



00814170

WELL RESUME

OPERATOR: BOWEN/EDWARDS ASSOCIATES, INC.
WELL NAME & NUMBER: S.E. DURANGO FEDERAL #34-1/2-34-1
LOCATION: SE SE SEC. 34, T34-1/2N - R9W
COUNTY & STATE: LA PLATA COUNTY, COLORADO
SPUD DATE: AUGUST 3, 1990
COMPLETION DATE: AUGUST 8, 1990
ELEVATIONS: GL 7,041' KB 7,056'
TOTAL DEPTH: 2,350' (DRILLER'S DEPTH)
2,348' (LOGGER'S DEPTH)
CONTRACTOR: SANDERS DRILLING, RIG #14
ENGINEER: TOM ERWIN/JACK E. VAUGHN
GEOLOGIST: BRAD BOYCE/T. A. CASEY
TOOL PUSHER: ROGER McCUNE
TYPE DRILLING FLUID: LSND
MUD COMPANY: DAVIS MUD
MUD ENGINEER: CARROLL HART
HOLE SIZE: 12-1/4" to 315', 7-7/8" to TD
CASING: 8-5/8" to 315', 5-1/2" 0' TO TD
MUD LOGGING BY: ROCKY MOUNTAIN GEO-ENGINEERING
(PETER RECHS AND DARON CLAY)
CORE INTERVALS: #1: 2,027'-37-1/2', #2: 2,132'-35',
#3: 2,135'-63'
ELECTRIC LOGS: DUAL INDUCTION - SFL, COMPENSATED
NEUTRON-DENSITY, MICRO-LOG
LOGGING ENGINEER: MR. GARBER
BOTTOM FORMATION: PICTURED CLIFFS
WELL STATUS: RUNNING PRODUCTION CASING

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SUMMARY AND CONCLUSIONS

On August 8, 1990, Bowen/Edwards & Associates, Inc., operator, reached total depth of 2350 feet (driller's) or 2348 feet (logger's) in the S.E. Durango Federal 34 1/2 - 34 - 1 well. The well reached the objective of Fruitland coal seam gas, drilling through the Fruitland and penetrating approximately 170 feet of the Pictured Cliffs Formation. Preliminary analysis of samples, logs and sample desorption are very encouraging. Production casing has been run for the purpose of completing the well in the coal seams.

The well was spudded on August 3, 1990 by Sanders Drilling Company, Rig #14. Mud logging commenced below surface casing at 315 feet on the evening of August 4. After drilling through the upper sands, gravels, shales and volcanoclastics of the Animas and Kirtland Formations, the Fruitland Formation was encountered at approximately 1710 (+5346) feet. Three cores were taken in the lower Fruitland from two intervals. Carbonaceous shale was recovered from core #1 and #2. Excellent coal samples for desorption were recovered from the third core. Recovery in core #3 was 100 percent. Schlumberger logged the well bore with Compensated Neutron - Formation Density, Dual Induction - SFL and Micro-log logs.

Analysis of the electric logs shows that a total net coal thickness of 50 feet was penetrated. This figure is based on a formation density of 1.75 g/cm³ and does not include coal seams of one foot or less. Dramatic gas increases and high resistivities characterized the coal seams. Between 1855 and 1980 feet several thin, ratty coal stringers were encountered which were commonly dull, occasionally vitreous, with fair to good bleeding gas. None of these stringers were large enough or demonstrated the quality on electric log analysis to be included in the net coal sum. Generally this upper Fruitland section consists of small coal and carbonaceous stringers and grades into better defined and thicker coal seams in the middle and lower part of the formation.

The two productive intervals are divided for convenience into the middle and basal zones. The middle zone between 2024 and 2042 feet consists of two stringers, from 2024 to 2029 feet (5 feet net of coal) and from 2038 to 2042 feet (3 feet net of coal) with a shale dividing the two. The samples showed a black, vitreous coal of fair to good quality with generally fair cleating and fair to good visible bleeding gas. Cuttings were taken for desorption analysis.

SUMMARY AND CONCLUSIONS
CONTINUED

The basal zone covers a total of 54 feet from 2125 to 2179 feet and contains a net coal thickness of 42 feet. The coals are separated by thin shale stringers of one to two feet, except at the bottom where there is a basal shale stringer five feet thick. The coal was of excellent quality, black and vitreous with abundant bleeding gas, good cleats and fractures. Several samples from various intervals of the core were sent in for desorption analysis.

The Pictured Cliffs was intercepted at 2178 (+4878) feet, resulting in a total thickness of Fruitland Formation of 468 feet. The well correlates very well with the Day-V Ranch #34 1/2 - 35 - 1 which lies approximately one half mile to the east, the main difference being a considerable thickening of the basal zone in this S.E. Durango Federal 34 1/2 - 34 -1 well.

Pictured Cliffs sandstone does not appear to be productive. Some small quantities of gas were observed but nothing to warrant an attempt to produce the gas.

CORES

Three 3.5 inch cores were taken from the Bowen/Edwards S.E. Durango Federal #34-1/2-34-1 for the purpose of reservoir analysis. Good coal was recovered from the third core and samples are undergoing desorption and detailed analysis. The bulk of this core which was not placed in desorption was taken to the Bowen/Edwards lab.

Core #1, taken from 2,027 to 2,037-1/2 feet contained coal in the top, most of which was not recovered. The remaining part, below 2,030 feet, consisted of carbonaceous shale with fractures evident at the top and occasional thin coal stringers throughout. A thin 6 inch bed of bentonite was recovered at approximately 2,034 feet.

Core #2 and Core #3 were an attempt to core the same interval. Core #2 started at 2,133 feet, drilled two feet of carbonaceous shale, which was coaly at the top, and then became plugged. After pulling the core barrel, a second attempt was made. Core #3 began at 2,137 feet and a full core of excellent coal was recovered, as well as some interbedded carbonaceous shale. These coals bled gas rapidly and were characterized by excellent cleating and some fracturing.

Core descriptions and penetration rates are shown graphically on the following pages. Scales are 5 and 10 inches per 100 feet. Final gas desorption values for Core #3 are not yet available.

Well Name: BOWEN / EDWARDS
SE DURANGO #34 $\frac{1}{2}$ - 34-1

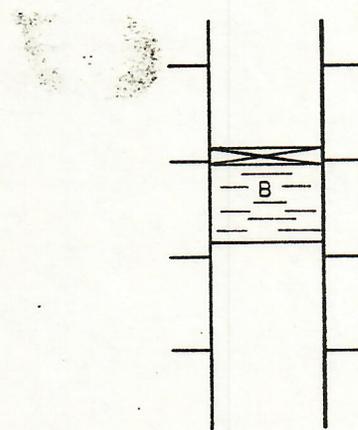
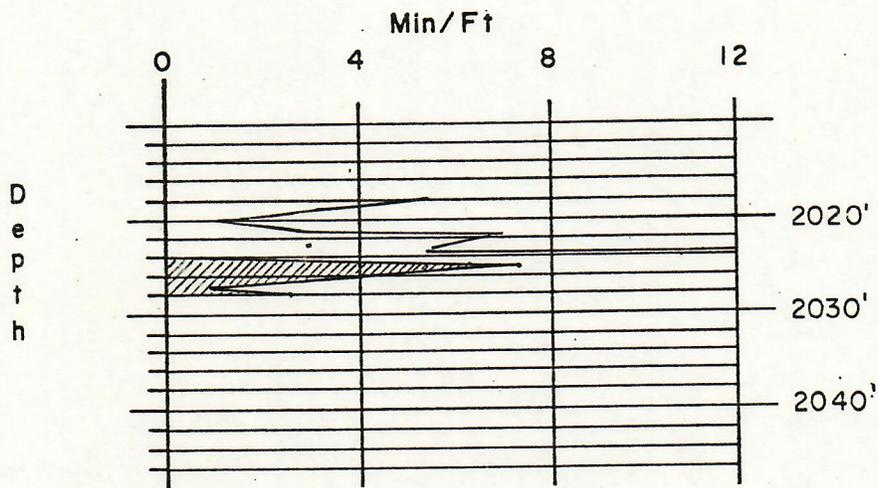
Core: #1

Ftge: 2027 - 37 1/2 % Recovery: 63 %

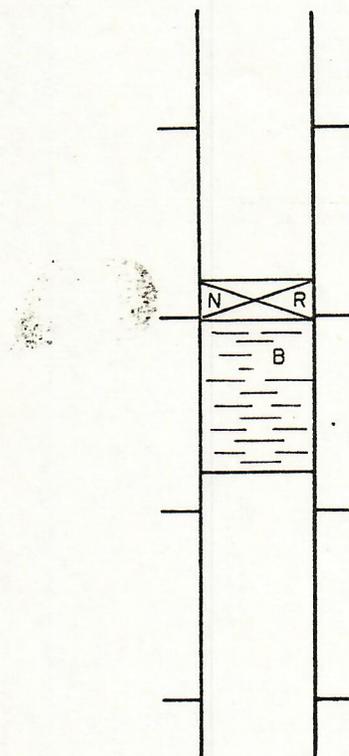
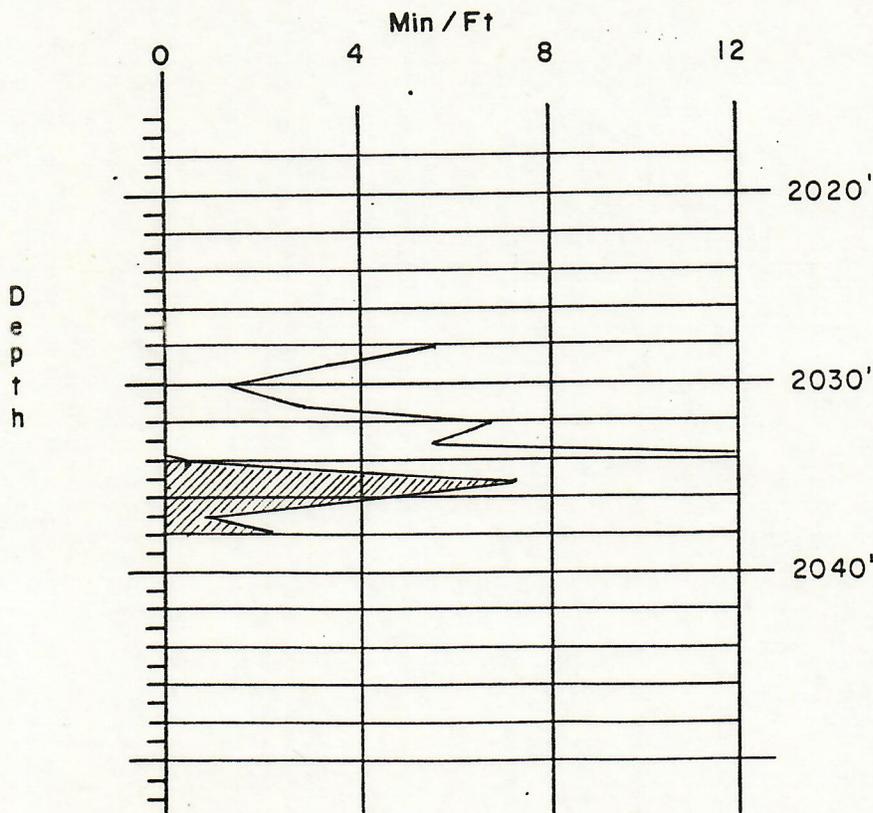
Drilling Rate

5" / 100'

Lithology



10" / 100'



Well Name: BOWEN / EDWARDS

SE DURANGO #34 1/2 - 34-1

Core: #2

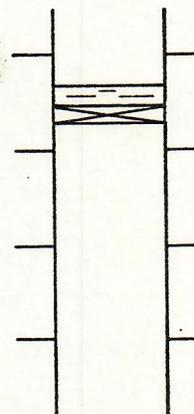
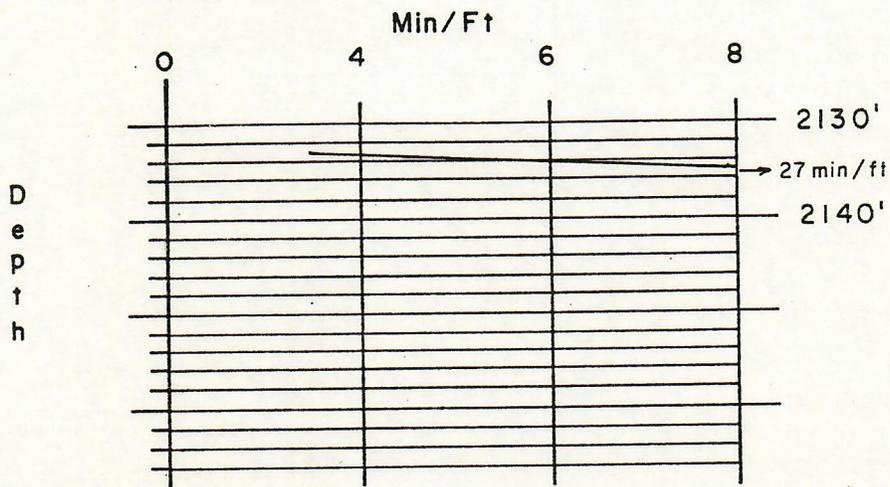
Ftge: 2133 - 37'

% Recovery: 75 %

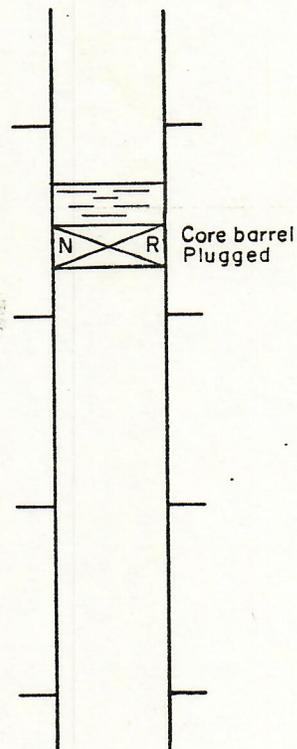
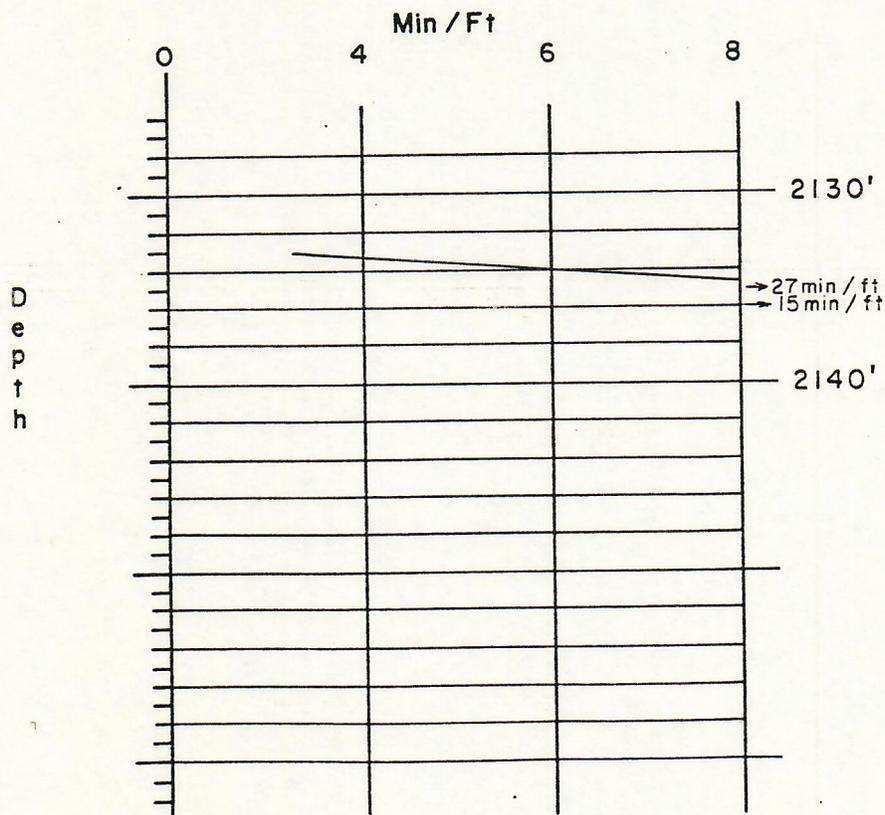
Drilling Rate

5" / 100'

Lithology



10" / 100'



Well Name: BOWEN / EDWARDS ASSOC.
SE DURANGO #34½ - 34-1

Core: #3

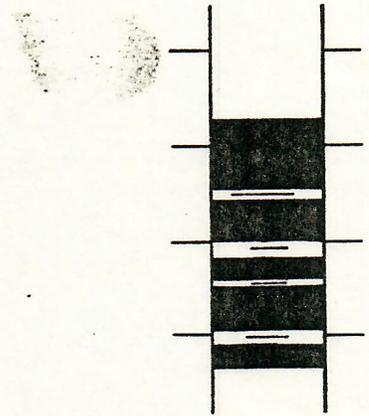
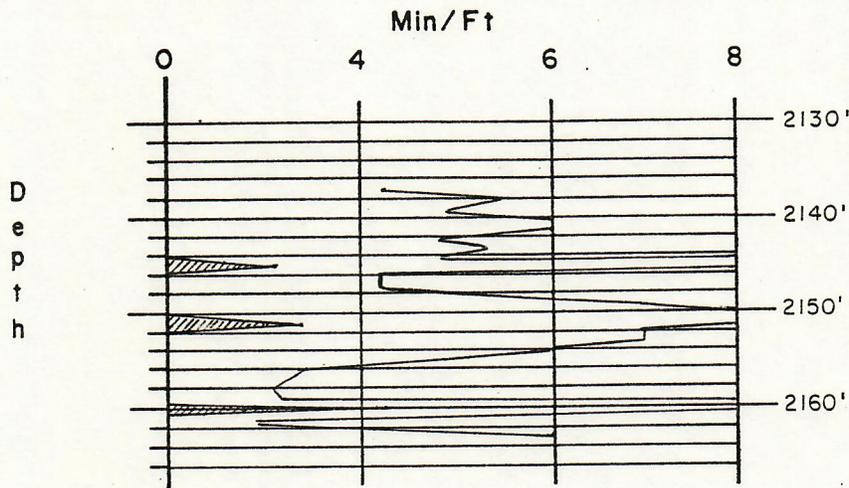
Ftge: 2137' - 63'

% Recovery: 100 %

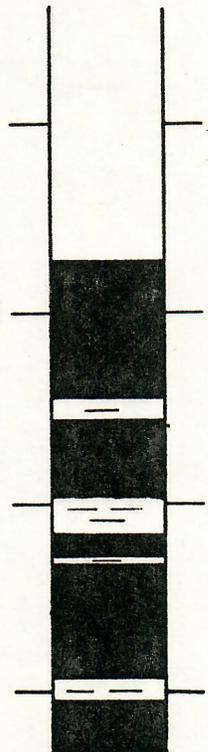
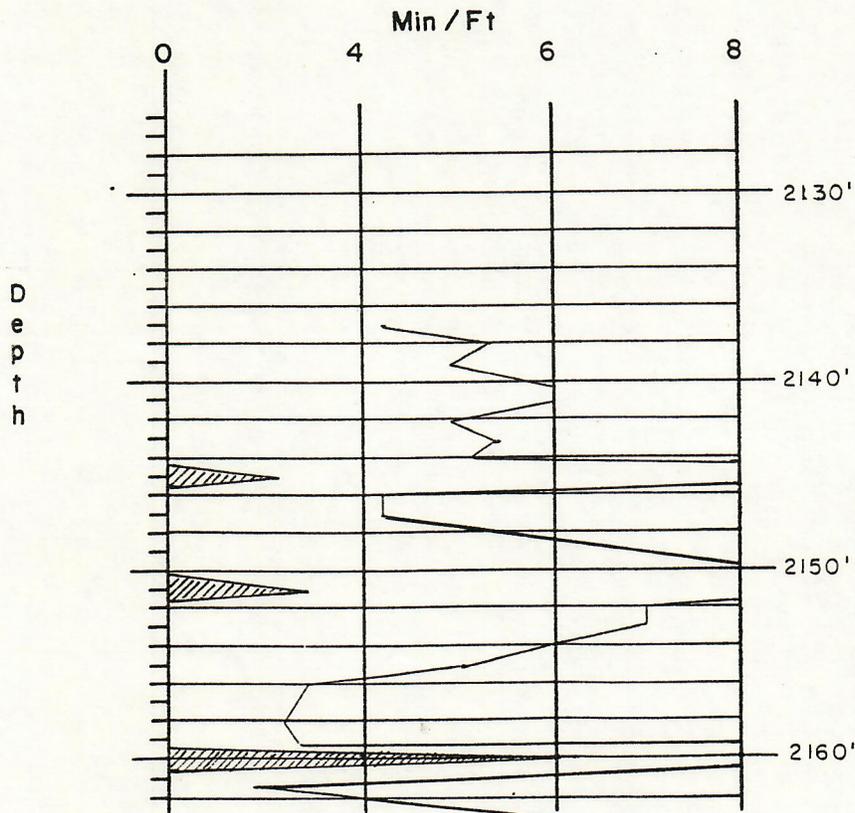
Drilling Rate

5" / 100'

Lithology



10" / 100'



DAILY DRILLING CHRONOLOGY

<u>DATE</u>	<u>8:00 A.M. DEPTH</u>	<u>24 HR. FTGE</u>	<u>COMMENTS</u>
8/03/90	0'	Spud at 8:30 AM	Drilling & Set Surface
8/04/90	315'	315'	Testing, Drilling Cement & New Hole
8/05/90	800'	515'	Drilling Ahead, No Problems
8/06/90	1,529'	729'	Drilling Ahead, No Problems
8/07/90	2,037'	508'	Drilling & Coring
8/08/90	2,162'	125'	Drilling & Coring
8/09/90	2,348'	186'	Logging Well, Run Production Casing, No Problems

BIT RECORD

<u>BIT #</u>	<u>MAKE</u>	<u>TYPE</u>	<u>SIZE</u>	<u>IN</u>	<u>OUT</u>	<u>FTGE</u>	<u>HRS.</u>
1.	HTC	HPH-J	12-1/4	16	315	299	13
2.	Sandvic	CFF10	7-7/8	315	2,027	1,712	46-1/4
3.	DBS	Cmt123	7-7/8	2,027	2,037	10	1-1/4
4.	HTC	ATJ-05	7-7/8	2,037	2,133	96	3-1/4
5.	DBS	Cmt125	7-7/8	2,133	2,163	30	4
6.	HTC	ATJ-05	7-7/8	2,163	2,350	187	4-3/4

DRILLING FUNCTIONS

8:00 A.M.

<u>DATE</u>	<u>DEPTH</u>	<u>W.O.B.</u>	<u>R.P.M.</u>	<u>P.P.</u>
8/03/90	0-315'	10-12,000	90-100	800
8/04/90	315'	12-15,000	60	1,000
8/05/90	800'	10-12,000	90-100	1,000
8/06/90	1,529'	20-30,000	60-80	1,000
8/07/90	2,037'	20-25,000	60-70	850-950
8/08/90	2,162'	20-25,000	60-70	950

SURVEYS

<u>DEPTH</u>	<u>DEGREES</u>	<u>DEPTH</u>	<u>DEGREES</u>
63'	3/4	1,430'	1-1/2
125'	3/4	1,563'	1-3/4
186'	3/4	1,730'	1-1/2
315'	7/8	1,889'	1-3/4
411'	1	2,077'	2
569'	3/4	2,267'	2
655'	1-1/2		
749'	1-3/4		
843'	1-1/4		
937'	1-1/4		
1,032'	1-1/4		
1,167'	1-1/4		
1,324'	1-1/2		

MUD RECORD

DATE	Depth	Wt	F.Vis	P.Vis	Yld	G.Strat	pH	Fil	Ck	Alka	Salt	Chlo	Calc	Gyp/ Sand	Solids	
8/02/90	0		GEL WATER			SPUD	MUD THICKENED WITH LIME TO DRILL SURFACE									
8/03/90	226	8.6	46	-	-	-	9.5	NC	-	-	-	-	-	-	-	
8/04/90	315	WOC	-	-	-	-	-	-	-	-	-	-	-	-	-	
8/05/90	1,004	8.4	27	-	-	-	9.5	NC	-	.3/.5	-	400	80	-	-	
8/06/90	1,600	8.6	32	3	2	0/1	10.0	21.0	1	.5/.6	-	400	40	0	2.5%	
8/07/90	2,029	8.8	41	7	4	1/4	8.5	10.4	1+	.1/.4	-	500	40	TR	3.5%	
8/08/90	2,297	9.1	44	11	8	2/8	8.0	9.6	2	.1/1.4	-	600	20	TR	5.0%	

Bowen/Edwards Associates, Inc.
S.E. Durango Federal #34-1/2-34-1

SAMPLE DESCRIPTIONS

850-880' 50% SS, 50% SLTST

SS: wh-clr-lt gy, occ orng, f-m gr, mod fri, mod w rdd, m-w srt, occ frstd, occ wh cly mtx

SLTST: m gy, occ rust, blk, m srt, sft-m firm, com gyp, n calc

880-910' 80% SH, 20% SS

SS: AA, incr lt gy

SH: lt gy, occ dk gy-grn gy, plty-sbblky, sft-m firm, occ slty, occ calc

910-940' 90% SH, 10% SS

SS: AA

SH: AA, gen m-dk gy, com slty

940-970' 80% SH, 20% SS

SH: AA, lt-m gy

SS: AA

970-1000' 70% SH, 30% SS

SH: AA, occ pk, gen gy-gy gn, sbplty, sft

SS: wh-clr, c gr, fri, m-w rd, p cmt, glauc i.p.

1000-1030' 80% SH, 20% SS

SH: AA, occ slty, occ sdy

SS: AA, occ m gy, f gr, sft, m rd, w srt

1030-1060' 80% SS, 20% SH

SS: AA

SH: AA

1060-1090' 50% SH, 50% SS

SH: dk-m gy, sft-m firm, sbblky, carb, slty, occ gn

SS: wh-clr, m-cr gr, fri, occ uncons in spl, m rd, w srt, qtzc, tr orng, sil, glau, tr mica

1090-1120' 20% SH, 80% SS

SS: AA

SH: AA, occ gyp

1120-1150' 50% SH, 50% SS

SS: AA

SH: AA, incr to slt

Bowen/Edwards Associates, Inc.
S.E. Durango Federal #34-1/2-34-1

SAMPLE DESCRIPTIONS

1150-1180'80% SH, 20% SLTST

SH: AA, m-dk gy, occ carb

SLTST: dk gy, dft, sbblky-lmpy, occ carb, grdg to SH

1180-1210'90% SS, 10% SH

SS: w-clr, bl gy, occ yel, m-c gr, fri, lse gr com,
sbang-sbrd, w srt, no vis por, sli, v f spls

SH: AA

1210-1240'50% SS, 30% SLTST, 20% SH

SS: AA, incr f gr, occ glau

SLTST: AA

SH: AA

1240-1270'40% SH, 30% SLTST, 30% SS

SH: AA, m-dk gy

SLTST: AA

SS: AA

1270-1300'70% SS, 30% SH

SS: AA, wh-clr, m-m bl gy, com lse gr, f spl

SH: AA

1300-1330'80% SS, 20% SH

SS: AA

SH: AA

1330-1360'80% SH, 20% SS

SH: AA, incr slty, occ carb

SS: AA, decr gr size

1360-1390'75% SS, 25% SH

SS: AA, v fri, f spl

SH: AA, m gy, rthy

1390-1420'60% SH, 40% SS

SH: AA, sbplty-blky, vlvty, occ slty

SS: AA, occ orng

1420-1450'50% SS, 50% SH

SS: AA

SH: AA, tr gyp, n calc

1450-1480'80% SS, 20% SLTST

SS: lt gy, occ wh, trns, v f-m gr, firm-fri, sbang-sbang, w
srt, no vis por, occ lse gr, f spl

SLTST: AA, gy occ brn, sbblky, occ lmpy, sit, occ carb

Bowen/Edwards Associates, Inc.
S.E. Durango Federal #34-1/2-34-1

SAMPLE DESCRIPTIONS

1480-1510'80% SS, 20% SH
SS: AA, incr gr size
SH: AA

1510-1540'90% SH, 10% SS
SH: m gy, sbblky, frm, rthy-wxy, occ bluish
SS: AA

1540-1570'50% SS, 50% SH
SS: AA
SH: AA, occ slty

1570-1600'70% SH, 30% SS
SH: AA, f spls, occ-com plty, gen sbblky
SS: AA, f spls

1600-1630'90% SH, 10% SS
SH: AA, com slty
SS: Aa

1630-1660'100% SH
SS: AA, occ gn - gy - bl gy, occ carb

1660-1690'20% SS, 30% SLTST, 50% SH
SH: AA, decr slt
SS: AA
SLTST: AA

1690-1720'80% SH, 20% SLTST
SH: lt-m gy, brn, sft-frm, plty, gen sbblky, tr carb, wxy
SLTST: AA, brn, grdg to SH

Sample Top: FRUITLAND

1720-1750'70% SH, 30% SS
SH: dk gy, m bl gy, frm-m brit, sbplty-sbblky, occ splty, dk
gy sh v carb, sm
SS: wh-crm, sft-frm, lmpy, v f gr, w srt, sbrdd, wh cly cmt,
no vis por

1750-1780'70% SH, 30% SS
SH: m gy, dk gy, frm, blky-sbblky, carb
SS: AA

1780-1810'90% SH, 10%SS
SH: AA, incr carb, com slty
SS: wh-ltgy, frm-hd, sbang-sbrdd, m w srt, f-m gr, tite, no
vis por, occ mica, com carb

Bowen/Edwards Associates, Inc.
S.E. Durango Federal #34-1/2-34-1

SAMPLE DESCRIPTIONS

1810-1840' 50% SS, 50% SH
SS: AA, occ s&p
SH: AA

1840-1870' 90% SH, 10% SS
SH: AA, incr dk gy, carb
SS: m gy, hd f gr, sbrd, w srt, carb

1870-1900' 100% SH
SH: AA, com v dk gy & carb

1900-1930' 20% COAL, 80% SH
SH: dk gy, sbblky-splty, frm, v carb, grdg to COAL, occ slty
COAL: blk, dull-occ bri, occ conch frac, p cleat, frm-hd

1930-1960' 80% SLTST, 20% SH
SLTST: gy-gy brn, frm-brit, sbplty-lmpy, mot, carb, no vis
por
SH: AA, decr carb, dk-m gy

1960-1990' 60% SH, 40% SLTST
SH: AA, dk gy, carb
SLTST: AA

1990-2020' 70% SS, 30% SH
SS: AA, com wh-trnsl, incr cr, f-m gr, w cmt / sil
SH: AA, occ coal
COAL @ 2025': blk, sbplty-sbsplty, brit-frm, vit, p-f cleat,
f-g vis bleeding gas

2020-2050' 80% SH, 20% COAL
SH: gy, dk gy-dk brn, frm-brit, sbblky-sbsplty, occ gritty,
gen rthy, tr carb, n calc
COAL: blk, blk-sbplty, brit-frm, vit, gen f cleats

2050-2080' 80% SLTST, 20% SH
SLTST: gy-brn, sbplty, frm-brit, carb grdg to SH
SH: crm-m brn, sbplty, hd-brit, rthy, gne n-sl calc

2080-2110' 80% SS, 10% SH, 10% SLTST
SS: wh, lt gy, lt brn, hd, lmpy, sbrd, m w srt, com carb, sl
s&p in app, wh cly mtx, m calc, no vis por
SH: gy, dk gy, frm-brit, sbblky, occ gritty, m carb
SLTST: AA

Bowen/Edwards Associates, Inc.
S.E. Durango Federal #34-1/2-34-1

SAMPLE DESCRIPTIONS

2110-2140'80% COAL, 20% SH

COAL: blk, sbblky-sbplty, firm-brit, dull occ bri, p cleat,
com grdg to carb SH
SH: AA

2140-2170'70% COAL, 30% SS

COAL: AA

SS: wh-crm, f gr, gen firm, ang-sbang, w srt, w cmt,
sbplty-lmpy

2170-2200'90% SS, 10% COAL

SS: wh, trnsl, lt gy-tan, lt brn, f-m gr, firm-hd, com fri
w/lse gr in spl, sbrd, m w srt, tr pyr, tr carb, n calc, tr
cly cmt

COAL: AA, incr to carb SH

2200-2230'80% SS, 20% SH

SS: m brn, occ lt gy, f gr, firm, m rd-sbrd, m w srt, w cmt
by crm-rust cly cmt

SH: lt gy-bl gn gy, firm-hd, sbplty, gen n carb, rthy-wxy

2230-2260'50% SS, 50% SH

SH: blk-dk brn blk, firm-brit, sbblky, slty, v carb

SS: wh-lt gy, s&p, m g gr, firm, sbang-sbrd, m w srt, lmpy,
wh cly mtx, p vis por

2260-2290'100% SLTST

SLTST: dk brn, firm, sbblky-lmpy, v carb, occ dk brn cly mtx,
grdg to v f sd

2290-2320'100% SLTST

SLTST: AA, incr gr size, grdg to v f sd, occ SH AA, com SS,
AA

2320-2350'75% SS, 25% SH

SS: wh, s&p, m-f gr, sbrd, w srt, firm-gen sft & fri, calc
cmt i.p., n calc cly mtx i.p.

SH: AA