ESTTA Tracking number: **ESTTA476074**

Filing date: **06/04/2012**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE TRADEMARK TRIAL AND APPEAL BOARD

Notice of Opposition

Notice is hereby given that the following party opposes registration of the indicated application.

Opposer Information

Name	Halliburton Energy Services, Inc.
Granted to Date of previous extension	06/13/2012
Address	1-B-121 2601 Beltline Road Carrollton, TX 75006 UNITED STATES

Correspondence information	Joel D. Leviton Attorney Fish & Richardson P.C. 60 South Sixth Street Suite 3200 Minneapolis, MN 55402 UNITED STATES tmdoctc@fr.com, Leviton@fr.com, lls@fr.com, rnr@fr.com Phone:612-335-5070

Applicant Information

Application No	85409760	Publication date	02/14/2012
Opposition Filing Date	06/04/2012	Opposition Period Ends	06/13/2012
Applicant	Schlumberger Technology Corporation 14910 Airline Road Rosharon, TX 77583 UNITED STATES		

Goods/Services Affected by Opposition

Class 037. First Use: 1995/10/06 First Use In Commerce: 1995/10/06
All goods and services in the class are opposed, namely: Drilling and construction of multiple branch wells from a parent well

Grounds for Opposition

The mark is merely descriptive	Trademark Act section 2(e)(1)

Related Proceedings	91201442; 91203935; 91203936; 91203938; 91203939

Attachments	Halliburton NotOpp_29pages_224130022pp1.pdf (30 pages)(4653087 bytes)

Certificate of Service

The undersigned hereby certifies that a copy of this paper has been served upon all parties, at their address

record by First Class Mail on this date.

Signature	/Joel D. Leviton/
Name	Joel D. Leviton
Date	06/04/2012

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE TRADEMARK TRIAL AND APPEAL BOARD

HALLIBURTON ENERGY SERVICES, INC., Opposer, v. SCHLUMBERGER TECHNOLOGY CORPORATION Applicant.	In the matter of App. Serial No. 85/409,760 For the mark RAPID Published February 14, 2012 Opposition No. _____

NOTICE OF OPPOSITION

Halliburton Energy Services, Inc., a Delaware corporation having a principal place of business at 10200 Bellaire Blvd., Houston, Texas 77072-5206 ("Halliburton" or "Opposer"), believes that it will be damaged by the registration of the claimed mark "Rapid" that is the subject of Application Serial No. 85/409,760 (the "Application") and hereby opposes the same pursuant to the provisions of 15 U.S.C. Section 1063.

The grounds for opposition are as follows:

1. Applicant, Schlumberger Technology Corporation ("Applicant"), seeks to register the single word "Rapid" as a service mark for "Drilling and construction of multiple branch wells from a parent well" in International Class 37.

2. The Application was filed on April 29, 2011 and has been designated Application Serial No. 85/409,760.

3. The Application was published for opposition on February 14, 2012. On February 15, 2012, Opposer requested and obtained a 90-day extension of time to oppose the Application.

4. In the Application, Applicant claims to have first used the purported mark "Rapid" in connection with the services identified in the Application on October 6, 1995.

5. In the Application, Applicant did not claim that the word "Rapid" has become distinctive of Applicant's services.

6. The word "Rapid," as used in connection with the services identified in the Application, is merely descriptive. As such, the word "Rapid" is not registrable on the Principal Register without a showing that it has become distinctive of Applicant's services.

7. The single word "Rapid," when used in connection with the services identified in the Application, is merely descriptive in that the word immediately informs consumers that Applicant's services assist in connection with quick and efficient (*i.e.*, rapid) drilling operations. The merely descriptive nature of the word "Rapid" to refer to efficient drilling operations is confirmed by Applicant's own marketing materials, including the following statements from Applicant's website, among others (emphasis added):

- QuickSEIS **rapid** screening process for 3D seismic allows an asset manager to quickly prioritize drilling opportunities
- Technical Paper: An Automated System for Accurate and **Rapid** Detection of Drilling Anomalies
- Experienced Consultants Deliver **Rapid**, In-Depth Evaluation of Acreage in Eagle Ford Shale Play
- Spectroscopy: The Key to **Rapid**, Reliable Petrophysical Answers
- Case Study: **Rapid** Cased Hole Intervention Increases Production by Almost 1,200 bbl/d in Marginal UK North Sea Oil Field

- CT EXPRESS **Rapid**-Deployment Coiled Tubing Service
- Case Study: **Rapid**, Accurate Flow Rate Measurements Optimize Lift
- Monitoring of Openhole Completion Provides **Rapid** Feedback from Wells in Early Production
- **Rapid** system response
  Quick and reliable detection of fluid influx or loss in the well is crucial, especially when drilling a slimhole or when drilling under HPHT conditions.
- **Rapid** fault interpretation and quality control (QC) of structural models
- **Rapid** prospect identification using ISIS inversion and lithology prediction on the Keystone 3D seismic survey
- Designed for **Rapid** Deployment at Remote Locations

True and correct printouts from Applicant's website showing the above statements are attached hereto as Exhibit 1. As confirmed by the above statements, Applicant routinely uses the word "Rapid" to describe that Applicant can assist its customers with efficient and rapid drilling operations and oil production. Even the specimen of use Applicant submitted in connection with the Application demonstrates that the term Rapid describes how Applicant claims to be able to assist customers with **rapid** and efficient operations (*see, e.g.*, "RAPID* multilateral junctions for improved reservoir access have a proven track record of reliability and minimizing nonproductive time during installation, which helps operators save money." (emphasis added)). Given the descriptive nature of the word "Rapid" and Applicant's repeated non-trademark use of the word to describe and refer to rapid and efficient operations, the term Rapid is not distinctive of Applicant's services (either inherently or through acquired distinctiveness) because Applicant (like others in the oil and gas industry) uses the word to describe its goods and services.

8. Halliburton is in the business of providing products and services to the oil and gas drilling and production industry.

9. Halliburton has an interest in using, and in fact has used for a number of years and continues to use, the word "Rapid" in conjunction with other terms as composite marks used in connection with its products and services offered to the oil and gas industry. For example, Halliburton has used the composite mark RAPIDFRAC in connection with oil and gas well perforating treatment services for over six years. Halliburton uses various composite marks containing the term "Rapid," including the marks RAPIDFRAC, RAPIDSTART, RAPIDSTAGE, RAPIDSUITE, and RAPIDSHIFT in connection with oil and gas production products and/or services.

10. Halliburton has the equal right to use the word "Rapid" to describe its products and services and in composite marks with other terms to identify its products and services.

11. Applicant has objected to Halliburton's use and attempted registration of marks that contain "Rapid," claiming that Applicant has the exclusive right to use the word "Rapid" in marks for oil and gas production products and services. Applicant claims exclusive rights in "Rapid" for oil and gas production products and services notwithstanding the fact that the word "Rapid" is commonly used by third parties in names and composite marks that identify various products and services in the oil and gas industry such that the word "Rapid" alone cannot, and does not, identify a single source of goods or services. Examples of such third-party names and marks include:

- RAPID ENERGY SERVICES (Rapid Energy Services);
- RAPID WELL SERVICE (Rapid Well Service, Inc.);
- RAPIDRIG (National Oilwell Varco);
- RAPID MILL (Magnum Oil Tools);
- RAPID PARTS (Dresser, Inc.);

- RAPIDFLUX (Weatherford/Lamb, Inc.);
- RAPIDCORE (Dynagen Technologies Incorporated);
- RAPIDATA (Rapid Technology Corporation);
- RAPID LOK (Hiltap Fittings Ltd.);
- RAPIDMATRIX (Packers Plus); and
- RAPIDJET (Packers Plus).

12. Registration of the single word RAPID without proof that it has acquired distinctiveness as an identifier of a single source of services in the oil and gas industry (which it has not) would damage Halliburton because such a federal registration would falsely suggest that the word "Rapid" is inherently distinctive and that Applicant has the exclusive right to use the word as a trademark, which is inconsistent with Applicant's own use of the word "Rapid" in a descriptive manner to describe efficiency, and the use by others in the oil and gas industry of the word "Rapid" both descriptively and in composite marks. The existence of a federal registration for the single word "Rapid" for the identified services would be a further source of damage to Halliburton due to the evidentiary value the registration would possess. Such a registration would presumptively give Applicant the exclusive right to use the word "Rapid" as trademark for products and services offered to the oil and gas industry and therefore could be used to improperly prevent Halliburton and third parties from adopting and using composite marks that contain the common word "Rapid" in the oil and gas industry.

WHEREFORE, pursuant to Section 13 of the Lanham Act, 15 U.S.C. § 1063, Halliburton respectfully requests that Application Serial No. 85/409,760 be rejected and that registration of the mark therein for the services therein identified be refused.

Please charge the opposition fee to the Deposit Account of Fish & Richardson P.C., Account No. 06-1050.

Respectfully submitted,

Date: 6/4/2012

By _____

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ATTORNEYS FOR HALLIBURTON ENERGY SERVICES, INC.

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a true and correct copy of the **NOTICE OF OPPOSITION** has been served this 4th day of June, 2012 by First Class U.S. Mail, postage prepaid, upon counsel for Applicant Schlumberger Technology Corporation at the following addresses:

MARGARET A. BOULWARE
BOULWARE & VALOIR
3 RIVERWAY STE 950
HOUSTON, TX 77056-1927

Joel D. Leviton

60769923.doc

EXHIBIT 1

Services & Products

Characterization

Reservoir Consulting & Interpretation Services

Geophysics Consulting

Borehole Seismic Interpretation

Rapid 3D Seismic Screening

QuickSEIS Rapid 3D Seismic Screening Process

Quickly Locate and Assess Drilling Opportunities

QuickSEIS rapid screening process for 3D seismic allows an asset manager to quickly prioritize drilling opportunities. Using advanced and innovative seismic interpretation technology, the QuickSEIS technique quickly locates and assesses potential drilling opportunities from 3D seismic cubes and identifies major structural and stratigraphic features as well as amplitude anomalies.

Using customer-provided geological markers, log input in American Standard Code for Information Interchange (ASCII) format, and 3D SEG Y format files, the QuickSEIS system delivers to the asset manager

ten variance cube volume attribute software slices at points of structural or stratigraphic interest, presented in GIF format on a CD-ROM
2D graphical images of 3D anomalies
a 2-min, 3D visualization movie
color graphics of time and selected attributes grid-generated over significant anomalies
and an interactive review with an experienced geophysicist.

QuickSEIS Plus

QuickSEIS Plus advanced rapid screening process for 3D seismic provides a rapid analysis of structural and stratigraphic features, including preliminary economic analysis. Using volume-based autopicking (Voxel picking) of an event, the QuickSEIS Plus screening process can produce a targeted high-resolution image of structural and stratigraphic features. Classifying volume attribute anomalies into discrete facies and pore fluid by calibration with well logs and production data enables asset managers to assess and rank potential prospects and infill locations.

Request More Information

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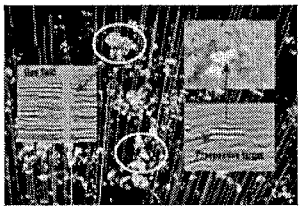

View image

QuickSEIS Process
QuickSEIS screening enables quick prioritization of drilling opportunities.

1 of 1

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Resources

Technical Papers

An Automated System for Accurate and Rapid Detection of Drilling Anomalies

Technical Paper: An Automated System for Accurate and Rapid Detection of Drilling Anomalies

Society: IADC
Paper Number: 140255
Presentation Date: 2011
Download: Development of an Automated System for the Rapid Detection of Drilling Anomalies Using Standpipe and Discharge Pressure (1.64 MB PDF)

Abstract

The requirements for the early detection and the control of kicks, losses and other anomalous conditions while drilling are becoming increasingly important as the industry drills in more challenging environments both onshore and offshore due to greater challenges with respect to equipment stresses and pressure regimes.

This paper will present the design and testing of a high fidelity and high certainty system for the early identification of anomalous conditions while drilling such as kicks, losses, washouts, drill string plugging and hole bridging without the need for traditional delta flow equipment and interpretation methods. An explanation of how the system minimizes false alarms and how visual and audible methods inform the operator of the different anomalies as they are detected will be included. Installation of the equipment on the rig will also be presented and compared to current delta flow methods both for managed pressure drilling operations and conventional drilling operations. Maintenance and reliability issues will also be discussed. Full scale testing and tests using collected field data will be presented to demonstrate the system operation. Further development and field testing will also be discussed.

More Schlumberger IADC papers

High Performance Wellbore Departure and Drilling System for Accessing New Target

Approaching the Technical Limit: Mature Basin Benefits from Influx of Advanced Drilling Rigs/Tool Technology

Drilling Fluid Design Enlarges the Hydraulic Operating Windows of Managed Pressure Drilling Operations

Increased Rate of Penetration Through Automation

Results of July 15, 2010 IADC Stick-Slip Mitigation Workshop

Application Of Tandem Rotary Steerable-Positive Displacement Motor Bottom Hole Assembly In Drilling Horizontal Wells: Case Study Of Three East Siberia Wells

ECD Management and Pore Pressure Determination with MPD Improves Efficiency in GOM Well

Effective BHA Design and Vibration Modeling for Improving the Quality of Sonic Measurements

Testing the Combination of High Frequency Surface and Downhole Drilling Mechanics and Dynamics Data Under a Variety of Drilling Conditions

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Learn more about IADC 2011

Presenter

Don Reitsma, vice president of engineering and technology for At Balance, a Schlumberger company, is a pioneer and leading expert in the design and delivery of automated pressure drilling systems. Mr. Reitsma has more than 30 years of diversified upstream industry experience with exploration and production companies, national oil companies, and major service providers.

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EXHIBIT 1

CASE STUDY

Schlumberger

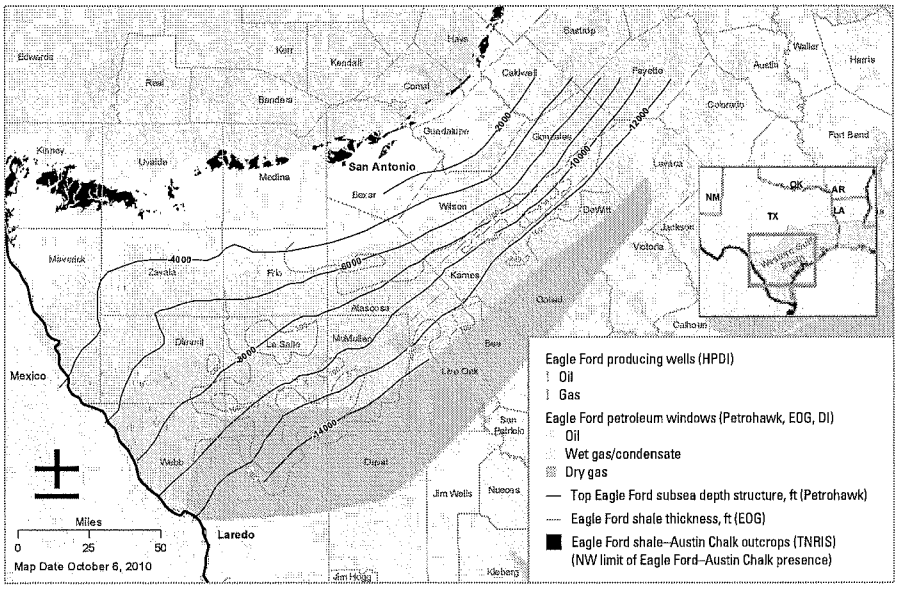
Experienced Consultants Deliver Rapid, In-Depth Evaluation of Acreage in Eagle Ford Shale Play

Petrophysics, reservoir modeling, and simulation identify main production drivers, forecast recovery from unconventional resource

CHALLENGE
Obtain a thorough "quick look" evaluation of potential oil recovery from Eagle Ford Shale assets in a very short time frame to support a strategic economic decision.

SOLUTION
Contracted Schlumberger DCS consultants with technology and local expertise in this prolific unconventional play to conduct a rapid, in-depth assessment.

RESULTS
Completed project in less than a month. Identified production drivers, oil in place, and potential long-term recovery. Enabled operator to develop firm plans for asset.



An independent operator with acreage in the "oil window" of the Eagle Ford Shale play (green) engaged Schlumberger DCS to provide a detailed engineering evaluation of its assets. DCS consultants completed the project in less than a month.

Overcoming technical constraints

In mid-2010, an independent operator holding leases in the oil window of the prolific Eagle Ford Shale play of South Texas realized it was running out of time to make a critical economic decision about the fate of its assets.

Urgent questions included: What are the key production drivers here? How much oil is in place? What is the effective drainage area of a typical horizontal well with multistage fracture completions? How much oil could we recover over 10 years, or longer?

Not only did the operator have to answer these questions quickly, but it also faced major technical constraints. For one thing, existing well data for petrophysical analysis was limited both in number and quality. No cores were available.

Despite the current practice of drilling horizontal laterals with multistage completions, the operator's well and production data came only from legacy vertical wells with single-stage completions. Also, like many companies entering unconventional plays, the company lacked the experience and appropriate modeling tools to conduct a full evaluation by itself.

Forecasting potential long-term production

To obtain the information they needed, management approached Schlumberger Data & Consulting Services (DCS). They knew that DCS specialists had both local expertise in the Eagle Ford and the right technology to deliver a thorough and reliable quick look evaluation of its assets—despite limited time and data.

DCS geotechnical specialists performed a rapid petrophysical analysis of digital log data from 21 vertical wells, supplementing the client's data with the Schlumberger proprietary local database. Using Petrel* software, they built a 3D static reservoir model and populated it with petrophysical properties to calculate original oil in place (OOIP).

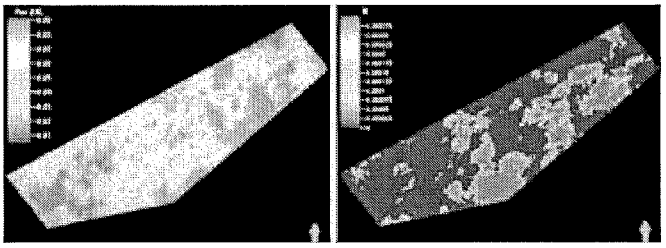
Using ECLIPSE* software, the specialists built a typical vertical well simulation model and performed history matching with production data from 8 wells to derive formation permeability and estimate drainage area. In addition, they modified the completion to represent a single-stage hydraulic fracture treatment, and ran the model to predict oil and gas production for a 10-year period. Next, the consultants constructed a typical 5,000-ft horizontal well simulation model assuming a 14-stage hydraulic fracture treatment, and ran the model to forecast potential recovery. Finally, they performed sensitivity analysis to rank the main production drivers in the study area and specify uncertainties.

Facilitating a more informed decision

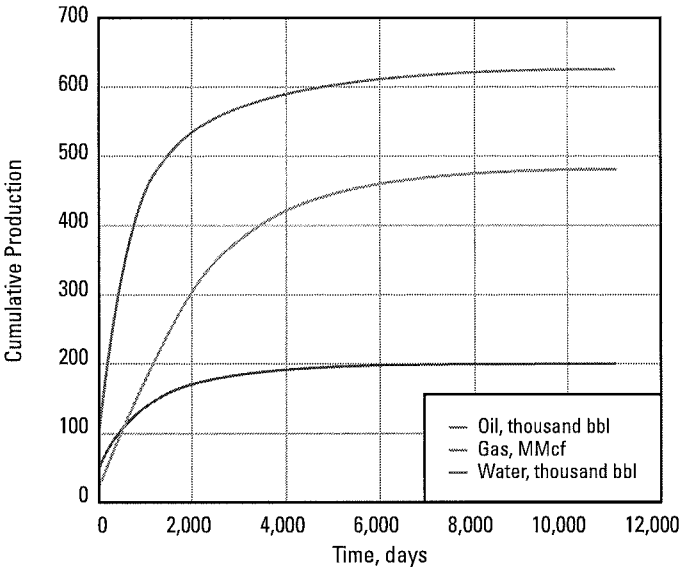
Schlumberger completed the entire Eagle Ford asset evaluation in less than 1 month, successfully answering all of the client's primary questions within stated ranges of uncertainty.

The results of petrophysical analysis and reservoir modeling indicated the Eagle Ford acreage under consideration appeared to contain significant volumes of oil in place. The report provided a reliable estimate of oil volumes per acre. DCS experts found that the two highest-ranking production drivers in the study area were natural fractures and hydrocarbon pore volume. They were able to forecast low, median, and high oil and gas cumulative production estimates for up to 30 years. For example, a properly designed and completed 5,000-ft horizontal well in the area could potentially recover more than 600,000 bbl over a 30-year period.

By accessing Schlumberger expertise in the Eagle Ford Shale play, the operator's management team was able to obtain a working model of the asset, estimate its long-term value, and make a more informed economic decision. As a result, they developed a firm plan to move the asset forward and meet strategic objectives.



Using Petrel software, DCS consultants built a static reservoir model of the study area, populated it with petrophysical properties (left: effective porosity, right: permeability), and calculated OOIP, which appeared significant.



Using ECLIPSE software, Schlumberger experts performed history matching and ran production forecasts for a typical 5,000-ft multistage fractured horizontal well. A properly engineered well could recover more than 600,000 bbl over 30 years.

www.slb.com/shaleoil

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Schlumberger

Resources

Publications

Industry Articles

Spectroscopy: The Key to Rapid, Reliable Petrophysical Answers

Spectroscopy: The Key to Rapid, Reliable Petrophysical Answers

Publication: Oilfield Review
Volume: 17
Issue: 2
Publication Date: 06/01/2005

A new log interpretation technique obtains rock properties from elemental concentrations with nearly automatic processing of data from modern spectroscopy and conventional logging tools. The method provides fast, objective and reliable interpretations to make completion decisions. Case studies from Egypt, Venezuela and the North Sea illustrate the technique.

Download: Spectroscopy: The Key to Rapid, Reliable Petrophysical Answers (0.92 MB PDF)

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EXHIBIT 1

Resources

Case Studies

Rapid Cased Hole Intervention Increases Production by Almost 1,200 bbl/d in Marginal UK North Sea Oil Field

Case Study: Rapid Cased Hole Intervention Increases Production by Almost 1,200 bbl/d in Marginal UK North Sea Oil Field

Fit-for-purpose wireline tools and experienced analysts help Fairfield Energy boost production by a factor of 60 in Osprey well

Challenge: Quickly identify the appropriate intervention to remedy an extreme increase in water cut and almost complete loss of oil production when two other wells came online.

Solution: Engage Schlumberger Data & Consulting Services (DCS) analysts to acquire and provide an expert rush interpretation of data from fit-for-purpose reservoir saturation and production logging technologies.

Result: Reduced water cut by 11 percent and increased production from 20 to 1,200 barrels per day through the accurate placement of plug and perforation of bypassed zone.

Quickly addressing lost production

The Osprey field is part of a cluster of producing assets owned and operated by Fairfield Energy in the UK North Sea. Discovered in 1974, the field began oil production in 1991 from sandstone reservoirs of the Mid-Jurassic Brent Group. In 1992, Osprey well P3S1 was perforated in the Tarbert and Upper Ness formations, the two uppermost Brent producing intervals within the East Shetland basin.

When Fairfield acquired this mature field from Royal Dutch Shell in 2008, the well had been producing approximately 2,200 bbl/d at 79 percent water cut. The company's strategic objective for this and other assets in the area was to extend their expected lifespan through careful technical and operational development. However, after two additional wells came online, production unexpectedly plummeted to almost 20 bbl/d, and water cut jumped to 99 percent.

Every day of lost production represented a significant impact on Fairfield's bottom line. It was urgent, therefore, to remedy the high water cut and boost oil production again.

Accurately identifying appropriate solutions

Fairfield planned to set a permanent plug to shut in all or part of the Upper Ness formation, and to perforate any potential oil-bearing zones remaining in the Tarbert formation. To accurately identify and isolate any swept intervals and determine exactly where to perforate, the operator planned to run a cased hole saturation and production log survey.

Previously, Fairfield had used another service provider in the Osprey field. However, after reviewing the technologies and services offered by Schlumberger, the company decided to engage Wireline and DCS to acquire and interpret a PS Platform production logging tool (PLT) and RST reservoir saturation tool carbon-oxygen survey. Schlumberger was chosen because specialists demonstrated their ability to both obtain the high-quality technical data that Fairfield required, and to provide a rush evaluation in time to meet its urgent deadline.

Wireline completed the survey while the well was shut in. Within six hours of receiving the data, DCS analysts performed an expert interpretation and presented the results to the operator's team—even before the tools had returned to the surface.

Reducing water cut, boosting oil production

Rapid, in-depth evaluation of the RST carbon-oxygen survey showed that original oil was still in place in the uppermost Tarbert interval. Hence, that zone was a

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"The results we achieved in this well with the assistance of Schlumberger are fantastic. We are extremely pleased."

Doug Smith
Senior Reservoir Engineering
Fairfield Energy

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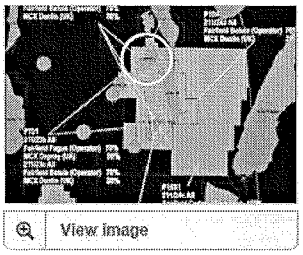

View image

Osprey Field
The Osprey field (circled) is one of several mature oil-producing assets that Fairfield Energy acquired from Royal Dutch Shell in 2008.

1 of 3

EXHIBIT 1

good candidate for perforation. Interpretation of the PLT data revealed cross flow of water into other Tarbert zones from lower perforations, and provided critical information about differential pressure depletion across several Upper Ness intervals, which appeared largely water-swept.

Based on a comparison of the RST-PLT log analysis with Fairfield's model of the Osprey field, the operator's reservoir engineering team decided to set the permanent plug at 9,080 ft MD to isolate the Upper Ness, and to perforate a 20-foot interval from 9,015 to 9,035 ft MD to access bypassed oil in the uppermost Tarbert layer. Initial results were good and after five months of stable flow, well tests showed that water cut had decreased a full 11 percent, while oil production had increased by a factor of 60—from 20 bbl/d before the intervention to 1,200 bbl/d afterward.

Key success factors in this marginal brownfield situation included the right combination of fit-for-purpose technologies, the availability on short notice of highly experienced analysts, excellent operational execution, and close collaboration between operator and service provider.

Download: Rapid Cased Hole Intervention Increases Production by Almost 1,200 bbl/d in Marginal UK North Sea Oil Field (0.78 MB PDF)

Related services and products

Production Engineering & Consulting Services

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EXHIBIT 1

Services & Products

Well Intervention

Coiled Tubing

Coiled Tubing Equipment

CT EXPRESS

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X-11

CT EXPRESS Rapid-Deployment Coiled Tubing Service

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Rapid-Deployment CT for Low-Pressure Land Wells

The CT EXPRESS rapid-deployment coiled tubing (CT) service is designed for low -pressure, intermediate-depth land-based wells. This service

- combines capabilities of four trucks into two tractor trailer units
- enables quick rig up and rig down
- eliminates the need to work under suspended load or climb on unit
- provides process control of CT and pumping functions
- improves job efficiency, economics, and safety of operation
- provides reliability over rough terrain and in extreme conditions.

The system is designed to complement CT operations with low pump rates, moderate pressures and nonstop pumping.

By electrically controlling the coiled tubing unit and pumps from the control chair, the unit provides better use of manpower, eliminating communication problems among operators.

Related resources

CT EXPRESS (1.74 MB PDF)

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EXHIBIT 1

Case Study: Rapid, Accurate Flow Rate Measurements Optimize Lift

Vx technology extends well testing to "untestable" wells offshore West Africa

Challenge: A new deepwater well offshore West Africa, completed with a gravel pack and brine completion fluid, lost fluid during postgravel-pack upper-hole operations. In addition, the crude formed a stable emulsion with the completion brine, causing water to carry over into the oil leg of the separator and making oil-meter measurements artificially high.

Solution: Vx technology, developed by Schlumberger and Framo Engineering A/S, made multiphase testing quicker and more efficient. This advanced flowmeter technology, used in both PhaseTester mobile units and PhaseWatcher permanent installations, requires no phase separation and is insensitive to slugs, foam, and emulsions.

Result: Comparing the volume of lost completion fluids with the PhaseTester measurements made it possible to monitor cleanup, optimize lift, and predict the well's ability to flow naturally.

Low-temperature effluent, high cleanup rates

A new deepwater well offshore West Africa, completed with a gravel pack and brine completion fluid, lost fluid during postgravel-pack upper-hole operations. Low -temperature effluent, combined with high cleanup rates, caused severe foaming of the crude in the test separator. The resulting liquid carryover prevented accurate measurement of gas rates through the orifice plate meter. In addition, the crude formed a stable emulsion with the completion brine, causing water to carry over into the oil leg of the separator and making oil-meter measurements artificially high. The emulsion could not be broken, and therefore water content in the oil could not be determined. Because of these problems the client selected Vx technology for subsequent wells.

Complete measurement 45 times per second

Accurate measurements of gas, oil and water flow rates are essential for diagnosis and optimization of well and field performance. In the past these measurements required use of bulky mobile test units or large, maintenance intensive test facilities.

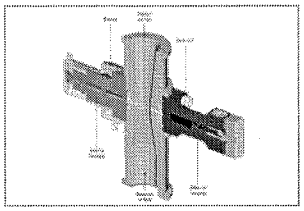
Vx technology makes multiphase testing quicker and more efficient. This advanced flowmeter technology, used in both PhaseTester mobile units and PhaseWatcher permanent installations, requires no phase separation and is insensitive to slugs, foam, and emulsions. Suitable for even "untestable" wells, it is used for

- production well testing
- production allocation
- production trends
- artificial lift optimization
- well cleanup optimization
- subsea well testing
- exploration and appraisal testing.

Vx technology couples venturi mass flow rate and dual-energy gamma ray phase holdup measurements. The high-speed detector processes 1 million points per second for a complete calculation of water, oil, and gas fractions every 22 ms.

The PhaseTester service, which uses a lightweight mobile unit designed for easy deployment, covers all steps of the testing process, from design to reservoir interpretation. This service can be tailored to meet specific needs, including sitespecific safety analysis, wellsite operations, well test reporting, well data analysis, and production diagnosis.

Request More Information



Venturi with dual-energy gamma ray holdup meter is the heart of the flowmeter. Pressure housings for source and detector provide a second pressure barrier to well fluids.

1 of 2

Real-time monitoring reduced lifting costs

A PhaseTester unit monitored cleanup and measured backflow of nonreservoir fluids during the period when a conventional test system was bypassed and no data were obtained. Real-time monitoring of brine, oil, and gas rates identified the crossover from brine to oil and gas production, permitting the nitrogen lift to be stopped as soon as it was no longer needed. Comparing the volume of lost completion fluids with the PhaseTester measurements made it possible to monitor cleanup, optimize lift, and predict the well's ability to flow naturally.

Download: Rapid, Accurate Flow Rate Measurements Optimize Lift (0.10 MB PDF)

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EXHIBIT 1

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Monitoring of Openhole Completion Provides Rapid Feedback from Wells in Early Production

Case study: WellWatcher DTS system installed on periphery of sand screens monitors reservoir depletion effects over time

Challenge

Obtain early, rapid feedback of production rates and reservoir depletion effects over time from wells with sand control issues.

Solution

Installed WellWatcher* distributed temperature sensing (DTS) system along the sand screen to allow early time-surveillance data acquisition.

Results

Obtained rapid feedback that allowed a better understanding of reservoir performance, helped optimize new well placement, and improved the reservoir model. Achieved significant cost savings since conventional production logging tool (PLT) measurements would have required interruptions to the drilling program.

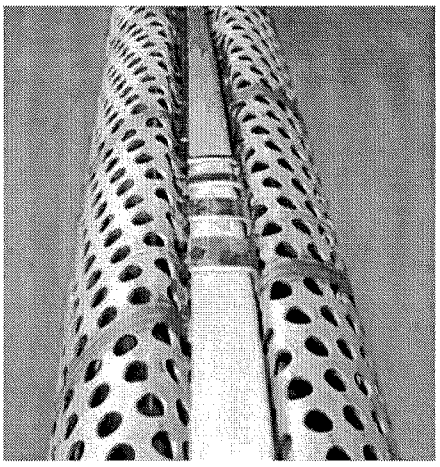
Sand control, well performance and management, and reservoir uncertainty

A field located in the South Caspian region contained wells producing from three multilayered reservoirs. Sand control issues with soft sands and long, high-angle wellbores led the client to use gravel-packed sand screen completions. The high-deviation wells were capable of flow rates to 7,949 m^3/d [50,000 bbl/d] in the early stages of production. Technical challenges facing the client included reservoir uncertainties, gas/oil and oil/water contact, and fluid contact movement over time.

Distributed temperature sensing for reservoir monitoring

Conventional reservoir surveillance programs frequently use PLTs to determine the flow contribution from individual sand bodies. In this South Caspian field, however, restricted wellhead access, high flow rates, and differential depletion of the reservoir intervals limited the use of PLTs. Consideration of delayed production and rig costs made PLTs even less attractive.

Because sand screen completions were standard in the field, installing the WellWatcher DTS system with the sand screen was determined to be the best way to obtain the time-surveillance temperature data needed. Temperature measurements were made every meter along the length of the optical fiber. The data were continuous and showed how production varied with time because of changing reservoir conditions.

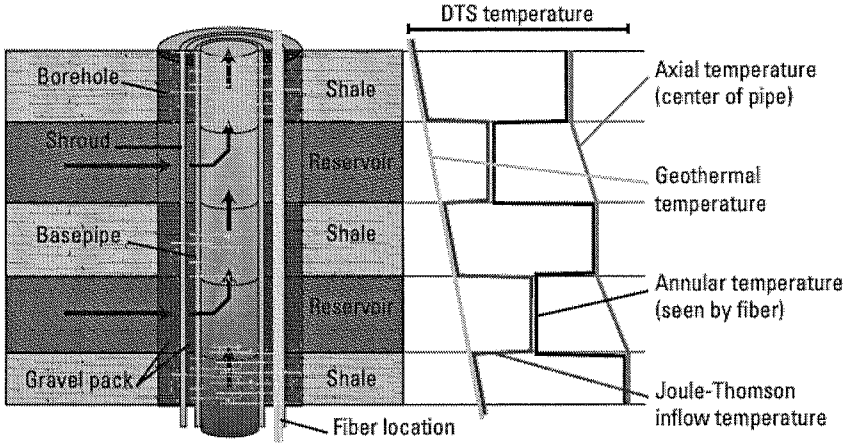


Sand screen shroud and gravel pack showing the location of the optical fibers.

Successful monitoring of reservoir depletion and gas breakthrough

A WellWatcher DTS system was installed in a new well producing at the rate of 5,565 m^3/d [35,000 bbl/d] with a constant gas/oil ratio (GOR) of 880. Temperature data changed in layers after the well was on production for 2 months. Because the oil properties did not change, the only explanation for the temperature change was that reservoir depletion had occurred. The reservoir pressures in the thermal model were decreased until the Joule-Thomson inflow temperatures matched the WellWatcher DTS data and the calculated flowing wellbore pressure matched the pressure gauge recordings.

Case study: WellWatcher DTS system installed on periphery of sand screens monitors reservoir depletion effects over time



WellWatcher DTS temperature measurement on the sand-screen shroud.

These results confirmed that WellWatcher DTS measurements can be applied in multilayered reservoirs to determine the magnitude of changes in the pressures of individual layers after a well has been placed on production.

During the first 3 months of production, the GOR increased to more than 2,500 from 1,000 in one of the other new wells. The WellWatcher DTS system showed rapidly decreasing temperatures in some reservoir layers, whereas temperatures in other layers remained unchanged. Comparing the early DTS data with those recorded 4 months later clearly indicated that gas breakthrough was occurring in much thinner layers than suggested by the gamma ray shale indicator in the first thermal well model. Initial WellWatcher DTS data indicated a flow split of 50% between two of the reservoirs; however, after only 3 months of production, the analysis showed that the flow split had changed to 25% from one reservoir and 75% from the other. These results confirmed that the gas was not breaking through in a flat flood front but that individual layers were fingering gas through different parts of the reservoir.

Advantage of installing DTS system outside the sand screen

The temperature measured by a temperature log or a DTS system is usually the axial mixture temperature, that is, the temperature at the center of the completion. However, when a WellWatcher DTS system is installed on the outside of the shunt tube in a high-flow-rate well that is gravel packed, the fiber measures the Joule-Thomson temperature of the layer flow before it passes through the wire-wrapped sand screen and mixes with the flow coming up the well from deeper reservoirs. Measuring at that point has significant benefits because the temperature responds both to each flowing layer, allowing layer identification, and to the effects of changes in layer drawdown and fluid properties.

The WellWatcher DTS system provided rapid feedback from wells early in their production cycle, which allowed a better understanding of reservoir performance, helped optimize new well placement, and improved the reservoir model. In addition, significant cost savings were achieved because conventional production logging tool (PLT) measurements would have required interruptions to the drilling program.

About Transcend services

The WellWatcher DTS system is part of the IntelliPac* family of Transcend* openhole sand management services. Transcend services include

- screens and injection and inflow control devices
- AquaPac* integrated water packing technologies
- OptiPac* Alternate Path† gravel-pack system
- IntelliPac* measurements in real time, featuring WellWatcher distributed temperature sensing and WellWatcher Flux* monitoring systems.

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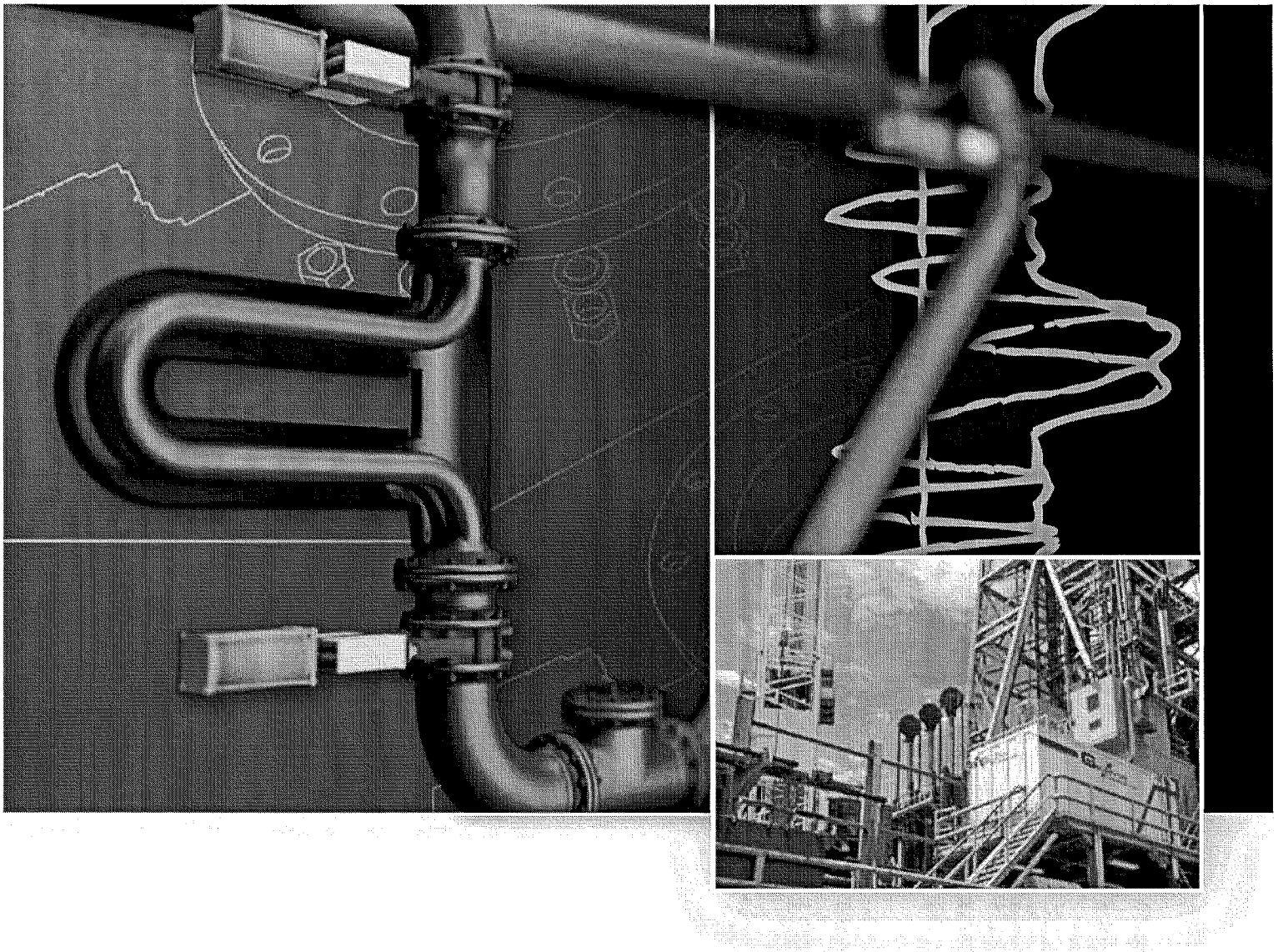
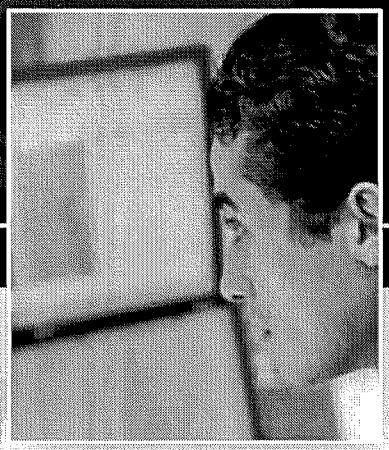


Flag

Well balance assessment service

Benefits

- Improved well safety
- Reduced NPT
- Lower environmental risk



Features

- Coriolis flowmeter
- Reliable differential flow-out corrected for heave, flowline effect, and reciprocation
- True assessment of flow from the wellbore
- Accurate monitoring under various operating conditions—drilling, circulating, making a pipe connection, tripping, or cementing
- User-friendly visual displays, alarms, and quality control
- Suitable for deepwater, HPHT, slimhole, and conventional wells on any type of rig
- Dedicated support technician for supervision of design, installation, and commissioning
- Stand-alone capability

Applications

- Rapid kick and loss detection
- Wellbore ballooning characterization
- Drilling fluid displacement monitoring
- Cement displacement and free fall monitoring
- Pump efficiency measurement
- Tripping and casing run monitoring

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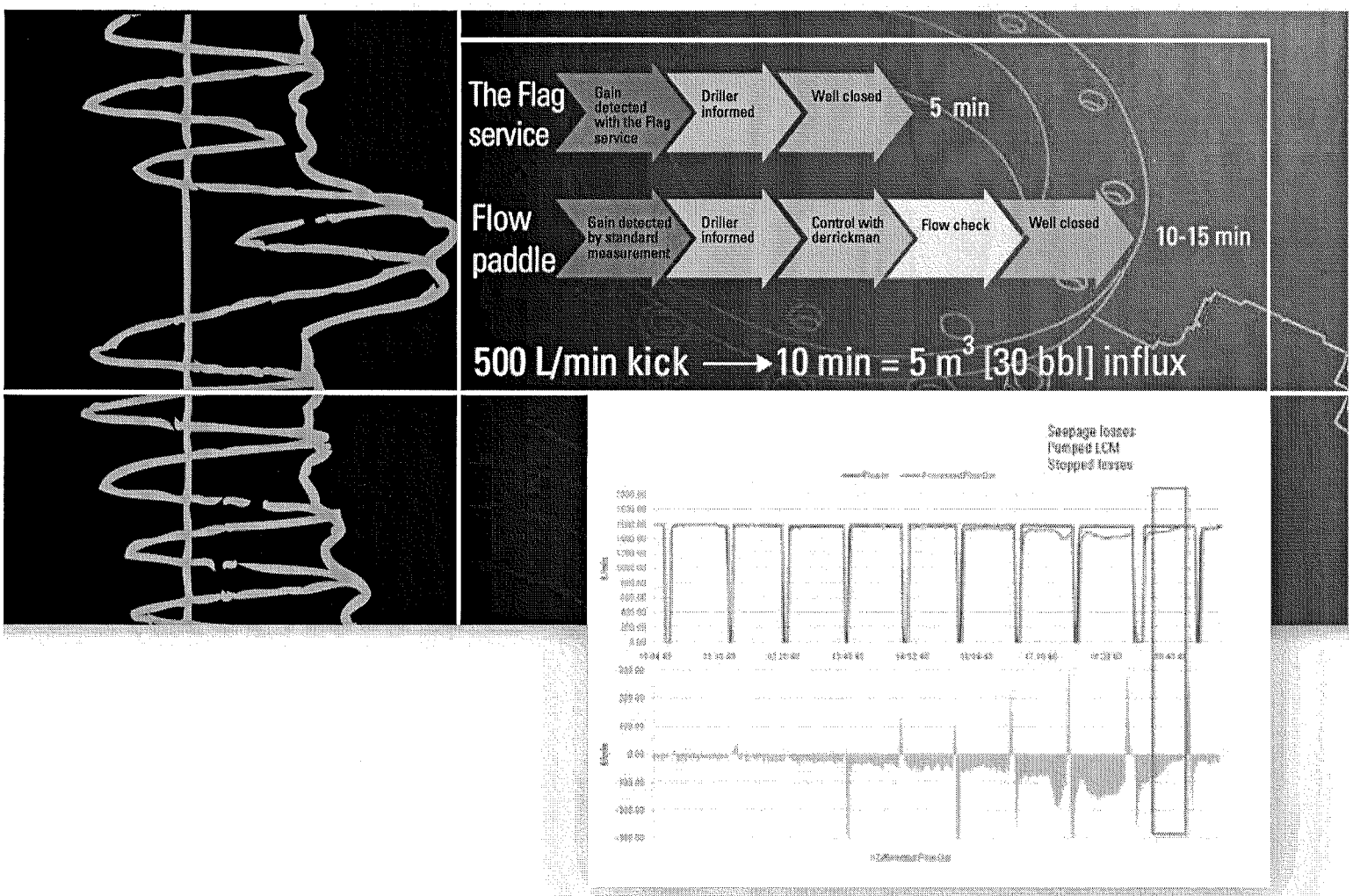


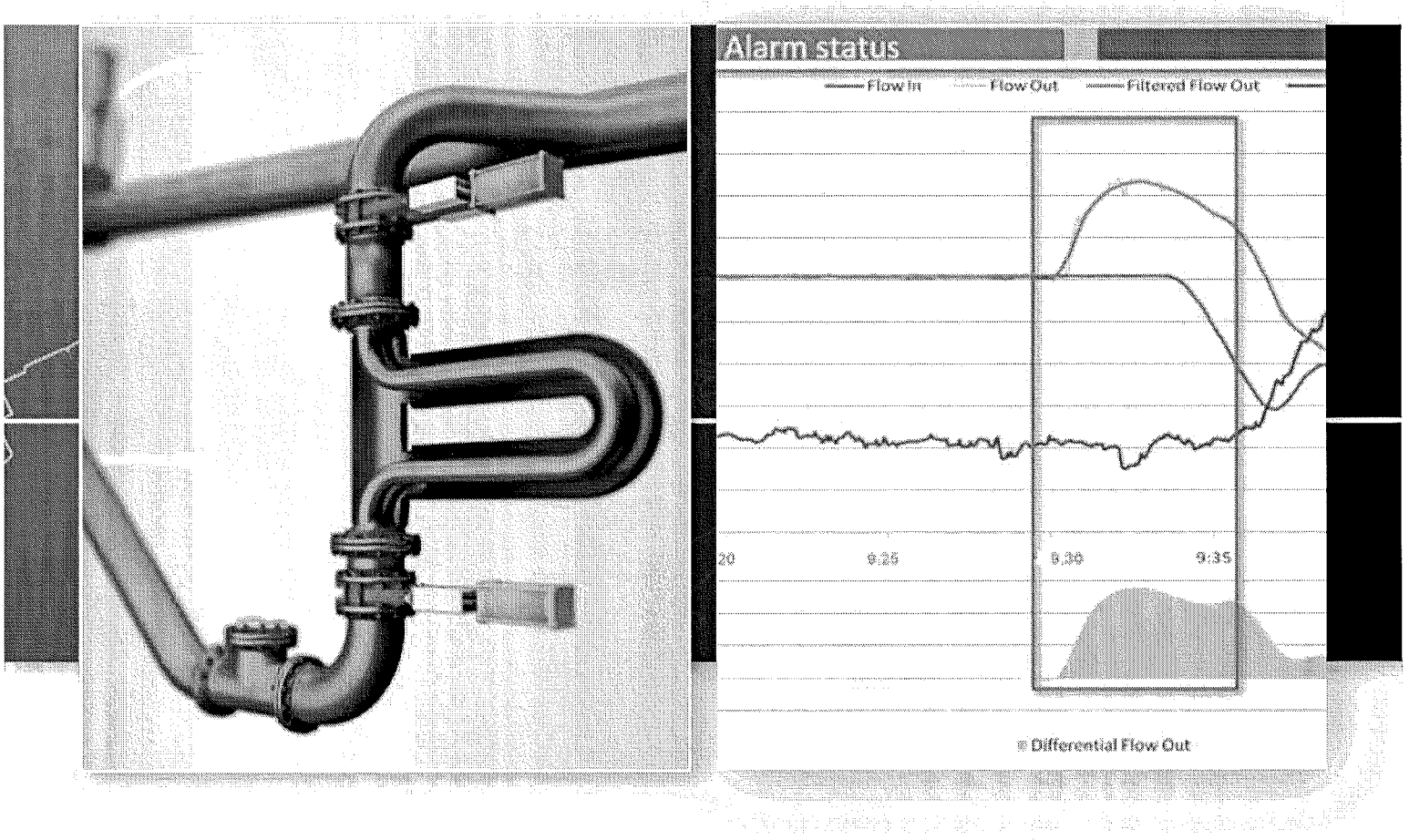
From 13:40:48 onwards, mud losses into the formation were increasing every time the pumps were turned on, as indicated by the Flag service. Injection of lost circulation material (LCM) successfully stopped the losses. The differential flow-out provided rapid confirmation.

Rapid system response

Quick and reliable detection of fluid influx or loss in the well is crucial, especially when drilling a slimhole or when drilling under HPHT conditions. Detecting gains and losses 5 to 10 minutes faster than conventional systems, the Flag* well balance assessment service provides significantly earlier warning of any abnormalities, thus allowing more time for remedial action. In addition, this automated early kick detection system gives a valuable edge during drilling operations by accurately indicating influx or loss at very low volumes and by reducing the number of false alarms that require time-consuming flow checks.

System requirements

- Drilling parameters (standpipe pressure, hook height, weight on hook, pump strokes)
- Geoservices acquisition system
- Geoservices Coriolis flow sensor



Accurate differential flow-out under various operating conditions

The Flag service is calibrated for the rig circulating system to compute the theoretical return flow from the well in real time. The streamlined interface minimizes user dependence. A Coriolis flowmeter† installed in the return flowline continuously measures the actual return flow. By comparing the measured and theoretical values, the Flag service can detect an influx or loss almost as soon as it occurs, even under conditions that may make detection difficult by conventional means. Monitoring losses and gains in the flowline instead of the mud pit ensures faster detection and gives a true picture of downhole conditions, unaffected by surface actions such as addition of chemicals to the mud pit or mud transfers.

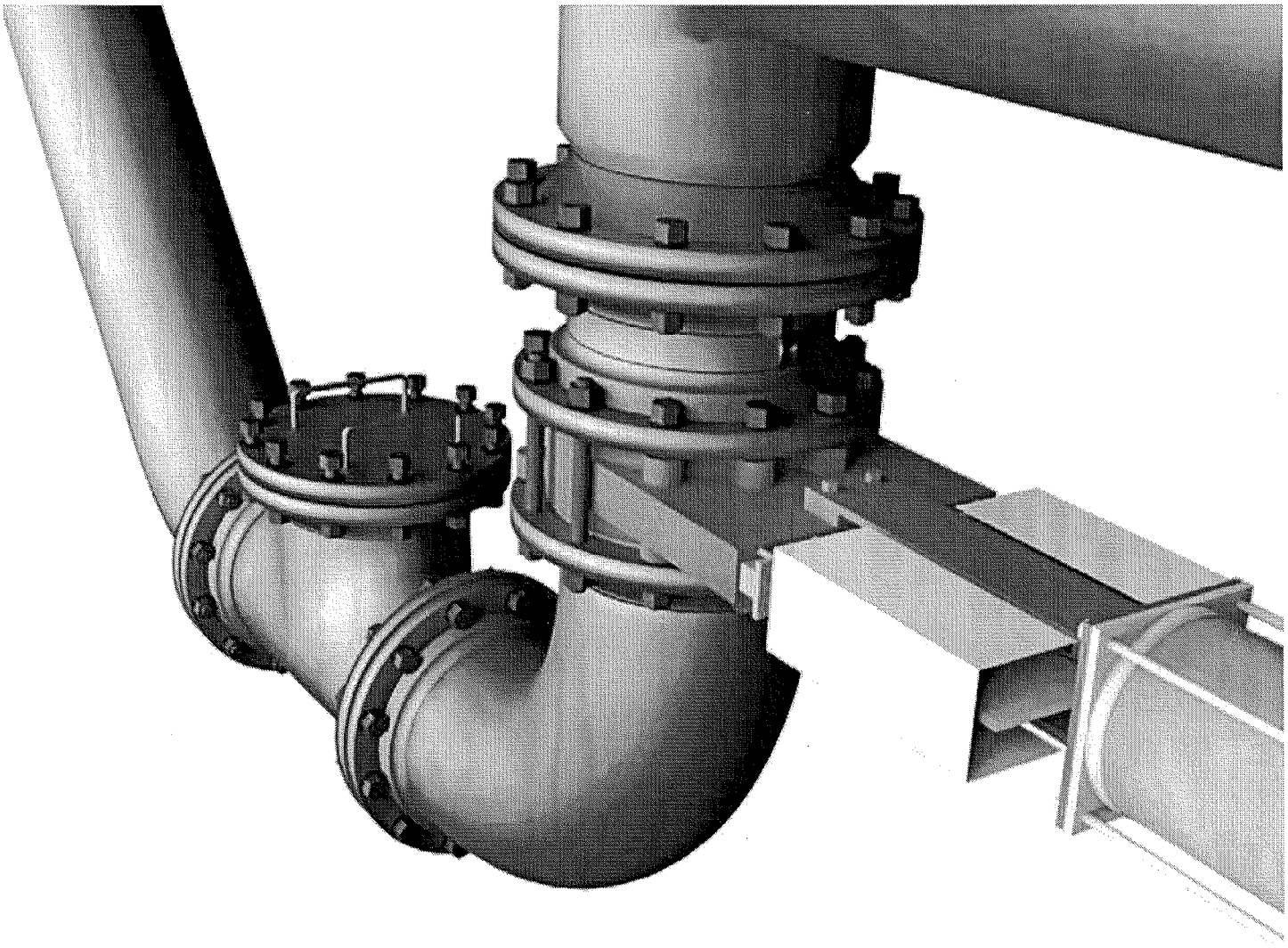
The algorithm is accurate under a number of operating conditions—drilling, tripping, circulating, and cementing. The system automatically compensates for mud compressibility and disturbances that could mask the true flow, such as pipe movement or heave on a floating rig. Transitional flow regimes, like those created by starting or stopping the pumps, can also be accommodated.

In addition to visual and audible alarms activated by preset thresholds, computed and measured data and the alarm status are continually displayed in log format on the Geoservices monitors. When used as part of the Thema* drilling operations support and analysis service, depth- and time-based data from the Flag service and a number of other sensors is used to display decision-ready information on drilling performance and safety via customizable screens in real time.

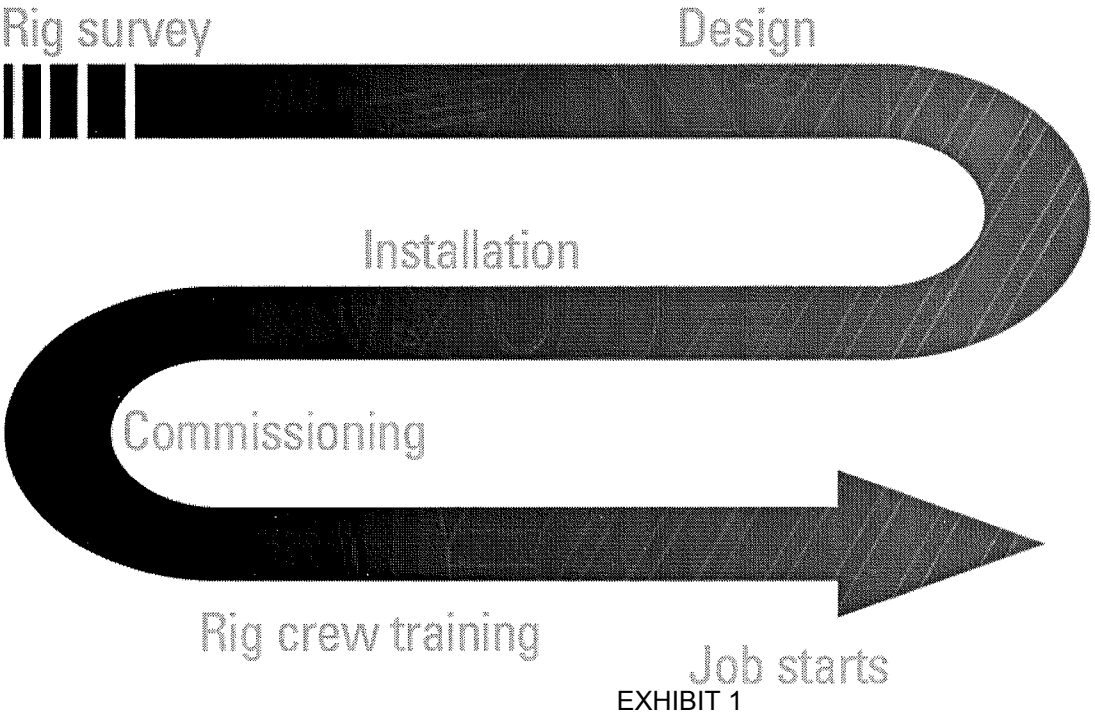
Significant reduction in risk

Fluid influx or loss is a potential hazard that can lead to loss of control of a well, with potential loss of life and property, and damage to the environment. As deepwater and other increasingly complex drilling programs multiply, the magnitude of the possible risks continues to grow. The Flag service aims to meet these challenges with an essential early warning system that is highly sensitive to fluctuations but intelligent enough to help prevent false alarms, making it an ideal primary well control device.

† An electromagnetic flowmeter is used when space constraints do not permit installation of a Coriolis flowmeter and a water-based mud is in use.



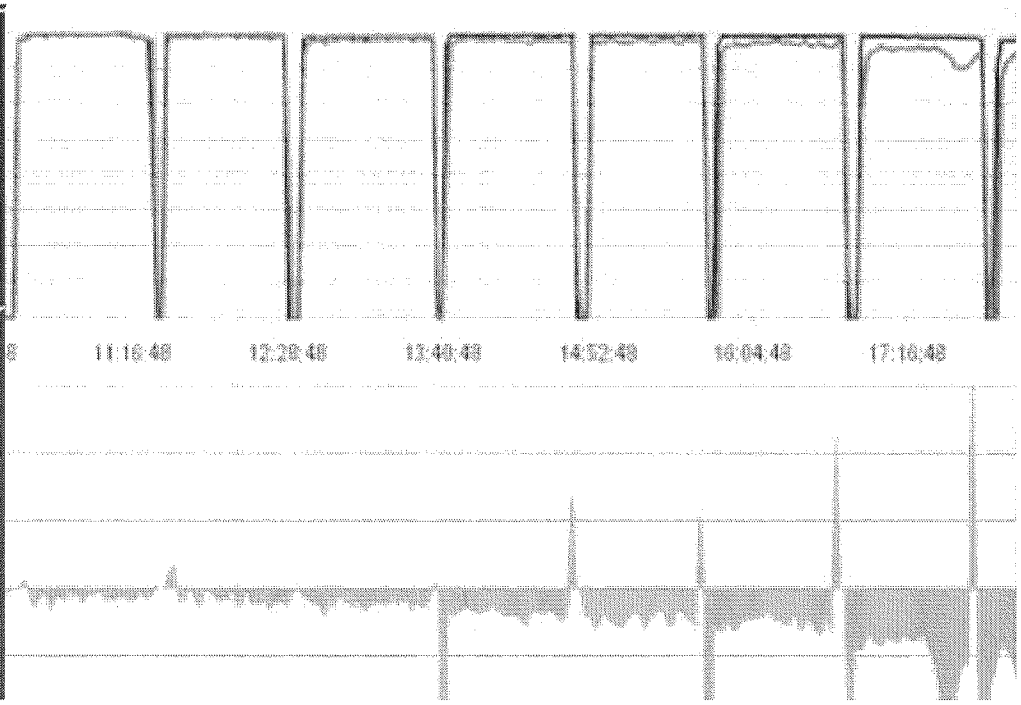
Service delivery process



Flag

Well balance assessment service

The Flag well balance assessment service provides significantly earlier warning of any abnormalities, thus allowing more time for remedial action.



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Faster, bigger, better 3D interpretation & visualization

GeoViz 3D interpretation and visualization software brings you power and flexibility for maximum impact on your workflows—whatever your workflows.

GeoViz rapidly reads and writes all data to the GeoFrame integrated reservoir characterization database, which enables every member of your team to increase their throughput and understanding. Data types handled by GeoViz include seismic (2D, 3D and 4D); interpreted horizons and faults; wells (logs, markers, zones); geological cross sections; velocity models and structural models.

Benefits

No data transfer saves you time.
Use the same tool to work on large exploration data sets or perform detailed reservoir studies.
Rapid fault interpretation and quality control (QC) of structural models.
Live updates of real-time data allow you to monitor wells as they are drilled.
Access to a large breadth of data types ensures you always see the big picture.

Features

Voxel picking tool provides rapid interpretation of connected amplitudes
Automatic Seismic Area Picker (ASAP) running in the 3D workspace is rapid and allows instant QC and refinement of interpretation
Well planning is fully integrated with GeoFrame
Multi attribute analysis of four volumes of data simultaneously
Volumes can be cut along horizons and extracted along fault planes
Opacity tool allows user to pick and choose which amplitudes to display within volume
Easy display of geological data from the database including logs, markers, zones and cross sections
Display Framework models in time or depth within GeoViz
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EXHIBIT 1

Resources

Case Studies

Simultaneous AVO Inversion Adds Value to Multiclient Data on Australia's North West Shelf

Case Study: Simultaneous AVO Inversion Adds Value to Multiclient Data on Australia's North West Shelf

Rapid prospect identification using ISIS inversion and lithology prediction on the Keystone 3D seismic survey

Challenge: Identify gas reservoirs within 5,000-km2 survey containing many promising flat spots and other direct hydrocarbon indicators (DHIs) that require validation and quantification.

Solution: Perform regional exploration study to correlate petrophysics with elastic parameters, perform an AVO inversion, and screen for hydrocarbons.

Result: Inversion results matched well data, and the gas sand probability cube facilitated rapid identification and quantification of prospective areas.

Identify gas reservoirs

In 2008, WesternGeco acquired the 5,000-km2 Keystone 3D multiclient survey. The Jupiter gas field is situated at the center of the survey area, which lies between the Io/Jansz and Scarborough gas fields in the Northern Carnarvon Basin on Australia's North West Shelf, just west of the Chandon gas field. Acreage in this large, highly prospective area had recently been relinquished. Operators wanted to identify gas reservoirs within the survey but needed a quantitative interpretation study to do so.

Create a reliable gas sand probability cube

To provide operators with a rapid screening tool, Schlumberger DCS experts used ISIS simultaneous AVO inversion technology to create a well log-calibrated gas sand probability cube. A prestack AVO inversion was performed to compute seismic elastic attributes, which, in turn, would generate reliable lithology and fluid properties. Running the ISIS simultaneous inversion algorithm on parallel CPUs would be a highly efficient method of processing this large dataset.

The comprehensive "inversion-friendly" data processing flow included full curved ray Kirchhoff 3D anisotropic prestack time migration (PreSTM) and PreSTM gathers stacked into near-, mid- and far-angle volumes. Seismic was then calibrated with log data from four wells in the survey area. To better predict changes in geology, low-frequency models were generated using seismic velocities and six additional wells outside the survey area as input for the inversion.

Extrapolating low-frequency trends throughout the volume would make it possible to directly relate rock properties from inversion outputs to well log measurements. Using log data from these 10 wells, a non-Gaussian probability density function (PDF) was derived, which relates gas sand probability to acoustic impedance and Poisson's ratio (Fig. 2). In this area, targets exist at multiple stratigraphic levels and depths. Therefore, to accurately predict gas sands at all levels, two-way time was included as a third dimension on the lithology PDF.

Efficiently identified potential prospects

Applying the function to the AVO inversion outputs (acoustic impedance and Poisson's ratio) produced a reliable gas sand probability cube, verified by matching with gas saturation logs at the wells (Fig. 3). The gas sand probability volume was finally loaded into Petrel seismic-to-simulation software for interpretation and further analysis. Not only were structural traps with associated DHIs identified, but also structural traps without obvious DHIs and more subtle stratigraphic traps (Fig. 4). Analysis of this large dataset by DCS experts offers considerable value to operators exploring Australia's North West Shelf.

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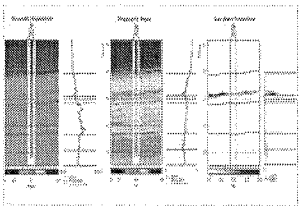

View image

Quantitative Interpretations
ISIS inversion and lithology prediction were used for rapid prospect identification.

1 of 4

Download: Simultaneous AVO Inversion Adds Value to Multiclient Data on Australia's North West Shelf (1.99 MB PDF)

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Mobile nitrogen generation units (MNGU) are mounted on a single trailer, are fully interconnected, and are calibrated, complete with inlet and outlet metering. They are specifically designed for rapid deployment to remote locations. MNGUs minimize transport, rig-up and removal, and environmental footprint, while maximizing efficiency and maintenance.

The MNGU is the optimal, cost-effective choice for remote locations because it facilitates nitrogen logistics, provides continuous mobility, and produces nitrogen at high purities.

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