

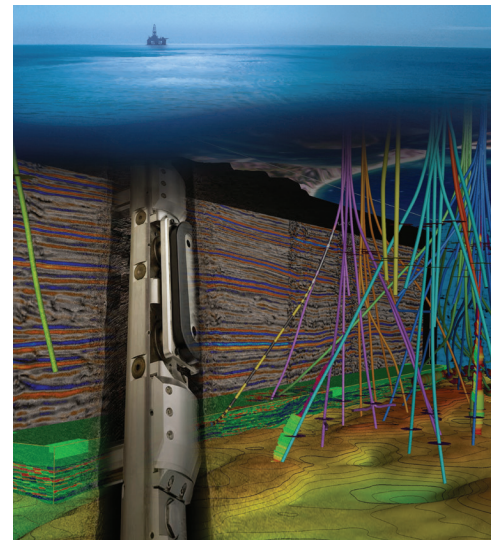
Advanced Technology Solutions

Two large-scale deepwater projects successfully launched using Halliburton's advanced technology and top service delivery

Location: Deepwater Southeast Asia

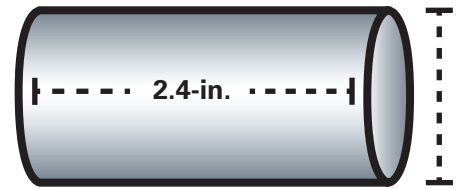
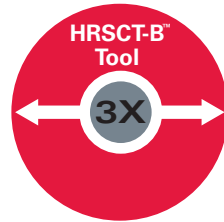
Overview

Two operating companies launched large-scale deepwater development projects in southeast Asia. Both projects required exploration wells at the beginning of the program with new rig deliveries and quick startup windows, which necessitated top service delivery and unique technology solutions. Both companies turned to Halliburton for their exploration needs. Halliburton completed successful campaigns for both clients with excellent operating efficiency. Over 190 hours of logging were performed with zero HSE incidents. Halliburton saved one client USD 458,000 by eliminating two cased-hole runs on separate wells because the Array Sonic Tool (AST) was able to retrieve a cement bond log answer product on the downlog, combined with an openhole run. A Halliburton super-string combination saved USD 400,000 by combining two openhole logging runs into one.



CHALLENGES	SOLUTIONS	RESULTS
<p>Short startup time for simultaneous operations Both deepwater rigs were new to southeast Asia and required immediate readiness for a wireline program in a short drilling timeframe.</p>	<p>Experience with mobilization and execution in deepwater southeast Asia operations Proper planning and competent Halliburton professionals ensured job performance.</p>	<p>Unparalleled service delivery despite overlapping jobs The experienced Halliburton team in was able to deploy the technology in a short timeframe for overlapping jobs, resulting in top service delivery.</p>
<p>Real-time operations required for decision making To ensure data quality and real-time decision-making capabilities, both operators required a full-time dedicated team of petrophysicists, geophysicists, and reservoir engineers.</p>	<p>Simultaneous Halliburton FRS support in real time The skilled and competent Halliburton Formation Reservoir Solutions (FRS) team in southeast Asia, through direct collaboration with the clients, delivered answers and support in real time.</p>	<p>Informed customers make informed decisions Both customers were able to take the information provided by Halliburton to make informed decisions for their projects.</p>
<p>Advanced technology for core and sample analysis One operator required special core analysis and sampling of single-phase gas with a small mercury content, which was important for facilities planning. The other client had a significant discovery exploration well that required several additional logging services to be added in situ.</p>	<p>Advanced technology solutions Halliburton offered hostile rotary sidewall coring, optical fluid analysis using its integrated characterization section (ICS), deepwater conveyance for high tension with jars, advanced acoustic logging with an AST, and mini-drill stem test (DST) using the Reservoir Description Tool (RDT™) tester's oval pad.</p>	<p>Technology and professional expertise delivers results Using Halliburton tools, backed by good planning and teamwork, both customers received the high-quality data they desired.</p>

TRIPLE THE VOLUME



The HR SCT-B sidewall coring tool can extract 1.5-in. cores that are 2.4-in. long, providing a sample three times larger than other sidewall coring tools.



24-HOUR
FRS Support

198
Hours Operating Time

51
Services Delivered

11
Logging Runs

16
Recovered Samples

All with
ZERO
HSE Incidents

**Real-Time
Collaboration**

Limited Time Window Startup

Both deepwater rigs were new imports for startups of large development campaigns. Both operating companies made the decision to start with exploration wells that would require the highest technology, support, and answer products. Both wells had narrow drilling timeframes—shorter than traditionally encountered in previous deepwater projects in southeast Asia—for Halliburton to prepare for service. Additionally, both rigs had overlapping logging and drilling programs with Halliburton as the only wireline service provider on both rigs.



Real-time Operations Required for Decision Making

To ensure data quality and real-time decision making, both operators required full-time, dedicated petrophysicists, geophysicists, and reservoir engineers. Time is critical in deepwater operations, especially in the exploration environment where decisions are made in real time due to many unknown factors.

Advanced Technology for Core and Sample Analysis

One operator required special core analysis and sampling single-phase gas with a small mercury content, which was important for facilities planning. The other operator had a significant discovery in its exploration well that required several additional logging services to be added in situ. Several of these technologies were deployed for the first time in the deepwater southeast Asia market.

Halliburton Shows Experience with Mobilization and Execution in Deepwater Southeast Asia

Excellent teamwork, coupled with experience and outstanding Halliburton technology, ensured top service delivery. Teamwork was required across all domains: operations, maintenance, front-line supervisors, and country and regional management, because in deepwater the equipment and personnel must be of the highest quality.

Much of the success of these two projects can also be attributed to job preparation, compliance with Halliburton procedures, and API Spec Q2 Quality Management System, along with proper risk assessment prior to commencing operations.

Simultaneous Halliburton FRS Support in Real Time

Halliburton FRS provided full-time support in southeast Asia. In collaboration with each client, Halliburton's petrophysicists, reservoir engineers, and geophysicists delivered answers at the client's office. As one customer said, "The FRS team as a whole made us feel like we were a valued customer. I think the customer service was exemplary."

Around-the-clock support was delivered during the overlap of both jobs. Reservoir engineers monitored the mini-DST and assisted in RDT point selection, recommendations on core points, immediate petrophysics answers, rush cement evaluations, and rush seismic interpretation and processing.

Halliburton Advanced Technology Solutions

Halliburton offered hostile rotary sidewall coring, optical fluid analysis using ICS, deepwater conveyance for high tension with jars, advanced acoustic logging using AST and mini-DST using the RDT service's oval pad.

One operator had a significant discovery in their portfolio characterized by Halliburton's mini-DST with RDT technology. The other operator was able to make major facility decisions for its future projects with Halliburton's recovered nitrogen-balanced H₂S-coated sample bottles and Hostile Rotary Sidewall Coring Tool (HRST-B™) service's 1.5-in. diameter rotary cores. This HRST-B tool was run for the first time in the world in a 17.5-in. hole and for the first time in southeast Asia for any hole size. Another new technology introduced during these southeast Asian projects included the Halliburton's Xaminer™ Multicomponent Induction (MCI) tool.

Further, wireline jars and high-tension conveyance systems were deployed, which allowed Halliburton to pull to tensions exceeding 15,000 lb at surface if stuck in the well, to activate hydraulically actuated wireline jars.

Halliburton Team Saves Time and Money

On one project, Halliburton created a direct cost savings of USD 458,000 by eliminating two cased-hole runs on separate wells because the AST was able retrieve a cement bond log answer product on the downlog, combined with an openhole run. The main purpose of the AST run was to obtain compressional and refracted shear measurements in the openhole section. However, the customer had some concerns regarding the cement job of the cased upper section (13-5/8-in. casing) for each well and was planning to evaluate the cement. Halliburton was able to capture that information with the AST while running in the hole. This saved the customer an extra run and operating time for each well in a very expensive deepwater rig.

On the other project, a Halliburton super-string combination using a CSDD switching sub saved USD 400,000, further reducing two openhole logging runs to one. This technology allowed Halliburton to combine two downhole tools that would normally be incompatible to run together, saving one extra trip in the hole.

Halliburton's success on these projects was solidified by a formal "thank you" note from the customer:

"We would like to take this opportunity to thank you for the support of our project and to recognize the efforts and contributions of the many personnel within your organization who made the drilling campaign a success.

Planning a startup drilling campaign in remote offshore southeast Asia with a new project team, a new-build dual activity rig, and a new shore-base is a challenging task. This could not have been done successfully without the commitment of your team. Most importantly, your employees on location worked incident free. A job well done!"