



JOHNSTON TESTERS

A WORLD OF EXPERIENCE

DRILL STEM TEST SPECIAL DATA ANALYSIS

FIELD REPORT #62524 L

JUNE 8, 1962

THIS APPEARS TO BE A GOOD FORMATION TEST AND A GOOD MECHANICAL TEST. THE TEST WAS CONDUCTED IN SUCH A MANNER THAT THE DATA OBTAINED SHOULD BE ADEQUATE FOR RELIABLE ANALYSIS.

1. WELL BORE DAMAGE: THE CALCULATED ESTIMATED DAMAGE RATIO OF 8.44 INDICATES THAT WELL BORE DAMAGE IS PRESENT AT THE TIME AND CONDITIONS OF THIS TEST. THIS VALUE INFERS THAT THE RATE OF PRODUCTION OBSERVED DURING THIS TEST MAY BE INCREASED 8.44 TIMES IF THE WELL BORE DAMAGE WERE REMOVED.
2. PERMEABILITY: THE CALCULATED TRANSMISSIBILITY FACTOR OF 155.2 MD.-FT./CP. INDICATES AN AVERAGE EFFECTIVE PERMEABILITY TO WATER OF 12.93 MD. FOR THE 12 FOOT TEST INTERVAL. THIS VALUE WAS CALCULATED ASSUMING THE PRODUCT OF THE VISCOSITY AND FORMATION VOLUME FACTOR OF THE PRODUCED WATER WAS 1.0.
3. RESERVOIR PRESSURE: EXTRAPOLATION OF THE INITIAL SHUT-IN PRESSURE BUILD UP PLOT INDICATES A RESERVOIR PRESSURE OF 1511 P.S.I.G. AT RECORDER DEPTH.
4. GENERAL COMMENTS: THIS TEST INDICATES THAT THE LANSING ZONE IN THIS AREA HAS FAIR PERMEABILITY AND IS SUBJECT TO HIGH DAMAGE. MUD PROGRAM MODIFICATION MAY PREVENT SOME OF THIS DAMAGE IN POSSIBLE HYDROCARBON BEARING ZONES.

James D. Hillhouse
JAMES D. HILLHOUSE,
CHART ANALYST

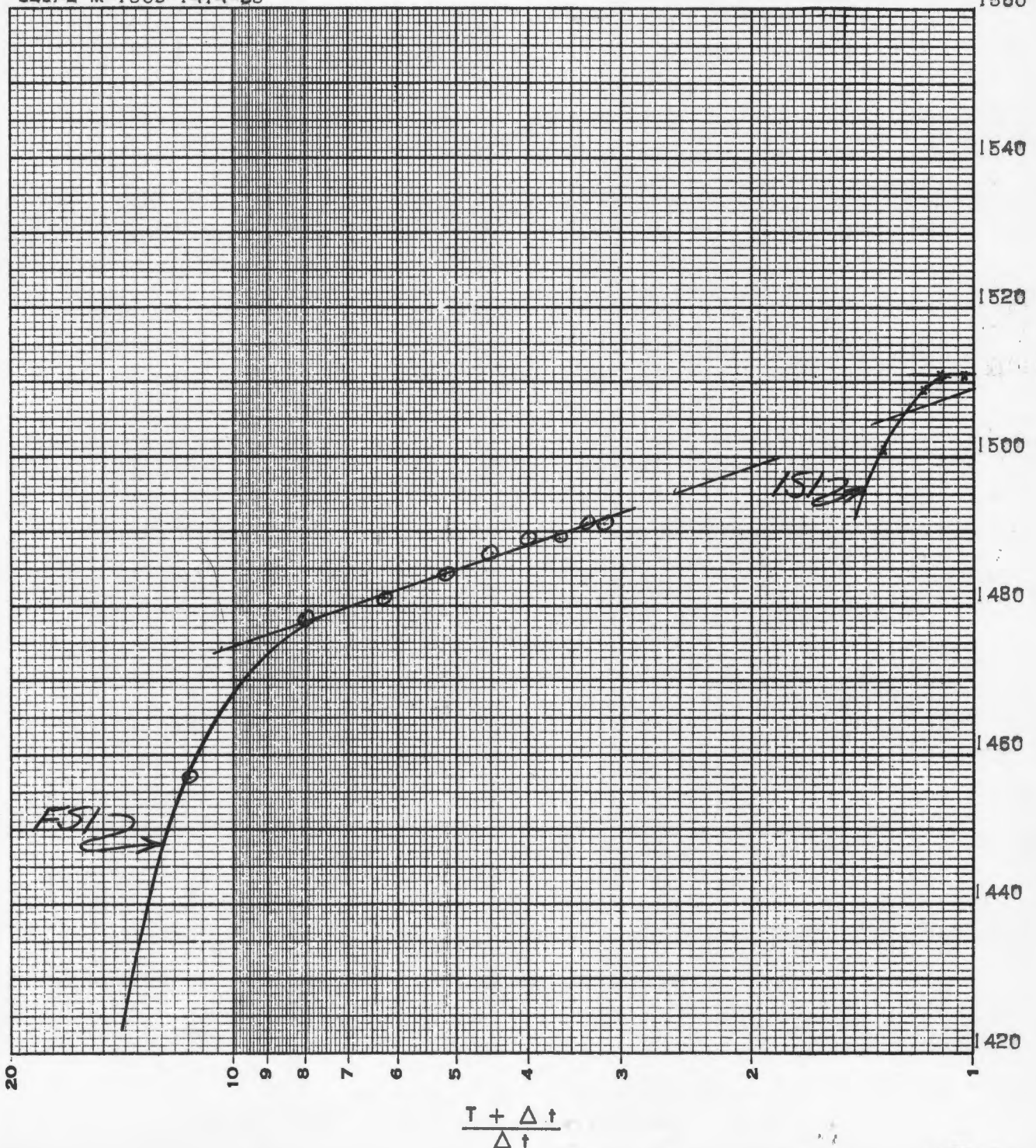
ANADARKO PRODUCTION COMPANY
EVERSON #A-1, SEWARD CO., KANSAS
TEST #1, 4690' TO 4702'

Reservoir Engineering Data

Field Report No. 62524 L

Estimated Damage Ratio	EDR	8.44	Effective Transmissibility	$\frac{Kh}{\mu B}$	155.2	$\frac{Md-ft.}{Cp.}$
Maximum Reservoir Pressure	P _o	1511 P.S.I.G.	Effective Transmissibility	$\frac{Kh}{\mu B}$		$\frac{Md-ft.}{Cp.}$
Slope of Shut-in Curve	M	35 PSI /log cycle	Flow Rate WATER	Q	33.4	Bbl./day
Potentiometric Surface (Datum Plane, Sea Level)	PS	1527 ft.	Flow Rate	Q		Bbl./day
Productivity Index	PI	.03 Bbl./day/PSI	Gas Oil Ratio	GOR		CF/Bbl.
			K(EFFECTIVE TO WATER)		12.93	

SLOPE $M = 1509 - 1474 = 35$



Assumptions made for Calculations for Liquid Recoveries

1. Q is taken as steady state flow.
2. P_f is formation flowing pressure at steady state flow.
3. Formation flow is taken as single phase flow.
If gas is produced at surface, phase separation is assumed to have occurred in drill pipe.
4. Radial flow is assumed.
5. Where PVT data is not available then it is assumed that:

Effective permeability, K, will fall between 1 to 200 md
 Formation porosity, f, will fall between 0.1 to 0.3
 Fluid compressibility, c, will fall between 10^{-8} to 10^{-4}
 Fluid viscosity, μ , will fall between 0.05 to 50 cp.
 Well bore radius, r_w , will fall between $3\frac{7}{8}$ " to $4\frac{3}{8}$ "
 Which gives an average value for the function $\log \frac{K}{f\mu cr_w^2}$ of 5.5

6. Other standard radial flow, steady state assumptions.

Empirical Equations:

1. $EDR = \frac{1}{\log T + 2.65} \left[\frac{P_o - P_f}{M} \right]$
2. Transmissibility $\frac{Kh}{\mu B} = \frac{162.6Q}{M}$
3. P.I. = $\frac{Q}{P_o - P_f}$
4. P.S. = $\left[P_o \times 2.309 \text{ ft./PSI} \right] - \left[\text{Recorder depth to sea level.} \right]$

Symbols		Dimensions	Symbols		Dimensions
B	Formation volume factor	vol./vol.	Q	Rate of flow during test	Bbls./day
c	Fluid compressibility	vol./vol./psi.	Q_o	Rate of oil flow during test	Bbls./day
EDR	Estimated damage ratio		Q_w	Rate of water flow during test	Bbls./day
f	Formation porosity	fractional	Q_g	Rate of gas flow during test	MCF/day
h	Producing interval	feet	r_w	Well bore radius	inches
J	Productivity index	Bbls./day/PSI	t	Final shut-in time period	minutes
K	Permeability	Millidarcies	Δt	Increment time of final shut-in	minutes
M	Slope of shut-in build up	PSI/log cycle		time period	minutes
P_f	Final flowing pressure	PSI	T	Open flow time period	minutes
P_{fsl}	Final shut-in pressure at time t	PSI	$^{\circ}T_f$	Formation temperature	$^{\circ}$ Rankin
P_{isl}	Initial shut-in pressure	PSI	μ	Fluid viscosity	Centipoise
P_o	Maximum reservoir pressure	PSI	Z	Gas deviation factor (Compressibility factor)	
P. S.	Potentiometric surface	ft.	$\frac{Kh}{\mu B}$ or $\frac{Kh}{\mu}$	Transmissibility factor	$\frac{\text{Md.} - \text{ft.}}{\text{Cp.}}$

In making any interpretation, our employees will give Customer the benefit of their best judgment as to the correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical, mechanical or other measurements, we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not be liable or responsible, except in the case of gross or wilful negligence on our part, for any loss, costs, damages or expenses incurred or sustained by Customer resulting from any interpretation made by any of our agents or employees.

JOHNSTON TESTERS, INC.

SURFACE INFORMATION

TOOL, HOLE & MUD DATA

Well Flowed	Amount
NO	

Reversed Out	Amount
NO	

[illegible]

Blow FAIR BLOW THROUGHOUT TEST.

[illegible]

Remarks:

Type Test	CONVENTIONAL
Formation Tested	LOWER LANING
Elevation	2710 Ft.
All Depths Measured From	GROUND LEVEL

TOOL SEQUENCE

[illegible]

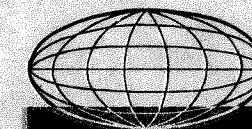
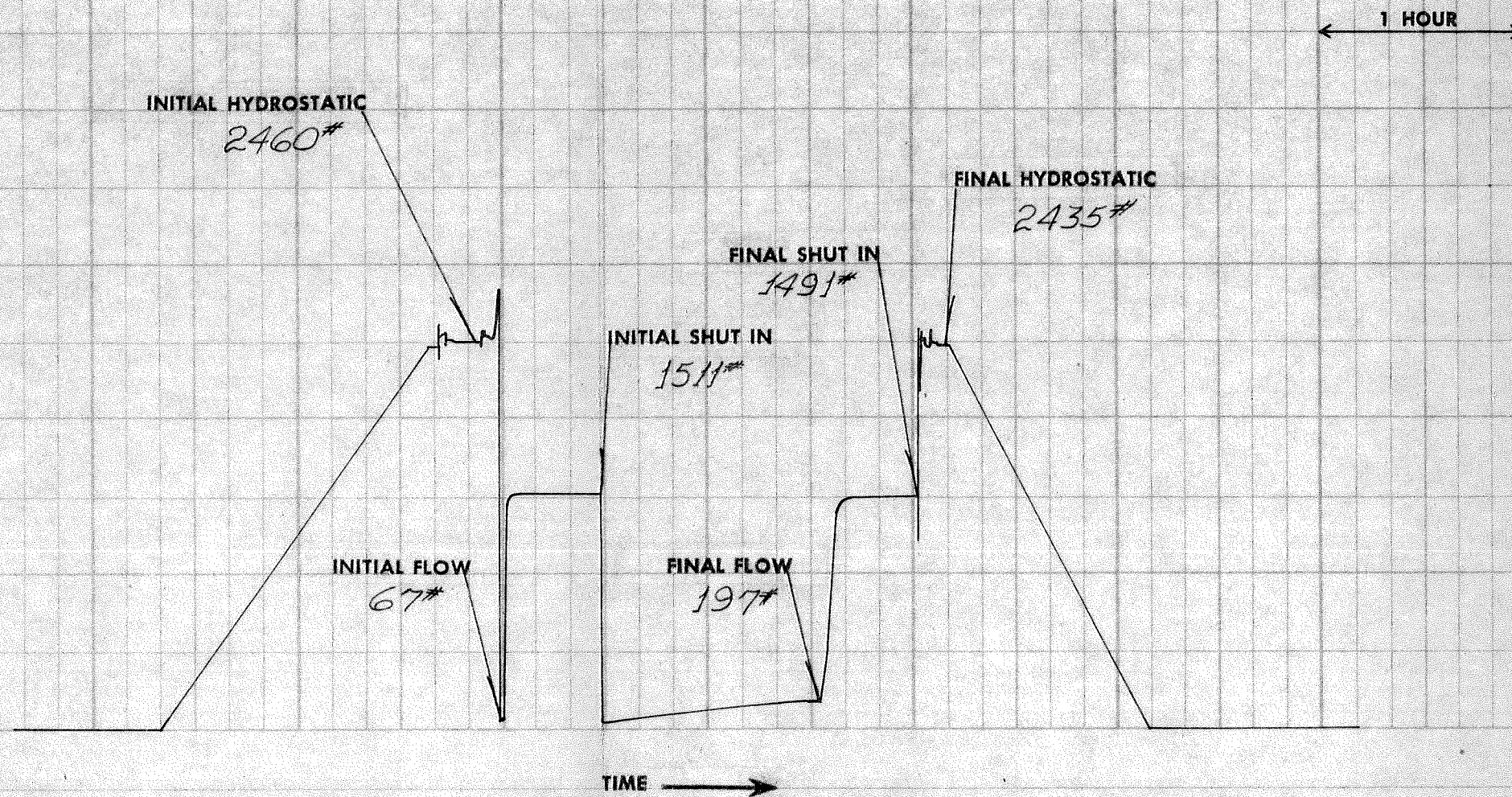
Total Depth	4702	Ft.
Main Hole Size	8 3/4"	Rat Hole Size -
Casing Size	-	Liner Size -
Bottom Choke Size	3/4"	Mud Type SALT
Mud. Wt.	9.9	Mud Viscosity 44
Air Chamber Length		Ft. I.D.

Cushion Type	Amount	Pressure

TIME DATA

Initial Shut-in _____ Hrs. 30 Mins.
Flow Period _____ Hrs. 1 Mins.
Final Shut-in _____ Hrs. 30 Mins.

Company	ANADARKO PRODUCTION COMPANY; BOX 351; LIBERAL, KANSAS			Date	5-6-62
Well	EVERSON #A-1	Field	SOUTH KISMET	Location	36-33-31
Test Interval	4690' TO 4702'	Formation Test #	1	Casing Test #	-
County	SEWARD	State	KANSAS	Field Report No.	62524 L
Tester	WENDELL E. BRUNNER	Test Approved By	MR. DANIEL L. SANDERS	No. DST Reports Requested	5



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JOHNSTON TESTERS

Pressure
Log*

Field Report No. 62524L

Recorder No. T-241

Capacity 5000 p.s.i.

Recorder Depth 4672 ft.

*a continuous tracing of the original chart

JOHNSTON TESTERS, INC.

Pressure Data

Field Report No. 62524 L

Recorder No.	T-241	Inside			
Capacity (P.S.I.G.)	5,000				
Recorder Depth	4,672'				
Pressure Gradient P.S.I./Ft.					
Well Temperature °F.	118				
A Initial Hydrostatic Mud	2460				
B Initial Shut-in	1511				
C Initial Flow	67				
D Final Flow	197				
E Final Shut-in	*1491				
F Final Hydrostatic Mud	2435				
Remarks:	C-1 63				
	C-2 67				

*Shut in pressure did not reach static reservoir pressure.

