Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14092.00 FEET
SAMPLE NUMBER: 7 CK-McCoy

PLATE 7

T.O.C.: 0.01% (weight percent)

This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14092.00'
Plate 7

Weatherford LABORATORIES

A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14092.00 FEET
SAMPLE NUMBER: 7 CK-McCoy

PLATE 7

T.O.C.: 0.01% (weight percent)

Lithology:	Dolomitized, peloidal, lower fine-grained sandstone to peloidal, very sandy dolostone
Sedimentary Fabric:	Burrowed/bioturbated; organic-rich microstylolites
Grain Size Range:	0.02mm to 0.64mm
Average Grain Size:	0.14mm
Compaction:	Moderate to high (microstylolites present)
Sorting:	Moderately well to well
Framework Grains:	
Major:	Potassium feldspar (28% by weight, XRD); monocrystalline quartz (11% by weight); dolomitized peloids
Minor:	Plagioclase feldspar (trace by weight)
Accessory:	Trace zircon and tourmaline; trace altered organic fragments
Clay Content:	
Detrital Matrix:	None observed
Authigenic Clay:	Rare chlorite per XRD (1% by weight) likely occurring as grain replacement
Cement Types:	Very abundant amounts of dolomite occurring as intergranular cement and grain/allochem replacement (58% by weight, total dolomite/Fe-dolomite); minor feldspar overgrowths and lesser quartz overgrowths; minor calcite replacement of unstable grains (2% by weight); trace pyrite replacement of organic material and other labile particles (large localized cluster of pyrite replacement at top of section, left of the notch); trace bitumen trapped within intergranular/intercrystalline spaces and concentrated along microstylolites
Porosity Types:	No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

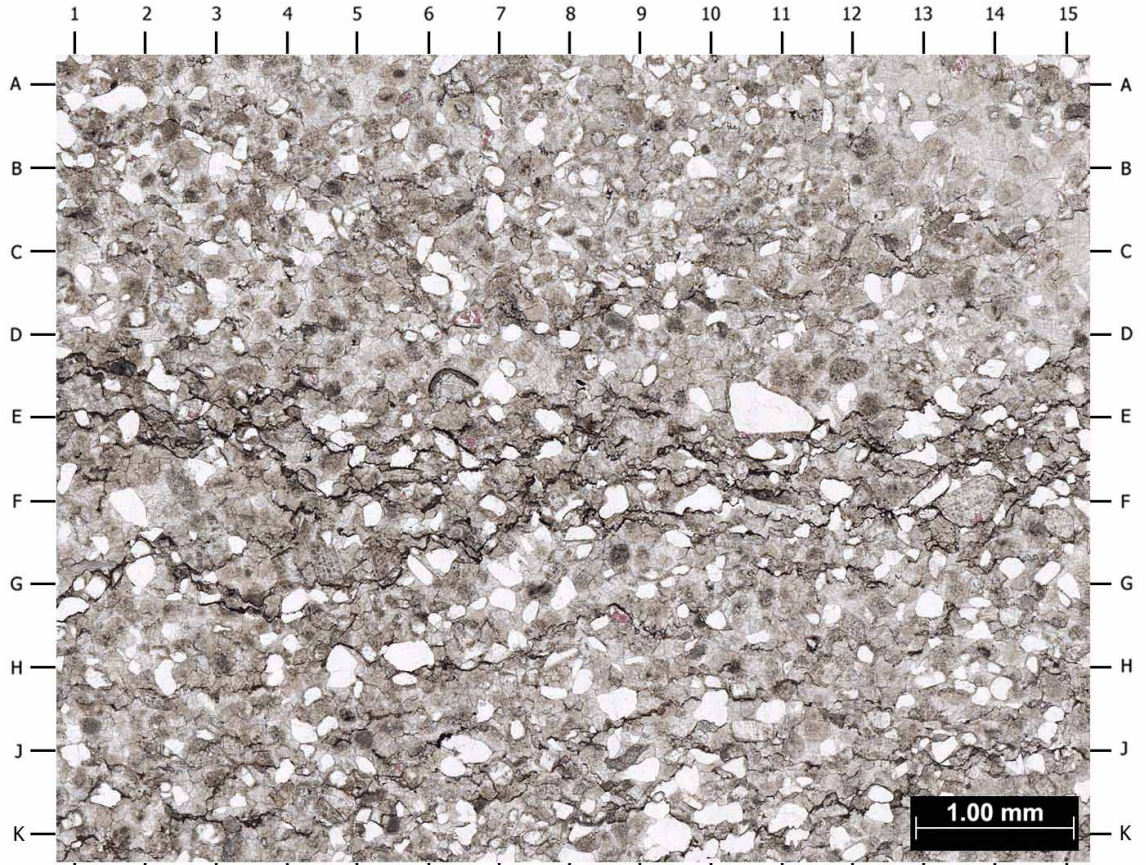
B) This dolomitized, peloidal, lower fine-grained sandstone to peloidal, very sandy dolostone exhibits a burrowed/bioturbated fabric and is estimated to be moderately well to well sorted. The presence of several organic-rich microstylolites (DE1-EF15, G1-F8, HJ8-11) indicates that the sample has undergone moderate to high levels of compaction.

C) This photomicrograph provides a high magnification view of the area centered near E3.5 in Photo B and documents an area along a cluster of microstylolites (F1 to H15, CD1 to E13.5). Abundant amounts of dolomite cement occludes all intergranular spaces between grains of potassium feldspar (AB3.8, FG3, BC9.5, DE2), quartz (K3, B7.5), and dolomitized peloids (AB14.8, E14.5, HJ14.5, D10). Many of the feldspar grains exhibit well developed overgrowth cement (AB3, AB4.2, DE3, E2, BC9.8). Rare calcite partially replaces a feldspar grain at F6.5 (stained red).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

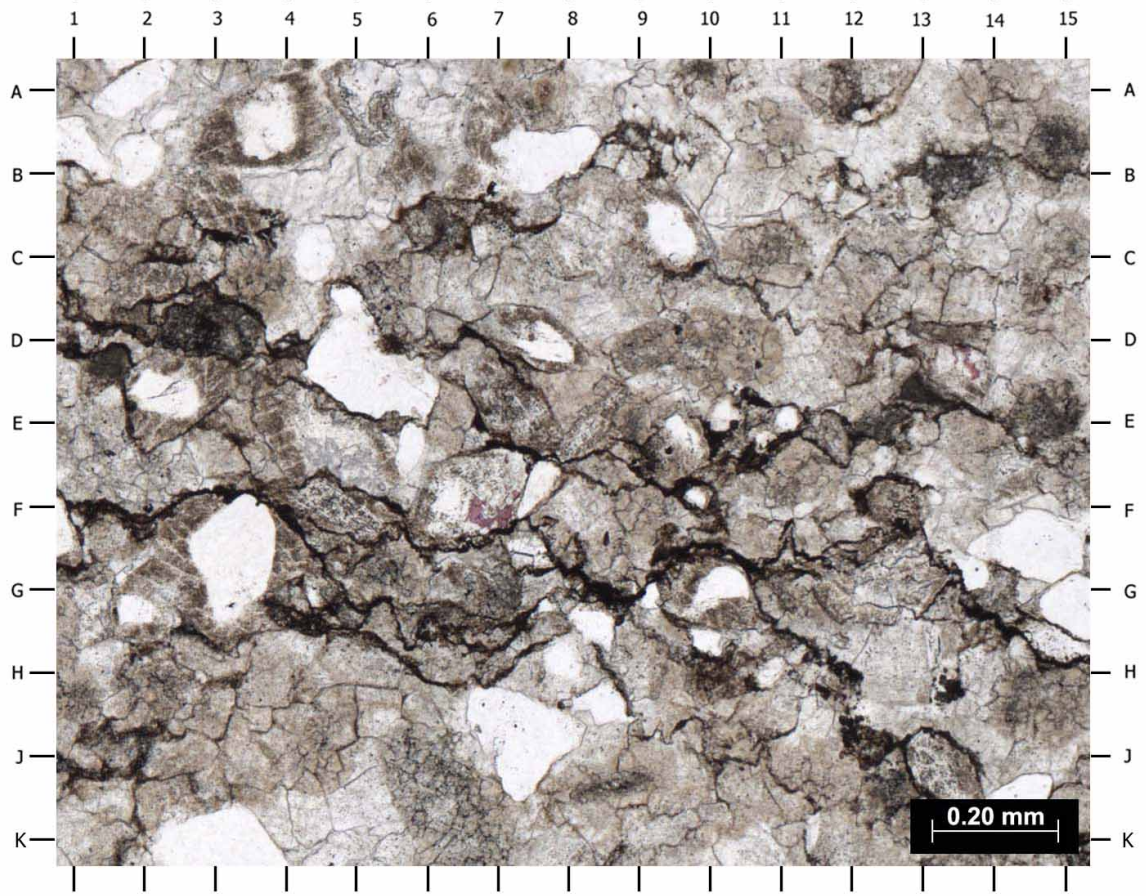
14092.00'
Plate 7

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14099.00 FEET
SAMPLE NUMBER: 8 CK-McCoy

PLATE 8

T.O.C.: 0.01% (weight percent)

This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14099.00'
Plate 8

Weatherford LABORATORIES

A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14099.00 FEET
SAMPLE NUMBER: 8 CK-McCoy

PLATE 8

T.O.C.: 0.01% (weight percent)

Lithology:	Dolomitic, lower fine-grained sandstone
Sedimentary Fabric:	Massive
Grain Size Range:	0.04mm to 0.86mm
Average Grain Size:	0.14mm
Compaction:	Moderate to high
Sorting:	Moderately well
Framework Grains:	
Major:	Potassium feldspar (46% by weight) and monocrystalline quartz (20% by weight, total quartz)
Minor:	Plagioclase feldspar (1% by weight) and micritic allochems
Accessory:	Trace heavy minerals (tourmaline, zircon, and rutile) and a trace dolomitized ooid
Clay Content:	
Detrital Matrix:	None observed
Authigenic Clay:	Trace undifferentiated grain replacement
Cement Types:	Abundant dolomite occurring as intergranular cement and grain replacement (30% by weight, total dolomite/Fe-dolomite); minor calcite (3% by weight) occurring as grain replacement and in lesser amounts as intergranular cement; common feldspar overgrowths; minor quartz overgrowths; trace possible intergranular anhydrite cement; and trace pyrite occurring as replacement of organic material and other unstable particles
Porosity Types:	Rare to minor secondary intragranular to grain-moldic pores associated with leached feldspar grains; and trace primary intergranular pores

Magnification: B: 50X C: 200X

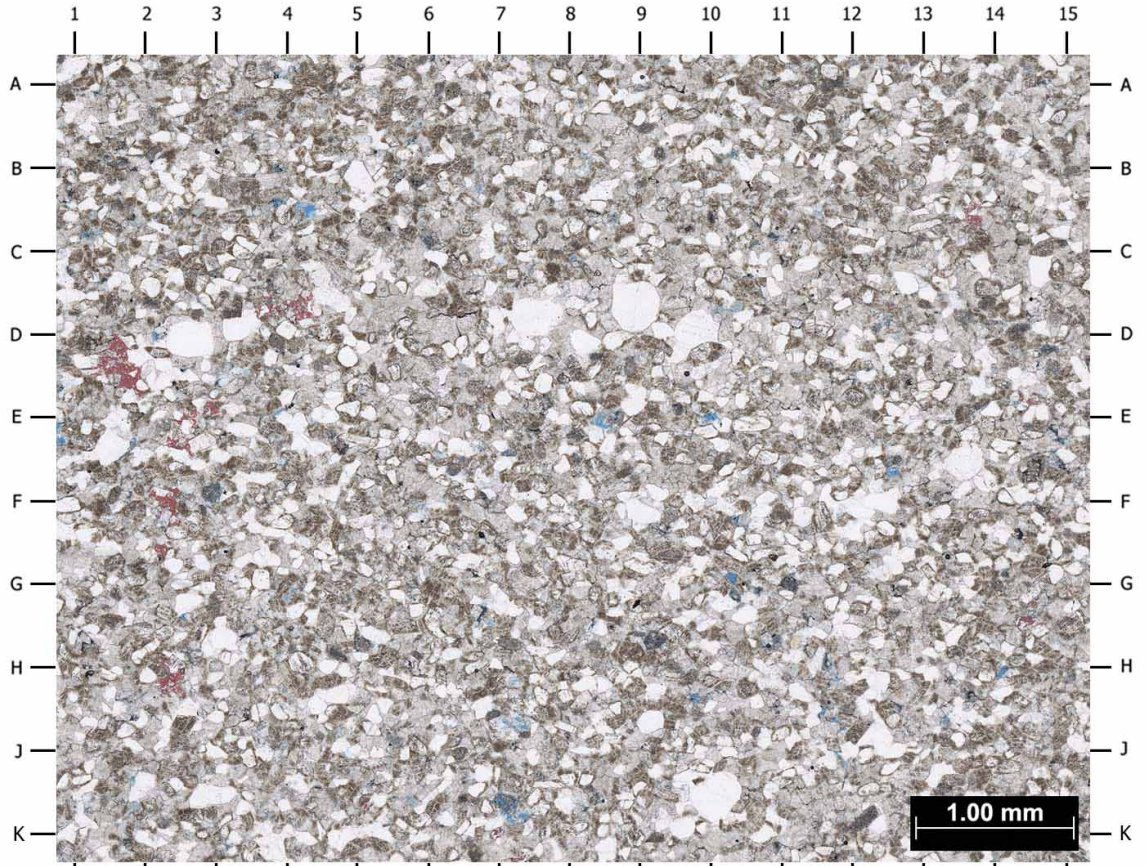
B) This dolomitic, lower fine-grained sandstone is massive and moderately well sorted with detrital grains that are mainly sub-rounded to rounded in sphericity. For scale, the larger monocrystalline quartz grain at JK10 has a measured grain diameter of 0.33mm. Rare to minor secondary intragranular pores to grain-moldic pores occur scattered throughout the sample and are associated with leached feldspar grains (blue epoxy; BC4.2, JK7.2, E8.5, EF12.5).

C) This photomicrograph provides a high magnification view of the area centered near DE4.8 Photo B. Abundant amounts of dolomite replaces unstable grains (D14, C11, GH7) and occurs as intergranular cement (GH3, CD1.6, B12.7) between framework grains of feldspar (F11.8, GH13.8, AB6.3, CD7.5, BC8, E9) and quartz (HJ6.3, JK6.2, B10.2). Common feldspar overgrowths (H9, CD8.1, K1) and minor quartz overgrowths (J6.5) also contribute to intergranular cementation. Calcite occurs mostly as a minor replacement of unstable feldspar grains (stained red; C6, GH1.5). An isolated primary intergranular pore is visible at H5.

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

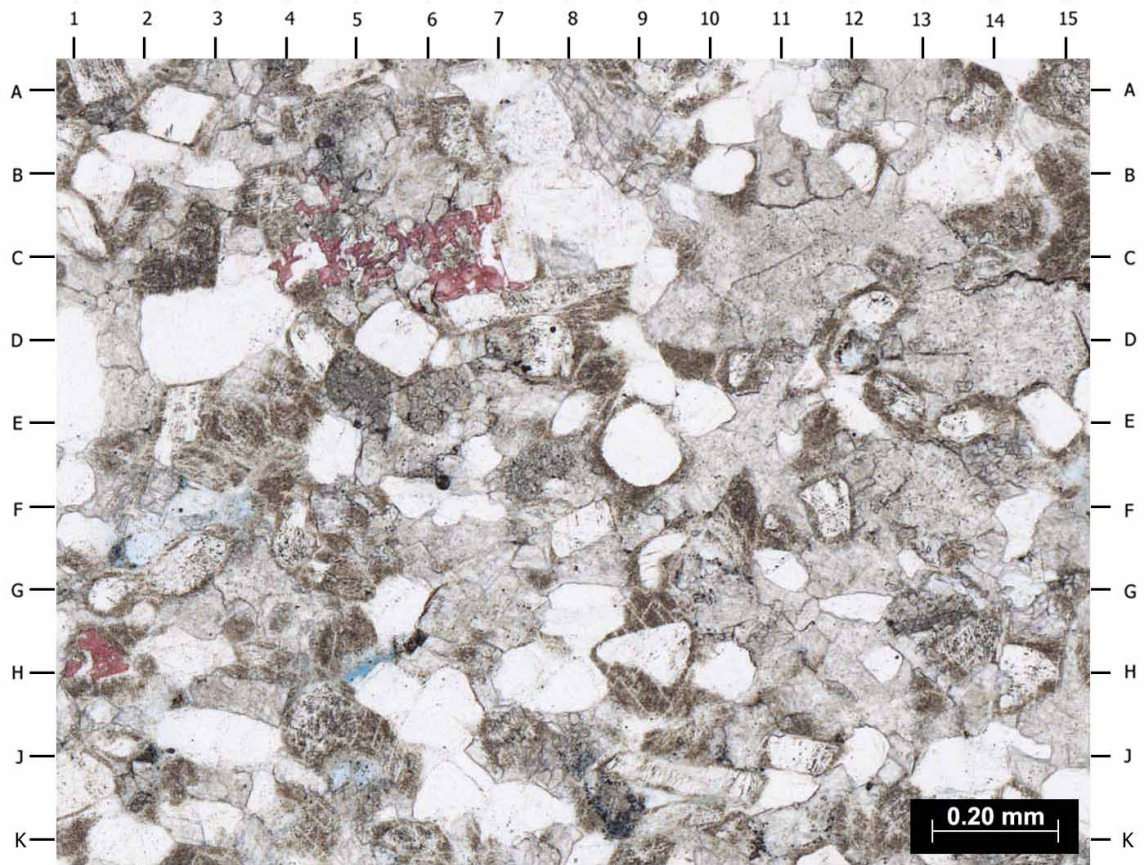
14099.00'
Plate 8

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14106.00 FEET
SAMPLE NUMBER: 9 CK-McCoy

PLATE 9

T.O.C.: 0.01% (weight percent)

This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14106.00'
Plate 9

Weatherford LABORATORIES

A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14106.00 FEET
SAMPLE NUMBER: 9 CK-McCoy

PLATE 9

T.O.C.: 0.01% (weight percent)

Lithology:	Dolomitic, fine-grained sandstone
Sedimentary Fabric:	Laminated; slightly cross-laminated; slightly burrowed; grain size varies between laminations
Grain Size Range:	0.04mm to 0.67mm
Average Grain Size:	0.16mm (dominant); 0.14mm (minor layer along bottom of section)
Compaction:	Moderate to high
Sorting:	Moderate to moderately well (dominant); minor thick layer along bottom of section is well sorted (see Photo A)
Framework Grains:	
Major:	Potassium feldspar (37% by weight, XRD) and monocrystalline quartz (27% by weight, total quartz)
Minor:	Minor plagioclase feldspar (1% by weight), micritic allochems, and trace plutonic rock fragments
Accessory:	Trace heavy minerals (zircon and tourmaline)
Clay Content:	
Detrital Matrix:	None observed
Authigenic Clay:	Trace undifferentiated grain replacement
Cement Types:	Abundant dolomite (33% by weight, total dolomite/Fe-dolomite) occurring as intergranular cement and replacement of unstable grains; minor to common feldspar overgrowths; minor quartz overgrowths; minor calcite (2% by weight) occurring mostly as replacement of unstable grains; trace pyrite occurring as replacement of unstable particles; and trace possible anhydrite occurring as intergranular cement and grain replacement
Porosity Types:	Rare secondary intragranular to grain-moldic pores associated with leached feldspar grains; and trace isolated primary intergranular pores

Magnification: B: 50X C: 200X

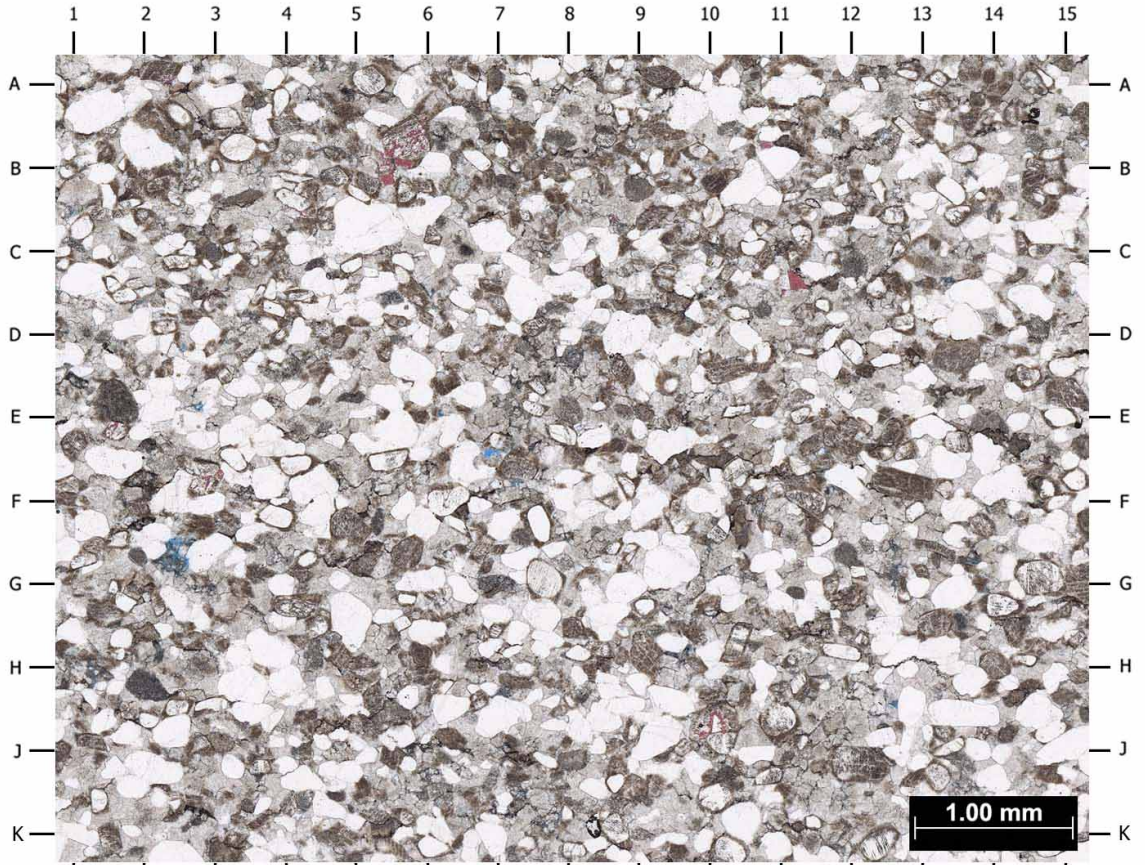
B) This photo documents the dominant moderate to moderately well sorted portion of this dolomitic, fine-grained sandstone. Rare secondary intragranular pores are visible at FG2.4 and EF6.9 (filled with blue-dyed epoxy). Minor calcite replaces unstable grains (stained red; B5.6, CD11.2). A minor well sorted and slightly finer-grained sandstone zone occurs along the bottom of the section (visible in Photo A). The low magnification macro photo (Photo A) illustrates best the laminated, slightly cross-laminated, and slightly burrowed fabric of this sample.

C) This photomicrograph provides a high magnification view of the area centered near EF5 in Photo B. Potassium feldspar (EF10.5, GH14, F5.5, HJ4.5) and quartz (D11, HJ7, CD3.7, C5.5) grains often exhibit overgrowth cement around their grain perimeters (GH7.7, F6.8, F2.7, G14, J7.3), but abundant dolomite cement occludes the majority of the intergranular pore volume (CD2.5, A14, BC8, BC4.5, F3.5, J11). Calcite (stained red) replaces an unstable grain at FG1.5. A trace isolated primary intergranular pore occurs at CD13.7 (blue epoxy).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

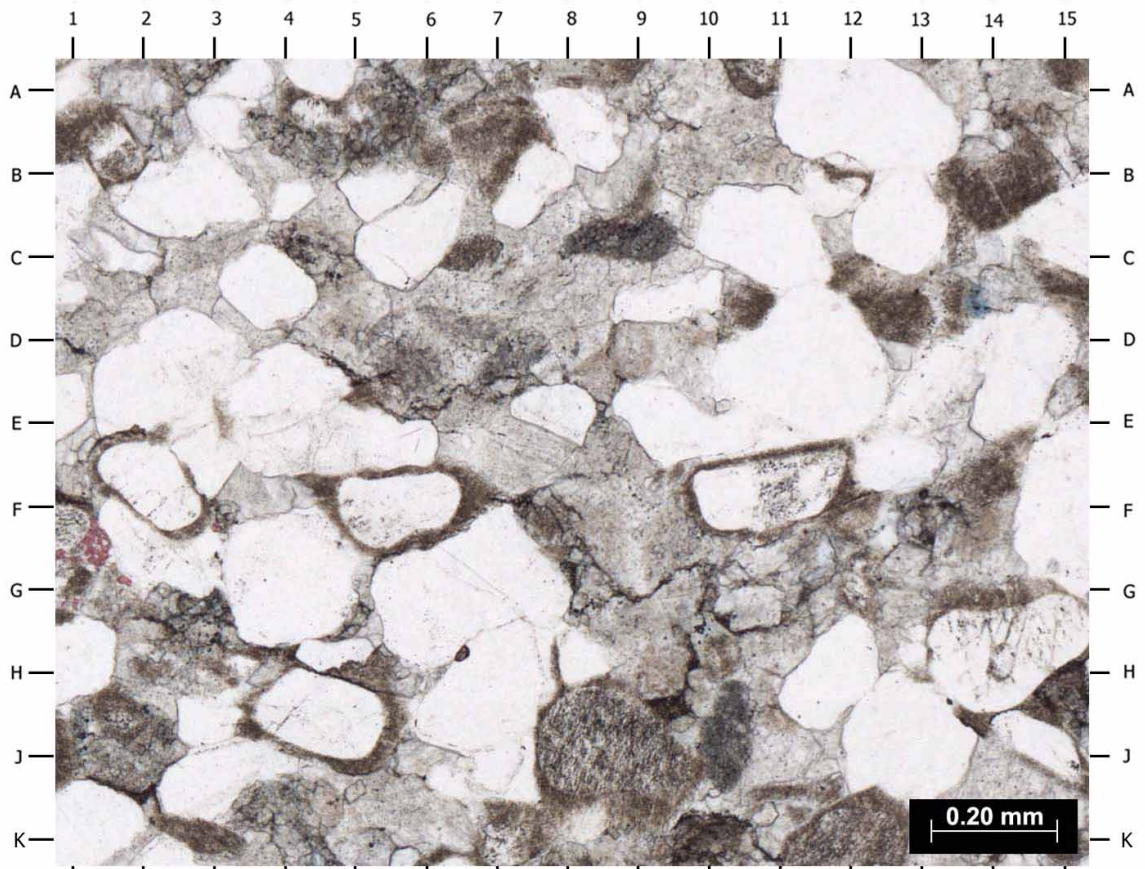
14106.00'
Plate 9

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14108.00 FEET
SAMPLE NUMBER: 10 CK-McCoy

PLATE 10

T.O.C.: 0.01% (weight percent)

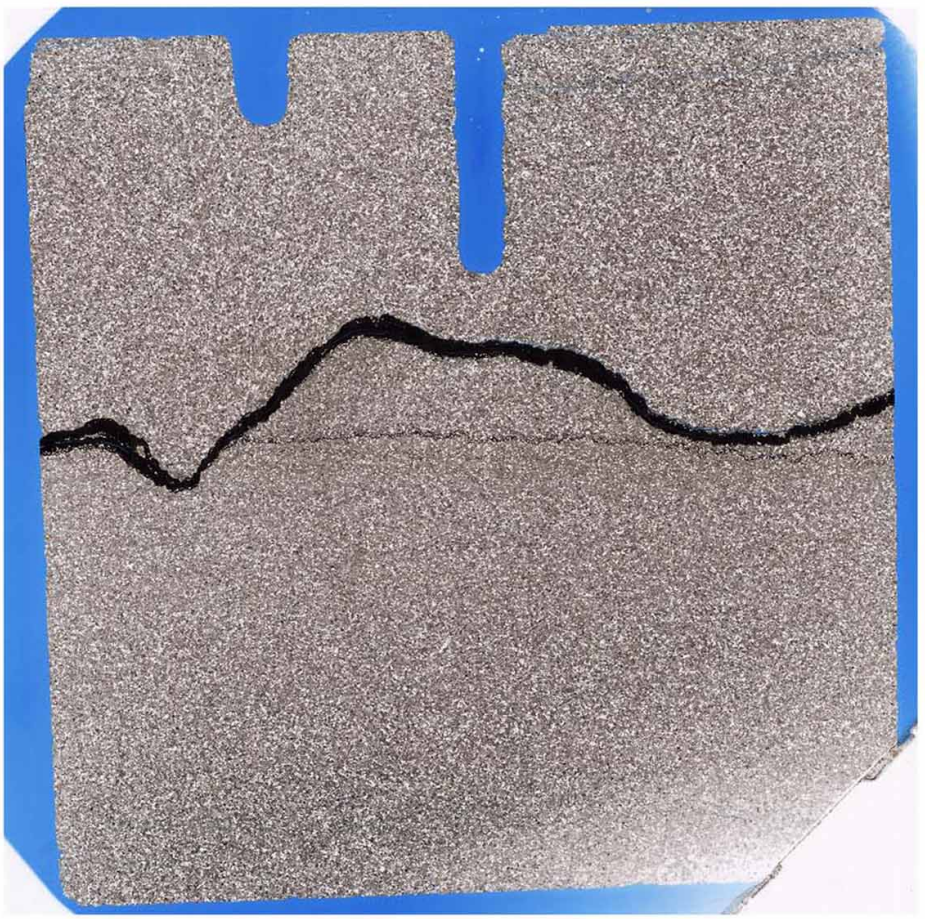
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14108.00'
Plate 10

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14108.00 FEET
SAMPLE NUMBER: 10 CK-McCoy

PLATE 10

T.O.C.: 0.01% (weight percent)

Lithology:	Dolomitic, very fine-grained sandstone
Sedimentary Fabric:	Massive; horizontal partially pyritized, organic/clay-rich stylolites across center of section
Grain Size Range:	<0.03mm to 0.21mm
Average Grain Size:	0.10mm
Compaction:	Moderate to high (well developed stylolites across center, but no sutured grain-to-grain contacts observed)
Sorting:	Moderately well
Framework Grains:	
Major:	Very abundant amounts of potassium feldspar (60% by weight, XRD)
Minor:	Common monocrystalline quartz (13% by weight, total quartz); minor micritic allochems; and trace plagioclase feldspar (by weight)
Accessory:	Trace muscovite mica
Clay Content:	
Detrital Matrix:	Trace detrital clays concentrated along stylolites
Authigenic Clay:	Rare chlorite (1% by weight) likely occurring as grain replacement
Cement Types:	Common to abundant dolomite (23% by weight, total dolomite/Fe-dolomite) occurring as intergranular cement and replacement of unstable grains; minor to common feldspar overgrowths; minor quartz overgrowths; minor calcite (3% by weight) occurring as replacement of labile grains; trace pyrite occurring as replacement of organic material and unstable grains; and trace bitumen concentrated along stylolites
Porosity Types:	Trace secondary intragranular pores and trace isolated primary intergranular pores

Magnification: B: 50X C: 200X

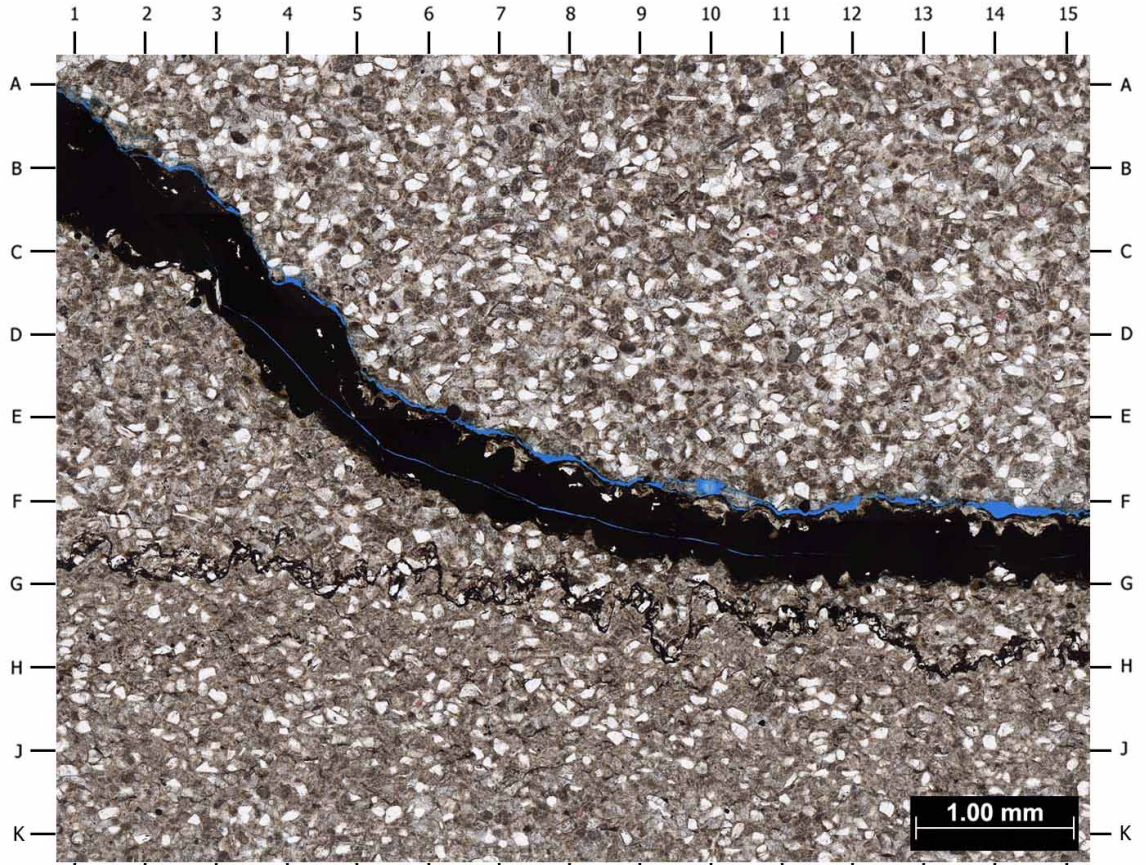
B) This photo documents partially pyritized organic/clay-rich stylolites (black; B1-FG15 and FG1-H15) that cut across the center of this massive, dolomitic, very fine-grained sandstone. The open fracture porosity that runs along the larger stylolite was likely artificially induced during sample preparation and/or acquisition (blue epoxy; B2.5-F15).

C) This photomicrograph provides a high magnification view of the area centered near FG2 in Photo B and documents the smaller of the two stylolites (DF1-FG15). This sample is dominated by potassium feldspar grains (60% by weight; CD14, E8, CD12.5, HJ3.5) with common monocrystalline quartz grains also present (J10, G3.5, BC7). A muscovite mica fragments occurs at DE11-13. The intergranular pore volume has been almost completely occluded through a combination of moderate to high levels of sediment compaction, common to abundant dolomite cement (23% by weight; C1.5, E9, CD6.3), and minor to common feldspar/quartz overgrowths (BC7.5, C8.5, AB10.5).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

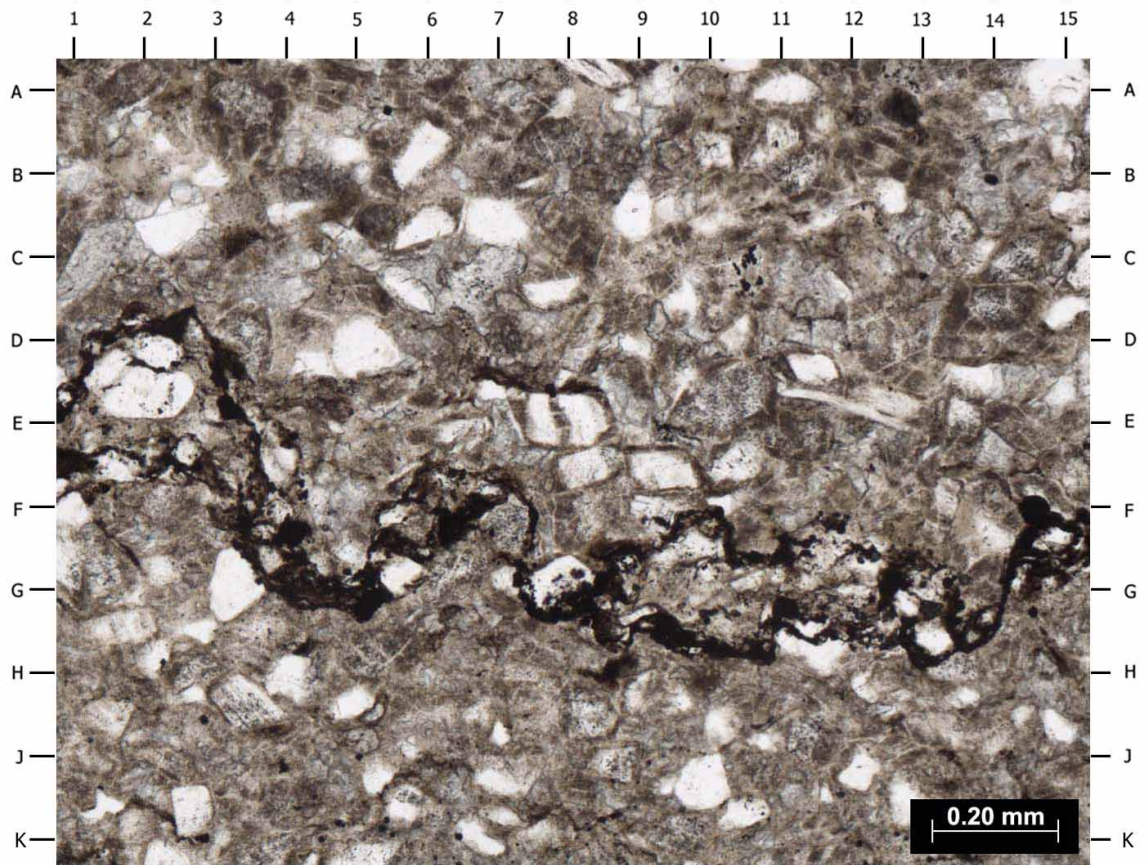
14108.00'
Plate 10

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14126.50 FEET
SAMPLE NUMBER: 11 CK-McCoy

PLATE 11

T.O.C.: 0.02% (weight percent)

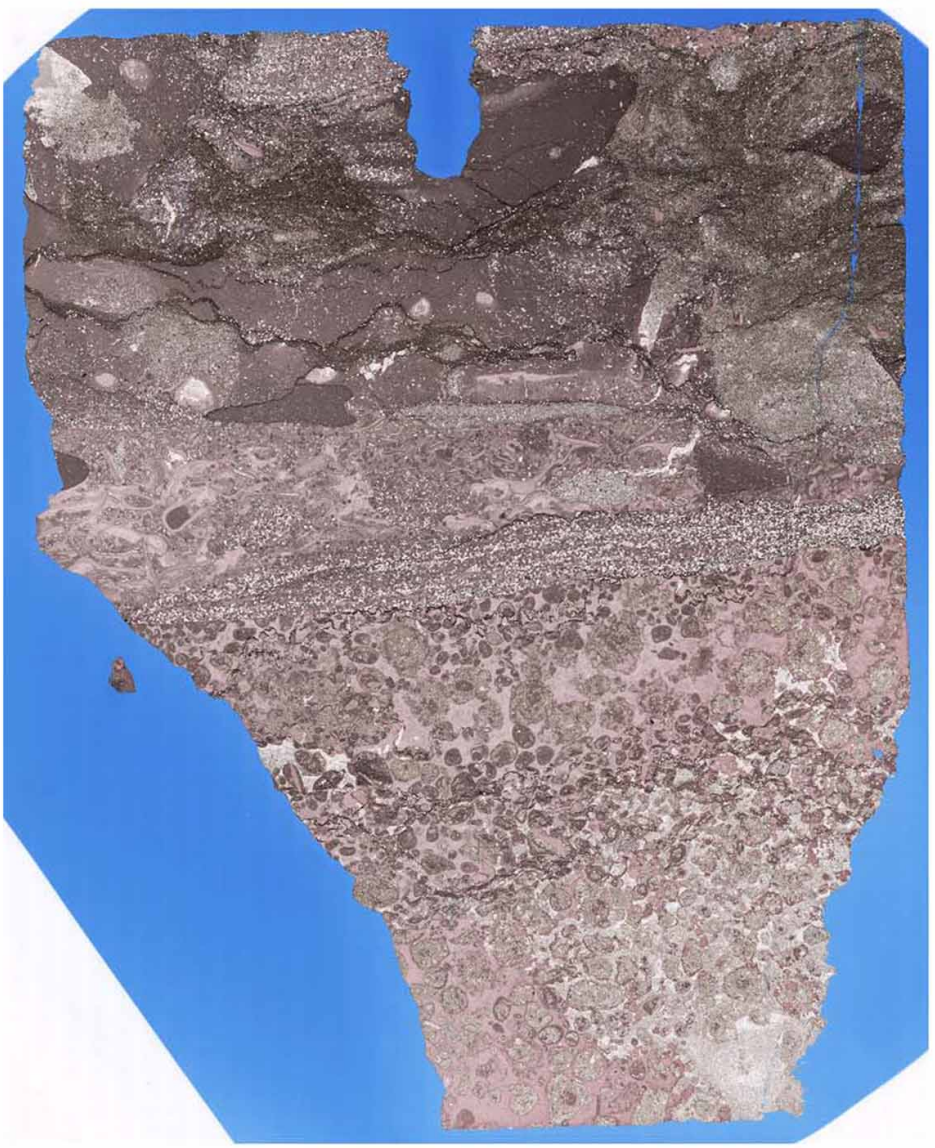
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14126.50'
Plate 11

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14126.50 FEET
SAMPLE NUMBER: 11 CK-McCoy

PLATE 11

T.O.C.: 0.02% (weight percent)

Lithology: Dolomitic, sandy limestone

Texture: Starting from bottom – laminated, partially dolomitized, oolitic grainstone with organic-rich microstylolites and average ooid size varying between laminations (18mm thick at bottom of section); laminated, very sandy, peloidal grainstone (1-2mm thick); sandy, peloidal, fossiliferous grainstone to packstone (5mm thick on left to ~1mm on right); chaotic, partially dolomitized, sandy wackestone to lime mudstone with organic-rich to dolomitized stylolites and over-sized intraclasts (~13-14mm thick at top of section); trace localized/discontinuous dolomite-cemented fractures and dolomite-cemented voids

Detrital Grains/Allochems: Partially dolomitized ooids (dominant in lower half of the slide); common micritic peloids; common potassium feldspar grains (19% by weight; coarse silt to very fine sand); minor quartz grains (4% by weight); minor trilobite fragments; minor echinoderm fragments; minor intraclasts; trace plagioclase feldspar grains; trace altered organic plant/algal fragments; trace muscovite and biotite mica

Matrix: The upper portion of the sample contains patchy lime mud matrix with large patches of slightly carbonaceous, finely crystalline dolomite matrix; minor clays detected in XRD are likely present along stylolites and within dolomitized zones in the upper portion of the sample (XRD clay distribution by weight: 1% chlorite, 1% illite/mica, and a trace of kaolinite and mixed-layer illite/smectite)

Cements and Replacement Minerals: Abundant sparry calcite interparticle cement throughout the lower 2/3rds of the sample (54% by weight, total calcite); common calcite replacement/recrystallization of matrix and grains/allochems; common dolomite (20% by weight, total dolomite/Fe-dolomite) occurring as replacement of grains/allochems and matrix material; minor pyrite (1% by weight) occurring as replacement of organic material and other unstable particles; trace bitumen concentrated along stylolites; trace localized/discontinuous dolomite-cemented fractures

Pore System: A trace moldic pore at bottom-right edge of sample may represent a plucked grain; no other pores are visible using standard petrographic techniques

Magnification: B: 50X C: 200X

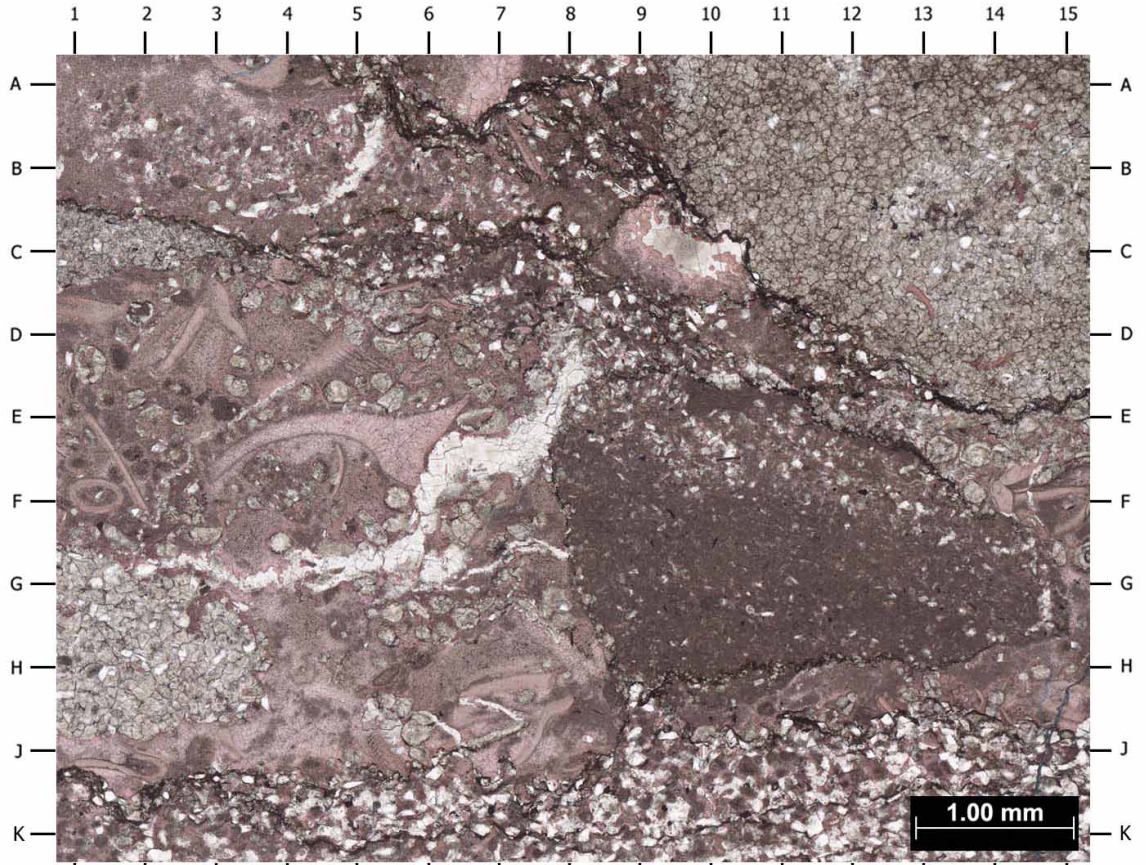
B) This photo documents laminated, very sandy, peloidal grainstone (K1-JK15) in contact with sandy, peloidal fossiliferous grainstone to packstone (AJ1-15) with large limestone intraclasts (EG8-G14.8) and dolomitized intraclasts (AB9.5-AD15, GH1-3.5). Localized/discontinuous, dolomite-cemented fractures occur at FG2-DE8 and BC4-AB5.2. Bituminous organic material occurs concentrated along microstylolites (black; A5-DE15, BC1-DE11, JK1-HJ13). The interparticle spaces between trilobite fragments (F1.2, EF3-6, JK2, J7.3, D2.5, A3.5), micritic peloids (BC2.5, DE1.7, E3, J2.8), and dolomitized peloids (F5.5, D5.3, DE1.2) are cemented by sparry calcite within the grainstone areas.

C) This photomicrograph provides a high magnification view of the area centered near EF12.5 in Photo B. A sandy/silty micritic intraclast dominates the bottom-left portion of this photo. Organic-rich microstylolites occur at B1-H12.5 and A4-BC15. Probable dolomitized ooids are pictured at E9.5 and E11.8. The area from A8 to AB15 represents the bottom edge of a large dolomitized intraclast.

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

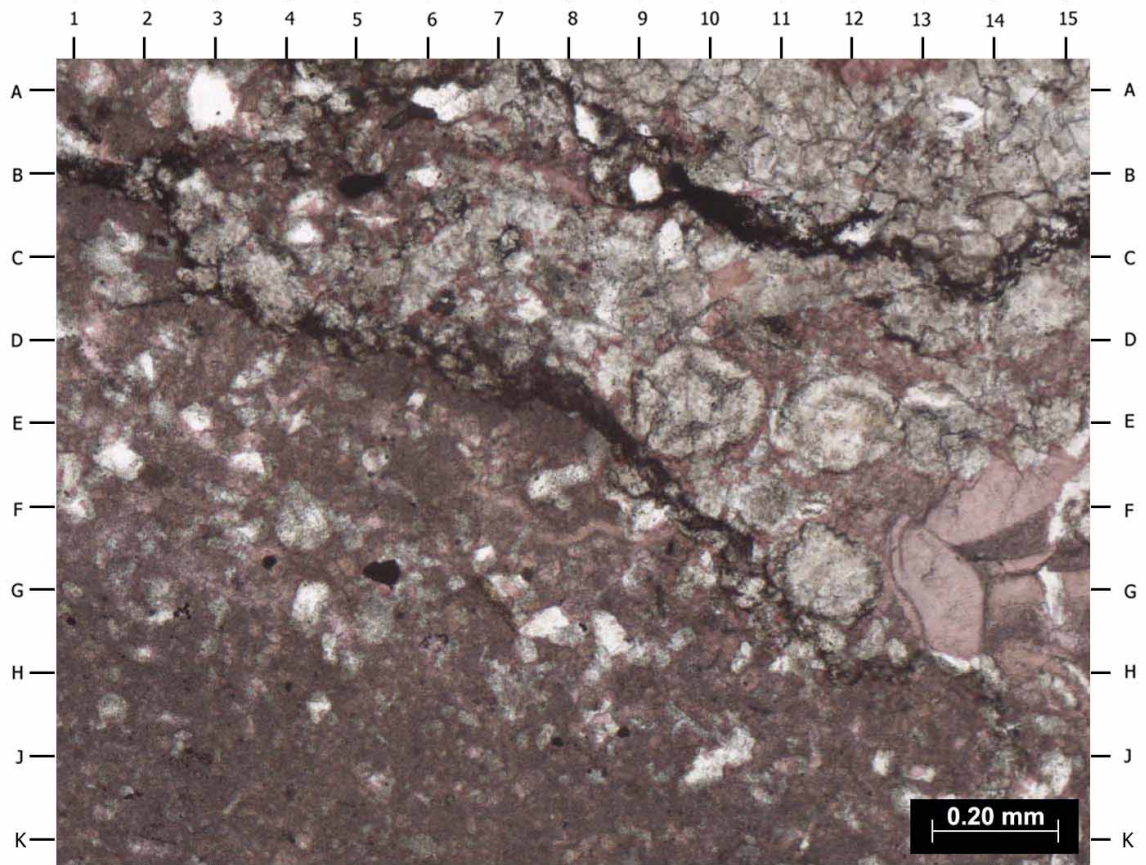
14126.50'
Plate 11

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14358.00 FEET
SAMPLE NUMBER: 12 CK-McCoy

PLATE 12

T.O.C.: 0.01% (weight percent)

This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14358.00'
Plate 12

Weatherford LABORATORIES

A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14358.00 FEET
SAMPLE NUMBER: 12 CK-McCoy

PLATE 12

T.O.C.: 0.01% (weight percent)

Lithology: Slightly sandy dolostone

Texture: Vaguely laminated, burrowed, completely dolomitized, peloidal grainstone

Detrital Grains/Allochems: Abundant dolomitized peloids; minor dolomitized ooids; minor potassium feldspar grains (8% by weight) and monocrystalline quartz grains (2% by weight; mostly very fine- to fine-grained sand); minor dolomitized intraclasts; trace plagioclase feldspar grains; trace dolomitized echinoderm fragments; trace heavy minerals (tourmaline and zircon); and trace altered organic macerals

Matrix: Minor lamination and patches of very fine to finely crystalline dolomite representing probable dolomitized micrite; no detrital matrix observed (completely dolomitized); rare amounts of clay were detected by XRD, but not observed in thin section (XRD clay distribution by weight: 1% illite/mica and traces of chlorite, kaolinite, and mixed-layer illite/smectite)

Cements and Replacement Minerals: Very abundant amounts of dolomite (88% by weight, total dolomite/Fe-dolomite) occurring as replacement of interparticle sparry cement, allochems, and other unstable grains; rare feldspar overgrowths; trace dolomitized syntaxial overgrowths around the edges of echinoderm fragments; trace dolomite spar occluding larger voids or vugs; trace pyrite replacement of unstable material; trace bituminous organic material occluding secondary pores and imbedded within some intercrystalline spaces

Pore System: Trace secondary grain-moldic pores partially occluded by bitumen (isolated and not filled with blue-dyed epoxy)

Magnification: B: 50X C: 200X

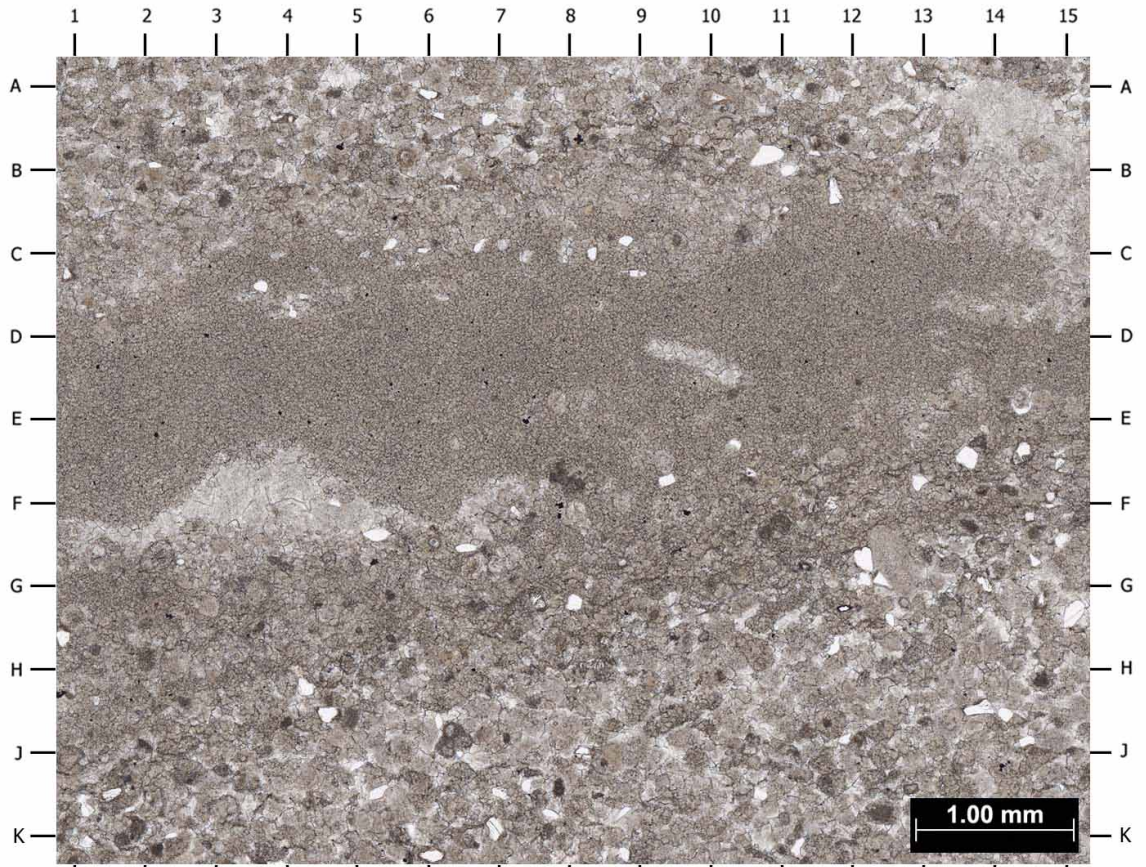
B) This slightly sandy dolostone contains abundant dolomitized peloids (AB2, JK12.4, GH13), minor dolomitized ooids (EF9), and minor scattered feldspar/quartz grains (white; B11, EF13.5, FG12.2, HJ4.5) that are cemented by sparry dolomite cement. The area at DF1 to DE15 represents an irregular lamination or possible horizontal burrow structure composed of very fine to finely crystalline dolomite with patches of more coarsely crystalline dolomite spar occluding voids or possible vugs (F3.5, AB14).

C) This photomicrograph provides a high magnification view of the area centered near FG8 in Photo B. The majority of this photo consists of very fine to finely crystalline dolomite (AC1-7, AB7-12). Dolomitized peloids are identified by vague circular structures scattered throughout the dolomitized substrate (DE9, B14.2, G3.5, H5.8, F9, F14-15). Quartz (J9, C14.3) and feldspar grains (J7, FG3, DE6) are also pictured within this view. Pyritized organic fragments occur at DE8.4.

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

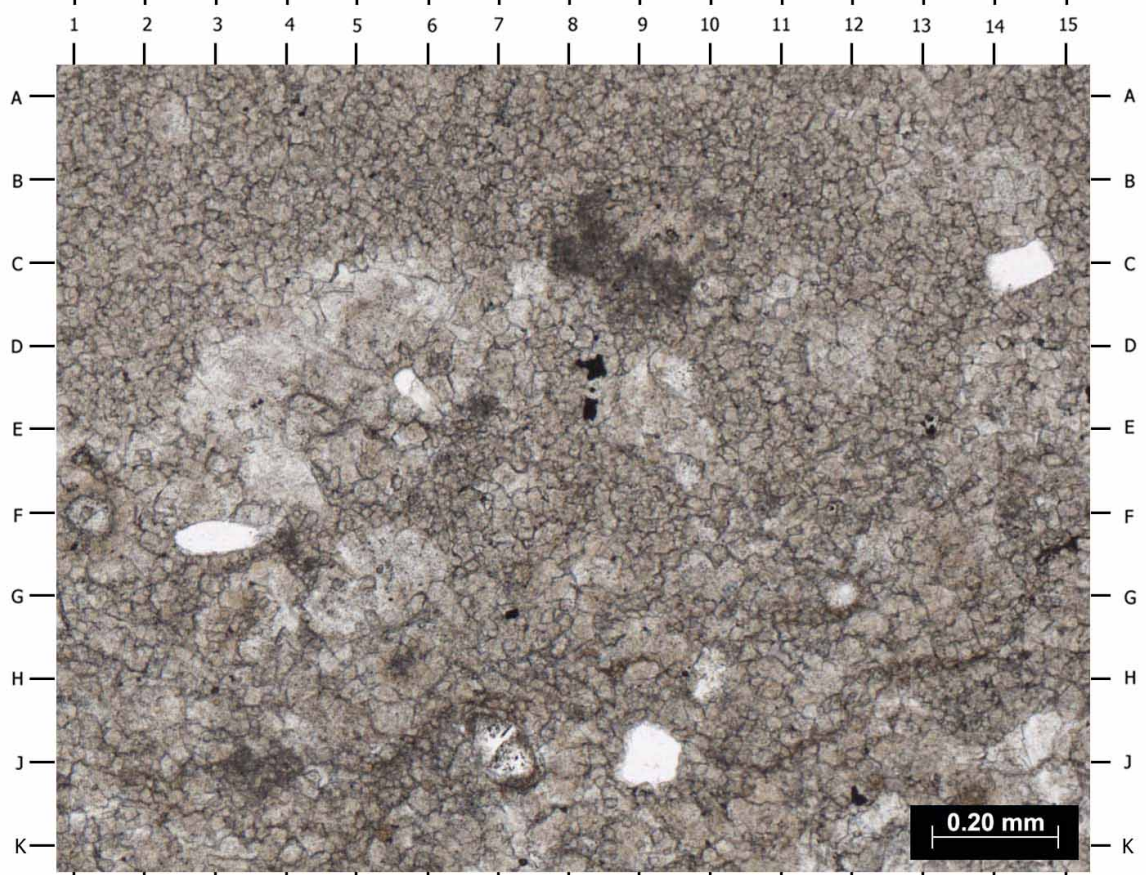
14358.00'
Plate 12

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14359.50 FEET
SAMPLE NUMBER: 13 CK-McCoy

PLATE 13

T.O.C.: 0.01% (weight percent)

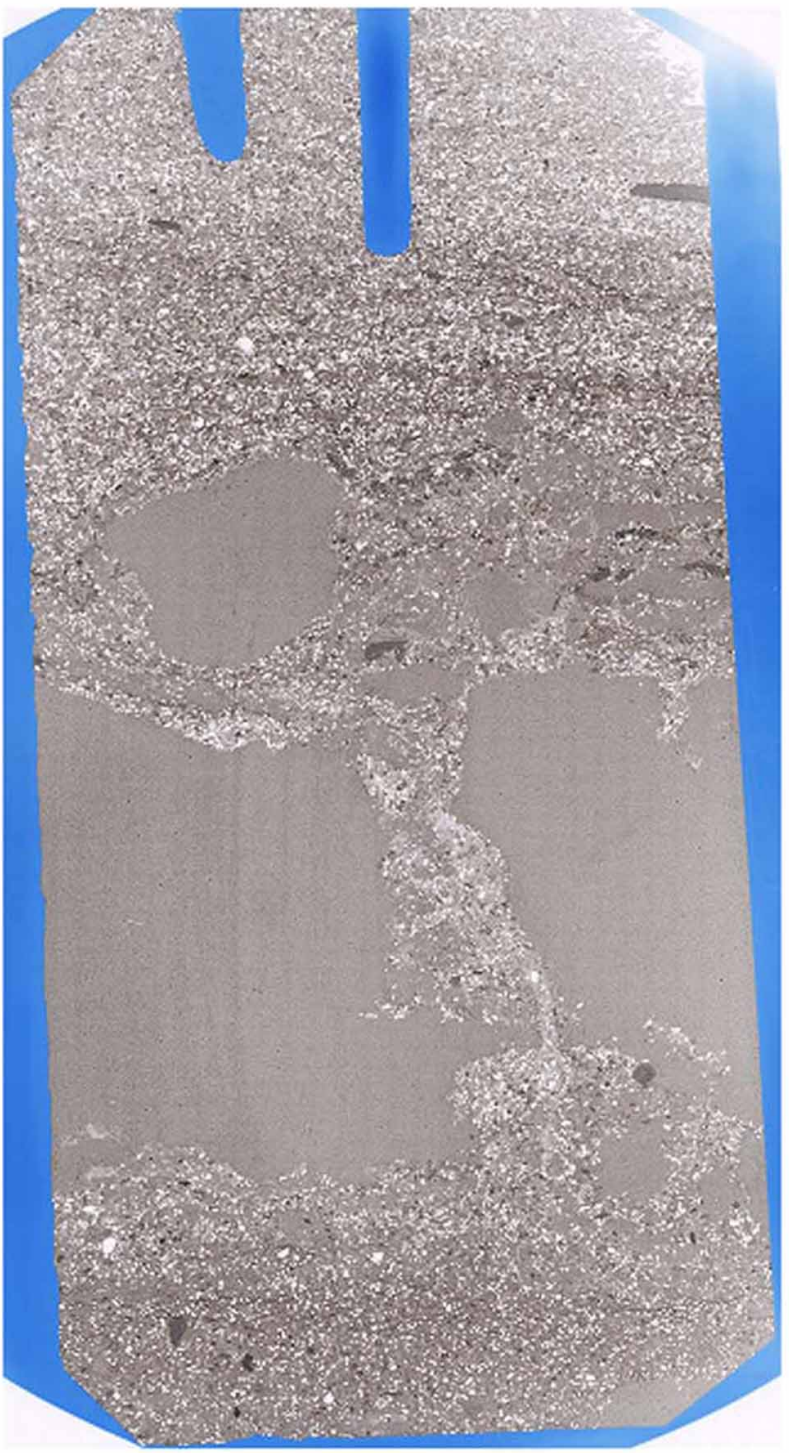
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14359.50'
Plate 13

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14359.50 FEET
SAMPLE NUMBER: 13 CK-McCoy

PLATE 13

T.O.C.: 0.01% (weight percent)

Lithology: Very sandy dolostone

Texture: Vaguely laminated, burrowed, peloidal, very sandy, dolomitized grainstone (dominant at top and bottom of the thin section) with several over-sized dolomitized intraclasts (including pebble-sized; largest at least 20mm in diameter) composed of very fine to finely crystalline dolomite (intraclasts dominate through 2.5cm thick section across center); rare, discontinuous, organic-rich incipient microstylolites

Detrital Grains/Allochems: Abundant dolomitized peloids; dolomitized intraclasts, including pebble-sized intraclasts (up to >20mm in diameter); common potassium feldspar (22% by weight) and monocrystalline quartz grains (12% by weight, very fine- to fine-grained sand); minor dolomitized ooids; minor plagioclase feldspar grains (1% by weight); trace muscovite mica; trace partially pyritized organic fragments; and trace zircon

Matrix: Predominantly finely crystalline dolomite; no detrital matrix preserved; trace amounts of clay were detected in XRD, but not observed in thin section

Cements and Replacement Minerals: Abundant finely crystalline dolomite cement occluding interparticle spaces; abundant dolomite replacement of precursor matrix, peloids, and other grains/allochems (64% by weight, total dolomite/Fe-dolomite); minor to common feldspar overgrowths; minor quartz overgrowths; trace pyrite replacement of organic material and other unstable particles; trace bituminous organic material locally imbedded between dolomite crystals and occurring along incipient microstylolites

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

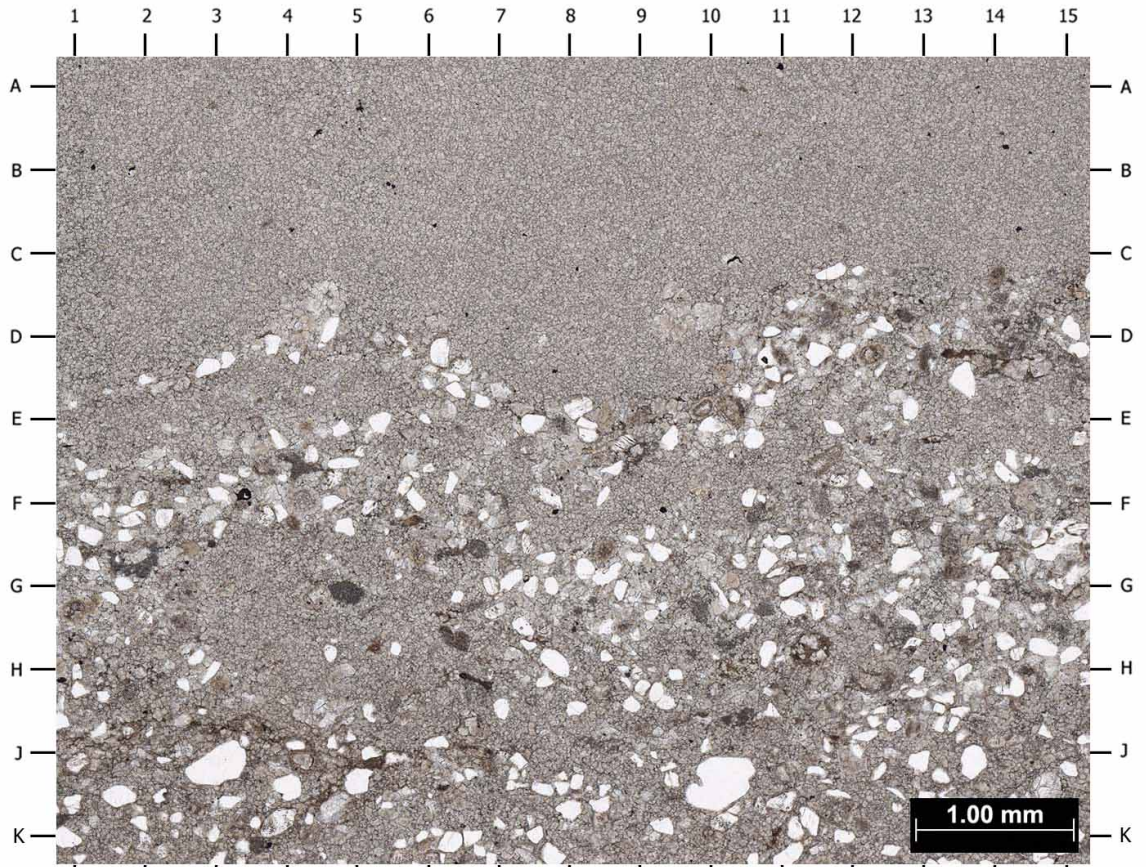
B) This image was taken from near the bottom of macro Photo A. The bottom edge of a large dolomitized intraclast dominates the top portion of this photo (AC1-15) and a smaller dolomitized intraclast occurs at GH3-6. The very fine- to fine-grained sand portion consists of common potassium feldspar (22% by weight; DE8, JK4, FG1.9), common monocrystalline quartz (12%, by weight; J3, JK10, J13.7), and minor plagioclase feldspar grains (1% by weight).

C) This photomicrograph provides a high magnification view of the area centered near E7.5 in Photo B. The interparticle dolomite cement (H5.5, JK4.5, H8.5-10.5, JK11) that occludes spaces between dolomitized allochems, quartz (G8, EF3.5), and feldspar grains (CD2.5, F10.5, H13, GH11) is typically comprised of slightly coarser dolomite crystals than the dolomite crystals that are contained within dolomitized allochems, such as peloids (JK5.5-8, H1.5-4.3, G9.5) and intraclasts (AB1-AE15). A trace muscovite mica fragment occurs at FG1.5-2.5.

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

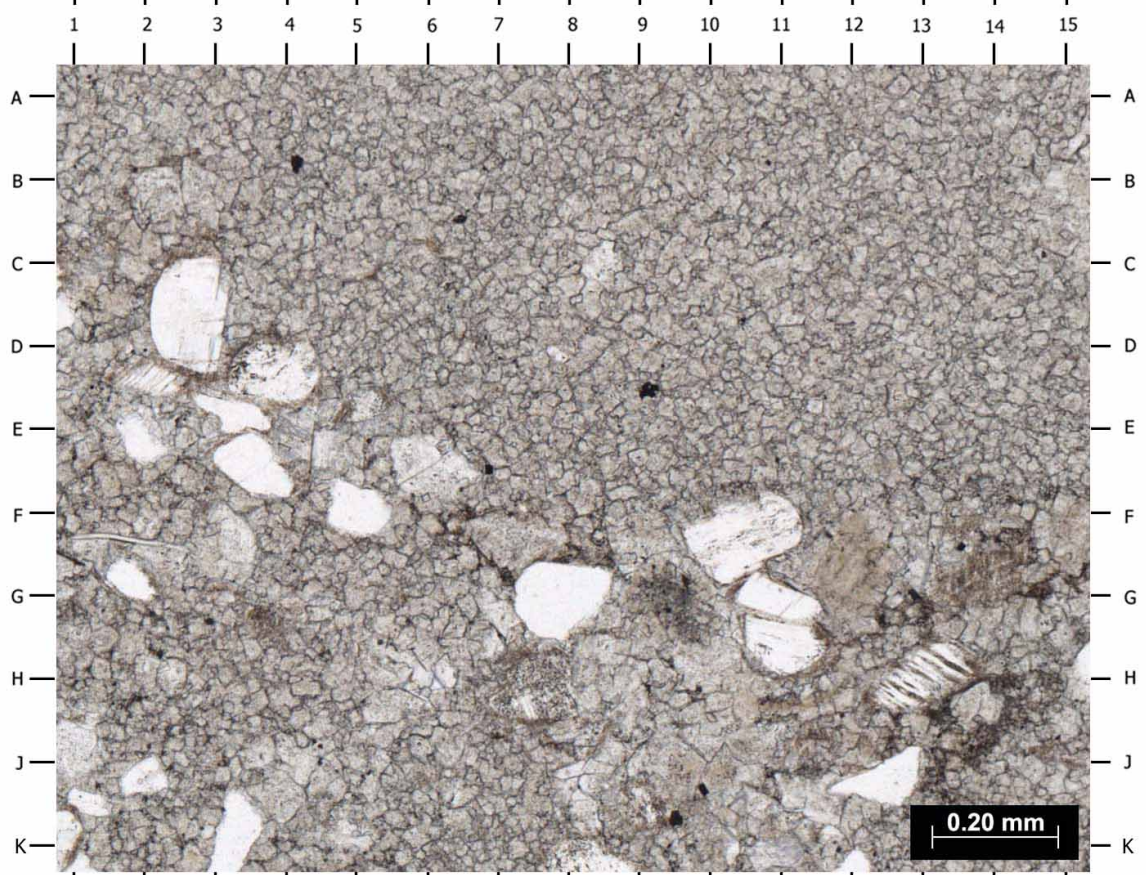
14359.50'
Plate 13

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14360.00 FEET
SAMPLE NUMBER: 14 CK-McCoy

PLATE 14

T.O.C.: 0.09% (weight percent)

This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14360.00'
Plate 14

Weatherford LABORATORIES

A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14360.00 FEET
SAMPLE NUMBER: 14 CK-McCoy

PLATE 14

T.O.C.: 0.09% (weight percent)

Lithology: Peloidal, very sandy dolostone; slightly sandy dolostone

Texture: Laminated to thinly interbedded; slightly burrowed; bands of peloidal, very sandy, dolomitized grainstone to packstone alternating with laminated, slightly sandy, dolomitized mudstone; organic-rich microstylolites

Detrital Grains/Allochems: Abundant dolomitized peloids; common potassium feldspar (22% by weight; very fine- to fine-grained sand); minor monocrystalline quartz (6% by weight); minor dolomitized ooids; minor dolomitized intraclasts; rare plagioclase feldspar (trace by weight); trace altered organic plant/algal fragments; trace heavy minerals (tourmaline and zircon)

Matrix: Predominantly very fine to finely crystalline dolomite; no detrital matrix observed; trace to rare amounts of clay were detected by XRD and are likely associated with microstylolites (XRD clay distribution by weight: 1% illite/mica and traces of chlorite, kaolinite, and mixed-layer illite/smectite)

Cements and Replacement Minerals: Very abundant dolomite (70% by weight, total dolomite/Fe-dolomite) occurring as replacement of precursor matrix and unstable grains/allochems and occurring as interparticle cement within dolomitized grainstone bands; minor feldspar and quartz overgrowths; minor pyrite (1% by weight) occurring as replacement of organic material and other unstable grains/allochems; trace bitumen concentrated along microstylolites and occurring along some crystal/grain contacts; and trace scattered siderite microcrystals

Pore System: Trace secondary intragranular pores associated with leached feldspars

Magnification: B: 50X C: 200X

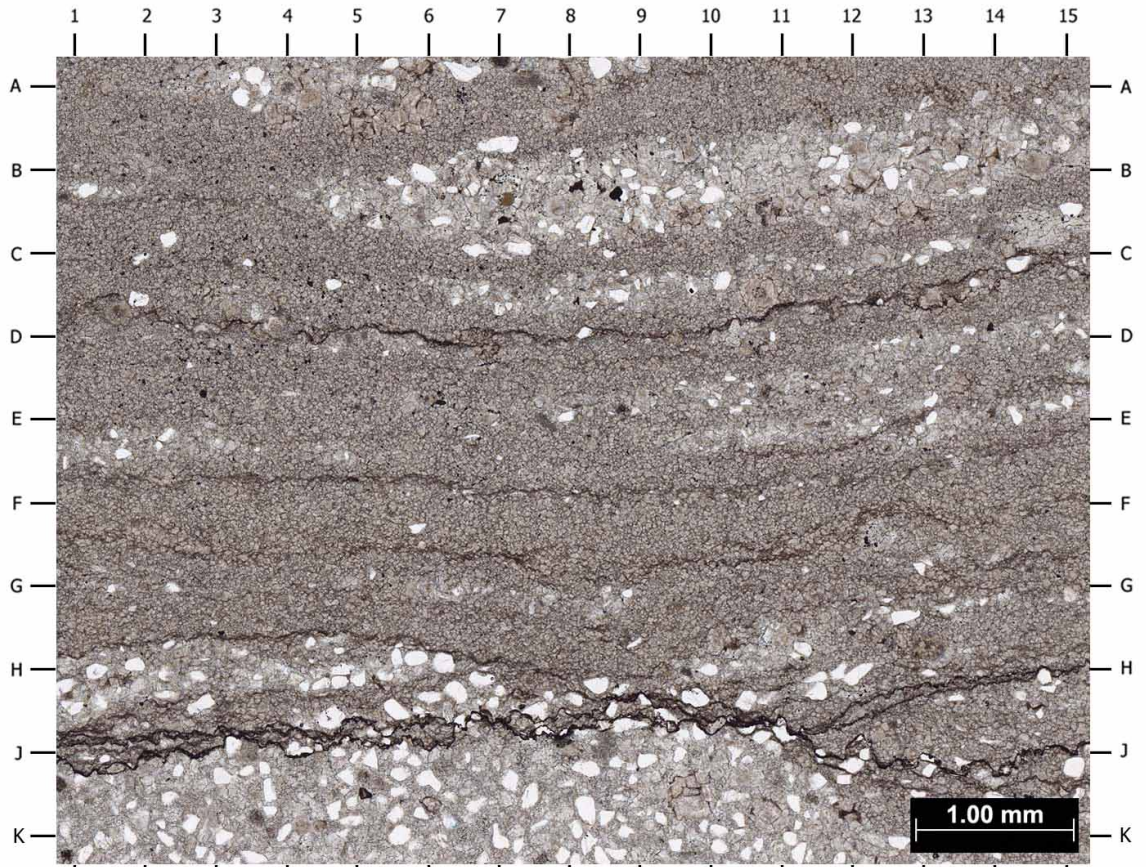
B) This sample consists of slightly sandy dolostone thinly interbedded with peloidal, very sandy dolostone (not pictured; see Photo A). This image was taken near the bottom of macro Photo A and documents one of the slightly sandy dolostone layers with a dolomitized mudstone texture. The dominant matrix is composed of very fine to finely crystalline dolomite (DE1-7, F1-15, A10-14) and contains several organic-rich microstylolites (J1-15, CD1-C15). The patches of very sandy dolostone at JK1-12 and BC5-B14 may represent burrowed laminations or possible intraclasts.

C) This photomicrograph provides a high magnification view of the area centered near GH10.9 in Photo B. Very fine to fine sand-sized grains of potassium feldspar (G7, DE10, FG4, JK5) and monocrystalline quartz (EF13, EF5) are supported within a matrix of very fine to finely crystalline dolomite (AC1-10, DE11-14). Dolomitized allochems occur at CD9.5, J14.8, and EF3.6. Bituminous organic material occurs concentrated along a microstylolite from GH1 to FG15 and JK12. The more coarsely crystalline dolomite from J1 to JK8 likely represents interparticle cement rather than replaced matrix, as above (AB1-15).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

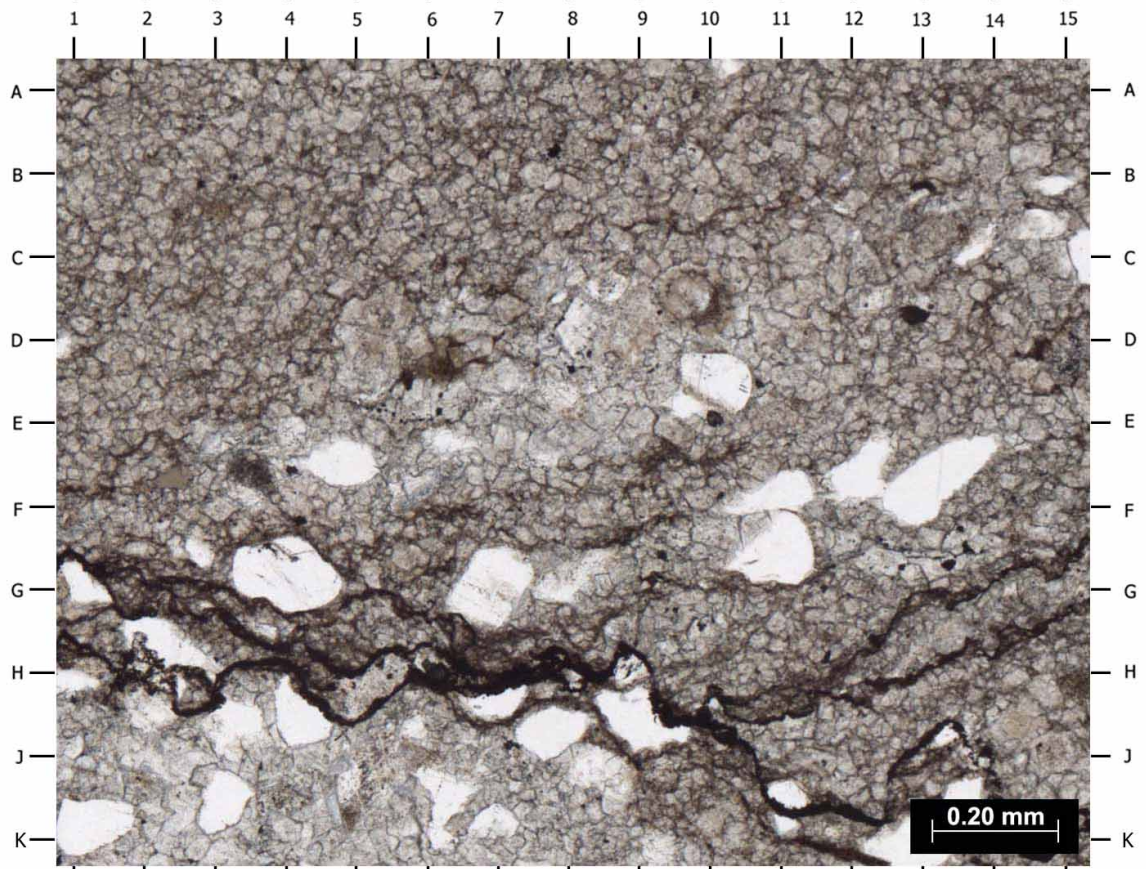
14360.00'
Plate 14

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14361.00 FEET
SAMPLE NUMBER: 15 CK-McCoy

PLATE 15

T.O.C.: 0.01% (weight percent)

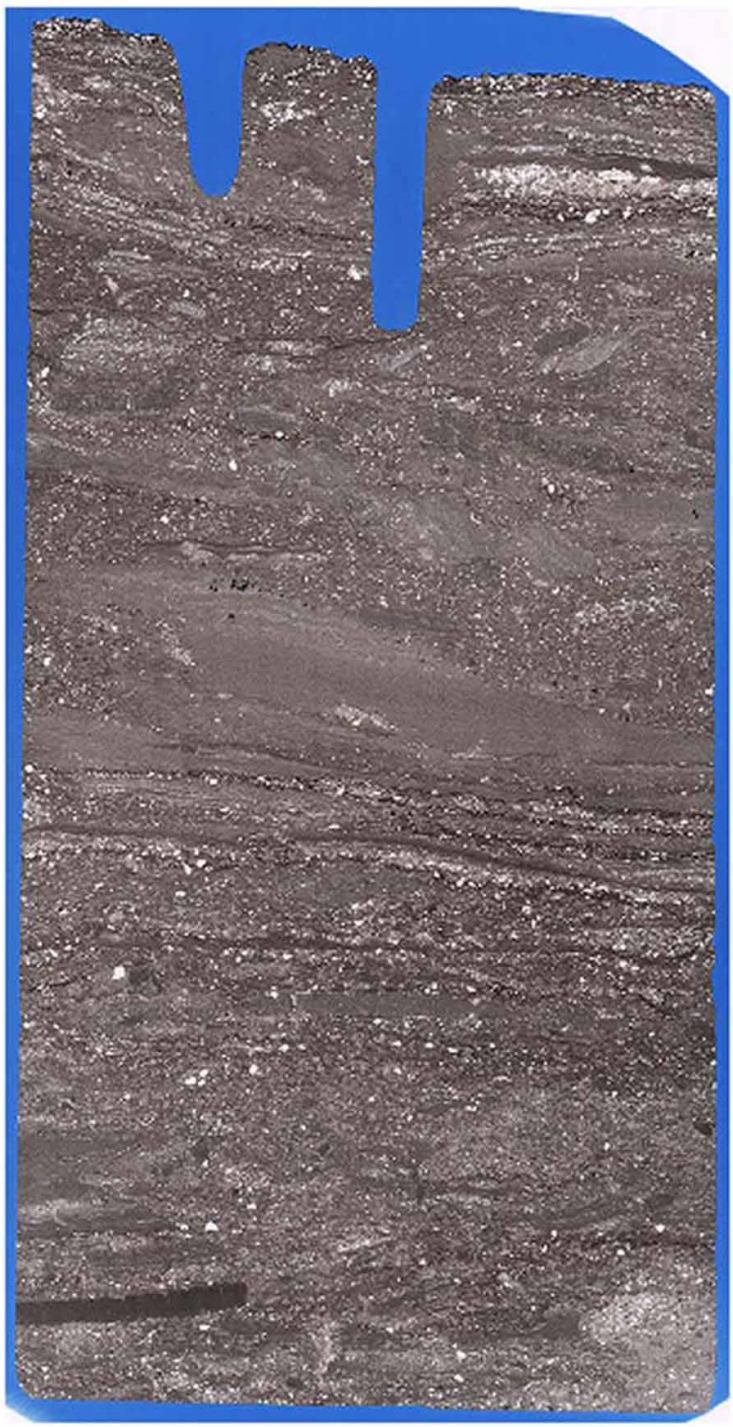
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14361.00'
Plate 15

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14361.00 FEET
SAMPLE NUMBER: 15 CK-McCoy

PLATE 15

T.O.C.: 0.01% (weight percent)

Lithology: Sandy dolostone

Texture: Laminated; burrowed; intraclast-rich, sandy, dolomitized wackestone/packstone to mudstone; organic-rich microstylolites

Detrital Grains/Allochems: Common to abundant potassium feldspar grains (27% by weight; mostly coarse silt to fine sand); common dolomitized intraclasts; common dolomicritic peloids; minor monocrystalline quartz (6% by weight) and plagioclase feldspar grains (1% by weight); rare dolomitized ooids; other undifferentiated dolomitized allochems; trace muscovite mica; and trace altered organic plant/algal fragments

Matrix: Predominantly very fine to finely crystalline dolomite mixed with lesser amounts of dolomicrite

Cements and Replacement Minerals: Very abundant dolomite (61% by weight, total dolomite/Fe-dolomite) occurring as replacement of precursor matrix, allochems, and unstable grains; rare to minor calcite occurring as replacement of unstable grains/allochems (2% by weight); rare to minor pyrite (1% by weight) occurring as replacement of organic material and other unstable materials; and trace bituminous organic material concentrated along microstylolites

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

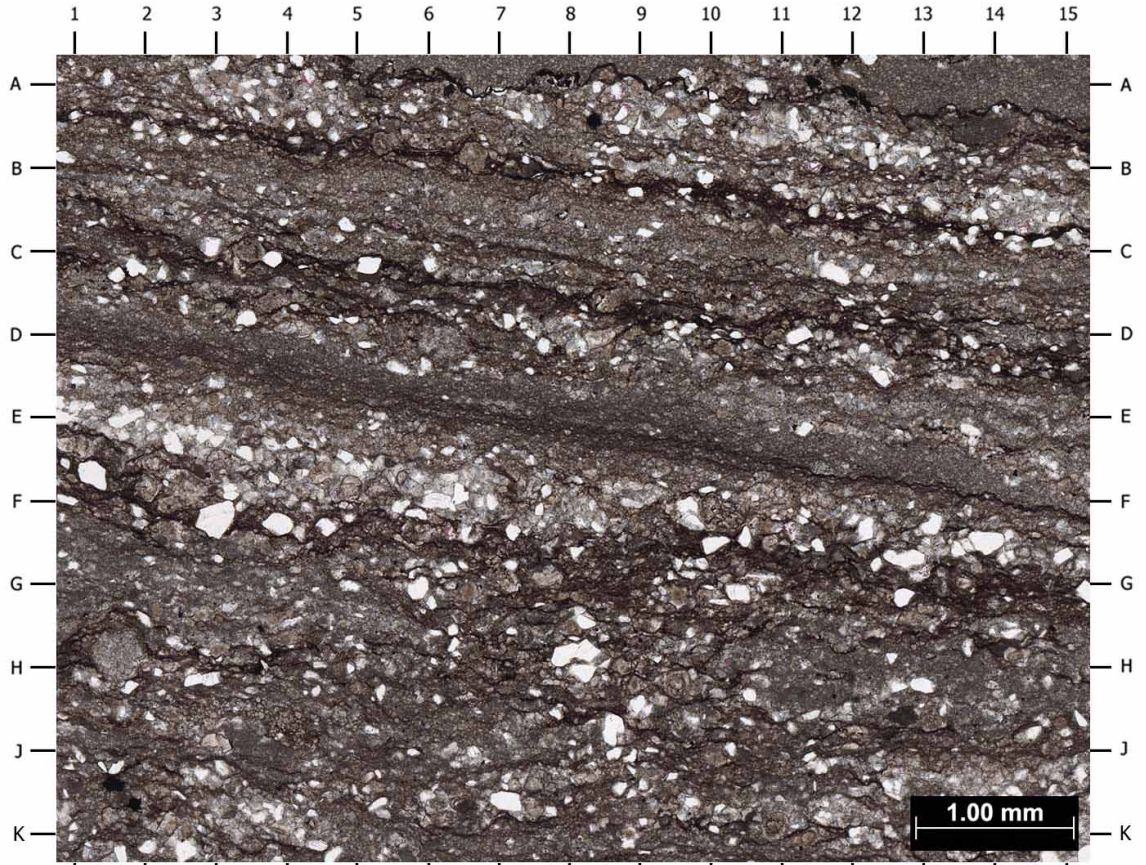
B) This sandy mudstone is burrowed and contains sandy laminations (E1-FG15) and organic-rich microstylolites (black; AB1-BC15, BC1-DE15). The original wackestone/packstone to mudstone texture has been completely replaced by dolomite.

C) This photomicrograph provides a high magnification view of the area centered near C9 in Photo B. In this view, quartz/feldspar grains (white; AB12, B8, J13.5, JK2.7, DE8.4) are supported within a matrix of very fine to finely crystalline dolomite (C4.5-10, E12-15). Potassium feldspar is difficult to differentiate from quartz in thin section without the use of an additional stain (sodium cobaltinitrite stains K-spar yellow) because it does not always exhibit twining under cross-polarized light; however, XRD results indicate that potassium feldspar (27% by weight) is dominant over quartz (6%) and plagioclase feldspar (1%) in this sample. Undifferentiated dolomitized grains/allochems occur at GH6, EF2, and J5.8. Bituminous organic material occludes some intercrystalline spaces within the dolomite matrix, but mostly occurs concentrated along microstylolites (FG1-HJ15, AB1-BC15). Minor pyrite replaces organic material along these microstylolites (AB4.3, HJ11.3) along with other unstable particles (CD3.5, G13.3).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

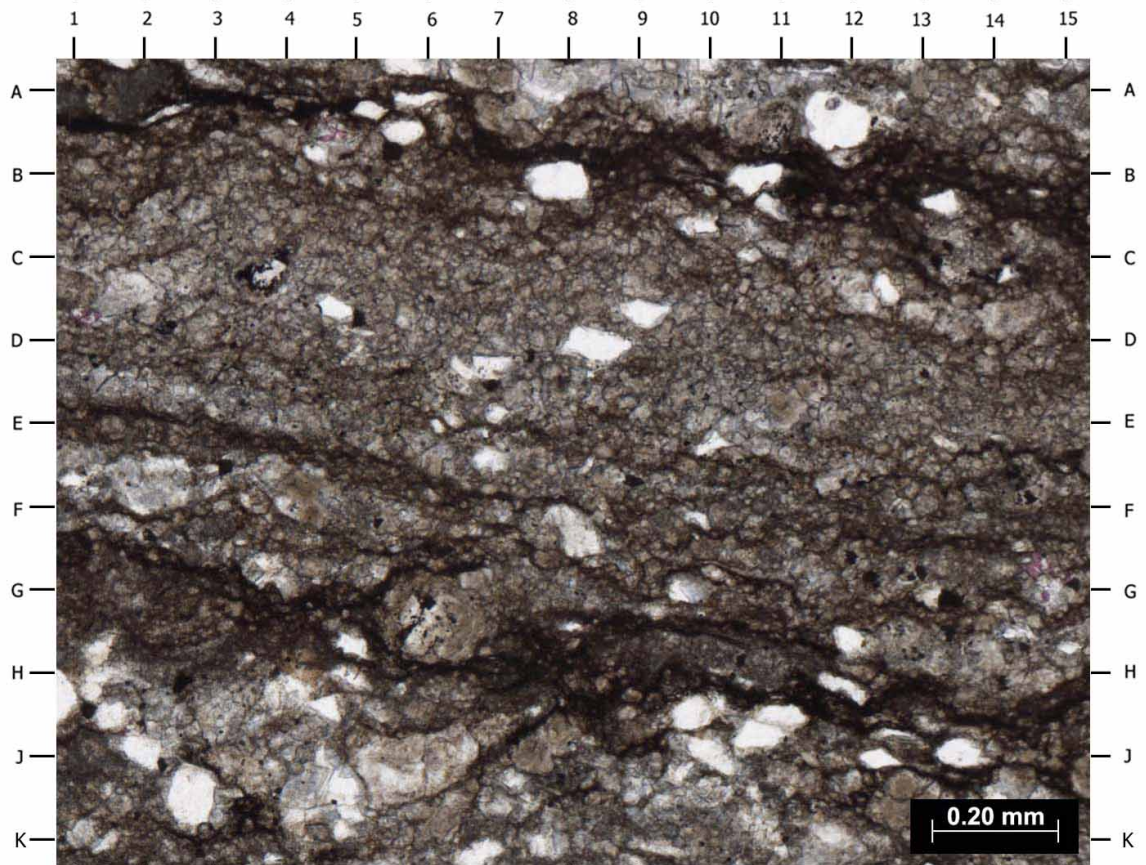
14361.00'
Plate 15

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14363.90 FEET
SAMPLE NUMBER: 16 CK-McCoy

PLATE 16

T.O.C.: 0.04% (weight percent)

This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14363.90'
Plate 16

Weatherford LABORATORIES

A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14363.90 FEET
SAMPLE NUMBER: 16 CK-McCoy

PLATE 16

T.O.C.: 0.04% (weight percent)

Lithology: Calcareous, argillaceous, silty/sandy dolostone

Texture: Bioturbated; disturbed laminations; thin, wavy, discontinuous, clay/organic-rich laminations and/or incipient microstylolites

Detrital Grains/Allochems: Common potassium feldspar grains (27% by weight; grains range from coarse silt to coarse sand in size); minor to common peloids (calcareous and dolomitized); minor quartz (6% by weight) and plagioclase feldspar (1% by weight); minor other undifferentiated, calcareous/dolomitized allochems; minor dolomitized/calcareous intraclasts; rare muscovite mica; and trace altered organic plant/algal fragments

Matrix: Common detrital clay (XRD clay distribution by weight: 11% illite/mica, 10% chlorite, 1% mixed-layer illite/smectite, and trace kaolinite) intermixed with common very fine to finely crystalline dolomite and minor calcite matrix replacement

Cements and Replacement Minerals: Common dolomite (24% by weight, total dolomite/Fe-dolomite) occurring as replacement of matrix and unstable grains/allochems; common calcite (19% by weight) occurring mostly as replacement/recrystallization of unstable grains/allochems and as lesser matrix replacement; minor pyrite occurring as replacement of organic material and other unstable particles; rare localized interparticle sparry calcite cement (within probable burrow structures); trace isolated siderite crystals occurring as matrix replacement

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

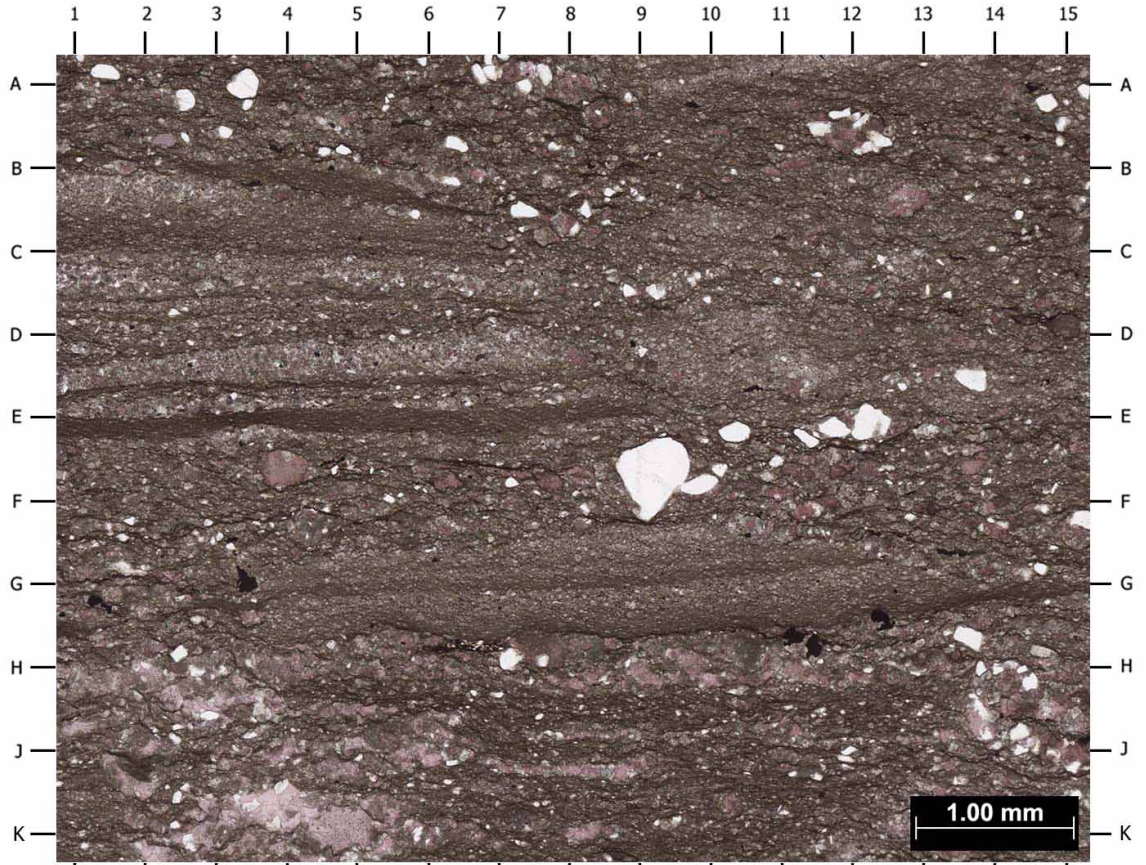
B) This calcareous, argillaceous, silty/sandy dolostone contains laminations (E1-9, G2-13, CE1-8, BC1-7) that have been cut off through bioturbation by burrowing organisms. Feldspar and quartz grains (most white) occur scattered throughout the sample and range in size from coarse silt (BC14.3) to coarse-grained sand (EF9). Calcite replaced allochems, grains, and matrix material are stained red (JK3-5). This image was taken within the top portion of the macro Photo A

C) This photomicrograph provides a high magnification view of the area centered near EF3 in Photo B. The matrix consists predominantly of common detrital clay compacted/deformed between common very fine to finely crystalline dolomite. A clay-rich lamination occurs at C1-15. Grains/allochems visible within this view include feldspar (GH3, G14.2) and quartz (GH7.6, HJ8.3, HJ8.9) grains; small, vague peloids replaced by dolomite (JK6, B8.8, F6.6, DE6.5) and calcite (stained red; JK1.9, JK2.4, BC2.7); calcareous intraclasts (E11-13); dolomitized intraclasts (H12.5-14.5); and pyritized organic fragments (K9.5, HJ9, CD9.3).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

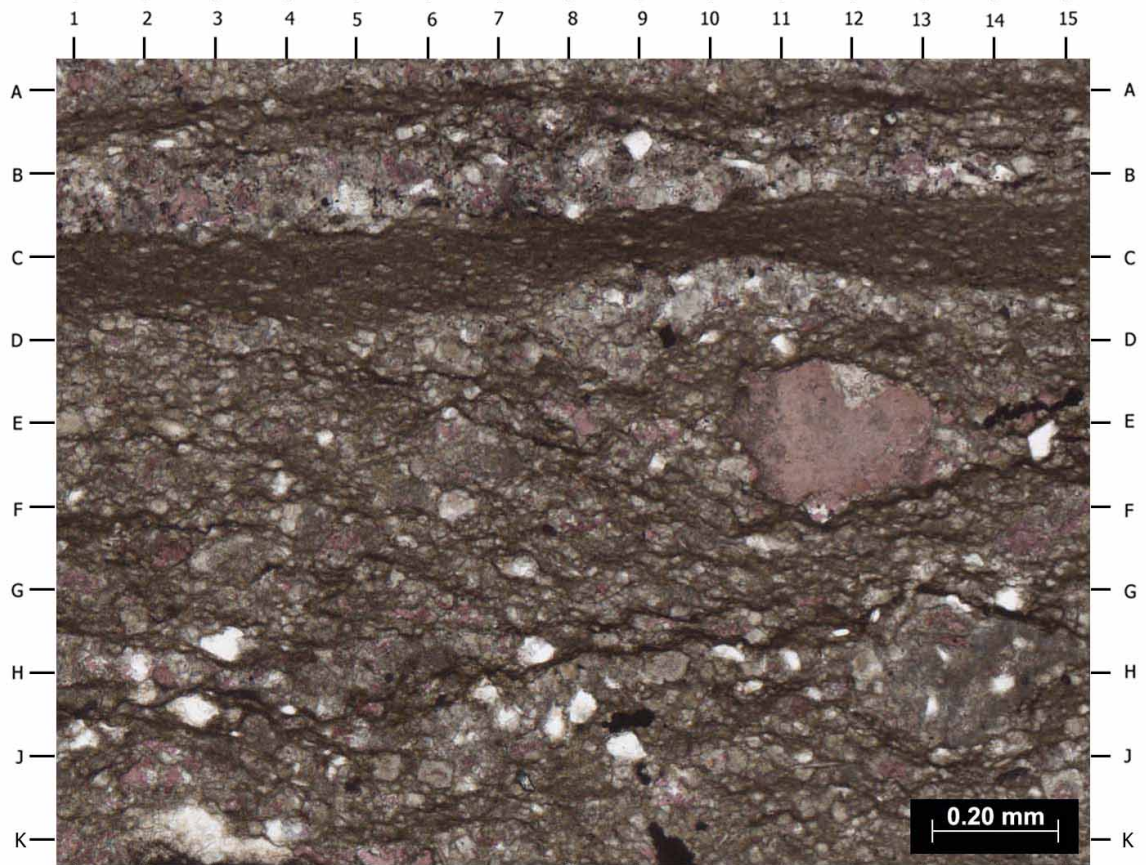
14363.90'
Plate 16

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14365.10 FEET
SAMPLE NUMBER: 17 CK-McCoy

PLATE 17

T.O.C.: 0.04% (weight percent)

This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14365.10'
Plate 17

Weatherford LABORATORIES

A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14365.10 FEET
SAMPLE NUMBER: 17 CK-McCoy

PLATE 17

T.O.C.: 0.04% (weight percent)

Lithology: Slightly argillaceous, dolomitic, silty/sandy limestone

Texture: Bioturbated with remnant disturbed laminations; silty/sandy, partially dolomitized/recrystallized, peloidal packstone to wackestone; siliciclastic grains ranging from <0.04mm up to 1.06mm

Detrital Grains/Allochems: Abundant peloids (calcareous and dolomitized); common potassium feldspar grains (17% by weight) with minor monocrystalline quartz (9% by weight) and plagioclase feldspar (1% by weight) grains (silt to coarse sand); minor ooids (calcareous and dolomite replaced); minor intraclasts (calcareous and dolomitized); trace muscovite mica; trace altered organic plant/algal fragments

Matrix: Predominantly very fine to finely crystalline dolomite intermixed with minor to common amounts of detrital clay (XRD clay distribution by weight: 5% illite/mica, 3% chlorite, 2% mixed-layer illite/smectite, and traces of kaolinite and corrensite) with common patchy calcite replacement of the matrix

Cements and Replacement Minerals: Abundant calcite (43% by weight) occurring as replacement/recrystallization of grains/allochems and patchy matrix replacement with minor patches of sparry calcite interparticle cement; common to abundant dolomite (20% by weight, total dolomite/Fe-dolomite) occurring as replacement of matrix and unstable grains/allochems; and rare pyrite replacement of organic material and other unstable grains/allochems (trace by weight); trace scattered siderite crystals occurring as probable matrix replacement; and trace bituminous organic material concentrated along thin discontinuous laminations and incipient microstylolites

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

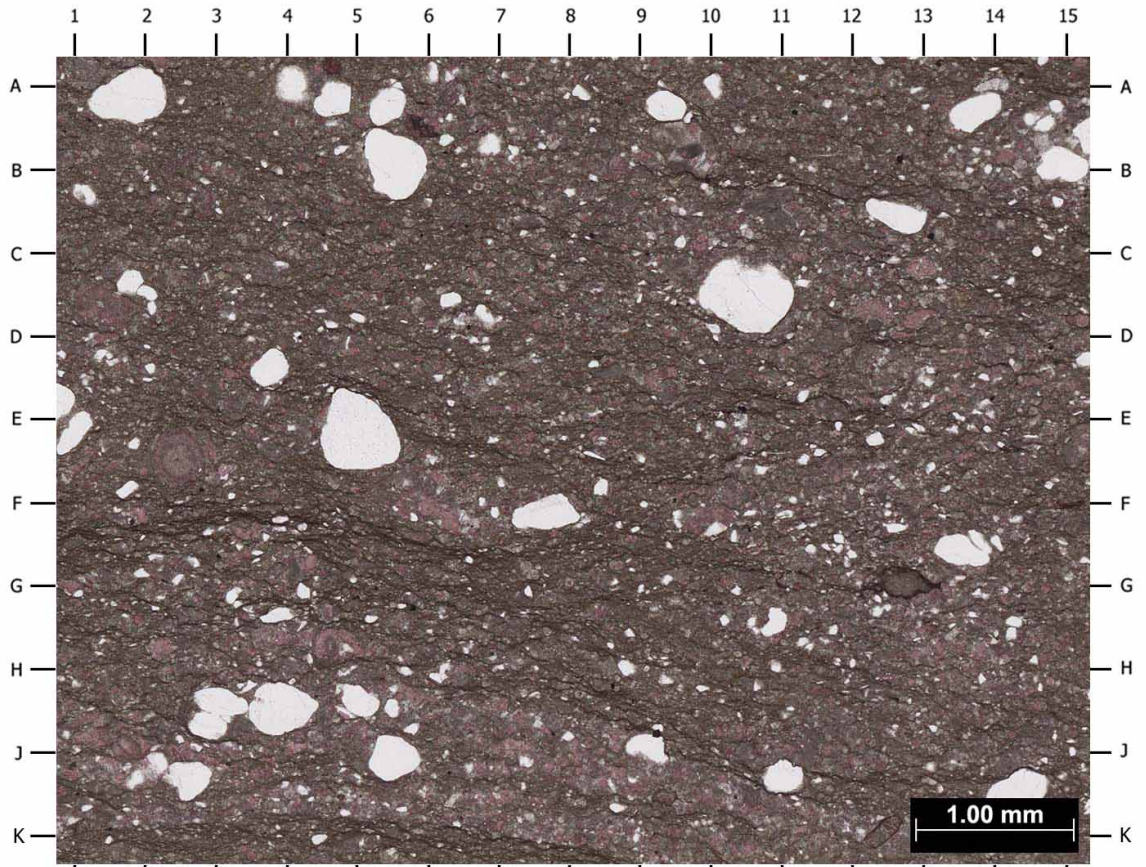
B) This slightly argillaceous, dolomitic silty/sandy limestone exhibits a bioturbated and slightly laminated texture. Scattered coarse sand grains are mostly sub-rounded to rounded in sphericity (E5, AB2, CD10.5, B5.5, HJ4).

C) This photomicrograph provides a high magnification view of the area centered near FG3.7 in Photo B. Detrital clay and organic material within the matrix is compacted into thin, wavy laminations and incipient microstylolites (dark brown to black; EF1-12, JK8-12); these swarms of thin organic/clay-rich laminations occur within the more rigid framework very fine to finely crystalline dolomite matrix cement (DE14.5, G5.5, G13.3). Abundant calcite (stained red) occurs throughout the sample as patchy replacement/recrystallization of the matrix and grains/allochems (EF2, GH12, C7, F8). A recrystallized calcareous ooid occurs at BC3-5.5. Quart/feldspar grains range in size from silt (E4, J12, JK3) to coarse sand (AB14). XRD results indicate that potassium feldspar (17% by weight) is the dominant siliciclastic grain type.

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

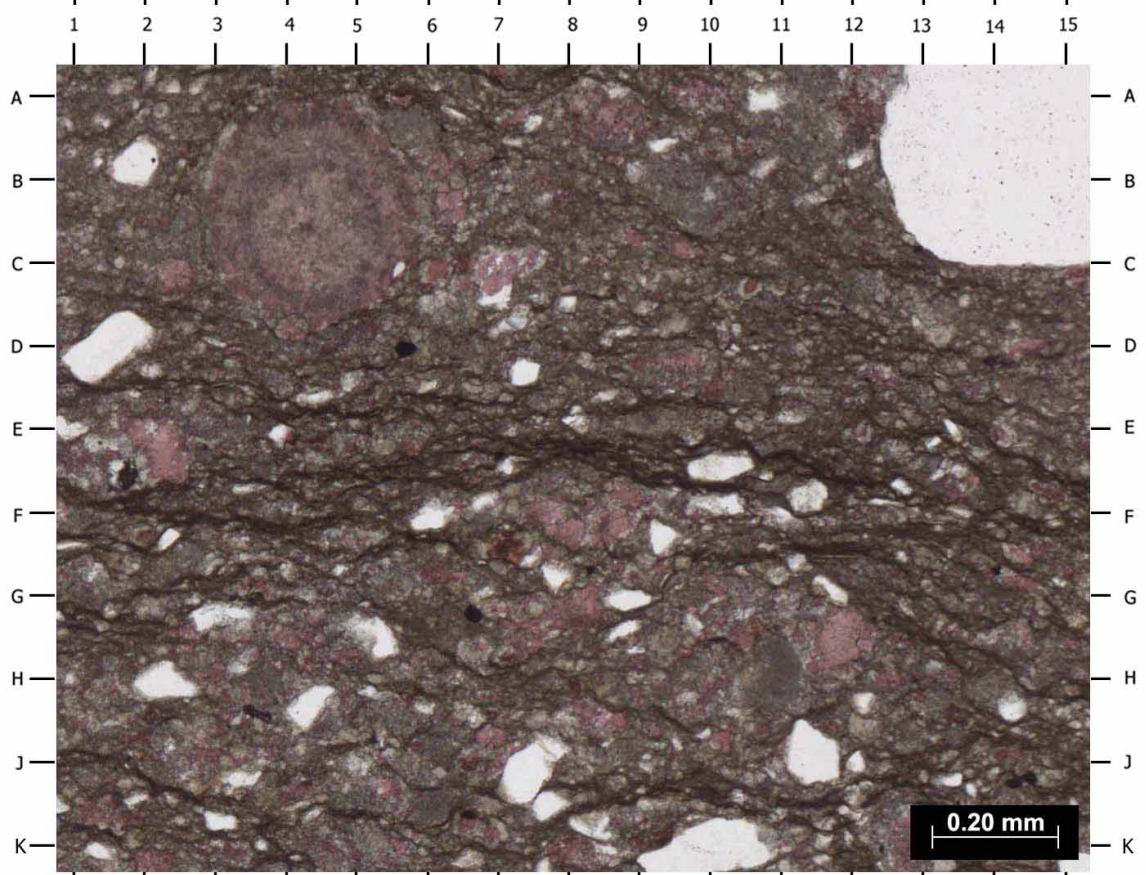
14365.10'
Plate 17

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14365.50 FEET
SAMPLE NUMBER: 18 CK-McCoy

PLATE 18

T.O.C.: 0.01% (weight percent)

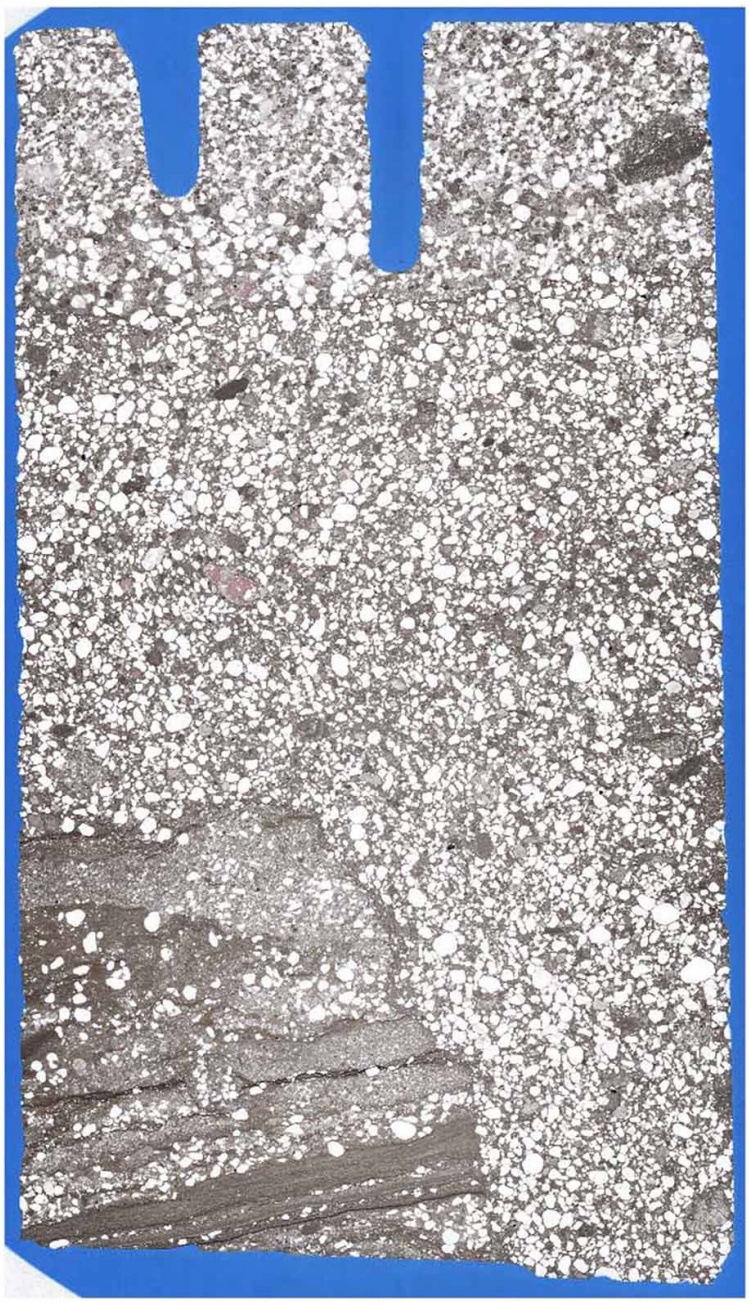
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14365.50'
Plate 18

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14365.50 FEET
SAMPLE NUMBER: 18 CK-McCoy

PLATE 18

T.O.C.: 0.01% (weight percent)

Lithology:	Very dolomitic, medium-grained sandstone
Sedimentary Fabric:	Bioturbated with large patch of remnant laminations; rare organic-rich microstylolites
Grain Size Range:	<0.02mm to 0.88mm
Average Grain Size:	0.31mm
Compaction:	Moderate to high (rare microstylolites and rare sutured grain contacts)
Sorting:	Poor to moderate
Framework Grains:	
Major:	Monocrystalline quartz (34% by weight, total quartz) and potassium feldspar (20% by weight)
Minor:	Plagioclase feldspar (1% by weight); dolomitized peloids; dolomitized ooids (radiating rims); dolomitized intraclasts; trace polycrystalline quartz; and trace plutonic rock fragments
Accessory:	Rare muscovite mica; trace altered organic plant/algal fragments; trace phosphatic fragments; trace zircon
Matrix:	Dolomicrite mixed with very fine to finely crystalline dolomite and minor detrital clay (6% by weight, total clay)
Authigenic Clay:	None observed
Cement Types:	Abundant dolomite (36% by weight, total dolomite/Fe-dolomite) occurring as replacement of precursor interstitial detrital matrix and grains/allochems; minor calcite (3% by weight) occurring mostly as replacement of unstable grains/allochems; rare quartz/feldspar overgrowths; rare pyrite (trace by weight) occurring as replacement of organic material and other unstable particles; and trace bituminous organic material concentrated along microstylolites
Porosity Types:	No visible porosity using standard petrographic techniques

Magnification: B: 50X C: 200X

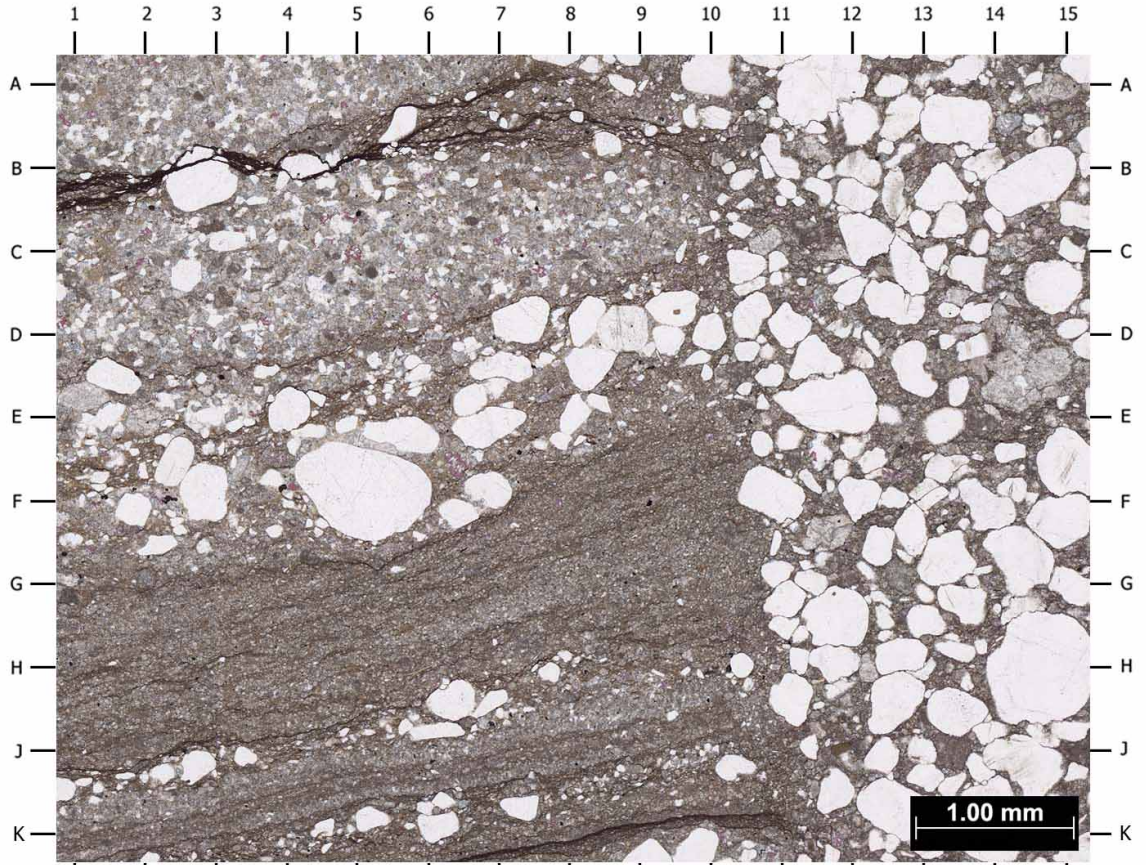
B) This image was taken near to bottom center of macro Photo A. The area from A10-15 to K12-15 best represents the dominant bioturbated texture within this very dolomitic, medium-grained sandstone. The laminated section at AK1-10 likely represents a remnant patch of the original laminated fabric that was not re-worked by bioturbation of burrowing organisms. An organic-rich microstylolite is visible at BC1 to B7.5.

C) This photomicrograph provides a high magnification view of the area centered near EF8 in Photo B. Dolomicrite mixed with very fine to finely crystalline dolomite occurs throughout this sample as replacement of precursor detrital matrix (CD2, C13.5, K3-EK15) between detrital grains of quartz (B10.5, E1, H1, DE5, D10) and potassium feldspar (H5, C5.5, B5.5). Calcite (stained red) partially replaces a feldspar grain at FG3.

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

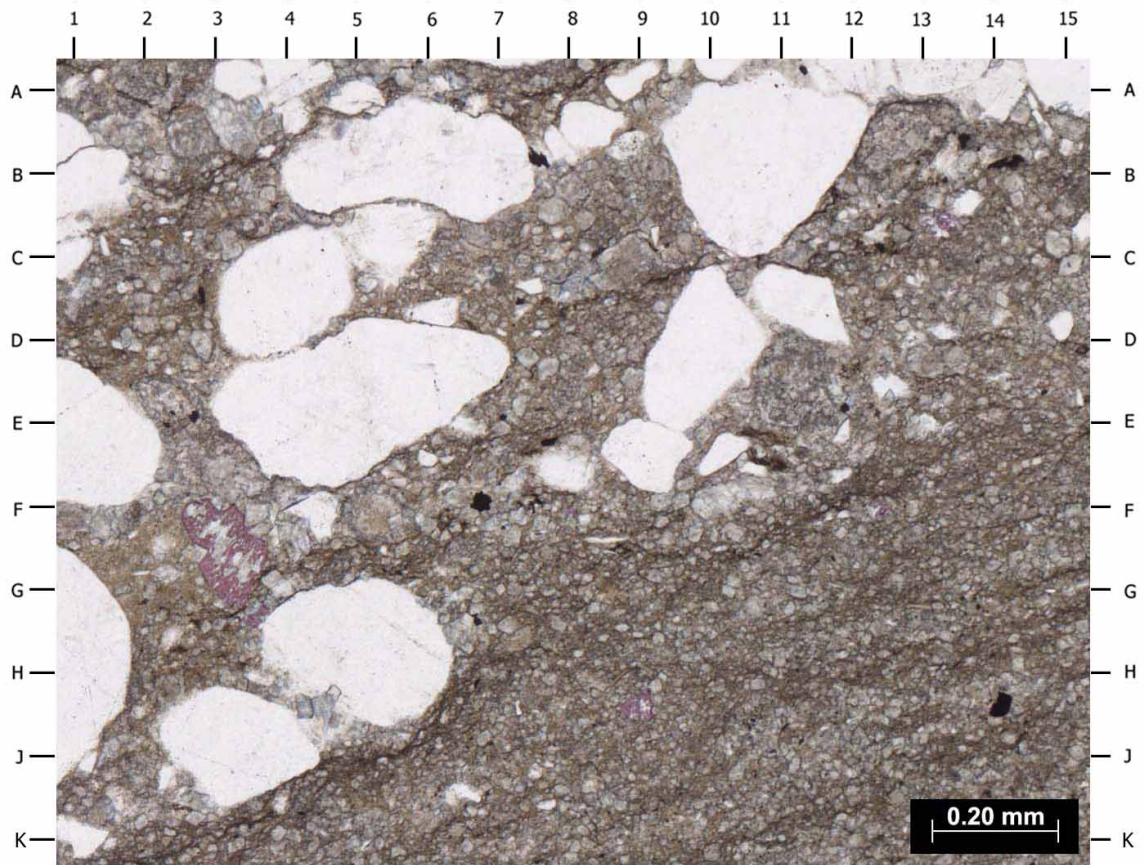
14365.50'
Plate 18

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14366.50 FEET
SAMPLE NUMBER: 19 CK-McCoy

PLATE 19

T.O.C.: 0.02% (weight percent)

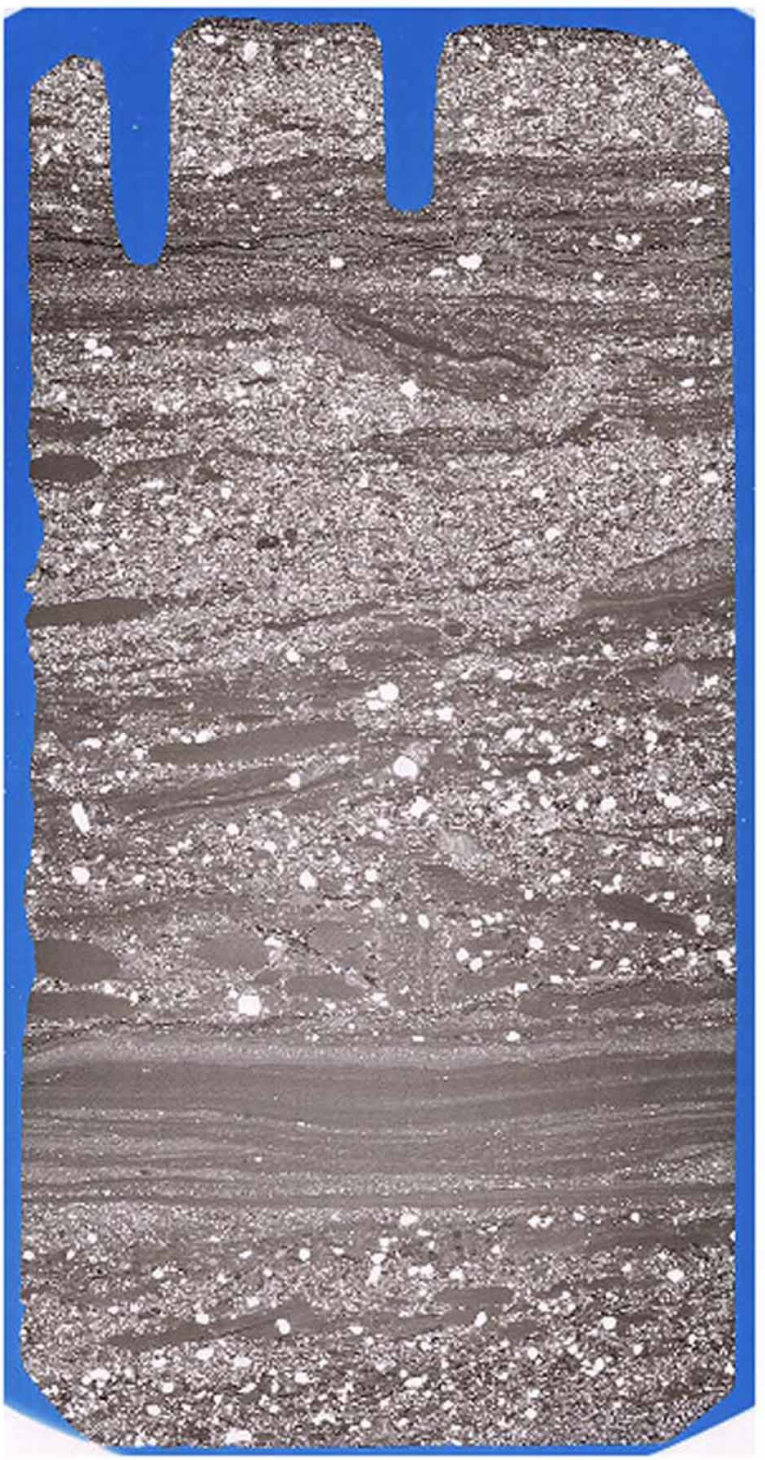
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14366.50'
Plate 19

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14366.50 FEET
SAMPLE NUMBER: 19 CK-McCoy

PLATE 19

T.O.C.: 0.02% (weight percent)

Lithology:	Very dolomitic, fine-grained sandstone; sandy/silty dolostone
Sedimentary Fabric:	Laminated; burrowed; dolomicrite laminations and thick sandstone layers containing large dolomicritic intraclasts; clay/organic-rich microstylolites
Grain Size Range:	<0.02mm to 1.03mm (rigid siliciclastic grains only)
Average Grain Size:	0.17mm (rigid siliciclastic grains only)
Compaction:	Moderate to high (microstylolites observed)
Sorting:	Poor
Framework Grains:	
Major:	Potassium feldspar (26% by weight) and monocrystalline quartz (11% by weight, total quartz)
Minor:	Dolomicritic intraclast; plagioclase feldspar (1% by weight); dolomitized peloids; dolomitized ooids; and polycrystalline quartz
Accessory:	Trace muscovite mica; trace altered organic plant/algal fragments; trace dolomitized echinoderm fragments; trace heavy minerals (tourmaline and zircon); and trace phosphatic fragments
Matrix:	Dolomicrite laminations and dolomicrite mixed with very fine to finely crystalline dolomite replacing precursor interstitial detrital matrix; matrix also contains minor detrital clay (7% by weight, total clay, XRD) intermixed with dolomicrite and concentrated along thin discontinuous laminations and microstylolites
Authigenic Clay:	None observed
Cement Types:	Very abundant amounts of dolomite (52% by weight, total dolomite/Fe-dolomite) occurring as replacement of precursor detrital matrix, intraclasts, and other unstable grains/allochems; minor calcite (3% by weight) occurring mostly as replacement of unstable grains/allochems; minor feldspar/quartz overgrowths; rare pyrite (trace by weight) occurring as replacement of organic material and other unstable particles; trace bituminous organic material concentrated along microstylolites; and trace localized chert replacement of the matrix
Porosity Types:	No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

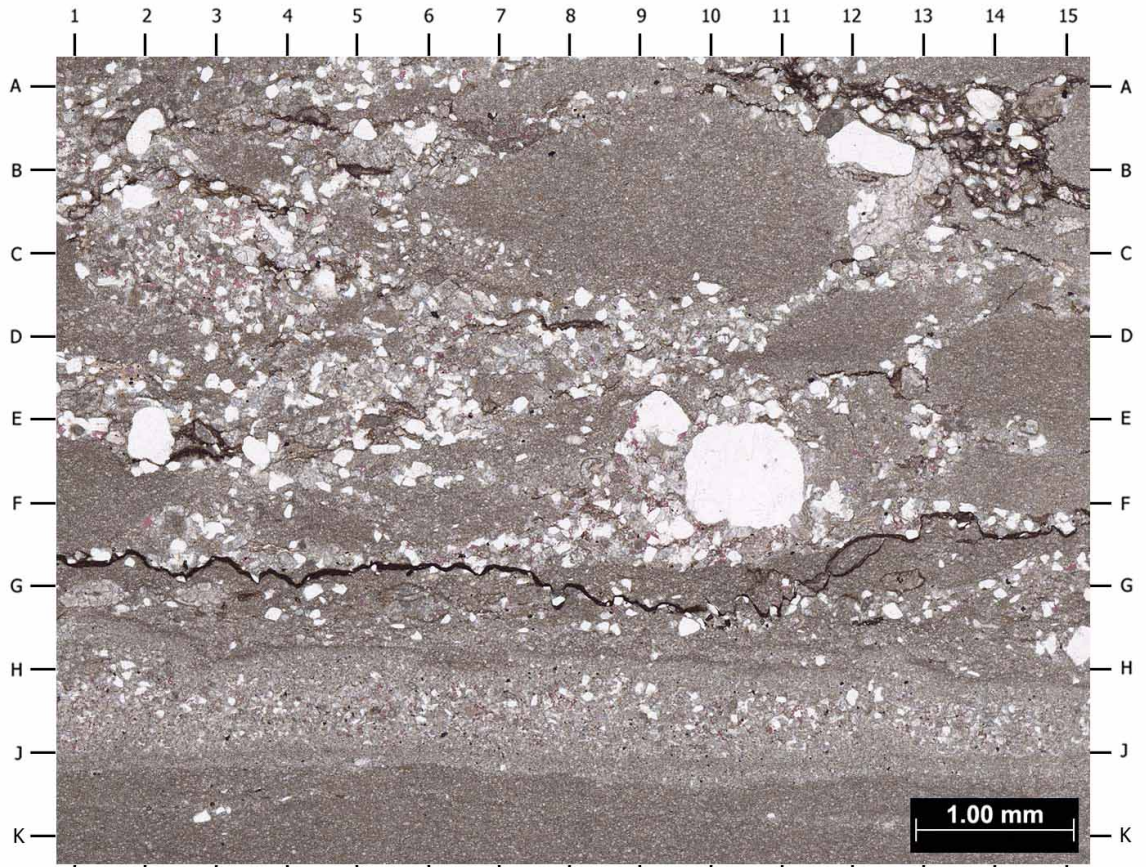
B) This image was taken within the bottom-left quadrant of macro Photo A and documents a thick lamination of dolomicrite (HK1-15) and an organic-rich microstylolite (FG1-15). This portion of the sample is predominantly sandy/silty dolostone, while other portions of the sample are classified as very dolomitic, fine-grained sandstone (see Photo A). Several dolomicrite intraclasts are pictured within this view (F1.5, BC7-11, DE14-15, D11-12). Rigid siliciclastic grains are poorly sorted in this sample and range in size from silt (HJ11) upwards to coarse sand (EF10.5).

C) This photomicrograph provides a high magnification view of the area centered near FG4 in Photo A. Clay and bituminous organic material occur concentrated along a microstylolite from DE1-15. The matrix is predominantly dolomicrite (A1-4, BC10-13, H1-4, EF12-15). Visible grains/allochems include monocrystalline quartz (BC4.5, EF10, AB8.6), potassium feldspar (CD2.2, FG7.8, D9, CD8.8), dolomitized peloids (BC2, CD9.3, CD11), and a phosphatic fragment (F6).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

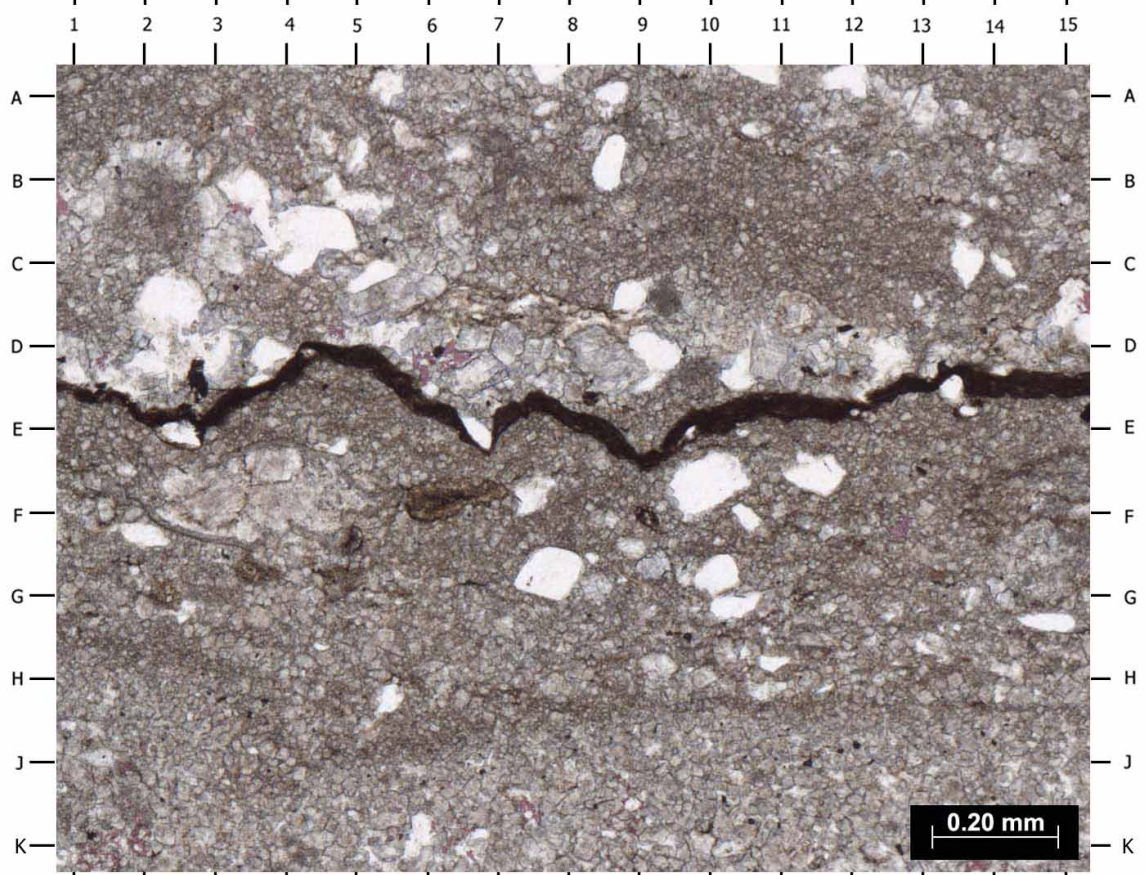
14366.50'
Plate 19

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14368.00 FEET
SAMPLE NUMBER: 20 CK-McCoy

PLATE 20

T.O.C.: 0.08% (weight percent)

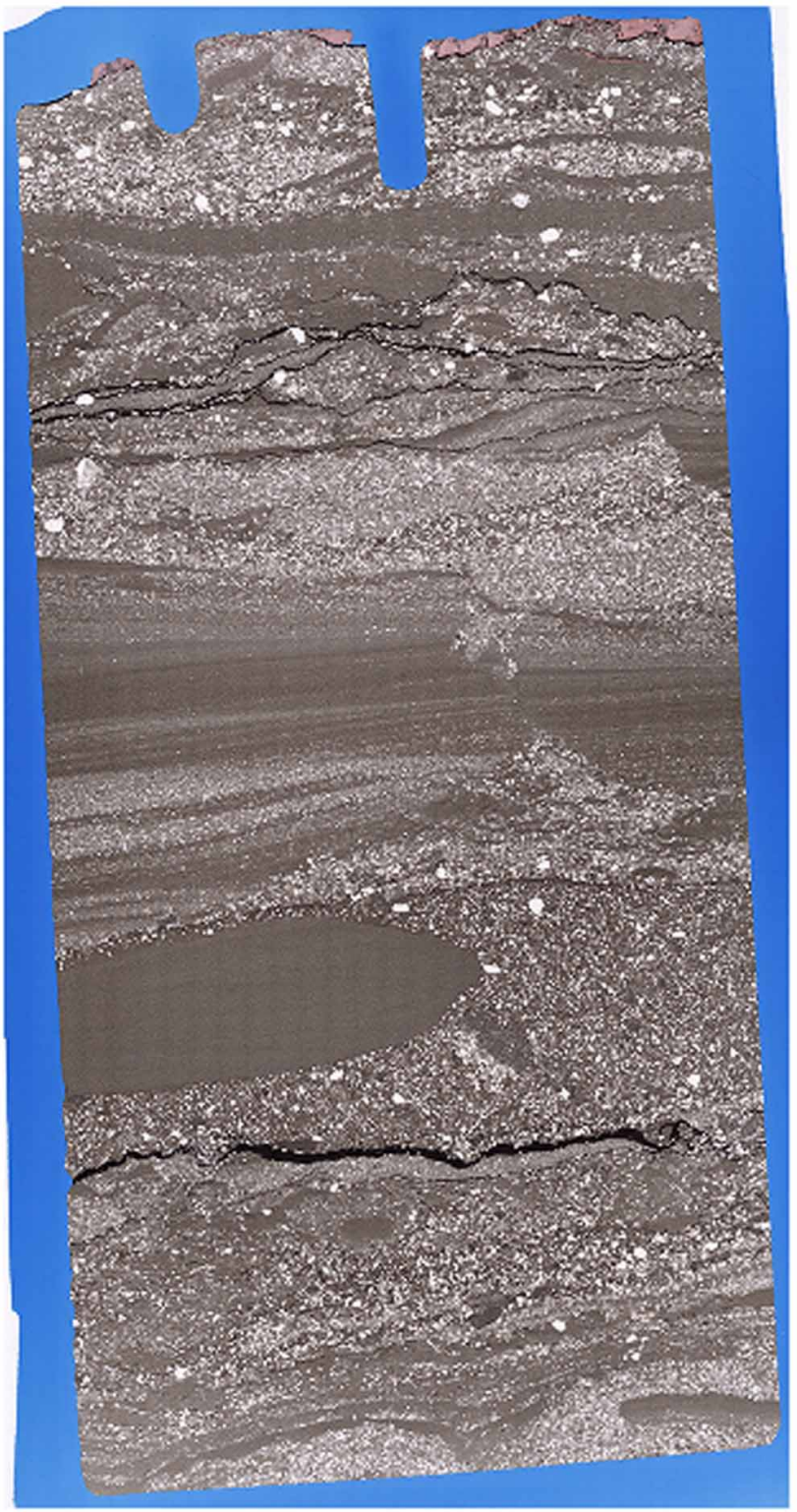
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14368.00'
Plate 20

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14368.00 FEET
SAMPLE NUMBER: 20 CK-McCoy

PLATE 20

T.O.C.: 0.08% (weight percent)

Lithology: Silty, very sandy dolostone

Texture: Laminated; burrowed; alternating dolomitic and sandy layers; fabric displacement due to possible micro faulting; organic/clay-rich stylolites and microstylolites; horizontal calcite-filled fracture along stylolite at very top of thin section; over-sized dolostone intraclasts

Detrital Grains/Allochems: Abundant potassium feldspar grains (29% by weight; mostly very fine- to fine-grained sand; rare coarse sand grains) with minor to common monocrystalline quartz grains (9% by weight) and minor plagioclase feldspar grains (1% by weight); dolomitized peloids; dolomitized intraclasts and over-sized intraclasts; trace echinoderm fragments; trace muscovite mica; trace altered organic plant/algal fragments; trace polycrystalline quartz; and trace heavy minerals (zircon and possible rutile)

Matrix: Predominantly very fine to finely crystalline dolomite intermixed with lesser dolomicrite and minor to common amounts of detrital clay (XRD clay distribution by weight: 8% chlorite, 3% illite/mica, and traces of corrensite, kaolinite, and mixed-layer illite/smectite)

Cements and Replacement Minerals: Very abundant amounts of dolomite (47% by weight, total dolomite/Fe-dolomite) occurring as replacement of precursor matrix, intraclasts, and other unstable grains/allochems; rare calcite replacement of unstable grains/allochems (3% by weight); rare bituminous organic material concentrated along stylolites; rare feldspar/quartz overgrowths; trace calcite cement along horizontal fracture/stylolite at top of thin section; trace pyrite occurring as replacement of organic material and other unstable particles; and trace siderite replacement of unstable grains/allochems

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

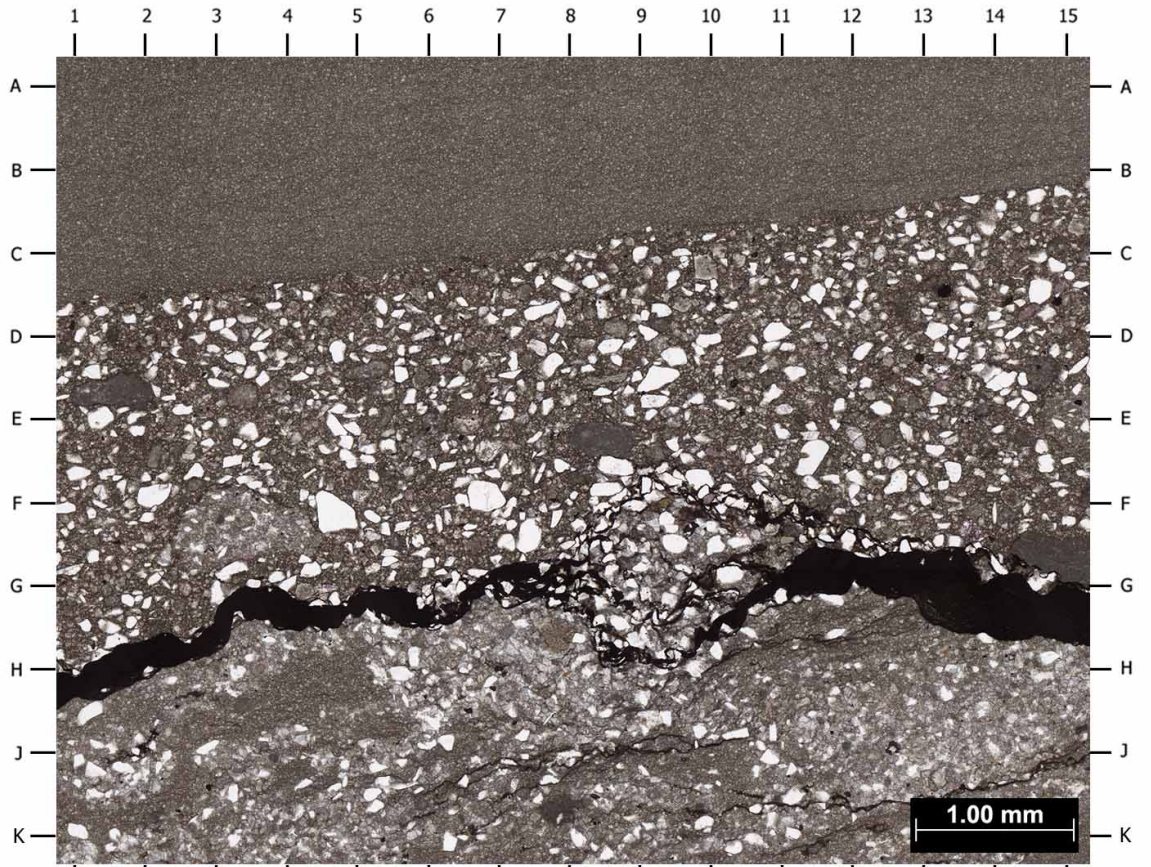
B) This image was taken within the bottom-left quadrant of the macro Photo A. The bottom edge of an over-sized, dolomicritic intraclast is visible at AC1 to AB15 and a partially pyritized, organic-rich stylolite (black) occurs from HJ1 to GH15. This silty, very sandy dolomite is laminated and burrowed. Probable burrow structures are visible at FG9 and JK1-HJ5.

C) This photomicrograph provides a high magnification view of the area centered near FG7 in Photo B. Feldspar (EF10, EF3, BC14.5, BC5.3, BC10.5) and quartz (D7.5, F8.5) grains occur supported within a matrix of very fine to finely crystalline dolomite (C2, CD4-5.5, B13, A9.5). Calcite occurs as a rare replacement of labile grains (stained red; CD3, FG11). Allochems are predominantly replaced by dolomite throughout this sample (A13-15, FG7). Partially pyritized, bituminous, organic material occurs along a stylolite from HJ1 to GJ12 (black).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

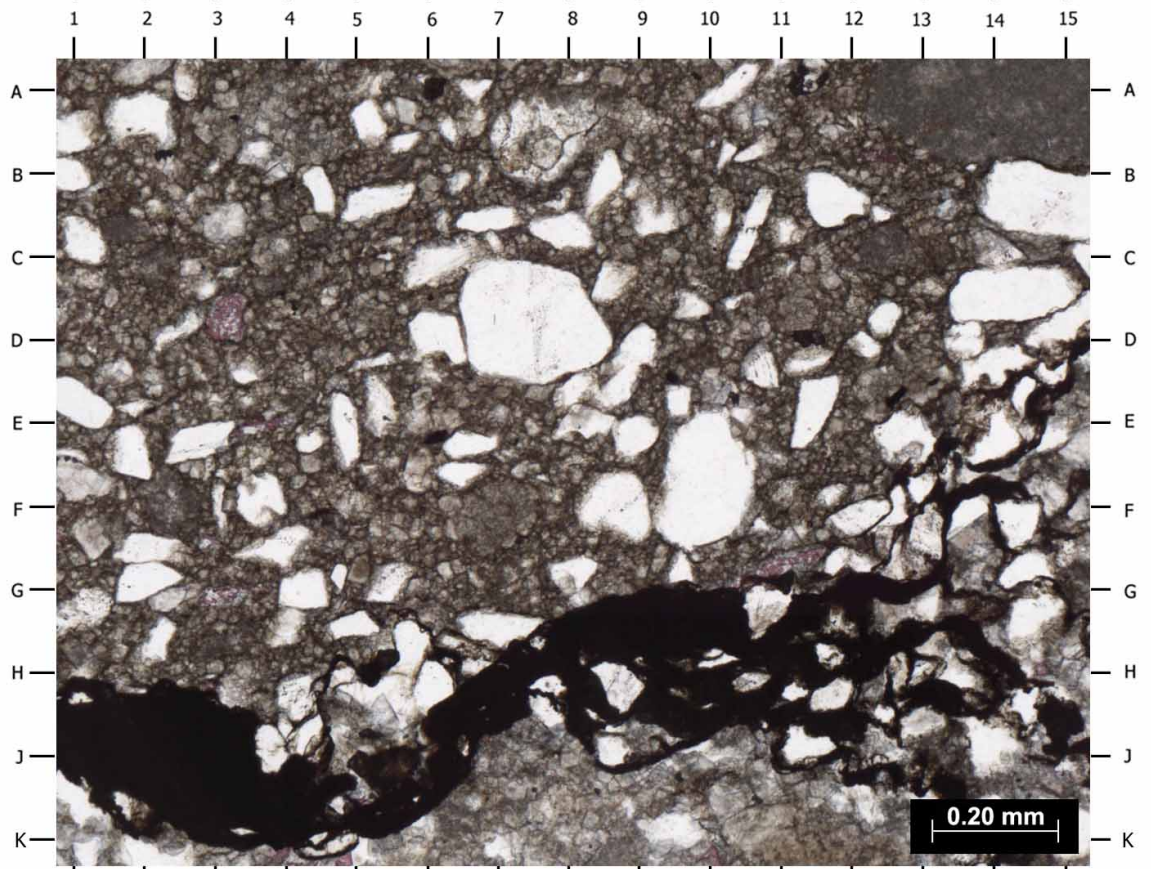
14368.00'
Plate 20

Weatherford LABORATORIES



A

50X



B

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14369.00 FEET
SAMPLE NUMBER: 21 CK-McCoy

PLATE 21

T.O.C.: 0.01% (weight percent)

This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14369.00'
Plate 21

Weatherford LABORATORIES

A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14369.00 FEET
SAMPLE NUMBER: 21 CK-McCoy

PLATE 21

T.O.C.: 0.01% (weight percent)

Lithology: Sandy, dolomitic, peloidal limestone

Texture: Laminated and slightly burrowed, sandy, peloidal grainstone, with thick dolomite laminations in the upper half of the section and over-sized dolomite intraclasts; common organic-rich microstylolites occurring throughout the sample

Detrital Grains/Allochems: Abundant micritic peloids (and lesser dolomitized peloids); common very fine to fine sand-sized grains of potassium feldspar (15% by weight) with minor monocrystalline quartz (5% by weight, total quartz) and plagioclase feldspar grains (1% by weight); minor ooids; minor dolomite/limestone intraclasts and over-sized dolomite intraclasts; minor echinoderm fragments; trace altered organic plant/algal fragments; trace zircon; and trace muscovite mica

Matrix: Common very fine to finely crystalline dolomite occurring along thick laminations and within burrow structures in the upper half of the section; common microstylolites containing minor clay (1% by weight, total clay) and bituminous organic material

Cements and Replacement Minerals: Abundant amounts of interparticle sparry calcite cement (56% by weight, total calcite); abundant calcite replacement/recrystallization of grains/allochems; common dolomite (22% by weight, total dolomite/Fe-dolomite) occurring as replacement of matrix along laminations and replacement of unstable grains/allochems; minor bituminous organic material concentrated along microstylolites (visually common) with minor dolomite replacement along microstylolites; rare interparticle dolomite cement; trace pyrite occurring as replacement of organic material and other unstable particles; trace coarsely crystalline dolomite cement occluding possible vugs, localized fractures, and/or burrows; and trace syntaxial sparry calcite overgrowths around echinoderm fragments

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

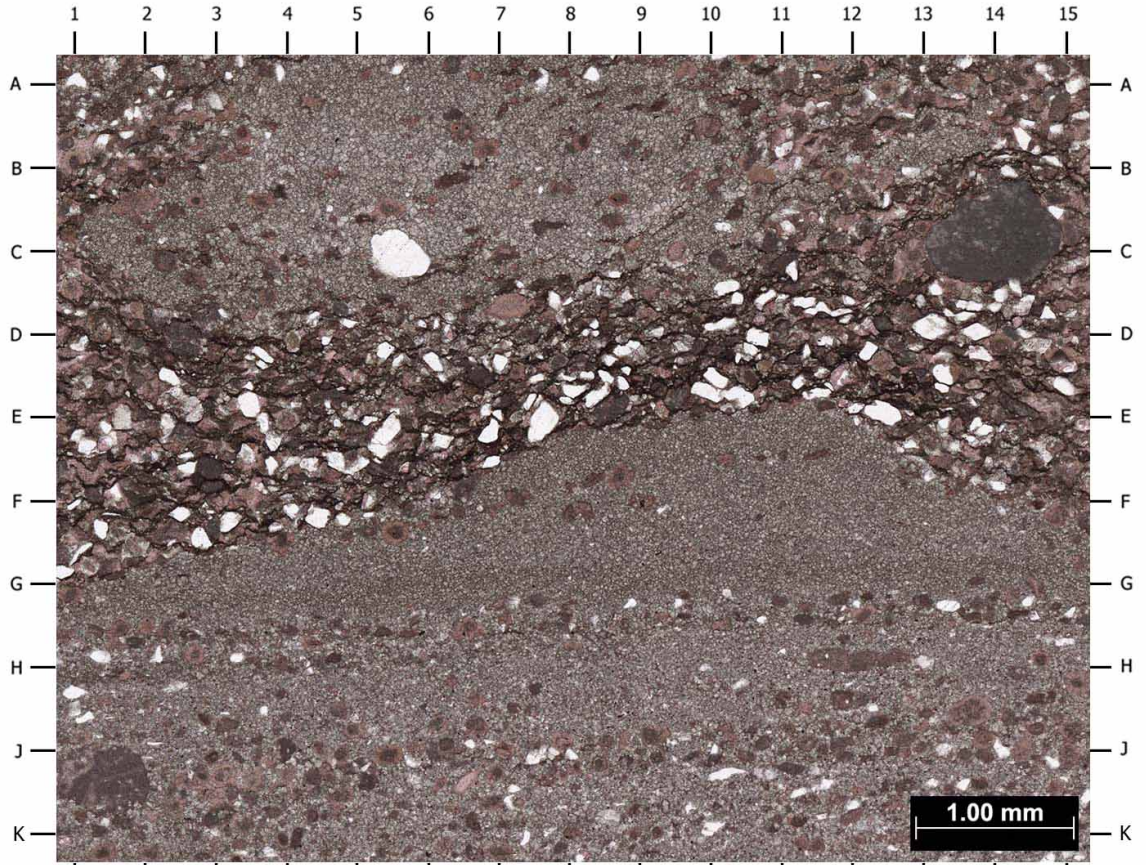
B) This image was taken near the top-left corner of macro Photo A. This sandy, dolomitic, peloidal limestone contains thick dolomitized laminations (GK1-FK15) and dolomitized burrow structures (C1-BC10) within this upper portion of the section. The lower half of the sample is dominated by sparry calcite cement occluding interparticle spaces between micritic peloids and sand grains (see Photo A).

C) This photomicrograph provides a high magnification view of the area centered near EF9 in Photo B. The matrix within the dolomite lamination consists of very fine to finely crystalline dolomite (FK1 top DK15). Common organic-rich microstylolites occur throughout the sample (black; DE3.5, BC9-11, AB14). Visible grains/allochems include partially dolomitized micritic peloids (CD6, C10, B14, AB3.4), potassium feldspar grains (BC11.5, C5.5, C2, CD4, A7), possible quartz grains (D2.5, B6), and a partially recrystallized calcareous ooid (FG7).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

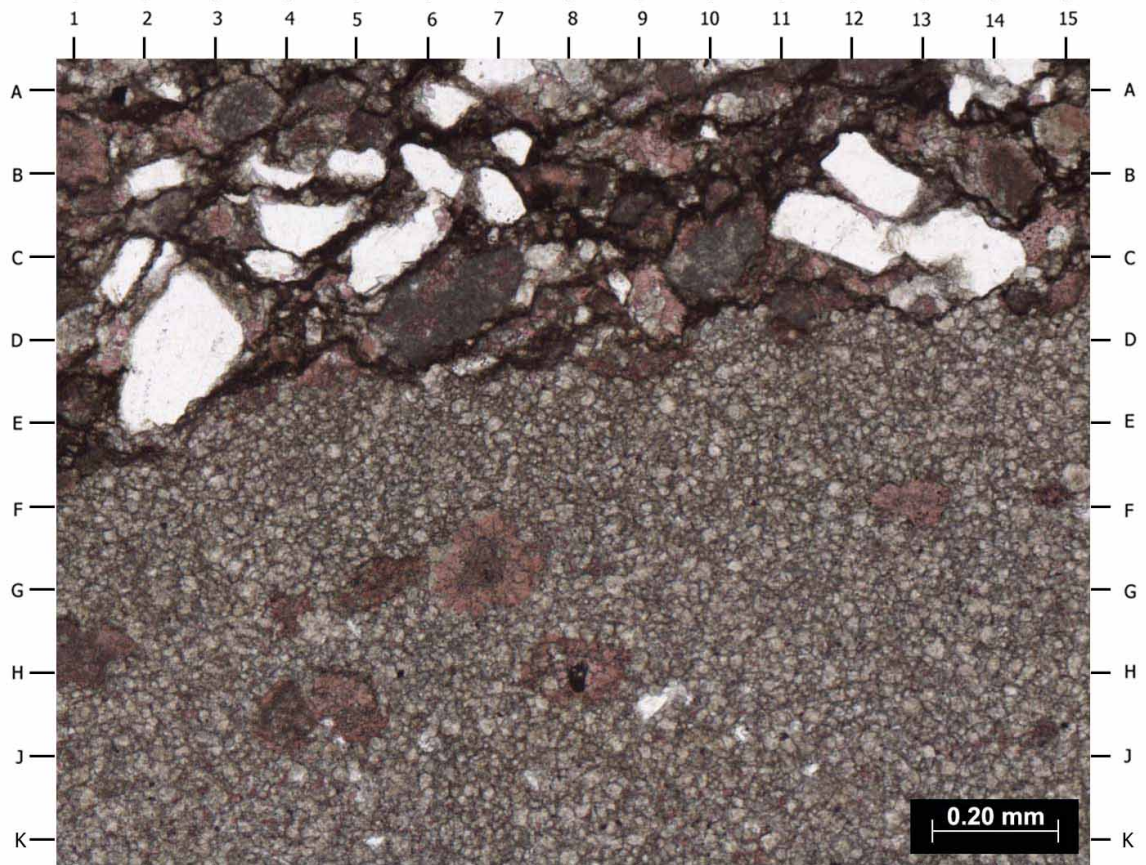
14369.00'
Plate 21

Weatherford LABORATORIES



A

50X



B

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14371.00 FEET
SAMPLE NUMBER: 22 CK-McCoy

PLATE 22

T.O.C.: 0.03% (weight percent)

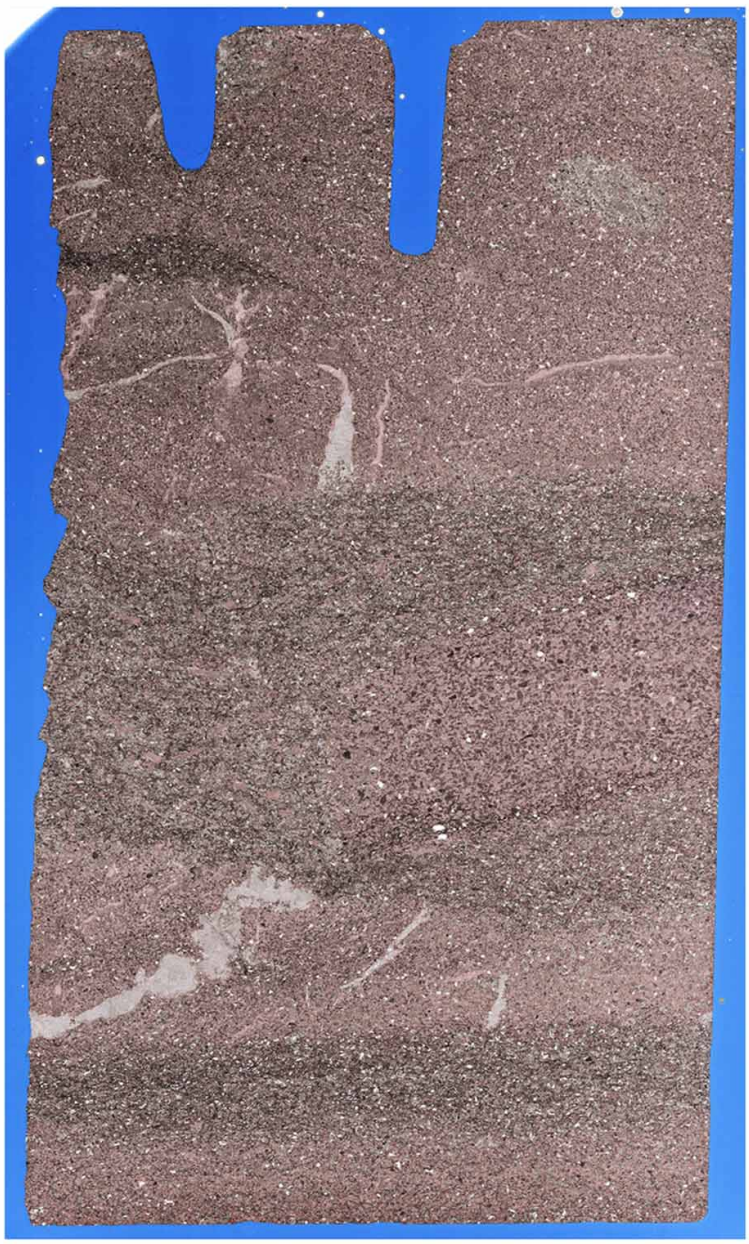
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14371.00'
Plate 22

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14371.00 FEET
SAMPLE NUMBER: 22 CK-McCoy

PLATE 22

T.O.C.: 0.03% (weight percent)

Lithology: Slightly sandy, very dolomitic, peloidal limestone

Texture: Burrowed; slightly laminated; slightly sandy, peloidal grainstone with partially dolomitized bands; localized, irregular, calcite/dolomite-cemented fractures and/or possible burrow structures; common organic-rich microstylolites

Detrital Grains/Allochems: Abundant micritic peloids (commonly dolomite replaced); minor very fine to fine sized sand grains of potassium feldspar (7% by weight) and monocrystalline quartz (3% by weight, total quartz); rare plagioclase feldspar (trace by weight); echinoderm fragments; trace altered organic plant/algal fragments; and trace intraclasts

Matrix: Trace to rare clay, micrite, dolomicrite, and organic material occurring along microstylolites

Cements and Replacement Minerals: Abundant interparticle sparry calcite cement and common to abundant calcite replacement/recrystallization of grains/allochems (49% by weight, total calcite); abundant dolomite (41% by weight, total dolomite/Fe-dolomite) occurring as replacement unstable grains/allochems with common dolomite replacement of interparticle cement (mostly along localized bands associated with microstylolites); rare pyrite (trace by weight) occurring as replacement of organic material and other unstable particles; rare quartz/feldspar overgrowths; rare bituminous organic material concentrated along microstylolites; trace syntaxial overgrowths around echinoderm fragments; and trace sparry calcite and dolomite cement occluding voids within possible burrow structures and/or localized, irregular fractures

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

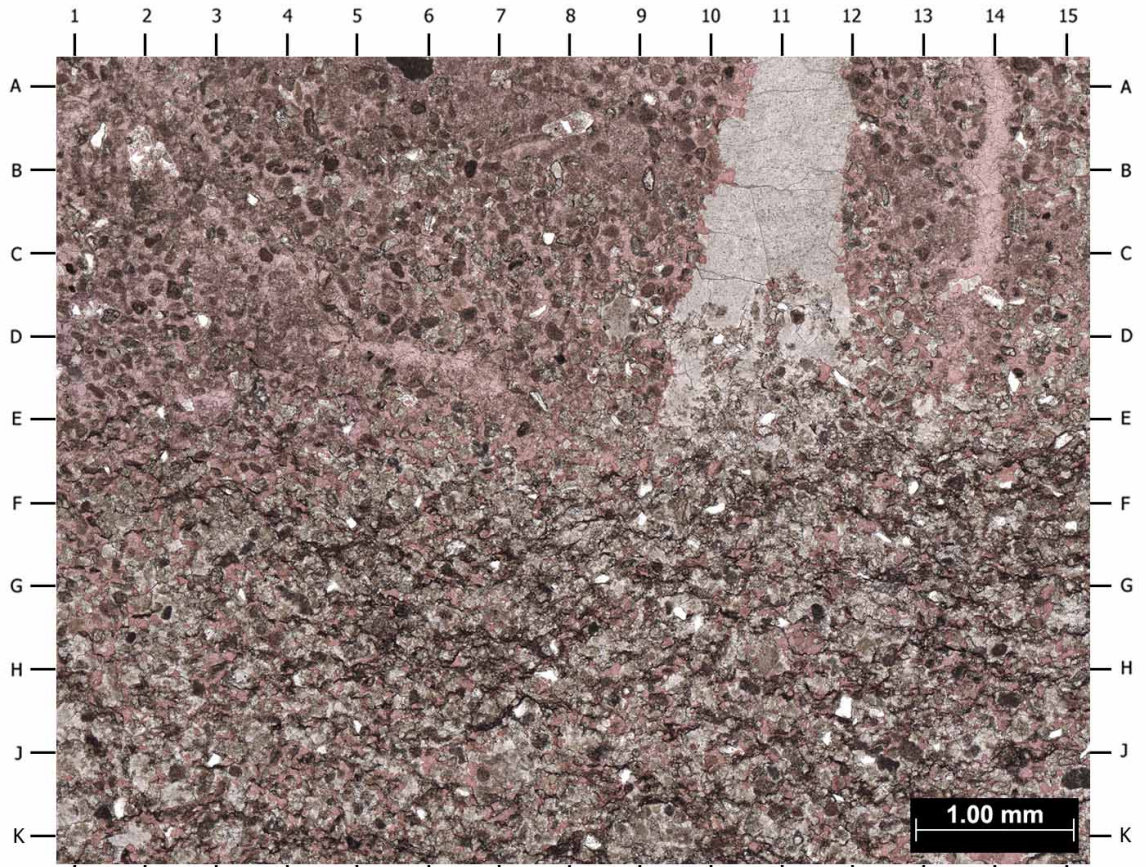
B) This image was taken above center in macro Photo A and documents a partially dolomitized band (FK1-EK15) and localized, irregular fractures and/or burrows cemented by sparry calcite (AD14, A10.4, B10.2) and dolomite (AE11). This sample is classified as a slightly sandy, very dolomitic, peloidal limestone with a grainstone carbonate texture.

C) This photomicrograph provides a high magnification view of the area centered near E8 in Photo B. This sample consists predominantly of interparticle sparry calcite cement (stained red; B7.5, B6, AB7.5, G3) occluding interparticle spaces between peloids (A8, AB2.5, EF6, C7, CD13.5), feldspar (D7, E11.5), and quartz grains (HJ6.9). Dolomite commonly replaces unstable grains/allochems (DE13.4, A11.5, BC11, EF2) and replaces the interparticle cement (J5, J14.3, JK8.5) along horizontal bands that contain localized concentrations of organic-rich microstylolites (black; K9-JK11).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

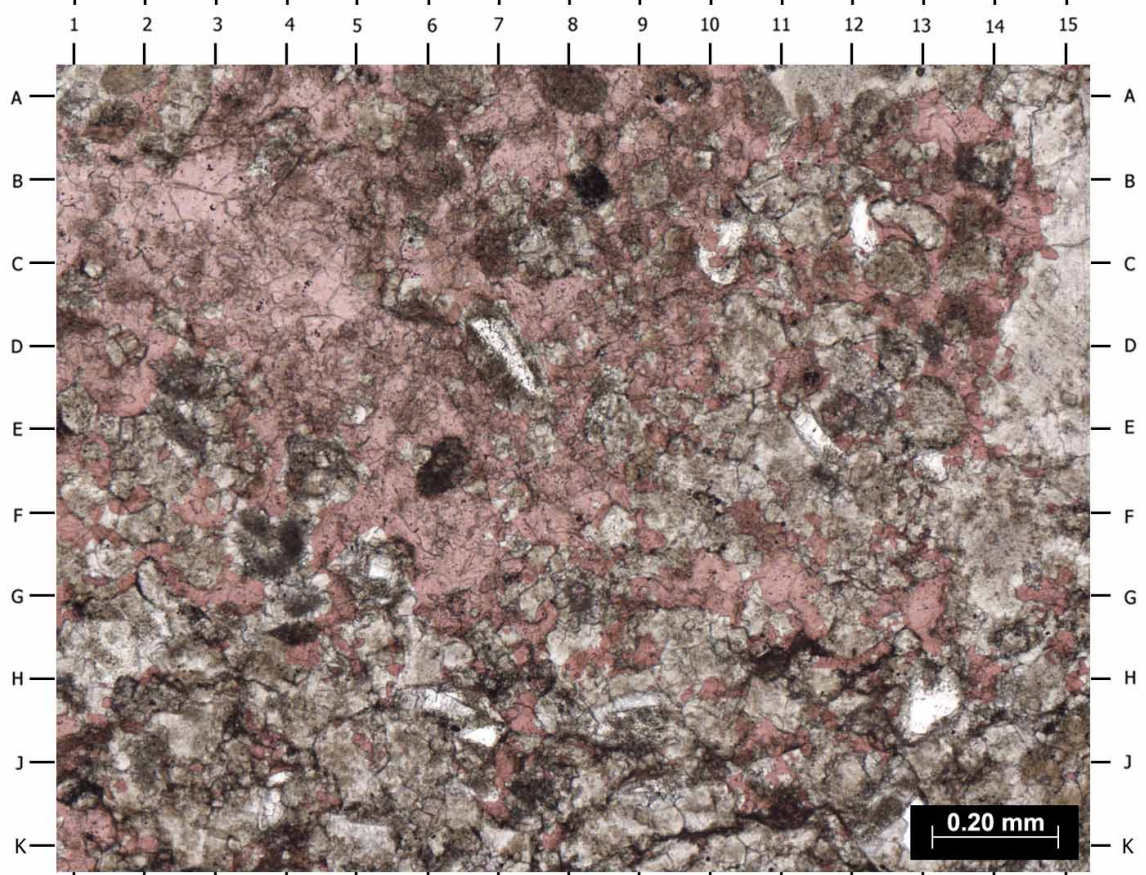
14371.00'
Plate 22

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14379.50 FEET
SAMPLE NUMBER: 23 CK-McCoy

PLATE 23

T.O.C.: 0.06% (weight percent)

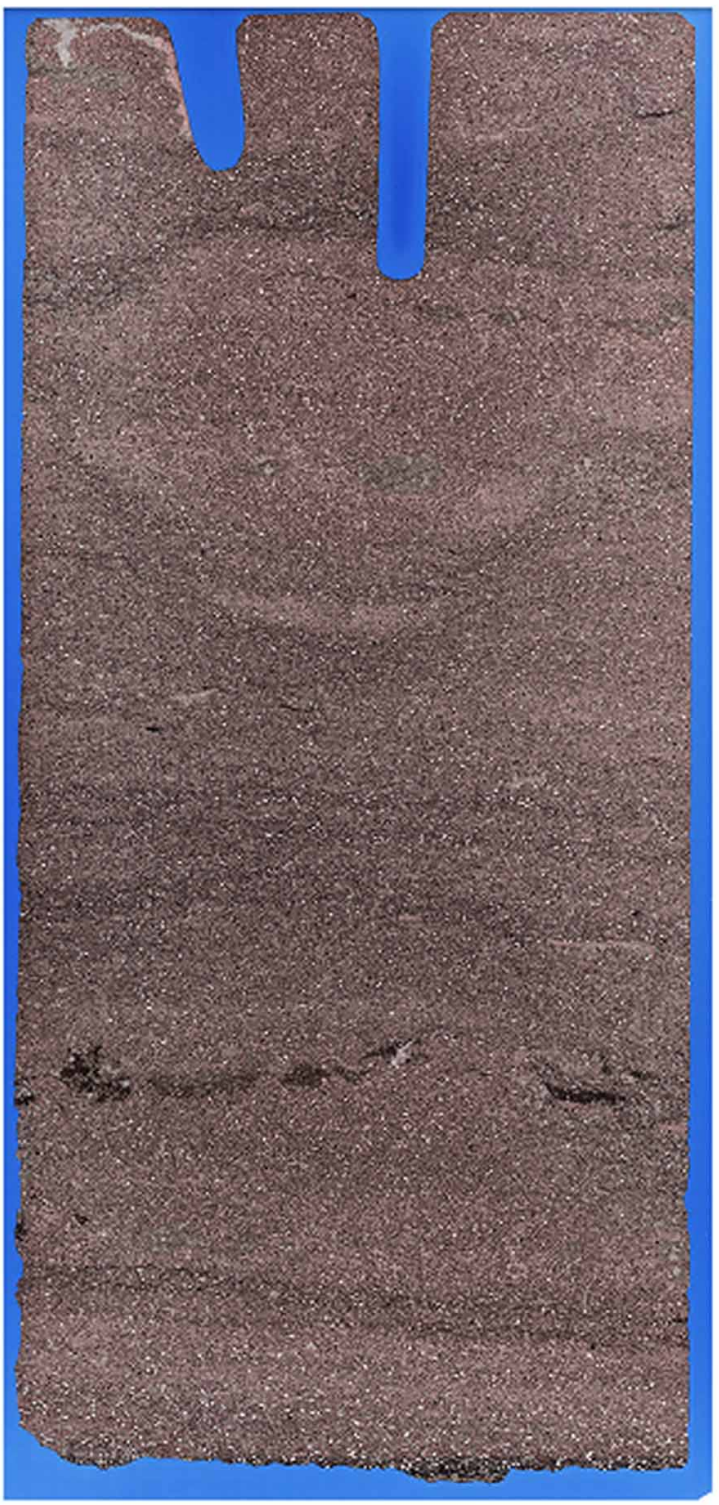
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14379.50'
Plate 23

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14379.50 FEET
SAMPLE NUMBER: 23 CK-McCoy

PLATE 23

T.O.C.: 0.06% (weight percent)

Lithology: Slightly sandy, dolomitic, peloidal limestone

Texture: Burrowed, laminated, peloidal grainstone; common organic-rich, incipient microstylolites

Detrital Grains/Allochems: Abundant micritic peloids (commonly replaced by dolomite); minor coarse silt to very fine sand grains of potassium feldspar (8% by weight) and monocrystalline quartz (1% by weight); minor echinoderm fragments; minor altered organic plant/algal fragments are difficult to visually differentiated from common (by volume, visual estimate) bituminous organic material; rare trilobite carapace fragments; and trace altered biotite (partially replaced by apatite?)

Matrix: Trace to rare clay, micrite, dolomicrite, and organic material occurring along incipient microstylolites

Cements and Replacement Minerals: Very abundant amounts of calcite (60% by weight) occurring mostly as sparry interparticle cement and in lesser amounts as replacement/recrystallization of grains/allochems; abundant dolomite (31% by weight, total dolomite/Fe-dolomite) occurring as replacement of grains/allochems, localized replacement of interparticle cement, and rare dolomite replacement within burrow structures; visually common bituminous organic material occluding intercrystalline spaces within sparry calcite cement and concentrated along incipient microstylolites; minor syntaxial sparry calcite overgrowths associated with echinoderm fragments; rare pyrite (trace by weight) occurring as replacement of organic material and other unstable grains/allochems; and trace quartz/feldspar overgrowths

Pore System: No visible porosity using standard petrographic techniques

Magnification: B: 50X C: 200X

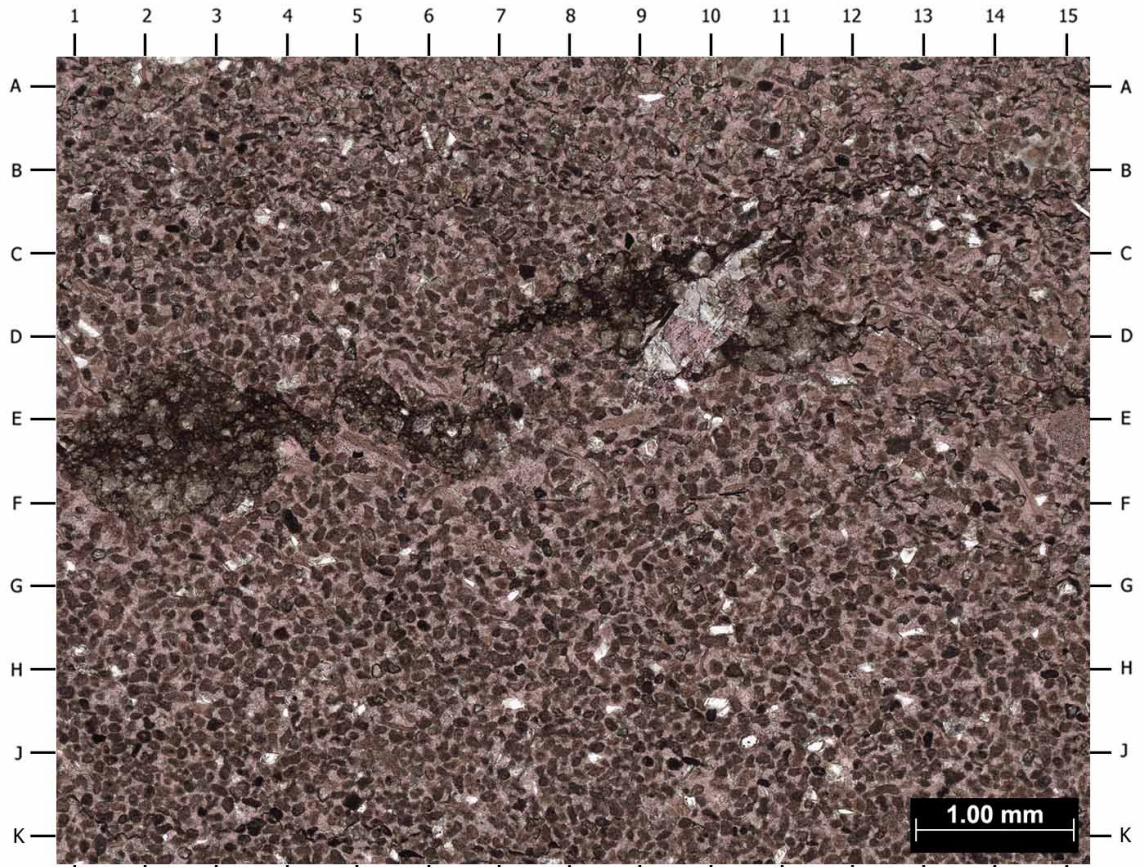
B) This image was taken near the central lower half of macro Photo A. This slightly sandy, dolomitic, peloidal grainstone is slightly laminated and burrowed. Burrow structures filled with bitumen saturated dolomite crystals occur at EF1-3.5, E6, and CD7-12 (this also appears to be associated with a stylolitic contact). Echinoderm fragments with syntaxial sparry calcite overgrowths are visible at EF5, DE8.5, and E15.

C) This photomicrograph provides a high magnification view of the area centered near D6 in Photo B. Abundant sparry calcite cement (stained red; A4, GH8, BC12.5, A9, DE9) occludes the interparticle spaces between abundant micritic peloids (AB15, CD3, D4.8, AB2, GH11.8) and minor feldspar/quartz grains (CD13, C2, EF3, GH13.5). Unstable potassium feldspar grains are partially replaced by calcite (BC1.7, CD13, BC4.5) and peloids are commonly replaced by dolomite (AB5.3, CD11.5, C8).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

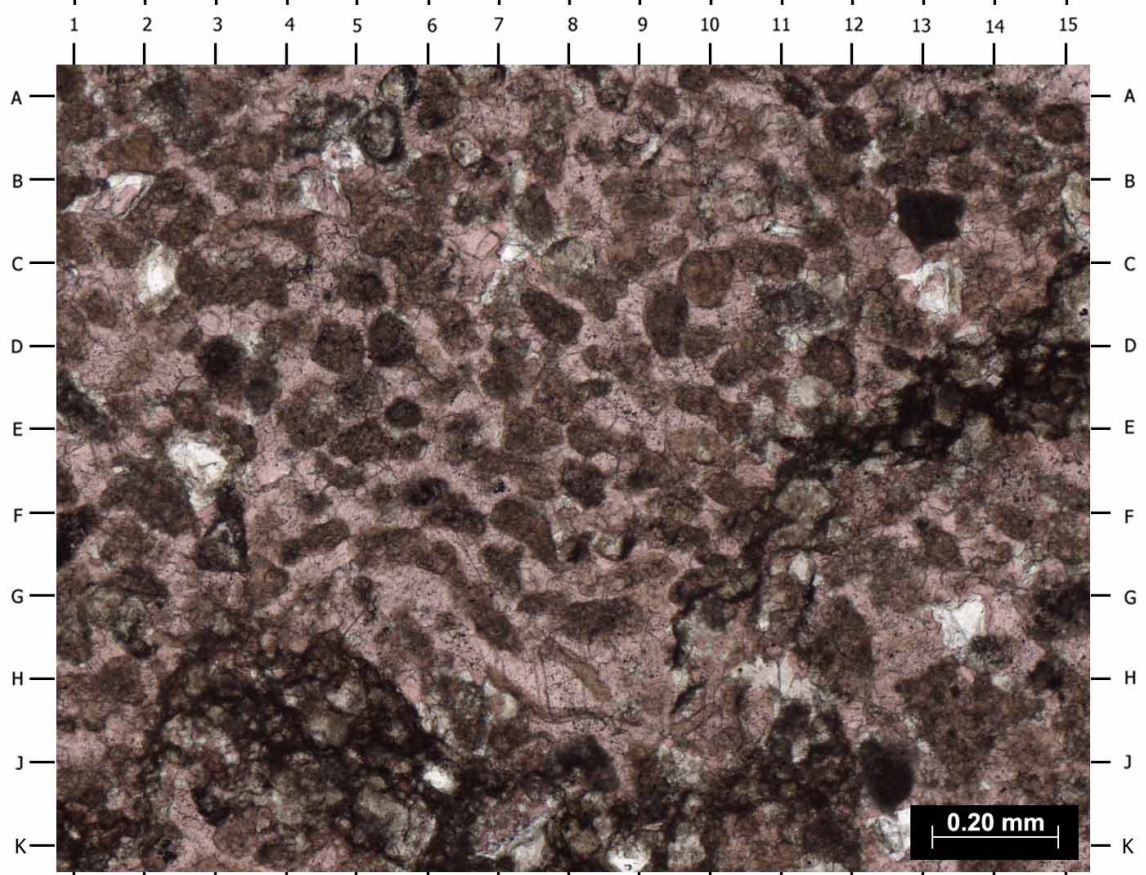
14379.50'
Plate 23

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14383.00 FEET
SAMPLE NUMBER: 24 CK-McCoy

PLATE 24

T.O.C.: 0.04% (weight percent)

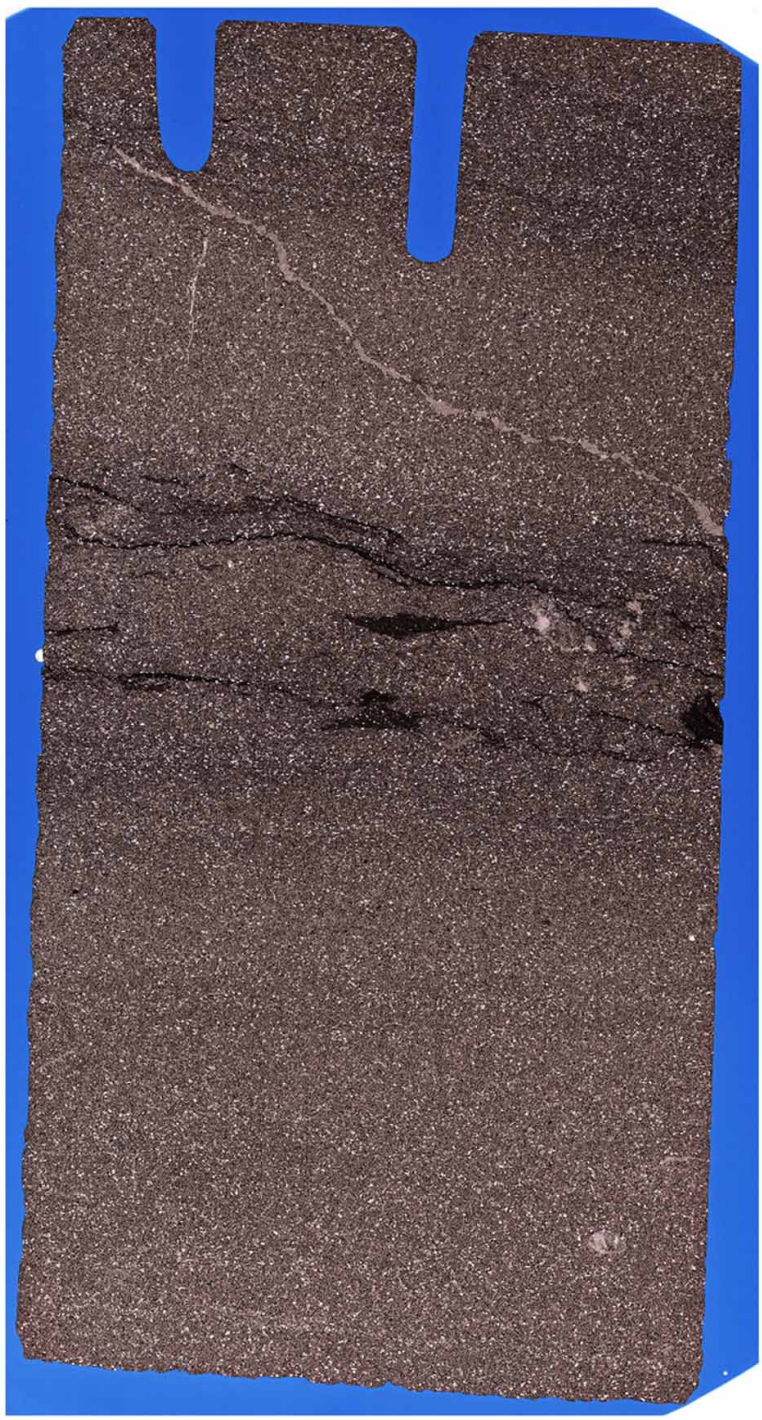
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14383.00'
Plate 24

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14383.00 FEET
SAMPLE NUMBER: 24 CK-McCoy

PLATE 24

T.O.C.: 0.04% (weight percent)

Lithology: Slightly dolomitic, slightly silty/sandy, peloidal limestone

Texture: Bioturbated; slightly laminated; peloidal grainstone; calcite-cemented fractures; organic-rich microstylolites

Detrital Grains/Allochems: Abundant micritic peloids (minor dolomite replacement); common coarse silt to very fine sand-sized grains of potassium feldspar (10% by weight), with minor monocrystalline quartz (2% by weight, total quartz) and rare plagioclase feldspar (trace by weight); minor altered organic plant/algal fragments are difficult to visually differentiated from common (by volume, visual estimate) bituminous organic material; minor muscovite and biotite mica; minor trilobite carapace fragments; and minor echinoderm fragments

Matrix: Trace to rare clay, micrite, dolomicrite, and organic material occurring along incipient microstylolites

Cements and Replacement Minerals: Very abundant amounts of calcite (75% by weight) occurring mostly as sparry interparticle cement and in lesser amounts as replacement/recrystallization of grains/allochems; common dolomite (12% by weight, total dolomite/Fe-dolomite) occurring as replacement of grains/allochems, and as localized replacement of interparticle cement; visually common bituminous organic material occluding intercrystalline spaces within sparry calcite cement, concentrated within some micritic peloids, and concentrated along microstylolites; rare pyrite (trace by weight) occurring as replacement of organic material and other unstable grains/allochems; and trace quartz/feldspar overgrowths

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

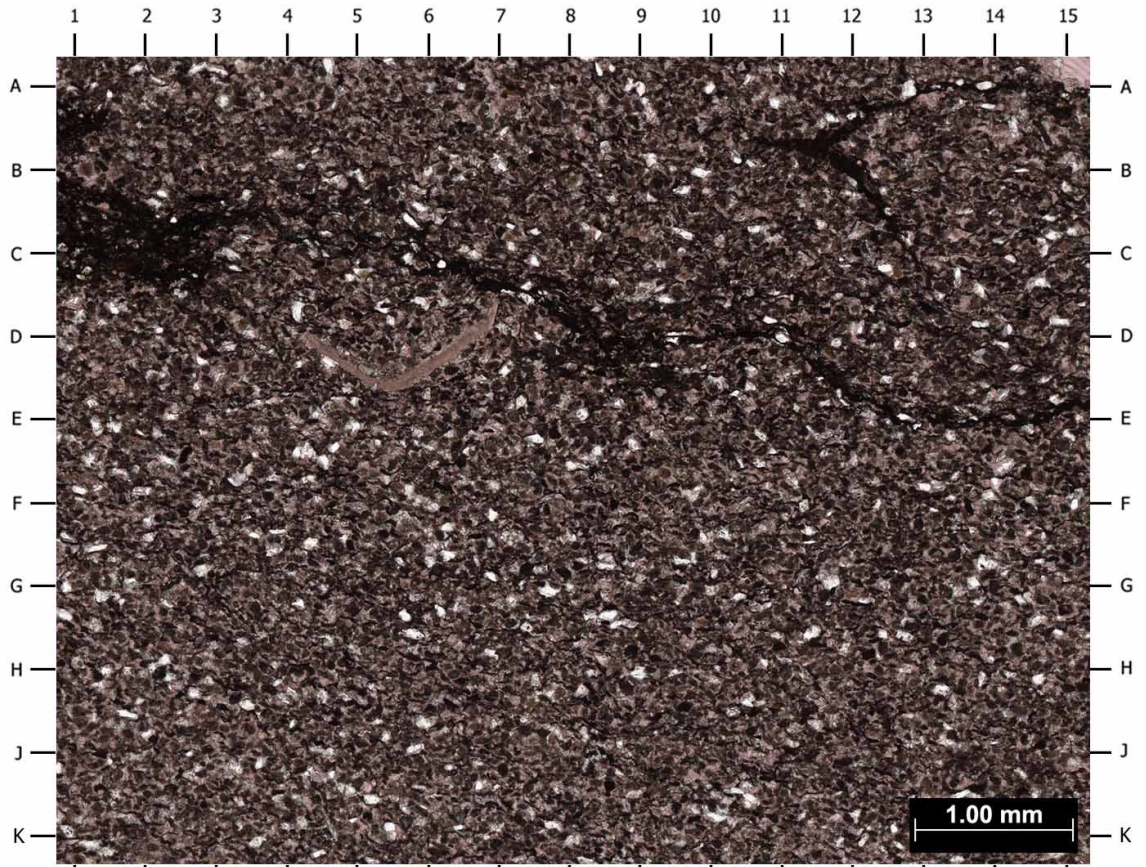
B) This image was taken near the area right of center in macro Photo A. This slightly dolomitic, slightly silty/sandy, peloidal grainstone is bioturbated and slightly laminated. An organic-rich microstylolite occurs from BC1 to DE15. Minor trilobite carapace fragments are found scattered throughout the sample (DE4-D7).

C) This photomicrograph provides a high magnification view of the area centered near EF12.5 in Photo B. Abundant sparry calcite cement occludes the interparticle spaces between abundant micritic peloids (CD3.5, DE8.4, JK11.3, GH4.3), common potassium feldspar (FG13.3, CD11, GH3, AB7.5), and minor quartz grains (2% by weight). This sample contains 0.04% TOC (by weight), but visually (by volume) organic material appear much more common; organic material occurs as altered plant/algal fragments (GH12) and as bitumen concentrated along microstylolites (A4 to C15), concentrated within micritic peloids (making them appear dark; DE8, CD2.6), and occluding intercrystalline spaces within the calcite cement (C2, G3.5, F14.3). It is often difficult to differentiated bituminous organic material from altered plant/algal (kerogen) fragments in thin section. Much of the organic material has undergone some partial replacement by pyrite (trace by weight), which must be identified using reflected white light.

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

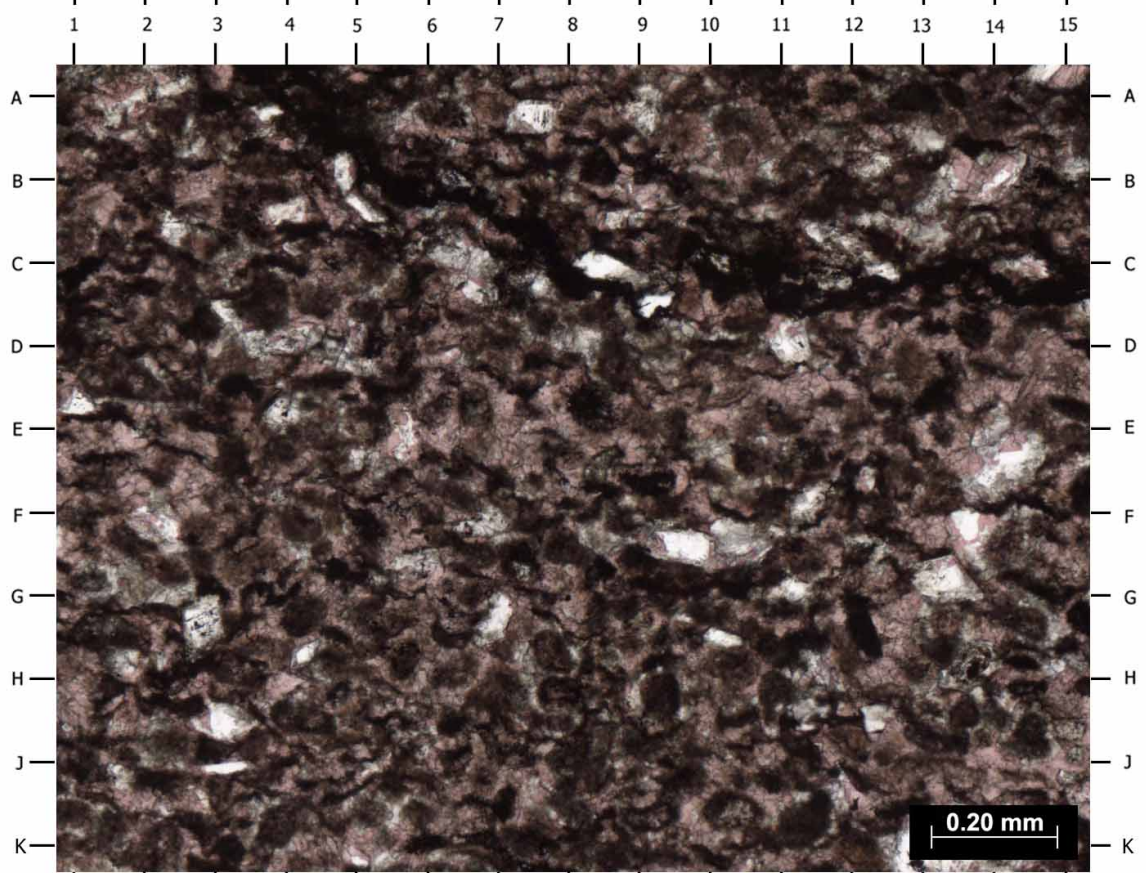
14383.00'
Plate 24

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14387.00 FEET
SAMPLE NUMBER: 25 CK-McCoy

PLATE 25

T.O.C.: 0.11% (weight percent)

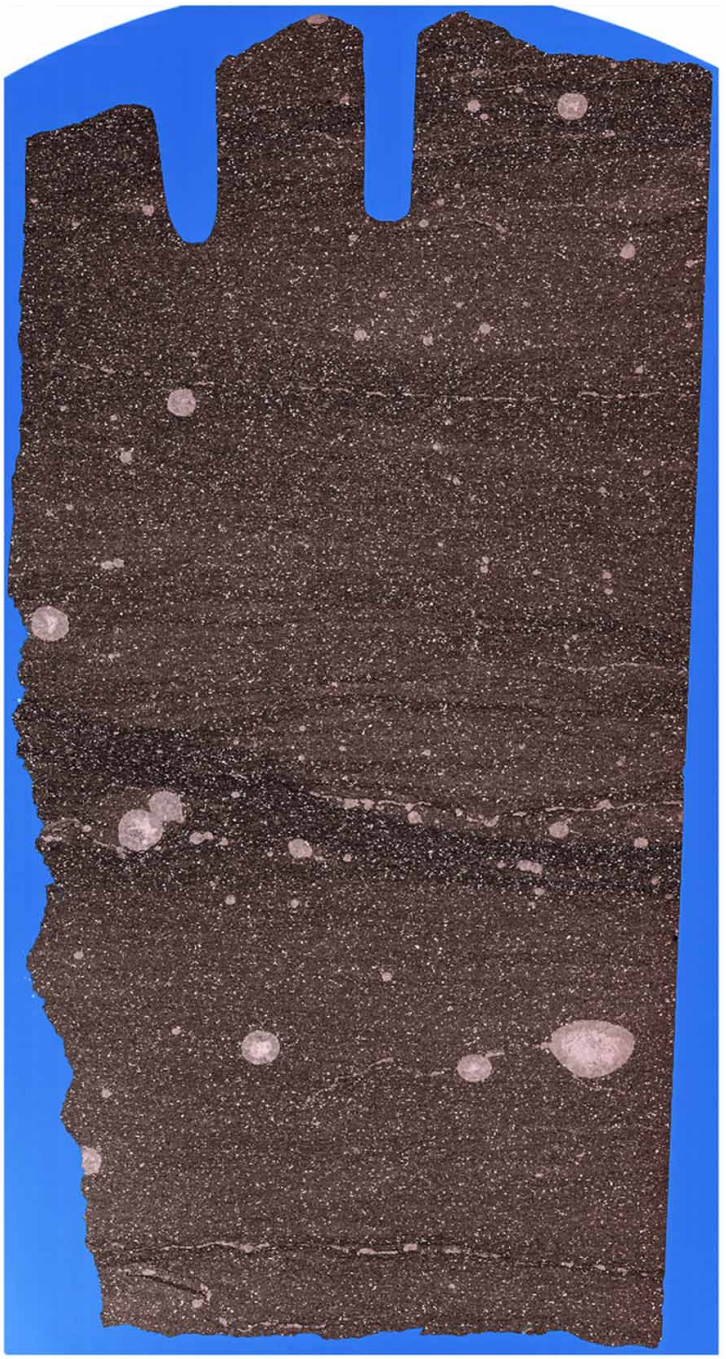
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14387.00'
Plate 25

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14387.00 FEET
SAMPLE NUMBER: 25 CK-McCoy

PLATE 25

T.O.C.: 0.11% (weight percent)

Lithology: Slightly silty/sandy, peloidal limestone

Texture: Bioturbated; slightly laminated; peloidal grainstone to recrystallized packstone; organic-rich microstylolites and laminations containing swarms of microstylolites; discontinuous, horizontal, calcite-cemented fractures occurring along microstylolites

Detrital Grains/Allochems: Abundant micritic peloids; common coarse silt to very fine sand-sized grains of potassium feldspar (13% by weight) with minor monocrystalline quartz (2% by weight) and rare plagioclase feldspar (trace by weight); minor muscovite > biotite mica; minor altered organic plant/algal fragments; minor round/circular recrystallized allochems (ranging from 0.20mm to 2.8mm in diameter); and rare trilobite carapace fragments

Matrix: Common recrystallized micrite (microspar) occurring mostly along laminations of microstylolitic swarms intermixed with rare detrital clay (1% by weight, total clay)

Cements and Replacement Minerals: Very abundant amounts of calcite (75% by weight) occurring mostly as sparry interparticle cement and in lesser amounts as replacement/recrystallization of grains/allochems; minor dolomite (8% by weight, total dolomite/Fe-dolomite) occurring as replacement of grains/allochems, and as localized replacement of interparticle cement; minor bituminous organic material concentrated along microstylolites and within some micritic peloids; minor pyrite (1% by weight) occurring as replacement of organic material and other unstable grains/allochems; trace quartz/feldspar overgrowths; and trace sparry calcite cement occluding discontinuous horizontal fractures along microstylolite boundaries

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

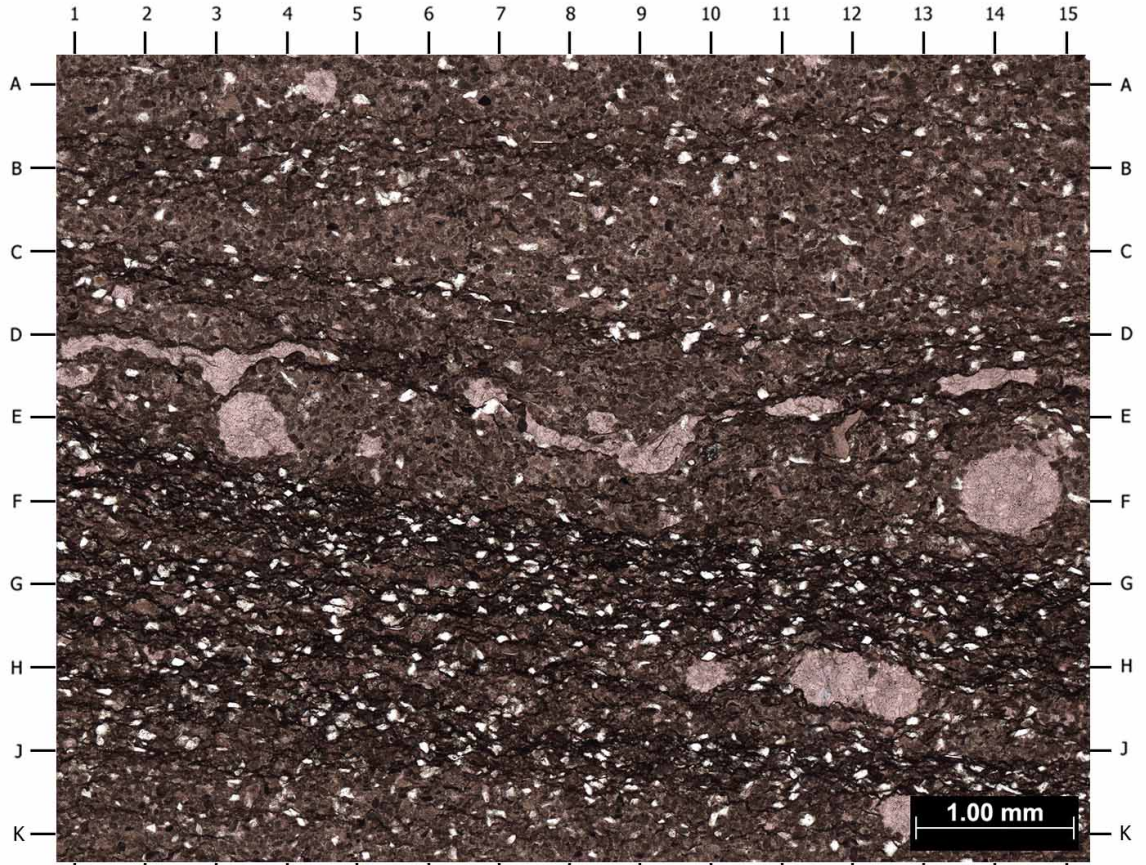
B) This slightly silty/sandy, peloidal grainstone to recrystallized packstone is bioturbated and slightly laminated. This sample contains individual microstylolites (C1-D15) and laminations containing swarms of microstylolites (EH1-GK15). Calcite cement occludes rare horizontal, discontinuous microfractures forming along microstylolite boundaries (D1-DE5, E7-10, DE11-11.7, DE13.5-14.5). Minor undifferentiated/recrystallized circular allochems occur scattered throughout the sample (E3.5, AB4.5, F14, H10, H11.8, HJ12.5, JK12.8).

C) This photomicrograph provides a high magnification view of the area centered near D8 in Photo B. Abundant micritic peloids (B2.8, BC5, BC11.5, CD9.5, EF6.2), common potassium feldspar (C2.5, BC10, EF13.3), minor quartz grains (2% by weight), and minor muscovite mica (DE6) occur cemented by interparticle microspar to sparry calcite (stained red; BC4, FG13.5). Although no original lime mud matrix remains, it is probable that patchy interstitial lime mud matrix existed at deposition, which has since been recrystallized to microspar. Organic-rich microstylolites occur at CD1 to EF15 and from H1 to J4.

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

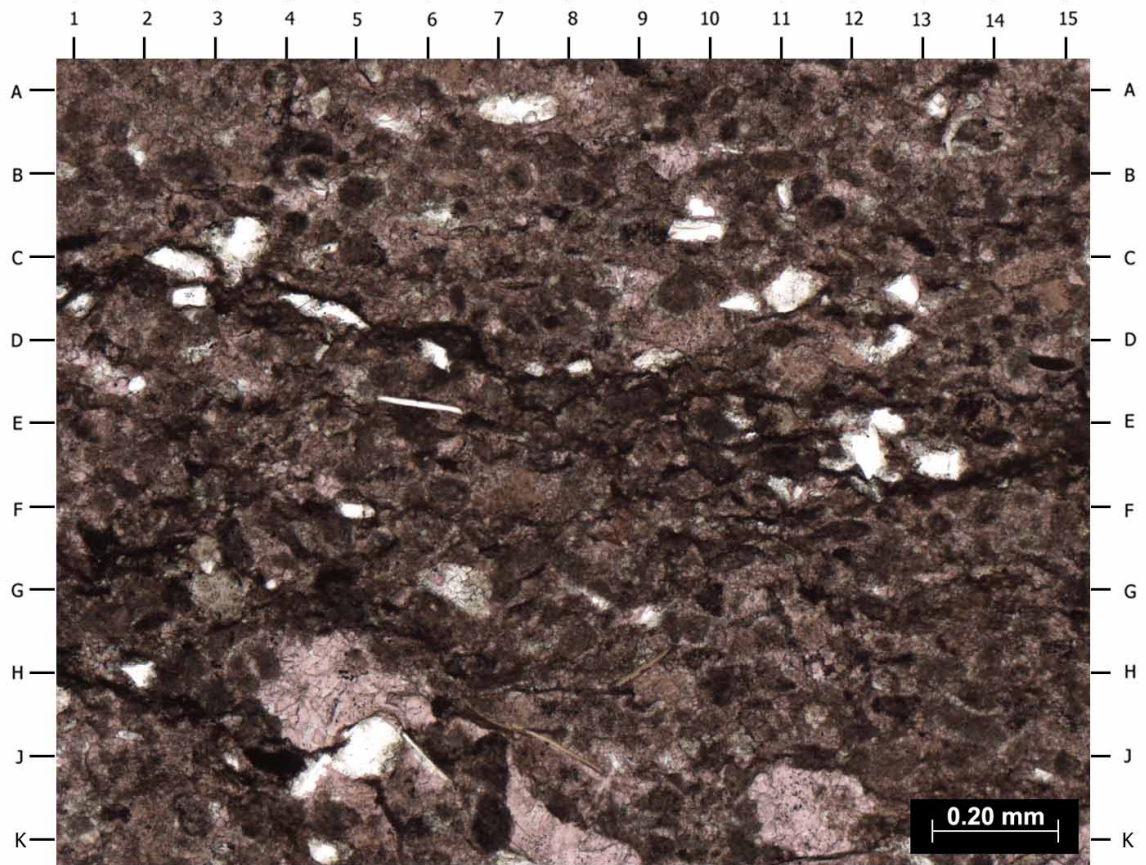
14387.00'
Plate 25

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14388.00 FEET
SAMPLE NUMBER: 26 CK-McCoy

PLATE 26

T.O.C.: 0.01% (weight percent)

This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14388.00'
Plate 26

Weatherford LABORATORIES

A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14388.00 FEET
SAMPLE NUMBER: 26 CK-McCoy

PLATE 26

T.O.C.: 0.01% (weight percent)

Lithology: Slightly silty/sandy, peloidal limestone

Texture: Bioturbated (near massive in appearance), peloidal grainstone; minor calcite/dolomite-cemented, vertical microfractures; trace organic-rich microstylolites (along bottom and top of section)

Detrital Grains/Allochems: Abundant micritic peloids; common coarse silt to very fine sand sized grains of potassium feldspar (10% by weight) with minor monocrystalline quartz (2% by weight) and rare plagioclase feldspar (trace by weight); minor muscovite > biotite mica; minor altered organic plant/algal fragments; and trace echinoderm fragments

Matrix: Trace partially recrystallized micrite and trace detrital clay

Cements and Replacement Minerals: Very abundant amounts of calcite (79% by weight) occurring mostly as sparry interparticle cement and in lesser amounts as replacement/recrystallization of grains/allochems; minor dolomite (9% by weight, total dolomite/Fe-dolomite) occurring as replacement of grains/allochems, and as rare localized replacement of interparticle cement; trace bituminous organic material concentrated along microstylolites and within some micritic peloids; and minor pyrite (1% by weight) occurring as replacement of organic material and other unstable grains/allochems; large, shoehorn-shaped patch of coarsely crystalline sparry calcite (recrystallized fossil fragment?)

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

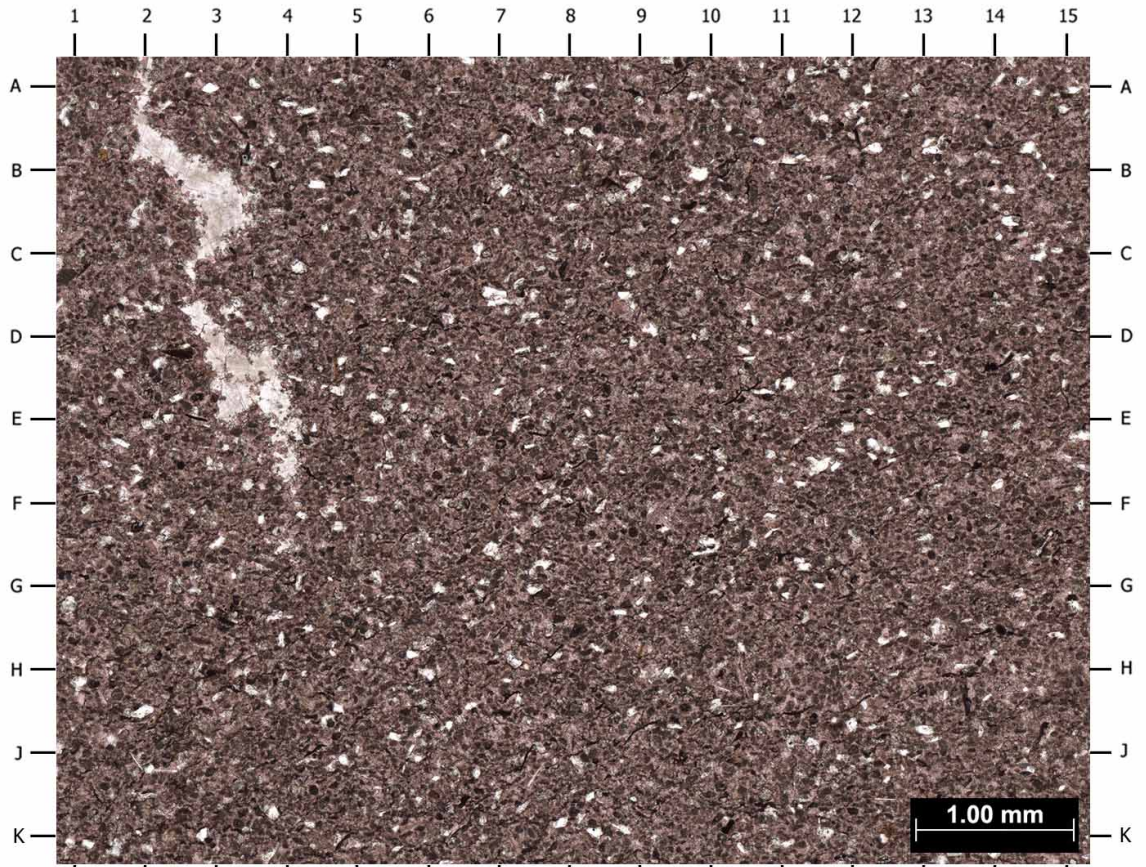
B) This slightly silty/sandy peloidal grainstone has a bioturbated to near-massive texture. A discontinuous, dolomite-cemented microfracture occurs at A2 to EF4. This image was taken just below center in macro Photo A.

C) This photomicrograph provides a high magnification view of the area centered near EF10 in Photo B. Abundant sparry calcite cement (stained red; J2, FG9, AB5.7) occludes the interparticle spaces between abundant, micritic peloids (B2.2, J3.9, J1.4, CD15. B8.6); minor to common quartz/feldspar grains (white; EF14.5, CD1.2, AB12.2, B11, JK8, GH8.9); and minor, altered, organic plant/algal fragments (black; BC9-B10.8, HJ9). Dolomite occurs mostly as a minor replacement of unstable grains/allochems (B13.3, AB10, F12).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

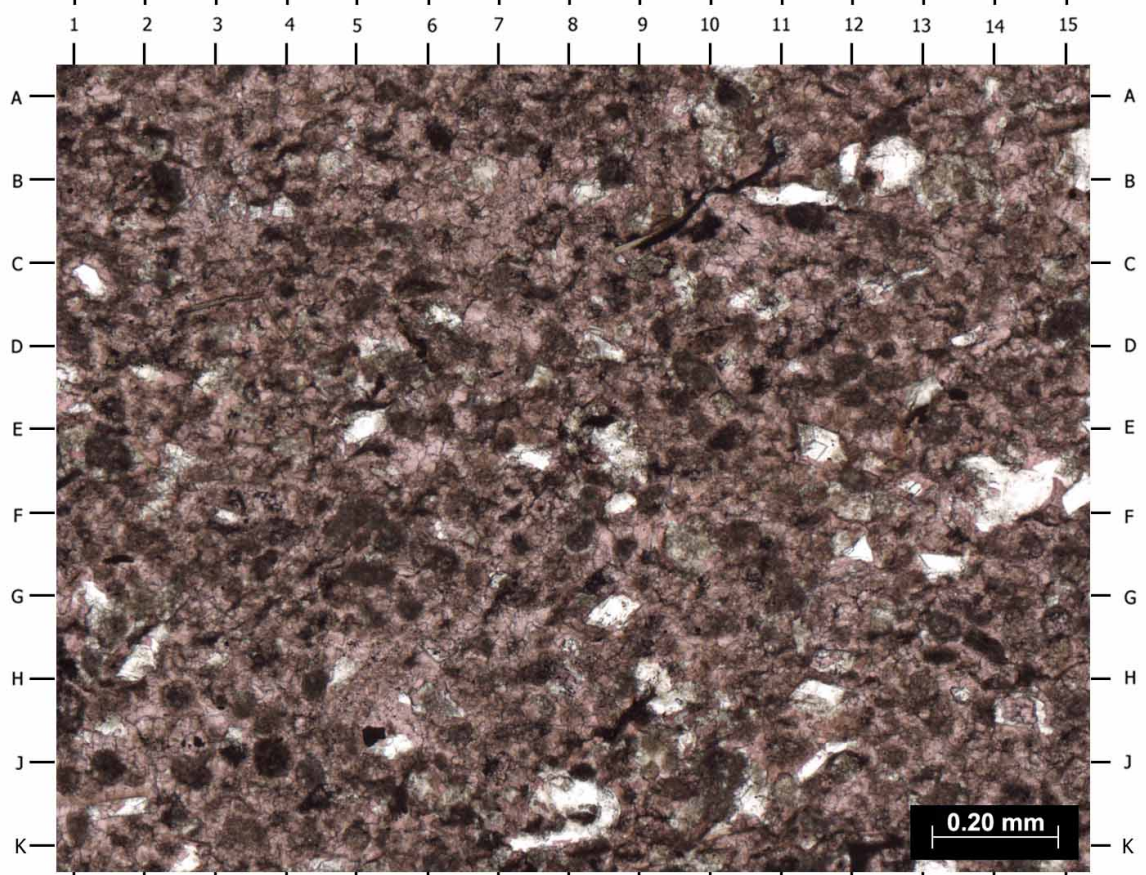
14388.00'
Plate 26

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14389.00 FEET
SAMPLE NUMBER: 27 CK-McCoy

PLATE 27

T.O.C.: 0.12% (weight percent)

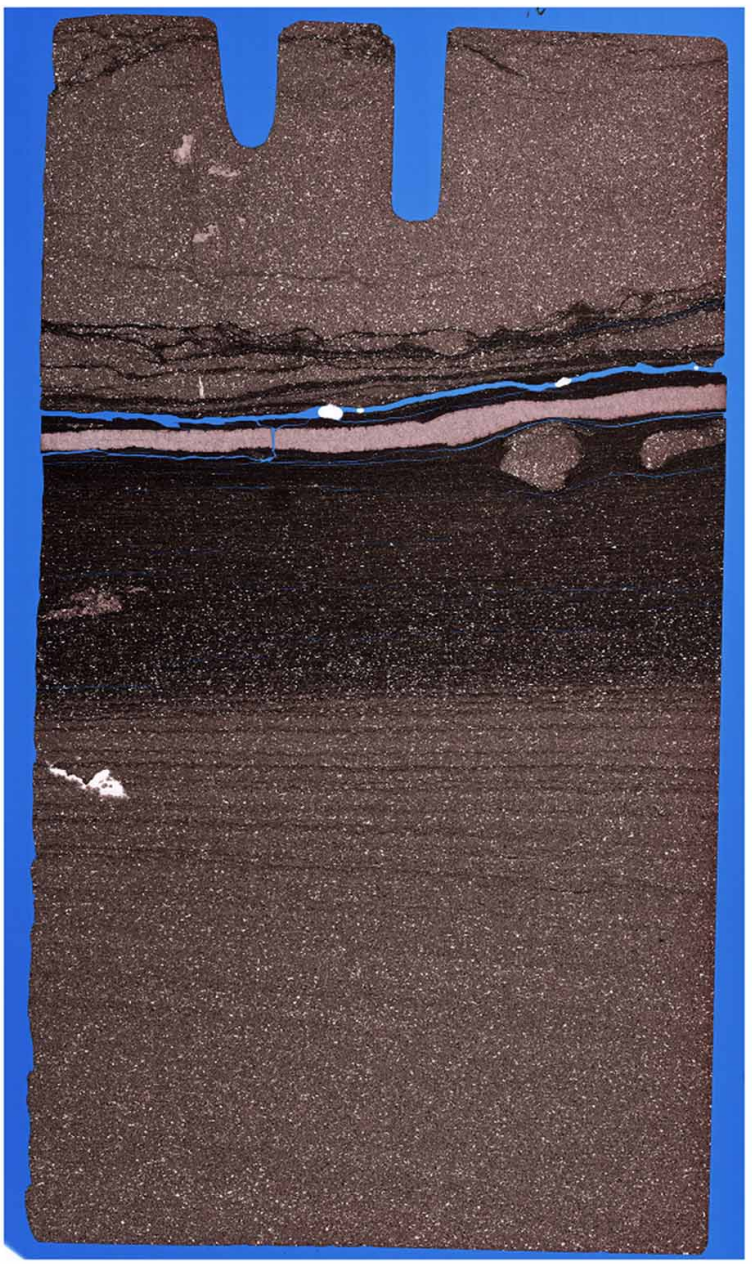
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14389.00'
Plate 27

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14389.00 FEET
SAMPLE NUMBER: 27 CK-McCoy

PLATE 27

T.O.C.: 0.12% (weight percent)

Lithology: Sandy, peloidal limestone (dominant); slightly carbonaceous, silty/sandy, calcareous/dolomitic mudstone (minor lithology)

Texture: Laminated, slightly burrowed, sandy, peloidal grainstone with organic-rich microstylolites (dominant texture; 1.8cm-1.9cm thick at bottom and 1.2cm-1cm thick at top of section); dark slightly carbonaceous mudstone band contains a large horizontal calcite-cemented fracture close to the contact with the upper lithology (this dark band is ~1cm thick and occurs above center of section, splitting the dominant lithology)

Detrital Grains/Allochems: Abundant micritic peloids; common very fine to fine sand grains of potassium feldspar grains (24% by weight) with minor monocrystalline quartz (2% by weight, total quartz from XRD) and rare plagioclase feldspar (trace by weight); minor muscovite and biotite mica; minor altered organic plant/algal fragments; trace over-sized grainstone intraclasts (within dark mudstone band); and trace echinoderm fragments

Matrix: Detrital clay (5% total clay by weight) and bituminous organic material occurs locally concentrated along a thick dark mudstone band above the center of the thin section and concentrated along microstylolites; rare partially recrystallized micrite occurs mostly along microstylolites

Cements and Replacement Minerals: Very abundant amounts of calcite (63% by weight) occurring mostly as sparry interparticle cement and in lesser amounts as replacement/recrystallization of grains/allochems and rare matrix; minor dolomite (5% by weight, total dolomite/Fe-dolomite) occurring as replacement of grains/allochems, and as rare localized replacement of interparticle cement; minor (visually) bituminous organic material occurs concentrated along microstylolites and along a dark mudstone band; minor pyrite (1% by weight) occurring as replacement of organic material and other unstable grains/allochems; trace sparry calcite cement occluding a large horizontal fracture and discontinuous, vertical microfractures are occluded by calcite and dolomite cement; trace patches of coarsely crystalline calcite occluding vugs (near the top left corner of the section)

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

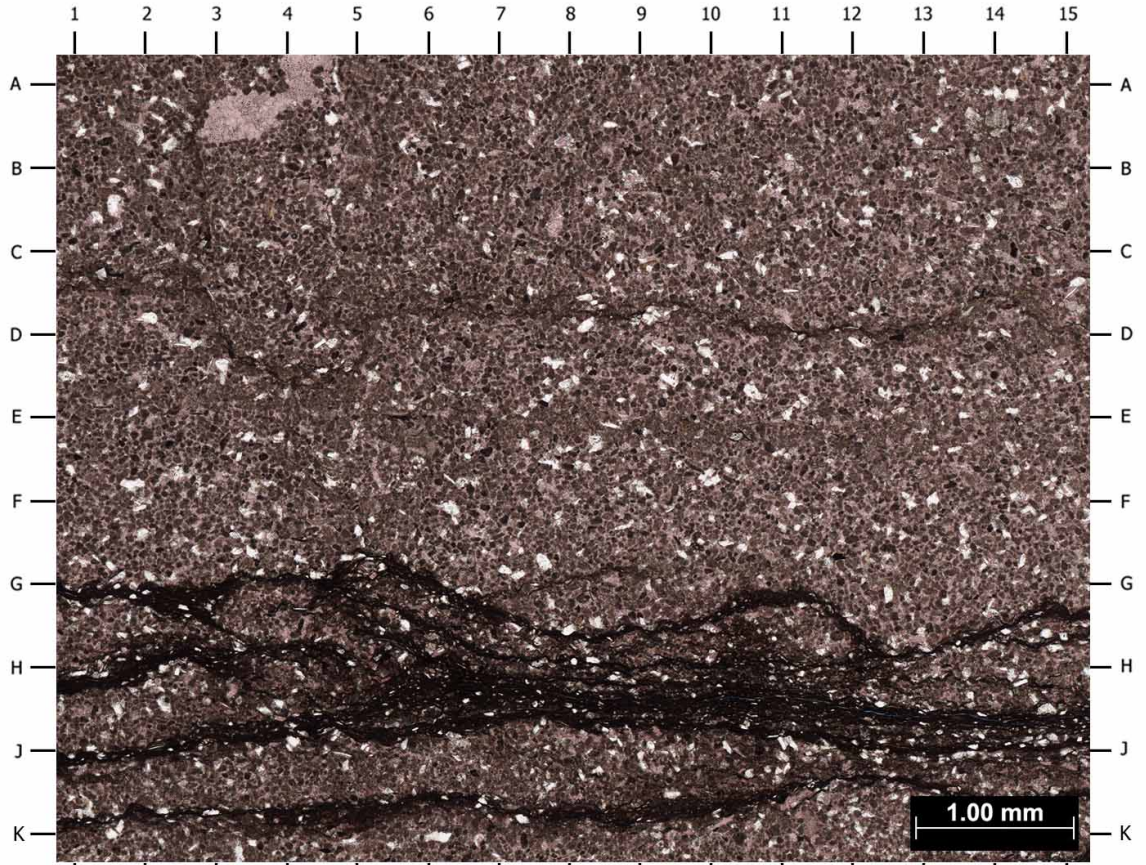
B) This image was taken near the top-left corner of macro Photo A. This view illustrates the dominant laminated and slightly burrowed, sandy, peloidal grainstone with organic/clay-rich microstylolites (GK1-15 and CD1-D15). A calcite-cement vug (AB3-4.5) occurs within a small section of displaced fabric (AD3.5); a vertical calcite-cemented microfracture (A4.7 to C4.7) occurs just to the right of this displaced section (due to burrowing?).

C) This photomicrograph provides a high magnification view of the area centered near F5 in Photo B. Abundant sparry calcite cement (stained red; B3.5, EF1.2, F13.5) occludes interparticle spaces between abundant micritic peloids (C14, CD1.3, EF1, GH14.2) and feldspar/quartz grains (white; BC2, CD5, EF12, B13, G6.6). Other grains/allochems pictured include muscovite (DE12), organic fragments (AB9, GH3.3), and a small echinoderm fragment with syntaxial overgrowths (FG4.5).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

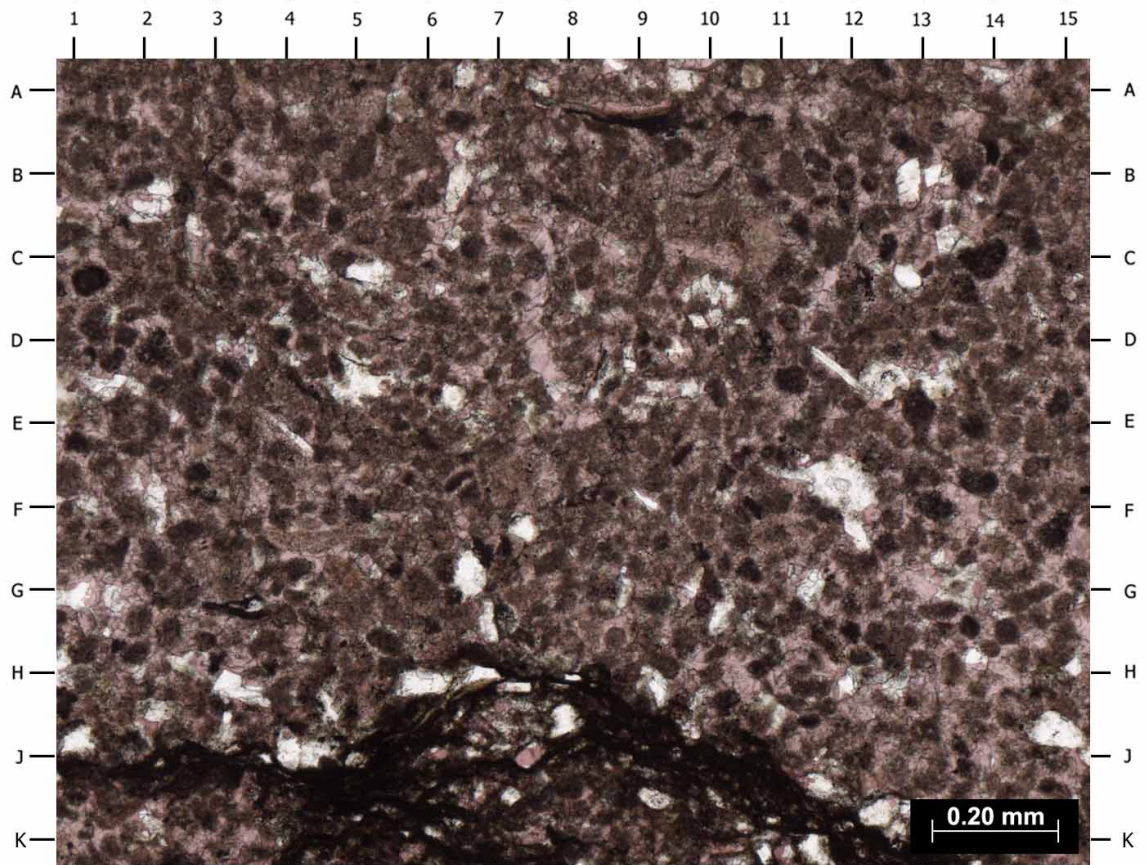
14389.00'
Plate 27

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14395.00 FEET
SAMPLE NUMBER: 28 CK-McCoy

PLATE 28

T.O.C.: 0.13% (weight percent)

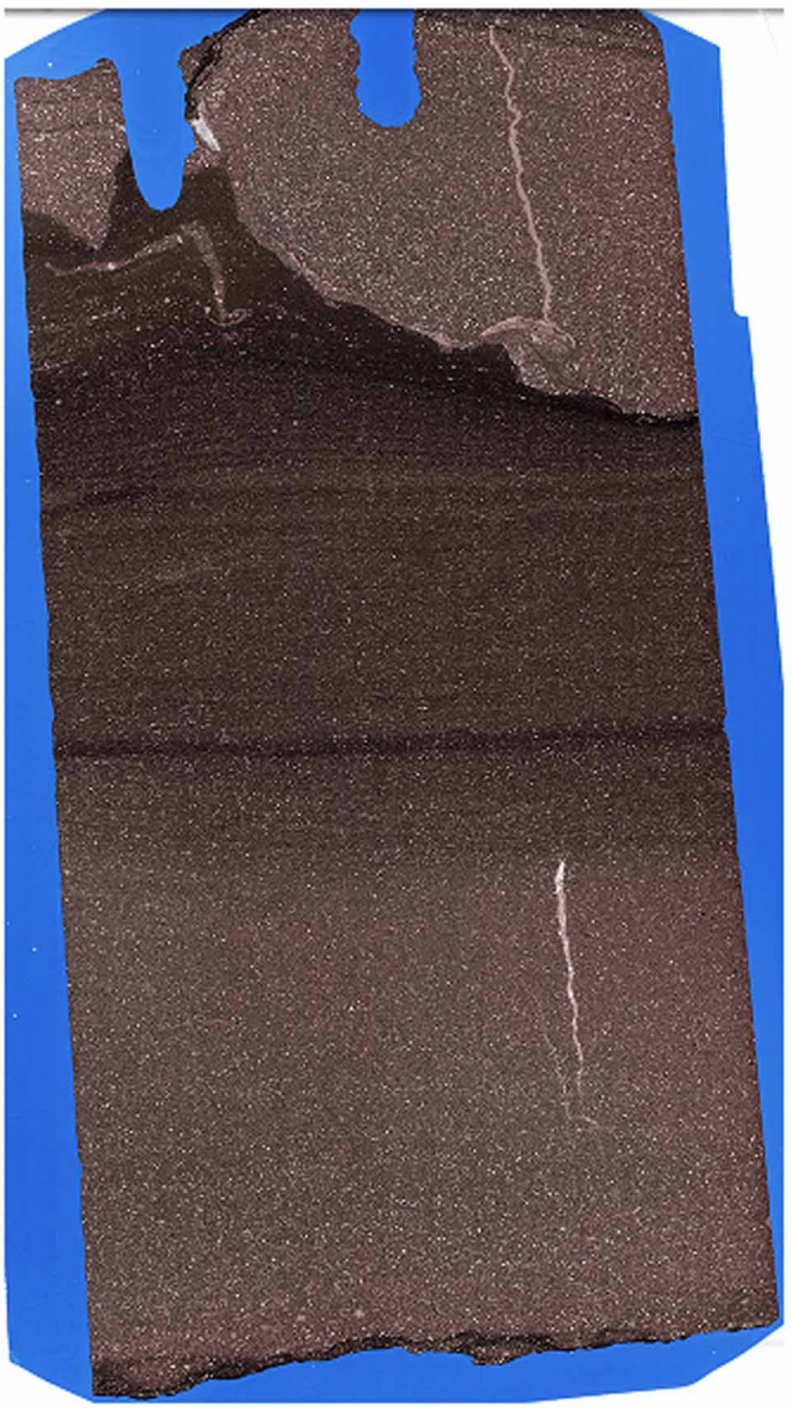
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14395.00'
Plate 28

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14395.00 FEET
SAMPLE NUMBER: 28 CK-McCoy

PLATE 28

T.O.C.: 0.13% (weight percent)

Lithology: Silty/sandy, peloidal limestone

Texture: *Basal section*- bioturbated, vaguely laminated silty/sandy, peloidal grainstone with discontinuous, vertical, calcite/dolomite-cemented fractures and a horizontal, organic-rich stylolite at the base of the section (1.9cm-1.6cm thick); *Middle Section*- vague contact with silty/sandy, peloidal grainstone to partially recrystallized packstone upwards becoming more micritic and slightly more carbonaceous, then grading into slightly carbonaceous dolomicrite close to the top, with thin laminations and organic-rich microstylolites (1.5cm to 2.2cm thick section); *Top Section*- sharp irregular contact (rip-up intraclasts matching upper section) with bioturbated to massive-appearing, silty/sandy, peloidal grainstone with vertical calcite-filled fracture and cemented compaction fractures following base of the grainstone section, organic-rich microstylolites occur along the very top of the section (0.5cm to 1.4cm thick)

Detrital Grains/Allochems: Abundant micritic peloids; common coarse silt to very fine sand grains of potassium feldspar (19% by weight) with minor monocrystalline quartz (2% by weight, total quartz) and rare plagioclase feldspar (trace by weight); minor muscovite and altered biotite mica; minor altered organic plant/algal fragments; trace trilobite carapace fragments; trace echinoderm fragments; and trace grainstone intraclast

Matrix: Minor to common partially recrystallized micrite, rare dolomicrite, minor detrital clay (3% by weight, total clay), and bituminous organic material occurring mostly within the middle section

Cements and Replacement Minerals: Very abundant amounts of calcite (68% by weight) occurring mostly as microsparry interparticle cement and in lesser amounts as replacement/recrystallization of grains/allochems and matrix replacement; minor dolomite (7% by weight, total dolomite/Fe-dolomite) occurring as replacement of grains/allochems, occurring as rare localized replacement of interparticle cement, and minor dolomicrite replacement of matrix; minor (visually) bituminous organic material occurs concentrated along microstylolites and darker laminations; minor pyrite (1% by weight) occurring as replacement of organic material and other unstable grains/allochems; and trace sparry calcite/dolomite cement occluding vertical fractures

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

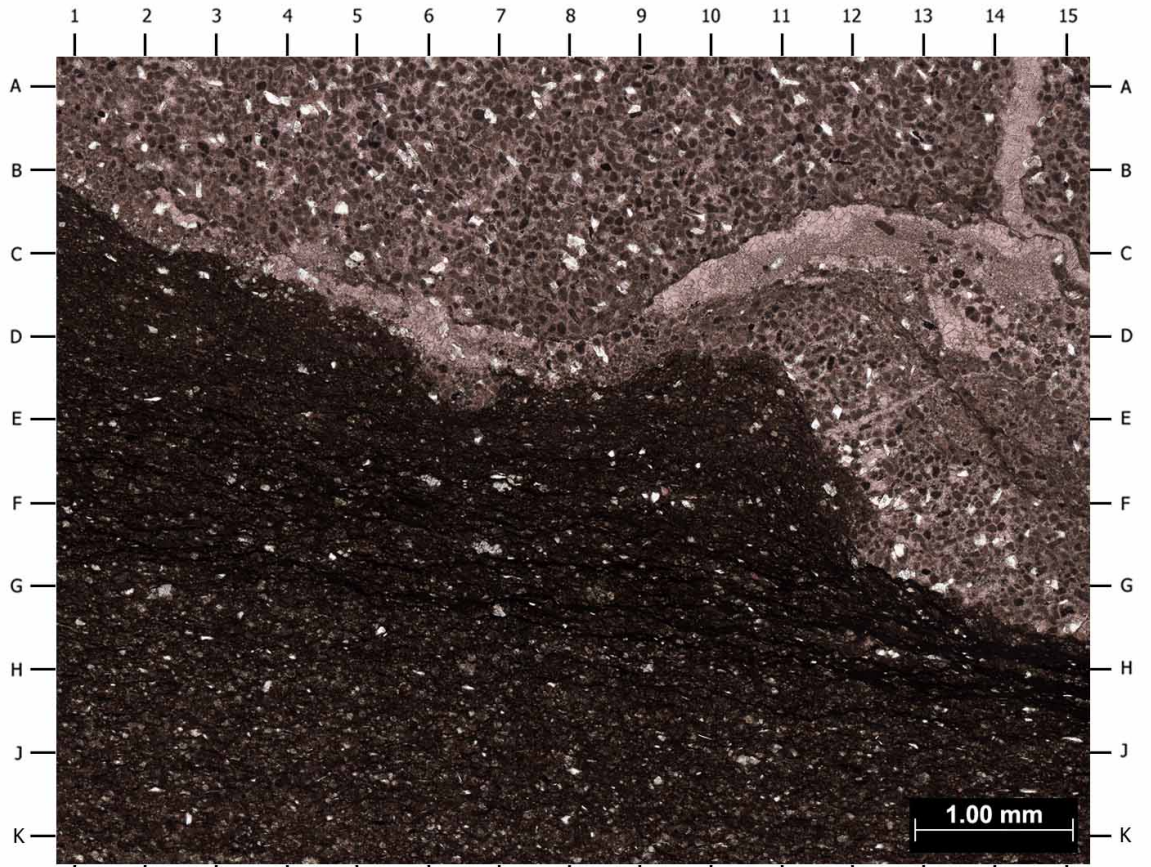
B) This image was taken within the top-left quadrant of macro Photo A. This image also documents the sharp contact between the top silty/sandy, peloidal grainstone section (AB1 to AG15) and the top of the middle section, consisting of slightly carbonaceous dolomicrite (BK1 to HK15). Localized stress has caused fractures with subsequent calcite cementation along the depositional contact between the two lithologies (C4 to D7, CD9-14.5, E11-DE13) and within the upper grainstone section (AC14.4).

C) This photomicrograph provides a high magnification view of the area centered near DE7.5 in Photo B. This grainstone portion (AE1-AC15; similar to bottom section in Photo A) is characterized by microsparry calcite cement (AB6.5) occluding spaces between peloids (B7, CD7, B11) and feldspar/quartz grains (C9, CD7.5, A9.2). Slightly carbonaceous dolomicrite occurs from FK1 to CK15.

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

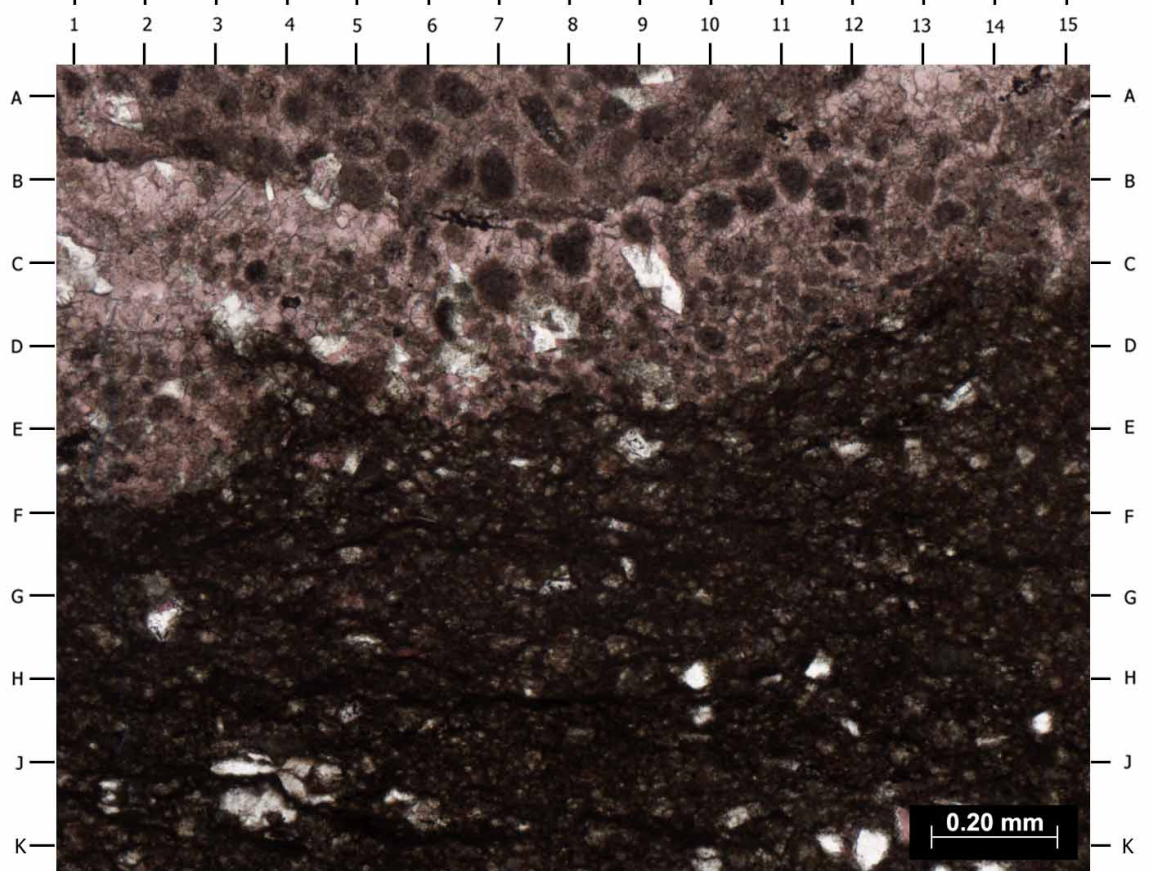
14395.00'
Plate 28

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14401.00 FEET
SAMPLE NUMBER: 29 CK-McCoy

PLATE 29

T.O.C.: 0.04% (weight percent)

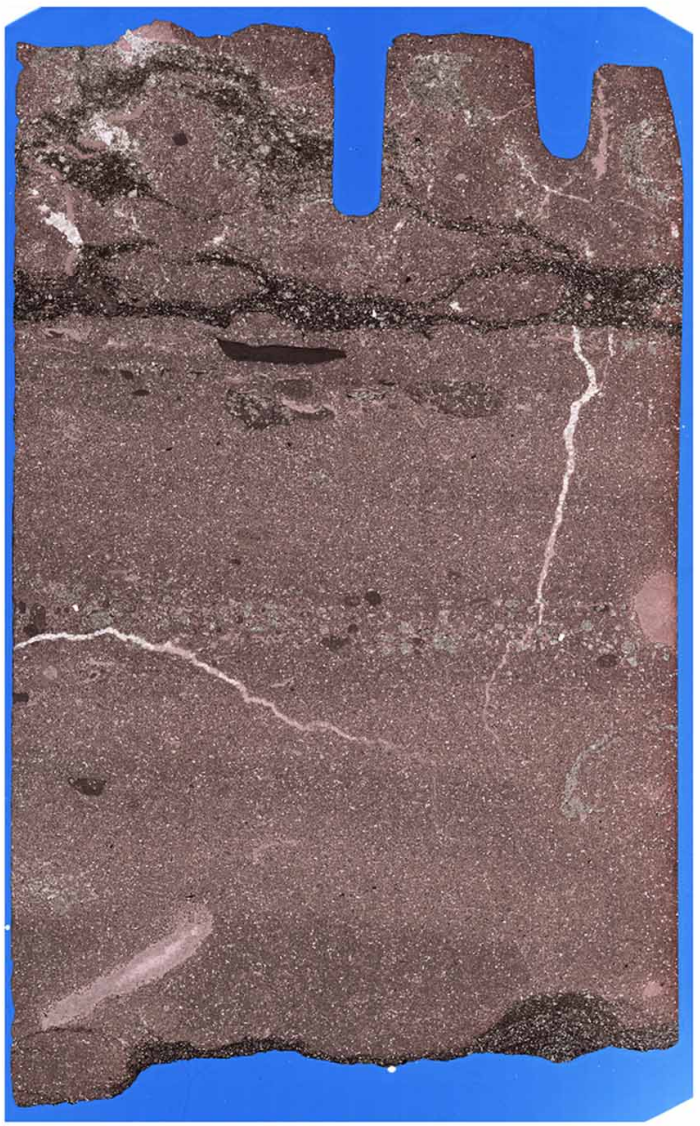
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14401.00'
Plate 29

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14401.00 FEET
SAMPLE NUMBER: 29 CK-McCoy

PLATE 29

T.O.C.: 0.04% (weight percent)

Lithology: Slightly silty/sandy, peloidal limestone

Texture: Bioturbated, slightly laminated, peloidal grainstone with minor patches of partially recrystallized packstone; irregular dolomitic/organic/clay-rich laminations and/or stylolites; calcite/dolomite-cemented fractures

Detrital Grains/Allochems: Abundant micritic peloids; minor coarse silt to very fine sand grains of potassium feldspar (8% by weight) and monocrystalline quartz (1% by weight, total quartz) with rare plagioclase feldspar (trace by weight); minor micritic intraclasts; rare muscovite and biotite mica; rare trilobite carapace fragments; rare echinoderm fragments; and rare altered organic plant/algal fragments

Matrix: Minor partially recrystallized micrite; rare detrital clay (trace by weight) and bituminous organic material concentrated along irregular laminations and/or stylolites

Cements and Replacement Minerals: Very abundant calcite (82% by weight, total calcite) occurring predominantly as interparticle microspar to sparry calcite cement and in lesser amounts as replacement/recrystallization of unstable grains/allochems and matrix; minor dolomite (8% by weight, total dolomite/Fe-dolomite) occurring as replacement of unstable grains/allochems and as replacement of matrix along organic-rich laminations/stylolites; minor pyrite (1% by weight) occurring as replacement of organic material and other unstable gains/allochems; rare sparry dolomite/calcite cement occluding fractures; rare bituminous organic material concentrated along irregular laminations and/or stylolites; trace syntaxial overgrowths around echinoderm fragments; and trace localized patches of coarsely crystalline calcite

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

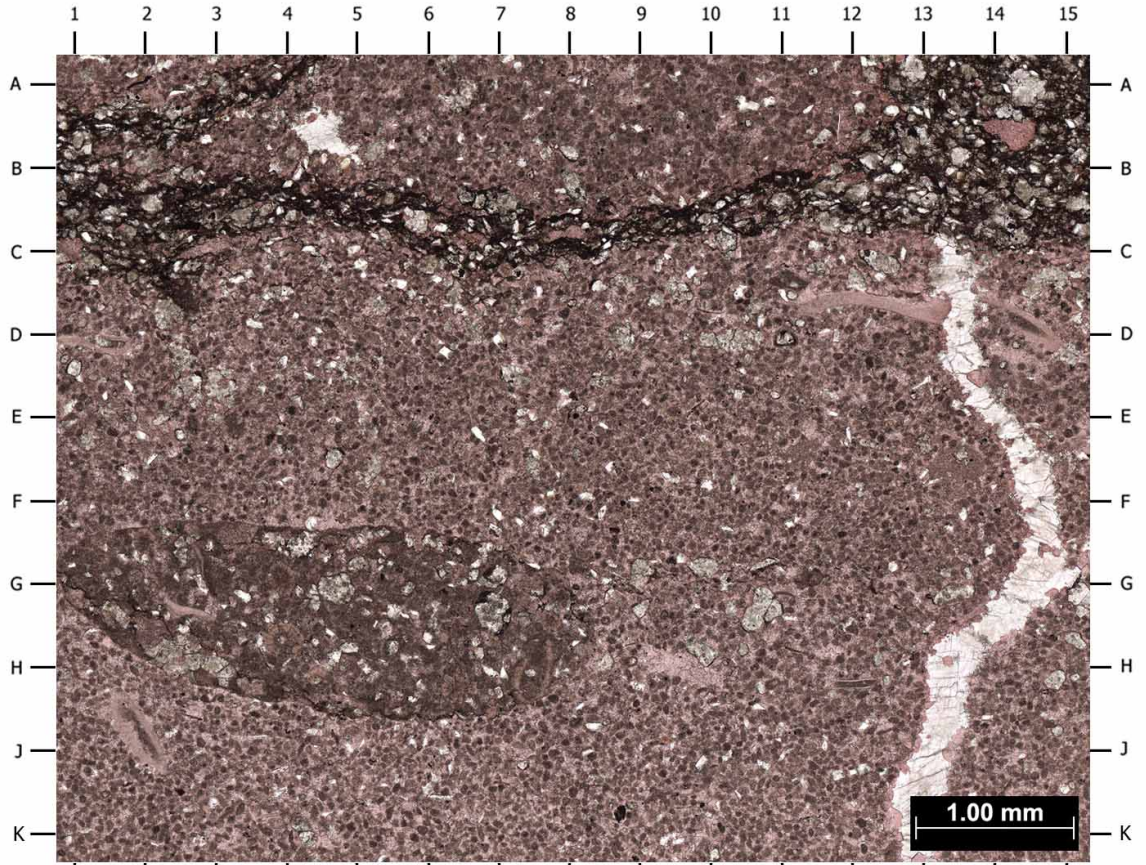
B) This image was taken within the top-right quadrant of macro Photo A. A vertical, dolomite-cemented fracture propagates through the more rigid framework of the slightly silty/sandy, peloidal grainstone texture, but terminates where it encounters the more ductile components of a dolomitized, organic/clay-rich lamination and/or stylolite (dark; B1 to AC15). An intraclast occurs at G1-8 and trilobite fragments are visible at CD12 and D14.5.

C) This photomicrograph provides a high magnification view of the area centered near HJ3 in Photo B. This sample is dominated by micritic peloids (HJ1.2, HJ12.8, JK2) cemented by sparry to microsparry calcite cement (stained red; CD2, EF8, H13.3). A large intraclast at AB1-AF15 contains micritic peloids (B13.5, B7), a possible ooid (BC11.5), a trilobite fragment (AB5-7), and dolomite-replaced allochems (CD4-8.5). Other grains/allochems pictured include potassium feldspar (HJ11.3, JK11.3, G5.2, G13), quartz (JK12.4), muscovite mica (GH10.3), biotite (FG6.5), an undifferentiated fossil fragment (EF2-HJ4.5), and organic fragments (black; JK5.7).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

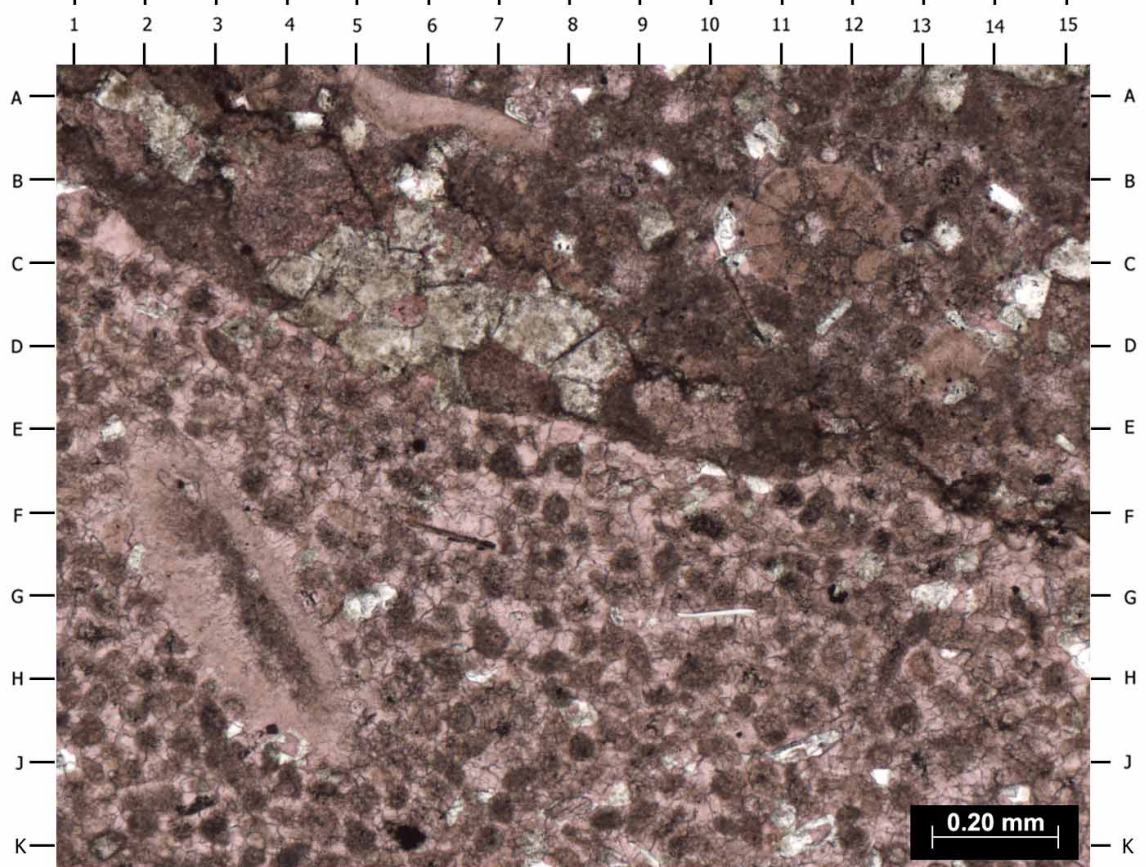
14401.00'
Plate 29

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14402.00 FEET
SAMPLE NUMBER: 30 CK-McCoy

PLATE 30

T.O.C.: 0.01% (weight percent)

This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14402.00'
Plate 30

Weatherford LABORATORIES

A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14402.00 FEET
SAMPLE NUMBER: 30 CK-McCoy

PLATE 30

T.O.C.: 0.01% (weight percent)

Lithology: Slightly oolitic, sandy, peloidal limestone

Texture: Laminated, burrowed, slightly oolitic, sandy, peloidal grainstone; very sandy, organic-rich stylolites and thin organic-rich microstylolites; rare calcite/dolomite-cemented microfractures

Detrital Grains/Allochems: Abundant micritic peloids; common ooids; common potassium feldspar (16% by weight) with minor monocrystalline quartz (6% by weight, total quartz) and rare plagioclase feldspar grains (trace by weight) ranging in size from coarse silt to medium-grained sand; trace trilobite carapace fragments; trace echinoderm fragments; and trace polycrystalline quartz grains

Matrix: Trace clay and bituminous organic material concentrated along stylolites; trace patches of recrystallized micrite likely associated with burrowing

Cements and Replacement Minerals: Very abundant amounts of calcite (71% by weight, total calcite) occurring predominantly as sparry interparticle cement and in lesser amounts as replacement/recrystallization of grains/allochems; minor dolomite (7% by weight, total dolomite/Fe-dolomite) occurring predominantly as replacement of grains/allochems; rare feldspar/quartz overgrowths; trace pyrite occurring as replacement of organic material and other unstable grains/allochems; trace bituminous organic material occurring mostly along stylolites and microstylolites; and trace calcite/dolomite fracture-filling cement

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

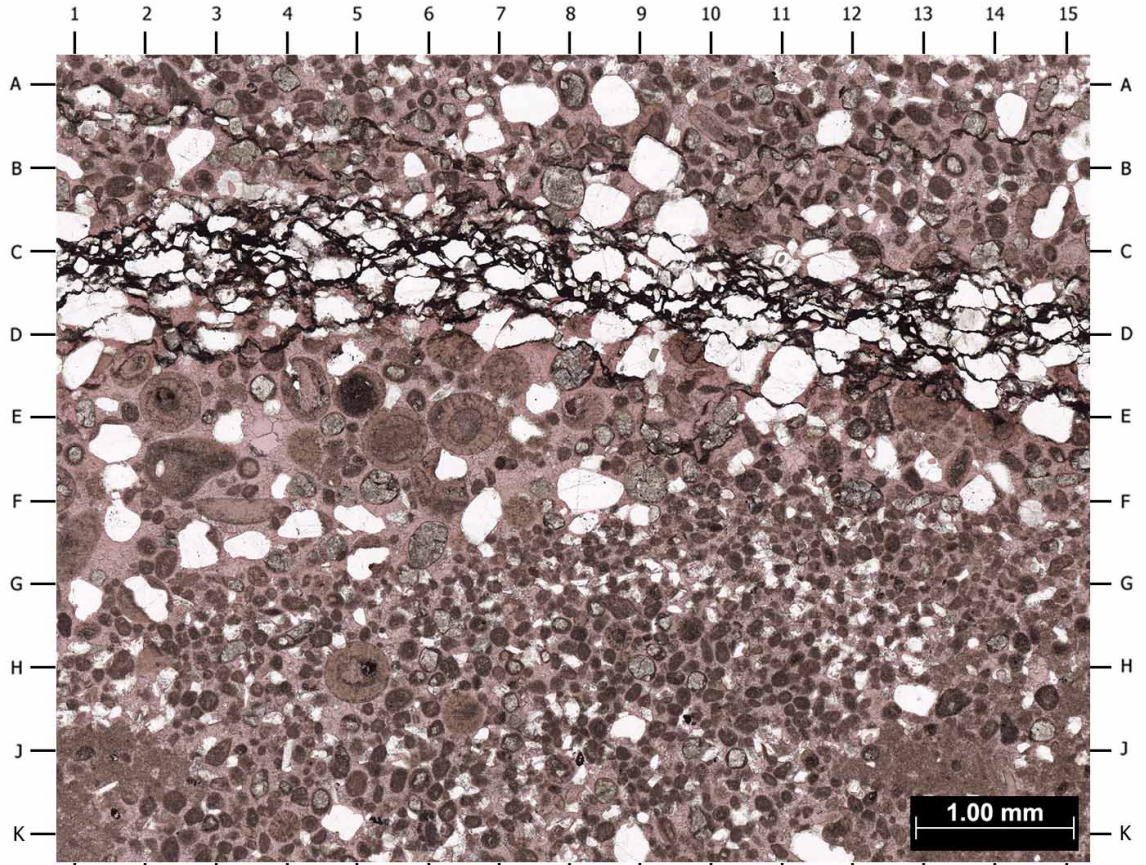
B) This image was taken below center and near the left edge of macro Photo A and illustrates bituminous organic material and feldspar/quartz grains concentrated along a stylolite (CD1-D15). This limestone exhibits a laminated, burrowed, slightly oolitic, sandy, peloidal grainstone texture. Burrowing has caused a patchy distribution of grain/allochem size, with ooids (E2, EF6.2) and medium-grained sand (EF1.5, F8) at EG1 to EF8, and mostly very fine sand (HJ8, G9) and peloids at GK3 to FK12. The medium-sized sand grains appear to be predominantly quartz. Localized patches of partially recrystallized micrite are likely also related to burrowing (J1-2, JK13-14).

C) This photomicrograph provides a high magnification view of the area centered near DE7 in Photo B. Abundant sparry calcite cement occludes the interparticle spaces between potassium feldspar (DE2, GH1.2, GH4), quartz (GH10, J8.5), ooids (JK1-3, J4-7, FG7.5), and peloids (HJ10.3, FG4.3, K11). Dolomite occurs as a minor replacement of unstable grains/allochems (FG1.5, F11, J14.3, JK13.2, K12). Reflected light microscopy reveals that the bituminous organic material along the stylolite is partially pyritized (black; BC11, BC15).

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

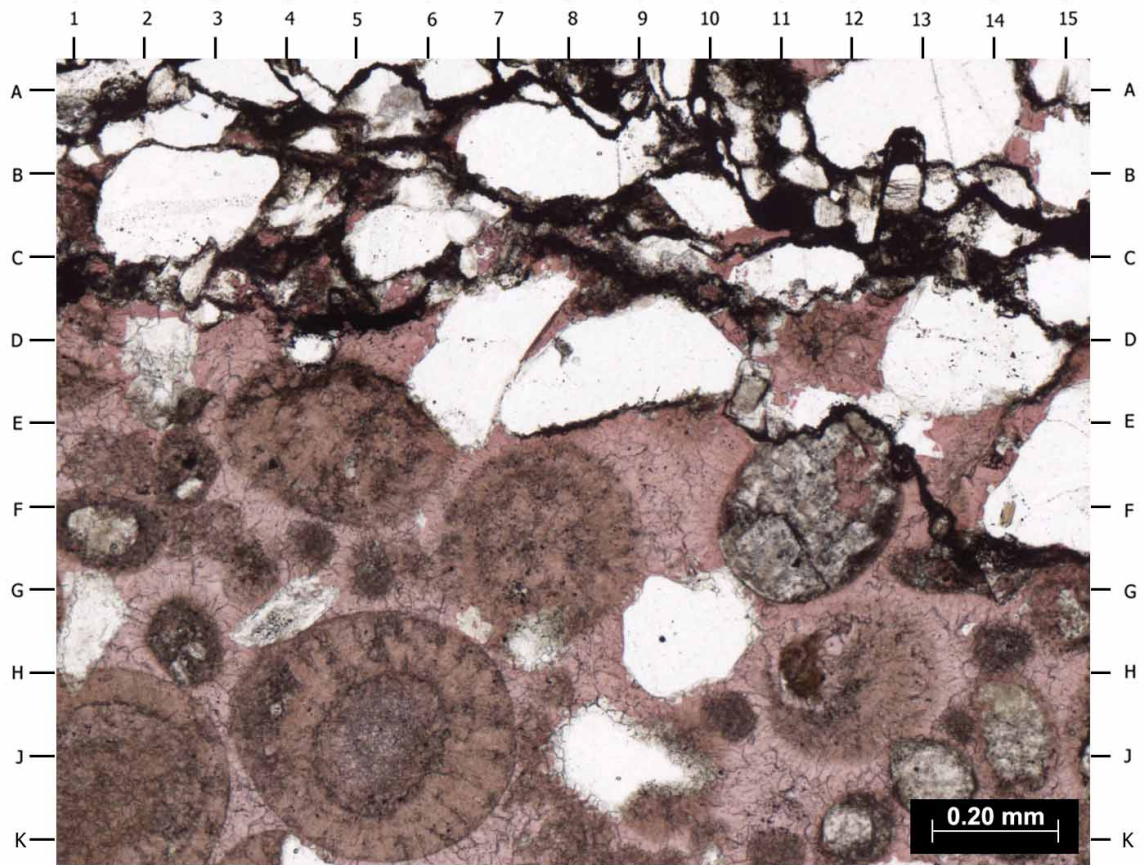
14402.00'
Plate 30

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14403.00 FEET
SAMPLE NUMBER: 31 CK-McCoy

PLATE 31

T.O.C.: 0.07% (weight percent)

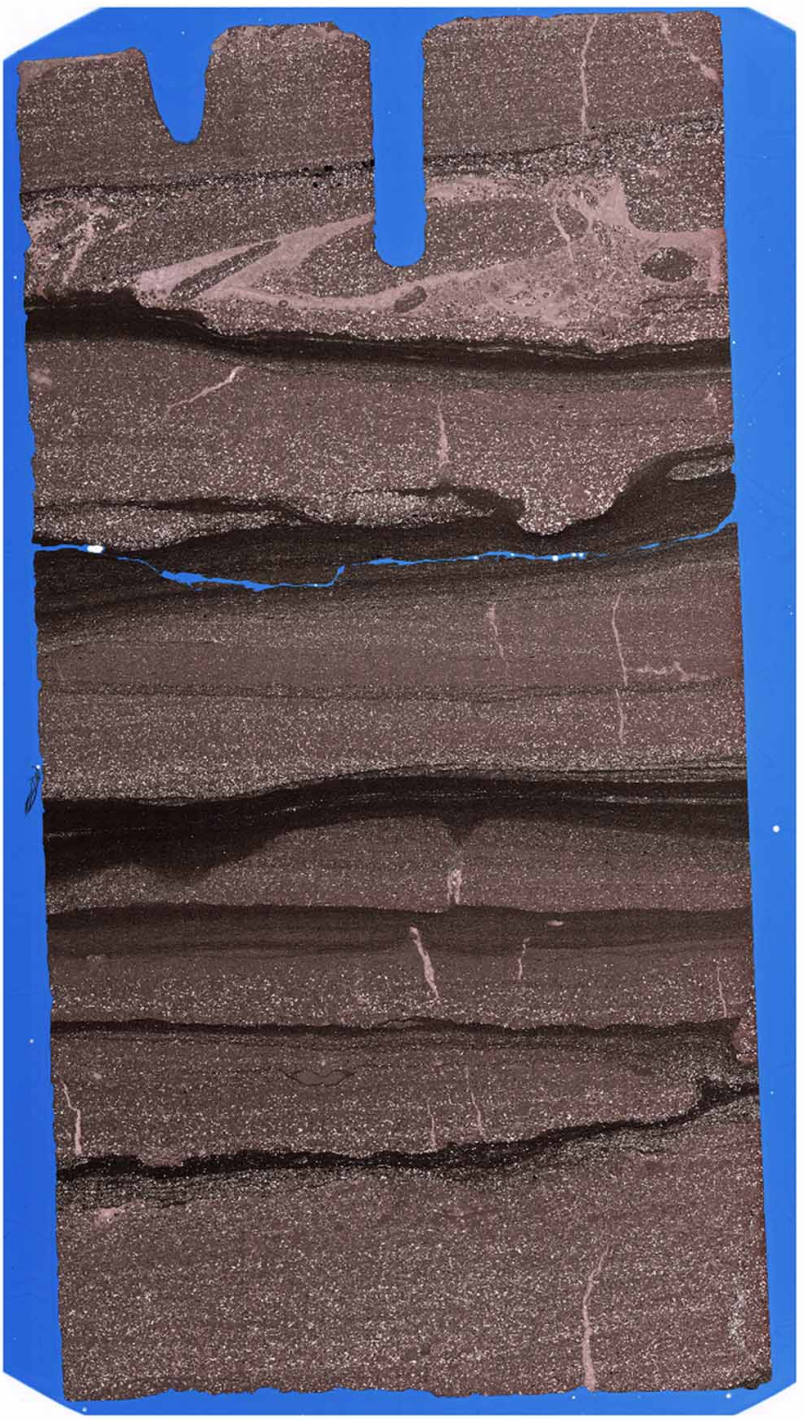
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14403.00'
Plate 31

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14403.00 FEET
SAMPLE NUMBER: 31 CK-McCoy

PLATE 31

T.O.C.: 0.07% (weight percent)

Lithology: Silty/sandy, peloidal limestone (dominant); slightly carbonaceous, argillaceous dolostone (minor)

Texture: Laminated, burrowed, silty/sandy, peloidal, partially recrystallized packstone to grainstone thinly interbedded with dark irregular bands of slightly carbonaceous, argillaceous dolostone; near the top of the section is an intraclast-rich, peloidal grainstone bed with large shelter cavities (cemented by sparry calcite) occurring under tilted over-sized limestone intraclasts; calcite-cemented microfractures and calcite-cemented escape burrows; organic-rich microstylolites

Detrital Grains/Allochems: Abundant micritic peloids; common to abundant coarse silt to very fine sand grains of potassium feldspar (24% by weight) with minor monocrystalline quartz (4% by weight, total quartz) and rare plagioclase feldspar (trace by weight); limestone intraclasts; muscovite mica; altered organic plant/algal fragments; trilobite carapace fragments; and echinoderm fragments

Matrix: Common partially recrystallized micrite (limestone layers); minor detrital clay (4% by weight, total clay), bituminous organic material, dolomicrite, and very finely crystalline dolomite comprise the matrix within the dark-colored dolostone layers

Cements and Replacement Minerals: Very abundant amounts of calcite (59% by weight, total calcite) occurring as recrystallization of micrite to microspar, recrystallization/replacement of unstable grains/allochems, microspar to sparry calcite interparticle cement, sparry calcite cement occluding fractures, burrows, and large shelter cavities; minor dolomite (8% by weight, total dolomite/Fe-dolomite) occurring as replacement of unstable grains/allochems and as replacement of matrix along dark-colored layers; minor pyrite (1% by weight) occurring as replacement of organic material and other unstable particles; and trace bituminous organic material occurs concentrated within the matrix along dark dolomitic layers

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

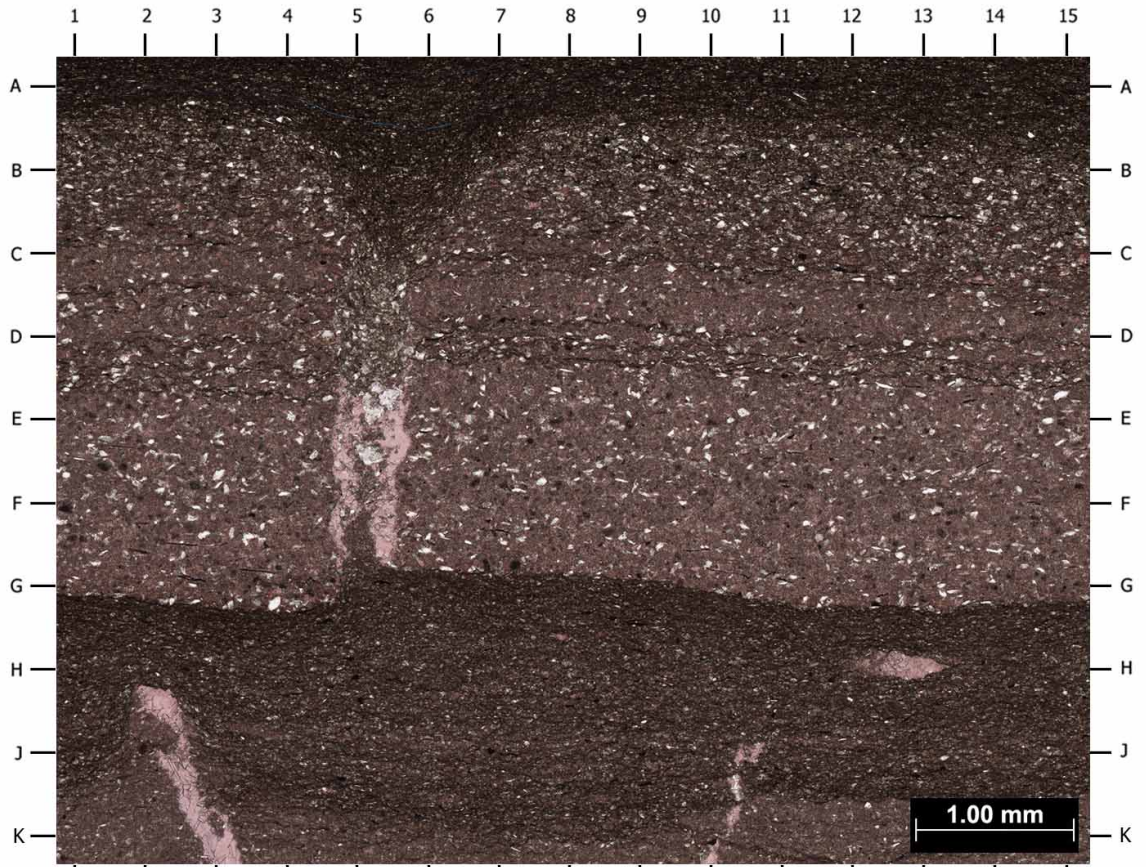
B) This image was taken near the bottom-right of center in macro Photo A. This view illustrates laminated, silty/sandy, peloidal partially recrystallized packstone to grainstone (BG1-15) sandwiched between layers of slightly carbonaceous, argillaceous dolostone (A1-AB15, GJ1-GK15). Probable vertical escape burrows, crossing between adjacent layers, are partially cemented by sparry calcite (CF5, HJ2-K3, K10-J10.5).

C) This photomicrograph provides a high magnification view of the area centered near DE5.5 in Photo B. The lower portion of the vertical burrow contains sparry calcite (stained red; GK3.5, GK6.2) and dolomite (JK5, GH5.5, G6.2) cement, while the upper portion of the burrow is filled with dolomicrite matrix material from the dolomitic layer above. The limestone pictured here represents the dominant lithology in this sample. Vague micritic peloids (EF11, J14, HJ11.5, JK9.5) and coarse silt to very fine sand grains of potassium feldspar (JK2, G3, GH12) and quartz (FG11.5, D12.4) occur within an interstitial matrix of micrite partially recrystallized to microspar. Thin, organic-rich microstylolites occur at DE8-15 and A9-14.

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

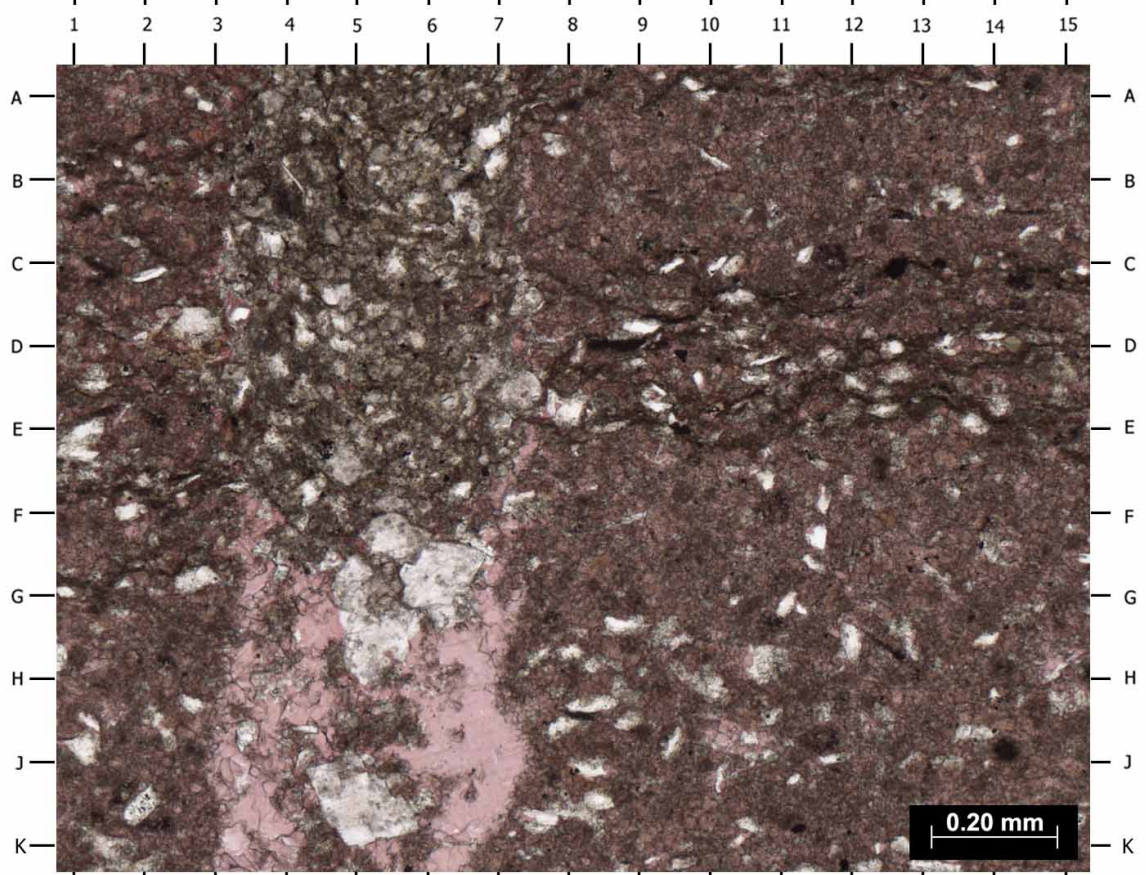
14403.00'
Plate 31

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14409.00 FEET
SAMPLE NUMBER: 32 CK-McCoy

PLATE 32

T.O.C.: 0.11% (weight percent)

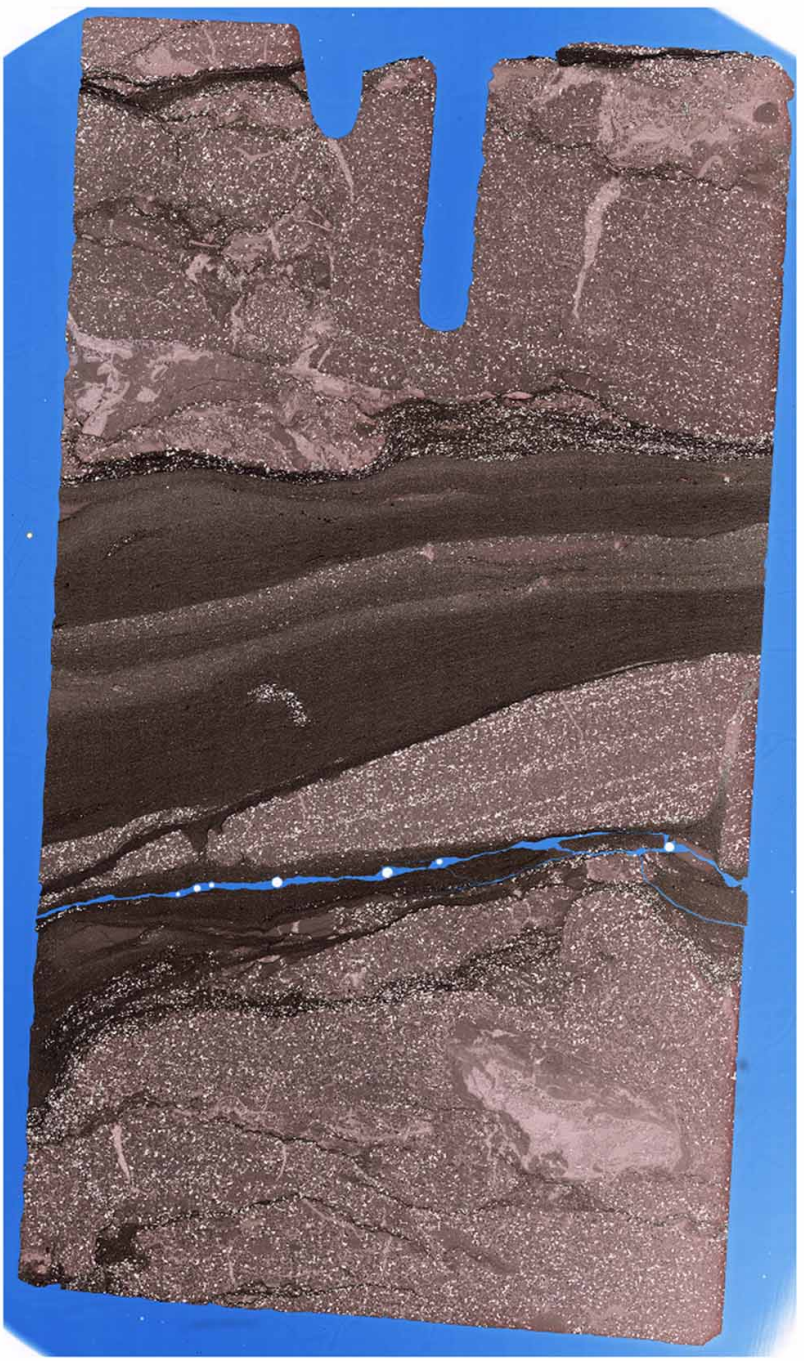
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14409.00'
Plate 32

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14409.00 FEET
SAMPLE NUMBER: 32 CK-McCoy

PLATE 32

T.O.C.: 0.11% (weight percent)

Lithology: Silty/sandy, peloidal limestone (dominant); slightly carbonaceous, argillaceous dolostone (minor)

Texture: Laminated to bioturbated/burrowed, silty/sandy, peloidal, partially recrystallized packstone to grainstone thinly interbedded with irregular, dark-colored bands of slightly carbonaceous, argillaceous dolostone; localized/discontinuous, calcite-cemented fractures and calcite-cemented burrows; organic-rich microstylolites (often contain concentrations of silt/sand with dolomitization of matrix)

Detrital Grains/Allochems: Abundant micritic peloids; common to abundant coarse silt to upper very fine sand grains of potassium feldspar (25%, by weight) with minor monocrystalline quartz (3% by weight) and rare plagioclase feldspar (trace by weight); minor muscovite > biotite mica; minor limestone intraclasts; rare altered organic plant/algal fragments; trace echinoderm fragments; trace trilobite carapace fragments; and trace phosphatic fragments

Matrix: Common partially recrystallized micrite (limestone layers); minor detrital clay (3% by weight, total clay), bituminous organic material, dolomicrite, and very finely crystalline dolomite comprise the matrix within the dark-colored dolostone layers

Cements and Replacement Minerals: Very abundant amounts of calcite (63% by weight, total calcite) occurring as recrystallization of micrite to microspar, recrystallization/replacement of unstable grains/allochems, microspar to sparry calcite interparticle cement, sparry calcite cement occluding fractures and burrows; minor dolomite (5% by weight, total dolomite/Fe-dolomite) occurring as replacement of unstable grains/allochems and as replacement of matrix along dark-colored bands/laminations/microstylolites; minor pyrite (1% by weight) occurring as replacement of organic material and other unstable particles; and rare bituminous organic material occurs concentrated within the matrix along dark dolomitic bands, laminations, and microstylolites

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

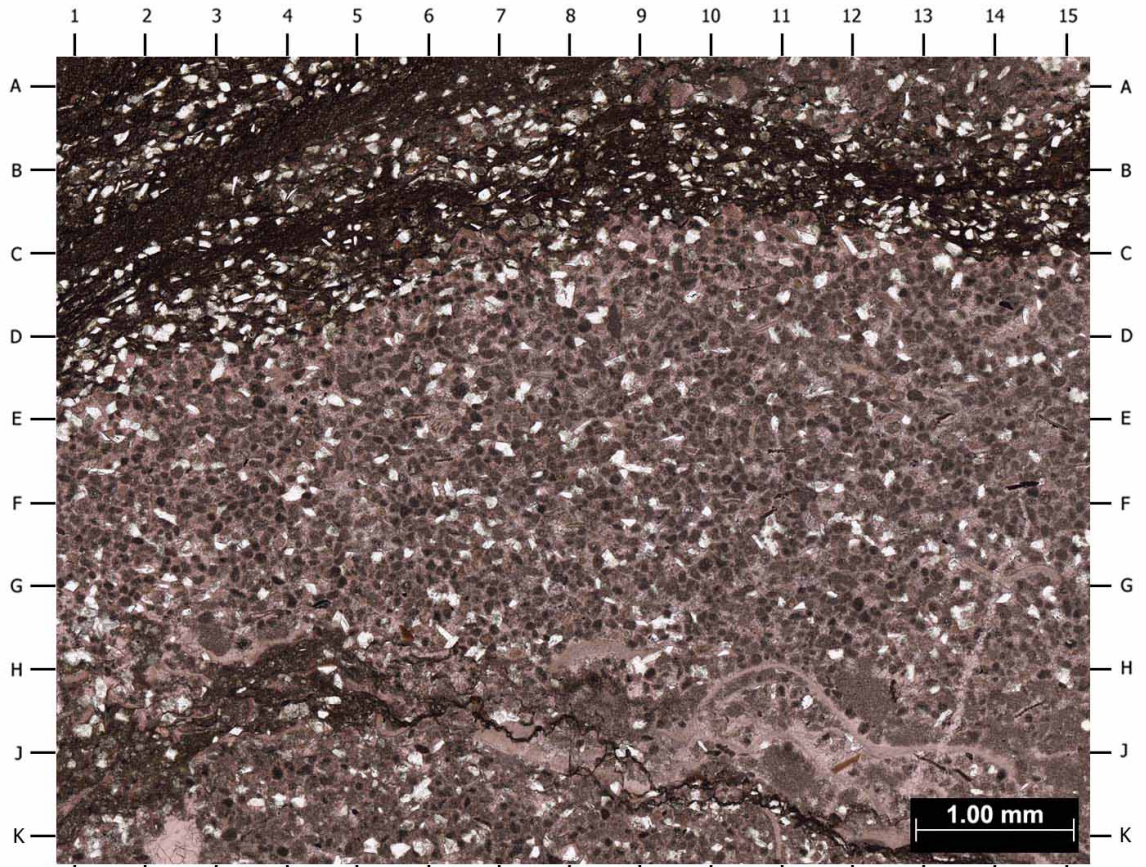
B) This image was taken within the bottom-left quadrant of macro Photo A. A portion of the dark-colored band of slightly carbonaceous, argillaceous dolostone is visible at AD1-BC15 and a microstylolite occurs at JK1-K12.5. Silty/sandy, peloidal limestone represents the dominant lithology (EJ1-CK15).

C) This photomicrograph provides a high magnification view of the area centered near G13 in Photo B. The limestone pictured within this zone consists of abundant micritic peloids (BC14.4, B3.3, B6.6, EF3.5, G8.2), common potassium feldspar grains (white; FG10, G14.6, B1.7, AB5.6), organic fragments (AB13, DE8.5), and a trilobite fragment (EF10-F15) with abundant microspar to sparry calcite cement (stained red; BC1.7, AB6.5, C10) occluding the interparticle spaces. A calcite-cemented microfracture occurs from K10 to BC13.

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

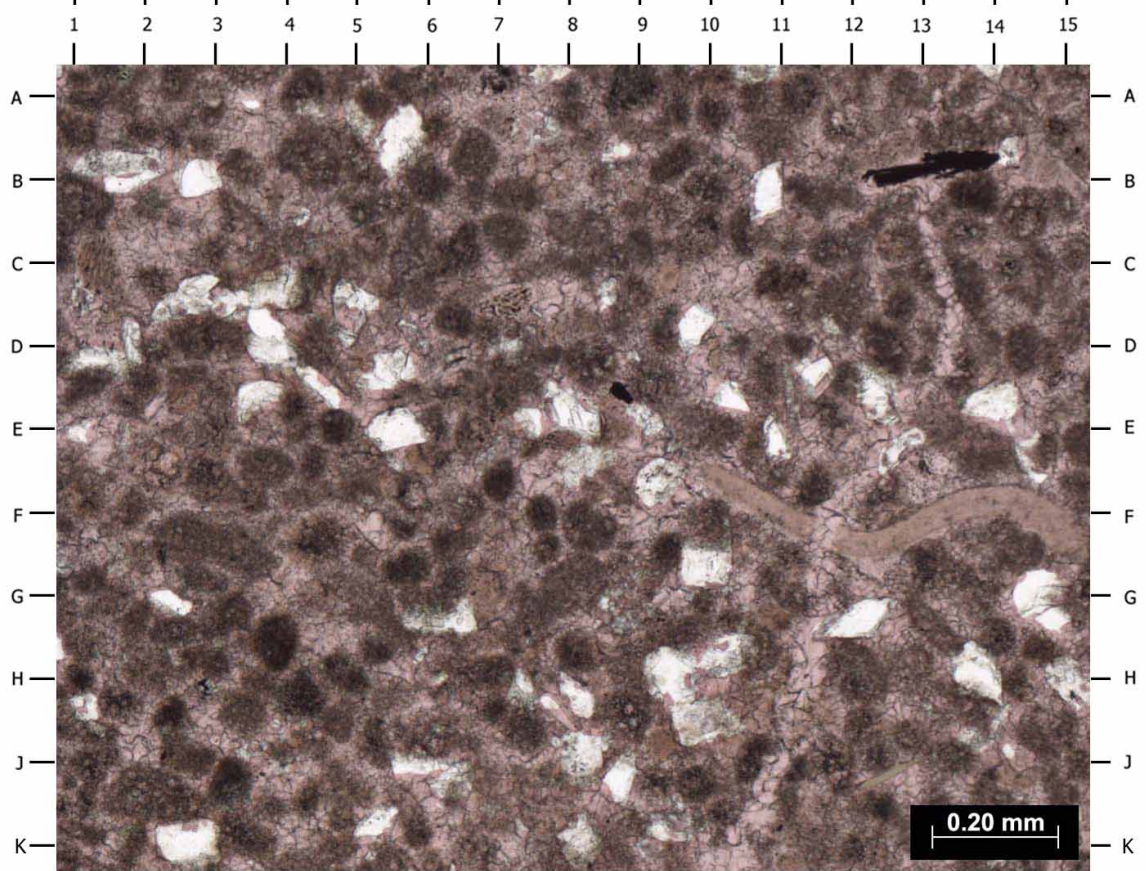
14409.00'
Plate 32

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14411.00 FEET
SAMPLE NUMBER: 33 CK-McCoy

PLATE 33

T.O.C.: 0.01% (weight percent)

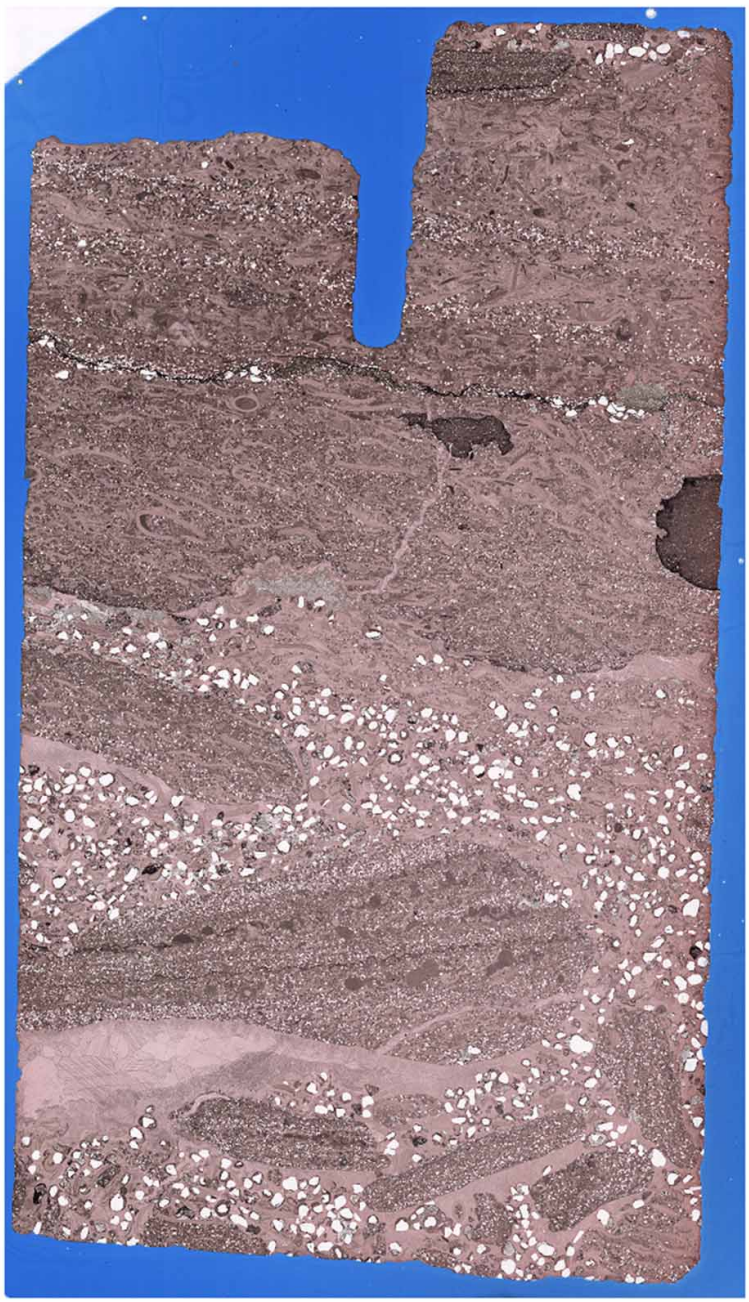
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14411.00'
Plate 33

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14411.00 FEET
SAMPLE NUMBER: 33 CK-McCoy

PLATE 33

T.O.C.: 0.01% (weight percent)

Lithology: Silty/sandy, peloidal, fossiliferous limestone

Texture: Slightly laminated to massive/chaotic, silty/sandy, peloidal, fossiliferous grainstone with layers of partially recrystallized packstone; several over-sized, limestone intraclasts (with minor calcite-cemented shelter cavities underneath); rare organic-rich microstylolites (with minor concentrations of silt/sand and associated dolomitization of matrix); trace calcite-cemented microfractures and intraparticle cemented microfractures within intraclasts

Detrital Grains/Allochems: Abundant micritic peloids; common trilobite carapace fragments; over-sized limestone intraclasts (comprise approximately 15-20%, visual estimate, of overall sample volume); common coarse silt to medium sand grains of potassium feldspar (16% by weight) with minor monocrystalline quartz (8% by weight) and rare plagioclase feldspar (trace by weight); minor to common echinoderm fragments; minor micrite-coated medium sand grains (surficial ooids); rare phosphatic fossil fragments;

Matrix: Minor to common partially recrystallized micrite occurring within packstone layers and rare micrite filling intraskeletal cavities within trilobite fragments and coating grains; rare clay (1% by weight, total clay) is detected by XRD, but not directly observed in thin section, and is likely associated with microstylolites

Cements and Replacement Minerals: Very abundant amounts of calcite (71% by weight, total calcite) occurring as interparticle sparry calcite cement (grainstone portion), partial recrystallization of micrite in matrix (packstone portion), recrystallization/replacement of unstable grains/allochems, coarsely crystalline sparry calcite occluding shelter cavities beneath over-sized intraclasts, calcite cementation of trace microfractures and intraparticle microfractures; minor dolomite (4% by weight, total dolomite/Fe-dolomite) occurring as replacement of unstable grains/allochems and replacement of the matrix along microstylolites; rare pyrite (trace by weight) occurring as replacement of organic material and other unstable grains/allochems; and trace bituminous organic material occurs concentrated along microstylolites

Pore System: No visible pores using standard petrographic techniques

Magnification: B: 50X C: 200X

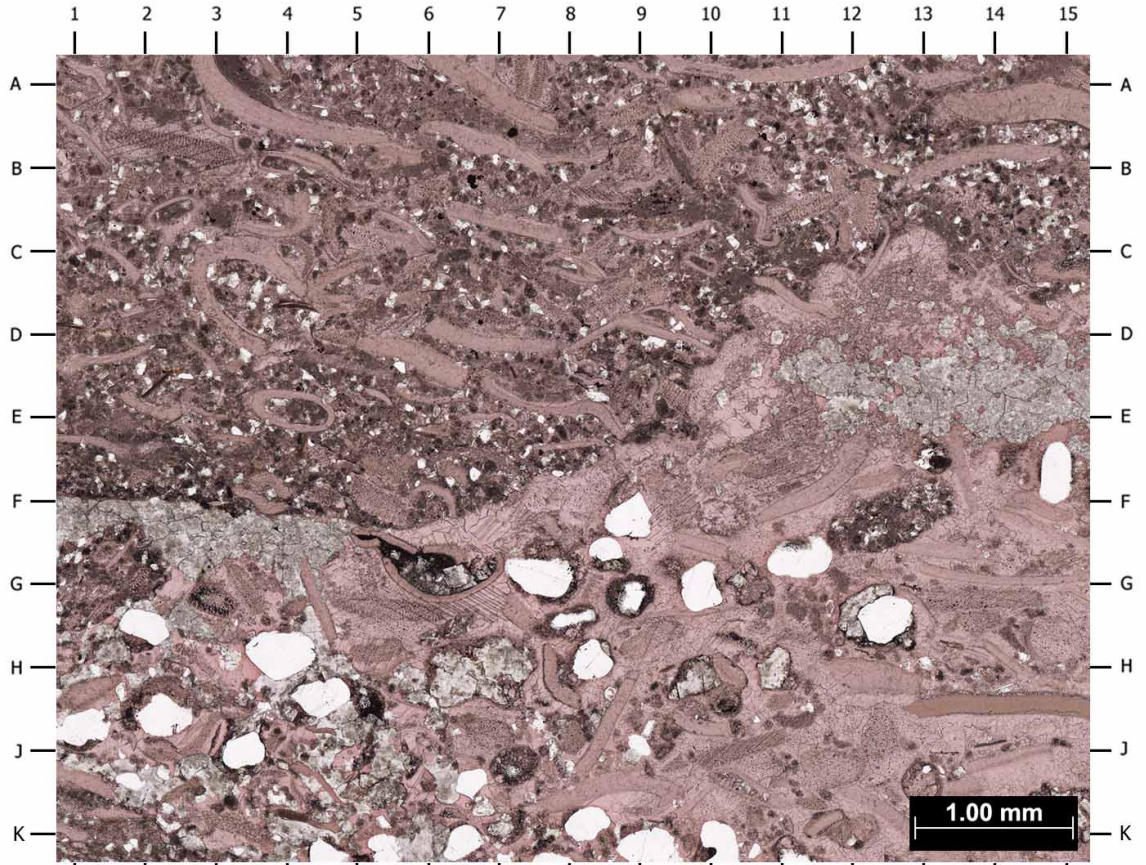
B) This image was taken top-left of center in macro Photo A. An irregular, stylolitic contact (F1 to CD15) separates silty/sandy, peloidal, fossiliferous packstone (AF1 to AC15) from sandy, peloidal, fossiliferous grainstone (FK1 to DK15) textures. Limestone intraclasts occur at G1-2, F12.5, and K1.5; larger over-sized intraclasts are visible in the lower half of Photo A. Other visible grains/allochems include trilobite fragments (AB3-5, AB14.5, DE5.5, HJ13-15), echinoderm fragments (J11.7, GH9, H5.3), coarse silt (AB11.3, CD3.5) to medium sand grains (EF14.8, FG11.56, H4) of quartz/feldspar, and micrite-coated grains (surficial ooids; G9, GH8).

C) This photomicrograph provides a high magnification view of the area centered near FG6 in Photo B and focuses on the stylolitic contact between the two limestone textures (packstone: AE1-AD15 / grainstone: FK1-EK15). Interstitial partially recrystallized micrite and sparry calcite cement occludes the interparticle spaces with each zone, respectively. Dolomite replacement occurs at FG1-5 and HJ9-12.

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

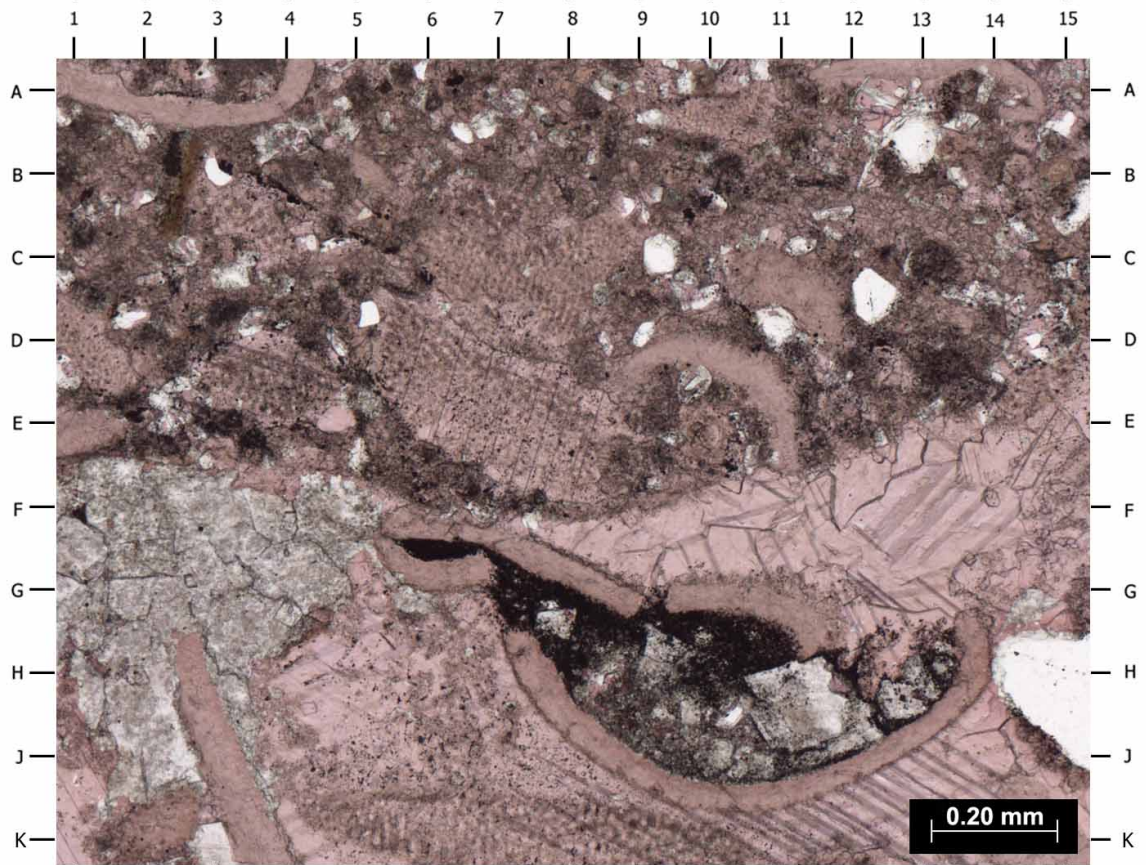
14411.00'
Plate 33

Weatherford LABORATORIES



B

50X



C

200X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 14415.50 FEET
SAMPLE NUMBER: 34 CK-McCoy

PLATE 34

T.O.C.: 0.12% (weight percent)

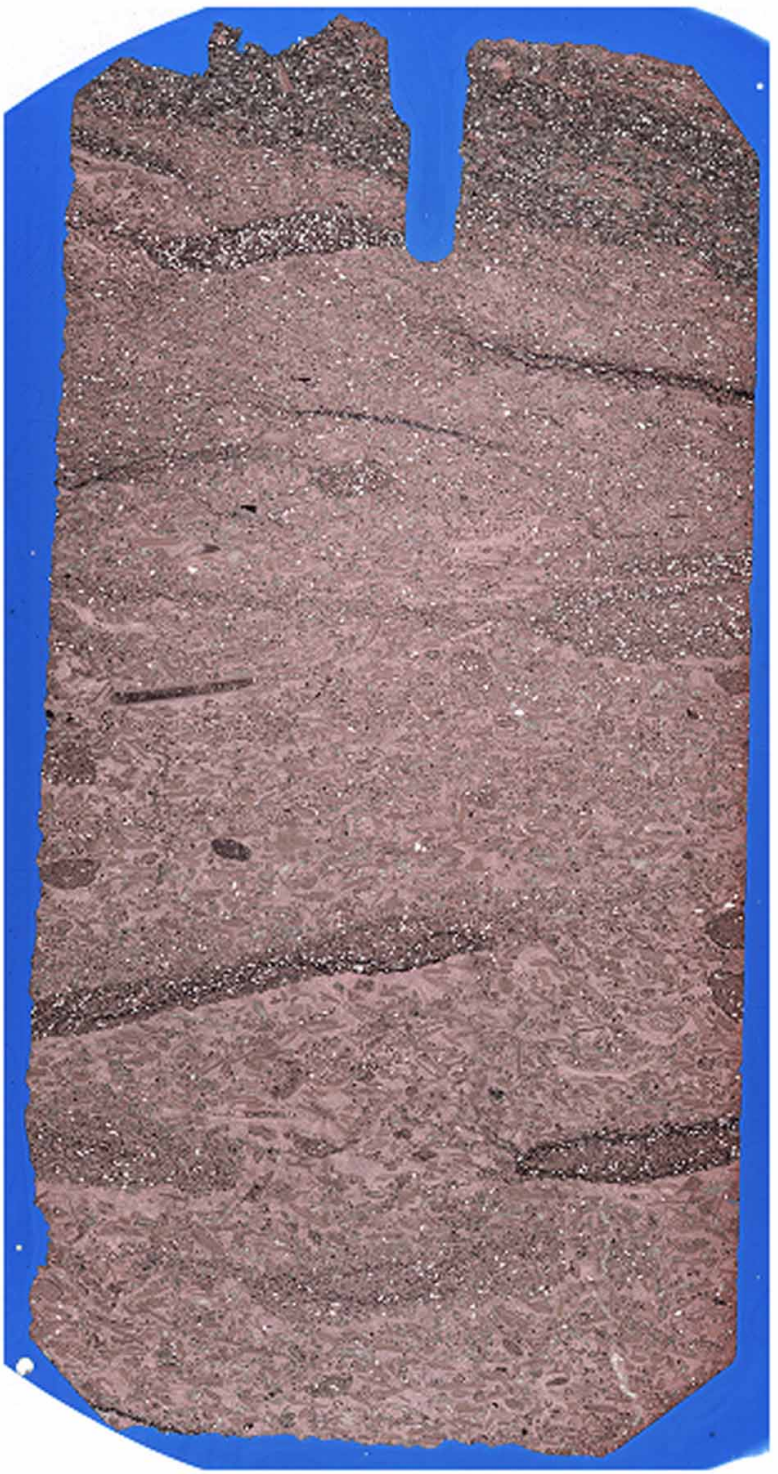
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

14415.50'
Plate 34

Weatherford LABORATORIES



A

1X

Cambrian No. 1 Project **Weatherford File No.: HH-77641**
McCoy
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 14415.50 FEET
SAMPLE NUMBER: 34 CK-McCoy

PLATE 34

T.O.C.: 0.12% (weight percent)

Lithology: Slightly silty/sandy, dolomitic, fossiliferous limestone

Texture: Laminated to slightly burrowed, peloidal, echinoderm-rich grainstone with dolomitization along a thick band and minor stylolitic laminations; organic-rich microstylolites; minor irregular patches of silty/sandy peloidal grainstone to packstone may represent over-sized intraclasts and/or possible burrow structures; and trace dolomite/calcite-cemented microfracture in bottom right corner of the thin section

Detrital Grains/Allochems: Common to abundant micritic peloids (and dolomitized peloids); common to abundant echinoderm fragments; minor to common coarse silt to upper very fine sand grains of potassium feldspar (9% by weight) with minor monocrystalline quartz (2% by weight, total quartz) and rare plagioclase feldspar (trace by weight); minor limestone intraclasts; trace ooids and dolomitized ooids; and trace altered organic plant/algal fragments

Matrix: Minor patches partially recrystallized micrite; trace clay is detected by XRD and is likely associated with microstylolites

Cements and Replacement Minerals: Very abundant calcite (53% by weight) occurring predominantly as interparticle sparry calcite cement (common syntaxial overgrowths around echinoderm fragments) and in lesser amounts as replacement/recrystallization of grains/allochems, minor recrystallization of micrite, and trace fracture cement; abundant dolomite (35% by weight, total dolomite/Fe-dolomite) occurring as matrix replacement along minor laminations (near top of section), replacement of grains/allochems throughout, dolomitization along microstylolites, and trace dolomite fracture cement; trace bituminous organic material concentrated along microstylolites

Pore System: A trace secondary moldic pore was observed; no other visible porosity using standard petrographic techniques

Magnification: B: 50X C: 200X

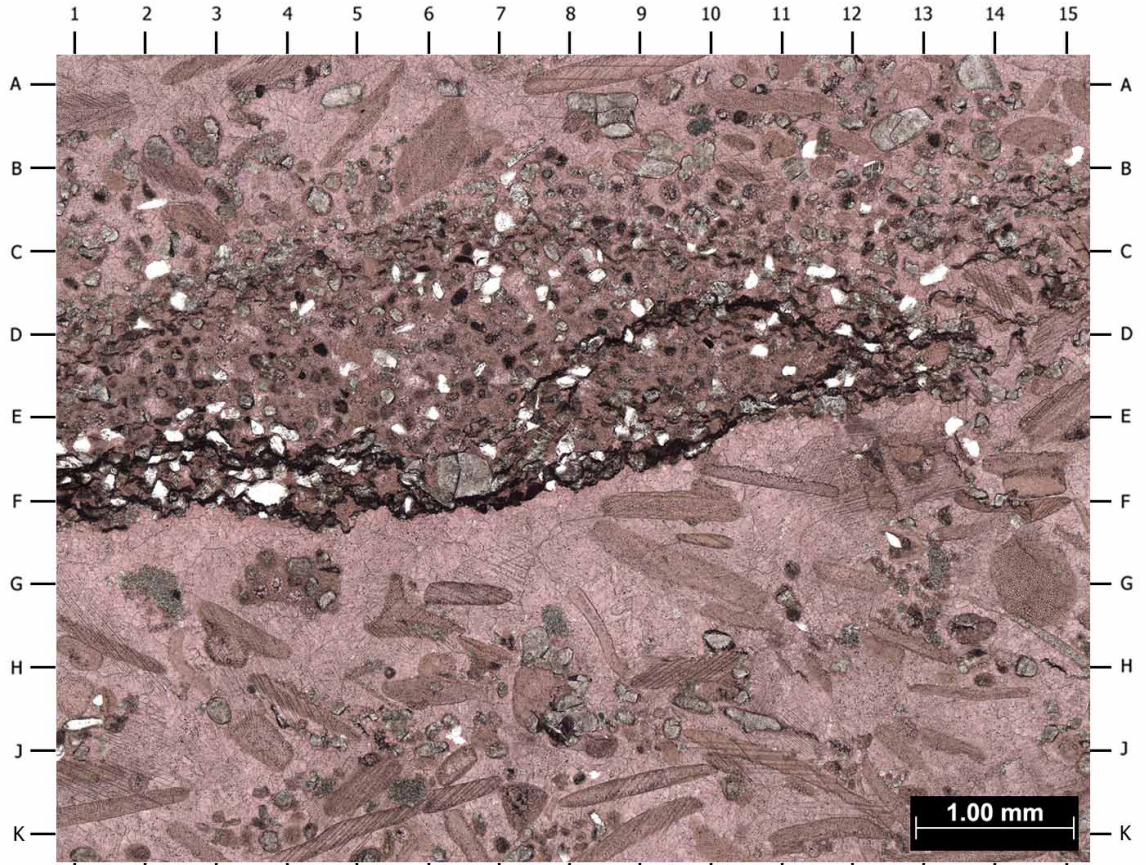
B) This image was taken approximately 0.5cm below the center of the thin section. This limestone contains common to abundant echinoderm fragments (AB1.3, JK1-2, G14.5, EF14.5, JK9). Echinoderm fragments exhibit unit crystal extinction under cross-polarized light and are often associated with syntaxial overgrowth sparry calcite cement around their perimeters. An organic-rich microstylolite occurs at EF1 to DE13 in association with a localized concentration of micritic peloids (DE2.5, CD8.5) as well as very fine sand grains of feldspar/quartz (white; BC2, BC7, CD13).

C) This photomicrograph provides a high magnification view of the area centered near E14.5 in Photo B. Sparry calcite cement occludes the interparticle spaces between echinoderm fragments (HJ8, JK4-10, F7.5-C14, B9, C2.2), quartz/feldspar grains (B1.2, FG3, GH4.5), and dolomite-replaced grains/allochems (BC4, B11, B14.3, AB11.8, F5). A microstylolite occurs from CE1 to B15.

Cabot Oil & Gas Corporation
Cambrian No. 1
McCoy Well
Wayne County, West Virginia

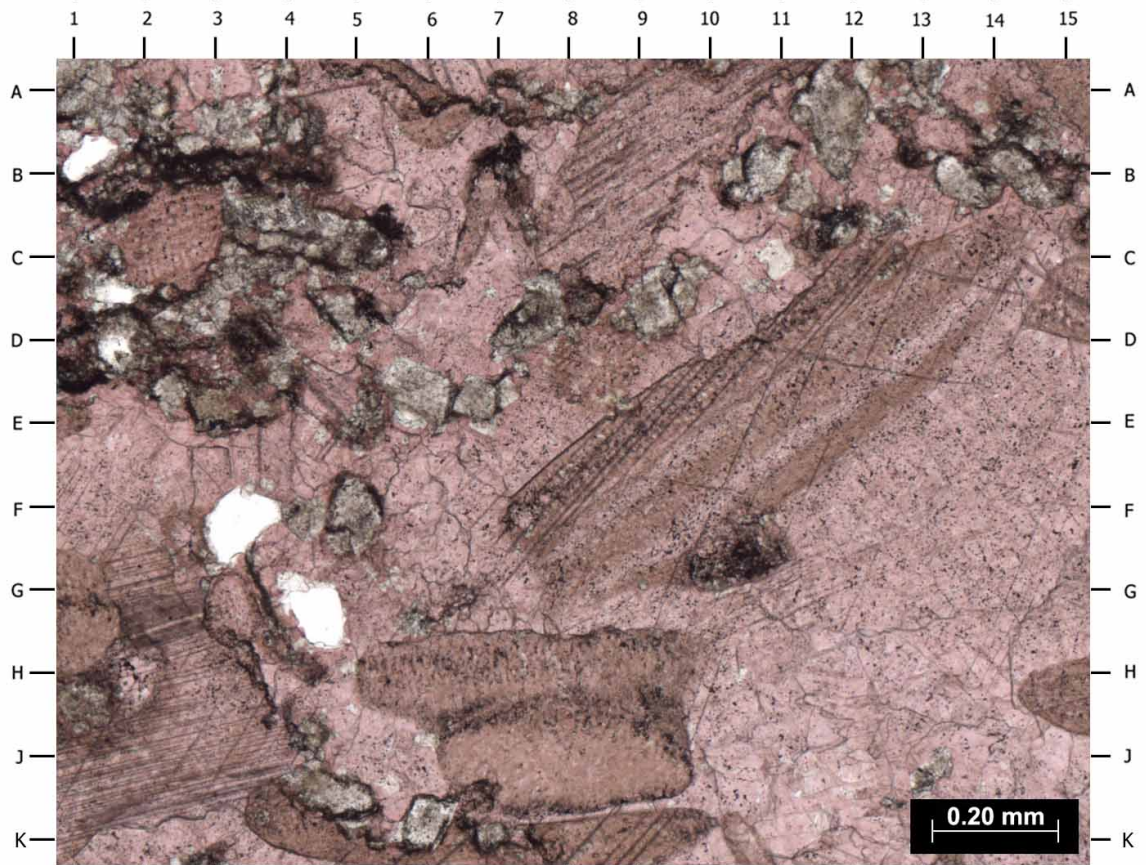
14415.50'
Plate 34

Weatherford LABORATORIES



B

50X



C

200X