

## **General Case Histories**

**Date:** March 2010

**Job Objective:**

W/line was unable to Latch a Prong set at 11744ft after an upper completion workover. Bailing had retrieved approx 30lbs of milling debris, shear pins, sand and settled out drilling fluids.

**Job Outcome:**

Welltonic ran a 2 1/8" BHA consisting of a Bi-Di Accelerator, Bi-Di Jar and an External Catch Flow Release Pulling Tool to wash the debris from around the fishneck and pull the Prong. After the prong was retrieved a Flow Release GS Pulling Tool was run to retrieve the PRR Plug after washing away any debris in and around the fishneck.

This job was successfully completed in 2 runs

**Date:** February 2010

**Job Objective:**

To break a Ceramic Disc on a new well at approx 15630ft with 15ft of settled out drilling mud on top of Disc.

**Job Outcome:**

Welltonic ran a 2 1/8" Welldrill Motor with a 3.25" Taper Tungsten Mill. When reaching depth the motor was activated by pumping Diesel at 1bpm, the CT was run in slowly washing out the Mud until setting down 2k and milled the disc out. The fluid pump was stopped and the area drifted.

**Date:** October 2009

**Job Objective:**

To break a Ceramic Disc on a new well at approx 14781ft with + - 70ft of fill on top of Disc.

**Job Outcome:**

Welltonic ran a 2 7/8" Welldrill Motor with a 3.25" Taper Tungsten Mill. When reaching a depth of 50ft above the fill the motor was activated by pumping Diesel at 1.6bpm to wash out the fill taking 10ft bites before reaching depth to mill/break the Disc. After the Disc was broken the fluid pump was stopped and the area was drifted to ensure the Disc had gone.

**Date:** July 2009

**Job Objective:**

The job was to retrieve a bridge plug in a debris barrier and to get to TD and set an inflatable, then plug and abandonment. The well had been killed and shut in since 2006, and was thought to have been extensively scaled up with NORM contaminated Barium scale. This was seen on a Wireline calliper log before the temporary abandonment in 2006.

We were approached by our client in 2007 to attend a meeting to discuss the feasibility of the proposed upcoming operations in the North Sea. This operation was on a Semi submersible, and was given a 30% chance of success by the client and partners, but if successful, it would save the client around \$100 million on drilling a new intersecting well.

Before the operation was attempted offshore, we were required to perform an extensive yard trial to prove the job was possible. For the yard trial we had to manufacture purpose built tools, and we were required to alter tool designs and make modifications overnight to fine tune them and eventually arrive at the optimum designs to complete the trial. The trial proved that the job was in fact feasible and provided an insight into some of the obstacles we may encounter offshore.

**The job scope was as below:**

- Wireline to recover two shallow set isolation plugs in the well.
- Mill Barium scale down to the SSSV (***SSSV c/w damaged control line & only scale holding the flapper open***).
- Mill through the SSSV and down to a predetermined depth, using a specially designed extended PDC dressed shoe which could not be trapped by the flapper closing after the scale was removed.
- Run a swellable hold open sleeve through the SSSV to allow safe passage of future toolstrings.
- Mill and under ream scale from below the hold open sleeve and down to the packer at the top of the debris barrier.
- Mill scale inside the perforated debris barrier joint down to the top of the bridge plug.
- Recover the bridge plug (contingency was to mill out the plug with specially designed thin wall burn shoes, which were proven to perform well on the yard trial).
- Run a jetting assembly and clean out degraded mud to the reservoir depth 11,500ft. (Contingency was to mill out scale to reach reservoir depth).
- Run and set an inflatable plug @ +/- 11,400 ft.
- Run coil tubing and set a 700 ft cement plug above the inflatable.
- Tag cement and displace the well to sea water and inflow test the cement plug.
- Rig down coil tubing.

**Job Outcome:**

The initial stages of the operation were carried out without too much problems being encountered. Due to the shallow depths being worked at, the coil tubing runs were turned around very quickly, and rapid progress was seen on a daily basis. A potential problem to recovering the plug was seen to be a restriction in the packer at the top of the debris barrier. The bridge plug had been set 12 years previously, in a well which had scaled up over the 12 years with Barium scale. Several clean up runs, VJJB and jetting runs were performed in order to remove as much scale as possible before attempting to recover the plug. The plug was latched and pulled, but the fishing neck of the plug detached and was pulled out of the well separately. During the subsequent coil tubing fishing runs, the entire plug was recovered in several parts & without the need to mill it out (***crucially no part of***

***the plug had fallen out of and below the debris barrier, which would have impacted on the success of gaining access to the well for the future coil tubing runs).*** During this stage of the job, our Engineering Manager & Operations Engineer were in daily contact with our client, discussing new tool designs and or modifications to existing tools to enable the complete recovery of the bridge plug. As a direct result of Welltonic's commitment to design and manufacture the tools required, of which most were manufactured overnight and at the weekend, many of which were on a chopper the very next day. Therefore minimising any rig waiting time (NPT) for our client. The remainder of the job went as per programme. TD was achieved and the well was abandoned with cement plugs and tested before rigging down the coil tubing equipment.

***Note – This was arguably the most challenging coil tubing job that our client & Welltonic have ever undertaken. But it has also proved that with the proper preparation and planning, and the ability for Welltonic to react to the situation and conditions offshore which developed and changed almost daily, during the debris barrier plug recovery stage. It was possible to achieve the desired result in the end.***

**Date:** June 2009

**Job Objective:**

We were approached by clients in February 2009 to attend a meeting to discuss upcoming operations in the North Sea. This operation was on a Satellite Platform, where man days were restricted for the year for all operations so trying to condense CT intervention runs to a minimum to achieve job outcome was a priority. The job scope was as below

- **Run 1-**Jetting Cleanout to 10,000ft then drop ball to open circulating sub and POOH to surface
- **Run 2-**Standard Nipple Locator Run to correlate on WEG and Petroline QN nipple
- **Run 3-** Drift Run to TD jetting across liner and drop ball to open circulating sub and POOH to surface
- **Run 4-**Milling Run to cleanout (If required)
- **Run 5,6,7-**Perforating Runs

**Note-** It was deemed dangerous to try and incorporate runs 2 and 3 in one run due to liner damage and previous problems with this type of nipple locator

With this job scope we were confident that we could reduce the amount of runs required by a minimum of 1 and hopefully 2.

After discussions we decided to design a toolstring to suit this application. We designed and manufactured a Flow Activated Nipple Locator. This tool has a 3.6" Nozzle with the nipple locating dogs at 3.5" OD when in collapsed mode, this allowed us to jet conventionally up to a pump rate of 1bpm, over 1bpm the nipple locating dogs move downwards over a collet thus allowing us to locate the WEG and nipple. Incorporated in the design was a emergency shear out mechanism in the unlikely event of not being able to retract locating dogs.

With all tools manufactured and tested and witnessed by clients the operation shall consist of the following run.

- **Run 1-** Jetting Nozzle Cleanout to 10,000ft, Function Circulating tool and POOH to 1000ft back jetting, RIH to locate nipple and WEG at 16,000ft and flag CT, RIH and dry tag HUD, and jet if required, function Circulating tool and POOH to surface.

With this one toolstring we can accomplish Runs 1, 2 and 3 from the previous job scope and save the operators 2-3 days rig time.

**Job Outcome:**

Run 1 toolstring was deployed in well and functioned exactly as per Welltonic design. A depth of 10,000ft depth was achieved in jetting mode and debris circulated out to surface. We then located the Wireline Entry Guide Pumping at 1.3 bpm, a 3000lb overpull was taken and CT flagged at surface.

This allowed us to correlate from known pipe tally depths and change CT counters to suit. The well was then cleaned out to TD in jetting mode and debris circulated to surface. This correlation from known depths meant that no milling was required to allow further access

This one run saved the operator 3 days rig time and allowed access for re-perforating. The well has subsequently been re-perforated and production has seen a threefold increase.

**Date:** August 2008**Job Objective:**

Open and close 7 sliding side doors to enable fracturing of 7 zones independently and open all 7 sleeves upon completion to allow a well test.

**Job Outcome:**

Welltonic ran a bi-directional shifting tool in conjunction with X-stroke bi-directional impact hammer to enable the opening and closing of 7 SSD's. Commencing from SSD 1 at the bottom most zone, the SSD was opened, the zone was fractured with Hydrochloric Acid at high rates (20 – 30 BPM) down the backside of the CT string and then the SSD was closed. This was successfully repeated for each independent zone. Upon completion of the fracturing of the uppermost zone 7, all SSD's were opened in preparation for a well test. The job was completed safely without incident and saved the client significant rig time (semi submersible) due to not pulling out of hole between fractures.

**Date:** April 2007**Job Objective:**

Open a sliding sleeve for circulating and then close sleeve upon completion.

**Job Outcome:**

Wireline had failed to open the sliding sleeve, Welltonic were called at midnight and had the tools mobilized to the dock by the following morning (4 hour drive). The personnel flew out by helicopter and waited on the tools arriving. The first part of the job (opening the sleeve) was completed within 6 hours of the tools arriving on the rig and the whole job was completed in good time with no incidents.

**Date:** October 2006**Job Objective:**

A campaign of 5 wells where the Ceramic Flapper on a KOIV (Knock Out Isolation Valve) had to be broken and a sliding sleeve opened and then closed on 2 of the wells.

**Job Outcome:**

On all of the wells a 2-1/8" OD motor was ran in conjunction with a 2.625" OD PDC mill. The disk was tagged with 2K weight. The coil tubing was pulled back 10' and the pump was kicked in a 0.75 barrels per minute allowing time for the rate and pressure to stabilize. The mill was then slowly run in hole until the disk was tagged. The mill broke through the disk in approximately 5 seconds. A shifting tool was run in conjunction with an Impact Hammer to firstly open and then close the sliding sleeves.

**Date:** October 2006

**Job Objective:**

To break the Ceramic Flapper on a KOIV (Knock Out Isolation Valve) to allow full access to the wellbore.

**Job Outcome:**

Wire-line was unable to burst the disk due to the well deviation. A 2-1/8" OD motor was ran in conjunction with a 2.625" OD Hurricane mill. The disk was tagged with 2K weight. The coil tubing was pulled back 10' and the pump was kicked in a 0.75 barrels per minute allowing time for the rate and pressure to stabilize. The mill was then slowly run in hole until the disk was tagged. The mill broke through the disk in approximately 5 seconds. A pressure increase was noted on the well-head at this time. The BHA was then drifted past twice to ensure the disk was fully gone. The BHA was then pulled back to surface. The well was then cleaned up and handed to production.

**Date:** October 2005

**Job Objective:**

To break the Ceramic Flapper on a KOIV (Knock Out Isolation Valve) to allow full access to the wellbore.

**Job Outcome:**

A BHA consisting of a Hammer and Accelerator was run in to above the KOIV. The hammer was activated by pumping fluid from surface and applying weight down to the valve. The flapper was broken allowing the full access to wellbore.

**Date:** September 2005

**Job Objective:**

Cleanout obstruction with 2-1/2" SpinCat @ 2,345ft to top of phoenix blanking plug @ 5,748ft, and then to retrieve blanking plug and set isolation sleeve.

**Job Outcome:**

The SpinCat was RIH and the well was successfully cleaned out to 5,748ft. The BHA was then changed out for a 3.00" OD Modified Slickline JDC assembly with Jar/ Accelerator. This assembly was RIH, the blanking plug was latched and only 1 jar was required to release the plug, which was then retrieved to surface. The 3rd run was to install an isolation sleeve to blank off the lower ESP and this was deployed using a Flow Release 3-1/2" GS with Jar/ Accelerator, the sleeve was successfully ran and set as per procedure.

**Date:** May 2005

**Job Objective:**

Welltonic were asked to provide a cost effective solution to a customer who wanted to selectively acidize several zones within their Gas Wells to allow conversion to Gas Storage Wells.

**Job Outcome:**

Welltonic made a tool consisting of Bull Nose, Swab Cup, Injection Sub and Inverted Swab Cup.

The tool was run and successfully selectively acidized numerous zones on 4 wells. The tool was completely successful and far more cost effective than other proposed Straddle Assemblies.

**Date:** May 2005

**Job Objective:**

Welltonic were asked to provide a cost effective solution to a customer who wanted to selectively acidize several zones within their Gas Wells to allow conversion to Gas Storage Wells.

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Welltonic made a tool consisting of Bull Nose, Swab Cup, Injection Sub and Inverted Swab Cup.

The tool was run and successfully selectively acidized numerous zones on 4 wells. The tool was completely successful and far more cost effective than other proposed Straddle Assemblies.

**Date:** January 2002

**Job Objective:**

Clean out scale build up of in well using a Roto-Wash tool.

**Job Outcome:**

The Roto-Wash BHA was run in the well and cleaned out all the scale from 1,100mtrs to a depth of 6,100mtrs. The BHA was POOH and checked. It was then changed out to a jetting BHA to pump a gel pill to clean all debris from the well before the next operation could be achieved. The cleanout operation was completed as per the customer's requirements.