Case No
7086

Large Exhibits



EXHIBIT NO. 18

Drill Stem Test

Northeast Blanco Unit Well No. 13-A

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 18
CASE NO. 7086
Submitted By Bedlwood
Hearing Date June 3, 1981

FLUID SAMPLE DATA

Sampler Pressure ..... @ ..... P.S.I.G. at Surface
Recovery: Cu. Ft. Gas .....
cc. Oil .....
cc. Water 1500
cc. Mud 1500
Tot. Liquid cc .....
Gravity ..... ° API @ ..... °F.
Sor/Dil Ratio ..... cu. ft./bbl.

	RESISTIVITY		CHLORIDE CONTENT
Recovery Water	@ °F.		ppm
Recovery Mud	4.55 @ 70 °F.		ppm
Recovery Mud Filtrate	@ °F.		ppm
Mud Pit Sample	4.61 @ 67 °F.		ppm
Mud Pit Sample Filtrate	@ °F.		ppm
Mud Weight	11.6	vis. 57	sec.

Cushion TYPE ..... AMOUNT ..... Depth Back Pr. Valve ..... Surface Choke ..... Bottom Choke 3/4"

Recovered 320 Feet of Gas cut mud
Recovered ..... Feet of .....
Recovered ..... Feet of .....
Recovered ..... Feet of .....
Recovered ..... Feet of .....

Remarks SEE PRODUCTION TEST DATA SHEET.

NOTE: If this formation contains a minimum 1500 PSI bottom hole pressure as stated by Mr. Charles Blackwood, the visual appearance of this drill stem test indicates the formation is too tight to yield permeability information during the length of this test.

Date 11-29-80 Ticket Number 717313
Kind of D.S.T. OPEN HOLE Halliburton Location FARMINGTON
Tester MR. FREIDLINE Witness MR. LOOS
Drilling Contractor FOUR CORNERS DRILLING COMPANY #4 bc

EQUIPMENT & HOLE DATA

Formation Tested Pictured Cliff
Elevation 6342' KB Ft.
Net Productive Interval 18' Ft.
All Depths Measured From Kelly Bushing
Total Depth 3430' Ft.
Main Hole/Casing Size 8 3/4" .....
Drill Collar Length 625' I.D. 2.25" O.D. 3.826"
Drill Pipe Length 2737' I.D. 3.826"
Packer Depth(s) 3227' - 3248' Ft.
Depth Tester Valve 3200.5' Ft.

TEMPERATURE	Gauge No. 349	Gauge No. 283	Gauge No.	TIME (00-00-24-00 hrs.)
	Depth 3226.51' Ft.	Depth 3227' Ft.	Depth: Ft.	Tool Opened 1112
	24 Hour Clock	24 Hour Clock	Hour Clock	Opened 1530
Est. 124 °F.	Blanked Off No	Blanked Off Yes	Blanked Off	Reports Reported / Computed
Actual °F.	Pressures	Pressures	Pressures	Minutes / Minutes

	Field	Office	Field	Office	Field	Office		
Initial Hydrostatic	2047.5	1938.8	2050.9	2055.6				
Flow — Initial	133.7	122.3	292.2	265.2			32	29
Flow — Final	200.6	199.4	324.7	326.4			89	92
Closed In	293.9	293.8	409.7	418.1				
Flow — Initial	214.9	217.3	337.7	340.4			16	16
Flow — Final	214.9	216.0	337.7	341.7			121	121
Closed In	240.7	239.9	357.4	363.0				
Flow — Initial								
Flow — Final								
Closed In								
Final Hydrostatic	2047.5	1932.8	2050.9	2053.5				

FORMATION TEST DATA

N. E. U. — 20 — 30N — 13W — 1 — 3248' - 3430' — 810 1881 BA — BLACKWOOD AND NICHOLS COMPANY LIMITED — NOT RECEIVED

Casing perfs. ____ Est. rm chokes ____ Bot. temp. ____ °F Ticket No. 717 313
Gas gravity ____ Oil gravity ____ GOR ____
Spec. gravity ____ Chlorides ____ ppm Rec. ____ @ ____ °F
INDICATE TYPE AND SIZE OF GAS MEASURING DEVICE USED ____

Date Time a.m. p.m.	Choke Size	Surface Pressure psi	Gas Rate MCF	Liquid Rate BPD	Remarks
0100					On location
0530					Picked up tools
0900					Trip in hole with tools
1112					Opened tool with a fair blow
1127					Decreasing blow
1144					Closed tool with a weak blow
1313					Opened tool with a weak blow
1329					Closed tool with a weak blow
1530					By-passed tools, unseated packers
					Pulled out of hole
1900					Jut of hole with tools

PRODUCTION TEST DATA

U.S.D.E.C.F. MICROGRAPHICS
BEST AVAILABLE COPY

BLACKWOOD AND NICHOLS — 717313

Lease Owner/Company Name — Ticket Number —

B.T. 349 — Depth 3226.51'

B.T. 283 — Depth 3427'

B.T. — Depth

INITIAL FLOW

	Time Delt .000"	Log $\frac{t+\Delta t}{\Delta t}$	P	P(sig) Corr.	Time Delt .000"	Log $\frac{t+\Delta t}{\Delta t}$	P	P(sig) Corr.	Time Delt .000"	Log $\frac{t+\Delta t}{\Delta t}$	P	P(sig) Corr.
0.	.0000	------		122.3	.0000			225.2				
1.	.0133	------		146.2*	.0134			268.6*				
2.	.0298	------		162.2	.0301			285.8				
3.	.0463	------		170.8	.0468			295.8				
4.	.0629	------		184.1	.0636			309.8				
5.	.0794	------		190.7	.0803			318.4				
6.	.0960	------		199.4	.0970			326.4				
	5 minute intervals											
	*Interval = 4 minutes											
	29 TOTAL MINUTES											

	INITIAL CLOSED IN PRESSURE											
0.	.0000	------		199.4	.0000	------		326.4				
1.	.0033	1.478		198.1	.0033	1.481		325.7				
2.	.0066	1.192		197.4	.0066	1.186		325.7				
3.	.0099	1.029		199.4	.0099	1.033		325.7				
4.	.0133	.915		200.7	.0133	.919		327.7				
5.	.0166	.831		202.7	.0166	.835		329.7				
6.	.0199	.765		204.7	.0199	.769		331.7				
7.	.0232	.711		206.7	.0232	.714		334.4				
8.	.0265	.665		208.7	.0265	.668		335.7				
9.	.0298	.625		210.7	.0298	.629		337.7				
10.	.0332	.590		212.7	.0332	.593		340.4				
11.	.0398	.533		216.0	.0398	.536		343.7				
12.	.0464	.487		219.3	.0464	.490		347.0				
13.	.0530	.449		222.7	.0530	.452		350.3				
14.	.0597	.416		225.3	.0597	.419		353.0				
15.	.0663	.389		228.6	.0663	.391		355.7				
16.	.0729	.365		231.3	.0729	.367		358.3				
17.	.0796	.344		234.0	.0796	.346		361.0				
18.	.0862	.325		237.3	.0862	.327		363.6				
19.	.0928	.308		239.3	.0928	.311		366.3				
20.	.0995	.293		241.9	.0995	.296		368.9				
	CONTINUED ON PAGE 2.....											

Remarks:

U.S.D.I. GEOLOGICAL SURVEY

BEST AVAILABLE COPY

BLACKWOOD AND NICHOLS — 717313

Lease Owner/Company Name — Ticket Number

B.T. 349 — B.T. 283 — B.T.

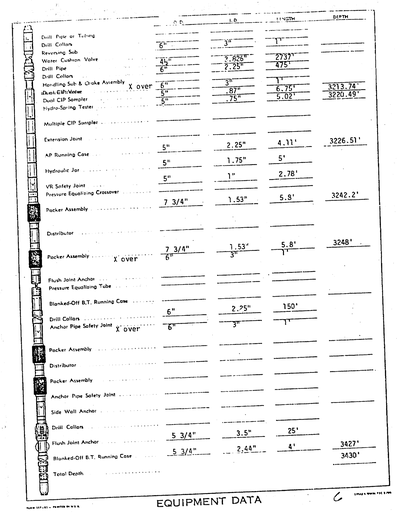
Depth 3226.51' — Depth 3427' — Depth

INITIAL CLOSED IN PRESSURE CONTINUED.....

	Time Delt (Δt)*	Log $\frac{t+\Delta t}{\Delta t}$	PSIG Tube Pressure	Time Delt (Δt)*	Log $\frac{t+\Delta t}{\Delta t}$	PSIG Tube Pressure	Time Delt (Δt)*	Log $\frac{t+\Delta t}{\Delta t}$	PSIG Tube Pressure
21.	.1160	.262	248.6	.1160	.264	374.3			
22.	.1376	.237	253.0	.1326	.238	379.6			
23.	.1494	.216	259.1	.1492	.218	384.2			
24.	.1658	.198	264.3	.1658	.200	386.9			
25.	.1825	.184	268.5	.1823	.185	393.5			
26.	.1989	.171	272.9	.1989	.173	396.9			
27.	.2155	.160	277.4	.2155	.161	401.3			
28.	.2321	.150	281.4	.2321	.152	404.8			
29.	.2486	.142	284.6	.2486	.143	408.8			
30.	.2652	.134	288.6	.2652	.135	412.8			
31.	.2818	.127	291.2	.2818	.128	415.5			
32.	.2984	.121	293.1	.2984	.122	417.5			
33.	.3050	.119	293.8	.3050	.120	418.1			
	First 10 intervals = 1 minute each; next 10 intervals = 2 minutes each; next 12 intervals = 5 minutes each; last interval = 2 minutes								
	92 TOTAL MINUTES								
	SECOND FLOW								
0.	.0000		217.3	.0000		340.4			
1.	.0560		218.0	.0530		341.7			
	16 TOTAL MINUTES								
	SECOND CLOSED IN PRESSURE								
0.	.0000		218.0	.0000		341.7			
1.	.0430		220.0*	.0431		343.7*			
2.	.0827		222.1	.0829		347.0			
3.	.1223		225.3	.1226		349.0			
4.	.1620		227.3	.1624		351.7			
5.	.2017		230.0	.2022		353.7			
6.	.2413		232.0	.2419		355.7			
7.	.2810		234.0	.2817		357.6			
8.	.3207		236.0	.3215		359.6			
9.	.3604		237.9	.3612		361.6			
10.	.4000		239.9	.4010		363.0			
	12 minute intervals *(interval) = 13 minutes 121 TOTAL MINUTES								

Remarks:

6



	O.D.	I.D.	Length	Depth
Drill Pipe or Tubing				
Drill Collars	6"	3"	1"	
Reversing Sub				
Water Cushion Valve	4½	3.826"	2737'	
Drill Pipe	4	2.25"	475'	
Drill Collars	6"	2.25"		
Handling Sub & Choke Assembly X over	6"	3"	1"	
Quest-Eith Meter	5"	.87"	6.75'	3213.74'
Dual CIP Sampler	5"	.75"	5.02'	3220.49'
Hydro-Spring Tester				
Multiple CIP Sampler				
Extension Joint	5"	2.25"	4.31'	3226.51'
AP Running Case	5"	1.75"	5'	
Hydraulic Jar	5"	1"	2.78'	
VR Safety Joint				
Pressure Equalizing Crossover	7 3/4"	1.53"	5.8'	3242.2'
Packer Assembly				
Distributor				
Packer Assembly X over	7 3/4" 6"	1.53" 3"	5.8" 1"	3248'
Flush Joint Anchor				
Pressure Equalizing Tube				
Blanked-Off B.T. Running Case				
Drill Collars	6"	2.75"	150'	
Anchor Pipe Safety Joint X over	6"	3"	1"	
Packer Assembly				
Distributor				
Packer Assembly				
Anchor Pipe Safety Joint				
Side Wall Anchor				
Drill Collars				
Flush Joint Anchor	5 3/4"	3.5"	25'	3427'
Blanked-Off B.T. Running Case	5 3/4"	2.44"	4'	3430'
Total Depth				

EQUIPMENT DATA



Each Horizontal Line Equal to 1000 p.s.i.

U.S.D.C.T. MICROGRAPHICS

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EXHIBIT NO. 19

Permeability Information

Northeast Blanco Unit Well No. 206

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 19
CASE NO. 7086
Submitted by
Hearing Date June 3, 1981

BEST AVAILABLE COPY

NEW MEXICO OIL CONSERVATION COMMISSION
MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 8-1-65

Type Test: [ ] Initial [ ] Annual [X] Special — Test Date: 6-27-81

Company: Blackwood & Nichols Co., Ltd. — Connection: Natural Formation Test — Unit:

Pool: So. Los Pinos-Fruitland PC — Formation: Pictured Cliff — Unit:

Completion Date	Total Depth	Plug Back TD	Elevation	Farm or Lease Name
Not completed	3704'	3657'	6625' Gl.	Northeast Blanco Unit

Csg. Size	Wt.	d	Set At	Perforations	Well No.	Unit	Sec.	Twp.	Rge.
4.50	10.50	4.052	3690'	From 3518' To 3549'	208	M	10	31N	7W
Tbg. Size	Wt.	d	Set At	Perforations	County				
2.375	4.7	1.995	3588'	From 3557' To 3560'	San Juan				

Type Well - Single - Bradenhead - G.G. or G.O. Multiple: Single — Packer Set At: None — County: San Juan

Producing Thru	Reservoir Temp. °F	Mean Annual Temp. °F	Baro. Press. - P_a	State
Tubing				New Mexico

L	H	Gg	$\%CO_2$	$\%N_2$	$\%H_2S$	Prover	Meter Run	Taps
		0.660						

NO.	Prover Line Size	X	Orifice Size	FLOW DATA Press. p.s.i.g.	Diff. h_w	Temp. °F	TUBING DATA Press. p.s.i.g.	Temp. °F	CASING DATA Press. p.s.i.g.	Temp. °F	Duration of Flow
SI							315		426		7 days
1.	2"		1/16	186		62			293		3 hrs.
2.											
3.											
4.											
5.											

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w p_m}$	Pressure p_m	Flow Temp. Factor Ft.	Gravity Factor Fg	Super Compress. Factor, Fpv	Rate of Flow Q, Mcfd
1	0.0866		198	0.9933	0.9682	1.013	17
2							
3							
4							
5							

NO.	P_t	Temp. °R	%	Z
1				
2				
3				
4				
5				

Gas Liquid Hydrocarbon Ratio _____ Mcf/Bbl.
A.P.I. Gravity of Liquid Hydrocarbons _____ Deg.
Specific Gravity Separator Gas _____ XXXXXXXXX
Specific Gravity Flowing Fluid XXXXX _____ XXXXXXXXX
Critical Pressure _____ P.S.I.A. _____ P.S.I.A.
Critical Temperature _____ °R _____ °R

P_c 638 P_c^2 191844

NO.	P_t^2	P_w	P_w^2	$P_c^2 - P_w^2$
1		305	93025	98819
2				
3				
4				
5				

(1) $\frac{P_c^2}{P_c^2 - P_w^2} = \frac{191844}{98819} = 1.9414$ (2) $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.9414$

AOF = Q $\left[\frac{P_c^2}{P_c^2 - P_w^2}\right]^n = 1.2575 \times 17 = 30$ Mcfd

Absolute Open Flow 30 Mcfd @ 15.025 — Angle of Slope θ _____ — Slope, n 0.85

Remarks: B & R Wireline Co. ran Wireline tools after the 3 hr. flow and found top of liquids @ 3249' 6-26-81. Start 3 days build up test 6-24-81 - 6-27-81.

Approved By Commission: — Conducted By: C. R. Wagner — Calculated By: C. R. Wagner — Checked By: DeLano Loux

U.S.G.S. TOPOGRAPHIC
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FIELD DATA SHEET (Not Returned To Files)

Type Test: ( ) Initial ( ) Annual (X) Special — Test Date: 4-24-81

Company: Blackwood & Nichols Co., Ltd.

Lease No. or Serial No.:

Operator:

Field: So. Los Pinos-F-PC

Reservoir: Pictured Cliffs

Unit:

Location: M-10-31N-2W

Casing Data: Size 2.375, Wt. 4.7, I.D. 1.995, Set At 3688'

Tubing Data: Size 1.315, Wt. 2.4, I.D. 1.049, Set At 3637'

Perforations: From 3518', To 3549'

Pkr. Set At: 6625' GL

Type Completion (Describe): Natural Tight Formation Test

Producing Thru: Tubing

Reservoir Temp. °F:

Mean Annual Temp. °F:

Baro. Press. — Pa:

Elev.: 6635' GL

Pay Zone: From 3518', To 3560'

Total Depth: 3688'

Plug Back TD: 3557'

Packer Set At:

Gas Gravity: Meas. 0.640

%CO2:

%N2:

%H2S:

Prover: 2"

Line: Size 2", Wall Reg. Type

Orifice: Size 1.750, Wall Reg. Type

Meter Run: Size 2", Wall Reg. Type

County or Parish: San Juan

State: New Mexico

Pipeline Connection: Northeast Blanco Unit

Meter No.: 296

Run No.: 10

Taps: Flg.

Gauge No.: 314

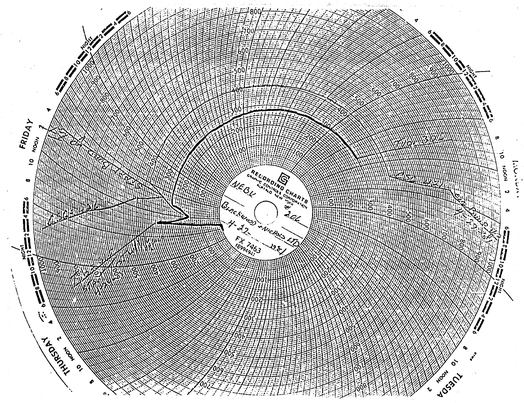
Clock No.: 72

DATE Time of Reading	ELAPSED TIME Hrs.	Without Orifice Plate Tbg. Press.	Without Orifice Plate Csg. Press.	Temp. °F	WITH ORIFICE PLATE Differential Press.	WITH ORIFICE PLATE Static Press.	WITH ORIFICE PLATE Diff.	WITH ORIFICE PLATE Temp. °F	WITH ORIFICE PLATE Orifice	REMARKS (Indicate Shut-in Pressure, Type & P.I. Gravity Meter)
4-24-81		315	626							Shut-in Pressure
										9:30 AM Start Test
	0:15	301	610	63					1/16	Coeff. = 0.0846
	0:30	291	597	64						
	0:45	279	587	65						
	1:00	270	577	65						
	1:15	253	563	65						
	1:30	244	551	65						
	1:45	232	541	66						
	2:00	224	529	66						
	2:15	213	521	66						
	2:30	206	511	67						
	2:45	196	503	67						
	3:00	186	493	67						Shut well in for buildup
										B & R Service Company
4-24-81										Ran wireline tools
1:30PM		Start Build Up Test								Found water @ 3240'
										378' fill up water
4-27-81		306	621							End Test

Page ___ of ___ Date By: C. R. Wagner

W.R.C.F. MICROGRAPHICS

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V.P.I.&S.U. MICROGRAPHICS
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Pi = Initial Shut-in Pressure (Theoretical Reservoir Pressure)

m = PSI/Cycle

μmu = cp

Q = Mcfd

h = ft.

K = md (Gas) Permeability

Pi = 413 PSIG

m = 100

μmu = 0.013

Q = 17 Mcfd

h = 31 ft.

$$K = \frac{(162.6)\ (17)\ (0.013)}{(100)\ \ (31)} = 0.0116 \text{ md}$$

U.S.B.M.-I.C. MICROGRAPHICS

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NKHU #206

Hours	$\frac{T+\Delta T}{\Delta T}$	Pressure
1	1.817	290
2	1.642	330
3	1.529	380
4	1.462	380
5	1.400	380
6	1.353	385
7	1.316	388
8	1.286	390
9	1.261	390
10	1.240	393
11	1.222	395
12	1.207	398
13	1.194	391
14	1.182	400
15	1.171	400

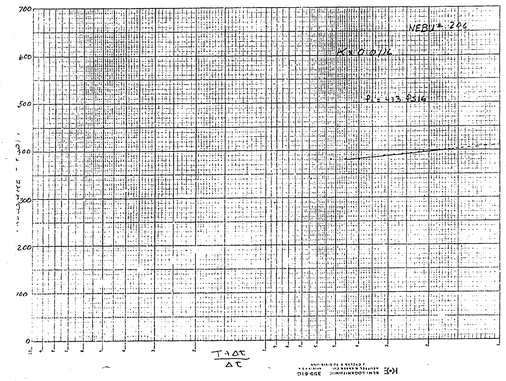
$\frac{T+\Delta T}{\Delta T}$

T = Flow Time

ΔT = Time Since Shut-in

U.M.I.F. MICROGRAPHICS

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U.S.A.F.R.L. MICROGRAPHICS
BEST AVAILABLE COPY

B & R SERVICE, INC.
P. O. Box 1048
Farmington, New Mexico 87401
(505) 325-2393

Company BLACKWOOD NICHOLS Lease MESU Well 206

County SAN JUAN State NEW MEXICO Date 4-7-14-81

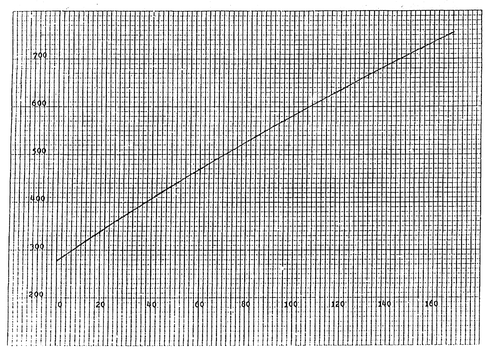
Shut-In 12 Noon 4-2-81 Zero Point K.B. Tbg. Pressure

Casing Pressure Tbg. Depth Bomb @ 3550' Casing Perf.

Max. Temp. Fluid Level

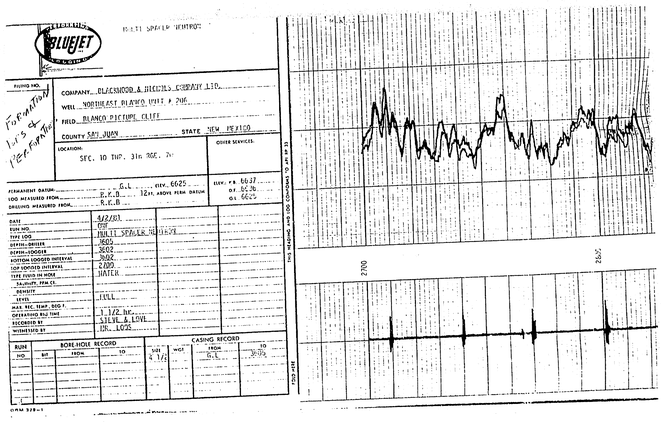
TIME	PSIG
0 Hrs.	280
6 "	297
12 "	320
18 "	337
24 "	357
30 "	377
36 "	399
42 "	416
48 "	436
54 "	455
60 "	470
66 "	489
72 "	506
84 "	540
96 "	574
108 "	608
120 "	637
132 "	666
144 "	698
156 "	730
168 "	755

U.M.I. MICROGRAPHICS
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N.A.S.A.C.R. MICROGRAPHICS

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BLUEJET

MULTI SPACED RECEIVERS

FLYING NO.

COMPANY BLACKWOOD & NICHOLS COMPANY LTD.

WELL NORTHEAST BLANCO UNIT # 20F

FIELD BLANCO PICTURE CLIFF

COUNTY SAN JUAN STATE NEW MEXICO

LOCATION: SEC. 10 TWP. 31n RGE. 7w

OTHER SERVICES:

PERMANENT DATUM G.L. ELEV. 6625

LOG MEASURED FROM K.B. 12ft. ABOVE PERM. DATUM

DRILLING MEASURED FROM K.B.

ELEV.: K.B. 6637
D.F. 6636
G.L. 6625

DATE	4/2/83		
RUN NO.	ONE		
TYPE LOG	MULTI SPACED RECEIVER		
DEPTH-DRILLER	1605		
DEPTH-LOGGER	1602		
BOTTOM LOGGED INTERVAL	1602		
TOP LOGGED INTERVAL	2100		
TYPE FLUID IN HOLE	WATER		
SALINITY, PPM CL			
DENSITY			
LEVEL	FULL		
MAX. REC. TEMP. DEG. F.			
OPERATING RIG TIME	1 1/2 hr.		
RECORDED BY	STEVE & LOVE		
WITNESSED BY	DR. LOSS		

RUN NO.	BIT	BORE-HOLE RECORD FROM	TO	CASING RECORD SIZE	WGT.	FROM	TO
				4 1/2		G.L.	30'0"

FORM 328-1

Formation tops & perforations

2700

2650

U.S.G.S. RECORDS

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U.S.G.S. MICROGRAPHICS

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EXHIBIT NO. 20

Permeability Information

Northeast Blanco Unit Well No. 208

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 20
CASE NO. 7086
Submitted by Bardwell
Hearing Date June 3, 1981

U.S.G.S. REPRESENTATIVE

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NEW MEXICO OIL CONSERVATION COMMISSION
MULTIPOINT AND ONE POINT BACK PRESSURE TEST FOR GAS WELL

Form C-122
Revised 10-1-78

Type Test: [ ] Initial [ ] Annual [X] Special — Test Date: 4-23-81

Company: Clarkwood & Nichols Co., Ltd. — Lease: Natural Formation Test — Well No.:

Pool: So. Los Pinos-Fruitland PC — Producing Formation: Pictured Cliffs — Unit:

Completion Date: — Total Depth: 3675' — Plug Back TD: 3662' — Elevation: 6541' GL — Farm or Lease Name: Northeast Blanco Unit

Csg. Size: 4.50 — Wt.: 10.50 — d: 0.052 — Set At: 3674 — Perforations: From 3477 To 3561 — Unit: N — Sec.: 12 — Twp.: 31N — Rge.: 7W

Tbg. Size: 2.375 — Wt.: 4.7 — d: 1.995 — Set At: 3566 — Perforations: From ---- To 3566 — County: San Juan

Type Well - Single - Bradenhead - G.G. or G.O. Multiple: Single — Packer Set At: ---- — State: New Mexico

Producing Thru: tubing — Reservoir Temp. °F: ---- — Mean Annual Temp. °F: ---- — Baro. Press. - P_a: ---- — Tested Thru: Annulus / Tubing

L	H	G_g	$\%CO_2$	$\%N_2$	$\%H_2S$	Prover:	
		0.610					

FLOW DATA / TUBING DATA / CASING DATA

NO	Prover Line Size	X	Orifice Size	Press. p.s.i.g.	Diff. h_w	Temp. °F	Press. p.s.i.g.	Temp. °F	Press. p.s.i.g.	Temp. °F	Duration of Flow
SI							722		686		7 days
1.	2"		1/16	15		61			227		24 hrs.
2.											
3.											
4.											
5.											

RATE OF FLOW CALCULATIONS

NO.	Coefficient (24 Hour)	$\sqrt{h_w P_m}$	Pressure P_m	Flow Temp. Factor F_t	Gravity Factor F_g	Supercompress. Factor, F_{pv}	Rate of Flow Q, Mcfd
1	0.0846		27	0.9971	0.9682	1.003	2,026
2							
3							
4							
5							

NO.	P_t	Temp. °R	T_r	Z
1				
2				
3				
4				
5				

Gas Liquid Hydrocarbon Ratio ---- Mcf/bbl.
A.P.I. Gravity of Liquid Hydrocarbons ---- Deg. — XXXXXXXX
Specific Gravity Separator Gas ---- XXXXX
Specific Gravity Flowing Fluid ---- XXXXX
Critical Pressure ---- P.S.I.A. — P.S.I.A.
Critical Temperature ---- R — R

NO	P_t^2	P_w	P_w^2	$P_w^2 + R^2$	$\frac{P_w^2}{P_w^2 - R^2}$	n	$\left[\frac{P_w^2}{P_w^2 - R^2}\right]^n$
1	298	239	57121	190883	$\frac{248.15}{190883}$	.85	1.2992
2							
3							
4							
5							

$P_w^2 = 240096$

$AOF = Q\left[\frac{P_w^2}{P_w^2 - R^2}\right]^n = 1.2492 \times 2 = 2.498$

Absolute Open Flow: 2 — MCFD @ 15.025 — Angle of Slope θ: ---- — Slope, n: .85

Remarks: R & R Wireline Co. ran wireline tools after the 24 hour flow and found the top of the liquids @ 2950'. 4-23-81. Start 7 day build up test 4-23-81.

Approved By Commission:	Conducted By:	Calculated By:	Checked By:
4-30-81	C. R. Napier	C. R. Napier	DeLasso Loos

FIELD DATA SHEET (For Pressure Tests Only)

Type Test: [ ] Initial [ ] Annual [X] Special — Test Date: 4-22-81 — Lease No. or Serial No.

Company: Blackwood & Nichols Co., Ltd. — Address

Pool: So. Los Pinos-F-PC Pictured Cliffs — Formation — County: Archuleta — State: N-12-31N-7W

Unit — Farm or Lease Name: Northeast Blanco Unit — Well No.: 208

Casing: O.D. 2.375 — Wt. 4.7 — I.D. 1.995 — Set At: 3625' — Perforations: From 3674' To 3564' — Total Depth: 3662' — Plug Back Total Depth: 3627' — Packer Set At: 3520' — Unit: M — Sec.: 12 — Twp.: 31N — Rge.: 7W

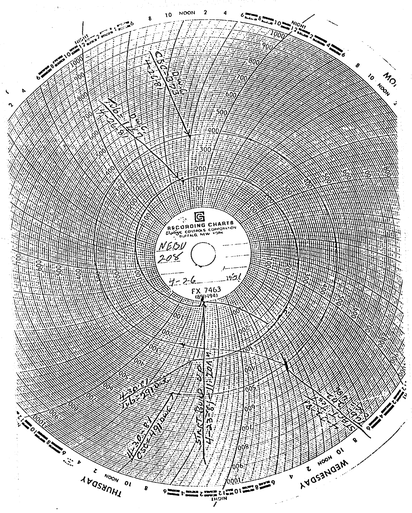
Type Completion (Describe): Natural Tight Formation Test — Producing Thru: Tubing — Reservoir Temp. F — Mean Annual Temp. F — Baro. Press. - Pa — H — Gg — %CO2 — %N2 — %H2S — Meter Run Size: 4" — Orifice Size — Meter Run — Taps

County: San Juan — State: New Mexico

DATE: Time of Reading	ELAPS. TIME Hrs.	Wellhead Casing Pressure Tbg. Press.	Csg. Press.	Temp. F	MEASURING PROVER 2" Pressure Psig.	Diff.	Temp. F	Orifice	REMARKS (Indicate liquid production during test) Type - A.P.I. Gravity - Amount
4-22-81		272	686						Shut-in Pressure
									10:40 AM Start Test
	0:15	261	671	62					1/16 Coeff. = 0.0846
	0:30	249	662	63					
	0:45	242	652	63					
	1:00	233	642	64					
	1:15	224	635	64					
	1:30	214	625	64					
	1:45	207	618	64					
	2:00	198	611	64					
	2:15	192	603	65					
	2:30	184	598	65					
	2:45	178	589	65					
	3:00	171	583	65					
	3:30	163	572	65					
	4:05	148	557	65					
4-23-81									
8:40AM	22	15	230	63					B & W Service Company
9:40	23	15	228	63					Ran wireline tools.
10:40	24	15	227	62	Shut well in.				Found water level @ 2950'
									522' water fill up
4-23-81 11:15AM		Start Build Up Test							
4-26-81		347	373						
4-30-81		295	493						

Page ___ of ___ — Done By C. R. Wright

U.S.G.S. RESTRICTED
BEST AVAILABLE COPY



BEST AVAILABLE COPY

NEBU #208

Hours	$\frac{T + \Delta T}{\Delta T}$	Pressure
2	13.000	239
4	7.000	242
6	5.000	247
8	4.000	250
10	3.400	255
12	3.000	260
14	2.714	265
16	2.500	270
18	2.333	273
20	2.200	278
22	2.091	281
24	2.000	284
26	1.923	289
28	1.292	292
30	1.750	301
32	1.750	307
34	1.706	311
36	1.667	315
42	1.571	327
48	1.500	338
54	1.444	349
60	1.400	360
66	1.364	370
72	1.333	375
84	1.286	393
96	1.250	410
108	1.222	428
120	1.200	440
132	1.182	459
144	1.167	472
156	1.154	488
164	1.146	491

U.S.D.O.E. MICROGRAPHICS

BEST AVAILABLE COPY

P1 = Initial Shut-in Pressure (Theoretical Reservoir Pressure)

m = PSI/Cycle

μ_{gas} = cp

Q = mcfd

h = ft.

K = md (Gas) Permeability

P1 = 524 PSIG

m = 28.4

μ_{gas} = 0.013

Q = 2 mcfd

h = 43 ft.

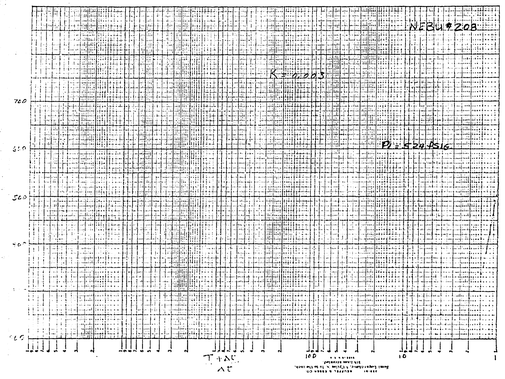
$$K = \frac{(162.6)(Q)(\mu_{gas})}{(m)(h)}$$

$$K = \frac{(162.6)(2)(0.013)}{(28.4)(43)}$$

K = 0.003 md

U.S.D.O.E.-T. MICROGRAPHICS

BEST AVAILABLE COPY



BEST AVAILABLE COPY

B & R SERVICE, INC.
P. O. Box 1049
Farmington, New Mexico 87401
(505) 325-2393

Company BLACKWOOD NICHOLS Lease NEBU Well 208

County SAN JUAN State NEW MEXICO Date 4-14-21-81

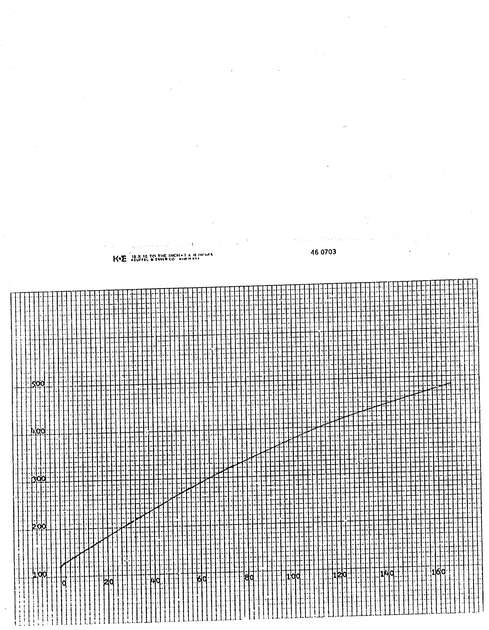
Shut-In 2:00 P.M. 4-14-81 Zero Point K.B. Tbg. Pressure

Casing Pressure Tbg. Depth Bomb @ 3530' Casing Perf.

Max. Temp. Fluid Level

TIME	PSIG
0 Hrs.	122
6 "	139
12 "	158
18 "	176
24 "	192
30 "	210
36 "	224
42 "	243
48 "	260
54 "	275
60 "	291
66 "	305
72 "	319
84 "	345
96 "	370
108 "	393
120 "	419
132 "	438
144 "	451
156 "	469
168 "	486

V.J.B.L.I. RECORDS
BEST AVAILABLE COPY



U.S.A.F.C.F. MICROGRAPHICS

BEST AVAILABLE COPY

BLUEJET

MULTISPACE RECORD

FILING NO.

Formation Tops & Remarks

COMPANY BLACKWOOD & NICHOLS COMPANY

WELL N.E.B.U. # 239

FIELD PICTURED CLIFFS

COUNTY SAN JUAN STATE NEW MEXICO

LOCATION: SEC. 12 TWP. 31N RGE. 7W

OTHER SERVICES: G.R.N. C.N.L. TDT.

PERMANENT DATUM: GROUND LEVEL ELEV. 6541

LOG MEASURED FROM: R.K.B. 13 FT. ABOVE PERM. DATUM

DRILLING MEASURED FROM: R.K.B.

ELEV.: K.B. 6554 D.F. 6553 G.L. 6541

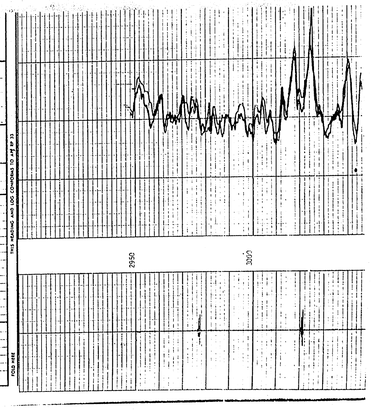
DATE	5-10-81		
RUN NO.	ONE		
TYPE LOG	MULTISPACE RECORD		
DEPTH-DRILLER	3651		
DEPTH-LOGGER	3654		
BOTTOM LOGGED INTERVAL	3653		
TOP LOGGED INTERVAL	2000		
TYPE FLUID IN HOLE	WATER		
SALINITY, PPM CL.			
DENSITY			
LEVEL	FULL		
MAX. REC. TEMP., DEG. F.			
OPERATING RIG TIME	1 HOUR		
RECORDED BY	LETHCOE-LOVE		
WITNESSED BY	MR. TOOT		

RUN NO.	BIT	BOREHOLE RECORD FROM	TO	CASING RECORD SIZE	WGT.	FROM	TO
				4 1/2		SURFACE	3653

FORM 330-1

TIED TO 3652

THIS READING AND LOG COMMENCE TO 1/4 BY 25





U.S.D.E.T.F. MICROGRAPHICS

BEST AVAILABLE COPY

A

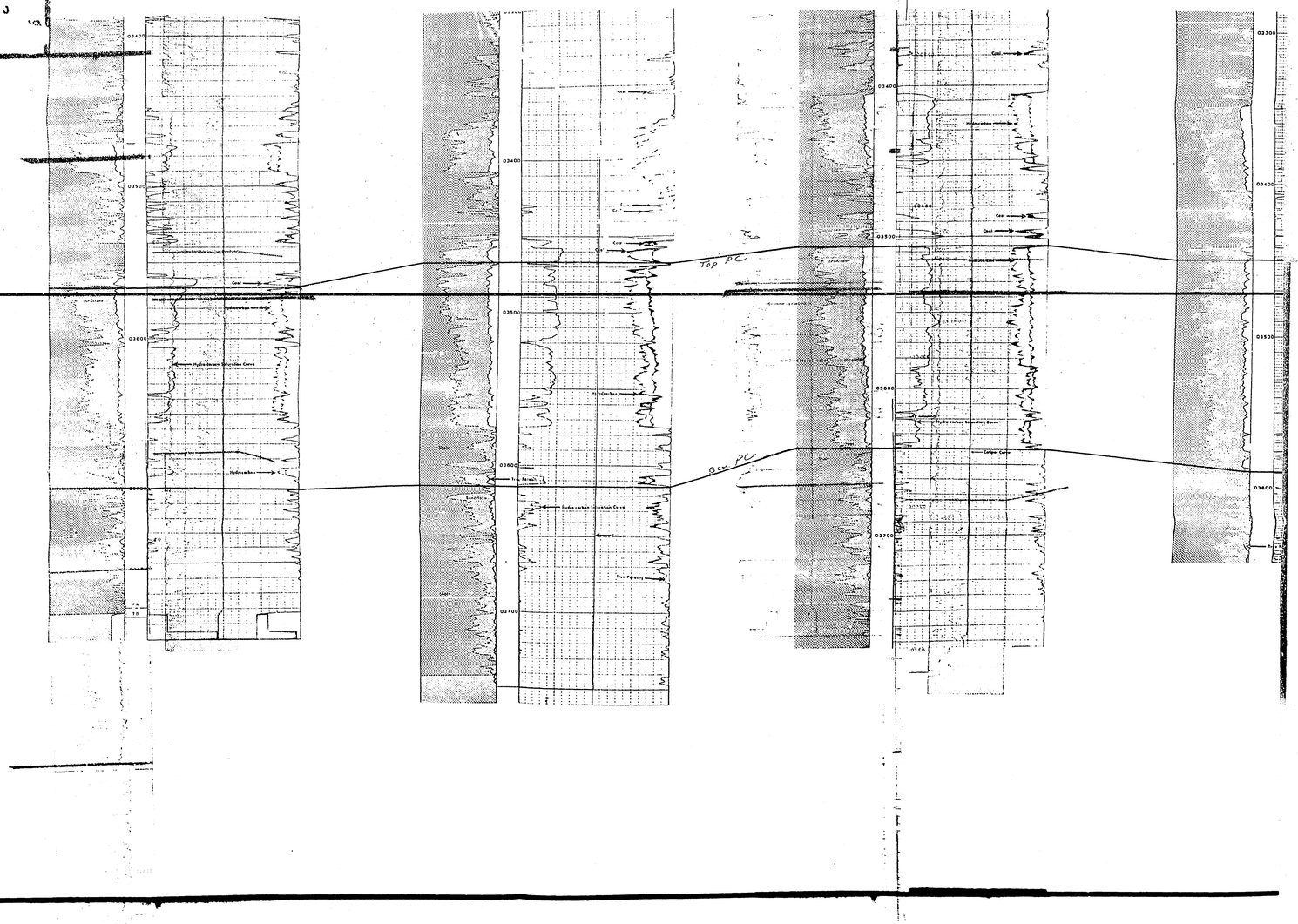
67
UNIT M
SEC. 9 - 31 N - 7 W.
ELEV. + 6671 K.B.

67 A
UNIT O
SEC. 9 - 31 N - 7 W.
ELEV. + 6588 K.B.

64
UNIT M
SEC. 10 - 31 N - 7W.
ELEV. + 6637 K.B.

U
SEC. I
ELEV

DATUM
+ 3100



Jim Watts Donated
P 755
SP WELL 54
RESISTIVITY 355
DATE 2-27-58
DISTRICT Petro Div.

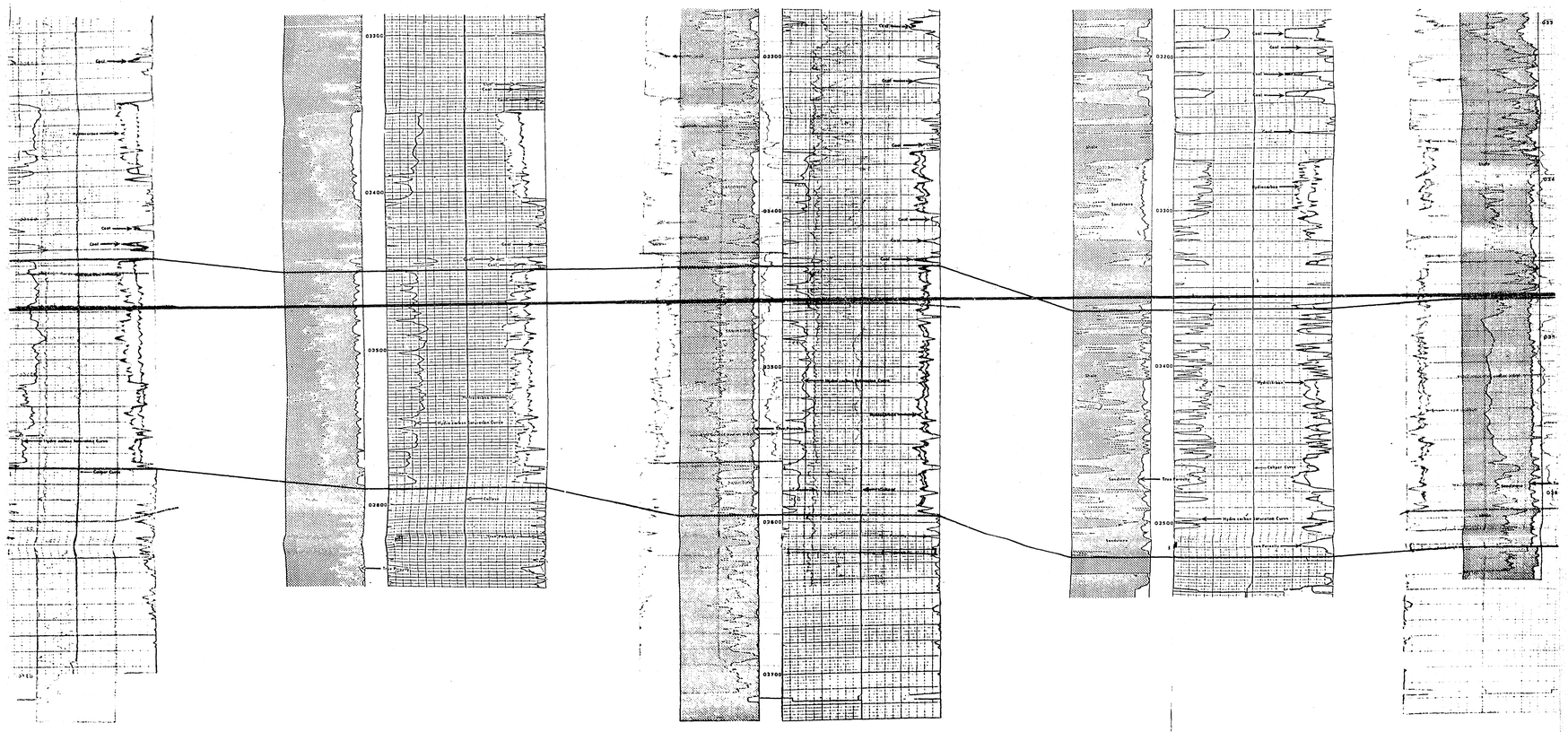
U.S.B.L.F. HYDROGRAPHICS
BEST AVAILABLE COPY

64
UNIT M
C: 10-31 N-7W.
LEV. +6637 K.B.

64 A
UNIT P
SEC. 10-31 N-7W.
ELEV. + 6572 K.B.

43A
UNIT C
SEC. 11-31 N-7W.
ELEV. + 6557 K.B.

65
UNIT P
SEC. 11-31 N-7W.
ELEV. + 6457 K.B.



U.S.G.S. PHOTOGRAPHICS
BEST AVAILABLE COPY

A'

43 A
NIT C
1 - 31 N - 7 W.
+ 6557 K B.

65
UNIT P
SEC. 11 - 31 N - 7 W.
ELEV + 6457 K B.

83
UNIT M
SEC. 1 - 31 N - 7 W.
ELEV. +6572 K B.

DATUM
+3100

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 21
CASE NO. 7084
Submitted by Blackwood
Hearing Date June 3, 1981

BLACKWOOD & NICHOLS CO. LTD.

NORTHEAST BLANCO UNIT
SAN JUAN & RIO ARRIBA COUNTIES, NEW MEXICO

CROSS SECTION A-A'
PICTURED CLIFFS FORMATION

Charles F. Blackwood Oklahoma City, Okla.

Exhibit # 21

Case Number 7084
Exhibit Number 54
Prepared by: Blackwood & Nichols
Date 2-11-82
Submitted by Blackwood & Nichols
Hearing Date 3-3-82

WELL RECORDS

BEST AVAILABLE COPY

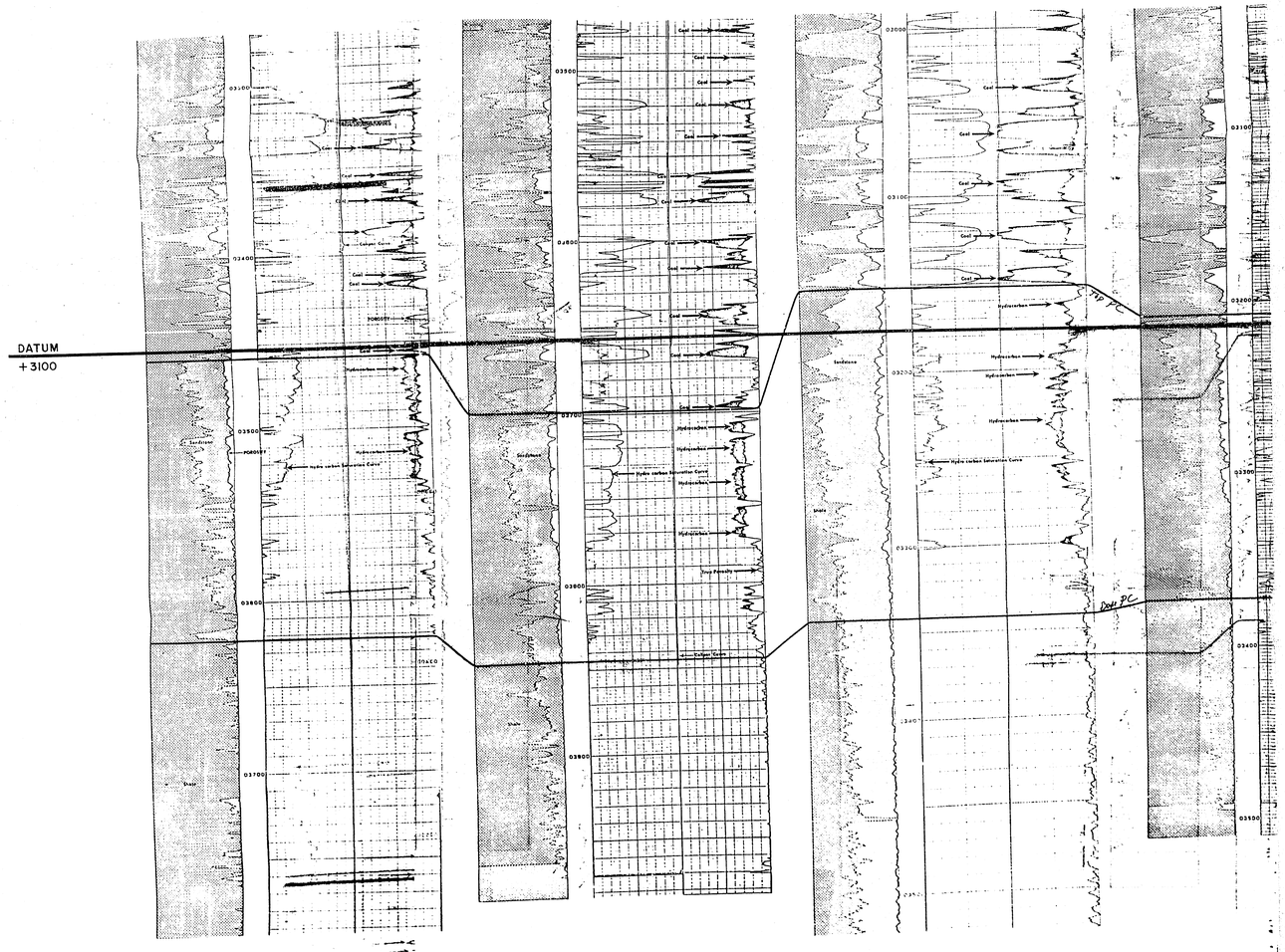
B

6 A
UNIT T
SEC. 29 - 30 N - 7 W.
ELEV. + 655[illegible] B

19 A
UNIT P
SEC. 20 - 30 N - 7 W.
ELEV. + 6756 K. B.

4 A
UNIT D
SEC. 21 - 30 N. - 7 W.
ELEV. + 6276 K. B.

24
UN
SEC. 17 -
ELEV. + [illegible]


DATUM
+3100
Coal
Sandstone
Shale
Hydrocarbon
Hydrocarbon
Hydrocarbon

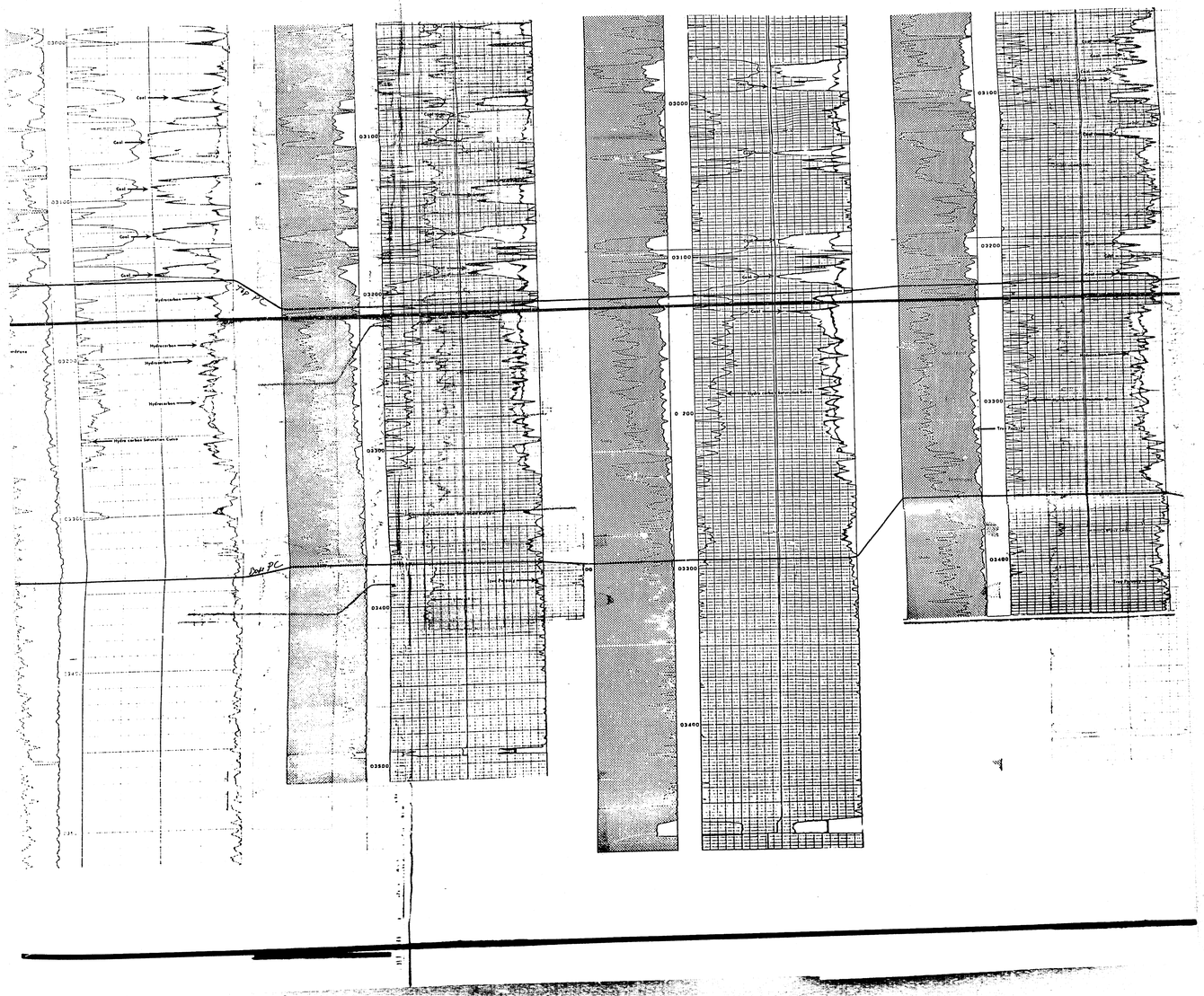
4 A
UNIT D
SEC. 21- 30 N. - 7 W.
ELEV. + 6276 K. B.

24 A
UNIT I
SEC. 17- 30 N. - 7 W.
ELEV. + 6314 K. B.

10 A
UNIT D
SEC. 16 - 30 N. - 7 W.
ELEV. + 6229 K. B.

17 A
UNIT E
SEC. 9 - 30 N. - 7 N.
ELEV + 6334 K.B.

Type Log
for
Area



BEST AVAILABLE COPY

17 A
UNIT E
SEC. 9 - 30 N. - 7 N
ELEV. + 6334 K B

44 A
UNIT P
SEC. 4 - 30 N. - 7 W
ELEV. + 6214 K. B.

102 A
UNIT F
SEC. 3 - 30 N. -7 W.
ELEV. + 6327 K. B.



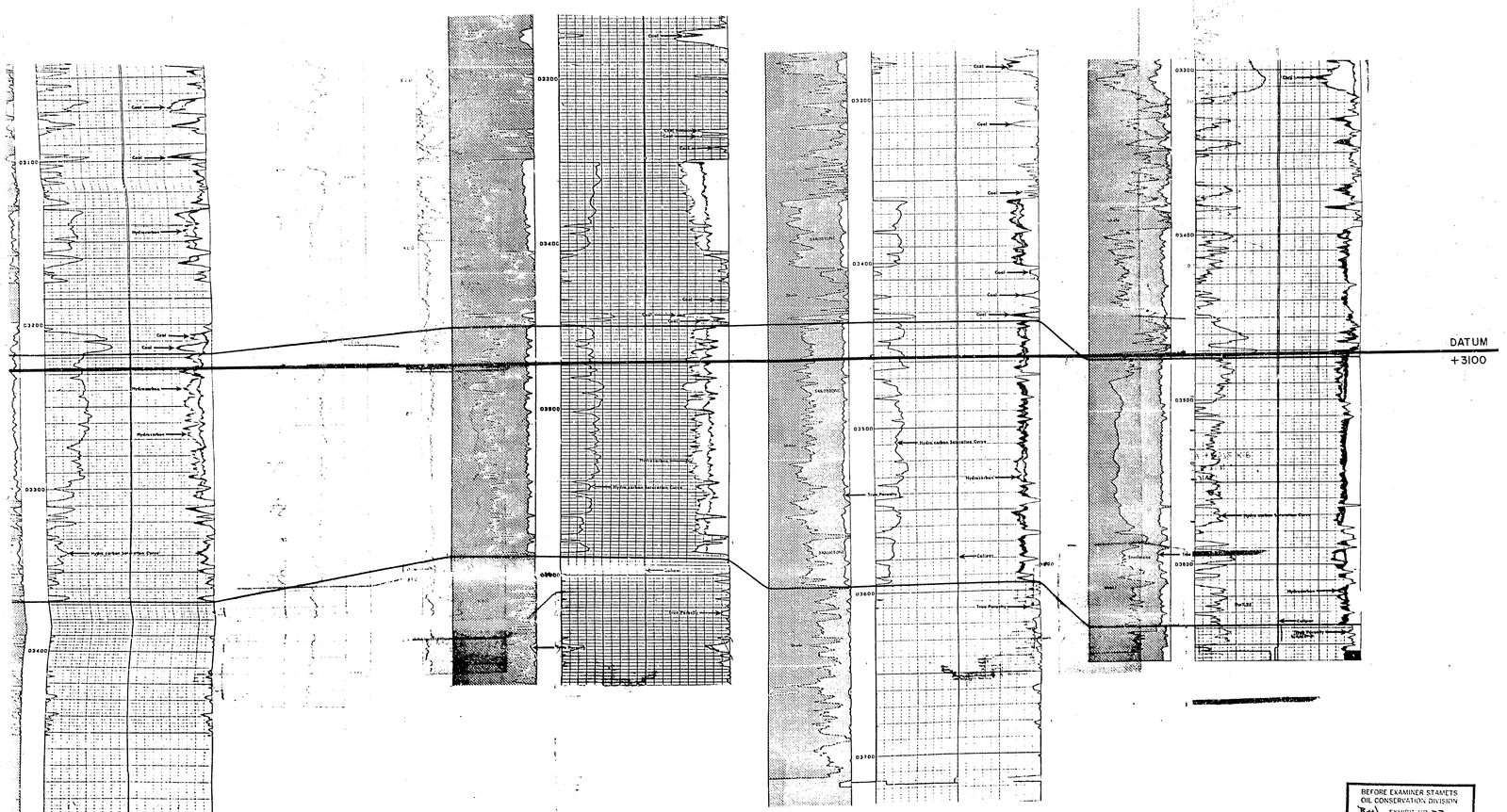
B'

102 A
UNIT F
SEC. 3 - 30 N.-7 W.
ELEV. + 6327 K. B.

64 A
UNIT P
SEC. 10 - 31 N.- 7 W.
ELEV. + 6572 K. B.

43 A
UNIT C
SEC. 11 - 31 N. - 7 N.
ELEV. + 6557 K. B

63
UNIT M
SEC. 1- 31 N. - 7 W
ELEV. + 6572 K. B.

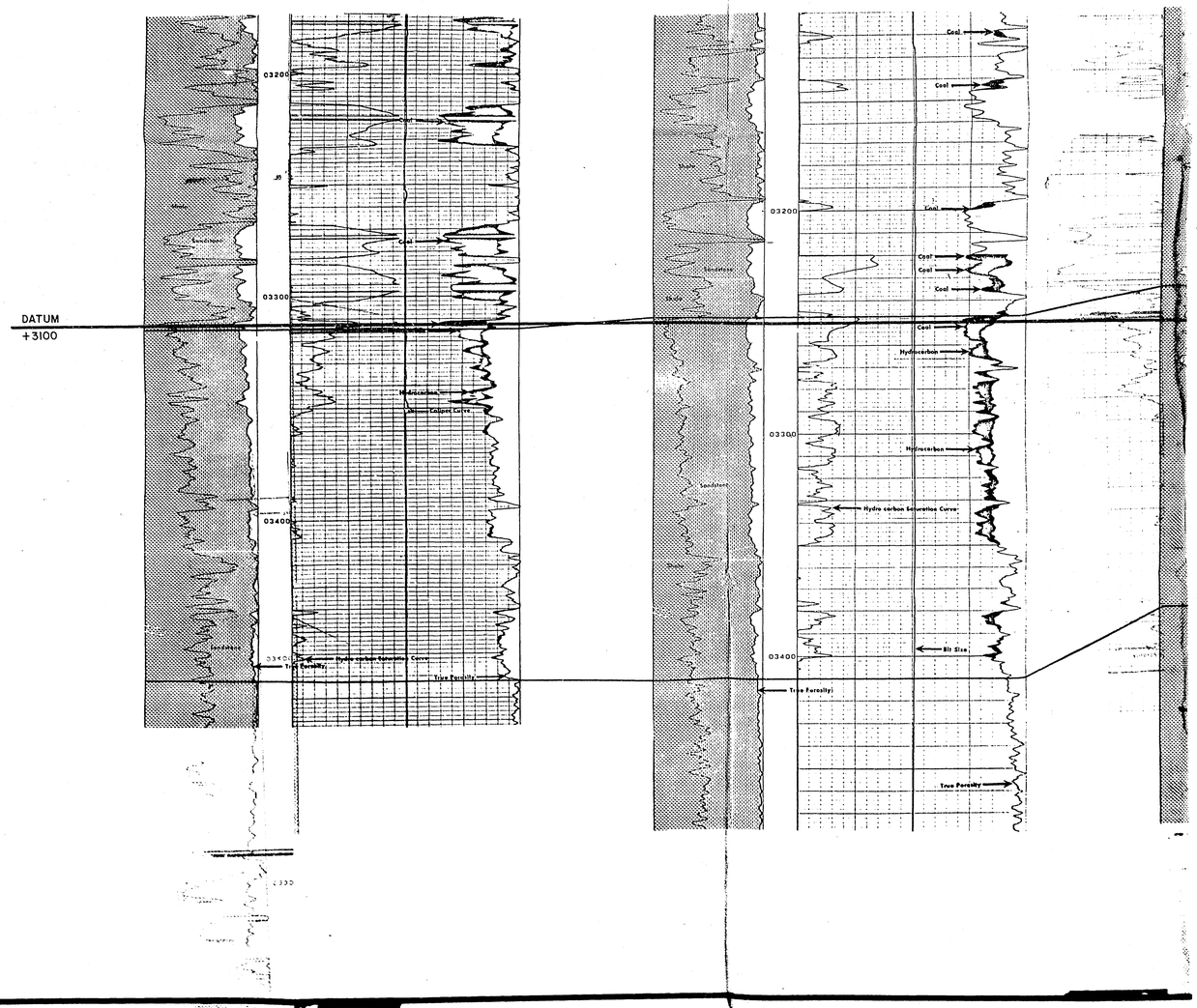

03100
03200
03300
03400
03500
03600
03700
Coal
Hydrocarbon Saturation Curve
Hydrocarbon Saturation Curve
Hydrocarbon Saturation Curve

C

104 A
UNIT D
SEC. 1 - 30 N - 8 W.
ELEV + 6413 K B

36 A
UNIT O
SEC. 1 - 30 N - 8 W.
ELEV + 6360 K B.

A 401
C T-MU
WB [illegible]
[illegible]



[illegible] Water Resources
[illegible] 7750
[illegible] 59
[illegible] 35N-8W, 1W-2W-3W-5W-6W-7W-8W
[illegible] Salt Dome

U.S.B.L.M. RECORDS
BEST AVAILABLE COPY

36 A
UNIT O
SEC. 1 - 30 N - 8 W.
ELEV. + 6360 K. B.

3 A
UNIT E
SEC. 5 - 30 N - 7 W.
ELEV. + 6323 K. B.

17 A
UNIT E
SEC. 9 - 30 N - 7 W.
ELEV. + 6334 K. B.

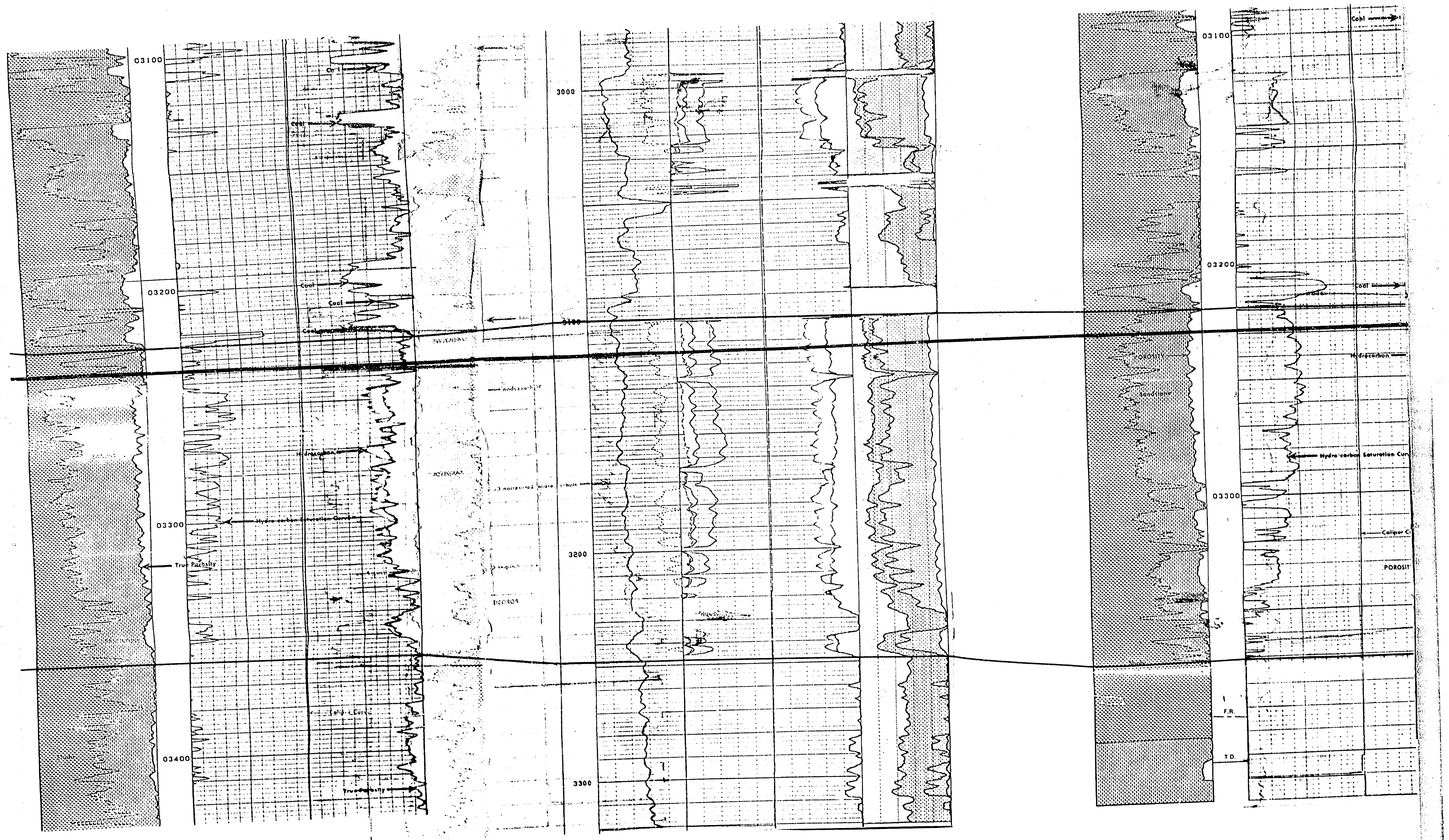
03100
03200
03300
03400
Coal
Hydrocarbon
Hydro carbon Saturation Curve
Silt Size
True Porosity
Sandstone
Caliper
Hydrocarbon Saturation Curve

BEST AVAILABLE COPY

17 A
UNIT E
SEC. 9 - 30 N - 7 W.
ELEV. +6334 K.B.

44 A
UNIT P
SEC. 4 - 30 N - 7 W.
ELEV. +6213 K.B.

16 A
UNIT J
SEC. 3 - 30 N - 7 W.
ELEV. +6328 K.B.

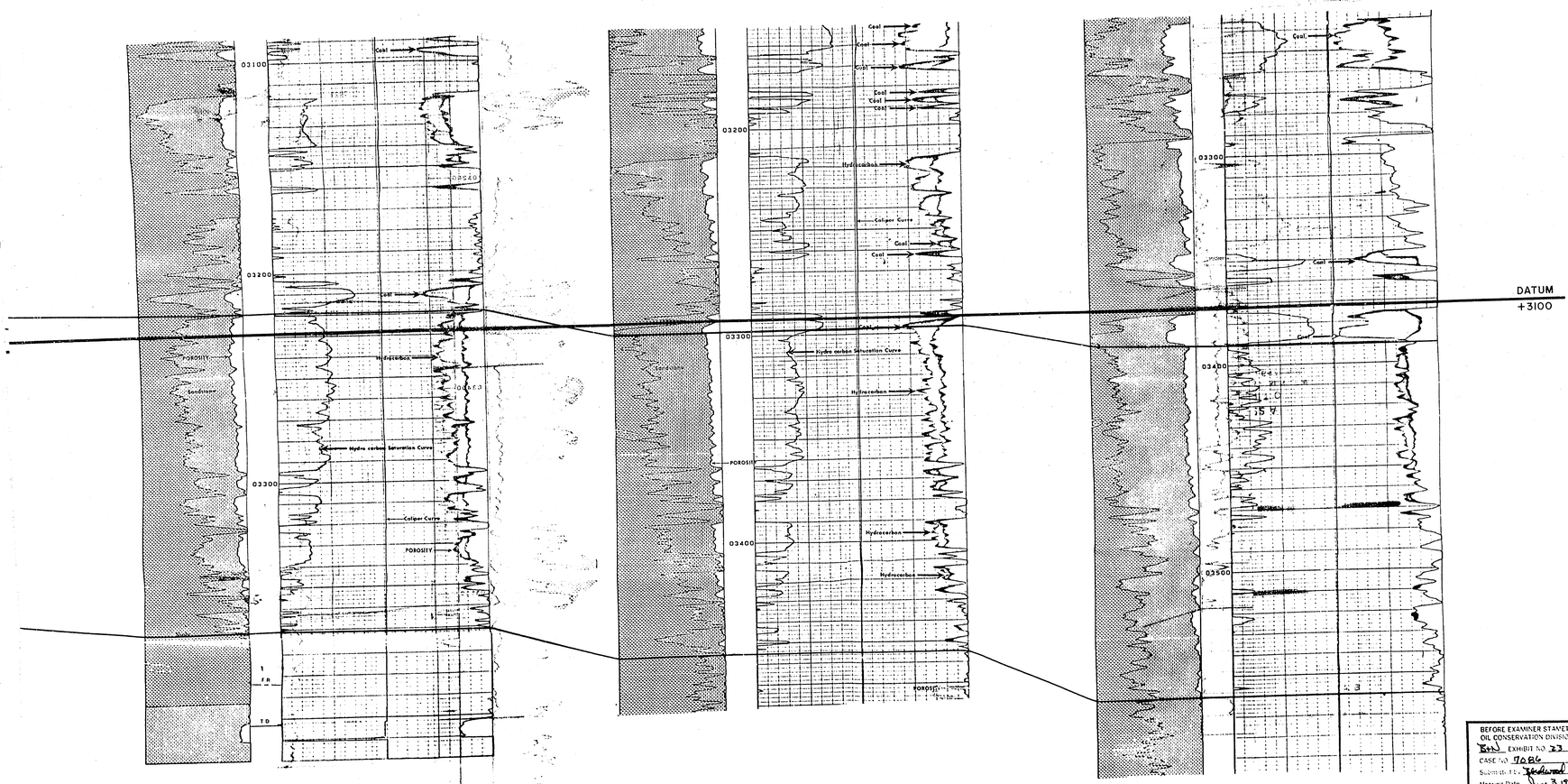


C'

16 A
UNIT J
SEC. 3 - 30 N - 7 W.
ELEV. + 6328 K.B.

14 A
UNIT I
SEC. 2 - 30 N - 7 W.
ELEV. + 6392 K.B.

22 A
UNIT O
SEC. 36 - 31 N - 7 W.
ELEV. + 6472 K.B.



BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 23
CASE NO. 7086
Submitted by Blackwood
Hearing Date June 3, 1981

BLACKWOOD & NICHOLS CO. LTD.

NORTHEAST BLANCO UNIT
RIO ARRIBA AND SAN JUAN COUNTIES, NEW MEXICO

CROSS SECTION C-C'
PICTURED CLIFFS FORMATION

Charles F. Blackwood Oklahoma City, Okla

Exhibit #23

U.S.G.S. PHOTOGRAPHICS
BEST AVAILABLE COPY

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 24
CASE NO. 7086
Submitted by Blackwood
Hearing Date June 3, 1981

PICTURED CLIFFS FORMATION
ISOPACHOUS MAP GROSS INTERVAL

BLACKWOOD & NICHOLS CO., LTD.
NORTHEAST BLANCO UNIT
SAN JUAN & RIO ARRIBA COS., N. M.

Exhibit #24

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 25
CASE NO. 7086
Submitted by Blackwood
Hearing Date June 3, 1981

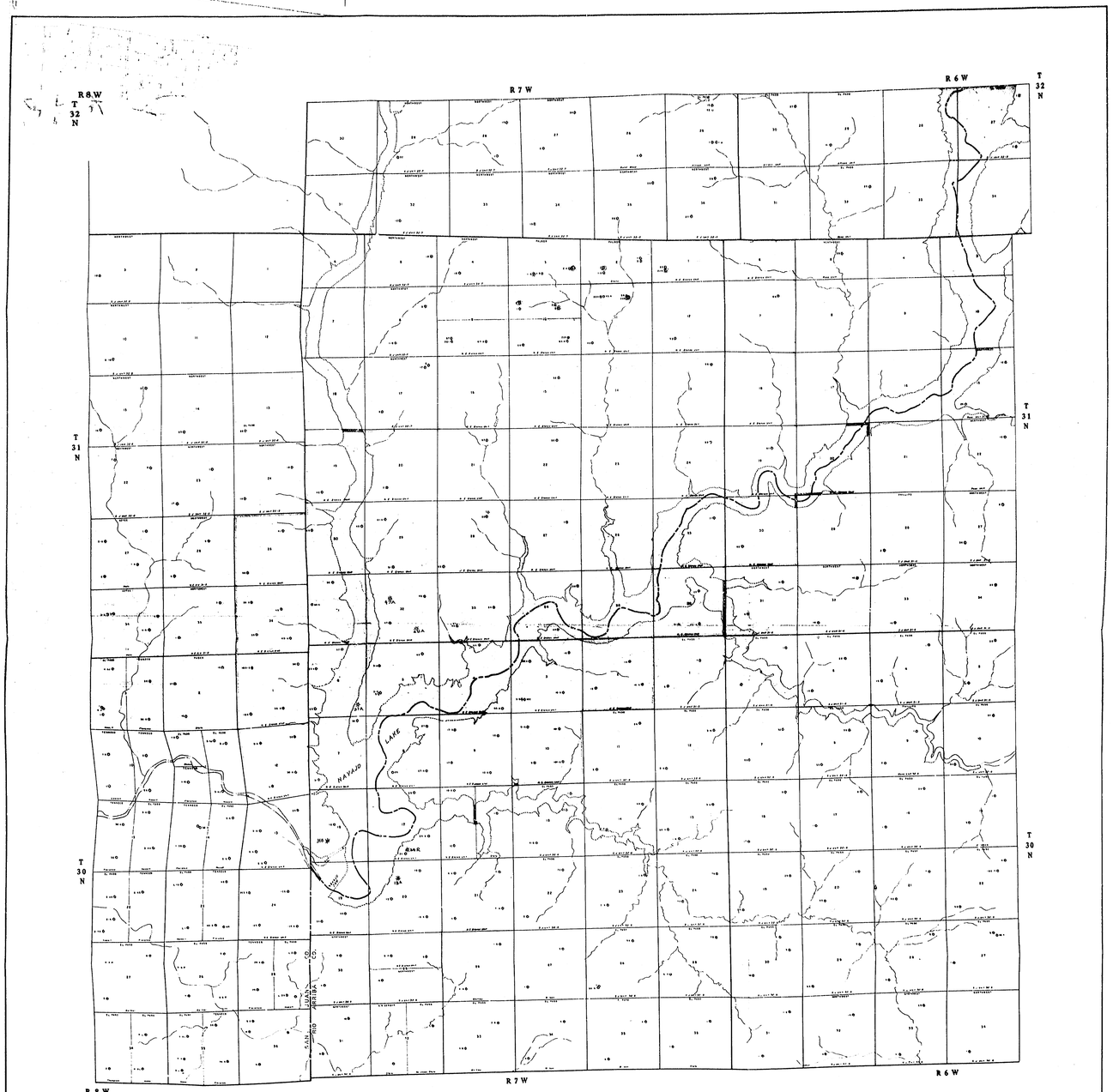
PICTURED CLIFFS FORMATION
STRUCTURE MAP ON TOP PC ABOVE SEA LEVEL

BLACKWOOD & NICHOLS CO., LTD.
NORTHEAST BLANCO UNIT
SAN JUAN & RIO ARRIBA COS., N. M.

Exhibit # 25

V.P.I.C.F. MICROGRAPHICS

BEST AVAILABLE COPY



Pictured Cliffs Gas Well ⊕
Mesaverde Gas Well ⊕

BLACKWOOD & NICHOLS CO., LTD.
NORTHEAST BLANCO UNIT
SAN JUAN & RIO ARRIBA COS., N. M.

Jic Water Disposal
[illegible] 2750
[illegible] 5-4
[illegible] 332-333-334-335-336-337-[illegible]
and 2-[illegible] 341-342-343-344
[illegible] Jicarilla Apache

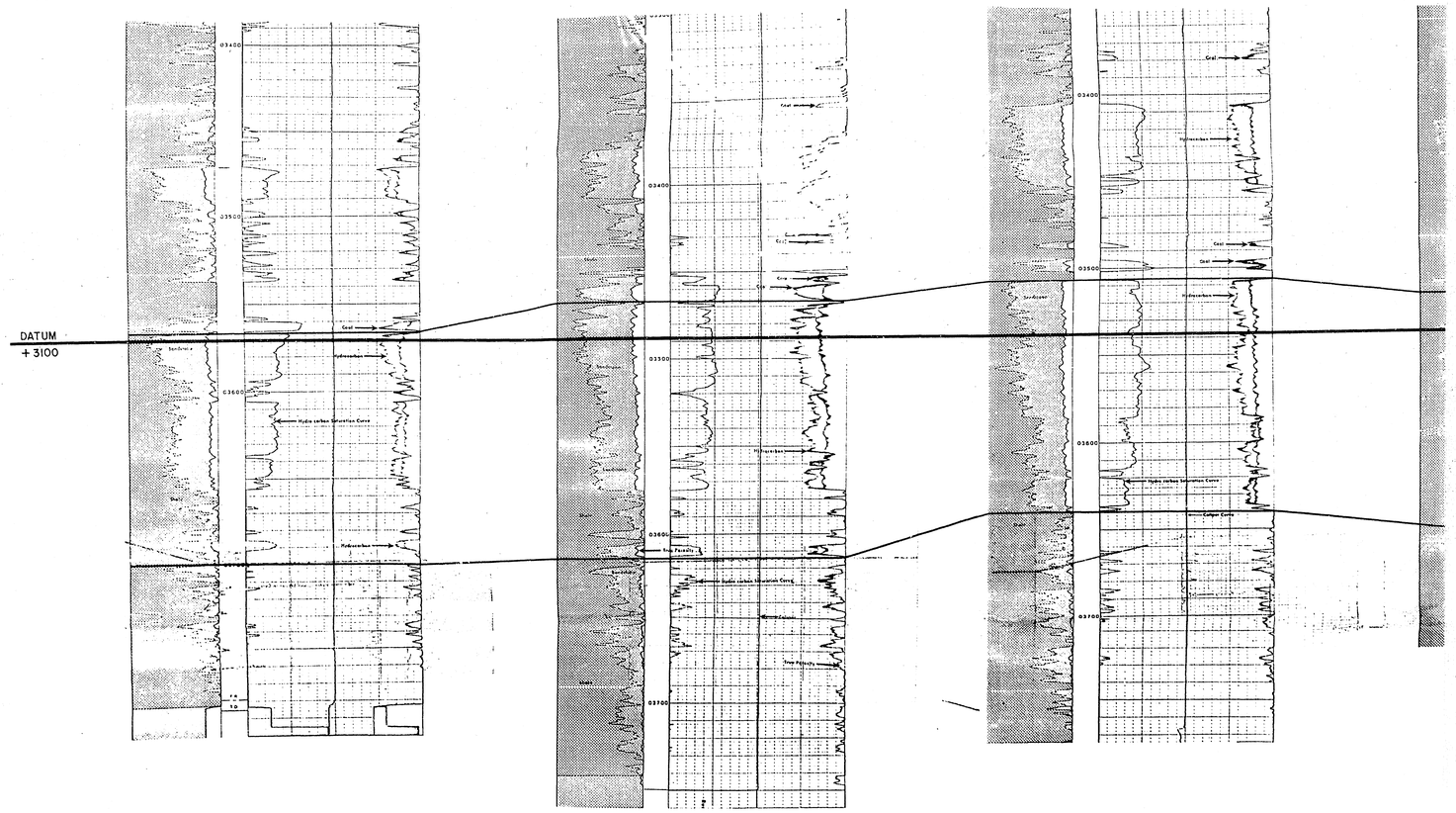
U.S.G.S. TOPOGRAPHICS
BEST AVAILABLE COPY

A

67
UNIT M
SEC. 9 - 31 N - 7 W.
ELEV. + 6671 K. B.

67 A
UNIT O
SEC. 9 - 31 N - 7 W.
ELEV. + 6588 K. B.

64
UNIT M
SEC. 10-31 N-7W.
ELEV. + 6637 K. B.

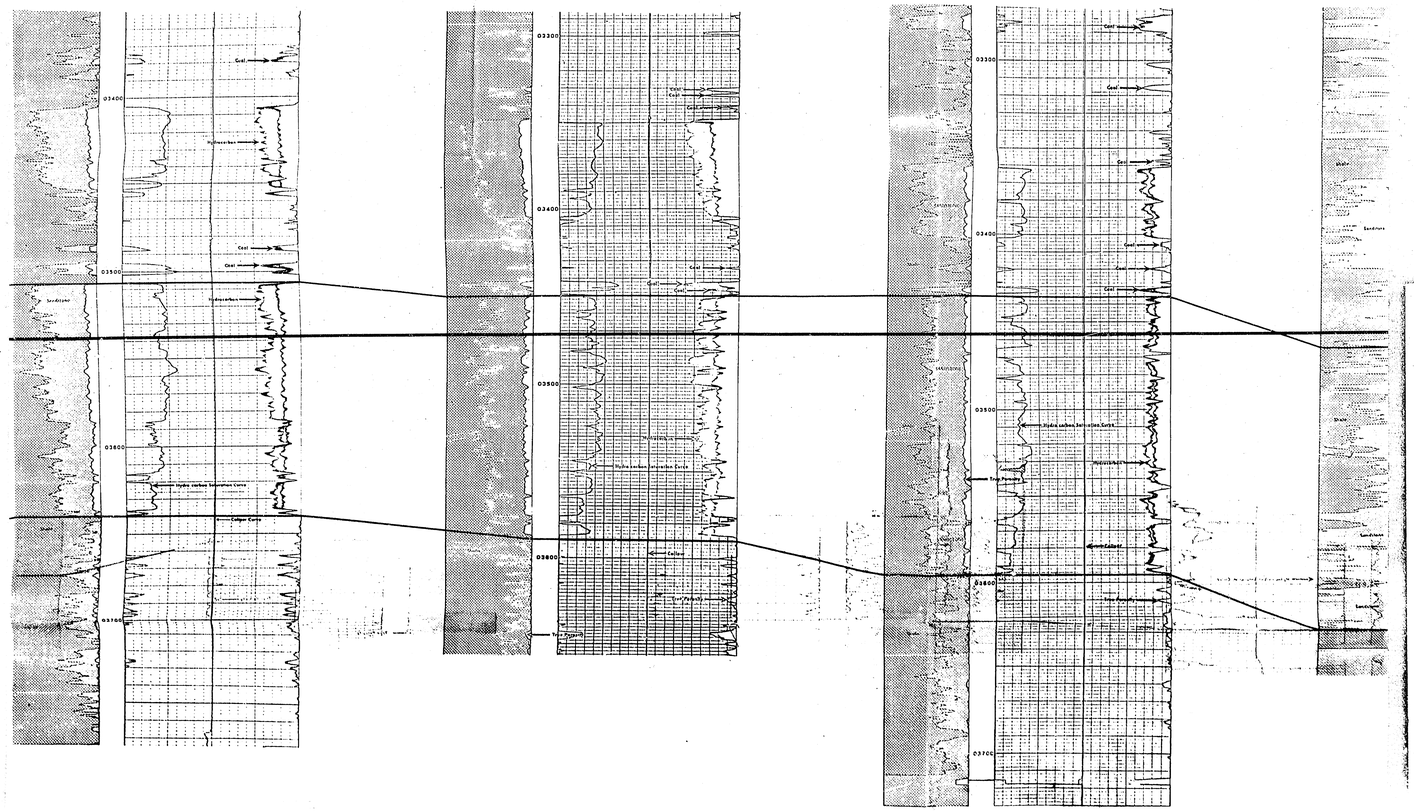


U.S.G.S. TOPOGRAPHICS
BEST AVAILABLE COPY

64
UNIT M
SEC. 10-31 N-7W.
ELEV. +6637 K.B.

64 A
UNIT P
SEC. 10-31 N-7W.
ELEV. +6572 K.B.

43 A
UNIT C
SEC. 11-31 N-7W.
ELEV. +6557 K.B.



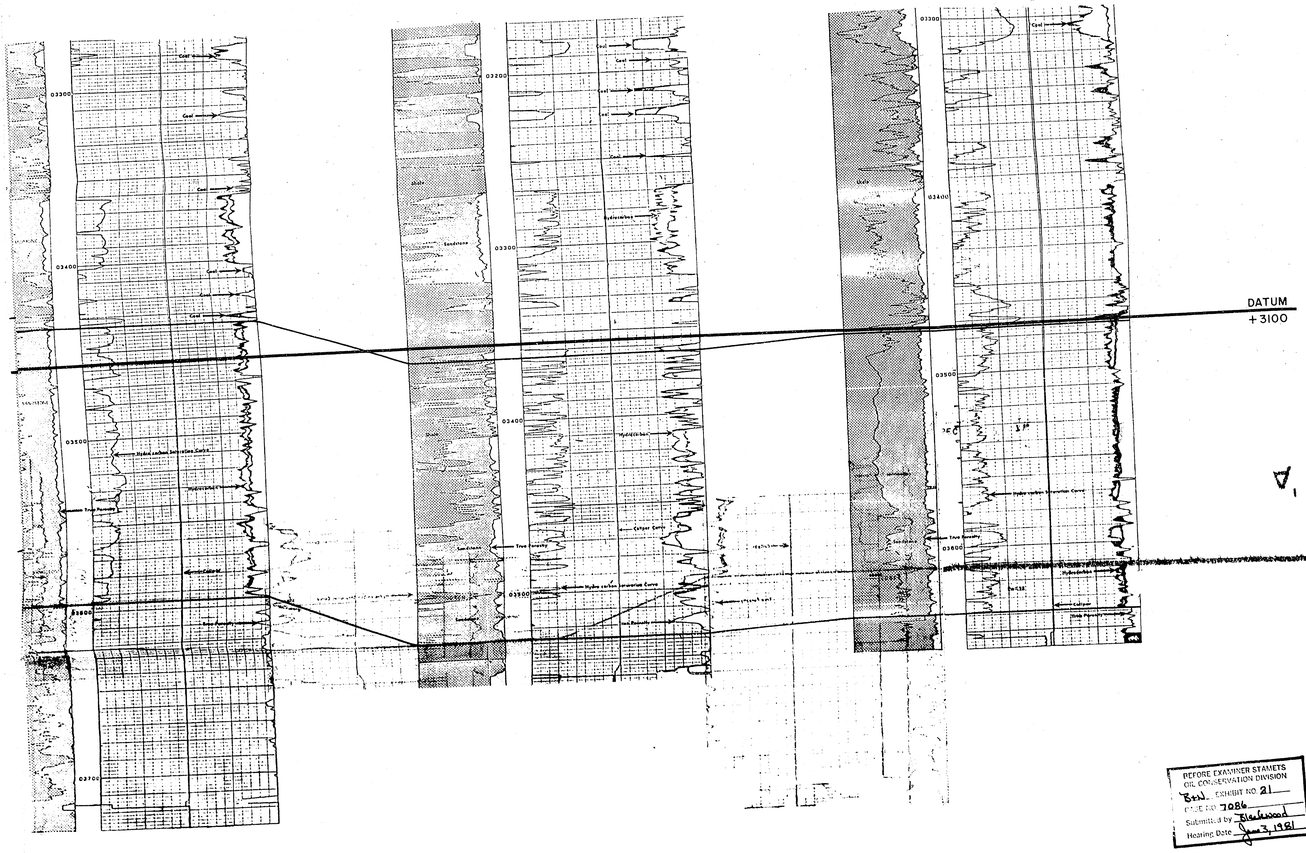
U.N.M.C.F. MICROGRAPHICS
BEST AVAILABLE COPY

A'

43 A
UNIT C
SEC. 11 - 31 N - 7 W.
ELEV. + 6557 K.B.

65
UNIT P
SEC. 11 - 31 N - 7 W
ELEV. + 6457 K.B.

63
UNIT M
SEC. 1 - 31 N - 7 W
ELEV. + 6572 K.B.



BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 21
CASE NO. 7086
Submitted by Blackwood
Hearing Date June 3, 1981

BLACKWOOD & NICHOLS CO. LTD.

NORTHEAST BLANCO UNIT
SAN JUAN & RIO ARRIBA COUNTIES, NEW MEXICO

CROSS SECTION A-A'
PICTURED CLIFFS FORMATION

Charles F. Blackwood Oklahoma City, Okla

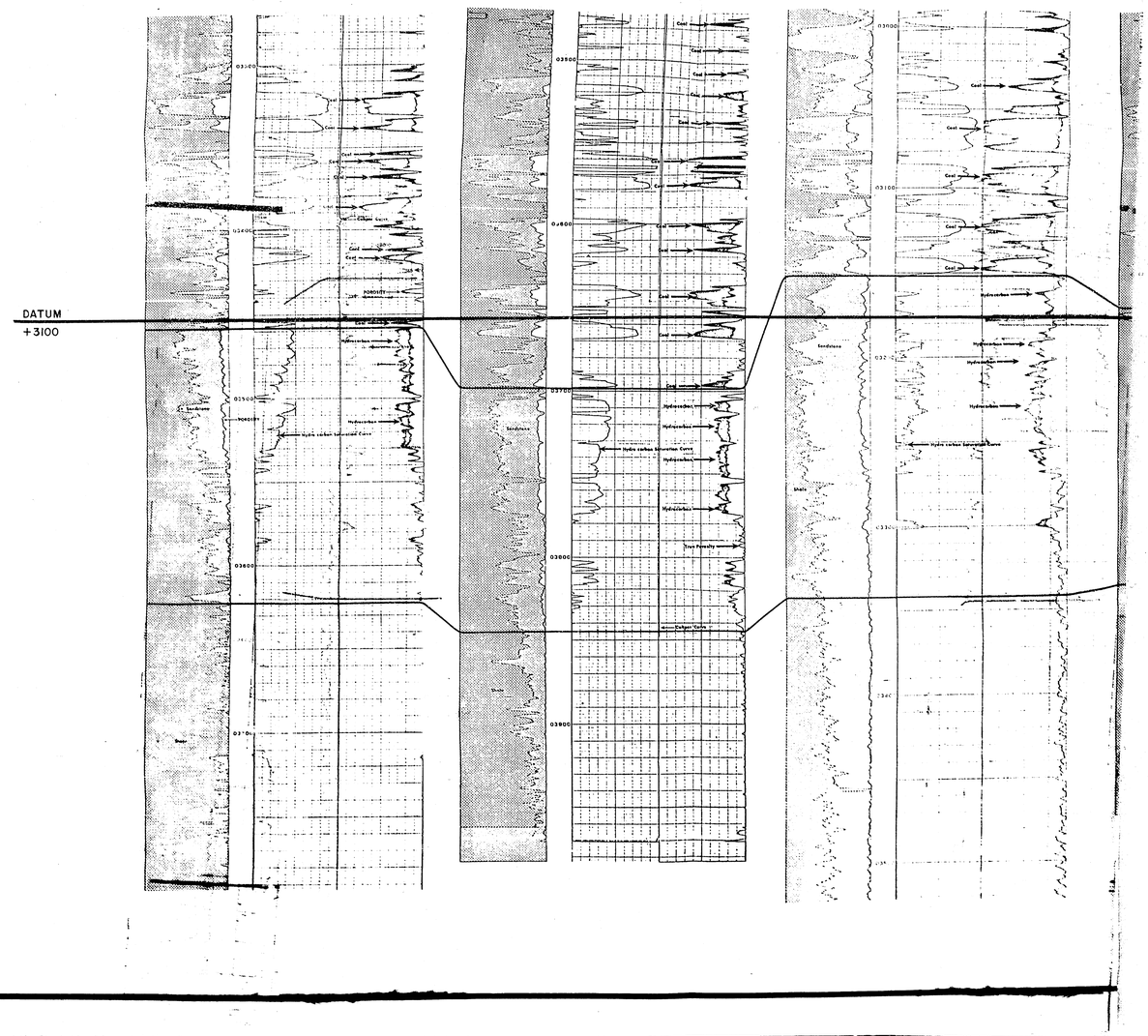
Exhibit #21

B

6 A
UNIT I
SEC. 29 - 30 N - 7 W.
ELEV. + 655[illegible] K. B.

19 A
UNIT P
SEC. 20 - 30 N - 7 W.
ELEV. + 6756 K. B.

4 A
UNIT D
SEC. 21 - 30 N - 7 W.
ELEV. + 6276 K. B.


DATUM
+3100
03400
03500
03600
03700
03800
03900
04000
03100
03200
03300
03400
Coal
Sandstone
Hydrocarbon
Hydro carbon Saturation Curve
Hydrocarbon
Pore Porosity
Hydrocarbon
Hydro carbon Saturation Curve
Hydrocarbon
Hydrocarbon
Hydrocarbon
Hydro carbon Saturation Curve
Hydrocarbon
Pore Porosity

4 A
UNIT D
SEC. 21- 30 N. - 7 W.
ELEV. + 6276 K. B.

24 A
UNIT I
SEC. 17 - 30 N. - 7 W.
ELEV. + 6314 K. B.

10 A
UNIT D
SEC. 16 - 30 N. - 7 W.
ELEV. + 6229 K. B.

17 A
UNIT E
SEC. 9 - 30 N. - 7 N.
ELEV. + 6334 K. B.

U.S.B.L.E. MICROGRAPHICS
BEST AVAILABLE COPY

10 A
UNIT D
16 - 30 N. - 7 W.
EV + 6229 K. B.

17 A
UNIT E
SEC. 9 - 30 N. - 7 N.
ELEV. + 6834 K. B.

44 A
UNIT P
SEC. 4 - 30 N. - 7 W.
ELEV. + 6214 K. B.

102 A
UNIT F
SEC. 3 - 30 N.-7 W.
ELEV. + 6327 K. B.

U.S.G.S. HOROGRAPHICS

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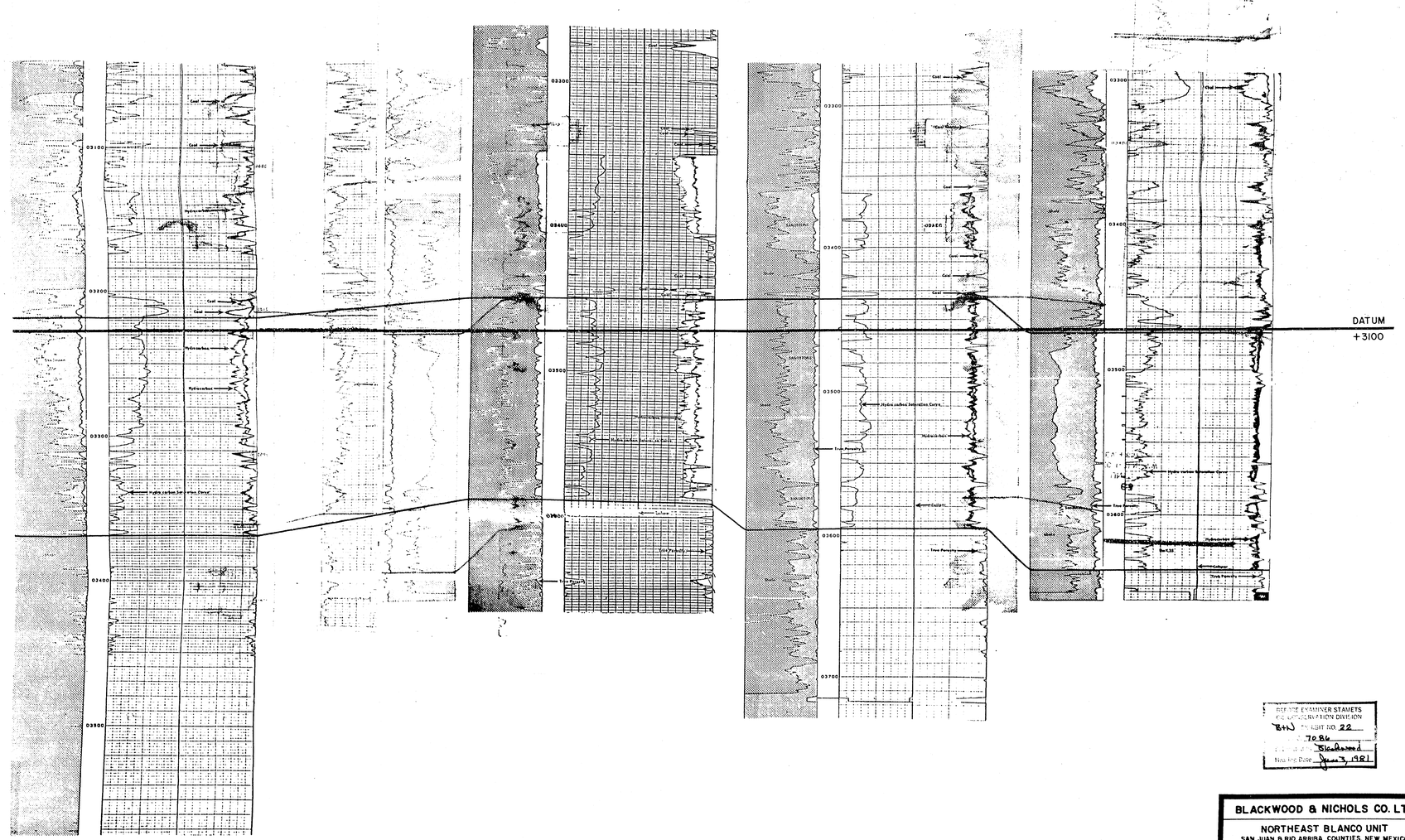
B'

102 A
UNIT F
SEC. 3 - 30 N.-7 W.
ELEV. + 6327 K. B.

64 A
UNIT P
SEC. 10 - 31 N.- 7 W.
ELEV. + 6572 K. B.

43 A
UNIT C
SEC. 11-31 N. - 7 N.
ELEV. + 6557 K. B

63
UNIT M
SEC. 1-31 N. -7W
ELEV. + 6572 K. B.



BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
CASE NO. 22
Exhibit No. 7
Submitted by Blackwood
Hearing Date June 3, 1981

BLACKWOOD & NICHOLS CO. LTD.

NORTHEAST BLANCO UNIT
SAN JUAN & RIO ARRIBA COUNTIES, NEW MEXICO

CROSS SECTION B-B'
PICTURED CLIFFS FORMATION

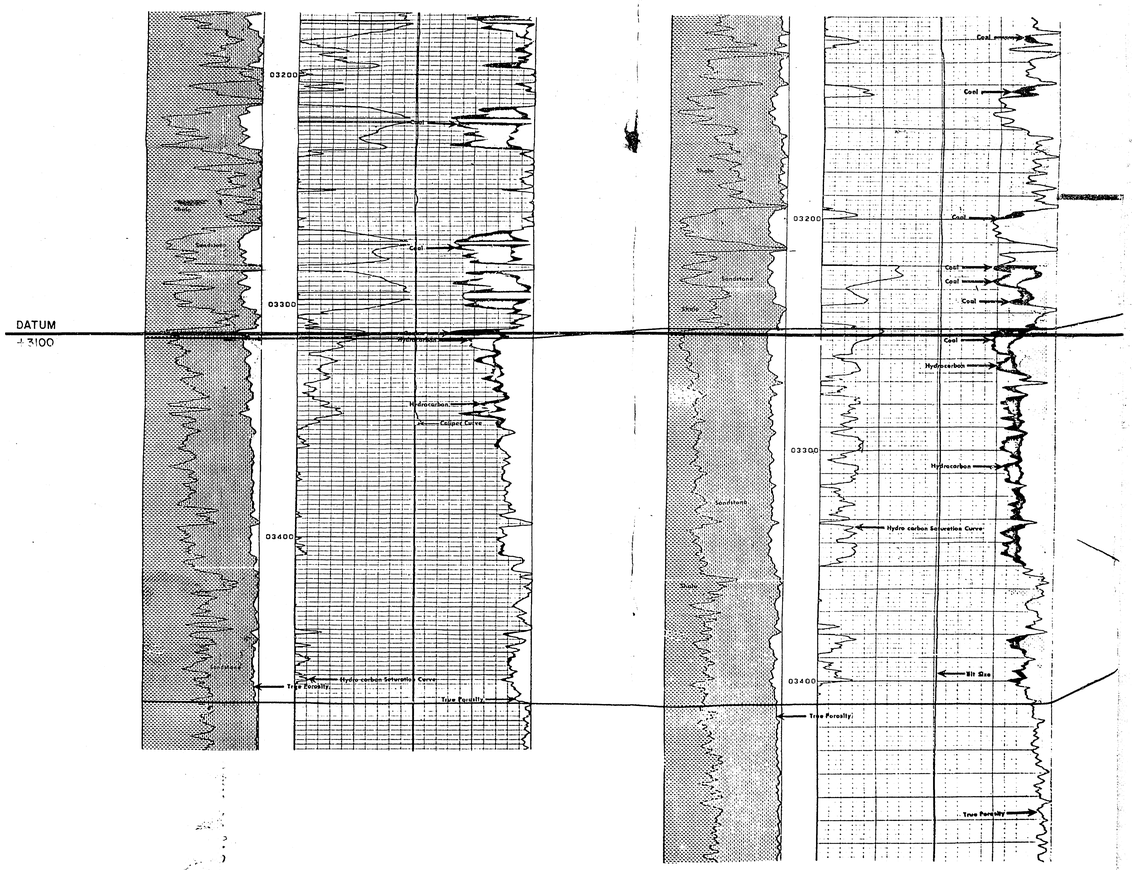
Charles F. Blackwood Oklahoma City, Okla.

Exhibit #22

C

104 A
UNIT D
SEC. 1 - 30 N - 8 W.
ELEV. + 6413 K.B

36 A
UNIT O
SEC. 1 - 30 N - 8 W.
ELEV. + 6360 K.B.



U.S.B.C.F. WORKSHOPS
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36 A
UNIT O
SEC. 1 - 30 N - 8 W.
ELEV. + 6360 K. B.

3 A
UNIT E
SEC. 5 - 30 N - 7 W.
ELEV. + 6323 K. B.

17 A
UNIT E
SEC. 9 - 30 N - 7 W.
ELEV + 6334 K. B.

17 A
UNIT E
SEC. 9 - 30 N - 7 W.
ELEV. +6334 K. B.

44 A
UNIT P
SEC. 4 - 30 N - 7 W.
ELEV. +6213 K.B.

16 A
UNIT J
SEC. 3 - 30 N - 7 W.
ELEV. +6328 K. B.

16 A
UNIT J
SEC. 3 - 30 N - 7 W.
ELEV + 6328 K B

14 A
UNIT I
SEC. 2 - 30 N - 7 W.
ELEV + 6392 K B

C'

14 A
UNIT I
SEC. 2 - 30 N - 7 W.
ELEV. + 6392 K B

22 A
UNIT O
SEC. 36 - 31 N - 7 W.
ELEV. + 6472 K B

DATUM
+3100

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 23
CASE NO. 7986
Submitted by Blackwood
Hearing Date June 3 1981

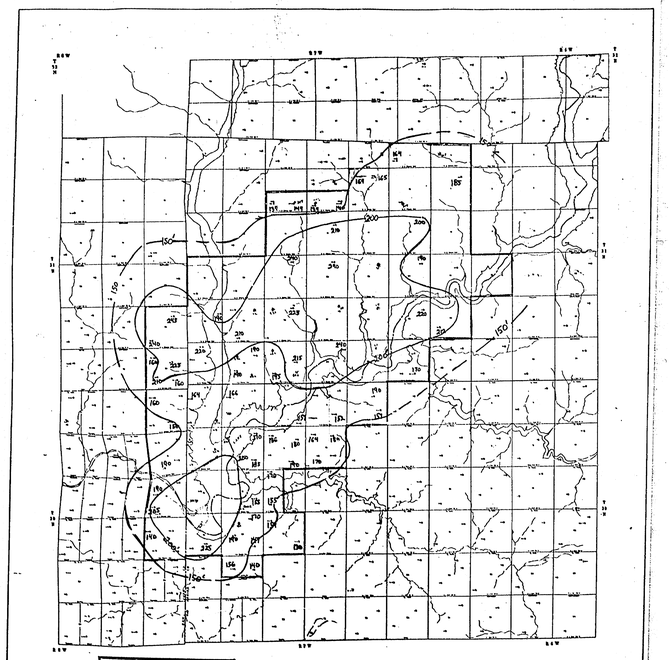
BLACKWOOD & NICHOLS CO. LTD.

NORTHEAST BLANCO UNIT
SAN JUAN & RIO ARRIBA COUNTIES, NEW MEXICO

CROSS SECTION C-C'
PICTURED CLIFFS FORMATION

Charles F Blackwood Oklahoma City, Okla

Exhibit #23

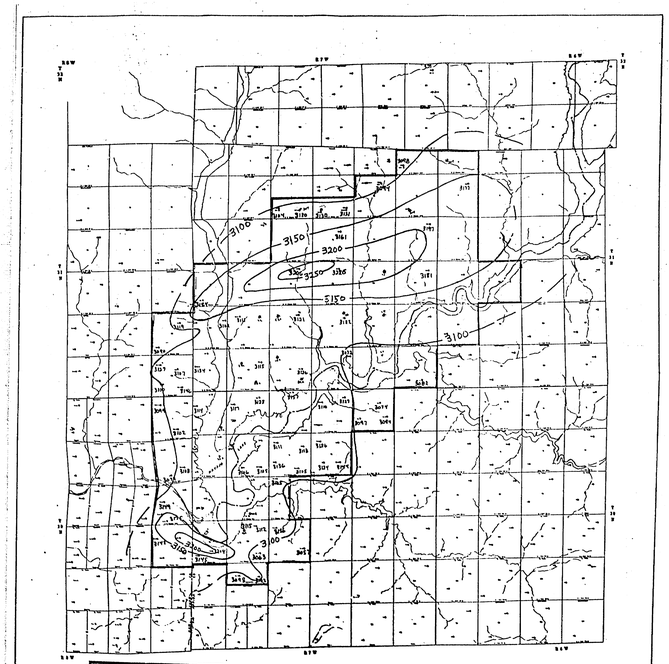


BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 24
CASE NO. 7086
Submitted by Blackwood
Hearing Date June 3, 1981

PICTURED CLIFFS FORMATION
ISOPACHOUS MAP GROSS INTERVAL

BLACKWOOD & NICHOLS CO., LTD.
NORTHEAST BLANCO UNIT
SAN JUAN & RIO ARRIBA COS., N. M.

Exhibit # 24



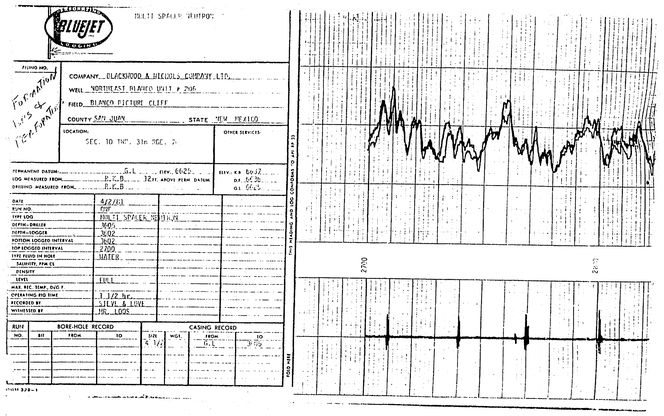
BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 25
CASE NO. 7086
Submitted by Blackwood
Hearing Date June 3, 1981

PICTURED CLIFFS FORMATION
STRUCTURE MAP ON TOP Pt ABOVE SEA LEVEL

BLACKWOOD & NICHOLS CO., LTD.
NORTHEAST BLANCO UNIT
SAN JUAN & RIO ARRIBA COS., N. M.

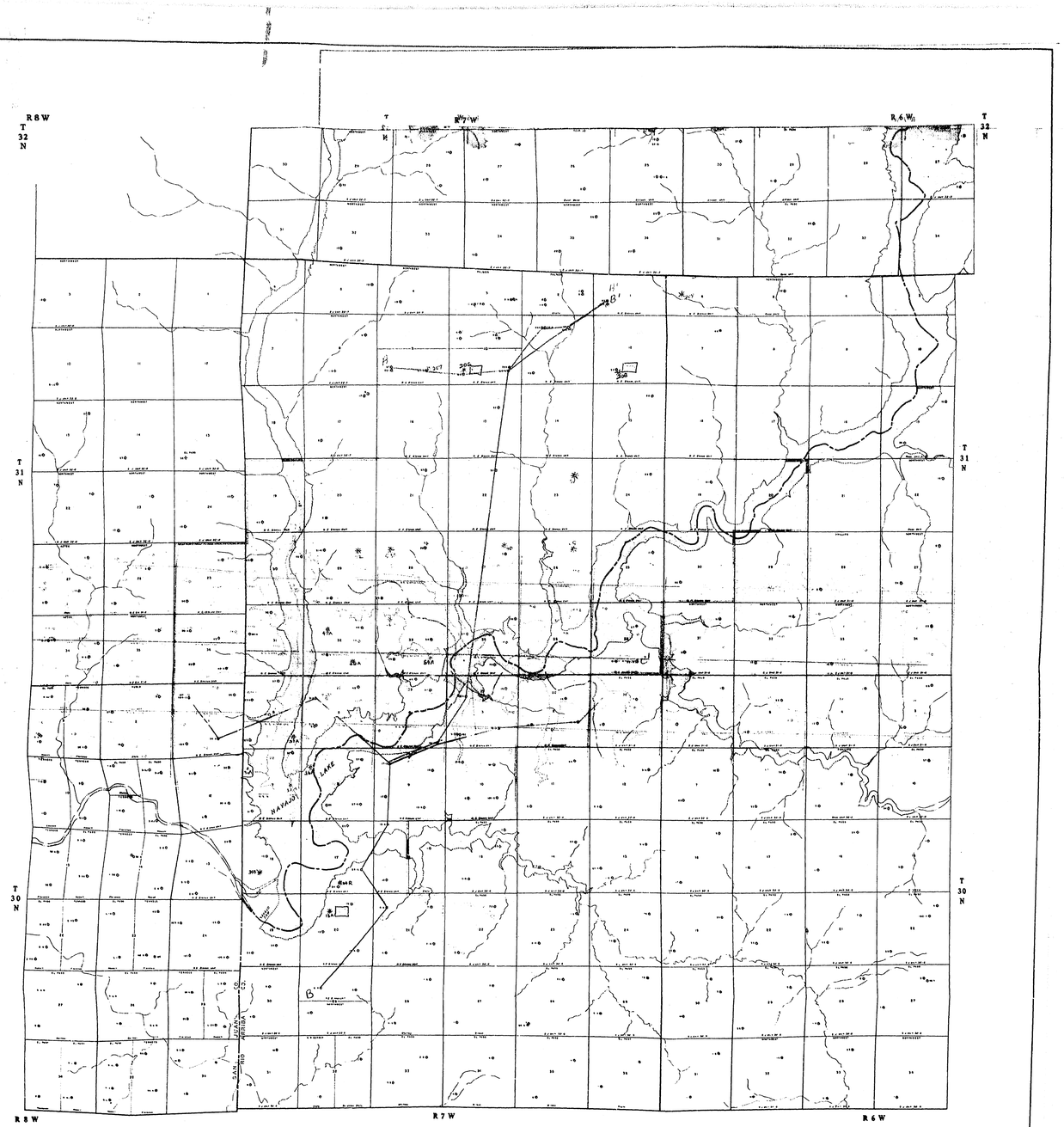
Exhibit # 25

U.S.G.S. PHOTOGRAPHICS
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SCHLUMBERGER WELL SERVICES
BEST AVAILABLE COPY

BEST AVAILABLE COPY



Pictured Cliffs Gas Well ●
Mesaverde Gas Well ●
Abandoned, Gas Well ☐

BLACKWOOD & NICHOLS CO., LTD.
NORTHEAST BLANCO UNIT
SAN JUAN & RIO ARRIBA COS., N. M.

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. (Revised)
CASE NO. 7086
Submitted by Blackwood
Hearing Date June 3, 1981

EXHIBIT #1