

GL07337

FET 7-79

ATTEMPT 10-12-79

WELLS RRGE-1 & RRGE-7 RESPONSES.

PURSE TEST RRBE-1 & RRBE-7

(10-22-79)

8 HOUR TEST (approx.)

WELL RRBE-1 response to shutdown & recovery

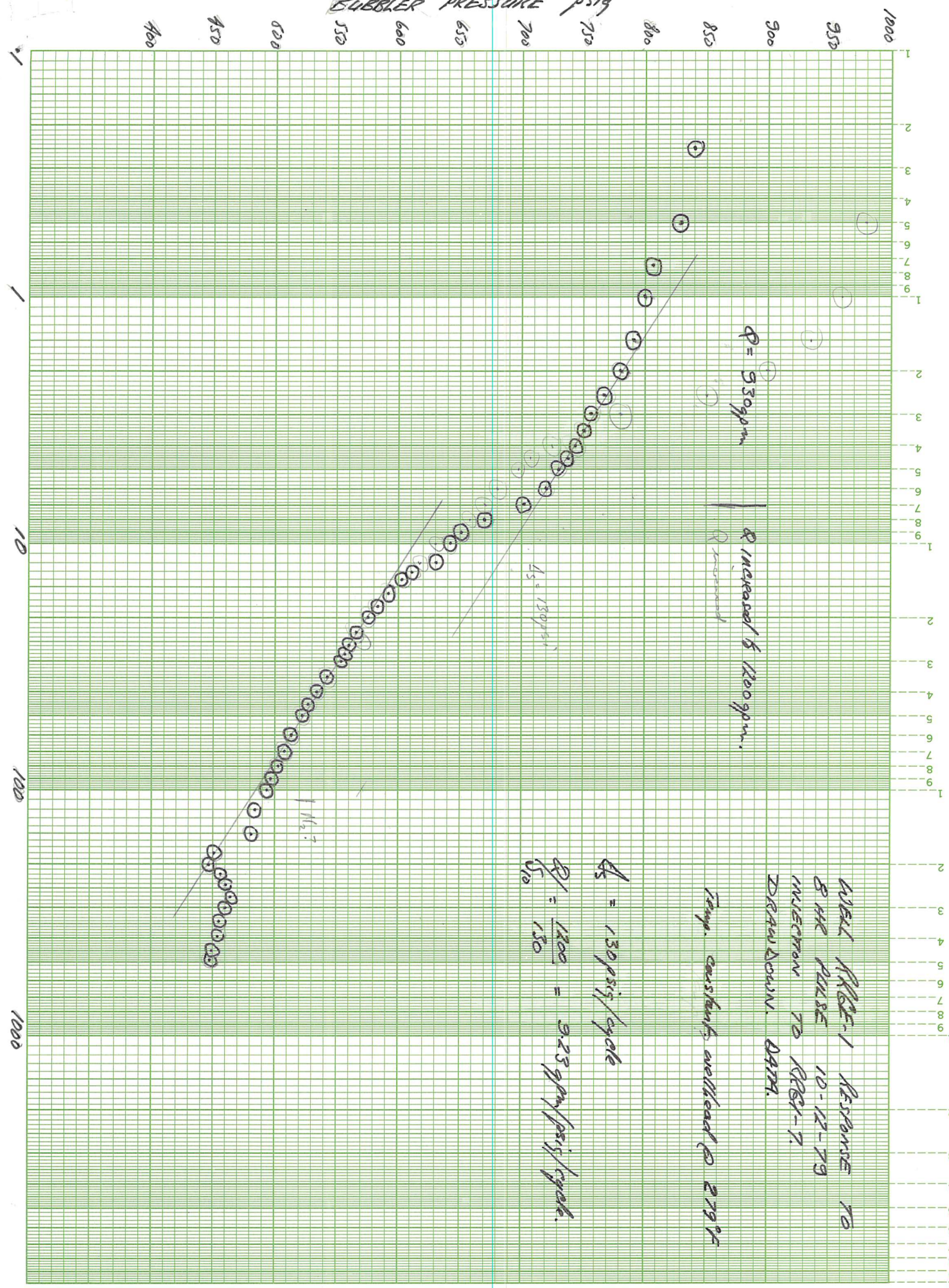
ISIP 893 psig (bubbles.)

Start: 14:31

Strip chart at RRBE-1 shows constant y-line (1200) and temp 279°F

FSIP 900 psig

Q = 1200 gpm.



WELL RISE-1 RESPONSE TO
BHR PULSE 10-12-79
INJECTION TO RISE-7.
DRAW-DOWN DATA.

Temp. constant wellhead @ 279°F

$$k_s = 150 \text{ psi/cycle}$$

$$\frac{Q_1}{Q_0} = \frac{1200}{930} = 3.23 \text{ gpm/psi/cycle.}$$

WELL KRIST-1 RESPONSE TO
5 HR PULSE 10-12-79
INJECTION TO KRIST-7
RECOVERY DATA

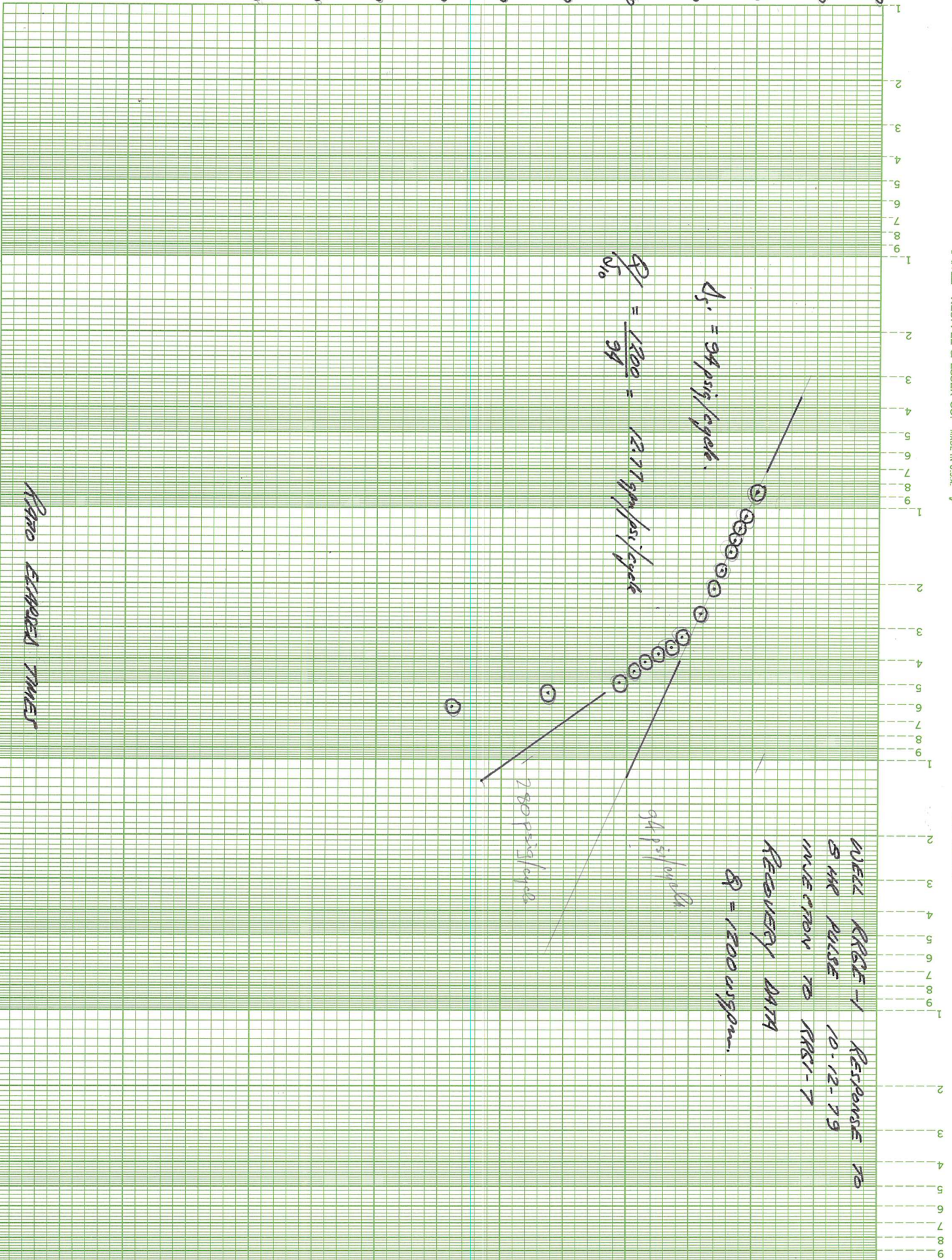
$Q = 1200 \text{ usgpm}$

94 psi/cycle

1200 psi/cycle

$\Delta S = 94 \text{ psi/cycle}$

$\frac{Q}{S_1} = \frac{1200}{94} = 12.77 \text{ gpm/psi/cycle}$



PUMP SHUT-TIME HOURS

10 PUMP SHUT-TIME HOURS

1,000

BUBBLER PRESSURE psig
500 550 600 650 700 750 800 850 900 950 1000

BUBBLER DATA

TIME INTO TEST

- 0 to 5 MIN.
- 5 to 60 MIN.
- 1 HR. TO 5 HR.
- 5 HR. to 100 HR.
- 100 HR. TO 500 HR.

READINGS

- QUICKLY AS POSSIBLE
- EVERY MINUTE
- EVERY 10 MINUTES
- EVERY HOUR
- EVERY 4 HOURS

PULSE TEST TO 7
SITE 1

DATE	TIME	INTERVAL TIME	BUBBLER GAUGE PSIG # L 9090	WELLHEAD PRESS. HEISE GAUGE PSIG # L 9395	INITIALS	COMMENTS
10-12-79	14:30	←	893	140	GR	Reading Before Drawdown
	14:31:15	15 Sec	840	25	GR	Started Drawdown Pump on
		11:50	830	27	GR	
		11:75	806	28	GR	
	14:32	11:10	800	28	GR	
		11:125	794	28	GR	
		11:150	789	28.2	GR	
		11:175	784	28.5	GR	
	14:33	11:200	780	28.6	GR	
		11	776	29.5	GR	
		11:25	66	29.5	GR	
		11	762	29.4	GR	
	14:34	11:3	756	29	GR	
		11	752	29.1	GR	
		11:35	750	29.1	GR	
		11	746	29	GR	
	14:35	11:4	744	29	GR	
		11	730	29	GR	
		11:45	737	29	GR	
		11	734	28.9	GR	
	14:36	11:50	730	28.9	GR	

DRAWDOWN AND RECOVERY

DATA SHEET 5A

BUBBLER DATA

TIME INTO TEST

READINGS

- 0 to 5 MIN.
- 5 to 60 MIN.
- 1 HR. TO 5 HR.
- 5 HR. TO 100 HR.
- 100 HR. TO 500 HR.

- QUICKLY AS POSSIBLE
- EVERY MINUTE
- EVERY 10 MINUTES
- EVERY HOUR
- EVERY 4 HOURS

PULSE TEST TO 7

DATE	TIME	INTERVAL TIME	BUBBLER GAUGE PSIG # L 9090	WELLHEAD PRESS. HEISE GAUGE PSIG # L 9295	INITIALS	COMMENTS
10-12-79	14:36:30	30 seconds ^{5.5}	724	28.9	GR	
	14:37	" 6	720	28.9	GR	
	14:38	1 minute ⁷	701	29	GR	1200 GPM increased Flow
	14:39	" 8	670	29.4	GR	
	14:40	" 9	650	29.4	GR	
	14:41	" 10	642	29.4	GR	
	14:42	" 11	640	29.4	GR	
	14:43	" 12	630	29.4	GR	
	14:44	" 13	610	29.4	GR	
	14:45	" 14	602	29.4	GR	
	14:46	" 15	596	29.4	GR	
	14:47	" 16	592	29.4	GR	
	14:48	" 17	588	29.4	GR	
	14:49	" 18	584	29.4	GR	
	14:50	" 19	580	29.4	GR	
	14:51	" 20	576	29.4	GR	
	14:52	" 21	572	29.4	GR	
	14:53	" 22	560	29.4	GR	
	14:54	" 23	566	29.2	GR	
	14:55	" 24	564	29.2	GR	

DRAWDOWN AND RECOVERY

DATA SHEET 5A

FET-7-79

Page 22

PAGE 3

BUBBLER DATA

TIME INTO TEST

- 0 to 5 MIN.
- 5 to 60 MIN.
- 1 HR. TO 5 HR.
- 5 HR. TO 100 HR.
- 100 HR. TO 500 HR.

READINGS

- QUICKLY AS POSSIBLE
- EVERY MINUTE
- EVERY 10 MINUTES
- EVERY HOUR
- EVERY 4 HOURS

PULSE TEST TO 7

DATE	TIME	INTERVAL TIME	BUBBLER GAUGE PSIG # L 9090	WELLHEAD PRESS. HEISE GAUGE PSIG # L 9395	INITIALS	COMMENTS
10-12-79	14:56	1 min 25	562	29.2	GR	
	14:57	11 26	560	29.1	GR	
	14:58	11 27	559	29.1	GR	
	14:59	11 28	557	29.2	GR	
	15:00	11 29	556	29.2	GR	
	15:01	11 30	554	29.2	GR	
	15:02	11 31	550	29.1	GR	
	15:03	11 32	558	29	GR	
	15:04	11 33	556	29	GR	
	15:05	11 34	544	29	GR	
	15:06	11 35	542	29	GR	
	15:07	11 36	540	29	GR	
	15:08	11 37	538	29	GR	
	15:09	11 38	537	29	GR	
	15:10	11 39	534	29	GR	
	15:11	11 40	533	29	GR	
	15:12	11 41	532	29	GR	
	15:13	11 42	531	29	GR	
	15:14	11 43	530	29	GR	
	15:15	11 44	528	29	GR	

DRAWDOWN AND RECOVERY

DATA SHEET 5A

PAGE 4
PULSE TEST TO
7

BUBBLER DATA

TIME INTO TEST

- 0 to 5 MIN.
- 5 to 60 MIN.
- 1 HR. TO 5 HR.
- 5 HR. TO 100 HR.
- 100 HR. TO 500 HR.

READINGS

- QUICKLY AS POSSIBLE
- EVERY MINUTE
- EVERY 10 MINUTES
- EVERY HOUR
- EVERY 4 HOURS

DATE	TIME	INTERVAL TIME	BUBBLER GAUGE PSIG #	WELLHEAD PRESS. HEISE GAUGE PSIG #	INITIALS	COMMENTS
10-12-79	15:16	1 min 15	# L 9090 527	# L 9395 29	GR	FLOW AT
	15:17	// 46	526	29	GR	1200 G.P.M
	15:18	//	525	29	GR	
	15:19	//	524	29	GR	
	15:20	//	523	28.9	GR	
	15:21	// 50	522	28.9	GR	
	15:22	//	521	28.9	GR	
	15:23	//	520	28.9	GR	
	15:24	//	519	28.9	GR	
	15:25	//	518	28.9	GR	
	15:26	// 55	517	28.9	GR	
	15:27	//	516	28.9	GR	
	15:28	//	515.5	28.9	GR	
	15:29	//	514	28.9	GR	
	15:30	//	513.5	28.9	GR	
	15:31	10 Mins 60	513	28.9	GR	
	15:41	// 70	508	28.8	GR	
	15:51	// 80	502	28.6	GR	
	16:01	// 90	497	28.7	GR	
	16:11	// 100	494	28.6	GR	

DRAWDOWN AND RECOVERY
DATA SHEET 5A

PAGE 5
PLEASE TEST 70312

BUBBLER DATA

TIME INTO TEST
0 to 5 MIN. QUICKLY AS POSSIBLE
5 to 60 MIN. EVERY MINUTE
1 HR. TO 5 HR. EVERY 10 MINUTES
5 HR. to 100 HR. EVERY HOUR
100 HR. TO 500 HR. EVERY 4 HOURS

DATE	TIME	INTERVAL TIME	BUBBLER GAUGE PSIG # L9090	WELLHEAD PRESS. HEISE GAUGE PSIG # L9395	INITIALS	COMMENTS
10-12-79	16:20	10 Min 110	488	+	KT	Draw down
'	16:30	" 120	484	+	GR	'
'	16:40	11 130	484	+	GR	'
10-12-79	16:50	11 140	483	+	KT	" "
'	17:00	1 150	480	+	'	Draw down
'	17:10	1 160	480	+	KT	CHANGED N2 700 PSIG
'	17:20	1 170	452	+	KT	NOTE CHANGED N2 AND PURGED TARGET READING
'	17:30	1 180	450	+	KT	Draw down
10/12/79	17:40	10 min 190	448	+	" "	" "
" "	17:50	" 200 "	447	+	KT	" "
" "	18:00	" 210 "	459	+	KT	" "
10/12/79	18:10	" 220 "	457	+	GR	" "
'	18:20	" 230	462	+	KT	" "
'	18:30	10 min 240	460	+	KT	Draw down
'	18:40	" 250	460	+	KT	Blow down
'	18:50	11 260	454	+	'	
'	19:00	" 270	464	+	KT	" "
'	19:10	" 280	466	+		
'	19:20	" 290	463	+	KT	" "
'	19:30	" 300	460	+	KT	Blow down

DRAWDOWN AND RECOVERY
DATA SHEET 5A

BUBBLER DATA

TIME INTO TEST

- 0 to 5 MIN.
- 5 to 60 MIN.
- 1 HR. TO 5 HR.
- 5 HR. TO 100 HR.
- 100 HR. TO 500 HR.

READINGS

- QUICKLY AS POSSIBLE
- EVERY MINUTE
- EVERY 10 MINUTES
- EVERY HOUR
- EVERY 4 HOURS

PAGE #6
PULSE TEST TO SITE #2

DATE	TIME	INTERVAL TIME	BUBBLER GAUGE PSIG	WELLHEAD PRESS. HEISE GAUGE PSIG	INITIALS	COMMENTS
10-12-79	20:15	45 minutes ²⁹⁵	455	# L9295 Blew down	KT	CHANGED TO ON READING SO THERE WOULD BE A READING EVERY 30 min ON THE BUBBLER NOTE OTHER READING ON DATA SHEET #2
" "	21:00	" " " ³⁹⁰	453	" - "	KT	
" "	22:00	1 hr. ⁴⁵⁰	449	" "	KT	
" "	22:35	⁴⁸⁶	448	pump shut OFF (22:37)	KT	FOR RRO #1 BLEW DOWN BEFORE SHUT OFF
10-12-79					KT	
	22:37				KT	Pump Off
					KT	
10/12/79	22:38		450		KT	Recovery
		20 seconds	460		KT	
		"	465		KT	
	22:39	"	470		KT	
		"	475		KT	
		"	480		KT	
	22:40	"	485		KT	
		12 seconds	490		KT	
		"	493		KT	
		"	498		KT	
		"	500		KT	
	22:41	"	504		KT	
		8.5 seconds	509		KT	

DRAWDOWN AND RECOVERY

DATA SHEET 5A

BUBBLER DATA

TIME INTO TEST

READINGS

0 to 5 MIN.
5 to 60 MIN.
1 HR. TO 5 HR.
5 HR. to 100 HR.
100 HR. TO 500 HR.

QUICKLY AS POSSIBLE
EVERY MINUTE
EVERY 10 MINUTES
EVERY HOUR
EVERY 4 HOURS

DATE	TIME	INTERVAL TIME	BUBBLER GAUGE PSIG # L9090	WELLHEAD PRESS. HEISE GAUGE PSIG # L9395
10-12-79	22:41:17	8.5 seconds	510	
		"	512	
		"	520	
		"	525	
		"	530	
		"	531	
	22:42	"	535	
		12 seconds	540	
		"	542	
		"	546	
		"	548	
	22:43	"	550	
10-12-79	22:44	1 ⁸ min	660	494
	22:45	" 11 ⁹	738	495
	22:46	" 11 ¹⁰	794	496
	22:47	" 11 ¹¹	805	497
	22:48	" 11 ¹²	815	498
	22:49	" 11 ¹³	825	499
	22:50	1 ¹⁴ min	836	500
	22:51	" 11 ¹⁵	844	501

DATE	TIME	Ratio
	8	61.75
	9	55
	10	49.6
	11	45.2
	12	41.5
	13	38.4
	14	35.7
	15	33.4

DRAWDOWN AND RECOVERY

DATA SHEET 5A

BUBBLER DATA

TIME INTO TEST

READINGS

0 to 5 MIN.
5 to 60 MIN.
1 HR. TO 5 HR.
5 HR. TO 100 HR.
100 HR. TO 500 HR.

QUICKLY AS POSSIBLE
EVERY MINUTE
EVERY 10 MINUTES
EVERY HOUR
EVERY 4 HOURS

DATE	TIME	INTERVAL TIME	BUBBLER GAUGE PSIG #	WELLHEAD PRESS. HEISE GAUGE PSIG #			Ratio
10-12-79	22:52	1 min	# L 9090 848	# L 9395 —	502	16	
1	22:53		852	—	503	17	
1	22:54	1	855	—	504	18	
1	22:55	1	858	—	505	19	20.6
1	22:56	1	860	—	506	20	
1	22:57	1	862	—	507	21	
10-12-79	22:58	1 min	864	—	508	22	
	22:59	1	866	—	509	23	
	23:00	1	869	—	510	24	21.3
	23:01	1	870	—	511	25	
	23:02	1	871	—	512	26	
	23:04	1	872	—	513	27	
	23:05	1	875	—	514	27	
	23:06	1	875	—	515	29	17.8
	23:07	1	878	—	516	30	
10-12-79	23:08	1	879	—	517	31	
	23:09	1	880	—	518	32	
	23:10	1	880	—	519	33	
	23:11	1	881	—	520	34	
	23:12	1	882	—	521	35	17.9

DRAWDOWN AND RECOVERY

DATA SHEET 5A

BUBBLER DATA

TIME INTO TEST

READINGS

0 to 5 MIN.
5 to 60 MIN.
1 HR. TO 5 HR.
5 HR. TO 100 HR.
100 HR. TO 500 HR.

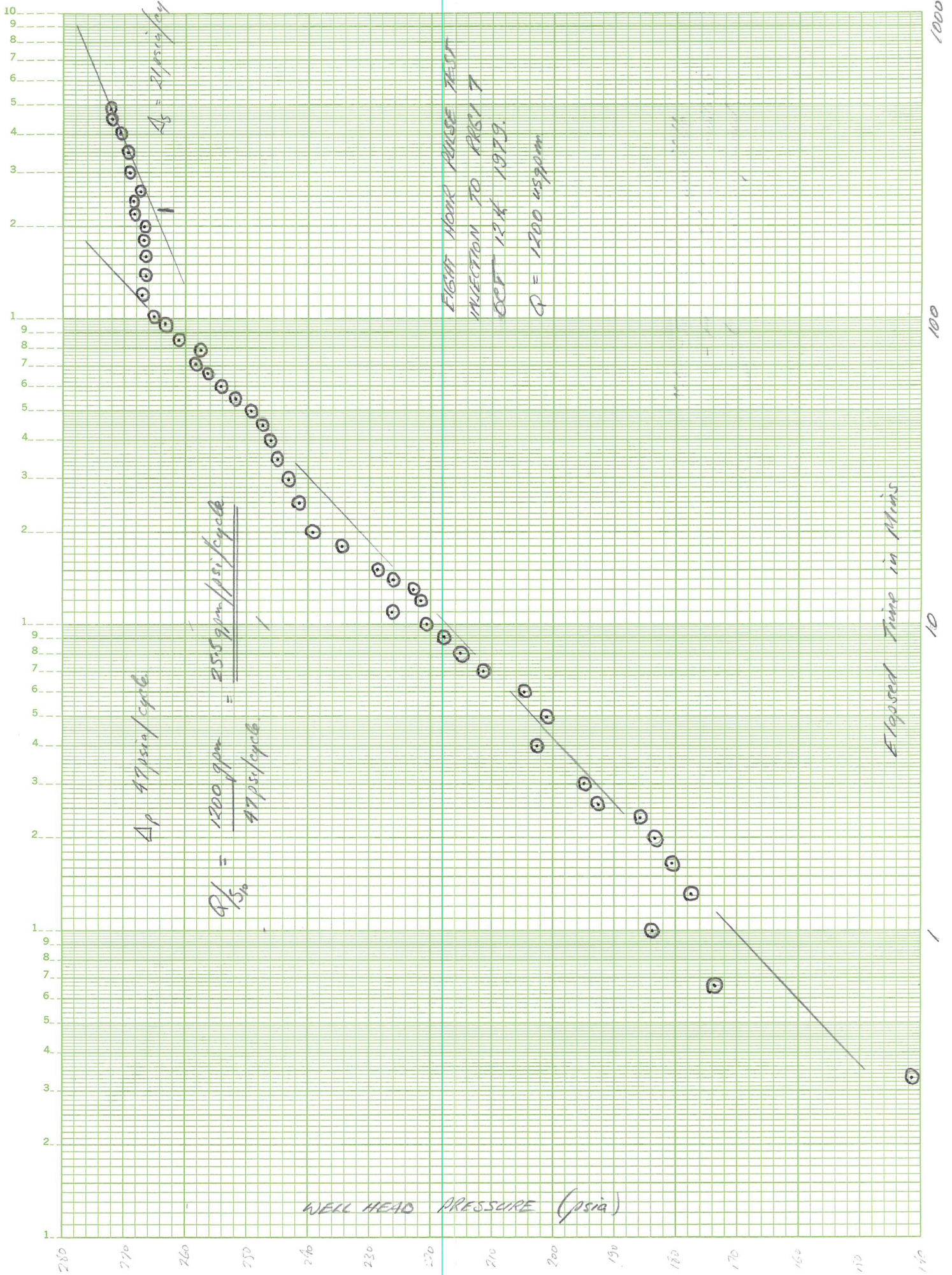
QUICKLY AS POSSIBLE
EVERY MINUTE
EVERY 10 MINUTES
EVERY HOUR
EVERY 4 HOURS

DATE	TIME	INTERVAL TIME	BUBBLER GAUGE PSIG #L9090	WELLHEAD PRESS. HEISE GAUGE PSIG #L9395	t	h	Rate
10/12/79	23:13	1 min	883	-	522	36	
1	23:14	1	884	-	523	37	
1	23:15	1	885	-	524	39	
1	23:16	1	885	-	525	39	13.5
1	23:17	1	886	-	526	40	
1	23:18	1	886	-	527	41	
1	23:19	1	887	-	528	42	
10-12-79	23:20	1 min	889	-	529	43	
1	23:21	1 min	890	-	530	44	12.05
1	23:22	1	890	-	531	45	
1	23:23	1	890	-	532	46	
1	23:24	1	893	-	533	47	
10.12.79	23:25	1 min	893	-	534	48	
1	23:26	1	894	-	535	49	10.9
1	23:27	1	894	-	536	50	
1	23:28	1	895	-	537	51	
1	23:29	1	896	-	538	52	
1	24:00	1	896	-	539	53	
10/13/79	00:10	10 min	902	-	549	63	8.7
00:06	openect well warm up flow						

RRG1-7 RESPONSE TO FET-7-79 ATTEMPT
10-12-79. 8 HOUR PULSE.

$Q = 1200 \text{ gpm.}$

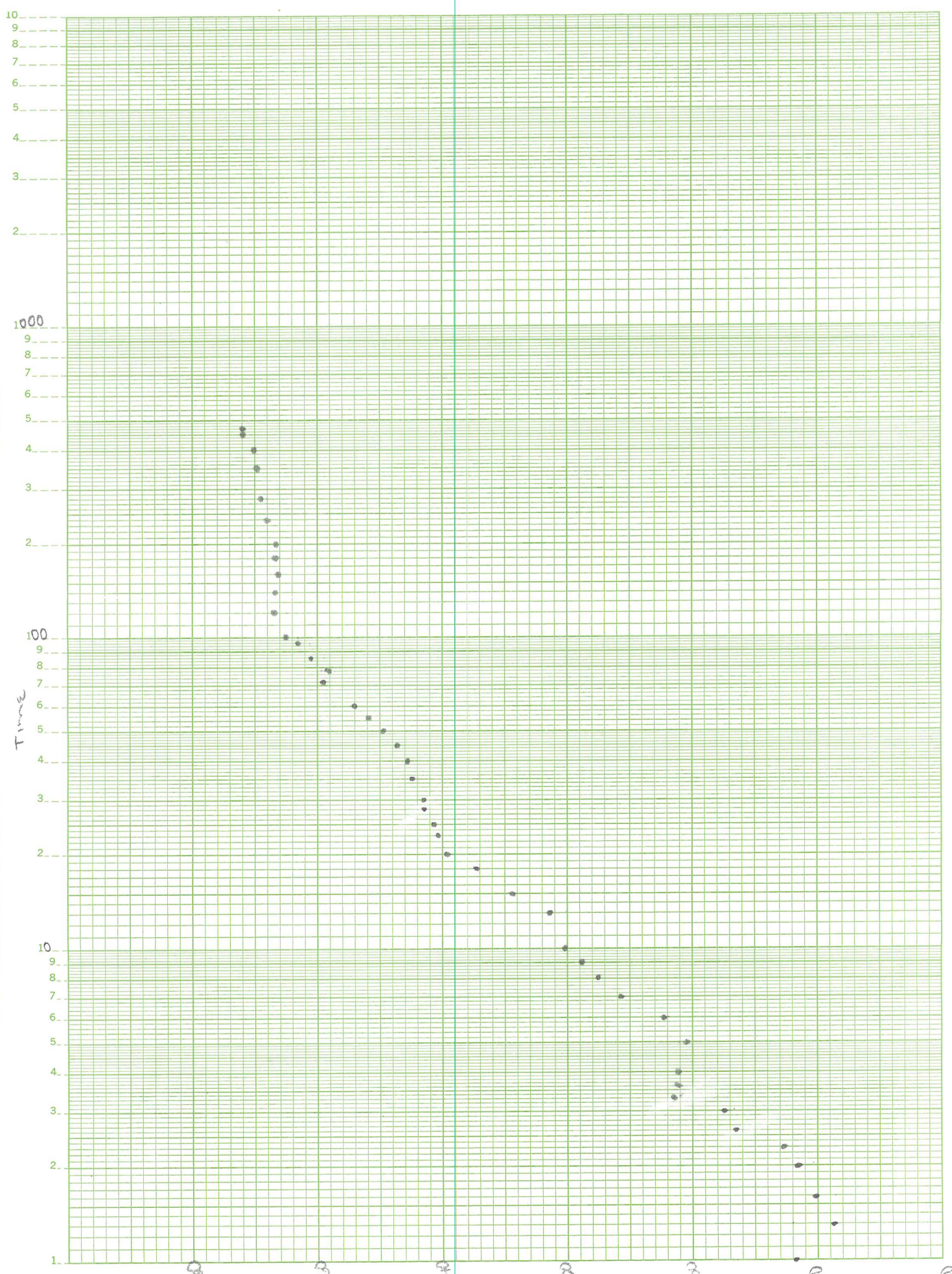
Temp. (inj) stable after ca 120 min., fully stable at 264°F
after 225 min.



RRGI #7 10-12 1433:30

46 6012

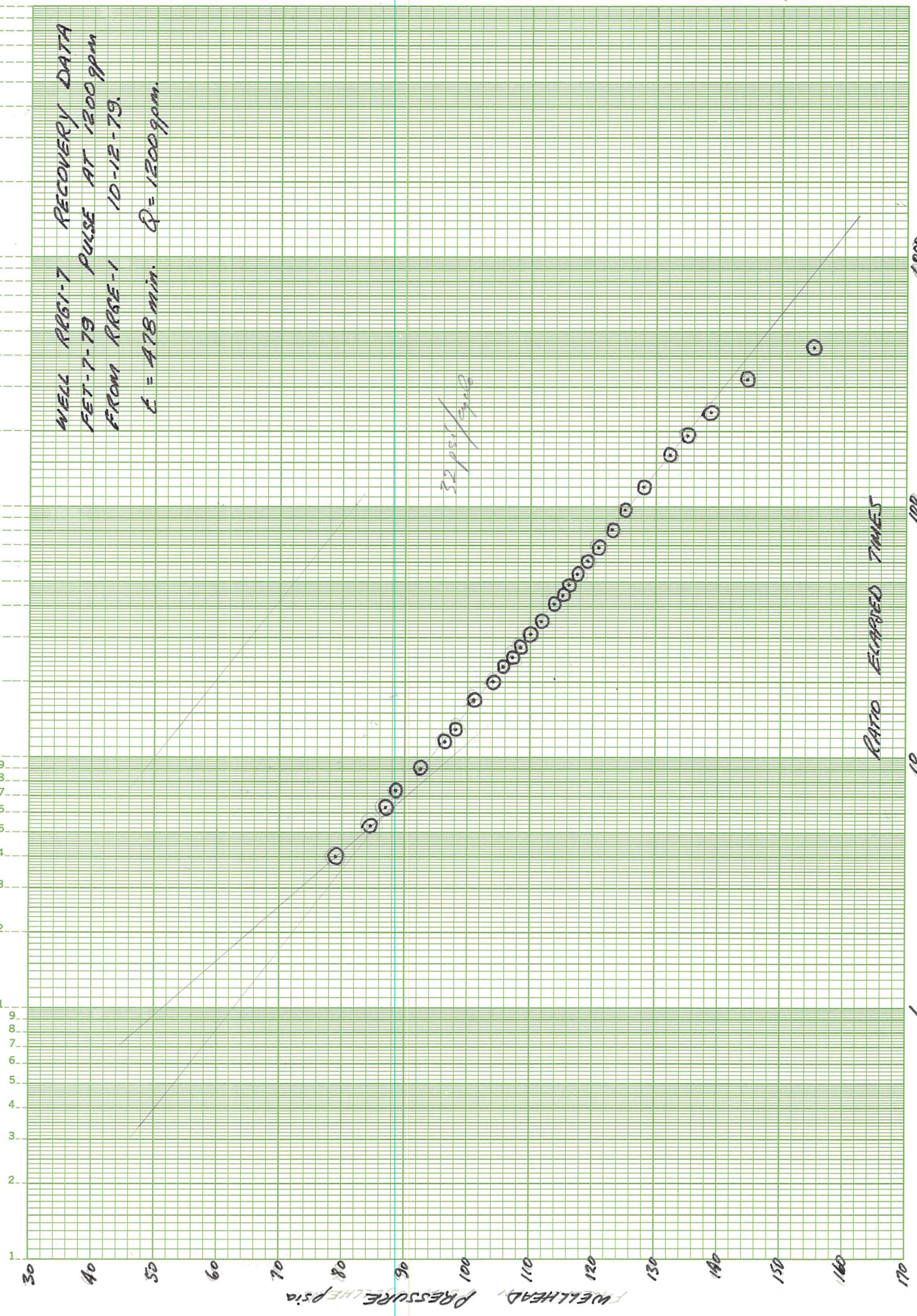
KE SEMI-LOGARITHMIC 4 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.



WHP (POT)

WELL RRG1-7 RECOVERY DATA
FET-7-79 PULSE AT 1200 gpm
FROM RRG1-1 10-12-79.
 $t = 478$ min. $Q = 1200$ gpm.

32 psf / ft²



RATIO ELAPSED TIMES

WELLHEAD PRESSURE psia

RECOVERY DATA RR61-7 (10-12-79) 1WHP 34psia. 8hr Pulse Q=12009pm.

t	t'	k _{ho}	P
478			
479	1	479	155.24
479.5	1.5	320	144.58
480	2	240	138.72
480.5	2.5	192	135.10
481	3	160	132.37
482	4	120	128.32
483	5	97	125.31
484	6	81	122.91
485	7	69	120.90
486	8	61	119.16
487	9	54	117.60
488	10	49	116.22
489	11	44	114.97
490	12	41	113.82
491	13		112.75
492	14	35	111.77
493	15		110.86
494	16	31	110.00
495	17		109.19
496	18	27.5	108.43
497	19		107.71
498	20	25	107.03
499	21		106.39
500	22	23	105.77
501	23		105.18
502	24		104.61
503	25	20	104.06
504	26		103.54
505	27		103.04
506	28		102.54
507	29		102.07
508	30	17	101.61
513	35		99.54
518	40	13	97.77
523	45	11.6	96.24
528	50		94.83
538	60	9	92.43
548	70		90.37
558	80	7.35	88.58
568	90	6.3	86.99
578	100		85.57
588	110	5.3	84.27
598	120		83.07
608	130		81.95
618	140		80.92
628	150		79.95
638	160	4	79.03
648	170		78.17

Pump off 22:37.