MASTER

STUDY OF HYDROCARBON - SHALE INTERACTION

PROGRESS REPORT #13

January 1 - March 31, 1979

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QUARTERLY PROGRESS REPORT

January 1 - March 31, 1979

Contract No. DE-AS05-76MC05197

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1. Executive Summary.

Work was effected on all four of our contractual tasks. Two aspects of this work have particularly important practical applications. First a correlation was noted between U₂₃₈ content of shale samples and specific degasibility. Second a generalization of all our productivity modeling to date (taking into account fracture and diffusive flow) indicates that flat production curves can be associated with a variety of constrictive effects in the fracture system at or near the well bore.

2. Technical Progress.

2.1 Task 1 - High Pressure

2.1.1 Current Status. Valves used in construction were shown to leak in excess of manufacturer's specifications during initial checkout. No other valves of a similar nature are made, hence we have decided to utilize pneumatic valves and construct a computer operated electro-pneumatic system to operate them. We are awaiting ordered parts. The old valves have been returned for credit.

2.1.2 Problem Areas. None.

2.1.3 Plans. Continue construction as parts are received.

2.2 Task 2 - Low Pressure Data

2.2.1 Current Status. 100 data points submitted in Appendix B of this report, plus 66 data points associated with a temperature study submitted in Appendix C.

2.2.2 Problem Areas. None major. The temperature work presently uses a bath that is awkward to use.

2.2.3 Plans. Continue.

2.3 Task 3 - Productivity Calculations

2.3.1 Current Status. Report on radial case presented in Appendix D.

2.3.2 Problem Areas. None.

2.3.3 Plans. Consider effects of transient testing and production from a finite set of fractures.

2.4 Task 4 - Interpretation in Terms of Laboratory Data

2.4.1 Current Status. No active work.

2.4.2 Problem areas. None.

2.4.3 Plans. Continue work with selected samples during summer of 1979.

3. Financial Progress

(Note: This informal report will be superseded by formal monthly reports issued by our business office. The period of this report will be completely covered by April 30, 1979.)

Faculty Salaries	\$ 2,982.33
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Student Salaries	94.21
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Supplies and Equipment	8,144.17
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HP Plotter	\$5,036.00
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High Pressure Valves and Fittings	1,681.53
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Miscellaneous Supplies	1,426.64
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Indirect Costs	<u>2,719.89</u>
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	\$13,940.60
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APPENDICES

A. WORK SCHEDULES	A1
B. DATA SUMMARY	B1-B100
C. TEMPERATURE COEFFICIENTS OF DEGASIBILITY AND ISOTHERM PARAMETERS IN DEVONIAN SHALES (66 data sheets are included in this section)	C1-C10
D. WELL PRODUCTION IN TIGHT SHALES: DIFFUSION-FLOW IN THE RADIAL CASE	

WORK SCHEDULES

Juniata College
Huntingdon, Pennsylvania 16652

WORK SCHEDULES

Faculty

Paul Schettler

1/2 time during academic year.

Dale Wampler

1/2 time during Spring term (4 March to May 23)

Students

Scott Klinger
Evelyne Fossaert
Bryan Winship
Scott Sparks
Dean Roth
Jay Nelson

38 hours reimbursed; approximately 90 hours non-reimbursed*.

* Part of the work in Appendix C was accomplished as part of a student research project.

DATA SUMMARY

Juniata College
Huntingdon, Pennsylvania 16652

Data Tables Explanation

Sample ID

This is ordinarily the identification on the can as received.

Gas

The gas used in the sorption experiment (methane, helium, or nitrogen).

Initials, Book, Page

Location of original data and sample description at Juniata.

Weight

Weighings are made on a Mettler H20 balance (sensitivity .01 mg) whose calibration is checked biennially.

Density

Determined by displacement of toluene using a pycnometer and the balance mentioned above.

Sample Temperature

0°C is regulated by an ice bath. The temperature for BET's is calculated from the variation of the boiling point of N₂ with barometric pressure.

Particle Size

Mean diameter as determined by sieving, e.g., .06 means 500-700 μ mesh.

Slope of Isotherm

This is determined by a least squares fit of a straight line through the data for several different units.

% Slope Uncertainty

Relative standard error associated with the slope as calculated from least squares.

Detailed Data (Isotherm and BET)

Pressure: Determined by Datametrix Barocel.

Adsorbed Gas: Method of obtaining described in ORO-1 and ORO-8.

Uncertainty %: Approximate percentage uncertainty to be associated with each point.

Flag: This parameter expresses the criteria for determining equilibrium.

0 - assumed value (after degassing).

1 - Final equilibrium reading constant. Uncertainty in reading less than .02 torr and drift observed less than uncertainty in drift (nominally 1 minute readings).

2 - Equilibrium reading shows drift in pressure of opposite sign to previous reading. This change in slope (pressure vs. time) is usually due to (minor) temperature fluctuation ($\sim \pm .001^\circ\text{C}$).

3 - point took more than 4 hours to obtain.

Flag Parameter: 0 if flag = 0 or 1. Pressure drift in torr/hr if flag = 2 or 3.

P_{initial}

Initial equilibrium pressure before the step change in pressure expressed in torr.

P_{equilibrium}

Final equilibrium pressure after the step change in pressure and after equilibrium has been reestablished (torr).

P₀

Pressure after the pressure jump but before diffusion occurs (torr).

Specific Degasibility

Amount of gas (volume STP) degassed from the sample per area of rock per torr of pressure per $(\text{sec})^{1/2}$. $\text{cm}^3 \text{ gas/cm}^2 \text{ rock area/torr}/(\text{sec})^{1/2}$.

Uncertainty in Specific Degasibility

Least squares estimate of error.

System d moles/dP

An apparatus parameter. The number of moles of gas necessary to change the system pressure by one torr.

Date 1/ 3/1979

Sample ID : 20403:3066.1

Gas : Helium

Initials : PDS

Book : 3

Page : 45

SAMPLE DATA

Weight : 5.36822 (grams)

Density : 2.58163 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

8.39648E-05 Vol Gas/Vol Rock/Torr
4.34223E-05 Vol Gas/Vol rock/PSI
6.38132E-02 Vol Gas/Vol Rock/ATM
1.45103E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 2.21069 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
244.865	3.72089E-07	6.82777	1	0
531.494	7.11735E-07	5.05659	1	0
824.899	1.23398E-06	3.5781	1	0
901.135	1.31443E-06	3.80255	1	0

Date 1/ 3/1979

Sample ID : 20403:3066.1

Gas : Methane

Initials : PDS

Book : 3

Page : 45

SAMPLE DATA

Weight : 5.36822 (grams)

Density : 2.58163 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

2.96587E-04 Vol Gas/Vol Rock/Torr

.015338 Vol Gas/Vol rock/PSI

.225406 Vol Gas/Vol Rock/ATM

5.12543E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .637294 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
238.523	1.14203E-06	2.22806	1	0
524.568	2.46353E-06	1.46447	1	0
817.365	4.26663E-06	1.0383	1	0
883.672	4.79109E-06	1.06923	1	0

Date 1/ 3/1979

Sample ID : 20403:3066.1

Gas : Methane

Initials : PDS

Book : 3

Page : 45

SAMPLE DATA

Weight : 5.36822 (grams)

Density : 2.58163 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 381.054

P equilibrium : 195.818

P o : 190.344

SPECIFIC DEGASIBILITY 1.46196E-07

UNCERTAINTY 8.33091E-02 %

System d Moles/ dP 2.00432E-06

Date 1/ 3/1979

Sample ID : 20403-3066.1

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 45

SAMPLE DATA

Weight : 5.36822 (grams)

Density : 2.58163 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

3.91949E-05	Moles/Gram
1.51822E-05	Moles/ml.
2.26658	ml. gas/ml. rock
3.7294	Specific Area (sq. meters/gram)

UNCERTAINTY : .389217 %

C : 28.5643

UNCERTAINTY IN C : 2.50553 %

BAROMETRIC PRESSURE 754.018 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
25.9855	2.11136E-05	.556796	1	0
90.2763	3.257E-05	.510507	1	0
143.807	4.11474E-05	.494952	1	0
195.475	4.88971E-05	.480985	1	0
244.59	5.63952E-05	.4663	1	0

Date 1/ 3/1979

Sample ID : 20403:3066.1

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 45

SAMPLE DATA

Weight : 5.36822 (grams)

Density : 2.58163 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 240.157

P equilibrium : 35.5726

P o : 29.9128

SPECIFIC DEGASIBILITY 1.4604E-06

UNCERTAINTY 6.29672E-02 %

System d Moles/ dP 8.23774E-06

Date 1/4/1979

Sample ID : 20403:3291.3

Gas : Helium

Initials : PDS

Book : 3

Page : 46

SAMPLE DATA

Weight : 6.20387 (grams)

Density : 2.71601 (gm/cc)

Sample Temp : 273.16 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.02298E-04 Vol Gas/Vol Rock/Torr
5.29036E-03 Vol Gas/Vol rock/PSI
7.77468E-02 Vol Gas/Vol Rock/ATM
1.68039E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .900909 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
227.64	3.44717E-07	3.37335	1	0
510.431	8.16913E-07	2.01662	1	0
802.622	1.38151E-06	1.46303	1	0
887.533	1.53813E-06	1.5189	1	0

Date 1/4/1979

Sample ID : 20403:3291.3

Gas : Methane

Initials : PDS

Book : 3

Page : 46

SAMPLE DATA

Weight : 6.20387 (grams)

Density : 2.71601 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

3.76878E-04 Vol Gas/Vol Rock/Torr

1.94902E-02 Vol Gas/Vol rock/PSI

.286427 Vol Gas/Vol Rock/ATM

6.19073E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .474925 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
222.353	1.4282E-06	1.55927	1	0
504.159	3.13352E-06	1.00762	1	0
795.556	4.91544E-06	.788707	1	0
875.137	5.36182E-06	.836112	1	0

Date 1/ 4/1979

Sample ID : 20403:3291.3

Gas : Methane

Initials : PDS

Book : 3

Page : 46

SAMPLE DATA

Weight : 6.20387 (grams)

Density : 2.71601 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 874.981

P equilibrium : 236.898

P o : 230.83

SPECIFIC DEGASIBILITY 3.59568E-07

UNCERTAINTY .630132 %

System d Moles/ dP 2.12721E-06

Date 1/ 4/1979

Sample ID : 20403:3291.3

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 46

SAMPLE DATA

Weight : 6.20387 (grams)

Density : 2.71601 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

1.1234E-04	Moles/Gram
4.1362E-05	Moles/ml.
6.83459	ml. gas/ml. rock
10.6891	Specific Area (sq. meters/gram)

UNCERTAINTY : .06804 %

C : 671.572

UNCERTAINTY IN C : 6.81024E-02 %

BAROMETRIC PRESSURE 757.022 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
.881666	4.96635E-05	.204982	1	0
50.4068	1.07505E-04	.133931	1	0
125.201	1.3422E-04	.131396	1	0
182.937	1.52555E-04	.1335	1	0
235.455	1.68441E-04	.135195	1	0

Date 1/ 4/1979

Sample ID : 20403:3291.3

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 46

SAMPLE DATA

Weight : 6.20387 (grams)

Density : 2.71601 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 235.214

P equilibrium : 59.3573

P o : 42.1321

SPECIFIC DEGASIBILITY 6.25062E-06

UNCERTAINTY 4.99044E-02 %

System d Moles/ dP 8.68805E-06

Date 1/7/1979

Sample ID : 20403:3116.3

Gas : Helium

Initials : PDS

Book : 3

Page : 47

SAMPLE DATA

Weight : 5.82863 (grams)

Density : 2.59726 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

8.14538E-05 Vol Gas/Vol Rock/Torr
4.21238E-03 Vol Gas/Vol rock/PSI
6.19049E-02 Vol Gas/Vol Rock/ATM
1.39916E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 2.12646 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
239.794	2.97718E-07	7.87434	1	0
532.321	6.97577E-07	4.76096	2	141533
820.998	1.2005E-06	3.39393	2	160889
896.125	1.28766E-06	3.65723	2	200911

Date 1/ 7/1979

Sample ID : 20403:3116.3

Gas : Methane

Initials : PDS

Book : 3

Page : 47

SAMPLE DATA

Weight : 5.82863 (grams)

Density : 2.59726 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

3.57872E-04 Vol Gas/Vol Rock/Torr

1.85073E-02 Vol Gas/Vol rock/PSI

.271983 Vol Gas/Vol Rock/ATM

6.14731E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .493155 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
235.001	1.32829E-06	1.76772	1	0
521.287	3.1704E-06	1.0501	1	0
812.501	5.05657E-06	.808448	1	0
881.481	5.50888E-06	.858102	1	0

Date 1/ 7/1979

Sample ID : 20403-3116.3

Gas : Methane

Initials : PDS

Book : 3

Page : 47

SAMPLE DATA

Weight : 5.82863 (grams)

Density : 2.59726 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 881.33

P equilibrium : 205.868

P o : 198.44

SPECIFIC DEGASIBILITY 1.36013E-07

UNCERTAINTY 5.17289E-02 %

System d Moles/ dP 2.02629E-06

Date 1/ 7/1979

Sample ID : 20403-3116.3

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 47

SAMPLE DATA

Weight : 5.82863 (grams)

Density : 2.59726 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

4.0958E-05 Moles/Gram
1.57697E-05 Moles/ml.
2.38288 ml. gas/ml. rock
3.89716 Specific Area (sq.meters/gram)

UNCERTAINTY : .304114 %

C : 35.6834

UNCERTAINTY IN C : 1.44168 %

BAROMETRIC PRESSURE 737.25 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
22.6195	2.29475E-05	.471945	1	0
88.2139	3.58996E-05	.426677	1	0
142.549	4.44574E-05	.422019	1	0
192.716	5.22823E-05	.41441	1	0
244.383	6.03421E-05	.401475	1	0

Date 1/7/1979

Sample ID : 20403:3116.3

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 47

SAMPLE DATA

Weight : 5.82863 (grams)

Density : 2.59726 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 241.197

P equilibrium : 38.7883

P o : 31.7465

SPECIFIC DEGASIBILITY 1.19281E-06

UNCERTAINTY 2.06781E-02 %

System d Moles/ dP 8.31147E-06

Date 1/ 9/1979

Sample ID : 20403:3046.3

Gas : Helium

Initials : PDS

Book : 3

Page : 48

SAMPLE DATA

Weight : 4.57759 (grams)

Density : 2.67012 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

3.33809E-05 Vol Gas/Vol Rock/Torr

1.72629E-03 Vol Gas/Vol rock/PSI

2.53695E-02 Vol Gas/Vol Rock/ATM

5.5775E-10 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 6.80024 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
238.236	8.61113E-08	34.6791	1	0
532.706	2.47907E-07	17.0652	2	198335
820.562	5.25518E-07	9.87618	2	434477
895.78	5.25619E-07	11.4129	2	410731

Date 1/ 9/1979

Sample ID : 20403-3046.3

Gas : Methane

Initials : PDS

Book : 3

Page : 48

SAMPLE DATA

Weight : 4.57759 (grams)

Density : 2.67012 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

2.52079E-04 Vol Gas/Vol Rock/Torr

1.30363E-02 Vol Gas/Vol rock/PSI

.19158 Vol Gas/Vol Rock/ATM

4.21191E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .916203 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
233.831	1.00999E-06	2.96136	1	0
520.613	2.18401E-06	1.94174	1	0
814.411	3.43942E-06	1.51402	1	0
883.129	3.6918E-06	1.63108	1	0

Date 1/ 9/1979

Sample ID : 20403:3046.3

Gas : Methane

Initials : PDS

Book : 3

Page : 48

SAMPLE DATA

Weight : 4.57759 (grams)

Density : 2.67012 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 883.022

P equilibrium : 204.559

P o : 199.881

SPECIFIC DEGASIBILITY 2.77553E-07

UNCERTAINTY .495671 %

System d Moles/ dP 2.03326E-06

Date 1/9/1979

Sample ID : 20403:3046.3

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 48

SAMPLE DATA

Weight : 4.57759 (grams)

Density : 2.67012 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

7.12313E-05	Moles/Gram
2.66772E-05	Moles/ml.
4.2604	ml. gas/ml. rock
6.77766	Specific Area (sq. meters/gram)

UNCERTAINTY : .16653 %

C : 107.757

UNCERTAINTY IN C : .286645 %

BAROMETRIC PRESSURE 749.076 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
12.1787	4.67814E-05	.294716	1	0
84.0853	7.01247E-05	.27808	1	0
140.878	8.41896E-05	.283707	1	0
192.98	9.61395E-05	.286904	1	0
243.685	1.06241E-04	.290295	2	34.7932

Date 1/ 9/1979

Sample ID : 20403-3046.3

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 48

SAMPLE DATA

Weight : 4.57759 (grams)

Density : 2.67012 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 241.971

P equilibrium : 41.9911

P o : 32.4086

SPECIFIC DEGASIBILITY 3.58505E-06

UNCERTAINTY 5.26691E-02 %

System d Moles/ dP 8.32299E-06

Date 3/ 7/1979

Sample ID : 20403:3376.3

Gas : Helium

Initials : DLW

Book : 3

Page : 50

SAMPLE DATA

Weight : 6.01176 (grams)

Density : 2.63076 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.23352E-04 Vol Gas/Vol Rock/Torr
6.37912E-03 Vol Gas/Vol rock/PSI
9.37472E-02 Vol Gas/Vol Rock/ATM
2.09188E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.37752 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
243.336	5.01659E-07	4.54276	1	0
535.304	1.10243E-06	2.92748	1	0
822.134	1.73561E-06	2.28044	2	178306
895.929	1.88371E-06	2.42807	2	203783

Date 3/7/1979

Sample ID : 20403:3376.3

Gas : Methane

Initials : DLW

Book : 3

Page : 50

SAMPLE DATA

Weight : 6.01176 (grams)

Density : 2.63076 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

3.36151E-04 Vol Gas/Vol Rock/Torr

.017384 Vol Gas/Vol rock/PSI

.255475 Vol Gas/Vol Rock/ATM

5.70067E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .513352 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
237.916	1.41621E-06	1.61175	1	0
526.434	3.00643E-06	1.07615	1	0
817.308	4.6355E-06	.856735	1	0
884.069	4.99734E-06	.918788	1	0

Date 3/ 7/1979

Sample ID : 20403:3376.3

Gas : Methane

Initials : DLW

Book : 3

Page : 50

SAMPLE DATA

Weight : 6.01176 (grams)

Density : 2.63076 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 884.062

P equilibrium : 202.105

P o : 195.674

SPECIFIC DEGASIBILITY 2.3903E-07

UNCERTAINTY 238429 %

System d Moles/ dP 2.01911E-06

Date 3/ 7/1979

Sample ID : 20403:3376.3

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 50

SAMPLE DATA

Weight : 6.01176 (grams)

Density : 2.63076 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

6.06118E-05 Moles/Gram
 2.30397E-05 Moles/ml.
 3.5718 ml. gas/ml. rock
 5.76722 Specific Area (sq. meters/gram)

UNCERTAINTY : .143779 %

C : 127.778

UNCERTAINTY IN C : .196884 %

BAROMETRIC PRESSURE 739.23 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
9.65341	3.89104E-05	.270566	1	0
81.5872	6.00862E-05	.247811	1	0
140.082	7.19206E-05	.253585	1	0
191.642	8.19729E-05	.256927	1	0
242.08	9.18384E-05	.256416	1	0

Date 3/ 7/1979

Sample ID : 20403:3376.3

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 50

SAMPLE DATA

Weight : 6.01176 (grams)

Density : 2.63076 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 240.336

P equilibrium : 43.2866

P o : 30.9939

SPECIFIC DEGASIBILITY 2.97017E-06

UNCERTAINTY 5.61783E-02 %

System d Moles/ dP 8.32631E-06

Date 3/ 9/1979

Sample ID : 20403:3301.3

Gas : Helium

Initials : DLW

Book : 3

Page : 54

SAMPLE DATA

Weight : 6.27882 (grams)

Density : 2.75047 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

6.21625E-05 Vol Gas/Vol Rock/Torr
3.21473E-03 Vol Gas/Vol rock/PSI
4.72435E-02 Vol Gas/Vol Rock/ATM
1.00831E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 2.85863 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
225.661	2.21342E-07	9.97464	1	0
509.322	4.86514E-07	6.4262	1	0
799.918	8.24405E-07	4.65078	1	0
884.469	9.07913E-07	4.88003	1	0

Date 3/ 9/1979

Sample ID : 20403:3301.3

Gas : Methane

Initials : DLW

Book : 3

Page : 54

SAMPLE DATA

Weight : 6.27882 (grams)

Density : 2.75047 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

3.7404E-04 Vol Gas/Vol Rock/Torr

1.93434E-02 Vol Gas/Vol rock/PSI

.28427 Vol Gas/Vol Rock/ATM

6.06713E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .482701 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
222.352	1.43941E-06	1.53625	1	0
500.544	3.04754E-06	1.02839	1	0
792.818	4.78293E-06	.804297	1	0
872.697	5.22232E-06	.851653	1	0

Date 3/ 9/1979

Sample ID : 20403:3301.3

Gas : Methane

Initials : DLW

Book : 3

Page : 54

SAMPLE DATA

Weight : 6.27882 (grams)

Density : 2.75047 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 872.58

P equilibrium : 239.278

P o : 233.091

SPECIFIC DEGASIBILITY 3.45094E-07

UNCERTAINTY .331803 %

System d Moles/ dP 2.14659E-06

Date 3/9/1979

Sample ID : 20403:3301.3

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 54

SAMPLE DATA

Weight : 6.27882 (grams)

Density : 2.75047 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

9.50176E-05 Moles/Gram
 3.45459E-05 Moles/ml.
 5.85408 ml. gas/ml. rock
 9.04092 Specific Area (sq. meters/gram)

UNCERTAINTY : .079914 %

C : 404.757

UNCERTAINTY IN C : 8.02839E-02 %

BAROMETRIC PRESSURE 743.884 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
1.91492	4.89529E-05	.206013	1	0
62.7636	9.21721E-05	.154749	2	2.74501E-02
130.474	1.14097E-04	.153121	1	0
185.29	1.298E-04	.155432	1	0
238.062	1.44575E-04	.156031	1	0

Date 3/ 9/1979

Sample ID : 20403-3301.3

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 54

SAMPLE DATA

Weight : 6.27882 (grams)

Density : 2.75047 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 236.665

P equilibrium : 57.3445

P o : 43.1738

SPECIFIC DEGASIBILITY 4.91729E-06

UNCERTAINTY 9.57161E-02 %

System d Moles/ dP 8.77212E-06

Date 3/ 9/1979

Sample ID : 20403:3786.1

Gas : Helium

Initials : PDS

Book : 3

Page : 51

SAMPLE DATA

Weight : 4.62461 (grams)

Density : 2.76712 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.1881E-04 Vol Gas/Vol Rock/Torr

6.14424E-03 Vol Gas/Vol rock/PSI

9.02955E-02 Vol Gas/Vol Rock/ATM

1.91557E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.97236 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
240.146	4.43447E-07	6.69273	1	0
526.532	9.71678E-07	4.32537	1	0
818.827	1.58766E-06	3.24653	1	0
894.948	1.75249E-06	3.3988	1	0

Date 3/ 9/1979

Sample ID : 20403-3786.1

Gas : Methane

Initials : PDS

Book : 3

Page : 51

SAMPLE DATA

Weight : 4.62461 (grams)

Density : 2.76712 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

3.3493E-04 Vol Gas/Vol Rock/Torr

1.73209E-02 Vol Gas/Vol rock/PSI

.254546 Vol Gas/Vol Rock/ATM

5.40005E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .710329 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
232.985	1.30089E-06	2.28496	1	0
521.402	2.8155E-06	1.49645	1	0
813.442	4.37179E-06	1.18299	1	0
882.19	4.744E-06	1.2604	1	0

Date 3/ 9/1979

Sample ID : 20403-3786.1

Gas : Methane

Initials : PDS

Book : 3

Page : 51

SAMPLE DATA

Weight : 4.62461 (grams)

Density : 2.76712 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 882.258

P equilibrium : 206.255

P o : 205.895

SPECIFIC DEGASIBILITY 1.2162E-08

UNCERTAINTY 1.45983 %

System d Moles/ dP 2.04111E-06

Date 3/ 9/1979

Sample ID : 20403:3786.1

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 51

SAMPLE DATA

Weight : 4.62461 (grams)

Density : 2.76712 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

9.3977E-05	Moles/Gram
3.3962E-05	Moles/ml.
5.82502	ml. gas/ml. rock
8.94191	Specific Area (sq. meters/gram)

UNCERTAINTY : .11275 %

C : 228.268

UNCERTAINTY IN C : .120413 %

BAROMETRIC PRESSURE 740.067 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS. GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
5.18737	5.86921E-05	.23318	1	0
75.182	9.50647E-05	.203614	1	0
136.915	1.12785E-04	.210213	1	0
189.858	1.2782E-04	.214198	1	0
240.241	1.42302E-04	.215125	1	0

Date 3/ 9/1979

Sample ID : 20403:3786.1

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 51

SAMPLE DATA

Weight : 4.62461 (grams)

Density : 2.76712 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 239.618

P equilibrium : 47.389

P o : 34.6003

SPECIFIC DEGASIBILITY 1.32365E-05

UNCERTAINTY .184356 %

System d Moles/ dP 7.9073E-06

Date 3/11/1979

Sample ID : 20403-2756.3

Gas : Helium

Initials : PDS

Book : 3

Page : 52

SAMPLE DATA

Weight : 6.95275 (grams)

Density : 2.76481 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

3.72139E-05 Vol Gas/Vol Rock/Torr
1.92451E-03 Vol Gas/Vol rock/PSI
2.82825E-02 Vol Gas/Vol Rock/ATM
6.00499E-10 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 4.31619 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
226.505	1.23201E-07	16.1951	1	0
516.173	2.83104E-07	9.98051	1	0
801.018	4.97893E-07	6.9594	1	0
887.781	5.573E-07	7.18488	2	16882

Date 3/11/1979

Sample ID : 20403:2756.3

Gas : Methane

Initials : PDS

Book : 3

Page : 52

SAMPLE DATA

Weight : 6.95275 (grams)

Density : 2.76481 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

2.4848E-04 Vol Gas/Vol Rock/Torr

1.28501E-02 Vol Gas/Vol rock/PSI

.188845 Vol Gas/Vol Rock/ATM

4.00959E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .651956 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
239.56	1.04789E-06	1.90763	1	0
508.593	2.07958E-06	1.36222	1	0
796.248	3.14498E-06	1.10556	1	0
874.266	3.41941E-06	1.17558	1	0

Date 3/11/1979

Sample ID : 20403:2756.3

Gas : Methane

Initials : PDS

Book : 3

Page : 52

SAMPLE DATA

Weight : 6.95275 (grams)

Density : 2.76481 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 874.164

P equilibrium : 239.107

P o : 236.46

SPECIFIC DEGASIBILITY 1.36772E-07

UNCERTAINTY .548831 %

System d Moles/ dP 2.15381E-06

Date 3/11/1979

Sample ID : 20403:2756.3

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 52

SAMPLE DATA

Weight : 6.95275 (grams)

Density : 2.76481 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

6.74992E-05	Moles/Gram
2.44137E-05	Moles/ml.
4.18035	ml. gas/ml. rock
6.42256	Specific Area (sq. meters/gram)

UNCERTAINTY : .104499 %

C : 239.462

UNCERTAINTY IN C : .108661 %

BAROMETRIC PRESSURE 746.061 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
4.44055	4.02674E-05	.226167	1	0
72.7958	6.64848E-05	.193739	1	0
135.039	8.0491E-05	.196008	1	0
188.617	9.19166E-05	.198213	1	0
239.198	1.0258E-04	.198587	1	0

Date 3/11/1979

Sample ID : 20403-2756.3

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 52

SAMPLE DATA

Weight : 6.95275 (grams)

Density : 2.76481 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 239.161

P equilibrium : 52.613

P o : 44.9131

SPECIFIC DEGASIBILITY 3.79922E-06

UNCERTAINTY .127862 %

System d Moles/ dP 8.78163E-06

Date 3/12/1979

Sample ID : 20403:3546.3

Gas : Helium

Initials : DLW

Book : 3

Page : 53

SAMPLE DATA

Weight : 6.23067 (grams)

Density : 2.58319 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

3.18121E-05 Vol Gas/Vol Rock/Torr
1.64516E-03 Vol Gas/Vol rock/PSI
2.41772E-02 Vol Gas/Vol Rock/ATM
5.49426E-10 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 5.17969 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
232.923	9.07307E-08	24.4352	1	0
520.628	2.66774E-07	11.7687	1	0
810.305	4.6591E-07	8.26396	1	0
897.03	5.29287E-07	8.40635	2	.428167

Date 3/12/1979

Sample ID : 20403:3546.3

Gas : Methane

Initials : DLW

Book : 3

Page : 53

SAMPLE DATA

Weight : 6.23067 (grams)

Density : 2.58319 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.60768E-04 Vol Gas/Vol Rock/Torr
8.31408E-03 Vol Gas/Vol rock/PSI
.122183 Vol Gas/Vol Rock/ATM
2.77661E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.04481 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
228.533	6.23194E-07	3.56313	1	0
511.093	1.36918E-06	2.29863	1	0
802.513	2.26363E-06	1.7066	1	0
878.659	2.46695E-06	1.81048	1	0

Date 3/12/1979

Sample ID : 20403:3546.3

Gas : Methane

Initials : DLW

Book : 3

Page : 53

SAMPLE DATA

Weight : 6.23067 (grams)

Density : 2.58319 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 878.426

P equilibrium : 223.817

P o : 221.457

SPECIFIC DEGASIBILITY 4.13202E-08

UNCERTAINTY 9.58787E-02 %

System d Moles/ dP 2.11177E-06

Date 3/12/1979

Sample ID : 20403:3546.3

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 53

SAMPLE DATA

Weight : 6.23067 (grams)

Density : 2.58319 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

3.08738E-05	Moles/Gram
1.19518E-05	Moles/ml.
1.78647	ml. gas/ml. rock
2.93764	Specific Area (sq. meters/gram)

UNCERTAINTY : 1.86567 %

C : 7.94885

UNCERTAINTY IN C : 11.3575 %
BAROMETRIC PRESSURE 741.286 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
33.6783	9.42829E-06	1.07771	1	0
93.4862	1.77498E-05	.809644	1	0
144.769	2.4513E-05	.718079	1	0
195.108	3.11406E-05	.652745	1	0
245.758	3.77951E-05	.601342	1	0

Date 3/12/1979

Sample ID : 20403-3546.3

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 53

SAMPLE DATA

Weight : 6.23067 (grams)

Density : 2.58319 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 245.277

P equilibrium : 38.6381

P o : 38.2538

SPECIFIC DEGASIBILITY 1.4921E-07

UNCERTAINTY .612458 %

System d Moles/ dP 8.63347E-06

Date 3/14/1979

Sample ID : 20403:3526.3

Gas : Helium

Initials : PDS

Book : 3

Page : 55

SAMPLE DATA

Weight : 5.01762 (grams)

Density : 2.4943 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

9.94791E-05 Vol Gas/Vol Rock/Torr
5.14455E-03 Vol Gas/Vol rock/PSI
7.56041E-02 Vol Gas/Vol Rock/ATM
1.77933E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.98308 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
239.627	4.01243E-07	6.86435	1	0
525.129	8.88563E-07	4.38945	1	0
807.402	1.46512E-06	3.26463	1	0
893.386	1.63648E-06	3.3775	1	0

Date 3/14/1979

Sample ID : 20403:3526.3

Gas : Methane

Initials : PDS

Book : 3

Page : 55

SAMPLE DATA

Weight : 5.01762 (grams)

Density : 2.4943 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

2.20995E-04 Vol Gas/Vol Rock/Torr

1.14287E-02 Vol Gas/Vol rock/PSI

.167956 Vol Gas/Vol Rock/ATM

3.95282E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .914409 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
227.703	8.41604E-07	3.27753	1	0
508.639	1.97749E-06	1.97701	1	0
800.679	3.17709E-06	1.51044	1	0
876.581	3.55022E-06	1.56276	1	0

Date 3/14/1979

Sample ID : 20403:3526.3

Gas : Methane

Initials : PDS

Book : 3

Page : 55

SAMPLE DATA

Weight : 5.01762 (grams)

Density : 2.4343 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 876.359

P equilibrium : 225.609

P o : 223.801

SPECIFIC DEGASIBILITY 3.12534E-08

UNCERTAINTY .115093 %

System d Moles/ dP 2.11504E-06

Date 3/14/1979

Sample ID : 20403:3526.3

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 55

SAMPLE DATA

Weight : 5.01762 (grams)

Density : 2.4943 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

3.95438E-05	Moles/Gram
1.58537E-05	Moles/ml.
2.2094	ml. gas/ml. rock
3.76259	Specific Area (sq. meters/gram)

UNCERTAINTY : 3.84196 %

C : 5.56501

UNCERTAINTY IN C : 16.6265 %

BAROMETRIC PRESSURE 737.338 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
34.2122	9.36623E-06	1.3471	1	0
91.7393	1.91056E-05	.934022	1	0
144.335	2.76995E-05	.78909	1	0
193.313	3.5688E-05	.707259	1	0
243.594	4.39622E-05	.64196	1	0

Date : 3/14/1979

Sample ID : 20403:3526.3

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 55

SAMPLE DATA

Weight : 5.01762 (grams)

Density : 2.4943 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 243.626

P equilibrium : 38.1505

P o : 37.8452

SPECIFIC DEGASIBILITY 1.36845E-07

UNCERTAINTY .732589 %

System d Moles/ dP 8.62931E-06

Date 3/15/1979

Sample ID : 20403-3756.1

Gas : Helium

Initials : DLW

Book : 3

Page : 56

SAMPLE DATA

Weight : 6.24537 (grams)

Density : 2.33 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

6.59151E-05 Vol Gas/Vol Rock/Torr
3.40879E-03 Vol Gas/Vol rock/PSI
5.00955E-02 Vol Gas/Vol Rock/ATM
1.26212E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 2.28179 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
228.579	2.8199E-07	7.87666	1	0
515.156	6.1785E-07	5.09081	1	0
802.599	1.02987E-06	3.74539	1	0
889.944	1.1472E-06	3.88549	1	0

Date 3/15/1979

Sample ID : 20403:3756.1

Gas : Methane

Initials : DLW

Book : 3

Page : 56

SAMPLE DATA

Weight : 6.24537 (grams)

Density : 2.33 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

8.85712E-04 Vol Gas/Vol Rock/Torr

4.58045E-02 Vol Gas/Vol rock/PSI

.673141 Vol Gas/Vol Rock/ATM

1.69594E-08 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .17608 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
215.373	3.51645E-06	.632584	2	1.80693
490.351	8.36743E-06	.37678	1	0
781.06	1.33368E-05	.290154	1	0
870.277	1.47287E-05	.303766	1	0

Date 3/15/1979

Sample ID : 20403:3756.1

Gas : Methane

Initials : DLW

Book : 3

Page : 56

SAMPLE DATA

Weight : 6.24537 (grams)

Density : 2.33 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 866.981

P equilibrium : 251.423

P o : 234.025

SPECIFIC DEGASIBILITY 1.41042E-07

UNCERTAINTY 3.05263E-02 %

System d Moles/ dP 2.15384E-06

Date 3/15/1979

Sample ID : 20403:3756.1

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 56

SAMPLE DATA

Weight : 6.24537 (grams)

Density : 2.33 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

3.61E-05	Moles/Gram
1.54936E-05	Moles/ml.
1.88413	ml. gas/ml. rock
3.43492	Specific Area (sq. meters/gram)

UNCERTAINTY : 3.87409 %

C : 4.79823

UNCERTAINTY IN C : 13.9167 %
BAROMETRIC PRESSURE 752.978 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
36.3505	7.79871E-06	1.30007	2	.86624
92.5973	1.60153E-05	.895374	1	0
146.12	2.36327E-05	.743202	1	0
197.483	3.09538E-05	.655253	1	0
246.879	3.80053E-05	.596714	1	0

Date 3/15/1979

Sample ID : 20403-3756.1

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 56

SAMPLE DATA

Weight : 6.24537 (grams)

Density : 2.33 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .005 (cm)

DATA COLLECTED

P initial : 246.959

P equilibrium : 41.2881

P o : 41.1889

SPECIFIC DEGASIBILITY 2.93908E-08

UNCERTAINTY 1.81643 %

System d Moles/ dP 8.77756E-06

Date 3/16/1979

Sample ID : EGSP-WU#7:6621

Gas : Helium

Initials : DLW

Book : 3

Page : 58

SAMPLE DATA

Weight : 5.21426 (grams)

Density : 2.49687 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

9.4316E-05 Vol Gas/Vol Rock/Torr

4.87754E-03 Vol Gas/Vol rock/PSI

7.16802E-02 Vol Gas/Vol Rock/ATM

1.68524E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.9757 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
243.388	3.90532E-07	6.73349	1	0
530.68	8.67914E-07	4.29066	1	0
821.618	1.41674E-06	3.2236	1	0
898.215	1.52726E-06	3.45562	1	0

Date 3/16/1979

Sample ID : EGSP-WU#7:6621

Gas : Methane

Initials : DLW

Book : 3

Page : 58

SAMPLE DATA

Weight : 5.21426 (grams)

Density : 2.49687 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.07605E-03 Vol Gas/Vol Rock/Torr
5.56479E-02 Vol Gas/Vol rock/PSI
.817798 Vol Gas/Vol Rock/ATM
1.92269E-08 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .179091 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
223.441	5.15117E-06	.511231	1	0
510.775	1.03342E-05	.361197	1	0
805.274	1.49734E-05	.306004	1	0
878.932	1.60424E-05	.330218	1	0

Date 3/16/1979

Sample ID : EGSP-WU#7:6621

Gas : Methane

Initials : DLW

Book : 3

Page : 58

SAMPLE DATA

Weight : 5.21426 (grams)

Density : 2.49687 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 878.682

P equilibrium : 220.926

P o : 206.146

SPECIFIC DEGASIBILITY 9.04162E-07

UNCERTAINTY .283213 %

System d Moles/ dP 2.03026E-06

Date 3/16/1979

Sample ID : EGSP-WV#7-6621

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 58

SAMPLE DATA

Weight : 5.21426 (grams)

Density : 2.49687 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

1.51952E-04	Moles/Gram
6.08571E-05	Moles/ml.
8.49867	ml. gas/ml. rock
14.4583	Specific Area (sq.meters/gram)

UNCERTAINTY : 6.47191E-02 %

C : 205.184

UNCERTAINTY IN C : 6.50675E-02 %
BAROMETRIC PRESSURE 752.347 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
2.08275	5.67902E-05	.213726	1	0
47.6084	1.30419E-04	.131624	1	0
117.658	1.74485E-04	.120504	2	.13216
179.533	2.04519E-04	.118723	1	0
233.764	2.28785E-04	.118667	1	0

Date 3/16/1979

Sample ID : EGSP-WU#7:6621

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 58

SAMPLE DATA

Weight : 5.21426 (grams)

Density : 2.49687 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 232.269

P equilibrium : 64.9994

P o : 41.4947

SPECIFIC DEGASIBILITY 1.39828E-05

UNCERTAINTY .221257 %

System d Moles/ dP: 8.36816E-06

Date 3/17/1979

Sample ID : 20403:3436.1

Gas : Helium

Initials : PDS

Book : 3

Page : 44

SAMPLE DATA

Weight : 5.08108 (grams)

Density : 2.39034 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.36934E-04 Vol Gas/Vol Rock/Torr

7.08155E-03 Vol Gas/Vol rock/PSI

.10407 Vol Gas/Vol Rock/ATM

2.55579E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.3333 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
239.338	6.04589E-07	4.45995	1	0
536.48	1.35526E-06	2.8177	1	0
822.718	2.114E-06	2.21535	1	0
899.795	2.31251E-06	2.34031	1	0

Date 3/17/1979

Sample ID : 20403:3436.1

Gas : Methane

Initials : PDS

Book : 3

Page : 44

SAMPLE DATA

Weight : 5.08108 (grams)

Density : 2.39034 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

4.71722E-04 Vol Gas/Vol Rock/Torr

2.43951E-02 Vol Gas/Vol rock/PSI

.358508 Vol Gas/Vol Rock/ATM

8.80438E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .394943 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
234.188	2.09164E-06	1.29121	1	0
522.438	4.62304E-06	.828046	1	0
813.377	7.17475E-06	.65493	1	0
886.029	7.72494E-06	.703279	1	0

Date 3/17/1979

Sample ID : 20403:3436.1

Gas : Methane

Initials : PDS

Book : 3

Page : 44

SAMPLE DATA

Weight : 5.08108 (grams)

Density : 2.39034 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 885.691

P equilibrium : 240.796

P o : 234.603

SPECIFIC DEGASIBILITY 7.06828E-08

UNCERTAINTY 7.28736E-02 %

System d Moles/ dP 2.02157E-06

Date 3/17/1979

Sample ID : 20403:3436.1

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 44

SAMPLE DATA

Weight : 5.08108 (grams)

Density : 2.39034 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

3.21778E-05	Moles/Gram
1.34616E-05	Moles/ml.
1.72292	ml. gas/ml. rock
3.06172	Specific Area (sq. meters/gram)

UNCERTAINTY : 2.18723 %

C : 9.02447

 UNCERTAINTY IN C : 15.8013 %
 BAROMETRIC PRESSURE 746.984 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
33.3374	1.06025E-05	1.17476	1	0
93.321	1.9326E-05	.911528	2	.737595
145.693	2.65119E-05	.813861	2	5.49605E-02
196.622	3.35798E-05	.742021	1	0
246.842	4.03869E-05	.689829	1	0

Date 3/17/1979

Sample ID : 20403:3436.1

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 44

SAMPLE DATA

Weight : 5.08108 (grams)

Density : 2.39034 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 246.521

P equilibrium : 32.3546

P o : 30.7611

SPECIFIC DEGASIBILITY 4.61406E-07

UNCERTAINTY 8.28921E-02 %

System d Moles/ dP 8.30324E-06

Date 3/18/1979

Sample ID : EGSP-WU#7-6516

Gas : Helium

Initials : DLW

Book : 3

Page : 59

SAMPLE DATA

Weight : 4.65222 (grams)

Density : 2.76461 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

4.59763E-06 Vol Gas/Vol Rock/Torr
2.37766E-04 Vol Gas/Vol rock/PSI
3.4942E-03 Vol Gas/Vol Rock/ATM
7.41948E-11 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 49.9526 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
247.337	1.00094E-09	2943.42	1	0
538.786	1.76166E-08	236.838	1	0
824.75	8.45297E-08	60.5325	1	0
898.621	8.42294E-08	70.2001	1	0

Date 3/18/1979

Sample ID : EGSP-WU#7-6516

Gas : Methane

Initials : DLW

Book : 3

Page : 59

SAMPLE DATA

Weight : 4.65222 (grams)

Density : 2.76461 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.00223E-04 Vol Gas/Vol Rock/Torr

.005183 Vol Gas/Vol rock/PSI

7.61691E-02 Vol Gas/Vol Rock/ATM

1.61735E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 2.33151 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
241.05	3.99927E-07	7.3786	1	0
526.522	8.47399E-07	4.93573	1	0
820.317	1.33311E-06	3.8512	2	.418797
885.925	1.41889E-06	4.18336	2	6.45861E-02

Date 3/18/1979

Sample ID : EGSP-WU#7-6516

Gas : Methane

Initials : DLW

Book : 3

Page : 59

SAMPLE DATA

Weight : 4.65222 (grams)

Density : 2.76461 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 885.834

P equilibrium : 195.845

P o : 194.978

SPECIFIC DEGASIBILITY 6.97235E-08

UNCERTAINTY 3.86724 %

System d Moles/ dP 2.02411E-06

Date 3/18/1979

Sample ID : EGSP-WV#7:6516

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 59

SAMPLE DATA

Weight : 4.65222 (grams)

Density : 2.76461 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

5.1124E-05	Moles/Gram
1.84923E-05	Moles/ml.
3.16597	ml. gas/ml. rock
4.86445	Specific Area (sq. meters/gram)

UNCERTAINTY : .255503 %

C : 68.2288

UNCERTAINTY IN C : 1.03151 %

BAROMETRIC PRESSURE 744.402 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
19.4001	3.43766E-05	.395733	1	0
89.7375	4.89957E-05	.392702	1	0
143.46	5.87647E-05	.401039	1	0
194.774	6.79231E-05	.400672	1	0
244.517	7.69476E-05	.395457	1	0

Date 3/18/1979

Sample ID : EGSP-WU#7:6516

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 59

SAMPLE DATA

Weight : 4.65222 (grams)

Density : 2.76461 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 243.983

P equilibrium : 36.9197

P o : 30.0935

SPECIFIC DEGASIBILITY 5.1888E-06

UNCERTAINTY .305166 %

System d Moles/ dP 8.33281E-06

Date 3/19/1979

Sample ID : WU#5-EGSP-6142

Gas : Helium

Initials : DLW

Book : 3

Page : 60

SAMPLE DATA

Weight : 6.54824 (grams)

Density : 2.61168 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

9.64976E-05 Vol Gas/Vol Rock/Torr
4.99037E-03 Vol Gas/Vol rock/PSI
7.33382E-02 Vol Gas/Vol Rock/ATM
1.64843E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.6232 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr.	ADS. GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
238.852	3.80843E-07	5.51167	1	0
528.134	8.45633E-07	3.51522	1	0
816.099	1.35786E-06	2.68476	2	1.39422
894.101	1.502E-06	2.80474	2	.077037

Date 3/19/1979

Sample ID : WU#5-EGSP:6142

Gas : Methane

Initials : DLW

Book : 3

Page : 60

SAMPLE DATA

Weight : 6.54824 (grams)

Density : 2.61168 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

3.42726E-04 Vol Gas/Vol Rock/Torr

.017724 Vol Gas/Vol rock/PSI

.260471 Vol Gas/Vol Rock/ATM

5.85462E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .465664 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
231.945	1.50086E-06	1.40078	1	0
515.776	3.07945E-06	.967651	1	0
809.863	4.65907E-06	.785077	1	0
880.861	5.03558E-06	.839803	2	8.96301E-02

Date 3/19/1979

Sample ID : WV#5-EGSP-6142

Gas : Methane

Initials : DLW

Book : 3

Page : 60

SAMPLE DATA

Weight : 6.54824 (grams)

Density : 2.61168 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 881.046

P equilibrium : 214.478

P o : 209.421

SPECIFIC DEGASIBILITY 1.87329E-07

UNCERTAINTY 281212 %

System d Moles/ dP 2.05837E-06

Date 3/19/1979

Sample ID : WV#5-EGSP-6142

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 60

SAMPLE DATA

Weight : 6.54824 (grams)

Density : 2.61168 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

4.72994E-05 Moles/Gram
1.81107E-05 Moles/ml.
2.76709 ml. gas/ml. rock
4.50054 Specific Area (sq.meters/gram)

UNCERTAINTY : .223038 %

C : 40.1963

UNCERTAINTY IN C : .597937 %

BAROMETRIC PRESSURE 744.434 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
18.8989	2.54533E-05	.379765	2	.944021
84.5452	4.12229E-05	.331647	1	0
140.442	5.15792E-05	.324654	1	0
191.538	6.05815E-05	.319198	1	0
241.863	6.949E-05	.311146	1	0

Date 3/19/1979

Sample ID : WU#5-EGSP:6142

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 60

SAMPLE DATA

Weight : 6.54824 (grams)

Density : 2.61168 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 239.856

P equilibrium : 44.9317

P o : 37.3036

SPECIFIC DEGASIBILITY 3.12179E-06

UNCERTAINTY .188954 %

System d Moles/ dP 8.46737E-06

Date 3/20/1979

Sample ID : WV#7-EGSP:6342

Gas : Helium

Initials : PDS

Book : 3

Page : 61

SAMPLE DATA

Weight : 4.60664 (grams)

Density : 2.70607 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.27684E-04 Vol Gas/Vol Rock/Torr
6.60319E-03 Vol Gas/Vol rock/PSI
9.70402E-02 Vol Gas/Vol Rock/ATM
2.1051E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.78829 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
241.949	4.95922E-07	5.99325	1	0
531.361	1.08833E-06	3.06745	1	0
822.998	1.74993E-06	2.94984	1	0
896.381	1.91616E-06	3.1131	1	0

Date 3/20/1979

Sample ID : WU#7-EGSP:6342

Gas : Methane

Initials : PDS

Book : 3

Page : 61

SAMPLE DATA

Weight : 4.60664 (grams)

Density : 2.70607 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

3.47388E-04 Vol Gas/Vol Rock/Torr

1.79651E-02 Vol Gas/Vol rock/PSI

.264015 Vol Gas/Vol Rock/ATM

5.72728E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .665123 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
239.006	1.45279E-06	2.04918	1	0
528.046	3.04665E-06	1.38503	1	0
819.135	4.64414E-06	1.11531	1	0
884.141	5.00355E-06	1.19684	1	0

Date 3/20/1979

Sample ID : WU#7-EGSP:6342

Gas : Methane

Initials : PDS

Book : 3

Page : 61

SAMPLE DATA

Weight : 4.60664 (grams)

Density : 2.70607 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 884.123

P equilibrium : 196.993

P₁₀ : 195.139

SPECIFIC DEGASIBILITY 1.64072E-07

UNCERTAINTY 1.69093 %

System d Moles/ dP 2.01082E-06

Date 3/20/1979

Sample ID : WV#7-EGSP:6342

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 61

SAMPLE DATA

Weight : 4.60664 (grams)

Density : 2.70607 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

7.64178E-05 Moles/Gram
2.82394E-05 Moles/ml.
4.63214 ml. gas/ml. rock
7.27116 Specific Area (sq. meters/gram)

UNCERTAINTY : .144955 %

C : 159.684

UNCERTAINTY IN C : .198951 %

BAROMETRIC PRESSURE 736.384 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
9.19032	5.2075E-05	.263824	1	0
82.937	7.7127E-05	.251938	2	8.53122E-03
141.22	9.19075E-05	.258959	1	0
192.491	1.04013E-04	.264241	1	0
242.082	1.1617E-04	.264534	1	0

Date 3/20/1979

Sample ID : WV#7-EGSP-6342

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 61

SAMPLE DATA

Weight : 4.60664 (grams)

Density : 2.70607 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 241.925

P equilibrium : 41.9753

P o : 31.0608

SPECIFIC DEGASIBILITY 7.92925E-06

UNCERTAINTY .149877 %

System d Moles/ dP 8.28651E-06

Date 3/24/1979

Sample ID : NU#7-EGSP-6566

Gas : Helium

Initials : PDS

Book : 3

Page : 62

SAMPLE DATA

Weight : 6.72276 (grams)

Density : 2.6174 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.02663E-04 Vol Gas/Vol Rock/Torr
5.30919E-03 Vol Gas/Vol rock/PSI
7.80236E-02 Vol Gas/Vol Rock/ATM
1.74991E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.51459 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
233.799	4.02195E-07	5.10953	1	0
520.976	8.86159E-07	3.28401	1	0
806.62	1.42232E-06	2.50919	1	0
887.23	1.57688E-06	2.61534	1	0

Date 3/24/1979

Sample ID : WV#7-EGSP-6566

Gas : Methane

Initials : PDS

Book : 3

Page : 62

SAMPLE DATA

Weight : 6.72276 (grams)

Density : 2.6174 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

3.77436E-04 Vol Gas/Vol Rock/Torr

.019519 Vol Gas/Vol rock/PSI

.286851 Vol Gas/Vol Rock/ATM

6.43348E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .420672 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
223.408	1.60539E-06	1.28201	1	0
508.465	3.35194E-06	.870285	1	0
798.754	5.04522E-06	.709717	1	0
874.288	5.47059E-06	.756736	1	0

Date 3/24/1979

Sample ID : WV#7-EGSP:6566

Gas : Methane

Initials : PDS

Book : 3

Page : 62

SAMPLE DATA

Weight : 6.72276 (grams)

Density : 2.6174 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 873.958

P equilibrium : 230.413

P o : 223.605

SPECIFIC DEGASIBILITY 3.18975E-07

UNCERTAINTY .335943 %

System d Moles/ dP 2.11141E-06

Date 3/24/1979

Sample ID : WV#7-EGSP:6566

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 62

SAMPLE DATA

Weight : 6.72276 (grams)

Density : 2.6174 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

6.37383E-05	Moles/Gram
2.43518E-05	Moles/ml.
3.73696	ml. gas/ml. rock
6.0647	Specific Area (sq. meters/gram)

UNCERTAINTY : .143918 %

C : 55.3235

UNCERTAINTY IN C : .204978 %

BAROMETRIC PRESSURE 740 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
12.3273	3.21724E-05	.292759	1	0
76.5206	5.5955E-05	.238073	1	0
135.88	7.09005E-05	.230134	1	0
188.742	8.32658E-05	.226291	1	0
239.376	9.4994E-05	.221782	1	0

Date 3/24/1979

Sample ID : WU#7-EGSP:6566

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 62

SAMPLE DATA

Weight : 6.72276 (grams)

Density : 2.6174 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 236.849

P equilibrium : 53.4725

P o : 41.1389

SPECIFIC DEGASIBILITY 4.49977E-06

UNCERTAINTY 6.81239E-02 %

System d Moles/ dP 8.64372E-06

Date 3/27/1979

Sample ID : WU#7-EGSP:6242

Gas : Helium

Initials : DLW

Book : 3

Page : 64

SAMPLE DATA

Weight : 8.3694 (grams)

Density : 2.672 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

8.68497E-05 Vol Gas/Vol Rock/Torr
4.49143E-03 Vol Gas/Vol rock/PSI
6.60058E-02 Vol Gas/Vol Rock/ATM
1.45012E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.46684 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
234.554	3.09629E-07	5.3351	2	2.38906
520.114	7.20658E-07	3.246	2	2.23695
805.769	1.20905E-06	2.37271	2	.366946
892.773	1.31727E-06	2.51663	2	.380168

Date 3/27/1979

Sample ID : WV#7-EGSP-6242

Gas : Methane

Initials : DLW

Book : 3

Page : 64

SAMPLE DATA

Weight : 8.3694 (grams)

Density : 2.672 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

4.56046E-04 Vol Gas/Vol Rock/Torr

2.35844E-02 Vol Gas/Vol rock/PSI

.346595 Vol Gas/Vol Rock/ATM

7.61457E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .287534 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
222.348	1.89271E-06	.874082	1	0
500.81	3.93704E-06	.595565	1	0
793.419	5.92278E-06	.485939	1	0
873.63	6.44825E-06	.51604	1	0

Date 3/27/1979

Sample ID : WU#7-EGSP-6242

Gas : Methane

Initials : DLW

Book : 3

Page : 64

SAMPLE DATA

Weight : 8.3694 (grams)

Density : 2.672 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 872.884

P equilibrium : 236.885

P o : 225.853

SPECIFIC DEGASIBILITY 2.83185E-07

UNCERTAINTY .123262 %

System d Moles/ dP 2.11752E-06

Date 3/27/1979

Sample ID : WU#7-EGSP:6242

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 64

SAMPLE DATA

Weight : 8.3694 (grams)

Density : 2.672 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

5.75473E-05 Moles/Gram
 2.15372E-05 Moles/ml.
 3.44437 ml. gas/ml. rock
 5.47563 Specific Area (sq.meters/gram)

UNCERTAINTY : .117167 %

C : 84.5409

UNCERTAINTY IN C : .135572 %
 BAROMETRIC PRESSURE 751.775 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
8.88429	2.99238E-05	.252871	1	0
73.6142	5.14703E-05	.207928	2	.677184
133.04	6.47395E-05	.20248	2	.864781
186.937	7.63253E-05	.198329	2	.901629
237.603	8.65974E-05	.195452	2	2.209

Date 3/27/1979

Sample ID : WV#7-EGSP:6242

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 64

SAMPLE DATA

Weight : 8.3694 (grams)

Density : 2.672 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 235.299

P equilibrium : 54.1754

P o : 40.7527

SPECIFIC DEGASIBILITY 2.73659E-06

UNCERTAINTY 8.41565E-02 %

System d Moles/ dP 8.65473E-06

Date 3/28/1979

Sample ID : WV#7-EGSP:6464

Gas : Helium

Initials : DLW

Book : 3

Page : 65

SAMPLE DATA

Weight : 5.39497 (grams)

Density : 2.609 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.18671E-04 Vol Gas/Vol Rock/Torr
6.13707E-03 Vol Gas/Vol rock/PSI
9.01901E-02 Vol Gas/Vol Rock/ATM
2.02929E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.57312 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
248.073	5.13482E-07	4.94521	1	0
535.951	1.04638E-06	3.43655	2	3.0886
825.288	1.68368E-06	2.61928	1	0
902.315	1.85817E-06	2.74262	1	0

Date 3/28/1979

Sample ID : WV#7-EGSP:6464

Gas : Methane

Initials : DLW

Book : 3

Page : 65

SAMPLE DATA

Weight : 5.39497 (grams)

Density : 2.609 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

2.88321E-04 Vol Gas/Vol Rock/Torr

1.49105E-02 Vol Gas/Vol rock/PSI

.219124 Vol Gas/Vol Rock/ATM

4.93032E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .661426 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
236.711	1.26532E-06	2.00989	1	0
526.327	2.61393E-06	1.37905	1	0
818.229	3.98451E-06	1.11051	1	0
883.977	4.29045E-06	1.19236	1	0

Date 3/28/1979

Sample ID : WU#7-EGSP:6464

Gas : Methane

Initials : DLW

Book : 3

Page : 65

SAMPLE DATA

Weight : 5.39497 (grams)

Density : 2.609 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 5.70783E-02

P equilibrium : -6065.27

P o : -6082.77

SPECIFIC DEGASIBILITY 1.34255E-07

UNCERTAINTY 3.0473 %

System d Moles/ dP 1.85033E-06

Date 3/28/1979

Sample ID : WU#7-EGSP:6464

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 65

SAMPLE DATA

Weight : 5.39497 (grams)

Density : 2.609 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

5.84455E-05 Moles/Gram
 2.24015E-05 Moles/ml.
 3.41565 ml. gas/ml. rock
 5.56109 Specific Area (sq.meters/gram)

UNCERTAINTY : .209473 %

C : 50.8835

UNCERTAINTY IN C : .613343 %

BAROMETRIC PRESSURE 747.061 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
24.8901	3.89514E-05	.301229	1	0
93.8361	5.59071E-05	.29683	2	5.70198
151.619	6.76034E-05	.300669	2	.28912
199.466	7.67874E-05	.305682	2	3.28342
249.25	8.65871E-05	.303106	1	0

Date 3/28/1979

Sample ID : WU#7-EGSP:6464

Gas : Nitrogen

Initials : DLW

Book : 3

Page : 65

SAMPLE DATA

Weight : 5.39497 (grams)

Density : 2.609 (gm/cc)

Sample Temp : -196 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 268.913

P equilibrium : 46.0151

P o : 36.2922

SPECIFIC DEGASIBILITY 5.39332E-06

UNCERTAINTY .311389 %

System d Moles/ dP 8.3131E-06

Date 3/30/1979

Sample ID : NY#1-EGSP:2295

Gas : Helium

Initials : PDS

Book : 3

Page : 66

SAMPLE DATA

Weight : 4.38559 (grams)

Density : 2.6507 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

7.82606E-05 Vol Gas/Vol Rock/Torr
4.04724E-03 Vol Gas/Vol rock/PSI
5.94781E-02 Vol Gas/Vol Rock/ATM
1.31721E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 2.99448 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
242.603	2.74156E-07	11.4061	1	0
535.418	6.194E-07	7.14958	1	0
823.909	1.15157E-06	4.71618	2	.999957
901.329	1.25797E-06	4.9891	2	6.90198

Date 3/30/1979

Sample ID : NY#1-EGSP:2295

Gas : Methane

Initials : PDS

Book : 3

Page : 66

SAMPLE DATA

Weight : 4.38559 (grams)

Density : 2.6507 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

2.03542E-04 Vol Gas/Vol Rock/Torr
1.05262E-02 Vol Gas/Vol rock/PSI
.154692 Vol Gas/Vol Rock/ATM
3.42584E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.17252 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
236.803	7.79785E-07	4.0165	2	1.83776
526.043	1.74602E-06	2.54258	2	.028132
817.432	2.85836E-06	1.90646	1	0
884.687	3.06047E-06	2.0586	1	0

Date 3/30/1979

Sample ID : NY#1-EGSP:2295

Gas : Methane

Initials : PDS

Book : 3

Page : 66

SAMPLE DATA

Weight : 4.38559 (grams)

Density : 2.6507 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 884.272

P equilibrium : 198.186

P o : 197.033

SPECIFIC DEGASIBILITY 8.93069E-08

UNCERTAINTY 2.3771 %

System d Moles/dP 2.02581E-06

Date 3/30/1979

Sample ID : NY#1-EGSP-2295

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 66

SAMPLE DATA

Weight : 4.38559 (grams)

Density : 2.6507 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

INTERNAL AREA

5.67326E-05	Moles/Gram
2.14029E-05	Moles/ml.
3.36854	ml. gas/ml. rock
5.39811	Specific Area (sq.meters/gram)

UNCERTAINTY : .252325 %

C : 59.1689

UNCERTAINTY IN C : .979602 %

BAROMETRIC PRESSURE 742.883 mm Hg

DETAILED DATA 5 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
20.5193	3.71576E-05	.388583	1	0
89.9834	5.34108E-05	.382348	2	3.12626
143.687	6.46018E-05	.387191	1	0
194.381	7.49747E-05	.385264	2	.447769
245.699	8.53711E-05	.378312	1	0

Date 3/30/1979

Sample ID : NY#1-ECSP-2295

Gas : Nitrogen

Initials : PDS

Book : 3

Page : 66

SAMPLE DATA

Weight : 4.38559 (grams)

Density : 2.6507 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 245.403

P equilibrium : 38.2908

P o : 32.6303

SPECIFIC DEGASIBILITY 3.94662E-06

UNCERTAINTY .144797 %

System d Moles/ dP 7.89518E-06

TEMPERATURE COEFFICIENTS OF DEGASIBILITY AND ISOTHERM PARAMETERS
IN DEVONIAN SHALES

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TEMPERATURE COEFFICIENTS OF DEGASIBILITY AND ISOTHERM PARAMETERS
IN DEVONIAN SHALES

Introduction

Schettler (1) has introduced the concept of specific degasibility, G , as a parameter which is directly related to the rate of diffusion of gas from a rock matrix. The magnitude of the specific degasibility for a particular Devonian shale is directly related to the potential of the shale for natural gas production. We have studied the temperature dependence of degasibility and isotherm parameters for three Devonian shale samples over the range of 64° to -21°C in an attempt to further develop a model for the degassing behavior of Devonian shales.

Schettler has shown that specific degasibility is related to the amount of gas which has flowed from a rock matrix in time t by the equation

$$M_T = 2(P_2 - P_0)GA t^{\frac{1}{2}} \quad (1)$$

where M_T is the amount of gas produced after time t ,

P_2 is the original equilibrium pressure of the gas in the rock,

P_0 is the pressure at the surface of the rock during the flow,

G is specific degasibility,

A is the surface area from which the gas is flowing.

Measurements of G are made at Juniata by measuring the rate of degassing from a shale sample after the sample has experienced a rapid pressure drop of known amount.

The specific degasibility is related to diffusion constant of the gas in shale and the solubility of the gas in the shale by the equation

$$G = \frac{KD^{\frac{1}{2}}}{\pi^{\frac{1}{2}}} \quad (2)$$

where K is the slope of the isotherm (i.e., solubility); units of volume of gas (STP)/volume of shale/pressure.

D is the diffusion constant; normal units cm^2/sec .

Any temperature dependence of the specific degasibility is thus related to the temperature dependence of both the isotherm parameter K and the diffusion constant D. The isotherm parameter K is an equilibrium constant and thus is expected to follow the Gibbs-Helmholtz relationship:

$$\frac{d \ln K}{d\left(\frac{1}{T}\right)} = \frac{-\Delta H^0}{R}$$

Thus $\ln K$ is expected to be a linear function of $\frac{1}{T}$.

The expected temperature dependence of the diffusion constant is more complex and the observed behavior should give insight as to the flow processes in Devonian shales. Barrer (2) has discussed the use of temperature dependence of permeability as an aid in sorting out different types of flow. If Knudsen flow is exhibited, the net flow is given by the expression (3)

$$\frac{dn}{dt} = \frac{1}{2} B \frac{(P_1 - P_2)}{(2\pi MRT)^{\frac{1}{2}}} \frac{1}{L} \left(\frac{2-f}{f} \right)$$

where $\frac{dn}{dt}$ is the net flow in moles/sec,

B is parameter depending on the shape of the capillary and is equal to $\frac{16}{3} r^3 \pi$ for tubes of circular cross section of radius r,

$P_1 - P_2$ is the pressure differential across the capillary,

L is the capillary length,

R is the gas constant,

M is the molecular weight of the gas,

f is the fraction of molecules striking the walls of the tube that are randomly reflected.

The equation predicts a $1/\sqrt{T}$ dependence of the flow rate and therefore the diffusion constant. Poiseuille flow, on the other hand is expressed by the equation (4)

$$\frac{dn}{dt} = \frac{d^4 \pi \bar{P}}{128 L \eta RT} (P_1 - P_2)$$

where $\frac{dn}{dt}$, L , R and T , P_1 and P_2 are the same as in the previous equation,
 d is the pore diameter,
 $\bar{P}$ is the average pressure in the capillary,
 η is the viscosity index for the gas.

From kinetic molecular theory of gases, η is expected to increase linearly with $\sqrt{T}$. Thus for Poiseuille flow the diffusion constant is expected to show a $1/T^{3/2}$ dependence, i.e., flow that decreases rapidly with temperature. For both Knudsen flow and Poiseuille flow the molar flow rate (5) would decrease with increasing temperature, with the effect being more dramatic with Poiseuille flow. An additional possibility is that activated diffusion is important because of molecules sticking to the surface. Activated diffusion introduces a $e^{-EA/RT}$ term into the diffusion constant. This term gives diffusion constants which increase with temperature, the relationship being that $\ln D$ should be proportional to $1/T$.

Experimental

Specific degasibility and isotherm data were measured as previously described (6). Diffusion constants were calculated from the degasibility and isotherm data by equation (2). Seven samples were chosen for study by considering data already obtained for the sample. Choices were made to provide for variety in sample characteristics. Sample information is given in Table I. Thus far, data taking has been completed for three samples. A summary of the data is given in Table II. Where the data seemed to warrant it, the correlations of isotherm data and diffusion constants with temperature were investigated by linear least squares analysis. The results of the analyses are given in Table III.

Discussion

The only data which yield consistent variation with temperature were the methane isotherm data. The $\ln K_{CH_4}$ versus $1/T$ relationship was reasonably linear for each sample. Heats of sorption calculated from the least squares analyses were -2.78 ± 0.23 , -3.44 ± 0.13 and -2.72 ± 0.58 kcal/mole. The uncertainties of the number are such that they must be considered essentially the same. The magnitudes are in the range expected for physical absorption.

The data for helium isotherms are less precise, because the quantity of He sorbed for most samples is not large compared to the sensitivity of our apparatus. The helium isotherm parameters for each of the three samples were inversely correlated with temperature. The WV#5 sample gave slightly negative helium isotherm parameters at higher temperature, so the data for the sample were not further analyzed. The other two samples gave heats of sorption of -1.7 ± 1.1 and -2.5 ± 0.3 kcal/mole. These results are consistent with an adsorption mechanism account for at least some of the takeup of He by the Devonian shale sample.

The results of diffusion constant measurements are more difficult to interpret. Because diffusion constants are computed from the squared values of two experimental measurements the expected precision is considerably poorer than that exhibited by the individual contributing measurements. Indeed, considerable scatter is observed. The diffusion constants for the 20403:2926.1 sample appear to increase with temperature as would be expected for activated diffusion. A least squares fit of $\ln D$ to $1/T$ allows a calculation of an energy of activation of 2.2 ± 0.8 kcal/mole. The data for the WV#6-MERC-IX:7474 sample, however, shows maximum values of diffusion constants at in the 20°C range with lower values at higher and lower temperatures. The WV#5-EGSP:3085 sample gave diffusion constants which show no apparent correlation with temperature. Thus, overall, little can be

concluded from the diffusion constant data. The meager support for activated diffusion in the 20403:2926.1 sample must be considered tentative until data from more samples and more refined measurements are available. The study does show that the temperature dependence in diffusion constants is small enough such that temperature dependence of isotherm values dominate in determining the temperature dependence of specific degasibility. This is shown by the decrease in specific degasibility with increasing temperature for each of the three sample.

References

1. P. Schettler, "Specific Degasibility: It's Definition, Measurement and Use," Progress Report No. 5, ORO-5197-5.

Also, Paul D. Schettler, Jr., "The Concept of Specific Degasibility and its Application to Gas-Bearing Tight Formations as Represented by the Devonian Shales of Appalachia," Progress Report No. 9, Department of Energy Contract No. EY-76-S-05-5197, ORO-4197-9.

2. Richard M. Barrer, "Diffusion In and Through Solids," Cambridge University Press, 1951, p. 71.
3. Barrer, Ibid., p. 55.
4. Barrer, Ibid., p. 56.
5. Note that if volume flow rates are measured, an additional RT term is introduced in each case giving Knudsen flow a $\sqrt{T}$ dependence and Poiseuille flow a $1/\sqrt{T}$ dependence. Our data are all reduced to STP condition so that our degasibilities measure molar flow rates.
6. See Progress reports 1-9, ORO-5197-1 through ORO-5197-9.

TABLE I

<u>Sample ID</u>	<u>Reason for Use</u>	<u>Book</u>	<u>Page</u>
WV#5-EGSP:3035	High GN2, Low BET, Low GCH4	1	54
20336:3029	Low GN2, GCH4 BET, Med. Gray	3	8
20403:2906.1	Average Gray	1	16
20403:2926.1	Slightly high BET, Gray	1	22
20403:3241.3	High GN2, BET, Avg. GCH4, Dark Gray	3	35
20403:3796.3	High GN2, Low GCH4 Avg. BET, Med. Gray	3	33
20403:3816.3	Same as Above	3	39
WV#5-EGSP:2935	Low GN2, BET, GCH4 Black	1	59
WV#6-MERC-IX:7474	Large Iso, GN2, Black	1	45

TABLE II

Data from the Study of Temperature Dependence of
Isotherms and Degasibilities

<u>Sample ID</u>	<u>T°C</u>	<u>Helium Isotherm x 10⁻⁵</u>	<u>Methane Isotherm x 10⁻⁵</u>	<u>Methane Degasibility x 10⁻⁷</u>	<u>Methane Diffusion Constant x 10⁻⁶</u>
#03:2926.1	30.7	5.43	21.4	1.80	2.22
	20.0	5.32	24.4	2.38	2.99
	12.0	6.52	28.4	2.37	2.19
	2.0	15.9	40.5	2.47	1.16
	-10.0	8.70	43.1	2.86	1.38
	-21.3	8.45	53.9	3.58	1.39
#6-MERC-IX:7474	60.0	4.21	59.9	5.56	2.71
	49.8	4.41	72.0	8.04	3.92
	41.0	4.89	98.3	10.74	3.75
	29.7		102.1	12.45	4.67
	29.5	4.87			
	21.2	5.81	122.6	15.30	4.89
	10.8	5.93			
	10.4		155.3	16.31	3.47
	0	6.96	186.8	18.63	3.12
	-2.5	10.49		20.68	
	-3.0		211.7		3.00
	-15.5	13.26	295.5	24.16	2.10
#5-EGSP:3085	64.0	-	14.4	-	
	36.7	-0.7	9.7	0.20	0.13
	30.2	-0.5	13.6	0.17	0.05
	10.8		17.8	0.62	0.38
	10.2	-0.2			
	0	2.8	23.9	1.29	0.92
	-5.5	5.6		1.48	0.76
	-6.5		30.1		
	-13.5	12.5			
	-15.5		42.8	2.13	0.78

TABLE III

Results of Linear Least Squares Analysis of Data From Study of
Temperature Dependence of Isotherms and Degasibilities

Sample 20403:2926.1 - Methane Isotherm Data

1/T	$(\ln K_{\text{CH}_4})_{\text{obs.}}$	$(\ln K_{\text{CH}_4})_{\text{calc.}}$	Δ
0.003291	-8.450	-8.439	0.011
0.003411	-8.313	-8.271	0.042
0.003507	-8.167	-8.136	0.031
0.003634	-7.812	-7.958	-0.146
0.003800	-7.749	-7.726	0.023
0.003971	-7.526	-7.486	0.040

Slope = 1400 with standard deviation of 117

 $\Delta H_{\text{sorption}} = -2.78 \pm 0.23 \text{ Kcal/mole}$

Sample 20403:2926.1 - Helium Isotherm Data

1/T	$(\ln K_{\text{He}})_{\text{obs.}}$	$(\ln K_{\text{He}})_{\text{calc.}}$	Δ
0.003291	-9.821	-9.734	0.088
0.003411	-9.841	-9.629	0.212
0.003507	-9.638	-9.545	0.093
0.003634	-8.747	-9.435	-0.688
0.003800	-9.350	-9.291	0.059
0.003971	-9.378	-9.142	0.236

Slope = 370 with a standard deviation of 557

 $\Delta H_{\text{sorption}} = -1.7 \pm 1.1 \text{ Kcal/mole}$

TABLE III (cont.)

Sample 20403:2926.1 - Methane Diffusion Constant Data

1/T	$(\ln D)_{\text{obs.}}$	$(\ln D)_{\text{obs.}}$	Δ
0.003291	-13.018	-12.896	0.122
0.003411	-12.720	-13.026	-0.306
0.003507	-13.032	-13.131	-0.099
0.003644	-13.667	-13.280	0.387
0.003800	-13.493	-13.449	0.044
0.003971	-13.486	-13.635	-0.149

The slope is -1087 with a standard deviation of 391

Sample WV#6-MERC-IX:7474 - Methane Isotherm Data

1/T	$(\ln K_{\text{CH}_4})_{\text{obs.}}$	$(\ln K_{\text{CH}_4})_{\text{calc.}}$	Δ
0.003001	- 7.420	- 7.376	0.044
0.003096	- 7.236	- 7.211	0.025
0.003183	- 6.925	- 7.061	-0.136
0.003302	- 6.887	- 6.855	0.032
0.003397	- 6.704	- 6.690	0.014
0.003527	- 6.468	- 6.465	0.003
0.003661	- 6.283	- 6.233	0.050
0.003702	- 6.158	- 6.162	-0.004
0.003881	- 5.824	- 5.852	-0.028

The slope is 1730 with a standard deviation of 63

 $\Delta H_{\text{adsorption}} = -3.44 \pm 0.13 \text{ Kcal/mole}$

TABLE III (cont.)

Sample WV#6-MERC-IX:7474 - Helium Isotherm Data

1/T	$(\ln K_{\text{He}})_{\text{obs.}}$	$(\ln K_{\text{He}})_{\text{calc.}}$	Δ
0.003001	-10.075	-10.193	-0.118
0.003096	-10.029	-10.075	-0.046
0.003183	- 9.926	- 9.967	-0.041
0.003304	- 9.930	- 9.817	0.113
0.003397	- 9.753	- 9.702	0.051
0.003522	- 9.733	- 9.547	0.186
0.003661	- 9.573	- 9.375	0.198
0.003695	- 9.163	- 9.332	-0.169
0.003881	- 8.928	- 9.102	-0.174

Slope = 1240 with a standard deviation of 161

$\Delta H_{\text{sorption}} = -2.5 \pm 0.3 \text{ Kcal/mole}$

Sample WV#5-EGSP:3085 - Methane Isotherm Data

1/T	$(\ln K_{\text{CH}_4})_{\text{obs.}}$	$(\ln K_{\text{CH}_4})_{\text{calc.}}$	Δ
0.002966	- 8.846	- 9.241	-0.395
0.003227	- 9.241	- 8.883	0.358
0.003297	- 8.903	- 8.787	0.116
0.003522	- 8.634	- 8.478	0.156
0.003661	- 8.339	- 8.287	0.052
0.003750	- 8.108	- 8.165	-0.057
0.003881	- 7.756	- 7.985	-0.229

Slope = 1370 with a standard deviation of 294

$\Delta H_{\text{sorption}} = -2.72 \pm 0.58 \text{ Kcal/mole}$

Date 1/29/1979

Sample ID : WV#5-EGSP:3035

Gas : Helium

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : -13.5 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.24772E-04 Vol Gas/Vol Rock/Torr
 6.4526E-03 Vol Gas/Vol rock/PSI
 9.48271E-02 Vol Gas/Vol Rock/ATM
 2.07787E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.71476 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
222.036	2.9741E-07	9.11484	1	0
586.004	0.57186E-07	4.47981	1	0
793.016	1.74769E-06	2.69538	2	1.14328
882.061	2.1077E-06	2.5832	1	0

Date 1/29/1979

Sample ID : WV#5-EGSP:3035

Gas : Helium

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : -5.5 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

5.60434E-05 Vol Gas/Vol Rock/Torr
2.89828E-03 Vol Gas/Vol rock/PSI
.042593 Vol Gas/Vol Rock/ATM
9.33307E-10 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 3.80984 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
222.463	1.52699E-07	17.7211	1	0
503.60	4.03763E-07	9.49351	1	0
798.655	7.81835E-07	6.01446	1	0
803.702	9.09342E-07	5.97682	1	0

Date 1/29/1979

Sample ID : WV#5-EGSP-3035

Gas : Helium

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

2.80883E-05 Vol Gas/Vol Rock/Torr
1.45258E-03 Vol Gas/Vol rock/PSI
2.13471E-02 Vol Gas/Vol Rock/ATM
4.67763E-10 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 7.55469 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
225.328	6.0417E-08	44.7583	1	0
508.885	1.76984E-07	21.6436	1	0
798.771	4.11979E-07	11.4063	1	0
885.696	4.84788E-07	11.2035	1	0

Date 1/29/1979

Sample ID : WU#5-EGSP:3035

Gas : Helium

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 10.2 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

-2.46952E-06 Vol Gas/Vol Rock/Torr
 -1.27711E-04 Vol Gas/Vol rock/PSI
 -1.87683E-03 Vol Gas/Vol Rock/ATM
 -4.11256E-11 Moles Gas/Gram Rock/Torr

UNCERTAINTY : -85.5758 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
226.446	-4.13977E-08	65.2808	1	0
513.394	-4.81157E-08	79.5641	1	0
800.737	6.64088E-08	70.7186	1	0
886.295	-9.18284E-08	59.1106	1	0

Date 1/29/1979

Sample ID : WV#5-EGSP:3035

Gas : Helium

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 29.8999 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

-4.33869E-06 Vol Gas/Vol Rock/Torr
-2.24375E-04 Vol Gas/Vol rock/PSI
-3.2974E-03 Vol Gas/Vol Rock/ATM
-7.22535E-11 Moles Gas/Gram Rock/Torr

UNCERTAINTY : -48.4766 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
229.425	-6.79521E-08	39.6786	1	0
513.039	-9.72301E-08	39.282	1	0
803.399	-1.86108E-08	251.762	1	0
887.018	1.17566E-08	460.639	1	0

Date 1/29/1979

Sample ID : WU#5-EGSP-3035

Gas : Helium

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 30 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

-4.63922E-06 Vol Gas/Vol Rock/Torr
 -2.39917E-04 Vol Gas/Vol rock/PSI
 -3.52581E-03 Vol Gas/Vol Rock/ATM
 -7.72583E-11 Moles Gas/Gram Rock/Torr

UNCERTAINTY : -45.2149 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
231.408	-6.03262E-08	44.704	1	0
514.451	-1.05991E-07	36.0426	1	0
804.084	-2.09712E-08	223.471	1	0
890.262	3.04128E-09	1781.05	1	0

Date 1/29/1979

Sample ID : WU#5-EGSP:3035

Gas : Helium

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 36.7 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

-7.67526E-06 Vol Gas/Vol Rock/Torr
-3.96925E-04 Vol Gas/Vol rock/PSI
-5.8332E-03 Vol Gas/Vol Rock/ATM
-1.27818E-10 Moles Gas/Gram Rock/Torr

UNCERTAINTY : -27.3442 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
232.066	=6.70896E-08	40.1715	2	2.92914E-02
513.733	=1.05128E-07	36.3147	1	0
803.989	=7.9164E-08	59.1609	1	0
887.319	=5.65587E-08	95.7081	1	0

Date 1/29/1979

Sample ID : WV#5-EGSP:3035

Gas : Helium

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 62.5 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

-1.29562E-05 Vol Gas/Vol Rock/Torr
 -6.70031E-04 Vol Gas/Vol rock/PSI
 -9.84674E-03 Vol Gas/Vol Rock/ATM
 -2.15764E-10 Moles Gas/Gram Rock/Torr

UNCERTAINTY : -16.001 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
231.79	-1.07216E-07	25.0806	1	0
525.593	-1.54787E-07	24.611	2	388038
910.754	-1.15024E-07	40.6294	1	0
993.936	-1.56467E-07	34.5218	1	0

Date 1/29/1979

Sample ID : WU#5-EGSP-3035

Gas : Methane

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : -15.5 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

4.27723E-04 Vol Gas/Vol Rock/Torr

2.21197E-02 Vol Gas/Vol rock/PSI

.32507 Vol Gas/Vol Rock/ATM

7.123E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .508783 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
217.155	1.6136E-06	1.68234	1	0
497.029	3.70446E-06	1.03896	1	0
787.415	5.50807E-06	.857969	1	0
869.224	6.05663E-06	.902269	1	0

Date 1/29/1979

Sample ID : WV#5-EGSP:3035

Gas : Methane

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : -6.5 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

3.0124E-04 Vol Gas/Vol Rock/Torr

1.55786E-02 Vol Gas/Vol rock/PSI

.228942 Vol Gas/Vol Rock/ATM

5.01663E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .717855 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
219.651	1.1541E-06	2.34078	1	0
500.465	2.40290E-06	1.54163	1	0
790.090	3.96973E-06	1.10073	2	.227533
871.512	4.23563E-06	1.2506	2	7.46078E-02

Date 1/29/1979

Sample ID : WV#5-EGSP:3035

Gas : Methane

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

2.39099E-04 Vol Gas/Vol Rock/Torr

.012365 Vol Gas/Vol rock/PSI

.181715 Vol Gas/Vol Rock/ATM

3.98178E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .900851 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
221.215	9.0276E-07	3.00007	1	0
503.192	1.97769E-06	1.94161	1	0
792.696	3.1558E-06	1.49401	1	0
872.496	3.48235E-06	1.56562	1	0

Date 1/29/1979

Sample ID : WV#5-EGSP:3035

Gas : Methane

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp. : 10.8 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.7831E-04 Vol Gas/Vol Rock/Torr

9.22127E-03 Vol Gas/Vol rock/PSI

.135515 Vol Gas/Vol Rock/ATM

2.96945E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.20473 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
222.454	6.59458E-07	4.10409	1	0
503.317	1.46426E-06	2.62057	1	0
795.173	2.37002E-06	1.96798	1	0
973.106	2.61895E-06	2.08032	1	0

Date 1/29/1979

Sample ID : WV#5-EGSP:3035

Gas : Methane

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 30.2 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.36215E-04 Vol Gas/Vol Rock/Torr

7.04435E-03 Vol Gas/Vol rock/PSI

.103523 Vol Gas/Vol Rock/ATM

2.26843E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.56639 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
226.079	4.59732E-07	5.07492	1	0
505.836	1.05673E-06	3.62364	2	4.45403E-02
798.848	1.76113E-06	2.66974	1	0
874.653	2.20779E-06	2.46261	1	0

Date 1/29/1979

Sample ID : WU#5-EGSP:3035

Gas : Methane

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 36.7 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

9.67322E-05 Vol Gas/Vol Rock/Torr
5.00249E-03 Vol Gas/Vol rock/PSI
7.35164E-02 Vol Gas/Vol Rock/ATM
1.61091E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 2.19893 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
227.931	3.41894E-07	7.89501	1	0
507.548	7.83923E-07	4.88171	1	0
800.303	1.30739E-06	3.59409	1	0
875.585	1.45432E-06	3.73615	1	0

Date 1/29/1979

Sample ID : WV#5-EGSP:3035

Gas : Methane

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 64 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.1447E-04 Vol Gas/Vol Rock/Torr

5.9198E-03 Vol Gas/Vol rock/PSI

.086997 Vol Gas/Vol Rock/ATM

1.9063E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.84726 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
228.097	2.4884E-07	10.8217	1	0
511.707	6.11024E-07	6.24848	1	0
805.426	1.10121E-06	4.25713	2	5.41309E-02
873.869	2.62789E-06	1.91686	2	1.68446

Date 1/29/1979

Sample ID : WU#5-EGSP:3035

Gas : Methane

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : -15.5 (Cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 869.248

P equilibrium : 248.935

P o : 246.227

SPECIFIC DEGASIBILITY 2.13286E-07

UNCERTAINTY 1.23421 %

System d Moles/ dP 2.18146E-06

Date 1/29/1979

Sample ID : WU#5-EGSP:3035

Gas : Methane

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : -5.5 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 871.192

P equilibrium : 243.885

P o : 242.07

SPECIFIC DEGASIBILITY 1.48125E-07

UNCERTAINTY 1.73547 %

System d Moles/ dP 2.16901E-06

Date 1/29/1979

Sample ID : WU#5-EGSP:3035

Gas : Methane

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 872.495

P equilibrium : 240.329

P o : 238.827

SPECIFIC DEGASIBILITY 1.28549E-07

UNCERTAINTY 2.01172 %

System d Moles/ dP 2.16313E-06

Date 1/29/1979

Sample ID : WV#5-EGSP:3035

Gas :

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 10.8 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 873.102

P equilibrium : 235.43

P o : 234.524

SPECIFIC DEGASIBILITY 6.20217E-08

UNCERTAINTY 2.36695 %

System d Moles/ dP 2.15297E-06

Date 1/29/1979

Sample ID : WV#5-EGSP-3035

Gas : Methane

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 30.2 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 903.088

P equilibrium : 236.501

P o : 236.017

SPECIFIC DEGASIBILITY 1.68579E-08

UNCERTAINTY 1.43901 %

System d Moles/ dP 2.13466E-06

Date 1/29/1979

Sample ID : WV#5-EGSP:3035

Gas : Methane

Initials : JCN

Book : 3

Page : 63

SAMPLE DATA

Weight : 5.12931 (grams)

Density : 2.679 (gm/cc)

Sample Temp : 36.7 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 875.55

P equilibrium : 226.452

P o : 226.031

SPECIFIC DEGASIBILITY 1.97668E-08

UNCERTAINTY 2.17904 %

System d Moles/dP 2.12883E-06

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X:7474

Gas : Helium

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : -15.5 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.3257E-04 Vol Gas/Vol Rock/Torr
6.85586E-03 Vol Gas/Vol rock/PSI
.100753 Vol Gas/Vol Rock/ATM
2.33775E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.57249 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
240.475	5.39083E-07	5.37251	2	7.18768E-02
529.715	1.21007E-06	3.39064	2	.145576
821.122	1.95498E-06	2.57471	2	.106083
898.012	2.11456E-06	2.75134	2	.201525

Date 2/ 6/1979

Sample ID : WV#6-MERC-1X:7474

Gas : Helium

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : -2.5 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.04861E-04 Vol Gas/Vol Rock/Torr
5.42286E-03 Vol Gas/Vol rock/PSI
.079694 Vol Gas/Vol Rock/ATM
1.84912E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.97868 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
242.599	4.24075E-07	6.82693	2	4.36606E-02
535.43	9.55869E-07	4.2908	2	.121779
823.923	1.55332E-06	3.23933	2	9.18584E-02
897.639	1.69108E-06	3.43906	2	.104385

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X-7474

Gas : Helium

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

6.95974E-05 Vol Gas/Vol Rock/Torr

3.59922E-03 Vol Gas/Vol rock/PSI

.052894 Vol Gas/Vol Rock/ATM

1.22729E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 2.98124 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
242.527	2.58386E-07	11.2052	1	0
533.955	6.02423E-07	6.80846	1	0
824.554	1.05206E-06	4.7829	1	0
898.802	1.15988E-06	5.01432	1	0

Date 12/16/1979

Sample ID : IWV#6-MERC-1X-7474

Gas : Helium

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 10.8 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

5.92772E-05 Vol Gas/Vol Rock/Torr
3.06552E-03 Vol Gas/Vol rock/PSI
4.50507E-02 Vol Gas/Vol Rock/ATM
1.0453E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 3.50757 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
240.147	2.05635E-07	14.0634	1	0
531.369	3.03423E-07	8.13806	1	0
823.687	3.05383E-07	5.55146	1	0
896.541	3.93695E-07	5.84628	1	0

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X:7474

Gas : Helium

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 21.2 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

5.80685E-05 Vol Gas/Vol Rock/Torr
 3.00301E-03 Vol Gas/Vol rock/PSI
 4.41321E-02 Vol Gas/Vol Rock/ATM
 1.02398E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 3.5481 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
245.553	2.17997E-07	13.2645	1	0
539.844	5.15737E-07	7.94305	1	0
828.327	8.8253E-07	5.69464	1	0
900.163	9.6104E-07	6.04428	1	0

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X:7474

Gas : Helium

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 29.5 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

4.87252E-05 Vol Gas/Vol Rock/Torr
 2.51982E-03 Vol Gas/Vol rock/PSI
 3.70311E-02 Vol Gas/Vol Rock/ATM
 8.59223E-10 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 4.23211 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
242.575	1.75294E-07	16.4867	1	0
539.446	4.19248E-07	9.76509	2	3.32745E-02
836.649	7.45259E-07	6.74001	1	0
1133.667	9.21406E-07	7.06809	2	.456974

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X:7474

Gas : Helium

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 41 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

4.89159E-05 Vol Gas/Vol Rock/Torr

2.52968E-03 Vol Gas/Vol rock/PSI

3.71761E-02 Vol Gas/Vol Rock/ATM

8.62586E-10 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 4.22565 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
244.193	1.65148E-07	17.4878	1	0
534.459	4.12353E-07	9.92211	1	0
826.519	7.52056E-07	6.67435	1	0
1097.670	9.34409E-07	6.95301	1	0

Date 2/ 6/1979

Sample ID : WV#6-MERC-1X:7474

Gas : Helium

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 49.8 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

4.41157E-05 Vol Gas/Vol Rock/Torr

2.28144E-03 Vol Gas/Vol rock/PSI

.033528 Vol Gas/Vol Rock/ATM

7.7794E-10 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 4.66391 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
247.726	1.52293E-07	18.9585	1	0
539.201	3.66517E-07	11.0992	1	0
826.055	6.06302E-07	7.31164	1	0
1106.300	7.83405E-07	7.69742	2	.348604

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X-7474

Gas : Helium

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 60 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

4.2106E-05 Vol Gas/Vol Rock/Torr
 2.17751E-03 Vol Gas/Vol rock/PSI
 3.20005E-02 Vol Gas/Vol Rock/ATM
 7.42499E-10 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 4.88772 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
246.237	1.43772E-07	20.0727	1	0
537.111	3.51559E-07	11.6109	1	0
630.969	5.53547E-07	7.67343	1	0
699.446	7.20306E-07	8.04749	1	0

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : -15.5 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

2.95465E-03 Vol Gas/Vol Rock/Torr

.1528 Vol Gas/Vol rock/PSI

2.24554 Vol Gas/Vol Rock/ATM

5.21025E-08 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 7.40698E-02 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
203.303	1.57696E-05	.1839	1	0
400.190	2.0434E-05	.14461	1	0
700.573	3.02422E-05	.132031	1	0
972.109	4.0607E-05	.143792	1	0

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : -3 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

2.11732E-03 Vol Gas/Vol Rock/Torr

.109497 Vol Gas/Vol rock/PSI

1.60916 Vol Gas/Vol Rock/ATM

3.73369E-08 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .102844 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
214.472	1.075E-05	.269693	1	0
501.254	2.03240E-05	.202254	1	0
797.020	2.02016E-05	.178989	1	0
875.573	3.00430E-05	.194292	1	0

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.86767E-03 Vol Gas/Vol Rock/Torr

9.65866E-02 Vol Gas/Vol rock/PSI

1.41943 Vol Gas/Vol Rock/ATM

3.29347E-08 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .116187 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
217.36	9.38398E-06	.388963	1	0
503.244	1.79617E-05	.22887	1	0
800.49	2.50389E-05	.201605	1	0
876.39	2.66382E-05	.219138	1	0

Date 2/ 6/1979

Sample ID : WV#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 10.3999 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.55261E-03 Vol Gas/Vol Rock/Torr

.080293 Vol Gas/Vol rock/PSI

1.17998 Vol Gas/Vol Rock/ATM

2.73788E-08 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .138858 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
221.651	7.62572E-06	.379803	1	0
506.942	1.48782E-05	.276011	1	0
803.667	2.10676E-05	.239354	1	0
878.400	2.24397E-05	.259863	1	0

Date 2/ 6/1979

Sample ID : NU#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 21.2 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.21644E-03 Vol Gas/Vol Rock/Torr

6.29079E-02 Vol Gas/Vol rock/PSI

.924492 Vol Gas/Vol Rock/ATM

2.14507E-08 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .175874 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
227.501	5.00239E-06	.499077	1	0
512.161	1.15960E-05	.354055	1	0
806.130	1.6755E-05	.300913	1	0
806.909	1.79299E-05	.325172	1	0

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X-7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 29.7 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.02126E-03 Vol Gas/Vol Rock/Torr
 5.28142E-02 Vol Gas/Vol rock/PSI
 .776154 Vol Gas/Vol Rock/ATM
 1.80089E-08 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .208206 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
229.156	4.74700E-06	.609706	1	0
519.146	9.7524E-06	.420817	1	0
811.905	1.42352E-05	.354009	1	0
881.759	1.5225E-05	.382756	1	0

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 41 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

9.82692E-04 Vol Gas/Vol Rock/Torr

5.08198E-02 Vol Gas/Vol rock/PSI

.746846 Vol Gas/Vol Rock/ATM

1.73289E-08 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .215337 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
233.86	3.97108E-06	.728401	1	0
516.096	9.89849E-06	.414325	1	0
817.955	1.38566E-05	.363448	1	0
884.447	1.46828E-05	.396634	1	0

Date 2/ 6/1979

Sample ID : WV#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 49.8 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

7.20445E-04 Vol Gas/Vol Rock/Torr

3.72577E-02 Vol Gas/Vol rock/PSI

.547538 Vol Gas/Vol Rock/ATM

1.27044E-08 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .292726 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr.	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
236.439	3.26912E-06	.884532	1	0
522.609	6.8085E-06	.602186	1	0
817.158	1.0203E-05	.493431	1	0
883.428	1.09546E-05	.53144	1	0

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 60 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

5.89295E-04 Vol Gas/Vol Rock/Torr

3.04754E-02 Vol Gas/Vol rock/PSI

.447864 Vol Gas/Vol Rock/ATM

1.03917E-08 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .356469 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
237.472	2.64109E-06	1.09438	1	0
526.519	5.58159E-06	.734248	1	0
819.676	8.4059E-06	.598672	1	0
884.266	9.00675E-06	.6461	2	.489974

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X-7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : -15.5 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 872.063

P equilibrium : 243.762

P o : 211.568

SPECIFIC DEGASIBILITY 2.41597E-06

UNCERTAINTY .745848 %

System d Moles/ dP 2.02771E-06

Date 2/6/1979

Sample ID : WU#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : -2.5 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 875.834

P equilibrium : 231.632

P o : 204.036

SPECIFIC DEGASIBILITY 2.06818E-06

UNCERTAINTY .516609 %

System d Moles/ dP 2.01973E-06

Date 2/ 6/1979

Sample ID : WU#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 0 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 876.912

P equilibrium : 228.04

P o : 203.387

SPECIFIC DEGASIBILITY 1.8626E-06

UNCERTAINTY .540661 %

System d Moles/ dP 2.01824E-06

Date 2/ 6/1979

Sample ID : WV#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 10.8 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 878.227

P equilibrium : 221.705

P o : 200.876

SPECIFIC DEGASIBILITY 1.63081E-06

UNCERTAINTY 1.01885 %

System d Moles/ dP 2.01074E-06

Date 2/ 6/1979

Sample ID : WV#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 21.2 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 880.987

P equilibrium : 214.285

P o : 195.675

SPECIFIC DEGASIBILITY 1.53007E-06

UNCERTAINTY .972417 %

System d Moles/ dP 2.00573E-06

Date 2/6/1979

Sample ID : WV#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 29.5 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 881.739

P equilibrium : 209.245

P o : 194.016

SPECIFIC DEGASIBILITY 1.2445E-06

UNCERTAINTY .589528 %

System d Moles/ dP 2.00114E-06

Date 2/ 6/1979

Sample ID : WV#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 41 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 883.95

P equilibrium : 205.15

P o : 192.427

SPECIFIC DEGASIBILITY 1.07361E-06

UNCERTAINTY .986246 %

System d Moles/ dP 1.99507E-06

Date 2/ 6/1979

Sample ID : WV#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 49.8 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 883.366

P equilibrium : 199.783

P o : 190.166

SPECIFIC DEGASIBILITY 8.03917E-07

UNCERTAINTY 2.01868 %

System d Moles/ dP 1.99122E-06

Date 2/6/1979

Sample ID : WU#6-MERC-1X:7474

Gas : Methane

Initials : JCN

Book : 3

Page : 65

SAMPLE DATA

Weight : 4.72716 (grams)

Density : 2.53 (gm/cc)

Sample Temp : 60 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 884.015

P equilibrium : 195.249

P o : 188.265

SPECIFIC DEGASIBILITY 5.56017E-07

UNCERTAINTY 1.88152 %

System d Moles/ dP 1.9866E-06

Date 2/24/1979

Sample ID : 20403:2926.1

Gas : Helium

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : -21.3 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

8.44928E-05 Vol Gas/Vol Rock/Torr
4.36954E-03 Vol Gas/Vol rock/PSI
6.42145E-02 Vol Gas/Vol Rock/ATM
1.38282E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 2.42857 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
222.717	2.94275E-07	8.67349	1	0
502.524	6.54078E-07	5.52579	1	0
792.668	1.11848E-06	3.9628	1	0
883.274	1.25517E-06	4.08065	1	0

Date 2/24/1979

Sample ID : 20403:2926.1

Gas : Helium

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : -10 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

8.70851E-05 Vol Gas/Vol Rock/Torr

4.5036E-03 Vol Gas/Vol rock/PSI

6.61846E-02 Vol Gas/Vol Rock/ATM

1.42525E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 2.34509 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
223.475	2.7576E-07	9.24067	1	0
506.678	6.33771E-07	5.69362	1	0
794.77	1.18952E-06	3.72014	1	0
883.516	1.33635E-06	3.82655	1	0

Date 2/24/1979

Sample ID : 20403-2926.1

Gas : Helium

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : 2 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

1.58731E-04 Vol Gas/Vol Rock/Torr

8.20877E-03 Vol Gas/Vol rock/PSI

.120636 Vol Gas/Vol Rock/ATM

2.59782E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 1.18036 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
230.014	6.33813E-07	4.0094	1	0
509.522	1.39382E-06	2.58174	1	0
799.093	2.25083E-06	1.96059	1	0
887.516	2.52689E-06	2.01811	1	0

Date 2/24/1979

Sample ID : 20403:2926.1

Gas : Helium

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : 12 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

6.52058E-05 Vol Gas/Vol Rock/Torr
3.37211E-03 Vol Gas/Vol rock/PSI
4.95564E-02 Vol Gas/Vol Rock/ATM
1.06717E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 3.1036 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
227.08	2.22903E-07	11.4013	1	0
508.517	5.03911E-07	7.14169	1	0
800.733	8.75445E-07	5.0413	1	0
887.633	9.86663E-07	5.169	1	0

Date 2/24/1979

Sample ID : 20403:2926.1

Gas : Helium

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : 20 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

5.31883E-05 Vol Gas/Vol Rock/Torr
2.75063E-03 Vol Gas/Vol rock/PSI
4.04231E-02 Vol Gas/Vol Rock/ATM
8.70489E-10 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 3.78024 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
228.225	1.91377E-07	13.2639	1	0
513.661	4.09972E-07	8.76799	1	0
803.862	7.27241E-07	6.06167	2	5.59227E-02
891.033	7.93067E-07	6.42341	1	0

Date 2/24/1979

Sample ID : 20403:2926.1

Gas : Helium

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : 30.7 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

5.42828E-05 Vol Gas/Vol Rock/Torr
2.80723E-03 Vol Gas/Vol rock/PSI
4.12549E-02 Vol Gas/Vol Rock/ATM
8.88402E-10 Moles Gas/Gram Rock/Torr

UNCERTAINTY : 3.69364 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
229.216	1.89671E-07	13.3727	1	0
518.705	4.27334E-07	8.40534	1	0
804.383	7.35048E-07	5.99269	1	0
888.993	8.18834E-07	6.21645	1	0

Date 2/24/1979

Sample ID : 20403-2926.1

Gas : Methane

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : -21.3 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

5.39249E-04 Vol Gas/Vol Rock/Torr
2.78872E-02 Vol Gas/Vol rock/PSI
.409829 Vol Gas/Vol Rock/ATM
8.82544E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .387556 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
214.627	2.20425E-06	1.15971	1	0
495.65	4.52377E-06	.80092	1	0
784.508	6.7673E-06	.657165	1	0
869.505	7.38107E-06	.696613	1	0

Date 2/24/1979

Sample ID : 20403:2926.1

Gas : Methane

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : -10 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

4.3183E-04 Vol Gas/Vol Rock/Torr

.022332 Vol Gas/Vol rock/PSI

.328191 Vol Gas/Vol Rock/ATM

7.0674E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .480482 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
217.504	1.72913E-06	1.47596	1	0
499.808	3.61215E-06	1.00142	1	0
789.334	5.48287E-06	.809798	1	0
870.578	5.98238E-06	.858073	1	0

Date 2/24/1979

Sample ID : 20403-2926.1

Gas : Methane

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : 2 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

4.05486E-04 Vol Gas/Vol Rock/Torr

2.09697E-02 Vol Gas/Vol rock/PSI

.30817 Vol Gas/Vol Rock/ATM

6.63626E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .471273 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
219.947	1.67265E-06	1.52153	1	0
500.457	3.60711E-06	.99999	1	0
792.363	5.63508E-06	.785706	1	0
872.302	6.16924E-06	.829742	2	.158869

Date 2/24/1979

Sample ID : 20403:2926.1

Gas : Methane

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : 12 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

2.84791E-04 Vol Gas/Vol Rock/Torr

014728 Vol Gas/Vol rock/PSI

216441 Vol Gas/Vol Rock/ATM

4.66094E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .722643 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
221.021	1.09203E-06	2.33075	1	0
501.871	2.32993E-06	1.54831	1	0
793.697	3.67959E-06	1.20338	1	0
873.631	4.04336E-06	1.26612	1	0

Date 2/24/1979

Sample ID : 20403-2926.1

Gas : Methane

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : 20 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

2.44362E-04 Vol Gas/Vol Rock/Torr

1.26371E-02 Vol Gas/Vol rock/PSI

.185715 Vol Gas/Vol Rock/ATM

3.99927E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .836524 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
225.212	9.31331E-07	2.72985	1	0
504.976	2.02081E-06	1.78311	1	0
797.823	3.18327E-06	1.38941	1	0
875.614	3.47751E-06	1.47045	1	0

Date 2/24/1979

Sample ID : 20403-2926.1

Gas : Methane

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : 30.7 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

SLOPE OF ISOTHERM

2.13679E-04 Vol Gas/Vol Rock/Torr

1.10504E-02 Vol Gas/Vol rock/PSI

.162396 Vol Gas/Vol Rock/ATM

3.49711E-09 Moles Gas/Gram Rock/Torr

UNCERTAINTY : .956426 %

DETAILED DATA 4 POINTS TAKEN

PRESSURE Torr	ADS GAS Moles/Gram	UNCERTAINTY %	FLAG	FLAG Parameter
0	0	0	0	0
224.517	8.00831E-07	3.17209	1	0
505.068	1.74842E-06	2.05923	1	0
797.974	2.78841E-06	1.58489	1	0
874.485	3.06536E-06	1.6668	1	0

Date 2/24/1979

Sample ID : 20403:2926.1

Gas : Methane

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : -21.3 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 869.385

P equilibrium : 252.212

P o : 244.678

SPECIFIC DEGASIBILITY 3.57566E-07

UNCERTAINTY .909905 %

System d Moles/ dP 2.19301E-06

Date 2/24/1979

Sample ID : 20403-2926.1

Gas : Methane

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : -10 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 870.453

P equilibrium : 246.765

P o : 240.593

SPECIFIC DEGASIBILITY 2.86374E-07

UNCERTAINTY .229889 %

System d Moles/ dP 2.17796E-06

Date 2/24/1979

Sample ID : 20403-2926.1

Gas : Methane

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : 2 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 872.125

P equilibrium : 241.304

P o : 236.062

SPECIFIC DEGASIBILITY 2.46521E-07

UNCERTAINTY 241021 %

System d Moles/ dP 2.15402E-06

Date 2/24/1979

Sample ID : 20403:2926.1

Gas : Methane

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : 12 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 873.659

P equilibrium : 237.415

P o : 233.045

SPECIFIC DEGASIBILITY 2.37405E-07

UNCERTAINTY .362762 %

System d Moles/ dP 2.15244E-06

Date 2/24/1979

Sample ID : 20403:2926.1

Gas : Methane

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : 20 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 875.617

P equilibrium : 235.068

P o : 230.986

SPECIFIC DEGASIBILITY 2.38227E-07

UNCERTAINTY .609193 %

System d Moles/ dP 2.14353E-06

Date 2/24/1979

Sample ID : 20403:2926.1

Gas : Methane

Initials : PDS

Book : 3

Page : 57

SAMPLE DATA

Weight : 5.4577 (grams)

Density : 2.726 (gm/cc)

Sample Temp : 30.7 (cent)

Particle Size : .085 (cm)

DATA COLLECTED

P initial : 874.473

P equilibrium : 230.325

P o : 227.112

SPECIFIC DEGASIBILITY 1.79809E-07

UNCERTAINTY .581805 %

System d Moles/ dP 2.13347E-06