

FINAL SERVICING REPORT

WELL:

Galinda-02

RIG:

KB-700

DATE:

August 1999

Prepared by:

Drilling

Checked by:

Petroleum Engineering

Operations

Approved by:

Technical Manager

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1. SERVICING SUMMARY

SERVICING SUMMARY

WELL NAME

: Galinda - 02.

PRE SERVICING STATUS

: Suspended.

POST SERVICING STATUS

: Completely abandoned.

OBJECTIVE OF SERVICING

: Definitive abandonment.

REFERENCES

: DT/SDE/SV - 015/97

SERVICING RIG

: KB-700.

TOTAL SERVICING TIME

: 30 days. Moved in: 24.07.99 - Moved out: 22.08.99

TOTAL SERVICING COST (USD):

386.520

ORIGINAL K. B. ELEVATION

: 224,51 masl

GROUND ELEVATION

: 220,78 masl

DRILLING T. D.

: 2,205,35 mkb

PRODUCTION CASING

: 7" casing with shoe at 2,163.05 mkb.

PRODUCTION INTERVAL

: Open hole = 2,205 - 2,163 mkb.

SUMMARY OF OPERATIONS:

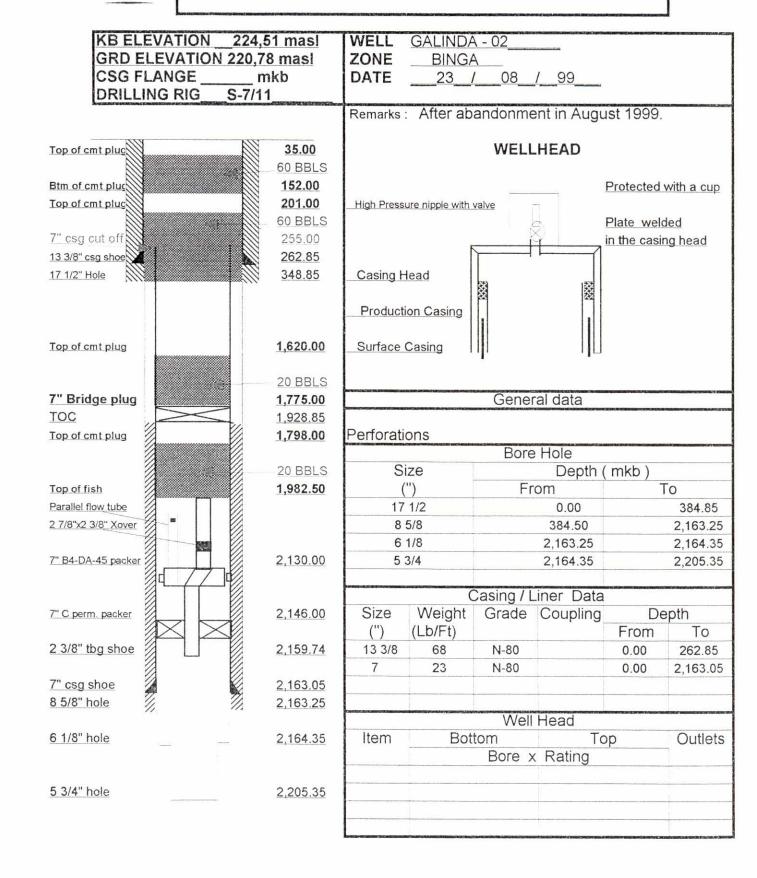
- Moved the rig KB-700 from GA-08 to GA-02 on 24th, July, 1999.
- Installed the rig. Raised the mast and rigged up. Filled up mud tanks with fresh water. Killed the well.
- Nippled down Xmas tree. Nippled up and pressure tested shaffer BOP's to 2,500 psig, for 15 minutes, OK.
- Unscrewed the tubing hanger tie-down studs with difficulty due to severe corrosion.
- Tried to release the tubing hanger with a maximum tension of 36 tons, negative.
- Removed and hung off casing spool together with Shaffer BOP's.
- Tried to release the tubing hanger with a maximum tension of 27 tons, negative.
- Hung off tubing hanger. Cut 2 7/8" tubing below the casing spool. Observed the well stable. Re-installed Shaffer BOP's with casing spool.
- Engaged the fish with the overshot. Worked the string to a maximum overpull of 50 tons, without success.
- Performed a mechanical back off. Displaced the well with KCI brine. Observed the well stable. Released the overshot from the fish. POOH 2 7/8" tubing string. Recovered 90 x 2 7/8" tubing joints.
- RIH 2 7/8" open ended tubing string to 610 mkb as kill string. Closed-in the well.
- Moved the generators, office, cistern, vehicles and trucks to Quenguela Norte.
- Immobilised the rig on 28th, July 1999, for security reasons.
- Moved back the generators, office, cistern, vehicles and trucks to the well location on 4th, August, 1999.
- Bled off wellhead pressure. Circulated the well with brine. POOH 2 7/8" open ended tubing string.
- Performed fishing operations and recovered in pieces 2 7/8" tubing string to 1,982 mkb. Unable to recover the remaining fish. 11 days were lost for fishing operations.
- Performed the complete abandonment of the well as follows:
- Set 20 bbls of class 'G' cement slurry 1,90 gr/cc at 1,982 mkb. WOC. Tagged top of cement plug at 1,798 mkb.
- Set 7" 'EZ-SV' bridge plug at 1,775 mkb. Set 20 bbls of class 'G' cement slurry 1,90 gr/cc above the 7" bridge plug.
- Cut and recovered 7" casing at 225 mkb.
- Set 30 bbls of class 'G' cement slurry 1,90 gr/cc at 225 mkb. Squeezed cement slurry with 10 bbls of fresh water. Found top of cement plug down to 265 mkb after WOC.
- Set 30 bbls of class 'G' cement slurry 1,90 gr/cc at 265 mkb. WOC. Tagged top of cement plug at 201 mkb.
- Set 30 bbls of class 'G' cement slurry 1,90 gr/cc at 152 mkb. WOC. Tagged top of cement plug at 95 mkb.
- Set 30 bbls of class 'G' cement slurry 1,90 gr/cc at 95 mkb. WOC. Tagged top of cement plug at 35 mkb.
- Pressure tested the well to 1,000 psig, for 15 minutes, OK. Nippled down shaffer BOP's and casing spool.
- Welded a steel plate on top of casing head with high pressure needle valve and a vertical post with name engraved. Filled up cellar and the pit with gravel. Moved the rig to GA-07 on 23rd, August, 1999.

2. NEW WELL DIAGRAMME AND WELLHEAD



FINA PETROLEOS DE ANGOLA

WELL DATA MEMO



3. PROGRAMME

	File No:						
SERVICING PROGRAMME (Definitive Abandonment)							
Well: GALINDA - 02 Field: GALINDA Zone: BINGA	Program No : DT/SDK/SV - 015/97 Account No :002.94xxxx.6337.9543 Date Aug, 1st, 1997						
Rig : H-35/KB-700	Well status: Shut-in since April 19						
Objective To permanently abandon the well.	Reservoir Characteristics Pres (): 3,670 psig @ datum Tres 230 °F @ datum Pl N.A. Datum at : 1,901 mss; 2,122 msg						
Program Outline 1. POOH 2 7/8" tubing completion. 2. RIH 2 7/8" open ended tubing. Circulate the well clean. 3. Set 1st cement plug. WOC. Tag TOC and POOH tubing. 4. RIH 6 1/8" bit with 7" scraper to 1,960 mKB. Circulate the well. POOH bit and scraper. 5. Set 7" Bridge plug at 1,950 mKB. 6. Set 2nd cement plug above BP. 7. Cut and recover 7" casing from 262 mkb. Set 30 bbls at 262 m and 60 bbls from 150 m.							
Cost Estimate: 46,900 usd (H-35) 64,400 usd (KB-700)	Annexes						
Expected Benefits No benefits are expected. The well has to be	 Well history Justification Well Diagramme Detailed Programme Cementing Plugs Programme Detailed Cost Estimation Proposed Well Diagramme 						
Prepared by: Drilling 14 days							
Checked by: Cirly While 13/08/55							
Petroleum Engineering Operations Approved by:	Internal distribution list LDA - Technical Mgr - Sd Kwanza - Sd Estudos QN - Prod Supt - Rig Supv						
Technical Manager							



WELL DATA MEMO

KB ELEVATION GRD ELEVATION CSG FLANGE DRILLING RIG		ZONE _ DATE _	BALINDA - BINGA 04_	- 02 /08	<u> </u>					
'r shoe	262.85 348.85	Remarks :	1							
tubing	1,928.85	. Asset Asse	General data Perforations							
el flow tube			') 1/2		Hole Depth (O 384.85 2,163.25			
/8"X2 3/8" Xover	2,130.0		1/8 3/4		384.50 2,163.25 2,164.35		2,164.35 2,205.35			
erm. packer 3/8" tbg shoe	2,146.0 2,159.7	(") 13 3/8	Weight (Lb/Ft) 68 23		iner Data Coupling	From 0.00 0.00	epth To 262.85 2,163.05			
sg shoe 5/8" hole	2,163.0 2,163.2	25		Well	Head		Outlets			
8" hole 4" hole	2,164.3		Rot	Bore :	To Rating	Ψ	Cullets			

ANNEX - 04

1/2

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 KB-700. 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" open ended tubing to 2,130 mKB.
 - 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 15 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 1,975 mKB.
- 12. POOH tubing shoe to 1,835 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.
- 13. Close pipe rams. Squeeze cement slurry with 15 bbls of fresh water @ max 500 psig. Open pipe rams.
- 14. POOH 2 7/8 " open ended tubing string to surface.
- 15. RIH 6 1/8" bit with 7" scraper and tag top of cement plug. Pressure test the well to 1000 psig, for 15 minutes.
- 16. Circulate well clean pumping at least 38 m3 completion fluid. Be sure the well is completely cleaned.
- 17. POOH bit and scraper.
- 18. RIH 7" Bridge plug made up on a 2 7/8" tubing string and set it at 1,950 mKB.
- 19. Disengage Bridge plug setting tool and pressure test the well to 1,000 psig for 15 minnutes. POOH 7" setting tool to surface.

2/2

- 20. RIH 2 7/8 " open ended tubing to top of 7" Bridge Plug at 1,950 mKB.
- 21. Batch mix 20 bbls of 1.90 gr/cc cement slurry

 Cement slurry properties required at bottom hole conditions:

 a) Thickening time +/- 6 hours
- 22. Set a balanced plug from 1,950 mKB to 1,795 mKB.
- 23. POOH 2 7/8" tubing shoe to 1655 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.
- 24. RIH with 7" mechanical casing cutter and cut off 7" casing at 262 mkb. Observe the well 15 minutes.
- 25. Nipple down shaffer BOP's and 7" casing spool.
- 26. Recover and lay down 7" casing.
- 27. Nipple up 7" casing spool and shaffer BOP's.
- 28. RIH 2 7/8" open ended tubing string to 262 mKB. Circulate the well with fresh water.
- 29. Batch mix 30 bbls of 1.90 gr/cc cement slurry
- 30. Set a balanced plug from 262 mKB to 200 mKB.
- 31. POOH 2 7/8" tubing shoe to 100 mKB (shoe of tubing +/- 100 mts above theoretical top of cement). Fill up annulus and tubing with fresh water. Record volumes. Reverse circulate twice tubing contents with fresh water.
- 32. Close pipe rams. Squeeze cement slurry with 10 bbls of fresh water @ max 250 psig. Open pipe rams.
- 33. WOC +/- 6 hours.
- 34. RIH 2 7/8 " open ended tubing string and tag top of cement plug. Report depth of top of cement plug. Pressure test well.
- 35. POOH 2 7/8" tubing shoe to 150 mkb.
- 36. Batch mix 30 bbls of 1.90 gr/cc cement slurry
- 37. Set a balanced plug from 150 mKB to 88 mKB.
- 38. POOH 2 7/8" tubing shoe to +/- 50 mKB (shoe of tubing +/- 38 mts above theoretical top of cement). Fill up annulus and tubing with fresh water. Record volumes. Reverse circulate twice tubing contents with fresh water. WOC.
- 39. RIH 2 7/8" open ended tubing string and tag top of cement plug. Report TOC.
- 40. Batch mix 30 bbls of 1.90 gr/cc cement slurry
- 41. Set a balanced plug from 88 mKB to 27 mKB.
- 42. POOH 2 7/8" tubing to surface.
- 43. Remove Shaffer BOP's.
- 44. 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.
- 45. 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 acessories of H - 35 rig as choke manifold, surface lines, chicksans, etc.

2. 1 st CEMENT PLUG

Batch mix

20 barrels (3.18 m3) of 1.90 gr/cc cement slurry

: 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 = nº bags 2.0

- Silic Flour

1.06 tons of silica = nº bags

1.0

- Retarder

2.58 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.
 - 5.7 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 $G = n^{\circ}$ bags 2.0

- Silic Flour 1.06 tons of silica = nº bags 1.0

- Retarder 2.36 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 22 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 23. Tubing shoe to be pulled out to 1650 mKB.

4. 3 rd CEMENT PLUG

Batch mix 30 barrels (4.77 m3) of 1.90 gr/cc cement slurry

Cement: YIELD - 82.3 lts/100 Kg (823 lt/ton)

Fresh water: RATIO - 0.61

- Water 2.93 m3

- Cement 5.80 tons of class $C = n^{\circ}$ bags 3.9

Procedure

This is the step 30 of main program. 2 7/8" tubing shoe at 262 mKB.

- 1. Connect surface lines and pressure test to 1,500 psig for 15 minutes.
- 2. Batch mix cement.
- 3. Pump down tubing
 - 30 bbls (4.77 m3) of Cement slurry
 - 0.6 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 31. Tubing shoe to be pulled out to 100 mkb.

5. 4th CEMENT PLUG

Batch mix 30 barrels (4.77 m3) of 1.90 gr/cc cement slurry

: YIELD - 82.3 lts/100 Kg (823 lt/ton)

Fresh water: RATIO - 0.61

 Water 2.93 m3

 Cement 5.80 tons of class G = nº bags

Procedure

This is the step 37 of main program. 2 7/8" tubing shoe at 150 mKB.

- 1. Connect surface lines and pressure test to 1,500 psig for 15 minutes.
- 2. Batch mix cement.
- 3. Pump down tubing
 - 30 bbls (4.77 m3) of Cement slurry
 - 0.26 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 38. Tubing shoe to be pulled out to +/- 50 mkb.

6.5th CEMENT PLUG

Batch mix 30 barrels (4.77 m3) of 1.90 gr/cc cement slurry

: YIELD - 82.3 lts/100 Kg (823 lt/ton)

Fresh water: RATIO - 0.61

 Water 2.93 m3

 Cement 5.80 tons of class G = nº bags 3.9

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Procedure

This is the step 41 of main program. 2 7/8" tubing shoe at 88 mKB.

- 1. Connect surface lines and pressure test to 1,500 psig for 15 minutes.
- 2. Batch mix cement.
- 3. Pump down tubing 30 bbls (4.77 m3) of Cement slurry

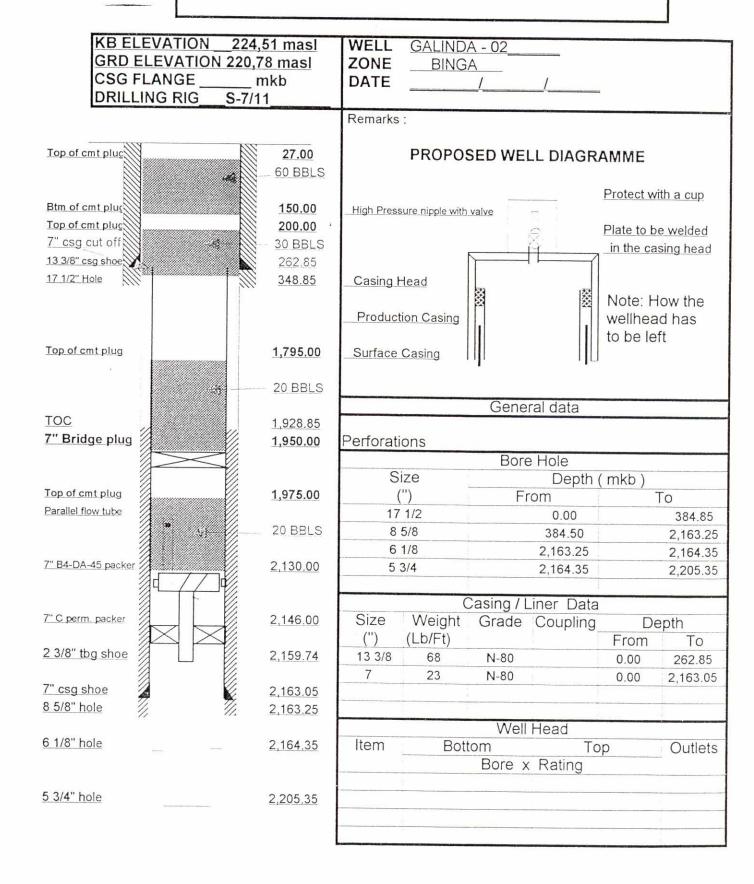
Pump cement at a controlled rate of 1 bbl per min.

4. Proceed operations with step 42. Tubing shoe to be pulled out to surface.



FINA PETROLEOS DE ANGOLA

WELL DATA MEMO



4. WEEKLY REPORT

4. WEEKLY REPORT

- Moved the rig KB-700 from GA-08 to GA-02 on 24th, July, 1999.
- Installed the rig. Raised the mast and rigged up. Filled up mud tanks with fresh water.
- Installed on Xmas tree 2 nipples, 1 wing valve, 1 swab valve and a pressure gauge.
- Observed the well: THP = 300 psig; CHP = 1,250 psig. Blended 20 m3 of KCl brine 1,20 gr/cc.
- Bled off annulus and tubing pressures to the pit. Observed the well: THP = CHP = 0 psig.
- Pumped down tubing 2,5 m³ of brine and down annulus 5 m³. Observed the well: THP = CHP = 0 psig.
- Nippled down Xmas tree. Nippled up and pressure tested shaffer BOP's to 2,500 psig, for 15 minutes, OK.
- Unscrewed the tubing hanger tie-down studs with difficulty due to severe corrosion.
- Tried to release the tubing hanger with a maximum tension of 36 tons, negative.
- Removed and hung off casing spool together with Shaffer BOP's.
- Tried to release the tubing hanger with a maximum tension of 27 tons, negative.
- Hung off tubing hanger. Cut 2 7/8" tubing below the casing spool. Observed the well stable. Re-installed Shaffer BOP's with casing spool.
- Prepared fishing equipment. Blended 25 m³ of KCI brine 1,22 gr/cc.
- Engaged the fish with the overshot. Worked the string to a maximum overpull of 50 tons, without success. The started flowing. Pumped down annulus 4 m³ of brine to a maximum pressure of 1,500 psig. Observed the well, OK.
- Performed a mechanical back off. Displaced the well with KCI brine. Observed the well stable. Released the overshot from the fish.
- POOH 2 7/8" tubing string. Recovered 90 x 2 7/8" tubing joints.
- RIH 2 7/8" open ended tubing string to 610 mkb as kill string. Closed-in the well.
- Moved the generators, office, cistern, vehicles and trucks to Quenguela Norte.
- Immobilised the rig on 28th, July 1999, for security reasons.
- Moved back the generators, office, cistern, vehicles and trucks to the well location on 4th, August, 1999.
- Bled off wellhead pressure. Circulated the well with brine. POOH 2 7/8" open ended tubing string.
- Performed fishing operations and recovered in pieces 2 7/8" tubing string to 1,982 mkb. Unable to recover the remaining fish. 11 days were lost for fishing operations.
- RIH 2 7/8" open ended tubing string to 2,982 mkb, top of fish. Circulated the well clean with fresh water.
- Connected and pressure tested cementing lines. Installed cementing equipment and products.
- Batch mixed and pumped down tubing 20 bbls of class 'G' cement slurry 1,90 gr/cc. Displaced cement slurry with fresh water. POOH 2 7/8" open ended tubing string to 1,670 mkb. Reverse circulated tubing contents. WOC.
- POOH 2 7/8" open ended tbg string to surface.
- RIH 6 1/8" bit with 7" scraper and tagged top of cement plug at 1,798 mkb. Circulated the well clean with fresh water.
- Pressure tested the well to 1000 psig, for 15 minutes, OK. POOH bit and scraper to surface.
- Set 7" 'EZ-SV' bridge plug at 1,775 mkb. Pressure tested the well to 1000 psig, for 15 minutes, OK.
- RIH 2 7/8" open ended tubing string to 1,775 mkb, top of 7" bridge plug.
- Batch mixed and pumped down tubing 20 bbls of class 'G' cement slurry 1,90 gr/cc. Displaced cement slurry with 5 m³ of fresh water. POOH 2 7/8" open ended tubing string to 1,470 mkb. Reverse circulated tbg contents.
- POOH 2 7/8" open ended tbg string to surface.
- Cut and recovered 7" casing at 255 mkb.
- RIH 2 7/8" open ended tubing string to 255 mkb. Circulated the well clean with fresh water.
- Batch mixed and pumped down tubing 30 bbls of class 'G' cement slurry 1,90 gr/cc. Displaced cement slurry with 0,6 m³ of fresh water. POOH 8 stands of 2 7/8" open ended tubing string. Reverse circulated tubing contents.
- Closed pipe rams. Squeezed cement slurry with 10 bbls of fresh water. Opened pipe rams. WOC.
- RIH 2 7/8" open ended tubing string and tagged top of cement plug at 265 mkb. No cement was found above 255 mkb.
- Batch mixed and pumped down tubing 30 bbls of class 'G' cement slurry 1,90 gr/cc. Displaced cement slurry with 0,6 m³ of fresh water. POOH 8 stands of 2 7/8" open ended tubing string. Reverse circulated tubing contents. WOC.
- RIH 2 7/8" open ended tubing string and tagged top of cement plug at 201 mkb. POOH tubing shoe to 152 mkb.
- Batch mixed and pumped down tubing 30 bbls of class 'G' cement slurry 1,90 gr/cc. Displaced cement slurry with fresh water. POOH 2 7/8" open ended tubing string to surface. WOC.
- RIH 2 7/8" open ended tubing string and tagged top of cement plug at 95 mkb.
- Batch mixed and pumped down tubing 30 bbls of class 'G' cement slurry 1,90 gr/cc. Displaced cement slurry with fresh water. POOH 2 7/8" open ended tubing string to surface. WOC.
- RIH 2 7/8" open ended tubing string and tagged top of cement plug at 35 mkb.
- Pressure tested the well to 1,000 psig, for 15 minutes, OK. Nippled down shaffer BOP's and casing spool.
- Welded a steel plate on top of casing head with high pressure needle valve and a vertical post with name engraved. Filled up cellar and the pit with gravel.
- Moved the rig to GA-07 on 23rd, August, 1999.

5. TOTAL SERVICING COST

5. TOTAL SERVICING COST (USD)

1. - Total rig cost KB-700 (12,000 USD x 30 days): 360.000,00

2. - Cement class 'G' and additives: 9.870,45

3. - 7" 'EZSV' bridge plug: 2.250,00

4. - 7" 'EZSV' bridging plug: 45,00

5. - Cutting & retrieving equipment rental: 14.354,30

Total (USD): 386.519,75