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SALTON SEA SCIENTIFIC DRILLING PROGRAM

FLOW TEST OF WELL STATE 2-14,

20-21 MARCH 1986

for

BECHTEL NATIONAL, INC.

SAN FRANCISCO, CALIFORNIA

by

GeothermEx, Inc.

June 1986

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CONCLUSIONS

The following conclusions are based on direct observations and analysis of data collected during the flow test of well State 2-14 conducted from 20 to 21 March 1986:

1. The well was flowed for a total period of 38 hours. The calculated total flow rate and enthalpy data and the measured wellhead pressure data indicate that the well did not stabilize during that time and the well's productivity was, in fact, improving with time.

2. Calculations based on the James method indicate that the well is capable of producing 710,000 lbs/hr at a wellhead pressure of 375 psig. The discharge enthalpy under these conditions is estimated to be 460 BTU/lb.

3. The James method calculations are based on the measured brine flow rate in the weir box and the lip pressure measured at the James tube. An orifice plate was also provided upstream of the James tube to provide a second method of estimating the total flow rate and enthalpy, but problems were encountered with the calculation procedure used for the orifice calculations.

4. During the test there was a general decline in discharge enthalpy from 560 BTU/lb to 440 BTU/lb. This decline is believed to be due to commingled production from more than one production zone and/or changes in the brine salinity during discharge.

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5. The temperature and pressure data collected from the surface gauges during the flow test were used to define the boiling point curve for the discharged brine. The data were found to fall between the curve for pure water and the brine curve defined from the first flow test conducted from 28 to 30 December 1985.

6. Data from downhole temperature logs indicate that the well was producing a significant amount of fluid from behind the liner during the flow test.

7. Analysis of the pressure buildup data collected after the well was shut-in indicated that the formation flow capacity was 16,000 md·ft and the skin factor was -5.5. The negative skin factor suggests the well was producing from fractures. In order to adequately match the measured pressure data it was necessary to use a double porosity model for the calculations, indicating that the well is producing from a fracture/matrix system.

8. The productivity index for the well was calculated to be 2,970 lbs/hr/psi, based on the flowing pressure log conducted immediately before the well was shut-in and the initial pressure calculated from the analysis of the pressure buildup data.

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1. INTRODUCTION

Well State 2-14 was flowed from 20 to 21 March 1986, as part of the Salton Sea Scientific Drilling Program. The well was completed on 17 March 1986 at a total depth of 10,564 feet.

After the previous flow test was conducted at 6,227 feet (28 to 30 December 1985), drilling continued with several partial losses of circulation at 6,637, 8,095, 8,948, 9,458 and 10,400 feet. These partial losses (with the exception of the last one) were treated either with lost circulation materials or squeezed cement in order to continue drilling with full mud returns to the surface.

At 10,475 feet, a total loss of circulation occurred. At this point it was decided to stop drilling and prepare for the final flow test. The bottomhole loss zone was cemented and a 7-inch, 29 lb/ft blank liner was hung from 5,700 inside the 9-5/8-inch casing at 5,700 to 10,135 feet depth. After drilling out the cement plug with a 6-1/8-inch bit, circulation was again lost and the well was drilled blind to a total depth of 10,564 feet. Wellhead equipment was then installed in preparation for the flow test.

GeothermEx personnel were on site during the meeting on 8 March 1986 when the decision was made to flow the well and also during the flow testing and sampling period from 20 to 22 March 1986.

During the flow testing and sampling period, GeothermEx personnel advised Bechtel on various aspects of the test such as data gathering, the flow metering system, flow rate and enthalpy calculations, flow rate changes, and so forth.

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GeothermEx was also responsible for the interpretation of physical and other data collected during the test.

The purpose of this report is to present the physical data collected during the flow test and an interpretation of that data.

1.1 Flow Test Facility

The facility used for testing well "State" 2-14 on 20 and 21 March 1986 is shown schematically in figure 1 and is basically the same as that used during the previous test of 28 to 30 December 1985. Based on the experience from the first test, GeothermEx recommended that Bechtel carry out modifications to overcome the problems that were encountered with operation of the James tube, muffler and weirbox due to mineral deposition.

The following modifications had been made to the existing facility before the flow test was conducted:

1. The James tube was extended in length to ensure that the fluid was discharged directly into the muffler and not into the baffle pipe.

2. An 8-inch line was installed from the muffler to the brine pit to allow drainage of the muffler.

3. The baffles in the weirbox and the weirplate were made removable in order to facilitate cleaning of sludge that was expected to accumulate inside the weirbox.

4. An inspection porthole was cut in the side of the muffler to allow the James tube to be cleaned of mineral scale.

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5. A nitrogen bottle was connected to the lip pressure tap line to permit the lip tap to be blown down on a routine basis during the test to prevent scale buildup.

6. The sight glass on the weirbox was relocated 2 feet upstream of the weir plate to ensure that the brine level was measured correctly.

7. The weircrest length was reduced to 10 inches from the previous 15 inches to improve the accuracy of the water flow measurements.

8. The pressure taps at the measuring orifice were changed from flange to radius taps.

9. A differential pressure gauge (DPI-12) and a static pressure gauge (PI-13), connected to both the upstream and downstream taps, were added to the orifice meter run to measure the pressure differential across the orifice plate. This was necessary because the range of the differential pressure element on the existing Foxboro recorder was inadequate.

In addition to the above, the following changes were made outside of the "muffler area":

1. The discharge from the blooie line at the fluid disposal pit was redirected downward to avoid spraying brine across the field behind the pit.

2. Extra insulation was added to the pipeline to protect personnel working in the area.

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3. A second temperature gauge was added to the bottom of the pipe at the sampling spool inlet (TI-9).

4. A kill-line was connected from the rig pumps to the wellhead, enabling the well to be killed, if necessary.

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2. DESCRIPTION OF THE FLOW TEST

Well State 2-14 was flowed as part of the Salton Sea Scientific Drilling Program from 20 to 21 March 1986. The decision to flow the well was made during an on-site meeting on 8 March 1986.

The well was completed to a total depth of 10,564 feet on 17 March 1986. After completion, the drilling mud in the hole was displaced with fresh water and the permanent wellhead was installed. The well was then left to heat-up in preparation for the flow test.

The well was flowed to the mudpit at 0905 hours (PST) on 20 March 1986. The wellhead pressure dropped from its pre-discharge static pressure of 270 psig to 5 psig during the first 10 minutes of discharge while the flow line temperature rose from 145°F to 250°F. At this point the wellhead pressure began to rise, indicating that the well would be able to sustain discharge and would not require nitrogen injection.

At 0919 hours, the flow was directed to the brine pond through the bypass blooie line, and by 1120 hours the flow, although unstable, was diverted through the James tube, muffler and weirbox to allow for better estimation of the enthalpy and flow rate using the James method. Early measurments indicated that the well was flowing approximately 450,000 lbs/hr with an enthalpy of 500 BTU/lb.

The brine level in the weirbox was measured with both a dip stick and a sight glass. However, the turbulent flow in the muffler produced a foamy layer on top of the brine which prevented accurate readings from being obtained with the dip stick. It was therefore decided to monitor the brine level with only the sight glass.

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At 1356 hours the flow was rediverted through the bypass blooie line to allow the warped weir plate to be repaired. Reinforcement braces were welded to the plate.

While the repairs were in progress, the muffler and weirbox were inspected and found to be free of deposition. At 1457 hours, the repairs to the weir plate were completed and the flow was diverted back to the muffler at 1514 hours.

It became apparent early in the test that the volume of the brine pit would be insufficient for a full 3-day flow test if the well continued to flow at 450,000 lbs/hr. GeothermEx personnel therefore provided Bechtel with regular updates on the enthalpy, steam, and brine flow rates as the test progressed so that the reserve in the brine pit and the number of hours available for flow could be estimated.

At 1543 hours, the flow was diverted through the sampling loop to determine if the pressures and temperatures in the sampling spools were within the desired range for obtaining brine, steam and gas samples. The conditions were not within the desired range and the orifice plates were then changed as required and by 2145 hours the appropriate orifice plates had been installed to give the desired sampling conditions. The flow was then diverted to the bypass loop and the well was throttled to maintain a flow rate of approximately 290,000 lbs/hr.

The flow was diverted to the sampling loop at 0640 hours on 21 March 1986 to allow chemical sampling to begin. It was also noted that only 30% of the brine pit volume remained available and at 0815 hours the well was throttled to approximately 260,000 lbs/hr to extend the time available for chemical sampling and downhole logging.

At 1245 hours, the well was shut-in to allow spinner and pressure tools to be run to 5,000 feet depth in preparation for conducting a combined spinner/pressure log under flowing conditions. The shut-in was necessary because if the spinner was run into of the well while two-phase flow was occurring, it was possible that the high flow velocity would damage the tool. The tool was run to 5,000 feet depth to ensure that the tool was only run in the single phase brine.

During the shut-in period, the muffler and weirbox were again inspected for scale buildup. During this inspection some scale build-up was found around the James tube, but when nitrogen was bled through the tube of the weir and this may have caused some minor error in the brine flow rate measurements. The internal part of the muffler, however, was found to be relatively clean.

The well was discharged again at 1330 hours and the spinner tool was lowered from 5,000 feet to 5,500 feet depth at 1355 hours, 10,000 feet depth at 1413 hours, 10,300 feet depth at 1450 hours, and 10,400 feet depth at 1505 hours. At 1551 hours, the well was again shut-in to remove the spinner and pressure tools. No evidence of scale was found in the wellbore while the tools were lowered into the flowing well, nor while they passed through the liner hanger constriction.

At 1600 hours, the well was again discharged and the sampling loop was isolated at 1618 hours. The well was then fully opened and flowed at its maximum rate through the 6-inch James tube until 1733 hours. Under the condition of full open flow, with the well flowing approximately 650,000 lbs/hr, it was found that both the muffler and weirbox were overloaded.

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The sampling loop was again opened at 1733 hours and the well was throttled back to its earlier flow rate of 260,000 lbs/hr. At 1856 hours, preparations were made to conduct pressure and temperature surveys in the well under flowing conditions. The pressure and temperature tools were run to 30 feet at 1916 hours and then to 4,000 feet at 1950 hours, 6,000 feet at 2046 hours, 9,000 feet at 2130 hours, and 10,000 feet depth at 2151 hours. The tools were then left at 10,000 feet depth to record the pressure buildup and temperature changes after the well was shut-in.

By 2200 hours, the brine pit was full and the well was shut-in. The wellhead pressure immediately rose to 508 psig and then decreased slowly. At 0530 hours on 22 March 1986 the pressure and temperature tools were recovered and rerun at 0858 hours to continue monitoring the pressure buildup and temperature changes. The tools were recovered at 2041 hours.

From 22 to 25 March 1986, a number of attempts were made to obtain downhole samples. Six runs were made with the LANL/SANDIA downhole sampler using a downhole motor and battery pack, three with the Leutert downhole sampler and one with the LBL flow through sampler. Only two of the attempts were successful in obtaining fluid samples. A downhole fluid inclusion experiment was also attempted but was unsuccessful as the OTIS wireline on which the experimental apparatus was run corroded and parted. An attempt was made to recover the fluid inclusion "bomb", but this was unsuccessful.

Injection of the produced brine back to the well began on the evening of 25 March and was completed by 0700 hours, 27 March. A continuous temperature log was then conducted. From 27 to 31 March a variety of geophysical logs were run in the well with periodic injection of cold

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water to keep the well cool. A second continuous temperature log was conducted at 2100 hours, 31 March, and after the log was completed the well was shut-in.

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3. DATA ANALYSIS

The data collected from the wellhead, sample loop and muffler areas during the flow test are tabulated in Appendix A and plotted in figures 2, 3 and 4. Also shown on each plot is a summary of the flow test history as discussed in Section 2.

3.1 Flow Rate and Enthalpy Calculations

Calculation Techniques

During the flow test, the total flow rate and enthalpy were monitored using the James (1962) method. The calculation procedure involves the simultaneous solution of two equations, with total flow rate and enthalpy as the unknown variables. The first equation, known as the James equation, relates the total flow rate and enthalpy to pressure measurements taken at the "lip" of the discharge pipe (James tube). The equation is:

$$w_t = \frac{2827.4 \; C \; p_c^{0.96} \; d_c^2}{h_t^a} \qquad (1)$$

where: w_t = total flow rate (lbs/hr)
p_c = pressure at lip of James tube (psia)
d_c = internal diameter of James tube (ft)
h_t = total fluid enthalpy (BTU/lb)
C, a — empirical constants

The values of the empirical constants, C and a, were found to be 11,400 and 1.102 respectively, based on experimental data for low salinity geothermal fluids. For high salinity brines experimental data are not

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available from which to obtain the empirical constants, and it was therefore necessary to derive the values from theoretical calculations.

The theoretical model used to calculate the empirical constants is a two-phase critical flow model developed by Wallis and Richter (1978). The calculations were initially carried out for pure water and the results are compared with the James correlation in figure 5. The good agreement over the expected range of enthalpy indicated that the theoretical model was applicable and the model was then used to calculate the James factors for brine concentrations of 10, 20 and 30 weight-%. The results of these calculations are also plotted in figure 5 and the derived values of the empirical constants are tabulated in table 1.

To obtain a second relationship between total flow rate and enthalpy, it is necessary to have an independent measure of the brine flow, steam flow or total flow. Generally this relationship is obtained by using either an orifice plate to measure the total flow rate or a weirbox to measure the brine flow rate after separation at atmospheric pressure.

For the second flow test at well State 2-14, a 7-inch orifice plate was provided in the 10-inch line upstream of the James tube to measure the total flow rate and a weirbox with a 10-inch rectangular weir was provided to measure the separated brine flow.

James (1966) presented the following equation to calculate the total flow rate from the pressure differential across an orifice plate:

$$w_t = \frac{22219.2\ d_m^2\ Y_{TP}}{\sqrt{1 - \beta^4}} \sqrt{\frac{\phi_{TP}}{x^b\ (V_g - V_f) + V_f}} \qquad (2)$$

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where: w_t = total flow rate (lbs/hr)
d_m = orifice plate diameter (ft)
Y_{TP} = expansion factor
β = ratio of orifice to pipe diameter
ϕ_{TP} = pressure differential (mm H_g under water)
x = steam fraction at orifice upstream pressure
V_g = specific volume of steam at upstream pressure (ft^3/lb)
V_f = specific volume of water at upstream pressure (ft^3/lb)
b = empirical constant

From experimental data for low salinity geothermal fluids, the value of the empirical constant, b, has been estimated to be 1.5 (James, 1966). It has not been verified that this value would also apply to high salinity brines.

The steam fraction (x) at the orifice upstream pressure is calculated from:

$$x = \frac{h_t - h_g^*}{h_g^* - h_f^*} \qquad (3)$$

where: h_g^* = steam enthalpy at upstream pressure (BTU/lb)
h_f^* = water enthalpy at upstream pressure (BTU/lb)

Equations (2) and (3) can be combined with equation (1) to calculate the fluid enthalpy:

$$h_t^a = 0.127\, C\, \frac{p_c^{0.96}}{Y_{TP}} \left(\frac{d_c}{d_m}\right)^2 \sqrt{1 - \beta^4} \sqrt{\frac{\left(\frac{h_t - h_f^*}{h_g^* - h_f^*}\right)^{1.5} (V_g - V_f) + V_f}{\phi_{TP}}} \qquad (4)$$

It should be noted that the total fluid enthalpy (h_t) appears on both sides of equation (3) and it is therefore necessary to solve the equation using an iterative process.

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After calculating the total fluid enthalpy, the total mass flow rate can be calculated from either equations (1) or (2).

For the weirbox, the equations to calculate the liquid flow rate and the total flow rate are:

$$w_f = 11988 \ \rho_f \ (0.833-0.2H) \ H^{1.5} \qquad (5)$$

where: w_f = liquid flow rate (lbs/hr)
ρ_f = liquid density in weirbox (lb/ft^3)
H = brine level above weir (ft)

$$w_t = w_f \left(\frac{h_g^{**} - h_f^{**}}{h_g^{**} - h_t} \right) \qquad (6)$$

where: h_g^{**} = steam enthalpy at atmospheric pressure (BTU/lb)
h_f^{**} = water enthalpy at atmospheric pressure (BTU/lb)

By combining equations (5) and (6) with equation (1), the total fluid enthalpy can be calculated from:

$$h_t^a = 3.389 \times 10^7 \ C \ \rho_f \ p_c^{0.96} \ d_c^2 \ (0.833 - 0.2H) \ H^{1.5} \left(\frac{h_g^{**} - h_f^{**}}{h_g^{**} - h_t} \right) \qquad (7)$$

As with the orifice calculation, it is necessary to use an iterative process to calculate the total fluid enthalpy. The total mass flow rate can then be calculated using either equations (1) or (6).

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Results

The data collected from the orifice plate, James tube and weirbox have been used to calculate the total fluid enthalpy and total mass flow rate using the calculation techniques described in the previous section.

Initially the weirbox and James tube data were used to calculate the total fluid enthalpy and total mass flow rate. The brine level and lip pressure measurements are plotted in figure 6 along with the calculated enthalpy, brine flow rate and total flow rates. The data are also tabulated in Appendix B. The calculations were carried out for assumed TDS contents of 20 and 30 weight-%. The differences in calculated enthalpy and total flow rate for the two TDS values are minor (figure 6). If either the lip pressure or weir level were not available, the total flow rate was calculated using either equations (1) or (6), assuming that the enthalpy was equal to the calculated value from the previous time step.

Figure 6 also shows that there was a significant drop in total fluid enthalpy during the flow test from an initial value of approximately 550 BTU/lb to approximately 430 BTU/lb by the end of the test. This change possibly results from commingled production of reservoir fluid from more than one production zone in changing proportions and/or an increase in salinity.

The ratio of the measured wellhead temperature to the saturation temperature for pure water at the corresponding wellhead pressure, was plotted as a function of time (figure 7). By comparing this plot with the plot of enthalpy vs. time in figure 6, it can be seen that there is a general correlation between the drop in enthalpy and the increase in temperture ratio from 15 to 30 hours. This correlation suggests that the

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change in enthalpy may be partially due to an increase in salinity of the produced fluid.

The plots of wellhead pressure (figure 2) and total mass flow rate (figure 6) both have increasing trends with time, suggesting that the well productivity was increasing during the test and the well output did not stabilize. The wellhead pressure and mass flow data are plotted in figure 8, along with the deliverability curve which is believed to best approximate stable conditions. These data indicate that the well is capable of producing approximately 710,000 lbs/hr at a wellhead pressure of 375 psig.

For the orifice calculations, the pressure differential across the orifice plate was measured by using a static pressure gauge (PI-13) to independently measure the upstream and downstream pressures and, secondly, by using a differential pressure gauge (DPI-12). Both sets of data have been used for the calculations of total fluid enthalpy and total mass flow rate.

The calculations were carried out assuming a 20 weight-% TDS brine and using the calculation technique described in the previous section. The detailed results are included in Appendix B. It was found that the calculated enthalpies were unreasonably high and generally higher than the values for saturated steam; indicating that a problem existed either in the data or in the calculation procedure.

Calculations were also carried out using the individual lip pressure and orifice equations (equations (1) and (2)) for a fixed enthalpy and assuming a 20 weight-% TDS brine (see Appendix B). The difference in calculated flow rate from the two equations was then computed and the data are plotted in figure 9 for fixed enthalpies of 400, 500 and 600 BTU/lb.

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The plot indicates that within the expected range of enthalpies from the weirbox calculations (400 to 560 BTU/lb), the calculated flow rates from the two equations are in agreement within the expected error for the James method of ± 7% for most of the test period. However, the plot also indicates that the difference in flow rate becomes increasingly insensitive to enthalpy as the enthalpy increases.

The results from the fixed enthalpy calculations indicate that the iterative scheme used for the orifice calculations was converging to the wrong root of equation (4). An attempt was made to change the iterative scheme, but this was not successful. However, it appears from the results of the fixed enthalpy calculations that the results using the orifice and weirbox methods would have been in reasonable agreement if the iterative scheme had worked correctly.

3.2 Surface Temperature/Pressure Data

Temperature and pressure data were collected from a number of points in the surface pipework (figure 1) during the flow test. These data are plotted in figure 10. The boiling point curve for pure water and the boiling point curve for the brine from the first flow test are included for comparison purposes. It can be seen that the data from the present test generally fall between the two curves.

It was observed during the first test that the temperature/pressure data collected at the wellhead (TI-1/PI-1) and upstream of the sampling spools (TI-8/PI-8) suggested that separation of the steam and brine phases had occurred in the pipeline. This effect was noted as the above data followed the pure water boiling point curve rather than the brine curve as would normally be expected. To check if separation was occurring during

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the second flow test, an additional temperature gauge (TI-9) was installed at the bottom of the pipeline near the location of TI-8. It was felt that the data from TI-9 would follow the brine curve, while the data from TI-8 would follow the pure water curve if separation of steam and brine was occurring. The difference in temperature between the two gauges (TI-9 - TI-8) should therefore be positive as the temperature measured in the brine would be higher than that measured in the steam. If no separation occurred, both gauges would register approximately the same temperature, and the temperature differential should therefore be close to zero. However, the temperature differences (figure 11) were, in fact, generally less than zero, indicating that the bottom gauge (TI-9) was reading a lower temperature than the gauge on top of the pipe (TI-8). It is considered that these results do not reflect the true fluid temperatures in the pipeline and suggests problems occurred either with the recording of the data or with the gauges. The data, therefore, are not considered useful for determining if separation of the brine and steam was occurring.

The data from the wellhead temperature gauge, TI-1, has been plotted in figure 7 as a ratio of the measured temperature to the saturation temperature for pure water corresponding to the wellhead pressure. This figure shows that the measured temperature was generally above the saturation temperature during the flow test indicating that separation of the brine and steam was probably not occurring. A possible reason for the lack of separation was that the well was flowing at a significantly higher flow rate (300,000 lbs/hr) in this test as compared to the first test (140,000 lbs/hr).

3.3. Downhole Production Logging

Downhole temperature, pressure and spinner logs were conducted on well State 2-14 during and/or after the flow test to determine:

1. the location of the possible production zones;
2. the production temperature; and
3. the deliverability characteristics of the well.

The temperature and pressure logs are plotted in figure 12. The spinner log was not successful.

Temperature Logs

Temperature logs were conducted while the well was flowing and just after the well was shut-in. The flowing temperature log conducted on 21 March indicated that the producing temperature at 10,000 feet depth was 532°F, 49°F cooler than the 581°F production temperature measured during the first flow test at 6,200 feet depth. The wellhead temperature was approximately 485°F at the time the survey was conducted, whereas the temperature measured during the survey at 4,000 feet depth was only 429°F.

Due to the above discrepancies, it is concluded that the measured temperatures from this log are unreliable. After the flowing log was completed, the instrument was left at 10,000 feet depth to measure the temperature changes after shut-in. The measured data indicate a rise in temperature of approximately 7°F over an 8-hour period. Generally, it is expected that the temperature in the casing or liner would drop after shut-in as the well cools after being heated by the produced fluid. The temperature rise suggests that the produced fluid temperature was lower than the rock temperature at 10,000 feet depth. This was possibly due to production of cooler brine from behind the liner.

After shut-in, two temperature logs (22 and 23 March) were conducted. Problems were encountered with both logs which meant that the

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absolute temperature measurements are probably unreliable. However, the shape of the two logs at the bottom of the hole are similar; both logs have significant temperature rises just below the liner. If the well had been producing from the zone of higher temperature at bottomhole, the temperature at 10,000 feet depth would be expected to drop after shut-in instead of rising as was observed. This further suggests that the well was producing fluid from behind the liner.

Two temperature logs were also conducted after periods of injection (27 and 31 March, 1986). Both logs indicate that the fluid entered the formation behind the liner. The log conducted on the 27 March suggests that very little fluid was injected into the formation below the liner as there is a sharp rise in temperature just below the bottom of the liner. This log further indicates that the fluid was flowing up the open hole/liner annulus from the bottom, with most of the fluid being injected into the formation at 8,400 to 8,800 feet depth.

The log conducted on the 31 March confirms the interpretation of the earlier log and further suggests that leakage into the open hole/liner annulus may have occurred through the liner hanger.

Pressure Logs

Three pressure logs were conducted during the period of the flow test, two with the well flowing and one after the well was shut-in. The first flowing pressure log (21 March) is believed to be unreliable as the pressure gradient is indicative of fluid with a density of 90 lb/ft^3, significantly higher than the measured density of 75.7 lb/ft^3 for the brine in the weirbox.

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The second flowing pressure log (21 March) was conducted with the flowing temperature log. The measured pressure at the surface of 453 psig is in reasonable agreement with the value of 490 psig measured at PI-1, considering the accuracy and range of the Kuster pressure element. Hence, it is felt that the data from this log are reliable. The measured pressure gradient corresponds to a brine with a density of 63.7 lb/ft^3, equating to a TDS content of approximately 25 weight-% at 570°F.

3.4 Well Deliverability

Pressure Buildup Analysis

At the completion of the flow test, a pressure buildup test was conducted, from which the formation flow capacity and skin factor can be estimated. The pressure buildup was monitored for approximately 22 hours, with two runs of the Kuster pressure tool. The data are plotted in figure 13. There is some discrepancy between the first and second runs as the final pressure measured during the first run is 28 psi higher than the first point measured during the second run. This is possibly due to error in returning to the same measuring depth; the difference of 28 psi equates to an error in depth of approximately 65 feet for a fluid density of 63.7 lb/ft^3.

Due to the discrepancy in the pressure measurements between the two Kuster logs, the analysis of the buildup data was initially based on the pressures measured during the first run. The data were first analyzed using the standard infinite radial model, including the effects of wellbore storage and skin. The calculated pressure response for this model, assuming a formation flow capacity of 16,000 md·ft, skin factor of -5.5 and wellbore storage of 0, is compared with the measured data in figure 14.

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Although the calculated pressure change is the same as the measured pressure change over the time the log was run, the model does not adequately fit the early measured pressure response. It was therefore decided to try a double porosity model and for the same values of formation flow capacity and skin factor, the fit to the early pressure data is significantly improved. The parameters used for the model calculations are summarized in table 2.

After analyzing the first pressure run, attempts were made to fit the data from both runs after correcting the pressures measured during the second run. These attempts were unsuccessful because the data from the second run do not appear to be consistent with the commonly used theoretical well test models.

Productivity Index

Based on the above analysis of the pressure buildup data, the initial pressure at 10,000 feet depth was calculated to be 4,317 psig. Using this pressure and the pressure measured during the second flowing pressure survey, it is possible to calculate an approximate productivity index for the well. During the flowing pressure survey, the well was producing a total flow rate of approximately 300,000 lbs/hr and the measured pressure at 10,000 feet depth was 4,216 psig. The calculated productivity index is therefore 2,970 lbs/hr/psi.

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James, R., 1966. Metering of steam-water two-phase flow by sharp-edged orifices. Proc. Inst. Mech. Engrs., 180(23), Part 1, pp. 549-572.

Wallis, G. B., and H. J. Richter, 1978. An isentropic stream tube model for flashing two-phase vapor-liquid flow. Jour. Heat Transfer, 100, pp. 595-600.

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FIGURES

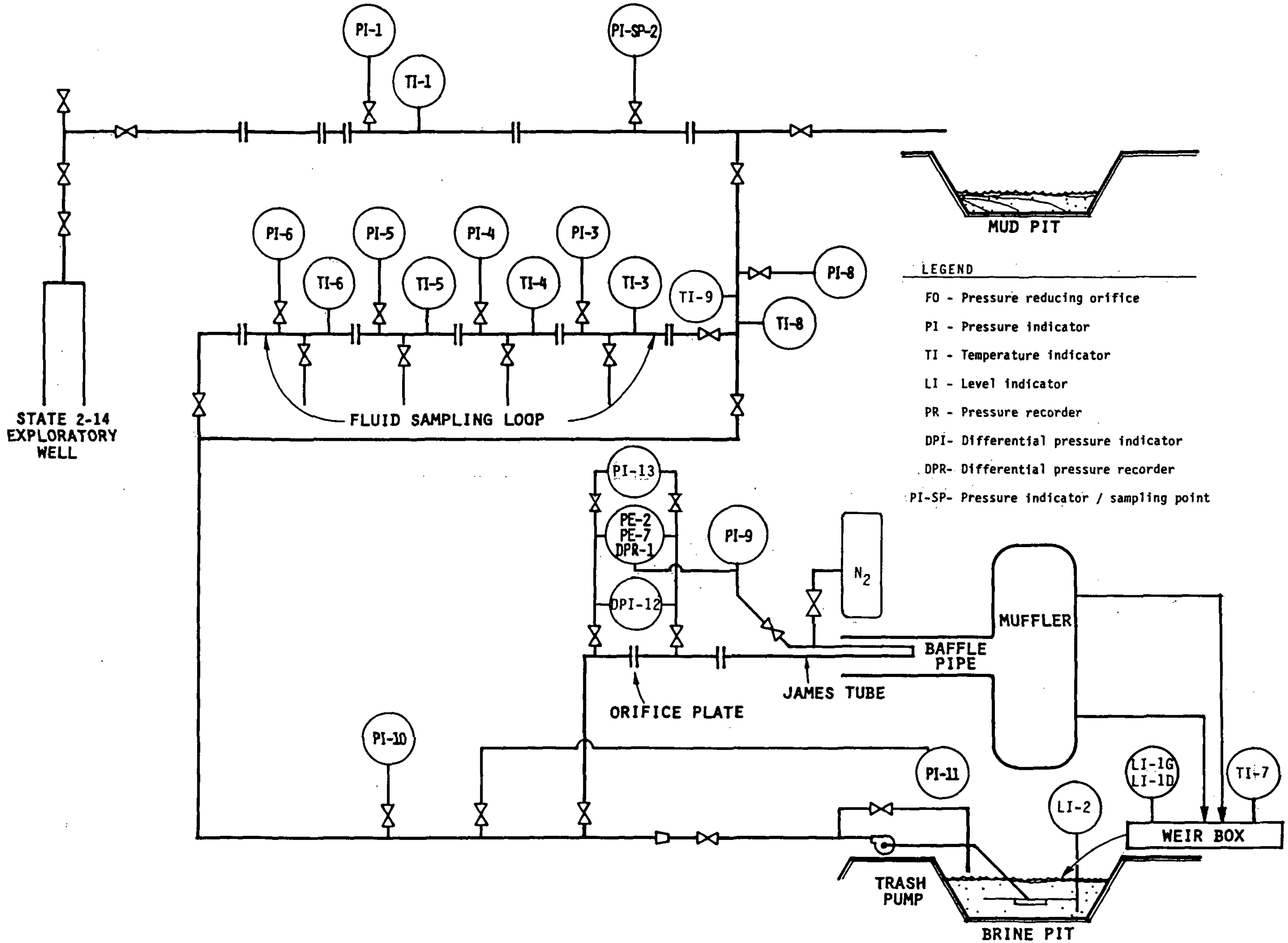
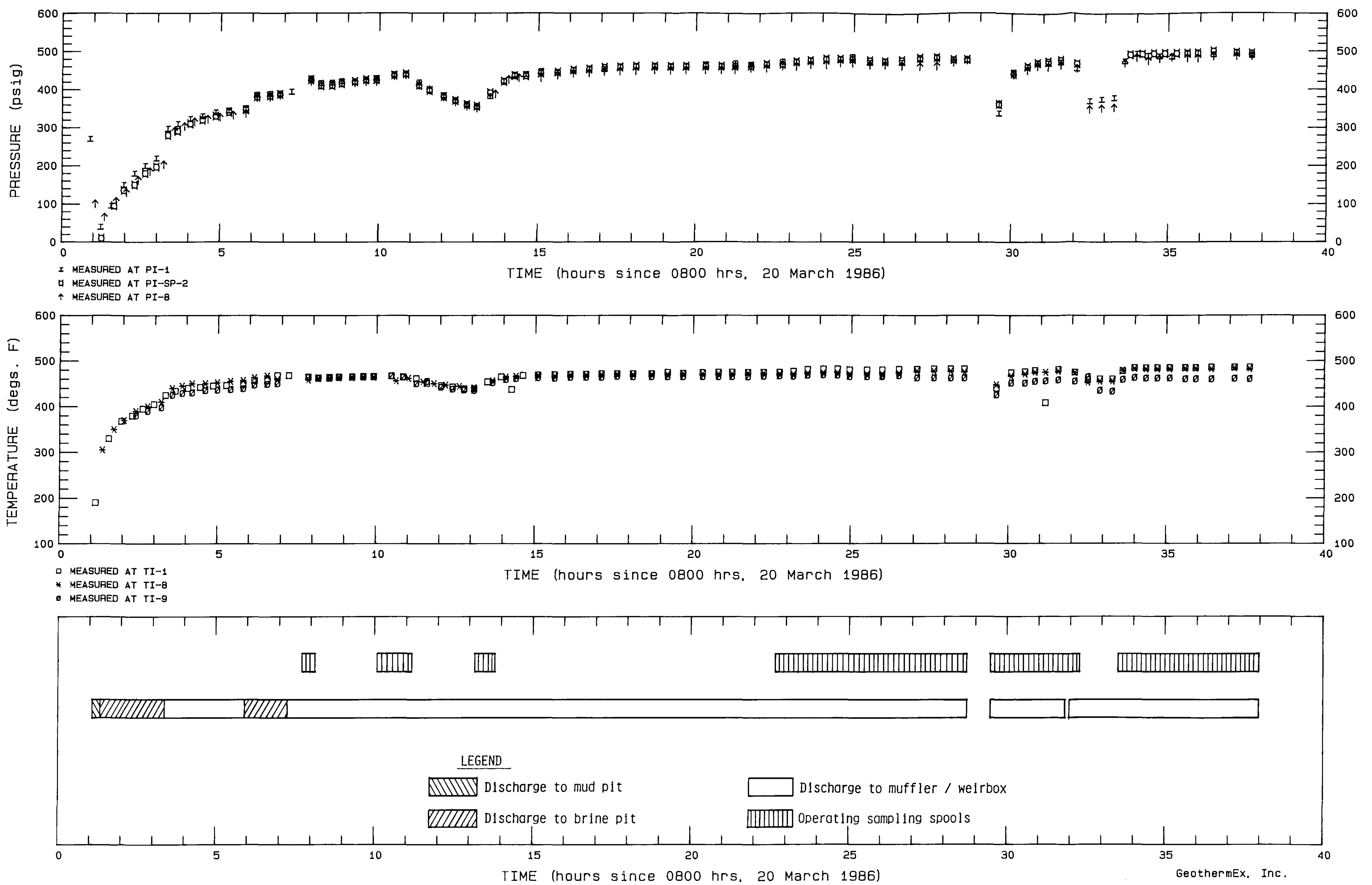


Figure 1. Schematic of flow test facility

FIGURE 2: DATA FROM WELLHEAD AREA, WELL STATE 2-14 FLOWTEST (20/21 MARCH, 1986)



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06-09-1986 A:WHAREA.PLT

FIGURE 3: DATA FROM SAMPLE SPOOLS, WELL STATE 2-14 FLOWTEST (20/21 MARCH, 1986)

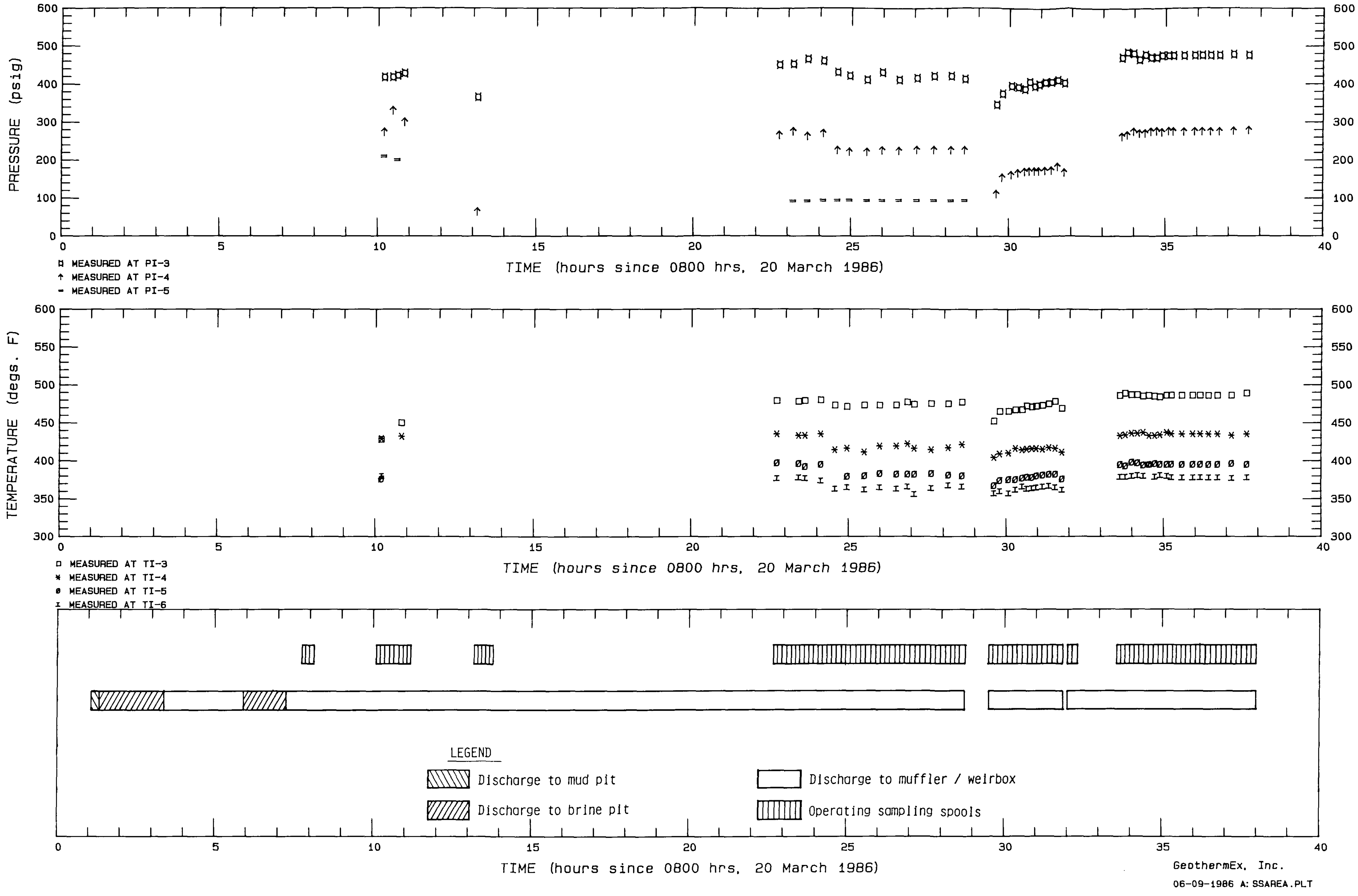

FIGURE 4: DATA FROM MUFFLER AREA, WELL STATE 2-14 FLOWTEST (20/21 MARCH, 1986)

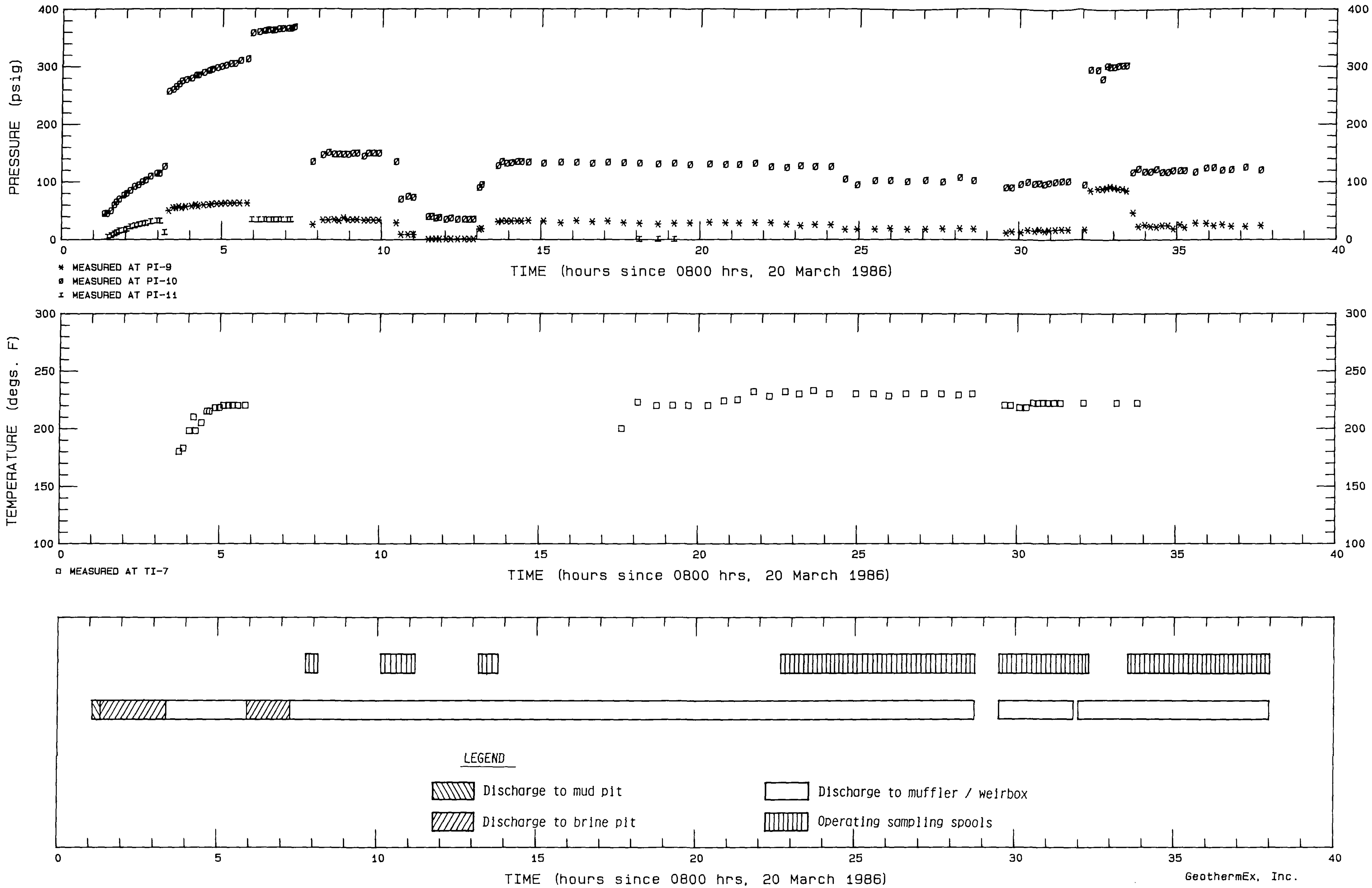

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FIGURE 5: JAMES FACTOR vs ENTHALPY

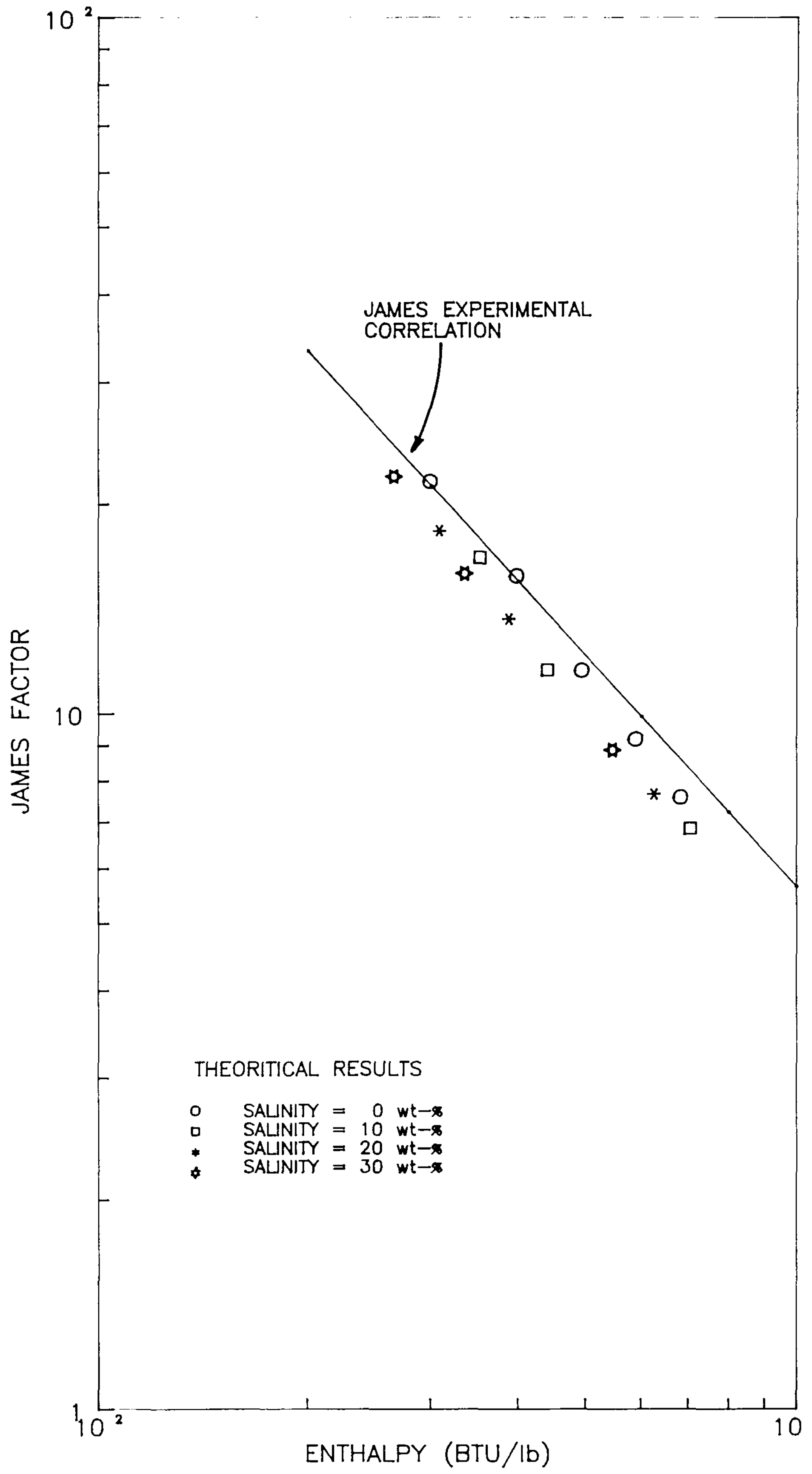
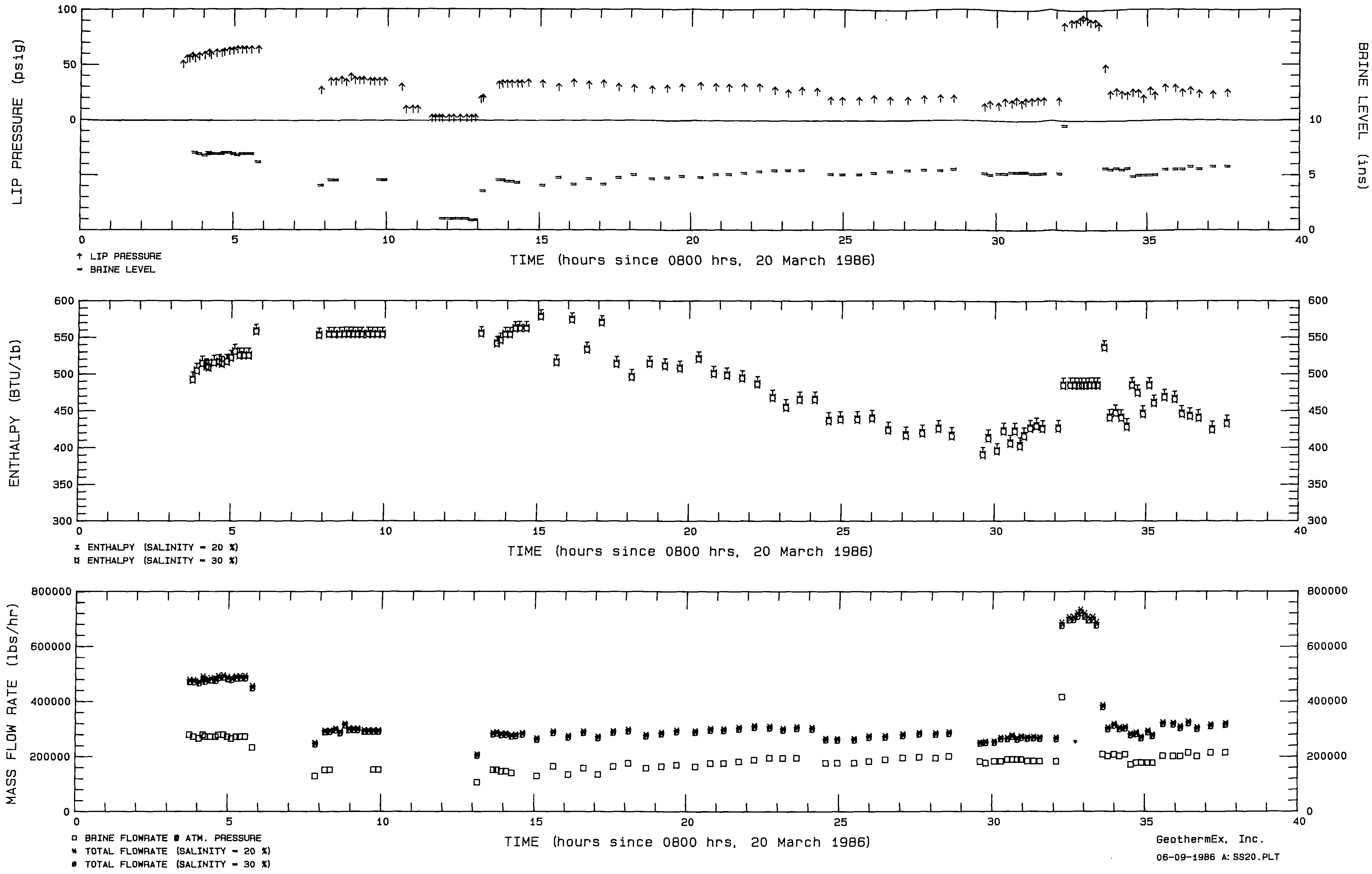


FIGURE 6: CALCULATED WELL OUTPUT - WEIRBOX METHOD



GeothermEx, Inc.
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FIGURE 7: TEMPERATURE RATIO (TI1/Tsatn) vs TIME

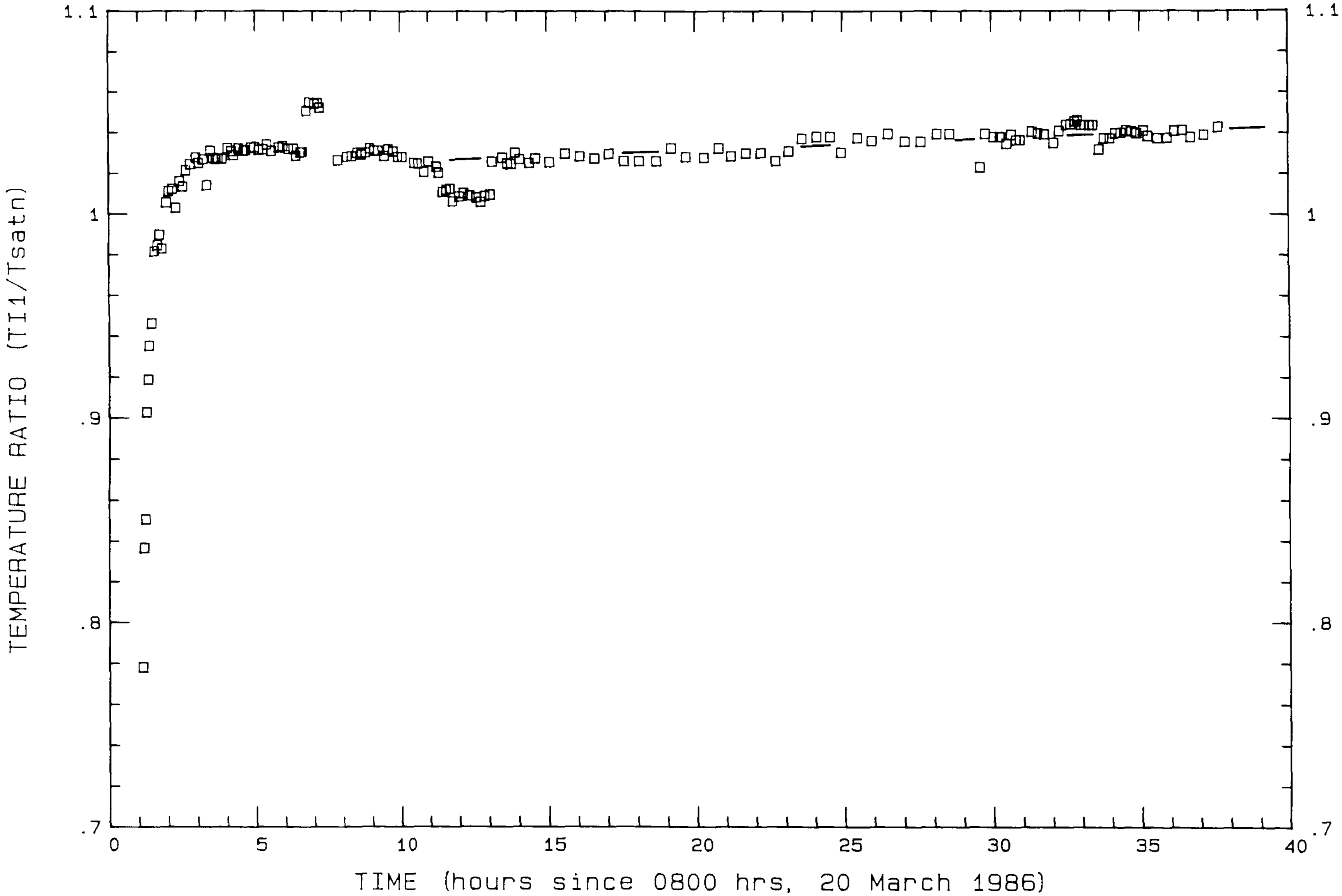

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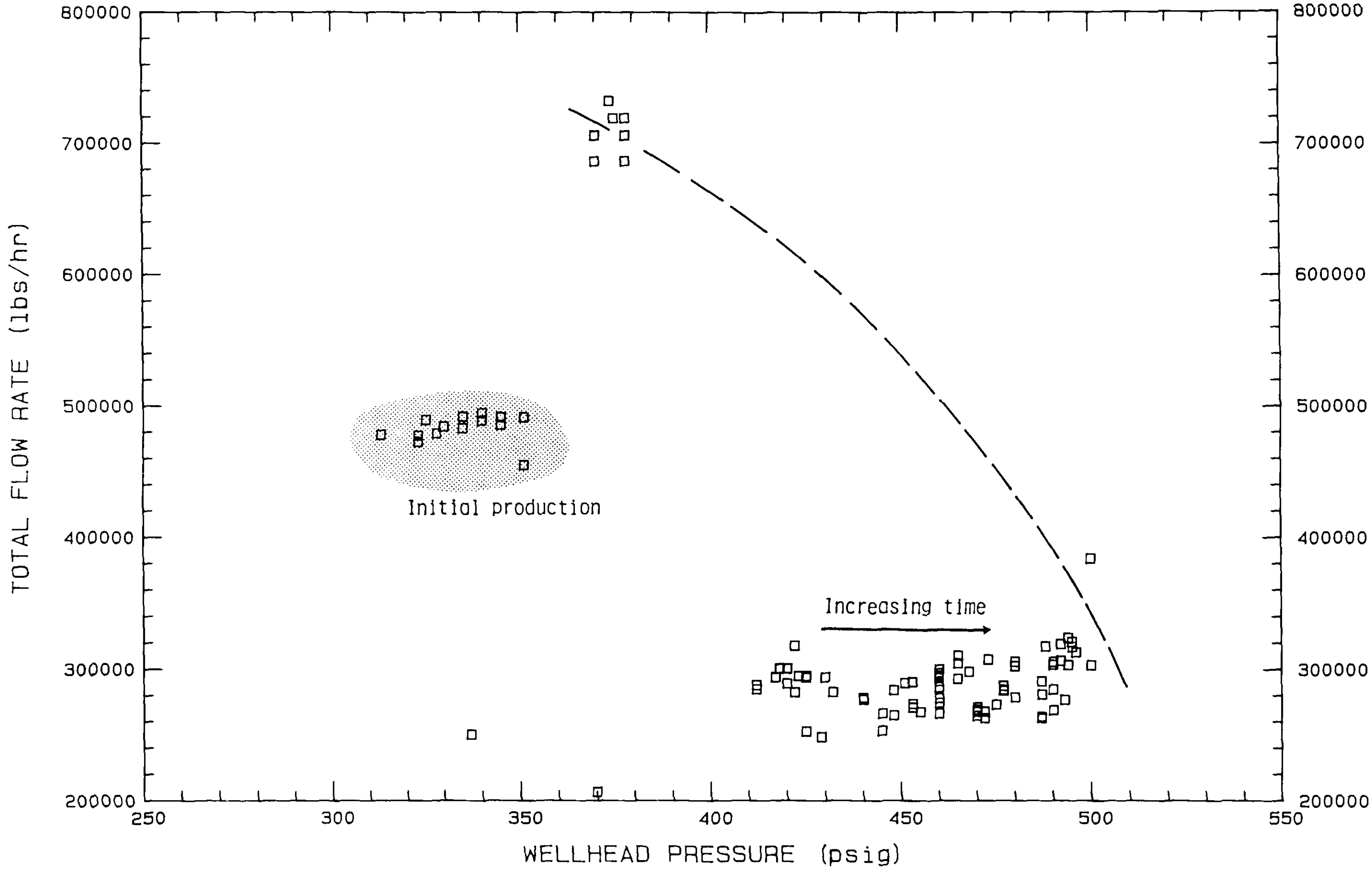
FIGURE 8: WELLHEAD PRESSURE vs TOTAL FLOW RATE



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06-09-1986 A: MFWHP.PLT

FIGURE 9: ANALYSIS OF ORIFICE FLOWRATE CALCULATIONS

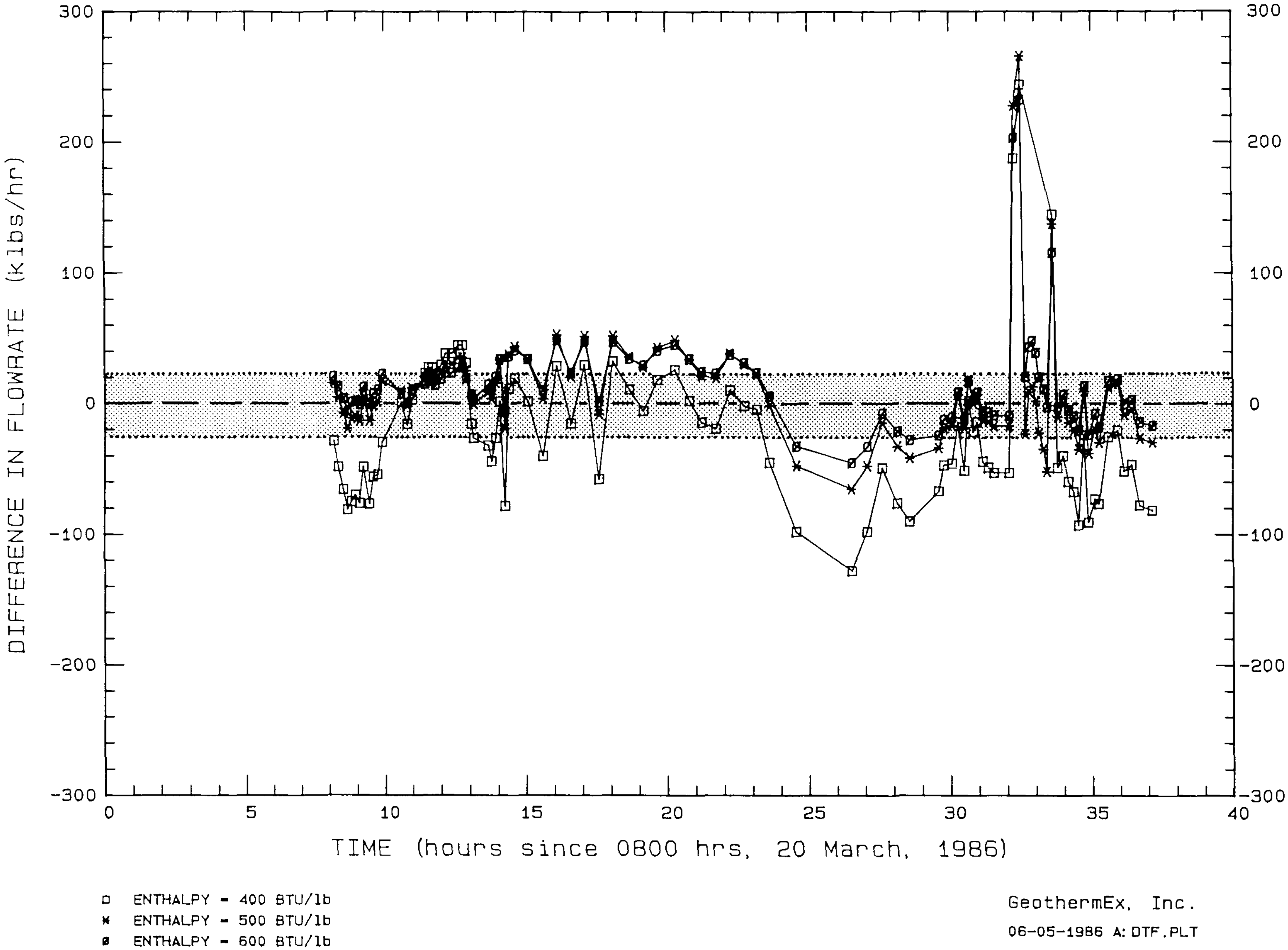

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FIGURE 10: BOILING POINT CURVE, WELL STATE 2-14

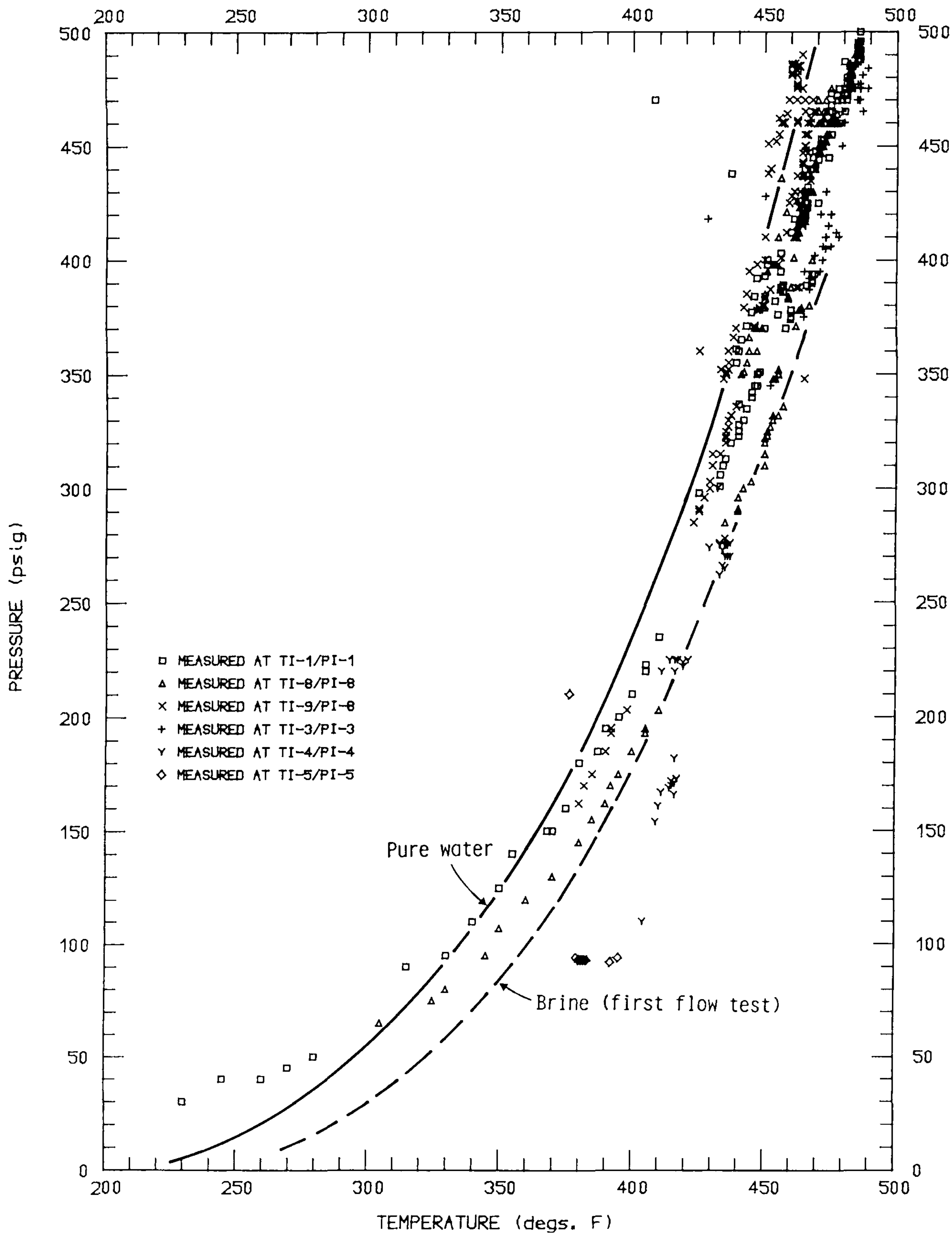

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FIGURE 11: TEMPERATURE DIFFERENCE (TI9 - TI8) vs TIME

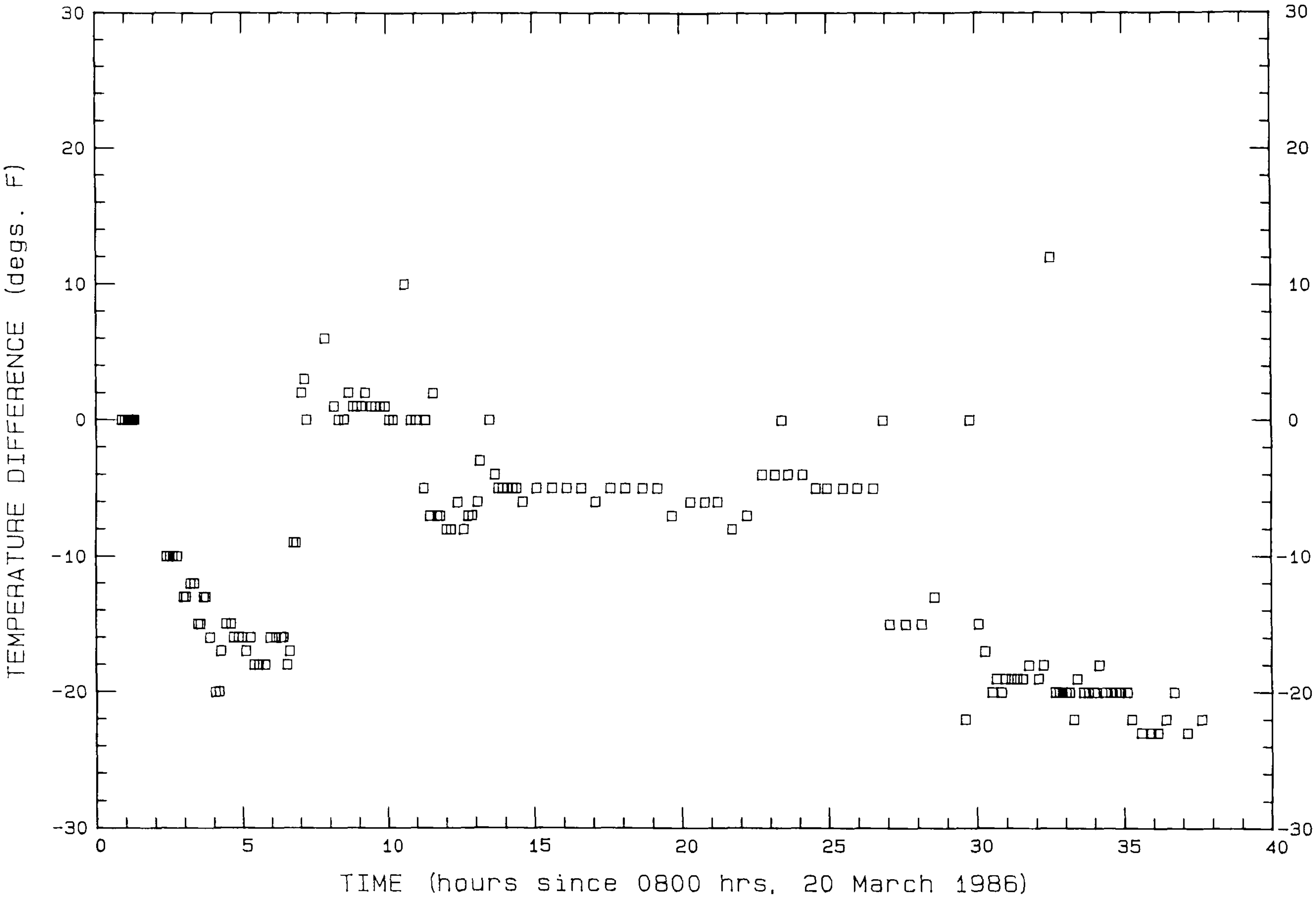

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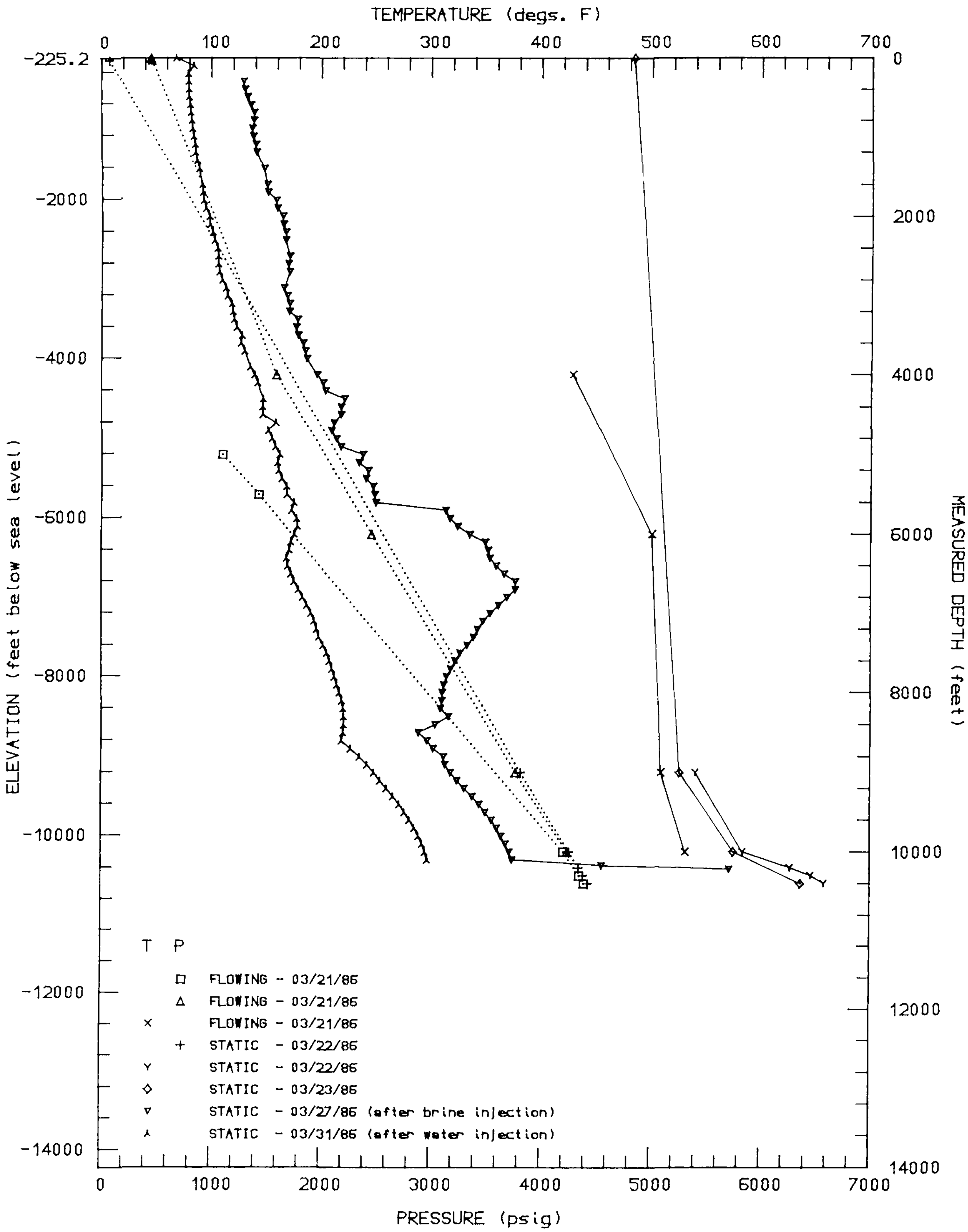
FIGURE 12: TEMPERATURE/PRESSURE SURVEYS, WELL STATE 2-14



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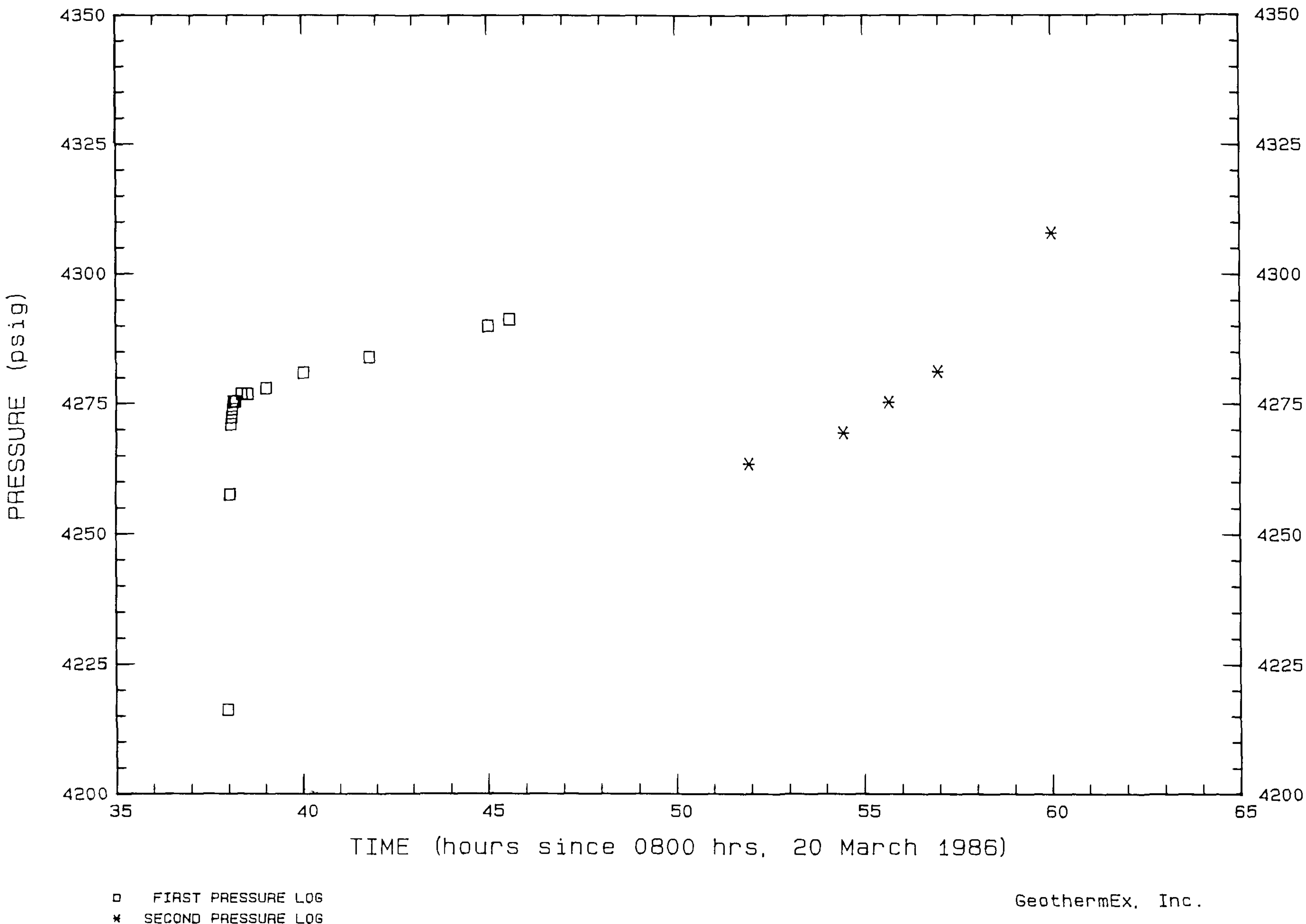
06-05-1986 A:SSTP.PLT

FIGURE 13: PRESSURE BUILDUP DATA, WELL STATE 2-14



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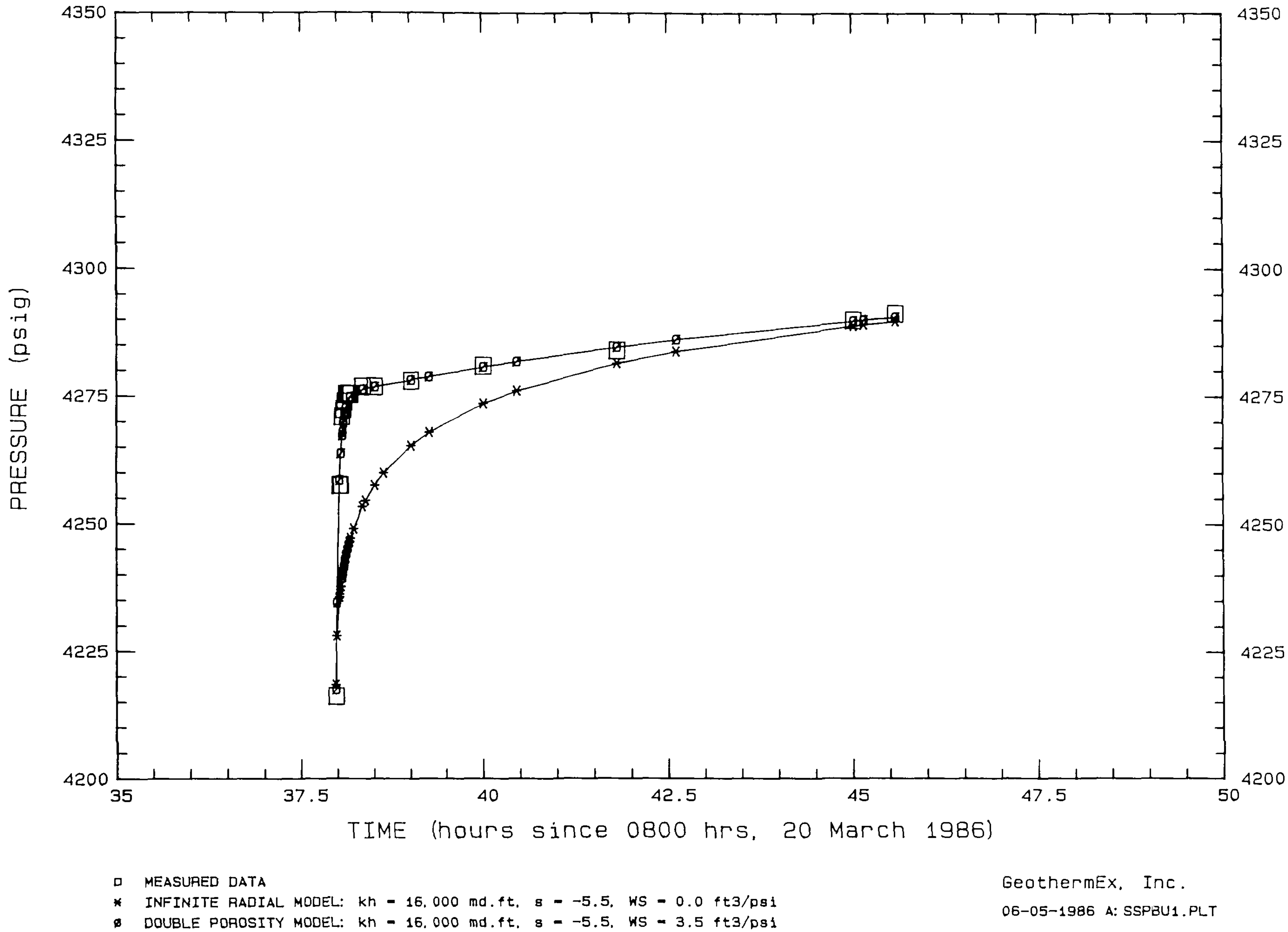
06-05-1986 A: SSPBU1.PLT

FIGURE 14: PRESSURE BUILDUP ANALYSIS, WELL STATE 2-14



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TABLES

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Table 1. Theoretical Values of the James Constants

Salinity (wt.-%)	C	A
0	11,400*	1.102*
0	32,818	1.28
10	17,132	1.27
20	20,703	1.23
30	22,785	1.25

*James correlation

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Table 2. Parameters Used for Well Test Analysis

	Infinite Radial Model	Double Porosity Model
Formation flow capacity (kh) (md·ft)	16,000	16,000
Skin factor	-5.5	-5.5
Wellbore storage (ft^3/psi)	0	3.5
Lambda	-	$5.02x10^{-7}$
Omega	-	$1.44x10^{-2}$
Initial pressure (psig)	4,317	4,317
Fluid viscosity	0.12	0.12

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APPENDIX A

Data Collected During Flow Test

A.1: DATA FROM WELLHEAD AREA

Rec #	MMDDYY	TIME	DELT	PI1	PISP2	PI8	TI1	TI8	TI9
1	32086	853	0.883	270	-1	-1	-1	-1	-1
2	32086	859	0.983	170	-1	-1	-1	-1	-1
3	32086	903	1.050	250	-1	100	-1	70	-1
4	32086	905	1.083	5	-1	-1	-1	-1	-1
5	32086	908	1.133	10	-1	-1	190	-1	-1
6	32086	911	1.183	30	-1	-1	230	-1	-1
7	32086	914	1.233	40	-1	-1	245	-1	-1
8	32086	916	1.267	40	10	-1	260	-1	-1
9	32086	919	1.317	45	20	-1	270	-1	-1
10	32086	921	1.350	50	60	65	280	305	-1
11	32086	926	1.433	90	75	75	315	325	-1
12	32086	933	1.550	95	80	80	330	330	-1
13	32086	939	1.650	110	95	95	340	345	-1
14	32086	943	1.717	125	110	107	350	350	-1
15	32086	948	1.800	140	120	120	355	360	-1
16	32086	957	1.950	150	135	130	368	370	-1
17	32086	1002	2.033	150	135	130	370	370	-1
18	32086	1009	2.150	160	145	145	375	380	-1
19	32086	1017	2.283	180	150	155	380	385	-1
20	32086	1024	2.400	185	165	162	387	390	380
21	32086	1031	2.517	195	170	170	390	392	382
22	32086	1037	2.617	200	180	175	395	395	385
23	32086	1046	2.767	210	190	185	400	400	390
24	32086	1058	2.967	220	197	193	405	405	392
25	32086	1103	3.050	223	200	195	405	405	392
26	32086	1112	3.200	235	210	203	410	410	398
27	32086	1120	3.333	298	280	285	425	435	423
28	32086	1128	3.467	301	285	290	433	440	425
29	32086	1133	3.550	306	289	291	433	440	425
30	32086	1139	3.650	310	291	296	434	440	427
31	32086	1144	3.733	313	300	300	435	442	429
32	32086	1152	3.867	320	303	303	437	445	429
33	32086	1203	4.050	323	310	310	440	450	430
34	32086	1211	4.183	325	315	315	440	450	430
35	32086	1215	4.250	328	320	315	440	450	433
36	32086	1226	4.433	330	320	320	442	450	435
37	32086	1236	4.600	335	323	322	443	450	435
38	32086	1241	4.683	335	325	323	443	451	435
39	32086	1251	4.850	340	330	325	445	451	435
40	32086	1259	4.983	340	330	327	445	452	436
41	32086	1307	5.117	342	335	330	445	453	436
42	32086	1316	5.267	345	340	332	446	453	437
43	32086	1324	5.400	345	340	332	447	455	437
44	32086	1334	5.567	350	344	336	447	457	439
45	32086	1348	5.800	351	346	336	448	457	439
46	32086	1357	5.950	376	376	371	455	462	446
47	32086	1409	6.150	386	380	378	457	463	447
48	32086	1420	6.333	386	381	378	457	464	448
49	32086	1425	6.417	388	381	379	456	464	448
50	32086	1433	6.550	389	383	380	457	467	449

Rec #	MMDDYY	TIME	DELT	PI1	PISP2	PI8	TI1	TI8	TI9
51	32086	1438	6.633	389	383	380	457	467	450
52	32086	1446	6.767	389	385	383	466	459	450
53	32086	1452	6.867	390	387	384	468	459	450
54	32086	1503	7.050	391	389	388	468	460	462
55	32086	1509	7.150	394	391	388	469	460	463
56	32086	1514	7.233	394	-1	-1	468	-1	-1
57	32086	1551	7.850	429	425	421	465	458	464
58	32086	1610	8.167	417	410	410	463	461	462
59	32086	1620	8.333	417	410	410	463	462	462
60	32086	1631	8.517	418	410	412	464	462	462
61	32086	1640	8.667	420	418	415	464	462	464
62	32086	1649	8.817	422	415	416	465	463	464
63	32086	1657	8.950	418	418	418	465	463	464
64	32086	1706	9.100	420	420	417	465	463	464
65	32086	1714	9.233	420	420	417	465	463	465
66	32086	1727	9.450	425	425	420	465	464	465
67	32086	1735	9.583	423	425	420	466	464	465
68	32086	1745	9.750	425	425	420	466	464	465
69	32086	1755	9.917	430	425	420	466	464	465
70	32086	1804	10.067	430	425	424	466	-1	-1
71	32086	1812	10.200	-1	-1	-1	-1	-1	-1
72	32086	1828	10.467	440	437	435	467	-1	467
73	32086	1837	10.617	445	448	436	468	456	466
74	32086	1850	10.833	440	440	437	465	464	464
75	32086	1900	11.000	430	431	426	465	462	462
76	32086	1915	11.250	418	410	410	461	455	450
77	32086	1920	11.333	403	-1	-1	456	-1	-1
78	32086	1928	11.467	400	399	398	451	454	447
79	32086	1935	11.583	398	396	398	451	453	455
80	32086	1943	11.717	393	393	395	450	451	444
81	32086	1949	11.817	392	388	385	447	450	443
82	32086	2002	12.033	384	380	379	446	450	442
83	32086	2011	12.183	377	378	370	445	447	439
84	32086	2024	12.400	371	370	366	443	444	438
85	32086	2037	12.617	365	361	360	441	444	436
86	32086	2046	12.767	361	359	355	439	443	436
87	32086	2054	12.900	360	355	351	440	442	435
88	32086	2105	13.083	355	355	350	439	441	435
89	32086	2109	13.150	370	374	370	450	449	446
90	32086	2130	13.500	382	390	-1	454	-1	-1
91	32086	2140	13.667	395	398	387	456	456	452
92	32086	2147	13.783	412	410	401	460	461	456
93	32086	2156	13.933	422	420	412	465	463	458
94	32086	2205	14.083	432	415	425	466	464	459
95	32086	2216	14.267	438	435	428	437	465	460
96	32086	2224	14.400	440	435	430	467	466	461
97	32086	2237	14.617	440	435	430	468	467	461
98	32086	2305	15.083	448	442	430	469	468	463
99	32086	2337	15.617	444	445	437	470	467	462
100	32186	2407	16.117	451	450	442	471	469	464

Rec #	MMDDYY	TIME	DELT	PI1	PISP2	PI8	TI1	TI8	TI9
101	32186	2437	16.617	453	453	443	471	469	464
102	32186	106	17.100	453	457	447	472	470	464
103	32186	136	17.600	460	458	447	472	471	466
104	32186	206	18.100	460	460	448	472	470	465
105	32186	241	18.683	460	460	450	472	470	465
106	32186	311	19.183	460	460	450	475	470	465
107	32186	341	19.683	460	460	450	473	472	465
108	32186	418	20.300	465	460	450	474	471	465
109	32186	448	20.800	460	460	450	475	471	465
110	32186	514	21.233	468	460	450	475	471	465
111	32186	544	21.733	465	460	455	475	473	465
112	32186	614	22.233	465	465	455	475	473	466
113	32186	644	22.733	473	465	460	475	471	467
114	32186	710	23.167	472	472	460	477	470	466
115	32186	725	23.417	-1	-1	-1	-1	-1	-1
116	32186	737	23.617	477	475	465	481	472	468
117	32186	807	24.117	480	480	465	482	473	469
118	32186	834	24.567	480	480	470	482	473	468
119	32186	857	24.950	487	480	470	480	470	465
120	32186	930	25.500	472	477	465	480	470	465
121	32186	959	25.983	475	474	465	480	470	465
122	32186	1031	26.517	472	477	462	481	472	467
123	32186	1052	26.867	-1	-1	-1	-1	-1	-1
124	32186	1105	27.083	480	483	460	481	477	462
125	32186	1137	27.617	485	483	461	482	477	462
126	32186	1209	28.150	477	477	470	482	477	462
127	32186	1235	28.583	477	477	475	482	475	462
128	32186	1336	29.600	337	360	360	440	447	425
129	32186	1347	29.783	425	425	423	470	463	463
130	32186	1404	30.067	445	440	438	474	466	451
131	32186	1417	30.283	445	448	440	474	469	452
132	32186	1430	30.500	460	460	451	476	471	451
133	32186	1439	30.650	460	462	452	478	473	454
134	32186	1449	30.817	470	470	462	479	475	455
135	32186	1457	30.950	470	470	460	479	475	456
136	32186	1509	31.150	470	474	460	408	475	456
137	32186	1521	31.350	470	470	460	481	476	457
138	32186	1533	31.550	472	477	464	481	477	458
139	32186	1546	31.767	473	480	460	481	475	457
140	32186	1605	32.083	455	467	455	475	474	455
141	32186	1616	32.267	465	467	400	480	468	450
142	32186	1630	32.500	370	-1	348	458	453	465
143	32186	1639	32.650	370	-1	348	458	454	434
144	32186	1647	32.783	375	-1	350	460	455	435
145	32186	1653	32.883	374	-1	350	460	455	435
146	32186	1701	33.017	378	-1	350	460	455	435
147	32186	1708	33.133	378	-1	350	460	455	435
148	32186	1717	33.283	378	-1	352	460	455	433
149	32186	1724	33.400	378	-1	352	460	455	436
150	32186	1737	33.617	475	-1	470	478	479	459

Rec #	MMDDYY	TIME	DELT	PI1	PISP2	PI8	TI1	TI8	TI9
151	32186	1747	33.783	500	492	490	486	484	464
152	32186	1759	33.983	495	492	485	485	483	463
153	32186	1810	34.167	490	494	475	485	482	464
154	32186	1821	34.350	490	492	476	485	482	462
155	32186	1832	34.533	487	495	477	485	482	462
156	32186	1843	34.717	488	491	481	485	482	462
157	32186	1853	34.883	490	495	483	485	482	462
158	32186	1906	35.100	487	497	485	485	482	462
159	32186	1915	35.250	493	495	481	485	482	460
160	32186	1935	35.583	495	495	482	485	483	460
161	32186	1955	35.917	495	495	481	485	483	460
162	32186	2009	36.150	492	492	485	486	483	460
163	32186	2025	36.417	491	499	486	486	482	460
164	32186	2042	36.700	494	491	485	485	483	463
165	32186	2109	37.150	496	495	486	486	484	461
166	32186	2138	37.633	488	493	486	486	482	460

A.2: DATA FROM SAMPLE SPOOLS

Rec #	MMDDYY	TIME	DELT	PI3	PI4	PI5	TI3	TI4	TI5	TI6
1	32086	853	0.883	-1	-1	-1	-1	-1	-1	-1
2	32086	859	0.983	-1	-1	-1	-1	-1	-1	-1
3	32086	903	1.050	-1	-1	-1	-1	-1	-1	-1
4	32086	905	1.083	-1	-1	-1	-1	-1	-1	-1
5	32086	908	1.133	-1	-1	-1	-1	-1	-1	-1
6	32086	911	1.183	-1	-1	-1	-1	-1	-1	-1
7	32086	914	1.233	-1	-1	-1	-1	-1	-1	-1
8	32086	916	1.267	-1	-1	-1	-1	-1	-1	-1
9	32086	919	1.317	-1	-1	-1	-1	-1	-1	-1
10	32086	921	1.350	-1	-1	-1	-1	-1	-1	-1
11	32086	926	1.433	-1	-1	-1	-1	-1	-1	-1
12	32086	933	1.550	-1	-1	-1	-1	-1	-1	-1
13	32086	939	1.650	-1	-1	-1	-1	-1	-1	-1
14	32086	943	1.717	-1	-1	-1	-1	-1	-1	-1
15	32086	948	1.800	-1	-1	-1	-1	-1	-1	-1
16	32086	957	1.950	-1	-1	-1	-1	-1	-1	-1
17	32086	1002	2.033	-1	-1	-1	-1	-1	-1	-1
18	32086	1009	2.150	-1	-1	-1	-1	-1	-1	-1
19	32086	1017	2.283	-1	-1	-1	-1	-1	-1	-1
20	32086	1024	2.400	-1	-1	-1	-1	-1	-1	-1
21	32086	1031	2.517	-1	-1	-1	-1	-1	-1	-1
22	32086	1037	2.617	-1	-1	-1	-1	-1	-1	-1
23	32086	1046	2.767	-1	-1	-1	-1	-1	-1	-1
24	32086	1058	2.967	-1	-1	-1	-1	-1	-1	-1
25	32086	1103	3.050	-1	-1	-1	-1	-1	-1	-1
26	32086	1112	3.200	-1	-1	-1	-1	-1	-1	-1
27	32086	1120	3.333	-1	-1	-1	-1	-1	-1	-1
28	32086	1128	3.467	-1	-1	-1	-1	-1	-1	-1
29	32086	1133	3.550	-1	-1	-1	-1	-1	-1	-1
30	32086	1139	3.650	-1	-1	-1	-1	-1	-1	-1
31	32086	1144	3.733	-1	-1	-1	-1	-1	-1	-1
32	32086	1152	3.867	-1	-1	-1	-1	-1	-1	-1
33	32086	1203	4.050	-1	-1	-1	-1	-1	-1	-1
34	32086	1211	4.183	-1	-1	-1	-1	-1	-1	-1
35	32086	1215	4.250	-1	-1	-1	-1	-1	-1	-1
36	32086	1226	4.433	-1	-1	-1	-1	-1	-1	-1
37	32086	1236	4.600	-1	-1	-1	-1	-1	-1	-1
38	32086	1241	4.683	-1	-1	-1	-1	-1	-1	-1
39	32086	1251	4.850	-1	-1	-1	-1	-1	-1	-1
40	32086	1259	4.983	-1	-1	-1	-1	-1	-1	-1
41	32086	1307	5.117	-1	-1	-1	-1	-1	-1	-1
42	32086	1316	5.267	-1	-1	-1	-1	-1	-1	-1
43	32086	1324	5.400	-1	-1	-1	-1	-1	-1	-1
44	32086	1334	5.567	-1	-1	-1	-1	-1	-1	-1
45	32086	1348	5.800	-1	-1	-1	-1	-1	-1	-1
46	32086	1357	5.950	-1	-1	-1	-1	-1	-1	-1
47	32086	1409	6.150	-1	-1	-1	-1	-1	-1	-1
48	32086	1420	6.333	-1	-1	-1	-1	-1	-1	-1
49	32086	1425	6.417	-1	-1	-1	-1	-1	-1	-1
50	32086	1433	6.550	-1	-1	-1	-1	-1	-1	-1

Rec #	MMDDYY	TIME	DELT	PI3	PI4	PI5	TI3	TI4	TI5	TI6
51	32086	1438	6.633	-1	-1	-1	-1	-1	-1	-1
52	32086	1446	6.767	-1	-1	-1	-1	-1	-1	-1
53	32086	1452	6.867	-1	-1	-1	-1	-1	-1	-1
54	32086	1503	7.050	-1	-1	-1	-1	-1	-1	-1
55	32086	1509	7.150	-1	-1	-1	-1	-1	-1	-1
56	32086	1514	7.233	-1	-1	-1	-1	-1	-1	-1
57	32086	1551	7.850	-1	-1	-1	-1	-1	-1	-1
58	32086	1610	8.167	-1	-1	-1	-1	-1	-1	-1
59	32086	1620	8.333	-1	-1	-1	-1	-1	-1	-1
60	32086	1631	8.517	-1	-1	-1	-1	-1	-1	-1
61	32086	1640	8.667	-1	-1	-1	-1	-1	-1	-1
62	32086	1649	8.817	-1	-1	-1	-1	-1	-1	-1
63	32086	1657	8.950	-1	-1	-1	-1	-1	-1	-1
64	32086	1706	9.100	-1	-1	-1	-1	-1	-1	-1
65	32086	1714	9.233	-1	-1	-1	-1	-1	-1	-1
66	32086	1727	9.450	-1	-1	-1	-1	-1	-1	-1
67	32086	1735	9.583	-1	-1	-1	-1	-1	-1	-1
68	32086	1745	9.750	-1	-1	-1	-1	-1	-1	-1
69	32086	1755	9.917	-1	-1	-1	-1	-1	-1	-1
70	32086	1804	10.067	-1	-1	-1	-1	-1	-1	-1
71	32086	1812	10.200	418	274	210	428	429	376	380
72	32086	1828	10.467	418	330	-1	-1	-1	-1	-1
73	32086	1837	10.617	422	-1	200	-1	-1	-1	-1
74	32086	1850	10.833	428	300	-1	450	432	-1	-1
75	32086	1900	11.000	-1	-1	-1	-1	-1	-1	-1
76	32086	1915	11.250	-1	-1	-1	-1	-1	-1	-1
77	32086	1920	11.333	-1	-1	-1	-1	-1	-1	-1
78	32086	1928	11.467	-1	-1	-1	-1	-1	-1	-1
79	32086	1935	11.583	-1	-1	-1	-1	-1	-1	-1
80	32086	1943	11.717	-1	-1	-1	-1	-1	-1	-1
81	32086	1949	11.817	-1	-1	-1	-1	-1	-1	-1
82	32086	2002	12.033	-1	-1	-1	-1	-1	-1	-1
83	32086	2011	12.183	-1	-1	-1	-1	-1	-1	-1
84	32086	2024	12.400	-1	-1	-1	-1	-1	-1	-1
85	32086	2037	12.617	-1	-1	-1	-1	-1	-1	-1
86	32086	2046	12.767	-1	-1	-1	-1	-1	-1	-1
87	32086	2054	12.900	-1	-1	-1	-1	-1	-1	-1
88	32086	2105	13.083	-1	-1	-1	-1	-1	-1	-1
89	32086	2109	13.150	365	64	-1	-1	-1	-1	-1
90	32086	2130	13.500	-1	-1	-1	-1	-1	-1	-1
91	32086	2140	13.667	-1	-1	-1	-1	-1	-1	-1
92	32086	2147	13.783	-1	-1	-1	-1	-1	-1	-1
93	32086	2156	13.933	-1	-1	-1	-1	-1	-1	-1
94	32086	2205	14.083	-1	-1	-1	-1	-1	-1	-1
95	32086	2216	14.267	-1	-1	-1	-1	-1	-1	-1
96	32086	2224	14.400	-1	-1	-1	-1	-1	-1	-1
97	32086	2237	14.617	-1	-1	-1	-1	-1	-1	-1
98	32086	2305	15.083	-1	-1	-1	-1	-1	-1	-1
99	32086	2337	15.617	-1	-1	-1	-1	-1	-1	-1
100	32186	2407	16.117	-1	-1	-1	-1	-1	-1	-1

Rec #	MMDDYY	TIME	DELT	PI3	PI4	PI5	TI3	TI4	TI5	TI6
101	32186	2437	16.617	-1	-1	-1	-1	-1	-1	-1
102	32186	106	17.100	-1	-1	-1	-1	-1	-1	-1
103	32186	136	17.600	-1	-1	-1	-1	-1	-1	-1
104	32186	206	18.100	-1	-1	-1	-1	-1	-1	-1
105	32186	241	18.683	-1	-1	-1	-1	-1	-1	-1
106	32186	311	19.183	-1	-1	-1	-1	-1	-1	-1
107	32186	341	19.683	-1	-1	-1	-1	-1	-1	-1
108	32186	418	20.300	-1	-1	-1	-1	-1	-1	-1
109	32186	448	20.800	-1	-1	-1	-1	-1	-1	-1
110	32186	514	21.233	-1	-1	-1	-1	-1	-1	-1
111	32186	544	21.733	-1	-1	-1	-1	-1	-1	-1
112	32186	614	22.233	-1	-1	-1	-1	-1	-1	-1
113	32186	644	22.733	450	265	-1	479	435	397	377
114	32186	710	23.167	452	275	92	-1	-1	-1	-1
115	32186	725	23.417	-1	-1	-1	478	433	396	378
116	32186	737	23.617	465	262	92	479	433	392	377
117	32186	807	24.117	460	270	94	480	435	395	374
118	32186	834	24.567	430	225	94	473	414	-1	363
119	32186	857	24.950	420	220	94	471	416	379	365
120	32186	930	25.500	410	220	93	473	411	380	362
121	32186	959	25.983	430	224	93	473	419	383	365
122	32186	1031	26.517	410	222	93	473	419	382	363
123	32186	1052	26.867	-1	-1	-1	477	422	382	366
124	32186	1105	27.083	415	225	93	474	416	382	356
125	32186	1137	27.617	420	225	93	475	414	383	364
126	32186	1209	28.150	420	225	93	475	417	381	368
127	32186	1235	28.583	412	225	93	477	421	380	366
128	32186	1336	29.600	345	110	-1	452	404	367	357
129	32186	1347	29.783	375	154	-1	465	409	374	360
130	32186	1404	30.067	395	161	-1	465	410	375	357
131	32186	1417	30.283	392	166	-1	467	416	375	362
132	32186	1430	30.500	387	169	-1	467	414	377	366
133	32186	1439	30.650	406	170	-1	472	415	378	363
134	32186	1449	30.817	395	171	-1	471	416	378	364
135	32186	1457	30.950	400	171	-1	472	416	380	365
136	32186	1509	31.150	405	172	-1	473	415	381	366
137	32186	1521	31.350	406	173	-1	475	417	382	367
138	32186	1533	31.550	410	182	-1	478	416	382	365
139	32186	1546	31.767	402	167	-1	469	411	376	362
140	32186	1605	32.083	-1	-1	-1	-1	-1	-1	-1
141	32186	1616	32.267	-1	-1	-1	-1	-1	-1	-1
142	32186	1630	32.500	-1	-1	-1	-1	-1	-1	-1
143	32186	1639	32.650	-1	-1	-1	-1	-1	-1	-1
144	32186	1647	32.783	-1	-1	-1	-1	-1	-1	-1
145	32186	1653	32.883	-1	-1	-1	-1	-1	-1	-1
146	32186	1701	33.017	-1	-1	-1	-1	-1	-1	-1
147	32186	1708	33.133	-1	-1	-1	-1	-1	-1	-1
148	32186	1717	33.283	-1	-1	-1	-1	-1	-1	-1
149	32186	1724	33.400	-1	-1	-1	-1	-1	-1	-1
150	32186	1737	33.617	470	262	-1	486	433	395	379

Rec #	MMDDYY	TIME	DELT	PI3	PI4	PI5	TI3	TI4	TI5	TI6
151	32186	1747	33.783	484	266	-1	489	434	393	379
152	32186	1759	33.983	481	275	-1	487	436	398	380
153	32186	1810	34.167	465	270	-1	487	436	397	381
154	32186	1821	34.350	477	270	-1	485	437	394	380
155	32186	1832	34.533	470	275	-1	486	433	395	395
156	32186	1843	34.717	470	276	-1	485	433	396	379
157	32186	1853	34.883	475	273	-1	484	434	395	381
158	32186	1906	35.100	475	276	-1	486	437	395	380
159	32186	1915	35.250	475	275	-1	486	435	395	378
160	32186	1935	35.583	475	275	-1	486	435	395	378
161	32186	1955	35.917	475	275	-1	486	435	395	378
162	32186	2009	36.150	475	275	-1	486	435	395	378
163	32186	2025	36.417	475	275	-1	486	435	395	378
164	32186	2042	36.700	475	275	-1	486	435	395	378
165	32186	2109	37.150	477	276	-1	486	433	396	377
166	32186	2138	37.633	475	278	-1	489	435	395	378

A.3: DATA FROM MUFFLER AREA

Rec #	MMDDYY	TIME	DELT	PI9	PI10	PI11	PI13UP	DELP	TI7	LI1G
1	32086	853	0.883	-1	-1	-1	-1	-1.00	-1	-1.00
2	32086	859	0.983	-1	-1	-1	-1	-1.00	-1	-1.00
3	32086	903	1.050	-1	-1	-1	-1	-1.00	-1	-1.00
4	32086	905	1.083	-1	-1	-1	-1	-1.00	-1	-1.00
5	32086	908	1.133	-1	-1	-1	-1	-1.00	-1	-1.00
6	32086	911	1.183	-1	-1	-1	-1	-1.00	-1	-1.00
7	32086	914	1.233	-1	-1	-1	-1	-1.00	-1	-1.00
8	32086	916	1.267	-1	-1	-1	-1	-1.00	-1	-1.00
9	32086	919	1.317	-1	-1	-1	-1	-1.00	-1	-1.00
10	32086	921	1.350	-1	45	-1	-1	-1.00	-1	-1.00
11	32086	926	1.433	-1	45	5	-1	-1.00	-1	-1.00
12	32086	933	1.550	-1	50	8	-1	-1.00	-1	-1.00
13	32086	939	1.650	-1	60	11	-1	-1.00	-1	-1.00
14	32086	943	1.717	-1	65	13	-1	-1.00	-1	-1.00
15	32086	948	1.800	-1	70	16	-1	-1.00	-1	-1.00
16	32086	957	1.950	-1	77	17	-1	-1.00	-1	-1.00
17	32086	1002	2.033	-1	80	19	-1	-1.00	-1	-1.00
18	32086	1009	2.150	-1	85	23	-1	-1.00	-1	-1.00
19	32086	1017	2.283	-1	92	25	-1	-1.00	-1	-1.00
20	32086	1024	2.400	-1	95	27	-1	-1.00	-1	-1.00
21	32086	1031	2.517	-1	100	28	-1	-1.00	-1	-1.00
22	32086	1037	2.617	-1	103	29	-1	-1.00	-1	-1.00
23	32086	1046	2.767	-1	110	32	-1	-1.00	-1	-1.00
24	32086	1058	2.967	-1	115	33	-1	-1.00	-1	-1.00
25	32086	1103	3.050	-1	115	33	-1	-1.00	-1	-1.00
26	32086	1112	3.200	-1	127	13	-1	-1.00	-1	-1.00
27	32086	1120	3.333	50	257	-1	-1	-1.00	-1	-1.00
28	32086	1128	3.467	55	260	-1	-1	-1.00	-1	-1.00
29	32086	1133	3.550	55	265	-1	-1	-1.00	-1	-1.00
30	32086	1139	3.650	57	270	-1	-1	-1.00	-1	-1.00
31	32086	1144	3.733	55	275	-1	-1	-1.00	180	7.00
32	32086	1152	3.867	57	277	-1	-1	-1.00	183	6.88
33	32086	1203	4.050	58	280	-1	-1	-1.00	198	6.75
34	32086	1211	4.183	60	285	-1	-1	-1.00	210	7.00
35	32086	1215	4.250	58	285	-1	-1	-1.00	198	6.88
36	32086	1226	4.433	60	290	-1	220	25.00	205	6.88
37	32086	1236	4.600	60	293	-1	-1	-1.00	215	6.88
38	32086	1241	4.683	61	295	-1	210	16.00	215	7.00
39	32086	1251	4.850	62	298	-1	210	15.00	218	7.00
40	32086	1259	4.983	62	300	-1	215	20.00	218	6.88
41	32086	1307	5.117	63	302	-1	215	20.00	220	6.75
42	32086	1316	5.267	63	305	-1	215	15.00	220	6.88
43	32086	1324	5.400	63	305	-1	217	14.00	220	6.88
44	32086	1334	5.567	63	310	-1	220	18.00	220	6.88
45	32086	1348	5.800	63	313	-1	215	20.00	220	6.13
46	32086	1357	5.950	-1	358	35	-1	-1.00	-1	-1.00
47	32086	1409	6.150	-1	360	35	-1	-1.00	-1	-1.00
48	32086	1420	6.333	-1	362	35	-1	-1.00	-1	-1.00
49	32086	1425	6.417	-1	363	35	-1	-1.00	-1	-1.00
50	32086	1433	6.550	-1	363	35	-1	-1.00	-1	-1.00

Rec #	MMDDYY	TIME	DELT	PI9	PI10	PI11	PI13UP	DELP	TI7	LI1G
51	32086	1438	6.633	-1	363	35	-1	-1.00	-1	-1.00
52	32086	1446	6.767	-1	365	35	-1	-1.00	-1	-1.00
53	32086	1452	6.867	-1	365	35	-1	-1.00	-1	-1.00
54	32086	1503	7.050	-1	366	35	-1	-1.00	-1	-1.00
55	32086	1509	7.150	-1	366	35	-1	-1.00	-1	-1.00
56	32086	1514	7.233	-1	368	-1	-1	8.70	-1	-1.00
57	32086	1551	7.850	26	135	-1	-1	8.70	-1	4.00
58	32086	1610	8.167	34	147	-1	145	8.70	-1	4.50
59	32086	1620	8.333	34	151	-1	155	8.70	-1	4.50
60	32086	1631	8.517	35	148	-1	150	10.15	-1	-1.00
61	32086	1640	8.667	33	148	-1	150	10.15	-1	-1.00
62	32086	1649	8.817	38	148	-1	150	11.60	-1	-1.00
63	32086	1657	8.950	35	148	-1	152	10.15	-1	-1.00
64	32086	1706	9.100	35	150	-1	155	10.15	-1	-1.00
65	32086	1714	9.233	35	150	-1	150	9.42	-1	-1.00
66	32086	1727	9.450	34	145	-1	160	9.42	-1	-1.00
67	32086	1735	9.583	34	150	-1	150	9.42	-1	-1.00
68	32086	1745	9.750	34	150	-1	158	8.70	-1	4.50
69	32086	1755	9.917	34	150	-1	155	7.98	-1	4.50
70	32086	1804	10.067	-1	-1	-1	-1	-1.00	-1	-1.00
71	32086	1812	10.200	-1	-1	-1	-1	-1.00	-1	-1.00
72	32086	1828	10.467	29	135	-1	-1	-1.00	-1	-1.00
73	32086	1837	10.617	9	70	-1	65	5.07	-1	-1.00
74	32086	1850	10.833	9	75	-1	75	5.07	-1	-1.00
75	32086	1900	11.000	9	73	-1	73	4.35	-1	-1.00
76	32086	1915	11.250	-1	-1	-1	-1	-1.00	-1	-1.00
77	32086	1920	11.333	-1	-1	-1	-1	-1.00	-1	-1.00
78	32086	1928	11.467	1	40	-1	35	2.90	-1	-1.00
79	32086	1935	11.583	1	40	-1	33	2.90	-1	-1.00
80	32086	1943	11.717	1	37	-1	33	2.90	-1	-1.00
81	32086	1949	11.817	1	38	-1	37	2.90	-1	1.00
82	32086	2002	12.033	1	35	-1	35	2.61	-1	1.00
83	32086	2011	12.183	1	37	-1	30	2.46	-1	1.00
84	32086	2024	12.400	1	35	-1	30	2.46	-1	1.00
85	32086	2037	12.617	1	35	-1	30	2.18	-1	1.00
86	32086	2046	12.767	1	35	-1	30	2.18	-1	0.88
87	32086	2054	12.900	1	35	-1	30	2.90	-1	0.88
88	32086	2105	13.083	18	90	-1	90	7.25	-1	-1.00
89	32086	2109	13.150	19	95	-1	100	7.25	-1	3.50
90	32086	2130	13.500	-1	-1	-1	-1	-1.00	-1	-1.00
91	32086	2140	13.667	31	128	-1	135	8.70	-1	4.50
92	32086	2147	13.783	32	135	-1	145	8.70	-1	4.50
93	32086	2156	13.933	32	132	-1	145	7.98	-1	4.38
94	32086	2205	14.083	32	133	-1	140	7.25	-1	4.38
95	32086	2216	14.267	32	135	-1	145	10.15	-1	4.25
96	32086	2224	14.400	32	135	-1	125	7.98	-1	-1.00
97	32086	2237	14.617	33	134	-1	125	7.98	-1	-1.00
98	32086	2305	15.083	32	132	-1	140	7.25	-1	4.00
99	32086	2337	15.617	29	134	-1	140	7.98	-1	4.75
100	32186	2407	16.117	33	134	-1	140	6.52	-1	4.13

Rec #	MMDDYY	TIME	DELT	PI9	PI10	PI11	PI13UP	DELP	TI7	LI1G
101	32186	2437	16.617	31	132	-1	135	7.98	-1	4.63
102	32186	106	17.100	32	134	-1	135	6.52	-1	4.13
103	32186	136	17.600	29	133	-2	140	8.70	200	4.75
104	32186	206	18.100	28	132	1	140	5.07	223	5.00
105	32186	241	18.683	27	131	2	135	5.80	220	4.63
106	32186	311	19.183	28	132	1	150	5.80	220	4.75
107	32186	341	19.683	29	130	-1	140	5.80	220	4.88
108	32186	418	20.300	30	131	-1	140	5.80	220	4.75
109	32186	448	20.800	29	130	-1	150	5.80	224	5.00
110	32186	514	21.233	29	130	-1	145	6.52	225	5.00
111	32186	544	21.733	29	132	-1	150	6.52	232	5.13
112	32186	614	22.233	29	126	-1	145	5.80	228	5.25
113	32186	644	22.733	27	125	-1	155	5.07	232	5.38
114	32186	710	23.167	24	128	-1	130	5.80	230	5.38
115	32186	725	23.417	-1	-1	-1	-1	-1.00	-1	-1.00
116	32186	737	23.617	26	127	-1	140	7.25	233	5.38
117	32186	807	24.117	26	127	-1	150	-1.00	230	-1.00
118	32186	834	24.567	18	105	-1	115	8.70	-1	5.00
119	32186	857	24.950	18	95	-1	110	-1.00	230	5.00
120	32186	930	25.500	18	102	-1	130	-1.00	230	5.00
121	32186	959	25.983	19	102	-1	120	-1.00	228	5.13
122	32186	1031	26.517	18	100	-1	130	8.70	230	5.25
123	32186	1052	26.867	-1	-1	-1	-1	-1.00	-1	-1.00
124	32186	1105	27.083	18	102	-1	115	8.70	230	5.38
125	32186	1137	27.617	19	99	-1	110	7.25	230	5.44
126	32186	1209	28.150	19	107	-1	110	8.70	229	5.38
127	32186	1235	28.583	19	102	-1	115	8.70	230	5.50
128	32186	1336	29.600	12	90	-1	90	7.25	220	5.13
129	32186	1347	29.783	14	90	-1	90	7.25	220	5.00
130	32186	1404	30.067	13	96	-1	100	5.80	218	5.13
131	32186	1417	30.283	17	100	-1	100	5.80	218	5.13
132	32186	1430	30.500	15	97	-1	105	6.52	222	5.25
133	32186	1439	30.650	18	98	-1	95	5.80	222	5.25
134	32186	1449	30.817	15	96	-1	95	5.80	222	5.25
135	32186	1457	30.950	17	98	-1	100	5.80	222	5.25
136	32186	1509	31.150	17	100	-1	110	6.52	222	5.13
137	32186	1521	31.350	18	101	-1	115	6.52	222	5.13
138	32186	1533	31.550	17	101	-1	115	6.52	-1	5.13
139	32186	1546	31.767	-1	-1	-1	-1	-1.00	-1	-1.00
140	32186	1605	32.083	17	95	-1	115	6.52	222	5.13
141	32186	1616	32.267	85	295	-1	280	6.52	-1	9.50
142	32186	1630	32.500	88	295	-1	280	5.80	-1	-1.00
143	32186	1639	32.650	88	279	-1	305	17.40	-1	-1.00
144	32186	1647	32.783	90	302	-1	290	17.40	-1	-1.00
145	32186	1653	32.883	92	300	-1	295	17.40	-1	-1.00
146	32186	1701	33.017	90	300	-1	295	17.40	-1	-1.00
147	32186	1708	33.133	88	302	-1	295	18.13	222	-1.00
148	32186	1717	33.283	88	303	-1	295	18.85	-1	-1.00
149	32186	1724	33.400	85	303	-1	295	18.85	-1	-1.00
150	32186	1737	33.617	47	117	-1	125	7.25	-1	5.63

Rec #	MMDDYY	TIME	DELT	PI9	PI10	PI11	PI13UP	DELP	TI7	LI1G
151	32186	1747	33.783	23	123	-1	120	7.98	222	5.50
152	32186	1759	33.983	26	118	-1	135	7.25	-1	5.63
153	32186	1810	34.167	23	118	-1	135	7.25	-1	5.50
154	32186	1821	34.350	22	122	-1	135	7.25	-1	5.63
155	32186	1832	34.533	25	117	-1	140	8.70	-1	4.88
156	32186	1843	34.717	24	117	-1	130	6.52	-1	5.00
157	32186	1853	34.883	19	120	-1	135	7.25	-1	5.00
158	32186	1906	35.100	26	120	-1	145	7.98	-1	5.00
159	32186	1915	35.250	22	120	-1	120	8.70	-1	5.00
160	32186	1935	35.583	29	117	-1	140	7.25	-1	5.50
161	32186	1955	35.917	28	124	-1	135	7.25	-1	5.50
162	32186	2009	36.150	24	125	-1	135	7.25	-1	5.50
163	32186	2025	36.417	26	120	-1	131	7.98	-1	5.75
164	32186	2042	36.700	23	121	-1	135	7.98	-1	5.50
165	32186	2109	37.150	23	125	-1	135	7.98	-1	5.75
166	32186	2138	37.633	24	120	-1	135	8.70	-1	5.75

A.4: DOWNHOLE KUSTER TEMPERATURE/PRESSURE LOGS

Rec #	DEPTH	PF1032186	PF2032186	TF1032186	PS1032286	TS1032286	TS2032386
1	0	-1.0	453.0	-1.0	-1.0	-1.0	483.7
2	30	-1.0	461.0	-1.0	71.0	-1.0	-1.0
3	4000	-1.0	1599.6	428.9	-1.0	-1.0	-1.0
4	5000	1107.0	-1.0	-1.0	-1.0	-1.0	-1.0
5	5500	1436.8	-1.0	-1.0	-1.0	-1.0	-1.0
6	6000	-1.0	2465.5	500.9	-1.0	-1.0	-1.0
7	9000	-1.0	3775.3	509.5	3823.2	540.7	526.3
8	10000	4210.2	4246.2	531.5	4263.5	584.2	575.6
9	10200	-1.0	-1.0	-1.0	4349.4	627.4	-1.0
10	10300	4355.3	-1.0	-1.0	4389.4	646.2	-1.0
11	10400	4399.8	-1.0	-1.0	4432.3	658.4	636.9

PF - PRESSURE LOG (FLOWING)
PS - PRESSURE LOG (STATIC)
TF - TEMPERATURE LOG (FLOWING)
TS - TEMPERATURE LOG (STATIC)

A.5: DOWNHOLE USGS TEMPERATURE LOGS

Rec #	DEPTH	T032786	T033186
1	0	-1.0	68.0
2	100	-1.0	83.8
3	200	-1.0	78.8
4	300	128.8	79.2
5	400	130.1	79.3
6	500	132.3	79.7
7	600	135.5	80.6
8	700	138.7	81.0
9	800	138.4	81.9
10	900	136.9	82.6
11	1000	137.8	83.7
12	1100	140.0	84.9
13	1200	140.9	85.3
14	1300	-1.0	86.5
15	1400	147.6	88.3
16	1600	150.4	91.2
17	1700	151.2	91.6
18	1800	158.5	92.7
19	1900	159.6	94.5
20	2000	164.5	97.9
21	2100	165.0	98.4
22	2200	167.4	100.8
23	2300	167.4	102.6
24	2400	-1.0	105.3
25	2500	171.0	106.2
26	2600	169.9	106.0
27	2700	171.0	107.2
28	2800	-1.0	109.9
29	2900	165.9	113.4
30	3000	169.2	114.8
31	3100	171.3	118.6
32	3200	171.1	119.7
33	3300	178.7	120.9
34	3400	177.4	123.1
35	3500	179.2	127.8
36	3600	183.7	126.9
37	3700	185.7	130.3
38	3800	187.2	-1.0
39	3900	-1.0	135.9
40	4000	196.5	139.8
41	4100	202.1	142.7
42	4200	204.4	-1.0
43	4300	221.9	147.6
44	4400	218.5	147.0
45	4500	218.7	147.4
46	4600	212.0	159.3
47	4700	209.7	152.2
48	4800	213.8	155.5
49	4900	218.1	158.7
50	5000	238.1	162.5

Rec #	DEPTH	T032786	T033186
51	5100	234.5	160.5
52	5200	243.0	161.6
53	5300	241.2	164.5
54	5400	247.6	169.0
55	5500	249.1	169.3
56	5600	250.0	175.8
57	5700	313.7	173.5
58	5800	317.5	178.3
59	5900	324.7	179.1
60	6000	335.5	176.2
61	6100	349.7	173.1
62	6200	352.4	171.7
63	6300	353.8	169.2
64	6400	359.6	170.4
65	6500	366.8	173.3
66	6600	377.2	176.0
67	6700	377.2	180.0
68	6800	369.7	183.9
69	6900	361.8	187.9
70	7000	354.4	191.7
71	7100	347.9	194.4
72	7200	342.9	196.5
73	7300	339.3	198.7
74	7400	333.7	202.5
75	7500	327.0	205.9
76	7600	322.7	208.4
77	7700	318.6	210.7
78	7800	314.8	212.9
79	7900	312.4	215.2
80	8000	311.0	217.4
81	8100	310.3	219.4
82	8200	309.2	220.6
83	8300	316.6	221.2
84	8400	304.7	221.0
85	8500	289.6	220.5
86	8600	297.3	219.0
87	8700	302.9	227.5
88	8800	312.4	235.8
89	8900	313.7	242.8
90	9000	318.7	249.1
91	9100	324.5	254.7
92	9200	331.2	260.6
93	9300	338.4	266.7
94	9400	344.7	272.3
95	9500	350.2	277.2
96	9600	355.8	281.7
97	9700	360.5	286.2
98	9800	364.5	289.8
99	9900	368.6	293.0
100	10000	372.2	295.7

Rec #	DEPTH	T032786	T033186
101	10100	374.5	297.7
102	10172	456.1	-1.0
103	10200	0.0	0.0
104	10220	572.0	-1.0
105	10400	0.0	0.0

A.6: PRESSURE BUILDUP DATA

Rec #	DATE	TIME	DELT	PRESS
1	32086	800	0.00000	-1.0
2	32186	1450	30.83332	4210.2
3	32186	2159	37.98343	4216.2
4	32186	2202	38.03319	4257.6
5	32186	2203	38.04997	4257.6
6	32186	2204	38.06676	4271.0
7	32186	2205	38.08316	4272.4
8	32186	2206	38.09995	4273.9
9	32186	2207	38.11673	4275.4
10	32186	2208	38.13351	4275.4
11	32186	2209	38.14992	4275.4
12	32186	2210	38.16670	4275.4
13	32186	2211	38.18349	4275.4
14	32186	2221	38.35019	4276.9
15	32186	2231	38.51651	4276.9
16	32186	2301	39.01678	4278.0
17	32286	1	40.01678	4281.0
18	32286	149	41.81673	4284.0
19	32286	501	45.01678	4290.0
20	32286	535	45.58327	4291.3
21	32286	1156	51.93346	4263.5
22	32286	1427	54.45013	4269.5
23	32286	1539	55.65002	4275.4
24	32286	1657	56.94986	4281.3
25	32286	2000	60.00000	4308.0

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APPENDIX B

Results of Output Calculations
Using Weirbox and Orifice Methods

SALTON SEA, STATE WELL 2-14 FLOWTEST (20/2) MARCH 1986) SAL. = 20%

CONSTANTS FOR JAMES FORMULA; C = 20703.000

A = 1.230

WEIRBOX BRINE DENSITY (LB/FT3) = 72.910

WEIRBOX TDS CONTENT (PPM) = 350000.000

LOCAL ATMOSPHERIC PRESSURE (PSIA) = 15.000

JAMES TUBE DIAMETER (INS) = 6.065

WEIRBOX CREST LENGTH (INS) = 10.000

.O:	TIME (hrs)	WEIR HT. (ins)	LIP PRESS. (psig)	WATER FLOW (lbs/hr)	ENTHALPY (BTU/lb)	TOTAL FLOW (lbs/hr)
3	3.733	7.000	55.000	279078.400	472.383	453221.600
3	3.867	6.875	57.000	272426.200	484.091	451927.200
3	4.050	6.750	58.000	265798.500	494.220	446550.500
3	4.183	7.000	60.000	279078.400	490.695	462355.700
3	4.250	6.875	58.000	272426.200	488.804	452611.100
3	4.433	6.875	60.000	272426.200	495.343	457037.400
3	4.600	6.875	60.000	272426.200	496.572	455676.300
3	4.683	7.000	61.000	279078.400	494.096	464342.100
3	4.850	7.000	62.000	279078.400	497.197	466622.500
3	4.983	6.875	62.000	272426.200	502.420	460683.400
3	5.117	6.750	63.000	265798.500	510.663	457208.400
3	5.267	6.875	63.000	272426.200	505.342	463123.100
3	5.400	6.875	63.000	272426.200	505.342	463123.100
3	5.567	6.875	63.000	272426.200	505.342	463123.100
2	5.800	6.125	63.000	233070.300	538.948	427854.100
2	7.850	4.000	26.000	128961.000	533.476	233698.900
2	8.167	4.500	34.000	152209.200	534.629	276576.500
2	8.333	4.500	34.000	152209.200	534.629	276576.500
0	8.517	-1.000	35.000	.000	534.629	281988.200
0	8.667	-1.000	33.000	.000	534.629	271151.100
0	8.817	-1.000	38.000	.000	534.629	298211.600
0	8.950	-1.000	35.000	.000	534.629	281988.200
0	9.100	-1.000	35.000	.000	534.629	281988.200
0	9.233	-1.000	35.000	.000	534.629	281988.200
0	9.450	-1.000	34.000	.000	534.629	276571.800
0	9.583	-1.000	34.000	.000	534.629	276571.800
2	9.750	4.500	34.000	152209.200	534.629	276576.500
2	9.917	4.500	34.000	152209.200	534.629	276576.500
2	13.150	3.500	19.000	106700.300	535.570	194313.100
3	13.667	4.500	31.000	152209.200	521.569	268334.700
2	13.783	4.500	32.000	152209.200	526.000	271075.300
2	13.933	4.375	32.000	146312.300	534.523	265795.200
2	14.083	4.375	32.000	146312.300	534.523	265795.200
2	14.267	4.250	32.000	140470.500	543.201	260497.900
0	14.400	-1.000	32.000	.000	543.201	260577.400
0	14.617	-1.000	33.000	.000	543.201	265897.600
2	15.083	4.000	32.000	128961.000	560.876	249749.200
2	15.617	4.750	29.000	164160.900	496.027	273467.800
2	16.117	4.125	33.000	134686.100	556.160	257789.300

3	16.617	4.625	31.000	158159.400	515.295	275658.700
2	17.100	4.125	32.000	134686.100	552.000	255159.700
3	17.600	4.750	25.000	164160.900	499.550	275120.100
3	18.100	5.000	28.000	176310.500	476.276	281148.200
3	18.683	4.625	27.000	158159.400	494.424	262562.800
3	19.183	4.750	28.000	164160.900	491.257	270683.900
3	19.683	4.875	29.000	170211.900	488.204	278844.700
3	20.300	4.750	30.000	164160.900	500.691	276245.300
3	20.800	5.000	29.000	176310.500	481.169	283850.400
3	21.233	5.000	28.500	176310.500	478.954	282345.300
3	21.733	5.125	29.000	182455.100	475.008	288378.700
3	22.233	5.250	29.000	188643.900	467.261	294234.400
3	22.733	5.375	26.500	194875.200	449.050	292058.000
3	23.167	5.375	24.000	194875.200	436.125	285190.400
3	23.617	5.375	26.000	194875.200	446.761	290496.400
0	24.117	-1.000	25.500	.000	446.761	287268.800
3	24.567	5.000	17.500	176310.500	418.697	251736.000
3	24.950	5.000	17.500	176310.500	420.481	250425.800
3	25.500	5.000	17.500	176310.500	420.481	250425.800
3	25.983	5.125	19.000	182455.100	422.000	260346.300
2	26.517	5.250	17.500	188643.900	406.349	261002.500
1	27.083	5.375	17.500	194875.200	399.950	266497.800
1	27.617	5.437	18.500	197981.300	402.120	271814.300
2	28.150	5.375	19.000	194875.200	408.319	270846.100
1	28.583	5.500	18.500	201147.600	399.530	274866.200
1	29.600	5.125	11.500	182455.100	378.562	242522.400
1	29.783	5.000	14.000	176310.500	396.990	242027.500
1	30.067	5.125	12.500	182455.100	383.537	245067.200
2	30.283	5.125	16.500	182455.100	404.888	254468.700
1	30.500	5.250	15.000	188643.900	391.730	256093.600
2	30.650	5.250	17.500	188643.900	404.918	262197.500
1	30.817	5.250	14.500	188643.900	389.231	254969.100
1	30.950	5.250	16.500	188643.900	399.172	259502.500
2	31.150	5.125	17.000	182455.100	408.599	255293.700
2	31.350	5.125	17.500	182455.100	411.583	256687.500
2	31.550	5.125	17.000	182455.100	408.249	255574.800
2	32.083	5.125	17.000	182455.100	408.599	255293.700
3	32.267	9.500	85.000	415576.700	465.676	649769.600
0	32.500	-1.000	88.000	.000	465.676	668812.900
0	32.650	-1.000	88.000	.000	465.676	668812.900
0	32.783	-1.000	90.000	.000	465.676	681275.300
0	32.883	-1.000	92.000	.000	465.676	693728.100
0	33.017	-1.000	90.000	.000	465.676	681275.300
0	33.133	-1.000	88.000	.000	465.676	668812.900
0	33.283	-1.000	88.000	.000	465.676	668812.900
0	33.400	-1.000	85.000	.000	465.676	650101.100
3	33.617	5.625	47.000	207459.300	516.581	361621.400
3	33.783	5.500	23.000	201147.600	422.862	288946.600
3	33.983	5.625	25.500	207459.300	428.857	301878.000
3	34.167	5.500	23.000	201147.600	422.513	289238.300
2	34.350	5.625	22.000	207459.300	410.442	291759.500
3	34.533	4.875	24.500	170211.900	465.871	266237.800
3	34.717	5.000	24.000	176310.500	455.697	270211.200
3	34.883	5.000	19.000	176310.500	427.753	256020.600
3	35.100	5.000	26.000	176310.500	465.996	275846.400
3	35.250	5.000	21.500	176310.500	442.137	263133.800
3	35.583	5.500	28.500	201147.600	449.935	304793.000
3	35.917	5.500	28.000	201147.600	447.569	303385.100
3	36.150	5.500	24.000	201147.600	427.736	292077.400
3	36.417	5.750	26.000	213808.900	425.003	308875.800
3	36.700	5.500	23.000	201147.600	422.513	289238.300
2	37.150	5.750	22.500	213808.900	406.987	298810.300
2	37.633	5.750	24.000	213808.900	414.551	302955.800

SALTON SEA, STATE WELL 2-14 FLOWTEST (20/21 MARCH 1986) SAL. = 30%

CONSTANTS FOR JAMES FORMULA; C = 22785.000

A = 1.250

WEIRBOX BRINE DENSITY (LB/FT3) = 72.910

WEIRBOX TDS CONTENT (PPM) = 350000.000

LOCAL ATMOSPHERIC PRESSURE (PSIA) = 15.000

JAMES TUBE DIAMETER (INS) = 6.065

WEIRBOX CREST LENGTH (INS) = 10.000

NOI	TIME (hrs)	WEIR HT. (ins)	LIP PRESS. (psig)	WATER FLOW (lbs/hr)	ENTHALPY (BTU/lb)	TOTAL FLOW (lbs/hr)
3	3.733	7.000	55.000	279078.400	466.367	448032.200
3	3.867	6.875	57.000	272426.200	477.952	446502.300
3	4.050	6.750	58.000	265798.500	488.048	440917.600
3	4.183	7.000	60.000	279078.400	484.615	456537.700
3	4.250	6.875	58.000	272426.200	482.684	447012.200
3	4.433	6.875	60.000	272426.200	485.195	451214.700
3	4.600	6.875	60.000	272426.200	490.463	449795.700
3	4.683	7.000	61.000	279078.400	488.009	458402.100
3	4.850	7.000	62.000	279078.400	491.098	460571.900
3	4.983	6.875	62.000	272426.200	496.278	454599.900
3	5.117	6.750	63.000	265798.500	504.467	450987.200
3	5.267	6.875	63.000	272426.200	499.187	456934.700
3	5.400	6.875	63.000	272426.200	499.187	456934.700
3	5.567	6.875	63.000	272426.200	499.187	456934.700
2	5.800	6.125	63.000	233070.300	532.575	421471.700
3	7.850	4.000	26.000	128961.000	527.117	230264.800
3	8.167	4.500	34.000	152209.200	528.265	272497.900
3	8.333	4.500	34.000	152209.200	528.265	272497.900
0	8.517	-1.000	35.000	.000	528.265	277834.900
0	8.667	-1.000	33.000	.000	528.265	267157.400
0	8.817	-1.000	38.000	.000	528.265	293819.400
0	8.950	-1.000	35.000	.000	528.265	277834.900
0	9.100	-1.000	35.000	.000	528.265	277834.900
0	9.233	-1.000	35.000	.000	528.265	277834.900
0	9.450	-1.000	34.000	.000	528.265	272498.300
0	9.583	-1.000	34.000	.000	528.265	272498.300
3	9.750	4.500	34.000	152209.200	528.265	272497.900
3	9.917	4.500	34.000	152209.200	528.265	272497.900
3	13.150	3.500	19.000	106700.300	529.202	191439.900
3	13.667	4.500	31.000	152209.200	515.254	264547.400
3	13.783	4.500	32.000	152209.200	519.713	267203.400
3	13.933	4.375	32.000	146312.300	528.159	261876.800
3	14.083	4.375	32.000	146312.300	528.159	261876.800
2	14.267	4.250	32.000	140470.500	536.859	256592.100
0	14.400	-1.000	32.000	.000	536.859	256583.500
0	14.617	-1.000	33.000	.000	536.859	261822.100
2	15.083	4.000	32.000	128961.000	554.788	245995.100
3	15.617	4.750	29.000	164160.900	489.949	263930.400
2	16.117	4.125	33.000	134686.100	549.982	253903.500

3	16.617	4.625	31.000	158159.400	507.080	[illegible]
2	17.100	4.125	32.000	134686.100	545.758	251312.900
3	17.600	4.750	29.000	164160.900	487.395	271652.000
3	18.100	5.000	28.000	176310.500	470.400	277756.200
3	18.683	4.625	27.000	158159.400	488.360	259185.600
3	19.183	4.750	28.000	164160.900	485.221	267241.400
3	19.683	4.875	29.000	170211.900	482.196	275337.300
3	20.300	4.750	30.000	164160.900	494.573	272613.000
3	20.800	5.000	29.000	176310.500	475.248	280359.200
3	21.233	5.000	28.500	176310.500	473.059	278898.300
3	21.733	5.125	29.000	182455.100	469.185	284888.700
3	22.233	5.250	29.000	188643.900	461.503	290790.900
3	22.733	5.375	26.500	194875.200	443.524	288873.400
3	23.167	5.375	24.000	194875.200	430.765	282256.800
3	23.617	5.375	26.000	194875.200	441.268	287356.800
0	24.117	-1.000	25.500	.000	441.268	284196.200
2	24.567	5.000	17.500	176310.500	413.137	249176.000
2	24.950	5.000	17.500	176310.500	414.894	247820.100
2	25.500	5.000	17.500	176310.500	414.894	247820.100
3	25.983	5.125	19.000	182455.100	416.840	257842.600
1	26.517	5.250	17.500	188643.900	401.314	258615.300
1	27.083	5.375	17.500	194875.200	396.147	264674.300
1	27.617	5.437	18.500	197981.300	398.242	269910.300
2	28.150	5.375	19.000	194875.200	403.513	268475.800
1	28.583	5.500	18.500	201147.600	395.742	272994.000
1	29.600	5.125	11.500	182455.100	375.484	241244.800
1	29.783	5.000	14.000	176310.500	393.290	240446.900
1	30.067	5.125	12.500	182455.100	380.294	243699.400
1	30.283	5.125	16.500	182455.100	400.113	252304.100
1	30.500	5.250	15.000	188643.900	388.210	254512.400
1	30.650	5.250	17.500	188643.900	400.143	259954.100
1	30.817	5.250	14.500	188643.900	385.796	253439.200
1	30.950	5.250	16.500	188643.900	395.396	257761.800
2	31.150	5.125	17.000	182455.100	403.774	253072.600
2	31.350	5.125	17.500	182455.100	406.695	254412.800
2	31.550	5.125	17.000	182455.100	403.429	253360.900
2	32.083	5.125	17.000	182455.100	403.774	253072.600
3	32.267	9.500	85.000	415576.700	459.903	642266.100
0	32.500	-1.000	88.000	.000	459.903	661197.300
0	32.650	-1.000	88.000	.000	459.903	661197.300
0	32.783	-1.000	90.000	.000	459.903	673517.700
0	32.883	-1.000	92.000	.000	459.903	685828.800
0	33.017	-1.000	90.000	.000	459.903	673517.700
0	33.133	-1.000	88.000	.000	459.903	661197.300
0	33.283	-1.000	88.000	.000	459.903	661197.300
0	33.400	-1.000	85.000	.000	459.903	642698.500
3	33.617	5.625	47.000	207459.300	510.341	356601.800
3	33.783	5.500	23.000	201147.600	417.671	286172.200
3	33.983	5.625	25.500	207459.300	423.570	298902.100
3	34.167	5.500	23.000	201147.600	417.323	286470.900
2	34.350	5.625	22.000	207459.300	405.575	289197.600
3	34.533	4.875	24.500	170211.900	460.096	263161.000
3	34.717	5.000	24.000	176310.500	450.043	267214.500
3	34.883	5.000	19.000	176310.500	422.483	253509.600
3	35.100	5.000	26.000	176310.500	460.219	272656.900
3	35.250	5.000	21.500	176310.500	436.661	260379.500
3	35.583	5.500	28.500	201147.600	444.355	301493.400
3	35.917	5.500	28.000	201147.600	442.020	300133.800
3	36.150	5.500	24.000	201147.600	422.466	289213.000
3	36.417	5.750	26.000	213808.900	419.775	305885.400
3	36.700	5.500	23.000	201147.600	417.323	286470.900
1	37.150	5.750	22.500	213808.900	401.811	296038.700
2	37.633	5.750	24.000	213808.900	409.598	300228.100

SALTON SEA, WELL STATE 2-14 FLOW TEST, ORIFICE CALCULATIONS (SAL = 20%)

CONSTANTS FOR JAMES FORMULA; C = 20703.000

A = 1.230

BRINE SPECIFIC VOLUME (FT3/LB) = .015200

PIPE DIAMETER (INCHES) = 10.000

ORIFICE DIAMETER (INCHES) = 7.000

JAMES TUBE DIAMETER (INCHES) = 6.065

LOCAL ATMOSPHERIC PRESSURE (PSIA) = 15.000

BRINE SALINITY (WT. FRACTION) = .200

NOI	TIME (hrs)	DELTA P. (psi)	LIP PRESS. (psig)	ENTHALPY (BTU/lb)	TOTAL FLOW (lbs/hr)
38	8.167	8.700	34.000	1189.326	102803.800
41	8.333	8.700	34.000	1047.382	120097.900
50	8.517	10.150	35.000	404.972	456570.200
23	8.667	10.150	33.000	480.000	334615.700
1	8.817	11.600	38.000	600.542	257370.000
1	8.950	10.150	35.000	601.481	241931.100
1	9.100	10.150	35.000	598.956	245824.300
41	9.233	9.420	35.000	1021.940	126189.700
1	9.450	9.420	34.000	599.214	240710.700
44	9.583	9.420	34.000	923.056	140162.100
42	9.750	8.700	34.000	1002.437	126685.900
38	9.917	7.580	34.000	1249.790	96742.000
32	10.617	5.070	9.000	904.513	72449.250
1	10.833	5.070	9.000	600.192	120567.800
33	11.000	4.350	9.000	1017.104	62757.960
30	11.467	2.900	.800	1319.600	30541.680
30	11.583	2.900	1.000	1443.977	27678.310
30	11.717	2.900	1.000	1443.977	27678.310
30	11.817	2.900	.900	1270.266	32195.710
30	12.033	2.610	.900	1555.315	25111.800
31	12.183	2.460	.800	1888.384	19677.900
31	12.400	2.460	.800	1888.384	19677.900
31	12.617	2.180	.900	2228.823	16148.790
31	12.767	2.180	.900	2228.823	16148.790
30	12.900	2.900	.900	1545.830	25305.560
35	13.083	7.250	18.000	848.177	106361.000
35	13.150	7.250	19.000	740.739	129114.000
39	13.667	8.700	31.000	1059.958	111413.100
41	13.783	8.700	32.000	1002.750	121711.200
38	13.933	7.980	32.000	1204.183	97288.700
35	14.083	7.250	32.000	1494.972	74602.870
22	14.267	10.150	32.000	480.000	328024.600
35	14.400	7.980	32.000	1502.202	74186.180
34	14.617	7.980	33.000	1596.142	70248.790
35	15.083	7.250	32.000	1494.972	74602.870
41	15.617	7.980	29.000	983.856	116943.500
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

35	16.117	6.520	33.000	1861.347	58197.980
36	16.617	7.980	31.000	1253.048	90729.850
34	17.100	6.520	32.000	1835.249	58009.550
1	17.600	8.700	29.000	600.875	214814.700
34	18.100	5.070	28.000	1967.380	48906.050
35	18.683	5.800	27.000	1588.715	62168.200
36	19.183	5.800	28.000	1476.728	69551.640
35	19.683	5.800	29.000	1731.921	58479.790
35	20.300	5.800	30.000	1843.205	55362.660
35	20.800	5.800	29.000	1581.596	65348.710
36	21.233	6.520	28.500	1324.161	80363.300
37	21.733	6.520	29.000	1306.552	82617.100
35	22.233	5.800	29.000	1655.161	61815.520
36	22.733	5.070	26.500	1567.282	62493.870
36	23.167	5.800	24.000	1334.507	71709.470
44	23.617	7.250	26.000	880.581	125133.700
0	24.117	-1.000	25.500	880.581	124685.100
9	24.567	8.700	17.500	480.000	266001.000
0	24.950	-1.000	17.500	480.000	212914.600
0	25.500	-1.000	17.500	480.000	212914.600
0	25.983	-1.000	19.000	480.000	222339.800
8	26.517	8.700	17.500	480.000	285098.000
9	27.083	8.700	17.500	480.000	266001.000
20	27.617	7.250	18.500	480.000	236894.100
12	28.150	8.700	19.000	480.000	259504.500
10	28.583	8.700	18.500	480.000	266001.000
10	29.600	7.250	11.500	480.000	212449.600
16	29.783	7.250	14.000	480.000	212449.600
16	30.067	5.800	12.500	480.000	201091.600
36	30.283	5.800	16.500	940.502	89643.440
16	30.500	6.520	15.000	480.000	218963.900
34	30.650	5.800	17.500	1162.988	71229.140
34	30.817	5.800	14.500	735.455	113675.900
36	30.950	5.800	16.500	940.502	89643.440
23	31.150	6.520	17.000	480.000	224651.400
20	31.350	6.520	17.500	480.000	230275.400
17	31.550	6.520	17.000	480.000	230275.400
17	32.083	6.520	17.000	480.000	230275.400
37	32.267	6.520	85.000	5169.325	33571.640
37	32.500	5.800	88.000	6307.843	27039.950
47	32.650	17.400	88.000	1303.897	187329.800
41	32.783	17.400	90.000	1527.601	157162.700
41	32.883	17.400	92.000	1583.680	153145.000
42	33.017	17.400	90.000	1486.032	162579.600
48	33.133	18.130	88.000	1279.677	191757.100
50	33.283	18.850	88.000	579.181	505004.800
1	33.400	18.850	85.000	598.267	480535.800
35	33.617	7.250	47.000	3445.815	34926.400
33	33.783	7.980	23.000	480.000	260912.800
42	33.983	7.250	25.500	908.806	118989.600
23	34.167	7.250	23.000	480.000	265962.100
17	34.350	7.250	22.000	480.000	265962.100
12	34.533	8.700	24.500	480.000	297543.800
38	34.717	6.520	24.000	1072.026	93762.460
10	34.883	7.250	19.000	480.000	265962.100
19	35.100	7.980	26.000	480.000	290853.900
13	35.250	8.700	21.500	480.000	272429.100
38	35.583	7.250	28.500	1155.854	94963.440
37	35.917	7.250	28.000	1178.502	91693.870
1	36.150	7.250	24.000	599.477	193014.700
45	36.417	7.980	26.000	773.156	146662.400
14	36.700	7.980	23.000	480.000	279030.800
13	37.150	7.980	22.500	480.000	279030.800

SALTON SEA, WELL STATE 2-14 FLOW TEST, ORIFICE CALCULATIONS (SAL = 20%)

CONSTANTS FOR JAMES FORMULA: C = 20703.000

A = 1.230

BRINE SPECIFIC VOLUME (FT3/LB) = .015200

PIPE DIAMETER (INCHES) = 10.000

ORIFICE DIAMETER (INCHES) = 7.000

JAMES TUBE DIAMETER (INCHES) = 6.065

LOCAL ATMOSPHERIC PRESSURE (PSIA) = 15.000

BRINE SALINITY (WT. FRACTION) = .200

MIXED ENTHALPY = 400.000

NOI	TIME (hrs)	DELTA P. (psi)	LIP PRESS. (psig)	TOTAL FLOW(ORI) (lbs/hr)	TOTAL FLOW(LIP) (lbs/hr)
0	8.167	8.700	34.000	423869.200	395165.200
0	8.333	8.700	34.000	443524.400	395165.200
0	8.517	10.150	35.000	468456.900	402904.100
0	8.667	10.150	33.000	468456.900	387420.000
0	8.817	11.600	38.000	500801.400	426084.100
0	8.950	10.150	35.000	472701.000	402904.100
0	9.100	10.150	35.000	479061.100	402904.100
0	9.233	9.420	35.000	451296.600	402904.100
0	9.450	9.420	34.000	471710.700	395165.200
0	9.583	9.420	34.000	451296.600	395165.200
0	9.750	8.700	34.000	449406.700	395165.200
0	9.917	7.980	34.000	424775.400	395165.200
0	10.617	5.070	9.000	198273.900	199155.900
0	10.833	5.070	9.000	214831.400	199155.900
0	11.000	4.350	9.000	195955.000	199155.900
0	11.467	2.900	.800	110061.300	133321.800
0	11.583	2.900	1.000	107237.900	134941.500
0	11.717	2.900	1.000	107237.900	134941.500
0	11.817	2.900	.900	112860.100	134131.800
0	12.033	2.610	.900	104413.300	134131.800
0	12.133	2.460	.800	94822.910	133321.800
0	12.400	2.460	.800	94822.910	133321.800
0	12.617	2.180	.900	89263.520	134131.800
0	12.767	2.180	.900	89263.520	134131.800
0	12.900	2.900	.900	102954.400	134131.800
0	13.083	7.250	19.000	285807.900	270373.300
0	13.150	7.250	19.000	304663.200	278234.000
0	13.667	8.700	31.000	404119.500	371910.100
0	13.783	8.700	32.000	423869.200	379668.300
0	13.917	7.980	32.000	405951.100	379668.300
0	14.083	7.250	32.000	377335.900	379668.300
0	14.267	10.150	32.000	437831.100	379668.300
0	14.400	7.980	32.000	368000.600	379668.300
0	14.617	7.980	33.000	368000.600	387420.000
0	15.083	7.250	32.000	377335.900	379668.300

0	15.617	7.[illegible]	[illegible]	[illegible]	356373.000
0	16.117	6.520	32.000	358404.100	387420.000
0	16.617	7.980	31.000	387036.300	371910.100
0	17.100	6.520	32.000	349843.700	379668.300
0	17.600	8.700	29.000	414008.000	356373.200
0	18.100	5.070	28.000	316046.000	348594.200
0	18.683	5.800	27.000	329962.300	340808.000
0	19.183	5.800	28.000	354120.100	348594.200
0	19.683	5.800	29.000	338036.200	356373.200
0	20.300	5.800	30.000	338036.200	364145.100
0	20.800	5.800	29.000	354120.100	356373.200
0	21.233	6.520	28.500	366940.800	352484.600
0	21.733	6.520	29.000	375457.100	356373.200
0	22.233	5.800	29.000	346087.800	356373.200
0	22.733	5.070	26.500	338580.500	336912.100
0	23.167	5.800	24.000	321862.600	317404.100
0	23.617	7.250	26.000	377935.900	333014.300
0	24.567	8.700	17.500	364204.300	266439.400
0	26.517	8.700	17.500	394199.600	266439.400
0	27.083	8.700	17.500	364204.300	266439.400
0	27.617	7.250	18.500	323256.700	274304.800
0	28.150	8.700	19.000	354110.000	278234.000
0	28.583	8.700	18.500	364204.300	274304.800
0	29.600	7.250	11.500	285807.900	219031.500
0	29.767	7.250	14.000	285807.900	238832.000
0	30.067	5.800	12.500	272499.100	226960.300
0	30.283	5.800	16.500	272499.100	258564.300
0	30.500	6.520	15.000	297762.300	246732.800
0	30.650	5.800	17.500	264099.200	266439.400
0	30.817	5.800	14.500	264099.200	242783.700
0	30.950	5.800	16.500	272499.100	258564.300
0	31.150	6.520	17.000	306550.700	262503.100
0	31.350	6.520	17.500	315289.300	266439.400
0	31.550	6.520	17.000	315285.300	262503.100
0	32.083	6.520	17.000	315289.300	262503.100
0	32.267	6.520	85.000	596355.100	783773.200
0	32.500	5.800	88.000	562464.500	806332.500
0	32.650	17.400	88.000	**********	806332.500
0	32.783	17.400	90.000	**********	821357.400
0	32.883	17.400	92.000	**********	836370.800
0	33.017	17.400	90.000	**********	821357.400
0	33.133	18.130	88.000	**********	806332.500
0	33.283	18.850	88.000	**********	806332.500
0	33.400	18.850	85.000	**********	783773.200
0	33.617	7.250	47.000	350764.800	495320.700
0	33.783	7.980	23.000	358426.400	309587.000
0	33.983	7.250	25.500	368909.000	329114.700
0	34.167	7.250	23.000	368909.000	309587.000
0	34.350	7.250	22.000	368909.000	301761.700
0	34.533	8.700	24.500	414008.000	321309.600
0	34.717	6.520	24.000	341256.000	317404.100
0	34.883	7.250	19.000	368909.000	278234.000
0	35.100	7.980	26.000	405951.100	333014.300
0	35.250	8.700	21.500	374246.900	297845.900
	35.583	7.250	28.500	377935.900	352484.600
	35.917	7.250	28.000	368909.000	348594.200
	36.150	7.250	24.000	368909.000	317404.100
	36.417	7.980	26.000	379438.400	333014.300
	36.700	7.980	23.000	387036.300	309587.000
	37.15[illegible]	7.980	22.500	387036.300	305675.400

SALTON SEA, WELL STATE 2-14 FLOW TEST, ORIFICE CALCULATIONS (SAL = 20%)

CONSTANTS FOR JAMES FORMULA: C = 20703.000

A = 1.230

BRINE SPECIFIC VOLUME (FT3/LB) = .015200

PIPE DIAMETER (INCHES) = 10.000

ORIFICE DIAMETER (INCHES) = 7.000

JAMES TUBE DIAMETER (INCHES) = 6.065

LOCAL ATMOSPHERIC PRESSURE (PSIA) = 15.000

BRINE SALINITY (WT. FRACTION) = .200

FIXED ENTHALPY = 500.000

NOI	TIME (hrs)	DELTA P. (psi)	LIP PRESS. (psig)	TOTAL FLOW(ORI) (lbs/hr)	TOTAL FLOW(LIP) (lbs/hr)
0	8.167	8.700	34.000	284605.100	300316.600
0	8.333	8.700	34.000	295722.400	300316.600
0	8.517	10.150	35.000	313436.300	306198.000
0	8.667	10.150	33.000	313436.300	294430.500
0	8.817	11.600	38.000	335077.400	323814.300
0	8.950	10.150	35.000	315833.900	306198.000
0	9.100	10.150	35.000	319416.700	306198.000
0	9.233	9.420	35.000	301954.600	306198.000
0	9.450	9.420	34.000	313434.400	300316.600
0	9.583	9.420	34.000	301954.600	300316.600
0	9.750	8.700	34.000	299024.500	300316.600
0	9.917	7.980	34.000	283221.300	300316.600
0	10.617	5.070	9.000	142171.200	151354.000
0	10.833	5.070	9.000	152566.100	151354.000
0	11.000	4.350	9.000	139422.700	151354.000
0	11.467	2.900	.800	81587.460	101321.600
0	11.583	2.900	1.000	79691.800	102552.500
0	11.717	2.900	1.000	79691.800	102552.500
0	11.817	2.900	.900	83457.710	101937.100
0	12.033	2.610	.900	77400.660	101937.100
0	12.183	2.460	.800	70732.090	101321.600
0	12.400	2.460	.800	70732.090	101321.600
0	12.617	2.180	.900	66585.120	101937.100
0	12.767	2.180	.900	66585.120	101937.100
0	12.900	2.900	.900	76797.660	101937.100
0	13.083	7.250	18.000	200259.600	205477.600
0	13.150	7.250	19.000	211681.100	211451.500
0	13.667	8.700	31.000	273301.900	282643.300
0	13.783	8.700	32.000	284605.100	288539.300
0	13.933	7.980	32.000	272574.000	288539.300
0	14.083	7.250	32.000	254671.000	288539.300
0	14.267	10.150	32.000	307408.600	288539.300
0	14.400	7.980	32.000	250722.000	288539.300
0	14.617	7.980	33.000	250722.000	294430.500
0	15.083	7.250	32.000	254671.000	288539.300

0	15.617	7.980	29.000	267184.900	270835.600
0	16.117	6.520	33.000	241509.500	294430.500
0	16.617	7.980	31.000	261748.600	282643.300
0	17.100	6.520	32.000	236595.700	288539.300
0	17.600	8.700	29.000	278978.200	270835.600
0	18.100	5.070	28.000	212968.100	264923.700
0	18.683	5.800	27.000	223150.000	259006.400
0	19.183	5.800	28.000	236935.500	264923.700
0	19.683	5.800	29.000	227784.700	270835.600
0	20.300	5.800	30.000	227784.700	276742.000
0	20.800	5.800	29.000	236935.500	270835.600
0	21.233	6.520	28.500	246380.800	267880.300
0	21.733	6.520	29.000	251211.800	270835.600
0	22.233	5.800	29.000	232379.100	270835.600
0	22.733	5.070	26.500	225750.400	256045.600
0	23.167	5.800	24.000	218472.600	241219.900
0	23.617	7.250	26.000	254671.000	253083.400
0	24.567	8.700	17.500	250036.400	202487.900
0	26.517	8.700	17.500	267573.200	202487.900
0	27.083	8.700	17.500	250036.400	202487.900
0	27.617	7.250	18.500	222795.700	208465.500
0	28.150	8.700	19.000	244060.500	211451.500
0	28.583	8.700	18.500	250036.400	208465.500
0	29.600	7.250	11.500	200259.600	166459.000
0	29.783	7.250	14.000	200259.600	181506.900
0	30.067	5.800	12.500	189333.300	172484.700
0	30.283	5.800	16.500	189333.300	196503.000
0	30.500	6.520	15.000	206045.300	187511.300
0	30.650	5.800	17.500	184262.400	202487.900
0	30.817	5.800	14.500	184262.400	184510.200
0	30.950	5.800	16.500	189333.300	196503.000
0	31.150	6.520	17.000	211281.600	199496.400
0	31.350	6.520	17.500	216454.900	202487.900
0	31.550	6.520	17.000	216454.900	199496.400
0	32.083	6.520	17.000	216454.900	199496.400
0	32.267	6.520	85.000	367974.100	595649.900
0	32.500	5.800	88.000	347062.300	612794.500
0	32.650	17.400	88.000	635947.800	612794.500
0	32.783	17.400	90.000	615100.100	624213.100
0	32.883	17.400	92.000	622063.100	635622.900
0	33.017	17.400	90.000	622063.100	624213.100
0	33.133	18.130	88.000	634978.100	612794.500
0	33.283	18.850	88.000	647463.900	612794.500
0	33.400	18.850	85.000	647463.900	595649.900
0	33.617	7.250	47.000	238979.100	376432.500
0	33.783	7.980	23.000	245124.800	235279.100
0	33.983	7.250	25.500	249489.300	250119.700
0	34.167	7.250	23.000	249489.300	235279.100
0	34.350	7.250	22.000	249489.300	229332.100
0	34.533	8.700	24.500	278978.200	244188.000
0	34.717	6.520	24.000	231636.300	241219.900
0	34.883	7.250	19.000	249489.300	211451.500
0	35.100	7.980	26.000	272574.000	253083.400
0	35.250	8.700	21.500	255944.300	226356.100
0	35.583	7.250	28.500	254671.000	267880.300
0	35.917	7.250	28.000	249489.300	264923.700
0	36.150	7.250	24.000	249489.300	241219.900
0	36.417	7.980	26.000	257363.500	253083.400
0	36.700	7.980	23.000	261748.600	235279.100
0	37.150	7.980	22.500	261748.600	232306.400

SALTON SEA, WELL STATE 2-14 FLOW TEST, ORIFICE CALCULATIONS (SAL = 20%)

CONSTANTS FOR JAMES FORMULA: C = 20703.000

A = 1.230

BRINE SPECIFIC VOLUME (FT3/LB) = .015200

PIPE DIAMETER (INCHES) = 10.000

ORIFICE DIAMETER (INCHES) = 7.000

JAMES TUBE DIAMETER (INCHES) = 6.065

LOCAL ATMOSPHERIC PRESSURE (PSIA) = 15.000

BRINE SALINITY (WT. FRACTION) = .200

FIXED ENTHALPY = 600.000

NOI	TIME (hrs)	DELTA P. (psi)	LIP PRESS. (psig)	TOTAL FLOW(ORI) (lbs/hr)	TOTAL FLOW(LIP) (lbs/hr)
0	8.167	8.700	34.000	219214.200	239986.300
0	8.333	8.700	34.000	227058.500	239986.300
0	8.517	10.150	35.000	241037.200	244686.100
0	8.667	10.150	33.000	241037.200	235282.600
0	8.817	11.600	38.000	257679.600	258763.500
1	8.950	10.150	35.000	242728.000	244686.100
0	9.100	10.150	35.000	245251.200	244686.100
0	9.233	9.420	35.000	232207.600	244686.100
0	9.450	9.420	34.000	240285.900	239986.300
0	9.583	9.420	34.000	232207.600	239986.300
0	9.750	8.700	34.000	229380.300	239986.300
0	9.917	7.980	34.000	217460.100	239986.300
0	10.617	5.070	9.000	112921.700	120948.600
0	10.833	5.070	9.000	120614.600	120948.600
0	11.000	4.350	9.000	110323.400	120948.600
0	11.467	2.900	.800	65887.460	80967.170
0	11.583	2.900	1.000	64438.680	81950.830
0	11.717	2.900	1.000	64438.680	81950.830
0	11.817	2.900	.900	67313.460	81459.060
0	12.033	2.610	.900	62506.360	81459.060
0	12.183	2.460	.800	57305.520	80967.170
0	12.400	2.460	.800	57305.520	80967.170
0	12.617	2.180	.900	53945.740	81459.060
0	12.767	2.180	.900	53945.740	81459.060
0	12.900	2.900	.900	62219.700	81459.060
0	13.083	7.250	18.000	157309.300	164199.400
0	13.150	7.250	19.000	165624.900	168973.200
0	13.667	8.700	31.000	211195.100	225863.300
0	13.783	8.700	32.000	219214.200	230574.900
0	13.933	7.980	32.000	209947.400	230574.900
0	14.083	7.250	32.000	196475.000	230574.900
0	14.267	10.150	32.000	236778.400	230574.900
0	14.400	7.980	32.000	194400.900	230574.900
0	14.617	7.980	33.000	194400.900	235282.600
0	15.083	7.250	32.000	196475.000	230574.900

0	15.617	7.980	29.000	205129.300	216427.700
0	16.117	6.520	33.000	186321.100	235281.600
0	16.617	7.980	31.000	202267.300	225863.300
0	17.100	6.520	32.000	182830.200	230574.900
0	17.600	8.700	29.000	215227.600	216427.700
0	18.100	5.070	28.000	164301.800	211703.400
0	18.683	5.800	27.000	172440.000	206974.800
0	19.183	5.800	28.000	182207.000	211703.400
0	19.683	5.800	29.000	175732.600	216427.700
0	20.300	5.800	30.000	175732.600	221147.600
0	20.800	5.800	29.000	182207.000	216427.700
0	21.233	6.520	28.500	189772.300	214066.100
0	21.733	6.520	29.000	193185.600	216427.700
0	22.233	5.800	29.000	178987.600	216427.700
0	22.733	5.070	26.500	173333.400	204608.800
0	23.167	5.800	24.000	169107.800	192761.500
0	23.617	7.250	26.000	196475.000	202241.700
0	24.567	8.700	17.500	194550.200	161810.300
0	26.517	8.700	17.500	207114.000	161810.300
0	27.083	8.700	17.500	194550.200	161810.300
0	27.617	7.250	18.500	173668.600	166587.000
0	28.150	8.700	19.000	190244.400	168973.200
0	28.583	8.700	18.500	194550.200	166587.000
0	29.600	7.250	11.500	157309.300	133019.200
0	29.783	7.250	14.000	157309.300	145044.200
0	30.067	5.800	12.500	148139.500	137834.400
0	30.283	5.800	16.500	148139.500	157027.700
0	30.500	6.520	15.000	160909.500	149842.300
0	30.650	5.800	17.500	144453.100	161810.300
0	30.817	5.800	14.500	144453.100	147444.100
0	30.950	5.800	16.500	148139.500	157027.700
0	31.150	6.520	17.000	164693.400	159419.800
0	31.350	6.520	17.500	168420.800	161810.300
0	31.550	6.520	17.000	168420.800	159419.800
0	32.083	6.520	17.000	168420.800	159419.800
0	32.267	6.520	85.000	272939.100	475990.300
0	32.500	5.800	88.000	257428.100	489690.800
0	32.650	17.400	88.000	468778.200	489690.800
0	32.783	17.400	90.000	455097.600	498815.400
0	32.883	17.400	92.000	459677.000	507933.200
0	33.017	17.400	90.000	459677.000	498815.400
0	33.133	18.130	88.000	469220.500	489690.800
0	33.283	18.850	88.000	478447.000	489690.800
0	33.400	18.850	85.000	478447.000	475990.300
0	33.617	7.250	47.000	185295.900	300811.300
0	33.783	7.980	23.000	190391.000	188014.100
0	33.983	7.250	25.500	192793.800	199873.400
0	34.167	7.250	23.000	192793.800	188014.100
0	34.350	7.250	22.000	192793.800	183261.800
0	34.533	8.700	24.500	215227.600	195133.300
0	34.717	6.520	24.000	179297.200	192761.500
0	34.883	7.250	19.000	192793.800	168973.200
0	35.100	7.980	26.000	209947.400	202241.700
0	35.250	8.700	21.500	198794.700	180883.700
0	35.583	7.250	28.500	196475.000	214066.100
0	35.917	7.250	28.000	192793.800	211703.400
0	36.150	7.250	24.000	192793.800	192761.500
0	36.417	7.980	26.000	199144.200	202241.700
0	36.700	7.980	23.000	202267.300	188014.100
0	37.150	7.980	22.500	202267.300	185638.600