# RONDA COLOMBIA 2021

## Llanos Basin:
## Undeveloped Already Discovered Reservoirs (UADR)
## Incorporated Areas

October 1st, 2021

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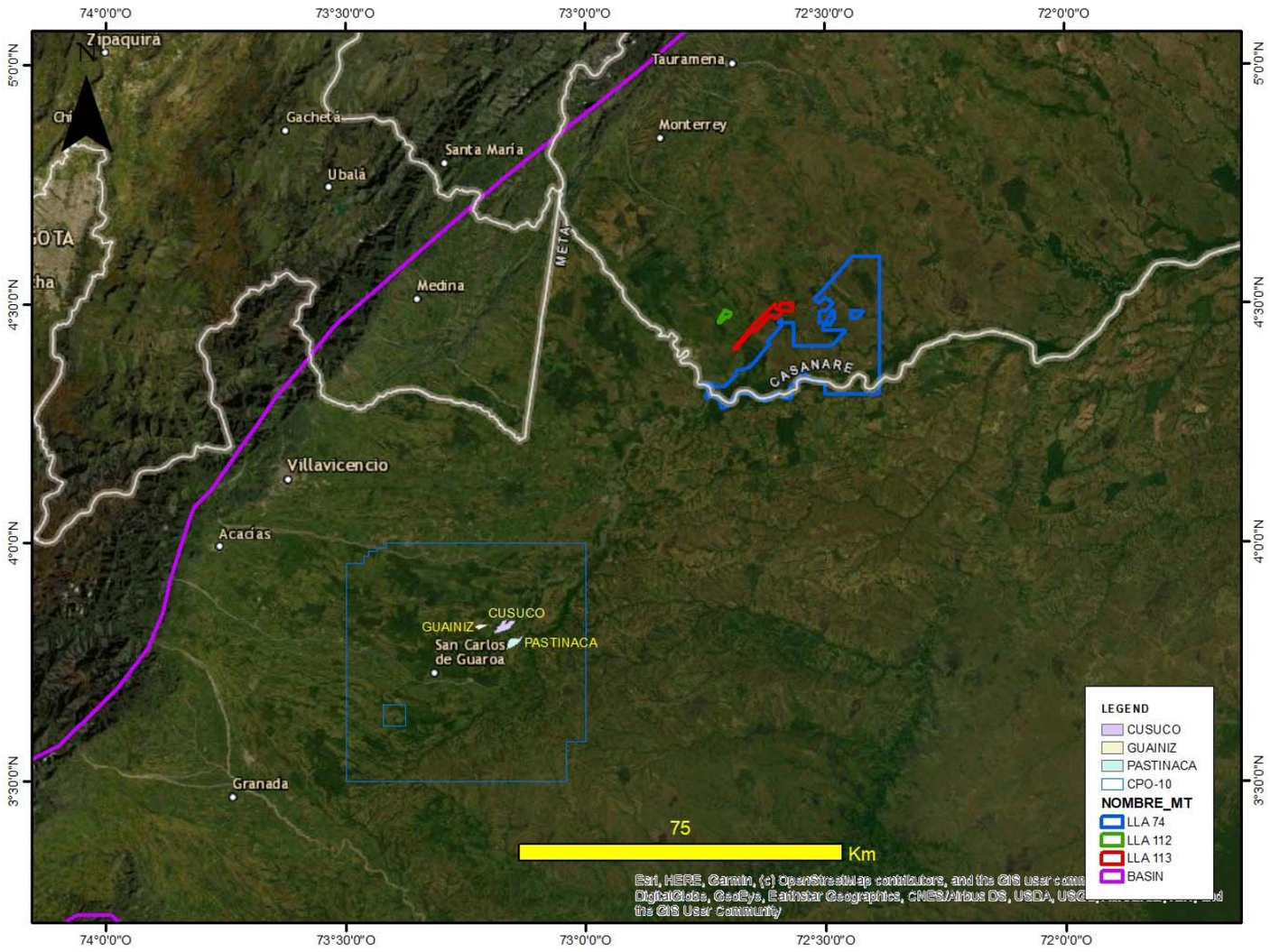
RONDA COLOMBIA 2021

ANH AGENCIA NACIONAL DE HIDROCARBUROS

El futuro es de todos | Minenergía

# Location




- Undeveloped Already Discovered Reservoirs
  - Cusuco (San Carlos de Guaroa, Meta)
  - Guainiz (San Carlos de Guaroa, Meta)
  - Pastinaca (Puerto Lopez, Meta)

- Incorporated Areas
  - LLA 74 Area: 60000 Ha
    - Municipalities:

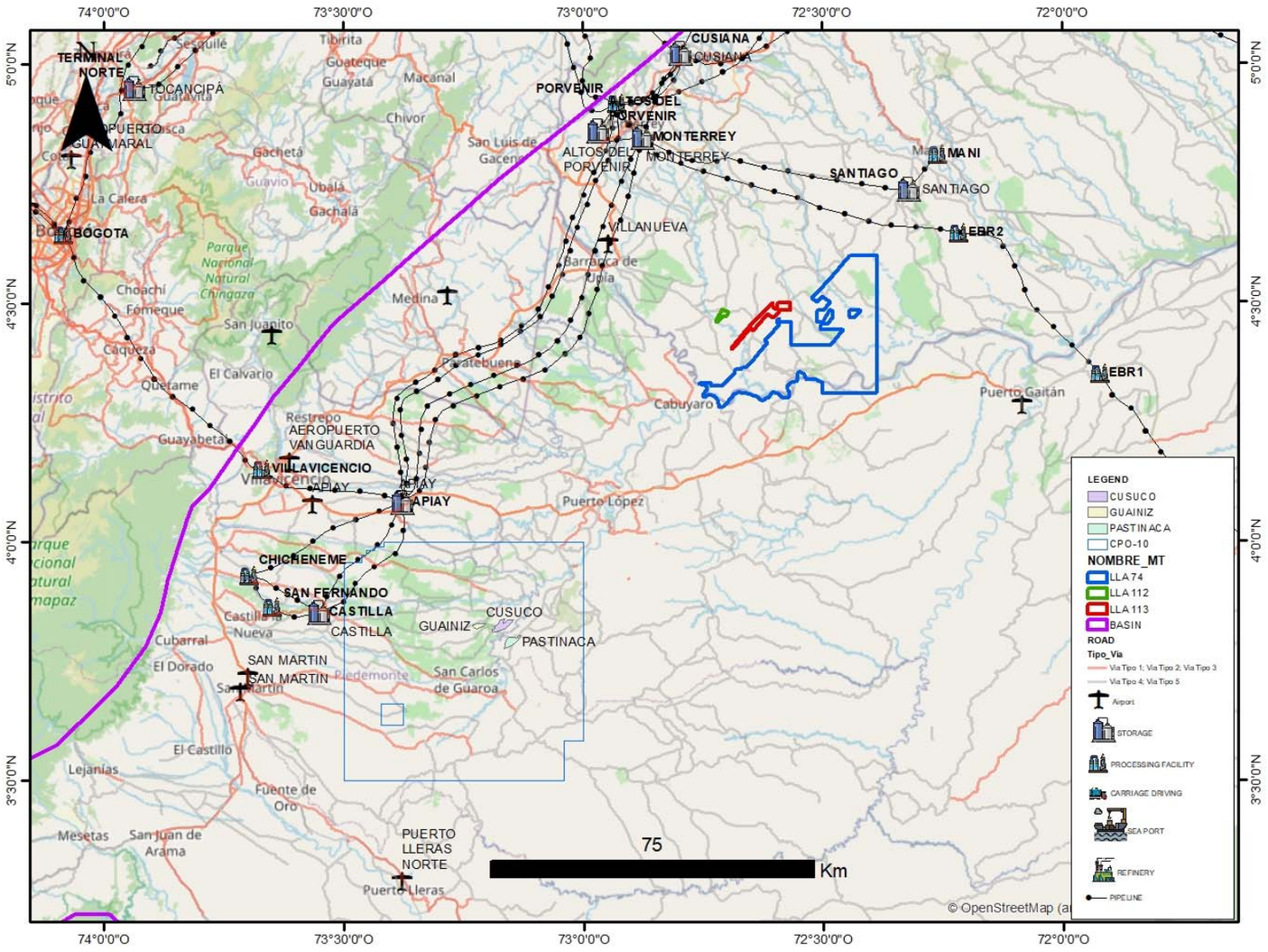
      (Casanare)
      - Tauramena (65.4%)
      - Maní (20.2%)
      - Puerto López (7.7%)

      (Meta)
      - Puerto Lopez (6.5%)
      - Cabuyaro (0.2%)
  - LLA 112 Area: 313.8 Ha
    - Municipalities:

      (Casanare)
      - Tauramena (96.1%)
      - Villanueva (3.9%)
  - LLA 113 Area: 1844 Ha
    - Municipalities:

      (Casanare)
      - Tauramena (92.9%)
      - Villanueva (7.1%)

# Infrastructure



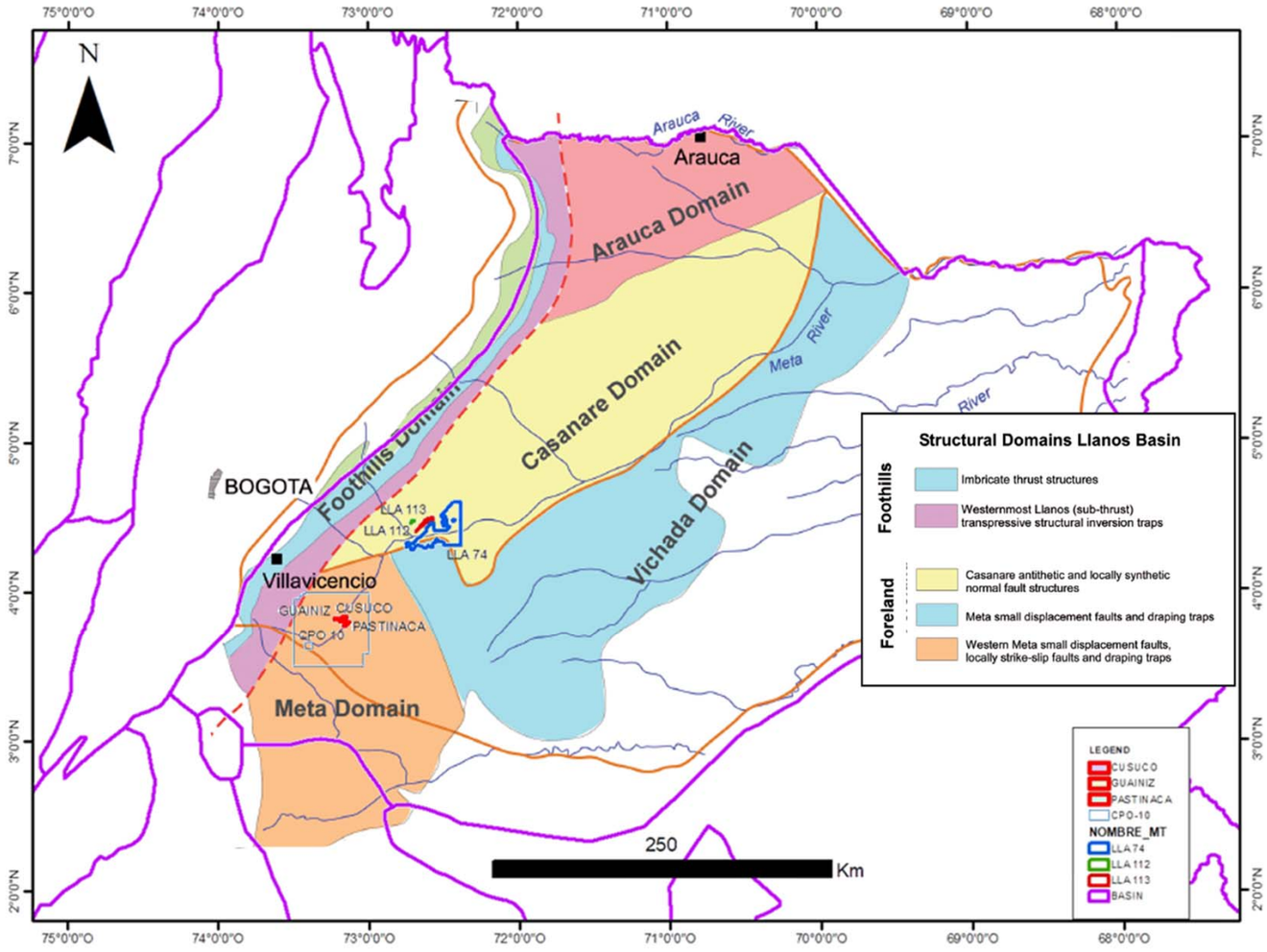

## Undeveloped Already Discovered Reservoirs

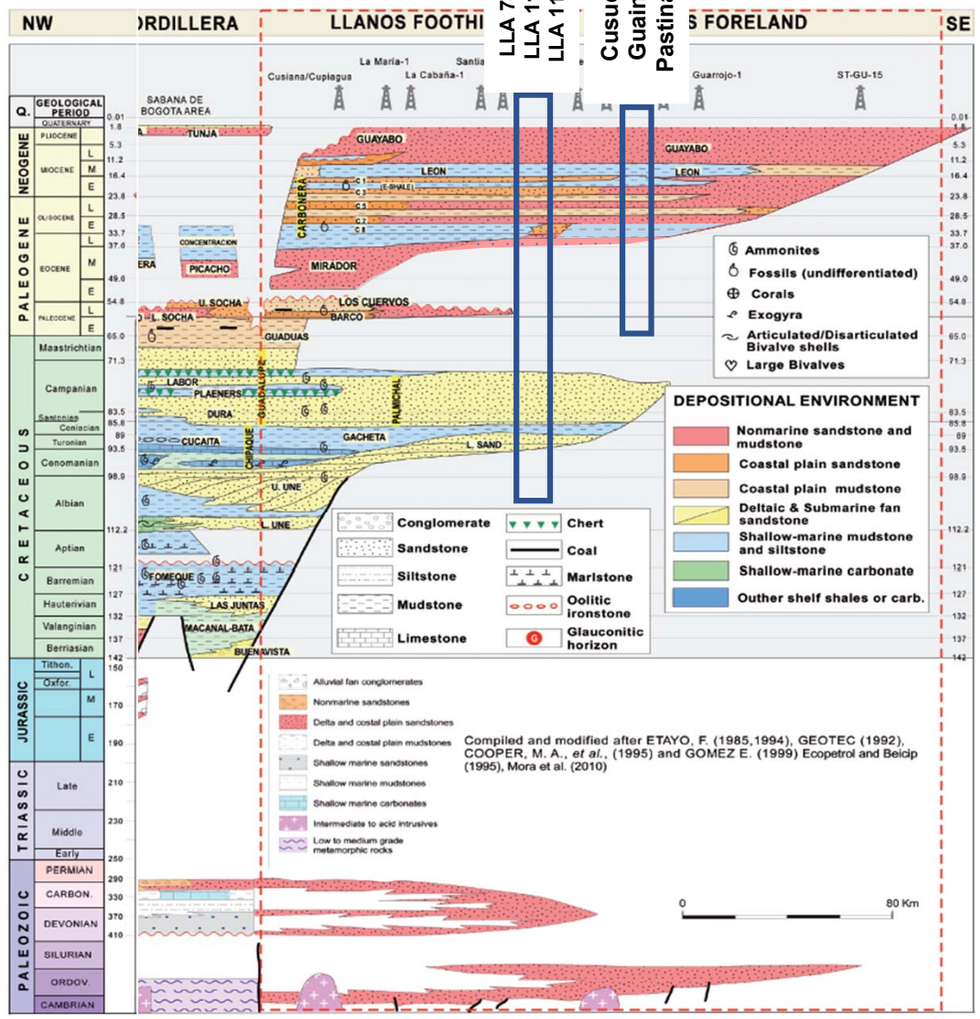
- Cusuco, Guainiz & Pastinaca
  - Unpaved roads that converge to the main road that potentially reaches at the oil facilities of Castilla oil fields.

## Incorporated Areas

- LLA 74, LLA 112 & LLA 113
  - Unpaved roads that connect with Barranca de Upia, Villanueva anda Monterrey towns.

# Geological Framework



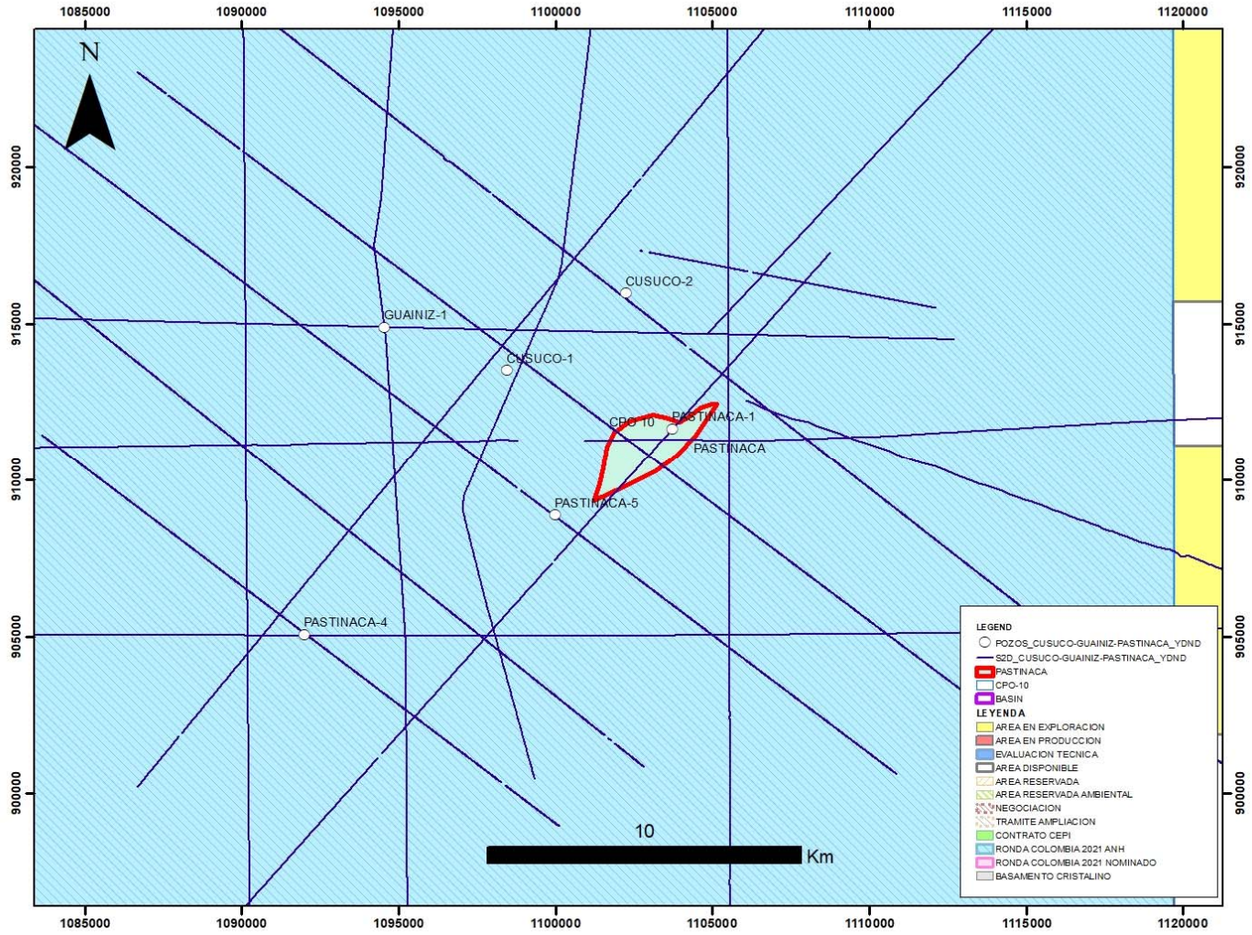



# Undeveloped Already Discovered Reservoirs (UADR)

# CPO 10 Available Area

## Pastinaca UARD

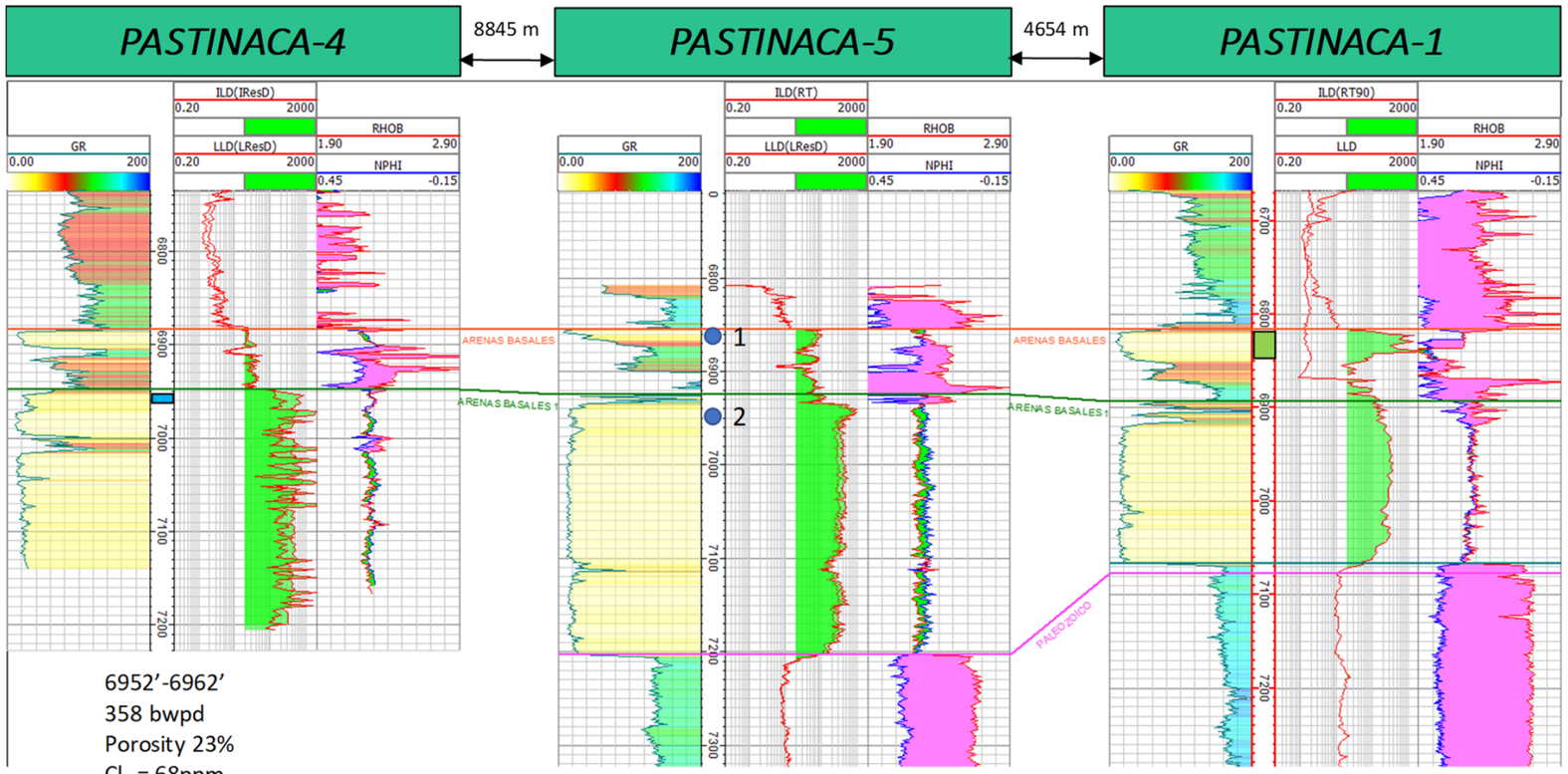
# RONDA COLOMBIA 2021 Database




- 2D Seismic lines
  - Q-1982-825 (85Km) W-E
  - CPO10-2009-1019 (37Km) NW-SE
  - CPO10-2009-1115 (33Km) NE-SW

- Wells
  - Pastinaca-1 (Producer)
  - Pastinaca-4 (Dry)
  - Pastinaca-5 (Dry)

# Pastinaca – Well Summary




6952'-6962'
358 bwpd
Porosity 23%
Cl- = 68ppm
Pi = 2887 psi

1) Porosity 25% SW>95%
2) Porosity 23% SW>95%

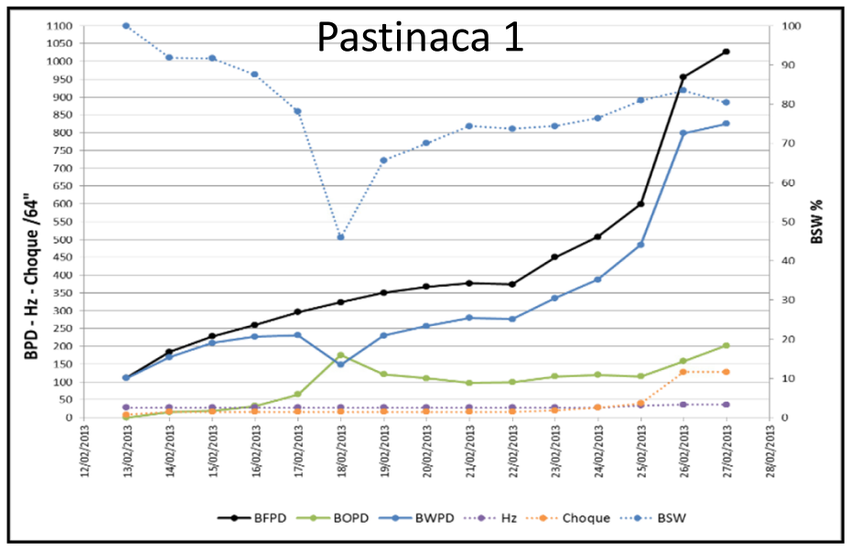
6818'-6848'
202 bopd
12ºapi
Net Pay 20 ft
Porosity 23%
BSW 80.4%
Cl- = 150ppm
Pi = 2875 psi

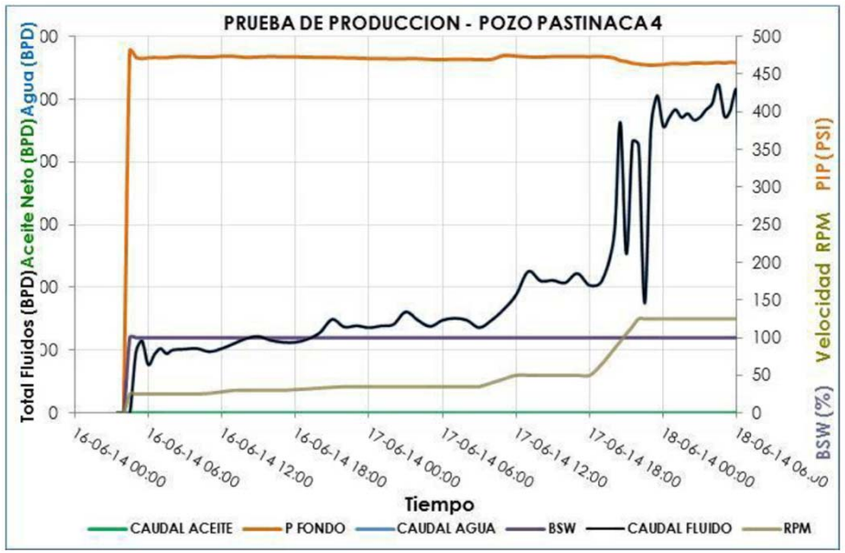
**Pastinaca-1**
Drilled (19/12/2012 – 17/01/2013)
Initial Test (13/02/2013 – 18/02/2013)
Average Production 202 BOPD (11.4ºAPI)
80% water cut

**Pastinaca-4**
Drilled (03/05/2014 – 28/05/2014)
Initial Test (16/06/2014 – 18/06/2014)
Recovered 136 Bbls water formation (100%BSW)

**Pastinaca-5**
Drilled (January 2015)
Oil shows (6855'-6870'; 6925'-7140')
No tested

# Pastinaca-1 & Pastinaca 4 Initial Tests




## Pastinaca 1 Initial Test

For the flow period, the well started with a production of 260 BFPD, 87.5% BSW, 32 BOPD and 28 Hz. These conditions were retained for the seven days of the test showing an oscillation of the BSW, for which an addition of five more days of initial testing was requested; the frequency of the pump was gradually increased, seeking to reach a flow rate of 1,000 BFPD. On February 27, 2013, the test ended with the following parameters: 1,027 BFPD, 80.4% BSW (stabilized on the last day of the test), 202 BOPD and 36 Hz. The maximum draw-down generated was 577 PSI (20.4%) and a PWF of 2,255 psi.

The result of the initial test (late Eocene-age basal sands, range 6,820–6,830 MD feet), was crude oil producer (Figure 1). A total of 5,895 barrels of fluid (1,448 barrels of oil and 4,447 barrels of water) were produced with a stabilized BSW of 80%; daily crude oil production was 202 BOPD, with a water production of 825 BWPD, with a submersance of 4,481 feet and a PIP of 1,860 psi. The produced water has a salinity of 150 ppm chlorides. The presence of mobile hydrocarbons with a gravity of 12° API in the Pastinaca structure was verified

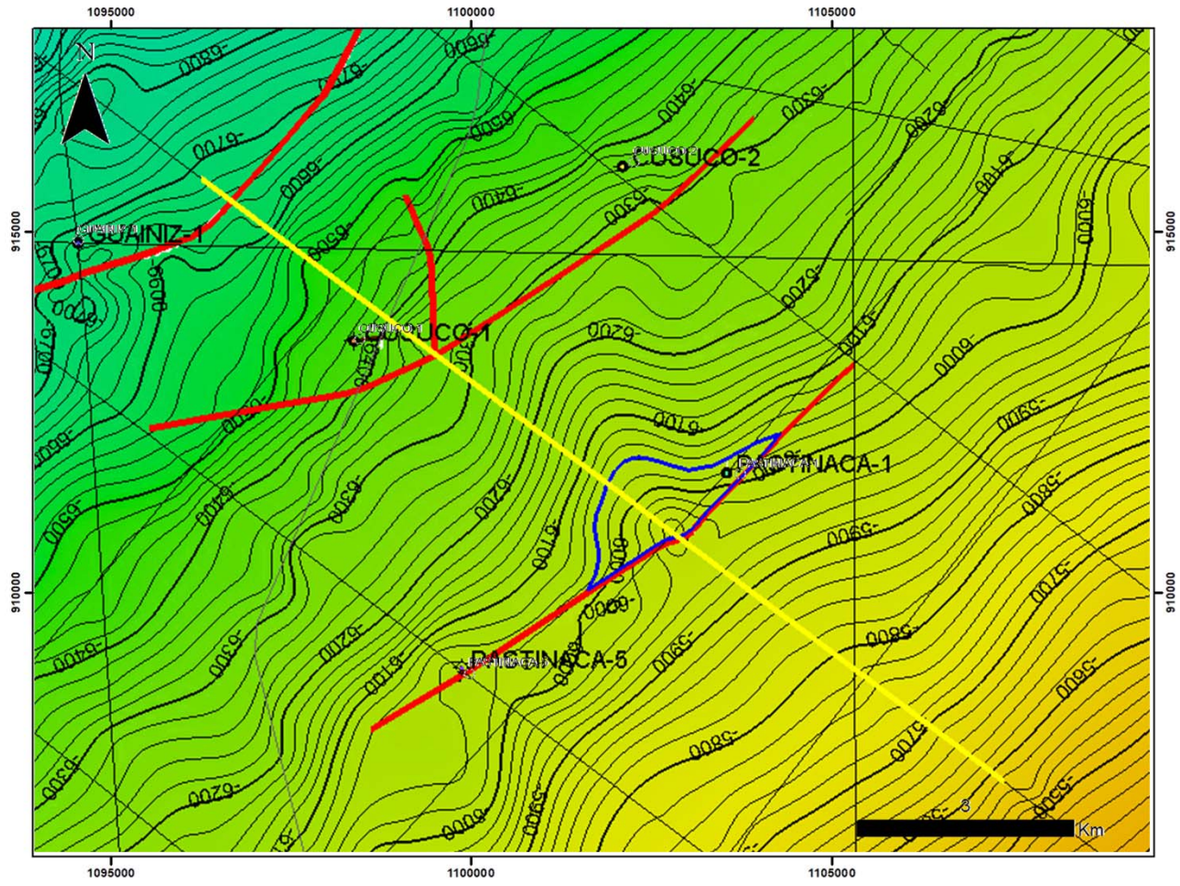
## Pastinaca 4 Initial Test

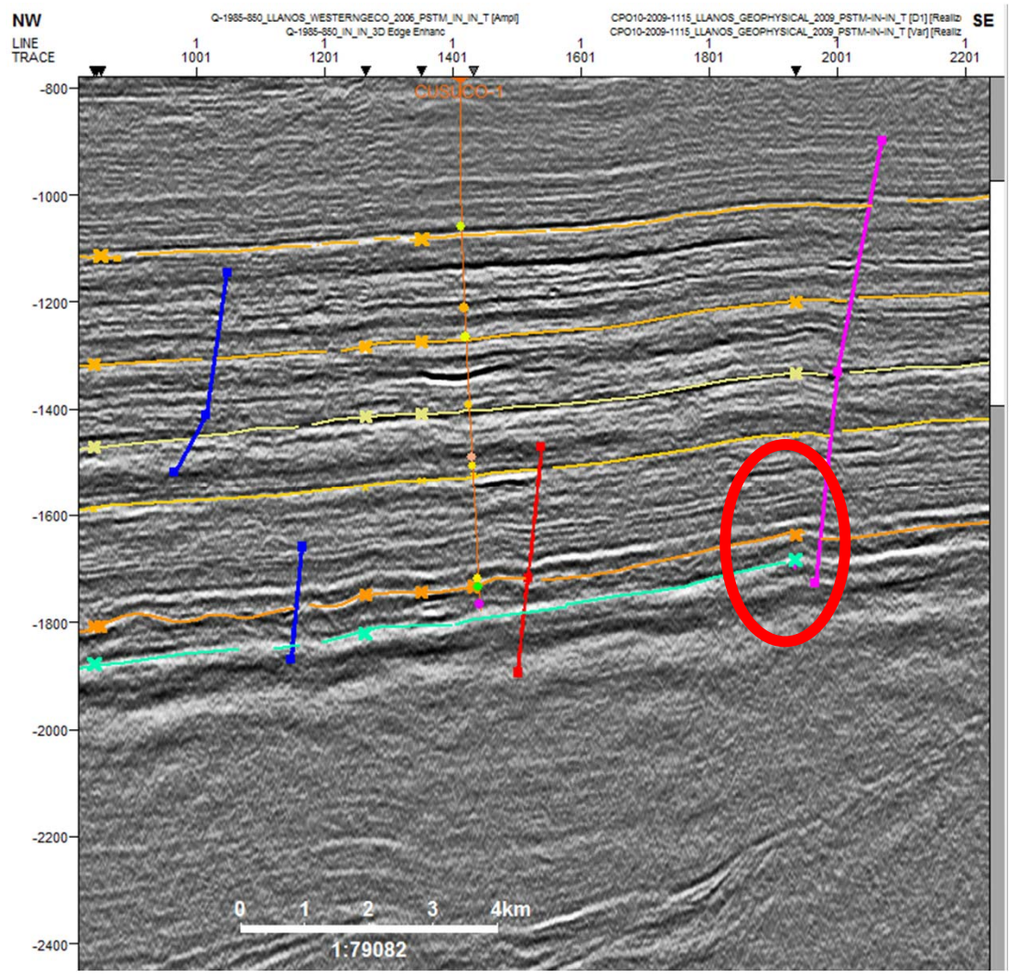
The initial production tests of the Pastinaca-4 well were carried out between June 16 and 18, 2014 with PCP artificial lifting system to artificially induce the flow of fluids from the formation to the well, and DST string for the realization of bottom closure. The main objective was to assess the quality of the fluids stored in the basal sands in the range 6,952–6,962 MD feet.

In total, 358 barrels of fluid were produced, including 8.4 lpg KCl control brine, mud and formation water filtration, distributed as follows: 52 barrels of control brine, 170 barrels of mixture between control brine, mud filtration and formation water, and 136 barrels of formation water (Table 2). The test result was aquifer (Figure 6) with a BSW of 100%.

*Taken from RPEV Pastinaca E&P CPO10 Report*

# Pastinaca Structural Map Basal Sandstone



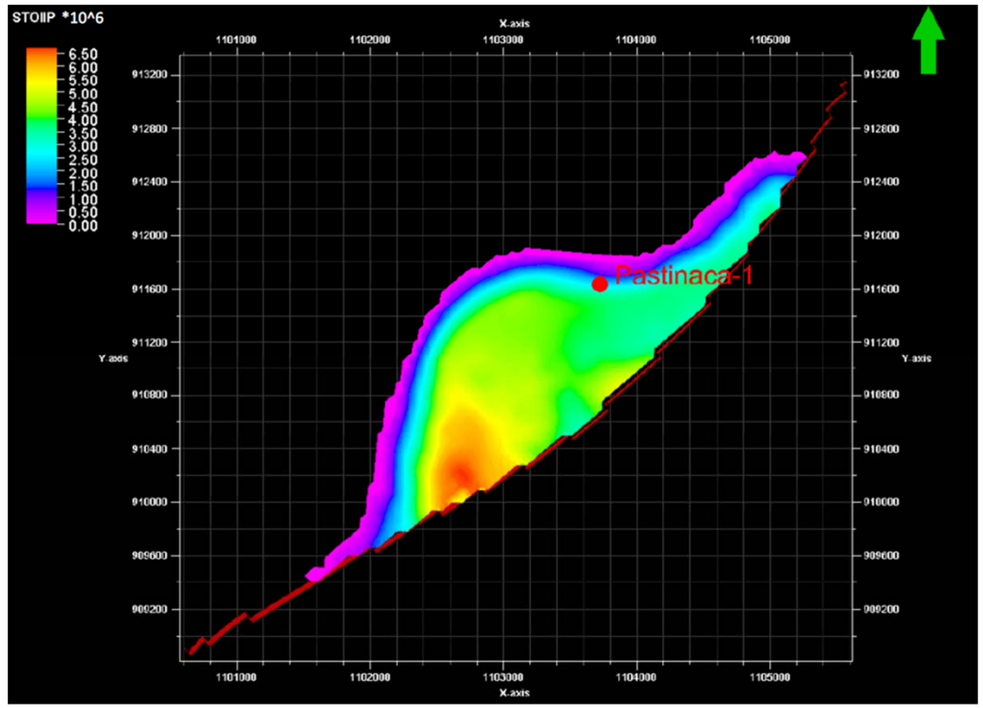

Dip Line CPO10-2009-1019

# Pastinaca Structure Volumetrics

## Operator Evaluation by simulation model of Dynamic Model

| | | |
|---|---|---|
| Initial Pressure at -6,121 feet TVDss | 2.872 | psia |
| Temperature | 175 | °F |
| Crude oil gravity | 12,0 | °API |
| Initial GOR | 4,1 | SCF/STB |
| Water-oil contact | -6.040 | feet TVDSS |
| Average porosity | 23 | % |
| Average permeability | 3.500 | md |
| Residual water saturation | 25 | % |
| Residual oil saturation | 20 | % |
| Oil viscosity to T and P of reservoir | 285 | cp |
| Bubble Pressure | 50 | psi |
| OOIP | 28,37 | MMbls |

*General Properties of the Reservoir in the Pastinaca-1 well.*

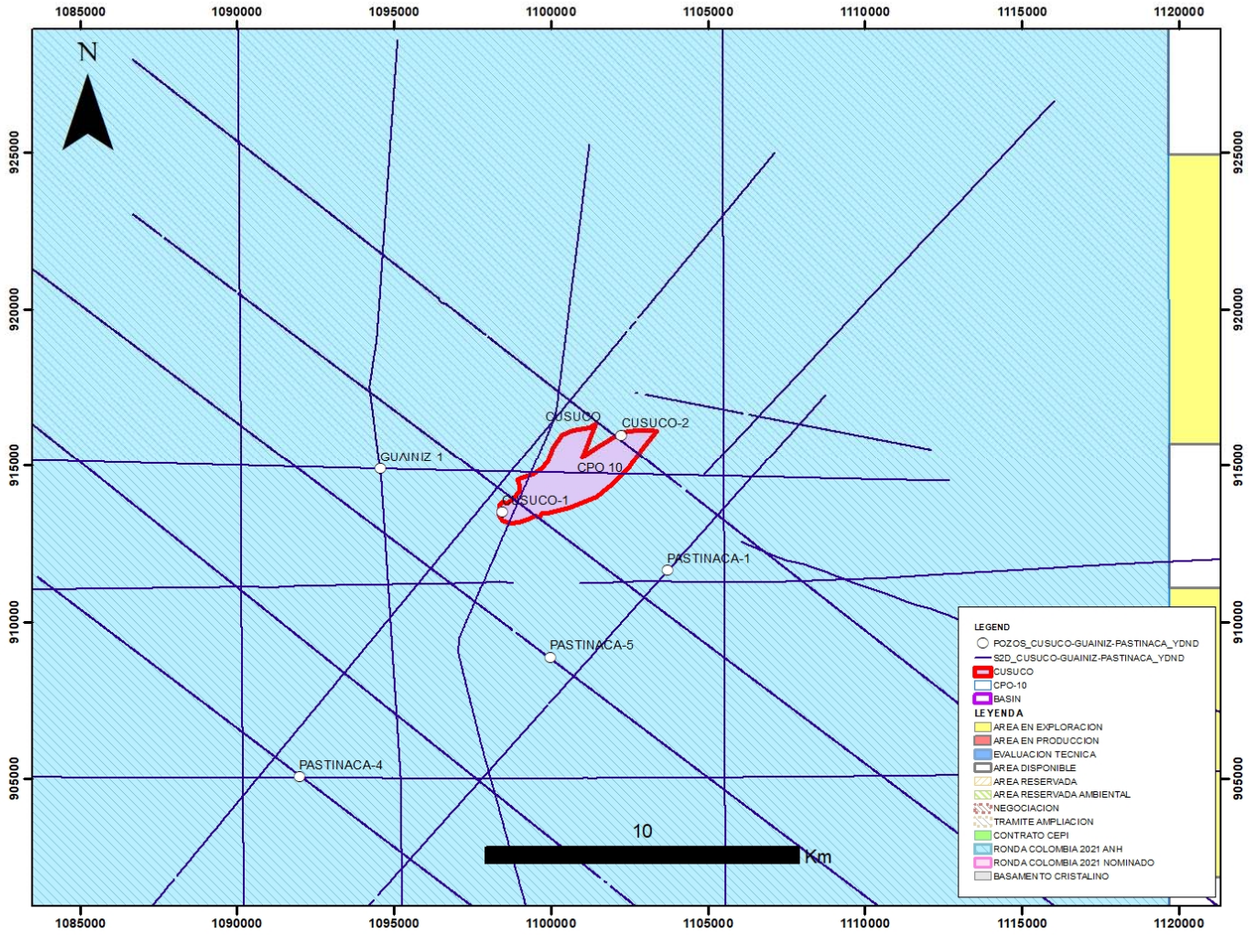



*OOIP map for the area of the Discovery of the Pastinaca-1 well*

*Taken from RPEV Pastinaca E&P CPO10 Report*

# CPO 10 Available Area

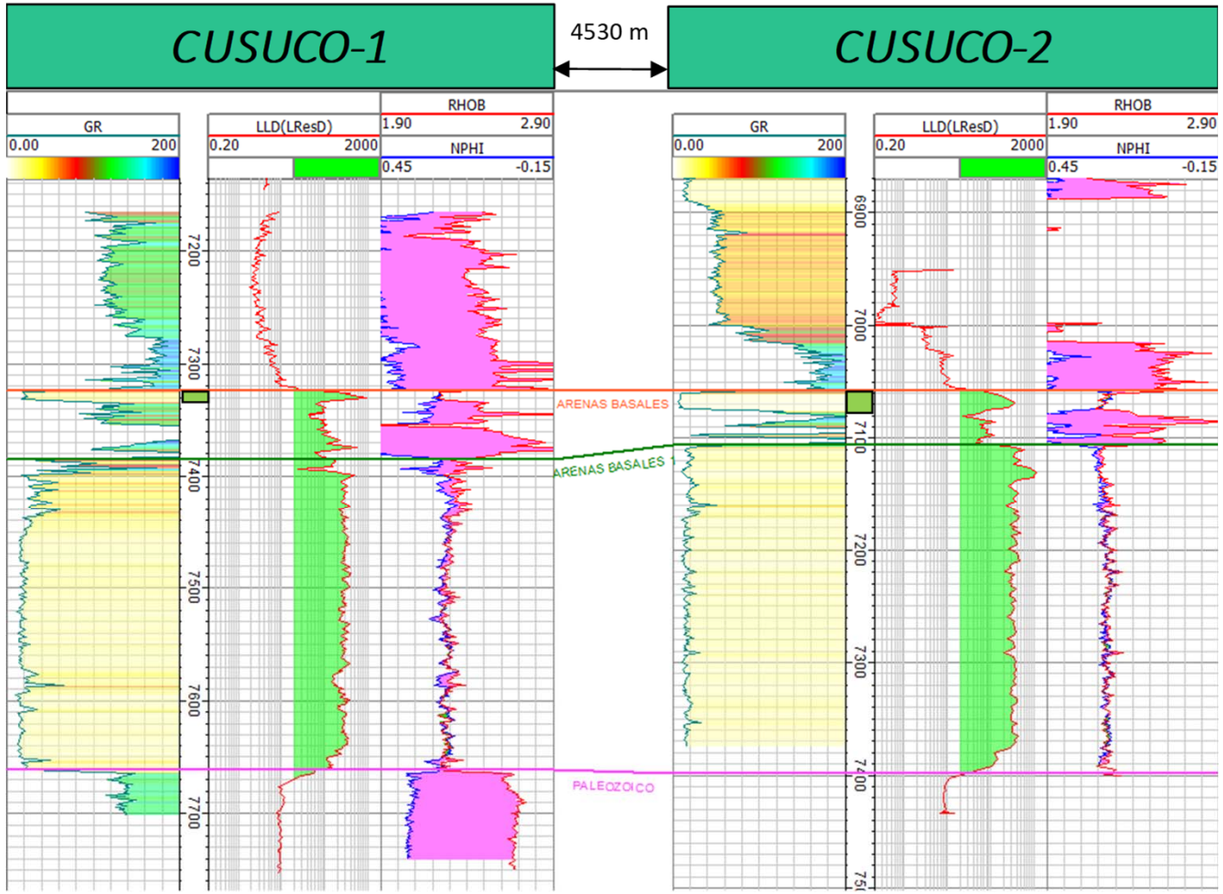
## Cusuco UARD




- 2D Seismic Lines
  - Q-1982-1900 (26Km) N-S
  - Q-1985-850 (46Km) W-E
  - CPO10-2009-1019 (37Km) NW-SE
  - CPO10-2009-1022 (43Km) NW-SE

- Wells
  - Cusuco-1 (Producer)
  - Cusuco-2 (Producer)

# Cusuco – Well Summary



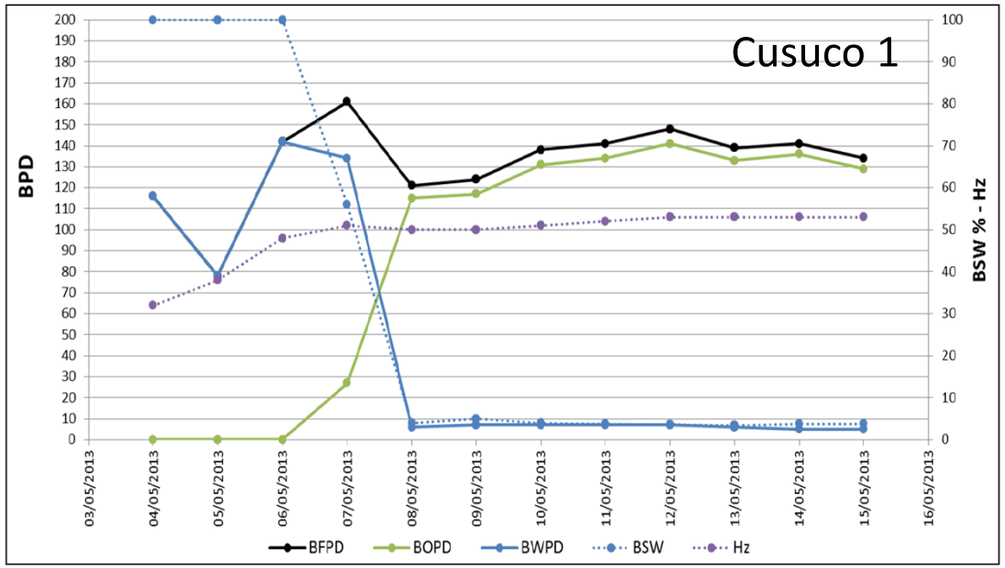

| Depth | Final rate | System | °API |
|---|---|---|---|
| 7324 ´- 7331 | ´135 BO / 6 BW | ESP | 13,8 |

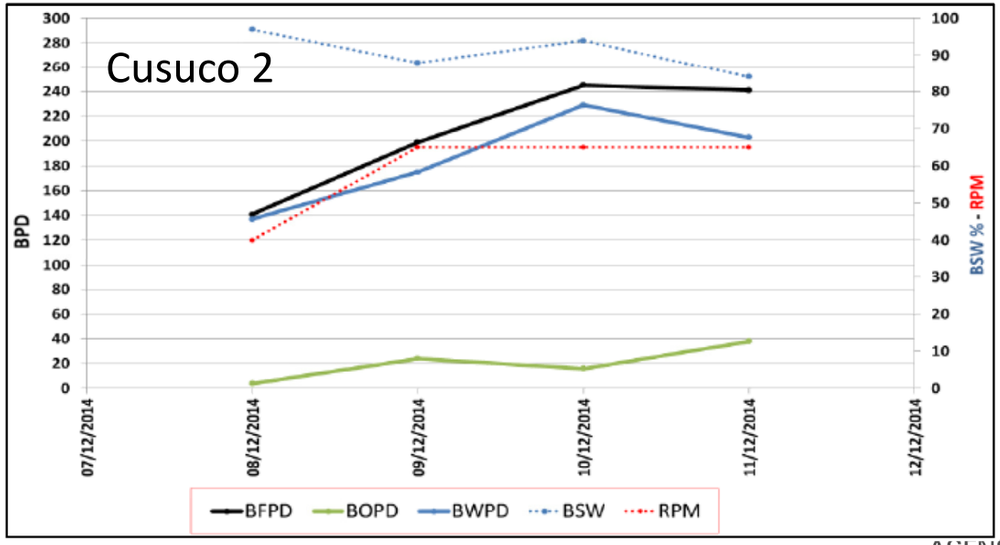
| Interval | BOPD | BWPD | Duration |
|---|---|---|---|
| 7057' – 7076' | 38 | 203 | 8 @ 12 dic. 2014 |

**Cusuco-1**
Drilled (17/03/2013 – 17/04/2013)
Initial Test (4/05/2013 – 15/05/2013)
Average Production 135 BOPD (13.8ºAPI)
3.8% water cut

**Cusuco-2**
Drilled (09/11/2014 – 28/11/2014)
Initial Test (08/12/2014 – 11/12/2014)
Average Production 38 BOPD (10.2ºAPI)
84% water cut

# Cusuco 1 & Cusuco 2 Initial Tests



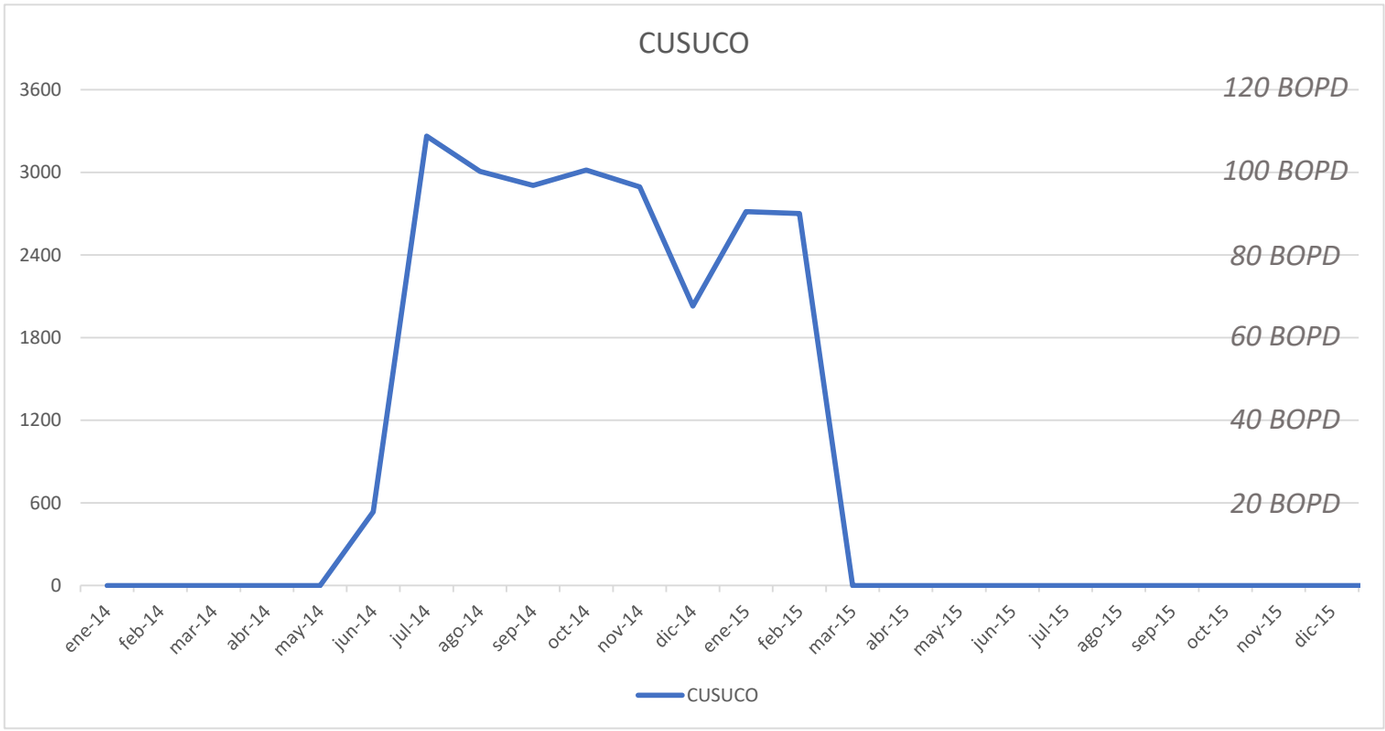

The initial production test of the Cusuco-1 well was carried out between May 4 and 15, 2013, with BES artificial lifting in the range 7,324-7,331 feet, with the aim of evaluating the quality of the accumulated fluids. The initial test was oil producing, producing 141 barrels of crude oil of 13.8°API@60°F and 520 barrels of water with a salinity of 1,043 ppm of chlorides. Average final rates were 141 bfpd, with 135 bopd and 6 bwpd for an average water outage of 3.8%

The initial production test of the Cusuco-2 well (PCP/DST) was carried out between December 8 and 11, 2014 in the range 7,057-7,076 feet, which was a crude producer, with a production of 82 barrels of crude oil of 10.2°API @ 60°F and 614 barrels of water; the final flow was 241 BFPD, with 38 BOPD and 203 BWPD with an average BSW of 84%, Finally, although the test was oily, it was not commercial, so the well was plugged and abandoned.

Given the differences in the results of the Cusuco-1 and Cusuco-2 wells (differences in pressures, API, BSW, salinity) it is inferred that the Cusuco structure is compartmentalized by failures of little jump, concluding that the faults against which the folds close are of less extension than initially proposed, which is presumed by its little vertical jump, less than 100 feet

*Taken from RPEV Cusuco E&P CPO10 Report*

# Cusuco 1 Extended Test

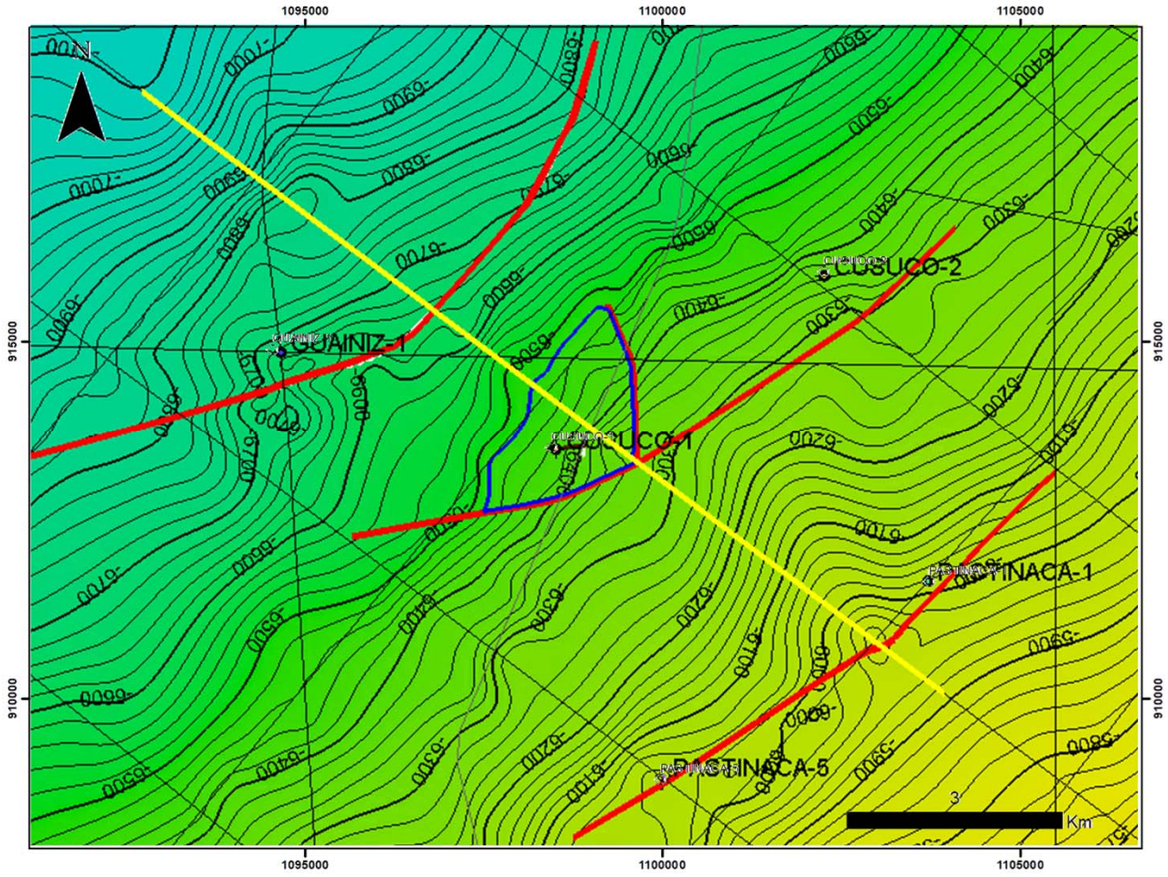


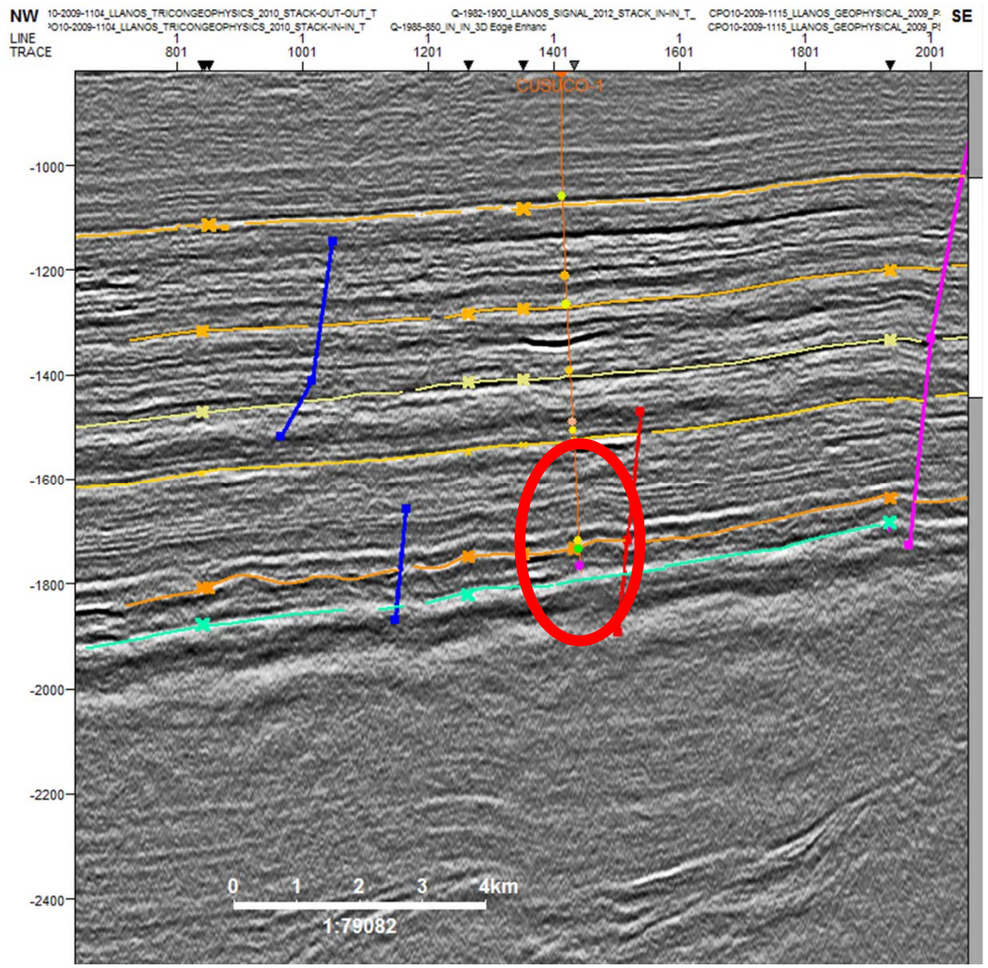

The extensive production test of the Cusuco-1 well (Figure 4), was conducted between June 23, 2014 and February 28, 2015, allowing to evaluate the basal sands unit in the range 7,324-7,331 feet for a total of 7 feet cannoned.
The well was opened to production for a period of 181 days during which it was produced with electrosinkable pumping at frequencies between 30–50 Hz. Presenting an average production of 110 total barrels of fluid per day with 98 barrels of oil per day and 12 barrels of water per day. The average BSW value recorded for the last day of this period was 11%.

Accumulative Production 23072 Bbls of oil

*Taken from RPEV Cusuco E&P CPO10 Report*

# Cusuco Structural Map Basal Sandstone




Dip Line CPO10-2009-1019

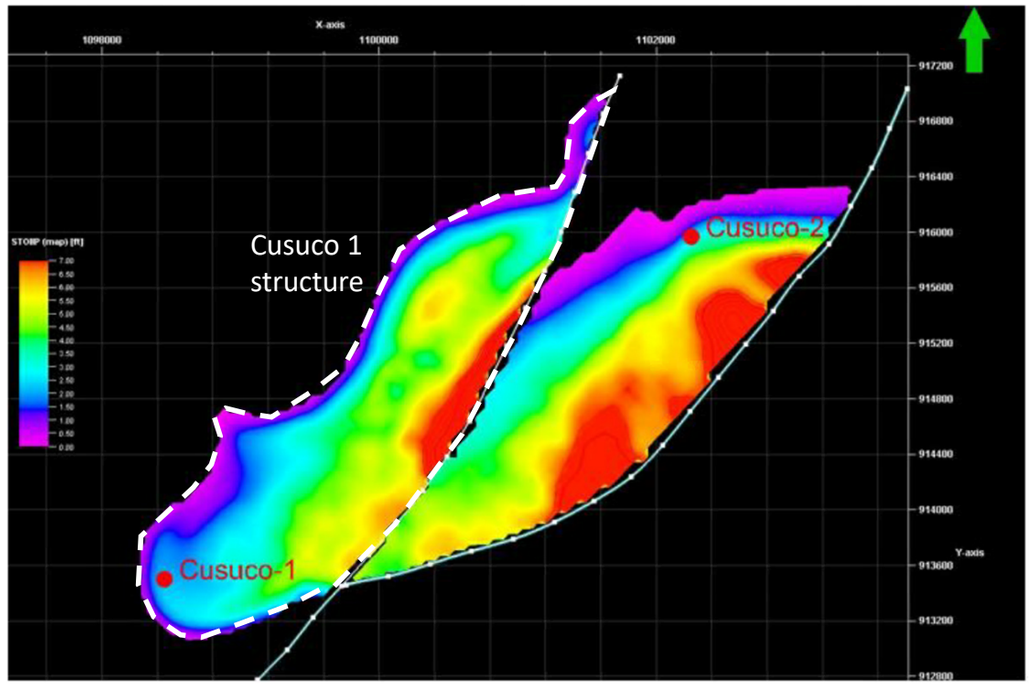
# Cusuco Structure Volumetrics



## Operator Evaluation by simulation model of Dynamic Model

| | | |
|---|---|---|
| Initial Pressure at -6,121 feet TVDss | 2.972 | psia |
| Temperature | 192 | °F |
| Crude oil gravity | 14,1 | °API |
| Initial GOR | 4 | SCF/STB |
| Water-oil contact | 6.460 | feet TVDSS |
| Average porosity | 22 | % |
| Average permeability | 3.800 | md |
| Residual water saturation | 35 | % |
| Residual oil saturation | 20 | % |
| Oil viscosity to T and P of reservoir | 75 | cp |
| Bubble Pressure | 50 | psi |
| OOIP | 16,7 | MMbls |

*General Properties of the Reservoir in the Cusuco-1 well.*



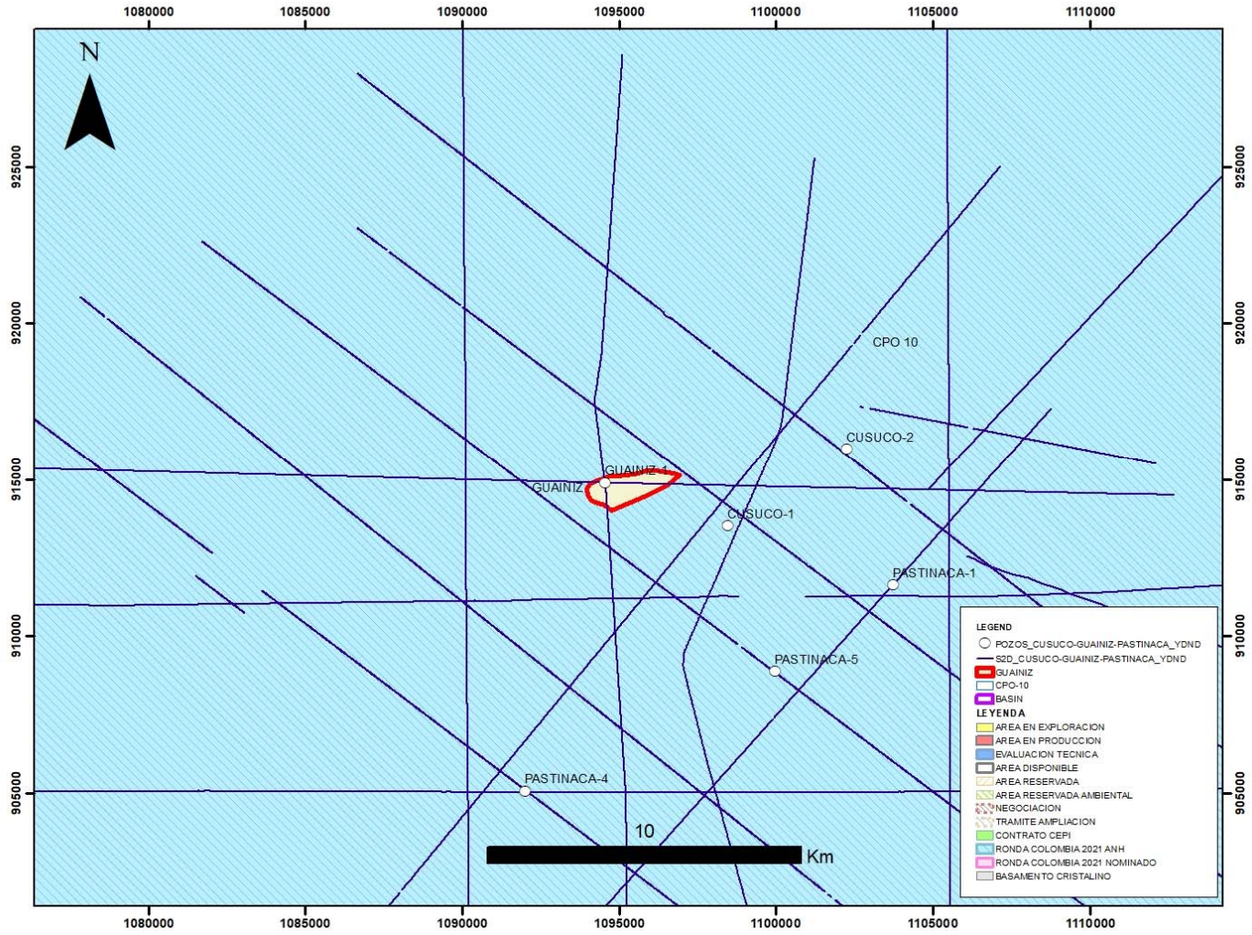

*OOIP map for the area of the Discovery of the Cusuco-1 well*

*Taken from RPEV Cusuco E&P CPO10 Report*

# CPO 10 Available Area

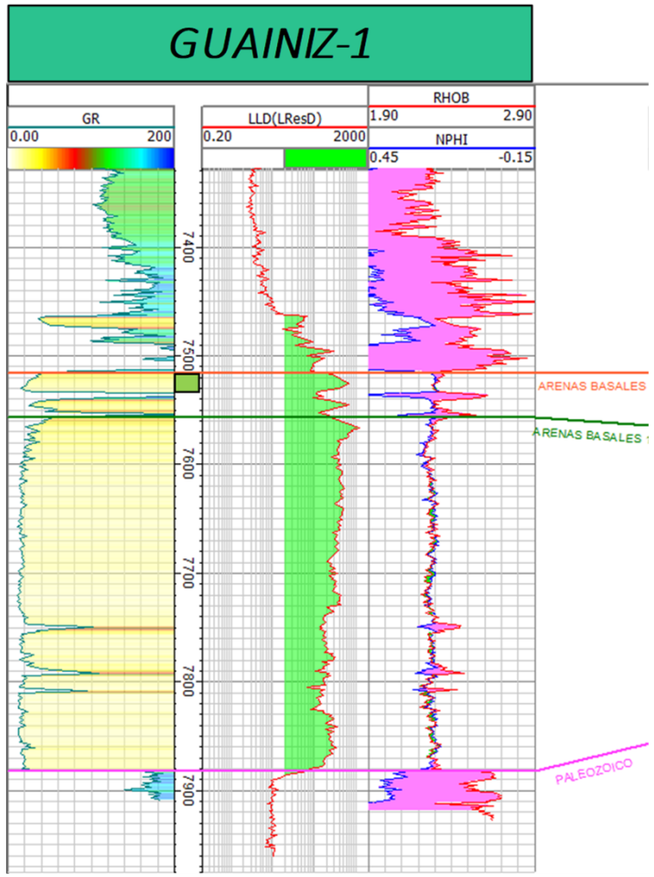
## Guainiz UARD

# RONDA COLOMBIA 2021 Database




- 2D Seismic Lines
  - Q-1985-1750 (48Km) N-S
  - Q-1985-850 (46Km) W-E
- Well
  - Guainiz-1 (Producer)

# Guainiz-1 Well Summary

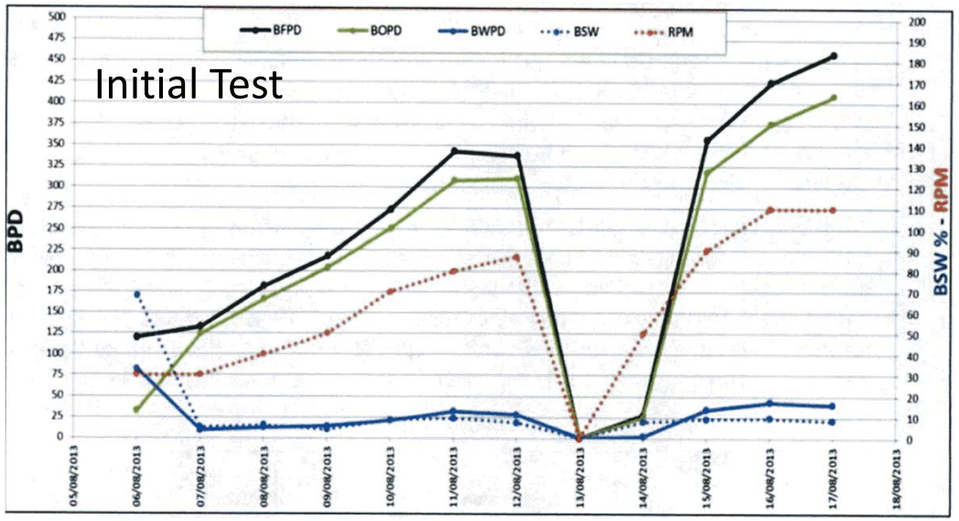


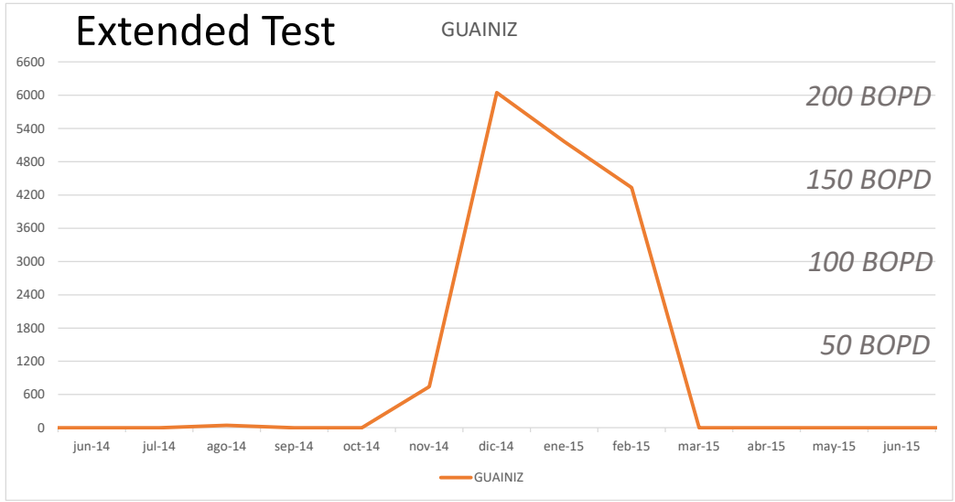

| Interval feet | Porosity % | Sw % | K md |
|---|---|---|---|
| 7515 - 7531 | 20 - 24 | 35 - 45 | 110 - 450 |

| BFPD | BOPD | BWPD | Cl |
|---|---|---|---|
| 440 | 405 | 35 | 50 ppm |

**Guainiz-1**
Drilled (7/06/2013 – 14/07/2013)
Initial Test (6/08/2013 – 17/08/2013)
Average Production 409 BOPD (14.4ºAPI)
8.4% water cut

# Guainiz-1 Initial & Extended Tests




The initial production test of the Guainiz-1 well was carried out between August 6 and 17, 2013, with PCP artificial lifting. The result was oil production, where 2,501 barrels of crude oil of 14.4ºAPI @60ºF and 245 barrels of water with salinity of 50 ppm of chlorides were produced. The average final rates were 444 bfpd, with 409 bopd and 35 bwpd for an average water outage of 8.4%

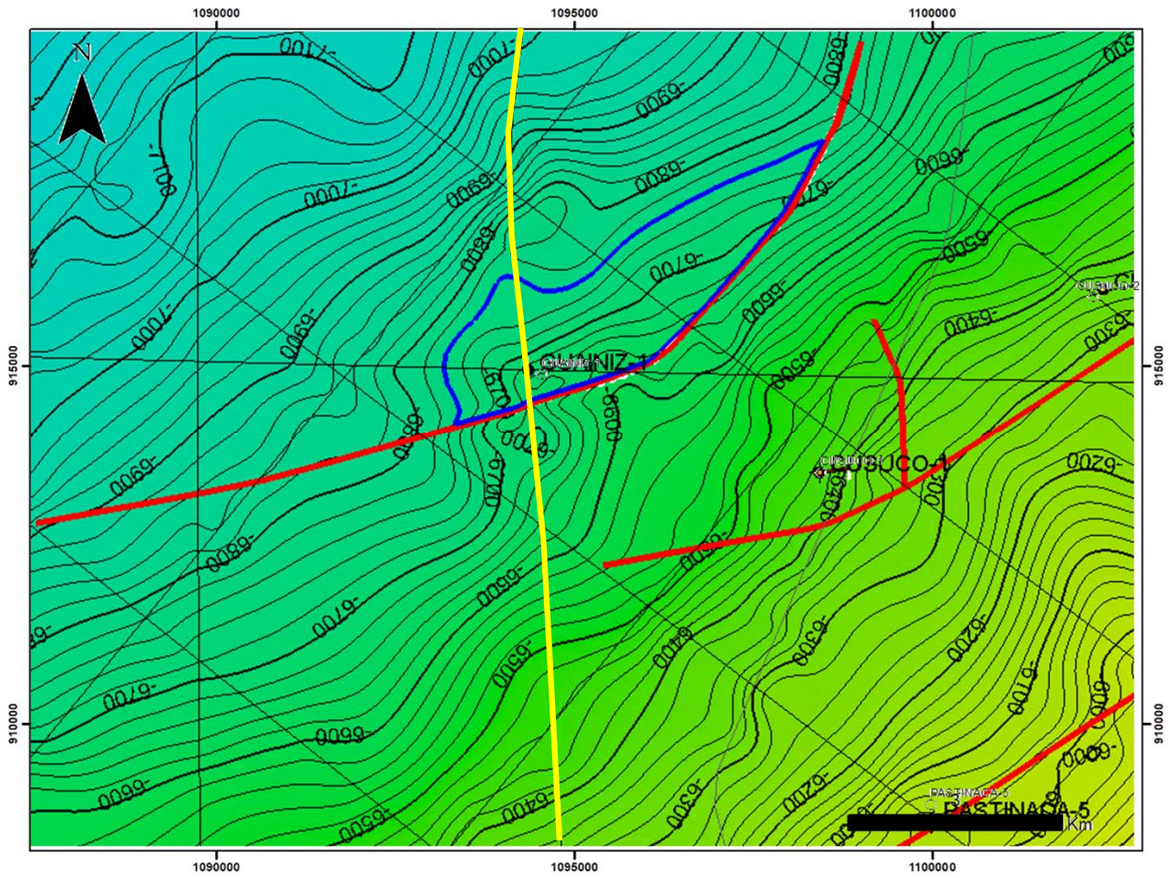
The extensive production test of the Guainiz-1 well was made between November 24, 2014 and March 13, 2015, allowing the basal sands unit to be evaluated in the interval 7,515-7,531 feet for a total of 16 feet cannoned.

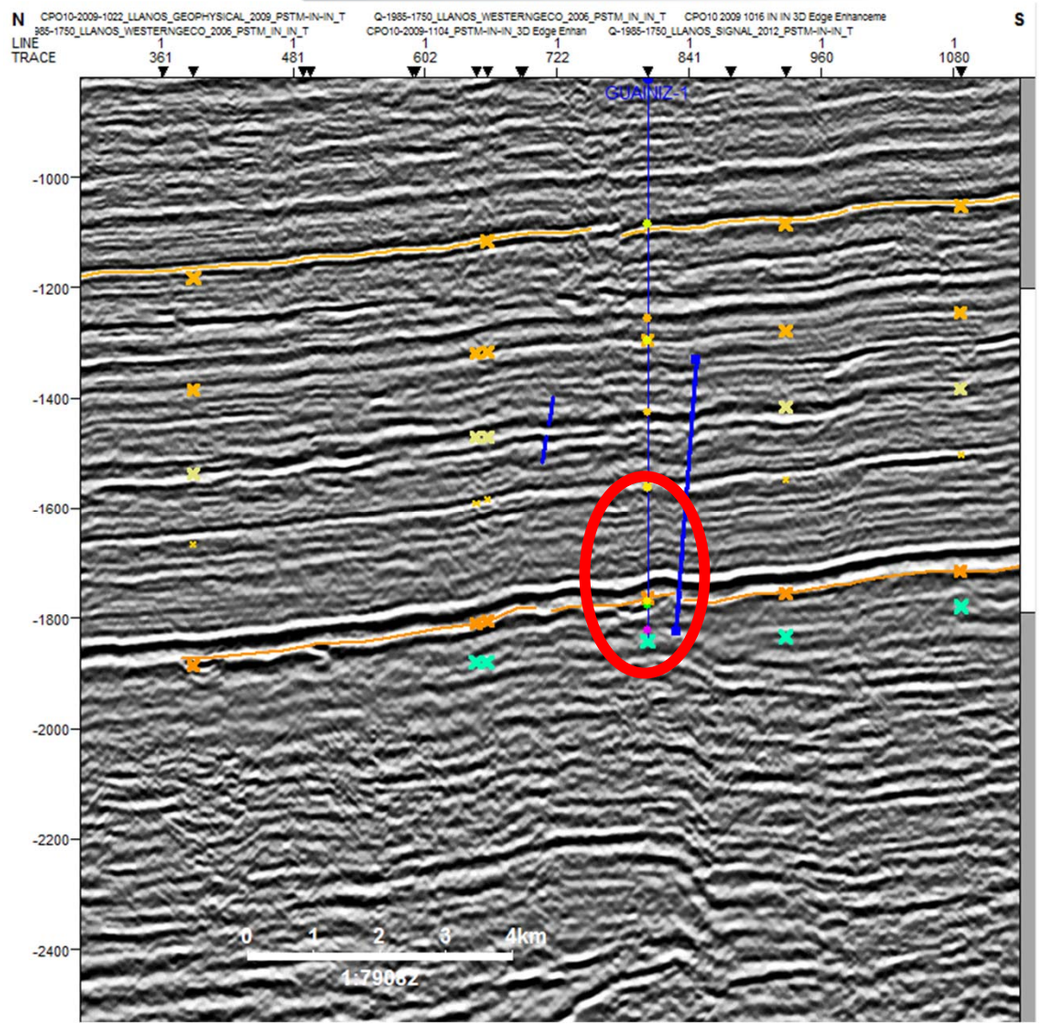
The well was opened to production for a period of 96 days during which it was produced with electrosinkable pumping at frequencies between 32-40 Hz. During this period, a total of 16,281 barrels of 14.4ºAPI oil and 5,764 barrels of 320 ppm chloride forming water (527 ppm NaCl) were recovered. The average BSW value recorded for the last day of this period was 38%

Accumulative Production 18782 Bbls of oil

*Taken from RPEV Guainiz E&P CPO10 Report*

# Guainiz Structural Map Basal Sandstone




Dip Line Q-1985-1750

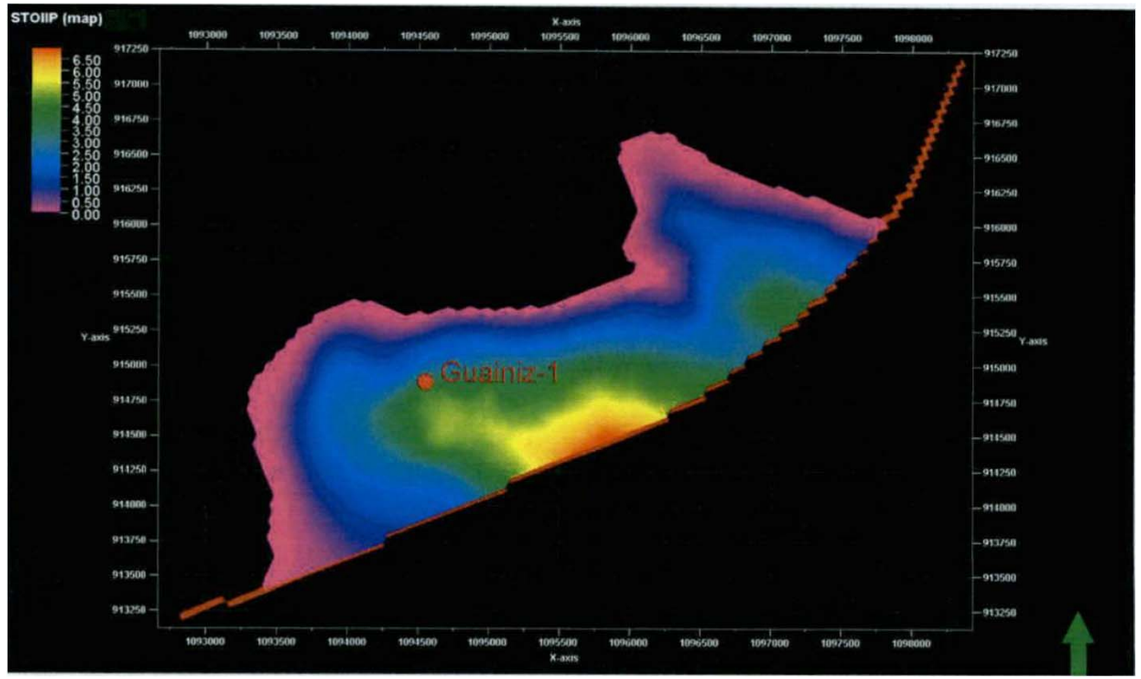
# Guainiz Structure Volumetrics



## Operator Evaluation by simulation model of Dynamic Model

| | | |
|---|---|---|
| Initial Pressure at -6,725 feet TVDss | 3.103 | psia |
| Temperature | 199,3 | °F |
| Crude oil gravity | 13,8 | °API |
| Initial GOR | 21,2 | SCF/STB |
| Water-oil contact | -6.782 | feet TVDSS |
| Average porosity | 22 | % |
| Average permeability | 3.800 | md |
| Residual water saturation | 25 | % |
| Residual oil saturation | 20 | % |
| Oil viscosity to T and P of reservoir | 55 | cp |
| Bubble Pressure | 137 | psi |
| OOIP | 34.42 | MMbls |

*General Properties of the Reservoir in the Guainiz-1 well.*




*OOIP map for the area of the Discovery of the Guaniz-1 well*

*Taken from RPEV Guainiz E&P CPO10 Report*

# Conclusions

- Pastinaca – 1 presented an accumulative production of 1,447 BO, 12 ° API. TD 7,870 feet.
- Cusuco apparently holds two structures.
- Cusuco - 1 had a final rate of 135 bopd, BSW 4.2%, 13.8 °API. TD: 7,775 feet
- Cusuco – 2 presented a final rate of 38 bopd, BSW 84%, 10.2 ° API. TD 7,449 feet.
- Guarniz is a single structure. One single well tested with average final rates of 409 bopd 14.4 °API. TD 7,975 feet.
- Previous operator estimated an OOIP of 79.5 MMBO.

| PROSPECT | OOIP (BLS) |
|---|---|
| Pastinaca Basal Sandstone Heavy Oil | 28 370 000 |
| Cusuco 1 Basal Sandstone Heavy Oil | 16 700 000 |
| Guainiz Basal Sandstone Heavy Oil | 34 420 000 |

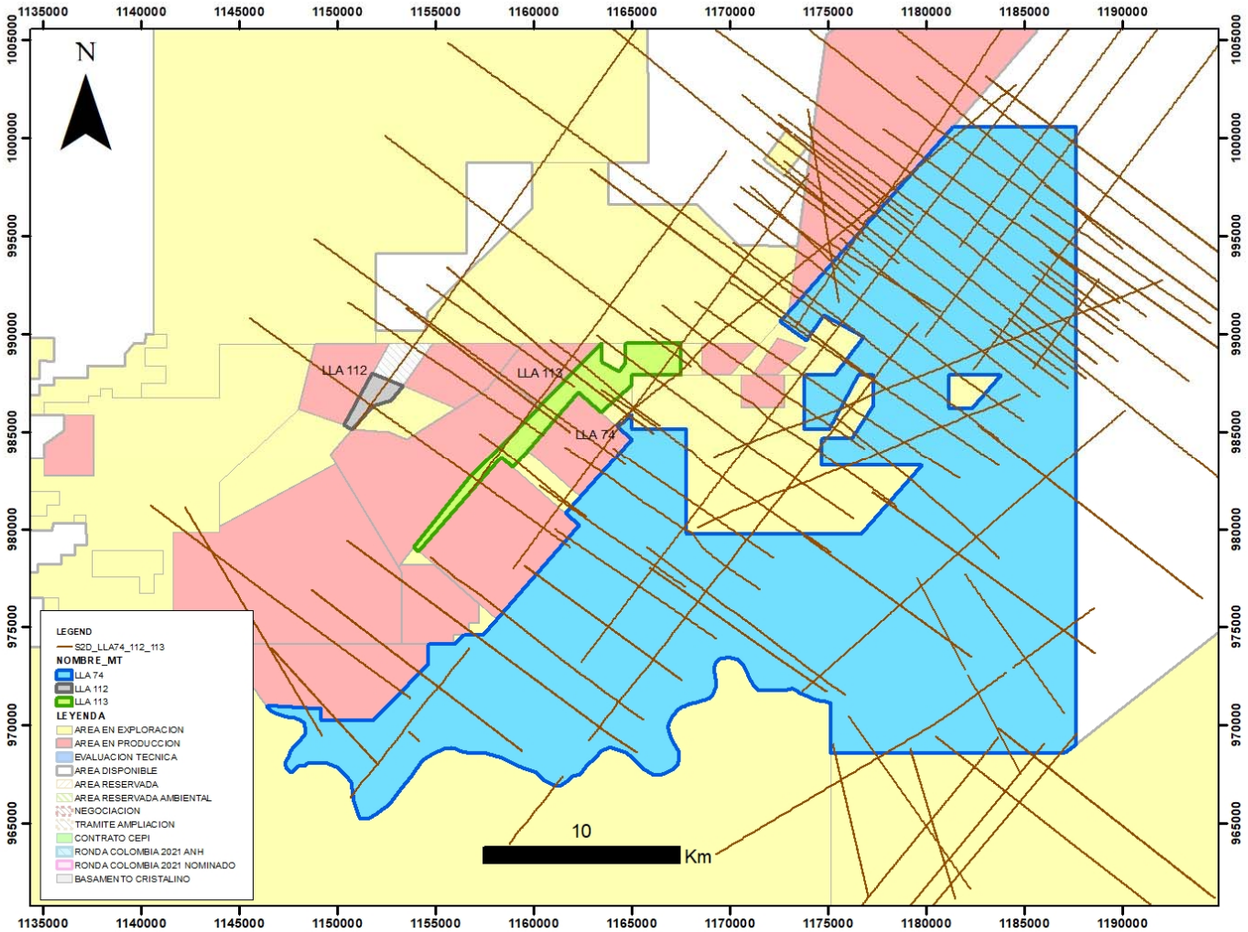
- The ANH evaluation indicates 41.5 MMBO.

| PROSPECT | AREA (Acres) | THICKNESS (Net Pay) (Ft) | POROSITY (%) | SO (%) | Boi | OOIP (BLS) |
|---|---|---|---|---|---|---|
| Pastinaca Basal Sandstone Heavy Oil | 536 | 17 | 0.24 | 0.50 | 1.0500 | 8 078 960 |
| Cusuco 1 Basal Sandstone Heavy Oil | 936 | 17 | 0.22 | 0.50 | 1.0500 | 12 932 364 |
| Guainiz Basal Sandstone Heavy Oil | 1482 | 17 | 0.22 | 0.50 | 1.0500 | 20 476 244 |

# Incorporated Areas

LLA 74 – LLA 112 – LLA 113

# Database – 2D Seismic




**LLA74**

| SURVEY | LINES | TOTAL LENGTH | LENGTH INSIDE |
|---|---|---|---|
| ARIPORO-71 | 7 | 79.5 | 58.8 |
| CHAVIVA-80 | 2 | 91.5 | 2.4 |
| CPO6 2D-2009 | 1 | 19.6 | 1.2 |
| CUERDAS II SARARE-98 | 2 | 32.4 | 4.2 |
| GARIBAY 2D-2006 | 3 | 58.0 | 6.3 |
| LA VORAGINE-89 | 9 | 121.9 | 87.5 |
| LLANOS SECTOR 3-74 | 7 | 128.9 | 7.8 |
| MATAPI-87 | 2 | 26.0 | 2.7 |
| MATAPI-88 | 2 | 16.0 | 0.7 |
| POMARROSO OESTE-85 | 6 | 50.2 | 8.9 |
| PUERTO LOPEZ-75 | 4 | 53.2 | 32.2 |
| SANTIAGO ATALAYAS-73 | 3 | 120.5 | 29.2 |
| SANTIAGO ATALAYAS-74 | 2 | 79.2 | 14.2 |
| UPIA B SUR-85 | 2 | 30.1 | 2.3 |
| UPIA B-90 | 8 | 40.3 | 23.7 |
| UPIA-82 | 8 | 188.2 | 86.8 |
| UPIA-83 | 16 | 260.9 | 127.4 |
| ***Total general*** | ***84*** | ***1396.41*** | ***496.16*** |

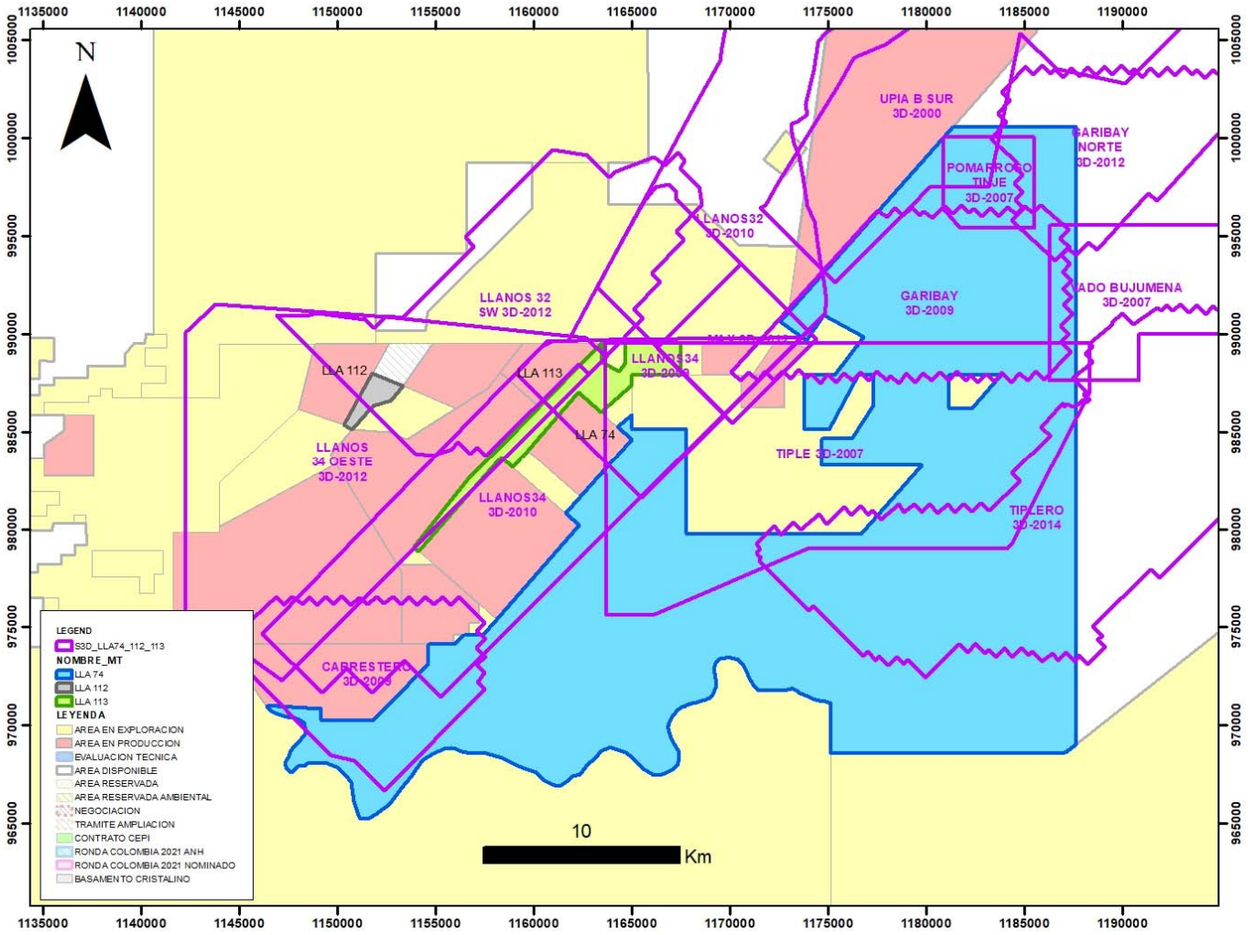
**LLA112**

| SURVEY | LINES | TOTAL LENGTH | LENGTH INSIDE |
|---|---|---|---|
| LLANOS SECTOR 3-74 | 2 | 55.0 | 3.3 |
| ***Total general*** | ***2*** | ***55.03*** | ***3.33*** |

**LLA113**

| SURVEY | LINES | TOTAL LENGTH | LENGTH INSIDE |
|---|---|---|---|
| CUERDAS II SARARE-98 | 2 | 24.1 | 3.6 |
| LLANOS SECTOR 3-72 | 1 | 21.9 | 3.9 |
| LLANOS SECTOR 3-74 | 6 | 98.6 | 8.5 |
| LLANOS SECTOR 3-75 | 2 | 21.3 | 1.7 |
| UPIA-82 | 1 | 16.1 | 1.6 |
| UPIA-83 | 3 | 57.6 | 1.7 |
| ***Total general*** | ***15*** | ***239.61*** | ***20.93*** |

# RONDA COLOMBIA 2021 Database – 3D Seismic




LLA74 (66.7%) LLA112 (100%) LLA113 (100%)

**LLA74**

| 3D SURVEY | AREA_TOTAL | AREA_INSIDE |
|---|---|---|
| CABRESTERO 3D-2009 | 83.3 | 29.5 |
| GARIBAY 3D-2009 | 112.7 | 99.1 |
| GARIBAY NORTE 3D-2012 | 81.7 | 19.6 |
| LLANOS32 3D-2010 | 283.4 | 3.5 |
| LLANOS34 3D-2009 | 114.3 | 9.7 |
| LLANOS34 3D-2010 | 212.5 | 29.1 |
| MAX 3D-2012 | 32.8 | 0.9 |
| POMARROSO TINJE 3D-2007 | 21.1 | 21.1 |
| TIPLE 3D-2007 | 265.5 | 155.5 |
| TIPLERO 3D-2014 | 339.4 | 114.2 |
| UPIA B SUR 3D-2000 | 192.6 | 16.8 |
| VADO BUJUMENA 3D-2007 | 81.4 | 10.8 |
| ***Total Inside*** | | ***400.28*** |

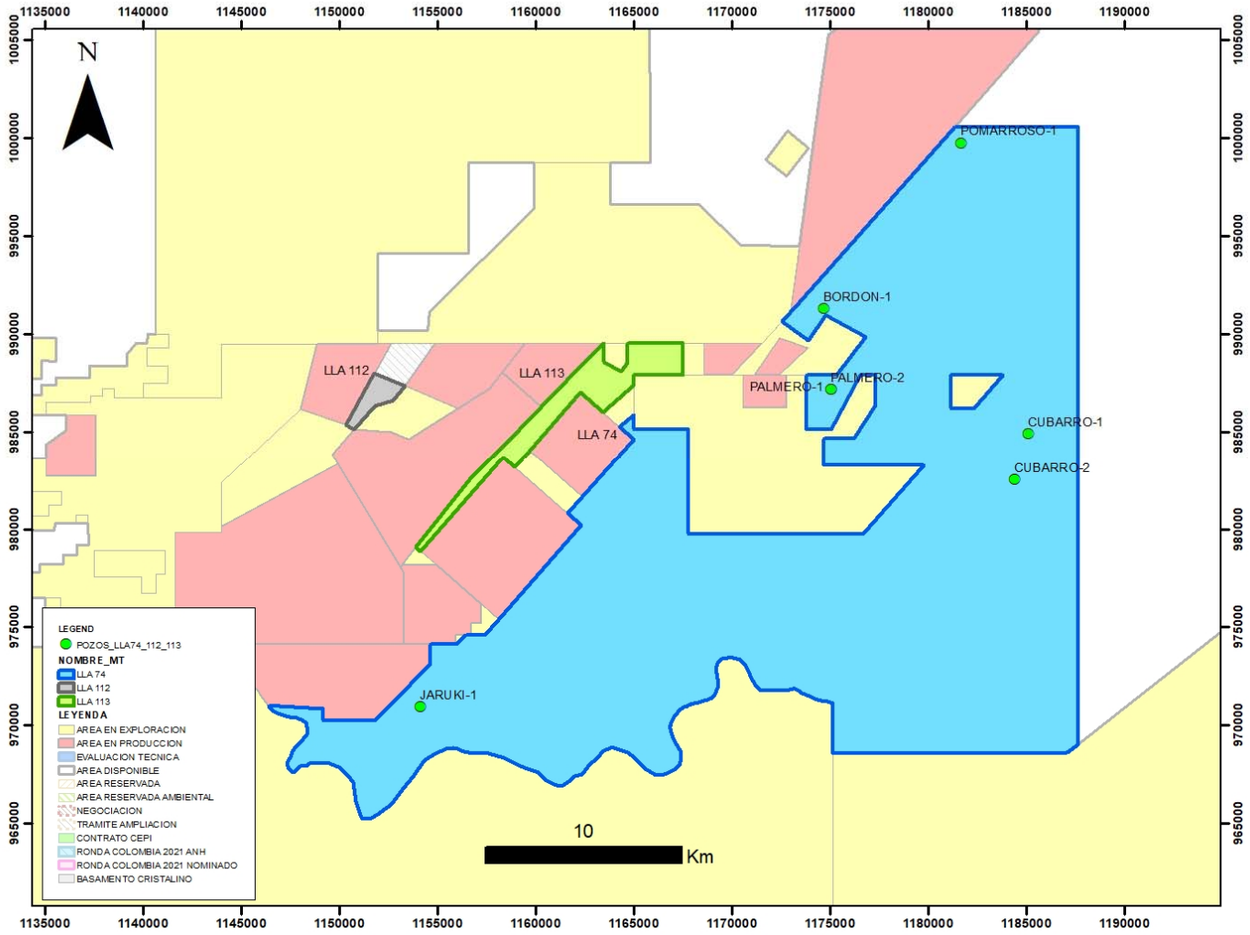
**LLA112**

| 3D SURVEY | AREA_TOTAL | AREA_INSIDE |
|---|---|---|
| LLANOS 34 OESTE 3D-2012 | 248.8 | 3.1 |
| LLANOS 32 SW 3D-2012 | 158.2 | 2.2 |
| ***Total Inside*** | | ***3.13*** |

**LLA113**

| 3D SURVEY | AREA_TOTAL | AREA_INSIDE |
|---|---|---|
| LLANOS32 3D-2010 | 283.4 | 1.0 |
| LLANOS 34 OESTE 3D-2012 | 248.8 | 6.8 |
| LLANOS 32 SW 3D-2012 | 158.2 | 0.8 |
| MAX 3D-2012 | 32.8 | 1.0 |
| LLANOS34 3D-2009 | 114.3 | 11.7 |
| LLANOS34 3D-2010 | 212.5 | 18.4 |
| TIPLE 3D-2007 | 265.5 | 6.6 |
| ***Total Inside*** | | ***18.44*** |

# RONDA COLOMBIA 2021 Database - Wells

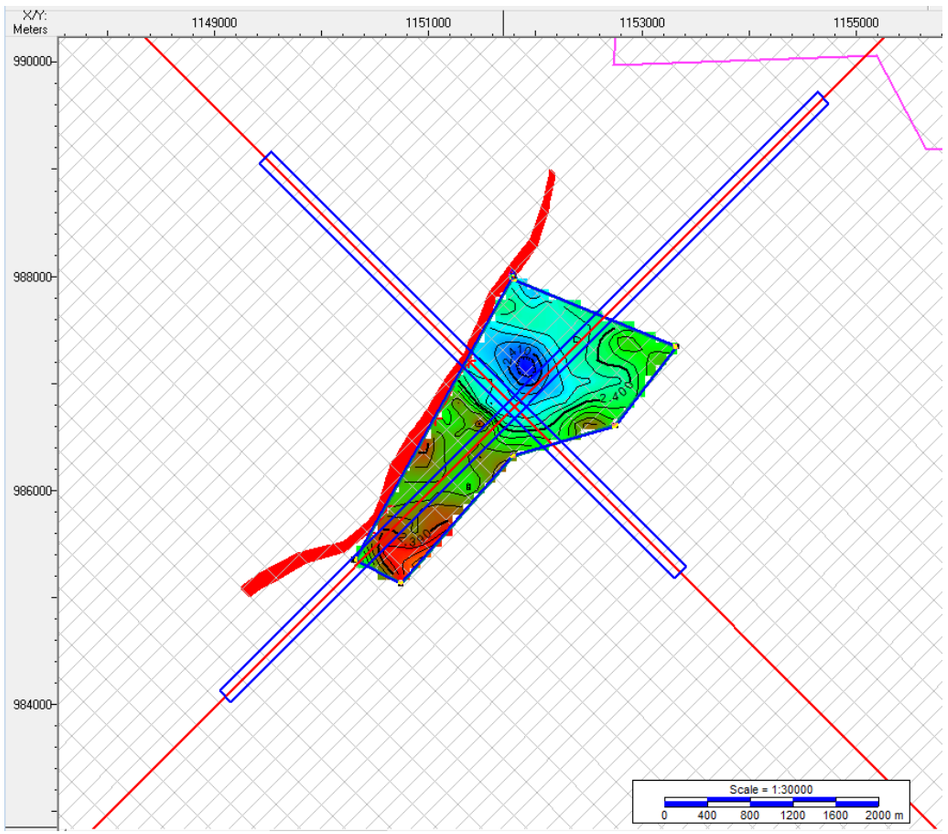



- LLA 74 Wells

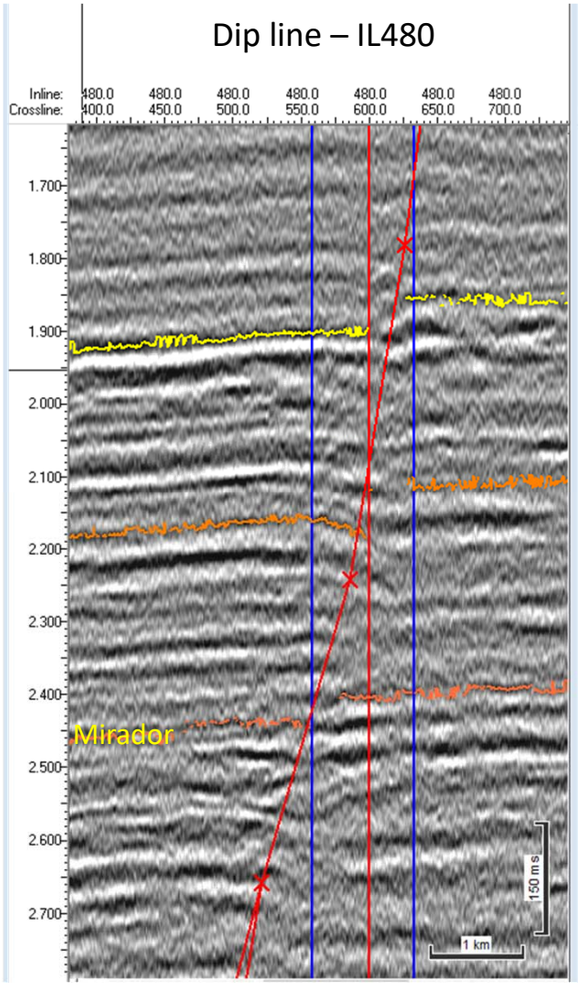
| WELL_NAME | UWI | RTE | WELL_TD | WELL_TVD | WELL_SPUD |
|---|---|---|---|---|---|
| BORDON-1 | BORD0001 | 585 | 9680 | 9680 | 06/06/2012 |
| CUBARRO-1 | CUBA0001 | 554 | 8952 | 8952 | 17/02/2010 |
| CUBARRO-2 | CUBA0002 | 552 | 8556 | 8556 | 30/04/2013 |
| JARUKI-1 | JARU0001 | 573 | 10282 | 9585 | 01/05/2016 |
| PALMERO-1 | PLMO0001 | 581 | 9492 | 9492 | 21/04/2012 |
| PALMERO-2 | PLMO0002 | 581 | 9024 | 8776 | 01/06/2012 |
| POMARROSO-1 | POMA0001 | 592 | 10285 | 10269 | 27/06/1983 |

- LLA112 & LLA113 (No Wells)

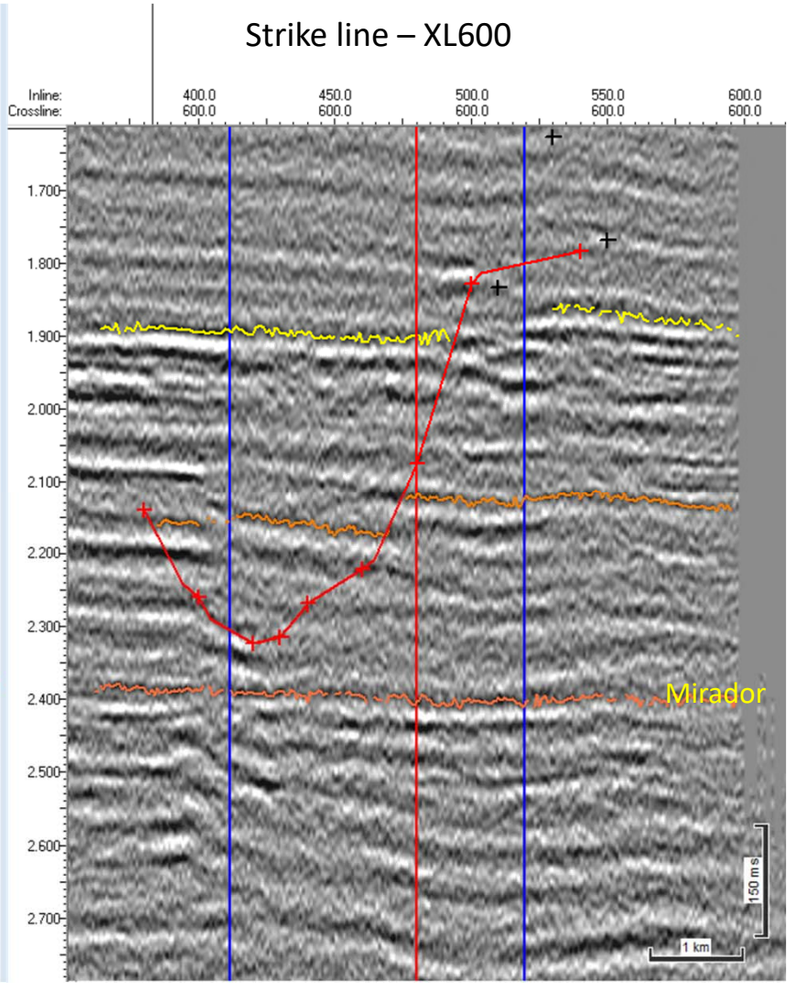
# LLANOS 34 OESTE 3D-2012



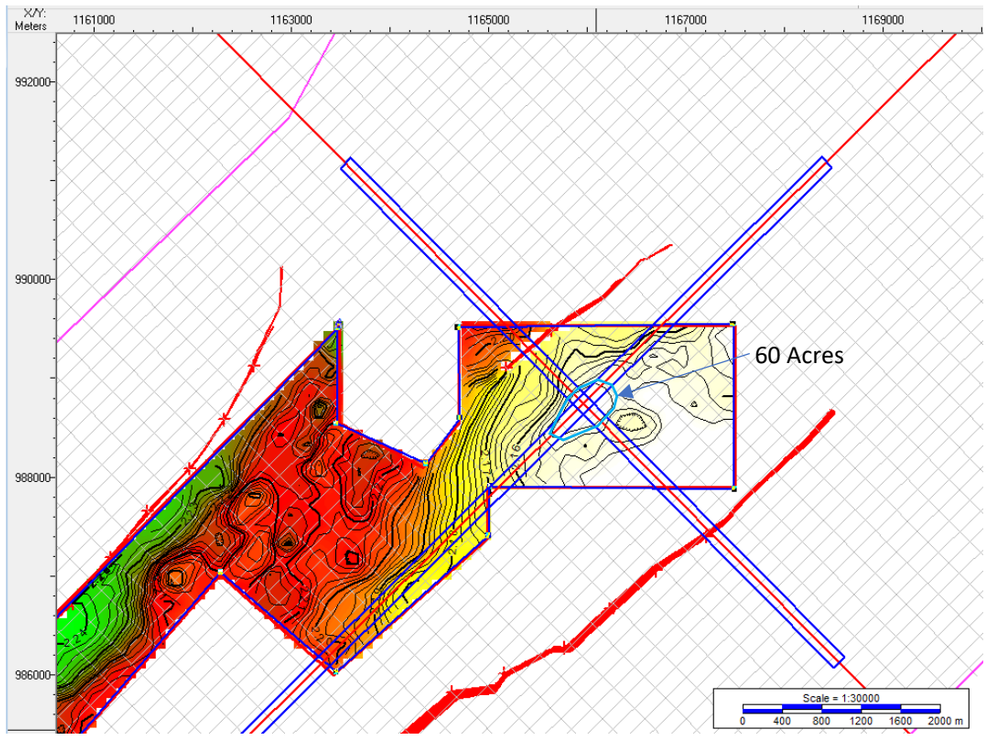

Dip line – IL480

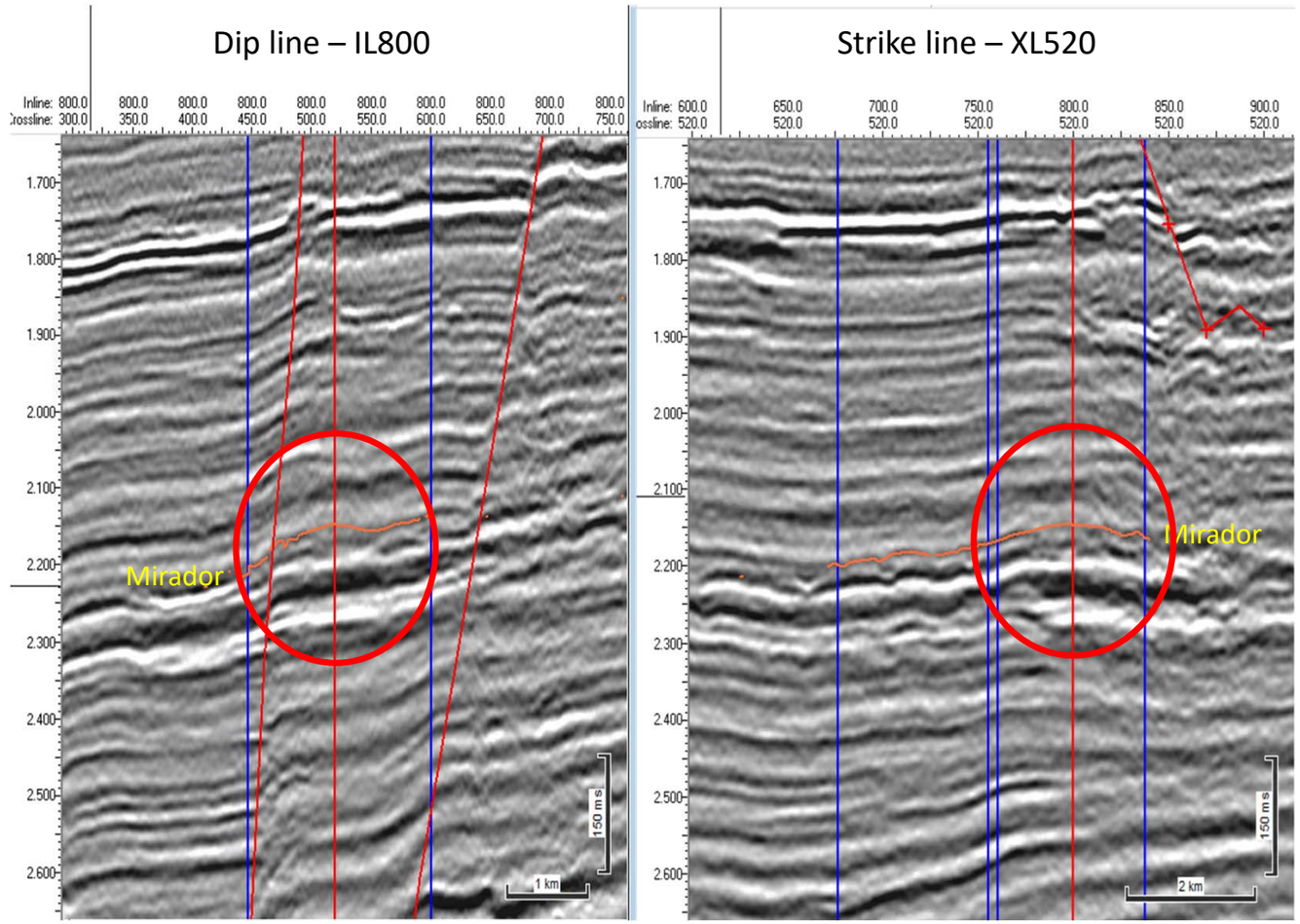



Strike line – XL600

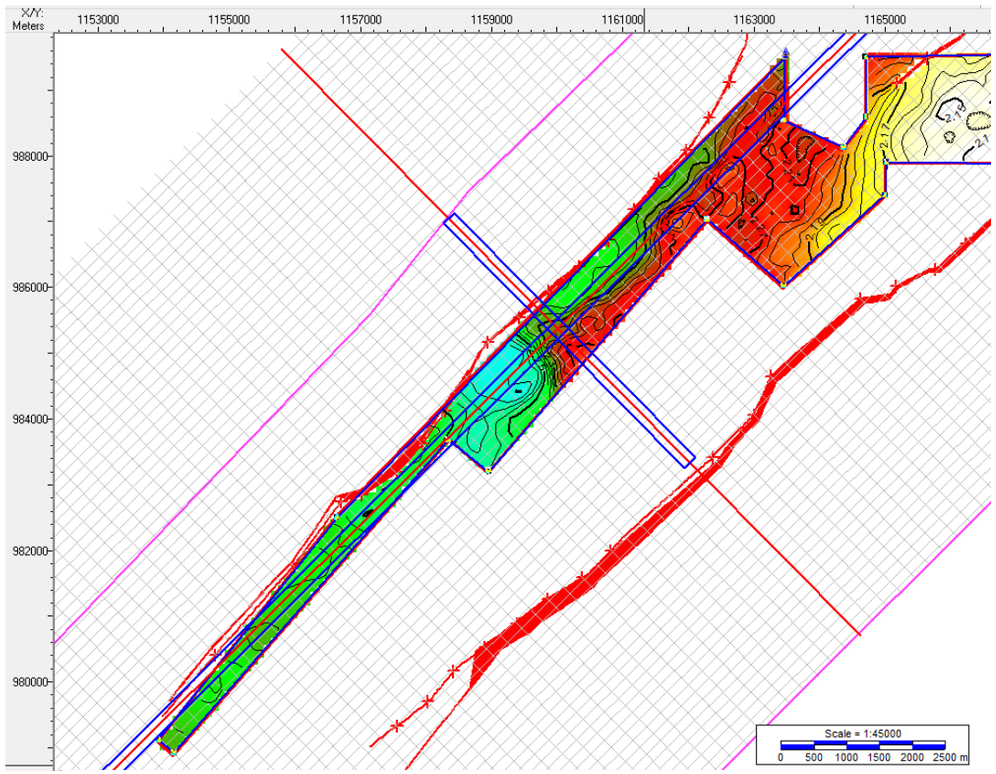


# MERGE LLANOS 34 3D-2009-2010

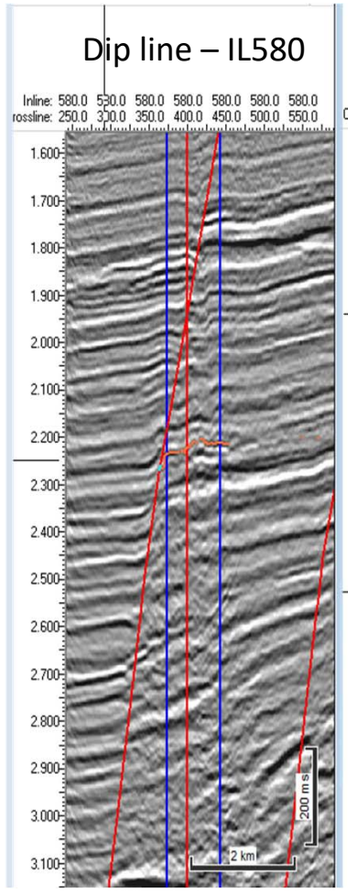


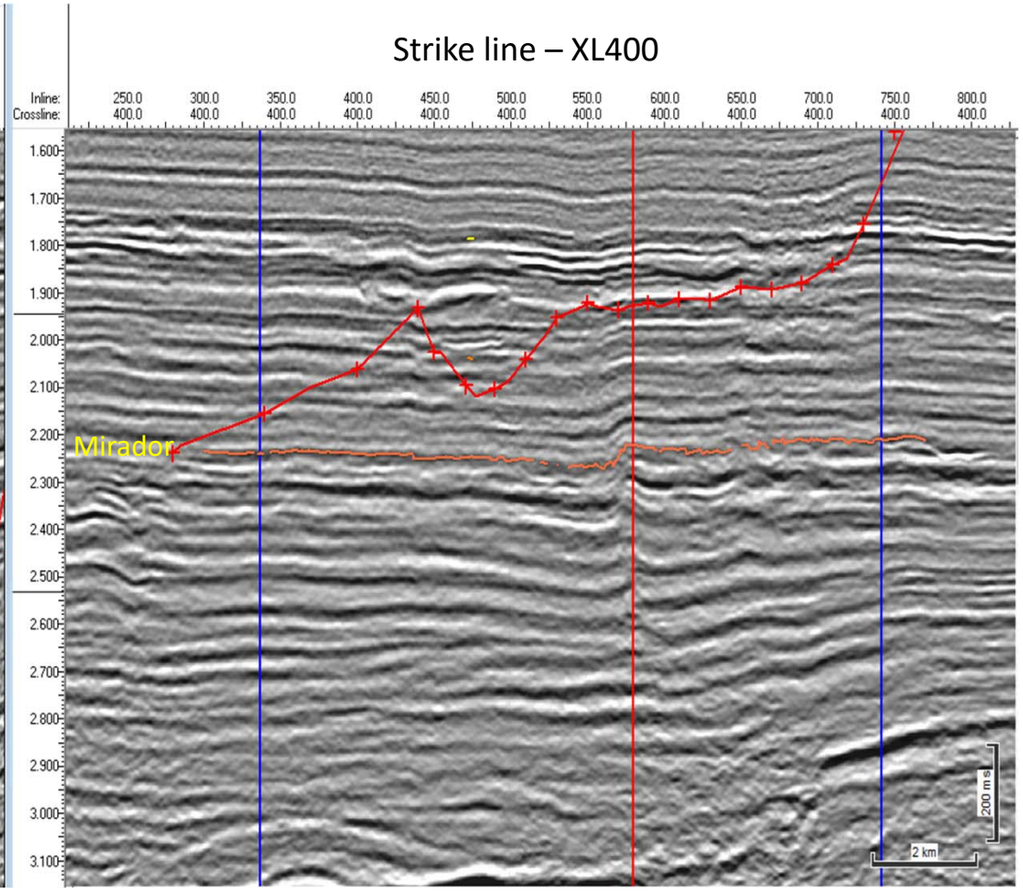
# MERGE LLANOS 34 3D-2009-2010

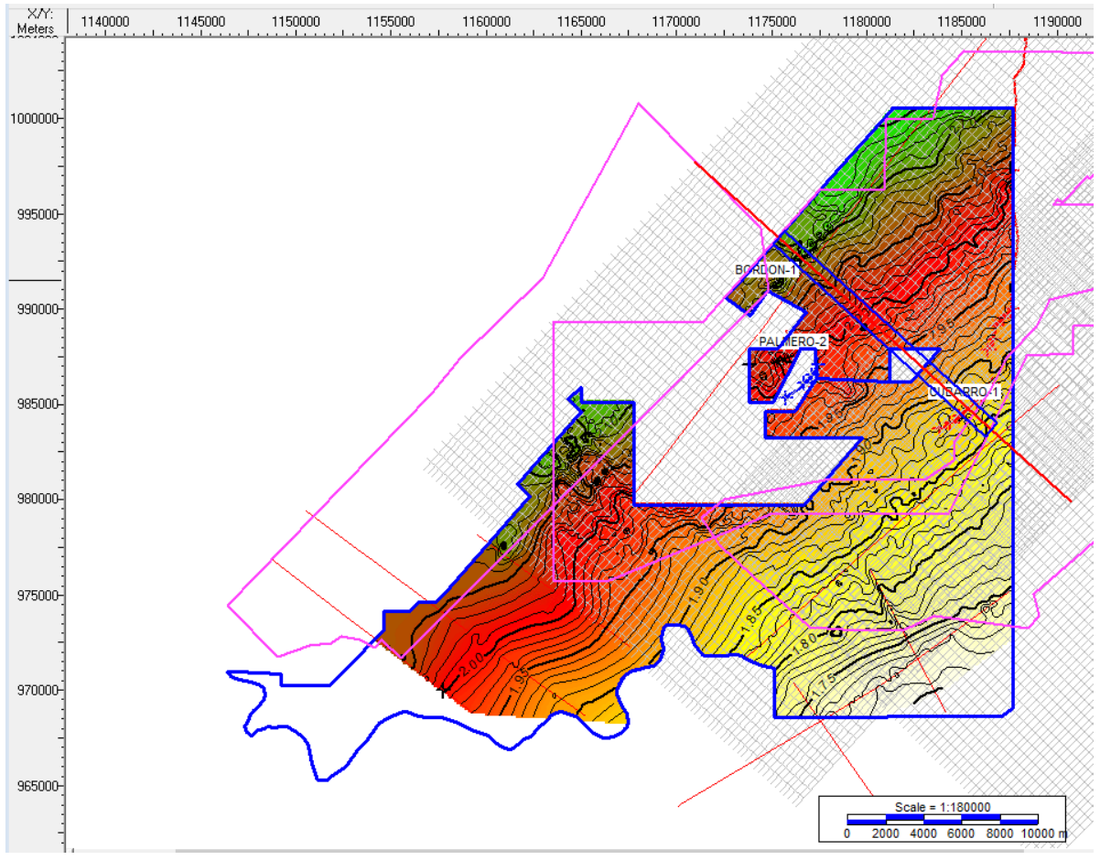



Dip line – IL580

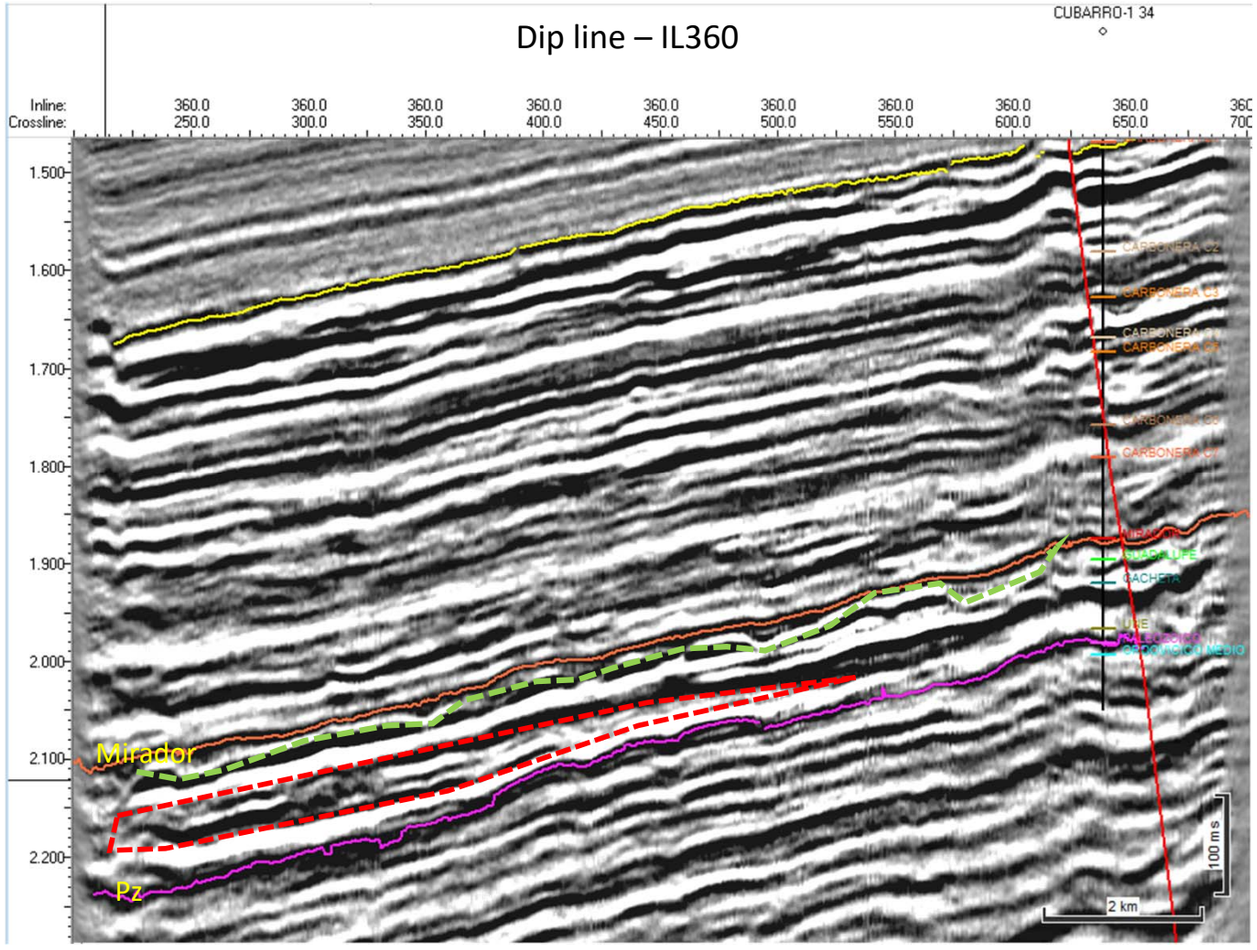


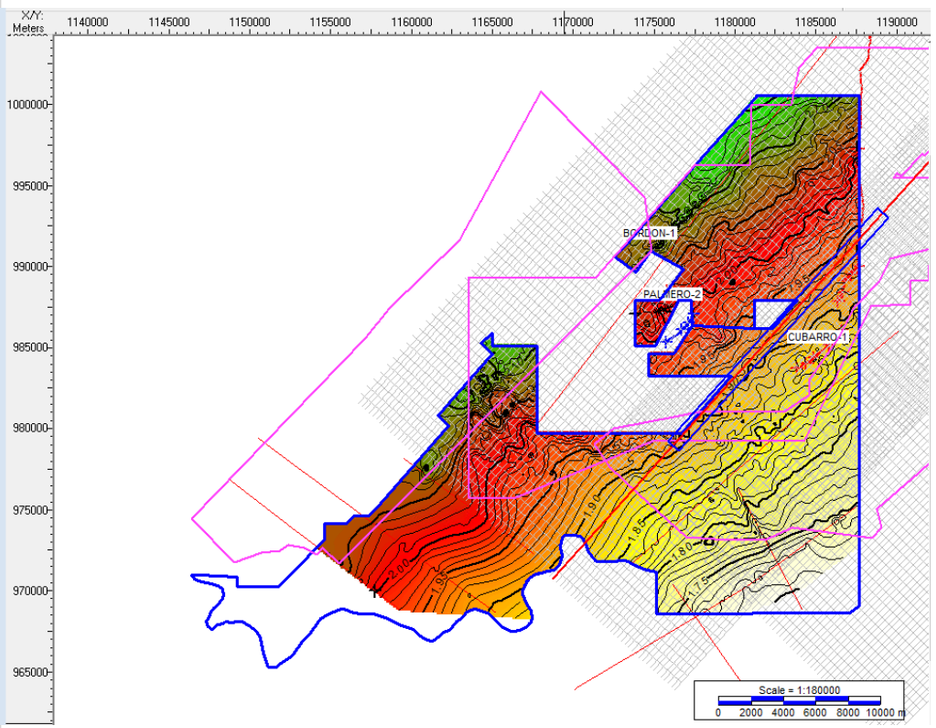

Strike line – XL400



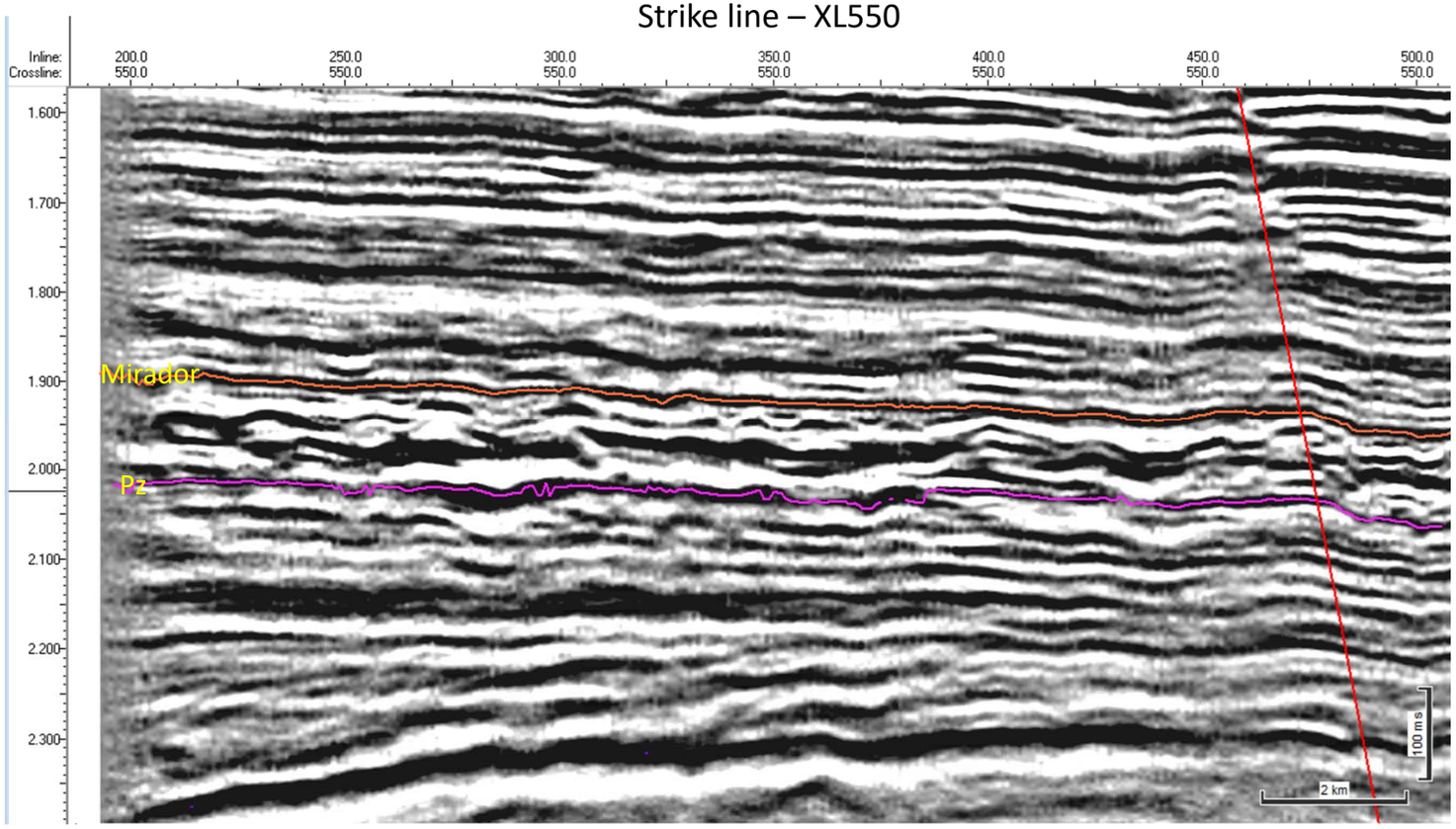



Dip line – IL360

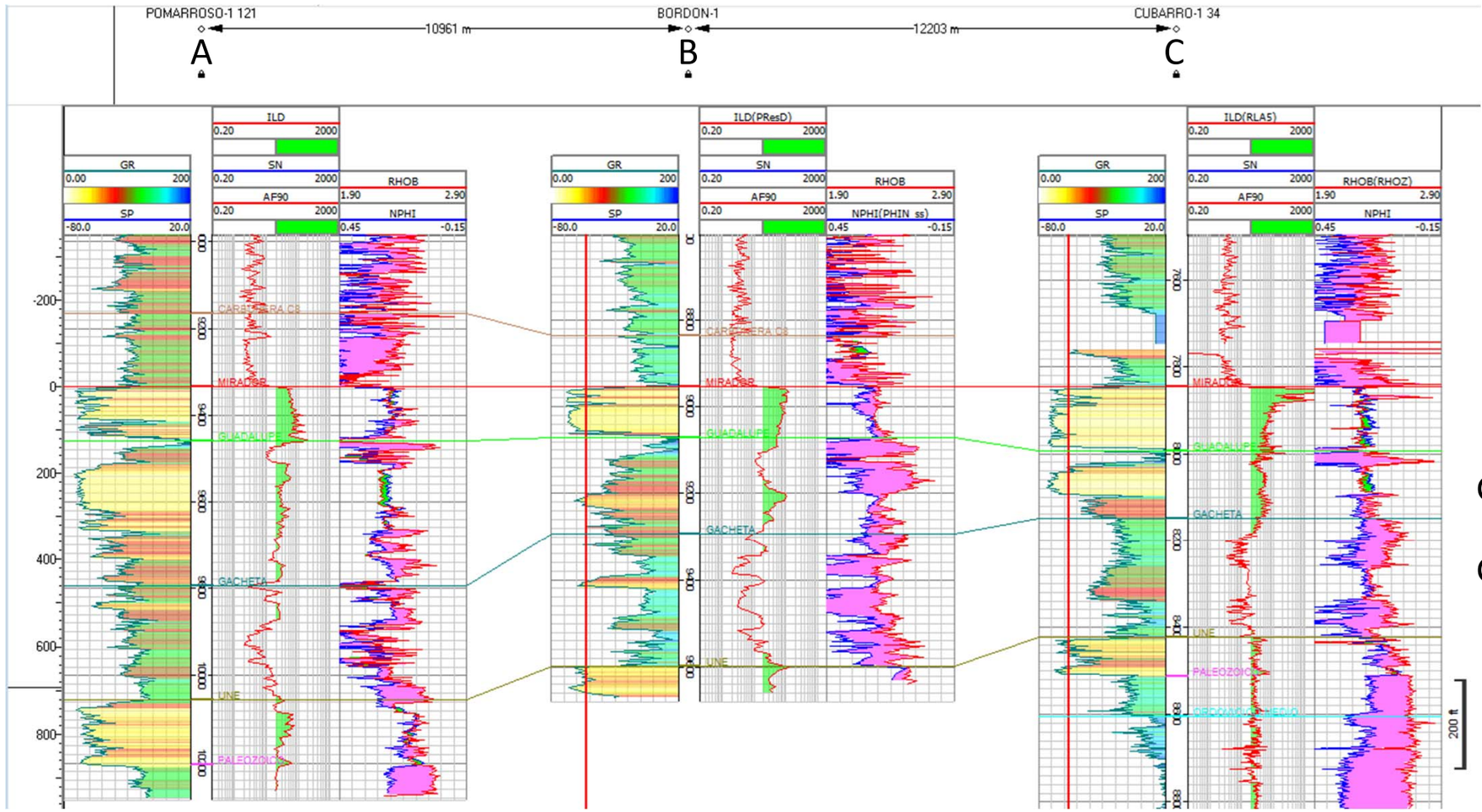


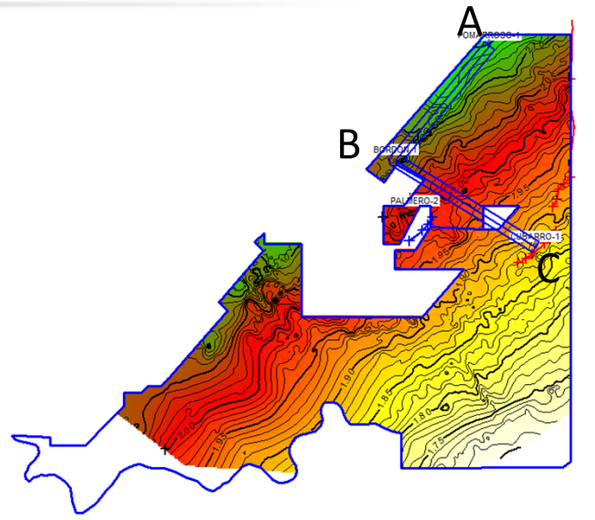



Strike line – XL550



# LLA 74 – Stratigraphic Correlation (Mirador Datum)




Mirador

Guadalupe

Guacheta

Une

# Recommendations

- Perform more exhaustive revisions looking for stratigraphic traps in levels between the Mirador and the Paleozoic unconformity.
- Carry out studies of seismic attributes that allow to define better the structural component of the proposed areas.

# Thanks