

K & A
LABORATORIES

30.29-341

15-187-20602

May 13, 1992

Amoco Production Company
P. O. Box 800
Denver, Colorado 80201

Attention: Ms. Terri Olson

Re: Revised Final Results of
Standard Core Analysis
Well B-3HI
Amoco Jones Gas Unit
Chase Group
Stanton County, Kansas
API Well No. 1518720602
Job No. 91-3114-03

Dear Ms. Olson:

This revised report contains the re-measured core gamma log. Also, the depth ranges for this individual formations have been corrected. K&A Laboratories requests that the original report for this project be destroyed. This report contains the results from the air permeability, porosity, grain density, and core gamma tests that were performed on the reservoir core material. These tests were authorized in a letter dated August 26, 1991 by Ms. Terri Olson of Amoco Production Company. The Amoco reference number is DWB-42-WF.

The results of the standard core analyses are presented in tabular and graphical form on pages 3 through 33. A crossplot of air permeabilities versus porosities for each formation within the Chase Group are provided separately. A composite crossplot, including data from all formations, is also provided. Note that some samples fractured and broke apart during the cleaning process. A lithological description of each of these samples is also included with this report although the samples were not tested. These samples were consistently found to be shale or siltstones. Other samples were fractured, but still suitable for porosity measurements. These samples are noted in the data tables.

Plugs were not obtained from some sections of the core which were obviously shale. Samples drilled from depths 2,237 feet to 2,291 feet were not analyzed, as requested by Amoco Production Company.

A comparison of grain density measurements and corresponding lithological descriptions suggest some of the grain density measurements were unusually low. As an example, Sample Nos. 189 and 191, from the Gage Formation, are described as fine grain laminated limestones; however, grain densities are reported as 2.62 gms/cc. The helium porosities for these samples were rechecked and the grain densities were verified. This suggests the presence of mineral constituents within the cores which may be reducing the grain densities. The low grain densities may be due to gypsum, which is known to be present in Chase Group core, and humidity drying after the cleaning process.

The results of the core gamma scan are presented in graphical form on pages 34 through 36. The procedures used for these tests are presented at the end of this report.

The conditions, under which this report is presented, are described immediately following this report. We request that the report be used in its entirety if reproductions are to be made. Please contact us if you have any questions concerning these data, or if we may be of further service.

Respectfully submitted,

K&A LABORATORIES

K & A Laboratories

RAE/bw

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample Number</u>	<u>Depth, feet</u>	<u>Air Permeability, md</u>	<u>Porosity, percent</u>	<u>Grain Density, gm/cc</u>	<u>Lithological Descriptions</u>
<u>Herington Formation</u>					
55	2,291.6	0.116	10.2	2.83	Dol, v f gr, lt gry, pyr.
56	2,292.6	3.12	13.5	2.76	Dol, v f gr, lt gry, bdg.
57	2,293.6	0.224	7.5	2.77	Same as Sample No. 56.
58	2,294.6	4.31	13.4	2.75	Dol, v f gr, lt gry, sdg.
59	2,295.6	0.241	12.0	2.74	Ls, v f gr, lt gry.
60	2,296.6	1.30	13.1	2.75	Ls, v f gr, lt gry.
61	2,297.6	0.872	13.1	2.74	Ls, v f gr, lt gry.
62	2,298.6	0.193	10.8	2.73	Same as Sample No. 61.
63	2,299.6	8.72	15.7	2.73	Same as Sample No. 61.
64	2,300.6	Fractured	11.8	2.67	Ls, v f gr, mott, sh lam, org?, frac.
65	2,301.6	1.25	13.4	2.71	Ls, v f gr, lt gry, fnly lam.
66	2,302.5	2.07	18.3	2.72	Ls, v f gr, lt gry.
67	2,303.6	15.8	18.9	2.71	Same as Sample No. 66.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample Number</u>	<u>Depth, feet</u>	<u>Air Permeability, md</u>	<u>Porosity, percent</u>	<u>Grain Density, gm/cc</u>	<u>Lithological Descriptions</u>
<u>Herrington Formation</u>					
68	2,304.6	1.52	12.5	2.72	Same as Sample No. 66.
69	2,305.6	0.588	15.3	2.72	Same as Sample No. 66.
70	2,306.6	0.364	9.3	2.74	Ls, v f-f gr, lt gry, anhy nod.
71	2,307.7	5.32	19.2	2.73	Ls, v f-f gr, lt gry.
<u>Krider Formation</u>					
72	2,308.6	Fractured			Ls, v f gr, gry, frac.
73	2,309.6	0.0407	14.6	2.76	Dol, v f-f gr, lt gry, anhy nod.
74	2,310.6	1.42	23.8	2.83	Dol, v f-f gr, lt gry, anhy nod, pyr.
75	2,311.7	2.06	21.0	2.83	Dol, v f gr, lt gry, anhy nod.
76	2,312.6	3.87	23.5	2.81	Dol, f gr, lt gry.
77	2,313.6	6.87	22.7	2.82	Dol, v f gr, lt gry.
78	2,314.6	2.37	16.0	2.84	Dol, v f-f gr, lt gry, anhy nod.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample</u> <u>Number</u>	<u>Depth,</u> <u>feet</u>	<u>Air</u> <u>Permeability,</u> <u>md</u>	<u>Porosity,</u> <u>percent</u>	<u>Grain</u> <u>Density,</u> <u>gm/cc</u>	<u>Lithological Descriptions</u>
<u>Krider Formation</u>					
79	2,315.5	0.611	11.3	2.86	Dol, v f-f gr, mott gry, ool, fnly lam, mass anhy.
*80	2,316.8	0.0231	13.7	2.78	Dol, f gr, lt gry, anhy, frac.
81	2,317.6	0.147	10.4	2.74	Ls, v f gr, gry, rdsh, sh lam, pyr.
82	2,318.6	2.69	20.7	2.80	Ls, v f gr, gry, p.p.
83	2,319.6	1.43	18.5	2.80	Ls, v f-f gr, gry, ool, anhy nod, p.p., foss.
84	2,320.6	0.245	13.8	2.76	Same as Sample No. 83.
85	2,321.6	0.193	11.1	2.73	Same as Sample No. 83.
86	2,322.6	0.686	12.4	2.75	Same as Sample No. 83.
87	2,323.6	0.396	13.7	2.74	Same as Sample No. 83.
88	2,324.6	1.44	16.4	2.75	Same as Sample No. 83.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample Number</u>	<u>Depth, feet</u>	<u>Air Permeability, md</u>	<u>Porosity, percent</u>	<u>Grain Density, gm/cc</u>	<u>Lithological Descriptions</u>
<u>Krider Formation</u>					
89	2,325.6	0.606	12.7	2.73	Same as Sample No. 83.
90	2,326.6	0.543	13.5	2.75	Same as Sample No. 83.
91	2,327.4	0.183	11.3	2.72	Same as Sample No. 83.
92	2,328.6	0.861	12.7	2.72	Ls, v f-f gr, lt gry, foss.
93	2,329.6	1.16	14.0	2.72	Same as Sample No. 92.
94	2,330.6	0.0988	9.2	2.71	Ls, v f-f gr, lt gry, styl.
95	2,331.6	0.00728	4.9	2.72	Ls, v f-f gr, gry, ool, foss.
<u>Odell Formation</u>					
96	2,332.4	Shale			Sh, v f gr, gry, frac.
97	2,333.6	Shale			Sh, f gr, gry, calc, frac.
98	2,334.6	Shale			Same as Sample No. 97.
99	2,335.5	Shale			Sh, f gr, gry, calc, frac, lam.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

Sample Number	Depth, feet	Air Permeability, md	Porosity, percent	Grain Density, gm/cc	<u>Lithological Descriptions</u>
<u>Odell Formation</u>					
100	2,336.2	Fractured			Sltst, v f gr, rdsh brn, frac.
101	2,337.6	Fractured			Sltst, v f gr, rdsh brn, sdy, frac.
102	2,338.6	Fractured			Sltst, v f gr, rdsh brn, calc, frac.
*103	2,339.6	0.0137	11.9	2.71	Ls, f gr, rdsh brn, frac.
104	2,340.6	Fractured	7.3	2.64	Ls, f gr, gry, sdy, frac.
105	2,341.5	Fractured			Sltst, v f gr, rdsh gry, calc, frac.
106	2,342.6	Fractured	8.0	2.67	Ls, f gr, rdsh gry, sdy, frac.
*107	2,343.7	0.0678	8.8	2.71	Ls, f gr, rdsh brn, sdy, frac.
108	2,344.6	Fractured	7.0	2.65	Same as Sample No. 107.
*109	2,345.6	0.211	7.8	2.69	Ls, f gr, rdsh brn, frac.
110	2,346.7	Fractured			Ls, f gr, gry, frac.
111	2,347.6	Fractured			Sltst, v f gr, rdsh brn, calc, frac.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample Number</u>	<u>Depth, feet</u>	<u>Air Permeability, md</u>	<u>Porosity, percent</u>	<u>Grain Density, gm/cc</u>	<u>Lithological Descriptions</u>
<u>Odell Formation</u>					
112	2,348.	Shale - No Plug			
*113	2,349.6	0.00368	3.4	2.67	Ls, v f-f gr, rdsh gry, frac.
114	2,350.6	Fractured			Same as Sample No. 113.
115	2,351.6	Fractured			Ls, f gr, gry, frac.
116	2,352.	Shale - No Plug			
117	2,353.6	Fractured			Sltst, f gr, gry, calc, sdy, frac.
118	2,354.6	0.0852	14.4	2.75	Ls, f gr, lt gry, brec.
<u>Winfield Formation</u>					
119	2,355.6	2.07	18.9	2.69	Ls, f gr, rdsh gry.
120	2,356.7	12.1	18.3	2.67	Ls, f gr, lt gry.
121	2,357.6	8.55	21.1	2.65	Ls, f gr, rdsh brn, brec, glauc, sdy.
122	2,358.6	4.35	18.6	2.65	Ls, f gr, lt gry, mnr lam.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample</u> <u>Number</u>	<u>Depth,</u> <u>feet</u>	<u>Air</u> <u>Permeability,</u> <u>md</u>	<u>Porosity,</u> <u>percent</u>	<u>Grain</u> <u>Density,</u> <u>gm/cc</u>	<u>Lithological Descriptions</u>
<u>Winfield Formation</u>					
*123	2,359.5	11.8	22.5	2.66	Ls, f gr, rdsh brn, brec, frac.
124	2,360.	Rubble			
125	2,361.1	4.45	19.8	2.64	Ls f gr, gry, brec.
126	2,362.	Rubble			
*127	2,363.6	0.124	11.6	2.61	Ls, f gr, gry, brec, frac, bdg?
128	2,364.4	1.37	13.3	2.65	Same as Sample No. 127.
129	2,365.4	0.307	12.9	2.64	Same as Sample No. 127.
130	2,366.7	0.378	10.7	2.63	Same as Sample No. 127.
131	2,367.6	0.486	12.2	2.64	Same as Sample No. 127.
132	2,368.5	0.361	11.3	2.65	Same as Sample No. 127.
*133	2,369.6	0.00804	5.3	2.69	Ls, f gr, lt gry, ool?, frac, foss.
134	2,370.6	0.0128	7.2	2.68	Ls, f gr, lt gry, bdg?
135	2,371.6	0.0123	5.5	2.68	Ls, f gr, lt gry, brec, foss.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample Number</u>	<u>Depth, feet</u>	<u>Air Permeability, md</u>	<u>Porosity, percent</u>	<u>Grain Density, gm/cc</u>	<u>Lithological Descriptions</u>
<u>Winfield Formation</u>					
136	2,372.6	0.00203	2.3	2.69	Same as Sample No. 135.
137	2,373.3	0.0107	3.8	2.66	Ls, f gr, gry, foss, org?
138	2,374.6	0.00256	3.4	2.70	Ls, f gr, lt gry, brec, foss, frac.
139	2,375.6	0.00392	4.9	2.72	Ls, f gr, lt gry, foss.
140	2,376.6	0.00667	5.0	2.73	Ls, f gr, gry, foss.
141	2,377.6	0.0102	6.0	2.71	Ls, f gr, lt gry, foss.
142	2,378.6	0.0203	7.5	2.72	Ls, f gr, lt gry, foss.
143	2,379.6	0.0744	7.6	2.73	Ls, f gr, lt gry, foss.
144	2,380.7	0.0303	7.7	2.71	Same as Sample No. 143.
145	2,381.6	0.00456	4.1	2.70	Ls, f gr, lt gry, brec, foss.
146	2,382.6	0.00358	4.9	2.70	Ls, f gr, lt gry, foss.
147	2,383.6	0.0349	6.6	2.71	Ls, f gr, lt gry, foss, lam.
148	2,384.6	0.382	13.4	2.68	Ls, f gr, lt gry, foss.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
 WELL B-3HI
 AMOCO JONES GAS UNIT
 CHASE GROUP
 API WELL NO. 1518720602
 STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

Sample Number	Depth, feet	Air Permeability, md	Porosity, percent	Grain Density, gm/cc	Lithological Descriptions
<u>Winfield Formation</u>					
*149	2,385.6	0.0475	8.8	2.67	Ls, f gr, lt gry, lam, frac.
150	2,386.6	1.49	15.5	2.67	Ls, f gr, lt gry.
*151	2,387.1	2.15	16.2	2.67	Ls, f gr, lt gry, frac.
*152	2,388.7	1.32	16.0	2.65	Same as Sample No. 151.
*153	2,389.6	1.22	16.2	2.67	Same as Sample No. 151.
<u>Gage Formation</u>					
154	2,390.6	Fractured			Sltst, v f gr, dk gry, calc, frac.
155	2,391.6	Fractured			Sltst, v f gr, rdsh brn, sl calc, frac.
156	2,392.6	0.0171	11.1	2.70	Ls, f gr, rdsh brn, slty.
157	2,393.6	Fractured			Sltst, v f gr, rdsh brn, frac.
158	2,394.6	Fractured			Same as Sample No. 157.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample Number</u>	<u>Depth, feet</u>	<u>Air Permeability, md</u>	<u>Porosity, percent</u>	<u>Grain Density, gm/cc</u>	<u>Lithological Descriptions</u>
<u>Gage Formation</u>					
159	2,395.	No Plug - Shale			
160	2,396.7	Fractured			Sltst, v f gr, rdsh brn, brec, frac, sl calc.
161	2,397.6	Fractured			Same as Sample No. 160.
162	2,398.6	Fractured			Same as Sample No. 160.
163	2,399.6	Fractured			Same as Sample No. 160.
164	2,400.6	Fractured			Dol, f gr, gry, lam, frac.
*165	2,401.6	0.0438	10.0	2.68	Dol, f gr, rdsh gry, frac.
166	2,402.	Shale - No Plug			
*167	2,403.6	0.0317	12.2	2.73	Dol, f gr, rdsh gry, frac.
168	2,404.	Rubble			
169	2,405.	Rubble			
170	2,406.6	Fractured			Dol, f gr, rdsh gry, frac.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample Number</u>	<u>Depth, feet</u>	<u>Air Permeability, md</u>	<u>Porosity, percent</u>	<u>Grain Density, gm/cc</u>	<u>Lithological Descriptions</u>
<u>Gage Formation</u>					
171	2,407.	Preserved by Amoco Production Co.			
172	2,408.7	0.198	15.9	2.70	Dol, f gr, rdsh brn, sdy.
173	2,409.6	0.148	14.3	2.68	Dol, f gr, rdsh brn, sl brec, sdy.
174	2,410.5	Fractured	14.8	2.68	Dol, f gr, rdsh brn, frac, sdy.
175	2,411.6	0.398	16.2	2.70	Dol, f gr, rdsh brn, anhy nod, sdy.
176	2,412.6	0.336	16.0	2.70	Same as Sample No. 175.
177	2,413.5	0.462	16.5	2.70	Same as Sample No. 175.
178	2,414.6	0.724	15.9	2.69	Dol, f gr, rdsh gry, bdg, sdy.
179	2,415.6	Fractured			Dol, f gr, rdsh gry, bdg, sdy, frac.
180	2,416.6	0.0539	12.6	2.70	Dol, f gr, rdsh gry, brec, anhy, sdy.
181	2,417.5	0.845	14.1	2.71	Dol, f gr, lt gry, anhy, frac.
182	2,418.6	0.204	14.2	2.70	Dol, f gr, lt gry, lam.
183	2,419.3	Fractured	11.8	2.69	Same as Sample No. 182.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample</u> <u>Number</u>	<u>Depth,</u> <u>feet</u>	<u>Air</u> <u>Permeability,</u> <u>md</u>	<u>Porosity,</u> <u>percent</u>	<u>Grain</u> <u>Density,</u> <u>gm/cc</u>	<u>Lithological Descriptions</u>
<u>Gage Formation</u>					
184	2,420.	Rubble			
185	2,421.7	Shale - No Plug			
186	2,422.6	Fractured	14.0	2.71	Dol, f gr, lt gry, frac.
187	2,423.6	Fractured			Ls, f gr, dk gry, foss?, frac.
188	2,424.7	Fractured			Ls, f gr, lt gry, anhy nod, frac.
189	2,425.6	0.00380	6.1	2.62	Ls, f gr, lt gry, lam.
190	2,426.6	Fractured			Ls, f gr, gry, lam, anhy nod, frac.
191	2,427.6	0.00356	5.0	2.62	Ls, f gr, gry, lam, frac.
<u>Towanda Formation</u>					
192	2,428.6	0.00212	2.4	2.62	Ls, f gr, lt gry, brec, foss.
193	2,429.7	0.00145	1.4	2.66	Ls, f gr, lt gry, ool?, foss.
194	2,430.5	0.00162	4.3	2.69	Ls, f gr, lt gry, foss.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample Number</u>	<u>Depth, feet</u>	<u>Air Permeability, md</u>	<u>Porosity, percent</u>	<u>Grain Density, gm/cc</u>	<u>Lithological Descriptions</u>
<u>Gage Formation</u>					
184	2,420.	Rubble			
185	2,421.7	Shale - No Plug			
186	2,422.6	Fractured	14.0	2.71	Dol, f gr, lt gry, frac.
187	2,423.6	Fractured			Ls, f gr, dk gry, foss?, frac.
188	2,424.7	Fractured			Ls, f gr, lt gry, anhy nod, frac.
189	2,425.6	0.00380	6.1	2.62	Ls, f gr, lt gry, lam.
190	2,426.6	Fractured			Ls, f gr, gry, lam, anhy nod, frac.
191	2,427.6	0.00356	5.0	2.62	Ls, f gr, gry, lam, frac.
<u>Towanda Formation</u>					
192	2,428.6	0.00212	2.4	2.62	Ls, f gr, lt gry, brec, foss.
193	2,429.7	0.00145	1.4	2.66	Ls, f gr, lt gry, ool?, foss.
194	2,430.5	0.00162	4.3	2.69	Ls, f gr, lt gry, foss.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample</u> <u>Number</u>	<u>Depth,</u> <u>feet</u>	<u>Air</u> <u>Permeability,</u> <u>md</u>	<u>Porosity,</u> <u>percent</u>	<u>Grain</u> <u>Density,</u> <u>gm/cc</u>	<u>Lithological Descriptions</u>
<u>Towanda Formation</u>					
195	2,431.6	0.00710	6.0	2.73	Ls, f gr, lt gry, ool?, foss.
196	2,432.6	0.00602	5.9	2.70	Ls, f gr, lt gry, brec, foss.
197	2,433.6	0.00961	7.0	2.71	Ls, f gr, lt gry, foss.
198	2,434.6	0.0126	5.0	2.71	Ls, f gr, lt gry, brec, foss.
199	2,435.6	1.11	4.7	2.69	Ls, f gr, gry, foss, brec.
200	2,436.5	0.0328	4.7	2.70	Ls, f gr, lt gry, foss.
201	2,437.6	0.00502	5.4	2.70	Ls, f gr, lt gry, sl brec, foss.
202	2,438.6	0.00648	5.6	2.70	Ls, f gr, lt gry, lam, foss.
203	2,439.6	0.0119	6.6	2.70	Ls, f gr, lt gry, foss.
204	2,440.6	0.0323	7.7	2.74	Same as Sample No. 203.
205	2,441.7	0.0384	6.9	2.71	Ls, f gr, lt gry, foss.
206	2,442.6	0.0200	7.4	2.70	Same as Sample No. 205.
207	2,443.6	0.00935	6.6	2.71	Same as Sample No. 205.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample</u> <u>Number</u>	<u>Depth,</u> <u>feet</u>	<u>Air</u> <u>Permeability,</u> <u>md</u>	<u>Porosity,</u> <u>percent</u>	<u>Grain</u> <u>Density,</u> <u>gm/cc</u>	<u>Lithological Descriptions</u>
--------------------------------	------------------------------	---	------------------------------------	---	----------------------------------

Towanda Formation

208	2,444.6	0.00527	5.9	2.69	Ls, f gr, gry, anhy nod.
209	2,445.7	0.459	12.3	2.69	Ls, f gr, lt gry.
210	2,446.7	1.24	11.7	2.71	Ls, f gr, lt gry, lam.
211	2,447.6	0.245	12.0	2.70	Same as Sample No. 210.

Holmesville Formation

212	2,448.	Shale - No Plug			
213	2,449.6	0.154	14.3	2.66	Ls, f gr, lt gry.
*214	2,450.7	Fractured	16.3	2.70	Ls, f gr, lt gry, frac.
215	2,451.6	0.391	15.5	2.68	Ls, f gr, rdsh brn.
216	2,452.6	0.121	14.2	2.66	Same as Sample No. 215.
217	2,453.6	0.0948	13.6	2.68	Same as Sample No. 215.
*218	2,454.6	0.0363	12.3	2.67	Ls, f gr, gry, sl brec, frac.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample</u> <u>Number</u>	<u>Depth,</u> <u>feet</u>	<u>Air</u> <u>Permeability,</u> <u>md</u>	<u>Porosity,</u> <u>percent</u>	<u>Grain</u> <u>Density,</u> <u>gm/cc</u>	<u>Lithological Descriptions</u>
<u>Holmesville Formation</u>					
219	2,455.6	0.0112	7.2	2.67	Ls, f gr, gry, lam.
220	2,456.6	0.0155	12.5	2.71	Dol, f gr, rdsh brn.
221	2,457.6	0.0528	12.4	2.70	Dol, f gr, rdsh brn.
222	2,458.6	Fractured	13.4	2.68	Dol, f gr, rdsh gry.
223	2,459.	Shale - No Plug			
224	2,460.6	0.104	12.7	2.72	Dol, f gr, rdsh gry, brec, anhy.
225	2,461.6	0.0417	12.7	2.70	Dol, f gr, rdsh gry, anhy.
226	2,462.6	0.0944	13.3	2.69	Same as Sample No. 225.
227	2,463.6	0.814	16.7	2.69	Same as Sample No. 225.
228	2,464.6	0.683	16.5	2.68	Same as Sample No. 225.
229	2,465.6	0.454	16.9	2.67	Dol, f gr, rdsh gry, anhy, sdy.
230	2,466.5	0.454	16.8	2.67	Same as Sample No. 229.
231	2,467.5	Fractured	10.6	2.65	Sltst, v f gr, dk gry, sdy, frac.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample Number</u>	<u>Depth, feet</u>	<u>Air Permeability, md</u>	<u>Porosity, percent</u>	<u>Grain Density, gm/cc</u>	<u>Lithological Descriptions</u>
<u>Fort Riley Formation</u>					
232	2,468.6	0.286	12.2	2.76	Dol, f gr, lt gry, lam, brec, styl, anhy.
233	2,469.6	1.31	19.8	2.81	Dol, f gr, lt gry, anhy.
234	2,470.6	0.0572	6.8	2.77	Ls, f gr, lt gry, anhy, foss.
235	2,471.6	1.84	14.4	2.78	Ls, f gr, lt gry, lam, foss.
236	2,472.6	14.3	22.9	2.82	Ls, f gr, lt gry, p.p., foss.
237	2,473.6	2.58	14.7	2.83	Ls, f gr, gry, p.p., foss.
238	2,474.6	0.295	12.2	2.78	Same as Sample No. 237.
239	2,475.6	1.19	19.4	2.81	Ls, f gr, gry, p.p., foss, anhy.
240	2,476.6	0.191	11.4	2.75	Ls, f gr, lt gry, p.p., foss.
241	2,477.6	0.231	14.2	2.76	Ls, f gr, gry, foss.
242	2,478.6	0.200	11.5	2.77	Same as Sample No. 241.
243	2,479.6	0.0647	9.7	2.76	Ls, f gr, gry, foss, anhy nod.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample</u> <u>Number</u>	<u>Depth,</u> <u>feet</u>	<u>Air</u> <u>Permeability,</u> <u>md</u>	<u>Porosity,</u> <u>percent</u>	<u>Grain</u> <u>Density,</u> <u>gm/cc</u>	<u>Lithological Descriptions</u>
<u>Fort Riley Formation</u>					
244	2,480.6	0.0265	8.2	2.76	Same as Sample No. 243.
245	2,481.6	0.0245	9.3	2.75	Same as Sample No. 243.
246	2,482.6	0.0308	8.9	2.74	Ls, f gr, lt gry, foss.
247	2,483.6	0.0176	8.0	2.73	Same as Sample No. 246.
248	2,484.6	0.0216	8.2	2.75	Ls, f gr, lt gry, foss, anhy nod.
249	2,485.7	0.0153	7.8	2.72	Ls, f gr, lt gry, foss.
250	2,486.6	0.0579	10.2	2.72	Ls, f gr, lt gry, foss.
251	2,487.6	0.164	11.2	2.71	Same as Sample No. 250.
252	2,488.7	0.466	12.2	2.72	Ls, f gr, lt gry, foss, anhy nod, styl.
*253	2,489.6	1.01	12.5	2.74	Ls, f gr, lt gry, foss, mnf frac.
254	2,490.6	1.17	14.1	2.72	Ls, f gr, lt gry, foss.
255	2,491.6	0.824	12.4	2.72	Same as Sample No. 254.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample</u> <u>Number</u>	<u>Depth,</u> <u>feet</u>	<u>Air</u> <u>Permeability,</u> <u>md</u>	<u>Porosity,</u> <u>percent</u>	<u>Grain</u> <u>Density,</u> <u>gm/cc</u>	<u>Lithological Descriptions</u>
<u>Fort Riley Formation</u>					
256	2,492.6	1.19	14.5	2.70	Same as Sample No. 254.
257	2,493.6	0.425	12.1	2.70	Same as Sample No. 254.
258	2,494.5	0.548	13.3	2.70	Ls, f gr, lt gry, foss, styl.
259	2,495.7	0.733	13.8	2.71	Ls, f gr, lt gry, foss.
260	2,496.6	0.165	10.7	2.71	Same as Sample No. 259.
261	2,497.6	0.470	13.0	2.70	Same as Sample No. 259.
*262	2,498.7	0.109	10.1	2.71	Ls, f gr, lt gry, foss, styl, frac.
263	2,499.6	0.0865	10.7	2.70	Ls, f gr, lt gry, foss, styl, anhy.
264	2,500.6	0.201	11.6	2.71	Ls, f gr, lt gry, foss, anhy.
265	2,501.6	0.0564	7.0	2.76	Ls, f gr, lt gry, foss, anhy nod.
*266	2,502.6	0.0324	7.5	2.71	Ls, f gr, lt gry, foss, frac.
267	2,503.6	0.0674	7.6	2.77	Ls, f gr, gry, foss, anhy nod, styl.
268	2,504.7	0.00521	4.9	2.73	Ls, f gr, gry, foss.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample Number</u>	<u>Depth, feet</u>	<u>Air Permeability, md</u>	<u>Porosity, percent</u>	<u>Grain Density, gm/cc</u>	<u>Lithological Descriptions</u>
<u>Fort Riley Formation</u>					
269	2,505.6	0.00311	3.9	2.72	Same as Sample No. 268.
270	2,506.6	0.00295	2.4	2.69	Ls, f gr, gry, foss, anhy.
271	2,507.5	0.00252	2.5	2.69	Ls, f gr, gry, foss.
272	2,508.6	0.00267	2.1	2.68	Same as Sample No. 271.
273	2,509.6	0.00270	0.8	2.67	Ls, f gr, dk gry, foss.
274	2,510.6	0.00640	3.0	2.68	Ls, f gr, gry, foss, anhy nod.
275	2,511.6	Fractured	1.8	2.61	Ls, f gr, gry, foss, org?, frac.
276	2,512.6	0.00220	1.1	2.64	Ls, f gr, dk gry, foss, anhy nod.
277	2,513.6	0.00233	0.8	2.63	Ls, f gr, gry, foss, org?
278	2,514.5	0.00233	0.9	2.62	Same as Sample No. 277.
279	2,515.6	0.00212	1.4	2.63	Ls, f gr, dk gry, foss.
280	2,516.6	0.00654	5.5	2.72	Ls, f gr, lt gry, foss.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample</u> <u>Number</u>	<u>Depth,</u> <u>feet</u>	<u>Air</u> <u>Permeability,</u> <u>md</u>	<u>Porosity,</u> <u>percent</u>	<u>Grain</u> <u>Density,</u> <u>gm/cc</u>	<u>Lithological Descriptions</u>
<u>Florence Formation</u>					
281	2,517.5	2.02	14.7	2.70	Ls, f gr, lt gry, lam.
*282	2,518.9	8.92	17.1	2.71	Ls, f gr, lt gry, mnr lam, frac.
283	2,519.6	4.26	15.5	2.71	Same as Sample No. 282.
284	2,520.6	6.03	15.4	2.71	Dol, f gr, lt gry, bdg?, org?
285	2,521.6	5.84	14.9	2.71	Same as Sample No. 284.
286	2,522.6	5.55	15.3	2.70	Ls, f gr, lt gry, mnr bdg.
287	2,523.6	0.283	12.2	2.69	Ls, f gr, gry, bdg.
288	2,524.6	0.593	14.0	2.70	Ls, f gr, gry, bdg, styl.
289	2,525.6	0.503	13.0	2.69	Ls, f gr, lt gr, mnr bdg.
290	2,526.6	2.78	15.7	2.70	Ls, f gr, lt gry, lam.

* Partial Fracture

STANDARD CORE ANALYSIS SUMMARY

AMOCO PRODUCTION COMPANY
WELL B-3HI
AMOCO JONES GAS UNIT
CHASE GROUP
API WELL NO. 1518720602
STANTON COUNTY, KANSAS

Coring Fluid: Water-Based Mud

Core Barrel Type: Standard

Core Diameter: 4 Inches

<u>Sample</u> <u>Number</u>	<u>Depth,</u> <u>feet</u>	<u>Air</u> <u>Permeability,</u> <u>md</u>	<u>Porosity,</u> <u>percent</u>	<u>Grain</u> <u>Density,</u> <u>gm/cc</u>	<u>Lithological Descriptions</u>
<u>Matfield Formation</u>					
291	2,527.6	0.0199	8.5	2.64	Ls, f gr, gry, lam.
292	2,528.6	0.0905	9.6	2.60	Ls, f gr, lt gry, sdy.
293	2,529.6	0.299	13.2	2.66	Same as Sample No. 292.
294	2,530.6	0.282	12.6	2.69	Same as Sample No. 292.
295	2,531.6	0.144	11.7	2.68	Ls, f gr, lt gry, sdy.
296	2,532.6	0.0810	10.9	2.69	Same as Sample No. 295.
297	2,533.7	0.0538	9.8	2.68	Same as Sample No. 295.
298	2,534.7	0.0280	8.6	2.67	Same as Sample No. 295.
299	2,535.8	Fractured			Ls, f gr, dk gry, slty, frac.
300	2,536.6	0.00923	5.1	2.71	Ls, f gr, rdsh brn.
301	2,537.	Shale - No Plug			
302	2,538.	Rubble			

* Partial Fracture