

ABBREVIATIONS

CO — Circulate Out
CG — Connection Gas
CB — Core Bit
DC — Depth Correction
DS — Directional Survey
DST — Drill Stem Test
DTG — Down Time Gas
FC — Filter Cake
LAT — Logged After Trip
NB — New Bit
NDR — No Data Recorded
NR — No Returns
PP — Pump Pressure
RPM — Rotary Speed
SPM — Pump Strokes
TG — Trip Gas
TGR — Trip Gas Recycle
Vis — Viscosity
WL — Water Loss
WOB — Weight on Bit
Wt — Density Of Drill Fluid

LITHOLOGY MODIFIERS

/// — Anhydritic
B — Bentonitic
+ — Calcareous
■ — Carbonaceous, Coaly
- — Dolomitic
F — Fossiliferous
~ — Glauconitic
◇ — Oolitic
P — Pyritic
^ — Siliceous

BENCH MARK GEOLOGICAL SERVICES

HYDROCARBON WELL LOG

OPERATOR Blackwood and NicholsWELL NE Blanco Unit 416

FIELD _____

LOCATION Sec 21 T31N R7WCO/STATE San Juan Co., New MexicoELEVATION KB 6418 GL 6403

SPUD DATE _____

INTERVAL LOGGED 2994 - 3172 ft.DATE LOGGED 10/19/89LOGGING GEOLOGISTS Randy Laney, Danny WyckoffINSTRUMENTATION FID chromatograph and total gas detector, Infrared CO₂ detector

WELL LOCATION

NEBU 78

NEBU 57
NEBU 416

sec 21

HYDROCARBON ANALYSIS

TOTAL GAS			Reported in Units	
10	100	1000	10	100
GAS CHROMATOGRAPHY			Reported in PPM	
100	1000	10000	100	1000
OIL INDICATOR			Dimension Less	
0.01	0.1	1.0	0.01	0.1

LEGEND — GAS CURVES

TOTAL GAS	T
METHANE	1
ETHANE	2
PROPANE	3
ISO & N-BUTANE	4
OIL INDICATOR $\frac{C_2 + C_3}{C_1}$	0

RATE OF PENETRATION

Min./Ft.

Porosity

G F P

DEPTH

CORE
LOG
DSTLITHOLOGY
OBSERVED

%

7" casing set at 2994 ft.

5 foot sample interval.
Drilling with fresh water.

100 units total gas = 1% methane
10 100 1000 units
100 1000 10,000 ppm

Depth of Coal Intervals

heavies — 100 1000 ppm
CO₂ — 1000 10,000 ppm

total gas —
max: 360 units
C₁ 16,815 ppm

- C₁

CG

CG

C₂ 3008-3021
C₃
CO₂

- Carbon Dioxide

max total gas:
560 units 20,292 ppm

895 units 28,480 ppm

500 units 16,376 ppm

max CO₂ — 18,900 ppm

3118-20

3130-35

TD 3172'

Visual
Show

G F P T

Lithology
InterpLithology
Descriptions
and Remarks

Sh lt-dark gy, med brn
platy, non-mod carb, wxy
earthy luster, tr pyr,
firm, occas. silty

Coal black-brn black,
pred platy-sb platy, arg
& carb, approx 10% vit-
majority sb vit-sb res
becoming less carb &
more vit to base, some
amber-brn resin

Sh pred med-dk brn, sb
platy-sb blk, sb res,
v carb & v silty

Ss lt gy, brn gy, sli S&P
vf gr, fr srt, sb ang,
v calcar. cement, dis-
aggregated samples, w/
wh calc clyst, sli dull
yel mnrl flr, NS

Ss cream-lt gy, f-vf
gr, fr-good srt, sb ang,
disagg, very calcar.,
occ dull gn chlorite
grs, becomes cleaner to
base, NS

Coal black, brn black,
becomes pred blk in
lower portion, sb platy
at top to blocky at
base, pred sb vit at
top-20 to 30% vit in
lower portion, sli-very
carb throughout, large
amnt amber resin in
top, scattered gy calc
veins, rated as only
fair quality coal

Coal lesser quality
than above, 10-20% vit,
mod-v carb, calcite
veins, fairly pyritic

Ss gy wh, brn gy, sli
S&P, f-vf gr, sb ang, pr-
fr srt, less calc than
above Ss, mod amnt wh
calc clyst, mod-v silty
NS

TD sample-pred med brn
Sltst & vf gr, lt gy
brn Ss, mod carb &
coaly