FLUID SAMPLE DATA

Sampler Pressure 0 P.S.I.G. at Surface
Recovery: Cu. Ft. Gas 0
cc. Oil 45 2.5%
cc. Water
cc. Mud 1755 97.5%
Tot. Liquid cc. 1800
Gravity ° API @ °F.
Gas/Oil Ratio cu. ft./bbl.

		RESISTIVITY		CHLORIDE CONTENT
Recovery Water	@ °F.			ppm
Recovery Mud	.112 @ 54	°F.	56,500	ppm
Recovery Mud Filtrate	.082 @ 54	°F.	91,500	ppm
Mud Pit Sample	@	°F.		ppm
Mud Pit Sample Filtrate	@	°F.		ppm

Mud Weight 9.4 vis 46 sec

Date 3-1-78 Ticket Number 334122
Kind of Job OPEN HOLE Halliburton District GREAT BEND
Tester MR. BRACK Witness MR. DOUGHERTY MR. HUNZEKER
Drilling Contractor RED TIGER DRILLING COMPANY BC S

EQUIPMENT & HOLE DATA

Formation Tested Kansas City
Elevation 1827' KB Ft.
Net Productive Interval Ft.
All Depths Measured From Kelly Bushing
Total Depth 3122' Ft.
Main Hole/Casing Size 7 7/8"
Drill Collar Length 1156' WP I.D. 2.764"
Drill Pipe Length 1903' I.D. 3.826"
Packer Depth(s) 3086' - 3092' Ft.
Depth Tester Valve 3069' Ft.

Cushion TYPE AMOUNT Ft. Depth Back Pres. Valve Surface Choke 1/8" Bottom Choke 3/4"

Recovered 45 Feet of Drilling mud with a show of oil
Recovered Feet of
Recovered Feet of
Recovered Feet of
Recovered Feet of

Remarks SEE PRODUCTION TEST DATA SHEET.

TEMPERATURE	Gauge No. 6176 Depth: 3070' Ft.	Gauge No. 6175 Depth: 3118' Ft.	Gauge No. Depth: Ft.	TIME
	12 Hour Clock	12 Hour Clock	Hour Clock	Tool Opened 0640 A.M. P.M.
Est. °F.	Blanked Off -	Blanked Off YES	Blanked Off	Opened A.M.
3117' Actual 96 °F.	Pressures	Pressures	Pressures	Bypass 1053 P.M.

	Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic		1591	1619	1621				
First Period Flow Initial		11	30	39			—	—
First Period Flow Final		13	30	40			11	13
First Period Closed in		81	111	104			62	60
Second Period Flow Initial		18	30	45			—	—
Second Period Flow Final		21	40	43			60	63
Second Period Closed in		77	111	101			120	117
Third Period Flow Initial							—	—
Third Period Flow Final								
Third Period Closed in								
Final Hydrostatic		1566	1619	1600			—	—

Legal Location Sec. - Twp. - Rng. SW SW SW 1 - 19S - 12W
Lease Name HEINS "B"
Well No. B
Test No. 1
Tested Interval 3092' - 3122'
Lease Owner/Company Name SOHIO PETROLEUM COMPANY
Field Area
County BARTON
State KANSAS
Mea. From Tester Valve

FORM 181-R2—PRINTED IN U.S.A.

FORMATION TEST DATA

LITTLE'S 102548 5M 9/76

7

Casing perfs._____ Bottom choke_____ Surf. temp_____ °F Ticket No. 334122

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
2350					Called out, ready now
0110					On location, made short trip
0450					Picked up and made up tool
0515					Started tool in hole
0636					Tool on bottom, no trouble
0640					Tool opened with a weak blow, increas-
					ing some throughout
0651					Closed tool
0753					Opened tool with a weak blow throughout
0853					Closed tool
1053					Tools off bottom, hydrospring closed
1210					Tool out of hole

FORM 182-R1—PRINTED IN U.S.A.

PRODUCTION TEST DATA

LITTLE'S 96672 5M 8/74

7

Gauge No.	6176	Depth	3070'	Clock No.	7098	12 hour	Ticket No.	334122

	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"	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	11	.0000		13	.0000	18	.0000		21					
1	.0730	13	.0406		22	.4200	21	.0588		26*					
2			.0812		31			.1371		32					
3			.1218		40			.2155		39					
4			.1624		47			.2938		44					
5			.2030		54			.3722		50					
6			.2436		60			.4506		56					
7			.2842		66			.5289		61					
8			.3248		71			.6073		67					
9			.3654		76			.6856		72					
10			.4060		81			.7640		77					
11															
12															
13															
14															
15															

Gauge No.	6175	Depth	3118'	Clock No.	6947	12 hour					
0	.0000	39	.0000		40	.0000	45	.0000		43					
1	.0860	40	.0405		48	.4260	43	.0609		48*					
2			.0810		58			.1422		56					
3			.1215		65			.2234		62					
4			.1620		73			.3046		67					
5			.2025		79			.3858		73					
6			.2430		85			.4671		78					
7			.2835		90			.5483		84					
8			.3240		96			.6295		89					
9			.3645		100			.7108		95					
10			.4050		104			.7920		101					
11															
12															
13															
14															
15															
Reading Interval			6					12							Minutes

REMARKS: *Interval = 9 minutes

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SPECIAL PRESSURE DATA

LITTLE'S 96673 75C 8/74

TICKET NO. 334122



	O. D.	I. D.	LENGTH	DEPTH
Drill Pipe or Tubing				
Reversing Sub	6.25"	2.75"	1'	
Water Cushion Valve				
Drill Pipe	4.50"	3.826"	1903'	
Drill Collars	4.50" WP	2.764"	1156'	
Handling Sub & Choke Assembly				
Dual CIP Valve				
Dual CIP Sampler	5"	.87"	6'	3060'
Hydro-Spring Tester	5"	.75"	5'	3069'
Multiple CIP Sampler				
Extension Joint				
AP Running Case	5"	3.75"	4'	3070'
Hydraulic Jar	5"	1.75"	5'	
VR Safety Joint	5"	1"	2.85'	
Pressure Equalizing Crossover				
Packer Assembly	6.75"	1.53"	5.85'	3086'
Distributor				
Packer Assembly	6.75"	1.53"	5.85'	3092'
Flush Joint Anchor				
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case				
Drill Collars				
Anchor Pipe Safety Joint				
Packer Assembly				
Distributor				
Packer Assembly				
Anchor Pipe Safety Joint				
Side Wall Anchor				
Drill Collars				
Flush Joint Anchor	5"	3.84"	22'	
Blanked-Off B.T. Running Case With Temp. Case	5"	2.75"	6'	3118'
Total Depth				3122'

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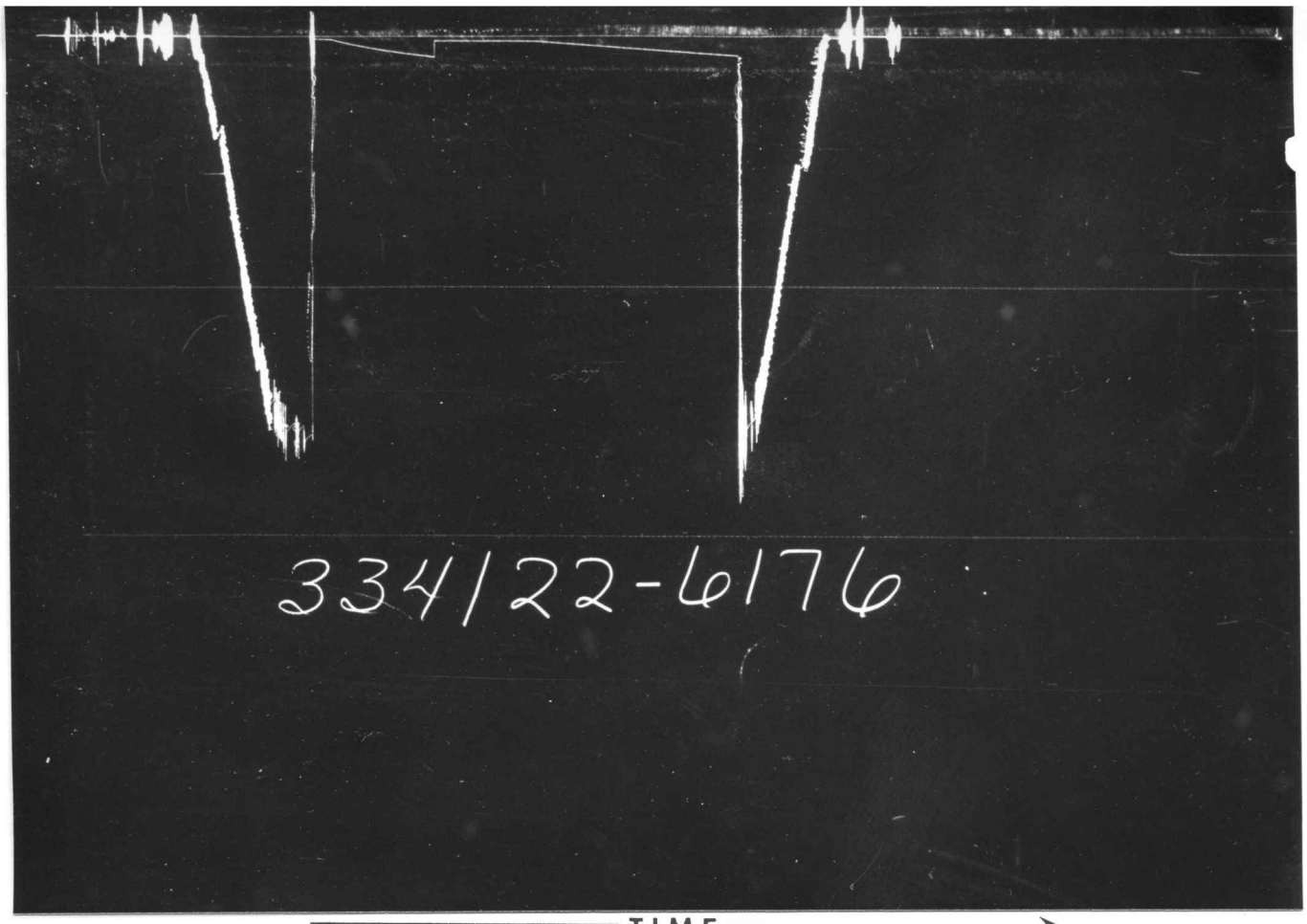
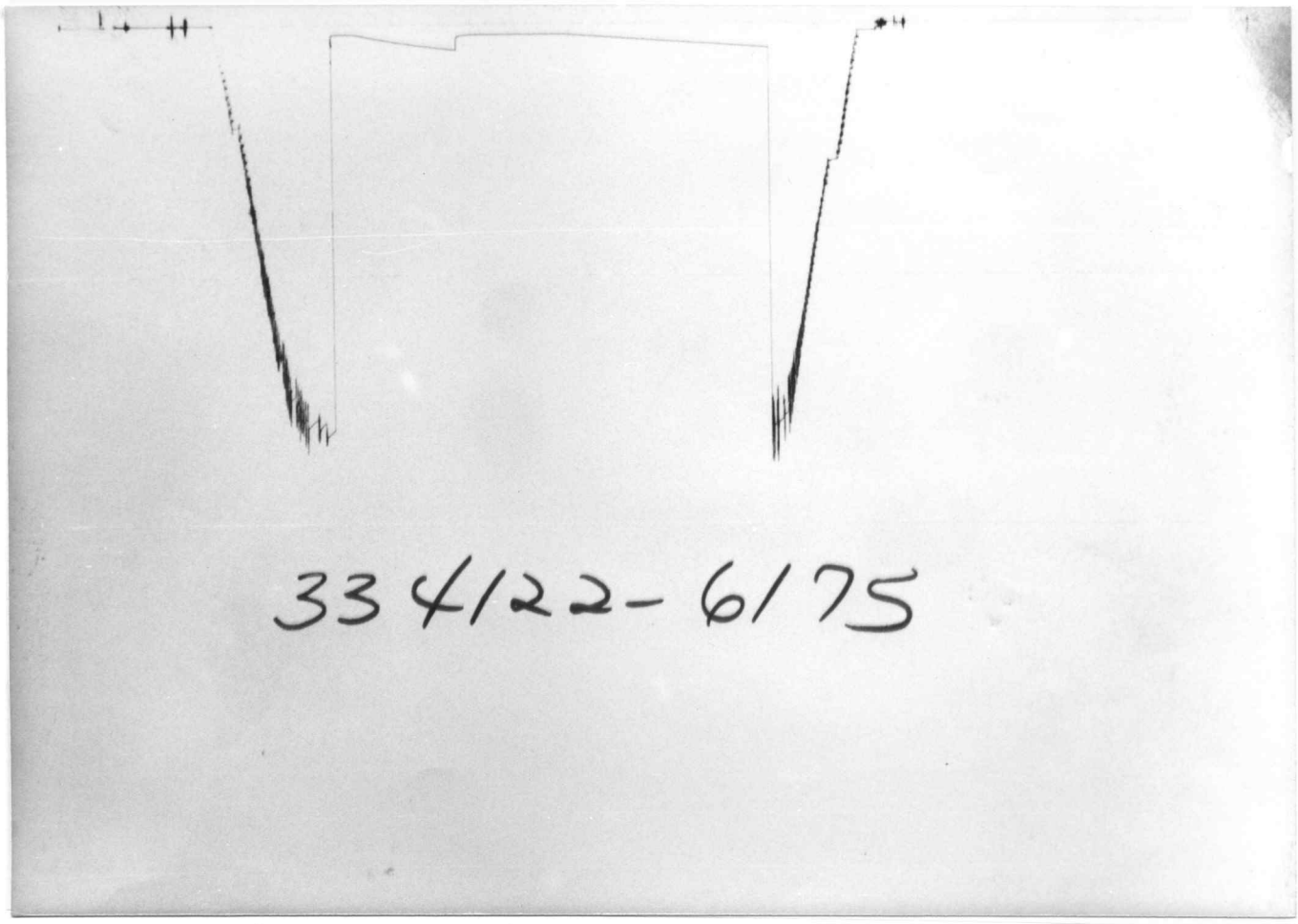
EQUIPMENT DATA

LITTLE'S 96676 75C 8/74

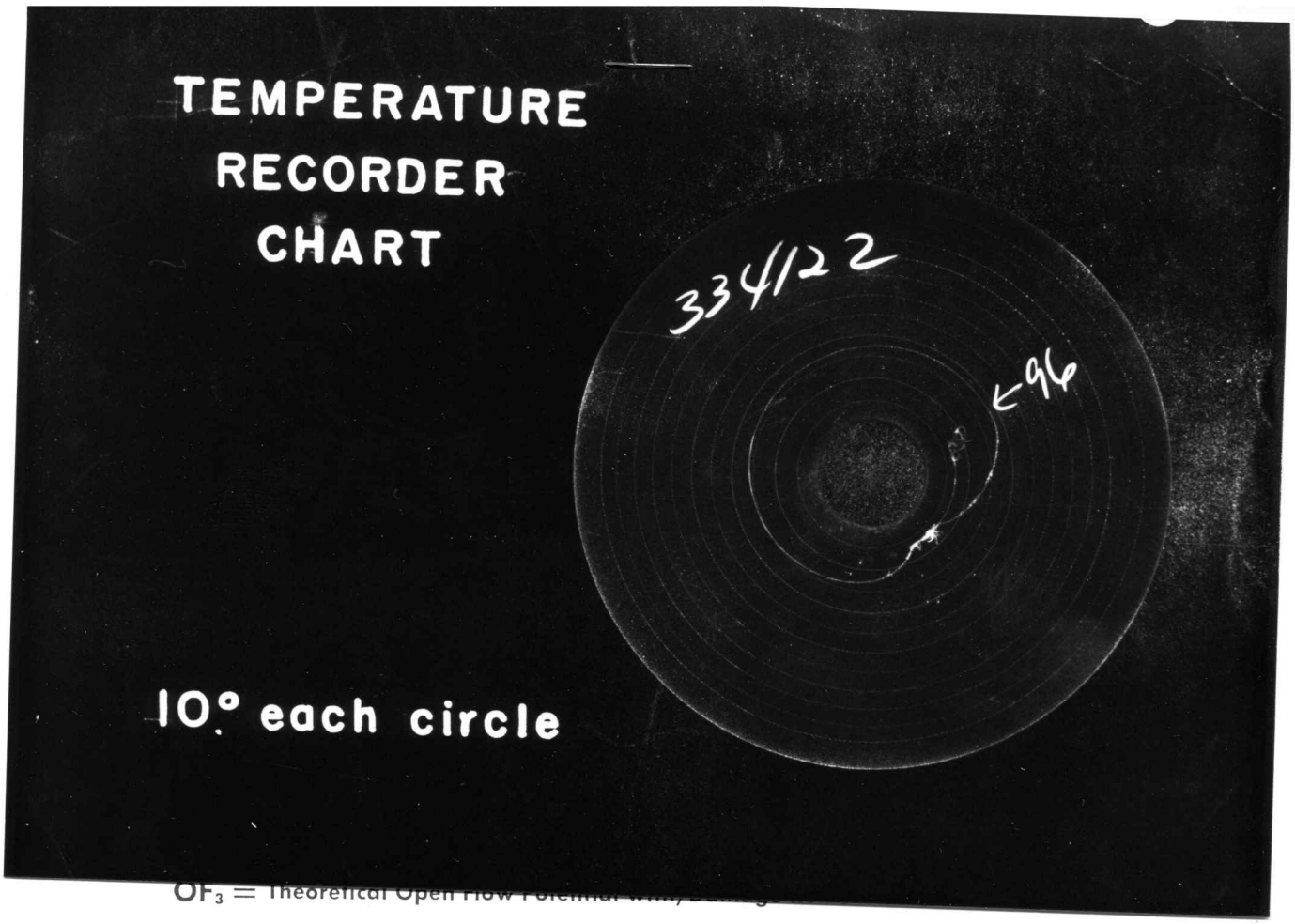


PRESSURE

TIME



Each Horizontal Line Equal to 1000 p.s.i.



OF_3 = Theoretical Open Flow Potential with/Damage

OF_4 = Theoretical Open Flow Potential with/Damage Removed Min. .... MCF/D

P_s = Extrapolated Static Pressure ..... Psig.

P_F = Final Flow Pressure ..... Psig.

P_{ot} = Potentiometric Surface (Fresh Water *) ..... Feet

Q = Average Adjusted Production Rate During Test ..... bbls/day

Q_1 = Theoretical Production w/Damage Removed ..... bbls/day

Q_g = Measured Gas Production Rate ..... MCF/D

R = Corrected Recovery ..... bbls

r_w = Radius of Well Bore ..... Feet

t = Flow Time ..... Minutes

t_o = Total Flow Time ..... Minutes

T = Temperature Rankine ..... °R

Z = Compressibility Factor ..... ——

μ = Viscosity Gas or Liquid ..... CP

Log = Common Log

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

FLUID SAMPLE DATA

Sampler Pressure _____ P.S.I.G. at Surface
Recovery: Cu. Ft. Gas _____
cc. Oil 92 5.5%
cc. Water _____
cc. Mud 1558 94.5%
Tot. Liquid cc. 1650
Gravity _____ ° API @ _____ °F.
Gas/Oil Ratio _____ cu. ft./bbl.

			RESISTIVITY		CHLORIDE CONTENT
Recovery Water	_____	@ _____	°F.	_____	ppm
Recovery Mud	.119	@ 49	°F.	63500	ppm
Recovery Mud Filtrate	.075	@ 49	°F.	81000	ppm
Mud Pit Sample	_____	@ _____	°F.	_____	ppm
Mud Pit Sample Filtrate	_____	@ _____	°F.	_____	ppm

Mud Weight 9.4 vis 44 sec

Date 3-2-78 Ticket Number 334123
Kind of Job OPEN HOLE Halliburton District GREAT BEND
Tester MR. BRACK Witness MR. HUNZEKER
Drilling Contractor RED TIGER DRILLING COMPANY BJ S

EQUIPMENT & HOLE DATA

Formation Tested Kansas City
Elevation 1827' KB Ft.
Net Productive Interval - Ft.
All Depths Measured From Kelly Bushing
Total Depth 3200' Ft.
Main Hole/Casing Size 7 7/8"
Drill Collar Length 1156' WP I.D. 2.764"
Drill Pipe Length 1995' I.D. 3.826"
Packer Depth(s) 3180' 3186' Ft.
Depth Tester Valve 3163' Ft.

Cushion TYPE AMOUNT Ft. Depth Back Pres. Valve
Surface Choke 1/4" Bottom Choke 3/4"

Recovered 45 Feet of drilling mud with show of oil.
Recovered Feet of
Recovered Feet of
Recovered Feet of
Recovered Feet of

Remarks SEE PRODUCTION TEST DATA SHEET....

TEMPERATURE	Gauge No. 6176	Gauge No. 6175	Gauge No.	TIME
	Depth: 3164' Ft.	Depth: 3196' Ft.	Depth: Ft.	
	12 Hour Clock	12 Hour Clock	Hour Clock	Tool Opened 0337 A.M. P.M.
Est. °F.	Blanked Off NO	Blanked Off YES	Blanked Off	
3195' Actual 97 °F.	Pressures	Pressures	Pressures	Opened Bypass 0747 A.M. P.M.

		Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic				1650	1630				
First Period	Flow Initial			20	32			———	———
	Flow Final			30	32			10	
	Closed in			161	167			60	
Second Period	Flow Initial	CHART NOT		30	36			———	———
	Flow Final	INSTALLED		40	38			60	
	Closed in	IN GAUGE....		181	177			120	
Third Period	Flow Initial							———	———
	Flow Final								
	Closed in								
Final Hydrostatic				1650	1630			———	———

Legal Location Sec. - Twp. - Rng. SW SW SW 1 19S 12W
Lease Name HEINZ
Well No. 6
Test No. 2
Tested Interval 3186' to 3200'
Lease Owner/Company Name SOHIO PETROLEUM COMPANY
Field Area
County BARTON
State KANSAS
Mea. From Tester Valve

FORM 181-R2—PRINTED IN U.S.A.

FORMATION TEST DATA

LITTLE'S 102548 5M 9/76

7-T

Casing perfs.____ Bottom choke____ Surf. temp____ °F Ticket No. 334123

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
2355					Called out, ready now.
0120					On location. Coming out for DST #2.
0150					Picked up and made up tools.
0210					Started tool in hole.
0333					Tool on bottom. No trouble.
0337					Opened tool with a weak blow, increasing
0347					Closed tool.
0447					Reopened tool with a weak to fair blow
					throughout flow period.
0547					Closed tool.
0747					Tool off bottom. Hydrospring closed.
0900					Tool out of hole.

FORM 182-R1—PRINTED IN U.S.A.

PRODUCTION TEST DATA

LITTLE'S 96672 5M 8/74

TICKET NO. 334123

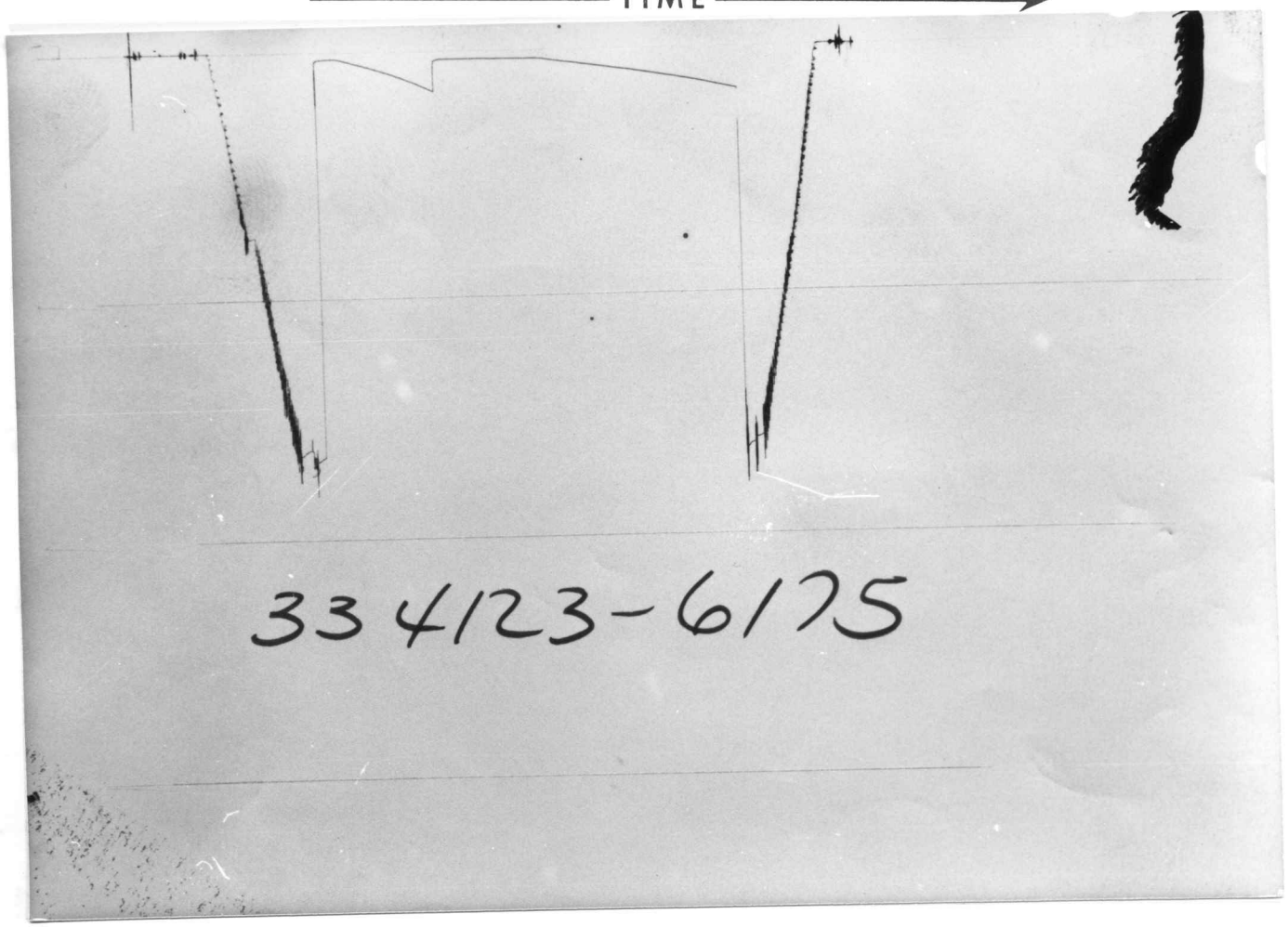


	O. D.	I. D.	LENGTH	DEPTH
Drill Pipe or Tubing				
Reversing Sub	6.00"	2.75"	1.00'	
Water Cushion Valve				
Drill Pipe	4.50"	3.826"	1995'	
Drill Collars WEIGHT PIPE	4.50"	2.764"	1156'	
Handling Sub & Choke Assembly				
Dual CIP Valve				
Dual CIP Sampler	5.00"	.87"	7.00'	3154'
Hydro-Spring Tester	5.00"	.75"	5.00'	3163'
Multiple CIP Sampler				
Extension Joint				
AP Running Case	5.00"	3.75"	4.00'	3164'
Hydraulic Jar	5.00"	1.75"	5.00'	
VR Safety Joint	5.00"	1.00"	2.85'	
Pressure Equalizing Crossover				
Packer Assembly	6.75"	1.53"	5.85'	3180'
Distributor				
Packer Assembly	6.75"	1.53"	5.85'	3186'
Flush Joint Anchor				
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case				
Drill Collars				
Anchor Pipe Safety Joint				
Packer Assembly				
Distributor				
Packer Assembly				
Anchor Pipe Safety Joint				
Side Wall Anchor				
Drill Collars				
Flush Joint Anchor	5.00"	3.84"	7.00'	
Blanked-Off B.T. Running Case	5.00"	2.75"	5.50'	3196'
Total Depth				3200'

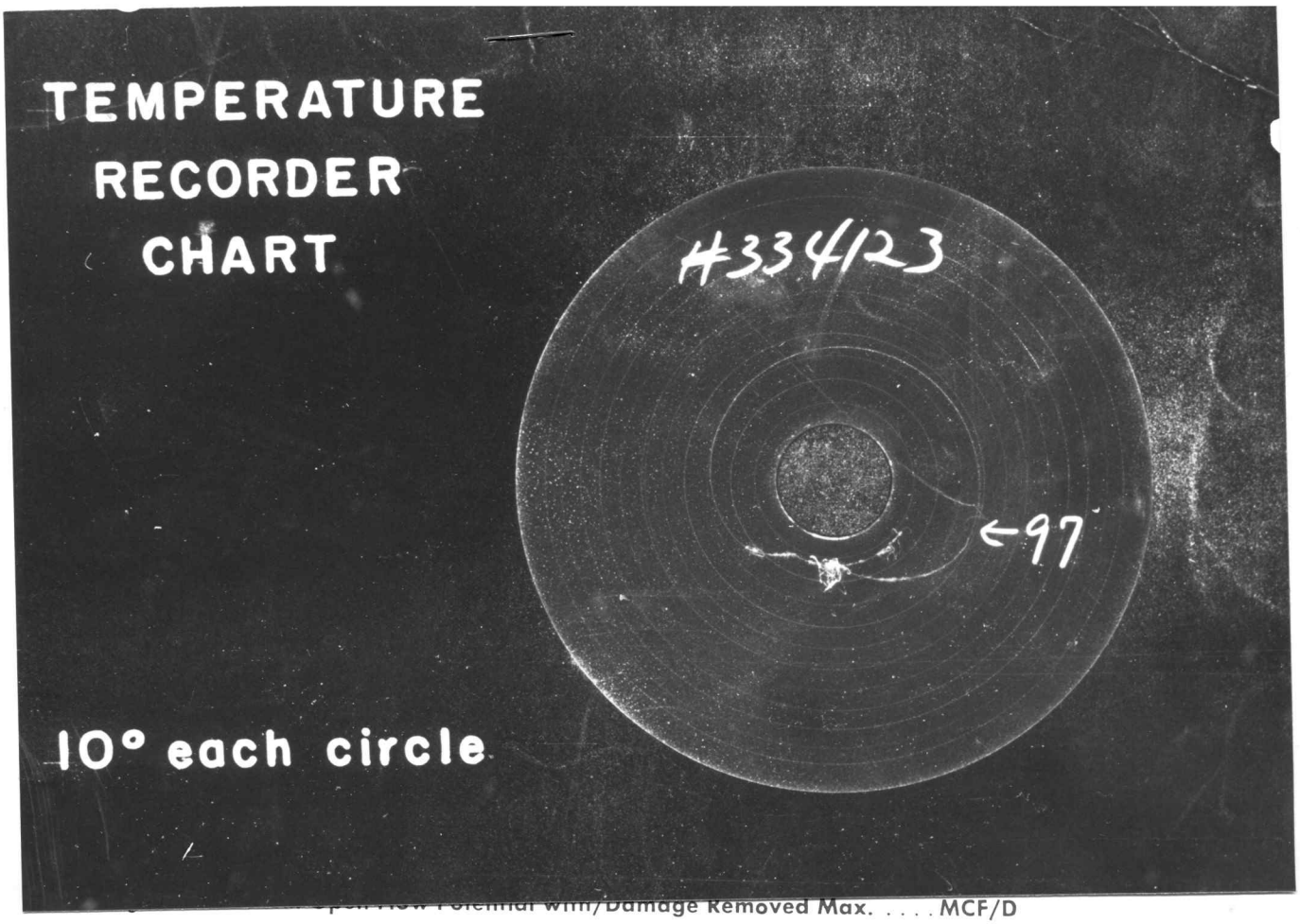
EQUIPMENT DATA

PRESSURE

TIME



Each Horizontal Line Equal to 1000 p.s.i.



OF_4 = Theoretical Open Flow Potential with/Damage Removed Min. ..... MCF/D

P_s = Extrapolated Static Pressure ..... Psig.

P_F = Final Flow Pressure ..... Psig.

P_{ot} = Potentiometric Surface (Fresh Water *) ..... Feet

Q = Average Adjusted Production Rate During Test ..... bbls/day

Q_1 = Theoretical Production w/Damage Removed ..... bbls/day

Q_g = Measured Gas Production Rate ..... MCF/D

R = Corrected Recovery ..... bbls

r_w = Radius of Well Bore ..... Feet

t = Flow Time ..... Minutes

t_o = Total Flow Time ..... Minutes

T = Temperature Rankine ..... °R

Z = Compressibility Factor ..... ——

μ = Viscosity Gas or Liquid ..... CP

Log = Common Log

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

FLUID SAMPLE DATA

Sampler Pressure 0 P.S.I.G. at Surface
Recovery: Cu. Ft. Gas 0
cc. Oil 0
cc. Water 0
cc. Mud 2100
Tot. Liquid cc. 2100
Gravity ____ ° API @ ____ °F.
Gas/Oil Ratio ____ cu. ft./bbl.

		RESISTIVITY		°F.	CHLORIDE CONTENT	
Recovery Water	____	@	____	°F.	____	ppm
Recovery Mud	.123	@	40	°F.	59,500	ppm
Recovery Mud Filtrate	.130	@	40	°F.	57,000	ppm
Mud Pit Sample	____	@	____	°F.	____	ppm
Mud Pit Sample Filtrate	____	@	____	°F.	____	ppm

Mud Weight 9.3 vis 43 sec

Date 3-3-78 Ticket Number 334124
Kind of Job OPEN HOLE Halliburton District GREAT BEND
Tester BRACK Witness DOUGHERTY HUNZEKER
Drilling Contractor RED TIGER DRILLING COMPANY NM

EQUIPMENT & HOLE DATA

Formation Tested Conglomerate
Elevation 1827' K.B. Ft.
Net Productive Interval - Ft.
All Depths Measured From Kelly B ushing
Total Depth 3392' Ft.
Main Hole/Casing Size 7 7/8"
Drill Collar Length WP 1156' I.D. 2.764" WP
Drill Pipe Length 2158' I.D. 3.826"
Packer Depth(s) 3341' - 3347' Ft.
Depth Tester Valve 3324' Ft.

Cushion TYPE NONE AMOUNT Ft. Depth Back Pres. Valve NONE Surface Choke 1/8" Bottom Choke 3/4"

Recovered 30' Feet of drilling mud - no show
Recovered Feet of
Recovered Feet of
Recovered Feet of
Recovered Feet of

Remarks SEE PRODUCTION TEST DATA SHEET...

TEMPERATURE	Gauge No. 6176 Depth: 3325' Ft.	Gauge No. 6175 Depth: 3388' Ft.	Gauge No. Depth: Ft.	TIME
	12 Hour Clock	12 Hour Clock	Hour Clock	Tool Opened 1533 A.M. P.M.
Est. °F.	Blanked Off -	Blanked Off -	Blanked Off	
3387' @ Actual 95 °F.	Pressures	Pressures	Pressures	Opened A.M. Bypass 1814 P.M.

		Field	Office	Field	Office	Field	Office	Reported Minutes	Computed Minutes
Initial Hydrostatic		-	1715	-	1745				
First Period	Flow Initial	-	19	-	88			____	____
	Flow Final	-	19	-	53			11	
	Closed in	-	221	-	247			60	
Second Period	Flow Initial	-	25	-	76			____	____
	Flow Final	-	25	-	60			30	
	Closed in	-	103	-	132			60	
Third Period	Flow Initial							____	____
	Flow Final								
	Closed in								
Final Hydrostatic		-	1692	-	1730			____	____

Legal Location Sec. - Twp. - Rng. SW SW SW 1 - 19S - 12W
Lease Name HEINZ "B"
Well No. 6
Test No. 3
Field Area -
Tested Interval 3347' - 3392'
County BARTON
State KANSAS
Lease Owner/Company Name SOHIO PETROLEUM COMPANY
Mea. From Tester Valve

FORM 181-R2—PRINTED IN U.S.A.

FORMATION TEST DATA

LITTLE'S 102548 5M 9/76

7

Casing perfs._____ Bottom choke_____ Surf. temp_____ °F Ticket No. 334124

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
0900					Called out - ready now.
1000					On location circulating.
1345					Picked up and made up the tool.
1405					Started tool in the hole.
1517					Tool tagged up 4' high - slid to the
					bottom.
1533					Hydrospring opened - weak blow.
1544					Closed for the first closed in pressure.
1644					Reopened tool with a weak blow - and
					decreasing - died in 25 minutes.
1714					Closed tool for the second CIP.
1814					Tool off bottom - hydrospring closed.
1945					Tool out of the hole..

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PRODUCTION TEST DATA

LITTLE'S 96672 5M 8/74

TICKET NO. 334124



	O. D.	I. D.	LENGTH	DEPTH
Drill Pipe or Tubing				
Reversing Sub	6.00"	2.75"	1.00'	
Water Cushion Valve				
Drill Pipe	4.50"	3.826"	2158'	
Drill Collars WEIGHT PIPE **********	4.50"	2.764"	1156' WEIGHT PIPE	
Handling Sub & Choke Assembly				
Dual CIP Valve	5.00"	.87"	6.00'	3315'
Dual CIP Sampler				
Hydro-Spring Tester	5.00"	.75"	5.00'	3324'
Multiple CIP Sampler				
Extension Joint				
AP Running Case	5.00"	3.75"	4.00'	3325'
Hydraulic Jar	5.00"	1.75"	5.00'	
VR Safety Joint	5.00"	1.00"	2.85'	
Pressure Equalizing Crossover				
Packer Assembly	6.75"	1.53"	5.85'	3341'
Distributor				
Packer Assembly	6.75"	1.53"	5.85'	3347'
Flush Joint Anchor				
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case				
Drill Collars				
Anchor Pipe Safety Joint				
Packer Assembly				
Distributor				
Packer Assembly				
Anchor Pipe Safety Joint				
Side Wall Anchor				
Drill Collars				
Flush Joint Anchor	5.00"	3.84"	38.00'	
Blanked-Off B.T. Running Case w/temp case	5.00"	2.75"	5.50'	3388'
Total Depth				3392'

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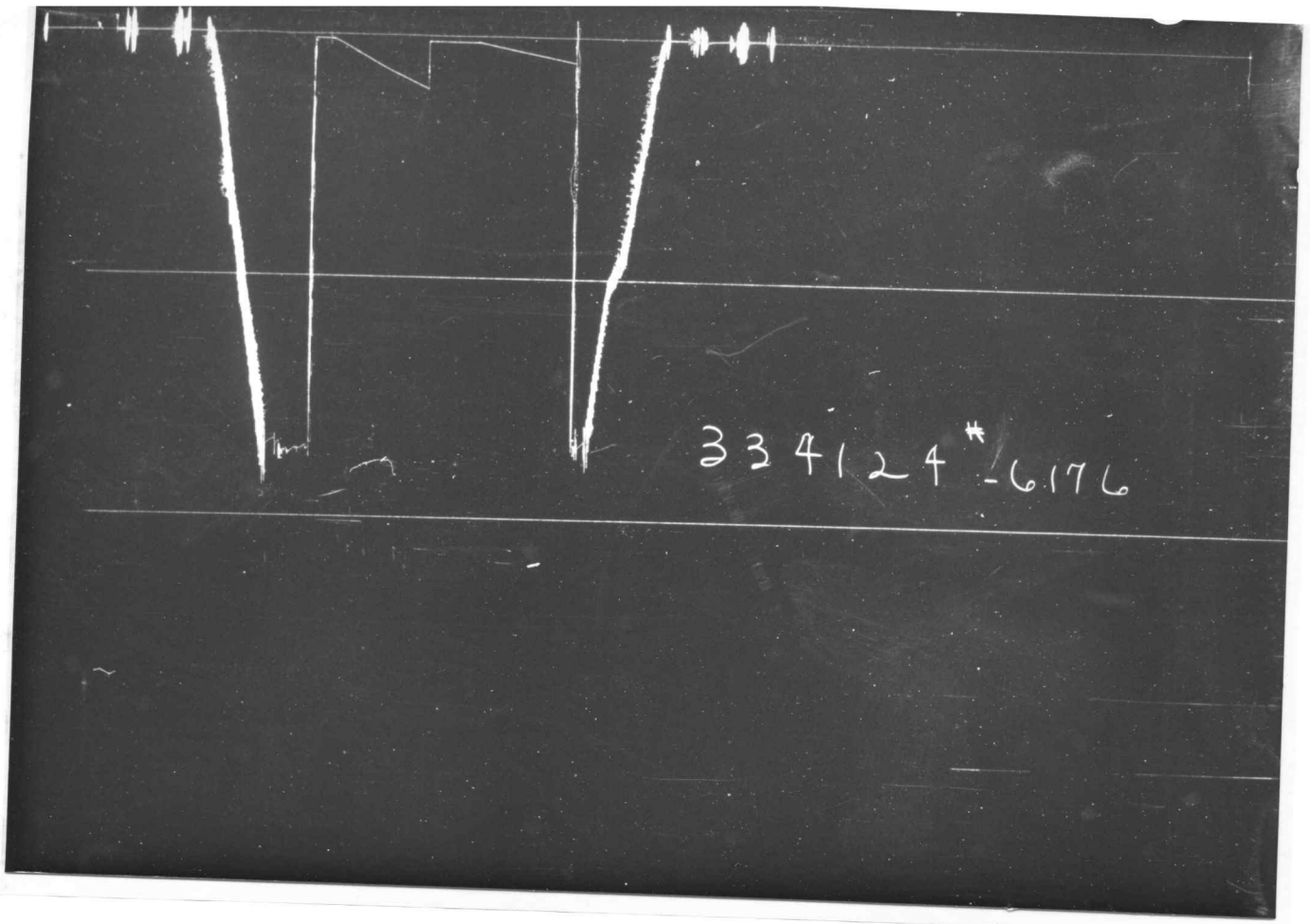
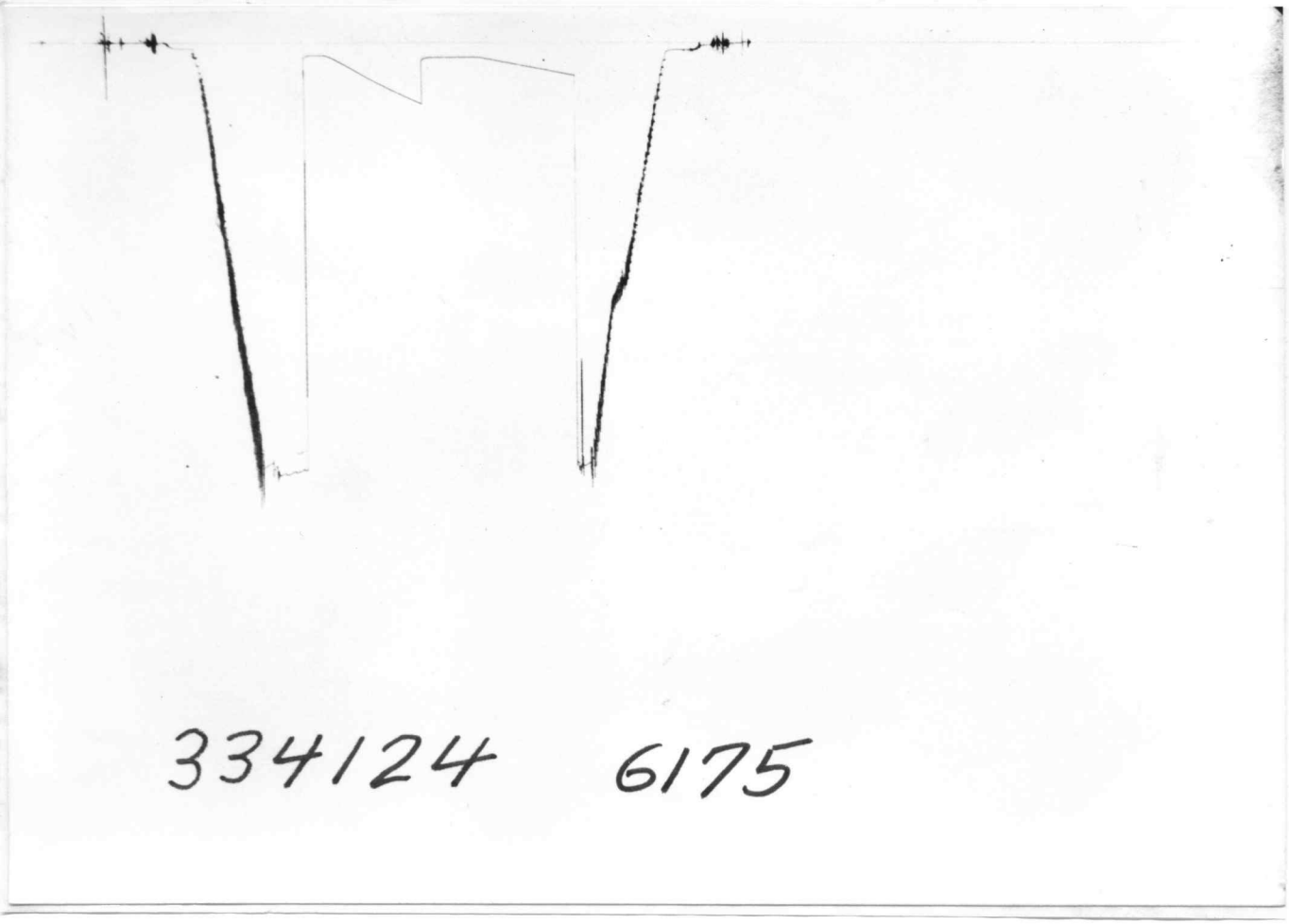
EQUIPMENT DATA

LITTLE'S 96676 75C 8/74

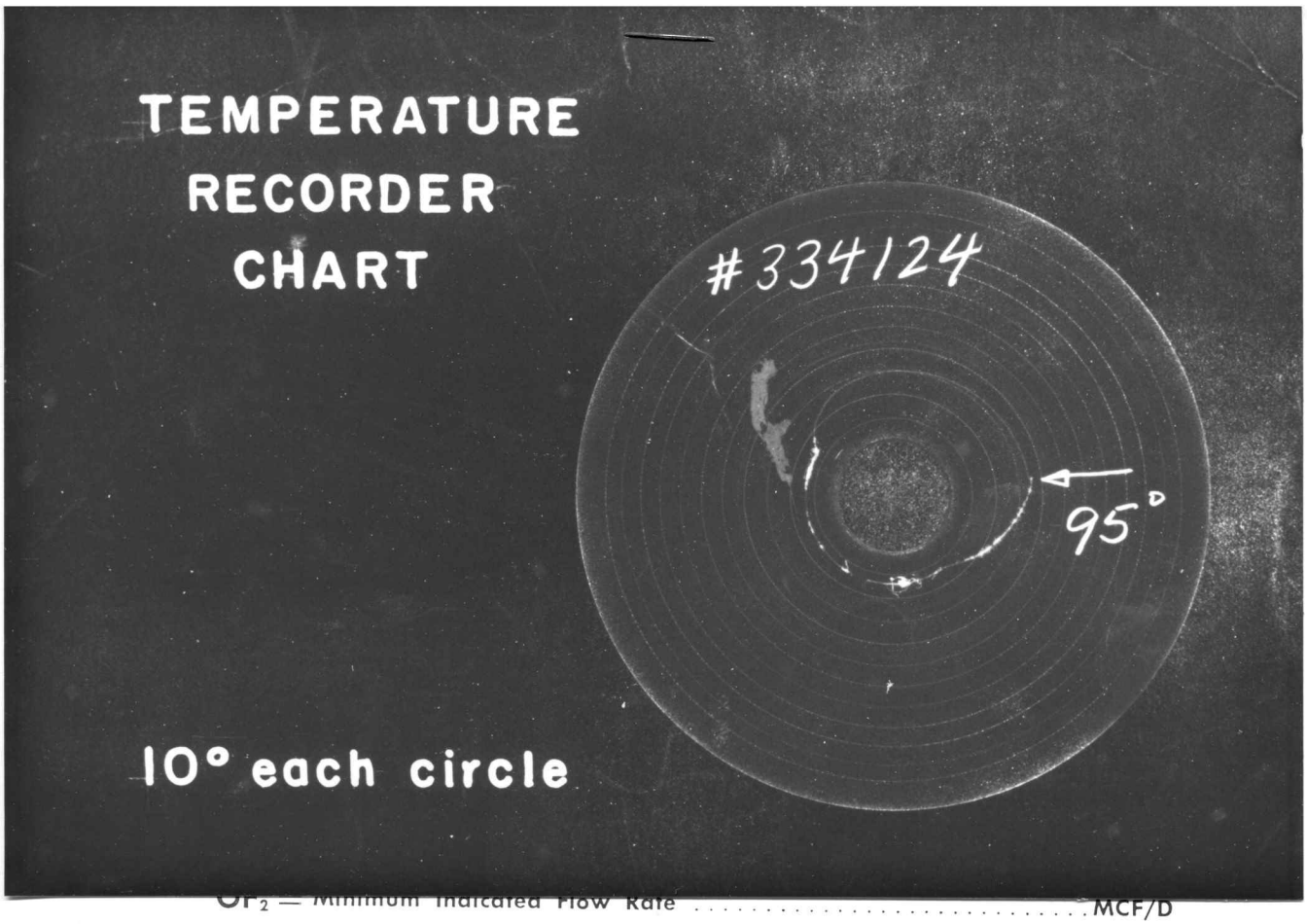


PRESSURE

TIME



Each Horizontal Line Equal to 1000 p.s.i.



OF_2 = Minimum Indicated Flow Rate ..... MCF/D

OF_3 = Theoretical Open Flow Potential with/Damage Removed Max. .... MCF/D

OF_4 = Theoretical Open Flow Potential with/Damage Removed Min. .... MCF/D

P_s = Extrapolated Static Pressure ..... Psig.

P_F = Final Flow Pressure ..... Psig.

P_{ot} = Potentiometric Surface (Fresh Water *) ..... Feet

Q = Average Adjusted Production Rate During Test ..... bbls/day

Q_1 = Theoretical Production w/Damage Removed ..... bbls/day

Q_g = Measured Gas Production Rate ..... MCF/D

R = Corrected Recovery ..... bbls

r_w = Radius of Well Bore ..... Feet

t = Flow Time ..... Minutes

t_o = Total Flow Time ..... Minutes

T = Temperature Rankine ..... °R

Z = Compressibility Factor ..... ——

μ = Viscosity Gas or Liquid ..... CP

Log = Common Log

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