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Essential Petroleum Resources Limited

DRILLING PROGRAM

PEP 152

KOROIT WEST NO 1

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1. Introduction

The Koroit No 1 prospect is located in PEP 152 in the onshore Victorian Otway Basin. The prospect is a simple northwest - southeast oriented tilted fault block with closure provided by a downthrow to the northeast fault. The prospect is located on an antithetic fault trending sub-parallel with the major basement Tyrendarra Fault. The structure formed in response to Late Cretaceous to early Tertiary east-west wrenching along the Tyrendarra Fault.

The primary objective is a 10 m thick sandstone which can be correlated with either the Flaxman Formation or an intra Belfast Mudstone sand. The upper Belfast Mudstone forms the seal. Secondary objectives are the Nullawarre Greensand sealed by the Skull Creek Mudstone, the Paaratte Formation sealed by the basal Pebble Point Formation and the Pebble Point Formation sealed by the Pember Mudstone.

The well is located approximately 7 kilometres northwest of the Koroit township on seismic line oc95-111, Shot Point 745.

The well will be a vertical well drilled to approximately 850 m into the Eumeralla Formation and is located to the northwest of the structural crest. Koroit West No 1 will target the Flaxman/Basal Belfast sand unit which is expected to have excellent permeability.

Stratigraphic control for the well is provided by Yangery 1 and Warrong 5, which were drilled by the Victorian Geological Survey as stratigraphic and groundwater exploration wells in 1959 and 1961 respectively.

2. Location

Spheroid: Australian 1965

Coordinates for the well are:

AMG Zone 54
Easting 613433.14 mE
Northing 5762322.04 mN

Latitude 38 deg. 16 min. 47.53 sec.
Longitude 142 deg. 17 min.48.55 sec.

Ground Elevation: 45 m AHD
Seismic Ref Target: Shot Point 745 on seismic line oc95-111

Koroit West No 1 is located on farmland approximately 7 km north-west of the town of Koroit. It is accessible from a gravel road. Closed gates will cover the entry point and signage to restrict entry to authorized personnel will be in place.

Surface basalt is not expected at the site and the bentonite in the mud system coupled with the heavy soil in the area should seal the sump and pits quickly.

The water storage pit will not need a liner to prevent leakage.

3. Primary Objective Summary

The target at Koroit West No1 is the Flaxman/Basal Belfast Sandstone.

The expected reservoir pressure is 1200psi and the reservoir temperature is expected to be approximately 75°C (180° F). The assumed temperature gradient is 1.55°C per 100ft.

The permeability of the primary objective is expected to be high, in the range of several darcies. Glauconitic sandstone associated with the primary reservoir may also be a potential reservoir.

Based on the results of Port Fairy No 1 gas saturated light oil is the expected hydrocarbon. Based on fields in the Port Campbell area carbon dioxide may be present in the gas phase.

Continuous mudlogging equipment on site will include a Total Gas Detector, a Carbon Dioxide detector, and an FID chromatograph.

The well will drill approximately 75 m into the Eumeralla formation to test for possible sand zones within the top Eumeralla Formation.

4. Predicted Stratigraphic Sequence

Table 1: Prognosed Formation Tops

Group	Formation	TWT (ms)	Depth SS (m)	Depth KB (m)	Thickness (m)
Heytesbury	Port Campbell Lst		-45	0	142
	Gellibrand Marl	84	97	144	290
	Clifton Fm	382	387	434	17
Nirranda	Narrawaturk Marl	398	404	451	22
	Mepunga Fm	419	426	473	30
Wangerip	Dilwyn Fm	446	456	503	41
	Pember Mudstone	483	497	544	83
	Pebble Point Fm	555	580	627	18
Sherbrook	Paaratte Fm	570	598	645	19
	Skull Creek Mudstone	586	617	664	48
	Nullawarre Greensand	626	665	712	12
	Belfast Mudstone (above expected reservoir)	636	677	724	32
	Intra Belfast Sandstone (reservoir)	662	709	756	10
	Belfast Mudstone (below expected reservoir)	672	719	766	27
	Waarre Formation	691	746	793	26
Otway Group	Eumeralla Fm	712	772	819	28
	TD		850	897	

Note: GL-AHD 45m KB-GL 2.00m

5. Bit / Hydraulics / BHA Program

Bit #1

8½" PDC FS2565 or equivalent. Nozzles 5 x 18 (TFA 1.243)
Flow rate 570 GPM. SPP 2200psi.
Liners 5"
Flow rate 403 gpm @ 65 spm.
Standpipe pressure 530 psi.

Annular Velocity 6¼" drill collars 300 fpm.
Annular Velocity 4¾" drill collars 200 fpm.
Annular velocity 2-7/8" drill pipe 140 fpm.

WOB 5 – 15 Klbs
RPM 90 – 160

BHA

Bit sub c/w float and Totco ring.
2 x 6¼" DC
Stabilizer.
4 x 6¼" DC
Xo
6 x 4¾" DC
Xo

Bit #2

6⅛" Bit 4.3.7
Nozzles 2 x 12, 1 x 10

BHA

Bit sub c/w float and Totco ring.
2 x 4¾" DC
Stabilizer
10 x 4¾" DC
Xo

Liners 5"
Flow rate 250 gpm @ 45 spm
Standpipe pressure 1100 psi

Annular Velocity 4¾" drill collars 337 fpm.
Annular velocity 2⅞" drill pipe 188 fpm.

Two used 8½" IADC 4.3.7 tri-cone bits will be provided as a back-up to the PDC.

6. Casing and Preventer Test Schedule

- The surface casing will be tested at plug bump to 500psi above final circulating pressure when displacing cement.
- The casing will be tested again to 1500 psi prior to drilling the shoe.
- The Blow-out Preventer rams will be tested 1500psi High / 250 psi Low pressure on installation.
- The Annular Preventer will be tested to 1000 psi or 80% of its rated WP.
- The preventer will be pressure tested after each casing run and at intervals of not less than 14 days during the course of the well.
- The preventer will be tested immediately after any repairs or ram changes.

7. Drilling Chronology

Lease builder will set 5m of 14" conductor. The location will be prepared to suit Sides Engineering Bourne 2000 THD.
The ground pits should not require polythene liners.

Move in rig and mudlogging shack. Set up lighting and shacks.
Test depth recording equipment and PVT.
Shallow basalt is not expected but if shallow basalt is encountered the basalt will be hammered using the rig compressor and a suitable hammer.

Move in the drilling rig.

Rig up. Fill the ground pits and water storage pit. Prepare spud mud.

Drill 8½" surface hole.

1. P/u 8½" BHA as outlined in program.
2. Survey as outlined in Operating Guidelines.
3. Drill with maximum flow rates and RPM.
4. Pump high-viscosity LCM sweeps as necessary to clear hole.
5. Wiper trip.
6. Circulate clean. Pump sweep.
7. POOH L/d 6¼" drill collars and 8½" equipment.
8. Move rig forward and rig up crane to run range 3 casing.
9. Rig up and run 7" casing. Run float shoe only. (No shoe track).
10. Head up to cement.
11. Circulate casing 1½ times casing capacity. Locate wellhead in correct position for heading up BOP. Hold down casing. Top of "A" section should 2.2m below ground level. (Check on site).
12. Cement casing with Class "A" cement neat at 15.8ppg using 100% excess. Cement requirements will be approximately 180sx. (6 cubic metres).
13. Displace with old drilling mud, approximately 32 bbls Pump until plug bumps.
14. Wait on cement 4hrs. Check samples. Perform top job if required.
15. Remove landing joint.
16. Nipple up Blow-out-Preventer.

17. Lay and secure flare line.

18. RIH w/ 6-1/8" drilling assembly.

19. Pressure test BOP and choke manifold.

Drill 6-1/8" hole.

1. RIH tag cement.

2. Drill out casing shoe and 3m of new hole.

3. Displace hole to new mud.

4. Conduct LOT.

5. Drill 6-1/8" hole to 830m+/-.

6. Drill into top of Flaxman Fm sand package. A 2m drilling break will be considered reason to stop drilling. Flow check well.

7. Circulate sample.

8. Geology will advise course of action. If a core is required, drop a survey, POOH, steel line measure drill-pipe.

9. If a core is not required drill on to TD and log well.

10. If a core is required a conventional barrel will be used to cut not more than 20m per run.

11. Drill sufficient distance into the Eumeralla formation to allow electric logs to be gathered across the entire Waarre sequence.

12. In the event the well is a discovery production casing will be run. It is anticipated this will be 4½" however productivity or availability may dictate a smaller diameter size.

13. A basic suite of logs and a velocity shoot will be performed regardless of shows. A more extensive logging program will be determined by quality of shows.

8. Mud Program

Surface hole will be drilled with bentonite spud mud. This system may require use of some lost circulation material to improve hole cleaning.

Funnel Viscosity	40 secs
Mud Weight	8.6 ppg.
Water Loss	NC to 7ccs in porous water sands.

Pump high viscosity and LCM pills to assist with hole cleaning.
Keep a quantity of medium LCM ready for immediate use.
Dump and dilute to control solids and mud weight.

6-1/8" Production hole will be drilled using a potassium chloride / polyacrylamide system.

The shoe track will be kept to a minimum drilled using old mud treated with Citric acid to prevent cement contamination of the PHPA system.
Basic parameters will be:

Mud weight	8.6 ppg to 9.4 ppg.	(9.1 ppg by top Waarre)
Funnel viscosity	35 – 40	secs
Yield point	4 – 6	lb/100ft^2
Plastic Viscosity	< 30	cP @ 120°F
Water Loss	<10	At casing shoe.
	< 7	Top of Waarre
Ph	9.0 – 9.5	
KCl content	4 – 6	% by volume
Excess PhPa	1	lb/bbl.
Low gravity solids	<6	% by volume

Maintain constant mud formulation from the initial displacement to ensure proper inhibition and optimum hole conditions throughout the well.
Minimize solids retention throughout the entire section as filter cake will build on the many permeable sands and will result in tight-hole conditions.

9. Formation Evaluation

9.1 Wellsite Geologist's Responsibilities

The Wellsite Geologist is responsible for geological supervision at the wellsite and for formation evaluation. He reports to the Drilling Supervisor at the wellsite and to the Operations Geologist in Melbourne. He will supervise the mud logging unit, mud loggers and wireline logging. He will prepare his own cuttings and core descriptions.

Additional samples may be collected at any time at his discretion. Significant drilling breaks will be penetrated by no more than 2m then flow checked for fluid influx. If a sample of the new lithology is required for hydrocarbon show evaluation, then pull up at least 6 metres above and circulate out the break. If a PDC bit is in use, the drilling parameters (WOB etc) should be kept relatively constant as the primary objectives are approached, and any significant change in drill rate (increase or decrease) investigated as above.

9.2 Ditch Cuttings

Table 2: Sample Requirements

Sets	Size	No	Type	In	For
A	500g	1	Unwashed & air dried	Cloth bag	EPR
B & C	250g	2	Washed & air dried	Minigrip bag	DNRE
D	100g	1	Washed & air dried	Minigrip bag	EPR
E		1	Washed	Samplex tray	EPR

Table 3: Sampling Intervals

Interval	From	To
10m	Surface	Surface casing shoe at ~ 250m
3m	Casing shoe	Total Depth

Additional samples will be taken to evaluate shows and at any time deemed necessary by the Wellsite Geologist.

9.3 Mud Logging

Suitable mud logging services from surface casing shoe to total depth will be provided. The unit will provide continuous 24 hour surveillance of drilling operations including:

- Total gas detection
- Chromatographic gas analysis
- Rate of penetration
- Weight on bit
- RPM
- Pump stroke rate
- Mud pit levels

A comprehensive 1:200 scale mud log will be maintained at all times from surface to total depth. An up to date log is to be submitted daily to the Wellsite Geologist in time for the daily report along with a *.PDF file for transmission to Melbourne. A complete ASCII file containing the metres drilled, rate of penetration, total gas breakdown is to be transmitted to the Melbourne office on reaching Total Depth.

All instrument charts are to be annotated with: depth (in metres), attenuation changes, dates, times and sample collection intervals. Charts are to be submitted to the Company Representative prior to release of the mud logging unit.

Gas detectors and chromatographs are to be calibrated with standard check gas blends each trip. Total gas detectors are to be calibrated so that 1% methane in air will produce a chart deflection of 50 units. Co_2 and H_2S draeger tubes will be on site for evaluation of formation gas samples from MDT, RFT or DST.

Calcium carbide lag checks will be run once per day or every 300m, whichever occurs first (or at the discretion of the Wellsite Geologist). Total gas units and lag times (actual and calculated) are to be recorded on the mud log in minutes. No carbides are to be run whilst evaluating prospective hydrocarbon zones.

Formation Integrity/Leak-off/Extended Leak-off Tests, pit losses/gains, tight-hole, bit data, mud information and survey data are to be recorded on the mud log. The mud loggers will be responsible for time lagging, collection and description of drill cutting from surface casing shoe to total depth. Routine microscopic and fluoroscopic examinations of ditch cuttings for hydrocarbon shows will be undertaken.

Upon encountering a significant drilling break the interval is to be penetrated by no more than 2m; drilling will be suspended and a flow check conducted. Bottoms up will be circulated if a sample of the new lithology is required for hydrocarbon show evaluation. Pull up at least 6m above the top of the drilling break to minimise formation damage. It is intended to use a tri cone bit to drill through the reservoir section but if a PDC bit is in use, the drilling parameters (WOB etc) should be kept relatively constant as the primary objectives are approached, and any significant change in drill rate (increase or decrease) investigated as above. If the Wellsite Geologist is not present, inform the Drilling Supervisor.

9.4 Coring

One 18m core is programmed for the first sand of the primary objective, whether Basal Belfast or Flaxman Formation, contingent on hydrocarbon shows. A sample will be circulated up after drilling no more than 2m of sandstone and a hydrocarbon show evaluation report prepared, which will be provided to the parties funding the well. They will decide whether to cut a core and advise the EPR Operations Geologist of their decision. Fibreglass or aluminium inner barrels will be used, with the core cut into 1m lengths and capped for transport. Sample chips for wellsite description will be taken from the end of each 1m core length prior to capping.

9.5 Testing

No Drill Stem Test is programmed for the well. Testing will be conducted after wireline logging, and contingent on hydrocarbon shows, wireline log interpretation and RFT/MDT results. No test tools will be on site. The decision to test will be made by the parties funding the well and advised to the Operations Geologist. Suitable casing or tubing will be run and testing will be done cased hole.

The following samples are required for each DST undertaken. All samples will be labelled with: Well Name, Date, DST Number, DST Interval, Formation, Sample Origin and Temperature.

9.5.1 Crude Oil Samples

If crude oil is recovered, two 5 litre can samples will be taken for analysis. Preliminary analysis of the API gravity and pour point of the oil will be made at the wellsite.

9.5.2 Gas Samples

A minimum of two samples will be collected under pressure in an evacuated steel cylinder (500-1000ml) for analysis. A sample of any gas to surface should be collected and analysed at the wellsite using the chromatograph in the mud logging unit. The sample will be tested for the presence of H_2S and CO_2 using draeger tubes supplied with the mud logging unit. Avoid saturating the detector by diluting with air.

9.5.3 Water Samples

The following samples are required for hydro geochemical evaluation:

(i) Drilling mud sample	-	1 litre plastic bottle
(ii) Make-up water	-	1 litre plastic bottle
(iii) DST samples	-	1 sample from the top
	-	1 sample from the middle
	-	1 sample from the bottom
(iv) Mud filtrate	-	20ml sample

Collect each sample in a 1 litre plastic bottle. If an organic extraction of possible petroleum components from the water is required, then two samples in 1litre glass bottles should be collected.

9.6 Measurement While Drilling

An MWD tool will not be used in Koroit West 1. A single shot survey tool will be used to obtain inclination data to monitor hole deviation while drilling.

An up to date listing of the survey data will be included in the daily drilling reports.

9.7 Wireline Logging

Openhole 200 mm (6-1/8"):

One logging run is proposed in open hole from casing shoe to total depth. Logs are to be displayed at 1:500 and 1:200 scales

NB: A single copy of the logs is to be produced on site. This will be quality controlled in the EPRL office and final prints are to be made from this edited copy.

Notes: Horizontal log scales:

GR	0 – 210 API
SP	-50 - +50MV
DLL<MSFL	0.2 – 2000 ohmm
BHC/AS	140 – 40 u/sec
RHOB	1.95 – 2.95 g/cc
NPHI	0.45 - -0.15pu

RUN 1:	DLL-MSFL-LDL-CNL-BHC-SP-CAL NGS GR	TD to surface casing shoe NGS run as a minimum survey from 600 – 800m over Pebble Point Fm and Sherbrook Group TD to surface
RUN 2:	FMS-GR	Contingent on shows Dipmeter survey only, real-time MSD processing, TD to case shoe
RUN 3:	MDT-GR	Contingent on shows and log evaluation

RUN 4:	Velocity Survey	TD to surface casing shoe, continued inside casing until signal deteriorates
RUN 5:	CST-GR	Contingent on shows, 30 shot gun

9.8 Sidewall Coring

One gun of 30 sidewall cores is programmed.

9.9 Velocity Survey

A velocity survey is programmed at the total depth of the well. An airgun placed in the mudpit will be the energy source for the survey.

Check shots will be taken at all formation tops within the well and the survey will be continued inside the casing until the signal deteriorates. The surface casing will be cemented back to surface but it is unlikely that good data will be obtained throughout the cased section. Two, or three shots if required, should be taken 1-2m below the formation tops and at 150m spacing within formations. Actual formation tops are to be picked from logs.

NOTE:

- The datum to be used in construction of the TD curve is Mean Sea Level.
- If it is at all possible, run the velocity survey during daylight hours. This may require rearrangement of the logging program.

10. Abandonment

In the event the well is non-commercial abandonment plugs will be set.

Plug depths will be picked from the wireline logs and placed across the top of all permeable formations.

All open-hole plugs will be calculated on calliper volume. All plugs will be balanced and if necessary will be set on a 30m viscous pill. A tubing stinger should be used.

The shoe plug will be tagged.

Treat mud to be left in casing with biocide.

A plug will be set at surface and a marker plaque will be fitted to the wellhead following removal of the bradenhead.

The cellar ring will be pulled and the cellar, rat-hole and mousehole will be backfilled.

11. Rehabilitation

The gravel pad will be lifted and stockpiled for the landholders use or removed and the topsoil spread back over the disturbed area.

The area shall be re-seeded to the landholders' satisfaction.

All gates and roads shall be removed, or left if so requested.

The sump shall be allowed to dry or the liquids transported to a facility for disposal. The cuttings and earth shall be used to fill the sump and topsoil shall be spread and re-seeded as on the location.

Notes: