GL02976-6

FLUID	SAMPL	E DATA	C	Date 5-14-	-75	Ticket Number	86370	8	Legal L Sec T	
ampler Pressure Recovery: Cu. Ft. G	0	P.S.I.G. o	it Surface K	Cind F Job OPEN	HOLE	Holliburt District	on VERNA	L	ocatio WD F	
cc. Oil									Rng.	
cc. Water	224	0	т	ester MR. I	MOUDRY	Witness	MR. M	ILLER		5
cc. Mud				Drilling DEVNI		CTDIC		DC C		se Z
Tot. Liqui	d cc. <u>22</u> 4	0	C	Contractor NET IN				DL 3	2	N R
oravity		API @			IIPMEN	I & HULE	DATA	·····	ω	AFI
	RESIST		DRIDE F	levation				E>		
		CON	TENT	Net Productive In	terval			Ft.	55	IV
lecovery Water	<u>3.10</u> @	80_°F. 160	0 ppm /	All Depths Measu	red From	Kelly Bushir	ng		1	ER
Recovery Mud	<u>2.10</u> @	120 °F. 160	0 ppm	Total Depth		4247'		Ft.	<u> </u>	
Recovery Mud Filtre	ote@	•F.	ppm /	Main Hole/Casin	g Size	124"		······································	μ.	
Aud Pit Somple	2.45 @	<u>_75_°F·210</u>		Drill Collar Leng	th	<u>262'</u>	. <u>3''</u>	0.054		$\leq \sim$
viud Pit Sample Pil		·	ppm [Drill Pipe Length		<u>3844'</u> I.D	. 5.9	965"		ii z
Aud Weight	8 9	vis 7		Pocker Depth(s)		$\frac{4151^{\circ}}{4121!}$	/	Ft.		?
TYPE	AMOUNT		Denth Denth	Depth Tester Vol	Surfa an	4131		Et.	-	
Cushion		Ft.	Pres. Valve		Choke	<u>1/8" ^{Cr}</u>	ioke	3/4"		1-1-
Recovered	341 Feel	of Drilli	ng fluid				•	X	Field	st No.
Recovered	859 Fee	of Water			·			a. From		
Recovered	Fee	of						n Test	WIL	
			·	,,,,,,,,,		aya — (dayaan di — aliya — alii i — gita — _si — aniyan	······································	er Vo	DCAT	
Decoursed	East	f								
Recovered	Fee	of								
Recovered	Fee Fee	t of		·						- 40 Test
Recovered vered Remarks	Fee Fee See pr	rof rof roduction to	est data	sheet			· · · · · · · · · · · · · · · · · · ·	ō	_	Tested Inte
Recovered vered Remarks	Fee Fee See pr	rof rof roduction to	est data	sheet						Tested Interval
Recovered vered Remarks	Fee Fee See pr	rof roduction to	est data	sheet						Tested Interval
Recovered vered Remarks	Fee Fee See pr	rof roduction to	est data	sheet		· · · · · · · · · · · · · · · · · · ·			f Count	Tested Intervol
Recovered vered Remarks	Fee Fee See pr	rof roduction to	est data	sheet		· · · · · · · · · · · · · · · · · · ·			r county CAS	Tested Interval
Recovered vered Remarks	Fee See pr	rof roduction to	est data	sheet	Gauge No	.205			r county CASS I	Tested Interval
Recovered vered Remarks TEMPERATURE	Fee See pr Gauge No. 4 Death: 4	rof roduction to 130	est data Gauge No.	sheet 76 4140' Ft	Gauge No	• 205 4243' Ft		Тіме	r county CASSIA	Tested Intervol
Recovered vered Remarks TEMPERATURE	Fee See pr Gauge No. 4 Depth: 4	rof roduction to 130 136 ¹ Ft. 24 Hour Clock	est data Gauge No. ; Depth:	sheet 76 4140' Ft. 24 Hour Clock	Gauge No Depth:	205 4243' Ft 24 Hour Clock	τ		r county CASSIA	Tested Interval
Recovered Remarks TEMPERATURE Est. °F.	Fee See pr See pr Gauge No. 4 Depth: 4 Blanked Off	130 130 136 ¹ Ft. 24 Hour Clock No	Gauge No. 7 Depth: 4 Blanked Off	sheet 76 4140' Ft. 24 Hour Clock * No	Gauge No Depth: Blanked C	205 4243' Ft 24 Hour Clock Off Yes	Tool Opened 2	тіме А.М. 2300 р.М.	r county CASSIA	Tested Intervol
Recovered Remarks TEMPERATURE Est. °F.	Fee See pr See pr Gauge No. 4 Depth: 4 Blanked Off	rof roduction to 130 136 ¹ Ft. 24 Hour Clock No	Gauge No. ; Depth: 2 Blonked Off	sheet 76 4140' Ft. 24 Hour Clock No	Gauge No Depth: Blanked C	205 4243' Ft 24 Hour Clock Off Yes	Tool Opened 2 Opened	тіме 2300 р.м. А.М.	r CASSIA	Tested Intervol
Recovered vered Remarks TEMPERATURE Est. °F. Actual 245 °F.	Fee Fee See pr Gauge No. 2 Depth: 2 Blanked Off Pre	i of t of roduction to roduction to roductio	Gauge No. Depth:	sheet 76 4140' Ft. 24 Hour Clock NO essures	Gauge No Depth: Blanked C	205 4243' Ft 24 Hour Clock Off Y ES Pressures	Tool Opened 2 Opened Bypass	TIME A.M. 2300 P.M. A.M. 130 P.M.	r CASSIA	Tested Interval
Recovered vered Remarks TEMPERATURE Est. °F. Actual 245 °F.	Fee See pr See pr Gauge No. 4 Depth: 4 Blanked Off Pre Field	t of t of t of t oduction to t	est data Gauge No. Depth: Blanked Off Field	sheet 76 4140' Ft. 24 Hour Clock NO essures Office	Gauge No Depth: Blanked C	205 4243' Ft 24 Hour Clock Off Yes Pressures Office	Tool Opened Bypass Reported	TIME A.M. 2300 P.M. A.M. 130 P.M. Computed	r county CASSIA	Tested Interval
Recovered vered Remarks TEMPERATURE Est. °F. Actual 245 °F. Initial Hydrostatic	Fee See pr See pr Gauge No. 4 Depth: 4 Blanked Off Pre Field	1 of 1 of 1 of 1 of 1 30 1 36 ¹ Ft. 24 Hour Clock No ssures 0ffice 1 874	Sauge No. ; Depth: 4 Blanked Off Field	Sheet 76 4140' Ft. 24 Hour Clock No essures Office 1874	Gauge No Depth: Blanked C Field	205 4243' Ft 24 Hour Clock Off Yes Pressures 0ffice 1926	Tool Opened 2 Opened Bypass T Reported Minutes	TIME A.M. 2300 P.M. A.M. 130 P.M. Computed Minutes	r county CASSIA	Tested Interval
Recovered Remarks TEMPERATURE Est. °F. Actual 245 °F. Initial Hydrostatic B Flow Initial	Fee See pr See pr Gauge No. 4 Depth: 4 Blanked Off Pre Field	t of t of t of t oduction to t o	Gauge No. ; Depth: 4 Blonked Off Field	sheet 76 4140' Ft. 24 Hour Clock No essures 0ffice 1874 35	Gauge No Depth: Blanked C Field	205 4243' Ft 24 Hour Clock Off Yes Pressures 0ffice 1926 90	Tool Opened 2 Opened Bypass Reported Minutes	TIME A.M. 2300 P.M. A.M. 130 P.M. Computed Minutes	r CASSIA store	Tested Intervol
Recovered remarks TEMPERATURE Est. °F. Actual 245 °F. Initial Hydrostatic Flow Initial Final Closed in	Fee Fee See pr Gauge No. 2 Depth: 2 Blanked Off Pre Field	t of t of	Gauge No. Depth: Blanked Off Field	sheet 76 4140' Ft. 24 Hour Clock NO essures 0ffice 1874 35 165 1707	Gauge No Depth: Blanked C	205 4243' Fr 24 Hour Clock Off Yes Pressures 0ffice 1926 90 210	Tool Opened 2 Opened 2 Opened Bypass 1 Reported Minutes 	TIME A.M. 2300 P.M. A.M. 130 P.M. Computed Minutes 27	r CASSIA store 1	Tested Interval
Recovered vered Remarks TEMPERATURE Est. °F. Actual 245 °F. Initial Hydrostatic Flow Initial Final Closed in Initial	Fee Fee See pr See pr Gauge No. 4 Depth: 4 Blanked Off Pre Field	t of t of	Sauge No. Depth:	sheet 76 4140' Ft. 24 Hour Clock No essures Office 1874 35 165 1727 177	Gauge No Depth: Blanked C Field	205 4243' Ft 24 Hour Clock 24	Tool Opened 2 Opened 2 Opened Bypass T Reported Minutes 30 120	TIME A.M. 2300 P.M. A.M. 130 P.M. Computed Minutes 27 121	r CASSIA Store IDA	Tested Interval
Recovered Remarks TEMPERATURE Est. °F. Actual 245 °F. Actual 245 °F. Initial Hydrostatic Prinal Closed in Closed in Prinal Final Closed in Prinal Fin	Fee Fee See pr See pr Gauge No. 4 Depth: 4 Blanked Off Pre Field	t of t of	est data Gauge No. ; Depth: 4 Blanked Off Pr Field	Sheet 76 4140' Ft. 24 Hour Clock No essures 0ffice 1874 35 165 1727 177 357	Gauge No Depth: Blanked C	205 4243' Ft 24 Hour Clock Off Yes Pressures - 0ffice 1926 90 210 1769 223 300	Tool Opened 2 Opened Bypass Reported Minutes 30 120 	TIME A.M. 2300 P.M. A.M. 130 P.M. Computed Minutes 27 121 118	r CASSIA Store IDAHO	Tested Interval Interval
Recovered Remarks TEMPERATURE Est. °F. Actual 245 °F. Initial Hydrostatic Por Flow Initial Final Closed in Pro Flow Initial Final Closed in	Fee Fee See pr See pr Gauge No. 4 Depth: 4 Blanked Off Pre Field	130 130 136 ¹ Ft. 24 Hour Clock No ssures 0ffice 1874 32 173 1730 184 364 1694	Gauge No. ; Depth: 4 Blanked Off Field	Sheet 76 4140' Ft. 24 Hour Clock 10 essures 0ffice 1874 35 165 1727 177 357 1693	Gauge No Depth: Blanked C	205 4243' Ft 24 Hour Clock Off Yes Pressures 0ffice 1926 90 210 1769 223 399 1737	Tool Opened 2 Opened 2 Opened 8 Bypass 7 Reported Minutes 30 120 	IME A.M. 2300 P.M. A.M. 130 P.M. Computed Minutes 27 121 27 121 118 182	r CASSIA Store IDAHO	Tested Interval Tested Interval
Recovered Remarks TEMPERATURE Est. °F. Actual 245 °F. Initial Hydrostatic Plow Initial Closed in Plow Initial Closed in Closed in Initial	Fee Fee See pr See pr Gauge No. 4 Depth: 4 Blanked Off Pre Field	1 of roduction roduction toduction	Gauge No. ; Depth: 4 Blonked Off Pr Field	sheet 76 4140' Ft. 24 Hour Clock NO essures 0ffice 1874 35 165 1727 177 357 1693 370	Gauge No Depth: Blanked C Field	205 4243' Ft 24 Hour Clock Off Yes Pressures 1926 90 210 1769 223 399 1737 414	Tool Opened 2 Opened 2 Opened Byposs 7 Reported Minutes 30 120 	TIME A.M. 2300 P.M. A.M. 130 P.M. Computed Minutes 27 121 118 182	r CASSIA Stote IDAHO	Tested Interval
Recovered Remarks TEMPERATURE Est. °F. Actual 245 °F. Initial Hydrostatic Plow Initial Closed in Plow Initial Closed in Plow Initial Final Closed in Final Closed in Final Closed in Final Closed in Final Final Final Final Closed in Final	Fee Fee See pr See pr Gauge No. 2 Depth: 2 Blanked Off Pre Field	t of t of t of t oduction to t o	Gauge No. ; Depth: 2 Blanked Off Field	sheet 76 4140' Ft. 24 Hour Clock NO essures 0ffice 1874 35 165 1727 177 357 1693 370 533	Gauge No Depth: Blanked C	205 4243' Fr 24 Hour Clock Off Yes Pressures 0ffice 1926 90 210 1769 223 399 1737 414 571	Tool Opened 2 Opened 2 Opened 3 Reported Minutes 30 120 120 180 	IME A.M. 2300 P.M. A.M. 130 P.M. Computed Minutes 27 121 118 182 122	r CASSIA Store IDAHO	Tested Interval
Recovered Remarks TEMPERATURE Est. °F. Actual 245 °F. Initial Hydrostatic P Flow Initial Closed in P Flow Initial Closed in Final Closed in Final Closed in Final Closed in Final	Fee Fee See pr See pr Gauge No. 4 Depth: 4 Blanked Off Pre Field	t of t of t of t oduction to t o	Gauge No. Depth:	sheet 76 4140' Ft. 24 Hour Clock NO essures 0ffice 1874 35 165 1727 177 357 1693 370 533 1683	Gauge No Depth: Blanked C	0.205 4243' Ft 24 Hour Clock 0ff Yes Pressures 0ffice 1926 90 210 1769 223 399 1737 414 571 1730	Tool Opened 2 Opened 2 Opened 8 Bypass 1 Reported Minutes 	TIME A.M. 2300 P.M. A.M. 2300 P.M. A.M. 130 P.M. Computed Minutes 27 121 118 182 122 180	r CASSIA Store IDAHO	Tested Interval
Recovered Remarks TEMPERATURE Est. °F. Actual 245 °F. Initial Hydrostatic Pop Flow Initial Closed in Final Closed in Final Closed in Final Final Closed in Final Final Final Final Final Final Final Final Final Final Final Final Final Closed in Final Final Final Final Final Final Closed in Final	Fee Fee See pr See pr Gauge No. 4 Depth: 4 Blanked Off Pre Field	r of r of roduction to roduction to roductio roductio roductio roduction to roduction to roduction to ro	Sauge No. Depth: Blanked Off Field	sheet 76 4140' Ft. 24 Hour Clock No essures 0ffice 1874 35 165 1727 177 357 1693 370 533 1683 1874	Gauge No Depth: Blanked C	205 4243' Ft 24 Hour Clock 24 Hour Clock 0ff Yes Pressures 0ffice 1926 90 210 1769 223 399 1737 414 571 1730 1926	Tool Opened 2 Opened 2 Opened 2 Bypass T Reported Minutes 30 120 120 120 120 120 120 180 120	IME A.M. 2300 P.M. A.M. 130 P.M. Computed Minutes 121 118 182 122 180	r CASSIA Store IDAHO	Tested Interval

Casing perfsBottom choke	Surf. temp°F	Ticket No. 863708
Gas gravityOil gravity	GOR	
Spec. gravityChlorides	ppm Res@	°F
 INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED_		

nte 5-12-75 ime a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
2000					Called
0900					On location
1800					Made up tools
2000					Trip in hole
2300					Set packers, opened tool with a weak
					blow, 3/4" in water
2330					Closed tool
0130					Opened tool with a weak blow, 3/4" into
					water, decreasing to ½"
0330	1			1	Closed tool
0630					Opened tool with a weak blow, 3/4" into
				`	water, decreasing to ½"
0830					Closed tool
1130				··	Pulled packers loose, by-passed
1600					Broke down, loaded out and off locatio
	-				
		-			·
		-			
·····					

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Ga	iuge No.		430		Depth 4	4136'		Clock No	s. 9989		24 hour	Ticket No.	863708		
	First Flow Pe	t riod	CI	First osed In Press	sure	Se Flow	cond Period	CI	Second osed In Press	ure	רד Flow	nird Period	CI	Third osed In Press	ure
	Time Defl. .000"	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.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000''	$\log \frac{t+\theta}{\theta}$	PSIG Temp, Corr,
0	.0000	32	.0000		173	.0000	184	.0000		364	.0000	376	.0000		535
P	.0106	69*	.0369		1435**	.0596	213***	.0569		1389***	1.0721	408****	1.0499		1394
2	.0246	106	.0705		1553	.1259	247	.1071		1496	.1377	437	.0998		1492
3	.0387	136	.1040		1609	.1922	279	.1573		1552	.2033	464	.1497		1546
4	.0528	148	.1376		1644	.2585	309	.2075		1588	.2689	490	.1997		1582
5	.0669	157	.1711		1667	. 3247	338	.2577		1614	.3344	512	.2496		1605
6	.0809	165	.2047		1683	. 3910	364	.3078		1635	.4000	535	.2995		1625
7	.0950	173	.2382		1697			.3580		1648			.3494		1639
8			.2718		1707			.4082		1662			.3993		1651
9			.3053		1713			.4584		1673			.4492		1662
10			.3389		1720			.5086		1681			.4992		1670
11			.3724		1726			.5588		1688			.5491		1677
12			.4060		1730			.6090		1694			.5990		1682
13							-								
14															
15			ll				l					[]			
Gai	uge No.	76			Depth 41	40'	•	Clock No	. 7139		24 hour				
0	.0000	35	.0000		165	.0000	177	.0000		357	.0000	370	.0000	ana ang ang ang ang ang ang ang ang ang	533
1	.0107	58*	.0366		1435**	.0592	208***	.0567		1392****	.0720	402****	.0498		1398
2	.0249	98	.0699		1550	.1249	241	.1067		1496	.1374	432	.0995		1495
3.	.0391	132	.1032		1609	.1907	273	.1568		1550	.2028	458	.1493		1548
4	.0533	143	.1366		1644	.2565	303	.2068		1587	.2682	485	.1990		1582
5.	.0676	151	.1699		1667	.3222	331	.2568		1614	.3336	508	.2488		1606
6.	0818	158	.2032		1683	.3880	357	.3068		1633	.3990	533	.2985		1625
7.	0960	165	.2365	•	1696			.3569		1649			.3483		1640
8			.2698		1705			.4069		1662			.3980		1652
9			.3031		1712			.4569		1671			.4478		1662
10			. 3364		1717			.5069		1681			.4975		1671
11			.3697		1723			.5570	1	1688			.5473		1677
12			.4030		1727			.6070		1693			.5970		1683
13			1							1					
14															
15															
Readin	g Interval	4		10			20		15		2	0		15	Minutes
REMA	RKS:	*Interva	al = 3 mi	nutes	**Interva	1 = 11	minutes	***Inte	rval = 1	8 minutes	s ****I	nterval :	= 17 minu	utes	
		****In	terval =	22 minu	tes										

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FORM 183-R1-PRINTED IN U.S.A.

SPECIAL PRESSURE DATA

	First Flow Pe	t riod	CI	First losed In Press	ure	Sec Flow	ond Period	CI	Second osed In Pressi	ure	רך Flow	nird Period	CI	Third osed In Press	ure
	Time Defl. .000''	PSIG Temp. Corr.	Time Defl. .000"	$\log \frac{t+\theta}{\theta}$	PSIG Temp. Corr.	Time Defi. .000''	PSIG Temp. Corr.	Time Defl. .000"	$\log \frac{t+\theta}{\theta}$	PSIG Temp, Corr.	Time Defl. .000"	PSIG Temp. Corr.	Time Defl. .000''	$\log \frac{t+\theta}{\theta}$	PSI Tem Corr
0	.0000	90	.0000		210	.0000	223	.0000		399	.0000	414	.0000		571
1	.0101	120*	.0366		1481**	.0601	247***	.0568		1441***	* .0732	440****	.0499	1	1440
2	.0236	152	.0699		1591	.1269	280	.1069		1537	.1398	470	.0998		1537
3.	.0371	178	.1032		1649	.1937	313	.1570		1595	.2063	499	.1497		1594
4	.0506	187	.1366		1682	.2604	343	.2071		1631	.2729	525	.1997		1627
5	.0640	194	:1699		1705	.3272	372	.2572		1657	.3394	548	.2496		1650
6	.0775	202	.2032		1723	. 3940	399	.3073		1675	.4060	571	.2995		1669
7	.0910	210	.2365		1736			.3574		1691			.3494		1685
8			.2698		1744			.4076		1704			.3993		1696
9			.3031		1752			.4577		1715			.4492		1707
10			.3364		1758			.5078		1723			.4992		1716
11			.3697		1763			.5579		1730			.5491		1723
12			.4030		1769			.6080		1737			.5990		1730
13					1										
14								- 1							
15							1								
0															
2															
4															
5															
6															
7				t											
8															
9															
10															
11															
12															
13															
14															
15															
Read	ing Interval	4		10		and the second	20	ور المراجع والمراجعة في المراجع	15			20		15	Minut
REM	<u>arks: *I</u>	nterval	<u>= 3 min</u>	utes **]	[nterva]	= 11 mi	nutes *	**Interv	al = 18 i	minutes	****Int	erval =	17 minut	es	
	*	****Inte	erval = 2	22 minute	es										

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SPECIAL PRESSURE DATA

Dill Pipe er Tubing 0.0. LD. DOUT DOTT Revening Sub 7.15/16 ^a 2.13/16 ^a .98 ^a Polit Cations Valve 6.5/8 ^a .965 ^a .98 ^a Dell Pipe 6.5/8 ^a .965 ^b .98 ^a Dell Catters $\frac{10^{a}}{2^{a}}$.92 ^b .92 ^b Asstelds Some Type I $\frac{10^{a}}{2^{a}}$.23 ^a .94 ^b Asstelds Some Type I $\frac{10^{a}}{2^{a}}$.23 ^a .412 ^b Multiple CIP Sompler		, •			and the second second	003700
Diff Pice or Tubing 7 15/16" 2 13/16"	A		0.D.	I.D.	LENGTH	DEPTH
Prevening Sub $f = 10/10$ $c = 13/10$ $g = 13/10$ Water Cashion Valve $6 = 5/8^{21}$ $33/41^{-}$ 262^{-1} Driff Pipe $6 = 5/8^{21}$ $33/41^{-}$ 262^{-1} Driff Callers Trippa 5^{-1} $23/7^{-1}$ $21/10^{-1}$ DaskEdB Sonoler Trippa 5^{-1} $23/7^{-1}$ 4^{-1} 4123^{-1} Hydro-Spring Tester 5^{-1} 2.37^{+1} 4^{-1} 4136^{+1} Autriple CP Sampler 5^{-1} 1.75^{-1} 5^{-1} 1.75^{-1} 5^{-1} V Solesy Joint 5^{-1} 1.75^{-1} 2^{-1} 4^{+1} 4136^{+1} Pecker Assembly 1114^{-1} 2.44^{-1} 6^{-1} 4157^{+1} Packer Joint $5 3/4^{+1}$ 1.75^{-1} 2^{+1} 4^{+1} Postar Eaglisting Totos $6 -1/8^{+1}$ 3.44^{+1} 1.44^{+1} Packer Assembly 1114^{-1} 2.44^{-1} 4^{-1} 4.157^{+1} Packer Massimily 1.114^{-1} 2.44^{-1} 4^{-1} 4.157^{+1} Packer Massembly		Drill Pipe or Tubing	7 15/16"	2 12/16		
Water Cashien Value 6 5/8" 3 3 265" Drift Pipe $\frac{6}{2}$ $\frac{5}{2}$ $\frac{3}{2}$ 262" 4116' Duilt Collers $\frac{5}{2}$ $\frac{2}{3}$ $\frac{7}{2}$ $\frac{4116'}{4123'}$ Duilt Collers $\frac{5}{2}$ $\frac{2}{37"}$ $\frac{3}{2}$ $\frac{4116'}{4123'}$ Duilt Collers $\frac{5}{2}$ $\frac{2}{37"}$ $\frac{4}{2}$ $\frac{4136'}{4123'}$ Multiple CP Sampler $\frac{1}{2}$ $\frac{4}{131'}$ $\frac{4136'}{4140'}$ Hydroalle Jar $\frac{5}{2}$ $\frac{1}{75"}$ $\frac{6}{2}$ Presure Equiliang Crese $\frac{5}{2}$ $\frac{1}{75"}$ $\frac{2}{2}$ Presure Equiliang Crese $\frac{5}{2}$ $\frac{1}{16'}$ $\frac{4}{136'}$ Pocker Asambly $\frac{111k''}{2}$ $\frac{2.44''}{2}$ $\frac{4}{157'}$ Packer Asambly $\frac{111k''}{2}$ $\frac{2.44''}{2}$ $\frac{4}{157'}$ Presure Equiliang Crossover $\frac{1}{2}$ $\frac{1}{2}$ $\frac{4}{157'}$ Packer Asambly $\frac{1}{11k''}$ $\frac{2.44''}{2}$ $\frac{4}{157'}$ $\frac{4}{157'}$ Duilt Coller $\frac{1}{12}$ $\frac{2}{10}$ $\frac{1}{164'}$ $\frac{1}{157'}$	Щ	Reversing Sub	7 15/10	2 13/10	.98.	
Diff Pice $6 \frac{5}{6} \frac{5}{6}^{m}$ $3 \frac{3}{2} 3$	R	Water Cushion Valve		、 、		
Diff Catters $\frac{8^n}{2}$ $\frac{3^n}{2}$ $\frac{262^n}{7}$ Handling Sub & Choke Assembly $\frac{5^n}{2}$ $\frac{67^n}{2}$ $\frac{7^n}{2}$ $\frac{4116^n}{4123^n}$ Handling Sub & Choke Assembly $\frac{5^n}{2}$ $\frac{27^n}{2}$ $\frac{8^n}{2}$ $\frac{47^n}{2}$ $\frac{4123^n}{4123^n}$ HydroxSpring Tester $\frac{5^n}{2}$ $\frac{2.37^n}{75^n}$ $\frac{4^n}{4}$ $\frac{4136^n}{4140^n}$ Multiple CIP Sampler $\frac{1}{2}$ $\frac{5^n}{2}$ $\frac{2.37^n}{2}$ $\frac{4^n}{4}$ $\frac{4136^n}{4140^n}$ Multiple CIP Sampler $\frac{1}{2}$ $\frac{5^n}{2}$ $\frac{2.37^n}{2}$ $\frac{4^n}{4}$ $\frac{4136^n}{4140^n}$ Multiple CIP Sampler $\frac{1}{2}$ $\frac{5^n}{2}$ $\frac{2.37^n}{2}$ $\frac{4^n}{4}$ $\frac{4136^n}{4140^n}$ Hydroxlic Jar $\frac{5^n}{2}$ $\frac{2.37^n}{2}$ $\frac{4^n}{4140^n}$ $\frac{4136^n}{4140^n}$ Pressure Equiliting Creasover $\frac{5^n}{1}$ 1.75^n 2^n $\frac{2^n}{4151^n}$ Datibuter $\frac{11k^n}{2}$ 2.44^n 4^n $\frac{4157^n}{1.44^n}$ $\frac{4157^n}{1.44^n}$ $\frac{4157^n}{1.44^n}$ $\frac{4157^n}{1.44^n}$ $\frac{4157^n}{1.44^n}$ $\frac{2578^n}{1.44^n}$ $\frac{4^n}{1.44^n}$ $\frac{2578^n}{1.44^n}$ $4^$	3	Drill Pipe	6 5/8"	5.965"	3844'	
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added somptime $\frac{5^{11}}{75^{11}}$ $\frac{2^{12}}{5^{11}}$ $\frac{5^{11}}{5^{11}}$ $\frac{4^{1}}{4^{1}3^{1}}$ Multiple CIP Sampler	•	Due CIP Same	<u>5</u> "			4116'
Multiple CIP Sampler	ΗH	Hydro-Sorino Tester	5"	.75"	<u> </u>	4123
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Pressure Equilizing Crossover Image: construct a symplex construction of the symplex constructi	М	VR Sofety Joint	5*	1.75"	2'	
Packer Assembly 111/2" 2.44" 6' 4151' Distributor	Ë	Pressure Equalizing Crossover				•
Packer Assembly 1112" 2.44" 6' 4151' Distributor	Щ					
Distributor		Packer Assembly	114"	2.44"	6'	4151'
Distributor 1114" 2.44" 4.50' 4157' Packer tail 53/4" 13/4" 4' Safety Joint 53/4" 13/4" 4' Flast startswees Sub 611/16" 25/8" .80' Pressure Equalizing Tube 611/16" 27/8" .80' Pressure Equalizing Tube 713/16" 27/8" .96' Bionked-Off B.T. Running Case 7	-					
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FRUE 5 dim Arches Sub 6 $11/16"$ 2 $5/8"$.80' Pressure Equalizing Tube 6 $11/16"$ 2 $5/8"$.80' Perf. anchor 6 $1/8"$ $31_2"$ 4' Blanked-Off B.T. Running Case 7 $13/16"$ 2 $7/8"$.96' Drill Collars 8" 3" $58.60"$.03' Anchor Pipe Sofety Joint 7 $7/8"$ 2 $7/8"$ 1.03' Sub 6 $3/4"$ 2 $3/4"$.84'		Safety Joint	5 3/4"	. 1 3/4"	1.44 Δ'	
Pressure Equalizing Tube $-$ Perf. anchor 6 Blanked-Off B.T. Running Case 7 Sub 7 Drill Collars $8^{"}$ Anchor Pipe Safety Joint 7 Sub 7 Perf. anchor 6 7 $7/8"$ 2 $7/8"$ $96'$ $3"$ $3"$ $58.60"$ Anchor Pipe Safety Joint 7 7 $7/8"$ 2 7 $7/8"$ 2 $9erf. anchor 6 3/4" 23/4" 80b 6 3/4" 23/4" .84' Distributor 5 7/8" 3" .94' Packer Assembly 5 7/8" 2'4" .76' Sub 6 1/8" 2'4" .76' HT-500 5 7/8" 2'5/8" .64' Anchor Pipe Safety Joint 5'7/8" 2'3/4" .82' Sub 6'2" 2'3/4" .82' $	0	Frush total Archarta Sub	6 11/16"	2 5/8"	.80'	
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Drill Collars $8"$ $3"$ $58.60"$ Anchor Pipe Safety Joint $77/8"$ $27/8"$ $1.03"$ Sub Perf. anchor $61/8"$ $3J_2"$ $10"$ Packer Assembly $63/4"$ $23/4"$ $.84"$ Distributor $57/8"$ $3"$ $.94"$ Packer Assembly $61/8"$ $2J_4"$ $.84"$ Distributor $57/8"$ $3"$ $.94"$ Packer Assembly $61/8"$ $2J_4"$ $.66"$ MT-500 $57/8"$ $2J_4"$ $.66"$ Packer Assembly $61/8"$ $2J_4"$ $.64"$ Anchor Pipe Safety Joint $57/8"$ $25/8"$ $.64"$ Anchor Pipe Safety Joint $57/8"$ $23/4"$ $.82"$ Sub $6J_2"$ $23/4"$ $.82"$ Side Wall Anchor	μ	Blanked-Off B.T. Running Case Stub	7 13/16"	. 2 7/8"	96'	
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Sub 7 7/8" 2 7/8" 1.03' Perf. anchor 6 1/8" $3\frac{1}{2}$ " 10' Pocker Assembly $\overline{6 3/4"}$ 2 3/4" .84' Distributor $\overline{6 3/4"}$ $\overline{2 3/4"}$.84' Distributor $\overline{6 3/4"}$ $\overline{2 3/4"}$.84' Distributor $\overline{6 1/8"}$ $\overline{2^{1}_{4"}}$.76' Number of the state of the	V	Anchor Pipe Safety Joint				
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Distributor $\overline{57/8"}$ $\overline{3"}$ $\overline{.94'}$ Packer Assembly $\overline{61/8"}$ $\overline{2'_4"}$ $\overline{.76'}$ Sub $\overline{61/8"}$ $\overline{2'_4"}$ $\overline{.76'}$ HT-500 $\overline{51/8"}$ $\overline{2'_4"}$ $\overline{1.51'}$ Sub $\overline{57/8"}$ $\overline{25/8"}$ $\overline{.64'}$ Anchor Pipe Safety Joint $\overline{6'_2"}$ $\overline{23/4"}$ $\overline{.82'}$ Sub $\overline{6'_2"}$ $\overline{23/4"}$ $\overline{.82'}$ Drill Collars $\overline{-6'_2"}$ $\overline{-6'_2"}$ $\overline{-4'}$ Flush Joint Anchor $\overline{-6'_2"}$ $\overline{3'_2"}$ $\overline{4'}$ Blanked-Off B.T. Running Case $\overline{61/8"}$ $\overline{3'_2"}$ $\overline{4'}$ $\overline{4243'}$ Total Depth $\overline{-16'2"}$ $\overline{-16'2"}$ $\overline{-16'2"}$ $\overline{-16'2"}$	A. A.	Sub	6 3/4"	2 3/4"	.84'	
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$HT-500$ $5 1/8"$ $24"$ $1.51'$ Sub $5 7/8"$ $2 5/8"$ $.64'$ Anchor Pipe Safety Joint $6\frac{1}{2}"$ $2 3/4"$ $.82'$ Sub $6\frac{1}{2}"$ $2 3/4"$ $.82'$ Drill Collars $$	and the second	Packer Assembly	6 1/0"	21."	761	
Sub 5 7/8" 2 5/8" .64" Anchor Pipe Safety Joint 6½" 2 3/4" .82" Sub 6½" 2 3/4" .82" Drill Collars		HT-500	5 1/8"	23 23	/0	
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Sub 6½" 2 3/4" .82" Side Wall Anchor	-	Anchor Pipe Safety Joint				
Side Wall Anchor		Sub	6 ¹ 2"	2 3/4"	.82'	
Drill Collors	۲. H	Side Wall Anchor	•			
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SUMMARY OF PUMP TEST RESULTS ON RRGE-2

AS OF AUGUST 16, 1978

David W. Allman

Several production tests have been performed on RRGE-2. One of the most significant tests was performed at a steady production rate of 225 gpm on September 12 and 13, 1975, during which the H-P downhole pressure probe was used. The use of this probe results in accurate drawdown data. The data can be interpreted as implying the presence of barrier boundaries near the well as indicated by the straight line segmented nature of the drawdown data (Figure 1). The first break in slope, after approximately 15 minutes (900 seconds) of pumping results in a straight-line segment having a slope approximately double that of data prior to 15 minutes. This can be interpreted as indicating the presence of a linear impermeable barrier boundry located 50 feet from RRGE-2. The affects on the potentiometric head in RRGE-2 of a linear impermeable barrier boundry can be mathematically modeled using an imaginary pumping well at a distance of 100 feet from RRGE-2, pumping at the same rate as RRGE-2. The mathematical model would result in a doubling of the slope as observed.

The third linear segment of the drawdown plot begins at approximately 333 minutes (20,000 seconds). The slope of this segment is approximately 4 times greater than the linear segment prior to 15 minutes. This can be interpreted as another linear impermeable barrier boundry perpendicular to the first hypothesized barrier boundry. This second barrier boundry is estimated to be 275 feet from RRGE-2. The influence on RRGE-2 potentiometric heads of the impermeable barrier boundry can be mathematically represented by 2 pumping image wells at distances of 550 feet and 559 feet from RRGE-2. Because the image wells have near identical radii from RRGE-2, the impact of these two image wells on the potentiometric head in RRGE-2 occurs at essentially the same time. As result, the third straight line segment of the drawdown data plot has a slope approximately four times greater than the initial slope.

The expected relationships between drawdown after five years of pumping with and without interference with surrounding wells as a function of pumping rate are plotted in Figure 2. This plot results from extrapolating the September 12 and 13 data. The lower sloping line is the drawdown pumping rate relationship that would result with no well interference using the drawdown of 30 psi at 333 minutes and a $Q/\Delta S/$ per cycle time of 11.25. The upper sloping line is the drawdown pumping rate relationship that would result from interference with the pumping wells. This interference was calculated assuming a reservoir kh of 100,000 md-ft, an S (storage coefficient) of 0.0005, a temperature of 300°F, equal production rates for RRGE-1, RRGE-4 and RRGE-5, a combined production rate of 2500 gpm, and radii from RRGE-2 of 3918 feet, 5280 feet, and 6160 feet for RRGE-1, RRGE-4 and RRGE-5 respectively. With no withdrawals from RRGE-2, interference of 66.68 psi would result because of pumping. The central line which depicts the expected well performance considers both the interference with the pumping wells and an estimated 20 psi of interference with the injection wells.

A series of relatively short drawdown tests of approximately one day duration have also been conducted RRGE-2. The results of these tests are plotted in Figure 3. The pressure declines are measured at the well head. As a result, considerable errors result in absolute drawdown. The changing

specific gravity of the water in the wellbore as the temperature of the water in the wellbore increases as a resule of discharging the well, can result in absolute drawdowns up to approximate y 35 psi greater than those indicated in Figure 3. However, once thermal quilibrium is reached in the wellbore, relative temporally dependent declines in drawdown data can be determined with what is believed to be an acceptable degree of accuracy. However, it must be recognized that it may be possible that all the parameters describing these plots have errors of such a magnitude that the conclusions based on these data are completely erroneous.

The data in Figure 3 exhibits some non-ideal characteristics. The data from the time pumping began to approximately 333 minutes appear to have significant errors because of temporally dependent borehold fluid density changes as suggested by the lack of distinct changes in slope of the data as presumed boundary affects influence the drawdown data. Since the data collected after approximately 333 minutes exhibits well defined linear trends for approximately 0.64 of a log cycle, some credence can be placed on the wellhead drawdown data being indicative of the drawdowns occurring in the wellbore fluid adjacent to the production zone(s). The slopes expressed as psi/log cycle of time (Δ S/log cycle time), of the linear trend from approximately 333 minutes until termination of the test are listed in Table 1 as a function of the flow rate used during the test. In addition, the value of the ratio Q/ Δ S/log cycle time is also listed in Table 1 along with the observed drawdown after flowing the well for 333 minutes.

Data for two additional tests at 800 and 740 gpm (Figure 4 and 5), have also been examined. The drawdown data for the 800 gpm test do not exhibit a distinct change in slope over the 725 minutes of pumping. However, the drawdown

data for the 740 gpm test exhibit an abrupt change in slope after pumping 500 minutes. The reason for the absence of a slope change in Figure 4 is not known. The drawdown after pumping 333 minutes as well as the slope of the drawdown data after 333 minutes are listed in Table 1.

The estimated drawdowns after pumping 333 minutes appear to be predictable. Figure 6 is a plot of the drawdown versus Q for the data listed in Table 1. The coefficient of determination r^2 , indicates that 98.5% of the variation in the drawdown after pumping 333 minutes is accounted for by the regression.

Contrary to that which would result with an ideal well, the value of $Q/\Delta S/\log$ cycle time is dependent on Q. Figure 7 is a plot of $\Delta S/\log$ cycle time versus Q. The best fitting linear regression between these variables indicates that the rates of $Q/\Delta S$ log cycle time is not a constant since there is a non zero interrupt. Figure 8 is a graph of $Q/\Delta S/\log$ cycle time versus Q. The non-linearity of this relationship is readily apparent. An ideal well would have a $Q/\Delta S/\log$ cycle time value independent of Q. The dashed line is the relationship between these two variables as obtained from the best fitting linear regression based on the data plotted in Figure 6.

The dependent relationship between the ratio $Q/\Delta S/\log$ cycle time and Q is significant in that it indicates the greater the rate of withdrawal from the wall, the poorer the well performs. This dependent relationship also indicates that significant errors in predicting drawdown can be expected unless: (a) the test pumping rate is fortuitously close to the pumping rate being used for projection purposes, (b) the ratio $Q/\Delta S/\log$ cycle time is not dependent on Q, or (c) the relationship between $Q/\Delta S/\log$ cycle time and Q can be defined.

The expected relationships between drawdown after five years of pumping with and without interference with surrounding wells as a function of pumping rate Q are plotted in Figure 9. The lower sloping solid line is the drawdown

pumping rate relationship that would result with no well interference using the drawdown at 333 minutes as obtained from the relationship in Figure 6 and the values for $\Delta S/\log$ cycle time as obtained from the linear relationship in Figure 7. The upper sloping solid line is the drawdownpumping rate relationship that would result from interference with the pumping wells. This interference was calculated using identical assumptions as those used for Figure 2. The central solid line depicts the expected well performance with both injection well and pumping well interference.

The comparison of the drawdown-pumping rate relationship using the 225 gpm test data only and all the available data indicates that above approximately 280 gpm, the data based on the 225 gpm test underestimate the resulting drawdowns. For convenience, the dashed line in Figure 9 is the expected well performance based on the 225 gpm test data as per Figure 2. Below approximately 280 gpm, the data based on the 225 gpm test overestimate the resulting drawdowns. Based on these results, the projection of drawdown-pumping rate relationships beyond the range of pumping rate data available can result in rather larger errors in estimated drawdown.

CONCLUSION:

(1) To eliminate the significant affects of temporally dependent borehole fluid density changes on the hypothesized drawdown data, drawdown data should be collected with a downhole pressure probe.

(2) Based on the 225 gpm test, the drawdown data can apparently be duplicated by assuming one real pumping well and 3 pumping image wells.

(3) Estimated drawdowns after pumping 333 minutes are apparently not linearly dependent on the pumping rate.

(4) The changes in drawdown (Δ S) per log cycle time appear to be linearly dependent on the pumping rate.

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(5) The ratio of pumping rate (Q) to the change in drawdown (Δ S) per log cycle time is not linearly dependent on Q as would be the case for an ideal well exhibiting constant values for kh and T.

<u>Table 1</u>

Selected Parameter Response Obtained From Withdrawal Tests On RRGE-2.

Pump Rate (9pm)	Drawdown at 333 min. (psi)	∆S/Log Cycle Time (psi)	Q/AS/Log Cycle Time (9pm/psi)
200	27.5	12.5	16.0
225	30.0	20.0	11.3
250	43.6	. 18.2	13.7
300	59.7	22.8	13.2
350	73.4	28.5	12.3
400	92.2	34.0	11.8
740	275.0	74.0	10.0
800	344.0	80.0	10.0

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80 7:: 200 450 6.92 302 800 100 200 1: -8/16/78 PUMPING RATE Q(gpm)

FIST 91 83171 112 1341 64 1 201 30

