

LAW OFFICES

LOSEE, CARSON & DICKERSON, P. A.

300 AMERICAN HOME BUILDING

P. O. DRAWER 239

ARTESIA, NEW MEXICO 88211-0239

AREA CODE 505

746-3508

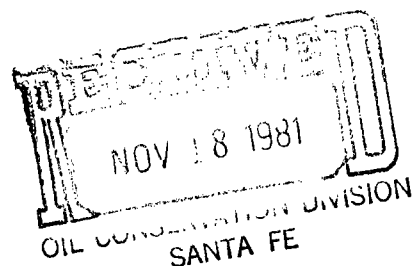
A. J. LOSEE

JOEL M. CARSON

CHAD DICKERSON

DAVID R. VANDIVER

November 16, 1981



Energy and Minerals Department
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

Attention: Mr. Dick Stamets

Re: Tight Formation Application
Case No. 7352
10/14/81 Examiner Hearing

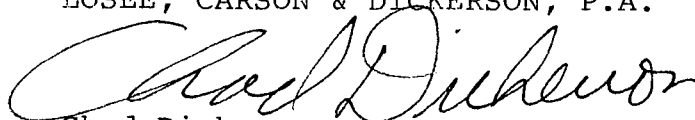
Gentlemen:

As requested at the hearing on the subject application, enclosed please find four copies of Supplement to Exhibit 12 furnished to further explain the information shown by Applicant's Exhibit 12. This information is composed of raw drillstem test data, and calculations based thereon.

Thank you.

Sincerely yours,

LOSEE, CARSON & DICKERSON, P.A.


Chad Dickerson

CD:pvm
Enclosures

cc: Mr. Dave Boneau

cc w/enclosure: United States Geological Survey
505 Marquette, N.W.
Albuquerque, New Mexico 87102

Examiner	<u>STAMETS</u>
Case No.	<u>7352</u>
EXHIBIT NO. <u>12-SUPP/834PPS</u>	

WELL NAME: Box Canyon #4A

LOCATION: 23-21S-21E

DST INTERVAL: 5876-6051

$$p^* = 1904 \text{ psi} \quad \text{slope (M)} = 92 \text{ psi/cycle}$$

$$T_c = 365^\circ\text{R} \quad P_c = 670 \text{ psi}$$

$$T = 130 + 460^\circ = 590^\circ\text{R} \quad P_{wf} = 1592 \text{ psi}$$

$$P_{avg} = \frac{P^* + P_{wf}}{2} = \frac{1904 + 1592}{2} = 1748 \text{ psi (Note 1)}$$

$$T_r = \frac{T}{T_c} = \frac{590}{365} = 1.62$$

$$P_r = \frac{P_{avg}}{P_c} = \frac{1748}{670} = 2.61$$

$$Z = 0.84 \quad T_{sc} = 520^\circ\text{R} \quad P_{sc} = 13.3 \text{ psi}$$

$$B_g = Z \cdot \frac{T}{T_{sc}} \cdot \frac{P_{sc}}{P_{avg}} = 0.84 \cdot \frac{590}{520} \cdot \frac{13.3}{1748} = 0.0073 \text{ (Note 1)}$$

$$q = 25 \text{ mcf/d} \quad 178.1 = 4452.50 \text{ b/d}$$

$$u = (0.0114) (1.3) = 0.0148 \text{ cp (Note 2)}$$

$$kh = \frac{162.6 \cdot q \cdot u \cdot B}{M} = \frac{162.6 (4452.5) (0.0148) (0.0073)}{92}$$

$$kh = 0.8502 \text{ md} \cdot \text{ft}$$

$$h = 40 \text{ ft (Note 3)}$$

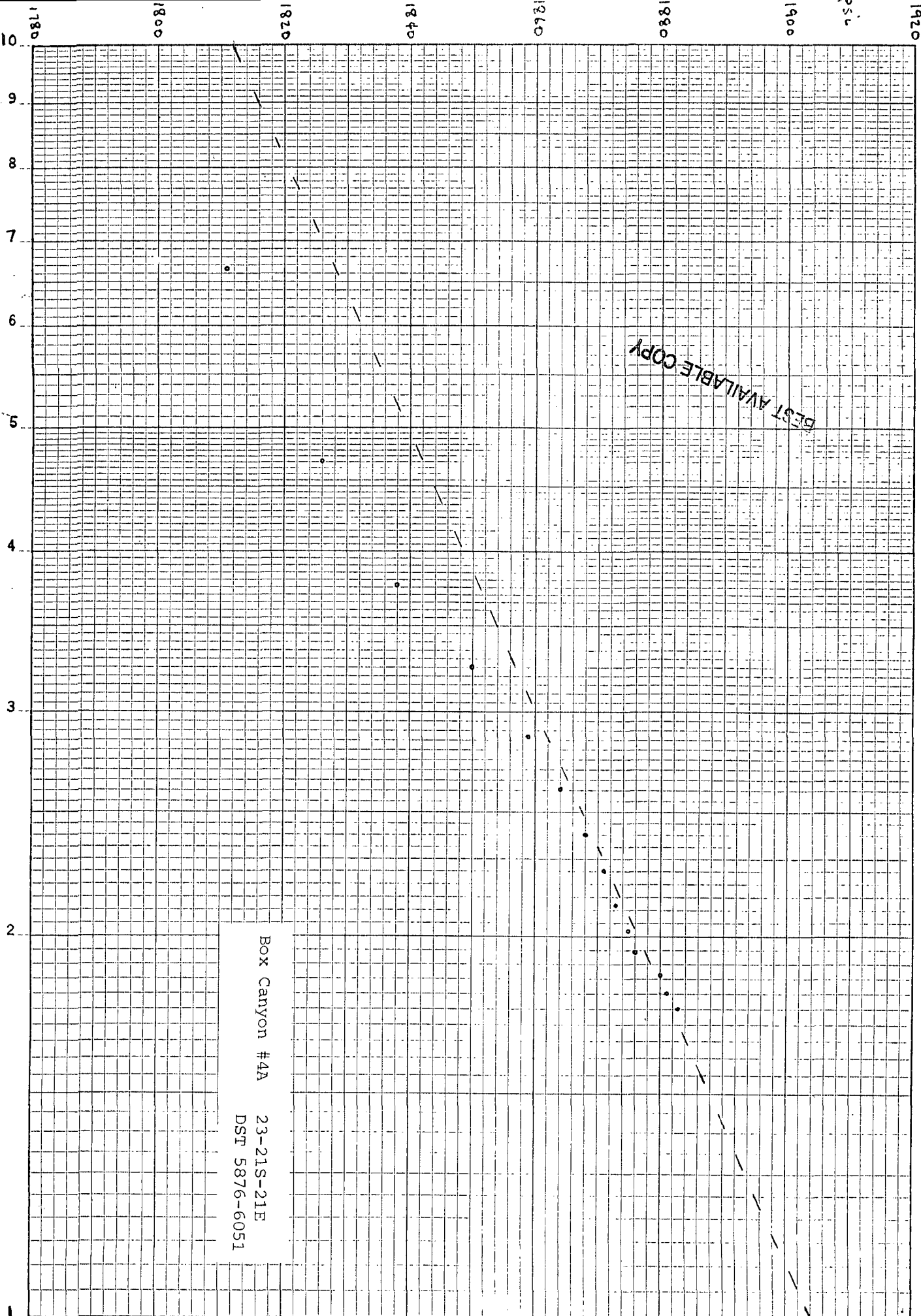
$$k = 0.021 \text{ md}$$

BEST AVAILABLE COPY

- 1) C.S. Matthews - D.G. Russell eqn 3.21a
- 2) C.S. Matthews - D.G. Russell Fig. G.3A&B
- 3) h estimated from log

Box Canyon #4A
23-21S-21E
DST 5876-6051

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46 4652

SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
A ESSER CO. MADE IN U.S.A.

RPT-ASL

221

EL PASO NATURAL GAS COMPANY
CHROMATOGRAPHIC GAS ANALYSIS REPORT

RPT DATE 07 27 79

ANAL DATE 07 12 79

METER STATION NAME
BOX CANYON 4A 21

METER STA 61929
OPER 9841

TYPE CODE	SAMPLE DATE	EFF. DATE	USE MOD.	SCALE	H2S GRAINS	LOCATION
00	07 10 79	07 27 79	00		0000*	1 J 13

NORMAL
MOL%

GPM

C O 2

00.00

0.000

H 2 S

00.00*

0.000

N2

01.99

0.000

METHANE

90.35

0.000

ETHANE

05.34

1.427

PROPANE

01.83

0.503

ISO-BUTANE

00.33

0.100

NORM-BUTANE

00.51

0.161

ISO-PENTANE

00.17

0.062

NORM-PENTANE

00.14

0.051

HEXANE PLUS

00.24

0.105

TOTALS

100.00

2.417

SPECIFIC GRAVITY

0.623

MIXTURE HEATING VALUE

(BTU/CF @ 14.73 PSIA, 60 DEGREES, DRY) 1111

RATIO OF SPECIFIC HEATS

1.299

* NO TEST SECURED FOR DETERMINATION H2S CONTENT.

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FLUID SAMPLE DATA				Date 2-4-78		Ticket Number 253334	
Sampler Pressure 1850		P.S.I.G. at Surface		Kind of Job STRADDLE		Halliburton District ARTESIA	
Recovery: Cu. Ft. Gas 3.2				PITTMAN		Witness JONAS	
cc. Oil				LAMAR			
cc. Water 1800				Drilling Contractor MORANCO RIG # 5		DR	
cc. Mud				EQUIPMENT & HOLE DATA			
Tot. Liquid cc. 1800				Formation Tested Upper Canyon			
Gravity ° API @ ° F.				Elevation 4592' Ft.			
Gas/Oil Ratio		cu. ft./bbl.		Net Productive Interval 32 Ft.			
RESISTIVITY		CHLORIDE CONTENT		All Depths Measured From Kelly Drive Bushing (13')			
Recovery Water @ ° F. ppm				Total Depth 8400' Ft.			
Recovery Mud @ ° F. ppm				Main Hole/Casing Size 7 7/8"			
Recovery Mud Filtrate @ ° F. ppm				Drill Collar Length 430' I.D. 2.25"			
Mud Pit Sample @ ° F. 25,000 ppm				Drill Pipe Length 5404' I.D. 3.826"			
Mud Pit Sample Filtrate @ ° F. ppm				Packer Depth(s) 5870-5876-6051-6057' Ft.			
Mud Weight 9 vis 42 sec				Depth Tester Valve 5863' Ft.			

Cushion		TYPE	AMOUNT	Depth Back Ft.	Surface Choke	Bottom Choke
				Pres. Valve	1" Adj.	.75"
Recovered	Approximately 200	Feet of	drilling mud			
Recovered	Approximately 2000	Feet of	formation fluid			
Recovered		Feet of				
Recovered		Feet of				
Recovered		Feet of				
Remarks SEE PRODUCTION TEST DATA SHEET						

BEST AVAILABLE COPY

TEMPERATURE		Gauge No. 512	Gauge No. 113	Gauge No.	TIME	
Depth: 5964 Ft.		Depth: 5905 Ft.	Depth:			
Calc. 24 Hour Clock		24 Hour Clock		Hour Clock		Tool A.M.
Est. 130 ° F.		Blanked Off NO	Blanked Off YES	Blanked Off		Opened 1000 P.M.
Actual ° F.		Pressures		Pressures		Opened 1530 A.M.
		Pressures		Pressures		Bypass P.M.
		Field	Office	Field	Office	Reported
		Field	Office	Field	Office	Computed
Initial Hydrostatic		2836	2817	2857	2846	Minutes
First Period	Flow Initial	355	446	398	575	Minutes
	Flow Final	801	781	519	811	30
	Closed in	1895	1896	1904	1909	90
Second Period	Flow Initial	749	733	767	759	Minutes
	Flow Final	1591	1592	1626	1622	90
	Closed in	1895	1883	1904	1893	120
Third Period	Flow Initial					Minutes
	Flow Final					Minutes
Final Hydrostatic		2809	2800	2830	2829	Minutes

Casing perms. _____ Bottom choke .75" Surf. temp. _____ °F Ticket No. 253334
Gas gravity _____ Oil gravity _____ GOR _____
Spec. gravity _____ Chlorides _____ ppm Res. _____ @ _____ °F
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED 1/4 x 60 PSI gauge

Date Time	a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
1000			1 1/2#			Opened tool with a good blow
1005		1/4"	35	73.50		Opened on 1/4" choke
1010		"	53	99.96		Gas to surface
1015		"	55	102.90		
1020		"	57	105.84		Started losing pressure
1025		"	52	98.49		-
1030		"	43	85.26		Closed tool
1200		"	0	-		Opened tool
1205		"	0	-		
1210		"	0	-		
1215		"	0	-		
1230		"	2	24.99		Pressure climbing
1245		"	5	29.40		
1200		"	2	24.99		
1215		"	2	24.99		
1330		"	2	24.99		Closed tool
1530						Pulled loose and started out of hole.
1600						Pulled 7 stands and reversed out.
						NOTE: Attempted to straddle section at
						6304'-6490', could not hook, came up
						and straddled section at 5876'-6051'.
						Got hook to set and went on with test.

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Gauge No.	512	Depth	5864'	Clock No.	13736	24 hour	Ticket No.	253334
First Flow Period	First Closed In Pressure			Second Closed In Pressure			Third Closed In Pressure	
	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.
0	.000	446	.000		.000	733	.000	
1	.0167	396	.0201		.0503	797	.0269	
2	.0333	485	.0403		.1007	1158	.0537	
3	.0500	526	.0604		.1510	1318	.0806	
4	.0667	628	.0805		.2013	1435	.1075	
5	.0834	720	.1007		.2517	1525	.1344	
6	.1000	781	.1208		.3020	1592	.1612	
7			.1409				.1881	
8			.1610				.2150	
9			.1812				.2418	
10			.2013				.2687	
11			.2214				.2956	
12			.2416				.3224	
13			.2617				.3493	
14			.2818				.3762	
15			.3020				.4030	

Gauge No.	113	Depth	5905'	Clock No.	13528	hour	24	Minutes
First Flow Period	First Closed In Pressure			Second Closed In Pressure			Third Closed In Pressure	
	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.
0	.000	575	.000		.000	759	.000	
1	.0172	422	.0203		.050	996	.0272	
2	.0343	519	.0405		.100	1180	.0544	
3	.0515	549	.0608		.150	1334	.0816	
4	.0687	656	.0811		.200	1455	.1088	
5	.0859	739	.1014		.250	1549	.1360	
6	.1030	811	.1216		.300	1622	.1632	
7			.1419				.1904	
8			.1622				.2176	
9			.1824				.2448	
10			.2027				.2720	
11			.2230				.2992	
12			.2432				.3264	
13			.2635				.3536	
14			.2838				.3808	
15			.3040				.4080	
Reading Interval	5		6		15	8		

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Box Canyon 4A

DST 5876-6051

Log footage contributing to height h:

<u>Interval</u>	<u>Feet</u>
5885-5889	4
5924-5925	1
5926-5927	1
5928-5934	6
5935-5937	2
5938-5939	1
5940-5949	9
5960-5966	6
5982-5983	1
5984-5985	1
5994-5996	2
6016-6020	4
6030-6032	<u>2</u>
	40 ft.

Box Canyon #4A

DST 5876-6051

Time to Reach Pseudosteady State

A) Average Porosity = 0.024

(Note 1)

<u>Interval</u>	<u>Porosity</u>
5885-5889	0.025
5924-5925	0.024
5926-5927	0.015
5928-5934	0.013
5935-5937	0.011
5938-5939	0.012
5940-5949	0.018
5960-5966	0.043
5982-5983	0.008
5984-5985	0.017
5994-5996	0.026
6016-6020	0.052
6030-6032	0.011

B) Total Compressibility = $S_g C_g$

$$C_t = (0.7) (0.00065) = 0.00046 \text{ psi}^{-1} \quad (\text{Note 2})$$

$$c) \text{ Time } t = \frac{1136 \phi u C_t r_e^2}{k}$$

$$t = \frac{1136 (0.024) (0.0148) (0.00046) (2106)^2}{0.021}$$

$$t = 39,200 \text{ hr}$$

$$t = 4.5 \text{ yr}$$

- 1) Porosity averaged over 40 ft of pay
- 2) C.S. Matthews - D.G. Russell Fig. G7.A

WELL NAME: Cities JG State #1

LOCATION: 13-18S-24E

DST INTERVAL: 6544-6865

$$p^* = 2312 \text{ psi} \quad \text{slope (M)} = 260 \text{ psi/cycle}$$

$$T_c = 377 \text{ } ^\circ\text{R} \quad P_c = 669 \text{ psi}$$

$$T = 122 + 460^\circ = 582 \text{ } ^\circ\text{R} \quad P_{wf} = 116 \text{ psi}$$

$$P_{avg} = \frac{p^* + P_{wf}}{2} = \frac{2312 + 116}{2} = 1214 \text{ psi} \quad (\text{Note 1})$$

$$T_r = \frac{T}{T_c} = \frac{582}{377} = 1.54$$

$$P_r = \frac{P_{avg}}{P_c} = \frac{1214}{669} = 1.81$$

$$Z = 0.885 \quad T_{sc} = 520^\circ\text{R} \quad P_{sc} = 13.3 \text{ psi}$$

$$B_g = Z \cdot \frac{T}{T_{sc}} \cdot \frac{P_{sc}}{P_{avg}} = 0.885 \cdot \frac{582}{520} \cdot \frac{13.3}{1214} = 0.0109 \quad (\text{Note 1})$$

$$q = 189 \text{ mcf/d} \quad 178.1 = 33660.9 \text{ b/d}$$

$$u = (1.2) (0.0114) = 0.0137 \quad \text{CP} \quad (\text{Note 2})$$

$$kh = \frac{162.6 \cdot q \cdot u \cdot B}{M} = \frac{162.6 (33660.9) (0.0137) (0.0109)}{260}$$

$$kh = 3.144 \text{ md} \cdot \text{ft}$$

$$h = 45 \text{ ft} \quad (\text{Note 3})$$

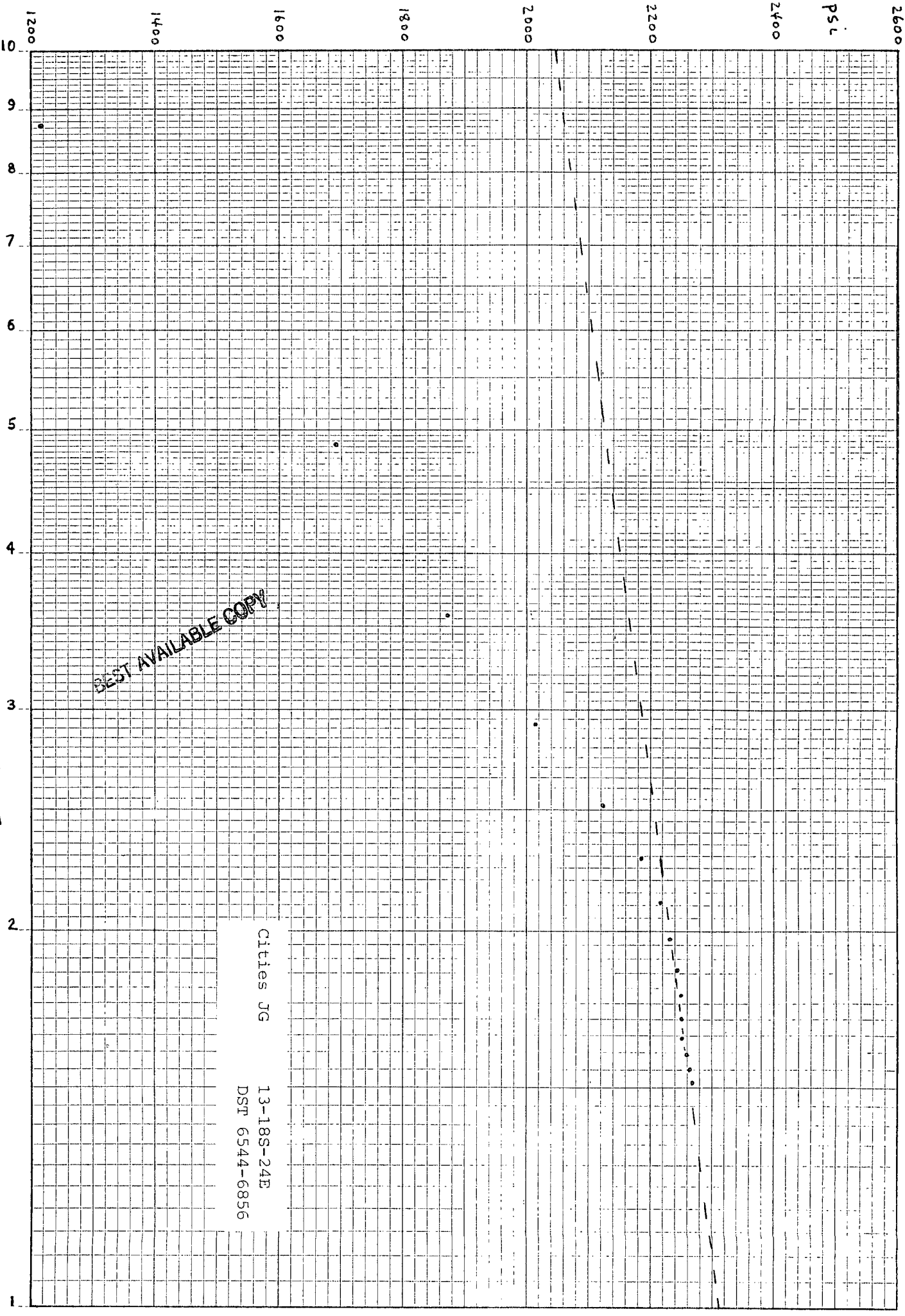
$$k = 0.069 \text{ md}$$

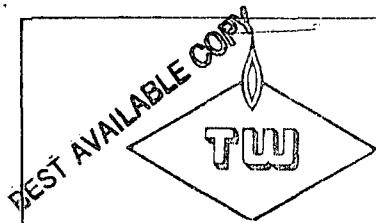
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- 1) C.S. Matthews - D.G. Russell eqn. 3.21a
- 2) C.S. Matthews - D.G. Russell Fig. G.3A&B
- 3) h estimated from Log

SEMILOGARITHMIC 1 CYCLE X 70 DIVISIONS
NEUFFEL & ESSER CO. MADE IN U.S.A.

46 4652





GAS QUALITY TEST REPORT

COMPANY SELLER YATES PET. Co.STA. NO. 1232-2FIELD OR
LOCATION _____

CONTRACT NO. _____

SOURCE OR
RESERVOIR _____TEST DATE 04.01.80WELL OR
STATION NAME CITIES "IG"LAB 4

COMPOUND COMPONENTS	COMPONENT SPECIFIC GRAVITY	COMPONENT MOLE FRACTION	LIQUEFIABLE HYDROCARBONS	COMPONENT G. P. M.	MOLE FRACTION	G. P. M. CONTENT
NITROGEN	.9672	.0126	PROPANE	27.514	.	
CARBON DIOXIDE	1.5195	.0019	ISO-BUTANE	32.698	.	
HELIUM	.1382	.	N-BUTANE	31.510	.	
OXYGEN	1.1048	.0002	LPG - - - - -			
HYDROGEN SULFIDE	1.1766	.	ISO-PENTANE	36.582	.	
WATER VAPOR	.6220	.	N-PENTANE	36.213	.	
HYDROCARBON DILUENTS		(.0147)	HEXANES	41.111	.	
			HEPTANES +	46.126	.	
METHANE	.5539	.8632	NATURAL GASOLINE - - - - -			
ETHANE	1.0382	.0710	TOTAL LIQUEFIABLE GPM			
PROPANE	1.5225	.0290	WATER VAPOR CONTENT:			
ISO-BUTANE	2.0068	.0039	Gas Mixture Static Pressure PSI _____			
N-BUTANE	2.0068	.0085	Hydrocarbon Dew Point °F _____			
ISO-PENTANE	2.4910	.0024	Water Vapor Dew Point °F _____			
N-PENTANE	2.4910	.0025	Lbs Water Vapor per MMCF _____			
HEXANES	2.9753	.0028	Conversion Constant <u>X 0.000021</u>			
HEPTANES +	3.7018	.0020	Water Vapor Mole Fraction _____			
			Moisture recorder reading _____			
			Make or type _____			

COMPOSITION - - - - - 1.0000

MIXTURE SPECIFIC GRAVITY:

Calculated From Analysis 664Determined by Test Instrument 663Instrument Make or Type Ray

MIXTURE HEATING VALUE:

(Btu/cf at 14.73 Psia, 60° F, Sat.)

Calculated From Analysis 1140

Determined by Calorimeter _____

Calorimeter Verified (_____) _____

SULFUR CONTENT:

H₂S - Hydrogen Sulfide, Gr./100 cf .00RSH - Mercaptans " .02RSR - Sulfides " .24RSSR - Residuals " .26Total Sulfur, Gr./100 cf .26H₂S Grains to fraction conversion X 0.0000157H₂S Mole Fraction _____Critical Pressure 668.7 Critical Temperature 376.5

REMARKS _____

MEASUREMENT
AREA RoswellGAS
ANALYST Arson

31

FLUID SAMPLE DATA				Date		Ticker Number	
Sampler Pressure <u>85</u> P.S.I.G. at Surface				11-14-78		520451	
Recovery: Cu. Ft. Gas <u>.107</u>				Kind of Job		Holliburton District	
cc. Oil _____				OPEN HOLE		ARTESIA	
cc. Water _____				Tester			
cc. Mud <u>500</u>				RICHARD PEPPERS Witness J. JONAS			
Tot. Liquid cc. _____				Drilling Contractor			
Gravity _____ ° API @ _____ °F.				LANDIS DRILLING # 4 DR			
Gas/Oil Ratio _____ cu. ft./bbl.				EQUIPMENT & HOLE DATA			
RESISTIVITY _____ CHLORIDE CONTENT _____				Formation Tested			
Recovery Water @ _____ °F. _____ ppm				Lower Cisco			
Recovery Mud @ _____ °F. _____ ppm				Elevation			
Recovery Mud Filtrate @ _____ °F. _____ ppm				3651' Ft.			
Mud Pit Sample @ _____ °F. _____ ppm				Net Productive Interval			
Mud Pit Sample Filtrate @ _____ °F. _____ ppm				20' Ft.			
Mud Weight <u>8.6</u> vis <u>28</u> sec				All Depths Measured From			
				Kelly Bushing			
				Total Depth			
				6856' Ft.			
				Main Hole/Casing Size			
				7 7/8"			
				Drill Collar Length			
				352' I.D. 1.25"			
				Drill Pipe Length			
				6156' I.D. 3.826"			
				Packer Depth(s)			
				6538-6544' Ft.			
				Depth Tester Valve			
				6518' Ft.			
TYPE		AMOUNT		Depth Back		Surface	
Cushion				Ft. Pres. Valve		Choke	
						5/8"	
						Bottom Choke	
						.75"	
Recovered <u>442</u> Feet of drilling mud							
Recovered _____ Feet of _____							
Recovered _____ Feet of _____							
Recovered _____ Feet of _____							
Recovered _____ Feet of _____							
Remarks SEE PRODUCTION TEST DATA SHEET							

Legal Location
 Sec. - Twp. - Rng.
 13-18S-24E

Field Area
 Memo. From Tester Valve

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County

TEMPERATURE		Gauge No. 1114 Depth: 6522 Ft.	Gauge No. 1113 Depth: 6852 Ft.	Gauge No. Depth: Ft.	TIME		
Est.	*F.	Blanked Off NO	Blanked Off YES	Blanked Off	Tool	A.M.	
Actual	122 *F.	Pressures	Pressures	Pressures	Opened 0800	P.M.	
		Field	Office	Field	Office	Reported	
						Computed	
						Minutes	
						Minutes	
First Period	Initial	125	226	214	416		
	Flow	178	178	285	312	30	31
	Final	2300	2297	2477	2429	90	89
Second Period	Initial	178	395	267	382		
	Flow	125	116	231	246	60	60
	Final	2265	2265	2406	2394	120	120
Third Period	Initial						
	Flow						
	Final						
	Final Hydrostatic	2975	2952	3135	3099		

Casing perf. _____ Bottom choke _____ Surf. temp _____ °F Ticket No. 520451
Gas gravity _____ Oil gravity _____ GOR _____
Spec. gravity _____ Chlorides _____ ppm Res. _____ @ _____ °F
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED _____

Date Time	a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
0800		1/8"				Opened tool with a good blow
0805		"	18			Good blow, no gas
0810		"	28			"
0815		"	38			"
0820		"	49			"
0825		"	60			"
0830		"	70			Closed tool
0834						Gas to surface
1000		5/8"				Opened tool, gas flare
1005		"	15	299		
1010		"	10	249		Gas depleating
1015		"	6	209		Gas Stabilized
1020		"	6	209		"
1025		"	6	209		"
1030		"	6	209		"
1035		"	6	209		"
1040		"	6	209		"
1045		"	6	209		"
1050		"	5	199		Gas depleating
1055		"	4	189		"
1100		"	4	189		Closed tool
1300						Pulled tool loose

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Gauge No.

1114

Depth

6522'

Clock No.

13428

24 hour

Ticket No.

520451

First Flow Period			First Closed In Pressure			Second Flow Period			Second Closed In Pressure			Third Flow Period			Third Closed In Pressure		
Time Defl. .000"	PSIG Temp. Corr.		Time Defl. .000"	$\log \frac{t+\theta}{\theta}$		Time Defl. .000"	PSIG Temp. Corr.		Time Defl. .000"	$\log \frac{t+\theta}{\theta}$		Time Defl. .000"	PSIG Temp. Corr.		Time Defl. .000"	$\log \frac{t+\theta}{\theta}$	PSIG Temp. Corr.
0	.000	336	.000		178	.000	395 Q		.000		116						
1	.0197	89*	.0165		848**	.0342	121		.0265		1219						
2	.0362	110	.0363		1502	.0683	107		.0531		1693						
3	.0526	132	.0562		1850	.1025	112		.0796		1876						
4	.0691	148	.0760		1970	.1367	114		.1061		2018						
5	.0855	164	.0958		2057	.1709	116		.1327		2124						
6	.1020	178	.1156		2125	.2050	116		.1592		2186						
7			.1354		2180				.1857		2219						
8			.1553		2217				.2122		2235						
9			.1751		2246				.2388		2246						
10			.1949		2263				.2653		2251						
11			.2147		2276				.2918		2253						
12			.2345		2284				.3184		2256						
13			.2544		2290				.3449		2260						
14			.2742		2293				.3714		2263						
15			.2940		2297				.3980		2265						

Gauge No.

1113

Depth

6852'

Clock No.

4365

hour

24

First Flow Period			First Closed In Pressure			Second Flow Period			Second Closed In Pressure			Third Flow Period			Third Closed In Pressure		
Time Defl. .000"	PSIG Temp. Corr.		Time Defl. .000"	$\log \frac{t+\theta}{\theta}$		Time Defl. .000"	PSIG Temp. Corr.		Time Defl. .000"	$\log \frac{t+\theta}{\theta}$		Time Defl. .000"	PSIG Temp. Corr.		Time Defl. .000"	$\log \frac{t+\theta}{\theta}$	PSIG Temp. Corr.
0	.000	416	.000		312	.000	382		.000		246						
1	.0199	218*	.0167		1033**	.0332	237		.0267		1371						
2	.0366	244	.0367		1643	.0663	232		.0533		1807						
3	.0532	263	.0567		1957	.0995	239		.0800		2005						
4	.0698	279	.0768		2086	.1327	244		.1067		2145						
5	.0864	295	.0968		2178	.1659	246		.1334		2244						
6	.1030	312	.1168		2253	.1990	246		.1600		2310						
7			.1368		2314				.1867		2348						
8			.1568		2355				.2134		2368						
9			.1769		2383				.2400		2376						
10			.1969		2402				.2667		2383						
11			.2169		2411				.2934		2385						
12			.2369		2420				.3200		2389						
13			.2569		2427				.3467		2392						
14			.2769		2429				.3734		2394						
15			.2970		2429				.4000		2394						

Reading Interval

5

6

10

8

Minutes

REMARKS:

* - 6 minutes

** - 5 minutes

Q-Questionable

BEST AVAILABLE COPY

Cities JG State #1

DST 6544-6865

Log footage contributing to height h:

<u>Interval</u>	<u>Feet</u>
6561-6583	22
6588-6593	5
6599-6601	2
6609-6615	6
6616-6618	2
6620-6625	5
6636-6639	<u>3</u>
	45 ft.

BEST AVAILABLE COPY

Cities JG State #1

DST 6544-6865

Time to Reach Pseudosteady State

A) Average Porosity = 0.025

(Note 1)

<u>Interval</u>	<u>Porosity</u>
6561-6583	0.026
6588-6593	0.028
6599-6601	0.021
6609-6615	0.035
6616-6618	0.026
6620-6625	0.020
6636-6639	0.010

B) Total Compressibility = $S \frac{C}{g \ g}$

$$C_t = (0.7) (0.00090) = 0.00063 \text{ psi}^{-1} \quad (\text{Note 2})$$

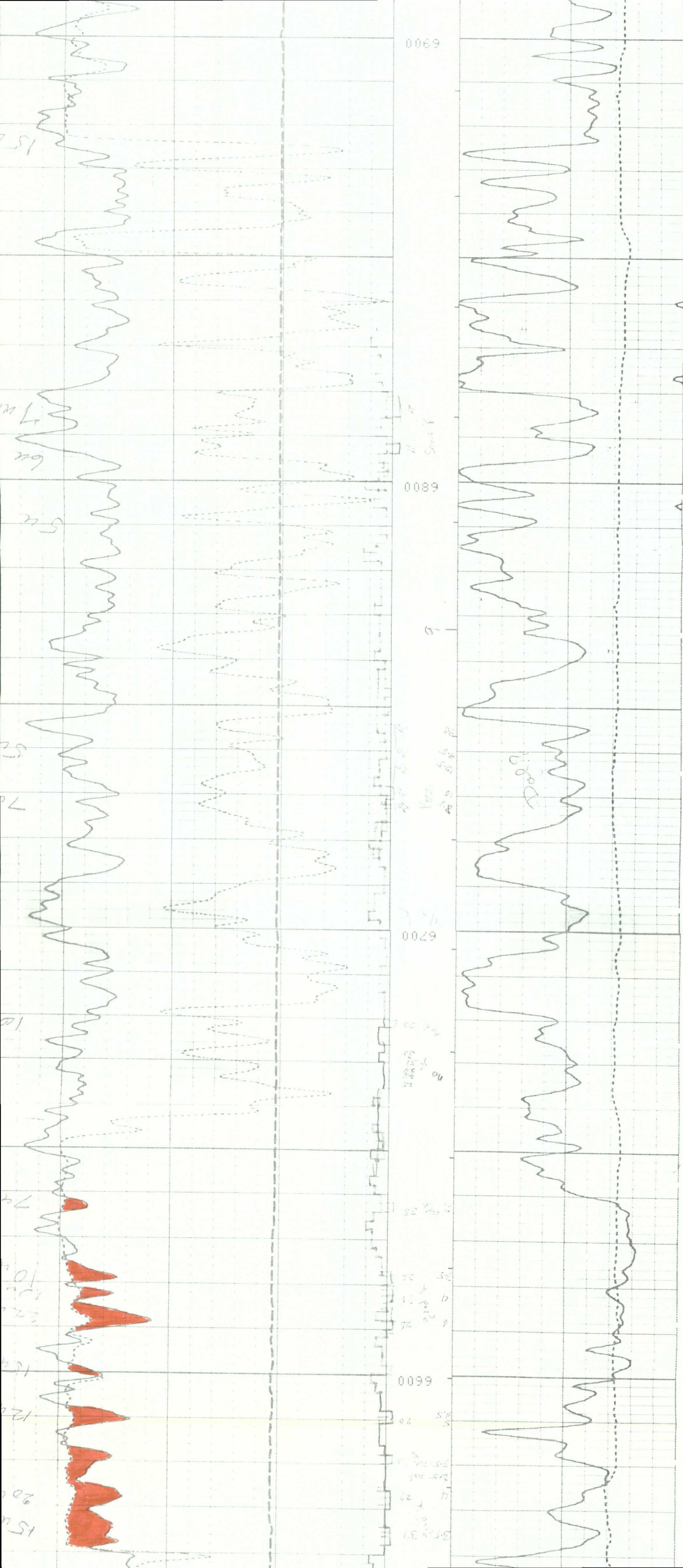
$$\text{C) Time } t = \frac{1136 \phi u C_t r_e^2}{k}$$

$$t = \frac{1136 (0.025) (0.0137) (0.00063) (2106)^2}{0.069}$$

$$t = 15,800 \text{ hr}$$

$$t = 1.8 \text{ yr}$$

- 1) Porosity averaged over 45 ft of pay
- 2) C.S. Matthews - D.G. Russell Fig. G7.A



WELL NAME: Cities JH State #1
LOCATION: 36-21S-21E
DST INTERVAL: 5900-6100

$$p^* = 2175 \text{ psi} \quad \text{slope (M)} = 2243 \text{ psi/cycle}$$

$$T_c = 386 ^\circ\text{R} \quad P_c = 688 \text{ psi}$$

$$T = 99 + 460^\circ = 559^\circ\text{R} \quad P_{wf} = 321 \text{ psi}$$

$$P_{avg} = \frac{p^* + P_{wf}}{2} = \frac{2175 + 321}{2} = 1248 \text{ psi (Note 1)}$$

$$Tr = \frac{T}{T_c} = \frac{559}{386} = 1.45$$

$$Pr = \frac{P_{avg}}{P_c} = \frac{1248}{668} = 1.87$$

$$Z = 0.81 \quad T_{sc} = 520^\circ\text{R} \quad P_{sc} = 13.3 \text{ psi}$$

$$Bg = Z \cdot \frac{T}{T_{sc}} \cdot \frac{P_{sc}}{P_{avg}} = 0.81 \cdot \frac{559}{520} \cdot \frac{13.3}{1248} = 0.0093 \text{ (Note 1)}$$

$$q = 54 \text{ Mcfd} \quad 178.1 \cdot = 9617 \text{ b/d}$$

$$u = (1.26) (0.0107) = 0.0135 \text{ cp (Note 2)}$$

$$kh = \frac{162.6 \cdot q \cdot u \cdot B}{M} = \frac{162.6 (9617.4) (0.0135) (0.0093)}{2243}$$

$$kh = 0.0875 \text{ md} \cdot \text{ft}$$

$$h = 18 \text{ ft (Note 3)}$$

$$k = 0.005 \text{ md}$$

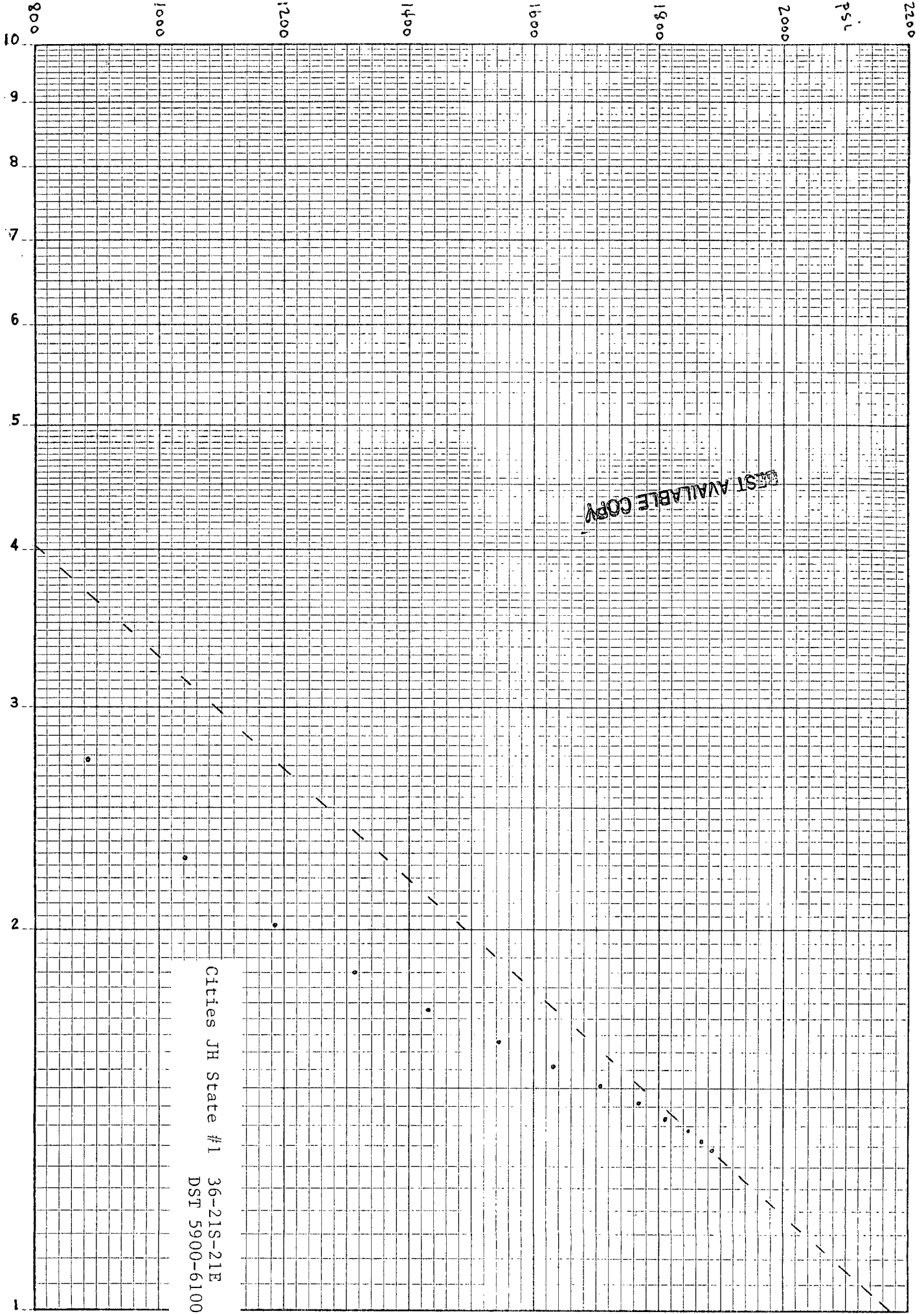
BEST AVAILABLE COPY

- 1) C.S. Matthews - D.G. Russell eqn. 3.21a
- 2) C.S. Matthews - D.G. Russell Fig. G.3A&B
- 3) h estimated from log

SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 4652

$T + \Delta T$



Cities JH State #1 36-21S-21E
DST 5900-6100

RPT-ASL

88

CHROMATOGRAPHIC GAS ANALYSIS REPORT

RPT DATE 07 27 79

ANAL DATE 07 12 79

METER STATION NAME

CITIES JH STATES #1

METER STA 58039

DPER 9841

TYPE CODE	SAMPLE DATE	EFF. DATE	USE MOS.	SCALE	H2S GRAINS	LOCATION
00	07 10 79	07 27 79	06		0000*	1 J 13

NORMAL
MOL%

GPM

C O 2

00.48

0.000

H 2 S

00.00*

0.000

N2

01.26

0.000

METHANE

83.21

0.000

ETHANE

08.25

2.205

PROPANE

03.59

0.908

ISO-BUTANE

00.64

0.209

NORM-BUTANE

01.22

0.384

ISO-PENTANE

00.41

0.150

NORM-PENTANE

00.36

0.130

HEXANE PLUS

00.58

0.253

TOTALS

100.00

4.319

SPECIFIC GRAVITY

0.698

MIXTURE HEATING VALUE

(BTU/CF @ 14.73 PSIA, 60 DEGREES, DRY) 1204

RATIO OF SPECIFIC HEATS

1.285

* NO TEST SECURED FOR DETERMINATION H2S CONTENT.

BEST AVAILABLE COPY

Casing perms. _____ Bottom choke _____ .75" Surf. temp _____ °F Ticket No. 253346
Gas gravity _____ Oil gravity _____ GOR _____
Spec. gravity _____ Chlorides _____ ppm Res. _____ @ _____ °F
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED 1/4 x 60 PSI Gauge

[illegible]

Gauge No.	1113	Depth	6097'	Clock No.	6728	hour	24	Minutes
0	.000	91	.000		257	.000	353	
1	.0199	201*	.0299		514	.0367	540**	
2	.0366	253	.0598		563	.0670	367	
3	.0532	297	.0897		302	.1005	367	
4	.0698	337	.1196		933	.1340	362	
5	.0864	371	.1495		1056	.1675	357	
6	.1030	390	.1794		1178	.2010	353	
7			.2093		1287			
8			.2392		1390			
9			.2691		1488			
10			.2990		1577			
11								
12								
13								
14								
15								
Reading Interval	5		9	10		12		

REMARKS: *-6 minutes

**** - 11 minutes.**

Minutes

Cities JH State #1

DST 5900-6100

Contributions to log height h:

<u>Interval</u>	<u>Feet</u>
5936-5938	2
5952-5960	8
6034-6042	<u>8</u>
	18 ft.

Cities JH State #1

DST 5900-6100

Time to Reach Pseudosteady State

A) Average Porosity = 0.033

(Note 1)

<u>Interval</u>	<u>Porosity</u>
5936-5938	0.014
5952-5960	0.024
6034-6042	0.046

B) Total Compressibility = $\frac{S}{g} \frac{C}{g}$

$$C_t = (0.7) (0.00093) = 0.00065 \text{ psi}^{-1}$$

(Note 2)

C) Time $t = \frac{1136 \phi u C_{tr_e}^2}{k}$

$$t = \frac{1136 (0.033) (0.0135) (0.00065) (2106)^2}{0.005}$$

$$t = 292,000 \text{ hr}$$

$$t = 33.3 \text{ yr}$$

BEST AVAILABLE COPY

- 1) Porosity averaged over 18 ft of pay
- 2) C.S. Matthews - D.G. Russell Fig. G7.A

Schlumberger

SIMULTANEOUS
COMPENSATED NEUTRON-
FORMATION DENSITYCOUNTY _____
FIELD _____
LOCATION _____
WELL _____
COMPANY _____

COMPANY Yates Petroleum Corp

WELL Cities IH State #1

FIELD Wadcat

COUNTY EDA STATE New Mexico

LOCATION 2205 EN 660 Full

Other Services: 2205 EN

API SERIAL NO. 360

SEC

TIME 21 E

RANGE 21 S

Permanent Datum: 6L; Elev: 4612

Log Measured From 1K3; 13ft. Above Perm. Datum

Drilling Measured From 1K3

Elev: K.B. 4625

D.F. 4612

G.L. 4612

Date Apr. 128 1978

Run No. ONE

Depth-Driller 8900

Depth-Logger 8895

Btm. Log Interval 8894

Top Log Interval 000

Casing-Driller 8 1/2 @ 1557

Casing-Logger 1560

Bit Size 7 1/8

Type Fluid in Hole Salt

Dens. Visc. 9.1 48

PH Fluid Loss 9.5 5 ml

Source of Sample P.T.

Rm @ Meas. Temp. 125 @ 74 F

Rmf @ Meas. Temp. 103 @ 78 F

Rmc @ Meas. Temp. 160 @ 76 F

Source: Rmf Rmc

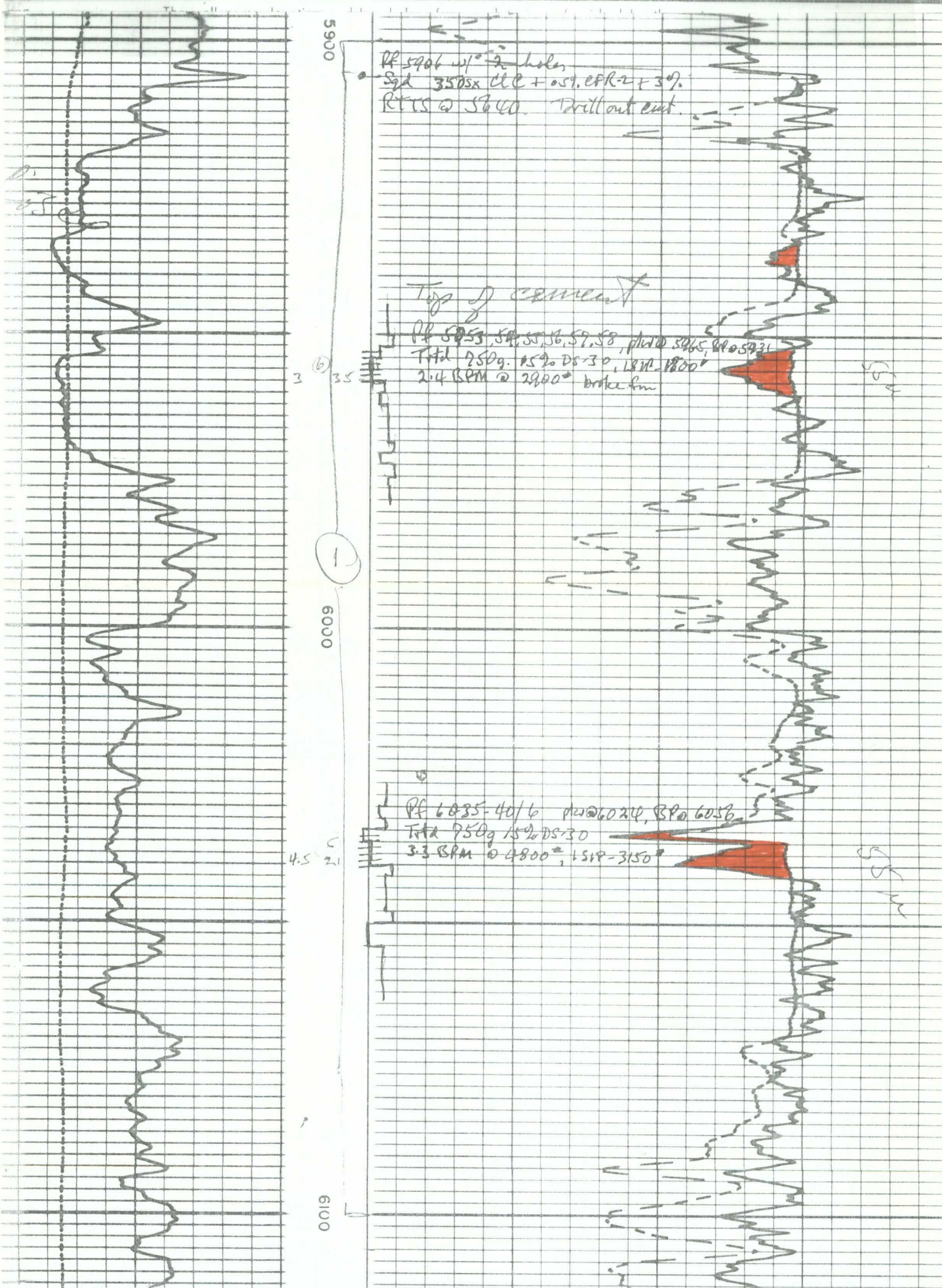
Rm @ BHT 164 @ 154 F

Circulation Stopped 2000 (4-27)

Logger on Bottom 1400 (4-28)

Rec. Temp. 156 F

BEST AVAILABLE COPY



WELL NAME: City of Artesia EQ #1

LOCATION: 24-17S-25E

DST INTERVAL: 6435-6650

$$P^* = 2331 \text{ psi} \quad \text{slope (M)} = 151 \text{ psi/cycle}$$

$$T_c = 377 \text{ } ^\circ\text{R} \quad P_c = 657 \text{ psi}$$

$$T = 115 + 460^\circ = 575 \text{ } ^\circ\text{R} \quad P_{wf} = 175 \text{ psi}$$

$$P_{avg} = \frac{P^* + P_{wf}}{2} = \frac{2331 + 175}{2} = 1253 \text{ psi (Note 1)}$$

$$T_r = \frac{T}{T_c} = \frac{575}{377} = 1.53$$

$$P_r = \frac{P_{avg}}{P_c} = \frac{1253}{675} = 1.86$$

$$Z = 0.84 \quad T_{sc} = 520^\circ\text{R} \quad P_{sc} = 13.3 \text{ psi}$$

$$B_g = Z \cdot \frac{T}{T_{sc}} \cdot \frac{P_{sc}}{P_{avg}} = 0.84 \cdot \frac{575}{520} \cdot \frac{13.3}{1253} = 0.0099 \text{ (Note 1)}$$

$$q = 83 \text{ Mcfd} \quad 178.1 = 14782 \text{ b/d}$$

$$u = (1.22) (0.0111) = 0.0135 \text{ cp (Note 2)}$$

$$kh = \frac{162.6 \cdot q \cdot u \cdot B}{M} = \frac{162.6 (14782) (0.0135) (0.0099)}{151}$$

$$kh = 2.127 \text{ md} \cdot \text{ft}$$

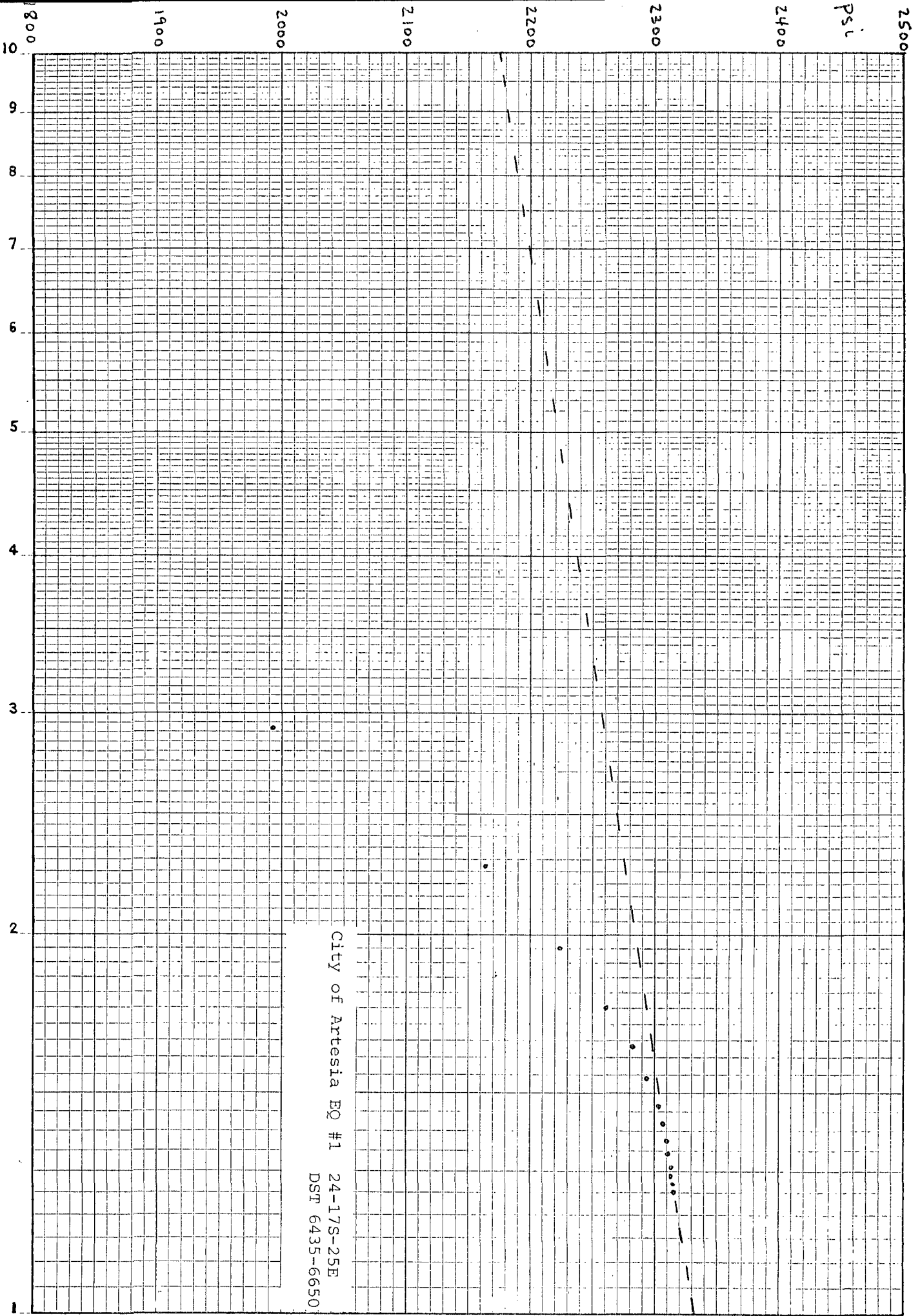
$$h = 32 \text{ ft (Note 3)}$$

$$k = 0.066 \text{ md (Note 4)}$$

- 1) C. S. Matthews - D.G. Russell eqn 3.21a
- 2) C. S. Matthews - D.G. Russell Fig. G.3A&B
- 3) h estimated from log
- 4) Also k = 0.066 md for q = 116 Mcfd and h = 45 ft.

BEST AVAILABLE COPY

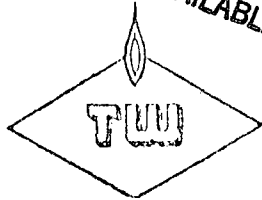
City of Artesia EQ #1 24-17S-25E
 DST 6435-6650



46 4652
 T + ΔT

SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
 K&E REDFELT & ESSER CO. MADE IN U.S.A.

BEST AVAILABLE COPY



CAS QUALITY TEST REPORT

Supplement to Exhibit 12 Page 4 - 3

COMPANY SELLER

YATES PET. CO.

RECEIVED

12/29/77

FIELD OR LOCATION

W. ATOKA

SOURCE OR RESERVOIR

PENN.

WELL OR STATION NAME

CITY OF ARTESIA

CONTRACT NO.

3161

TEST DATE

04/28/77

LAB

4

COMPOUND COMPONENTS	COMPONENT SPECIFIC GRAVITY	COMPONENT MOLE FRACTION	LIQUEFIABLE HYDROCARBONS	COMPONENT G. P. M.	MOLE FRACTION	G. P. M. CONTENT
NITROGEN	.9672	.0063	PROPANE	27.514	.	
CARBON DIOXIDE	1.5195	.0145	ISO-BUTANE	32.698	.	
HELIUM	.1382	.	N-BUTANE	31.510	.	
OXYGEN	1.1048	.0001	LPG - - - - -			
HYDROGEN SULFIDE	1.1766	.	ISO-PENTANE	36.582	.	
WATER VAPOR	.6220	.	N-PENTANE	36.213	.	
HYDROCARBON DILUENTS		(.0209)	HEXANES	41.111	.	
			HEPTANES +	46.126	.	
METHANE	.5539	.8666	NATURAL GASOLINE - - - - -			
ETHANE	1.0382	.0664	TOTAL LIQUEFIABLE GPM			
PROPANE	1.5225	.0257	WATER VAPOR CONTENT:			
ISO-BUTANE	2.0068	.0036	Gas Mixture Static Pressure PSI			
N-BUTANE	2.0068	.0069	Hydrocarbon Dew Point °F			
ISO-PENTANE	2.4910	.0022	Water Vapor Dew Point °F			
N-PENTANE	2.4910	.0018	Lbs Water Vapor per MMCF			
HEXANES	2.9753	.0040	Conversion Constant			
HEPTANES +	3.7018	.0019	Water Vapor Mole Fraction			
COMPOSITION - - - - -		1.0000	Moisture recorder reading			
			Make or type			

MIXTURE SPECIFIC GRAVITY:

Calculated From Analysis

667

Determined by Test Instrument

666

Instrument Make or Type

Rosen

MIXTURE HEATING VALUE:

(Btu/cf at 14.73 Psia, 60°F, Sat.)

Calculated From Analysis

1125

Determined by Calorimeter

1114

Calorimeter Verified (04-29-77)

SULFUR CONTENT:

H₂S - Hydrogen Sulfide, Gr./100 cf

No Trace

RSR - Mercaptans

RSR - Sulfides

RSSR - Residuals

Total Sulfur, Gr./100 cf

H₂S Grains to fraction conversion

X 0.0000157

H₂S Mole Fraction

Critical Pressure 675 Critical Temperature 377

REMARKS

MEASUREMENT
AREA

Rosen

GAS
ANALYST

Aston

FLUID SAMPLE DATA				Date		Ticket Number	
Pump Pressure		200	P.S.I.G. at Surface	8-31-75		788048	
Recovery: Cu. Ft. Gas		65		Kind of Job		Halliburton District	
cc. Oil				OPEN HOLE		ARTESIA	
cc. Water				Tester		Witness	
cc. Mud		450		GULLEY		MAHFOOD	
Tot. Liquid cc.				Drilling Contractor		ARD DRILLING COMPANY NM S	
Gravity			" API @ °F.	EQUIPMENT & HOLE DATA			
Gas/Oil Ratio			cu. ft./bbl.	Formation Tested		Cisco	
RESISTIVITY			CHLORIDE CONTENT	Elevation		3465' K.B. Ft.	
Recovery Water		@	°F. ppm	Net Productive Interval		-	
Recovery Mud		@	°F. ppm	All Depths Measured From		Kelly Bushing - 15'	
Recovery Mud Filtrate		@	°F. ppm	Total Depth		6650' Ft.	
Mud Pit Sample		@	°F. ppm	Main Hole/Casing Size		7 7/8"	
Mud Pit Sample Filtrate		@	°F. ppm	Drill Collar Length		948' I.D. 2.25"	
Mud Weight		8.6	vis 36 cp	Drill Pipe Length		5637' I.D. 3.826"	
				Packer Depth(s)		6429' - 6435' Ft.	
				Depth Tester Valve		6406' Ft.	
TYPE		AMOUNT		Depth Back Pres. Valve		Surface Choke	
Cushion		NONE		NONE		1" ADJ. Bottom Choke .75"	

Recovered	Feet of	drilling fluid - gas cut
Recovered	Feet of	
Recovered	Feet of	
Recovered	Feet of	
Recovered	Feet of	
Recovered	Feet of	

Remarks Tool opened for a 22 minute first flow. Had gas to the surface in 18 minutes. Maximum pressure was 24# on 1/4" choke. Closed tool for a 79 minute first close in pressure. Tool reopened for a 60 minute second flow with a maximum pressure of 65# on 1/4" choke. Took a 239 minute second closed in pressure. SEE PRODUCTION TEST

DATA SHEET									
TEMPERATURE		Gauge No. 512		Gauge No. 113		Gauge No.		TIME	
Depth: 6411' Ft.		Depth: 6646' Ft.		Depth: 12 Hour Clock		Depth: 12 Hour Clock		Hour Clock	
Est. °F.		Blanked Off NO		Blanked Off YES		Blanked Off		Tool Opened 820 A.M. P.M.	
Actual 115F.		Pressures		Pressures		Pressures		Bypass 300 A.M. P.M.	
		Field Office		Field Office		Field Office		Reported Computed	
		Initial Hydrostatic		Initial Hydrostatic		Initial Hydrostatic		Minutes Minutes	
Flow		Initial		Initial		Initial		20 22	
		Final		Final		Final		80 79	
Closed in		2240		2279		2363			
Flow		Initial		Initial		Initial		60 60	
		Final		Final		Final		240 239	
Closed in		2266		2316		2397			
Flow		Initial		Initial		Initial			
		Final		Final		Final			
Closed in									
Final Hydrostatic		2980		2984		3085			

Legal Location
Sec. - Twp. - Rng.

Well No.

Test No.

Field Area

WILDCAT - SW ARTESIA

County

EDDY

State

NEW MEXICO

Lessee Name

Well No.

Test No.

Tested Interval

Lessee Owner/Company Name

Casing perms. _____ Bottom choke _____ Surf. temp _____ °F Ticket No. 788048
 Gas gravity _____ Oil gravity _____ GOR _____
 Spec. gravity _____ Chlorides _____ ppm Res. _____ @ _____ °F
 INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED _____

[illegible]

Gauge No.	512	Depth	6411'	Clock No.	11888	Ticket No.	788048	
First Flow Period		First Closed In Pressure	Second Flow Period	Second Closed In Pressure	Third Flow Period	Third Closed In Pressure		
Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t + \theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t + \theta}{\theta}$	PSIG Temp. Corr.	
0 .000	188	.000		136	.000		175	
1 .0385	109*	.0268		511**	.0668	147	1344***	
2 .0641	123C	.0604		896	.1337	157	1992	
3 .0897	131	.0939		1228	.2005	169	2164	
4 .1154	134	.1275		1536	.2673	173	2224	
5 .1410	136	.1610		1774	.3342	173	2261	
6		.1946		1959	.4010	175	2282	
7		.2281		2090			2294	
8		.2616		2168			2303	
9		.2952		2213			2308	
10		.3287		2235			2310	
11		.3623		2249			2311	
12		.3958		2259			2314	
13		.4294		2266			2314	
14		.4629		2271			2315	
15		.4965		2275			2316	
		.5300		2279				
Gauge No.	113	Depth	6646'	Clock No.	7282	hour	12	
0 .000	297	.000		215	.000	329	.000	248
1 .0401	192*	.0268		580**	.0678	224	.1010	1423***
2 .0663	202C	.0604		990	.1357	231	.2088	2073
3 .0935	210	.0939		1315	.2035	244	.3166	2243
4 .1203	212	.1275		1615	.2715	248	.4244	2303
5 .1470	215	.1610		1859	.3392	248	.5322	2339
6		.1946		2043	.4070	248	.6399	2363
7		.2281		2166			.7477	2376
8		.2616		2247			.8555	2384
9		.2952		2285			.9633	2386
10		.3287		2317			1.0711	2392
11		.3623		2332			1.1789	2393
12		.3958		2343			1.2866	2396
13		.4294		2349			1.3944	2396
14		.4629		2355			1.5022	2397
15		.4965		2359			1.6100	2397
Reading Interval	4	.5300		2363		10	16	
Minutes								
REMARKS:	5 * INTERVAL = 6 MINUTES. ** INTERVAL = 4 MINUTES. *** INTERVAL = 15 MINUTES							

BEST AVAILABLE COPY

* INTERVAL = 6 MINUTES. ** INTERVAL = 4 MINUTES. *** INTERVAL = 15 MINUTES

5

REMARKS:

City of Artesia EQ #1

DST 6435-6650

Contributions to log height h:

<u>Interval</u>	<u>Feet</u>
6492-6494	2
6496-6500	4
6530-6541	11
6554-6560	6
6568-6571	3
6595-6601	<u>6</u>
	32 ft.

City of Artesia EQ #1

DST 6435-6650

Time to Reach Pseudosteady State

A) Average Porosity = 0.034

(Note 1)

<u>Interval</u>	<u>Porosity</u>
6492-6494	0.032
6496-6500	0.010
6530-6541	0.047
6554-6560	0.021
6568-6571	0.017
6595-6601	0.048

B) Total Compressibility = $\frac{S}{g} \frac{C}{g}$

$$C_t = 0.7 (0.00090) = 0.00063 \text{ psi}^{-1}$$

(Note 2)

C) Time $t = \frac{1136 \phi u C_{tr}^2}{k}$

$$t = \frac{1136 (0.034) (0.0135) (0.00063) (2106)^2}{0.066}$$

$$t = 22,100 \text{ hr}$$

$$t = 2.5 \text{ yr}$$

- 1) Porosity averaged over 32 ft of pay
- 2) C.S. Matthews - D.G. Russell Fig. G7.A

NEUTRON- ON DENSITY

Corporation

Q" #1

TE NEW Mexico

Other Services:

5-DLL/RXO

5-E

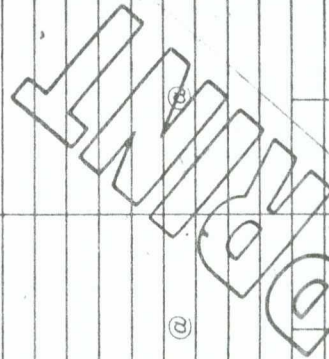
450

n. Datum

Elev.: K.B. 3465

D.F.

G.I. 3450



ml

°F

@

°F

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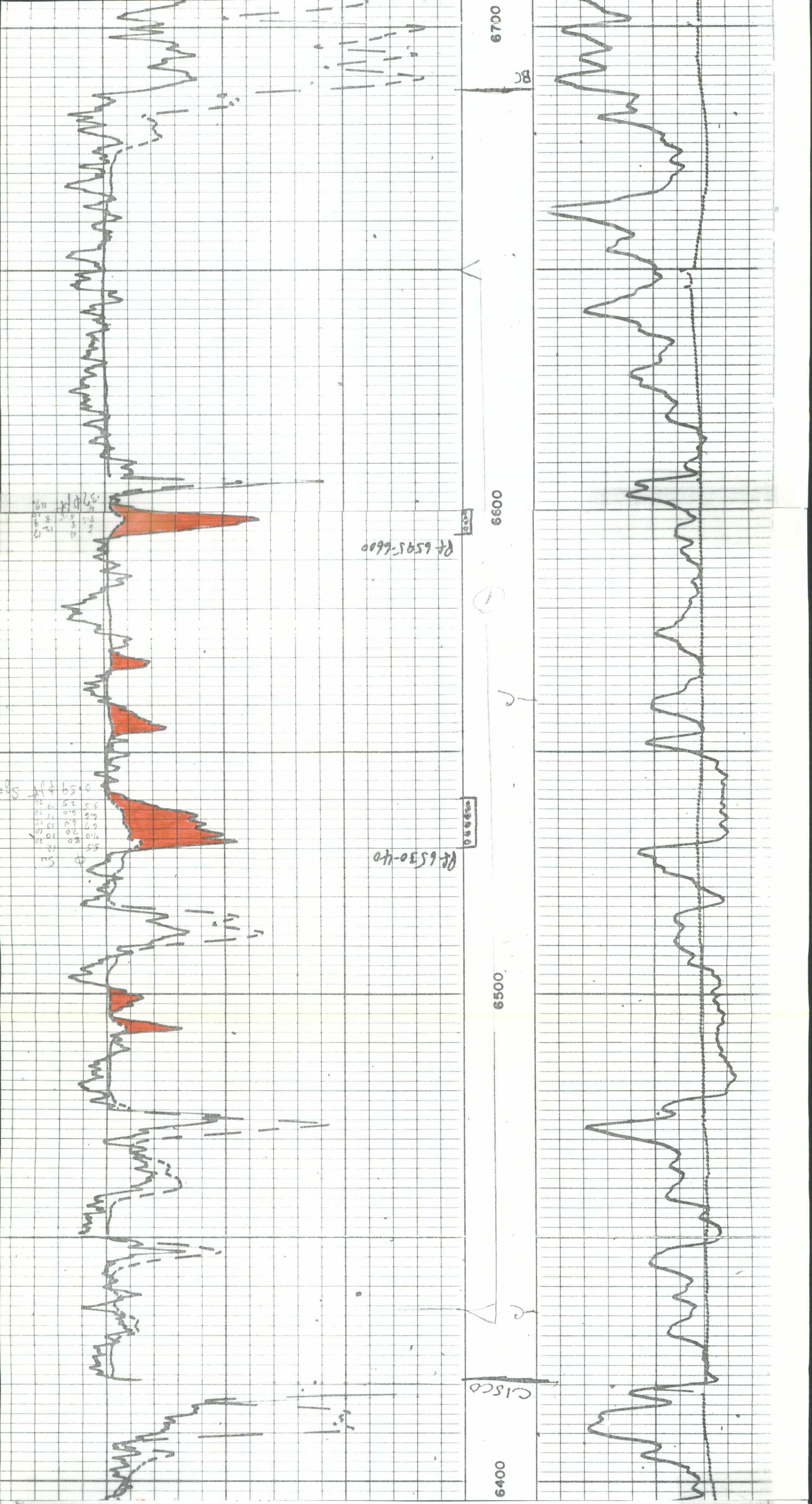
°F

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°F

@

°F



WELL NAME: Federal BZ #12
LOCATION: 21-17S-25E
DST INTERVAL: 6380-6600

$$\begin{aligned} p^* &= 2322 \text{ psi} & \text{slope (M)} &= 242 \text{ psi/cycle} \\ T_c &= 380 ^\circ\text{R} & P_c &= 679 \text{ psi} \\ T &= 115 + 460^\circ = 575 ^\circ\text{R} & P_{wf} &= 60 \text{ psi} \end{aligned}$$

$$P_{avg} = \frac{p^* + P_{wf}}{2} = \frac{2322 + 60}{2} = 1191 \text{ psi (Note 1)}$$

$$T_r = \frac{T}{T_c} = \frac{575}{380} = 1.51$$

$$P_r = \frac{P_{avg}}{P_c} = \frac{1191}{679} = 1.75$$

$$Z = 0.84 \quad T_{sc} = 520^\circ\text{R} \quad P_{sc} = 13.3 \text{ psi}$$

$$B_g = Z \cdot \frac{T}{T_{sc}} \cdot \frac{P_{sc}}{P_{avg}} = 0.84 \cdot \frac{575}{520} \cdot \frac{13.3}{1191} = 0.010 \text{ (Note 1)}$$

$$q = 29 \text{ Mcfd} \quad 178.1 = 5165 \text{ b/d}$$

$$u = (1.21) (0.0112) = 0.0136 \text{ cp (Note 2)}$$

$$kh = \frac{162.6 \cdot q \cdot u \cdot B}{M} = \frac{162.6 (5165) (0.0136) (0.010)}{242}$$

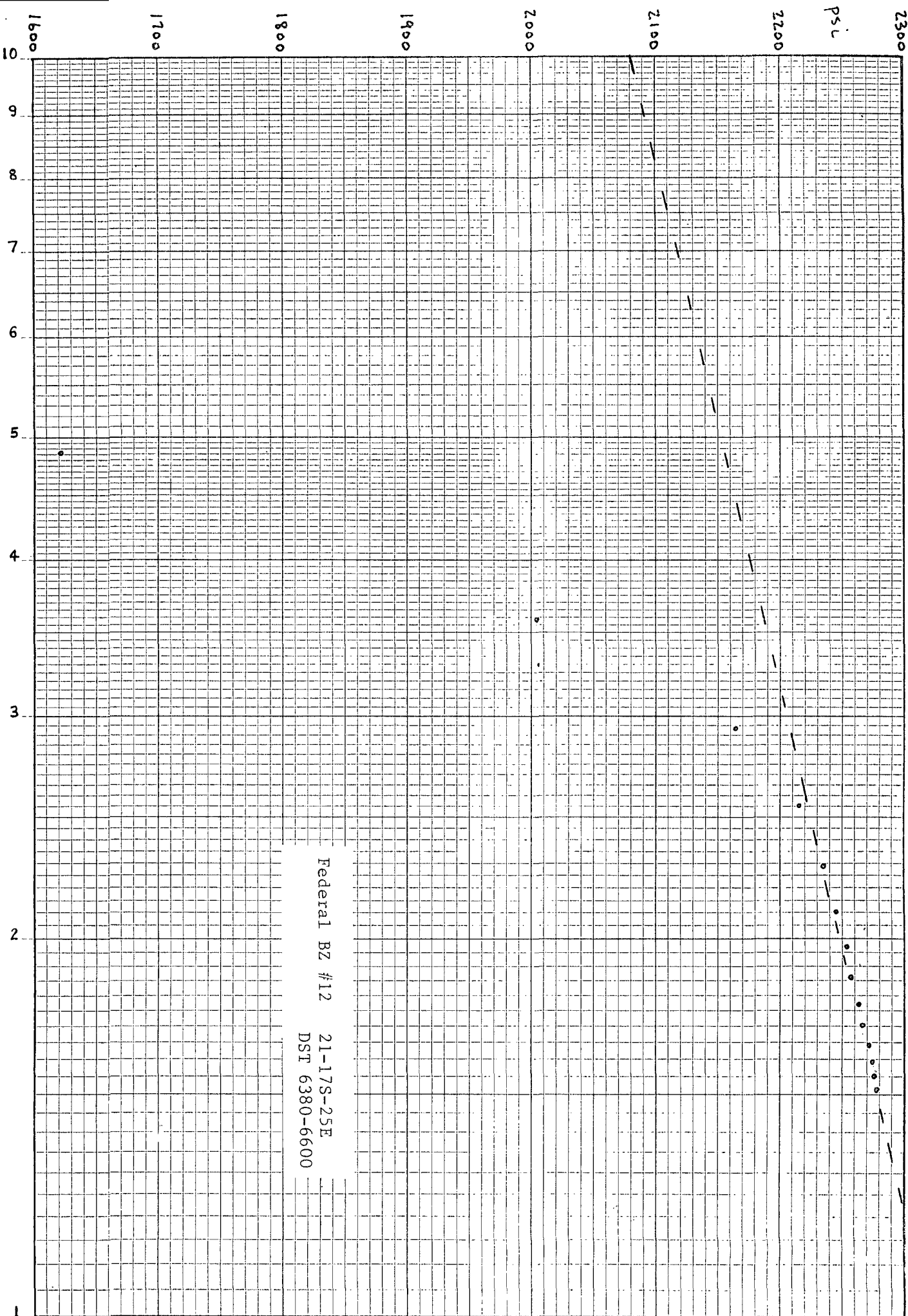
$$kh = 0.472 \text{ md} \cdot \text{ft}$$

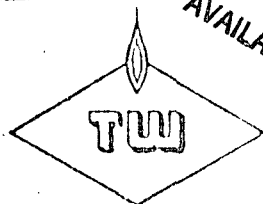
$$h = 30 \text{ ft (Note 3)}$$

$$k = 0.016 \text{ md (Note 4)}$$

- 1) C.S. Matthews - D.G. Russell eqn 3.21a
- 2) C.S. Matthews - D.G. Russell Fig G.3A&B
- 3) h estimated from log
- 4) $k = 0.005$ for $p^* = 2722$ and $M = 642 \text{ psi/cycle}$

Federal BZ #12
21-17S-25E
DST 6380-6600





GAS QUALITY TEST REPORT

COMPANY SELLER

Yates Prod. Co.

FIELD OR LOCATION

W. Arons

SOURCE OR RESERVOIR

WELL OR STATION NAME

Yates - Fed Com "BZ" #12

STA. NO. 1273-2

CONTRACT NO.

TEST DATE 01/01/79

LAB. A

COMPOUND COMPONENTS	COMPONENT SPECIFIC GRAVITY	COMPONENT MOLE FRACTION	LIQUEFIABLE HYDROCARBONS	COMPONENT G. P. M.	MOLE FRACTION	G. P. M. CONTENT
NITROGEN	.9672	.0110	PROPANE	27.514		
CARBON DIOXIDE	1.5195	.0246	ISO-BUTANE	32.698		
HELIUM	.1382		N-BUTANE	31.510		
OXYGEN	1.1048	.0008	LPG - - - - -			
HYDROGEN SULFIDE	1.1766		ISO-PENTANE	36.582		
WATER VAPOR	.6220		N-PENTANE	36.213		
HYDROCARBON DILUENTS		.0364	HEXANES	41.111		
			HEPTANES +	46.126		
METHANE	.5539	.8395	NATURAL GASOLINE - - - - -			
ETHANE	1.0382	.0741	TOTAL LIQUEFIABLE GPM			
PROPANE	1.5225	.0318	WATER VAPOR CONTENT:			
ISO-BUTANE	2.0068	.0050	Gas Mixture Static Pressure PSI			
N-BUTANE	2.0068	.0092	Hydrocarbon Dew Point °F			
ISO-PENTANE	2.4910	.0018	Water Vapor Dew Point °F			
N-PENTANE	2.4910	.0015	Lbs Water Vapor per MMCF			
HEXANES	2.9753	.0004	Conversion Constant X 0.000021			
HEPTANES +	3.7018	.0003	Water Vapor Mole Fraction			
COMPOSITION - - - - -		1.0000	Moisture recorder reading			
			Make or type			

MIXTURE SPECIFIC GRAVITY:

Calculated From Analysis

678

Determined by Test Instrument

678

Instrument Make or Type

Ray

MIXTURE HEATING VALUE:

(Btu/cf at 14.73 Psia, 60°F, Sat.)

Calculated From Analysis

1108

Determined by Calorimeter

Calorimeter Verified ()

REMARKS No DEHY (INSTALLED)

SULFUR CONTENT:

H₂S - Hydrogen Sulfide, Gr./100 cf

.00

RSH - Mercaptans

.02

RSR - Sulfides

.03

RSSR - Residuals

.07

Total Sulfur, Gr./100 cf

.12

H₂S Grains to fraction conversion

X 0.0000157

H₂S Mole Fraction

Critical Pressure 679

Critical Temperature 380

MEASUREMENT

GAS

NEW MEXICO

LEONARD A. DUBOIS, JR., President

Gauge No. 1114				Depth 6359		Clock No. 11955				24 hour	Ticket No.	773844	
First Flow Period		First Closed In Pressure		Second Flow Period		Second Closed In Pressure		Third Flow Period		Third Closed In Pressure			
Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t + \theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t + \theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $\frac{t + \theta}{\theta}$	PSIG Temp. Corr.	PSIG Temp. Corr.
0	.0000	41	.0000	43	.0000		60						
1	.0920	43	.0195	475	.0710**	62	.0529	954					
2			.0391	782	.1386	60	.1059	1621					
3			.0586	1059	.2062	60	.1588	2005					
4			.0781	1313	.2738	60	.2117	2166					
5			.0977	1548	.3414	60	.2647	2216					
6			.1172	1755	.4090	60	.3176	2236					
7			.1367	1916			.3705	2246					
8			.1562	2032			.4234	2254					
9			.1758	2123			.4764	2259					
10			.1953	2182			.5293	2264					
11			.2148	2221			.5822	2268					
12			.2344	2250			.6352	2271					
13			.2539	2264			.6881	2275					
14			.2734	2273			.7410	2277					
15			.2930	2279			.7940	2279					

Gauge No. 1113				Depth 6597		Clock No. 6728				24 hour	
0	.0000	149	.0000	142	.0000	139	.0000	151			
1	.0134*	139	.0202	479	.0703**	154	.0535	1052			
2	.0301	140	.0404	793	.1372	153	.1069	1702			
3	.0468	140	.0606	1091	.2042	153	.1604	2097			
4	.0635	142	.0808	1360	.2711	151	.2138	2255			
5	.0803	142	.1010	1589	.3380	151	.2673	2308			
6	.0970	142	.1212	1796	.4050	151	.3208	2327			
7			.1414	1972			.3742	2340			
8			.1616	2109			.4277	2347			
9			.1818	2206			.4811	2352			
10			.2020	2275			.5346	2359			
11			.2222	2315			.5881	2363			
12			.2424	2343			.6415	2366			
13			.2626	2359			.6950	2368			
14			.2828	2370			.7484	2371			
15			.3030	2377			.8020	2373			
Reading Interval		5		6		20		16			
BEST AVAILABLE COPY											
Minutes											

REMARKS: * - First interval is equal to 4 minutes, ** - 21 minutes.

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Federal BZ #12

DST 6380-6600

Contributions to log height h:

<u>Interval</u>	<u>Feet</u>
6380-6382	2
6387-6396	9
6401-6404	3
6471-6472	1
6476-6479	3
6487-6488	1
6490-6492	2
6501-6503	2
6504-6510	6
6520-6521	<u>1</u>
	30 ft.

Federal BZ #12

DST 6380-6600

Time to Reach Pseudosteady State

A) Average Porosity = 0.018

(Note 1)

<u>Interval</u>	<u>Porosity</u>
6380-6382	0.010
6387-6396	0.024
6401-6404	0.009
6471-6472	0.019
6476-6479	0.011
6487-6488	0.012
6490-6492	0.014
6501-6503	0.022
6504-6510	0.021
6520-6521	0.010

B) Total Compressibility = $S \frac{C}{g \ g}$

$$C_t = 0.7 (0.00099) = 0.00069 \text{ psi}^{-1} \quad (\text{Note 2})$$

C) Time $t = \frac{1136 \phi u C_t r_e^2}{k}$

$$t = \frac{1136 (0.018) (0.0136) (0.00069) (2106)^2}{0.016}$$

$$t = 53,200 \text{ hr}$$

$$t = 6.1 \text{ yr}$$

- 1) Porosity averaged over 30 ft of pay
- 2) C.S. Matthews - D.G. Russell Fig. G7.A

Schlumberger

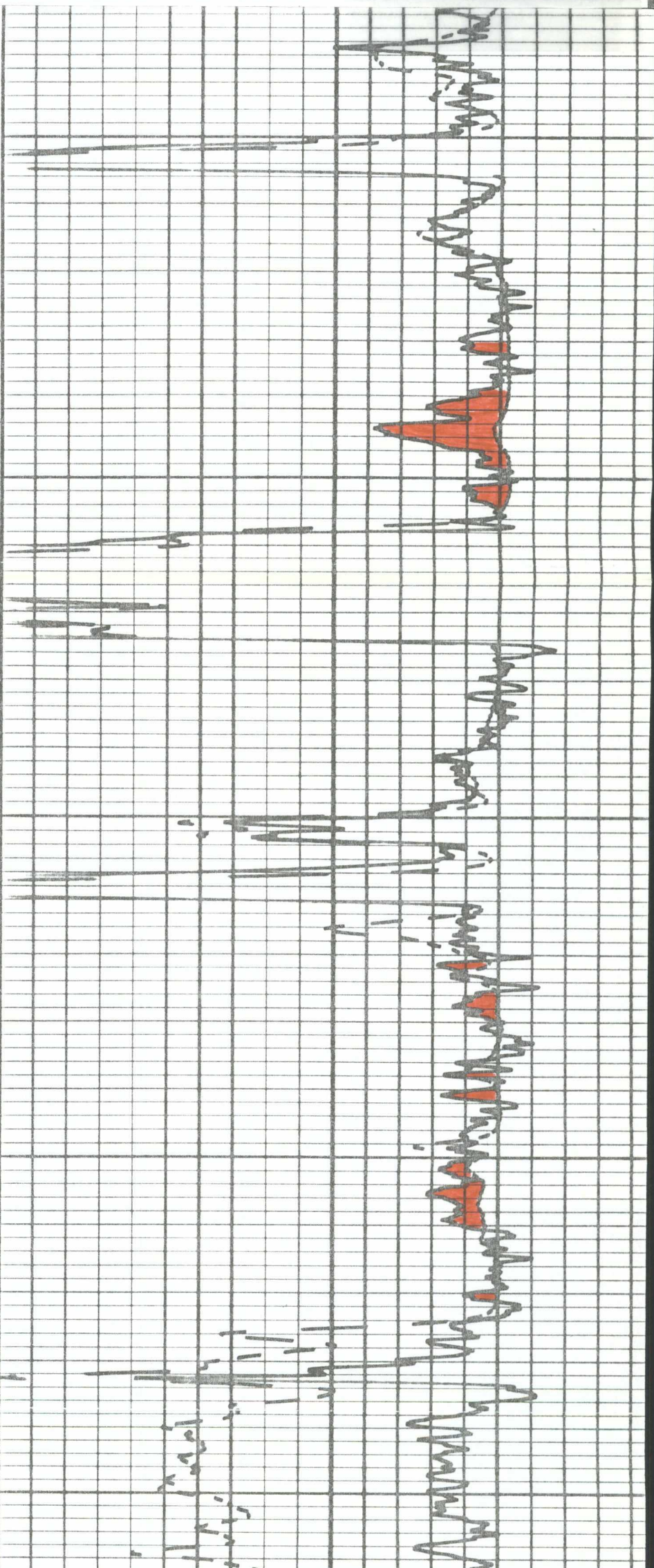
SIMULTANEOUS
COMPENSATED NEUTRON-
FORMATION DENSITY

COUNTY	EDDY
FIELD	WILDCAT
LOCATION	
WELL	FEDERAL "BZ" #12
COMPANY	YATES PETRO.
COMPANY	YATES PETROLEUM
WELL	FEDERAL "BZ" #12
FIELD	WILDCAT
COUNTY	EDDY
STATE	NEW MEXICO
LOCATION	1980' FSL, § 1980' FWL,
AFI SERIAL NO	21
SEC	17-S
TWP	25-E
RANGE	
Other Services:	DLL

Permanent Datum: G.L. _____; Elev.: 3572
Log Measured From K.B. _____, 15 Ft. Above Perm. Datum
Drilling Measured From K.B. _____

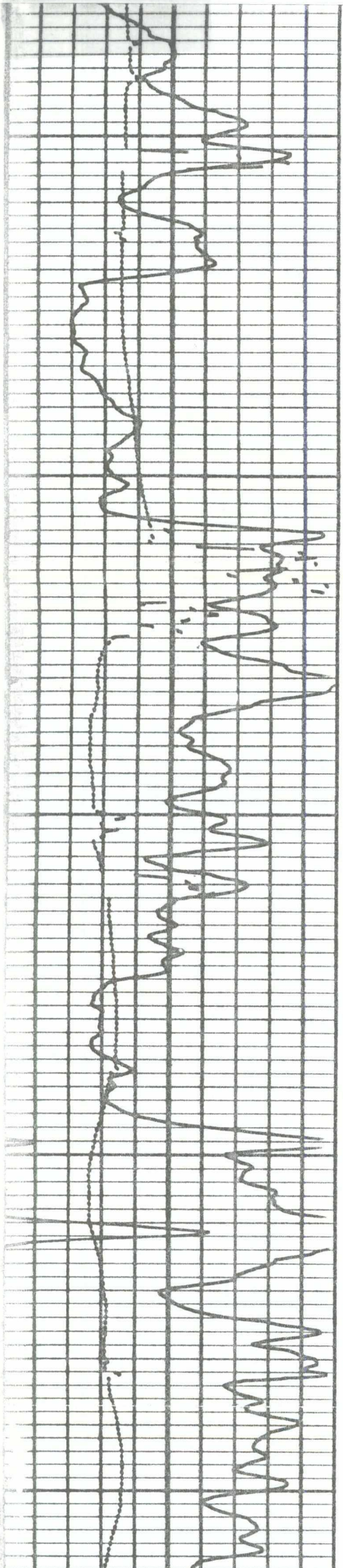
Elev.: K.B. 3587
D.F. _____
G.L. 3572

Date	10-7-75		
Run No.	ONE		
Depth-Driller	8180		
Depth-Logger	8179		
Btm. Log Interval	8178		
Top Log Interval	100		
Casing-Driller	85/8@1102	@	@
Casing-Logger	1100		
Bit Size	7 7/8		
Type Fluid in Hole	FLOSAI DRISPAK		
Dens. Visc.	9.1 39		
pH	11	7.6ml	ml
Source of Sample	CIRC.		
Rm @ Meas. Temp.	.24 @ 76 °F	@	@
Rmf @ Meas. Temp.	.22 @ 76 °F	@	@
Rmc @ Meas. Temp.	@ °F	@	@
Source: Rmf Rmc	M		
Rm @ BHT	.13 @ 136°F	@	@
Circulation Stopped	2400: 10-6		
Logger on Bottom	1200: 10-7		



6400

6500



WELL NAME: Griffin JJ Com #1

LOCATION: 4-18S-25E

DST INTERVAL: 6560-6643

$$p^* = 2495 \text{ psi} \quad \text{slope (M)} = 3545 \text{ psi/cycle}$$

$$T_c = 377^\circ \text{R} \quad P_c = 670 \text{ psi}$$

$$T = 121 + 460^\circ = 581^\circ \text{R} \quad P_{wf} = 120 \text{ psi}$$

$$P_{avg} = \frac{P^* + P_{wf}}{2} = \frac{2495 + 120}{2} = 1307.5 \text{ psi (Note 1)}$$

$$T_r = \frac{T}{T_c} = \frac{581^\circ}{377^\circ} = 1.54$$

$$P_r = \frac{P_{avg}}{P_c} = \frac{1307.5}{670} = 1.95$$

$$Z = 0.84 \quad T_{sc} = 520^\circ \text{R} \quad P_{sc} = 13.3 \text{ psi}$$

$$B_g = Z \cdot \frac{T}{T_{sc}} \cdot \frac{P_{sc}}{P_{avg}} = 0.84 \cdot \frac{581}{520} \cdot \frac{13.3}{1307.5} = 0.010 \text{ (Note 1)}$$

$$q = 27 \text{ Mcfd} \cdot 178.1 = 4,809 \text{ b/d}$$

$$u = 1.23 \times 0.0112 = 0.014 \text{ cp (Note 2)}$$

$$kh = \frac{162.6 \cdot q \cdot u \cdot B}{M} = \frac{162.6 (4809) (0.014) (0.010)}{3545}$$

$$kh = 0.031 \text{ md} \cdot \text{ft}$$

$$h = 20 \text{ ft (Note 3)}$$

$$k = 0.002 \text{ md (Note 4)}$$

- 1) C.S. Matthews - D.G. Russell eqn 3.21a
- 2) C.S. Matthews - D.G. Russell Fig G.3A&B
- 3) h estimated from log
- 4) k = 0.009 md for q = 190 Mcfd and h = 24 ft.

46 4652

$\frac{T + \Delta T}{T}$

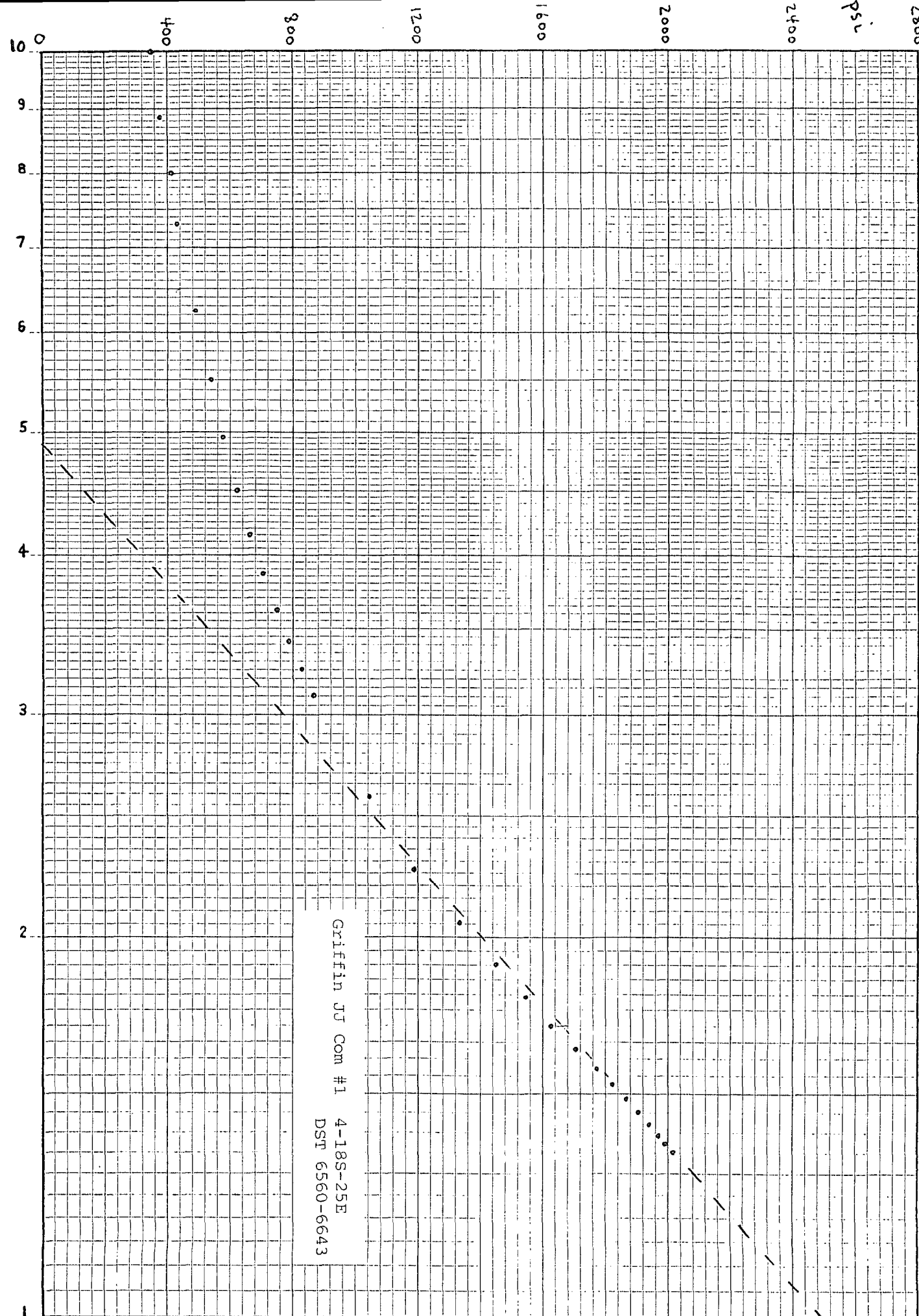
SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

KE

11

3

3



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TW

GAS QUALITY TEST REPORT

COMPANY SELLER

YATES PET. CO.

FIELD OR
LOCATION

W. A. A. R. KNOB

SOURCE OR
RESERVOIR

Perm Penn

WELL OR
STATION NAME

GRIFFIN Com #1

STA. NO.

1239-1

CONTRACT NO.

3694

TEST DATE

01/23/79

LAB

4

COMPOUND COMPONENTS	COMPONENT SPECIFIC GRAVITY	COMPONENT MOLE FRACTION	LIQUEFIABLE HYDROCARBONS	COMPONENT G. P. M.	MOLE FRACTION	G. P. M. CONTENT
NITROGEN	.9672	.0070	PROPANE	27.514		
CARBON DIOXIDE	1.5195	.0009	ISO-BUTANE	32.698		
HELIUM	.1382		N-BUTANE	31.510		
OXYGEN	1.1048	.0002	LPG - - - - -			
HYDROGEN SULFIDE	1.1766		ISO-PENTANE	36.582		
WATER VAPOR	.6220		N-PENTANE	36.213		
HYDROCARBON DILUENTS		(.0081)	HEXANES	41.111		
			HEPTANES +	46.126		
METHANE	.5539	.8660	NATURAL GASOLINE - - - - -			
ETHANE	1.0382	.0768	TOTAL LIQUEFIABLE GPM			
PROPANE	1.5225	.0303	WATER VAPOR CONTENT:			
ISO-BUTANE	2.0068	.0040	Gas Mixture Static Pressure PSI			
N-BUTANE	2.0068	.0083	Hydrocarbon Dew Point °F			
ISO-PENTANE	2.4910	.0021	Water Vapor Dew Point °F			
N-PENTANE	2.4910	.0019	Lbs Water Vapor per MMCF			
HEXANES	2.9753	.0015	Conversion Constant			X 0.000021
HEPTANES +	3.7018	.0010	Water Vapor Mole Fraction			
			Moisture recorder reading			6.0
			Make or type			DePom

COMPOSITION - - - - - 1.0000

MIXTURE SPECIFIC GRAVITY:

Calculated From Analysis

657

Determined by Test Instrument

657

Instrument Make or Type

Cox

MIXTURE HEATING VALUE:

(Btu/cf at 14.73 Psia, 60°F, Sat.)

Calculated From Analysis

1141

Determined by Calorimeter

Calorimeter Verified ()

SULFUR CONTENT:

H₂S - Hydrogen Sulfide, Gr./100 cf

.00

RSH - Mercaptans "

.02

RSR - Sulfides "

.04

RSSR - Residuals "

.05

Total Sulfur, Gr./100 cf

.11

H₂S Grains to fraction conversion

X 0.0000157

H₂S Mole Fraction

Critical Pressure Critical Temperature

REMARKS

MEASUREMENT
AREA

Rosen

GAS
ANALYST

Aston

24

JOHNSTON

Schlumberger

SURFACE INFORMATION

Description (Rate of Flow)	Time	Pressure (P.S.I.G.)	Surface Choke
Opened Tool	1433	—	—
GOOD BLOW, INCREASING TO STRONG BLOW			
	1437	2	CLOSED
CLOSED FOR INITIAL SHUT-IN	1438	—	"
FINISHED SHUT-IN	1608	—	"
RE-OPENED TOOL	1609	5	1/4"
STRONG BLOW, SLOWLY DECREASING DURING FLOW PERIOD			
	1624	3 1/2	"
	1641	1 1/2	"
GAS TO SURFACE	1654	1	"
CLOSED FOR FINAL SHUT-IN	1710	2/3	"
FINISHED SHUT-IN	2010	—	"
PULLED PACKER LOOSE	2011	—	—

Cushion Type	Amount	Pressure	Bottom Choke Size
	—		5/8"

MUD DATA

Mud Type	DRISPAC - PERMALOID	Wt.	10.3
Viscosity	—	Water Loss	8.0 C.C.
Resist: of Mud	— @ — °F	of Filtrate	.06 @ 72 °F
Chloride Content	116,000		PPM

EQUIPMENT & HOLE DATA

Type Test	M.F.E. SELECTIVE ZONE STRADDLE
Formation Tested	CISCO /OPEN HOLE (INFLATABLE)
Elevation	3567 K.B.
Net Productive Interval	—
Estimated Porosity	—
All Depths Measured From	KELLY BUSHING
Total Depth	8505
Main Hole/Casing Size	7 7/8"
Rat Hole/Liner Size	—
Drill Collar Length	663' I.D. 2.25"
Drill Pipe Length	5843' I.D. 3.8"
Packer Depth(s)	6560 & 6643

MULTI-FLOW EVALUATOR FLUID SAMPLE DATA

Sampler Pressure	70.0	P.S.I.G. at Surface
Recovery: Cu. Ft. Gas	0.2	
cc. Oil	—	
cc. Water	—	
cc. Mud	1020	
Tot. Liquid cc.	1020	
Gravity	— °API @ — °F	
Gas/Oil Ratio	—	cu. ft./bbl.

RESISTIVITY

CHLORIDE CONTENT

Recovery Water	— @ — °F	PPM
Recovery Mud	— @ — °F	
Recovery Mud Filtrate	.06 @ 72 °F	115,000 PPM
Mud Pit Sample	— @ — °F	
Mud Pit Sample Filtrate	.06 @ 72 °F	116,000 PPM

RECOVERY DESCRIPTION	FEET	BARRELS	% OIL	% WATER	% OTHERS	API GRAVITY	RESISTIVITY	CHL. PPM
SLIGHTLY GAS CUT DRILLING MUD	200	0.98				@ °F	.06 @ 72 °F	115,000
						@ °F	@ °F	
						@ °F	@ °F	
						@ °F	@ °F	
						@ °F	@ °F	
						@ °F	@ °F	
						@ °F	@ °F	

Remarks: _____

Address P.O. DRAWER 'A'; LEVELLAND, TEXAS 79336

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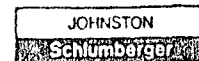
Company AMOCO PRODUCTION COMPANY
Well GRIFFIN COM. #1
Test Interval 6560' TO 6643'

Field RICHARD KNOB ATOKA
Location 1650' FNL & 1980' FWL SEC. 4 - T-10S - R-25
Test # 3
Date 3-26-78

County EDDY State NEW MEXICO
Technician CLAMON (HOBBS)
Test Approved By _____

Field Report No. 05873 D
No. Reports Requested 9 (6X)

BOTTOM HOLE PRESSURE AND TIME DATA

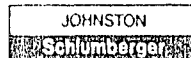


INSTRUMENT NO.: J-092 CAPACITY(P.S.I.): 6400 DEPTH: 6522 FT.
PORT OPENING: INSIDE BOTTOM HOLE TEMP.: 121 PAGE 1 OF 2

DESCRIPTION	LABELED POINTS	PRESSURE (P.S.I.)	GIVEN TIME	COMPUTED TIME
INITIAL HYDROSTATIC MUD	1	3473.8		
INITIAL FLOW(1)	2	54.0		
INITIAL FLOW(2)	3	52.8	5	5
INITIAL SHUT-IN	4	1909.9	90	91
FINAL FLOW(1)	5	71.8		
FINAL FLOW(2)	6	120.0	61	58
FINAL SHUT-IN	7	2015.3	180	182
FINAL HYDROSTATIC MUD	8	3475.1		

INCREMENTAL READINGS

LABEL POINT	DELTA TIME	PRESSURE (P.S.I.)	T + DT/DT	LOG	PW - PF (P.S.I.)	COMMENTS
1		3473.8				HYDROSTATIC MUD
2	0	54.0				INITIAL FLOW(1)
3	5	52.8				INITIAL FLOW(2)
3	0	52.8				STARTED SHUT-IN
	5	339.6	2.000	0.301	286.9	
	10	540.2	1.500	0.176	487.4	
	15	698.9	1.333	0.125	646.1	
	20	837.2	1.250	0.097	784.5	
	25	960.4	1.200	0.079	907.6	
	30	1072.1	1.167	0.067	1019.3	
	35	1177.4	1.143	0.058	1124.7	
	40	1276.5	1.125	0.051	1223.7	
	45	1367.9	1.111	0.046	1315.1	
	50	1449.1	1.100	0.041	1396.3	
	55	1524.0	1.091	0.038	1471.2	
	60	1591.3	1.083	0.035	1538.5	
	65	1656.0	1.077	0.032	1603.3	
	70	1714.4	1.071	0.030	1661.6	
	75	1767.7	1.067	0.028	1715.0	
	80	1817.2	1.063	0.026	1764.5	
	85	1861.7	1.059	0.025	1808.9	
	90	1903.5	1.056	0.023	1850.8	
4	91	1909.9	1.055	0.023	1857.1	INITIAL SHUT-IN
5	0	71.8				FINAL FLOW(1)
	5	102.3				
	10	107.3				
	15	112.4				
	20	115.0				
	25	116.2				
	30	116.2				
	35	116.2				
	40	116.2				
	45	117.5				
	50	118.8				
	55	120.0				

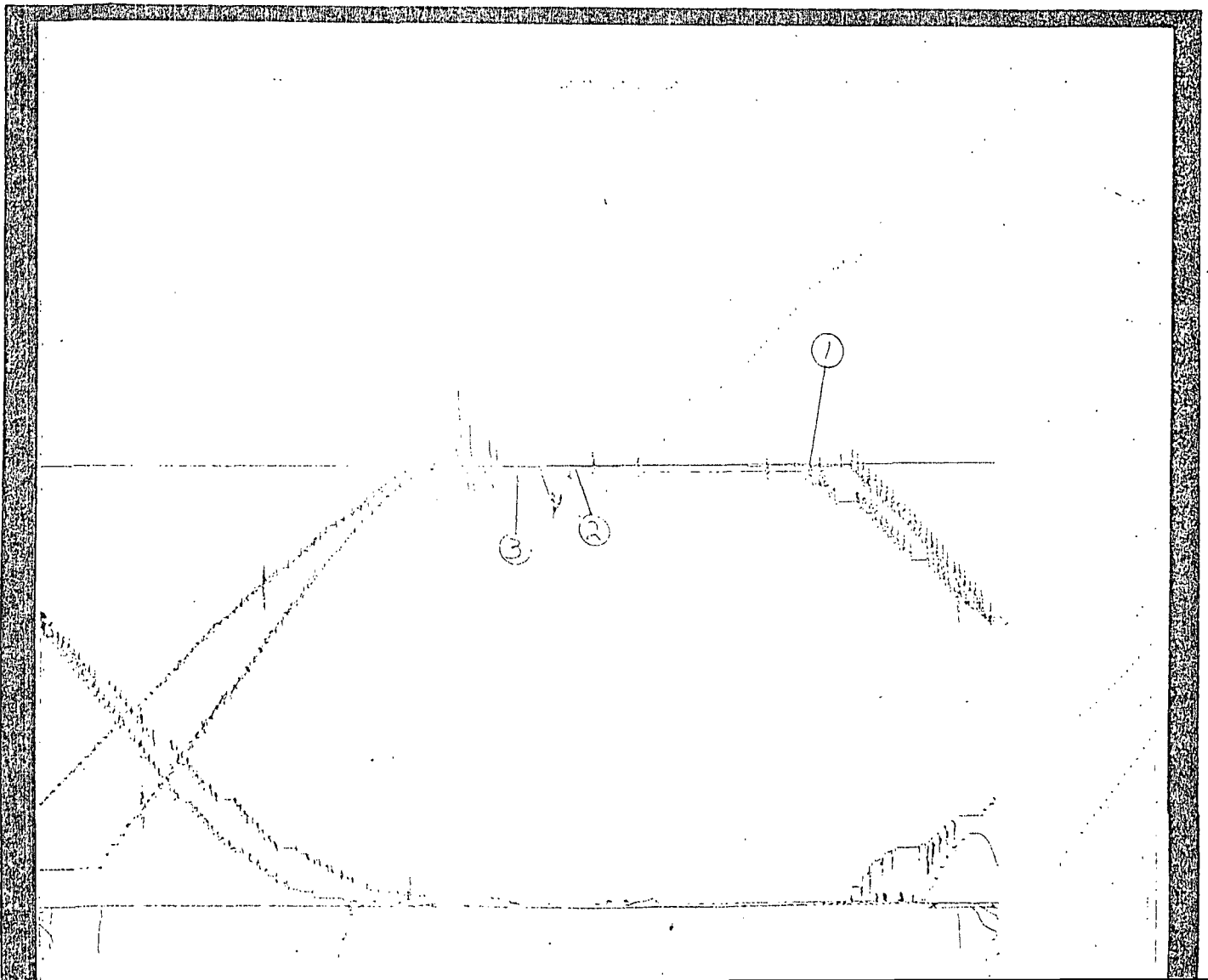


LABEL POINT	DELTA TIME	PRESSURE (P.S.I.)	T + DT/DT	LOG	PW - PF (P.S.I.)	COMMENTS
6	58	120.0				FINAL FLOW(2) STARTED SHUT-IN
6	0	120.0				
	1	144.2	64.000	1.806	24.1	
	2	205.1	32.500	1.512	85.0	
	3	240.6	22.000	1.342	120.6	
	4	268.6	16.750	1.224	148.5	
	5	297.8	13.600	1.134	177.7	
	6	325.7	11.500	1.061	205.6	
	7	353.6	10.000	1.000	233.6	
	8	381.5	8.875	0.948	261.5	
	9	406.9	8.000	0.903	286.9	
	10	433.6	7.300	0.863	313.5	
	12	486.9	6.250	0.796	366.9	
	14	535.1	5.500	0.740	415.1	
	16	580.8	4.937	0.694	460.8	
	18	626.5	4.500	0.653	506.5	
	20	669.7	4.150	0.618	549.7	
	22	712.8	3.864	0.587	592.8	
	24	754.7	3.625	0.559	634.7	
	26	794.1	3.423	0.534	674.1	
	28	832.2	3.250	0.512	712.1	
	30	870.3	3.100	0.491	750.2	
	40	1044.2	2.575	0.411	924.1	
	50	1196.5	2.260	0.354	1076.5	
	60	1331.0	2.050	0.312	1211.0	
	70	1449.1	1.900	0.279	1329.1	
	80	1549.4	1.787	0.252	1429.3	
	90	1635.7	1.700	0.230	1515.7	
	100	1709.3	1.630	0.212	1589.3	
	110	1771.5	1.573	0.197	1651.5	
	120	1826.1	1.525	0.183	1706.1	
	130	1871.8	1.485	0.172	1751.8	
	140	1908.6	1.450	0.161	1788.6	
	150	1940.4	1.420	0.152	1820.3	
	160	1967.0	1.394	0.144	1847.0	
	170	1991.1	1.371	0.137	1871.1	
	180	2011.4	1.350	0.130	1891.4	
7	182	2015.3	1.346	0.129	1895.2	FINAL SHUT-IN HYDROSTATIC MUD
8		3475.1				

BOTTOM HOLE PRESSURE AND TIME DATA

DESCRIPTION	LABELED POINTS	PRESSURE (P.S.I.)	GIVEN TIME	COMPUTED TIME
INITIAL HYDROSTATIC MUD	1	3548.3		
INITIAL FLOW (1)				
INITIAL FLOW (2)				
INITIAL SHUT-IN				
SECOND FLOW (1)				
SECOND FLOW (2)				
SECOND SHUT-IN				
FINAL FLOW (1)				
FINAL FLOW (2)				
FINAL SHUT-IN				
FINAL HYDROSTATIC MUD	3	3492.7		
	2	3546.9		

94



Griffin JJ Com #1

DST 6560-6643

Contributions to log height h:

<u>Interval</u>	<u>Feet</u>
6569-6571	2
6606-6624	<u>18</u>
	20 ft.

Griffin JJ Com #1

DST 6560-6643

Time to Reach Pseudosteady State

A) Average Porosity = 0.028

(Note 1)

<u>Interval</u>	<u>Porosity</u>
6569-6571	0.009
6606-6624	0.030

B) Total Compressibility = $S_g C_g$

$$C_t = 0.7 (0.00087) = 0.00061 \text{ psi}^{-1}$$

(Note 2)

C) Time $t = \frac{1136 \phi u C_{tr_e}^2}{k}$

$$t = \frac{1136 (0.028) (0.014) (0.00061) (2106)^2}{0.002}$$

$$t = 602,000 \text{ hr}$$

$$t = 68.7 \text{ yr}$$

- 1) Porosity averaged over 20 ft of pay
- 2) C.S. Matthews - D.G. Russell Fig. G7.A

NEUTRON-
DENSITY

D Co
4241

ITOKA - MORROW
N.M.

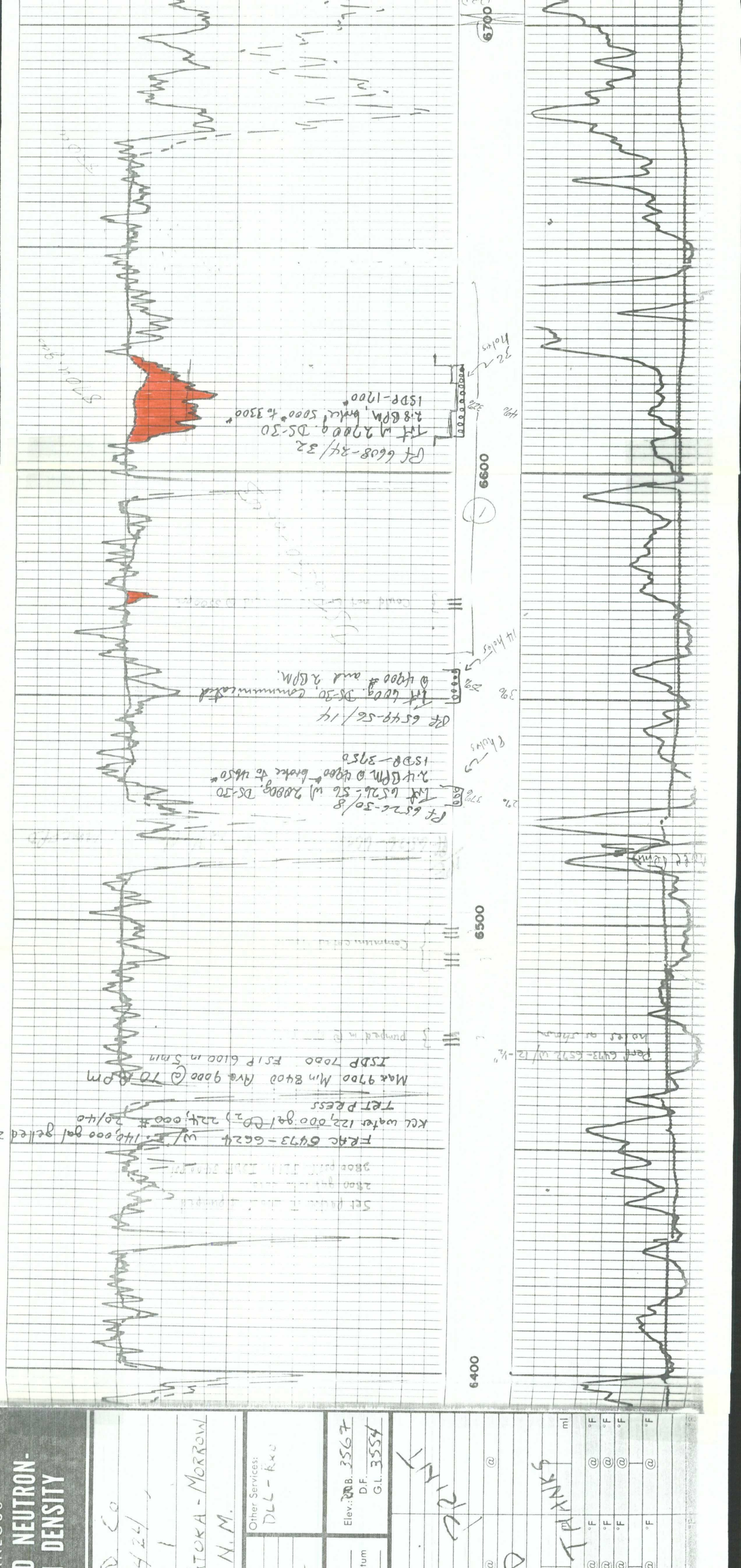
Other Services:
DLL - RKO

Elev.: 3567
D.F.
G.L. 3554

0217

PLANKS

°F	@
°F	@
°F	@
°F	@



WELL NAME: Irish Hills KW #2

LOCATION: 2-19S-24E

DST INTERVAL: 6532-6640

$$p^* = 2440 \text{ psi} \quad \text{slope (M)} = 2305 \text{ psi/cycle}$$

$$T_c = 370^\circ\text{R} \quad P_c = 670 \text{ psi}$$

$$T = 125 + 460^\circ = 585^\circ\text{R} \quad P_{wf} = 77.4 \text{ psi}$$

$$P_{avg} = \frac{P^* + P_{wf}}{2} = \frac{2440 + 77.4}{2} = 1259 \text{ psi (Note 1)}$$

$$T_r = \frac{T}{T_c} = \frac{585}{370} = 1.58$$

$$P_r = \frac{P_{avg}}{P_c} = \frac{1259}{670} = 1.90$$

$$Z = 0.86 \quad T_{sc} = 520^\circ\text{R} \quad P_{sc} = 13.3 \text{ psi}$$

$$B_g = Z \cdot \frac{T}{T_{sc}} \cdot \frac{P_{sc}}{P_{avg}} = 0.86 \cdot \frac{585}{520} \cdot \frac{13.3}{1259} = 0.010 \text{ (Note 1)}$$

$$q = 69.7 \text{ mcf/d} \quad 178.1 = 12414 \text{ b/d}$$

$$u = 1.20 \times 0.0114 = 0.0137 \text{ cp (Note 2)}$$

$$kh = \frac{162.6 \cdot q \cdot u \cdot B}{M} = \frac{162.6 (12414) (0.0137) (0.010)}{2305}$$

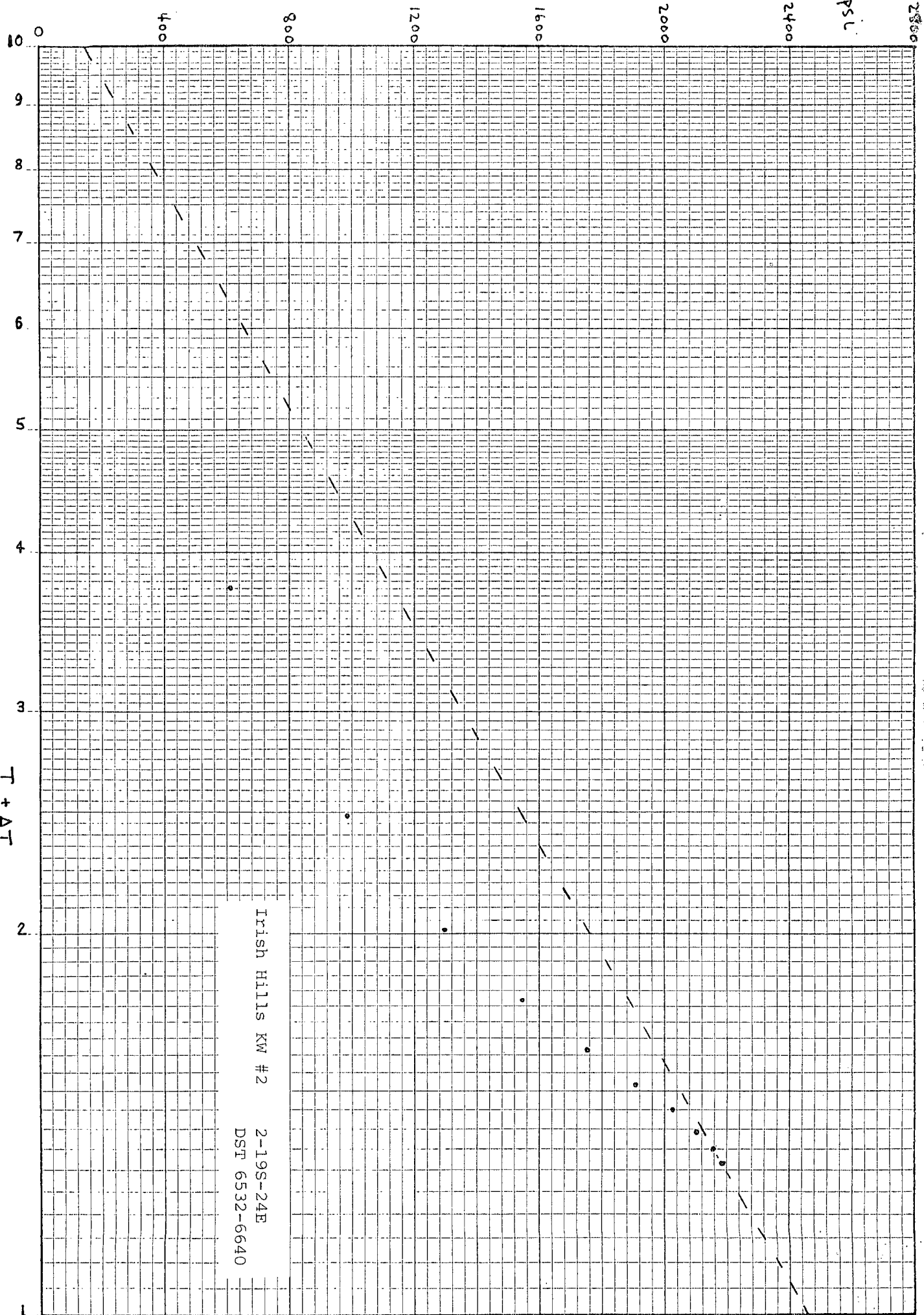
$$kh = 0.1200 \text{ md} \cdot \text{ft}$$

$$h = 58 \text{ ft (Note 3)}$$

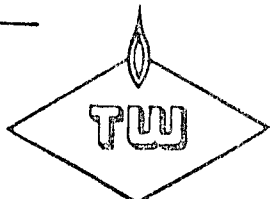
$$k = 0.0021 \text{ md (Note 4)}$$

- 1) C. S. Matthews - D.G. Russell eqn. 3.21a
- 2) C. S. Matthews - D.G. Russell Fig. G.3A&B
- 3) h estimated from Log
- 4) k = 0.0026 md for T=192°F

$$\frac{T + \Delta T}{\Delta T}$$



Irish Hills KW #2
2-19S-24E
DST 6532-6640



GAS QUALITY TEST REPORT

COMPANY SELLER

Supplement to Exhibit 12, Page 7

YATES PET. Co.

STA. NO.

1397-1

FIELD OR
LOCATION

CONTRACT NO.

SOURCE OR
RESERVOIR

TEST DATE

03/26/81

WELL OR

STATION NAME

IRISH HILLS "KW" #2

LAB

4

COMPOUND COMPONENTS	COMPONENT SPECIFIC GRAVITY	COMPONENT MOLE FRACTION	LIQUEFIABLE HYDROCARBONS	COMPONENT G. P. M.	MOLE FRACTION	G. P. M. CONTENT
NITROGEN	.9672	.0124	PROPANE	27.514	.	
CARBON DIOXIDE	1.5195	.0008	ISO-BUTANE	32.698	.	
HELIUM	.1382	.	N-BUTANE	31.510	.	
OXYGEN	1.1048	.	LPG - - - - -			
HYDROGEN SULFIDE	1.1766	.	ISO-PENTANE	36.582	.	
WATER VAPOR	.6220	.	N-PENTANE	36.213	.	
HYDROCARBON DILUENTS		(.0132)	HEXANES	41.111	.	
			HEPTANES +	46.126	.	
METHANE	.5539	.8859	NATURAL GASOLINE - - - - -			
ETHANE	1.0382	.0613	TOTAL LIQUEFIABLE GPM			
PROPANE	1.5225	.0230	WATER VAPOR CONTENT:			
ISO-BUTANE	2.0068	.0035	Gas Mixture Static Pressure PSIG 610 [#] 65 ^o			
N-BUTANE	2.0068	.0066	Hydrocarbon Dew Point °F _____			
ISO-PENTANE	2.4910	.0020	Water Vapor Dew Point °F _____			
N-PENTANE	2.4910	.0018	Lbs Water Vapor per MMCF 30 [#]			
HEXANES	2.9753	.0017	Conversion Constant X 0.000021			
HEPTANES +	3.7018	.0010	Water Vapor Mole Fraction _____			
COMPOSITION - - - - -		1.0000	Moisture recorder reading _____			
			Make or type _____			

MIXTURE SPECIFIC GRAVITY:

Calculated From Analysis

REAL.

643

Determined by Test Instrument

645

Instrument Make or Type

RNK.

MIXTURE HEATING VALUE:

(Btu/cf at 14.73 Psia, 60°F, Sat.)

Calculated From Analysis

1109

Determined by Calorimeter

Calorimeter Verified ()

SULFUR CONTENT:

H₂S - Hydrogen Sulfide, Gr./100 cf

.00

RSH - Mercaptans

RSR - Sulfides

RSSR - Residuals

Total Sulfur, Gr./100 cf

H₂S Grains to fraction conversion

X 0.0000157

H₂S Mole Fraction

Critical Pressure 669.4

Critical Temperature 369.7

REMARKS

INITIAL DELIVERY

MEASUREMENT

AREA

1

GAS

ANALYST

GARRATT / ALSTON

27

FLUID SAMPLE DATA				EQUIPMENT & HOLE DATA			
Date 7-6-80 Ticket Number 879639 Sampler Pressure 69 P.S.I.G. at Surface Recovery: Cu. Ft. Gas .284 cc. Oil _____ cc. Water _____ cc. Mud 500 drilling fluid Tot. Liquid cc. 500 Gravity _____ ° API @ _____ °F. Gas/Oil Ratio _____ cu. ft./bbl. RESISTIVITY CHLORIDE CONTENT Recovery Water _____ @ _____ °F. _____ ppm Recovery Mud _____ @ _____ °F. _____ ppm Recovery Mud Filtrate _____ @ _____ °F. _____ ppm Mud Pit Sample _____ @ _____ °F. _____ ppm Mud Pit Sample Filtrate _____ @ _____ °F. _____ ppm Mud Weight 8.9 vis _____ sec.				Kind of D.S.T. OPEN HOLE OFF BOTTOM STRADDLE Halliburton Location ARTESIA Tester MR. LAMAR Witness MR. D. JACKSON Drilling Contractor CAPITAN DRILLING COMPANY RIG # 14 sm			
				Formation Tested Cisco Elevation 3718' _____ Ft. Net Productive Interval _____ Ft. All Depths Measured From Kelly bushing (AGL) Total Depth 9190' _____ Ft. Main Hole/Casing Size 7 7/8" Drill Collar Length 660' I.D. 2.25" Drill Pipe Length 5835' I.D. 3.340" Packer Depth(s) 6526-6532-6640-6646' _____ Ft. Depth Tester Valve 6507' _____ Ft.			
TYPE AMOUNT Depth Back Surface Bottom Cushion _____ Ft. Pres. Valve _____ Choke _____ Choke .75"				Adj. choke 3/8"			
Recovered 180 Feet of drilling fluid				Field Area Meo. From Tester Valve WILDCAT County EDDY State NEW MEXICO			
Recovered _____ Feet of _____							
Recovered _____ Feet of _____							
Recovered _____ Feet of _____							
Recovered _____ Feet of _____							
Remarks SEE PRODUCTION TEST DATA SHEET							
TEMPERATURE		Gauge No. 512 Depth: 6511 Ft. 24 Hour Clock	Gauge No. 113 Depth: 6583 Ft. 24 Hour Clock	Gauge No. _____ Depth: _____ Ft. Hour Clock	TIME (00:00-24:00 hrs.)		
Est. 192 °F.		Blanked Off no	Blanked Off yes	Blanked Off _____	Tool 7-6-80 Opened 1900 Opened 7-7-80 Bypass 0100		
Actual	°F.	Pressures		Pressures		Pressures	
		Field	Office	Field	Office	Field	Office
First Period	Initial Hydrostatic	3028	3067.2	2996	3104.5		
	Flow Initial	53	57.7	92	96.0		
	Flow Final	66	80.0	92	100.0	30	29
Second Period	Closed in	1486	1496.0	1490	1509.2	90	89
	Flow Initial	66	60.3	79	102.6		
	Flow Final	66	77.4	92	92.1	60	58
Third Period	Closed in	2170	2181.5	2189	2197.9	180	183
	Flow Initial						
	Flow Final						
Final Hydrostatic		3081	3067.2	3115	3103.1		

10

Casing perms. _____ Bottom choke _____ Surf. temp. _____ °F Ticket No. 879639
Gas gravity _____ Oil gravity _____ GOR _____
Spec. gravity _____ Chlorides _____ ppm Res. _____ @ _____ °F
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED _____

[illegible]

Gauge No.		512		6511'		Clock No. 13528		24 hour		Ticket No.		879639		
First Flow Period		First Closed In Pressure				Second Closed In Pressure				Third Flow Period		Third Closed In Pressure		
Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.
0	.0000	57.7	.0000	80.0	.0000	60.3	.0000		77.4					
1	.0139*	80.0	.0272**	274.2	.0268**	72.1	.0705**		628.9					
2	.0313	81.3	.0579	436.9	.0602	70.8	.1308		990.7					
3	.0488	81.3	.0885	602.6	.0936	74.8	.1912		1301.3					
4	.0662	80.0	.1192	764.4	.1271	76.1	.2516		1557.9					
5	.0836	80.0	.1498	910.5	.1606	76.1	.3120		1760.5					
6	.1010	80.0	.1804	1051.3	.1940	77.4	.3724		1911.8					
7			.2111	1184.2			.4328		2018.4					
8			.2417	1298.6			.4932		2094.7					
9			.2724	1413.1			.5536		2148.6					
10			.3030	1496.0			.6140		2181.5					
11														
12														
13														
14														
15														

Gauge No.		113		6583'		Clock No. 6728		24 hour		Minutes				
First Flow Period		First Closed In Pressure				Second Closed In Pressure				Third Flow Period		Third Closed In Pressure		
Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	Log $t + \frac{\theta}{\theta}$	PSIG Temp. Corr.
0	.0000	96.0	.0000	100.0	.0000	102.6	.0000		92.1					
1	.0135*	106.5	.0270**	242.1	.0270**	88.1	.0705**		609.5					
2	.0304	107.8	.0573	415.7	.0608	88.1	.1308		984.1					
3	.0473	107.8	.0876	575.2	.0946	89.4	.1912		1296.8					
4	.0642	103.9	.1180	733.5	.1284	92.1	.2516		1550.1					
5	.0811	100.0	.1483	881.2	.1622	92.1	.3120		1758.6					
6	.0980	100.0	.1787	1029.0	.1960	92.1	.3724		1915.6					
7			.2090	1163.6			.4328		2029.0					
8			.2393	1287.6			.4932		2106.9					
9			.2697	1402.4			.5536		2160.9					
10			.3000	1509.2			.6140		2197.9					
11														
12														
13														
14														
15														

Reading Interval 5 9 10 18

Remarks: *First interval is equal to 4 minutes. ** = 8 minutes. *** = 21 minutes.

REMARKS: *First interval is equal to 4 minutes. ** = 8 minutes. *** = 21 minutes.

Irish Hills KW St #2

DST 6532-6640

Log footage contributing to height h:

<u>Interval</u>	<u>Feet</u>
6536-6538	2
6540-6552	12
6568-6570	2
6578-6592	14
6611-6619	8
6620-6640	<u>20</u>
	58 ft.

Irish Hills KW St #2

DST 6532-6640

Time to Reach Pseudosteady State

A) Average Porosity = 0.020

(Note 1)

<u>Interval</u>	<u>Porosity</u>
6536-6538	0.015
6540-6552	0.016
6568-6570	0.005
6578-6592	0.020
6611-6619	0.026
6620-6640	0.023

B) Total Compressibility = $S_g C_g$

$$C_t = 0.7 (0.00087) = 0.00061 \text{ psi}^{-1} \quad (\text{Note 2})$$

C) Time $t = \frac{1136 \phi u C_{tr}^2}{k}$

$$t = \frac{1136 (0.020) (0.0137) (0.00061) (2106)^2}{0.0021}$$

$$t = 401,000 \text{ hr}$$

$$t = 45.8 \text{ yr}$$

- 1) Porosity averaged over 58 ft of pay
- 2) C.S. Matthews - D.G. Russell Fig. G7.A

COMPENSATED NEUTRON-
FORMATION DENSITY

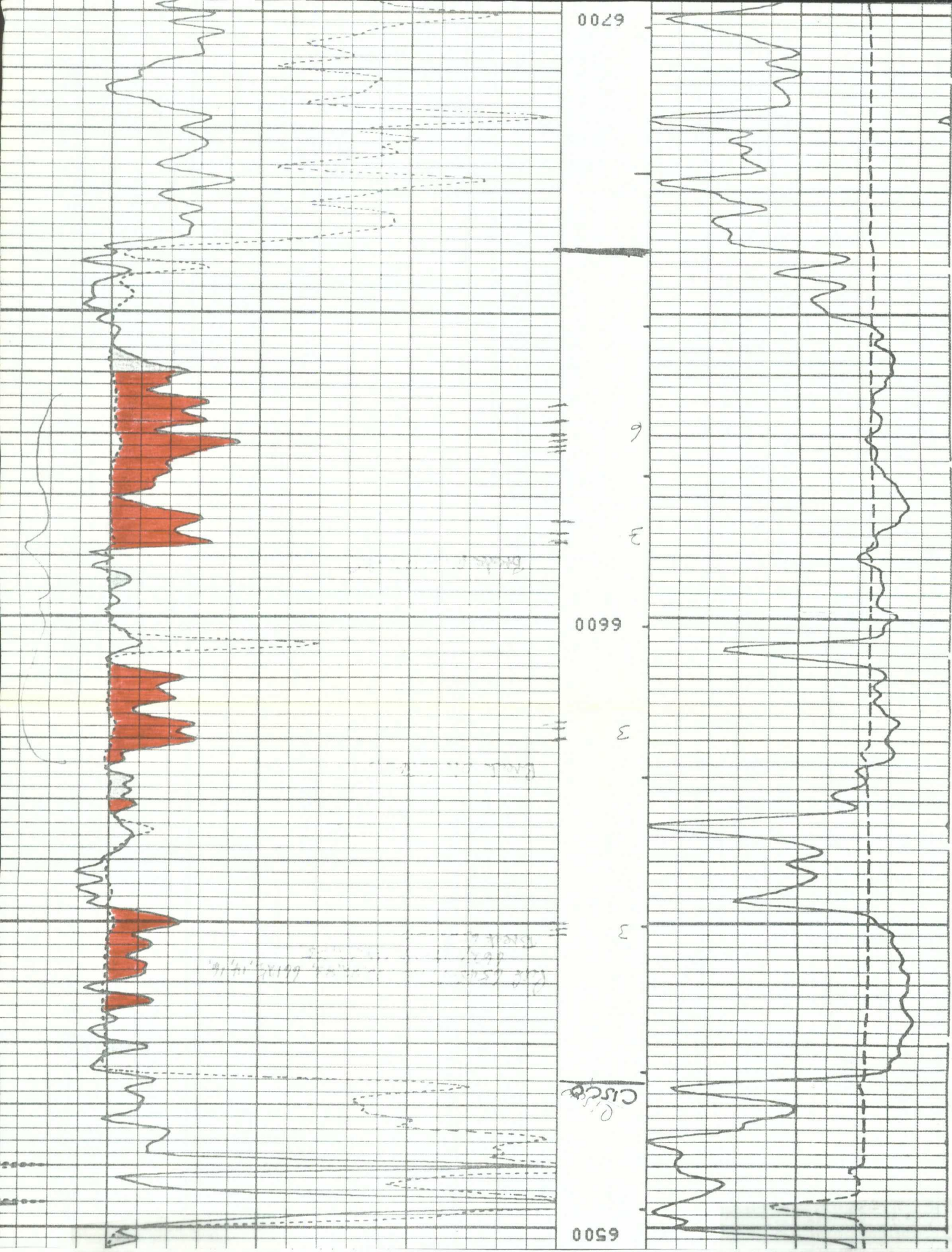
Schlumberger

COMPANY Yates Petroleum Corporation
WELL Irish Hills "KW" State Com. #2
FIELD Wildcat
COUNTY Eddy STATE New Mexico

LOCATION 1980' FNL + 1980' FEL
API SERIAL NO. 2 TWP. 19-S RANGE 24-E
Other Services: DLL-MSF

Permanent Datum: GL; Elev.: 3709
Log Measured From KB, 16.5 Ft. Above Perm. Datum
Drilling Measured From KB G.L. 3709

Date	7-5-80				
Run No.	ONE				
Depth-Driller	9190				
Depth-Logger	9189				
Btm. Log Interval	9188				
Top Log Interval	Surf				
Casing-Driller	8518 @ 950	@	@	@	@
Casing-Logger	948				
Bit Size	7 7/8				
Type Fluid in Hole	S.W. Gel, Starch				
Dens.	9.0	38			
pH	10.0	9.4	ml		ml
Fluid Loss					
Source of Sample	Circulated				
Rm @ Meas. Temp.	.17	@ 89 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	.13	@ 89 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	.25	@ 89 °F	@ °F	@ °F	@ °F
Source: Rmf	M	M			
Rm @ BHT	.10	@ 149 °F	@ °F	@ °F	@ °F
Circulation Stopped	0700	7-5			
Logger on Bottom	1430	7-5			
Max. Rec. Temp	149	°F			



WELL NAME: La Cama #1

LOCATION: 20-18S-25E

DST INTERVAL: 6812-7000

$$\begin{aligned} p^* &= 2418 \text{ psi} & \text{slope (M)} &= 392 \text{ psi/cycle} \\ T_c &= 374^\circ\text{R} & P_c &= 677 \text{ psi} \\ T &= 128 + 460^\circ = 588^\circ\text{R} & P_{wf} &= 551 \text{ psi} \end{aligned}$$

$$P_{avg} = \frac{P^* + P_{wf}}{2} = \frac{2418 + 551}{2} = 1484.5 \text{ psi (Note 1)}$$

$$Tr = \frac{T}{T_c} = \frac{588}{374} = 1.57$$

$$Pr = \frac{P_{avg}}{P_c} = \frac{1484.5}{667} = 2.23$$

$$Z = 0.84 \quad T_{sc} = 520^\circ\text{R} \quad P_{sc} = 13.3 \text{ psi}$$

$$Bg = Z \cdot \frac{T}{T_{sc}} \cdot \frac{P_{sc}}{P_{avg}} = 0.84 \cdot \frac{588}{520} \cdot \frac{13.3}{1484.5} = 0.0085 \text{ (Note 1)}$$

$$q = 390 \text{ mcf/d} \quad 178.1 = 69459 \text{ b/d (Note 2)}$$

$$u = (1.26) (0.0112) = 0.0141 \text{ cP (Note 3)}$$

$$kh = \frac{162.6 \cdot q \cdot u \cdot B}{M} = \frac{162.6 (69459) (0.0141) (0.0085)}{392}$$

$$kh = 3.45 \text{ md} \cdot \text{ft}$$

$$h = 38 \text{ ft (Note 4)}$$

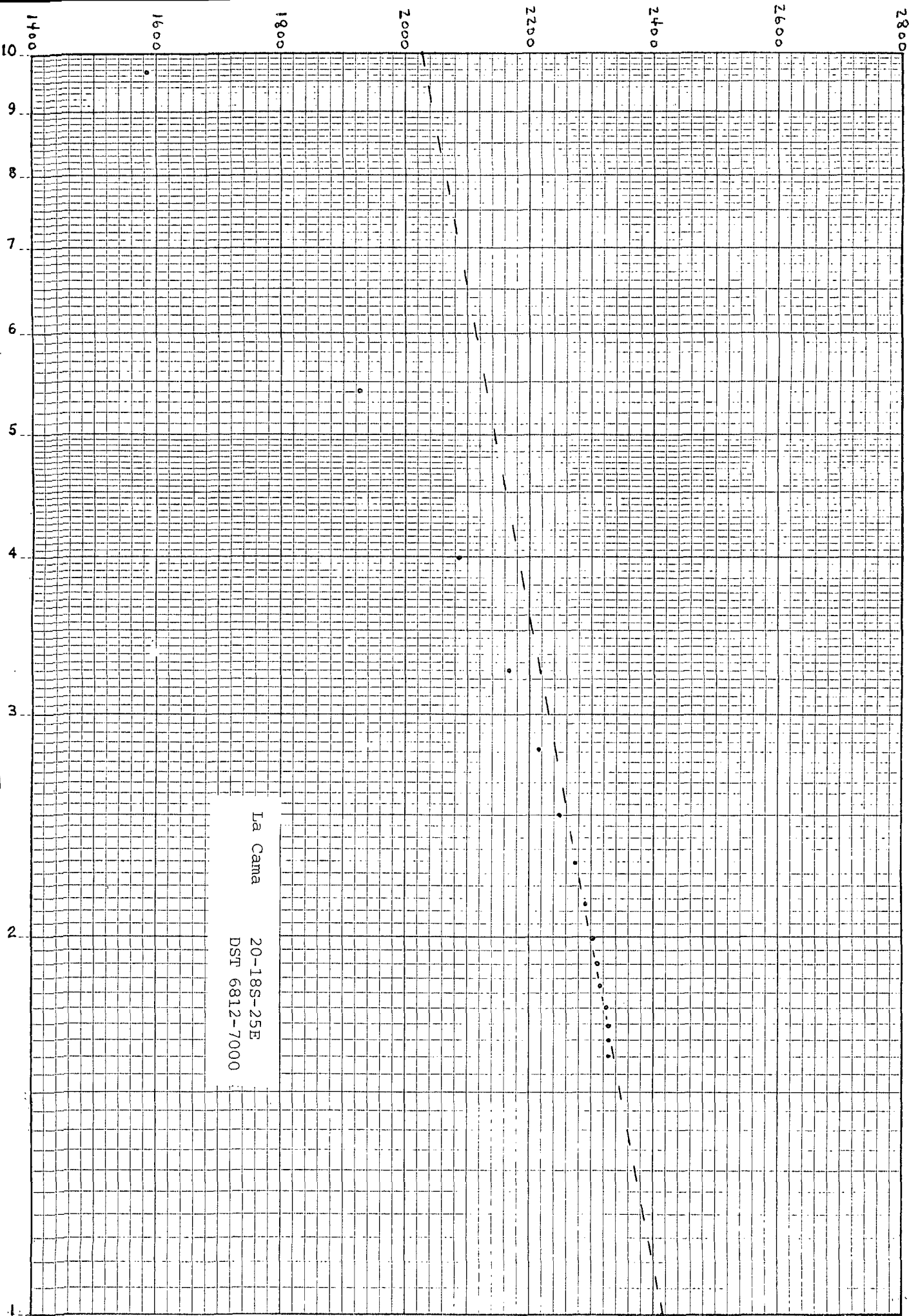
$$k = 0.091 \text{ md}$$

- 1) C.S. Matthews - D.G. Russell eqn. 3.21a
- 2) Flow rate is natural flow rate as reported on Drilling Report.
Flow during DST was actually less.
- 3) C.S. Matthews - D.G. Russell Fig. G.3A&B
- 4) h estimated from Log

SEMI-LOGARITHMIC 1 CYCLE X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 4652

$$\frac{T + \Delta T}{\Delta T}$$



La Cama
20-18S-25E
DST 6812-7000

EL PASO NATURAL GAS COMPANY
RPT-ASL 314 CHROMATOGRAPHIC GAS ANALYSIS REPORT

RPT DATE 02 03 81 METER STA 61894
ANAL DATE 01 29 81 METER STATION NAME OPER 9841
LA CAMA COM #1

TYPE CODE SAMPLE DATE EFF. DATE USE MOS. SCALE H2S GRAINS LOCATION
00 01 21 81 02 03 81 06 0000* 1 J 16

NORMAL
MOL%

GPM

C O 2

00.00

0.000

H 2 S

00.00*

0.000

N2

01.74

0.000

METHANE

83.51

0.000

ETHANE

08.93

2.387

PROPANE

03.21

0.883

ISO-BUTANE

00.36

0.118

NORM-BUTANE

01.14

0.359

ISO-PENTANE

00.34

0.124

NORM-PENTANE

00.35

0.127

HEXANE PLUS

00.42

0.183

TOTALS

100.00

4.181

SPECIFIC GRAVITY

0.684

MIXTURE HEATING VALUE

(BTU/CF @ 14.73 PSIA, 60 DEGREES, DRY) 1187

RATIO OF SPECIFIC HEATS

1.287

* NO TEST SECURED FOR DETERMINATION H2S CONTENT.

FORM 101-R2-PRINTED IN U.S.A. FORMATION TEST DATA LITTLER'S 102540 3M 8/76

Casing perms. _____ Bottom choke .75" Surf. temp. _____ °F Ticket No. 139167
Gas gravity _____ Oil gravity _____ GOR _____
Spec. gravity _____ Chlorides _____ ppm Res. _____ @ _____ °F
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED _____

Date Time	a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
1315		3/8"	1#			Opened tool with a good blow.
1320		"	5			Good blow.
1325		"	15			Good blow - no gas.
1330		"	20			"
1335		"	23	129.20		Gas to the surface in 20 minutes.
1340		"	24	132.60		Flared gas.
1345		"	24	132.60		"
1350		"	"	"		"
1355		"	23	129.20		"
1400		"	"	"		" Closed tool.
1530		"	2			Reopened tool with a good blow.
1535		"	28	146		Gas to flare in 3 minutes.
1545		"	43	197		Gas flare.
1600		"	34	166		"
1615		"	25	136		"
1630		"	20	119		"
1645		"	17	108		"
1700		"	18	112		"
1730		"	23	129		"
1800		"	24	132		Slight increase.
1830		"	25	136		Closed tool.
2330						Opened bypass - pulled loose.

SPECIAL PRESSURE DATA

Gauge No.		1114		Depth		6784'		Clock No.		4365		24 hour		Ticket No.		139167	
First Flow Period		First Closed In Pressure		Second Flow Period		Second Closed In Pressure		Third Flow Period		Third Closed In Pressure							
Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	$\log \frac{t + \theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	$\log \frac{t + \theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	$\log \frac{t + \theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	$\log \frac{t + \theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	$\log \frac{t + \theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"
0.000	269	.000		400	.000		555	.000		551							
1.0164*	254	.0298		1048	.0969**		415	.0692***		1585							
2.0428	295	.0596		1433	.1971		448	.1351		1926							
3.0691	317	.0894		1658	.2973		488	.2010		2086							
4.0954	349	.1192		1809	.3975		514	.2669		2164							
5.1217	377	.1490		1913	.4978		535	.3329		2217							
6.1480	400	.1788		1989	.5980		551	.3988		2251							
		.2086		2046				.4646		2276							
		.2384		2091				.5306		2292							
		.2682		2128				.5965		2304							
		.2980		2157				.6624		2313							
								.7283		2318							
								.7942		2324							
								.8601		2326							
								.9260		2327							
								.9920		2327							

Gauge No.		1113		Depth		6844'		Clock No.		13433		24 hour					
First Flow Period		First Closed In Pressure		Second Flow Period		Second Closed In Pressure		Third Flow Period		Third Closed In Pressure							
Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000"	$\log \frac{t + \theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	$\log \frac{t + \theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	$\log \frac{t + \theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	$\log \frac{t + \theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"	$\log \frac{t + \theta}{\theta}$	PSIG Temp. Corr.	Time Defl. .000"
0.000	366	.000		405	.000		594	.000		549							
1.0167*	271	.0300		1044	.0964**		415	.0698***		1552							
2.0433	305	.0600		1422	.1961		449	.1362		1908							
3.0700	322	.0900		1646	.2958		484	.2027		2066							
4.0967	352	.1200		1796	.3956		512	.2691		2156							
5.1234	379	.1500		1901	.4953		533	.3356		2210							
6.1500	405	.1800		1977	.5950		549	.4020		2247							
		.2100		2038				.4685		2271							
		.2400		2084				.5349		2288							
		.2700		2121				.6014		2301							
		.3000		2149				.6678		2311							
								.7343		2316							
								.8007		2320							
								.8672		2323							
								.9336		2325							
								1.0000		2327							

Reading Interval 8 9 30 20 Minutes
 REMARKS: * = 5 minute interval. ** = 29 minute interval. *** = 21 minute interval.

La Cama #1
DST 6912-7000

Log footage contributing to height h:

<u>Interval</u>	<u>Feet</u>
6896-6901	5
6919-6932	13
6933-6937	4
6939-6946	7
6947-6955	8
6960-6961	<u>1</u>
	38 ft.

La Cama #1

DST 6812-7000

Time to Reach Pseudosteady State

A) Average Porosity = 0.045

(Note 1)

<u>Interval</u>	<u>Porosity</u>
6896-6901	0.020
6919-6932	0.065
6933-6937	0.072
6939-6946	0.036
6947-6955	0.025
6960-6961	0.035

B) Total Compressibility = $S_g C_g$

$$C_t = 0.7 (0.00077) = 0.00054 \text{ psi}^{-1}$$

(Note 2)

C) Time $t = \frac{1136 \phi u C_r^2}{k}$

$$t = \frac{1136 (0.045) (0.0141) (0.00054) (2106)^2}{0.091}$$

$$t = 19,000 \text{ hr}$$

$$t = 2.2 \text{ yr}$$

1) Porosity averaged over 38 ft of pay

2) C.S. Matthews - D.G. Russell Fig. G7.A

COMPENSATED NEUTRON- FORMATION DENSITY

Schlumberger

COMPANY MORRIS R. ANTWEIL
WELL LA CAMA # 1
FIELD DINKUS RANCH
COUNTY EDDY STATE NEW MEXICO

Other Services:

DLL

1980' FNL & 1980' FWL
LOCATION
API SERIAL NO 20 TWP 18-S RANGE 25-E

Permanent Datum: G.L. ; Elev.: 3578
Log Measured From K.B. 15 Ft. Above Perm. Datum
Drilling Measured From K.B. Elev.: K.B. 3593
D.F. 3592
G.L. 3578

Date	10-5-77			
Run No.	ONE			
Depth-Driller	8750			
Depth-Logger	8742			
Btm. Log Interval	8741			
Top Log Interval	SURFACE			
Casing-Driller	8 5/8 @ 1200	@	@	@
Casing-Logger	1203			
Bit Size	7 7/8			
Type Fluid in Hole	BRINE - GEL			
Dens.	9.3	60	ml	ml
pH	10	6	ml	ml
Source of Sample	PIT			
Rm @ Meas. Temp.	11 @ 86 °F	@	°F	@ °F
Rmf @ Meas. Temp.	082 @ 86 °F	@	°F	@ °F
Rmc @ Meas. Temp.	16 @ 86 °F	@	°F	@ °F
Source: Rmf Rmc	M C			
Rm @ BHT	.066 @ 148 °F	@	°F	@ °F
Circulation Stopped	0630			
Logger on Bottom	1230			
Max. Rec. Temp.	144 °F			°F

6800

6900

7000

7 30
9 37
38
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42
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WELL NAME: Murphy NW Fed #1

LOCATION: 3-18S-25E

DST INTERVAL: 6540-6661

$$\begin{aligned} P^* &= 2505 \text{ psi} & \text{slope (M)} &= 513 \text{ psi/cycle} \\ T_c &= 377 ^\circ\text{R} & P_c &= 670 \text{ psi (Note 1)} \\ T &= 120 + 460^\circ = 580 ^\circ\text{R} & P_{wf} &= 196 \text{ psi} \end{aligned}$$

$$P_{avg} = \frac{P^* + P_{wf}}{2} = \frac{2505 + 196}{2} = 1350.5 \text{ psi (Note 2)}$$

$$Tr = \frac{T}{T_c} = \frac{580}{377} = 1.54$$

$$Pr = \frac{P_{avg}}{P_c} = \frac{1350.5}{670} = 2.02$$

$$Z = 0.84 \quad T_{sc} = 520^\circ\text{R} \quad P_{sc} = 13.3 \text{ psi}$$

$$Bg = Z \cdot \frac{T}{T_{sc}} \cdot \frac{P_{sc}}{P_{avg}} = 0.84 \cdot \frac{580}{520} \cdot \frac{13.3}{1350.5} = 0.0092 \text{ (Note 2)}$$

$$q = 221 \text{ Mcfd} \cdot 178.1 = 39360 \text{ b/d}$$

$$u = (1.25) (0.0111) = 0.0139 \text{ cp (Note 3)}$$

$$kh = \frac{162.6 \cdot q \cdot u \cdot B}{M} = \frac{162.6 (39360) (0.0139) (0.0092)}{513}$$

$$kh = 1.60 \text{ md} \cdot \text{ft}$$

$$h = 46 \text{ ft (Note 4)}$$

$$k = 0.035 \text{ md (Note 5)}$$

- 1) T_c & P_c from gas analyses for Griffin JJ
- 2) C.S. Matthews - D.G. Russell eqn 3.21a
- 3) C.S. Matthews - G.G. Russell Fig G.3A&B
- 4) h estimated from log *
- 5) Also $k = 0.035 \text{ md}$ for $P^* = 2300 \text{ psi}$ and $h = 50 \text{ ft}$.

2500
2300
2100
1900
1700
1500
1300
1100

10
9
8
7
6
5
4
3
2
1

45 4652

ΔT
 $T + \Delta T$

SEMILOGARITHMIC 1 CYCLE X 70 DIVISIONS
REUFFEL & ESSER CO. MADE IN U.S.A.

Murphy NW Fed #1
3-18S-25E
DST 6540-6661

FLUID SAMPLE DATA				Date 11-29-80		Ticket Number 984704																																																																																																																																																																																																																																																																																																																																																																																			
Sampler Pressure 250 P.S.I.G. at Surface		Kind of D.S.T. OPEN HOLE TEST		Halliburton Location ARTESIA		Legal Location Sec. - Twp. - Rng. 3 - 18S - 25E <tr> <td colspan="2">Recovery: Cu. Ft. Gas .615</td> <td colspan="2">Tester PEPPERS-R. THOMAS</td> <td colspan="2">Witness J. JONAS</td> <td colspan="2">Lease Name MURPHY NW FEDERAL</td> </tr> <tr> <td colspan="2">cc. Oil</td> <td colspan="2">Drilling Contractor KENAI #14</td> <td colspan="2">TJH S</td> <td colspan="2">Well No. 1</td> </tr> <tr> <td colspan="2">cc. Water</td> <td colspan="6" rowspan="2">EQUIPMENT & HOLE DATA</td> </tr> <tr> <td colspan="2">cc. Mud</td> </tr> <tr> <td colspan="2">Tot. 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Valve</td> <td colspan="2">Surface Choke</td> <td colspan="2">Bottom Choke .75"</td> </tr> <tr> <td colspan="2">Cushion</td> <td colspan="6">Recovered 525 Feet of slightly gas cut drilling fluid.</td> </tr> <tr> <td colspan="2"></td> <td colspan="6">Recovered Feet of</td> </tr> <tr> <td colspan="2"></td> <td colspan="6">Recovered Feet of</td> </tr> <tr> <td colspan="2"></td> <td colspan="6">Recovered Feet of</td> </tr> <tr> <td colspan="2"></td> <td colspan="6">Recovered Feet of</td> </tr> <tr> <td colspan="8">Remarks SEE PRODUCTION TEST DATA SHEET . . .</td> </tr> <tr> <td colspan="8">GAS TO SURFACE IN 13 MINUTES . . .</td> </tr> <tr> <td colspan="8">CHART FOR GAUGE #513 NOT SENT IN FOR PROCESSING . . .</td> </tr> <tr> <td colspan="8">County EDDY</td> </tr> <tr> <td colspan="2">TEMPERATURE</td> <td colspan="2">Gauge No. 513</td> <td colspan="2">Gauge No. 113</td> <td colspan="2">Gauge No.</td> </tr> <tr> <td colspan="2">Depth: 6522 Ft.</td> <td colspan="2">Depth: 6658 Ft.</td> <td colspan="2">Depth: Ft.</td> <td colspan="2">TIME (00:00-24:00 hrs.)</td> </tr> <tr> <td colspan="2">24 Hour Clock</td> <td colspan="2">24 Hour Clock</td> <td colspan="2">Hour Clock</td> <td colspan="2">Tool 11-29</td> </tr> <tr> <td colspan="2">Est. ° F. Blanked Off NO</td> <td colspan="2">Blanked Off YES</td> <td colspan="2">Blanked Off</td> <td colspan="2">Opened 2215</td> </tr> <tr> <td colspan="2">Actual 162 ° F.</td> <td colspan="2">Pressures</td> <td colspan="2">Pressures</td> <td colspan="2">Opened 11-30</td> </tr> <tr> <td colspan="2"></td> <td colspan="2">Pressures</td> <td colspan="2">Pressures</td> <td colspan="2">Bypass 0445</td> </tr> <tr> <td colspan="2"></td> <td colspan="2">Field Office</td> <td colspan="2">Field Office</td> <td colspan="2">Reported Computed</td> </tr> <tr> <td colspan="2"></td> <td colspan="2">Field Office</td> <td colspan="2">Field Office</td> <td colspan="2">Minutes Minutes</td> </tr> <tr> <td colspan="2">Initial Hydrostatic 3120.1</td> <td colspan="2">3168.0 3174.6</td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <td colspan="2">Flow Initial 10.5</td> <td colspan="2">144.8 147.3</td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <td colspan="2">Flow Final 144.4</td> <td colspan="2">184.3 192.4</td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <td colspan="2">Closed in 2301.4</td> <td colspan="2">2308.3 2305.5</td> <td colspan="2"></td> <td colspan="2">30 29</td> </tr> <tr> <td colspan="2">Flow Initial 144.4</td> <td colspan="2">144.8 164.4</td> <td colspan="2"></td> <td colspan="2">90 85</td> </tr> <tr> <td colspan="2">Flow Final 170.7</td> <td colspan="2">184.3 196.0</td> <td colspan="2"></td> <td colspan="2">90 88</td> </tr> <tr> <td colspan="2">Closed in 2301.4</td> <td colspan="2">2281.8 2292.3</td> <td colspan="2"></td> <td colspan="2">180 187</td> </tr> <tr> <td colspan="2">Flow Initial</td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <td colspan="2">Flow Final</td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <td colspan="2">Closed in</td> <td colspan="2"></td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <td colspan="2">Final Hydrostatic 3120.1</td> <td colspan="2">3154.8 3154.7</td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <td colspan="8">State NEW MEXICO</td> </tr> <tr> <td colspan="8">Lead Owner/Company Name YATES PETROLEUM CORPORATION</td> </tr> <tr> <td colspan="8">Test Int. 6540' - 6661'</td> </tr>		Recovery: Cu. Ft. Gas .615		Tester PEPPERS-R. THOMAS		Witness J. JONAS		Lease Name MURPHY NW FEDERAL		cc. Oil		Drilling Contractor KENAI #14		TJH S		Well No. 1		cc. Water		EQUIPMENT & HOLE DATA						cc. Mud		Tot. Liquid cc.		Formation Tested Ciscoe						Gravity ° API @ ° F.		Elevation 3519' Ft.						Gas/Oil Ratio cu. ft./bbl.		Net Productive Interval 4' Ft.						RESISTIVITY		All Depths Measured From Kelly Bushing						CHLORIDE CONTENT		Total Depth 6661' Ft.						Recovery Water @ ° F. ppm		Main Hole/Casing Size 7 7/8"						Recovery Mud @ ° F. ppm		Drill Collar Length 615' I.D. 2.25"						Recovery Mud Filtrate @ ° F. ppm		Drill Pipe Length 5895' I.D. 3.826"						Mud Pit Sample @ ° F. 20625 ppm		Packer Depth(s) 6534' - 6540' Ft.						Mud Pit Sample Filtrate @ ° F. ppm		Depth Tester Valve 6514' Ft.						Mud Weight 8.8 vis 34 sec.		Floor						TYPE AMOUNT		Depth Back Ft. Pres. Valve		Surface Choke		Bottom Choke .75"		Cushion		Recovered 525 Feet of slightly gas cut drilling fluid.								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Pressures		Pressures		Opened 11-30				Pressures		Pressures		Bypass 0445				Field Office		Field Office		Reported Computed				Field Office		Field Office		Minutes Minutes		Initial Hydrostatic 3120.1		3168.0 3174.6						Flow Initial 10.5		144.8 147.3						Flow Final 144.4		184.3 192.4						Closed in 2301.4		2308.3 2305.5				30 29		Flow Initial 144.4		144.8 164.4				90 85		Flow Final 170.7		184.3 196.0				90 88		Closed in 2301.4		2281.8 2292.3				180 187		Flow Initial								Flow Final								Closed in								Final Hydrostatic 3120.1		3154.8 3154.7						State NEW MEXICO								Lead Owner/Company Name YATES PETROLEUM CORPORATION								Test Int. 6540' - 6661'							
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Test Int. 6540' - 6661'																																																																																																																																																																																																																																																																																																																																																																																									

Casing perms. _____ Bottom choke .75" Surf. temp _____ °F Ticket No. 984704
Gas gravity _____ Oil gravity _____ GOR _____
Spec. gravity _____ Chlorides 20625 ppm Res. _____ @ _____ °F
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED 6" Positive Flow Manifold

Date Time	a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
11-29-80 1530						On location.
1630						Rigged up test tools.
2215						Opened tool with a weak blow.
2220		3/8	10			Opened on choke.
2225		"	19			No gas.
2227		"	26	139.4		Gas to surface in 13 minutes.
2230		"	28	146.2		
2235		"	32	159.8		
2240		"	35	170		
2245		"	36	173.4		Closed tool.
0015		"				Opened tool - gas flare.
0020		"	50	221		
0025		"	65	272		
0030		"	60	255		
0035		"	60	255		
0040		"	50	221		Pressure decreasing.
0045		"	50	221		Stabilized.
0100		"	50	221		"
0115		"	"	"		"
0130		"	"	"		"
0145		"	"	"		Closed tool.
0445						Opened bypass and pulled loose.
11-30-80 0900						Rig test tools down.
1100						left location.

Gauge No. 513	Depth 6522	Clock No. 7282	24 hour	Ticket No. 984704
---------------	------------	----------------	---------	-------------------

First Flow Period			First Closed In Pressure			Second Flow Period			Second Closed In Pressure			Third Flow Period			Third Closed In Pressure		
Time Defl. .000"	PSIG Temp. Corr.		Time Defl. .000"	Log $\frac{t + \theta}{\theta}$		Time Defl. .000"	PSIG Temp. Corr.		Time Defl. .000"	Log $\frac{t + \theta}{\theta}$		Time Defl. .000"	PSIG Temp. Corr.		Time Defl. .000"	Log $\frac{t + \theta}{\theta}$	PSIG Temp. Corr.
0																	
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	

CHART FOR GAUGE #513 NOT SENT IN FOR PROCESSING . . .

Gauge No. 113	Depth 6657	Clock No. 13528	24 hour
---------------	------------	-----------------	---------

Time Defl. .000"	PSIG Temp. Corr.		Time Defl. .000"	Log $\frac{t + \theta}{\theta}$		Time Defl. .000"	PSIG Temp. Corr.		Time Defl. .000"	Log $\frac{t + \theta}{\theta}$		Time Defl. .000"	PSIG Temp. Corr.		Time Defl. .000"	Log $\frac{t + \theta}{\theta}$	PSIG Temp. Corr.
0																	
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	

REMARKS: * - first interval is equal to 4 minutes, ** - 10 minutes.

Murphy NW Federal #1

DST 6540-6661

Contributions to log height h:

<u>Interval</u>	<u>Feet</u>
6545-6554	9
6562-6567	5
6582-6594	12
6600-6607	7
6608-6610	2
6632-6636	4
6648-6653	5
6659-6661	<u>2</u>
	46 ft.

Murphy NW Fed #1

DST 6540-6661

Time to Reach Pseudosteady State

A) Average Porosity = 0.027

(Note 1)

<u>Interval</u>	<u>Porosity</u>
6545-6554	0.035
6562-6567	0.027
6582-6594	0.030
6600-6607	0.028
6608-6610	0.005
6632-6636	0.008
6648-6653	0.025
6659-6661	0.035

B) Total Compressibility = $S_g C_g$

$$C_t = 0.7 (0.00084) = 0.00059 \text{ psi}^{-1}$$

(Note 2)

C) Time $t = \frac{1136 \phi u C_r r_e^2}{k}$

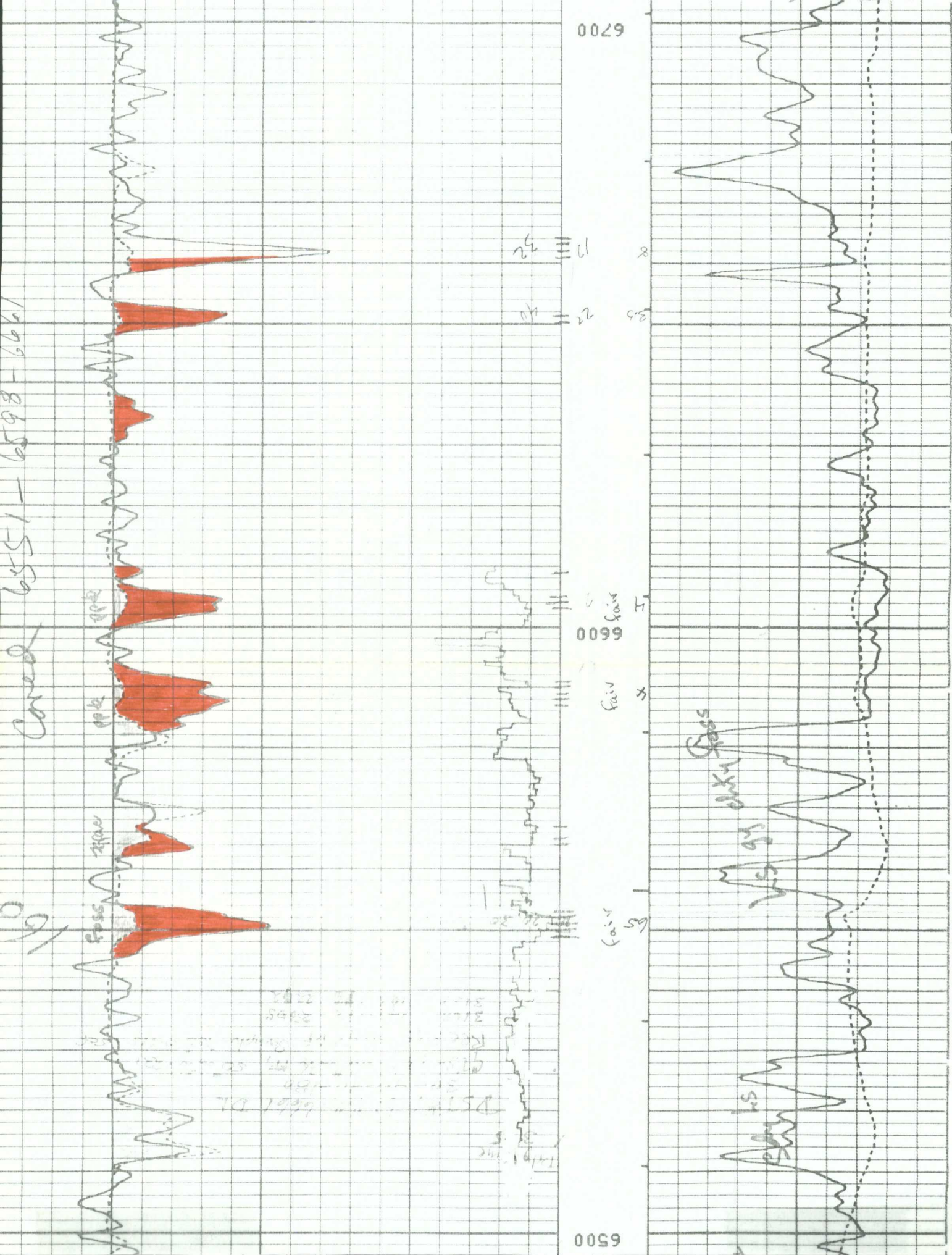
$$t = \frac{1136 (0.027) (0.0139) (0.00059) (2106)^2}{0.035}$$

$$t = 31,900 \text{ hr}$$

$$t = 3.6 \text{ yr}$$

- 1) Porosity averaged over 46 ft of pay
- 2) C. S. Matthews - D.G. Russell Fig. G7.A

Schlumberger

[illegible]

WELL NAME: Powell DG #1
LOCATION: 35-17S-25E
DST INTERVAL: 6445-6653

$$\begin{aligned} P^* &= 2760 \text{ psi} & \text{slope (M)} &= 6240 \text{ psi/cycle} \\ T_c &= 379 ^\circ\text{R} & P_c &= 671 \text{ psi} \\ T &= 115 + 460^\circ = 575 ^\circ\text{R} & P_{wf} &= 378 \text{ psi} \end{aligned}$$

$$P_{avg} = \frac{P^* + P_{wf}}{2} = \frac{2760 + 378}{2} = 1569 \text{ psi (Note 1)}$$

$$T_r = \frac{T}{T_c} = \frac{575}{379} = 1.52$$

$$P_r = \frac{P_{avg}}{P_c} = \frac{1569}{671} = 2.34$$

$$Z = 0.81 \quad T_{sc} = 520^\circ\text{R} \quad P_{sc} = 13.3 \text{ psi}$$

$$B_g = Z \cdot \frac{T}{T_{sc}} \cdot \frac{P_{sc}}{P_{avg}} = 0.81 \cdot \frac{575}{520} \cdot \frac{13.3}{1569} = 0.0076 \text{ (Note 1)}$$

$$q = 48 \text{ Mcfd} \quad 178.1 = 8549 \text{ b/d (Note 1)}$$

$$u = (1.32) (0.011) = 0.0145 \text{ cp (Note 2)}$$

$$kh = \frac{162.6 \cdot q \cdot u \cdot B}{M} = \frac{162.6 (8549) (0.0145) (0.0076)}{6240}$$

$$kh = 0.0245 \text{ md} \cdot \text{ft}$$

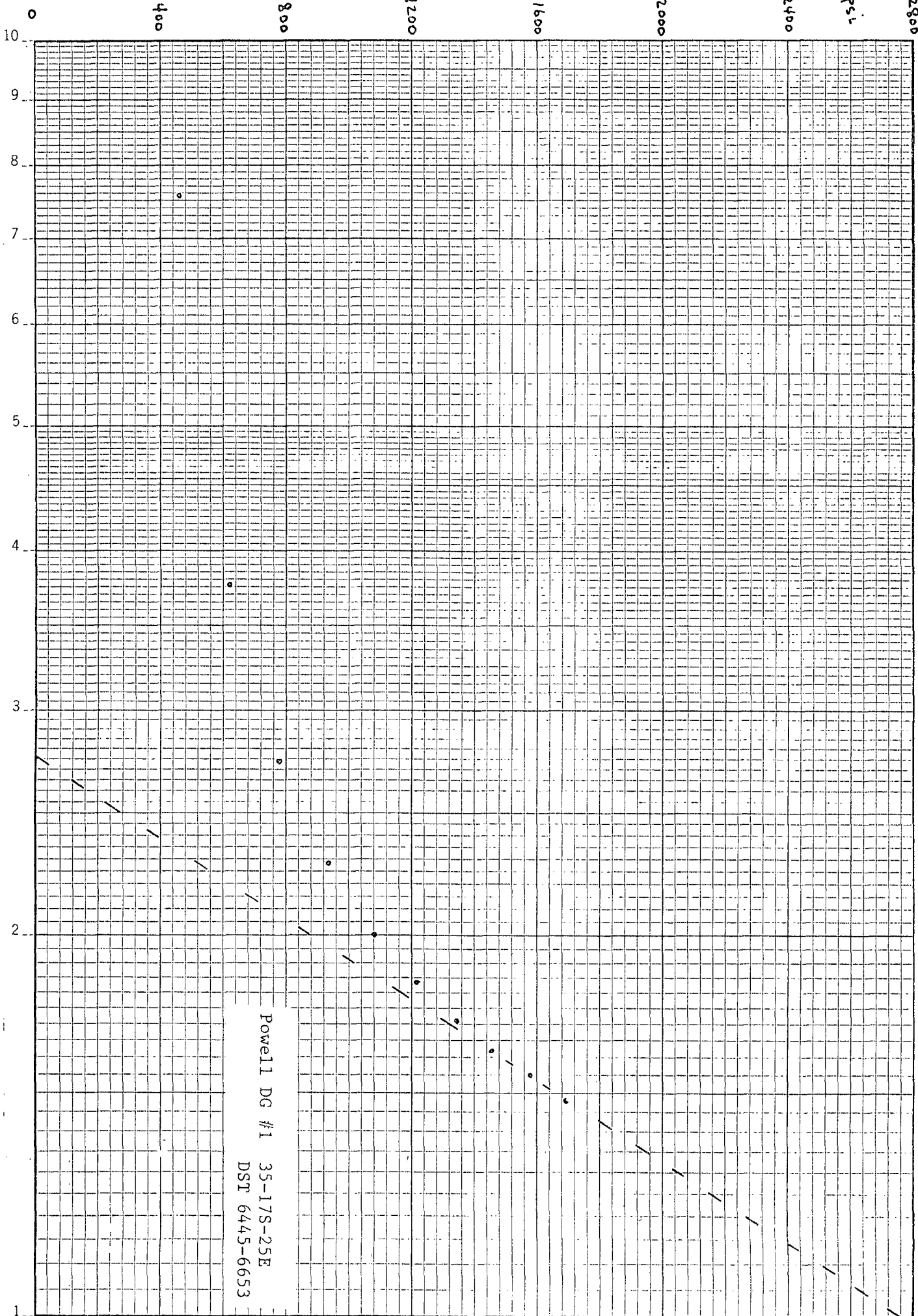
$$h = 40 \text{ ft (Note 3)}$$

$$k = 0.001 \text{ md (Note 4)}$$

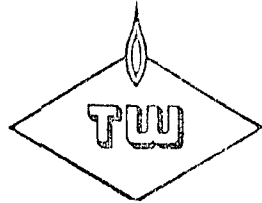
- 1) C.S. Matthews - D.G. Russell eqn 3.21a
- 2) C.S. Matthews - D.G. Russell Fig G.3A&B
- 3) h estimated from log
- 4) k= 0.009 md for $P^* = 1696$ and $M = 596$ psi/cycle

46 4652

$\frac{1}{T} + \Delta T$



Powell DG #1 35-17S-25E
DST 6445-6653



GAS QUALITY TEST REPORT

COMPANY SELLER YATES PET. Co.
FIELD OR LOCATION W. ATOKA
SOURCE OR RESERVOIR CISCO
WELL OR STATION NAME YATES-Powen "DG" Cont #1

STA. NO. 1275-2
CONTRACT NO. 3290
TEST DATE 06/21/77
LAB 4

COMPOUND COMPONENTS	COMPONENT SPECIFIC GRAVITY	COMPONENT MOLE FRACTION	LIQUEFIABLE HYDROCARBONS	COMPONENT G. P. M.	MOLE FRACTION	G. P. M. CONTENT
NITROGEN	.9672	.0137	PROPANE	27.514	.	
CARBON DIOXIDE	1.5195	.0006	ISO-BUTANE	32.698	.	
HELIUM	.1382	.	N-BUTANE	31.510	.	
OXYGEN	1.1048	.0001	LPG - - - - -			
HYDROGEN SULFIDE	1.1766	.	ISO-PENTANE	36.582	.	
WATER VAPOR	.6220	.	N-PENTANE	36.213	.	
HYDROCARBON DILUENTS		(.0144)	HEXANES	41.111	.	
			HEPTANES +	46.126	.	
METHANE	.5539	.8516	NATURAL GASOLINE - - - - -			
ETHANE	1.0382	.0811	TOTAL LIQUEFIABLE GPM			
PROPANE	1.5225	.0322	WATER VAPOR CONTENT:			
ISO-BUTANE	2.0068	.0041	Gas Mixture Static Pressure PSI			
N-BUTANE	2.0068	.0090	Hydrocarbon Dew Point °F			
ISO-PENTANE	2.4910	.0025	Water Vapor Dew Point °F			
N-PENTANE	2.4910	.0023	Lbs Water Vapor per MMCF			
HEXANES	2.9753	.0018	Conversion Constant			
HEPTANES +	3.7018	.0010	Water Vapor Mole Fraction			
			Moisture recorder reading			
			Make or type			

COMPOSITION - - - - - 1.0000

MIXTURE SPECIFIC GRAVITY:

Calculated From Analysis .667
Determined by Test Instrument .670
Instrument Make or Type Ranfac

MIXTURE HEATING VALUE:

(Btu/cf at 14.73 Psia, 60°F, Sat.)

Calculated From Analysis 1146
Determined by Colorimeter _____
Colorimeter Verified (_____)

SULFUR CONTENT:

H₂S - Hydrogen Sulfide, Gr./100 cf .02
RSH - Mercaptans " .03
RSR - Sulfides " .11
RSSR - Residuals " .10
Total Sulfur, Gr./100 cf .26
H₂S Grains to fraction conversion X 0.0000157
H₂S Mole Fraction _____

Critical Pressure _____ Critical Temperature _____

REMARKS _____

MEASUREMENT AREA _____

GAS ANALYST Auton

FLUID SAMPLE DATA		Date 7-3-74		Ticket Number 897327	
Sampler Pressure 300 P.S.I.G. at Surface		Kind of Job OPEN HOLE		Halliburton District ARTESIA	
Recovery: Cu. Ft. Gas 1.71		Tester MR. PITTMAN		Witness MR. MAHFOOD	
cc. Oil		Drilling Contractor ARD DRILLING COMPANY		DR S	
cc. Water		EQUIPMENT & HOLE DATA			
cc. Mud		Formation Tested CISC0			
Tot. Liquid cc.		Elevation 3490' Ft.			
Gravity " API @ " F.		Net Productive Interval " Ft.			
Gas/Oil Ratio cu. ft./bbl.		All Depths Measured From Kelly Drive Bushing (15')			
RESISTIVITY CHLORIDE CONTENT		Total Depth 6653' Ft.			
Recovery Water @ " F. ppm		Main Hole/Casing Size 7 7/8"			
Recovery Mud @ " F. ppm		Drill Collar Length " I.D. "			
Recovery Mud Filtrate @ " F. ppm		Drill Pipe Length " I.D. "			
Mud Pit Sample @ " F. ppm		Packer Depth(s) 6439'-6445' Ft.			
Mud Pit Sample Filtrate @ " F. ppm		Depth Tester Valve 6411' Ft.			
Mud Weight 8.5 vis 35 cp					

TYPE	AMOUNT	Depth Back Pres. Valve	Surface Choke	Bottom Choke
Cushion			1" Adj.	.75"

Recovered	Feet of	Field Area
910	Feet of drilling fluid (gas cut)	Med. From Tester Valve
	Feet of	
	Feet of	
	Feet of	
	Feet of	

Remarks
SEE PRODUCTION TEST DATA SHEET

TEMPERATURE	Gauge No. 512	Gauge No. 113	Gauge No.	TIME
Depth:	6425 Ft.	6649 Ft.	Ft.	
Est. °F.	12 Hour Clock	12 Hour Clock	Hour Clock	Tool A.M.
	Blanked Off No	Blanked Off Yes	Blanked Off	Opened 18:00 P.M.
Actual 115 °F.	Pressures	Pressures	Pressures	Opened 7-4-74 A.M.
	Field Office	Field Office	Field Office	Bypass 12:15 P.M.
Initial Hydrostatic	2871 2925	3029 3025		Reported Minutes
Flow Initial	83 84	161 184		Computed Minutes
Flow Final	302 306	402 414		30 41
Closed in	954 954	1069 1068		75 73
Flow Initial	275 UTR	322 327		
Flow Final	357 378	402 390		90 86
Closed in	1657 1692	1734 1725		180 175
Flow Initial				
Flow Final				
Closed in				
Final Hydrostatic	2844 2875	2976 2978		
	UTR-Unable to read			

Casing perms. _____ Bottom choke _____ .75" _____ Surf. temp. _____ °F Ticket No. 897327
Gas gravity _____ Oil gravity _____ GOR _____
Spec. gravity _____ Chlorides _____ ppm Res. _____ @ _____ °F

INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED _____

Date Time	a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
18:00						Opened tool with a fair blow
18:05						Slight increase
18:10						Good blow
18:15						
18:20						
18:25						
18:30						Closed tool
19:30						Customer requested tool to be cycled didn't believe opened.
19:45						Opened tool with a good blow
19:50			4½			Increased in blow
19:55		1/4"	21			On choke
20:00			36			
20:05			41			Peak flow-no gas
20:08			39			Blow decreasing
20:10			37			Gas to surface
20:15			36			Flaring
20:20			32			
20:25			30			
20:30			29			
20:35			28			
20:40			26½			
20:45			26			
20:50			25			
20:55			24			
21:00			23			
21:05			22½			
21:10			21			
21:15			20	48		Closed tool

[illegible]

Gauge No.	113	Depth	6649'	Clock No.	6234	hour	12
0 .000	.184	.000		.000	390		
1 .0407	273*	.490		.0880	519**		
2 (.080	(454M)		1068	.1763	395		
3 .0382	307			.2780	386		
4 .1357	347			.3797	387		
5 .1832	373			.4814	389		
6 .2307	394			.5830	390		
7 .2780	414						
8							
9							
10							
11							
12							
13							
14							
15							
Reading Interval	7			15		18	
* First interval equal to 6 minutes				** -11 minutes		*** -13 minutes	
M-Maximum pressure.							

Powell DG #1

DST 6445-6653

Contributions to log height h:

<u>Interval</u>	<u>Feet</u>
6491-6493	2
6494-6496	2
6500-6502	2
6536-6537	1
6539-6544	5
6574-6580	6
6581-6583	2
6593-6594	1
6610-6622	12
6637-6644	<u>7</u>
	40 ft.

Powell DG #1
DST 6445-6653

Time to Reach Pseudosteady State

A) Average Porosity = 0.021

(Note 1)

<u>Interval</u>	<u>Porosity</u>
6491-6493	0.028
6494-6496	0.012
6500-6502	0.018
6536-6537	0.014
6539-6544	0.031
6574-6580	0.026
6581-6583	0.016
6593-6594	0.012
6610-6622	0.019
6637-6644	0.018

B) Total Compressibility = $S_g C_g$

$$C_t = 0.7 (0.00075) = 0.00052 \text{ psi}^{-1} \quad (\text{Note 2})$$

C) Time $t = \frac{1136 \phi u C_{tr}^2}{k}$

$$t = \frac{1136 (0.021) (0.0145) (0.00052) (2106)^2}{0.001}$$

$$t = 798,000 \text{ hr}$$

$$t = 91.0 \text{ yr}$$

- 1) Porosity averaged over 40 ft of pay
- 2) C.S. Matthews - D.G. Russell Fig. G7.A

SIMULTANEOUS
COMPENSATED NEUTRON-
FORMATION DENSITY

YATES PETROLEUM CORPORATION

POWELL "DG" #1 COM.

WILDCAT

EDDY STATE NEW MEXICO

660' FSL & 1980' FEL,

Other Services:

DLL

SEC	TWP	RANGE
35	17-S	25-E

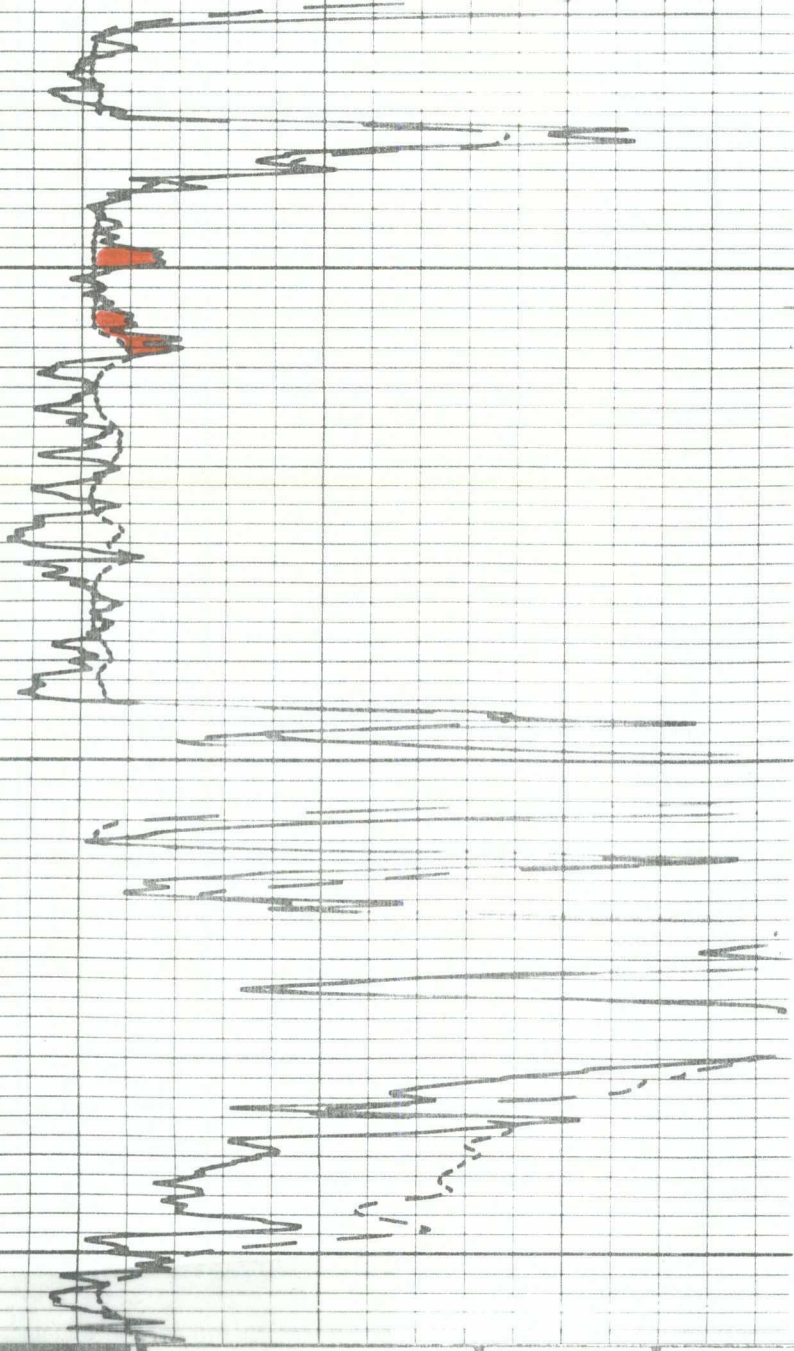
15' Elev.: 3490
Ft. Above Perm. Datum

Elev.: K.B. 3505
D.F. 3490
G.L.

38 @ @ @

RISPAC

ml	ml	ml	ml
°F	°F	°F	°F
@	@	@	@
@	@	@	@
@	@	@	@
6°F	°F	°F	°F



6400

6500

6600

Pf 6539-44/10

Twt 2500g 15% DSA 6539-6622
16000g 20% Deletrol + CO₂

Flowed 2052 wetpd on 1/10/82

Pf 6574-82/12

Pf 6611-22/22

<u>Tests (DST) After Corrections in Supplement</u>			
<u>Val</u>	<u>Feet of Pay</u>	<u>Calculated Permeability (md)</u>	<u>Years to Reach Pseudo-Steady State</u>
1	40	0.021	4.5
5	45	0.069	1.8
0	18	0.005	33.3
0	32	0.066	2.5
0	30	0.016	6.1
3	20	0.002	68.7
0	58	0.002	45.8
0	38	0.091	2.2
1	46	0.035	3.6
3	40	0.001	91.0
		0.031 md	26.0 years
		0.018 md	5.3 years