

# L. Smackover Brown Dense Union Parish, Louisiana 20,000 acres



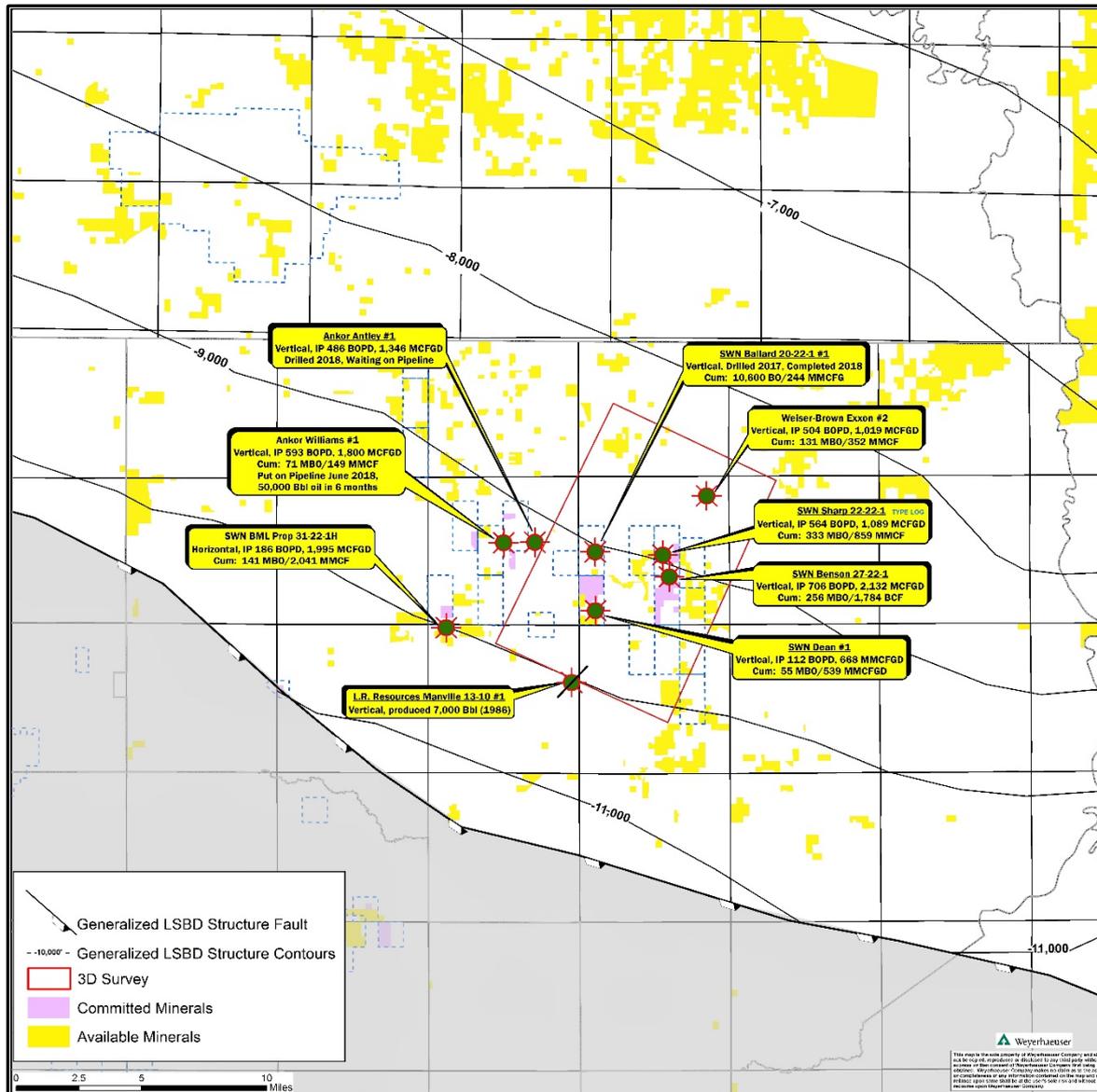
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Technical Presentation Available Upon Request

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# Executive Summary: Union Parish, Louisiana

## Weyerhaeuser Assets:

- 30,000 acres in Union Parish
- 20,000 acres available for lease in core

**Opportunity:** Productive 25,000 acres in Brown Dense Lime fairway de-risked with vertical and horizontal completions in the volatile oil and gas condensate windows with another 75,000 in trend across North Louisiana and South Arkansas. Southwestern Energy recently shot a 3D seismic shot over the core area to prove up the play concept.

**Play Concepts:** The Lower Smackover Brown Dense is a hybrid unconventional play supporting both vertical and horizontal well development produced through multi-stage fracture stimulation.

**Drill Depth(s):** 8,000' – 11,000' MD

**Producing Reservoirs:** Lower Smackover and Brown Dense Lime

**Geologic Overview:** The Lower Smackover Brown Dense formation is an Upper Jurassic age unconventional oil reservoir found in South Arkansas and North Louisiana. The formation ranges in vertical depths from 8,000'-11,000' and appears to be laterally extensive over a large area ranging in thickness from 300'-550'. The prospective interval is composed of a thick, organic-rich, carbonate laminated mudstone and is the source rock for Norphlet and Smackover oils. The Brown Dense can be subset into three general facies (upper, middle, and lower) with most wells targeting the middle or lower facies. There is a general west to east on-strike thickening of the Brown Dense onto the Monroe uplift and there have been 80-90 wells that penetrate and help delineate the Brown Dense in North Louisiana and South Arkansas.

Effective porosity ranges from 1 - 4% with matrix permeability of 1  $\mu$ D - 1 mD. Clay volumes average 10-20% with the low water saturations observed in the productive intervals (20-30%). TOC ranges from .5-2%+. Computed hydrocarbon pore volume thickness is 5.5'-11' with in-place volumes of 12-40+ MMBO/section. The Brown Dense pressure gradients are .5-.6 psi/ft with 50-60 API oils.

## Geologic Overview, continued:

Thermal maturities increase down-dip and distinct oil, volatile oil and gas condensate windows have been observed and mapped across the play.

In the Ora field, Union Parish, Louisiana, Southwestern completed a number of horizontal tests in the gas condensate window including the BML Prop 31-22-1H and the Doles 30-22-1H in 2012 which realized peak gas rates of 2+ MMCFD and 300+ BCPD through 5,000'+ laterals using 20 stage sand frac with EURs of 500 MBOE. To the east in Tick Creek field, Southwestern established the viability of vertical completions in the volatile oil window of the Brown Dense with the Sharp 22-22-1 and Benson 27-22-1 completed in 2014. The Sharp well realized a peak rate of 705 BOPD and the Benson reported a peak rate of 601 BOPD with initial GORS of 2,000. EURs are 500-600 MBOE. Southwestern drilled and completed a vertical well offsetting the Ballard well in late 2017 and early production had a cumulative production of over 10,500 BBL's so far.

ANKOR E&P in 2015 completed a successful vertical test, the #1 Williams, in Ora field reporting an IP of 593 BOPD and 1.8 MMCFD (893 BOEPD) in Union Parish; the well was placed on pipeline in July 2018 and has produced 86 MBO and 186 MMCF. In the 2Q of 2018 ANKOR E&P drilled the Antley #1 well, offsetting the Williams, and IP'd at 486 BOPD & 1,346 MCFD.

Velandera Energy Partners, LLC recently acquired Southwestern Energy Co.'s position in the play and has announced plans to spend \$100MM on additional exploration efforts.