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**INTEROFFICE MEMORANDUM
DEVN-024-13**

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

From: H. Jahanpā, H. Cornejo, J.C. Muñoz, E. Borda

Date: May 15th, 2013

Subject: **Proposal to Drill Development Well LO6-31D**

In order to continue developing the Rio Bravo reservoir towards south of LO6 platform in the Lobitos field, it is recommended to drill the proposed well **LO6-31D**, which will be located in a large reservoir block, where several wells have been drilled with good IPR's and cumulative production. Well control and 3D seismic data were used to locate the proposed well (Figures 1, 3, & 4)

Near production wells to proposed well are: LO6-22 with 624 BOPD of IPR and 352 MBO of accumulated, likewise the LO6-7, LO6-8 and LO6-9X with 155BOPD, 634 BOPD and 103 BOPD of IPR's and accumulates of 305 MBO, 249MBO and 87 MBO respectively. (Fig. 6)

Due to Rig capacity, the drilling design for **LO6-31D** is proposed as deviated well; with a maximum vertical angle of 59.21° towards S 57.03° W. Estimated final total depth is 8544 feet MD (-5300 feet VSS) (Figures 1, 2 & 4).

The top of Rio Bravo in the proposed **LO6-31D well**, will be located at 570 meters of last well drilled LO6-28D. (Fig.1)

The Chance of success (COS) is **80 %**

From sedimentary point of view, it is necessary to mention that the Rio Bravo formation consist of several sequences of sands, which act as independent reservoirs (Fig. 3).

The vertical sequence of Rio Bravo suggest that this formation was deposited as Deep sea Fan complex in the lower section, grading to Shallow marine sands in the upper section, restricted to coastal facies with presence of shell fragments, with beach sand bars cut by channels. This sequence constitute the main reservoir sands based on production, lithology and electrical characteristics, likewise according to last 3D reprocessed seismic, several cross lines have confirmed the time line during the sedimentation of Rio Bravo, with progradation from northeast to southwest therefore is important to find the zones where these sands were deposited .

Due to future development of the block, it is important to keep the vertical angle and direction as close as possible to proposed **LO6-31D well** (Figures 1, 2, 4 & 5)

The proposed well **LO6-31D** ,is located in a large developed reservoir block, where it is expected to find the top of Rio Bravo at 5175 feet MD (-3340 feet VSS), with 250 feet of vertical net sand thickness (Figures 1, 2 & 5)

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Lithologically, Rio Bravo formation is composed of light gray, sub angular to sub rounded fine to medium grained sandstones, with calcareous cement, interbedded with thin shale breaks. According to seismic interpretation this well could find a different sand sequence in Rio bravo (Fig. 3),

For a complete evaluation, better understanding and modeling of Rio Bravo reservoir, it is recommended a full logging set of gamma ray, resistivity, neutron-density and Pressure test points in Rio Bravo sands (Figure 2)

Based on production of neighboring wells for a Base Case, it is expected to produce with initial rate of 350 BOPD and reserves of 231 MBO for Rio Bravo (Fig. 7 & Table A)

The main risks associated with this well location are:

- Structural risk due to the existence of possible minor faults that could reduce the size of the block.
- Sedimentary changes that could reduce the net sand thickness and petrophysics properties.
- Unexpected low permeable sands could reduce production performance.

ECONOMIC SUMMARY

CASE	IP (BOPD)	EUR (MBO)	CAPEX (MUS\$)	NPV 10.5% (M\$)	PAY OUT (YRS)	AT PIR	ROR (%)
LOW	180	121	3,985	1,724	2.83	0.43	35
BASE	350	231	3,985	6,138	1.17	1.54	>100
HIGH	610	403	3,985	13,051	0.67	3.27	>100

CONSIDERATIONS

Net Revenue Interest %	84%
Discount Rate %	10.5%
Tax	30%
Variable Cost, US\$/BL	0.91
Fixed MUS\$/Year	36.6
Cost MUS\$	3,985
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 231 MBO & 350 BOPD respectively, the drilling cost estimated is US\$ 3985M, NPV is US\$ 6138M using portfolio parameters with discount rate of 10.5%
(Figures 7,8 & Tables A & B)

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J. Gwag	L. Torres	E. Gonzales	

Attached Documents

Fig. 1: Structural Map showing the Proposal Well ILO6-31D
Fig. 2: Geologic Prognosis
Fig. 3: SW-NE 3D seismic Line for proposal well LO6-31D
Fig. 4: SW-NE Structural Cross Section for proposal well LO6-31D
Fig. 5: Net Sand Thickness Map for Proposal well LO6-31D
Fig. 6: NW-SE Stratigraphic Correlation of Rio Bravo, south of LO6 Platform, including LO6-22, LO6-8, and LO16-26
Fig. 7: Estimated Oil Production and Reserves of Rio Bravo formation and closest producing wells
Fig. 8: Drilling Cost Time-Depth Chart of well LO6-31D.
Table A: Economic summary and Oil rate forecast for well LO6-31D
Table B: AFE for proposal well LO6-31D

E. Borda March 2013

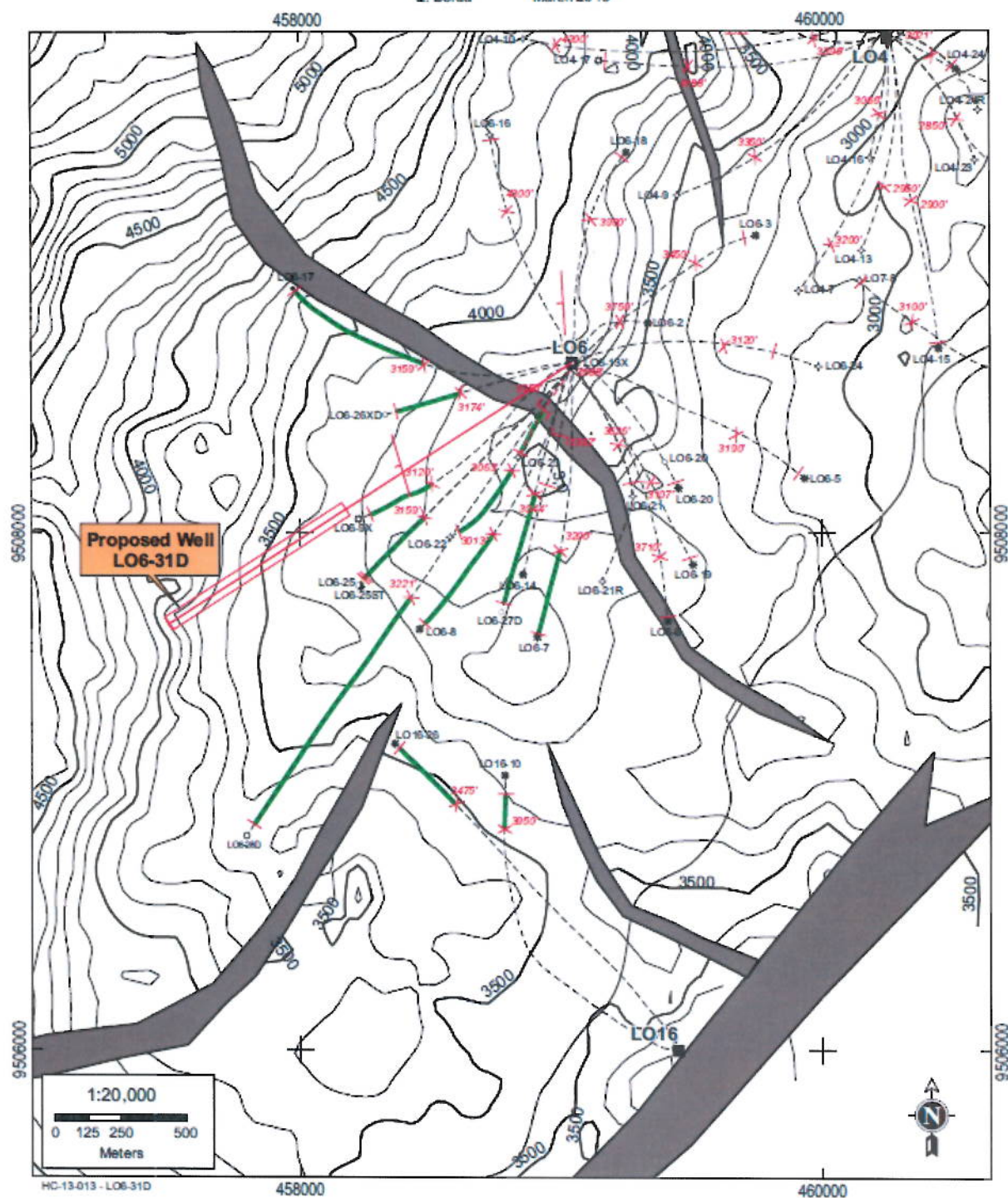


Fig 1: Structural Map showing the Proposal Well ILO6-31D

GEOLOGIC PROGNOSIS											
AREA LOBITOS OFFSHORE		OFFICIAL WELL NUMBER		SAVIA PERU SA. LO6-31D		TYPE OF WELL DEVELOPMENT		RIG N° PEPESA-40			
PRIMARY OBJECTIVE RIO BRAVO				SECONDARY OBJECTIVE							
SURFACE COORDINATES (UTM) 9°508,651.50 MN				(WGS-84) 459,047.72 ME		TARGET COORDINATES (UTM) 9°508,087.08 MN		(WGS-84) 458,178.39 ME			
E	KB:	50	FT	W	DIRECTION OF DEVIATE WELL	S 57.03° W	T	DRILLED DEPTH	5175	FT	
L				E	ANGLE CONDUCTOR		A	VERTICAL DEPTH	3390	FT	
E	WATER DEPTH	335	FT	L	FROM VERTICAL	VERT.	R				
V				L	RECOMENDED DEPTH	600	G	HORIZONTAL DRIFT	3400	FT	
A	GROUND LEVEL			L	OF K.O.P.	600	E				
T				L	BUILD UP ANGLE AT	Drop vert. Angle 4°/100 FT.	T	LIMITS (DIAMETER) TO MAIN OBJECTIVE. (LOW. BS)	TOP: 100 ft.	BASE: 100ft.	
FORMATION / MEMBER				DRILLED TOP (MD/FT)		VERT. TOP (VD/FT)		SUBSEA TOP (SS/FT)		OBSERVATIONS	
S											
T											
R											
A											
T											
I	TALARA				AT SEA BOTTOM						
G											
R	CHACRA				3045		2,300		2,250		
A											
P	RIO BRAVO				5175		3,390		3,340		
H									MAIN OBJECTIVE		
I	RIO BRAVO Shaly				8,320		5,200		5,150		
C											
	TD.				8,544		5,350		5,300		
S											
E											
Q											
U											
E											
N											
C											
E											
C BIT SAMPLES		EVERY 30 FT.FROM SURFACE TO 5000'				REMARKS At 6500 ft. MD. Drop vert. Angle 1°/100 ft. to reach 48 ° to TD.					
O TO BE TAKEN		EVERY 10 FT. FROM 5000' TO TOTAL DEPTH									
N RECOMMENDED		PALEONTOLOGY EVERY 150' FROM SURFACE TO 5000'									
T FOR		PALEONTOLOGY EVERY 90' FROM 5000' TO TOTAL DEPTH									
R PALEO-PALYNOLOGY		PALYNOLOGY AT REQUESTED BY LIMA OFFICE									
L RECOMMENDED		DLL-MSFL-GR; FDC-CNL-GR.									
O OPEN HOLE		Pressure Test (10 Points in Rio Bravo)									
G RECOMMENDED											
G AFTER CASING		GR-CCL									
I NEARBY WELLS											
N FOR											
G CORRELATION		LO6-9X, LO6-22, LO16-26XD, LO6-28D									
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		DATE:	
H.Cornejo / J.C. Muñoz/E. Borda		May. 2013		H. Janampa		May. 2013		P. Alarcon		May. 2013	

Fig 2: Geologic Prognosis

SW

NE

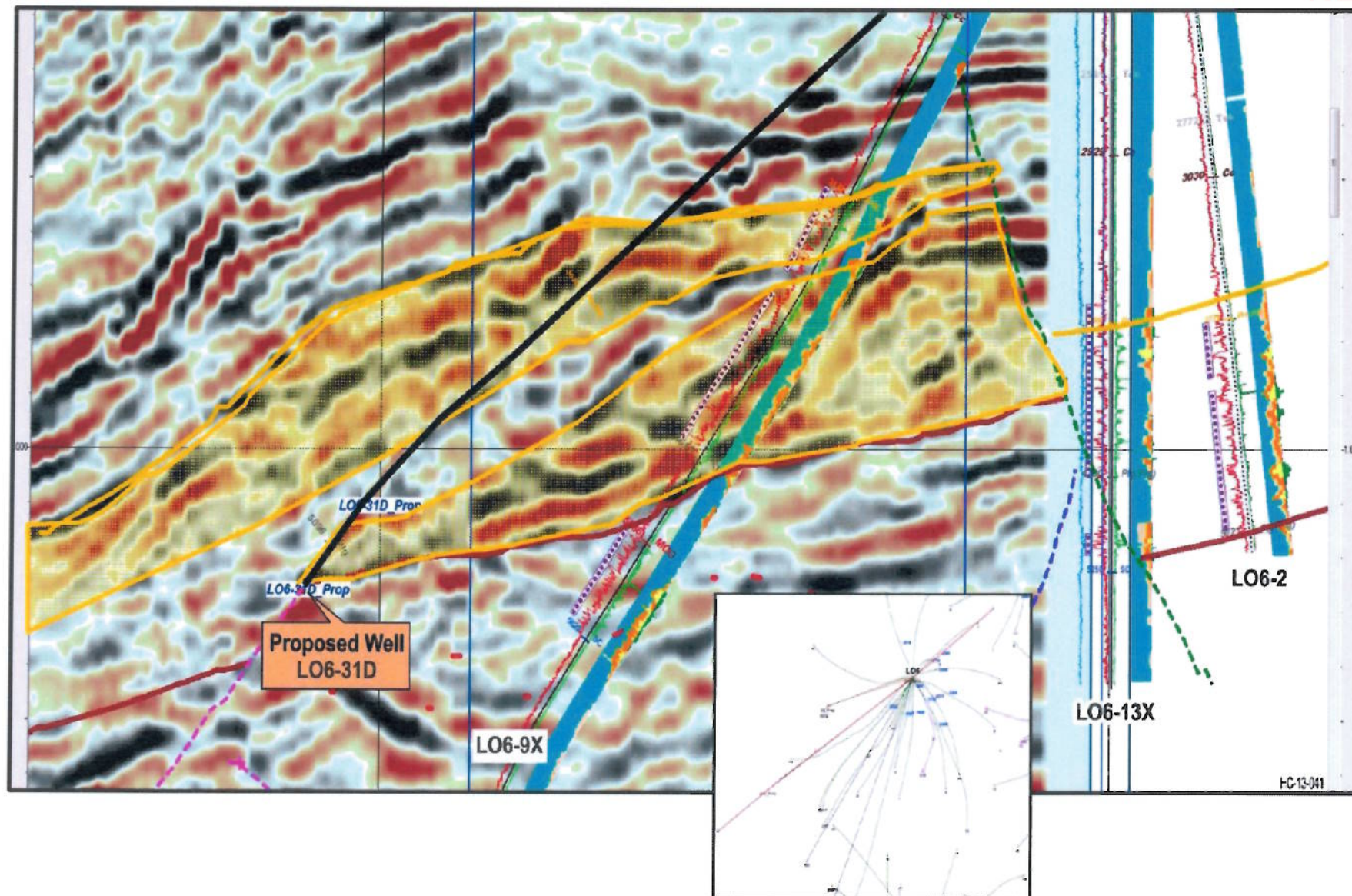


Fig. 3: SW-NE 3D seismic Line for proposal well LO6-31D

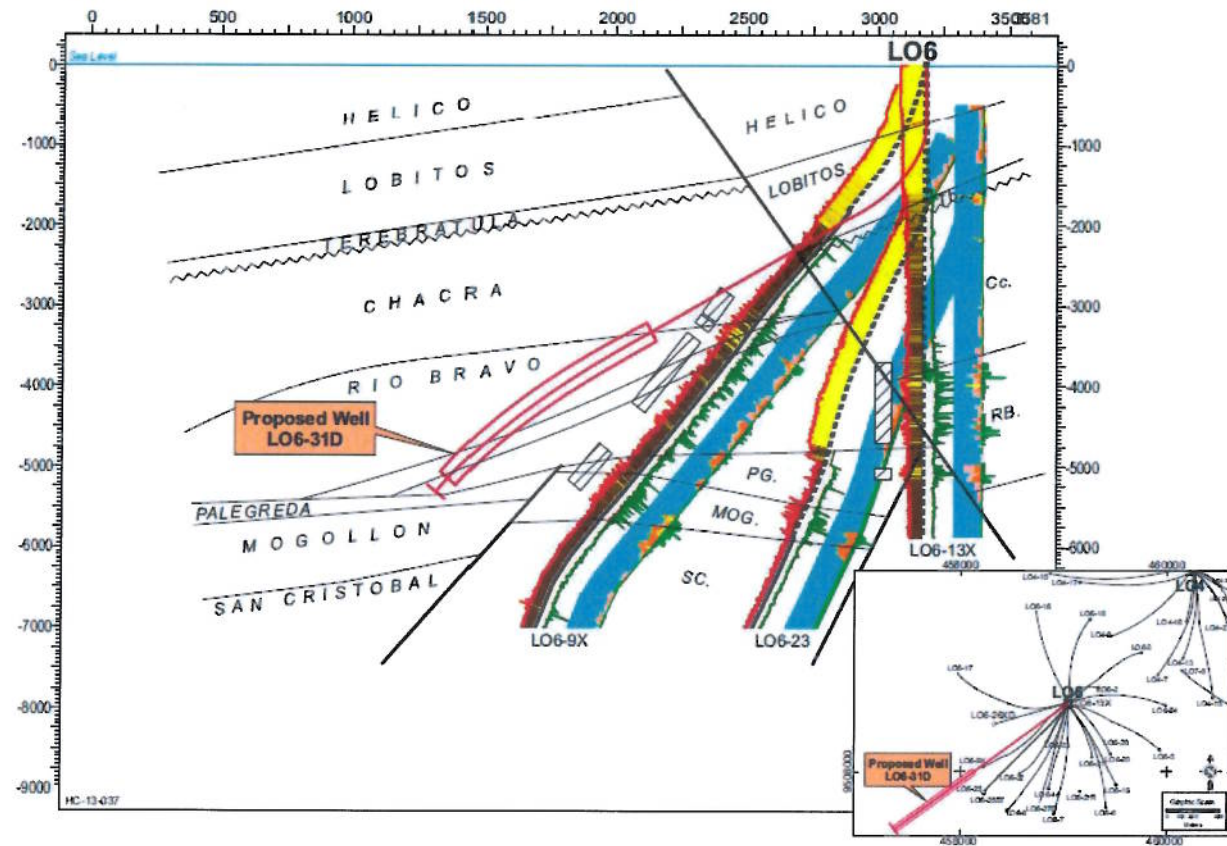
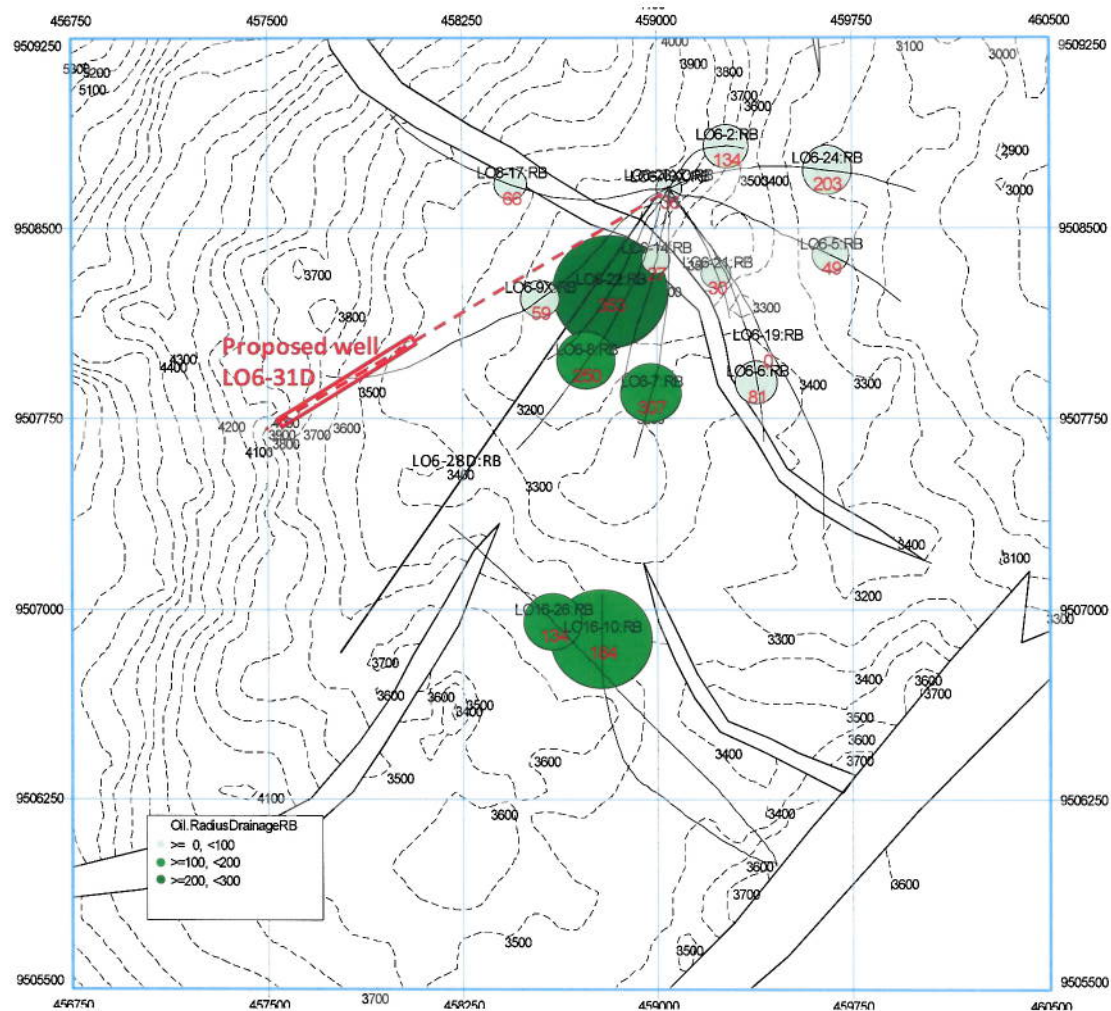


Fig. 4:SW-NE Structural Cross Section for proposal well LO6-31D

Cumulative Oil and Radius Drainage – Rio Bravo Formation



CASO	BASE ft	TOPE ft	Fm.	Pr inic. psi	Pr act. psi	Ind. Depl. %	EUR Mbls	Qo bopd
LOW	5300	3400	RIO BRAVO	2436	2436	100%	121	180
BASE	5300	3400	RIO BRAVO	2436	2436	100%	231	350
HIGH	5300	3400	RIO BRAVO	2436	2436	100%	403	610

Fig. 7: Estimated Oil Production and Reserves of Rio Bravo formation and closest producing wells

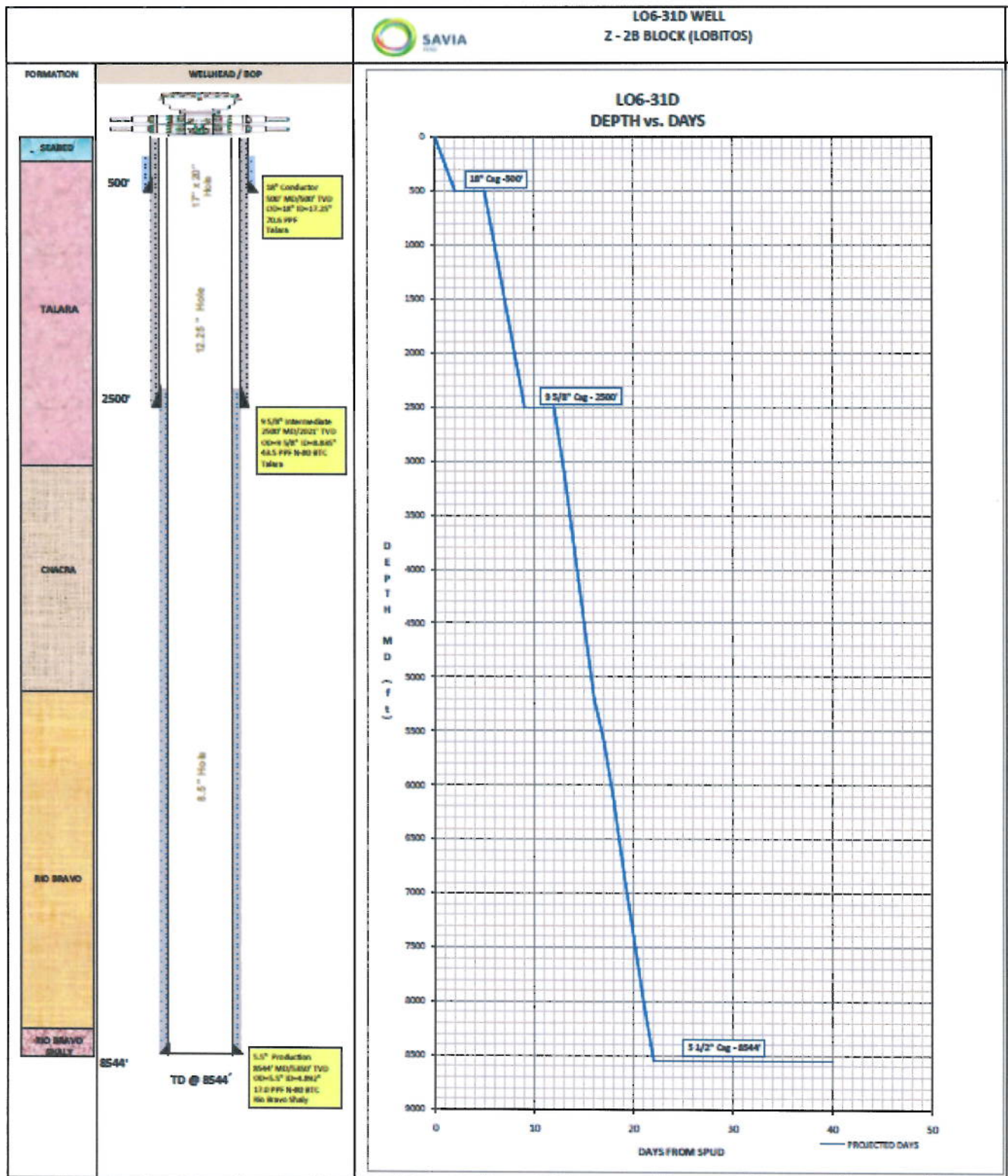


Fig. 8: Drilling Cost Time-Depth Chart of well LO6-31D

LO6 31D BASE New

(Normal values)

Interests & Exchange
The Journal of Law, Economics, & Organization, Vol. 19, No. 1, Spring 2003
DOI 10.1093/jleo/l191

Company (% of Total)	84.00	0.00	100.00	100.00	(%)	(M\$)	(M\$)	(fraction)	(fraction)	(M\$)	(fraction)		
Company (% of Total)	100.00	0.00	100.00	100.00	(%)	13,928.00	9,262.00	3.50	2.32	3.32	-3,665.00	2.32	
Partner (% of Cost)	0.00	0.00	0.00	0.00	(%)	9,847.00	6,246.00	2.47	1.67	0.00	0.00	0.00	
NGC	84.00	0.00	100.00	100.00		10.50	9,700.00	6,138.00	2.43	1.54	2.54	-3,985.00	1.54
Cost	0.00	0.00	0.00	0.00		12	9,285.00	5,831.00	2.33	1.46	2.46	0.00	0.00
Model	Peru License R Fact (2003)												
Global Params	Savia Peru												
Escalation Date	2013/01					@10.5 %			@12.0 %	@14.24 %			
Escalation Date	2013/01					198.82			198.82		Contr Take (%)	53.07	
Discount Date	2013/01					AT ROR (%)					53.07		
Economic Limit	2023/12					AT Payoff (yrs)			1.17	1.17	NGC Take (%)	0.00	
						F&D (\$/BOE)			20.54	20.54	20.54	Govt Take (%)	46.93

Cash Flow Breakdown

Net Revenue	18,508.00	95.40	14,237.00	73.39	100.00	Oil (MSTB)	231.00	194.00	231.00	194.00
Less:						Gas (MMSCFP)	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	594.00	3.06	406.00	2.69	3.21	Tax (MSTB)	0.00	0.00	0.00	0.00
Tariffs	0.00	0.00	0.00	0.00	0.00	Total (MBOE)	231.00	194.00	231.00	194.00
Prod & Asset Taxes										
Capital Costs	3,985.00	20.54	3,985.00	20.54	21.53					
Plus: Other Income/Expense					0.00					
						Acquisition Exploration	(M\$)	0.00	0.00	0.00
Before Tax Cash Flow	13,928.00	71.80	9,840.00	50.76	75.26	Development	(M\$)	3,985.00	3,985.00	3,985.00
Less Income Tax	4,665.00	24.65	3,647.00	18.56	25.12	Abandonment	(M\$)	0.00	0.00	0.00
After Tax Cash Flow	9,263.00	47.14	6,193.00	32.20	26.05	Total	(M\$)	3,985.00	3,985.00	3,985.00

All values are Company

All values are Company (Comp) Share unless specified otherwise

Project	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
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	Oil (MMSCF)	231.00	194.00	231.00	194.00
Gas	(MMSCF)	0.00	0.00	0.00	0.00
WOL	(MMSTB)	0.00	0.00	0.00	0.00
Tax	(MMSTB)	0.00	0.00	0.00	0.00
Total	(MBOE)	231.00	194.00	231.00	194.00
		Project	Contr	NOC	Company
Acquisition	(M\$)	0.00	0.00	0.00	0.00
Exploration	(M\$)	0.00	0.00	0.00	0.00
Development	(M\$)	3,985.00	3,985.00	3,985.00	0.00
Abandonment	(M\$)	0.00	0.00	0.00	0.00
Total	(M\$)	3,985.00	3,985.00	0.00	3,985.00

Date	Sales	Price	Net	Sales	Net	Net	(-)	(-)	Amortization	Taxable	(*)	(-)	(*)	=
	Volume	Oil	Revenue	Volume	Price	Revenue	Operating	Capital			Income	Before Tax	Income	After Tax
	MTB	\$/bbl	M\$	MBOE	\$/BOE	\$/BOE	M\$	M\$		M\$	M\$	M\$	M\$	Cash Flow [10.5 %]
2013(12)	46.00	95.00	3,845.00	46.00	47.50	3,265	81.00	3,585.00	---	831	2851	869	2011	-1191
2014(12)	49.00	95.00	3,905.00	49.00	95.00	3,905	81.00	---	---	844	2979	3824	998	2825
2015(12)	30.00	90.20	2,261.00	30.00	90.20	2,261	64	---	---	515	1682	2197	563	1633
2016(12)	22.00	92.01	1,693.00	22	92.01	1,693	57	---	---	378	1259	1637	422	1215
2017(12)	17.00	93.85	1,369.00	17	93.85	1,369	52	---	---	300	1017	1317	341	976
2018(12)	14.00	95.72	1,165.00	14	95.72	1,165	50	---	---	250	1115	1240	290	825
2019(12)	12.00	97.64	1,022.00	12	97.64	1,022	48	---	---	215	769	974	254	720
2020(12)	11.00	99.59	920.00	11	99.59	920	47	---	---	190	663	873	229	644
2021(12)	10.00	101.58	836.00	10	101.58	836	46	---	---	169	622	791	208	582
2022(12)	9.00	103.61	772.00	9	103.61	772	45	---	---	153	574	727	192	535
2023(12)	8.00	105.69	720.00	8	105.69	720	44	---	---	140	536	676	180	497
Total	231.00	97.37	18,508.00	231.00	---	18,508.00	594.00	3,985.00	---	3,985	13,928	13,928	4,666	9,262

Peep Version 2009.1

Net Revenue Interest %	84%
Discount Rate %	10.5%
Tax	30%
Variable Cost, US\$/BL	0.91
Fixed MU\$/Year	36.6
Cost MU\$	3,985
Oil Price according Portfolio MTP 2012: 95 US\$/BL for 2013 & 2014 phased 2% yearly from 2015 to 2023.	

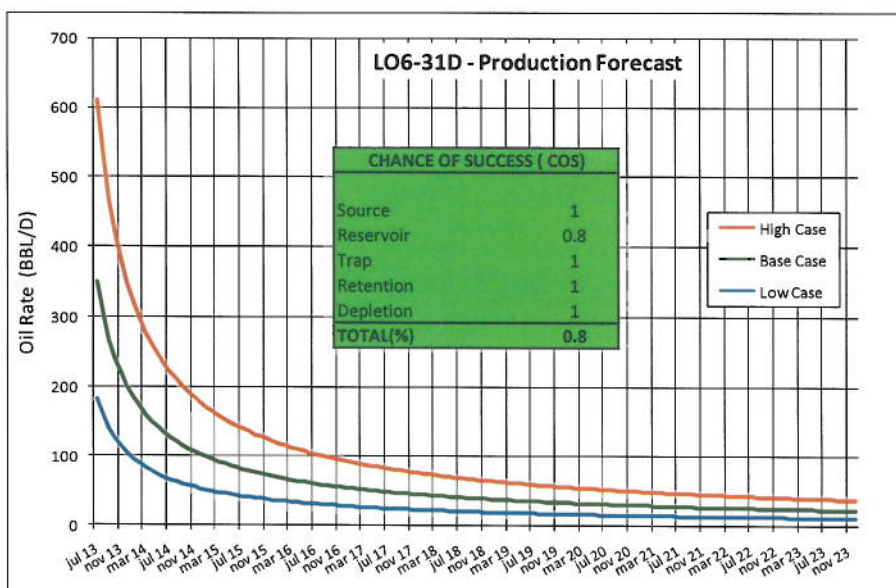


Table A: Economic summary and Oil rate forecast for well LO6-31D



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BUDGET ITEM

AFE No.

2214235

FU	WELL DESCRIPTION	OFFICIAL NUMBER		MM / DD / AA		
	LO6-31D	SAV-22B-24-LO6-31D				
TOTAL ESTIMATED DAYS						
FU	TYPE OF WELL	MOV / COND	DRILLING	COMPLETION	EST FOOTAGE	AREA
	DEVELOPMENT	3	22	18	8544	LOBITOS
FU	GEN	CC	AREA			
WELL COST BREAKDOWN						
SUB	DESCRIPTION		QUANTITY	UNIT COST	SUB-TOTAL	TOTAL US\$
OUTSIDE SERVICES:						
201	DRILLING RIG		21	22		918,500
203	DIRECTIONAL DRILLING					302,700
204	MUD LOGGING		31	1500		46,500
205	MUD ENGINEERING		29	12	1200 900	45,600
206	CEMENT. CONDUCT.					16,880
206	CEMENT. SURF. CSG					0
206	CEMENT. INTERM. CSG.					24,630
206	CEMENT. OTHERS					26,930
206	CEMENT. CASING 7"					0
206	CEMENT. CASING 5 1/2"					34,080
207	ELECTRIC LOGGING					190,000
208	PERFORATING					60,000
209	STIMULATION					60,000
211	TUBULAR INSPECTION					7,950
213	DIVING					12,000
212	HYDRAULIC TONGS					50,720
219	WELL TESTING					16,000
221	TOOL SERVICES					60,000
224	METALIC STRUCTURES CUT & WELD					10,000
226	CRANE MAINTENANCE					15,000
228	MACHINE WORK					7,500
229	BARGE OPERATIONS					227,900
231	BOAT OPERATIONS					290,900
237	MATER. & EQUIP. TRANSP.					14,000
240	WATER FURNISHMENT					15,000
244	TOOL RENTAL					54,200
248	CATERING					51,600
249	CONSULTING					53,750
252	ENVIRONMENTAL PROTECTION					7,700
	TOTAL OUTSIDE SERVICES:					2,620,040
MATERIALS & SUPPLIES:						
301	FITTING SCREWED					200
303	VALVES AND PARTS					1,500
304	API FLANGES & RING GASKET					1,000
306	HARDWARE					2,000
325	BITS					104,700
326	TOOLS FOR DRILLING					44,660
327	COMPLETIONS					65,000
328	FLOATING EQUIPMENT - CMT.					13,840
329	PRODUCTION FACILITIES EQUIP.					2,000
335	OTHERS TUBULAR CONNECTIONS					7,500
336	STRUCTURAL CONST. MAT.					2,200
340	WELDING MATERIAL					500
341	MAT. CMT. CONDUCT.					14,000
341	MAT. CMT. SURF. CSG.					0
341	MAT. CMT. INTERM. CSG.					19,500
341	MAT. CMT. CASING 7"					0
341	MAT. CMT. CASING 5 1/2"					33,000
341	MAT. CMT. OTHERS					16,920
342	STIMULATION MATERIAL					90,000
343	DRILLING / COMPLETION FLUIDS					171,000
344	CONDUCTORS		500	37.52		18,760
344	SURFACE CSG.		0	35.11		0
344	INTERMED. CSG. (9 5/8")		2500	28.42		71,050
344	7" CASING		0	18.33		0
344	5 1/2" CASING		8544	11.24		96,030
344	2 7/8" TUBING		8000	4.68		37,440
346	DIESEL-FUEL			4.60		550,630
347	OIL & GRASES					2,150
348	LOGISTICS COST					0
349	HELICOPTER					0
	TOTAL MATERIALS & SUPPLIES:					1,365,580
TOTAL PROJECT COST US \$						3,985,620

Table B: AFE for proposal well LO6-31D