





SERVICING PROGRAMME (Definitive Abandonment)		File No:
Well : GALINDA 02 Field : GALINDA Zone : BINGA Rig : H-35/KB-700	Program No : DT/SDK/SV - 015/97 Account No : 002.94xxxx.6337.9543 Date : Aug, 1st, 1997	
<u>Objective</u> To definitively abandon the well.		Well status : Shut-in since April 1985.
		Reservoir Characteristics Pres () : 3,670 psig @ datum Tres 230 ° F @ datum PI N.A. Datum at : 1,901 mss; 2,122 msg
<u>Program Outline</u> 1. POOH 2 7/8" tubing completion. 2. RIH 2 7/8" tubing with 7" scraper. Circulate the well clean. 3. Install 1st cement plug. WOC. Tag TOC and POOH tubing with scraper. 4. Set 7 " Bridge plug at 1,950 mKB. 5. Install 2nd cement plug above BP and the surface cement plug.		
Cost Estimate : 46,900 usd (H-35) or 64,400 usd (KB-700)		
<u>Expected Benefits</u> No benefits are expected. The well has to be definitively abandoned by safety reasons. Rig Time : 7 days	<u>Annexes</u> 1) Well history 2) Justification 3) Well Diagramme 4) Detailed Programme 5) Cementing Plugs Programme 6) Detailed Cost Estimation 7) Proposed Well Diagramme	
Prepared by: J. Maria /F. Miliciano/C. Botelho	Internal distribution list LDA - Technical Mgr - Sd Kwanza - Sd Estudos QN - Prod Supt - Rig Supv	
 		

ANNEX - 01

GALINDA - 02 WELL HISTORY

GA-02 was drilled and completed in the Binga formation in September 1959. It was put on production in April 1960 and produced on natural flow at about 100 m³/day declining rapidly to less than 40 m³ by May 1960.

From May 1960 until October 1961 several small treatments with solvents and water were carried out. Immediately after the treatments the production increased to 60 - 70 m³/day, and then declining quickly.

In October 1961 after a cumulative production of 27,200 m³, the well was closed until September 1965 when it was reopened at 50 m³/day, declining sharply to less than 25 m³/day.

In December 1965 the well was hydraulic fractured using 90 m³ of Dowell Petrofrac acid after which production rose to peak of 750 m³/day in September 1966.

In January 1967 the salt content of the crude oil began to rise and in February 1967 the well started to produce water in the range of 2 %.

Production was cut back by steps from February to October 1967 to +/- 80 m³/day with the water cut increasing to 40 %. From October 1967 to October 1968 production was cut back by steps to 30 m³/day at which time the water cut fell to zero.

During this time, continuous plugging of tubing due to salt deposition occurred and it was only possible to maintain production by frequent tubing cleanings out with fresh water at least up to 6 times a day.

In November 1967 the well was recompleted to permit continuous injection of fresh water into the well via annulus with a sliding sleeve.

Until the end of 1970 production remained stable at +/- 30 m³/day, THP = 840 psig and then dropped to +/- 15 m³/day with a THP = +/- 350 psi. It is almost certain that salt plugging of the tail pipe occurred at this time. Production with a salt problem continued until 1973, +/- 10 m³/day, followed by a period of intermittent production until July 1975 when it was closed in. With the exception of a few days production in October 1976, the well remained closed in since then.

From March to May 1982 the well was worked over. The completion was pulled out and a new completion with a parallel flow tube to allow continuous water injection was run. The type C Halliburton permanent packer was left in the hole at 2,146 mKB and a new 7" Baker DA packer set at 2,130 mkb. The well was then "bullhead acidized" with 5,000 gals of 5 % HCl + 8,000 gal of 15 % HCl (with 1500 gal of Xilene) + 2,000 gal of diesel + U66.

After the acid job the well was tested with THP=1440 psi; CHP=900 psi; choke size 14/64" and QI=295.2 m³/day.

However the production rate started decreasing and in May it had dropped to 172.2 m³/d; in June, 107.4 m³/day; but in July a sharp decline was verified to 65.9 m³/day.

From July to December 1982 the production rate steadily went down to 19.5 m³/day in November and 21.99 m³/day in December 1982.

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From January to August 1983 the production rate was kept between 19.2 and 14.5 m³/d being suddenly dropped to 5.5 m³/day in September 1983.

The well was closed in for two months and reopened in December 1983 at 16.4 m³/day. From January to March 1984 the well produced an averaged rate of 8.4 m³/day and then the field was closed due to a sabotage occurred on the surface facilities.

In 1985 an attempt to reopen the field was made. The well was reopened at 16.7 m³/day in January but the production rate dropped to 10.1 m³/day at the end of March 1985.

In April 1985 the field was closed again due to lack of security in the area.

ANNEX - 02

JUSTIFICATION

The Kwanza Basin oil production is declining and reaching no economic levels. Due to that negotiations between Fina Petroleos de Angola and the concessionaire, Sonangol, are under way to relinquish the current concession in a near future.

The Operator proposed to the Concessionaire to initiate the definitive abandonment of the wells and the fields with no production and with no potential to become producers until the Kwanza Basin fields future is decided. An abandonment campaign was initiated in December 1995 with the well BT-03.

In May 1984 the Galinda tank farm was destroyed by sabotage actions. After minor works the field was put back on production from January to March 1985. In March 1985 the Galinda tank farm was again destroyed by sabotage actions and the wellheads of GA-02 and GA-04 damaged by explosive charge. Since then this field has been closed in.

After the events in February 1986 which originated the shut down of Tobias field, the transfer line from Tobias to Quenguela Norte field was deactivated.

In the current conditions of the Kwanza Basin and previous production levels of Galinda field there is no other solution than to definitively abandon the field integrated in the abandonment campaign of the Kwanza Basin and wells. This well, GA-02, is therefore to be abandoned by safety reasons and mandatory obligations of the Operator to the Concessionaire, Sonangol.

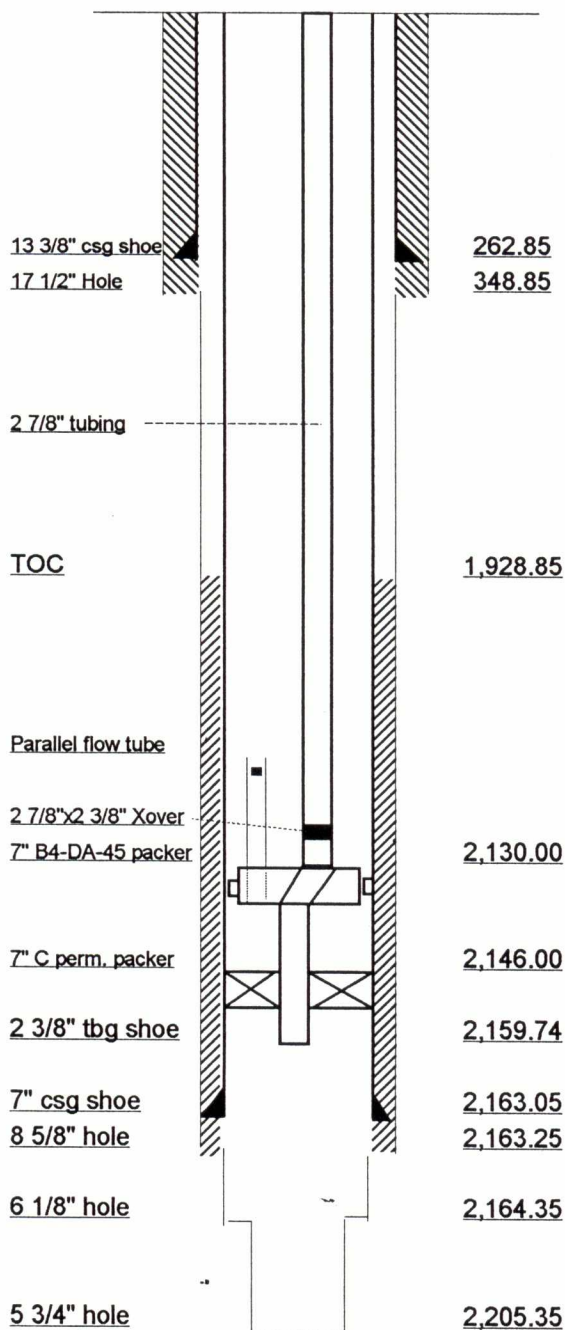
An abandonment cost estimate is here presented in annex 6.



WELL DATA MEMO

KB ELEVATION 224,51 masl GRD ELEVATION 220,78 masl CSG FLANGE _____ mkb DRILLING RIG S-7/11	WELL GALINDA - 02 ZONE BINGA DATE 04 / 08 / 97
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Remarks :



General data

Perforations

Bore Hole			
Size (")	Depth (mkb)		
	From	To	
17 1/2	0.00	384.85	
8 5/8	384.50	2,163.25	
6 1/8	2,163.25	2,164.35	
5 3/4	2,164.35	2,205.35	

Casing / Liner Data

Size (")	Weight (Lb/Ft)	Grade	Coupling	Depth	
				From	To
13 3/8	68	N-80		0.00	262.85
7	23	N-80		0.00	2,163.05

Well Head

Item	Bottom	Top	Outlets
	Bore x Rating		

ANNEX - 04

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DETAILED PROGRAM

NOTES : 1. Completion fluid to be used : CaCl brine ; SG = 1.22; until setting 1st cement plug. Clean fresh water after.

1. Move in and rig up H - 35. Bleed off tubing and annulus pressures, if any.
Fill up the well with completion fluid; tubing and annulus.
2. Pump down tubing 13 m3 of completion fluid (1.22 CaCl brine). Observe the well to make sure it is dead. Pump down more completion fluid into the formation, if required.
3. Remove X mas tree. Install Shafer BOP's and pressure test to 2,000 psi for 15 minutes.
4. Fill up the well with completion fluid.
Note losses at static conditions.
5. Disengage locator from 'DA' packer at 2,130 mKB.
6. Reverse circulate well twice tubing contents; +/- 13 m3 completion fluid.
7. POOH 2 7/8" tubing completion.
8. RIH 2 7/8" tubing with 7" scraper at 2,130 mKB (7" scraper to clean 7" casing to 1,955 mKB). Be sure of 175 meters from tubing shoe to scraper.
9. Circulate well clean by pumping at least 40 m3 completion fluid. Be sure the well is completely cleaned. If circulation can not be obtained due to losses:
Pump down annulus well contents (+/- 34 m3 completion fluid)
Pump down tubing string tubing contents (+/- 6 m3 completion fluid)
10. Batch mix 20 bbls of 1.90 gr/cc cement slurry
Cement slurry properties required at bottom hole conditions :
a) Thickening time +/- 6 hours
11. Set a balanced plug from 2,130 mKB to 1,970 mKB.
12. POOH tubing shoe to 1,830 mKB (shoe of tubing +/- 140 mts above theoretical top of cement). Fill up annulus and tubing with completion fluid. Record volumes. Reverse circulate twice tubing contents; +/- 11 m3 of fresh water. Close pipe rams.
13. WOC over night. RIH and tag TOC . Report TOC depth. Pressure test the well to 1,000 psig for 15 minutes.
14. POOH 2 7/8 " tubing with scraper.
15. RIH 7" Bridge plug made up on a 2 7/8" tubing string and set it at 1,950 mKB.
16. Disengage Bridge plug setting tool and pressure test the well to 1,000 psig for 15 minutes. POOH 2 7/8" tubing string.
17. RIH 2 7/8 " open ended tubing to top of 7" Bridge Plug at 1,950 mKB.
18. Batch mix 20 bbls of 1.90 gr/cc cement slurry
Cement slurry properties required at bottom hole conditions :
a) Thickening time +/- 6 hours
19. Set a balanced plug from 1,950 mKB to 1,790 mKB.
20. POOH 2 7/8" tubing shoe to 1650 mKB (shoe of tubing +/- 140 mts above theoretical top of cement). Fill up annulus and tubing with completion fluid. Record volumes.
Reverse circulate twice tubing contents; +/- 10 m3 of fresh water.

21. POOH 2 7/8" tubing shoe to 200 mKB.
22. Batch mix 20 bbls of 1.83 gr/cc cement slurry
23. Set a balanced plug from 200 mKB to 40 mKB.
24. POOH 2 7/8" tubing .
25. Remove Shaffer BOP's.
26. Weld a steel plate (+/- 1.5 centimeters thickness) on top of casing head with a high pressure needle valve (see details in annex 7). Engrave well name on plate. Weld vertical post along the casing head, to be one meter above ground level (2 7/8" tbg). Engrave well name on post. Fill cellar with gravel. Break away cellar cement, if any.
27. Rig down and move the rig to the next location.

GALINDA - 02

ANNEX 5 - CEMENT PLUGS PROGRAMME

1. MATERIALS TO BE ON SITE

- Pumps : T - 10 pump truck mounted with 7 m³ tank
Circulating Pump (Mission or Bowen)
- Tanks : To be filled full with fresh water
2 x 50 m³
1 x 34 m³
2 x 6 m³
- All accessories of H - 35 rig as choke manifold, surface lines, chocks, etc.

2. 1 st CEMENT PLUG

Batch mix 20 barrels (3.18 m³) of 1.90 gr/cc cement slurry
Cement : YIELD - 105.0 lbs/100 Kg (1050 lb/ton)
Fresh water : RATIO - 0.52 bbls/bbl of slurry

- Water 1.67 m³
- Cement 3.03 tons of class G = n° bags 2.0
- Silic Flour 1.06 tons of silica = n° bags 1.0
- Retarder 7.03 gals
- Defoamer 0.55 gals

Cement slurry properties required at bottom hole conditions :

a) Thickening time +/- 5 hours

Take a cement sample and note setting time at surface.

Procedure

This is the step 11 of main program. 2 7/8" tubing shoe at 2,130 mKB.

1. Connect surface lines and pressure test to 1,500 psig for 15 minutes.
2. Batch mix cement.
3. Pump down tubing
0.5 m³ of fresh water.
20 bbls (3.18 m³) of Cement slurry
0.5 m³ of fresh water.
5 m³ of completion fluid to displace cement into a balanced position.
Pump cement at a controlled rate of 1 bbl per min. Pumping rate can be increased during displacement.
4. Proceed operations with step 12. Tubing shoe to be pulled out to 1,830 mKB.

3. 2 nd CEMENT PLUG

Batch mix 20 barrels (3.18 m³) of 1.90 gr/cc cement slurry
Cement : YIELD - 105.0 lts/100 Kg (1050 lt/ton)
Fresh water : RATIO - 0.52 bbls/bbl of slurry

- Water 1.67 m³
- Cement 3.03 tons of class G = n° bags 2.0
- Silic Flour 1.06 tons of silica = n° bags 1.0
- Retarder 7.03 gals
- Defoamer 0.55 gals

Cement slurry properties required at bottom hole conditions :

a) Thickening time +/- 5 hours

Take a cement sample and note setting time at surface.

Procedure

This is the step 19 of main program. 2 7/8" tubing shoe at 1,950 mKB.

1. Connect surface lines and pressure test to 1,500 psig for 15 minutes.
2. Batch mix cement.
3. Pump down tubing
20 bbls (3.18 m³) of Cement slurry
5 m³ of fresh water to displace cement into a balanced position.

Pump cement at a controlled rate of 1 bbl per min. Pumping rate can be increased during displacement.

4. Proceed operations with step 20. Tubing shoe to be pulled out to 1650 mKB.

4. 3 rd CEMENT PLUG

Batch mix 20 barrels (3.18 m³) of 1.90 gr/cc cement slurry
Cement : YIELD - 82.3 lts/100 Kg (823 lt/ton)
Fresh water : RATIO - 0.61

- Water 1.95 m³
- Cement 3.86 tons of class C = n° bags 2.6

Procedure

This is the step 23 of main program. 2 7/8" tubing shoe at 200 mKB.

1. Connect surface lines and pressure test to 1,500 psig for 15 minutes.
2. Batch mix cement.
3. Pump down tubing
20 bbls (3.18 m³) of Cement slurry
0.12 m³ of fresh water to displace cement into a balanced position.

Pump cement at a controlled rate of 1 bbl per min.

4. Proceed operations with step 24. Tubing shoe to be pulled out to surface.

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ANNEX - 06

GALINDA - 02

COST ESTIMATE

H-35 RIG AND PERSONNEL

Rig Time @ 7 days at 3,500 usd/day 24,500

SERVICE COMPANY

Completion fluid	CaCl	@	30.00	Tons	@	500	15,000
Cementing - 3 jobs	Cement	@	12.00	Tons	@	300	3,600
	Additives	@	16.00	Gals	@	50	800
Bridge Plug Instal.	Bridge Plug			1	@	3,000	3,000

SUB TOTAL 22,400

TOTAL 46,900

KB-700 RIG AND PERSONNEL

Rig Time @ 7 days at 6,000 usd/day 42,000

SERVICE COMPANY

Completion fluid	CaCl	@	30.00	Tons	@	500	15,000
Cementing - 3 jobs	Cement	@	12.00	Tons	@	300	3,600
	Additives	@	16.00	Gals	@	50	800
Bridge Plug Instal.	Bridge Plug			1	@	3,000	3,000

SUB TOTAL 22,400

TOTAL 64,400

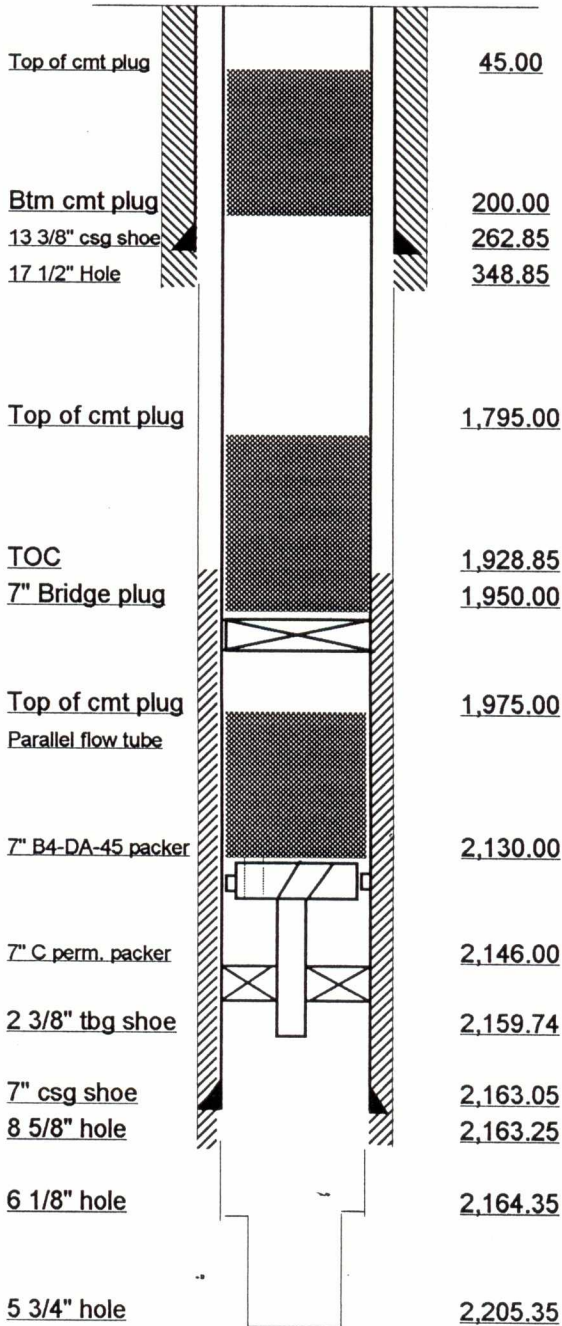


WELL DATA MEMO

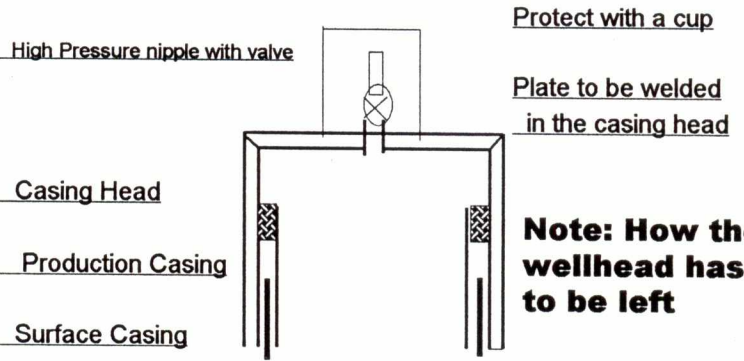
KB ELEVATION 224,51 masl
GRD ELEVATION 220,78 masl
CSG FLANGE _____ mkb
DRILLING RIG S-7/11

WELL GALINDA - 02 _____
ZONE BINGA _____
DATE 04 / 08 / 97 _____

Remarks :



PROPOSED WELL DIAGRAMME



General data

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	Depth (mkb)	
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Well Head

Item	Bottom	Top	Outlets
	Bore x Rating		