

# Summary: Thesis 2016

La Creciente Block, Lower Magdalena Valley Basin, Colombia

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## Context

The document is a thesis titled "Oil and Gas Search (OFT): Geological Reinterpretation Using Technology", authored by Juan Sebastian Barrera Mountain and Ramiro Alonso Jaimes Villamizar. It was submitted in 2016 as a comprehensive degree project to the University of America Foundation, Bogotá, Colombia, under the Petroleum Engineering Program.

The thesis focuses on applying innovative oil and gas exploration technology (OFT) to the La Creciente Block in the Lower Magdalena Valley Basin in Colombia. The authors analyse how advanced exploration technologies can improve the identification of hydrocarbon reservoirs, compare these technologies with conventional methods, and evaluate their economic implications.



## Objective

The main goal was to conduct a geological reinterpretation of the La Creciente Block using OFT, focusing on improving the identification of reservoir boundaries and optimising the location of future development wells.

## Key Activities

### 1. Study Area Definition

- The La Creciente Block spans approximately 89 km<sup>2</sup>. Two zones (North and South) were selected based on initial data for subsequent analysis phases.

### 2. Technological Approach

- Phase 1: Satellite Spectrography (SS) was used to detect potential hydrocarbon reservoirs.
- Phase 2: Establishment of Short Impulse Electromagnetic Fields (SEMP) to confirm findings from SS.
- Phase 3: Vertical Electroresonance Sounding (VES) to delineate reservoir properties.

### 3. Comparison with Conventional Methods

- Conventional methods relied on seismic data and electrical logs, which focused on identifying geological structures without explicitly detecting fluids.
- OFT demonstrated higher efficiency by directly detecting hydrocarbons, thus offering faster results and lower costs.

### 4. Validation

- Structural maps generated through OFT were compared to conventional maps, highlighting discrepancies and failures in prior development projects.

### 5. Economic Evaluation

- A financial analysis of CAPEX and OPEX revealed that OFT reduced costs compared to traditional exploration techniques.



## Findings

### 1. Technological Superiority

- OFT identified hydrocarbon presence and boundaries more effectively, surpassing seismic and electrical logging in accuracy and operational simplicity.
- The ability to focus on fluid detection challenged conventional paradigms, significantly enhancing exploration efficiency.

### 2. Application Results

- The reinterpretation clarified reservoir limits in the La Creciente Block, aiding in the accurate placement of development wells.
- Potential zones for future drilling were identified in both the North and South work areas.

### 3. Economic Impact

- OFT technologies enabled substantial cost savings by minimising exploratory risks and avoiding unnecessary drilling.

## Conclusions

The project concluded that OFT is a viable, efficient alternative to conventional methods for hydrocarbon exploration. Its application in the La Creciente Block demonstrated improved detection accuracy, cost-effectiveness, and potential for further technological advancements in the petroleum industry.

**OFT**<sup>™</sup>

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