BENCH MARK
GEOLOGICAL SERVICES

HYDROCARBON WELL LOG

OPERATOR Blackwood and Nichols

WELL NE Blanco Unit 416 FIELD

LOCATION Sec 21 T31N R7W CO./STATE San Juan Co., New Mexico

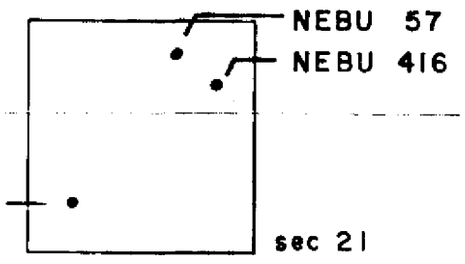
ELEVATION KB 6418 GL 6403 SPUD DATE

INTERVAL LOGGED 2994 - 3172 ft. DATE LOGGED 10/19/89

LOGGING GEOLOGISTS Randy Laney, Danny Wyckoff

INSTRUMENTATION FID chromatograph and total gas detector, Infrared CO_2 detector

WELL LOCATION



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
WI — 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
Λ — Siliceous

Cgl, Ss, Sltst, Sh, Coal, Cht, Salt, Anhy, Dol, Ls, Igneous, Meta, Tuff, No Sample (NS)

HYDROCARBON ANALYSIS

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

LEGEND — GAS CURVES

TOTAL GAS	T
METHANE	1
ETHANE	2
PROPANE	3
ISO & N-BUTANE	4
OIL INDICATOR $\frac{C_3 + C_4}{C_1}$	0

7" casing set at 2994 ft.

5 foot sample interval.
Drilling with fresh water.

RATE OF PENETRATION
Min./Ft.
2.5 5 7.5 10

Porosity G F P

DEPTH CORE DST

LITHOLOGY OBSERVED %

2980, 3000, 20, 40, 60, 80, 3100, 20, 40, 60, 80

cement

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

total gas -
max: 360 units
C_1 16,815 ppm
C_1
CG
CG

max total gas:
660 units 20,292 ppm
895 units 28,480 ppm
500 units 16,376 ppm

Depth of Coal Intervals
heavies — 100 1000 ppm
CO_2 — 1000 10,000 ppm

C_2
3008-3021
C_3
CO_2
Carbon Dioxide
3084-86
3090-3115
3118-20
max CO_2 - 18,900ppm
3130-35

TD 3172'

Visual Show G F P T

Lithology Interp

Lithology 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 pltv,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 plty-sb blky,sb res, v carb & v silty

Sslt gy,brn gy,sli S&P vf gr,fr srt,sb ang, v calcar. cement,dis-aggragated samples,w/ wh calc clyst,sli dull yel mnrl flor,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 plty 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