

**BENCH MARK** **HYDROCARBON**  
**GEOLOGICAL SERVICES** **OIL CON. DIV.**  
**WELL LOG**

RECEIVED  
JUL 5 1990  
DIST. 3

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

Cg  
Ss  
Stst  
Sh  
Coal  
Chl  
Salt  
Anhy  
Dol  
Ls  
Igneous  
Meta  
Tuff  
No Sample

OPERATOR **BLACKWOOD AND NICHOLS**

WELL **NE Blanco Unit 469**

FIELD **Basin Fruitland Coal**

LOCATION **sec 13 T30N R8W**

CO/STATE **San Juan Co., New Mexico**

ELEVATION · KB **6317 ft.** GL **6303' (ungrd)**

SPUD DATE

INTERVAL LOGGED **2965 - 3215 ft.**

DATE LOGGED **6/17 thru 6/18/90**

LOGGING GEOLOGISTS **Randy Laney, Mike Mixter, Ron Horton**

INSTRUMENTATION **FID Chromatograph and Total Gas Detector**

WELL LOCATION

NEBU 5-A  
NEBU 5-X  
NEBU 439  
NEBU 5-R

NEBU 29  
NEBU 469

LEGEND—GAS CURVES

|                |   |
|----------------|---|
| TOTAL GAS      | T |
| METHANE        | 1 |
| ETHANE         | 2 |
| PROPANE        | 3 |
| ISO & N-BUTANE | 4 |
| OIL INDICATOR  | 0 |

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  |

7" casing set at 2965 ft.

5 ft. sample interval  
Drilling with fresh water

Depth of Coal Intervals  
(# of canistered samples)

100 units Total Gas = 1% methane  
10 100 1000 units  
100 1000 10,000 ppm

heavies 100 1000 ppm  
CO<sub>2</sub> detector unavailable.

total — C<sub>1</sub>

C<sub>3</sub> —  
C<sub>2</sub> —  
C<sub>1</sub> —

CG

CG

total 2020 units  
C<sub>1</sub> 81,100 ppm  
C<sub>2</sub> 750 ppm

total 2,825 units  
C<sub>1</sub> 281,450 ppm

total 4,100 units  
C<sub>1</sub> 271,240 ppm

total 1,656 units  
C<sub>1</sub> 153,500 ppm  
C<sub>2</sub> 1,050 ppm

total 469 units  
C<sub>1</sub> 35,300 ppm

ONSET OF FLARED GAS  
3074-98  
(2 cans)

3110-21  
(1 can)

3126-27

3150-56  
(1 can)

3195-  
3205  
(1 can)

RATE OF PENETRATION

Min./Ft.

STC FDT 6 1/4"  
3-20's

2.5 5 7.5 10

WOB 10  
RPM 100  
PP 300

TD 3215 ft.

Posity  
CORE  
DEPT

LITHOLOGY  
OBSERVED  
%

Visual  
Show  
G F P T

Lithology  
Interp

Lithology  
Descriptions  
and Remarks

Sh med to dk brn, some  
gy, platy-sub platy,  
earthy-sub res, non-  
mod calc, carb w/ occ  
coaly lam, tr pyr, mod  
silty in part

Ss brn gy, pred vf  
gr, sub ang, poor-fair  
srt, disagg, fros, very  
calc cement, some carb  
grs, NS

Sh & Coal Sh is dk  
blk brn, platy-fissile,  
res, very carb, intbd  
w/ brn blk Coal, platy,  
sub vit w/ some vit  
grs, some amber resin  
Ss a gy wh, f-vf gr,  
sub ang, good srt, fros,  
very calc cat, NS

Coal & Sh Coal is blk  
& brn blk, sub platy-  
sub blk, 10-25% vit  
material, mod carb, some  
amber resin, fair qual-  
ity coal, intbd w/ dk  
blk brn, platy, v carb  
& coaly Sh

Coal black, sub blocky  
& blocky w/ rare conch  
frac, 30-40% vit at top  
becoming less vit to  
base, massive w/ some  
finely striated, more  
carb at base, tr sec  
calc, tr qtz xl cluster  
some amber resin, over-  
all good quality, mod  
abnt colored fibers,  
source NEBU 29 (?)  
Coal black, sub blk-  
blk w/ poor conch,  
50-60% vit-massive &  
coarse banded, qtz xl  
clusters, better coal  
than above

Stst dk gy-gy brn,  
sub blk, v firm-hd,  
some calc mottling,  
occ carb-coaly lamin.  
Coal black, blk-sub  
blk w/ some conch  
frac, 30-40% vit, mod  
carb, fair-good quality  
Sh dk brn, platy-sub  
blk, firm, earthy-sub  
res, mod-v carb w/ some  
coaly lam, some lt  
org clayst

Ss m-dk gy, vf-f gr,  
sub ang, calc cat, some  
coaly lam, NS

Coal black, blk w/  
fr conch frac & cleat  
develop., 75% vit-both  
massive & banded, littl  
carb, tr sec calc, very  
good coal-best of well

T/ Main P.C. 3213 ft.  
TD sample- Ss a gy-gy  
brn S&P, f-vf gr, gen  
fair srt, mod fri, sil  
calc, glauc & carb grs,  
fair amt dd intgran  
residue, faint flor, NC