

PEIRO-TECH
PERLANA SA



PTP-DRLG-148-02

July 15, 2002

TO : Operations Manager

FROM : Drilling Manager

CC : P. Alarcón, M. Chávez, O. Nieto, E. Vega, J. Nakao, Drlg. Foreman,
PEPESA, SCLUMBERGER, M-I OVERSEAS.

SUBJECT : **DRILLING PROGRAM FOR WELL: Z-2B-24-089-D-LO16 (LO16-26)**

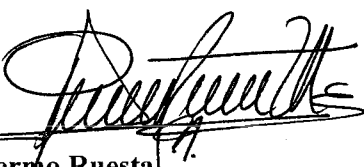
Attached is the Drilling Program for well LO16-26 to be drilled by PEPESA Rig 48 as part of the 2,002 Drilling Project in Lobitos area.

The purpose of this drilling project is to develop production in the Rio Bravo reservoir towards northwest. This will be an unconventional well (type "extended reach") drilled to a projected TD of 8,470 feet MD (4,800 ft. TVD) and 6,400 ft. departure.

40.41 The geological top of the pay zone is expected at 6,915 ft MD (4,050' TVD) in direction N 49.59° W. The KOP for this well will be under conductor at 600 ft. and accomplished using a steerable motor and MWD to reach an angle of 61.25° holding a dogleg severity to no more than 5.5°/100ft. Mud Motor will be kept to drill 12 1/4" and 8 1/2" sections in order to maintain angle and direction and avoid high torque values until to be sure either that no exists conditions to miss target or to be close to the top of the objective formation. After, stabilized rotary assembly will be used until the TD. High drag values are expected at TD.

9 5/8" casing will be sat on Chacra formation. Special cautions will be taken when drilling Rio Bravo formation to control solids content and mud weight. Mud density will be increased as dictated by well bore conditions. Mud logging unit will be used to monitor gas and control mud weights. Sufficient weight material must be stocked at the Rig to raise the mud weight by two pounds.

The estimated time to drill this well is 23 days plus 5 days for completion. The expenditure estimated to develop this project will be \$ 1'260, 485.00.


Guillermo Ruesta
Drilling Manager

GEOSCIENCES
Central File
<i>A60-21-06</i>
DATE

Drilling Prognosis
LO16-26

CENTRAL FILE
Geosciences

GENERAL INFORMATION

Area : Lobitos Well : LO16-26
Official Number : Z-2B-24-089-D-LO16 Well Type : Development

GEOLOGICAL RECOMMENDATION

<u>FORMATION</u>	<u>MEASURE DEPTH</u> (MD)	<u>VERTICAL DEPTH</u> (VD)	<u>REMARKS</u>
TALARA	AT SURFACE		
CHACRA.	3,380	2,350	
RIO BRAVO	6,915	4,050	MAIN OBJECTIVE
T. D.	8,470	4,800	

COORDINATES

SURFACE	N: 9'505, 990.43 mts.	E: 459,452.05 mts.
OBJECTIVE	N: 9'507, 135.00 mts.	E: 458,430.00 mts.

DIRECTIONAL

Kick off point	: ±600 ft.	
Rate of build	: 5.5° / 100 ft.	
Maximum Angle	: 61.25°	
Direction	: N 49.59° W	no! 40.59
Drilled Depth to Target	: 6,915 ft.	
Vertical Depth to Target	: 4,050 ft.	
Horizontal Distance to Target	: 5,040 ft.	
Drilled Depth Programmed	: 8,470 ft.	
Estimated Drilling Days	: 23	
Completion Days	: 5	

DRILLING RIG

Contractor	: PEPESA
Rig	: 48
Draw works Type	: OIME-750
Traveling Blocks Type	: IDECO - 265 TN
Pump N° 1	: IDECO - T - 1000 (10" x 7")
Pump N° 2	: IDECO - T - 1000 (10" x 7")

ELEVATIONS

KB	: 50 ft.
Water Depth	: 309 ft.

Drilling Prognosis
LO16-26

GENERAL DRILLING PROGRAM

Move PEPESA # 48 rig over conductor "loca" # 26 at the southwest of the platform.

18" (CONDUCTOR):

1. Set conductor on bottom and secure to platform. RIH with modified 17" bit w/3 Jets (16/32"). Drilling 200 feet with seawater pumping high viscosity sweeps. POOH.
2. RIH w/ Under reamer and opening hole (+/- 24") to bottom. Circulate and POOH. Add on conductor and run to bottom.
3. Attach conductor to the floor of the first level and weld adapter flange.
4. Install 21^{1/4}" Annular BOP, lines, flow diverter and flow line. RIH with open ended string and cement conductor **according to attached program.**

17" PHASE

1. RIH with Slick Assembly and 17" Tooth bit (RR), to drill cement and formation 10'. Circulate and POOH.
2. P/U Power Pak Motor and MWD with a 17" Tooth bit and RIH for starting KOP. To build angle to 61.25° in the direction of N 49.59° W, holding dogleg severity to no more than 5.5°/100 ft. The angle should be established at +/- 1,800 feet. Continue drilling up to 2,000 feet. Circulate and make short trip to conductor shoe in order to condition hole. POOH to run 13 3/8" casing.
3. RIH and cement 13 3/8", K-55, 54.5 #/ ft, STC casing at 2,000 feet **according to attached program.**
4. Cut off conductor and casing, install ring between 18" & 13 3/8", welding wellhead 13 5/8" x 13 3/8"-2M and test same with 1200 psi. N/U and test BOP's (Blind rams with 1,200 psi).

12^{1/4}" PHASE

1. RIH w/ slick assembly and Tooth bit (RR). Test BOP's (Annular w/ 800 psi and Pipe Rams and Kill Manifold w/ 1,200 psi.). Drill floating equipment, cement and 10 ft. of new hole. Circulate and POOH.
2. RIH w/ Power Pak Motor, MWD and PDC bit. Continue drilling maintaining direction and angle up to 5,500 feet. **Pump continuous low viscosity pills follow by heavy sweeps to get clean up hole.** Circulate make short trip in order to condition hole to run intermediate casing and POOH.
3. RIH and cement 9^{5/8}", N-80, 43.5 # / ft, LTC casing at 5,500 feet **according to attached program.**
4. Set casing hanger and cut off casing. Install wellhead 9 5/8" x 11" - 2000 x 3000. N/U and test BOP's. (Blind Rams w/ 1,500 psi).

Drilling Prognosis
LO16-26

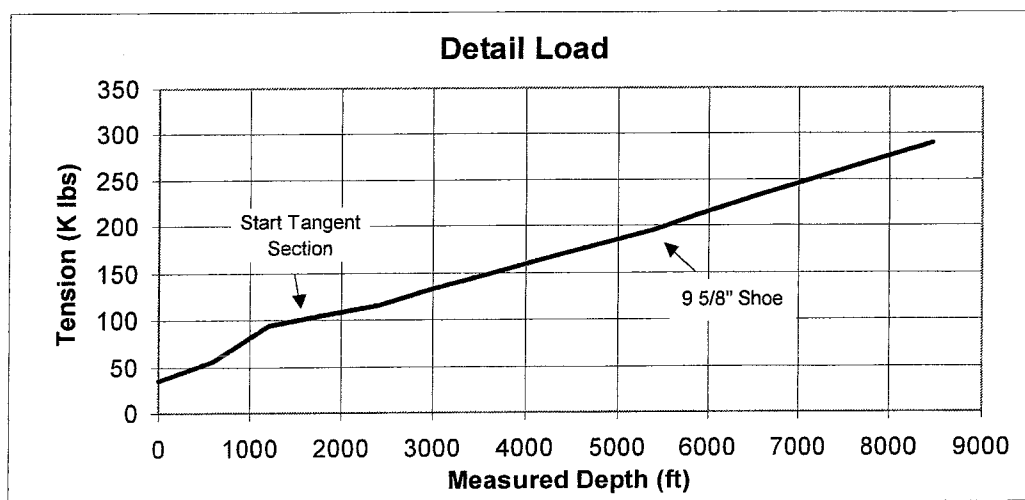
- Notes:**
- * To Keep the Drilling String either in movement or rotation all time.
 - * Drill no more than 500 feet between short trips.
 - * Jars will be run in the HWDP. Make sure that the jars on location have to correct connections and that a backup is available.
 - * All components of the BHA should be correctly calipered and reported on a BHA form in IADC report.

8^{1/2}" PHASE

1. RIH with slick assembly and tooth bit (RR). Test BOP's (Annular w/ 1,000 psi, Pipe Rams and kill manifold with 2,000 psi.). To drill floating equipment, cement and formation 50 feet. Circulate and POOH.
2. RIH with Mud Motor, MWD and PDC bit. Continue drilling maintaining angle and direction until to be sure that no exists conditions to miss target or to be close to top of objective formation. After, packed rotary assembly will be used to TD. Circulate and make short trip in order to condition hole to run electric logs. POOH.
Pump continuous low viscosity pills follow by weighted sweeps to unloading hole of cuttings.

- **Notes:**
- 1) Take care to maintain necessary lowest mud weight as well bore conditions dictate using as minimum 6 lb/bbl seal material concentration while drilling Rio Bravo formation
 - 2) To Keep the Drilling String either in movement or rotation all time.
 - 3) Drill no more than 500 feet between short trips.

3. Run electrical logs according to program.
4. Make conditioning trip to run production casing. Circulate and POOH laying down drill pipe.
5. Run 5^{1/2}" N-80, 17#/ft casing, cement according to program.
6. Install 11" x 7^{1/16}" - 3000 x 5000 psi tubing head.



Drilling Prognosis
LO16-26

LO16-26 Rev#2

Report Date: July 13, 2002	Survey / DLS Computation Method: Minimum Curvature / Lubinski
Client: Petro-Tech Peruana S.A.	Vertical Section Azimuth: 318.510°
Field: Lobitos	Vertical Section Origin: N 0.000 ft, E 0.000 ft
Structure / Slot: Platform LO16 (WGS84) / Slot #26	TVD Reference Datum: KB
Well: Well LO16-26	TVD Reference Elevation: 50.0 ft relative to MSL
Borehole: Borehole LO16-26	Sea Bed / Ground Level Elevation: 0.000 ft relative to MSL
UWI/API#:	Magnetic Declination: 1.453°
Survey Name / Date: LO16-26 Rev#2 / July 3, 2002	Total Field Strength: 28764.880 nT
Tort / AHD / DDI / ERD ratio: 65.907° / 6424.43 ft / 5.874 / 1.338	Magnetic Dip: 14.664°
Grid Coordinate System: UTM Zone 17S - WGS84, Meters	Declination Date: July 02, 2002
Location Lat/Long: S 4 28 9.399, W 81 21 55.785	Magnetic Declination Model: BGGM 2002
Location Grid N/E Y/X: N 9505990.430 m, E 459452.050 m	North Reference: True North
Grid Convergence Angle: +0.02848147°	Total Corr Mag North -> True North: +1.453°
Grid Scale Factor: 0.99962035	Local Coordinates Referenced To: Well Head

Comments	Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Vertical Section (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (deg)	DLS (deg/100 ft)	Tool Face (deg)
Tie-In	0.00	0.00	270.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-90.00M
	100.00	0.00	270.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	-90.00M
	200.00	0.00	270.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	-90.00M
	300.00	0.00	270.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	-90.00M
	400.00	0.00	270.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	-90.00M
KOP	500.00	0.00	270.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	-90.00M
	600.00	0.00	270.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	-90.00M
	700.00	5.50	270.00	699.85	3.18	0.00	-4.80	4.80	270.00	5.50	0.00G
	800.00	11.00	270.00	798.77	12.68	0.00	-19.14	19.14	270.00	5.50	0.00G
Start Turn	818.18	12.00	270.00	816.59	15.08	0.00	-22.76	22.76	270.00	5.50	55.48G
	900.00	15.01	284.46	896.16	29.50	2.65	-41.54	41.62	273.64	5.50	41.42G
	1000.00	19.47	295.42	991.67	55.58	13.04	-69.15	70.37	280.68	5.50	30.93G
	1100.00	24.34	302.29	1084.44	90.72	31.22	-101.65	106.33	287.07	5.50	24.56G
	1200.00	29.43	306.94	1173.61	134.62	57.01	-138.74	149.99	292.34	5.50	20.40G
	1300.00	34.63	310.31	1258.36	186.85	90.18	-180.07	201.39	296.60	5.50	17.54G
	1400.00	39.91	312.89	1337.92	246.94	130.43	-225.28	260.31	300.07	5.50	15.49G
	1500.00	45.23	314.95	1411.54	314.35	177.37	-273.94	326.35	302.92	5.50	13.96G
	1600.00	50.58	316.67	1478.56	388.44	230.59	-325.60	398.98	305.31	5.50	12.81G
	1700.00	55.95	318.14	1538.35	468.53	289.58	-379.79	477.60	307.32	5.50	11.93G
Start Tangent Section	1798.31	61.25	319.41	1589.55	552.40	352.69	-435.05	560.05	309.03	5.50	0.00G
	1800.00	61.25	319.41	1590.37	553.89	353.82	-436.02	561.51	309.06	0.00	0.00G
	1900.00	61.25	319.41	1638.47	641.55	420.40	-493.05	647.95	310.45	0.00	0.00G
Csg. 13 3/8"	2000.00	61.25	319.41	1686.57	729.21	486.97	-550.09	734.67	311.52	0.00	0.00G
	2100.00	61.25	319.41	1734.67	816.87	553.55	-607.13	821.60	312.36	0.00	0.00G
	2200.00	61.25	319.41	1782.78	904.53	620.13	-664.17	908.67	313.04	0.00	0.00G
	2300.00	61.25	319.41	1830.88	992.19	686.71	-721.21	995.85	313.60	0.00	0.00G
	2400.00	61.25	319.41	1878.98	1079.85	753.29	-778.25	1083.10	314.07	0.00	0.00G
	2500.00	61.25	319.41	1927.08	1167.51	819.87	-835.28	1170.42	314.47	0.00	0.00G
	2600.00	61.25	319.41	1975.18	1255.17	886.45	-892.32	1257.79	314.81	0.00	0.00G
	2700.00	61.25	319.41	2023.29	1342.83	953.03	-949.36	1345.20	315.11	0.00	0.00G
	2800.00	61.25	319.41	2071.39	1430.49	1019.61	-1006.40	1432.63	315.37	0.00	0.00G
	2900.00	61.25	319.41	2119.49	1518.15	1086.19	-1063.44	1520.10	315.61	0.00	0.00G
	3000.00	61.25	319.41	2167.59	1605.81	1152.77	-1120.48	1607.59	315.81	0.00	0.00G
	3100.00	61.25	319.41	2215.70	1693.47	1219.35	-1177.51	1695.10	316.00	0.00	0.00G
	3200.00	61.25	319.41	2263.80	1781.13	1285.93	-1234.55	1782.62	316.17	0.00	0.00G
	3300.00	61.25	319.41	2311.90	1868.79	1352.50	-1291.59	1870.15	316.32	0.00	0.00G
Chacra	3379.21	61.25	319.41	2350.00	1938.22	1405.24	-1336.77	1939.50	316.43	0.00	0.00G
	3400.00	61.25	319.41	2360.00	1956.45	1419.08	-1348.63	1957.70	316.46	0.00	0.00G
	3500.00	61.25	319.41	2408.10	2044.11	1485.66	-1405.67	2045.26	316.58	0.00	0.00G
	3600.00	61.25	319.41	2456.21	2131.77	1552.24	-1462.71	2132.83	316.70	0.00	0.00G
	3700.00	61.25	319.41	2504.31	2219.43	1618.82	-1519.75	2220.41	316.81	0.00	0.00G
	3800.00	61.25	319.41	2552.41	2307.09	1685.40	-1576.78	2307.99	316.91	0.00	0.00G
	3900.00	61.25	319.41	2600.51	2394.75	1751.98	-1633.82	2395.58	317.00	0.00	0.00G
	4000.00	61.25	319.41	2648.62	2482.41	1818.56	-1690.86	2483.18	317.08	0.00	0.00G
	4100.00	61.25	319.41	2696.72	2570.07	1885.14	-1747.90	2570.78	317.16	0.00	0.00G

Comments	Measured Depth (ft)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Vertical Section (ft)	NS (ft)	EW (ft)	Closure (ft)	Closure Azimuth (deg)	DLS (deg/100 ft)	Tool Face (deg)
	4200.00	61.25	319.41	2744.82	2657.73	1951.72	-1804.94	2658.38	317.24	0.00	0.00G
	4300.00	61.25	319.41	2792.92	2745.39	2018.30	-1861.98	2745.99	317.31	0.00	0.00G
	4400.00	61.25	319.41	2841.02	2833.05	2084.88	-1919.01	2833.61	317.37	0.00	0.00G
	4500.00	61.25	319.41	2889.13	2920.71	2151.46	-1976.05	2921.22	317.43	0.00	0.00G
	4600.00	61.25	319.41	2937.23	3008.37	2218.04	-2033.09	3008.84	317.49	0.00	0.00G
	4700.00	61.25	319.41	2985.33	3096.03	2284.61	-2090.13	3096.47	317.55	0.00	0.00G
	4800.00	61.25	319.41	3033.43	3183.69	2351.19	-2147.17	3184.09	317.60	0.00	0.00G
	4900.00	61.25	319.41	3081.54	3271.35	2417.77	-2204.21	3271.72	317.65	0.00	0.00G
	5000.00	61.25	319.41	3129.64	3359.01	2484.35	-2261.25	3359.35	317.69	0.00	0.00G
	5100.00	61.25	319.41	3177.74	3446.67	2550.93	-2318.28	3446.98	317.74	0.00	0.00G
	5200.00	61.25	319.41	3225.84	3534.33	2617.51	-2375.32	3534.62	317.78	0.00	0.00G
	5300.00	61.25	319.41	3273.94	3621.99	2684.09	-2432.36	3622.25	317.82	0.00	0.00G
	5400.00	61.25	319.41	3322.05	3709.65	2750.67	-2489.40	3709.89	317.85	0.00	0.00G
Csg. 9 5/8"	5500.00	61.25	319.41	3370.15	3797.31	2817.25	-2546.44	3797.53	317.89	0.00	0.00G
	5600.00	61.25	319.41	3418.25	3884.97	2883.83	-2603.48	3885.17	317.92	0.00	0.00G
	5700.00	61.25	319.41	3466.35	3972.63	2950.41	-2660.51	3972.81	317.96	0.00	0.00G
	5800.00	61.25	319.41	3514.46	4060.29	3016.99	-2717.55	4060.46	317.99	0.00	0.00G
	5900.00	61.25	319.41	3562.56	4147.95	3083.57	-2774.59	4148.10	318.02	0.00	0.00G
	6000.00	61.25	319.41	3610.66	4235.61	3150.14	-2831.63	4235.74	318.05	0.00	0.00G
	6100.00	61.25	319.41	3658.76	4323.27	3216.72	-2888.67	4323.39	318.08	0.00	0.00G
	6200.00	61.25	319.41	3706.86	4410.93	3283.30	-2945.71	4411.04	318.10	0.00	0.00G
	6300.00	61.25	319.41	3754.97	4498.59	3349.88	-3002.74	4498.69	318.13	0.00	0.00G
	6400.00	61.25	319.41	3803.07	4586.25	3416.46	-3059.78	4586.34	318.15	0.00	0.00G
	6500.00	61.25	319.41	3851.17	4673.91	3483.04	-3116.82	4673.99	318.18	0.00	0.00G
	6600.00	61.25	319.41	3899.27	4761.57	3549.62	-3173.86	4761.64	318.20	0.00	0.00G
	6700.00	61.25	319.41	3947.38	4849.23	3616.20	-3230.90	4849.29	318.22	0.00	0.00G
	6800.00	61.25	319.41	3995.48	4936.89	3682.78	-3287.94	4936.94	318.24	0.00	0.00G
LO16-26 Rio Bravo	6900.00	61.25	319.41	4043.58	5024.55	3749.36	-3344.98	5024.59	318.26	0.00	0.00G
	6913.35	61.25	319.41	4050.00	5036.25	3758.24	-3352.59	5036.29	318.27	0.00	0.00G
	7000.00	61.25	319.41	4091.68	5112.21	3815.94	-3402.01	5112.25	318.28	0.00	0.00G
	7100.00	61.25	319.41	4139.78	5199.87	3882.52	-3459.05	5199.90	318.30	0.00	0.00G
	7200.00	61.25	319.41	4187.89	5287.53	3949.10	-3516.09	5287.56	318.32	0.00	0.00G
	7300.00	61.25	319.41	4235.99	5375.19	4015.67	-3573.13	5375.21	318.34	0.00	0.00G
	7400.00	61.25	319.41	4284.09	5462.85	4082.25	-3630.17	5462.87	318.35	0.00	0.00G
	7500.00	61.25	319.41	4332.19	5550.51	4148.83	-3687.21	5550.52	318.37	0.00	0.00G
	7600.00	61.25	319.41	4380.30	5638.17	4215.41	-3744.24	5638.18	318.39	0.00	0.00G
	7700.00	61.25	319.41	4428.40	5725.83	4281.99	-3801.28	5725.84	318.40	0.00	0.00G
	7800.00	61.25	319.41	4476.50	5813.49	4348.57	-3858.32	5813.49	318.42	0.00	0.00G
	7900.00	61.25	319.41	4524.60	5901.15	4415.15	-3915.36	5901.15	318.43	0.00	0.00G
	8000.00	61.25	319.41	4572.70	5988.81	4481.73	-3972.40	5988.81	318.45	0.00	0.00G
	8100.00	61.25	319.41	4620.81	6076.47	4548.31	-4029.44	6076.47	318.46	0.00	0.00G
	8200.00	61.25	319.41	4668.91	6164.13	4614.89	-4086.47	6164.13	318.48	0.00	0.00G
	8300.00	61.25	319.41	4717.01	6251.79	4681.47	-4143.51	6251.79	318.49	0.00	0.00G
	8400.00	61.25	319.41	4765.11	6339.45	4748.05	-4200.55	6339.45	318.50	0.00	0.00G
T.D.	8472.53	61.25	319.41	4800.00	6403.02	4796.33	-4241.92	6403.02	318.51	0.00	0.00G

Survey Type: Raw Proposal

Survey Error Model: SLB ISCWSA 3-D 95.00% Confidence 2.7955 sigma

Surveying Prog:

MD From (ft)

0.00

MD To (ft)

8472.53

EQU Freq

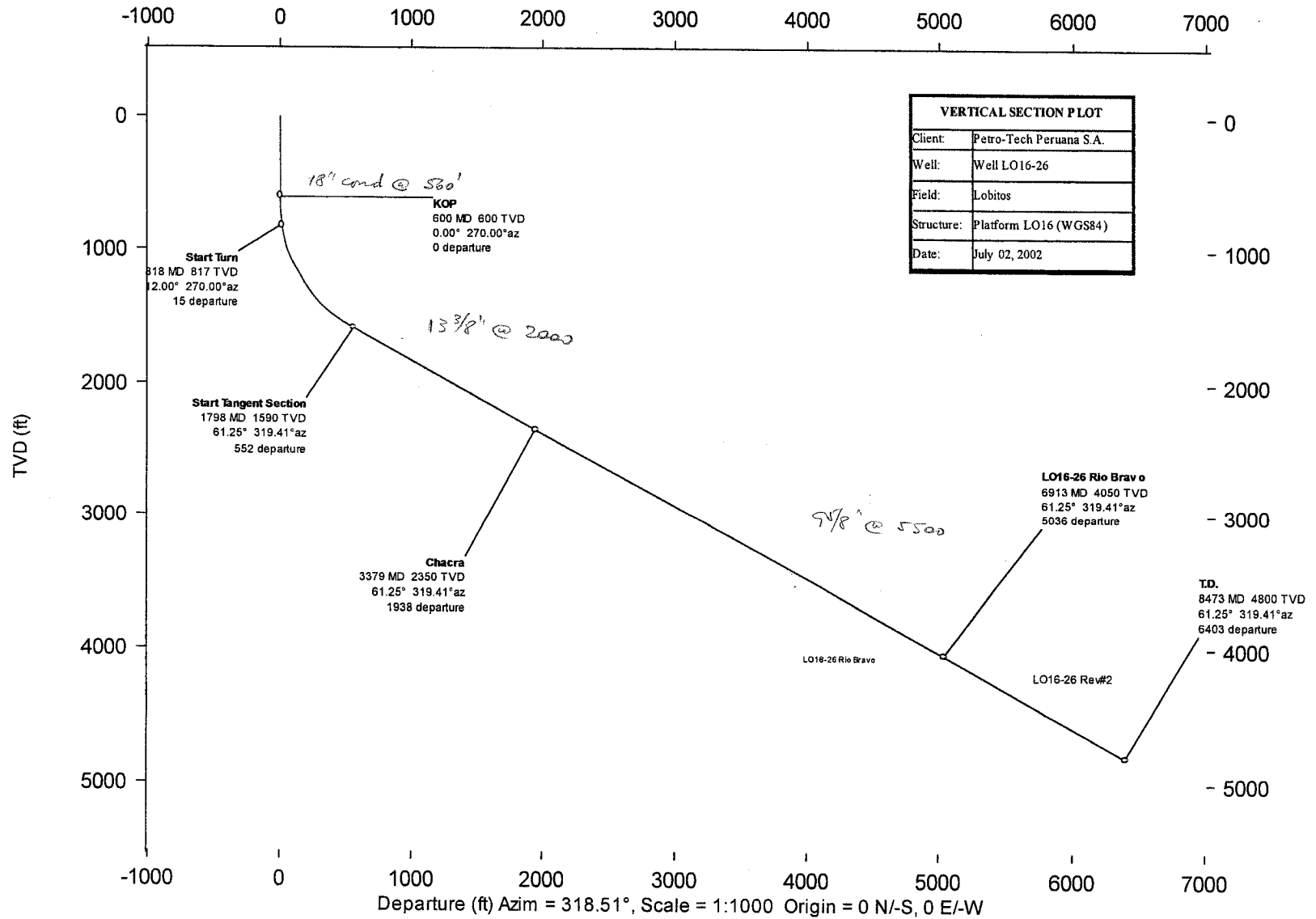
1/100.00 ft

Survey Tool Type

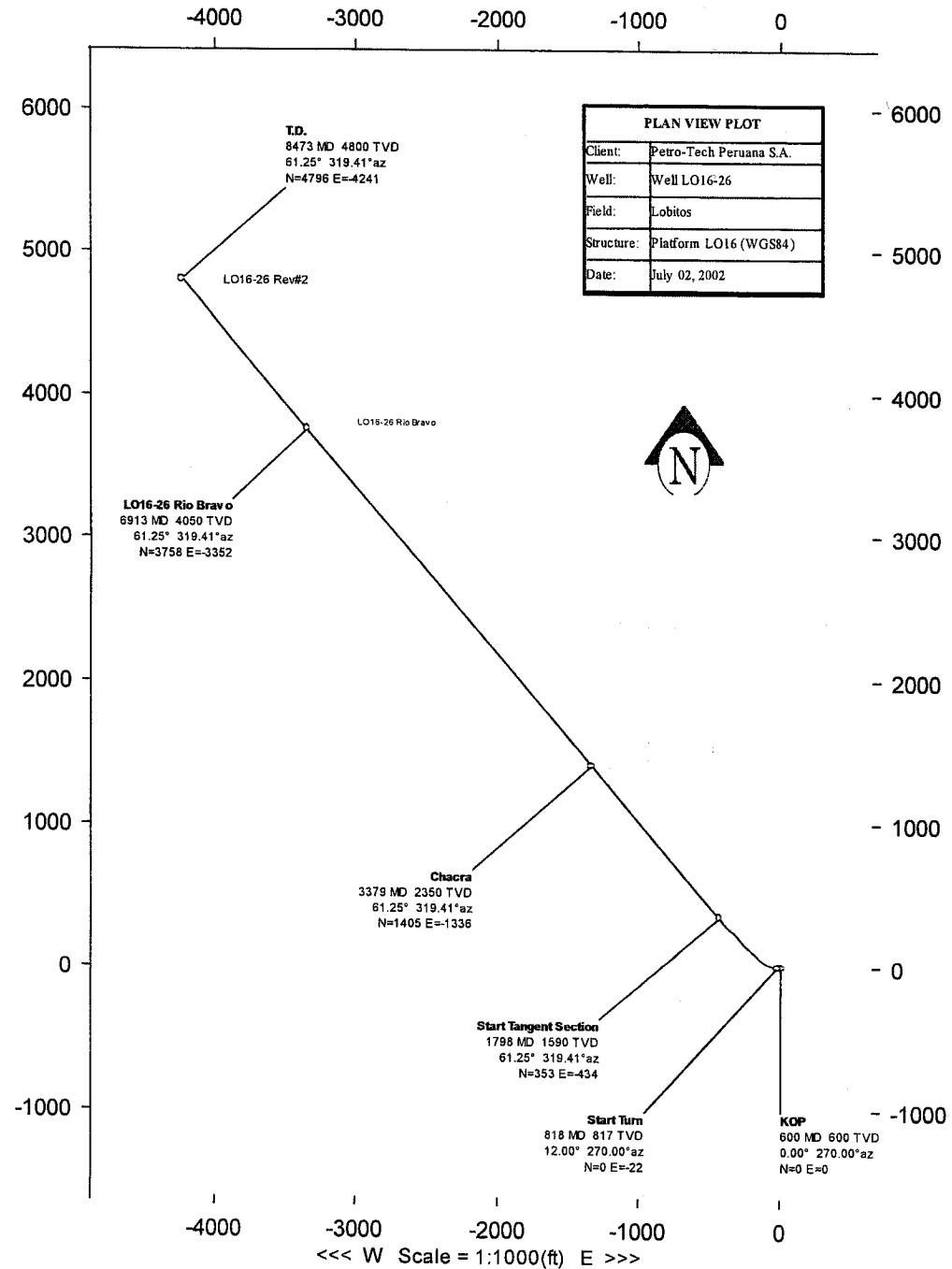
SLB_MWD-STD

Schlumberger

Vertical Section Plot

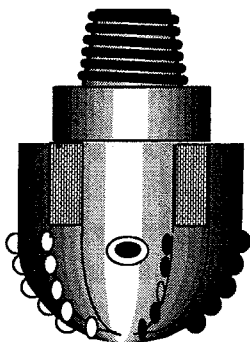


Plan View Plot



PLAN VIEW PLOT	
Client:	Petro-Tech Peruana S.A.
Well:	Well LO16-26
Field:	Lobitos
Structure:	Platform LO16 (WGS84)
Date:	July 02, 2002





LO16 - 26 BIT PROGRAM

DEPTH	SIZE	TYPE	IADC CODE	W.O.B	RPM
560-2,000	17	GTX-C1(RR)	1-1-4	15-25	MM/40
2,010-5,500	12 1/4	S987BHPX	PDC	15-20	MM/40
5,510-7,000	8 1/2	M88PX-R (RR)	PDC	15/20	120
7,000-8,470	8 1/2	DS110SV (RR)	PDC	25-30	90-80

HYDRAULIC PROGRAM

	PIPE		TOOL JOINT		WEIGHT lbs/pie
	O.D	I.D	O.D	I.D	
DRILL STEM					
Drill pipe "S-135"	5.00	4.27	6.25	3.25	19.50
Heavy weight	5.00	3.00	6.50	2.875	53.00
Drill collar (two size)	8.00	3.00	6.25	2.813	150 / 92

INTERVAL		NOZZLES						Flow Gpm	Pressure (psi)		Velocity (ft/min)			HSI	J. Vel ft/seg	Impt Force	ECD ppg	BHA
From	To	J-1	J-2	J-3	J-4	J-5	J-6		Bit	System	D.p	D.c	Crit.					
560	2,000	18	18	18	18			703	382	1800	65	77	351	0.7	227	721	9.2	1
2,010	5,500	16	16	16	16	16	16	703	290	2240	138	155	361	1.0	191	648	9.8	2
5,500	7,000	14	14	14	14	14	14	500	261	1690	259	369	432	1.3	178	446	10.5	3
7,000	8,470	14	14	14	14	14	14	470	244	1830	244	347	445	1.2	167	417	11.1	3

BHA:

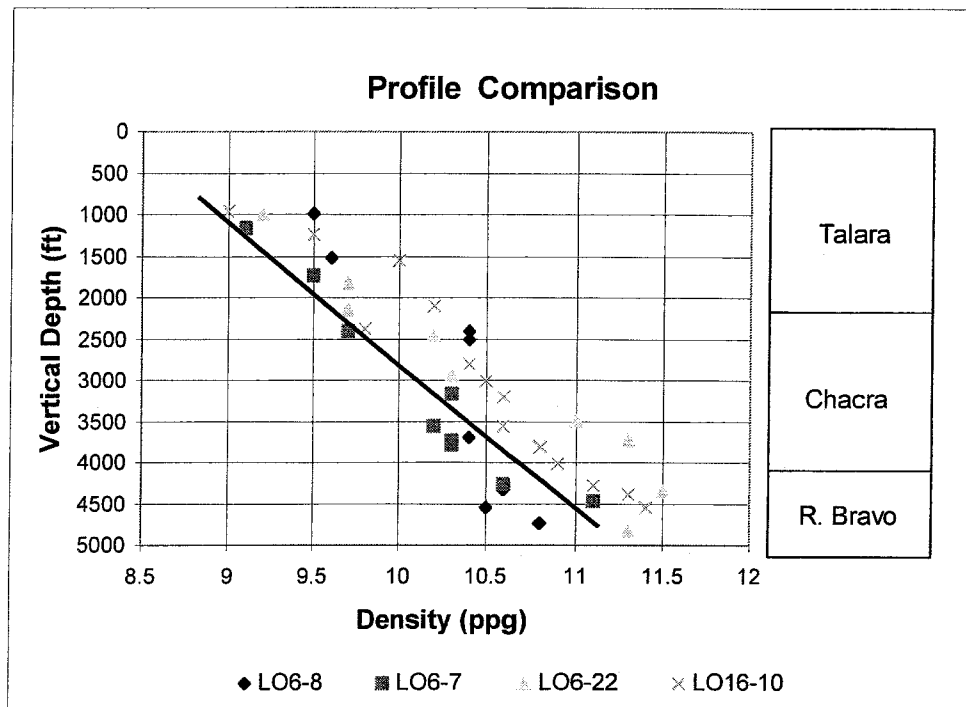
B/ PP/ Stb / F Sub/ NMDC/ UBHO/ 2NMDC/ Dc1/ Xo/ 3Dc's/ 6Hw's/ Xo/ Jar/ Xo/ 18Hw's (1)

B/ PP/ Stb / F Sub/ SNMDC/ UBHO/ 2NMDC/ Dc1/ Xo/ 3Dc's/ 7Hw's/ Xo/ Jar/ Xo/ 19Hw's (2)

B/ NBstb/ F Sub/ SNMDC/ Stb/ SNMDC/ UBHO/ NMDC/ Stb/ NMDC/ 3Dc's / 7Hw's/ Xo/ Jar/ Xo/ 19Hw's (3)

Drilling Prognosis
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MUD PROGRAM



SURFACE HOLE

INTERVAL

560 – 2,000

MUD TYPE

Bentonite Polymer

After cement 18" conductor, pre hydrate bentonite with fresh water. Prepare the drilling fluid mixing Caustic Soda and enough amounts of polymers to get proper fluid properties. While drilling keep the fluid with low solids content, in order to increased the rate of penetration and clean the hole. **Pump frequent sweeps as necessary to unload hole of cuttings.**

PROPERTIES

Weight	: 8.8 - 9.2 lbs/gal
Visc	: 55 - 70 Sec/qt
pH	: 9.5
PV / YP	: 0.6 (Max Yp of 26)
Filt. API	: 8
K+	: 2000 mg/Lt

INTERMEDIATE HOLE

INTERVAL

2,010 – 5,500

MUD TYPE

FLO DRILL

After cleaning the tanks make the mud conversion according to the recommended rheological properties adjusting the levels of Calcium and Potassium Ions.

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Pump frequent sweeps as necessary to unload hole of cuttings.

PROPERTIES

Interval (feet)	Weight Lbs/gl	Visc. Sec/qt	Vp Cps	Yp Lb/100ft ²	Sol %	Filt. cc/30'
2,010 – 5,500	9.2-10.0	56 - 55	22 - 26	28 - 36	8	6

PH	PM (cc)	PF (cc)	CALCIUM (PPM)	POTASIUM(PPM)
9.5	0.8 - 1.2	0.2 - 0.50	180	18,000

PRODUCTION HOLE

INTERVAL	MUD TYPE
5,510 – 8,470	FLO DRLL

While 9 5/8" W.O.C. condition the recovered mud according to the recommended rheological properties. YP and PV will be kept at levels that allow good bottom hole cleanness, adjusting the levels of Calcium and Potassium Ions.

Pump frequent viscosity pills and weighted sweeps as necessary to unload hole of cuttings.

→ The Rio Bravo formation is highly porous and permeable. Take care to maintain the necessary lowest mud weight as well bore conditions dictate using as minimum 6 lb/bbl seal material concentration while drilling this formation.

PROPERTIES

Interval (feet)	Weight Lbs/gl	Visc. Sec/qt	Vp Cps	Yp Lb/100ft ²	Sol %	Filt. cc/30'
5,510 – 7,000	9.6 – 10.0	55	18 – 22	28 - 36	8	6
7,000 – 8,470	10.2 – 10.8	50	22 - 26	36	8	<5

PH	PM Cc	PF cc	CALCIUM PPM	POTASIUM PPM
9.5	0.8 - 1.2	0.2 - 0.50	180	18,000

CEMENT PROGRAM

18" O.D. CONDUCTOR (Hole Average: 24")

1. Reach the maximum penetration of 200 feet. Circulate and POOH.
2. Install 21 1/4" control.
3. RIH drilling string with diverter tool to the bottom and circulate for 25 minutes.
4. Pump 250 sxs of net cement + 15 sx gilsonite + 2% Cl_2Ca ($\rho = 15.6 \text{ \#/ gal}$)
5. Pull out the pipe slowly to 100 ft. Circulate.
6. Shut the BOP and displace with 20 bbls of mud (4 bpm). Leave pressurized.
7. After 5 hours open valve and preventor. POOH.
8. Cut off conductor and welding Braden head. WOC. 14 hours.

13 3/8" O.D. CASING AT 2,000 feet (Hole average 19 1/2")

1. Maximum speed to run casing: 40 sec. / tube.
2. Install the guide shoe followed by one (01) joint, and Insert Float Valve.
Note: Use thread locking compound.
3. Install 15 centralizers. 13 between the first 15 joints starting from the float valve. Install the rest (2) at 700 and 350 feet.
4. Circulate $1^{1/2}$ casing volumes prior to pumping cement, condition mud during circulation to desired rheology. ($\text{YP} \pm 15 \text{ lbs/ } 100 \text{ ft}^2$). Mix spacers and mud flush at this time.
5. Test cement lines and head with pressure of 1,500 psi.
6. Release bottom wiper plug (red) and reload the cement with the top plug (black) and pump the following slurries:

Slurries	Density (lb/ gl)	Rend. (ft ³ / sx)	Water (gls/ sx)
Sea Water (10 bbls)	8.5	---	---
1st. Slurry			
850 sx cement (6%gel) + 0.5 gl/10 bbl FP-6L	13.5	1.75	7.93
2nd. Slurry			
600 Net sx + 1% CaCl_2 + 0.5 gls/ 10 bbl FP-6L	15.6	1.20	5.20

Release top plug (black) and displace with 302 bbls of drilling mud. Pump pressure approximately 450 psi. Sit the casing a foot off bottom. Be careful to space out where there is no danger of a casing a casing collar in the well

Cement returns to surface are expected.

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9^{5/8}" O.D. CASING AT 5,500 feet (Hole Average: 13")

1. Maximum speed to run casing: 40 sec. / tube.
2. Install the guide shoe followed by two (02) joints, and Differential float collar.
Note: Use thread locking compound.
3. Install 20 centralizers, 15 between the first 30 joints starting from the float collar. Install the remaining between the interval: 2500 to 1000 ft one every other joint.
4. Circulate 1^{1/2} casing volumes prior to pumping cement, condition mud during circulation to desired rheology. (YP $\pm$ 18 lbs/ 100 ft²). Mix spacers and or mud flush at this time.
5. Test cement lines and head with pressure of 2,000 psi.
6. Release bottom wiper plug (red) and reload the cement with the top plug (black) and pump the following slurries:

Slurries	Density (lb/ gl)	Rend. (ft ³ / sx)	Water (gls/ sx)
Sea Water (10 bbls)	8.5	---	---
1st. Slurry			
950 sx cement (6% Gel)+ 0.5 gl/10 bbls FP-6L + 0.25% F1-52	13.5	1.75	7.93
2nd. Slurry			
600 Net sx + 0.5 gls/ 10 bbls FP- 6L + 0.5% BA-562	15.6	1.20	5.20

Release top plug (black) and displace with 402 bbls of drilling mud. Pump pressure approximately 850 psi. Sit the casing a foot off bottom. Be careful to space out where there is no danger of a casing a casing collar in the well

Cement returns to surface are expected.

5^{1/2}" O.D. CASING AT 8,470 feet (Hole Average: 9 1/2")

1. POOH laying down string. Fill the hole with mud to keep hydrostatic pressure.
2. Maximum speed for running casing hole: 40 sec/ft.
3. Install the floating equipment Super Seal II. Apply thread lock compound.
4. Place centralizers (total: 25), the first 20 in each tube starting from the first couple and the remaining between: 5600'- 5000' (5).
5. Run a flag joint ($\pm$ 25 feet) on the # 49 position of the casing string.
6. Reciprocate during the circulating. Condition mud rheology - Yp $\pm$ 15 Lbs/ 100 ft².
7. Make-up cementing head, lines and test with 2500 psi. Release bottom wiper plug (red) and reload the cement with the top plug (black) and pump the following slurries:

Slurries	Density (lb/ gl)	Rend. (ft ³ / sx)	Water (gls/ sx)
Mud Clean (20 bbls)	8.9	---	---
Mud Sweep (30 bbls.)	11.8		
1st. Slurry			
300 sx cmt. (4% Gel) + 0.5 gal/ 10 bbls FP-6L + 0.5% FL-52	14.1	1.53	7.6
2nd. Slurry			
100 Net sx+ 0.7% BA-56 + 0.5 gal/ 10 bbls. FP-6L + 0.35% CD-32	15.6	1.20	5.33

Release top plug (black) and displace with 195 Bbls diesel. Bump plug with 1800 psi. Hold for 5 minutes and then bleed pressure off to see if floats hold.

Run temperature survey after 08 hours of WOC.

ELECTRICAL LOGS PROGRAM

1) OPEN HOLE LOGS:

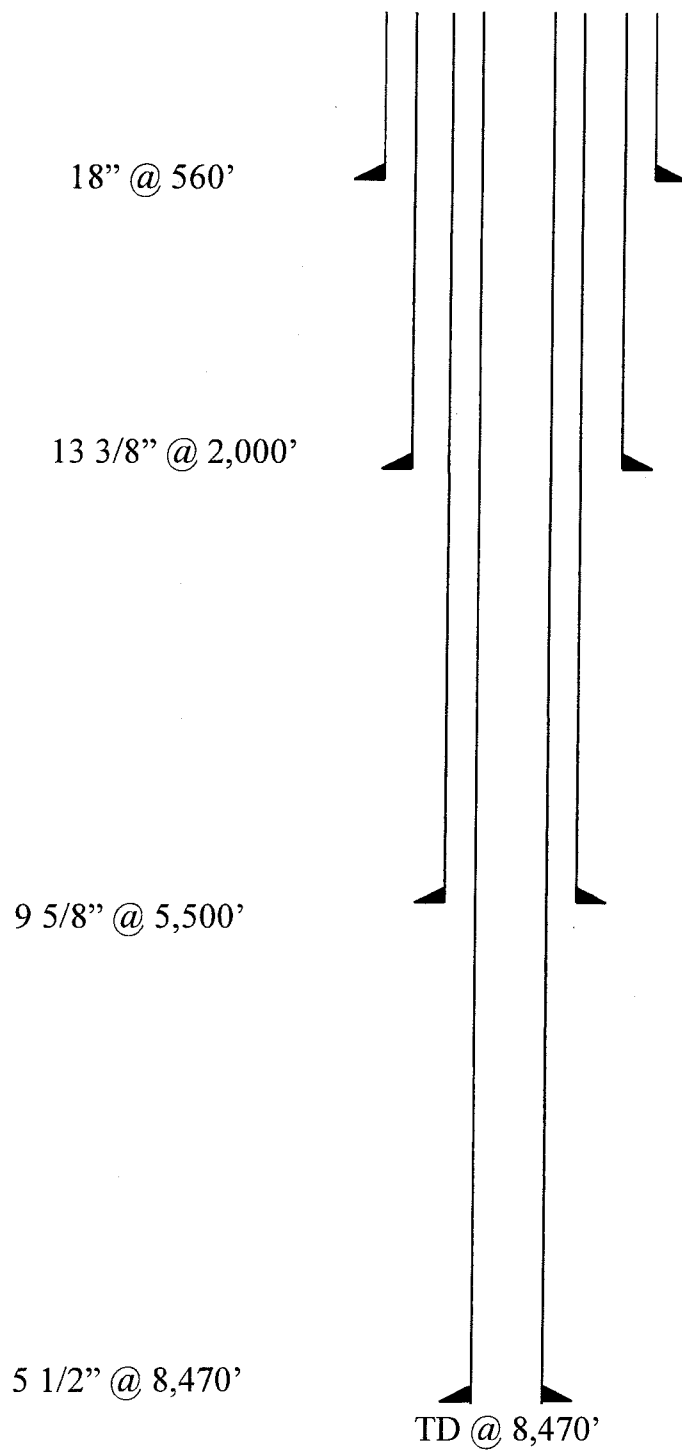
- DLL - MSFL - GR
- FDC - CNL - GR

2) CASED HOLE LOGS:

- GR - CCL

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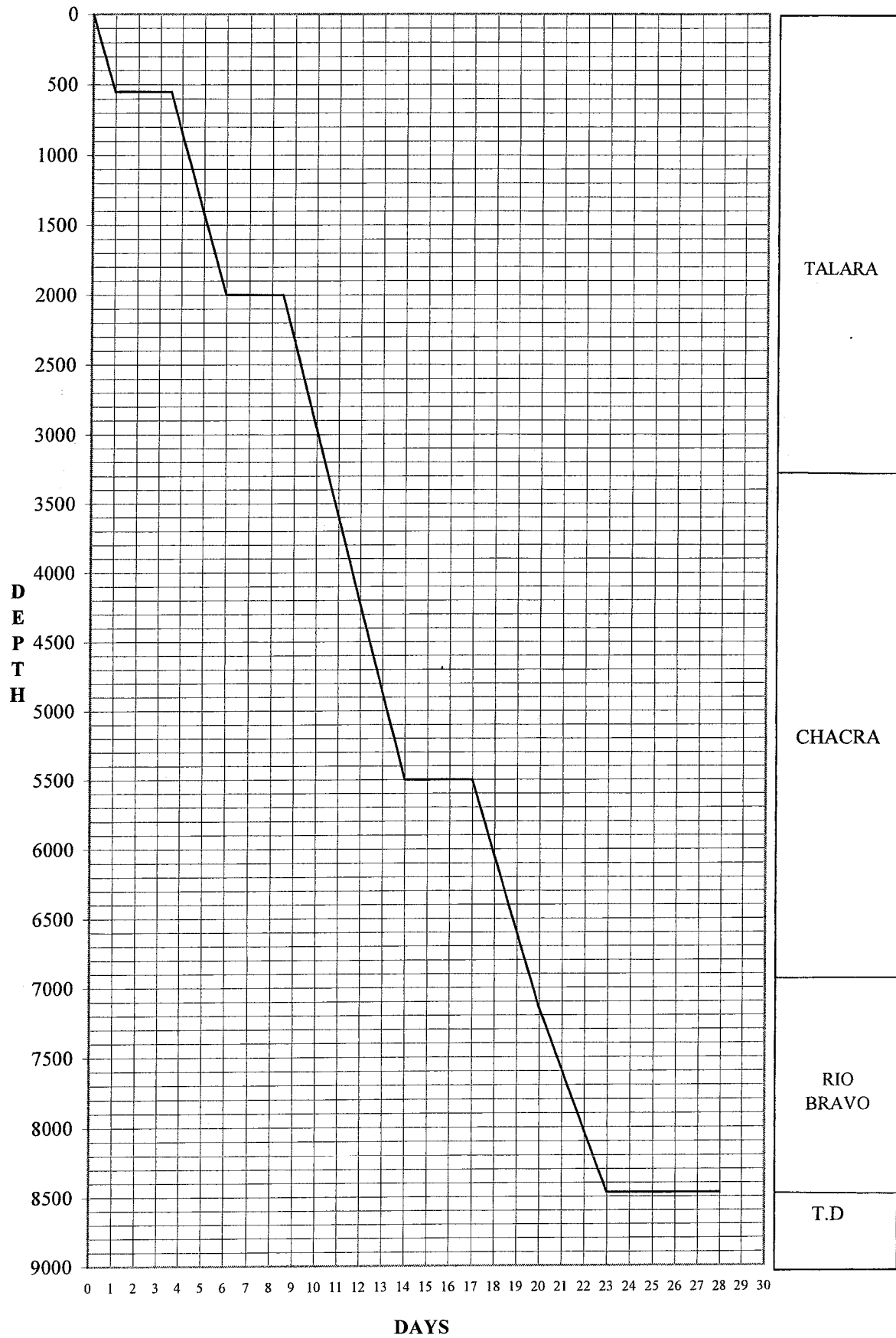
CASING SETTING DEPTHS



Drilling Prognosis
LO16-26

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Drilling Curve



DATA TABLES

GENERAL CASING DATA

SIZE	WEIGHT LBS/FT	GRADE	CONNECTION	OPTIMUM MAKE UP TORQUE (FT/LBS)	MAXIMUM OVERPULL (TENSION) LBS
18	70.59	ASTM A53B	WELD CONN	N/A	N/A
13 3/8"	54.5	K-55	STC	5470	547,000
9 5/8"	43.5	N-80	LTC	8130	813,000
5 1/2"	17.0	K-55	LTC	2720	272,000
5 1/2"	17.0	N-80	LTC	3410	338,000
5 1/2"	20.0	N-80	LTC	4200	416,000
3 1/2"	9.3	J-55	Atlas Bradford FL4S	1400	78,000

SIZE	GRADE	WT	ID	DRIFT DIA	Burst psi	Collapse psi	BBL/FT	FT/BBL
13 3/8"	K-55	54.5	12.615	12.459	2730	1130	.1545	6.47
9 5/8"	N-80	43.5	8.755	8.599	6330	3810	.0744	13.43
5 1/2"	K-55	17.0	4.892	4.767	5320	4910	.0232	43.01
5 1/2"	N-80	17.0	4.892	4.767	7740	6280	.0232	43.01
5 1/2"	N-80	20.0	4.778	4.653	9190	8830	.0221	45.09
3 1/2"	K-55	9.3	2.992	2.867	6980	7400	.0087	114.99

BUOYANCY FACTORS FOR STEEL PIPE IN VARIOUS WEIGHT FLUIDS

LBS/GAL	FACTOR	LBS/GAL	FACTOR	LBS/GAL	FACTOR	LBS/GAL	FACTOR	LBS/GAL	FACTOR
9.1	.8609	9.6	.8533	10.1	.8457	10.6	.8380	11.1	.8304
9.2	.8594	9.7	.8518	10.2	.8441	10.7	.8365	11.2	.8289
9.3	.8579	9.8	.8502	10.3	.8426	10.8	.8350	11.3	.8273
9.4	.8564	9.9	.8487	10.4	.8411	10.9	.8334	11.4	.8258
9.5	.8548	10.0	.8472	10.5	.8395	11.0	.8319	11.5	.8243

CONVERSION FACTORS

Centigrade Degree	(C° x 1.8) + 32	= Degrees Fahrenheit
Centimeter (cm)	x .393700	= Inch
Circle Diameter	x 3.1416	= Circumference
Cubic Foot	x .1781	= Barrel (42)
Diameter x Circumference	x .25	= Area
Fahrenheit Degree	(F°-32) x .555	= Degrees Centigrade
Foot-Pound	x .138255	= Kilogram-Meter
Gallon Liquid U.S.	x .133680555	= Cubic Feet
Knot US	x 1.15155	= Mile/Hour
Liter	x .035316	= Cubic Feet
Liter	x .264178	= Gallon US
Pound	x .4536	= Kilograms
Steel (cubic foot)	x 489.569	= Pounds (pipe or tubing)
Cost of any item	-\$1.00	= Amount in your pocket