

# Cuba - Santa Cruz: Incremental Oil opportunity



## OVERVIEW OF SANTA CRUZ OIL FIELD CUBA (Melbana 100%)

*Santa Cruz is located in the heart of the premier oil trend in Cuba*

The Santa Cruz oil field is located approximately 45km from Havana between Boca de Jaruco and Canasí oil fields and approximately 150 km west of Melbana's existing Block 9. Santa Cruz is in the northern foldbelt of Cuba – the trend that is responsible for the vast majority of Cuba's oil and gas production.

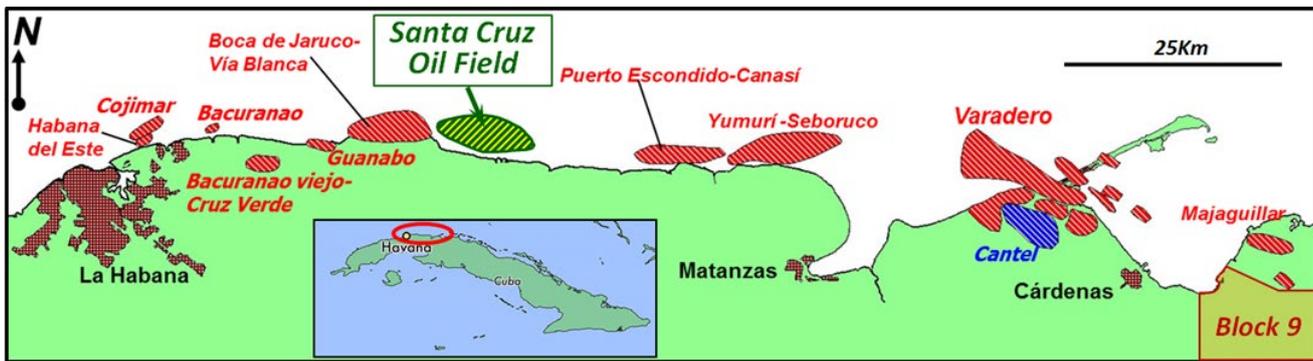


Figure 1: Santa Cruz location map showing adjacent fields.

*Early drilling established a large oil field with a 250m oil column*

*Oil quality typical of current Cuban production*

- Located immediately offshore northern Cuba
- Recent significant lighter oil discovery at Bacuranao, in nearby area along trend
- 3D seismic survey acquired in 2003 defined Santa Cruz as a 20km<sup>2</sup> structure
- Santa Cruz discovery well drilled in 2004 with land based rig as a deviated well out to the offshore structure. Took <3 months to drill. Tested at 1,250 barrels per day
- Oil quality varies from 10°API to 22°API, typical of most Cuban oil production
- Early estimates of up to 100 million barrels of recoverable oil
- Appraisal drilling confirmed a field area of >20km<sup>2</sup>
- Appraisal drilling indicated a significant oil column of 250 metres
- Commerciality declaration approved in 2006
- Produced >1 million barrels in first year
- Field production in 2012 was approximately 1,600 barrels/day
- By 2013 Santa Cruz had produced 7.4 million barrels from 18 wells

*Melbana has finalized an IOR contract over the Santa Cruz field*



Figure 2. Map view of Santa Cruz oil field facilities

In October 2018, Cuba national oil company (Cubapetroleo or Cupet) reported to Cuban media a significant discovery of lighter than typical crude oil in an exploration well drilled on the Bacuranao prospect in the northern part of the western region of the island. The discovery was made late in 2017 and has been undergoing long term testing for 10 months.

**22° API Oil**

Cupet representative Mr Osvaldo Lopez reported that the oil produced from the field has a density of 22° API, which is the highest quality oil discovered in the area and is encouraging for oil exploration activities in the area. The Bacuranao discovery is in the northern fold belt trend that continues into Melbana’s Block 9 and is in close proximity to the Santa Cruz oil field.

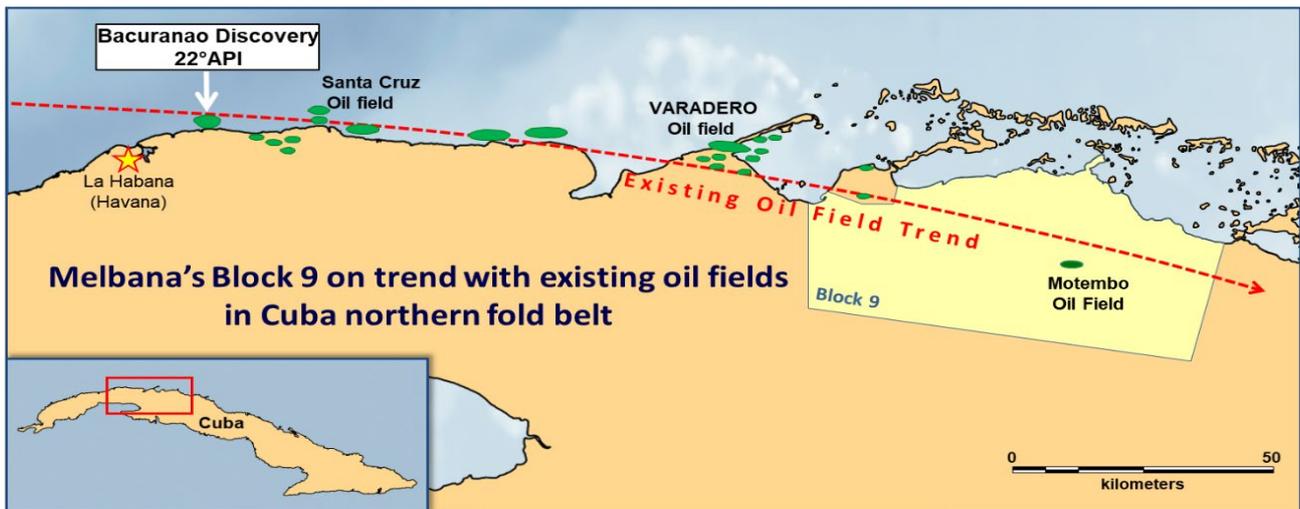


Figure 3: Santa Cruz and Block 9 on oil field trend

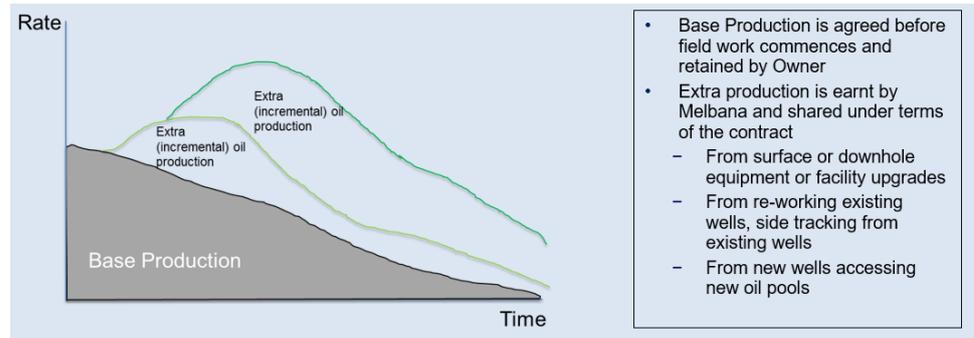


Figure 4: Ground level view of Santa Cruz oil field operation

**PROCESS GOING FORWARD**

Melbana completed its initial assessment, yielding a number of promising opportunities to enhance production from the designated area and has finalised a binding contract with CubaPetroleo, which is subject to standard Cuban regulatory approvals. This provides Melbana with a long term right to share in any enhanced production from the Santa Cruz oil field.

Under an IOR contract, additional production above an agreed base production rate is shared as depicted figuratively below in Figure 5. In general, the commercial terms are consistent with exploration PSC terms, such as those that apply to Melbana’s Block 9 PSC, with provisions for cost recovery and sharing of profit oil.



*Figure 5: Graphical portrayal of Santa Cruz Incremental Oil Recovery*

**Multiple Phase IOR**

The Santa Cruz IOR PSC is split into multiple phases, with an initial study period of desk-based technical work followed by an implementation phase. The initial study period phase will last a maximum of 8 months at which point Melbana may elect to proceed to the next implementation phase, which includes a minimum program of two side-track wells from existing well bores to new geological targets. To accelerate opportunities to enhance oil production as soon as possible, Melbana has engaged a Canadian consultant with extensive Cuban IOR experience to identify possible debottlenecking opportunities.

As part of its evaluation during the initial study period, Melbana will undertake systematic investigative studies as part of the development of Melbana’s new integrated seismic interpretation methodology. This methodology aims to develop a new predictive structural/stratigraphic geoscientific approach resulting in a subsurface model that can be applied broadly across a wide range of complex settings, including Santa Cruz. New knowledge acquired through the Santa Cruz investigative studies will enable Melbana to build a more comprehensive integrated seismic interpretation methodology.

**TECHNICAL SUPPLEMENT**

Melbana has developed a multi layered duplex structural model for Block 9 which described undiscovered potential within the deeper sheet below a seal at the mid level detachment. This Block 9 structural model has now been applied at Santa Cruz field where there is a good quality PSDM 3D seismic dataset with 18 deviated development wells for control. All the main elements that characterize the Block 9 structural model are observed to also be present at Santa Cruz: – upper and lower duplex sheets with internal thrusting – A mid level detachment separates the sheets and can be seen clearly.

All the development wells currently drilled there from the 3 pads intersect the same stratigraphic level, so have confirmed production from only one target horizon. This is extremely encouraging for the ultimate resource potential in the Santa Cruz field and vicinity with additional potential now described from the 3D at several levels, both above and below the currently producing zone at Santa Cruz field. New or side-track wells need to be drilled to confirm this potential.

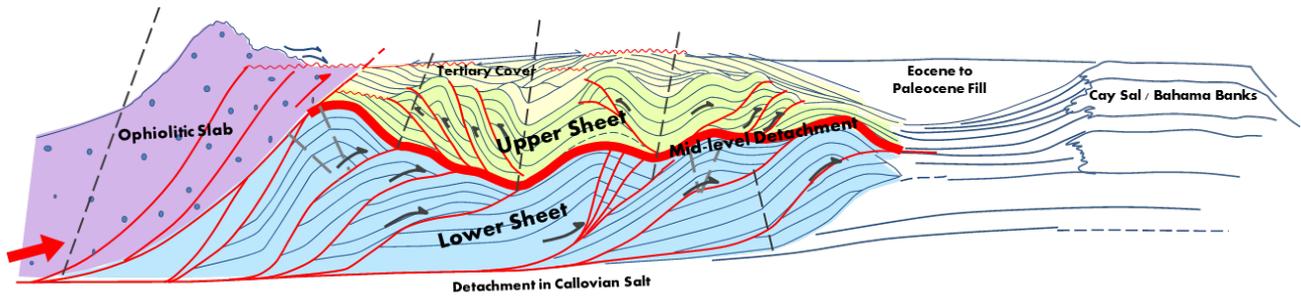


Figure 6: General Structural Model for Block 9 Exploration

Mapping the mid level detachment describes leads in the the lower sheet play

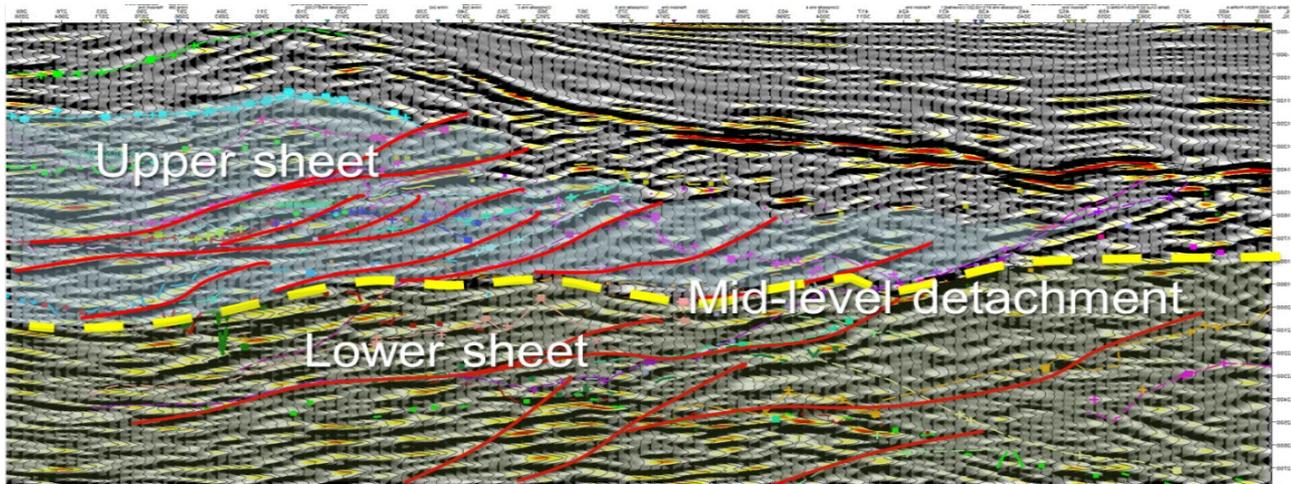


Figure 7: Block 9 structural model now used in the 3D PSDM at Santa Cruz field

**Further Information**

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