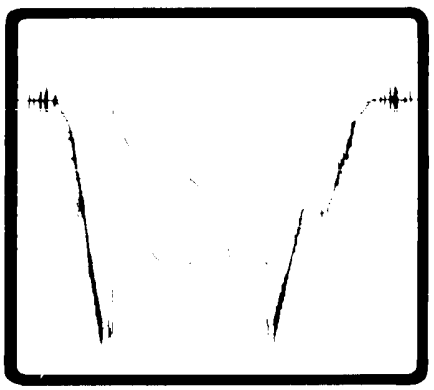
FORMATION TESTING SERVICE REPORT



HALLIBURTON
SERVICES

Duncan, Oklahoma 73536

A Halliburton Company

1296-R5 Ⓓ—Southwestern

NOMENCLATURE

B	=	Formation Volume Factor (Res Vol / Std Vol)	—
c_t	=	System Total Compressibility	(Vol / Vol) / psi
DR	=	Damage Ratio	—
h	=	Estimated Net Pay Thickness	Ft
k	=	Permeability	md
m	=	(Liquid) Slope Extrapolated Pressure Plot	psi / cycle
		(Gas) Slope Extrapolated m(P) Plot	MM psi²/ cp cycle
m(P*)	=	Real Gas Potential at P*	MM psi² / cp
$m(P_f)$	=	Real Gas Potential at P_f	MM psi² / cp
AOF_1	=	Maximum Indicated Absolute Open Flow at Test Conditions	MCFD
AOF_2	=	Minimum Indicated Absolute Open Flow at Test Conditions	MCFD
P*	=	Extrapolated Static Pressure	Psig
P_f	=	Final Flow Pressure	Psig
Q	=	Liquid Production Rate During Test	BPD
Q_1		Theoretical Liquid Production w/ Damage Removed	BPD
Q_g		Measured Gas Production Rate	MCFD
r_i		Approximate Radius of Investigation	Ft
r_w		Radius of Well Bore	Ft
S		Skin Factor	
t		Total Flow Time Previous to Closed-in	Minutes
Δt		Closed-in Time at Data Point	Minutes
T		Temperature Rankine	R
ϕ		Porosity	—
μ		Viscosity of Gas or Liquid	cp
Log		Common Log	

EQUATIONS FOR DST LIQUID WELL ANALYSIS

Transmissibility	$\frac{kh}{\mu} = \frac{162.6\ QB}{m}$	md-ft / cp
Indicated Flow Capacity	$kh = \frac{kh}{\mu}\ \mu$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Damage Ratio	$DR = .183\ \frac{P^* - P_f}{m}$	—
Theoretical Potential w/ Damage Removed	$Q_1 = Q\ DR$	BPD
Approx. Radius of Investigation	$r_i = 4.63 \sqrt{kt}$	ft

EQUATIONS FOR DST GAS WELL ANALYSIS

Indicated Flow Capacity	$kh = \frac{1637\ Q_g\ T}{m}$	md-ft
Average Effective Permeability	$k = \frac{kh}{h}$	md
Skin Factor	$S = 1.151 \left[\frac{m(P^*) - m(P_f)}{m} - \text{LOG} \frac{k(t/60)}{\phi\ \mu\ c_t r_w^2} + 3.23 \right]$	—
Damage Ratio	$DR = \frac{m(P^*) - m(P_f)}{m(P^*) - m(P_f) - 0.87\ mS}$	—
Indicated Flow Rate (Maximum)	$AOF_1 = \frac{Q_g\ m(P^*)}{m(P^*) - m(P_f)}$	MCFD
Indicated Flow Rate (Minimum)	$AOF = Q \sqrt{\frac{m(P^*)}{m(P^*) - m(P_f)}}$	MCFD
Approx. Radius of Investigation	$r = 0.032 \sqrt{\frac{k(t/60)}{\phi \mu c_t}}$	ft