ANH
AGENCIA NACIONAL DE HIDROCARBUROS

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Minenergía

RONDA COLOMBIA 2021

LLANOS BASIN

MAY 28TH 2021

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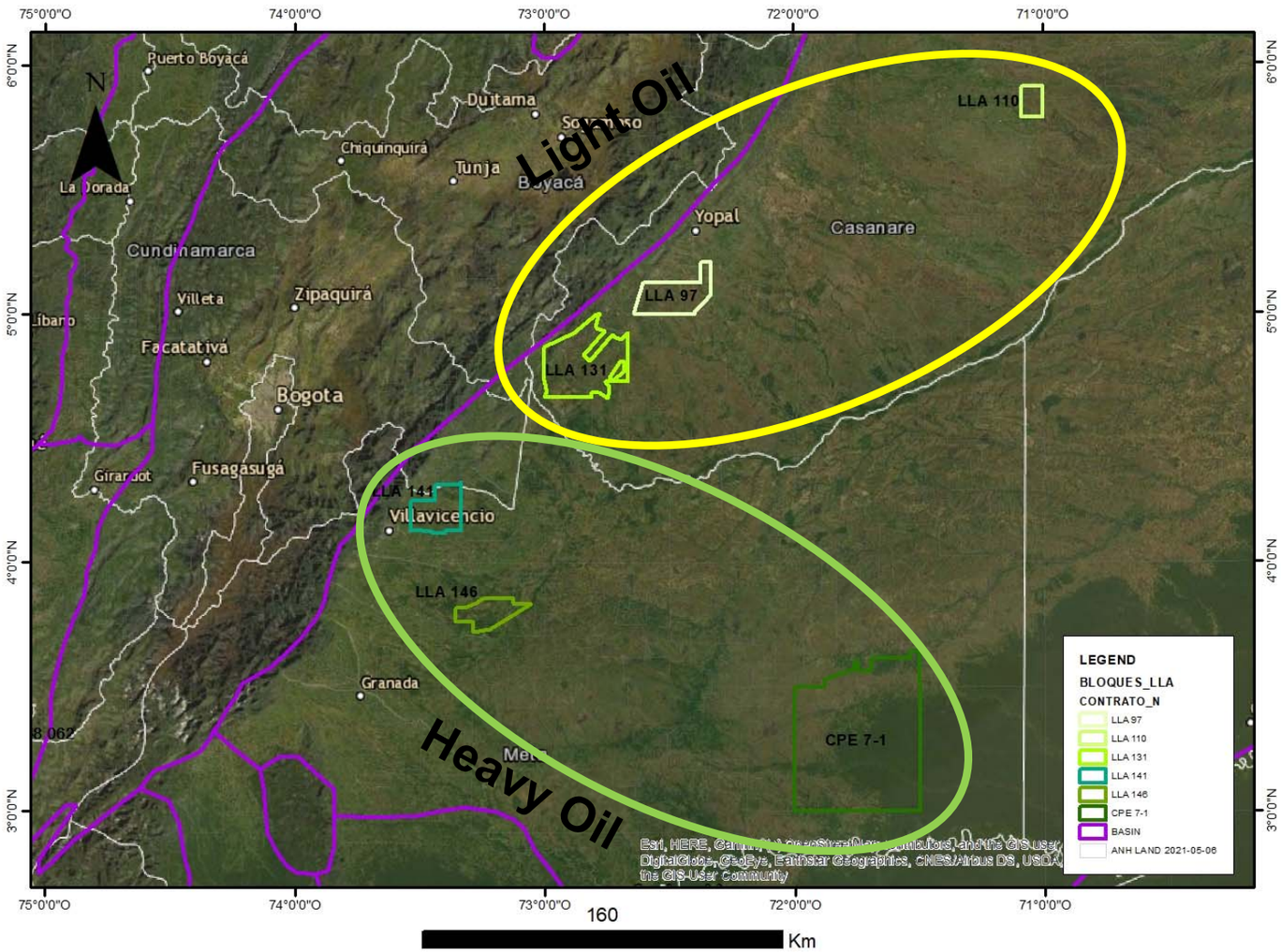
LOCATION



Light Oil Areas

LLA 97 and **LLA 131** areas are located in the central part of the "Llanos Orientales" Basin, in the deep foreland part of the basin, close to the Cusiana (Foothill oilfiled) and Ramiriqui (Deepforeland Oilfield) fields.

LLA 110 area is located in the central part of the "Llanos Orientales" Basin, close to the limit with Arauca Domain

Heavy Oil Areas

LLA 141 and LLA 146 areas are located in the southwestern part of the "Llanos Orientales" Basin, close to Apiay oil field

CPE7-1 area is located in the southern part of the "Llanos Orientales" Basin, in the heavy oil zone close to the Rubiales oil field

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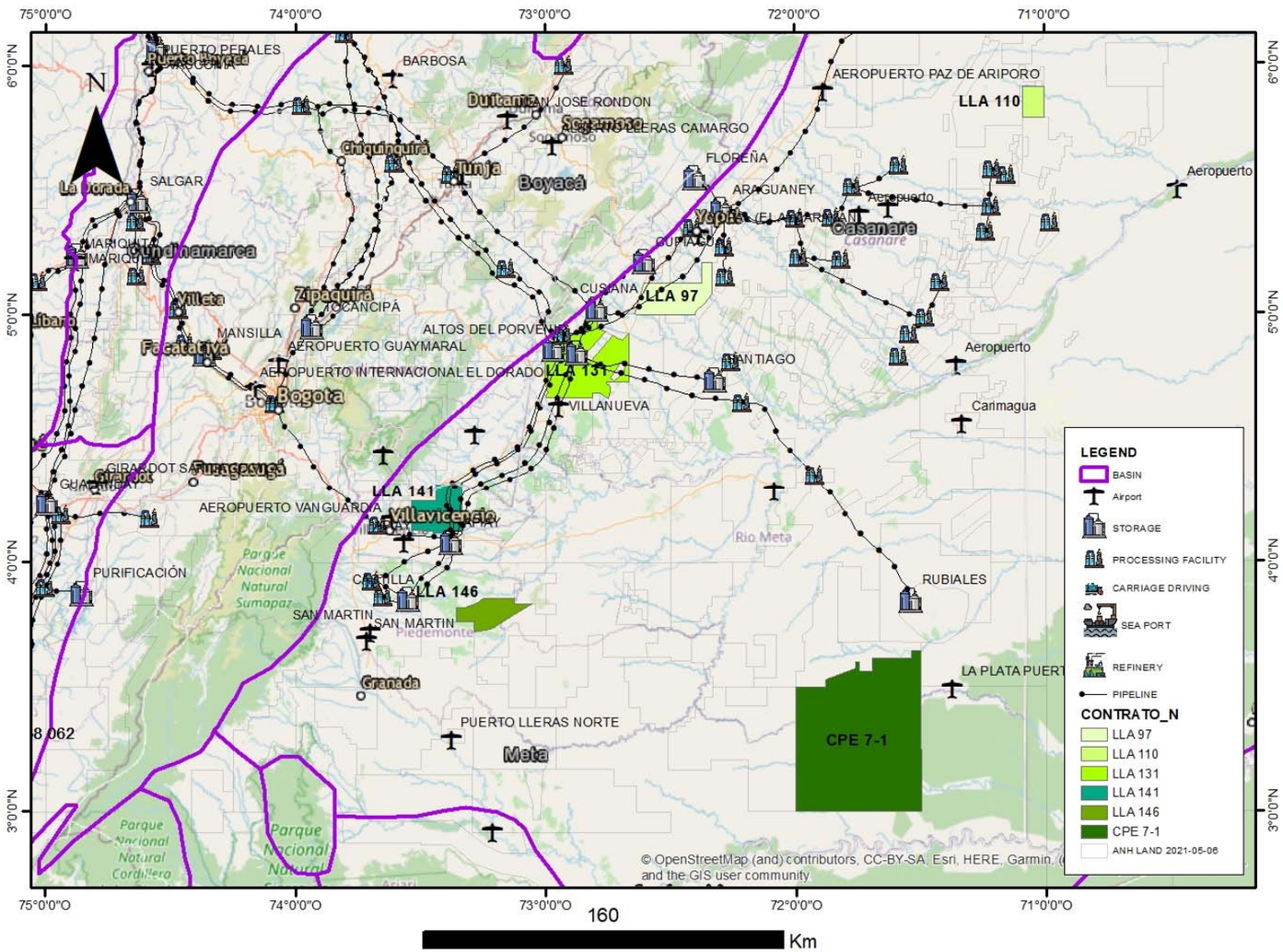
INFRASTRUCTURE



LLA 97, LLA 131 are located near to Piedemonte oil fields (20Km approximately), close to facilities of Cusiana-Cupiagua oil fields, and Cross the main road to connect Yopal with Villavicencio cities.

LLA 141 areas are located near to Apiay oil fields (20Km approximately), One main paved road cross opportunity and may connect with facilities of Apiay oil fields, and Villavicencio city and Airport is close to the block.

LLA 110 areas has several roads that converge to the main road that reaches the Paz de Ariporo urban area.

LLA 146 areas has several unpaved roads that converge to the main road that potentially reaches at the oil facilities of Castilla and Apiay oil fields.

CPE7-1 area is located Near to Rubiales and Hamaca oil fields (60Km approximately), Several unpaved road to communicate proposed lead with Rubiales oil facilities, One airfield near to the block (40Km approximately)

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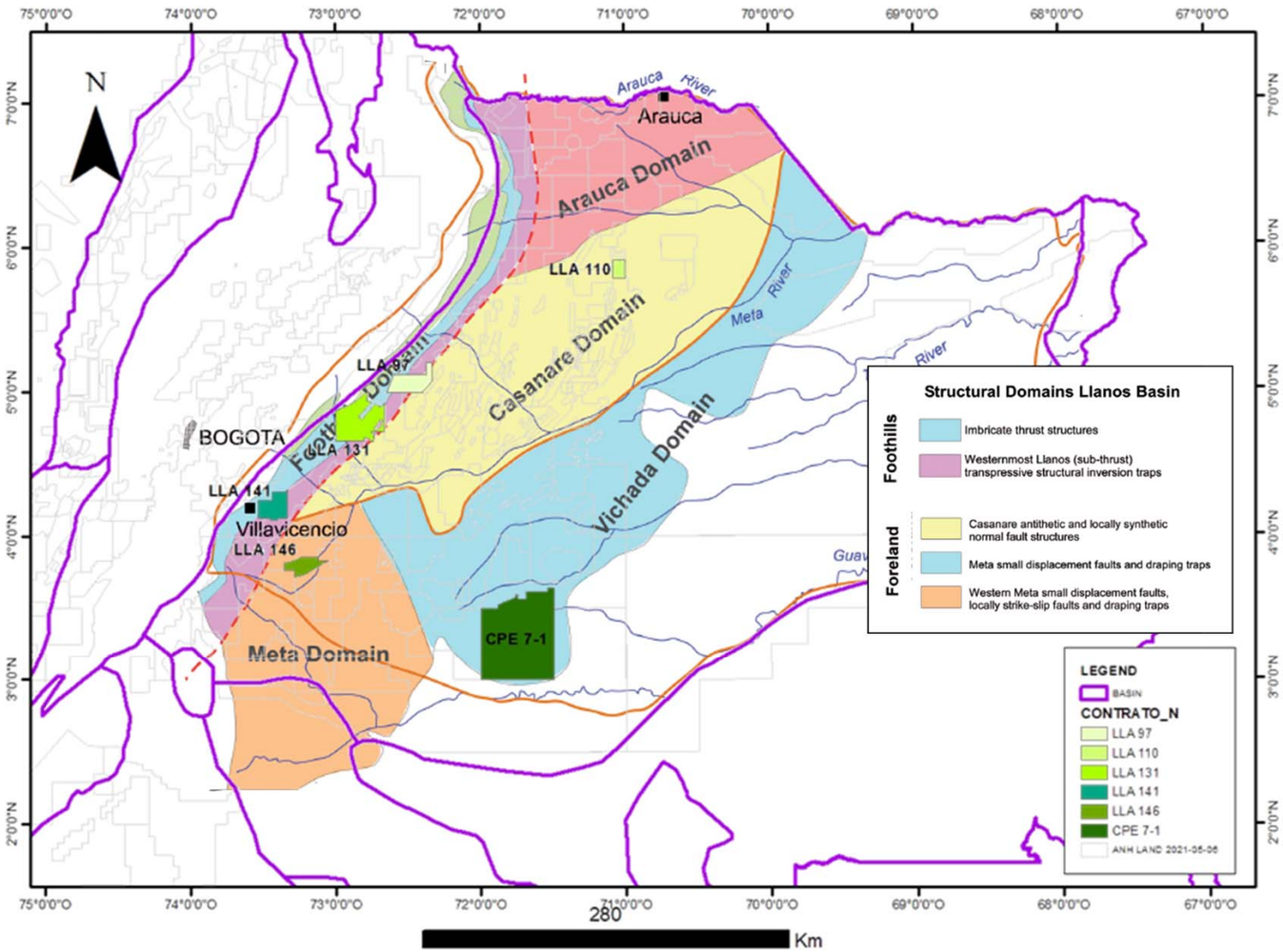
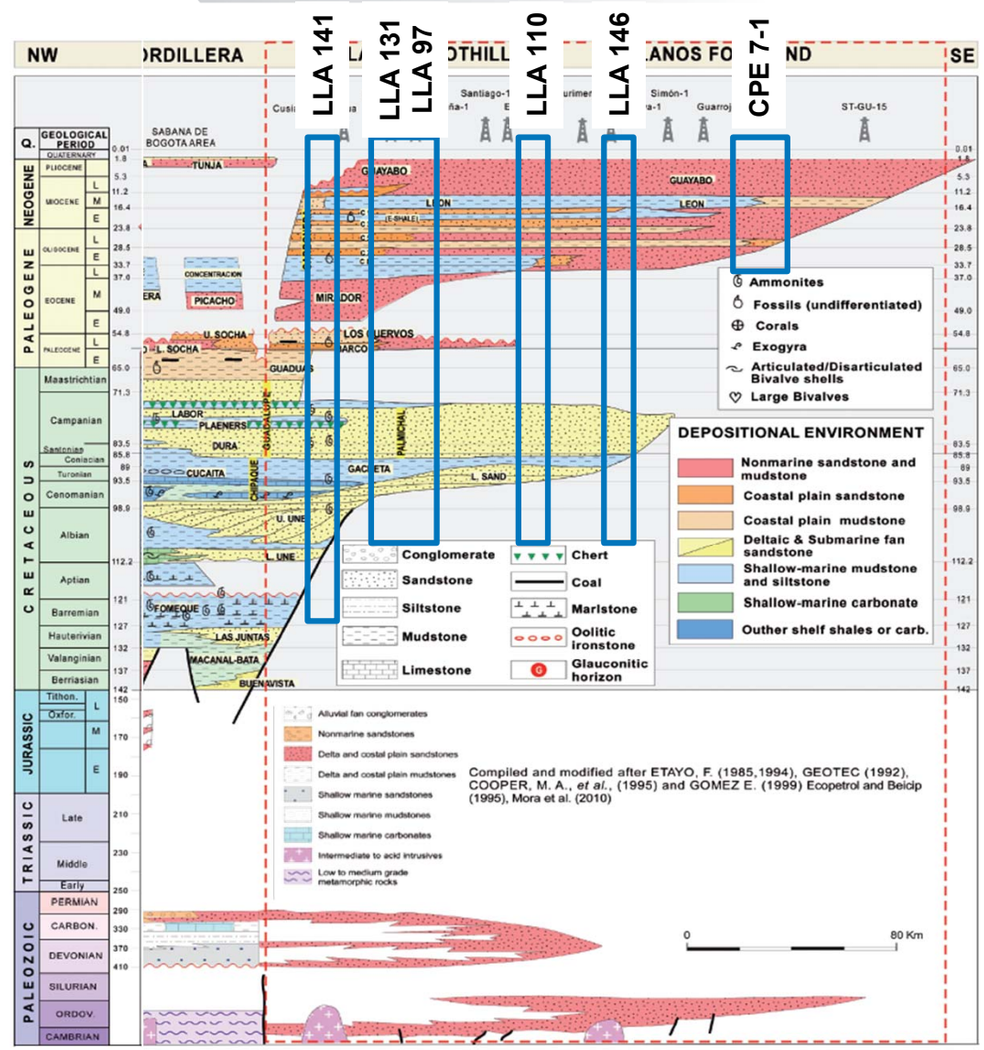
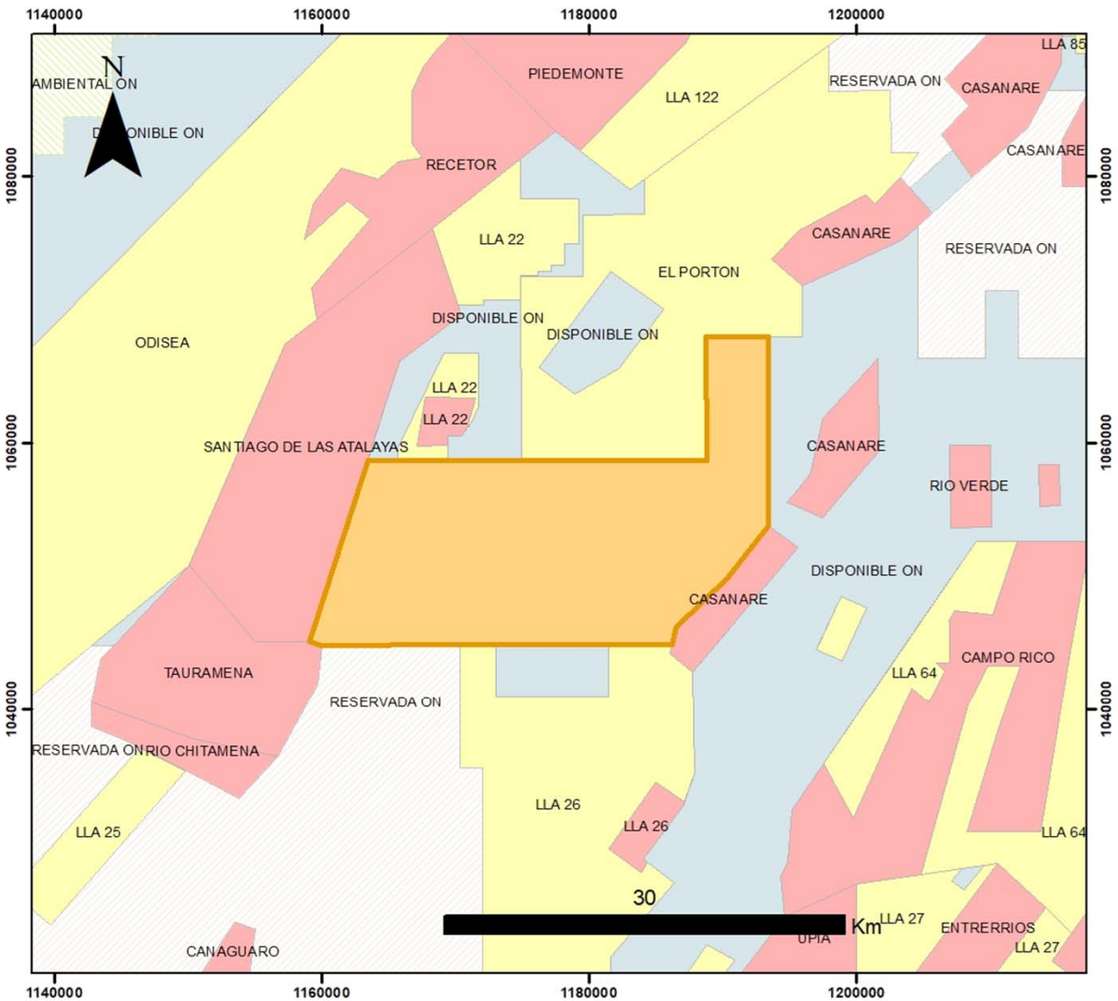
GEOLOGICAL FRAMEWORK



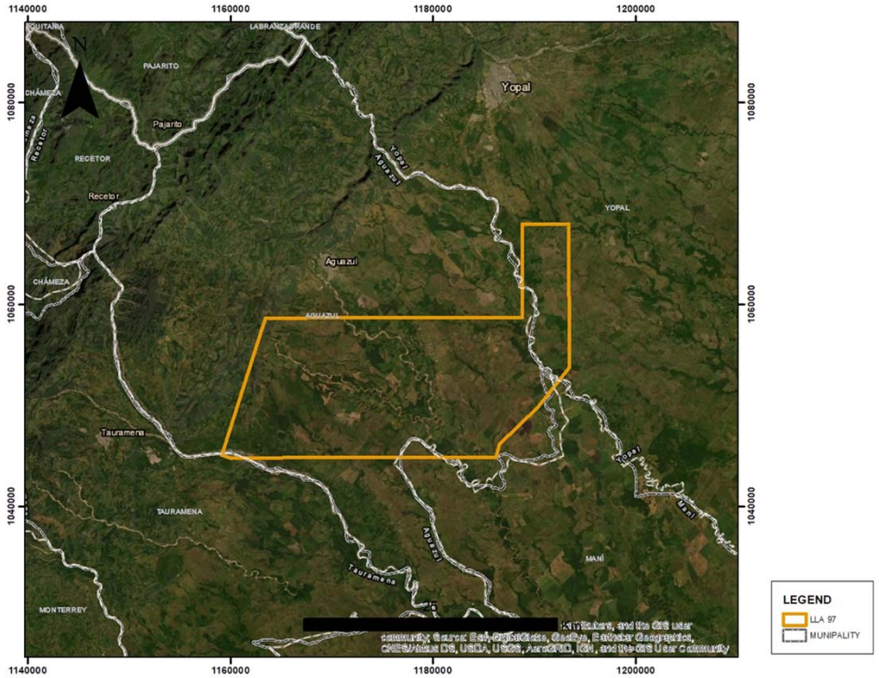


LLANOS BASIN - LIGHT OIL AREAS
LLA 97, LLA 110, and LLA 131 Areas

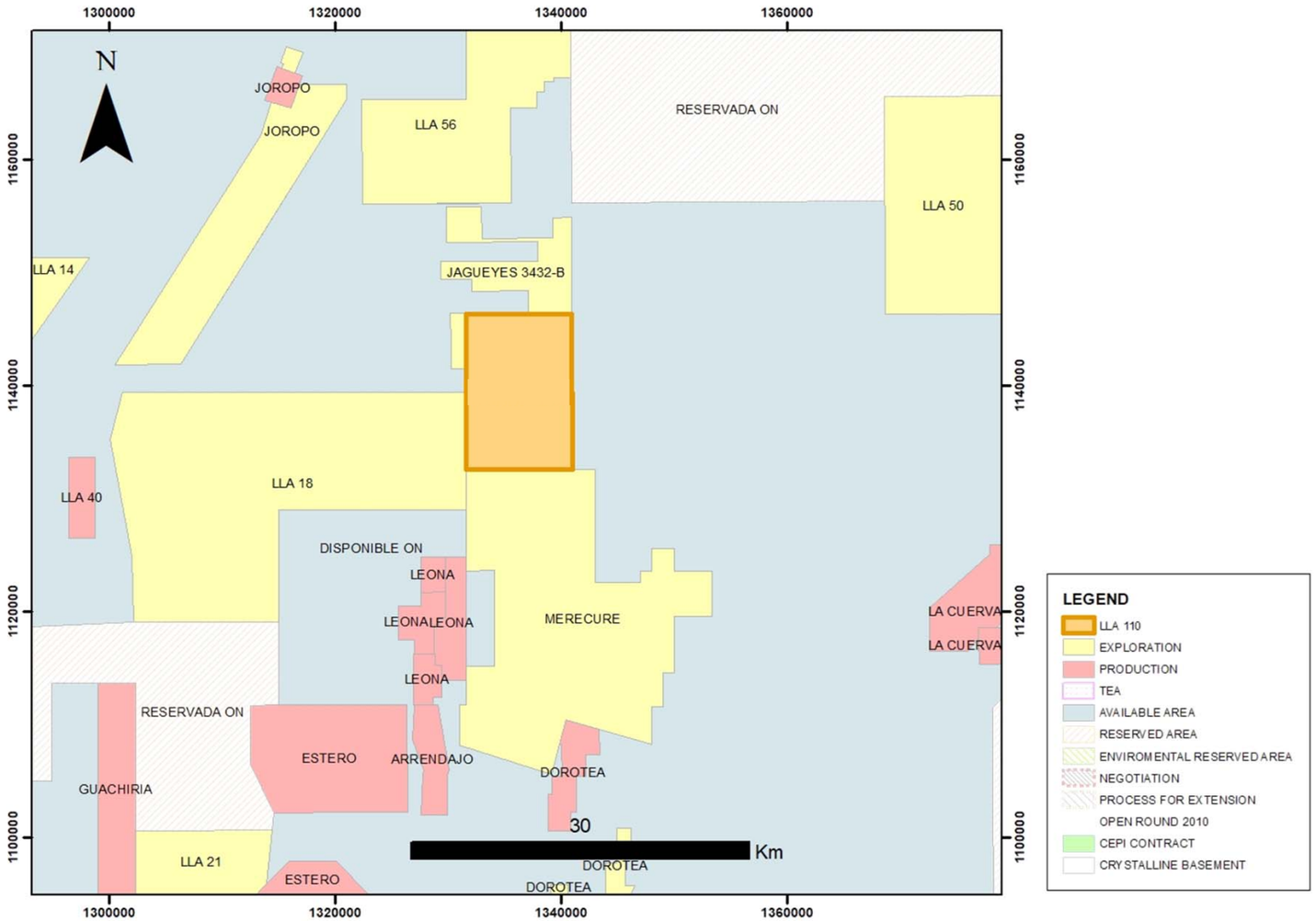
LLA 97 - LOCATION



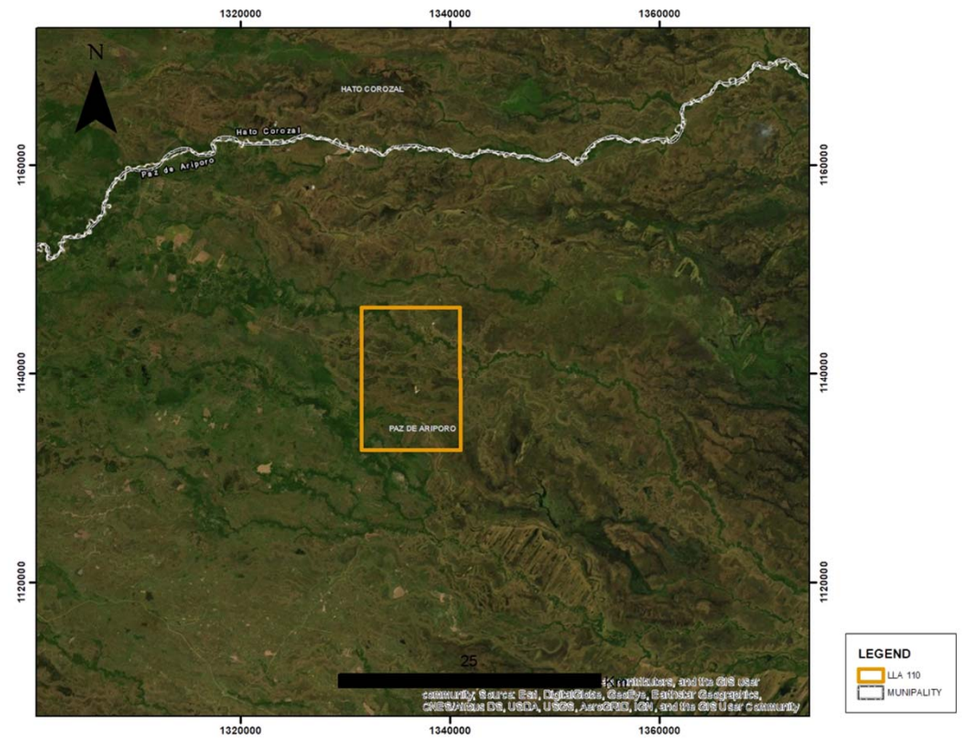
- **Block Area: 45443.6 Ha**
- **Municipalities: (Casanare)**
  Aguazul (85.6%)
  Yopal (12.8%)
  Maní (1.4%)
  Tauramena (0.1%)



LLA 110 - LOCATION



- **Block Area: 12916 Ha**
- **Municipalities: (Casanare)**
  Paz de Ariporo (100%)



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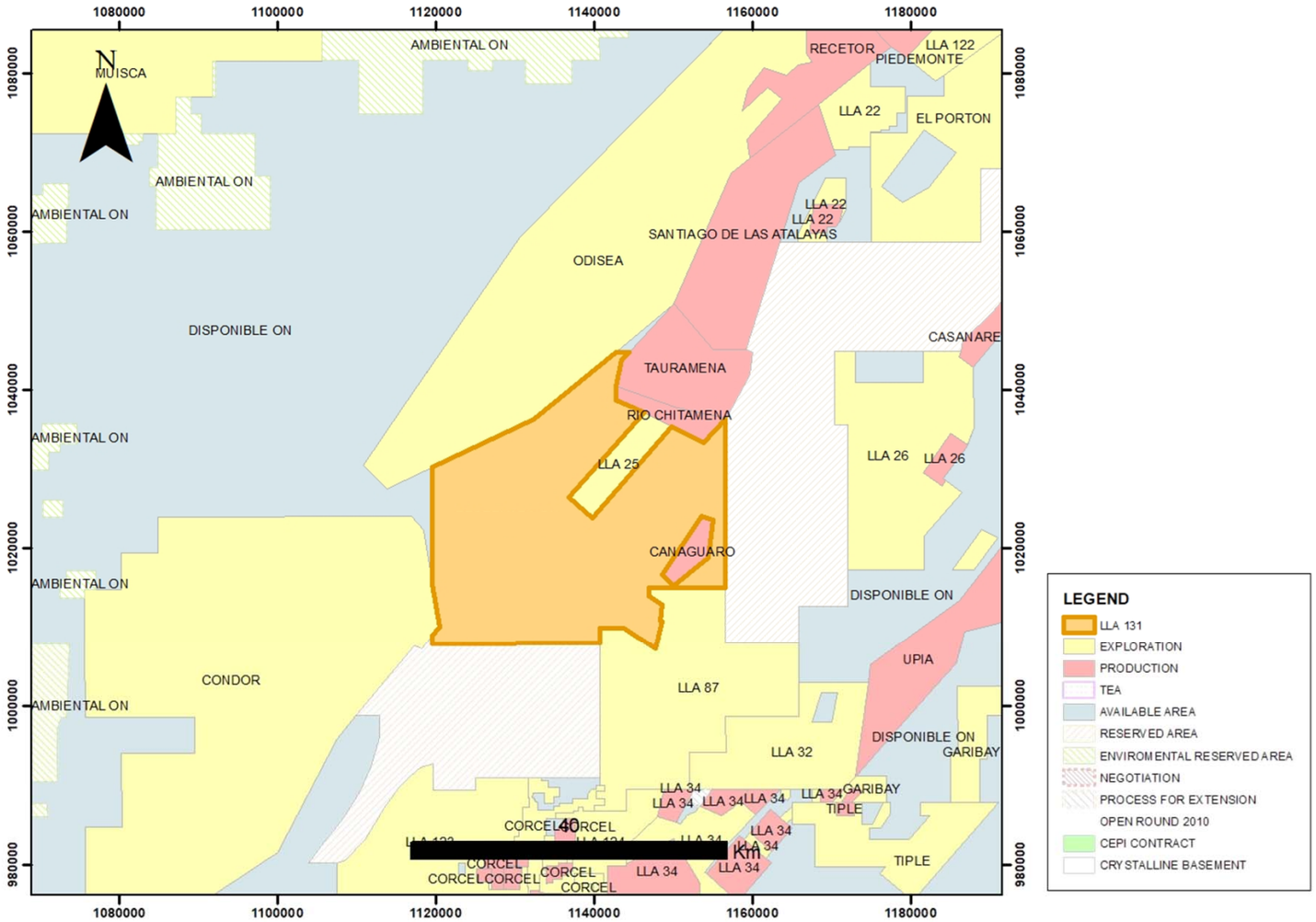
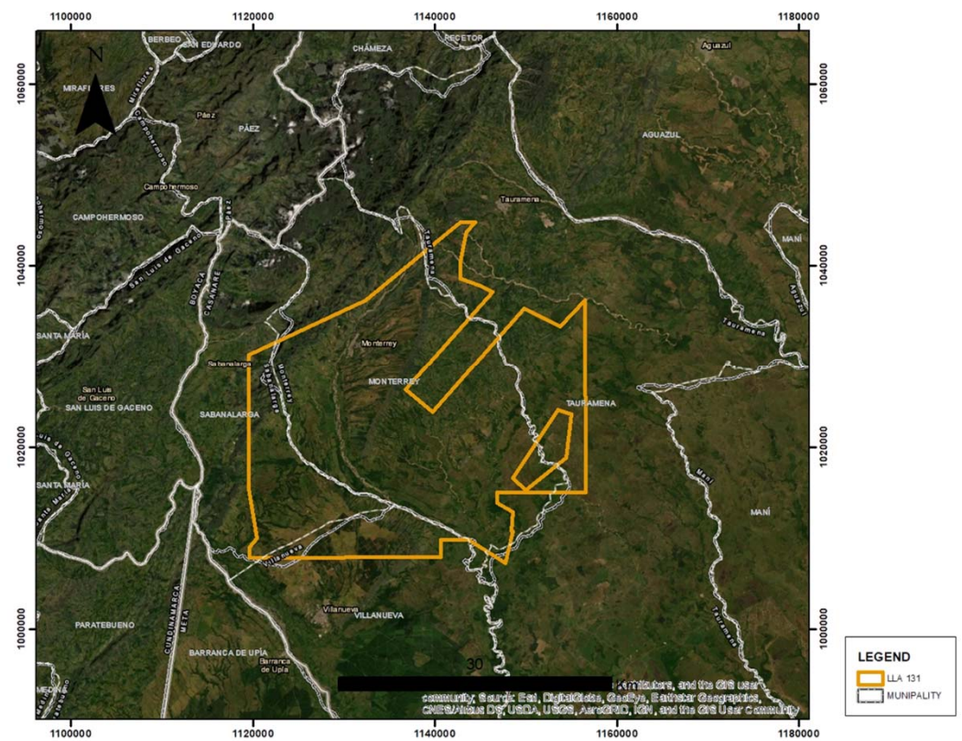
LLA 131 - LOCATION

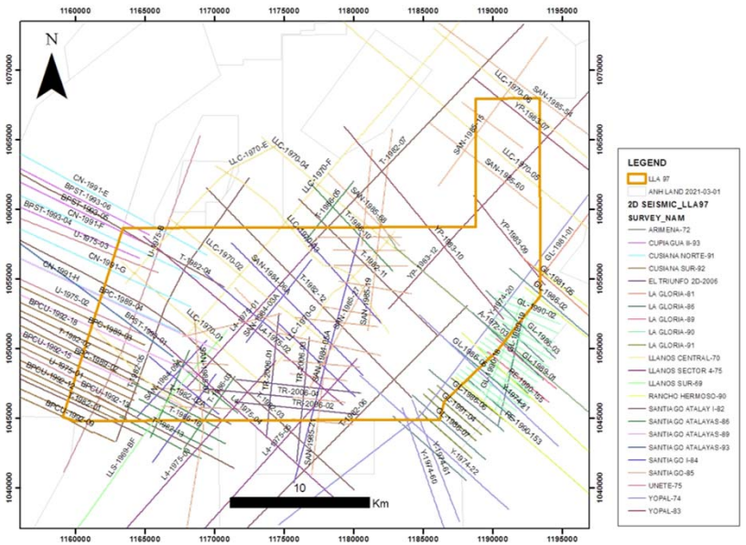


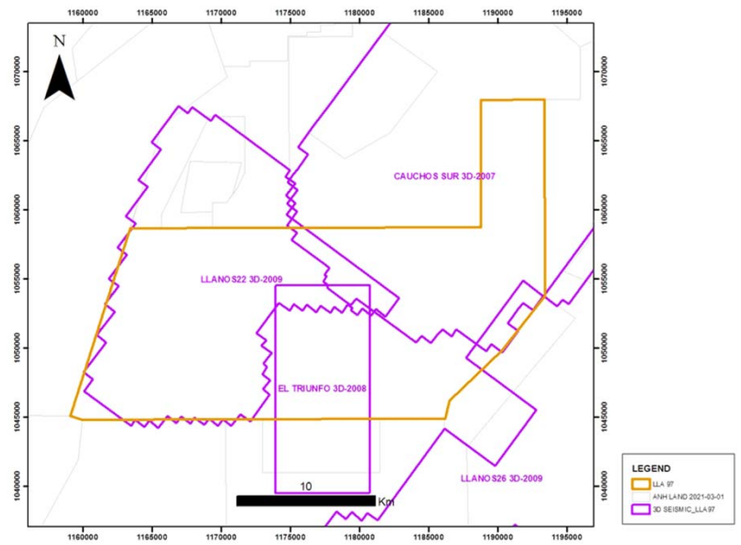
- **Block Area: 89647 Ha**
- **Municipalities: (Casanare)**
  - **Monterrey (60.7%)**
  - **Sabanalarga (16.6%)**
  - **Tauramena (15.9%)**
  - **Villanueva (6.8%)**

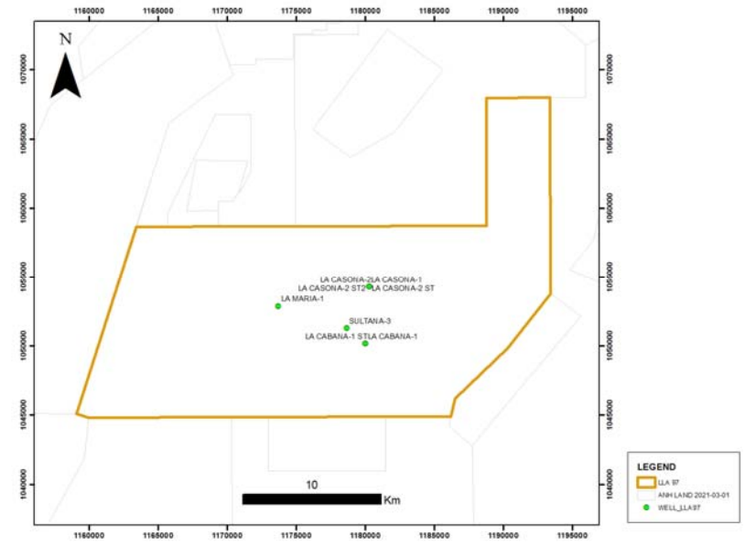


DATABASE

LLA 97 - DATABASE







SURVEY	LINES	TOTAL LENGTH	LENGTH INSIDE
ARIMENA-72	1	20.8	12.0
CUPIAGUA II-93	3	43.2	4.8
CUSIANA NORTE-91	4	72.9	23.3
CUSIANA SUR-92	11	229.9	40.4
EL TRIUNFO 2D-2006	5	45.0	40.7
LA GLORIA-81	2	27.0	2.6
LA GLORIA-86	11	70.4	19.2
LA GLORIA-89	2	11.4	1.1
LA GLORIA-90	19	102.0	27.9
LA GLORIA-91	5	25.4	6.3
LLANOS CENTRAL-70	10	244.3	95.5
LLANOS SECTOR 4-75	5	106.8	54.3
LLANOS SUR-69	1	21.3	8.4
RANCHO HERMOSO-90	4	96.7	5.4
SANTIAGO ATALAY I-82	11	215.4	101.3
SANTIAGO ATALAYAS-86	9	60.0	33.0
SANTIAGO ATALAYAS-89	3	59.5	26.0
SANTIAGO ATALAYAS-93	1	17.5	6.7
SANTIAGO I-84	9	85.7	77.3
SANTIAGO-85	26	196.5	129.0
UNETE-75	4	74.2	24.6
YOPAL-74	5	92.0	27.7
YOPAL-83	4	68.3	34.3
Total general	***155***	***1986.14***	***801.87***

- **23 Seismic Program (155 lines)**
- **Total coverage 801.9 Km**

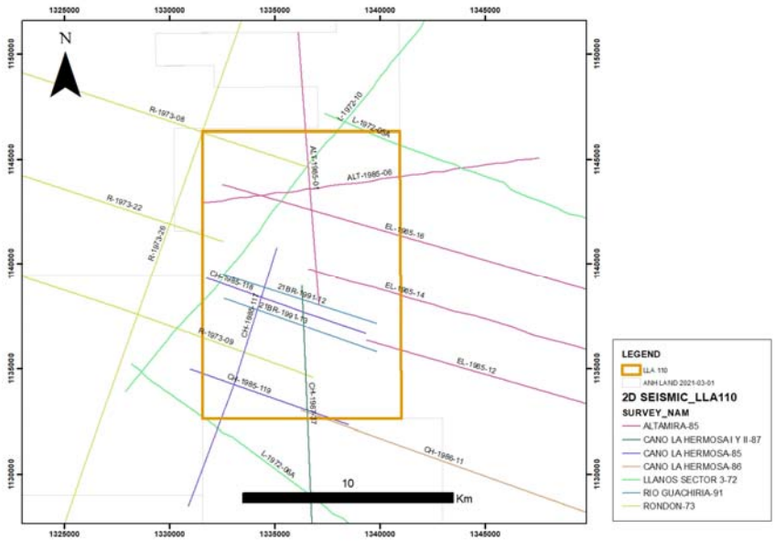
- **4 Seismic Program (394.6 Km²)**
- **Total coverage 87.2%**

PROGRAM	AREA_KM2	AREA_INSIDE (Km2)
LLANOS22 3D-2009	273.39	196.70
EL TRIUNFO 3D-2008	101.78	65.46
LLANOS26 3D-2009	638.94	12.37
CAUCHOS SUR 3D-2007	611.33	157.14

- **6 Wells drilled (2 wells with sidetracks)**

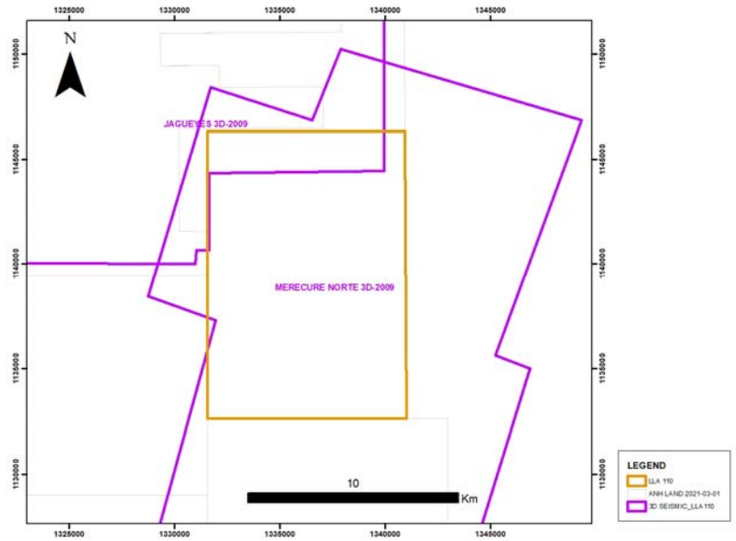
WELL_NAME	SPUD DATE	RTE (ft)	TOTAL DEPTH (ft)
LA CABANA-1	17/04/1984	675	17609
LA MARIA-1	22/04/1985	797	17360
LA CABANA-1 ST	10/12/2002	677	17610
SULTANA-3	30/09/2007	750	15962
LA CASONA-1	04/09/2012	772	16450
LA CASONA-2	30/05/2013	772	14371
LA CASONA-2 ST	05/07/2013	772	16700
LA CASONA-2 ST2	01/11/2013	772	15210

LLA 110 - DATABASE



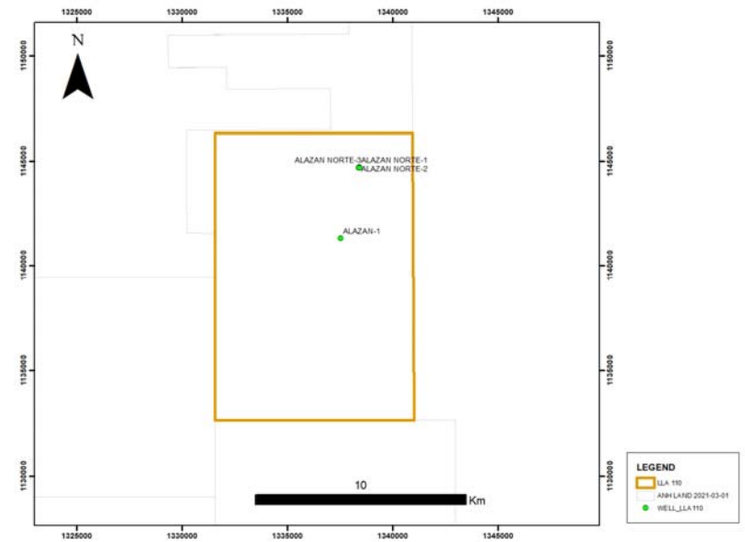
- **7 Seismic Program (19 lines)**
- **Total coverage 103.2 Km**

SURVEY	LINES	TOTAL LENGTH	LENGTH INSIDE
ALTAMIRA-85	5	187.24	32.92
CANO LA HERMOSA I Y II-87	1	15.98	6.35
CANO LA HERMOSA-85	3	29.04	23.07
CANO LA HERMOSA-86	1	16.55	1.20
LLANOS SECTOR 3-72	3	112.59	12.27
RIO GUACHIRIA-91	2	15.38	15.38
RONDON-73	4	243.13	12.03
Total general	***19***	***619.91***	***103.23***



- **2 Seismic Program (125.9 Km²)**
- **Total coverage 99.8%**

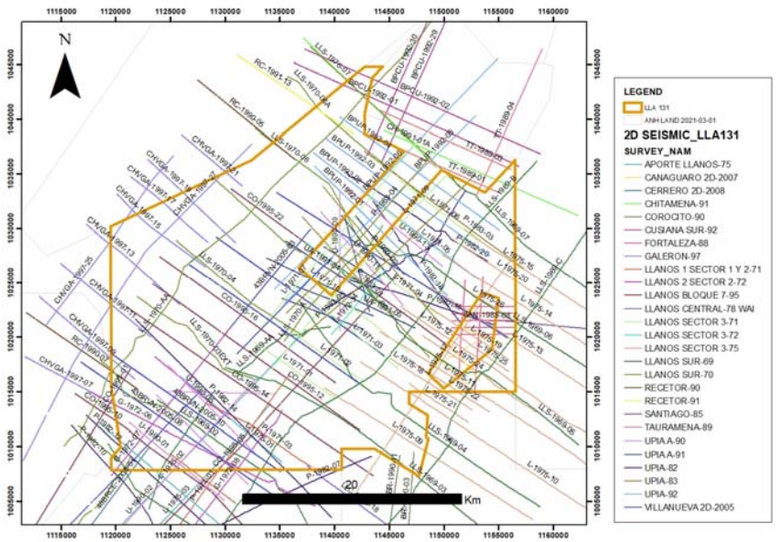
PROGRAM	AREA_KM2	AREA_INSIDE (Km2)
MERECURE NORTE 3D-2009	380.01	128.85
JAGUEYES 3D-2009	331.49	16.64

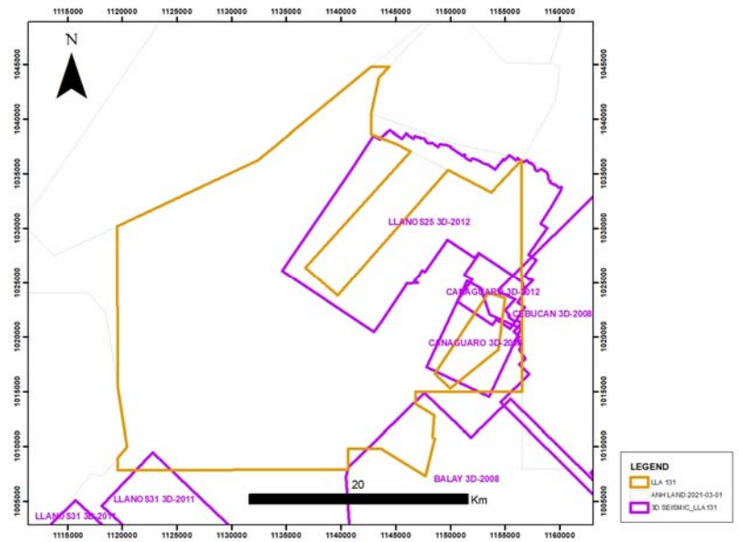


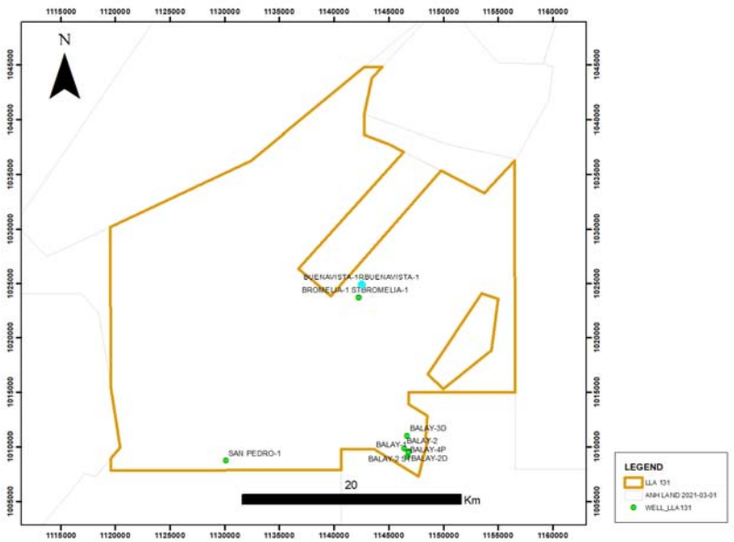
- **4 Wells drilled**

WELL_NAME	UWI	WELL_SPUD_	ROTARY_ELE	TOTAL DEPTH
ALAZAN-1	ALAZ0001	04/03/2012	451	6555
ALAZAN NORTE-1	ALAZ0001N	01/02/2014	451	6555
ALAZAN NORTE-2	ALAZ0002N	31/03/2014	451	7226
ALAZAN NORTE-3	ALAZ0003N	31/03/2014	451	7151

LLA 131 - DATABASE







SURVEY	LINES	TOTAL LENGTH	LENGTH INSIDE
APORTE LLANOS-75	4	81.0	42.2
CANAGUARO 2D-2007	4	20.1	5.3
CERRERO 2D-2008	1	40.5	2.5
CHITAMENA-91	2	36.5	4.4
COROCITO-90	2	32.8	2.7
CUSIANA SUR-92	4	115.4	7.9
FORTALEZA-88	7	49.9	23.0
GALERON-97	10	137.9	57.9
LLANOS 1 SECTOR 1 Y 2-71	3	56.5	24.7
LLANOS 2 SECTOR 2-72	4	68.1	45.8
LLANOS BLOQUE 7-95	7	209.5	121.2
LLANOS CENTRAL-78 WAI	1	10.0	0.6
LLANOS SECTOR 3-71	9	125.6	94.5
LLANOS SECTOR 3-72	2	16.3	12.4
LLANOS SECTOR 3-75	16	266.3	102.2
LLANOS SUR-69	11	332.4	150.2
LLANOS SUR-70	10	220.5	115.5
RECETOR-90	2	28.0	5.6
RECETOR-91	1	13.0	4.3
SANTIAGO-85	1	11.1	1.8
TAURAMENA-89	3	41.1	2.8
UPIA A-90	8	103.0	71.8
UPIA A-91	8	73.3	52.0
UPIA-82	9	144.6	78.3
UPIA-83	5	93.8	64.4
UPIA-92	6	126.7	69.8
VILLANUEVA 2D-2005	8	156.9	120.0
Total general	***148***	***2610.76***	***1283.43***

- **27 Seismic Program (148 lines)**
- **Total coverage 1283.4 Km**

- **4 Seismic Program (218.8 Km²)**
- **Total coverage 24.4%**

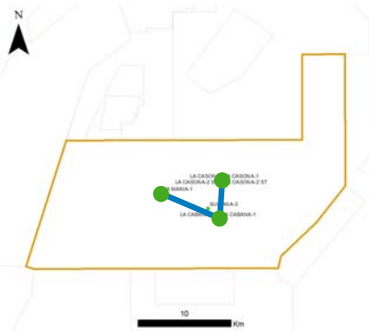
PROGRAM	AREA_KM2	AREA_INSIDE (Km2)
LLANOS25 3D-2012	250.29	151.96
CANAGUARO 3D-2008	47.44	26.08
BALAY 3D-2008	450.91	21.07
CANAGUARO 3D-2012	25.34	19.95
CEBUCAN 3D-2008	381.67	7.06
LLANOS31 3D-2011	246.23	2.47

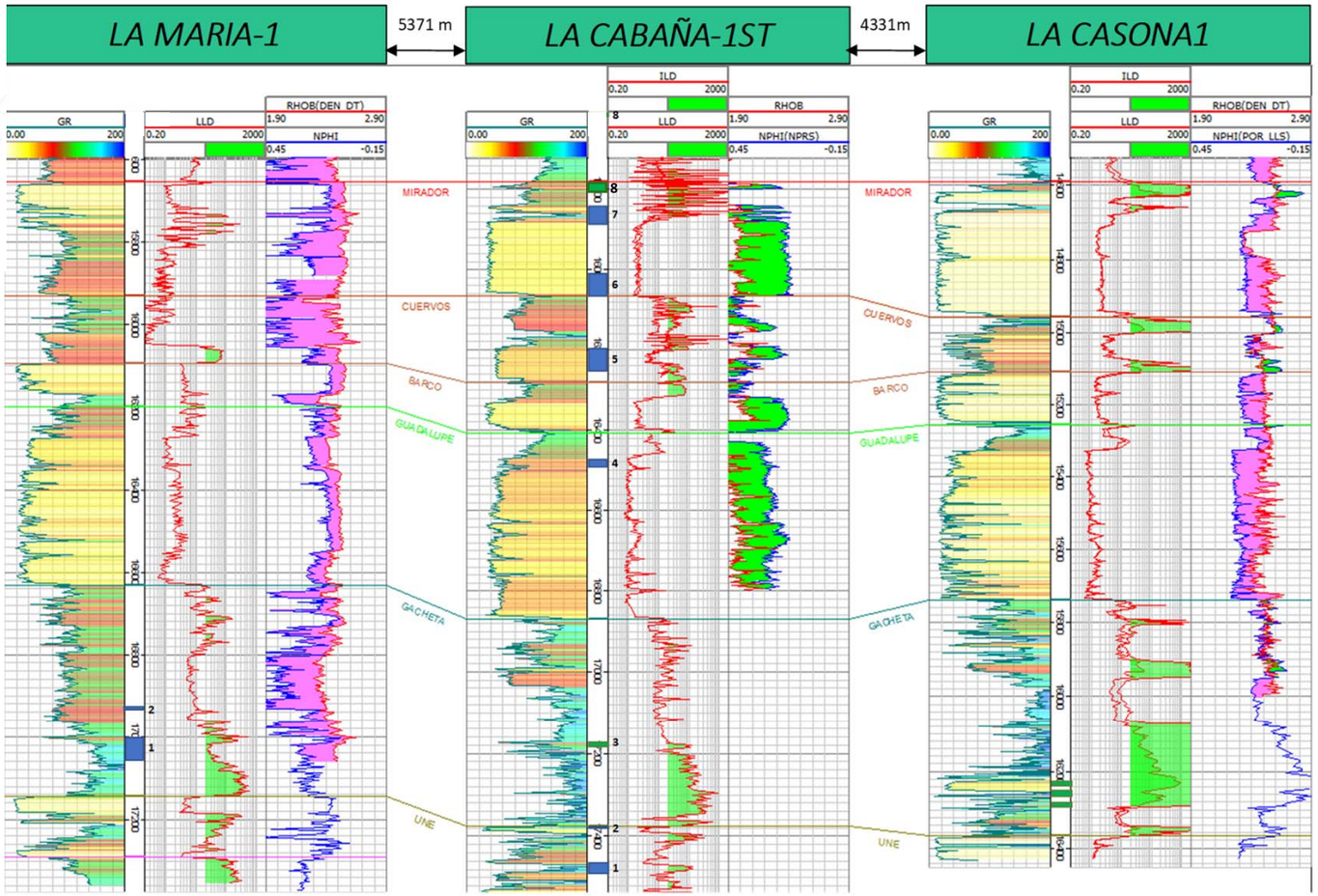
- **7 Wells drilled (4 wells with sidetracks)**

WELL_NAME	SPUD DATE	RTE (ft)	TOTAL DEPTH (ft)
BALAY-1	28/11/2009	669	15263
BALAY-2 ST	27/09/2010	669	15312
BALAY-2D	27/09/2010	669	11383
BALAY-2D ST	27/09/2010	669	15380
BALAY-3D	08/09/2011	673	14610
BALAY-4P	16/10/2012	670	15230
BROMELIA-1	18/08/2011	934	16919
BROMELIA-1 ST	18/08/2011	934	18550
BUENAVISTA-1	23/02/1973	894	13896
BUENAVISTA-1R	22/12/1981	894	15243
BUENAVISTA-1R ST1	17/03/1982	894	15243
BUENAVISTA-1R ST2	10/06/1982	894	14982
SAN PEDRO-1	16/03/1971	1314	13826

SUMMARY WELLS

LLA 97 - WELL SUMMARY





Well correlation (Datum Mirador)

LA MARIA-1

Interval	Fm	Test	Observations
15420' - 15700'	MIRADOR	DST 1 (OH)	7.6bls of mud
15420' - 15700'	MIRADOR	DST 1A (OH)	83.5 bls of oil stained mud and 61.6 bls of salt water
16994' - 17060'	GACHETA	DST 1	81.2 bls of water 6000 ppm Cl
16927' - 16938'	GACHETA	DST 2	81.2 bls of water 4200-15500 ppm Cl
15660' - 15685'	MIRADOR	DST 3	1740 bls of water 21200ppm Cl
15556' - 15570'	MIRADOR	DST 4	58 bls of formation water 21000ppm Cl
15556' - 15570'	MIRADOR	DST 4A	607 bls of formation water 21000ppm Cl

LA CABAÑA-1 ST

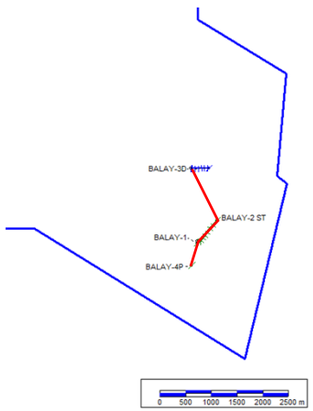
Interval	Fm	Test	Observations
17470' - 17491'	GUADALUPE	DST #1B	79 B salt water
17373' - 17383'	GUADALUPE	DST #2A	80 B saltwater 27,300 ppm Cl
17163' - 17171'	GUADALUPE	DST 3C	338 BOPD AND 1,000 RGA
16467' - 16479'	GUADALUPE	DST #4	Dry
16198' - 16227'	MIRADOR	DST #5	55 B salt water 12,000 - 15,000 ppm Cl
16116' - 16152'	MIRADOR	DST #6	Dry
15841' - 15849' 15855' - 15859' 15870' - 15875'	MIRADOR	DST #7	Sparkling salt water flowed
15786' - 15798'	MIRADOR	DST #8	Initial: 736 BOPD, 296 BWPD, 5441 RGA, 3,600 ppm Cl
15786' - 15798'	MIRADOR	DST #8A	Final: 84 BOPD, 510 BWPD, 18,500 RGA
15770' - 15780'	MIRADOR	DST #9	Inconclusive evidence

LA CASONA-1

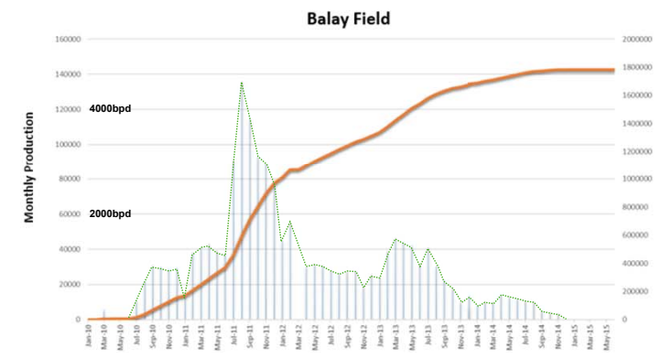
Fecha	FM	Intervalo Cañoneado	Horas Prueba	Fluido (bls)	Petroleo (bls)	API	Agua (bls)	BSW (%)
10-12 de Nov 2012	Une	16282'-16289', 16254'-16270', 16234-16242'	37	1168.64	1162.03	34.92	6.61	0.56
14 de Nov de 2012	Une	16282'-16289'	11	750.9	565.8	34.9	185.13	24.65

LLA 131 - WELL SUMMARY

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



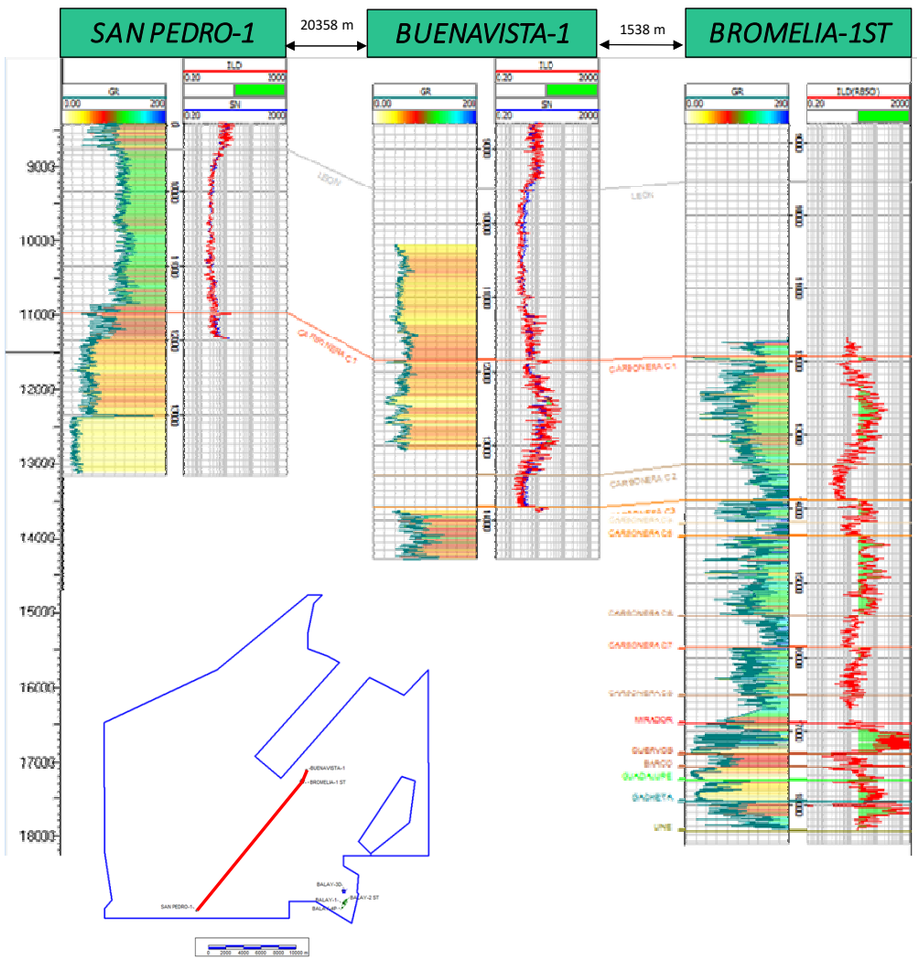
WELL	UNIT	TOP	BASE	BFPD	BOPD	BSW	API
BALAY-1	Une	14835	14870	719	629	13%	36
	Mirador	13700	13720	4358		100%	28
BALAY-2	Une	15162	15182	water 20860 Cl-	0	100%	-
		15105	15113	Dry	-	-	-
	Gacheta	14720	14750	Water 4328 Cl-	-	100%	-
	Cuervos	14337	14347	Water 4484 Cl-	83	16%	10
	Mirador	14015	14025	Water 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				

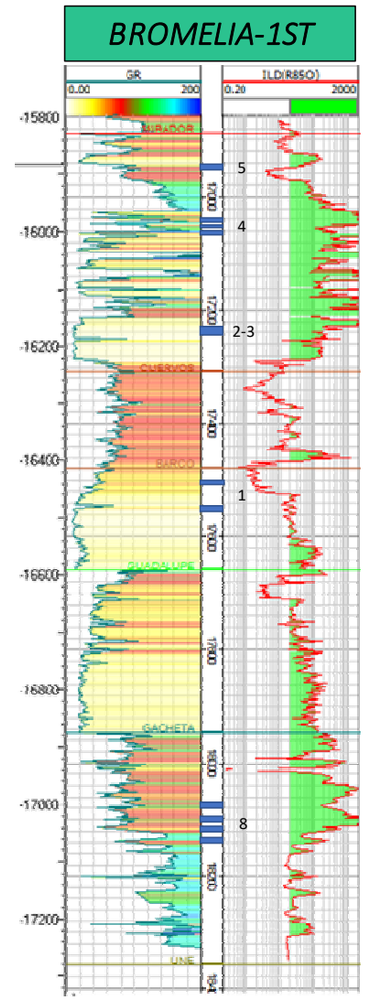


- The BALAY field was discovered by PETROBRAS in February 2010, with the exploratory well BALAY-1 (15261' TVD)
- Production started in February 2010 and ended in June 2015 with 150 BOPD production (Operated by Perenco, after the departure of Petrobras).
- Total production reported 1.800.000 Barrels

LLA 131 - WELL SUMMARY

San Pedro-1, Buenavista-1 & Bromelia-1ST



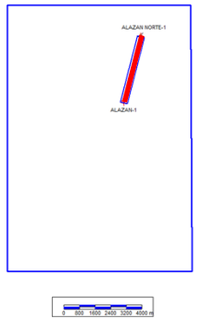


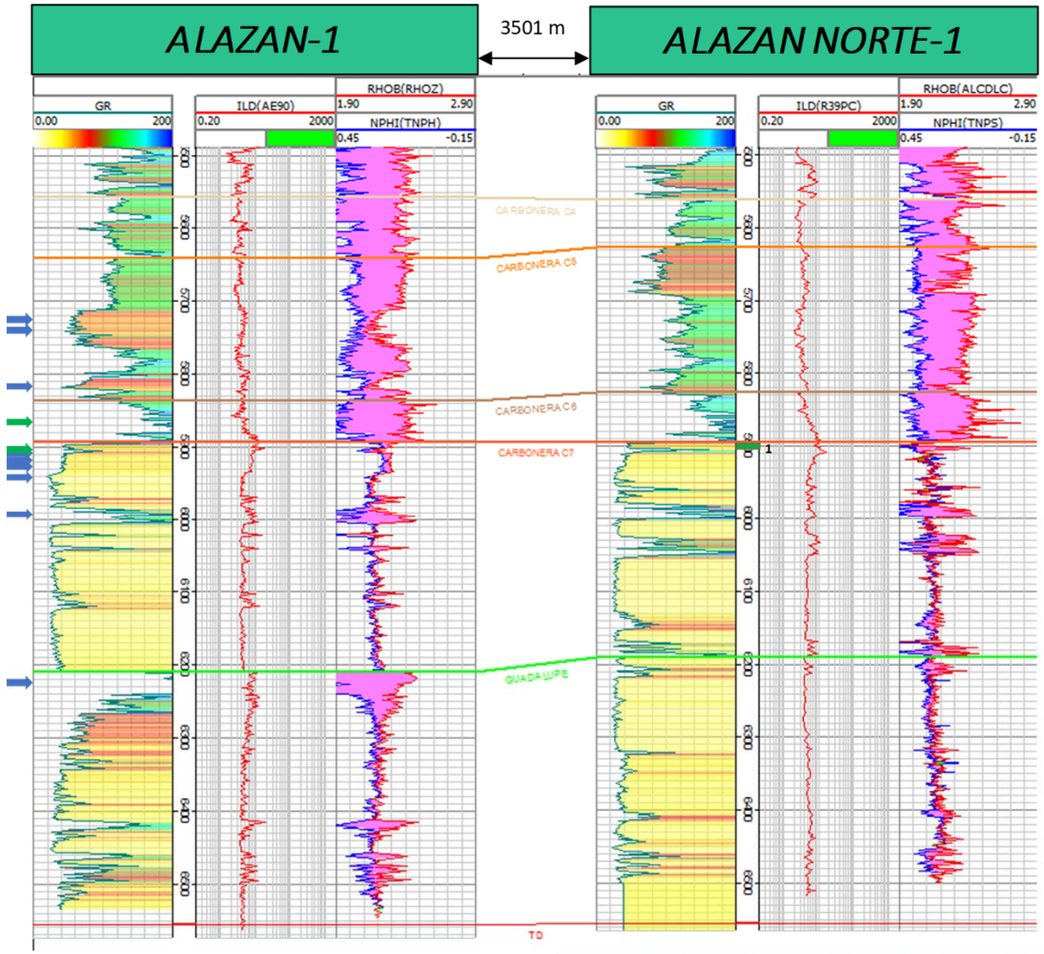
Bromelia-1 ST Test Summary

Unit	Interval	Test	Production System	Total Fluid	Water	Oil Neto	Brine	Qgas	BS&W	Cloride
BARCO	17500' -17510' 17544' -17554'	1	STIMULATION WITH N2 INJECTION	609,46 Bbl	609,46 Bbl	0,00 Bbl		0 MSCFD	100,00%	
LOWER MIRADOR	17232' -17244'	2	STIMULATION WITH N2 INJECTION	74,64 Bbl	74,64 Bbl	0,00 Bbl		0 MSCFD	100,00%	
LOWER MIRADOR	17232' -17244'	3	STIMULATION WITH N2 INJECTION	1170,24 Bbl	1170,24 Bbl	0,00 Bbl		0 MSCFD	100,00%	
UPPER MIRADOR	17043' - 17050' 17054' - 17058' 17064' - 17068'	4	STIMULATION WITH N2 INJECTION	325,73 Bbl	69,29 Bbl	0,00 Bbl	256,44 Bbl	0 MSCFD	100,00%	8979.0 ppm
CARBONERA C8	16947' - 16957'	5	STIMULATION WITH N2 INJECTION	1395,5 Bbl	1265,5 Bbl	0,00 Bbl	130 Bbl	0 MSCFD	100,00%	14100 ppm
UNE	18387' - 18397' 18402´- 18417´ 18434´- 18441´	6	NATURAL FLOW	337,7 Bbl	285,7 Bbl	0,00 Bbl	52 Bbl	0 MSCFD	100,0%	1564 ppm
UNE	18354´ - 18369´ 18365´ - 18380´ 18387' - 18397' 18402´- 18417´ 18434´- 18441´	7	NATURAL FLOW	515,72 Bbl	350,82 Bbl	0,00 Bbl	164.90 Bbl + 24,87* Bbl	0 MSCFD	100,0%	1355 ppm
GACHETA	18067´- 18082´ 18094´ - 18109´ 18109' - 18124' 18127´- 18142´	8	STIMULATION WITH N2 INJECTION	222,37 Bbl	220,26 Bbl	2,15 Bbl	256 Bbl	0 MSCFD	99,87%	730 ppm

Bromelia-1ST only showed any manifestation of oil in the Gacheta Interval during tests.

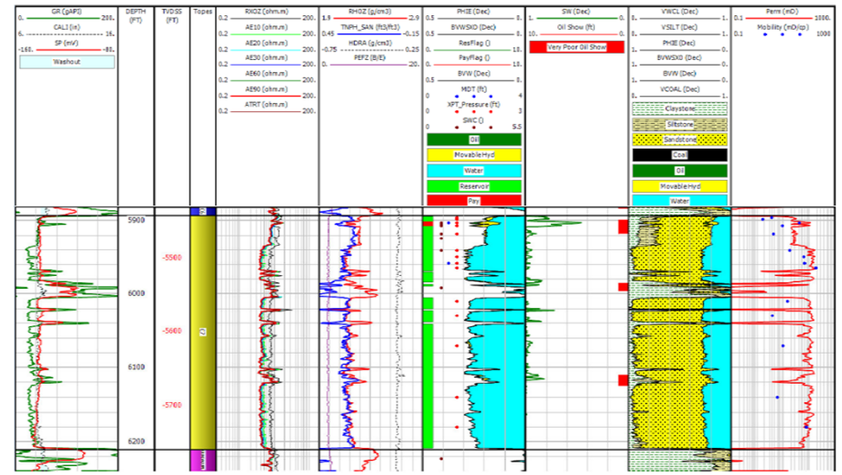
LLA 110 - WELL SUMMARY





Interval	Unit	BOPD	BWPD	API	BSW	Observation
5893-5902	C7	68	25	22.2°	27%	Formation Water (1151ppm Cl)

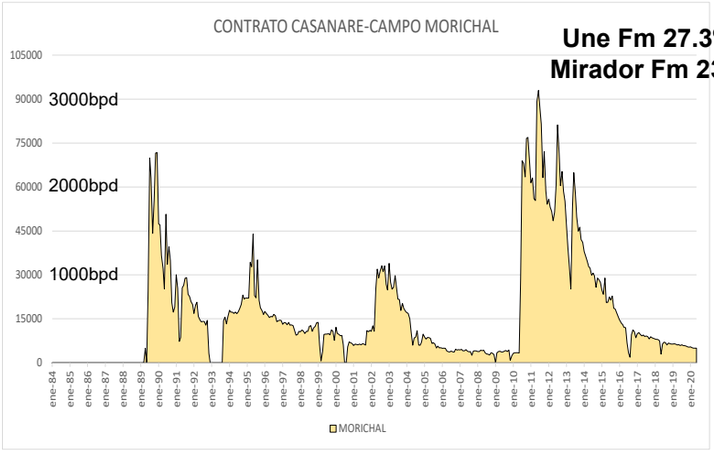
ALAZAN-1



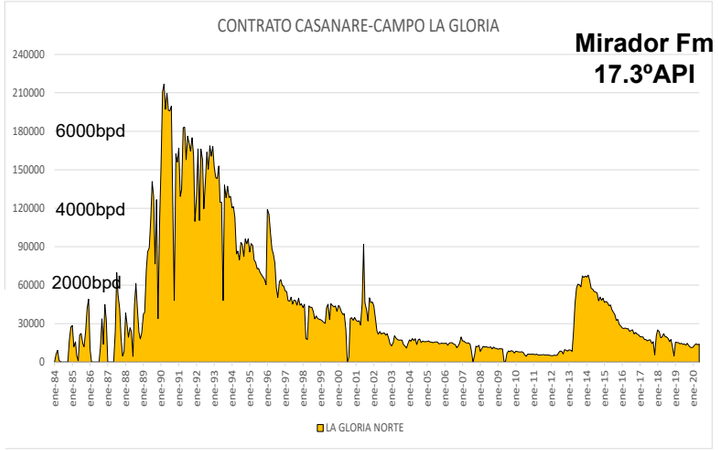
Petrophysical analysis concluded that all the prospective intervals were water bearing; the well was plugged and abandoned.

ANALOG OIL FIELDS

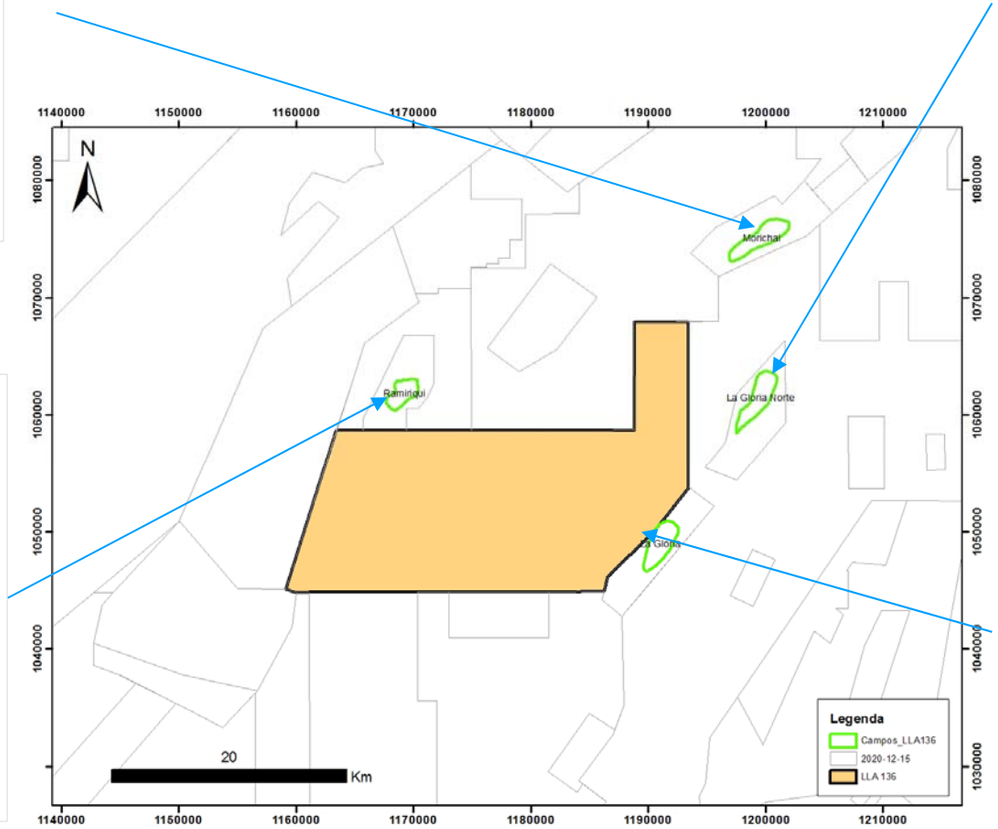
LLA 97 – ANALOGIC OILFIELDS

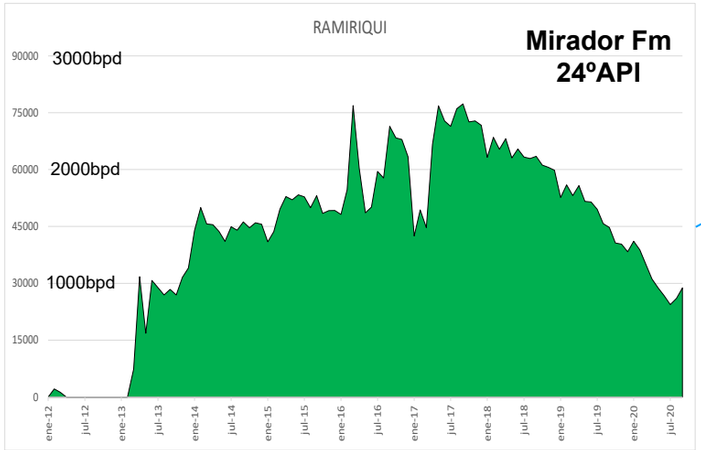


Acummulated Production 7.1 MM

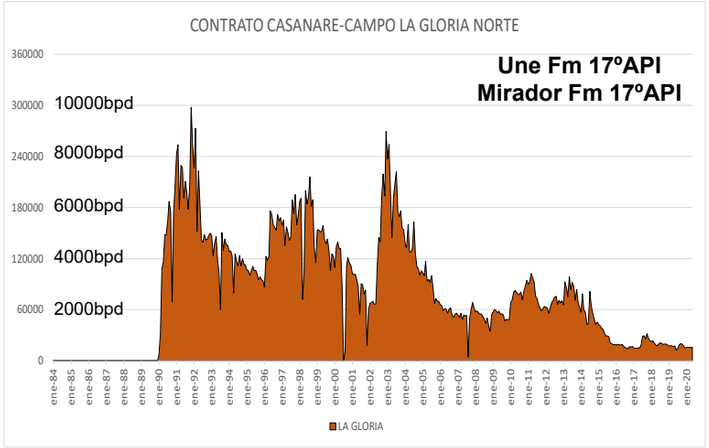


Acummulated Production 19 MM



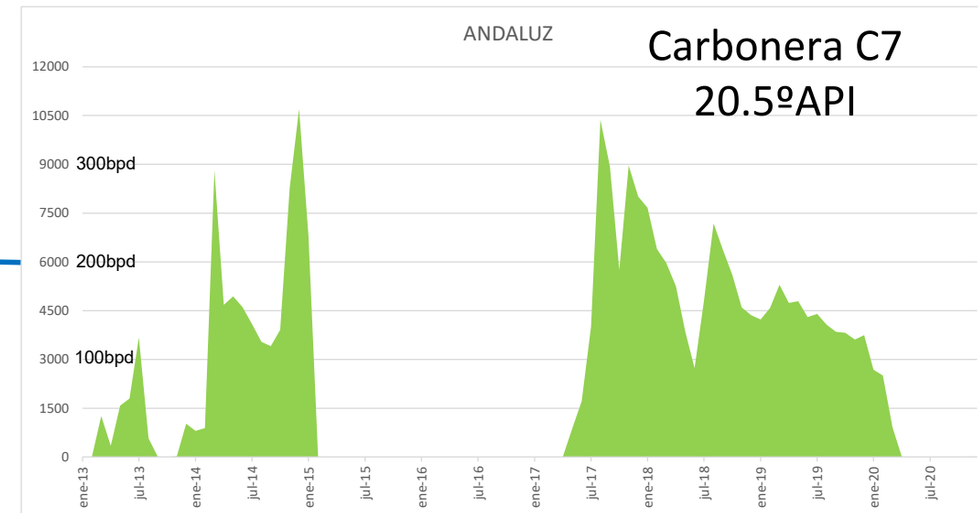


Acummulated Production 4.6 MM



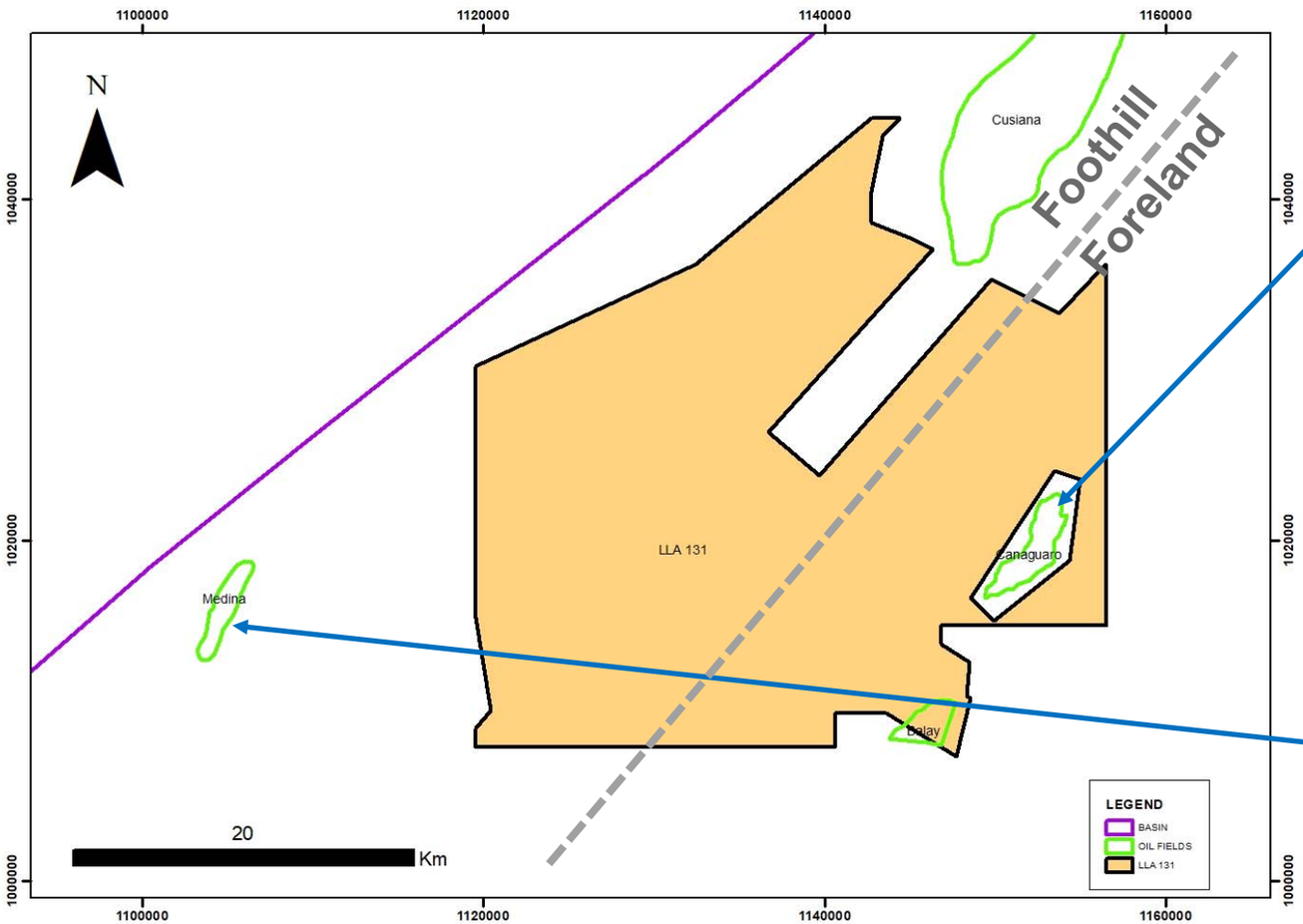
Acummulated Production 34.6 MM

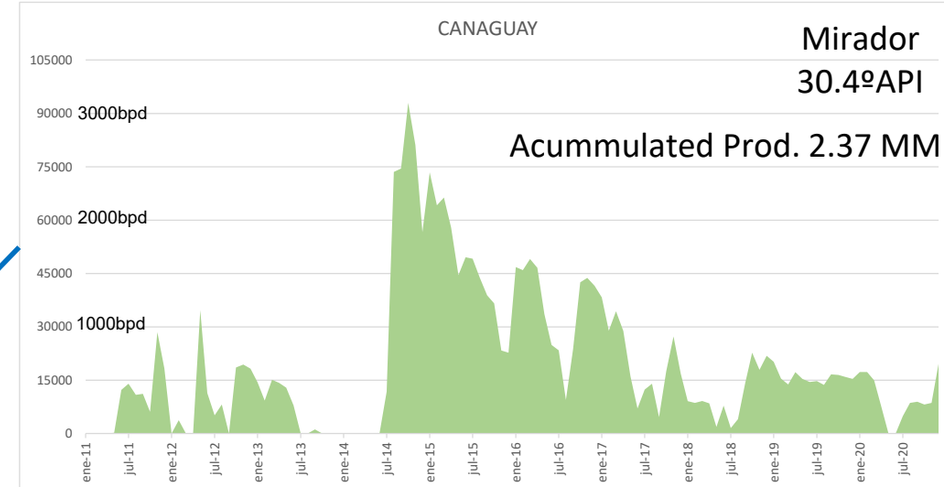
LLA 110 – ANALOGIC OILFIELDS

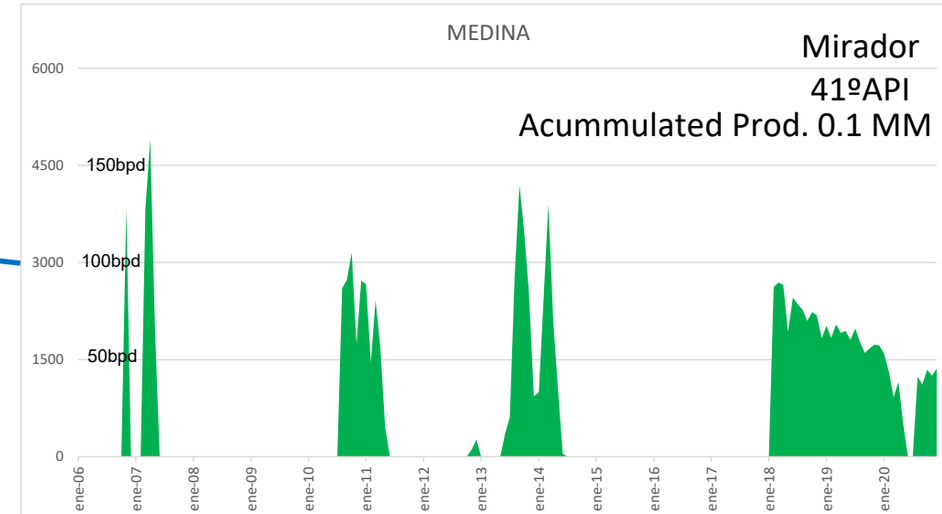


Acummulated Prod. 0.246 MM

LLA 131 – ANALOGIC OILFIELDS





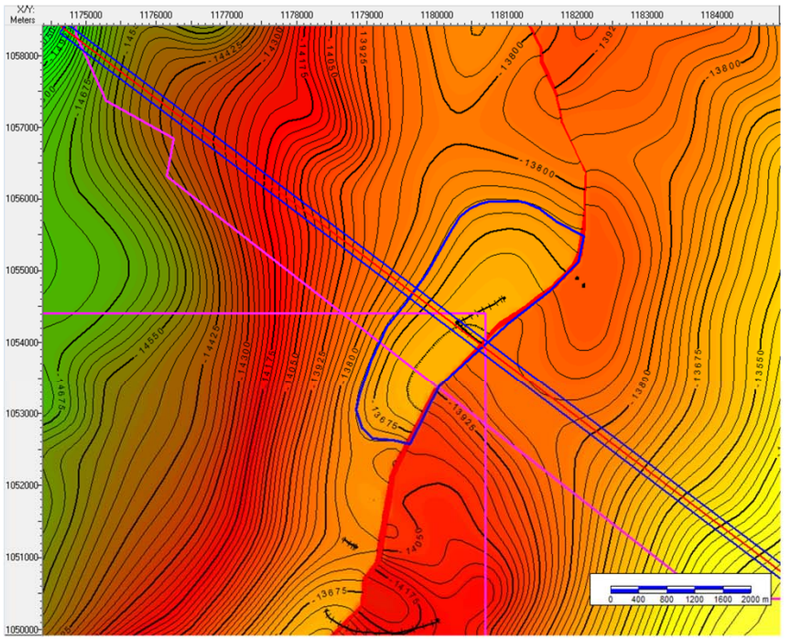


SEISMIC INTERPRETATION

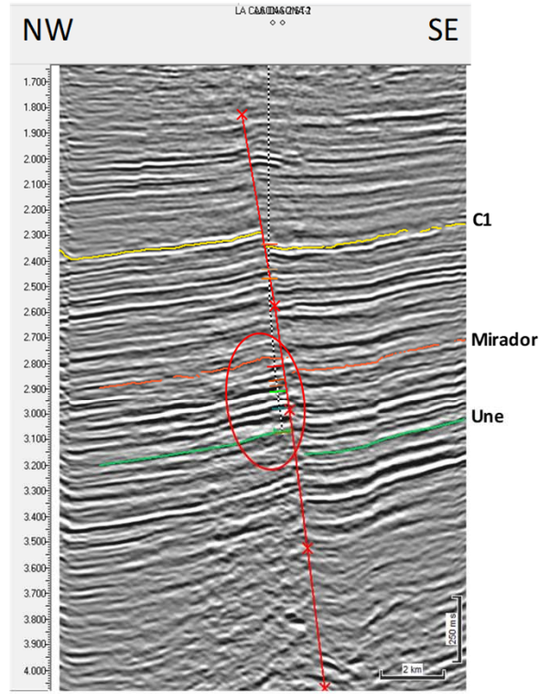
LLA 97 AREA

LLA 97 – SEISMIC INTERPRETATION

La Casona Lead

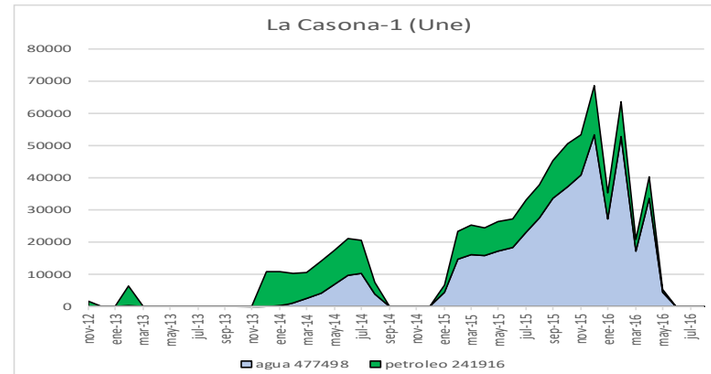


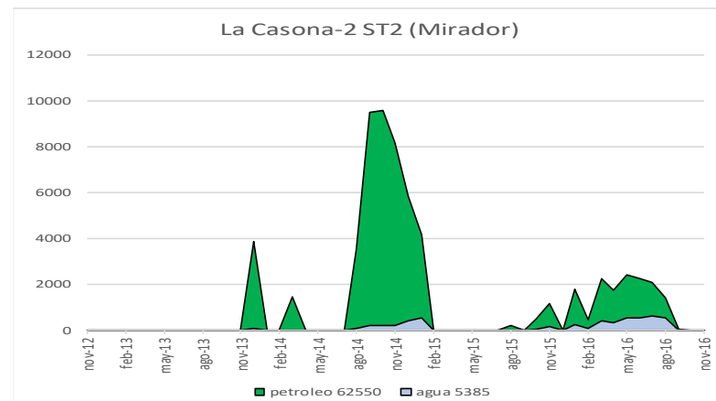
STRUCTURAL MAP IN DEPTH (TVDss)
MIRADOR TOP



DIP LINE
CAUCHOS SUR 3D-2007(IL 2060)

The structure is an anticline against to normal antithetic fault. 2 well was drilled in the area, but mechanicals issues may generate to close the prospect.



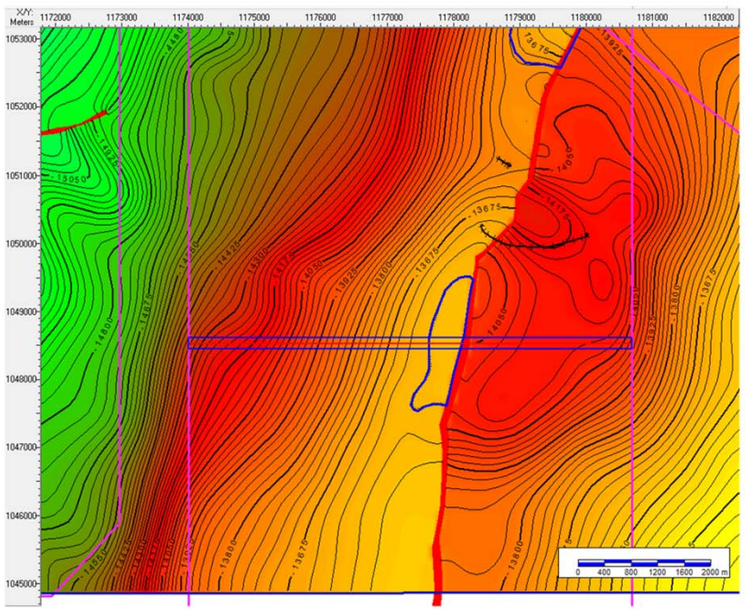


Extended Test Results

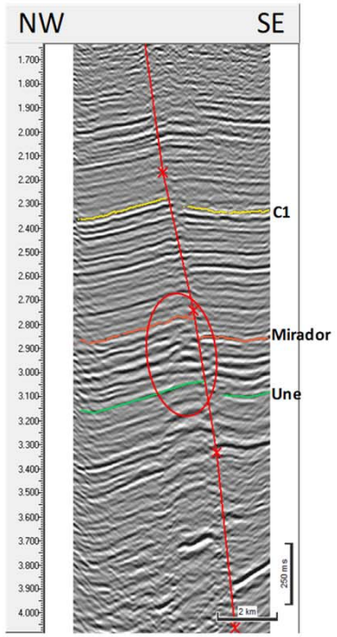
WELL	UNIT	OIL	WATER	PROD DAYS
LA CASONA-1	UNE	241916	477498	687
LA CASONA-1	GACHETA	4322	669	6
LA CASONA 2 ST	MIRADOR	62550	5385	400

LLA 97 – SEISMIC INTERPRETATION

La Cabaña Sur Lead

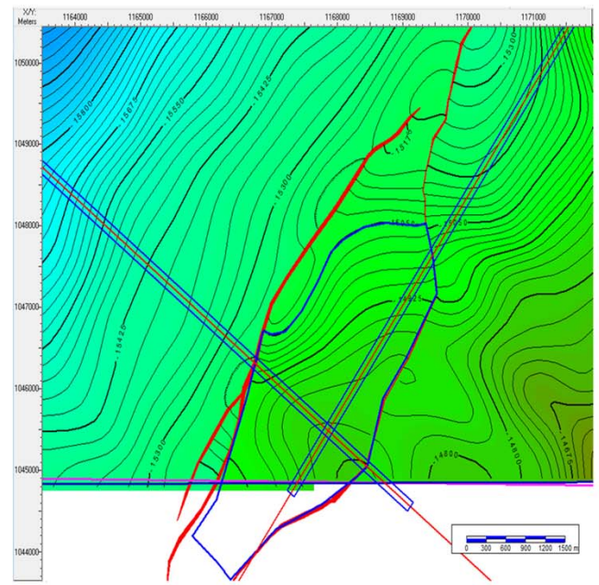


STRUCTURAL MAP IN DEPTH (TVDss)
MIRADOR TOP

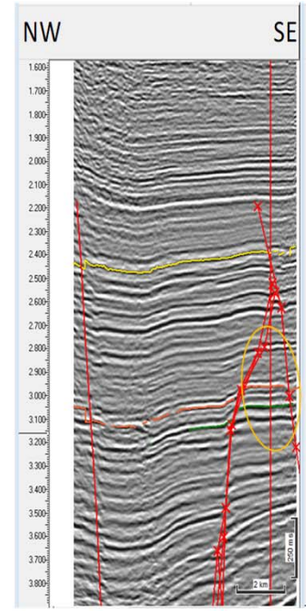


DIP LINE
EL TRIUNFO 3D-2008 (IL 250)

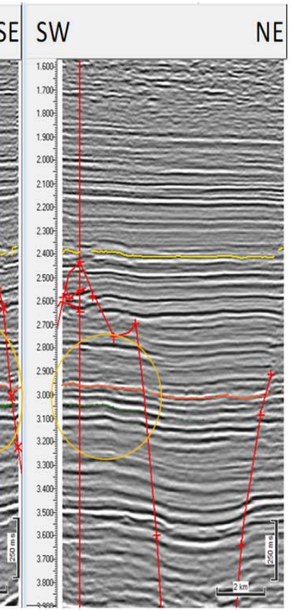
La Maria Sur Lead



STRUCTURAL MAP IN DEPTH (TVDss)
MIRADOR TOP



DIP LINE
LLANOS22 3D-2009(IL 1740)

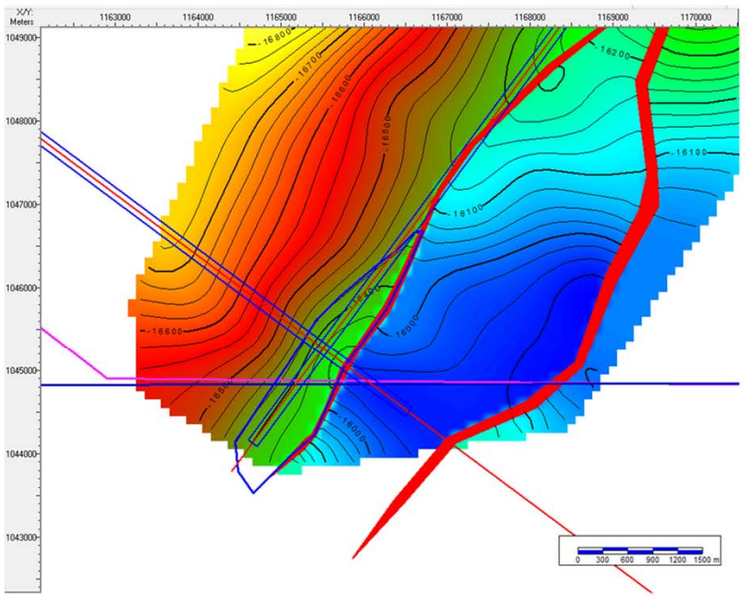


STRIKE LINE
LLANOS22 3D-2009(IL 10240)

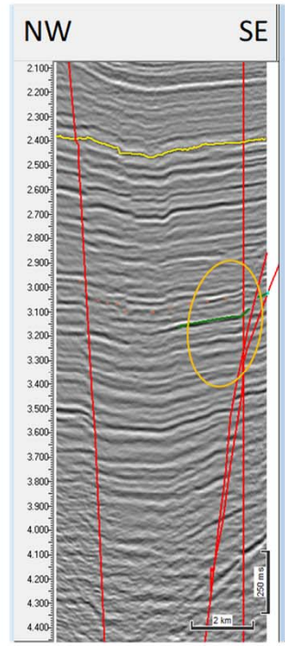
The structure is an anticline against to normal antithetic fault
Main Target Mirador Fm.
Secondary Target Une Fm.

LLA 97 – SEISMIC INTERPRETATION

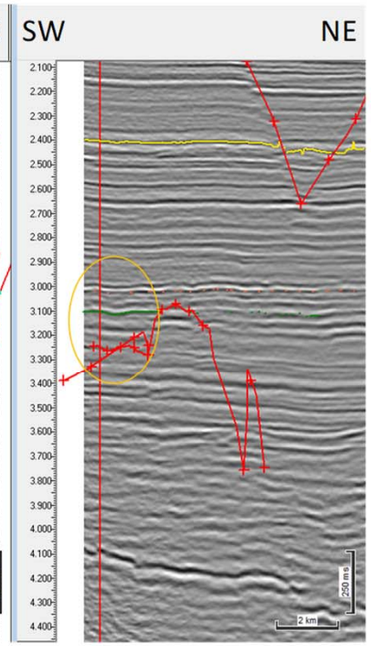
La Maria Sur Lead (Synthetic)



STRUCTURAL MAP IN DEPTH (TVDss)
GACHETA TOP



DIP LINE
LLANOS22 3D-2009(IL 1705)



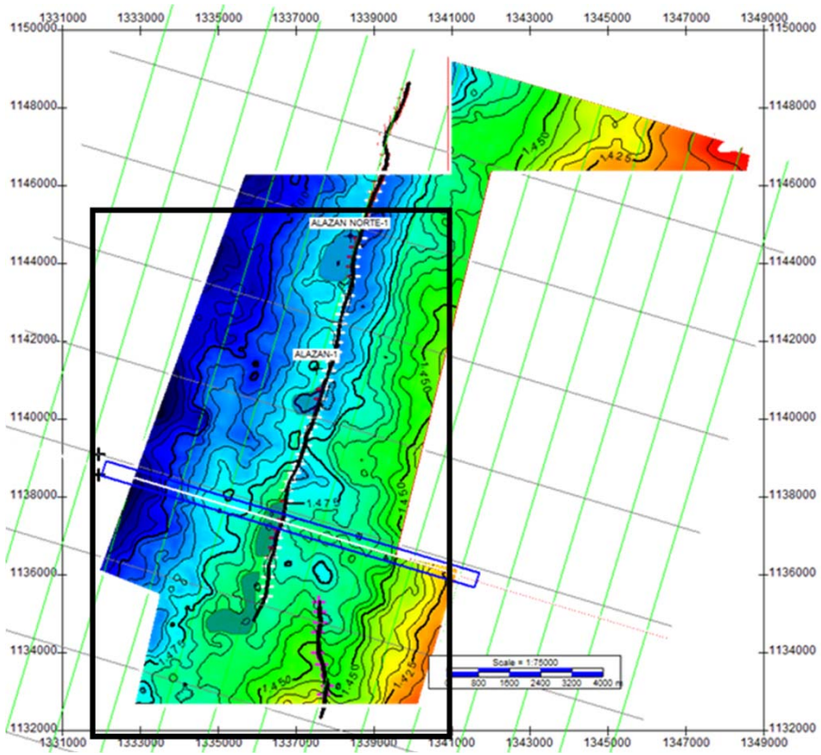
STRIKE LINE
LLANOS22 3D-2009(IL 10180)

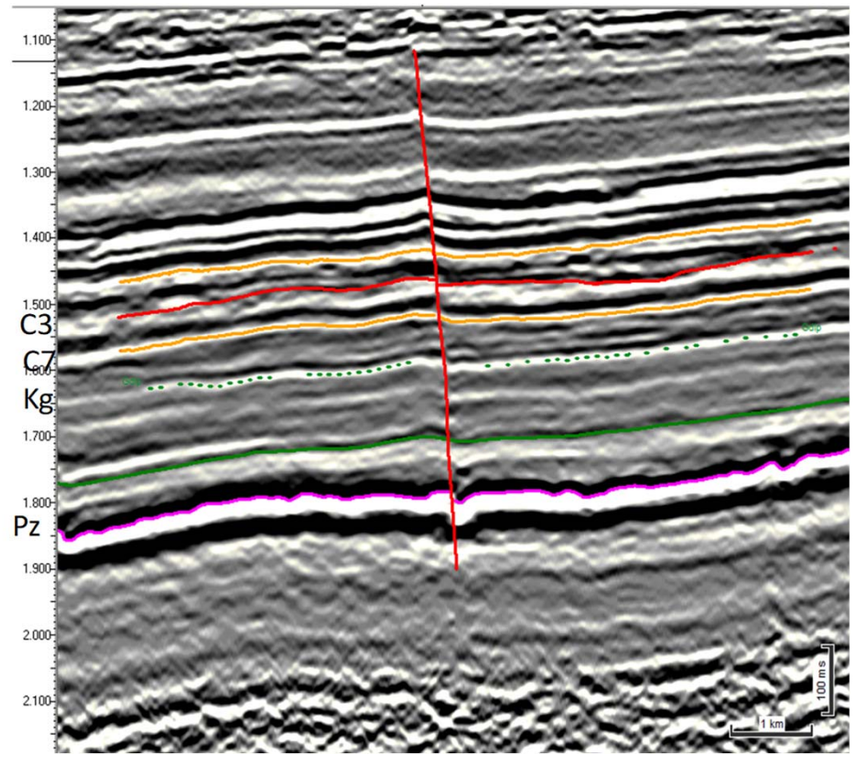
The structure is an anticline against to normal Synthetic fault
Main Target Gacheta Fm..

LLA 110 AREA

LLA 110 – SEISMIC INTERPRETATION

Alazan Sur Lead



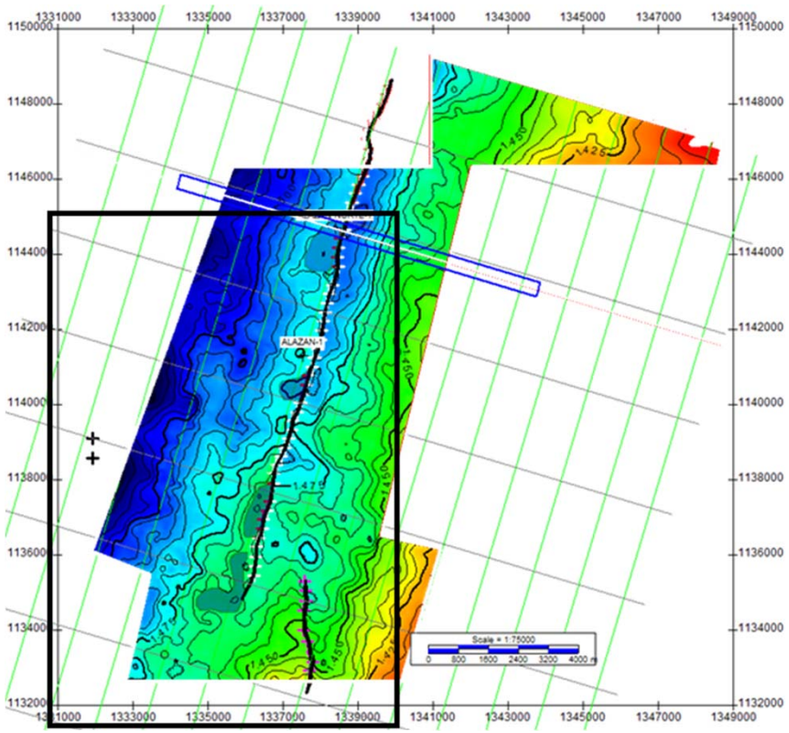


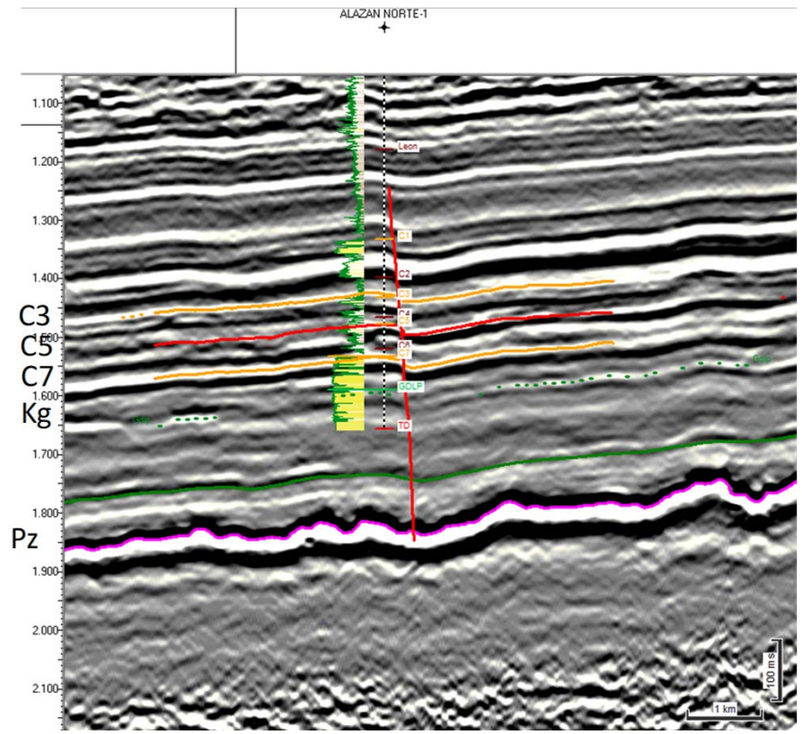
Dip Line (Northern section IL 345 Merecure Norte 3D 2009)

The structure is an anticline against to normal antithetic fault
Main Target Carbonera Fm C7 level.
Secondary Target Carbonera Fm C5 level.

LLA 110 – SEISMIC INTERPRETATION

Alazan Norte Lead





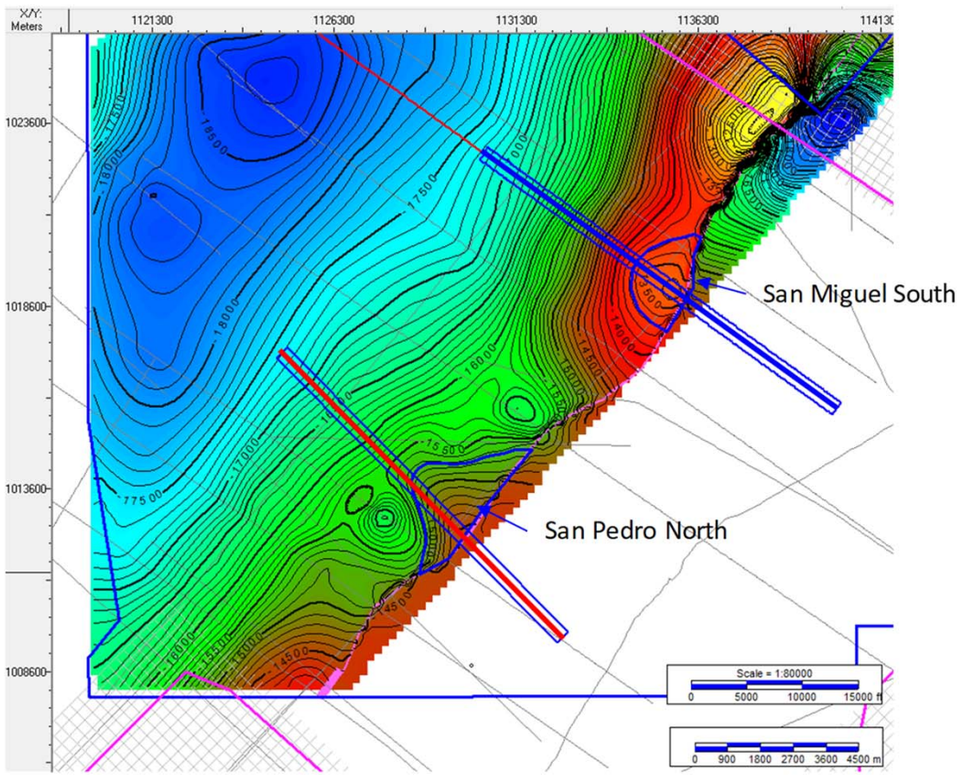
Dip Line (Northern section IL 495 Merecure Norte 3D 2009)

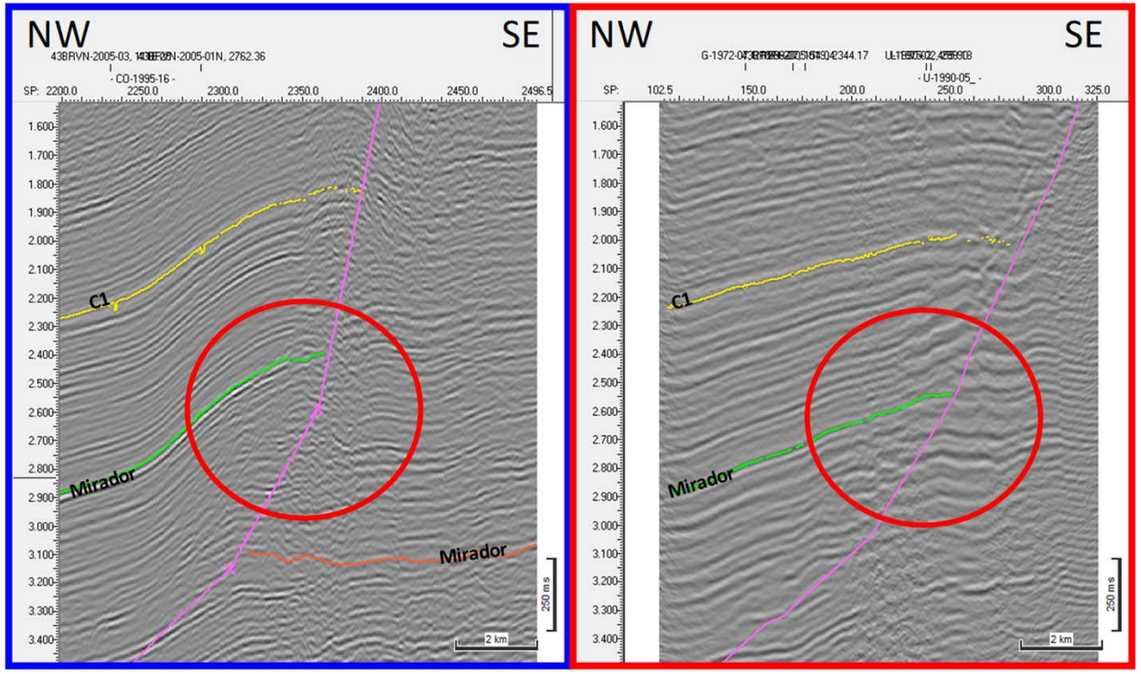
The structure is an anticline against to normal antithetic fault
Main Target Carbonera Fm C7 level.
Secondary Target Carbonera Fm C5 level.

LLA 131 AREA

LLA 131 – SEISMIC INTERPRETATION

Leads associated to Foothill





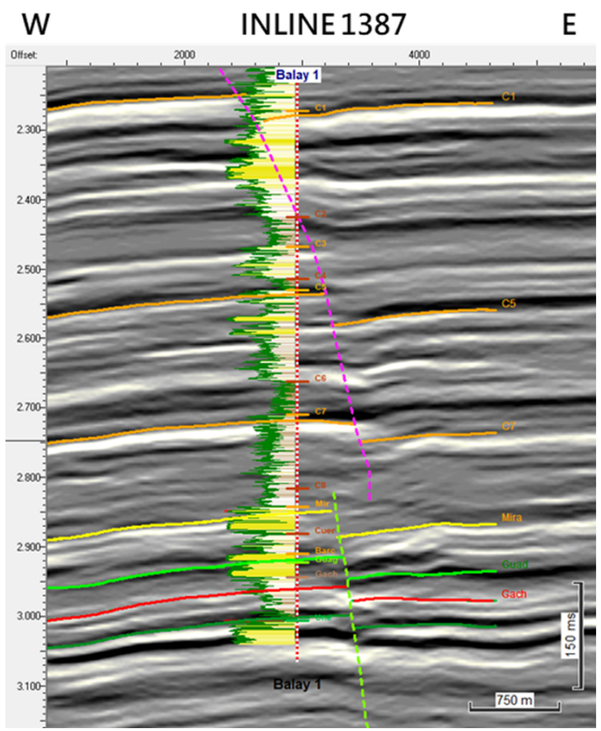
Dip Line CO-1995-16

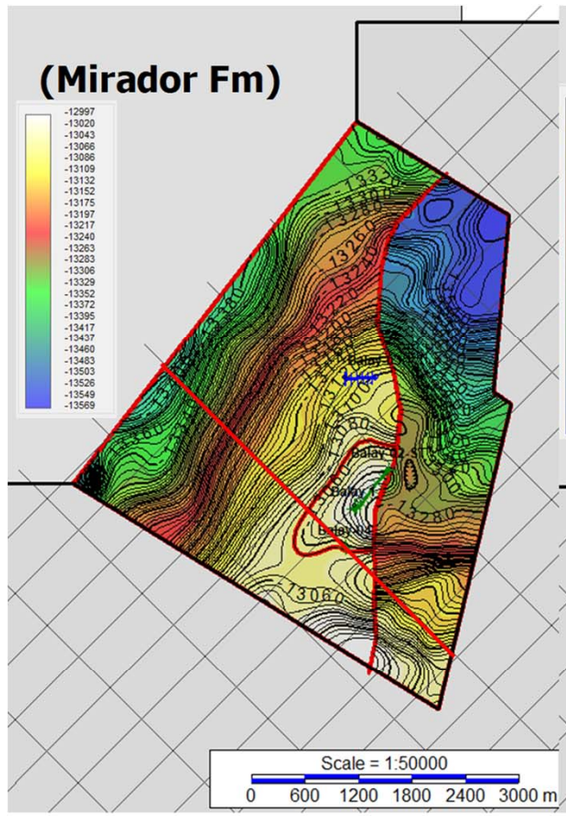
Dip Line U-1990-05

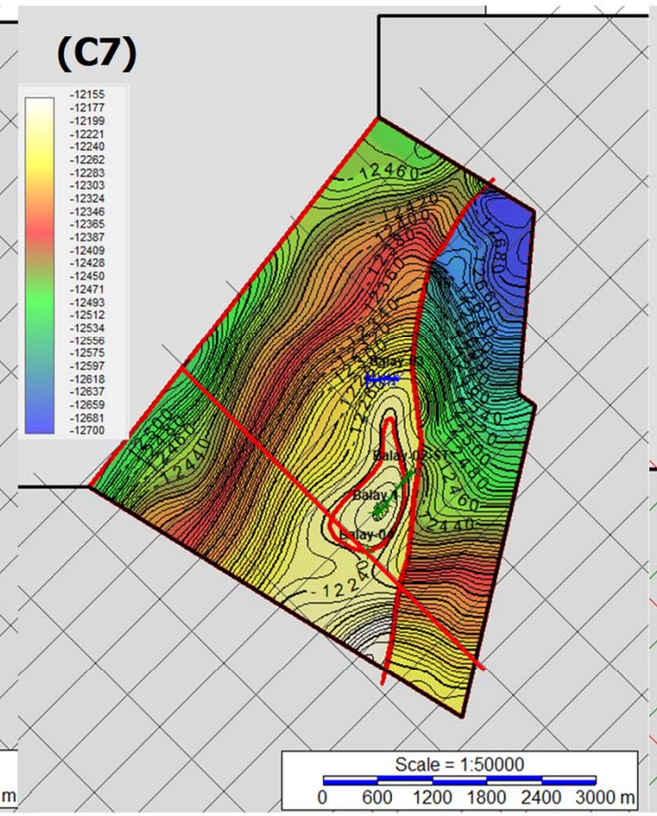
Anticline close on 3 ways against Inverse Fault (San Miguel Fault)

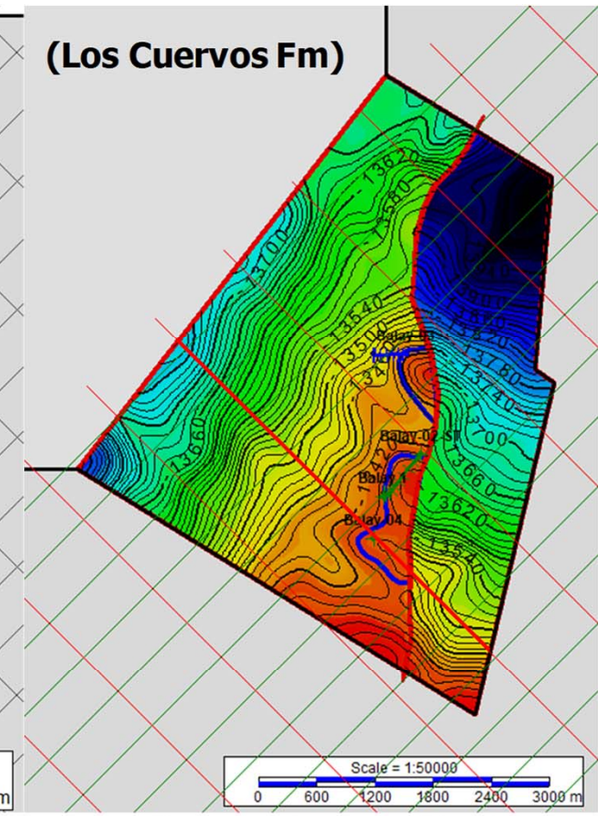
LLA 131 – SEISMIC INTERPRETATION

Balay Lead







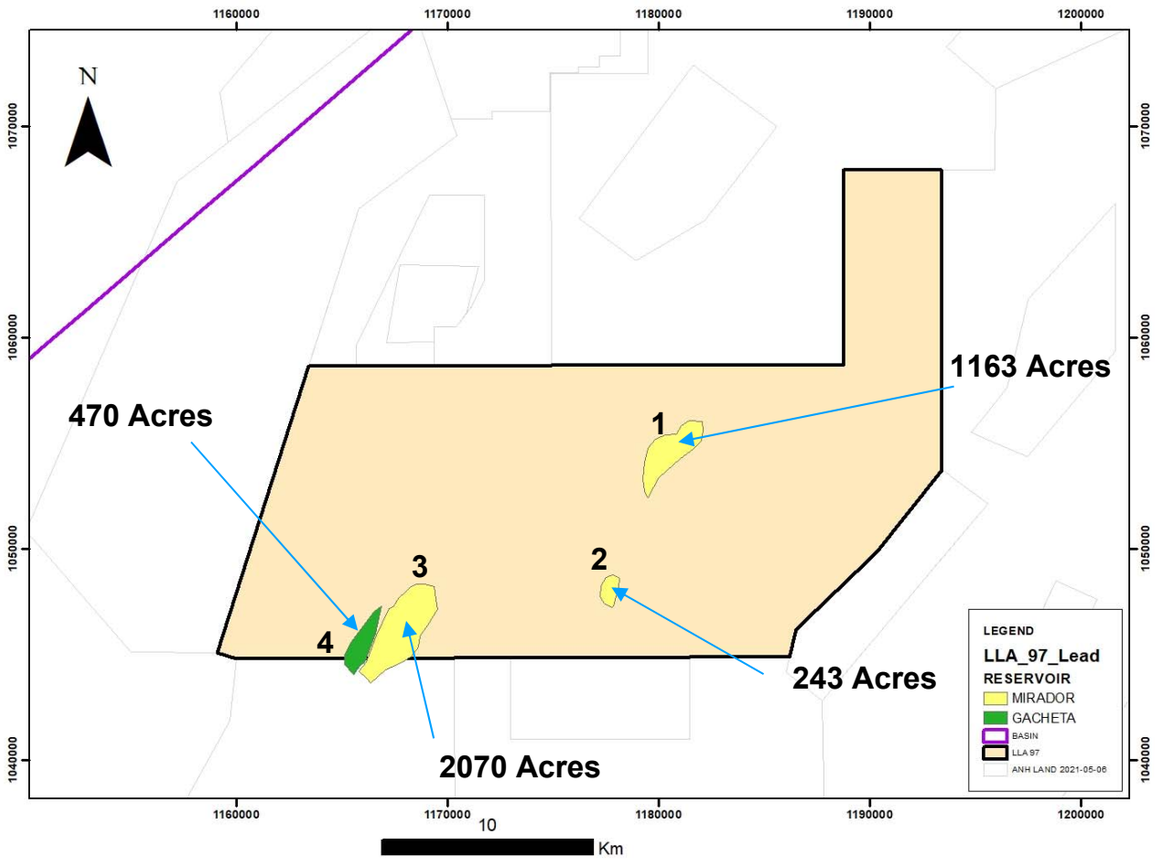


- Two (2) structural closures were identified
  - 110 acres
  - 46 acres
- DST
  - Balay-2 / 83 BOPD – 16% BSW / 10°API

The structure is an anticline against to normal antithetic fault
Main Target Mirador Fm (200 Acres).
Secondary Target Carbonera Fm C7 level (150 Acres) and Los Cuervos Fm.

PROSPECTIVE RESOURCES

LLA 97 - PROSPECTIVITY



PROSPECTIVE RESOURCES

4 LEAD

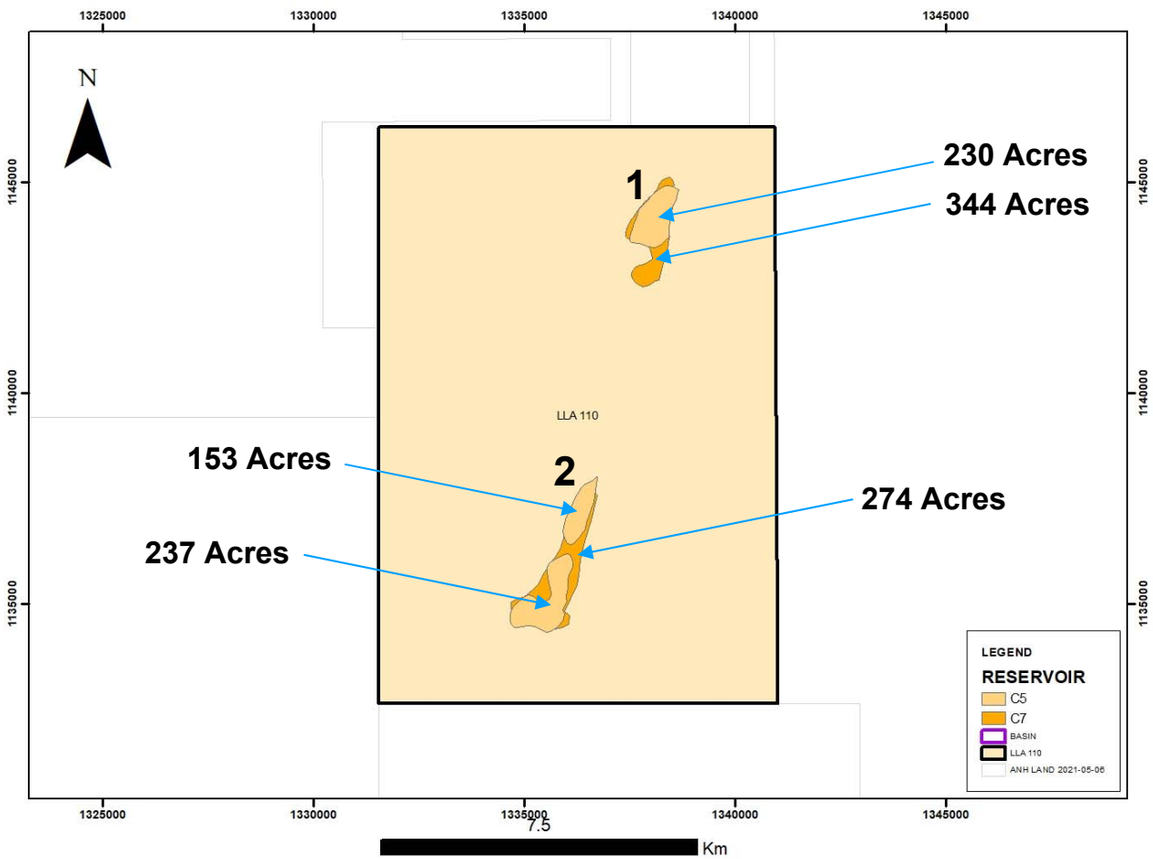
Prospective Resources

Lead No	AREA (Acres)	OOIP (MMBO)	Prospective Resources (MMBO)
1	1163	102.4	5.12
2	243	16.19	0.81
3	2070	137.96	6.90
4	470	11.19	0.56

OOIP: 267.74 MMBO

PROSPECTIVE RESOURCES: 13.39 MMBO

LLA 110 - PROSPECTIVITY



PROSPECTIVE RESOURCES

2 LEAD

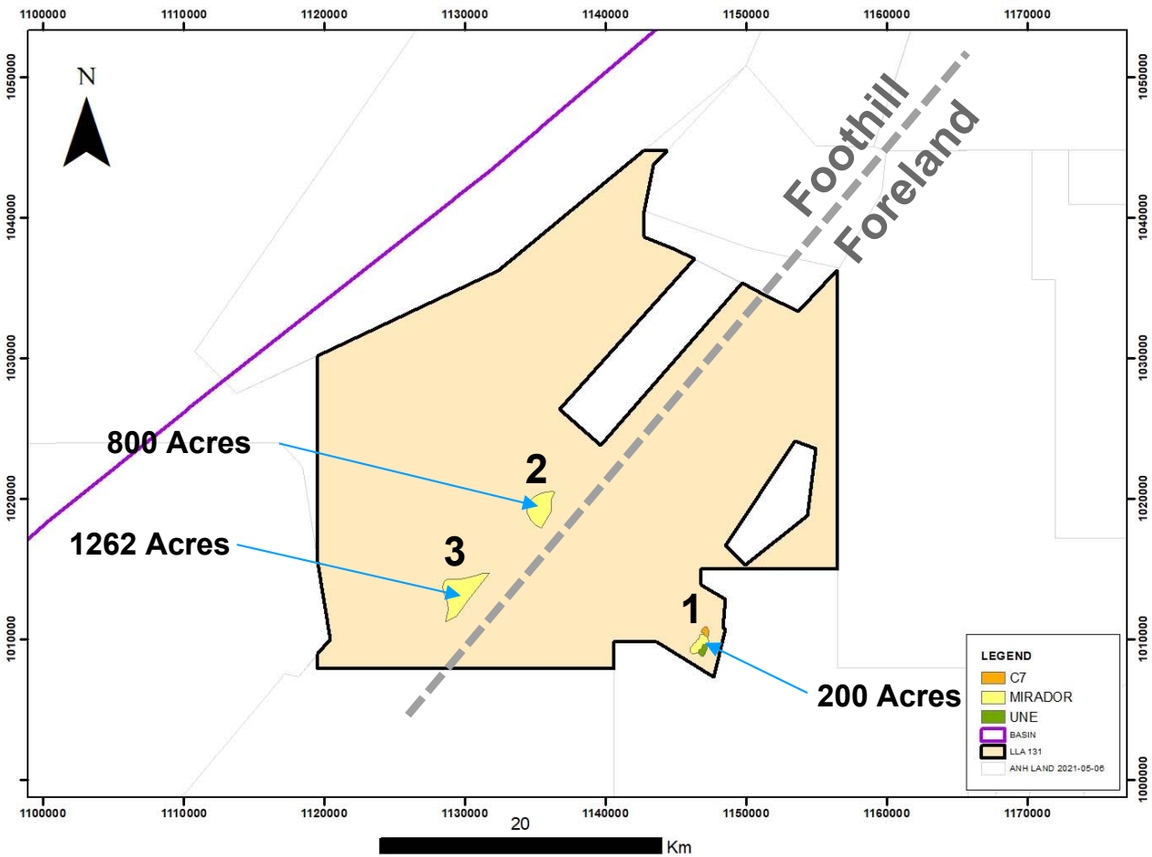
Prospective Resources

Lead No	AREA (Acres)	OOIP (MMBO)	Prospective Resources (MMBO)
1	344	4.51	0.22
2	274	5.31	0.26

OOIP: 9.82 MMBO

PROSPECTIVE RESOURCES: 0.49 MMBO

LLA 131 - PROSPECTIVITY



PROSPECTIVE RESOURCES

3 LEAD

Prospective Resources

Lead No	AREA (Acres)	OOIP (MMBO)	Prospective Resources (MMBO)
1*	200	14.77	0.92
2	800	27.68	1.73
3	1262	43.67	2.73

*** Balay Opportunity (COS 25%)**

OOIP: 86.1 MMBO

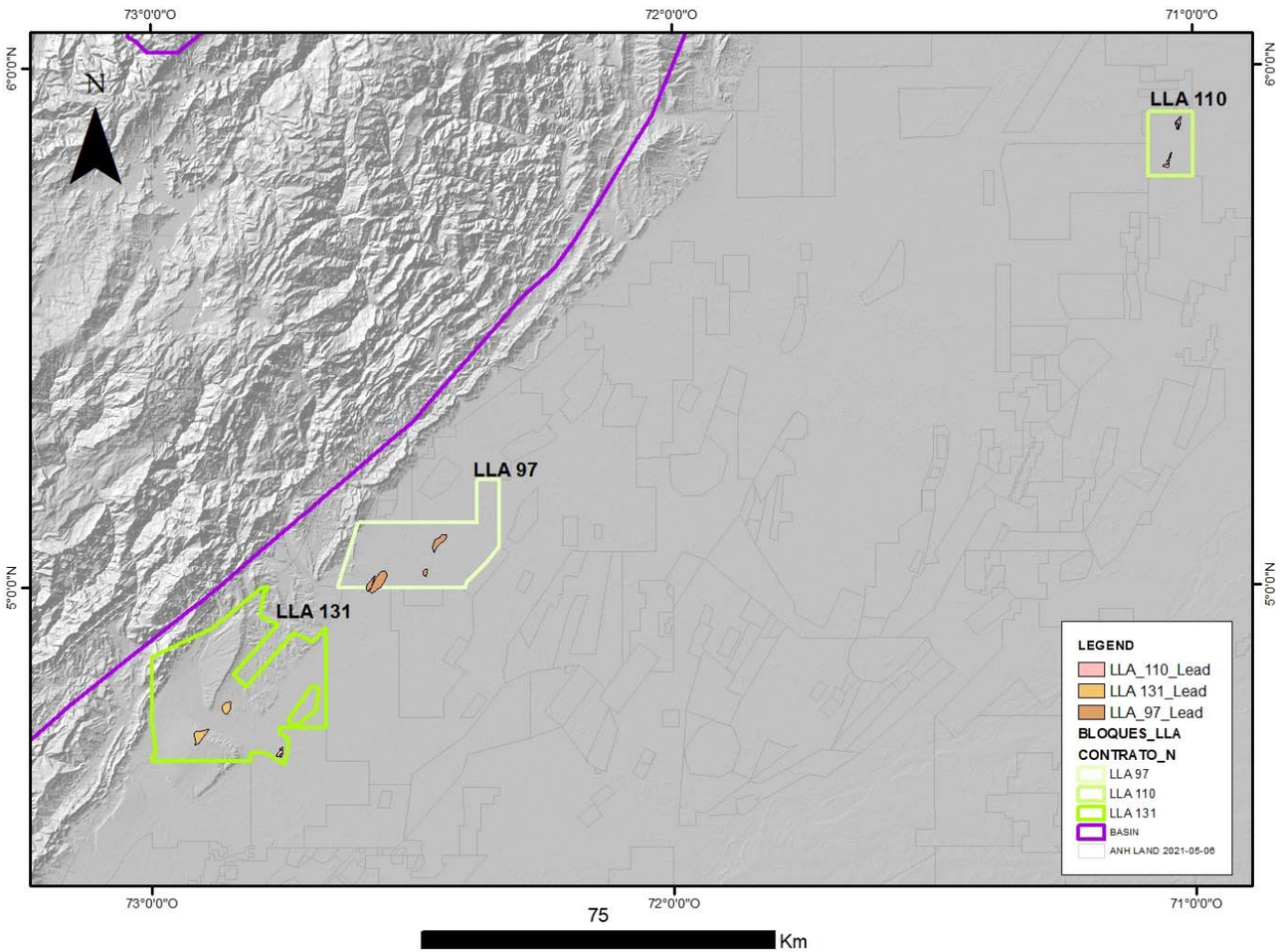
PROSPECTIVE RESOURCES: 5.38 MMBO

RONDA COLOMBIA 2021

ANH AGENCIA NACIONAL DE HIDROCARBUROS

El futuro es de todos | Minenergía

VOLUMETRICS: TOTAL



Oil (Deterministic)

- **9 leads in total**
- **OOIP: 363.7 MMBls**

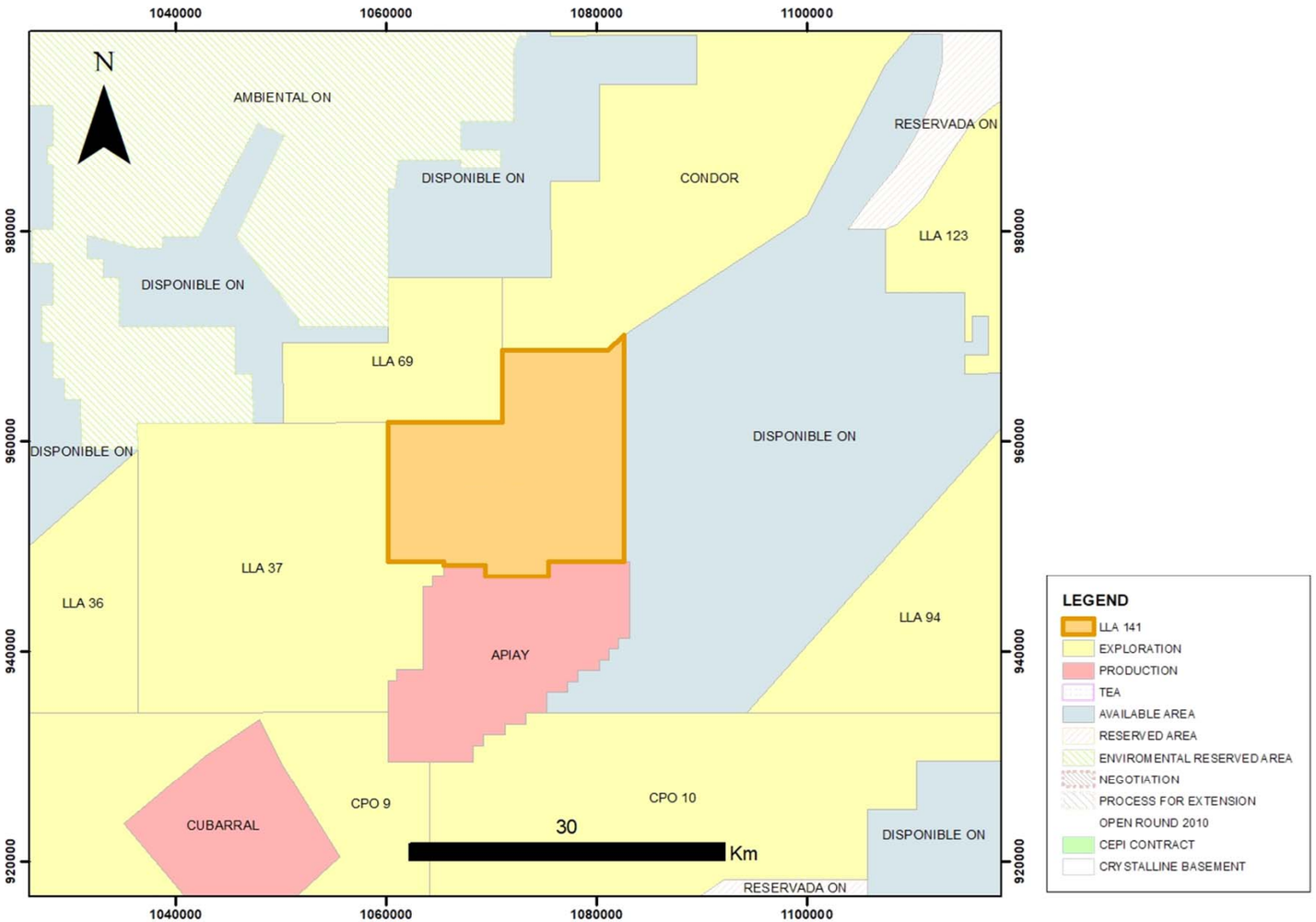
Recovery factor	LLA 97 (25%)
	LLA 110 (25%)
	LLA 131 (25%)
Chance of success	LLA 97 (20%)
	LLA 110 (20%)
	LLA 131 (15%)Foothill
	LLA 131 (25%)Foreland

- **Prospective Resources**

High Estimate	17.11 MMBls
Best Estimate	**5.38 MMBls**
Low Estimate	0.68 MMBls

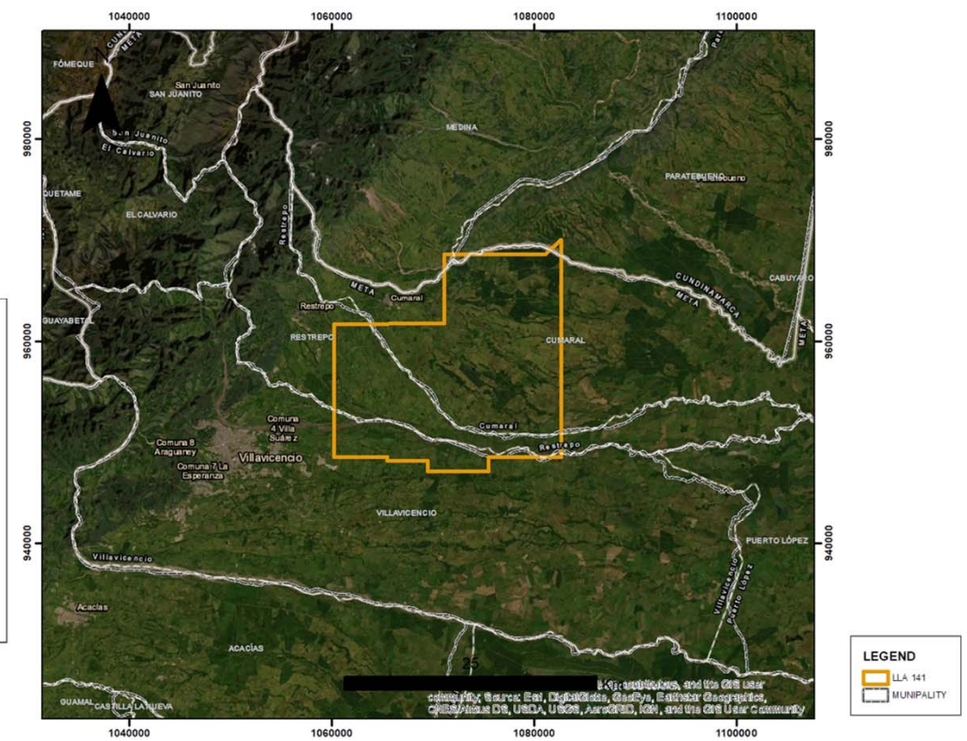
LLANOS BASIN - HEAVY OIL AREAS
LLA 141, LLA 146, and CPE 7-1 Areas

LLA 141 - LOCATION

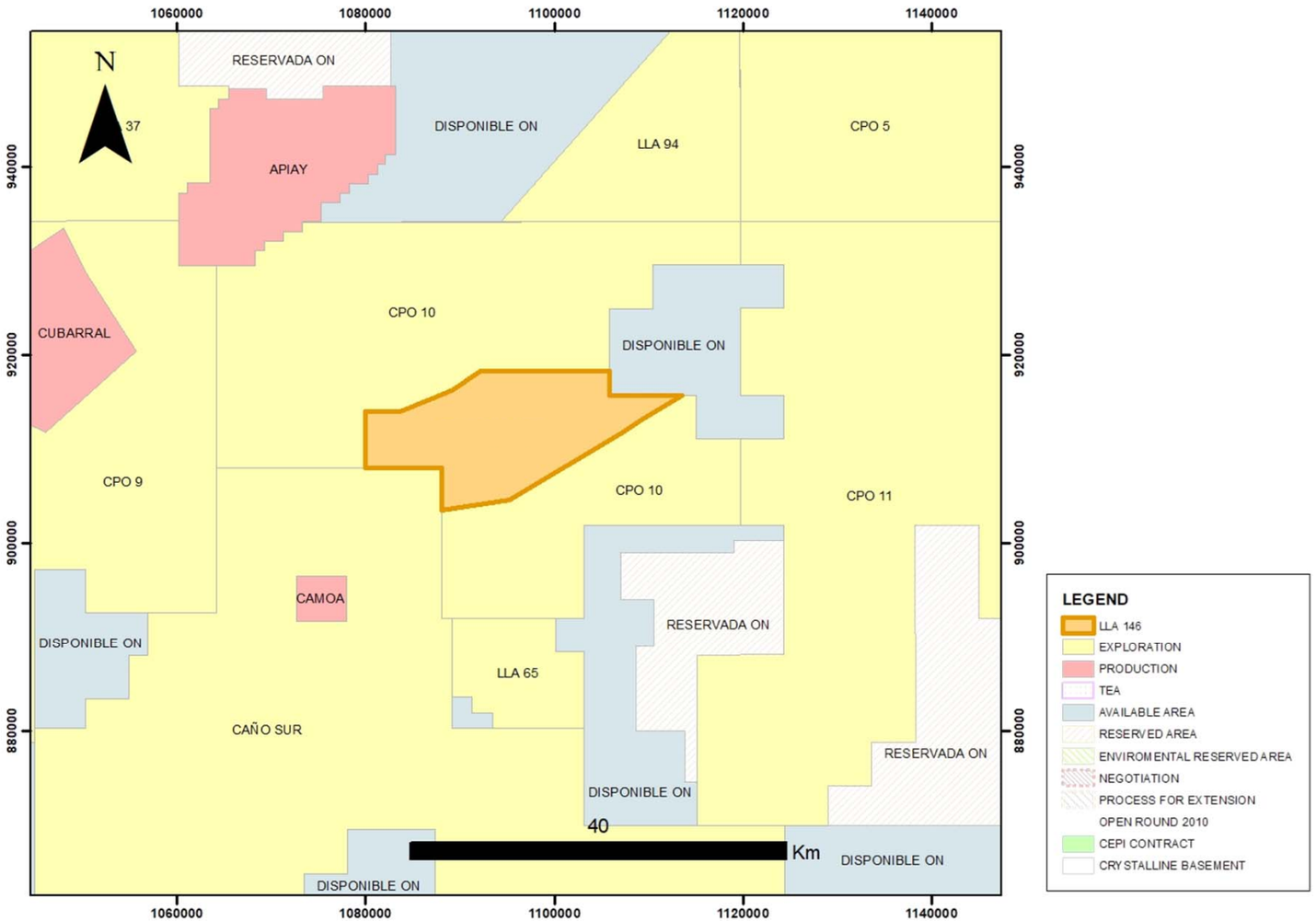


- **Block Area: 38619 Ha**
- **Municipalities:**

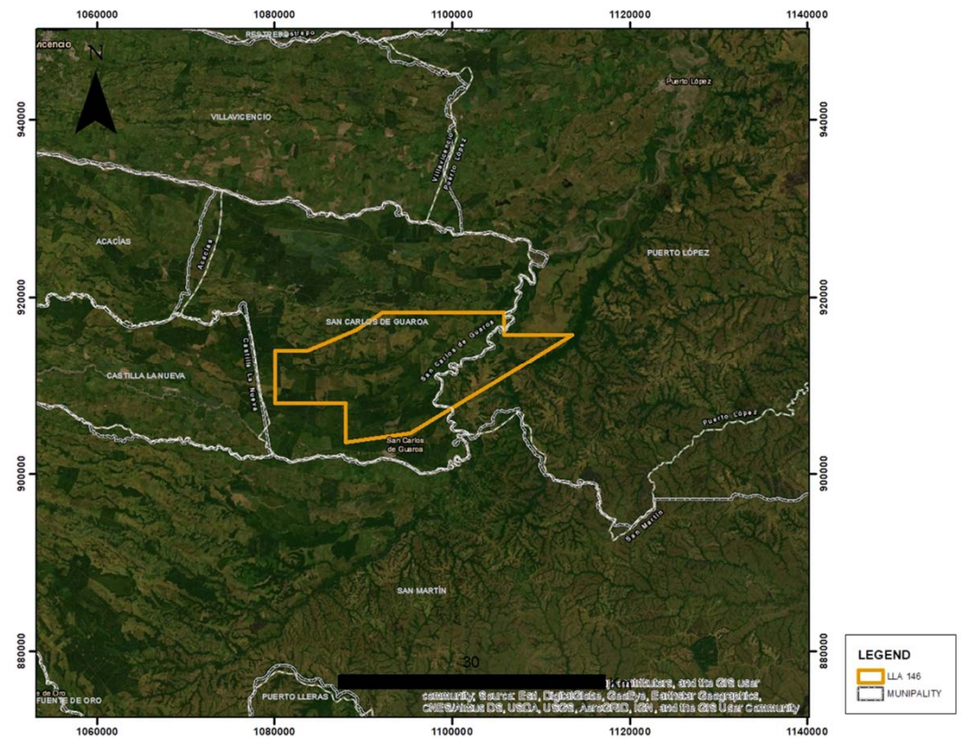
(Meta)	**Cumaral (60.7%)**
	Restrepo (25.5%)
	Villavicencio (13.1%)
(Cundinamarca)	**Paratebueno (0.4%)**
	Medina (0.3%)



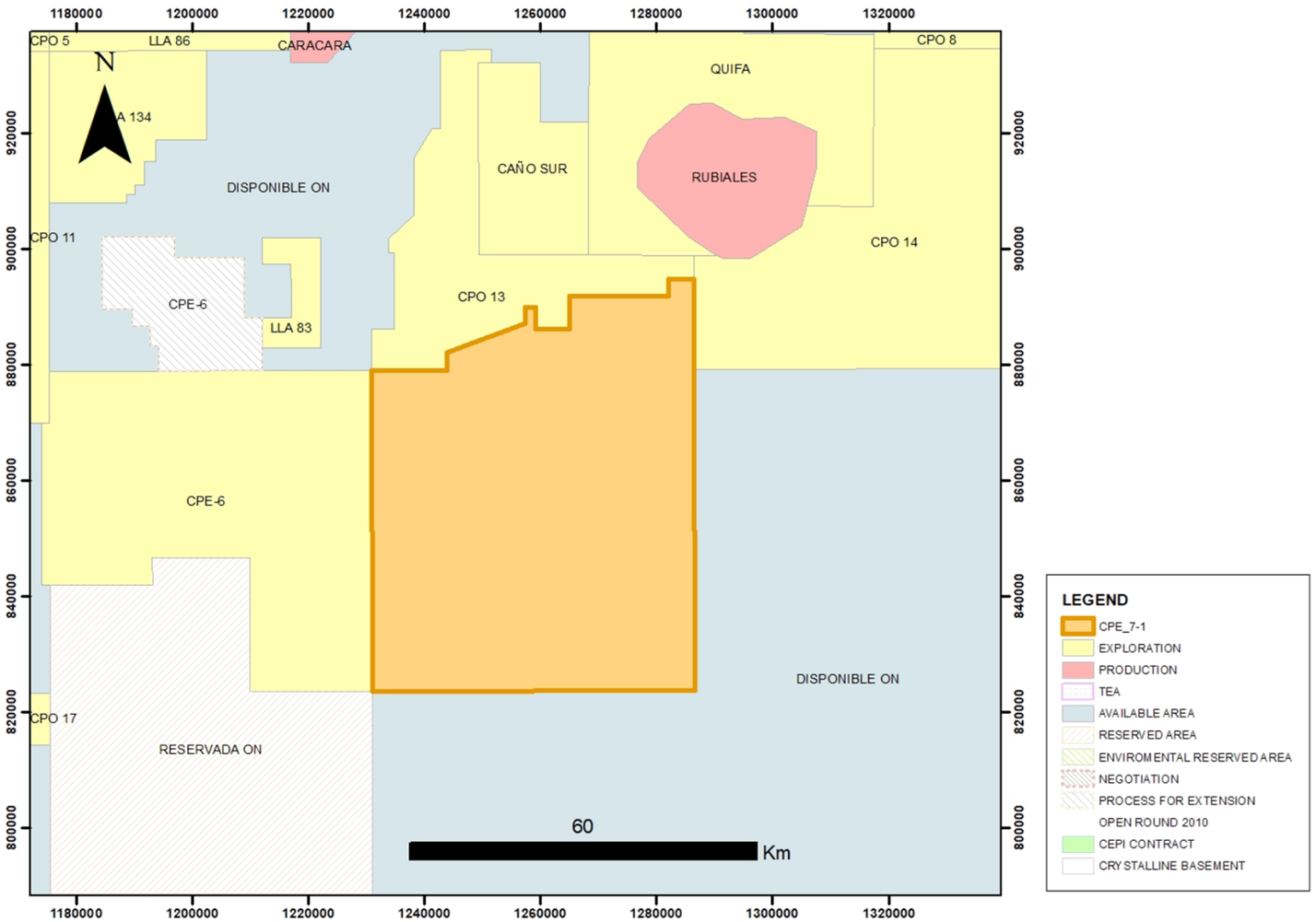
LLA 146 - LOCATION



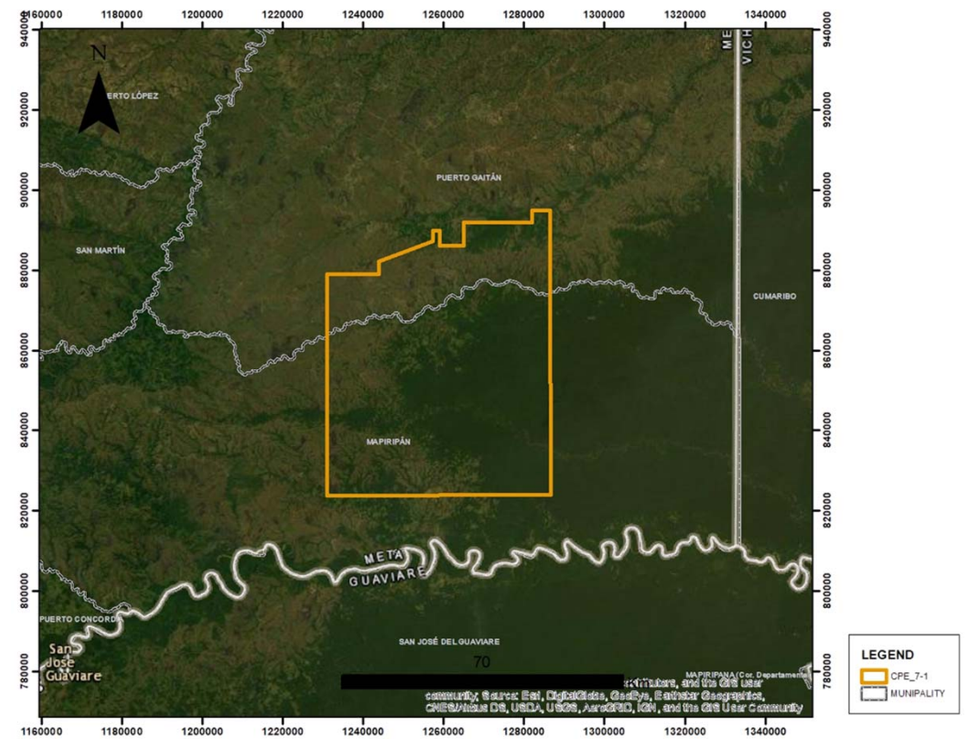
- **Block Area: 27893 Ha**
- **Municipalities: (Meta)**
  San Carlos de Guaroa (81.5%)
  Puerto Lopez (18.5%)



CPE 7-1 - LOCATION

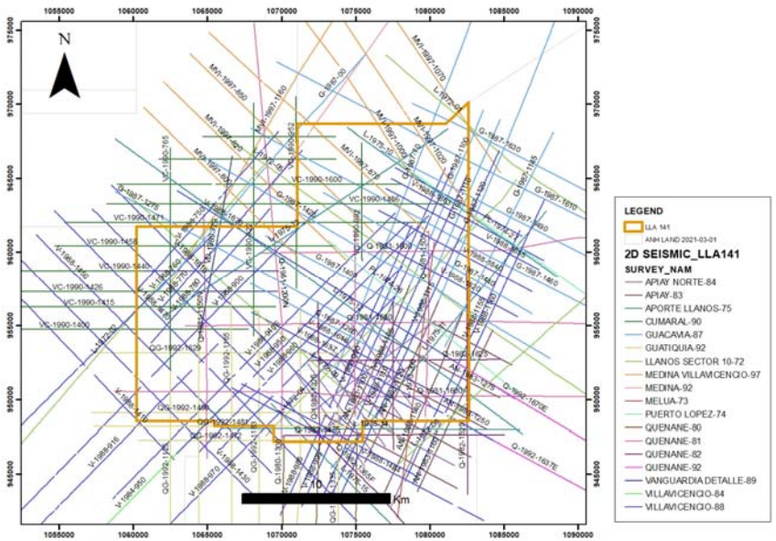


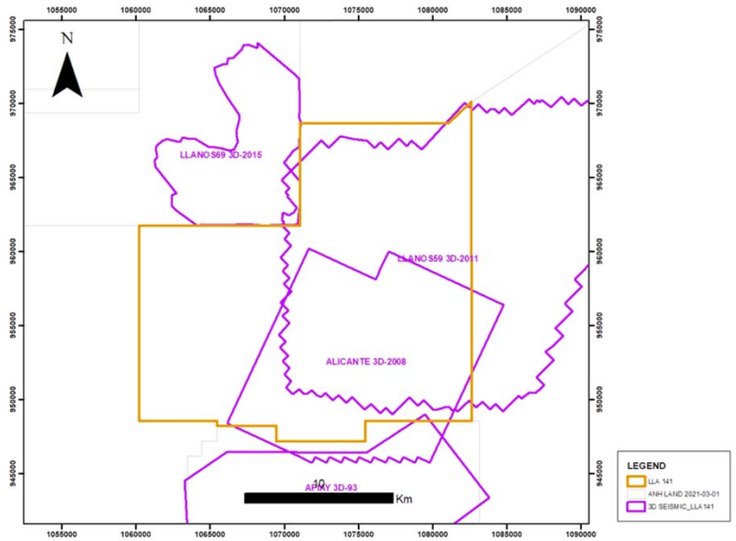
- **Block Area: 349921 Ha**
- **Municipalities: (Meta)**
  - **Puerto Gaitan (24.2%)**
  - **Mapiripán (75.8%)**

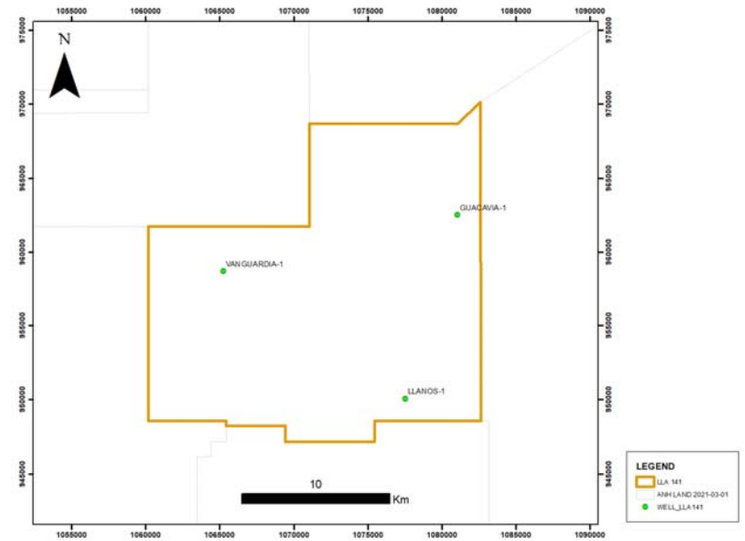


DATABASE

LLA 141 - DATABASE







SURVEY	LINES	TOTAL LENGTH	LENGTH INSIDE
APIAY NORTE-84	11	85.86	65.46
APIAY-83	9	99.40	61.99
APORTE LLANOS-75	6	136.80	73.52
CUMARAL-90	14	218.77	99.68
GUACAVIA-87	15	291.97	150.39
GUATIQUIA-92	10	166.18	84.68
LLANOS SECTOR 10-72	6	219.87	63.50
MEDINA VILLAVICENCIO-97	8	176.24	44.31
MEDINA-92	1	35.28	1.70
MELUA-73	1	18.82	12.24
PUERTO LOPEZ-74	2	62.32	17.98
QUENANE-80	3	45.02	1.63
QUENANE-81	7	212.11	108.60
QUENANE-82	6	76.13	45.46
QUENANE-92	2	52.65	1.18
VANGUARDIA DETALLE-89	3	31.20	26.34
VILLAVICENCIO-84	1	27.95	1.28
VILLAVICENCIO-88	36	690.04	409.39
Total general	***141***	***2646.60***	***1269.32***

- **18 Seismic Program (141 lines)**
- **Total coverage 1269.3 Km**

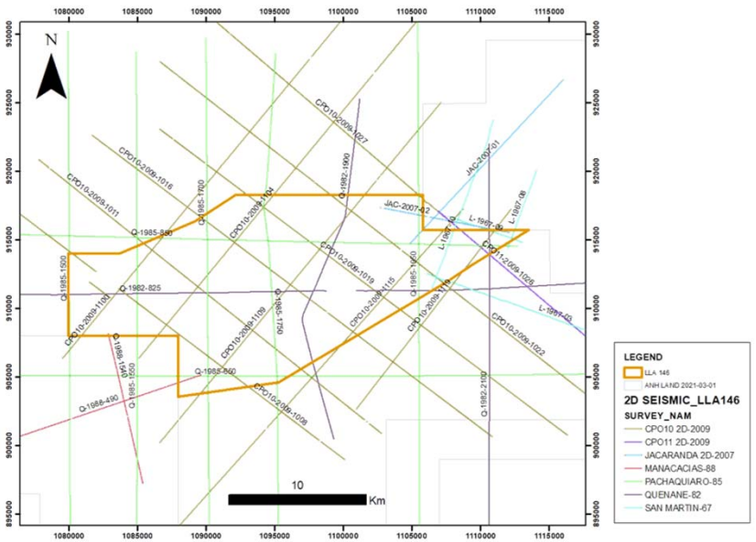
- **4 Seismic Program (257.1 Km²)**
- **Total coverage 66.6%**

PROGRAM	AREA_KM2	AREA_INSIDE (Km2)
LLANOS59 3D-2011	379.67	217.50
ALICANTE 3D-2008	180.12	152.02
APIAY 3D-93	185.70	0.21
LLANOS69 3D-2015	75.55	0.01

- **3 Wells drilled**

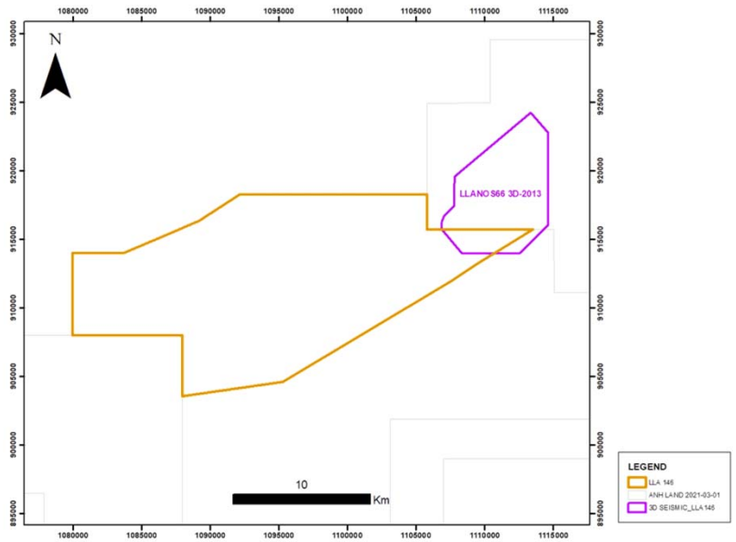
WELL_NAME	SPUD DATE	RTE (ft)	TOTAL DEPTH (ft)
LLANOS-1	05/12/1985	925.0	11808.0
GUACAVIA-1	09/08/1988	1077.0	14063.0
VANGUARDIA-1	28/12/1989	1228.0	15163.0

LLA 146 - DATABASE



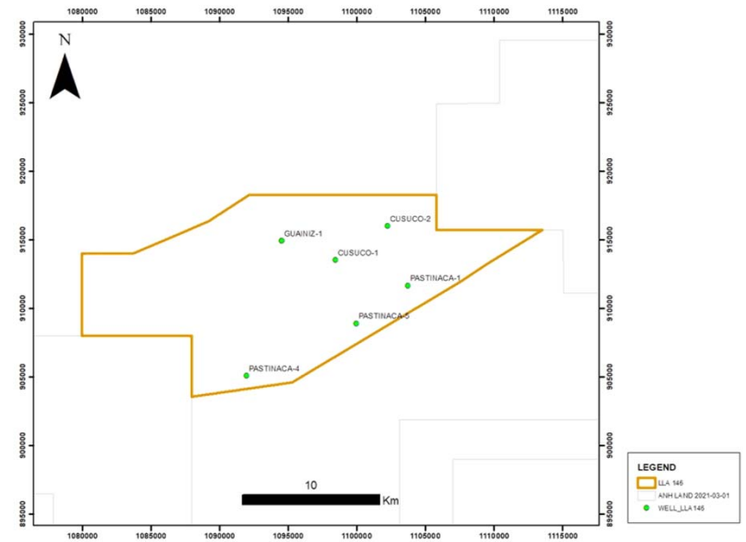
- **7 Seismic Program (30 lines)**
- **Total coverage 264.68 Km**

SURVEY	LINES	TOTAL LENGTH	LENGTH INSIDE
CPO10 2D-2009	11	356.04	125.99
CPO11 2D-2009	1	43.14	2.74
JACARANDA 2D-2007	2	25.60	5.39
MANACACIAS-88	2	37.07	1.92
PACHAQUIARO-85	7	379.46	80.12
QUENANE-82	3	146.29	39.40
SAN MARTIN-67	4	44.18	9.11
Total general	***30***	***1031.79***	***264.68***



- **4 Seismic Program (7.8 Km²)**
- **Total coverage 2.8%**

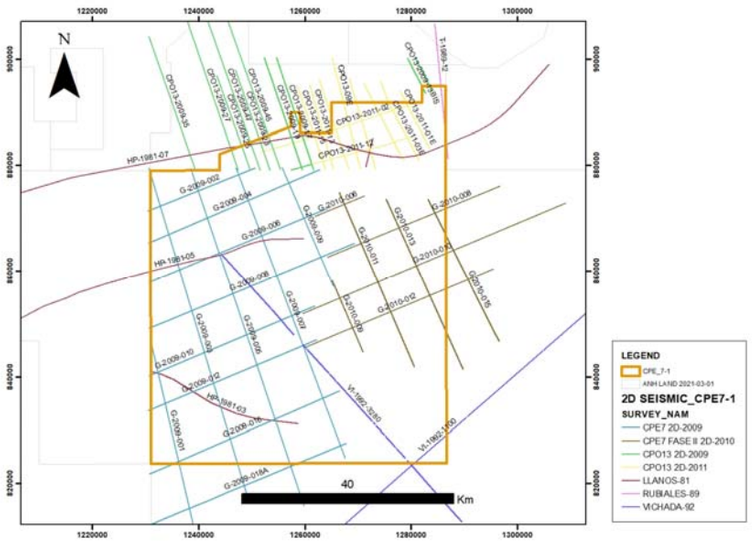
PROGRAM	AREA_KM2	AREA_INSIDE (Km2)
LLANOS66 3D-2013	55.31	7.81

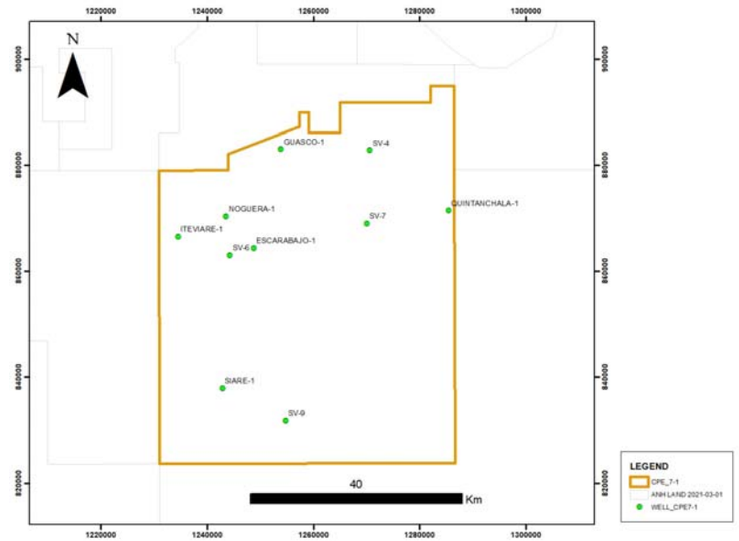


- **6 Wells drilled**

WELL_NAME	SPUD DATE	RTE (ft)	TOTAL DEPTH (ft)
CUSUCO-1	17/03/2013	696	7775
CUSUCO-2	09/11/2014	872	7519
GUAINIZ-1	07/06/2013	798	7975
PASTINACA-1	19/12/2012	801	7870
PASTINACA-4	03/05/2014	762	7227
PASTINACA-5	05/01/2015	799	7322

CPE 7-1 - DATABASE





- **7 Seismic Program (50 lines)**
- **Total coverage 1019.7 Km**

SURVEY	LINES	TOTAL LENGTH	LENGTH INSIDE
CPE7 2D-2009	13	535.8	467.1
CPE7 FASE II 2D-2010	8	253.5	177.9
CPO13 2D-2009	11	309.4	56.2
CPO13 2D-2011	11	209.7	149.8
LLANOS-81	4	210.7	104.5
RUBIALES-89	1	25.4	8.5
VICHADA-92	2	427.0	55.6
Total general	***50***	***1971.57***	***1019.70***

- **9 Wells drilled (7 stratigraphic wells)**

WELL_NAME	SPUD DATE	RTE (ft)	TOTAL DEPTH (ft)	WELL TYPE
SV-4	20/01/1981	686	2963	STRATIGRAPHIC
SV-6	30/01/1981	703	2742	STRATIGRAPHIC
SV-7	10/02/1981	703	2862	STRATIGRAPHIC
SV-9	07/03/1981	700	2100	STRATIGRAPHIC
ITEVIARE-1	29/06/2011	721	3295	STRATIGRAPHIC
SIARE-1	27/08/2011	764	2400	STRATIGRAPHIC
NOGUERA-1	30/12/2012	725	2974	
GUASCO-1	08/01/2013	831	3114	
QUINTANCHALA-1	01/04/2014	735	2470	STRATIGRAPHIC

WELL SUMMARY

RONDA COLOMBIA 2021

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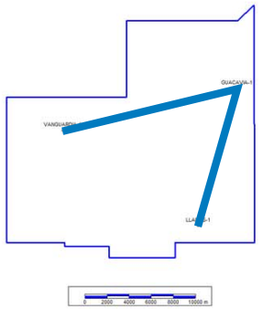
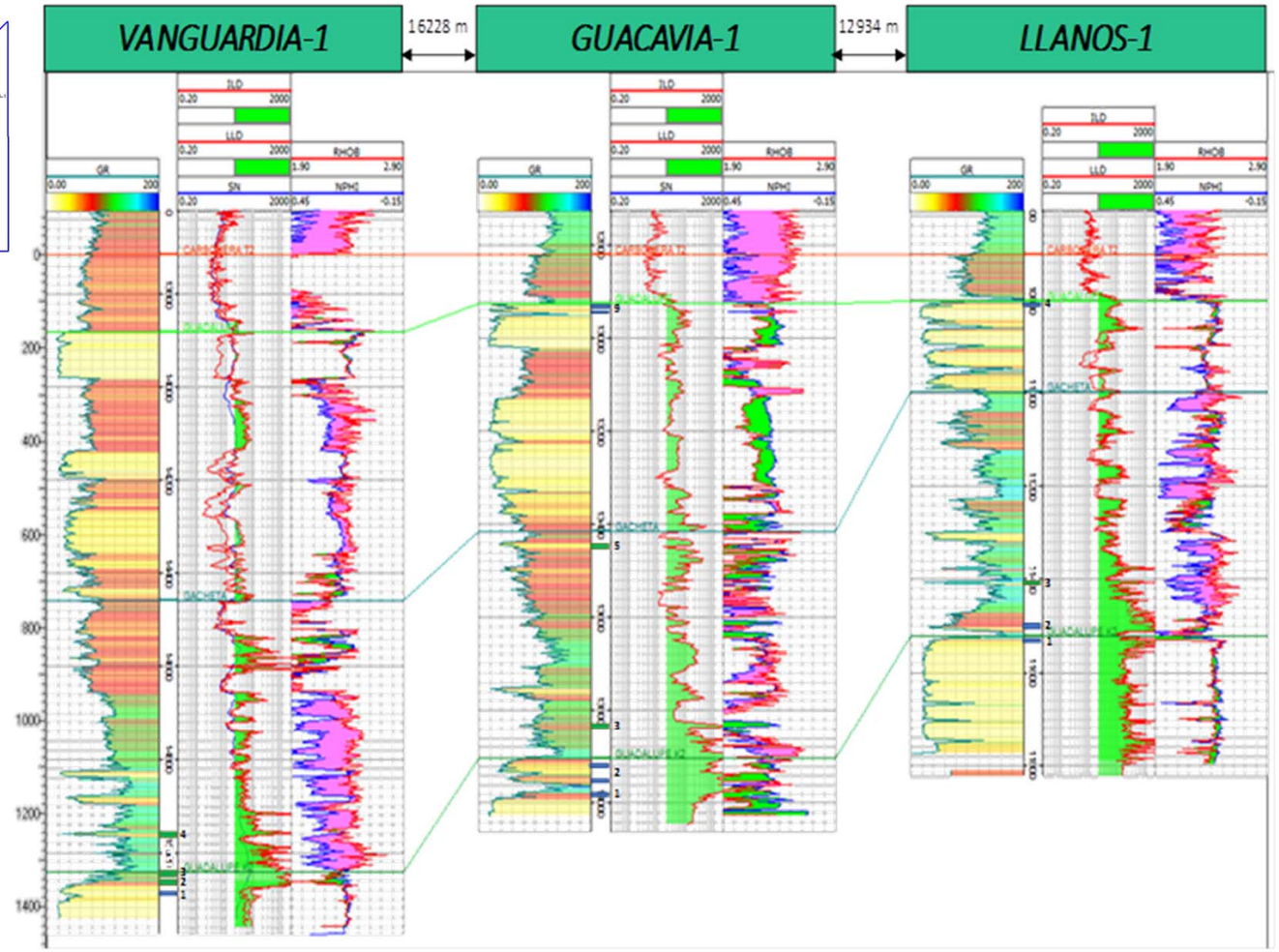
El futuro es de todos | Minenergía

LLA 141 - WELL SUMMARY





VANGUARDIA-1

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%	

GUACAVIA-1

Test	Interval	Fm	Observations
1	13984' - 13978'	K2 top	By shrinking 164 bls of fluid (69 bls Water of Fm. Of 1000 / 2000ppm Cl, 95 bls Water of Fm. Of 500ppm Cl with traces of
2	13950' - 13942' 13924' - 13916'	K1 inf.	By shrinking 55 bls of fluid mainly brine
3	13836' - 13826'	K1 inf.	By shrinking 336 bls of fluid (240 bls Water of 1500ppm Cl with traces of crude oil of 28 ° API, 96 bls Water of 100 / 800ppm Cl with traces of crude oil of 28 ° API)
4	13760' - 13742'		suspended
5	13440' - 13432'	K1 med	By shrinking 82.5 bls of fluid (76.5 bls of Fm.water of 800 / 500ppm Cl and 6 bls of crude oil of 17.1 ° API / 60 ° F)
6	13334' - 13326'		suspended
7	13230'- 13220'		suspended
8	13958' - 12954'		suspended
9	12938' - 12932' 12928' - 12920'	T2	By shrinking 27 bls of fluid (8.5 bls of fresh mattress water, 4 bls of contaminated water. 6.5 bls of fluid plugged with fine sand, mud and traces of oil, 5.5 bls of flocculated fluid cut with gas and traces of oil, 2.5 bls of water of Fm. of 4800ppm
9A	12938' - 12932' 12928' - 12920'	T2	By shrinking 221.5 bls of fluid (91 bls of cloudy mud water of 5000ppm Cl, 130.5 bls of water with 3000ppm Cl)

LLANOS-1

Test	Interval	Fm	BFPD	API	Clorides	Observations
1	11530' - 11538'	K2	798	-	1800	Aquifer
2	11498' - 11508'	K1	968	-	1100	Aquifer
3	11404' - 11409'	K1		13°/60°F		56 Bis of Oil were recovered by "swabbing"
4	10816' - 10824'	T2	187	-	4200	Aquifer

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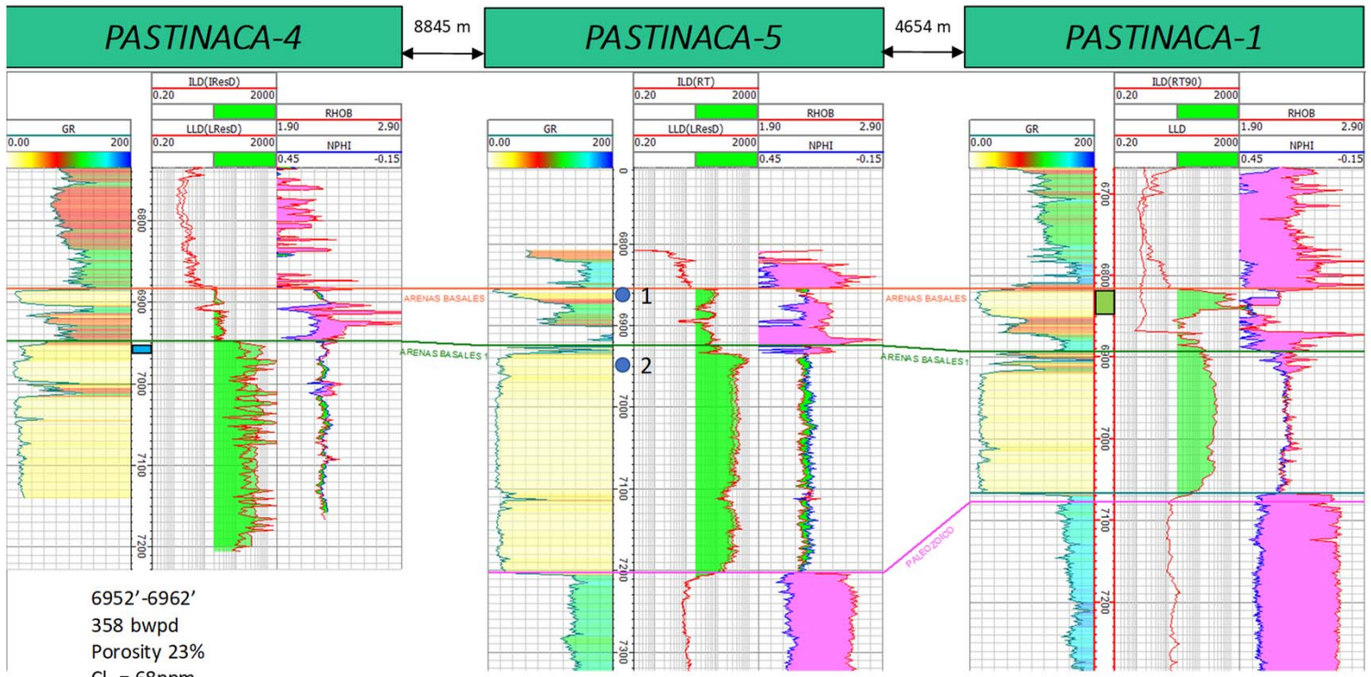
El futuro es de todos | Minenergía

LLA 146 - WELL SUMMARY

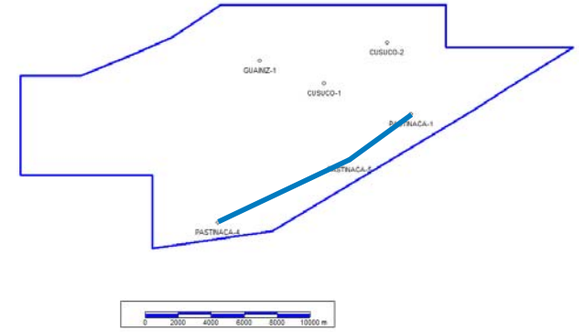
Pastinaca-1 , Pastinaca-4 & Pastinaca-5



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

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

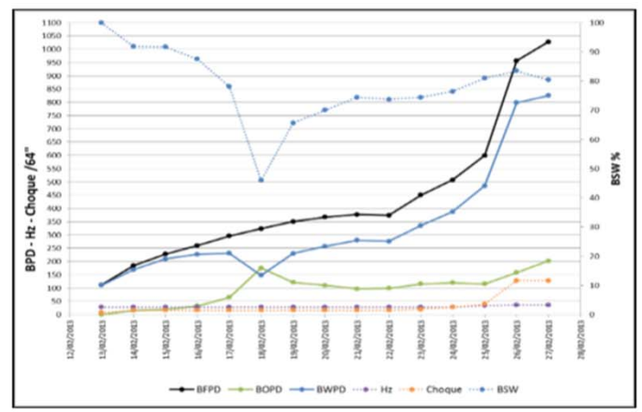
6818'-6848'
202 bopd
12ºapi
Net Pay 20 ft
Porosity 23%
BSW 80.4%
Cl- = 150ppm
Pi = 2875 psi



Wells

Well	Date	TD feet	Results	Operator
Pastinaca 1	Jan 2013	7870	B3	Ecopetrol
Pastinaca 4	May 2014	7227	C1	Ecopetrol
Pastinaca 5	jan 2015	7274	C1	Ecopetrol

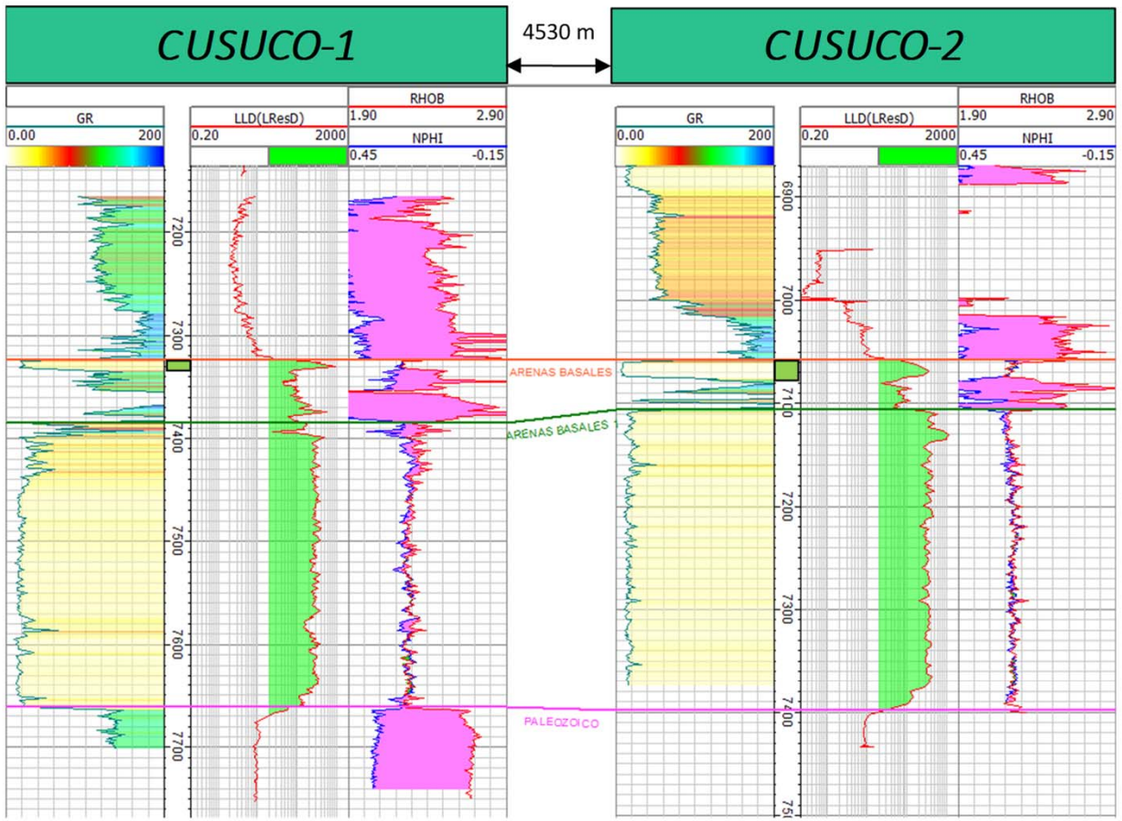
Initial Tests Pastinaca 1 well



Recovered: 5895 Bbl. Fluid (1448 Bbl. Oil – 4447 Bbl. Water)
Initial Production: 260 BFPD, 87,5% BSW, 32 BOPD

LLA 146 - WELL SUMMARY

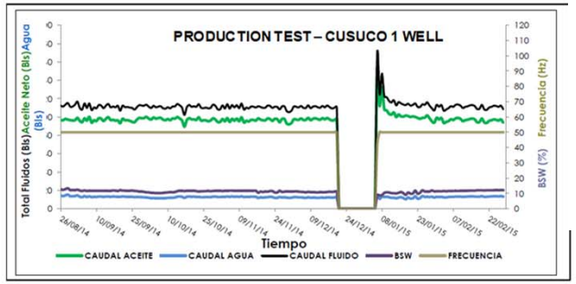
Cusuco-1 & Cusuco-2



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 Long term tests



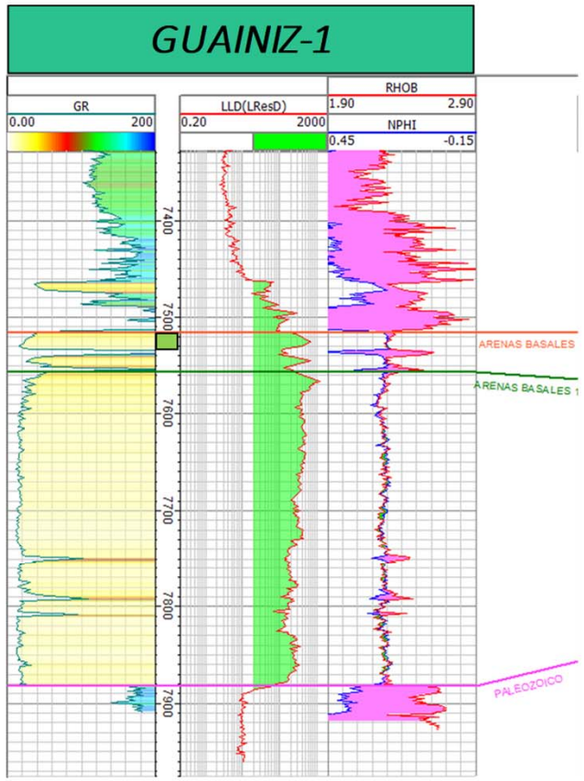
Flow period	Rates b/d	System	°API
06-23-2014 12-23-2014	98 oil/12 water	ESP	13,8
Close 15 days			
01-05.2015 02-28-2015	100 oil/13 water	ESP	13,8

Tests comparison

Well	Depth. feet	°API	BSW%
Cusuco 1	7093 - 7100	13,8	4,2
Cusuco 2	7056 - 7106	10,2	84,0

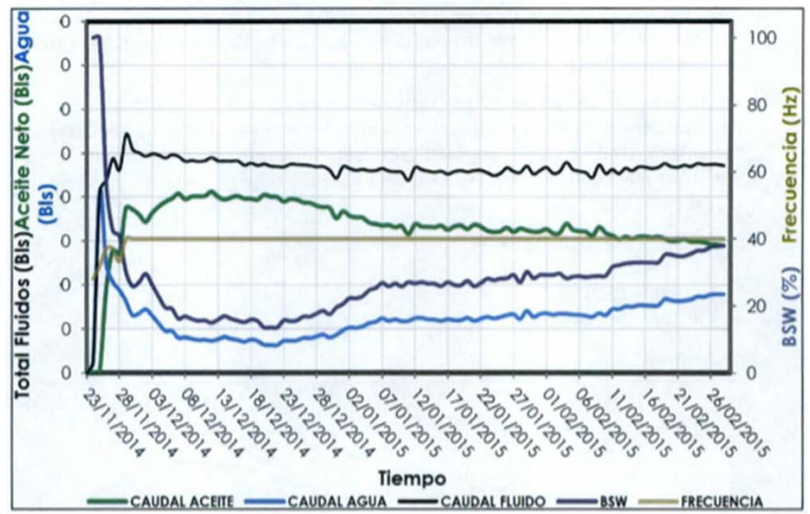
LLA 146 – WELL SUMMARY

Guainiz-1

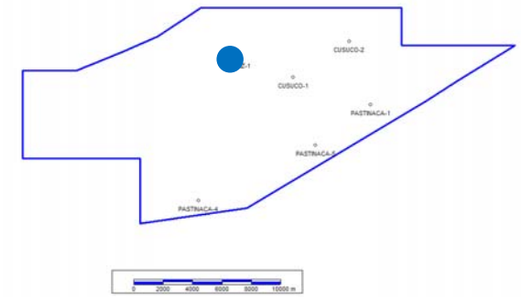


Interval feet	Porosity %	Sw %	K md
7515 - 7531	20 - 24	35 - 45	110 - 450
BFPD	**BOPD**	**BWPD**	**CI**
440	405	35	50 ppm

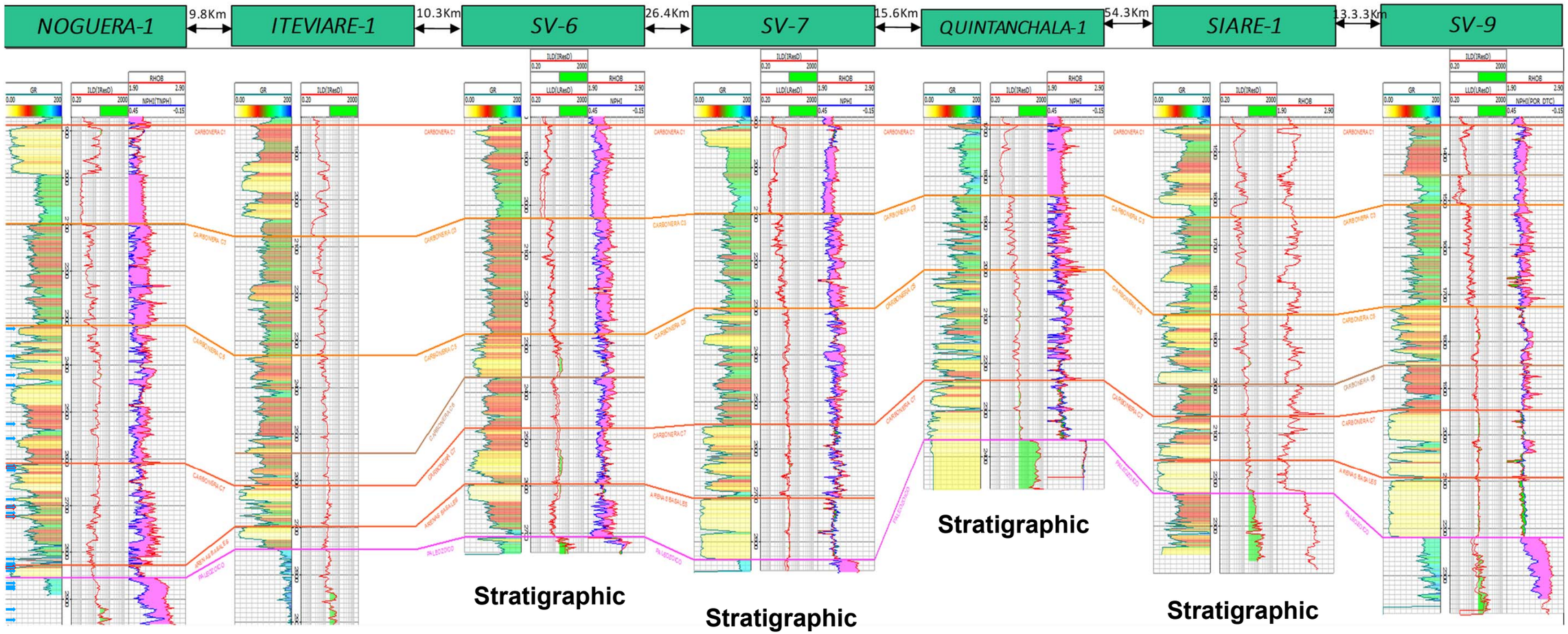
Long Term tests



Period	Interval feet	System	Np oil	Np water
24 Nov 2014 15 mar 2015	7515 - 7531	ESP	16281	5764



CPE 7-1 - WELL SUMMARY



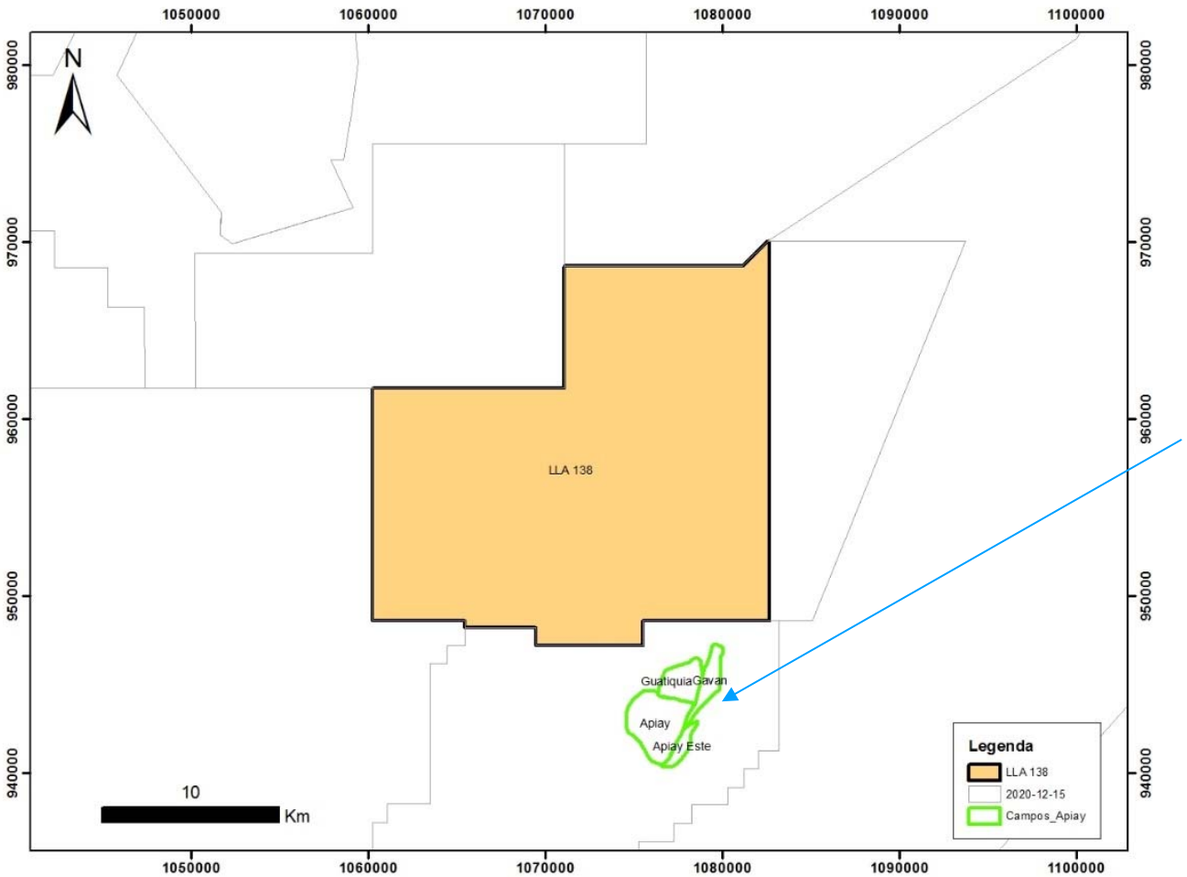
SWC: only 3 samples with fluorecense

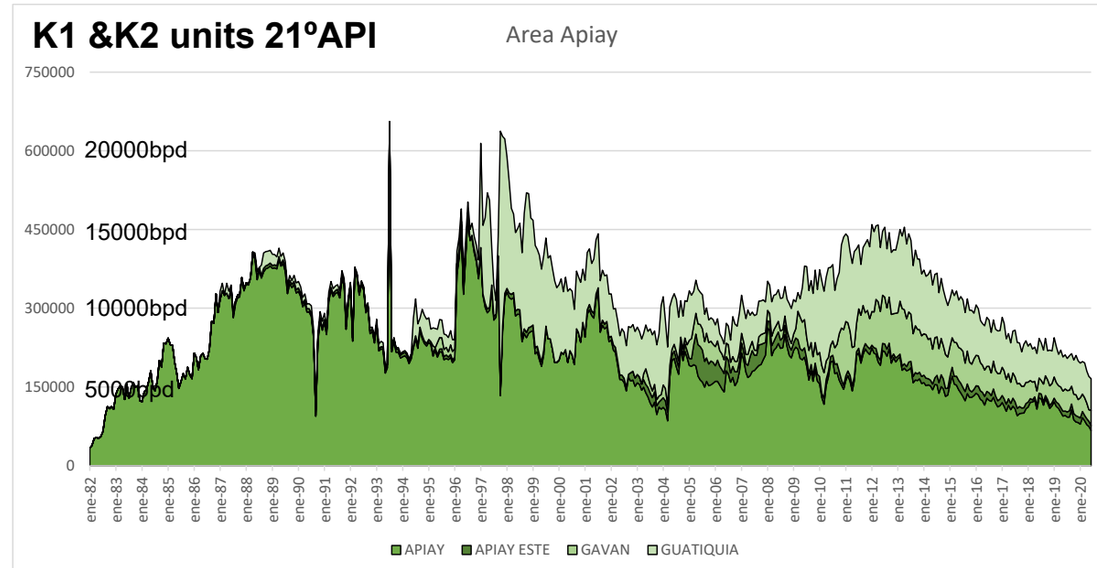
Stratigraphic

Stratigraphic

ANALOG OIL FIELDS

LLA 141 – ANALOGIC OILFIELDS

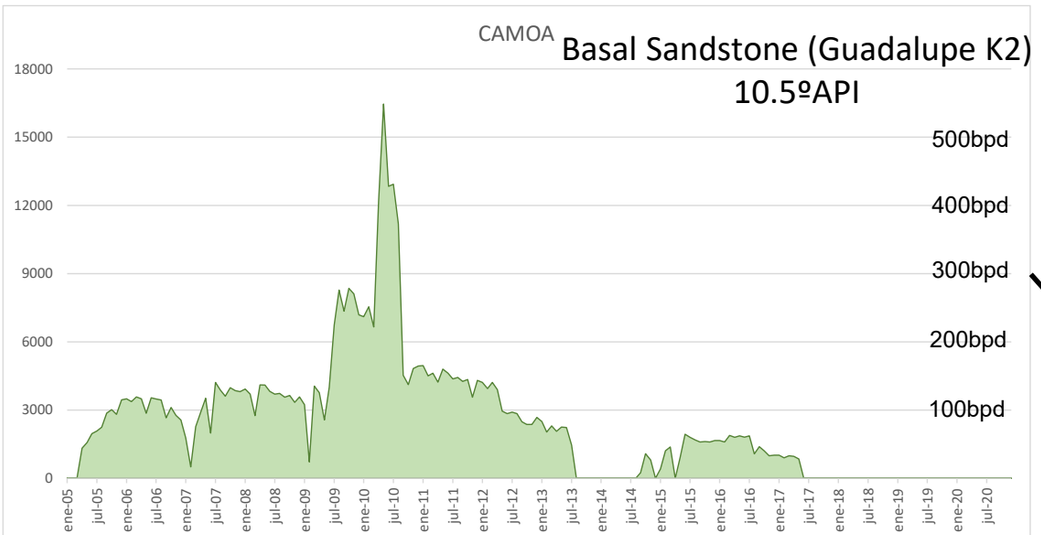




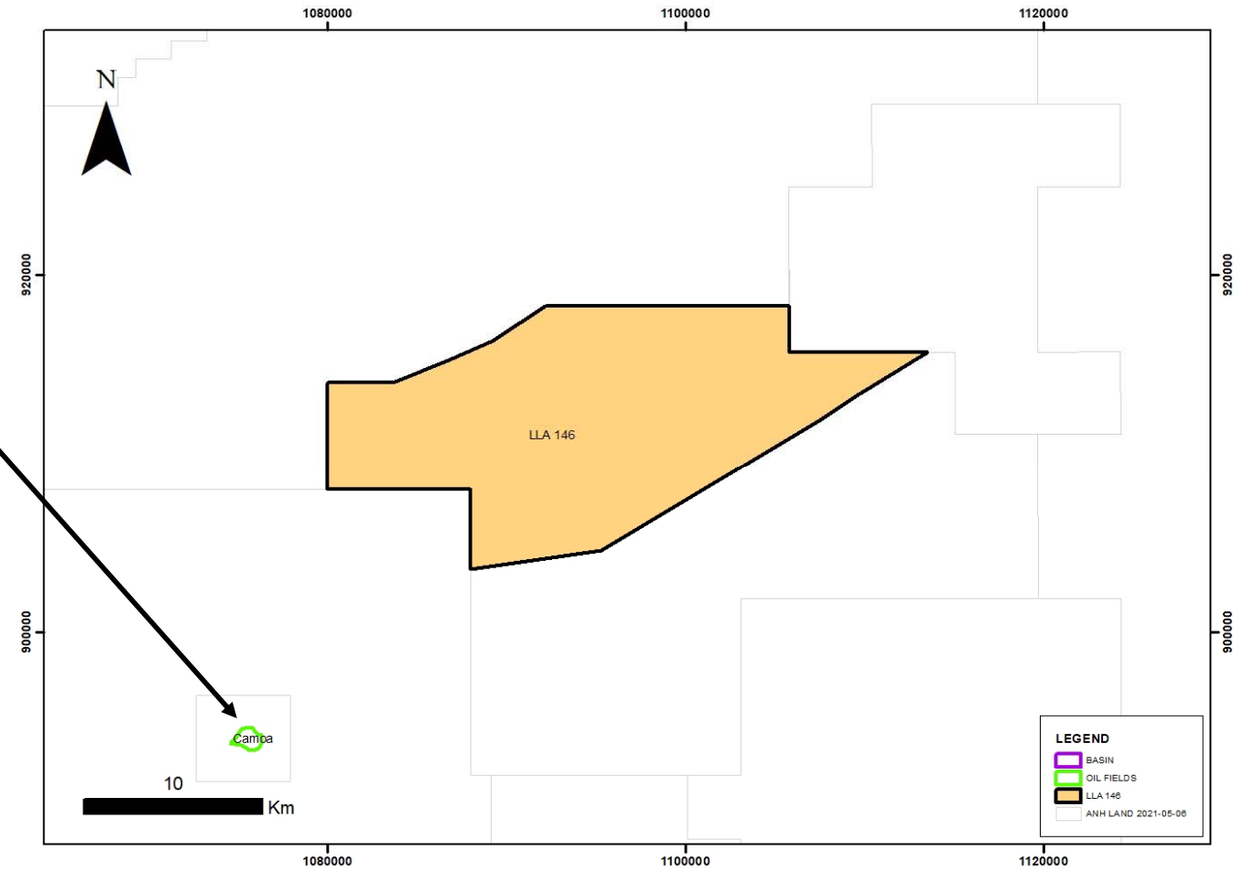
Acummulated Production :

Apiay Field 97.6 MMBbls
Apiay Este Field 4.53 MMBbls
Gavan Field 9.53 MMBbls
Guatiquia 31.4 MMBbls

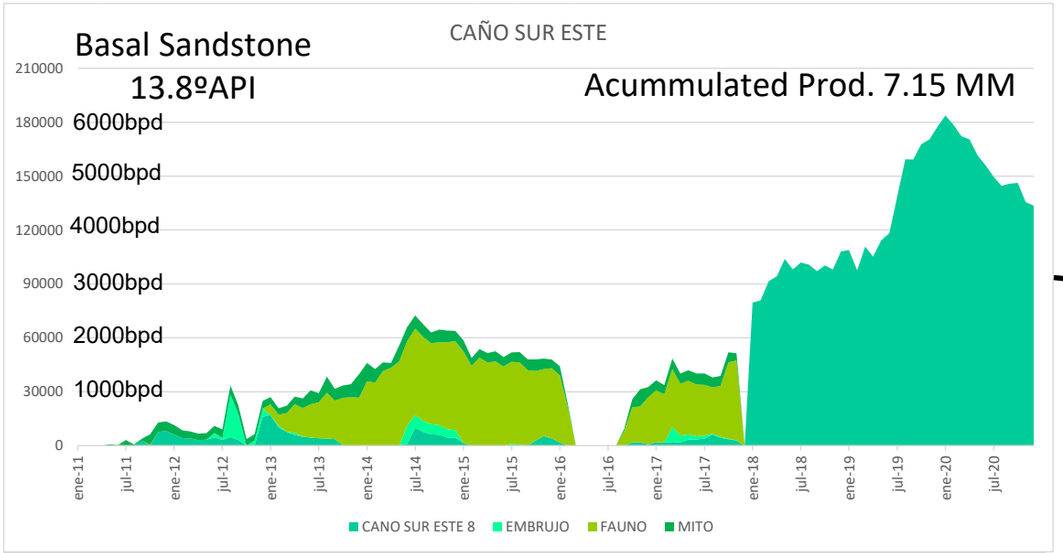
LLA 146 – ANALOGIC OILFIELDS

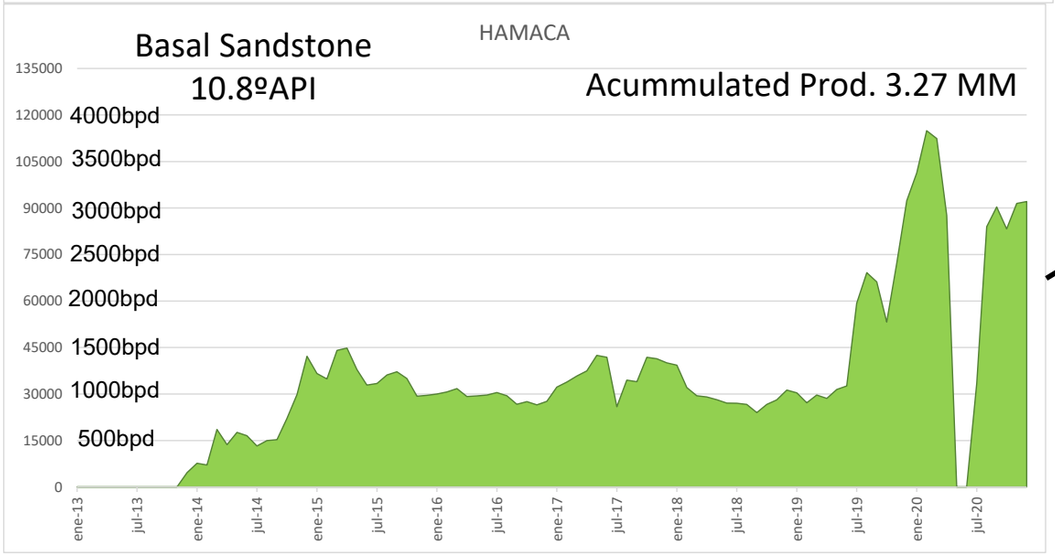


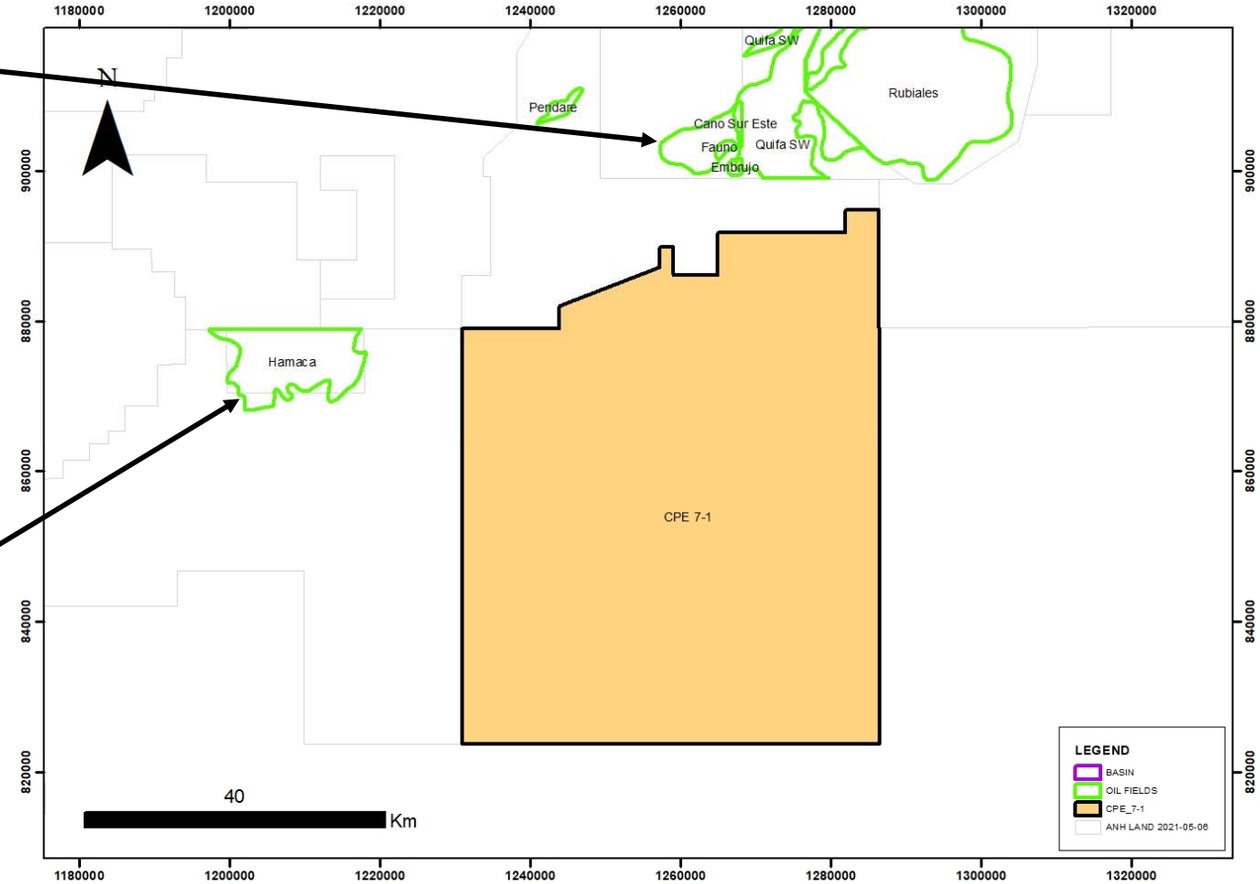
Acummulated Prod. 0.456 MM



CPE 7-1 – ANALOGIC OILFIELDS





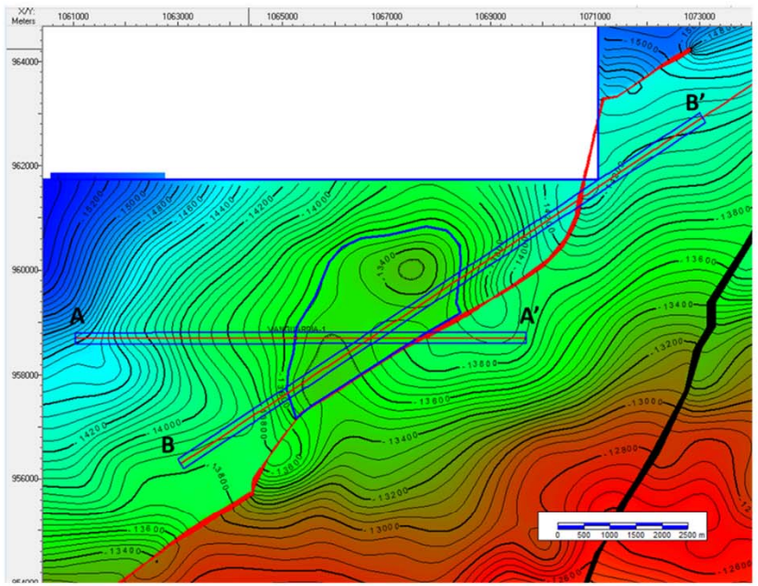


SEISMIC INTERPRETATION

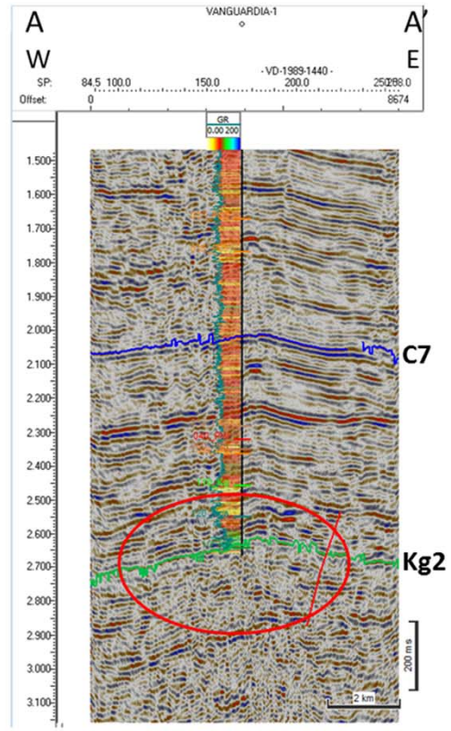
LLA 141 AREA

LLA 141 – SEISMIC INTERPRETATION

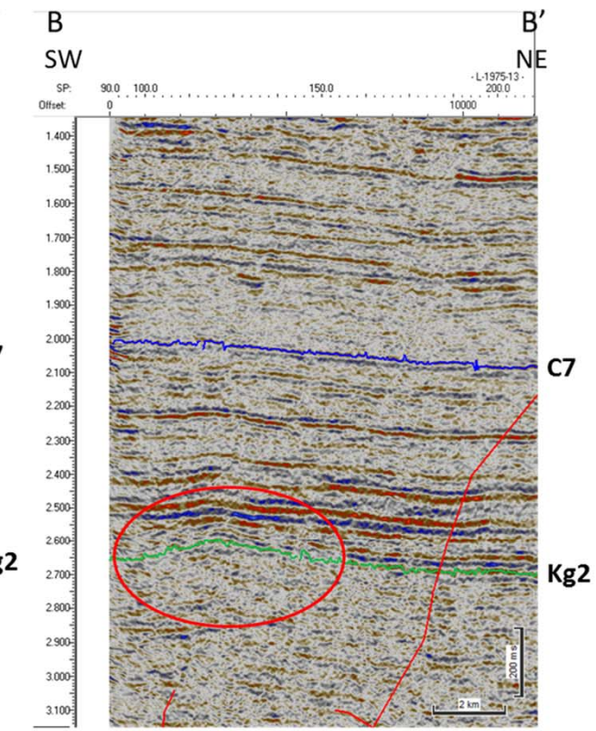
Vanguardia Lead



Structural Map in Depth (TVDss) Guadalupe K2 top



Dip Line (VD-1989-1440)

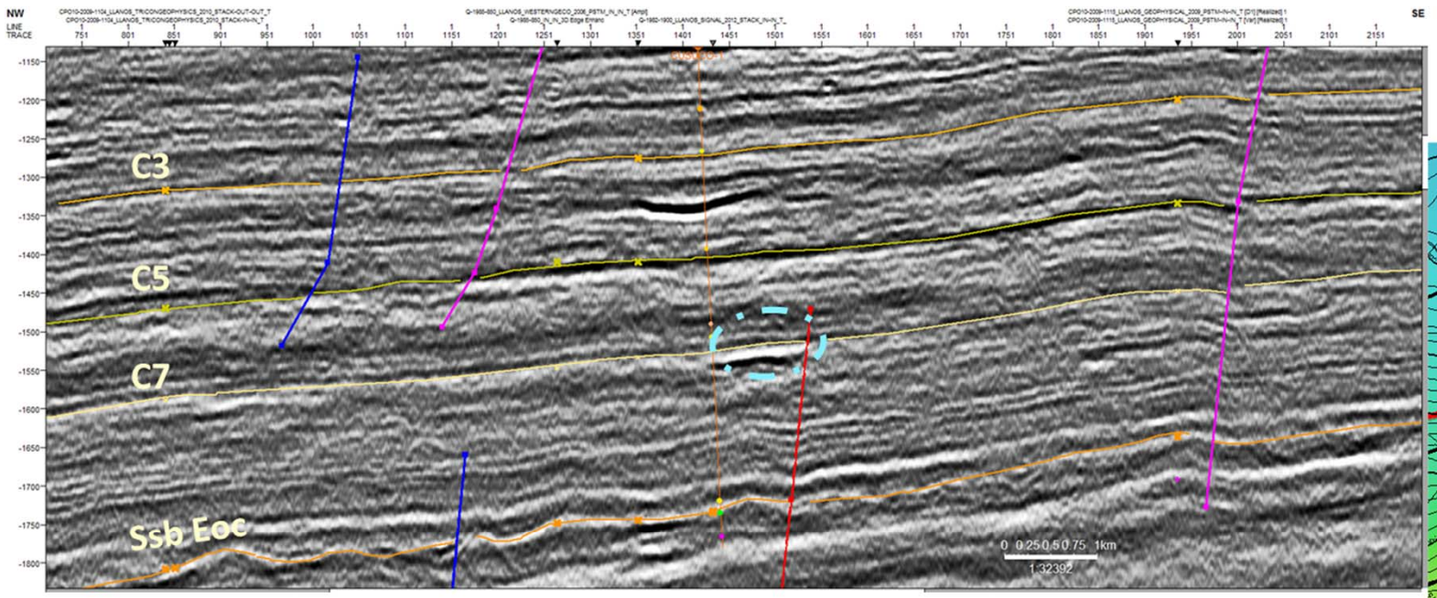


Strike Line (L-1975-13)

The structure is an anticline against to normal anthitetic fault
Main Target K2 Fm.
Secondary Target K1 Fm.

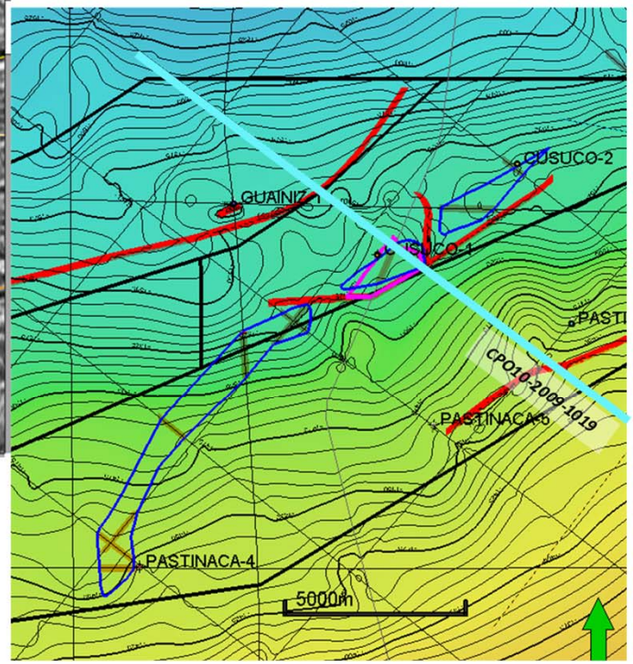
LLA 146 AREA

LLA 146 – SEISMIC INTERPRETATION



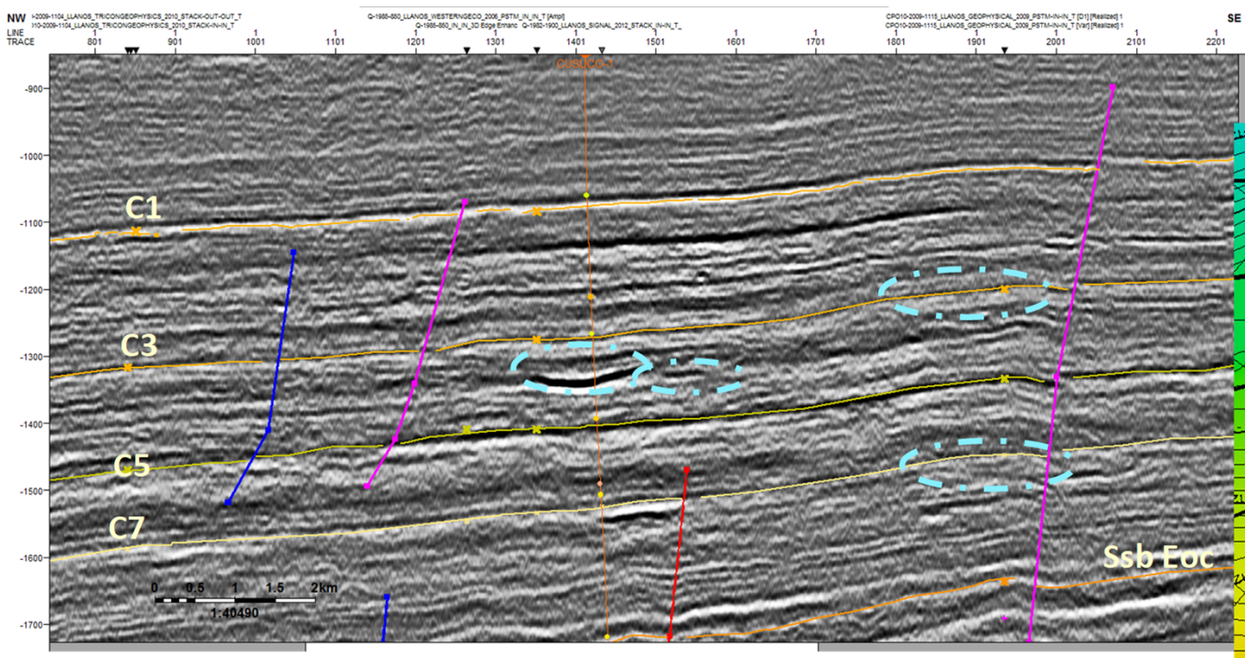
DIP LINE CPO10-2009-1019

Structural Map
Carbonera C7 Top



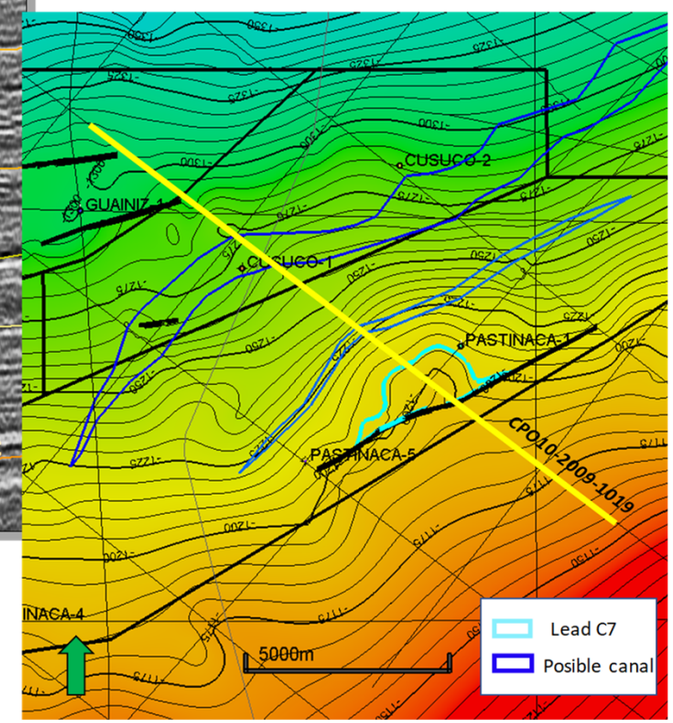
Pastinaca and Cusuco leads are stratigraphic traps with 3 way closure associated to synthetic faults
Main Target Carbonera Fm. C7 Level.
Secondary Carbonera Fm. C3 and C5 Levels.

LLA 146 – SEISMIC INTERPRETATION



DIP LINE CPO10-2009-1019

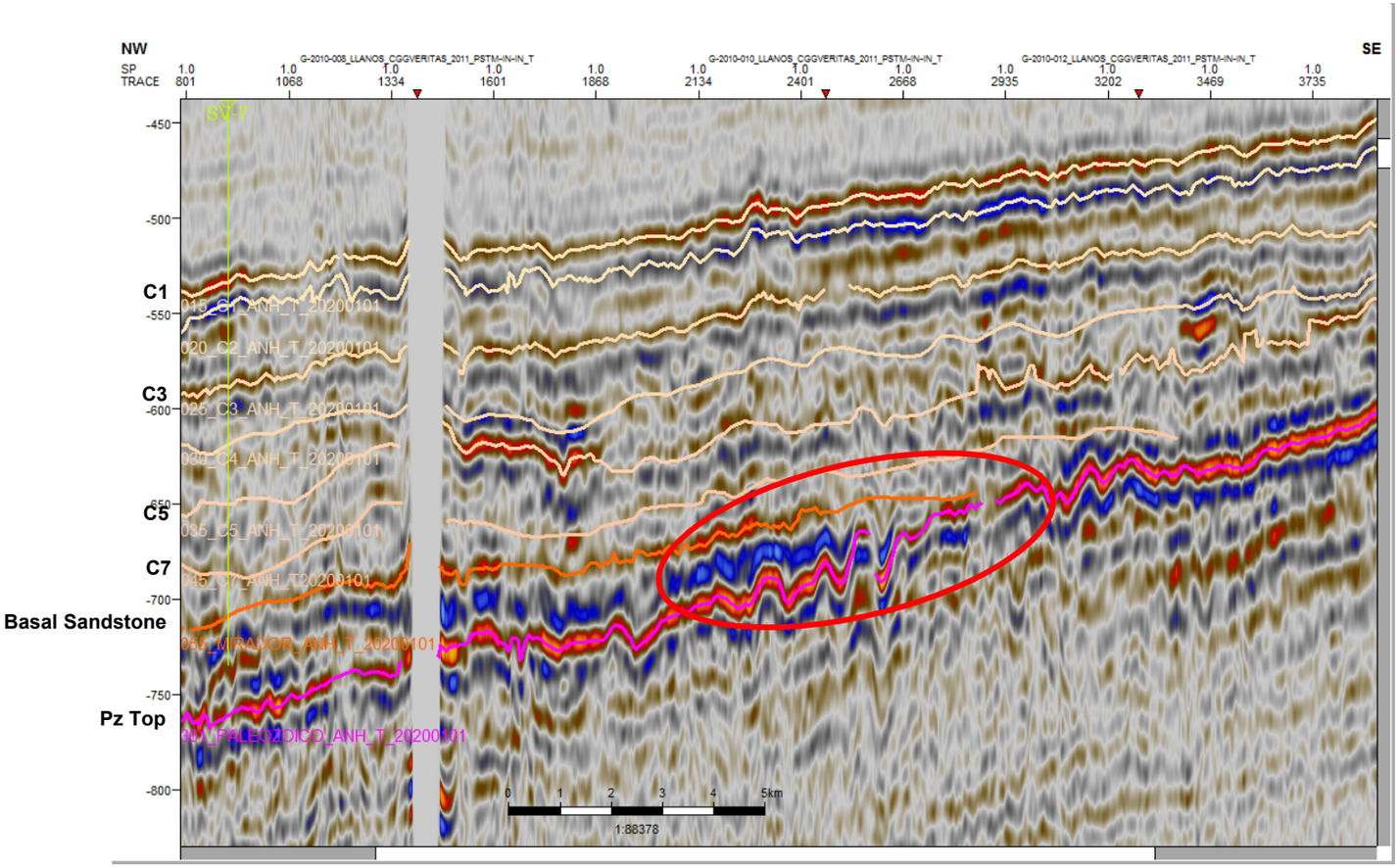
Structural Map
Carbonera C3 Top



Pastinaca and Cusuco leads are stratigraphic traps with 3 way closure associated to synthetic faults
Main Target Carbonera Fm. C7 Level.
Secondary Carbonera Fm. C3 and C5 Levels.

CPE 7-1 AREA

LLA CPE 7-1 – SEISMIC INTERPRETATION



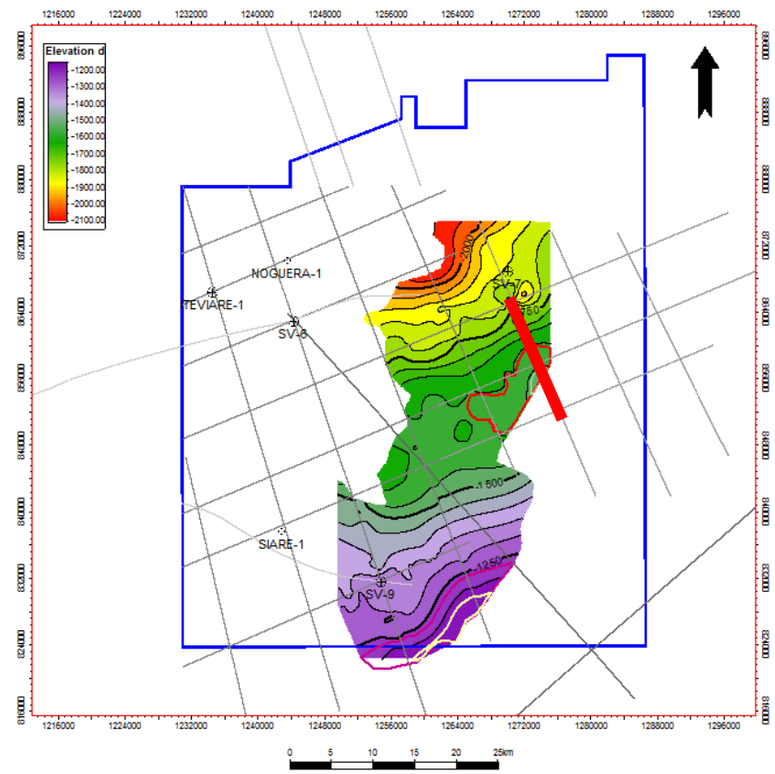
Dip Line G-2010-11

Red and Purple leads are stratigraphic traps, both with pinch-out Basal Sandstone against to Economical Basement

Main Target Basal Sandstone

Secondary Carbonera Fm. C7 Levels.

Structural Map
Basal Sandstone Top

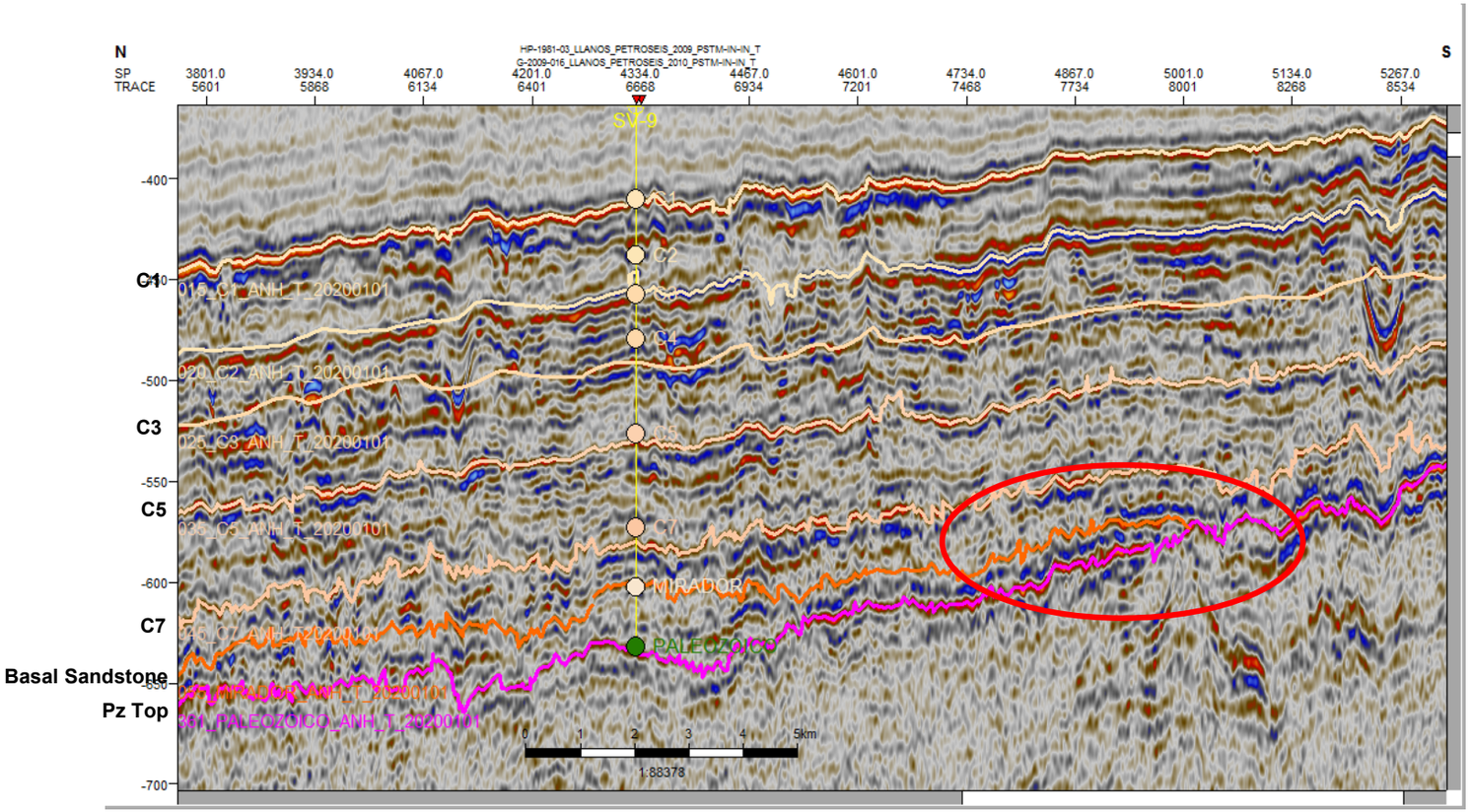


LLA CPE 7-1 – SEISMIC INTERPRETATION

Red and Purple leads are stratigraphic traps, both with pinch-out Basal Sandstone against to Economical Basement

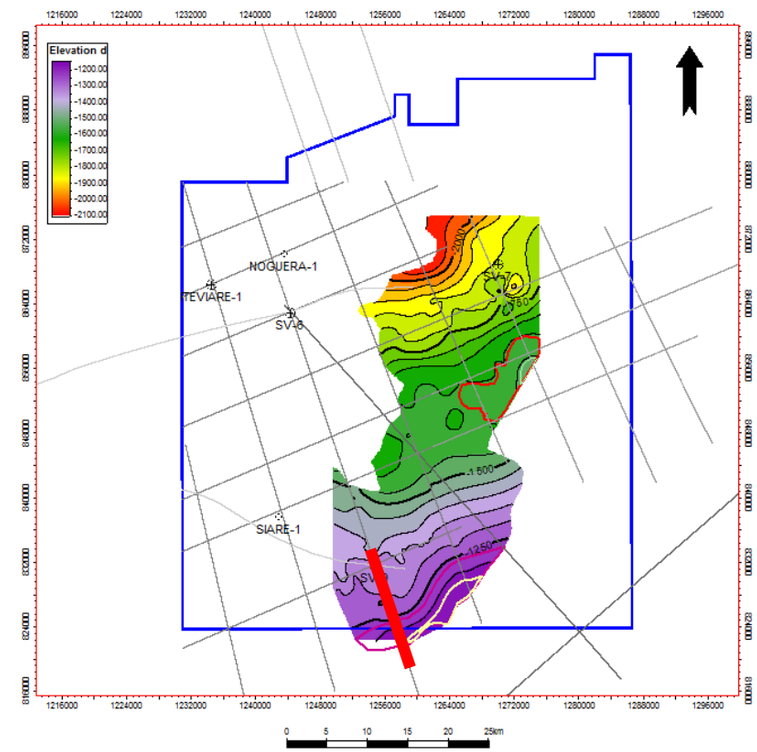
Main Target Basal Sandstone

Secondary Carbonera Fm. C7 Levels.



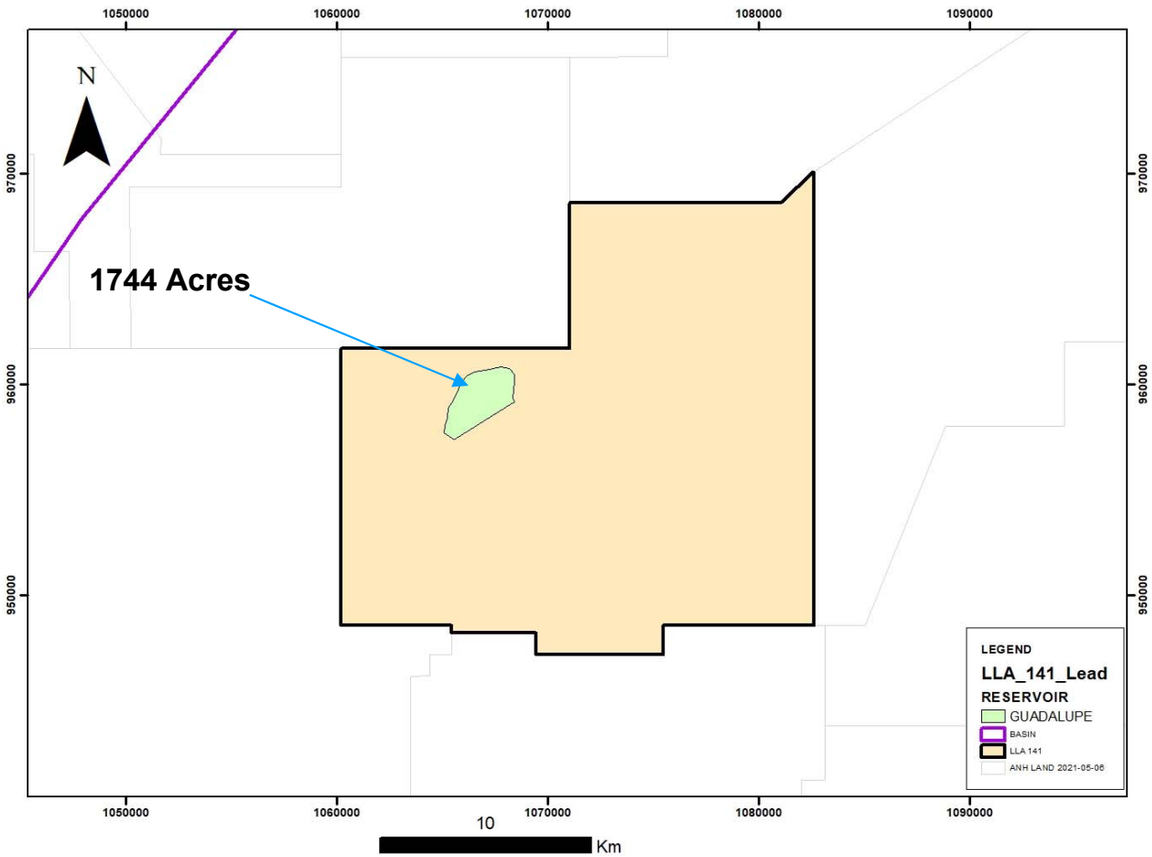
Dip Line C-2009-05

Structural Map
Basal Sandstone Top



PROSPECTIVE RESOURCES

LLA 141 - PROSPECTIVITY



PROSPECTIVE RESOURCES

1 LEAD

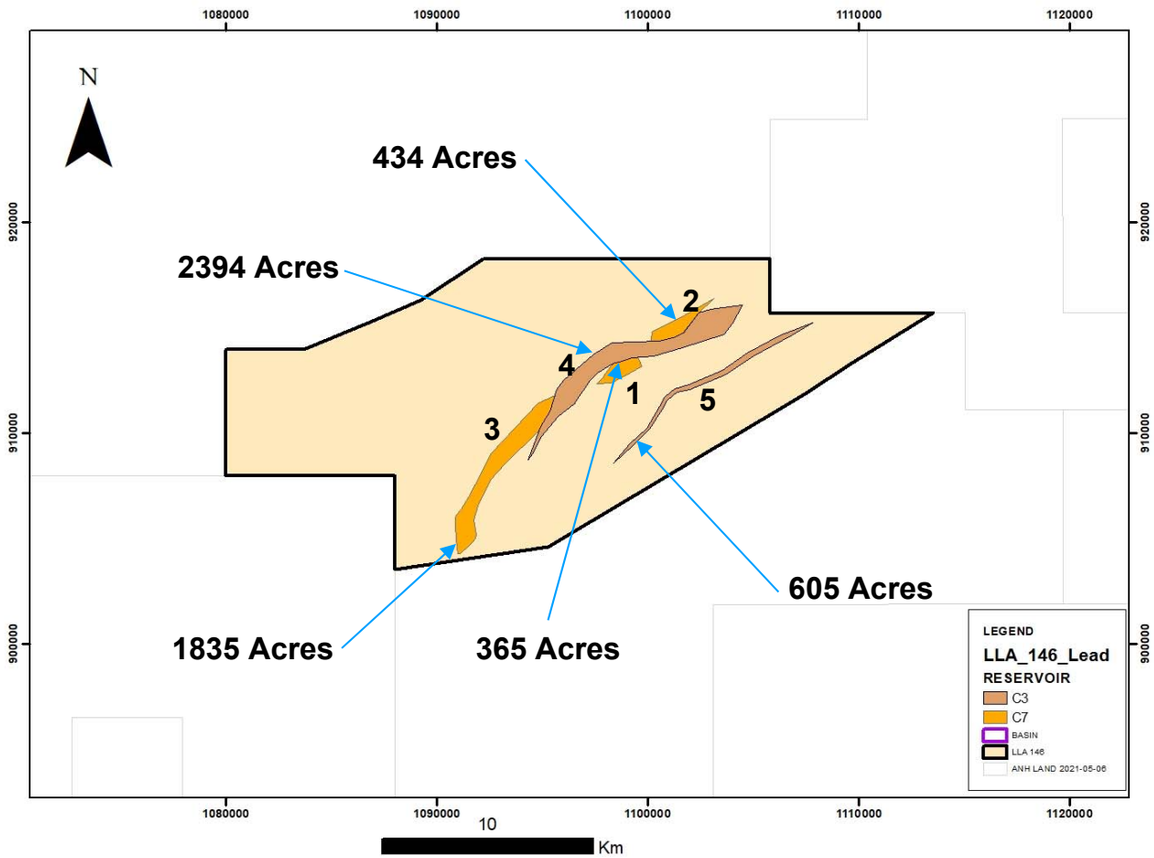
Prospective Resources

Lead No	AREA (Acres)	OOIP (MMBO)	Prospective Resources (MMBO)
1	1744	87.8	4.39

OOIP: 87.8 MMBO

PROSPECTIVE RESOURCES: 4.39 MMBO

LLA 146 - PROSPECTIVITY



PROSPECTIVE RESOURCES

5 LEAD

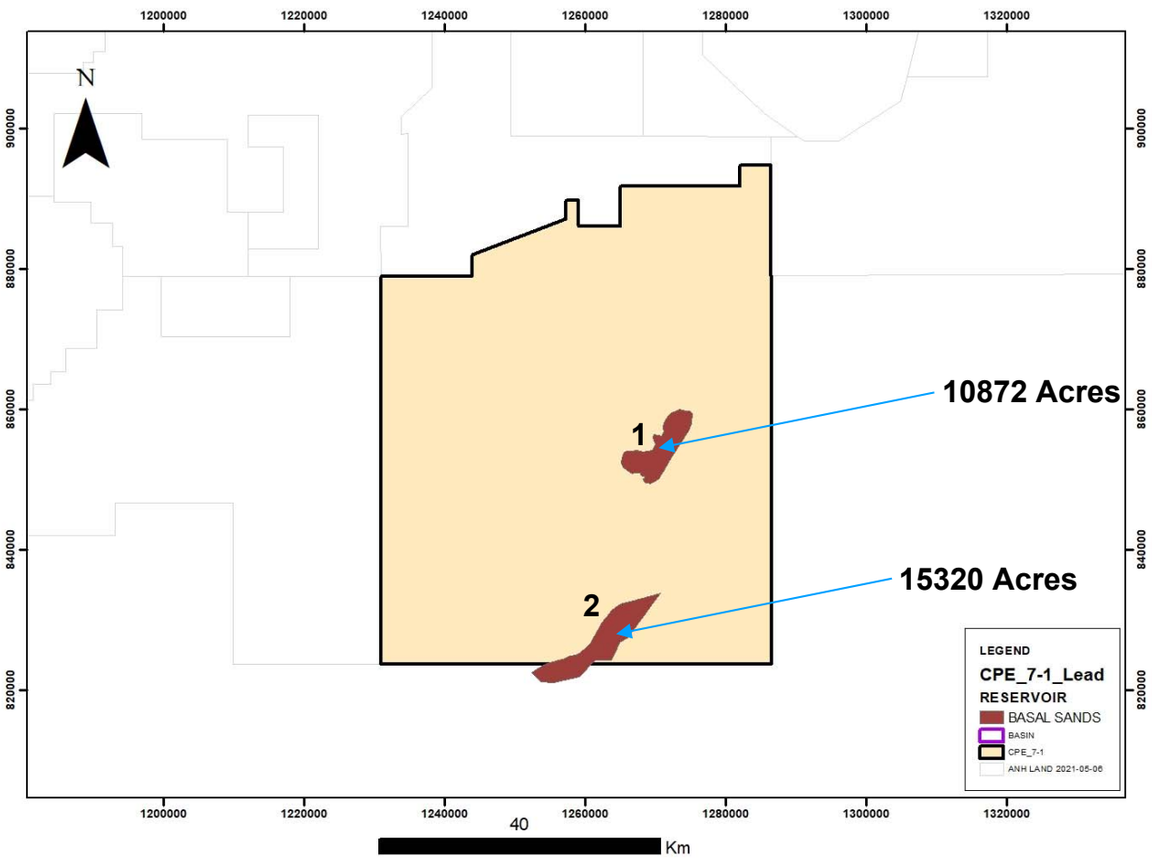
Prospective Resources

Lead No	AREA (Acres)	OOIP (MMBO)	Prospective Resources (MMBO)
1	365	4.85	0.18
2	434	5.71	0.22
3	1835	24.40	0.91
4	2394	23.35	0.88
5	605	5.90	0.22

OOIP: 64.21 MMBO

PROSPECTIVE RESOURCES: 2.41 MMBO

CPE 7-1 - PROSPECTIVITY



PROSPECTIVE RESOURCES

2 LEAD

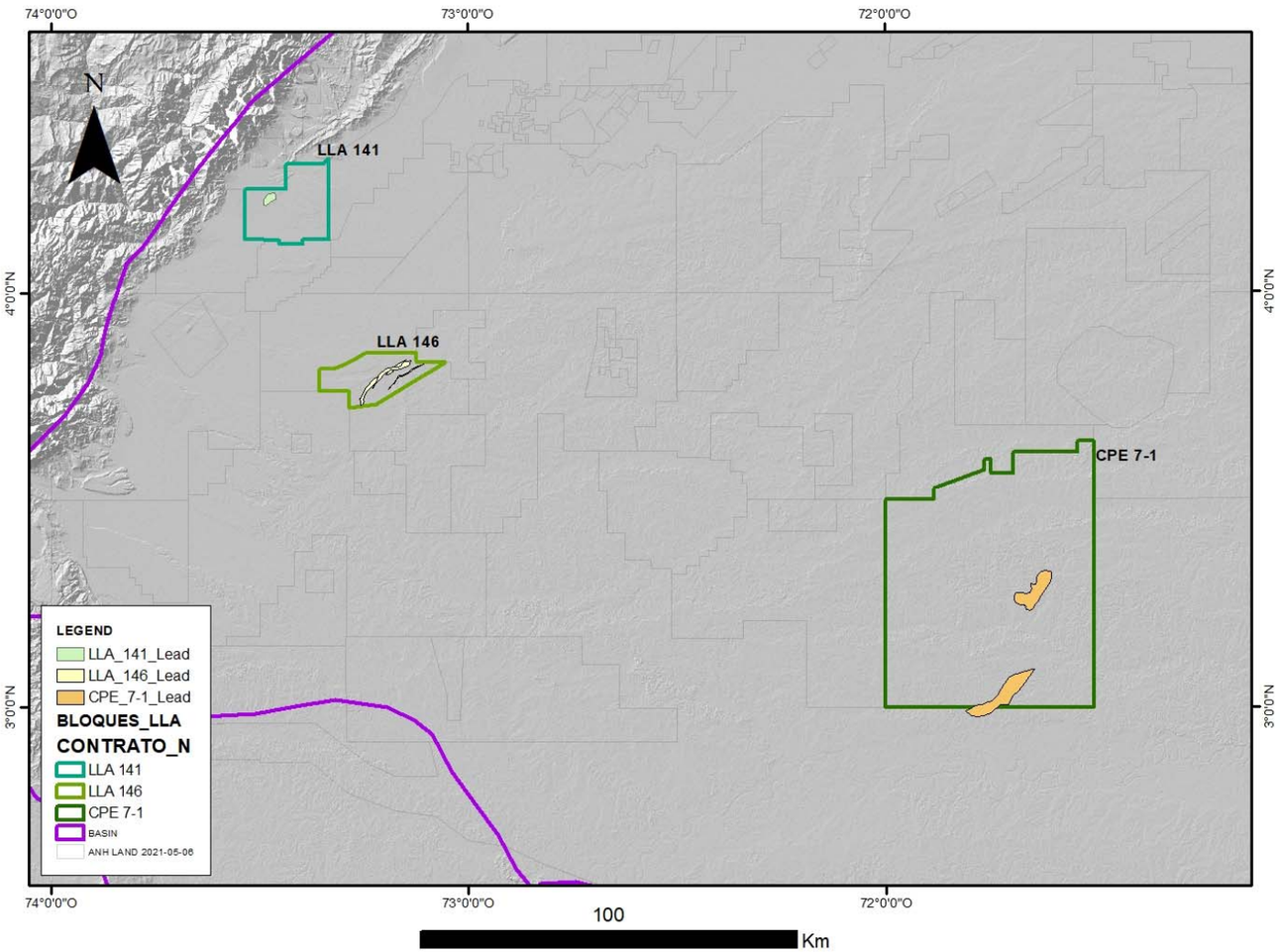
Prospective Resources

Lead No	AREA (Acres)	OOIP (MMBO)	Prospective Resources (MMBO)
1	10872	180.50	4.39
2	15320	128.09	2.56

OOIP: 308.59 MMBO

PROSPECTIVE RESOURCES: 6.17 MMBO

CPE 7-1 - PROSPECTIVITY



Oil (Deterministic)

- **8 leads in total**
- **OOIP: 460.3 MMBls**

Recovery factor	LLA 141 (25%)
	LLA 146 (15%)
	CPE 7-1 (15%)
Chance of success	LLA 141 (20%)
	LLA 146 (15%)
	CPE 7-1 (15%)

- **Prospective Resources**

High Estimate	12.77 MMBls
Best Estimate	**5.61 MMBls**
Low Estimate	0.86 MMBls

CONCLUSIONS

- Three of the six blocks offered by the ANH LLA 97, LLA 110 and LLA 131 are located at the Casanare zone of the Llanos Basin and are characterized for producing light oil in the Mirador and Carbonera C7 sandstones. Two Blocks LLA 146 and CPE 7-1 are located inside Meta department with most of the oil fields nearby produce heavy oil between 10 to 15º API of the Basal Sandstone, and the block LLA 141 is located near to Apiay contract that produce intermediate oil (21ºAPI) of the Guadalupe Fm.

- 16 wells have been drilled in the “light oil” blocks (LLA 97, LLA 110 and LLA 131) while in the “Heavy oil” block (LLA 141, LLA 146 and CPE 7-1) 18 wells have been drilled

- In the “light oil” blocks (LLA 97, LLA 110 and LLA 131) there are 2188 km of 2D seismic and 739 Km2 of 3D seismic coverage. In the “heavy oil” blocks (LLA 141, LLA 146 and CPE 7-1) there are 2553 km of 2D seismic and 265 Km^2 of 3D seismic coverage.

- The main type of trap is associated with anticlines against normal antithetic faults, but in the south east zone of the basin the traps are stratigraphic where the basal sands are pinched to the basement. Towards the top this level there is an angular unconformity against the basal levels of the Carbonera formation

- The depth of the leads is shallow for block CPE 7-1 about 4000 feet MD, intermediate for blocks LLA 110 and LLA 146 between 5800 to 7000 feet, and deep for blocks LLA 141 and LLA 97 with values between 13000 and 14000 and more than 15000 in the foothills area.

- Inside the areas offered by the ANH, 17 leads have been mapped using seismic interpretation with a best estimate of recoverable prospective resources of 10.99 MMBO.

Thanks You