Home Office: Wichita, Kansas 67201
P.O. Box 1599 (316) 262-5861

Company Thunderbird Drilling, Inc. Lease & Well No. Ritter #1

Elevation - Formation Topeka Effective Pay - Ft. Ticket No. 7491

Date 9-24-80 Sec. 4 Twp. 4S Range 25W County Norton State Kansas

Test Approved by Stanton Cox Western Representative Les Holtz

Formation Test No. 1 Interval Tested from 3192 ft. to 3200 ft. Total Depth 3200 ft.

Packer Depth 3192 ft. Size 6 3/4 in. Packer Depth - ft. Size - in.

Packer Depth - ft. Size - in. Packer Depth - ft. Size - in.

Depth of Selective Zone Set -

Top Recorder Depth (Inside) 3197 ft. Recorder Number 2608 Cap. 4150

Bottom Recorder Depth (Outside) 3200 ft. Recorder Number 3473 Cap. 4000

Below Straddle Recorder Depth - ft. Recorder Number - Cap. -

Drilling Contractor Thunderbird Drlg. Drill Collar Length - I. D. - in.

Mud Type Drispac Viscosity 44 Weight Pipe Length 575 I. D. 2.76 in.

Weight 9.3 Water Loss - cc. Drill Pipe Length 2602 I. D. 3.8 in.

Chlorides - P.P.M. Test Tool Length 15 ft. Tool Size 5 1/2 in.

Jars: Make No Serial Number - Anchor Length 8 ft. Size 5 1/2 in.

Did Well Flow? No Reversed Out - Surface Choke Size 3/4 in. Bottom Choke Size 3/4

Main Hole Size 7 7/8 in. Tool Joint Size 4½FH

Blow: No blow, flushed tool in 10 minutes. Very weak blow died in 5 minutes on initial flow period. No blow on final flow period.

Recovered 5 ft. of heavy mud

Recovered ft. of

Recovered ft. of

Recovered ft. of

Recovered ft. of

Remarks: Misrun, leaking by packer false shutin pressure.

Time Set Packer(s) 10:45 ~~A.M.~~ ~~P.M.~~ Time Started Off Bottom 12:45 ~~A.M.~~ P.M. Maximum Temperature 99

Initial Hydrostatic Pressure (A) 1554 P.S.I.

Initial Flow Period Minutes 30 (B) - P.S.I. to (C) - P.S.I.

Initial Closed In Period Minutes 30 (D) - P.S.I.

Final Flow Period Minutes 30 (E) - P.S.I. to (F) - P.S.I.

Final Closed In Period Minutes 30 (G) - P.S.I.

Final Hydrostatic Pressure (H) 1515 P.S.I.

JK# 7491

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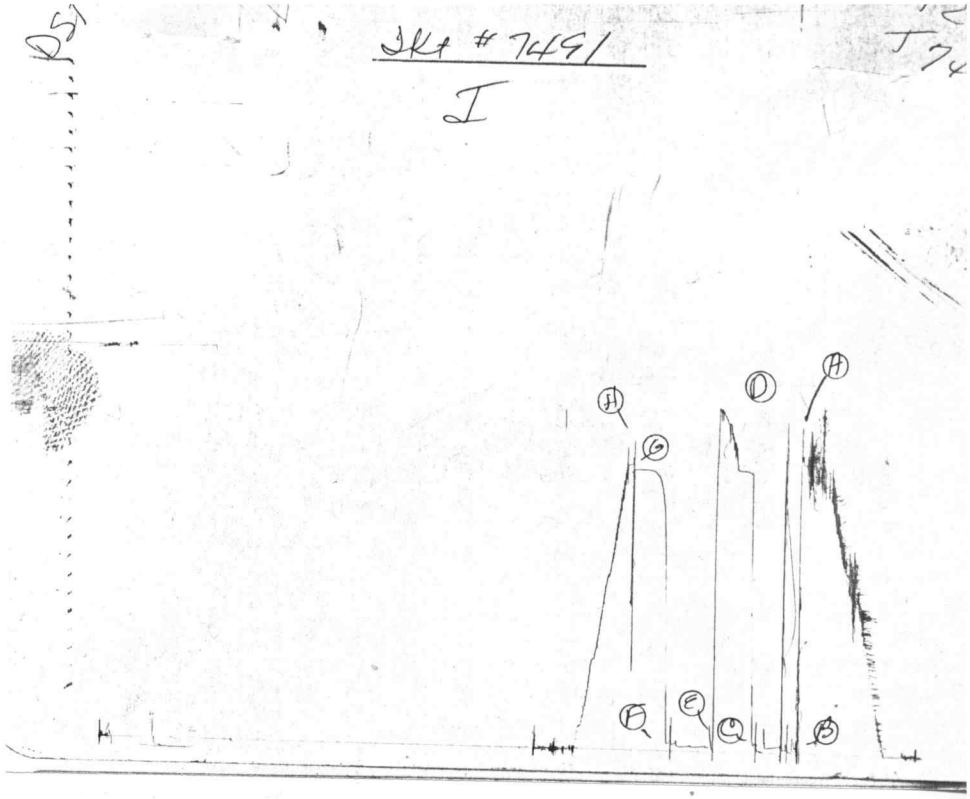


Home Office: Wichita, Kansas 67201
P.O. Box 1599 (316) 262-5861

Company Thunderbird Drilling, Inc. Lease & Well No. Ritter #1

Elevation - Formation - Effective Pay - Ft. Ticket No. 7493

Date 9-26-80 Sec. 4 Twp. 4S Range 25W County Norton State Kansas

Test Approved by Stanton Cox Western Representative Les Holtz

Formation Test No. 2 Interval Tested from 3500 ft. to 3535 ft. Total Depth 3535 ft.

Packer Depth 3500 ft. Size 6 3/4 in. Packer Depth - ft. Size - in.

Packer Depth - ft. Size - in. Packer Depth - ft. Size - in.

Depth of Selective Zone Set -

Top Recorder Depth (Inside) 3532 ft. Recorder Number 2608 Cap. 4150

Bottom Recorder Depth (Outside) 3535 ft. Recorder Number 3473 Cap. 4000

Below Straddle Recorder Depth - ft. Recorder Number - Cap. -

Drilling Contractor Thunderbird Drilling, Inc. Drill Collar Length - I. D. - in.

Mud Type Drispac Viscosity - Weight Pipe Length 575 I. D. 2.76 in.

Weight - Water Loss - cc. Drill Pipe Length 2910 I. D. 3.8 in.

Chlorides - P.P.M. Test Tool Length 15 ft. Tool Size 5 1/2 in.

Jars: Make - Serial Number - Anchor Length 35 ft. Size 5 1/2 in.

Did Well Flow? No Reversed Out No Surface Choke Size 3/4 in. Bottom Choke Size 3/4

Main Hole Size 7 7/8 in. Tool Joint Size 4½FH

Blow: Weak blow throughout initial flow period. No blow on final flow period.

Recovered 15 ft. of mud

Recovered ft. of

Recovered ft. of

Recovered ft. of

Recovered ft. of

Remarks:

Time Set Packer(s) 3:00 ~~A.M.~~ ~~P.M.~~ Time Started Off Bottom 6:15 ~~A.M.~~ ~~P.M.~~ Maximum Temperature 102

Initial Hydrostatic Pressure ..... (A) 1783 P.S.I.

Initial Flow Period ..... Minutes 45 (B) 62 P.S.I. to (C) 56 P.S.I.

Initial Closed In Period ..... Minutes 45 (D) 100 P.S.I.

Final Flow Period ..... Minutes 75 (E) 64 P.S.I. to (F) 58 P.S.I.

Final Closed In Period ..... Minutes 30 (G) 58 P.S.I.

Final Hydrostatic Pressure ..... (H) 1748 P.S.I.

WESTERN TESTING CO., INC.
Pressure Data

Date 9-26-80 Test Ticket No. 7493

Recorder No. 2608 Capacity 4150 Location 3532 F

Clock No. - Elevation - Well Temperature 102 °

Point		Pressure	
A	Initial Hydrostatic Mud	1783	P.S.I.
B	First Initial Flow Pressure	62	P.S.I.
C	First Final Flow Pressure	56	P.S.I.
D	Initial Closed-in Pressure	100	P.S.I.
E	Second Initial Flow Pressure	64	P.S.I.
F	Second Final Flow Pressure	58	P.S.I.
G	Final Closed-in Pressure	58	P.S.I.
H	Final Hydrostatic Mud	1748	P.S.I.

	Time Given	Time Computed
Open Tool	3:00A. M	
First Flow Pressure	45 Mins.	45 Min
Initial Closed-in Pressure	45 Mins.	45 Min
Second Flow Pressure	75 Mins.	75 Min
Final Closed-in Pressure	30 Mins.	30 Min

PRESSURE BREAKDOWN

First Flow Pressure
Breakdown: 9 Inc. of 5 mins. and a final inc. of 0 Min.

Point Mins.	Press.
P 1 0	62
P 2 5	58
P 3 10	56
P 4 15	56
P 5 20	56
P 6 25	56
P 7 30	56
P 8 35	56
P 9 40	56
P10 45	56
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

Initial Shut-In
Breakdown: 15 Inc. of 3 mins. and a final inc. of 0 Min.

Point Minutes	Press.
0	56
3	56
6	56
9	58
12	60
15	62
18	67
21	71
24	75
27	77
30	81
33	85
36	87
39	92
42	96
45	100

Second Flow Pressure
Breakdown: 15 Inc. of 5 mins. and a final inc. of 0 Min.

Point Minutes	Press.
0	64
5	62
10	60
15	59
20	58
25	58
30	58
35	58
40	58
45	58
50	58
55	58
60	58
65	58
70	58
75	58

Final Shut-In
Breakdown: 10 Inc. of 3 mins. and a final inc. of 0 Min.

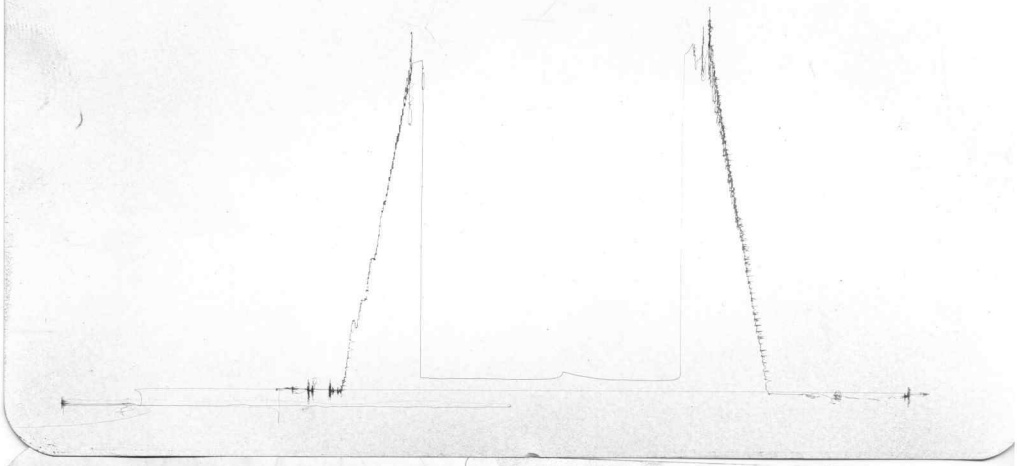
Point Minutes	Press.
0	58
3	58
6	58
9	58
12	58
15	58
18	58
21	58
24	58
27	58
30	58

DST #2

JK # 7493

O

B-3473
T-7493



DST #2

JK # 7493

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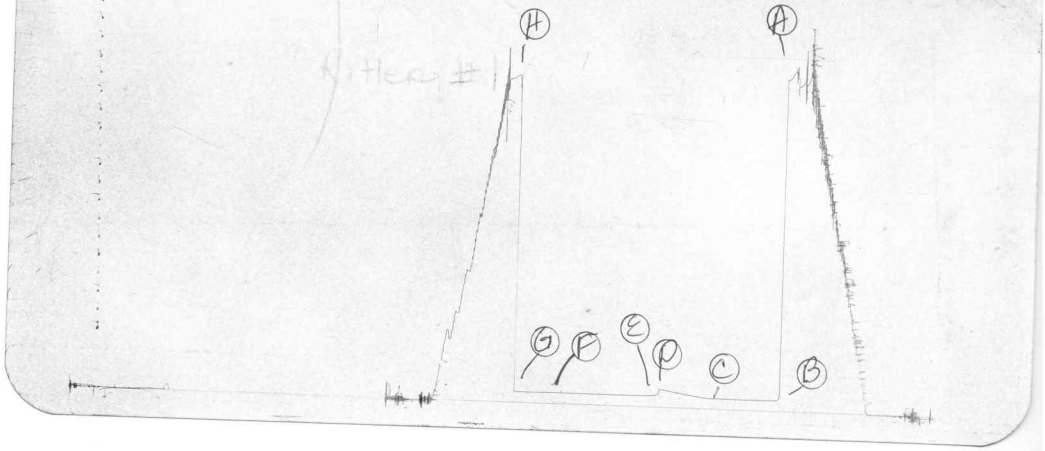
T-2408
T-7493



Home Office: Wichita, Kansas 67201
P.O. Box 1599 (316) 262-5861

Company Thunderbird Drilling, Inc. Lease & Well No. Ritter #1

Elevation - Formation - Effective Pay - Ft. Ticket No. 7494

Date 9-26-80 Sec. 4 Twp. 4S Range 25W County Norton State Kansas

Test Approved by Stanton Cox Western Representative Les Holtz

Formation Test No. 3 Interval Tested from 3539 ft. to 3570 ft. Total Depth 3570 ft.

Packer Depth 3539 ft. Size 6 3/4 in. Packer Depth - ft. Size - in.

Packer Depth - ft. Size - in. Packer Depth - ft. Size - in.

Depth of Selective Zone Set -

Top Recorder Depth (Inside) 3567 ft. Recorder Number 2608 Cap. 4150

Bottom Recorder Depth (Outside) 3570 ft. Recorder Number 3473 Cap. 4000

Below Straddle Recorder Depth - ft. Recorder Number - Cap. -

Drilling Contractor Thunderbird Drlg. Co. Drill Collar Length - I. D. - in.

Mud Type Drispac Viscosity 56 Weight Pipe Length 575 I. D. 2.76 in.

Weight 9.4 Water Loss 8.0 cc. Drill Pipe Length 2949 I. D. 3.8 in.

Chlorides 2,300 P.P.M. Test Tool Length 15 ft. Tool Size 5 1/2 in.

Jars: Make No Serial Number - Anchor Length 31 ft. Size 5 1/2 in.

Did Well Flow? No Reversed Out no Surface Choke Size 3/4 in. Bottom Choke Size 3/4 in.

Main Hole Size 7 7/8 in. Tool Joint Size 4½FH in.

Blow: Very weak blow throughout test.

Recovered 130 ft. of mud

Recovered ft. of

Recovered ft. of

Recovered ft. of

Recovered ft. of

Remarks:

Time Set Packer(s) 5:00 ~~A.M.~~ P.M. Time Started Off Bottom 8:00 ~~A.M.~~ P.M. Maximum Temperature 102

Initial Hydrostatic Pressure (A) 1845 P.S.I.

Initial Flow Period Minutes 45 (B) 89 P.S.I. to (C) 125 P.S.I.

Initial Closed In Period Minutes 48 (D) 714 P.S.I.

Final Flow Period Minutes 45 (E) 158 P.S.I. to (F) 150 P.S.I.

Final Closed In Period Minutes 45 (G) 663 P.S.I.

Final Hydrostatic Pressure (H) 1797 P.S.I.

WTC-

WESTERN TESTING CO., INC.
Pressure Data

Date 9-26-80 Test Ticket No. 7494

Recorder No. 2608 Capacity 4150 Location 3567 Ft.

Clock No. - Elevation - Well Temperature 102 °F

Point		Pressure			Time Given	Time Computed
A	Initial Hydrostatic Mud	1845	P.S.I.	Open Tool	5:00P. M	
B	First Initial Flow Pressure	89	P.S.I.	First Flow Pressure	45 Mins.	45 Mins.
C	First Final Flow Pressure	125	P.S.I.	Initial Closed-in Pressure	45 Mins.	48 Mins.
D	Initial Closed-in Pressure	714	P.S.I.	Second Flow Pressure	45 Mins.	45 Mins.
E	Second Initial Flow Pressure	158	P.S.I.	Final Closed-in Pressure	45 Mins.	45 Mins.
F	Second Final Flow Pressure	150	P.S.I.			
G	Final Closed-in Pressure	663	P.S.I.			
H	Final Hydrostatic Mud	1797	P.S.I.			

PRESSURE BREAKDOWN

First Flow Pressure
Breakdown: 9 Inc. of 5 mins. and a final inc. of 0 Min.

Point Mins.	Press.
P 1 0	89
P 2 5	110
P 3 10	116
P 4 15	116
P 5 20	119
P 6 25	119
P 7 30	119
P 8 35	121
P 9 40	123
P10 45	125
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

Initial Shut-In
Breakdown: 16 Inc. of 3 mins. and a final inc. of 0 Min.

Point Minutes	Press.
0	125
3	450
6	494
9	535
12	574
15	599
18	619
21	636
24	648
27	663
30	675
33	683
36	690
39	700
42	706
45	710
48	714

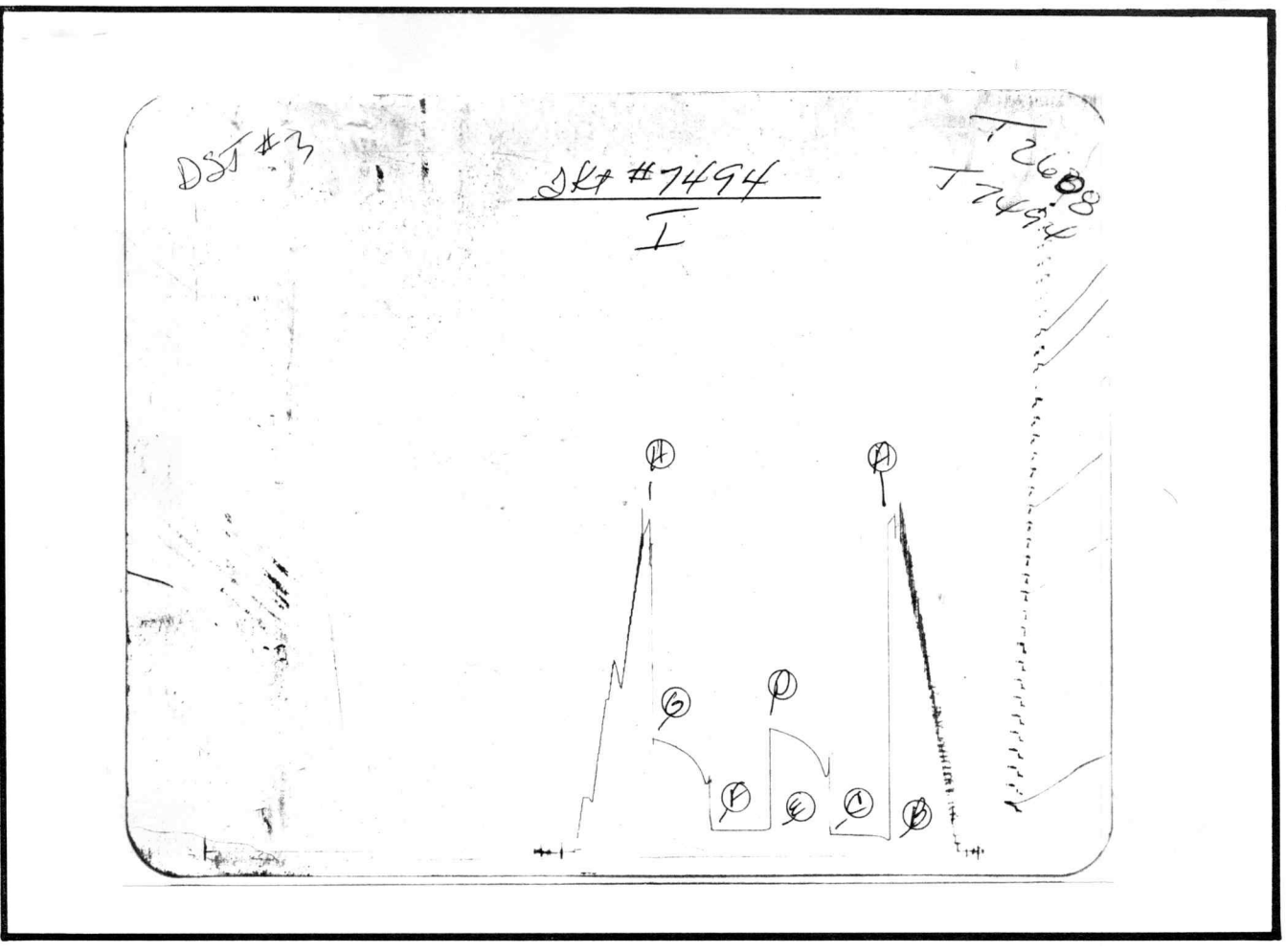
Second Flow Pressure
Breakdown: 9 Inc. of 5 mins. and a final inc. of 0 Min.

Point Minutes	Press.
0	158
5	152
10	150
15	150
20	150
25	150
30	150
35	150
40	150
45	150

Final Shut-In
Breakdown: 15 Inc. of 3 mins. and a final inc. of 0 Min.

Point Minutes	Press.
0	150
3	412
6	448
9	494
12	525
15	552
18	574
21	591
24	603
27	615
30	628
33	634
36	644
39	652
42	657
45	663

COMPANY Thunderbird Drilling, Inc. LEASE AND WELL NO. Ritter #1 SEC. 4 TWP. 4S RGE. 25W TEST NO. 3 DATE 9-26-80



This is an actual photograph of recorder chart.

POINT		PRESSURE Field Reading	Office Reading	
(A)	Initial Hydrostatic Mud	1847	1845	PSI
(B)	First Initial Flow Pressure	83	89	PSI
(C)	First Final Flow Pressure	125	125	PSI
(D)	Initial Closed-in Pressure	706	714	PSI
(E)	Second Initial Flow Pressure	135	158	PSI
(F)	Second Final Flow Pressure	146	150	PSI
(G)	Final Closed-in Pressure	665	663	PSI
(H)	Final Hydrostatic Mud	1816	1797	PSI

NOMENCLATURE

b	=	**Approximate Radius of Investigation**	**Feet**
b^1	=	**Approximate Radius of Investigation (Net Pay Zone h^1)**	**Feet**
D.R.	=	**Damage Ratio**	**——**
El	=	**Elevation**	**Feet**
GD	=	**B.T. Gauge Depth (From Surface Reference)**	**Feet**
h	=	**Interval Tested**	**Feet**
h^1	=	**Net Pay Thickness**	**Feet**
K	=	**Permeability**	**md**
K^1	=	**Permeability (From Net Pay Zone h^1)**	**md**
m	=	**Slope Extrapolated Pressure Plot (Psi^2/cycle Gas)**	**psi/cycle**
OF^1	=	**Maximum Indicated Flow Rate**	**MCF/D**
OF^2	=	**Minimum Indicated Flow Rate**	**MCF/D**
OF^3	=	**Theoretical Open Flow Potential with/Damage Removed Max.**	**MCF/D**
OF^4	=	**Theoretical Open Flow Potential with/Damage Removed Min.**	**MCF/D**
P^S	=	**Extrapolated Static Pressure**	**Psig.**
P^F	=	**Final Flow Pressure**	**Psig.**
P^{OT}	=	**Potentiometric Surface (Fresh Water*)**	**Feet**
Q	=	**Average Adjusted Production Rate During Test**	**bbls/day**
Q^1	=	**Theoretical Production w/Damage Removed**	**bbls/day**
Q^g	=	**Measured Gas Production Rate**	**MCF/D**
R	=	**Corrected Recovery**	**bbls**
r^w	=	**Radius of Well Bore**	**Feet**
t	=	**Flow Time**	**Minutes**
t^o	=	**Total Flow Time**	**Minutes**
T	=	**Temperature Rankine**	**°R**
Z	=	**Compressibility Factor**	**——**
u	=	**Viscosity Gas or Liquid**	**CP**
Log	=	**Common Log**	

* Potentiometric Surface Reference to Rotary Table When Elevation Not Given, Fresh Water Corrected to 100° F.