COMPLETION HISTORY

SOUTHERN UNION - GOVERNMENT 1-19

San Juan County, New Mexico

1090' from South Line
1090' from West Line
Sec. 19-[illegible]

1) Drilled 8 3/4" hole, encountered oil emulsion mud to 3002'. Drilling to this depth was generally uneventful except for lost circulation (Point Lookout believed thief zone) at 2000'. Returns (75%) regained in 10 hours.

2) Ran 7"-20 #J55 casing and set at 3000'. Cemented with 150 sacks with 6% gel. Hole stayed full with negligible to moderate loss while running in. Circulated last joint to bottom with 75% returns. Reciprocated casing 20 minutes with 50-75% returns. Returns dropped to 25% and reciprocation stopped. Mixed and displaced cement with water to 50% returns throughout job. Bumped plugs with 1400 psig -- purposely bled to 700 psig and shut in.

Centralizers (reciprocating) and scratchers from shoe to 4400'. Ran Baker Aluminoseal fill-up float shoe and collar on lower joint. Casing consists of 66 jts.-1971' of 23#-J-55 on bottom and 139 jts.-3017' of 20#-J-55 on top.

3) WOC 12 hours - - pulsated pressure - - ran temperature survey. Found cement top at 4500'.

4) Blew well dry with supply gas and drilled plug (reportedly hard cement) after 24 hours WOC.

5) Drilled 6¼" hole with gas to 6830'. Drilling time indicated Dakota top at 6767'. Measured gas flow test at 6685' indicated no flow - - test at 6815' indicated 700 MCFD.

6) Ran Welex Radioactivity Log, but depth compensator failed. Plan to rerun log after cutting liner.

COMPLETION HISTORY

SOUTHWEST UNION - GOVERNMENT 1-19

San Juan County, New Mexico

1000' from South Line
1000' from West Line
Sec. 19-T31N-R4W

1) Drilled 8 3/4" hole, mechanical oil emulsion mud to 3012'. Drilling to this depth was generally uneventful except for lost circulation (basal Nacimiento believed thief zone) at 2000'. Returns (75%) regained in 10 hours.

2) Ran 7"-20 lb. casing and set at 6000'. Cemented with 150 sacks with 5% gel. Hole stayed full with negligible to moderate loss while running in. Circulated last joint to bottom with 75% returns. Reciprocated casing 30 minutes with 50-75% returns. Returns dropped to 25% and reciprocation stopped. Mixed and displaced cement with zero to 30% returns throughout job. Bumped plugs with 1500 psig -- suddenly bled to 700 psig and shut in.

Centralizers (reciprocating) and scratchers from shoe to 4000'. Ran Baker differential fill-up float shoe and collar on lower joint. String consists of 64 jts.-1971' of 23#-J-55 on bottom and 139 jts.-4017' of 20#-J-55 on top.

3) WOC 12 hours - - released pressure - - ran temperature survey. Found cement top at 4300'.

4) Blew well dry with supply gas and drilled plug (reported hard cement) after 36 hours WOC.

5) Drilled 6¼" hole with gas to 6650'. Drilling time indicated Dakota top at 6767'. Natural gas flow test at 6605' indicated no flow - - test at 6615' indicated 700 MCFD.

6) Ran Welex Radioactivity log, but depth compensator failed. Plan to rerun log after setting liner.

7) Ran 1918' (63 joints) of 5½"-14 and 15.5#-J-55 liner with couplings cemented to 5,672'. (String consists of 1006' of 5½" casing and 4' Brown liner hanger-packer. Last through 5th joints from bottom are 14# (828'), remainder 15.5#. Liner extends from 4999' to 6917'. Cemented by displacing 100 sacks with 4% gel around liner in dry hole. Displaced with water and bumped plug with 1000 psig. Released pressure and set packing element on hanger. Pulled up 35' and reversed out excess cement.

It was necessary to circulate last three joints to bottom with gas, presumably because of condensate accumulation. Could not get below 6888'.

8) WOC 24 hours and then found only soft mushy cement around liner top - - - this believed due to gas cutting and not representative of that behind liner. Found liner plug as expected at 6705' and drilled hard cement to 6889'.

9) Ran Schlumberger temperature survey and confirmed cement to liner top.

10) Ran Welex Radioactivity Log.

11) Tested everything below casing to 6889' to 3000 psig.

12) Perforated with 4 Welex Dyna Jets per foot: 6747'-6779' and 6786'-6802'.

13) Broke down formation with water at 800 psig - - - took 10 BPM at 900 psig.

14) Sand-water fracked formation through casing at 31 BPM with 40,000#(40-60 mesh) sand. Slow gradual pressure buildup throughout job from 2000 to 2600 psig --- no sharp buildups or breakdowns. Used 1400 bbls. water --- 150 bbls. before sand, 900 bbls., with sand, 500 bbls. flush. Pressure bled slowly after job to 1000 psig in 5 minutes, 500 psig in 20 minutes, 140 psig in 1 hour 45 minutes. Opened well and flowed 2" stream water for 30 minutes.

Injected rubber balls as follows: 30 after 10,000# sand, 30 after 22,000# sand, 30 after 34,000# sand, and 30 after 40,000 # sand.

Ran wireline and found no sand fill-up.

15) Started blowing well dry with supply gas. Well blew in naturally after 6 hours blowing at 120#. Cleaned to bottom with bit (4 3/4") and made 2' hole to 6891' - Plug Back Total Depth.

7) Ran 1910' (65 joints) of 5½"-16 and 15.5#-J-55 liner with couplings turned to 5.672". (String consists of 1906' of 5½" casing and 4' Burns Liner Hanger-Packer. 2nd through 8th joints from bottom are 16# (330') remainder 15.5#. Liner extends from 4909' to 6819'. Cemented by displacing 100 sacks with 6% gel around liner to dry hole. Displaced with water and bumped plug with 1500 psig. Released pressure and set packing element on hanger. Pulled up 35' and reversed out excess cement.

It was necessary to circulate last three joints to bottom with gas, presumably because of condensate accumulation. Could not get below 6820'.

8) WOC 24 hours and then found only soft cavey cement across liner top - - - this believed due to gas cutting and not representative of that behind liner. Found lower plug as expected at 6708' and drilled hard cement to 6809'.

9) Ran collar-temperature survey and verified cement to liner top.

10) Ran Welex Radioactivity Log.

11) Tested everything below surface to 6809' to 3000 psig.

12) Perforated with 4 Welex Dyna Jets per foot: (6767'-6779' and 6790'-6802').

13) Broke down formation with water at 880 psig - - took 10 BPM at 900 psig.

14) Sand-water fraced formation through casing at 51 BPM with 40,000#(40-60 mesh) sand. Slow gradual pressure buildup throughout job from 2000 to 2400 psig --- no sharp buildups or breakdowns. Used 1600 bbls. water --- 150 bbls. before sand, 950 bbls., with sand, 500 bbls. flush. Pressure bled slowly after job to 1000 psig in 5 minutes, 500 psig in 30 minutes, 140 psig in 1 hour 40 minutes. Opened well and flowed 2" stream water for 30 minutes.

Injected rubber balls as follows: 50 after 10,000# sand, 50 after 22,000# sand, 50 after 34,000# sand, and 50 after 46,000 # sand.

Ran wireline and found no sand fill-up.

15) Started cleaning well dry with supply gas. Well blew in naturally after 6 hours blowing at 1100'. Cleaned to bottom with bit (4 3/4") and made 7' hole to 6831' - Plug Back Total Depth.

16) Settled sand after 15 hours blowing was 3.5 MMCFD.

17) Set Baker Magnesium Bridge Plug on wireline at 6720'. Filled with water and pressure tested to 700 psig.

18) Perforated Point Lookout (Mesa Verde) with 2 Baker Hyna Jets per foot: 4613'-4630', 4722'-4732', 4737'-4746', 4757'- 4766', 4773'-4787', 4796'-4809', 4824'-4833'. (Checked Bridge Plug with first gun and found properly in place.)

19) Sand-water fracced Point Lookout (Mesa Verde) at 67 BPM with 100,000# (20-40 mesh) sand. Broke down at 900 psig, minimum pressure 700 psig, maximum pressure 1100 psig. Injected 150 rubber balls with distinct results as follows: 50 balls after 10,000# sand (pressure buildup from 900 psig to 1300 psig), 50 balls after 30,000# sand (pressure buildup from 1200 psig to 2000 psig -- broke back to 1500 psig), 25 balls after 62,000# sand(pressure buildup from 1300 psig to 1800 psig -- broke back to 1300 psig), 25 balls after 88,000# sand (pressure building from 1600 psig to 2000 psig). Flushed with 300 barrels water. Used total of 3000 barrels water (300 bbls. before sand - 2000 barrels with sand - 300 barrels after flush). Pressure bled to 200 psig immediately and to zero 10 minutes after pumping stopped. Found 170' of sand fill-up in 5½" casing above Bridge Plug.

20) Blew well dry with supply gas and cleaned out sand. Well did not blow in naturally but made 1 MMCFD when cleaned below perfs.

21) Drilled Bridge Plug at 6720' and cleaned to PBTD of 6811'.

22) Both zones together made 5.9 MMCFD, blowing generally dry after 7 hours. Later when Baker shut off the Mesa Verde made 1.25 MMCFD. Therefore, Dakota making 4.5 MMCFD.

23) Recommend dual completion as detailed by attached schematic diagram dated 9-11-57.

Pertinent data regarding physical aspects of dual completion equipment are:

A) Baker Model D-45 set in 5½" casing 6570'-6582'.

B) Baker Model D-37-SB set in 7" casing 4567'-4591½'.

C) 1985' of 2 3/8" EUE tubing with a Baker Right Hand Release sub at 3735' is included in the string between packers.

D) 8½' of sealing element coverage is centered through the lower packer.

E) A 5' orange peeled, slotted 2" regular production tube hangs below the sand tube.

16) Settled test after 15 hours blowing was 3.5 MMCFD.

17) Set Baker Magnesium Bridge Plug on wireline at 6780'. Filled with water and pressure tested to 700 psig.

18) Perforated Point Lookout (Mesa Verde) with 2 Holes Dyna Jets per foot: 4613'-4620', 4723'-4732', 4737'-4744', 4757'-4766', 4775'-4787', 4796'-4800', 4814'-4819'. (Checked Bridge Plug with first gun and found properly in place.)

19) Sand-water fraced Point Lookout (Mesa Verde) at 67 BPM with 110,000# (20-40 mesh) sand. Broke down at 800 psig, minimum pressure 700 psig, maximum pressure 2100 psig. Injected 150 rubber balls with distinct results as follows: 30 balls after 10,000# sand (caused buildup from 700 psig to 1200 psig), 50 balls after 35,000# sand (caused buildup from 1200 psig to 2000 psig -- broke back to 1300 psig), 25 balls after 62,000# sand (caused buildup from 1300 psig to 1500 psig -- broke back to 1500 psig), 25 balls after 85,000# sand (caused buildup from 1650 psig to 2000 psig). Flushed with 160 barrels water. Used total of 3300 barrels water (320 bbls. before sand - 2980 barrels with sand - 160 barrels after flush). Pressure bled to 250 psig immediately and to zero 10 minutes after pumping stopped. Found 270' of sand fill-up in 5½" casing above Bridge Plug.

20) Blew well dry with empty gas and cleaned out sand. Well did not blow in naturally but made 1 MMCFD when cleaned below perfs.

21) Drilled Bridge Plug at 6780' and cleaned to PBTD of 6811'.

22) Both zones together made 5.9 MMCFD, blowing generally dry after 7 hours. Later when Dakota shut off the Mesa Verde made 1.25 MMCFD. Therefore, Dakota making 4.6 MMCFD.

23) Effected dual completion as detailed by attached schematic diagram dated 9-11-57.

Pertinent data regarding physical aspects of dual completion equipment are:

A) Baker Model D-45 set in 5½" casing 6578'-6581'.

B) Baker Model D-57-32 set in 7" casing 4587'-4591½'.

C) 1992' of 2 3/8" EUE tubing with a Baker Right Hand Release sub at 5724' is included in the string between packers.

D) 3½' of sealing element coverage is centered through the lower packer.

E) A 5" orange peeled, slotted 1" regular production tube hangs below the seal tube.

F) A 6' Baker Dual Zone Flow Tube suspends the 2 3/8" tubing. A locator sub situated 4' below the top of the Flow tube seats about 2' below the top of the top packer. Also, gauge - tubing sealing elements are contained on the Flow Tube.

G) A 2' Otis Type X Cross-Over Assembly ties on top of the Baker Dual Zone Flow Tube. A Type X choke now allows the fluids to be diverted into the annulus above the top packer. This could be replaced with a Type A Choke which would divert the upper Moss Verde through the annulus.

H) 4573' of 2 7/8" EUE tubing extends from the top of the Otis Cross-Over Nipple to the surface tubing landing mount in a Hunter Type HH, joint with oil/gas rubber.

24) Initial surface pressure buildup data were:

	Annulus	Moss Verde
After 24 hours	2025 psig	980 psig
After 48 hours	2030 psig	1000 psig
After 72 hours	2035 psig	1020 psig
After 96 hours	2075 psig	1030 psig
After 120 hours	2065 psig	1040 psig
After 144 hours		

Note: All mentioned depths are Kelly bushing reference. The tubing is landed at ground level or 13' below Kelly Bushing.

By J. B. Ladd

J. B. LADD

September 13, 1957

F) A 9½' Baker Dual Zone Flow Tube suspends the 2 3/8" tubing. A locator sub situated ½' below the top of the Flow tube seats about 2" below the top of the top packer. Also, packer - tubing sealing elements are contained on the Flow Tube.

G) A 2½' Otis Type H Cross-Over Assembly sits on top of the Baker Dual Zone Flow Tube. A Type X choke now allows the Dakota to be diverted into the annulus above the top packer. This could be replaced with a Type X Choke which would divert the upper Mesa Verde through the annulus.

H) 4573' of 2 3/8" EUE tubing extends from the top of the Otis Cross-Over Nipple to the surface tubing landing donut in a Rector Type MSL Head with stripper rubber.

24) Initial surface pressure building data were:

	DAKOTA	MESA VERDE
After 24 hours	2025 psig	920 psig
After 48 hours	2050 psig	1000 psig
After 72 hours	2060 psig	1030 psig
After 96 hours	2075 psig	1050 psig
After 120 hours	2065 psig	1060 psig
After 144 hours		

Note: All mentioned depths are Kelly Bushing reference. The tubing is landed at ground level or 12' below Kelly Bushing.

By [signature]

L. R. LADD

September 15, 1957