

# MERIDIAN OIL

October 25, 1989

State of New Mexico  
Oil Conservation Division  
1000 Rio Brazo Road  
Aztec, New Mexico 87410

Gentlemen:

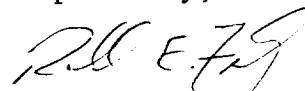
Order SWD-344 dated June 13, 1988 established a limiting surface injection pressure of 1478 psi for the captioned well. During August, 1989 two additional zones were completed as provided for in the original order.

A step-rate injection test was run August 24, 1989 under the auspices of the New Mexico Oil Commission. The results of this test indicated a parting pressure of 4358 psi at 8050'. This corresponds to a surface pressure of 1940 psi at 22 BPM.

Meridian Oil requests that the surface injection pressure be increased from 1478 psi to 1940 psi. Attached for your review is the raw data collected during the test with the results from the pressure transient analysis.

Your timely response to this request will be appreciated.

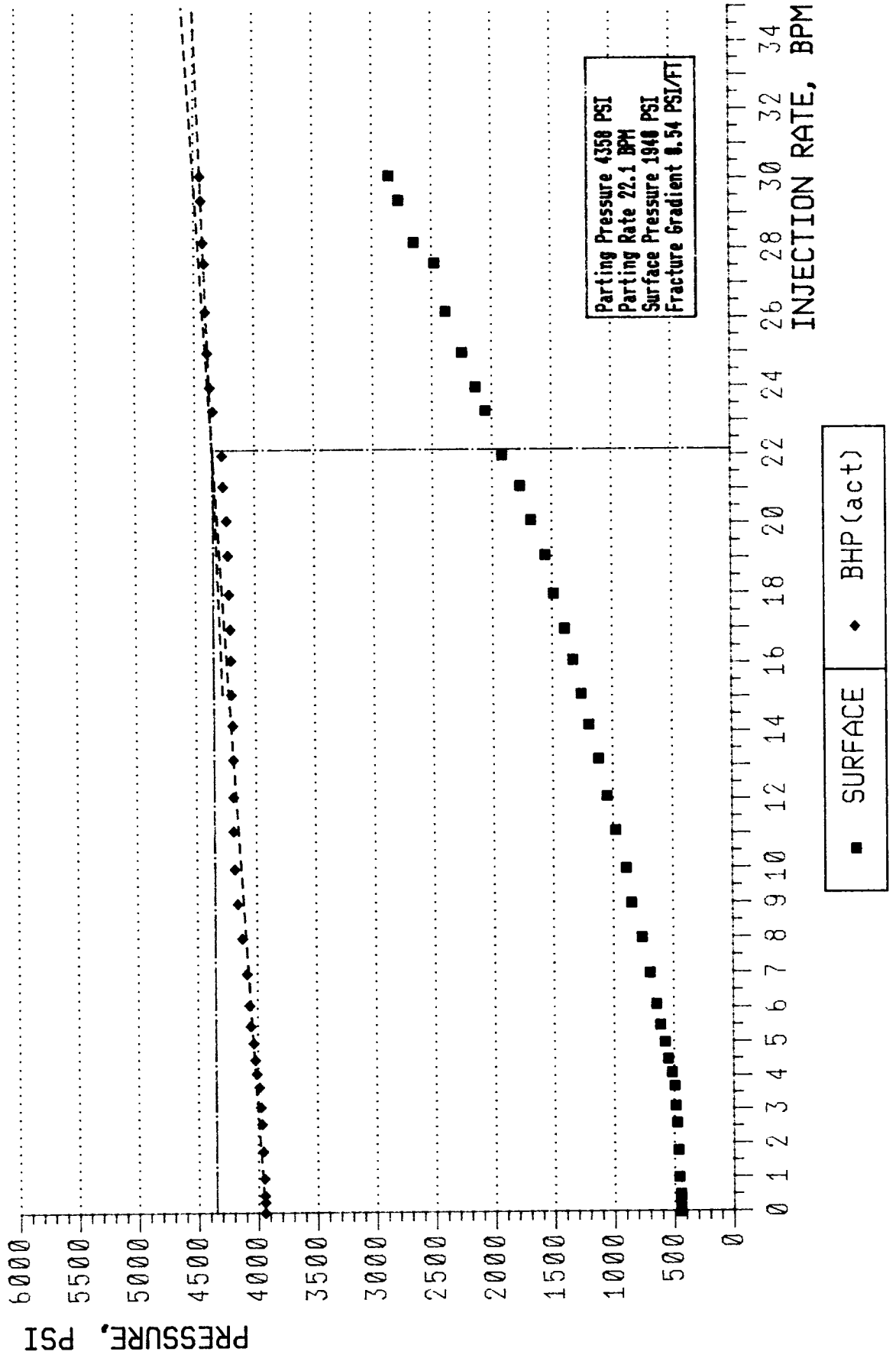
Respectfully,



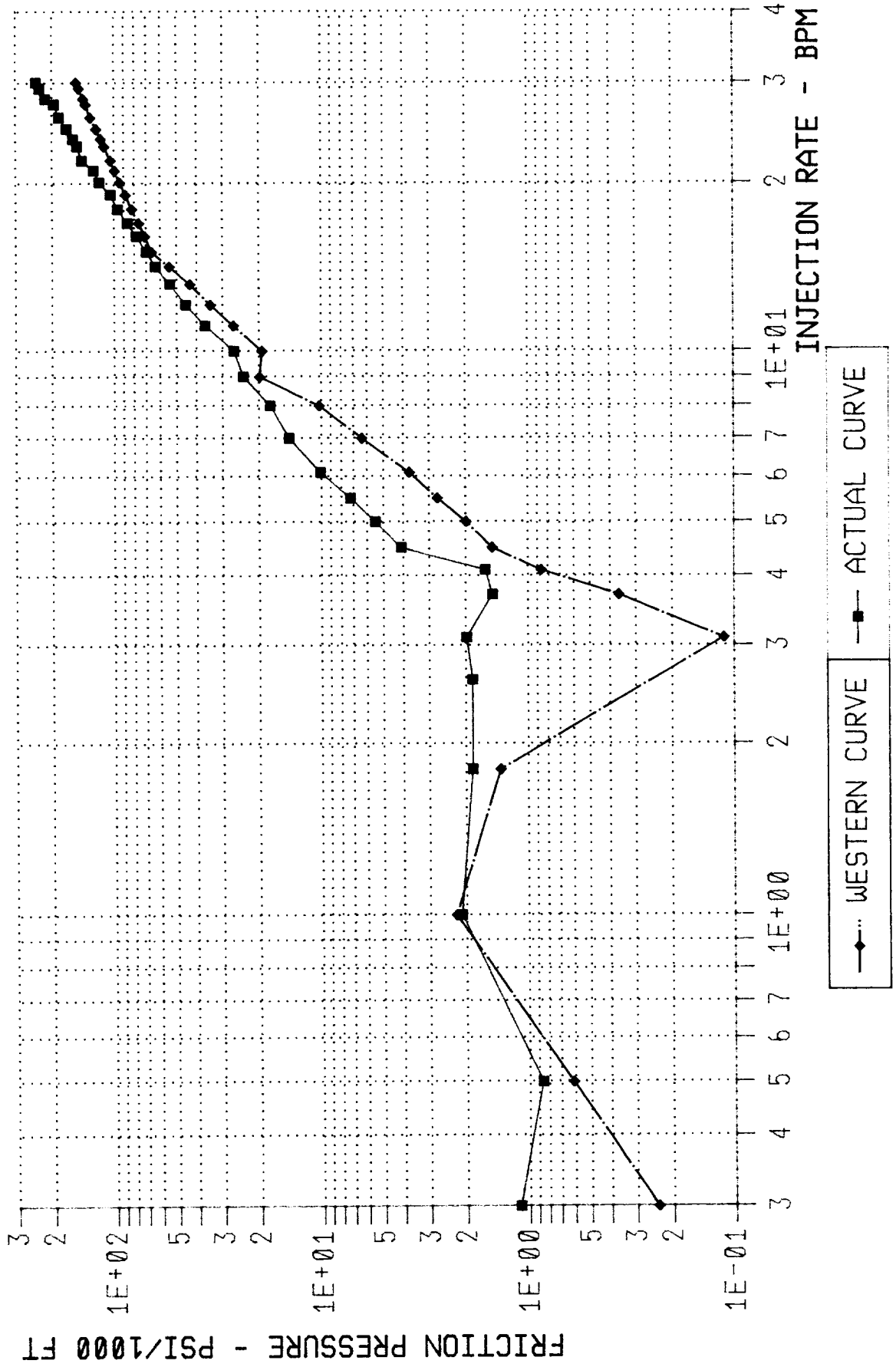
Richard E. Fraley  
Regional Production Engineer

REF:WSS:tt

**PUMP CANYON SWD #1  
COMBINED STEP-RATE TEST**



PUMP CANYON SWD #1  
FRICTION CURVE



AS STATISTICS Bivariate Curve Fitting

Y Axis dFRIC

X Axis RATE

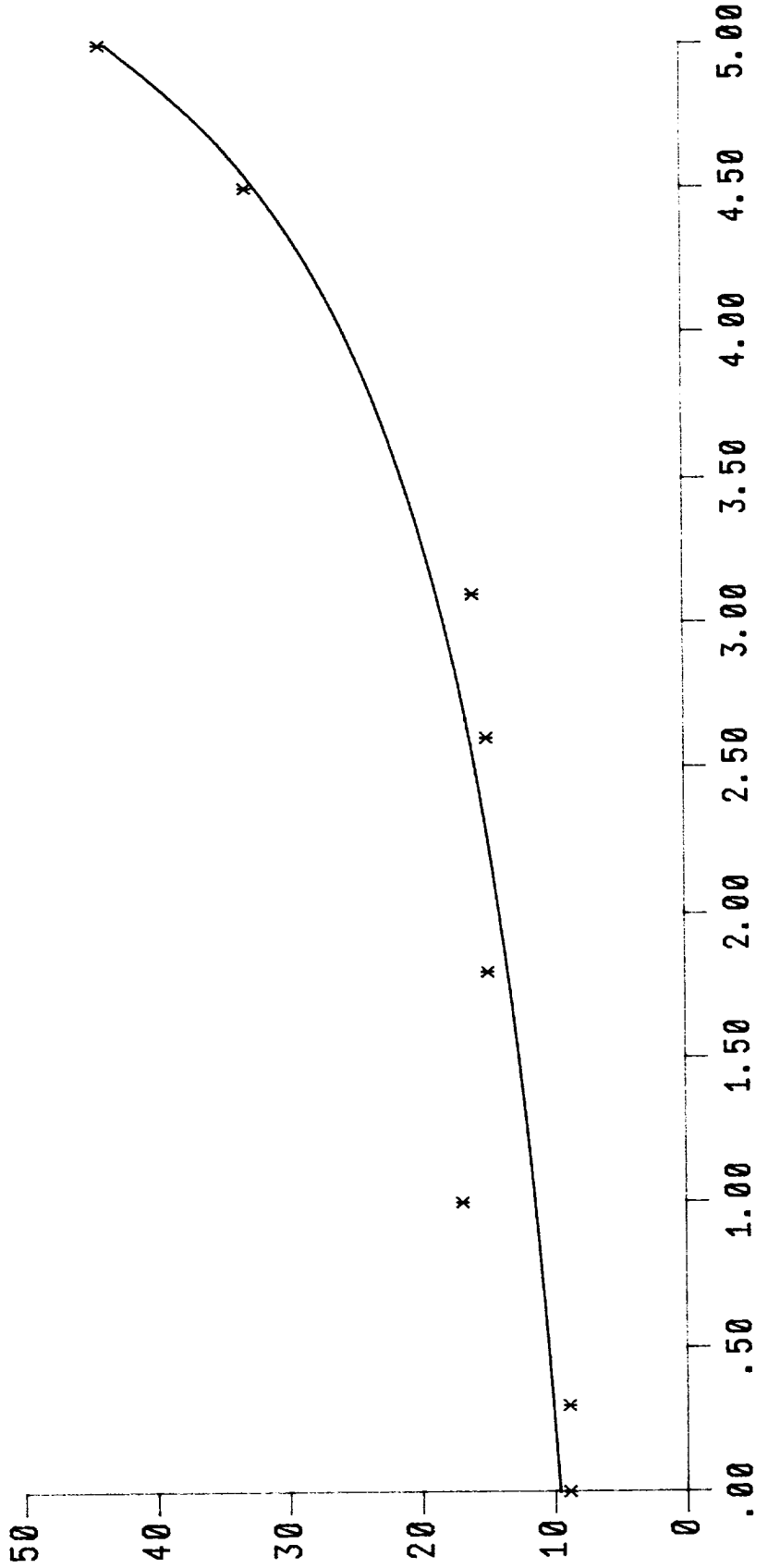
Reciprocal Curve  $Y=1/(0.104-0.0161*X)$

Residual Standard Deviation 2.72

Correlation Coefficient -0.914

x Data

— Trend

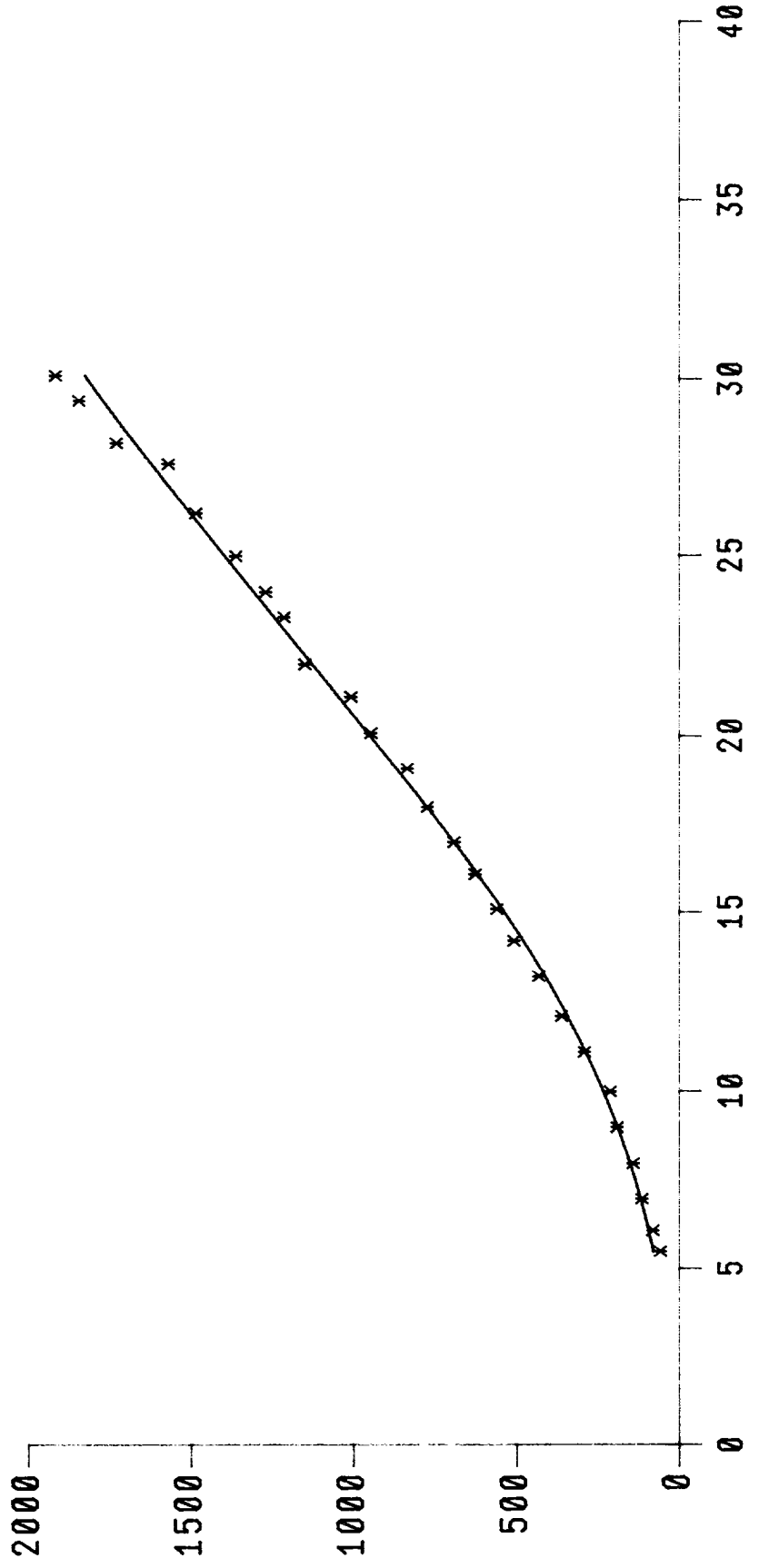


AS STATISTICS Bivariate Curve Fitting

Y Axis dFRIC  
X Axis RATE

Gompertz Curve  $Y=3203.18*0.00356^{**}(0.926^{**X})$   
Residual Standard Deviation 35.92  
Correlation Coefficient 0.998

\* Data      — Trend



Water Well Analysis  
Falloff Test

Operator : MERIDIAN OIL INC  
Well : PUMP CANYON SWD #1  
Location : T30N-R8W  
Formation : MORRISON/ENTRADA

Perforated Interval : 7628-8422  
Analyst : WSS  
Test Date : 8-24-89

Remarks : Memory gauge failed to collect data.  
Used backup gauge losing data after 3.5 hrs of shut in.

RESERVOIR PARAMETERS

Net pay (ft)	603.00
Wellbore radius (ft)	.3646
Porosity (fraction)	.0282
Gas saturation (fraction)	.2000
Oil saturation (fraction)	.0000
Water saturation (fraction)	.8000
Formation compressibility (1/psi)	.0000110
Total compressibility (1/psi)	.0000477

RESERVOIR FLUID PROPERTIES

Bottom hole temperature (deg F)	182.00
Separator gas gravity	.6500
Mole percent hydrogen sulfide (%)	.0000
Mole percent carbon dioxide (%)	.0000
Mole percent nitrogen (%)	.0000
Gas-condensate ratio (scf/STB)	.000000
Condensate gravity (Deg API)	.00
Gas equivalent of condensate (scf/STB)	.000
Wet gas specific gravity	.6500
Water compressibility (1/psi)	.0000029
Water viscosity (cp)	.350
Water formation volume factor (RB/STB)	1.016

### PRODUCTION PARAMETERS

Input pressure at $t = 0$ (psig)	4449.00
Initial drainage area pressure (psia)	3961.00
Corrected pressure at $t = 0$ (psia)	4463.70

#### Pressure Corrections

Pressure bomb depth (ft)	8050.00
Mid-perforation depth (ft)	8050.00
Pressure datum depth (ft)	8050.00
Fluid gradient in wellbore (psi/ft)	.4368
Fluid gradient in reservoir (psi/ft)	.4368
Atmospheric pressure correction (psi)	14.70
Total pressure correction (psi)	14.70
Time correction	.0000

### SEMI-LOG ANALYSIS

Semi-log slope (psi/cycle)	484.59
Permeability (md)	3.1352
Permeability thickness, kh (md-ft)	1890.5480
Skin factor	-4.971
Pressure at time of one hour (psia)	4422.70
Pressure at Horner time ratio = 1 (psia)	4013.17
Radius of investigation (ft)	
End of test	156.9
End of production	205.5
Start of middle-time region	156.9

### LINEAR FLOW ANALYSIS

Slope of linear flow (psi/sqrt(hr))	-80.92
Permeability (md)	2.3220
Fracture half-length (ft)	449.21
Permeability-fracture length (kLf) (md-ft)	468552.80

TYPE CURVE ANALYSIS - FINITE CONDUCTIVITY VERTICAL FRACTURE

Permeability (md)	2.8138
Permeability thickness, kh (md-ft)	1696.729
Fracture half-length (ft)	186.8
Dimensionless fracture conductivity	67.32
Fracture conductivity (md-ft)	.1112E+06

MATCH POINT

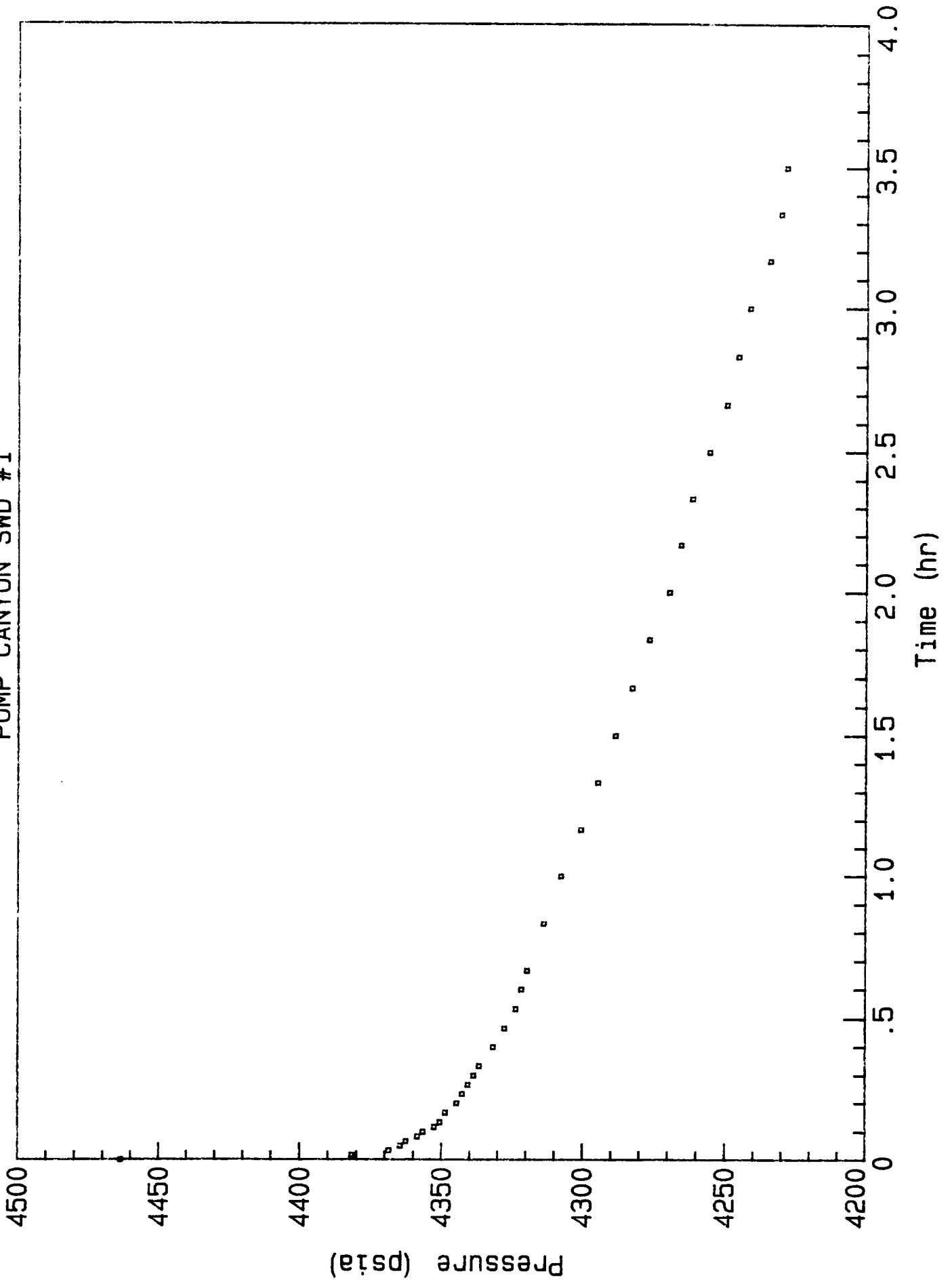
Dimensionless pressure	2.133
Dimensionless time	.4524E-01
Pressure Change (psi)	1000.
Equivalent Time (hr)	1.000

RATE DATA

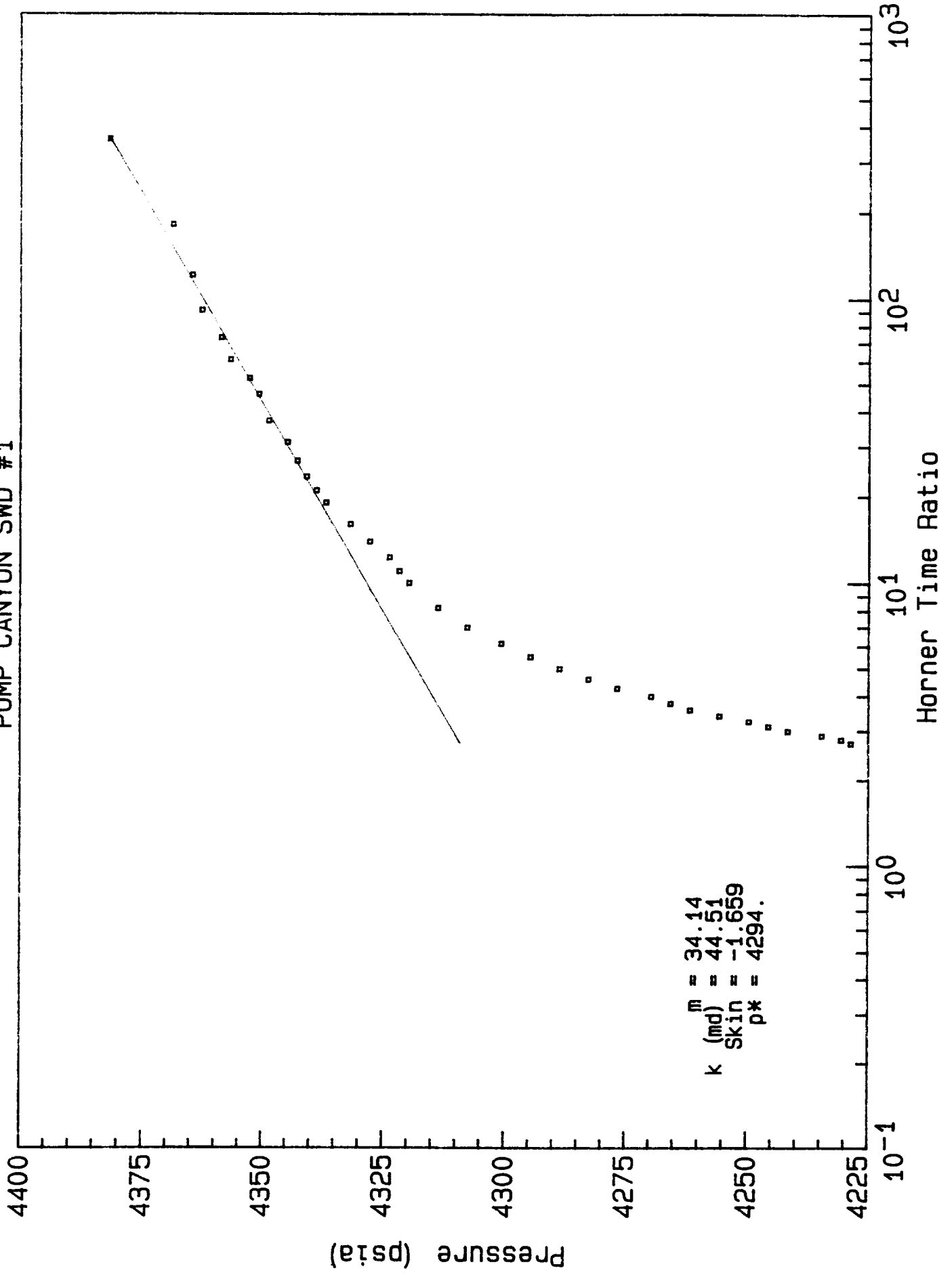
Cumulative Time (hr)	Water Rate (STB/D)
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1 6.0000	15840.



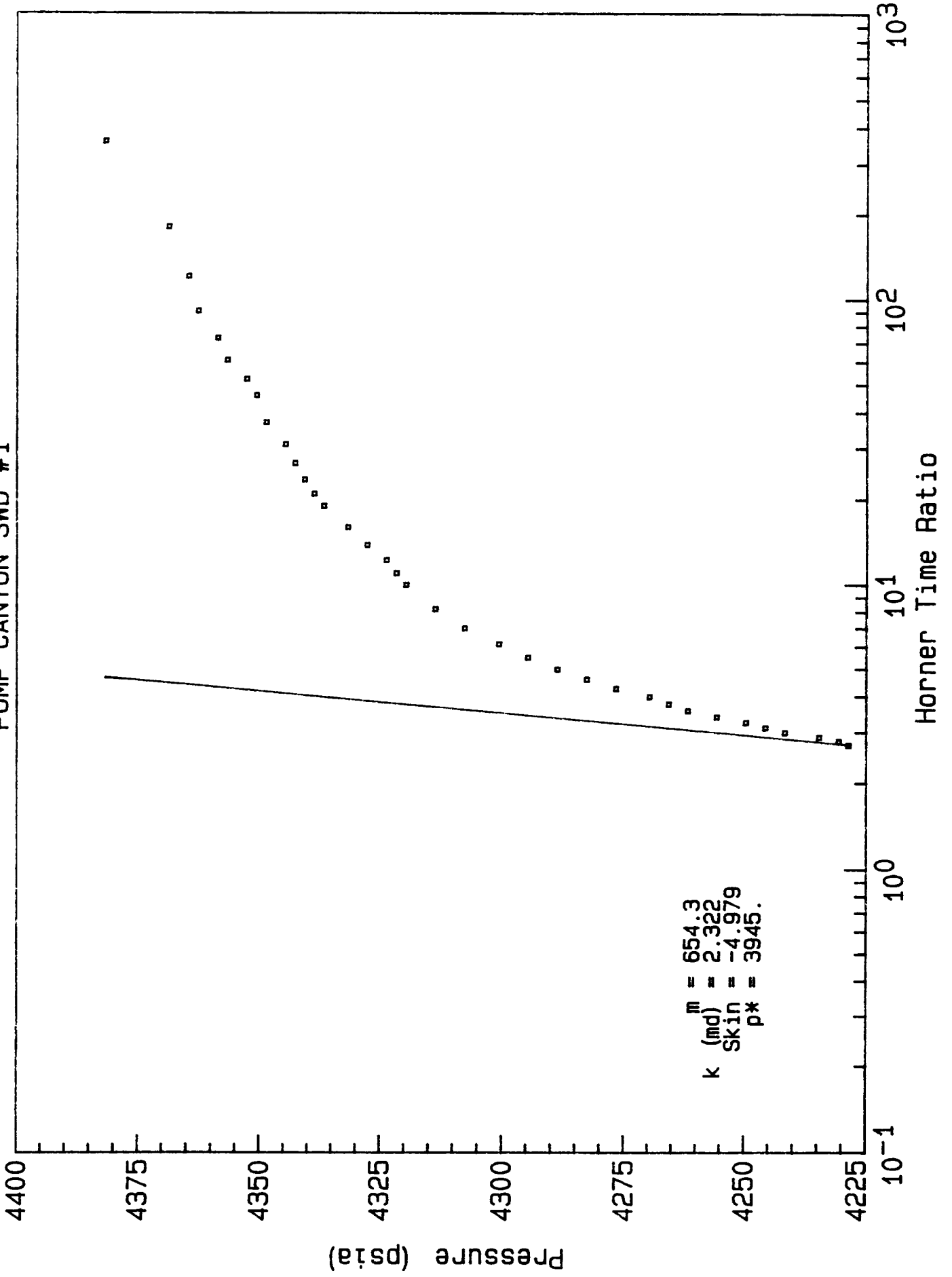
CARTESIAN PRESSURE VS. TIME  
PUMP CANYON SWD #1



SEMI-LOG PLOT  
PUMP CANYON SWD #1

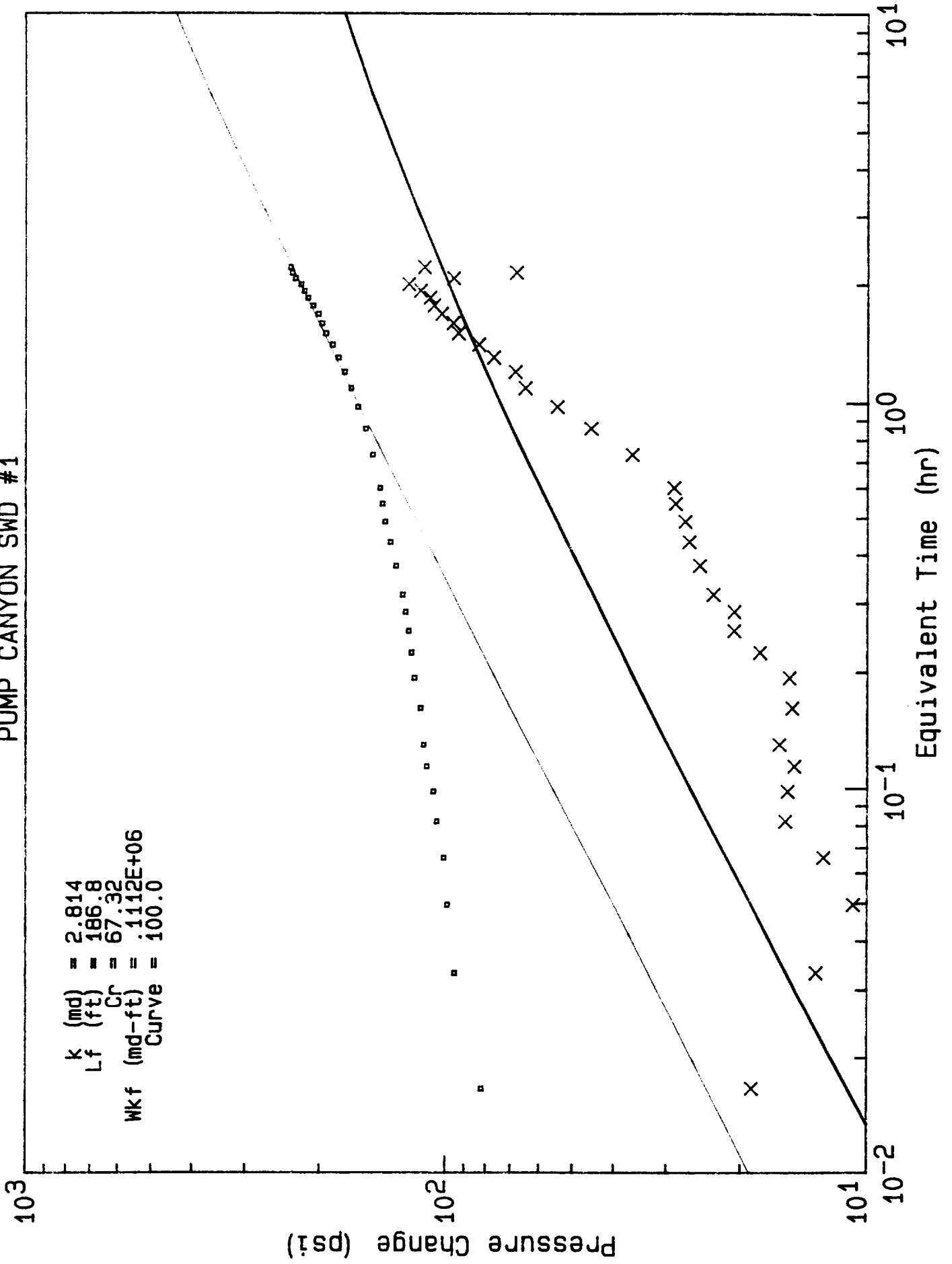


SEMI-LOG PLOT  
PUMP CANYON SWD #1

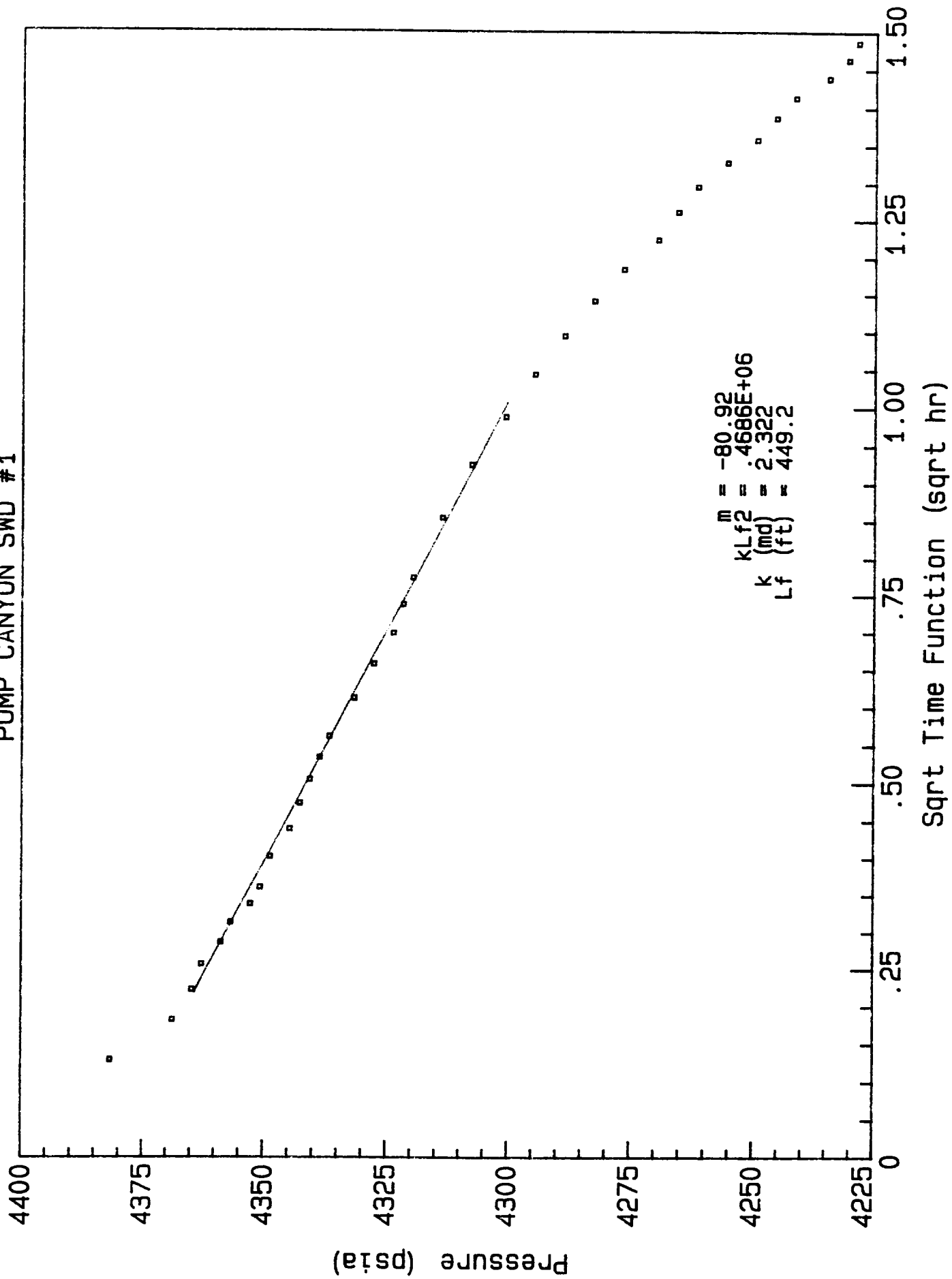


TYPE CURVE PLOT  
PUMP CANYON SWD #1

k (md) = 2.814  
 Lf (ft) = 186.8  
 Cr = 67.32  
 Wkf (md-ft) = .1112E+06  
 Curve = 100.0

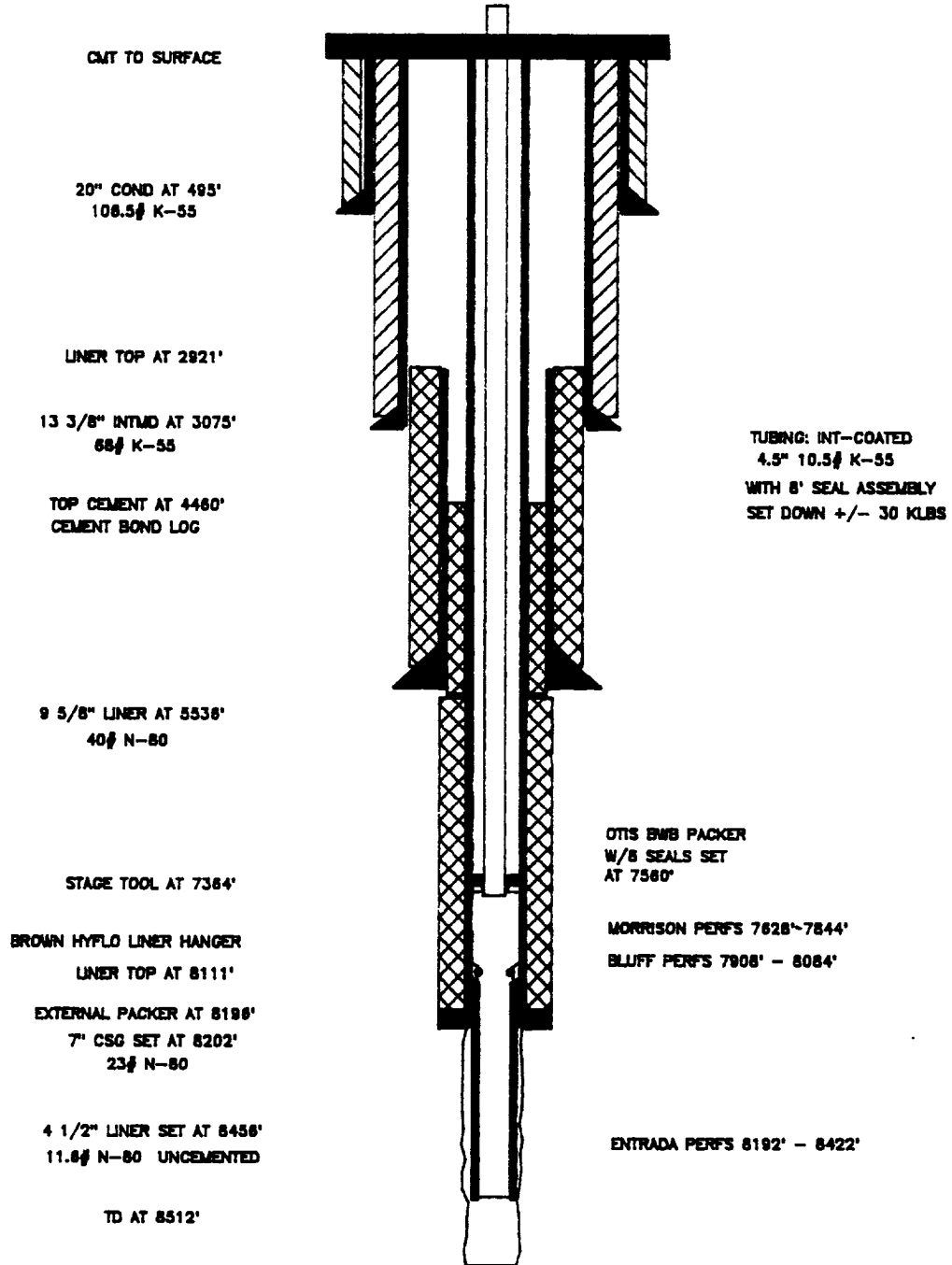


LINEAR FLOW PLOT  
PUMP CANYON SWD #1



# PUMP CANYON SWD #1

## WELLBORE DIAGRAM



10/10/89

OPEN HOLE- UNCEMENTED LINER

INSTRUCTIONS: COPIES: FOUR (4) COPIES. SEND 1st COPY TO DIVISION OFFICE. 2nd COPY TO DISTRICT OFFICE. 3rd COPY TO DISTRICT OFFICE. 4th COPY TO CUSTOMER.

DALLAS ACCOUNTING ATTACHED TO DELIVERY TICKET (M.S.O.).

COMPANY: **MERIDIAN OIL CO.** FIELD: **Pump Canyon** SVC. \_\_\_\_\_  
 WELL NAME: **Pump Canyon S.W. Q. #1** COUNTY: **SAN JUAN** STATE: **N.M.**  
 CASING SIZE: **7"** WEIGHT: **23\*** GRADE: \_\_\_\_\_  
 LNER SIZE: **4 1/2"** WEIGHT: **11.6\*** GRADE: **K-55**  
 FLUID CONTENT AND CONDITION: \_\_\_\_\_  
 COMMENTS: **Circulated PKR. Fluid before stringing in SEALS.**  
**PKR. SET @ 7560' E-Line Logged Measurement**

TYPE PACKER	PART NO.	SERIAL NO.
<b>BWB - PERMANENT</b>	<b>212BWB70402-A</b>	
LONG STRING	BORE ID	TUBING SIZE
INTER-MEDIATE STRING	BORE ID	TUBING SIZE
SHORT STRING	BORE ID	TUBING SIZE

Prod. TBG. - **4 1/2" 10.5" K-55 grade**  
 TBG. LANDED w/ **30,000\* COMPRESSION**

TYPE PACKER	PART NO.	SERIAL NO.
LONG STRING	BORE ID	TUBING SIZE
SHORT STRING	BORE ID	TUBING SIZE

TYPE PACKER	PART NO.	SERIAL NO.
LONG STRING	BORE ID	TUBING SIZE
SHORT STRING	BORE ID	TUBING SIZE

TYPE PACKER	PART NO.	SERIAL NO.
TYPE SEALING UNIT	PART NO.	TENSION
	EXPENDABLE PLUG	FLAPPER VALVE

TYPE PACKER	PART NO.	SERIAL NO.
TYPE SEALING UNIT	PART NO.	TENSION
SIZE TENSION SLEEVE	EXPENDABLE PLUG	FLAPPER VALVE

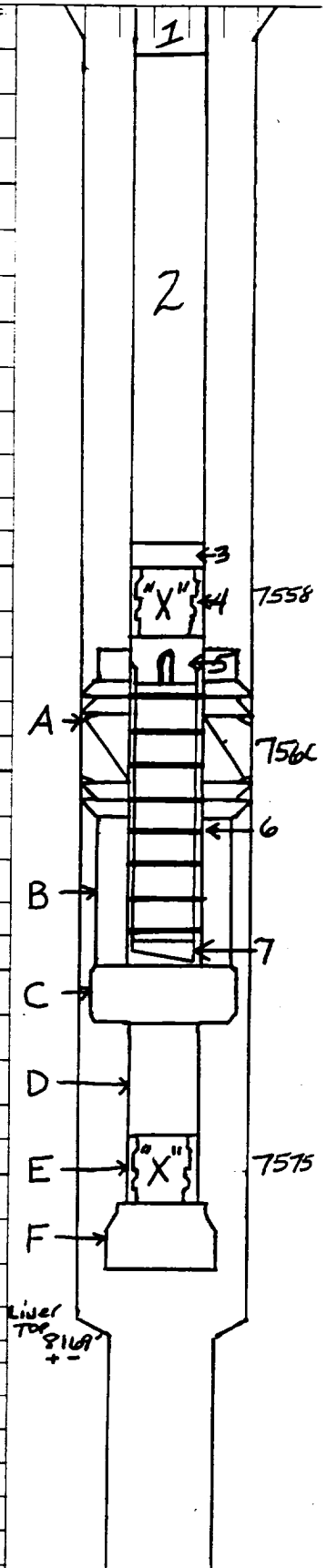
ACCESSORY EQUIPMENT ON WELL DIAGRAM — NUMBER THE SYMBOL & IDENTIFY BELOW:

1	9	
2	10	
3	11	
4	12	
5	13	
6	14	
7	15	
8	16	

COMMENTS ON PACKER PERFORMANCE:

**SET GOOD**

DIVISION: **FARMINGTON, N.M.** OPERATOR'S NAME: **JOE EUGER** DATE: **8-21-89**  
 NO. PROD. TONES: **Disp 6221** ACC. ONLY: **Injection Well**  
 M.S.O. NO. \_\_\_\_\_



COMPLETION EQUIPMENT

MERIDIAN OIL CO. Pump Canyon S.W.D. #1 8-21-89

	Length	O.D.	I.D.
A OTIS 7" BWB PERM. DRILLABLE PKR.	3.19	6"	4"
B OTIS SEAL BORE EXTENSION	7.40	4.985"	4"
C OTIS X-OVER SEAL BORE TO 3 1/2" EUE BOX	.81	5.730"	3.434"
D Pup JOINT 3 1/2" EUE 8rd	6.12	3.50"	3.03"
E OTIS 2.813 X-NIPPLE	.85	3.697"	2.813"
F OTIS WIRELINE RE-ENTRY GUIDE	.47	5.919"	3.389"
① 1 JOINT 4 1/2" 10.5" TBG.	25.40	4.50"	4.052"
② 181 JOINTS 4 1/2" 10.5" TBG.	7524.03	4.50"	4.052"
③ OTIS X-OVER 4 1/2" X 3 1/2" EUE	.55	5.027"	2.943"
④ OTIS 2.813 X-NIPPLE	.85	3.697"	2.813"
⑤ OTIS LOCATOR	1.43	4.460"	3.028"
⑥ OTIS SEAL UNIT QTY. ⑧ 1.0 Length each	TOTAL 8.0	3.950"	3"
⑦ OTIS MULE SHOE GUIDE	.54	3.90"	3.016"