ANH
AGENCIA NACIONAL DE HIDROCARBUROS

El futuro es de todos

Minenergía

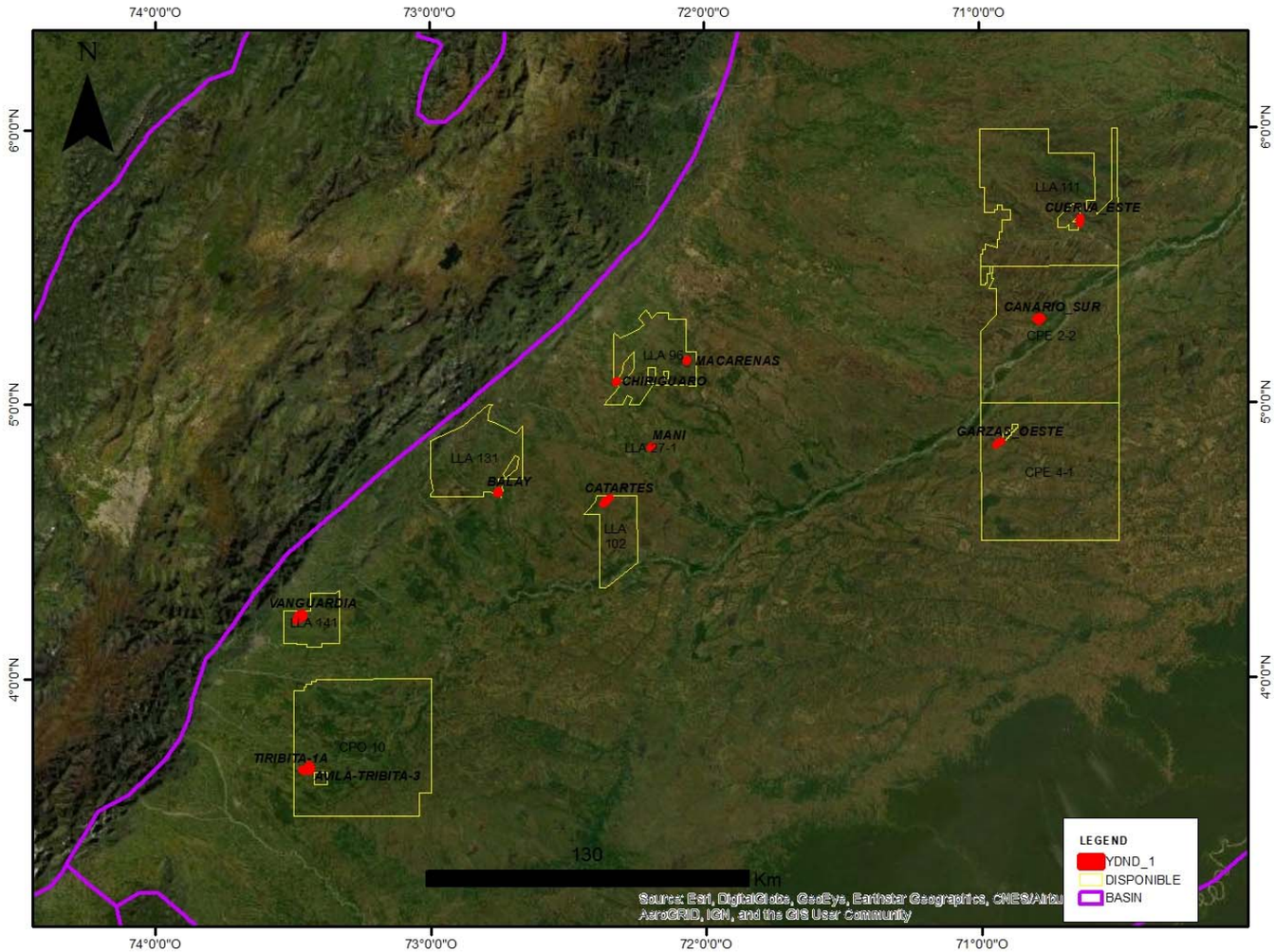
RONDA COLOMBIA 2021

Llanos Basin:
Undeveloped Already Discovered Reservoirs (UADR)

September 17th, 2021

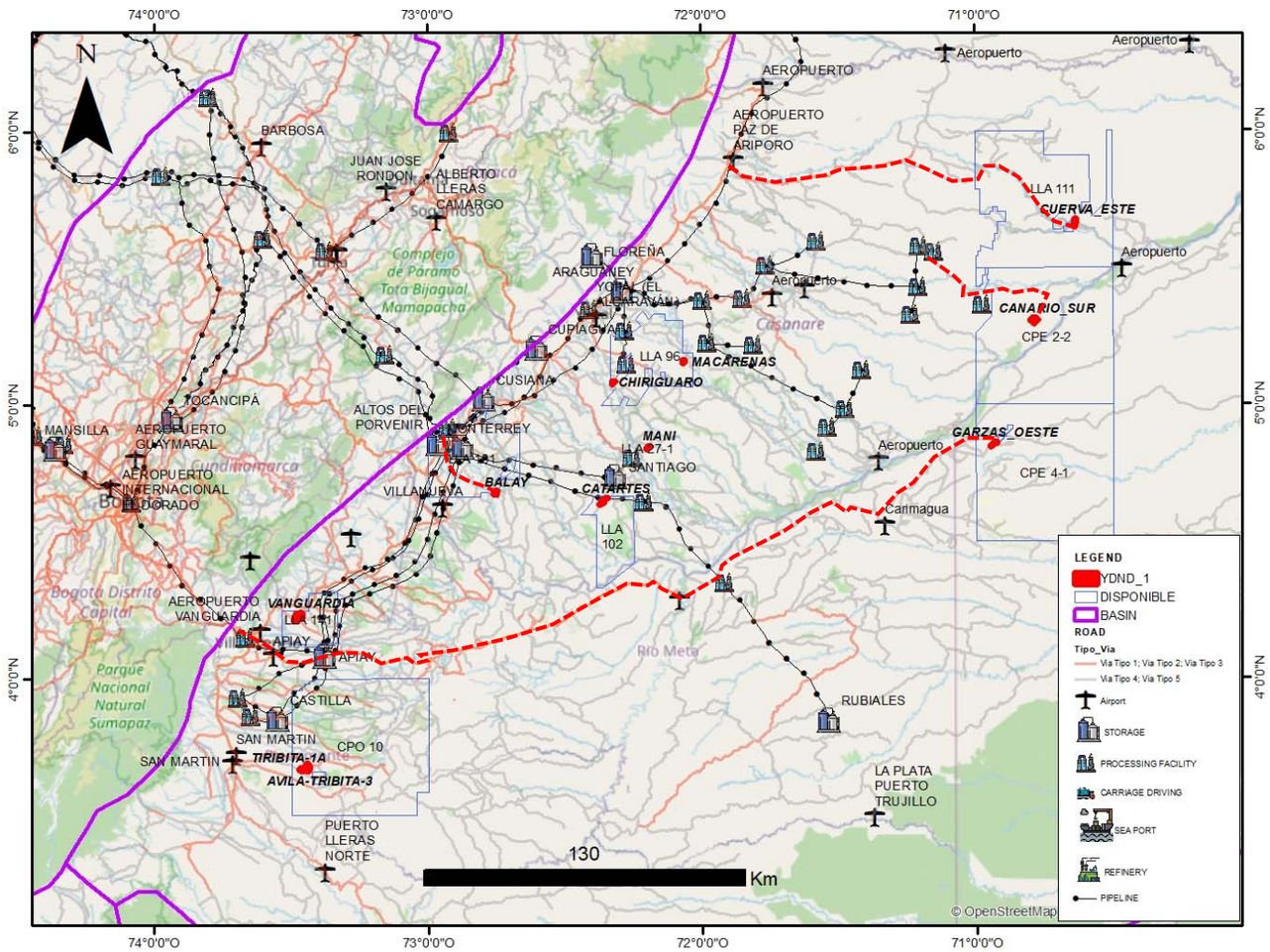
Content

Location



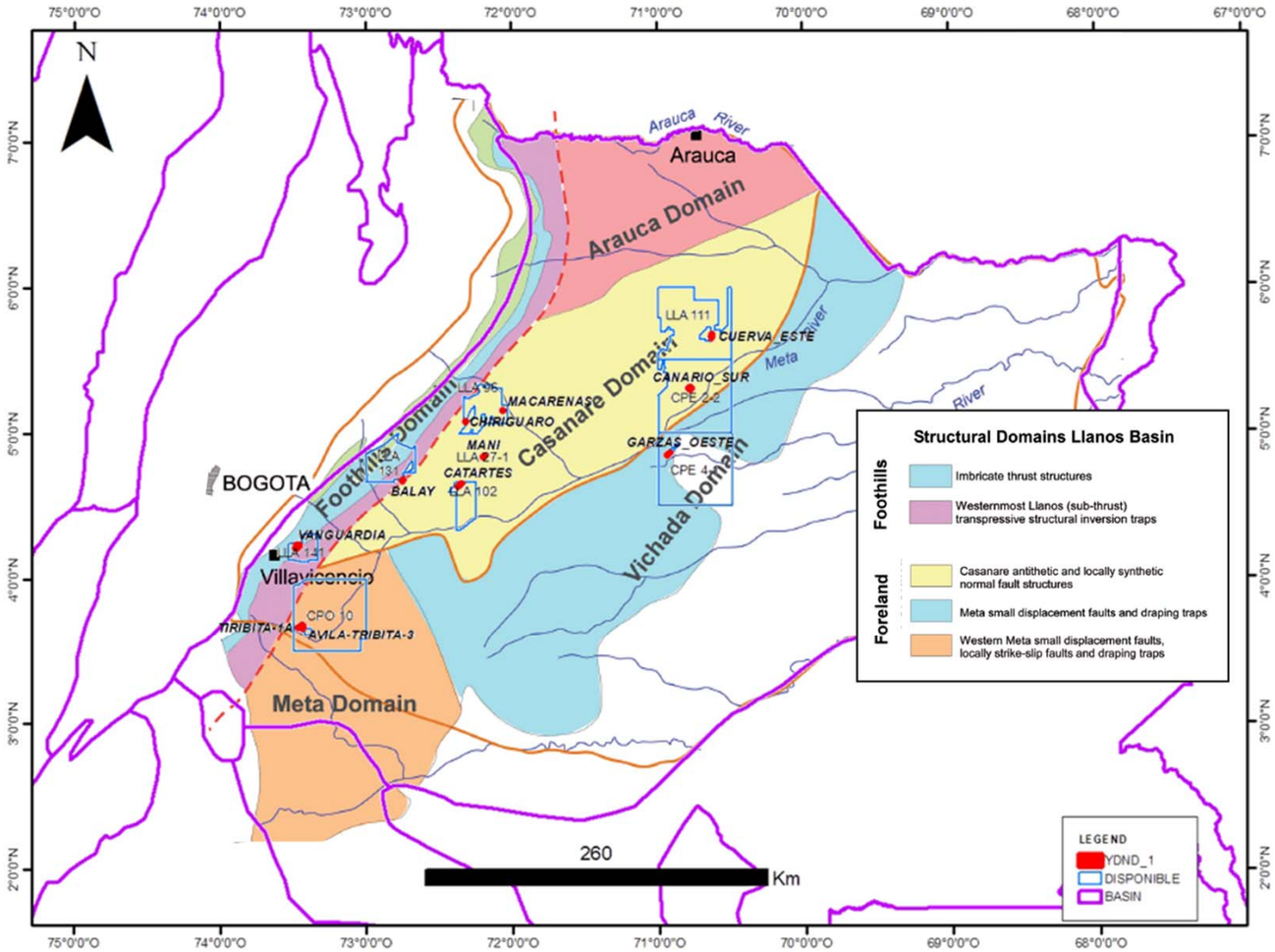
- Meta Department
  - Tiribita (San Martín)
  - Vanguardia (Restrepo-Cumaral)
- Casanare Department
  - Balay (Monterrey)
  - Catartes (Maní)
  - Maní (Maní)
  - Macarenas (Yopal)
  - Chiriguaro (Yopal)
  - Canario Sur (Trinidad)
  - Cuerva Oeste (Paz de Ariporo)
- Vichada Department
  - Garzas Oeste (Santa Rosalía)

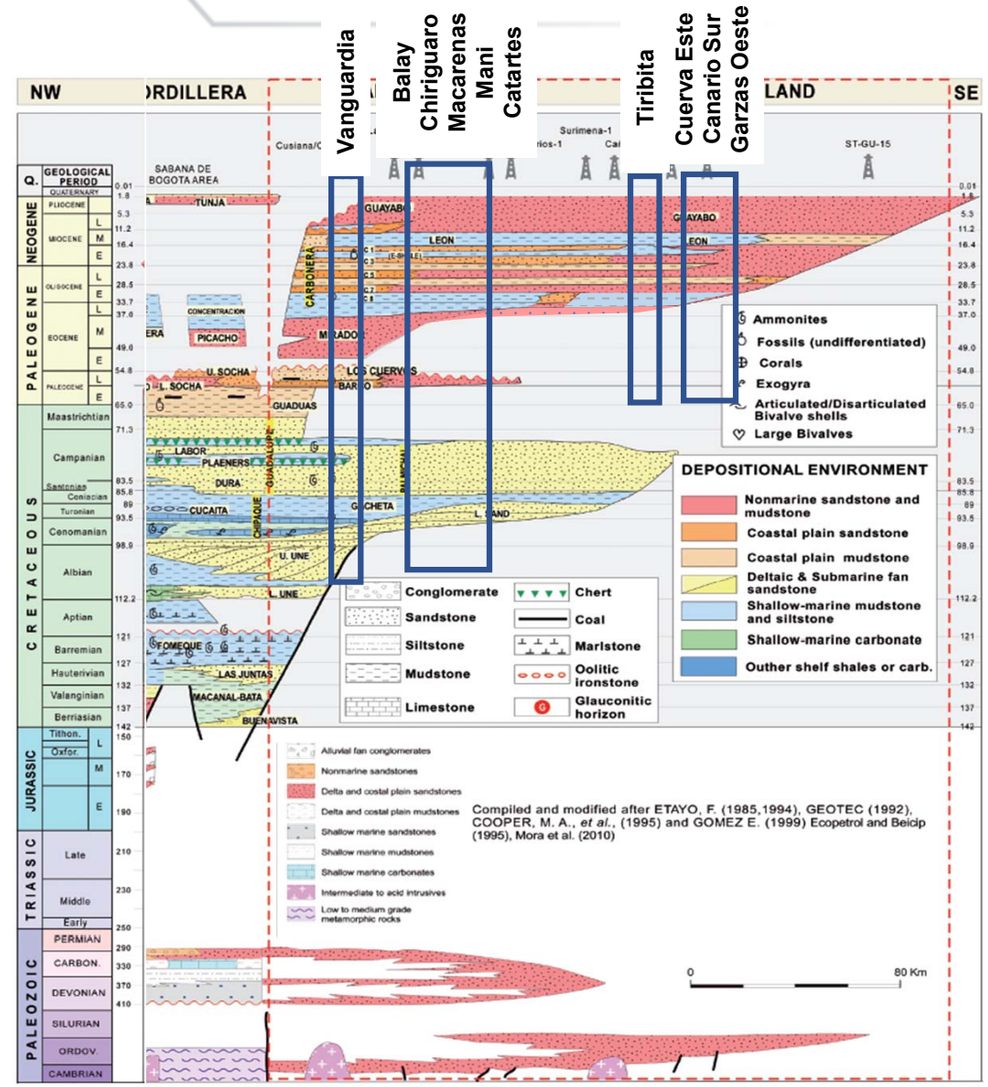
Infrastructure



- Macarenas
  - Near to Tiloridan oil facilities
- Chiriguaro
  - Near to La Gloria oil facilities
- Maní-Catartes
  - Near to Santiago oil facilities
- Balay
  - Road to connect to Porvenir Processing Facility
- Vanguardia
  - Near to Apiay oil facilities
- Avila - Tiribita
  - Road to connect to San Martín town
- Garzas Oeste
  - Near to Garzas Doradas oil facilities and Road to connect to Puerto Gaitan town and Villavicencio city
- Canario Sur
  - Road to connect to Corocora and Los Toros oil faclities
- Cuerva Este
  - Near to Cuerva oil facilities and road to connect to Paz de Ariporo town

Geological Framework

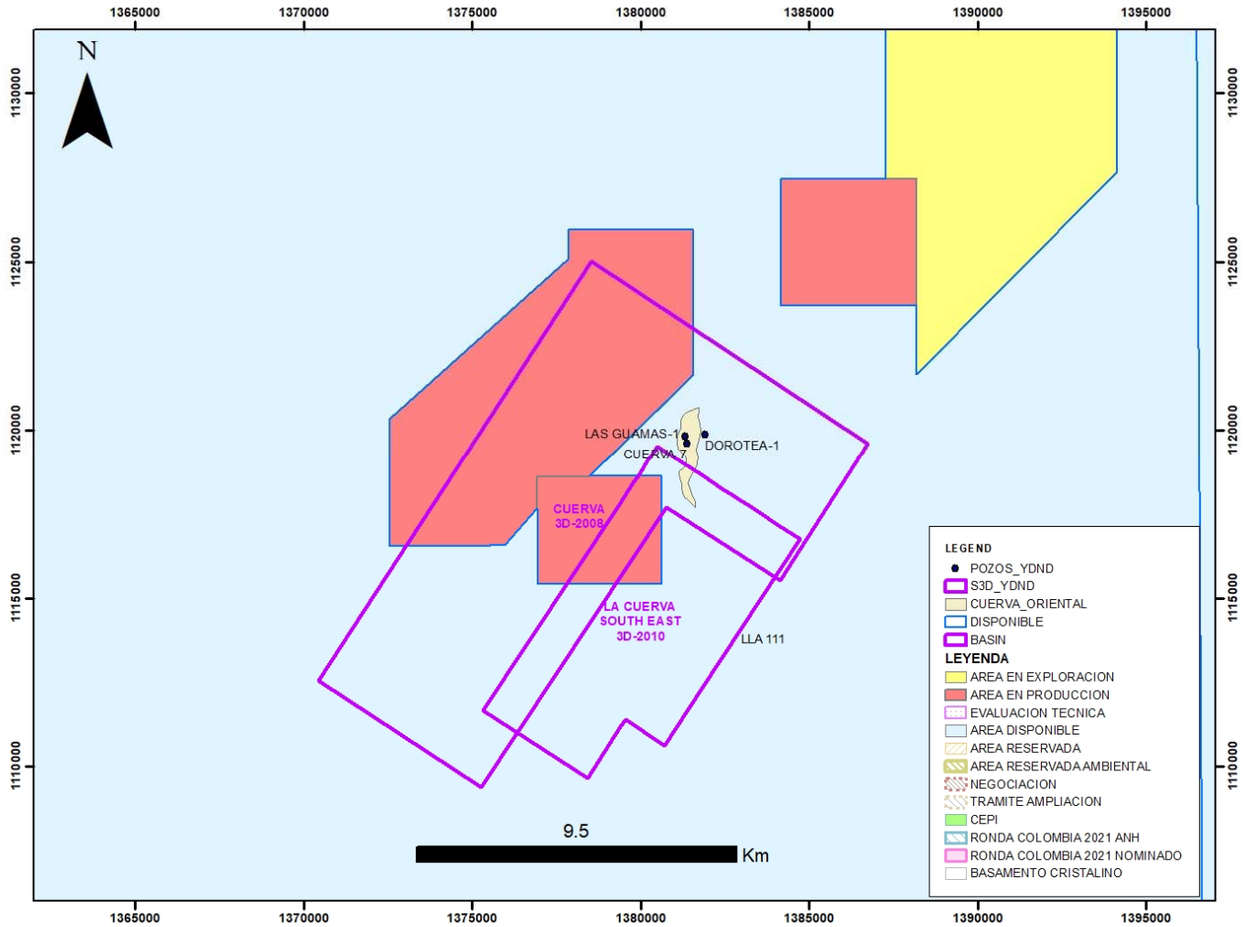




LLA 111 Available Area

Cuerva Este UARD

Database

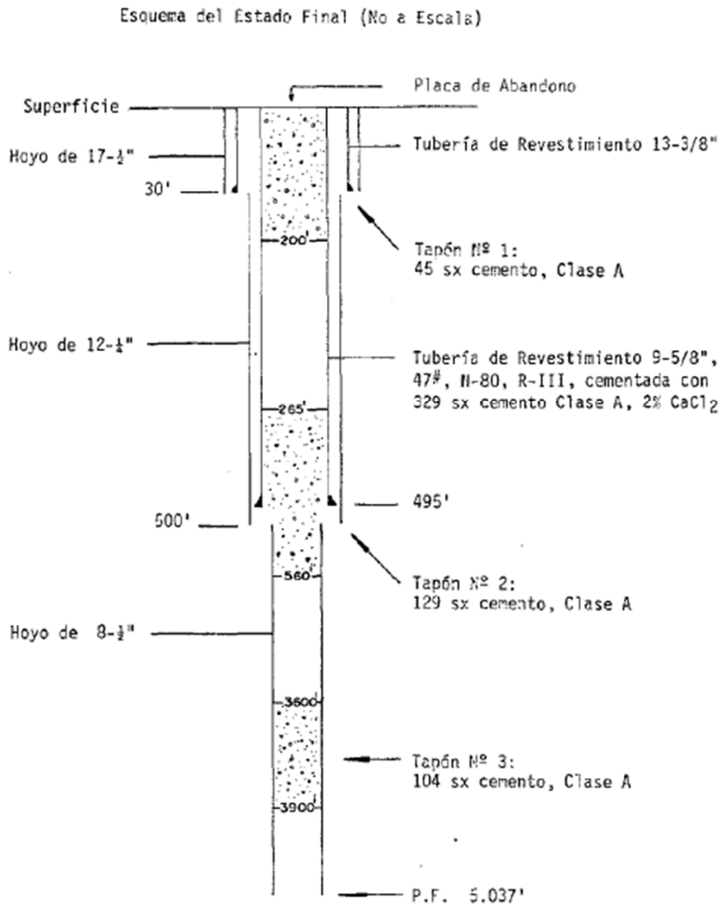


- 3D Seismic
  - CUERVA_3D-2008 (102Km^2)
  - CUERVA SOUTH EAST 3D-2008 (44Km^2)

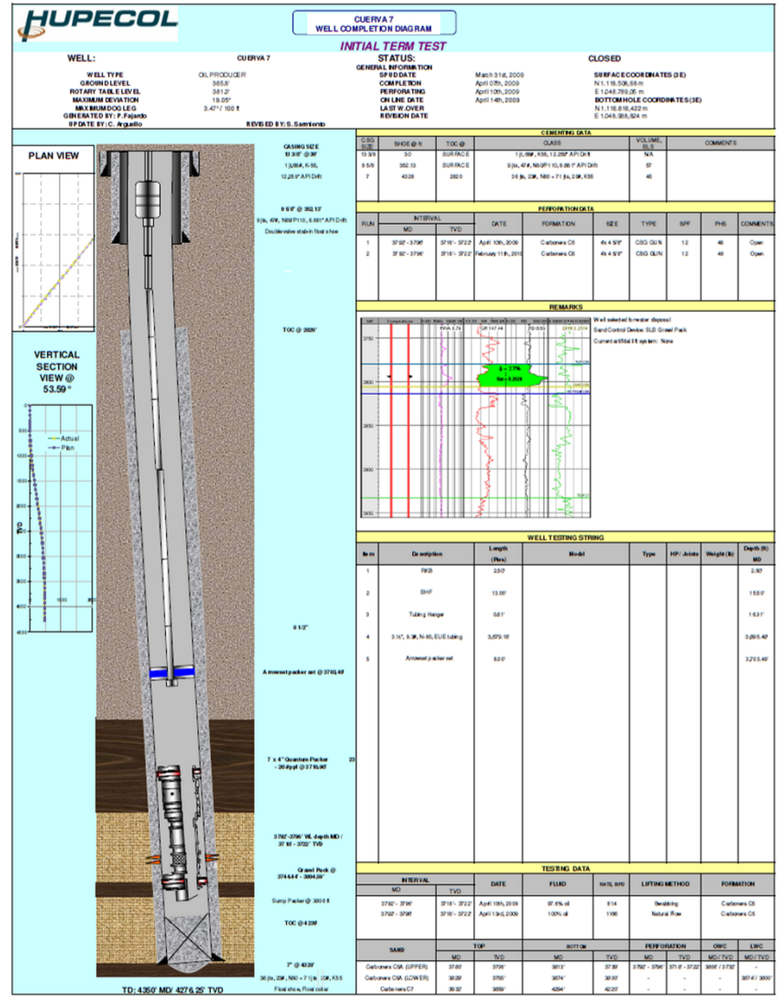
- Wells
  - Las Guamas-1
  - Dorotea-1
  - Cuerva-7

RONDA COLOMBIA 2021 Well Status

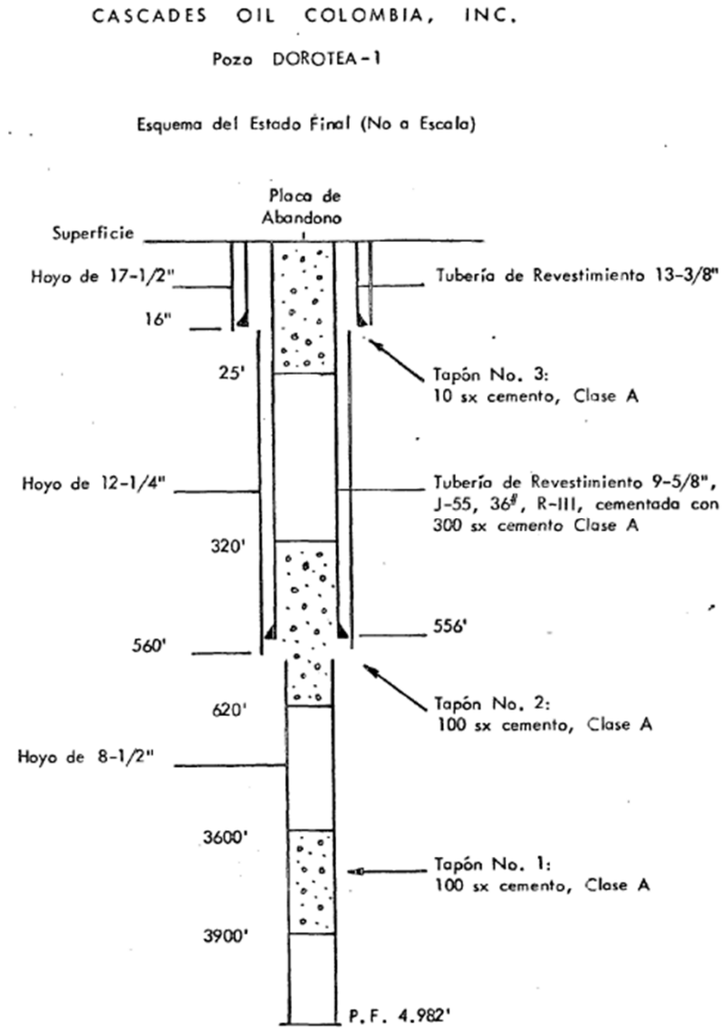
LAS GUAMAS-1



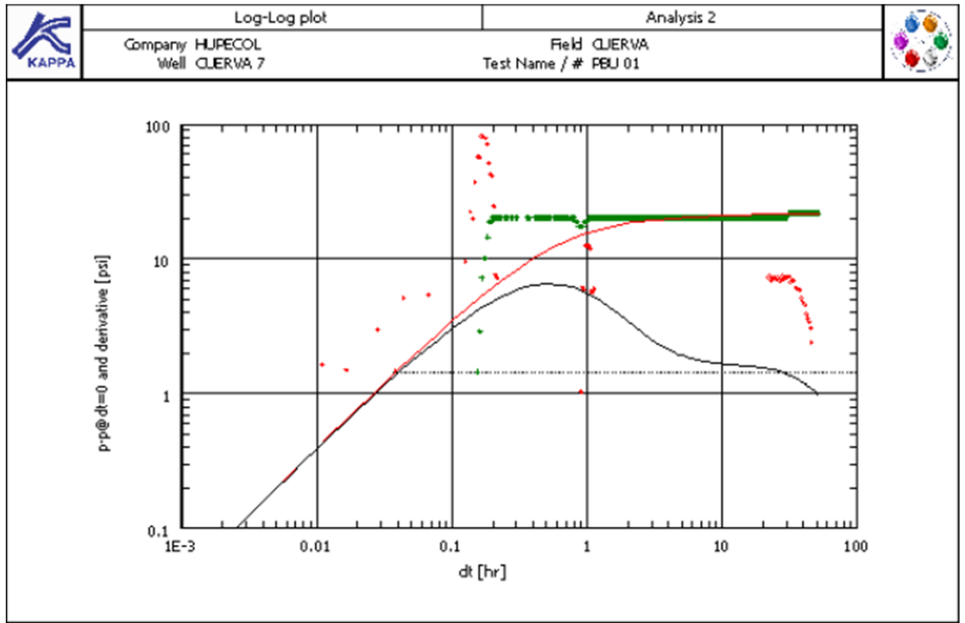
CUERVA-7



DOROTEA-1



RONDA COLOMBIA 2021 Cuerva-7 Test



Data Pressure Cuerva 7 build-up #1

Rate	0 STB/D
Rate change	340.607 STB/D
P@dt=0	1458.7 psia
Pi	1480.92 psia
Smoothing	0.1

Default values are used!

Selected Model

Model Option	Standard Model
Well	Vertical, Changing Storage (Fair)
Reservoir	Homogeneous
Boundary	Circle, No flow

Main Model Parameters

TMatch	14.1 [hr]-1
PMatch	0.35 [psia]-1
C	0.366 bbl/psi
Total Skin	-0.784
k.h, total	2.44E+5 md.ft
k, average	9370 md
Pi	1480.92 psia

Model Parameters

Well & Wellbore parameters (CUERVA 7)

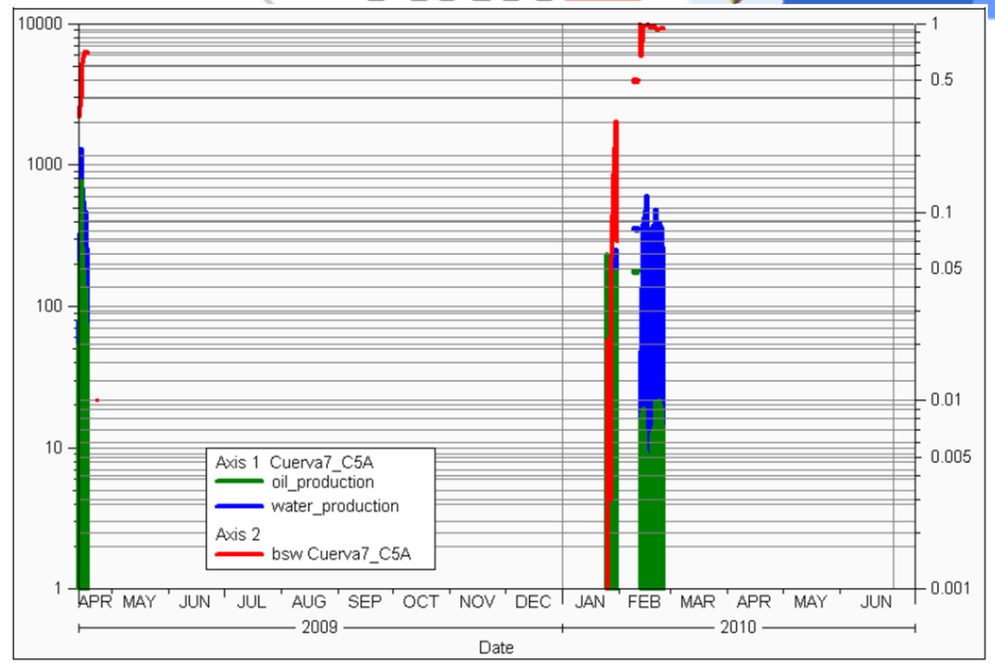
C	0.366 bbl/psi
Cf/Cf	1
delta_t	1.43E-5 hr
Skin	-0.784

Reservoir & Boundary parameters

Pi	1480.92 psia
ko_eq.h	2.44E+5 md.ft
ko_eq	9370 md
kro	0.5
Re - No flow	5000 ft

Derived & Secondary Parameters

ko (Perrine)	510 md
kw (Perrine)	281 md
Delta P (Total Skin)	-2.24015 psi
Delta P Ratio (Total Skin)	-0.102357 Fraction
Pbar	1480.64 psia



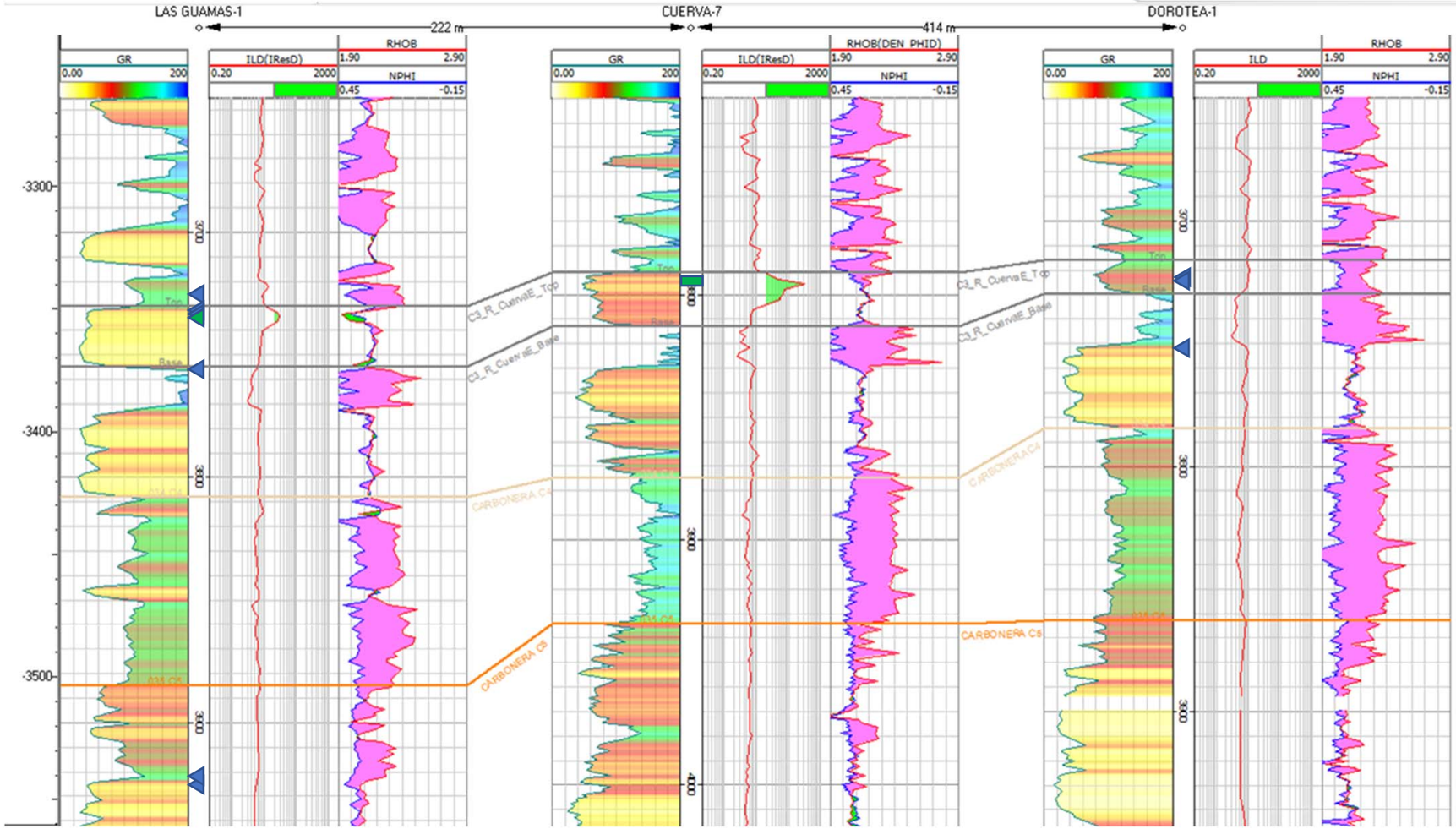
Initial tests of the well took place between April 13 and April 18, 2009. The average daily production of the well for 4.5 days that the test lasted was 540 BFPD, with a final BS&W of 70%. The well is temporarily closed.

The cumulative production of the Cuerva-7 well had an accumulated of 3,152 Bls of fluid, 1,412 Bls of crude oil, API 19.7° @ 60°F, in 2009.

The well opens again in natural flow on January 25, 2010, once the early production facility at the Cuerva 1 well location for the start of extensive testing has been completed. The well flowed 7 days after an increase in water cut the well stops flowing, the average rate during this period was 100 BOPD, 19 BWPD with a water cut of 30%.

Between February 8 and 12, workover work is carried out to complete the well with an electrosinkable pump; the well flows for a few days with a low potential of 14 BOPD and 340 BWPD and water cut of 99%.

Structural Correlation

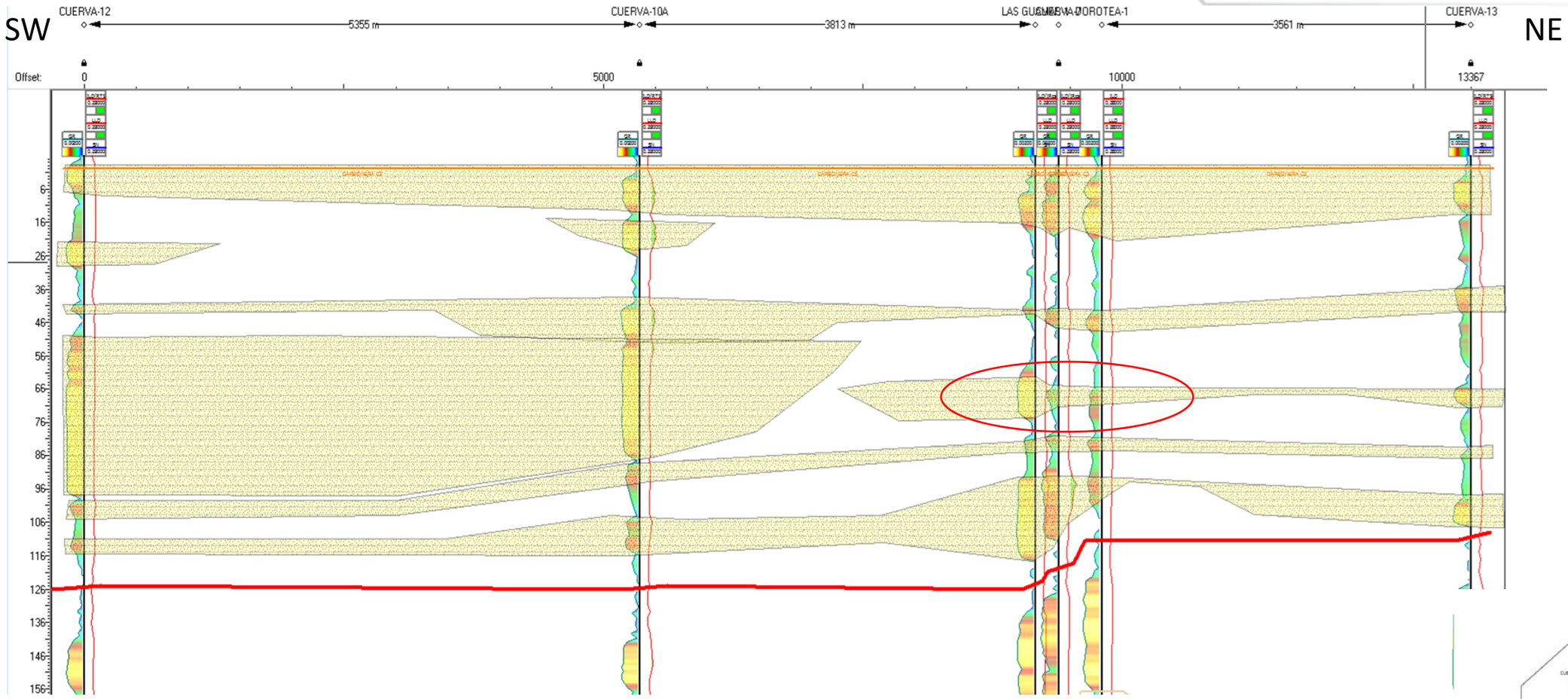


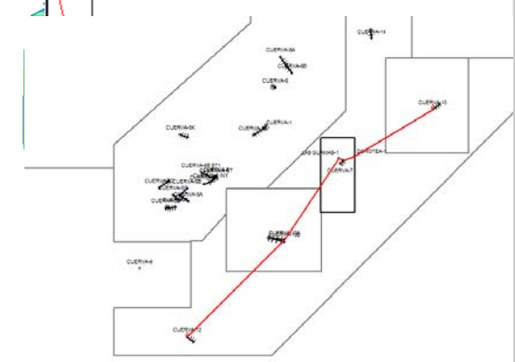
SWC 3735’ oil saturated.

Oficial Initial test
3792’-3796’
382.6 bbls fluid
45.1% BSW & 54.9% Oil @19.7ºAPI

3 SWC water saturated.

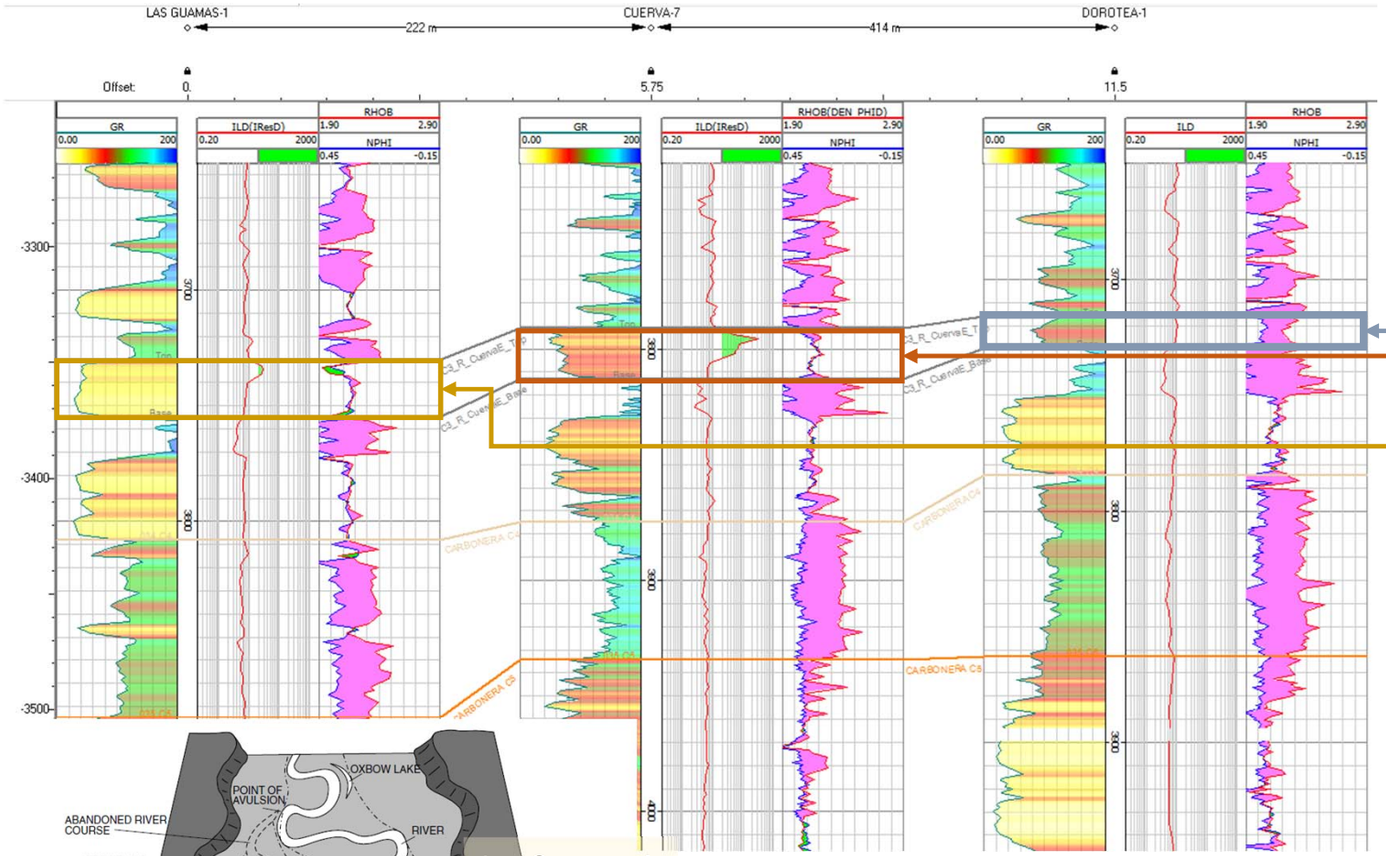
Stratigraphic Correlation





In the SW-NE section the stratigraphic interpretation is observed within the C3 unit, where the distributions of the different channels are shown and in the red ellipse the producing reservoir of the Cuerva-7 wells

Stratigraphy of the Cuerva Este area



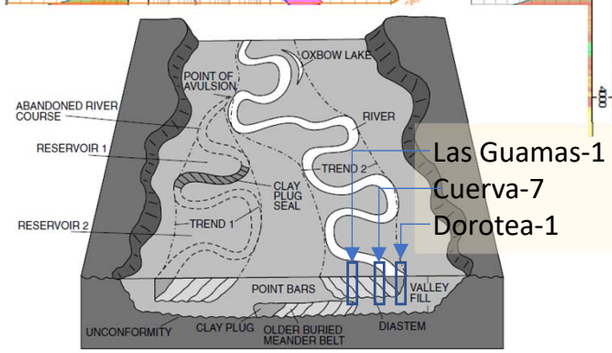


Fig. 6.35. Cartoon illustrating the distribution of fluvial sediments in an incised valley. The valley has been incised into preexisting sediments, which are shown in brown/light gray. The valley floor is an unconformity. The locations of point-bar deposits vary laterally and vertically as a result of lateral migration of the meander bends over time (Fig. 6.25). (Figure courtesy of R. Weimer.)

The area of Cuerva Este shows according to the drilled wells a fluvial environment associated with a Point Bar. The area of the Dorotea-1 well functions as a seal, due to the lithological characteristics.
The Cuerva-7 well is in the most prospective area, stratigraphically speaking.

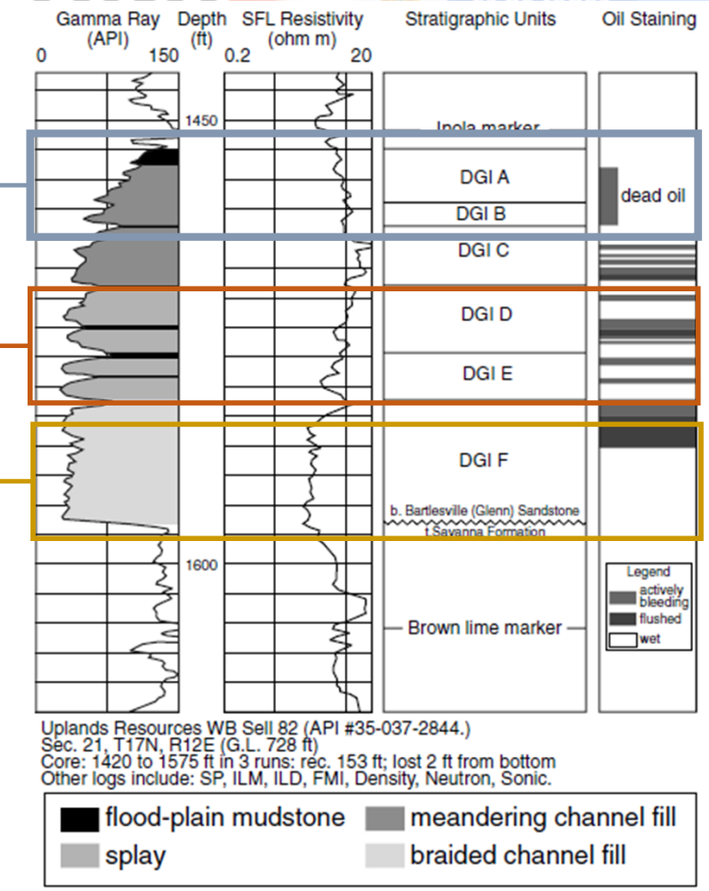
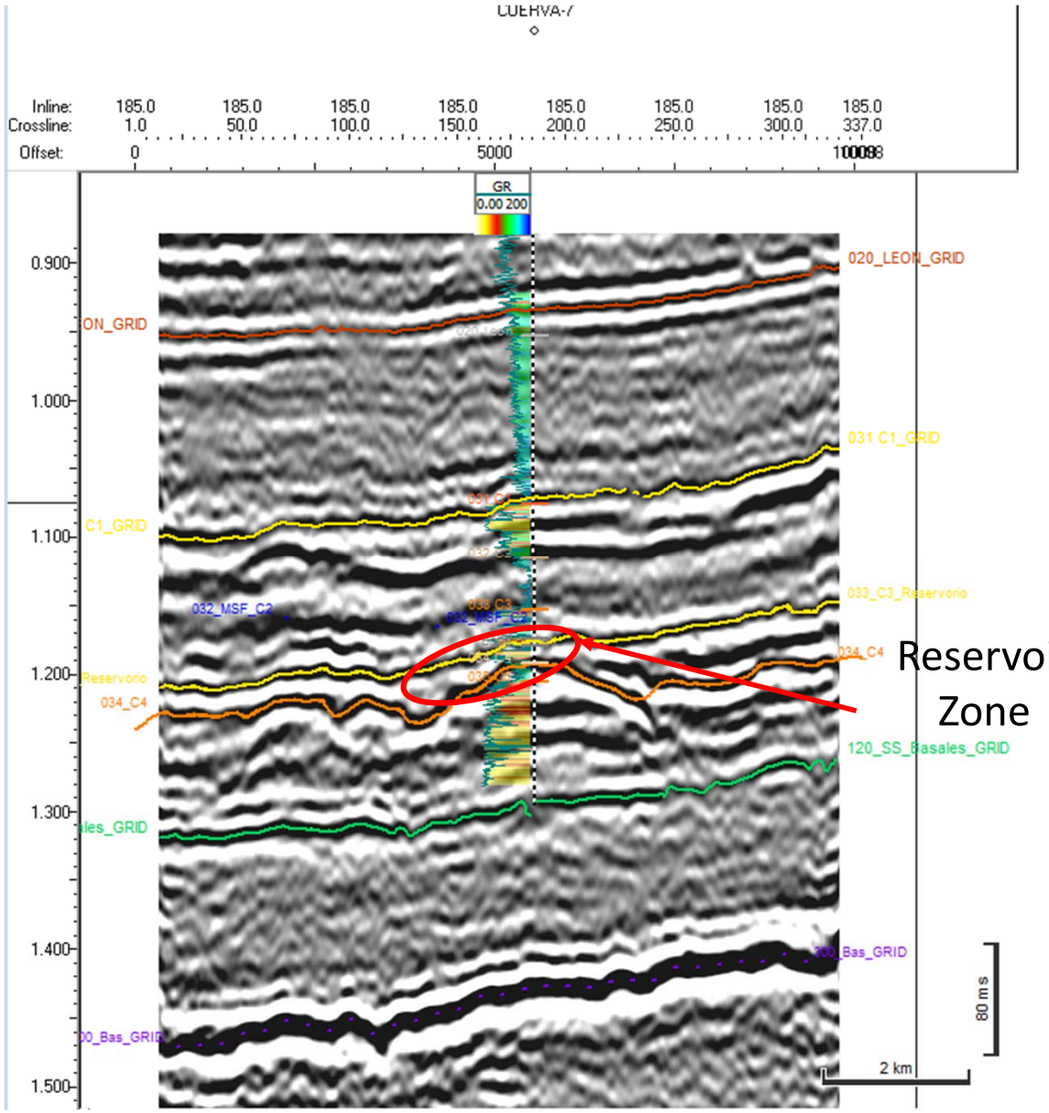


Fig. 6.47. Gamma-ray and resistivity logs from a cored well of the Bartlesville Sandstone. The yellow/bright-gray interval comprises a braided-river deposit. The orange/middle-gray interval comprises a meandering-river deposit. The pink/dark-gray interval is a transitional interval. The right-hand column depicts oil staining in the well, with green/middle gray being zones where oil was actively bleeding when the core was brought to the ground surface. Blue/black zones contained oil stain but did not bleed (because most of the oil had been flushed during a prior waterflood). White zones are water-bearing. Note that most of the actively bleeding intervals are in the transition and meandering-river deposits, because the permeability is lower in these strata and water selectively bypassed these zones. After Kerr et al. (1999) and Ye and Kerr (2000). (Reprinted with permission of AAPG, whose permission is required for further use.)

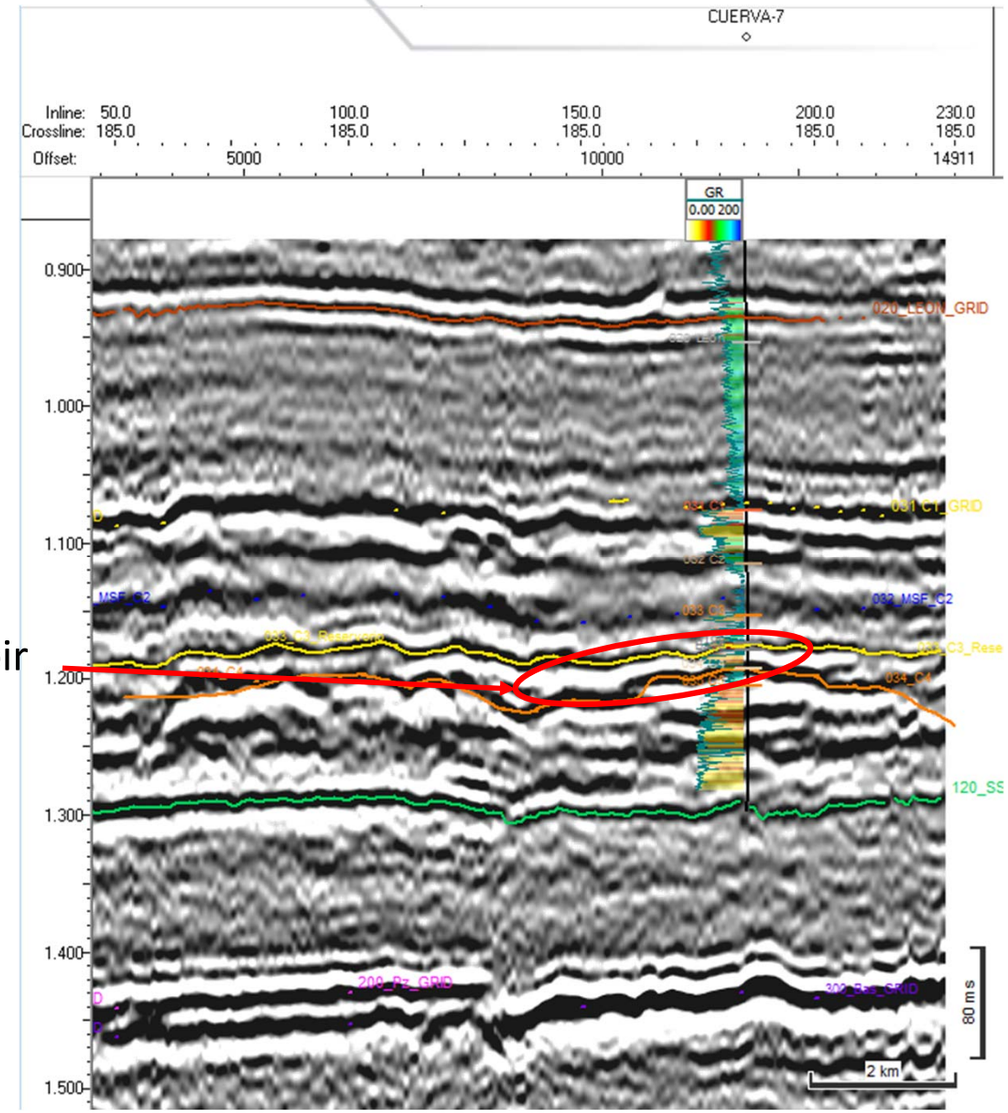
Images all from Handbook of Petroleum Exploration and Production Volume 6, 2006, Chapter 6

Interpreted Seismic Lines (Cuerva 3D-2008)



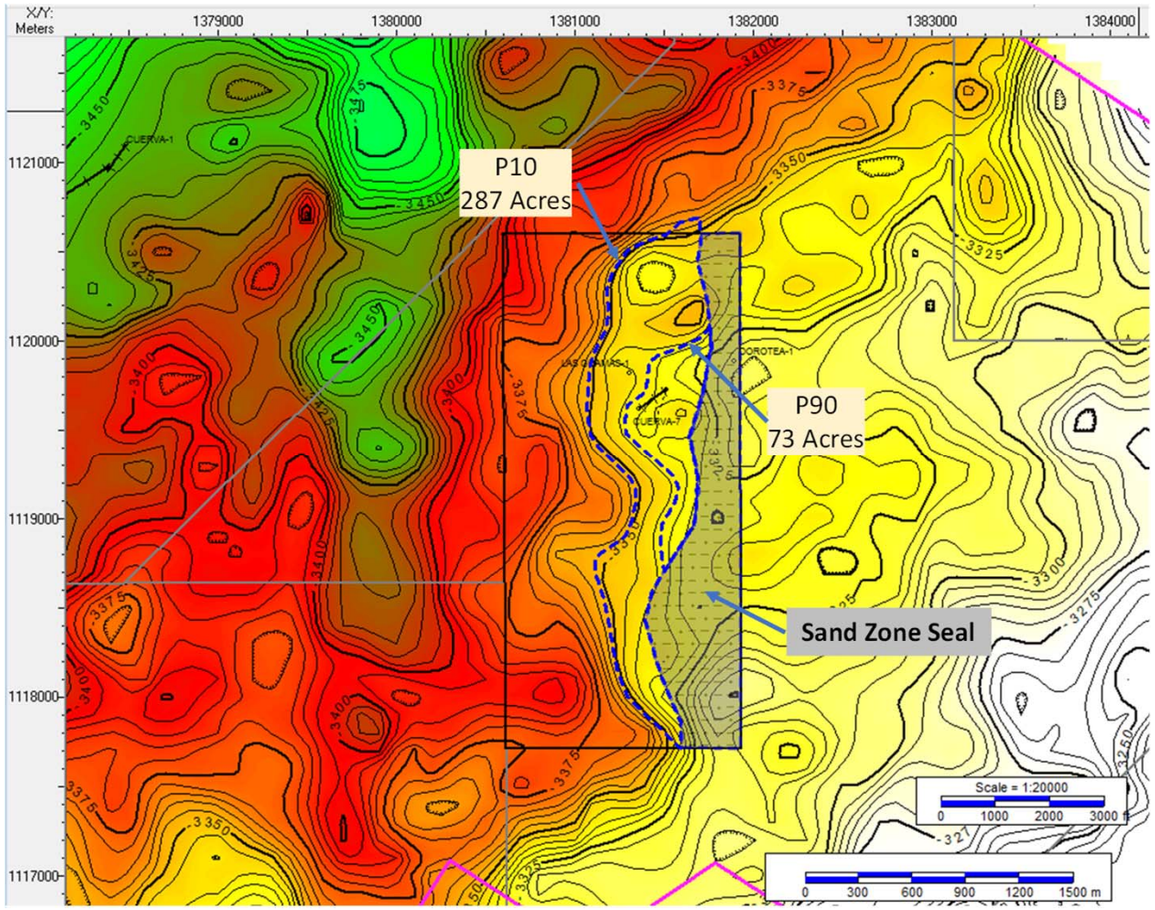
Dip Line IL 183 Cuerva 3D

Reservoir Zone



Strike Line XL 185 Cuerva 3D

Structural Map in Depth (C3 Level)



Layer 1

Grid type:	Structure
Upper grid:	033_C3_Reservorio - Depth_Cuerva Este_LGUA_Tope
Lower grid:	033_C3_Reservorio - Depth_Cuerva Este_LGUA_Base
OW Contact:	-3358.00 Subsea

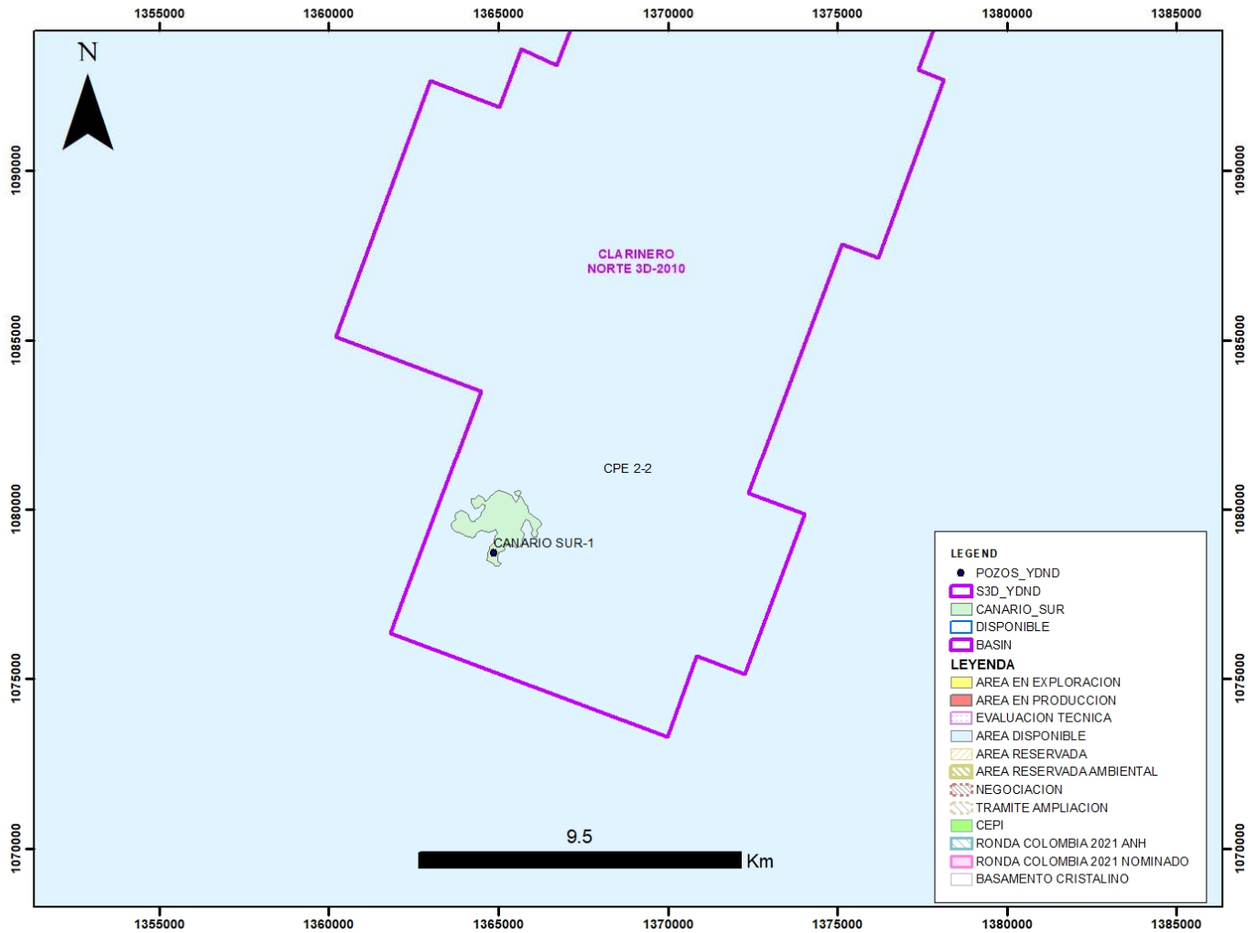
Areal extent (A):	1164033.85
Avg. Thickness (h):	16.96
Net/Gross (NTG):	0.40
Porosity (Φ):	0.31
Water saturation (Sw):	0.45
Oil volume factor (Bo):	1.10
Oil recovery factor (ORF):	0.25

Result (D-Deterministic:)	In-Place (STB)	Recoverable (STB)
Swanson's Mean	1.386 MM	348.137 M
P90	662.914 M	165.513 M
P50	1.246 MM	312.054 M
P10	2.297 MM	578.871 M
(D) CUERVA_ESTE_C3	2.347 MM	586.737 M

CPE 2-2 Available Area

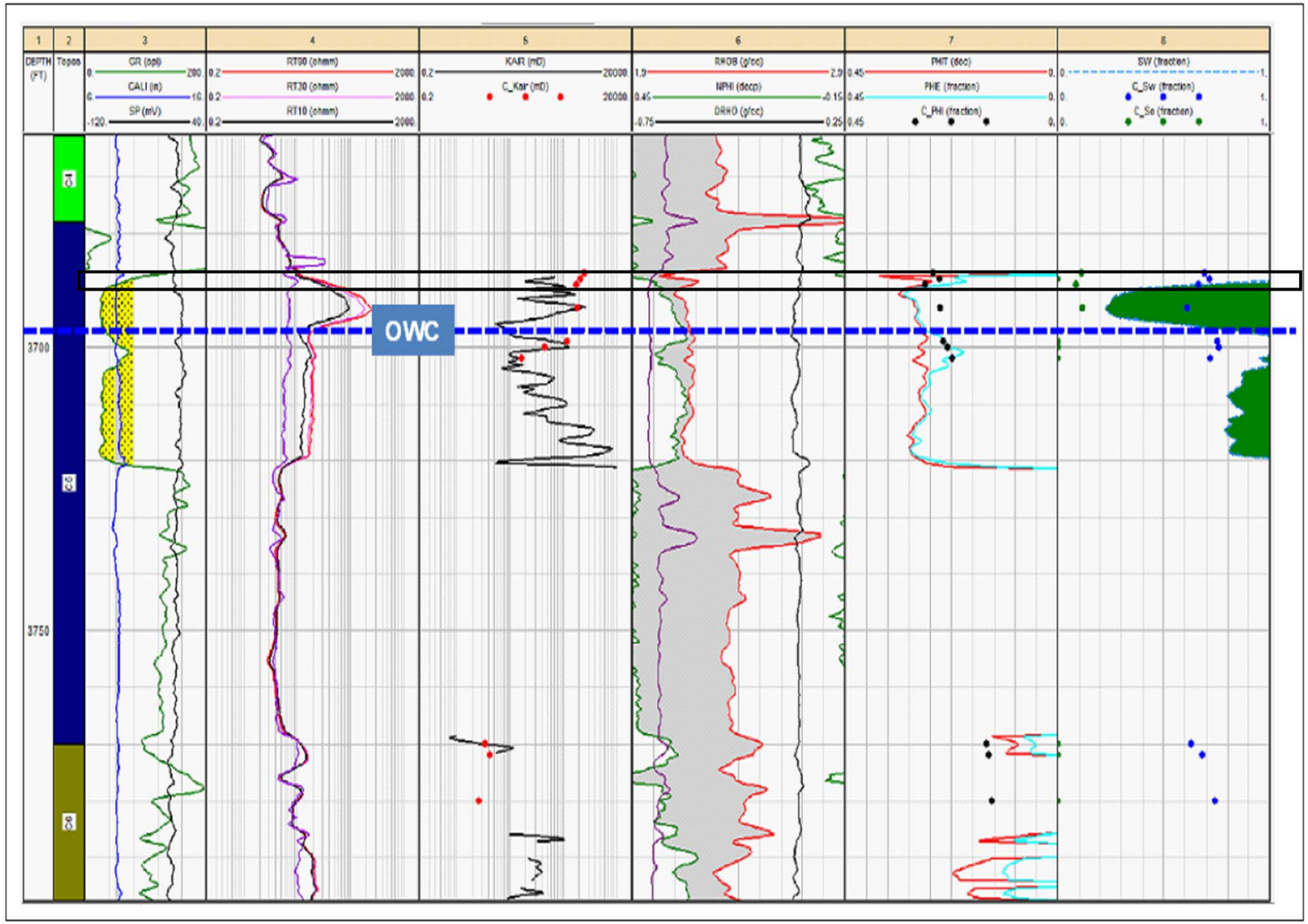
Canario Sur UARD

Database



- 3D Seismic
  - CLARINERO NORTE 3D-2010 (293Km^2)
- Well
  - Canario Sur-1

Canario Sur Petrophysics (Hocol 2014)

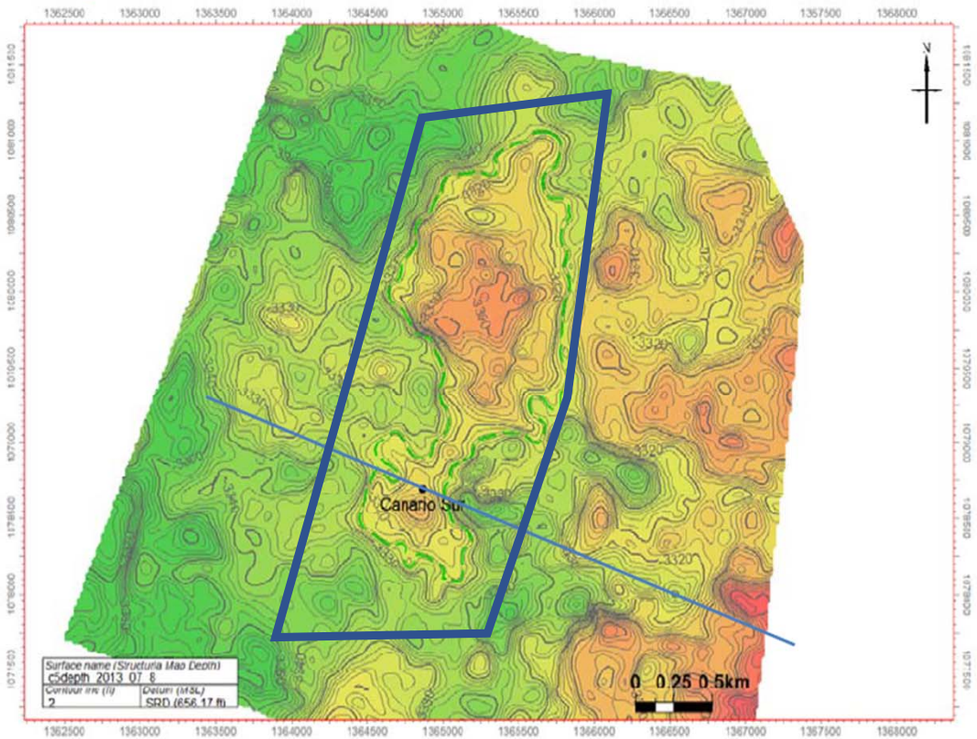


Shoot Section (3687-3690)

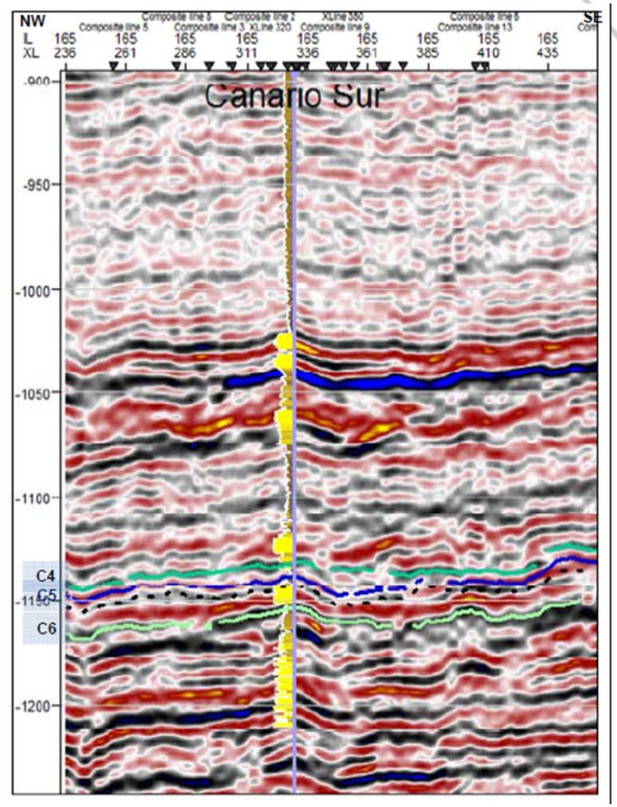
OWC -3327 ft

Petrofisica Unidad C5 - Pozo Canario Sur-1: 9 pies saturados con HC.

Área de Evaluación Canario Sur



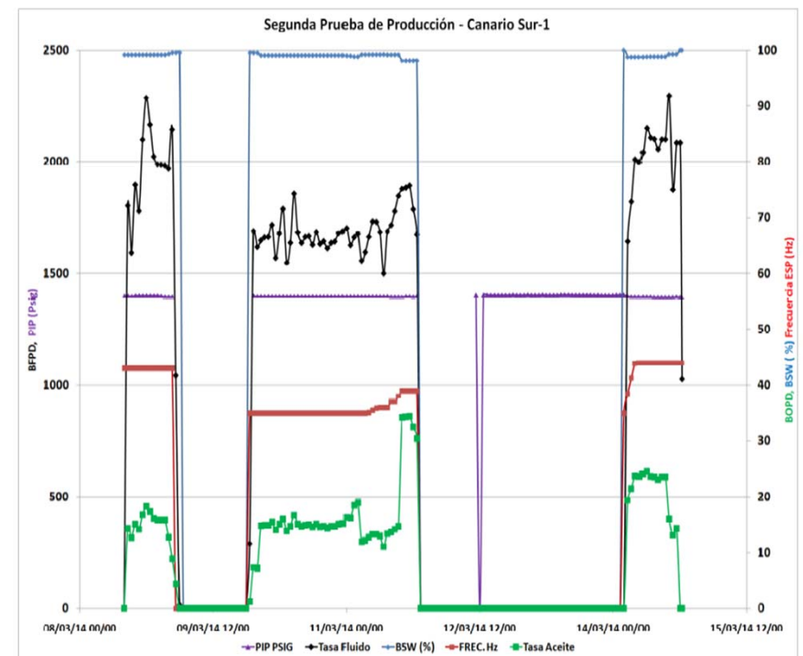
In-depth map at the top of the producer level



Dip Seismic section IL165

Duración de la Prueba	26 Horas
Volumen Total Recuperado	1028 Bbls de agua
BSW Inicial	100%
BSW Final de Prueba	91.99%
Total Aceite Recuperado	76 Bbls
Total Agua Recuperada	952
Gas Producido	0 Mscfd
API	18.2
THP	15 psi
Frecuencia ESP	35 Hz
PIP	1406.81

. Resultados Obtenidos durante 26 Horas de Prueba en el pozo Canario Sur.1



Final Well Status – Canario Sur-1

ESTADO MECANICO FINAL	FECHA 17-mar-14	C. MONTAÑA	POZO CANARIO SUR 1
			SURF. COORD. N: 1,078,702 E:1,364,866

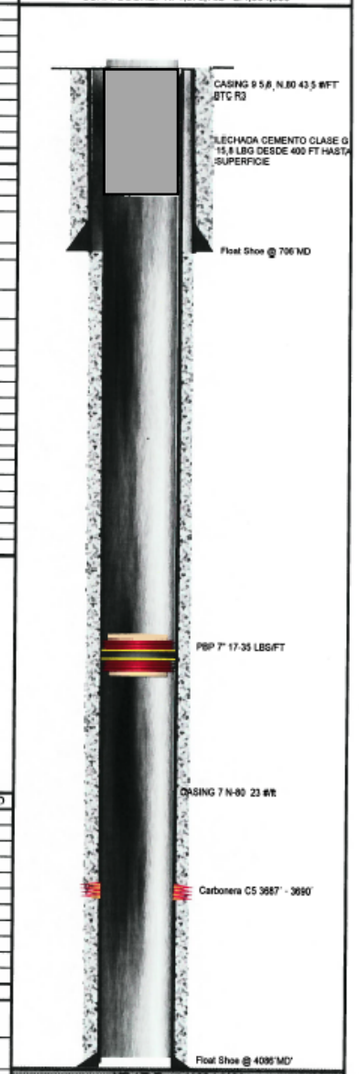
TIPO	CABEZAL DE SUPERFICIE	DESCRIPCION
FEPCO	CASING HEAD HYDRILL TIPO GK	11" 5M x 11" 5M

ITEM	CANT	EQUIPO DE SUBSUELO	LONG.	PROF.	I.D.	O.D.
		PBP (PERMANENT BRIDGE PLUG) GOMAS ARRIBA	1	2499		7
		PBP (PERMANENT BRIDGE PLUG) 7" 17-35 LBS/FT S/N 164792	1,55	2500		7
		PBP (PERMANENT BRIDGE PLUG) GOMAS ABAJO	0,55	2500,55		7

FORMACIONES	TOP (MD / TVD) (FT)
GUAYABO SUP	SUP /SUP
LEON	2580 / 2580
CARBONERA C1	3190 / 3190
CARBONERA C2	3431 / 3431
CARBONERA C3	3490 / 3490
CARBONERA C4	3635 / 3635
CARBONERA C5	3678 / 3678
CARBONERA C6	3770 / 3770
CARBONERA C7	3800 / 3800
TD	4100 / 4100

FORMACIONES	INTERVALOS	ESPESOR	SPF	FECHA DE DISPARO
CARBONERA C5	3687 - 3690	3	12	21/03/2013

CASING	DESCRIPCION	ZAPATO	Desde	Hasta
9 5/8"	N-80 43,5 #/FT	706	0	705,0
7"	N-80 23#/ft BTC R3	4.086	0	4086,000



MD / TVD: 4100 / 4103

BOTT. COORD.N: 1,078,702 E:1,364,866

GLE:360 / RTE: 372

RONDA 4CR Approved Canario Norte-1

-MINISTERIO DE MINAS Y ENERGIA
-DIVISION DE HIDROCARBUROS-
INTENCIÓN DE PERFORAR
Forma 4CR

POZO CANARIO NORTE-1

Compañía: HOCOL Concesión: CLARINERO Clasificación: (Lahee) A-3
Campo: Exploratorio Estructura: Anticlinal

ORIGEN COORDENADAS

Observatorio Astronómico de Bogotá
Coordenadas Gauss Origen Bogotá Magna

Latitud 4° 35' 46".32 N
Longitud 74° 04' 39".02 W

X (E) Metros 1'000.000.00
Y (N) Metros 1'000.000.00

MOJON DE REFERENCIA LIBERTAD 1541
Coordenadas Geográficas
Longitud: 70° 32' 46.760" W
Latitud: 4° 24' 18.485" N

Coordenadas Gauss Origen Bogotá Magna
X (E): 1'392.183.37 m
Y (N): 979.800.88 m

LOCALIZACIÓN DEL POZO Origen Magna – Sirgas
Superficie:
X (E): 1'365.237 m
Y (N): 1'080.157 m

Fondo:
X (E): 1'365.237 m
Y (N): 1'080.157 m

Fecha aproximada en que se iniciarán los trabajos de perforación Diciembre de 2014
Elevación del terreno sobre el nivel del mar 360 pies Distancia del pozo al lindero más cercano 13056.44 m
Equipo de Perforación: Rig N° 22 Lewis Energy Colombia

Profundidad Total Aprobada 4235 pies

a) Vertical: 4235 pies
b) Desviada 4235 pies

Espaciamiento entre pozos Hectáreas

Se intenta completar el pozo en la Fm. Carbonera, Unidad C-3 a la profundidad de 3525'MD, -3153' TVDss y Unidad C-5 a la profundidad de 3677'MD, -3305' TVDss.

TUBERÍA DE REVESTIMIENTO

Se usarán las siguientes tuberías y se cementarán en la forma que se indica:

Diámetro del Hoyo	Diámetro del Revestimiento	Profundidad pies	Tope Cemento
12-1/4" 8-3/4"	9,5/8" 7"	Superficie - 500' 500' - 4235'	Superficie 3000'

En caso de que haya cambios en los planes de perforación del pozo deberá comunicarse inmediatamente a la dirección general de hidrocarburos o a la oficina de zona correspondiente

Nota

a) Acompáñese el plano de localización respectivo, de dimensiones iguales a las de esta forma, en la que se muestre la distancia y ubicación exacta y del mojón de referencia, firmado por ingeniero matriculado
b) Para los pozos exploratorios debe incluirse:
1) El programa completo y detallado de perforación (Programa del Pozo)
2) Mapa estructural de la zona donde se va a perforar el pozo, firmado por geólogo matriculado a escala 1:25.000
3) Al menos dos (2) líneas sísmicas interpretadas de la estructura que va a ser probada
4) Informe geológico y/o geofísico que justifique la perforación
5) En pozos direccionales deberán darse las razones para su desviación y acompañará un esquema en el cual se muestre en detalle la localización y los posibles intervalos productores
6) Toda la información pertinente adicional de geosísmica en idioma Español venir referida a coordenadas Gauss origen Bogotá

Presentado Por:

Lenin Bueno Vincenz
Geólogo, Nro Matrícula 2216
Lenin Bueno

Ingeniera de Petróleos, Nro Matrícula 03069 CPIP
Pilar Rojas

Original Exploración y Contratos
CC: Conservación y Reservas
Oficina de Zona
Operador

Aprobado por:

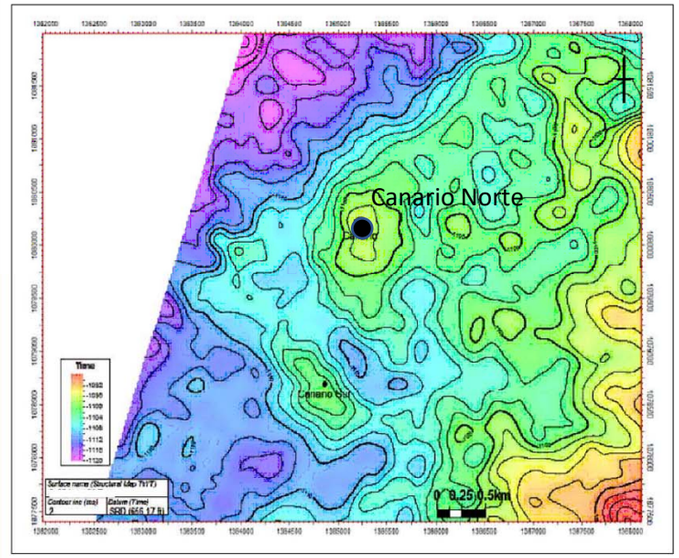
Berny José Méndez Castro
INGENIERO DE PETROLEOS
CPIP 6548

División Exploración y Contratos

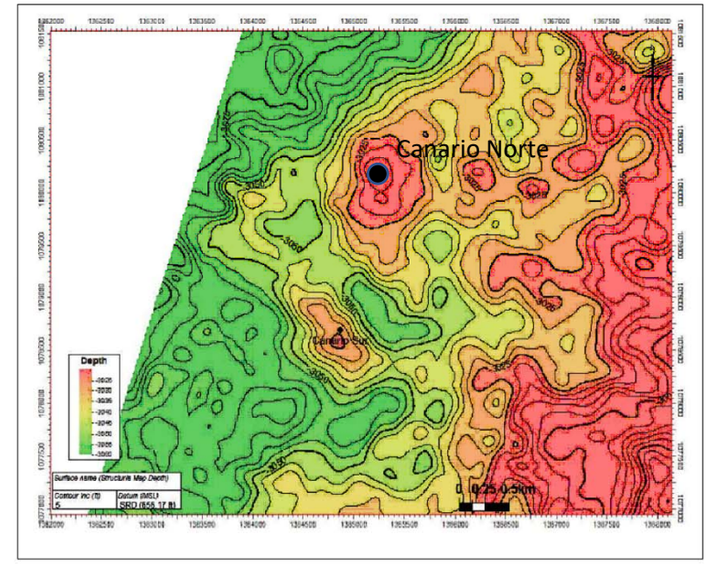
División Conservación y Reservas

Diciembre 9, 2014
Fecha: 28 de Noviembre de 2014

Mapas Estructurales Pozo Canario Sur-1



Mapa en Tiempo C5 Canario Sur-1

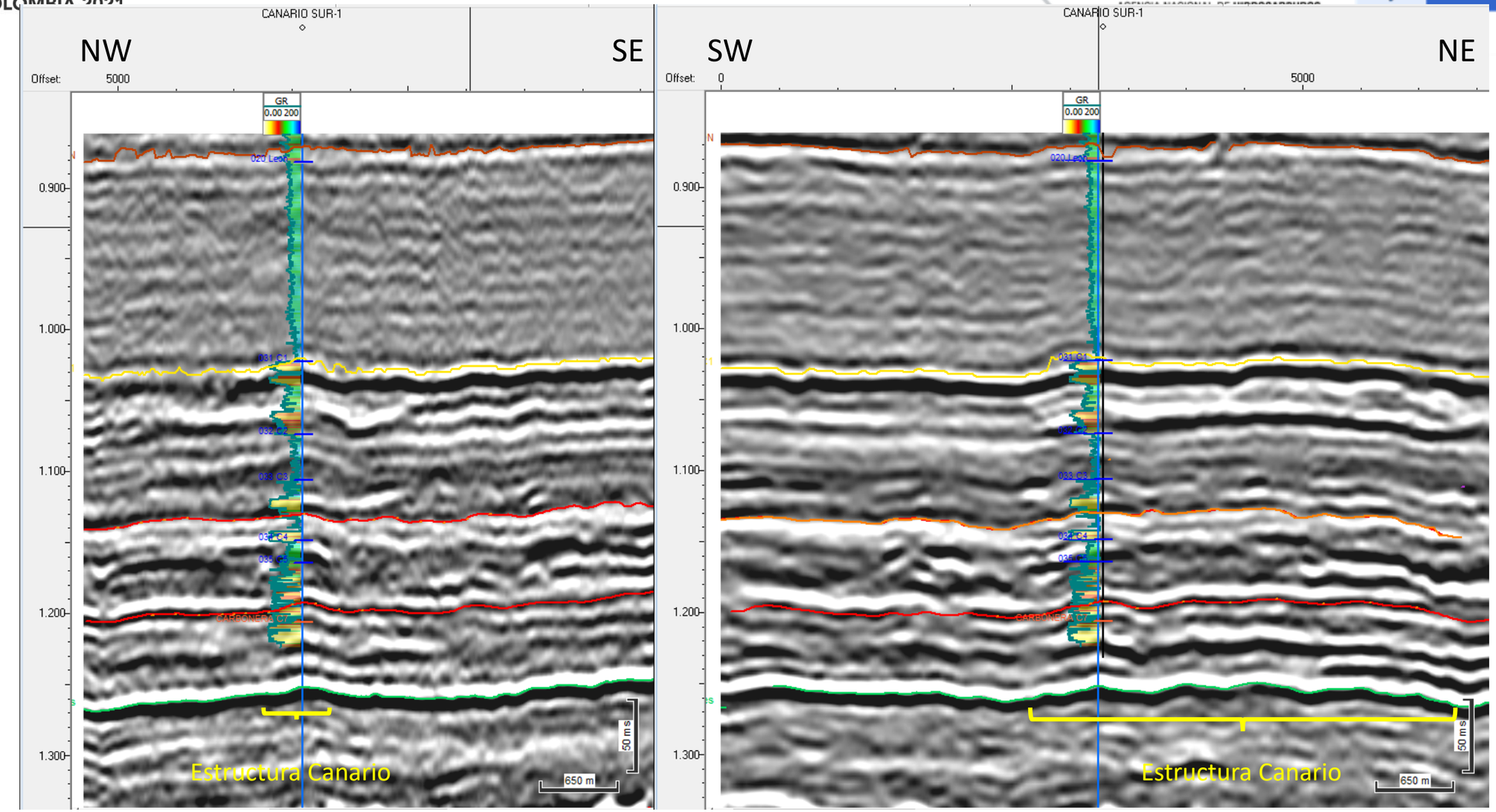


Mapa en Profundidad C5 Canario Sur - 1

FORMACIÓN	PROFUNDIDAD VERTICAL (Pies)	TVD ss (Pies)	PROFUNDIDAD MEDIDA (Pies)
GUAYABO	Superficie	360	Superficie
LEÓN	2683	-2311	2683
CARBONERA C1	3167	-2795	3167
CARBONERA C2	3401	-3029	3401
CARBONERA C3	3525	-3153	3525
CARBONERA C4	3637	-3265	3637
CARBONERA C5	3677	-3305	3677
CARBONERA C6	3766	-3394	3766
CARBONERA C7	3808	-3436	3808
CRETACEO	4085	-3713	4085
TD	4235	-3863	4235

Tabla 2. Unidades a atravesar durante la perforación del pozo Canario Norte - 1.

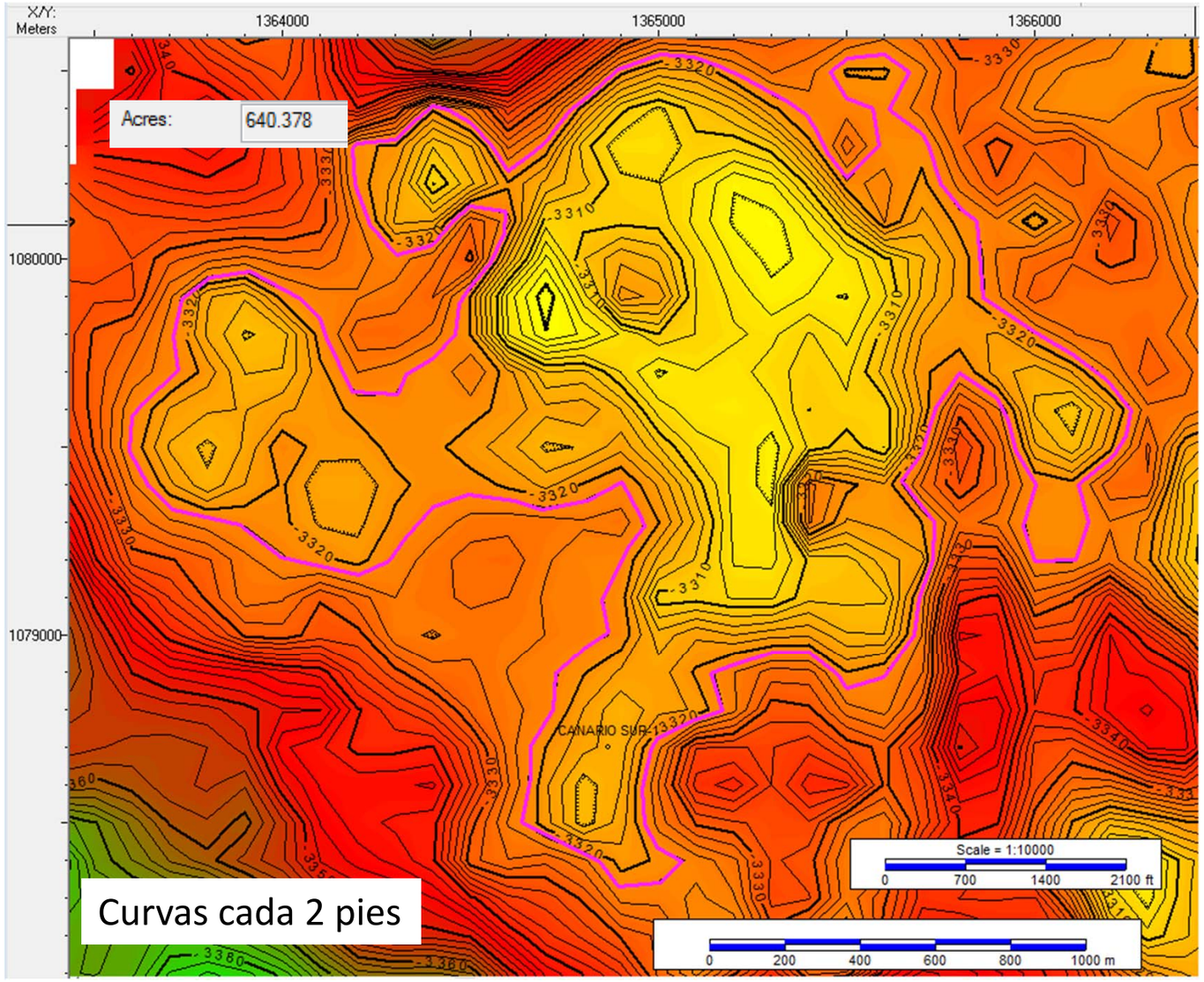
Seismic Lines Canario Sur-1

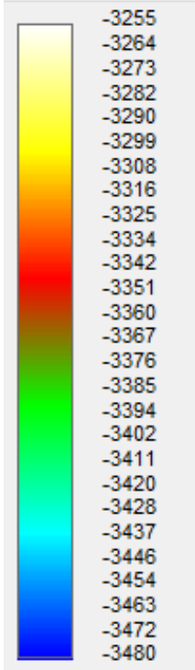


IL 82 – Dip Line

XL 330 – Strike Line

Structural Map C3 Basal level





Layer 1

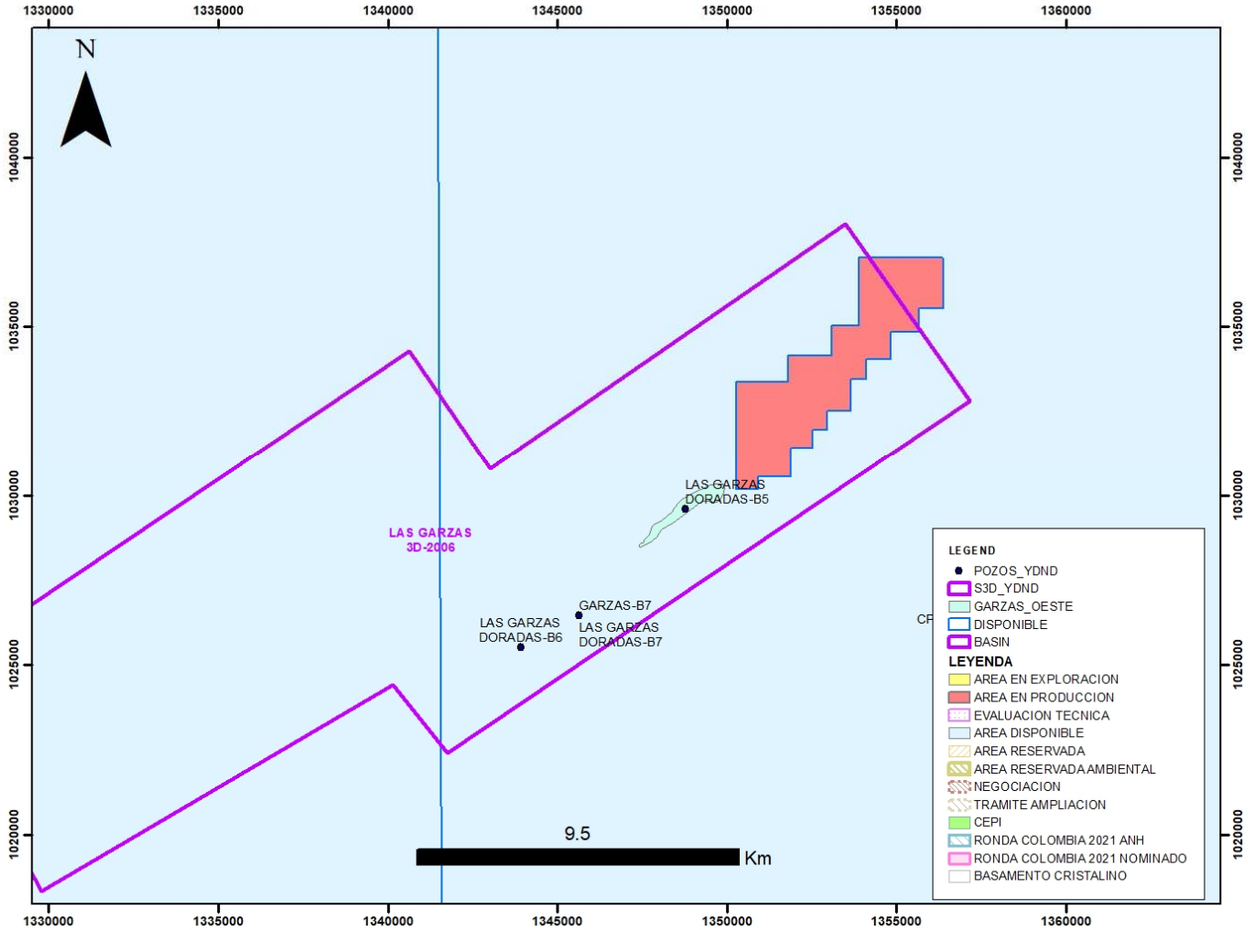
Grid type:	Structure
Upper grid:	034_C4 - Canario Sur Depth TVDss_mod
Lower grid:	034_C4 - Canario Sur Depth TVDss_Base
OW Contact:	-3327.00 Subsea

Areal extent (A):	2591516.70
Avg. Thickness (h):	12.53
Net/Gross (NTG):	0.75
Porosity (Φ):	0.25
Water saturation (Sw):	0.50
Oil volume factor (Bo):	1.10

Result (D-Deterministic:)	In-Place (STB)	Recoverable (STB)
Swanson's Mean	3.936 MM	983.961 M
P90	1.982 MM	491.311 M
P50	3.554 MM	891.284 M
P10	6.399 MM	1.600 MM
(D) CANARIO SUR-1_3322	5.308 MM	1.327 MM

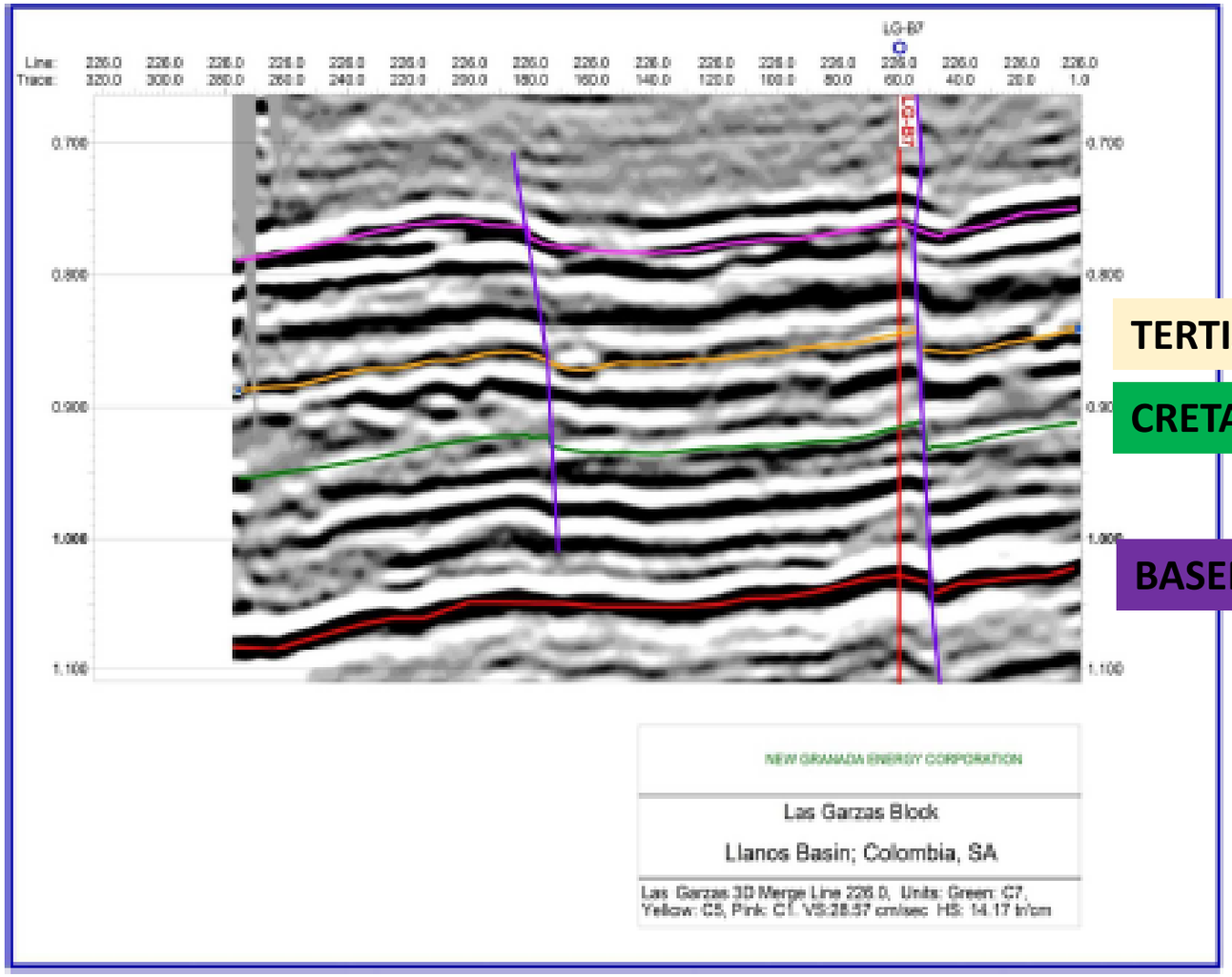
CPE 4-1 Available Area

Garzas Oeste UARD



- 3D Seismic
  - LAS GARZAS 3D-2006 (230Km^2)
- Well
  - Las Garzas Doradas-B5

Seismic interpretation



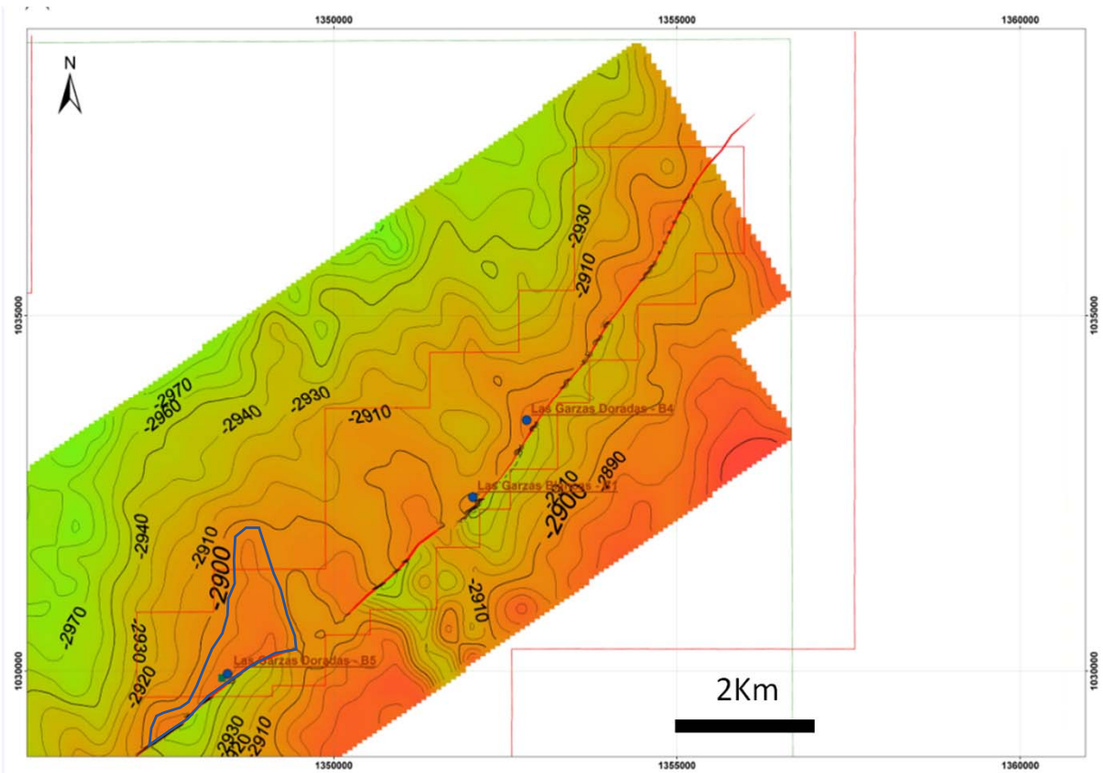
ANTICLINAL RELATED TO ANTHITETIC FAULT

TERTIARY

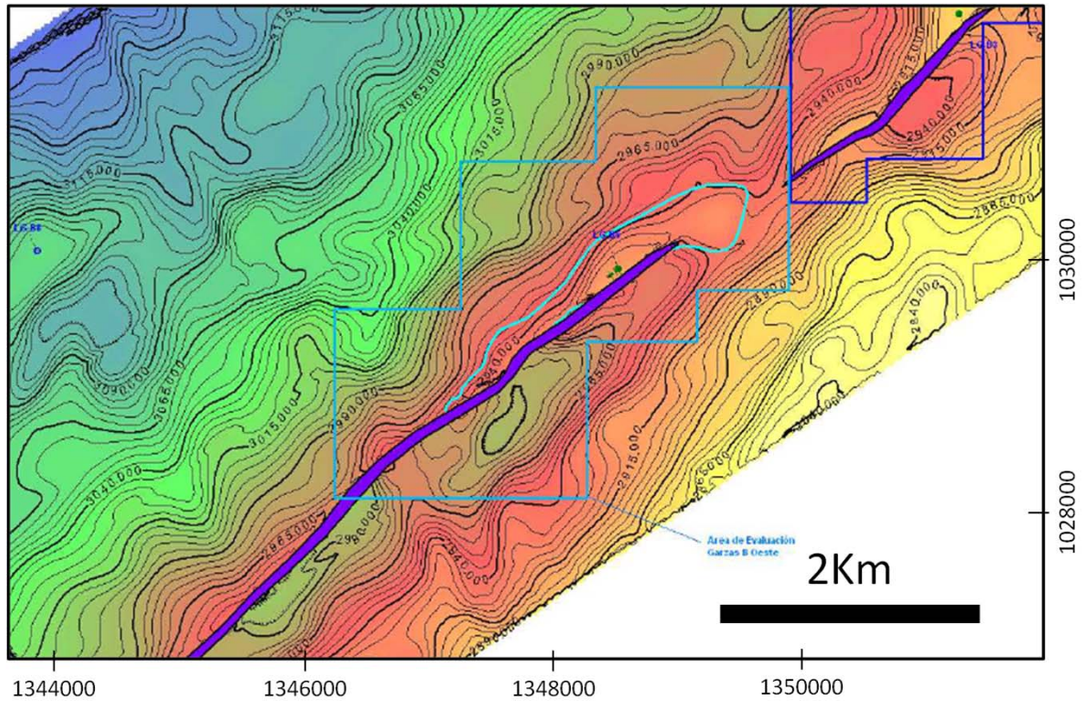
CRETACEOUS

BASEMENT

Structural Maps by previous operator

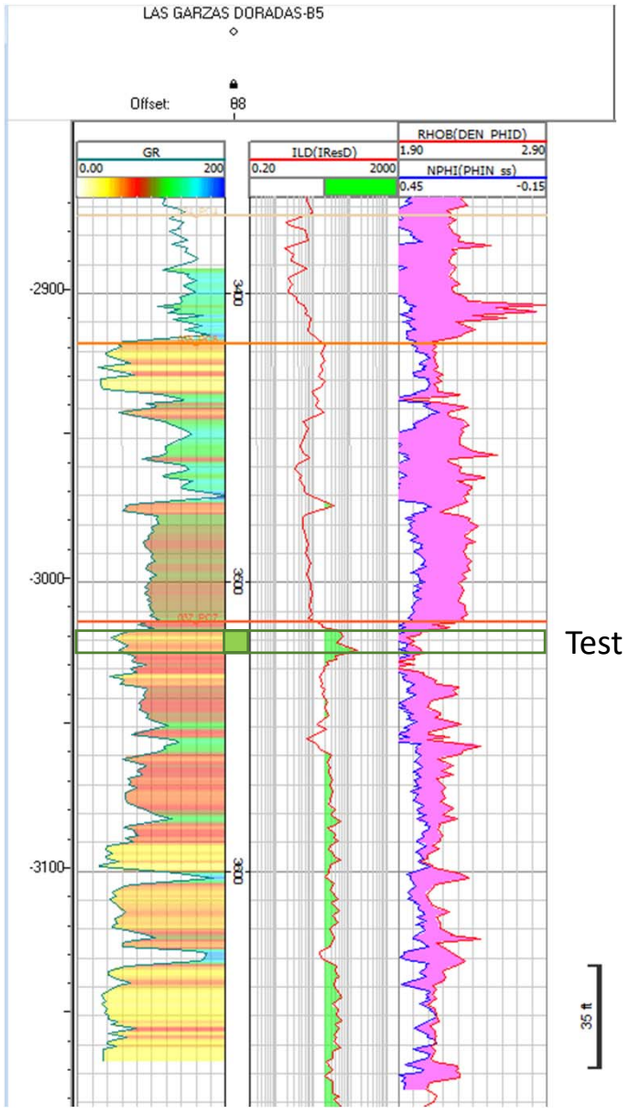


Las Garzas Carbonera C5
Map in depth

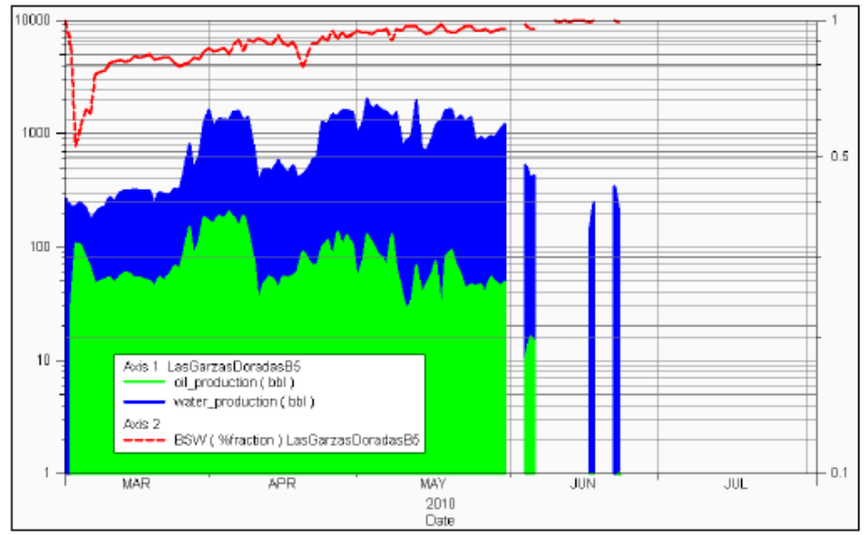


Las Garzas Carbonera C7
Map in depth

Well Test (Las Garzas Doradas B5)



Test



Pozo	Zona	DEPTH (ft) HRI-GR (Logs)	Kair (mD)	POR (%) (Logs)	Sco (%)	Stw (%)
Garzas B5	C7	3517' - 3525'	1600	35	13.7	53.8

Swc: Side well cores (Muestras de Pared)
Sco: Core Oil saturation % volume porous
Stw: Saturación Total de agua % Volumen poroso

- **PRODUCER INTERVAL: 3,517-3,525 FEET**
- **AVERAGE PRODUCTION: 70 BOPD, 1317 BWPD, 95% BSW, 46/64" CHOKE**
- **ACCUMULATED VOLUME: 7,121 BO; 72,647 BW**
- **AVERAGE BSW% : 95.45%**

FLUID PROPERTIES

OIL: API Gravity 16.4° @ 60°F. Paraffin content 56.3% weight; asphalt content 0.72% weight and sulfide content 0.214% weight

Volumetrics by previous operator

Proved reserves
Garzas B5 well and offset locations

	Unidades	Pozo Garzas B5 - Probadas
Área	acre	153
Espesor Total	pies	20
Espesor Neto	pies	8
Volumen Efectivo	Acre – pie	1167.9
Factor Geométrico	%	100
Volumen Neto	Acre - pie	1167

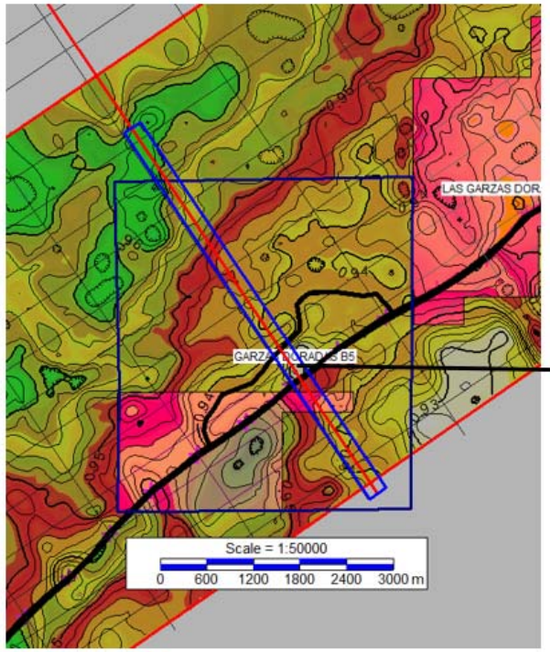
Porosidad	%	30
Saturación de agua	%	51
Factor Volumétrico	Rb/stb	1.072

Petróleo Original en Sitio (POES)	Mbbl	1261.18
Factor de Recobro	%	40

Petróleo Recuperable	Mbbl	504.65
Producción acumulada @ 31 de Diciembre de 2010	Mbbl	7.1
Petróleo Remante Recuperable	Mbbl	497.35

Structural map – Volumetrics (ANH)

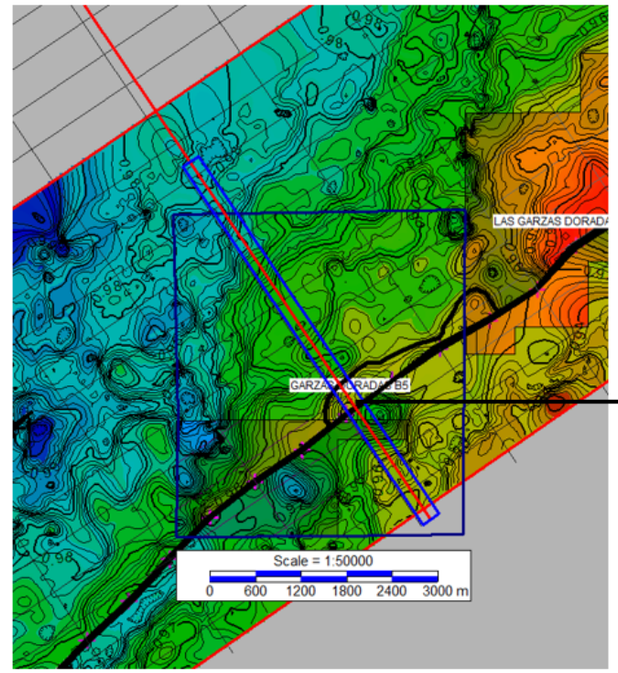
Structural map C5 top (TWT)



Área 393 Acres

* Part of the structure is outside the evaluation area

Structural map at C7 top (TWT)



Área 200 Acres

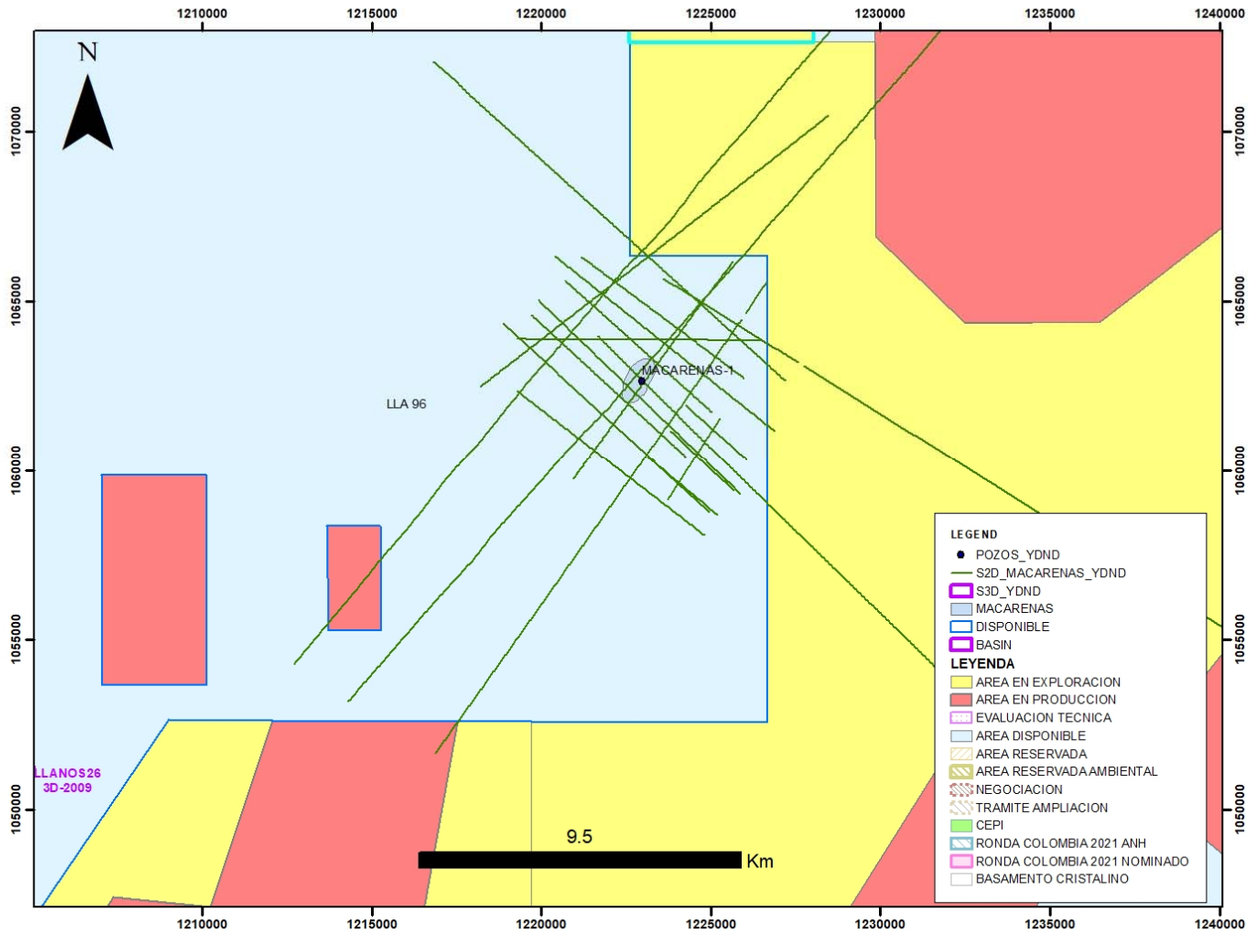
* Structure outside the área of evaluation

PROSPECT OR LEAD	AREA (Acres)	THICKNESS (Net Pay) (Ft)	POROSITY (%)	SO (%)	Boi	POES (BLS)	FR (%)	RESOURCES (BLS)
Las Garzas Oeste C7	200	8	0,28	0,50	1,0720	1.621.075	0,30	486.322
Las Garzas Oeste C5	393	6	0,20	0,50	1,0720	1.706.471	0,25	426.618

LLA 96 Available Area

Macarenas UARD

Database

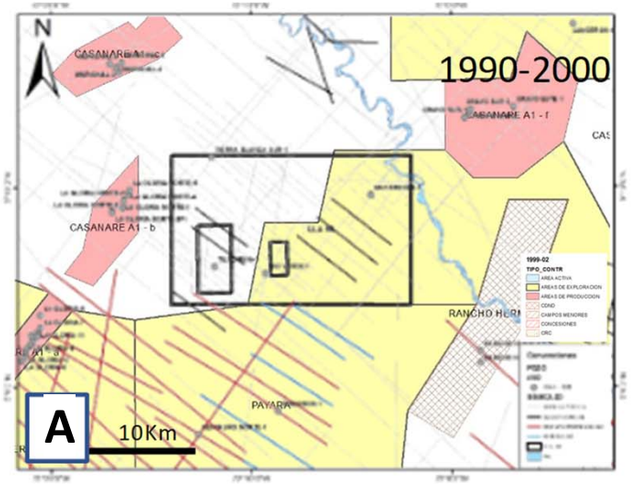


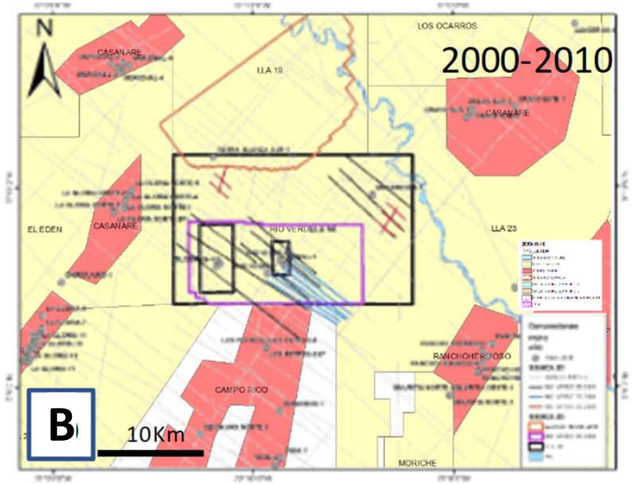
- 2D Seismic

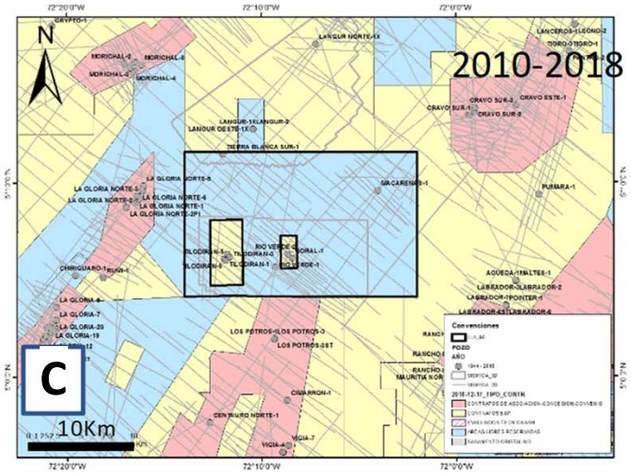
SURVEY	LINES	TOTAL LENGTH
AGUA VERDE-85	4	25.2
AGUA VERDE-86	2	27.0
ALGARROBO-92	1	7.0
ARIPORO-71	1	35.3
CRAVO SUR-85	3	65.4
RIO VERDE 2D-2005	3	24.9
RIO VERDE 2D-2009	4	10.5
TIESTAL-87	1	8.0
TRINIDAD-74	1	31.4
Total general	***20***	***234.82***

- Well
  - Macarenas-1

History of Exploration





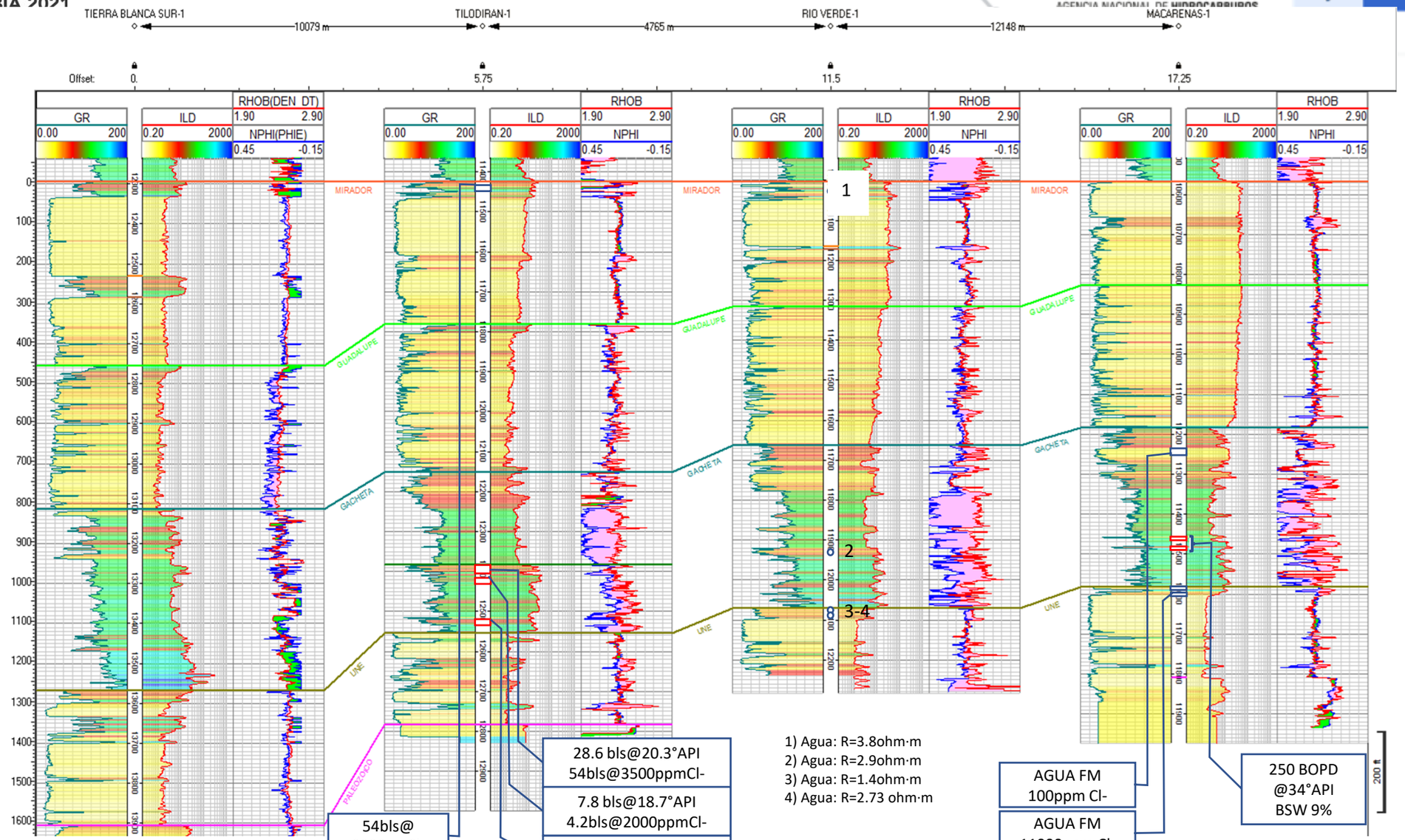


a) 1990-2000
- Heritage (Algarrobo Association)
  - Drilled Macarenas-1 (1993) - 250 BOPD with 34°API
- Mohave (Tapir Association, after Matepiña A)
  - Signed in 1998 and returned in 2002

b) 2000-2010
- Harken (E&P Rio Verde)
  - Acquire 3 2D seismic surveys: RIO VERDE 2D-2005, RIO VERDE 2D-2006 y RIO VERDE 2D-2009
  - Acquire 3 D seismic survey: RIO VERDE 3D-2010
  - Start Developmen oil field No develop Tiloridan
  - Drilled Boral-1 and discovered a new oil field
  - Started workover in Macarenas-1 (2004), stop the extended test because mechanical problems (26288bbls oil accumulated)
  - In December 2006 the well was abandoned by Harken.

c) 2010-2018
- Harken (E&P Rio Verde)
  - Returned area outside Tiloridan and Boral oil fields in 2012

Well Correlation



54bls@
8000pp Cl-

28.6 bls@20.3°API
54bls@3500ppmCl-

7.8 bls@18.7°API
4.2bls@2000ppmCl-

3.1 bls@23.4°API
1.6bls@12000ppmCl

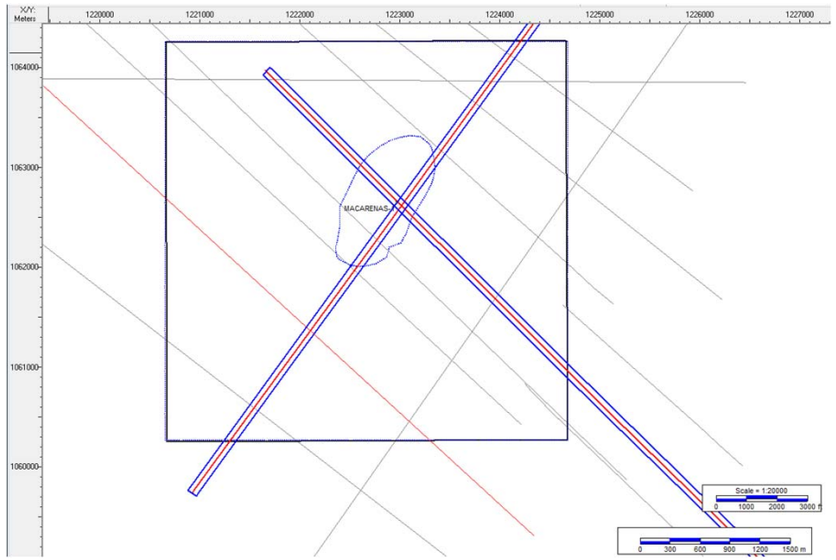
1) Agua: R=3.8ohm·m
2) Agua: R=2.9ohm·m
3) Agua: R=1.4ohm·m
4) Agua: R=2.73 ohm·m

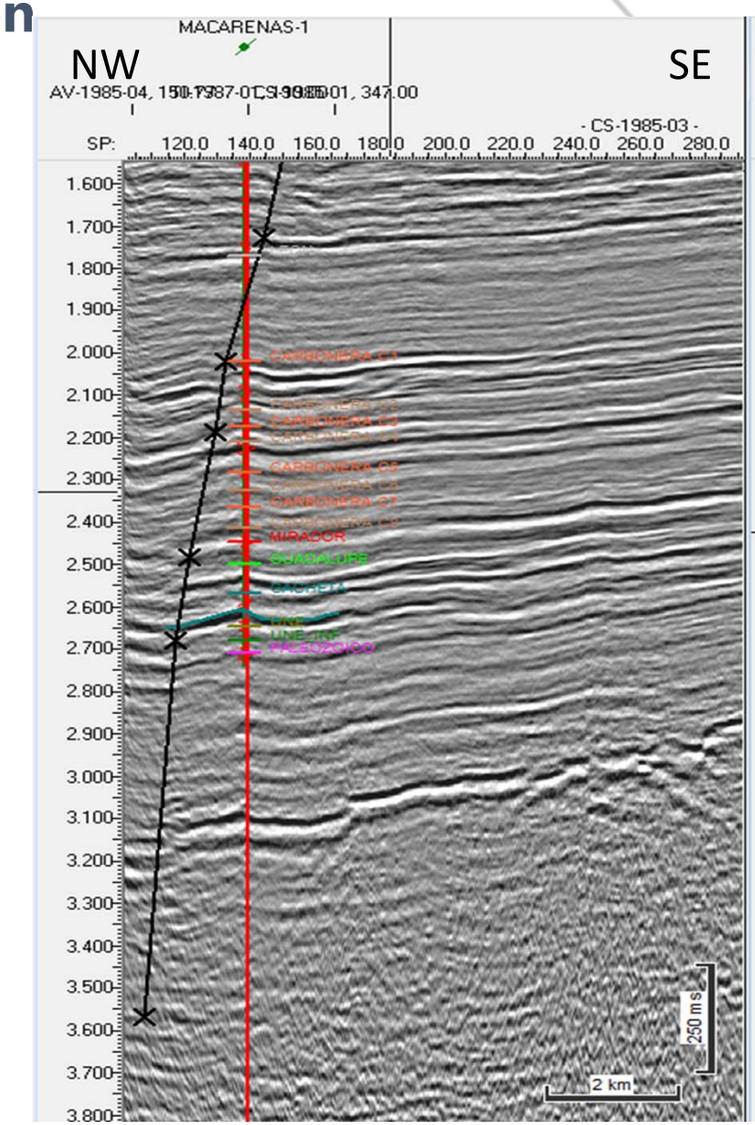
AGUA FM
100ppm Cl-

AGUA FM
11000ppm Cl-

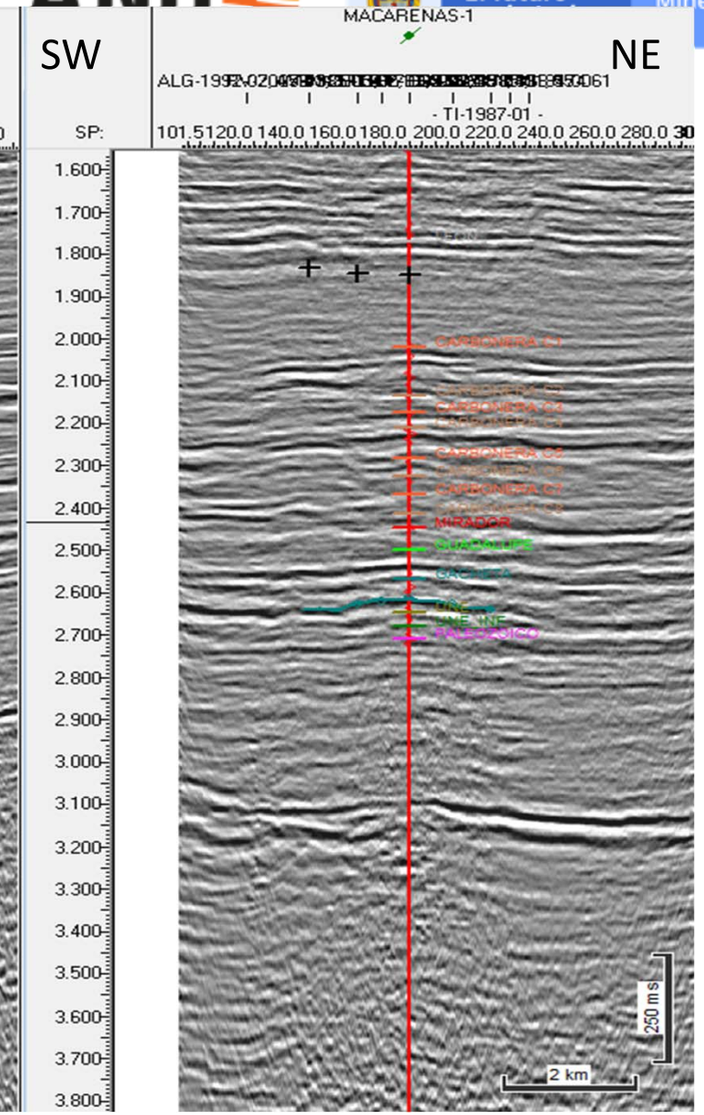
250 BOPD
@34°API
BSW 9%

Seismic Interpretation





Dip Line CS-1985-03

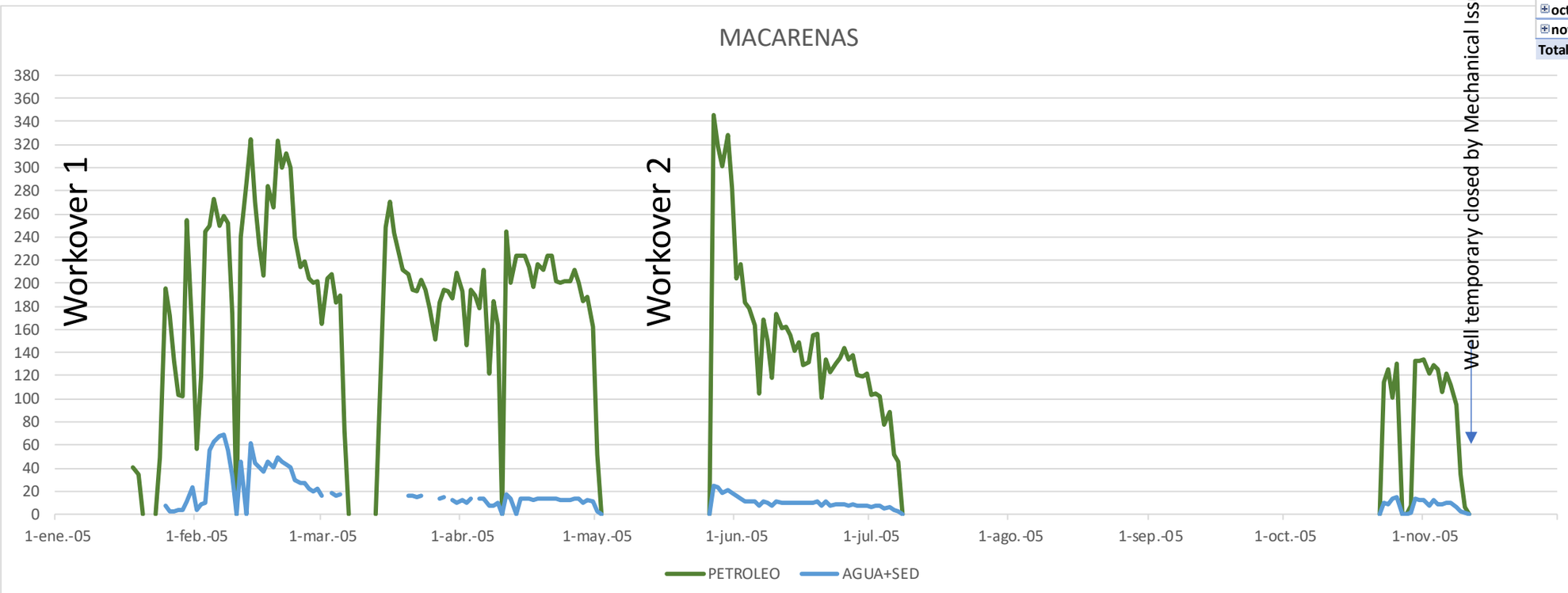


Strike Line TI-1987-01

Production

First workovers were made by Harken in 2005 to improve well productivity, in order to comply with the obligations of the PEV Macarenas

Etiquetas de fila	Suma de PETROLEO	Suma de AGUA+SED
⊞ene	1236	54.3
⊞feb	6503	1011.3
⊞mar	4651	221.4
⊞abr	5740	340
⊞may	1625	110
⊞jun	4400	293
⊞jul	573	37
⊞ago		
⊞sep		
⊞oct	744	74
⊞nov	985	79
Total general	26457	2220



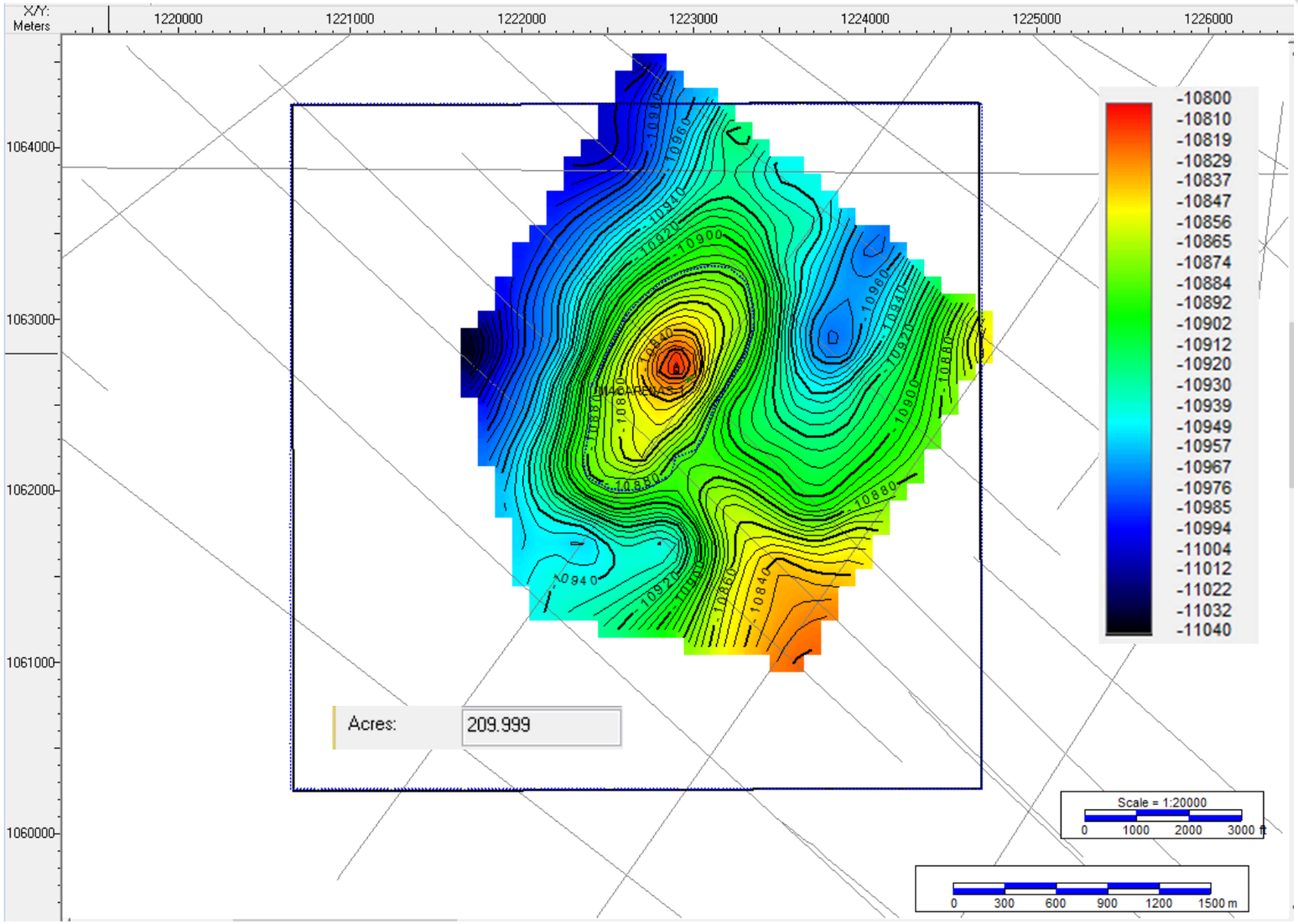
Volumetrias (Harken 2006)

Proyecto Macarenas	
Area	922 acres
Espesor	6 pies
Porosidad	15%
Saturación de Agua	64%
Factor Volumétrico de Formación	1.15 by/bn
OOIP	2.02 MMBO
FR	25%
Reservas Probadas	0,51 MMBO

TABLANo. 9 PRODUCCIÓN AÑO 2006 POZO TILODIRÁN-2

POZO	PRODUCCIÓN AÑO 2006			PRODUCCIÓN PROMEDIA – 2004			ACUMULADOS A 31-12-06		
	ACEITE BO	AGUA BW	GAS KPC	ACEITE BOPD	AGUA BWPD	GAS KPCD	ACEITE BO	AGUA BW	GAS KPC
TILODIRAN-2 (U)							12.576	58.936	9.877
TILODIRAN-2 (G)	113.108	3.372		694	3		113.108	3..372	
TILODIRAN-1							58.322	18.944	
MACARENAS-1							26.289	2.662	2.427
TOTAL	113.108	3.372		694	3		210.295	83.914	12.304

Volumetrics ANH

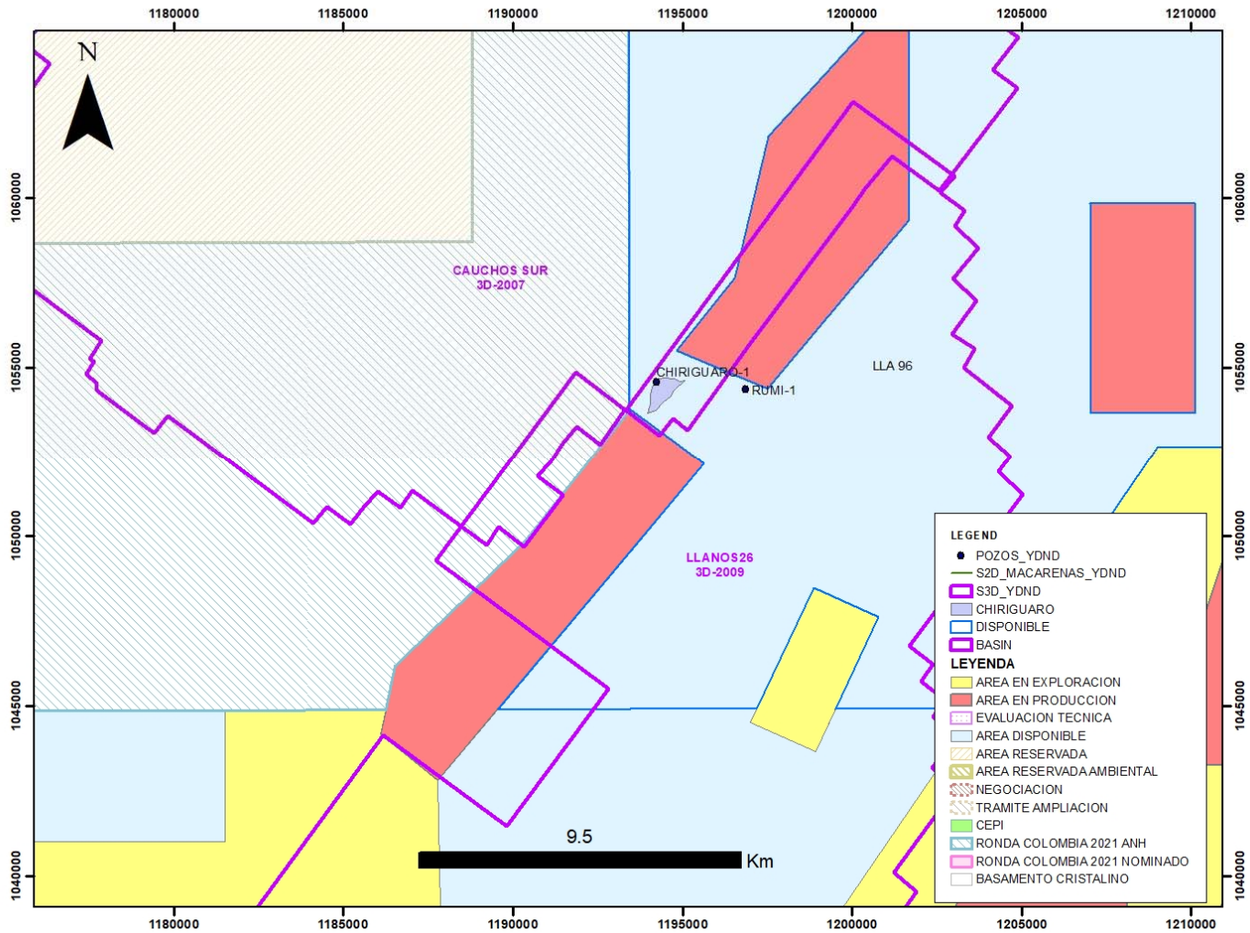


Grid type: Structure	
Upper grid: Gacheta - Depth	
Lower grid: Gacheta - Depth_Base	
OW Contact: -10883.00 Subsea	
Net/Gross (NTG): 0.80	
Porosity (Φ): 0.20	
Water saturation (Sw): 0.45	
Oil volume factor (Bo): 1.09	
Oil recovery factor (ORF): 0.25	
Result	(D-Determin
Polygon area (M2)	849.799 M
Gross (Meter2 Feet)	7.330 MM
Net (Meter2 Feet)	5.864 MM
Pore (Meter2 Feet)	1.173 MM
HC Pore (Meter2 Feet)	645.057 M
In-Place (STB)	1.135 MM
Recoverable (STB)	283.707 M

LLA 96 Available Area

Chiriguaro UARD

Database

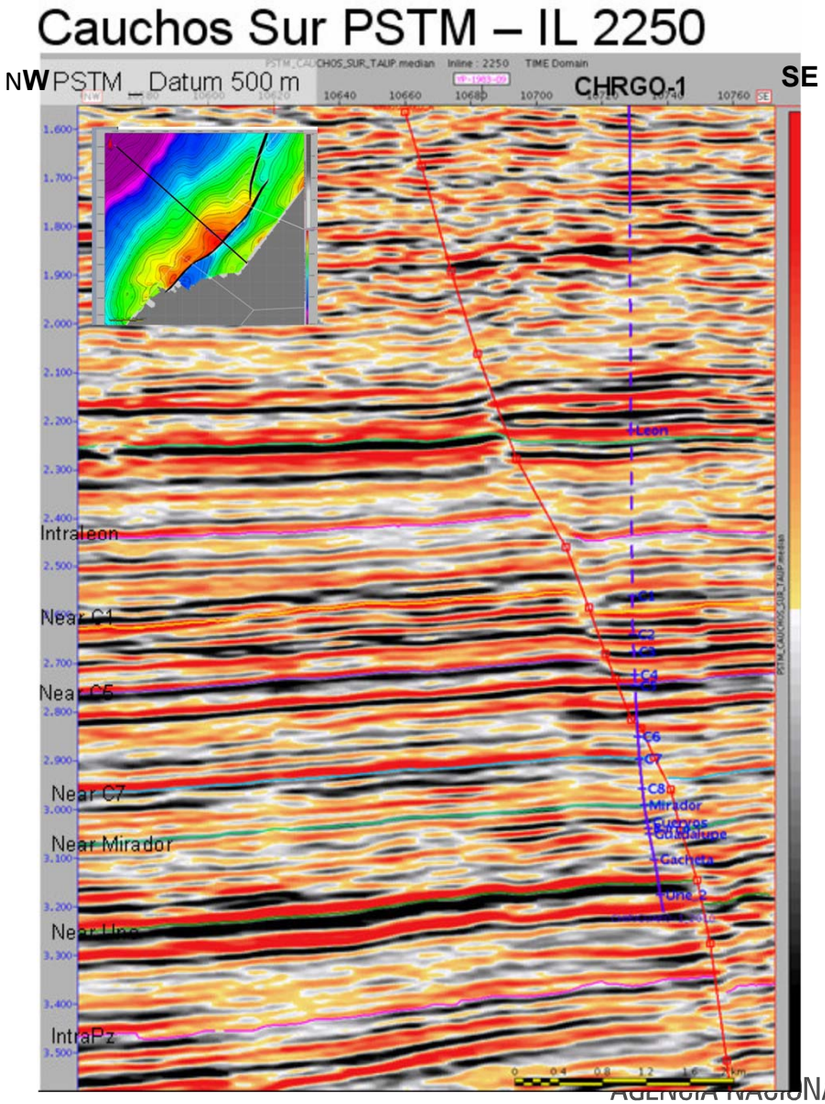


- 3D Seismic
  - CAUCHOS SUR 3D-2007 (611Km^2)
  - LLANOS26 3D-2009 (638Km^2)

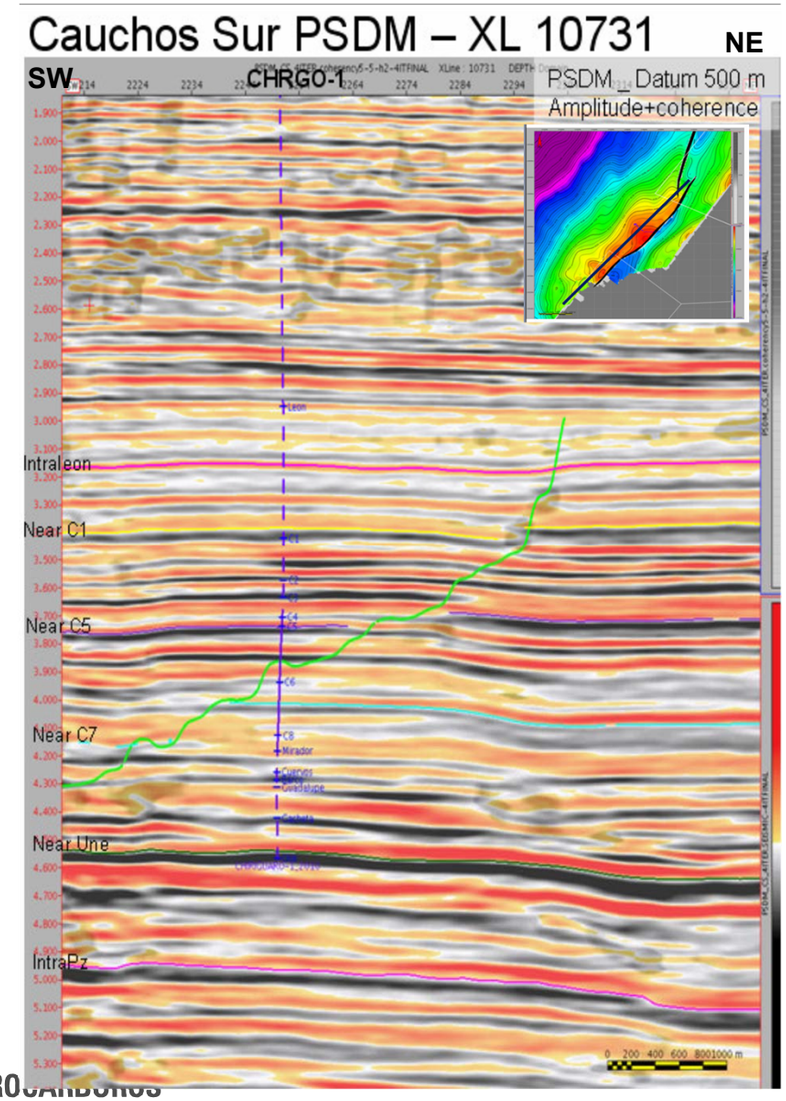
- Well
  - CHIRIGUARO-1

Seismic Lines

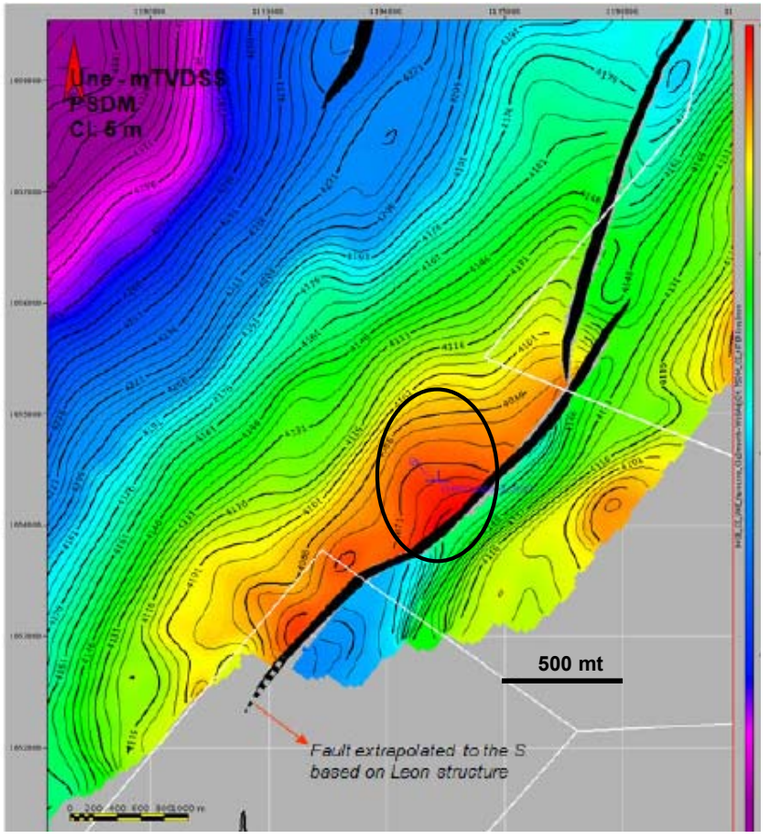
Dip Line



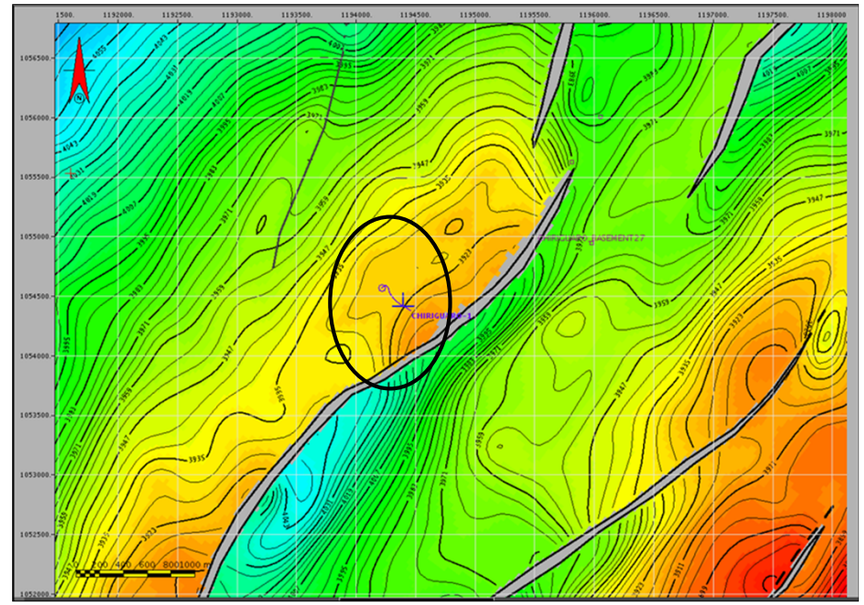
Strike Line



Structural Map in Depth (TVDss)



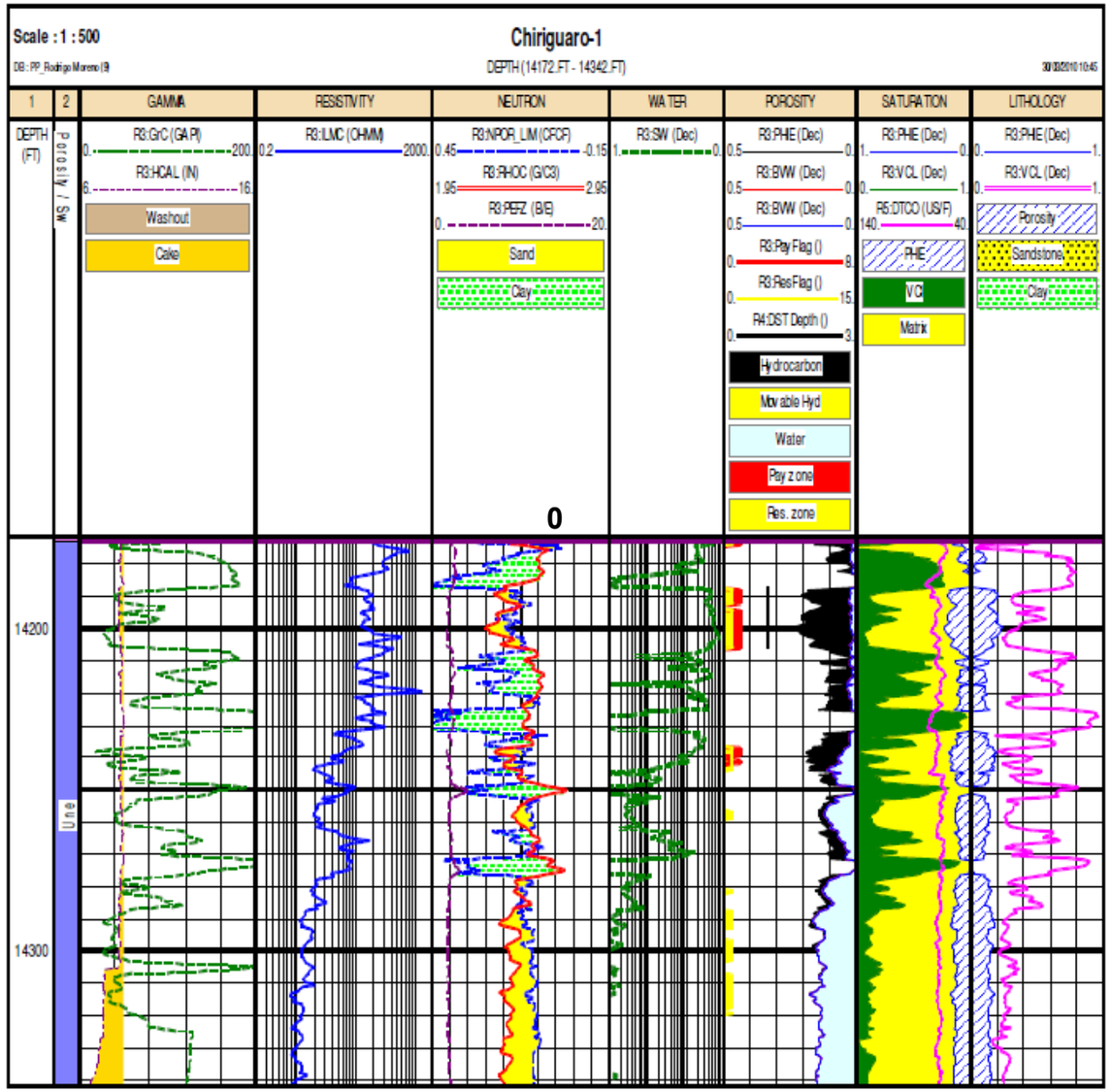
Structural Map at the Top of the Une Formation



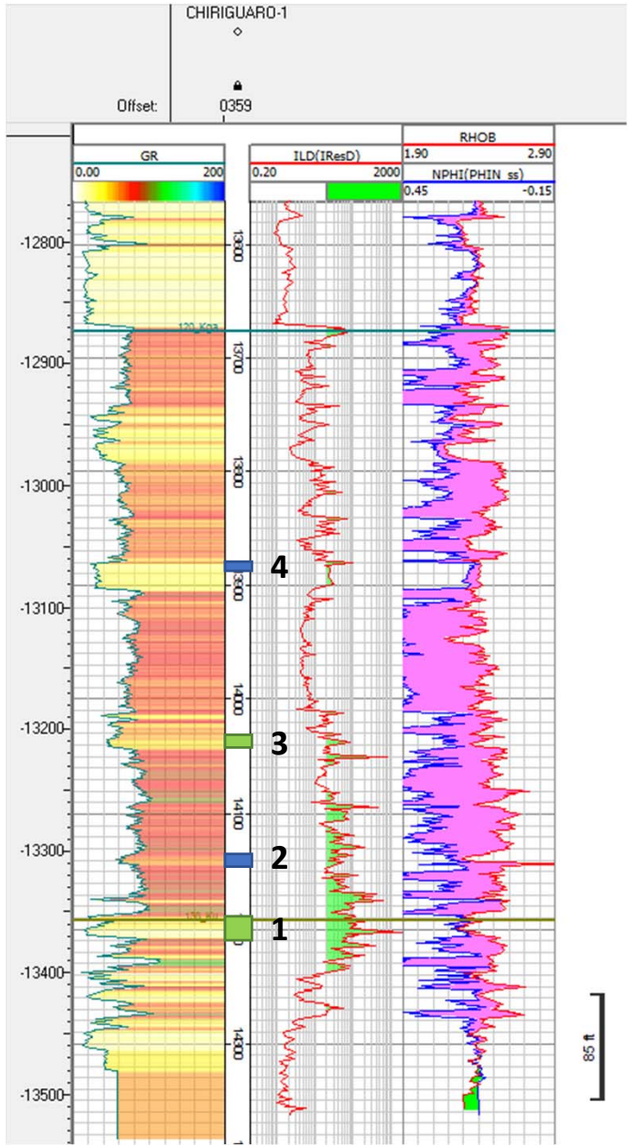
Structural Map at the Top of the Gachetá Formation

Estimated Closure: 750 acres
for Une Top

Petrophysical Evaluation Une Fm.



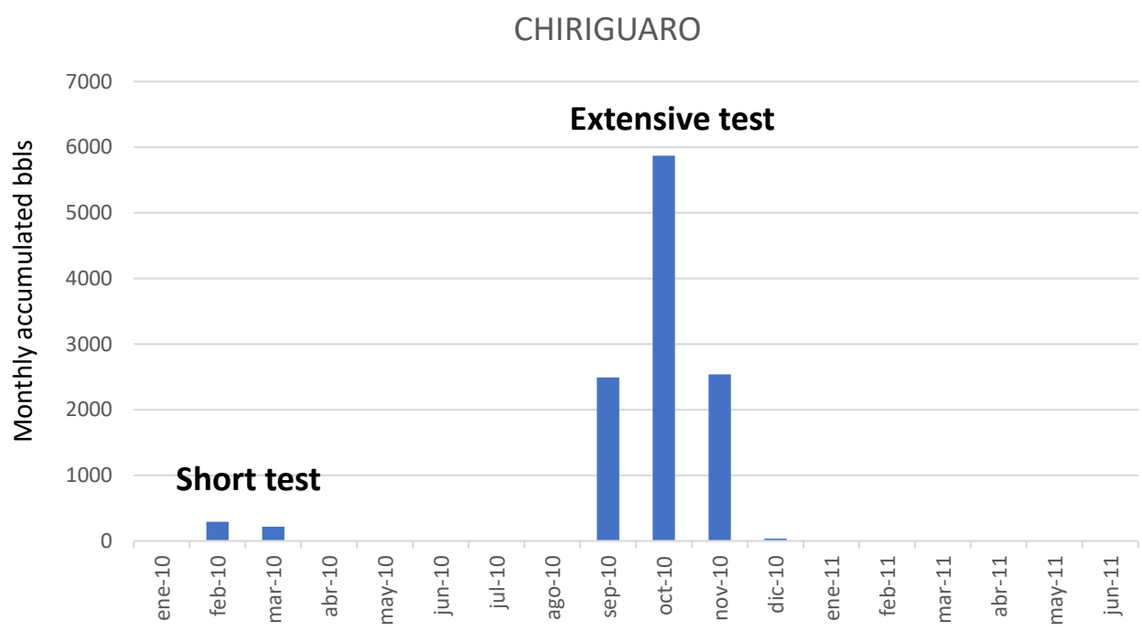
Chiriguaro-1 Short test DST



- ✓ DST-1 (Une Fm. 14.187´- 14.206´ MD): 358 BOPD of13.20 °API and 0% de agua
- ✓ DST-3 (Gachetá Fm.14.031´- 14041´ MD): 280 BOPD of 12,4 °API and 120 BWPD
- ✓ DST-2 and 4 (Gachetá Fm.) produced 100% water

	DST-1	DST-2	DST-3	DST-4
FORMACION	Une	Gacheta	Gacheta	Gacheta
FECHA	22 de feb - 01 de Mar de 2010	01 DE Mar -07 de Mar de 2010	08 de Mar-13 de Mar de 2010	13 de Mar-18 de Mar de 2010
INTERVALO PROBADO	14.187' – 14.206´	14135-14042" MD	14031-14041" MD	13880'-13885' MD
DURACION FLUJO INICIAL	0 h 15 min	0 h 20 min	0 h 20 min	0 h 20 min
DURACION PRIMER CIERRE	2 h	3 h 40 min	3 h 10 min	3 h
DURACION FLUJO PRINCIPAL	36 h	22 h	25 h	25 h
DURACION CIERRE FINAL	31 h	N/A	28 h	N/A
CHOKE FINAL	32/64"	48/64"	48/64"	40/64"
PRESION EN CABEZA	257 PSI	89 PSI	220 PSI	85 PSI
SISTEMA DE LEVANTAMEINTO	NITROGENO	NITROGENO	NITROGENO	NITROGENO
CAUDAL PROMEDIO	358 BFPD	414 BFPD	418 BFPD	350 BFPD
FLUIDO DE FORMACION	PETROLEO	AGUA	PETROLEO	AGUA
BSW	0.1%	100%	30%**	100%
API	13.2	N/A	12.4	N/A
TASA CALCULADA DE GAS	0	0	0	0
PRESION DE YACIMEINTO CALCULADA	5700 PSIA @13897.8' TVD	5900 PSIA @ 13842.7' TVD	5795 PSIA @ 13741' TVD	5628 PSIA
TEMPERATURA DE FORMACION	250 °F	248 °F	254 °F	249 °F
OBSERVACIONES:	Intervalo productor de petróleo Aislado el intervalo con un tapón recuperable	Intervalo productor de agua Aislado el intervalo con un tapon recuperable	Intervalo productor de petróleo ** Existe incertidumbre sobre la procedencia del agua de formación producida. Posible fuga del empaque desde intervalo inf. Aislado con un tapón recuperable	Intervalo productor de agua

Extensive Testing (LTT)



- The Extensive Tests (LTT) in the Une Formation, began on September 8, 2010 and lasted until November 28, 2010, maintaining a production close to 200 BOPD and 0.4% of BS&W
- By November 27, 2010, the cumulative oil production was 11,553 barrels, when an increase in BS&W was reported to 30% and the next day, that is, on November 28, 2010, the well was with 100% of BS&W, so it was closed.
- The results of the Chiriguaro 1 well evaluation program classified it as non-commercial
- The well remained closed until the return of the "Chiriguaro Commercial Field" to the ANH in 2017

Reserves Submitted by the Operator (2012)

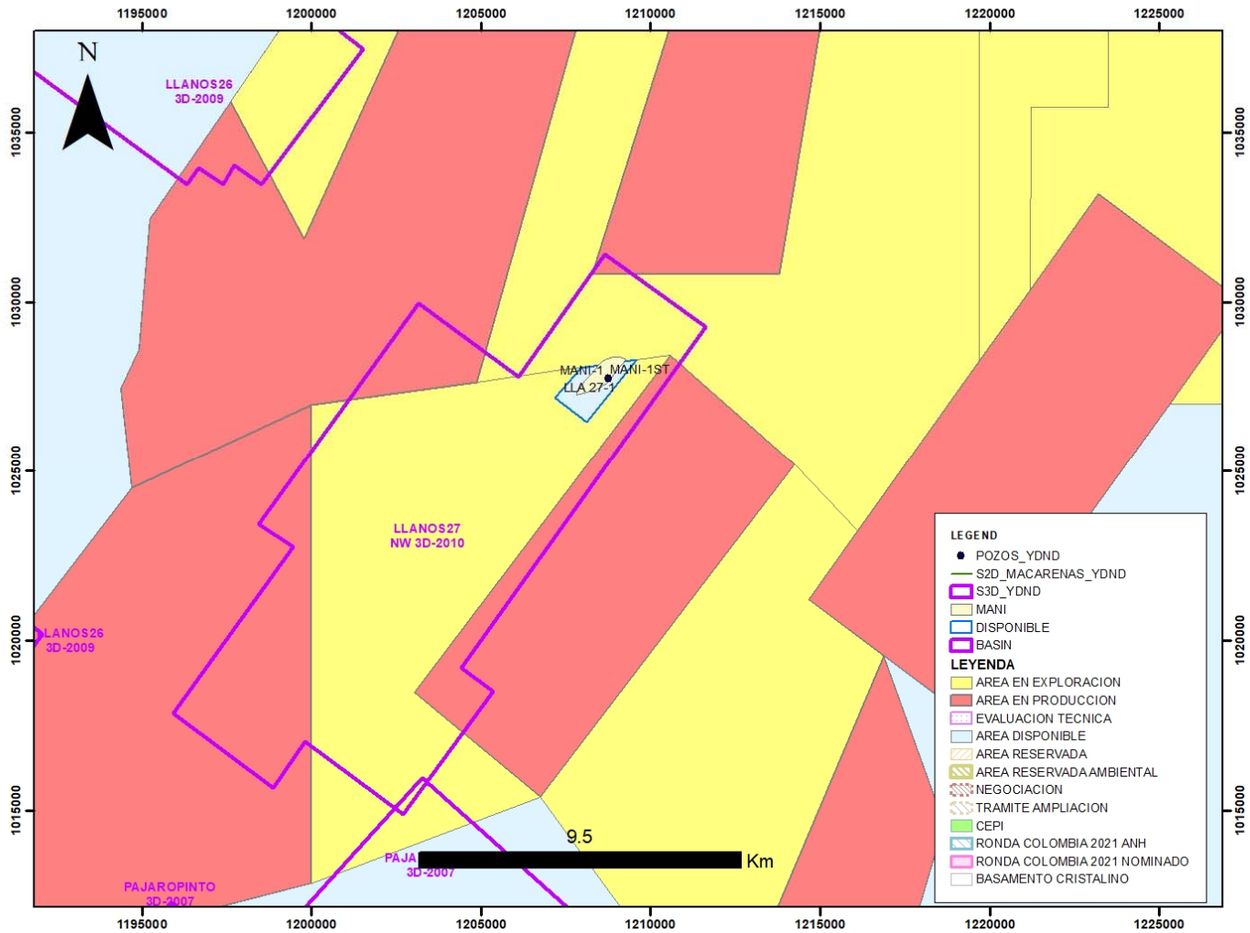
ESCENARIOS	Alto	Medio	Bajo
Reservas (MMBLS)	0,73	0,58	0,43

- On November 20, 2012, the Contractor sent ANH a schedule of activities for the "reactivation of the Chiriguaro 1 well", with the following objectives:
  - Invest the Chiriguaro-1 well to enable it to production, after the abandonment in August 2011.
  - Perform mechanical corrections to control the influx of water presented during the initial test of the Une formation.
  - Obtain production information to adjust the evaluation of reserves made in the Chiriguaro field and define the activities to be carried out in the 2013 Exploitation Work Plan
- On February 8, 2013, the Contractor (No longer Cepcolsa but Parex), expressed its decision to return the Chiriguaro Exploitation Area, considering that the Chiriguaro-1 well was not commercially viable.
- On November 2, 2017, this return was formalized

LLA 27-1 Available Area

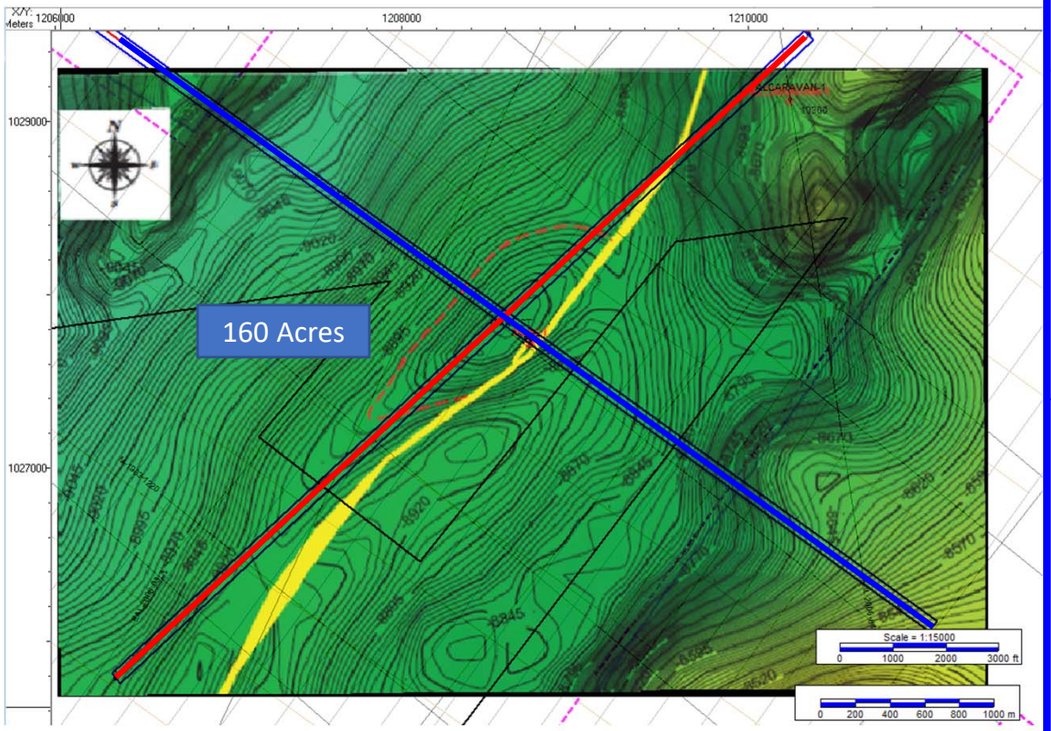
Maní UARD

Database



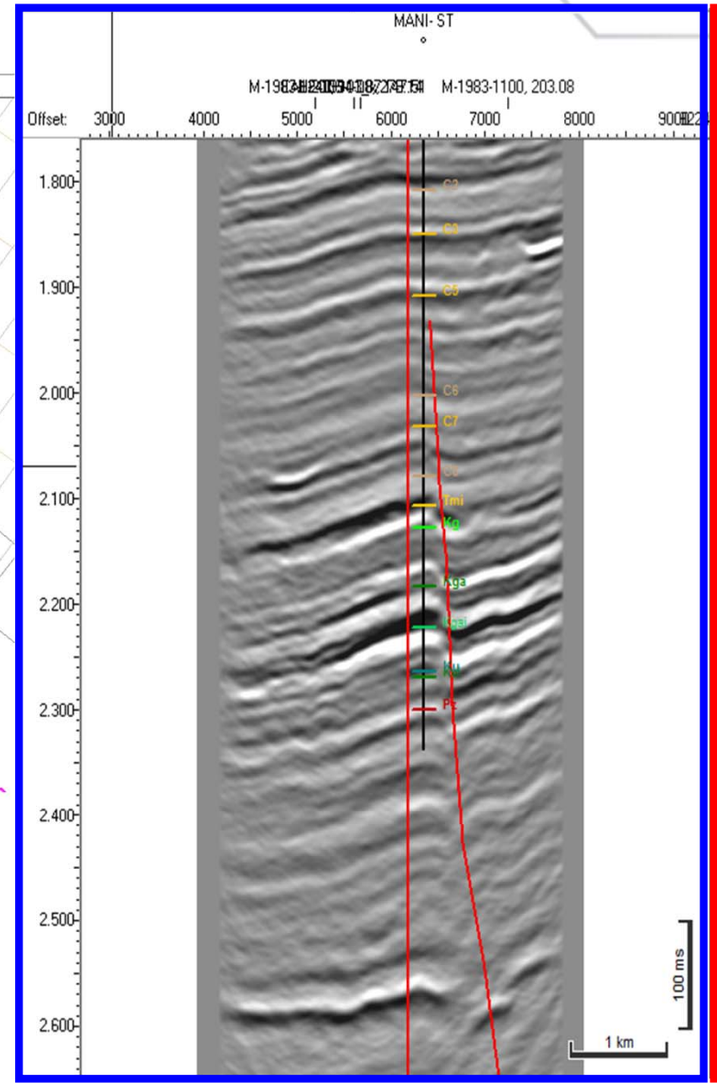
- 3D Seismic
  - LLANOS27 NW 3D-2010 (113Km^2)
- Wells
  - MANI-1 & MANI-1ST

Structural Map & Seismic Lines

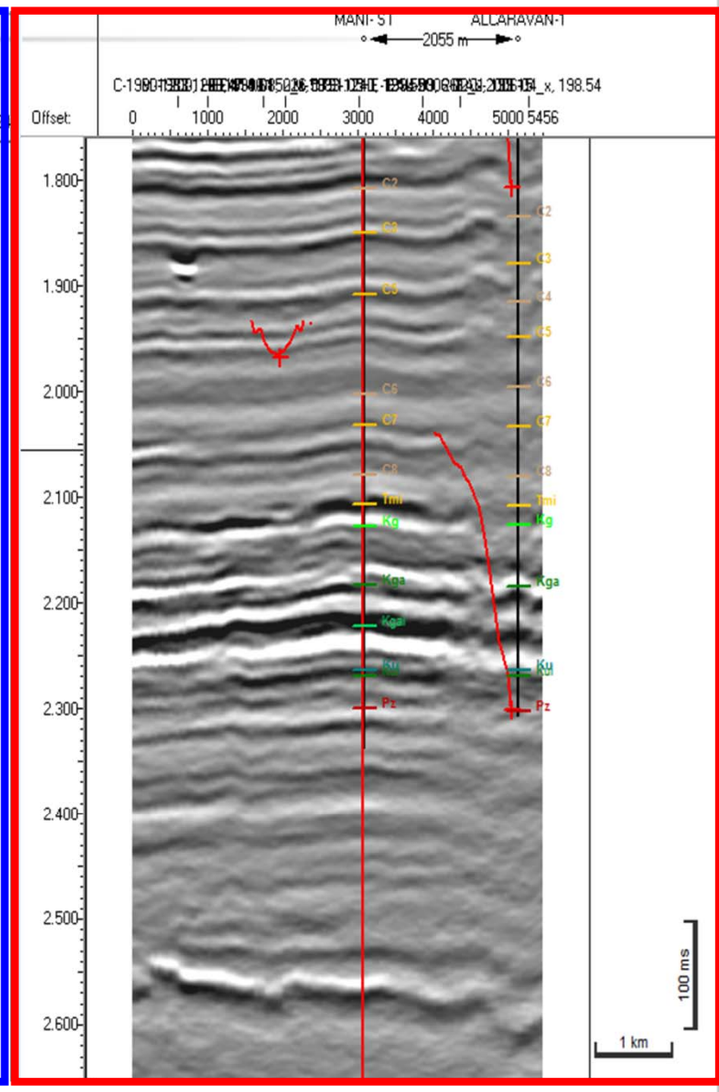


structural map
Top Mirador
(Depth)

Dip Line

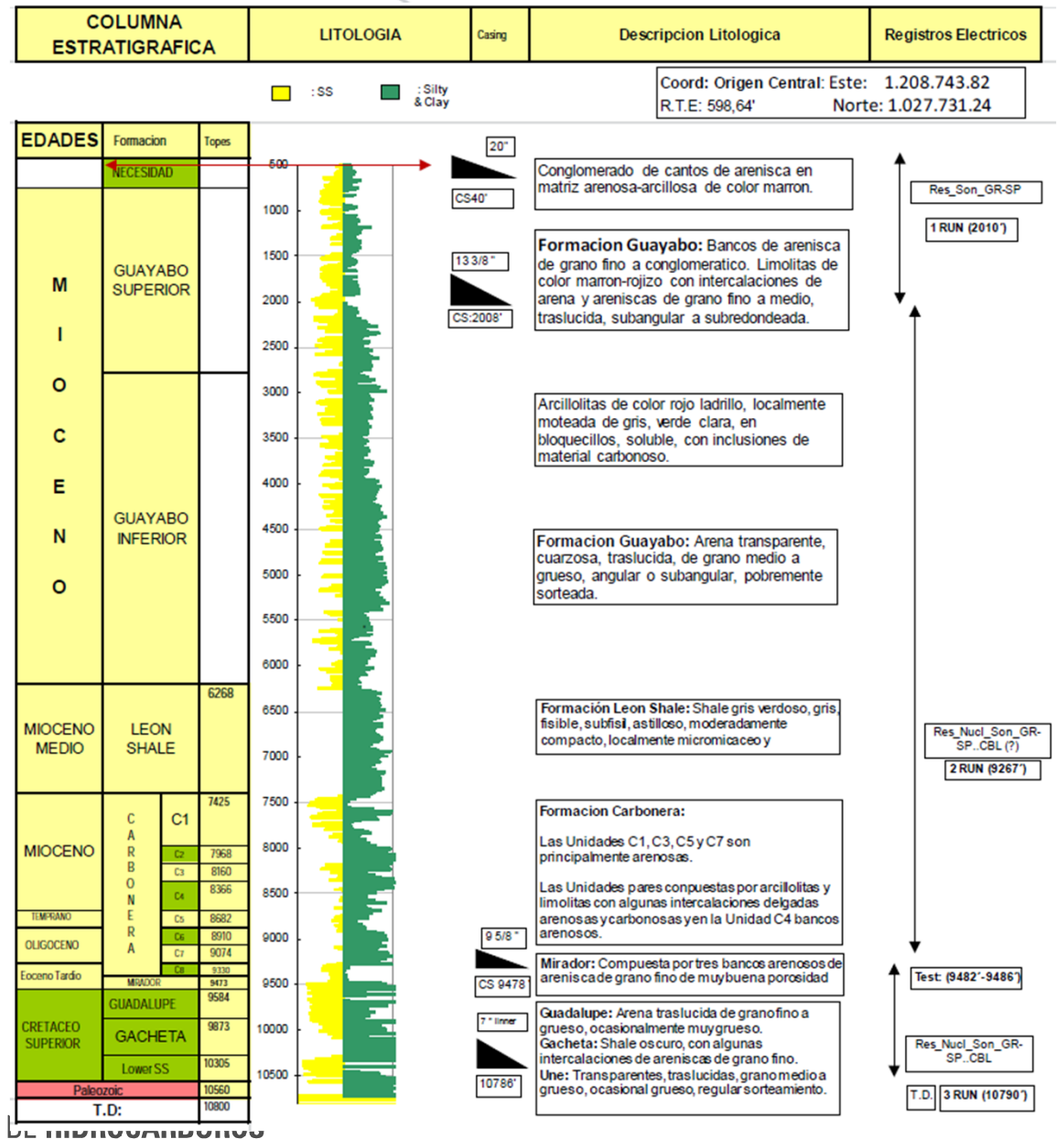


Strike Line

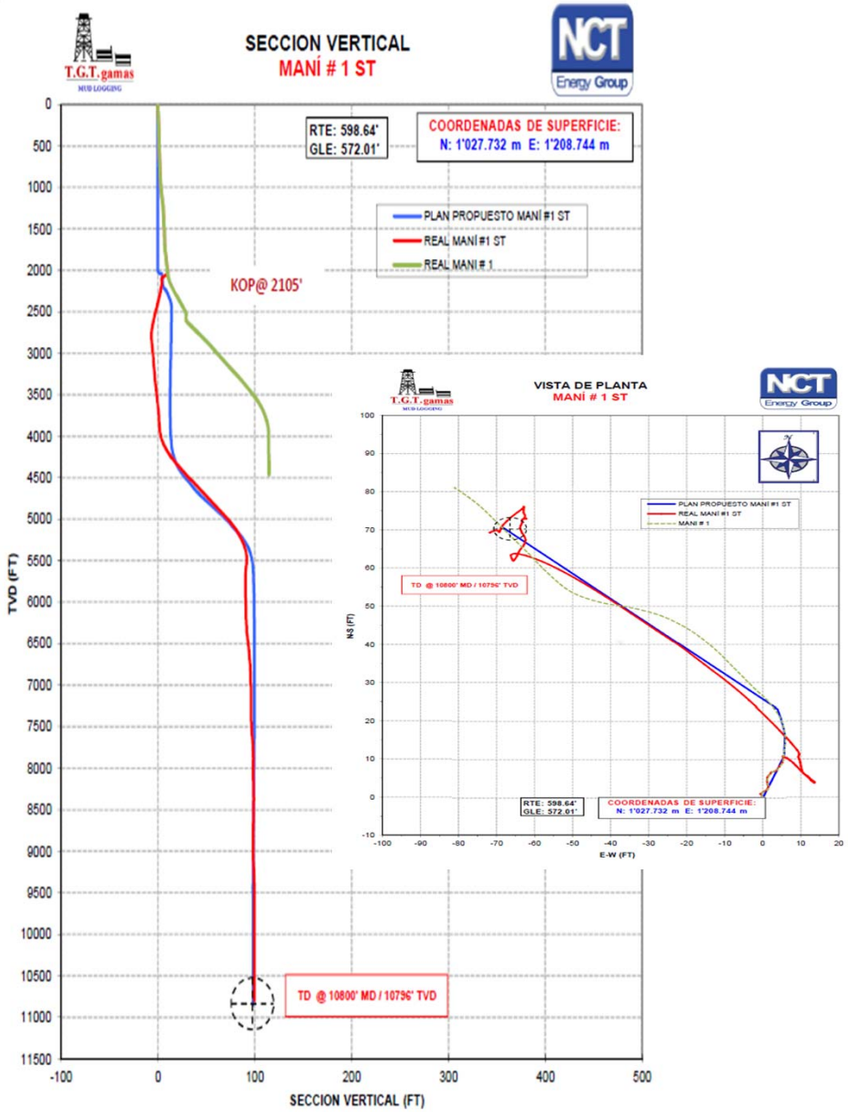


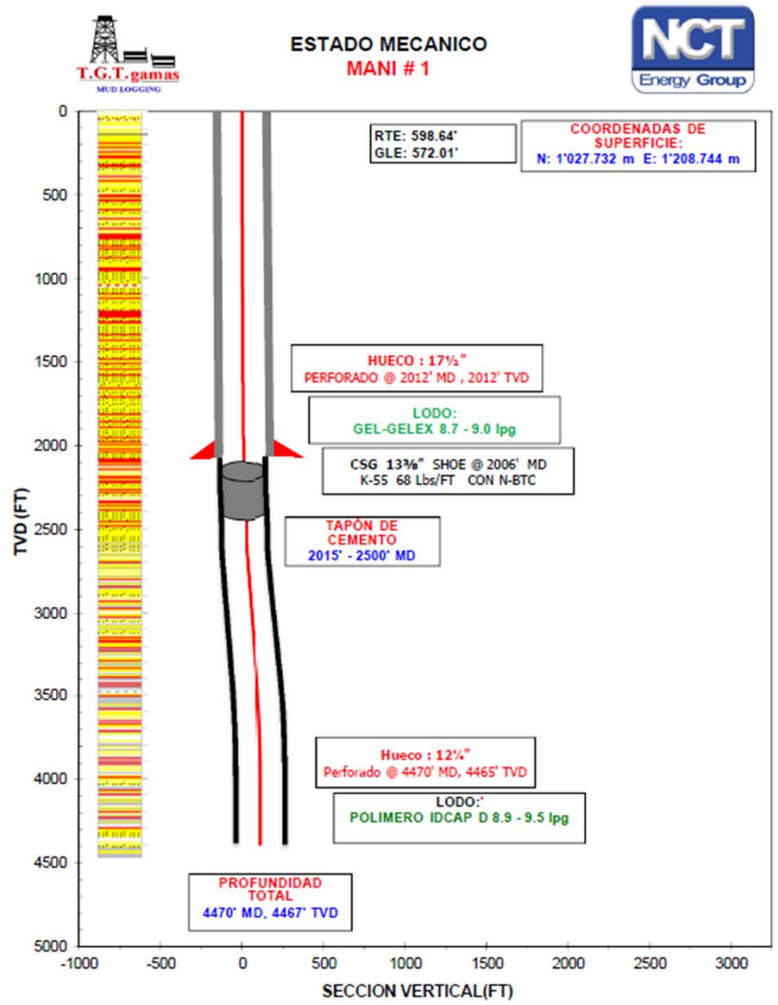
Overview Mani-1 ST well

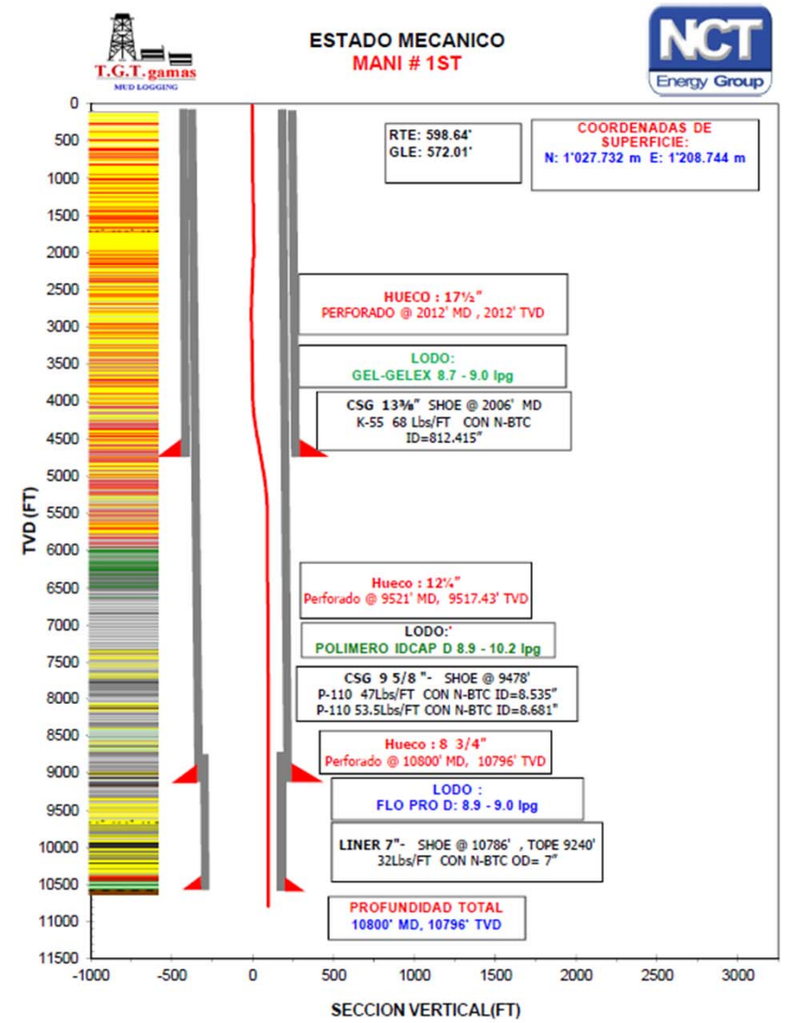
DATOS TÉCNICOS DEL POZO.	
POZO:	MANI-1ST.
CLASIFICACIÓN:	EXPLORATORIO (A3).
CONTRATO E&P:	LLANOS-27
OPERADOR:	NCT ENERGY GROUP C. A. COLOMBIA
TRAYECTORIA:	DESVIADO
COORDENADAS GAUSS SUP. MAGNA SIRGAS ORIGEN BOGOTÁ	Este: 1.208.743.82 Norte: 1.027.731.24
MÁXIMO ANGULO:	Ang: 4.81° a 4834' MD Azimuth: 302.35°
ALTURA DEL SUELO:	572,01 pies snm.
ALTURA DE LA M. R.:	598,64 pies snm.
PROF. FINAL PERFORACIÓN:	10.800' (10.796,4' TVD).
PROF. FINAL REGISTROS:	10.798' MD .
CLASIFICACIÓN INICIAL:	EXPLORATORIO.
CLASIFICACIÓN FINAL:	PRODUCTOR.
OBJETIVO INICIAL:	FORMACIÓN MIRADOR.
NIVEL GEOLÓGICO INICIAL:	FORMACIÓN NECESIDAD.
NIVEL GEOLÓGICO FINAL:	PALEOZOICO.



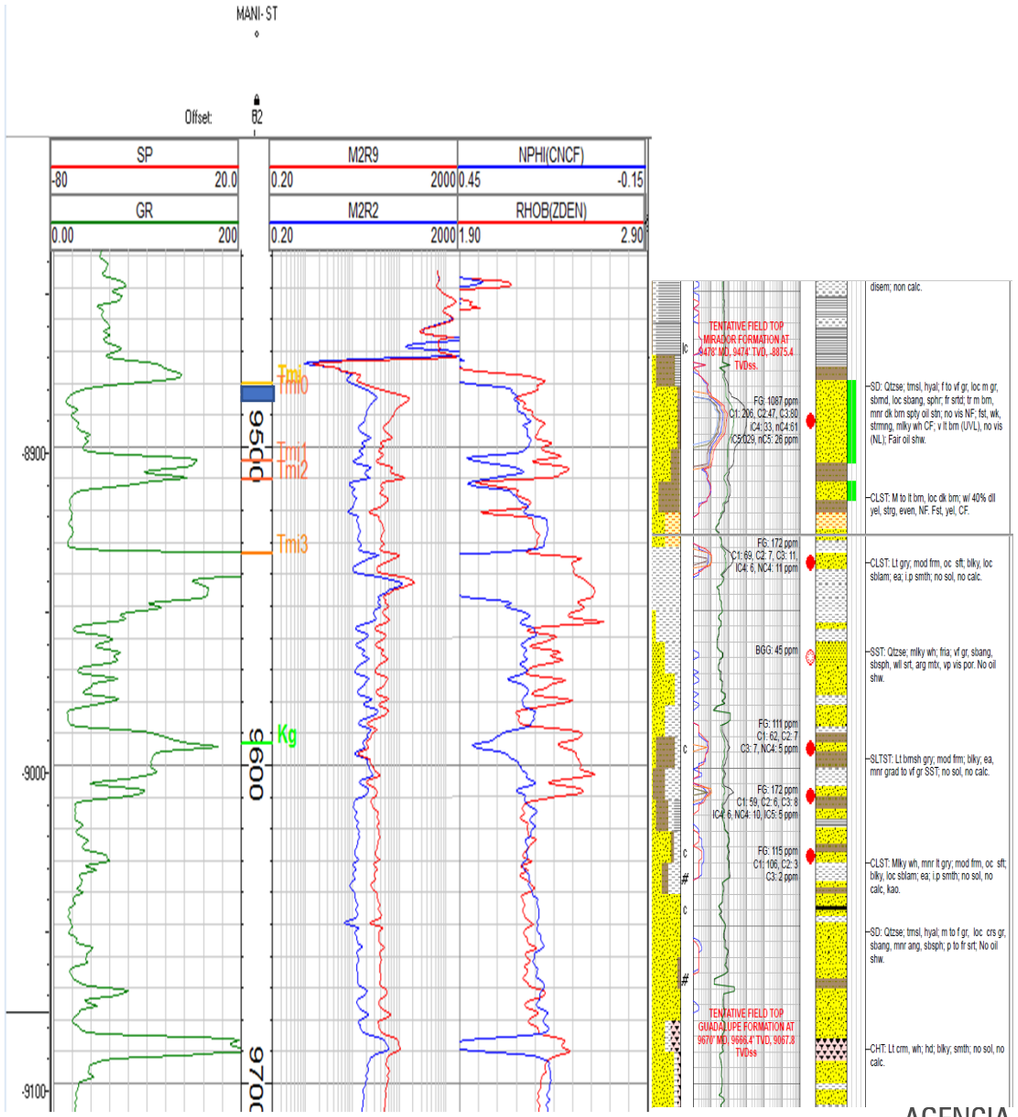
Maní-1 y Maní-1 ST (Deviations – well status)

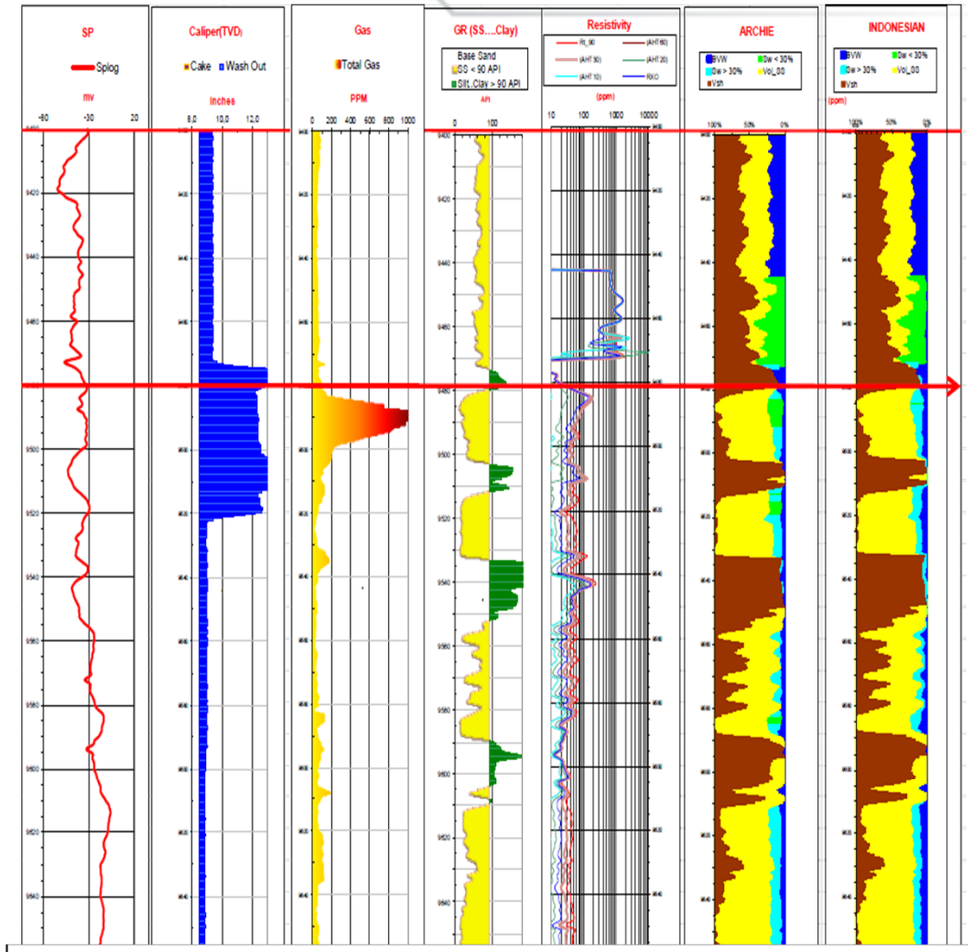






Mirador Fm. Section (Petrophysics)





Mani-1 ST			Fm Mirador												Rw: 1,30 199 °F 945 ppm Cl-					
Archie			Formula - Indonesian												Simandoux					
Intervals			Intervals			Saturation(Sw)			Vol. Shale(Vsh)			Porosity			Intervalos			Saturation(Sw)		
Tope	Base	Sw	Tope	Base	Esp.	Min	Prom	Max	Min	Prom	Max	Min	Prom	Max	Tope	Base	Esp.	Min	Prom	Max
9483	9492	0,17	9485	9486	1,0	0,27	0,28	0,29	0,00	0,00	0,00	0,21	0,21	0,21	9484	9485	1,0	0,27	0,28	0,29
9497	9497	0,27																		
9513	9514	0,28																		
9515	9520	0,25																		
9582	9585	0,23																		

RONDA COLOMBIA 2021 Short Tests Mani-1ST

NCT Energy Group	POZO FORMACION INTERVALO	MANI ST 01 MIRADOR 9482'-9486'		
Datos a la Hora		Promedio de la Prueba	Promedio de la Prueba 1 Dia	Promedio de la Prueba 2 Dia
30/12/2011 13:30		29/12/2011 0:00	29/12/2011 0:00	30/12/2011 0:15
PARAMETER	VALUE	30/12/2011 6:00	29/12/2011 23:59	30/12/2011 13:30
Total Fluid Rate (BFPD)	1511,89	3309,72	2601,78	1573,97
Water Rate (BWPD)	1511,89	3309,72	2601,78	1573,97
Gross Oil Rate (BOPH)	0,00	0,00	0,00	0,00
Net Oil Rate (BONPD)	**0,00**	**0,00**	**0,00**	**0,00**
Gas Rate (KSCFD)	0,00	0,00	0,00	0,00
Formation BS&W (%)	100,00	100,00	100,00	100,00
GOR (SCF/STB)	0,00	0,0	0,0	0,0
RGL (SCF/BBL)	0,00	0,0	0,0	0,0
Frequency (Hz)	30,00	30	30	30
PIP (Psi)	3724,30	3732,47	3734,47	3724,61
Motor Temperature	233,30	230,65	230,35	233,16
Intake Temperature	221,50	219	218	221
Current (A)	42,10	42	42	42
API (Degrees)	10,00	10,0	10,0	10,0
Chlorides (ppm)	0,00	305,8	314,7	277,2
Sediments (PTB)	0,00	N/M	N/M	N/M
Tubing Head Pressure (psi)	1,00	0,9	1	1,0
Tubing Head Temperature (F)	134,00	112,7	107,3	133,7
Accumulated Oil (Bls)	0,00	0,00	0,00	0,00
Accumulated Water (Bls)	4175,75	3309,72	2601,78	4175,75
Accumulated Fluid (Bls)	4175,75	3309,72	2601,78	4175,75

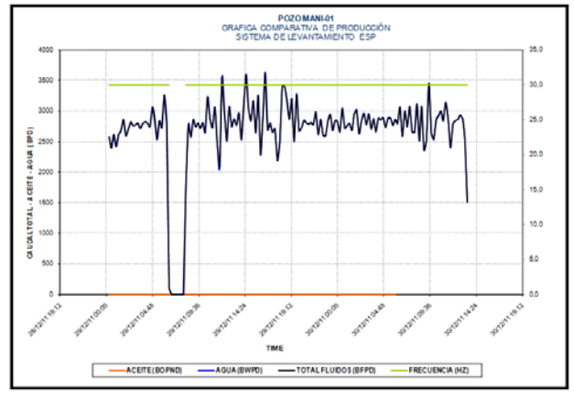
Short test 1 (Mirador Formation. Interval: 9482´-9486´)

NCT Energy Group	POZO FORMACION INTERVALO	MANI 1 MIRADOR 9482'-9486'	Weatherford			
Datos a la Hora		Promedio de la Prueba	Promedio de la Prueba 1 Dia	Promedio de la Prueba 2 Dia	Promedio de la Prueba 3 Dia	Promedio de la Prueba 4 Dia
14/01/2012 2:30		11/01/2012 17:30	11/01/2012 17:30	11/01/2012 17:30	11/01/2012 17:30	11/01/2012 17:30
PARAMETER	VALUE	12/01/2012 0:00	12/01/2012 0:00	13/01/2012 0:00	14/01/2012 0:00	14/01/2012 2:30
Total Fluid Rate (BFPD)	2161,06	1495,30	179,11	1623,28	3492,11	3710,92
Water Rate (BWPD)	345,77	615,07	179,11	630,43	863,80	898,81
Gross Oil Rate (BOPH)	37,82	880,22	0,00	992,85	2628,30	2812,11
Net Oil Rate (BONPD)	**887,31**	**870,74**	**0,00**	**981,93**	**2590,36**	**2770,21**
Gas Rate (KSCFD)	0,00	0,00	0,00	0,00	0,00	0,00
Formation BS&W (%)	16,00	55,69	100,00	53,94	45,90	45,20
GOR (SCF/STB)	0,00	0,0	#¡DIV/0!	0,0	0,0	0,0
RGL (SCF/BBL)	0,00	0,0	0,0	0,0	0,0	0,0
Frequency (Hz)	39,00	34	31	34	34	34
PIP (Psi)	2689,90	2747,41	2994,51	2744,15	2748,69	2747,29
Motor Temperature	266,90	263,69	235,23	264,15	267,31	267,76
Intake Temperature	223,70	219	211	219	220	220
Current (A)	60,90	51	36	51	52	53
API (Degrees)	16,00	14,3	#¡DIV/0!	14,3	14,7	14,8
Chlorides (ppm)	250,00	814,1	1631,5	791,4	689,3	678,9
Sediments (PTB)	0,00	N/M	N/M	N/M	N/M	N/M
Tubing Head Pressure (psi)	7,50	4,5	#¡DIV/0!	4,5	4,8	4,9
Tubing Head Temperature (F)	136,00	96,0	#¡DIV/0!	97,0	104,3	105,2
Accumulated Oil (Bls)	2770,21	0,00	0,00	992,85	2628,30	2812,11
Accumulated Water (Bls)	898,81	179,11	179,11	630,43	863,80	898,81
Accumulated Fluid (Bls)	3710,92	179,11	179,11	1623,28	3492,11	3710,92

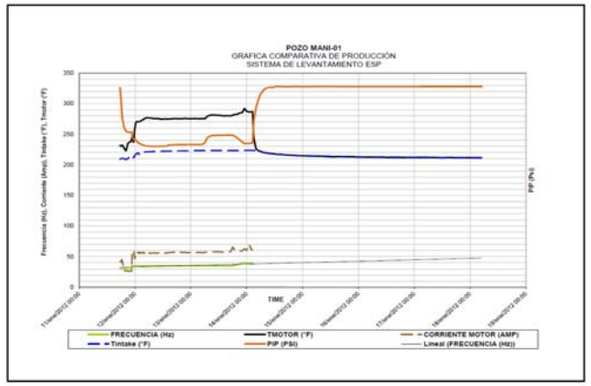
Short test 2 (Mirador Formation. Interval: 9482´-9486´)

•Short Test 1 (Mirador Formation, Interval 9482'-9486'):

•This test is carried out from December 29, 2011 to December 30, 2011 with artificial lifting Electro submersible pumping at 30Hz, recovering a total of 4175.75 Bbls of production water, delivered to the External plant for treatment.



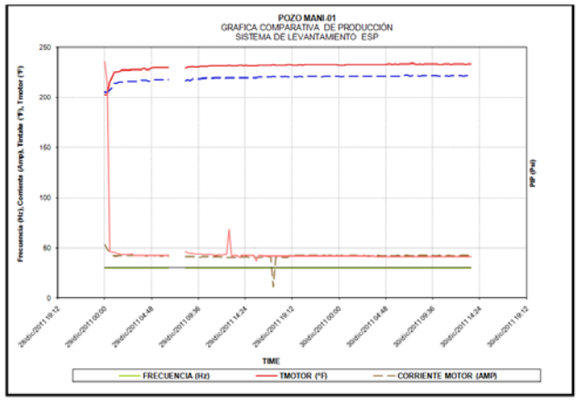
Grafica Relación Agua, Aceite y Frecuencia Variador



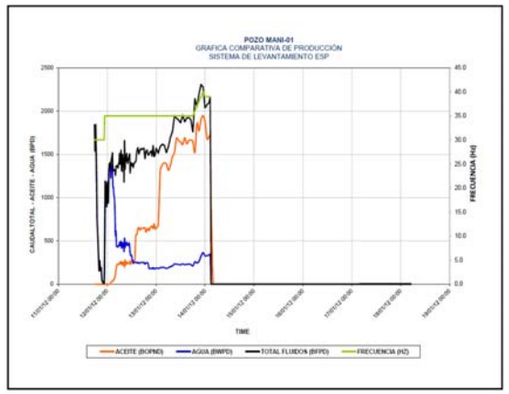
COMPARATIVA DE PRODUCCIÓN CON BOMBA (ESP).

•Short Test 2 (Mirador Formation, Interval 9482'-9486'):

•The test begins on January 11, 2012 and ended on January 14. He used electro-submersible pumping as an artificial lifting system, starting with 30 Hz and ending the test with 39 Hz. During this period, a total of 898.81 Bbls of Production water and 2770.2 Bbls of 16º API Gravity Net crude oil were recovered.

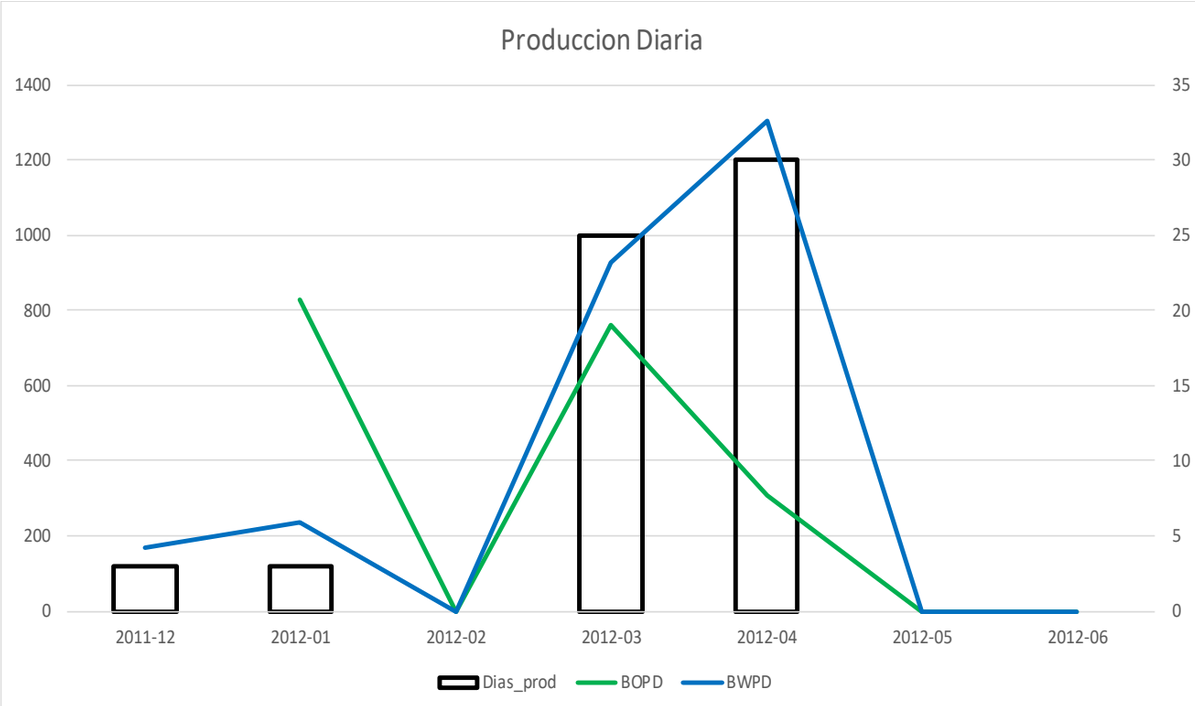


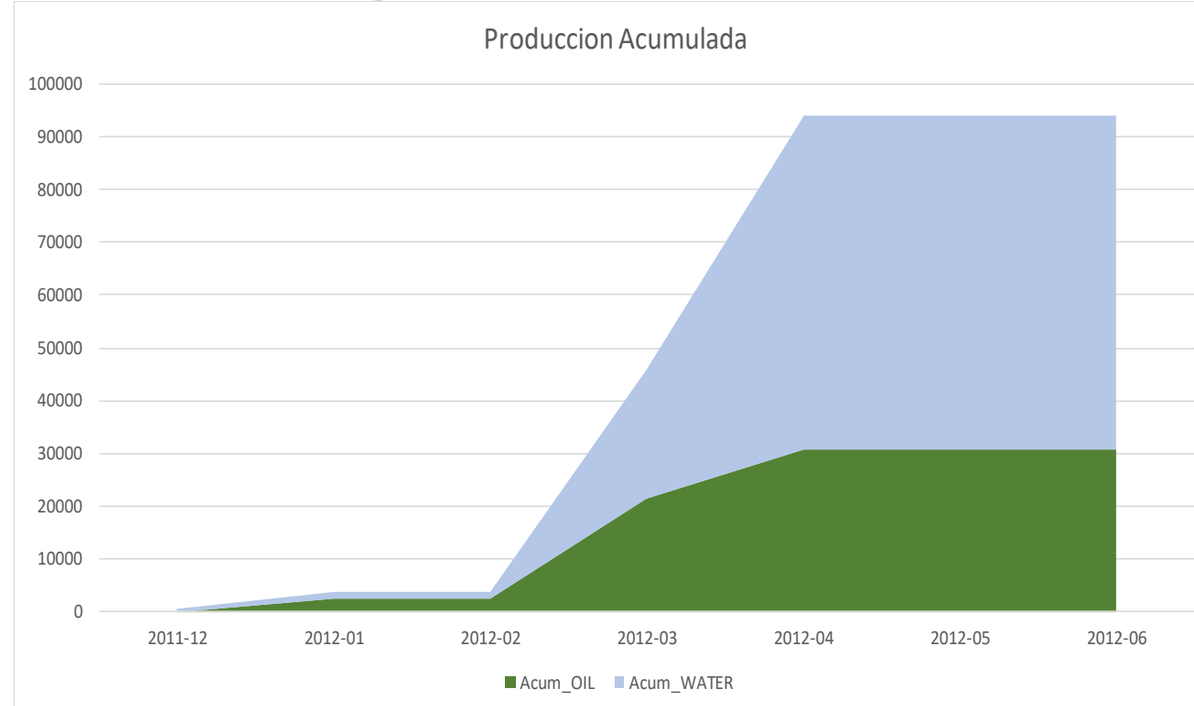
Grafica Relación Frecuencia, Temp. motor y Corriente Motor



COMPARATIVA DE PRODUCCIÓN INCLUYENDO FRECUENCIA.

Production (Extensive Test)

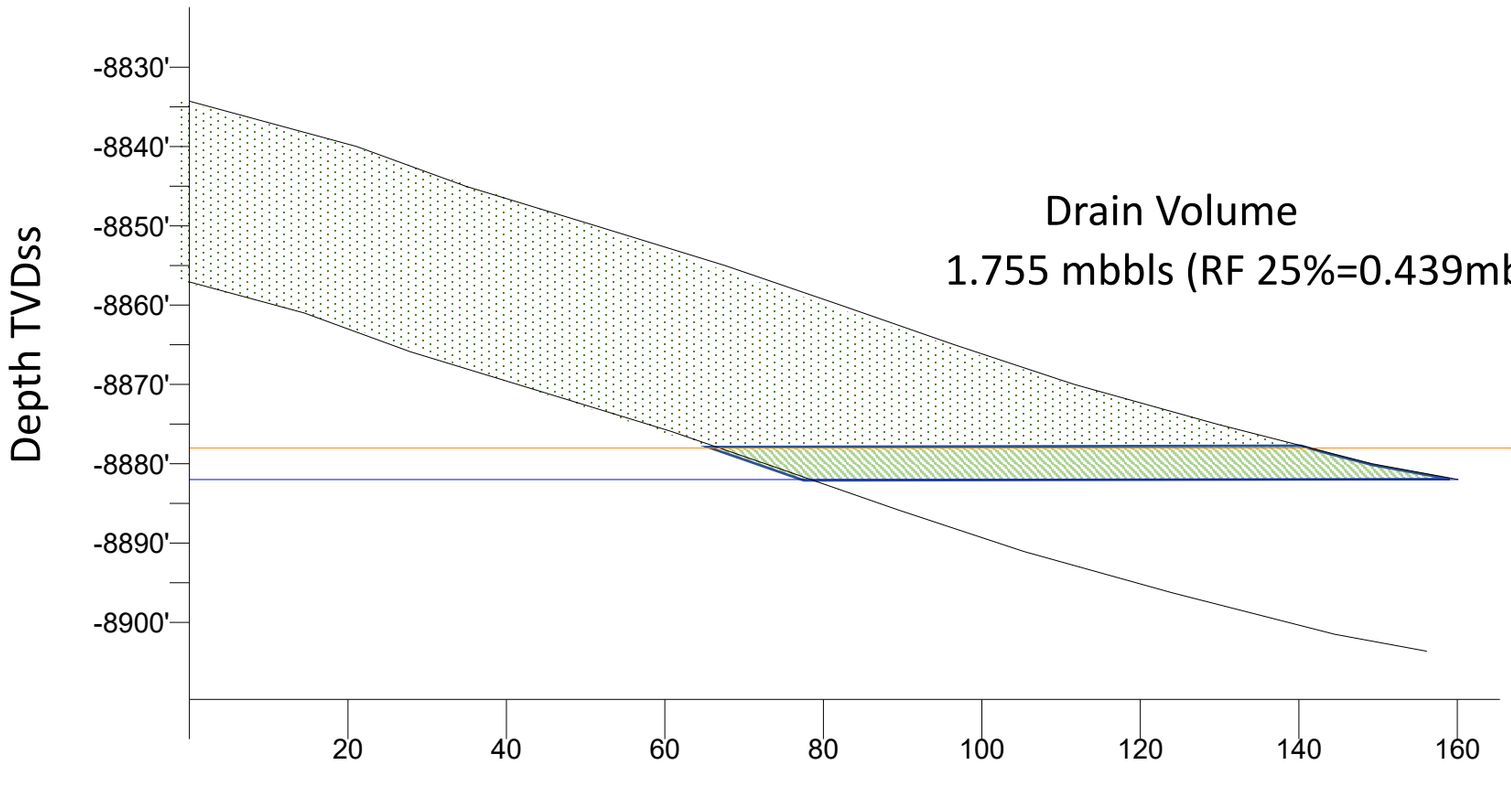


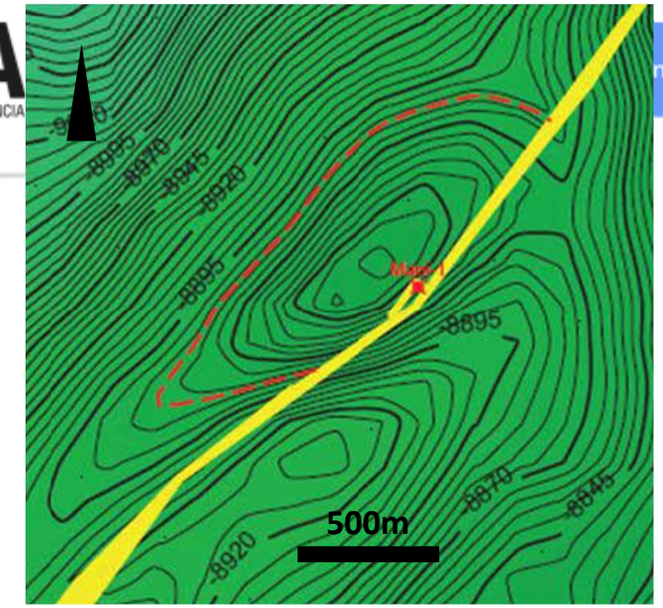


Cumulative Production:

- Oil: 31222 bbls
- Water: 63689 bbls

Volumetric Calculation (ANH)



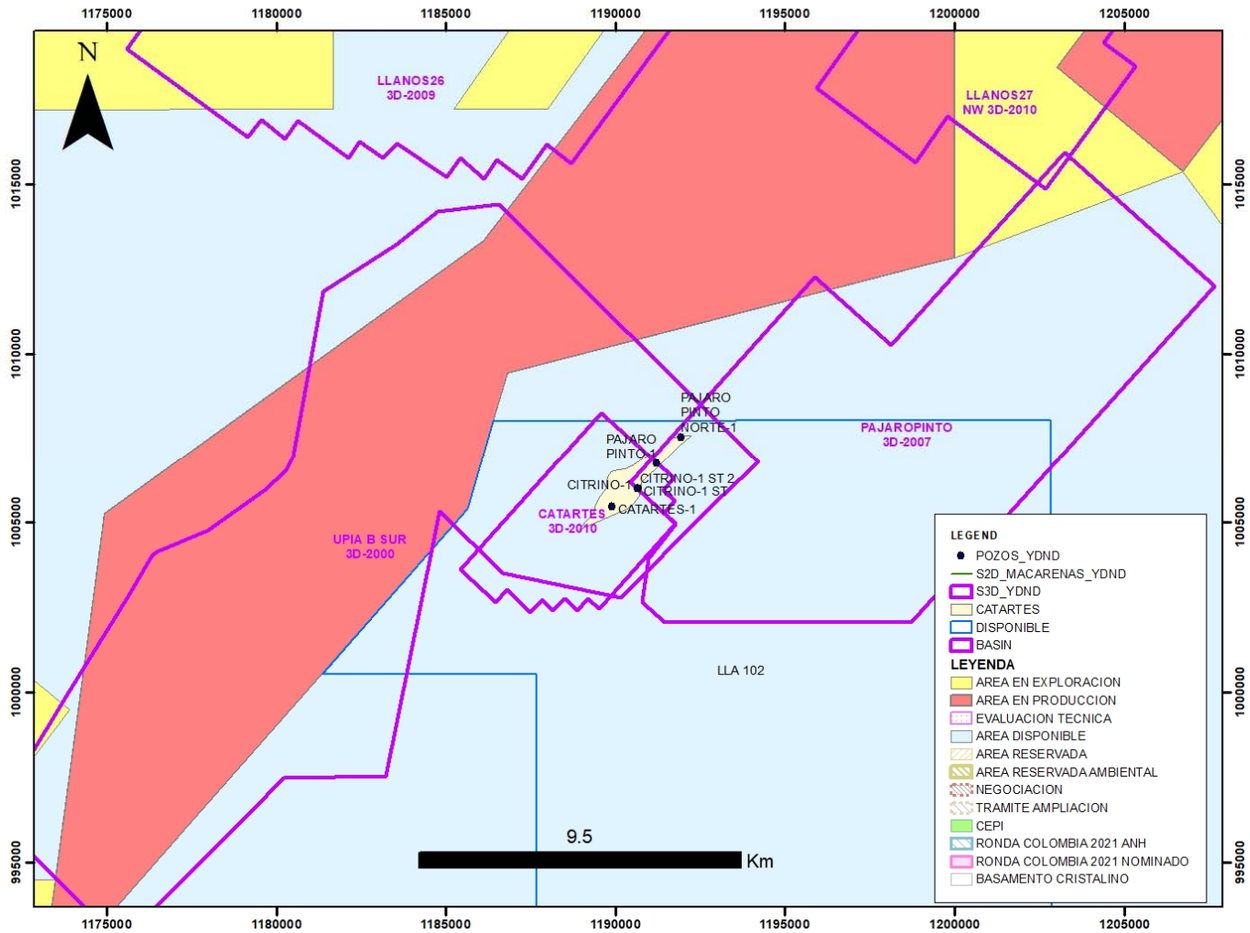


	Acre-ft	Ø	Sw	Bo	RF	OOIP	Rec
Vol Drenada	309.4	0.2	0.5	1.04	0.25	0.2308	0.0577
Vol Por Drenada	2354	0.2	0.5	1.04	0.25	1.7560	0.4390
Vol Total	2663.4	0.2	0.5	1.04	0.25	1.9868	0.4967

LLA 102 Available Area

Catartes UARD

Database



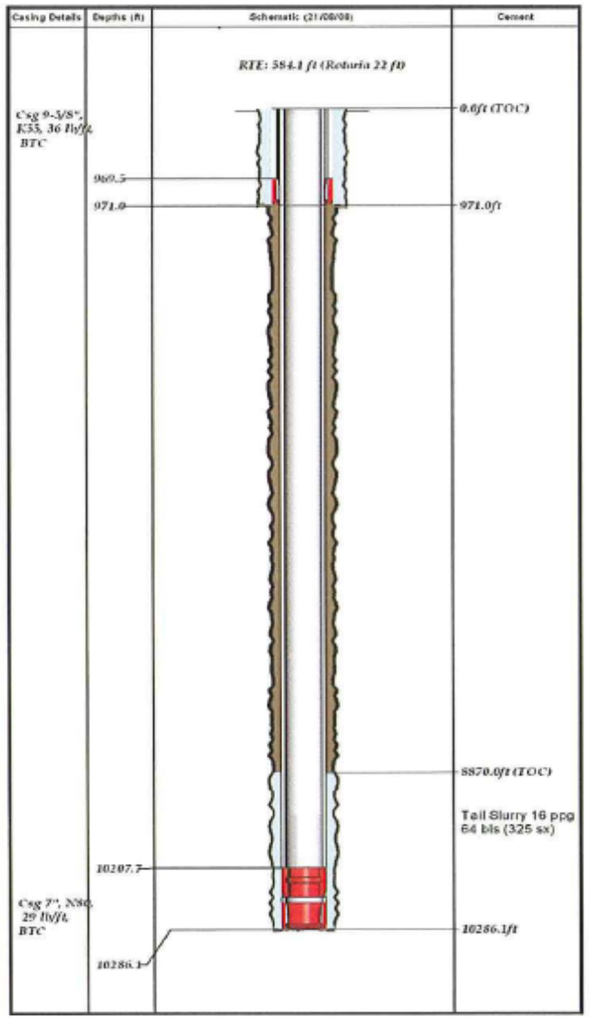
- 3D Seismic
  - UPIA B SUR 3D 2000 (192Km^2)
  - CATARTES 3D-2010 (20.7Km^2)
  - PAJAROPINTO 3D-2007 (121.8Km^2)
- Wells
  - PAJARO PINTO-1
  - CITRINO-1 & CITRINO-1ST
  - PAJARO PINTO NORTE-1
  - CATARTES-1

RONDA COLOMBIA 2021 Well Status

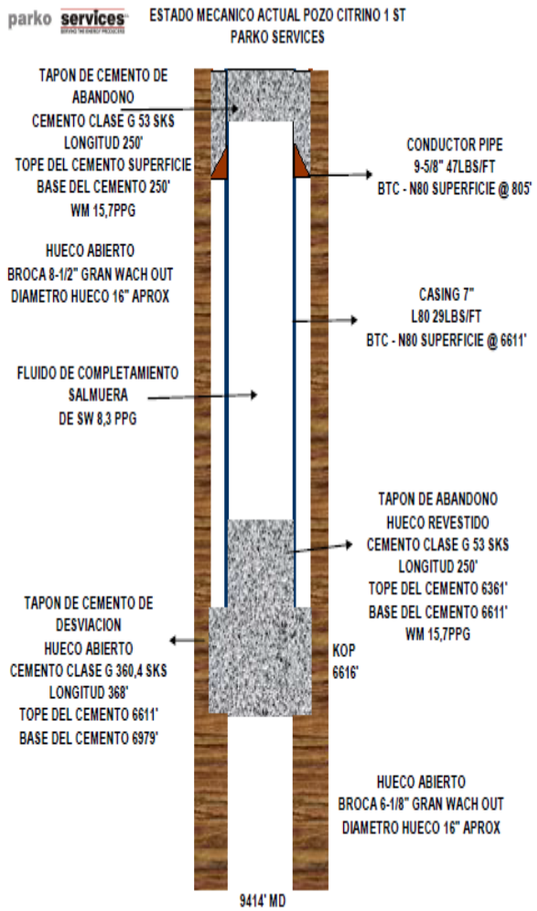
ANH AGENCIA NACIONAL DE HIDROCARBUROS

El futuro es de todos | Minenergía

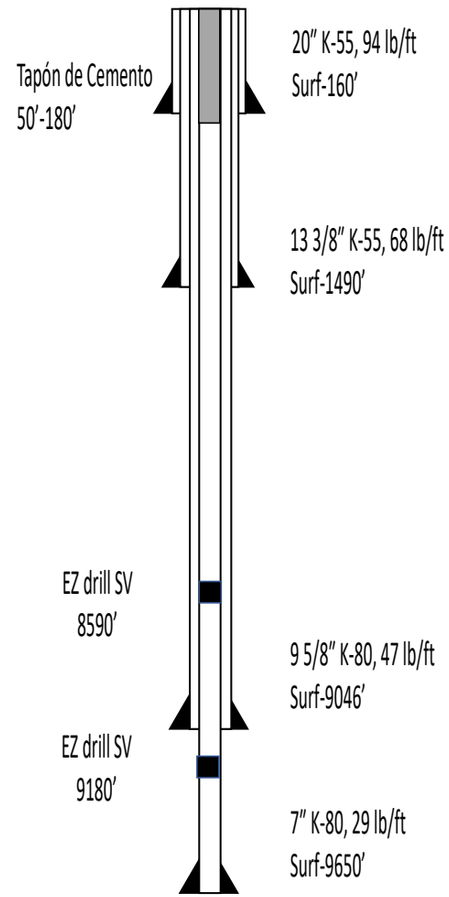
CATARTES-1



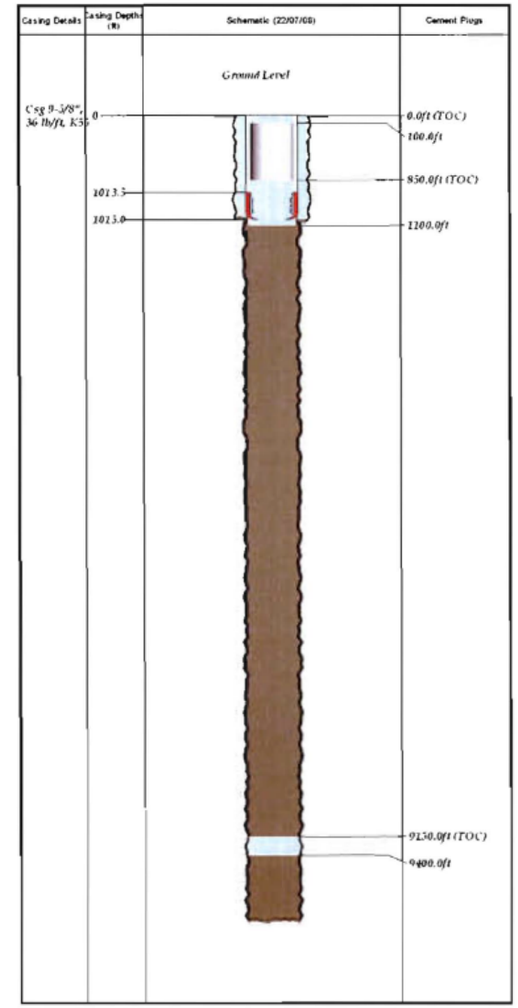
CITRINO-1ST



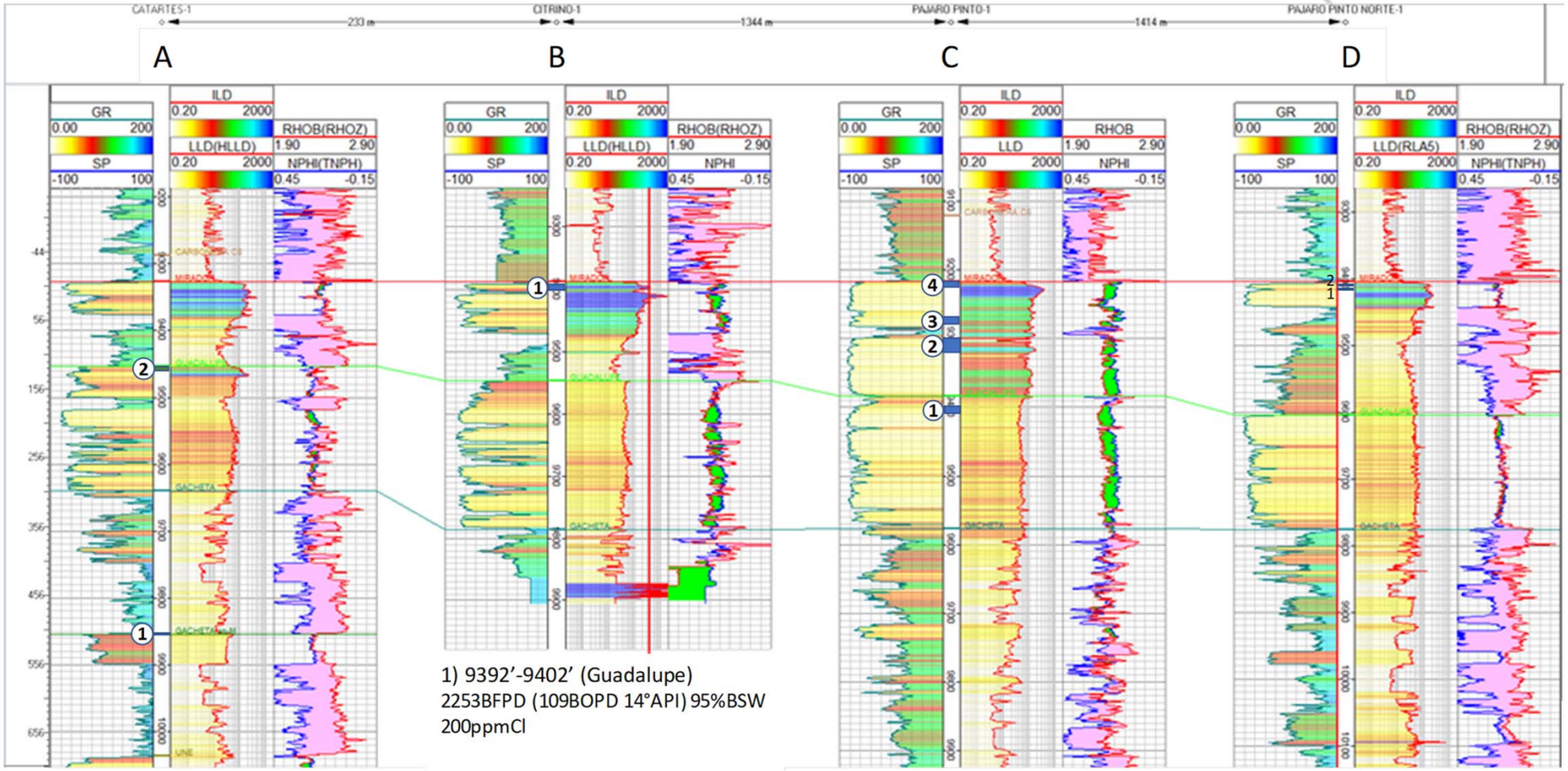
PAJARO PINTO-1



PAJARO PINTO NORTE-1



Stratigraphic Correlation (Mirador Datum)

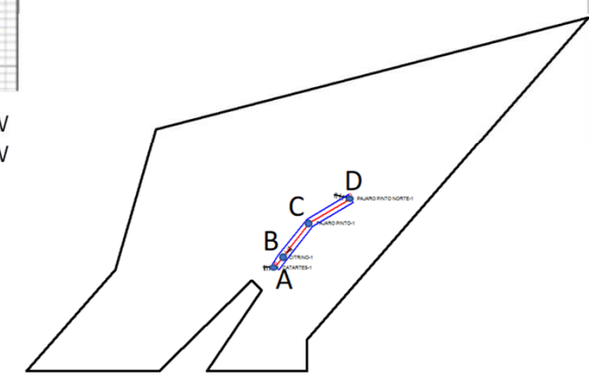


1) 9392'-9402' (Guadalupe)
2253BFPD (109BOPD 14°API) 95%BSW
200ppmCl

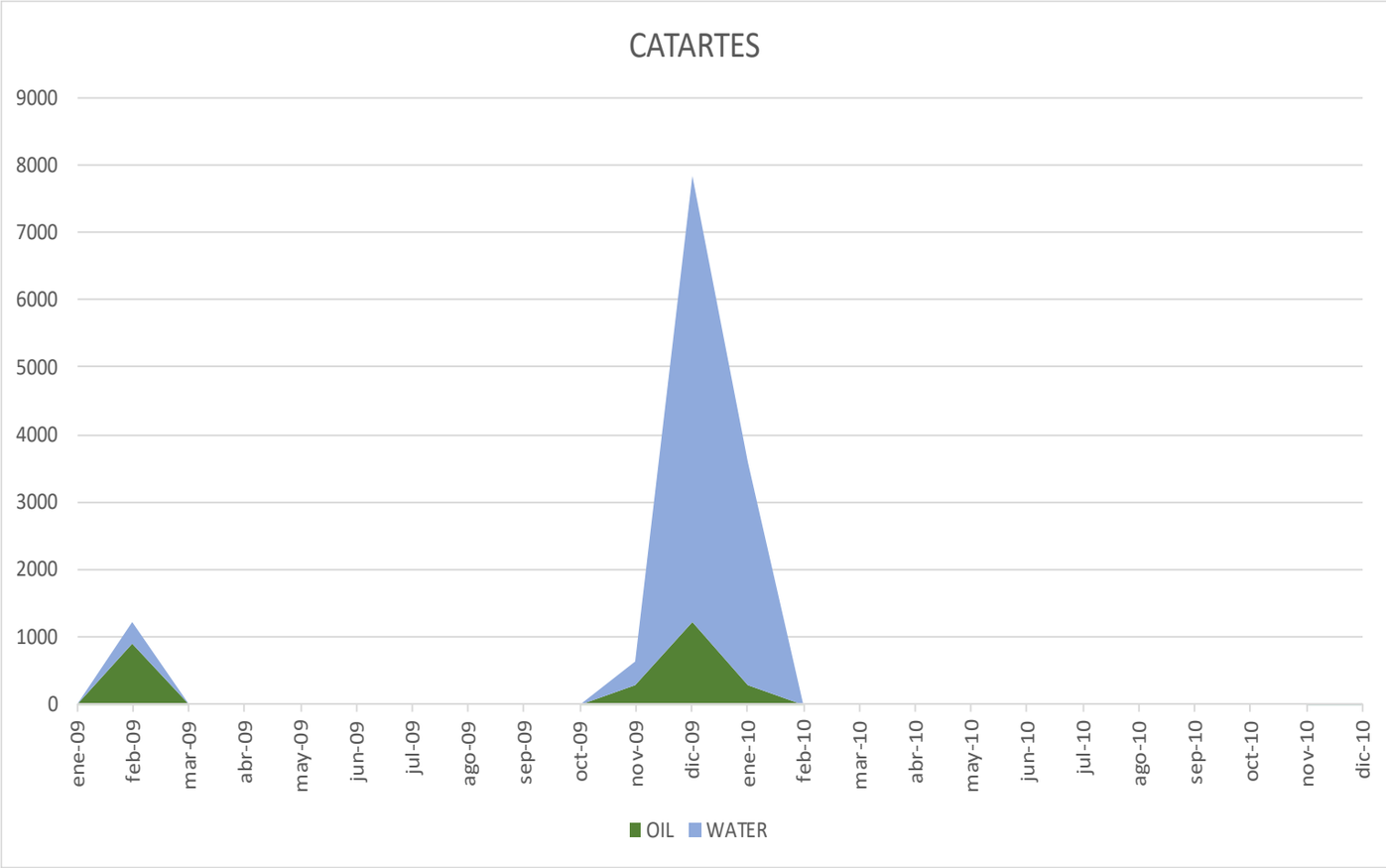
1) 9854'-9855' (Gacheta)
Swabbing 118BFPD (7BOPD 16°API) 94.1%BSW
2) 9453'-9460' (Guadalupe)
BH 328BFPD (312BOPD 14°API) 5.1%BSW

1) 9400'-9410' (Guadalupe)
105BblsF 100%BSW 300ppmCl
2) 9300'-9320' (Mirador)
182BblsF 100%BSW 300ppmCl
3) 9270'-9282' (Mirador)
143BblsF 100%BSW 150ppmCl
4) 9218'-9228' (Mirador)
328BblsF 200ppmCl (Oil traces 15°API)

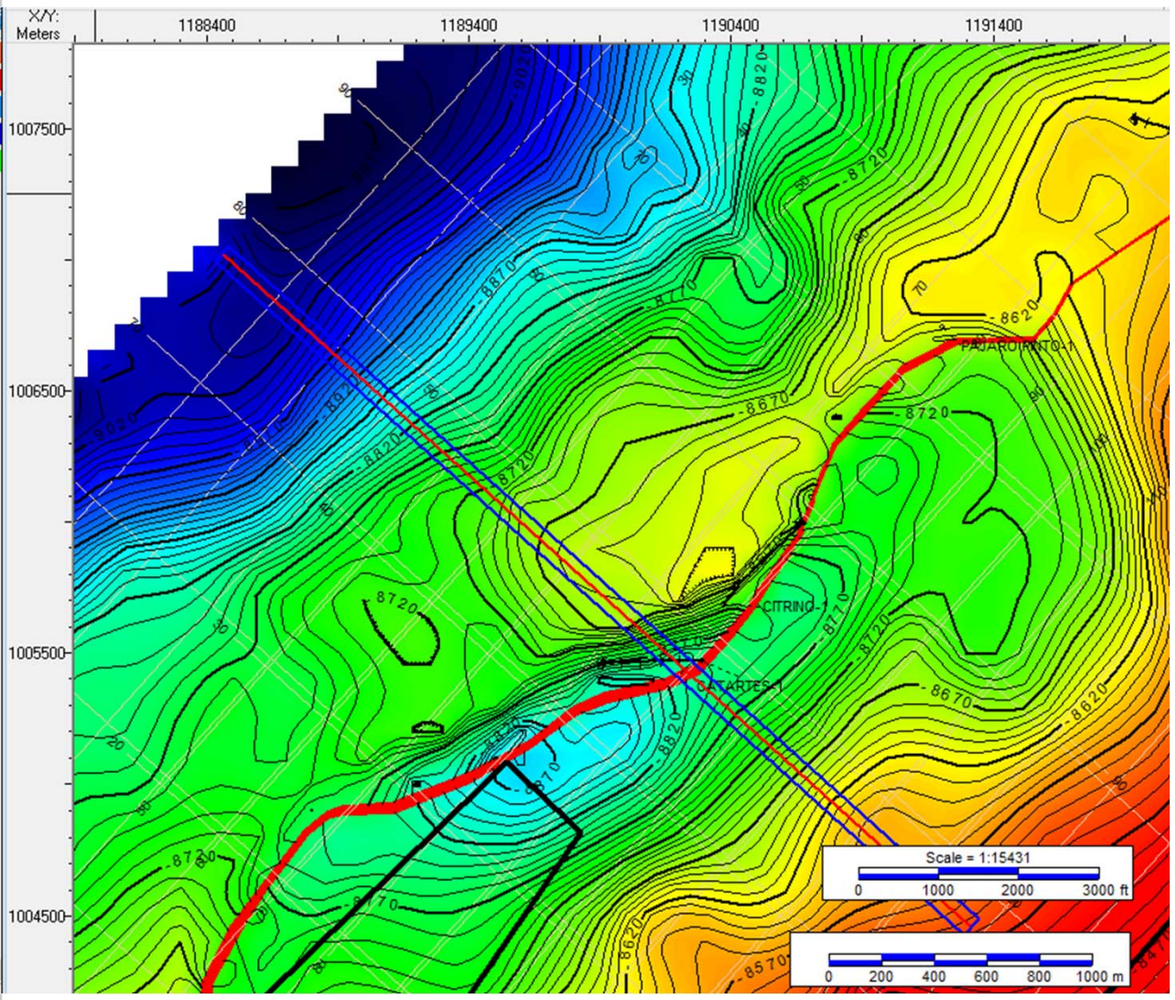
MDT 1) 9419'(Mirador) 100%BSW
MDT 2) 9410'(Mirador) 100%BSW

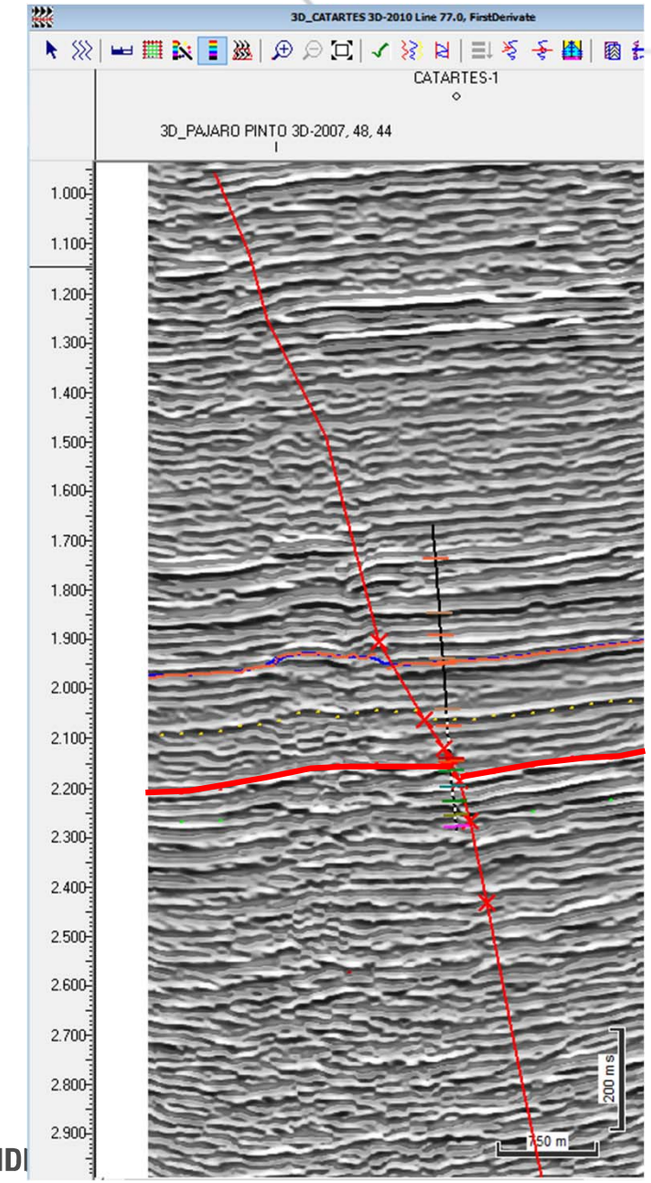


Catartes Production

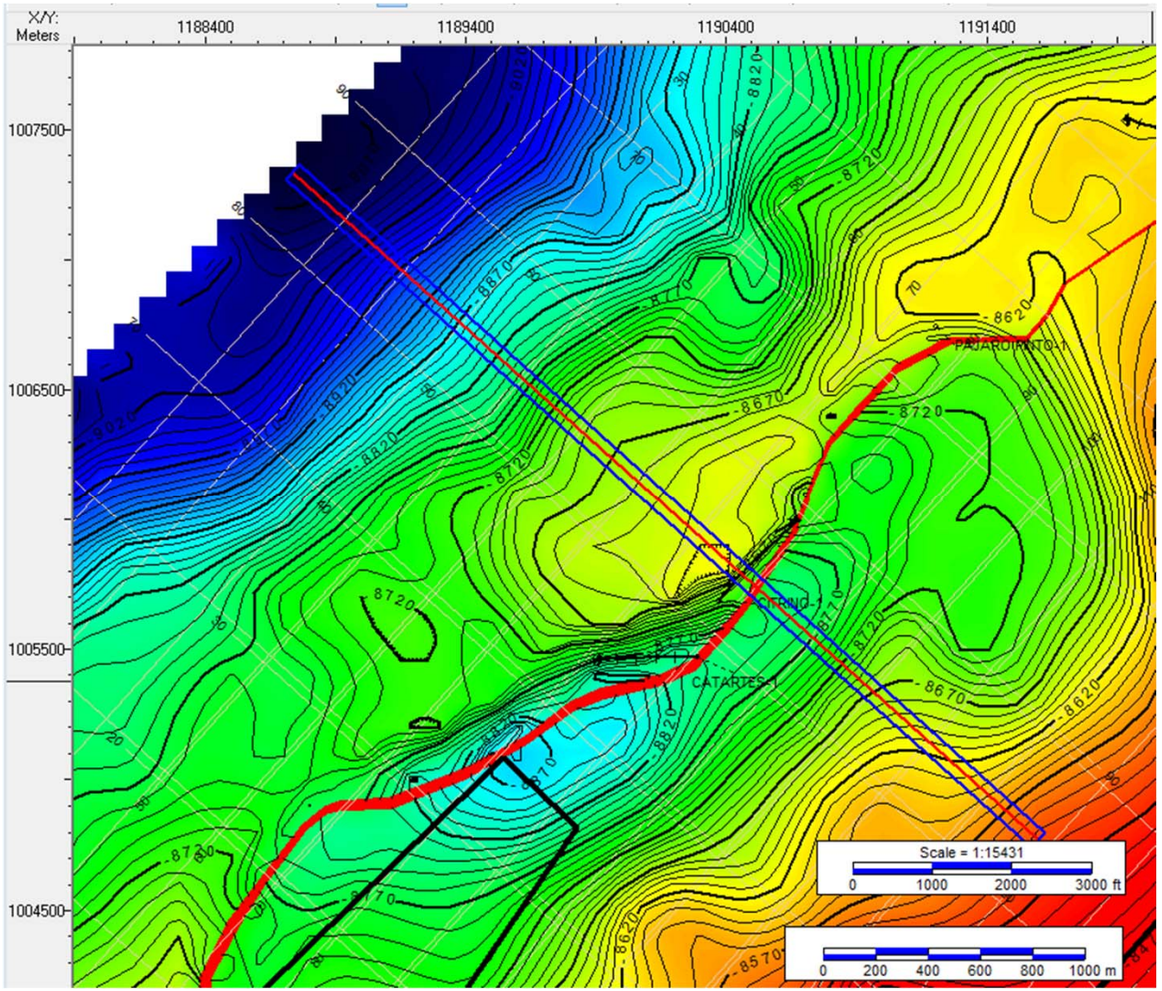


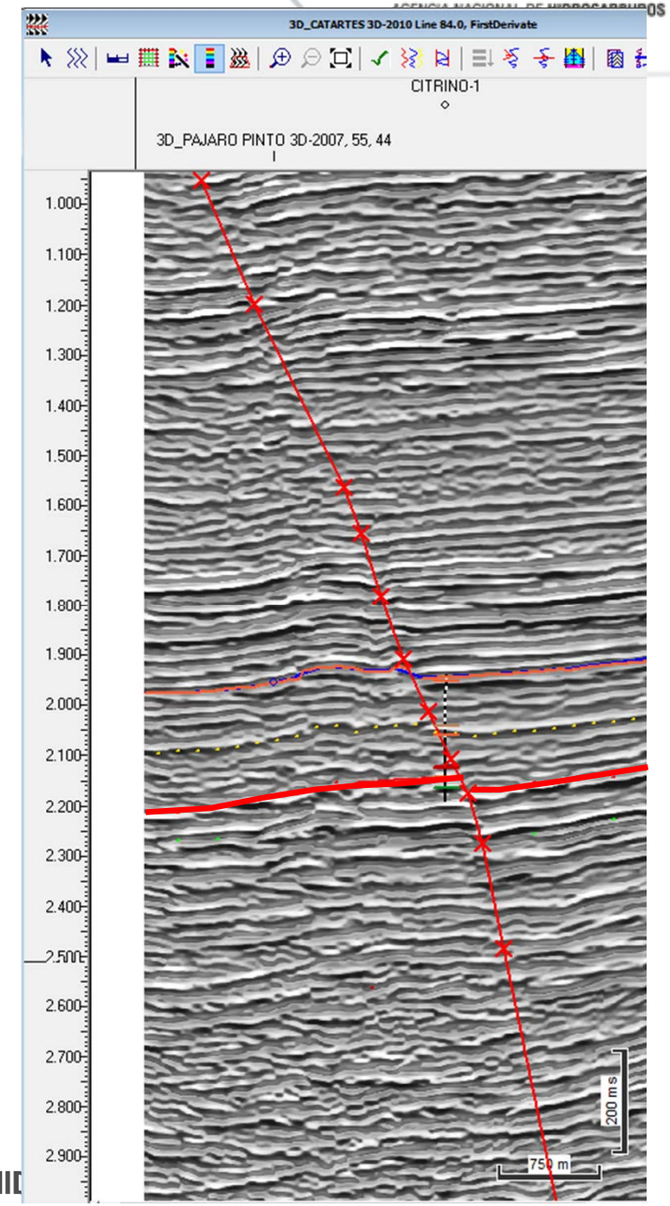
Catartes-1 well



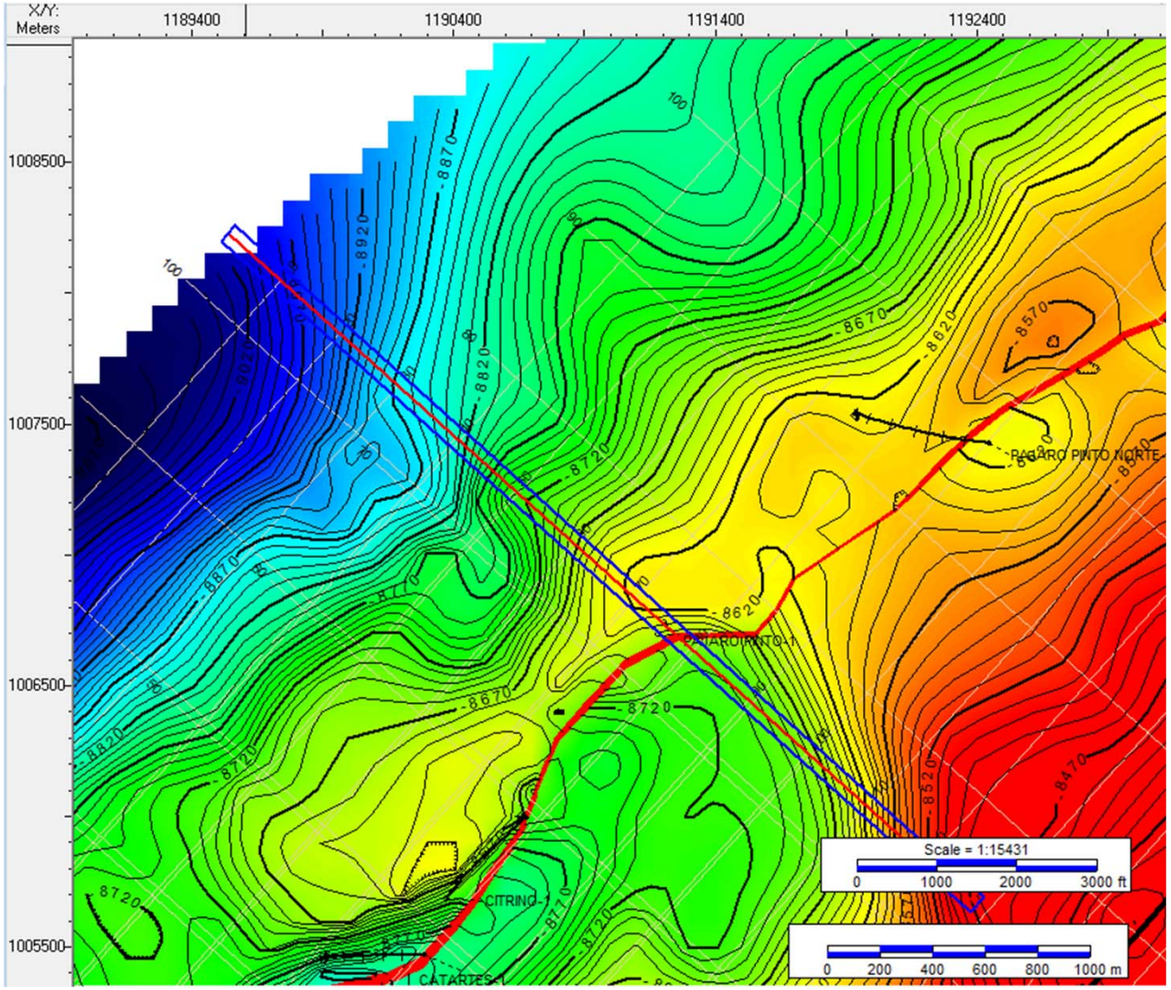


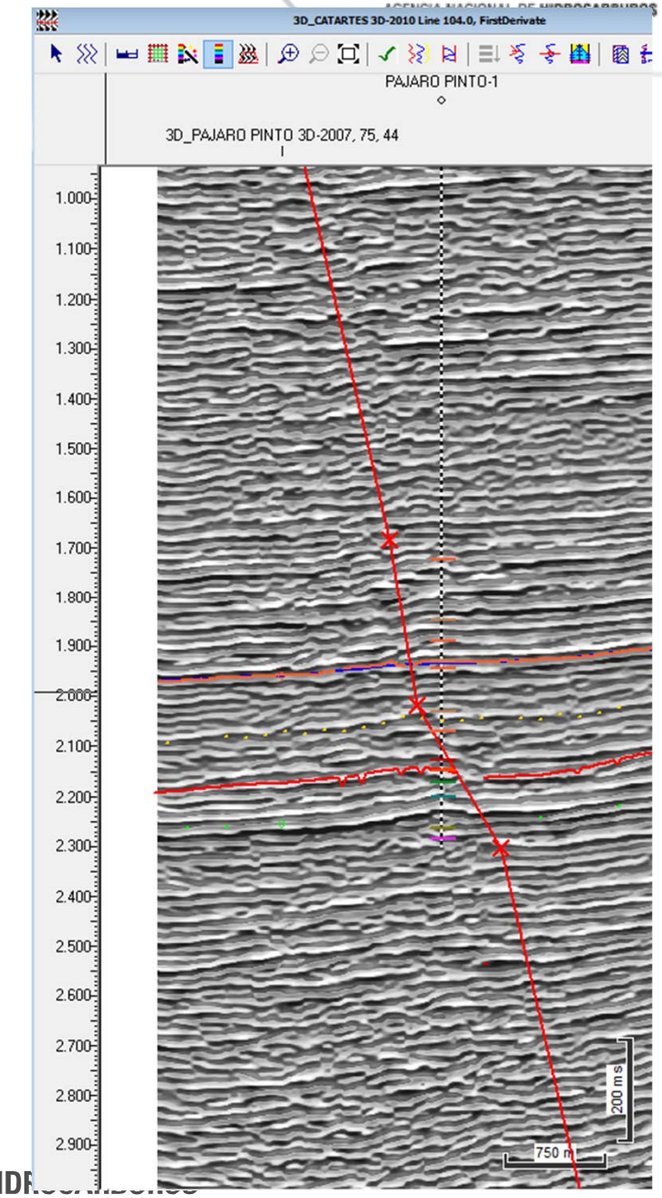
Citrino-1 well



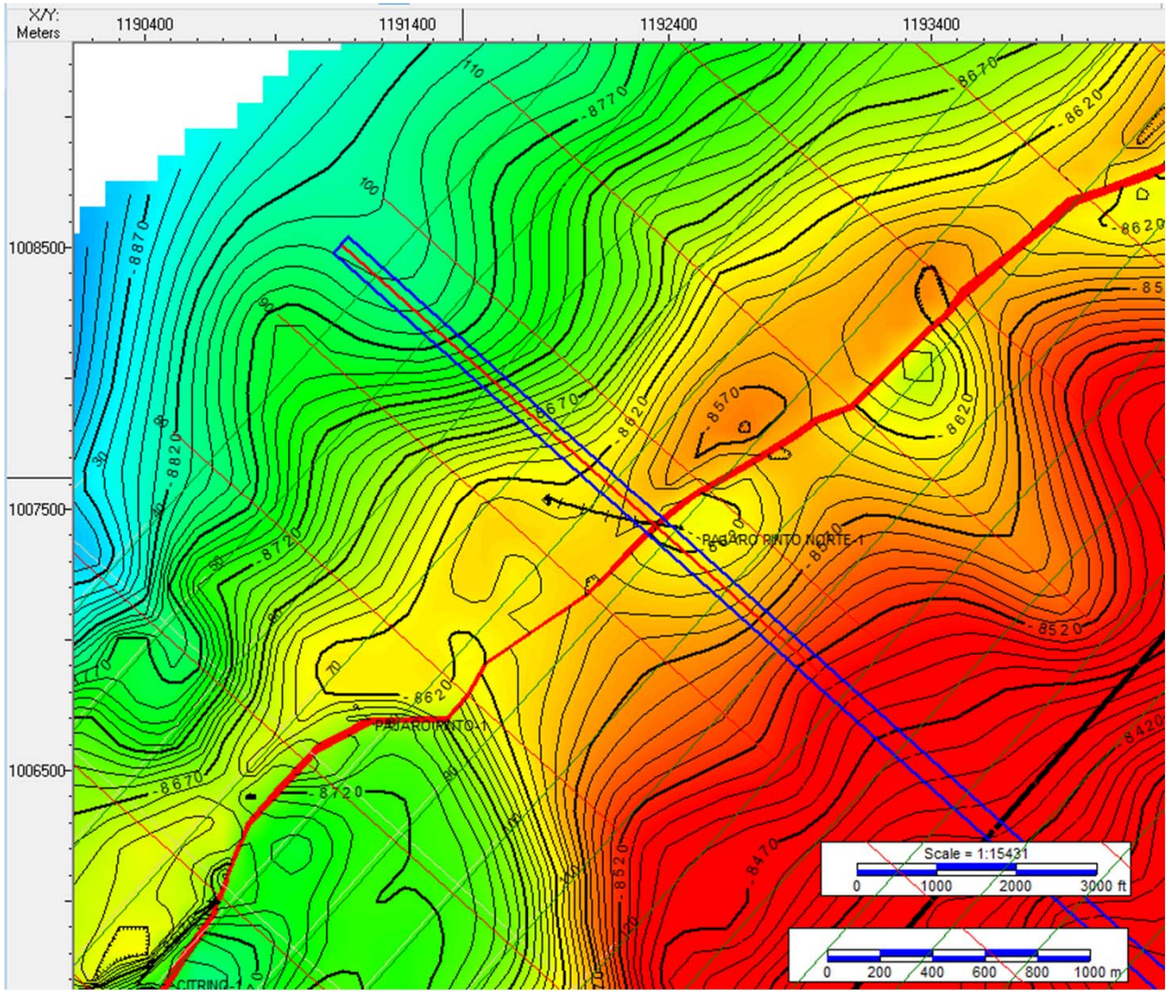


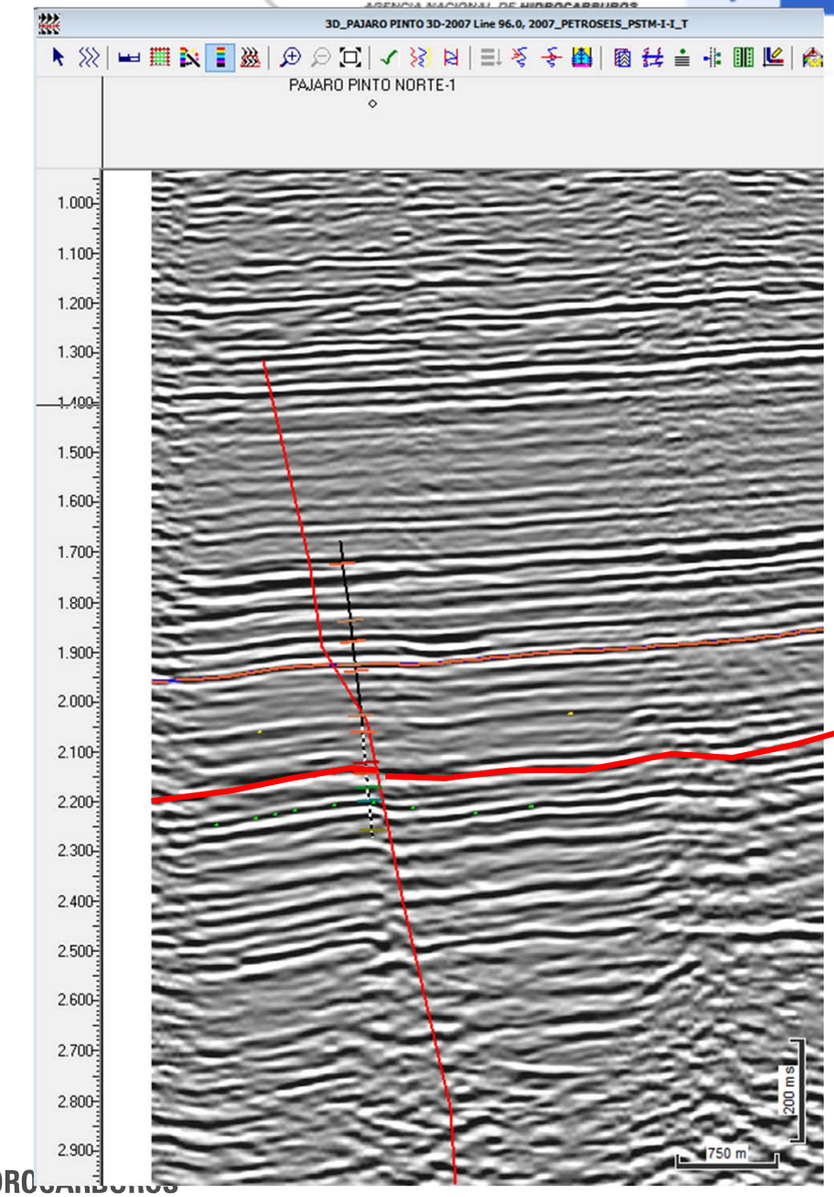
Pajaro Pinto-1 well



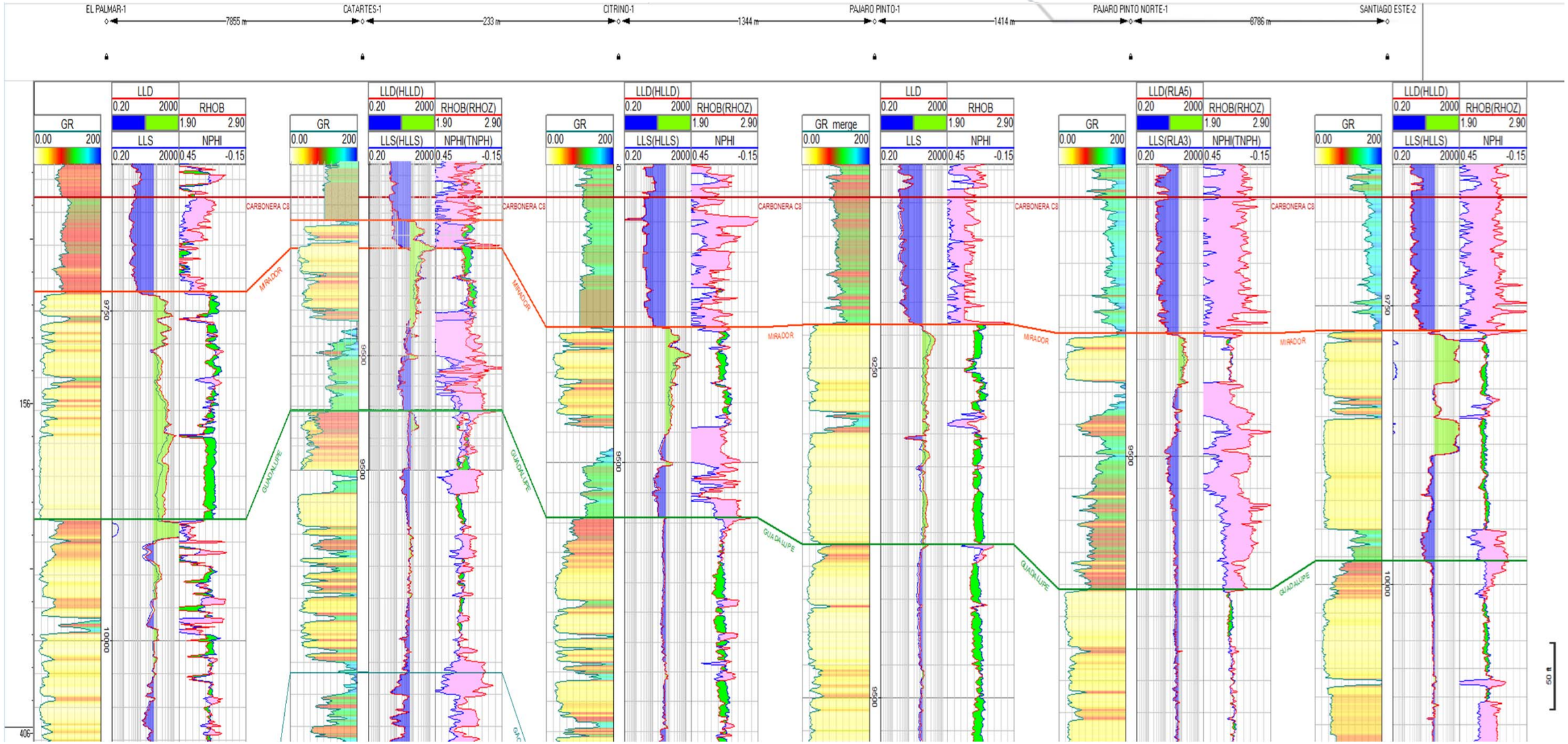


Pajaro Pinto Norte-1 well

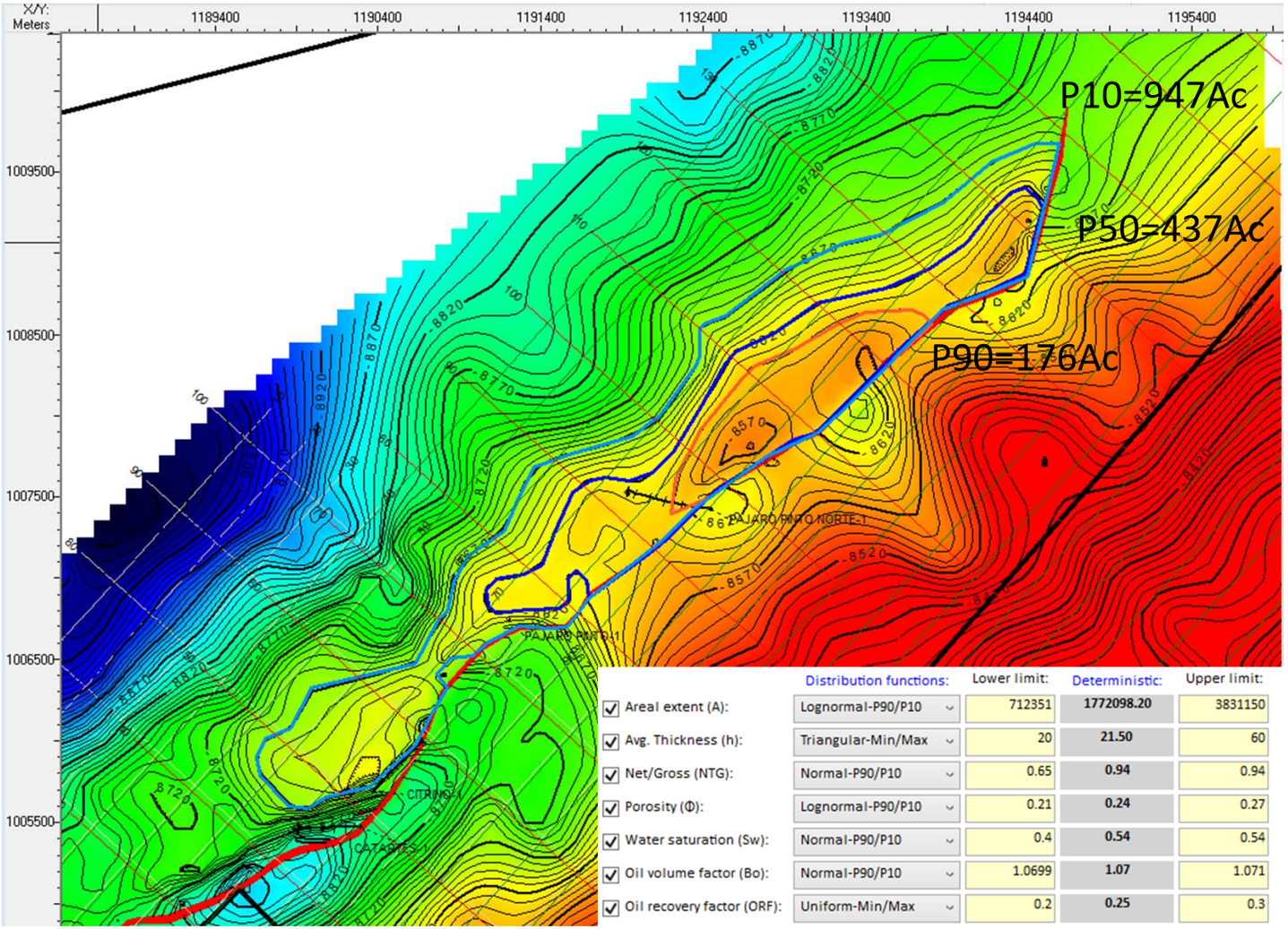




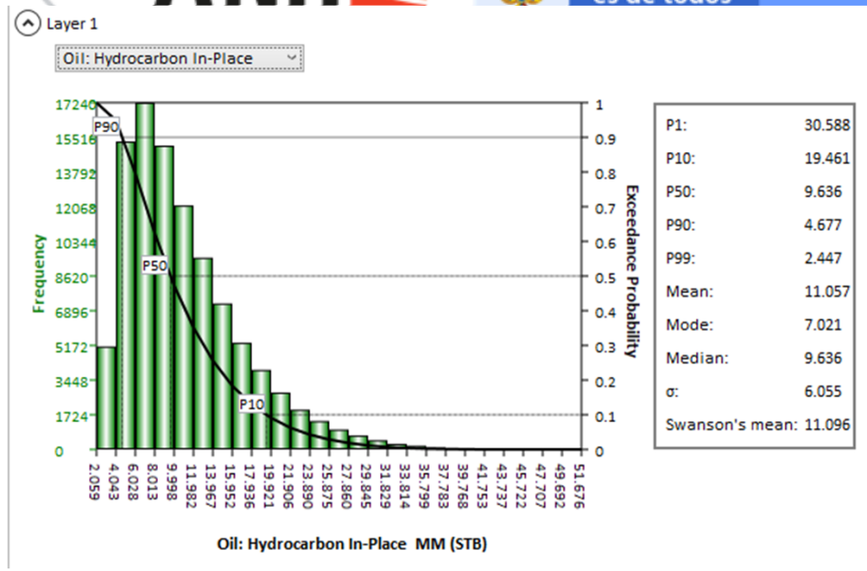
Stratigraphic Correlation (C8 Datum)

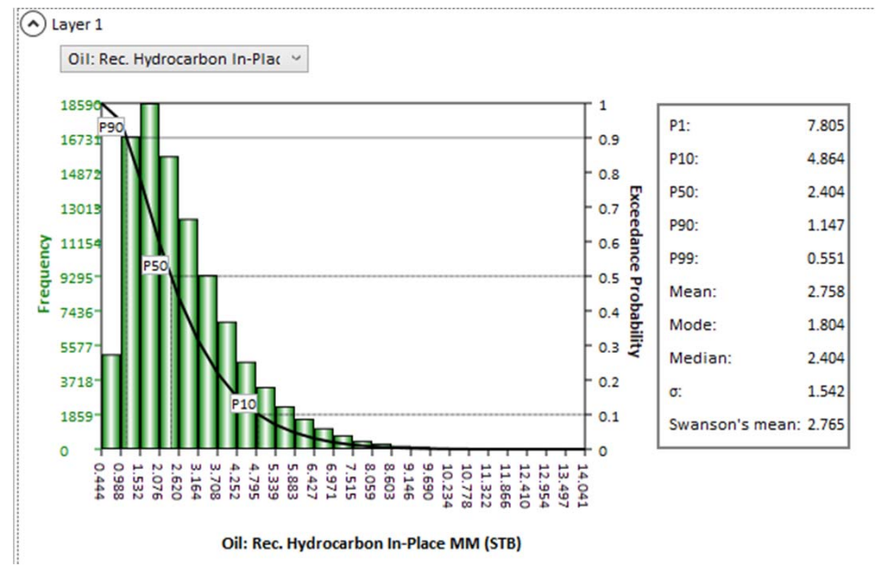


RONDA COLOMBIA 2021 Volumetry (ANH)

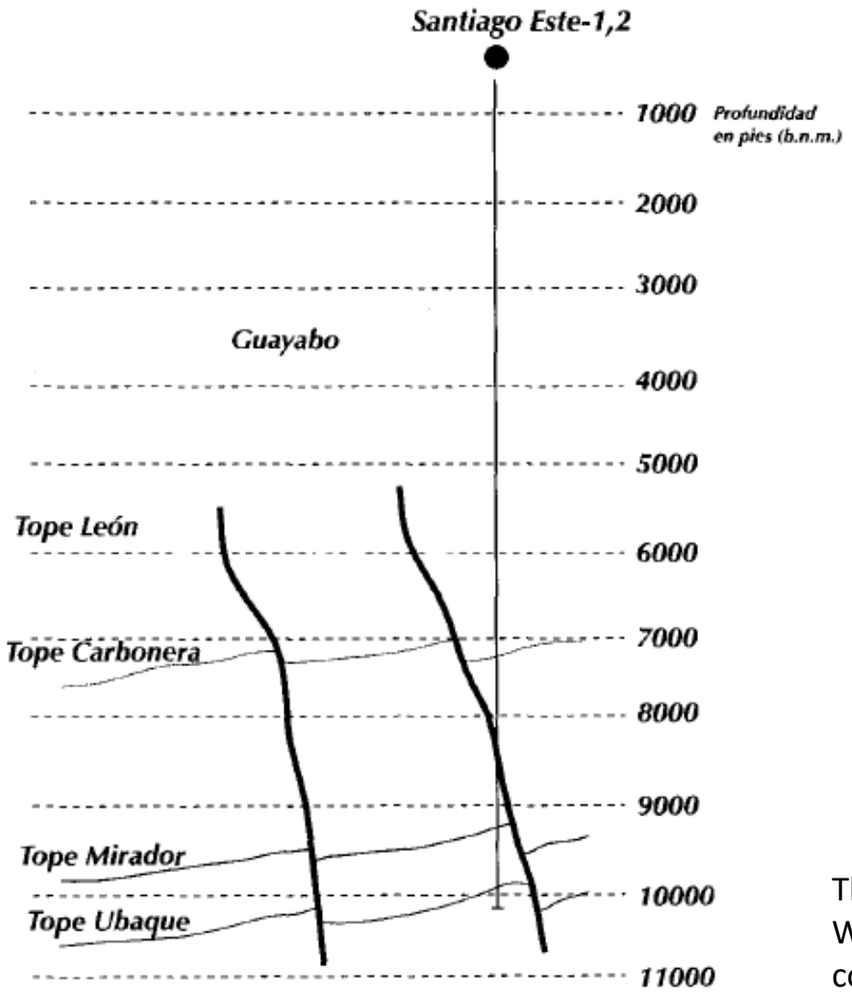


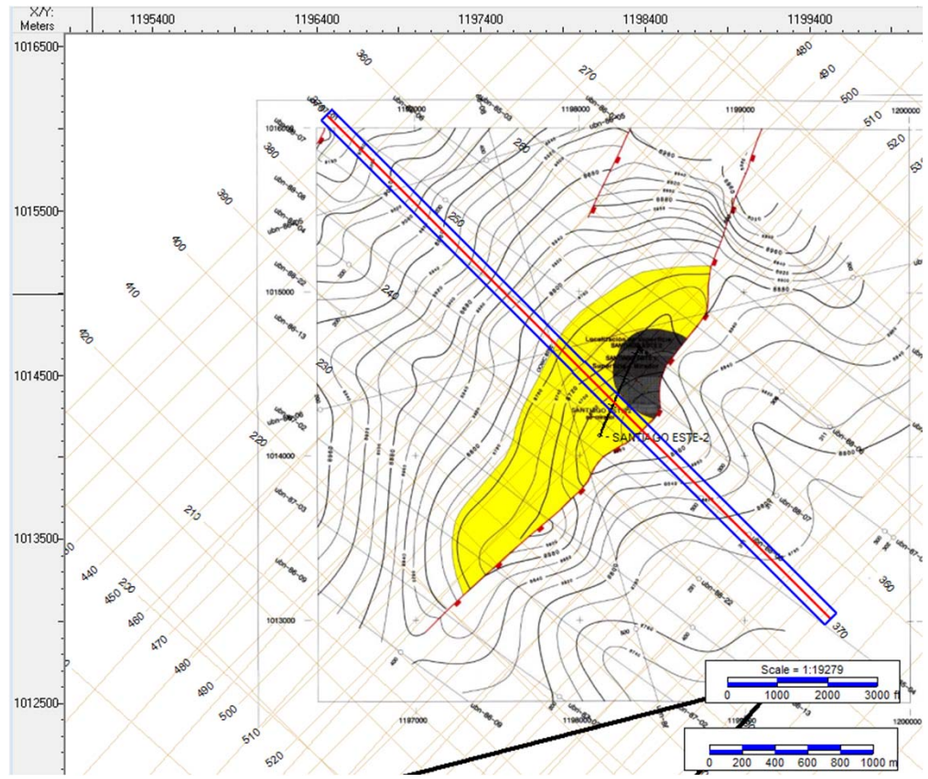
	Distribution functions:	Lower limit:	Deterministic:	Upper limit:
Areal extent (A):	Lognormal-P90/P10	712351	1772098.20	3831150
Avg. Thickness (h):	Triangular-Min/Max	20	21.50	60
Net/Gross (NTG):	Normal-P90/P10	0.65	0.94	0.94
Porosity (Φ):	Lognormal-P90/P10	0.21	0.24	0.27
Water saturation (Sw):	Normal-P90/P10	0.4	0.54	0.54
Oil volume factor (Bo):	Normal-P90/P10	1.0699	1.07	1.071
Oil recovery factor (ORF):	Uniform-Min/Max	0.2	0.25	0.3

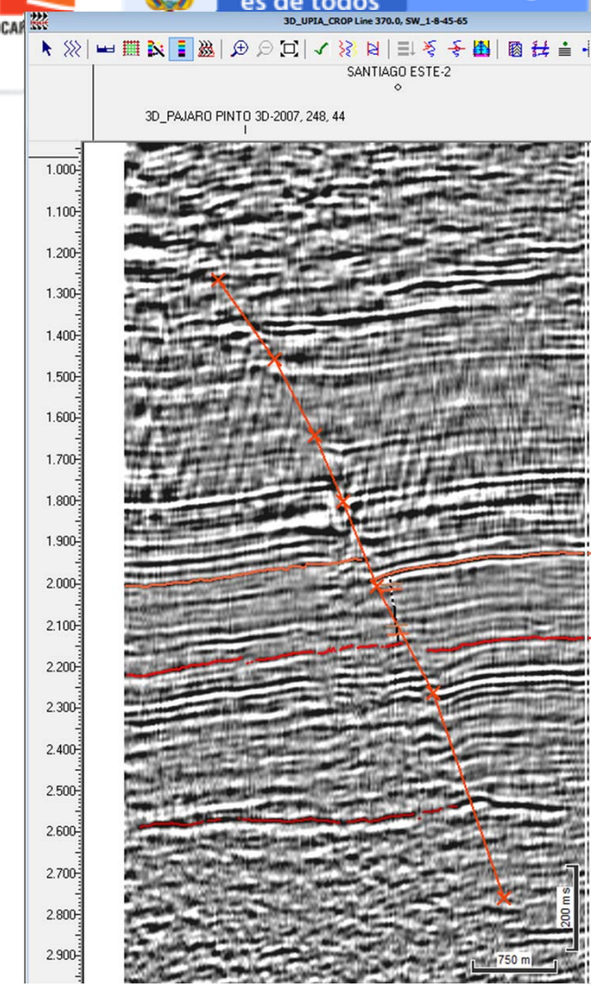




Analog Field (Santiago Este)

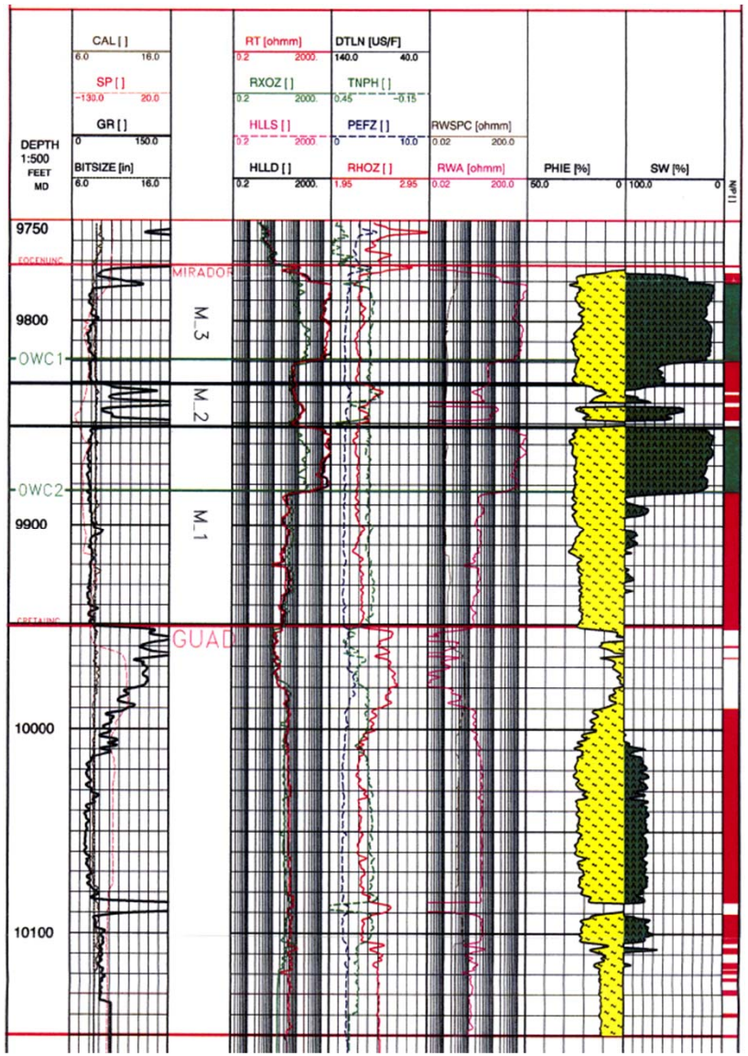


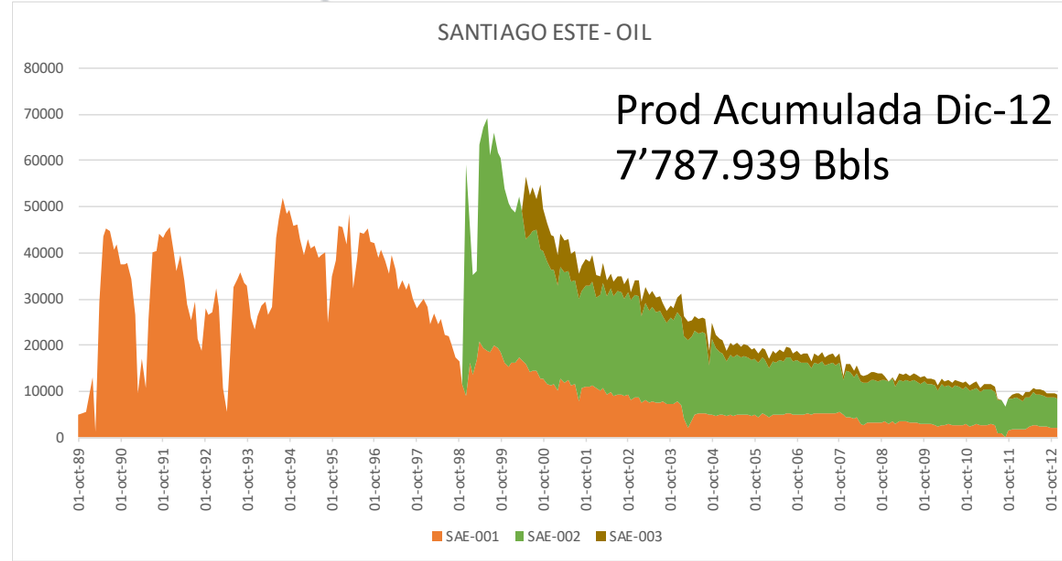


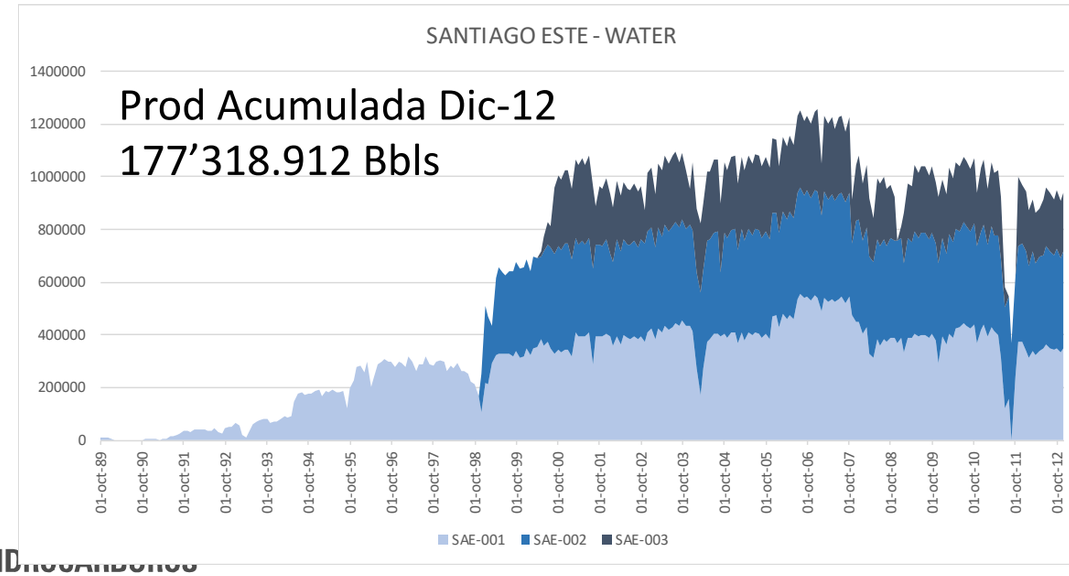


The Santiago Este field is a failed anticline, located in the Llanos Basin, in Block Upía B. The Santiago Este-2 Well is the second well drilled in the Santiago Este structure, just as the first well (Santiago Este-I) was completed in the Tertiary Sandstones of the Mirador Formation.
The oil found is a sweet, non-paraphynic crude of 21" API with a viscosity of 5.5 cp.

Campo Análogo (Santiago Este)

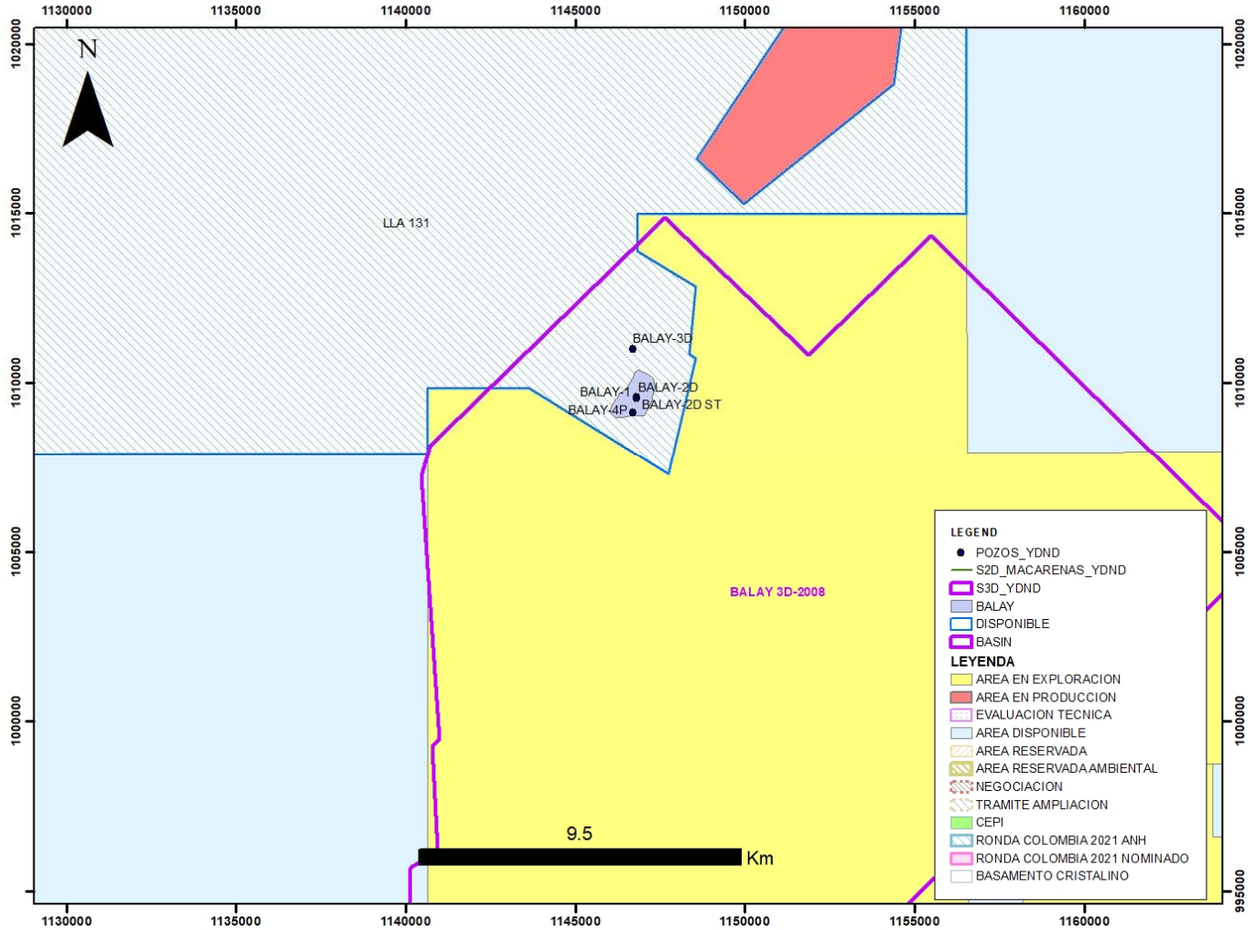






LLA 131 Available Area

Balay UARD



- 3D Seismic
  - BALAY 3D-2008 (451Km^2)
- Wells
  - BALAY-1 (Mirador Produced)
  - BALAY-2D & BALAY-2DST (Mirador Produced)
  - BALAY-3D (Injector)
  - BALAY-4P ((Mirador Produced)

Field History

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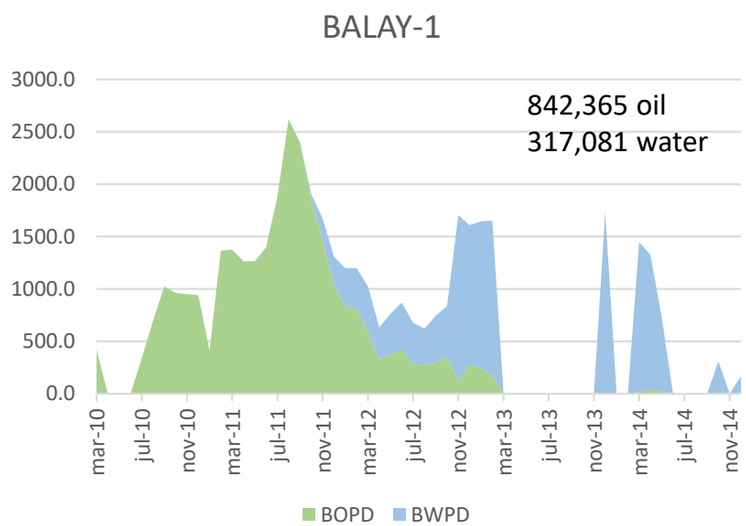
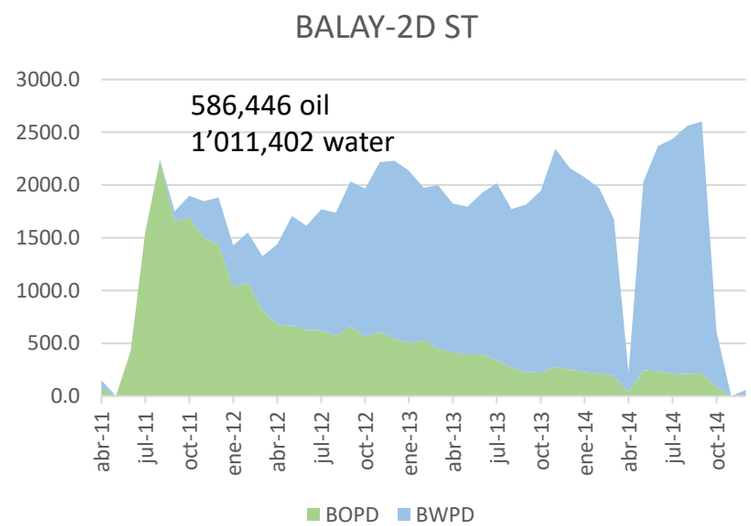
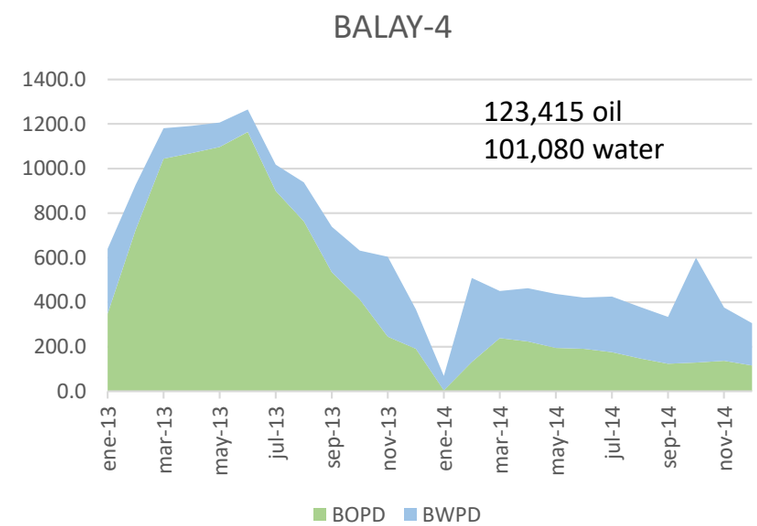
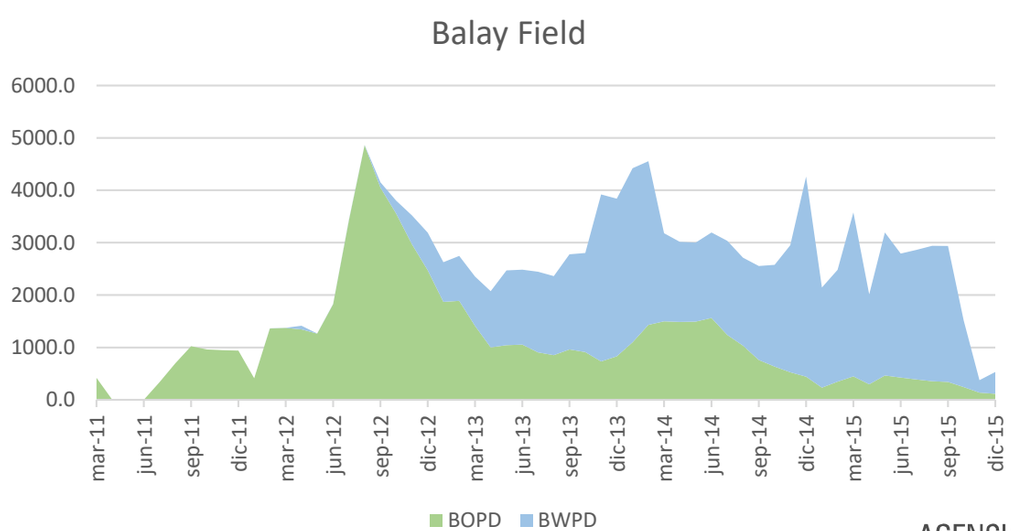








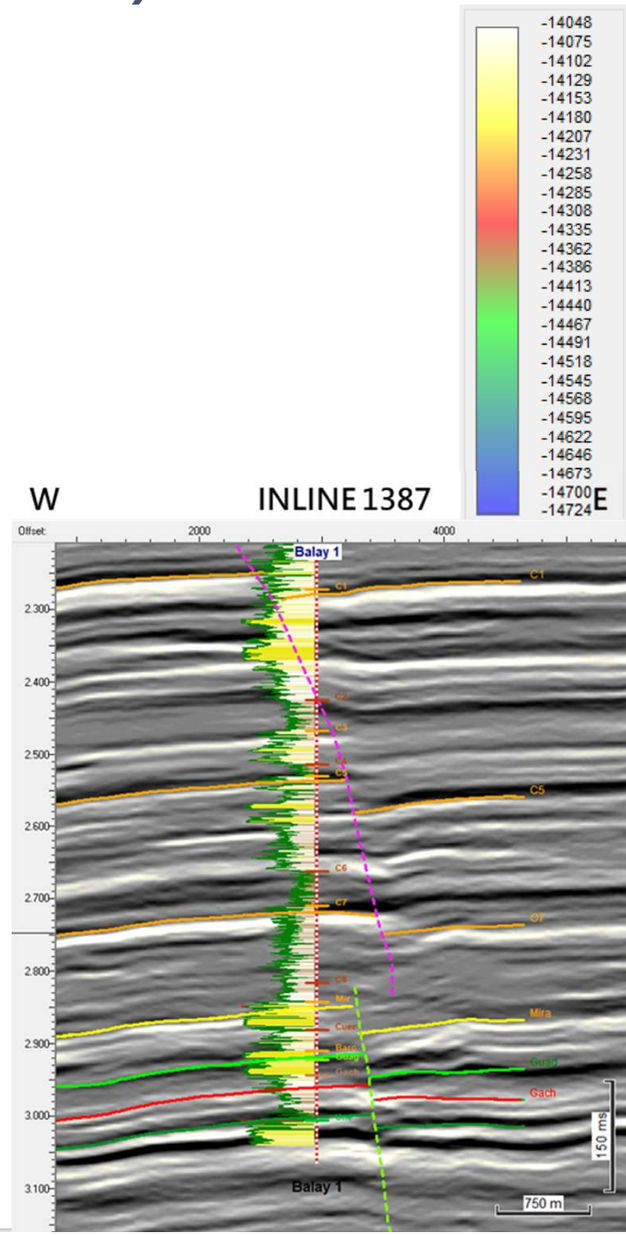
The BALAY field was discovered by PETROBRAS in February 2010, with the exploratory well BALAY-1 (15261' TVD)

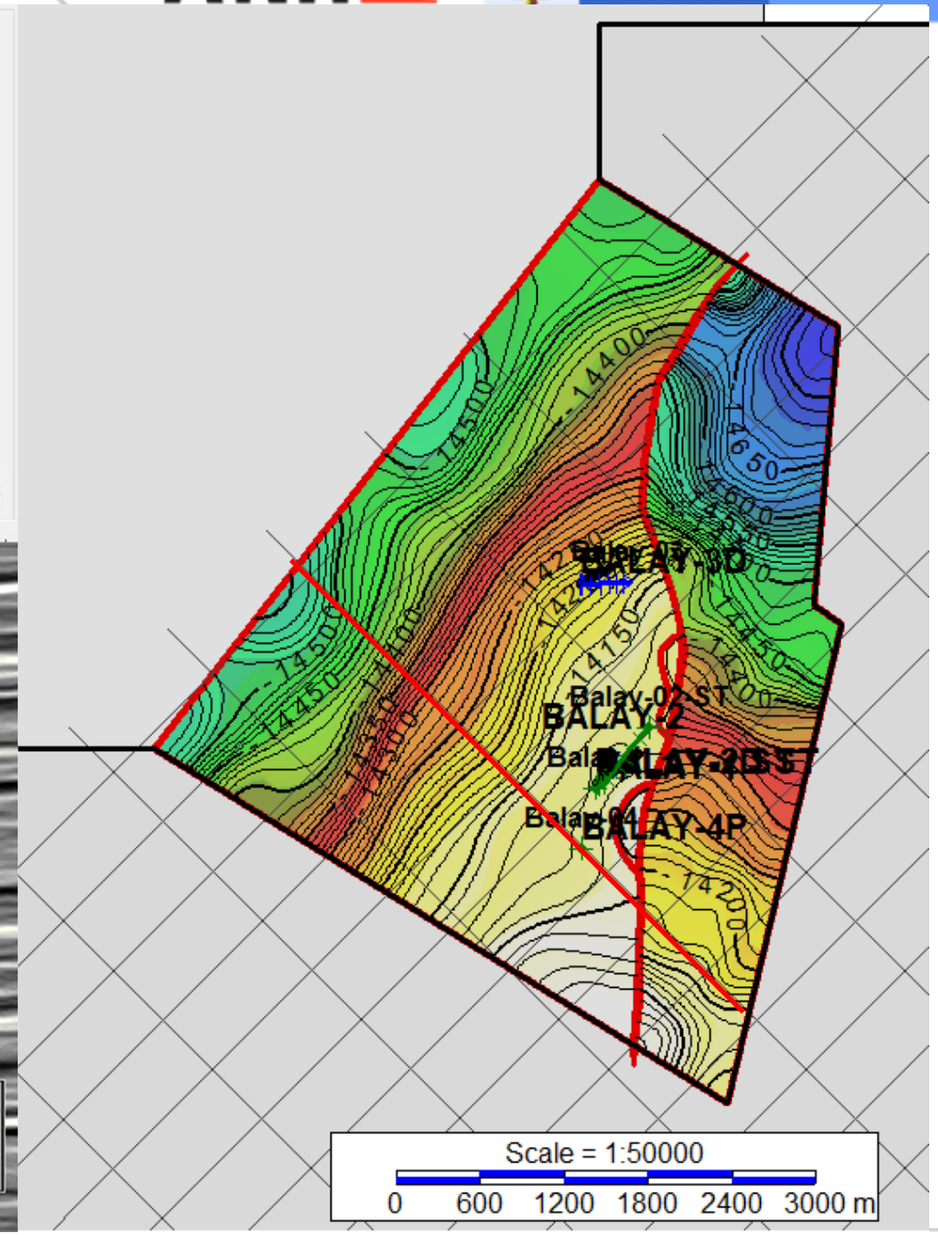
Production starts in February 2010 and ends in June 2015 with 150 BOPD production (Operated by Perenco, after the departure of Petrobras).

Total production reported 1.800.000 Barrels

Structural Maps (Une Fm)

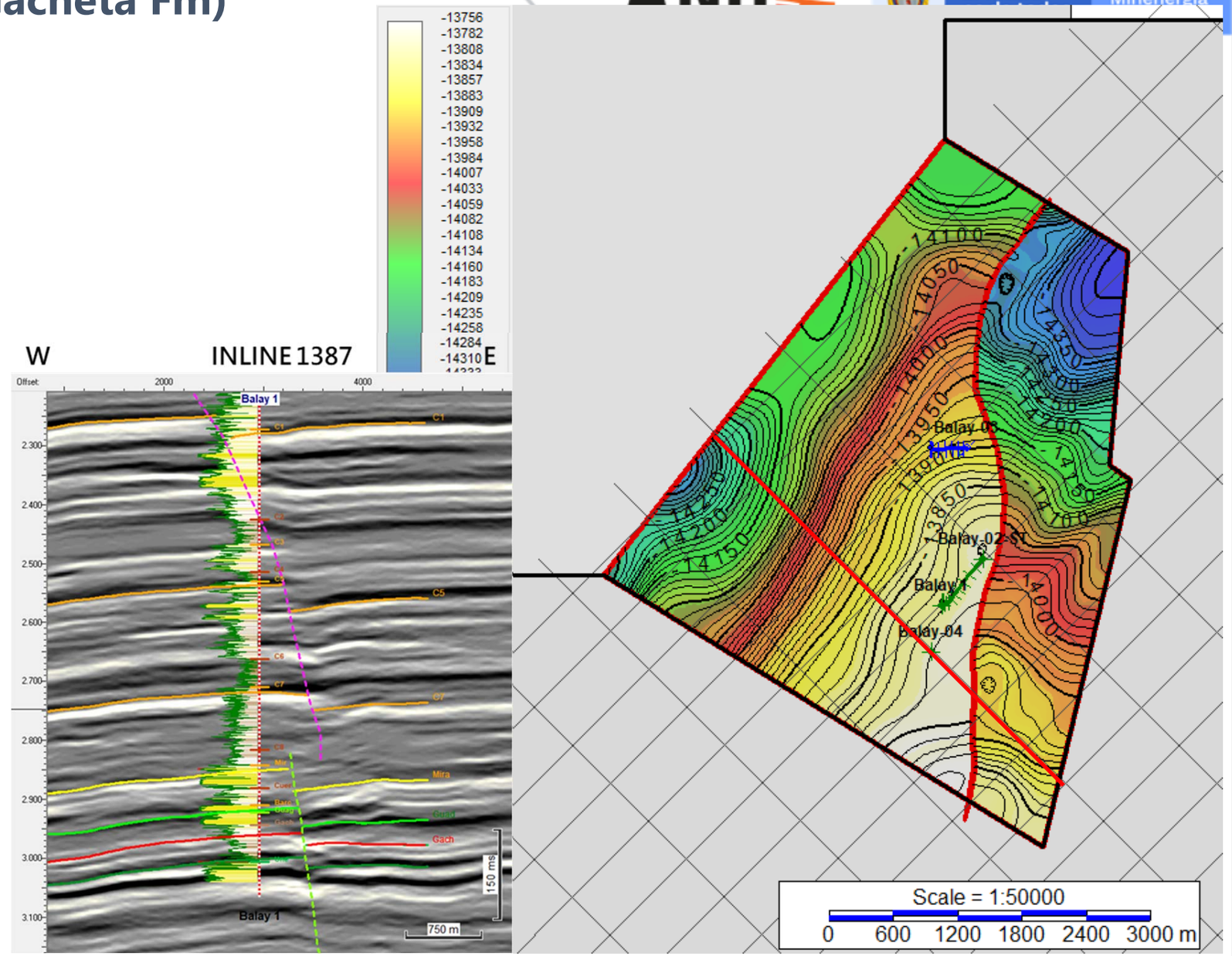
- Identified two (2) strcutural closures.
  - 16 acres & 21 acres
- DST :
  - Balay-1 / Fm Une / 719 BFPD – 90% BSW – 161 KPCD / 36ºAPI
  - Balay-4 / Fm Une / 430 BFPD – 90% BSW - / 33ºAPI





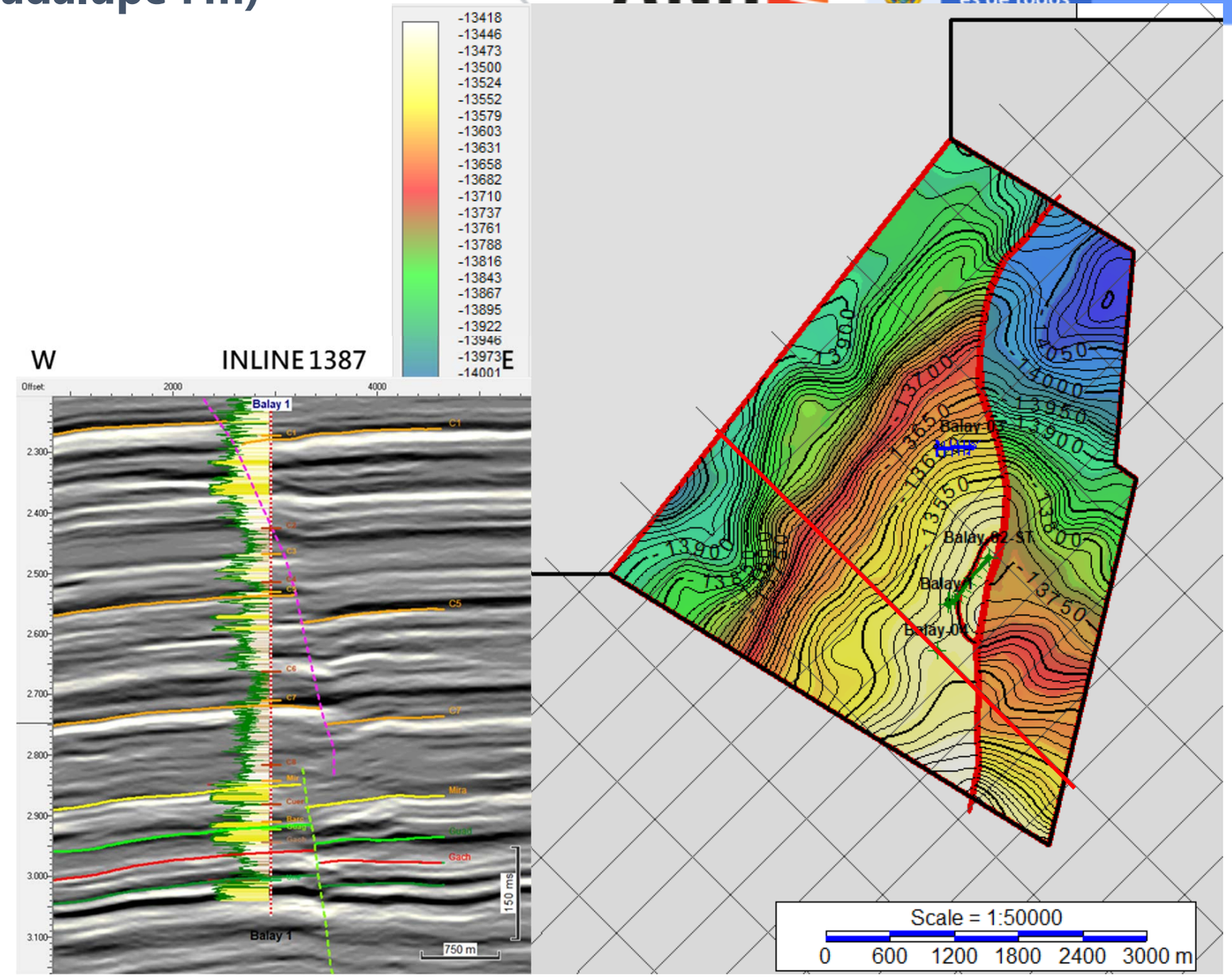
Structural Maps (Gacheta Fm)

Without structural closures



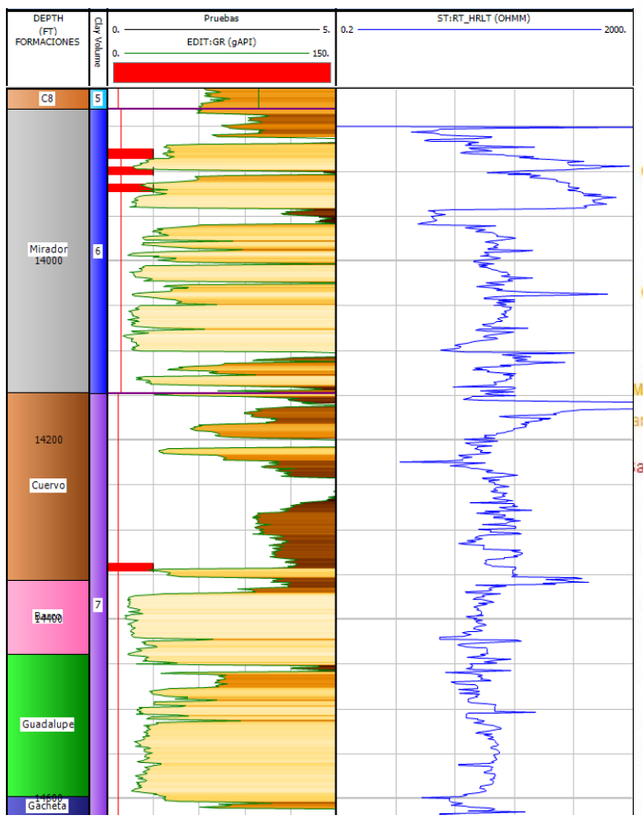
Structural Maps (Guadalupe Fm)

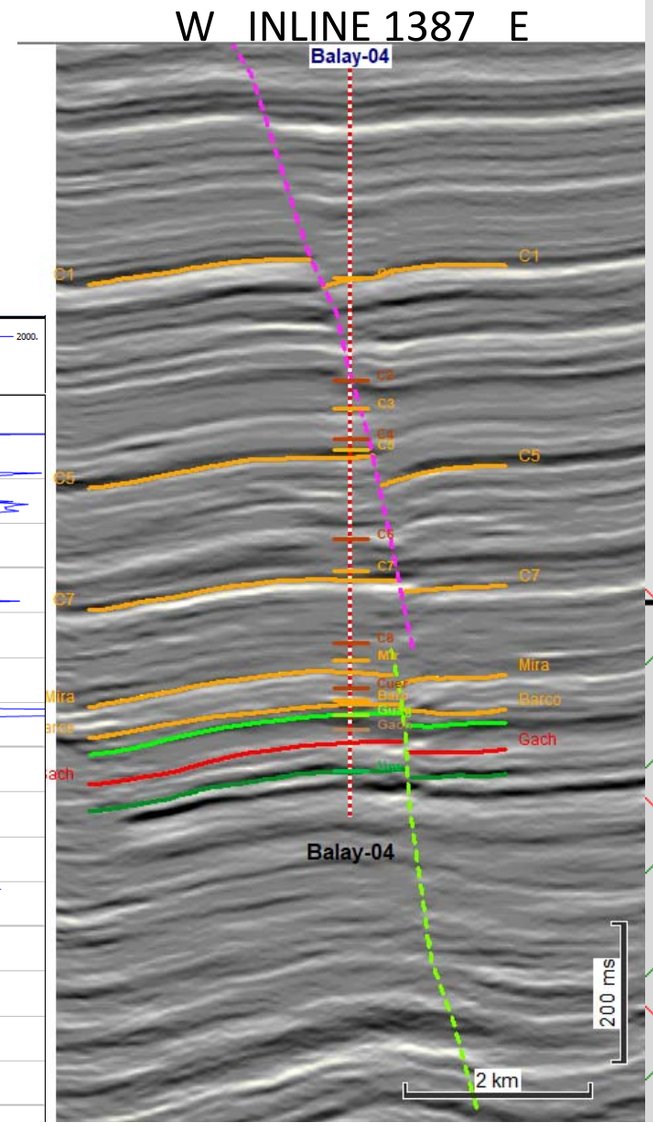
- Structural closure was identified
  - 46 acres

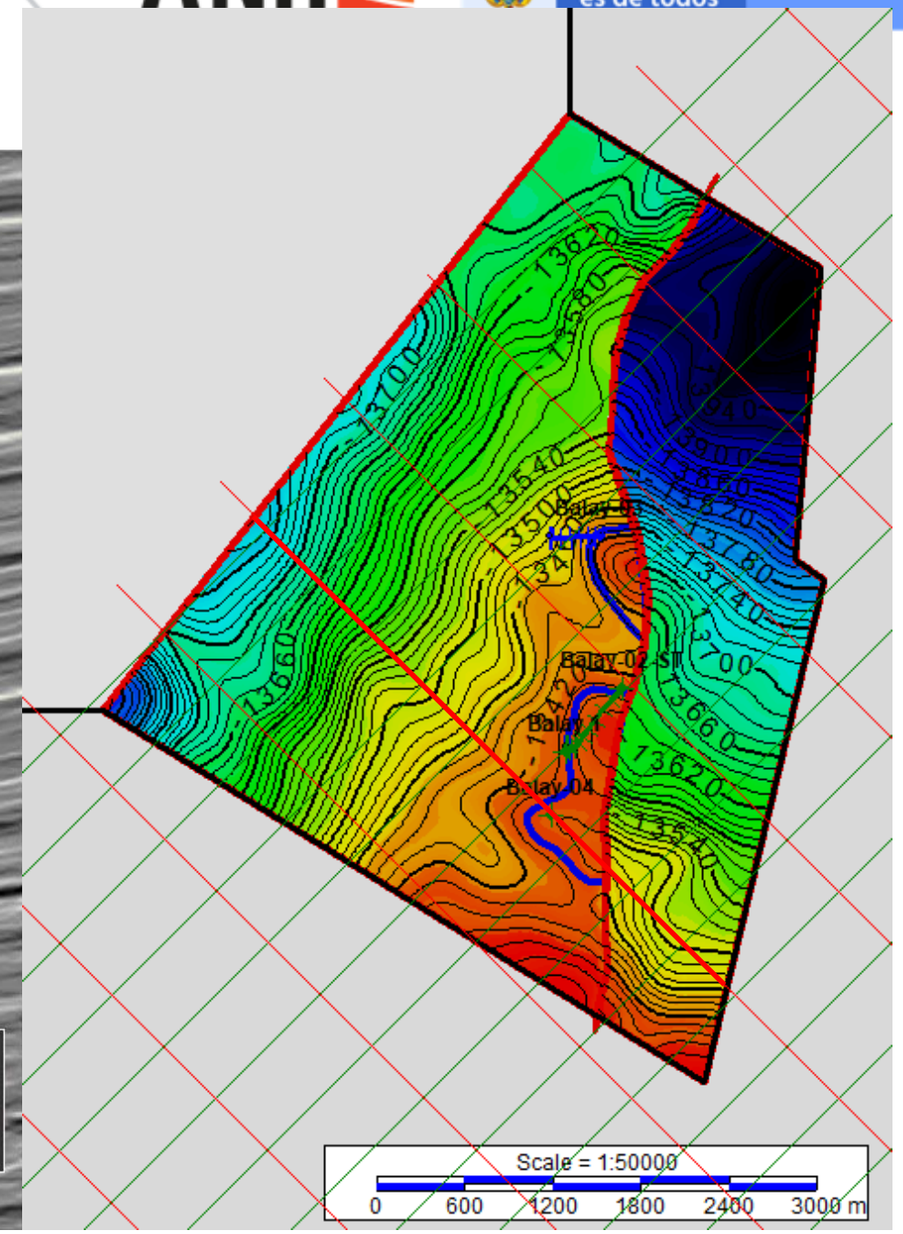


Structural Maps (Los Cuervos Fm)

- Two (2) structural closures were identified
  - 110 acres
  - 46 acres
- DST
  - Balay-2 / 83 BOPD – 16% BSW / 10ºAPI

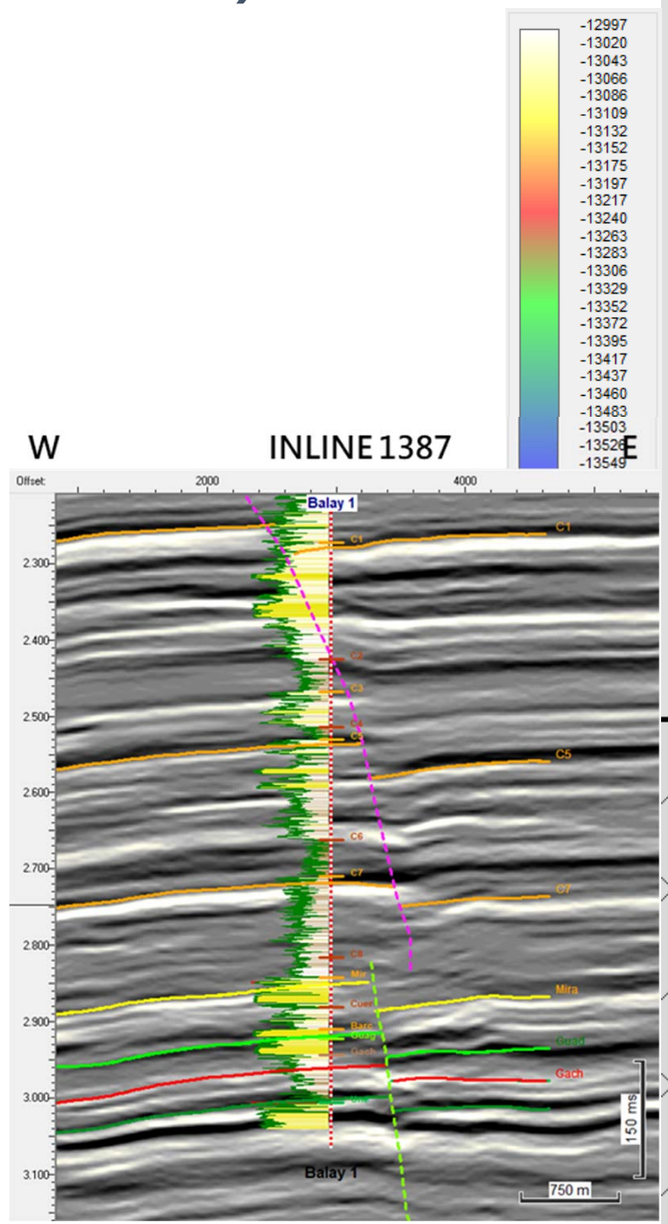


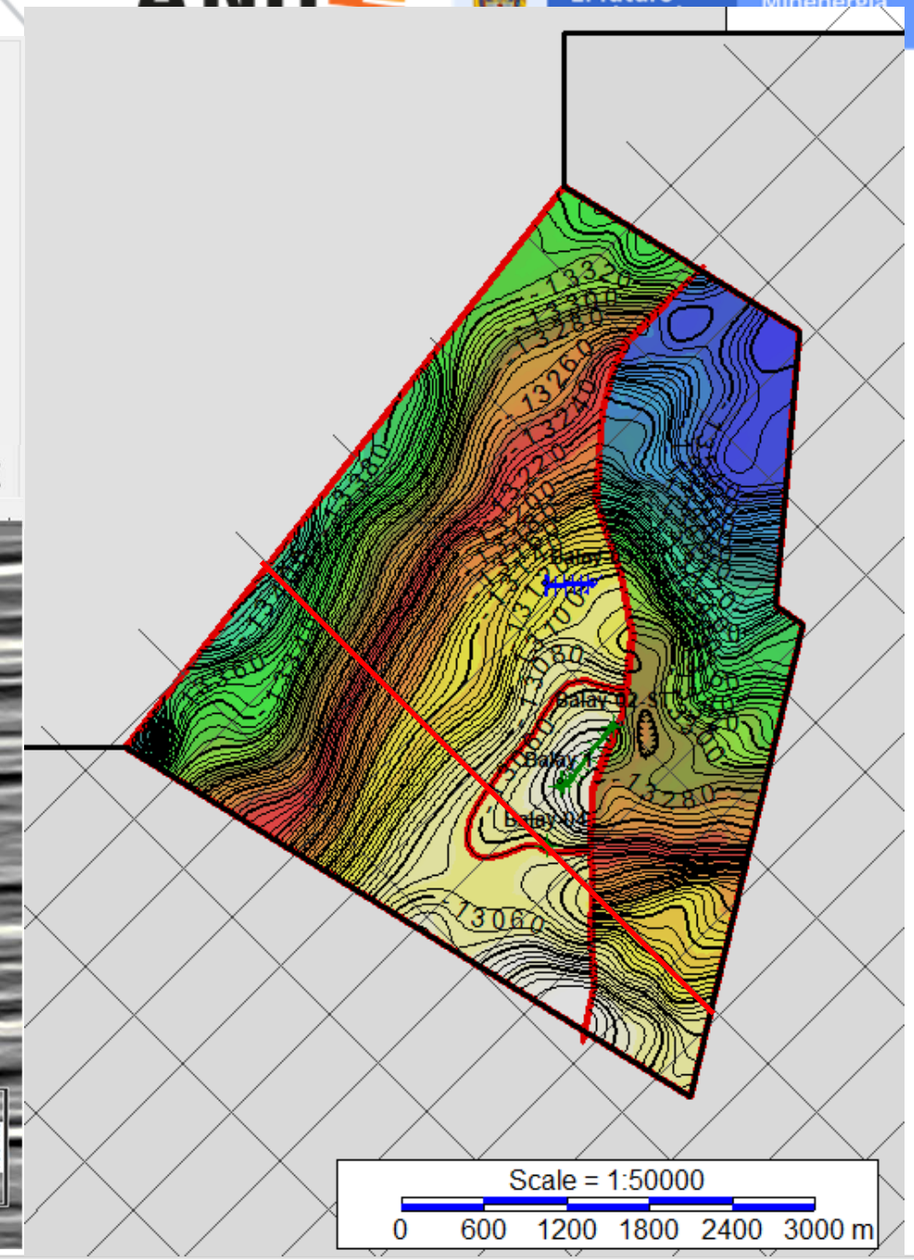




Structural Maps (Mirador Fm)

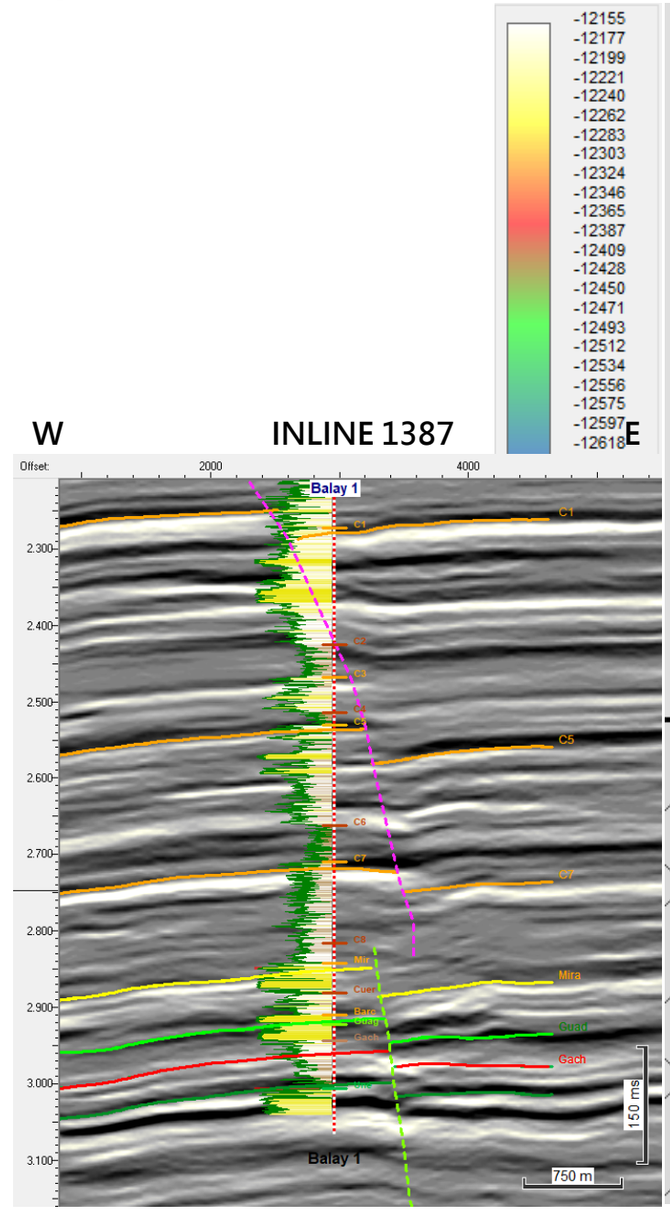
- Structural closure was identified
  - 200 acres
  - 26°API

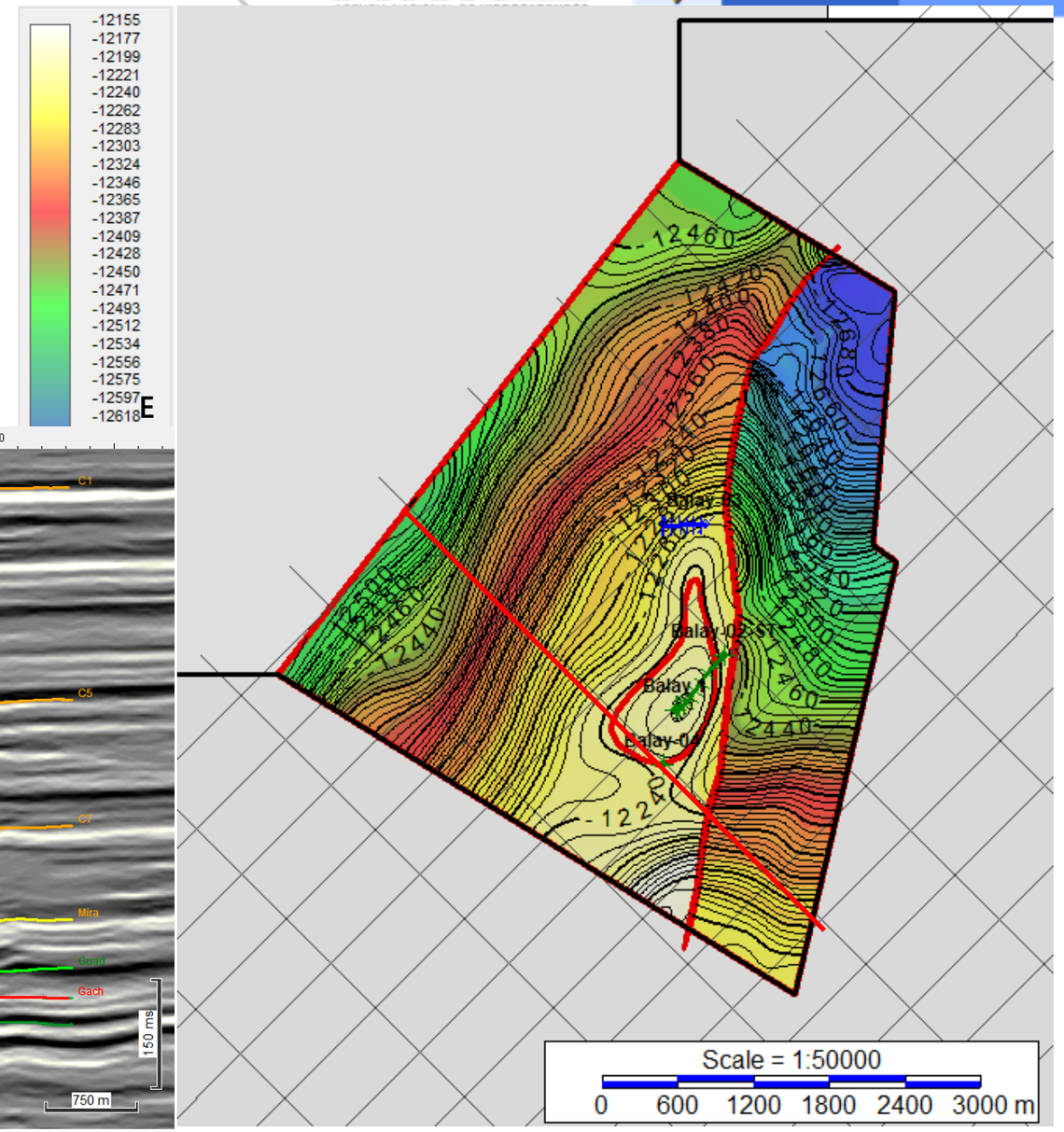




Structural Maps (C7)

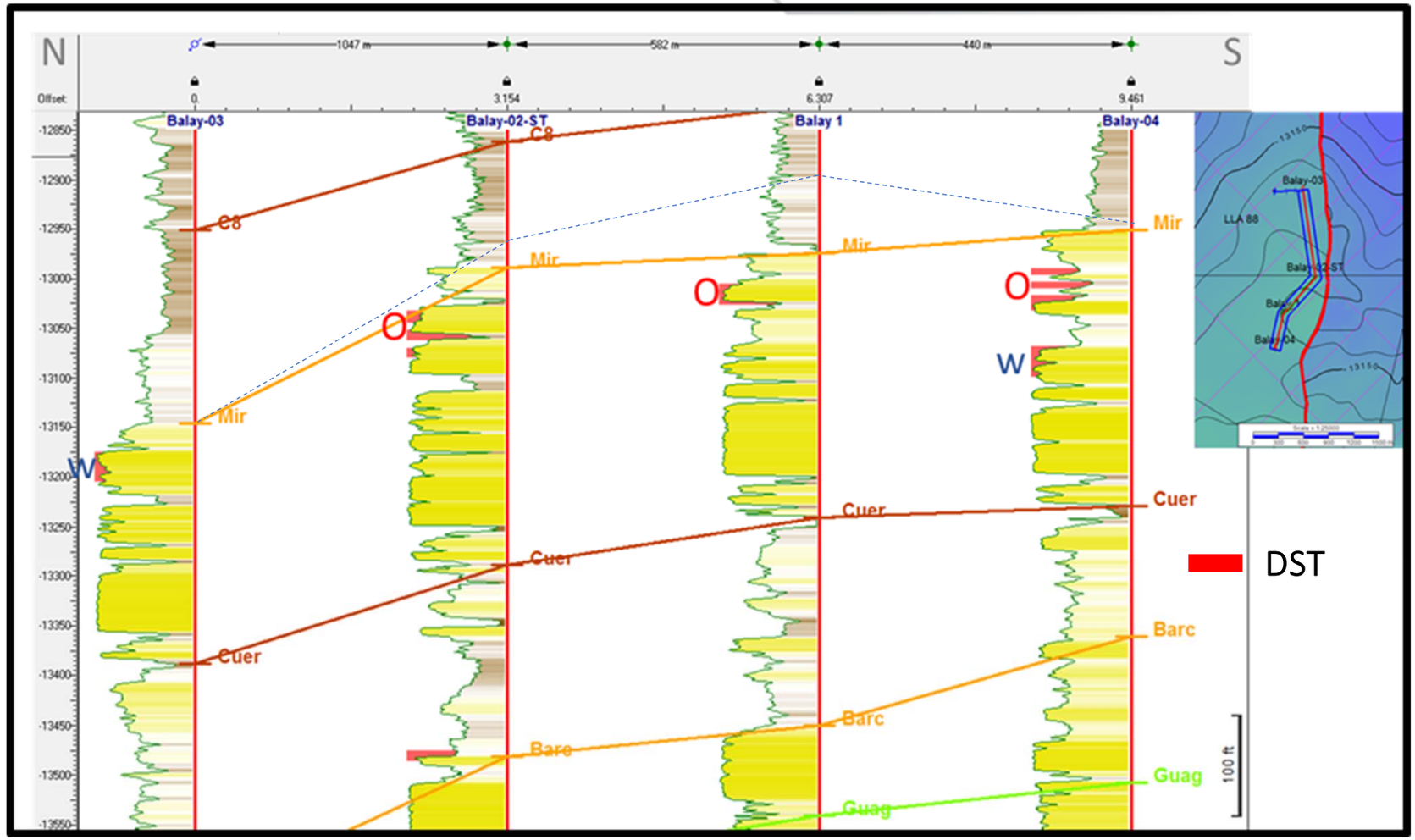
- Structural closure was identified
  - 150 acres



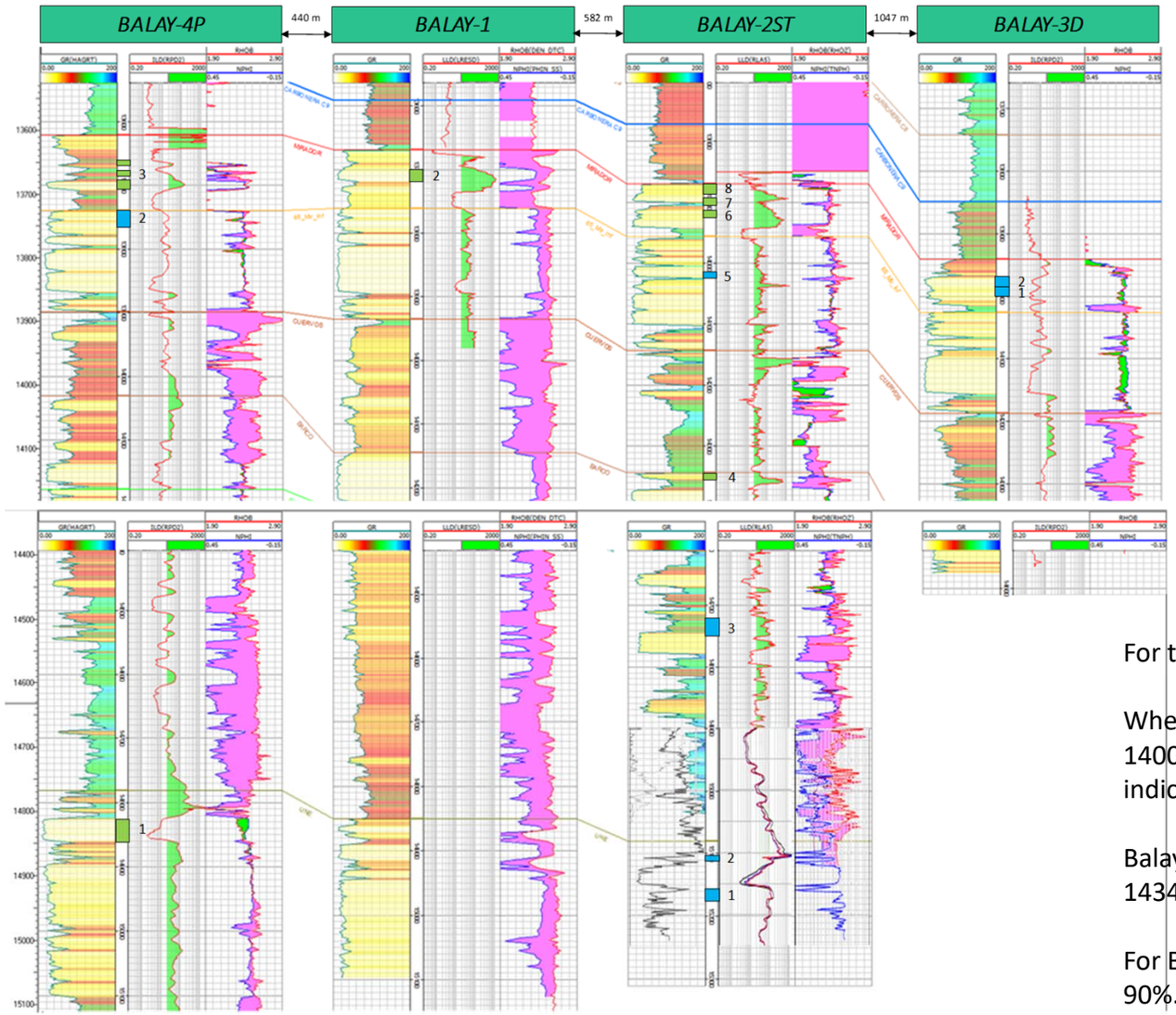


Well Correlation

Possible levels at the top of the Mirador Formation, without testing



Balay-1, Balay-2ST, Balay-3D & Balay-4P



Initial Test

WELL	UNIT	TOP	BASE	BFPD	BOPD	BSW	API
BALAY-1	Une	14835	14870	719	629	13%	36
	Mirador	13700	13720	4358		100%	28
BALAY-2	Une	15162	15182	water 20860 Cl-	0	100%	-
		15105	15113	Dry	-	-	-
	Gacheta	14720	14750	Water 4328 Cl-	-	100%	-
	Cuervos	14337	14347	Water 4484 Cl-	83	16%	10
	Mirador	14015	14025	Water 3338 Cl-	0	100%	-
		13914	13924	1108	1097	1%	-
		13895	14905	1773	1756	0.1%	26
		13875	13887				
BALAY-3	Mirador	13984	14000	Water 14500 Cl-	-	100%	-
		13970	13984	Dry	-		-
BALAY-4	Une	14783	14814	430 (18500 Cl-)	46	90%	34
	Lw Mirador	13738	13768	957 (14200 Cl-)	-	99%	-
	Up Mirador	13687	13701	643 (750 Cl-)	527	18%	26
		13673	13679				
		13659	13665				

For the Balay field the main producing unit is the upper sands of the Mirador Formation.

When comparing the salinity values of the formation water, the average for Mirador is 14000 ppm of Cl, except for BALAY-2 & 4 where it is 750 & 1700 ppm of Cl. This may indicate that it is another hydraulic unit, not developed in the other wells.

Balay-2 well, (DST) were production on the Los Cuervos Formation, at depth (14337-14347 MD) with oil of 10ºAPI and BSW 10-16%. (UNDEVELOPED POTENTIAL)

For Balay-1 & Balay-4 the tests in the Une Formation produce oil 34° API with BSW of 90%. (southern wells). For Balay-2 well the DST tests in the Une Formation are 100% BSW.

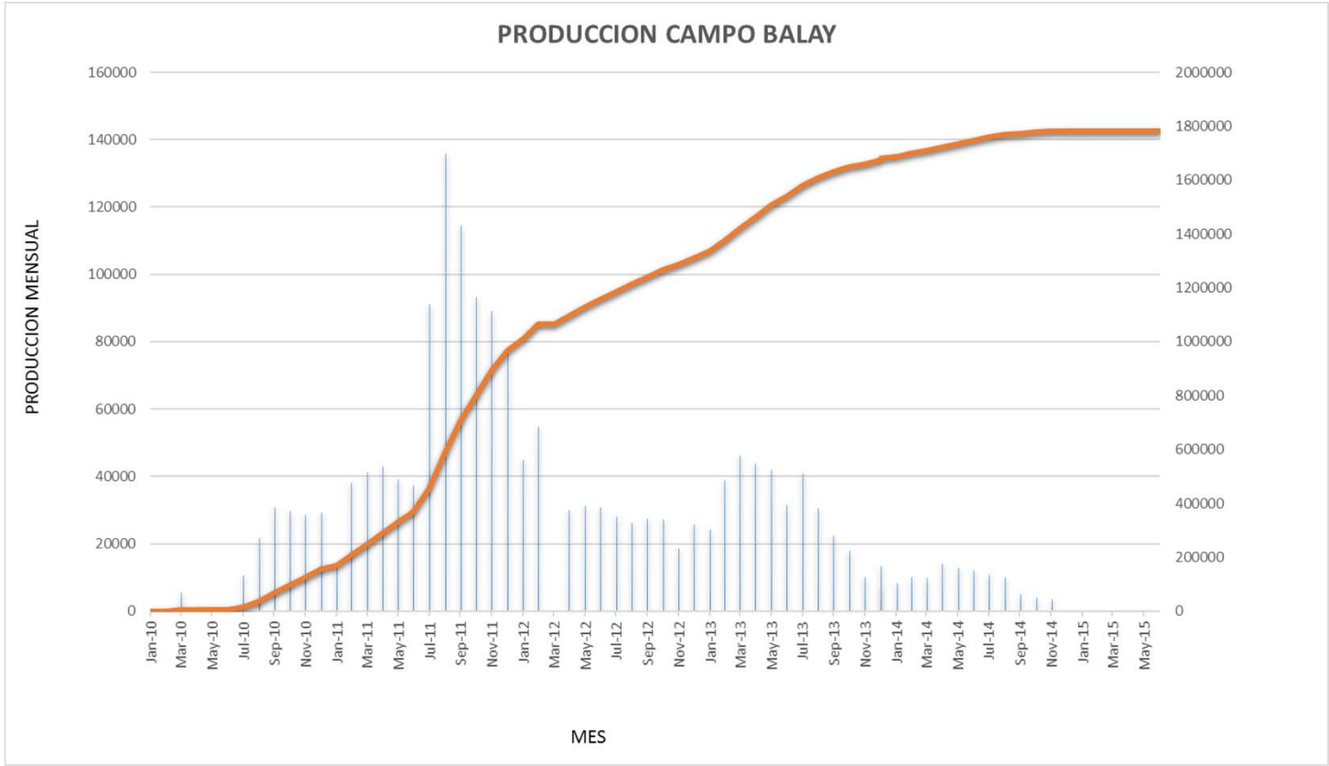
Volumetrics (ANH)

Volumetric Model: Dual Structure
Upper Structure Grid: 60_Mirador_D - Depth
Lower Structure Grid: 60_Mirador_D - Depth + 99
Polygons Used: Poligono ACP Balay
Lower Contact: -13,066.0000
Net/Gross Ratio: 0.6790
Average Porosity: 0.1510
Average Water Saturation: 0.0100
Unit Conversion Constant: 1.9176
Oil Volume Factor: 1.0500

Polygon Poligono ACP Balay

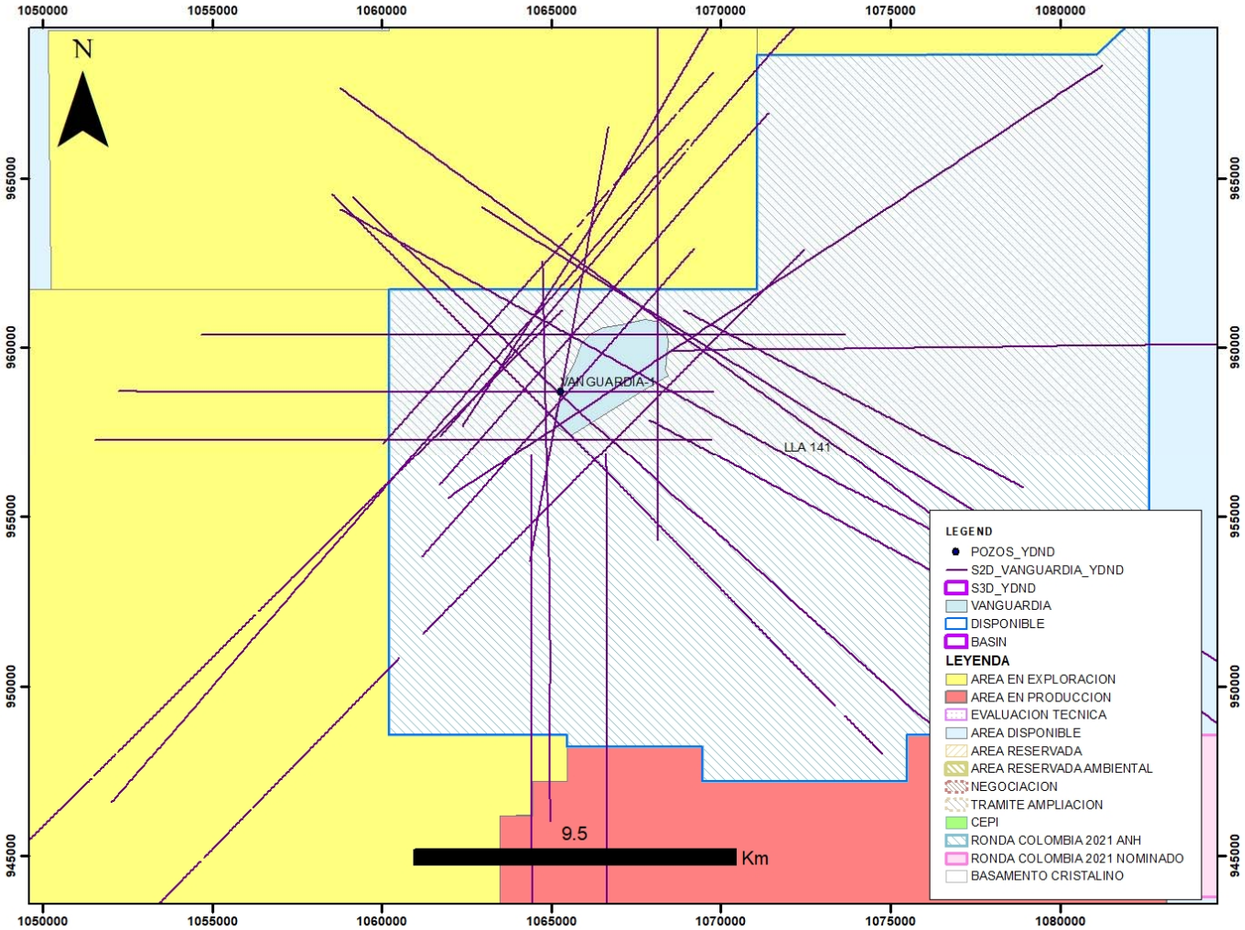
Polygon Area: 18,199,959.2896 M2
Polygon Area within the Grid(s): 1,838,000.0000 M2
Gross Volume: 37,096,653.5875 M2 Feet
Net Volume: 25,188,627.7859 M2 Feet
Pore Volume: 3,803,482.7957 M2 Feet
Hydrocarbon Pore Volume: 3,765,447.9677 M2 Feet
Oil In-Place: 6,876,783.8313 STB

- Final production close to 1.8 MBO



LLA 141 Available Area

Vanguardia UARD

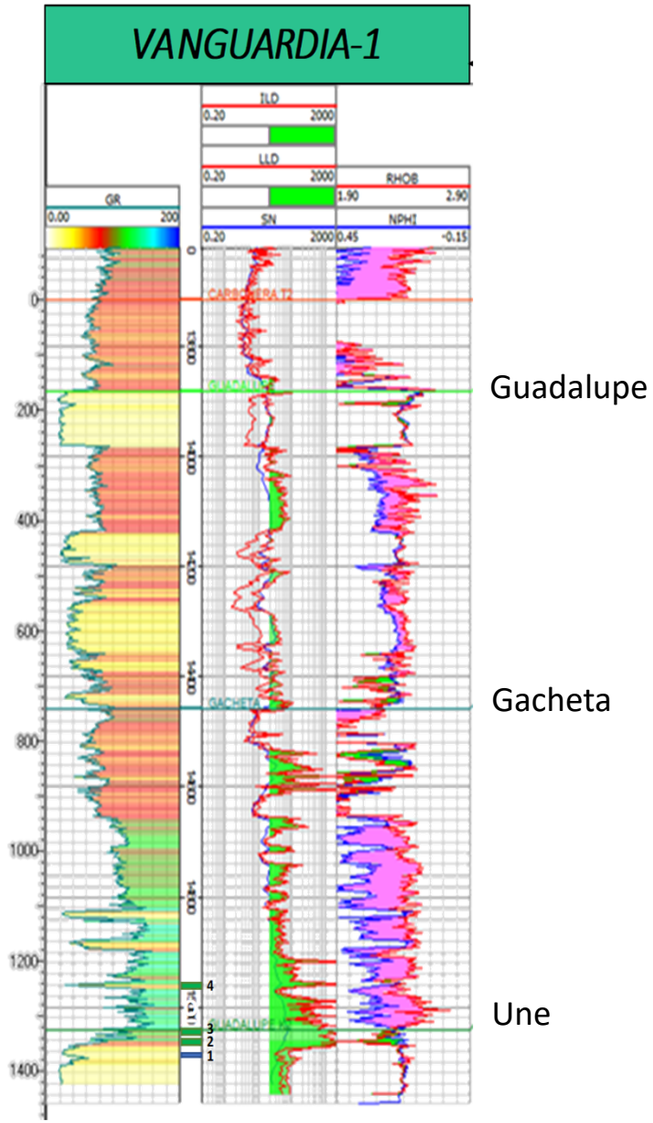


- 2D Seismic

SURVEY	LINES	TOTAL LENGTH
APORTE LLANOS-75	2	57.2
CUMARAL-90	4	60.4
GUACAVIA-87	4	63.9
GUATIQUIA-92	2	33.3
LLANOS SECTOR 10-72	2	52.4
MEDINA VILLAVICENCIO-97	1	31.4
QUENANE-81	2	58.0
VANGUARDIA DETALLE-89	3	31.2
VILLAVICENCIO-88	7	142.6
Total general	***27***	***530.30***

- Well
  - Vanguardia-1

Vanguardia-1 Well Summary



OPERATOR: Ecopetrol
YEAR: December-1989 to May-1990
NOTES:
During the cementing of the 9-5/8 casing, damage was found in this casing at 430 and 223 feet (cementation without success). For this reason, the actual production potential could not be assessed.

Initial Test

Test	Interval	Fm.	BOPD	BWPD	API	BSW	Observations
1	15084' - 15090'	K2		113			Formation water (1000ppm Cl)
2	15060' - 15066'	K2	24	95	30.7°	88%	Formation water (500ppm Cl)
3	15038' - 15046'	K2	65		15.1°	2%	
4	14952' - 14962'	K2	57	13	13°	10%	

- The calculated OOIP is 27 MBls for the field (the recommendation of deposits is to perform extensive tests, to determine reservoir pressure)
- Confirmation of the field's possible reserves requires the drilling of an additional well, according to reservoir recommendations.

In the reconditioning work, the capacity of the well could be recovered, but there was a drop in production. Due to mechanical and economic problems, the well was not put into production.

Reserves (Ecopetrol 1990)

3.1 **RESERVAS PROBADA (METODO VOLUMETRICO)**

Estas reservas fueron calculadas considerando presencia de hidrocarburos únicamente por encima del LKO (15046´).

Area Aproximada: 210 Acres (Fig.-9).
Espesor neto: 22 pies.
Volumen probado: 4620 Acre-pie

$$OOIP = \frac{7758 \times A \times h \times O \times (1-Swi)}{Bo} = \frac{7758 \times 4620 \times 0.14 (1-.27)}{1.11} = 3.3 MBLS$$

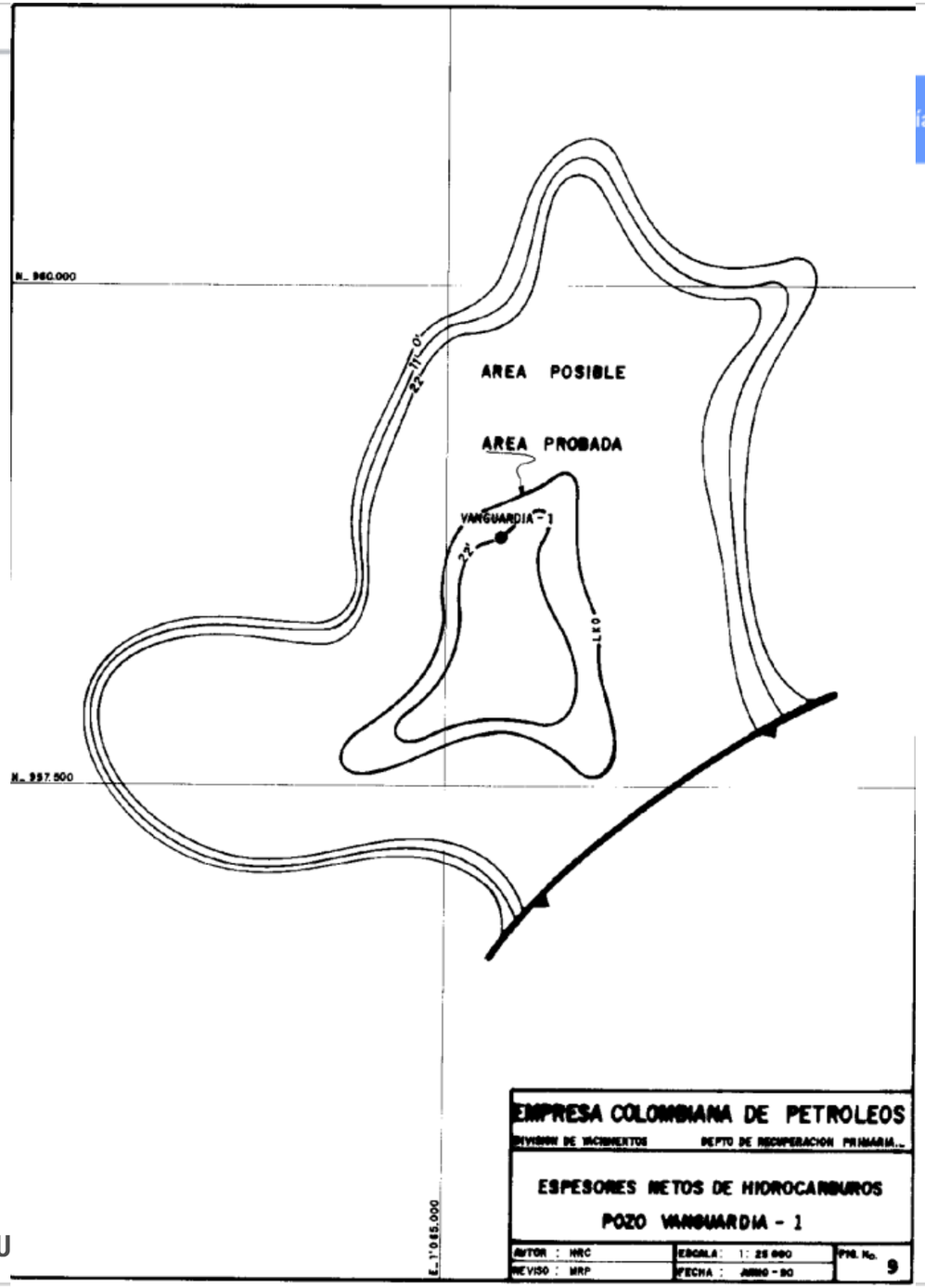
Res. Recuperables = OOIPxFR = 0.33 MBLS

3.2 **RESERVAS POSIBLES (METODO VOLUMETRICO)**

Considerando presencia de hidrocarburos hasta el cierre estructural (Fig.-9).

Area Aprox: 1710 Acres (Fig.9).
Espesor: 22 pies
Volumen posible: $\frac{7758 \times 37702 \times 014 (1-.27)}{1.11} = 27.0$ MBLS

Res. recuperables= OOIPx FR= 2.7 MBLS.



RONDA COLOMBIA 2021 Volumetrics ANH

ANH

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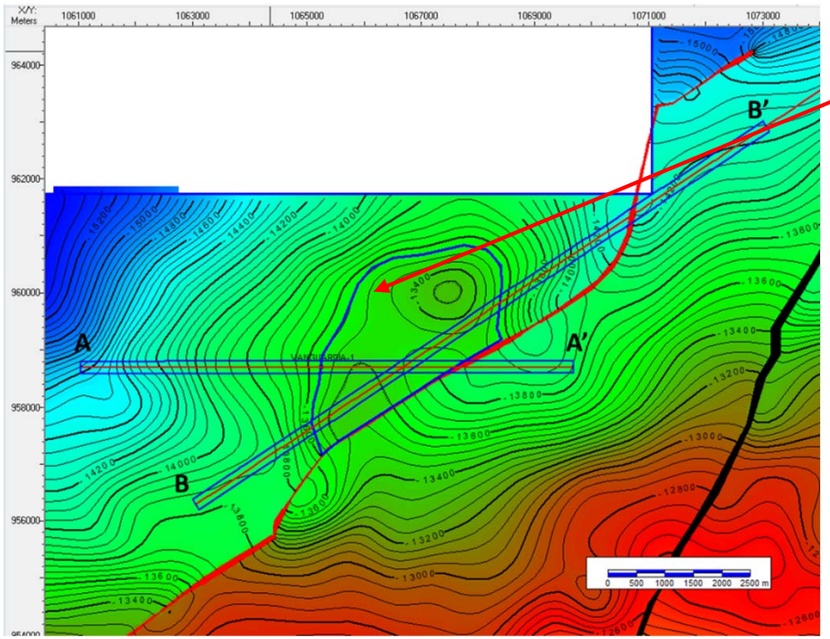
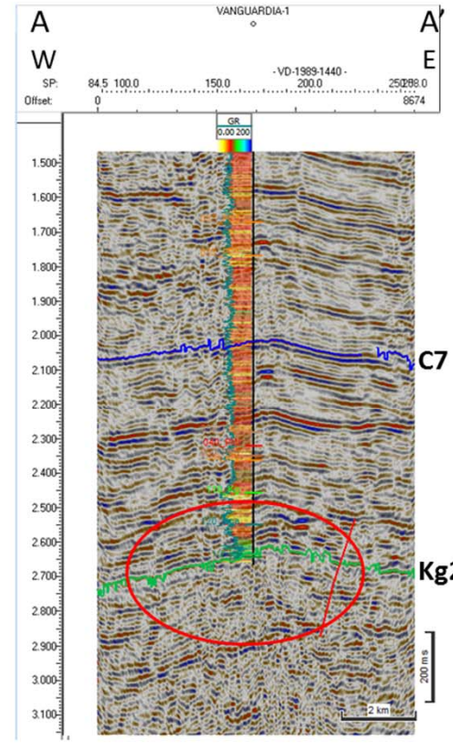
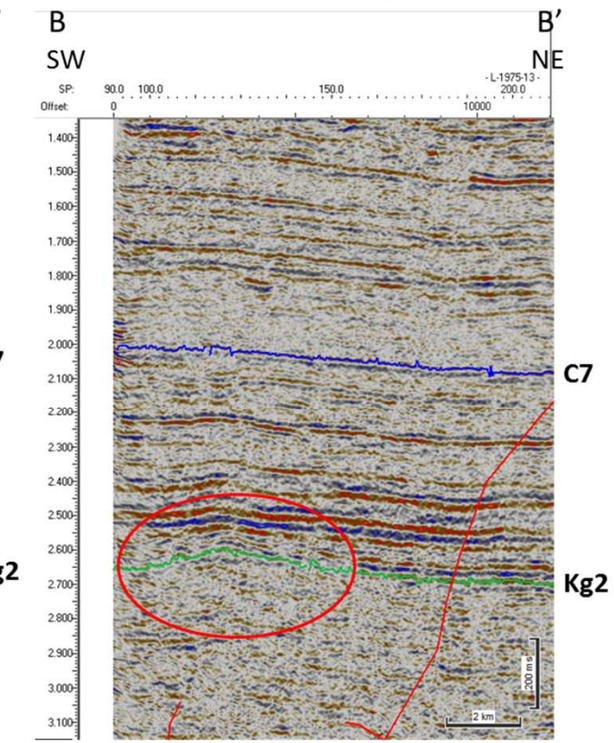


- **Vanguardia lead: 6.93 km² (1714 Acres)**



Dip Line (VD-1989-1440)



Strike Line (L-1975-13)

Structural Map in Depth (TVDss) Guadalupe K2 top

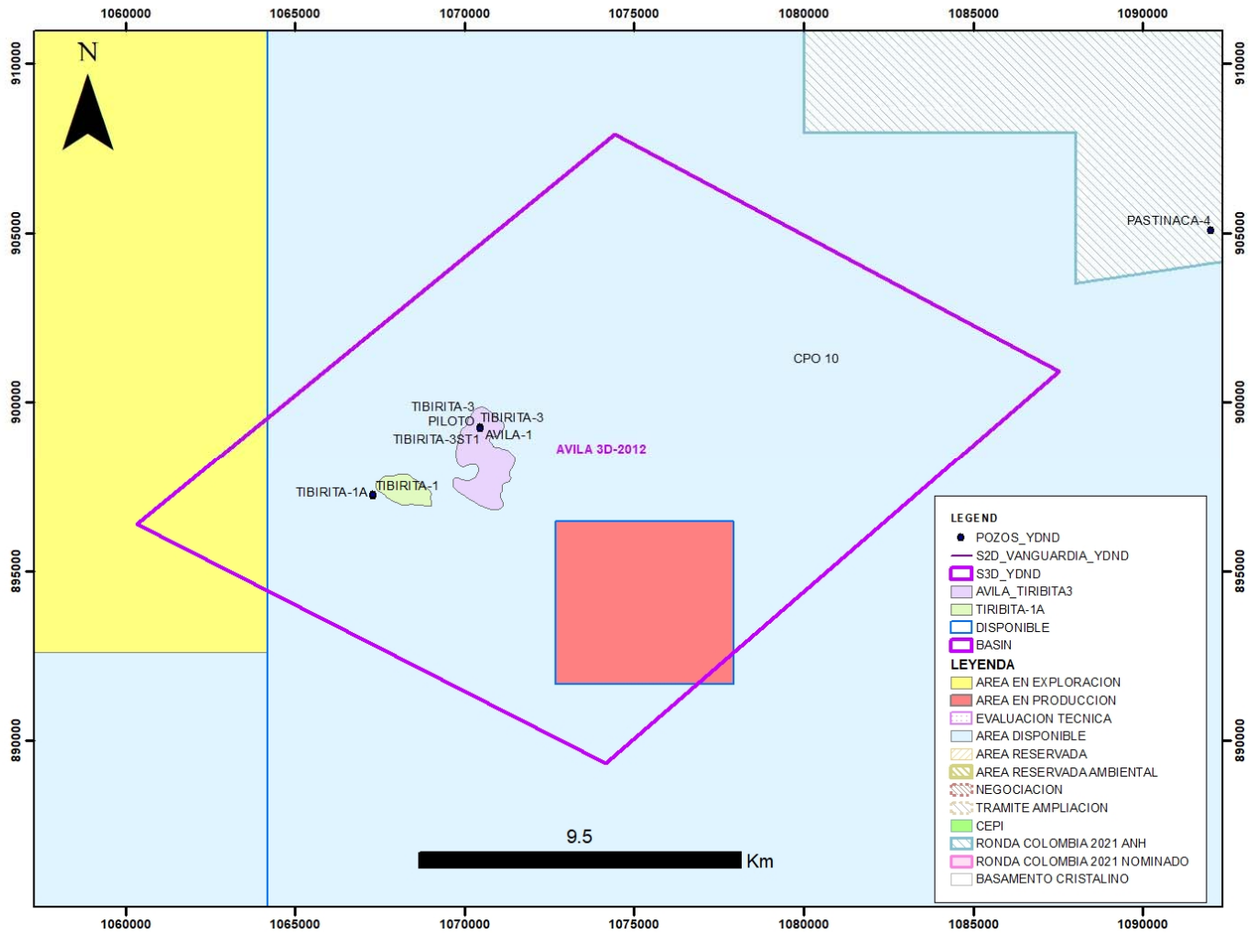
The structure is an anticline against to normal anthitetic fault
Main Target Une Fm. (K2)
Secondary Target Gacheta sst & Guadalupe Fm. (K1)

AREA	LEAD NAME	TRAP TYPE	UNIT	PETROPHYSICAL PARAMETERS						ESTIMATED DEPTH TVDss (Ft)	RESOURCES (MMbl)		POS
					AREA (Acres)	Ø	NET PAY	Sw	Bo		TOTAL		
LLA-141	VANGUARDIA X:1067400 Y:960000	Anticline against to anthitetic fault	K1	P90	260.00	0.12	5.00	0.65	1.34	-13190	0.32	P90	27%
				P50	1002.00	0.15	15.00	0.45	1.34		7.18	P50	
				P10	1744.00	0.18	25.00	0.25	1.34		34.08	P10	
			K2	P90	260.00	0.12	12.00	0.65	1.19	-13350	0.85	P90	27%
				P50	1002.00	0.15	22.00	0.45	1.19		11.86	P50	
				P10	1744.00	0.18	35.00	0.25	1.19		53.72	P10	

CPO-10 Available Area

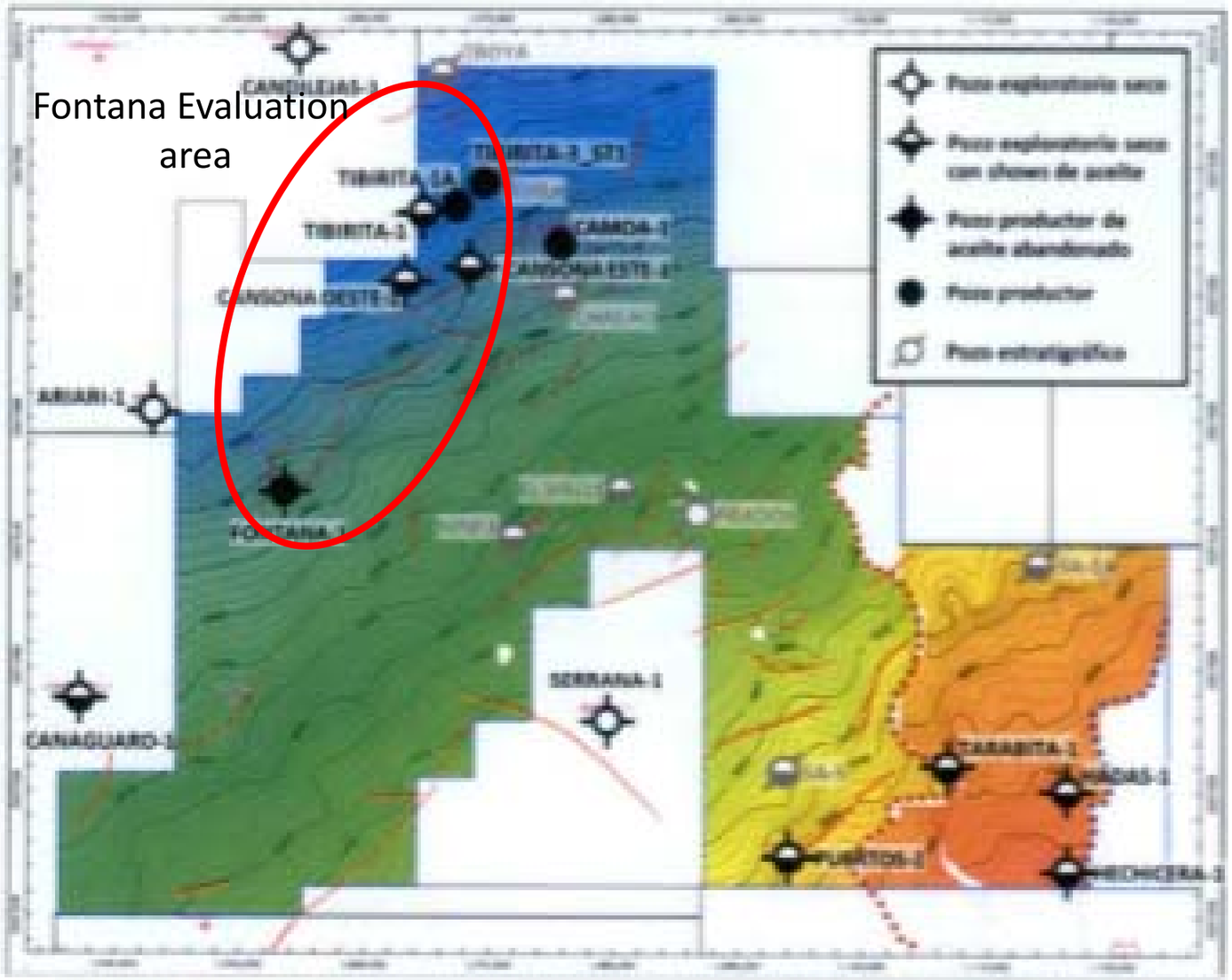
Avila (Tiribita 3) – Tiribita 1A UARD

Database

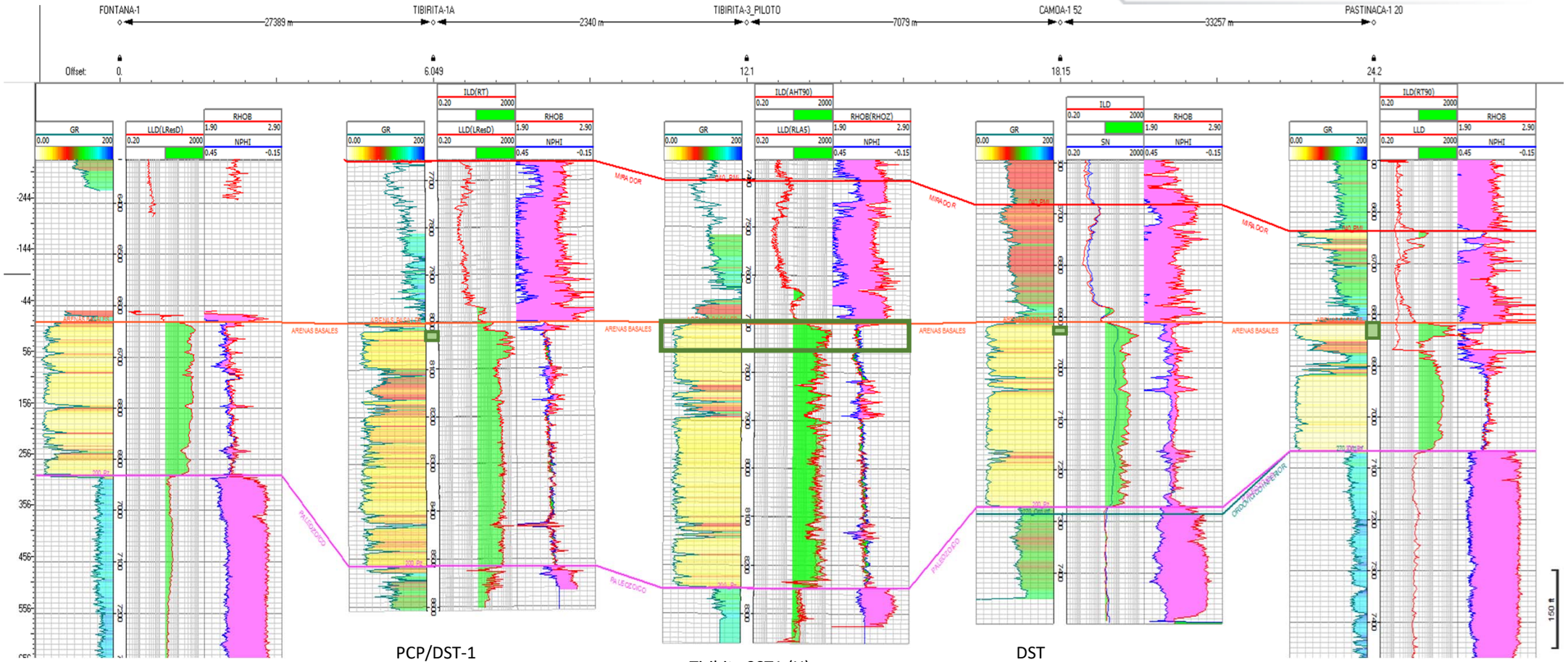


- 3D Seismic
  - AVILA 3D-2012 (252Km^2)
- Wells
  - AVILA-1
  - TIRIBITA-1
  - TIRIBITA-1A
  - TIRIBITA-3, TIRIBITA-3 PILOTO & TIRIBITA-3ST1

Fontana Evaluation Area



Stratigraphic Correlation (Basal SST datum)



PCP/DST-1
8020-8037
2941 bbls oil @11.3ºAPI
197 bbls water
570BOPD BSW 1.55%

Tiribita 3ST1 (H)
Completititon Test
Qf 1000BFD
Qo 680 BOPD @11.3ºAPI
Qw 320 BWPD
BSW 29.2%

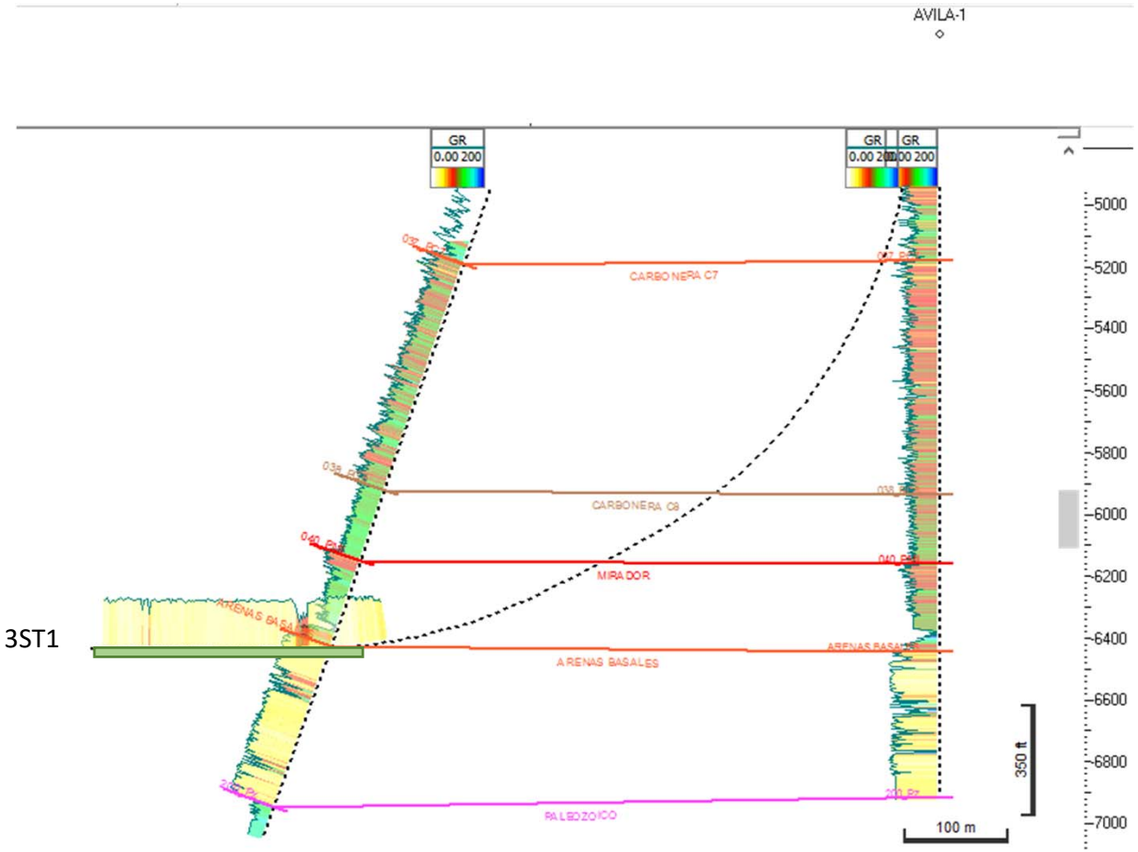
DST
6922-6928
680BOPD@11.7ºAPI

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

Tibirita – 3 ST1 Initial test

Pruebas iniciales pozo Tibirita 3ST1									
Prueba No	Fecha	Intervals probado MD	Formación probada	Fluido de trabajo. Agua Bls	Agua de formación Bls	Crudo Bls	Total líquidos Bls	Gas MPC	Resultados
FT - ESP - 1	06 @ 20 septiembre de 2014	8299 - 9218	Carbonera Arenas basales	620	2769	7758	11147	0	Parámetros de producción: al final de la prueba se obtuvo un caudal promedio de 1000 BFPD, 680 BOPD (11,3 API) y 320 BWPD. 2030 psi de PIP

Tiribita 3ST1



Tiribita 3 Piloto

Long term tests
Tibirita - 1A and Tibirita - 3 ST1 wells

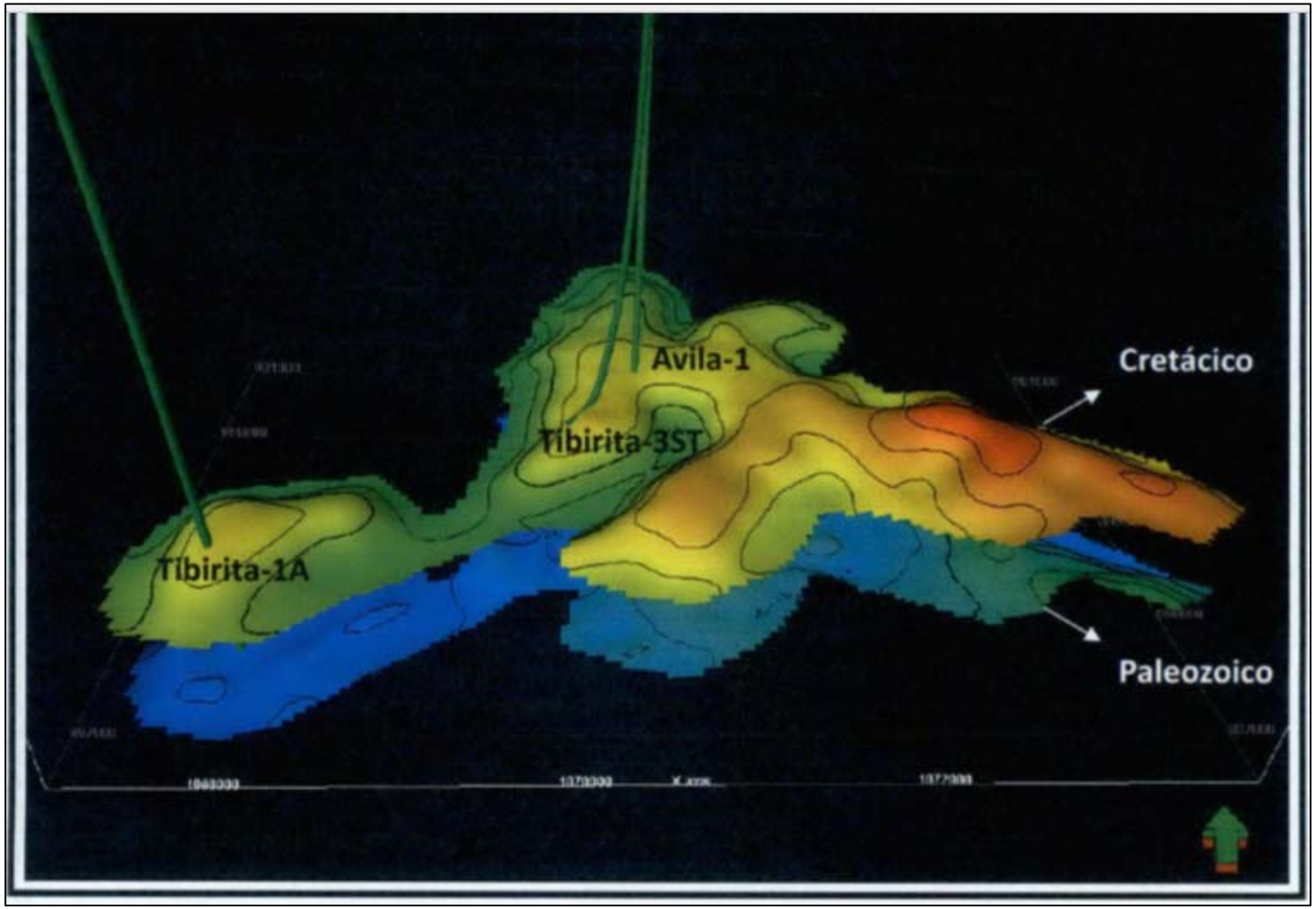
Pozo	Duración	Objetivo	Método	Resultados
Tibirita 1A	28 Abril 2014. 28 Febrero 2015 305 dias	Eoceno basal	PCP	68805 BDP, 12 API 13% BSW
Tibirita 3 ST1	09 Noviembre 2014. 05 Marzo 2015 120 dias	Eoceno basal	ESP	25000 BDP, 11,3 API 81% BSW

Production capacity

N°	POZO	FORMACIÓN	UNIDAD	INTERVALO DE INTERES CAÑONEADO (ft) Tope-Base	INDICE DE PRODUCCIÓN (BOPD/PSI)	CAPACIDAD MÁXIMA DE PRODUCCIÓN (BOPD)	PRESIÓN DE YACIMIENTO (PSIA)	DAÑO DE FORMACIÓN (S)	SISTEMA DE LEVANTAMIENTO ARTIFICIAL	GOR (SCL/BBL)	CORTE DE AGUA final (%)
1	TIBIRITA-1A	Carbonera	Arenas basales	8020-8037	1.23	220	2800	NA	PCP	NA	13
2	TIBIRITA-3ST1	Carbonera	Arenas basales	8299-9218	2.5	200	2958	NA	ESP	NA	55

Np Tibirita 1 = 155878 BDP (inicial tests + long term test)
Np Tibirita 3 ST = 32758 BDP (initial tests + long term tests)

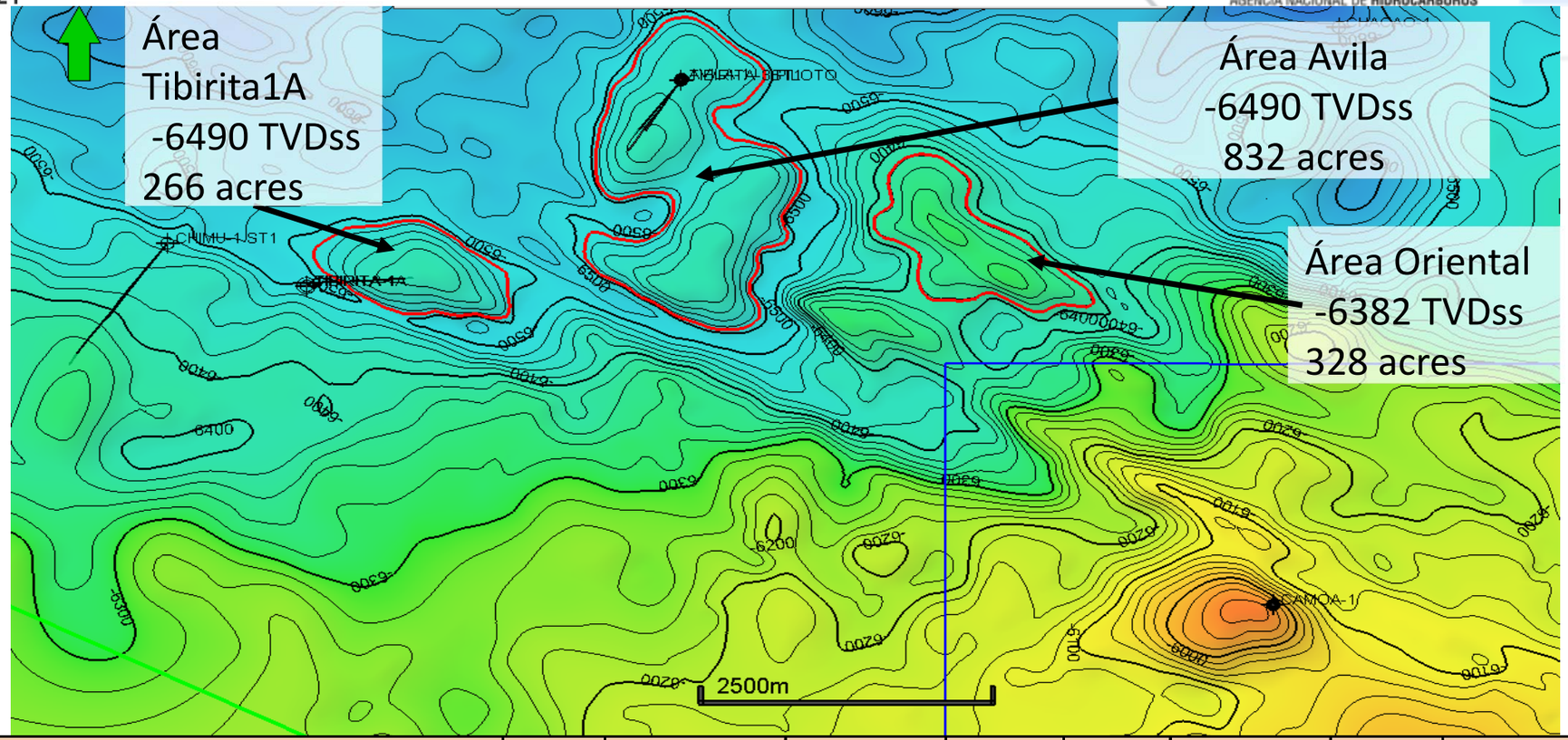
Fontana Evaluation Area
Static Model- Structural map



Input:
Well information
Production tests
252,0 Km2 Avila 3D
307,1 km seismic Caño Sur, Fontana

Volumetrics = 38.7 MMBLS OOIP

ANH evaluation and volumetrics



PROSPECT OR LEAD	AREA (Acres)	THICKNESS (Net Pay) (Ft)	POROSITY (%)	SO (%)	Boi	POES (BLS)	FR (%)	RESOURCES (BLS)
Fontana Tibirita Avila Arenas Basales	869	25	0,22	0,65	1,0500	22.953.890	0,10	2.295.389
Fontana Tibirita Avila Este Arenas Basales	328	30	0,22	0,65	1,0500	10.396.607	0,10	1.039.661
Fontana Tibirita 1A Arenas basales	264	50	0,22	0,65	1,0500	13.946.667	0,10	1.394.667
					TOTAL	47.297.164		4.729.716

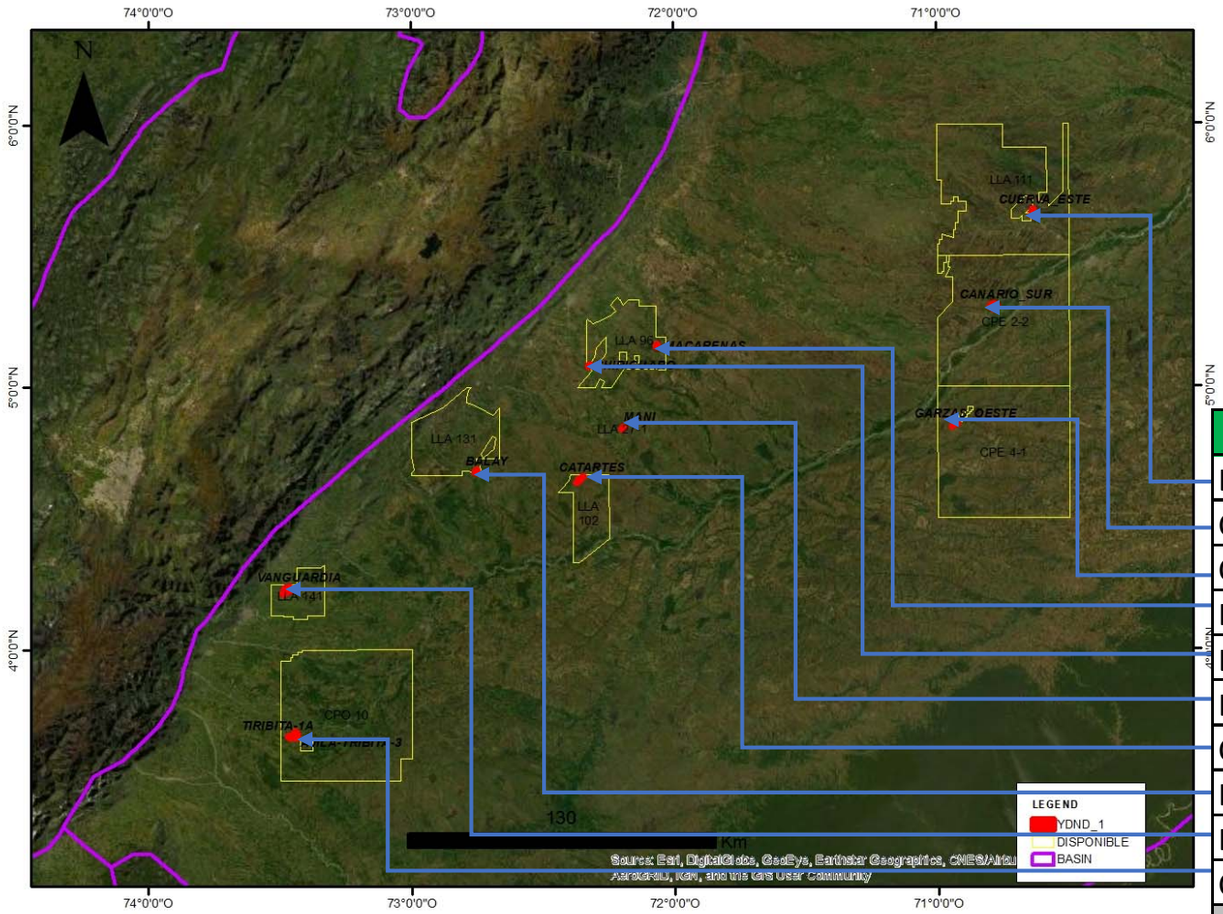
Conclusions

- The Cuerva Oriental area has a prospective level tested by the Cuerva-7 and Las Guamas-1 wells. The area had a cumulative production of 7414 Barrels of Oil of 19ºAPI (2009-2010), although the Cuerva-7 well started with a low BSW (about 30%) and in the extensive test came to have almost BSW of 99%, the area would still have a remaining potential.
- The area of Canario Sur was abandoned due to low productivity (19-24 BOPD), although it would still have potential in the northern zone.
- Garzas Oeste had an average production of 70BOPD of 16.4ºAPI and BSW of 95.4%. The previous operator estimated prospective resources of 0.497 MM Bbls and the ANH estimates 0.486 MM at C7 and 0.426 MM at C5
- The Macarenas well in its extensive test phase had production levels of 200 BOPD, but due to mechanical problems had to be abandoned, the structure would have a potential of 0.51 MMBO of proven reserves according to the operator.
- The Chiriguaro well had a production of 11553 barrels in its extensive test, the operator had indications that there were failures in the mechanical seal, which led to an increase in BSW. The operator estimated prospective resources of 0.73 MM.
- The Maní-1ST well in its time of extensive tests managed to drain about 31222 bbls of oil, it is estimated that this well only drained the lowest part of the structure and therefore, additional studies are necessary to corroborate the existence of hydrocarbon at the top of the structure.

Conclusions

- For the structure of the Citrino-Catartes and Pajaro Pinto wells, according to the stratigraphic observations within the Mirador level, it is estimated that there are possibilities of having a larger structure analogous to the Santiago Este field, with a potential of 4.8MMBO recoverable, but additional studies are required in the seismic and the wells already drilled.
- For the Balay field, a petrophysical re-evaluation is necessary to determine the potential of the Cuervo and Une units, as well as an evaluation of reservoirs to observe the remaining potential that still remains within Mirador Fm.
- In the Vanguardia structure, the acquisition of new seismic information is recommended to corroborate the extension of the structure.
- In the area of the Tiribita 1A and Tiribita 3 wells, a resource potential of 4.7 MMBO observed with the 3D seismic of the Avila program is observed, and both structures have already tested about 187000 Bbls of hydrocarbon between 11.3 and 11.7ºAPI

RONDA COLOMBIA 2021 Summary



Block	UARD	OOIP (MM)	API	Source	Reservoir
LLA 111	Cuerva Este	2.3	19.7	ANH	C3
CPE 2-2	Canario Sur	6.39	18.2	ANH	C5
CPE 4-1	Garzas Oeste	1.7	16.4	ANH	C5-C7
LLA 96	Macarenas	1.13	34	ANH	Gacheta sst
LLA 96	Chiriguaro	0.73	13.2	Operator	Une
LLA 27-1	Maní	1.76	14.3	ANH	Mirador
CPE 102	Catartes	19.46	14	ANH	Mirador
LLA 131	Balay	6.88	26	ANH	Mirador
LLA 141	Vanguardia	53.72	15.1	ANH	Une
CPO 10	Tiribita 1A-3	47.3	11.3	ANH	Basal SST
Total		**141.37**			

Thanks