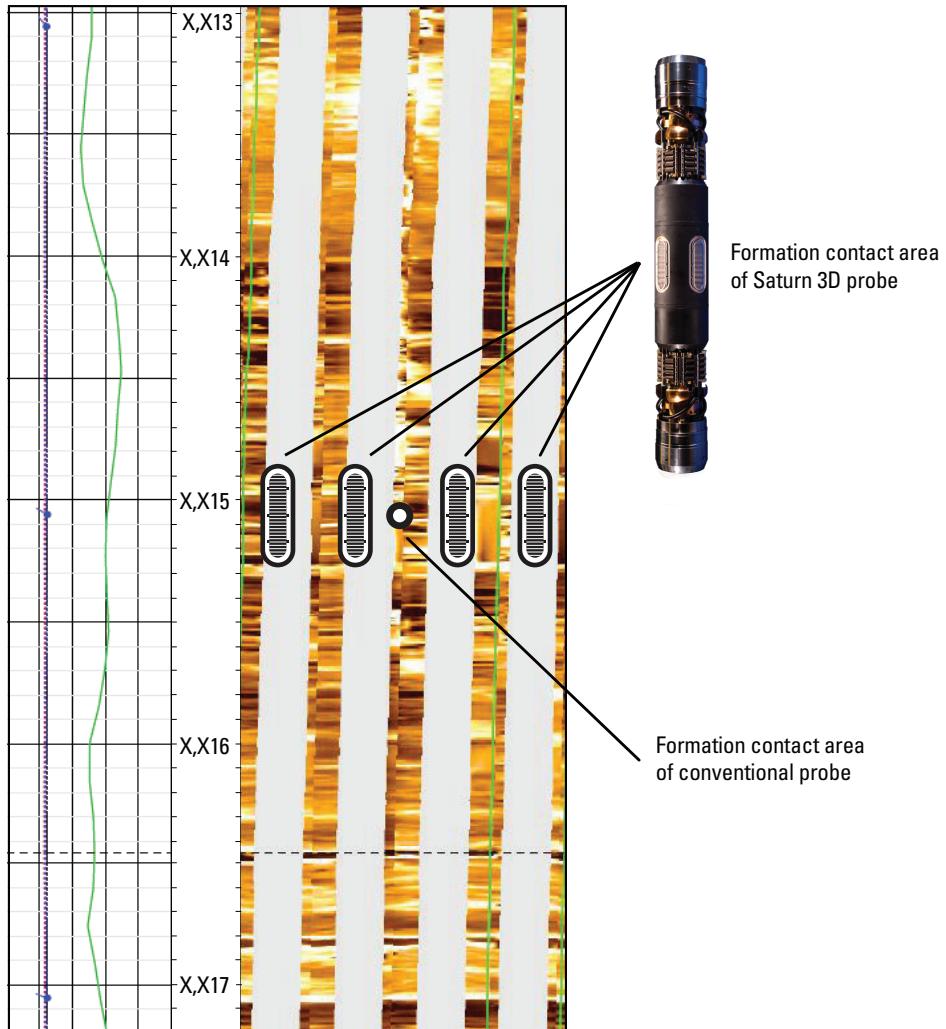
With its large surface flow area totaling more than 79 in², the Saturn 3D radial probe performed well in the low-permeability laminated sands. Valid pressure measurements were obtained in submillidarcy formations for pressure transient analysis to accurately determine permeability. Fluid samples were collected for identification, with a gas sample captured from a zone with 0.36-mD permeability, where conventional probe tools could not extract reservoir content. Reservoir evaluation was greatly improved by the test results to significantly increase the net pay for the well.



The mechanical retract mechanism of the Saturn 3D radial probe employs heavy-duty springs to secure the probes when not deployed.

Formation Evaluation

CASE STUDY: Saturn 3D radial probe finds laminated pay, deepwater offshore Australia



High-quality borehole images obtained with the OBMI oil-based microimager were used to identify areas for investigation, first with conventional probes and then with the Saturn 3D radial probe. It was not possible to perform pressure measurements with the small contact area of the conventional probe. Pressure measurements and fluid samples were obtained with the Saturn radial probe and its large 79-in² contact area.

www.slb.com/saturn

Schlumberger

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Rt Scanner Triaxial Induction Service Identifies Drilling-Induced Fractures, Deepwater Gulf of Mexico

Vertical fracture detection processing with 24-h turn around speeds bypass trajectory design to avoid the loss zone

CHALLENGE

Determine the cause and extent of extreme unexplained losses during drilling to avoid their recurrence in drilling a bypass well trajectory.

SOLUTION

Conduct innovative vertical fracture detection processing of data from Rt Scanner* triaxial induction service to indicate fractures and determine dip.

RESULTS

In only 24 h, diagnosed orientation and magnitude of the likely drilling-induced petal fracturing as much more extensive than originally thought for designing the bypass well trajectory and successfully avoiding the loss zone to not waste the USD 7.8 million cost of the bypass.



Extreme mud losses

Unexpectedly extreme mud losses occurred while a difficult intermediate section of a deepwater Gulf of Mexico well was being drilled. The operator wanted to understand the cause of the losses and extent of their occurrence to effectively plan the trajectory for the bypass well.

Insight on fracturing from vertical fracturing detection processing

Rt Scanner triaxial induction service calculates vertical and horizontal resistivity (R_v and R_h , respectively) from direct measurements while simultaneously solving for formation dip at any well deviation. Measuring at multiple depths of investigation in three dimensions avoids the biases introduced in conventional resistivity logging by formation heterogeneity and inclined layers. Processing provides information on formation anisotropy, dip and cross-bedding, and geometry. New vertical fracture detection processing calculates the vertical fracture indicator (VFI) and fracture orientation to support advanced structural interpretation.

Successful bypass of the loss zone

Data from Rt Scanner service across the estimated loss zone was processed to characterize the fractures by VFI and dip. It took only 24 h for the vertical fracture detection processing and to make an in-house presentation by Schlumberger petrotechnical experts. With this information, key decisions could be confidently taken for handling the losses and planning the bypass trajectory.

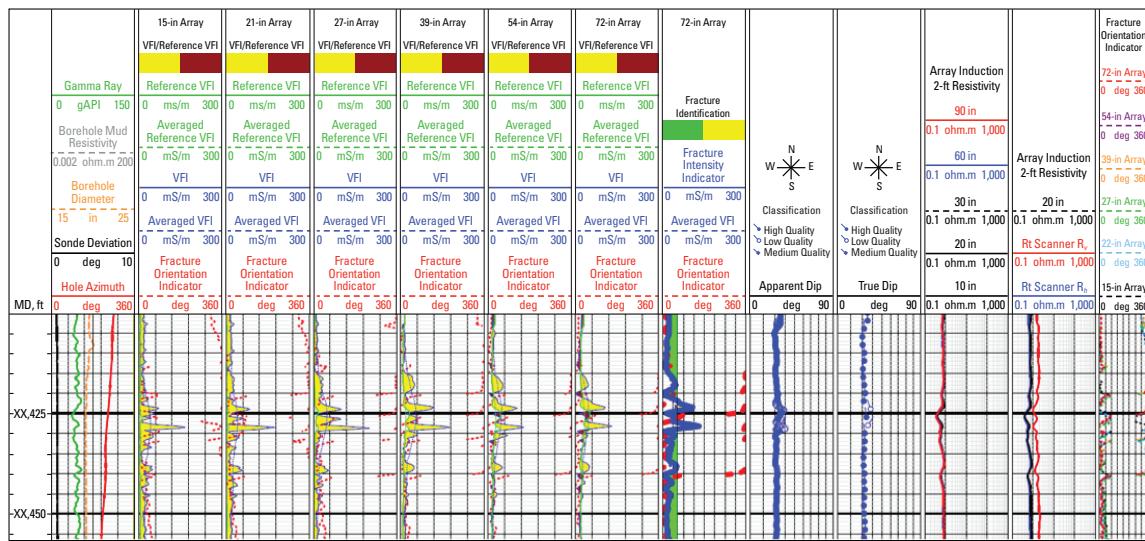
Analysis of the vertical fracture detection processing showed that the likely drilling-induced petal fractures were more abundant and widespread across a zone that was much larger than was originally thought. Understanding the generation and extent of the loss zone enabled selecting a kickoff direction for the bypass well that successfully avoided recurrence of the fracturing.

"With the help of the Rt Scanner fracture analysis, we were able to establish the orientation and direction objective for our bypass well. Without this analysis, we would have kicked off without accurately knowing if we would be drilling into the same fracture system, creating large mud losses, as we did previously."

Operations Geologist

Formation Evaluation

CASE STUDY: Rapid fracture detection processing of Rt Scanner service, deepwater Gulf of Mexico



www.slb.com/scanner

Schlumberger

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Chevron Optimizes Production and Recovery Offshore Angola by Using AllFRAC Alternate Path Screens

Sand screens with shunt tubes ensure complete gravel packing of screen-to-casing annulus

CHALLENGE

Ensure long-term sandface completion reliability and prevent scale deposition in cased-hole frac-packed wells.

SOLUTION

Use AllFRAC[†] Alternate Path[†] frac-pack sand screens to improve gravel and frac packing and prevent screenouts, with a fit-for-purpose fluid, including scale inhibitor.

RESULTS

Achieved 100% gravel placement around screens and improved production from both wells.

**High-permeability layers complicate gravel packing**

Chevron has ongoing developments in Block 14 of the Cabinda region offshore Angola. The producing zone in Block 14 is long, with layers varying from low permeability shale to multi-Darcy sands, and the area is susceptible to sand production.

Previous frac-packed wells in this block had established the need for complete screen coverage with the proppant after frac-packing. Otherwise, bridging in the high-permeability layers could leave voids in the annular pack. The voids could create conductivity channels and allow the produced oil and formation particles to be focused on certain areas of the screen. Screen erosion and plugging would require that production be curtailed or stopped.

AllFRAC Alternate Path screens ensure complete gravel placement

Chevron collaborated with Schlumberger and elected to incorporate AllFRAC Alternate Path frac-pack sand screens in its fracturing treatment to ensure that the gravel packs would be 100% complete. Alternate Path technology uses shunt tubes along the screen joints to provide alternate pathways that enable slurry to fill all the spaces around the screen. If a bridge forms, the slurry flows through the tubes below or past the bridge, reaching and filling any voids. This process continues until the gravel pack is complete.

Custom inhibitor prevents scale deposition

Most formations in this block are susceptible to scale formation, so the frac-pack fluid needed a scale inhibitor that would prevent scale deposition without affecting the fracture treatment. An existing Schlumberger frac-pack fluid was modified to include a large concentration of scale inhibitor and to retain all of the required properties needed for the fracturing. The customized fluid design met stringent environmental and technical standards and country-specific guidelines.



AllFRAC sand screens feature one or more shunt tubes attached either concentrically or eccentrically to the screen joint, with exit nozzles spaced out on each shunt tube for optimum performance. Treatment rates can be up to 8 bbl/min for each shunt tube, depending on the screen, the blank length, and the type of carrier fluid. The shunt tubes are made of stainless steel, and the nozzles are erosion resistant. Timed premium threads are available for simultaneous torquing of the screen joints and aligning of the shunt tubes.

Completions

CASE STUDY: Sand screens with shunt tubes ensure complete gravel packing of screen-to-casing annulus

Deepwater vessel with advanced safety systems supports stimulation operations

The Schlumberger DeepSTIM* stimulation vessel pumped the frac-pack fluids. This vessel provides a wide range of services in deep water, including matrix acidizing, acid fracturing, proppant fracturing, sand control, and scale control. A central vessel management system and the ship's engineering, manufacturing, and sustaining organization support the stimulation operations and help overcome the technical, logistical, and operational challenges of deep water.

Schlumberger service facilitates collaboration among teams

The Schlumberger InterACT™ global connectivity, collaborating, and information service enabled Chevron and Schlumberger engineers to share information about the wells and reservoir in real-time across multiple locations, enabling them to make decisions more quickly with input from multiple sources.

Successful gravel placement enhances production

In the two wells completed to date, the slurry placement was a 100% success, and excellent fracture parameters were recorded. A radioactive-tracer log run after the gravel pack showed complete gravel placement around the screens and better-than-expected production from both wells. Production has continued trouble-free for nearly 6 months, convincing Chevron to continue using AllFRAC Alternate Path frac-pack sand screens in its future frac-pack operations.

slb.com/sandscreens

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Schlumberger

Chevron's Production from Extended-Reach-Drilling Well Exceeds Expectations in Undeveloped Reserves

Combination of new and old completion technologies yields positive budget and schedule metrics in deepwater well offshore Indonesia

CHALLENGE

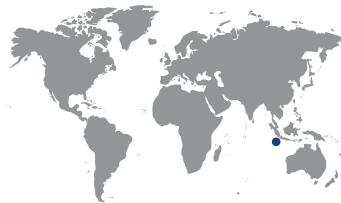
Provide extended-reach-drilling (ERD) sandface completion in field with highly variable permeability to access undeveloped reserves off existing deepwater platform.

SOLUTION

Design completion with Endure* premium sintered mesh screens, ResFlow* inflow control devices (ICDs), oil-swellable packers, and MFIV* mechanical formation isolation valve to accommodate ERD wellbores and address permeability and pressures conditions, fines and plugging potential, and possible screen damage from erosion and hot spotting.

RESULTS

Achieved balanced production from full length of extended-reach lateral across multiple heterogeneous zones and completed the well under budget, ahead of schedule, and incident free.



Deep water and shallow reservoir require innovative completion approach

Chevron planned to produce undeveloped deepwater oil reserves near an existing deepwater platform offshore Indonesia. The deepwater environment (3,000 ft) and shallow reservoir depth of approximately 3,000 ft TVD below mudline required a wellbore trajectory with kickoff points very near the mudline. This environment was especially tough because of highly variable permeabilities and low pore pressures along the lateral.

Combined technologies meet requirements of ERD well

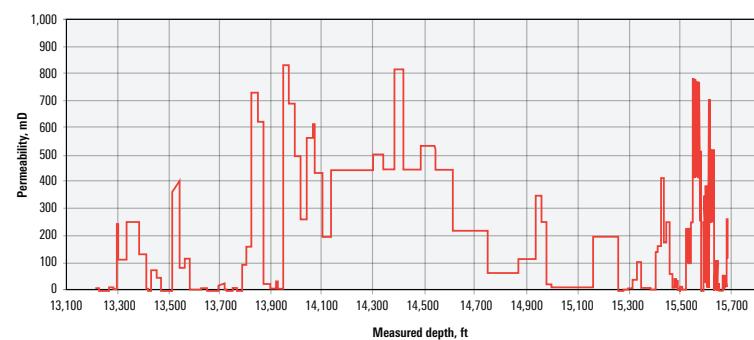
After considering various completion approaches, the Chevron-Schlumberger team settled on a strategy that included inflow control devices (ICDs), swellable packers, stand-alone screens, and formation isolation valves. The final design had to accommodate the ERD wellbores and address the permeability and pressures conditions, fines and plugging potential, and possible screen damage from erosion and hot spotting.

Screen filter minimizes plugging and optimizes gravel pack geometry

Stand-alone Endure premium sintered mesh screens were selected as the optimal filter medium to minimize plugging. These screens are among the strongest premium mesh screens available with a small outer diameter. Inner and outer drainage layers help ensure uniform flow over the surface area of the filter medium and enable operators to optimize the completion geometry.

ICDs promote balanced inflow and protect screens

Geomodeling had shown significant permeability variations along the lateral, indicating that segregation of the segments was required. ResFlow* inflow control devices (ICDs) were used to promote uniform distribution of inflow and heel-to-toe production, prevent fines transport along the laterals, and reduce erosion velocities that could create hot-spotting holes in the screens.



Permeability variations due to the lack of overburden across the horizontal section required the use of ICDs and swellable packers to uniformly distribute the inflow of oil across the flow regions.

Completions

CASE STUDY: Chevron's production from extended-reach-drilling well exceeds expectations in undeveloped reserves

Swellable packers compartmentalize variable flow regions along lateral

Openhole oil-swellable packers were spaced at every screen length to provide compartments of approximately 38 ft, depending on the permeability variations along the lateral. The packer's elastomer swelled on contact with the oil and sealed the annulus around the screen, with differential sealing pressures from 1,000 to 1,600 psi, much higher than the 400 psi that was considered the minimal acceptable sealing pressure.

FIV isolates upper and lower completion sections and prevents fluid loss

The MFIV* mechanical formation isolation valve was run below the production packer and above the screens to allow the completion to be isolated while a tieback liner and the upper completion were installed. This isolation prevented completion fluid loss into the open hole and later, produced fluid loss to the formation.

ERD completion succeeds where other completion types did not

Despite the inherent complexities, the ERD well produced at or above expectations with minimal solids production. Moreover, because of the extensive preparation and collaboration of the multidisciplined, cross-functional teams, the well came in under budget, ahead of schedule, and incident free.

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Schlumberger

Chevron Saves USD 4.6 Million in Total Cost of Ownership with Process Improvements

Schlumberger worked 7.5 years without an OSHA recordable incident during cementing operations and achieved a 99.1% operating efficiency in 2013

CHALLENGE

Obtain high-quality, cost-effective cement zonal coverage in a tough operating environment and improve efficiency at the well site in a high-volume market.

SOLUTION

- Use LOSSEAL* family of reinforced composite mat pills and CemNET* advanced fiber technology to control losses in conjunction with MUDPUSH Express* stable, continuously mixed mud removal system.
- Collaborate with Chevron's San Joaquin Valley Business Unit engineers and category managers to set clear goals and objectives for a streamlined workflow.

RESULTS

- Achieved rating of A on D&C KPI and Interim Performance Review Scorecards through safe, efficient operations.
- Added value to operations through the application of process improvement and new technologies.
- Attained an operating efficiency of 99.1% with a decrease in NPT time.



Drilling and completion challenges in the San Joaquin Valley

Chevron needed to address challenges with drilling and completing wells in the San Joaquin Valley that included depleted reservoirs, marginal economics, and lost circulation. In an effort to optimize cementing operations and improve the overall operating efficiency, Chevron consulted with Schlumberger.

Efficiency improvements at wellsite

Schlumberger and Chevron engineers have worked collaboratively to identify process improvements and technology to improve efficiency at the well site.

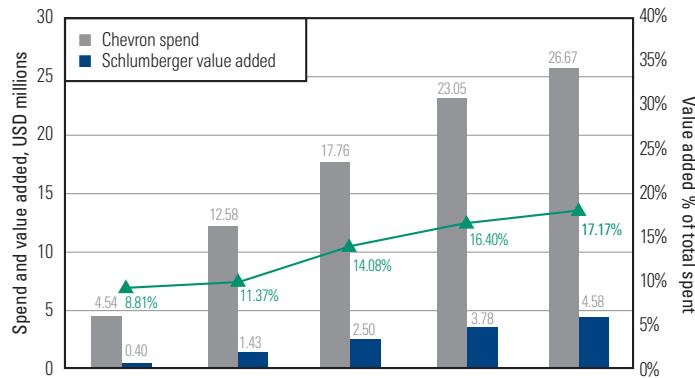
The improvements included

- optimizing cement systems
- applying lost circulation technology LOSSEAL composite mat pills and CemNET advanced fiber technology to control losses
- using MUDPUSH Express system, a more effective spacer.

Total cost of ownership savings, excellent safety, and service quality results

The improvements provided Chevron with savings of USD 4.58 million in total cost of ownership, which represents 17% of the total spend. Through several initiatives, Schlumberger cementing has worked 2,660 days without an OSHA recordable incident since operations began over 7.5 years ago. In 2013, 1,130 jobs were performed with 1,188 behavioral-based safety (BBS) reports classified correctly in WellView, which surpasses the goal of one BBS per job.

Among the 8,269 operating hours in 2013, there were only 73.5 hours of NPT, hence an operating efficiency of 99.1%. Through continuous review of performance and recognition, outstanding results have been achieved.



The cost savings has risen each year and has resulted in a steady increase of the value added percent of total spent as new process improvements are implemented.

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Chevron Chooses TRC II Safety Valve for Its Future Deepwater Developments

More than 60 successfully installed worldwide, minimizing risks to wells, personnel, and environment

Safety valves in subsea deepwater wells must withstand extreme environments

Chevron has a robust portfolio of subsea deepwater developments around the world. The safety valves used in the production tubing must be extremely reliable to ensure well control as a last resort in the event of a subsea wellhead or integrity failure. Traditional safety valve operation in these deepwater applications is complicated by the amount of surface pressure required and the cost, the complexity of the subsea infrastructure, and the impact of failures.

TRC II safety valve performs at depths where other technologies are ineffective

The TRC II* 20 tubing-retrievable charged safety valve is designed for extreme environments: deep and ultradeep water and temperatures ranging from 40 to 400 degF [4 to 205 degC]. This surface-controlled subsurface safety valve performs reliably at depths where other technologies are challenged. Because these valves can be installed at depths greater than 12,000 ft [3,658 m], they can be positioned below the hydrate, asphaltene, or paraffin deposit regions within the wellbore to increase operating efficiency. The TRC II safety valve is insensitive to tubing pressure, its bubble tight flapper exceeds the industry's highest leak rate standards, and its redundant hydraulic control feature reduces the need for workovers—all features contributing to the valve's reliability.

Chevron plans to use TRC II safety valves in its future deepwater developments

Chevron has historically used the TRC II safety valve in the Gulf of Mexico and Nigeria; to date, approximately 60 have been installed successfully. In addition, Chevron now plans to use them in future deepwater wells in Angola, the UK, and Indonesia.



Chevron has historically used TRC II safety valves in the Gulf of Mexico and Nigeria and plans to begin using them in its future deepwater wells in Angola, Indonesia, and the UK.

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Completions

Single-BHA Design Eliminates Four Trips, Saving Chevron USD 8.3 Million

PowerPak ERT motor drills 26-in sections of four wells in one run each and maintains high average ROP

CHALLENGE

Increase the drilling efficiency for the 26-in section of four ultradeepwater wells on a tight platform.

SOLUTION

Use PowerPak ERT* even rubber thickness high-performance motor for enhanced control while nudging; optimized hydraulics, hole cleaning, and vibration and shock resistance while drilling through salt canopy; and increased drilling efficiency beyond collision risk zone.

RESULTS

Drilled 26-in section of four wells in one run with a single BHA while maintaining ROP. This eliminated four round trips, which reduced the total cost of ownership by USD 8.3 million.



Increase efficiency of drilling 26-in section of tight platform wells

Chevron drilled the 26-in sections of the first 11 wells planned for its 15-slot Big Foot development project in the Gulf of Mexico using a motor BHA and then a RSS BHA. This dual-BHA design from Schlumberger required making two trips to drill to section TD for each well. For the remaining four wells, Chevron wanted to find a more efficient method of safely drilling the 26-in sections that maintained the ROP previously achieved. Because of the short slot-to-slot distances on the development project, the risk of colliding with another well was a large concern.

Eliminate one trip per well by using a single, high-performance motor BHA

After conducting an in-depth risk assessment in collaboration with Chevron, Schlumberger recommended a single-BHA design that would allow Chevron to eliminate four trips. Schlumberger proposed using the PowerPak ERT even rubber thickness high-performance motor, which has twice the torque of a conventional motor BHA. Capable of delivering power at the bit for increased ROP and smoother bit RPM, the PowerPak ERT motor offers the versatility required for nudging in the anticollision zone; delivering optimized hydraulics, hole cleaning, and vibration and shock resistance while drilling through the salt canopy; and achieving high drilling efficiency beyond the anticollision zone.

Eliminated four trips with a single-BHA design, saving Chevron USD 8.3 million

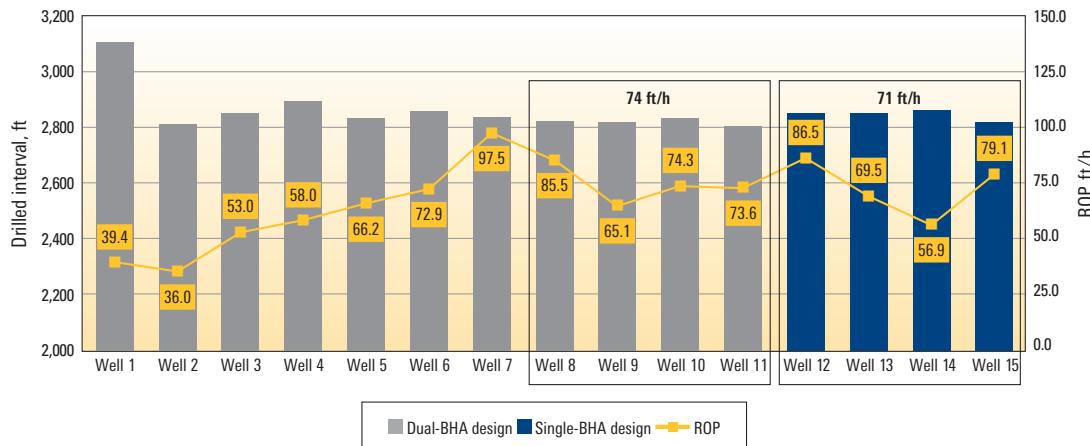
The PowerPak ERT motor enabled Chevron to safely drill through the high-risk, anticollision zone and salt canopy while maintaining ROP for each of the four wells. The single-BHA design eliminated four trips and achieved an average ROP of 71 ft/hr, which was comparable to the average ROP of the previous four wells and exceeded the average ROP of the first 11 wells drilled in the Big Foot development project. By making four fewer round trips, Chevron reduced its total cost of ownership by USD 8.3 million.



PowerPak ERT even rubber thickness high-performance motor

Drilling

CASE STUDY: PowerPak ERT motor increases drilling efficiency by eliminating four round trips and maintaining ROP



While drilling the last four wells planned for the Big Foot platform, the single-BHA design provided by the PowerPak ERT motor achieved 71 ft/hr. This was comparable to the ROP for the previous four wells and exceeded the average ROP of 60 ft/hr achieved while drilling the first 11 wells.

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Schlumberger

CASE STUDY

Confidential to Chevron and Schlumberger

Schlumberger

Real-Time Dip Picking Reduces Uncertainty, Enabling Chevron to Drill to TD in GOM

While-drilling imaging and interpretation avoids 42 hours of wait time, reducing total cost of ownership by USD 800,000

CHALLENGE

Determine formation dip angle while drilling to make real-time steering decisions despite signal constraints in challenging formation.

SOLUTION

Use EcoScope* multifunction LWD service and prioritize data transmission to deliver real-time images for dip picking while drilling.

RESULTS

- Determined formation dip angle, enabling Chevron to drill to TD.
- Reduced total cost of ownership by USD 800,000 by avoiding 42 hours of wait time with real-time imaging and interpretation.

**Reduce formation dip angle uncertainty with real-time dip picking**

Chevron was drilling an exploration well in the Tahiti field in the Gulf of Mexico when difficulties were encountered in correlating the ultradepwater well with offset wells. The formation dip angle was not as expected, and Chevron faced the possibility of drilling a sidetrack if the formation dip was not as expected at TD. Chevron needed real-time dip picking in order to make steering decisions while drilling.

Transmit and interpret images while drilling with EcoScope service

Schlumberger consulted with the asset team and recommended real-time imaging from the EcoScope multifunction LWD service paired with real-time interpretation support. To transmit real-time images, Schlumberger experts would need to prioritize the data transmission to deliver density images in real time despite anticipated signal constraints. Real-time interpretation would reduce uncertainty of formation dip angle to assist in correlation with offset wells.

Determined formation dip angle, enabling Chevron to drill to TD

Data transmission from the EcoScope service successfully delivered density images that enabled the formation dip angle to be ascertained. This allowed dip angle analysis—typically done after the job—to be completed while drilling. By not pulling the EcoScope service out of hole to process the memory data, Chevron saved a total of 42 hours of wait time. As part of Chevron's innovation and value-added process, the operator calculated the time savings as equivalent to USD 800,000.



*EcoScope multifunction
LWD service.*

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Drilling

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Fluid management facility and integrated approach gives operator major reduction in drilling waste disposal

“Since the inception of the FMF’s, M-I SWACO has observed efficient recycling of whole muds, which has afforded the customer a 19% reduction in retail fluids spend.”

Reginald Stanfield, M-I SWACO



THE CHALLENGE

Traditional method for treatment of liquid drilling waste could generate tons of solid waste for disposal.

THE SOLUTION

The creation of a centralized process to allow for the processing, reconditioning and re-use of drilling fluids.

THE RESULTS

Fluid management facility was implemented in 2013 to process liquid waste streams for re-use.

- 75% reduction in waste hauled off-site for disposal
- \$22K waste disposal cost reduction per well
- 451 wells drilled at a single field in the course of one year

Excessive waste volumes create high costs

Land drilling operations in California’s San Joaquin Valley are projected to generate a considerable amount of drilling waste as a result of the solidification/stabilization of liquid waste. The solidification process increases the overall amount of waste disposed by addition of stabilization agents. Cost for disposal of solidified and stabilized waste can be considerable.

Fluid management facility provides answers

To address the concerns associated with drilling waste generation and disposal, M-I SWACO worked with the operator to develop a process that would allow for the recovery and reconditioning of drilling and washout fluids. M-I SWACO proposed and the operator approved the creation of a fluid management facility where fluids were processed and treated.

Coordinated approach proves effective

Fluids used at drilling rigs were transported to a centralized fluids management facility where the treatment method was determined by the type of fluid, fluid quality and intended method of reuse.

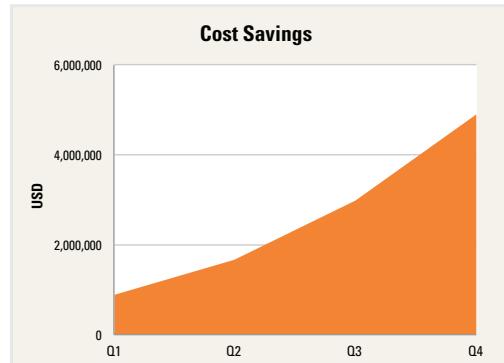
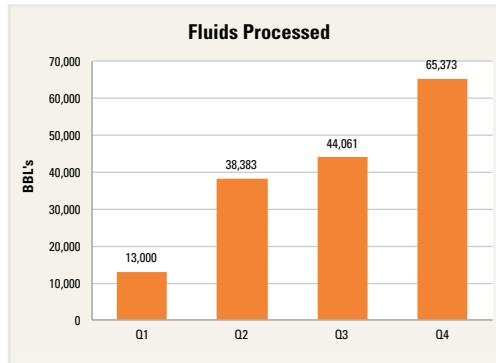
Processing criteria were developed through the joint efforts of M-I SWACO Drilling Solutions and Environmental Solutions specialists..

Fluid processing methods included:

- Mechanical processing of drilling and washout fluids
- Chemical treatment of drilling and washout fluids
- Mix Plant chemical reconditioning of drilling fluids to meet the client’s specific needs.

Meeting client objectives

Previously, management of used drilling fluid and liquid waste stream included solidification and stabilization, which resulted in the generation of excessive solid waste. The operator's proactive approach to waste management resulted in the development of a solution for effective waste minimization. Implementation of the fluid management facility reduced the projected amount of waste to be generated 75%. In addition, \$22k in cost savings were realized per well by recovering, processing, and reusing drilling fluids as well as washout fluids. As a result of this project, several fluid management facilities have been implemented throughout the San Joaquin Valley.



Questions? We'll be glad to answer them.

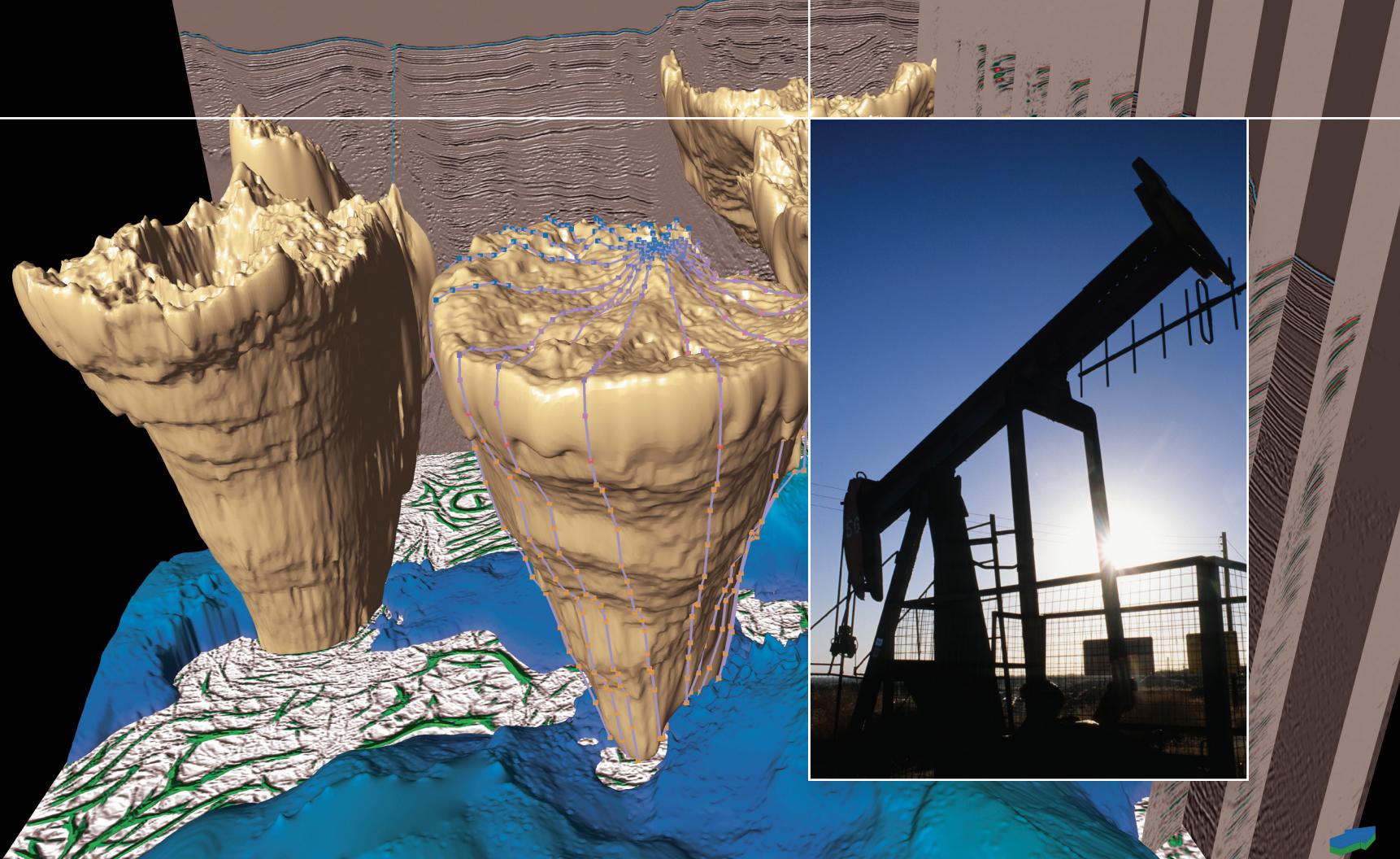
If you'd like to know more about fluids management and how it's performing for our other customers, please call the M-I SWACO office nearest you.



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Chevron-Schlumberger Business Partner Executive Meeting

Photos on front cover: Worker at Frade Field, Brazil & Tombua-Landana Platform, Angola, courtesy of Chevron
Photos on back cover: Pump at Kern River, California, courtesy of Chevron
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