Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 15234.00 FEET
SAMPLE NUMBER: 35 CK-Gainer Lee

PLATE 44A

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

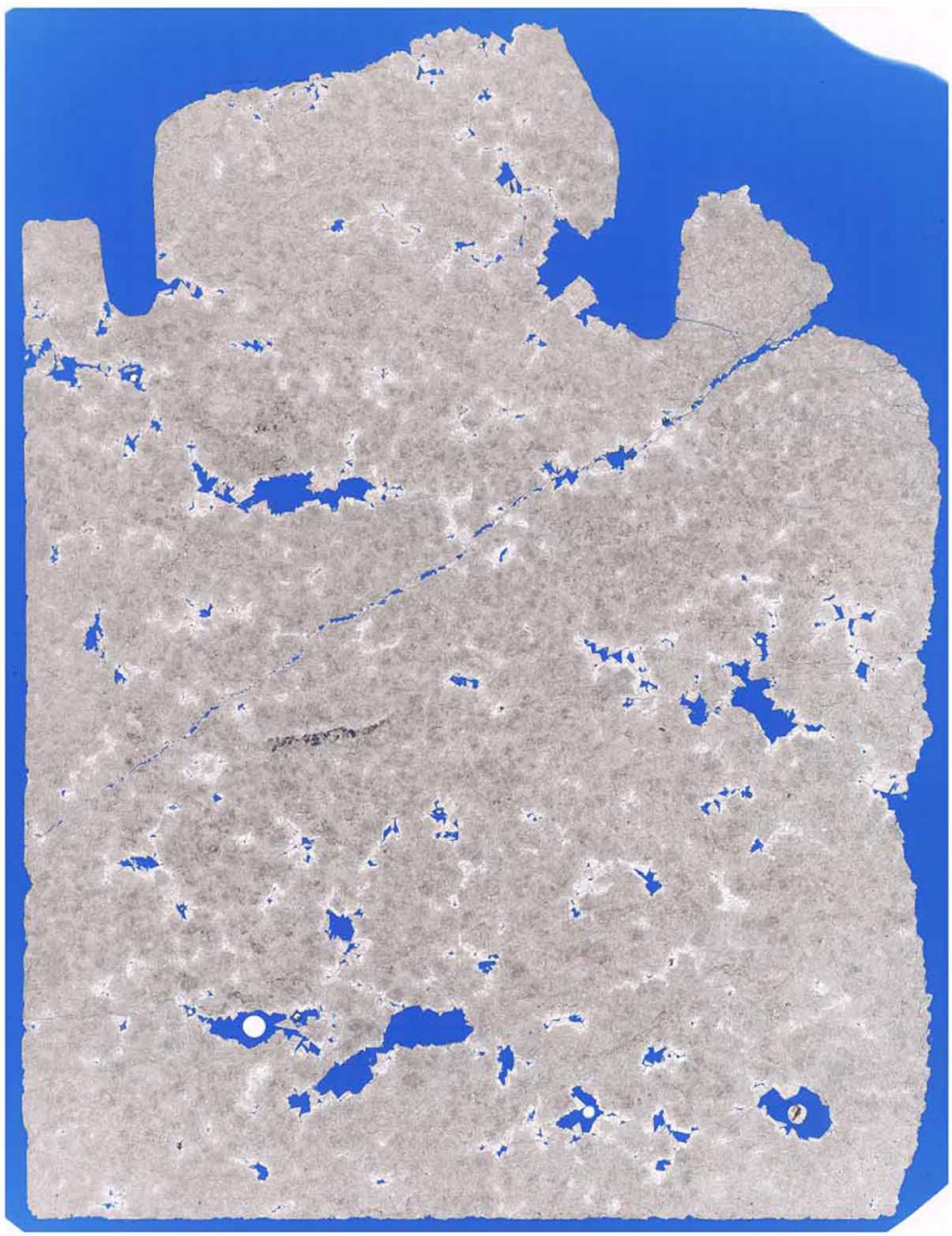
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

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

15234.00'
Plate 44

Weatherford LABORATORIES



A

1X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 15234.00 FEET
SAMPLE NUMBER: 35 CK-Gainer Lee

PLATE 44

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

Lithology: Dolostone

Texture: Massive, coarsely crystalline, mostly anhedral dolomite with minor euhedral dolomite occurring along the edges of large vugs; partially cemented, open, natural fractures

Detrital Grains/Allochems: Trace dolomitic peloids; rare quartz (1% by weight) along with trace amounts of feldspar were detected in XRD, but not observed in thin section

Matrix: No detrital matrix preserved; crystalline dolomite; rare clay detected by XRD, but not observed in thin section (XRD clay distribution by weight: 1% illite/mica and traces of mixed-layer illite/smectite, kaolinite, and chlorite)

Cements and Replacement Minerals: Very abundant amounts of dolomite (98% by weight, XRD) completely replacing pre-existing fabric; later stage euhedral dolomite restricting open vugs and overgrowths around dolomite crystals occluding intercrystalline spaces; trace calcite was detected in XRD, but was not observed in thin section

Pore System: Minor to common large open vugs; minor smaller intercrystalline pores; rare open fracture porosity

Magnification: B: 50X C: 200X

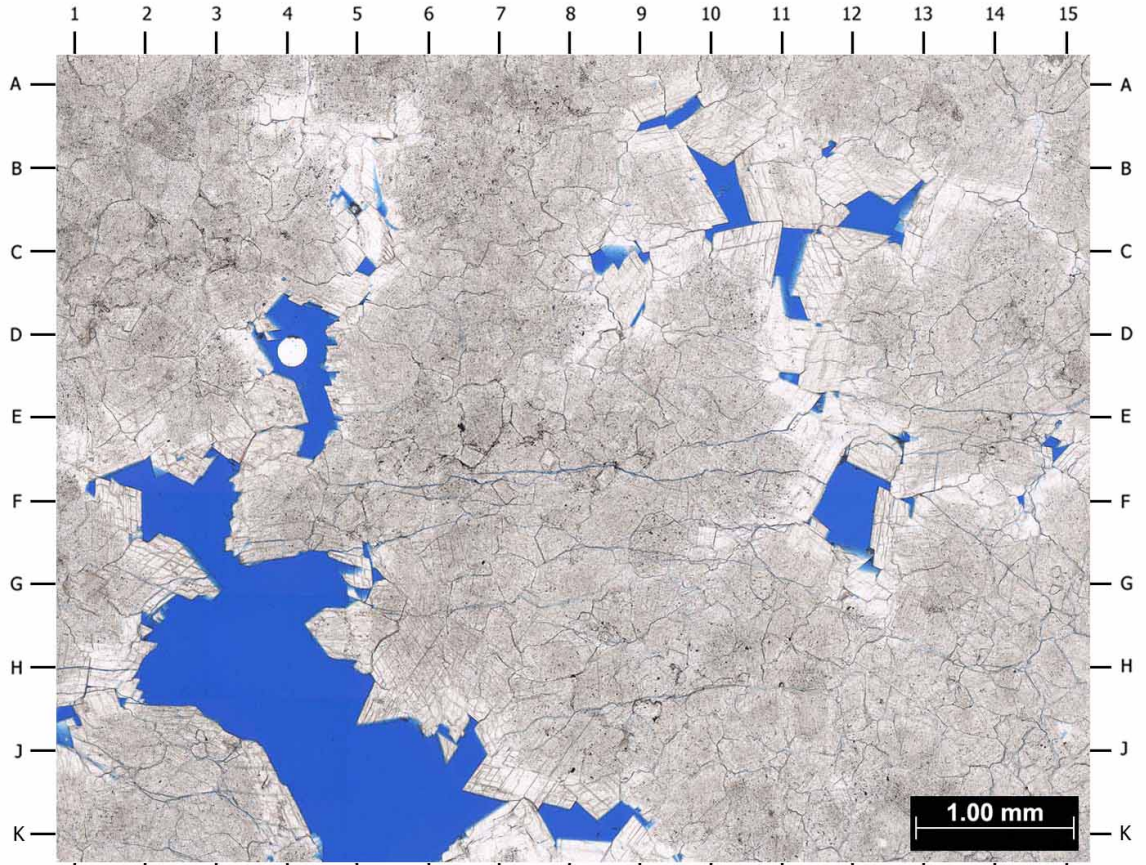
B) This massive, coarsely crystalline dolomite contains large open vugs filled with blue-dyed epoxy (F11.5, F2.5-K5.5, F12). The white circle at DE4 is an air bubble that was trapped in the epoxy before it cured and hardened.

C) This photomicrograph provides a high magnification view of the area centered near D8 in Photo B. The mostly anhedral, dirty-looking dolomite crystals represent an earlier stage of pre-existing fabric replacement. The purer white overgrowths (G9) and euhedral, vug-filling dolomite crystals (CD11.5) represent later stage dolomite precipitation. An open vug at BC10 is partially restricted by this later stage dolomite cement.

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

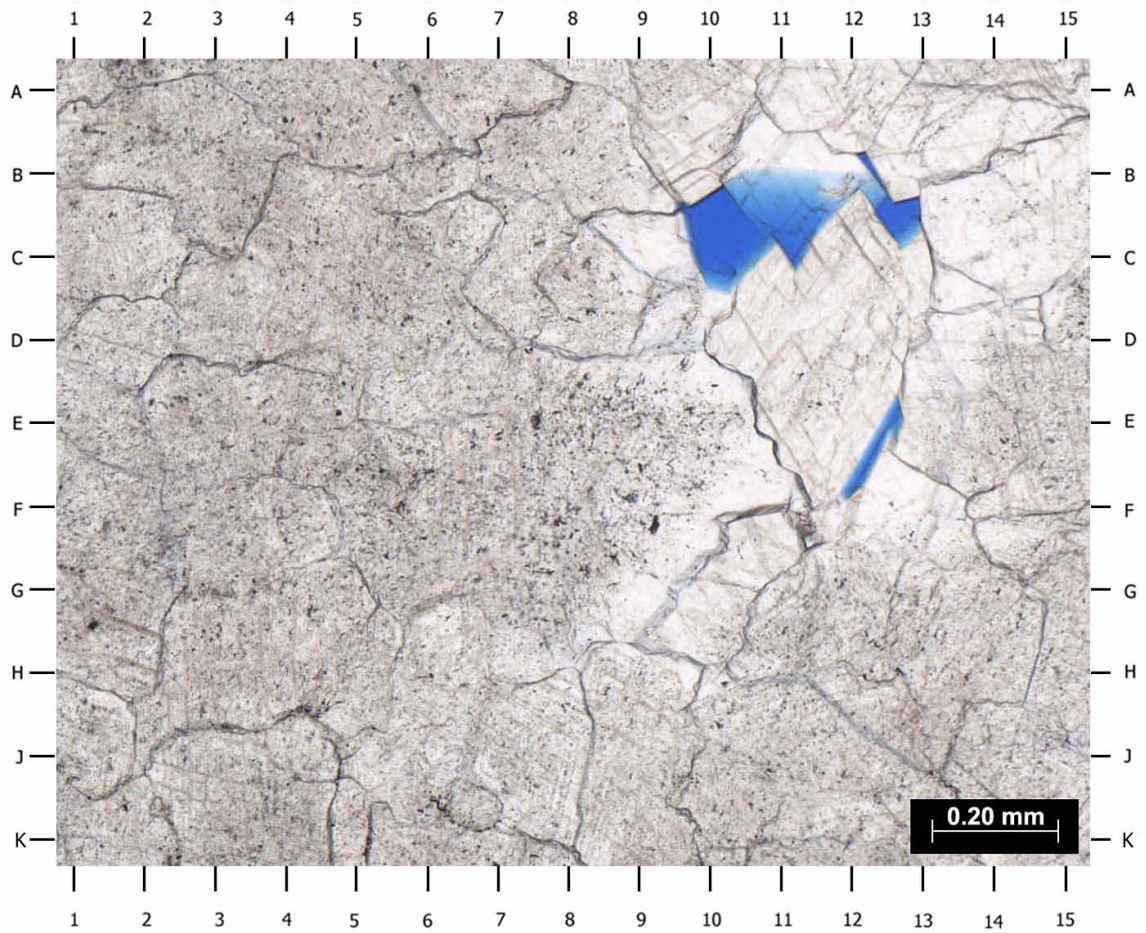
15234.00'
Plate 44

Weatherford LABORATORIES



B

50X



C

200X

Cabot Oil & Gas Corporation
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

Weatherford File No.: HH-77641

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 15235.00 FEET
SAMPLE NUMBER: 36 CK-Gainer Lee

PLATE 45A

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

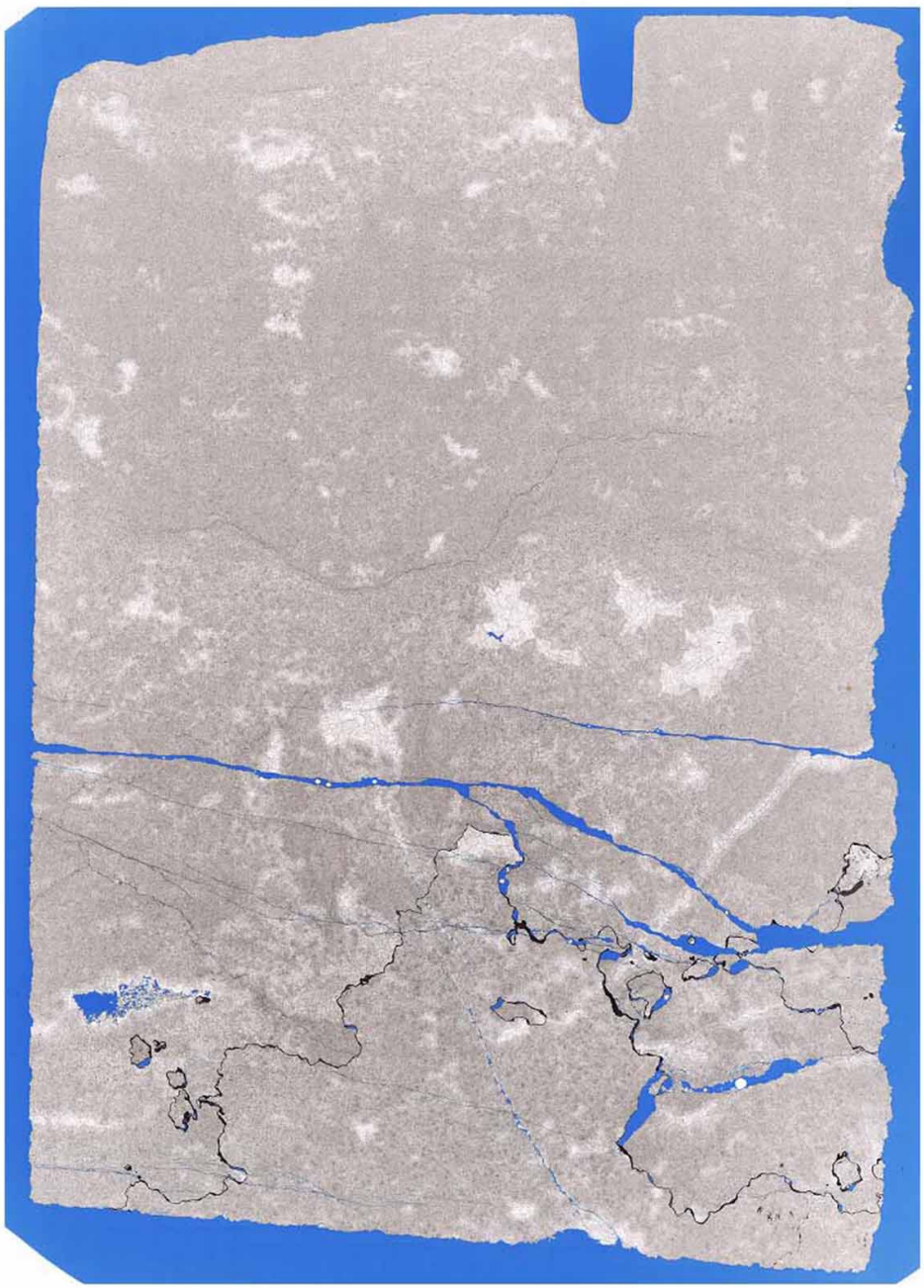
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

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

15235.00'
Plate 45

Weatherford LABORATORIES



A

1X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 15235.00 FEET
SAMPLE NUMBER: 36 CK-Gainer Lee

PLATE 45

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

Lithology: Dolostone

Texture: Massive, mostly anhedral, medium crystalline dolomite with localized patches of coarsely crystalline dolomite representing probable later stage cementation of vugs; pyritized bitumen occurring along irregular stylolites and/or fractures; natural open fractures

Detrital Grains/Allochems: Trace undifferentiated vague allochems and dolomitic peloids; trace to rare quartz and feldspar were detected by XRD, but were not observed in thin section

Matrix: No detrital matrix preserved; crystalline dolomite; only trace amounts of clay were detected by XRD

Cements and Replacement Minerals: Very abundant amounts of dolomite (97% by weight) completely replacing pre-existing fabric with later stage dolomite cement occluding vugs and fractures; minor pyrite (1% by weight) occurring as replacement of bitumen within irregular stylolites and fractures; irregular polygonal-shapes of pyritized bitumen may represent pyritized bitumen lining vugs walls with later dolomite cementation of the vug with porosity only preserved along the pyritized bitumen lining; trace calcite was detected in XRD, but not observed in thin section

Pore System: Minor open fracture porosity (mostly lower half of the section); large open vugs are present, but relatively rare; minor porosity preserved along stylolites and walls of vugs lined with pyritized bitumen; and trace intercrystalline pores

Magnification: B: 50X C: 200X

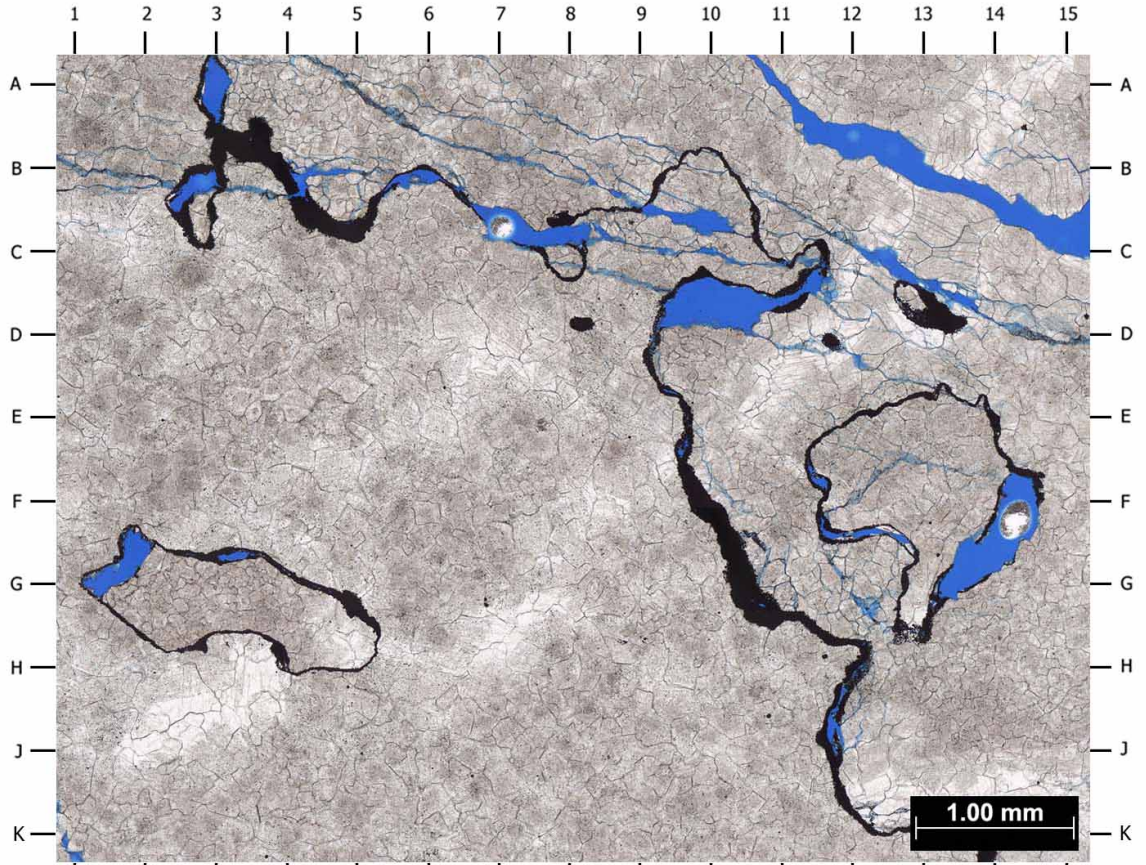
B) This photomicrograph was taken in the bottom-right quadrant of the thin section (see Photo A). This massive, medium crystalline dolostone contains open fractures (filled with blue-dyed epoxy; A10.7-C15, B1-D15) with other fractures and vugs cemented by later stage dolomite cement (A15 to E10.5, HJ2.5). Pyritized bitumen occurs along irregular stylolites and/or fractures (black; B3 to CD11.5 to JK12.5) and also lines the walls of dolomite-cemented vugs (GH1.3-5, EG11.4-14, CD13). Preserved porosity is associated within this pyritized bitumen cement (FG1.5, A3, BC2.7, BC6, CD10, J11.8, FG13.5, FG12.5). White air bubbles are trapped within the blue epoxy at FG14 and BC7.

C) This photomicrograph provides a high magnification view of the area centered near HJ11 in Photo B. Pyritized bitumen lining an irregular stylolite is visible from A5 to K11. Open fracture porosity is preserved along this stylolite at FG10 (blue epoxy). Small framboidal pyrite crystals occur at EF6 and C9.5. More pyritized bitumen occurs at AB13.5-15 lining the bottom edge of a dolomite-cemented vug. The tightly interlocking nature of the mostly anhedral dolomite crystals yields almost no visible intercrystalline porosity at this scale; therefore the only possible remaining connected pore network is expected to be associated with fracture porosity.

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

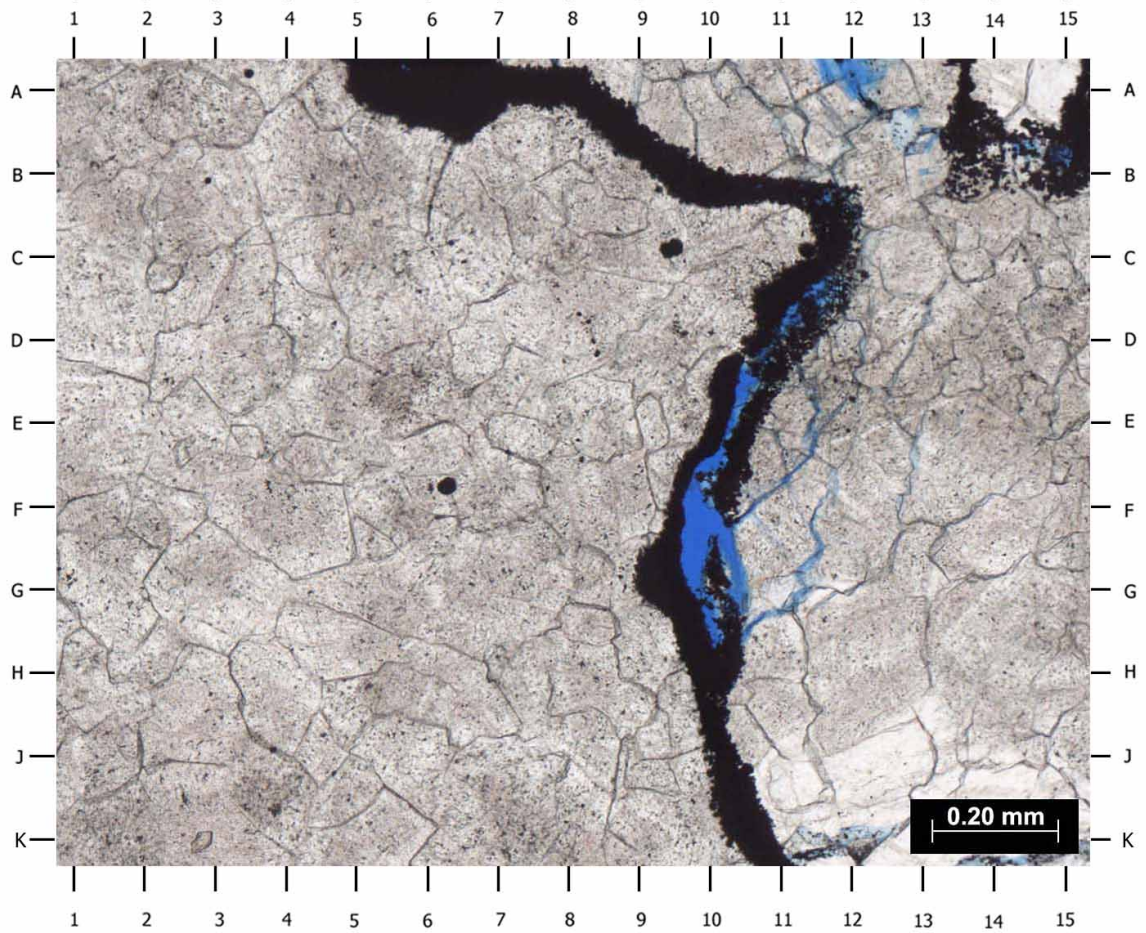
15235.00'
Plate 45

Weatherford LABORATORIES



B

50X



C

200X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 15241.00 FEET
SAMPLE NUMBER: 37 CK-Gainer Lee

PLATE 46A

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

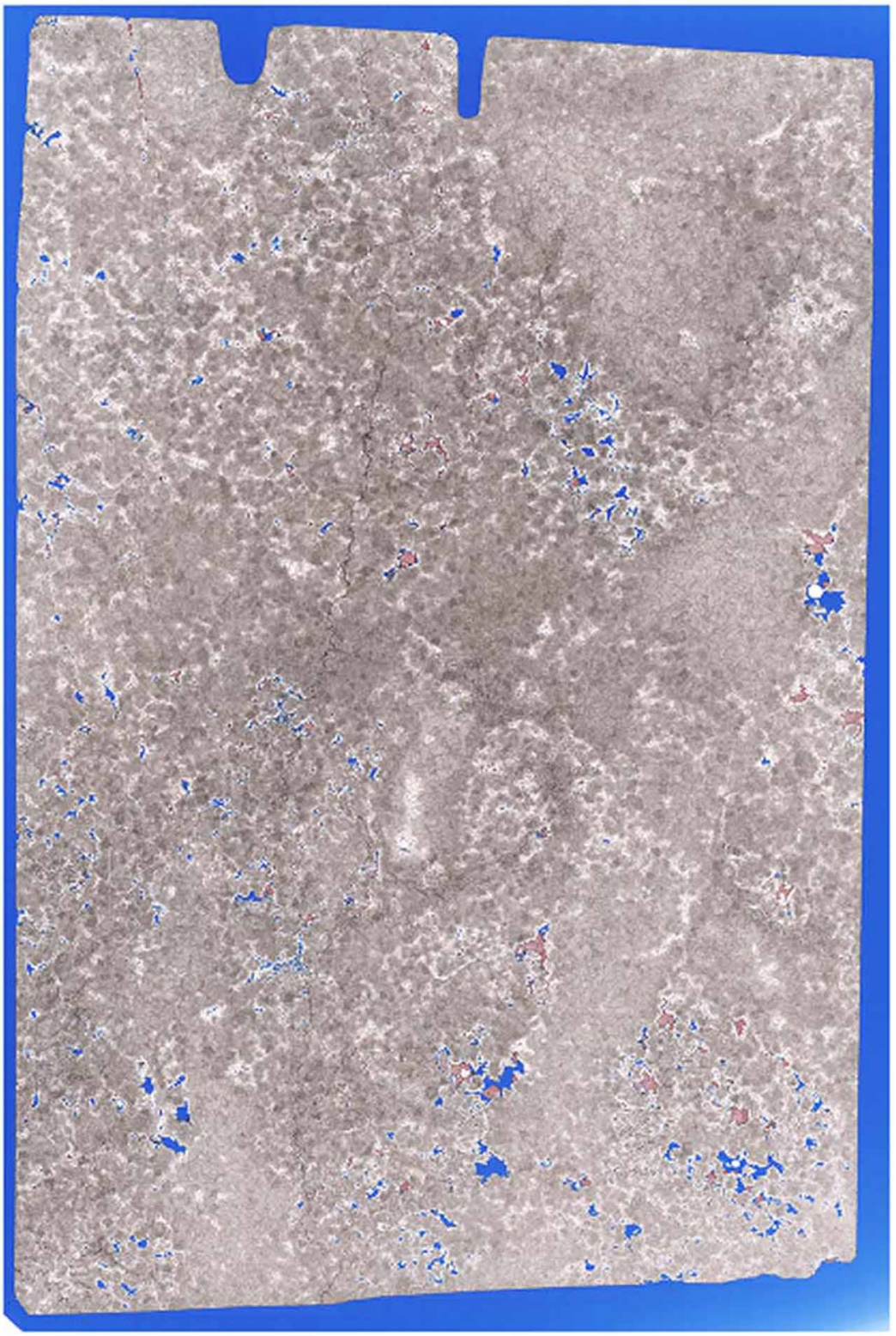
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

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

15241.00'
Plate 46

Weatherford LABORATORIES



A

1X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 15241.00 FEET
SAMPLE NUMBER: 37 CK-Gainer Lee

PLATE 46

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

Lithology: Dolostone

Texture: Completely dolomitized, peloidal grainstone to packstone; anhedral to subhedral, medium to coarsely crystalline dolomite with euhedral crystals lining vugs; trace closed microfractures; and trace microstylolites containing pyritized bitumen

Detrital Grains/Allochems: Abundant vague dolomitized peloids (remnant of original fabric); trace to rare quartz and feldspar were detected by XRD, but not observed in thin section

Matrix: No detrital matrix preserved; crystalline dolomite; only trace amounts of clay were detected by XRD

Cements and Replacement Minerals: Early stage sparry interparticle cement was followed by complete dolomitization of the pre-existing grainstone to packstone fabric (98% total dolomite, by weight); intermediate stage euhedral dolomite overgrowths further restrict vugs and interparticle pores; minor late stage sparry calcite cement (1% total calcite by weight) partially occludes remaining vugs and intercrystalline pores; and trace pyritized bitumen occurring along trace microstylolites

Pore System: Minor to common restricted vugs and intercrystalline pores

Magnification: B: 50X C: 200X

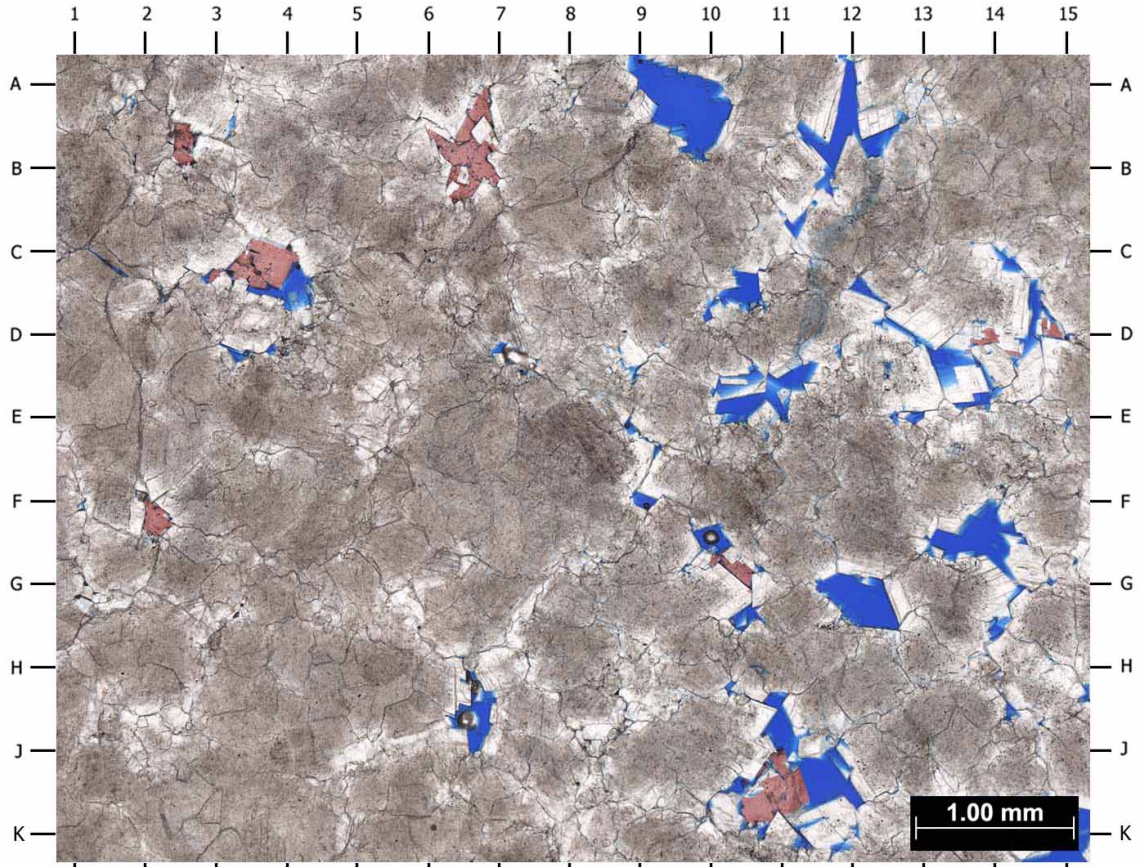
B) Vague dark, round structures occurring throughout this medium to coarsely crystalline dolostone represent dolomitized peloids (AB5, GH15, F14.8, GH13.5, FG1.7) within the original peloidal grainstone to packstone texture (best viewed in macro Photo A). Minor to common restricted vugs to intercrystalline pores are preserved throughout the section; however the distribution is patchy and many pores may be isolated (blue epoxy; AB9.5, AB12, DE10.5, FG13.5, G12, JK11.5, HJ6.7, CD4).

C) This photomicrograph provides a high magnification view of the area centered near D2.5 in Photo B and documents well the various stages of replacement and cementation that have occurred within this sample. Most of the dark, dingy dolomite represents initial dolomitization of the original fabric (GK1-5, AB1-9, A14-15, J7-15, F7.5). The whiter, cleaner-looking dolomite overgrowths represent an intermediate stage of dolomite cementation (CD6.5, BC8.5, A11.5, BC14.3, DE11-13, E14, FG10-12). The most recent stage of cementation is minor sparry calcite cement precipitating within the remaining pores (stained red; C10.5-13.3, CD9.2). A trace amount of bitumen occurs imbedded within the calcite crystal at B11.5 (black).

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

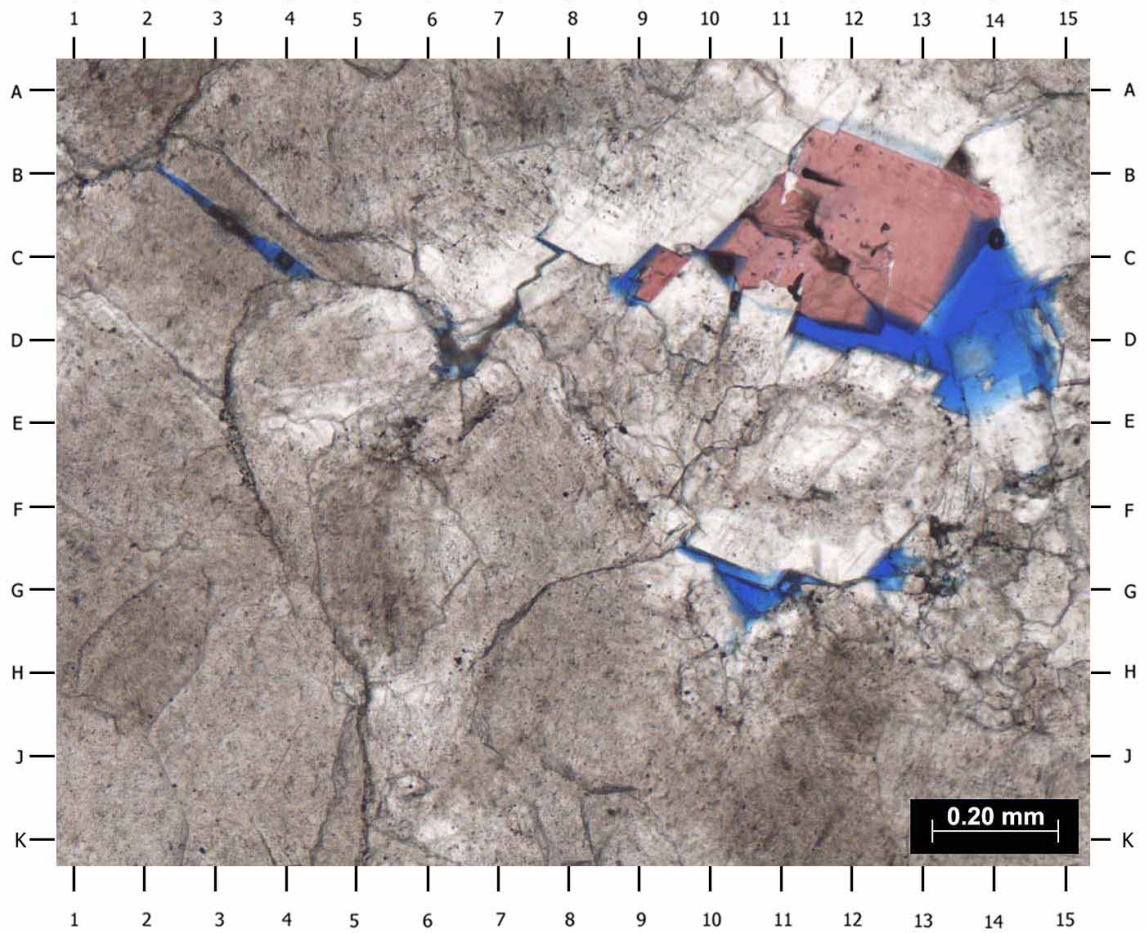
15241.00'
Plate 46

Weatherford LABORATORIES



B

50X



C

200X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 15243.00 FEET
SAMPLE NUMBER: 38 CK-Gainer Lee

PLATE 47A

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

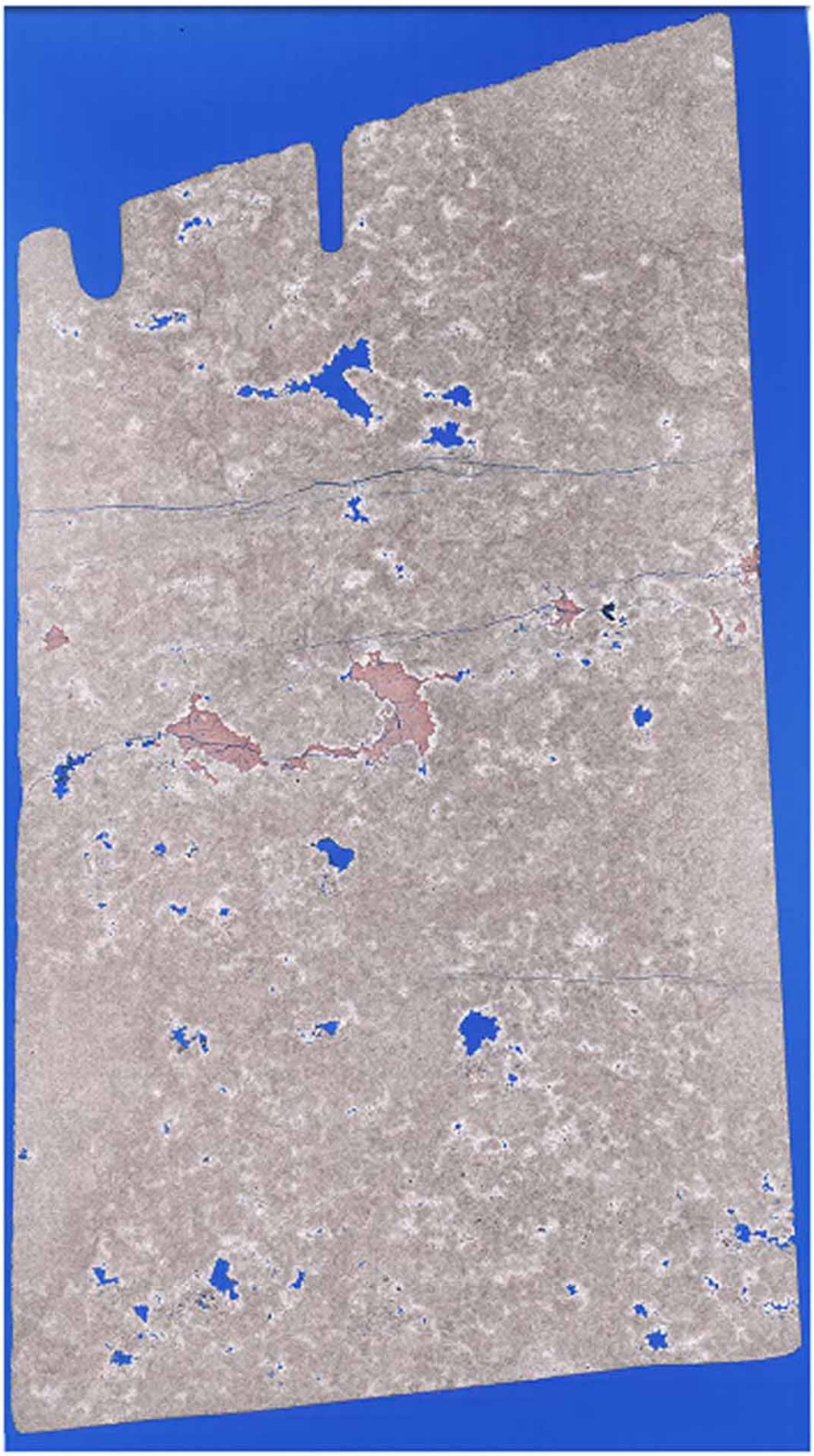
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

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

15243.00'
Plate 47

Weatherford LABORATORIES



A

1X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 15243.00 FEET
SAMPLE NUMBER: 38 CK-Gainer Lee

PLATE 47

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

Lithology: Dolostone

Texture: Completely dolomitized, peloidal grainstone to packstone; anhedral to subhedral, medium to coarsely crystalline dolomite with euhedral crystals lining walls of vugs; open horizontal microfractures may be artificially induced

Detrital Grains/Allochems: Abundant vague dolomitized peloids (remnant of original fabric); trace partially pyritized organic fragments; and trace quartz and feldspar were detected by XRD, but not observed in thin section

Matrix: No detrital matrix preserved; crystalline dolomite; only trace amounts of clay were detected by XRD

Cements and Replacement Minerals: Complete dolomitization of the pre-existing fabric (99% total dolomite, by weight); intermediate stage euhedral dolomite overgrowths further restrict vugs and interparticle pores; minor late stage sparry calcite cement (1% total calcite by weight) occludes vugs locally along a horizon across the central portion of the section; trace amounts of pyrite occurring as replacement of organic material and dolomite; trace siderite replacement of unstable particles; and trace amounts of bitumen and/or hydrocarbon residue were observed lightly coating the walls of some vugs

Pore System: Minor large open vugs; minor scattered intercrystalline pores; trace secondary intracrystalline pores; open horizontal fractures were likely artificially induced during core extraction or sample preparation

Magnification: B: 50X C: 200X

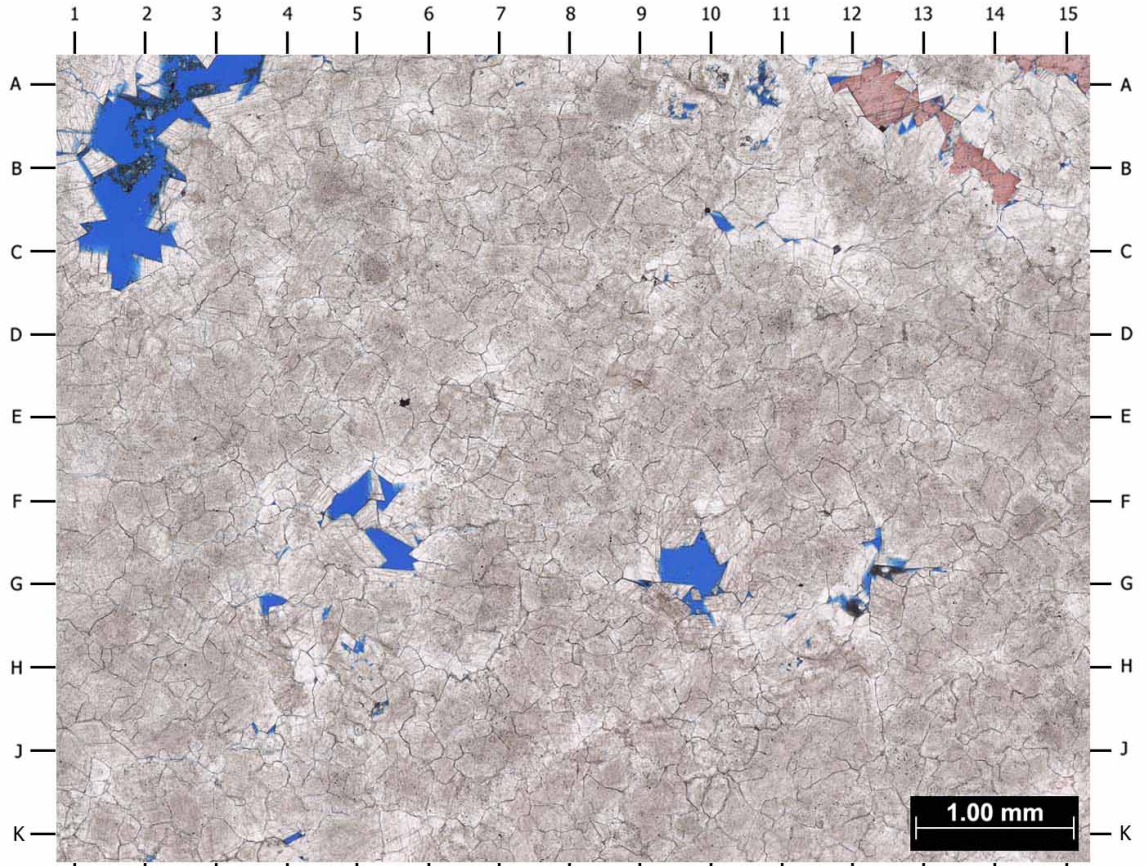
B) This medium to coarsely crystalline dolostone exhibits a dolomitized, peloidal grainstone to packstone texture. Minor large vugs (filled with blue epoxy; BC2, F5, G9.5, GH4) are restricted by euhedral dolomite overgrowths (BC2.5, AB2.4, C11) and/or occluded by late stage sparry calcite cement (stained red; AB12.4-B14, A15). Vague round peloidal structures occur throughout and are remnants of the original fabric (CD5.2, FG14.4, AB8.9).

C) This photomicrograph provides a high magnification view of the area centered near GH2.8 in Photo B. This photo documents the tightly interlocking nature of the subhedral to anhedral dolomite crystals that dominate this sample. Small intercrystalline pores are likely isolated from other nearby pores (AB13.5, DE13, K11.9).

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

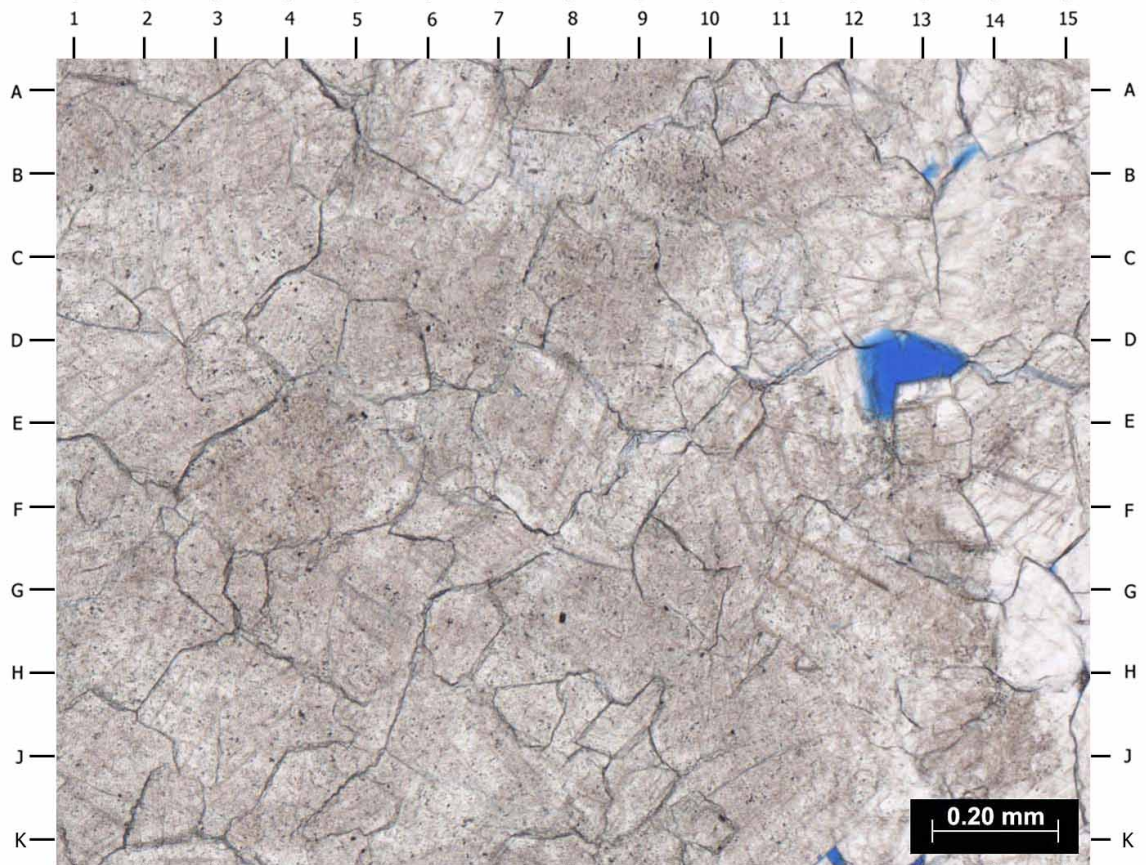
15243.00'
Plate 47

Weatherford LABORATORIES



B

50X



C

200X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 15247.00 FEET
SAMPLE NUMBER: 39 CK-Gainer Lee

PLATE 48A

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

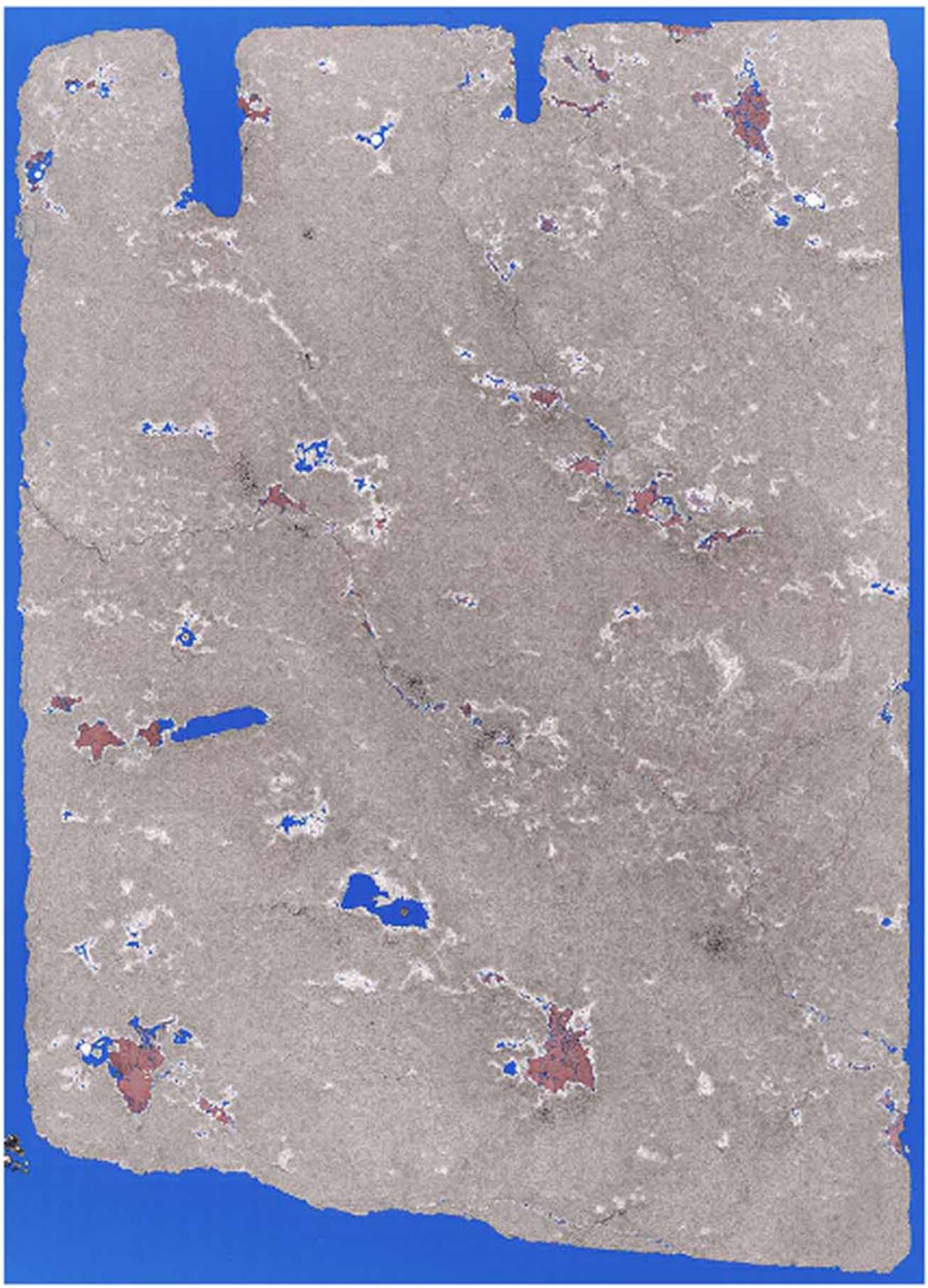
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

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

15247.00'
Plate 48

Weatherford LABORATORIES



A

1X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 15247.00 FEET
SAMPLE NUMBER: 39 CK-Gainer Lee

PLATE 48

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

Lithology: Dolostone

Texture: Medium crystalline, subhedral to anhedral dolomite; vague patches of possible dolomitized peloidal grainstone to packstone; a faint, thin microstylolite containing pyritized bitumen crosses the section at an angle from left side (above center) to near the bottom right corner, and another irregular fracture and/or incipient microstylolite occurs from top-center of section to near right side center of the section

Detrital Grains/Allochems: Common vague dolomitized peloids (remnant of original fabric); and trace to rare quartz and feldspar were detected by XRD, but not observed in thin section

Matrix: No detrital matrix preserved; crystalline dolomite; only trace amounts of clay were detected by XRD

Cements and Replacement Minerals: Complete dolomitization of the pre-existing fabric (97% total dolomite, by weight); intermediate stage euhedral dolomite overgrowths further restrict vugs and interparticle pores; minor late stage sparry calcite cement (1% total calcite by weight) partially occludes vugs and some intercrystalline spaces, trace calcite is also observed partially cementing pores developed along microstylolites and/or irregular microfractures; trace amounts of pyrite occurring as replacement of organic material and dolomite (occurring along microstylolites and as seemingly random patches of microcrystals); trace siderite replacement of unstable particles; and trace amounts of bitumen were observed imbedded between dolomite crystals, and imbedded within calcite cement

Pore System: Minor scattered open vugs; minor intracrystalline pores associated with calcite cement; rare secondary porosity development observed along microstylolites and microfractures; rare scattered intercrystalline pores (usually associated with intermediate stage euhedral dolomite restriction of vugs)

Magnification: B: 50X C: 200X

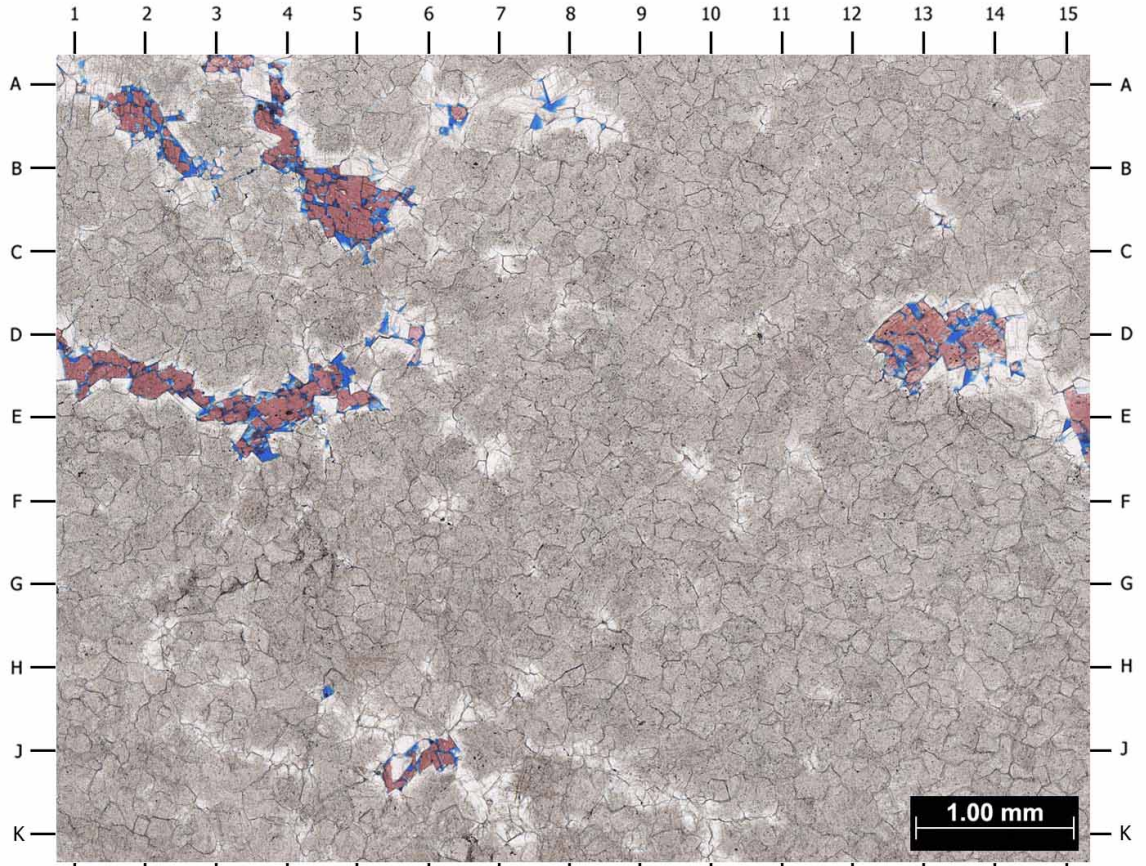
B) This medium crystalline dolostone is comprised predominantly of subhedral to anhedral, tightly interlocking dolomite crystals. Euhedral dolomite crystals are associated with dolomite overgrowths development along the edges of partially restricted vugs (blue-dyed epoxy; AB7.8, D5.4). Late stage sparry calcite cement partially occluded the remaining secondary porosity within vugs (stained red; AB2, BC5, D13, DE1-5, J6). This photo illustrates the area near the top right of the thin section, just to the right of the smaller notch in the macro Photo A.

C) This photomicrograph provides a high magnification view of the area centered near E6 in Photo B. A small partially cemented vug is visible in the top left; the presence of blue-dyed epoxy indicates open pores (C3, C1.2, E4.8, AB4.4, A5.3, AB7.4, BC6.9). The darker dirty-looking dolomite represents early stage dolomite replacement of the original fabric and is very tight with almost no intercrystalline porosity observed (DE6-15, AB9-13, GK3-7). Intermediate stage dolomite overgrowths appear white and restrict secondary vugs (DE2, D4.6, B5.5, GH11.3, JK8). More recent sparry calcite cementation is incomplete, leaving open porosity within and around the edges of the calcite crystals (stained red; CD2, DE3).

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

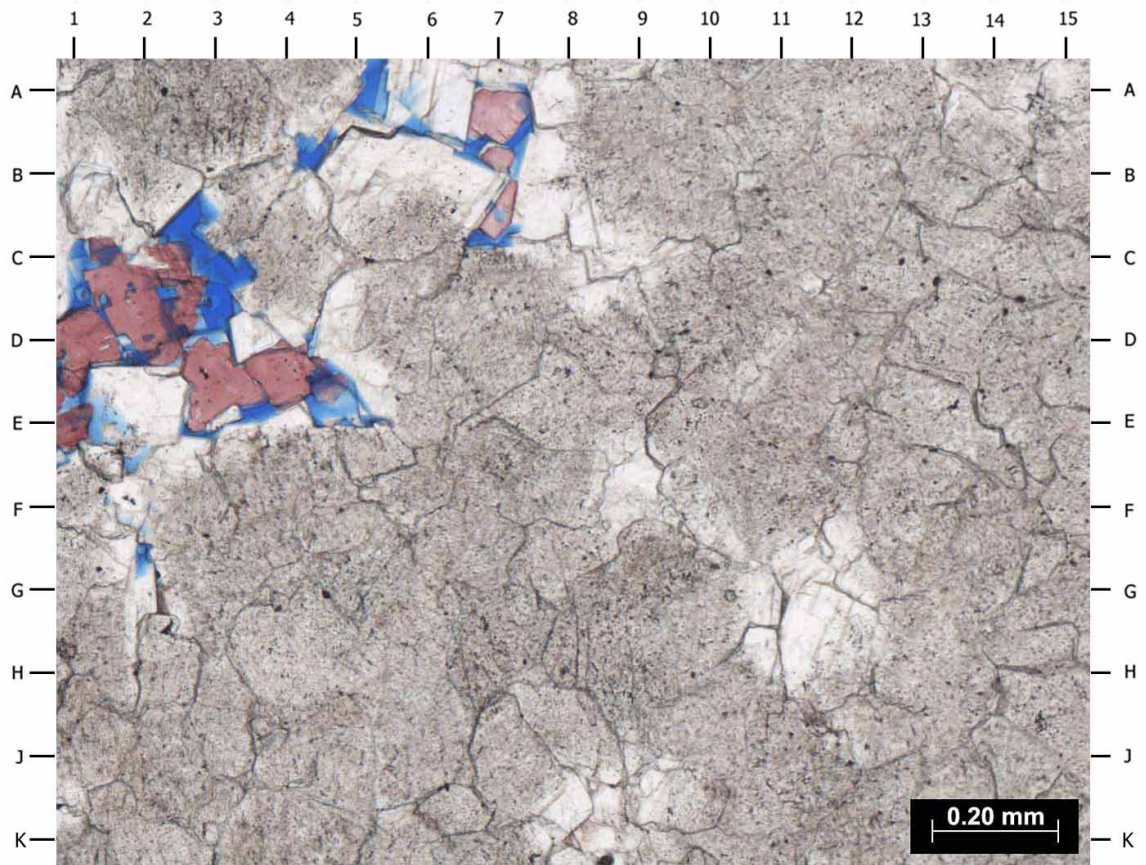
15247.00'
Plate 48

Weatherford LABORATORIES



B

50X



C

200X

Cabot Oil & Gas Corporation
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

Weatherford File No.: HH-77641

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 15250.00 FEET
SAMPLE NUMBER: 40 CK-Gainer Lee

PLATE 49A

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

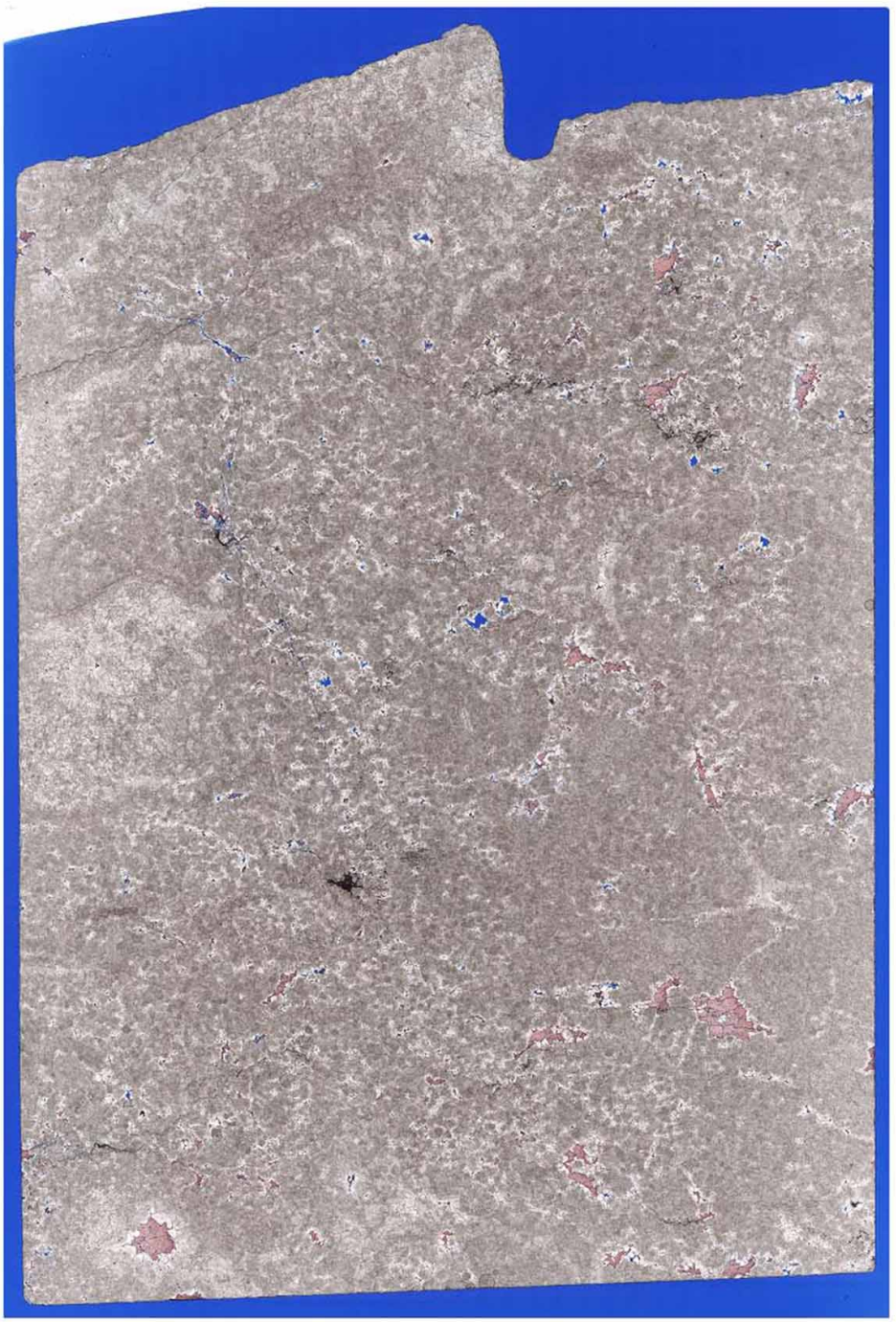
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

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

15250.00'
Plate 49

Weatherford LABORATORIES



A

1X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 15250.00 FEET
SAMPLE NUMBER: 40 CK-Gainer Lee

PLATE 49

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

Lithology: Dolostone

Texture: Medium crystalline, subhedral to anhedral dolomite; dolomitized bioturbated, patchy peloidal grainstone to packstone; open microfractures and pyritized microstylolites

Detrital Grains/Allochems: Abundant vague dolomitized peloids (remnant of original fabric); possible dolomitized intraclast (left side center of section); and trace quartz and feldspar were detected by XRD, but not observed in thin section

Matrix: No detrital matrix preserved; crystalline dolomite; only trace amounts of clay were detected by XRD

Cements and Replacement Minerals: Complete dolomitization of the pre-existing fabric (96% total dolomite, by weight); intermediate stage euhedral dolomite overgrowths further restrict vugs and interparticle pores; minor late stage sparry calcite cement (2% total calcite by weight) partially occludes vugs and some intercrystalline spaces, trace calcite is also observed partially cementing pores developed along microstylolites and/or irregular microfractures; trace amounts of pyrite occurring as replacement of organic material and dolomite (occurring mostly along microstylolites and as random scattered microcrystals); trace microcrystalline siderite occluding intercrystalline spaces; and trace amounts of bitumen were observed imbedded between dolomite crystals, and imbedded within calcite cement

Pore System: Minor intercrystalline pores to small restricted vugs; porosity along natural microfractures (some microfractures may be artificially induced)

Magnification: B: 50X C: 200X

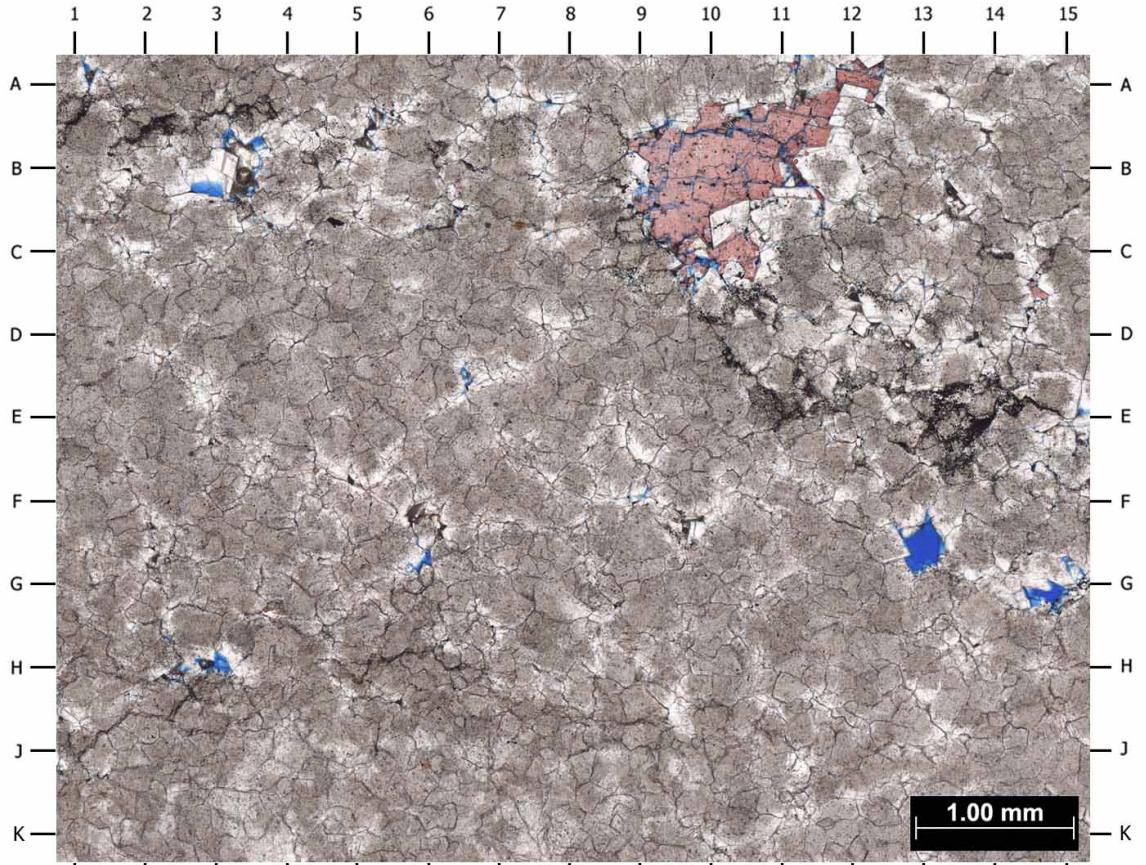
B) This completely dolomitized sample consists predominantly of medium crystalline, subhedral to anhedral dolomite crystals (CD1-7, JK1-15). Euhedral dolomite overgrowths (whiter; B3, B12, D12) occur along minor secondary intercrystalline pores and vugs (blue epoxy; FG13, H3, BC3, G14.7). Sparry calcite cement occludes most of the larger vugs (stained red; B10). The original texture of this sample (before dolomitization) is interpreted to be bioturbated, patchy, peloidal grainstone to packstone.

C) This photomicrograph provides a high magnification view of the area centered near D9.5 in Photo B. The majority dolomite matrix consists of tightly interconnected crystals with almost no visible intercrystalline porosity. Although most of the hairline microfractures presently connecting restricted vugs appear to be completely closed and non-viable passageways for fluid exchange, the presence of microcrystalline pyrite (black; AB5, CD9.5, EF10.5, G13-J13.5, G15, BC13) precipitating along some of these microfractures and intercrystalline joints provides evidence that (at least in the past) some of these microfractures were viable avenues for fluids and ion exchange between neighboring vugs. The presence of sparry calcite (stained red; AB12, A8.5) within these vugs provides further evidence that these vugs were once interconnected by a local microfracture network that allowed for fluid exchange between vugs.

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

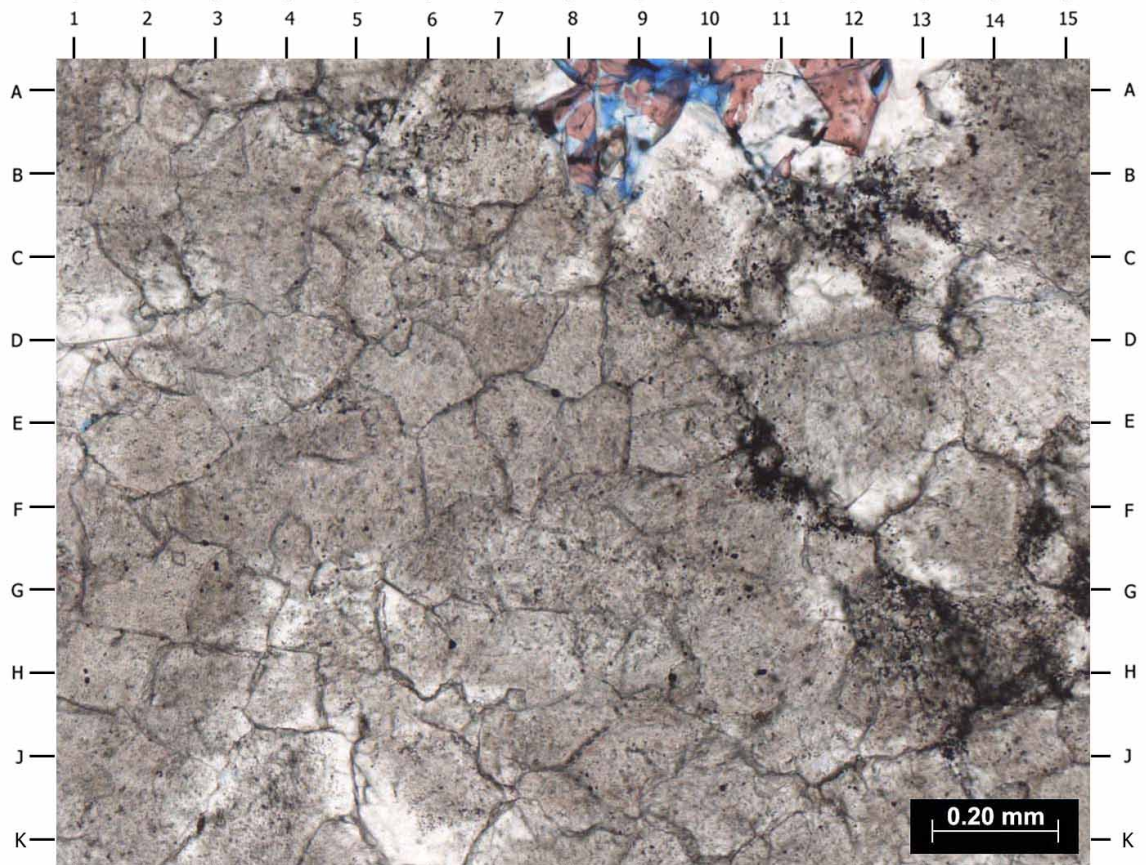
15250.00'
Plate 49

Weatherford LABORATORIES



B

50X



C

200X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 15254.00 FEET
SAMPLE NUMBER: 41 CK-Gainer Lee

PLATE 50A

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

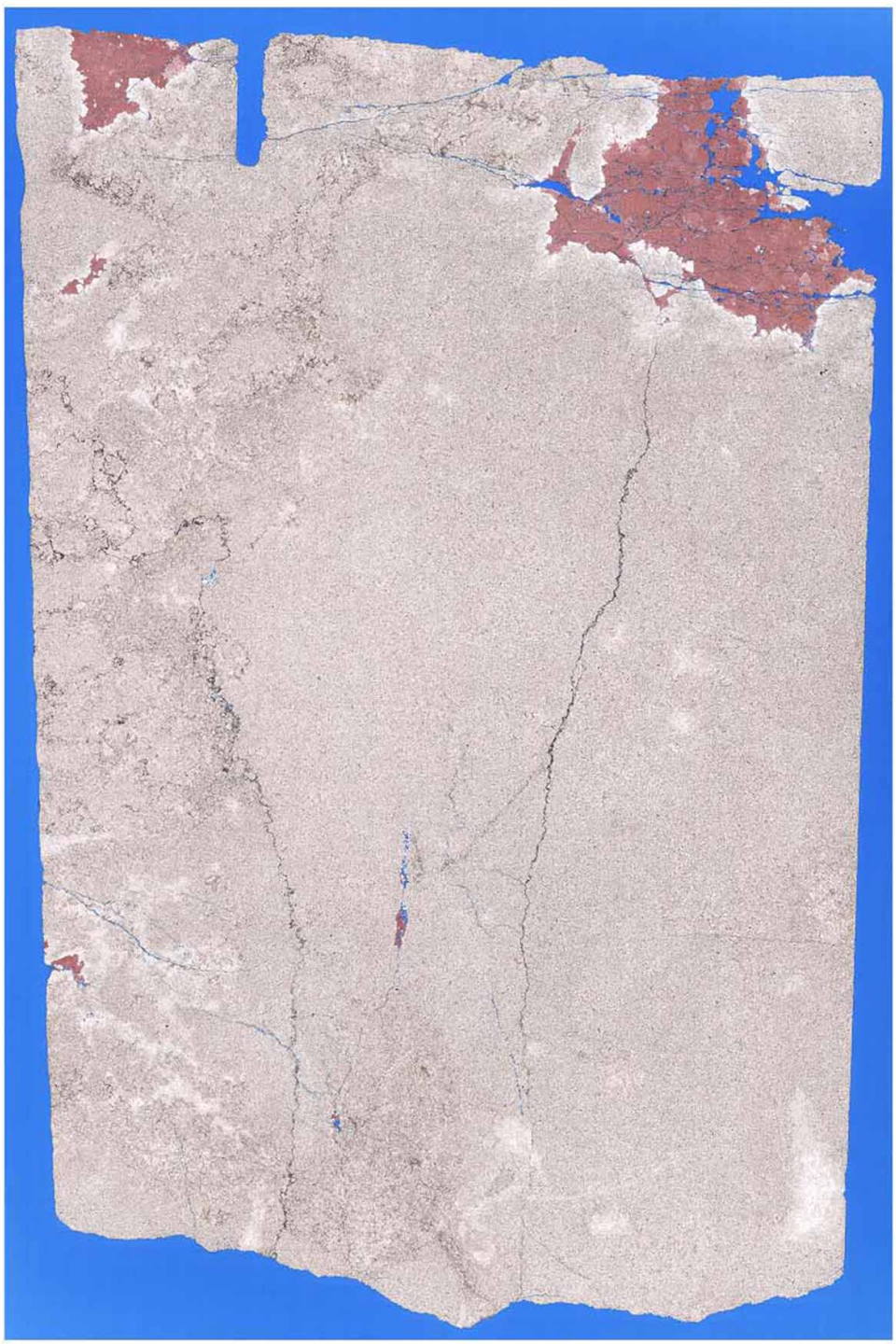
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

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

15254.00'
Plate 50

Weatherford®
LABORATORIES



A

1X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 15254.00 FEET
SAMPLE NUMBER: 41 CK-Gainer Lee

PLATE 50

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

Lithology: Dolostone

Texture: Fine to medium crystalline, anhedral to euhedral dolomite; localized patches of coarsely crystalline dolomite are associated with cemented vugs; natural microfractures; incipient microstylolites

Detrital Grains/Allochems: Original detrital fabric is destroyed and/or recrystallized with no recognizable allochems preserved; trace to rare amounts of quartz and feldspar were detected by XRD, but only trace quartz grains were observed in thin section

Matrix: No detrital matrix preserved; crystalline dolomite; only trace amounts of clay were detected by XRD

Cements and Replacement Minerals: Complete dolomitization of the pre-existing fabric (97% total dolomite, by weight); intermediate stage euhedral dolomite overgrowths restrict to completely fill secondary vugs (dolomite crystals occluding vugs are typically larger, coarsely crystalline, compared to the dominant fine to medium-sized crystals that comprise the groundmass); minor late stage sparry calcite cement (1% total calcite by weight) partially occludes vugs, trace calcite is also observed partially cementing pores developed along microfractures; trace amounts of microcrystalline pyrite occurs mostly along incipient microstylolites (replacing bitumen) and as random scattered microcrystals; trace microcrystalline siderite occludes intercrystalline spaces; and trace amounts of bitumen were observed imbedded along joints between dolomite crystals, and imbedded within calcite cement; a trace authigenic euhedral quartz crystal was observed partially filling a vug

Pore System: Rare secondary porosity preserved within partially restricted vugs and along natural microfractures; micropores occurring along joints between interconnecting dolomite crystals

Magnification: B: 50X C: 200X

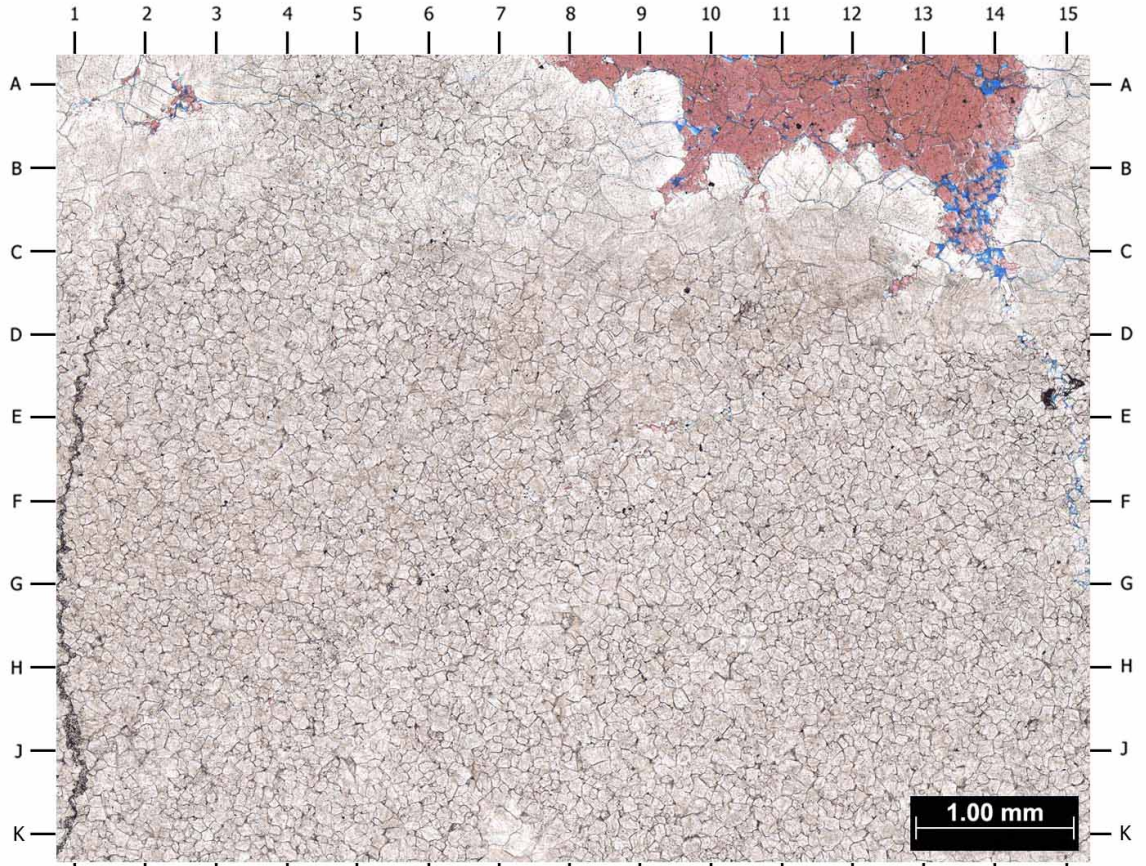
B) This photomicrograph was taken from the top-right quadrant of Photo A, just below a large vug cemented by sparry calcite cement (stained red; AB10-14). Microcrystalline pyrite occurs along an incipient microstylolite from K1 to C1.7. The process of dolomitization has completely destroyed the original texture within this dolostone.

C) This photomicrograph provides a high magnification view of the area centered near D13.5 in Photo B. The dominant groundmass within this sample consists of fine to medium crystalline dolomite (FK1-12). Coarse-sized dolomite crystals typically only develop as cement filling vugs (AC1-4, D9, B12.5, A14.5). Open secondary pores (blue epoxy; AB7.4, B10, BC10.6) remain around the calcite-cemented vug (calcite stained red; A9, B11, AB7, CD5). Calcite cement also occurs along a partially open microfracture from EF12 to JK14.6. Clusters of microcrystalline pyrite occur at HJ13.4 and GH14.5-15. A quick visual assessment of microporosity using epifluorescent light to excite the fluorescent spike present within the blue-dyed epoxy, revealed a possible tortuous network of micropores along the joints between the interlocking dolomite crystals. The presence of trace bitumen and/or hydrocarbons (black; HJ8, FG9) along some of these joints provides further evidence of a possibly viable network of micropores that could be further enhanced by fracking.

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

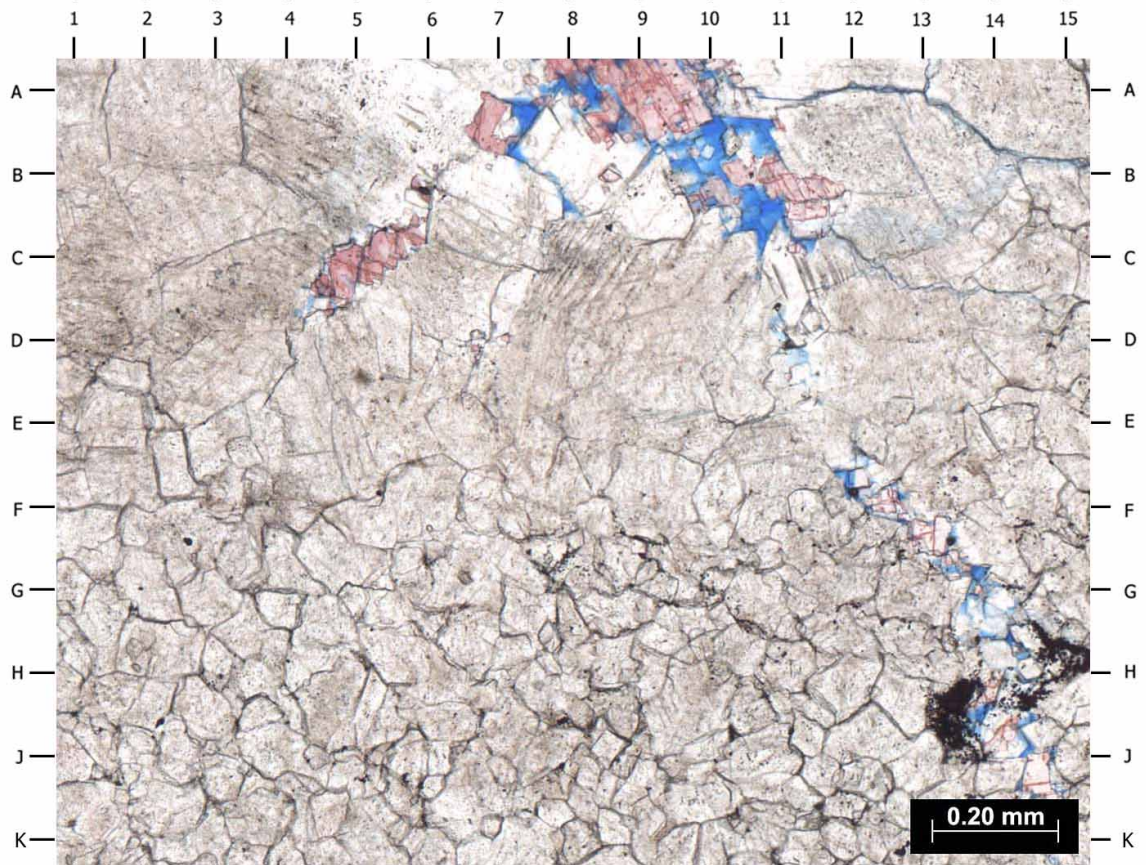
15254.00'
Plate 50

Weatherford LABORATORIES



B

50X



C

200X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 17164.00 FEET
SAMPLE NUMBER: 42 CK-Gainer Lee

PLATE 51A

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

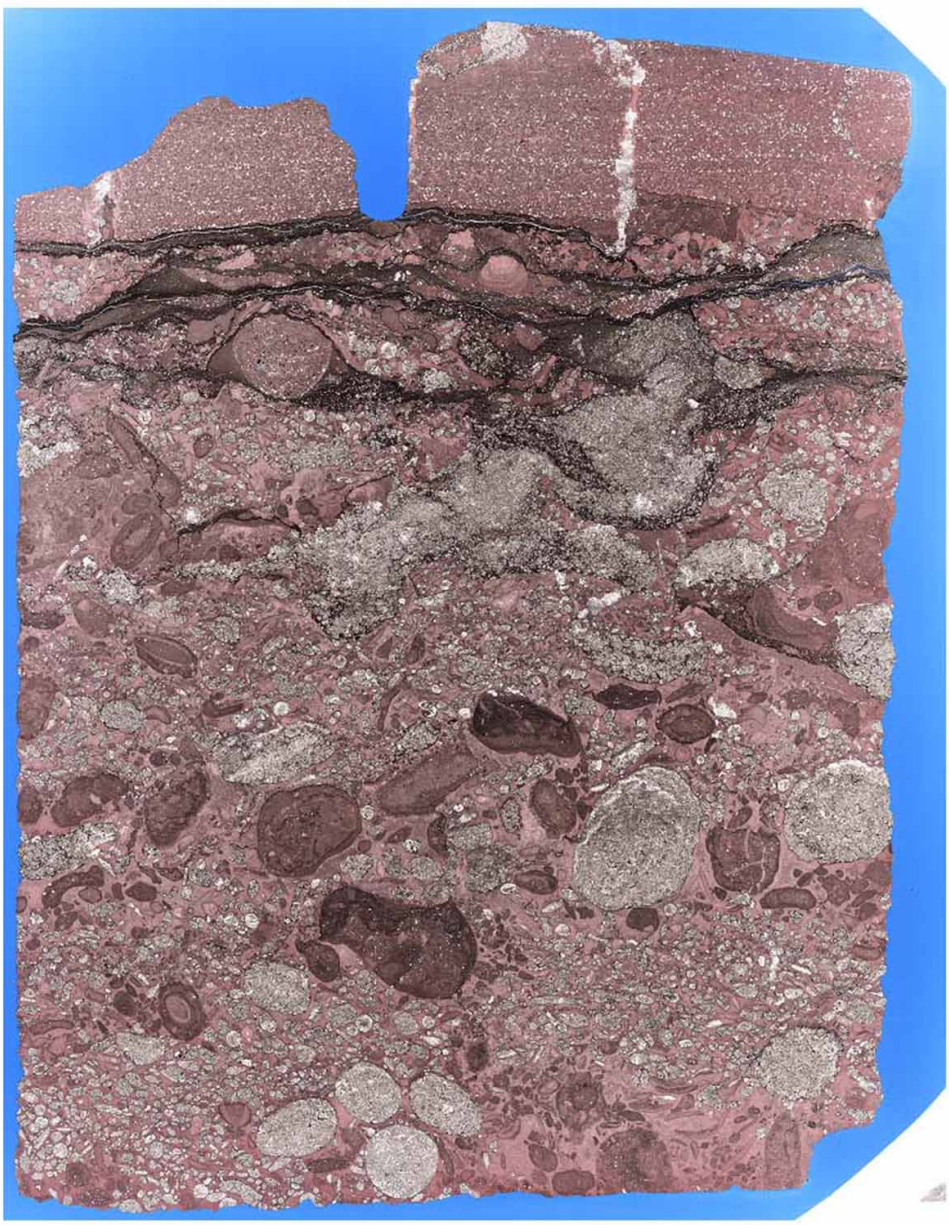
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

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

17164.00'
Plate 51

Weatherford LABORATORIES



A

1X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 17164.00 FEET
SAMPLE NUMBER: 42 CK-Gainer Lee

PLATE 51

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

Lithology: Dolomitic limestone

Texture: Bottom half of section is massive, very poorly sorted grainstone containing fine- to pebble-sized peloids and dolomitized peloids; an area approximately 1cm thick above the center of the section contains several thick, partially pyritized, clay/organic-rich stylolites with associated dolomitization of the surrounding fabric along these pressure-dissolution boundaries; the top of the section (approximately 0.5cm thick) consists of slightly laminated, slightly burrowed, peloidal grainstone with cemented vertical fractures that stop at the stylolite layer below (the fracture 7mm to right of the notch exhibits localized fabric displacement associated with possible micro faulting) and microstylolites

Detrital Grains/Allochems: Abundant fine- to pebble-sized dolomitized peloids; common micritic peloids; minor grains (silt to very fine sand) of potassium feldspar (7% by weight, XRD) and quartz (1% by weight); intraclasts; pisoids; echinoderm fragments; trilobite fragments; recrystallized to dolomitized ooids; and trace muscovite mica

Matrix: Rare localized patches of partially recrystallized micrite; trace amounts of clay and organic material concentrated along stylolites

Cements and Replacement Minerals: Very abundant amounts of interparticle sparry calcite cement occurring throughout the section (59% total calcite, by weight, XRD); abundant dolomite (32% total dolomite/Fe-dolomite, by weight) occurring as replacement of peloids and localized replacement of the matrix along stylolites; common calcite recrystallization/replacement of grains/allochems; rare to minor pyrite (1% by weight) occurring as a replacement of organic material (mostly along stylolites) and, to a lesser extent, replacement of other unstable particles; trace gypsum observed precipitating along artificially induced open microfractures; trace bituminous organic material concentrated along stylolites; trace dolomite and calcite cementation of fractures and intraparticle fractures

Pore System: No visible naturally occurring pores using standard petrographic techniques; open to partially gypsum-cemented microfractures are interpreted to have been artificially induced.

Magnification: B: 50X C: 200X

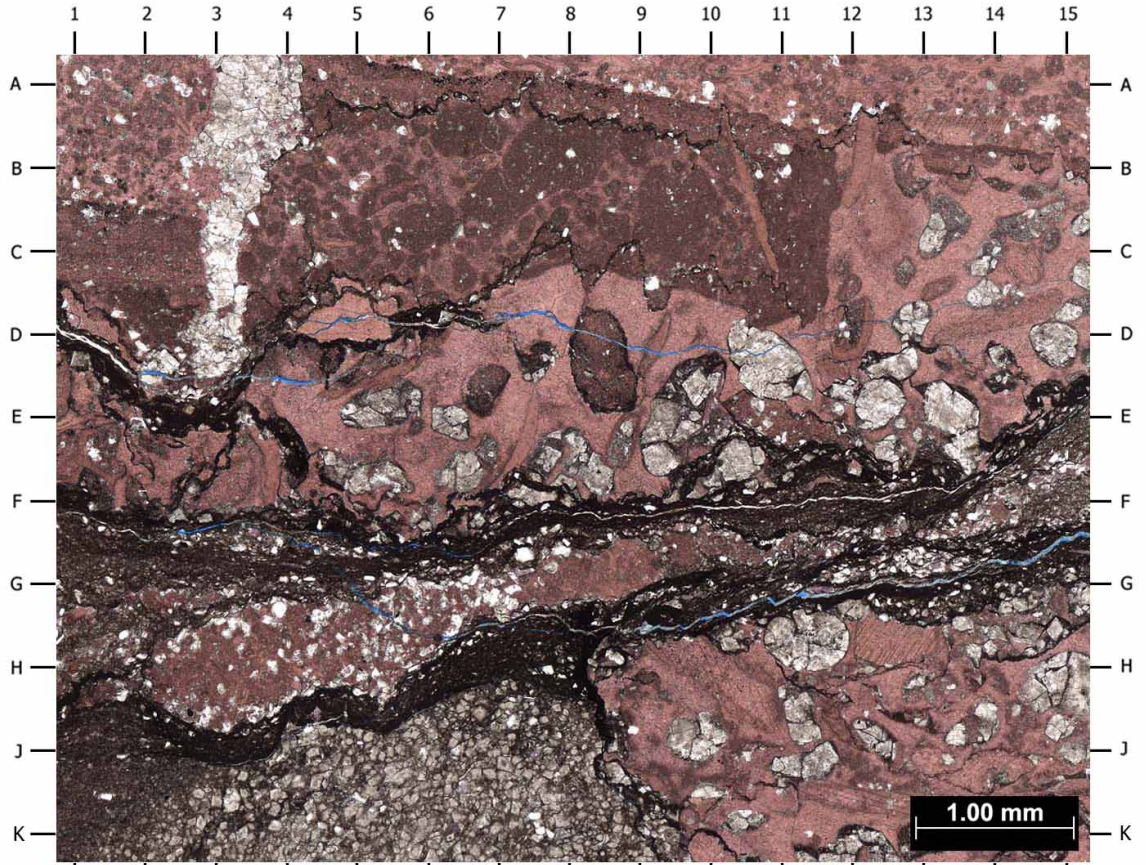
B) This dolomitic limestone exhibits a grainstone texture. This image was taken from the top-right quadrant of Photo A. Clay and partially pyritized bituminous organic material occur concentrated along stylolites (AB5-12.5, D1-C8, FG1-EG15, JK1-G15) with dolomitization (JK3-9, FG12.5) of the matrix occurring along these pressure-dissolution boundaries. The fabric appears to be locally displaced due to possible micro faulting along a dolomite-cemented vertical fracture (AD3.2).

C) This photomicrograph provides a high magnification view of the area centered near BC11.6 in Photo B. Grains/allochems visible in this view include micritic peloids (B15, A5, AB8.7, FG2, GH3), potassium feldspar grains (AB1.7, D6, BC10), quartz grains (B6.4), dolomitized intraclasts (GJ14.5, EF13), probable trilobite fragments (DE3.5-JK5.5, FG9.5-BC11), and an echinoderm fragment (GH11.5).

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

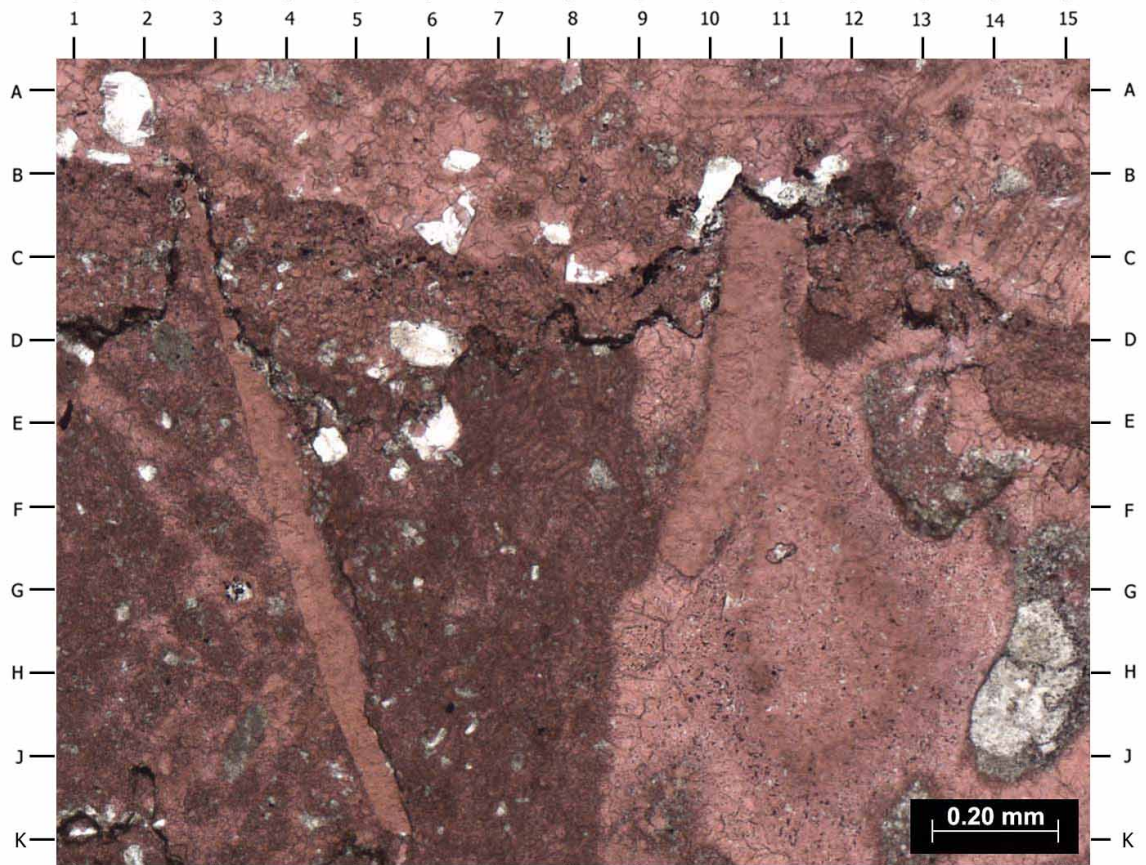
17164.00'
Plate 51

Weatherford LABORATORIES



B

50X



C

200X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 17176.00 FEET
SAMPLE NUMBER: 43 CK-Gainer Lee

PLATE 52A

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

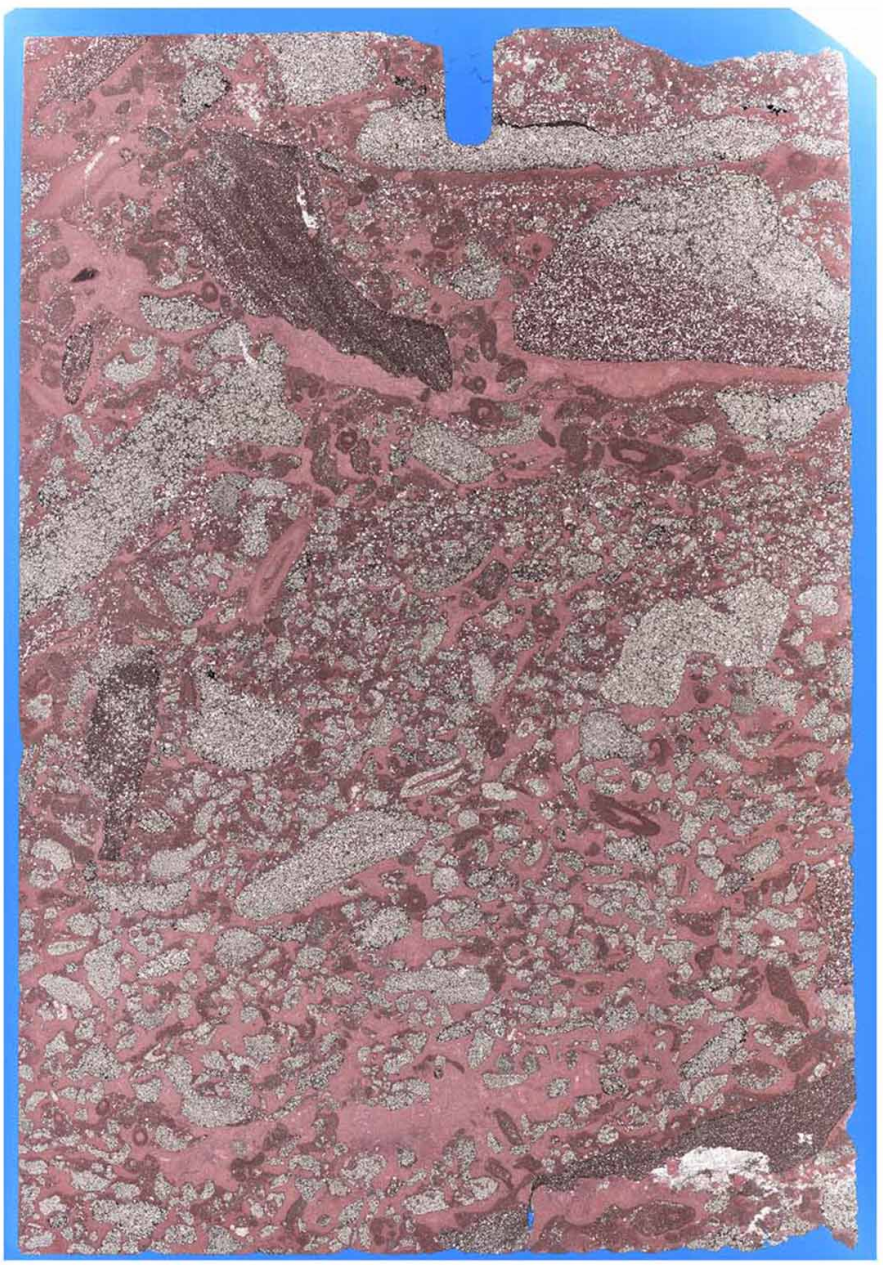
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

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

17176.00'
Plate 52

Weatherford LABORATORIES



A

1X

Cabot Oil & Gas Corporation **Weatherford File No.: HH-77641**
Cambrian No. 1 Project
Gainer Lee
Wayne County, West Virginia
Conventional Core Samples

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 17176.00 FEET
SAMPLE NUMBER: 43 CK-Gainer Lee

PLATE 52

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

Lithology: Dolomitic limestone

Texture: Massive (with slight horizontal alignment of elongate clasts) grainstone containing common dolomitized intrabasinal rip-up clasts (up to 14mm in diameter)

Detrital Grains/Allochems: Common micritic peloids and dolomitized peloids; common dolomitized intrabasinal rip-up clasts; silty/sandy limestone intraclasts; minor grains (silt to very fine sand) of potassium feldspar (7% by weight) and quartz (1% by weight); trilobite carapace fragments; and echinoderm fragments

Matrix: Rare localized patches of partially recrystallized micrite; trace amounts of clay were detected in XRD

Cements and Replacement Minerals: Very abundant amounts of interparticle sparry calcite cement (64% total calcite, by weight, XRD); abundant dolomite occurring as replacement of allochems/intraclasts (27% by weight, total dolomite/Fe-dolomite); common calcite replacement/recrystallization of matrix and grains/allochems; minor syntaxial calcite overgrowths around echinoderm fragments; minor pyrite (1% by weight) occurring as replacement of organic material and other unstable materials; and trace bituminous organic material

Pore System: No visible porosity using standard petrographic techniques

Magnification: B: 50X C: 200X

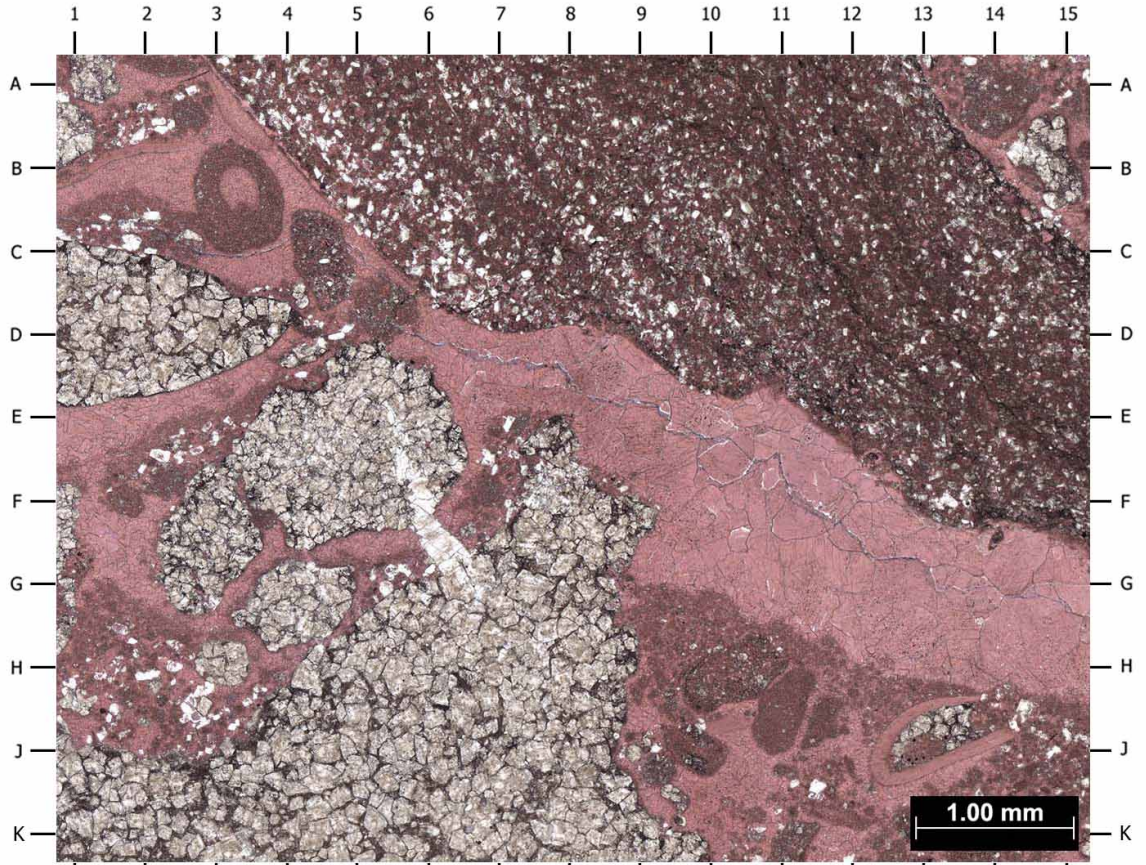
B) This image was taken from within the top-left quadrant of Photo A. This dolomitic limestone exhibits a massive grainstone texture. Very abundant amounts of sparry calcite cement (stained red; B2, E1-2, FG1.5, DE6-9, G9-15, J10.5) occlude the interparticle spaces between over-sized silty/sandy limestone intraclasts (A4-CF15), dolomitized intraclasts (D1-3.5, EF4.5, GH4, JK1-FK8), and micritic peloids (C4.5, HJ11, AB14).

C) This photomicrograph provides a high magnification view of the area centered near J12.2 in Photo B. Sparry calcite cement occludes open spaces between micritic peloids (G2.5, J7.2, CD6.3, H10.8, DE2.5), feldspar grains (H4.2, HJ13.3, J2, CD14.4), localized patches of partially recrystallized lime mud (CD8-13), and a trilobite fossil fragment (G7.5-EF15). Dolomite cement occurs within the hooked end of the trilobite fragment (E9-12). Crystal size development of the sparry calcite cement appears to be related to the available size of the void space that the cement is filling, with finely crystalline spar occupying smaller voids (H8.5, G1.5, G6.5, FG6, K5) and coarsely crystalline spar filling larger voids (AB6-15).

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

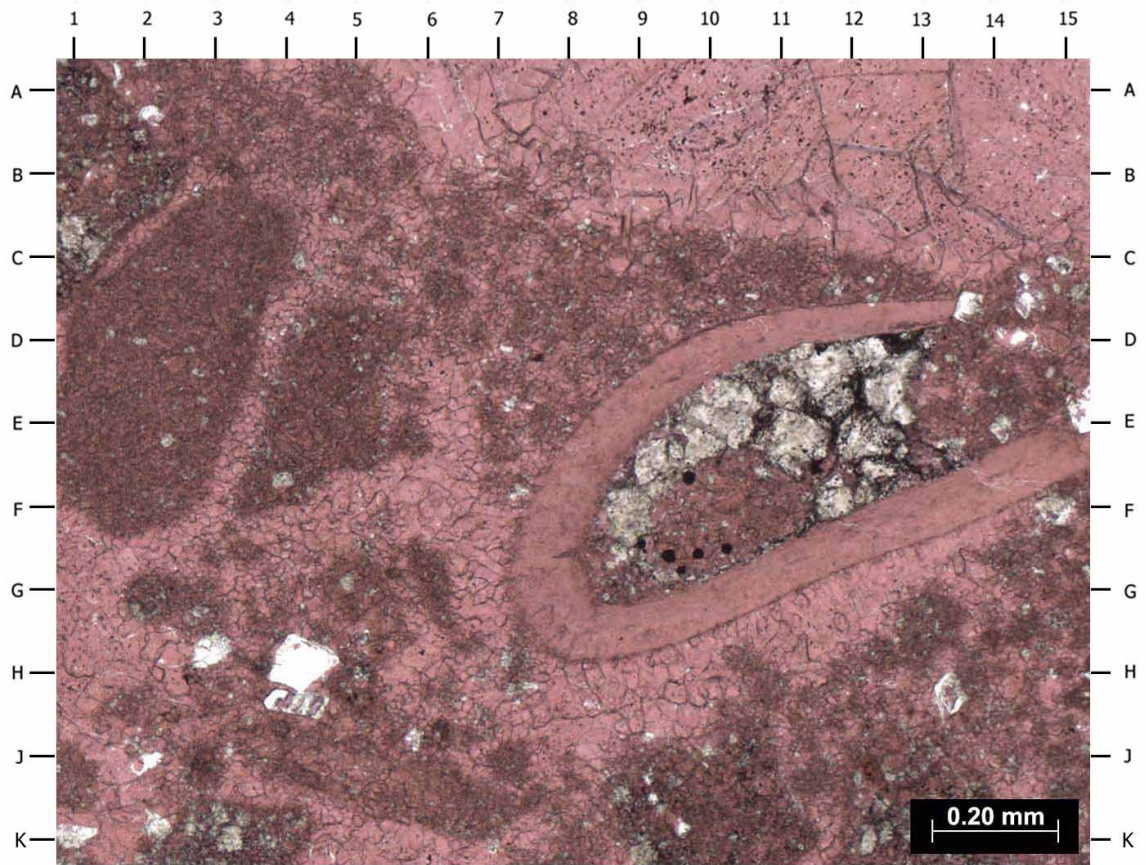
17176.00'
Plate 52

Weatherford LABORATORIES



B

50X



C

200X

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

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 18576.00 FEET
SAMPLE NUMBER: 5 CK-Gainer Lee

PLATE 1

T.O.C.: 0.50% (weight percent)

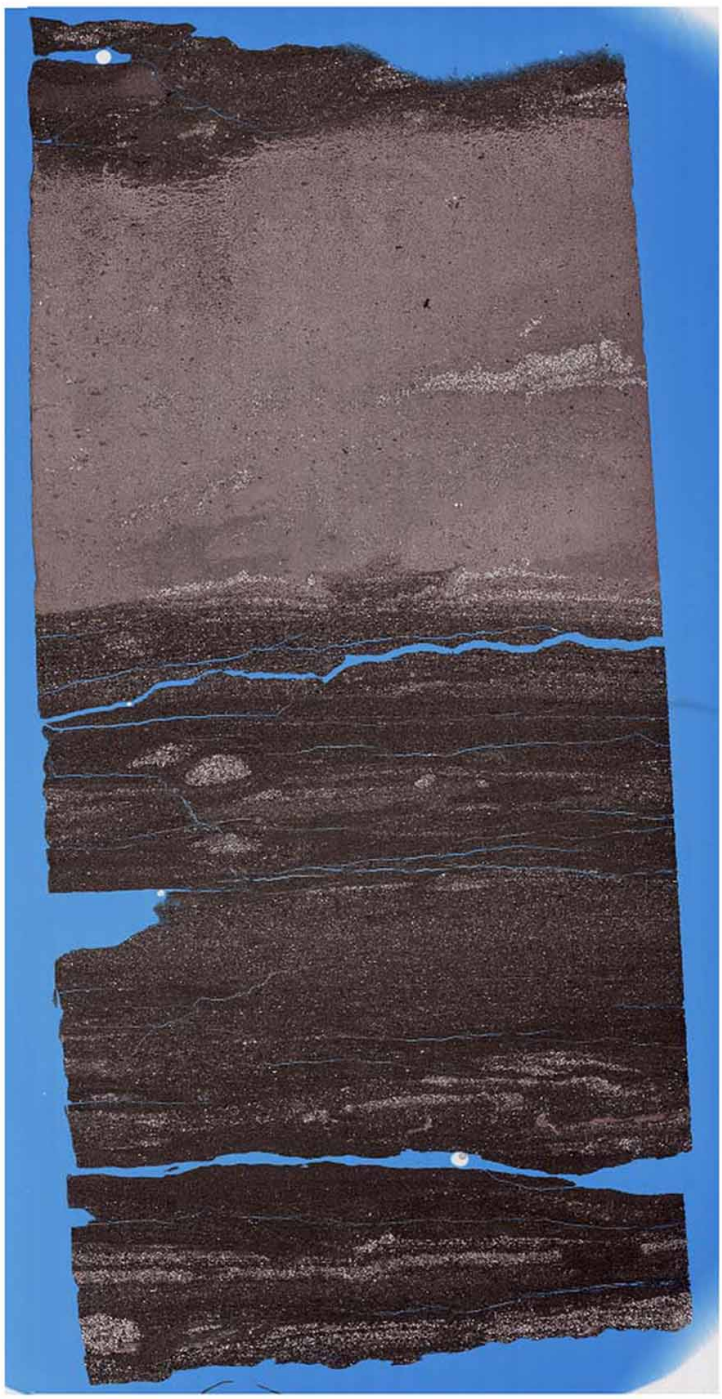
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

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

18576.00'
Plate 1

Weatherford LABORATORIES



A

1X

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

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 18576.00 FEET
SAMPLE NUMBER: 5 CK-Gainer Lee

PLATE 1

T.O.C.: 0.50% (weight percent)

Lithology: Silty, calcareous mudstone (~2mm to 4mm thick at top of section and bottom 2.2cm-2.3cm of section); slightly argillaceous limestone (~1.5cm-1.4cm thick above middle of section)

Texture: Burrowed; slightly laminated; disturbed silty/sandy laminations and silt/sand-filled burrows; mudstone interbedded with slightly argillaceous, partially recrystallized, lime mudstone to wackestone

Detrital Grains/Allochems: Minor coarse silt to very fine sand-sized grains of quartz (7% by weight, total quartz) and plagioclase feldspar (3% by weight); trace potassium feldspar grains (by weight); altered organic plant/algal fragments; muscovite and biotite mica; micritic peloids; and trace trilobite carapace fragments

Matrix: Detrital clay matrix is locally abundant within the mudstone lithology (XRD clay distribution by weight: 15% illite/mica, 3% mixed-layer illite/smectite, 2% chlorite, and trace kaolinite); partially recrystallized micrite is locally abundant within the limestone lithology and is minor within the mudstone lithology where it occurs intermixed with detrital clays and as localized patches

Cements and Replacement Minerals: Very abundant calcite replacement and/or recrystallization of matrix and grains/allochems (66% by weight, total calcite); minor interparticle sparry calcite cement occurring between silt/sand grains that are concentrated along laminations and within burrow structures; minor dolomite (3% by weight, total dolomite/Fe-dolomite) occurring as replacement of matrix and grains/allochems; and minor pyrite (1% by weight) occurring as a replacement of organic material and other unstable particles; trace bitumen completely occluding secondary moldic pores (mostly within the limestone lithology)

Pore System: No visible open pores using standard petrographic techniques; artificially induced fractures

Magnification: B: 50X C: 200X

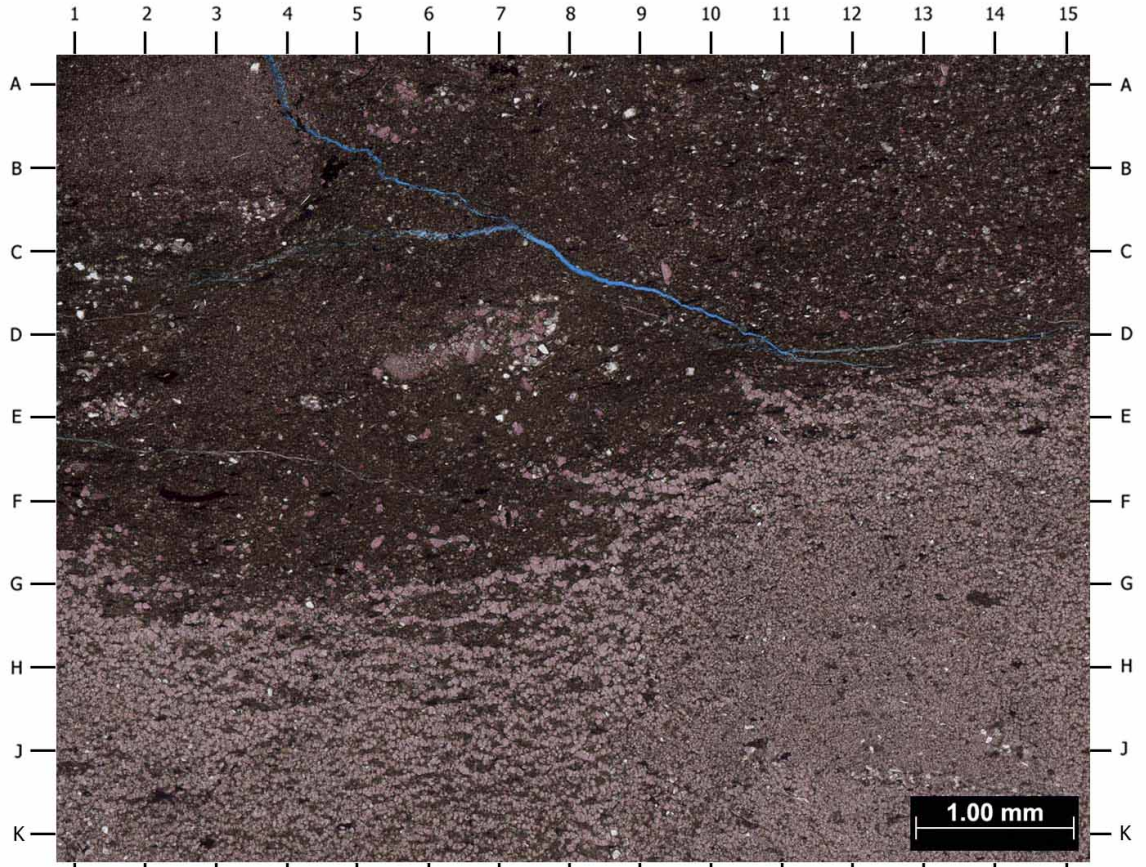
B) This image was taken near the top-left corner of the macro Photo A and illustrates the contact between the silty calcareous mudstone lithology (AF1-AD15) and the slightly argillaceous limestone lithology (HK1-EK15). Patches of partially recrystallized micrite occur within the mudstone portion at AB2-4 and DE3-5. The general texture of this sample is burrowed and slightly laminated. Microfractures filled with blue-dyed epoxy were artificially induced during sample preparation.

C) This photomicrograph provides a high magnification view of the area centered near EF8 in Photo B. Grains/allochems visible in this view include silt-sized quartz grains (A6, DE3.3, BC3.7, EF9.6), mica (EF11, HJ10.3), and organic fragments (GH2.3, HJ1.3, J3.8, BC5.9). Calcite replaces unstable grains (C7.5, B14, FG12.3, K1.3). The transitional region between the mudstone to limestone consists of high concentrations of fine calcite crystals (stained red) with detrital clay matrix filling the intercrystalline spaces (GK9-15). Minor scattered dolomite crystals replace unstable grains and small particles within the matrix (DE11.5, F1.9, D2.3, CD14).

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

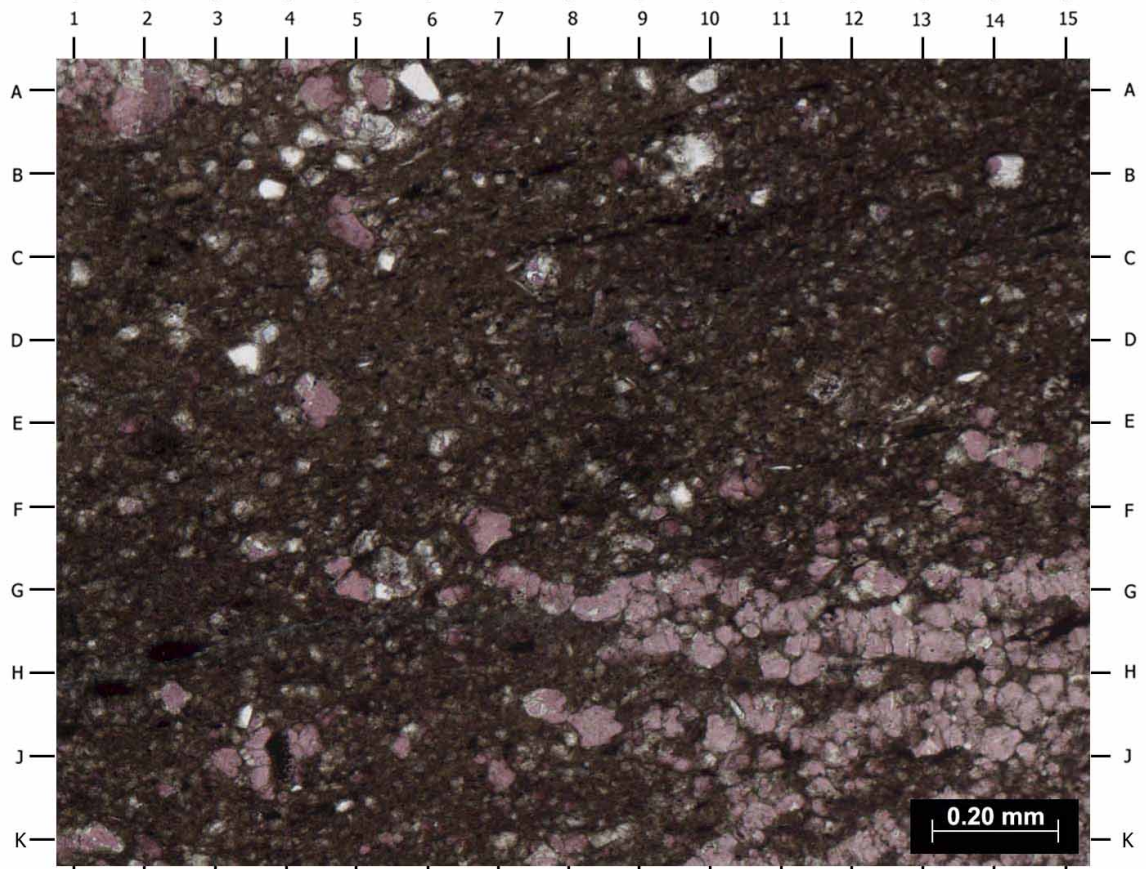
18576.00'
Plate 1

Weatherford LABORATORIES



B

50X



C

200X

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

THIN SECTION MACRO PHOTO
SAMPLE DEPTH: 18576.10 FEET
SAMPLE NUMBER: 6 CK-Gainer Lee

PLATE 2

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

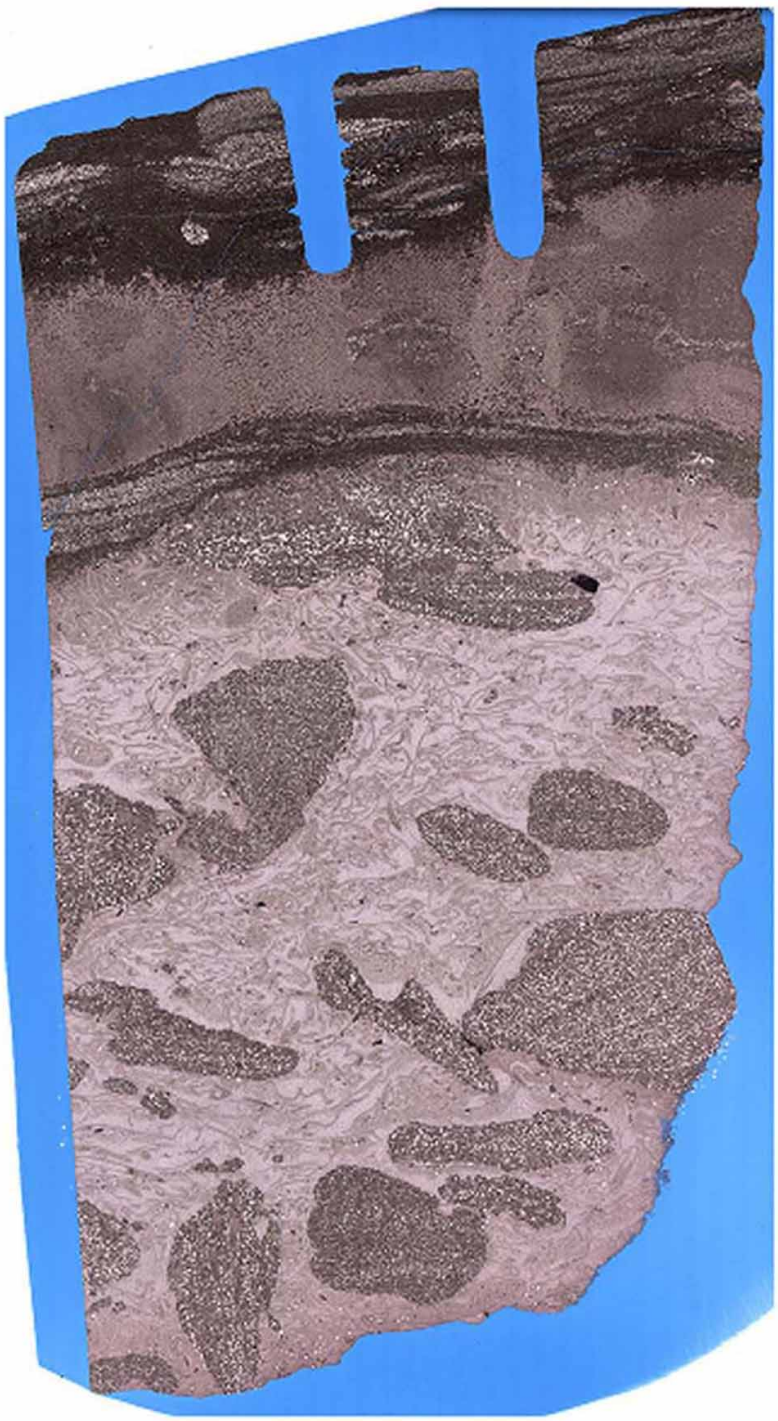
This static macro photo was captured from the high resolution thin section mosaic image and documents the entire thin section slide.

Magnification: A: 1X

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

18576.10'
Plate 2

Weatherford LABORATORIES



A

1X

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

THIN SECTION DESCRIPTION - GENERAL
SAMPLE DEPTH: 18576.10 FEET
SAMPLE NUMBER: 6 CK-Gainer Lee

PLATE 2

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

Lithology: Fossiliferous limestone (dominant); slightly calcareous, silty mudstone (minor lithology at and near the top of the section); slightly argillaceous limestone (near top of section between adjacent mudstone layers)

Texture: Working up from the bottom: massive, intraclast-rich, fossiliferous grainstone (>3cm thick); thin slightly calcareous, silty mudstone layer that is burrowed and contains silty laminations (1-3mm thick); burrowed, slightly argillaceous, partially recrystallized lime mudstone (0.5-0.9mm thick); burrowed slightly calcareous, silty mudstone containing disturbed, silty laminations and silt-filled burrow structures

Detrital Grains/Allochems: Abundant trilobite carapace fragments (dominant within the lower grainstone); common fossiliferous, silty, peloidal intraclasts (gravel to pebble sized); minor to common monocrystalline quartz grains (coarse silt to very fine sand sized; 10% total quartz, by weight, XRD); minor silt/sand-sized plagioclase feldspar grains (5% by weight); minor echinoderm fragments (contained within over-sized intraclasts); trace potassium feldspar (XRD by weight); trace altered organic plant/algal fragments; trace muscovite and biotite mica; and trace phosphatic fragments

Matrix: Detrital clay matrix occurs locally only within the minor mudstone layers (XRD clay distribution by weight: 7% illite/mica, 2% chlorite, 1% mixed-layer illite/smectite, and trace kaolinite); a minor limestone layer (sandwiched between the two mudstone layers) consists predominantly of recrystallized micrite with minor detrital clay occluding intercrystalline spaces; no detrital matrix within the dominant grainstone texture

Cements and Replacement Minerals: The dominant grainstone fabric contains abundant amounts of sparry interparticle cement (69% total calcite by weight); calcite also occurs as replacement/recrystallization of matrix (mostly within the minor lime mudstone layer) and grains/allochems; minor dolomite (5% by weight, total dolomite/Fe-dolomite) occurs as a replacement of matrix and grains/allochems throughout the sample; minor pyrite (1% by weight) occurring as a replacement of organic material and other unstable particles; minor authigenic quartz/feldspar overgrowths on detrital grains; trace quartz replacement of calcareous fossil fragments; and trace bitumen completely occluding secondary moldic pores (only observed within the slightly argillaceous, recrystallized lime mudstone layer)

Pore System: No visible porosity using standard petrographic techniques

Magnification: B: 50X C: 200X

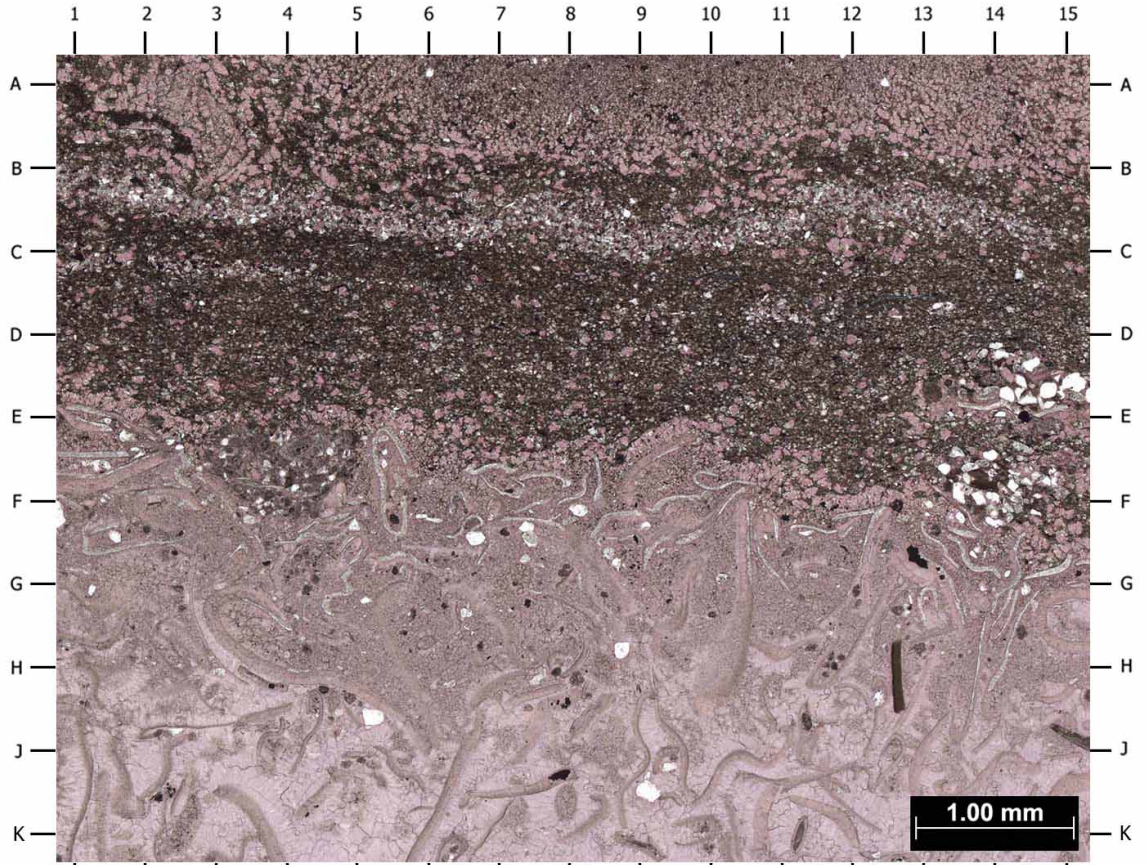
B) This photo illustrates the following three lithologies represented within this sample: dominant fossiliferous limestone (EK1-GK15); slightly calcareous, silty mudstone (BD1-15), and slightly argillaceous limestone (AB1-15). Abundant amounts of sparry calcite cement (K4.5, JK1) occlude interparticle spaces between trilobite fragments (JK6, GH3.5, J10) within the dominant limestone lithology. Probable silt/sand-filled burrows are pictured at DE14.5 and F14.

C) This photomicrograph provides a high magnification view of the area centered near EF7 in Photo B and documents trilobite fragments replaced by dolomite/quartz (EJ2, FG14) only along the transitional boundary between limestone (stained red) and slightly calcareous, silty mudstone (AB1-AD15). Quartz (J10), feldspar (JK10.3, HJ4), and organic particles (DE11, B15) are also pictured within this view.

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

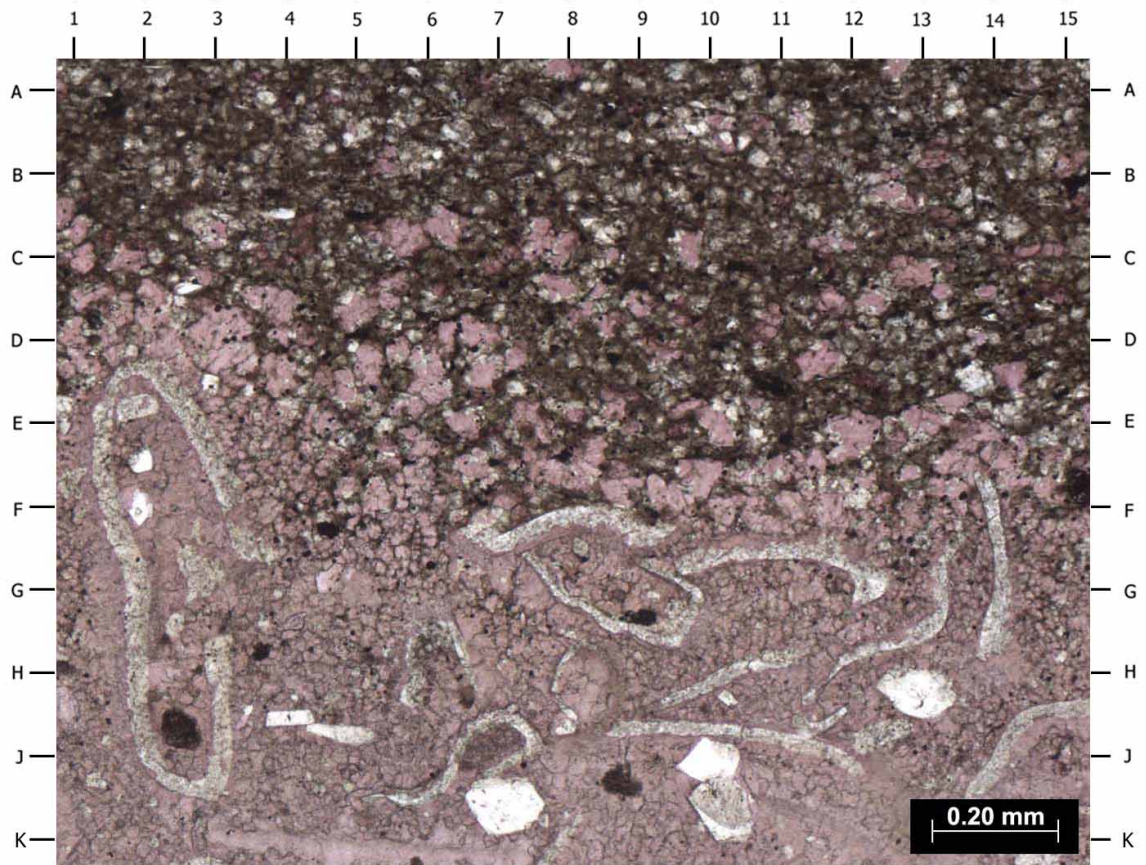
18576.10'
Plate 2

Weatherford LABORATORIES



B

50X



C

200X