

## **SUMMARY**

Shenandoah-1A was drilled from 155m to 2714m in late August to early October 2009 as a re-entry and deepening of the Shenandoah-1 well, drilled to 1555m in 2007. Shenandoah-1 and 1A are located in the Beetaloo Basin, approximately 500km southeast of Darwin and 45km SE of Daly Waters, Northern Territory (NT), Australia. Shenandoah-1 was predominantly air-drilled by Sweetpea Petroleum in September 2007 but was suspended with a view to later deepening after drilling to 1555m and setting casing. Shenandoah-1 recorded oil fluorescence shows in the Hayfield Sandstone and upper Kyalla Formation and may have intersected unconventional basin centered gas at 1500m. Gas shows were recorded in the Kyalla Formation and middle Kyalla Sandstone unit.

The Beetaloo Basin is a broad intracratonic feature that contains Late to possibly Middle Proterozoic (there is evidence of Mesoproterozoic and Paleoproterozoic, but not Neoproterozoic) pre-Cambrian sediments. The Proterozoic section is overlain by Cambrian volcanics and sedimentary rocks and in turn by Cretaceous sediments. Early compression and strike-slip movements have created a large axial arch with basin-margin highs.

The main objectives were to evaluate the gas bearing potential of the Mesoproterozoic Kyalla Formation, Moroak Sandstone, Velkerri Formation and Bessie Creek Sandstone of the Maiwok Subgroup within a basin-centered location. Cores were cut in the Kyalla and Velkerri Formation sections to provide rock property and gas-desorption data for future gas exploitation options.

The re-entry and deepening of Shenandoah-1 commenced on the 23rd August 2009. A 216mm (8.5") hole was mud-drilled from 1555m to 2714.3m driller (2714.5m logger) terminating in the Bessie Creek Sandstone on October 11<sup>th</sup> 2009.

LWD tools (Gamma Ray and Resistivity) were run from 1918.6m to identify the presence of high total organic content (TOC) shales and siltstones suitable for full-hole coring.

Two cores were cut in Shenandoah-1A. Core-1 was cut in the Lower Kyalla Formation from 1585-1595.5m (10.5m) and Core-2 was cut in the Velkerri Formation from 2511-2517.38m (6.38m). On-site gas desorption analyses was performed on these cores prior to extended remote laboratory evaluation.

One drill-stem test (DST-1) was attempted across the Lower Kyalla Formation/upper Moroak Sandstone in the interval 1580-1745m to test high-recorded gas values. This test was a misrun as the packer seat failed five minutes after the tool was opened. There was no recovery.

There were no oil fluorescence shows recorded in Shenandoah-1A but several significant wet-gas shows (methane to pentane, C1 – C5) were detected in the Lower Kyalla Formation and through the Moroak Sandstone. The latter gas shows were seen in fine to coarse-grained sandstone with poor visual porosity from 2043-2063m, 2168-2200m and 2410-2500m. However, the MREX and laterolog data suggest some high permeability in the Moroak Sandstone. Good gas shows were maintained through the Velkerri Formation to total depth.

Baker-Atlas ran four wireline log suites at the total depth. The first run comprised the 'Minislam' logging suite consisting of the resistivity, sonic, spontaneous potential and gamma ray tools. This was followed by Run-2 comprising the neutron, density and photo-electric tools. Run-3 was a MREX magnetic resonance survey run to 2571m. Run-4 was a STAR borehole imager run covering four zones of interest.

Following wireline logging, the well was suspended with six plugs being set to isolate permeable zones. The well may be re-entered and deepened to the Bessie Creek Sandstone in 2010.

ADS Rig-6 was released at 12:00 hrs, on the 19<sup>th</sup> October, 2009.

Evaluation of the Shenandoah-1 and Shenandoah-1A data concluded that the basal Shenandoah-1 section below 1500m and the entire Shenandoah-1A section to total depth at 2714m were gas bearing through the Lower Kyalla, sections of the Moroak Sandstone and the Middle Velkerri Formation.

Gas shale resources (unconventional) have been identified in the Lower Kyalla Formation and the Mid Velkerri Formation. Tight gas resource plays have been identified in the Mid Velkerri as well as in the lower part of the Moroak Sandstone. The Moroak Sandstone may contain a conventional gas accumulation as well as tight gas sandstone (unconventional).

This well confirmed the Basin Centered Gas Accumulation (BCGA) play as a regionally extensive system extending 100km to the northern Velkerri Formation penetrated wells.

The Lower Kyalla and Middle Velkerri Formations had good preliminary desorption values and fractures and the Upper Kyalla Formation at around 1000m (cased in Shenandoah-1) seemed to be highly prospective for oil following new petrophysical work and resource evaluation.

The Moroak Sandstone had free conventional gas interpreted and good calculated permeabilities of up to 100 mD from the MREX log in Shenandoah-1A. Up to 88m of gas pay with a well-defined gas/water contact has been interpreted.

L.Burgess, March 2010.

## 1.0 GENERAL INFORMATION

<b>Well Name</b>	: Shenandoah-1A (Shenandoah-1 deepening)
<b>Well Classification</b>	: Gas Exploration
<b>Title Holders and Joint Venture</b>	: Falcon Oil & Gas (Australia) Pty Ltd, 75% Operator, Sweetpea Corporation 25%
<b>Rig</b>	: Australia Drilling Services Rig-6
<b>Permit / State</b>	: EP98, N.T
<b>Latitude</b>	: 16° 37' 22.16" S
<b>Longitude</b>	: 133° 34' 38.22" E (GDA 94)
<b>Easting</b>	: 348248m
<b>Northing</b>	: 8161624m (MGA 94, Zone 53k South)
<b>Seismic Station</b>	: 200m SW of SP 1725, Line MC92-100 (Balmain-1).
<b>Ground / RT Elevations</b>	: GL 226.8m AHD / RT 231m
<b>Proposed TD</b>	: 3250m RT, -3017.5 SSTVD
<b>Actual TD Driller</b>	: 2714.3mMDRT, -2482.4mSSTVD
<b>Actual TD Logger</b>	: 2714.5mMDRT, -2482.6mSSTVD
<b>Primary Objectives</b>	: Kyalla Formation, Moroak Sandstone, Velkerri Formation, Bessie Creek Sandstone – GAS.
<b>Secondary Objectives</b>	: None
<b>Status</b>	: Plugged & Suspended for future re-entry
<b>Drilling Contractor</b>	: Australian Drilling Services
<b>Drilling Supervision</b>	: Mike Sumpter (Falcon Oil & Gas)
<b>Geological Supervision</b>	: Les Burgess & Paul Elliott (Westminster Geological P/L)
<b>Drilling Fluids</b>	: Australian Mud Services
<b>Mud Logging Services</b>	: Baker Hughes Inteq (BHI)
<b>Cementing Services</b>	: BJ Services
<b>LWD / Wireline Logging</b>	: Baker Atlas
<b>Drill-Stem Testing</b>	: Australian DST Australasia Pty Ltd
<b>Coring - Cutting / Preparation</b>	: Baker Atlas / Weatherford