

TRILOBITE TESTING, L.L.C.

P.O. Box 362 • Hays, Kansas 67601

Drill-Stem Test Data

Well Name POWELL A-4 Test No. 1 Date 1/21/94
Company HELMERICH & PAYNE Zone LANSING "A"
Address 1579 EAST 21st ST TULSA OK 74114-1398 Elevation 2955
Co. Rep./Geo. ART CHILDERS Cont. CHEYENNE RIG #4 Est. Ft. of Pay 6
Location: Sec. 22 Twp. 29S Rge. 33W Co. HASKELL State KS

Interval Tested 4596-4608 Drill Pipe Size 4.5" FH
Anchor Length 12 Wt. Pipe I.D. - 2.7 Ft. Run 734
Top Packer Depth 4591 Drill Collar - 2.25 Ft. Run 9
Bottom Packer Depth 4596 Mud Wt. 45 lb/Gal. 12
Total Depth 4608 Viscosity 45 Filtrate 12

Tool Open @ 4:03 PM Initial Blow STRONG BLOW-OFF BOTTOM OF BUCKET IMMEDIATELY
GAS TO SURFACE IN 3.5 MINUTES
Final Blow STRONG BLOW - OFF BOTTOM OF BUCKET IMMEDIATELY

Recovery - Total Feet 900 Flush Tool? NO

Rec. 780 Feet of GASSY OIL- 10% GAS/ 90% OIL
Rec. 120 Feet of GASSY OIL CUT MUD-5%GAS/30%OIL/15%FILTRATE/50%MUD
Rec. _____ Feet of _____
Rec. _____ Feet of _____
Rec. _____ Feet of _____

BHT 122 °F Gravity 33 °API @ 30 °F Corrected Gravity 30 °API
RW _____ @ _____ °F Chlorides _____ ppm Recovery Chlorides _____ ppm System

(A) Initial Hydrostatic Mud 2171.8 PSI AK1 Recorder No. 13337 Range 3975

(B) First Initial Flow Pressure 165.9 PSI @ (depth) 4599 w / Clock No. 25810

(C) First Final Flow Pressure 147.2 PSI AK1 Recorder No. 10333 Range 4050

(D) Initial Shut-in Pressure 1208.5 PSI @ (depth) 4605 w / Clock No. 14389

(E) Second Initial Flow Pressure 159.0 PSI AK1 Recorder No. _____ Range _____

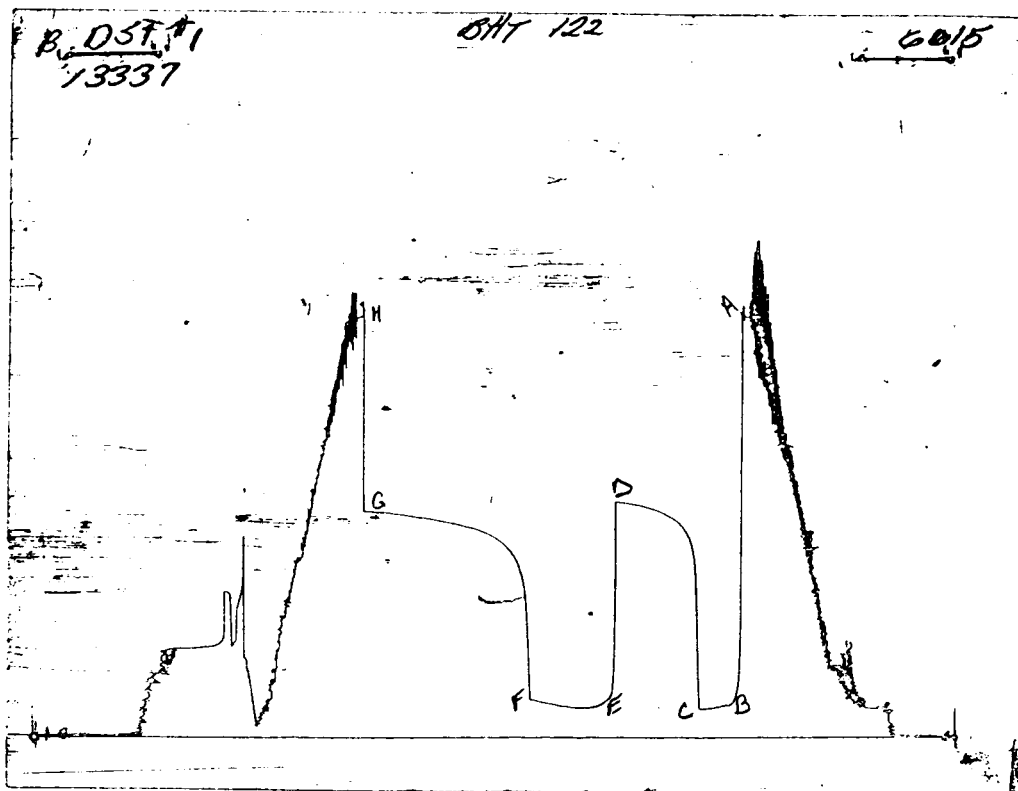
(F) Second Final Flow Pressure 197.6 PSI @ (depth) _____ w / Clock No. _____

(G) Final Shut-in Pressure 1156.6 PSI Initial Opening 30 Final Flow 60

(H) Final Hydrostatic Mud 2151.1 PSI Initial Shut-in 60 Final Shut-in 120

Our Representative PETE WAGGONER

CHART PAGE



This is an actual photograph of recorder chart

	FIELD READING	OFFICE READING
(A) INITIAL HYDROSTATIC MUD	2194	2171.8
(B) FIRST INITIAL FLOW PRESSURE	132	165.9
(C) FIRST FINAL FLOW PRESSURE	132	147.2
(D) INITIAL CLOSED-IN PRESSURE	1190	1208.5
(E) SECOND INITIAL FLOW PRESSURE	142	159
(F) SECOND FINAL FLOW PRESSURE	152	197.6
(G) FINAL CLOSED-IN PRESSURE	1139	1156.6
(H) FINAL HYDROSTATIC MUD	2184	2151.1

COMPUTER OIL EVALUATION BY TRILOBITE TESTING, L.L.C.

HELMERICH & PAYNE

POWELL A-4

DST 1

22

29S

33W

HASKELL KS

ELEVATION:	2955	KB	EST. PAY	6	FT
DATUM:	-1645		ZONE TESTED:	LANSING "A"	
TEST INTERVAL:	4596-4608		TIME INTERVALS:	30-60-60-120	
RECORDER DEPTH:	4599		VISCOSITY:	2.83	CP
BOTTOM HOLE TEMP:	122		HOLE SIZE:	7.875	IN

CUBIC FEET OF GAS IN PIPE:	23375			
TOTAL FEET OF RECOVERY:	900.00	CORRECTED PIPE FILLUP:	521.372	
TOTAL BARRELS OF RECOVERY:	5.95	CORR. BARRELS OF RECOVERY:	2.548	BBL
BARRELS IN DRILL PIPE:	2.36	API GRAVITY:	30	
BARRELS IN WEIGHT PIPE:	0.00	FLUID GRADIENT:	0.379	
BARRELS IN DRILL COLLARS:	3.59			
GAS OIL RATIO:	3928.72	CU.FT/BBL		
BUBBLE POINT PRESSURE:	1232			
UNCORRECTED INITIAL PRODUCTION:			95.20	BBL
INITIAL PRODUCTION CORRECTED TO FINAL FLOW PRESSURE:			40.76	BBL/DAY
INITIAL PRODUCTION CORRECTED TO PSEUDO STEADY FLOW STATE:			26.527	

INITIAL SLOPE	374.14	PSI/CYCL	FINAL SLOPE	320.06	PSI/CYCLE
INITIAL P*	1269.38	PSI	FINAL P*	1231.52	PSI

TRANSMISSIBILITY	20.71	(MD.-FT./CP.)
PERMEABILITY	9.78	(MD.)
INDICATED FLOW CAPACITY	58.67	(MD.FT)
PRODUCTIVITY INDEX	0.02	(BARREL/DAY/PSI)
DAMAGE RATIO	0.59	
RADIUS OF INVESTIGATION	29.66	(FT,)
POTENTIOMETRIC SURFACE	1211.89	(FT.)
DRAWDOWN FACTOR	2.983	(%)
THEORETICAL POTENTIAL FROM FINAL FLOW PRESSURE	0.00	
THEORETICAL POTENTIAL FROM PSEUDO STEADY FLOW STATE	0.00	

INITIAL FLOW

RECORDER 13337

DST # 1

TIME(MIN) PRESSURE <> PRESSURE

TIME(MIN)	PRESSURE	<> PRESSURE
0	165.9	165.9
3	165.9	0.0
6	163.0	-2.9
9	158.1	-4.9
12	155.1	-3.0
15	152.1	-3.0
18	149.1	-3.0
21	147.2	-1.9
24	147.2	0.0

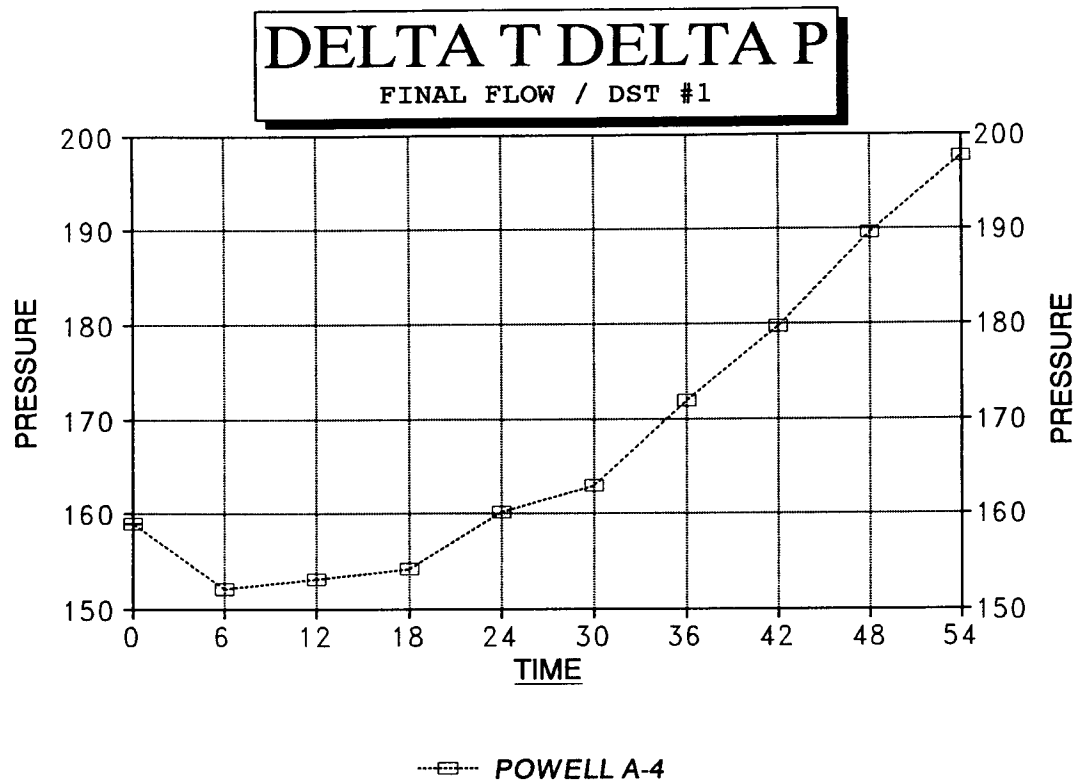
FINAL FLOW

RECORDER 13337

DST # 1

TIME(MIN) PRESSURE <> PRESSURE

TIME(MIN)	PRESSURE	<> PRESSURE
0	159.0	159.0
6	152.1	-6.9
12	153.1	1.0
18	154.1	1.0
24	160.1	6.0
30	163.0	2.9
36	171.9	8.9
42	179.8	7.9
48	189.6	9.8
54	197.6	8.0



INITIAL PRODUCTION CORRECTED TO PSEUDO STEADY FLOW STATE:

26.527

POWELL A-4
INITIAL

DST #1					
SHUTIN		-----			
30	INITIAL FLOW TIME	SLOPE	374.1	PSI/CYCLE	
		P*	1269.38	PSI	

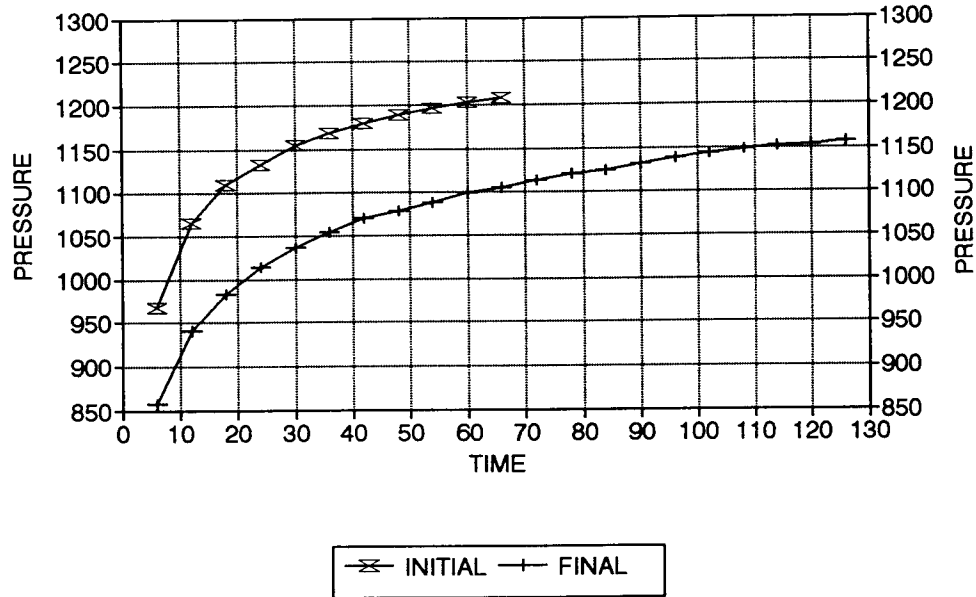
		Log	<>		
	TIME(MIN)	Pws (psi)	Horn T	PRESSURE	Horn T
	-----	-----	-----	-----	-----
	6	967.6	0.778	967.6	6
	12	1065.8	0.544	98.2	4
	18	1109.7	0.426	43.9	3
	24	1132.6	0.352	22.9	2
	30	1154.6	0.301	22.0	2
	36	1168.6	0.263	14.0	2
	42	1179.6	0.234	11.0	2
	48	1188.5	0.211	8.9	2
	54	1196.5	0.192	8.0	2
X	60	1203.5	0.176	7.0	2
X	66	1208.5	0.163	5.0	1

POWELL A-4
FINAL

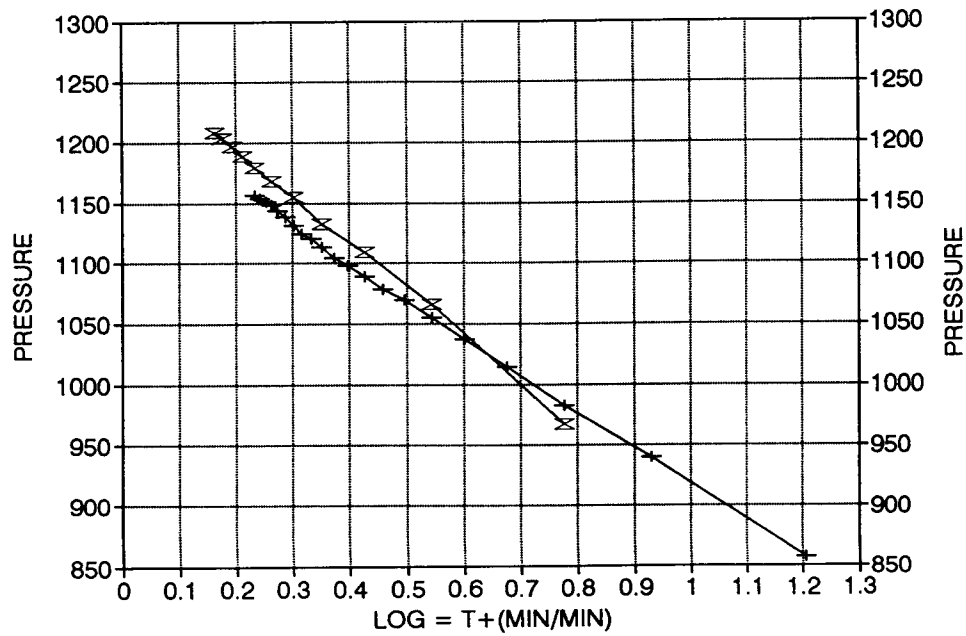
DST #1					
SHUTIN		-----			
90	TOTAL FLOW TIME	SLOPE	320.1	PSI/CYCLE	
		P*	1231.5	PSI	

		Log	<>		
		Horn T	PRESSURE	Horn T	
		-----	-----	-----	
	6	857.5	1.204	857.5	16
	12	940.1	0.929	82.6	9
	18	982.3	0.778	42.2	6
	24	1014.1	0.677	31.8	5
	30	1037.0	0.602	22.9	4
	36	1054.9	0.544	17.9	4
	42	1069.8	0.497	14.9	3
	48	1078.8	0.459	9.0	3
	54	1088.7	0.426	9.9	3
	60	1098.7	0.398	10.0	3
	66	1104.7	0.374	6.0	2
	72	1113.7	0.352	9.0	2
	78	1120.7	0.333	7.0	2
	84	1124.6	0.316	3.9	2
	90	1131.6	0.301	7.0	2
	96	1138.6	0.287	7.0	2
X	102	1143.6	0.275	5.0	2
	108	1148.6	0.263	5.0	2
	114	1151.6	0.253	3.0	2
	120	1153.6	0.243	2.0	2
X	126	1156.6	0.234	3.0	2

POWELL A-4 / DST #1 DELTA T DELTA P



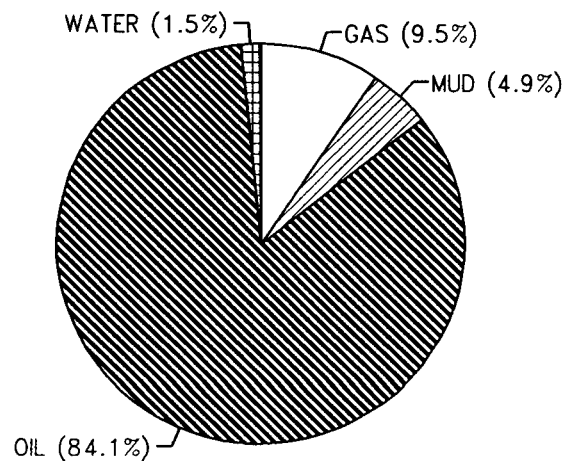
HORNER PLOT



CALCULATED RECOVERY ANALYSIS

DST	1				TICKET #	6615			
SAMPLE	TOTAL	GAS		OIL		WATER		MUD	
#	FEET	%	FEET	%	FEET	%	FEET	%	FEET
DRILL 1	166	10	16.6	90	149.4	0	0	0	0
PIPE 2			0		0		0		0
3			0		0		0		0
4			0		0		0		0
5			0		0		0		0
6			0		0		0		0
WEIGHT 1			0		0		0		0
PIPE 2			0		0		0		0
3			0		0		0		0
4			0		0		0		0
DRILL 1	614	10	61.4	90	552.6	0	0	0	0
COLLAR 2	120	5	6	30	36	15	18	50	60
3			0		0		0		0
4			0		0		0		0
5			0		0		0		0
TOTAL	900		84		738		18		60

			HRS OPEN	BBL/DAY
BBL OIL=	5.002722	*	1.5	80.043552
BBL WATER=	0.08802	*		1.40832
BBL MUD=	0.2934			
BBL GAS =	0.565638			



NATURAL GAS ANALYSIS REPORT

Sampled by:
Trilobite Testing, L.L.C.
Hays, Kansas
Scott City, Kansas
Phone: 800-728-5369
Fax: 913-625-5620

Analyzed by:
Caraway Analytical, L.L.C.
728 North Roosevelt
Liberal, Kansas 67901
Phone: 316-324-5389
Fax: 316-626-7108

Lab Number:	940034	Analyzed:	01/24/94
Sample From:	Powell A-4	Pressure:	
Producer:	Helmerich & Payne	Temperature:	
Date:		Location:	22-29-33
Time:		County:	Haskell
Sampler:		State:	Kansas
Source:	DST 1	Formation:	Lansing "A"

	Mole %	GPM
Helium	He: 0.275	0.000
Oxygen	O2: 0.000	0.000
Nitrogen	N2: 18.498	0.000
Carbon Dioxide	CO2: 0.255	0.000
Methane	C1: 62.402	0.000
Ethane	C2: 7.234	1.935
Propane	C3: 5.910	1.629
Iso Butane	iC4: 0.835	0.273
Normal Butane	nC4: 2.029	0.640
Iso Pentane	iC5: 0.568	0.208
Normal Pentane	nC5: 0.606	0.219
Hexanes Plus	C6+: 1.388	0.606

TOTAL: 100.000 5.509
Z Fact: 0.9968
SP.GR.: 0.8270
BTU (SAT): 1105.2 @ 14.73 psia
BTU (DRY): 1124.7 @ 14.73 psia

COMMENTS:

FLUID SAMPLER DATA

Ticket No.: 6615 **Date:** 1/21/94
Company: HELMERICH & PAYNE
Lease: POWELL A-4 **Test No.:** 1
County: HASKELL **Sec.:** 22 **Twp.:** 29S **Rng.:** 33W

SAMPLER RECOVERY

Gas 3500
Oil 500
Mud
Water
Other
Pressure 250
TOTAL 4000

SAMPLER ANALYSIS

Resistivity ohms@ F
Chlorides ppm.
Gravity 30 corrected @60°F

PIT MUD ANALYSIS

Chlorides
Resistivity ohms@ F
Viscosity 45
Mud Wt. 9
Filtrate 12
Other

PIPE RECOVERY

TOP

Resistivity ohms@ F
Chlorides ppm

MIDDLE

Resistivity ohms@ F
Chlorides ppm

BOTTOM

Resistivity ohms@ F
Chlorides ppm

GAS VOLUME REPORT

HELMERICH & PAYNE

POWELL A-4

DST # 1

MIN	PSIG	ORIFICE	MCF/D	MIN	PSIG	ORIFICE	MCF/D
10	4#	1.25	480	10	3#	1.25	411
20	3#	1.25	411	20	2.5#	1.25	374
30	3#	1.25	411	30	2.5#	1.25	374
				40	2.5#	1.25	374
				50	2.5#	1.25	374
				60	2.5#	1.25	374

Remarks: GAS TO SURFACE IN 3.5 MINUTES



GAS VOLUME REPORT

DST NO

OPERATOR

WELL NAME AND NO.

DST NO.

Remarks: GAS to surface in 3 1/2 mins

TRILOBITE TESTING L.L.C.

P.O. Box 362 - Hays, Kansas 67601

FLUID SAMPLER DATA

Ticket No. 6615 Date 1-21-94
Company Name Helmreich & Payne
Lease Powell A-4 Test No. 1
County Haskell Ks. Sec. 22 Twp. 29 Rng. 33

SAMPLER RECOVERY

Gas 3500 ML
Oil 500 ML
Mud — ML
Water — ML
Other — ML
Pressure 250[±] PSI
Total 4000 ML

PIT MUD ANALYSIS

Chlorides — ppm.
Resistivity — ohms @ — F
Viscosity 45
Mud Weight 9.0
Filtrate 12.0
Other —

SAMPLER ANALYSIS

Resistivity — ohms @ — F
Chlorides — ppm.
Gravity 30 corrected @ 60 F

.8 cu ft gas

PIPE RECOVERY

TOP
Resistivity — ohms @ — F
Chlorides — ppm.

MIDDLE
Resistivity — ohms @ — F
Chlorides — ppm.

BOTTOM
Resistivity — ohms @ — F
Chlorides — ppm.

Helm + Payne.

WELL NAME Powell A-4 DST # 1 RECORDER # 13337

INIT. HYD. MUD. 2.202 2171.8 FINAL HYD. MUD 2.181 2151.1

INITIAL FLOW MINUTES 30 INITIAL SHUTIN MINUTES 60 FINAL FLOW MINUTES 60 FINAL SHUTIN MINUTES 120
INTERVAL INTERVAL 6 INTERVAL 6 INTERVAL 6

<u>.1168</u>	<u>165.9</u>			1	<u>.242</u>		
<u>"</u>		<u>.982</u>		2	<u>.198</u>		<u>.870</u>
<u>.165</u>		<u>1.081</u>		3	<u>.161</u>	<u>159.0</u>	<u>.954</u>
<u>.160</u>		<u>1.125</u>		4	<u>.154</u>		<u>.997</u>
<u>.157</u>		<u>1.148</u>		5	<u>.155</u>		<u>1.029</u>
<u>.154</u>		<u>1.170</u>		6	<u>.156</u>		<u>1.052</u>
<u>.151</u>		<u>1.184</u>		7	<u>.162</u>		<u>1.070</u>
<u>.149</u>		<u>1.195</u>		8	<u>.165</u>		<u>1.085</u>
<u>.149</u>	<u>147.2</u>	<u>1.204</u>		9	<u>.174</u>		<u>1.094</u>
		<u>1.212</u>		10	<u>.182</u>		<u>1.104</u>
		<u>1.219</u>		11	<u>.192</u>	<u>137.6</u>	<u>1.114</u>
		<u>1.224</u>	<u>1208.5</u>	12	<u>.200</u>	<u>197.6</u>	<u>1.120</u>
				13			<u>1.129</u>
				14			<u>1.136</u>
				15			<u>1.140</u>
				16			<u>1.147</u>
				17			<u>1.154</u>
				18			<u>1.159</u>
				19			<u>1.164</u>
				20			<u>1.167</u>
				21			<u>1.169</u>
				22			<u>1.172</u> <u>1156.6</u>
				23			
				24			
				25			
				26			
				27			

0.982	967.6098
1.081	1065.881
1.125	1109.732
1.148	1132.679
1.17	1154.639
1.184	1168.619
1.195	1179.605
1.204	1188.589
1.212	1196.567
1.219	1203.549
1.224	1208.537

0.87	857.5493
0.954	940.0883
0.997	982.3517
1.029	1014.137
1.052	1037.018
1.07	1054.931
1.085	1069.864
1.094	1078.825
1.104	1088.788
1.114	1098.76
1.12	1104.744
1.129	1113.722
1.136	1120.705
1.14	1124.696
1.147	1131.681
1.154	1138.668
1.159	1143.658
1.164	1148.649
1.167	1151.644
1.169	1153.641
1.172	1156.636

J - 1275.4
 F - ~~1275.4~~ 1220.8

C - 12
 A25. A45
 D1...D32

C.R.A - 80.0

0.168	165.984
0.168	165.984
0.165	163.02
0.16	158.08
0.157	155.116
0.154	152.152
0.151	149.188
0.149	147.212
0.149	147.212

0.161	159.068
0.154	152.152
0.155	153.14
0.156	154.128
0.162	160.056
0.165	163.02
0.174	171.912
0.182	179.816
0.192	189.696
0.2	197.6