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To : HON-GT-01S2 project team
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Subject : After Action review workover & drilling operations HON-GT-01S2

Table of Contents

Goal & participants.....	1
Service contractors:.....	2
General.....	2
Planning & preparation	2
Organization	3
Operations.....	3
Rig up.....	3
Fishing.....	3
Bridgeplug setting	3
Whipstock setting & window milling.....	3
Drilling	3
Liner running	4
Rig down.....	4
Suggested improvements.....	4

Goal & participants

The goal of the After Action Review (AAR) is to:

- Evaluate various aspects of the project
- Provide feedback to the involved parties
- Highlight improvements for future projects

Participants:

Maarten Middelburg	Drilling manager
Kornelius Boersma	Sr. Drilling engineer
Bas Kaldenbach	DSV
Art de Vetter	DSV

Service contractors:

AMC (mud engineers + drilling fluids):

Solids control (shakers + tanks) were rented at AMC through BPC. Mud engineers showed no interest in the performance of this in combination with the drilling fluid.

Drill-in fluid was planned to be re-used at 4P, yet was planned without KCl, which differs from the program for 4P, where KCl is planned to be included in the fluid.

Weatherford fishing:

Good support overall. Pro-active attitude. Bad luck with the parted connection on the spear.

Weatherford directional drilling:

Poor preparation with regards to depth reference on HWU with GR unit; only found out on site that a HWU does not have a hookposition as a rig. Solved issue OK with geologist.

MWD sleeve damaged on the whipstock run. Also difficulty to install on drilling run. Potential issue with the NM collar.

Heijningen/Staalduinen/Boekestijn (local support services):

Good support.

BPC wireline:

Good support. Well aware of capacities & limitations of the BPC HWU.

BPC HWU:

HWU not perfectly suited for drilling operations, but job well performed. Planned tripping speeds (also from BPC) were exceeding actual performance. (180m/hr vs. 140m/hr), could be used to improve planning and prevent reported delays while operations are running smooth.

Initial rig up not according to drawings cost some additional time. Limited effect due to fixed price rig up rate. ATEX zones + escape routes to be added to drawings while planning rig-up.

Odfjell:

No inspection performed on 2-7/8" pipe prior to sending out – 2 jnts did not pass drift. Not charged, but an inspection cost was included in the original offer. If inspection was required post-job a pre-job inspection is also required.

General

Overall the sidetrack operations was a compact job, with only a few separate operational steps, planned for total 19days and executed in 25 days, with a large portion of this time spent on tripping pipe. This made the team, logistics and further organization also more compact in comparison to other drilling projects. This is reflected in the planning and organization structure of the project.

Planning & preparation

Program was lean, some (minor) steps were found missing, but these were easily filled with communication with team members. DSV's could have been involved in process bit earlier to clarify such issues pre-job.

Organization

Site:

Only DSV on location; no NDSV or other type of operator representative for support. DSV's relative busy with door management – whose on site and handling deliveries
Hotel located close to location (positive), yet did not have hot meals during weekends.

Support:

Could be reached when required. No further comments

Client:

Due to close vicinity and personal involvement of client (due to direct ownership of project, both technically and financially) a high level of informal communication on site, including remarks concerning costs. Not always constructive to the project, yet understandable.

Reporting:

Due to light rig delegation (only DSV) reformatted drilling report (in comparison to previous projects). Saved time. Clear report. Further reports directly from service companies also clear. Weekly cost reporting & daily cost tracking was performed from office, with updates from the field with material movements. Due to short/compact operations this worked fine.

Operations

Rig up

All equipment was required to be NORM measured when it arrived on-site and when it left site. Due to the large amount of equipment arriving during rig up (DP for example) this took significant time. This was delegated to the DSV, which made him unavailable for other task at that moment.

Fishing

Good result with combined drift/fishing run (planned to be combined due to slow HWU tripping speeds). Failing spear connection; no big impact on operations, but would have been nice to retrieve either liner or conclude that is would be too stuck to POOH.

Bridgeplug setting

According to plan. Quick rig up/rig down

Whipstock setting & window milling

Difficulty loading MWD sleeve, broke one. Investigation not conclusive to cause, first time for Weatherford.

Option to use hydraulic set whipstock (w/ packer) instead of mechanical? Might save cost on the overall project.

Drilling

Bit was FOC, yet performed significantly less than foreseen. Low on-bottom ROP (5-15m/hr GT-01 vs. 1-2m/hr S2). Design similar to previous used bits (offset). Possibly pump-off and thus lower actual WOB, however GT-01 also circulated 1000lpm (similar flowrates).

Cavings potentially self induced? High flowrates, high bend. Not only bit was washed out, but also bearing section/shaft of the PDM.

Drilled sufficient rathole to accommodate hole fill.

Liner running

Making up liner took long time, especially to change over to 2-7/8" inner string and to the 3-1/2" DP. Large crane (200t) required to assist in M/U string. On-site survey by crane company performed to assist in crane selection. Successful job. Hole in good condition – liner to TD.

Sediments settled above TOL & required perforation to loosen the tool.

Rig down

No DSV on site after sending all service equipment to suppliers. All NORM measurements performed by expert from operator (one of the owners)

Liner setting tool arrived at wrong company (Weatherford instead of GOT), although discussed with transport company & separate delivery tickets.

Suggested improvements

- Involve DSV's early with the program for review & questions to solve uncertainties prior to arrival in the field.
- Support in hotshot decisions from suppliers: provide clearer cost estimates for expected work. (for example during perforation shots on liner hanger)
- Use best data for planning – actual tripping (incl. breaks & regular maintenance) was significantly below the forecasted speeds (also from contractor)
- DSV's should be cared for, especially when managing 24hr operations with one person (good food & bed). Alternative to hotel could be self-sufficient unit with bed/kitchen/lounge.
- Check pre-job inspection data if a post-job inspection is required (at operator cost) by supplier
- ATEX zones and escape routes to be specified in contractor rigsite drawings.
- Evaluate benefit of hydraulic whipstock (w/ packer) vs. separate packer with mechanical set system.
- Use KCl for drill in fluids, especially when drilling clay sections
- Increase liner hanger setting pressures to allow circulation with higher flowrates to prevent sediments from settling above the TOL.