

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

REPLY TO
8 N. W. 42ND ST.
OKLAHOMA CITY, OKLA.
73118

Gentlemen:

Subject: Core Analysis

The measured physical properties presented on the accompanying report were determined on samples submitted to our laboratory for analysis.

Information pertaining to the well name, field, location, type of analysis, coring method and drilling fluid used is shown in the heading of the report.

Thank you for this opportunity to be of service.

Yours very truly,

CORE LABORATORIES, INC.



J. G. Evertson, Jr.
District Manager

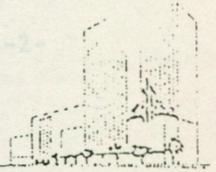
JGE:jc

DONALD R. DOUGLASS

PETROLEUM GEOLOGIST

RES.: TEL. P A 2 - 4873
9710 WEST NINTH ST.
ZIP CODE 67212

OFFICE: TEL. A M 2 - 5503
1620 ~~XXXX~~ WICHITA PLAZA BLDG.
ZIP CODE 67202
WICHITA - KANSAS



August 9, 1966

Braden-Zenith, Inc.
1620 Wichita Plaza
Wichita, Kansas 67202

RE: Braden-Zenith, Inc.
Zenith Waterflood Unit ZU-3
1100' SNL; 600' EWL
NE/4, Section 11-24S-11W
Stafford County, Kansas.

CORE DESCRIPTION

Core #1: Misener and Viola

3709-3738 Recovered 29'. (6-1/8" Corehead)

- 3709-3711 Chert and Limestone; Gray, white, opaque, sharp banded chert plus gray finely crystalline limestone. Fine grain sandy limestone from 3710-3710½; occasional calcite seams. Fair pinpoint porosity and occasional fractured porosity; show of free oil, some black residual stain; fair gassey odor.
- 3711-3713 Limestone; Dense, green, pink, crystalline; some calcite crystals; no porosity; no shows.
- 3713-3714 Limestone; Medium crystalline, occasional chert nodules and green shale partings; some black grain sized rounded shale pellets. Occasional pinpoint porosity; good saturation and odor. Occasional sand grains imbedded in Limestone Matrix.
- 3714-3715 Sandy limestone; Tan, crystalline limestone with loose sand grains imbedded in Matrix. Fair porosity, good saturation and odor.
- 3715-3715½ Sandstone; Clear, medium to coarse grained, well sorted, sub-rounded to sub-angular, friable with imbedded shale pellets. Spotted light stain; fair porosity; fair show of free oil and good odor.
- 3715½-3730 Shale, green, waxy with occasional streaks of Maroon shale. Shale is calcareous in part from 3715½ to 3719. Some limestone pebbles imbedded in shale matrix from 3729 to 3730.
- 3730-3735½ Dolomite. Green, granular, to finely crystalline. Sparkling, fair pinpoint vugular porosity with some hairline fractures. Large cavernous vugs at 3733 and 3734. Fair to good show of free oil and odor.
- 3735½-3738 Limestone; Dense, buff, crystalline; some interbedded slickensided, green, maroon shale, occasional calcite seams. Poor porosity; rare show of free oil; no odor.

Core #2: Viola

3758-3786'3" Recovered 27'3"

DEPTH (FEET)	DESCRIPTION	PERCENTAGE	GRANULARITY	TEXTURE	STRUCTURE	FRACTURES	OTHER
3758-3759	It is assumed that this portion of the core was lost.						
3759-3769	Dolomite; Gray, crystalline with imbedded chert nodules and banded chert streaks. Good vugular porosity at 3760 and 3761. Occasional vertical hairline fractures. Good show of free oil and odor.						
3769-3775	Limestone and Chert; Dense, buff, crystalline limestone with interbedded chert nodules and fragments. Some thin bedded chert streaks. Poor porosity; slight show of free oil; slight odor; appears tight.						
3775-3781	Dolomite; Crystalline, sparkling with imbedded chert nodules, fragments and occasional thin, sharp chert bands. Occasional fair to good vugular porosity; show of free oil; good saturation and odor.						
3781-3785	Dolomite and chert; described as above with increase in sharp chert. Some fractured porosity with show of free oil and light odor.						
3785-3786'3"	Dolomite as above plus banded, bluish, sharp, opaque chert with occasional fractured porosity; fair to good show of free oil. Good odor.						

Note: All depths have been corrected 3' down the hole to correlate with log measurements.

Donald R. Douglass
DONALD R. DOUGLASS

DRD:bl

DEPTHS CORRECTED DOWN THREE
 FEET TO MATCH ELECTRIC LOG.

CORE ANALYSIS RESULTS

Company BRADEN-ZENITH, INCORPORATED Formation VIOLA LIME File CP-1-6098
 Well ZENITH WATERFLOOD UNIT ZU-3 Core Type DIAMOND Date Report 8-11-66
 Field ZENITH Drilling Fluid WATER BASE MUD 5% OIL Analysts KUHLMAN
 County STAFFORD State KANSAS Elev. 1810'KB Location 1100'SNL 600'EWL NE/4 SEC 11-24S-11W

Lithological Abbreviations

SAND - SD SHALE - SH LIME - LM	DOLOMITE - DOL CHERT - CH GYPSUM - GYP	ANHYDRITE - ANHY CONGLOMERATE - CONG FOSSILIFEROUS - FOSS	SANDY - SDY SHALY - SHY LIMY - LMY	FINE - FN MEDIUM - MED COARSE - CSE	CRYSTALLINE - KLN GRAIN - GRN GRANULAR - GRNL	BROWN - BRN GRAY - GRV VUGGY - VUG	FRACTURED - FRAC LAMINATION - LAM STYLLITIC - STY	SLIGHTLY - SL/ VERY - V/ WITH - W/
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SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCY		POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE		SAMPLE DESCRIPTION AND REMARKS
		PERM. MAX.	PERM. 90°		OIL	TOTAL WATER	
1	3709.0-10.5	15.5	15.1	8.2	11.7	64.9	Lm, chert, pp/vug
2	10.5-12.0	* 2.4		5.0	9.4	74.4	Lm, v/cherty
3	12.0-13.5	0.2	0.1	4.0	11.8	60.3	Lm, pp/vug, vert/frac
4	13.5-15.0	0.8	0.5	7.1	21.1	60.4	Lm, vuggy, sdy
5	15.0-15.5	*27.6		7.8	17.6	55.1	Lm, cherty, pp/vug, sdy
	3715.5-30.0						Shale
6	3730.0-31.8	175.4	0.4	9.5	10.7	75.5	Lm, sl/shy, pp/vug, vert/frac
7	31.8-32.8	2.8	0.4	8.9	10.4	80.4	Lm, pp/vug, vert/frac
8	32.8-34.1	4.1	1.9	11.1	16.7	59.3	Lm, vuggy, vert/frac
9	34.1-35.4	6.0	4.9	9.2	29.5	51.8	Dolo, vuggy
10	35.4-36.5	0.1	0.1	2.6	0.8	91.9	Dolo
11	36.5-37.3	0.3	0.2	1.1	0.0	90.0	Dolo
12	37.3-38.0	0.8	0.7	1.9	5.8	49.5	Dolo, pp/vug
	3738.0-58.0						Drilled
	3758.0-59.0						Lost Core
13	3759.0-60.8	* 3.8		11.5	12.4	51.7	Dolo, chert, vuggy
14	60.8-62.3	3247.0	0.3	7.1	9.7	74.6	Dolo, cherty, vert/frac
15	62.3-64.0	1.6	0.8	9.1	20.1	53.4	Dolo, cherty
16	64.0-65.9	0.9	0.4	5.8	7.4	75.9	Dolo, cherty, sl/vuggy
17	65.9-67.7	8.5	7.6	8.6	18.3	54.8	Dolo, cherty, sl/vuggy
18	67.7-69.0	11.8	11.0	6.8	15.1	66.8	Dolo, lmy, cherty, vert/frac
19	69.0-70.8	0.3	<0.1	2.7	12.2	62.2	Lm, cherty, vert/frac
20	70.8-72.0	<0.1	<0.1	3.8	7.9	76.8	Lm, med. cc. cherty, vert/frac
21	72.0-73.2	46.5	0.1	6.1	16.7	65.7	Lm, vert/frac
22	73.2-74.9	0.4	0.2	6.5	4.0	84.5	Dolo, sl/shy, cherty
23	74.9-76.0	<0.1	<0.1	6.0	8.3	78.7	Dolo, cherty, sl/vuggy
24	76.0-77.7	2.7	2.4	11.1	10.8	70.9	Dolo, cherty, sl/vuggy
25	77.7-78.9	1.7	1.6	12.1	18.2	59.3	Dolo, cherty, sl/vuggy
26	78.9-80.3	8.2	1.5	12.1	13.1	67.8	Dolo, cherty, vert/frac
27	80.3-81.9	13.4	13.1	7.1	6.3	77.3	Lm, dolo, cherty
28	81.9-83.3	59.3	<0.1	6.6	4.8	83.5	Lm, dolo, cherty, vert/frac
29	83.3-84.9	0.6	0.4	8.6	4.9	79.8	Lm, dolo, cherty, sl/vuggy
30	3784.9-86.3	13.5	11.4	11.5	4.9	68.5	Dolo, cherty, sl/vuggy

10CC: BRADEN-ZENITH, INC., MR. GEORGE R. JONES, 1620 WICHITA PLAZA, WICHITA, KANSAS

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations, as to the productivity, proper operations, or profitability of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

E2 SW NW NE



CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

COMPANY BRADEN-ZENITH, INCORPORATED FIELD ZENITH FILE CP-1-6098
 WELL ZENITH WATERFLOOD UNIT ZU-3 COUNTY STAFFORD DATE 8-8-66
 LOCATION 1100'SNL 600'EWL NE/4 STATE KANSAS ELEV. 1810'KB
SEC 11-24S-11W

CORE-GAMMA CORRELATION

U. S. PATENT NO. 3,025,398 CANADA PATENT NO. 819167

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VERTICAL SCALE: 5" = 100'

CORE-GAMMA SURFACE LOG

(PATENT APPLIED FOR)

GAMMA RAY

RADIATION INCREASE →

COREGRAPH

TOTAL WATER

PERCENT TOTAL WATER

80 60 40 20

PERMEABILITY

MILLIDARCYs

100 50 10 5 1

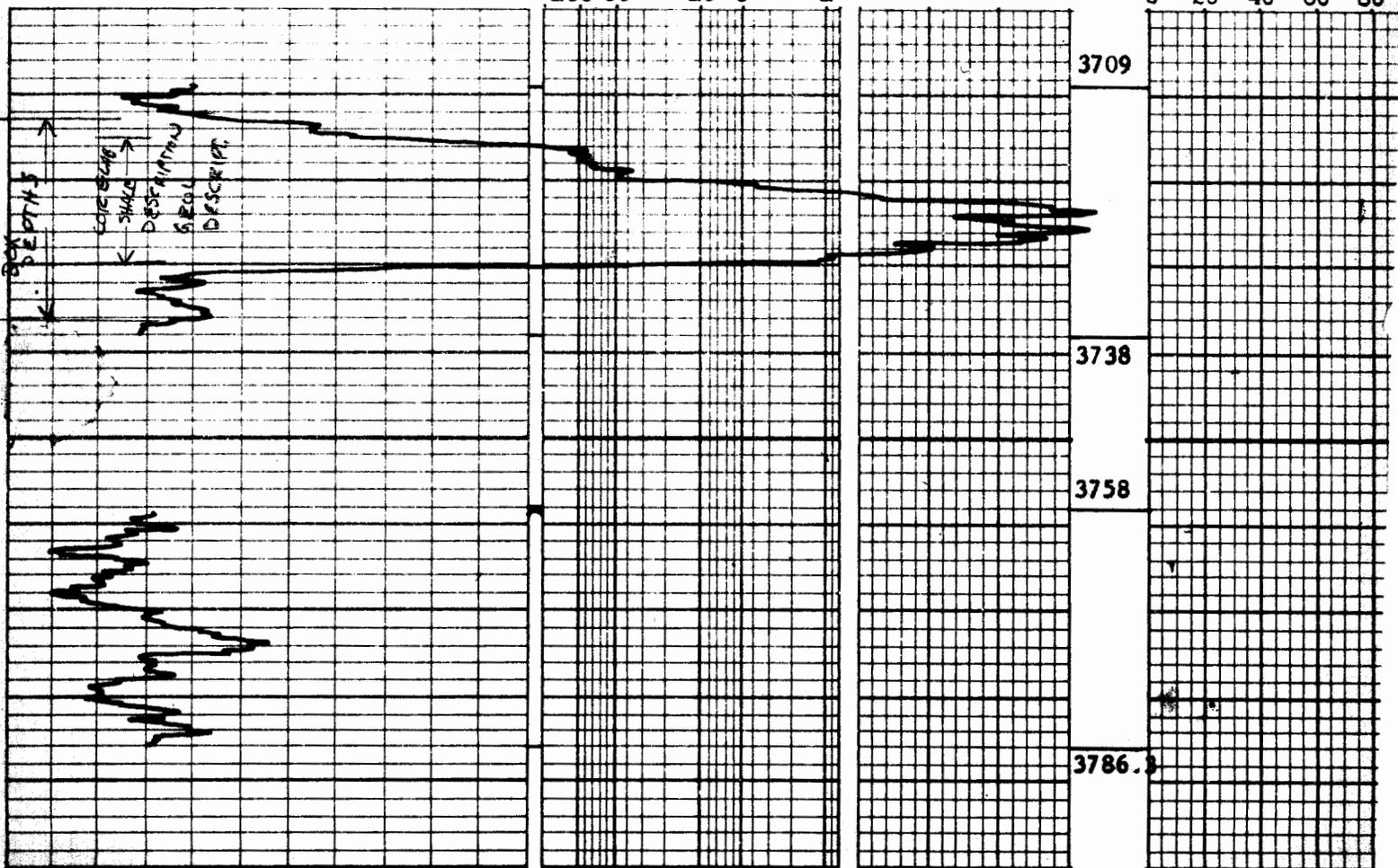
POROSITY

PERCENT

OIL SATURATION

PERCENT PORE SPACE

0 20 40 60 80



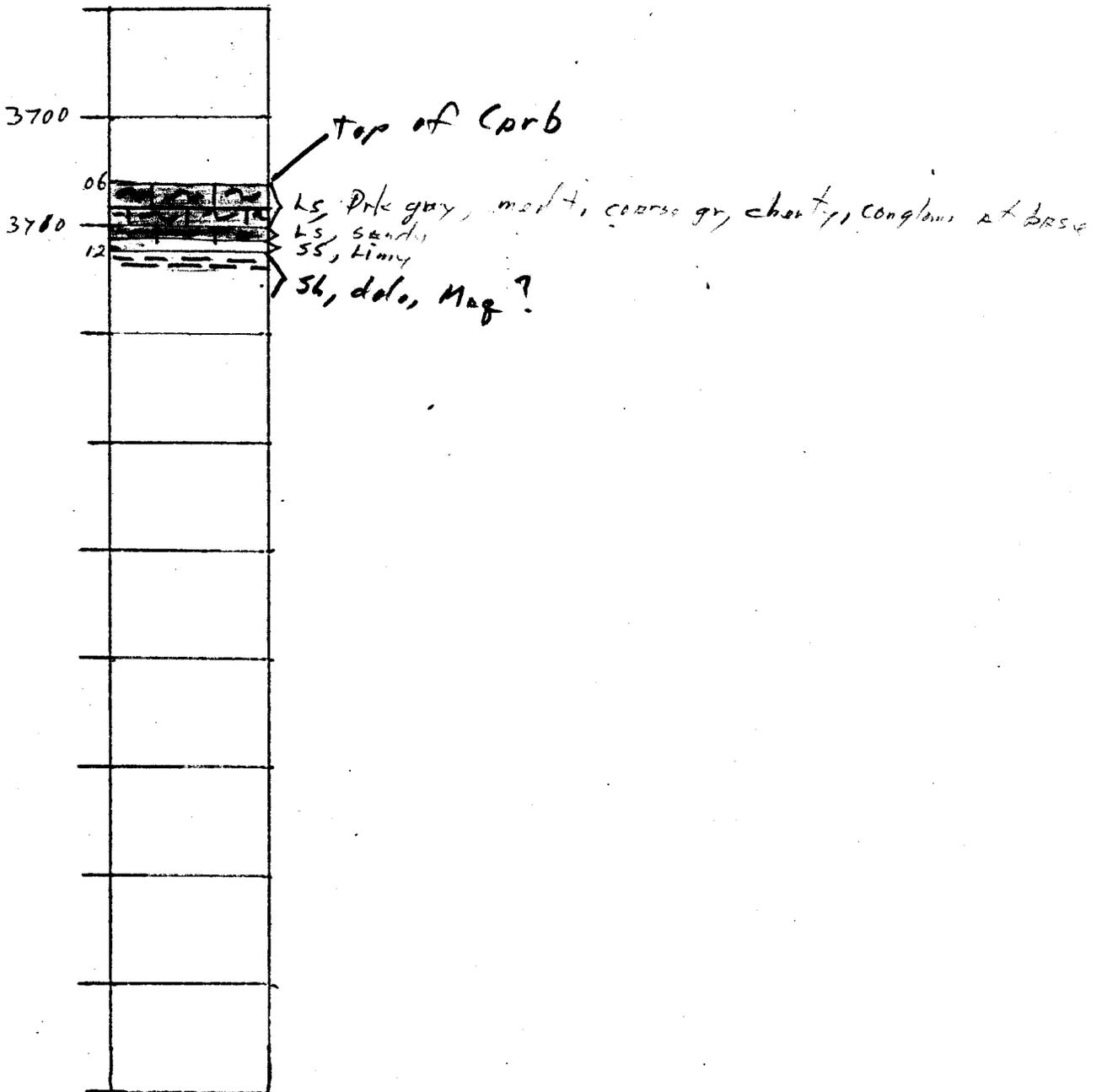
Well No. 3 Farm ZU County Stafford

Company Braden-Zenith Inc

Spot Loc. C W 1/2 NE sec. 11 T. 24 R. 11 ~~E~~ W

Elev. 1813 Total Depth 3820

E-log _____ Completion Date 12-19-66



CORE ANALYSIS RESULTS

Company BRADEN-ZENITH INCORPORATED Formation VIOLA LIME File CP-1-6098
 Well ZENITH WATERFLOOD UNIT ZU-3 Core Type DIAMOND Date Report 8-4-66
 Field ZENITH Drilling Fluid WATER BASE MUD 5% Analysts KUHLMAN
 County STAFFORD State KANSAS Elev. 1810'KB Location 1100'SNL 600'EWL NE/4 SEC 11-24S-11W

Lithological Abbreviations

SAND-SD DOLOMITE-DOL ANHYDRITE-ANHY SANDY-SDY FINE-FN CRYSTALLINE-CLM BROWN-GRN FRACTURED-FRAC SLIGHTLY-SL
 SHALE-SH CHERT-CH CONGLOMERATE-CONG SHALY-SHY MEDIUM-MED GRAIN-GRN GRAY-GY LAMINATION-LAM VERY-V/
 LIME-LM GYPSUM-GYP FOSSILIFEROUS-FOSS LIMY-LMY COARSE-CSE GRANULAR-GRNL VUGGY-VGY STYLOLITIC-STY WITH-W/

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYs		POROSITY PER CENT	RESIDUAL SATURATION PER CENT PORE		SAMPLE DESCRIPTION AND REMARKS
		PERM. MAX.	PERM. 90°		OIL	TOTAL WATER	
1	3706.0-07.5	15.5	15.1	8.2	11.7	64.9	Lm, chert, pp/vug
2	07.5-09.0	* 2.4		5.0	9.4	74.4	Lm, v/chert
3	09.0-10.5	0.2	0.1	4.0	11.8	60.3	Lm, pp/vug, vert/frac
4	10.5-12.0	0.8	0.5	7.1	21.1	60.4	Lm, pp/vug
5	12.0-12.5	*27.6		7.8	17.6	55.1	Lm, chert, pp/vug
	3712.5-27.0						Shale, no analysis
6	3727.0-28.8	175.4	0.4	9.5	10.7	75.5	Lm, sl/shy, pp/vug, vert/frac
7	28.8-29.8	2.8	0.4	8.9	10.4	80.4	Lm, pp/vug, vert/frac
8	29.8-31.1	4.1	1.9	11.1	16.7	59.3	Lm, vug, vert/frac
9	31.1-32.4	6.0	4.9	9.2	29.5	51.8	Lm, vug
10	32.4-33.5	0.1	0.1	2.6	0.8	91.9	Lm
11	33.5-34.3	0.3	0.2	1.1	0.0	90.0	Lm
12	3734.3-35.0	0.8	0.7	1.9	5.8	49.5	Lm, pp/vug

All depths and data on both cores should be corrected 3' down the hole to correlate with log measurements.

THIS IS A PRELIMINARY REPORT.

3756.0-57.8	3.8*		11.5	12.4	57.7
57.8-59.3	3247	0.3	7.1	9.7	74.6
59.3-61.0	1.6	0.8	9.1	20.1	53.4
61.0-62.9	0.9	0.4	5.8	7.4	75.9
62.9-64.7	8.5	7.6	8.6	18.3	54.8
64.7-66.0	11.8	11.0	6.8	15.1	66.8
66.0-67.8	0.3	-0.1	2.7	12.2	62.2
67.8-69.0	-0.1	-0.1	3.8	7.9	76.8
69.0-70.2	46.5	0.1	6.1	16.7	65.7
70.2-71.9	0.4	0.2	6.5	4.0	84.5
71.9-73.0	-0.1	-0.1	6.0	8.3	78.7
73.0-74.7	2.7	2.4	11.1	10.8	70.9
74.7-75.9	1.7	1.6	12.1	18.2	59.3
75.9-77.3	8.2	1.5	13.1	13.1	67.8
77.3-78.9	13.4	13.1	7.1	6.3	77.3
78.9-80.3	59.3	-0.1	6.6	4.8	83.5
80.3-81.9	0.6	0.4	8.6	4.9	79.8
81.9-83.3	13.5	11.4	11.5	4.9	68.5

*plug
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3	09.0-10.5	0.2	0.1	4.0	11.8	60.3	Lm, pp/vug, vert/frac
4	10.5-12.0	0.8	0.5	7.1	21.1	60.4	Lm, pp/vug
5	12.0-12.5	*27.6		7.8	17.6	55.1	Lm, chert, pp/vug
	3712.5-27.0						Shale, no analysis
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7	28.8-29.8	2.8	0.4	8.9	10.4	80.4	Lm, pp/vug, vert/frac
8	29.8-31.1	4.1	1.9	11.1	16.7	59.3	Lm, vug, vert/frac
9	31.1-32.4	6.0	4.9	9.2	29.5	51.8	Lm, vug
10	32.4-33.5	0.1	0.1	2.6	0.8	91.9	Lm
11	33.5-34.3	0.3	0.2	1.1	0.0	90.0	Lm
12	3734.3-35.0	0.8	0.7	1.9	5.8	49.5	Lm, pp/vug

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DONALD R. DOUGLASS

PETROLEUM GEOLOGIST

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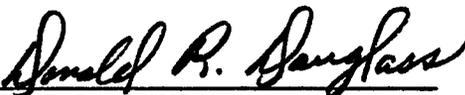
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- 3781-3785 Dolomite and chert; described as above with increase in sharp chert. Some fractured porosity with show of free oil and light odor.
- 3785-3786'3" Dolomite as above plus banded, bluish, sharp, opaque chert with occasional fractured porosity; fair to good show of free oil. Good odor.

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DONALD R. DOUGLASS

DRD:b1

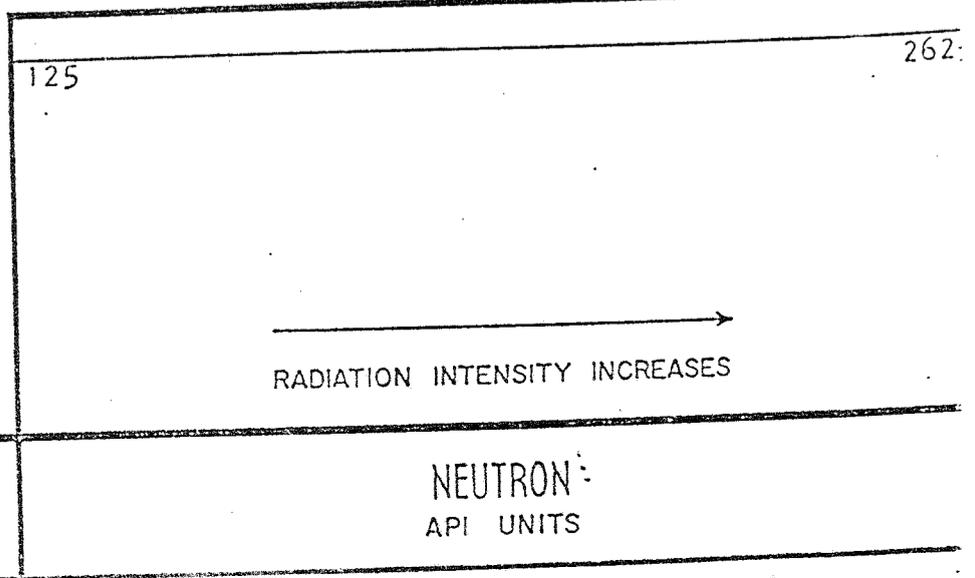
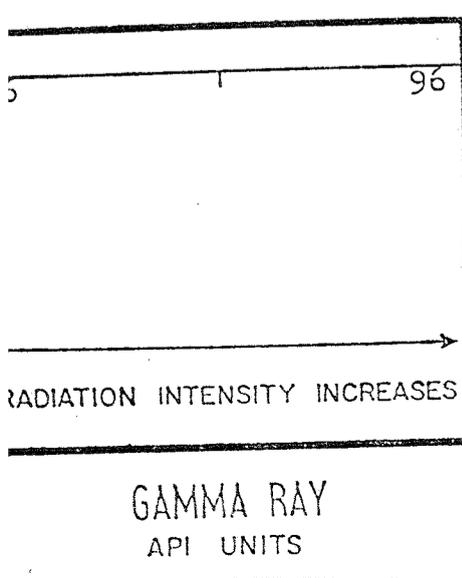
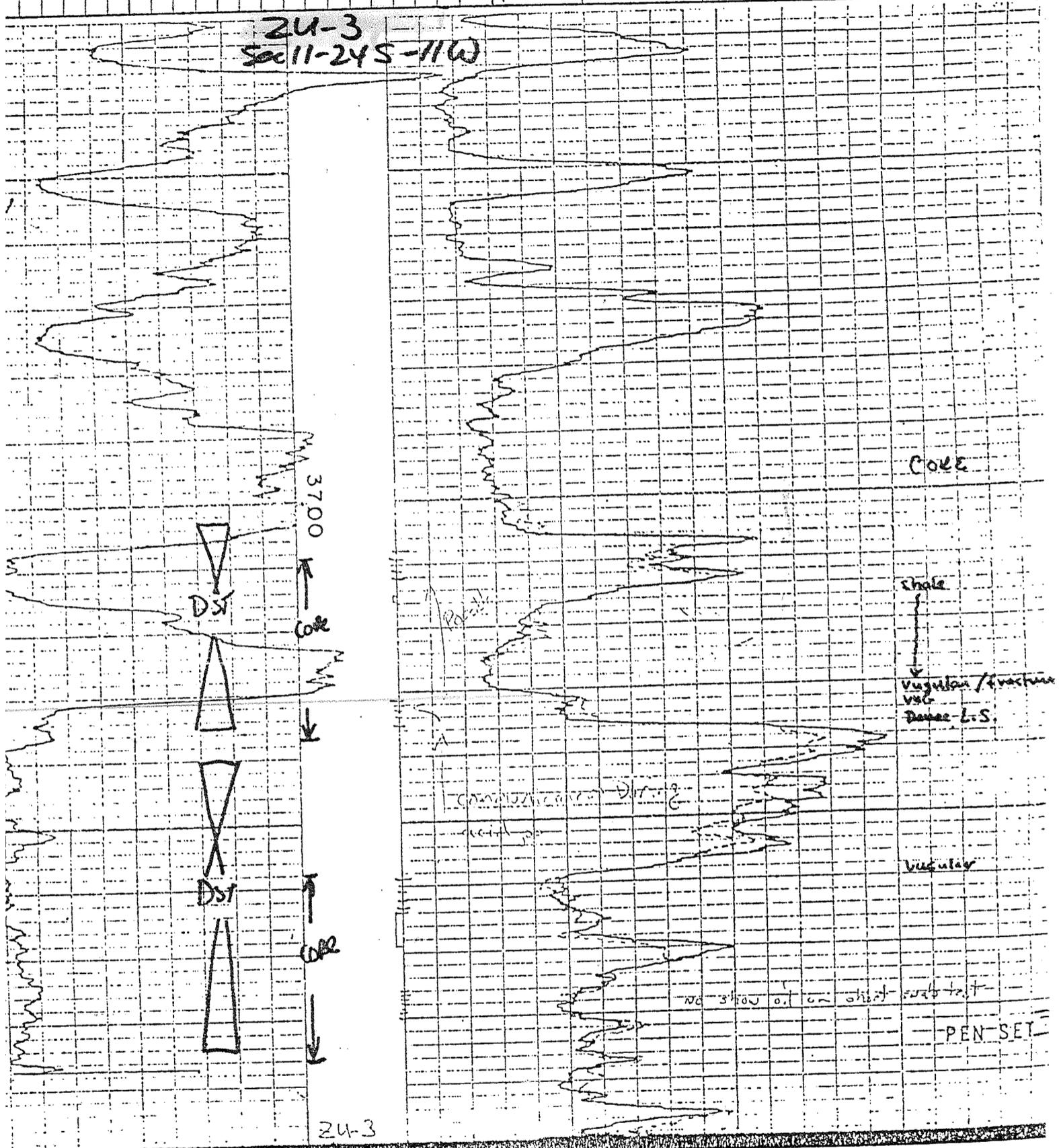


KANSAS
Other Services

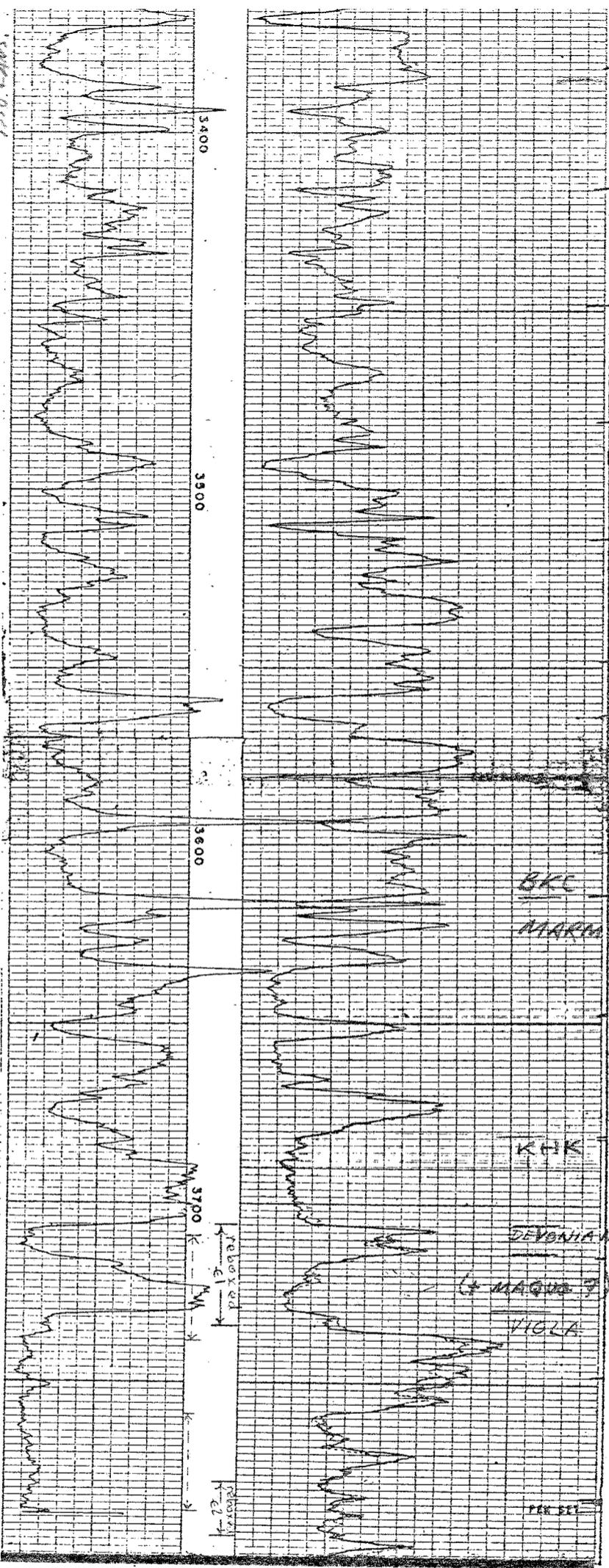
Elevations:
KB 813
DF 1810
GL 1808

Record	
From	To
SJRF	248
SJRF	3817.5

24-3
Sec 11-24S-11W



3350' LAMS



RADIATION INTENSITY INCREASES →		RADIATION INTENSITY INCREASES →	
GAMMA RAY API UNITS	DEPTH	NEUTRON API UNITS	
Company	BRADEN-ZENITH, INC.	Drillers T.D.	3800
Well	ZU NO. 3 C W 1/2 NE	Lane-Wells F.R.	3798 1/2
Field	ZENITH 11-24-11 W	Lane-Wells T.D.	3799 1/2
County	STAFFORD	Elevations:	
State	KANSAS	K.B.	1813 D.F. 1810 G.L. 1808
LANE WELLS 11-24-11 W			

Flow Time	1st	Min.	2nd	Min.	Date	8-3-66	Ticket Number	412142-S
Closed In Pres. Time	1st	Min.	2nd	Min.	Kind of Job	Open hole	Halliburton District	Great Bend
Pressure Readings	Field		Office Corrected		Tester	Jack Walker	Witness	Mr. Douglass
Depth Top Gauge	Ft.		Blanked Off		Drilling Contractor	BRADEN DRILLING COMPANY	SM	
BT. P.R.D. No.			Hour Clock		Elevation	1813'	Top Packer	-
Initial Hydro Mud Pressure					Total Depth	3735'	Bottom Packer	3703'
Initial Closed in Pres.					Interval Tested	3703-3735'	Formation Tested	
Initial Flow Pres.	1				Casing or Hole Size	7 7/8"	Casing Perfs.	Top
	2							Bot.
Final Flow Pres.	1				Surface Choke	1"	Bottom Choke	3/4"
Final Closed in Pres.					Size & Kind Drill Pipe	4 1/2" X Hole	Drill Collars Above Tester	I.D. - LENGTH
Final Hydro Mud Pressure					Mud Weight	9.9	Mud Viscosity	38
Depth Cen. Gauge	Ft.		Blanked Off		Temperature	101	*F Est. Anchor Size	ID 2 3/8
							*F Actual & Length	OD 4 1/2 X 3.2'
BT. P.R.D. No.			Hour Clock		Depths Mea. From	Derrick Floor	Depth of Tester Valve	3697 Ft.
Initial Hydro Mud Pres.					TYPZ AMOUNT Cushion		Depth Back Pres. Valve	Ft.
Initial Closed in Pres.					Recovered	20	Feet of drilling mud	
Initial Flow Pres.	1				Gas to surface			
	2				Recovered		Feet of	
Final Flow Pres.	1							
	2				Recovered		Feet of	
Final Closed in Pres.					Recovered		Feet of	
Final Hydro Mud Pres.					Oil A.P.I. Gravity		Water Spec. Gravity	
Depth Bot. Gauge	3733 Ft.		yes Blanked Off		Gas Gravity		Surface Pressure	psi
BT. P.R.D. No.	396		12 Hour Clock		Tool Opened	4:15	A.M. P.M. Tool Closed	A.M. P.M.
Initial Hydro Mud Pres.	2040		2027		Remarks	Tool opened with a good blow for a 5		
Initial Closed in Pres.	87		98		minute first flow. Rotated tool for a 15			
Initial Flow Pres.	17		1 32					
	26		2 35		minute initial closed in pressure. Tool re-			
Final Flow Pres.	26		1 34					
	35		2 43		opened with a good blow with gas to the surface			
Final Closed in Pres.	78		99		at the end of flow. Took a 45 minute final			
Final Hydro Mud Pres.	2013		2011		closed in pressure.			

Legal Location Sec. - Twp. - Rng. 11-24-11 Field Area ZENITH County STAFFORD State KANSAS

FORMATION TEST DATA
SPECIAL PRESSURE DATA

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Flow Time	1st Min. 10	2nd Min. 90	Date	8-5-66	Ticket Number	412143 S
Closed In Press. Time	1st Min. 20	2nd Min. 60	Kind of Job	OPEN HOLE	Halliburton District	GREAT BEND
Pressure Readings	Field	Office Corrected	Tester	WALKER	Witness	MR. DOUGLASS
Depth Top Gauge	Ft.	Blanked Off	Drilling Contractor	BRADEN DRILLING COMPANY		SS
BT. P.R.D. No.		Hour Clock	Elevation	1813'	Top Packer	
Initial Hydro Mud Pressure			Total Depth	3783'	Bottom Packer	3740'
Initial Closed in Pres.			Interval Tested	3740' - 3783'	Formation Tested	WIOOLA
Initial Flow Pres.	1		Casing or Hole Size	7 7/8"	Casing Perfs. Top	
	2				Bot.	
Final Flow Pres.	1		Surface Choke	1"	Bottom Choke	3/4"
	2				I.D. - LENGTH	
Final Closed in Pres.			Size & Kind Drill Pipe	4 1/2" X HOLE	Drill Collars Above Tester	-
Final Hydro Mud Pressure			Mud Weight	10.2	Mud Viscosity	37
Depth Cen. Gauge	Ft.	Blanked Off	Temperature	102 °F Est. °F Actual	Anchor Size & Length	ID 2 3/8" OD 4 1/2" X 43'
BT. P.R.D. No.		Hour Clock	Depths Mea. From	DERRICK FLOOR	Depth of Tester Valve	3734' Ft.
Initial Hydro Mud Pres.			TYPE AMOUNT		Depth Back Pres. Valve	Ft.
Initial Closed in Pres.			Cushion			
Initial Flow Pres.	1		Recovered	15	Foot of	slightly oil cut mud
	2		Recovered	100	Foot of	gas
Final Flow Pres.	1		Recovered		Feet of	
	2		Recovered		Feet of	
Final Closed in Pres.			Recovered		Feet of	
Final Hydro Mud Pres.			Oil A.P.I. Gravity		Water Spec. Gravity	
Depth Bot. Gauge	3779 Ft.	Blanked yes Off	Gas Gravity		Surface Pressure	psi
BT. P.R.D. No.	396	Hour Clock 12	Tool Opened	2:00	A.M. P.M. Tool Closed	4:00 A.M. P.M.
Initial Hydro Mud Pres.	-	2020	Remarks	Tool opened for 10 minute first flow with		
Initial Closed in Pres.	-	105	a weak blow. Closed for 20 minute initial closed in			
Initial Flow Pres.	-	1 38	pressure. Reopened for 90 minute second flow with			
	-	2 44				
Final Flow Pres.	-	1 39	a weak blow throughout test. Closed for 60 minute			
	-	2 56				
Final Closed in Pres.	-	103	final closed in pressure.			
Final Hydro Mud Pres.	-	2009				

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