

**INTEROFFICE MEMORANDUM
DEV- 083-2013**

To: Pedro Alarcon / Jae Hwii Gwag / Jin Seok Yi

From: H. Janampa, V. Delgado, H. Cornejo, J.C. Muñoz, E. Borda

Date: 12th November 2013

Subject: **Proposal to Drill Development Well LO16-27D**

It is recommended to drill the proposed well **LO16-27D to develop 196 MBO** of reserves in Basal Salina Formation Northwest of LO16 platform. Programmed TD is 10600' MD (-8700' VSS) and well cost estimated is 4,380 MU\$ (Figures 1, 2, 3, 4)

LO16-27D is proposed as a directional well; with a maximum vertical angle of 38.5° towards N 61° W (Figure 1)

The chance of success (COS) is 80% (Fig. 8)

The proposed location LO16-27D for Basal Salina is located 800 and 1000 meters wells LO6-25ST and LO16-14 respectively. These wells have accumulated 879 and 860 MBO respectively. The proposed well is located in a good trend of sands with 75 and 120 feet of vertical gross sand thickness in upper and Lower Basal Salina (Fig. 7)

The depositional model of the Basal Salina, based on cores and sedimentary studies, indicate that this formation was deposited as Turbidity submarine fans. Lithologically, the Basal Salina formation is composed of medium to coarse grained sandstones and conglomerates, interbedded with thin shale breaks, and according to sedimentary deposition trend, it is expected to find lithological characteristics similar to well LO6-25ST with porosities ranging from 6.5 to 7.5%.

Mogollon formation is considered as a secondary objective where the more recent wells completed in this formation LO6-27D and LO6-29D had an initial rate of 230 BOPD and 834 BOPD. (Mogollon and Rio Bravo) (Fig. 2,4,8,10)

For a complete evaluation, better understanding and modeling of Basal Salina reservoirs, it is recommended a full logging set of gamma ray, resistivity, neutron-density, and Pressure test points in Basal Salina sands (Fig.3)

The main risks associated with this well location are:

- Lateral sedimentary changes that could reduce the net sand thickness and petrophysics properties.

ECONOMIC SUMMARY

CASE	IP (BOPD)	EUR (MBO)	CAPEX (MU\$)	NPV 10.5% (M\$)	PAY OUT (MONTHS)	AT PIR	ROR (%)
LOW	260	98	4,380	771	42.00	0.18	19
BASE	510	196	4,380	4,925	6.00	1.12	69
HIGH	1210	463	4,380	16,266	3.00	3.71	>100

CONSIDERATIONS

Net Revenue Interest %	84%
Discount Rate %	10.5%
Tax	30%
Variable Cost, US\$/BL	0.91
Fixed MUS\$/Year	36.6
Cost MUSD\$	4,380
Oil Price according Portfolio MTP 2012: 95 US\$/BL for 2013 & 2014 phased 2% yearly from 2015 to 2023.	

Base case reserves and IPR for this well are estimated 196 MBO & 510 BOPD respectively, the drilling cost estimated is US\$ 4,380 M, and NPV is US\$ 4,925 M using portfolio parameters with discount rate of 10.5%
(Figures 9, 10 & Tables A & B)

Proposed well is supported with AFE N° 2214329, EIA with Directorial Resolution N° 444-2009-MEM/AEE and risks evaluation according to SIMOP procedure.

Cc: J. Duarte,	C. Hwang;	O. Nieto	E. Borda
J. Garzon	R. Gilabert	V. Peralta	Central File
B. Kim	J. Chuyes	A. Agurto	E. Gonzales
C. Valdizan	C. Montes	R. Corman	L. Torres V
C. Ramírez	K. Valencia	J. Gwag	G. Idiaquez

Attached Documents

Fig.1: Top Basal Salina Fm., showing the proposed well LO16-27D
Fig.2: Top Mogollon Fm., showing the proposed well LO16-27D
Fig.3: Geological Prognosis
Fig.4: Seismic Line showing the proposed well LO16-27D
Fig 5: 3D Seismic Arbitrary Line – Geomage PSTM - Proposed well LO16-27D
Fig 6: NW-SE Structural Cross Section for proposed well LO16-27D
Fig.7: Basal Salina Fm. Gross Sand Map for proposed well LO16-27D
Fig.8: Mogollon Fm. Gross Sand Map for proposed well LO16-27D
Fig.9: NW-SE Stratigraphic correlation of Basal Salina Fm. for proposed well LO16-27D
Fig.10: NW-SE Stratigraphic correlation of Mogollon Fm. for proposed well LO16-27D
Fig 11: Bubble Map of Basal Salina Formation - Estimated oil production and reserves.
Fig 12: Drilling and Cost Time-Depth Chart of well LO16-27D
Table A: Economic Summary and Oil rate forecast for well LO16-27D
Table B: AFE for Proposed well LO16-27D

Z-2B LOBITOS FIELD

TOP UPPER BASAL SALINA FM. – DEPTH STRUCTURE MAP

H. Cornejo / E. Borda

October 2013

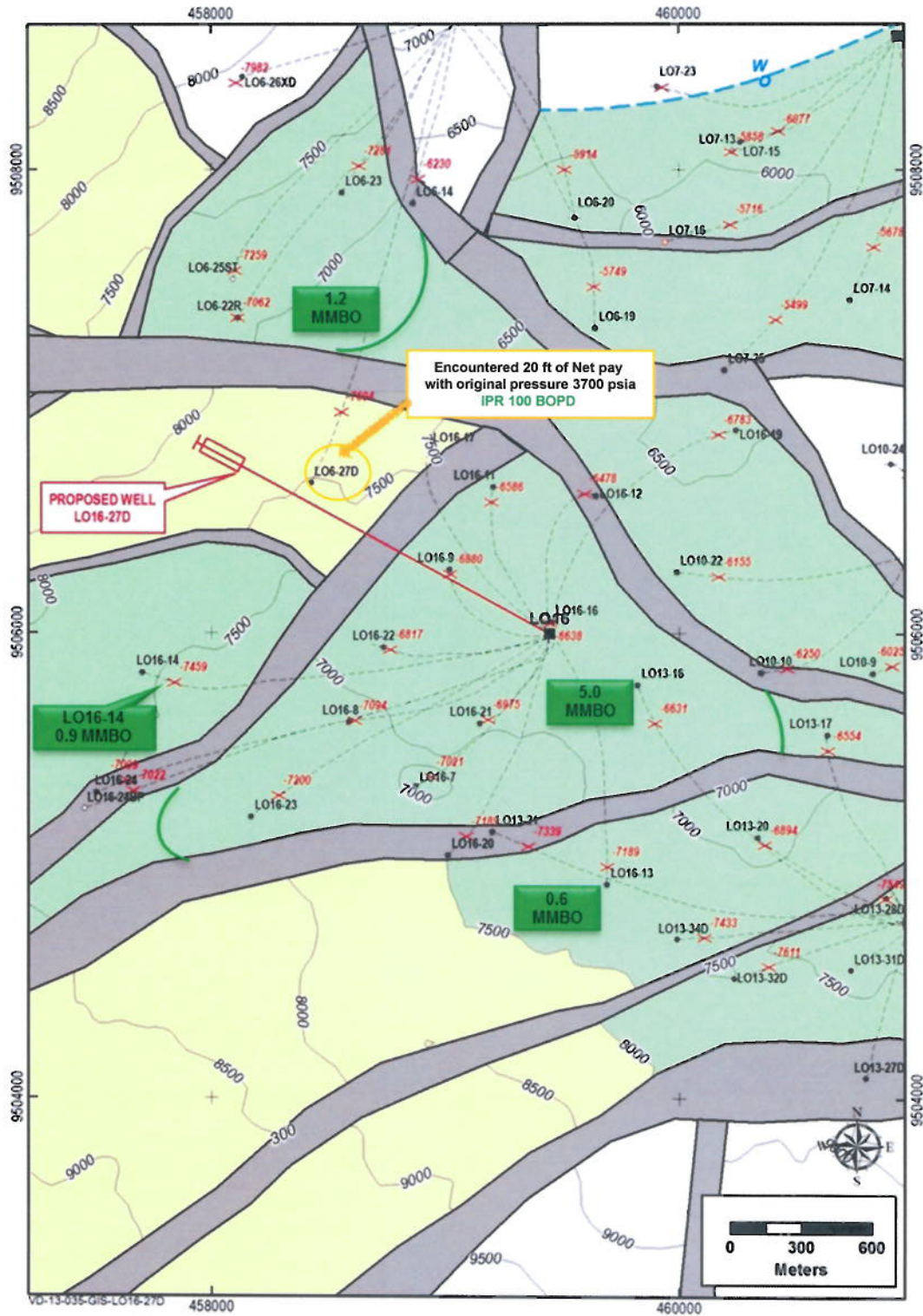


Figure 1

Z-2B LOBITOS FIELD

TOP MOGOLLON FM. – DEPTH STRUCTURE MAP

H. Cornejo / E. Borda

October 2013

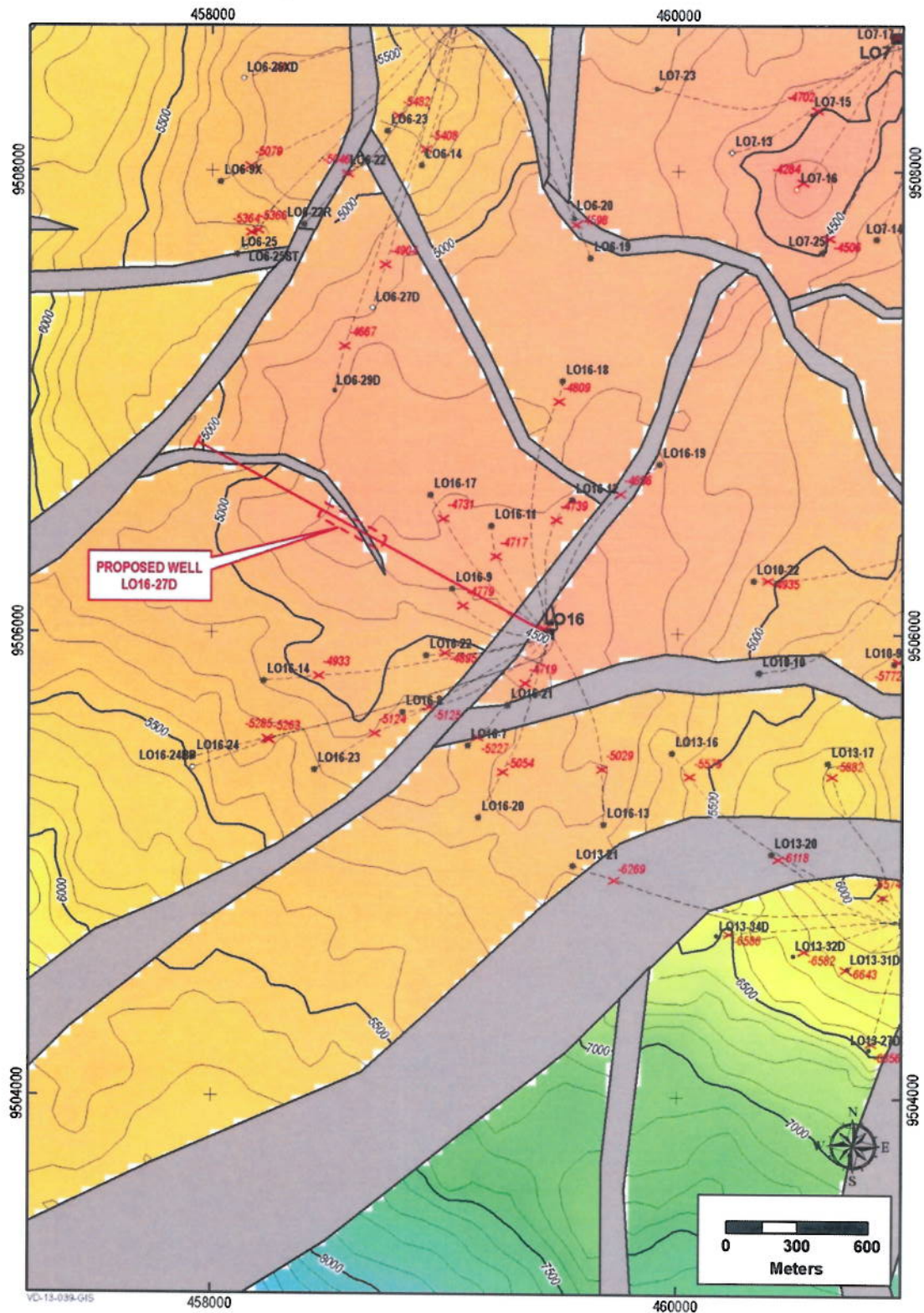


Figure 2

GEOLOGIC PROGNOSIS									
AREA LOBITOS OFFSHORE		OFFICIAL WELL NUMBER		SAVIA PERU SA LO16 - 27D		TYPE OF WELL DEVELOPMENT		RIG N° PEPESA-44	
PRIMARY OBJECTIVE BASAL SALINA				SECONDARY OBJECTIVE MOGOLLON					
SURFACE COORDINATES (UTM) 9'505,998.82 mN 459,445.74 mE (WGS-84)				TARGET COORDINATES (UTM) 9'506,703.90 mN 458,118.62 mE (WGS-84)					
E	KB:	DIRECTION OF DEVIATE WELL N 61° W		T	DRILLED DEPTH	9416 FT		T	ESTIMATED FINAL
L	50 FT	W		A				O	10,600 FT
E	WATER DEPTH	E	ANGLE CONDUCTOR	R	VERTICAL DEPTH	7750 FT		T	HORIZONTAL DRIFT
V	309 FT	L	FROM VERTICAL VERT.	G				D	5,668 FT
A	GROUND LEVEL	L	RECOMMENDED DEPTH	E	HORIZONTAL DRIFT	4930 FT		E	MAX. ANGLE
T.			OF K.O.P. 530 FT	T				P.	38.56°
			BUILD UP ANGLE AT	LIMITS (DIAMETER) TO MAIN OBJECTIVE (LOW. BS)					
			Drop vert. Angle 2.5°/100 FT.	TOP: 100 ft BASE: 100ft					
FORMATION / MEMBER				DRILLED TOP (MD/FT)	VERT. TOP (VD/FT)	SUBSEA TOP (SS/FT)	OBSERVATIONS		
S									
T									
R	TALARA			AT SEA BOTTOM					
A									
T	CHACRA			2574	2,400	2,350			
I									
G	PARIÑAS			4019	3,530	3,480			
R									
A	PALEGREDA			4,224	3,690	3,640			
P									
H	MOGOLLON			5,605	4,770	4,720	SECONDARY OBJECTIVE		
I									
C	SAN CRISTOBAL			7,370	6,150	6,100			
S	BASAL SALINA			9,416	7,750	7,700	MAIN OBJECTIVE		
E									
Q	BALCONES			10,439	8,550	8,500			
U									
E	TD			10,600	8,750	8,700			
N									
C									
E									
C BIT SAMPLES				EVERY 30 FT. FROM SURFACE TO 5500			REMARKS		
O TO BE TAKEN				EVERY 10 FT. FROM 5500' TO TOTAL DEPTH					
N RECOMMENDED									
T FOR									
R PALEO-PALYNOLOGY				PALYNOLOGY AT REQUESTED BY LIMA OFFICE					
L RECOMMENDED				DLL-FDC-CNL-GR					
O OPEN HOLE				Pressure Test (10 Points in Basal Salina)					
G RECOMMENDED									
G AFTER CASING				GR-CCL					
I NEARBY WELLS									
N FOR									
G CORRELATION				LO6-25BP, LO6-22R, LO16-14, LO16-22, LO16-17, LO6-29D					
E SIDEWALL				SWC * HRCT					
V CORES				NOT CONSIDERED					
A CONVENTIONAL									
L CORES				NOT CONSIDERED					
U GAS									
A LOGGER				MUD LOGGING UNIT.					
T. FORMATION									
TESTING				NOT CONSIDERED					
RECOMMENDED BY		DATE		REVISED BY		DATE		APPROVED BY	
H. Cornejo / J.C. Muñoz		Nov. 2013		V. DELGADO / H. JANAMPA		Nov. 2013		P. ALARCON	

Figure 3



Block Z-2B

3D Seismic Line showing the proposed well LO16-27D

E.Borda Oct-2013

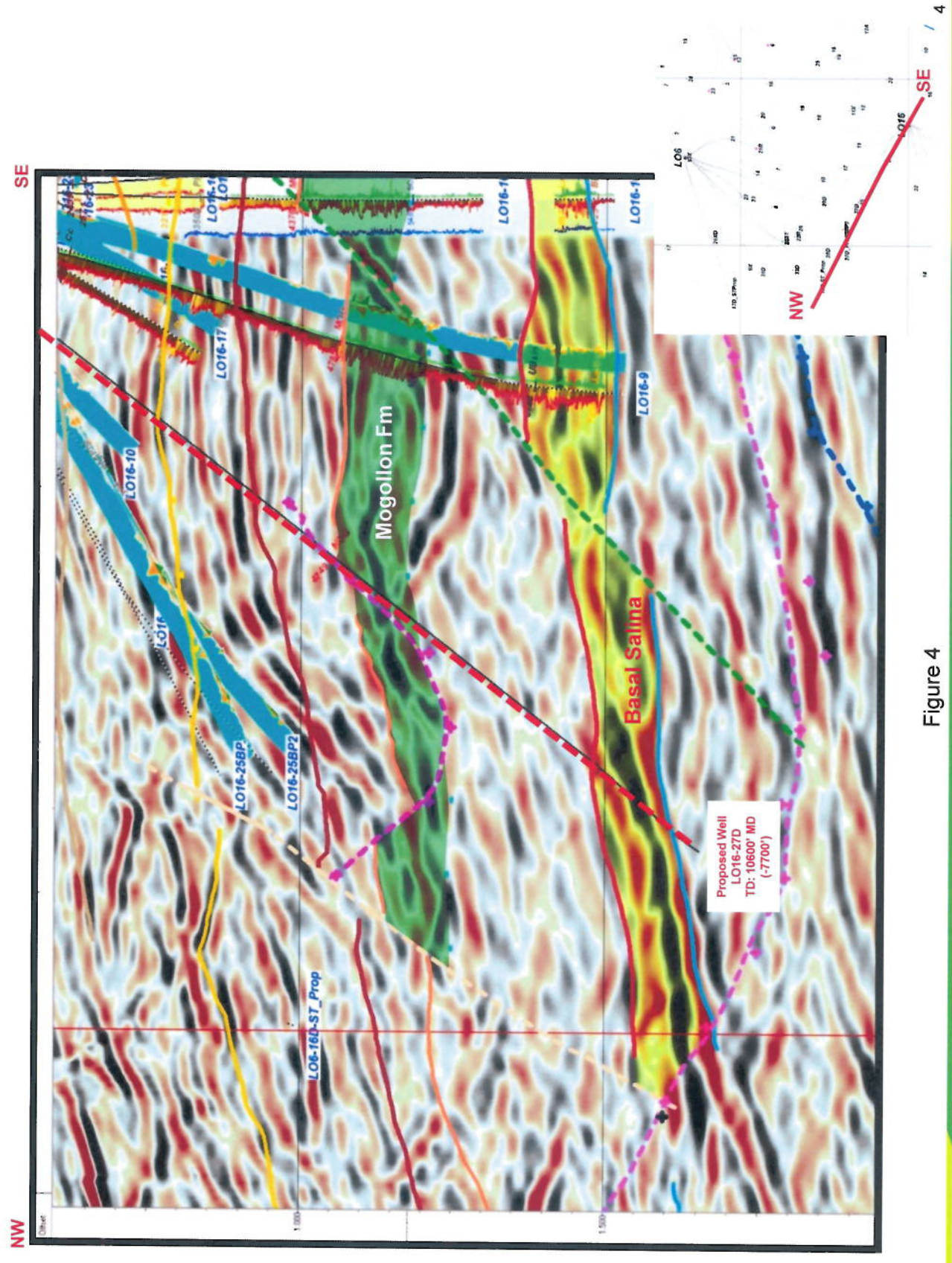
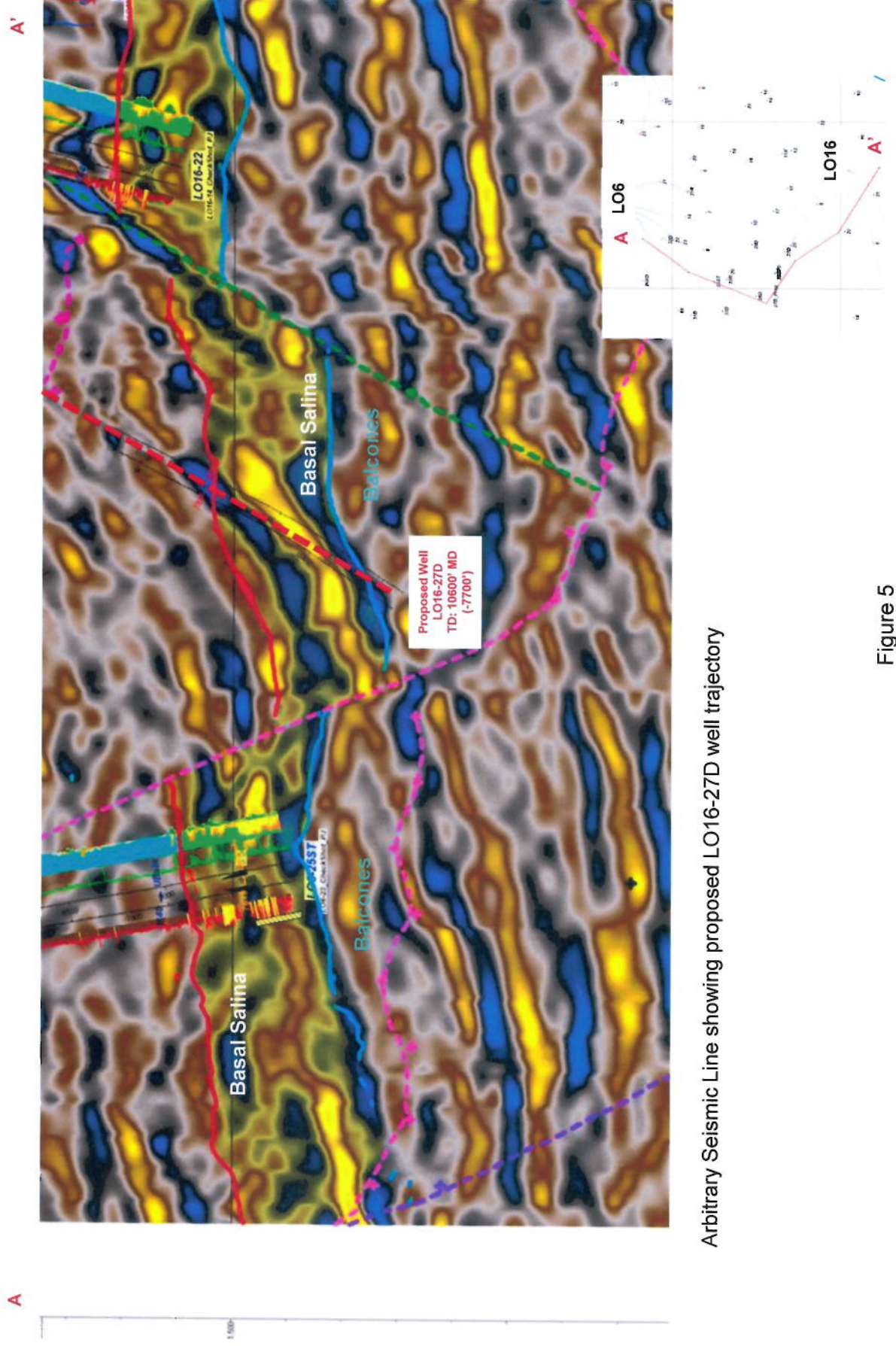


Figure 4



Block Z-2B
Basal Salina LO16 Project
3D Seismic Arbitrary Line- Geomage PSTM
 E.Borda Oct-2013



Arbitrary Seismic Line showing proposed LO16-27D well trajectory

Figure 5

LOBITOS FIELD

NW-SE STRUCTURAL SECTION FOR PROPOSED WELL LO16-27D

Graphic Scale

H. Cornejo

Nov. 2013

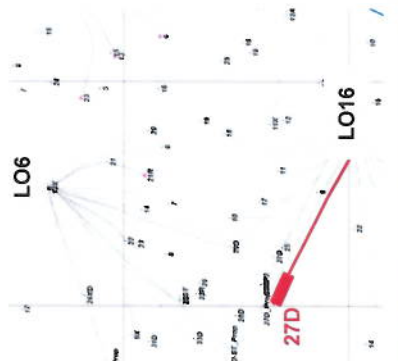
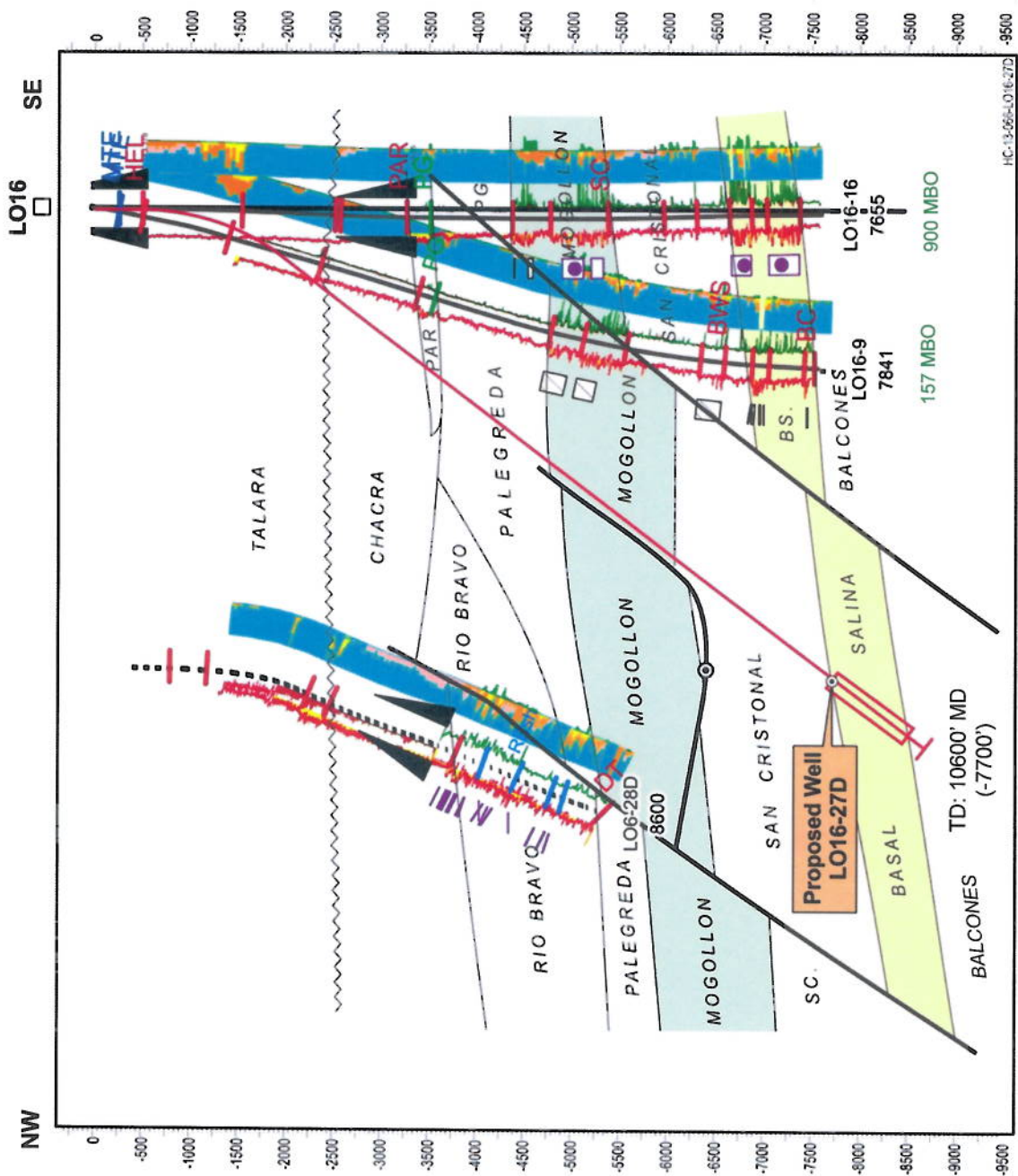


Figure 6



Z-2B LOBITOS FIELD
UPP BASAL SALINA FM. - GROSS SAND MAP
July 2013
C. Canales / E. Coronado

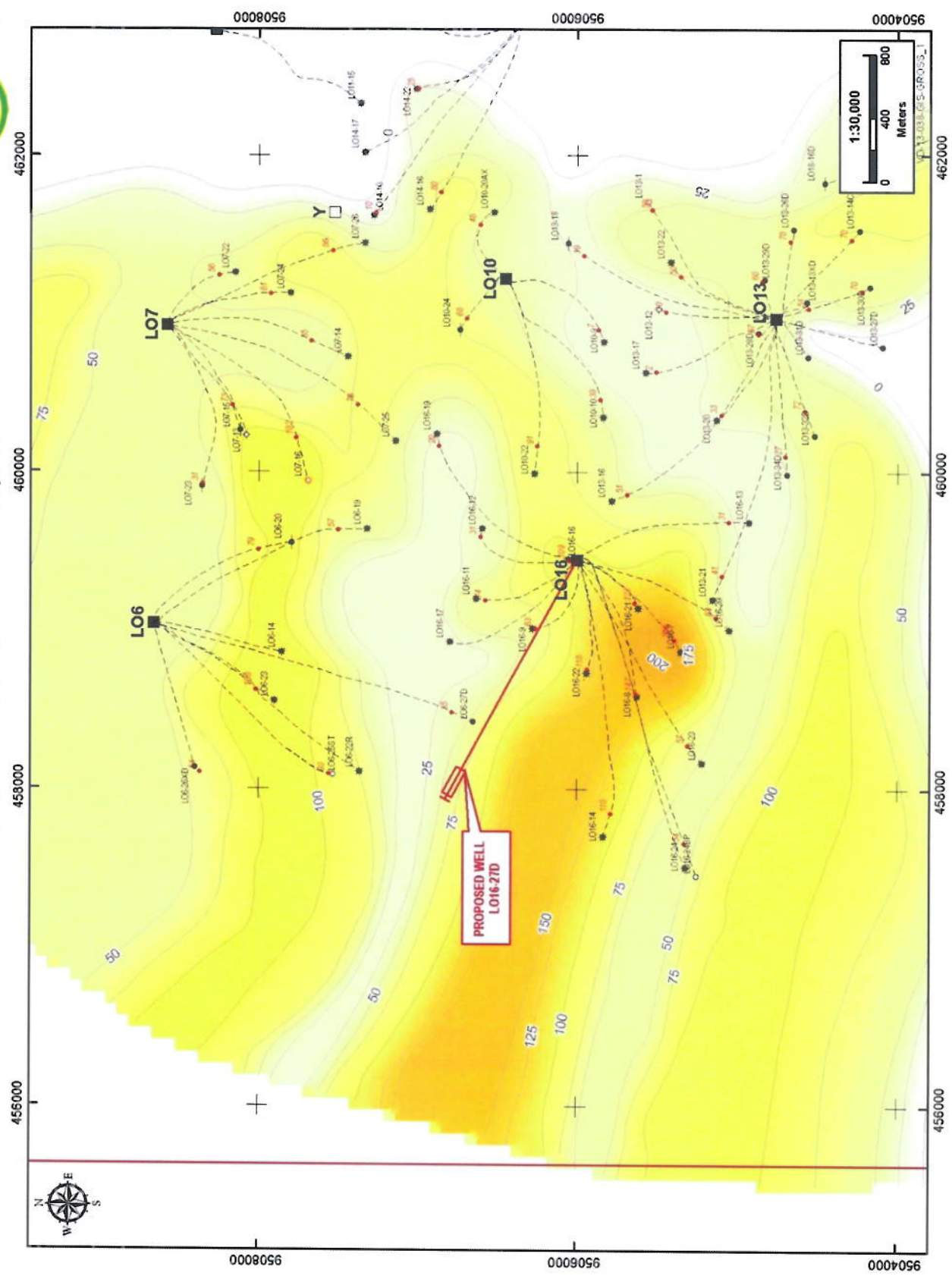


Figure 7



Z-2B LOBITOS FIELD **MOGOLLON FM. - GROSS SAND MAP** July 2013 C. Canales / E. Coronado

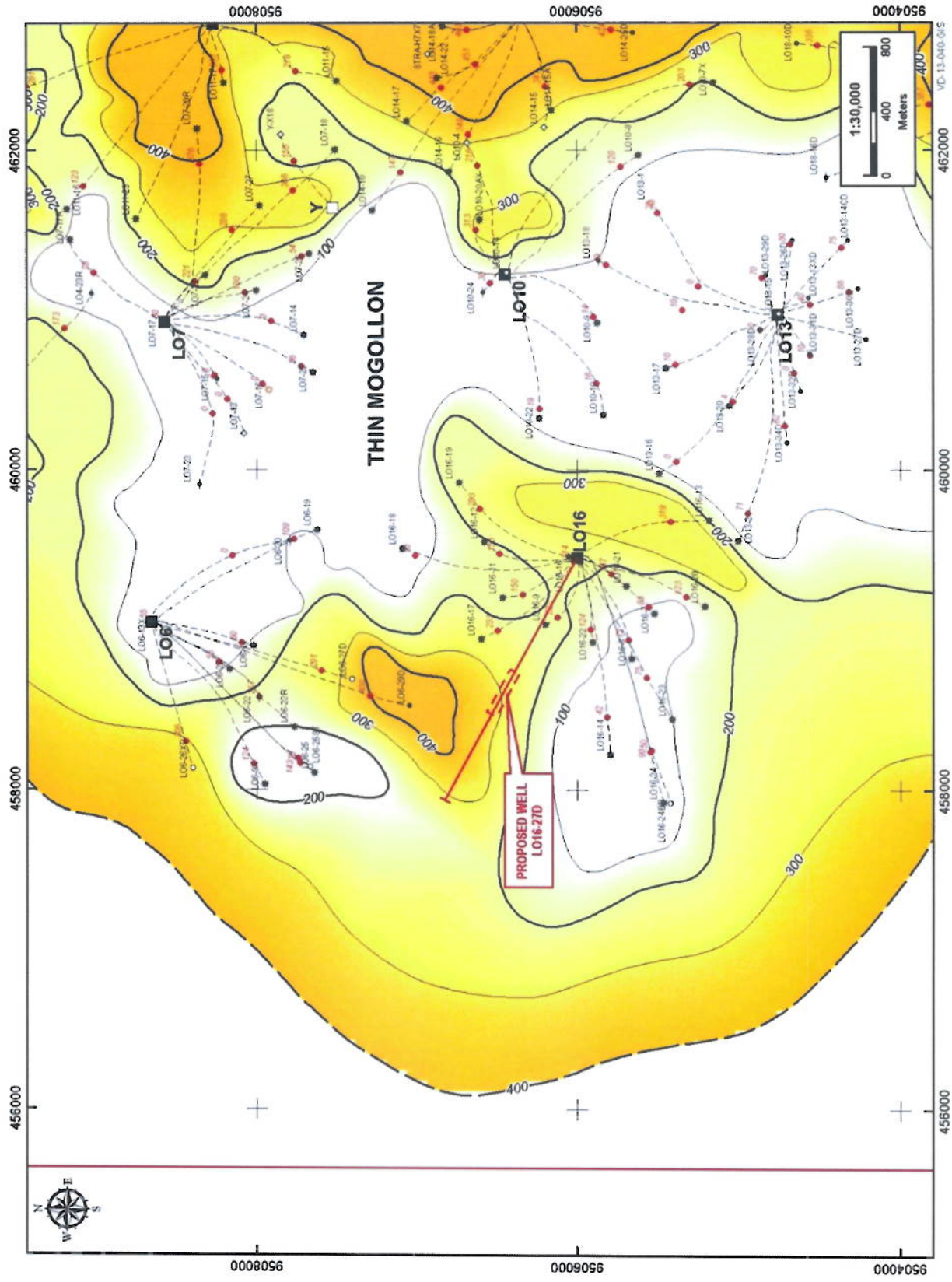


Figure 8

NE-SW STRATIGRAPHIC SECTION A-A' SHOWING BASAL SALINA FM.

Graphic Scale

H. Cornejo

October 2013

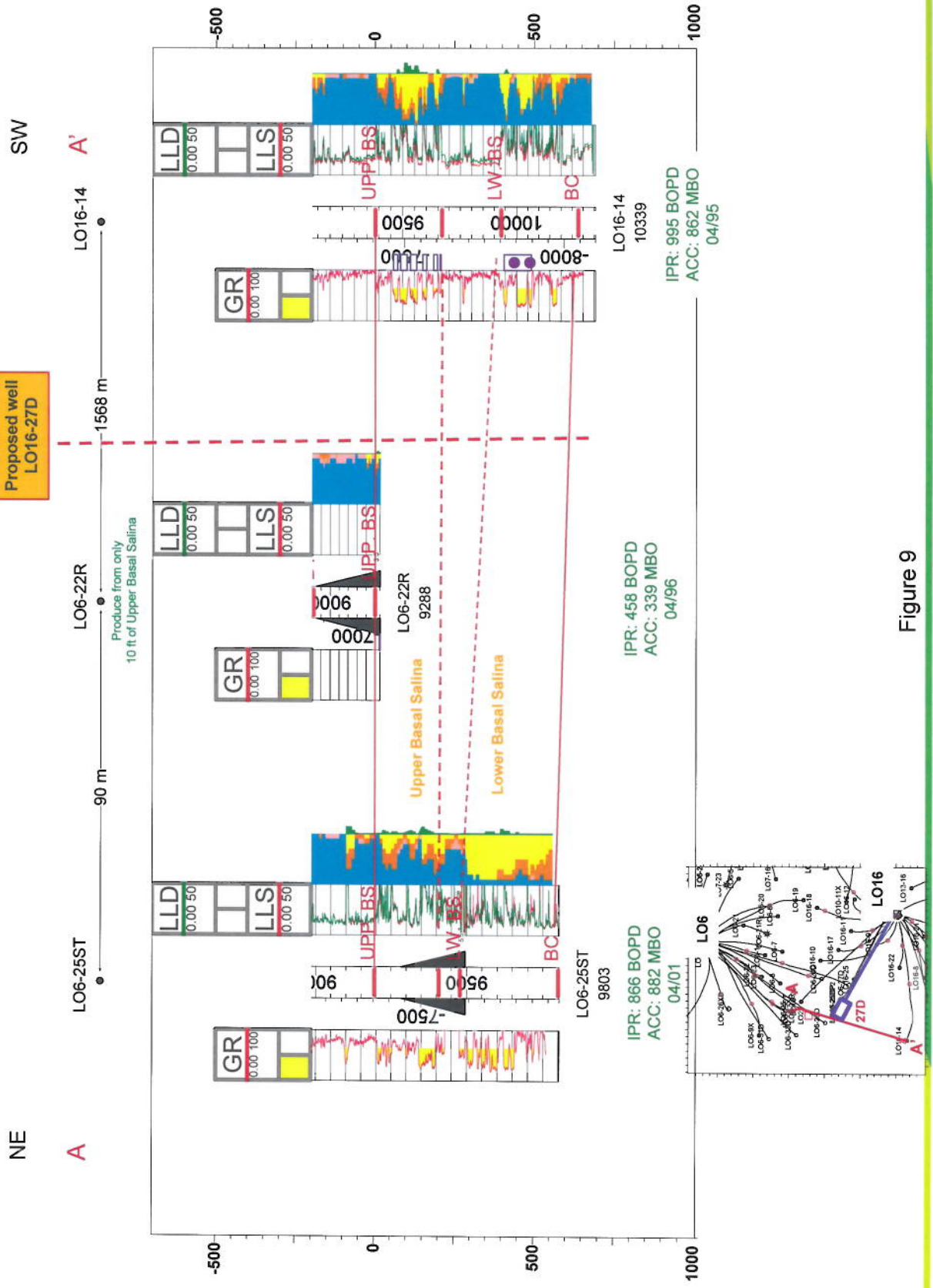


Figure 9

NW-SE STRATIGRAPHIC SECTION B-B' SHOWING MOGOLLON FM.

Graphic Scale

H. Cornejo

October 2013

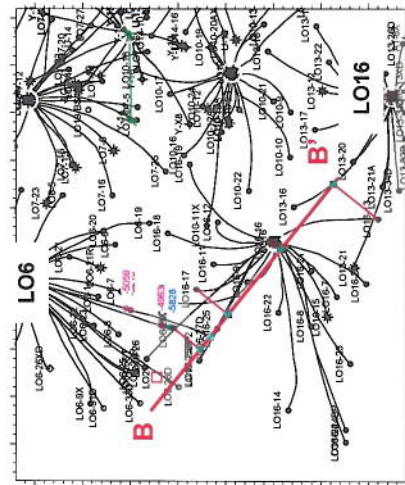
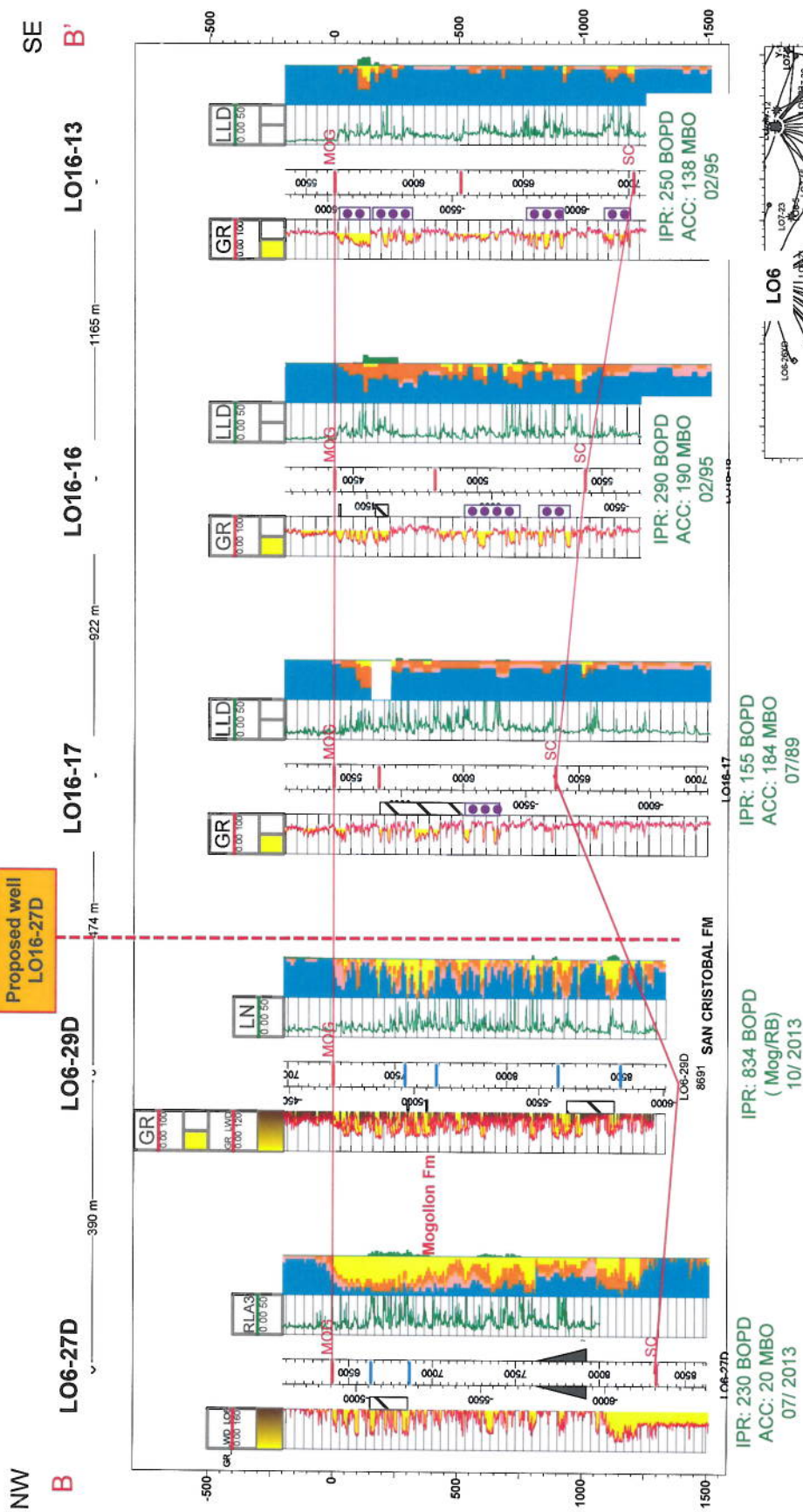
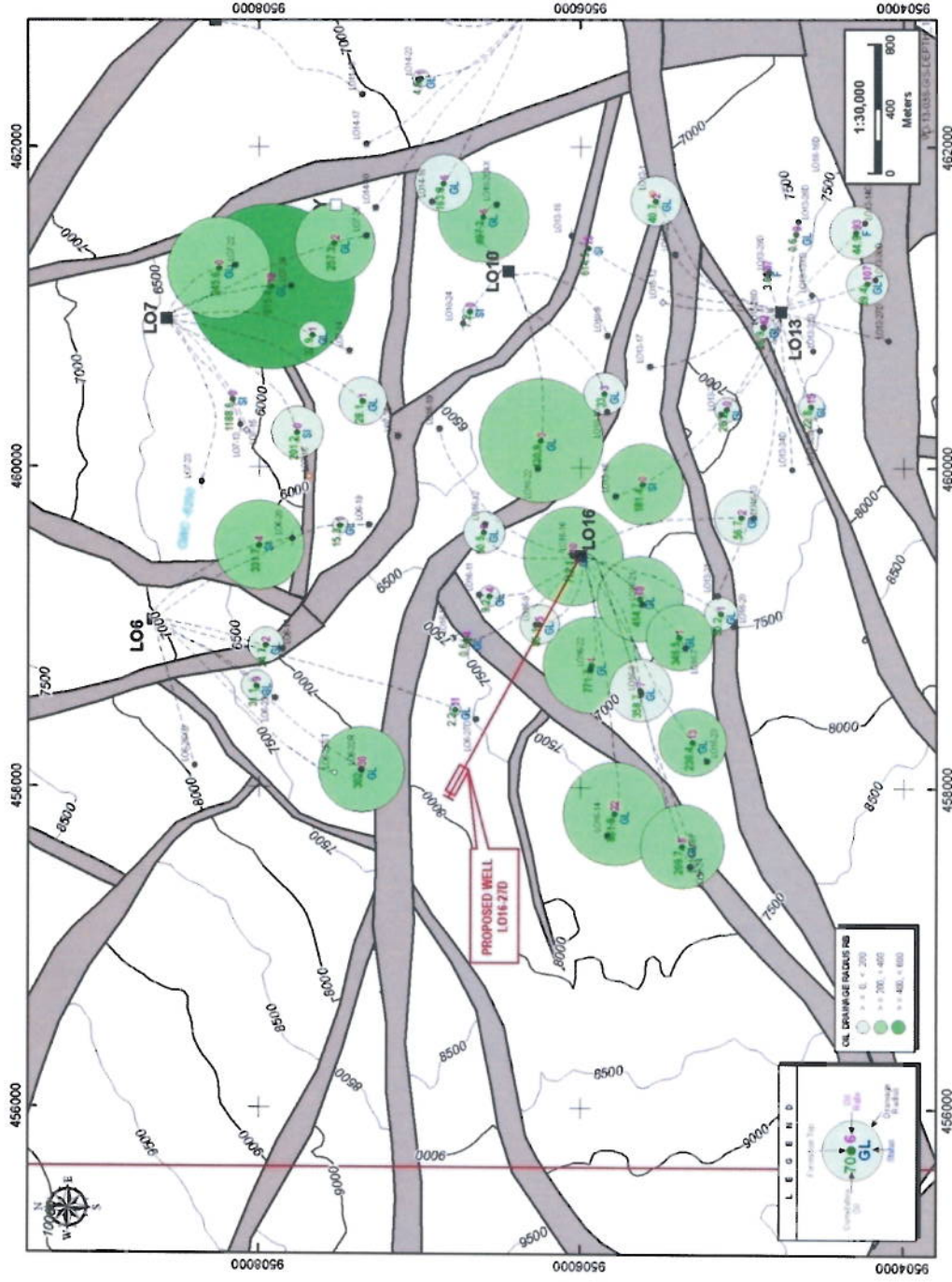


Figure 10

Z-2B LOBITOS FIELD BUBBLE MAP - UPPER BASAL SALINA FORMATION ESTIMATED OIL PRODUCTION AND RESERVES

J. MUNOZ Nov. 2013



ETAPA	BASE ft	TOPE ft	Fm.	Mbro.	Pr inic. psi	Pr act. psi	Depl. %	EUR Mbls	Qo bopd
LOW	8550	7750	BASAL SALINA		4564	4564	0%	98	260
BASE	8550	7750	BASAL SALINA		4564	4564	0%	196	510
HIGH	8550	7750	BASAL SALINA		4564	4564	0%	463	1210

Figure 11

Z-2B LOBITOS FIELD
DRILLING AND COST TIME-DEPTH CHART
 Drilling Department Nov 2013

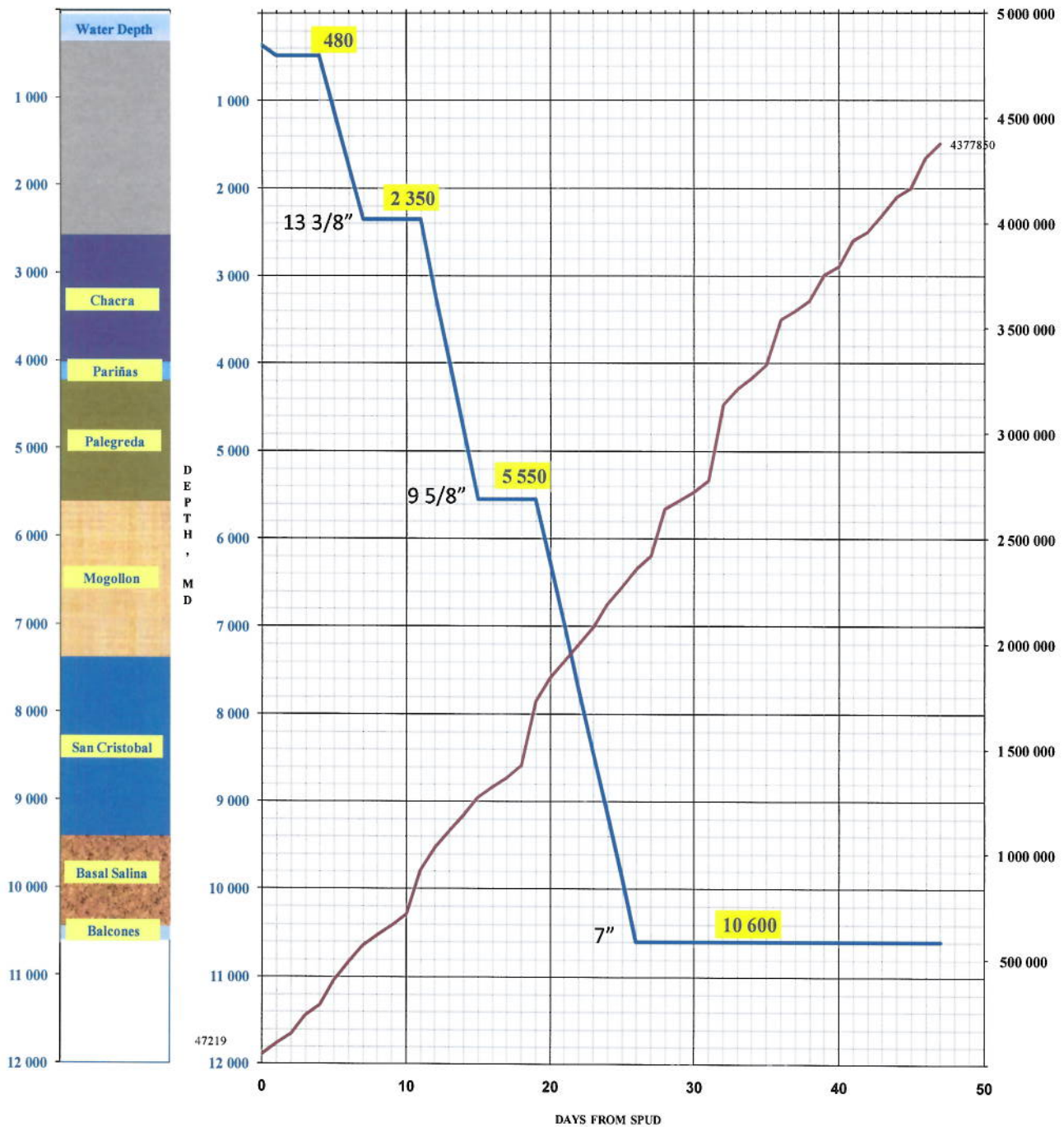


Figure 12

Nov 2013

Economic Summary (Savia)

LO16_27D_BASE

(Nominal values)

Interests & Settings

	Net Revenue	Net Expi	Net Dev	Net Opex	Disc. Rate	BT NPV	AT NPV	PT PIR	AT PIR	DPI	AT ME	AT IE
	(M\$)	(M\$)	(M\$)	(M\$)	(%)	(M\$)	(M\$)	(fraction)	(fraction)	(fraction)	(M\$)	(fraction)
Company (% of Total)	84.00	0.00	100.00	100.00								
Company (% of Contr)	100.00	0.00	100.00	100.00	0.00	11,507.00	7,052.00	2.63	1.75	2.75	-4,360.00	1.75
Partner (% of Contr)	0.00	0.00	0.00	0.00	10.00	8,046.00	5,024.00	1.84	1.15	2.15	0.00	0.00
Contr	84.00	0.00	0.00	100.00	10.00	7,975.00	4,928.00	1.81	1.12	2.12	-4,360.00	1.12
NOC	0.00	0.00	0.00	0.00	11.1	7,761.00	4,808.00	1.77	1.1	2.1	0.00	0
Model	Peru License R Fact (2003)											
Global Params	Savia Peru											
Escalation Date	2013/12					AT ROR (%)	68.96	68.96	68.96	Contr Take (%)	52.25	
Discount Date	2013/12					AT Payout (months)	6.00	6.00	6.00	NOC Take (%)	0.00	
Economic Limit	2023/12					F&D (\$/BOE)	26.59	26.59	26.59	Gov't Take (%)	47.75	

Cash Flow Breakdown

	(\$M)	(\$/BOE)	(\$M) @10.5 %	(\$/BOE) @10.5 %	(%)		Project	Contr	Comp WI	Company	
Net Revenue	16,474.00	100.00	12,811.00	77.77	100.00	Oil	(MSTB)	196.00	165.00	196.00	165.00
Less:						Gas	(MMSCF)	0.00	0.00	0.00	0.00
Bonuses & Fees	0.00	0.00	0.00	0.00	0.00	NGL	(MSTB)	0.00	0.00	0.00	0.00
Operating Costs	587.00	3.56	386.00	2.34	3.56	Total	(MSTB)	0.00	0.00	0.00	0.00
Tariffs	0.00	0.00	0.00	0.00	0.00	Total	(BOE)	196.00	165.00	196.00	165.00
Prod & Asset Taxes	0.00	0.00	0.00	0.00	0.00						
Capital Costs	4,380.00	26.59	4,380.00	26.59	26.59						
Plus: Other Income/Expense	0.00	0.00	0.00	0.00	0.00	Acquisition	(M\$)	0.00	0.00	0.00	0.00
						Exploration	(M\$)	0.00	0.00	0.00	0.00
Before Tax Cash Flow	11,507.00	69.85	8,046.00	48.84	69.85	Development	(M\$)	4,380.00	4,380.00	0.00	4,380.00
Less Income Tax	3,855.00	23.40	3,022.00	18.34	23.40	Abandonment	(M\$)	0.00	0.00	0.00	0.00
After Tax Cash Flow	7,652.00	46.45	5,024.00	30.50	46.45	Total	(M\$)	4,380.00	4,380.00	0.00	4,380.00

Reserves and Investments

		Project	Contr	Comp WI	Company
Oil	(MSTB)	196.00	165.00	196.00	165.00
Gas	(MMSCF)	0.00	0.00	0.00	0.00
NGL	(MSTB)	0.00	0.00	0.00	0.00
Tax	(MSTB)	0.00	0.00	0.00	0.00
Total	(MBOE)	196.00	165.00	196.00	165.00

		Project	Contr	NOC	Company
Acquisition	(\$)	0.00	0.00	0.00	0.00
Exploration	(\$)	0.00	0.00	0.00	0.00
Development	(\$)	4,380.00	4,380.00	0.00	4,380.00
Abandonment	(\$)	0.00	0.00	0.00	0.00
Total	(\$)	4,380.00	4,380.00	0.00	4,380.00

Comp Cash Flow

All values are Company (Comp) Share unless specified otherwise.

Date	Sales Volume	Price	Net Revenue	Sales Volume	Net Price	Net Revenue	(-) Operating	(-) Capital	Amortization	Taxable	(=) Before Tax	(-) Income	(=) After Tax	(=) After Tax
	Oil	Oil	Oil	Total	[BOE]	[BOE]	Costs	Costs		Income	Cash Flow	Taxes	Cash Flow	Cash Flow
	MSTB	\$/bbl	M\$	MBOE	\$/BOE	M\$	M\$	M\$	M\$	M\$	M\$	M\$	M\$	10.5 %
2013(12)				---				4,380.00		---	-4380	---	-4380	-4380
2014(12)	88.00	100.00	7,406.00	88	100.00	7406	117.00	---	1969	5320	7289	1782	5507	4983
2015(12)	31.00	100.00	2,845.00	31	100	2845	67	---	703	1876	2759	628	1951	1597
2016(12)	19.00	100.00	1,619.00	19	100	1619	56	---	430	1132	1562	379	1183	677
2017(12)	14.00	100.00	1,155.00	14	100	52	155	307	---	330	1102	266	836	561
2018(12)	11.00	100.00	895.00	11	100	895	50	---	238	607	845	203	642	390
2019(12)	9.00	100.00	729.00	9	100	729	49	---	194	466	680	163	517	284
2020(12)	7.00	100.00	616.00	7	100	616	49	---	164	403	567	135	432	215
2021(12)	6.00	100.00	530.00	6	100	530	49	---	141	340	481	114	367	165
2022(12)	6.00	100.00	465.00	6	100	465	49	---	124	293	416	98	318	130
2023(12)	5.00	100.00	414.00	5	100	414	49	---	110	255	365	85	280	103
Total	196.00	100.00	16,474.00	196.00	---	16,474.00	587.00	4,380.00	4380	11507	11507	3655	7652	4925

Peep Version 2009.1

CONSIDERATIONS

Net Revenue Interest %	84%
Discount Rate %	10.5%
Tax	30%
Variable Cost, US\$/BL	0.91
Fixed MU\$\$/Year	36.6
Cost MUS\$	4,380

Oil Price according Portfolio MTP 2012: 95 US\$/BL for 2013 & 2014 phased 2% yearly from 2015 to 2023.

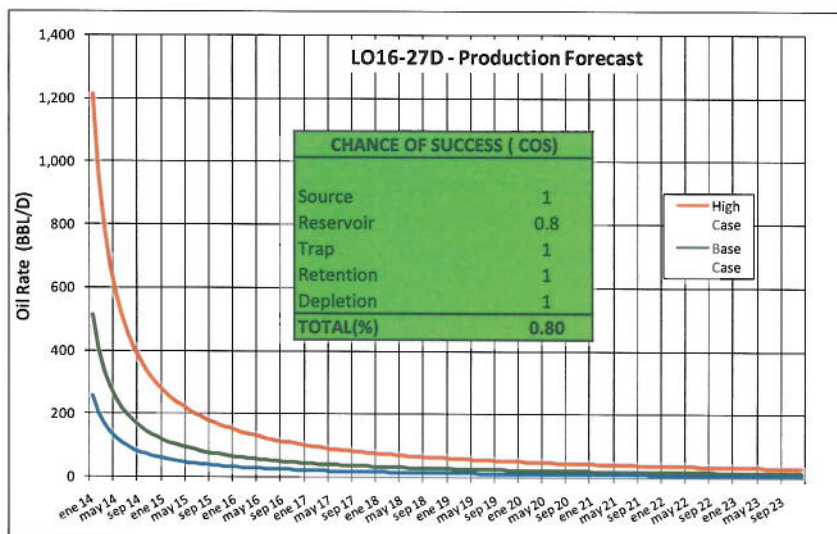


TABLE A

Z-2B LOBITOS FIELD

AFE

Drilling Department

Nov 2013



LO16-27D

CIA	ACD	BUDGET ITEM
06		

AFE No.
2214329

FU	WELL DESCRIPTION	OFFICIAL NUMBER	MM / DD / AA
18	LO16-27D	SAVIA-Z2B-24-LO16-27D	

FU	TYPE OF WELL	MOV / COND	DRILLING	COMPLETION	EST. FOOTAGE	AREA
19	DEVELOPMENT	1	26	21	10600	LOBITOS

FU	GEN	CC	AREA
20		061	

WELL COST BREAKDOWN

SUB	DESCRIPTION	QUANTITY	UNIT COST	SUB-TOTAL	TOTAL US\$
OUTSIDE SERVICES:					
201	DRILLING RIG	22	26		1 030 000
203	DIRECTIONAL DRILLING				345 760
204	MUD LOGGING	27	1450		39 150
205	MUD ENGINEERING				214 890
206	CEMENT CONDUCTOR				13 990
206	CEMENT. SURF. COG. (13 3/8")				22 060
206	CEMENT. INTERM. COG. (9 5/8")				22 890
206	CEMENT. OTHERS				17 150
206	CEMENT 7" COG.				0
206	CEMENT 5.5" COG.				21 990
207	ELECTRIC LOGGING				150 000
208	PERFORATING				150 000
209	STIMULATION				100 000
211	TUBULAR INSPECTION				13 250
212	HYDRAULIC TONGS				55 200
213	DIVING				10 500
219	WELL TESTING				8 000
221	TOOL SERVICES				26 060
224	METALIC STRUCTURES CUT & WELD				2 500
228	MACHINE WORK				7 500
229	BARGE OPERATIONS				216 000
231	BOAT OPERATIONS				297 600
237	MATER. & EQUIP. TRANSP.				16 800
240	WATER FURNISHING				15 000
243	CHARTER				0
244	TOOLS RENTAL				34 550
248	CATERING				43 200
249	CONSULTING				60 000
252	ENVIRONMENTAL PROTECTION				6 500
	TOTAL OUTSIDE SERVICES:				2 940 690
MATERIALS & SUPPLIES:					
301	FITTING SCREWED				220
303	VALVES AND PARTS				800
304	API FLANGES & RING GASKET				800
306	HARDWARE				1 000
325	BITS				109 600
326	TOOLS FOR DRILLING				63 790
327	COMPLETION EQUIPMENT				93 500
328	FLOATING EQUIPMENT - CMT.				18 710
329	PRODUCTION FACILITIES EQUIP.				1 500
335	OTHERS TUBULAR CONNECTIONS				7 500
336	STRUCTURAL CONST. MAT.				2 500
340	WELDING MATERIAL				700
341	MAT. CMT. CONDUCT.				2 400
341	MAT. CMT. SURF. COG. (13 3/8")				17 160
341	MAT. CMT. INTERM. COG. (9 5/8")				27 750
341	MAT. CMT. 7" COG.				0
341	MAT. CMT. 5.5" COG.				52 000
341	MAT. CMT. OTHERS				5 540
342	STIMULATION MATERIAL				100 000
343	DRILLING / COMPLETION FLUIDS				65 750
344	CONDUCTORS	480	45.50		21 940
344	SURFACE COG. (13 3/8")	2350	45.50		106 930
344	INTERM. COG. (9 5/8")	5550	34.00		188 700
344	7" COG.	0	21.00		0
344	5.5" COG.	10500	18.00		190 800
344	4.5" LINER	0	18.70		0
344	2 7/8" TUBING	10000	5.90		59 000
346	DIESEL-FUEL				291 230
347	OIL & GRADES	1			7 500
	TOTAL MATERIALS & SUPPLIES:				1 437 829
TOTAL PROJECT COST US \$					4 377 860

TABLE B