

Characterization of core extracted from the Olmos Formation (Cretaceous), Southwest Texas

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INTRODUCTION

This preliminary report presents data from ongoing activities of the U.S. Geological Survey (USGS), Energy Resources Program, Gulf Coast Framework Studies Project (GCFSP). The purpose of the GCFSP is to conduct geologic framework studies that will aid in the evaluation of all fossil fuel energy commodities (coal, gas, and oil) in the Gulf Coast Region. The project will: (1) define the petroleum systems of the region; (2) conduct specific geologic framework studies and petroleum system analyses on selected priority intervals; (3) study the coal-bearing intervals to evaluate coal distribution and quality, and coal-bed methane, and source rock potential; (4) work in cooperation with the National Oil and Gas Assessment (NOGA) Project to conduct a focused assessment of the Gulf Region; and (5) contribute to the next phase of the National Coal Resource Assessment.

The USGS, through a Cooperative Research and Development Agreement (CRADA) with The Exploration Company (TXCO) of San Antonio, has drilled a series of wells to assess the coalbed methane potential in the South Texas portion of the Gulf Coast Region. This report presents lithologic descriptions, photographs, and x-ray prints of cored intervals from the Olmos Formation (Cretaceous) from two wells, 1-117CR and 1-613CR, located in Maverick County (Figure 1). The cored interval for 1-117CR (from 1090.0 feet to 1212.5 feet below the surface) is 122.5 feet in length. For the 1-613CR well, the cored interval (from 1390.0 feet to 1525.7 feet below the surface) is 135.7 feet in length. The depths and lithology thicknesses for 1-117CR and 1-613CR were corrected based on comparison with borehole e-logs from the well locations. Due to depth correction of intervals for 1-613CR, information on cardboard or wood block labeled markers used in the core photographs to denote portions of the cores that were removed or missing, at the time of photography, do not reflect the corrected depth intervals.

X-ray radiographs were taken of the coal and carbonaceous shale portions of the cores to determine internal structural properties such as, partings, cleats, and burrows. For conversion to digital format the x-ray prints were scanned and, as a result, they appear as reversed images in this report. Additionally, in the scanned x-ray prints, carbonaceous shales or clays appear white and coals are black.

Initial analyses of sample data from cores 1-117CR and 1-613CR show average as-received ash yield values of 61.09 percent and 58.94 percent, respectively. Less than 50 percent ash yield occurs for five of the samples from 1-117CR and four of the samples from 1-613CR. Based on these initial results, intervals described as coal in 1-117CR and 1-613CR, in some cases, would be classified as carbonaceous shales and not coal (Wood and others, 1981).

REFERENCES

Wood, G.H. and others. 1983, Coal resource classification system of the U.S. Geological Survey: U.S. Geological Survey Circular 891, 65 p.

ACKNOWLEDGEMENTS

We wish to acknowledge The Exploration Company for their continuing assistance and collaboration. The radiographs were performed with the assistance of Jeff Halka and William Panageotou of the Maryland Geological Survey and we would like to thank them for their cooperation in this study. In addition, we wish to acknowledge Bryan Williams of Stata Log for his assistance in the field.

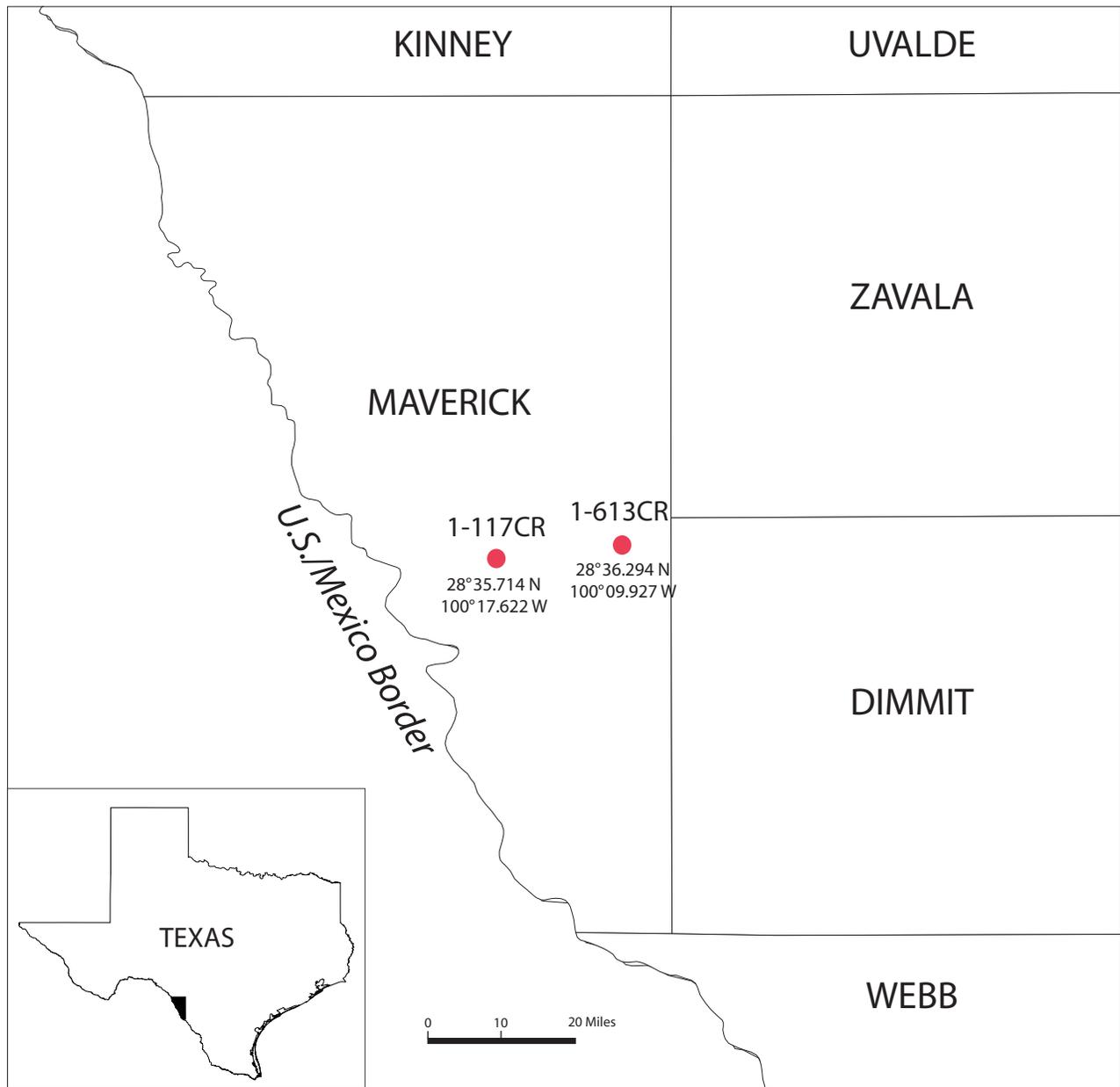
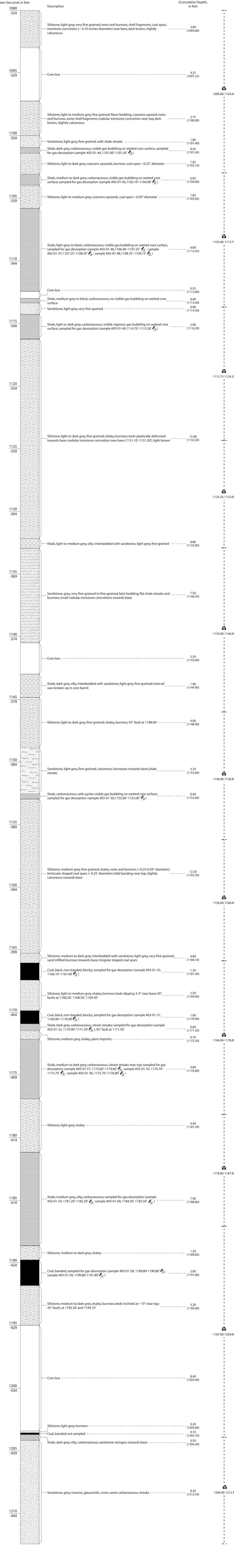


Figure 1. Locations of drill holes (red circles) in Maverick County, Texas. Click on the drill hole locations for core stratigraphy, photographs, and x-ray radiographs

Borehole:	TXCO/USGS 1-117CR Comanche Ranch
Company or Agency:	TXCO The Exploration Company/U.S. Geological Survey
Location:	Comanche Ranch, Maverick County, TX
Coordinates:	28° 35.714' N, 100° 17.622' W (GPS)
Ground Elevation:	766 ± 25 ft. (GPS)
Coring Depth:	1090.0-1212.5' (122.5')
Total Borehole Depth:	1214.0'
Driller:	A. Clark, U.S. Geological Survey
Drilling Method:	Truck-mounted mobile drill rig
Bit type:	Continuous wireline coring, 10 ft spring loaded push tube with shoe
Drilling Medium:	Bentonite mud
Casing:	None (PVC to 6ft)
Geophysical Logs:	Natural gamma, caliper, gamma-gamma density, conductivity, resistivity
Dates Drilled:	6/2/01-6/10/01
Rock Descriptions by:	P. Warwick, A. Karlsen
Stratigraphic Log Scale:	1 inch = 2.50 feet

Click on located adjacent to the stratigraphic descriptions for x-ray radiographs of coal/carbonaceous shale samples
 Click on located adjacent to the stratigraphic descriptions for core photos



TXCO/USGS
1-117 CR Box 1
1090'-1103'

R1
R2

5 in Carb uq
Scale Cap

Run 2 Indeterminant
Core loss (~4.25
ft)



TXCO/USGS
1-117 CR Box 2
1103-1113.75

03-01-46
.85 FT CARB SHALE

03-01-47
1.1 FT CARB SHALE

03-01-48
.8 FT CARB SHALE

03-01-45
0.9 FT Carb Shale



TXCO / USGS
1-117 CR Box 3
1113.75-1124.2

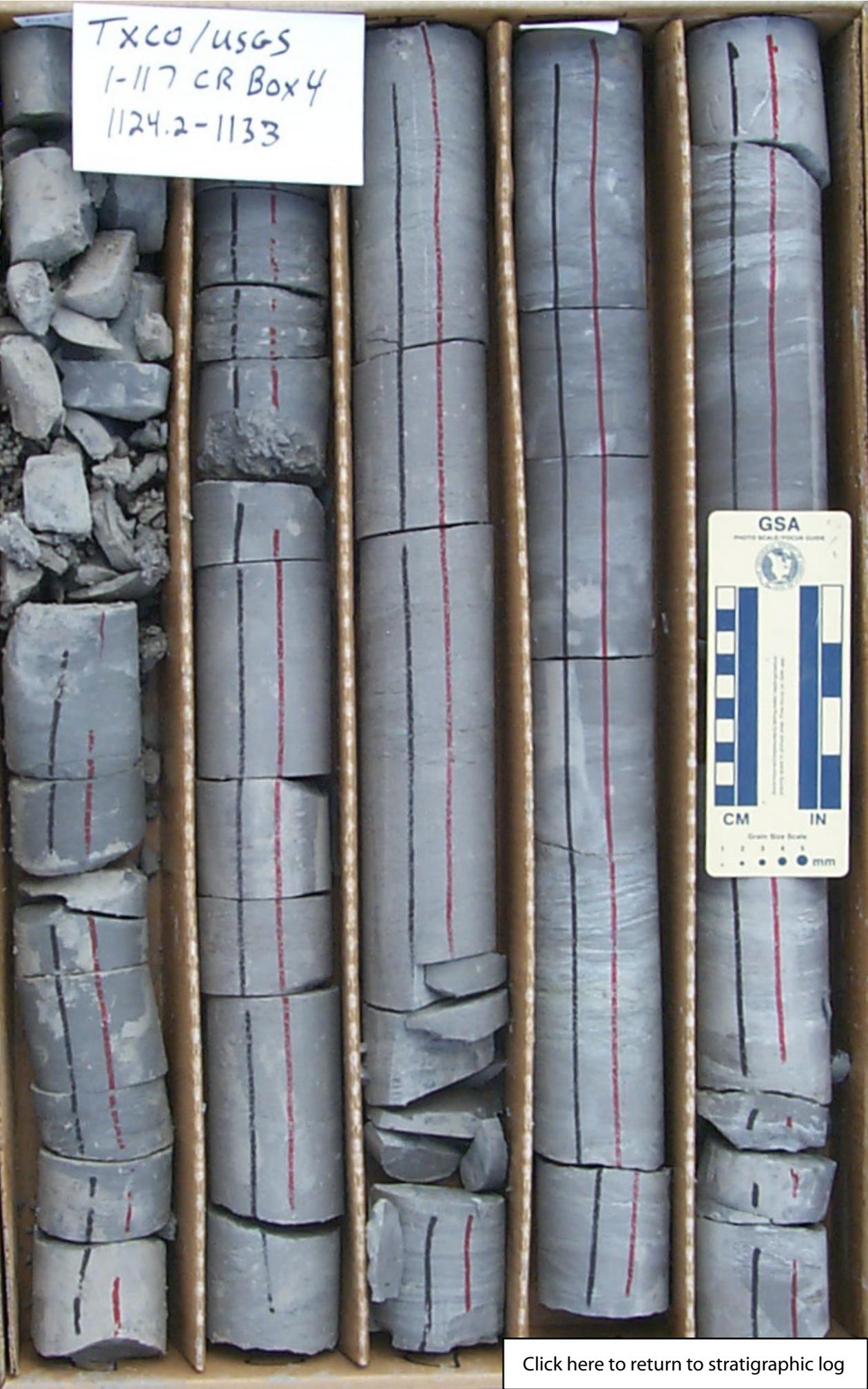
03-01-117
71

Mark 6



[Click here to return to stratigraphic log](#)

TXCO/USGS
1-117 CR Box 4
1124.2-1133



[Click here to return to stratigraphic log](#)

TXCO/USGS
1-117 CR Box 5
1133-1146



TXCO/USGS
1-117 CR Box 6
1146-1156

CARB SHALE 0.4M
13-01-50 to Coal?



TXCO/USGS
1-117CR Box 7
1156-1166



[Click here to return to stratigraphic log](#)

TXCO/USGS
1-117 CR Box 8
1166-1178

Coal
15-10-EO
194

Coal
25-10-EO
9-0-1902

194

CARB SHALE
194
CAN 57

CARB SHALE
194
CAN 55

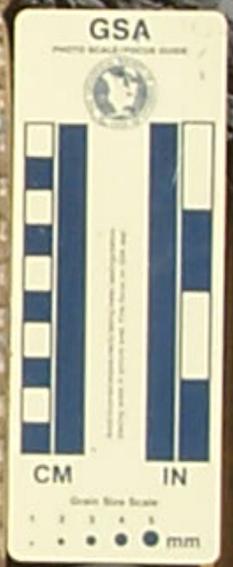
CARB SHALE
194
CAN 56



TXCO/USGS
1-117CR Box 9
1178-1187

CARB SHALE
9 ft CAN 54

CARB SHALE
14 ft CAN 60



TXCO/USGS
1-117 CR Box 10
1187-1204

COAL
1#1
03-01-58

CARB SHALE
1#2
03-01-59



RUN 16

TXCO/USGS
1-117 CR
BOX 11
1204-1212.5



GSA
Geological Survey of America

CM IN

Grain Size Scale

1 2 3 4 mm

A scale bar showing centimeters (CM) and inches (IN). Below it is a grain size scale diagram with four vertical bars of increasing height, labeled 1, 2, 3, and 4 mm. The diagram includes a legend for particle sizes: a small dot for 1 mm, a larger dot for 2 mm, a larger dot for 3 mm, and a larger dot for 4 mm.

[Click here to return to stratigraphic log](#)

X-ray radiograph



Well: Comanche 1-117CR

Sample: 03-01-44

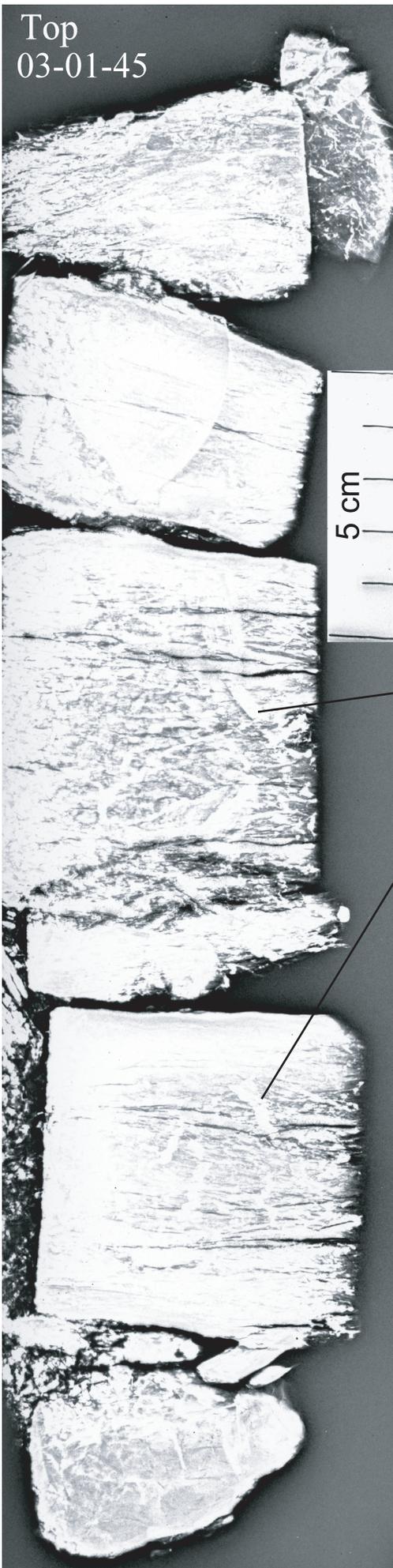
Depth: 1101.00 - 1101.45 ft

AR Ash: 81.72%

Carbonaceous shale,
broken pieces

[Click here to return to stratigraphic log](#)

Top
03-01-45



Well: Comanche 1-117CR
Sample: 03-01-45
Depth: 1103.10 - 1104.00 ft
AR Ash: 79.50%

Carbonaceous shale

Burrows

Coaly lenses



Well: Comanche 1-117CR
Sample: 03-01-46
Depth: 1106.40 - 1107.25 ft
AR Ash: 56.26%

Carbonaceous shale
and mudstone

Coaly stringers

Burrows

Ripple laminations?

X-ray radiograph

Top



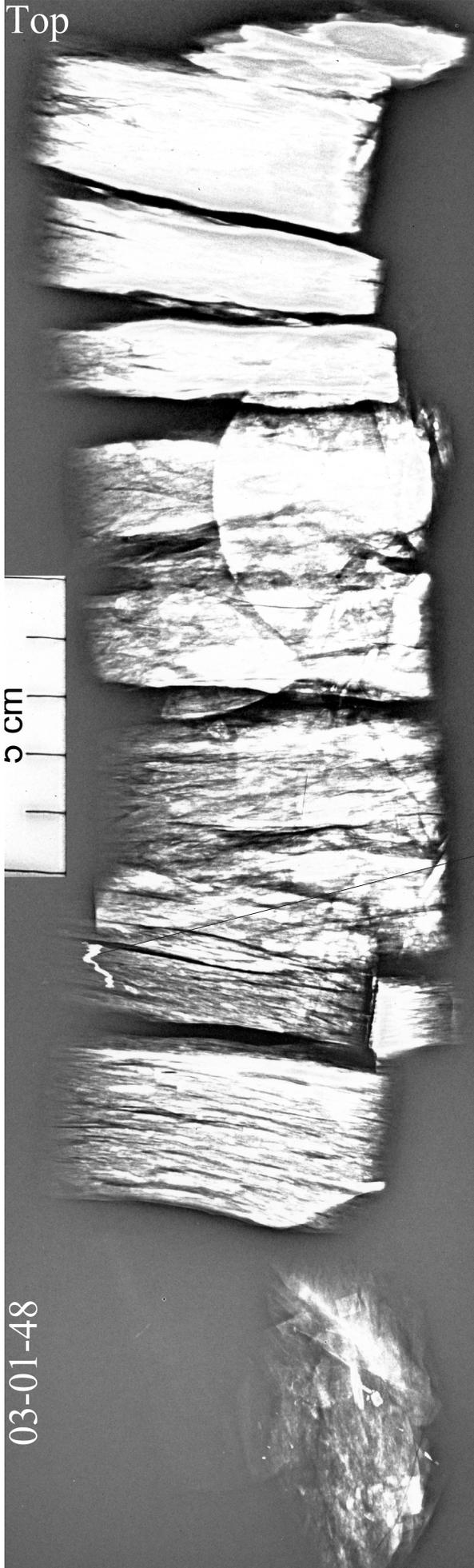
Well: Comanche 1-117CR
Sample: 03-01-47
Depth: 1107.25 - 1108.35 ft
AR Ash: not available

Carbonaceous shale
with coaly streaks

[Click here to return to stratigraphic log](#)

X-ray radiograph

Top



Well: Comanche 1-117CR
Sample: 03-01-48
Depth: 1108.35 - 1109.15 ft
AR Ash: 60.37%

Carbonaceous shale
with coaly streaks

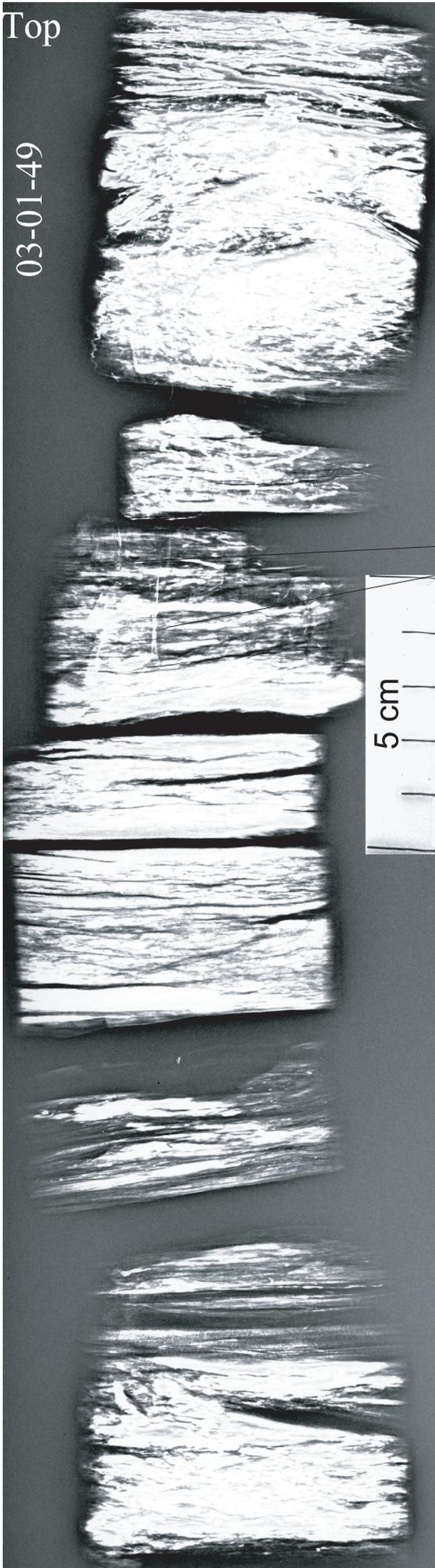
Clay-filled vertical burrow

Becoming more
organic-rich towards
the base

[Click here to return to stratigraphic log](#)

Top

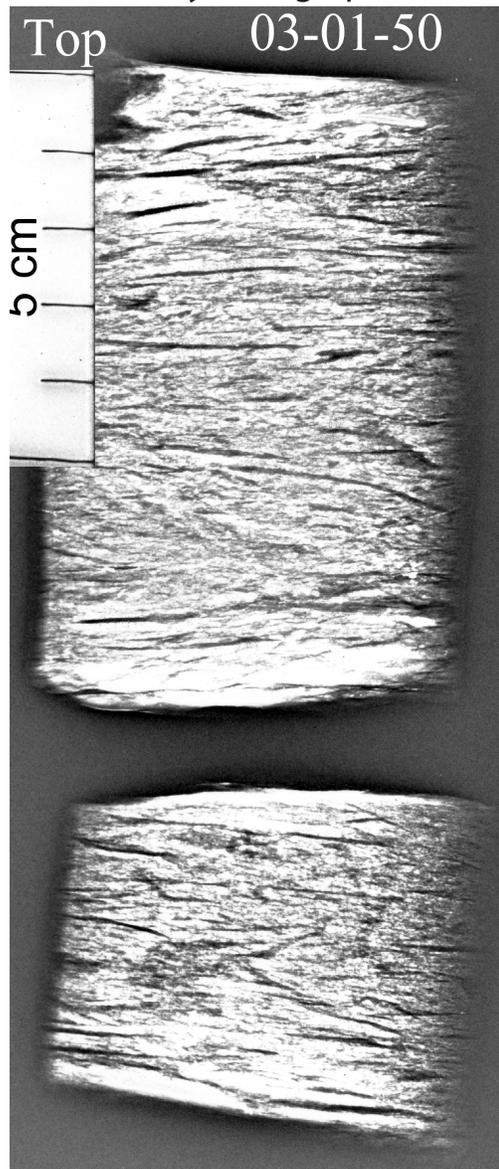
03-01-49



Well: Comanche 1-117CR
Sample: 03-01-49
Depth: 1114.70 - 1115.50 ft
AR Ash: 45.00%

Cleats, filled with mineralization? with approximately 1 cm spacing

X-ray radiograph



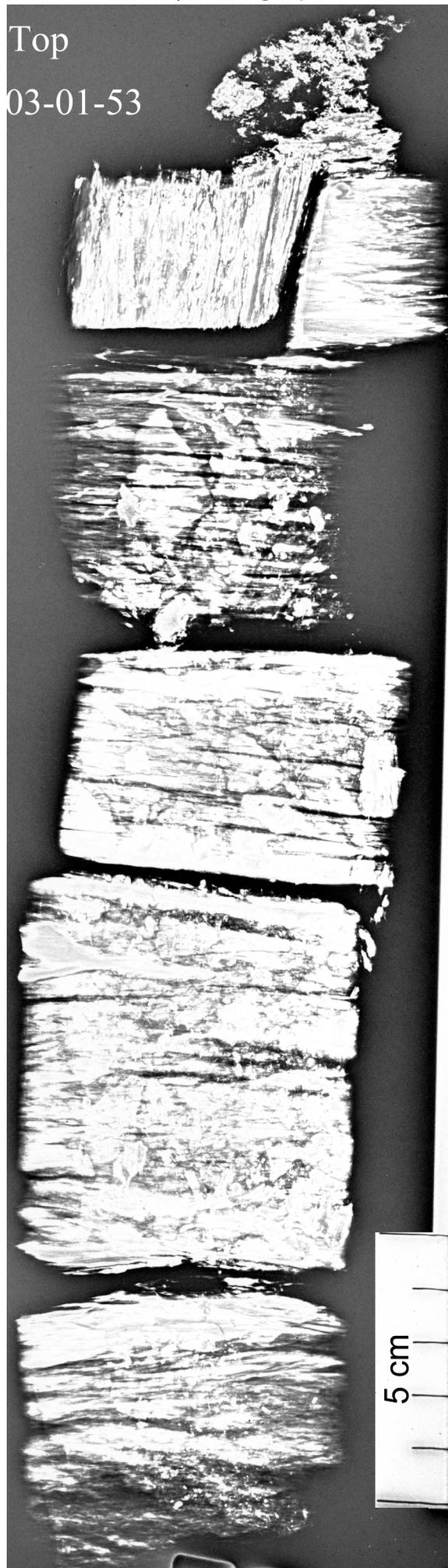
Well: Comanche 1-117CR
Sample: 03-01-50
Depth: 1152.60 - 1153.00 ft
AR Ash: 62.91%

Carbonaceous shale
with coaly lenses

[Click here to return to stratigraphic log](#)

Top

03-01-53



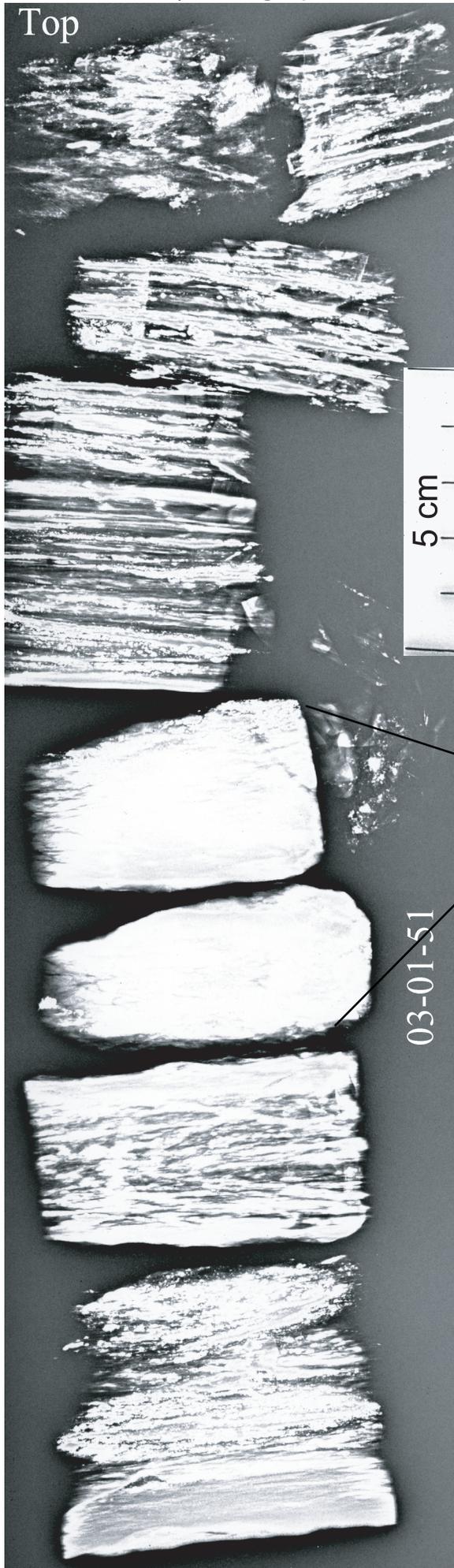
Well: Comanche 1-117CR
Sample: 03-01-53
Depth: 1166.10 - 1167.40 ft
AR Ash: 38.30%

Coal, shaley, with
burrows and shale lenses

Zone with high ash
content

X-ray radiograph

Top



Well: Comanche 1-117CR
Sample: 03-01-51
Depth: 1169.90 - 1170.90 ft
AR Ash: 36.68%

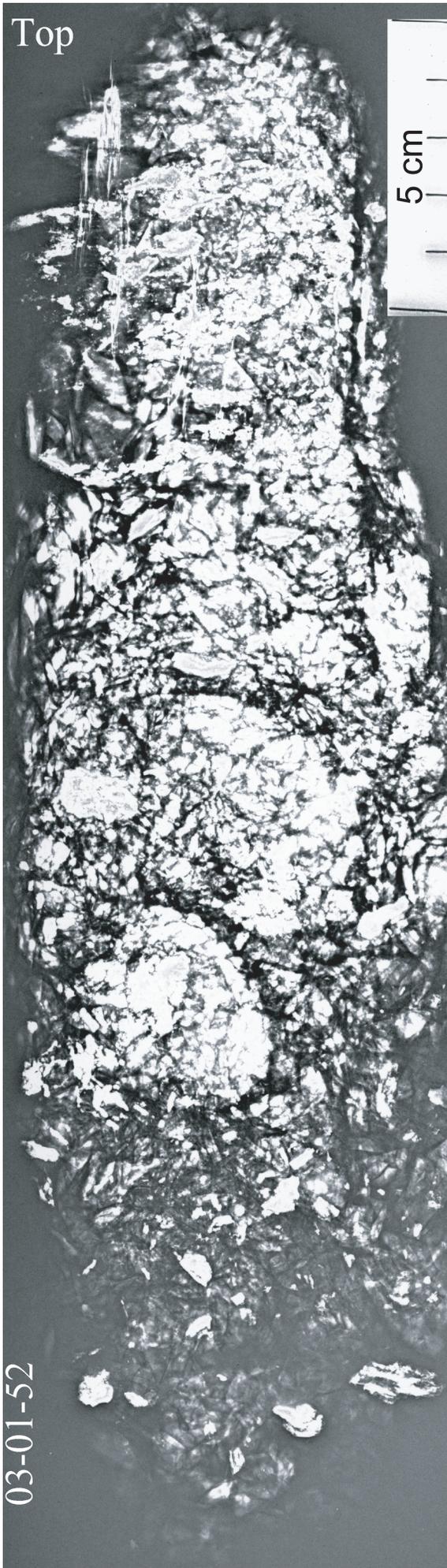
Coal, shaley, with
burrows and shale lenses

Zone with high ash
content

[Click here to return to stratigraphic log](#)

X-ray radiograph

Top



Well: Comanche 1-117CR
Sample: 03-01-52
Depth: 1170.90 - 1171.50 ft
AR Ash: 63.81%

Carbonaceous shale,
broken pieces

[Click here to return to stratigraphic log](#)

X-ray radiograph

Top

Well: Comanche 1-117CR
Sample: 03-01-57
Depth: 1173.60 - 1174.60 ft
AR Ash: 81.28%

Carbonaceous shale,
broken pieces



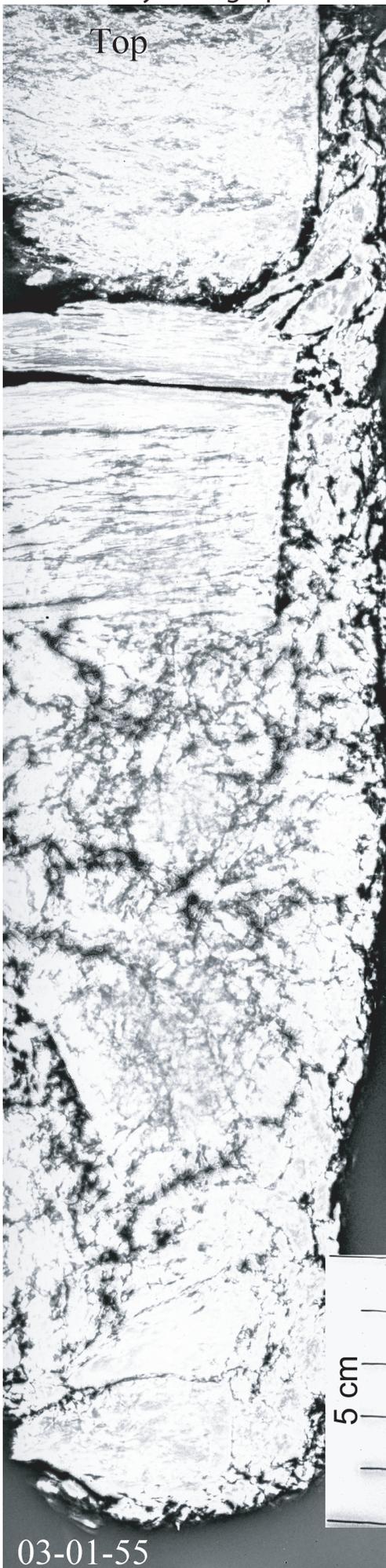
[Click here to return to stratigraphic log](#)

X-ray radiograph

Top

Well: Comanche 1-117CR
Sample: 03-01-55
Depth: 1174.70 - 1175.70 ft
AR Ash: 71.61%

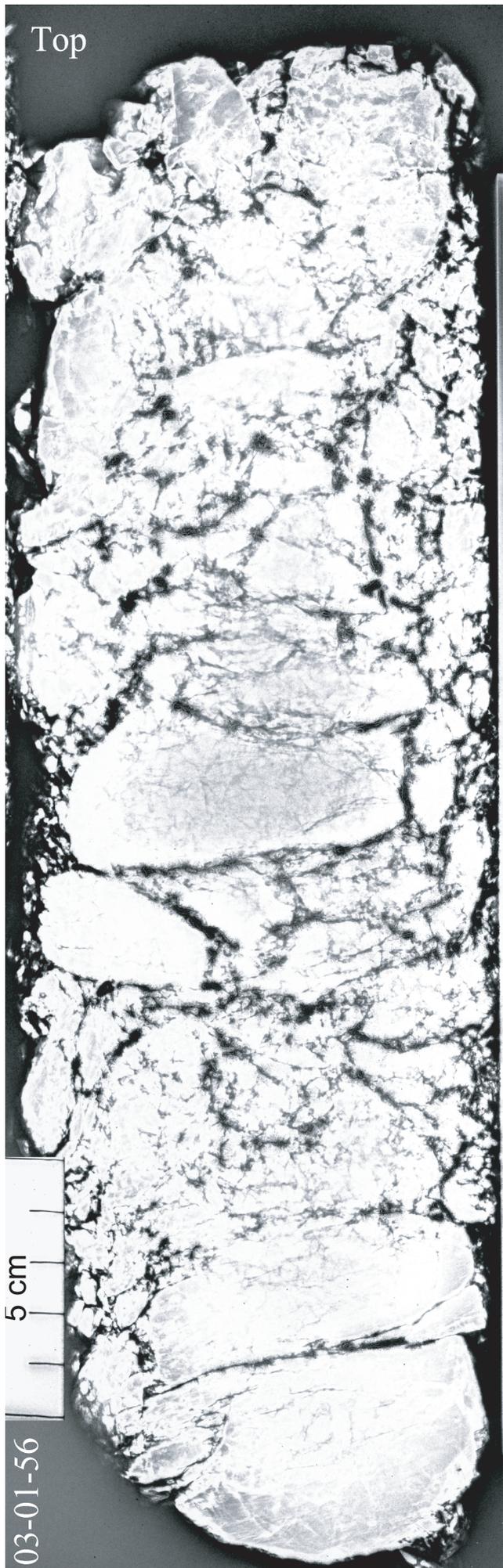
Carbonaceous shale
with burrows and
coaly lenses



03-01-55

[Click here to return to stratigraphic log](#)

Top



Well: Comanche 1-117CR
Sample: 03-01-56
Depth: 1175.70 - 1176.80 ft
AR Ash: 82.69%

Carbonaceous shale,
broken pieces

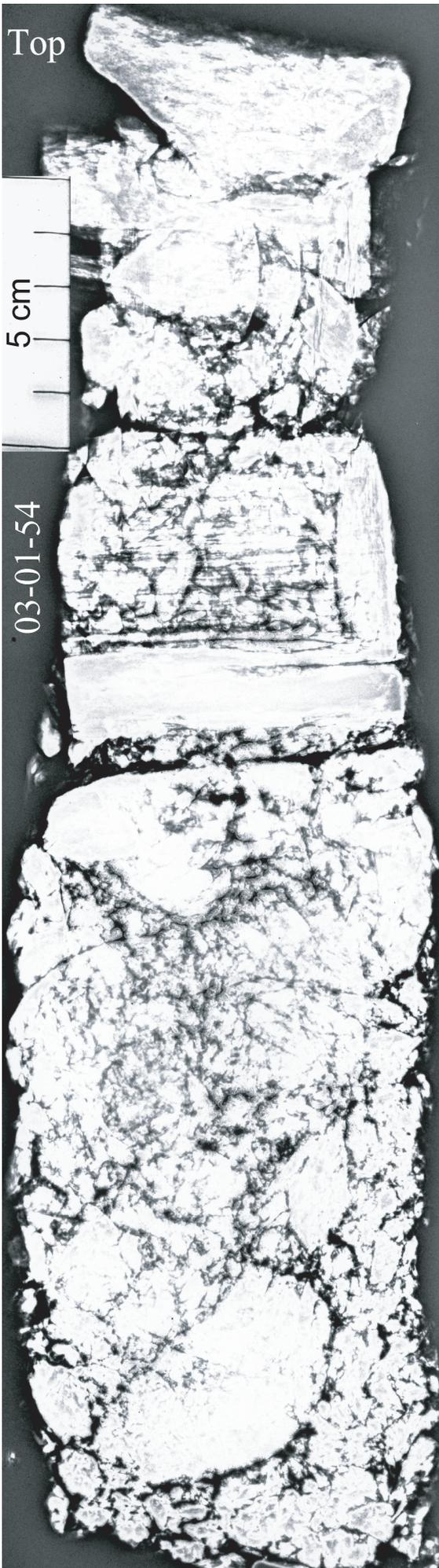
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X-ray radiograph

Top

5 cm

03-01-54



Well: Comanche 1-117CR
Sample: 03-01-54
Depth: 1181.20 - 1182.20 ft
AR Ash: not available

Carbonaceous shale,
broken pieces

[Click here to return to stratigraphic log](#)

X-ray radiograph



Well: Comanche 1-117CR
Sample: 03-01-60
Depth: 1184.50 - 1185.50 ft
AR Ash: 69.53%

Carbonaceous shale with
coaly lenses

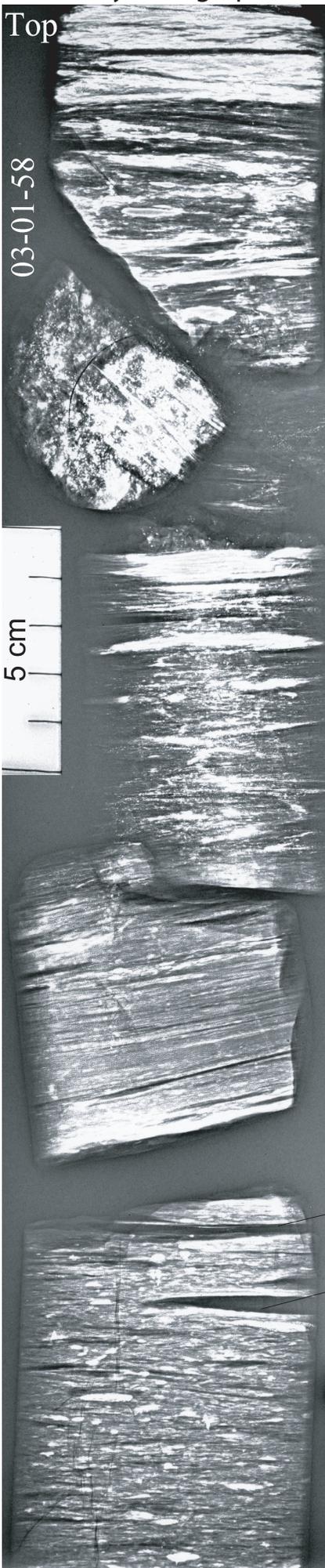
Carbonaceous shale,
broken pieces

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Top

03-01-58

5 cm



Well: Comanche 1-117CR
Sample: 03-01-58
Depth: 1189.80 - 1190.80 ft
AR Ash: 16.37%

Coal with shale lenses

Coal with horizontal and vertical burrows

Coal, laminated with horizontal burrows

Woody lenses - compressed root? cross-sections

Coal with horizontal burrows and vertical cleat development

Well: Comanche 1-117CR
Sample: 03-01-59
Depth: 1190.80 - 1191.80 ft
AR Ash: 38.01%

Coal with shale lenses and burrows

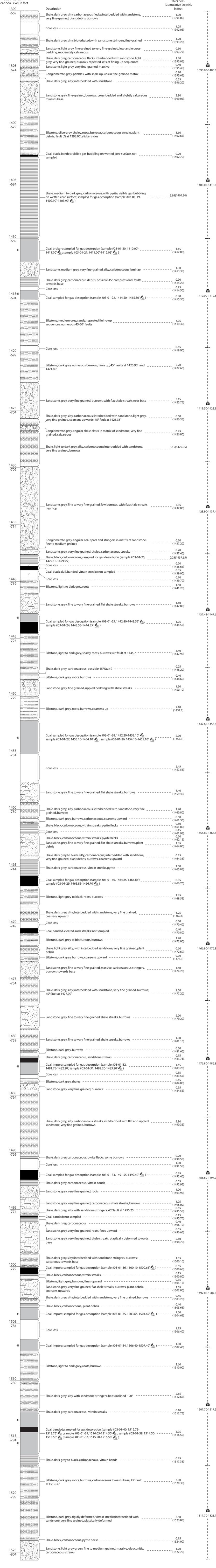
Carbonaceous shale with coaly lenses



Borehole: TXCO/USGS 1-613CR Comanche Ranch
 Company or Agency: TXCO The Exploration Company/U.S. Geological Survey
 Location: Comanche Ranch, Maverick County, TX
 Coordinates: 28°36.294 N, 100°09.927 W (GPS)
 Ground Elevation: 721 ± 25 ft. (GPS)
 Coring Depth: 1390-1525.7' (135.7')
 Total Borehole Depth: 1649.6'
 Driller: A. Clark, U.S. Geological Survey
 Drill Rig: Truck-mounted mobile drill rig
 Drilling Method: Continuous wireline coring, 10 ft spring loaded push tube with shoe
 Bit type: Tungsten-carbide/diamond HC 4.75" OD, 3" ID core
 Drilling Medium: Bentonite mud
 Casing: None (PVC to 6ft)
 Geophysical Logs: Natural gamma, caliper, gamma-gamma density, conductivity, resistivity
 Dates Drilled: 4/28/01-5/6/01
 Rock Descriptions by: J.SanFilippo, R. Hook, P. Warwick

Stratigraphic Log Scale: 1 inch = 2.50 feet

* located to the left of the stratigraphic column indicates lithologic symbol for interval modified from "coal" to "carbonaceous shale" based on as-recieved ash yield >50 percent
 Click on  located in the stratigraphic descriptions for x-ray radiographs of coal/carbonaceous shale samples
 Click on  located adjacent to the stratigraphic descriptions for core photos



Click here to return to core location map

TXCO 1-613CR
1390.00-1400.00'

TOP

1F

[Click here to return to stratigraphic log](#)

TXCO 1-613CR
1400.00-1410.00'



1' CARB. SH.
TOP 1402.5'
BS 1403.9'

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TXCO 1-613CR
1419.15-1428.90'



Cope
1421.0
1428.90
1428.90

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TXCO 1-613CR
1428.90-1437.45'

1438

CORE LOSS INTERVAL
1431.1 - 1439.55
(LOSSES AT VARIOUS PLACES IN
SS)



[Click here to return to stratigraphic log](#)

TXCO 1-613CR
1437.45-1447.60'

3-01-23
CARB. SHALE
1440.2-1441.0
0.8'

3-01-25 0.75' CON
1444.45-1445.20

3-01-26 1.0' COAL
1445.2-1446.2'

TXCO 1-613CR
1447.60-1456.80'



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TXCO 1-613CR
1456.80-1466.80'

COLE
LOSS

3-01-30 1' COAL
1468.05-1469.05

3-01-29 0-85' COAL
1467.05-1469.9'

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TXCO 1-613CR
1466.80-1476.80'



CORE LOSS EST. AT TOP
OF RUN #11 IN COAL
0.6'
1473.0-1473.6'

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TXCO 1-613CR
1476.80-1486.80'



3-01-31 COAL 10'
1485.4-1486.4

3-01-32 0.45'
COAL + CARB SH.
1484.95-1485.40

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TXCO 1-613CR
1486.80-1497.00'

1494 1494 1498

CORE LOSS
PROBABLY AT
TOP OF DAL 20.4'
1493.5-1494.15

3-01-33
0.95 CORL
1494.15-1495.

CORE LOSS
PROBABLY IN CORL
ABOUT 1496.3-
1498.7'

TXCO 1-613CR
1497.00-1507.70'

SOBE LOSS
ESTIMATED
3' IN LOCAL
CORE
1504.0'
1504.2'

0.05 EST.
1508.25'

COAL, BROKEN
SAMPLE 3-01-34
1508.25' - 1509.25'

COAL + CARB SHL #03.01-36
±0.7' 1503.3-1504.0'

#3-01-35 Coal PARTIAL
1.0'
1507.2-1508.2'



TXCO 1-613CR
1507.70-1517.50'

COAL + CARB SUFF. BASE - 1.0'
3-01-37
1518.0-1519.0

COAL SUFF.
PLE. TD
1516.25

COAL # 3-01-39
± 0.45'
1516.55-1517.00

COAL # 3-01-38
1.0'
1517.0-1518.0'

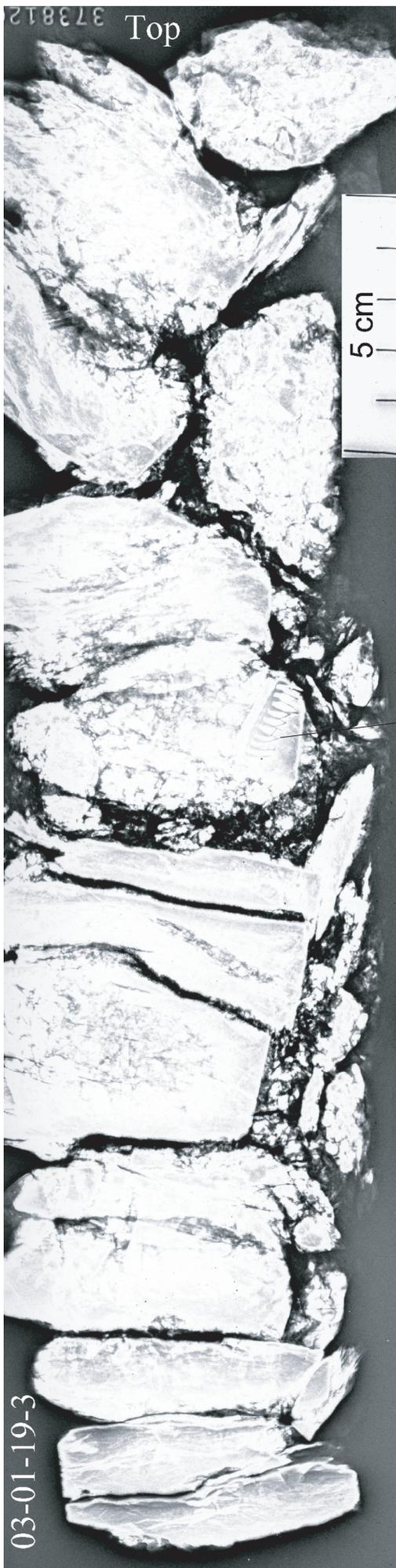
3-01-40
1' COAL + CARB SUFF.
1515.25-1516.25



TXCO 1-613CR
1517.50-1525.70

[Click here to return to stratigraphic log](#)

X-ray radiograph



Well: Comanche 1-613CR
Sample: 03-01-19
Depth: 1402.90 - 1403.90 ft
AR Ash: not available

Carbonaceous shale
with coaly lenses

Transistor (not part of core)

[Click here to return to stratigraphic log](#)

Top



Well: Comanche 1-613CR
Sample: 03-01-20
Depth: 1410.00 - 1411.00 ft
AR Ash: 73.28 %

Carbonaceous shale
with coaly lenses and
burrows

Top



Well: Comanche 1-613CR

Sample: 03-01-21

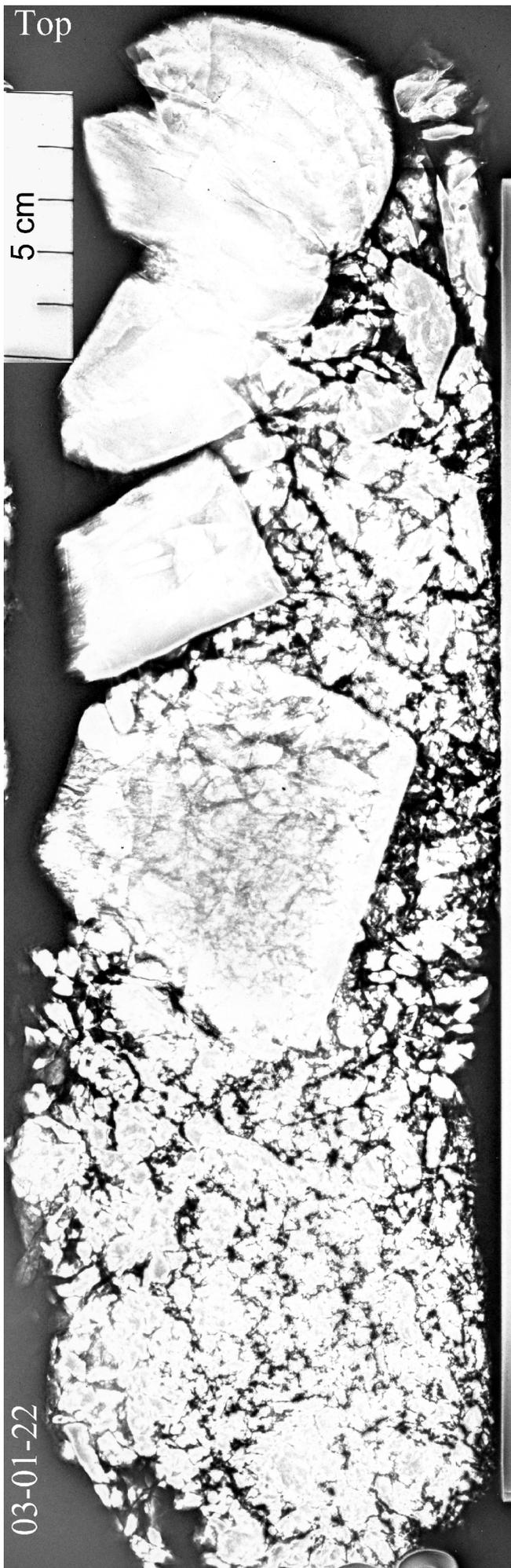
Depth: 1411.00 - 1412.05 ft

AR Ash: 74.92 %

Carbonaceous shale,
broken pieces

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X-ray radiograph

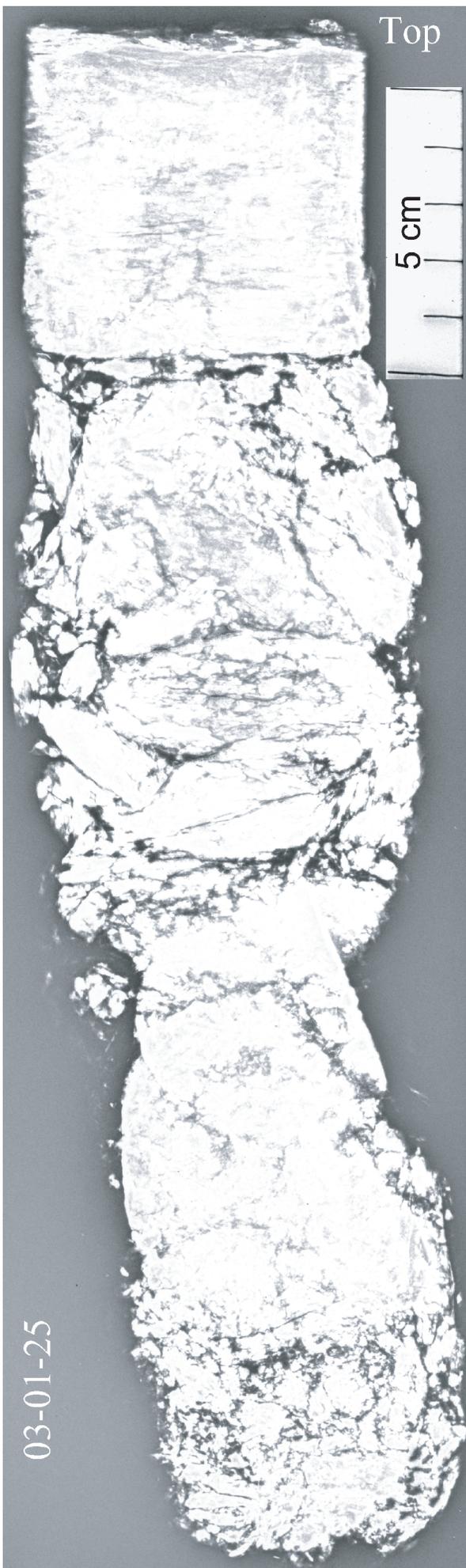


Well: Comanche 1-613CR
Sample: 03-01-22
Depth: 1414.50 - 1415.30 ft
AR Ash: 83.38 %

Carbonaceous shale,
broken pieces

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X-ray radiograph



Well: Comanche 1-613CR

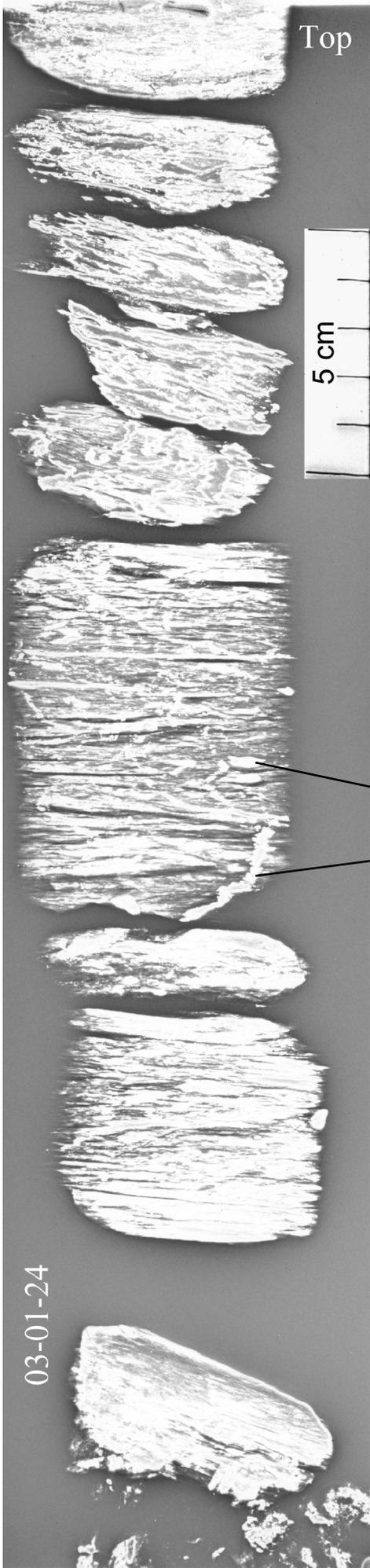
Sample: 03-01-25

Depth: 1442.80 - 1443.55 ft

AR Ash: 64.59 %

Carbonaceous shale,
broken pieces

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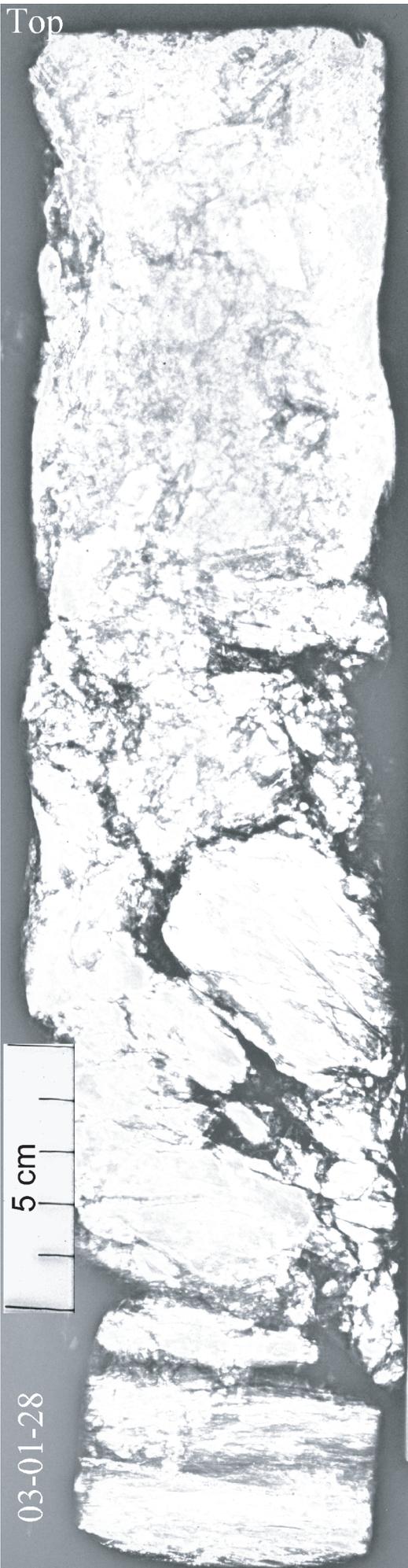
Well: Comanche 1-613CR
Sample: 03-01-24
Depth: 1443.55 - 1444.55 ft
AR Ash: 41.65%

Coal with shale lenses,
with many horizontal and
near-vertical burrows

Burrows

X-ray radiograph

Top



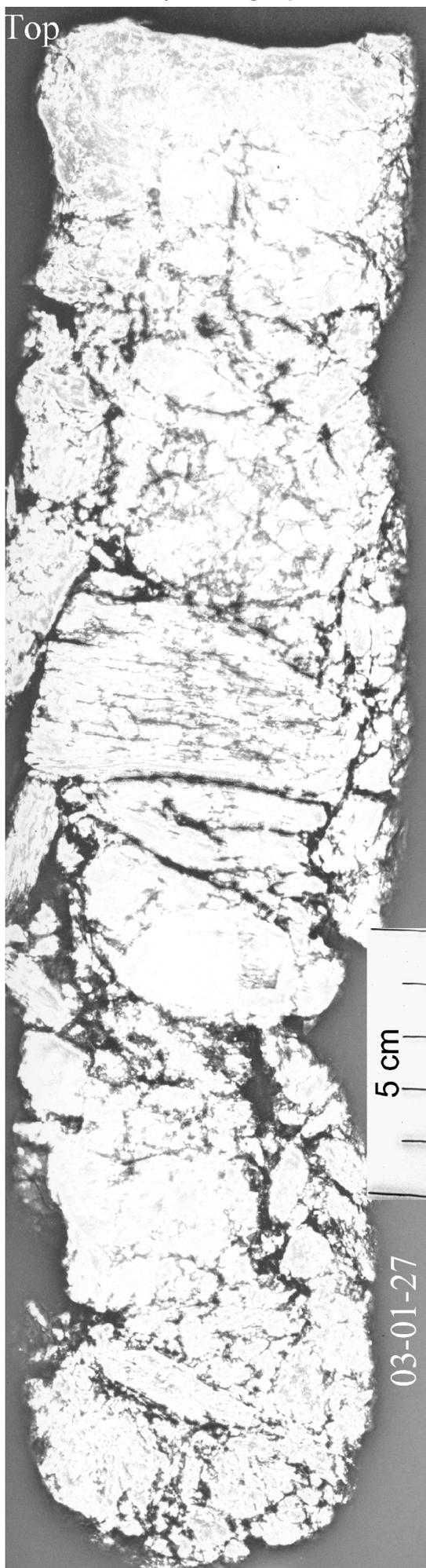
Well: Comanche 1-613CR
Sample: 03-01-28
Depth: 1452.20 - 1453.10 ft
AR Ash: 60.12 %

Carbonaceous shale,
broken pieces

[Click here to return to stratigraphic log](#)

X-ray radiograph

Top



Well: Comanche 1-613CR
Sample: 03-01-27
Depth: 1453.10 - 1454.10 ft
AR Ash: 68.57 %

Carbonaceous shale,
broken pieces

[Click here to return to stratigraphic log](#)

X-ray radiograph



Well: Comanche 1-613CR
Sample: 03-01-26
Depth: 1454.10 - 1455.10 ft
AR Ash: 50.48 %

Carbonaceous shale,
with coaly lenses and
burrows

[Click here to return to stratigraphic log](#)

Top



5 cm

03-01-29

Well: Comanche 1-613

Sample: 03-01-29

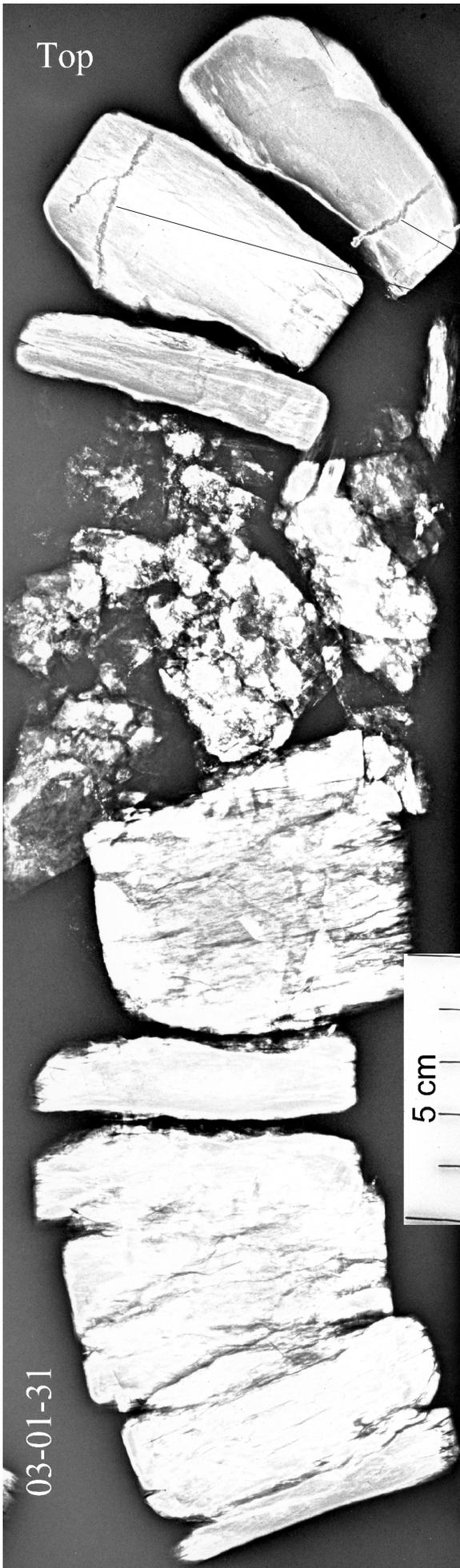
Depth: 1465.85 - 1466.70 ft

AR Ash: 42.82 %

Carbonaceous shale,
with coaly lenses and
burrows

Compressed woody
lens, root?

X-ray radiograph



Well: Comanche 1-613CR
Sample: 03-01-31
Depth: 1482.20 - 1483.20 ft
AR Ash: 65.69 %

Burrows, or roots (?)

Carbonaceous shale,
with coaly lenses and
burrows, broken pieces

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Well: Comanche 1-613CR
Sample: 03-01-33
Depth: 1491.55 - 1492.40 ft
AR Ash: 39.83 %

Carbonaceous shale,
with coaly lenses and
burrows, broken pieces



X-ray radiograph



Well: Comanche 1-613CR
Sample: 03-01-36
Depth: 1500.10 - 1500.65 ft
AR Ash: 50.69 %

Carbonaceous shale,
broken pieces with coaly
lenses and burrows

[Click here to return to stratigraphic log](#)

X-ray radiograph

Top

5 cm

03-01-35

Well: Comanche 1-613CR
Sample: 03-01-35
Depth: 1503.65 - 1504.65 ft
AR Ash: 63.94 %

Carbonaceous shale,
broken pieces with coaly
lenses and burrows

[Click here to return to stratigraphic log](#)

X-ray radiograph

Top

5 cm

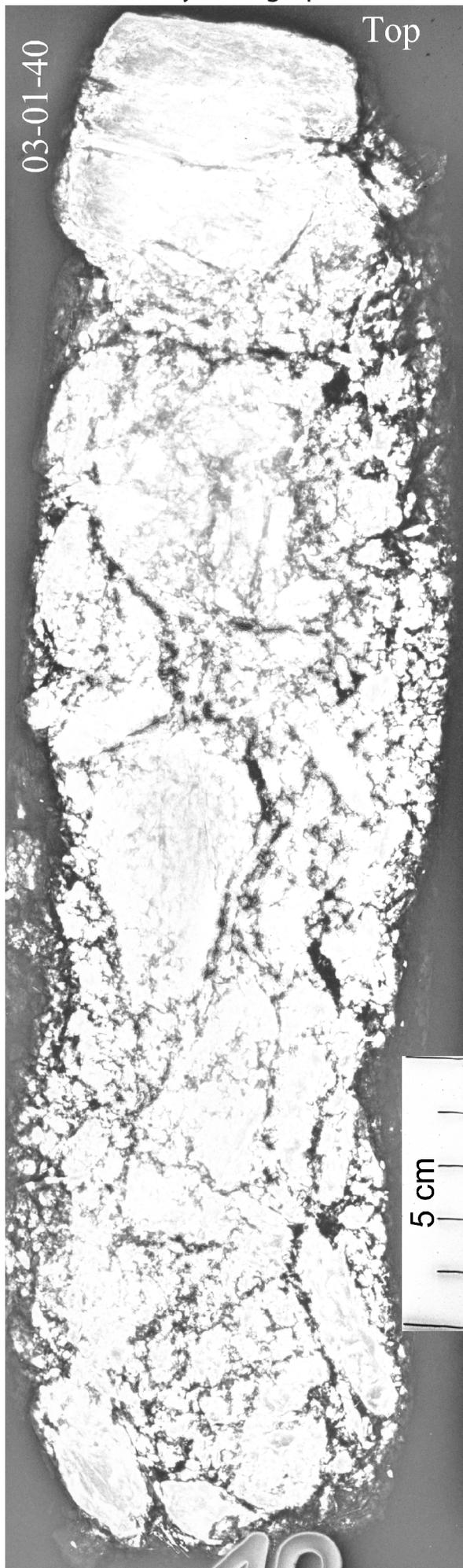
03-01-34

Well: Comanche 1-613CR
Sample: 03-01-34
Depth: 1506.40 - 1507.40 ft
AR Ash: 61.77 %

Carbonaceous shale,
broken pieces with coaly
lenses and burrows

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X-ray radiograph



Well: Comanche 1-613

Sample: 03-01-40

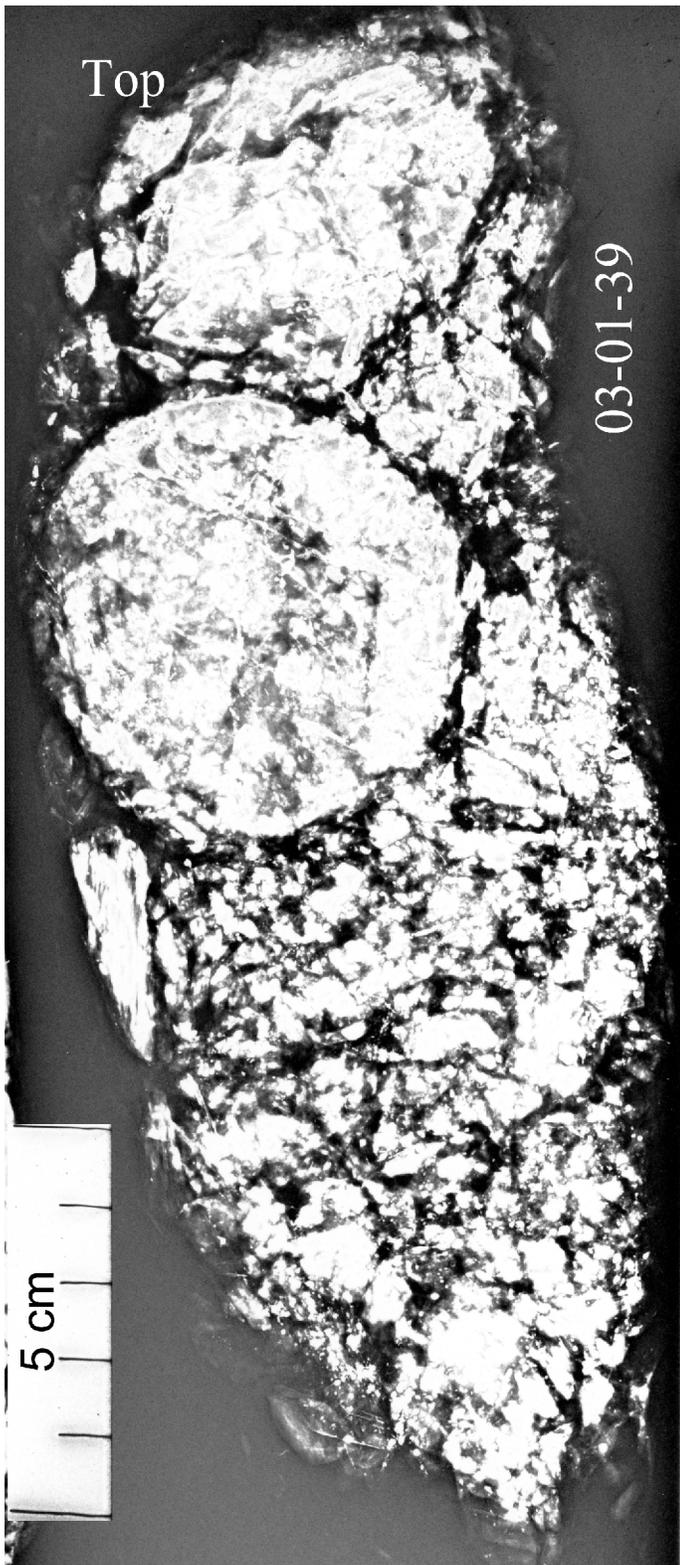
Depth: 1512.78 - 1513.75 ft

AR Ash: 64.24 %

Carbonaceous shale,
broken pieces

[Click here to return to stratigraphic log](#)

X-ray radiograph



Well: Comanche 1-613CR
Sample: 03-01-39
Depth: 1514.05 - 1514.50 ft
AR Ash: 48.77 %

Carbonaceous shale,
broken pieces

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X-ray radiograph



Well: Comanche 1-613CR
Sample: 03-01-38
Depth: 1514.50 - 1515.50 ft
AR Ash: 72.31 %

Carbonaceous shale,
broken pieces

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Well: Comanche 1-613CR
Sample: 03-01-37
Depth: 1515.50 - 1516.50 ft
AR Ash: 68.66 %

Carbonaceous shale,
some coaly lenses