SPOCH WELL LOGGING, INC.

COMPANY	ARCO OIL and GAS Co.
WELL	LF # 32-20-65
FIELD	MIST
LOCATION	1565'S and 1349'W from the NE corner of Sec 20, T6N, R5W
COUNTY, STATE	Columbia, Oregon
API WELL INDEX NO.	
ELEVATION	1023'G.L. 1033'K.B.
DATES FROM	7-8-88 TO 7-12-88
DEPTHS FROM	50'K.B. TO 1249'K.B.
SPUD DATE	7-8-88
DRILLING CONTRACTOR	Paul Graham Rig #4
MUD COMPANY	Barold
LOGGING GEOLOGISTS	John Day Jim Eastes

ABBREVIATIONS

NB	BIT	MW	MUD WEIGHT
RRB	RERUN BIT	VIS	FUNNEL VISCOSITY
RTB	RE-TIP BIT	PV	PLASTIC VISCOSITY
CB	CORE BIT	YP	YIELD POINT
T.G.	TRIP GAS	FL	FLUID LOSS (cc/30 min)
S.G.	SURVEY GAS	CL	PPM CHLORIDE ION
W.G.	WIPER GAS	RM	MUD RESISTIVITY
C.G.	CONNECTION GAS	RMF	FILTRATE RESISTIVITY
WOB	WEIGHT ON BIT	LAT	LOGGED AFTER TRIP
RPM	ROTARY REV/MIN	NR	NO RETURNS
PP	PUMP PRESSURE	PR	POOR RETURNS
SPM	STROKES/MIN	MUD TYPE	Fw Mud

CASING RECORD

7"	AT	458'
	AT	
	AT	
	AT	

HOLE SIZE

9 7/8"	AT	458'
6 1/4"	AT	1249'
	AT	
	AT	

SAND/SANDSTONE · SHALE · SILTSTONE · CLAY · DIATOMITE · CONGLOMERATE · LIMESTONE · DOLOMITE · BASALT · TUFF · FOSSIL · MICA · LIGNITE · GLAUCONITE · PYRITE

OIL: BASED ON LIVE OIL IN UNWASHED CUTTINGS AND PERCENT STAINING AND FLUORESCENCE OF WASHED SAMPLES.

PENETRATION

SPOCH WELL LOGGING, INC.

DRILL RATE (FT/HR)

drilling data

ANALYSIS OF RETURNS

DEPTH

LITOLOGY

OIL — TRACE, FLUORESCENCE, SHOW, STAINING

GAS — UNITS

DITCH — TOTAL GAS

CUTTINGS GAS

CALIBRATION 100 units = 2% methane by volume

CHROMATOGRAPH — PPM

METHANE, C-1, _____

ETHANE, C-2, _____

PROPANE, C-3, _____

BUTANES, C-4, _____ 4 _____

PENTANES, C-5, _____ 5 _____

Accessory Mineral Column

Examples:

Spud @ 15:30pm 7-8-88
RRB No. 1, 9 7/8"
Sec. 32, T5N, R3W, Wm.

WOB 2,000
RPM 150
PP 450
SPM #1-98

No Discernable Ditch Gas

WOB 10,000
RPM 150
PP 460
SPM #1-98

Ditch and Cuttings Gas 1X

7-9-88

TG 2u

7" csg @ 458'K.B., cmtd.
7-10-88
RB No. 2, 6¼"
Sec. 133, 82½'
12 hrs.

WOB 10-20,000
RPM 150
PP 1550
SPM #1-91 to 95

No Return of ditch cuttings to obtain Cuttings Gas data

WOB 10,000
RPM 80
PP 600
SPM #1-83

Ditch and Ctgs Gas on 1X

CEMENT CONTAM

EXTRAM

Caroline

WOB 10,000
RPM 80
PP 600
SPM #1-85

WOB 10,000
RPM 80
PP 600
SPM #1-85

TD 10:30pm 7-12-88

REMARKS

LITHOLOGIC DESCRIPTION
MUD PROPERTIES
SURVEYS, OTHER TEST DATA

Note: All carolines 500pm unless otherwise noted.
Note: All Munsell colors referenced to the USA Rock Color Chart.
Note: Modifiers in Accessory Mineral Column are referenced to the number of cuttings present in a standard sample tray:
Rare.....1-5 cuttings
Occasional.....6-50 cuttings
Common.....10+ cuttings
Abundant.....present thru entire sample.

Note: "Gearing" approx 40 bbls/hr to formation beginning approx 260'K.B.

Rm 3.9@
Rmf 3.0@
Rw 1800ppm

Rm 4.2@
Rmf 3.4@
Rw 1400ppm

Rm 7.0@
Rmf 5.6@
Rw 600ppm

Rm 4.1@
Rmf 3.2@
Rw 1100ppm

Rm 7.0@
Rmf 5.6@
Rw 600ppm

Rm 4.1@
Rmf 3.2@
Rw 1100ppm

Note: "Gearing" approx 100-400 bbls to formation

Survey @ 458', 0°30'

Wiper Run @ 527'

Lost Circ. @ 755'K.B.

Note: Spot LCM and regain partial returns; drill ahead w/25-40% return of drilling fluid and LCM; no return of formation ctgs - tr silt washed from LCM.

Note: Pull to shoe @ 625'K.B. and build surface volume; MW, drill to 1249'K.B., no returns. Regain full strength after sty 3 cmt plugs.

Note: Poor rpl quality due to shut LCM content added to control partial lost circ below 840'. LCM ranges from 30 to 90% making rpl % determination difficult.

MW 9.4+
VIS 38

Note: Extrm pr TGs return over end of shaker - 79% LCM; TGs are being taken f/rear of shaker where bulk of cuttings are collecting.

Note: Cont'd lost circ; lost approx 396-400bbls f/824'-1249'; hole sd @ 1105' approx 2%vol.

MW 9.6
VIS 59

Wipe Hole @ 1100'K.B.

MW 9.4+
Rm 4.1@
Rmf 3.2@
Rw 1100ppm

Note: POOH @ 1249', set cmt plug to surface, abandon well.