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SANTOS LIMITED

E. MEREENIE WELL NO. 39
LOWER-P3 TSO FRAC TREATMENT

INTERPRETIVE DATA

Signed
Delegate of: Designated Authority
Minister for Mines & Energy

Date

[redacted]

PR96-69

1 OCTOBER 1996

E. MEREENIE WELL NO. 34
LOWER P3 TSO FRACTURE TREATMENT

Prepared for:
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1 October 1996

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SUMMARY

On 23 June 1996, a tip-screenout (TSO) fracture treatment was performed on Santos' East Mereenie Well No. 34 through Pacoota P3-190/230/250 sand perforations at 5041-5097 ft. Reservoir properties were estimated to be an average porosity of 8.5%, a net pay thickness of 15 ft, a reservoir pressure of 1750 psi (no depletion), and a BHT of 145°F. While the well was pre-frac flow tested at 50 bopd, a pressure buildup test was not conducted. Permeability was estimated to be similar to the lower P3 in EM#38, i.e. 10 md with a high positive skin. Wellbore deviation through the pay was 18.5°

Prior to the treatment, pre-frac tests were conducted to evaluate closure stress, fluid efficiency, and fracture geometry for final design formulation. The results indicated a closure pressure of 3480 psi and a fluid efficiency of 0.45 from pressure decline analysis. This gave an efficiency during injection, using the Mereenie correlation of decline to injection efficiency, of 0.24. A reasonably good model history match of the minifrac was obtained with boundary stresses of 4050-4200 psi, modulii values of 4.5×10^6 psi (pay) to 6.5×10^6 psi (barriers), and a leak-off coefficient of 0.0034 ft/sq.rt. minute. This "calibrated" model was used to design the final treatment.

With the desire to minimize fracture growth into the P3-120/130, the final treatment design required 2000 gals of pad and an additional 6300 gals of gel carrying 25,550 lbs of 20/40 Carbo-Lite proppant at 0.5-8 ppg and at a rate of 15 bpm. The model-predicted TSO occurred at the beginning of the 3 ppg stage and net BHTP went from 550 to 1767 psi with a corresponding average fracture width increase from 0.06 to 0.24 inches. Other fracture dimensions were a propped half-length of 138 ft, a maximum height of 147 ft, an average conductivity of 2352 md-ft, and an average in-situ concentration of 1.2 lbs/sq.ft.

The treatment was pumped in its entirety, placing 97.3% (24,850 lbs) of the designed proppant amount in the fracture with 102.3% (8517 gals) of the design gel volume. The TSO did occur as predicted, however the net BHTP gain was only about 800 psi as compared to the design prediction of 1200 psi. To model history match this behavior required (1) the same stress profile used in the final design, (2) a reduction in the pay zone modulus to 3.5×10^6 psi and (2) a reduction in the leak-off coefficient to 0.0025

ft/sq.rt minute. Resultant dimensions were a propped half-length of 197 ft, a maximum height of 142 ft, an average conductivity of 1644 md-ft, and an average in-situ concentration of 0.9 lbs/sq.ft. The top of the modeled fracture remained below the base of the P3-120/130. From all indications, this was an effective treatment.

DISCUSSION

Introduction:

This report details the design, execution, and analysis of the tip-screenout (TSO) fracturing treatment performed in Santos' East Mereenie Well No. 34 on 23 June 1996. The treatment was pumped through Pacoota P3-190/230/250 perforations at 5041-5097 ft (MD), 4887-4940 ft (TVD), as shown in Fig. 1. The well was recompleted from the P3-120/130 in May 1996 and flowed at 50 bopd with no water indicating these sands as an attractive fracturing candidate. Reservoir properties were an average porosity of 8.5%, an average water saturation of 44%, a total net pay thickness of 15 ft, virgin pressure of 1750 psi, and a BHT of 145^{o}F. No pre-frac pressure buildup was conducted, however, permeability was expected to be similar to the lower P3 in EM#38, i.e. on the order of 10 md with a high positive skin. Wellbore deviation through the pay was about 18.5^{o}.

The fracture treatment, performed by Halliburton, was preceded with pre-frac injection/decline tests to evaluate closure pressure, fluid efficiency, and fracture geometry for final design formulation. Bottomhole pressure was obtained with electronic memory gauges set in the tailpipe for both the testing and main treatment. The following discusses the details of this testing and treatment.

Pre-Frac Test Analysis:

Pre-frac testing consisted of (1) a 10 bbl slick water pump-in/shut-in (PI/SI) test at 5 bpm, (2) a slick water step-rate test (SRT)/SI at rates of 0.5-10 bpm, and (3) a 2500 gal, 30 ppt borate XL gel (Boragel H3595) minifrac at 15 bpm. The first two tests were designed to evaluate closure pressure and the minifrac was used to determine fluid efficiency and fracture geometry.

Fig. 2 shows the gauge BHP for the first PI/SI test. After an initial breakdown of 5750 psi, pressure dropped to about 3760 psi prior to shut-down. At shut-down, the ISIP appeared to be at 2910 psi, as shown in Fig. 3; this indicating a high downhole excess

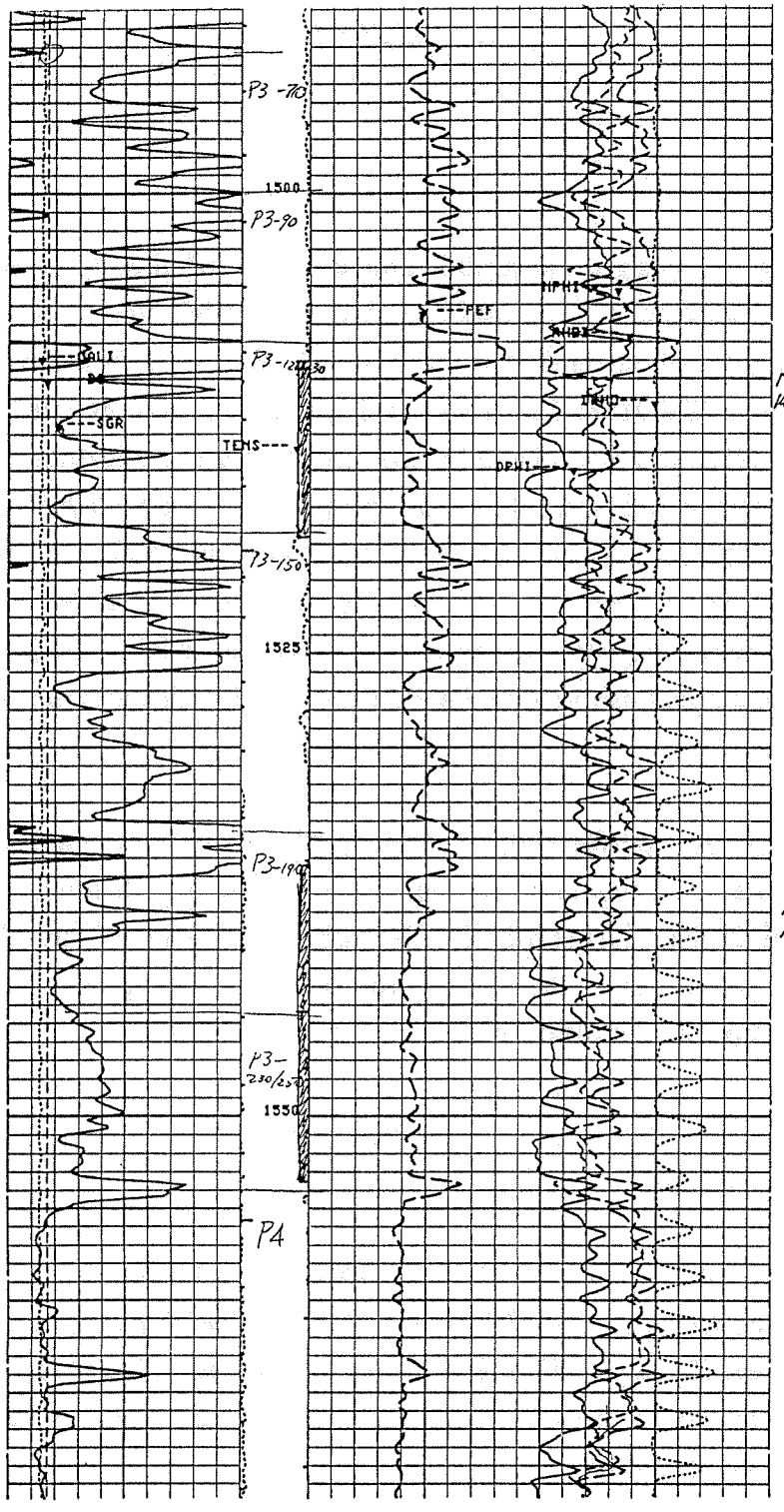

FIG. 1 - Log section thru pay interval and boundaries, E. Mereenie #34 (lower P3).

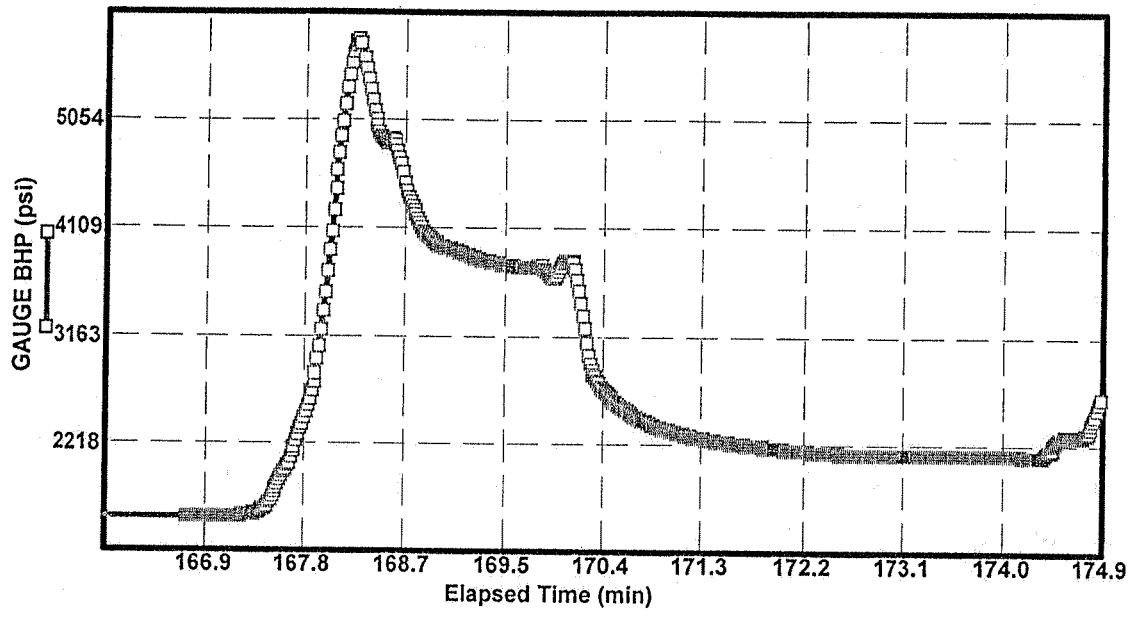

FIG. 2 - Slick water PI/SI test BHP record, E. Mereenie #34 (lower P3).

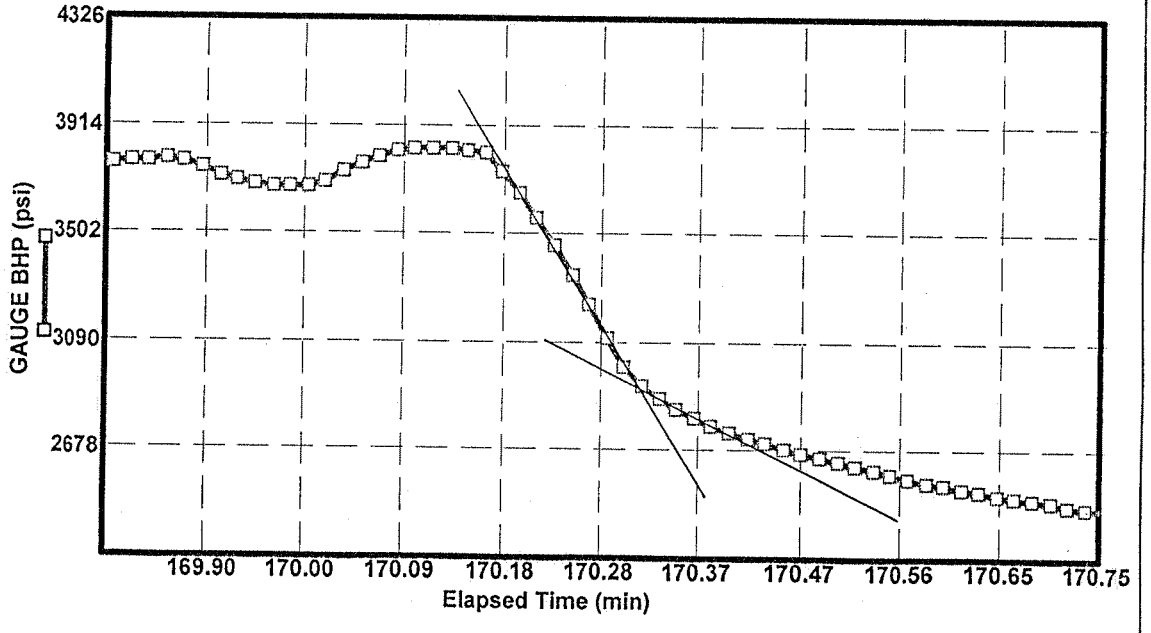

FIG. 3 - Slick water PI/SI test BH ISIP evaluation, E. Mereenie #34 (lower P3).

pressure of 850 psi. From the Horner plot of the pressure decline, Fig. 4, the pressure extrapolated to 1995 psi or higher than the expected reservoir pressure and probably due to insufficient decline data to reach the correct psuedo-steady-state straight line. The square-root of SI time plot indicated closure pressure at 2532 psi (Fig. 5). This, however, was nearly 1000 psi lower than the closure pressure measured on other wells in this zone.

Fig. 6 shows the gauge BHP record for the SRT/SI. At the end of injection, BHP was 3930 psi and the ISIP was 3150 psi (Fig. 7), giving a slightly lower downhole excess pressure of 780 psi. From the plot of stabilized BHP versus injection rate, Fig. 8, fracture extension pressure could not be determined, with the first data point up around 3900 psi. The square-root of SI time plot of the pressure decline, Fig. 9, indicated two possible closure pressures at 2985 and 2500 psi. Again, both were lower than observed in this zone on other wells. From the G-function plot, Fig. 10, the higher value was not apparent and closure was picked at 2580 psi.

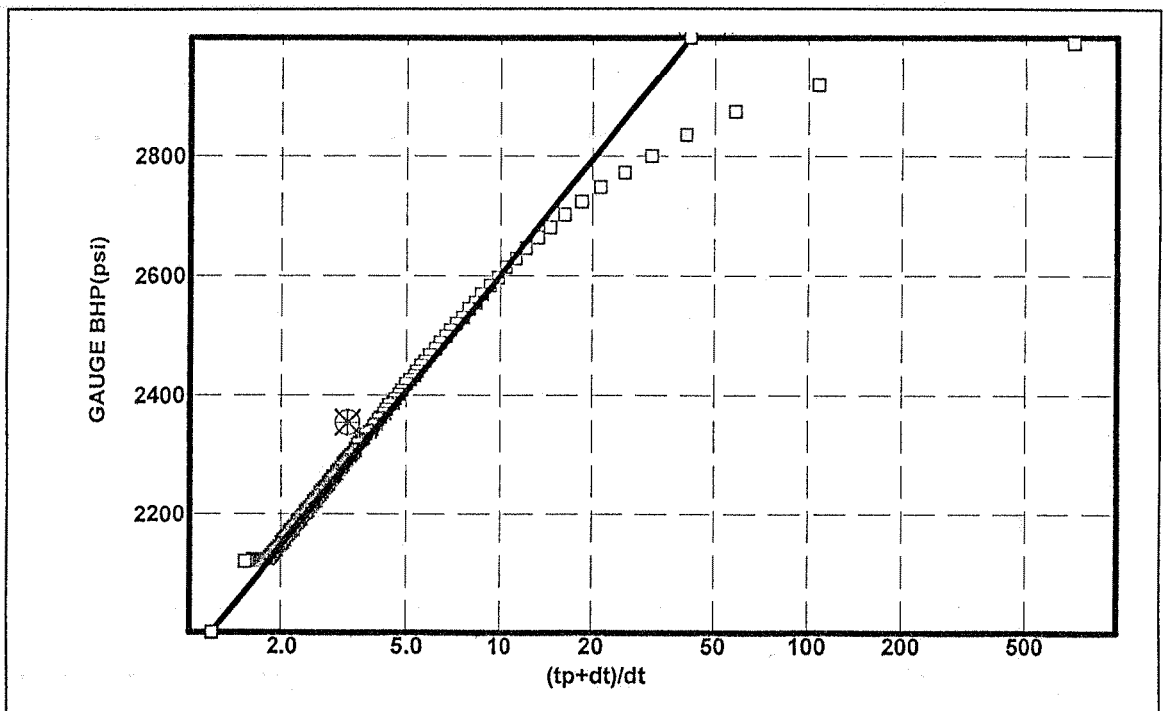

FIG. 4 - Slick water PI/SI test BH Horner plot, E. Mereenie #34 (lower P3).

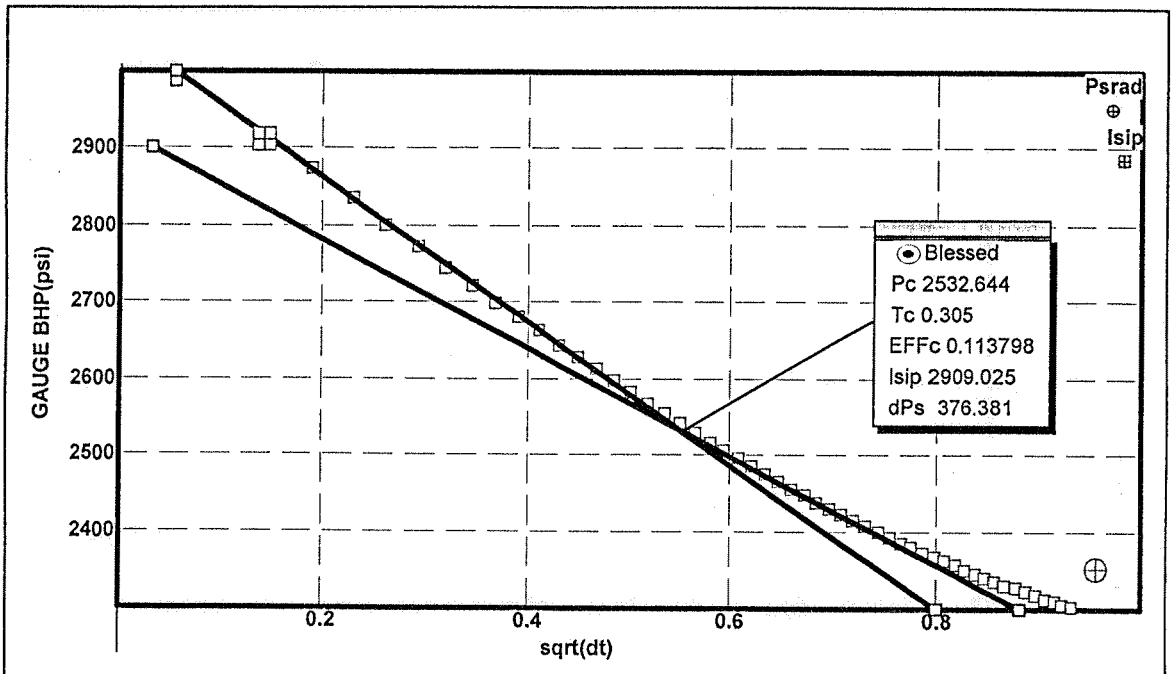

FIG. 5 - Slick water PI/SI test BH sq.rt. SI time plot, E. Mereenie #34 (lower P3).

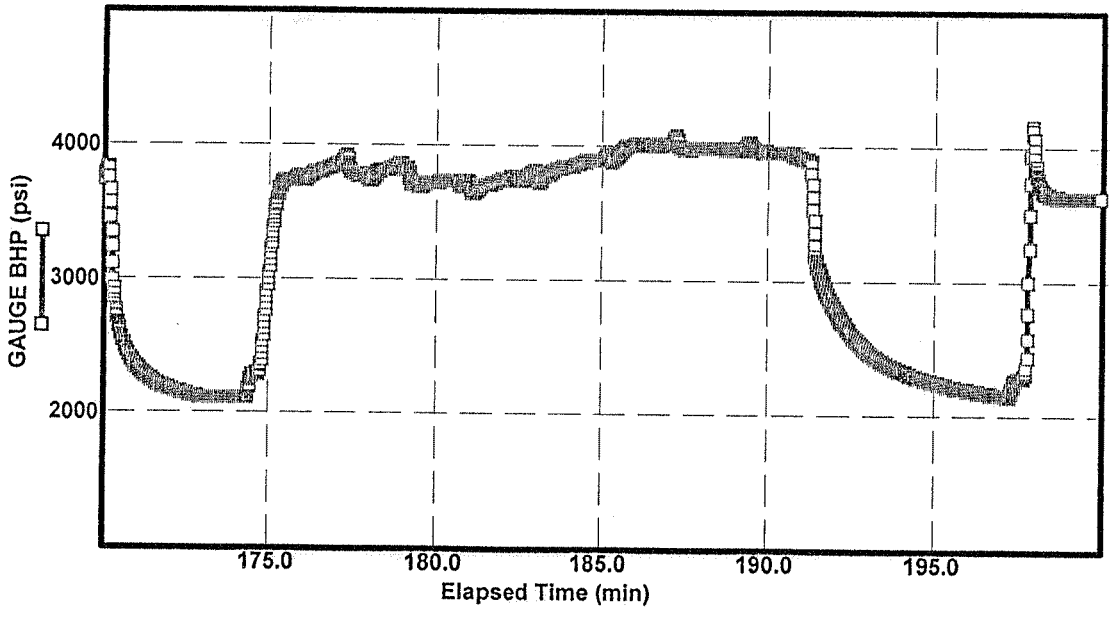

FIG. 6 - Slick water SRT/SI test BHP record, E. Mereenie #34 (lower P3).

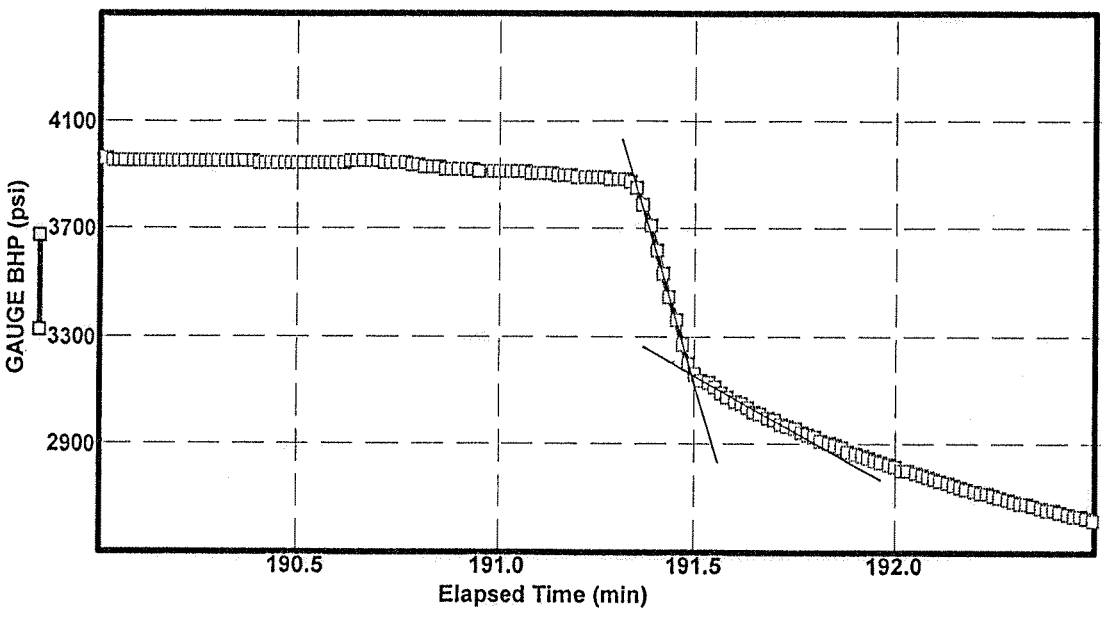

FIG. 7 - Slick water SRT/SI test BH ISIP evaluation, E. Mereenie #34 (lower P3).

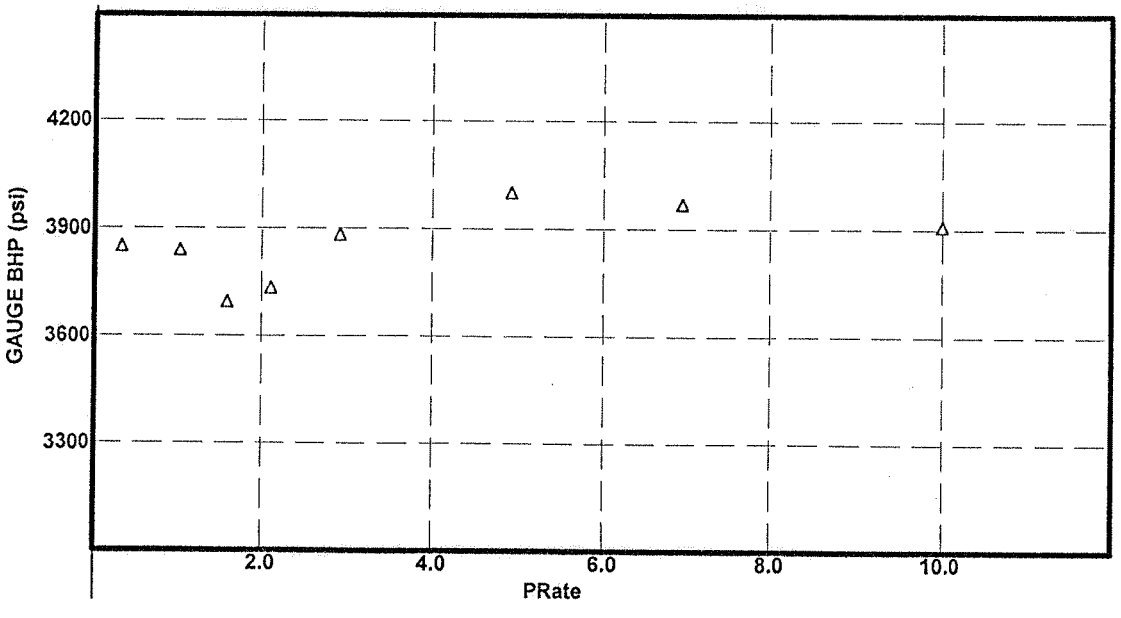

FIG. 8 - Slick water SRT/SI test BH fracture extension evaluation, E. Mereenie #34 (lower P3).

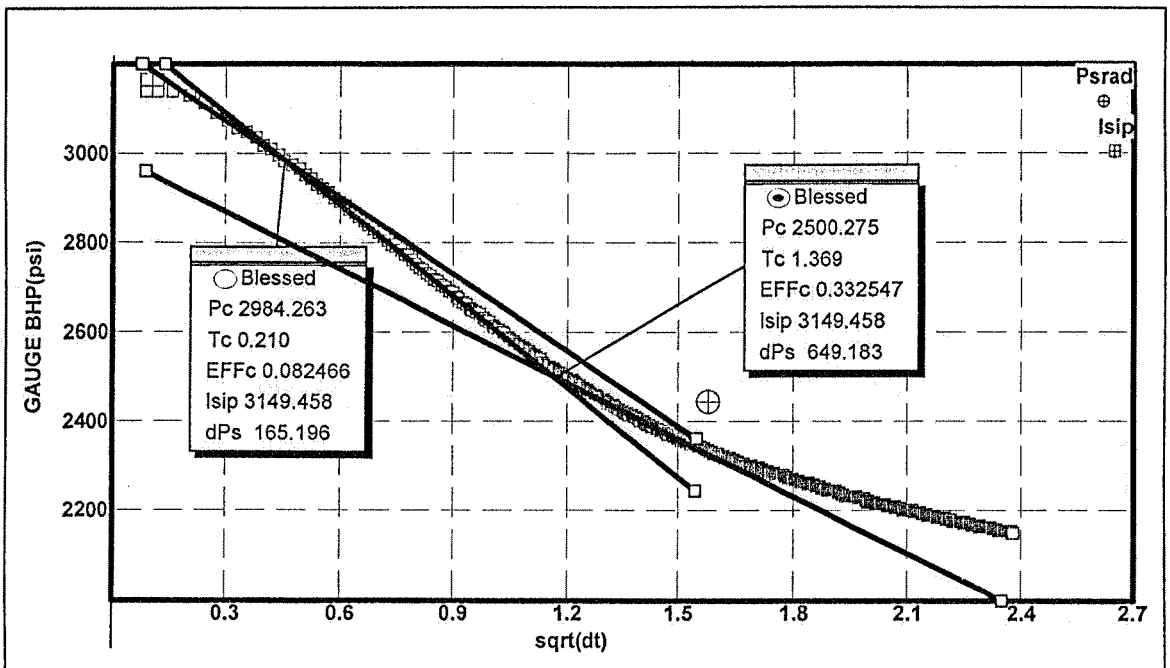

FIG. 9 - Slick water SRT/SI test BH sq.rt. SI time plot, E. Mereenie #34 (lower P3).

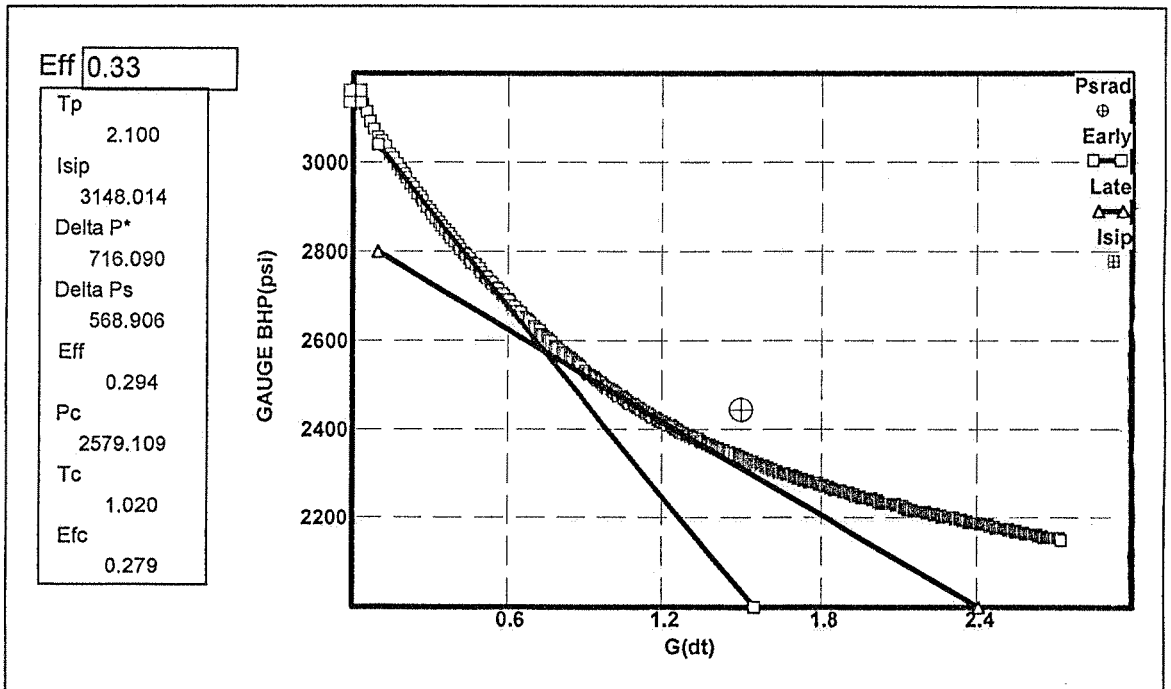

FIG. 10 - Slick water SRT/SI test BH G-function plot, E. Mereenie #34 (lower P3).

Fig. 11 shows the gauge BHP record for the minifrac. To minimize the effect of the residual wellbore fluid ahead of the crosslinked gel on determining fluid efficiency, the leading edge of the gel was pumped to near bottom at 5 bpm and the well shut-in for a period to allow the bullheaded wellbore fluid to leak-off before proceeding. The XL gel was then injected at 15 bpm. At the end of the minifrac, displaced with slick water, the BHTP was 4250 psi and the ISIP was 3980 psi, Fig. 12, indicating a downhole "excess" pressure of only 270 psi. It was apparent from this that the XL gel at the higher rate was successful in establishing much better wellbore-fracture communication than previously existed.

From the minifrac pressure decline analysis, closure pressure was very distinct at 3482 psi on the square-root of SI time plot, Fig. 13; this corresponding to a fluid efficiency of 0.43 and a net BHTP (BHTP-closure P) of 495 psi. This was also consistent with previous measurements of this variable on other wells. From the Nolte type-curve match, Fig. 14, the indicated fluid efficiency was 0.48.

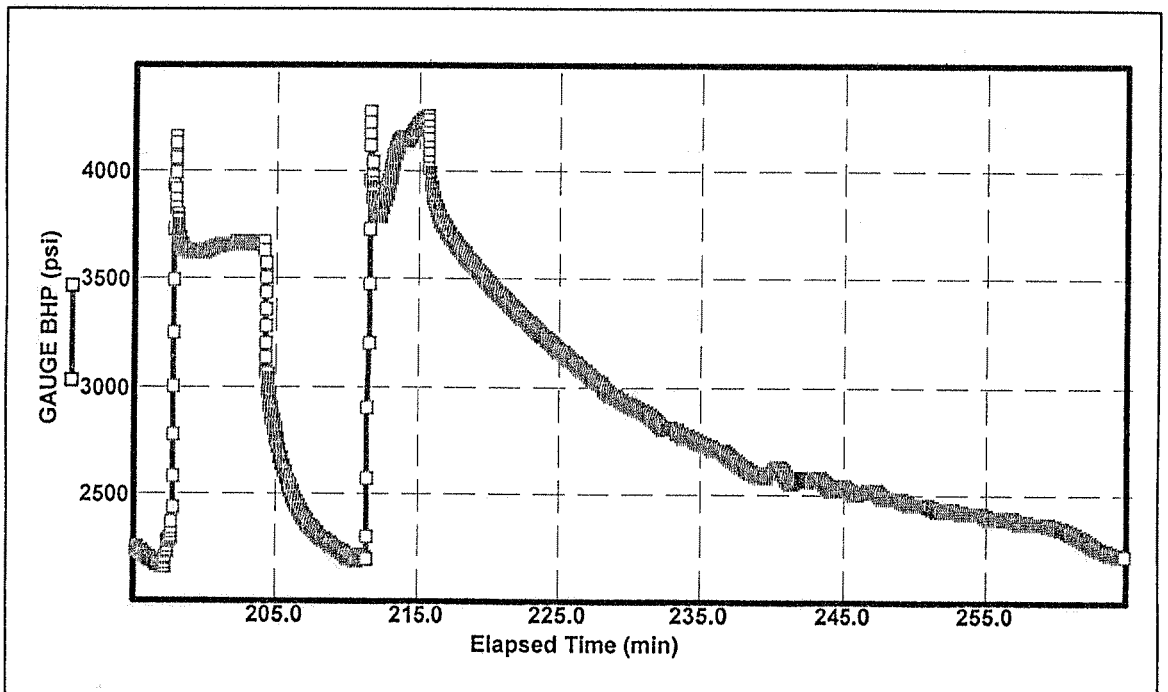

FIG. 11 - Boragel minifrac BHP record, E. Mereenie #34 (lower P3).

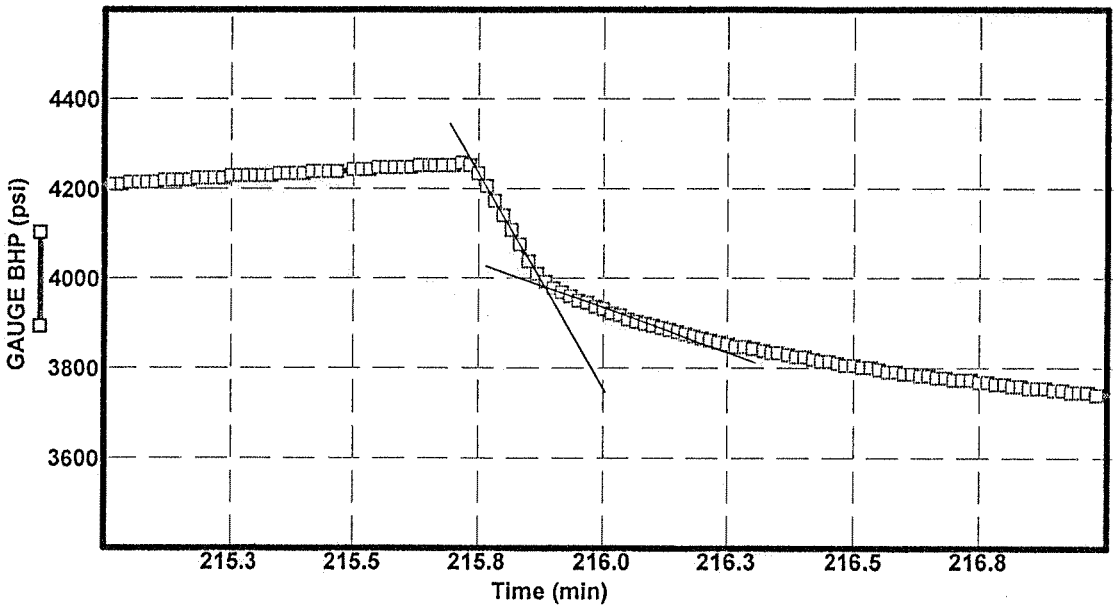

FIG. 12 - Boragel minifrac BH ISIP evaluation, E. Mereenie #34 (lower P3).

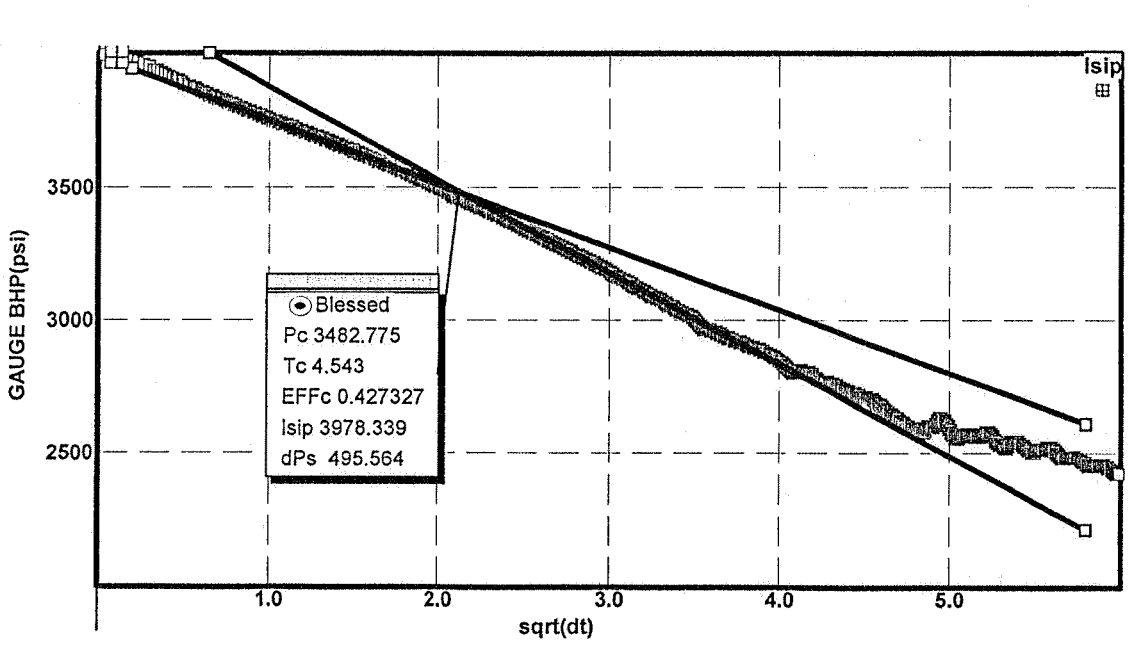

FIG. 13 - Boragel minifrac BH sq.rt. SI time plot, E. Mereenie #34 (lower P3).

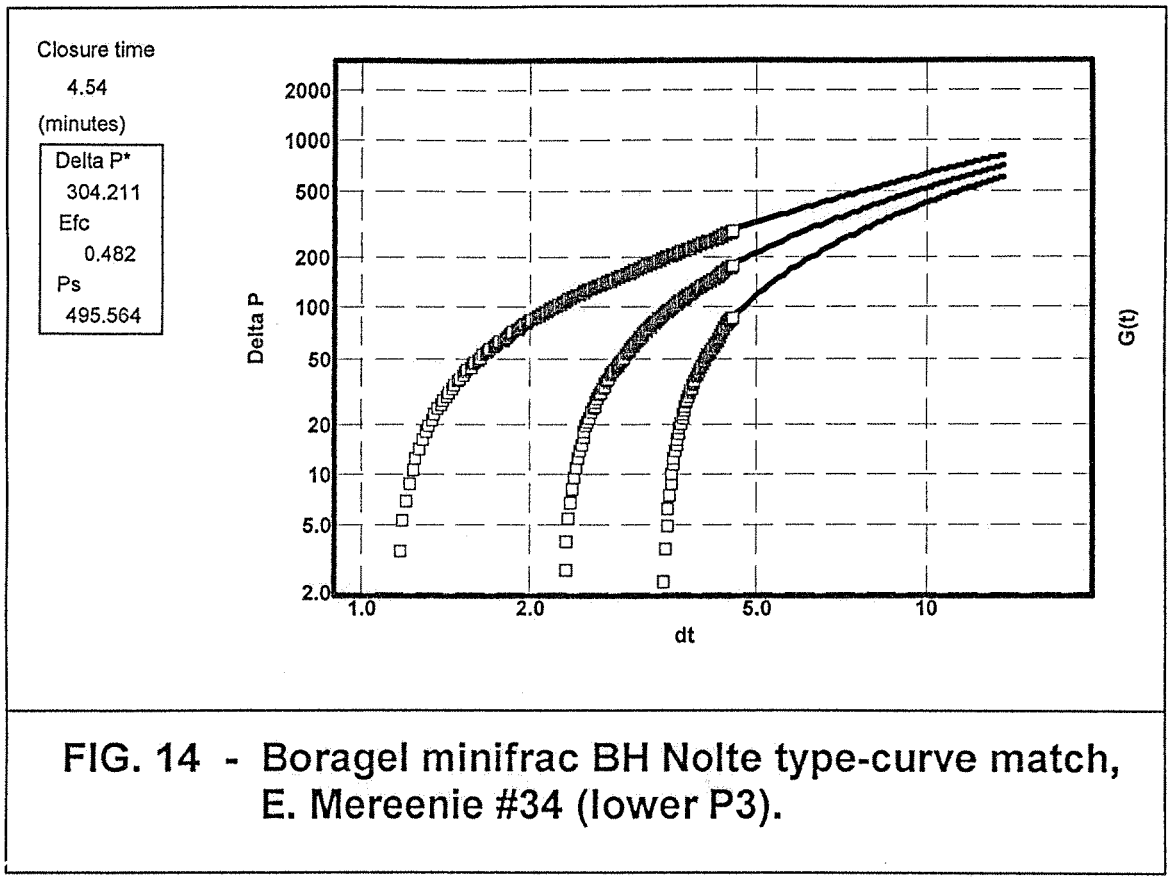

FIG. 14 - Boragel minifrac BH Nolte type-curve match, E. Mereenie #34 (lower P3).

Based on the combined analysis of the three tests, the "true" closure pressure was not seen until the excessive downhole friction was removed with the XL gel minifrac. From the established Mereenie correlation of efficiency during injection to that determined from the decline, the injection efficiency was estimated to be 0.24.

To further the minifrac analysis and generate a "calibrated" model for final design evaluation, the minifrac injection profile was history matched. As shown in Fig. 15, the match to simulate the net BHTP and resultant "injection" fluid efficiency required (1) boundary stresses of 4050-4200 psi, (2) a pay zone modulus of 4.5×10^6 and 6.5×10^6 psi in the boundaries, and (3) a leak-off coefficient of 0.0034 ft/sq.rt. minute in the pay. The model-predicted fracture dimensions were a created half-length of 103 ft and a maximum height at the wellbore of 116 ft as shown in Fig. 16. The model I/O is included in Appendix Table A-1.

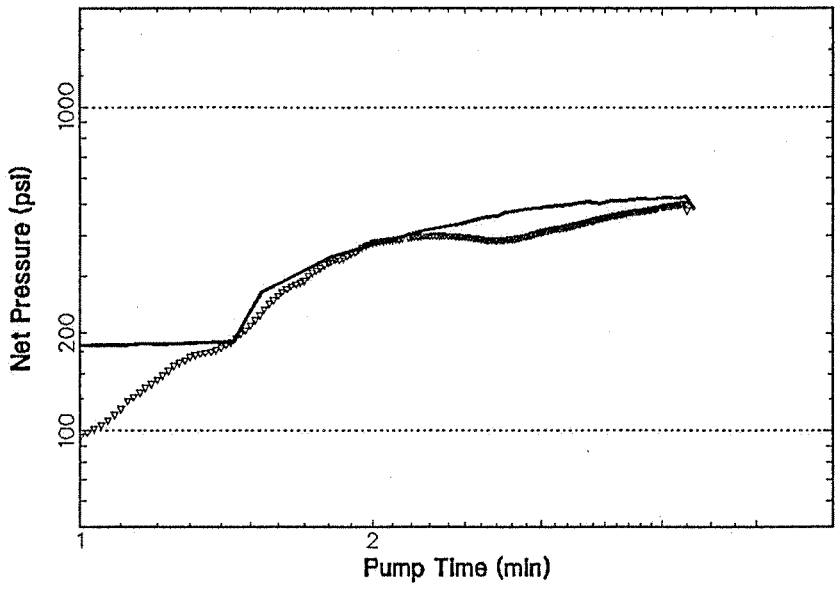

FIG. 15 - Boragel minifrac net BHTP model history match, E. Mereenie #34 (lower P3).

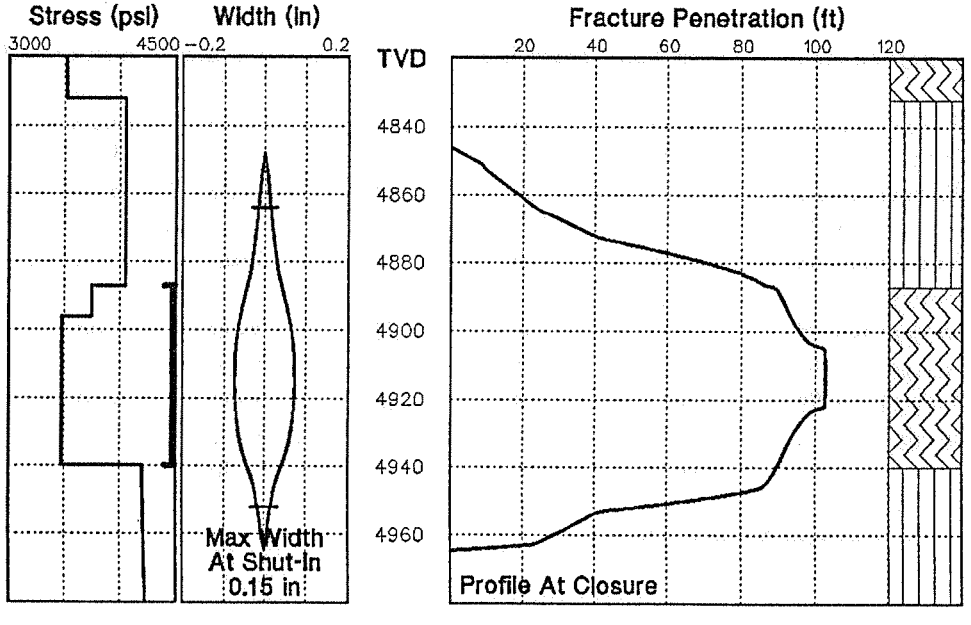

FIG. 16 - Boragel minifrac history match predicted frac geometry, E. Mereenie #34 (lower P3).

Final Treatment Design:

Using the "calibrated" design model, the final design pad stage was limited to 2000 gals to minimize upward growth into the overlying P3-120/130 sands (Table 1). The slurry stages consisted of an additional 6300 gals of gel carrying 25,550 lbs of 20/40 Carbo-Lite at 0.5-8 ppg. With this pad and the design injection rate of 15 bpm, the model-predicted TSO started at the beginning of the 3 ppg stage (Fig. 17) and net BHTP increased from 550 to 1767 psi with a corresponding average fracture width increase from 0.06 to 0.24 inches. At the wellbore, the final predicted average and maximum widths were 0.29 and 0.52 inches. Other modeled dimensions were a propped half-length of 138 ft, a maximum height at the wellbore of 147 ft, an average conductivity of 2352 md-ft, and an average in-situ concentration of 1.2 lbs/sq.ft. These are shown in Figs. 18-20 with the model I/O included in Appendix Table A-2.

TABLE 1 - Final treatment design schedule, E. Mereenie #34 (lower P3).

Fluid Type	Slur. Vol. (gal)	Fluid Vol. (gal)	Prop Conc. (ppg)	Prop Amt. (lbs)	Avg. Q (bpm)	Pump t (min)
Boragel H3595	2000	2000	0.00	0	15.00	3.17
Boragel H3595	715	700	0.50	350	15.00	1.13
Boragel H3595	731	700	1.00	700	15.00	1.16
Boragel H3595	762	700	2.00	1400	15.00	1.21
Boragel H3595	792	700	3.00	2100	15.00	1.26
Boragel H3595	823	700	4.00	2800	15.00	1.31
Boragel H3595	854	700	5.00	3500	15.00	1.36
Boragel H3595	885	700	6.00	4200	15.00	1.40
Boragel H3595	916	700	7.00	4900	15.00	1.45
Boragel H3595	946	700	8.00	5600	15.00	1.50
	9424	8300		25550		14.95

Note: Proppant 20/40 Carbo-Lite.

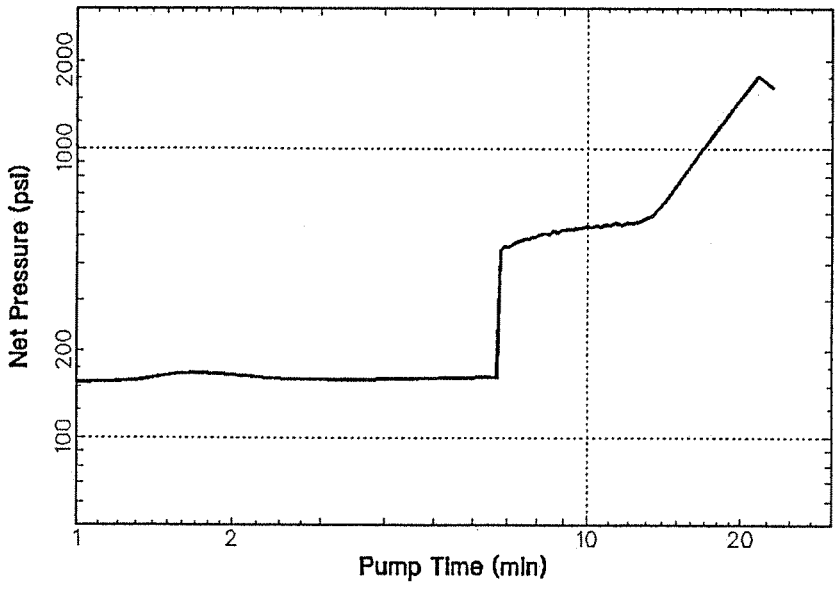

FIG. 17 - Final treatment design predicted net BHTP, E. Mereenie #34 (lower P3).

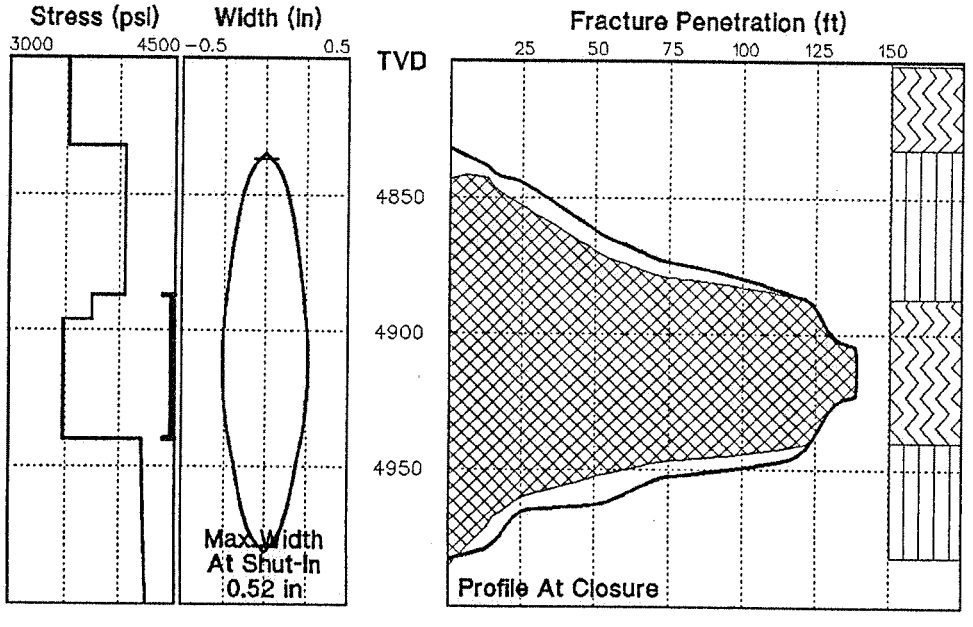

FIG. 18 - Final treatment design predicted frac geometry, E. Mereenie #34 (lower P3).

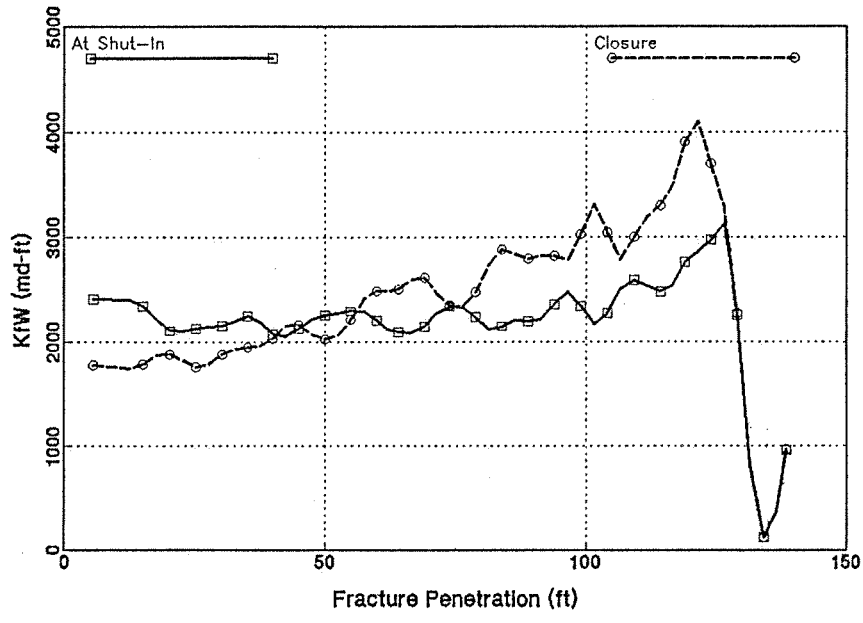

FIG. 19 - Final treatment design predicted conductivity, E. Mereenie #34 (lower P3).

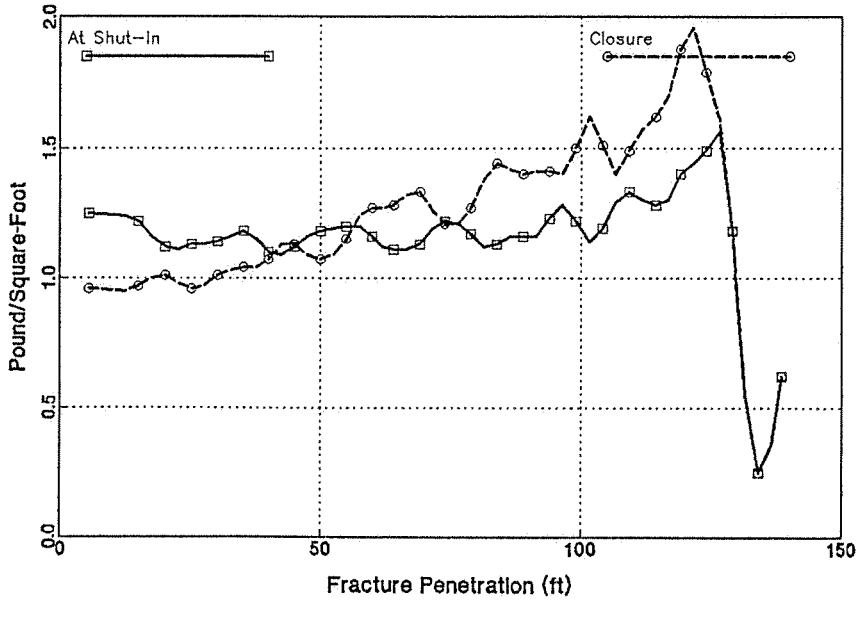

FIG. 20 - Final treatment design predicted in-situ conc., E. Mereenie #34 (lower P3).

Treatment Execution:

Samples of the gel were tested on-site prior to the treatment and found to possess the proper characteristics with respect to base gel viscosity, pH, and crosslink. To minimize the effect of the bullheaded residual wellbore fluid ahead of the pad, the pad was pumped to the bottom of the tubing at 5 bpm. The rate was then increased to 15 bpm for the remainder of the treatment. The only problem encountered during pumping of the treatment was with pumps somehow getting air into them, causing the fluctuations in rate and pressure seen in Fig. 21, a summary of the surface treating parameters. Table 2 shows the surface schedule from Halliburton's computer printout. This indicated a total of 27,700 lbs of proppant pumped with 9854 gals of gel and flush. Based on the amount of proppant loaded/pumped (27,400 lbs) and accounting for approximately 250 lbs spillage at the surface, this indicated that the densiometer was reading 2% too high. Also, based on tank dips, the flowmeter also seemed to be reading about 2% too high. Making these correction, the revised surface schedule is shown in Table 3. This was

TABLE 2 - Treatment Halco computer surface schedule, E. Mereenie #34 (lower P3).

Fluid Type	Slur. Vol. (gal)	Fluid Vol. (gal)	Prop Conc. (ppg)	Prop Amt. (lbs)	Avg. Q (bpm)	Pump t (min)
Boragel H3595	1398	1398	0.00	0	4.80	6.93
Boragel H3595	595	595	0.00	0	14.41	0.98
Boragel H3595	990	968	0.52	503	14.14	1.67
Boragel H3595	1104	1058	0.99	1051	14.34	1.83
Boragel H3595	670	617	1.96	1210	14.73	1.08
Boragel H3595	836	740	2.94	2177	14.93	1.33
Boragel H3595	841	715	4.02	2872	15.02	1.33
Boragel H3595	770	629	5.08	3200	15.71	1.17
Boragel H3595	458	361	6.08	2197	15.22	0.72
Boragel H3595	927	708	7.04	4984	15.96	1.38
Boragel H3595	1306	967	7.96	7698	16.22	1.92
Flush	1178	1098	1.65	1808	16.34	1.72
	11073	9854		27700		22.06

Note: (1) Proppant 20/40 Carbo-Lite.
(2) 27,400 lbs proppant loaded - approx. 250 lbs spillage = 27.150 lbs pumped in well. WH dens. reading 2.03% high.
(3) From tank dips pumped 9660 gals of fluid. FM reading 1.97% high.

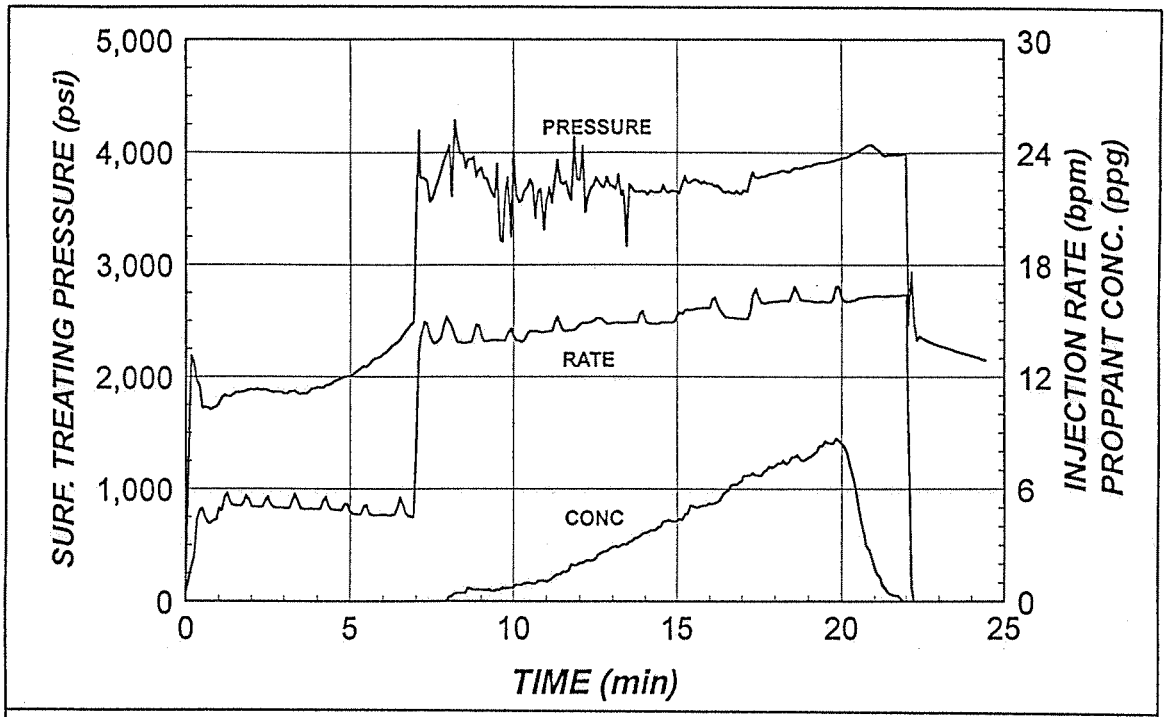

FIG. 21 - Treatment summary of surface parameters, E. Mereenie #34 (lower P3).

TABLE 3 - Treatment corrected surface pump schedule, E. Mereenie #34 (lower P3).

Fluid Type	Slur. Vol. (gal)	Fluid Vol. (gal)	Prop Conc. (ppg)	Prop Amt. (lbs)	Avg. Q (bpm)	Pump t (min)
Boragel H3595	1370	1370	0.00	0	4.70	6.93
Boragel H3595	583	583	0.00	0	14.16	0.98
Boragel H3595	971	949	0.52	493	13.87	1.67
Boragel H3595	1082	1037	0.99	1030	14.05	1.83
Boragel H3595	657	605	1.96	1186	14.48	1.08
Boragel H3595	819	725	2.94	2134	14.63	1.33
Boragel H3595	825	701	4.02	2815	14.73	1.33
Boragel H3595	755	617	5.08	3136	15.41	1.17
Boragel H3595	449	354	6.08	2153	14.85	0.72
Boragel H3595	909	694	7.04	4885	15.68	1.38
Boragel H3595	1280	948	7.96	7545	15.90	1.92
Flush	1154	1076	1.65	1772	16.01	1.72
	10854	9659		27149		22.06

Note: Proppant 20/40 Carbo-Lite.

used to determine the downhole treatment schedule shown in Table 4. From this, a total of 24,850 lbs of proppant (97.3% of design) was placed in the fracture with 8517 gals of gel (102.3% of design). This resulted in an actual average slurry concentration of 3.79 ppg as compared to the design of 4.06 ppg. When compared to the design proppant schedule, Fig. 22, the actual proppant schedule was somewhat less aggressive, but still tracking fairly close.

TABLE 4 - Treatment downhole pump schedule, E. Mereenie #34 (lower P3).

Fluid Type	Slur. Vol. (gal)	Fluid Vol. (gal)	Prop Conc. (ppg)	Prop Amt. (lbs)	Avg. Q (bpm)	Pump t (min)
WB Fluid	1243	1243	0.00	0	4.70	6.30
Boragel H3595	127	127	0.00	0	4.70	0.64
Boragel H3595	1826	1826	0.00	0	13.99	3.11
Boragel H3595	971	949	0.52	493	14.12	1.64
Boragel H3595	1082	1037	0.99	1030	14.56	1.77
Boragel H3595	657	605	1.96	1196	14.69	1.06
Boragel H3595	819	725	2.94	2134	15.08	1.29
Boragel H3595	825	701	4.02	2815	15.12	1.30
Boragel H3595	755	617	5.08	3136	15.68	1.15
Boragel H3595	449	354	6.08	2153	15.84	0.67
Boragel H3595	909	694	7.04	4885	15.90	1.36
Boragel H3595	1191	882	7.96	7020	16.01	1.77
	10854	9760		24852		22.06

Note: (1) Proppant 20/40 Carbo-Lite.
(2) Placed 97.3% of design proppant amount with 102.6% of design gel volume. Avg. slurry conc. = 3.79 ppg (design = 4.06 ppg).

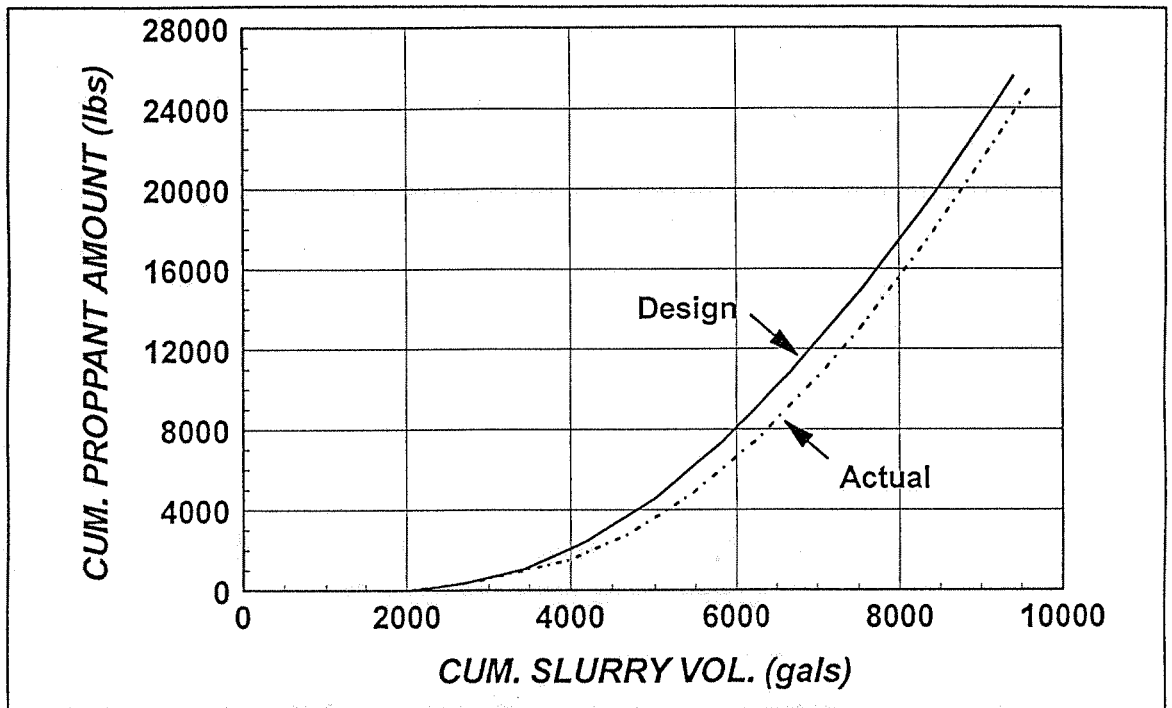

FIG. 22 - Comparison of actual to design treatment schedule, E. Mereenie #34 (lower P3).

Post-Frac Evaluation:

Fig. 23 shows the gauge BHTP record plotted with the corresponding rate and downhole proppant concentration. From this it seemed that the TSO started somewhere around 15 minutes, with a pressure gain of around 700 psi as compared to the design prediction of 1200 psi. There was, however, a nearly 200 psi rise in pressure when the initial sand stage reached the formation and this would have masked the beginning of TSO. In all likelihood, the TSO started at about 13 minutes as indicated in Fig. 23.

To history match the downhole pressure behavior, net BHTP was calculated using the closure pressure of 3480 psi and a downhole "excess" pressure of 135 psi (Fig. 24). To obtain the match shown in Fig. 25 required (1) the same stress profile used in the final design, (2) a reduction in the pay zone modulus from 4.5×10^6 to 3.5×10^6 psi, and (3) a reduction in the leak-off coefficient from 0.0034 to 0.0025 ft/sq.rt. minute. Model-predicted dimensions were a propped half-length of 197 ft (design - 138 ft), a maximum

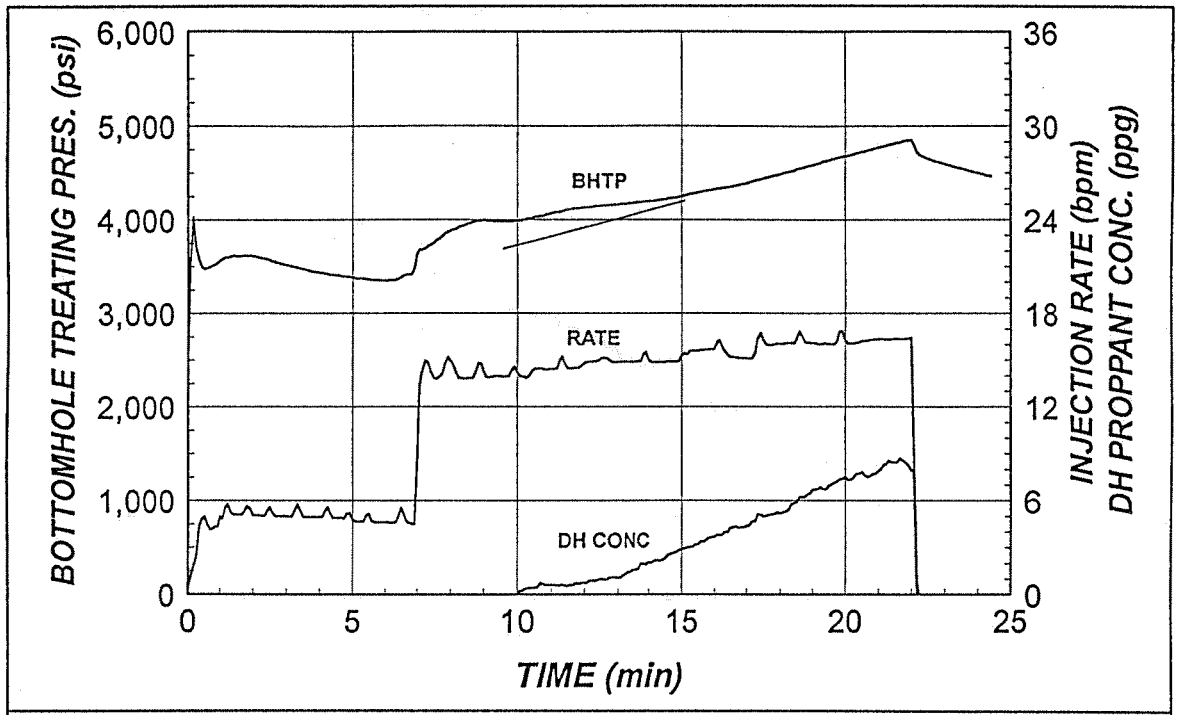

FIG. 23 - Treatment summary of bottomhole parameters, E. Mereenie #34 (lower P3).

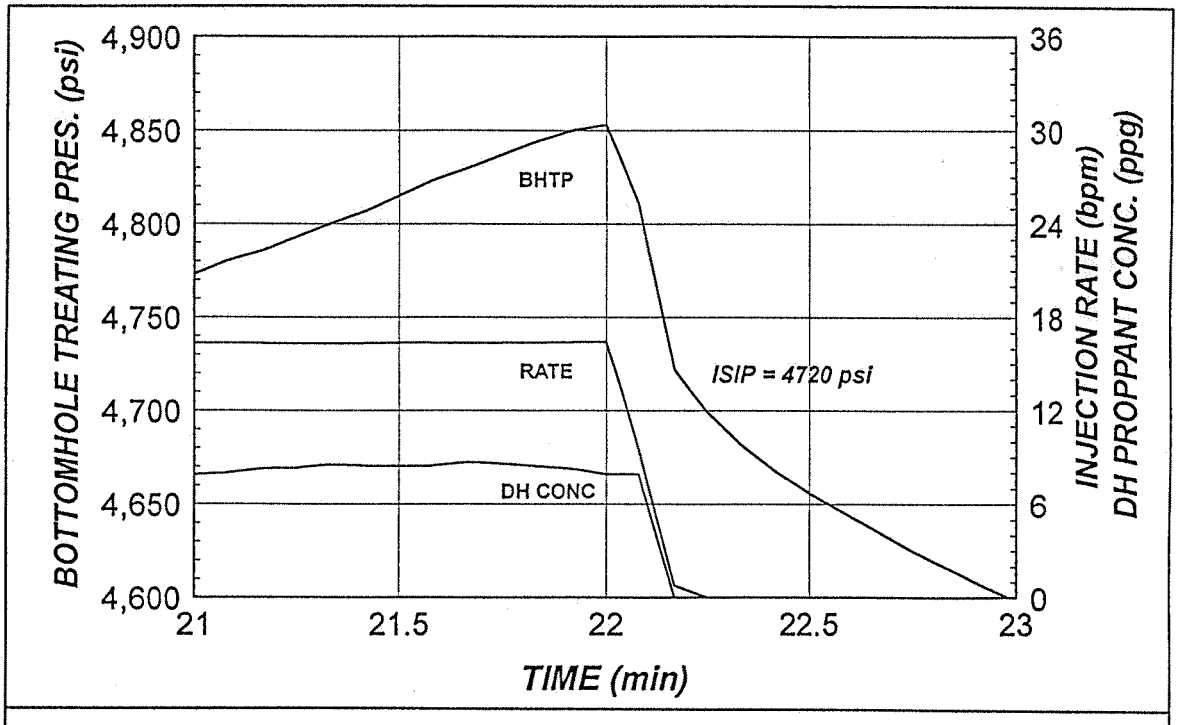

FIG. 24 - Treatment bottomhole ISIP evaluation, E. Mereenie #34 (lower P3).

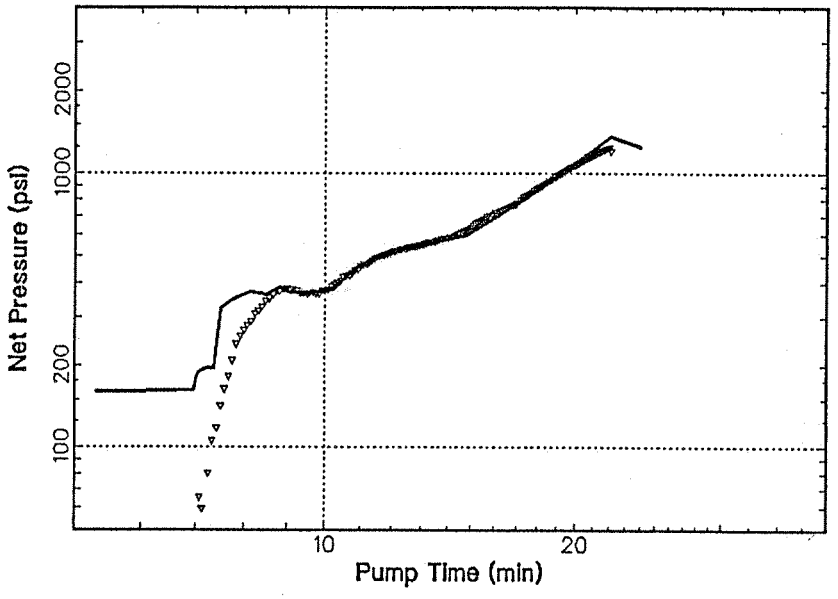

FIG. 25 - Treatment net BHTP model history match, E. Mereenie #34 (lower P3).

height of 142 ft (design - 147 ft), an average conductivity of 1644 md-ft (design - 2352 md-ft), and an average in-situ concentration of 0.9 lbs/sf (design - 1.2 lbs/sf). These are shown in Figs. 26-28 with the model I/O included in Appendix Table A-3. The lower conductivity and in-situ conc. were a result of the lower than predicted leak-off and additional fracture penetration created. The top of the modeled fracture was at 4838 ft or just below the base of the P3-120/130.

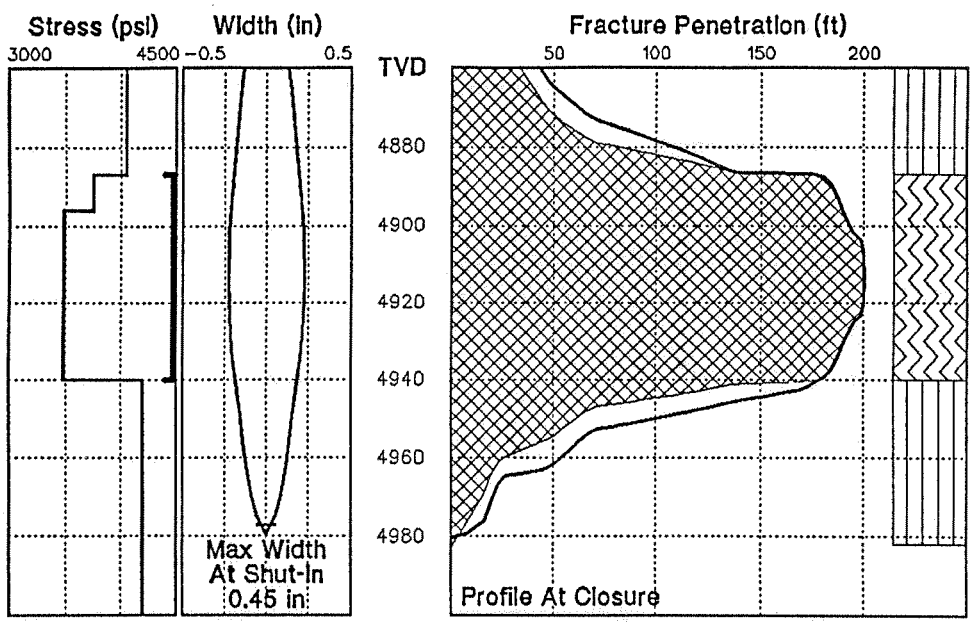

FIG. 26 - Treatment history match predicted frac geometry, E. Mereenie #34 (lower P3).

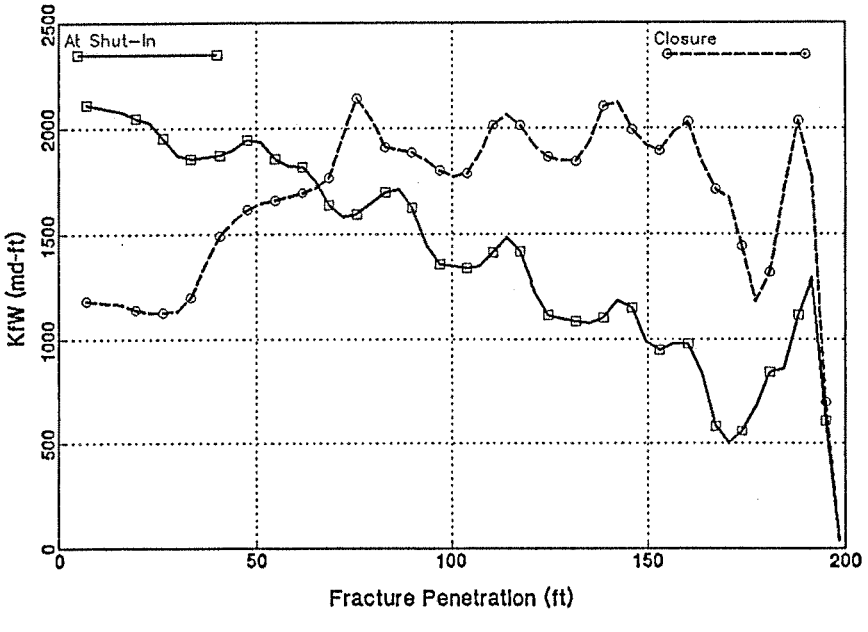

FIG. 27 - Treatment history match predicted frac conductivity, E. Mereenie #34 (lower P3).

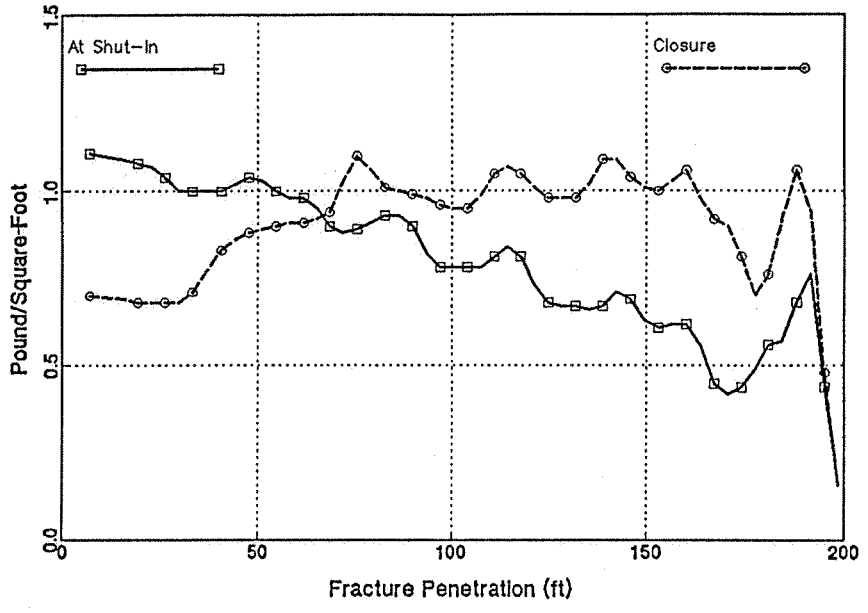

FIG. 28 - Treatment history match predicted frac in-situ conc., E. Mereenie #34 (lower P3).

CONCLUSIONS / RECOMMENDATIONS

From pre-frac test analysis, closure pressure was 3480 psi (0.71 psi/ft), fluid efficiency from pressure decline analysis was 0.45, and net BHTP was on the order of 500 psi with the XL gel at 15 bpm. Using the Mereenie correlation of fluid efficiency from pressure decline to injection efficiency, the efficiency was reduced to 0.24 for final design formulation. Downhole "excess" pressure during the minifrac was only 270 psi, indicating good wellbore to fracture communication.

The minifrac net BHTP seemed to increase throughout much of the crosslinked gel phase, suggesting some degree of height confinement. A reasonably good model history match was obtained with boundary stresses of 4050-4200 psi, modulii values of $4.5x10^6$ psi (pay) to $6.5x10^6$ psi (boundaries), and a leak-off coefficient of 0.0034 ft/sq.rt. minute.

The treatment was pumped reasonably close to design, placing 97.3% of the designed proppant amount in the fracture with 102.3% of the designed gel volume. While it was apparent from BHP that the TSO occurred, the net BHTP gain was only 800 psi as compared to the design prediction of 1200 psi. To model match this behavior required (1) the same stress profile used in the final design, (2) a reduction in the pay zone modulus from $4.5x10^6$ to $3.5x10^6$ psi, and (3) a reduction in the pay zone leak-off coefficient from 0.0034 to 0.0025 ft/sq.rt. minute. Model-predicted dimensions were a propped half-length of 197 ft (design - 138 ft), a maximum height of 142 ft (design - 147 ft), an average conductivity of 1644 md-ft (design - 2352 md-ft), and an average in-situ concentration of 0.9 lbs/sf (design - 1.2 lbs/sf). The top of the modeled fracture was below the base of the P3-120/130. From all indications, this was an effective treatment.

APPENDIX A

Fracture Model Simulations

Frac Summary * SANTOS - E.MEREENIE 34 (L-P3) MINIFRAC HISTORY MATCH
Filename: EM34MF.FRK ; Jun 22, 96

Design Data

FLUID LOSS LAYERS:	Top (ft)	Bottom (ft)	Thick (ft)	Loss Coef. (ft/sqrt(min))	Spurt (Gal/100 ft^2)
	4801.0	4832.0	31.0	0.00500	0.50
	4832.0	4887.0	55.0	0.00100	0.00
	4887.0	4940.0	53.0	0.00340	0.40
	4940.0	4982.0	42.0	0.00100	0.00

FORMATION:	Modulus (e6_psi)	4.54
	Perforated Height (ft)	53.0
	Permeability (md)	10.000
TEMPERATURE:	Bottom Hole (deg_F)	145
PRESSURE:	Reservoir Pressure (psi)	1750.0
	Closure Pressure (psi)	3480.0
DEPTH:	Well Depth (ft)	4887.0

FORMATION LAYER DATA - Multi-Layer Height Growth

-----Depth(ft)------ Top	Botm	Thick	-Stress (psi)-- Top	Botm	Gradient (psi/ft)	Modulus (e6_psi)	Toughness (psi/in)
4801.0	4832.0	31.0	3525.0	3525.0	0.000	5.50	3000.0
4832.0	4887.0	55.0	4050.0	4050.0	0.000	6.20	3000.0
4887.0	4896.0	9.0	3750.0	3750.0	0.000	5.20	3000.0
4896.0	4940.0	44.0	3480.0	3480.0	0.000	4.40	3000.0
4940.0			4200.0		0.700	6.50	3000.0

	Fluid Pressure Gradient (psi/ft)	0.450
	Perforations - Top (ft)	4887
	- Bot (ft)	4940
	Initial Fracture Top (ft)	4887
	Fracture Bottom (ft)	4940
3-D SIMULATOR	Step Size (ft)	1.4
PROGRAM CONTROL	Time Step (min)	0.4

Calculated Results
from 3-D Simulator
STIMPLAN (TM) , NSI , Tulsa,OK
Licensed To: ARCO Exploration & Production Technology

1/2 LENGTH:	'Hydraulic' length (ft)	102.9
	Propped length (ft)	0.0
PRESSURE:	Max Net Pressure (psi)	526.0
TIME:	Max Exposure to Form. Temp. (min)	1.2
	Time to Close (min)	3.5
RATE:	Fluid Loss Rate during pad (_BPM) ..	0.00
EFFICIENCY:	at end of pumping schedule	0.22
PROPPANT:	Average In Situ Conc. (#/sq ft)	0.0
	Average Conductivity (md-ft)	0
HEIGHT:	Max Fracture Height (ft)	116.4
WIDTH:	Avg width at end of pumping (in) ...	0.05

StimPlan 2.61 (TM). NSI Technologies, Tulsa, OK
Licensed To: ARCO Exploration & Production Technology

WELL ID:
SANTOS - E.MEREENIE 34 (L-P3) MINIFRAC HISTORY MATCH

DEPTH:	Well Depth (ft)	4887
PRESSURE:	Reservoir Pressure (psi)	1750
	Closure Pressure (psi)	3480
TEMPERATURE:	Bottom Hole Temperature (deg_F)	145

**** Pumping Schedule ****

Sl Vol (MGal)	Fl Vol (MGal)	Conc (_PPG_) Start	End	Rate (_BPM)	Fluid Type	Prop Type	Cum Prop (MLbs)	Pump Time (min)
0.10	0.10	0.0	0.0	14.74	2	1	0.0	0.2
0.77	0.77	0.0	0.0	14.74	2	1	0.0	1.2
0.28	0.28	0.0	0.0	13.53	3	1	0.0	0.5
0.23	0.23	0.0	0.0	14.73	3	1	0.0	0.4
0.23	0.23	0.0	0.0	14.73	1	1	0.0	0.4
1.02	1.02	0.0	0.0	15.33	1	1	0.0	1.6

Total Slurry ...	2.6		Total Fluid ...	2.6
Total Proppant ...	0.0		Avg. Conc	0.0
Total Pump Time	4.2	min	Pad %	100.0

Proppant ID No. 1	20- 40 Un-Defined				
Specific Gravity	2.65				
'Damage Factor'	0.70				
Proppant Stress (Mpsi)	0	2	4	8	16
KfW @ 2 #/sq ft (md-ft)	4800	3850	2750	990	50

Fluid ID No. 2	SLICK_WATER					
Specific Gravity	1.04					
	@Welbor	@FormTmp	@1Hr	@2Hr	@4Hr	@8Hr
vis (cp @ 170 1/sec) .	1	1	1	1	1	1
non-Newtonian n'	0.90	0.90	0.90	0.90	0.90	0.90
K(lb·sec/ft^2)x1000	0.03	0.03	0.03	0.03	0.03	0.03

TABLE A-1

Fluid ID No. 3	PART._XL_GEL					
Specific Gravity					1.04	
	@Welbor	@FormTmp	@1Hr	@2Hr	@4Hr	@8Hr
vis (cp @ 170 1/sec) .	200	175	125	80	5	2
non-Newtonian n'	0.38	0.40	0.41	0.42	0.90	0.95
K(lb·sec/ft^2)x1000	98.97	78.14	53.02	32.24	0.17	0.05

Fluid ID No. 1	BORAGEL_H3595					
Specific Gravity					1.04	
	@Welbor	@FormTmp	@1Hr	@2Hr	@4Hr	@8Hr
vis (cp @ 170 1/sec) .	275	225	150	125	10	2
non-Newtonian n'	0.38	0.40	0.41	0.42	0.90	0.95
K(lb·sec/ft^2)x1000	136.08	100.47	63.63	50.37	0.34	0.05

Time History * NSI STIMPLAN 3-D Fracture Simulation
SANTOS - E.MEREENIE 34 (L-P3) MINIFRAC HISTORY MATCH

Time (min)	Pen (ft)	Pres (psi)	Rate (_BPM)	Prop (_PPG_)	Sl Vol (MGal)	Eff-ciency	Loss (_BPM)	Hght (ft)	W-Avg (in)
0.1	9.0	152	14.74	0.0	0.0	0.34	8.9	54	0.02
0.1	10.4	152	14.74	0.0	0.1	0.36	8.7	54	0.02
0.1	11.8	160	14.74	0.0	0.1	0.36	10.9	54	0.02
0.1	13.2	163	14.74	0.0	0.1	0.34	13.6	54	0.02
0.1	14.6	165	14.74	0.0	0.1	0.32	14.8	54	0.02
0.1	16.0	165	14.74	0.0	0.1	0.29	15.0	55	0.02
0.1	17.4	167	14.74	0.0	0.1	0.27	14.8	55	0.01
0.1	18.8	164	14.74	0.0	0.1	0.24	13.7	55	0.01
0.1	20.2	165	14.74	0.0	0.1	0.23	12.6	55	0.01
0.2	21.6	167	14.74	0.0	0.1	0.22	12.8	55	0.01
0.2	23.0	168	14.74	0.0	0.1	0.21	13.0	55	0.01
0.2	24.4	169	14.74	0.0	0.1	0.20	12.8	55	0.01
0.2	25.8	170	14.74	0.0	0.1	0.20	13.1	55	0.01
0.2	27.2	175	14.74	0.0	0.1	0.19	12.4	56	0.01
0.2	28.6	178	14.74	0.0	0.2	0.19	12.8	56	0.01
0.3	30.0	177	14.74	0.0	0.2	0.19	12.5	56	0.01
0.3	31.4	176	14.74	0.0	0.2	0.18	12.9	56	0.01
0.3	32.8	175	14.74	0.0	0.2	0.18	12.5	56	0.01
0.3	34.2	173	14.74	0.0	0.2	0.18	12.8	56	0.01
0.3	35.6	173	14.74	0.0	0.2	0.17	12.7	56	0.01
0.4	37.0	174	14.74	0.0	0.2	0.17	12.2	56	0.01
0.4	38.4	174	14.74	0.0	0.2	0.17	12.5	56	0.02
0.4	39.8	175	14.74	0.0	0.3	0.17	12.5	56	0.02
0.4	41.2	175	14.74	0.0	0.3	0.17	12.5	56	0.02
0.4	42.6	176	14.74	0.0	0.3	0.17	12.6	56	0.02
0.5	44.0	176	14.74	0.0	0.3	0.17	12.5	56	0.02
0.5	45.4	177	14.74	0.0	0.3	0.17	12.6	56	0.02
0.5	46.8	177	14.74	0.0	0.3	0.17	12.6	56	0.02
0.6	48.2	178	14.74	0.0	0.3	0.16	12.6	56	0.02
0.6	49.6	179	14.74	0.0	0.4	0.16	12.6	56	0.02
0.6	51.0	179	14.74	0.0	0.4	0.16	12.7	56	0.02
0.6	52.4	180	14.74	0.0	0.4	0.16	12.8	56	0.02
0.7	53.8	181	14.74	0.0	0.4	0.16	12.9	56	0.02
0.7	55.2	181	14.74	0.0	0.4	0.16	12.9	56	0.02
0.8	56.6	181	14.74	0.0	0.5	0.16	13.0	56	0.02
0.8	58.0	182	14.74	0.0	0.5	0.15	13.1	56	0.02
0.8	59.4	182	14.74	0.0	0.5	0.15	13.1	56	0.02
0.9	60.8	182	14.74	0.0	0.5	0.15	13.1	56	0.02
0.9	62.2	182	14.74	0.0	0.6	0.15	13.1	56	0.02
1.0	63.6	183	14.74	0.0	0.6	0.15	13.2	56	0.02
1.0	65.0	183	14.74	0.0	0.6	0.14	13.2	56	0.02
1.0	66.4	183	14.74	0.0	0.6	0.14	13.1	56	0.02
1.1	67.8	183	14.74	0.0	0.7	0.14	13.1	56	0.02
1.2	69.2	185	14.74	0.0	0.7	0.14	13.1	56	0.02
1.2	70.6	185	14.74	0.0	0.8	0.14	13.1	56	0.02
1.3	72.0	185	14.74	0.0	0.8	0.14	13.1	56	0.02
1.3	73.4	186	14.74	0.0	0.8	0.14	13.3	56	0.02

Time History * NSI STIMPLAN 3-D Fracture Simulation
SANTOS - E.MEREENIE 34 (L-P3) MINIFRAC HISTORY MATCH

Time (min)	Pen (ft)	Pres (psi)	Rate (_BPM)	Prop (_PPG_)	Sl Vol (MGal)	Eff-ciency	Loss (_BPM)	Hght (ft)	W-Avg (in)
1.4	74.8	187	14.74	0.0	0.8	0.13	13.1	56	0.02
1.4	76.2	187	14.74	0.0	0.9	0.13	13.2	56	0.02
1.4	77.6	188	14.74	0.0	0.9	0.13	13.3	56	0.02
1.5	79.0	267	13.53	0.0	0.9	0.13	12.1	58	0.02
1.8	80.4	343	13.53	0.0	1.1	0.14	10.9	65	0.03
2.3	80.4	413	13.53	0.0	1.4	0.17	9.7	74	0.03
2.5	80.5	434	14.73	0.0	1.5	0.19	9.6	78	0.04
2.6	80.7	455	14.73	0.0	1.6	0.20	9.4	81	0.04
2.7	81.0	459	14.73	0.0	1.6	0.20	10.0	85	0.04
2.8	82.4	471	15.33	0.0	1.7	0.20	9.4	89	0.04
2.8	83.8	476	15.33	0.0	1.7	0.21	10.1	93	0.04
2.9	85.2	482	15.33	0.0	1.8	0.21	10.4	96	0.04
3.0	86.6	487	15.33	0.0	1.8	0.21	10.7	98	0.04
3.0	88.0	491	15.33	0.0	1.9	0.22	10.8	100	0.04
3.1	89.4	494	15.33	0.0	1.9	0.22	10.9	102	0.05
3.2	90.8	498	15.33	0.0	2.0	0.22	10.9	104	0.05
3.4	92.2	509	15.33	0.0	2.0	0.22	11.6	107	0.05
3.5	93.6	502	15.33	0.0	2.1	0.22	11.7	107	0.05
3.5	95.0	513	15.33	0.0	2.2	0.22	11.2	109	0.05
3.7	96.4	511	15.33	0.0	2.3	0.22	11.4	110	0.05
3.8	97.8	518	15.33	0.0	2.3	0.22	11.4	113	0.05
3.9	99.2	517	15.33	0.0	2.4	0.22	11.8	113	0.05
4.0	100.6	524	15.33	0.0	2.5	0.22	11.6	115	0.05
4.2	102.0	521	15.33	0.0	2.6	0.22	11.9	115	0.05
4.2	102.9	526	15.33	0.0	2.6	0.22	10.2	116	0.05
4.3	102.9	484	0.00	0.0	2.6	0.20	14.8	116	0.05
4.4	102.9	442	0.00	0.0	2.6	0.19	10.4	116	0.04
4.5	102.9	400	0.00	0.0	2.6	0.17	9.8	116	0.04
4.7	102.9	358	0.00	0.0	2.6	0.15	9.4	116	0.03
4.7	102.9	337	0.00	0.0	2.6	0.14	9.1	116	0.03
4.8	102.9	316	0.00	0.0	2.6	0.13	9.0	116	0.03
4.8	102.9	295	0.00	0.0	2.6	0.12	8.8	116	0.03
4.9	102.9	274	0.00	0.0	2.6	0.11	8.7	116	0.03
5.0	102.9	253	0.00	0.0	2.6	0.10	8.6	116	0.02
5.1	102.9	231	0.00	0.0	2.6	0.10	8.4	116	0.02
5.1	102.9	210	0.00	0.0	2.6	0.09	8.3	116	0.02
5.2	102.9	189	0.00	0.0	2.6	0.08	8.2	116	0.02
5.3	102.9	168	0.00	0.0	2.6	0.07	8.1	116	0.02
5.3	102.9	147	0.00	0.0	2.6	0.06	8.0	116	0.01
5.4	102.9	126	0.00	0.0	2.6	0.05	7.9	116	0.01
5.5	102.9	105	0.00	0.0	2.6	0.04	7.8	116	0.01

GEOMETRY SUMMARY * At End of Pumping Schedule
SANTOS - E.MEREENIE 34 (L-P3) MINIFRAC HISTORY MATCH

Dstnce (ft)	Press (psi)	W-Avg (in)	Q (_BPM)	Sh-Rate (1/sec)	------Hght (ft)------- Total	Up	Dn	Prop	Bank Fraction	Prop (PSF)
4	522	0.08	7.7	402	116	39	24	102	0.00	0.00
8	513	0.07	7.2	407	113	35	24	97	0.00	0.00
10	511	0.07	7.1	413	111	34	24	96	0.00	0.00
11	508	0.07	7.0	419	110	33	24	94	0.00	0.00
12	505	0.07	6.9	426	109	32	24	93	0.00	0.00
14	502	0.07	6.8	432	108	31	24	91	0.00	0.00
15	500	0.07	6.7	438	106	30	24	90	0.00	0.00
17	497	0.07	6.6	445	105	29	23	88	0.00	0.00
18	494	0.07	6.5	453	104	28	23	87	0.00	0.00
19	491	0.07	6.4	461	103	26	23	85	0.00	0.00
21	488	0.07	6.3	469	101	25	23	83	0.00	0.00
22	485	0.07	6.3	477	100	24	23	82	0.00	0.00
24	482	0.07	6.2	483	99	23	23	81	0.00	0.00
25	479	0.07	6.1	488	97	22	22	80	0.00	0.00
26	476	0.07	6.0	497	96	22	21	79	0.00	0.00
28	473	0.07	5.9	504	95	21	21	78	0.00	0.00
29	470	0.07	5.8	510	93	20	20	77	0.00	0.00
31	467	0.06	5.8	517	92	20	19	76	0.00	0.00
32	464	0.06	5.7	524	90	19	18	75	0.00	0.00
33	460	0.06	5.6	528	89	18	18	74	0.00	0.00
35	457	0.06	5.5	535	87	17	17	73	0.00	0.00
36	454	0.06	5.4	543	86	17	16	72	0.00	0.00
38	450	0.06	5.3	551	84	16	15	71	0.00	0.00
39	447	0.06	5.3	559	83	15	14	70	0.00	0.00
40	444	0.06	5.2	560	81	15	14	69	0.00	0.00
42	440	0.06	5.1	560	80	14	13	68	0.00	0.00
43	437	0.06	5.0	564	80	14	13	68	0.00	0.00
45	433	0.06	4.9	568	79	14	13	68	0.00	0.00
46	430	0.06	4.8	573	79	13	13	67	0.00	0.00
47	426	0.06	4.8	578	78	13	12	67	0.00	0.00
49	422	0.06	4.7	583	78	13	12	67	0.00	0.00
50	419	0.06	4.6	588	77	12	12	66	0.00	0.00
52	415	0.06	4.5	593	77	12	12	66	0.00	0.00
53	411	0.06	4.4	599	76	12	12	66	0.00	0.00
54	407	0.06	4.4	604	76	11	12	66	0.00	0.00
56	403	0.06	4.3	610	75	11	11	65	0.00	0.00
57	399	0.06	4.2	617	75	11	11	65	0.00	0.00
59	394	0.06	4.1	624	74	10	11	65	0.00	0.00
60	390	0.05	4.0	631	74	10	11	64	0.00	0.00
61	386	0.05	4.0	638	73	10	11	64	0.00	0.00
63	381	0.05	3.9	646	73	9	10	63	0.00	0.00
64	377	0.05	3.8	654	72	9	10	63	0.00	0.00
66	372	0.05	3.7	663	72	8	10	63	0.00	0.00
67	367	0.05	3.6	672	71	8	10	62	0.00	0.00
68	362	0.05	3.5	682	70	8	10	62	0.00	0.00
70	357	0.05	3.5	692	70	7	9	62	0.00	0.00
71	352	0.05	3.4	702	69	7	9	61	0.00	0.00
73	347	0.05	3.3	714	68	6	9	61	0.00	0.00
74	341	0.05	3.2	725	68	6	9	60	0.00	0.00
75	336	0.05	3.1	738	67	6	8	60	0.00	0.00
77	330	0.05	3.0	750	66	5	8	59	0.00	0.00
78	324	0.04	2.9	764	66	5	8	59	0.00	0.00
80	318	0.04	2.8	777	65	4	8	58	0.00	0.00

80	315	0.04	2.7	767	64	4	7	58	0.00	0.00
80	315	0.04	2.7	768	64	4	7	58	0.00	0.00
81	314	0.04	2.7	770	64	4	7	58	0.00	0.00
81	313	0.04	2.7	774	64	4	7	58	0.00	0.00
82	309	0.04	2.6	794	64	3	7	58	0.00	0.00
83	302	0.04	2.5	806	63	3	7	57	0.00	0.00
85	285	0.04	2.4	864	61	2	6	56	0.00	0.00
86	280	0.04	2.2	841	60	1	6	55	0.00	0.00
87	278	0.04	2.0	919	58	0	5	54	0.00	0.00
89	250	0.03	1.8	1062	55	0	2	54	0.00	0.00
90	228	0.02	1.5	2069	49	0	0	49	0.00	0.00
92	225	0.02	1.1	2390	42	0	0	42	0.00	0.00
93	220	0.01	0.9	4211	32	0	0	32	0.00	0.00
94	199	0.01	0.7	5954	29	0	0	29	0.00	0.00
96	195	0.01	0.5	9387	23	0	0	23	0.00	0.00
97	188	0.01	0.4	9999	19	0	0	19	0.00	0.00
99	176	0.01	0.3	9999	16	0	0	16	0.00	0.00
100	159	0.01	0.3	9999	15	0	0	15	0.00	0.00
101	143	0.00	0.2	9999	14	0	0	14	0.00	0.00
102	88	0.00	0.1	9999	13	0	0	13	0.00	0.00

FLUID SUMMARY * At End of Pumping Schedule
SANTOS - E.MEREENIE 34 (L-P3) MINIFRAC HISTORY MATCH

Stage No	Gone	Fluid ID	Prop ID	Pos (ft)	Concentration In	Now	Desgn	Fl Vol (MGal)	Ex Tim (min)	Temp (deg_F)	Visc (cp)	Fall Frac
1	1	2	1	103	0.0	0.0	0.0	0.0	0.1	145	1	0.00
1	1	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
1	1	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
1	1	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
1	0	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
1	1	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
1	1	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
1	1	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
1	1	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
1	1	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
1	1	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.1	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.2	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.2	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.2	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.2	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.2	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.2	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.2	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.2	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.3	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.3	0.1	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.3	0.2	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.3	0.2	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.3	0.2	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.3	0.2	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.3	0.2	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.4	0.2	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.4	0.2	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.4	0.2	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.4	0.2	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.4	0.2	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.5	0.2	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.5	0.2	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.5	0.2	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.5	0.3	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.6	0.3	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.6	0.3	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.6	0.3	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.6	0.3	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.7	0.3	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.7	0.4	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.8	0.4	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.8	0.7	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.8	0.7	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.8	0.6	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.9	0.9	145	1	0.00
2	1	2	1	103	0.0	0.0	0.0	0.9	0.9	145	1	0.00
3	1	3	1	103	0.0	0.0	0.0	0.9	0.9	145	33	0.00
3	1	3	1	103	0.0	0.0	0.0	0.9	1.0	145	8	0.00

3	1	3	1	103	0.0	0.0	0.0	1.1	0.9	145	9	0.00
3	1	3	1	103	0.0	0.0	0.0	1.1	1.1	145	9	0.00
4	1	3	1	103	0.0	0.0	0.0	1.4	1.0	145	9	0.00
4	1	3	1	103	0.0	0.0	0.0	1.4	0.9	145	10	0.00
5	1	1	1	103	0.0	0.0	0.0	1.5	1.1	145	13	0.00
5	1	1	1	103	0.0	0.0	0.0	1.6	1.1	145	12	0.00
5	1	1	1	103	0.0	0.0	0.0	1.6	1.1	145	10	0.00
6	1	1	1	103	0.0	0.0	0.0	1.6	1.1	145	9	0.00
6	0	1	1	97	0.0	0.0	0.0	1.7	1.2	145	11	0.00
6	0	1	1	92	0.0	0.0	0.0	1.7	1.0	145	22	0.00
6	0	1	1	87	0.0	0.0	0.1	1.8	0.9	145	39	0.00
6	0	1	1	83	0.0	0.0	0.1	1.8	0.9	145	41	0.00
6	0	1	1	78	0.0	0.0	0.2	1.9	0.8	145	43	0.00
6	0	1	1	73	0.0	0.0	0.2	1.9	0.7	145	45	0.00
6	0	1	1	68	0.0	0.0	0.2	2.0	0.6	145	47	0.00
6	0	1	1	60	0.0	0.0	0.2	2.0	0.5	145	49	0.00
6	0	1	1	51	0.0	0.0	0.2	2.1	0.3	145	50	0.00
6	0	1	1	45	0.0	0.0	0.3	2.2	0.2	145	52	0.00
6	0	1	1	38	0.0	0.0	0.3	2.2	0.1	145	53	0.00
6	0	1	1	30	0.0	0.0	0.3	2.3	0.0	145	55	0.00
6	0	1	1	22	0.0	0.0	0.3	2.4	0.0	87	64	0.00
6	0	1	1	14	0.0	0.0	0.3	2.5	0.0	80	69	0.00
6	0	1	1	7	0.0	0.0	0.4	2.6	0.0	75	72	0.00
6	0	1	1	2	0.0	0.0	0.4	2.6	0.0	73	73	0.00

Frac Summary * SANTOS - E.MEREENIE 34 (L-P3) FINAL TREATMENT DESIGN
Filename: EM34FD.FRK ; Jun 22, 96

Design Data

FLUID LOSS LAYERS:	Top (ft)	Bottom (ft)	Thick (ft)	Loss Coef. (ft/sqrt(min))	Spurt (Gal/100 ft^2)
	4801.0	4832.0	31.0	0.00500	0.50
	4832.0	4887.0	55.0	0.00100	0.00
	4887.0	4940.0	53.0	0.00340	0.40
	4940.0	4982.0	42.0	0.00100	0.00

FORMATION:	Modulus (e6_psi)	4.54
	Perforated Height (ft)	53.0
	Permeability (md)	10.000
TEMPERATURE:	Bottom Hole (deg_F)	145
PRESSURE:	Reservoir Pressure (psi)	1750.0
	Closure Pressure (psi)	3480.0
DEPTH:	Well Depth (ft)	4887.0

FORMATION LAYER DATA - Multi-Layer Height Growth

-Depth(ft)- Top	Botm	Thick	-Stress (psi)- Top	Botm	Gradient (psi/ft)	Modulus (e6_psi)	Toughness (psi/in)
4801.0	4832.0	31.0	3525.0	3525.0	0.000	5.50	3000.0
4832.0	4887.0	55.0	4050.0	4050.0	0.000	6.20	3000.0
4887.0	4896.0	9.0	3750.0	3750.0	0.000	5.20	3000.0
4896.0	4940.0	44.0	3480.0	3480.0	0.000	4.40	3000.0
4940.0			4200.0		0.700	6.50	3000.0

	Fluid Pressure Gradient (psi/ft)	0.450
	Perforations - Top (ft)	4887
	- Bot (ft)	4940
	Initial Fracture Top (ft)	4887
	Fracture Bottom (ft)	4940
3-D SIMULATOR	Step Size (ft)	2.5
PROGRAM CONTROL	Time Step (min)	0.8

Calculated Results
from 3-D Simulator
STIMPLAN (TM) , NSI , Tulsa,OK
Licensed To: ARCO Exploration & Production Technology

1/2 LENGTH:	'Hydraulic' length (ft)	139.1
	Propped length (ft)	138.4
PRESSURE:	Max Net Pressure (psi)	1767.4
TIME:	Max Exposure to Form. Temp. (min)	8.7
	Time to Close (min)	11.3
RATE:	Fluid Loss Rate during pad (_BPM)	11.52
EFFICIENCY:	at end of pumping schedule	0.36
PROPPANT:	Average In Situ Conc. (#/sq ft)	1.2
	Average Conductivity (md-ft)	2352
HEIGHT:	Max Fracture Height (ft)	146.9
WIDTH:	Avg width at end of pumping (in)	0.24

StimPlan 2.61 (TM). NSI Technologies, Tulsa, OK
Licensed To: ARCO Exploration & Production Technology

WELL ID:
SANTOS - E.MEREENIE 34 (L-P3) FINAL TREATMENT DESIGN

DEPTH:	Well Depth (ft)	4887
PRESSURE:	Reservoir Pressure (psi)	1750
	Closure Pressure (psi)	3480
TEMPERATURE:	Bottom Hole Temperature (deg_F)	145

**** Pumping Schedule ****

Sl Vol (MGal)	Fl Vol (MGal)	Conc (_PPG_) Start	End	Rate (_BPM)	Fluid Type	Prop Type	Cum Prop (MLbs)	Pump Time (min)
1.40	1.40	0.0	0.0	5.00	2	1	0.0	6.7
0.25	0.25	0.0	0.0	15.00	3	1	0.0	0.4
1.75	1.75	0.0	0.0	15.00	1	1	0.0	2.8
0.72	0.70	0.5	0.5	15.00	1	1	0.4	1.1
0.73	0.70	1.0	1.0	15.00	1	1	1.1	1.2
0.76	0.70	2.0	2.0	15.00	1	1	2.4	1.2
0.80	0.70	3.0	3.0	15.00	1	1	4.6	1.3
0.83	0.70	4.0	4.0	15.00	1	1	7.4	1.3
0.86	0.70	5.0	5.0	15.00	1	1	10.9	1.4
0.89	0.70	6.0	6.0	15.00	1	1	15.1	1.4
0.91	0.70	7.0	7.0	15.00	1	1	20.0	1.5
0.94	0.70	8.0	8.0	15.00	1	1	25.5	1.5

Total Slurry ...	10.8		Total Fluid ...	9.7
Total Proppant ...	25.5		Avg. Conc	2.6
Total Pump Time	21.6	min	Pad %	31.4

Proppant ID No. 1 20- 40 CARBO-LITE

Specific Gravity					2.72
'Damage Factor'					0.60
Proppant Stress (Mpsi)	0	2	4	8	16
KfW @ 2 #/sq ft (md-ft)	10500	9200	7600	3200	500

Fluid ID No. 2 SLICK_WATER

Specific Gravity 1.04

	@Welbor	@FormTmp	@1Hr	@2Hr	@4Hr	@8Hr
vis (cp @ 170 1/sec) .	1	1	1	1	1	1
non-Newtonian n'	0.90	0.90	0.90	0.90	0.90	0.90
K(lb·sec/ft^2)x1000	0.03	0.03	0.03	0.03	0.03	0.03

TABLE A-2

Fluid ID No. 3	PART._XL_GEL					
Specific Gravity					1.04	
	@Welbor	@FormTmp	@1Hr	@2Hr	@4Hr	@8Hr
vis (cp @ 170 1/sec) .	200	175	125	80	5	2
non-Newtonian n'	0.38	0.40	0.41	0.42	0.90	0.95
K(lb·sec/ft^2)x1000	98.97	78.14	53.02	32.24	0.17	0.05

Fluid ID No. 1	BORAGEL_H3595					
Specific Gravity					1.04	
	@Welbor	@FormTmp	@1Hr	@2Hr	@4Hr	@8Hr
vis (cp @ 170 1/sec) .	275	225	150	125	10	2
non-Newtonian n'	0.38	0.40	0.41	0.42	0.90	0.95
K(lb·sec/ft^2)x1000	136.08	100.47	63.63	50.37	0.34	0.05

Time History * NSI STIMPLAN 3-D Fracture Simulation
SANTOS - E.MEREENIE 34 (L-P3) FINAL TREATMENT DESIGN

Time (min)	Pen (ft)	Pres (psi)	Rate (_BPM)	Prop (_PPG_)	Sl Vol (MGal)	Eff-ciency	Loss (_BPM)	Hght (ft)	W-Avg (in)
0.5	13.8	151	5.00	0.0	0.1	0.15	3.9	54	0.02
0.8	16.3	151	5.00	0.0	0.2	0.16	4.1	55	0.02
0.9	18.8	154	5.00	0.0	0.2	0.15	4.7	55	0.02
1.0	21.3	155	5.00	0.0	0.2	0.13	5.0	55	0.02
1.1	23.8	156	5.00	0.0	0.2	0.11	4.9	55	0.02
1.3	26.3	157	5.00	0.0	0.3	0.10	4.9	55	0.02
1.6	28.8	167	5.00	0.0	0.3	0.09	4.9	55	0.01
1.8	31.3	168	5.00	0.0	0.4	0.09	4.7	55	0.01
2.0	33.8	165	5.00	0.0	0.4	0.08	4.7	55	0.01
2.4	36.3	160	5.00	0.0	0.5	0.08	4.8	55	0.02
2.7	38.8	159	5.00	0.0	0.6	0.07	4.8	55	0.02
2.9	41.3	159	5.00	0.0	0.6	0.07	4.7	55	0.02
3.3	43.8	159	5.00	0.0	0.7	0.07	4.8	55	0.02
3.7	46.3	159	5.00	0.0	0.8	0.07	4.8	55	0.02
4.1	48.8	159	5.00	0.0	0.9	0.07	4.8	55	0.02
4.5	51.3	160	5.00	0.0	0.9	0.06	4.8	55	0.02
4.9	53.8	160	5.00	0.0	1.0	0.06	4.8	55	0.02
5.4	56.3	161	5.00	0.0	1.1	0.06	4.8	55	0.02
5.8	58.8	161	5.00	0.0	1.2	0.06	4.8	55	0.02
6.3	61.3	162	5.00	0.0	1.3	0.06	4.8	55	0.02
6.7	62.8	161	5.00	0.0	1.4	0.06	4.6	55	0.02
6.8	65.3	449	15.00	0.0	1.5	0.08	8.2	65	0.02
6.9	67.8	459	15.00	0.0	1.5	0.10	7.2	73	0.03
7.0	70.3	457	15.00	0.0	1.6	0.12	7.8	78	0.03
7.3	72.8	472	15.00	0.0	1.8	0.14	8.1	85	0.04
7.4	75.3	480	15.00	0.0	1.9	0.16	8.6	91	0.04
7.6	77.8	488	15.00	0.0	2.0	0.17	9.4	96	0.04
7.7	80.3	487	15.00	0.0	2.0	0.17	10.7	97	0.04
7.8	82.8	494	15.00	0.0	2.1	0.18	10.8	100	0.04
7.9	85.3	493	15.00	0.0	2.2	0.18	10.5	100	0.05
8.0	87.8	503	15.00	0.0	2.3	0.18	10.9	103	0.05
8.3	90.3	510	15.00	0.0	2.4	0.19	11.9	108	0.05
8.4	92.8	507	15.00	0.0	2.5	0.19	10.8	108	0.05
8.6	95.3	519	15.00	0.0	2.6	0.19	10.9	111	0.05
8.8	97.8	515	15.00	0.0	2.7	0.19	11.3	111	0.05
8.9	100.3	525	15.00	0.0	2.8	0.20	11.2	114	0.05
9.2	102.8	526	15.00	0.0	3.0	0.20	12.0	116	0.05
9.4	105.3	528	15.00	0.0	3.1	0.20	11.6	117	0.05
9.5	107.8	532	15.00	0.0	3.2	0.20	11.5	118	0.05
9.7	110.3	533	15.00	0.0	3.3	0.20	11.8	119	0.05
9.9	112.8	539	15.00	0.0	3.5	0.20	11.5	122	0.05
10.2	115.3	537	15.00	0.5	3.6	0.20	12.3	122	0.05
10.4	117.8	544	15.00	0.5	3.8	0.20	11.9	126	0.05
10.6	120.3	539	15.00	0.5	3.9	0.20	12.0	127	0.05
10.8	122.8	548	15.00	0.5	4.0	0.20	11.9	130	0.05
11.1	125.3	545	15.00	0.5	4.2	0.20	12.1	130	0.05
11.3	127.8	554	15.00	1.0	4.3	0.20	11.9	134	0.05

Time History * NSI STIMPLAN 3-D Fracture Simulation
SANTOS - E.MEREENIE 34 (L-P3) FINAL TREATMENT DESIGN

Time (min)	Pen (ft)	Pres (psi)	Rate (_BPM)	Prop (_PPG_)	Sl Vol (MGal)	Eff- ciency	Loss (_BPM)	Hght (ft)	W-Avg (in)
11.7	130.3	547	15.00	1.0	4.5	0.20	12.3	137	0.06
11.9	132.8	557	15.00	1.0	4.7	0.20	12.1	141	0.06
12.3	135.3	554	15.00	1.0	4.9	0.20	12.2	144	0.06
Bridge Stage 0 at 12 min, at 116.1 (ft), Avg Dia/W 0.03/0.04 in									
12.6	137.8	561	15.00	2.0	5.1	0.20	11.9	147	0.06
Bridge Stage 0 at 13 min, at 127.1 (ft), Avg Dia/W 0.03/0.01 in									
13.4	139.1	591	15.00	2.0	5.6	0.21	10.8	147	0.07
Bridge Stage 0 at 13 min, at 123.9 (ft), Avg Dia/W 0.03/0.04 in									
Screen Out in Stage 4 at Time = 13.4 min at 131.6 (ft)									
14.2	139.1	663	15.00	3.0	6.1	0.22	9.0	147	0.08
Screen Out in Stage 4 at Time = 14.2 min at 129.1 (ft)									
15.0	139.1	751	15.00	3.0	6.6	0.24	8.3	147	0.09
15.8	139.1	850	15.00	4.0	7.1	0.26	7.7	147	0.11
16.6	139.1	958	15.00	4.0	7.7	0.27	7.3	147	0.13
17.4	139.1	1072	15.00	5.0	8.1	0.29	6.9	147	0.14
18.2	139.1	1193	15.00	6.0	8.6	0.31	6.6	147	0.16
19.0	139.1	1322	15.00	6.0	9.2	0.32	6.3	147	0.18
Screen Out in Stage 5 at Time = 19.0 min at 126.6 (ft)									
19.8	139.1	1454	15.00	7.0	9.7	0.34	6.1	147	0.19
20.6	139.1	1588	15.00	7.0	10.2	0.35	5.9	147	0.21
21.6	139.1	1767	15.00	8.0	10.8	0.36	5.6	147	0.24
23.0	139.1	1626	0.00	0.0	10.8	0.34	5.4	147	0.22
24.4	139.1	1485	0.00	0.0	10.8	0.31	5.2	147	0.20
25.9	139.1	1343	0.00	0.0	10.8	0.28	5.0	147	0.18
27.5	139.1	1202	0.00	0.0	10.8	0.25	4.8	147	0.17
28.3	139.1	1131	0.00	0.0	10.8	0.24	4.6	147	0.16
29.0	139.1	1060	0.00	0.0	10.8	0.22	4.5	147	0.15
29.8	139.1	990	0.00	0.0	10.8	0.21	4.4	147	0.14
30.5	139.1	919	0.00	0.0	10.8	0.20	4.4	147	0.13
31.3	139.1	848	0.00	0.0	10.8	0.19	4.3	147	0.13
31.9	139.1	778	0.00	0.0	10.8	0.17	4.2	147	0.12
32.5	139.1	707	0.00	0.0	10.8	0.17	4.2	147	0.12
33.0	139.1	636	0.00	0.0	10.8	0.16	4.1	147	0.12

GEOMETRY SUMMARY * At End of Pumping Schedule
SANTOS - E.MEREENIE 34 (L-P3) FINAL TREATMENT DESIGN

Dstnce (ft)	Press (psi)	W-Avg (in)	Q (_BPM)	Sh-Rate (1/sec)	------Hght (ft)------- Total	Up	Dn	Prop	Bank Fraction	Prop (PSF)
6	1767	0.29	7.5	21	147	53	41	131	0.00	1.25
13	1766	0.28	6.5	20	140	48	39	124	0.00	1.24
15	1765	0.28	6.3	21	137	46	38	121	0.00	1.24
18	1765	0.27	6.1	22	132	45	34	117	0.00	1.16
20	1764	0.27	5.9	22	127	44	30	113	0.00	1.09
23	1763	0.27	5.7	22	125	44	28	111	0.00	1.12
25	1763	0.26	5.6	23	121	43	25	107	0.00	1.13
28	1762	0.26	5.4	23	119	41	25	105	0.00	1.13
30	1761	0.26	5.2	22	117	39	25	103	0.00	1.14
33	1761	0.26	5.1	22	115	38	24	100	0.00	1.14
35	1760	0.26	4.9	22	113	36	24	98	0.00	1.20
38	1760	0.26	4.7	22	111	34	24	95	0.00	1.16
40	1759	0.26	4.6	22	109	32	24	93	0.00	1.08
43	1758	0.26	4.4	22	107	31	24	91	0.00	1.09
45	1758	0.26	4.3	21	105	29	23	88	0.00	1.12
48	1757	0.26	4.1	21	103	27	23	86	0.00	1.17
50	1756	0.25	4.0	21	101	25	23	83	0.00	1.18
53	1756	0.25	3.8	21	99	23	23	81	0.00	1.19
55	1755	0.25	3.7	20	97	22	22	79	0.00	1.19
58	1755	0.25	3.5	20	94	21	21	78	0.00	1.23
60	1754	0.25	3.4	20	92	20	19	76	0.00	1.15
62	1754	0.25	3.3	19	90	19	18	75	0.00	1.12
64	1753	0.25	3.2	19	88	18	17	74	0.00	1.11
67	1752	0.26	3.0	19	86	17	16	72	0.00	1.11
69	1752	0.26	2.9	19	83	15	14	70	0.00	1.10
72	1751	0.26	2.8	18	80	14	13	68	0.00	1.22
74	1751	0.26	2.7	18	80	14	13	68	0.00	1.22
77	1750	0.26	2.5	17	79	13	13	67	0.00	1.21
79	1749	0.25	2.4	16	78	13	12	67	0.00	1.21
82	1749	0.25	2.3	16	77	12	12	66	0.00	1.06
84	1748	0.25	2.2	15	76	12	12	66	0.00	1.16
87	1747	0.25	2.0	14	75	11	11	65	0.00	1.16
89	1747	0.25	1.9	14	74	10	11	65	0.00	1.16
92	1746	0.25	1.8	13	73	10	11	64	0.00	1.14
94	1746	0.25	1.6	12	72	9	10	63	0.00	1.21
97	1745	0.25	1.5	12	71	8	10	63	0.00	1.33
99	1744	0.25	1.4	11	70	8	10	62	0.00	1.23
102	1744	0.25	1.3	10	69	7	9	61	0.00	1.09
104	1743	0.25	1.2	10	68	6	9	60	0.00	1.17
107	1743	0.25	1.0	9	67	5	8	60	0.00	1.33
109	1742	0.25	0.9	8	66	5	8	59	0.00	1.33
112	1741	0.25	0.8	7	64	4	7	58	0.00	1.32
114	1741	0.25	0.7	6	63	3	7	57	0.00	1.25
117	1740	0.25	0.6	6	61	2	6	56	0.00	1.30
119	1738	0.24	0.5	5	59	1	6	55	0.00	1.37
122	1736	0.24	0.4	4	55	0	2	54	0.00	1.56
124	1734	0.24	0.3	3	53	0	0	53	0.12	1.28
127	1732	0.19	0.2	4	41	0	0	41	1.00	1.86
129	1265	0.13	0.1	11	29	0	0	29	1.00	1.25
132	434	0.04	0.1	274	23	0	0	23	1.00	0.37
134	186	0.02	0.1	1191	21	0	0	21	1.00	0.21
137	145	0.02	0.1	1395	19	0	0	19	1.00	0.23
138	134	0.08	0.1	198	18	0	0	18	1.00	0.78

FLUID SUMMARY * At End of Pumping Schedule
SANTOS - E.MEREENIE 34 (L-P3) FINAL TREATMENT DESIGN

Stage No	Gone	Fluid ID	Prop ID	Pos (ft)	Concentration In	Now	Desgn	Fl Vol (MGal)	Ex Tim (min)	Temp (deg_F)	Visc (cp)	Fall Frac
1	1	2	1	139	0.0	0.0	0.0	0.1	0.5	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.2	0.4	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.2	0.4	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.2	0.5	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.2	0.4	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.3	0.2	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.3	0.2	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.4	0.3	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.4	0.3	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.5	0.3	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.6	0.3	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.6	0.4	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.7	0.4	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.8	0.4	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.9	0.4	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	0.9	0.5	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	1.0	0.5	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	1.1	0.5	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	1.2	0.6	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	1.3	0.5	145	1	0.00
1	1	2	1	139	0.0	0.0	0.0	1.4	0.4	145	1	0.00
2	1	3	1	139	0.0	0.0	0.0	1.4	0.6	145	10	0.00
2	1	3	1	139	0.0	0.0	0.0	1.5	0.6	145	8	0.00
2	1	3	1	139	0.0	0.0	0.0	1.5	0.6	145	8	0.00
2	1	3	1	139	0.0	0.0	0.0	1.6	0.8	145	8	0.00
2	1	3	1	139	0.0	0.0	0.0	1.6	0.8	145	8	0.00
3	1	1	1	139	0.0	0.0	0.0	1.8	0.8	145	12	0.00
3	1	1	1	139	0.0	0.0	0.0	1.9	0.9	145	13	0.00
3	1	1	1	139	0.0	0.0	0.0	2.0	1.0	145	13	0.00
3	1	1	1	139	0.0	0.0	0.0	2.0	1.1	145	13	0.00
3	1	1	1	139	0.0	0.0	0.0	2.1	1.1	145	13	0.00
3	1	1	1	139	0.0	0.0	0.0	2.2	1.3	145	13	0.00
3	1	1	1	139	0.0	0.0	0.0	2.3	1.3	145	13	0.00
3	1	1	1	139	0.0	0.0	0.0	2.4	1.4	145	13	0.00
3	1	1	1	139	0.0	0.0	0.0	2.5	1.5	145	14	0.00
3	1	1	1	139	0.0	0.0	0.0	2.6	1.5	145	13	0.00
3	1	1	1	139	0.0	0.0	0.0	2.7	1.5	145	14	0.00
3	1	1	1	139	0.0	0.0	0.0	2.8	1.5	145	13	0.00
3	1	1	1	139	0.0	0.0	0.0	3.0	1.9	145	15	0.00
3	1	1	1	139	0.0	0.0	0.0	3.1	2.0	145	15	0.00
3	1	1	1	139	0.0	0.0	0.0	3.2	1.7	145	15	0.00
3	1	1	1	139	0.0	0.0	0.0	3.3	1.8	145	16	0.00
3	1	1	1	139	0.0	0.0	0.0	3.4	1.9	145	30	0.00
4	1	1	1	139	0.5	45.3	0.0	3.5	2.5	145	30	0.00
4	1	1	1	139	0.5	45.3	0.0	3.6	2.0	145	25	0.00
4	1	1	1	132	0.5	45.3	0.0	3.8	2.8	145	75	0.00
4	1	1	1	130	0.5	45.3	0.0	3.9	4.2	145	201	0.00
4	1	1	1	130	0.5	45.3	0.0	4.0	5.5	145	334	0.00
4	1	1	1	130	0.5	45.3	0.0	4.1	6.0	145	441	0.00
5	1	1	1	129	1.0	45.3	0.0	4.2	6.8	145	526	0.00
5	1	1	1	128	1.0	45.3	0.0	4.3	6.5	145	618	0.00
5	1	1	1	126	1.0	45.3	0.0	4.5	8.7	145	959	0.00
5	0	1	1	124	1.0	13.3	0.7	4.7	8.1	145	1112	0.00
5	0	1	1	123	1.0	9.2	0.9	4.8	8.1	145	1069	0.00
6	0	1	1	122	2.0	25.0	0.9	4.9	8.1	145	944	0.00
6	0	1	1	121	2.0	17.3	1.2	5.1	7.3	145	919	0.00
6	0	1	1	117	2.0	11.9	1.5	5.4	6.5	145	813	0.00
6	0	1	1	114	2.0	9.9	1.7	5.6	6.5	145	724	0.00
7	0	1	1	113	3.0	16.6	1.8	5.6	6.5	145	724	0.00
7	0	1	1	109	3.0	11.7	2.2	6.0	5.7	145	633	0.00
7	0	1	1	102	3.0	8.5	2.8	6.3	4.9	145	556	0.00
8	0	1	1	97	4.0	11.2	3.0	6.5	4.9	145	513	0.00
8	0	1	1	89	4.0	8.8	3.7	6.9	3.3	145	467	0.00
8	0	1	1	82	4.0	7.4	4.3	7.0	3.3	145	433	0.00
9	0	1	1	76	5.0	9.2	4.4	7.3	2.5	145	412	0.00
9	0	1	1	65	5.0	7.9	5.1	7.7	1.7	145	390	0.00
10	0	1	1	59	6.0	9.4	5.2	7.8	1.7	145	379	0.00
10	0	1	1	52	6.0	8.4	5.7	8.1	0.9	145	372	0.00
10	0	1	1	42	6.0	7.7	6.2	8.4	0.0	145	366	0.00
11	0	1	1	36	7.0	9.0	6.3	8.5	0.0	145	362	0.00
11	0	1	1	28	7.0	8.3	6.7	8.9	0.0	97	404	0.00
11	0	1	1	20	7.0	7.8	7.1	9.1	0.0	82	425	0.00
12	0	1	1	15	8.0	8.9	7.2	9.3	0.0	79	443	0.00
12	0	1	1	6	8.0	8.5	7.6	9.8	0.0	74	451	0.00

PROPPANT SUMMARY * At End of Pumping Schedule
SANTOS - E.MEREENIE 34 (L-P3) FINAL TREATMENT DESIGN

Lb/Sq-Ft Lost to Embedment 0.200

Distance (ft)	KfW (md-ft)	Prop Concentration(Total lb/sq foot) Prop ID--> 1
5.6	2414	1.25
12.5	2401	1.24
15.0	2348	1.22
17.5	2219	1.16
20.0	2110	1.12
22.5	2104	1.11
25.0	2134	1.13
27.5	2147	1.13
30.0	2157	1.14
32.5	2202	1.16
35.0	2252	1.18
37.5	2195	1.15
40.0	2081	1.10
42.5	2058	1.09
45.0	2129	1.12
47.5	2215	1.16
50.0	2261	1.18
52.5	2274	1.19
55.0	2298	1.20
57.5	2297	1.20
60.0	2211	1.16
62.0	2125	1.12
64.1	2100	1.11
66.6	2091	1.11
69.1	2151	1.13
71.6	2280	1.19
74.1	2341	1.22
76.6	2332	1.21
79.1	2239	1.17
81.6	2122	1.12
84.1	2152	1.13
86.6	2211	1.16
89.1	2201	1.16
91.6	2221	1.16
94.1	2362	1.23
96.6	2479	1.28
99.1	2346	1.22
101.6	2171	1.14
104.1	2276	1.19
106.6	2508	1.29
109.1	2591	1.33
111.6	2538	1.30
114.1	2483	1.28
116.6	2541	1.30
119.1	2764	1.40
121.6	2861	1.44
124.1	2975	1.49
126.6	3127	1.56
129.1	2255	1.18
131.6	804	0.55
134.1	125	0.25
136.6	376	0.36
138.4	962	0.62

Average Conductivity (md-ft) 2206

PROPPANT SUMMARY * At Fracture Closure
SANTOS - E.MEREENIE 34 (L-P3) FINAL TREATMENT DESIGN

Lb/Sq-Ft Lost to Embedment 0.200

Distance (ft)	KfW (md-ft)	Prop Concentration(Total lb/sq foot) Prop ID--> 1
5.6	1779	0.96
12.5	1751	0.95
15.0	1787	0.97
17.5	1871	1.00
20.0	1887	1.01
22.5	1825	0.98
25.0	1763	0.96
27.5	1789	0.97
30.0	1885	1.01
32.5	1938	1.03
35.0	1949	1.04
37.5	1962	1.04
40.0	2034	1.07
42.5	2154	1.13
45.0	2165	1.13
47.5	2078	1.09
50.0	2031	1.07
52.5	2063	1.09
55.0	2216	1.15
57.5	2413	1.24
60.0	2493	1.27
62.0	2489	1.27
64.1	2505	1.28
66.6	2595	1.32
69.1	2618	1.33
71.6	2462	1.26
74.1	2352	1.21
76.6	2347	1.21
79.1	2478	1.27
81.6	2742	1.38
84.1	2886	1.44
86.6	2845	1.42
89.1	2796	1.40
91.6	2825	1.41
94.1	2822	1.41
96.6	2789	1.40
99.1	3028	1.50
101.6	3310	1.62
104.1	3049	1.51
106.6	2787	1.40
109.1	3001	1.49
111.6	3190	1.57
114.1	3305	1.62
116.6	3492	1.70
119.1	3907	1.88
121.6	4100	1.96
124.1	3700	1.79
126.6	3288	1.61
129.1	2279	1.18
131.6	812	0.55
134.1	127	0.25
136.6	380	0.36
138.4	972	0.62

Average Conductivity (md-ft) 2353

Frac Summary * SANTOS - E. MEREENIE 34 (L-P3) POST-FRAC EVALUATION
Filename: EM34LPF.FRK ; Oct 1, 96

Design Data

FLUID LOSS LAYERS:	Top (ft)	Bottom (ft)	Thick (ft)	Loss Coef. (ft/sqrt(min))	Spurt (Gal/100 ft^2)
	4801.0	4832.0	31.0	0.00500	0.50
	4832.0	4887.0	55.0	0.00010	0.00
	4887.0	4940.0	53.0	0.00245	0.20
	4940.0	4982.0	42.0	0.00010	0.00

FORMATION:	Modulus (e6_psi)	3.67
	Perforated Height (ft)	53.0
	Permeability (md)	10.000
TEMPERATURE:	Bottom Hole (deg_F)	145
PRESSURE:	Reservoir Pressure (psi)	1750.0
	Closure Pressure (psi)	3480.0
DEPTH:	Well Depth (ft)	4887.0

FORMATION LAYER DATA - Multi-Layer Height Growth

-----Depth(ft)------ Top	Botm	Thick	-Stress (psi)-- Top	Botm	Gradient (psi/ft)	Modulus (e6_psi)	Toughness (psi«in)
4801.0	4832.0	31.0	3525.0	3525.0	0.000	5.50	3000.0
4832.0	4887.0	55.0	4050.0	4050.0	0.000	6.20	3000.0
4887.0	4896.0	9.0	3750.0	3750.0	0.000	4.50	3000.0
4896.0	4940.0	44.0	3480.0	3480.0	0.000	3.50	3000.0
4940.0			4200.0		0.000	6.50	3000.0

	Fluid Pressure Gradient (psi/ft)	0.450
Perforations - Top	(ft)	4887
- Bot	(ft)	4940
Initial Fracture Top	(ft)	4887
Fracture Bottom	(ft)	4940

3-D SIMULATOR	Step Size (ft)	3.5
PROGRAM CONTROL	Time Step (min)	2.0

Calculated Results
from 3-D Simulator
STIMPLAN (TM) , NSI , Tulsa,OK
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1/2 LENGTH:	'Hydraulic' length (ft)	200.3
	Propped length (ft)	196.8
PRESSURE:	Max Net Pressure (psi)	1358.9
TIME:	Max Exposure to Form. Temp. (min)	9.2
	Time to Close (min)	22.3
RATE:	Fluid Loss Rate during pad (_BPM)	11.51
EFFICIENCY:	at end of pumping schedule	0.43
PROPPANT:	Average In Situ Conc. (#/sq ft)	0.9
	Average Conductivity (md-ft)	1644
HEIGHT:	Max Fracture Height (ft)	141.5
WIDTH:	Avg width at end of pumping (in)	0.23

StimPlan 2.60 (TM). NSI Technologies, Tulsa, OK
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WELL ID:		
SANTOS - E. MEREENIE 34 (L-P3) POST-FRAC EVALUATION		
DEPTH:	Well Depth (ft)	4887
PRESSURE:	Reservoir Pressure (psi)	1750
	Closure Pressure (psi)	3480
TEMPERATURE:	Bottom Hole Temperature (deg_F)	145

**** Pumping Schedule ****

Sl Vol (MGal)	Fl Vol (MGal)	Conc (_PPG_) Start	End	Rate (_BPM)	Fluid Type	Prop Type	Cum Prop (MLbs)	Pump Time (min)
1.24	1.24	0.0	0.0	4.70	3	1	0.0	6.3
0.13	0.13	0.0	0.0	4.70	3	1	0.0	0.7
0.23	0.23	0.0	0.0	13.99	3	1	0.0	0.4
1.60	1.60	0.0	0.0	13.99	2	1	0.0	2.7
0.97	0.95	0.5	0.5	14.12	1	1	0.5	1.6
1.09	1.04	1.0	1.0	14.56	1	1	1.5	1.8
0.66	0.61	2.0	2.0	14.69	1	1	2.7	1.1
0.82	0.73	2.9	2.9	15.08	1	1	4.8	1.3
0.82	0.70	4.0	4.0	15.12	1	1	7.6	1.3
0.76	0.62	5.1	5.1	15.68	1	1	10.8	1.2
0.44	0.35	6.1	6.1	15.84	1	1	12.9	0.7
0.90	0.69	7.0	7.0	15.90	1	1	17.7	1.3
1.19	0.88	8.0	8.0	16.01	1	1	24.8	1.8

Total Slurry ...	10.8		Total Fluid ...	9.8
Total Proppant ...	24.8		Avg. Conc	2.5
Total Pump Time	22.1	min	Pad %	29.5

Proppant ID No. 1 — 20- 40 CARBO-LITE

Specific Gravity					2.72
'Damage Factor'					0.60
Proppant Stress (Mpsi)	0	2	4	8	16
KfW @ 2 #/sq ft (md-ft)	10500	9200	7600	3200	500

Fluid ID No. 3 — SLICK_WATER

Specific Gravity 1.04

	@Welbor	@FormTmp	@1Hr	@2Hr	@4Hr	@8Hr
vis (cp @ 170 1/sec)	1	1	1	1	1	1
non-Newtonian n'	1.00	1.00	1.00	1.00	1.00	1.00
K(lb*sec/ft^2)x1000	0.02	0.02	0.02	0.02	0.02	0.02

TABLE A-3

Fluid ID No. 2	PART._XL_GEL					
Specific Gravity					1.04	
	@Welbor	@FormTmp	@1Hr	@2Hr	@4Hr	@8Hr
vis (cp @ 170 1/sec) .	75	50	25	10	5	2
non-Newtonian n'	0.38	0.40	0.41	0.42	0.90	0.95
K(lb*sec/ft^2)x1000	37.11	22.33	10.60	4.03	0.17	0.05

Fluid ID No. 1	BORAGEL_H3595					
Specific Gravity					1.04	
	@Welbor	@FormTmp	@1Hr	@2Hr	@4Hr	@8Hr
vis (cp @ 170 1/sec) .	275	225	150	125	10	2
non-Newtonian n'	0.38	0.40	0.41	0.42	0.90	0.95
K(lb*sec/ft^2)x1000	136.08	100.47	63.63	50.37	0.34	0.05

Time History * NSI STIMPLAN 3-D Fracture Simulation
SANTOS - E. MEREENIE 34 (L-P3) POST-FRAC EVALUATION

Time (min)	Pen (ft)	Pres (psi)	Rate (_BPM)	Prop (_PPG_)	Sl Vol (MGal)	Eff-ciency	Loss (_BPM)	Hght (ft)	W-Avg (in)
0.6	18.0	151	4.70	0.0	0.1	0.21	3.4	55	0.02
0.9	21.5	151	4.70	0.0	0.2	0.23	3.4	55	0.03
1.0	25.0	155	4.70	0.0	0.2	0.22	4.2	55	0.02
1.2	28.5	170	4.70	0.0	0.2	0.20	4.2	55	0.02
1.3	32.0	172	4.70	0.0	0.3	0.18	4.3	55	0.02
1.5	35.5	167	4.70	0.0	0.3	0.16	4.6	55	0.02
1.8	39.0	161	4.70	0.0	0.3	0.14	4.6	55	0.02
2.1	42.5	158	4.70	0.0	0.4	0.14	4.3	55	0.02
2.4	46.0	157	4.70	0.0	0.5	0.13	4.2	55	0.02
2.7	49.5	157	4.70	0.0	0.5	0.12	4.3	55	0.02
3.1	53.0	157	4.70	0.0	0.6	0.12	4.3	55	0.02
3.5	56.5	158	4.70	0.0	0.7	0.12	4.3	55	0.02
3.9	60.0	158	4.70	0.0	0.8	0.11	4.3	55	0.02
4.4	63.5	159	4.70	0.0	0.9	0.11	4.3	55	0.02
4.8	67.0	159	4.70	0.0	0.9	0.11	4.4	55	0.02
5.3	70.5	160	4.70	0.0	1.0	0.10	4.4	55	0.02
5.8	74.0	160	4.70	0.0	1.1	0.10	4.4	55	0.02
6.4	77.5	161	4.70	0.0	1.3	0.10	4.4	55	0.02
6.9	81.3	162	4.70	0.0	1.4	0.10	4.4	55	0.02
7.0	84.8	184	13.99	0.0	1.4	0.11	7.9	56	0.03
7.1	88.3	189	13.99	0.0	1.4	0.11	7.6	56	0.03
7.1	91.8	191	13.99	0.0	1.5	0.12	8.3	56	0.03
7.1	95.3	193	13.99	0.0	1.5	0.12	9.1	56	0.03
7.2	98.8	195	13.99	0.0	1.5	0.12	9.7	56	0.03
7.2	102.3	196	13.99	0.0	1.5	0.12	11.1	56	0.03
7.3	105.8	196	13.99	0.0	1.6	0.13	10.5	56	0.03
7.4	109.3	196	13.99	0.0	1.6	0.13	11.1	56	0.03
7.5	112.8	325	13.99	0.0	1.7	0.14	10.0	59	0.03
7.8	116.3	349	13.99	0.0	1.9	0.15	9.4	65	0.03
8.1	119.8	371	13.99	0.0	2.1	0.18	8.6	69	0.04
8.4	123.3	366	13.99	0.0	2.2	0.19	8.6	70	0.04
8.5	126.8	363	13.99	0.0	2.3	0.20	9.2	70	0.04
8.8	130.3	386	13.99	0.0	2.5	0.22	7.9	72	0.05
9.0	133.8	375	13.99	0.0	2.5	0.22	10.2	72	0.05
9.0	137.3	374	13.99	0.0	2.6	0.22	11.8	72	0.05
9.0	140.8	372	13.99	0.0	2.6	0.22	11.6	72	0.05
9.1	144.3	370	13.99	0.0	2.6	0.22	11.9	72	0.05
9.1	147.8	368	13.99	0.0	2.7	0.22	11.9	72	0.05
9.3	151.3	368	13.99	0.0	2.8	0.21	12.9	72	0.05
9.4	154.8	369	13.99	0.0	2.8	0.21	11.3	72	0.05
9.6	158.3	369	13.99	0.0	2.9	0.21	11.5	72	0.05
9.7	161.8	371	13.99	0.0	3.0	0.21	11.5	72	0.05
9.9	165.3	373	13.99	0.0	3.1	0.21	11.4	72	0.05
10.1	168.8	376	13.99	0.0	3.2	0.21	11.5	72	0.05
10.2	172.3	379	14.12	0.5	3.3	0.21	11.4	72	0.05
10.4	175.8	398	14.12	0.5	3.4	0.20	11.6	73	0.05
10.6	179.3	425	14.12	0.5	3.5	0.20	11.2	76	0.05

Time History * NSI STIMPLAN 3-D Fracture Simulation
SANTOS - E. MEREENIE 34 (L-P3) POST-FRAC EVALUATION

Time (min)	Pen (ft)	Pres (psi)	Rate (_BPM)	Prop (_PPG_)	Sl Vol (MGal)	Eff- ciency	Loss (_BPM)	Hght (ft)	W-Avg (in)
10.9	182.8	454	14.12	0.5	3.7	0.21	10.9	80	0.05
11.2	186.3	483	14.12	0.5	3.9	0.21	10.5	91	0.05
11.8	189.8	510	14.12	0.5	4.2	0.22	10.0	106	0.05
12.5	193.3	541	14.56	1.0	4.7	0.23	9.4	122	0.05
Bridge Stage 0 at 12 min, at 151.9 (ft), Avg Dia/W 0.03/0.04 in									
13.4	196.8	562	14.56	1.0	5.2	0.25	8.7	142	0.06
Bridge Stage 0 at 13 min, at 177.2 (ft), Avg Dia/W 0.03/0.03 in									
14.8	200.3	595	14.56	1.0	6.1	0.28	8.0	142	0.08
Bridge Stage 0 at 15 min, at 184.6 (ft), Avg Dia/W 0.03/0.03 in									
Screen Out in Stage 5 at Time = 14.8 min at 192 (ft)									
16.3	200.3	706	15.08	2.9	7.0	0.32	6.7	142	0.10
17.7	200.3	839	15.12	4.0	7.9	0.35	6.0	142	0.13
19.2	200.3	999	15.68	5.1	8.9	0.38	5.6	142	0.16
20.6	200.3	1174	15.90	7.0	9.8	0.41	5.2	142	0.19
22.1	200.3	1359	16.01	8.0	10.8	0.43	4.9	142	0.23
24.0	200.3	1250	0.00	0.0	10.8	0.40	4.7	142	0.21
26.0	200.3	1142	0.00	0.0	10.8	0.37	4.4	142	0.19
28.3	200.3	1033	0.00	0.0	10.8	0.33	4.1	142	0.18
30.7	200.3	924	0.00	0.0	10.8	0.30	3.9	142	0.16
32.0	200.3	870	0.00	0.0	10.8	0.28	3.7	142	0.15
33.3	200.3	815	0.00	0.0	10.8	0.26	3.6	142	0.14
34.6	200.3	761	0.00	0.0	10.8	0.24	3.5	142	0.13
36.0	200.3	707	0.00	0.0	10.8	0.23	3.5	142	0.12
37.4	200.3	652	0.00	0.0	10.8	0.21	3.4	142	0.11
39.0	200.3	598	0.00	0.0	10.8	0.19	3.3	142	0.11
40.6	200.3	544	0.00	0.0	10.8	0.19	3.2	142	0.10
42.2	200.3	489	0.00	0.0	10.8	0.18	3.1	142	0.10
44.4	200.3	435	0.00	0.0	10.8	0.17	3.0	142	0.10

GEOMETRY SUMMARY * At End of Pumping Schedule
SANTOS - E. MEREENIE 34 (L-P3) POST-FRAC EVALUATION

Dstnce (ft)	Press (psi)	W-Avg (in)	Q (_BPM)	Sh-Rate (1/sec)	Hght (ft) Total	Hght (ft) Up	Hght (ft) Dn	Prop	Bank Fraction	Prop (PSF)
7	1358	0.26	7.9	28	142	49	39	125	0.00	1.11
16	1355	0.25	7.0	27	137	46	38	122	0.00	1.09
20	1354	0.25	6.8	30	128	44	31	114	0.00	1.07
23	1353	0.24	6.6	32	121	43	25	108	0.00	1.09
27	1352	0.24	6.4	32	118	41	25	105	0.00	1.04
30	1350	0.24	6.3	32	115	38	24	101	0.00	0.99
34	1349	0.24	6.1	32	112	35	24	98	0.00	1.00
37	1348	0.24	5.9	32	109	32	24	95	0.00	1.00
41	1346	0.24	5.7	33	106	29	23	91	0.00	1.00
44	1345	0.24	5.6	33	102	26	23	88	0.00	1.01
48	1344	0.24	5.4	34	99	23	23	84	0.00	1.04
51	1342	0.24	5.3	33	96	22	21	82	0.00	1.05
55	1341	0.24	5.1	33	93	20	20	79	0.00	0.98
58	1340	0.24	4.9	33	90	19	18	77	0.00	0.98
62	1339	0.24	4.8	33	87	17	17	74	0.00	0.99
65	1337	0.24	4.7	33	84	16	15	71	0.00	0.97
69	1336	0.24	4.5	33	80	14	13	69	0.00	0.88
72	1335	0.24	4.4	33	79	14	13	68	0.00	0.88
76	1334	0.24	4.2	32	79	13	12	67	0.00	0.88
79	1333	0.24	4.1	31	78	12	12	67	0.00	0.91
83	1331	0.24	3.9	31	77	12	12	66	0.00	0.94
87	1330	0.24	3.8	30	76	11	11	65	0.00	0.93
90	1329	0.24	3.7	30	75	11	11	65	0.00	0.93
94	1328	0.24	3.5	29	74	10	11	64	0.00	0.79
97	1327	0.24	3.4	28	73	9	10	63	0.00	0.78
101	1325	0.24	3.3	28	72	9	10	63	0.00	0.78
104	1324	0.24	3.1	27	71	8	10	62	0.00	0.78
108	1323	0.24	3.0	27	70	7	9	61	0.00	0.77
111	1322	0.24	2.9	26	68	7	9	61	0.00	0.80
115	1321	0.24	2.7	25	67	6	9	60	0.00	0.85
118	1320	0.24	2.6	25	66	5	8	59	0.00	0.85
122	1318	0.23	2.5	24	65	4	8	58	0.00	0.70
125	1317	0.23	2.3	23	64	3	7	58	0.00	0.68
129	1316	0.23	2.2	23	62	3	7	57	0.00	0.67
132	1315	0.23	2.1	22	61	2	6	56	0.00	0.67
136	1314	0.23	2.0	21	60	1	6	55	0.00	0.66
139	1313	0.23	1.9	20	59	0	6	55	0.00	0.66
143	1312	0.23	1.7	19	59	0	5	54	0.00	0.72
146	1311	0.23	1.6	18	58	0	5	54	0.00	0.74
150	1310	0.23	1.5	17	58	0	5	54	0.00	0.57
153	1309	0.23	1.4	15	58	0	4	54	0.00	0.62
157	1308	0.23	1.3	14	57	0	4	54	0.00	0.62
160	1307	0.23	1.1	13	57	0	4	54	0.00	0.62
164	1306	0.23	1.0	12	56	0	3	54	0.00	0.62
167	1305	0.23	0.9	10	56	0	3	54	0.00	0.38
171	1305	0.23	0.8	9	56	0	3	54	0.00	0.42
174	1304	0.23	0.6	8	55	0	2	54	0.00	0.44
178	1303	0.23	0.5	6	53	0	0	53	0.00	0.46
181	1303	0.23	0.4	5	53	0	0	53	0.00	0.60
185	1302	0.21	0.3	5	49	0	0	49	0.00	0.59
188	1300	0.19	0.2	4	43	0	0	43	0.01	0.49
192	1299	0.14	0.1	6	31	0	0	31	0.63	1.14
195	151	0.03	0.0	897	21	0	0	21	1.00	0.25

FLUID SUMMARY * At End of Pumping Schedule
SANTOS - E. MEREENIE 34 (L-P3) POST-FRAC EVALUATION

Stage No	Gone	Fluid ID	Prop ID	Pos (ft)	Concentration In	Now	Desgn	Fl Vol (MGal)	Ex Tim (min)	Temp (deg_F)	Visc (cp)	Fall Frac
1	1	3	1	200	0.0	0.0	0.0	0.1	0.8	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.2	0.7	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.2	0.7	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.2	0.8	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.3	0.6	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.3	0.6	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.3	0.6	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.4	0.7	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.5	0.8	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.5	0.8	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.6	0.9	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.7	0.9	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.8	0.9	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.9	1.0	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	0.9	1.0	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	1.0	1.4	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	1.1	1.0	145	1	0.00
1	1	3	1	200	0.0	0.0	0.0	1.2	0.6	145	1	0.00
2	1	3	1	200	0.0	0.0	0.0	1.3	0.6	145	1	0.00
2	1	3	1	200	0.0	0.0	0.0	1.4	0.4	145	1	0.00
3	1	3	1	200	0.0	0.0	0.0	1.4	0.6	145	1	0.00
3	1	3	1	200	0.0	0.0	0.0	1.4	0.8	145	1	0.00
3	1	3	1	200	0.0	0.0	0.0	1.4	0.8	145	1	0.00
3	1	3	1	200	0.0	0.0	0.0	1.5	1.0	145	1	0.00
3	1	3	1	200	0.0	0.0	0.0	1.5	1.0	145	1	0.00
3	1	3	1	200	0.0	0.0	0.0	1.5	1.0	145	1	0.00
3	1	3	1	200	0.0	0.0	0.0	1.5	1.1	145	1	0.00
3	1	3	1	200	0.0	0.0	0.0	1.6	1.0	145	1	0.00
4	1	2	1	200	0.0	0.0	0.0	1.6	1.0	145	3	0.00
4	1	2	1	200	0.0	0.0	0.0	1.7	1.3	145	2	0.00
4	1	2	1	200	0.0	0.0	0.0	1.9	1.3	145	3	0.00
4	1	2	1	200	0.0	0.0	0.0	2.1	1.4	145	3	0.00
4	1	2	1	200	0.0	0.0	0.0	2.2	1.5	145	3	0.00
4	1	2	1	200	0.0	0.0	0.0	2.3	1.4	145	3	0.00
4	1	2	1	200	0.0	0.0	0.0	2.5	1.5	145	4	0.00
4	1	2	1	200	0.0	0.0	0.0	2.5	1.7	145	5	0.00
4	1	2	1	200	0.0	0.0	0.0	2.6	2.1	145	5	0.00
4	1	2	1	200	0.0	0.0	0.0	2.6	2.0	145	5	0.00
4	1	2	1	200	0.0	0.0	0.0	2.6	2.0	145	5	0.00
4	1	2	1	200	0.0	0.0	0.0	2.7	2.0	145	5	0.00
4	1	2	1	200	0.0	0.0	0.0	2.8	2.5	145	5	0.00
4	1	2	1	200	0.0	0.0	0.0	2.8	2.3	145	5	0.00
4	1	2	1	200	0.0	0.0	0.0	2.9	2.2	145	5	0.00
4	1	2	1	200	0.0	0.0	0.0	3.0	2.8	145	5	0.00
4	1	2	1	200	0.0	0.0	0.0	3.1	2.6	145	6	0.00
4	1	2	1	200	0.0	0.0	0.0	3.2	3.6	145	6	0.00
5	1	1	1	200	0.5	45.3	0.0	3.3	3.3	145	25	0.00
5	1	1	1	200	0.5	45.3	0.0	3.4	3.0	145	41	0.00
5	1	1	1	193	0.5	45.3	0.0	3.5	4.0	145	160	0.00
5	1	1	1	193	0.5	45.3	0.0	3.7	6.9	145	434	0.00
5	0	1	1	191	0.5	17.8	0.3	3.9	9.2	145	787	0.00
5	0	1	1	188	0.5	4.4	0.8	4.2	8.4	145	907	0.01
5	0	1	1	186	0.5	3.4	1.0	4.2	8.4	145	878	0.01
6	0	1	1	186	1.0	7.7	1.0	4.2	8.4	145	878	0.01
6	0	1	1	183	1.0	5.5	1.4	4.5	7.3	145	856	0.01
6	0	1	1	179	1.0	4.4	1.6	4.6	7.3	145	773	0.01
6	0	1	1	174	1.0	3.5	2.1	5.0	7.3	145	654	0.01
6	0	1	1	169	1.0	3.0	2.4	5.1	5.8	145	573	0.01
6	0	1	1	166	1.0	2.6	2.7	5.2	5.8	145	551	0.01
7	0	1	1	159	2.0	5.0	3.0	5.6	5.8	145	470	0.01
7	0	1	1	149	2.0	4.4	3.4	5.7	5.8	145	412	0.01
8	0	1	1	145	2.9	6.4	3.5	5.9	4.4	145	393	0.01
8	0	1	1	131	2.9	5.2	4.3	6.4	2.9	145	356	0.01
9	0	1	1	116	4.0	6.7	4.7	6.6	2.9	145	329	0.00
9	0	1	1	102	4.0	5.8	5.4	7.1	1.5	145	313	0.00
10	0	1	1	86	5.1	7.1	5.7	7.4	1.5	145	295	0.00
10	0	1	1	73	5.1	6.4	6.3	7.7	0.0	145	286	0.00
11	0	1	1	59	6.1	7.5	6.5	8.0	0.0	145	282	0.00
12	0	1	1	50	7.0	8.5	6.6	8.1	0.0	124	296	0.00
12	0	1	1	37	7.0	7.8	7.1	8.7	0.0	84	333	0.00
13	0	1	1	24	8.0	8.9	7.2	8.9	0.0	79	342	0.00
13	0	1	1	11	8.0	8.4	7.7	9.6	0.0	74	371	0.00

PROPPANT SUMMARY * At End of Pumping Schedule
SANTOS - E. MEREENIE 34 (L-P3) POST-FRAC EVALUATION

Lb/Sq-Ft Lost to Embedment 0.200

Distance (ft)	KfW (md-ft)	Prop Concentration(Total lb/sq foot) Prop ID--> 1
7.2	2114	1.11
16.2	2076	1.09
19.7	2048	1.08
23.2	2028	1.07
26.7	1954	1.04
30.2	1874	1.00
33.7	1854	1.00
37.2	1863	1.00
40.7	1874	1.00
44.2	1901	1.02
47.7	1947	1.04
51.2	1936	1.03
54.7	1856	1.00
58.2	1821	0.98
61.7	1819	0.98
65.2	1749	0.95
68.7	1637	0.90
72.2	1583	0.88
75.7	1596	0.89
79.4	1647	0.91
83.0	1699	0.93
86.5	1712	0.93
90.0	1623	0.90
93.5	1453	0.82
97.0	1361	0.78
100.5	1351	0.78
104.0	1342	0.78
107.5	1353	0.78
111.0	1416	0.81
114.5	1486	0.84
118.0	1419	0.81
121.5	1230	0.73
125.0	1117	0.68
128.5	1098	0.67
132.0	1088	0.67
135.5	1079	0.66
139.0	1106	0.67
142.5	1186	0.71
146.0	1150	0.69
149.5	991	0.63
153.0	949	0.61
156.5	981	0.62
160.0	979	0.62
163.5	837	0.56
167.0	584	0.45
170.5	502	0.42
174.0	559	0.44
177.5	673	0.49
181.0	842	0.56
184.5	860	0.57
188.0	1117	0.68
191.5	1295	0.76
195.0	608	0.44
198.5	36	0.16

Average Conductivity (md-ft) 1417

PROPPANT SUMMARY * At Fracture Closure
SANTOS - E. MEREENIE 34 (L-P3) POST-FRAC EVALUATION

Lb/Sq-Ft Lost to Embedment 0.200

Distance (ft)	KfW (md-ft)	Prop Concentration(Total lb/sq foot) Prop ID--> 1
7.2	1186	0.70
16.2	1167	0.69
19.7	1142	0.68
23.2	1129	0.68
26.7	1130	0.68
30.2	1135	0.68
33.7	1204	0.71
37.2	1361	0.77
40.7	1493	0.83
44.2	1564	0.86
47.7	1616	0.88
51.2	1644	0.89
54.7	1660	0.90
58.2	1677	0.91
61.7	1696	0.91
65.2	1717	0.92
68.7	1764	0.94
72.2	1962	1.03
75.7	2144	1.10
79.4	2044	1.06
83.0	1913	1.01
86.5	1899	1.00
90.0	1887	0.99
93.5	1850	0.98
97.0	1799	0.96
100.5	1772	0.95
104.0	1787	0.95
107.5	1885	0.99
111.0	2016	1.05
114.5	2063	1.07
118.0	2013	1.05
121.5	1920	1.01
125.0	1862	0.98
128.5	1847	0.98
132.0	1845	0.98
135.5	1936	1.02
139.0	2103	1.09
142.5	2120	1.09
146.0	1994	1.04
149.5	1920	1.01
153.0	1895	1.00
156.5	1979	1.03
160.0	2032	1.06
163.5	1844	0.98
167.0	1711	0.92
170.5	1673	0.90
174.0	1444	0.81
177.5	1184	0.70
181.0	1324	0.76
184.5	1704	0.92
188.0	2035	1.06
191.5	1767	0.94
195.0	696	0.48
198.5	37	0.16

Average Conductivity (md-ft) 1644

APPENDIX B

Service Co. Treatment Job Log

Customer: Santos Ltd
Well Desc: East Mereenie 34
Formation: Pacoota P3

Date: 23-Jun-1996
Ticket #: EM34FRAC.1
Job Type: Boragel H3595

DATA LISTING

TABLE B-1

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slurry Rt (bpm)	Slry Vol (gal)	Slurry Den (lb/gal)	Sand Conc (lb/gal)	Sand Vol (lb)
15:00:00	184	293	0.40	28	8.15	0.00	0.0
15:00:05	184	293	0.03	29	8.14	0.00	0.0
15:00:10	183	295	0.00	29	8.12	0.00	0.0
15:00:15	184	296	0.00	29	8.14	0.00	0.0
15:00:18 Event #11 Zero Flow Total							
15:00:20	184	295	0.00	0	8.11	0.00	0.0
15:00:25	184	297	0.00	0	8.20	0.00	0.0
15:00:30	117	296	5.93	8	8.10	0.00	0.0
15:00:35	37	295	4.02	31	7.87	0.00	0.0
15:00:40	59	298	0.04	35	8.15	0.00	0.0
15:00:45	113	297	0.01	35	8.08	0.00	0.0
15:00:50	139	296	0.00	35	8.13	0.00	0.0
==== Stage Total 2144.91 (gal) ====							
15:00:55 Stage #2 FILL HOLE PAD 1150g							
15:00:55	152	297	0.00	35	8.13	0.00	0.0
15:01:00	155	297	0.02	35	8.21	0.00	0.0
15:01:05	154	300	0.23	36	8.16	0.00	0.0
15:01:10	153	302	0.21	36	8.16	0.00	0.0
15:01:15	152	301	0.08	37	8.03	0.00	0.0
15:01:20	171	302	0.53	38	8.15	0.00	0.0
15:01:25	1039	308	1.01	40	8.14	0.00	0.0
15:01:30	2187	319	1.78	46	8.18	0.00	0.0
15:01:35	2124	327	2.40	54	8.19	0.00	0.0
15:01:40	1967	322	4.32	66	8.18	0.00	0.0
15:01:45	1922	310	4.84	82	8.17	0.00	0.0
15:01:50	1722	301	4.97	99	8.18	0.00	0.0
15:01:55	1731	297	4.51	116	8.21	0.00	0.0
15:02:00	1722	295	4.15	131	8.19	0.00	0.0
15:02:05	1706	292	4.17	146	8.21	0.00	0.0
15:02:10	1721	298	4.30	161	8.19	0.00	0.0
15:02:15	1734	302	4.34	176	8.17	0.00	0.0
15:02:20	1759	297	4.47	191	8.21	0.00	0.0
15:02:25	1813	300	4.82	207	8.26	0.00	0.0
15:02:30	1836	297	5.57	226	8.23	0.00	0.0
15:02:35	1824	287	5.78	246	8.40	0.11	1.3
15:02:40	1824	290	5.27	265	8.43	0.15	3.9
15:02:45	1843	295	5.10	283	8.42	0.15	6.7
15:02:50	1859	296	5.10	301	8.37	0.06	8.1
15:02:55	1861	297	5.08	319	8.37	0.07	9.4
15:03:00	1862	295	5.08	337	8.38	0.07	11.1

Customer: Santos Ltd
Well Desc: East Mereenie 34
Formation: Pacoota P3

Date: 23-Jun-1996
Ticket #: EM34FRAC.1
Job Type: Boragel H3595

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slurry Rt (bpm)	Slry Vol (gal)	Slurry Den (lb/gal)	Sand Conc (lb/gal)	Sand Vol (lb)
15:03:05	1867	298	5.28	355	8.73	0.66	15.1
15:03:10	1873	296	5.64	374	8.36	0.05	15.9
15:03:15	1887	294	5.45	394	8.35	0.03	16.3
15:03:20	1885	292	5.07	412	8.31	0.00	16.4
15:03:25	1883	293	5.04	429	8.31	0.00	16.4
15:03:30	1891	297	5.03	447	8.35	0.04	17.1
15:03:35	1882	298	5.03	465	8.29	0.00	17.3
15:03:40	1884	297	5.02	482	8.37	0.07	17.6
15:03:45	1885	293	5.39	501	8.35	0.03	18.2
15:03:50	1877	292	5.56	520	8.33	0.01	18.3
15:03:55	1868	294	5.19	539	8.33	0.00	18.3
15:04:00	1861	292	5.02	556	8.31	0.00	18.3
15:04:05	1867	293	4.99	574	8.30	0.00	18.4
15:04:10	1865	293	4.98	591	8.23	0.00	18.4
15:04:15	1863	293	5.01	609	8.30	0.00	18.4
15:04:20	1850	294	4.99	626	8.30	0.00	18.4
15:04:25	1849	292	4.96	644	8.32	0.00	18.4
15:04:30	1867	289	4.98	661	8.29	0.00	18.4
15:04:35	1871	292	5.40	679	8.30	0.00	18.4
15:04:40	1873	292	5.73	699	8.34	0.01	18.5
15:04:45	1854	289	5.33	718	8.34	0.02	18.8
15:04:50	1844	291	4.96	736	8.31	0.00	18.9
15:04:55	1854	291	4.92	753	8.33	0.01	18.9
15:05:00	1850	290	4.92	771	8.32	0.00	19.0
15:05:05	1866	291	4.93	788	8.27	0.00	19.0
15:05:10	1892	290	4.93	805	8.32	0.00	19.0
15:05:15	1897	288	4.92	822	8.30	0.00	19.0
15:05:20	1905	290	4.92	840	8.29	0.00	19.0
15:05:25	1903	290	4.92	857	8.28	0.00	19.0
15:05:30	1901	289	5.35	875	8.30	0.00	19.0
15:05:35	1927	289	5.56	894	8.29	0.00	19.0
15:05:40	1924	289	5.13	913	8.34	0.01	19.1
15:05:45	1935	285	4.89	930	8.35	0.03	19.4
15:05:50	1957	287	4.89	947	8.33	0.00	19.5
15:05:55	1968	288	4.88	964	8.32	0.00	19.5
15:06:00	1981	286	4.87	981	8.30	0.00	19.5
15:06:05	1987	286	4.84	998	8.29	0.00	19.5
15:06:10	2001	287	5.17	1016	8.29	0.00	19.5
15:06:15	2004	290	5.20	1034	8.31	0.00	19.5
15:06:20	2006	291	4.79	1051	8.33	0.01	20.0
15:06:25	2019	289	4.69	1068	8.34	0.01	20.2
15:06:30	2039	291	4.66	1084	8.33	0.00	20.3
15:06:35	2055	291	4.64	1101	8.33	0.00	20.7
15:06:40	2077	286	4.64	1117	8.33	0.01	20.8
15:06:45	2096	287	5.06	1134	8.34	0.01	21.2
15:06:50	2090	291	5.13	1152	8.34	0.01	21.3
15:06:55	2109	294	4.70	1169	8.34	0.01	21.5
15:07:00	2145	294	4.62	1185	8.30	0.00	21.5
15:07:05	2163	292	4.59	1201	8.31	0.00	21.5
15:07:10	2168	291	4.59	1217	8.34	0.01	21.6

Customer: Santos Ltd
Well Desc: East Mereenie 34
Formation: Pacoota P3

Date: 23-Jun-1996
Ticket #: EM34FRAC.1
Job Type: Boragel H3595

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slurry Rt (bpm)	Slry Vol (gal)	Slurry Den (lb/gal)	Sand Conc (lb/gal)	Sand Vol (lb)
15:07:15	2180	292	4.60	1233	8.36	0.05	22.4
15:07:20	2203	295	4.63	1250	8.34	0.01	22.7
15:07:25	2219	296	4.61	1266	8.33	0.00	22.7
15:07:30	2247	296	4.57	1282	8.31	0.00	22.7
15:07:35	2278	296	4.60	1298	8.31	0.00	22.7
15:07:40	2290	299	4.60	1314	8.25	0.00	22.7
15:07:45	2310	300	4.99	1331	8.32	0.00	22.7
15:07:50	2334	294	5.53	1349	8.32	0.00	22.7
15:07:55	2370	294	5.23	1368	8.35	0.03	23.1
15:08:00	2410	299	4.68	1385	8.31	0.00	24.2
15:08:05	2437	299	4.56	1401	8.35	0.03	24.5
15:08:10	2470	297	4.52	1417	8.35	0.03	25.0
15:08:15	2487	296	4.48	1433	8.33	0.00	25.2

==== Stage Total 1401.21 (gal) ====

15:08:16 Stage #3 Start Pad

15:08:20	3518	300	8.26	1454	8.36	0.05	26.1
15:08:25	4193	305	13.28	1495	8.34	0.01	27.5
15:08:30	3781	304	14.05	1543	8.35	0.03	28.3
15:08:35	3772	299	14.95	1595	8.34	0.02	31.4
15:08:40	3752	297	14.84	1647	8.34	0.01	32.1
15:08:45	3568	296	14.19	1698	8.37	0.06	34.4
15:08:50	3599	297	13.86	1746	8.33	0.01	35.4
15:08:55	3676	298	13.79	1795	8.36	0.05	37.8
15:09:00	3758	297	13.93	1843	8.36	0.04	40.1
15:09:05	3833	301	14.08	1892	8.44	0.18	46.8
15:09:10	3925	299	14.73	1943	8.45	0.19	56.8
15:09:15	3994	298	15.20	1996	8.38	0.09	61.6
15:09:20	4063	290	14.95	2048	8.48	0.24	71.3

==== Stage Total 643.30 (gal) ====

15:09:24 Stage #4 START SAND @0.5PPG

15:09:25	3619	296	14.68	2100	8.50	0.27	85.1
15:09:30	4286	301	14.21	2150	8.57	0.39	102.3
15:09:35	4107	292	13.86	2199	8.60	0.43	122.5
15:09:40	3991	290	13.85	2248	8.60	0.43	142.9
15:09:45	3998	291	13.81	2296	8.60	0.44	163.9
15:09:50	3863	297	13.83	2345	8.62	0.46	185.7
15:09:55	3943	301	13.85	2393	8.77	0.72	211.6
15:10:00	3939	304	13.86	2442	8.75	0.68	244.8
15:10:05	3963	303	14.23	2491	8.70	0.60	275.4
15:10:10	3789	293	14.79	2542	8.70	0.61	305.4

Customer: Santos Ltd
Well Desc: East Mereenie 34
Formation: Pacoota P3

Date: 23-Jun-1996
Ticket #: EM34FRAC.1
Job Type: Boragel H3595

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slurry Rt (bpm)	Slry Vol (gal)	Slurry Den (lb/gal)	Sand Conc (lb/gal)	Sand Vol (lb)
15:10:15	3849	295	14.76	2594	8.73	0.64	338.7
15:10:20	3867	311	14.22	2644	8.70	0.60	369.4
15:10:25	3776	294	13.90	2693	8.71	0.61	398.1
15:10:30	3772	302	13.89	2742	8.69	0.59	426.4
15:10:35	3709	320	13.94	2791	8.71	0.62	455.2

==== Stage Total 730.64 (gal) ====

15:10:37 Stage #5 INCREASE SAND 1.0PPG

15:10:40	3647	319	13.97	2839	8.68	0.57	483.2
15:10:45	3601	310	13.97	2888	8.66	0.54	508.8
15:10:50	3901	303	13.96	2937	8.72	0.63	537.1
15:10:55	3228	316	13.94	2986	8.70	0.59	564.6
15:11:00	3208	307	13.94	3035	8.78	0.74	598.6
15:11:05	3660	310	13.96	3084	8.76	0.69	633.2
15:11:10	3782	308	14.33	3133	8.77	0.72	666.5
15:11:15	3256	314	14.57	3184	8.77	0.72	700.9
15:11:20	4009	318	14.21	3234	8.79	0.75	736.8
15:11:25	3629	304	13.97	3283	8.88	0.90	778.7
15:11:30	3558	321	13.94	3332	8.86	0.88	820.9
15:11:35	3578	325	13.85	3381	8.85	0.86	861.6
15:11:40	3659	321	13.97	3429	8.91	0.96	904.2
15:11:45	3696	320	14.31	3479	8.93	0.99	951.3
15:11:50	3759	317	14.43	3529	8.93	0.99	998.1

==== Stage Total 739.49 (gal) ====

15:11:52 Stage #6 INCREASE SAND 1.0PPG

15:11:55	3714	323	14.43	3580	8.91	0.96	1045.1
15:12:00	3419	333	14.47	3630	8.91	0.95	1091.4
15:12:05	3666	335	14.41	3681	8.98	1.08	1142.5
15:12:10	3674	331	14.38	3731	9.00	1.11	1194.9
15:12:15	3318	328	14.40	3782	8.99	1.10	1248.5
15:12:20	3564	333	14.41	3832	8.97	1.05	1300.6
15:12:25	3690	338	14.44	3883	8.99	1.10	1352.6
15:12:30	3557	339	14.45	3933	9.07	1.23	1410.3
15:12:35	3769	334	14.98	3985	9.13	1.34	1473.2
15:12:40	3934	335	15.21	4038	9.19	1.45	1544.2
15:12:45	3734	339	14.70	4090	9.20	1.46	1615.2
15:12:50	3720	336	14.48	4141	9.26	1.58	1688.9
15:12:55	3745	356	14.44	4192	9.26	1.57	1764.4
15:13:00	3624	363	14.48	4242	9.30	1.65	1841.0
15:13:05	3583	350	14.50	4293	9.48	1.98	1928.3

Customer: Santos Ltd
Well Desc: East Mereenie 34
Formation: Pacoota P3

Date: 23-Jun-1996
Ticket #: EM34FRAC.1
Job Type: Boragel H3595

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slurry Rt (bpm)	Slry Vol (gal)	Slurry Den (lb/gal)	Sand Conc (lb/gal)	Sand Vol (lb)
==== Stage Total 783.90 (gal) ====							
15:13:09 Stage #7 INCREASE SAND 2.0PPG							
15:13:10	4134	339	14.49	4344	9.46	1.95	2019.6
15:13:15	3762	350	14.63	4395	9.44	1.91	2109.9
15:13:20	3757	350	14.81	4446	9.53	2.07	2205.2
15:13:25	4057	348	14.87	4498	9.50	2.02	2303.2
15:13:30	3473	352	14.88	4550	9.57	2.16	2402.2
15:13:35	3607	355	14.90	4603	9.60	2.20	2508.9
15:13:40	3674	364	14.91	4655	9.57	2.15	2612.4
15:13:45	3711	361	14.99	4707	9.60	2.20	2716.4
15:13:50	3778	350	15.11	4760	9.65	2.30	2825.6
15:13:55	3744	352	15.14	4813	9.76	2.51	2939.4
15:14:00	3697	358	15.11	4866	9.80	2.59	3061.9
15:14:05	3690	354	14.97	4918	9.83	2.65	3185.1
15:14:10	3780	358	14.85	4970	9.84	2.68	3310.1
15:14:15	3708	360	14.84	5022	9.91	2.81	3437.9
15:14:20	3703	363	14.87	5074	9.95	2.89	3570.6
15:14:25	3674	364	14.89	5127	9.97	2.94	3704.5
==== Stage Total 793.12 (gal) ====							
15:14:26 Stage #8 INCREASE SAND 4.0PPG							
15:14:30	3802	358	14.89	5179	9.94	2.87	3838.4
15:14:35	3621	362	14.87	5231	10.01	3.01	3974.0
15:14:40	3662	359	14.87	5283	10.03	3.04	4112.4
15:14:45	3168	359	14.89	5335	10.02	3.03	4251.9
15:14:50	3715	355	14.89	5387	10.10	3.19	4396.7
15:14:55	3693	351	14.89	5439	10.10	3.20	4542.1
15:15:00	3651	366	14.92	5491	10.18	3.37	4690.2
15:15:05	3652	362	14.90	5543	10.19	3.38	4843.1
15:15:10	3656	360	15.39	5596	10.24	3.48	5002.7
15:15:15	3657	360	15.50	5650	10.30	3.61	5168.9
15:15:20	3649	355	14.98	5704	10.32	3.65	5336.0
15:15:25	3625	353	14.87	5756	10.34	3.69	5501.9
15:15:30	3663	355	14.85	5808	10.38	3.79	5669.4
15:15:35	3654	365	14.84	5860	10.38	3.78	5838.1
15:15:40	3643	361	14.84	5912	10.39	3.81	6007.0
==== Stage Total 816.52 (gal) ====							

Customer: Santos Ltd
Well Desc: East Mereenie 34
Formation: Pacoota P3

Date: 23-Jun-1996
Ticket #: EM34FRAC.1
Job Type: Boragel H3595

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slurry Rt (bpm)	Slry Vol (gal)	Slurry Den (lb/gal)	Sand Conc (lb/gal)	Sand Vol (lb)
15:15:44 Stage #9 INCREASE SAND 4.0PPG							
15:15:45	3651	368	14.84	5964	10.47	3.97	6180.3
15:15:50	3656	366	14.89	6016	10.47	3.98	6355.7
15:15:55	3707	356	14.91	6068	10.60	4.26	6538.7
15:16:00	3655	358	14.90	6120	10.61	4.29	6726.3
15:16:05	3643	357	14.89	6172	10.63	4.34	6915.5
15:16:10	3664	355	14.90	6224	10.60	4.26	7104.6
15:16:15	3656	361	14.93	6277	10.60	4.27	7291.1
15:16:20	3655	361	15.30	6330	10.61	4.29	7481.3
15:16:25	3634	360	15.43	6383	10.66	4.39	7678.2
15:16:30	3725	364	15.36	6437	10.63	4.34	7875.0
15:16:35	3792	361	15.57	6491	10.76	4.64	8080.0
15:16:40	3730	361	15.59	6546	10.79	4.69	8292.0
15:16:45	3734	371	15.57	6601	10.96	5.10	8517.3
15:16:50	3756	368	15.60	6655	10.95	5.08	8744.7
15:16:55	3764	365	15.63	6710	10.92	5.00	8970.9
15:17:00	3746	367	15.66	6765	10.93	5.02	9196.8
==== Stage Total 843.45 (gal) ====							
15:17:03 Stage #10 INCREASE SAND 5.0PPG							
15:17:05	3724	370	15.67	6819	10.96	5.09	9425.9
15:17:10	3744	373	15.68	6874	10.96	5.10	9654.4
15:17:15	3724	369	15.68	6929	10.98	5.13	9883.0
15:17:20	3722	366	15.68	6984	11.02	5.24	10115.6
15:17:25	3722	368	16.13	7040	10.99	5.18	10353.4
15:17:30	3699	371	16.26	7097	11.02	5.24	10596.3
15:17:35	3709	367	15.81	7153	11.05	5.30	10837.2
15:17:40	3687	369	15.58	7207	11.09	5.41	11075.0
15:17:45	3653	372	15.33	7262	11.22	5.73	11314.3
15:17:50	3641	374	15.19	7315	11.27	5.86	11561.1
15:17:55	3657	377	15.18	7368	11.29	5.91	11809.2
15:18:00	3644	371	15.16	7421	11.41	6.21	12062.3
15:18:05	3637	370	15.15	7474	11.43	6.25	12323.4
15:18:10	3661	373	15.12	7527	11.42	6.22	12582.3
15:18:15	3631	373	15.11	7580	11.48	6.37	12844.0
15:18:20	3640	372	15.11	7633	11.50	6.44	13108.1
==== Stage Total 878.01 (gal) ====				7665			13272

Customer: Santos Ltd
Well Desc: East Mereenie 34
Formation: Pacoota P3

Date: 23-Jun-1996
Ticket #: EM34FRAC.1
Job Type: Boragel H3595

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slurry Rt (bpm)	Slry Vol (gal)	Slurry Den (lb/gal)	Sand Conc (lb/gal)	Sand Vol (lb)
15:18:23 Stage #11 INCREASE SAND 7.0PPG							
15:18:25	3665	381	15.10	7686	11.59	6.67	13380.9
15:18:30	3655	386	15.09	7739	11.61	6.72	13653.9
15:18:35	3758	387	15.49	7792	11.61	6.74	13931.0
15:18:40	3825	389	16.40	7848	11.66	6.85	14223.5
15:18:45	3779	387	16.73	7906	11.61	6.72	14528.1
15:18:50	3779	385	16.30	7964	11.61	6.72	14826.7
15:18:55	3789	372	15.99	8020	11.60	6.70	15118.4
15:19:00	3787	351	15.94	8076	11.68	6.93	15412.8
15:19:05	3794	339	15.96	8132	11.72	7.01	15712.2
15:19:10	3810	331	16.01	8188	11.79	7.20	16014.8
15:19:15	3816	324	16.04	8244	11.76	7.13	16319.3
15:19:20	3816	322	16.03	8300	11.79	7.22	16624.6
15:19:25	3824	318	16.03	8356	11.85	7.37	16934.8
15:19:30	3839	314	16.08	8413	11.84	7.36	17246.9
15:19:35	3841	313	16.09	8469	11.90	7.52	17563.7
15:19:40	3836	311	16.10	8525	11.82	7.30	17875.7
15:19:45	3829	310	16.05	8581	11.88	7.47	18191.4
==== Stage Total 916.93 (gal) ====				8592			18256
15:19:46 Stage #12 INCREASE SAND 8.0PPG							
15:19:50	3844	308	16.39	8638	11.96	7.70	18516.1
15:19:55	3866	305	16.86	8697	11.96	7.70	18852.5
15:20:00	3864	307	16.56	8755	12.00	7.80	19191.6
15:20:05	3861	306	16.15	8812	11.93	7.59	19518.8
15:20:10	3868	305	16.11	8869	11.89	7.50	19837.5
15:20:15	3882	307	16.10	8925	11.92	7.58	20157.0
15:20:20	3883	305	16.08	8981	11.96	7.69	20478.8
15:20:25	3881	305	16.08	9038	11.98	7.74	20802.0
15:20:30	3895	306	16.03	9094	12.03	7.88	21129.5
15:20:35	3905	304	16.00	9150	12.07	8.00	21459.2
15:20:40	3912	305	16.04	9206	12.16	8.28	21796.6
15:20:45	3910	307	16.05	9262	12.17	8.30	22137.7
15:20:50	3913	309	16.03	9318	12.25	8.54	22482.9
15:20:55	3919	309	16.00	9374	12.22	8.46	22828.6
15:21:00	3922	308	16.01	9430	12.21	8.42	23172.8
15:21:05	3930	309	16.23	9487	12.22	8.45	23519.7
15:21:10	3937	309	16.84	9545	12.30	8.70	23884.8
15:21:15	3946	308	16.84	9604	12.27	8.59	24255.8
15:21:20	3950	308	16.26	9662	12.22	8.43	24613.9
15:21:25	3955	310	16.09	9718	12.15	8.24	24955.8
15:21:30	3962	310	16.04	9774	12.03	7.90	25289.3
15:21:35	3976	310	16.05	9831	11.78	7.18	25603.1

Customer: Santos Ltd
Well Desc: East Mereenie 34
Formation: Pacoota P3

Date: 23-Jun-1996
Ticket #: EM34FRAC.1
Job Type: Boragel H3595

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slurry Rt (bpm)	Slry Vol (gal)	Slurry Den (lb/gal)	Sand Conc (lb/gal)	Sand Vol (lb)
15:21:40	3991	311	16.10	9887	11.61	6.72	25898.3
==== Stage Total 1316.55 (gal) ====				9898			25954
15:21:41 Stage #13 Start Flush							
15:21:45	4000	312	16.12	9943	11.39	6.06	26178.8
15:21:50	4012	312	16.20	10000	11.01	5.14	26423.4
15:21:55	4028	313	16.24	10056	10.63	4.26	26638.2
15:22:00	4043	312	16.24	10113	10.33	3.61	26824.5
15:22:05	4058	314	16.30	10170	10.01	2.93	26989.6
15:22:10	4071	314	16.32	10227	9.92	2.76	27133.0
15:22:15	4071	314	16.31	10285	9.71	2.33	27265.2
15:22:20	4051	315	16.33	10342	9.42	1.80	27369.0
15:22:25	4033	316	16.35	10399	9.25	1.48	27451.2
15:22:30	4017	314	16.33	10456	9.14	1.29	27522.2
15:22:35	3984	311	16.31	10513	8.90	0.88	27575.4
15:22:40	3974	312	16.31	10570	8.80	0.70	27616.2
15:22:45	3979	314	16.33	10627	8.68	0.50	27647.5
15:22:50	3981	316	16.36	10685	8.61	0.39	27668.3
15:22:55	3984	316	16.36	10742	8.59	0.35	27687.0
15:23:00	3979	313	16.34	10799	8.56	0.31	27706.5
15:23:05	3980	315	16.35	10856	8.56	0.30	27723.9
15:23:10	3985	316	16.37	10914	8.49	0.19	27737.9
15:23:15	3991	314	16.40	10971	8.47	0.16	27747.6
15:23:20	3995	319	16.41	11028	8.46	0.15	27754.7
==== Stage Total 1176.29 (gal) ====							
15:23:24 Stage #14 MONITOR P.DECLINE							
15:23:25	2467	316	9.53	11081	8.46	0.14	27762.1
15:23:30	2937	307	0.80	11087	8.41	0.07	27762.7
15:23:35	2498	306	0.38	11088	8.33	0.00	27762.7
15:23:40	2326	308	0.24	11089	8.31	0.00	27762.7
15:23:45	2363	315	0.24	11090	8.31	0.00	27762.7
15:23:50	2345	316	0.00	11090	8.29	0.00	27762.7
15:23:55	2334	314	0.00	11090	8.32	0.00	27762.7
15:24:00	2321	322	0.00	11090	8.35	0.00	27762.7
15:24:05	2308	322	0.00	11090	8.36	0.00	27762.7
15:24:10	2300	320	0.00	11090	8.35	0.00	27762.7
15:24:15	2291	325	0.00	11090	8.32	0.00	27762.7
15:24:20	2281	331	0.00	11090	8.30	0.00	27762.7
15:24:25	2273	329	0.00	11090	8.30	0.00	27762.7
15:24:30	2266	323	0.00	11090	8.28	0.00	27762.7
15:24:35	2260	327	0.00	11090	8.29	0.00	27762.7

Customer: Santos Ltd
Well Desc: East Mereenie 34
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Date: 23-Jun-1996
Ticket #: EM34FRAC.1
Job Type: Boragel H3595

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slurry Rt (bpm)	Slry Vol (gal)	Slurry Den (lb/gal)	Sand Conc (lb/gal)	Sand Vol (lb)
15:24:40	2251	331	0.00	11090	8.28	0.00	27762.7
15:24:45	2242	334	0.00	11090	8.29	0.00	27762.7
15:24:50	2233	341	0.00	11090	8.34	0.00	27762.7
15:24:55	2226	347	0.00	11090	8.29	0.00	27762.7
15:25:00	2219	345	0.00	11090	8.33	0.00	27762.7
15:25:05	2212	338	0.00	11090	8.32	0.00	27762.7
15:25:10	2204	333	0.00	11090	8.32	0.00	27762.7
15:25:15	2197	332	0.00	11090	8.30	0.00	27762.7
15:25:20	2190	333	0.00	11090	8.34	0.00	27762.7
15:25:25	2182	333	0.00	11090	8.33	0.00	27762.7
15:25:30	2174	333	0.00	11090	8.28	0.00	27762.7
15:25:35	2166	334	0.00	11090	8.30	0.00	27762.7
15:25:40	2158	334	0.00	11090	8.29	0.00	27762.7
15:25:45	2149	334	0.00	11090	8.29	0.00	27762.7
15:25:50	2141	336	0.00	11090	8.30	0.00	27762.7
15:25:55	2133	337	0.00	11090	8.33	0.00	27762.7
15:26:00	2125	339	0.00	11090	8.32	0.00	27762.7
15:26:05	2116	341	0.00	11090	8.33	0.00	27762.7
15:26:10	2108	342	0.00	11090	8.33	0.00	27762.7
15:26:15	2100	341	0.00	11090	8.37	0.00	27762.7
15:26:20	2092	340	0.00	11090	8.33	0.00	27762.7
15:26:25	2085	338	0.00	11090	8.34	0.00	27762.7
15:26:30	2077	338	0.00	11090	8.33	0.00	27762.7
15:26:35	2069	339	0.00	11090	8.32	0.00	27762.7
15:26:40	2061	340	0.00	11090	8.30	0.00	27762.7
15:26:45	2053	342	0.00	11090	8.26	0.00	27762.7
15:26:50	2044	345	0.00	11090	8.28	0.00	27762.7
15:26:55	2034	348	0.00	11090	8.29	0.00	27762.7
15:27:00	2023	347	0.00	11090	8.29	0.00	27762.7
15:27:05	2012	346	0.00	11090	8.31	0.00	27762.7
15:27:10	2001	344	0.00	11090	8.30	0.00	27762.7
15:27:15	1989	313	0.00	11090	8.39	0.03	27762.7
15:27:20	1976	249	0.00	11090	8.32	0.00	27762.7
15:27:25	1964	182	0.00	11090	8.31	0.00	27762.7
15:27:30	1955	131	0.00	11090	8.30	0.00	27762.7
15:27:35	1946	95	0.00	11090	8.34	0.00	27762.7
15:27:40	1938	68	0.00	11090	8.27	0.00	27762.7
15:27:45	1930	48	0.00	11090	8.29	0.00	27762.7
15:27:50	1921	32	0.00	11090	8.30	0.00	27762.7
15:27:55	1913	21	0.00	11090	8.35	0.00	27762.7
15:28:00	1904	15	0.00	11090	8.33	0.00	27762.7
15:28:05	1895	12	0.00	11090	8.35	0.00	27762.7
15:28:10	1886	12	0.00	11090	8.31	0.00	27762.7
15:28:15	1877	11	0.00	11090	8.36	0.00	27762.7
15:28:20	1868	11	0.00	11090	8.35	0.00	27762.7
15:28:25	1859	11	0.00	11090	8.35	0.00	27762.7
15:28:30	1849	12	0.00	11090	8.28	0.00	27762.7
15:28:35	1839	13	0.00	11090	8.26	0.00	27762.7
15:28:40	1830	13	0.00	11090	8.27	0.00	27762.7
15:28:45	1820	14	0.00	11090	8.26	0.00	27762.7