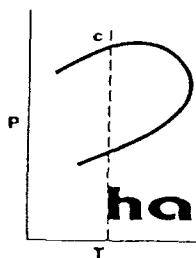


WLSU PVT Analysis

Phase Behavior, Inc. sampled the Speight #1 (WLSU #7) on December 12, 1992. Their recombined analysis resulted in a GOR of 2,716.8 SCF/STB at a pressure base of 14.65. The GOR corrected to a pressure base of 15.025 resulted in 2,649 SCF/STB.

Core Labs sampled the Hamilton Federal #1 (WLSU #1) a year later on November 12, 1993. Their recombined analysis resulted in a GOR of 2,463.8 SCF/STB at a pressure base of 15.025.

The WLSU oil meets the definition for a "Volatile Oil" with a gravity greater than 40° API, a GOR greater than 2000/1, an oil formation factor greater than 2.0 RB/STB and heptanes plus between 12.5 to 20.0 mole percent. The WLSU oil is nearly identical to the properties of the Runnells #3, identified in Case # 12,400, to set a GOR limit for the NM Shoe Bar Strawn pool.



Phase Behavior, Inc.

December 18, 1992

Specializing in P-V-T

Mr. William R. Crow
CHARLES B. GILLESPIE JR.
P.O. Box 8
Midland, TX 79702

Dear Mr. Crow;

Included in this report are the results of laboratory studies performed using samples of liquid and vapor collected from the Speight Fee No. 1, Lee County, New Mexico.

The producing gas-liquid ratio of the Speight Fee No. 1 was reported as 2300 SCF/STB. The separator products were combined at a ratio of 1985 SCF/SEPB which had a "Bubble-Point" of 4115 PSIG, at 171 degrees F. Since the reservoir pressure is 4342 PSIG, the reservoir is an under-saturated oil, and the 1985 SCF/SEPB fluid was used to represent the reservoir fluid.

The compositions of the separator liquid and separator gas together with the calculated well stream composition are reported in Table I of this report.

Table II is the P-V relation of the recombined 1985 SCF/SEPB mixture. Table III is the properties of a 1985 SCF/SEPB mixture determined by a Differential Liberation Process. The differentially liberated gas is summarized in Table IV. The separator tests were performed and are reported in Table V.

Thank you for the opportunity to serve CHARLES B. GILLESPIE JR. If you have any questions, don't hesitate to call.

Yours very truly,

Ralph E. Gilchrist
Ralph E. Gilchrist, Ph.D.
Petroleum Consultant

REG/do

FIELD DATA

COMPANY	CHARLES B. GILLESPIE JR.
FIELD	Lovington Field
WELL	Speight Fee No. 1
DATE SAMPLED	December 2, 1992
SEPARATOR CONDITIONS	
Pressure	140 PSIG
Temperature	40 degrees F
RESERVOIR CONDITIONS	
Pressure	4342 PSIG
Temperature	171 degrees F
PRIMARY SEPARATOR	
GOR	1985 SCF/SEPB @ 60 degrees F

CHARLES B. GILLESPIE JR.
Speight Fee No. 1

P-V-T SUMMARY

Reservoir Temperature, degrees F	171
Saturation Pressure at 171 degrees F, Psig	4115
Compressibility of Reservoir Oil at 171 degrees F	
Vol. per Vol. per Psi X 10 ⁶	
From 5000 Psig to 4500 Psig	28.1
From 4500 Psig to 4115 Psig	31.7
Saturated Oil at 4115 Psig, 171 degrees F	
Density, Gms. per Ml.	0.5273
Viscosity, Centipoise	0.18
Formation Volume Factor, Bbls. per Bbl.	
"Residual Stock Tank Oil" at 60 degrees F	2.5840
Solution Gas-Oil Ratio, Cu. Ft. per Bbl.	
"Residual Stock Tank Oil" at 60 degrees F	2716.8

CHARLES B. GILLESPIE JR.
Speight Fee No. 1

TABLE I
HYDROCARBON ANALYSIS OF SEPARATOR PRODUCTS
AND
CALCULATED WELL STREAM
GOR = 1985 SCF/SEPB

COMPONENT	SEPARATOR OIL	SEPARATOR GAS		WELL STREAM	
	MOL %	MOL %	GPM@ 14.65	MOL %	GPM@14.65
Nitrogen	0.000	2.227	0.000	1.588	0.000
Carbon Dioxide	0.000	1.021	0.000	0.728	0.000
Methane	4.350	57.563	0.000	42.291	0.000
Ethane	6.390	15.368	4.082	12.791	3.397
Propane	12.330	11.740	3.219	11.909	3.266
Iso-butane	3.460	1.664	0.542	2.179	0.710
N-butane	8.070	5.001	1.570	5.882	1.847
Iso-pentane	3.190	1.254	0.456	1.810	0.659
N-pentane	3.810	1.475	0.531	2.145	0.773
Hexanes	6.650	1.387	0.567	2.897	1.185
Heptanes Plus	51.750	1.300	0.632	15.779	11.545
	100.000	100.000	11.600	100.000	23.381

Properties of Heptanes Plus

(Sep. Oil)
Degrees API 38.0400
S.G. @ 60 F 0.8346
Mol Wt. 194.0000

Separator Gas & Well Stream

Calculated S.G.
(Air = 1.0) 0.99210
Mol. Wt. 28.73717 56.63
B.T.U. Calc. Dry @ 14.65
and 60 Deg. f 1624.0

Gas-Oil Ratio

Separator Ratio, SCF/SEPB 1985.00

Total Separator Oil

Degrees API 56.1600
S.G. @ 60 F 0.7540
Mol. Wt. 125.9340

CHARLES B GILLESPIE JR.
Speight Fee No. 1

TABLE II

PRESSURE VOLUME RELATIONS OF
A 1985 GOR MIXTURE @ 171 DEGREES F
(Constant Composition Expansion)

PRESSURE (PSIG)	RELATIVE VOLUME (V/VSAT)	DENSITY (gm/cc)	"Y" FUNCTION *	FVF Bt**
5000.0	0.9745	0.54108		2.1916
4500.0	0.9882	0.53358		2.2224
4342.0 R.P.	0.9930	0.53100		2.2332
4115.0 B.P.	1.0000	0.52730		2.2488
	TWO		PHASE	
4000.0	1.0077	0.52325	3.702	2.2662
3500.0	1.0559	0.49936	3.127	2.3747
3000.0	1.1348	0.46466	2.744	2.5520
2500.0	1.2663	0.41642	2.412	2.8476
2000.0	1.4925	0.35329	2.131	3.3565
1500.0	1.9200	0.27464	1.877	4.3178
1000.0	2.8801	0.18308	1.633	6.4770
820.0	3.5423	0.14886	1.553	7.9661

$$* \quad Y = \frac{P_{sat} - P}{P \left(\frac{V}{V_{sat}} - 1 \right)}$$

** Based on Produced Stock Tank Oil

CHARLES B. GILLESPIE JR.
Speight Fee No. 1

TABLE III

PROPERTIES OF A 1985 GOR MIXTURE AT 171 DEGREES F
(BASIS: 41.1 DEGREES API STOCK TANK OIL)

PRESSURE (FSIG)	Bt V/VSTL	Bo VSAT/VSTO	Bg(Ri-Rs)	Rs	(Ri - Rs)	Bg BBL/MSCF	uo cp
5000	2.5182						0.25
4500	2.5536						0.21
4342 R.P.	2.5660						0.20
4115 B.P.	2.5840	2.5840	0.0000	2716.8	0.0		0.18
4000	2.5943	2.4442	0.1501	2516.3	200.4	0.7489	0.19
3500	2.7286	2.1365	0.5921	1949.5	767.3	0.7717	0.22
3000	2.9324	1.8517	1.0807	1449.0	1267.7	0.8524	0.24
2500	3.2721	1.6985	1.5736	1149.0	1567.7	1.0037	0.27
2000	3.8081	1.5797	2.2284	904.8	1812.0	1.2298	0.30
1500	4.9613	1.4757	3.4856	692.4	2024.4	1.7218	0.33
1000	7.4424	1.3818	6.0606	497.3	2219.5	2.7306	0.37
500		1.2837		300.8	2416.0		0.50
0		1.0555		0.0	2716.8		0.93

CHARLES B. GILLESPIE JR.
Speight Fee No. 1

TABLE IV
GAS DIFFERENTIALLY LIBERATED
AT 171 DEGREES F

PRESSURE PSIG	SPECIFIC GRAVITY INCREM	GRAVITY ACCUM	DEV FACT Z	Bg BBL/MSCF

4115.00	B.P.			
4000.00	0.8872	0.8872	0.9500	0.7492
3500.00	0.8862	0.8865	0.8245	0.7428
3000.00	0.8852	0.8860	0.7920	0.8318
2500.00	0.8578	0.8806	0.7970	1.0035
2000.00	0.8496	0.8764	0.8125	1.2769
1500.00	0.8496	0.8736	0.8392	1.7542
1000.00	0.8529	0.8718	0.8727	2.7231
500.00	0.9130	0.8751	0.9376	5.7677
0.00	1.2624	0.9180	1.0000	215.3899



CORE LABORATORIES

24 November, 1993

Charles B. Gillespie, Jr.
P.O. Box 8
Midland, Texas 79702

Attention: Mr. Kevin Widner

Subject: Volatile Oil Reservoir Fluid Study
Well: Hamilton Federal No. 1
File: RFLM 93062

Gentlemen :

Samples of separator liquid and vapor were submitted to our Midland laboratory facilities on November 15, 1993 for use in a Volatile Oil Reservoir Fluid Study. These products were recombined to a gas/oil ratio provided by a Charles B. Gillespie, Jr. representative. Presented in the following report are the results of this study.

Should any questions arise or if we may be of further service in anyway, please do not hesitate to contact us. Thank you.

Sincerely,

Thomas R. Coleman
Supervisor
Reservoir Fluid Laboratory-Midland

LABORATORY PROCEDURES

CHARLES B. GILLESPIE, JR.
Reservoir Fluid Study
Hamilton Federal No.1
RFLM 93062

Duplicate samples of separator gas and separator liquid were received in our laboratory on November 15, 1993. As a quality check, the opening pressures of the separator gas cylinders were determined. In addition, the room temperature bubblepoint pressures of the separator liquid samples were measured. This information is summarized on page three of the report.

The composition of the separator gas was determined using temperature programmed extended gas chromatography. The composition, together with the calculated properties of the separator gas, is presented on page four. The composition of the separator liquid was measured to a eicosanes plus fraction using the flash/chromatographic technique. This resulted in the composition listed on page five. Using the reported gas/liquid ratio in conjunction with the compositions of the separator products, the reservoir fluid composition was calculated. This composition is presented on page six. The separator gas and separator liquid were physically recombined to the gas/liquid ratio and the resulting fluid was used to complete the remaining testing program.

A portion of the recombined reservoir fluid was charged to a high-pressure visual cell and thermally expanded to the reported reservoir temperature of 165 °F. After establishing thermal equilibrium, the fluid sample was subjected to a constant composition expansion. During the expansion, a bubblepoint pressure was observed to occur at 4001 psig. Complete data derived from the pressure-volume relations measurements, including relative volumes, liquid phase volumes, and average single-phase compressibilities, may be found on pages seven through nine.

As instructed by a Charles B. Gillespie, Jr. representative no further testing was performed.

TABLE OF CONTENTS

	<i>pg</i>
<i>Laboratory Procedures</i>	<i>i</i>
<i>General Well Information</i>	<i>1-2</i>
<i>Preliminary Quality Checks</i>	<i>3</i>
<i>Wellstream Recombination</i>	<i>4-6</i>
<i>Pressure Volume Relations</i>	<i>7-9</i>

General Well Information

(Section 1)

RFLM 93062
24-Nov-93

CHARLES B. GILLESPIE JR.

Hamilton Federal No. 1

RFLM 93062

General Well Information

Company.....	CHARLES B. GILLESPIE JR.
Well Name.....	Hamilton Federal No. 1
API Well Number.....	
File Number.....	RFLM 93062
Date Sample Collected.....	12-Nov-93
Sample Type.....	Separator
Geographical Location.....	Lea County, New Mexico
Field.....	West Lovington

Well Description

Formation.....	Strawn	
Pool (or Zone).....	*	
Date Completed.....	*	
Elevation.....	*	ft
Producing Interval.....	*	ft
Total Depth.....	*	ft
Tubing Size.....	*	in
Tubing Depth.....	*	ft
Casing Size.....	*	in
Casing Depth.....	*	ft

Pressure Survey Data

Data from Original Discovery Well

Date	*	
Reservoir Pressure	*	psig

Data at Sample Collection

Date.....	12-Nov-93	
Reservoir Pressure.....	*	psig
Reservoir Temperature.....	165	°F
Pressure Tool.....	*	
Flowing Bottom-Hole Pressure.....	*	psig
Flowing Tubing Pressure.....	1090	psig

* Data not forwarded to Core Laboratories.

CHARLES B. GILLESPIE JR.

Hamilton Federal No. 1

RFLM 93062

Production Data

Data from Original discovery Well

Location.....	*	
Date.....	*	
Oil Gravity @ STP.....	*	°API
Separator Pressure.....	*	psig
Separator Temperature.....	*	°F
Production Rates		
Gas.....	*	Mscf/D
Liquid.....	*	STbbl/D
Gas/Liquid Ratio.....	*	scf/bbl

Separator Conditions

Primary Separator Pressure.....	200	psig
Primary Separator Temperature.....	80	°F
Secondary Separator Pressure.....	*	psig
Secondary Separator Temperature.....	*	°F
Primary Separator Gas Production Rate.....	*	Mscf/D

Gas Factors -**Field Values:**

Pressure Base.....	15.025	psia
Temperature Base.....	60	°F
Compressibility Factor (Fpv).....	1	
Gas Gravity Factor (Fg).....	1	

Laboratory Values:

Pressure Base.....	15.025	psia
Temperature Base.....	60	°F
Compressibility Factor (Fpv).....	1.0236	
Gas Gravity Factor (Fg).....	1.1091	

Adjusted Primary Separator Gas Prod Rate.....	Mscf/D	
Primary Separator Liquid Rate.....	bbl/D	at °F
Stock Tank Liquid Rate.....	bbl/D	at °F
Separator Gas / Separator Liquid Ratio.....	scf/bbl	
Separator Gas / Stock Tank Liquid Ratio.....	scf/bbl	
Stock Tank Liquid / Separator Gas Ratio.....	bbl/Mscf	
Separator Liquid / Stock Tank Liquid Ratio.....	bbl/bbl	at °F

* Data not forwarded to Core Laboratories.

Preliminary Quality Checks

(Section 2)

RFLM 93062
24-Nov-93

CHARLES B. GILLESPIE JR.

Hamilton Federal No. 1

RFLM 93062

PRELIMINARY QUALITY CHECKS PERFORMED ON SAMPLES
RECEIVED IN LABORATORY

Separator Gas					
Cylinder Number	Sampling Conditions		Laboratory Opening Conditions		Liquid Recovered (cc)
	psig	°F	psig	°F	
*K24417	200	80	175	72	0
K18286	200	80	175	72	0

Separator Liquid					
Cylinder Number	Sampling Conditions		Laboratory Bubblepoint		Water Recovered (cc)
	psig	°F	psig	°F	
*11	200	80	164	68	0
10	200	80	165	68	0

* Used for recombination

Wellstream Composition

(Section 3)

RFLM 93062
24-Nov-93

CHARLES B. GILLESPIE JR.

Hamilton Federal No. 1

RFLM 93062

SEPARATOR LIQUID COMPOSITION
IN WELLSTREAM RECOMBINATION

Component	Mol %	Weight %	Plus Fractions	
			Density gm/cc at 60 °F	Molecular Weight
Hydrogen Sulfide	0.00			
Carbon Dioxide	0.15	0.05		
Nitrogen	0.04	0.01		
Methane	3.84	0.51		
Ethane	4.49	1.12		
Propane	7.00	2.57		
i-Butane	1.73	0.84		
n-Butane	5.90	2.85		
i-Pentane	2.74	1.64		
n-Pentane	4.09	2.45		
Hexanes	6.07	4.24		
Heptanes	11.55	9.21	0.8269	162.
Octanes	12.07	10.73		
Nonanes	7.25	7.29		
Decanes	5.32	5.92		
Undecanes	3.74	4.57	0.8853	229.
Dodecanes	2.73	3.65		
Tridecanes	2.78	4.04		
Tetradecanes	2.22	3.51		
Pentadecanes	1.92	3.29	0.9248	275.
Hexadecanes	1.39	2.56		
Heptadecanes	1.24	2.44		
Octadecanes	1.16	2.42		
Nonadecanes	1.04	2.27		
Eicosanes	9.54	21.82	0.9748	305.
Totals	100.00	100.00		

Liquid Cylinder Number

11:1

Sampling Conditions

Separator Pressure, psig 200

Separator Temperature, °F 80

Stock Tank Flow Rate

(at 60 °F)

90 bbl/D

Separator Flow Rate

(at sampling conditions)

93.54 bbl/D

Total Liquid Properties

(at sampling conditions)

Sample Density, gm/cc 0.7607

Sample Molecular Weight 123.

CHARLES B. GILLESPIE JR.

Hamilton Federal No. 1

RFLM 93062

RESERVOIR FLUID COMPOSITION FROM RECOMBINED WELLSTREAM

Component	Mol %	Weight %	Plus Fractions	
			Density gm/cc at 60 °F	Molecular Weight
Hydrogen Sulfide	0.00	0.00		
Carbon Dioxide	1.01	0.93		
Nitrogen	1.97	1.15		
Methane	51.48	17.20		
Ethane	12.99	8.13		
Propane	8.35	7.66		
i-Butane	1.12	1.35		
n-Butane	3.24	3.92		
i-Pentane	0.99	1.49		
n-Pentane	1.34	2.02		
Hexanes	1.66	2.90		
Heptanes	2.95	5.89	0.8264	162.
Octanes	2.98	6.63		
Nonanes	1.78	4.49		
Decanes	1.31	3.65		
Undecanes	0.92	2.81		
Dodecanes	0.67	2.25		
Tridecanes	0.68	2.49		
Tetradecanes	0.55	2.16		
Pentadecanes	0.47	2.02		
Hexadecanes	0.34	1.58		
Heptadecanes	0.30	1.50		
Octadecanes	0.29	1.49		
Nonadecanes	0.26	1.40		
Eicosanes	2.35	14.89	0.9748	305.
Totals	100.00	100.00		

Sampling Conditions

Separator Pressure, psig 200
Separator Temperature, °F 80

Field measured
Separator Gas / Stock Tank Liquid ratio
at sampling conditions
2.2556 Mscf/bbl

Lab corrected
Separator Gas / Separator Liquid ratio
at sampling conditions
2.4638 Mscf/bbl

Sample Molecular Weight

48.

Pressure-Volume Relations

(Section 4)

RFLM 93062
24-Nov-93

CHARLES B. GILLESPIE JR.

Hamilton Federal No. 1

RFLM 93062

VOLUMETRIC DATA

(at 165 °F)

Bubblepoint Pressure (Pb)	4001	psig
Thermal Exp @ 5000 psig	1.08927	V at 165 °F / V at 71 °F

AVERAGE SINGLE-PHASE COMPRESSIBILITIES

Pressure Range psig			Single-Phase Compressibility V/V/psi
5000	to	4500	34.28 E -6
4500	to	4300	38.12 E -6
4300	to	4001	43.46 E -6

CHARLES B. GILLESPIE JR.

Hamilton Federal No. 1

RFLM 93062

PRESSURE-VOLUME RELATIONS

(at 165 °F)

Pressure psig	Relative Volume (A)	Liquid Phase Volume (B)
5000	0.9627	
4500	0.9795	
4400	0.9832	
4300	0.9870	
4200	0.9910	
4100	0.9953	
4001	1.0000	100.0
3956	1.0030	97.6
3913	1.0059	92.7
3879	1.0083	88.7
3848	1.0105	85.4
3729	1.0197	77.1
3461	1.0444	68.4
3071	1.0934	61.3
2581	1.1893	
2059	1.3703	
1591	1.6803	
1205	2.1818	
902	2.9534	
641	4.3047	

(A) Relative Volume: V/V_{sat} or volume at indicated pressure per volume at saturation pressure.

(B) Percent of total volume.

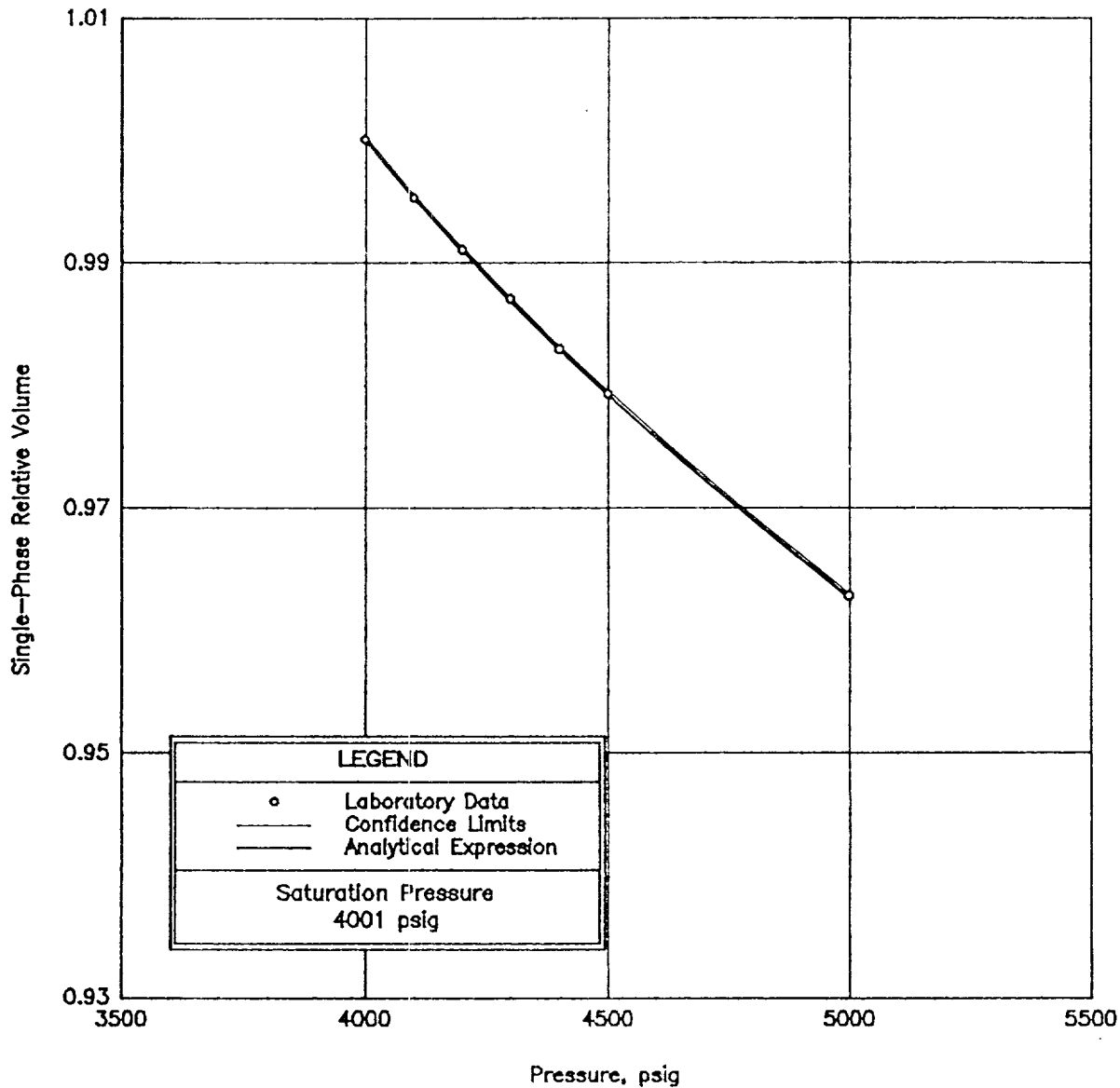
CHARLES B. GILLESPIE JR.

Hamilton Federal No. 1

RFLM 93062

RELATIVE VOLUME

(at 165 °F)



Analytical Expression

$$1 - 10^{-4.200E00 + 9.410E-01 (\log(dP)) + -7.022E-05 (\log(dP))^6}$$

Note: dP is defined as | P1 - Pstat |, psig

Statistical Summary

r squared: 0.999943
Confidence Interval (+/-): 0.0002
Confidence: 99 %

Pressure-Volume Relations

Figure A-1