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SANTOS LIMITED

E. MEREENIE WELL NO. 38
P3-230/250 TSO FRAC TREATMENT

17 JANUARY 1996

E. MEREENIE WELL NO. 38
P3-230/250 TSO FRACTURE TREATMENT

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17 January 1996

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SUMMARY

On 31 October 1995, a tip-screenout (TSO) fracture treatment was performed on Santos' East Mereenie Well No. 38 through "P3-190" and "P3-23/250" perforations at 4964-5018 ft. From a pre-frac PBU test, reservoir parameters were a kh of 298 md-ft, an average permeability of 10.1 md, a skin of +32, and a reservoir pressure of 1735 psi (minimal depletion). The wellbore deviation through the pay was 16.5^{o}

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 3350 psi and a fluid efficiency of 0.32 from pressure decline analysis. This gave an efficiency during injection, using the established Mereenie correlation of decline to injection efficiency, of 0.13. A reasonably good model history match of the minifrac was obtained using (1) stresses of 3900-4200 psi in the shalier region between the P3-190/230/250 and P3-120/130 alternative pay zone, (2) a modulus of 6.5x10^{6} psi in the pay and 7-8x10^{6} psi in the barriers, and (3) a leak-off coefficient of 0.008 ft/sq.rt. minute in the 190/230/250. This "calibrated" model was used to design the final treatment.

With the desire to limit fracture growth to below the P3-120/130, the final treatment design required 3250 gals of pad and an additional 3900 gals of gel carrying 14,800 lbs of 20/40 Carbo-Lite proppant at 0.5-8 ppg and at a rate of 15 bpm. The model-predicted TSO occurred in the 2 ppg stage and net BHTP went from 775 to 2575 psi with a corresponding average fracture width increase from 0.05 to 0.19 inches. Other fracture dimensions were a propped half-length of 84 ft, a maximum height of 105 ft (frac top 20 ft below the 120/130), an average conductivity of 2695 md-ft, and an average in-situ concentration of 1.2 lbs/sq.ft.

The treatment was pumped fairly close to design, placing 93% (13,735 lbs) of the designed proppant amount in the fracture with 101% (7187 gals) of the design gel volume. While a TSO did occur, the pressure gain was only about 400 psi. To model history match this behavior required a reduction in the design leak-off coefficient (pay) from 0.008 to 0.0052 ft/sq.rt. minute (similar reductions also required on EM #35 and

#36 to match treating pressures). Model-predicted dimensions were a propped half-length of 158 ft, a maximum height of 132 ft, an average conductivity of 1080 md-ft, and an average in-situ concentration of 0.6 lbs/sq.ft. The predicted fracture top was at 4768 ft or 13 ft below the P3-120/130. Based on this analysis, the treatment did not come very close to design predictions.

With injection leak-off repeatedly lower on the 230/250 treatments than predicted with the original P3-120/130 efficiency correlation, this was re-evaluated. The 230/250 does not seem to follow behavior consistent with the original (120/130) correlation, with leak-off appearing to be less pressure dependent than observed in the 120/130. A revised 230/250 correlation was derived and presented herein for use on future designs.

An estimate of initial post-frac production for the P3-190/230/250 in this well, using a single-phase production model and the reservoir and fracturing parameters acquired, is 300 bopd at a BHFP of 750 psi.

DISCUSSION

Introduction:

This report details the design, execution, and analysis of the tip-screenout (TSO) fracturing treatment performed in Santos' East Mereenie Well No. 38 on 31 October 1995. The treatment was pumped through Pacoota P3-190 and P3-230/250 perforations at 4964-5018 ft (MD), 4822-4874 ft (TVD), as shown in Fig. 1. From a pre-frac pressure buildup test (Fig. 2), reservoir parameters were estimated to be an average permeability of 10 md, a skin of +32, a reservoir pressure of 1735 psi (minimal depletion), and a BHT of 143^{o}F. Prior to the PBU test, this zone was making around 70-80 bopd (Fig. 3). The average porosity from log and core analysis was on the order of 8.1% in the P3-190 and 9.4% in the P3-230/250. The estimated GOR was 100 scf/stb and the wellbore deviation through the pay was 16.5^{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 SRO wireline gauges during testing and with electronic memory gauges set in the tailpipe during the treatment. The following discusses the details of this testing and treatment.

Preliminary Fracture Treatment Design:

The objective of the EM #38 treatment was to obtain as much propped penetration as possible with an in-situ proppant concentration of at least 1.0 lb/sq.ft. without fracturing into the P3-120/130 alternative pay zone at 4765 ft-TVD (57 ft above top P3-190 perf). At the indicated BHT, 30 ppt borate XL gel (Boragel H3595) was recommended and 20/40 mesh Carbo-Lite was used to insure good conductivity. The design injection rate was 15 bpm with plans to pump down 2-7/8 inch tubing. With reservoir parameters/quality very similar to those seen in EM #37, the final design from that well was used for preliminary design purposes here. Design parameters included a modulus of 6.5x10^{6} psi in the pay and 7.5-8x10^{6} psi in the boundary layers, a toughness of 3000 psi/sq.rt. inch in all layers, and a leak-off coefficient of 0.005 ft/sq.rt. minute. Closure

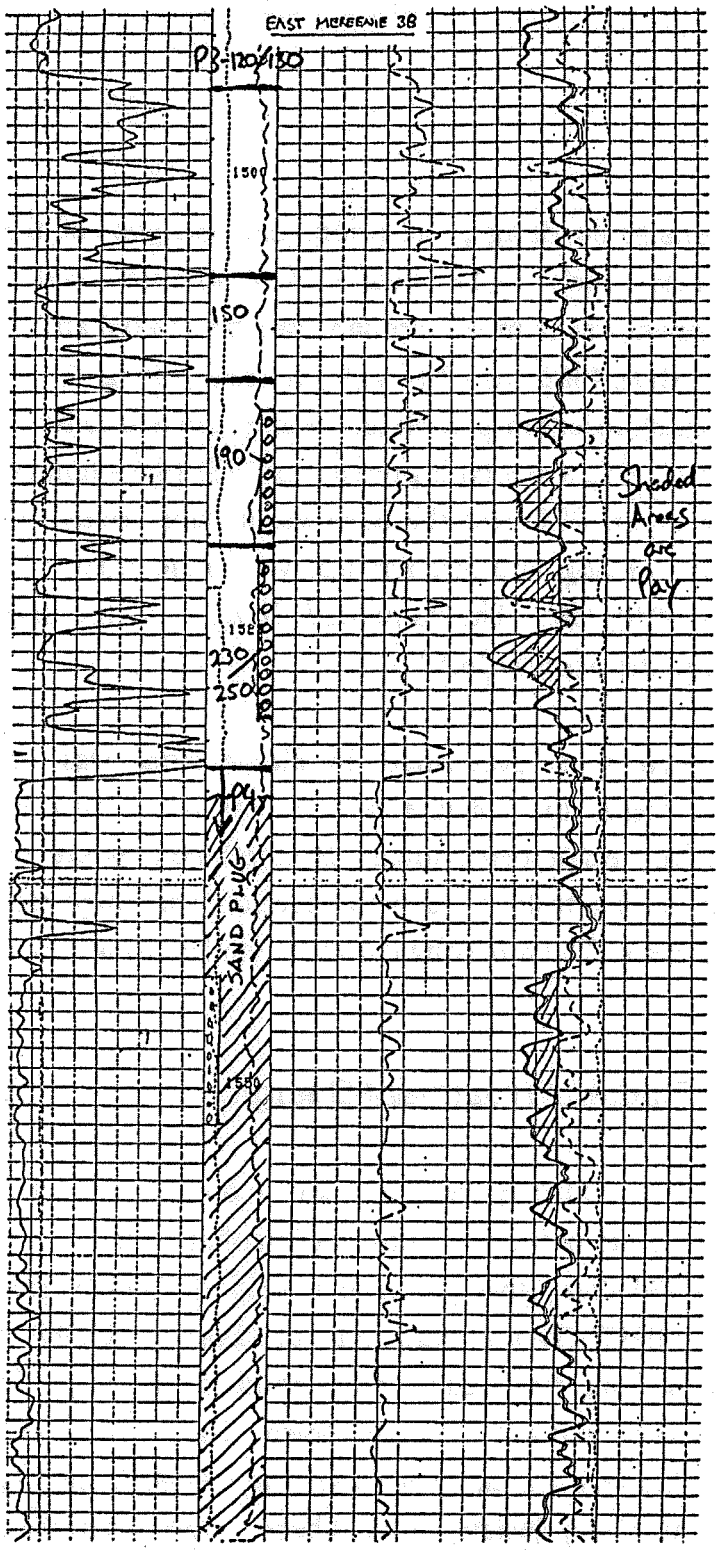


FIG. 1 - Log section thru pay intervals and boundaries, E. Mereenie 38 (P3-190/230/250).

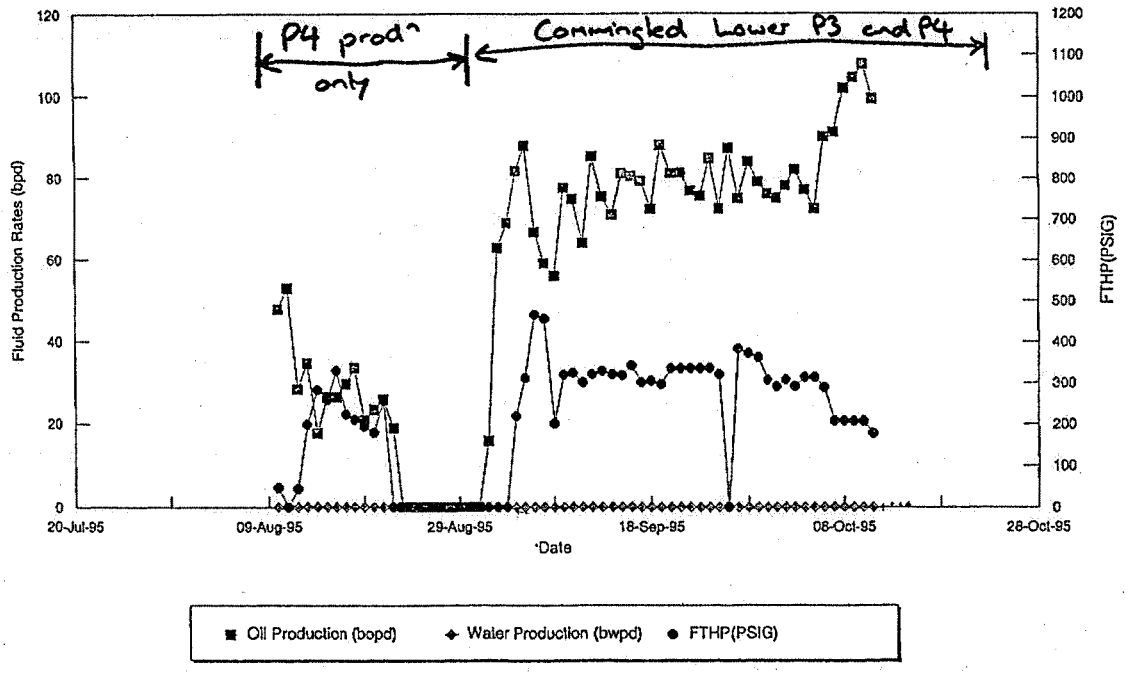


FIG. 2 - Pre-frac production history, E. Mereenie 38 (P3-190/230/250).

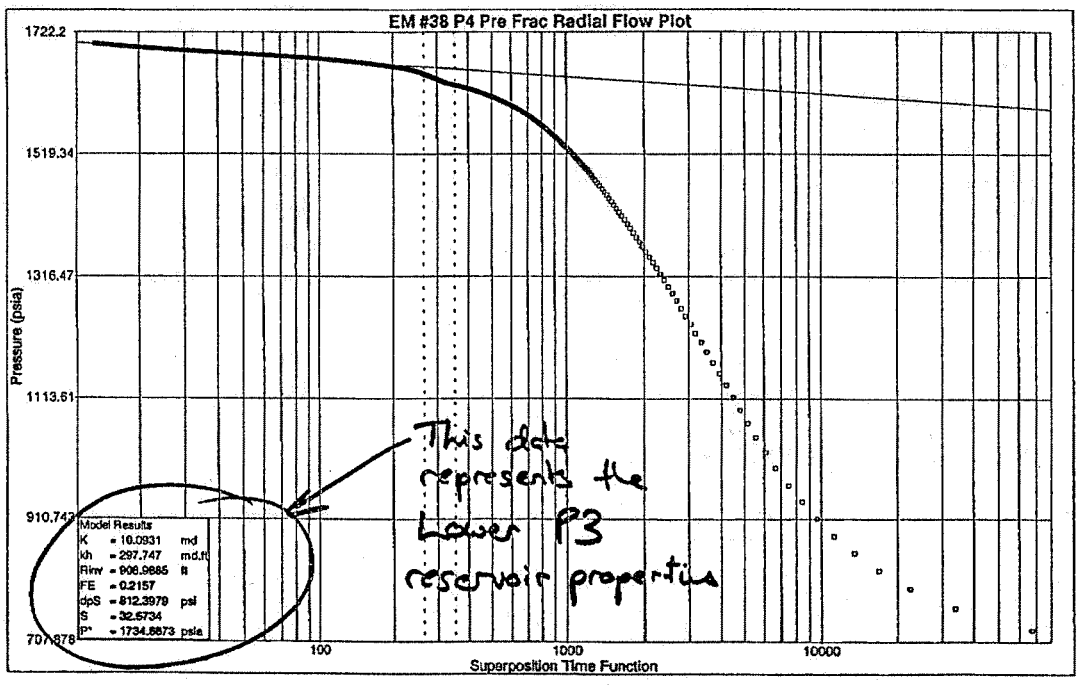


FIG. 3 - Pre-frac pressure buildup test results, E. Mereenie 38 (P3-190/230/250).

pressure was estimated to be on the order of 3300 psi in the pay and 4000-4500 psi in the boundaries.

Table 1 shows the preliminary design schedule. The pad size was limited to 2000 gals to prevent growth into the P3-120/130 and the resultant slurry stages included 2900 gals of gel carrying 14,800 lbs of proppant at concentrations of 0.5-8 ppg. The model-predicted TSO occurred in the 1.0 ppg stage, with net BHTP going from 940 to 2694 psi over the remainder of the treatment (Fig. 4). Model-predicted dimensions were a propped half-length of 115 ft, a maximum height of 123 ft (top at 4774 ft or 9 ft below the 120/130), an average conductivity of 1874 md-ft, and an average in-situ concentration of 1.0 lbs/sq.ft. These are shown in Figs. 5-7, with the model I/O included in Appendix Table A-1.

TABLE 1 - Treatment preliminary design schedule, E. Mereenie 38 (P3-190/230/250).

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	613	600	0.50	300	15.00	0.97
Boragel H3595	522	500	1.00	500	15.00	0.83
Boragel H3595	435	400	2.00	805	15.00	0.69
Boragel H3595	453	400	3.00	1200	15.00	0.72
Boragel H3595	470	400	4.00	1600	15.00	0.75
Boragel H3595	488	400	5.00	2000	15.00	0.77
Boragel H3595	506	400	6.00	2400	15.00	0.80
Boragel H3595	523	400	7.00	2800	15.00	0.83
Boragel H3595	541	400	8.00	3200	15.00	0.86
	6551	5900		14800		10.39

Note: Proppant 20/40 Carbo-Lite.

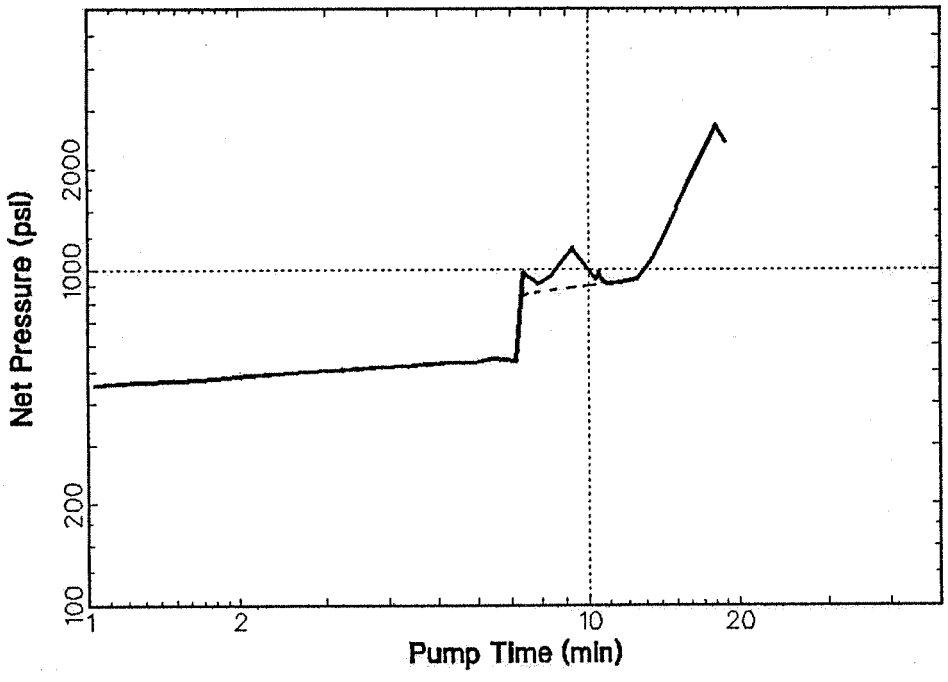


FIG. 4 - Preliminary treatment design predicted net BHTP, E. Mereenie 38 (P3-190/230/250).

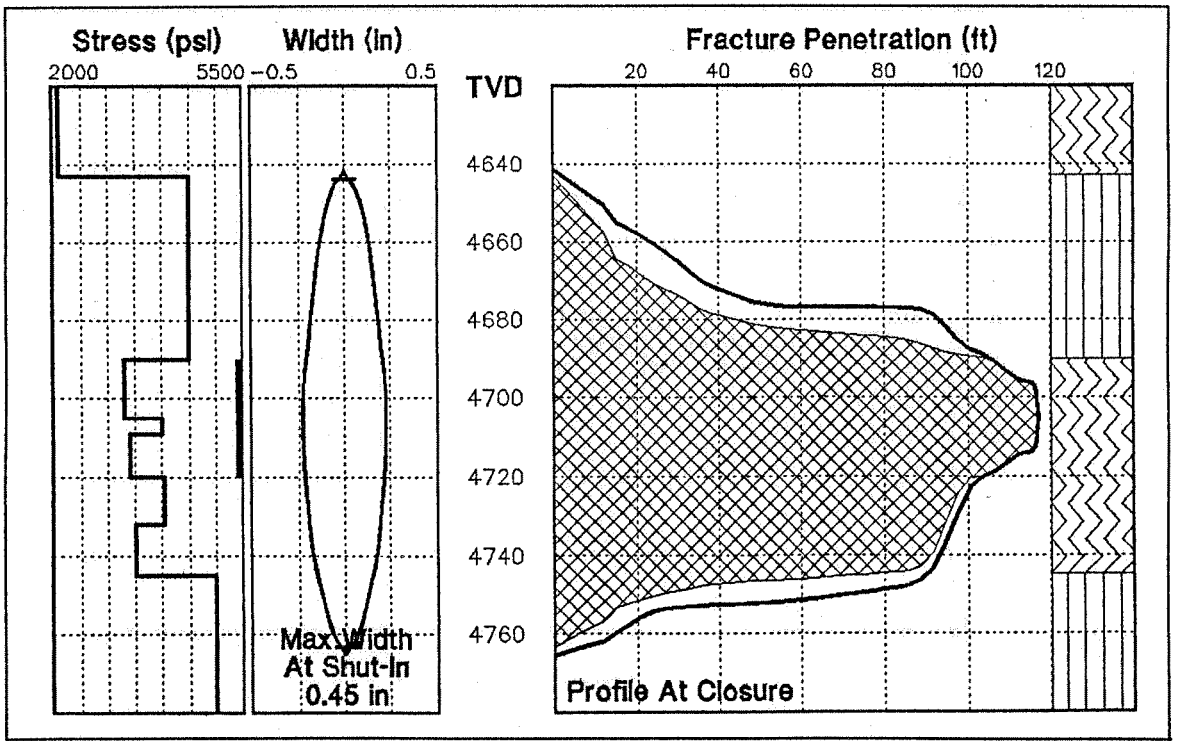


FIG. 5 - Preliminary treatment design predicted fracture geometry, E. Mereenie 38 (P3-190/230/250).

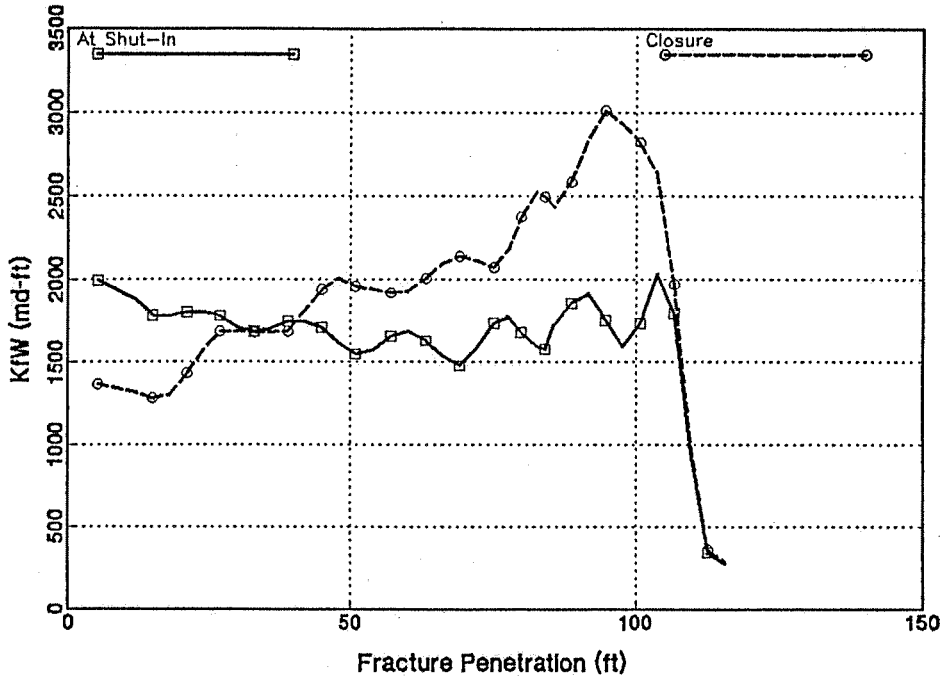


FIG. 6 - Preliminary treatment design predicted conductivity, E. Mereenie 38 (P3-190/230/250).

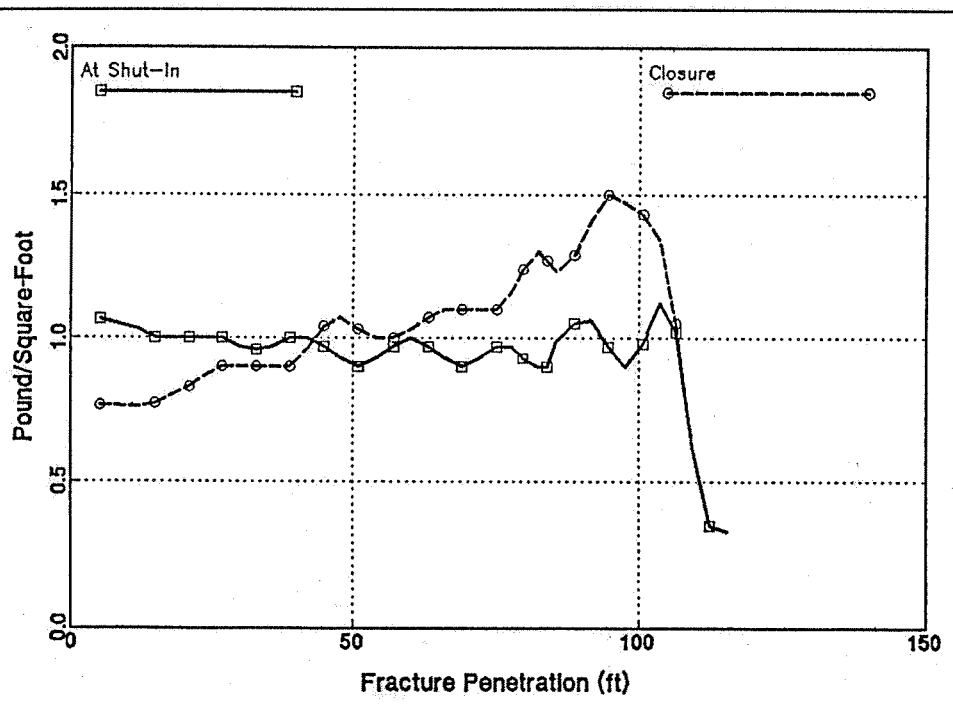


FIG. 7 - Preliminary treatment design predicted in-situ concentration, E. Mereenie 38 (P3-190/230/250).

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 1500 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. 8 shows the gauge BHP for the first PI/SI test. After an initial breakdown of 4840 psi, pressure dropped to about 4375 psi. At shut-down it was difficult to pick an ISIP as shown in Fig. 9. From the Horner plot of the pressure decline, Fig. 10, the pressure extrapolated to 1937 psi or 200 psi higher than expected and probably due to insufficient decline data to reach the correct psuedo-steady state straight line. The square-root of SI time plot, Fig. 11, indicated a closure pressure at 3360 psi and the G-function plot, Fig. 12, gave a closure pressure of 3339 psi.

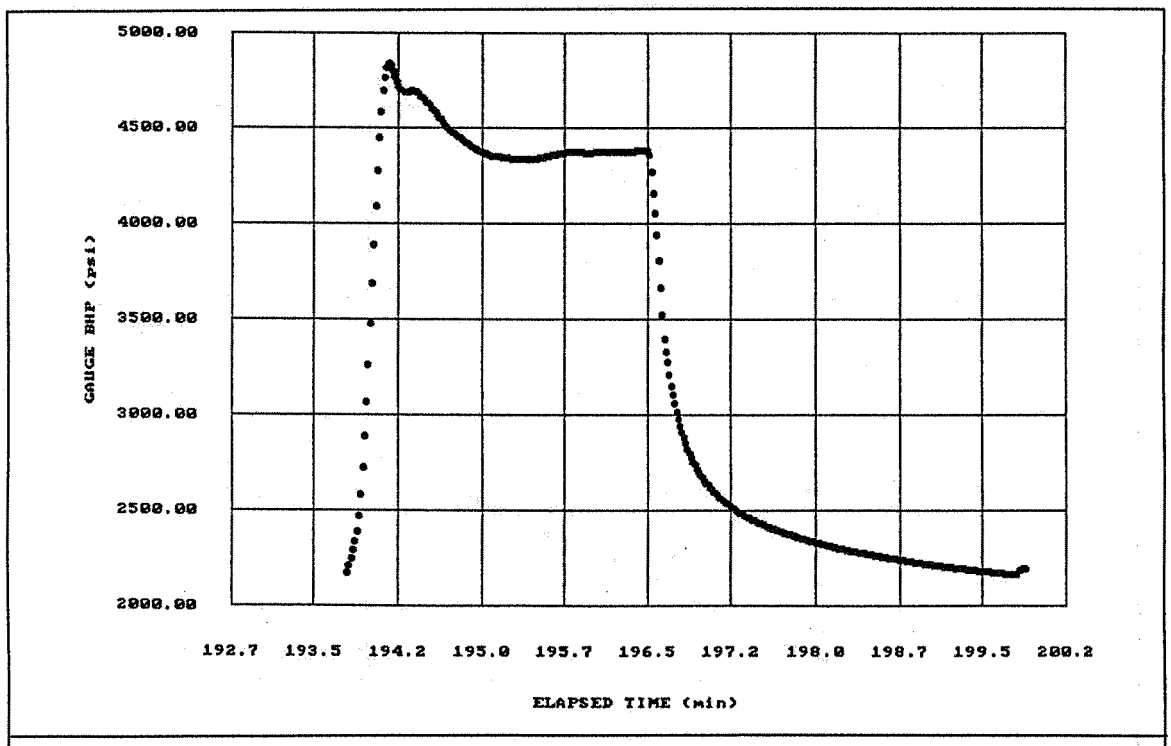


FIG. 8 - Slick water PI/SI test #1 BHP record, E. Mereenie 38 (P3-190/230/250).

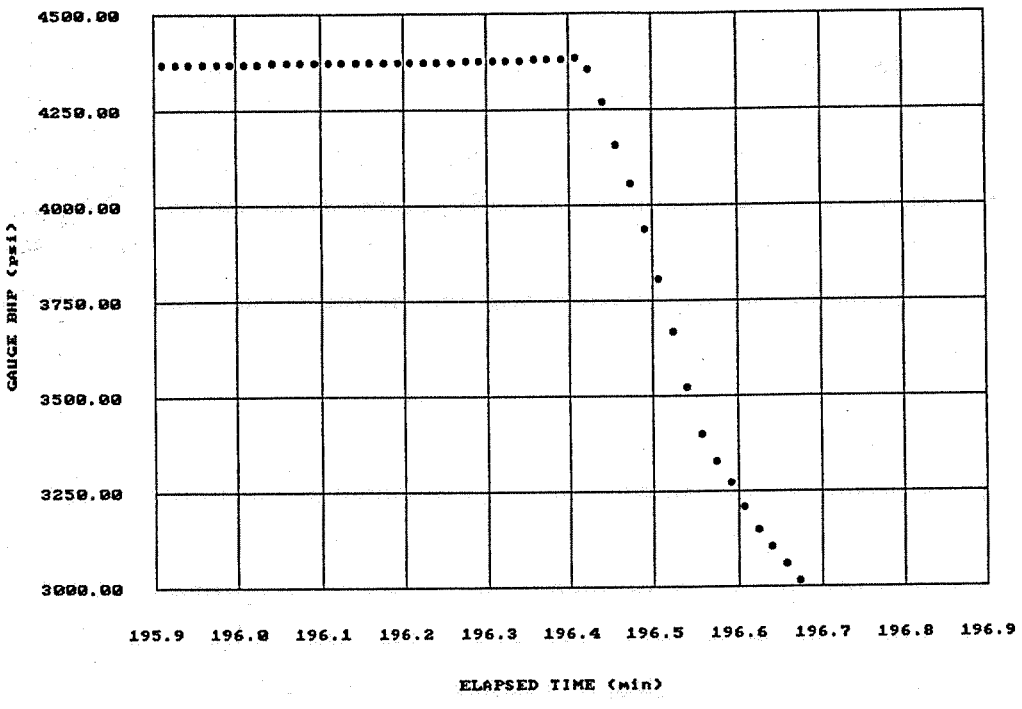


FIG. 9 - Slick water PI/SI test #1 BHP ISIP evaluation, E. Mereenie 38 (P3-190/230/250).

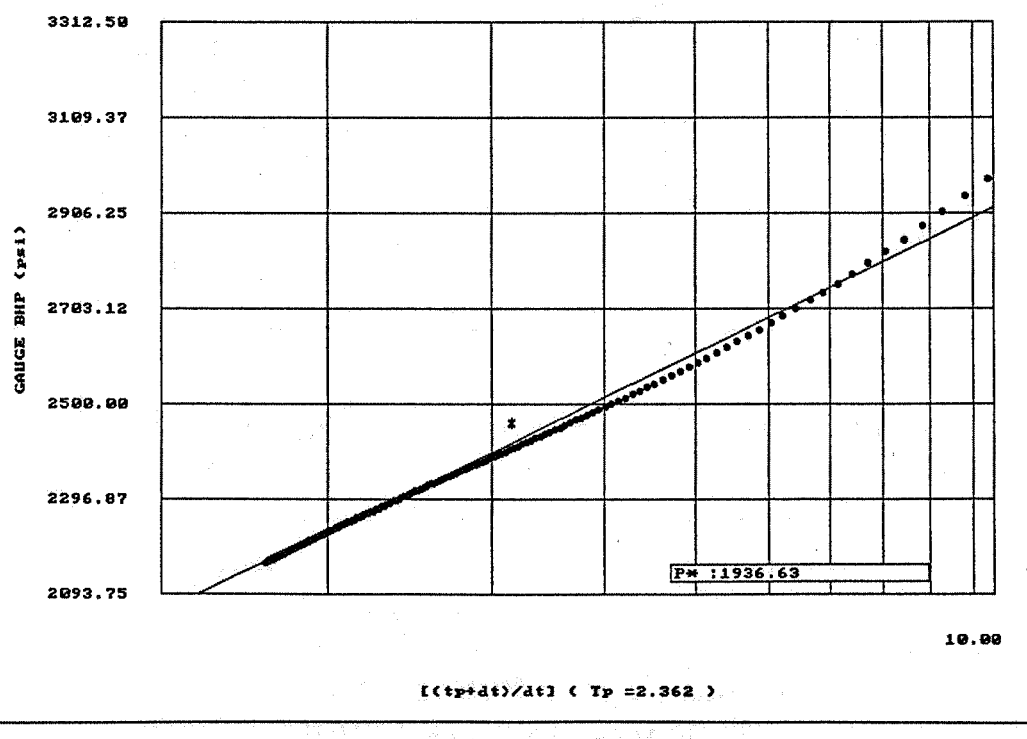


FIG. 10 - Slick water PI/SI test #1 BHP Horner plot, E. Mereenie 38 (P3-190/230/250).

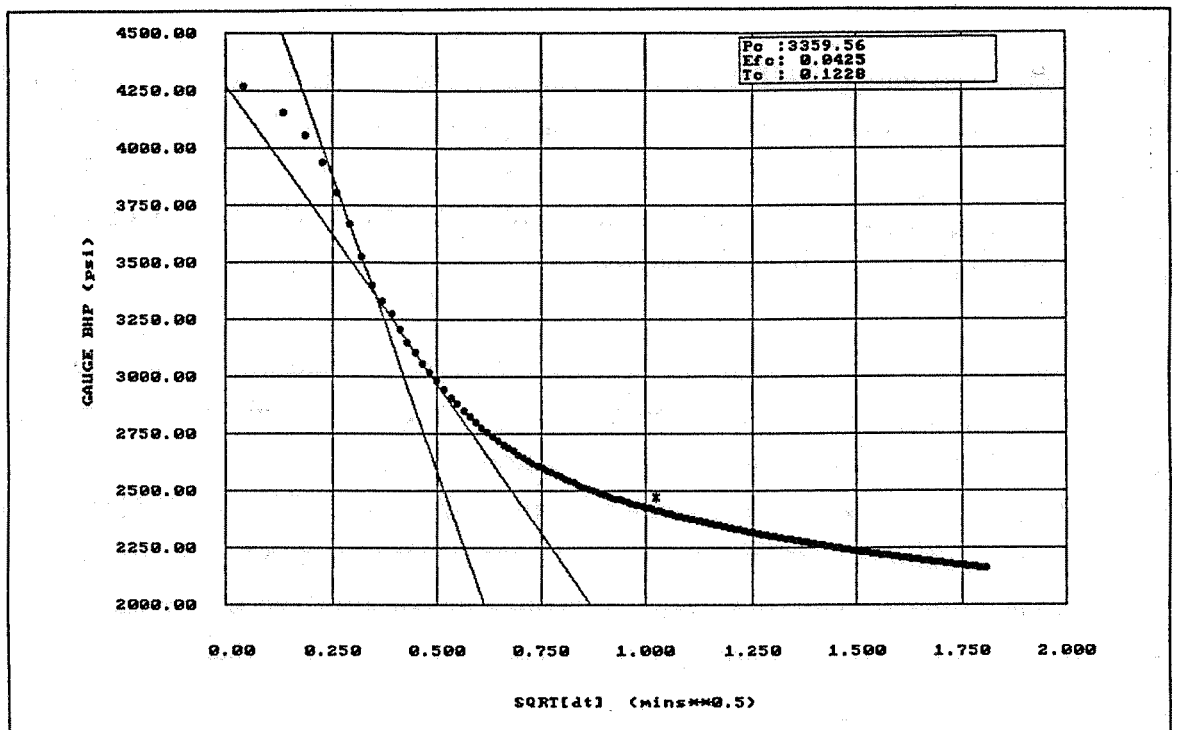


FIG. 11 - Slick water PI/SI test #1 BHP sq.rt. SI time plot, E. Mereenie 38 (P3-190/230/250).

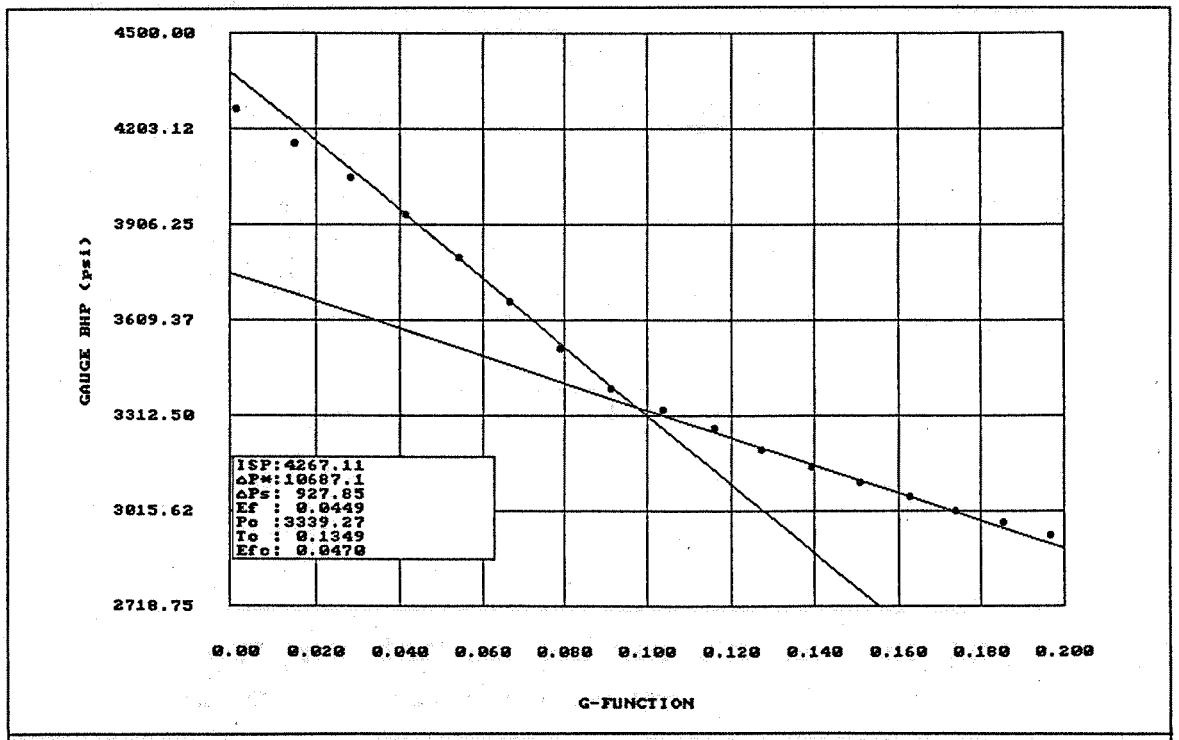


FIG. 12 - Slick water PI/SI test #1 BHP G-function plot, E. Mereenie 38 (P3-190/230/250).

Fig. 13 shows the gauge BHP record for the SRT/SI. Based on the ISIP, Fig. 14, fracture extension pressure was probably somewhere around 3700-3800 psi, which was fairly consistent with the closure pressure picks from the preceding test. From the square-root of SI time plot, Fig. 15, closure was picked at 3491 psi. From the G-function plot, Fig. 16, closure was picked at 3469 psi.

Fig. 17 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 to bullhead the slick water into the fracture. This was followed by a 6.5 minute shut-in to allow this fluid to leak-off to the formation and the fracture to close prior to injecting the XL gel. At the end of the minifrac, displaced with slick water to the top perforation, the BHTP was 4465 psi. At shut-down, the ISIP appeared to be at 4134 psi, Fig. 18, indicating a downhole "excess" pressure of 331 psi.

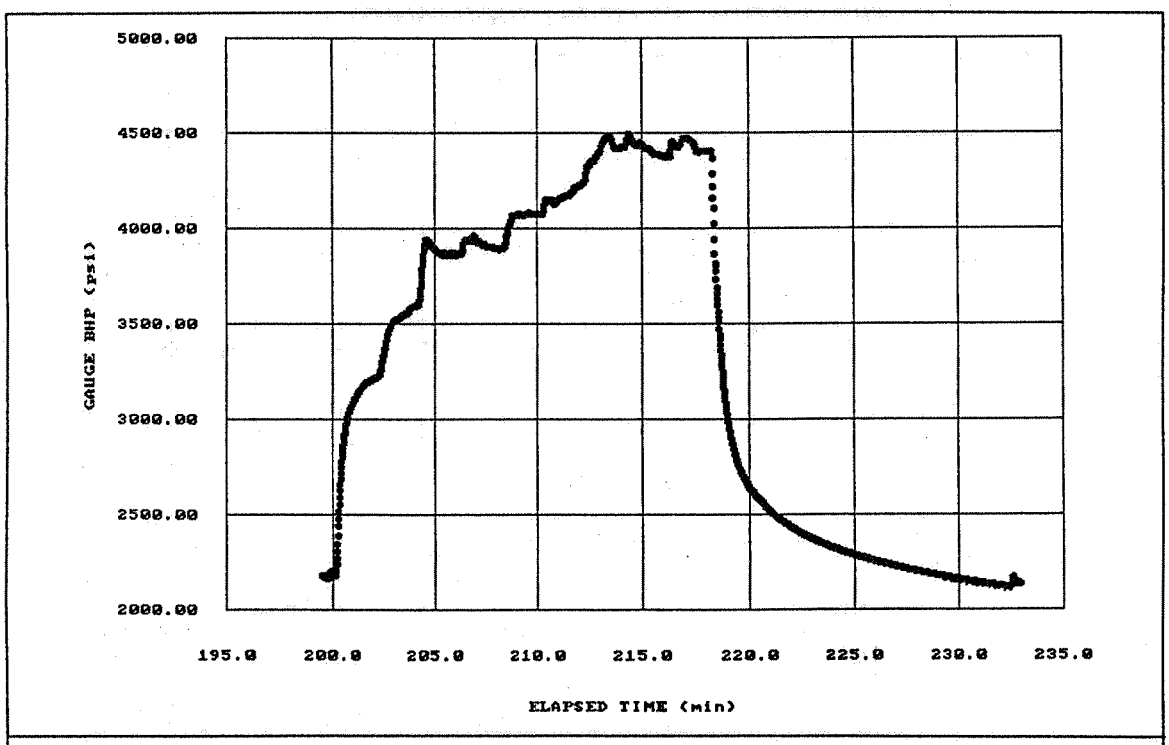


FIG. 13 - Slick water SRT/SI test BHP record, E. Mereenie 38 (P3-190/230/250).

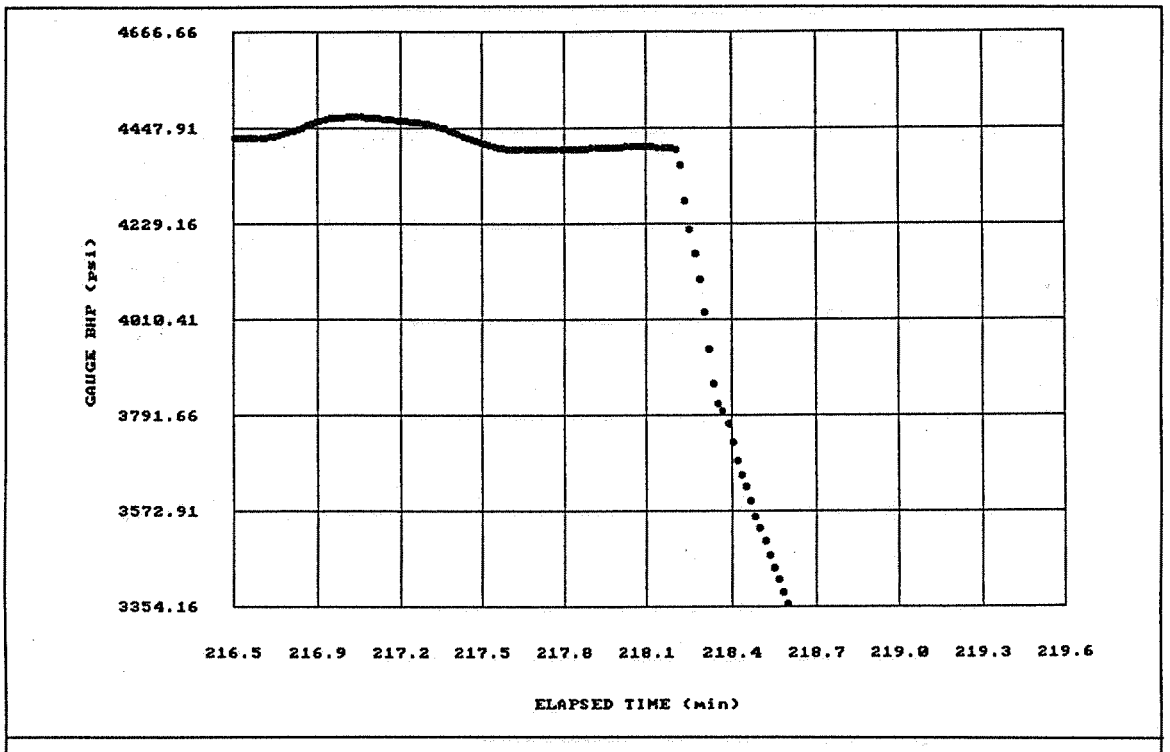


FIG. 14 - Slick water SRT/SI test BHP ISIP evaluation, E. Mereenie 38 (P3-190/230/250).

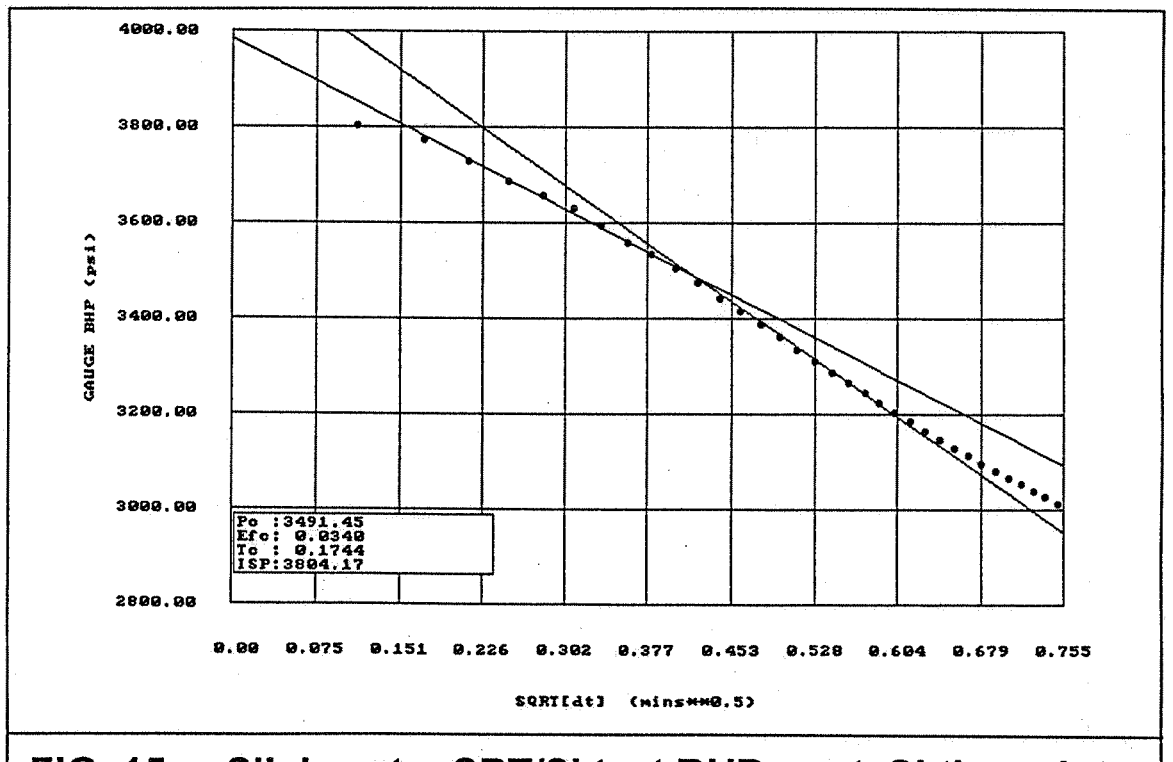


FIG. 15 - Slick water SRT/SI test BHP sq.rt. SI time plot, E. Mereenie 38 (P3-190/230/250).

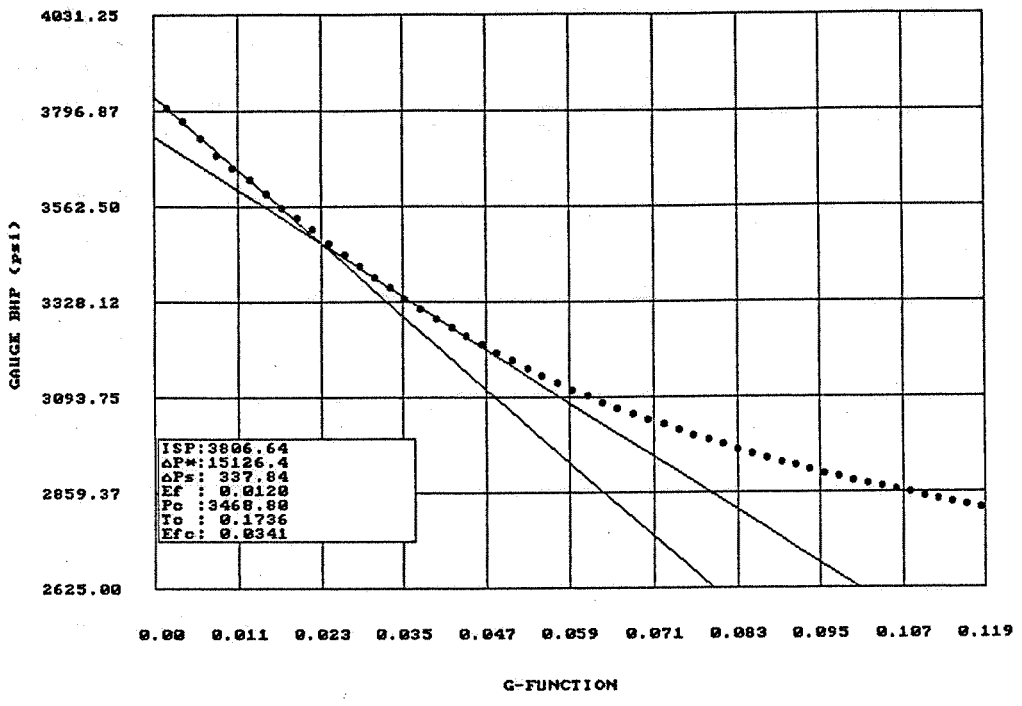


FIG. 16 - Slick water SRT/SI test BHP G-function plot, E. Mereenie 38 (P3-190/230/250).

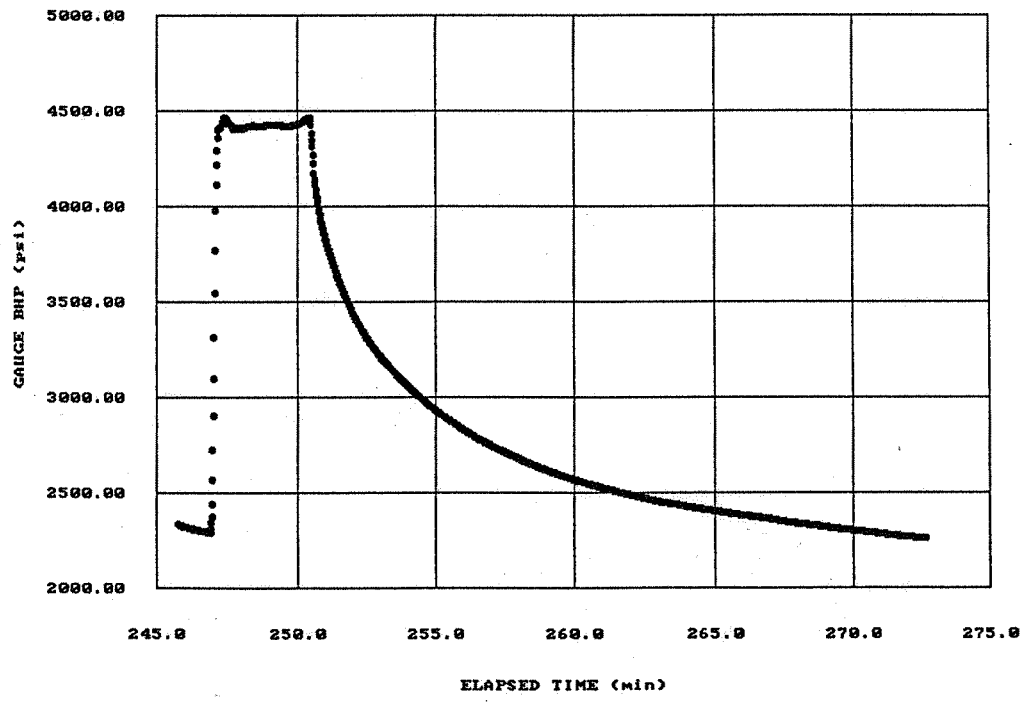


FIG. 17 - Boragel minifrac BHP record, E. Mereenie 38 (P3-190/230/250).

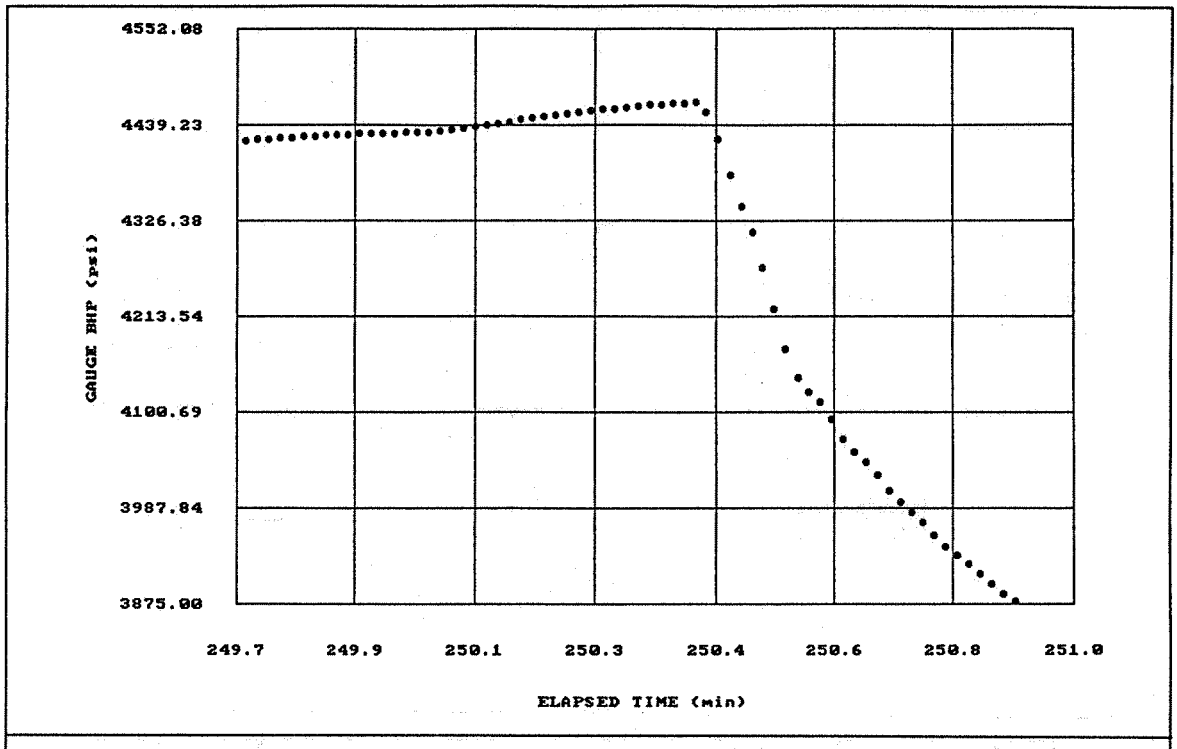


FIG. 18 - Boragel minifrac BHP ISIP evaluation, E. Mereenie 38 (P3-190/230/250).

From the minifrac pressure decline analysis, closure was picked at 3319 psi on the square-root of SI time plot, Fig. 19, which corresponded to a fluid efficiency of 0.31 and a net BHTP (BHTP-closure P) of 815 psi. From the G-function plot, Fig. 20, closure was picked at 3377 psi with a corresponding fluid efficiency of 0.28 and a net BHTP of 757 psi. From the Nolte type-curve match, Fig. 21, the indicated fluid efficiency was 0.35.

Based on the combined analysis of the three tests, closure pressure was thought to be at 3350 psi, fluid efficiency from pressure decline analysis was 0.32, and net BHTP for the XL gel at 15 bpm was on the order of 750-800 psi. From the established Mereenie correlation of efficiency during injection to that determined from the decline, the injection efficiency was 0.13.

To further the minifrac analysis and generate a "calibrated" model for final design evaluation, the minifrac injection profile was history matched. Shown in Fig. 22, this

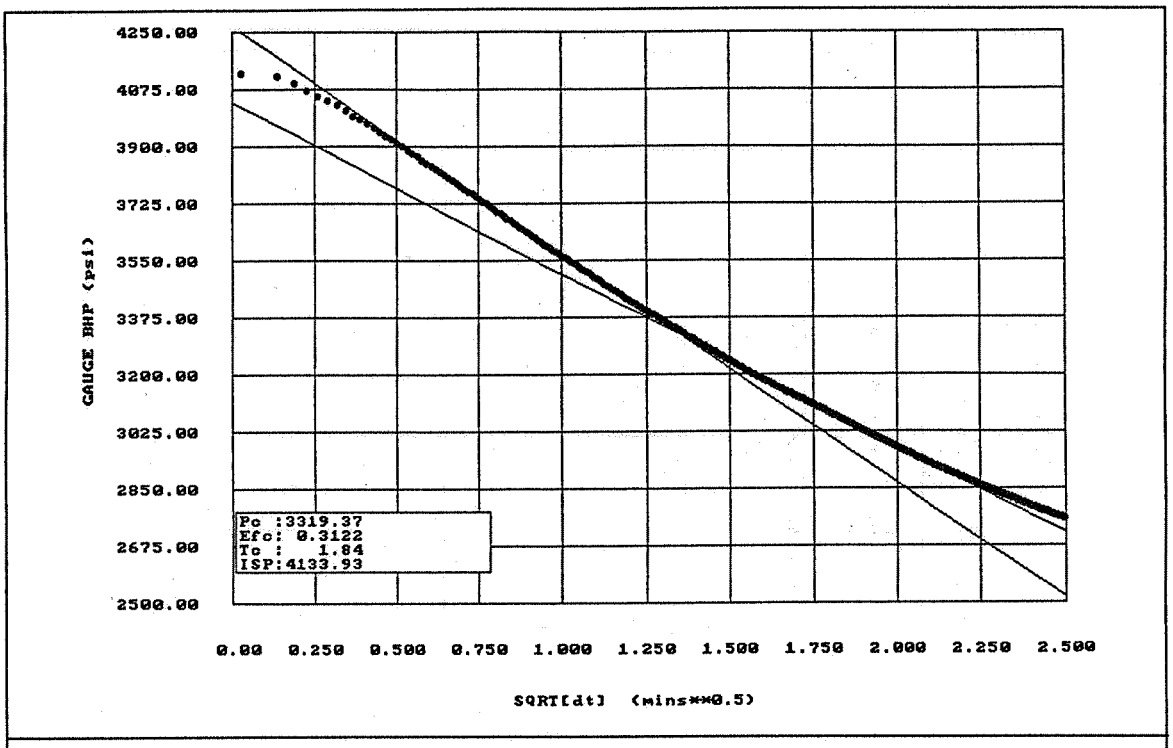


FIG. 19 - Boragel minifrac BHP sq.rt. SI time plot, E. Mereenie 38 (P3-190/230/250).

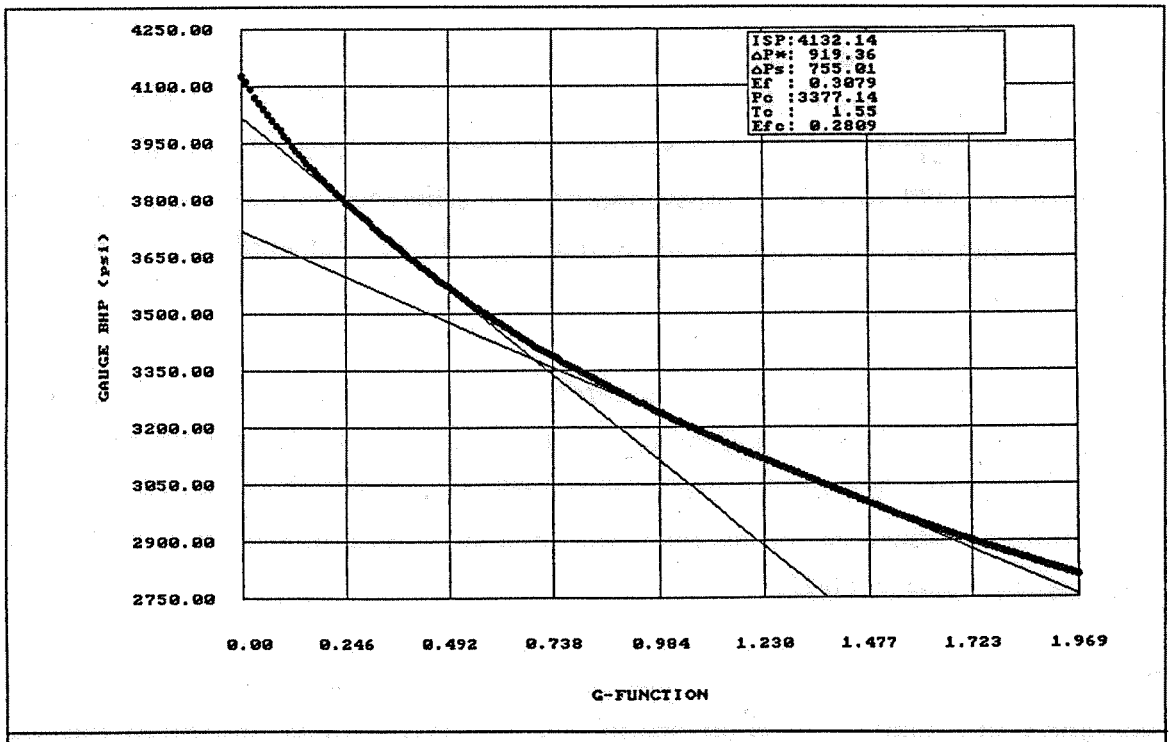


FIG. 20 - Boragel minifrac BHP G-function plot, E. Mereenie 38 (P3-190/230/250).

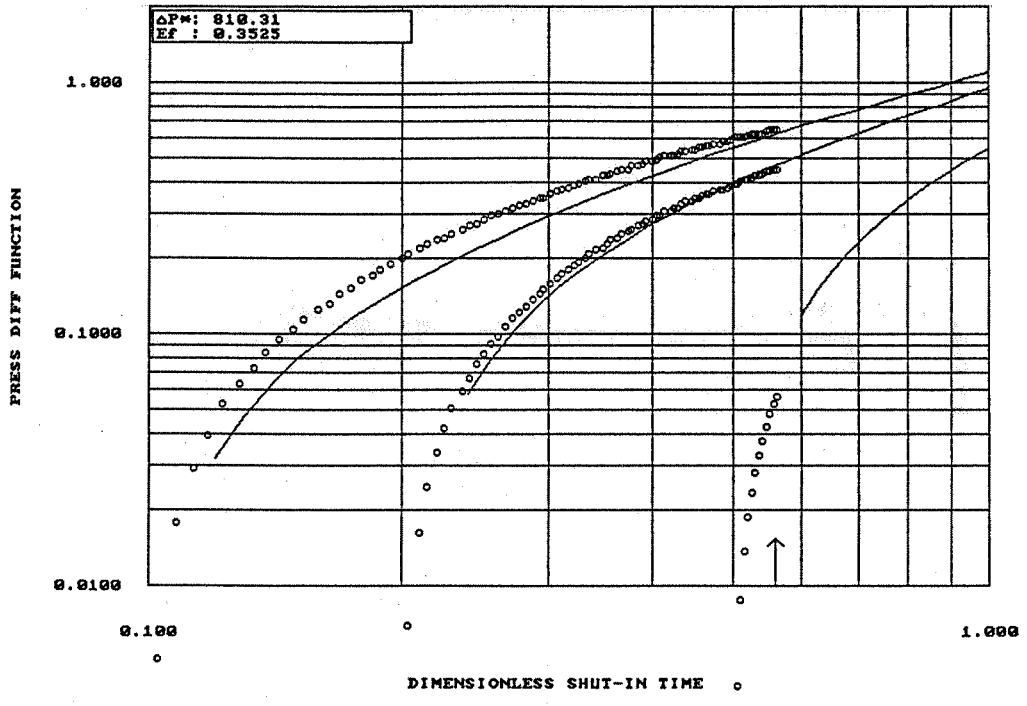


FIG. 21 - Boragel minifrac BHP type-curve match, E. Mereenie 38 (P3-190/230/250).

match required (1) a closure stress of 3800 psi in the shalier region between the P3-230/250 and P3-190, and boundary stresses of 3900-4900 psi, (2) the same approximate modulus/toughness profile from the preliminary design, and (3) an increase in the preliminary design leak-off coefficient from 0.005 to 0.008 ft/sq.rt. minute. The model-predicted fracture dimensions were a created half-length of 60 ft and a maximum height at the wellbore of 98 ft. This is shown in Fig. 23 with the model I/O included in Appendix Table A-2.

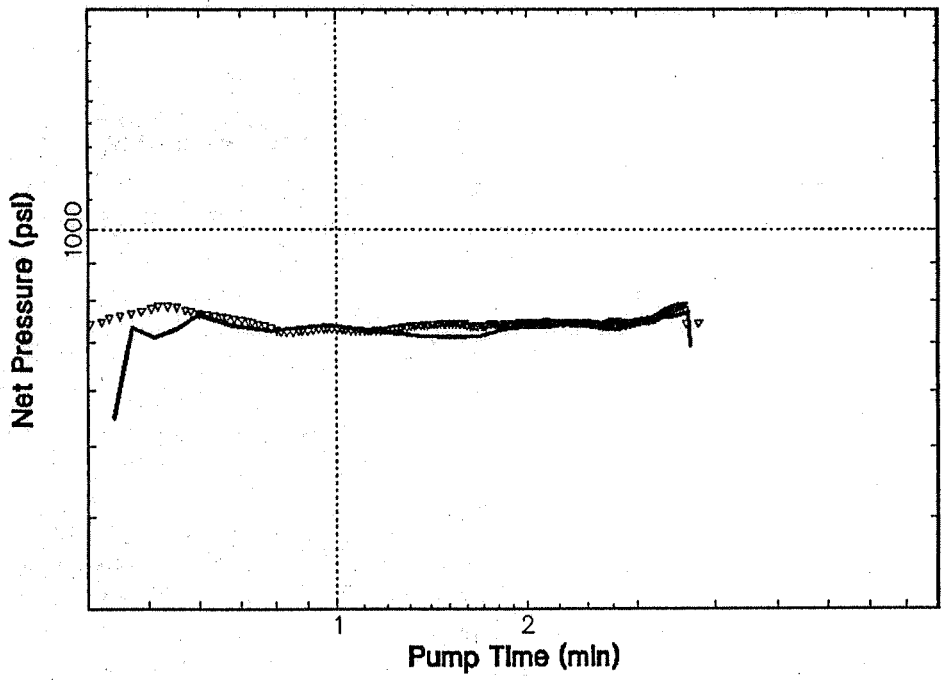


FIG. 22 - Boragel minifrac net BHP model history match, E. Mereenie 38 (P3-190/230/250).

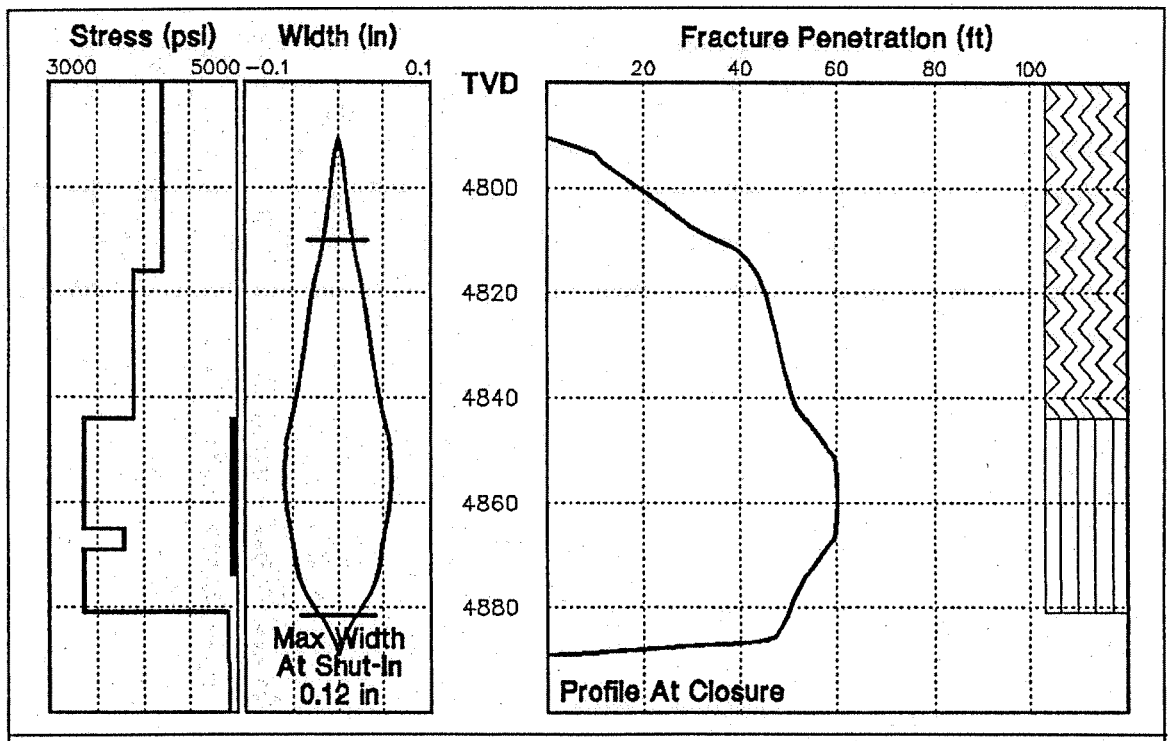


FIG. 23 - Boragel minifrac model history match predicted frac geometry, E. Mereenie 38 (P3-190/230/250).

Final Treatment Design:

Using the "calibrated" design model, the final design pad stage was limited to 3250 gals to prevent upward growth into the P3-120/130 sands (Table 2). The slurry stages consisted of 3900 gals of gel carrying 14,800 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 in the 2 ppg stage (Fig. 24) and net BHTP increased from 775 to 2575 psi with a corresponding average fracture width increase from 0.05 to 0.19 inches. At the wellbore, the final predicted average and maximum widths were 0.24 and 0.42 inches. Other modeled dimensions were a propped half-length of 84 ft, a maximum height of 105 ft (frac top at 4785 ft or 20 ft from the base of 120/130), an average conductivity of 2695 md-ft, and an average in-situ concentration of 1.2 lbs/sq.ft. These are shown in Figs. 25-27 with the model I/O included in Appendix Table A-3.

TABLE 2 - Treatment final design schedule, E. Mereenie 38 (P3-190/230/250).

Fluid Type	Slur. Vol. (gal)	Fluid Vol. (gal)	Prop Conc. (ppg)	Prop Amt. (lbs)	Avg. Q (bpm)	Pump t (min)
Boragel H3595	3250	3250	0.00	0	15.00	5.16
Boragel H3595	613	600	0.50	300	15.00	0.97
Boragel H3595	522	500	1.00	500	15.00	0.83
Boragel H3595	435	400	2.00	805	15.00	0.69
Boragel H3595	453	400	3.00	1200	15.00	0.72
Boragel H3595	470	400	4.00	1600	15.00	0.75
Boragel H3595	488	400	5.00	2000	15.00	0.77
Boragel H3595	506	400	6.00	2400	15.00	0.80
Boragel H3595	523	400	7.00	2800	15.00	0.83
Boragel H3595	541	400	8.00	3200	15.00	0.86
	7801	7150		14800		12.38

Note: (1) Proppant 20/40 Carbo-Lite.
(2) SP (raw) breaker ramped from 0.5-5 ppt in 1-8 ppg stages & Opti-flo II (encapsulated) breaker ramped from 5-2 ppt throughout treatment.

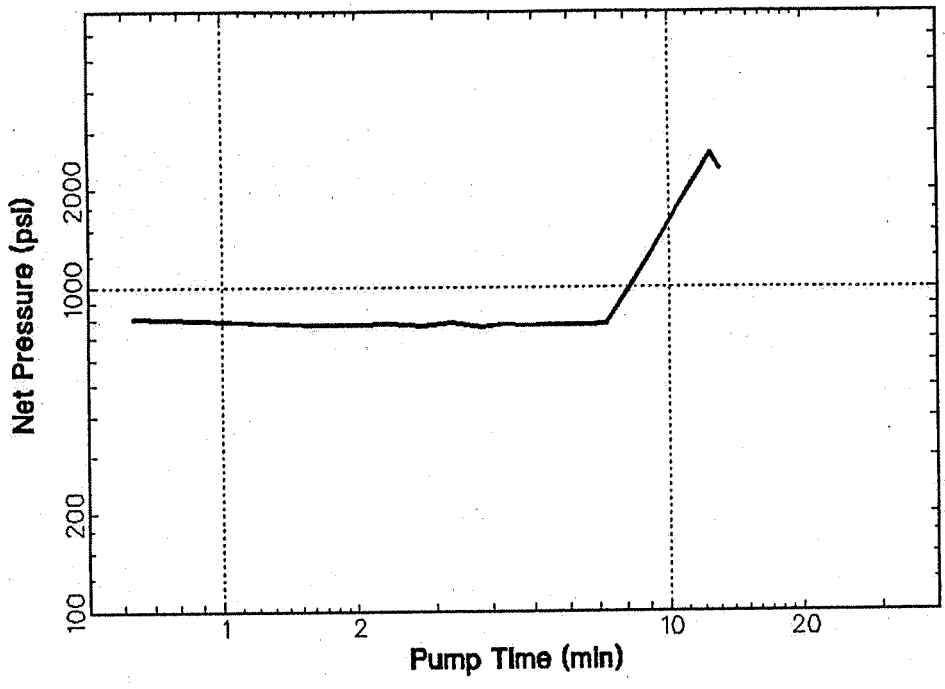


FIG. 24 - Final treatment design predicted net BHTP, E. Mereenie 38 (P3-190/230/250).

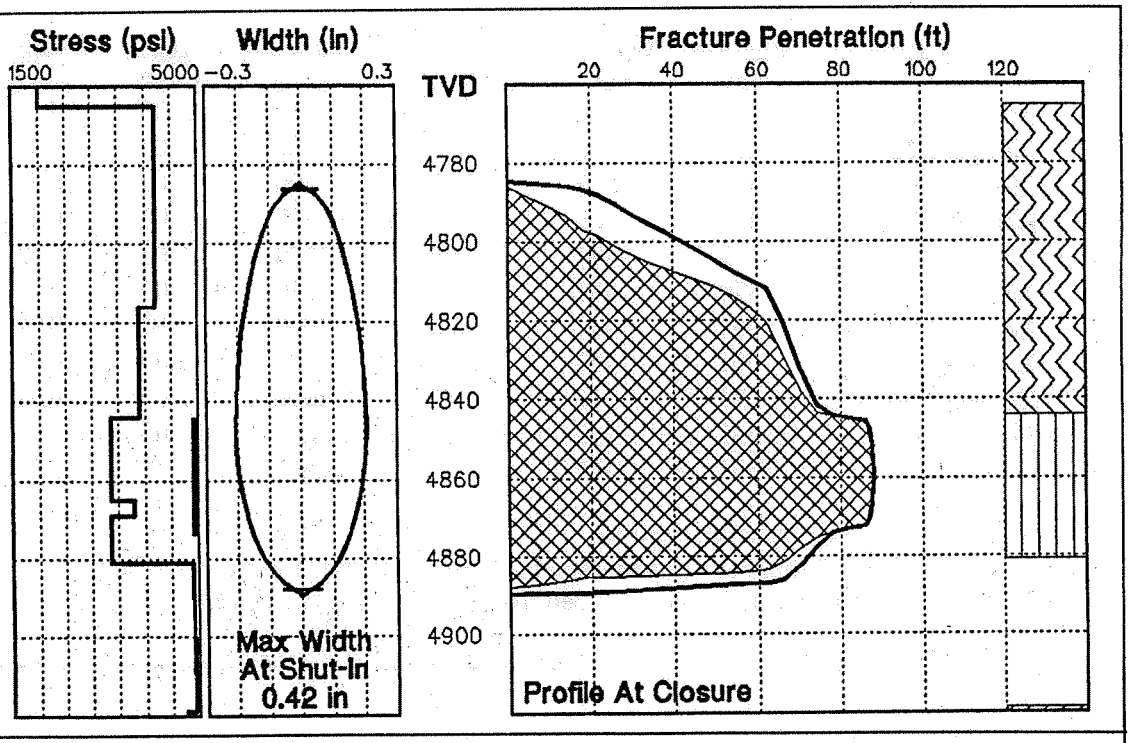


FIG. 25 - Final treatment design predicted fracture, geometry, E. Mereenie 38 (P3-190/230/250).

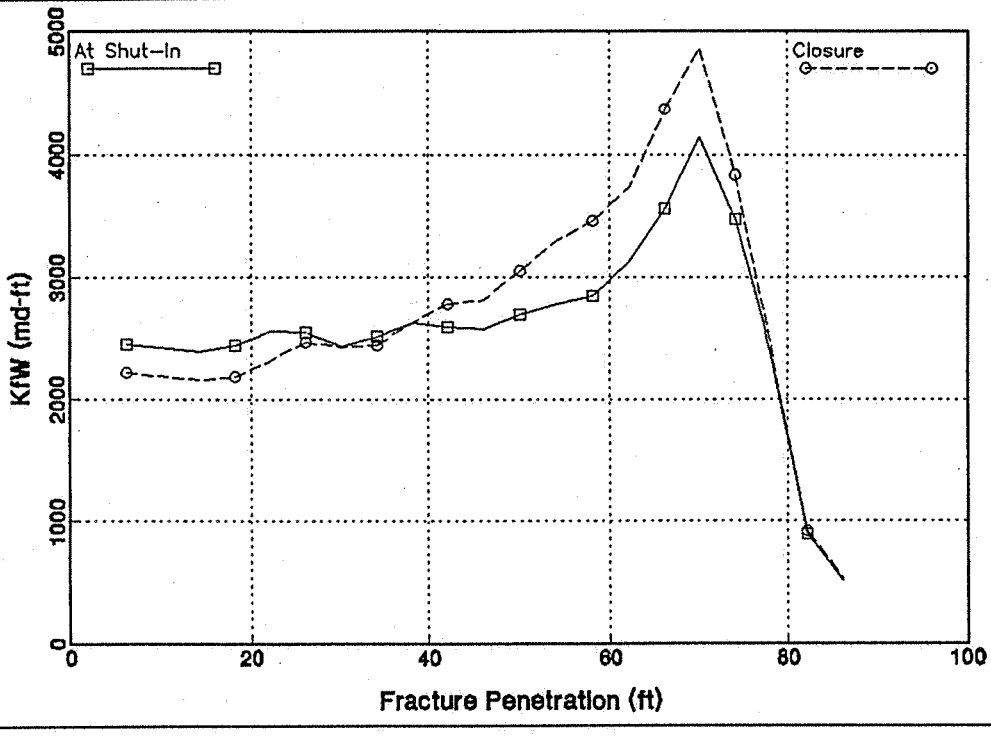


FIG. 26 - Final treatment design predicted conductivity, E. Mereenie 38 (P3-190/230/250).

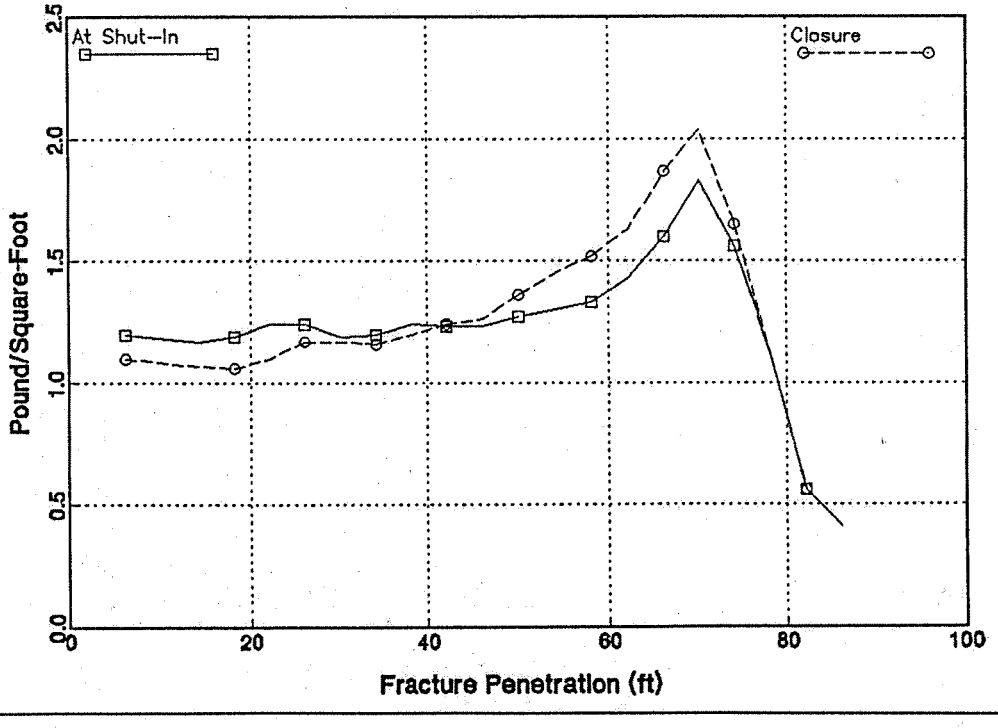


FIG. 27 - Final treatment design predicted in-situ conc., E. Mereenie 38 (P3-190/230/250).

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 time/consistency. While this was not the smallest treatment performed to date in Mereenie, its relatively small size and short pump time required precise execution. 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 treatment was pumped without any mechanical or blending mishaps. Fig. 28 shows the surface treating parameters. From this, it appeared that a TSO did occur with pressure increasing for the last 3-3.5 minutes. Table 3 shows the surface schedule from Halliburton's computer printout. This indicated a total of 14,846 lbs of proppant pumped with 8400 gals of gel and flush. Based on the amount of proppant loaded/pumped (17,000 lbs) and accounting for 500 lbs spillage, though, this was 10% low. With this correction made in Table 4, the 16,500 lbs of proppant was pumped with

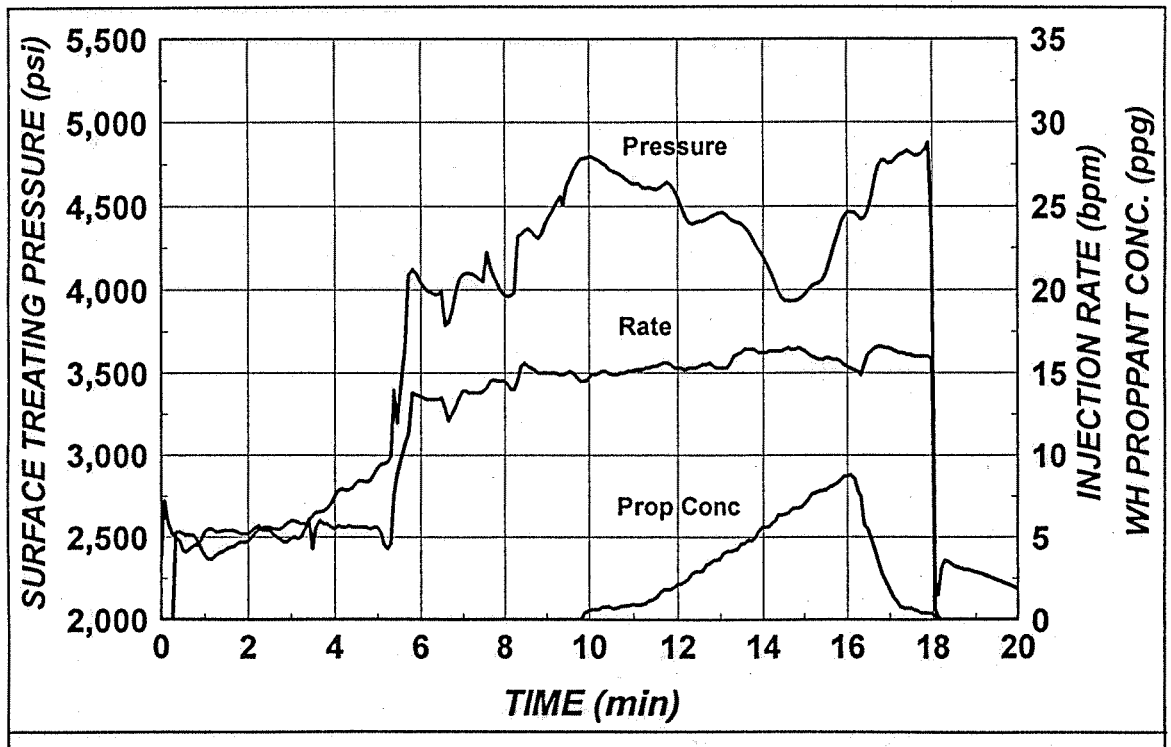


FIG. 28 - Boragel treatment summary of surface parameters, E. Mereenie 38 (P3-190/230/250).

TABLE 3 - Treatment Halliburton (computer)surface pump schedule, E. Mereenie 38 (P3-190/230/250).

Fluid Type	Slur. Vol. (gal)	Fluid Vol. (gal)	Prop Conc. (ppg)	Prop Amt. (lbs)	Avg. Q (bpm)	Pump t (min)
Slick Water	137	137	0.00	0	4.87	0.67
Boragel H3595	1059	1059	0.00	0	5.30	4.76
Boragel H3595	148	148	0.00	0	10.07	0.35
Boragel H3595	648	648	0.00	0	13.26	1.16
Boragel H3595	388	338	0.00	0	13.89	0.67
Boragel H3595	1390	1390	0.00	0	14.83	2.23
Boragel H3595	384	375	0.55	205	14.87	0.61
Boragel H3595	538	521	0.74	386	15.06	0.85
Boragel H3595	454	428	1.37	588	15.43	0.70
Boragel H3595	613	550	2.60	1428	15.37	0.95
Boragel H3595	204	176	3.58	631	15.38	0.32
Boragel H3595	272	232	3.97	919	16.18	0.40
Boragel H3595	491	405	4.85	1961	16.30	0.72
Boragel H3595	527	416	6.04	2514	16.36	0.77
Boragel H3595	532	405	7.16	2898	15.84	0.80
Boragel H3595	214	160	7.64	1224	15.30	0.33
Flush	1191	1099	1.90	2092	16.12	1.76
	9190	8537		14846		18.05

Note: (1) Proppant 20/40 Carbo-Lite.
(2) Schedule calc. from WH densiometer. Actual pumped = 16,500 lbs, resulting in a 10% error.

8326 gals of gel and flush. This schedule was used to determine the downhole treatment schedule shown in Table 5. From this, a total of 13,735 lbs of proppant (92.8% of design) was placed in the fracture with 7187 gals of gel (100.5% of design). When compared to the design proppant schedule, the actual schedule was reasonably close as shown in Fig. 29.

TABLE 4 - Treatment "corrected" surface pump schedule, E. Mereenie 38 (P3-190/230/250).

Fluid Type	Slur. Vol, (gal)	Fluid Vol, (gal)	Prop Conc, (ppg)	Prop Amt, (lbs)	Avg. Q (bpm)	Pump t (min)
Slick Water	137	137	0.00	0	4.87	0.67
Boragel H3595	1059	1059	0.00	0	5.30	4.76
Boragel H3595	148	148	0.00	0	10.07	0.35
Boragel H3595	648	648	0.00	0	13.26	1.16
Boragel H3595	388	338	0.00	0	13.89	0.67
Boragel H3595	1390	1390	0.00	0	14.83	2.23
Boragel H3595	384	374	0.61	228	14.87	0.61
Boragel H3595	538	519	0.83	429	15.06	0.85
Boragel H3595	454	425	1.54	654	15.43	0.70
Boragel H3595	613	543	2.92	1587	15.37	0.95
Boragel H3595	204	173	4.05	701	15.38	0.32
Boragel H3595	272	227	4.50	1021	16.18	0.40
Boragel H3595	491	395	5.52	2179	16.30	0.72
Boragel H3595	527	404	6.92	2794	16.36	0.77
Boragel H3595	532	390	8.26	3221	15.84	0.80
Boragel H3595	214	154	8.83	1360	15.30	0.33
Flush	1191	1089	2.14	2325	16.12	1.76
	9190	8463		16499		18.05

Note: (1) Proppant 20/40 Carbo-Lite.
(2) Schedule calc. from WH densiometer.

TABLE 5 - Treatment downhole pump schedule, E. Mereenie 38 (P3-190/230/250).

Fluid Type	Slur. Vol. (gal)	Fluid Vol. (gal)	Prop Conc. (ppg)	Prop Amt. (lbs)	Avg. Q (bpm)	Pump t (min)
WB Fluid	1196	1196	0.00	0	5.25	5.42
WB Fluid	64	64	0.00	0	10.07	0.15
Slick Water	84	84	0.00	0	10.07	0.20
Slick Water	53	53	0.00	0	13.26	0.10
Boragel H3595	595	595	0.00	0	13.26	1.07
Boragel H3595	388	388	0.00	0	13.89	0.67
Boragel H3595	1774	1774	0.00	0	14.84	2.85
Boragel H3595	538	538	0.00	0	15.06	0.85
Boragel H3595	338	338	0.00	0	15.43	0.52
Boragel H3595	384	374	0.61	228	15.39	0.59
Boragel H3595	538	519	0.83	429	15.37	0.83
Boragel H3595	454	425	1.54	654	16.21	0.67
Boragel H3595	613	543	2.92	1587	16.33	0.89
Boragel H3595	204	173	4.05	701	16.36	0.30
Boragel H3595	272	227	4.50	1021	15.90	0.41
Boragel H3595	491	395	5.52	2179	15.62	0.75
Boragel H3595	527	404	6.92	2794	16.10	0.78
Boragel H3595	532	390	8.26	3221	16.12	0.79
Boragel H3595	145	104	8.83	921	16.12	0.21
	9190	8584		13735		18.05

Note: (1) Proppant 20/40 Carbo-Lite.
(2) Placed 92.8% of design prop amt. w/ 100.5% of design gel vol. Act. slur. conc. avg. = 1.91 ppg as compared to design of 2.07 ppg.

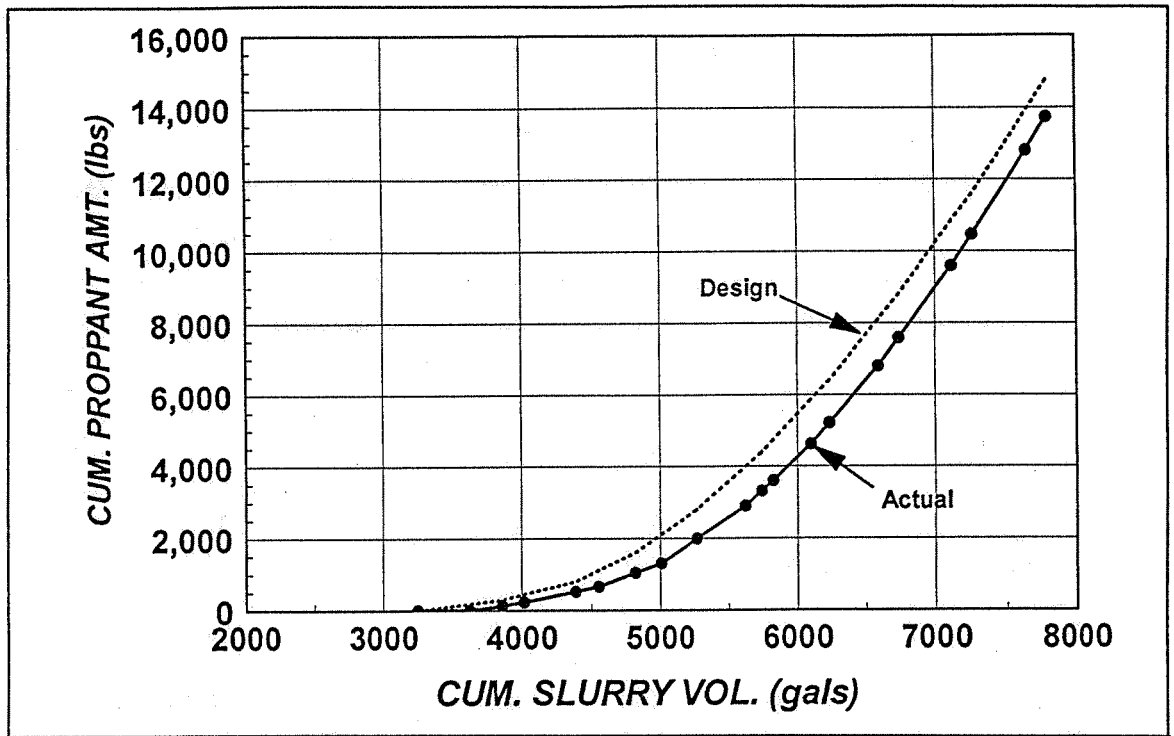


FIG. 29 - Boragel treatment comparison of actual to design schedule, E. Mereenie 38 (P3-190/230/250).

Post-Frac Evaluation:

Fig. 30 shows the gauge BHTP record plotted with the corresponding rate and downhole proppant concentration. From this it was apparent that the TSO started somewhere around 13.5 minutes, with a pressure gain of around 350 psi or considerably less than final design predictions. From the treatment ISIP, Fig. 31, the downhole excess pressure was 250 psi or reasonably close to that seen during testing. To evaluate the treatment through model history matching of the net BHTP's, an excess pressure of 300 psi was used along with the closure pressure of 3350 psi. This resulted in approximately 800-950 psi net BHTP prior to the TSO, and then a net pressure rise from 950 to around 1300 psi.

The treatment model history match is shown in Fig. 32. To achieve this match required several changes to the final design model, the most important of these being a reduction

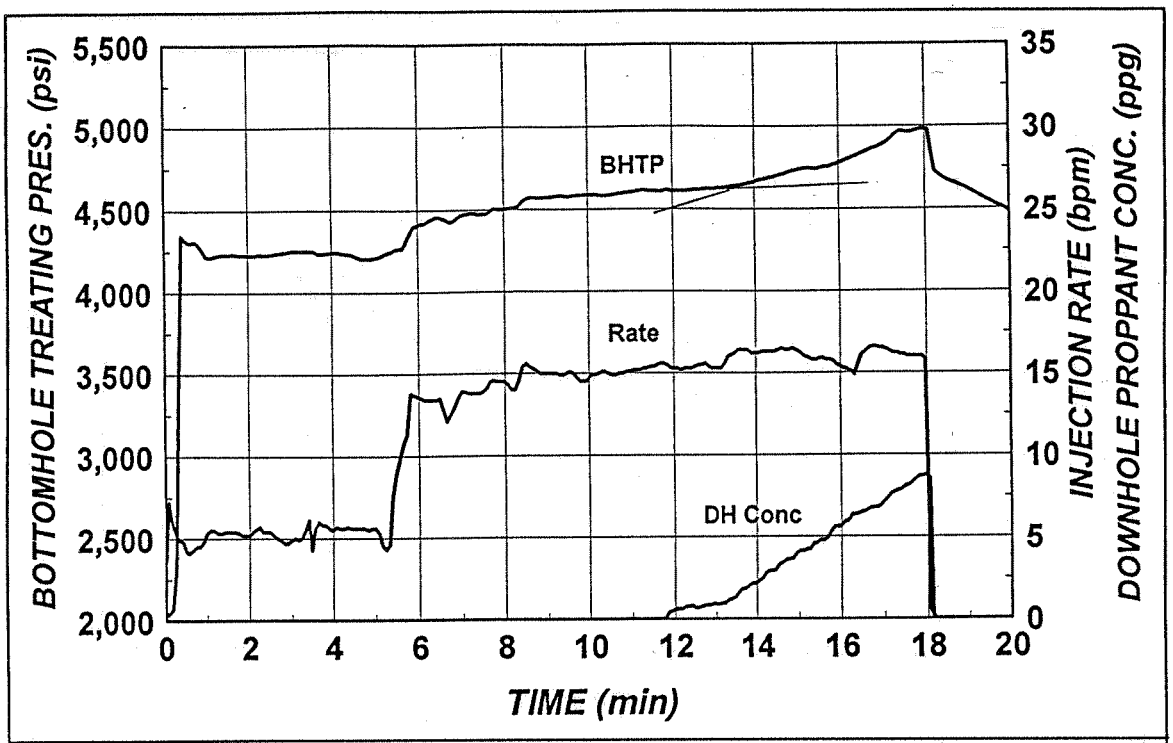


FIG. 30 - Boragel treatment summary of BH treating parameters, E. Mereenie 38 (P3-190/230/250).

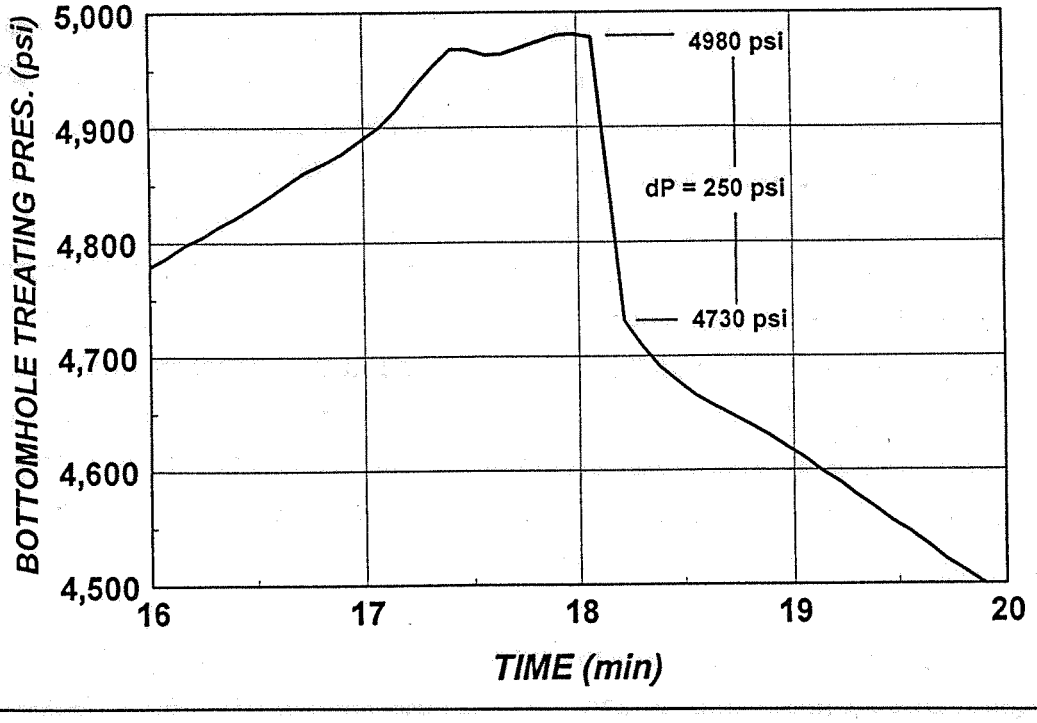


FIG. 31 - Boragel treatment BHP ISIP evaluation, E. Mereenie 38 (P3-190/230/250).

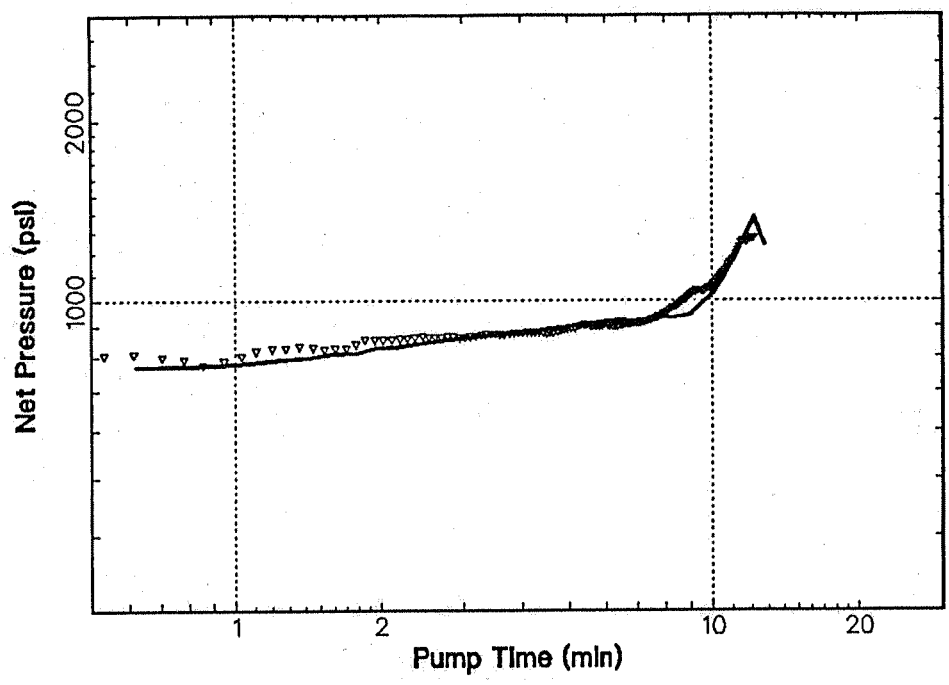


FIG. 32 - Boragel treatment post-frac net BHTP history match, E. Mereenie 38 (P3-190/230/250).

in leak-off in the pay zones from 0.008 to 0.0052 ft/sq.rt. minute. Other changes included (1) an increase in the upper boundary stresses from 3900-4200 psi to 4125-4300 psi, (2) a reduction in the stress between the P3-190 and P3-230/250 from 3800 to 3550 psi, and (3) a reduction in modulus from 7.5 to 7.25×10^6 psi in these same layers. The remainder of the model stayed the same as before. With the actual downhole treatment schedule, this model resulted in fracture dimensions of a propped half-length of 158 ft (design - 84 ft), a maximum height of 132 ft (design - 105 ft), an average conductivity of 1080 md-ft (design - 2695 md-ft), and an average in-situ concentration of 0.6 lbs/sq.ft (design 1.2 lbs/sq.ft.). These are shown in Figs. 33-35 with the model I/O included in Appendix Table A-4. The predicted top of the fracture was at 4768 ft or only 3 ft below the 120/130. The resultant average and maximum widths at the wellbore at the end of the treatment were 0.15 and 0.26 inches, respectively.

Based on this analysis, the treatment did not come very close to design predictions, with injection leak-off being considerably less than determined from the Mereenie efficiency

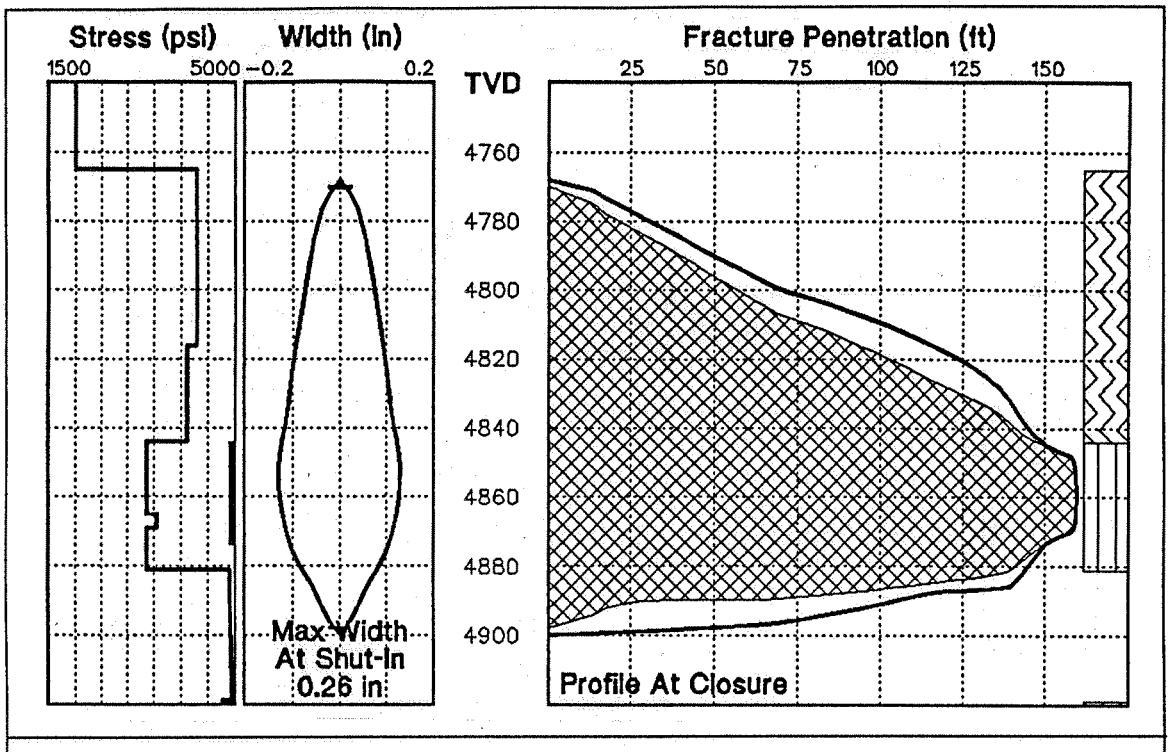


FIG. 33 - Boragel treatment history match predicted frac geometry, E. Mereenie 38 (P3-190/230/250).

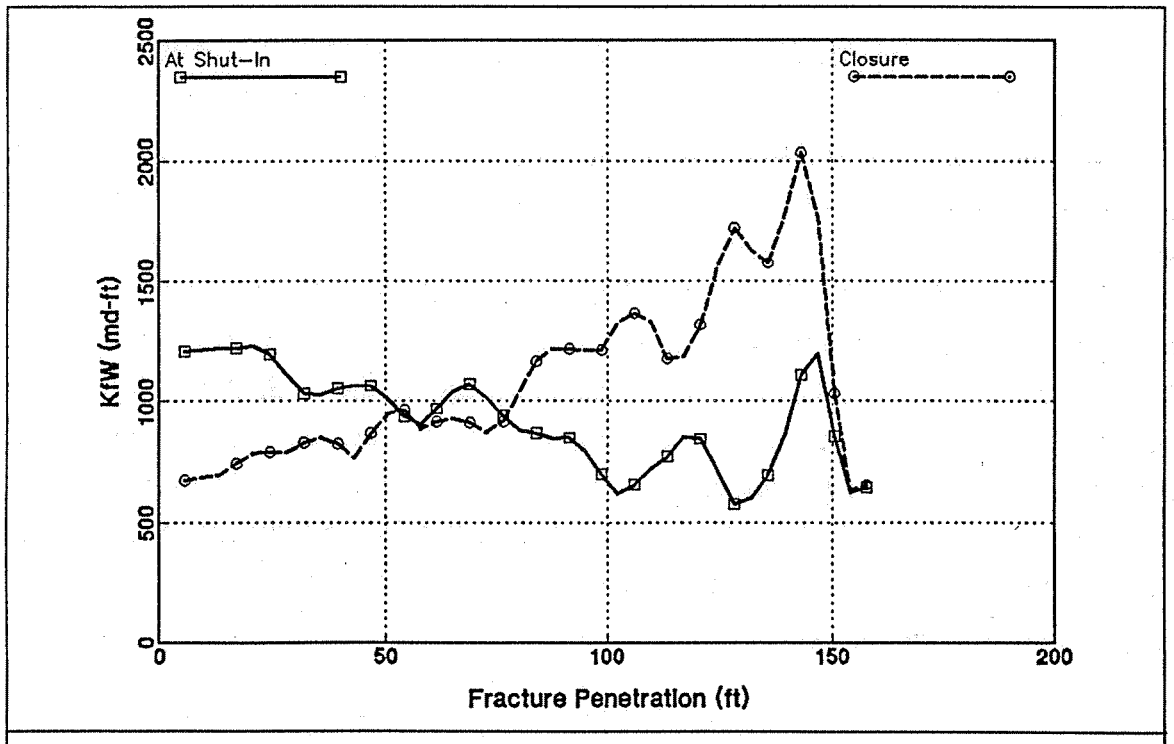


FIG. 34 - Boragel treatment history match predicted conductivity, E. Mereenie 38 (P3-190/230/250).

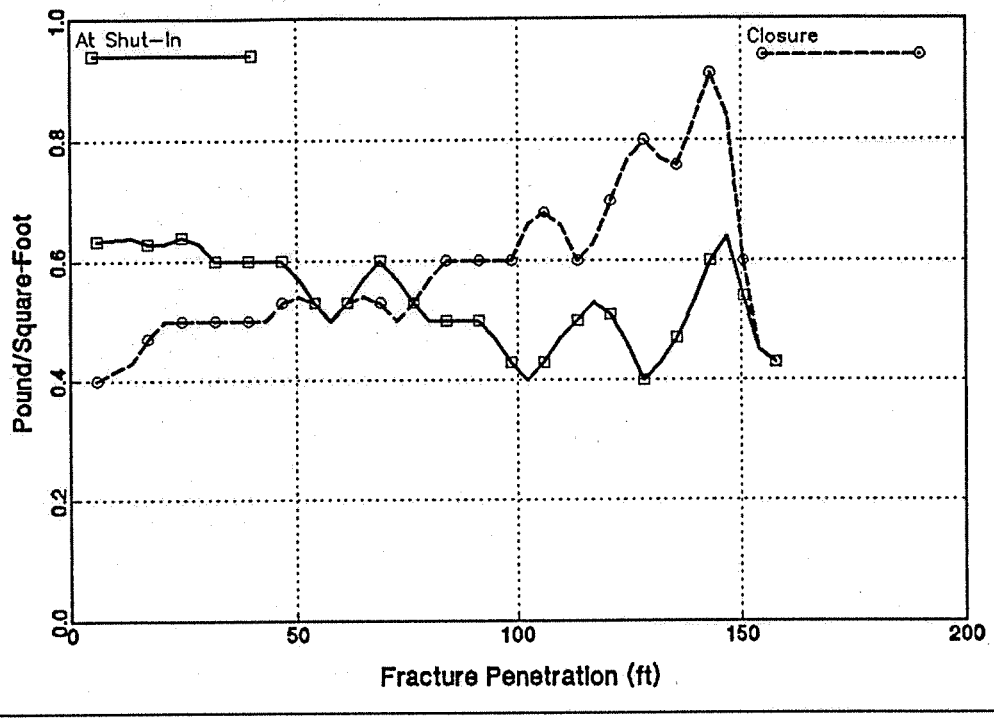
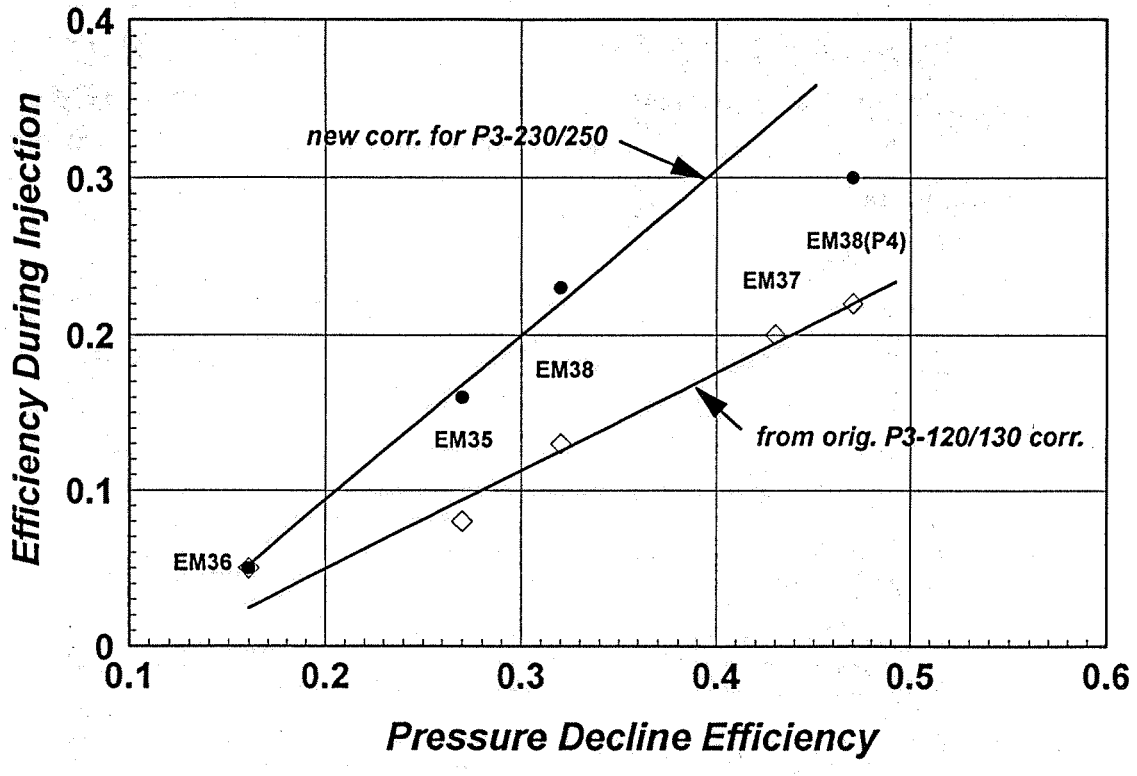


FIG. 35 - Boragel treatment history match predicted in-situ conc, E. Mereenie 38 (P3-190/230/250).

correlation. With the correlation derived from early P3-120/130 treatments, the four P3-230/250 jobs performed in the last year were re-evaluated to see how closely they followed the original correlation. In comparing the injection efficiencies, derived from post-frac treatment model history matches, the efficiencies just prior to the TSO's were considerably higher than predicted from the original correlation as shown in Fig. 36. This is compared to the injection efficiencies derived from decline analysis efficiency and the 120/130 correlation, with these having been used in the 230/250 final design formulations. This seems to indicate that leak-off in the 230/250 is less pressure dependent than observed in the 120/130, e.g. maybe less natural fracturing. It is recommended that the new correlation be adopted for future 230/250 (and possibly P4) fracture treatments. This should result in obtaining net BHTP increases closer to design predictions, increased conductivity, and being able to more accurately predict fracture growth into adjacent layers.



Well Name/No.	ef(d)	ef(i)[1]	ef(i)[2]	P(res.) (psi)	P(clos.) (psi)
EM 35 (230/250)	0.27	0.08	0.16	1746	3370
EM 36 (230/250)	0.16	0.05	0.05	1774	3400
EM 37 (230/250)	0.43	0.20	****	1770	3280
EM 38 (230/250)	0.32	0.13	0.23	1735	3350
EM 38 (P4)	0.47	0.22	0.30	1851	3740

Note: (1) ef(i)[1] determined from original Mereenie 120/130 efficiency correlation.
(2) ef(i)[2] determined from post-frac treatment model history matching of efficiency just prior to TSO.
(3) EM 37 (230/250) treatment post-frac analysis has not been completed.

FIG. 36 - Revised Mereenie efficiency correlation for Pacoota P3-230/250 sands.

To evaluate post-frac potential with the estimated fracture dimensions, NSI's single-phase production model was used. With an average permeability of 10 md, a net pay of 29.5 ft, a porosity of 9%, a reservoir pressure of 1735 psi, a BHFP of 750 psi, and a drainage area of 160 acres; the estimated initial post-frac rate is on the order of 300 bopd as shown in Table 6.

TABLE 6 - Post-frac performance prediction for E. Mereenie 38 (P3-190/230/250).

Formation/Reservoir Data	
Type of Well	Oil
Permeability (md)	10.000
Net Pay (ft)	29.5
Porosity	0.090
Water Saturation	0.200
Pressure (psi) - Reservoir	1735.0
BHFP	750.0
Frac Closure	3350.0
Formation Temp (deg_F)	143
Drainage Area (acres)	160
Reservoir Fluid Data	
Viscosity (cp)	1.780
Compressibility (e6 1/psi)	13.13
Volume Factor (B-Oil)	1.090
Oil Gravity	38.00
Fracture -	
1/2 Length, Xf (ft)	500.0
Conductivity, KfW (md-ft)	1000.0

E. MEREENIE #38 (P3-190/230/250) POST-FRAC EVALUATION

Time	Rate (BOPD)	Cum (MBO)	Time	Rate (BOPD)	Cum (MBO)
0.25 mon	305.2	2.4	3.00 mon	119.6	19.1
0.50 mon	274.5	4.6	6.00 mon	56.7	27.1
1.00 mon	229.4	8.5	12.00 mon	8.7	33.1
2.00 mon	174.3	14.6			

CONCLUSIONS / RECOMMENDATIONS

From pre-frac test analysis, closure pressure was 3350 psi (0.691 psi/ft), fluid efficiency from pressure decline analysis was 0.32, and net BHTP was on the order of 750-800 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 0.13 for final design formulation. A moderate downhole "excess" pressure of 300 psi was measured on the minifrac with the crosslinked gel at 15 bpm.

With the desire to not fracture into the alternative pay zone P3-120/130, it was possible to design and execute a small treatment to accomplish this, the distance between the two zones being 57 ft. The small treatment did, however, require considerable planning and precise execution. The treatment was pumped fairly close to design, placing 93% of the designed proppant amount in the fracture with 101% of the design gel volume. The post-frac model history match of the treatment net BHP's required slight stress and modulus changes from the minifrac history match, and a reduction in leak-off in the pay zones from 0.008 to 0.0052 ft/sq.rt. minute (similar reductions in leak-off also required on EM #35 and #36 P3-230/250 to history match treatment pressures). The resultant TSO net pressure gain was on the order of 400 psi (considerably less than design prediction) and the model-predicted dimensions were a propped half-length of 158 ft (design - 84 ft), a maximum height of 132 ft (design - 105 ft), an average conductivity of 1080 md-ft (design 2695 ft), and an average in-situ concentration of 0.6 lbs/sq.ft. (design - 1.2 lbs/sq.ft.). The lower achieved conductivity was due to the greater fracture area created than design predictions, this a result of the lower than predicted leak-off. The modeled fracture top was at 4768 ft or 13 ft below the P3-120/130. Based on this analysis, the treatment did not come very close to design predictions.

With injection leak-off repeatedly lower on the 230/250 treatments than predicted with the original P3-120/130 efficiency correlation, this was re-evaluated in light of the recent treatments. The 230/250 does not follow behavior consistent with the original (120/130) correlation, with leak-off appearing to be less pressure dependent than observed in the 120/130. A revised 230/250 correlation was derived and presented

herein and should be used for future designs in this zone, updating the correlation with each subsequent treatment.

An estimate of initial post-frac production for the P3-230/250 in EM #38, using a single-phase production model and the reservoir and fracturing parameters from pre-frac buildup testing and the analysis in this report, is 300 bopd at a BHFP of 750 psi.

APPENDIX A

Fracture Model Simulations

Frac Summary * SANTOS - EM#37 (190/230/250) FINAL FRAC DESIGN
Filename: EM37FD.FRK ; Jul 30, 95

Design Data

FLUID LOSS LAYERS:	Top (ft)	Bottom (ft)	Thick (ft)	Loss Coef. (ft/sqrt(min))	Spurt (Gal/100 ft^2)
	4610.0	4643.0	33.0	0.01000	0.50
	4643.0	4690.0	47.0	0.00010	0.00
	4690.0	4745.0	55.0	0.00500	0.20
	4745.0	4900.0	155.0	0.00010	0.00

FORMATION:	Modulus (e6_psi)	6.63
	Perforated Height (ft)	30.0
	Permeability (md)	10.000
TEMPERATURE:	Bottom Hole (deg_F)	143
PRESSURE:	Reservoir Pressure (psi)	1770.0
	Closure Pressure (psi)	3300.0
DEPTH:	Well Depth (ft)	4690.0

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)
4610.0	4643.0	33.0	2100.0	2100.0	0.000	5.50	3000.0
4643.0	4675.0	32.0	4500.0	4500.0	0.000	8.00	3000.0
4675.0	4690.0	15.0	4500.0	4500.0	0.000	8.00	3000.0
4690.0	4705.0	15.0	3300.0	3300.0	0.000	6.50	3000.0
4705.0	4709.0	4.0	4000.0	4000.0	0.000	7.50	3000.0
4709.0	4720.0	11.0	3400.0	3400.0	0.000	6.50	3000.0
4720.0	4732.0	12.0	4050.0	4050.0	0.000	7.50	3000.0
4732.0	4745.0	13.0	3500.0	3500.0	0.000	6.50	3000.0
4745.0			5000.0		0.000	8.00	3000.0

	Fluid Pressure Gradient (psi/ft)	0.450
	Initial Fracture Top (ft)	4690
	Initial Fracture Bottom (ft)	4720
3-D SIMULATOR	Step Size (ft)	3.0
PROGRAM CONTROL	Time Step (min)	1.0

Calculated Results
from 3-D Simulator
STIMPLAN (TM) , NSI , Tulsa,OK
Licensed To: Internal Use - NSI Technologies

1/2 LENGTH:	'Hydraulic' length (ft)	117.2
	Propped length (ft)	115.7
PRESSURE:	Max Net Pressure (psi)	2694.5
TIME:	Max Exposure to Form. Temp. (min)	4.6
	Time to Close (min)	6.4
RATE:	Fluid Loss Rate during pad (_BPM) ..	12.87
EFFICIENCY:	at end of pumping schedule	0.27
PROPPANT:	Average In Situ Conc. (#/sq ft)	1.0
	Average Conductivity (md-ft)	1874
HEIGHT:	Max Fracture Height (ft)	123.1
WIDTH:	Avg width at end of pumping (in) ...	0.18

StimPlan 2.50 (TM). NSI Technologies, Tulsa, OK
Licensed To: Internal Use - NSI Technologies

WELL ID:	SANTOS - EM#37 (190/230/250) FINAL FRAC DESIGN	
DEPTH:	Well Depth (ft)	4690
PRESSURE:	Reservoir Pressure (psi)	1770
	Closure Pressure (psi)	3300
TEMPERATURE:	Bottom Hole Temperature (deg_F)	143

**** Pumping Schedule ****

Sl Vol (MGal)	Fl Vol (MGal)	Conc (_PPG_)	Rate (_BPM)	Fluid Type	Prop Type	Cum Prop (MLbs)	Pump Time (min)
1.50	1.50	0.0	5.00	2	1	0.0	7.1
0.25	0.25	0.0	8.00	1	1	0.0	0.7
0.25	0.25	0.0	12.00	1	1	0.0	0.5
1.50	1.50	0.0	15.00	1	1	0.0	2.4
0.61	0.60	0.5	15.00	1	1	0.3	1.0
0.52	0.50	1.0	15.00	1	1	0.8	0.8
0.44	0.40	2.0	15.00	1	1	1.6	0.7
0.45	0.40	3.0	15.00	1	1	2.8	0.7
0.47	0.40	4.0	15.00	1	1	4.4	0.7
0.49	0.40	5.0	15.00	1	1	6.4	0.8
0.51	0.40	6.0	15.00	1	1	8.8	0.8
0.52	0.40	7.0	15.00	1	1	11.6	0.8
0.54	0.40	8.0	15.00	1	1	14.8	0.9

Total Slurry ...	8.1	Total Fluid ...	7.4
Total Proppant ...	14.8	Avg. Conc	2.0
Total Pump Time	18.0 min		

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) .	10	10	10	10	10	10
non-Newtonian n'	0.90	0.90	0.90	0.90	0.90	0.90
K(lb·sec/ft^2)x1000	0.34	0.34	0.34	0.34	0.34	0.34

TABLE A-1

Fluid ID No. 1	BORAGEL_H3595					
Specific Gravity					1.04	
	@Welbor	@FormTmp	@1Hr	@2Hr	@4Hr	@8Hr
vis (cp @ 170 1/sec) .	325	275	225	175	10	2
non-Newtonian n'	0.38	0.40	0.41	0.42	0.90	0.95
K(lb·sec/ft^2)x1000	160.82	122.80	95.44	70.51	0.34	0.05

Time History * NSI STIMPLAN 3-D Fracture Simulation
SANTOS - EM#37 (190/230/250) FINAL FRAC DESIGN

Time (min)	Pen (ft)	Pres (psi)	Rate (_BPM)	Prop (_PPG_)	Sl Vol (MGal)	Eff- ciency	Loss (_BPM)	Hght (ft)	W-Avg (in)
0.3	14	355	5.00	0.0	0.1	0.10	4.4	31	0.01
0.4	17	381	5.00	0.0	0.1	0.11	4.3	32	0.01
0.6	20	408	5.00	0.0	0.1	0.11	4.5	34	0.01
0.7	23	426	5.00	0.0	0.1	0.10	4.7	34	0.01
0.9	26	441	5.00	0.0	0.2	0.09	4.8	35	0.01
1.0	29	455	5.00	0.0	0.2	0.08	4.8	35	0.01
1.3	32	464	5.00	0.0	0.3	0.07	4.8	35	0.01
1.5	35	468	5.00	0.0	0.3	0.07	4.8	36	0.01
1.8	38	476	5.00	0.0	0.4	0.07	4.8	36	0.01
2.1	41	484	5.00	0.0	0.4	0.07	4.8	36	0.02
2.4	44	491	5.00	0.0	0.5	0.06	4.8	36	0.02
2.7	47	498	5.00	0.0	0.6	0.06	4.8	36	0.02
3.1	50	501	5.00	0.0	0.6	0.06	4.8	36	0.02
3.5	53	507	5.00	0.0	0.7	0.06	4.8	37	0.02
3.9	56	513	5.00	0.0	0.8	0.06	4.8	37	0.02
4.3	59	517	5.00	0.0	0.9	0.05	4.8	37	0.02
4.8	62	523	5.00	0.0	1.0	0.05	4.8	38	0.02
5.3	65	530	5.00	0.0	1.1	0.05	4.9	38	0.02
5.9	68	531	5.00	0.0	1.2	0.05	4.8	38	0.02
6.5	71	544	5.00	0.0	1.4	0.05	4.8	39	0.02
7.2	73	537	5.00	0.0	1.5	0.05	4.8	39	0.02
7.4	76	980	8.00	0.0	1.6	0.05	5.9	58	0.02
7.9	79	907	8.00	0.0	1.8	0.06	6.7	75	0.02
8.4	81	957	12.00	0.0	2.0	0.09	8.4	82	0.03
9.3	84	1153	15.00	0.0	2.6	0.13	11.1	123	0.03
10.3	84	938	15.00	0.0	3.2	0.16	11.3	123	0.05
10.5	87	976	15.00	0.0	3.3	0.15	14.2	123	0.05
10.6	90	942	15.00	0.0	3.4	0.15	12.4	123	0.05
10.7	93	922	15.00	0.0	3.5	0.15	12.9	123	0.05
10.9	96	913	15.00	0.0	3.6	0.15	12.6	123	0.05
11.1	99	914	15.00	0.5	3.7	0.15	12.9	123	0.05
11.3	102	915	15.00	0.5	3.8	0.15	12.9	123	0.05
11.6	105	920	15.00	0.5	4.0	0.15	13.0	123	0.05
11.9	108	925	15.00	0.5	4.2	0.15	13.2	123	0.05
12.2	111	932	15.00	1.0	4.4	0.15	13.1	123	0.05
12.5	114	940	15.00	1.0	4.6	0.15	13.1	123	0.05
Bridge Stage 5 at 13 min, at 95.4 (ft), Avg Dia/W 0.03/0.03 in									
13.4	117	1082	15.00	1.0	5.2	0.16	11.3	123	0.06
Bridge Stage 5 at 13 min, at 96.9 (ft), Avg Dia/W 0.03/0.03 in									
ScreenOut in Stage 5 at Time = 13.4 min at 110 (ft)									
14.3	117	1325	15.00	3.0	5.8	0.18	9.3	123	0.09
Bridge Stage 5 at 14 min, at 99.3 (ft), Avg Dia/W 0.03/0.05 in									
ScreenOut in Stage 5 at Time = 14.3 min at 107 (ft)									
15.3	117	1630	15.00	4.0	6.3	0.21	8.4	123	0.11
16.2	117	1960	15.00	5.0	6.9	0.23	7.7	123	0.13
17.1	117	2316	15.00	6.0	7.5	0.25	7.2	123	0.15
ScreenOut in Stage 6 at Time = 17.1 min at 104 (ft)									
18.0	117	2694	15.00	7.0	8.1	0.27	6.8	123	0.18
18.8	117	2425	0.00	0.0	8.1	0.25	6.6	123	0.17
19.7	117	2156	0.00	0.0	8.1	0.22	6.3	123	0.15
20.6	117	1886	0.00	0.0	8.1	0.20	6.0	123	0.14
21.5	117	1617	0.00	0.0	8.1	0.17	5.8	123	0.13
22.5	117	1347	0.00	0.0	8.1	0.15	5.6	123	0.12

23.5	117	1078	0.00	0.0	8.1	0.14	5.4	123	0.11
24.4	117	808	0.00	0.0	8.1	0.13	5.2	123	0.11

GEOMETRY SUMMARY * At End of Pumping Schedule
SANTOS - EM#37 (190/230/250) FINAL FRAC DESIGN

Dstnce (ft)	Press (psi)	W-Avg (in)	Q (_BPM)	Sh-Rate (1/sec)	Hght (ft) Total	Up	Dn	Prop	Bank Fraction	Prop (PSF)
5	2694	0.25	7.4	33	123	48	45	105	0.00	1.15
12	2693	0.22	6.4	42	108	36	41	92	0.00	1.03
15	2692	0.22	6.2	41	104	35	39	89	0.00	0.99
18	2691	0.22	5.9	41	101	33	38	86	0.00	1.02
21	2690	0.22	5.7	41	97	32	36	83	0.00	1.02
24	2688	0.22	5.4	41	94	30	34	80	0.00	1.02
27	2687	0.22	5.2	41	91	28	34	78	0.00	1.02
30	2686	0.22	5.0	41	89	25	33	76	0.00	0.99
33	2684	0.22	4.8	41	86	23	33	73	0.00	0.93
36	2683	0.21	4.6	43	82	19	33	70	0.00	1.00
39	2682	0.21	4.4	42	81	18	33	69	0.00	1.00
42	2680	0.21	4.2	40	80	18	33	68	0.00	1.00
45	2679	0.21	4.0	40	78	15	32	66	0.00	0.99
48	2678	0.21	3.8	40	77	15	32	66	0.00	0.95
51	2676	0.20	3.6	39	76	14	32	65	0.00	0.87
54	2675	0.20	3.4	39	76	13	32	64	0.00	0.91
57	2673	0.20	3.2	37	75	13	32	64	0.00	0.97
60	2672	0.20	3.0	36	75	13	31	63	0.00	0.97
63	2670	0.19	2.8	35	74	13	31	63	0.00	0.96
66	2669	0.19	2.6	33	74	13	31	63	0.00	0.89
69	2667	0.19	2.4	32	74	13	30	62	0.00	0.85
72	2666	0.19	2.2	30	73	13	30	62	0.00	0.89
75	2665	0.18	2.0	28	73	13	30	61	0.00	1.04
78	2663	0.18	1.8	26	72	13	29	61	0.00	1.03
80	2662	0.18	1.6	25	72	13	29	60	0.00	0.94
82	2661	0.18	1.5	23	71	13	28	60	0.00	0.93
84	2660	0.18	1.3	20	71	13	28	59	0.00	0.92
86	2660	0.17	1.3	21	71	13	28	59	0.00	0.91
89	2658	0.17	1.1	18	70	13	27	58	0.00	1.15
92	2657	0.16	0.9	18	66	12	24	53	0.00	1.03
95	2655	0.15	0.7	18	57	9	18	45	0.00	1.04
98	2649	0.13	0.5	25	42	4	8	31	0.00	0.91
101	2634	0.13	0.4	27	32	2	0	31	0.15	0.84
104	2626	0.13	0.3	21	32	2	0	31	0.79	1.28
107	2211	0.13	0.2	22	30	0	0	30	1.00	1.21
110	889	0.05	0.2	256	22	0	0	22	1.00	0.51
113	295	0.02	0.2	2676	18	0	0	18	1.00	0.23
116	188	0.04	0.2	1156	17	0	0	17	1.00	0.38

FLUID SUMMARY * At End of Pumping Schedule
SANTOS - EM#37 (190/230/250) FINAL FRAC 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	117	0.0	0.0	0.0	0.1	0.1	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.1	0.3	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.1	0.3	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.1	0.2	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.2	0.2	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.2	0.3	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.3	0.3	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.3	0.3	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.4	0.3	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.4	0.3	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.5	0.3	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.6	0.4	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.6	0.4	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.7	0.4	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.8	0.5	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	0.9	0.5	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	1.0	0.5	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	1.1	0.6	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	1.2	0.6	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	1.4	0.4	143	6	0.00
1	1	2	1	117	0.0	0.0	0.0	1.5	0.4	143	6	0.00
2	1	1	1	117	0.0	0.0	0.0	1.5	0.9	143	11	0.00
2	1	1	1	117	0.0	0.0	0.0	1.6	0.5	143	18	0.00
2	1	1	1	117	0.0	0.0	0.0	1.8	0.7	143	22	0.00
3	1	1	1	117	0.0	0.0	0.0	1.8	1.7	143	19	0.00
3	1	1	1	117	0.0	0.0	0.0	2.0	1.0	143	14	0.00
4	1	1	1	117	0.0	0.0	0.0	2.0	1.6	143	26	0.00
4	1	1	1	117	0.0	0.0	0.0	2.6	1.0	143	12	0.00
4	1	1	1	117	0.0	0.0	0.0	3.2	1.1	143	15	0.00
4	1	1	1	117	0.0	0.0	0.0	3.3	1.0	143	15	0.00
4	1	1	1	117	0.0	0.0	0.0	3.4	1.4	143	15	0.00
4	1	1	1	117	0.0	0.0	0.0	3.5	1.1	143	20	0.00
4	1	1	1	117	0.0	0.0	0.0	3.5	1.8	143	20	0.00
5	1	1	1	117	0.5	45.3	0.0	3.6	1.5	143	20	0.00
5	1	1	1	117	0.5	45.3	0.0	3.7	1.5	143	20	0.00
5	1	1	1	109	0.5	45.3	0.0	3.8	2.2	143	86	0.00
5	1	1	1	107	0.5	45.3	0.0	4.0	1.9	143	98	0.00
5	1	1	1	107	0.5	45.3	0.0	4.1	3.4	143	294	0.00
6	1	1	1	107	1.0	45.3	0.0	4.2	3.4	143	278	0.00
6	1	1	1	107	1.0	45.3	0.0	4.4	3.7	143	352	0.00
6	0	1	1	102	1.0	20.8	0.5	4.6	4.6	143	403	0.00
6	0	1	1	98	1.0	8.9	0.9	4.6	4.6	143	408	0.00
7	0	1	1	94	2.0	13.9	1.3	5.0	3.7	143	477	0.00
8	0	1	1	89	3.0	16.2	1.8	5.1	3.7	143	490	0.00
8	0	1	1	83	3.0	10.1	2.5	5.4	2.7	143	435	0.00
9	0	1	1	76	4.0	11.4	3.0	5.7	1.8	143	387	0.00
9	0	1	1	69	4.0	8.4	3.8	5.9	1.8	143	355	0.00
10	0	1	1	60	5.0	9.6	4.3	6.1	0.9	143	327	0.00
10	0	1	1	51	5.0	7.9	5.1	6.3	0.9	143	311	0.00
11	0	1	1	41	6.0	9.0	5.4	6.6	0.0	143	304	0.00
11	0	1	1	32	6.0	7.7	6.2	6.7	0.0	143	303	0.00
12	0	1	1	23	7.0	8.7	6.4	7.1	0.0	103	331	0.00
12	0	1	1	15	7.0	7.8	7.2	7.1	0.0	80	344	0.00
13	0	1	1	7	8.0	8.8	7.3	7.5	0.0	75	387	0.00

PROPPANT SUMMARY * At End of Pumping Schedule
SANTOS - EM#37 (190/230/250) FINAL FRAC DESIGN

Lb/Sq-Ft Lost to Embedment 0.200

Distance (ft)	KfW (md-ft)	Prop Concentration(Total lb/sq foot) Prop ID--> 1
5.3	2085	1.10
12.0	1831	1.00
15.0	1738	1.00
18.0	1796	1.00
21.0	1803	1.00
24.0	1807	1.00
27.0	1795	1.00
30.0	1736	1.00
33.0	1602	0.90
36.0	1753	1.00
39.0	1749	1.00
42.0	1747	1.00
45.0	1736	1.00
48.0	1645	0.90
51.0	1467	0.90
54.0	1563	0.90
57.0	1702	1.00
60.0	1691	1.00
63.0	1680	1.00
66.0	1505	0.90
69.0	1437	0.90
72.0	1508	0.90
75.0	1836	1.00
77.6	1825	1.00
79.8	1633	0.90
82.5	1595	0.90
84.1	1574	0.90
85.7	1569	0.90
88.7	2088	1.20
91.7	1830	1.00
94.7	1849	1.00
97.7	1549	0.90
100.7	1403	0.80
103.7	2368	1.30
106.7	2207	1.20
109.7	677	0.50
112.7	61	0.20
115.7	392	0.40

Average Conductivity (md-ft) 1656

PROPPANT SUMMARY * At Fracture Closure
SANTOS - EM#37 (190/230/250) FINAL FRAC DESIGN

Lb/Sq-Ft Lost to Embedment 0.200

Distance (ft)	KfW (md-ft)	Prop Concentration(Total lb/sq foot) Prop ID--> 1
5.3	1419	0.80
12.0	1262	0.70
15.0	1278	0.80
18.0	1291	0.80
21.0	1333	0.80
24.0	1690	0.90
27.0	1688	0.90
30.0	1686	0.90
33.0	1684	0.90
36.0	1682	0.90
39.0	1683	0.90
42.0	1706	0.90
45.0	2080	1.10
48.0	1984	1.10
51.0	1959	1.00
54.0	1936	1.00
57.0	1928	1.00
60.0	1887	1.00
63.0	1988	1.10
66.0	2146	1.10
69.0	2137	1.10
72.0	2136	1.10
75.0	2053	1.10
77.6	2035	1.10
79.8	2505	1.30
82.5	2553	1.30
84.1	2512	1.30
85.7	2428	1.20
88.7	2383	1.20
91.7	3023	1.50
94.7	3069	1.50
97.7	2924	1.50
100.7	2807	1.40
103.7	2742	1.40
106.7	2326	1.20
109.7	714	0.50
112.7	64	0.20
115.7	413	0.40

Average Conductivity (md-ft) 1874

Frac Summary * E. MEREENIE 38 (P3-230/250) MINIFRAC HISTORY MATCH
Filename: EM38BMF.FRK ; Oct 30, 95

Design Data

FLUID LOSS LAYERS:	Top (ft)	Bottom (ft)	Thick (ft)	Loss Coef. (ft/sqrt(min))	Spurt (Gal/100 ft^2)
	4765.0	4844.0	79.0	0.00200	0.00
	4844.0	4881.0	37.0	0.00800	0.00
	4919.0	4928.0	9.0	0.00250	0.00
	4928.0	4936.0	8.0	0.01300	0.00
	4936.0	4960.0	24.0	0.00250	0.00

FORMATION:	Modulus (e6_psi)	6.57
	Perforated Height (ft)	30.0
	Permeability (md)	0.700
TEMPERATURE:	Bottom Hole (deg_F)	144
PRESSURE:	Reservoir Pressure (psi)	1850.0
	Closure Pressure (psi)	3350.0
DEPTH:	Well Depth (ft)	4844.0

FORMATION LAYER DATA - Multi-Layer Height Growth

Depth(ft) Top	Depth(ft) Botm	Thick	Stress (psi) Top	Stress (psi) Botm	Gradient (psi/ft)	Modulus (e6_psi)	Toughness (psi/in)
4718.0	4765.0	47.0	2000.0	2000.0	0.000	5.80	3000.0
4765.0	4816.0	51.0	4200.0	4200.0	0.000	7.50	3000.0
4816.0	4844.0	28.0	3900.0	3900.0	0.000	7.00	3000.0
4844.0	4865.0	21.0	3350.0	3350.0	0.000	6.50	3000.0
4865.0	4869.0	4.0	3800.0	3800.0	0.000	7.00	3000.0
4869.0	4881.0	12.0	3350.0	3350.0	0.000	6.50	3000.0
4881.0	4919.0	38.0	4910.0	4936.6	0.700	8.00	3000.0
4919.0	4928.0	9.0	4780.0	4786.3	0.700	7.50	3000.0
4928.0	4936.0	8.0	3740.0	3740.0	0.000	5.50	3000.0
4936.0	4982.0	46.0	4755.0	4787.2	0.700	7.50	3000.0
4982.0			5000.0		0.700	8.00	3000.0

	Fluid Pressure Gradient (psi/ft)	0.450
	Initial Fracture Top (ft)	4844
	Initial Fracture Bottom (ft)	4874
3-D SIMULATOR	Step Size (ft)	2.0
PROGRAM CONTROL	Time Step (min)	0.3

Calculated Results
from 3-D Simulator
STIMPLAN (TM) , NSI , Tulsa,OK
Licensed To: Internal Use - NSI Technologies

1/2 LENGTH:	'Hydraulic' length (ft)	60.3
	Propped length (ft)	0.0
PRESSURE:	Max Net Pressure (psi)	770.8
	Surface Pres-Start of Flush (psi)	3863.3
	Surface Pres-End of Job (psi)	3863.3
	Maximum Hydraulic Horsepower	1400
TIME:	Max Exposure to Form. Temp. (min)	0.7
	Time to Close (min)	0.6
RATE:	Fluid Loss Rate during pad (_BPM)	0.00
EFFICIENCY:	at end of pumping schedule	0.13
PROPPANT:	Average In Situ Conc. (#/sq ft)	0.0
	Average Conductivity (md-ft)	0
HEIGHT:	Max Fracture Height (ft)	98.3
WIDTH:	Avg width at end of pumping (in)	0.04

TABLE A-2

StimPlan 2.50 (TM). NSI Technologies, Tulsa, OK
Licensed To: Internal Use - NSI Technologies

WELL ID:
E. MEREENIE 38 (P3-230/250) MINIFRAC HISTORY MATCH

DEPTH:	Well Depth (ft)	4844
PRESSURE:	Reservoir Pressure (psi)	1850
	Closure Pressure (psi)	3350
TEMPERATURE:	Bottom Hole Temperature (deg_F)	144

** Pumping Schedule **

Sl Vol (MGal)	Fl Vol (MGal)	Conc (_PPG_)	Rate (_BPM)	Fluid Type	Prop Type	Cum Prop (MLbs)	Pump Time (min)
0.11	0.11	0.0	6.06	4	1	0.0	0.4
0.25	0.25	0.0	14.00	4	1	0.0	0.4
0.35	0.35	0.0	14.83	4	1	0.0	0.6
1.34	1.34	0.0	14.50	4	1	0.0	2.2

Total Slurry ...	2.0	Total Fluid ...	2.0
Total Proppant ...	0.0	Avg. Conc	0.0
Total Pump Time	3.6 min		

Proppant ID No. 1 20- 40 CARBO-LITE

Specific Gravity					2.72
'Damage Factor'					0.70
Proppant Stress (Mpsi)	0	2	4	8	16
KfW @ 2 #/sq ft (md-ft)	10500	9200	7600	3200	500

Fluid ID No. 4 BORAGEL_H3595

Specific Gravity 1.04

	@Welbor	@FormTmp	@1Hr	@2Hr	@4Hr	@8Hr
vis (cp @ 170 1/sec) .	400	350	275	150	10	2
non-Newtonian n'	0.38	0.40	0.41	0.42	0.90	0.98
K(lb·sec/ft^2)x1000	197.93	156.29	116.65	60.44	0.34	0.05

Q (_BPM)	dP/dL (psi/100ft)
5.0	30.0
10.0	32.0
15.0	40.0
20.0	60.0
Measured Depth (ft) ...	4900.0

Time History * NSI STIMPLAN 3-D Fracture Simulation
E. MEREENIE 38 (P3-230/250) 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)
0.3	11	533	6.06	0.0	0.1	0.11	5.3	31	0.02
0.4	13	550	6.06	0.0	0.1	0.12	5.0	31	0.02
0.5	15	667	14.00	0.0	0.1	0.14	8.9	31	0.03
0.5	17	735	14.00	0.0	0.1	0.15	10.4	37	0.02
0.5	19	711	14.00	0.0	0.2	0.15	11.8	41	0.02
0.6	21	731	14.00	0.0	0.2	0.15	12.2	45	0.02
0.6	23	765	14.00	0.0	0.2	0.14	12.0	50	0.02
0.7	25	738	14.00	0.0	0.3	0.14	12.3	54	0.02
0.8	27	727	14.00	0.0	0.3	0.14	12.2	59	0.02
0.9	29	735	14.00	0.0	0.4	0.14	11.9	63	0.02
1.0	31	740	14.83	0.0	0.4	0.14	12.4	67	0.02
1.1	33	730	14.83	0.0	0.5	0.14	12.8	72	0.02
1.2	35	723	14.83	0.0	0.6	0.14	12.8	76	0.03
1.4	37	714	14.83	0.0	0.7	0.14	12.6	81	0.03
1.5	39	712	14.83	0.0	0.8	0.15	12.7	84	0.03
1.7	41	714	14.50	0.0	0.9	0.14	12.5	87	0.03
1.8	43	730	14.50	0.0	0.9	0.14	12.4	89	0.03
2.0	45	735	14.50	0.0	1.0	0.14	12.7	91	0.03
2.2	47	736	14.50	0.0	1.2	0.14	12.7	91	0.03
2.4	49	743	14.50	0.0	1.3	0.14	12.8	92	0.03
2.6	51	736	14.50	0.0	1.4	0.14	12.9	92	0.04
2.7	53	752	14.50	0.0	1.5	0.14	12.5	94	0.04
2.9	55	750	14.50	0.0	1.6	0.14	12.7	94	0.04
3.2	57	757	14.50	0.0	1.8	0.13	12.8	96	0.04
3.4	59	758	14.50	0.0	1.9	0.13	12.9	96	0.04
3.6	60	771	14.50	0.0	2.0	0.13	12.2	98	0.04
3.7	60	694	0.00	0.0	2.0	0.12	26.4	98	0.04
3.7	60	617	0.00	0.0	2.0	0.10	11.7	98	0.03
3.8	60	540	0.00	0.0	2.0	0.09	11.3	98	0.03
3.8	60	463	0.00	0.0	2.0	0.08	11.0	98	0.02
3.9	60	385	0.00	0.0	2.0	0.06	10.7	98	0.02
4.0	60	308	0.00	0.0	2.0	0.05	10.5	98	0.02
4.1	60	231	0.00	0.0	2.0	0.04	10.2	98	0.02
4.2	60	154	0.00	0.0	2.0	0.03	9.9	98	0.02
4.3	60	77	0.00	0.0	2.0	0.02	9.6	98	0.01

GEOMETRY SUMMARY * At End of Pumping Schedule
E. MEREENIE 38 (P3-230/250) 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	762	0.06	7.3	695	98	53	15	84	0.00	0.00
10	746	0.06	6.5	686	95	50	15	81	0.00	0.00
12	739	0.06	6.3	697	93	49	15	80	0.00	0.00
14	732	0.06	6.1	707	92	48	14	79	0.00	0.00
16	725	0.06	5.9	721	91	46	14	78	0.00	0.00
18	717	0.06	5.7	733	89	45	14	77	0.00	0.00
20	710	0.05	5.6	744	88	44	14	76	0.00	0.00
22	703	0.05	5.4	756	86	42	14	75	0.00	0.00
24	695	0.05	5.2	768	85	41	14	74	0.00	0.00
26	688	0.05	5.0	781	83	40	14	73	0.00	0.00
28	680	0.05	4.8	795	82	38	13	72	0.00	0.00
30	672	0.05	4.6	799	80	37	13	71	0.00	0.00
32	664	0.05	4.4	798	79	35	13	70	0.00	0.00
34	655	0.05	4.2	805	78	35	13	68	0.00	0.00
36	646	0.05	4.0	813	77	34	13	67	0.00	0.00
38	630	0.05	3.7	835	76	33	13	65	0.00	0.00
40	619	0.04	3.4	869	75	32	13	63	0.00	0.00
42	608	0.04	3.2	896	74	31	13	61	0.00	0.00
44	595	0.04	2.9	1121	70	27	12	52	0.00	0.00
46	567	0.03	2.6	1237	68	26	12	49	0.00	0.00
48	535	0.03	2.2	1929	60	18	12	42	0.00	0.00
50	523	0.02	1.7	3809	48	7	11	35	0.00	0.00
52	478	0.02	1.4	3341	32	1	1	31	0.00	0.00
54	414	0.02	1.1	3611	30	0	0	30	0.00	0.00
56	359	0.01	0.7	9999	28	0	0	28	0.00	0.00
58	268	0.01	0.4	9999	18	0	0	18	0.00	0.00
59	144	0.00	0.3	9999	15	0	0	15	0.00	0.00

FLUID SUMMARY * At End of Pumping Schedule
E. MEREENIE 38 (P3-230/250) 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	4	1	60	0.0	0.0	0.0	0.1	0.1	144	11	0.00
1	1	4	1	60	0.0	0.0	0.0	0.1	0.2	144	13	0.00
2	1	4	1	60	0.0	0.0	0.0	0.1	0.2	144	13	0.00
2	1	4	1	60	0.0	0.0	0.0	0.1	0.1	144	13	0.00
2	1	4	1	60	0.0	0.0	0.0	0.1	0.1	144	13	0.00
2	1	4	1	60	0.0	0.0	0.0	0.2	0.1	144	15	0.00
2	1	4	1	60	0.0	0.0	0.0	0.2	0.2	144	15	0.00
2	1	4	1	60	0.0	0.0	0.0	0.2	0.1	144	14	0.00
2	1	4	1	60	0.0	0.0	0.0	0.3	0.1	144	14	0.00
2	1	4	1	60	0.0	0.0	0.0	0.3	0.2	144	14	0.00
2	1	4	1	60	0.0	0.0	0.0	0.4	0.2	144	15	0.00
3	1	4	1	60	0.0	0.0	0.0	0.4	0.2	144	15	0.00
3	1	4	1	60	0.0	0.0	0.0	0.4	0.3	144	15	0.00
3	1	4	1	60	0.0	0.0	0.0	0.5	0.3	144	15	0.00
3	1	4	1	60	0.0	0.0	0.0	0.6	0.3	144	14	0.00
3	1	4	1	60	0.0	0.0	0.0	0.7	0.3	144	15	0.00
3	1	4	1	60	0.0	0.0	0.0	0.7	0.3	144	15	0.00
4	1	4	1	60	0.0	0.0	0.0	0.8	0.5	144	15	0.00
4	1	4	1	60	0.0	0.0	0.0	0.9	0.5	144	14	0.00
4	1	4	1	60	0.0	0.0	0.0	0.9	0.6	144	15	0.00
4	1	4	1	60	0.0	0.0	0.0	1.0	0.6	144	15	0.00
4	1	4	1	60	0.0	0.0	0.0	1.2	0.6	144	15	0.00
4	1	4	1	60	0.0	0.0	0.0	1.3	0.6	144	15	0.00
4	1	4	1	60	0.0	0.0	0.0	1.4	0.6	144	12	0.00
4	1	4	1	60	0.0	0.0	0.0	1.5	0.7	144	13	0.00
4	0	4	1	50	0.0	0.0	0.0	1.6	0.5	144	36	0.00
4	0	4	1	39	0.0	0.0	0.2	1.8	0.2	144	63	0.00
4	0	4	1	24	0.0	0.0	0.2	1.9	0.0	144	68	0.00
4	0	4	1	8	0.0	0.0	0.3	2.0	0.0	82	75	0.00

Frac Summary * E. MEREENIE 38 (P3-230/250) FINAL TSO FRAC DESIGN
Filename: EM38BFD.FRK ; Oct 30, 95

Design Data

FLUID LOSS LAYERS:	Top (ft)	Bottom (ft)	Thick (ft)	Loss Coef. (ft/sqrt(min))	Spurt (Gal/100 ft^2)
	4765.0	4844.0	79.0	0.00200	0.00
	4844.0	4881.0	37.0	0.00800	0.00
	4919.0	4928.0	9.0	0.00250	0.00
	4928.0	4936.0	8.0	0.01300	0.00
	4936.0	4960.0	24.0	0.00250	0.00

FORMATION:	Modulus (e6_psi)	6.57
	Perforated Height (ft)	30.0
	Permeability (md)	0.700
TEMPERATURE:	Bottom Hole (deg_F)	144
PRESSURE:	Reservoir Pressure (psi)	1850.0
	Closure Pressure (psi)	3350.0
DEPTH:	Well Depth (ft)	4844.0

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)
4718.0	4765.0	47.0	2000.0	2000.0	0.000	5.80	3000.0
4765.0	4816.0	51.0	4200.0	4200.0	0.000	7.50	3000.0
4816.0	4844.0	28.0	3900.0	3900.0	0.000	7.00	3000.0
4844.0	4865.0	21.0	3350.0	3350.0	0.000	6.50	3000.0
4865.0	4869.0	4.0	3800.0	3800.0	0.000	7.00	3000.0
4869.0	4881.0	12.0	3350.0	3350.0	0.000	6.50	3000.0
4881.0	4919.0	38.0	4910.0	4936.6	0.700	8.00	3000.0
4919.0	4928.0	9.0	4780.0	4786.3	0.700	7.50	3000.0
4928.0	4936.0	8.0	3740.0	3740.0	0.000	5.50	3000.0
4936.0	4982.0	46.0	4755.0	4787.2	0.700	7.50	3000.0
4982.0			5000.0		0.700	8.00	3000.0

	Fluid Pressure Gradient (psi/ft)	0.450
	Initial Fracture Top (ft)	4844
	Initial Fracture Bottom (ft)	4874
3-D SIMULATOR PROGRAM CONTROL	Step Size (ft)	Automatic
	Time Step (min)	Automatic

Calculated Results
from 3-D Simulator
STIMPLAN (TM) , NSI , Tulsa,OK
Licensed To: Internal Use - NSI Technologies

1/2 LENGTH:	'Hydraulic' length (ft)	88.2
	Propped length (ft)	84.2
PRESSURE:	Max Net Pressure (psi)	2575.1
	Surface Pres-End of Pad (psi)	3900.4
	Surface Pres-Start of Flush (psi) .	5954.5
	Surface Pres-End of Job (psi)	5703.7
	Maximum Hydraulic Horsepower	2233
TIME:	Max Exposure to Form. Temp. (min)	4.1
	Time to Close (min)	4.1
RATE:	Fluid Loss Rate during pad (_BPM) ..	13.60
EFFICIENCY:	at end of pumping schedule	0.24
PROPPANT:	Average In Situ Conc. (#/sq ft)	1.2
	Average Conductivity (md-ft)	2695
HEIGHT:	Max Fracture Height (ft)	104.9
WIDTH:	Avg width at end of pumping (in) ...	0.19

TABLE A-3

StimPlan 2.50 (TM). NSI Technologies, Tulsa, OK
Licensed To: Internal Use - NSI Technologies

WELL ID:
E. MEREENIE 38 (P3-230/250) FINAL TSO FRAC DESIGN

DEPTH:	Well Depth (ft)	4844
PRESSURE:	Reservoir Pressure (psi)	1850
	Closure Pressure (psi)	3350
TEMPERATURE:	Bottom Hole Temperature (deg_F)	144

** Pumping Schedule **

Sl Vol (MGal)	Fl Vol (MGal)	Conc (_PPG_)	Rate (_BPM)	Fluid Type	Prop Type	Cum Prop (MLbs)	Pump Time (min)
3.25	3.25	0.0	15.00	4	1	0.0	5.2
0.61	0.60	0.5	15.00	4	1	0.3	1.0
0.52	0.50	1.0	15.00	4	1	0.8	0.8
0.44	0.40	2.0	15.00	4	1	1.6	0.7
0.45	0.40	3.0	15.00	4	1	2.8	0.7
0.47	0.40	4.0	15.00	4	1	4.4	0.7
0.49	0.40	5.0	15.00	4	1	6.4	0.8
0.51	0.40	6.0	15.00	4	1	8.8	0.8
0.52	0.40	7.0	15.00	4	1	11.6	0.8
0.54	0.40	8.0	15.00	4	1	14.8	0.9

Total Slurry ...	7.8	Total Fluid ...	7.2
Total Proppant ...	14.8	Avg. Conc	2.1
Total Pump Time	12.4 min		

Proppant ID No. 1 20- 40 CARBO-LITE

Specific Gravity					2.72
'Damage Factor'					0.70
Proppant Stress (Mpsi)	0	2	4	8	16
KfW @ 2 #/sq ft (md-ft)	10500	9200	7600	3200	500

Fluid ID No. 4 BORAGEL_H3595

Specific Gravity 1.04

	@Welbor	@FormTmp	@1Hr	@2Hr	@4Hr	@8Hr
vis (cp @ 170 1/sec) .	400	350	275	150	10	2
non-Newtonian n'	0.38	0.40	0.41	0.42	0.90	0.98
K(lb·sec/ft^2)x1000	197.93	156.29	116.65	60.44	0.34	0.05

Q (_BPM)	dP/dL (psi/100ft)
5.0	30.0
10.0	32.0
15.0	40.0
20.0	60.0

Measured Depth (ft) ... 4900.0

Time History * NSI STIMPLAN 3-D Fracture Simulation
E. MEREENIE 38 (P3-230/250) FINAL TSO FRAC DESIGN

Time (min)	Pen (ft)	Pres (psi)	Rate (_BPM)	Prop (_PPG_)	Sl Vol (MGal)	Eff- ciency	Loss (_BPM)	Hght (ft)	W-Avg (in)
0.1	16	718	15.00	0.0	0.1	0.18	12.2	32	0.02
0.2	20	724	15.00	0.0	0.1	0.20	11.8	44	0.03
0.4	24	715	15.00	0.0	0.3	0.18	12.6	53	0.03
0.5	28	774	15.00	0.0	0.3	0.18	12.1	62	0.03
0.6	32	806	15.00	0.0	0.4	0.17	13.1	71	0.02
0.9	36	793	15.00	0.0	0.6	0.15	13.4	80	0.02
1.2	40	780	15.00	0.0	0.8	0.15	13.2	88	0.03
1.6	44	771	15.00	0.0	1.0	0.14	13.0	96	0.03
2.0	48	771	15.00	0.0	1.3	0.14	13.1	98	0.03
2.4	52	775	15.00	0.0	1.5	0.14	13.3	101	0.03
2.8	56	765	15.00	0.0	1.8	0.14	13.3	101	0.04
3.3	60	784	15.00	0.0	2.1	0.14	13.2	105	0.04
3.8	64	757	15.00	0.0	2.4	0.13	13.4	105	0.04
4.3	68	774	15.00	0.0	2.7	0.13	13.4	105	0.04
4.8	72	766	15.00	0.0	3.0	0.13	13.5	105	0.05
5.3	76	769	15.00	0.0	3.4	0.12	13.4	105	0.05
5.9	80	772	15.00	0.5	3.7	0.12	13.6	105	0.05
6.6	84	771	15.00	0.5	4.2	0.12	13.5	105	0.05
Bridge Stage 2 at 7 min, at 59.6 (ft), Avg Dia/W 0.03/0.05 in									
7.3	88	775	15.00	1.0	4.6	0.12	13.4	105	0.05
Bridge Stage 2 at 7 min, at 62.8 (ft), Avg Dia/W 0.03/0.04 in									
ScreenOut in Stage 2 at Time = 7.3 min at 82 (ft)									
8.3	88	1034	15.00	2.0	5.2	0.14	10.7	105	0.08
Bridge Stage 2 at 8 min, at 76.6 (ft), Avg Dia/W 0.03/0.05 in									
9.3	88	1338	15.00	3.0	5.8	0.17	9.4	105	0.10
ScreenOut in Stage 3 at Time = 9.3 min at 74 (ft)									
10.3	88	1700	15.00	5.0	6.5	0.19	8.6	105	0.13
11.3	88	2100	15.00	6.0	7.1	0.22	8.0	105	0.16
12.4	88	2575	15.00	7.0	7.8	0.24	7.4	105	0.19
13.0	88	2318	0.00	0.0	7.8	0.22	7.2	105	0.19
13.7	88	2060	0.00	0.0	7.8	0.20	6.9	105	0.17
14.4	88	1803	0.00	0.0	7.8	0.18	6.7	105	0.16
15.1	88	1545	0.00	0.0	7.8	0.16	6.5	105	0.14
15.8	88	1288	0.00	0.0	7.8	0.14	6.3	105	0.13
16.5	88	1030	0.00	0.0	7.8	0.13	6.1	105	0.13

GEOMETRY SUMMARY * At End of Pumping Schedule
E. MEREENIE 38 (P3-230/250) FINAL TSO FRAC 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	2575	0.24	7.5	41	105	59	16	91	0.00	1.19
14	2575	0.24	6.2	35	103	58	15	89	0.00	1.15
18	2575	0.24	5.7	33	103	57	15	89	0.00	1.12
22	2575	0.24	5.3	32	102	56	15	87	0.00	1.27
26	2575	0.24	4.9	31	98	53	15	84	0.00	1.25
30	2574	0.23	4.5	30	95	51	15	82	0.00	1.11
34	2572	0.23	4.1	29	93	48	15	80	0.00	1.16
38	2570	0.23	3.7	27	91	46	14	78	0.00	1.35
42	2569	0.23	3.3	26	88	44	14	77	0.00	1.19
46	2567	0.22	3.0	24	85	42	14	75	0.00	1.16
50	2565	0.22	2.6	22	83	39	14	73	0.00	1.34
54	2563	0.22	2.2	21	79	36	13	70	0.00	1.29
58	2562	0.21	1.9	19	77	34	13	67	0.00	1.30
62	2560	0.21	1.5	17	75	32	13	64	0.01	1.43
66	2557	0.20	1.2	15	72	29	13	57	0.05	1.62
70	2549	0.17	0.9	22	48	7	11	35	0.36	1.81
74	2542	0.14	0.6	31	32	1	1	31	1.00	2.14
78	1236	0.07	0.4	169	30	0	0	30	1.00	0.62
82	1208	0.08	0.4	102	28	0	0	28	1.00	0.78
86	183	0.02	0.2	3282	26	0	0	26	1.00	0.18

FLUID SUMMARY * At End of Pumping Schedule
E. MEREENIE 38 (P3-230/250) FINAL TSO FRAC 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	4	1	88	0.0	0.0	0.0	0.1	0.1	144	16	0.00
1	1	4	1	88	0.0	0.0	0.0	0.1	0.3	144	14	0.00
1	1	4	1	88	0.0	0.0	0.0	0.3	0.3	144	17	0.00
1	1	4	1	88	0.0	0.0	0.0	0.3	0.2	144	18	0.00
1	1	4	1	88	0.0	0.0	0.0	0.4	0.3	144	19	0.00
1	1	4	1	88	0.0	0.0	0.0	0.6	0.4	144	19	0.00
1	1	4	1	88	0.0	0.0	0.0	0.8	0.4	144	19	0.00
1	1	4	1	88	0.0	0.0	0.0	1.0	0.4	144	20	0.00
1	1	4	1	88	0.0	0.0	0.0	1.3	0.4	144	20	0.00
1	1	4	1	88	0.0	0.0	0.0	1.5	0.9	144	20	0.00
1	1	4	1	88	0.0	0.0	0.0	1.8	1.0	144	21	0.00
1	1	4	1	88	0.0	0.0	0.0	2.1	1.0	144	21	0.00
1	1	4	1	88	0.0	0.0	0.0	2.4	1.0	144	21	0.00
1	1	4	1	88	0.0	0.0	0.0	2.7	1.1	144	21	0.00
1	1	4	1	88	0.0	0.0	0.0	3.0	1.2	144	21	0.00
1	1	4	1	88	0.0	0.0	0.0	3.3	1.3	144	21	0.00
2	1	4	1	88	0.5	45.3	0.0	3.4	1.3	144	20	0.00
2	1	4	1	84	0.5	45.3	0.0	3.7	0.7	144	55	0.00
2	1	4	1	83	0.5	45.3	0.0	3.9	2.5	144	182	0.00
3	1	4	1	79	1.0	45.3	0.0	4.2	1.8	144	166	0.00
3	1	4	1	76	1.0	45.3	0.0	4.4	3.0	144	334	0.00
4	1	4	1	74	2.0	45.3	0.0	4.6	4.1	144	494	0.00
4	0	4	1	69	2.0	17.4	1.2	4.8	4.1	144	597	0.00
5	0	4	1	64	3.0	19.6	1.6	5.2	3.1	144	680	0.00
5	0	4	1	61	3.0	10.6	2.4	5.2	3.1	144	660	0.00
6	0	4	1	56	4.0	13.7	2.6	5.7	2.1	144	595	0.00
7	0	4	1	51	5.0	16.9	2.8	5.7	2.1	144	553	0.00
7	0	4	1	45	5.0	10.8	3.9	6.1	1.1	144	526	0.00
8	0	4	1	38	6.0	12.9	4.0	6.3	1.1	144	491	0.00
8	0	4	1	32	6.0	9.3	5.3	6.5	0.0	144	471	0.00
9	0	4	1	24	7.0	10.8	5.3	6.8	0.0	138	459	0.00
9	0	4	1	17	7.0	8.5	6.6	6.9	0.0	86	478	0.00
10	0	4	1	7	8.0	9.7	6.6	7.3	0.0	77	436	0.00

PROPPANT SUMMARY * At End of Pumping Schedule
E. MEREENIE 38 (P3-230/250) FINAL TSO FRAC DESIGN

Lb/Sq-Ft Lost to Embedment 0.200

Distance (ft)	KfW (md-ft)	Prop Concentration(Total lb/sq foot) Prop ID--> 1
6.1	2494	1.20
14.2	2389	1.20
18.2	2318	1.10
22.2	2679	1.30
26.2	2651	1.30
30.2	2286	1.10
34.2	2418	1.20
38.2	2883	1.30
42.2	2496	1.20
46.2	2420	1.20
50.2	2865	1.30
54.2	2738	1.30
58.2	2760	1.30
62.2	3089	1.40
66.2	3558	1.60
70.2	4049	1.80
74.2	4879	2.10
78.2	1047	0.60
82.2	1453	0.80
86.2	0	0.20

Average Conductivity (md-ft) 2566

PROPPANT SUMMARY * At Fracture Closure
E. MEREENIE 38 (P3-230/250) FINAL TSO FRAC DESIGN

Lb/Sq-Ft Lost to Embedment 0.200

Distance (ft)	KfW (md-ft)	Prop Concentration(Total lb/sq foot) Prop ID--> 1
6.1	2224	1.10
14.2	2217	1.10
18.2	2032	1.00
22.2	2377	1.10
26.2	2538	1.20
30.2	2471	1.20
34.2	2281	1.10
38.2	2653	1.20
42.2	2945	1.30
46.2	2697	1.20
50.2	2836	1.30
54.2	3698	1.60
58.2	3226	1.40
62.2	3533	1.60
66.2	4516	1.90
70.2	5025	2.10
74.2	5016	2.10
78.2	1077	0.60
82.2	1494	0.80
86.2	0	0.20

Average Conductivity (md-ft) 2695

Frac Summary * E. MEREENIE 38 (P3-230/250) POST-FRAC EVAL.#2
Filename: EM38BFD.FRK ; Jan 11, 96

Design Data

FLUID LOSS LAYERS:	Top (ft)	Bottom (ft)	Thick (ft)	Loss Coef. (ft/sqrt(min))	Spurt (Gal/100 ft^2)
	4765.0	4844.0	79.0	0.00035	0.00
	4844.0	4881.0	37.0	0.00520	0.00
	4919.0	4928.0	9.0	0.00035	0.00
	4928.0	4936.0	8.0	0.00860	0.00
	4936.0	4960.0	24.0	0.00250	0.00

FORMATION:	Modulus (e6_psi)	6.60
	Perforated Height (ft)	30.0
	Permeability (md)	0.700
TEMPERATURE:	Bottom Hole (deg_F)	144
PRESSURE:	Reservoir Pressure (psi)	1850.0
	Closure Pressure (psi)	3350.0
DEPTH:	Well Depth (ft)	4844.0

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)
4718.0	4765.0	47.0	2000.0	2000.0	0.000	5.80	3000.0
4765.0	4816.0	51.0	4300.0	4300.0	0.000	7.25	3000.0
4816.0	4844.0	28.0	4125.0	4125.0	0.000	7.25	3000.0
4844.0	4865.0	21.0	3350.0	3350.0	0.000	6.50	3000.0
4865.0	4869.0	4.0	3550.0	3550.0	0.000	7.25	3000.0
4869.0	4881.0	12.0	3350.0	3350.0	0.000	6.50	3000.0
4881.0	4919.0	38.0	4910.0	4936.6	0.700	8.00	3000.0
4919.0	4928.0	9.0	4780.0	4786.3	0.700	7.50	3000.0
4928.0	4936.0	8.0	3740.0	3740.0	0.000	5.50	3000.0
4936.0	4982.0	46.0	4755.0	4787.2	0.700	7.50	3000.0
4982.0			5000.0		0.700	8.00	3000.0

	Fluid Pressure Gradient (psi/ft)	0.450
	Initial Fracture Top (ft)	4844
	Initial Fracture Bottom (ft)	4874
3-D SIMULATOR	Step Size (ft)	3.7
PROGRAM CONTROL	Time Step (min)	1.5

Calculated Results
from 3-D Simulator
STIMPLAN (TM) , NSI , Tulsa,OK
Licensed To: Internal Use - NSI Technologies

1/2 LENGTH:	'Hydraulic' length (ft)	159.7
	Propped length (ft)	157.9
PRESSURE:	Max Net Pressure (psi)	1378.8
	Surface Pres-End of Pad (psi)	3922.4
	Surface Pres-Start of Flush (psi) .	5125.4
	Surface Pres-End of Job (psi)	4716.9
	Maximum Hydraulic Horsepower	2066
TIME:	Max Exposure to Form. Temp. (min)	3.9
	Time to Close (min)	5.2
RATE:	Fluid Loss Rate during pad (_BPM) ..	12.01
EFFICIENCY:	at end of pumping schedule	0.28
PROPPANT:	Average In Situ Conc. (#/sq ft)	0.6
	Average Conductivity (md-ft)	1081
HEIGHT:	Max Fracture Height (ft)	131.7
WIDTH:	Avg width at end of pumping (in) ...	0.11

TABLE A-4

StimPlan 2.50 (TM). NSI Technologies, Tulsa, OK
Licensed To: Internal Use - NSI Technologies

WELL ID:
E. MEREENIE 38 (P3-230/250) POST-FRAC EVAL.#2

DEPTH:	Well Depth (ft)	4844
PRESSURE:	Reservoir Pressure (psi)	1850
	Closure Pressure (psi)	3350
TEMPERATURE:	Bottom Hole Temperature (deg_F)	144

** Pumping Schedule **

Sl Vol (MGal)	Fl Vol (MGal)	Conc (_PPG_)	Rate (_BPM)	Fluid Type	Prop Type	Cum Prop (MLbs)	Pump Time (min)
0.60	0.60	0.0	13.26	1	1	0.0	1.1
0.39	0.39	0.0	13.89	1	1	0.0	0.7
1.77	1.77	0.0	14.84	1	1	0.0	2.8
0.54	0.54	0.0	15.06	1	1	0.0	0.9
0.34	0.34	0.0	15.43	1	1	0.0	0.5
0.38	0.37	0.6	15.39	1	1	0.2	0.6
0.54	0.52	0.8	15.37	1	1	0.6	0.8
0.46	0.43	1.5	16.21	1	1	1.3	0.7
0.61	0.54	2.9	16.33	1	1	2.8	0.9
0.20	0.17	4.1	16.36	1	1	3.5	0.3
0.28	0.23	4.5	15.90	1	1	4.6	0.4
0.50	0.40	5.5	15.62	1	1	6.8	0.8
0.52	0.40	6.9	16.10	1	1	9.5	0.8
0.67	0.49	8.5	16.12	1	1	13.7	1.0

Total Slurry ...	7.8	Total Fluid ...	7.2
Total Proppant ...	13.7	Avg. Conc	1.9
Total Pump Time	12.2 min		

Proppant ID No. 1 20- 40 CARBO-LITE

Specific Gravity	2.72
'Damage Factor'	0.70

Proppant Stress (Mpsi)	0	2	4	8	16
KfW @ 2 #/sq ft (md-ft)	10500	9200	7600	3200	500

Fluid ID No. 1 BORAGEL_H3595

Specific Gravity 1.04

	@Welbor	@FormTmp	@1Hr	@2Hr	@4Hr	@8Hr
vis (cp @ 170 1/sec)	400	350	275	150	10	2
non-Newtonian n'	0.38	0.40	0.41	0.42	0.90	0.98
K(lb*sec/ft^2)x1000	197.93	156.29	116.65	60.44	0.34	0.05

Q (_BPM)	dP/dL (psi/100ft)
5.0	30.0
10.0	32.0
15.0	40.0
20.0	60.0

Time History * NSI STIMPLAN 3-D Fracture Simulation
E. MEREENIE 38 (P3-230/250) POST-FRAC EVAL.#2

Time (min)	Pen (ft)	Pres (psi)	Rate (_BPM)	Prop (_PPG_)	Sl Vol (MGal)	Eff-ciency	Loss (_BPM)	Hght (ft)	W-Avg (in)
0.1	15	707	13.26	0.0	0.0	0.30	9.4	32	0.02
0.2	19	700	13.26	0.0	0.1	0.31	9.1	42	0.03
0.2	23	698	13.26	0.0	0.1	0.29	9.8	50	0.03
0.3	27	736	13.26	0.0	0.2	0.31	8.7	58	0.03
0.4	30	777	13.26	0.0	0.2	0.30	9.6	66	0.02
0.5	34	767	13.26	0.0	0.3	0.29	10.3	74	0.03
0.6	38	770	13.26	0.0	0.3	0.28	10.2	79	0.03
0.8	41	771	13.26	0.0	0.4	0.27	10.1	82	0.03
0.9	45	774	13.26	0.0	0.5	0.26	10.1	83	0.03
1.1	49	781	13.26	0.0	0.6	0.26	10.2	85	0.03
1.3	52	790	13.89	0.0	0.7	0.26	10.3	86	0.04
1.4	56	796	13.89	0.0	0.8	0.26	10.3	88	0.04
1.6	60	807	13.89	0.0	0.9	0.26	10.5	89	0.04
1.8	64	810	13.89	0.0	1.0	0.25	10.6	90	0.04
2.0	67	827	14.84	0.0	1.1	0.26	10.9	93	0.04
2.2	71	830	14.84	0.0	1.3	0.26	10.9	94	0.04
2.4	75	839	14.84	0.0	1.4	0.25	11.1	95	0.05
2.6	78	845	14.84	0.0	1.5	0.25	11.3	97	0.05
2.8	82	852	14.84	0.0	1.6	0.25	11.4	98	0.05
3.0	86	857	14.84	0.0	1.8	0.25	11.4	100	0.05
3.3	89	863	14.84	0.0	1.9	0.25	11.5	102	0.05
3.5	93	870	14.84	0.0	2.1	0.25	11.6	104	0.05
3.8	97	875	14.84	0.0	2.2	0.25	11.6	106	0.05
4.0	101	878	14.84	0.0	2.4	0.24	11.6	108	0.05
4.3	104	885	14.84	0.0	2.6	0.24	11.6	109	0.05
4.6	108	891	14.84	0.0	2.8	0.24	11.7	111	0.05
4.9	112	897	15.06	0.0	3.0	0.24	11.8	113	0.06
5.2	115	902	15.06	0.0	3.1	0.24	11.8	115	0.06
5.5	119	907	15.06	0.0	3.3	0.23	11.9	116	0.06
5.8	123	914	15.43	0.0	3.5	0.23	11.9	118	0.06
6.2	126	919	15.43	0.0	3.8	0.23	12.0	120	0.06
6.5	130	922	15.39	0.6	4.0	0.23	12.0	121	0.06
6.8	134	920	15.39	0.6	4.2	0.23	12.0	123	0.06
7.2	138	921	15.37	0.8	4.4	0.23	12.1	124	0.06
7.6	141	925	15.37	0.8	4.7	0.23	12.1	126	0.06
7.9	145	932	16.21	1.5	4.9	0.23	12.2	127	0.06
8.3	149	932	16.21	1.5	5.2	0.23	12.3	129	0.06
8.7	152	936	16.33	2.9	5.4	0.23	12.3	130	0.06
9.1	156	942	16.33	2.9	5.7	0.23	12.4	132	0.07
Bridge Stage 6 at 9 min, at 140.5 (ft), Avg Dia/W 0.03/0.03 in									
10.1	160	1028	16.36	4.1	6.4	0.24	11.2	132	0.08
Bridge Stage 6 at 10 min, at 145.3 (ft), Avg Dia/W 0.03/0.04 in									
ScreenOut in Stage 6 at Time = 10.1 min at 150 (ft)									
10.5	160	1082	15.62	5.5	6.7	0.25	9.7	132	0.08
Bridge Stage 7 at 10 min, at 141.6 (ft), Avg Dia/W 0.03/0.06 in									
10.9	160	1148	16.10	6.9	6.9	0.25	9.3	132	0.09
ScreenOut in Stage 7 at Time = 10.9 min at 147 (ft)									
11.3	160	1221	16.10	6.9	7.2	0.26	8.9	132	0.10
11.8	160	1298	16.12	8.5	7.5	0.27	8.6	132	0.11
12.2	160	1379	16.12	8.5	7.8	0.28	8.1	132	0.11
12.8	160	1241	0.00	0.0	7.8	0.25	8.1	132	0.11
13.5	160	1103	0.00	0.0	7.8	0.22	7.7	132	0.10
14.3	160	965	0.00	0.0	7.8	0.20	7.3	132	0.09

15.1	160	827	0.00	0.0	7.8	0.17	7.0	132	0.08
15.9	160	689	0.00	0.0	7.8	0.15	6.8	132	0.07
16.7	160	552	0.00	0.0	7.8	0.13	6.5	132	0.06
17.4	160	414	0.00	0.0	7.8	0.13	6.3	132	0.07

GEOMETRY SUMMARY * At End of Pumping Schedule
E. MEREENIE 38 (P3-230/250) POST-FRAC EVAL.#2

Dstnce (ft)	Press (psi)	W-Avg (in)	Q (_BPM)	Sh-Rate (1/sec)	Hght (ft) Total	Up	Dn	Prop	Bank Fraction	Prop (PSF)
6	1379	0.15	8.0	98	132	76	26	121	0.00	0.63
14	1379	0.14	7.3	98	128	72	26	116	0.00	0.65
17	1379	0.14	7.1	99	126	71	25	114	0.00	0.65
21	1379	0.14	6.8	101	124	69	25	112	0.00	0.64
25	1379	0.13	6.6	103	122	67	25	109	0.00	0.66
28	1376	0.13	6.4	105	120	65	25	107	0.00	0.60
32	1371	0.13	6.2	105	118	63	25	104	0.00	0.56
36	1366	0.13	6.0	104	117	62	25	103	0.00	0.57
39	1361	0.13	5.8	105	114	60	24	100	0.00	0.59
43	1356	0.13	5.6	106	112	58	24	98	0.00	0.59
47	1351	0.13	5.4	106	110	56	24	96	0.00	0.59
51	1346	0.13	5.2	106	107	54	24	93	0.00	0.59
54	1341	0.12	5.0	106	106	52	24	92	0.00	0.52
58	1336	0.12	4.8	106	103	50	23	89	0.00	0.52
62	1331	0.12	4.6	105	102	48	23	87	0.00	0.55
65	1326	0.12	4.4	106	99	46	23	85	0.00	0.59
69	1321	0.12	4.2	105	97	44	22	83	0.00	0.59
73	1316	0.12	4.0	104	95	43	22	81	0.00	0.59
76	1311	0.12	3.9	102	94	42	21	79	0.00	0.53
80	1306	0.12	3.7	101	92	41	21	78	0.00	0.52
84	1301	0.12	3.5	99	90	40	20	76	0.00	0.52
88	1296	0.12	3.3	97	88	39	19	74	0.00	0.51
91	1291	0.11	3.1	95	87	38	19	73	0.00	0.50
95	1286	0.11	2.9	94	85	37	18	71	0.00	0.52
99	1281	0.11	2.8	92	83	35	17	69	0.00	0.44
102	1276	0.11	2.6	90	80	34	16	67	0.00	0.41
106	1271	0.11	2.4	88	78	32	16	64	0.00	0.43
110	1266	0.11	2.2	85	76	31	15	62	0.00	0.48
113	1260	0.11	2.0	83	73	29	14	60	0.00	0.48
117	1255	0.11	1.9	80	71	27	13	57	0.00	0.50
121	1250	0.11	1.7	76	69	26	13	56	0.00	0.57
125	1245	0.10	1.5	71	67	24	13	54	0.00	0.45
128	1240	0.10	1.3	66	64	22	13	52	0.00	0.38
132	1235	0.10	1.1	61	62	19	12	50	0.00	0.42
136	1230	0.10	1.0	56	59	17	12	47	0.00	0.46
139	1222	0.10	0.8	50	55	13	12	43	0.00	0.48
143	1201	0.09	0.6	49	48	7	11	38	0.05	0.61
147	1181	0.07	0.4	89	32	1	1	31	0.57	0.72
150	732	0.06	0.3	191	30	0	0	30	1.00	0.55
154	311	0.03	0.3	1767	23	0	0	23	1.00	0.25
158	181	0.06	0.2	704	22	0	0	22	1.00	0.53

FLUID SUMMARY * At End of Pumping Schedule
E. MEREENIE 38 (P3-230/250) POST-FRAC EVAL.#2

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	1	1	160	0.0	0.0	0.0	0.0	0.1	144	16	0.00
1	1	1	1	160	0.0	0.0	0.0	0.1	0.2	144	17	0.00
1	1	1	1	160	0.0	0.0	0.0	0.1	0.2	144	18	0.00
1	1	1	1	160	0.0	0.0	0.0	0.2	0.1	144	18	0.00
1	1	1	1	160	0.0	0.0	0.0	0.2	0.3	144	19	0.00
1	1	1	1	160	0.0	0.0	0.0	0.3	0.4	144	19	0.00
1	1	1	1	160	0.0	0.0	0.0	0.3	0.5	144	19	0.00
1	1	1	1	160	0.0	0.0	0.0	0.4	0.5	144	19	0.00
1	1	1	1	160	0.0	0.0	0.0	0.5	0.5	144	20	0.00
1	1	1	1	160	0.0	0.0	0.0	0.6	0.5	144	19	0.00
2	1	1	1	160	0.0	0.0	0.0	0.6	0.7	144	19	0.00
2	1	1	1	160	0.0	0.0	0.0	0.7	0.6	144	20	0.00
2	1	1	1	160	0.0	0.0	0.0	0.8	0.6	144	20	0.00
2	1	1	1	160	0.0	0.0	0.0	0.9	0.8	144	20	0.00
2	1	1	1	160	0.0	0.0	0.0	1.0	1.0	144	20	0.00
3	1	1	1	160	0.0	0.0	0.0	1.0	0.8	144	20	0.00
3	1	1	1	160	0.0	0.0	0.0	1.1	0.9	144	20	0.00
3	1	1	1	160	0.0	0.0	0.0	1.3	0.9	144	21	0.00
3	1	1	1	160	0.0	0.0	0.0	1.4	1.2	144	21	0.00
3	1	1	1	160	0.0	0.0	0.0	1.5	1.3	144	21	0.00
3	1	1	1	160	0.0	0.0	0.0	1.6	1.3	144	21	0.00
3	1	1	1	160	0.0	0.0	0.0	1.8	1.4	144	21	0.00
3	1	1	1	160	0.0	0.0	0.0	1.9	1.4	144	21	0.00
3	1	1	1	160	0.0	0.0	0.0	2.1	1.5	144	21	0.00
3	1	1	1	160	0.0	0.0	0.0	2.2	1.8	144	21	0.00
3	1	1	1	160	0.0	0.0	0.0	2.4	1.9	144	22	0.00
3	1	1	1	160	0.0	0.0	0.0	2.6	1.9	144	22	0.00
3	1	1	1	160	0.0	0.0	0.0	2.8	2.0	144	22	0.00
4	1	1	1	160	0.0	0.0	0.0	2.9	2.0	144	22	0.00
4	1	1	1	160	0.0	0.0	0.0	3.1	2.1	144	22	0.00
4	1	1	1	160	0.0	0.0	0.0	3.3	2.1	144	22	0.00
5	1	1	1	160	0.0	0.0	0.0	3.3	2.5	144	22	0.00
5	1	1	1	160	0.0	0.0	0.0	3.5	2.2	144	22	0.00
5	1	1	1	160	0.0	0.0	0.0	3.6	2.2	144	28	0.00
6	1	1	1	160	0.6	45.3	0.0	3.8	2.5	144	28	0.00
6	1	1	1	160	0.6	45.3	0.0	4.0	2.2	144	40	0.00
6	1	1	1	152	0.6	45.3	0.0	4.0	2.9	144	97	0.00
7	1	1	1	150	0.8	45.3	0.0	4.2	3.0	144	137	0.00
7	0	1	1	146	0.8	24.0	0.4	4.4	3.9	144	296	0.00
7	0	1	1	141	0.8	6.3	1.0	4.6	3.9	144	339	0.00
8	0	1	1	138	1.5	10.5	1.3	4.7	3.5	144	331	0.00
8	0	1	1	132	1.5	6.9	1.8	4.9	3.1	144	303	0.00
8	0	1	1	126	1.5	5.2	2.3	5.0	3.1	144	281	0.00
9	0	1	1	121	2.9	10.1	2.5	5.1	2.4	144	267	0.00
9	0	1	1	112	2.9	7.8	3.1	5.3	2.4	144	250	0.00
9	0	1	1	102	2.9	6.3	3.8	5.5	2.4	144	240	0.00
10	0	1	1	96	4.1	8.9	4.0	5.6	1.7	144	235	0.00
10	0	1	1	91	4.1	7.9	4.4	5.7	1.7	144	232	0.00
11	0	1	1	81	4.5	8.3	4.6	5.9	1.3	144	226	0.00
12	0	1	1	68	5.5	9.6	4.9	6.1	0.9	144	220	0.00
12	0	1	1	57	5.5	7.9	5.9	6.3	0.4	144	219	0.00
13	0	1	1	50	6.9	9.9	6.0	6.4	0.4	144	219	0.00
13	0	1	1	43	6.9	9.1	6.5	6.6	0.0	137	222	0.00
13	0	1	1	32	6.9	8.3	7.1	6.7	0.0	86	238	0.00
14	0	1	1	26	8.5	10.3	7.1	6.8	0.0	83	241	0.00
14	0	1	1	17	8.5	9.6	7.6	7.0	0.0	79	248	0.00
14	0	1	1	6	8.5	9.0	8.1	7.2	0.0	73	251	0.00

PROPPANT SUMMARY * At End of Pumping Schedule
E. MEREENIE 38 (P3-230/250) POST-FRAC EVAL.#2

Lb/Sq-Ft Lost to Embedment 0.200

Distance (ft)	KfW (md-ft)	Prop Concentration(Total lb/sq foot) Prop ID--> 1
5.8	1192	0.60
13.5	1234	0.70
17.2	1221	0.60
20.9	1206	0.60
24.6	1257	0.70
28.3	1093	0.60
32.0	992	0.60
35.7	1025	0.60
39.4	1070	0.60
43.1	1063	0.60
46.8	1057	0.60
50.5	1074	0.60
54.2	881	0.50
57.9	876	0.50
61.6	959	0.50
65.3	1076	0.60
69.0	1071	0.60
72.7	1066	0.60
76.4	894	0.50
80.1	878	0.50
83.8	874	0.50
87.5	852	0.50
91.2	817	0.50
94.9	890	0.50
98.6	651	0.40
102.3	582	0.40
106.0	640	0.40
109.7	758	0.50
113.4	759	0.50
117.1	811	0.50
120.8	1002	0.60
124.5	672	0.40
128.2	489	0.40
131.9	609	0.40
135.6	712	0.50
139.3	776	0.50
143.0	1130	0.60
146.7	1413	0.70
150.4	972	0.60
154.1	148	0.30
157.8	916	0.50

Average Conductivity (md-ft) 932

PROPPANT SUMMARY * At Fracture Closure
E. MEREENIE 38 (P3-230/250) POST-FRAC EVAL.#2

Lb/Sq-Ft Lost to Embedment 0.200

Distance (ft)	KfW (md-ft)	Prop Concentration(Total lb/sq foot) Prop ID--> 1
5.8	683	0.40
13.5	668	0.40
17.2	760	0.50
20.9	806	0.50
24.6	790	0.50
28.3	783	0.50
32.0	804	0.50
35.7	911	0.50
39.4	818	0.50
43.1	750	0.50
46.8	749	0.50
50.5	1146	0.60
54.2	887	0.50
57.9	887	0.50
61.6	888	0.50
65.3	982	0.60
69.0	902	0.50
72.7	861	0.50
76.4	862	0.50
80.1	1047	0.60
83.8	1212	0.60
87.5	1216	0.60
91.2	1221	0.60
94.9	1205	0.60
98.6	1211	0.60
102.3	1221	0.60
106.0	1578	0.80
109.7	1224	0.60
113.4	1222	0.60
117.1	1064	0.60
120.8	1309	0.70
124.5	1584	0.80
128.2	1803	0.80
131.9	1755	0.80
135.6	1282	0.70
139.3	1790	0.80
143.0	2270	1.00
146.7	1974	0.90
150.4	988	0.60
154.1	150	0.30
157.8	931	0.50

Average Conductivity (md-ft) 1081

APPENDIX B

Service Co. Treatment Job Log

Customer: SANTOS
Well Desc: EAST MEREENIE 38 38
Formation: Lower p3

Date: 31-Oct-1995
Ticket #: EM38.4
Job Type: FRAC

DATA LISTING

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slry Rate1 (bpm)	Slry Vol1 (gal)	W/head Den (lb/gal)	Well Conc (lb/gal)	PConc/Slur (lb/gal)	Stage Vol (gal)
12:17:24 Stage #1 Start Job								
12:17:28	8235	-21	0.1	0	8.25	0.00	0.00	0
12:17:33	8234	-21	0.0	0	8.27	0.00	0.00	0
12:17:34 Event #1 Test Lines								
12:17:37	8233	-21	0.1	1	8.26	0.00	0.00	1
12:17:42	8232	-20	0.1	1	8.26	0.00	0.00	1
12:17:47	8231	-15	0.0	1	8.28	0.00	0.00	1
12:17:52	8230	-18	0.0	1	8.27	0.00	0.00	1
12:17:57	8230	-24	0.0	1	8.27	0.00	0.00	1
12:18:02	8228	-24	0.0	1	8.25	0.00	0.00	1
12:18:07	8225	-23	0.4	9	8.25	0.00	0.00	9
12:18:12	8222	-21	0.1	9	8.25	0.00	0.00	9
12:18:17	8221	-19	0.0	9	8.25	0.00	0.00	9
12:18:22	8223	-20	0.0	9	8.33	0.00	0.00	9
12:18:22 Event #2 Zero Flow Total								
12:18:26	8226	-19	0.0	0	8.26	0.00	0.00	9
12:18:31	8228	-12	0.0	0	8.25	0.00	0.00	9
12:18:36	8227	4	0.0	0	8.28	0.00	0.00	9
12:18:41	8228	36	0.0	0	8.21	0.00	0.00	9
12:18:46	8227	127	0.0	0	8.24	0.00	0.00	9
12:18:51	8224	487	0.0	0	8.25	0.00	0.00	9
12:18:56	8222	608	0.0	0	8.25	0.00	0.00	9
12:19:01	8221	765	0.0	0	8.20	0.00	0.00	9
12:19:06	8221	960	0.0	0	8.22	0.00	0.00	9
12:19:11	8222	1061	0.0	0	8.23	0.00	0.00	9
12:19:16	8223	1077	0.0	0	8.30	0.00	0.00	9
12:19:21	8222	1078	0.2	0	8.30	0.00	0.00	9
12:19:26	8223	1077	0.2	1	8.27	0.00	0.00	10
12:19:31	6073	1077	0.0	2	8.24	0.00	0.00	11
12:19:36	464	1077	0.0	2	8.22	0.00	0.00	11
12:19:41	201	1077	0.1	2	8.07	0.00	0.00	11
12:19:46	129	1076	0.1	2	8.04	0.00	0.00	11
12:19:51	103	1075	0.1	3	8.07	0.00	0.00	12
12:19:56	95	1076	0.0	3	8.05	0.00	0.00	12
12:20:01	93	1076	0.0	3	7.99	0.00	0.00	12
12:20:06	92	1075	0.0	3	8.08	0.00	0.00	12
12:20:11	87	1075	0.0	3	8.10	0.00	0.00	12

Customer: SANTOS
Well Desc: EAST MEREENIE 38 38
Formation: Lower p3

Date: 31-Oct-1995
Ticket #: EM38.4
Job Type: FRAC

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slry Rate1 (bpm)	Slry Vol1 (gal)	W/head Den (lb/gal)	Well Conc (lb/gal)	PConc/Slur (lb/gal)	Stage Vol (gal)
12:20:14 Event #3 Zero Flow Total								
12:20:15	93	1075	0.1	0	8.10	0.00	0.00	12
12:20:20	106	1075	0.1	0	8.05	0.00	0.00	12
12:20:25	98	1075	0.3	1	8.08	0.00	0.00	13
**** Stage Total 13.23 (gal) ****								
12:20:26 Stage #2 Start Gel								
12:20:29	84	1075	3.7	8	8.08	0.00	0.00	7
12:20:34	68	1075	7.2	26	8.08	0.00	0.00	25
12:20:39	12	1078	5.8	49	8.02	0.00	0.00	47
12:20:44	1932	1105	5.2	68	8.06	0.00	0.00	66
12:20:49	2529	1160	4.9	85	8.13	0.00	0.00	83
12:20:54	2532	1192	4.8	102	8.15	0.00	0.00	101
12:20:59	2522	1189	4.2	117	8.15	0.00	0.00	116
12:21:04	2513	1185	4.1	132	8.19	0.00	0.00	130
12:21:09	2515	1186	4.3	147	8.15	0.00	0.00	145
12:21:14	2509	1184	4.5	162	8.16	0.00	0.00	161
12:21:19	2475	1179	4.5	178	8.15	0.00	0.00	176
12:21:24	2425	1175	4.8	194	8.14	0.00	0.00	193
12:21:29	2389	1171	5.3	212	8.17	0.00	0.00	210
12:21:34	2368	1168	5.5	231	8.15	0.00	0.00	230
12:21:39	2366	1166	5.5	250	8.08	0.00	0.00	249
12:21:44	2388	1162	5.3	269	8.19	0.00	0.00	268
12:21:49	2404	1156	5.3	288	8.17	0.00	0.02	286
12:21:54	2412	1156	5.4	306	8.14	0.00	0.00	305
12:21:59	2428	1154	5.4	325	8.15	0.00	0.01	324
12:22:04	2437	1147	5.4	344	8.16	0.00	0.00	343
12:22:09	2442	1144	5.4	363	8.22	0.00	0.01	362
12:22:14	2460	1140	5.3	382	8.19	0.00	0.00	381
12:22:19	2471	1132	5.2	400	8.18	0.00	0.00	399
12:22:24	2469	1129	5.2	419	8.17	0.00	0.00	417
12:22:29	2477	1127	5.2	437	8.20	0.00	0.00	436
12:22:34	2498	1119	5.4	455	8.18	0.00	0.00	454
12:22:39	2525	1112	5.6	475	8.19	0.00	0.00	473
12:22:44	2545	1114	5.7	494	8.22	0.00	0.00	493
12:22:49	2557	1113	5.4	514	8.20	0.00	0.00	512
12:22:54	2563	1104	5.4	533	8.17	0.00	0.00	531
12:22:59	2558	1094	5.4	552	8.15	0.00	0.00	550
12:23:04	2551	1087	5.2	570	8.15	0.00	0.00	569
12:23:09	2546	1081	5.0	588	8.18	0.00	0.03	587
12:23:14	2547	1078	4.9	605	8.13	0.00	0.00	604
12:23:19	2562	1080	4.7	622	8.16	0.00	0.00	620
12:23:24	2582	1079	4.7	638	8.13	0.00	0.00	637

TABLE B-1

Customer: SANTOS
Well Desc: EAST MEREENIE 38 38
Formation: Lower p3

Date: 31-Oct-1995
Ticket #: EM38.4
Job Type: FRAC

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slry Rate1 (bpm)	Slry Vol1 (gal)	W/head Den (lb/gal)	Well Conc (lb/gal)	PConc/Slur (lb/gal)	Stage Vol (gal)
12:23:29	2598	1072	4.9	655	8.17	0.00	0.00	654
12:23:34	2598	1063	5.0	673	8.18	0.00	0.00	672
12:23:39	2589	1053	4.9	690	8.20	0.00	0.00	689
12:23:44	2579	1044	5.0	708	8.20	0.00	0.00	707
12:23:49	2579	1042	5.5	726	8.17	0.00	0.00	725
12:23:54	2599	1046	6.1	746	8.16	0.00	0.07	745
12:23:59	2629	1046	4.3	765	8.16	0.00	0.02	764
12:24:04	2651	1040	5.6	784	8.15	0.00	0.00	782
12:24:09	2654	1030	6.0	804	8.16	0.00	0.04	803
12:24:14	2659	1019	5.8	824	8.16	0.00	0.05	823
12:24:19	2676	1014	5.8	845	8.19	0.00	0.00	843
12:24:24	2706	1017	5.6	865	8.20	0.00	0.00	863
12:24:29	2747	1019	5.5	884	8.21	0.00	0.00	883
12:24:34	2783	1015	5.7	903	8.21	0.00	0.02	902
12:24:39	2794	1005	5.6	923	8.19	0.00	0.01	922
12:24:44	2785	996	5.6	943	8.16	0.00	0.00	942
12:24:49	2786	993	5.7	963	8.19	0.00	0.00	961
12:24:54	2801	997	5.6	982	8.18	0.00	0.00	981
12:24:59	2828	999	5.6	1002	8.20	0.00	0.02	1001
12:25:04	2843	991	5.6	1022	8.36	0.00	0.00	1021
12:25:09	2841	981	5.6	1042	8.35	0.00	0.00	1040
12:25:14	2835	975	5.6	1061	8.34	0.00	0.00	1060
12:25:19	2844	977	5.5	1080	8.35	0.00	0.00	1079
12:25:24	2882	980	5.6	1100	8.41	0.05	0.00	1099
12:25:29	2919	980	5.6	1120	8.38	0.00	0.00	1118
12:25:34	2941	972	5.3	1139	8.38	0.00	0.01	1138
12:25:39	2948	965	4.5	1156	8.37	0.00	0.00	1155
12:25:44	2956	966	4.3	1171	8.37	0.00	0.00	1170
12:25:49	2989	970	4.6	1186	8.33	0.00	0.00	1185

**** Stage Total 1196.12 (gal) ****

12:25:52 Stage #3 Increase Rate

12:25:53	3399	971	7.5	1203	8.35	0.00	0.00	5
12:25:58	3195	971	8.8	1232	8.36	0.00	0.00	35
12:26:03	3463	970	9.9	1262	8.34	0.00	0.00	64
12:26:08	3651	970	10.7	1307	8.40	0.03	0.00	109
12:26:13	4086	973	11.3	1345	8.39	0.02	0.02	148
12:26:18	4120	979	13.8	1392	8.37	0.00	0.02	195
12:26:23	4099	983	13.7	1440	8.37	0.00	0.04	243
12:26:28	4052	981	13.6	1488	8.34	0.00	0.02	291
12:26:33	4017	982	13.5	1535	8.34	0.00	0.00	338
12:26:38	3996	983	13.4	1582	8.33	0.00	0.00	385
12:26:43	3985	979	13.4	1629	8.34	0.00	0.00	432
12:26:48	3970	973	13.4	1676	8.33	0.00	0.00	479
12:26:53	3974	972	13.4	1723	8.37	0.00	0.01	526
12:26:58	3993	970	13.5	1770	8.33	0.00	0.00	573

Customer: SANTOS
Well Desc: EAST MEREENIE 38 38
Formation: Lower p3

Date: 31-Oct-1995
Ticket #: EM38.4
Job Type: FRAC

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slry Rate1 (bpm)	Slry Vol1 (gal)	W/head Den (lb/gal)	Well Conc (lb/gal)	PConc/Slur (lb/gal)	Stage Vol (gal)
12:27:03	3788	962	12.8	1816	8.37	0.00	0.00	618
12:27:08	3802	954	12.1	1859	8.35	0.00	0.00	661
12:27:13	3872	954	12.5	1902	8.33	0.00	0.00	705
12:27:18	3984	959	13.0	1947	8.33	0.00	0.00	750
12:27:23	4057	962	13.5	1993	8.35	0.00	0.00	796
12:27:28	4087	960	13.9	2041	8.33	0.00	0.00	844
12:27:33	4097	954	13.9	2090	8.36	0.00	0.00	893
12:27:38	4096	955	13.8	2139	8.35	0.00	0.01	941
12:27:43	4091	958	13.8	2187	8.39	0.02	0.00	990
12:27:48	4076	953	13.8	2235	8.34	0.00	0.00	1038
12:27:53	4061	946	13.8	2284	8.37	0.00	0.00	1086
12:27:58	4048	945	13.9	2332	8.40	0.03	0.00	1135
12:28:03	4221	948	14.1	2381	8.39	0.02	0.00	1184
12:28:08	4134	948	14.5	2431	8.35	0.00	0.00	1234
12:28:13	4076	943	14.6	2482	8.35	0.00	0.00	1285
12:28:18	4038	941	14.5	2533	8.36	0.00	0.00	1336
12:28:23	3993	943	14.5	2584	8.36	0.00	0.00	1386
12:28:28	3968	943	14.5	2634	8.38	0.01	0.00	1437
12:28:33	3961	937	14.3	2685	8.36	0.00	0.01	1487
12:28:38	3964	933	14.0	2734	8.36	0.00	0.00	1537
12:28:43	3982	937	14.0	2783	8.33	0.00	0.00	1586
12:28:48	4321	939	14.6	2833	8.35	0.00	0.00	1636
12:28:53	4330	937	15.4	2886	8.38	0.00	0.00	1688
12:28:58	4352	939	15.6	2940	8.37	0.00	0.00	1743
12:29:03	4364	941	15.4	2995	8.39	0.02	0.00	1797
12:29:08	4348	933	15.3	3048	8.40	0.03	0.00	1851
12:29:13	4326	934	15.2	3101	8.41	0.05	0.00	1904
12:29:18	4308	936	15.0	3154	8.42	0.06	0.00	1957
12:29:23	4336	925	15.0	3207	8.39	0.01	0.00	2009
12:29:28	4401	922	15.0	3259	8.37	0.00	0.00	2062
12:29:33	4441	927	15.0	3312	8.44	0.09	0.00	2114
12:29:38	4475	923	15.0	3364	8.37	0.00	0.00	2167
12:29:43	4518	920	15.0	3416	8.35	0.00	0.00	2219
12:29:48	4558	926	14.9	3469	8.38	0.00	0.00	2271

**** Stage Total 2292.14 (gal) ****

12:29:51 Stage #4 Start Sand

12:29:52	4589	929	14.9	3510	8.40	0.03	0.00	21
12:29:57	4621	924	15.0	3563	8.40	0.03	0.42	73
12:30:02	4662	922	15.1	3615	8.39	0.02	0.55	126
12:30:07	4714	927	15.0	3668	8.39	0.02	0.65	179
12:30:12	4753	922	14.7	3720	8.39	0.02	0.65	231
12:30:17	4782	917	14.5	3771	8.40	0.03	0.68	282
12:30:22	4787	920	14.5	3822	8.61	0.37	0.63	333
12:30:27	4790	917	14.6	3873	8.66	0.45	0.65	384
12:30:32	4796	918	14.9	3925	8.71	0.53	0.67	435

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TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slry Rate1 (bpm)	Slry Vol1 (gal)	W/head Den (lb/gal)	Well Conc (lb/gal)	PConc/Slur (lb/gal)	Stage Vol (gal)
12:30:37	4783	922	14.9	3977	8.73	0.56	0.65	487
12:30:42	4774	917	15.0	4029	8.72	0.55	0.73	540
12:30:47	4758	915	15.1	4082	8.80	0.68	0.74	592
12:30:52	4742	912	15.1	4135	8.80	0.68	0.78	645
**** Stage Total 666.26 (gal) ****								
12:30:55 Stage #5 Increase Sand								
12:30:56	4722	909	15.0	4177	8.83	0.74	0.83	21
12:31:01	4707	912	14.9	4229	8.74	0.59	0.87	73
12:31:06	4700	917	14.9	4281	8.77	0.63	0.89	125
12:31:11	4688	917	15.0	4333	8.81	0.70	0.93	178
12:31:16	4670	915	15.0	4386	8.84	0.76	0.87	230
12:31:21	4653	912	15.1	4439	8.84	0.75	1.09	283
12:31:26	4637	910	15.1	4492	8.87	0.81	1.20	336
12:31:31	4631	909	15.2	4545	8.88	0.82	1.33	389
12:31:36	4630	906	15.2	4598	8.85	0.78	1.54	442
12:31:41	4611	908	15.2	4651	8.88	0.83	1.53	495
**** Stage Total 537.93 (gal) ****								
12:31:45 Stage #6 Increase Sand								
12:31:45	4606	908	15.3	4694	8.91	0.87	1.65	0
12:31:50	4611	908	15.3	4747	9.00	1.03	1.71	54
12:31:55	4604	911	15.4	4801	9.03	1.08	1.77	107
12:32:00	4597	908	15.4	4855	9.11	1.21	1.97	161
12:32:05	4609	905	15.5	4909	9.24	1.46	2.13	215
12:32:10	4626	905	15.6	4964	9.34	1.64	2.20	270
12:32:15	4641	906	15.6	5018	9.34	1.63	2.39	325
12:32:20	4624	907	15.5	5073	9.35	1.65	2.51	379
12:32:25	4587	906	15.3	5126	9.43	1.80	2.76	433
**** Stage Total 454.11 (gal) ****								
12:32:27 Stage #7 Increase Sand								
12:32:29	4554	906	15.3	5169	9.50	1.93	2.81	21
12:32:34	4496	906	15.3	5223	9.52	1.97	2.91	75
12:32:39	4439	903	15.2	5276	9.58	2.07	2.95	128
12:32:44	4407	901	15.3	5329	9.66	2.23	3.17	182
12:32:49	4394	899	15.3	5383	9.81	2.53	3.27	235
12:32:54	4400	901	15.3	5436	9.86	2.63	3.43	289

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TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slry Rate1 (bpm)	Slry Vol1 (gal)	W/head Den (lb/gal)	Well Conc (lb/gal)	PConc/Slur (lb/gal)	Stage Vol (gal)
12:32:59	4409	901	15.4	5490	9.86	2.63	3.47	342
12:33:04	4412	898	15.5	5544	9.87	2.65	3.58	396
12:33:09	4419	896	15.5	5598	10.03	2.97	3.85	451
12:33:14	4435	894	15.6	5653	10.09	3.07	3.89	505
12:33:19	4445	894	15.4	5707	10.16	3.23	3.88	559
12:33:24	4454	897	15.3	5761	10.17	3.25	3.98	613
**** Stage Total 612.81 (gal) ****								
12:33:24 Stage #8 Increase Sand								
12:33:28	4459	897	15.3	5803	10.20	3.30	4.06	43
12:33:33	4461	898	15.3	5857	10.33	3.59	4.40	96
12:33:38	4445	899	15.3	5911	10.38	3.70	4.49	150
12:33:43	4421	897	15.6	5965	10.39	3.72	4.66	204
12:33:48	4410	898	16.0	6020	10.42	3.78	4.62	260
12:33:53	4403	897	16.1	6077	10.44	3.82	4.89	316
12:33:58	4395	896	16.2	6133	10.58	4.13	4.92	373
12:34:03	4377	895	16.4	6190	10.59	4.15	4.95	430
**** Stage Total 475.65 (gal) ****								
12:34:07 Stage #9 Increase Sand								
12:34:07	4352	894	16.4	6236	10.67	4.33	5.04	0
12:34:12	4317	896	16.4	6294	10.65	4.28	5.15	57
12:34:17	4277	897	16.4	6351	10.71	4.41	5.28	115
12:34:22	4238	897	16.2	6408	10.87	4.80	5.49	172
12:34:27	4207	896	16.2	6465	10.97	5.02	5.76	229
12:34:32	4167	893	16.2	6522	10.97	5.02	5.72	285
12:34:37	4119	892	16.3	6578	10.99	5.08	5.86	342
12:34:42	4078	894	16.3	6635	11.08	5.28	5.85	399
12:34:47	4032	894	16.3	6693	11.13	5.40	6.02	456
**** Stage Total 490.58 (gal) ****								
12:34:51 Stage #10 Increase Sand								
12:34:51	3987	895	16.3	6738	11.25	5.71	6.04	11
12:34:56	3955	894	16.3	6795	11.25	5.70	6.16	69
12:35:01	3935	894	16.4	6853	11.28	5.77	6.20	126
12:35:06	3935	895	16.5	6910	11.30	5.84	6.30	183
12:35:11	3932	895	16.4	6968	11.38	6.03	6.59	241
12:35:16	3931	893	16.4	7025	11.41	6.09	6.80	298

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TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slry Rate1 (bpm)	Slry Vol1 (gal)	W/head Den (lb/gal)	Well Conc (lb/gal)	PConc/Slur (lb/gal)	Stage Vol (gal)
12:35:21	3940	891	16.5	7083	11.40	6.08	6.89	356
12:35:26	3954	891	16.4	7140	11.43	6.16	6.77	413
12:35:31	3976	891	16.3	7198	11.51	6.38	7.23	471
12:35:36	3999	892	16.1	7254	11.60	6.61	7.20	527
**** Stage Total 527.38 (gal) ****								
12:35:36 Stage #11 Increase Sand								
12:35:40	4021	892	16.0	7299	11.68	6.82	7.25	45
12:35:45	4034	894	15.9	7355	11.72	6.92	7.27	101
12:35:50	4040	895	15.8	7410	11.75	7.01	7.35	156
12:35:55	4060	895	15.8	7465	11.76	7.03	7.68	211
12:36:00	4105	894	15.9	7521	11.78	7.08	7.69	267
12:36:05	4167	895	15.9	7576	11.83	7.23	7.81	322
12:36:10	4245	897	15.8	7632	11.86	7.31	7.79	378
12:36:15	4322	894	15.8	7687	11.91	7.45	7.40	433
12:36:20	4393	894	15.7	7742	11.98	7.63	6.92	488
**** Stage Total 531.95 (gal) ****								
12:36:25 Stage #12 Increase Sand								
12:36:24	4433	897	15.5	7786	12.04	7.81	6.17	0
12:36:29	4463	899	15.4	7840	12.04	7.81	5.71	54
12:36:34	4465	900	15.3	7894	12.07	7.89	4.98	108
12:36:39	4462	900	15.2	7947	12.00	7.70	4.16	161
12:36:44	4442	898	15.1	8000	11.75	6.99	3.73	214
**** Stage Total 213.96 (gal) ****								
12:36:44 Stage #13 Start Flush								
12:36:48	4422	899	14.9	8042	11.63	6.67	3.26	42
12:36:53	4428	899	15.5	8095	11.03	5.16	2.80	95
12:36:58	4466	900	16.1	8151	10.95	4.96	2.26	151
12:37:03	4548	902	16.3	8208	10.69	4.38	2.02	207
12:37:08	4659	903	16.5	8265	10.41	3.76	1.66	265
12:37:13	4736	903	16.6	8323	10.11	3.12	1.38	323
12:37:18	4773	905	16.6	8381	9.77	2.45	1.09	381
12:37:23	4773	907	16.5	8439	9.60	2.11	0.89	439
12:37:28	4755	908	16.5	8497	9.40	1.74	0.81	497
12:37:33	4762	909	16.4	8554	9.13	1.26	0.62	554
12:37:38	4787	908	16.3	8611	9.00	1.02	0.41	611

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12:37:43	4805	909	16.2	8668	8.83	0.74	0.36	668
12:37:48	4814	910	16.2	8725	8.77	0.64	0.32	725
12:37:53	4831	913	16.1	8782	8.75	0.61	0.25	781
12:37:58	4822	913	16.1	8838	8.77	0.64	0.15	838
12:38:03	4805	907	16.0	8894	8.69	0.51	0.11	894
12:38:08	4803	904	16.0	8950	8.67	0.47	0.09	950
12:38:13	4811	908	16.0	9006	8.60	0.36	0.06	1006
12:38:18	4840	909	16.0	9062	8.63	0.40	0.03	1062
12:38:23	4880	905	16.0	9119	8.59	0.34	0.00	1118
12:38:28	4339	905	15.8	9175	8.61	0.37	0.00	1174
12:38:33	2227	874	0.6	9190	8.48	0.17	0.00	1190
**** Stage Total 1190.66 (gal) ****								
12:38:35 Stage #14 Stop, Monitor Decline								
12:38:37	2149	849	0.2	9191	8.38	0.00	0.00	1
12:38:42	2308	839	0.0	9192	8.35	0.00	0.00	1
12:38:47	2356	839	0.0	9192	8.33	0.00	0.00	1
12:38:52	2348	838	0.0	9192	8.33	0.00	0.00	1
12:38:57	2332	838	0.0	9192	8.32	0.00	0.00	1
12:39:02	2320	837	0.0	9192	8.37	0.00	0.00	1
12:39:07	2313	838	0.0	9192	8.35	0.00	0.00	1
12:39:12	2307	838	0.0	9192	8.37	0.00	0.00	1
12:39:17	2304	838	0.0	9192	8.31	0.00	0.00	1
12:39:22	2299	838	0.0	9192	8.31	0.00	0.00	1
12:39:27	2291	838	0.0	9192	8.33	0.00	0.00	1
12:39:32	2285	838	0.0	9192	8.35	0.00	0.00	1
12:39:37	2278	839	0.0	9192	8.34	0.00	0.00	1
12:39:42	2270	839	0.0	9192	8.29	0.00	0.00	1
12:39:47	2262	839	0.0	9192	8.31	0.00	0.00	1
12:39:52	2254	839	0.0	9192	8.32	0.00	0.00	1
12:39:57	2245	839	0.0	9192	8.33	0.00	0.00	1
12:40:02	2237	839	0.0	9192	8.32	0.00	0.00	1
12:40:07	2228	839	0.0	9192	8.29	0.00	0.00	1
12:40:12	2220	839	0.0	9192	8.32	0.00	0.00	1
12:40:17	2211	839	0.0	9192	8.28	0.00	0.00	1
12:40:22	2202	839	0.0	9192	8.27	0.00	0.00	1
12:40:27	2192	839	0.0	9192	8.30	0.00	0.00	1
12:40:32	2187	839	0.0	9192	8.31	0.00	0.00	1
12:40:37	2180	839	0.0	9192	8.30	0.00	0.00	1
12:40:42	2169	839	0.0	9192	8.34	0.00	0.00	1
12:40:47	2163	840	0.0	9192	8.37	0.00	0.00	1
12:40:52	2157	840	0.0	9192	8.35	0.00	0.00	1
12:40:57	2148	840	0.0	9192	8.33	0.00	0.00	1
12:41:02	2138	840	0.0	9192	8.30	0.00	0.00	1
12:41:07	2129	840	0.0	9192	8.30	0.00	0.00	1
12:41:12	2116	840	0.0	9192	8.26	0.00	0.00	1

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12:41:17	2105	840	0.0	9192	8.27	0.00	0.00	1
12:41:22	2096	841	0.0	9192	8.28	0.00	0.00	1
12:41:27	2085	841	0.0	9192	8.29	0.00	0.00	1
12:41:32	2076	841	0.0	9192	8.32	0.00	0.00	1
12:41:37	2067	841	0.0	9192	8.37	0.00	0.00	1
12:41:42	2058	841	0.0	9192	8.33	0.00	0.00	1
12:41:47	2049	841	0.0	9192	8.28	0.00	0.00	1
12:41:52	2040	841	0.0	9192	8.29	0.00	0.00	1
12:41:57	2030	841	0.0	9192	8.28	0.00	0.00	1
12:42:02	2020	841	0.0	9192	8.28	0.00	0.00	1
12:42:07	2011	841	0.0	9192	8.24	0.00	0.00	1
12:42:12	2003	841	0.0	9192	8.35	0.00	0.00	1
12:42:17	1994	841	0.0	9192	8.32	0.00	0.00	1
12:42:22	1984	841	0.0	9192	8.31	0.00	0.00	1
12:42:27	1975	841	0.0	9192	8.30	0.00	0.00	1
12:42:32	1966	842	0.0	9192	8.30	0.00	0.00	1
12:42:37	1957	842	0.0	9192	8.28	0.00	0.00	1
12:42:42	1948	841	0.0	9192	8.28	0.00	0.00	1
12:42:47	1939	842	0.0	9192	8.36	0.00	0.00	1
12:42:52	1930	842	0.0	9192	8.26	0.00	0.00	1
12:42:57	1921	842	0.0	9192	8.29	0.00	0.00	1
12:43:02	1912	842	0.0	9192	8.27	0.00	0.00	1
12:43:07	1903	842	0.0	9192	8.24	0.00	0.00	1
12:43:12	1897	842	0.0	9192	8.27	0.00	0.00	1
12:43:17	1890	842	0.0	9192	8.32	0.00	0.00	1
12:43:22	1883	842	0.0	9192	8.30	0.00	0.00	1
12:43:27	1877	842	0.0	9192	8.33	0.00	0.00	1
12:43:32	1869	842	0.0	9192	8.29	0.00	0.00	1
12:43:37	1859	842	0.0	9192	8.30	0.00	0.00	1
12:43:42	1849	842	0.0	9192	8.27	0.00	0.00	1
12:43:47	1839	842	0.0	9192	8.27	0.00	0.00	1
12:43:52	1829	842	0.0	9192	8.28	0.00	0.00	1
12:43:57	1820	842	0.0	9192	8.30	0.00	0.00	1
12:44:02	1811	842	0.0	9192	8.30	0.00	0.00	1
12:44:07	1802	842	0.0	9192	8.30	0.00	0.00	1
12:44:12	1792	842	0.0	9192	8.29	0.00	0.00	1
12:44:17	1783	842	0.0	9192	8.34	0.00	0.02	1
12:44:22	1774	842	0.0	9192	8.33	0.00	0.00	1
12:44:27	1766	842	0.0	9192	8.29	0.00	0.00	1
12:44:32	1757	842	0.0	9192	8.27	0.00	0.00	1
12:44:37	1748	842	0.0	9192	8.27	0.00	0.00	1
12:44:42	1740	842	0.0	9192	8.25	0.00	0.00	1
12:44:47	1731	842	0.0	9192	8.25	0.00	0.00	1
12:44:52	1723	842	0.0	9192	8.29	0.00	0.02	1
12:44:57	1716	842	0.0	9192	8.30	0.00	0.00	1
12:45:02	1708	842	0.0	9192	8.25	0.00	0.00	1
12:45:07	1700	842	0.0	9192	8.27	0.00	0.00	1
12:45:12	1689	842	0.0	9192	8.29	0.00	0.00	1
12:45:17	1678	842	0.0	9192	8.26	0.00	0.00	1
12:45:22	1668	842	0.0	9192	8.24	0.00	0.00	1

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12:45:27	1659	842	0.0	9192	8.28	0.00	0.00	1
12:45:32	1649	842	0.0	9192	8.28	0.00	0.00	1
12:45:37	1640	842	0.0	9192	8.28	0.00	0.00	1
12:45:42	1631	842	0.0	9192	8.30	0.00	0.00	1
12:45:47	1621	842	0.0	9192	8.29	0.00	0.00	1
12:45:52	1612	842	0.0	9192	8.29	0.00	0.00	1
12:45:57	1602	842	0.0	9192	8.28	0.00	0.00	1
12:46:02	1593	842	0.0	9192	8.28	0.00	0.00	1
12:46:07	1583	842	0.0	9192	8.29	0.00	0.00	1
12:46:12	1573	842	0.0	9192	8.28	0.00	0.00	1
12:46:17	1564	842	0.0	9192	8.27	0.00	0.00	1
12:46:22	1555	842	0.0	9192	8.24	0.00	0.00	1
12:46:27	1546	842	0.0	9192	8.26	0.00	0.00	1
12:46:32	1536	842	0.0	9192	8.29	0.00	0.00	1
12:46:37	1526	841	0.0	9192	8.27	0.00	0.02	1
12:46:42	1516	841	0.0	9192	8.28	0.00	0.00	1
12:46:47	1506	841	0.0	9192	8.28	0.00	0.00	1
12:46:52	1496	841	0.0	9192	8.30	0.00	0.00	1
12:46:57	1486	841	0.0	9192	8.29	0.00	0.00	1
12:47:02	1475	841	0.0	9192	8.29	0.00	0.00	1
12:47:07	1465	841	0.0	9192	8.29	0.00	0.00	1
12:47:12	1455	841	0.0	9192	8.30	0.00	0.00	1
12:47:17	1445	841	0.0	9192	8.29	0.00	0.00	1
12:47:22	1435	841	0.0	9192	8.26	0.00	0.00	1
12:47:27	1425	841	0.0	9192	8.28	0.00	0.00	1
12:47:32	1416	840	0.0	9192	8.27	0.00	0.00	1
12:47:37	1406	840	0.0	9192	8.27	0.00	0.00	1
12:47:42	1396	840	0.0	9192	8.28	0.00	0.00	1
12:47:47	1386	840	0.0	9192	8.29	0.00	0.00	1
12:47:52	1378	840	0.0	9192	8.28	0.00	0.00	1
12:47:57	1373	840	0.0	9192	8.25	0.00	0.00	1
12:48:02	1365	839	0.0	9192	8.25	0.00	0.00	1
12:48:07	1352	839	0.0	9192	8.24	0.00	0.00	1
12:48:12	1339	839	0.0	9192	8.30	0.00	0.00	1
12:48:17	1329	839	0.0	9192	8.26	0.00	0.00	1
12:48:22	1319	839	0.0	9192	8.25	0.00	0.00	1
12:48:27	1310	839	0.0	9192	8.27	0.00	0.00	1
12:48:32	1300	839	0.0	9192	8.27	0.00	0.00	1
12:48:37	1290	839	0.0	9192	8.23	0.00	0.00	1
12:48:42	1280	839	0.0	9192	8.24	0.00	0.00	1
12:48:47	1271	839	0.0	9192	8.25	0.00	0.00	1
12:48:52	1263	839	0.0	9192	8.26	0.00	0.00	1
12:48:57	1254	839	0.0	9192	8.27	0.00	0.00	1
12:49:02	1245	838	0.0	9192	8.22	0.00	0.00	1
12:49:07	1237	838	0.0	9192	8.21	0.00	0.00	1
12:49:12	1228	838	0.0	9192	8.23	0.00	0.00	1
12:49:17	1218	838	0.0	9192	8.24	0.00	0.00	1
12:49:22	1207	838	0.0	9192	8.23	0.00	0.00	1
12:49:27	1197	838	0.0	9192	8.18	0.00	0.00	1
12:49:32	1189	838	0.0	9192	8.21	0.00	0.00	1

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Date: 31-Oct-1995
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Job Type: FRAC

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slry Rate1 (bpm)	Slry Vol1 (gal)	W/head Den (lb/gal)	Well Conc (lb/gal)	PConc/Slur (lb/gal)	Stage Vol (gal)
12:49:37	1180	838	0.0	9192	8.23	0.00	0.00	1
12:49:42	1169	838	0.0	9192	8.28	0.00	0.00	1
12:49:47	1159	838	0.0	9192	8.19	0.00	0.00	1
12:49:52	1151	837	0.0	9192	8.23	0.00	0.00	1
12:49:57	1142	837	0.0	9192	8.27	0.00	0.00	1
12:50:02	1134	837	0.0	9192	8.22	0.00	0.00	1
12:50:07	1125	837	0.0	9192	8.22	0.00	0.00	1
12:50:12	1116	837	0.0	9192	8.23	0.00	0.00	1
12:50:17	1107	837	0.0	9192	8.26	0.00	0.00	1
12:50:22	1099	837	0.0	9192	8.23	0.00	0.00	1
12:50:27	1089	837	0.0	9192	8.21	0.00	0.00	1
12:50:32	1080	837	0.0	9192	8.23	0.00	0.00	1
12:50:37	1070	837	0.0	9192	8.23	0.00	0.00	1
12:50:42	1061	837	0.0	9192	8.21	0.00	0.00	1
12:50:47	1052	836	0.0	9192	8.24	0.00	0.00	1
12:50:52	1043	836	0.0	9192	8.23	0.00	0.00	1
12:50:57	1033	836	0.0	9192	8.25	0.00	0.00	1
12:51:02	1024	836	0.0	9192	8.25	0.00	0.00	1
12:51:07	1015	836	0.0	9192	8.22	0.00	0.00	1
12:51:12	1006	836	0.0	9192	8.25	0.00	0.00	1
12:51:17	997	836	0.0	9192	8.24	0.00	0.00	1
12:51:22	988	836	0.0	9192	8.24	0.00	0.00	1
12:51:27	979	836	0.0	9192	8.27	0.00	0.00	1
12:51:32	971	835	0.0	9192	8.26	0.00	0.00	1
12:51:37	963	835	0.0	9192	8.25	0.00	0.00	1
12:51:42	954	835	0.0	9192	8.21	0.00	0.00	1
12:51:47	946	835	0.0	9192	8.22	0.00	0.00	1
12:51:52	938	835	0.0	9192	8.23	0.00	0.00	1
12:51:57	929	835	0.0	9192	8.25	0.00	0.00	1
12:52:02	921	835	0.0	9192	8.25	0.00	0.00	1
12:52:07	914	835	0.0	9192	8.23	0.00	0.00	1
12:52:12	906	835	0.0	9192	8.21	0.00	0.00	1
12:52:17	897	835	0.0	9192	8.24	0.00	0.00	1
12:52:22	888	835	0.0	9192	8.22	0.00	0.00	1
12:52:27	879	835	0.0	9192	8.27	0.00	0.00	1
12:52:32	871	835	0.0	9192	8.26	0.00	0.00	1
12:52:37	862	835	0.0	9192	8.25	0.00	0.00	1
12:52:42	854	835	0.0	9192	8.24	0.00	0.00	1
12:52:47	846	835	0.0	9192	8.22	0.00	0.00	1
12:52:52	838	835	0.0	9192	8.23	0.00	0.00	1
12:52:57	829	835	0.0	9192	8.23	0.00	0.00	1
12:53:02	821	834	0.0	9192	8.22	0.00	0.00	1
12:53:07	813	834	0.0	9192	8.22	0.00	0.00	1
12:53:12	805	834	0.0	9192	8.22	0.00	0.00	1
12:53:17	797	834	0.0	9192	8.23	0.00	0.00	1
12:53:22	789	834	0.0	9192	8.22	0.00	0.00	1
12:53:27	781	834	0.0	9192	8.24	0.00	0.00	1
12:53:32	773	834	0.0	9192	8.24	0.00	0.00	1
12:53:37	765	834	0.0	9192	8.24	0.00	0.00	1
12:53:42	757	834	0.0	9192	8.24	0.00	0.00	1

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Date: 31-Oct-1995
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Job Type: FRAC

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slry Rate1 (bpm)	Slry Vol1 (gal)	W/head Den (lb/gal)	Well Conc (lb/gal)	PConc/Slur (lb/gal)	Stage Vol (gal)
12:53:47	749	834	0.0	9192	8.24	0.00	0.00	1
12:53:52	741	833	0.0	9192	8.32	0.00	0.00	1
12:53:57	732	833	0.0	9192	8.19	0.00	0.00	1
12:54:02	724	833	0.0	9192	8.21	0.00	0.00	1
12:54:07	716	833	0.0	9192	8.22	0.00	0.00	1
12:54:12	708	833	0.0	9192	8.24	0.00	0.00	1
12:54:17	700	833	0.0	9192	8.22	0.00	0.00	1
12:54:22	692	833	0.0	9192	8.17	0.00	0.00	1
12:54:27	684	833	0.0	9192	8.25	0.00	0.00	1
12:54:32	677	833	0.0	9192	8.27	0.00	0.00	1
12:54:37	670	833	0.0	9192	8.20	0.00	0.00	1
12:54:42	663	832	0.0	9192	8.23	0.00	0.00	1
12:54:47	656	832	0.0	9192	8.24	0.00	0.00	1
12:54:52	649	832	0.0	9192	8.21	0.00	0.00	1
12:54:57	641	832	0.0	9192	8.22	0.00	0.00	1
12:55:02	634	832	0.0	9192	8.24	0.00	0.00	1
12:55:07	627	832	0.0	9192	8.20	0.00	0.00	1
12:55:12	620	832	0.0	9192	8.22	0.00	0.01	1
12:55:17	612	832	0.0	9192	8.21	0.00	0.00	1
12:55:22	605	832	0.0	9192	8.25	0.00	0.00	1
12:55:27	598	832	0.0	9192	8.22	0.00	0.00	1
12:55:32	591	832	0.0	9192	8.21	0.00	0.00	1
12:55:37	584	832	0.0	9192	8.19	0.00	0.00	1
12:55:42	578	832	0.0	9192	8.21	0.00	0.00	1
12:55:47	571	832	0.0	9192	8.23	0.00	0.00	1
12:55:52	564	832	0.0	9192	8.22	0.00	0.00	1
12:55:57	557	832	0.0	9192	8.22	0.00	0.00	1
12:56:02	551	832	0.0	9192	8.23	0.00	0.00	1
12:56:07	544	832	0.0	9192	8.22	0.00	0.00	1
12:56:12	538	832	0.0	9192	8.20	0.00	0.00	1
12:56:17	532	831	0.0	9192	8.24	0.00	0.00	1
12:56:22	526	831	0.0	9192	8.21	0.00	0.00	1
12:56:27	519	831	0.0	9192	8.25	0.00	0.00	1
12:56:32	513	831	0.0	9192	8.21	0.00	0.00	1
12:56:37	507	831	0.0	9192	8.20	0.00	0.00	1
12:56:42	501	831	0.0	9192	8.21	0.00	0.00	1
12:56:47	495	831	0.0	9192	8.18	0.00	0.00	1
12:56:52	490	831	0.0	9192	8.26	0.00	0.00	1
12:56:57	484	831	0.0	9192	8.26	0.00	0.00	1
12:57:02	478	831	0.0	9192	8.23	0.00	0.00	1
12:57:07	472	831	0.0	9192	8.23	0.00	0.00	1
12:57:12	467	831	0.0	9192	8.23	0.00	0.00	1
12:57:17	461	831	0.0	9192	8.26	0.00	0.00	1
12:57:22	455	831	0.0	9192	8.25	0.00	0.00	1
12:57:27	449	831	0.0	9192	8.26	0.00	0.00	1
12:57:32	444	831	0.0	9192	8.23	0.00	0.00	1
12:57:37	438	831	0.0	9192	8.26	0.00	0.00	1
12:57:42	433	831	0.0	9192	8.23	0.00	0.00	1
12:57:47	427	831	0.0	9192	8.25	0.00	0.00	1
12:57:52	422	831	0.0	9192	8.22	0.00	0.00	1

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TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slry Rate1 (bpm)	Slry Vol1 (gal)	W/head Den (lb/gal)	Well Conc (lb/gal)	PConc/Slur (lb/gal)	Stage Vol (gal)
12:57:57	416	831	0.0	9192	8.21	0.00	0.00	1
12:58:02	410	831	0.0	9192	8.22	0.00	0.00	1
12:58:07	405	831	0.0	9192	8.24	0.00	0.00	1
12:58:12	399	831	0.0	9192	8.22	0.00	0.00	1
12:58:17	394	831	0.0	9192	8.20	0.00	0.00	1
12:58:22	388	831	0.0	9192	8.17	0.00	0.00	1
12:58:27	383	831	0.0	9192	8.18	0.00	0.00	1
12:58:32	377	831	0.0	9192	8.21	0.00	0.00	1
12:58:37	372	831	0.0	9192	8.22	0.00	0.00	1
12:58:42	367	831	0.0	9192	8.23	0.00	0.00	1
12:58:47	361	831	0.0	9192	8.23	0.00	0.00	1
12:58:52	356	831	0.0	9192	8.28	0.00	0.00	1
12:58:57	351	831	0.0	9192	8.26	0.00	0.00	1
12:59:02	346	831	0.0	9192	8.24	0.00	0.00	1
12:59:07	341	831	0.0	9192	8.23	0.00	0.00	1
12:59:12	336	831	0.0	9192	8.22	0.00	0.00	1
12:59:17	331	831	0.0	9192	8.23	0.00	0.00	1
12:59:22	326	832	0.0	9192	8.24	0.00	0.00	1
12:59:27	321	832	0.0	9192	8.24	0.00	0.01	1
12:59:32	316	832	0.0	9192	8.23	0.00	0.00	1
12:59:37	312	832	0.0	9192	8.25	0.00	0.00	1
12:59:42	308	832	0.0	9192	8.26	0.00	0.00	1
12:59:47	303	832	0.0	9192	8.30	0.00	0.00	1
12:59:52	299	832	0.0	9192	8.26	0.00	0.00	1
12:59:57	294	832	0.0	9192	8.25	0.00	0.00	1
13:00:02	290	832	0.0	9192	8.22	0.00	0.00	1
13:00:07	286	832	0.0	9192	8.22	0.00	0.00	1
13:00:12	282	832	0.0	9192	8.26	0.00	0.00	1
13:00:17	278	832	0.0	9192	8.24	0.00	0.00	1
13:00:22	276	832	0.0	9192	8.22	0.00	0.00	1
13:00:27	274	832	0.0	9192	8.20	0.00	0.00	1
13:00:32	271	832	0.0	9192	8.22	0.00	0.00	1
13:00:37	267	832	0.0	9192	8.29	0.00	0.00	1
13:00:42	264	832	0.0	9192	8.30	0.00	0.00	1
13:00:47	259	832	0.0	9192	8.26	0.00	0.00	1
13:00:52	253	832	0.0	9192	8.27	0.00	0.00	1
13:00:57	247	833	0.0	9192	8.25	0.00	0.00	1
13:01:02	243	833	0.0	9192	8.23	0.00	0.00	1
13:01:07	239	833	0.0	9192	8.23	0.00	0.00	1
13:01:12	236	833	0.0	9192	8.22	0.00	0.00	1
13:01:17	232	833	0.0	9192	8.25	0.00	0.00	1
13:01:22	229	833	0.0	9192	8.26	0.00	0.00	1
13:01:27	226	833	0.0	9192	8.22	0.00	0.00	1
13:01:32	222	833	0.0	9192	8.20	0.00	0.00	1
13:01:37	219	833	0.0	9192	8.20	0.00	0.00	1
13:01:42	216	833	0.0	9192	8.23	0.00	0.00	1
13:01:47	212	834	0.0	9192	8.22	0.00	0.00	1
13:01:52	209	834	0.0	9192	8.22	0.00	0.00	1
13:01:57	206	834	0.0	9192	8.24	0.00	0.00	1
13:02:02	203	834	0.0	9192	8.22	0.00	0.00	1

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TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slry Rate1 (bpm)	Slry Vol1 (gal)	W/head Den (lb/gal)	Well Conc (lb/gal)	PConc/Slur (lb/gal)	Stage Vol (gal)
13:02:07	200	834	0.0	9192	8.26	0.00	0.00	1
13:02:12	197	834	0.0	9192	8.25	0.00	0.00	1
13:02:17	196	834	0.0	9192	8.18	0.00	0.00	1
13:02:22	200	834	0.0	9192	8.23	0.00	0.00	1
13:02:27	201	834	0.0	9192	8.23	0.00	0.00	1
13:02:32	197	834	0.0	9192	8.20	0.00	0.00	1
13:02:37	187	834	0.0	9192	8.26	0.00	0.00	1
13:02:42	179	834	0.0	9192	8.16	0.00	0.00	1
13:02:47	177	834	0.0	9192	8.20	0.00	0.00	1
13:02:52	174	835	0.0	9192	8.20	0.00	0.00	1
13:02:57	171	835	0.0	9192	8.20	0.00	0.00	1
13:03:02	169	835	0.0	9192	8.19	0.00	0.00	1
13:03:07	166	835	0.0	9192	8.19	0.00	0.00	1
13:03:12	164	835	0.0	9192	8.20	0.00	0.00	1
13:03:17	161	835	0.0	9192	8.17	0.00	0.00	1
13:03:22	158	835	0.0	9192	8.21	0.00	0.00	1
13:03:27	156	835	0.0	9192	8.21	0.00	0.00	1
13:03:32	153	835	0.0	9192	8.18	0.00	0.00	1
13:03:37	151	836	0.0	9192	8.17	0.00	0.00	1
13:03:42	149	836	0.0	9192	8.26	0.00	0.00	1
13:03:47	146	836	0.0	9192	8.25	0.00	0.00	1
13:03:52	144	836	0.0	9192	8.22	0.00	0.00	1
13:03:57	142	836	0.0	9192	8.22	0.00	0.00	1
13:04:02	139	836	0.0	9192	8.23	0.00	0.00	1
13:04:07	137	836	0.0	9192	8.20	0.00	0.00	1
13:04:12	134	837	0.0	9192	8.21	0.00	0.00	1
13:04:17	131	837	0.0	9192	8.22	0.00	0.00	1
13:04:22	129	837	0.0	9192	8.24	0.00	0.00	1
13:04:27	127	837	0.0	9192	8.23	0.00	0.00	1
13:04:32	125	837	0.0	9192	8.20	0.00	0.00	1
13:04:37	123	837	0.0	9192	8.20	0.00	0.00	1
13:04:42	121	837	0.0	9192	8.21	0.00	0.00	1
13:04:47	119	838	0.0	9192	8.25	0.00	0.00	1
13:04:52	117	838	0.0	9192	8.27	0.00	0.00	1
13:04:57	115	838	0.0	9192	8.22	0.00	0.00	1
13:05:02	113	838	0.0	9192	8.21	0.00	0.00	1
13:05:07	111	838	0.0	9192	8.22	0.00	0.00	1
13:05:12	110	838	0.0	9192	8.23	0.00	0.00	1
13:05:17	108	839	0.0	9192	8.24	0.00	0.00	1
13:05:22	106	839	0.0	9192	8.21	0.00	0.00	1
13:05:27	105	839	0.0	9192	8.22	0.00	0.00	1
13:05:32	103	839	0.0	9192	8.24	0.00	0.00	1
13:05:37	101	839	0.0	9192	8.24	0.00	0.00	1
13:05:42	99	839	0.0	9192	8.23	0.00	0.00	1
13:05:47	98	839	0.0	9192	8.23	0.00	0.00	1
13:05:52	96	839	0.0	9192	8.21	0.00	0.00	1
13:05:57	94	840	0.0	9192	8.24	0.00	0.00	1
13:06:02	92	840	0.0	9192	8.23	0.00	0.00	1
13:06:07	91	840	0.0	9192	8.22	0.00	0.00	1
13:06:12	89	840	0.0	9192	8.21	0.00	0.00	1

Customer: SANTOS
Well Desc: EAST MEREENIE 38 38
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Date: 31-Oct-1995
Ticket #: EM38.4
Job Type: FRAC

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slry Rate1 (bpm)	Slry Vol1 (gal)	W/head Den (lb/gal)	Well Conc (lb/gal)	PConc/Slur (lb/gal)	Stage Vol (gal)
13:06:17	87	840	0.0	9192	8.20	0.00	0.00	1
13:06:22	86	840	0.0	9192	8.20	0.00	0.00	1
13:06:27	84	841	0.0	9192	8.19	0.00	0.00	1
13:06:32	83	841	0.0	9192	8.21	0.00	0.00	1
13:06:37	81	841	0.0	9192	8.22	0.00	0.00	1
13:06:42	79	841	0.0	9192	8.24	0.00	0.00	1
13:06:47	78	841	0.0	9192	8.25	0.00	0.00	1
13:06:52	76	841	0.0	9192	8.24	0.00	0.00	1
13:06:57	75	841	0.0	9192	8.24	0.00	0.00	1
13:07:02	73	841	0.0	9192	8.28	0.00	0.00	1
13:07:07	72	842	0.0	9192	8.28	0.00	0.00	1
13:07:12	71	842	0.0	9192	8.25	0.00	0.00	1
13:07:17	69	842	0.0	9192	8.27	0.00	0.00	1
13:07:22	69	842	0.0	9192	8.33	0.00	0.00	1
13:07:27	68	842	0.0	9192	8.24	0.00	0.00	1
13:07:32	68	843	0.0	9192	8.22	0.00	0.00	1
13:07:37	69	843	0.0	9192	8.22	0.00	0.00	1
13:07:42	69	843	0.0	9192	8.24	0.00	0.00	1
13:07:47	65	843	0.0	9192	8.25	0.00	0.02	1
13:07:52	60	843	0.0	9192	8.24	0.00	0.00	1
13:07:57	58	843	0.0	9192	8.27	0.00	0.00	1
13:08:02	57	843	0.0	9192	8.26	0.00	0.00	1
13:08:07	55	844	0.0	9192	8.26	0.00	0.00	1
13:08:12	53	844	0.0	9192	8.24	0.00	0.00	1
13:08:17	52	844	0.0	9192	8.26	0.00	0.00	1
13:08:22	51	844	0.0	9192	8.25	0.00	0.00	1
13:08:27	50	844	0.0	9192	8.25	0.00	0.00	1
13:08:32	48	844	0.0	9192	8.27	0.00	0.00	1
13:08:37	47	845	0.0	9192	8.25	0.00	0.00	1
13:08:42	46	845	0.0	9192	8.25	0.00	0.00	1
13:08:47	44	845	0.0	9192	8.25	0.00	0.00	1
13:08:52	43	845	0.0	9192	8.22	0.00	0.00	1
13:08:57	42	845	0.0	9192	8.24	0.00	0.00	1
13:09:02	41	846	0.0	9192	8.22	0.00	0.00	1
13:09:07	40	846	0.0	9192	8.19	0.00	0.00	1
13:09:12	38	846	0.0	9192	8.20	0.00	0.00	1
13:09:17	37	846	0.0	9192	8.22	0.00	0.00	1
13:09:22	36	846	0.0	9192	8.21	0.00	0.00	1
13:09:27	36	846	0.0	9192	8.23	0.00	0.00	1
13:09:32	35	847	0.0	9192	8.26	0.00	0.00	1
13:09:37	34	847	0.0	9192	8.25	0.00	0.00	1
13:09:42	34	847	0.0	9192	8.25	0.00	0.00	1
13:09:47	33	847	0.0	9192	8.25	0.00	0.00	1
13:09:52	32	847	0.0	9192	8.27	0.00	0.00	1
13:09:57	31	847	0.0	9192	8.27	0.00	0.00	1
13:10:02	30	848	0.0	9192	8.28	0.00	0.00	1
13:10:07	30	848	0.0	9192	8.26	0.00	0.00	1
13:10:12	30	848	0.0	9192	8.26	0.00	0.00	1
13:10:17	30	848	0.0	9192	8.24	0.00	0.00	1
13:10:22	29	849	0.0	9192	8.26	0.00	0.00	1

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Well Desc: EAST MEREENIE 38 38
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Ticket #: EM38.4
Job Type: FRAC

TIME	Tubing Pr (psi)	Annulus Pr (psi)	Slry Rate1 (bpm)	Slry Vol1 (gal)	W/head Den (lb/gal)	Well Conc (lb/gal)	PConc/Slur (lb/gal)	Stage Vol (gal)
13:10:27	29	849	0.0	9192	8.24	0.00	0.00	1
13:10:32	29	849	0.0	9192	8.24	0.00	0.00	1
13:10:37	29	849	0.0	9192	8.22	0.00	0.00	1
13:10:42	29	849	0.0	9192	8.28	0.00	0.00	1
13:10:47	29	849	0.0	9192	8.24	0.00	0.00	1
13:10:52	29	850	0.0	9192	8.25	0.00	0.00	1
13:10:57	29	850	0.0	9192	8.24	0.00	0.00	1
13:11:02	29	850	0.0	9192	8.25	0.00	0.00	1
13:11:07	29	850	0.0	9192	8.25	0.00	0.00	1
13:11:12	29	851	0.0	9192	8.22	0.00	0.00	1
13:11:17	29	851	0.0	9192	8.24	0.00	0.00	1
13:11:22	29	851	0.0	9192	8.24	0.00	0.00	1
13:11:27	29	851	0.0	9192	8.23	0.00	0.00	1
13:11:32	29	852	0.0	9192	8.25	0.00	0.00	1
13:11:37	29	852	0.0	9192	8.22	0.00	0.00	1
13:11:42	29	852	0.0	9192	8.27	0.00	0.00	1
13:11:47	29	852	0.0	9192	8.22	0.00	0.00	1
13:11:52	29	852	0.0	9192	8.22	0.00	0.00	1
13:11:57	29	852	0.0	9192	8.31	0.00	0.00	1
13:12:02	28	853	0.0	9192	8.30	0.00	0.00	1
13:12:07	28	853	0.0	9192	8.24	0.00	0.00	1
13:12:12	28	853	0.0	9192	8.21	0.00	0.00	1
13:12:17	28	853	0.0	9192	8.20	0.00	0.00	1
13:12:22	28	854	0.0	9192	8.23	0.00	0.00	1
13:12:27	28	854	0.0	9192	8.24	0.00	0.00	1
13:12:32	28	854	0.0	9192	8.23	0.00	0.00	1
13:12:37	28	854	0.0	9192	8.22	0.00	0.00	1
13:12:42	28	854	0.0	9192	8.26	0.00	0.00	1
13:12:47	28	855	0.0	9192	8.22	0.00	0.00	1
13:12:52	28	855	0.0	9192	8.21	0.00	0.00	1
13:12:57	28	855	0.0	9192	8.22	0.00	0.00	1
13:13:02	28	855	0.0	9192	8.25	0.00	0.00	1
13:13:07	28	856	0.0	9192	8.20	0.00	0.00	1
13:13:12	28	856	0.0	9192	8.23	0.00	0.00	1
13:13:17	28	856	0.0	9192	8.23	0.00	0.00	1
13:13:22	28	856	0.0	9192	8.24	0.00	0.00	1
13:13:27	28	856	0.0	9192	8.22	0.00	0.00	1
13:13:32	28	857	0.0	9192	8.20	0.00	0.00	1
13:13:37	28	857	0.0	9192	8.23	0.00	0.00	1
13:13:42	28	857	0.0	9192	8.23	0.00	0.00	1
13:13:47	28	857	0.0	9192	8.26	0.00	0.00	1
13:13:52	28	858	0.0	9192	8.26	0.00	0.00	1
13:13:57	28	858	0.0	9192	8.27	0.00	0.00	1
13:14:02	28	858	0.0	9192	8.26	0.00	0.00	1
13:14:07	29	858	0.0	9192	8.26	0.00	0.00	1
13:14:12	29	859	0.0	9192	8.20	0.00	0.00	1
13:14:17	29	859	0.0	9192	8.23	0.00	0.00	1
13:14:22	29	859	0.0	9192	8.25	0.00	0.00	1
13:14:27	29	859	0.0	9192	8.25	0.00	0.00	1
13:14:32	29	859	0.0	9192	8.25	0.00	0.00	1

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