GR 0 GAPI 600 | DEPTH FT | RT 0.2 OHMM 2000 | RHOB 1.95 2.95
CALI 6 IN 16 | RM 0.2 2000 | NPHI 0.45 CFCF -0.15
COREDS 20 0

GR 0 GAPI 600 | DEPTH FT | RT 0.2 OHMM 2000 | RHOB 1.95 2.95
CALI 6 IN 16 | RM 0.2 2000 | NPHI 0.45 CFCF -0.15

TOC 20 WT.% 0 | DEPTH FT

GRAVEL / CONGLOMERATE
COARSE GRAINED SANDSTONE
MEDIUM GRAINED SANDSTONE
FINE GRAINED SANDSTONE
VERY FINE GRAINED SANDSTONE
SILTSTONE
SILTY SHALE
SHALE
SILICICLASTIC
BOUNDSTONE
GRAINSTONE
PACKSTONE
WACKESTONE
MUDSTONE
SHALE
CARBONATE
LITHOLOGY

CORE DEPTH (FEET)

FRACTURES

COLOR

CaCO3 REACTION

SAMPLE LOCATION

COREPORE 20 % 0 | DEPTH FT | COREPERM 100 nd 0.0001

DESCRIPTION AND REMARKS

DEPOSITIONAL ENVIRONMENTS

FORMATION

AGE

6600 6700 6800 6900 7000 7100 7200 7300 7400 7500 7600 7700 7800 7900 8000

TOP: MARCELLUS FM

TOP: ONONDAGA FM

7690 7700 7710 7720 7730 7740 7750 7760 7770 7780 7790

7690 7691 7700 7701 7710 7711 7720 7721 7730 7731 7740 7741 7750 7751 7760 7761 7770 7771 7780 7781 7785

TWO INTENSELY PYRITIZED SKELETAL LAYERS (1CM THICK)
PARTIALLY PYRITIZED SKELETAL LAYER
A LONG VERTICAL FRACTURE CEMENTED WITH CALCITE
A 9CM THICK MICROFRACTURE SYSTEM CEMENTED WITH PYRITE AND CALCITE
MISSING CORE
A BRECCATED ZONE
MISSING CORE
CORE # 4
POLISHED SURFACE
A BRECCATED ZONE (4.5 CM THICK)
REVERSE MICROFAULT
POLISHED SURFACE
SLICKENSIDES
VOLCANIC ASH BED
POLISHED SURFACE
SLICKENSIDES
VOLCANIC ASH BEDS
CLOSELY SPACED POLISHED SURFACES
POLISHED SURFACE
VOLCANIC ASH BEDS
STYLOLITE
REVERSE MICROFAULT
VOLCANIC ASH BEDS
STYLOLITE
STYLOLITE
STYLIOLINIDS
VOLCANIC ASH BED
STYLOLITE

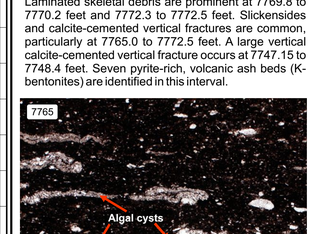
N3 N2 N5 N4 N6 N1

K < 0.0001

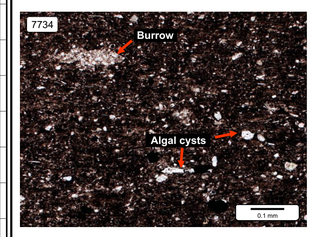
Log Depth = Core Depth + 6.5 Feet

7,689.0' - 7,707.2' (18.2') - Dark gray to black (N2 - N3), slabby to locally flaggy, faintly laminated, slightly calcareous, pyritic, organic-rich, silty shale with fairly amounts of skeletal debris. The calcareous fossil fragments are distributed in layers and some are pyritized (i.e., 7690.6 to 7690.8 feet) or associated with horizontal microfracture systems (i.e., 7696.6 feet, 7701.1 to 7701.5 feet, and 7701.75 to 7702.0 feet). Vertical calcite-cemented fractures, up to 6mm wide, are common at 7697.35 to 7701.1 feet and 7706.0 to 7706.8 feet.

7,707.2 - 7,709.2' (2.0') - Interbedded medium dark gray (N5), argillaceous limestone and skeletal debris layers and dark gray (N4), silty shale. The limy units either show roughly laminated texture due to the differential concentration of shell fragments (i.e., 7707.25 to 7707.55 feet) or evident bioturbation (i.e., 7708.15 to 7708.45 feet).



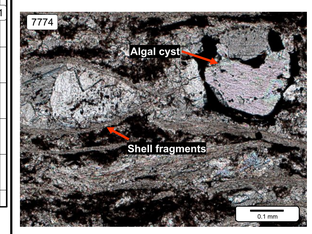
7,709.2 - 7,737.9' (28.7') - Dark gray to black (N2 N3), slabby to flaggy and locally platy, very faintly laminated, (very) slightly calcareous, pyritic, organic-rich, silty shale. A carbonate concretion occurs at 7725.5 to 7726.55 feet. Millimeter-sized pyrite concretions are common from 7616.5 to 7637.0 feet. Slickensides and mineralized fractures are very common at 7609.2 to 7621.5 feet. A brecciated shale zone occurs at 7717.05 to 7717.4 feet.



7,737.9 - 7,744.0' (6.1') - Dark gray (N3), slabby to flaggy, calcareous and pyritic, silty shale with skeletal debris layers and a massive, argillaceous limestone unit. The calcareous shell fragments accumulate in planar lamination (i.e., 7737.9 to 7738.1 feet). The limestone is cracked by several vertical calcite-cemented hairline fractures. Slickensides are common at this interval. A brecciated shale zone occurs at 7739.25 to 7739.4 feet and a deformed zone (with reversed microfaults) exists at 7742.4 feet.

7,745.0 - 7,772.95' (27.95') - Dark gray to black (N2 N3), slabby to flaggy, non-calcareous to calcareous, pyritic, organic-rich, silty shale with several large carbonate concretions (i.e., 7756.3 to 7758.15 feet, 7758.55 to 7760.0 feet, and 7771.0 to 7771.85 feet). Laminated skeletal debris are prominent at 7769.8 to 7770.2 feet and 7772.3 to 7772.5 feet. Slickensides and calcite-cemented vertical fractures are common, particularly at 7765.0 to 7772.5 feet. A large vertical calcite-cemented vertical fracture occurs at 7747.15 to 7748.4 feet. Seven pyrite-rich, volcanic ash beds (K-bentonites) are identified in this interval.

7,772.95 - 7,783.4' (10.45') - Interbedded medium dark gray (N5), fossiliferous, argillaceous limestone and dark gray (N4), calcareous, silty shale. Most of the limestone units have distinct lamination texture due to the accumulation of skeletal debris in horizontal layers (i.e., 7774.0 to 7774.9 feet). Bioturbation is visible at 7775.4 feet and 7777.2 feet. Slickensides and vertical (stylolite-like) calcite-cemented fractures are common at this interval. Compressional deformation characterized by reverse microfaults occurs at 7775.5 feet, 7775.9 feet, and 7776.75 feet. Three volcanic ash beds (K-bentonites) are identified in this interval.



CHERRY VALLEY
BASIN
MARCELLUS FORMATION
MIDDLE DEVONIAN
TIOGA ASH BED
SHELF
ONONDAGA FORMATION

Core Lab
RESERVOIR OPTIMIZATION

GEOLOGY BY:
Jie Zhou

COMPUTER DRAFTING BY:
J. Followell

VERTICAL SCALE
1 : 48

Job No. 090180
MSS 25

CORE LEGEND

LITHOLOGY

- SANDSTONE
- MUDDY SANDSTONE
- SILTSTONE
- SHALE
- SILTY SHALE
- LIMESTONE
- DOLOSTONE
- CALCITIC / DOLOMITIC
- FRACTURE
- CARBONATE GRAINS
- SHELL/SKELETAL FRAGMENTS
- BEDDED CHERT
- CHERT NODULES
- CHERT LAYERS
- PYRITE NODULES
- BURROWS
- SOFT SEDIMENT DEFORMATION
- CARBONACEOUS DETRITUS
- WAVY DISCONTINUOUS BEDDING
- HARDGROUND
- CONCRETIONS
- EROSIONAL CONTACT
- GRADATIONAL CONTACT
- SEPTARIAN NODULES
- AMMONOIDS
- BRACHIOPODS
- FLUORAPATITE
- ENCHINODERMS
- FINING UP BED
- CORING INDUCED FRACTURE
- OPEN/CLOSED NATURAL FRACTURE
- MINERALIZED FRACTURE

$CaCO_3$ REACTION

- PROFUSE
- MODERATE
- MINOR
- NONE

- FINING UPWARD
- COARSENING UPWARD

SAMPLE LOCATION

- □ - THIN SECTION
- X - XRAY
- △ - SCAL (MAY INCLUDE ROCK MECHANICS, PROPPANT EMBEDMENT, ACOUSTIC ANISOTROPY, GEOCHEMISTRY, GRI, FRACTURE CONDUCTIVITY, AND/OR FLUID SENSITIVITY)

SSD - SOFT SEDIMENT DEFORMATION
CARB. - CARBONACEOUS
PY - PYRITE
CALC. - CALCAREOUS
GLAUC. - GLAUCONITIC
SID. - SIDERITE

CORE DESCRIPTION PANEL

PETROLEUM DEV CORP

ARMSTRONG #1

COURT HOUSE FIELD

TAYLOR COUNTY, WEST VIRGINIA

PANEL 2 OF 2