FORMATION TESTING

Technical Report

HALLIBURTON
SERVICES LIMITED

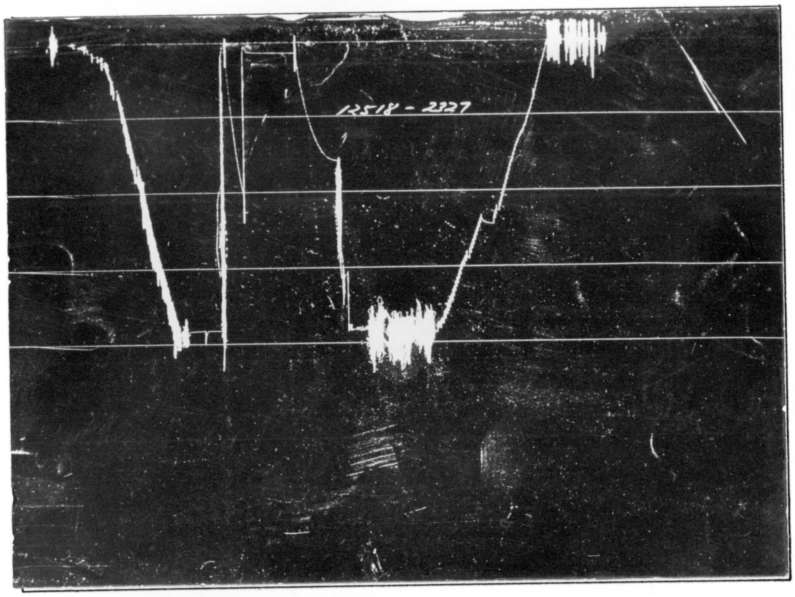
CALGARY, ALBERTA

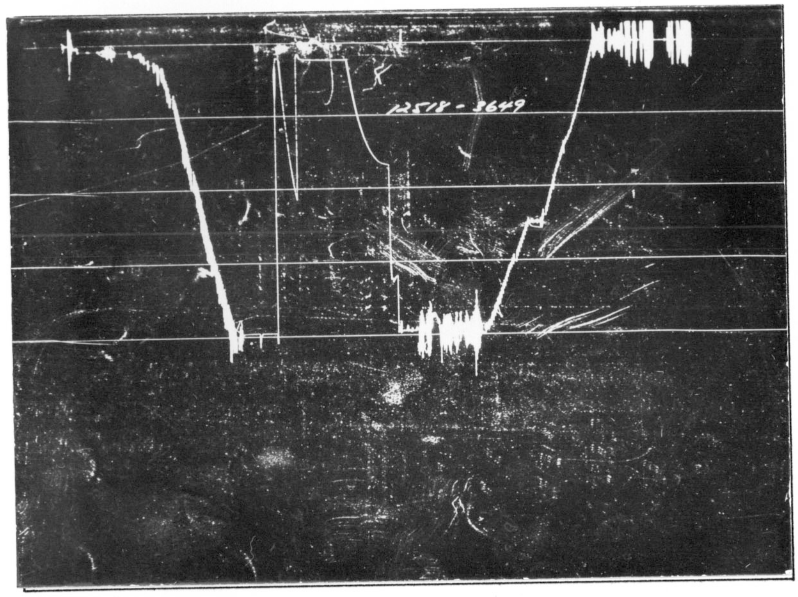
A Halliburton Company

PRESSURE

TIME

Each horizontal line equal to 1000 psi





TEMPERATURE RECORD

Each concentric line equals 10° F.
Temperature increases outwardly

Ticket No. 12518

Temperature Range °F

150 °F to 250 °F

A to B — Initial CIP

B to C — 2nd Flow

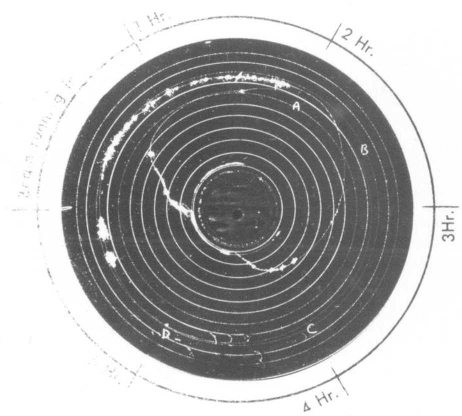
C to D — Final CIP

A 220 °F

B 220 °F

C 225 °F

D 230 °F



FORM 418

Halliburton Services Limited

FORMATION TESTING
DATA SHEET

REFER TO INVOICE NO. 12518

HALLIBURTON DISTRICT: Ft. Nelson

JOB DATE: February 2, 1973

OWNER, OPERATOR OR HIS AGENT STATES THE WELL IS IN CONDITION FOR THE SERVICE JOB TO BE PERFORMED AND SUBMITS THE FOLLOWING DATA:

PRESSURE DATA

	TOP	CENTRE	BOTTOM
GAUGE NUMBER	2327		3649
GAUGE DEPTH	8674		8896
BLANKED OFF	~~YES~~/NO	YES/NO	YES/~~NO~~
HOUR CLOCK TRAVEL	24		24
INITIAL HYDROSTATIC	3823		3957
FIRST FLOW INITIAL	110		207
FIRST FLOW FINAL	132		218
FIRST CLOSED IN	2035		2145
SECOND FLOW INITIAL	62		154
SECOND FLOW FINAL	147		237
SECOND CLOSED IN	1595		1692
THIRD FLOW INITIAL			
THIRD FLOW FINAL			
THIRD CLOSED IN			
FINAL HYDROSTATIC	3823		3957

TYPE OF TEST	TESTER	EMPL. NO.
Bottom Hole	H. Knippel	244

WITNESS	DRILLING CONTRACTOR
D. Snydmiller	Bawden 31

EQUIPMENT AND WELL DATA

FORMATION TESTED		GAUGE DEPTH TEMPERATURE	230 OF MEAS. / OF EST.
NET PRODUCTIVE THICKNESS	FT.	MUD TYPE	Gel
K B ELEVATION		MUD WEIGHT / MUD VISC.	60 / 8.6
ALL DEPTHS MEASURED FROM:	☑ KB ☐ GROUND	CASING OR HOLE SIZE	8 1/2 "
PACKER DEPTHS (TOP / BOTTOM)	/ 8695	RATHOLE SIZE	NA
DEPTH OF TESTER VALVE	8663	DRILL PIPE (OD / WEIGHT)	5" / 19.5
CASING PERFORATED INTERVAL	NA	DRILL COLLARS ABOVE TESTER (ID / LENGTH)	2 7/8" / 540'
TOTAL DEPTH	8900	SURFACE CHOKE	
AMOUNT AND TYPE CUSHION	Nil	BOTTOM CHOKE	5/8"

FLUID SAMPLER DATA

SAMPLER PRESSURE AT SURFACE ______ PSIG

RECOVERY: C.C. OIL ______ CU.FT. GAS ______

C.C. WATER ______

C.C. MUD ______

TOTAL LIQUID C.C. ______

SAMPLE SHIPPED TO LABORATORY: YES ☐ NO ☐

OIL GRAVITY ______ API @ ______ °F

GAS/OIL RATIO ______ CU.FT./BBL.

RESISTIVITY/REFRACTOMETER/SP. GR. READING			CHLORIDE CONTENT
RECOVERY WATER	@	°F	PPM
RECOVERY MUD FILTRATE	@	°F	PPM
MUD PIT SAMPLE FILTRATE	@	°F	PPM

TIME PERIODS

	FIRST	SECOND	THIRD		AM	PM
FLOW	5	90		TESTER OPENED	5:10	
CLOSED IN	30	60		PACKER UNSEATED	8:15	

LIQUID RECOVERY DATA

FEET (MEASURED FROM TESTER VALVE)	DESCRIPTION OF LIQUID
	TOTAL LIQUID RECOVERY

GAS FLOW RATE DATA

TYPE OF INSTRUMENT: ☐ CRITICAL FLOW PROVER ☐ ORIFICE WELL TESTER ☐ PITOT TUBE ☐ SIDE STATIC

FLOW TIME	INSTRUMENT PRESSURE "WATER	"MERC.	PSI	ORIFICE SIZE	GAS TEMP.	GAS RATE MCFD @ 60°F

REMARKS Weak air blow turning to good air blow on preflow. Good air blow on second flow. Gas to surface in 30 min. Too small to measure.

COMPANY	AMOCO CANADA PETROLEUM CO LTD.
LEGAL DESCRIPTION	65 41' 12.62 / 133 07' 52.10
PROVINCE OR TERRITORY	YUKON
FIELD OR AREA	CRANSWICK
TEST NUMBER	3
WELL NAME AND NUMBER	AMOCO PCP B-1 CRANSWICK
TESTED INTERVAL	8695-8900

NOMENCLATURE

AOF = absolute open flow potential, MCFD
AOF_t = theoretical absolute open flow potential if damage were removed, MCFD
B = formation volume factor, res bbl/ST bbl
c = compressibility, psi^{-1}
D = gauge depth from KB, ft
DR = damage ratio, dimensionless
E = KB elevation, ft
F = drill pipe capacity, bbl/ft
G = hydrostatic gradient of recovery fluid, psi/ft
h = net productive thickness of formation, ft
h^1 = thickness of test interval, ft
k = average effective permeability, md
k^1 = estimated average effective permeability, md
m = slope of final CIP buildup plot, psig/cycle ($psig^2$/cycle for gas)
M = slope of flow plot, min^{-1}
P_D = average pressure drop across damaged zone during flow, psig
P_f = reservoir pressure, psig
P_s = wellbore flow pressure, psig
$\overline{P}$ = weighted average wellbore flow pressure, psig
PI = productivity index, bbl/day-psi
PI_t = theoretical productivity index if damage were removed, bbl/day-psi
PS = potentiometric surface, fresh water corrected to 100°F, ft
Q = average liquid production rate during test, bbl/day
Q_g = measured gas production rate, MCFD at 60°F, 14.4 psig, sp. gr. 0.60
Q_m = maximum production rate, U.S. gal/min
Q_{mt} = maximum theoretical production rate if damage were removed, U.S. gal/min
q = flow rate calculated from hydrostatic of recovery, psi/X min
r_i = radius of investigation, ft
r_w = wellbore or shaft radius, ft
R_s = solution gas-oil ratio, MCFD/ST bbl
s = fluid saturation, fraction
t = effective flow time, min
t_f = time interval from start of continuous production to some future point of interest, min
T = reservoir temperature, °R
μ = viscosity, cp
x = time increment during which q values are calculated, min
Z = compressibility factor, dimensionless
ϕ = porosity, fraction
θ = time point during the closed-in period, minutes

Subscripts

g = gas
o = oil
w = water
t = total