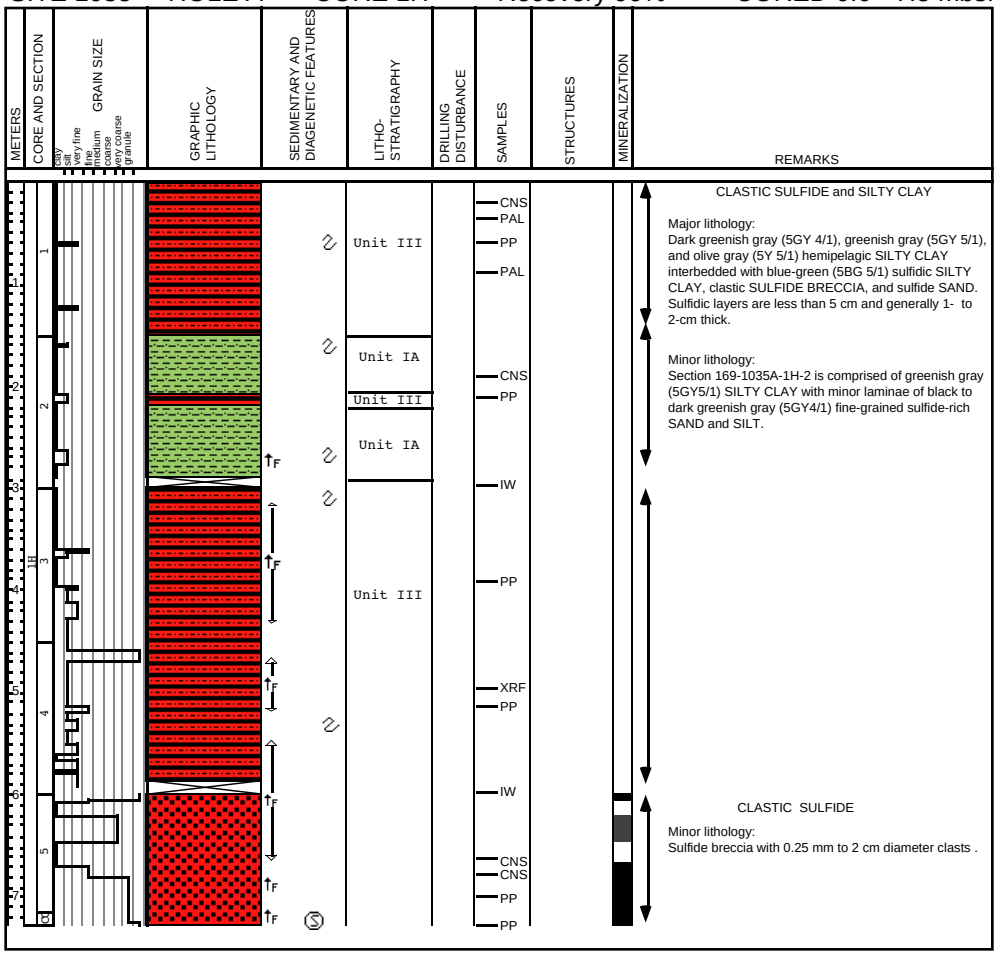
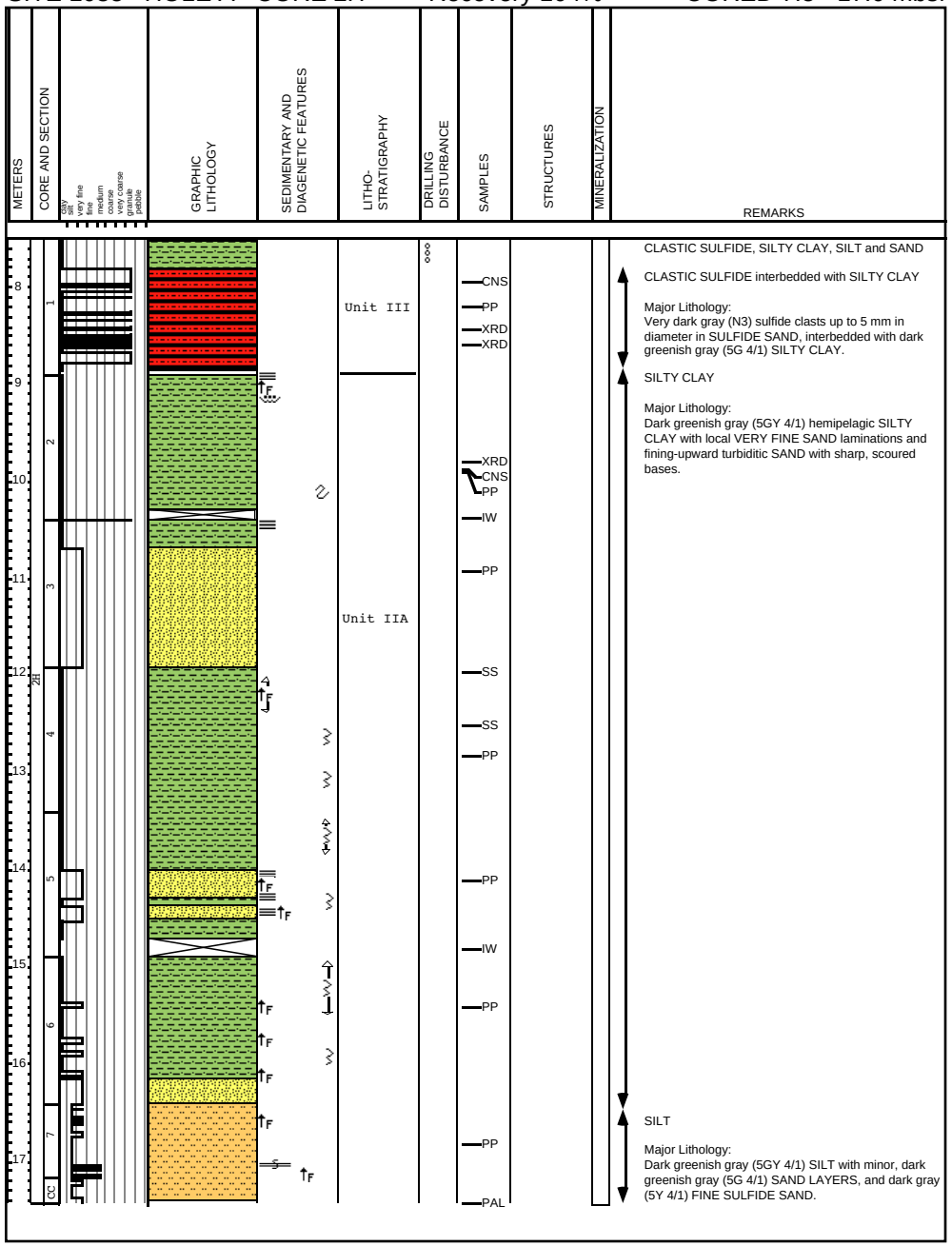
SITE 1035 HOLE A CORE 1H Recovery 99% CORED 0.0 - 7.5 mbsf 1035A-1H



Prior Chapter Contents Next Chapter

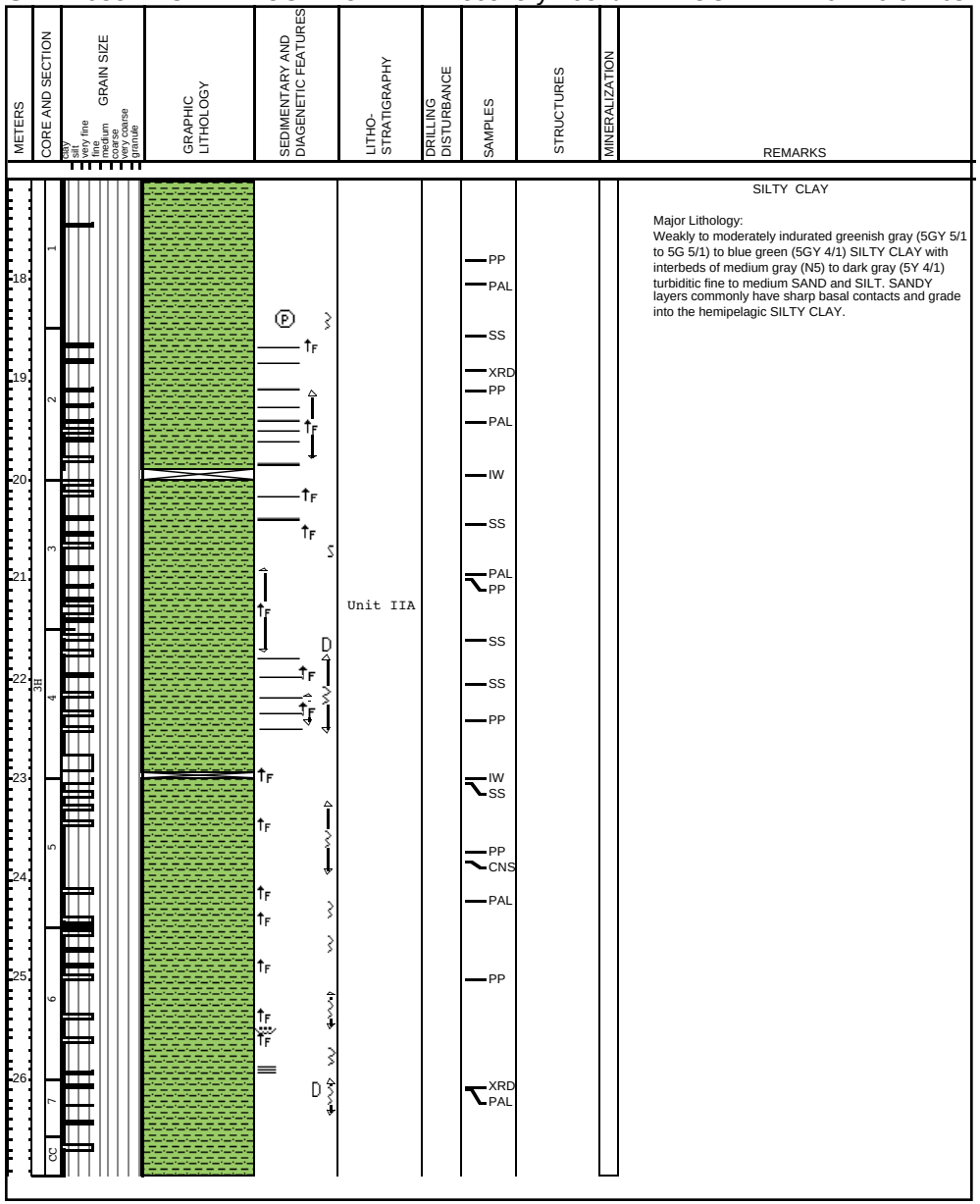
SITE 1035 HOLE A CORE 2H Recovery 104% CORED 7.5 - 17.0 mbsf

1035A-2H



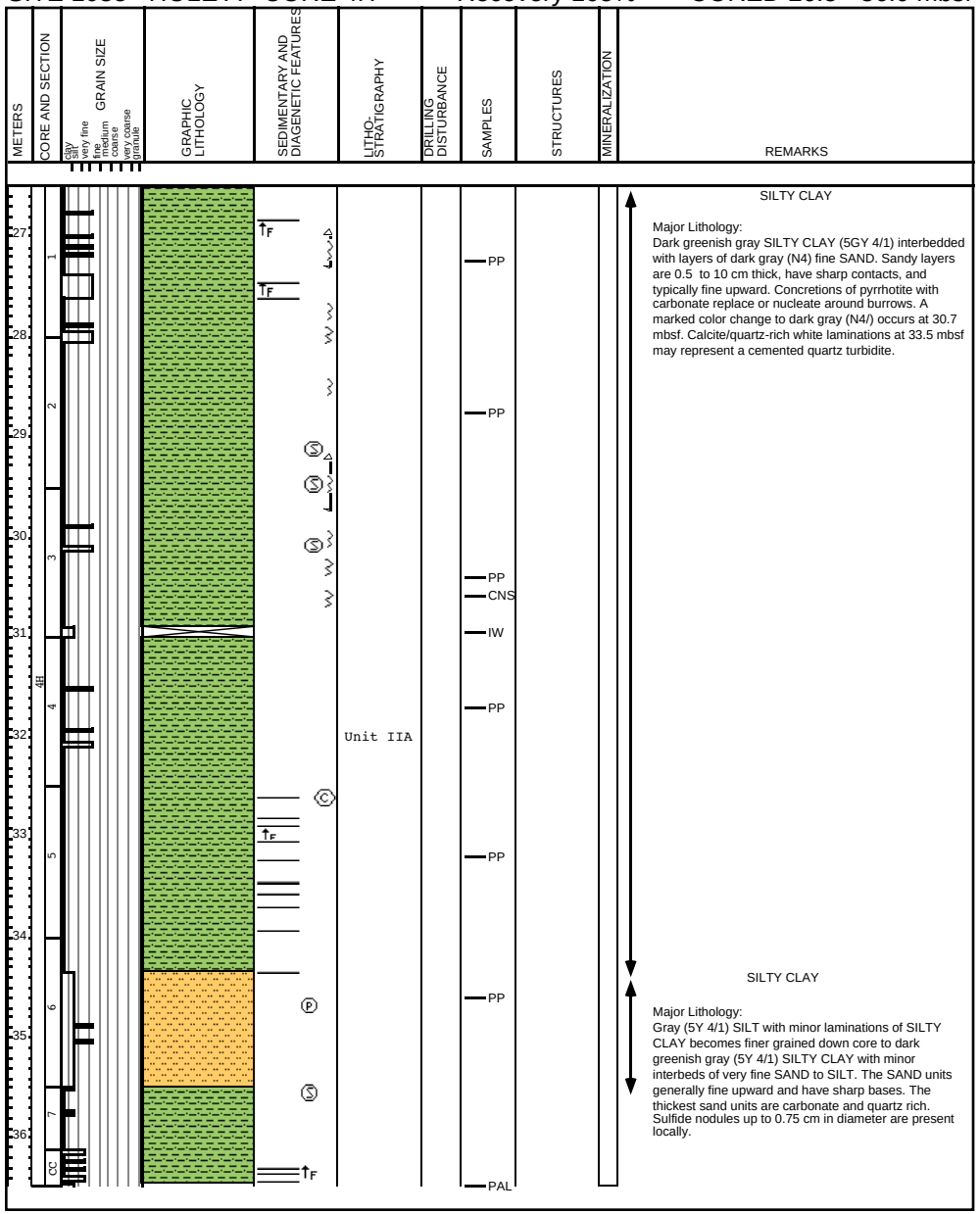
SITE 1035 HOLE A CORE 3H Recovery 105% CORED 17.0 - 26.5 mbsf

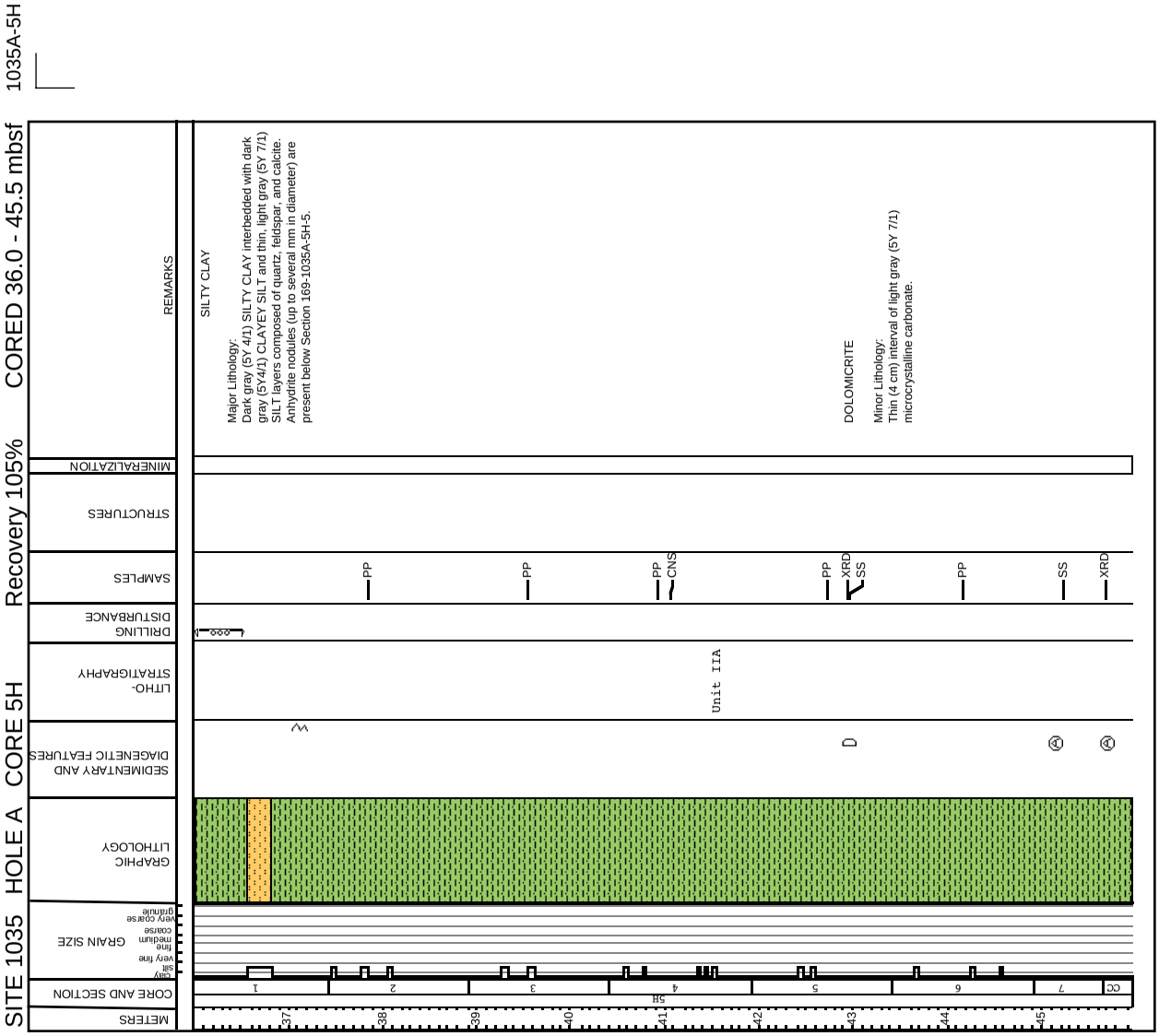
1035A-3H



SITE 1035 HOLE A CORE 4H Recovery 105% CORED 26.5 - 36.0 mbsf

1035A-4H



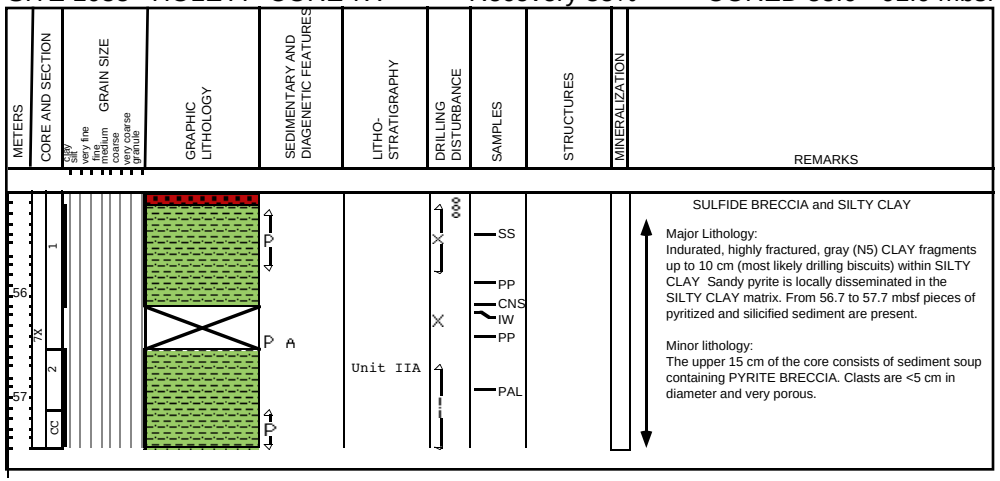

1035A-5H
SITE 1035 HOLE A CORE 5H Recovery 105% CORED 36.0 - 45.5 mbsf
METERS
CORE AND SECTION
GRAIN SIZE
clay
silt
very fine
fine
medium
coarse
very coarse
granule
GRAPHIC LITHOLOGY
SEDIMENTARY AND DIAGENETIC FEATURES
LITHO-STRATIGRAPHY
DRILLING DISTURBANCE
SAMPLES
STRUCTURES
MINERALIZATION
REMARKS
SILTY CLAY
Major Lithology:
Dark gray (5Y 4/1) SILTY CLAY interbedded with dark gray (5Y4/1) CLAYEY SILT and thin, light gray (5Y 7/1) SILT layers composed of quartz, feldspar, and calcite.
Anhydrite nodules (up to several mm in diameter) are present below Section 169-1035A-5H-5.
DOLOMICRITE
Minor Lithology:
Thin (4 cm) interval of light gray (5Y 7/1) microcrystalline carbonate.
Unit IIA
PP
CNS
XRD
SS
1
2
3
4
5
6
7
CC
5H
37
38
39
40
41
42
43
44
45


1035A-6H
SITE 1035 HOLE A CORE 6H Recovery 81% CORED 45.5 - 55.0 mbsf
METERS
CORE AND SECTION
GRAIN SIZE
GRAPHIC LITHOLOGY
SEDIMENTARY AND DIAGENETIC FEATURES
LITHO-STRATIGRAPHY
DRILLING DISTURBANCE
SAMPLES
STRUCTURES
MINERALIZATION
REMARKS
SILTY CLAY
Major Lithology:
Dark greenish gray (5G 4/1) SILTY CLAY. Slight bioturbation occurs down section.
Unit IIC
SS
PP
CNS
IW
PAL
1
2
3
4
5
CC
6H
46
47
48
49
50
51
52
53

SITE 1035 HOLE A CORE 7X Recovery 35% CORED 55.0 - 61.0 mbsf

1035A-7X

1035A-8X

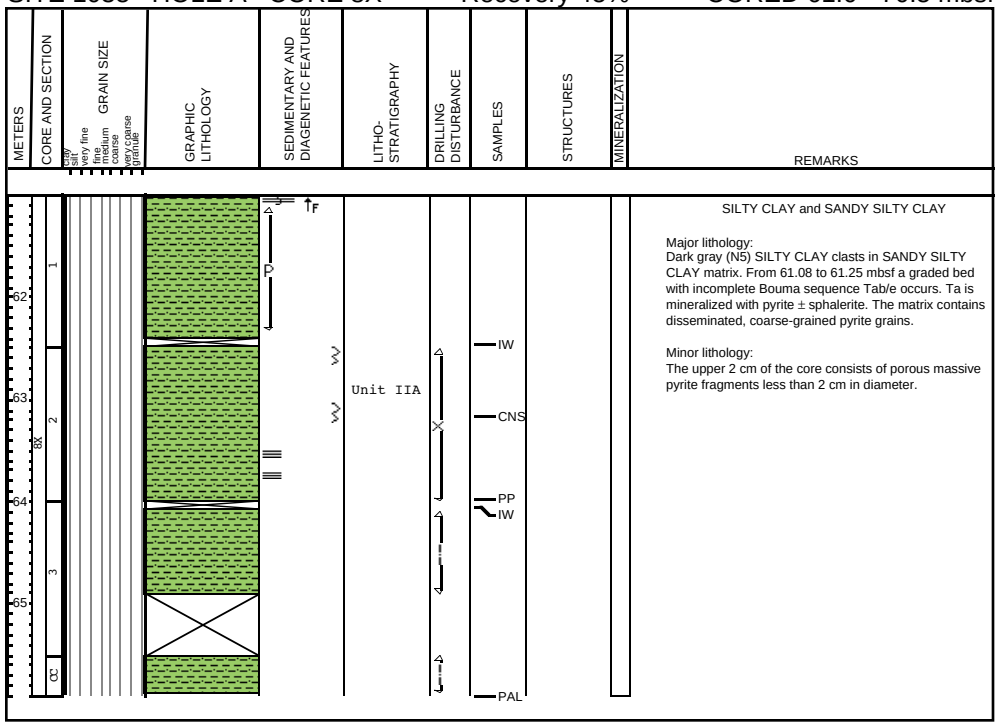


SULFIDE BRECCIA and SILTY CLAY

Major Lithology:
Indurated, highly fractured, gray (N5) CLAY fragments up to 10 cm (most likely drilling biscuits) within SILTY CLAY Sandy pyrite is locally disseminated in the SILTY CLAY matrix. From 56.7 to 57.7 mbsf pieces of pyritized and silicified sediment are present.

Minor lithology:
The upper 15 cm of the core consists of sediment soup containing PYRITE BRECCIA. Clasts are <5 cm in diameter and very porous.

SITE 1035 HOLE A CORE 8X Recovery 45% CORED 61.0 - 70.5 mbsf



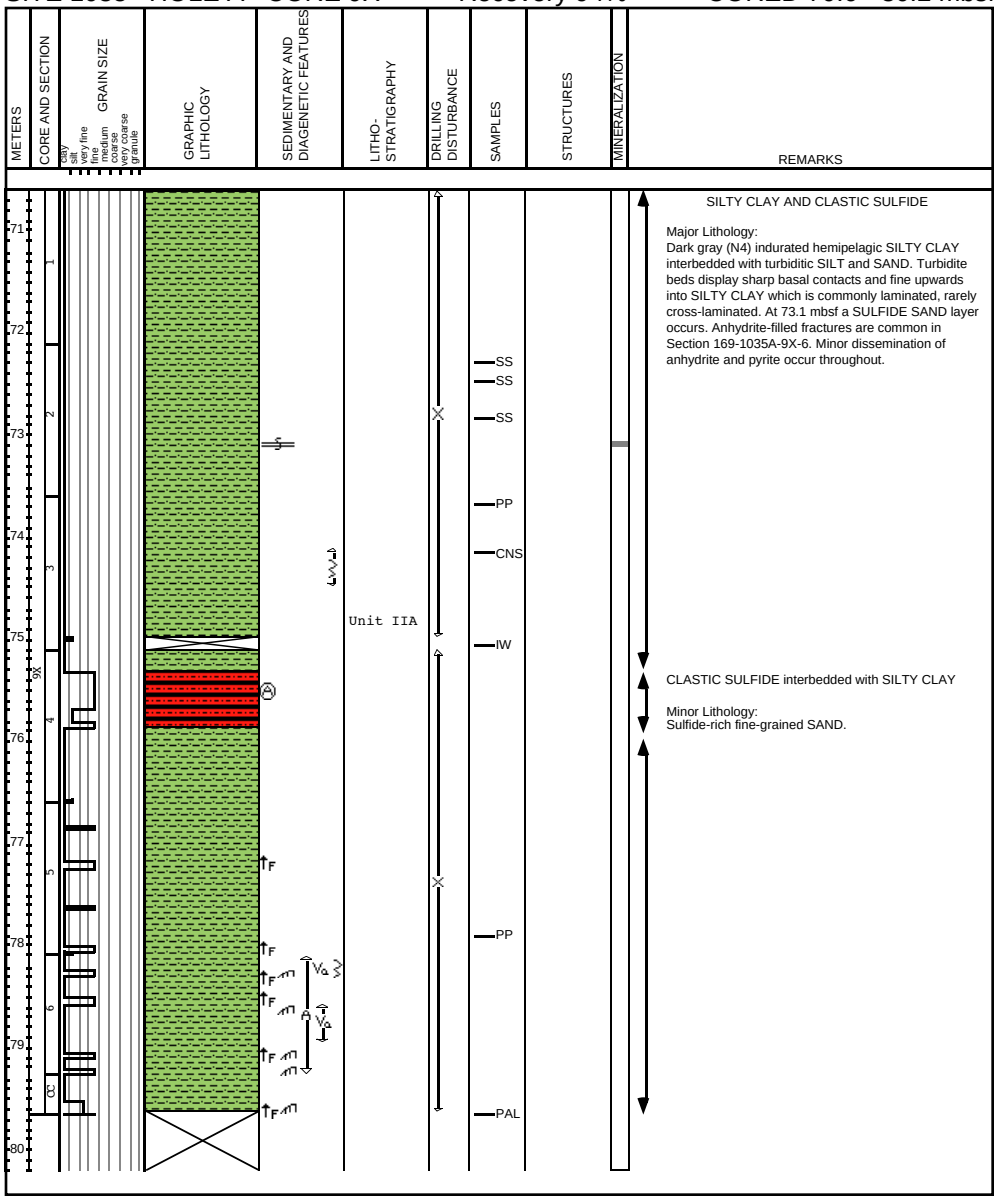
SILTY CLAY and SANDY SILTY CLAY

Major lithology:
Dark gray (N5) SILTY CLAY clasts in SANDY SILTY CLAY matrix. From 61.08 to 61.25 mbsf a graded bed with incomplete Bouma sequence Tab/e occurs. Ta is mineralized with pyrite ± sphalerite. The matrix contains disseminated, coarse-grained pyrite grains.

Minor lithology:
The upper 2 cm of the core consists of porous massive pyrite fragments less than 2 cm in diameter.

SITE 1035 HOLE A CORE 9X Recovery 94% CORED 70.6 - 80.2 mbsf

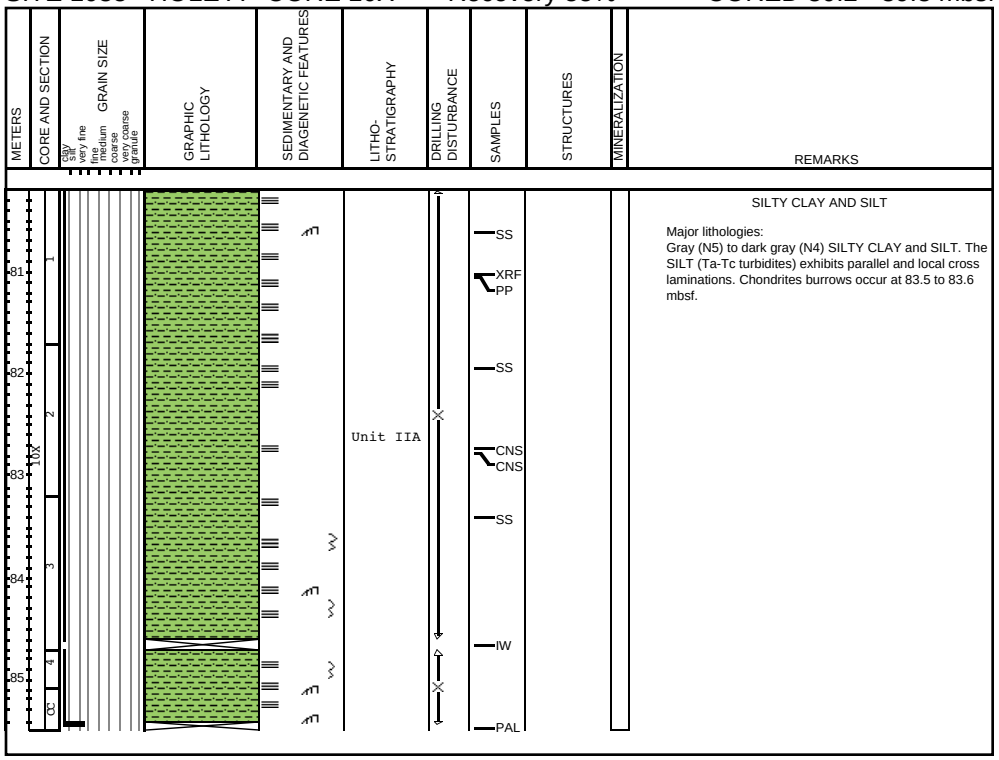
1035A-9X



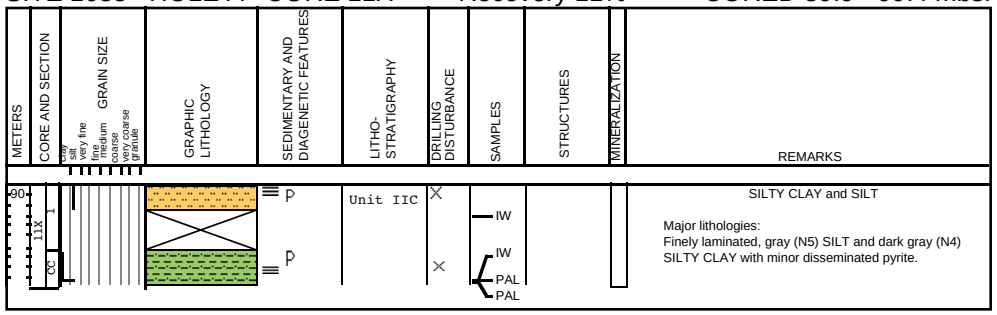
SITE 1035 HOLE A CORE 10X Recovery 55% CORED 80.2 - 89.8 mbsf

1035A-10X

1035A-11X

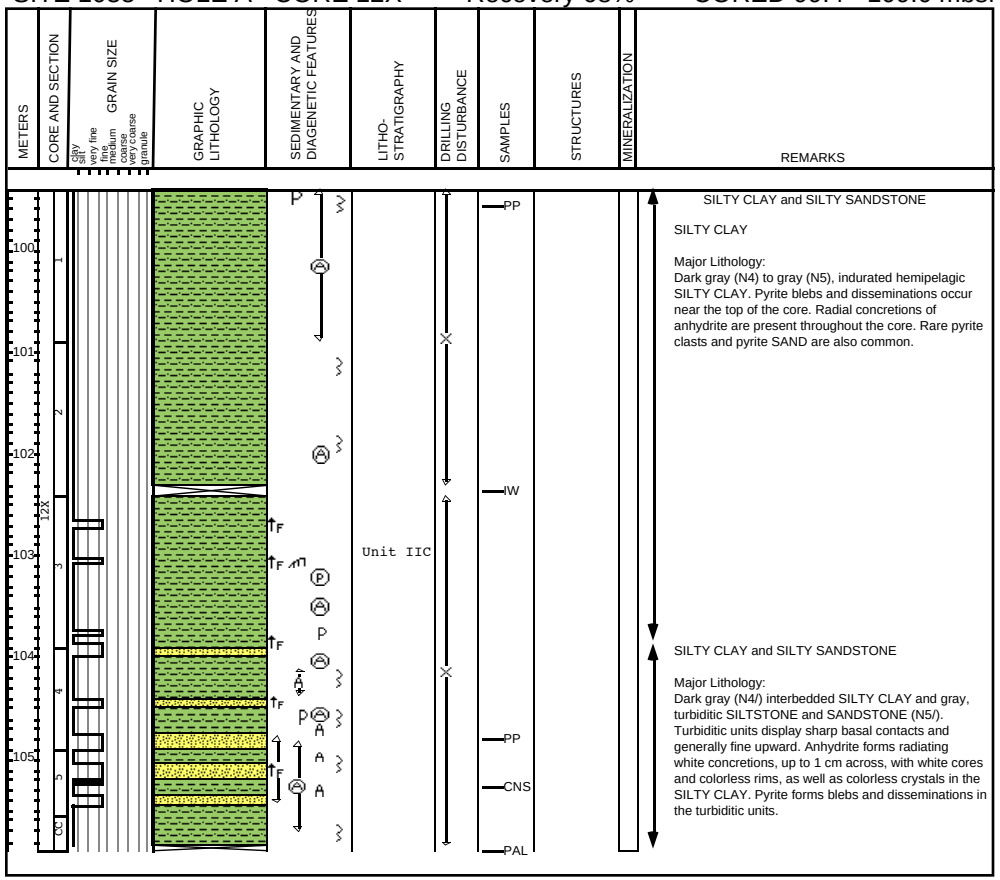


SITE 1035 HOLE A CORE 11X Recovery 11% CORED 89.9 - 99.4 mbsf

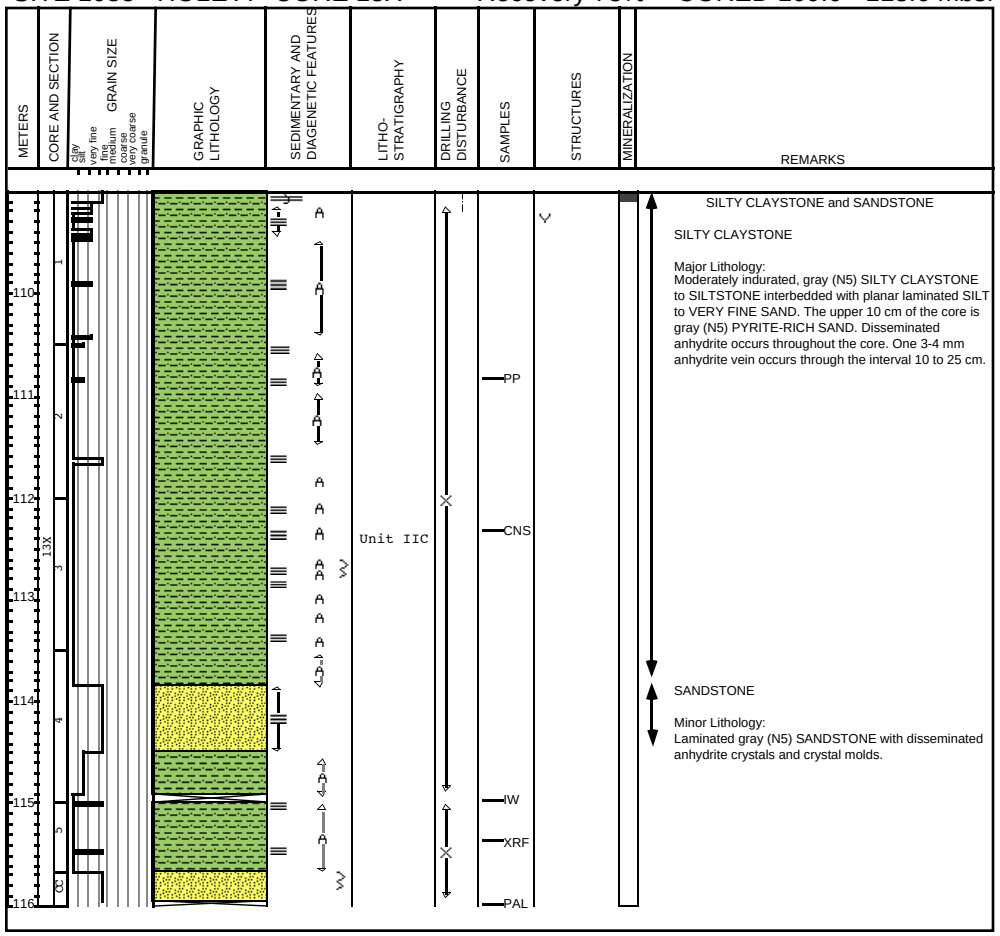


SITE 1035 HOLE A CORE 12X Recovery 68% CORED 99.4 - 109.0 mbsf

1035A-12X

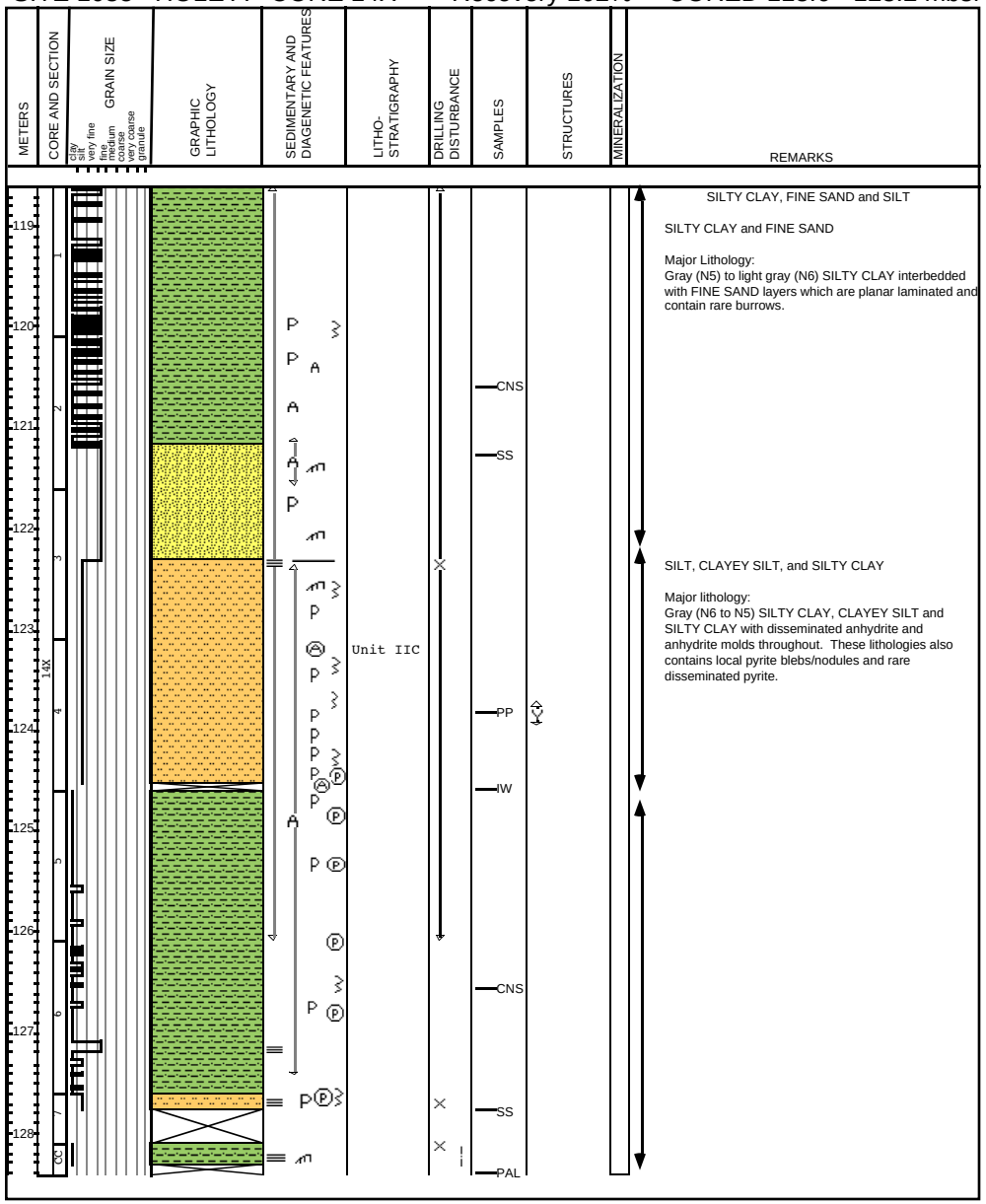


SITE 1035 HOLE A CORE 13X Recovery 73% CORED 109.0 - 118.6 mbsf 1035A-13X



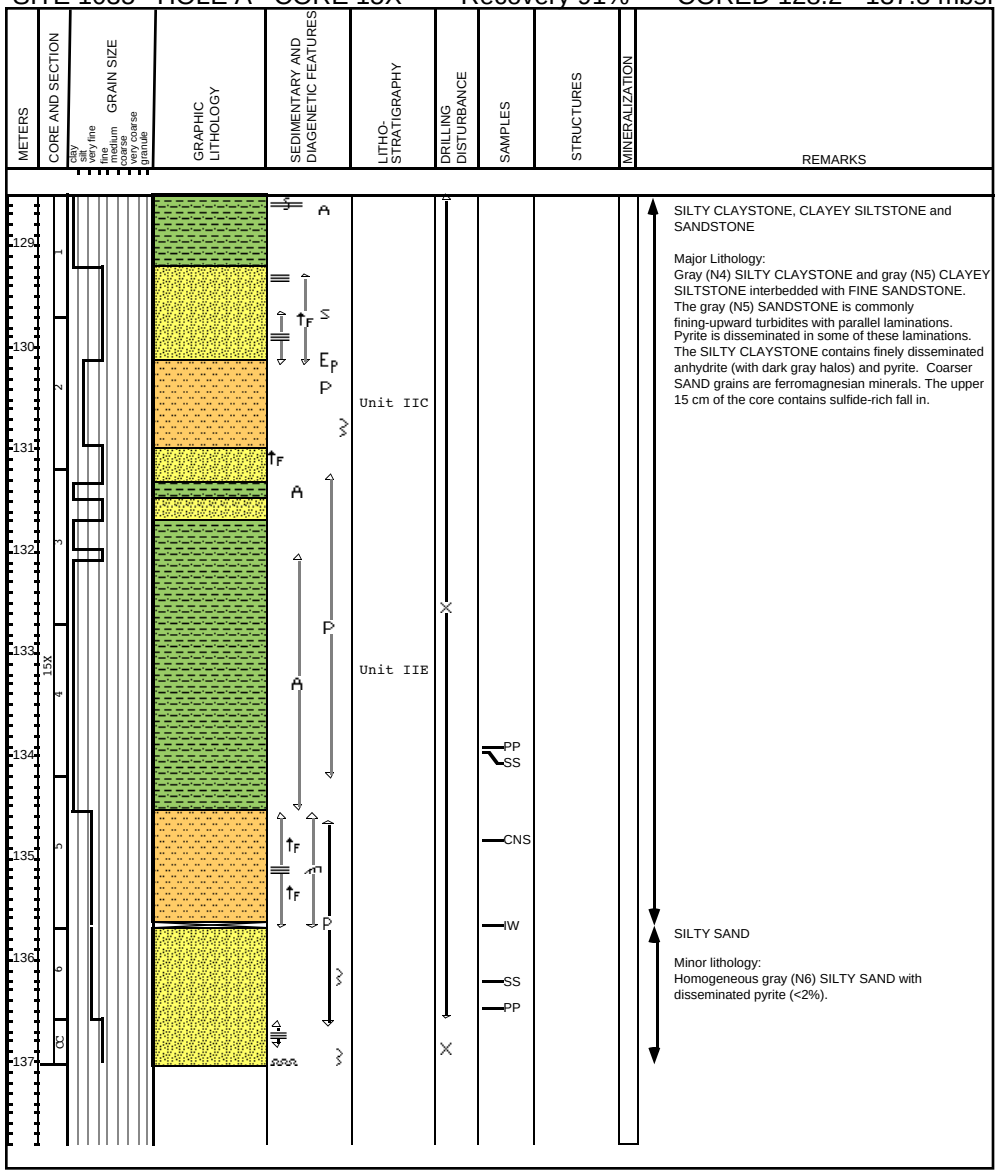
SITE 1035 HOLE A CORE 14X Recovery 102% CORED 118.6 - 128.2 mbsf

1035A-14X



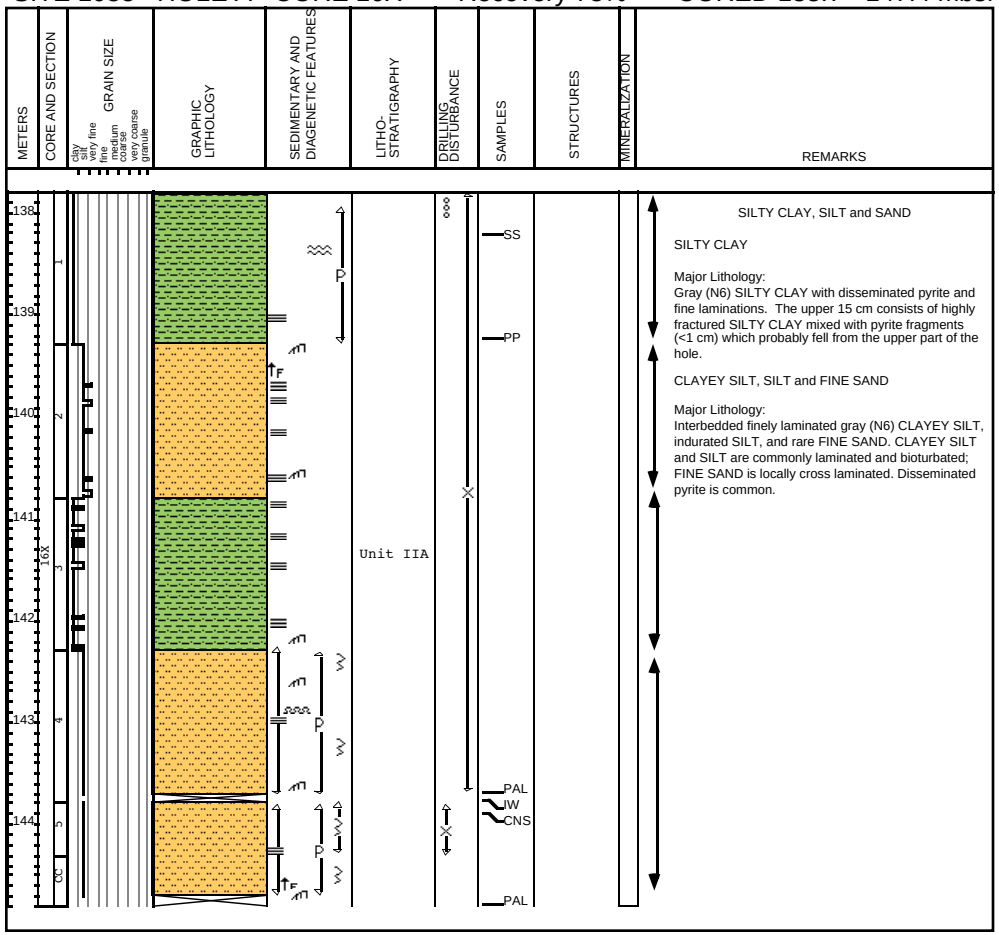
SITE 1035 HOLE A CORE 15X Recovery 91% CORED 128.2 - 137.8 mbsf

1035A-15X



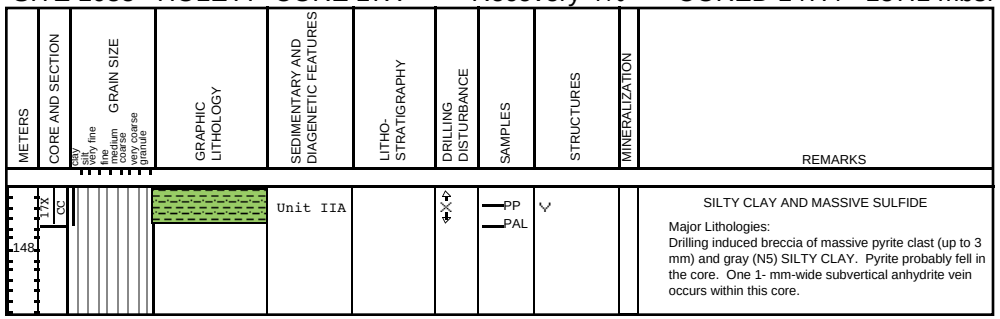
SITE 1035 HOLE A CORE 16X Recovery 73% CORED 138.7 - 147.4 mbsf

1035A-16X



1035A-17X 1035A-18X 1035A-19X

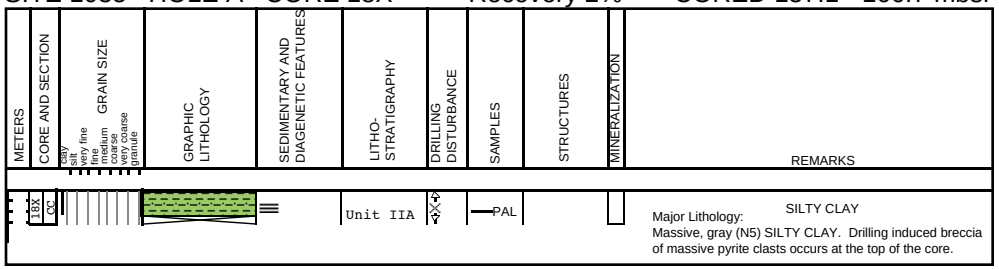
SITE 1035 HOLE A CORE 17X Recovery 4% CORED 147.4 - 157.1 mbsf



SILTY CLAY AND MASSIVE SULFIDE

Major Lithologies:
Drilling induced breccia of massive pyrite clast (up to 3 mm) and gray (N5) SILTY CLAY. Pyrite probably fell in the core. One 1- mm-wide subvertical anhydrite vein occurs within this core.

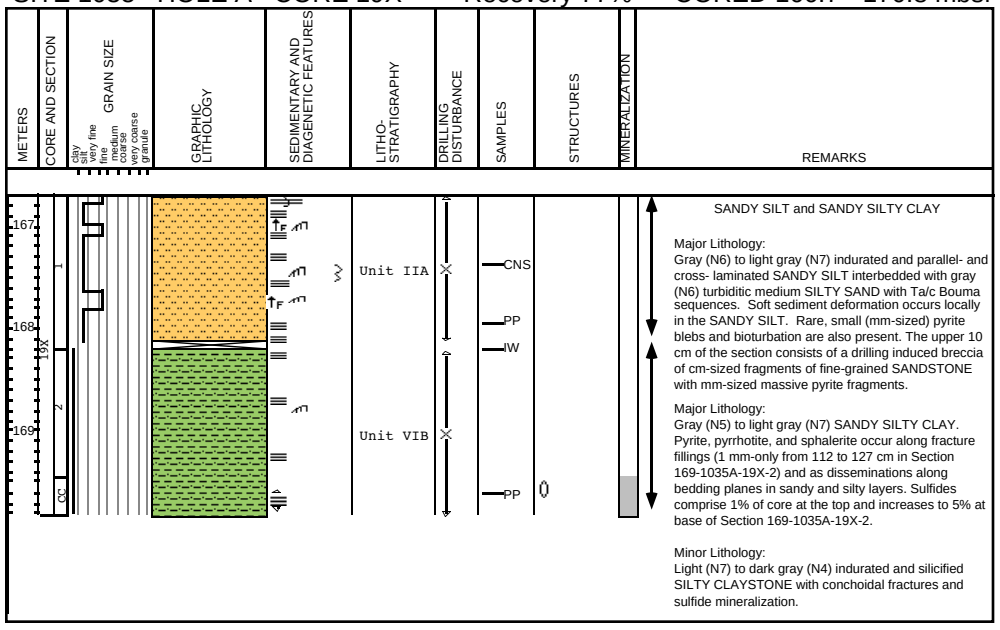
SITE 1035 HOLE A CORE 18X Recovery 2% CORED 157.1 - 166.7 mbsf



SILTY CLAY

Major Lithology:
Massive, gray (N5) SILTY CLAY. Drilling induced breccia of massive pyrite clasts occurs at the top of the core.

SITE 1035 HOLE A CORE 19X Recovery 77% CORED 166.7 - 170.8 mbsf

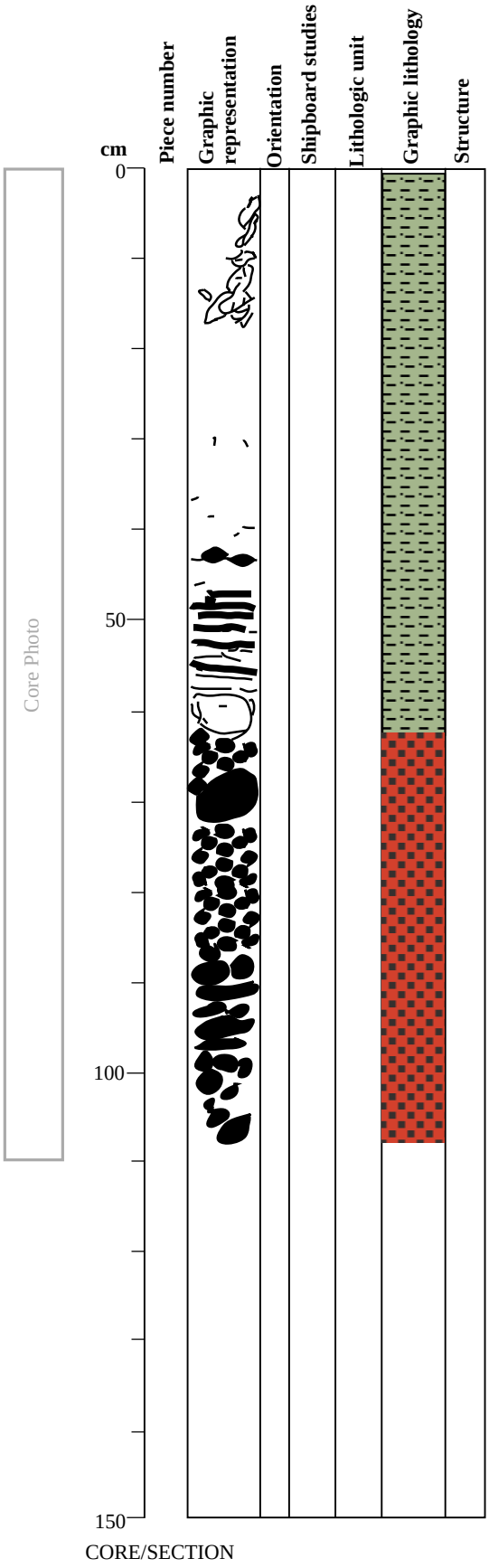


SANDY SILT and SANDY SILTY CLAY

Major Lithology:
Gray (N6) to light gray (N7) indurated and parallel- and cross- laminated SANDY SILT interbedded with gray (N6) turbiditic medium SILTY SAND with Ta/c Bouma sequences. Soft sediment deformation occurs locally in the SANDY SILT. Rare, small (mm-sized) pyrite blebs and bioturbation are also present. The upper 10 cm of the section consists of a drilling induced breccia of cm-sized fragments of fine-grained SANDSTONE with mm-sized massive pyrite fragments.

Major Lithology:
Gray (N5) to light gray (N7) SANDY SILTY CLAY. Pyrite, pyrrhotite, and sphalerite occur along fracture fillings (1 mm-only from 112 to 127 cm in Section 169-1035A-19X-2) and as disseminations along bedding planes in sandy and silty layers. Sulfides comprise 1% of core at the top and increases to 5% at base of Section 169-1035A-19X-2.

Minor Lithology:
Light (N7) to dark gray (N4) indurated and silicified SILTY CLAYSTONE with conchoidal fractures and sulfide mineralization.



169-1035C-1X-1
Top of Core 1, 0.0 mbsf

ROCK TYPE: HEMIPELAGIC MUD and CLASTIC SULFIDE BRECCIA

0 - 20 cm: Mud and sulfide fragments, 1 mm to 2 cm. Fragments are somewhat indurated pieces of mud, oxidized to rusty appearing sulfides, and there is some foramiknifera in adhering mud.

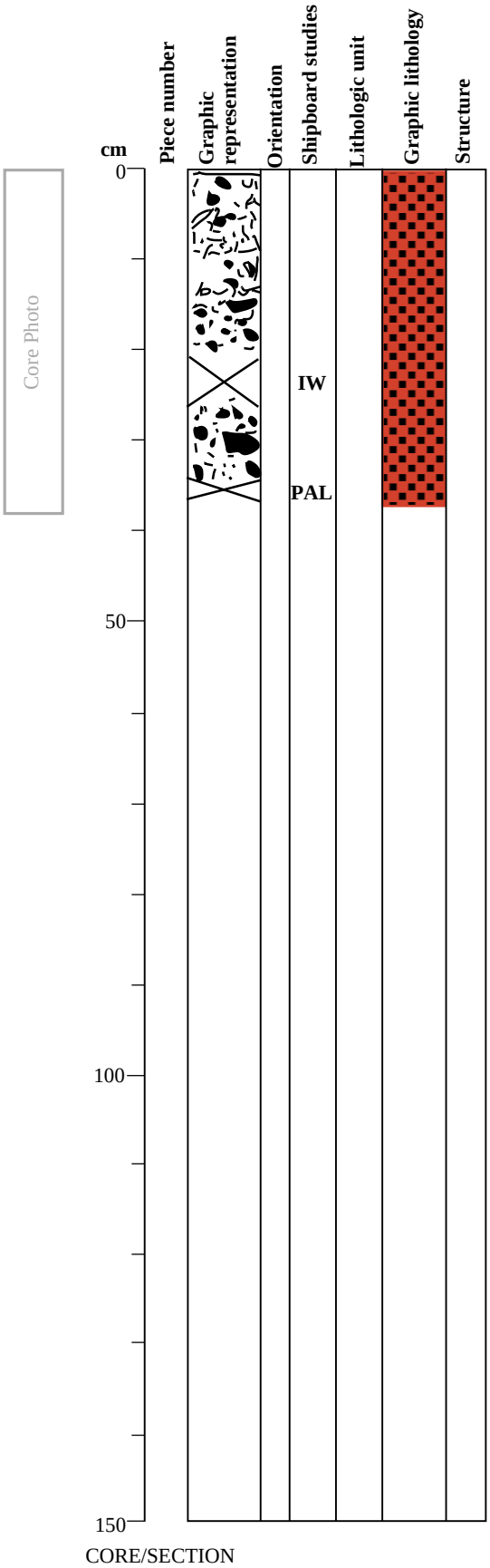
20 - 45 cm: Olive gray (5Y 4/2 hemipelagic clay with abundant 1 - 4 mm sulfide fragments. Dominantly pyrrhotite and oxidized pyrrhotite. 4% total sulfide.

45 - 60 cm: Laminated sulfide-bearing clay interlayered with hemipelagic clay. 5% - 10% sulfides.

60 - 65 cm: Indurated claystone clast (6 cm x 4 cm) 5GY 4/1, dark greenish gray.

65 - 110 cm: Sulfide breccia. > 90% sulfide minerals. Clasts from silt size to 6 - 8 cm. Massive pyrrhotite dominates the assemblage. A few clasts of vuggy pyrite are present. The breccia is completely unsorted, angular fragments, with a few 1 - 3 mm thick layers of sulfide sand. Probable sphalerite/wurtzite present.

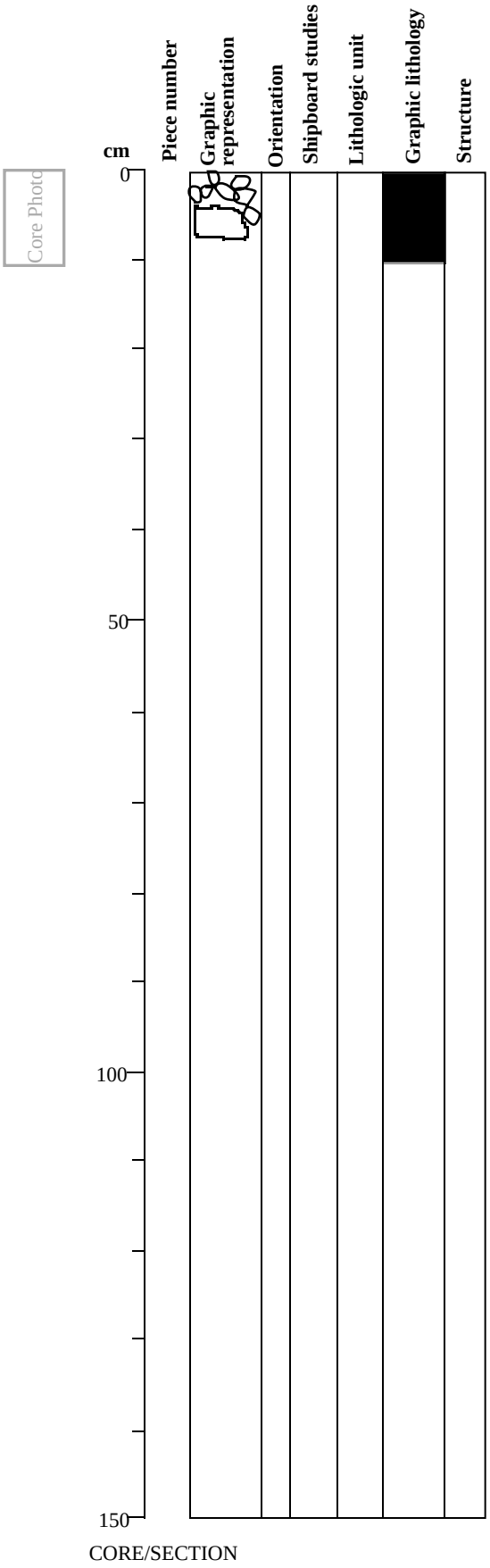
169-1035C-1X-CC
Top of Core 1, 0.0 mbsf



ROCK TYPE: SULFIDE BRECCIA
COMMENTS:

Sulfide breccia, 90% sulfide minerals, including pyrrhotite, pyrite, and some magnetite. Breccia consists of mm to 3 cm angular clasts of mainly pyrrhotite, with a few clasts of vuggy pyrite. Completely unsorted.

NOTE: Core 169-1035C-2X was not recovered.

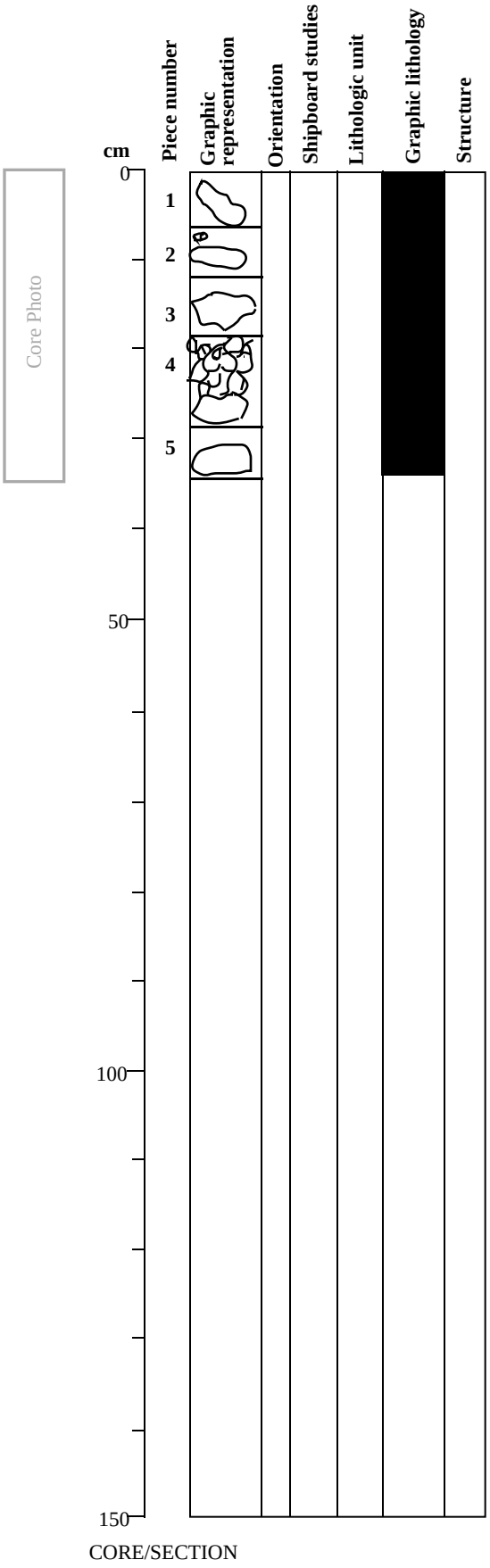


169-1035C-3X-CC
Top of Core 3, 20.1 mbsf

ROCK TYPE: MASSIVE PYRRHOTITE
COMMENTS:

85% - 90% pyrrhotite, 10% -12%, pyrite, 2% -5% magnetite. Clay minerals form part of the altered surface of some pieces. Some variation between pieces from very fine-grained massive pyrrhotite to yellow, porous, massive pyrite. Some pieces contain magnetite. Some dark pieces are less dense, and seem to be a mixture of mud and sulfide silt.

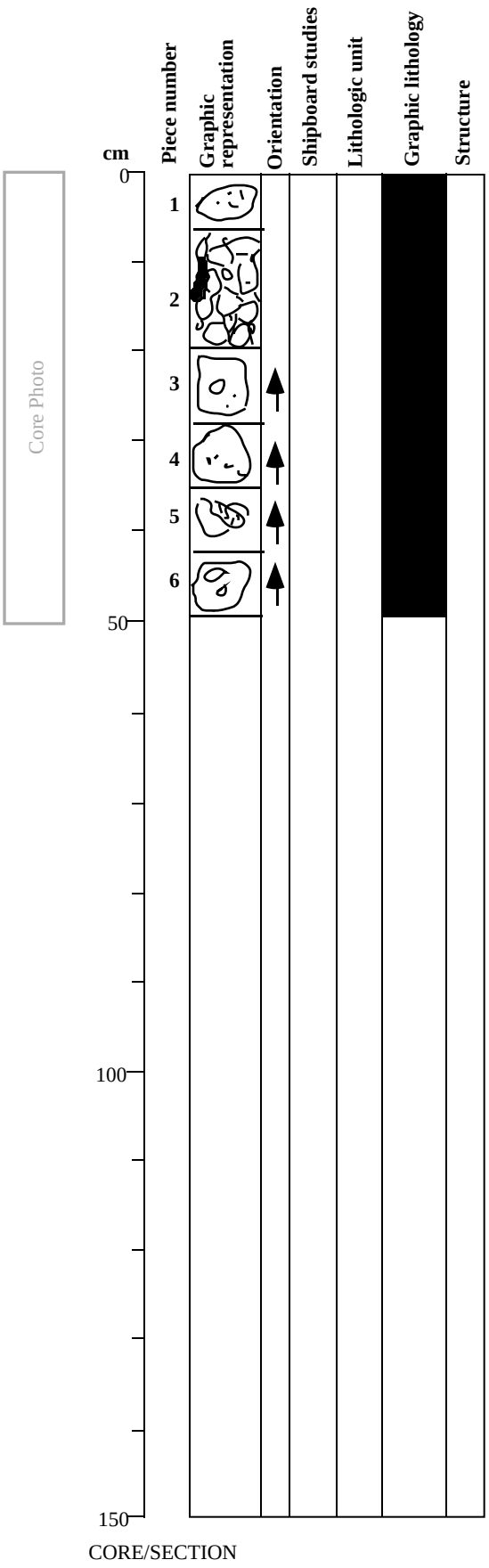
169-1035C-4X-1
Top of Core 4, 29.7 mbsf



Pieces 1-5

ROCK TYPE: MASSIVE COLLOFORM AND VUGGY PYRITE
COMMENTS:

Yellow color, 90% to 95% pyrite, only minor pyrrhotite, and some anhydrite. Vuggy, colloform pieces, with apparent worm tubes which appear to be cemented to a curviplanar surface. Piece 2 in Archive Half contains pyrrhotite-bearing siltstone, but the Working Half contains massive sulfide. Void space makes up ~10% of the rock, anhydrite has grown in void space.



169-1035C-5X-1
Top of Core 5, 39.3 mbsf

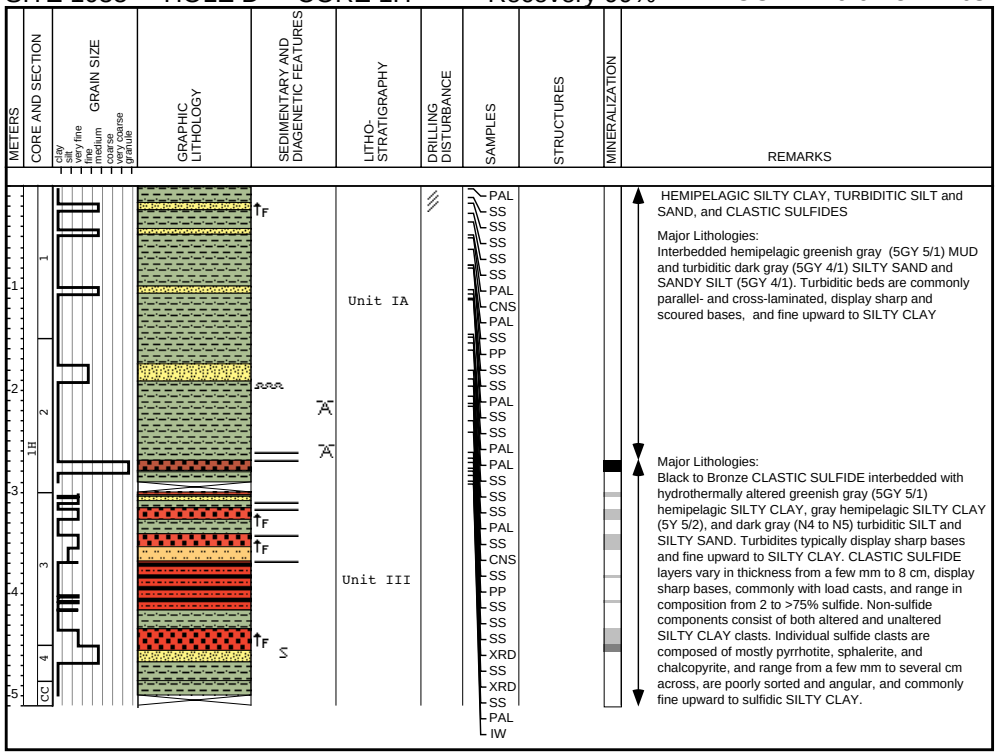
Pieces 1-6

ROCK TYPE: MASSIVE PYRITE and CHALCOPYRITE
COMMENTS:

70% pyrite, 25% chalcopyrite, 5% anhydrite, minor sphalerite as odd crystals and in 0.1- mm-wide veins. Some vugs are lined with little pyrite euhedra. Very thin veins up to 0.2 mm wide filled with sphalerite. Vugs vary in size from 0.1 to 2 cm. Shapes are rounded to ellipsoid, and subtriangular. Large anhydrite crystals line some of the vugs, and some colloform banding is present in Piece 5. Chalcopyrite abundant on the outer surfaces of pieces. In Archive Half, one of the pieces in bin 2 is altered sediment.

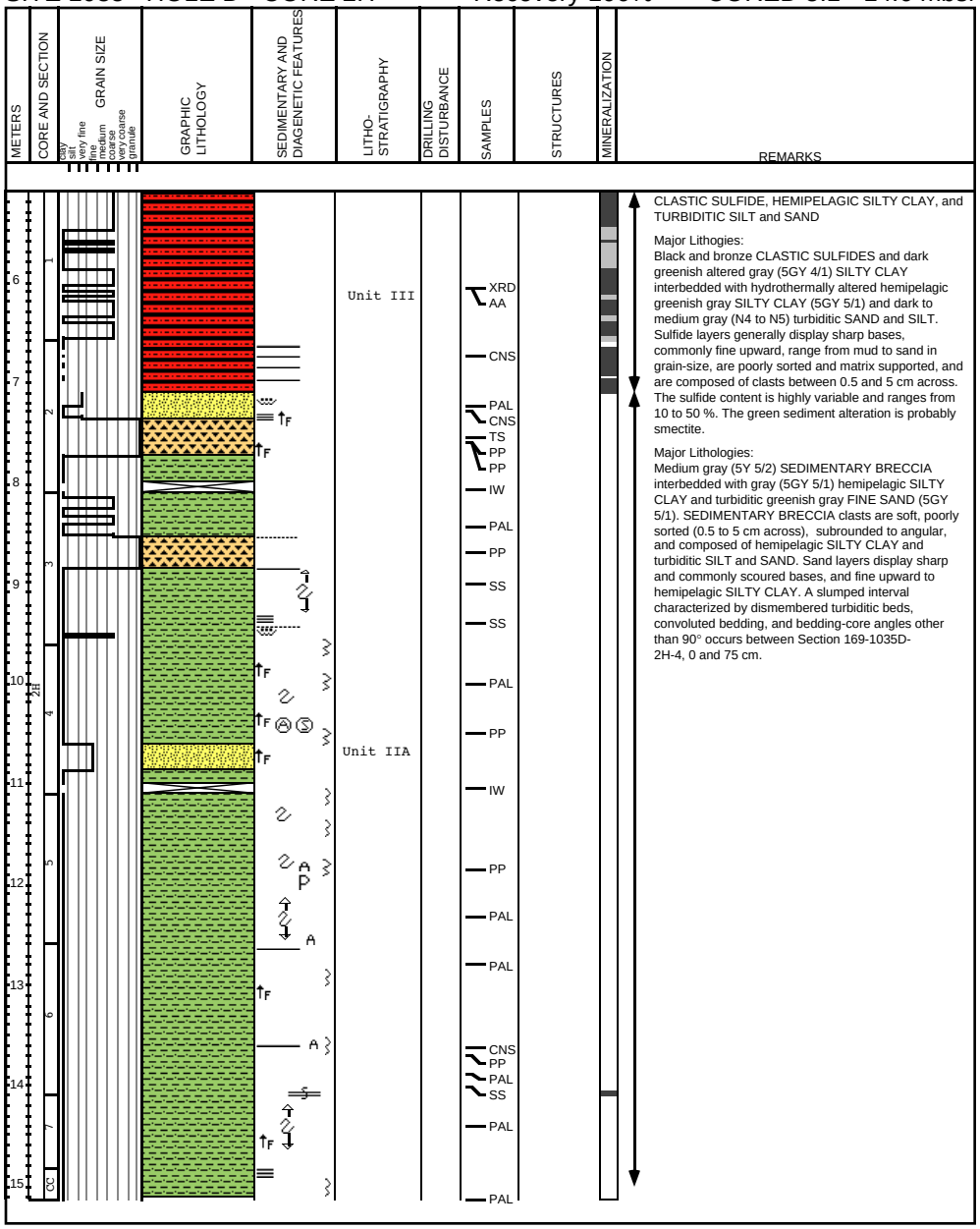
SITE 1035 HOLE D CORE 1H Recovery 99% CORED 0.0 - 5.1 mbsf

1035D-1H



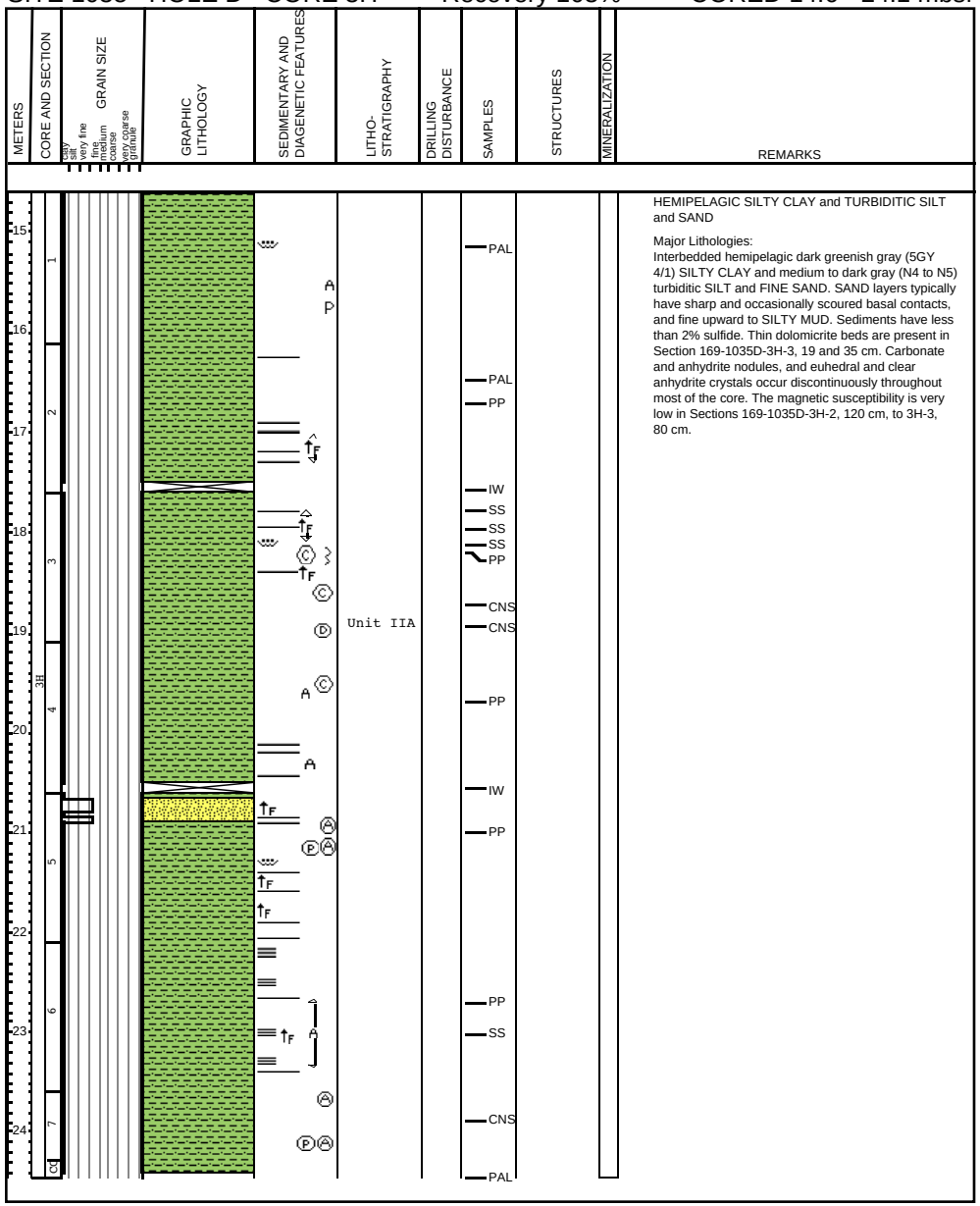
SITE 1035 HOLE D CORE 2H Recovery 106% CORED 5.1 - 14.6 mbsf

1035D-2H



SITE 1035 HOLE D CORE 3H Recovery 103% CORED 14.6 - 24.1 mbsf

1035D-3H

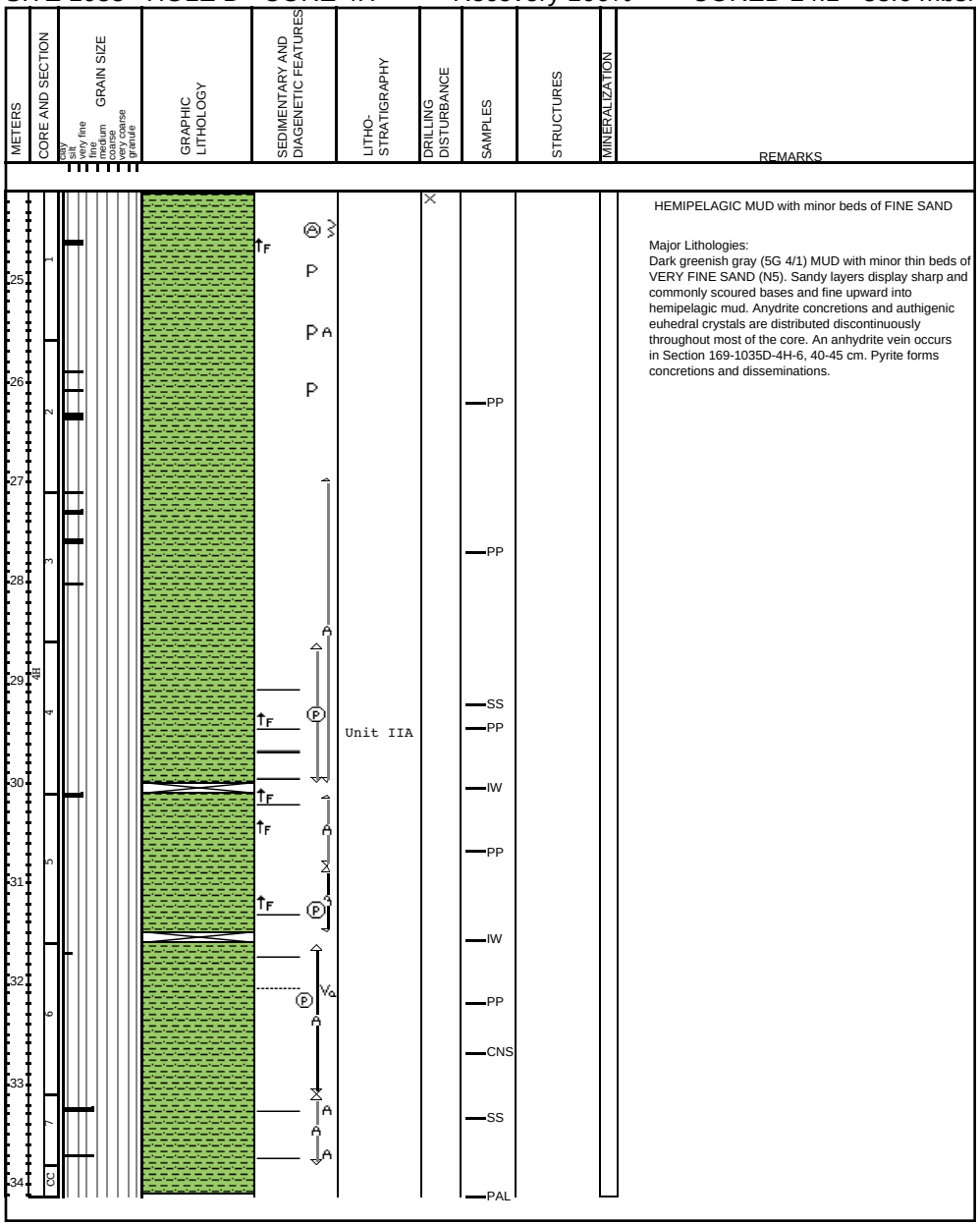


HEMIPELAGIC SILTY CLAY and TURBIDITIC SILT and SAND

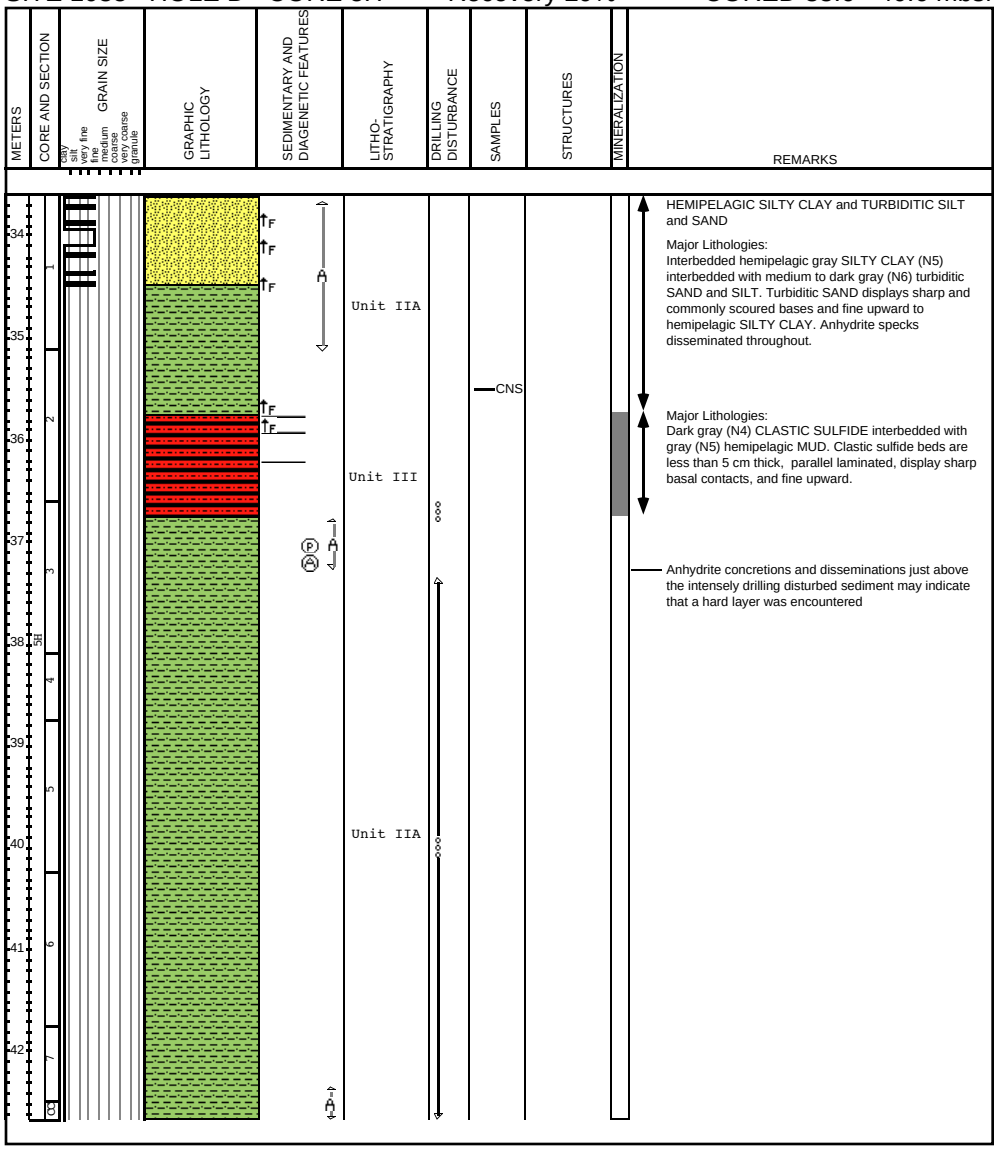
Major Lithologies:
Interbedded hemipelagic dark greenish gray (5GY 4/1) SILTY CLAY and medium to dark gray (N4 to N5) turbiditic SILT and FINE SAND. SAND layers typically have sharp and occasionally scoured basal contacts, and fine upward to SILTY MUD. Sediments have less than 2% sulfide. Thin dolomicrite beds are present in Section 169-1035D-3H-3, 19 and 35 cm. Carbonate and anhydrite nodules, and euhedral and clear anhydrite crystals occur discontinuously throughout most of the core. The magnetic susceptibility is very low in Sections 169-1035D-3H-2, 120 cm, to 3H-3, 80 cm.

SITE 1035 HOLE D CORE 4H Recovery 106% CORED 24.1 - 33.6 mbsf

1035D-4H

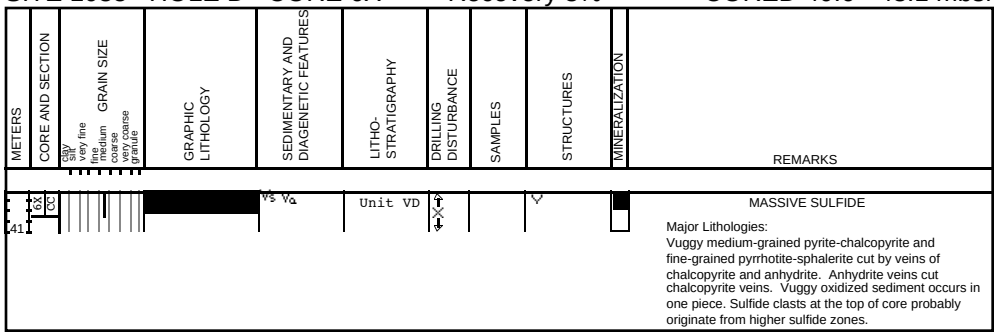


SITE 1035 HOLE D CORE 5H Recovery 29% CORED 33.6 - 40.6 mbsf 1035D-5H



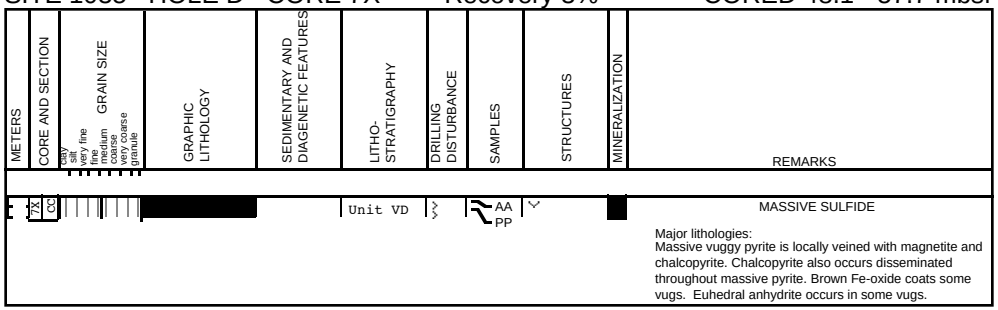
1035D-6X 1035D-7X 1035D-8N

SITE 1035 HOLE D CORE 6X Recovery 3% CORED 40.6 - 48.1 mbsf



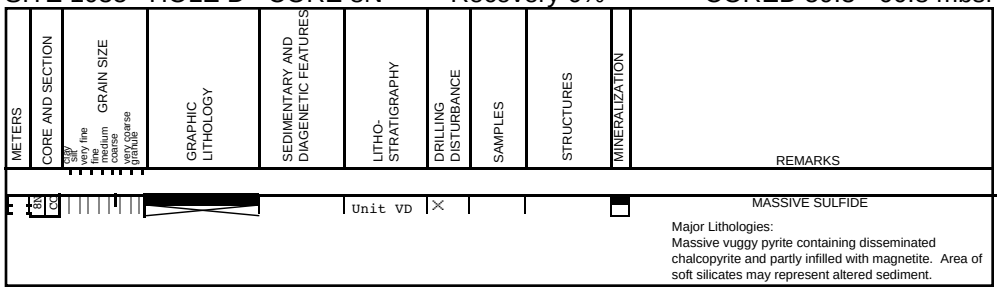
Major Lithologies:
Vuggy medium-grained pyrite-chalcopyrite and fine-grained pyrrhotite-sphalerite cut by veins of chalcopyrite and anhydrite. Anhydrite veins cut chalcopyrite veins. Vuggy oxidized sediment occurs in one piece. Sulfide clasts at the top of core probably originate from higher sulfide zones.

SITE 1035 HOLE D CORE 7X Recovery 3% CORED 48.1 - 57.7 mbsf



Major lithologies:
Massive vuggy pyrite is locally veined with magnetite and chalcopyrite. Chalcopyrite also occurs disseminated throughout massive pyrite. Brown Fe-oxide coats some vugs. Euhedral anhydrite occurs in some vugs.

SITE 1035 HOLE D CORE 8N Recovery 6% CORED 59.3 - 60.8 mbsf

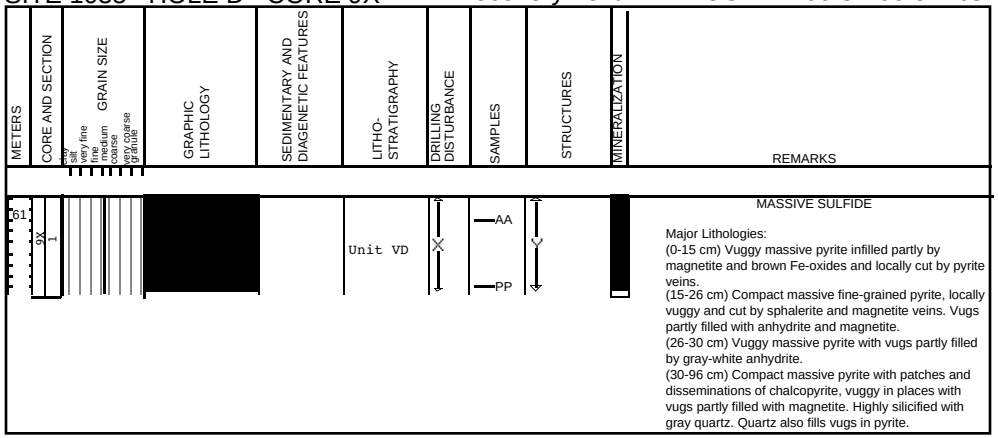


Major Lithologies:
Massive vuggy pyrite containing disseminated chalcopyrite and partly infilled with magnetite. Area of soft silicates may represent altered sediment.

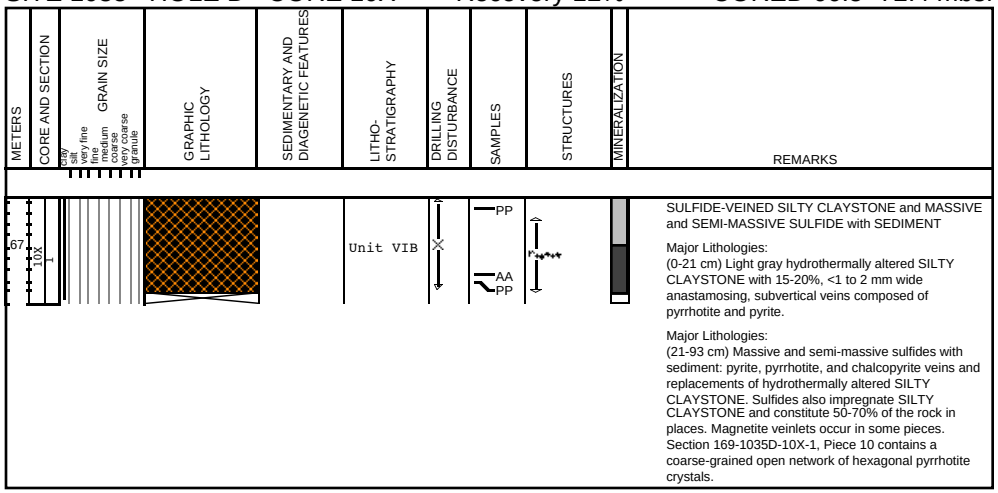
SITE 1035 HOLE D CORE 9X Recovery 15% CORED 60.8 - 66.5 mbsf

1035D-9X

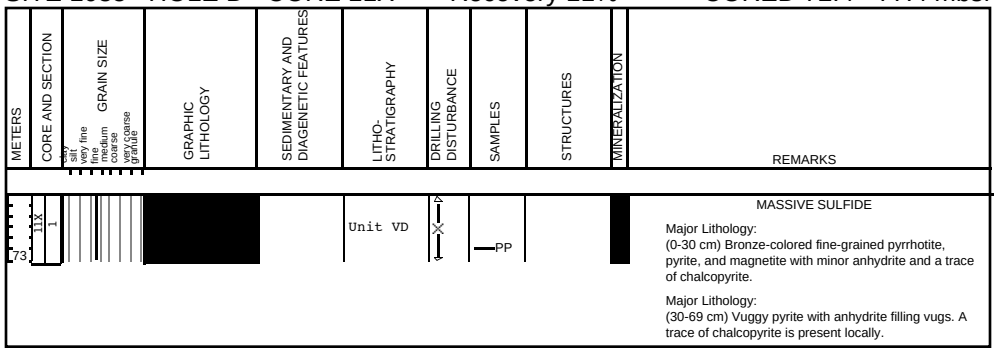
1035D-10X



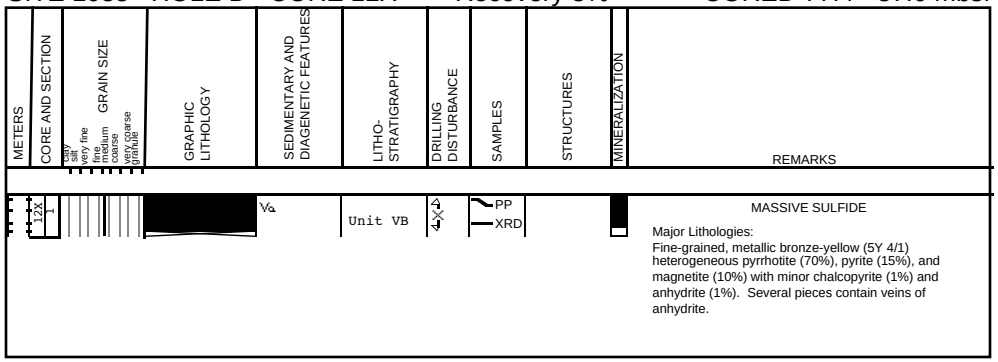
SITE 1035 HOLE D CORE 10X Recovery 12% CORED 66.5 -72.4 mbsf



SITE 1035 HOLE D CORE 11X Recovery 11% CORED 72.4 - 77.4 mbsf



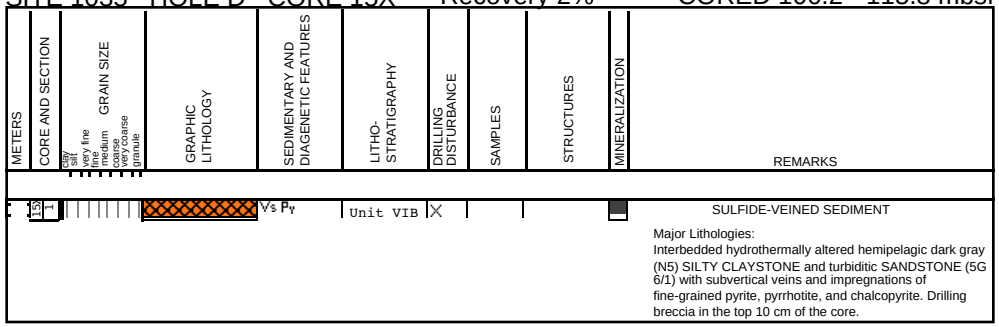
SITE 1035 HOLE D CORE 12X Recovery 3% CORED 77.4 - 87.0 mbsf



1035D-13X NO RECOVERY

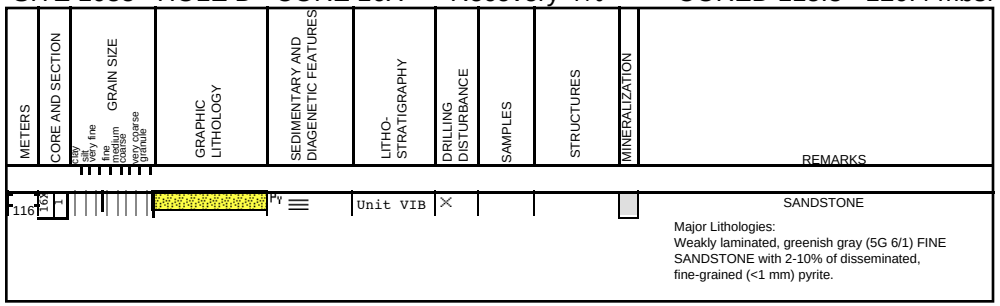
1035D-14X NO RECOVERY

SITE 1035 HOLE D CORE 15X Recovery 2% CORED 106.2 - 115.8 mbsf



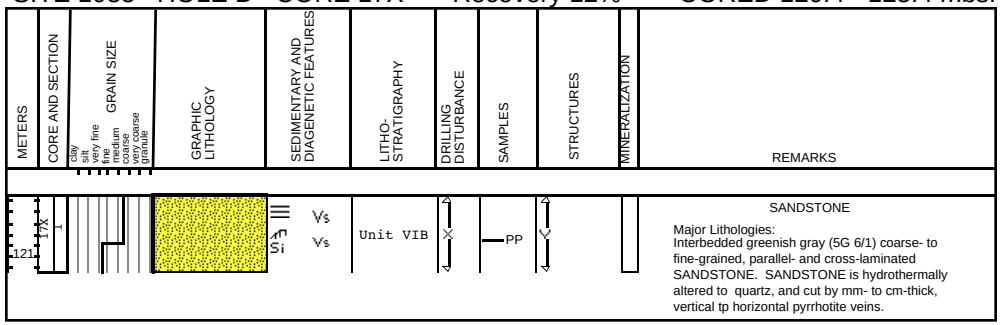
SITE 1035 HOLE D CORE 16X Recovery 4% CORED 115.8 - 120.4 mbsf

1035D-16X 1035D-17X 1035D-18X



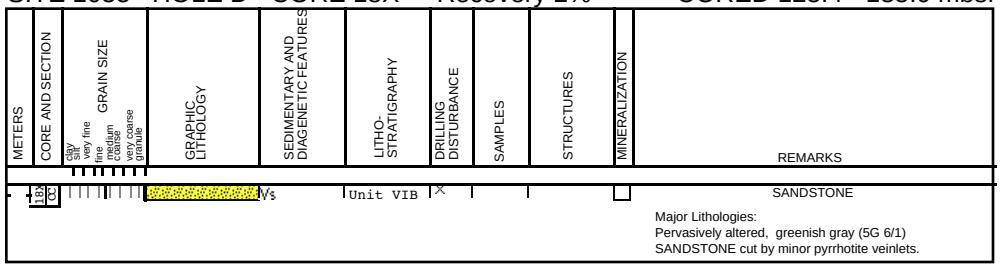
Major Lithologies:
Weakly laminated, greenish gray (5G 6/1) FINE SANDSTONE with 2-10% of disseminated, fine-grained (<1 mm) pyrite.

SITE 1035 HOLE D CORE 17X Recovery 12% CORED 120.4 - 125.4 mbsf



Major Lithologies:
Interbedded greenish gray (5G 6/1) coarse- to fine-grained, parallel- and cross-laminated SANDSTONE. SANDSTONE is hydrothermally altered to quartz, and cut by mm- to cm-thick, vertical tp horizontal pyrrhotite veins.

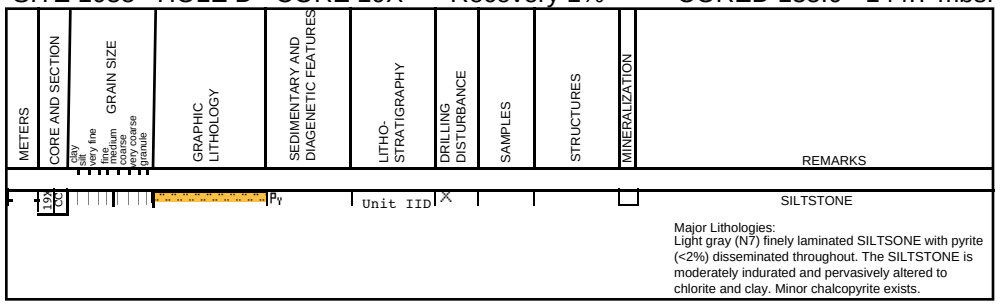
SITE 1035 HOLE D CORE 18X Recovery 2% CORED 125.4 - 135.0 mbsf



Major Lithologies:
Pervasively altered, greenish gray (5G 6/1) SANDSTONE cut by minor pyrrhotite veinlets.

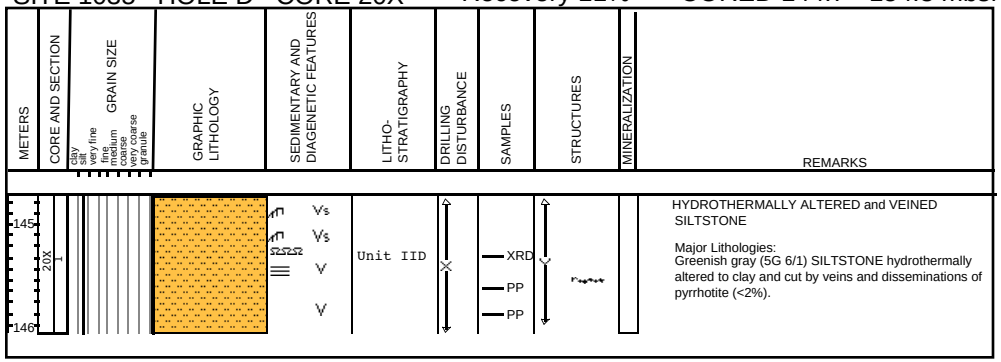
1035D-19X 1035D-20X 1035D-21X

SITE 1035 HOLE D CORE 19X Recovery 1% CORED 135.0 - 144.7 mbsf



Major Lithologies:
Light gray (N7) finely laminated SILTSONE with pyrite (<2%) disseminated throughout. The SILTSTONE is moderately indurated and pervasively altered to chlorite and clay. Minor chalcopyrite exists.

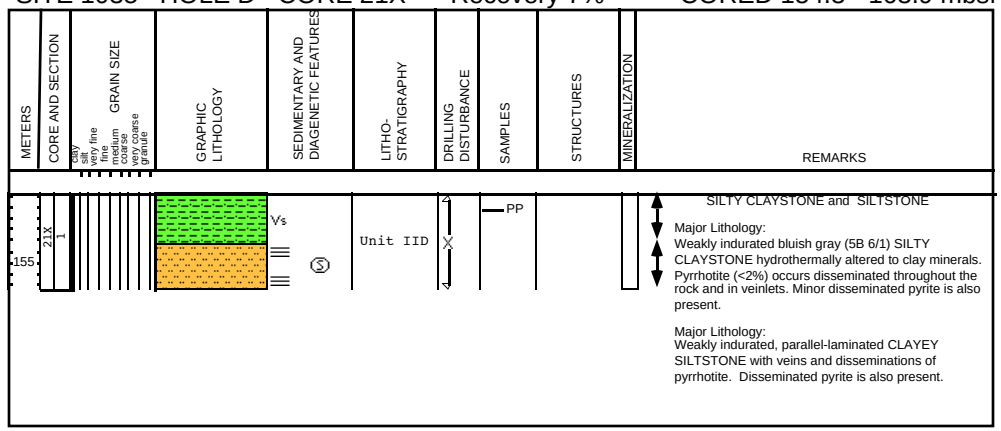
SITE 1035 HOLE D CORE 20X Recovery 11% CORED 144.7 - 154.3 mbsf



HYDROTHERMALLY ALTERED and VEINED SILTSTONE

Major Lithologies:
Greenish gray (5G 6/1) SILTSTONE hydrothermally altered to clay and cut by veins and disseminations of pyrrhotite (<2%).

SITE 1035 HOLE D CORE 21X Recovery 7% CORED 154.3 - 163.9 mbsf



Major Lithology:
Weakly indurated bluish gray (5B 6/1) SILTY CLAYSTONE hydrothermally altered to clay minerals. Pyrrhotite (<2%) occurs disseminated throughout the rock and in veinlets. Minor disseminated pyrite is also present.

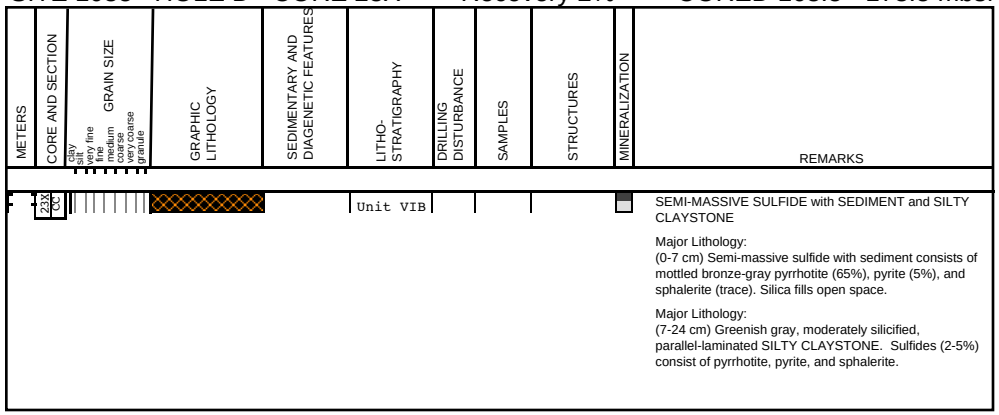
Major Lithology:
Weakly indurated, parallel-laminated CLAYEY SILTSTONE with veins and disseminations of pyrrhotite. Disseminated pyrite is also present.

1035D-22X NO RECOVERY

1035D-23X

1035D-24X

SITE 1035 HOLE D CORE 23X Recovery 2% CORED 168.5 - 173.5 mbsf

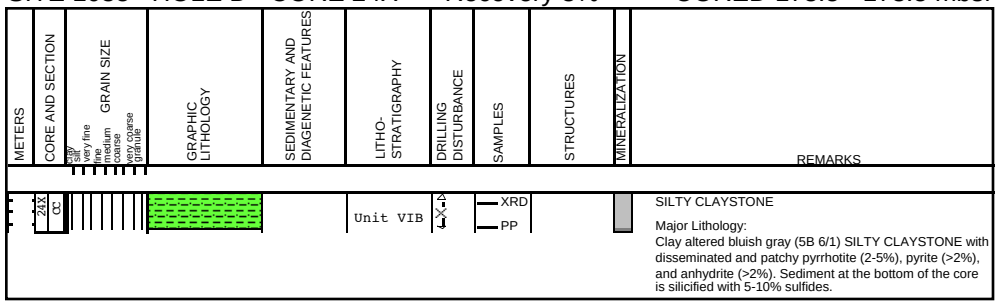


SEMI-MASSIVE SULFIDE with SEDIMENT and SILTY CLAYSTONE

Major Lithology:
(0-7 cm) Semi-massive sulfide with sediment consists of mottled bronze-gray pyrrhotite (65%), pyrite (5%), and sphalerite (trace). Silica fills open space.

Major Lithology:
(7-24 cm) Greenish gray, moderately silicified, parallel-laminated SILTY CLAYSTONE. Sulfides (2-5%) consist of pyrrhotite, pyrite, and sphalerite.

SITE 1035 HOLE D CORE 24X Recovery 8% CORED 173.5 - 178.5 mbsf

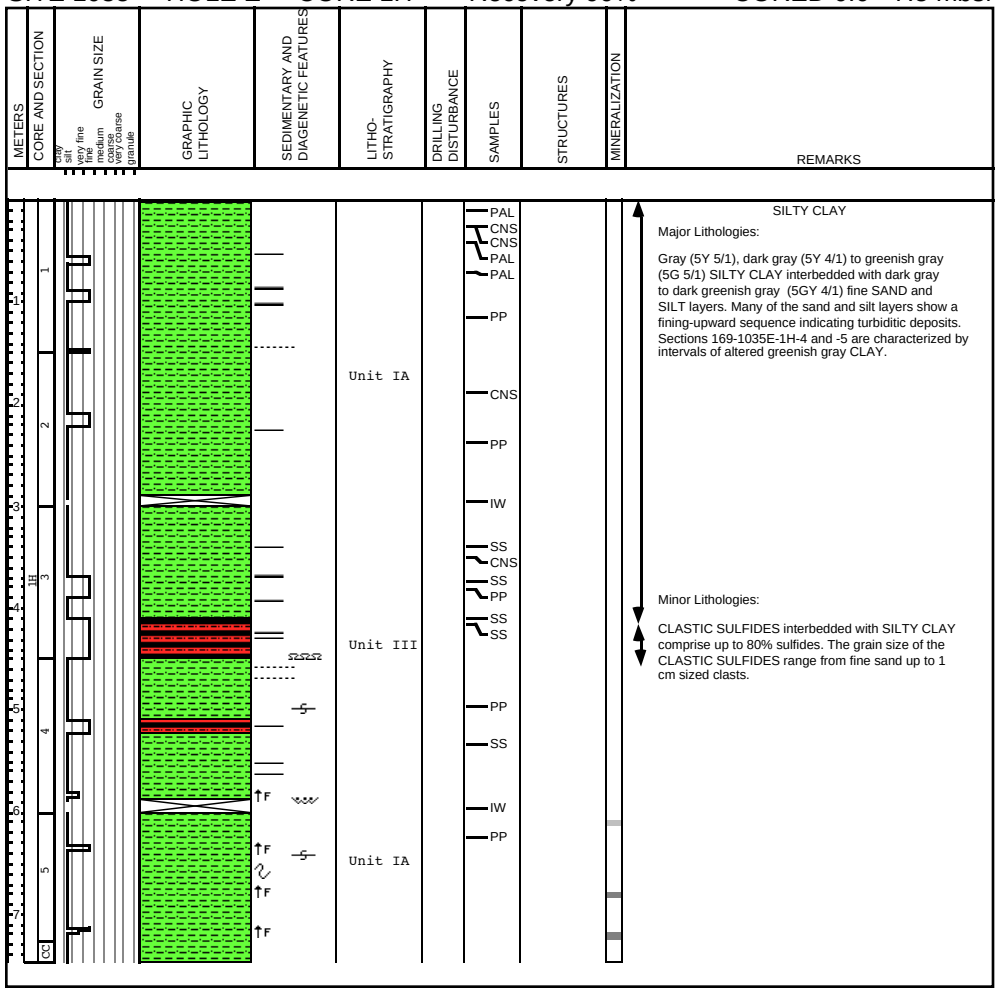


SILTY CLAYSTONE

Major Lithology:
Clay altered bluish gray (5B 6/1) SILTY CLAYSTONE with disseminated and patchy pyrrhotite (2-5%), pyrite (>2%), and anhydrite (>2%). Sediment at the bottom of the core is silicified with 5-10% sulfides.

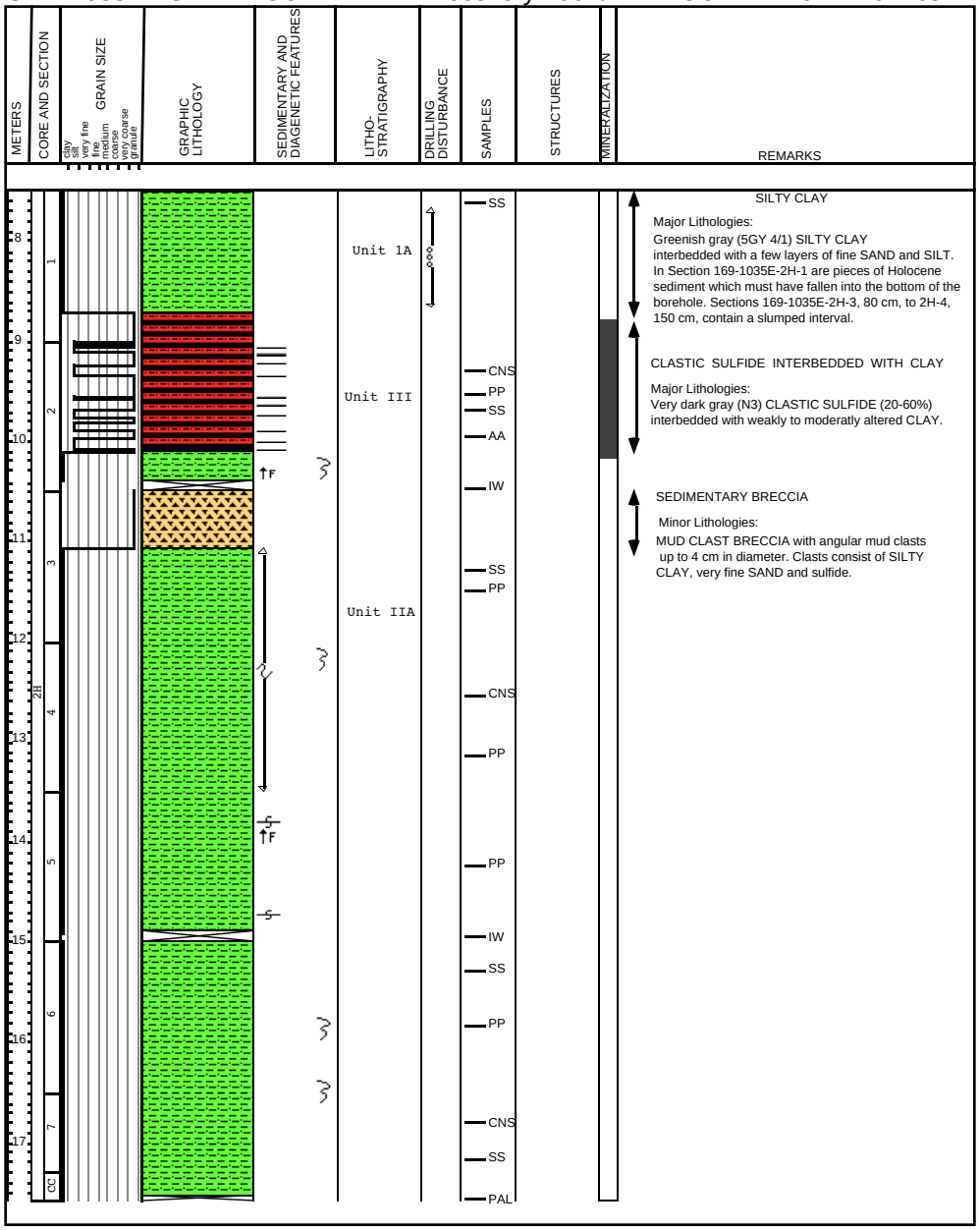
SITE 1035 HOLE E CORE 1H Recovery 99% CORED 0.0 - 7.5 mbsf

1035E-1H



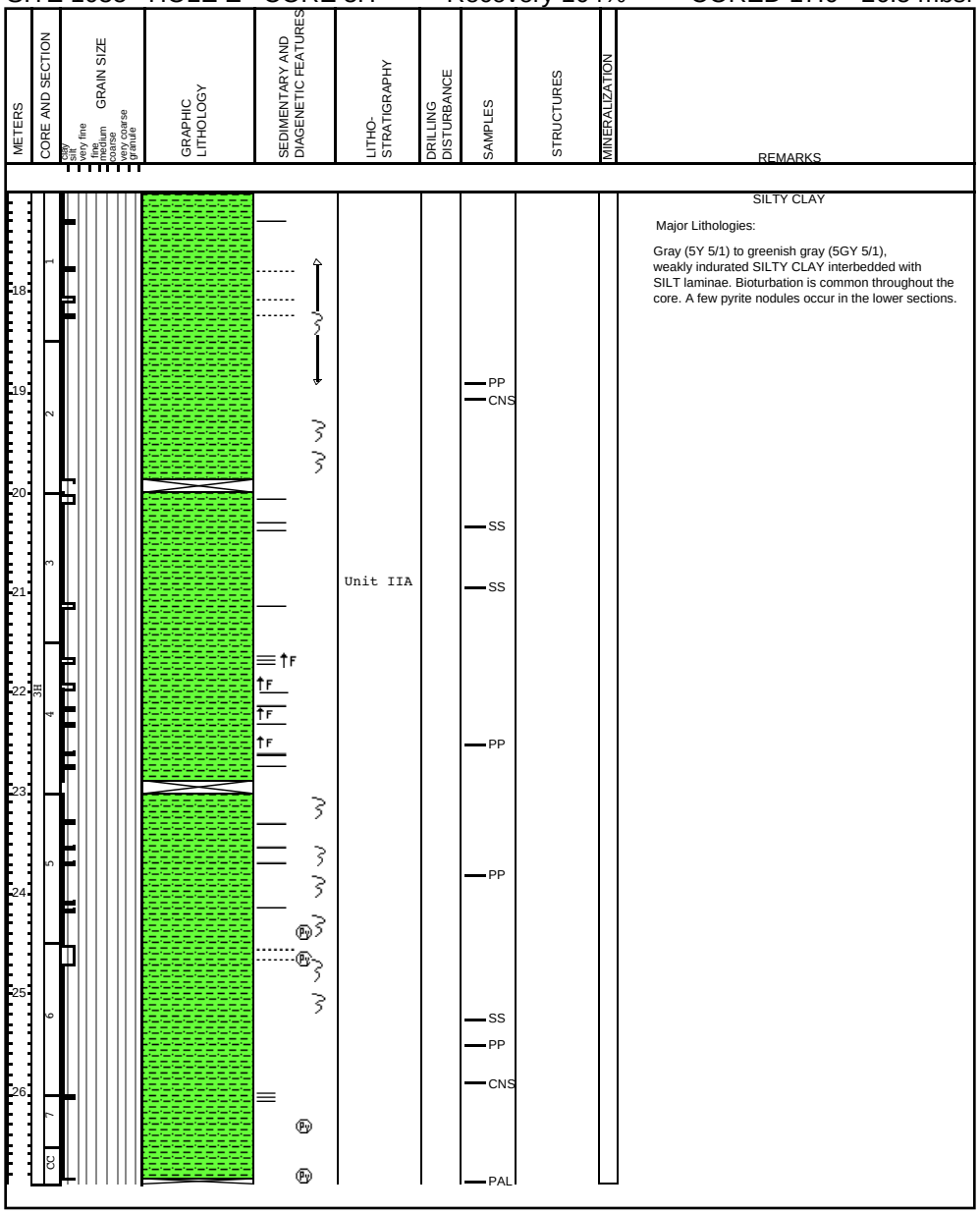
SITE 1035 HOLE E CORE 2H Recovery 106% CORED 7.5 - 17.0 mbsf

1035E-2H



SITE 1035 HOLE E CORE 3H Recovery 104% CORED 17.0 - 26.5 mbsf

1035E-3H

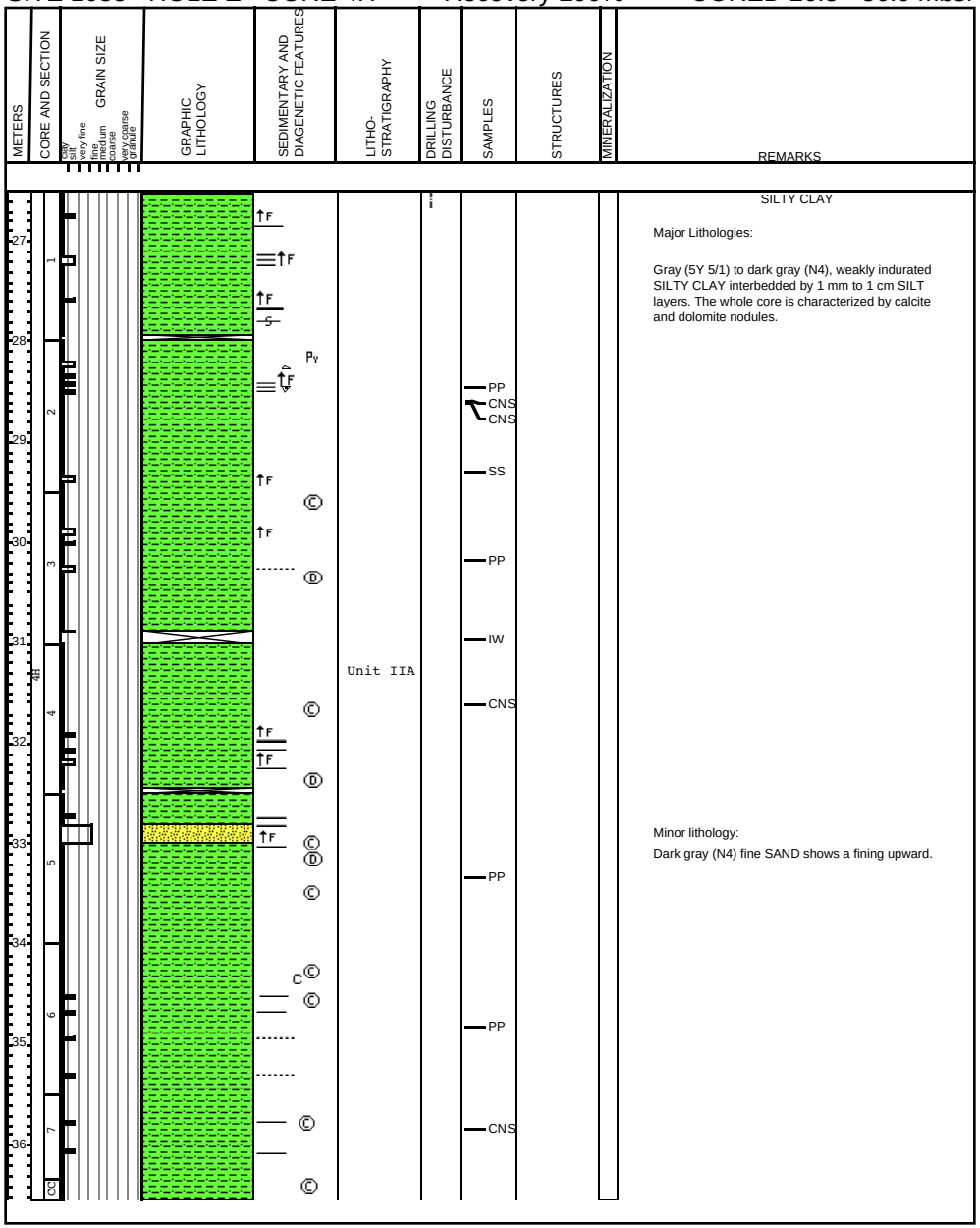


SILTY CLAY

Major Lithologies:

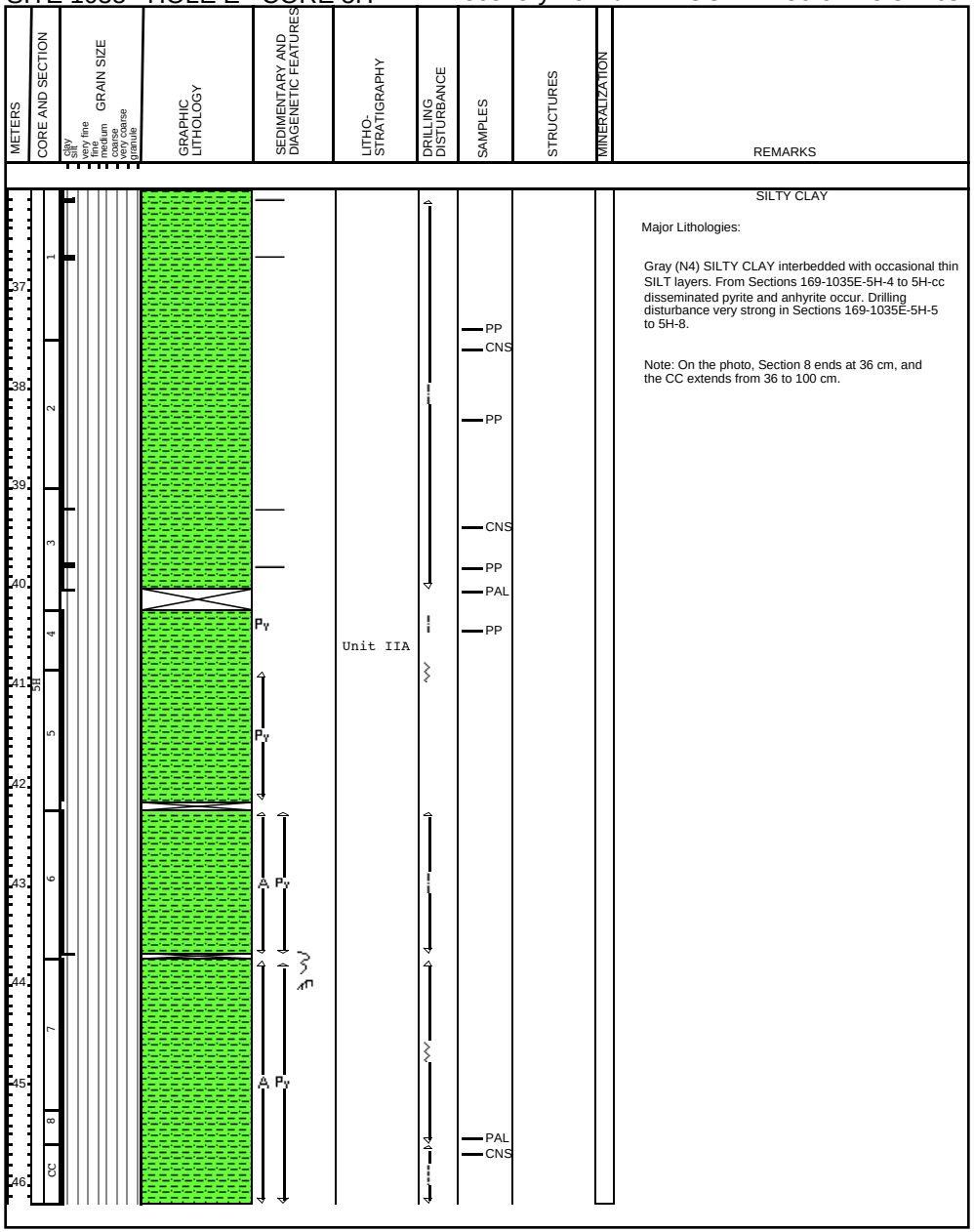
Gray (5Y 5/1) to greenish gray (5GY 5/1), weakly indurated SILTY CLAY interbedded with SILT laminae. Bioturbation is common throughout the core. A few pyrite nodules occur in the lower sections.

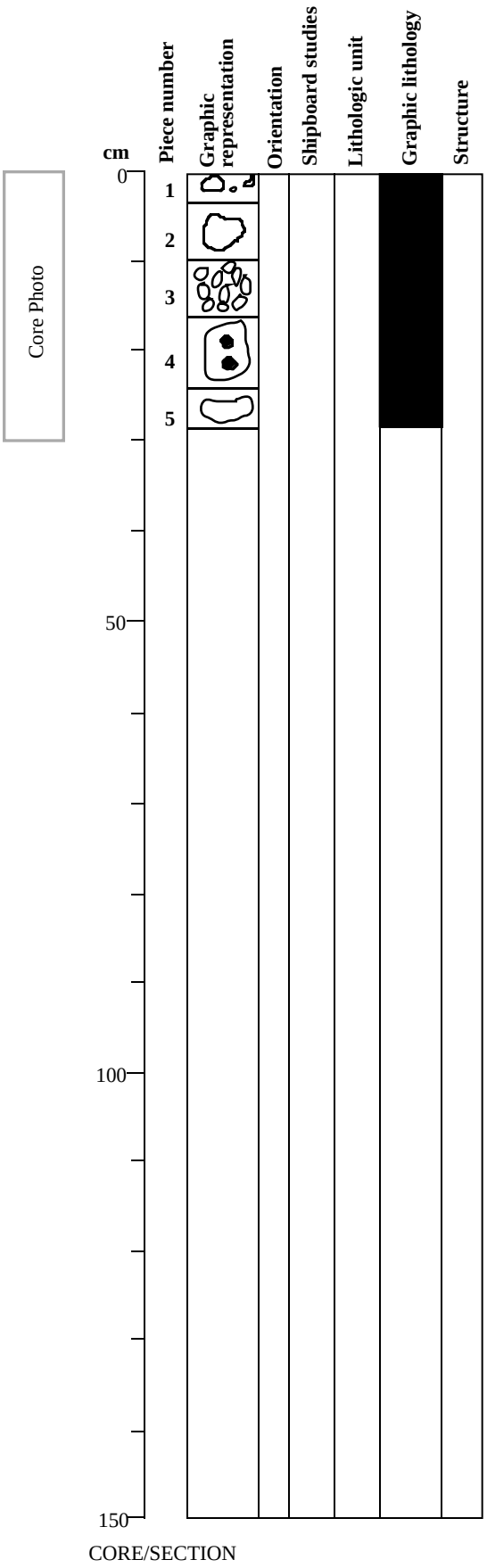
SITE 1035 HOLE E CORE 4H Recovery 106% CORED 26.5 - 36.0 mbsf 1035E-4H



SITE 1035 HOLE E CORE 5H Recovery 107% CORED 36.0 - 45.5 mbsf

1035E-5H





169-1035F-1R-1
Top of Core 1, 0.0 mbsf

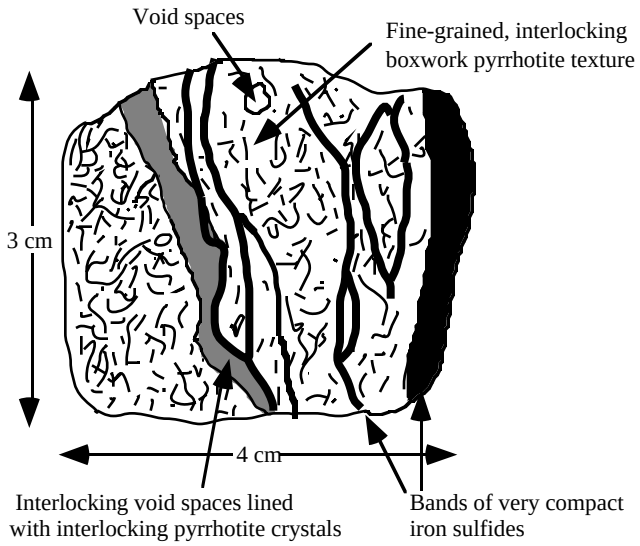
Pieces 1-5

ROCK TYPE: SULFIDE RUBBLE

COMMENTS: Fragments of gossan and massive sulfide

Piece 1: Oxidized gossan, Fe-oxyhydroxide, semilithified. Outer surface is greenish but internally it is bright orange red.

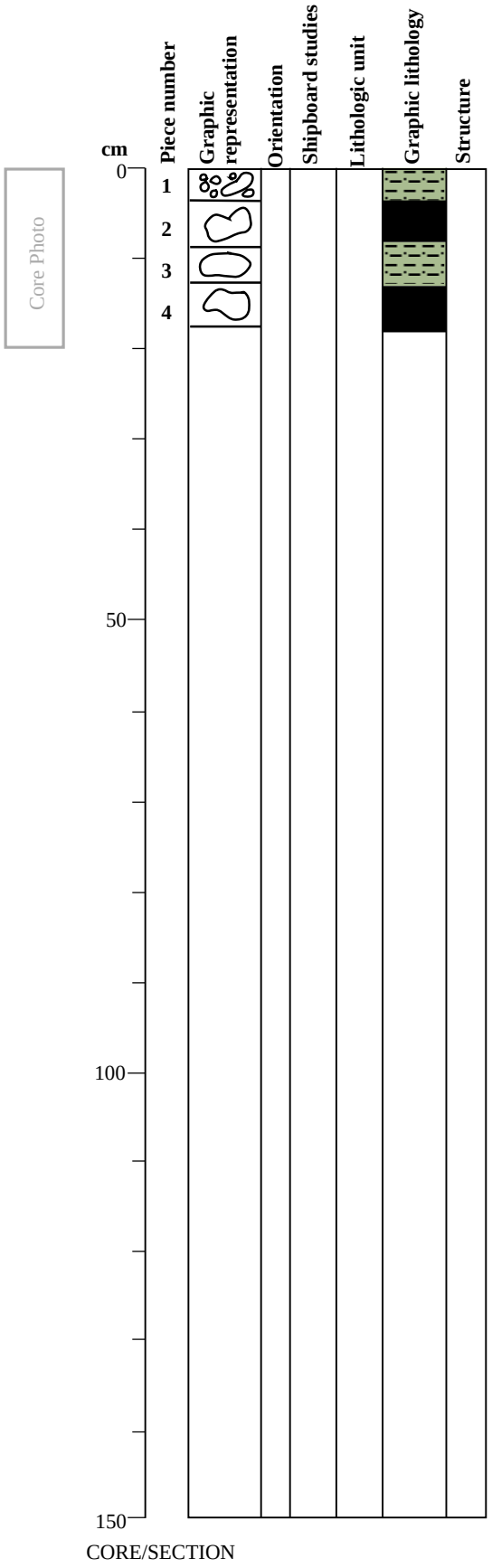
Piece 2: Piece of rubble with an oxidized outer crust and a banded internal texture. Piece is unoriented. If banding was originally vertical, it could be a chimney fragment. If banding was originally horizontal, it is most likely a fragment of mound crust (see sketch).



Piece 3: Fragments of subrounded rubble that vary from massive pyrite to sulfidized sediment (much less dense than the massive sulfide pieces).

Pieces 4 and 5: Massive fine-grained pyrrhotite with patches of vuggy coarser grained (0.2 mm) interlocking pyrrhotite crystals. Piece 5 is denser and less vuggy with possible white amorphous silica in some of the vugs.

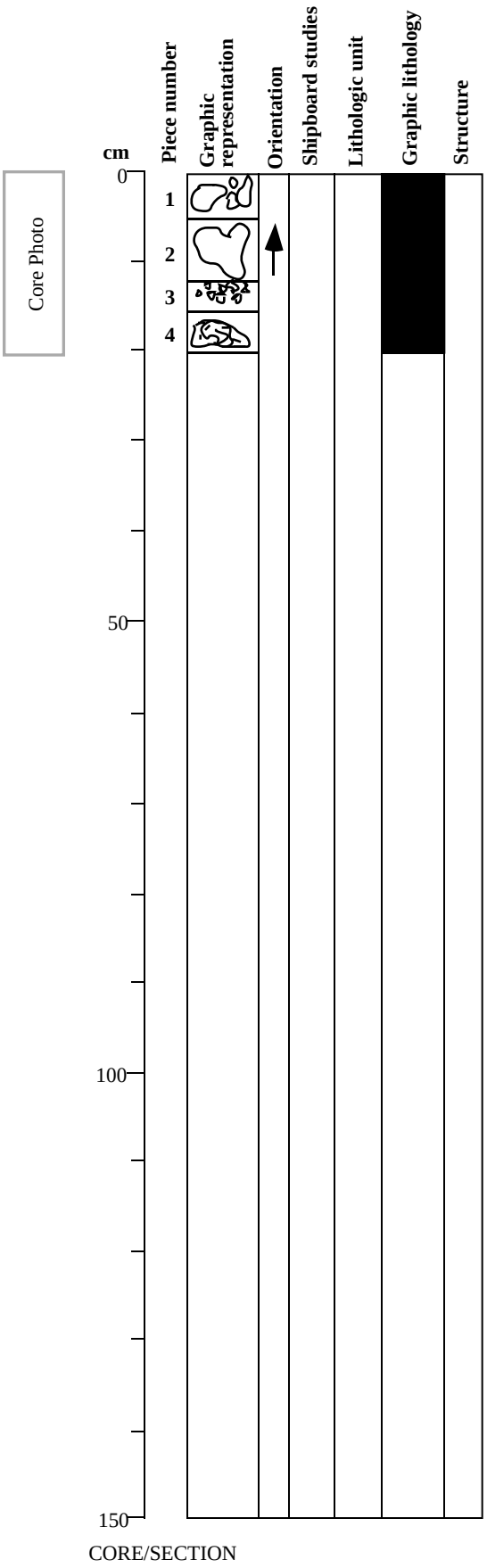
169-1035F-2R-1
Top of Core 2, 14.5 mbsf



Pieces 1-4

ROCK TYPE: MASSIVE SULFIDE and ALTERED SEDIMENT FRAGMENTS

COMMENTS: Pieces 1, 3, and 4 are highly indurated altered mud with disseminated pyrite (~3%). Greenish black (10Y 3/1). Piece 2 (and Piece 4 in the Archive half) are sulfide fragments. Piece 2 is highly porous, fine grained (0.1 - 0.5 mm) pyrrhotite with numerous open vugs imparting a scoriacious texture. Pyrite replaces pyrrhotite. Minor amorphous silica ± smectite and sulfate. Piece 4 (Archive half) is similar to Piece 2 but is much less porous and noticably more dense. Vugs are lined with euhedral pyrite. Broken surfaces and rare vugs are filled/ coated with Fe-oxyhydroxides and clay minerals.



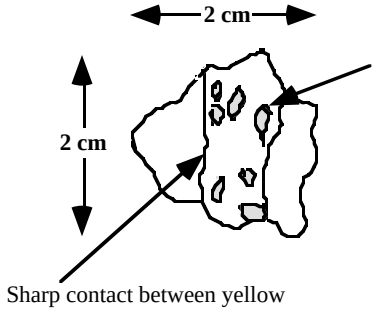
169-1035F-3R-1
Top of Core 3, 22.5 mbsf

Pieces 1-4

ROCK TYPE: MASSIVE SULFIDE
COMMENTS:

Pieces 1-4 are vuggy pyrite with anhydrite filling 50% of void space. Vuggy and locally colloform massive pyrite (50% -60%) with lesser pyrrhotite (20%), metallic pyritic yellow with colorless to gray white void fillings. 10% to 20% of the rock was void space, now 50% of that space is filled. Pyrite forms a contorted and irregular mesh-like texture with many voids imparting a high porosity, but low permeability. Anhydrite fills vugs either completely or partially, in which cases euhedral crystals are present.

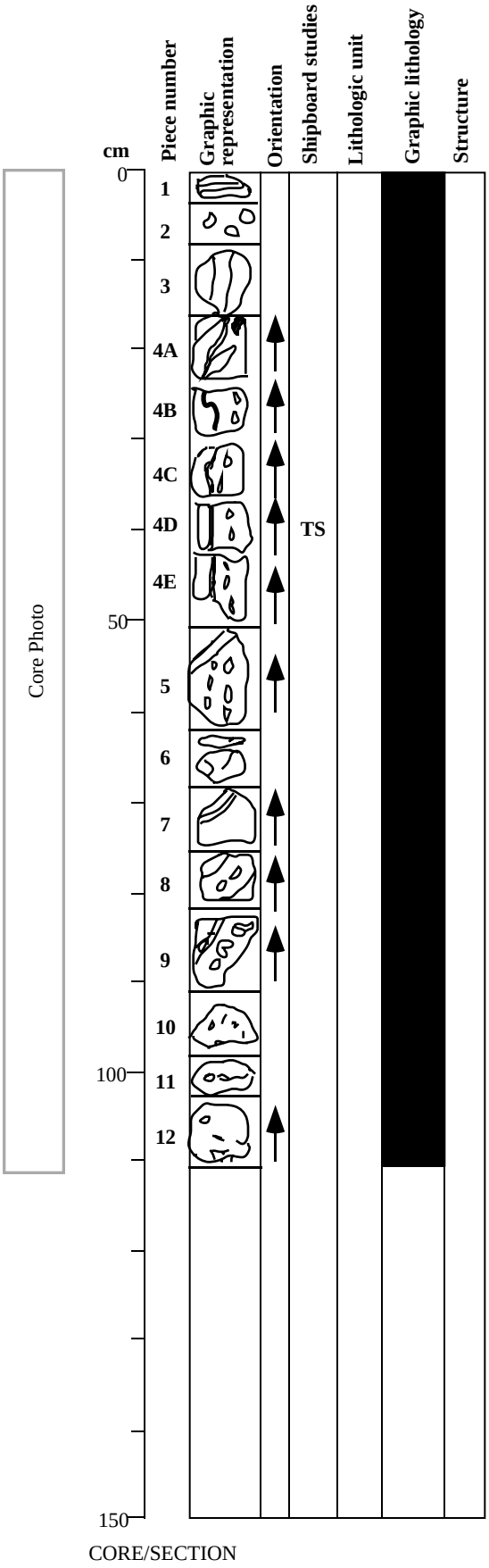
Sketch of one of the fragments of Piece 1



Irregular voids up to 5 mm long filled with colorless anhydrite

Sharp contact between yellow pyrite inside "vein" structure and the duller brown pyrite-pyrrhotite (filled channel?)

169-1035F-4R-1
Top of Core 4, 32.1 mbsf



Pieces 1-12

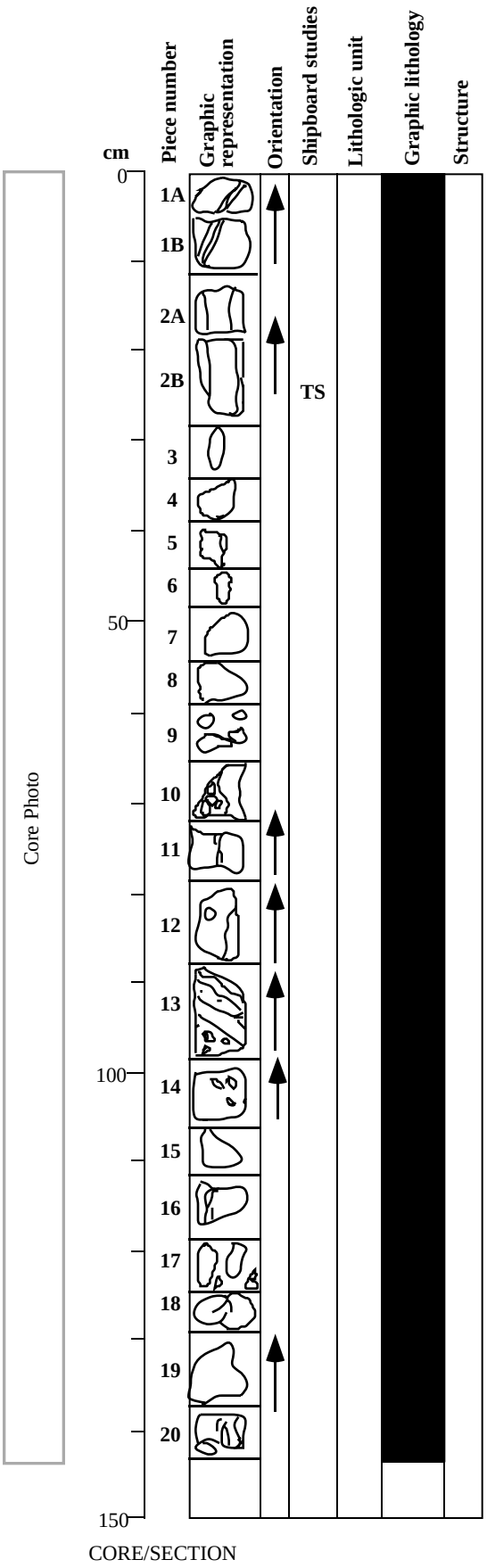
ROCK TYPE: MASSIVE SULFIDE
COMMENTS:

Massive pyrite, vuggy and colloform. Pyritic metallic yellow with black streaks. Anhydrite partially to completely fills 20% to 30% of the void space which makes up 10% of the rock.

Pieces 2 - 5 are enriched in sphalerite which occurs as subvertical bands that run parallel to colloform pyrite bands. These appear to be fracture-controlled channels for hydrothermal fluids. In some pieces sphalerite fills voids and commonly shows sharp contacts with pyrite. Some pyrite crosscuts sphalerite. Many vugs are lined with pyrite euhedra. Anhydrite fills some vugs and appears to be paragenetically later than the sulfide mineralization. Piece 6 has coarse crystals in vugs up to 1 cm long.

SULFIDE %: 90; of which pyrite, 85, and sphalerite, 5.

169-1035F-5R-1
Top of Core 5, 41.7 mbsf



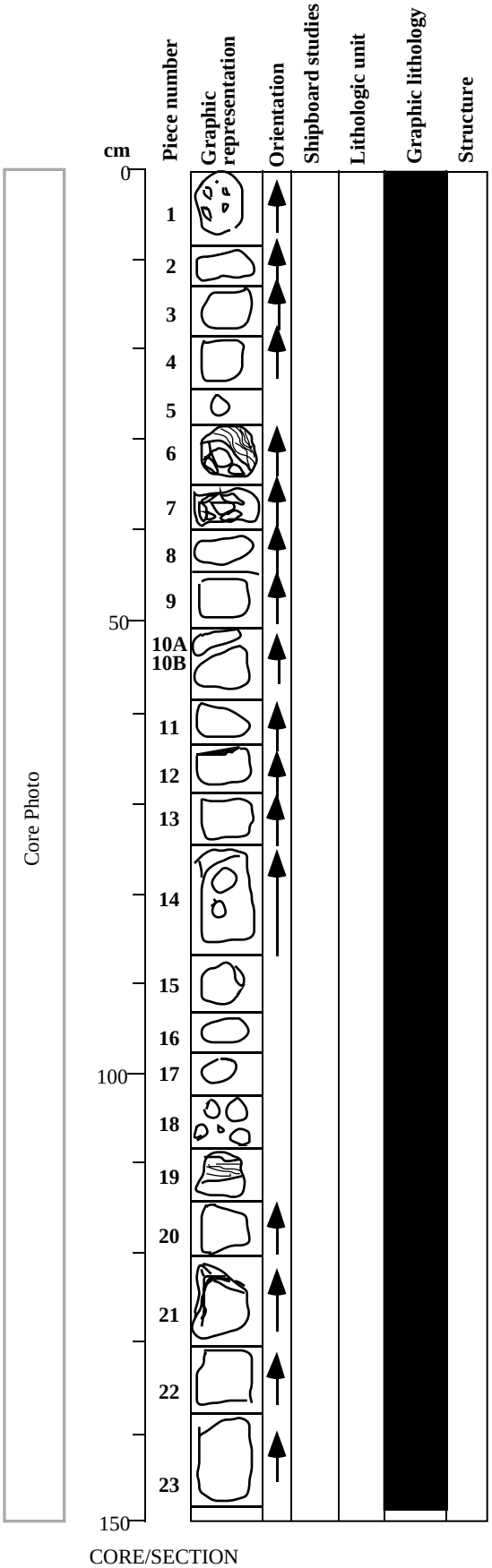
Pieces 1-20

ROCK TYPE: MASSIVE SULFIDE
COMMENTS:

Colloform and vuggy pyrite. Pieces 1 and 2 contain a vertical fluid channel with conduit walls lined with more pale yellow marcasite. Vuggy interior to filled conduit; conduit is 3 cm wide with sharp wall contacts. Piece 2A has a fracture surface on which large (1 - 2 cm) anhydrite crystals have grown along with fine-grained clay minerals. Piece 5 has a relict channel structure and marcasite. Piece 7 has a white, powdery, interstitial mineral, not anhydrite (Mg-smectite?). Piece 8 is a good example of meshwork texture, with very little fill in void spaces which constitute 20% of the piece. Piece 13 has a well-developed channel structure with possible marcasite on the walls. Working half has a good example of clusters of pyrite euhedra on a fracture surface. 30% - 35% voids, 3% anhydrite.

SULFIDE %: Pyrite and marcasite, 65%

169-1035F-5R-2
Top of Core 5, 41.7 mbsf



CORE/SECTION

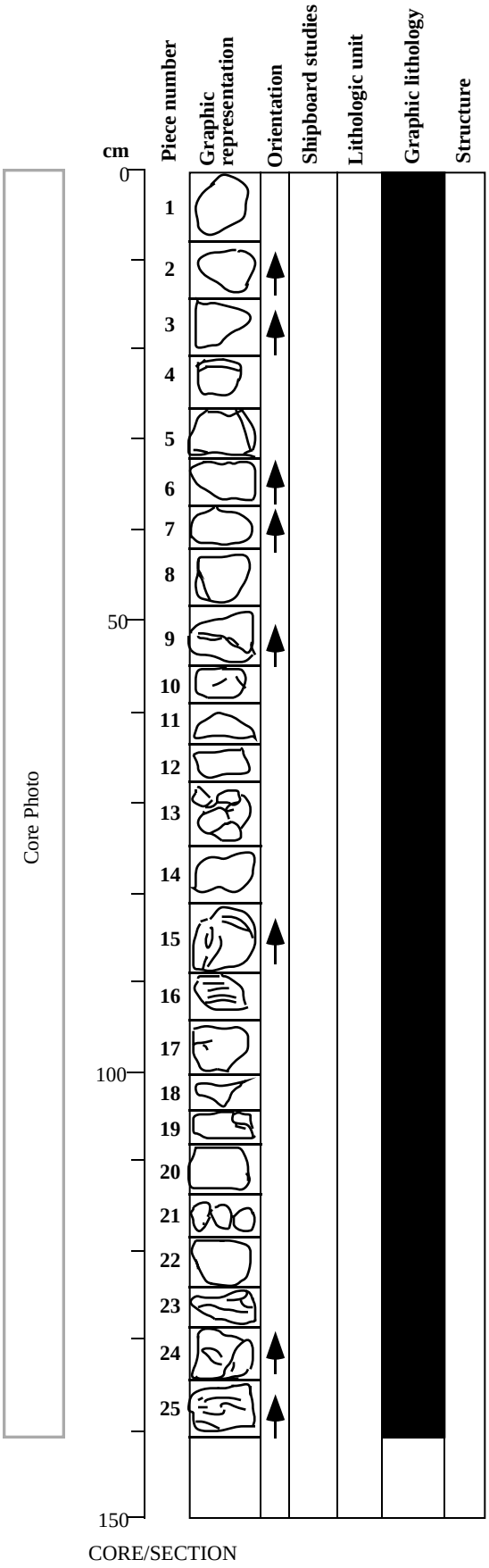
Pieces 1-23

ROCK TYPE: MASSIVE SULFIDE
COMMENTS:

Textures not observed in previous cores are present in this section. Mesh/reticulate textured pyrite with vugs almost completely filled with anhydrite. Also a sharp contact between this texture and massive pyrite/marcasite. Similar to the texture of the sample recovered from Section 139-856H-7R-1 and that is illustrated on the fronticepiece of the Leg 139 *Initial Reports* volume. However, anhydrite, not white clay is filling vugs. Pieces 6, 7, and 19 have similar textures. Pieces 1-4 are very vuggy and similar to the previous section but below Piece 4 the actual empty void percentage decreases, voids are more completely filled with white to gray anhydrite. Pieces 8 to 14 show possible brecciated texture with anhydrite interstitial to subrounded fine-grained pyrite fragments. Piece 14 also shows a sharp 45° contact between this type of texture and fine-grained anhydrite crystals set in a fine network of pyrite. Reticulate texture is present, but less coarse than seen in other pieces. Piece 21 contains sphalerite-pyrite veins. Overall 10% voids, anhydrite 10%.

SULFIDE %: 90, of which pyrite/marcasite, 80, and sphalerite, 10.

169-1035F-6R-1
Top of Core 6, 51.4 mbsf

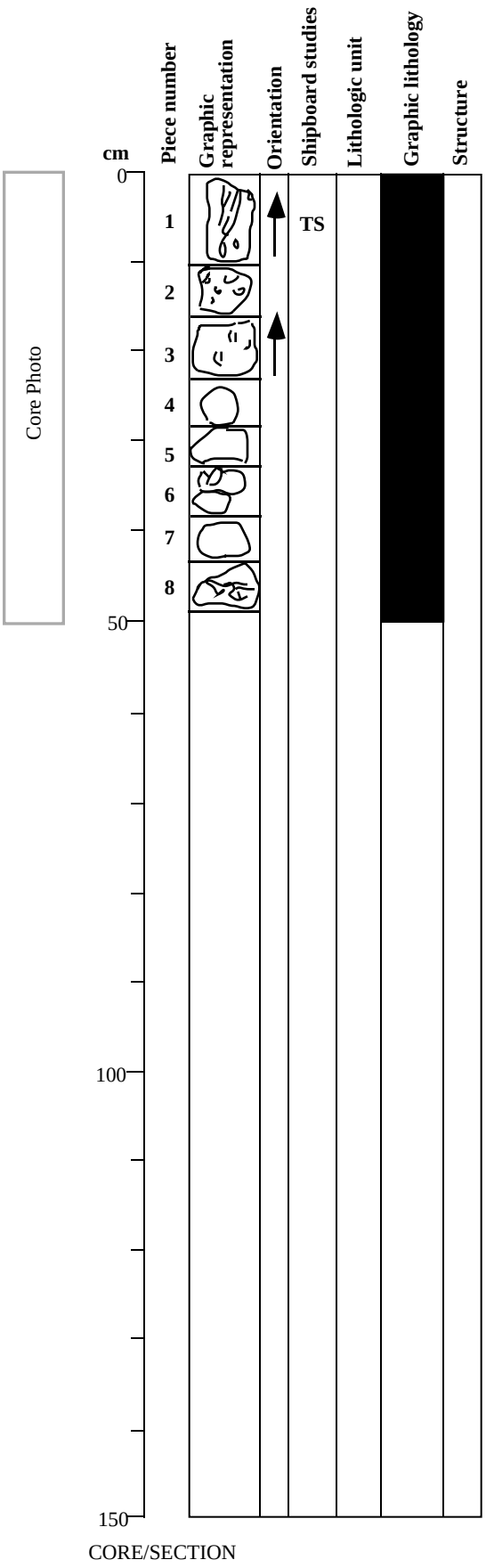


Pieces 1-25

ROCK TYPE: MASSIVE SULFIDE
COMMENTS:

Massive, compact to predominantly spongy, colloform pyrite (<0.1 to 1.0 mm) Dull brassy yellow. 20% - 30% pore space (<1 mm to 5 mm), <5% anhydrite. Pore spaces are commonly interconnected, vermicular networks. These are commonly lined with colloform, <2 mm wide pyrite layers over earlier, recrystallized pyrite euhedra. Anhydrite occurs as euhedral crystals partially filling cavities and as complete cavity fill. In several places, pyrite coats the late anhydrite (Piece 13). Probably contains a minor or trace amount of very fine-grained chalcopyrite/ISS. Pieces 4, 5, and 24 contain 1 to 2 mm crystals of high Fe sphalerite, as colloform bands interlayered with colloform pyrite bands. Pieces 11 and 12 display reticulate boxwork texture of interlocking ridges (1 - 5 mm wide) of pyrite forming channels, predominantly with a subvertical orientation.

SULFIDE %: 75



169-1035F-7R-1
Top of Core 7, 61.0 mbsf

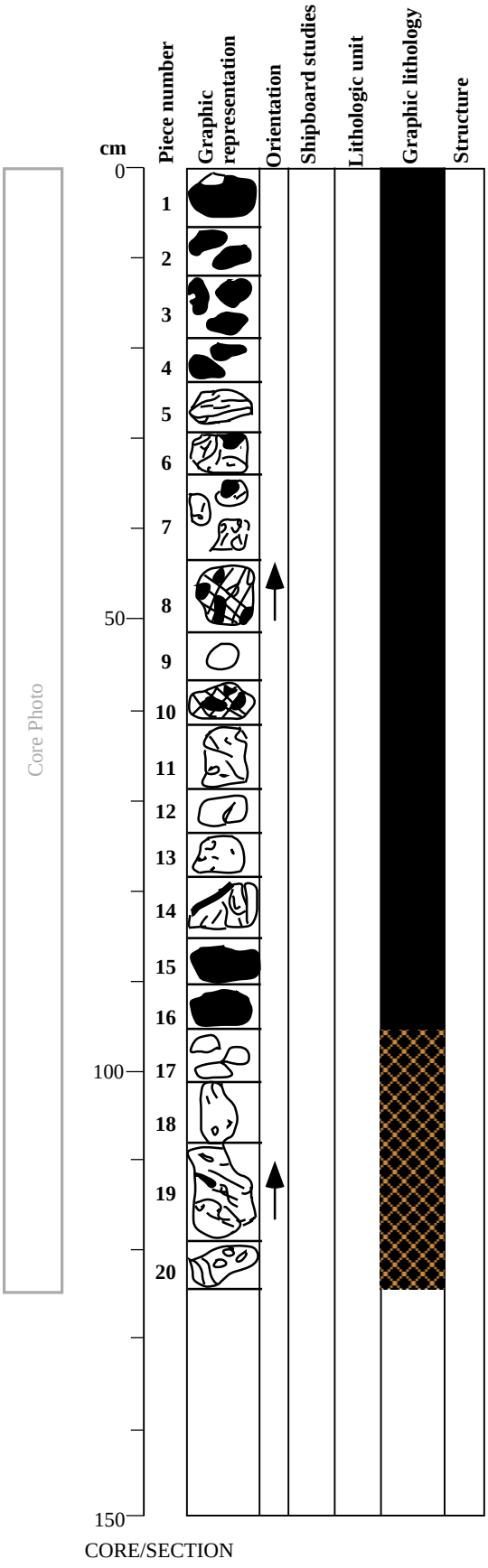
Pieces 1-8

ROCK TYPE: MASSIVE SULFIDE
COMMENTS:

Massive, compact to spongy, recrystallized colloform pyrite. Dull brassy yellow. 55% pore space (<0.1 to 5 mm diameter) interconnected vermicular texture. 5% - 10% anhydrite. Pyrite occurs as: 1) compact, fine-grained to very fine-grained, and 2) colloform layers on 1) up to 2 mm wide. Anhydrite completely fills void space in Pieces 3, 4, and 6. Piece 1 contains moderate and high Fe sphalerite as separate colloform layers lining subvertical channels. Sphalerite is later than colloform pyrite (which it coats). Piece 2 displays a reticulate, boxwork texture of intersecting platey ridges of fine-grained recrystallized pyrite, with minor interstitial anhydrite fill. Sphalerite 2% to 5% overall.

SULFIDE %: 45

169-1035F-8R-1
Top of Core 8, 70.6 mbsf



Pieces 1-20

ROCK TYPE: MASSIVE SULFIDE and SEMI-MASSIVE SULFIDE with SEDIMENT

COMMENTS:

Pieces 1-4: Massive, moderately compact vuggy pyrite with interstitial sphalerite and patches of pale gray to white crystalline anhydrite. Anhydrite also fills pore space.

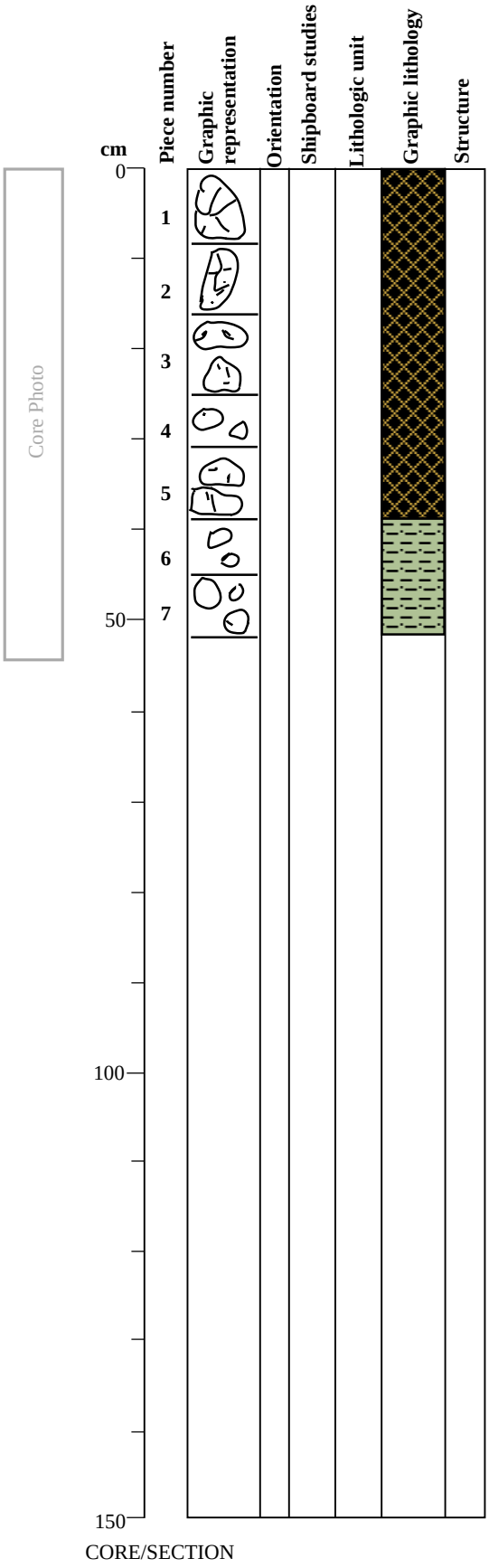
Piece 5: Vein of black to pale brown sphalerite with interstitial anhydrite cutting medium-grained vuggy pyrite with patches of black sphalerite. 10% - 15% sphalerite.

Pieces 6-14: Massive vuggy pyrite with a breccia texture in places containing patches and veins of black crystalline sphalerite. Vugs are also filled with pale gray to white anhydrite and lined with euhedral pyrite crystals. Minor oxidation of sulfides in vugs. Sphalerite patches consist of vuggy pyrite that has been filled and variably replaced by sphalerite. 2% - 12% sphalerite.

Pieces 15-16: Brown vuggy sphalerite with pyrite filled by a white soft mineral, probably a clay. Sphalerite appears to replace vuggy pyrite. 30% - 40% sphalerite.

Pieces 17-20: Bronzy vuggy pyrite almost completely filled by white clay. Gray soft patches may represent sediment clasts that have been pervasively altered and partly replaced.

SULFIDE %: >75



169-1035F-9R-1
Top of Core 9, 80.2 mbsf

Pieces 1-5

ROCK TYPE: MASSIVE AND SEMI-MASSIVE SULFIDE with SEDIMENT
COMMENTS:
Piece 1: Massive to semi-massive sulfide with altered sediment. Sulfides consist of fine-grained pyrrhotite that is partly replaced by euhedral pyrite. Pyrite also rims altered sediment.
Pieces 2-5: Vuggy semi-massive sulfide with altered sediment. Vugs are partly filled with white clay minerals.

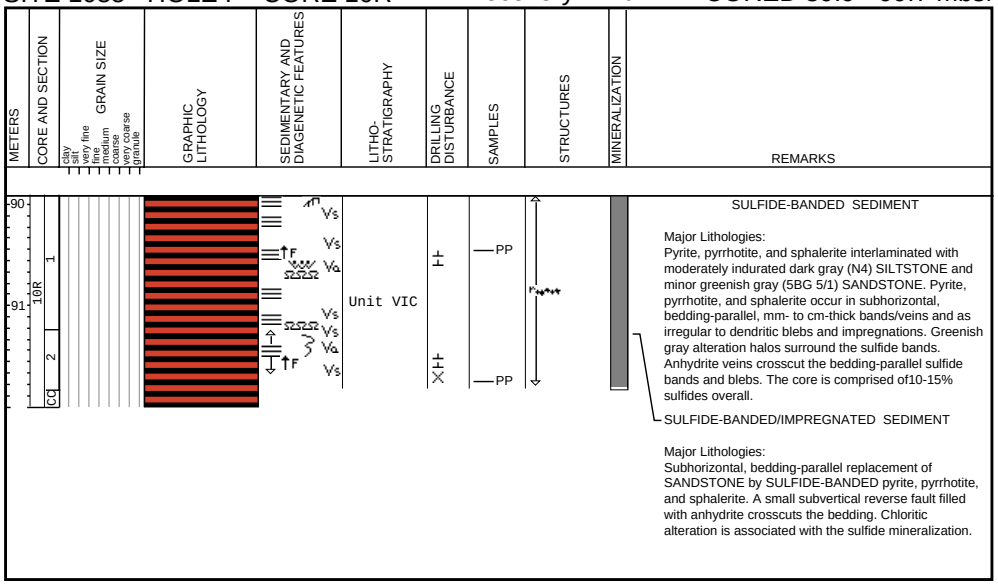
Pieces 6 and 7

ROCK TYPE: MUDSTONE
COMMENTS:
Medium gray, moderately indurated, hydrothermally altered mudstone cut by and impregnated with pyrite.

SITE 1035 HOLE F CORE 10R Recovery 21% CORED 89.9 - 99.7 mbsf

1035F-10R

1035F-11R



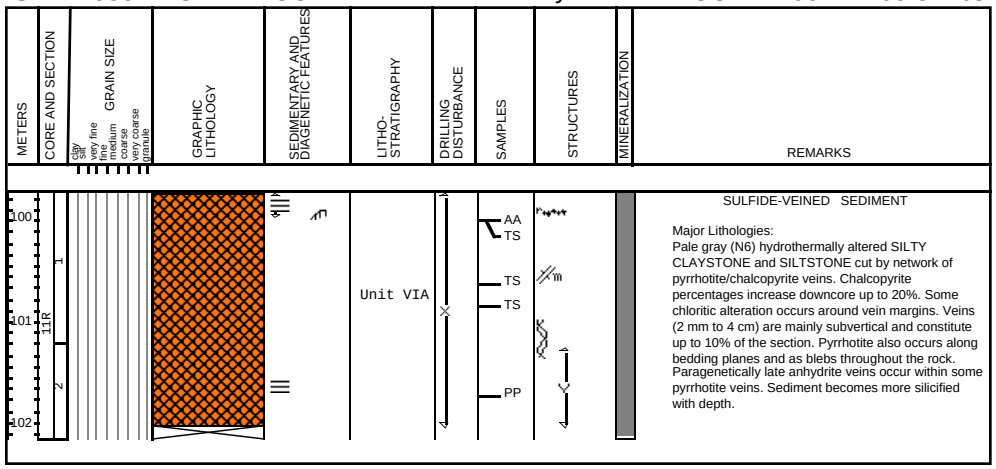
SULFIDE-BANDED SEDIMENT

Major Lithologies:
Pyrite, pyrrhotite, and sphalerite interlaminated with moderately indurated dark gray (N4) SILTSTONE and minor greenish gray (5BG 5/1) SANDSTONE. Pyrite, pyrrhotite, and sphalerite occur in subhorizontal, bedding-parallel, mm- to cm-thick bands/veins and as irregular to dendritic blebs and impregnations. Greenish gray alteration halos surround the sulfide bands. Anhydrite veins crosscut the bedding-parallel sulfide bands and blebs. The core is comprised of10-15% sulfides overall.

SULFIDE-BANDED/IMPREGNATED SEDIMENT

Major Lithologies:
Subhorizontal, bedding-parallel replacement of SANDSTONE by SULFIDE-BANDED pyrite, pyrrhotite, and sphalerite. A small subvertical reverse fault filled with anhydrite crosscuts the bedding. Chloritic alteration is associated with the sulfide mineralization.

SITE 1035 HOLE F CORE 11R Recovery 19% CORED 99.7 - 109.3 mbsf



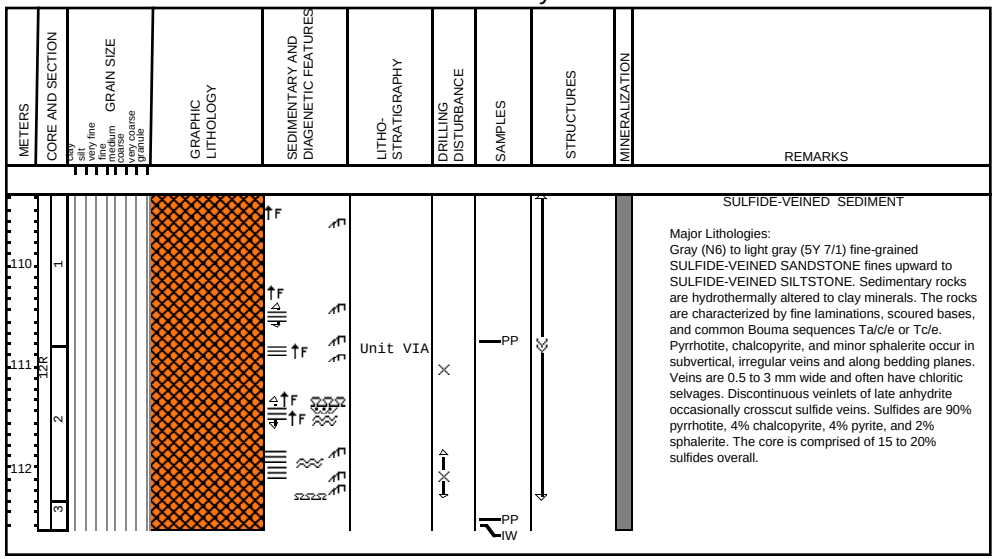
SULFIDE-VEINED SEDIMENT

Major Lithologies:
Pale gray (N6) hydrothermally altered SILTY CLAYSTONE and SILTSTONE cut by network of pyrrhotite/chalcopyrite veins. Chalcopyrite percentages increase downcore up to 20%. Some chloritic alteration occurs around vein margins. Veins (2 mm to 4 cm) are mainly subvertical and constitute up to 10% of the section. Pyrrhotite also occurs along bedding planes and as blebs throughout the rock. Paragenetically late anhydrite veins occur within some pyrrhotite veins. Sediment becomes more silicified with depth.

SITE 1035 HOLE F CORE 12R Recovery 25% CORED 109.3 - 119.0 mbsf

1035F-12R

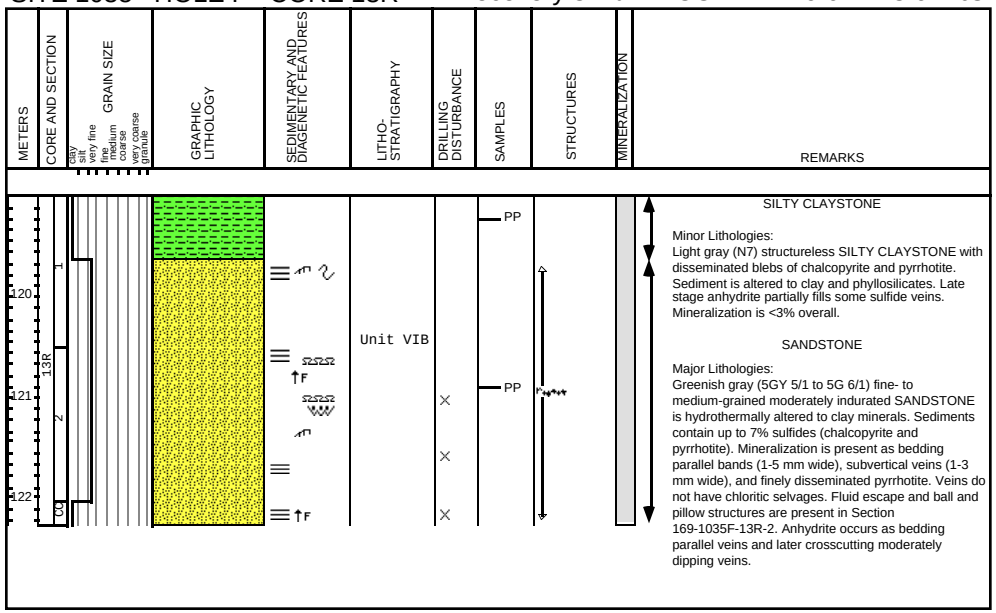
1035F-13R



SULFIDE-VEINED SEDIMENT

Major Lithologies:
Gray (N6) to light gray (5Y 7/1) fine-grained SULFIDE-VEINED SANDSTONE fines upward to SULFIDE-VEINED SILTSTONE. Sedimentary rocks are hydrothermally altered to clay minerals. The rocks are characterized by fine laminations, scoured bases, and common Bouma sequences Ta/c/e or Tc/e. Pyrrhotite, chalcopyrite, and minor sphalerite occur in subvertical, irregular veins and along bedding planes. Veins are 0.5 to 3 mm wide and often have chloritic selvages. Discontinuous veinlets of late anhydrite occasionally crosscut sulfide veins. Sulfides are 90% pyrrhotite, 4% chalcopyrite, 4% pyrite, and 2% sphalerite. The core is comprised of 15 to 20% sulfides overall.

SITE 1035 HOLE F CORE 13R Recovery 34% CORED 119.0 - 128.6 mbsf



SILTY CLAYSTONE

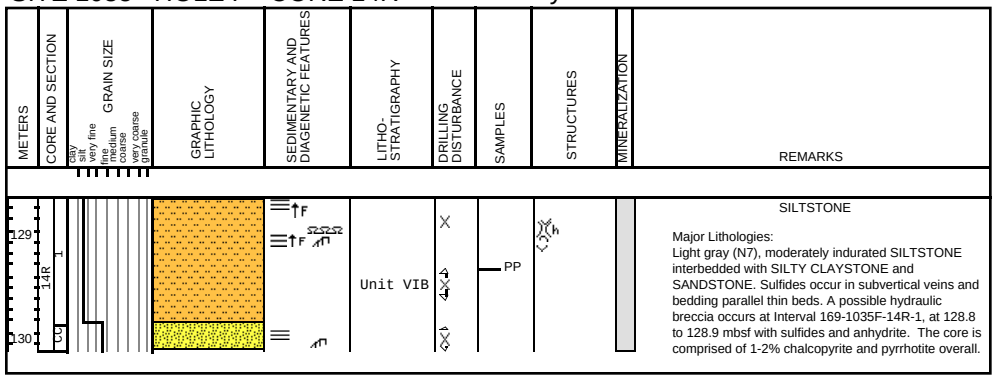
Minor Lithologies:
Light gray (N7) structureless SILTY CLAYSTONE with disseminated blebs of chalcopyrite and pyrrhotite. Sediment is altered to clay and phyllosilicates. Late stage anhydrite partially fills some sulfide veins. Mineralization is <3% overall.

SANDSTONE

Major Lithologies:
Greenish gray (5GY 5/1 to 5G 6/1) fine- to medium-grained moderately indurated SANDSTONE is hydrothermally altered to clay minerals. Sediments contain up to 7% sulfides (chalcopyrite and pyrrhotite). Mineralization is present as bedding parallel bands (1-5 mm wide), subvertical veins (1-3 mm wide), and finely disseminated pyrrhotite. Veins do not have chloritic selvages. Fluid escape and ball and pillow structures are present in Section 169-1035F-13R-2. Anhydrite occurs as bedding parallel veins and later crosscutting moderately dipping veins.

1035F-14R 1035F-15R 1035F-16R

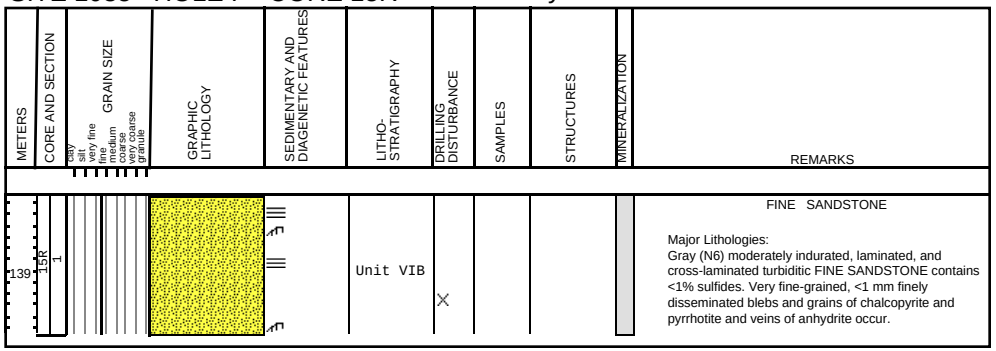
SITE 1035 HOLE F CORE 14R Recovery 15% CORED 128.6 - 138.2 mbsf



SILTSTONE

Major Lithologies:
Light gray (N7), moderately indurated SILTSTONE interbedded with SILTY CLAYSTONE and SANDSTONE. Sulfides occur in subvertical veins and bedding parallel thin beds. A possible hydraulic breccia occurs at Interval 169-1035F-14R-1, at 128.8 to 128.9 mbsf with sulfides and anhydrite. The core is comprised of 1-2% chalcopyrite and pyrrhotite overall.

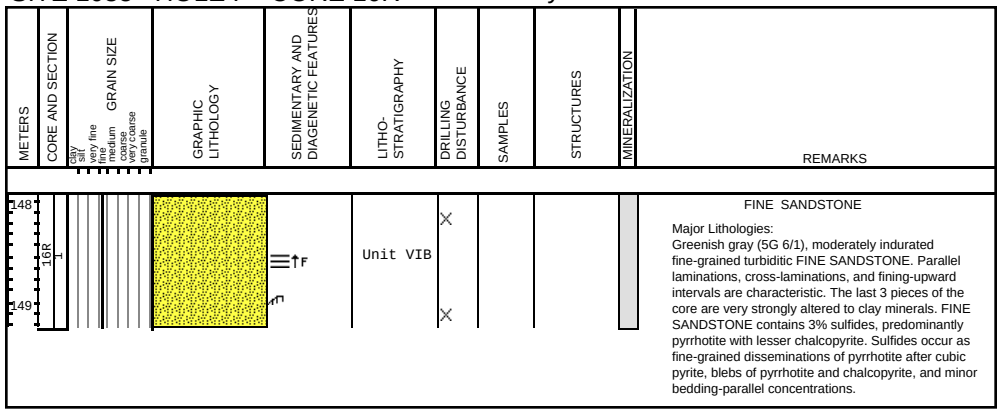
SITE 1035 HOLE F CORE 15R Recovery 9% CORED 138.2 - 147.9 mbsf



FINE SANDSTONE

Major Lithologies:
Gray (N6) moderately indurated, laminated, and cross-laminated turbiditic FINE SANDSTONE contains <1% sulfides. Very fine-grained, <1 mm finely disseminated blebs and grains of chalcopyrite and pyrrhotite and veins of anhydrite occur.

SITE 1035 HOLE F CORE 16R Recovery 10% CORED 147.9 - 157.5 mbsf



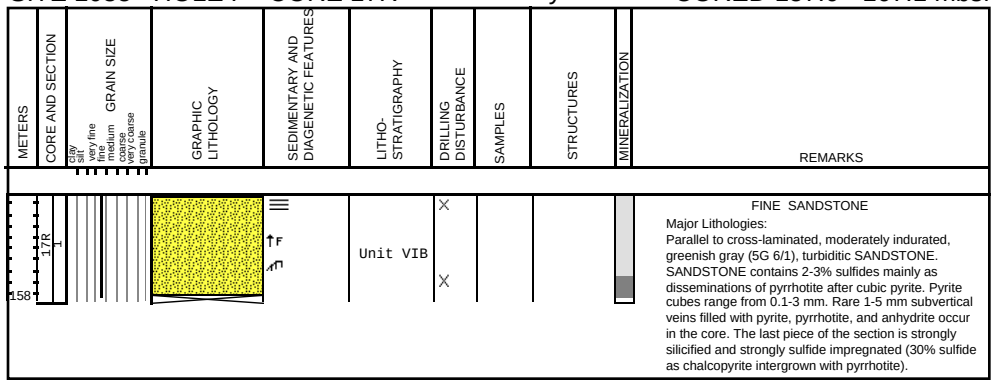
FINE SANDSTONE

Major Lithologies:
Greenish gray (5G 6/1), moderately indurated fine-grained turbiditic FINE SANDSTONE. Parallel laminations, cross-laminations, and fining-upward intervals are characteristic. The last 3 pieces of the core are very strongly altered to clay minerals. FINE SANDSTONE contains 3% sulfides, predominantly pyrrhotite with lesser chalcopyrite. Sulfides occur as fine-grained disseminations of pyrrhotite after cubic pyrite, blebs of pyrrhotite and chalcopyrite, and minor bedding-parallel concentrations.

SITE 1035 HOLE F CORE 17R Recovery 8% CORED 157.0 - 167.1 mbsf

1035F-17R

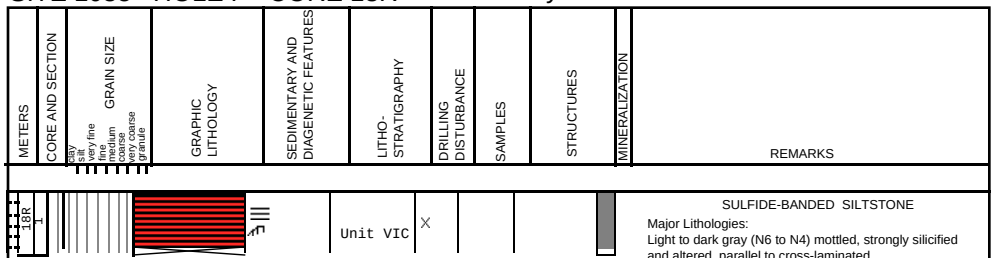
1035F-18R



FINE SANDSTONE

Major Lithologies:
Parallel to cross-laminated, moderately indurated, greenish gray (5G 6/1), turbiditic SANDSTONE. SANDSTONE contains 2-3% sulfides mainly as disseminations of pyrrhotite after cubic pyrite. Pyrite cubes range from 0.1-3 mm. Rare 1-5 mm subvertical veins filled with pyrite, pyrrhotite, and anhydrite occur in the core. The last piece of the section is strongly silicified and strongly sulfide impregnated (30% sulfide as chalcopyrite intergrown with pyrrhotite).

SITE 1035 HOLE F CORE 18R Recovery 3% CORED 167.1 - 176.8 mbsf



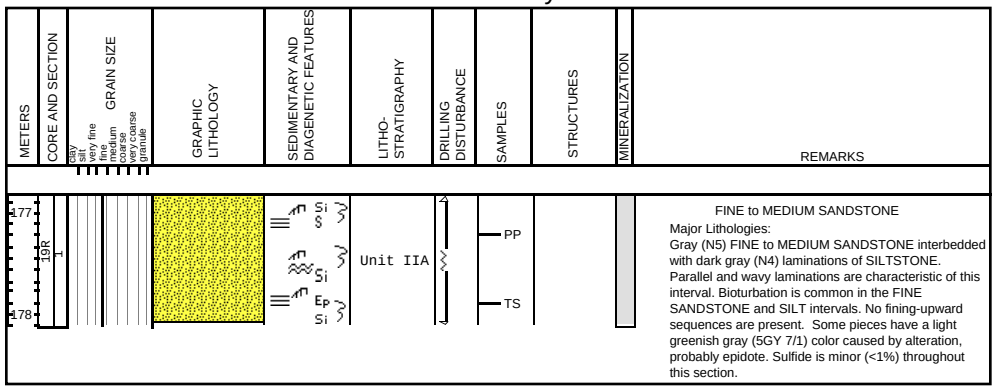
SULFIDE-BANDED SILTSTONE

Major Lithologies:
Light to dark gray (N6 to N4) mottled, strongly silicified and altered, parallel to cross-laminated SULFIDE-BANDED SILTSTONE. Darker gray zones are more silicified. Gray to greenish gray (5GY 5/1) chlorite or Mg-smectite alteration is also common. Sulfides constitute up to 30% of the rock and are dominated by pyrrhotite with subequal chalcopyrite in a few samples and minor sphalerite. Anhydrite occurs as coarse white to gray fibrous to bladed intergrowths with chlorite and as platey vug linings. Several pieces appear to be clay altered SILTY CLAYSTONE.

SITE 1035 HOLE F CORE 19R Recovery 10% CORED 176.8 - 186.4 mbsf

1035F-19R

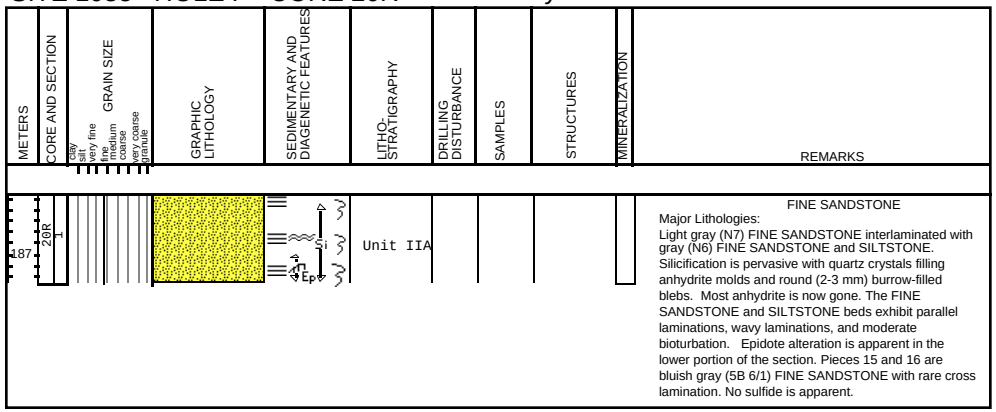
1035F-20R



FINE to MEDIUM SANDSTONE

Major Lithologies:
Gray (N5) FINE to MEDIUM SANDSTONE interbedded with dark gray (N4) laminations of SILTSTONE. Parallel and wavy laminations are characteristic of this interval. Bioturbation is common in the FINE SANDSTONE and SILT intervals. No fining-upward sequences are present. Some pieces have a light greenish gray (5GY 7/1) color caused by alteration, probably epidote. Sulfide is minor (<1%) throughout this section.

SITE 1035 HOLE F CORE 20R Recovery 6% CORED 186.4 - 196.0 mbsf

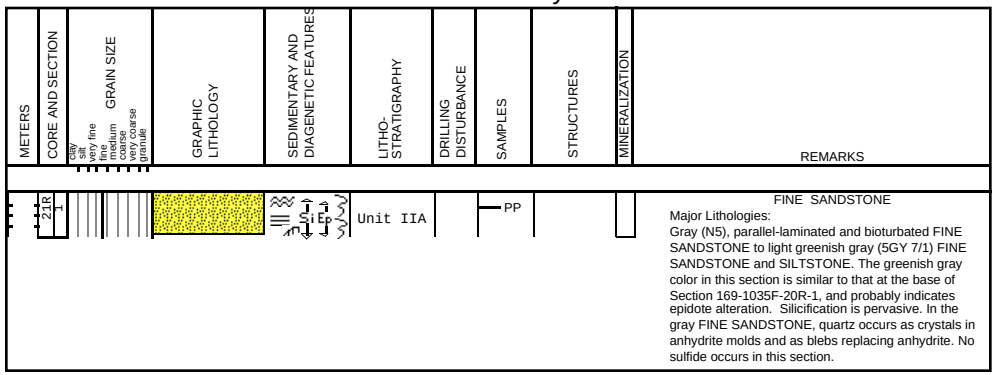


FINE SANDSTONE

Major Lithologies:
Light gray (N7) FINE SANDSTONE interlaminated with gray (N6) FINE SANDSTONE and SILTSTONE. Silicification is pervasive with quartz crystals filling anhydrite molds and round (2-3 mm) burrow-filled blebs. Most anhydrite is now gone. The FINE SANDSTONE and SILTSTONE beds exhibit parallel laminations, wavy laminations, and moderate bioturbation. Epidote alteration is apparent in the lower portion of the section. Pieces 15 and 16 are bluish gray (5B 6/1) FINE SANDSTONE with rare cross lamination. No sulfide is apparent.

1035F-21R 1035F-22R 1035F-23R

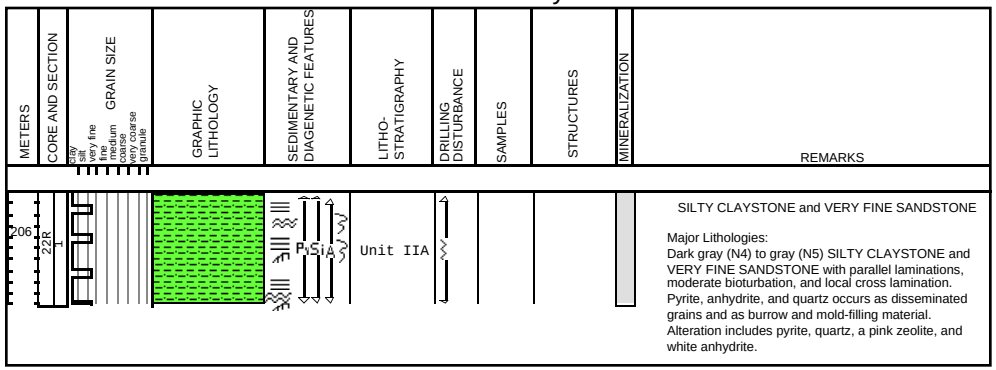
SITE 1035 HOLE F CORE 21R Recovery 2% CORED 196.0 - 205.6 mbsf



FINE SANDSTONE

Major Lithologies:
Gray (N5), parallel-laminated and bioturbated FINE SANDSTONE to light greenish gray (5GY 7/1) FINE SANDSTONE and SILTSTONE. The greenish gray color in this section is similar to that at the base of Section 169-1035F-20R-1, and probably indicates epidote alteration. Silicification is pervasive. In the gray FINE SANDSTONE, quartz occurs as crystals in anhydrite molds and as blebs replacing anhydrite. No sulfide occurs in this section.

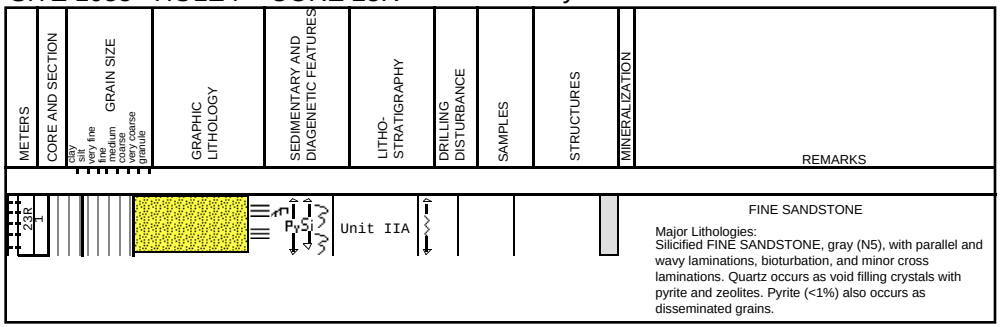
SITE 1035 HOLE F CORE 22R Recovery 8% CORED 205.6 - 215.2 mbsf



SILTY CLAYSTONE and VERY FINE SANDSTONE

Major Lithologies:
Dark gray (N4) to gray (N5) SILTY CLAYSTONE and VERY FINE SANDSTONE with parallel laminations, moderate bioturbation, and local cross lamination. Pyrite, anhydrite, and quartz occurs as disseminated grains and as burrow and mold-filling material. Alteration includes pyrite, quartz, a pink zeolite, and white anhydrite.

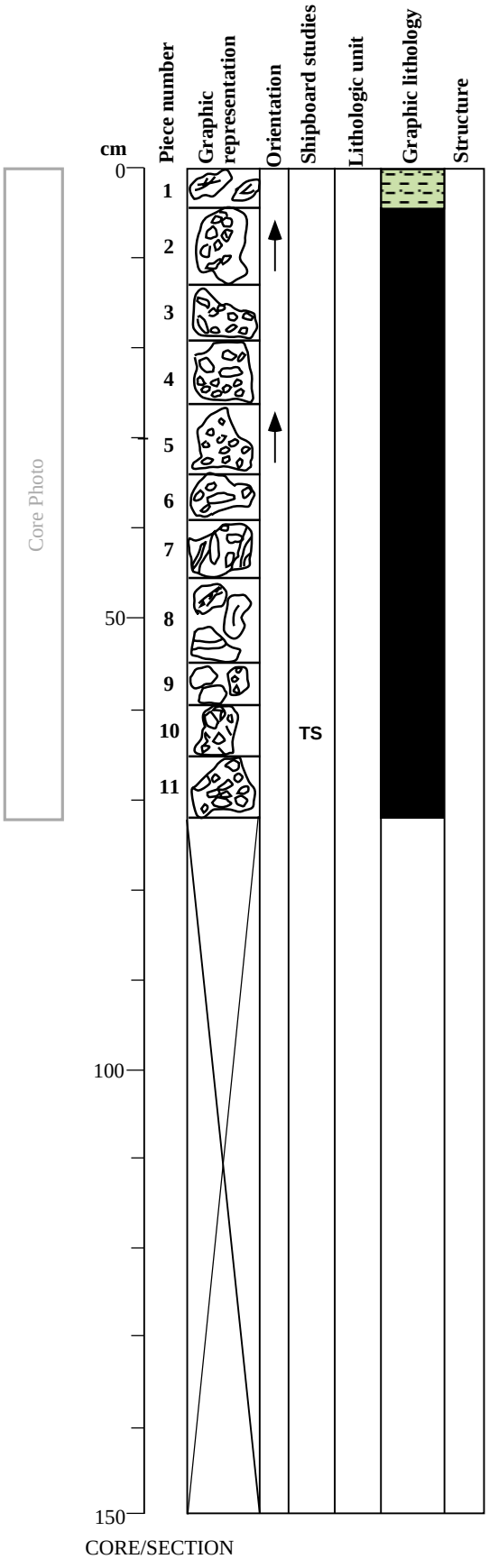
SITE 1035 HOLE F CORE 23R Recovery 4% CORED 215.2 - 224.8 mbsf



FINE SANDSTONE

Major Lithologies:
Silicified FINE SANDSTONE, gray (N5), with parallel and wavy laminations, bioturbation, and minor cross laminations. Quartz occurs as void filling crystals with pyrite and zeolites. Pyrite (<1%) also occurs as disseminated grains.

1035G-1R NO RECOVERY



169-1035G-2R-1
Top of Core 2R, 44.4 mbsf

Piece 1 (0-5 cm)

ROCK TYPE: SILTY MUDSTONE
COLOR: Pale gray (N6-N7)
COMMENTS:

Moderately indurated, laminated, and bioturbated silty mudstone. Vugs may represent dissolved anhydrite molds.

Pieces 2-6 (5-38 cm)

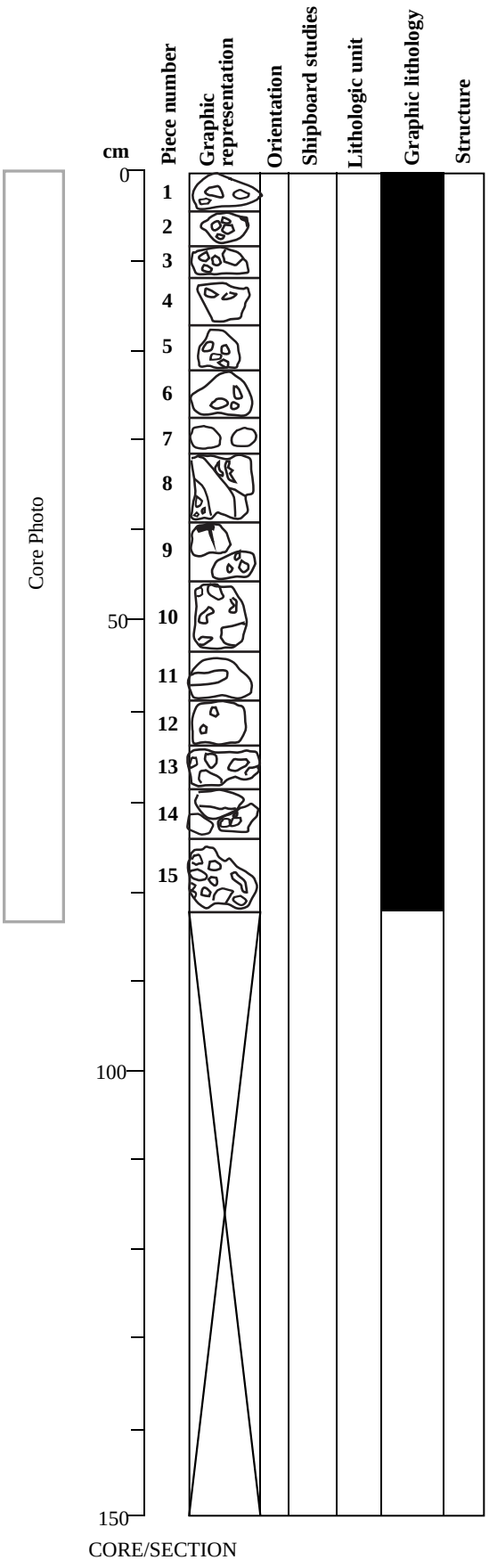
ROCK TYPE: MASSIVE PYRITE
COLOR: Bronze-yellow
COMMENTS:

Bronze-yellow colored vuggy pyrite cut by pyrite veins. Almost devoid of sphalerite and chalcopyrite (Type 5). The texture appears to pseudomorph a hexagonal pyrrhotite network in places. Pyrite is subhedral to euhedral.

Pieces 7-11 (38-72 cm)

ROCK TYPE: MASSIVE PYRITE
COLOR: Bronze yellow
COMMENTS:

Bronze-yellow subhedral to euhedral, medium-grained vuggy massive pyrite, infilled by clear to pale gray anhydrite. Sulfides are almost devoid of sphalerite and chalcopyrite. Anhydrite is very coarse-grained and crystalline. Some of the tabular structures may be after tube worms (vent fauna).



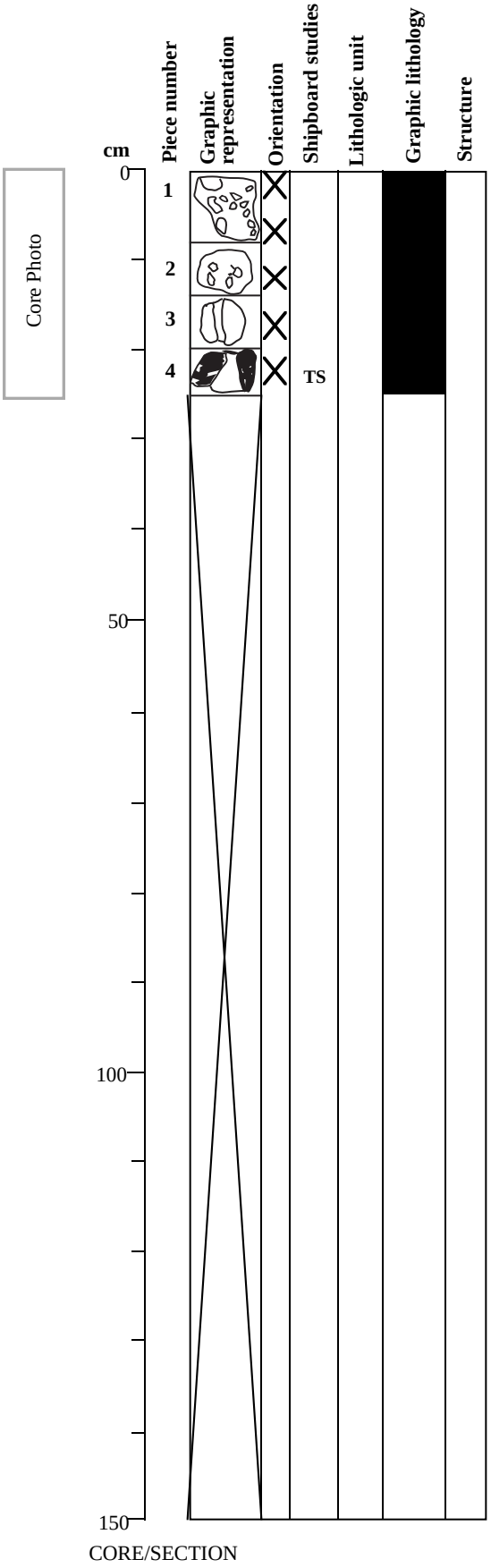
169-1035G-3R-1
Top of Core 3R, 54.4 mbsf

Pieces 1-15

ROCK TYPE: MASSIVE SULFIDE
COLOR: Bronze-yellow
COMMENTS:

0-32 cm**:** Vuggy bronze-yellow, medium-grained massive pyrite with up to 20% porosity. Vugs are lined with idiomorphic pyrite and partly filled with white to pale gray crystalline anhydrite. Sulfides are devoid of sphalerite and chalcopyrite.

32-82 cm: Vuggy bronze-yellow, medium-grained, massive pyrite with most of the vugs filled with clear to white anhydrite. The tabular morphology in some pieces (e.g., Piece 15) may be the result of replacement of tube worms. Sulfides are devoid of sphalerite and chalcopyrite.



169-1035G-4R-1
Top of Core 4R, 64.0 mbsf

Pieces 1 and 2

ROCK TYPE: MASSIVE SULFIDE
COLOR: Bronze-yellow
COMMENTS:

0-14 cm: Vuggy bronze-yellow massive pyrite with most of the vugs infilled with clear to white, coarse-grained, crystalline anhydrite. Vugs constitute up to 30-40% of the rock. Rocks are devoid of other sulfide minerals.

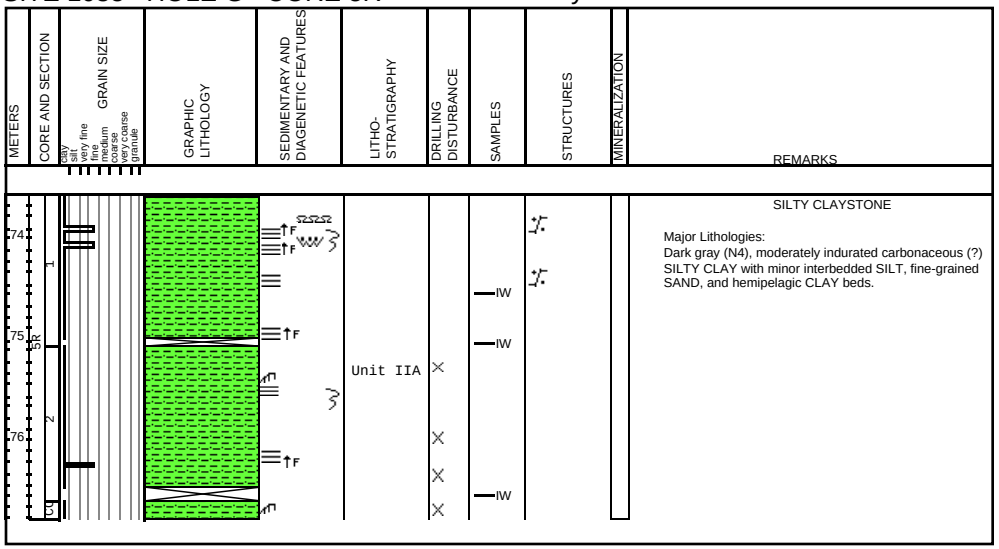
Pieces 3 and 4

ROCK TYPE: MASSIVE SULFIDE
COLOR: Bronze-yellow
COMMENTS:

14-25 cm: Bronze-yellow, fine- to medium-grained vuggy pyrite cut by clear to white, coarse-grained, crystalline anhydrite veins up to 2 cm wide. Pyrite appears to pseudomorph the morphology of hexagonal, interlocking pyrrhotite tablets. Rocks are devoid of other sulfide minerals

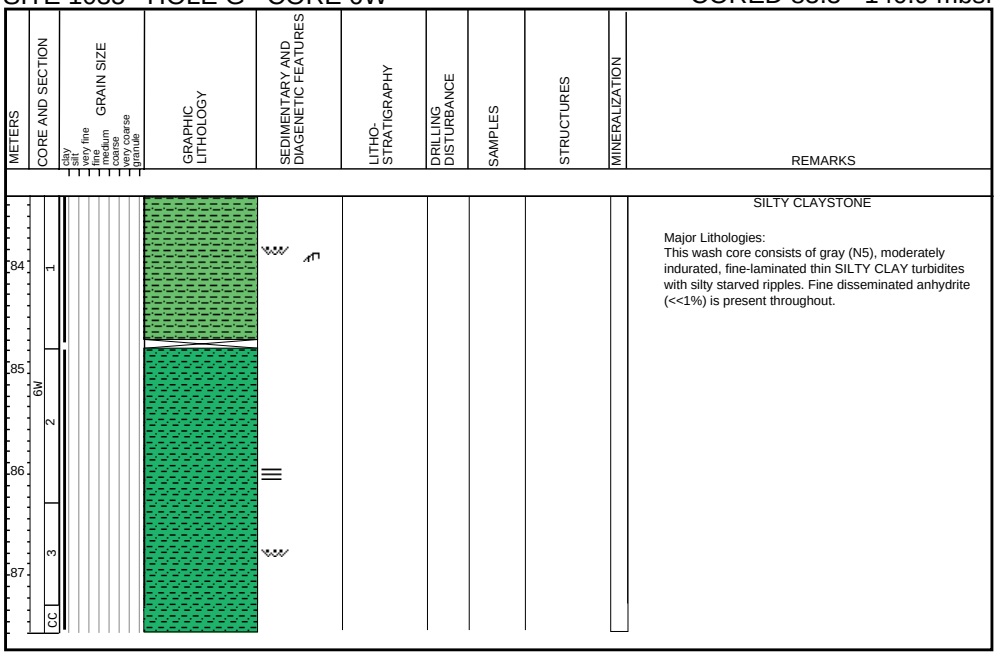
SITE 1035 HOLE G CORE 5R Recovery 32% CORED 73.6 - 83.3 mbsf

1035G-5R

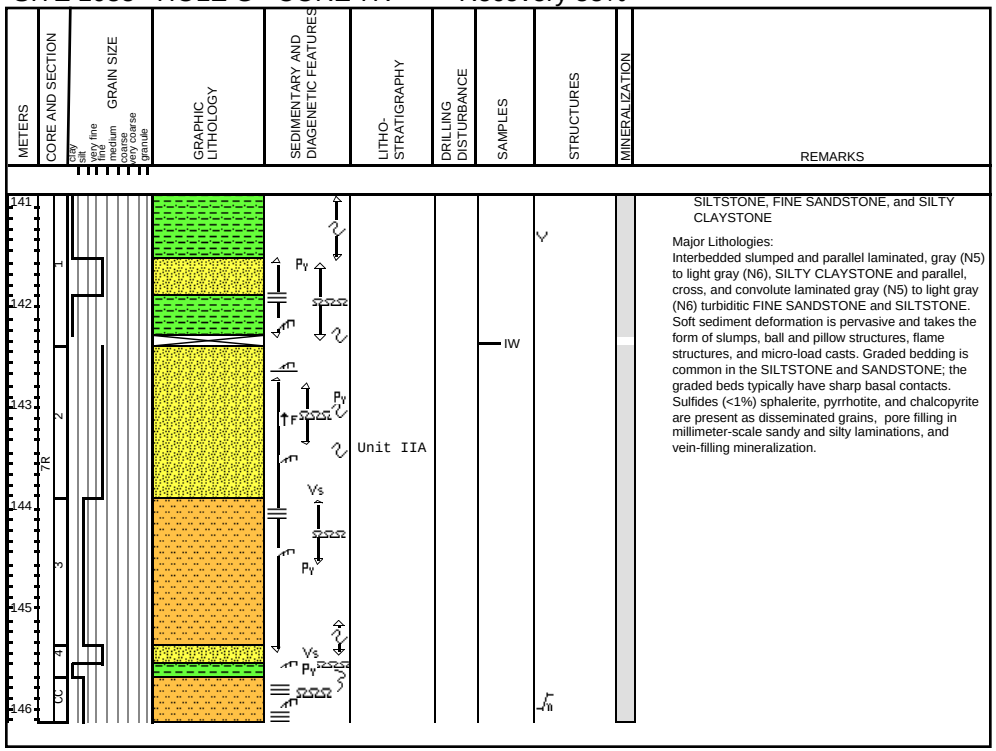


1035G-6W

SITE 1035 HOLE G CORE 6W CORED 83.3 - 140.9 mbsf



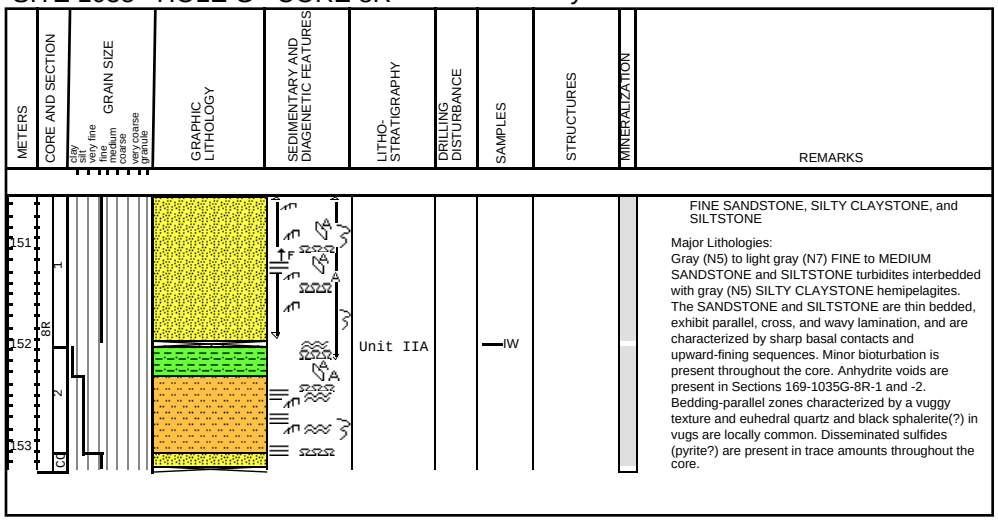
SITE 1035 HOLE G CORE 7R Recovery 55% CORED 140.9 - 150.5 mbsf 1035G-7R



1035G-8R

1035G-9R

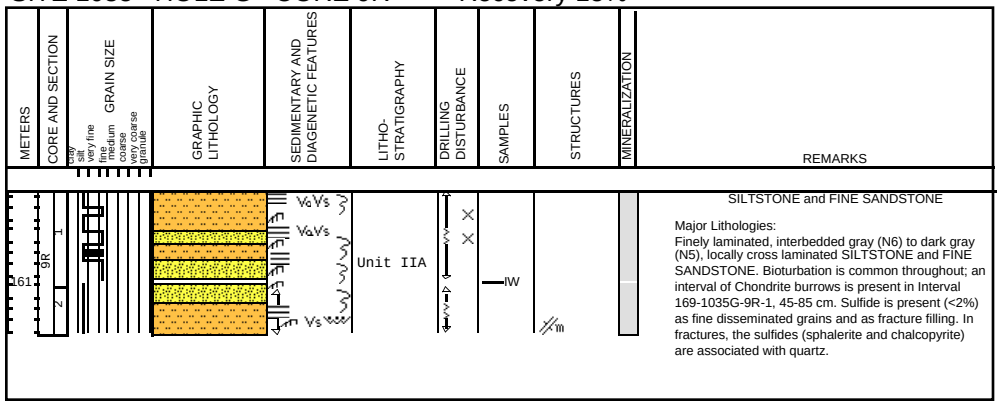
SITE 1035 HOLE G CORE 8R Recovery 28% CORED 150.5 - 160.1 mbsf



FINE SANDSTONE, SILTY CLAYSTONE, and SILTSTONE

Major Lithologies:
Gray (N5) to light gray (N7) FINE to MEDIUM SANDSTONE and SILTSTONE turbidites interbedded with gray (N5) SILTY CLAYSTONE hemipelagites. The SANDSTONE and SILTSTONE are thin bedded, exhibit parallel, cross, and wavy lamination, and are characterized by sharp basal contacts and upward-fining sequences. Minor bioturbation is present throughout the core. Anhydrite voids are present in Sections 169-1035G-8R-1 and -2. Bedding-parallel zones characterized by a vuggy texture and euhedral quartz and black sphalerite(?) in vugs are locally common. Disseminated sulfides (pyrite?) are present in trace amounts throughout the core.

SITE 1035 HOLE G CORE 9R Recovery 15% CORED 160.9 - 169.8 mbsf

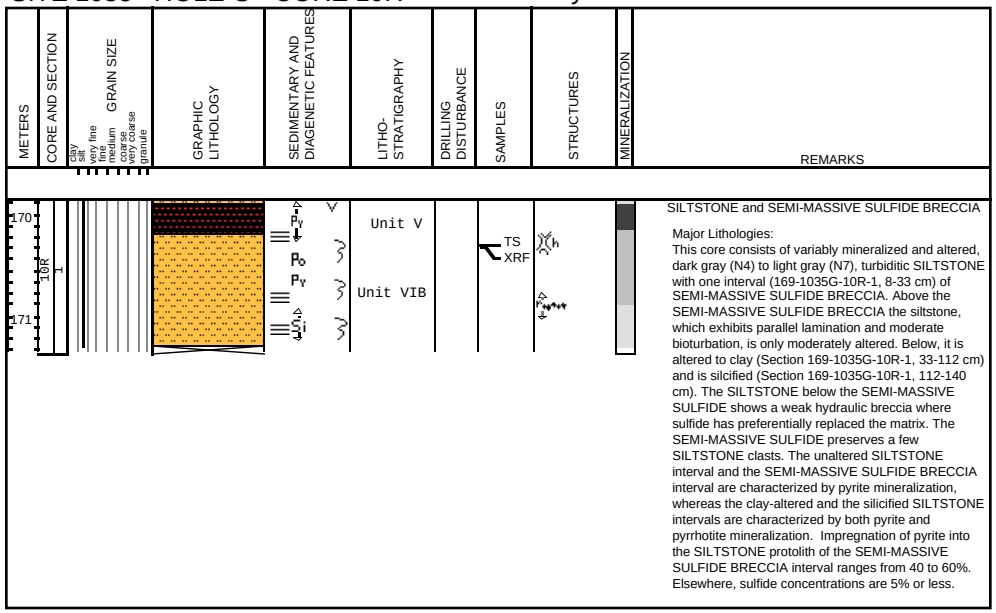


SILTSTONE and FINE SANDSTONE

Major Lithologies:
Finely laminated, interbedded gray (N6) to dark gray (N5), locally cross laminated SILTSTONE and FINE SANDSTONE. Bioturbation is common throughout; an interval of Chondrite burrows is present in Interval 169-1035G-9R-1, 45-85 cm. Sulfide is present (<2%) as fine disseminated grains and as fracture filling. In fractures, the sulfides (sphalerite and chalcopyrite) are associated with quartz.

SITE 1035 HOLE G CORE 10R Recovery 12% CORED 169.8 - 179.5 mbsf

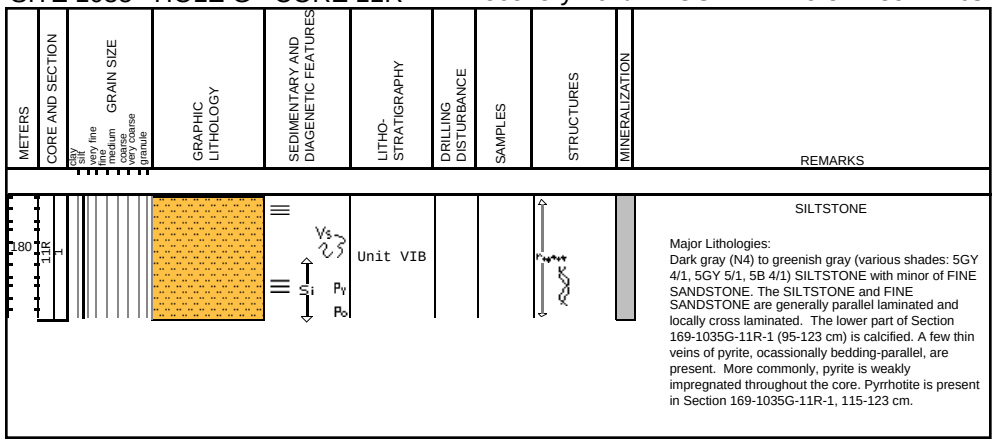
1035G-10R 1035G-11R



SILTSTONE and SEMI-MASSIVE SULFIDE BRECCIA

Major Lithologies:
This core consists of variably mineralized and altered, dark gray (N4) to light gray (N7), turbiditic SILTSTONE with one interval (169-1035G-10R-1, 8-33 cm) of SEMI-MASSIVE SULFIDE BRECCIA. Above the SEMI-MASSIVE SULFIDE BRECCIA the siltstone, which exhibits parallel lamination and moderate bioturbation, is only moderately altered. Below, it is altered to clay (Section 169-1035G-10R-1, 33-112 cm) and is silcified (Section 169-1035G-10R-1, 112-140 cm). The SILTSTONE below the SEMI-MASSIVE SULFIDE shows a weak hydraulic breccia where sulfide has preferentially replaced the matrix. The SEMI-MASSIVE SULFIDE preserves a few SILTSTONE clasts. The unaltered SILTSTONE interval and the SEMI-MASSIVE SULFIDE BRECCIA interval are characterized by pyrite mineralization, whereas the clay-altered and the silicified SILTSTONE intervals are characterized by both pyrite and pyrrhotite mineralization. Impregnation of pyrite into the SILTSTONE protolith of the SEMI-MASSIVE SULFIDE BRECCIA interval ranges from 40 to 60%. Elsewhere, sulfide concentrations are 5% or less.

SITE 1035 HOLE G CORE 11R Recovery 10% CORED 179.5 - 189.2 mbsf



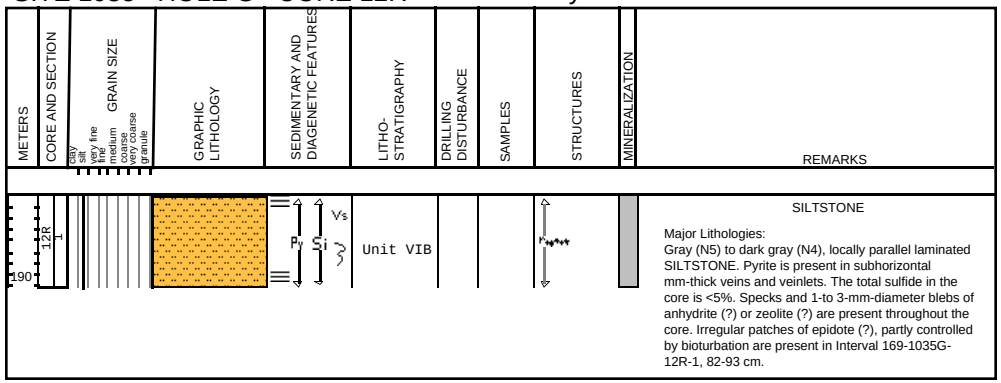
SILTSTONE

Major Lithologies:
Dark gray (N4) to greenish gray (various shades: 5GY 4/1, 5GY 5/1, 5B 4/1) SILTSTONE with minor of FINE SANDSTONE. The SILTSTONE and FINE SANDSTONE are generally parallel laminated and locally cross laminated. The lower part of Section 169-1035G-11R-1 (95-123 cm) is calcified. A few thin veins of pyrite, ocassionally bedding-parallel, are present. More commonly, pyrite is weakly impregnated throughout the core. Pyrrhotite is present in Section 169-1035G-11R-1, 115-123 cm.

SITE 1035 HOLE G CORE 12R Recovery 5% CORED 189.2 - 198.9 mbsf

1035G-12R

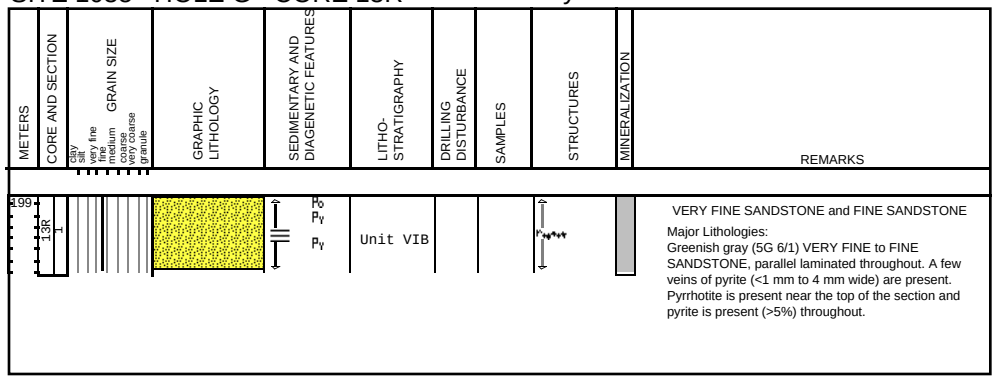
1035G-13R



SILTSTONE

Major Lithologies:
Gray (N5) to dark gray (N4), locally parallel laminated SILTSTONE. Pyrite is present in subhorizontal mm-thick veins and veinlets. The total sulfide in the core is <5%. Specks and 1-to 3-mm-diameter blebs of anhydrite (?) or zeolite (?) are present throughout the core. Irregular patches of epidote (?), partly controlled by bioturbation are present in Interval 169-1035G-12R-1, 82-93 cm.

SITE 1035 HOLE G CORE 13R Recovery 4% CORED 198.9 - 208.5 mbsf



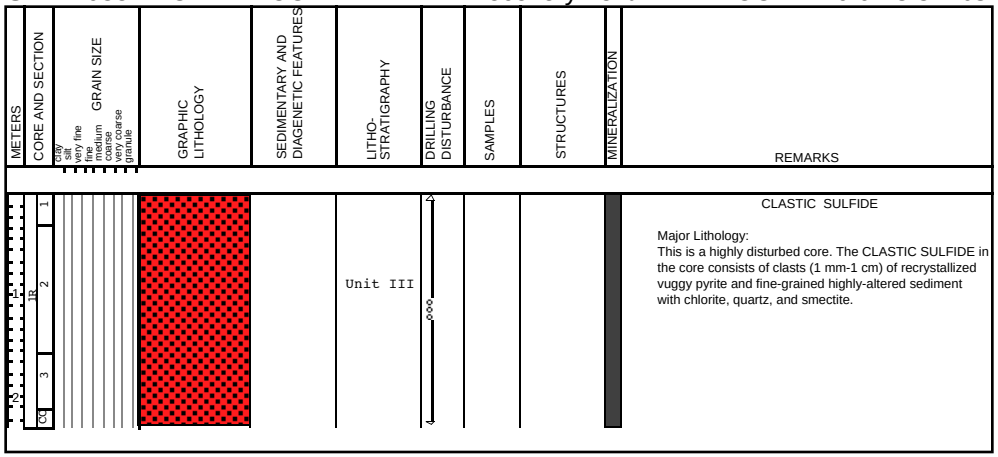
VERY FINE SANDSTONE and FINE SANDSTONE

Major Lithologies:
Greenish gray (5G 6/1) VERY FINE to FINE SANDSTONE, parallel laminated throughout. A few veins of pyrite (<1 mm to 4 mm wide) are present. Pyrrhotite is present near the top of the section and pyrite is present (>5%) throughout.

1035H-1R

1035H-2R

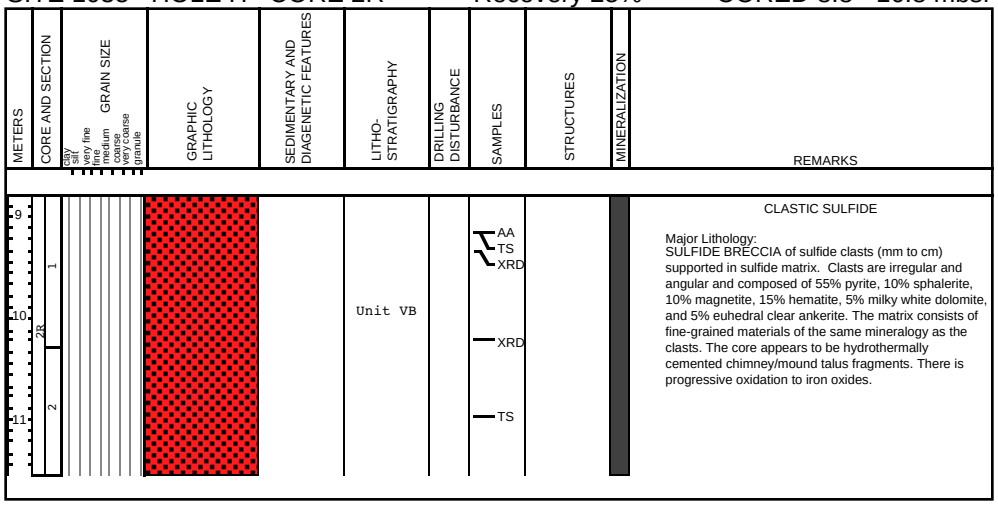
SITE 1035 HOLE H CORE 1R Recovery 25% CORED 0.0 - 8.8 mbsf



CLASTIC SULFIDE

Major Lithology:
This is a highly disturbed core. The CLASTIC SULFIDE in the core consists of clasts (1 mm-1 cm) of recrystallized vuggy pyrite and fine-grained highly-altered sediment with chlorite, quartz, and smectite.

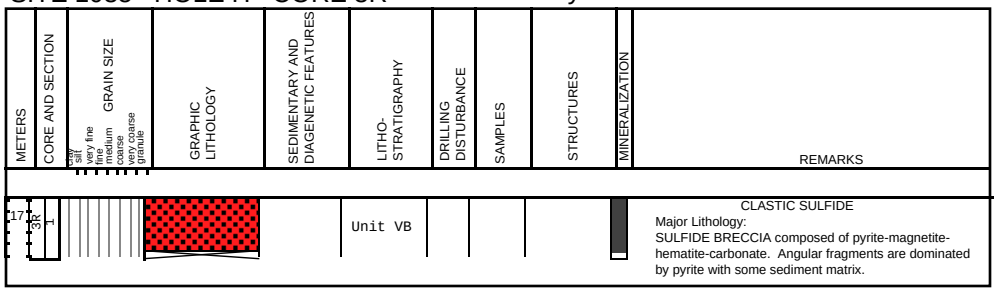
SITE 1035 HOLE H CORE 2R Recovery 25% CORED 8.8 - 16.8 mbsf



CLASTIC SULFIDE

Major Lithology:
SULFIDE BRECCIA of sulfide clasts (mm to cm) supported in sulfide matrix. Clasts are irregular and angular and composed of 55% pyrite, 10% sphalerite, 10% magnetite, 15% hematite, 5% milky white dolomite, and 5% euhedral clear ankerite. The matrix consists of fine-grained materials of the same mineralogy as the clasts. The core appears to be hydrothermally cemented chimney/mound talus fragments. There is progressive oxidation to iron oxides.

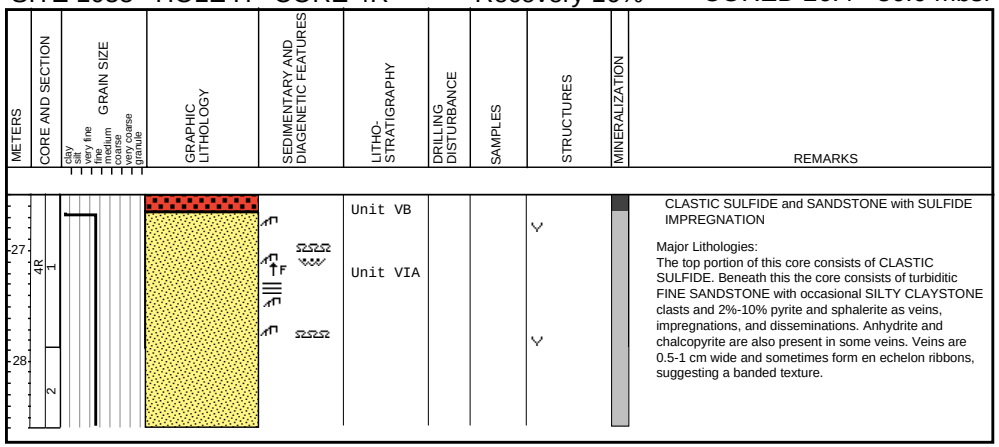
SITE 1035 HOLE H CORE 3R Recovery 4% CORED 16.8 - 26.4 mbsf



CLASTIC SULFIDE

Major Lithology:
SULFIDE BRECCIA composed of pyrite-magnetite-hematite-carbonate. Angular fragments are dominated by pyrite with some sediment matrix.

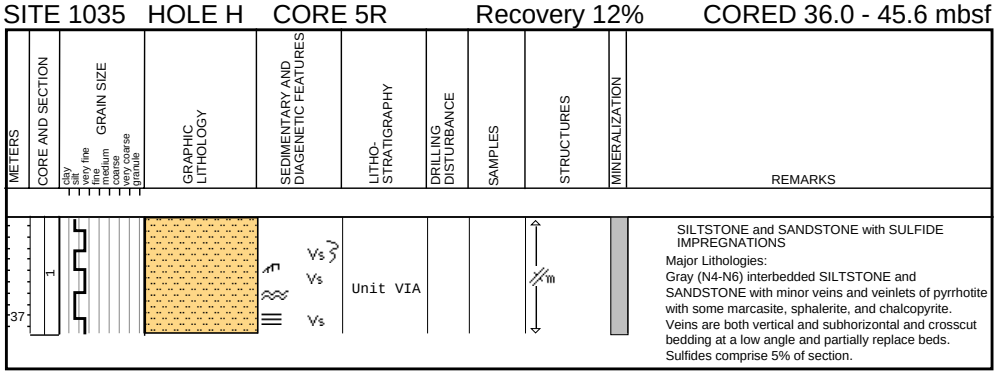
SITE 1035 HOLE H CORE 4R Recovery 16% CORED 26.4 - 36.0 mbsf



CLASTIC SULFIDE and SANDSTONE with SULFIDE IMPREGNATION

Major Lithologies:
The top portion of this core consists of CLASTIC SULFIDE. Beneath this the core consists of turbiditic FINE SANDSTONE with occasional SILTY CLAYSTONE clasts and 2%-10% pyrite and sphalerite as veins, impregnations, and disseminations. Anhydrite and chalcopyrite are also present in some veins. Veins are 0.5-1 cm wide and sometimes form en echelon ribbons, suggesting a banded texture.

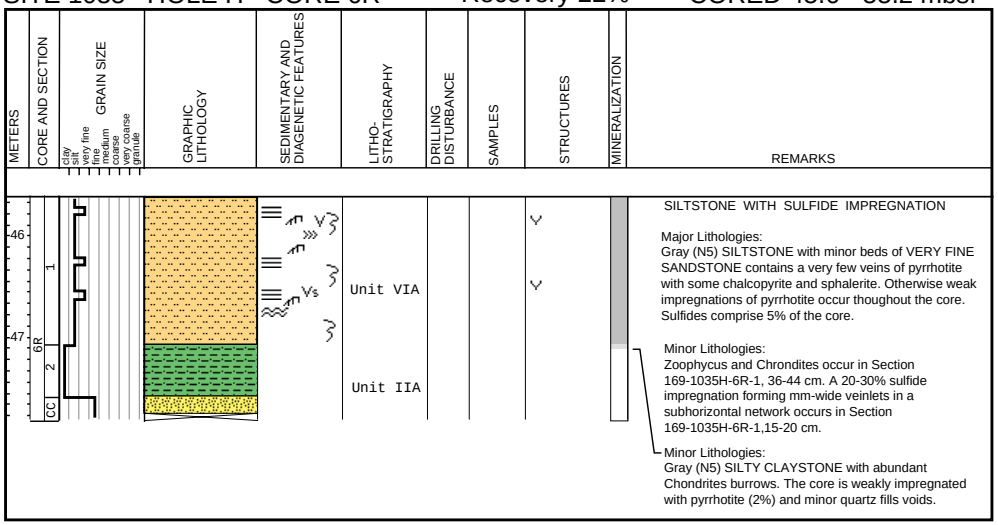
SITE 1035 HOLE H CORE 5R Recovery 12% CORED 36.0 - 45.6 mbsf



SILTSTONE and SANDSTONE with SULFIDE IMPREGNATIONS

Major Lithologies:
Gray (N4-N6) interbedded SILTSTONE and SANDSTONE with minor veins and veinlets of pyrrhotite with some marcasite, sphalerite, and chalcopyrite. Veins are both vertical and subhorizontal and crosscut bedding at a low angle and partially replace beds. Sulfides comprise 5% of section.

SITE 1035 HOLE H CORE 6R Recovery 22% CORED 45.6 - 55.2 mbsf



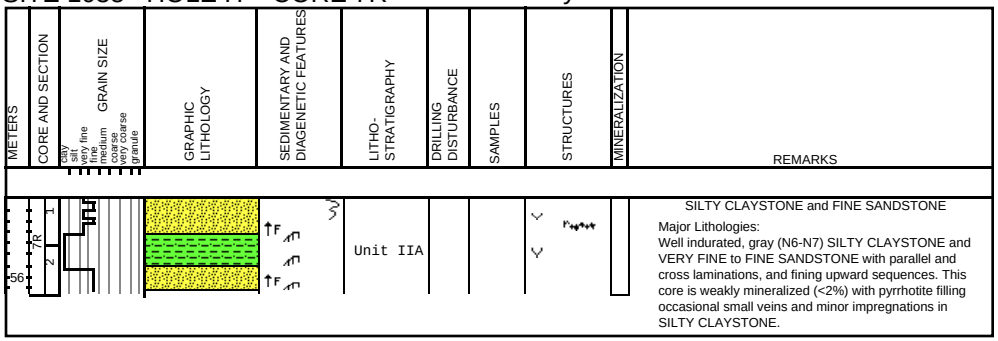
SILTSTONE WITH SULFIDE IMPREGNATION

Major Lithologies:
Gray (N5) SILTSTONE with minor beds of VERY FINE SANDSTONE contains a very few veins of pyrrhotite with some chalcopyrite and sphalerite. Otherwise weak impregnations of pyrrhotite occur thoughout the core. Sulfides comprise 5% of the core.

Minor Lithologies:
Zoophycus and Chrondites occur in Section 169-1035H-6R-1, 36-44 cm. A 20-30% sulfide impregnation forming mm-wide veinlets in a subhorizontal network occurs in Section 169-1035H-6R-1,15-20 cm.

Minor Lithologies:
Gray (N5) SILTY CLAYSTONE with abundant Chondrites burrows. The core is weakly impregnated with pyrrhotite (2%) and minor quartz fills voids.

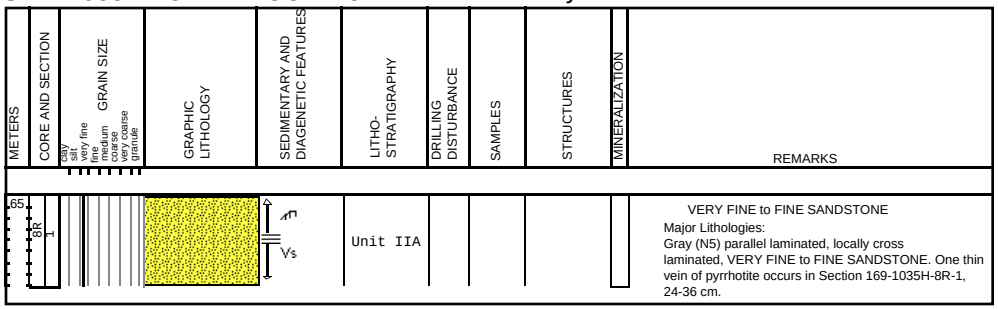
SITE 1035 HOLE H CORE 7R Recovery 9% CORED 55.2 - 64.9 mbsf



SILTY CLAYSTONE and FINE SANDSTONE

Major Lithologies:
Well indurated, gray (N6-N7) SILTY CLAYSTONE and VERY FINE to FINE SANDSTONE with parallel and cross laminations, and fining upward sequences. This core is weakly mineralized (<2%) with pyrrhotite filling occasional small veins and minor impregnations in SILTY CLAYSTONE.

SITE 1035 HOLE H CORE 8R Recovery 8% CORED 64.9 - 74.6 mbsf

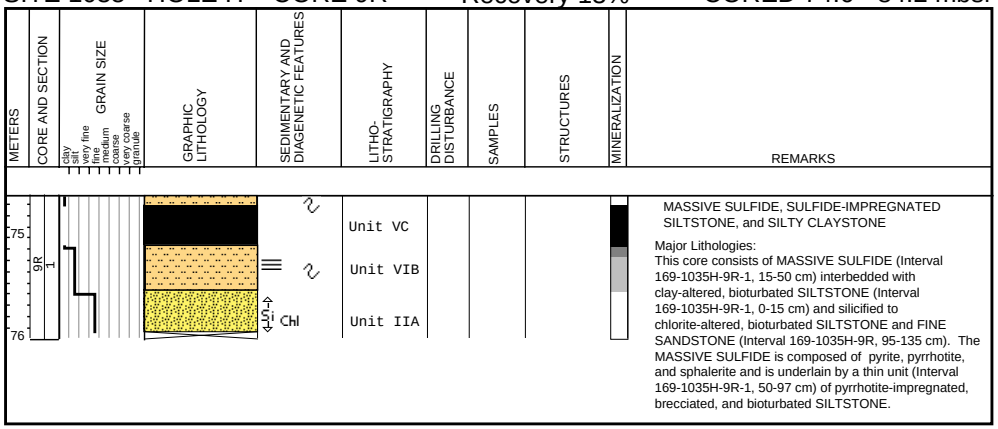


VERY FINE to FINE SANDSTONE

Major Lithologies:
Gray (N5) parallel laminated, locally cross laminated, VERY FINE to FINE SANDSTONE. One thin vein of pyrrhotite occurs in Section 169-1035H-8R-1, 24-36 cm.

1035H-9R 1035H-10R 1035H-11R

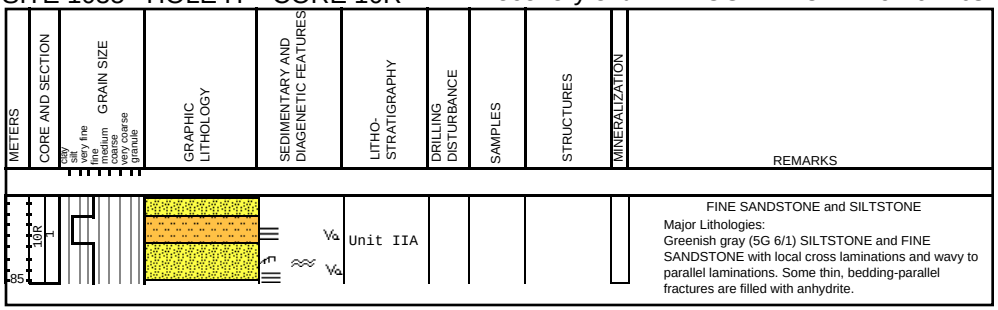
SITE 1035 HOLE H CORE 9R Recovery 13% CORED 74.6 - 84.2 mbsf



MASSIVE SULFIDE, SULFIDE-IMPREGNATED SILTSTONE, and SILTY CLAYSTONE

Major Lithologies:
This core consists of MASSIVE SULFIDE (Interval 169-1035H-9R-1, 15-50 cm) interbedded with clay-altered, bioturbated SILTSTONE (Interval 169-1035H-9R-1, 0-15 cm) and silicified to chlorite-altered, bioturbated SILTSTONE and FINE SANDSTONE (Interval 169-1035H-9R, 95-135 cm). The MASSIVE SULFIDE is composed of pyrite, pyrrhotite, and sphalerite and is underlain by a thin unit (Interval 169-1035H-9R-1, 50-97 cm) of pyrrhotite-impregnated, brecciated, and bioturbated SILTSTONE.

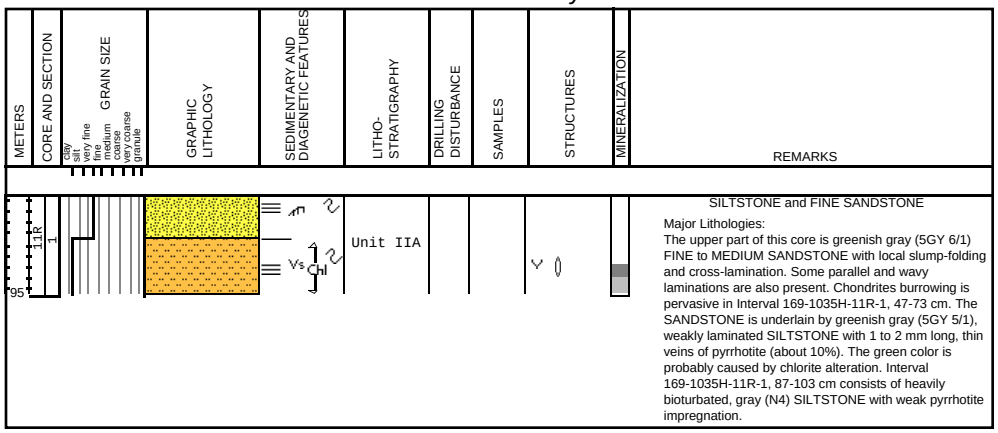
SITE 1035 HOLE H CORE 10R Recovery 5% CORED 84.2 - 94.0 mbsf



FINE SANDSTONE and SILTSTONE

Major Lithologies:
Greenish gray (5G 6/1) SILTSTONE and FINE SANDSTONE with local cross laminations and wavy to parallel laminations. Some thin, bedding-parallel fractures are filled with anhydrite.

SITE 1035 HOLE H CORE 11R Recovery 7% CORED 94.0 -103.7 mbsf

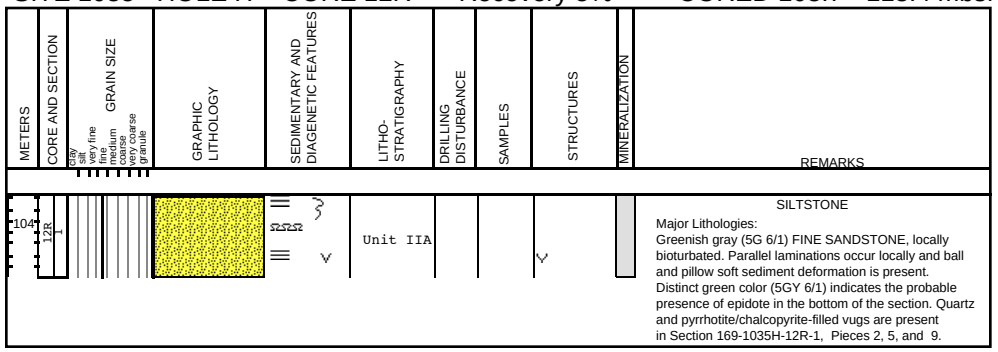


SILTSTONE and FINE SANDSTONE

Major Lithologies:
The upper part of this core is greenish gray (5GY 6/1) FINE to MEDIUM SANDSTONE with local slump-folding and cross-lamination. Some parallel and wavy laminations are also present. Chondrites burrowing is pervasive in Interval 169-1035H-11R-1, 47-73 cm. The SANDSTONE is underlain by greenish gray (5GY 5/1), weakly laminated SILTSTONE with 1 to 2 mm long, thin veins of pyrrhotite (about 10%). The green color is probably caused by chlorite alteration. Interval 169-1035H-11R-1, 87-103 cm consists of heavily bioturbated, gray (N4) SILTSTONE with weak pyrrhotite impregnation.

1035H-12R 1035H-13R 1035H-14R

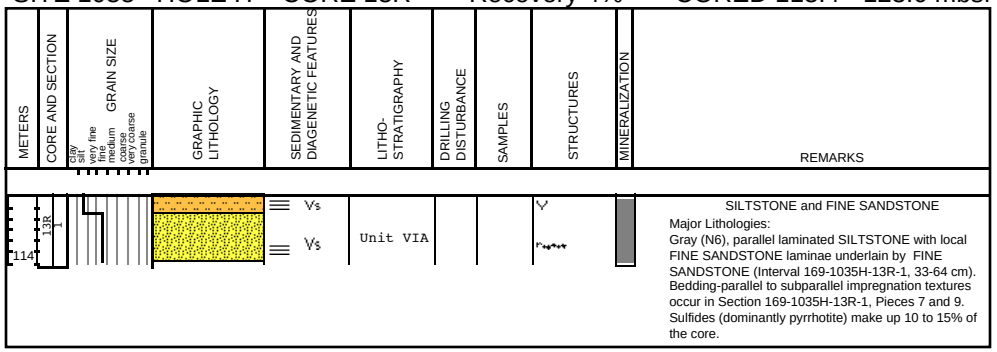
SITE 1035 HOLE H CORE 12R Recovery 5% CORED 103.7 - 113.4 mbsf



SILTSTONE

Major Lithologies:
Greenish gray (5G 6/1) FINE SANDSTONE, locally bioturbated. Parallel laminations occur locally and ball and pillow soft sediment deformation is present. Distinct green color (5GY 6/1) indicates the probable presence of epidote in the bottom of the section. Quartz and pyrrhotite/chalcopyrite-filled vugs are present in Section 169-1035H-12R-1, Pieces 2, 5, and 9.

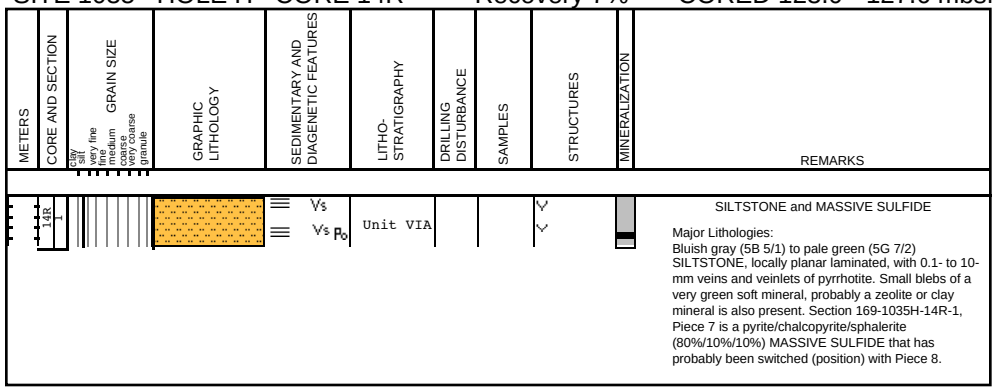
SITE 1035 HOLE H CORE 13R Recovery 4% CORED 113.4 - 123.0 mbsf



SILTSTONE and FINE SANDSTONE

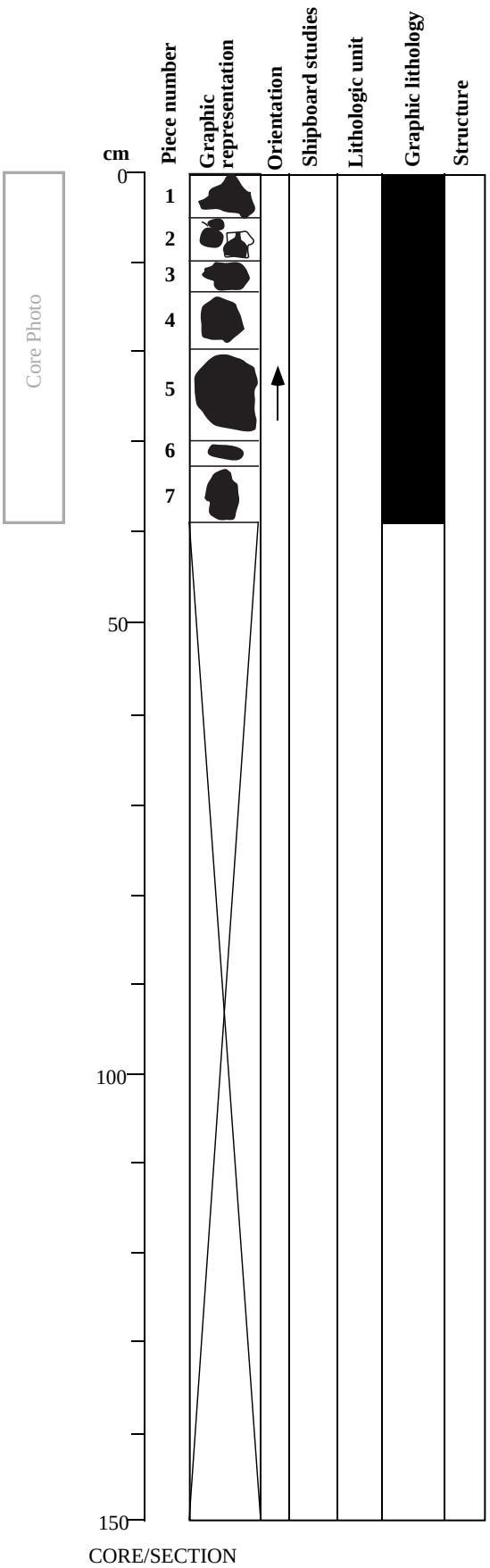
Major Lithologies:
Gray (N6), parallel laminated SILTSTONE with local FINE SANDSTONE laminae underlain by FINE SANDSTONE (Interval 169-1035H-13R-1, 33-64 cm). Bedding-parallel to subparallel impregnation textures occur in Section 169-1035H-13R-1, Pieces 7 and 9. Sulfides (dominantly pyrrhotite) make up 10 to 15% of the core.

SITE 1035 HOLE H CORE 14R Recovery 7% CORED 123.0 - 127.6 mbsf



SILTSTONE and MASSIVE SULFIDE

Major Lithologies:
Bluish gray (5B 5/1) to pale green (5G 7/2) SILTSTONE, locally planar laminated, with 0.1- to 10-mm veins and veinlets of pyrrhotite. Small blebs of a very green soft mineral, probably a zeolite or clay mineral is also present. Section 169-1035H-14R-1, Piece 7 is a pyrite/chalcopyrite/sphalerite (80%/10%/10%) MASSIVE SULFIDE that has probably been switched (position) with Piece 8.

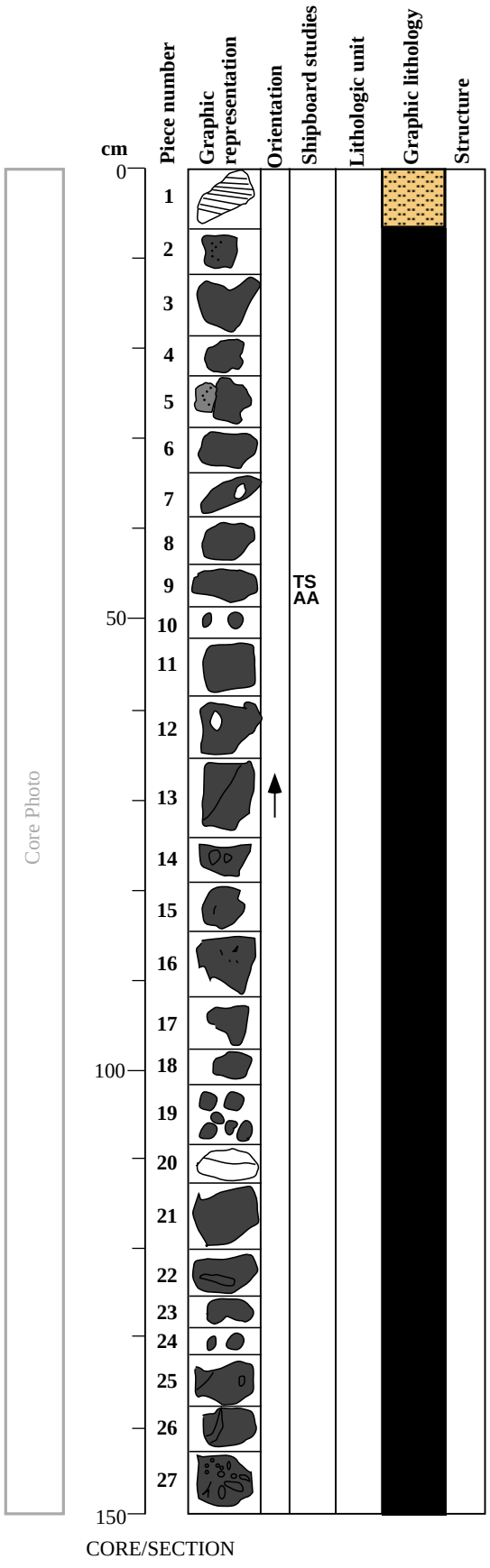


169-1035H-15R-1
Top of Section 15R-1, 127.6 mbsf

Pieces 1-7

ROCK TYPE: MASSIVE SULFIDE
COLOR:
COMMENTS:

Pyrrhotite and black (iron-rich) sphalerite with very minor pyrite and chalcopyrite. Blades of hexagonal pyrrhotite form a relatively open network with interstitial sphalerite and vugs with euhedral quartz crystals. Some anhydrite is present. Sphalerite content is up to 60% in some pieces.



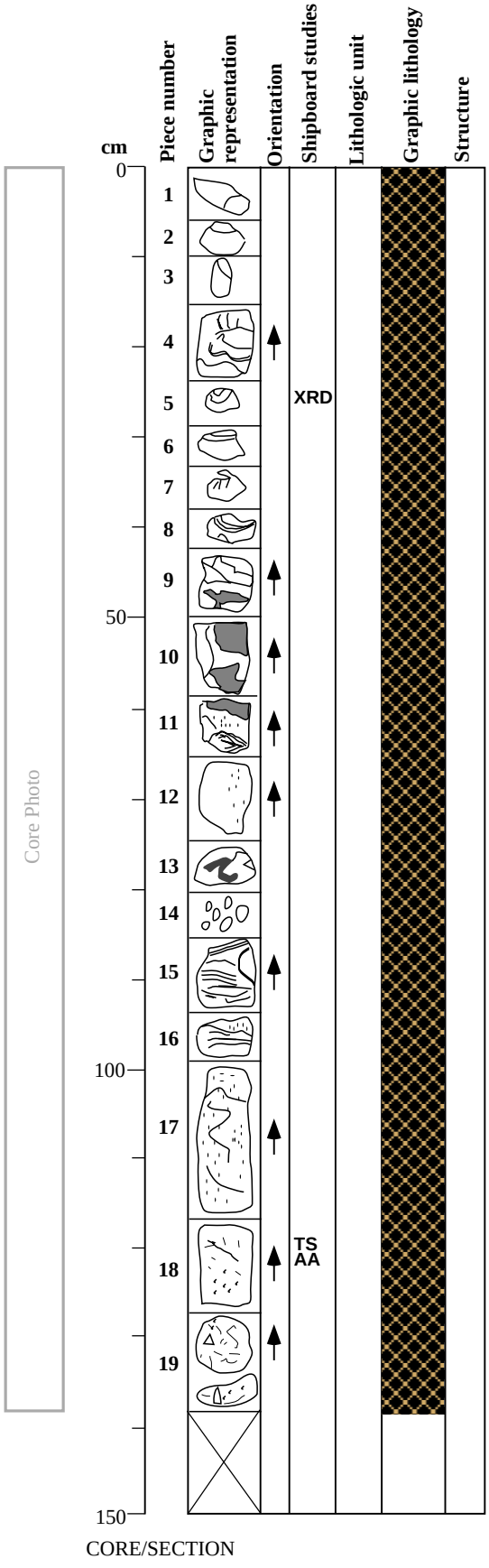
169-1035H-16R-1
Top of Section 16R-1, 132.6 mbsf

Piece 1

ROCK TYPE: SILTSTONE
COMMENTS:
0-8 cm: Probable fall-in from upper core. Parallel- and cross-laminated SILTSTONE with deformation structures and pyrite impregnations.

Pieces 2-27

ROCK TYPE: SPHALERITE-RICH MASSIVE SULFIDE
COLOR: Reddish black to dusky red
COMMENTS:
8-150 cm: Heterogeneous and vuggy texture. There are a few, random 1- to 5-mm-thick, partially filled veins with pyrite, white mineral and gray crystal (only 2 observed). Void space (5%-10%) is commonly infilled with deep red (iron-rich) sphalerite. Pieces 13 to 16 show relict clastic (sulfide clasts in sulfide matrix) texture. Pieces 20-27 are more compact and less vuggy and less pyrite is intergrown with the dusky red sphalerite. Nearly 100% of void space is infilled by soft, soapy white mineral (talc?, clay?).
SULFIDE: 50%-70% sphalerite; 5%-15% pyrite (intergrown and lining voids)



169-1035H-16R-2
Top of Section 16R-2, 134.1 mbsf

Pieces 1-8

ROCK TYPE: SEMI-MASSIVE SULFIDE WITH SEDIMENT
COLOR: Reddish, greenish and white
COMMENTS:

0-42 cm: Reddish, greenish and white SEMI-MASSIVE SULFIDE WITH SEDIMENT containing 10%-15% white clay mineral (smectite?), and about 20% of clays and altered sediment. Texture is heterogeneous. Piece 8 shows a banded texture (may indicate sulfide after sediment?). About 1% of minor green mineral (epidote? with fluid inclusions, or diopside?) is present (XRD identifies this phase as hedenbergite.) Density and magnetic susceptibilitiesare low in this interval.

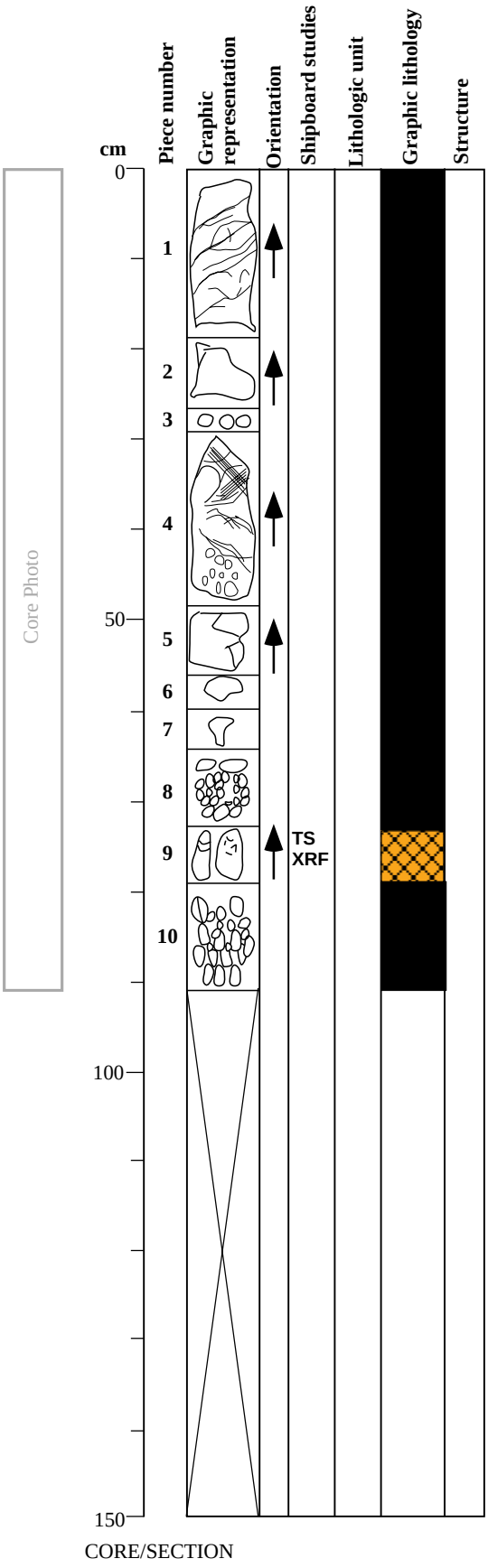
SULFIDE: 40%-60% sphalerite; 4%-5% pyrite

Pieces 9-19

ROCK TYPE: MASSIVE SULFIDE AND OXIDE
COLOR: Yellowish bronze to deep reddish black
COMMENTS:

42-137 cm**:** Rock contains approximately 10%-30% magnetite, and 5%-10% soft white clay(?) mineral. Textures are very heterogeneous, wavy, and spotty. Pieces 9-16 have higher magnetite/sphalerite:pyrite ratio than Pieces 17 to 19 which appear to have less magnetite. All pieces have possible vestiges of sediment protolith which is now altered to clay mineral.

SULFIDE: 5%-10% pyrite



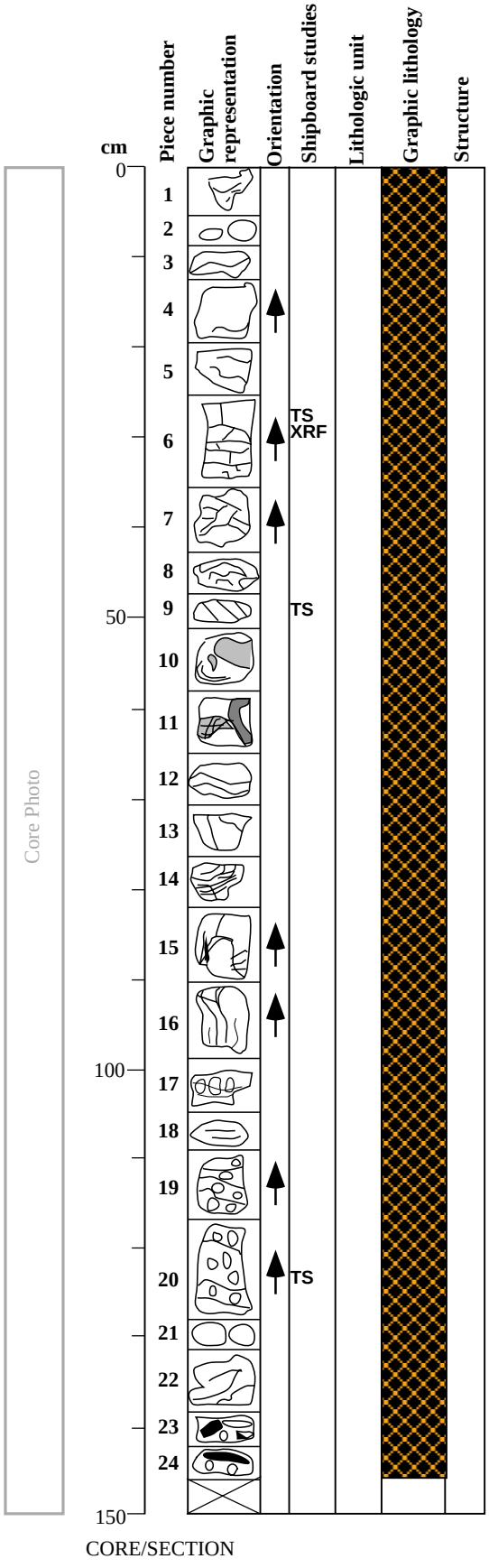
169-1035H-16R-3
Top of Section 16R-3, 135.47 mbsf

Pieces 1-8, 10

ROCK TYPE: MASSIVE SULFIDE AND OXIDE
COLOR: Yellowish, red black, and white/gray bits
COMMENTS:
0-72 cm,
78-90 cm**:** Contains approximately 40% magnetite (±sphalerite?), about 10% gray and white soft clay(?) minerals, and less than 1% barite(?) which coincides with a high natural gamma count. Piece 1 has pyrite blebs in a "relict" banded clay/oxide matrix. Piece 2 has a banded texture. Fractures that have acted as loci for pyrite crystals result in vein-like structures. Rocks in this interval have high density and magnetic susceptibilities.
SULFIDE: 50% pyrite; up to 2% pyrrhotite

Piece 9

ROCK TYPE: SULFIDE-VEINED SEDIMENT
COLOR:
COMMENTS:
72-79 cm**:** Altered sediment with impregnated pyrite and vertical to subvertical pyrrhotite veinlets at base of this piece. Approximately 2 cm at the top has a 0.6 mm rhombohedral white crystals, possibly altered clay minerals. This piece has features similar to those seen in Piece 2.
SULFIDE: ?%



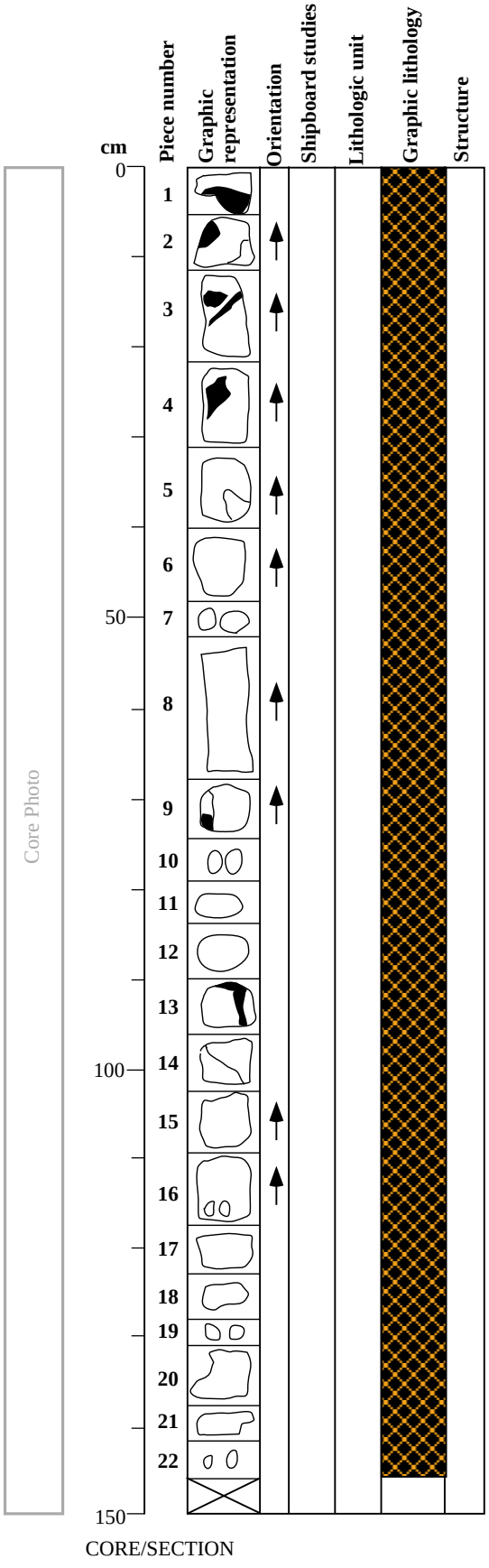
CORE/SECTION

169-1035H-17R-1
Top of Section 17R-1, 142.30 mbsf

Pieces 1-24

ROCK TYPE: MASSIVE AND SEMI-MASSIVE SULFIDE WITH SEDIMENT
COLOR: Bronze brown to green
COMMENTS:
0-147 cm**:** Kaleidoscopic to marbled bronze brown to green sulfide veined sediment consisting of approximately 60% clay minerals, sulfides, <5% chlorite, and <2% epidote. Pieces 19-24 are more sulfide-rich and also have ~5% magnetite and minor barite. This interval has higher magnetic susceptibilities probably due to the existence of magnetite and high natural gamma ray count due to barite. White silvery mineral (barite?) intergrown with sphalerite in veins (meta-hydraulic breccia) in Pieces 7-9, and 11. Piece 9 shows patches of intense silicification. Most pieces have heterogeneous, recrystallized textures. Pyrite neoblasts are present in Pieces 17-20. Clay minerals(?) varies in hue. These may be altered sediment protolith. Some epidote(?) patches are in Piece 14. Veins (meta-veins) are randomly oriented (many subvertical) with variable mineralogy. Sulfide impregnations are seen along laminae in Piece 6.

SULFIDE: 20%-30% pyrrhotite, 5%-20% pyrite, 5%-10% sphalerite; minor chalcopyrite (intergrown in pyrrhotite)



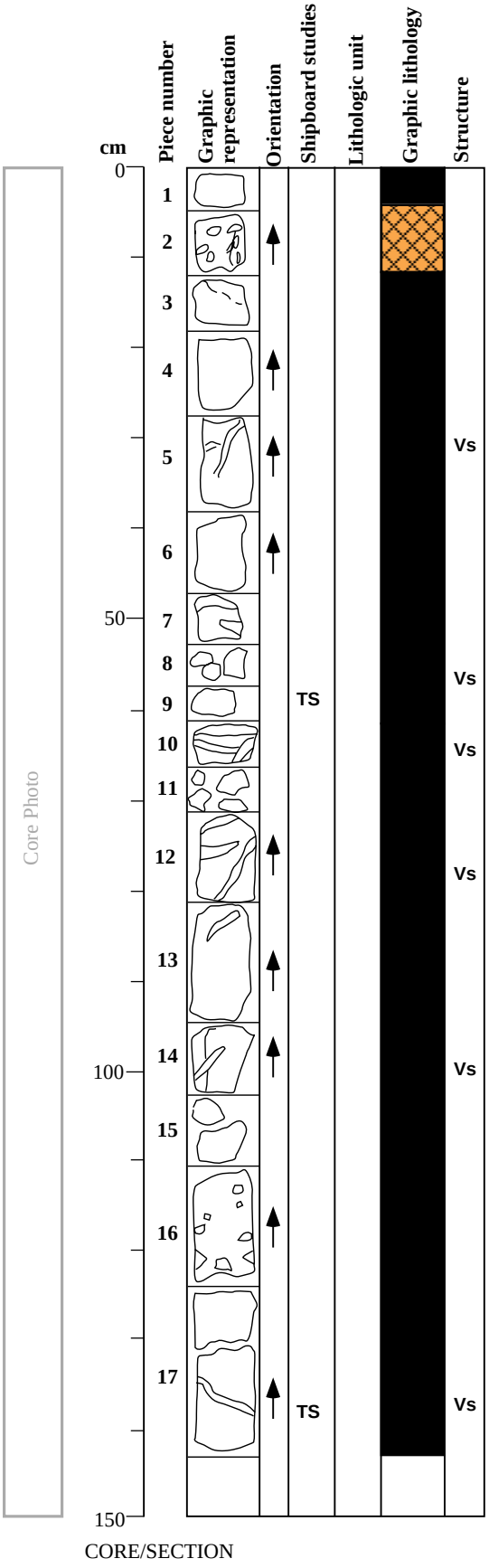
169-1035H-17R-2
Top of Section 17R-2, 143.77 mbsf

Pieces 1-22

ROCK TYPE: MASSIVE SULFIDE WITH SEDIMENT
COLOR: Yellow, black, and gray
COMMENTS:

0-145 cm**:** Coarsely recrystallized pyrite (crystals up to 1.5 cm diameter), finer-grained magnetite±sphalerite (~40%) matrix with some relict pyrrhotite and bits of altered sediment. Clay content is ~10%. Vestiges of altered sediment are visible in some pieces. A few vertical and subvertical veins exist in this interval. Magnetic susceptibilities are high down section, and natural gamma ray count is high between 45-100 cm, possibly due to the presence of barite? Pieces 7 and 10 are altered sediment with 10%-20% sulfide impregnations.

SULFIDE: ~50% pyrite, <5% pyrrhotite



169-1035H-17R-3
Top of Section 17R-3, 145.22 mbsf

Pieces 1, 3-6, 14-17

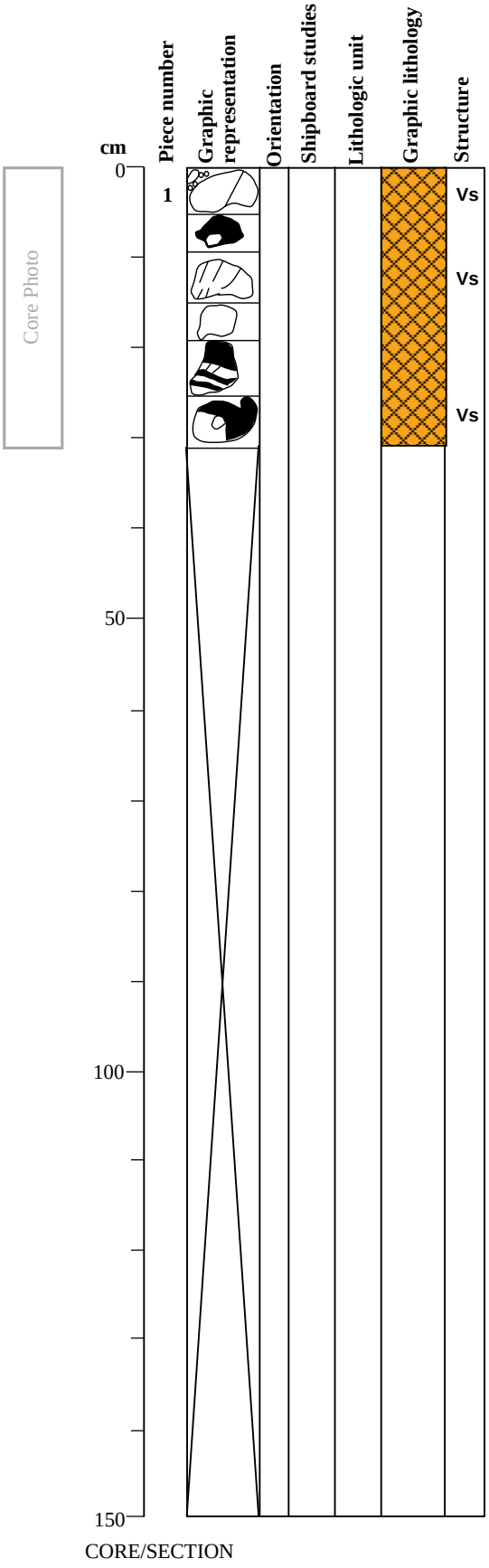
ROCK TYPE: MASSIVE SULFIDE
COLOR:
COMMENTS:

Piece 1	Neoblastic massive sulfide with brown sphalerite replacing pyrite. White mineral in matrix is chlorite. Sphalerite 10-15%.
SULFIDE:	>75%.
Pieces 3-4	Neoblastic pyrite with a pale green chlorite in the matrix and interstitial magnetite/sphalerite (6%-8%). Minor sphalerite (5-10%).
Pieces 5-6	Semi-massive sulfide with altered sedimentary rock(?). Neoblastic pyrite with magnetite/sphalerite. Interstitial green silicate is probably chlorite. Minor sphalerite (4%-10%).
Pieces 7-9	Brown compact and fine-grained massive sulfide consisting of magnetite and sphalerite (75%-80%) and pyrite (20%-30%) with interstitial silicates with minor pyrite veins. Green chlorite alteration is present. Minor chalcopyrite.
SULFIDE:	>95%
Pieces 10-13	High-grade sphalerite zone. Neoblastic pyrite (40%-60%) replaced and infilled by black sphalerite (30%-40%) with interstitial pale green silicates. Black hexagonal wurtzite occurs in vugs. Pyrite veins cut sphalerite.
SULFIDE:	50%-60%.
Pieces 14-17	Neoblastic pyrite (60%-70%) partly infilled with gray sphalerite (6%-8%) and pale green to white silicate. Silicate and black sphalerite are in vugs. Minor magnetite(?).
SULFIDE:	60%-75%

Piece 2

ROCK TYPE: SULFIDE-VEINED SEDIMENT

COLOR:	Bluish green (5B 6/1)
COMMENTS:	Chloritized sediment with pyrrhotite blebs and veinlet, and pyrite neoblasts.
SULFIDE:	10%-15%.



169-1035H-18R-1
Top of Core 1, 0.0 mbsf

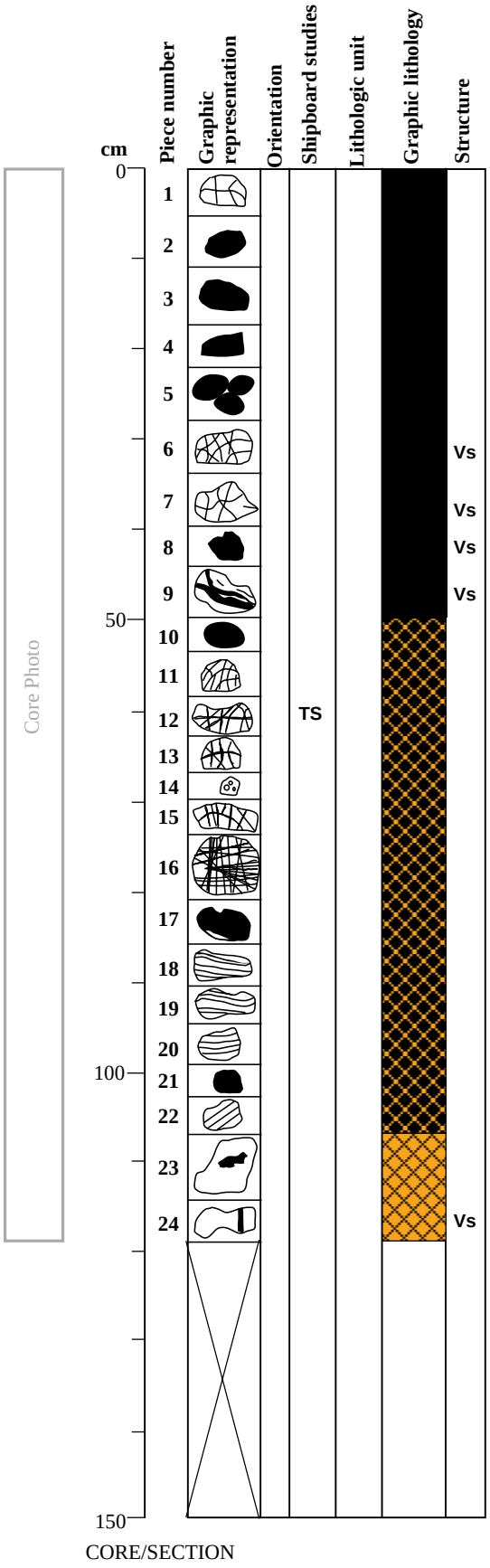
Piece 1-6

ROCK TYPE: SULFIDE-VEINED SEDIMENT
COLOR:
COMMENTS:

Pieces 1-2 Dark gray sphalerite veins cutting sphalerite-impregnated silicified sediment. Black coarse-grained euhedral sphalerite with interstitial pyrite and a pale green silicate coating vug minerals. Sphalerite: 60%-70%.

Pieces 3-6 Dark gray to black, fine-grained sphalerite impregnations and veins in pale gray (N7) silicified sediment. Sphalerite veins also contain pyrite and pyrrhotite. Sphalerite ranges from 5%-50%. Fractured post-silicification.

ADDITIONAL COMMENTS: Pieces 1 and 3 have pale green (10Y 7/2) euhedral crystals of clinozoisite(?) with radiating habit filling a vug.



169-1035H-19R-1
Top of Core 19R, 161.5 mbsf

Pieces 1-9

ROCK TYPE: SPHALERITE-PYRRHOTITE-PYRITE MASSIVE SULFIDE
COLOR:
COMMENTS:
0-49 cm: Fine-grained intergrowth of sphalerite and pyrrhotite. Paragenesis is complex: in some pieces sphalerite appears later than pyrrhotite and pyrite; in others pyrite and quartz cut sphalerite. Complex inter-veining. Very minor amount of chalcopyrite is present.
SULFIDE: 30-70% sphalerite; 10-30% pyrrhotite; 1-15% pyrite

Pieces 10-22

ROCK TYPE: MASSIVE/SEMI-MASSIVE SULFIDE WITH ALTERED SEDIMENT
COLOR:
COMMENTS:
49-108 cm: Isocubanite (fast oxidizing copper-iron-sulfur mineral with color between chalcopyrite and pyrite) with a matrix of altered mudstone and soft greenish white chlorite(?) or talc.
SULFIDE: 50% to 80%

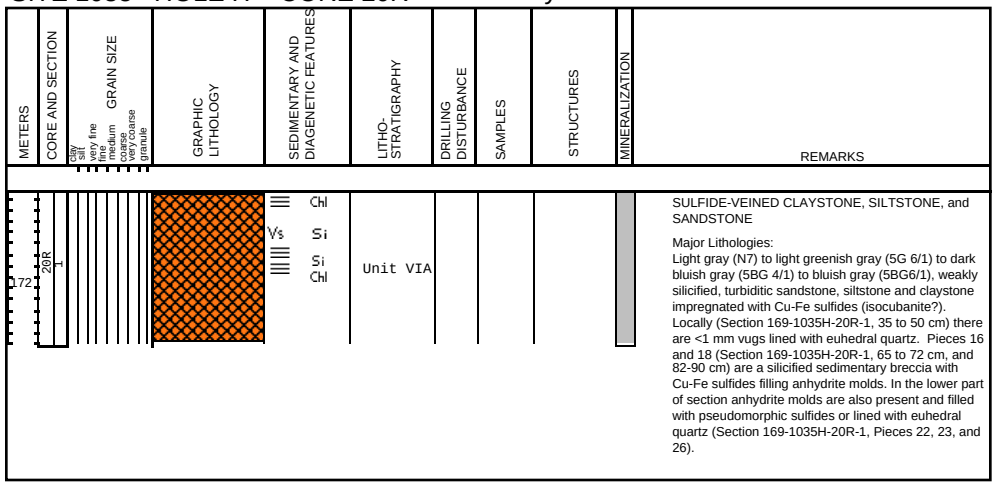
Pieces 23 and 24

ROCK TYPE: SILTY CLAYSTONE WITH IMPREGNATED ISOCUBANITE
COLOR: Gray (N5)
COMMENTS:
108-118 cm: Unbedded and silicified silty claystone with impregnated isocubanite.
SULFIDE: 5%-10% isocubanite

SITE 1035 HOLE H CORE 20R Recovery 13% CORED 171.1 - 180.7 mbsf

1035H-20R

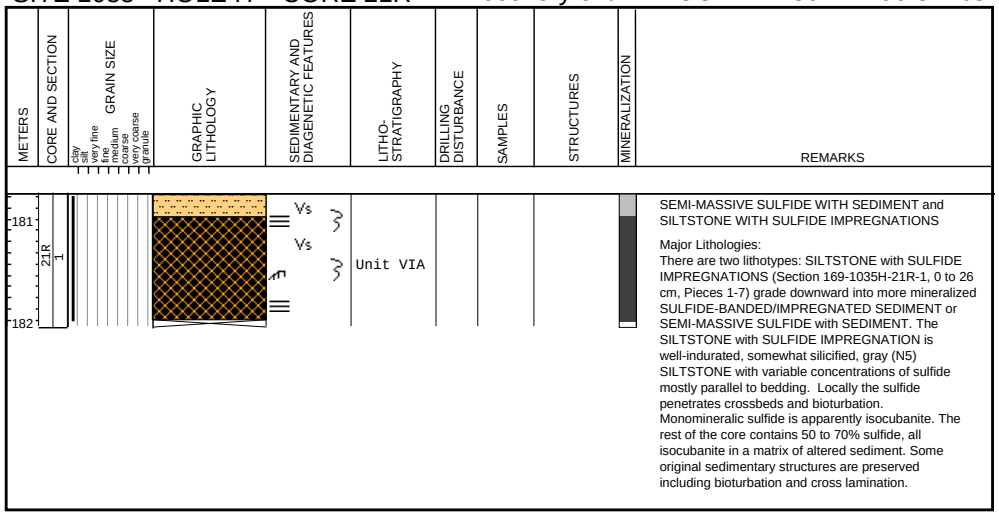
1035H-21R



SULFIDE-VEINED CLAYSTONE, SILTSTONE, and SANDSTONE

Major Lithologies:
Light gray (N7) to light greenish gray (5G 6/1) to dark bluish gray (5BG 4/1) to bluish gray (5BG6/1), weakly silicified, turbiditic sandstone, siltstone and claystone impregnated with Cu-Fe sulfides (isocubanite?). Locally (Section 169-1035H-20R-1, 35 to 50 cm) there are <1 mm vugs lined with euhedral quartz. Pieces 16 and 18 (Section 169-1035H-20R-1, 65 to 72 cm, and 82-90 cm) are a silicified sedimentary breccia with Cu-Fe sulfides filling anhydrite molds. In the lower part of section anhydrite molds are also present and filled with pseudomorphic sulfides or lined with euhedral quartz (Section 169-1035H-20R-1, Pieces 22, 23, and 26).

SITE 1035 HOLE H CORE 21R Recovery 9% CORED 180.7 - 190.3 mbsf



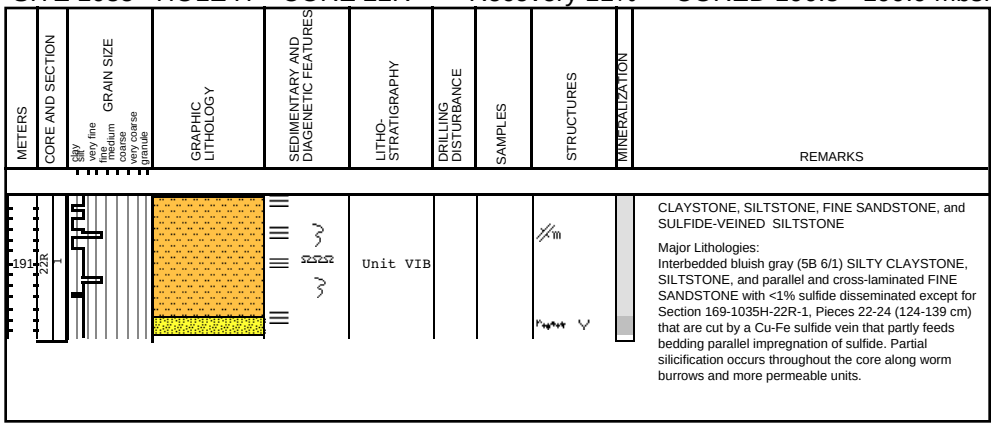
SEMI-MASSIVE SULFIDE WITH SEDIMENT and SILTSTONE WITH SULFIDE IMPREGNATIONS

Major Lithologies:
There are two lithotypes: SILTSTONE with SULFIDE IMPREGNATIONS (Section 169-1035H-21R-1, 0 to 26 cm, Pieces 1-7) grade downward into more mineralized SULFIDE-BANDED/IMPREGNATED SEDIMENT or SEMI-MASSIVE SULFIDE with SEDIMENT. The SILTSTONE with SULFIDE IMPREGNATION is well-indurated, somewhat silicified, gray (N5) SILTSTONE with variable concentrations of sulfide mostly parallel to bedding. Locally the sulfide penetrates crossbeds and bioturbation. Monomineralic sulfide is apparently isocubanite. The rest of the core contains 50 to 70% sulfide, all isocubanite in a matrix of altered sediment. Some original sedimentary structures are preserved including bioturbation and cross lamination.

1035H-22R

1035H-23R

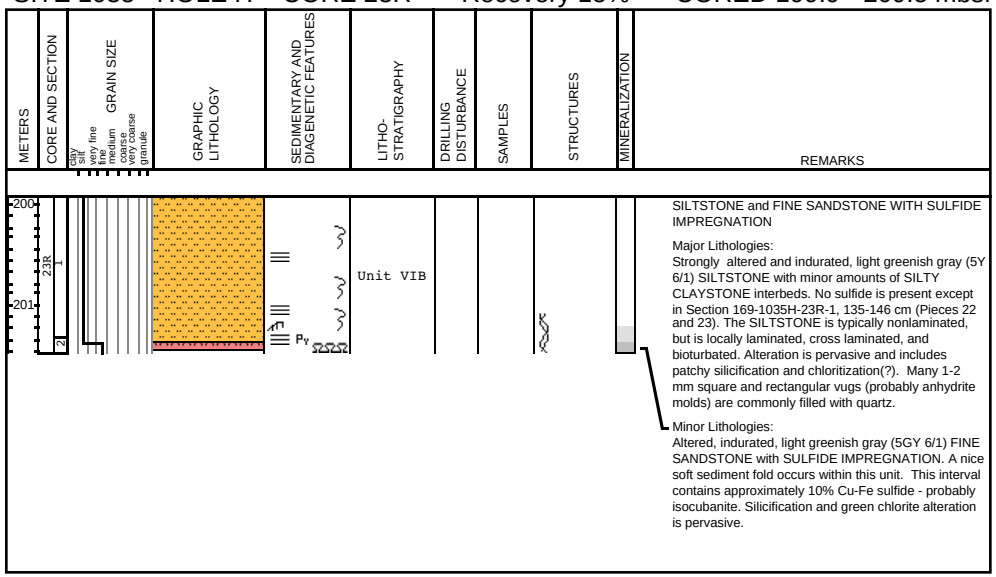
SITE 1035 HOLE H CORE 22R Recovery 11% CORED 190.3 - 199.9 mbsf



CLAYSTONE, SILTSTONE, FINE SANDSTONE, and SULFIDE-VEINED SILTSTONE

Major Lithologies:
Interbedded bluish gray (5B 6/1) SILTY CLAYSTONE, SILTSTONE, and parallel and cross-laminated FINE SANDSTONE with <1% sulfide disseminated except for Section 169-1035H-22R-1, Pieces 22-24 (124-139 cm) that are cut by a Cu-Fe sulfide vein that partly feeds bedding parallel impregnation of sulfide. Partial silicification occurs throughout the core along worm burrows and more permeable units.

SITE 1035 HOLE H CORE 23R Recovery 15% CORED 199.9 - 209.5 mbsf



SILTSTONE and FINE SANDSTONE WITH SULFIDE IMPREGNATION

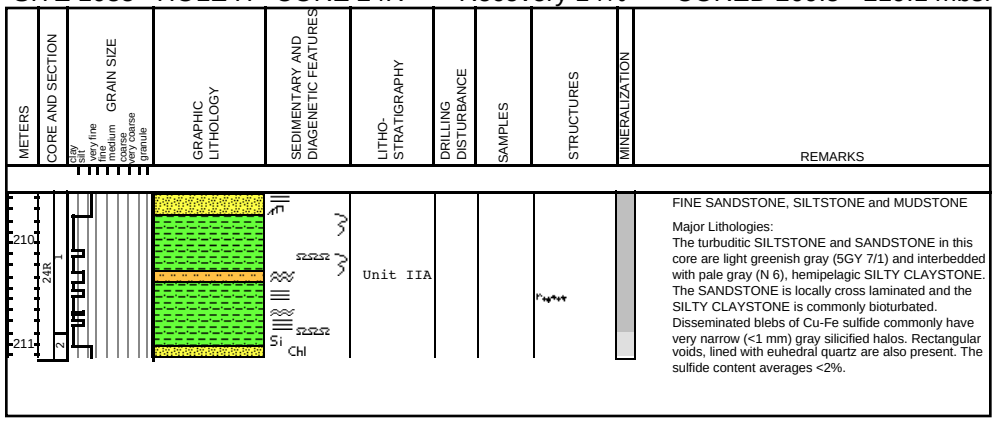
Major Lithologies:
Strongly altered and indurated, light greenish gray (5Y 6/1) SILTSTONE with minor amounts of SILTY CLAYSTONE interbeds. No sulfide is present except in Section 169-1035H-23R-1, 135-146 cm (Pieces 22 and 23). The SILTSTONE is typically nonlaminated, but is locally laminated, cross laminated, and bioturbated. Alteration is pervasive and includes patchy silicification and chloritization(?). Many 1-2 mm square and rectangular vugs (probably anhydrite molds) are commonly filled with quartz.

Minor Lithologies:
Altered, indurated, light greenish gray (5GY 6/1) FINE SANDSTONE with SULFIDE IMPREGNATION. A nice soft sediment fold occurs within this unit. This interval contains approximately 10% Cu-Fe sulfide - probably isocubanite. Silicification and green chlorite alteration is pervasive.

SITE 1035 HOLE H CORE 24R Recovery 14% CORED 209.5 - 219.1 mbsf

1035H-24R

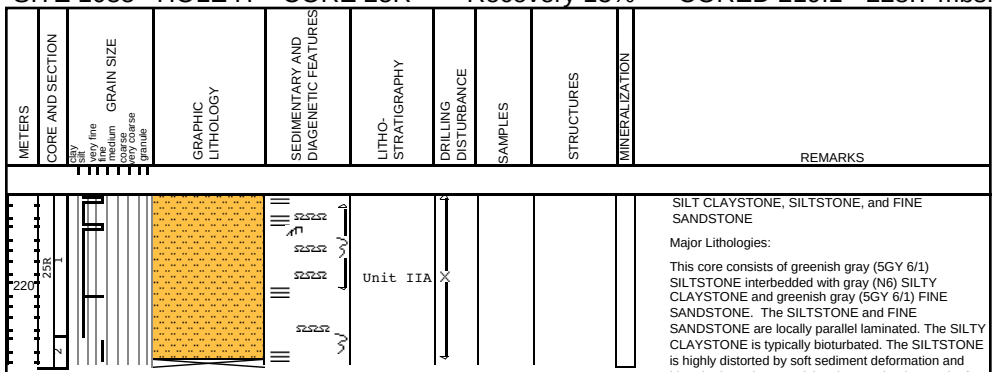
1035H-25R



FINE SANDSTONE, SILTSTONE and MUDSTONE

Major Lithologies:
The turbuditic SILTSTONE and SANDSTONE in this core are light greenish gray (5GY 7/1) and interbedded with pale gray (N 6), hemipelagic SILTY CLAYSTONE. The SANDSTONE is locally cross laminated and the SILTY CLAYSTONE is commonly bioturbated. Disseminated blebs of Cu-Fe sulfide commonly have very narrow (<1 mm) gray silicified halos. Rectangular voids, lined with euhedral quartz are also present. The sulfide content averages <2%.

SITE 1035 HOLE H CORE 25R Recovery 13% CORED 219.1 - 228.7 mbsf



SILT CLAYSTONE, SILTSTONE, and FINE SANDSTONE

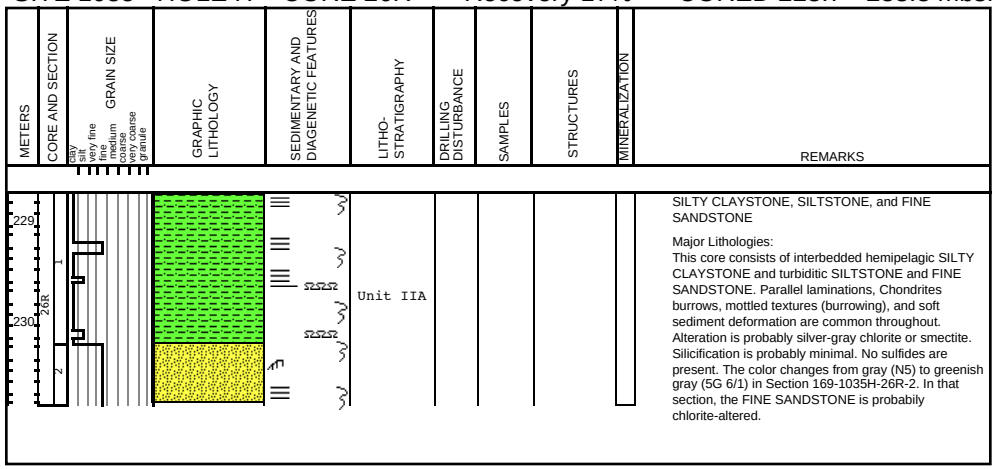
Major Lithologies:

This core consists of greenish gray (5GY 6/1) SILTSTONE interbedded with gray (N6) SILTY CLAYSTONE and greenish gray (5GY 6/1) FINE SANDSTONE. The SILTSTONE and FINE SANDSTONE are locally parallel laminated. The SILTY CLAYSTONE is typically bioturbated. The SILTSTONE is highly distorted by soft sediment deformation and bioturbation. The greenish color may be the result of hydrothermal alteration to chlorite. Molds of what was probably anhydrite are present in Intervals 169-1035H-25R, 93-118 and 142-150 cm. The core becomes bluish gray (5B 5/1) in Section 169-1035H-25R-2. In this section, the sandstone is locally spotted with medium gray quartz. Sulfides are rare (<2%) throughout.

1035H-26R

1035H-27R

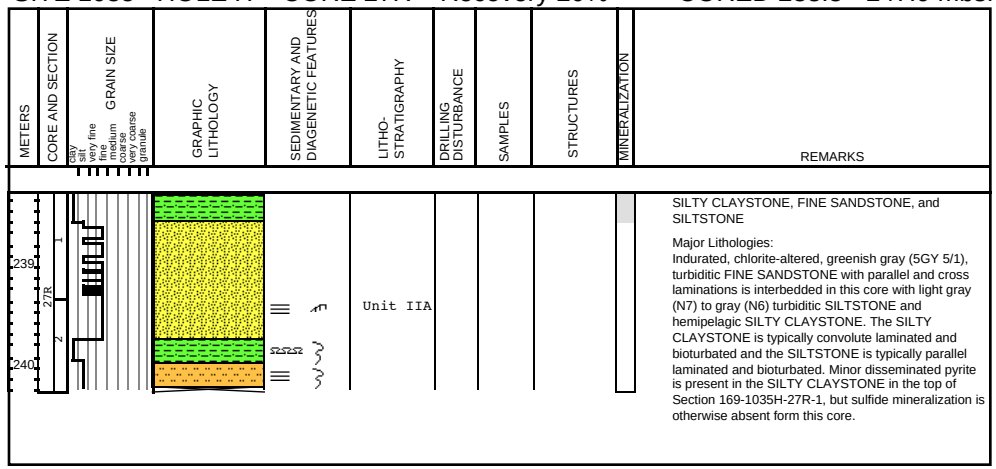
SITE 1035 HOLE H CORE 26R Recovery 17% CORED 228.7 - 238.3 mbsf



SILTY CLAYSTONE, SILTSTONE, and FINE SANDSTONE

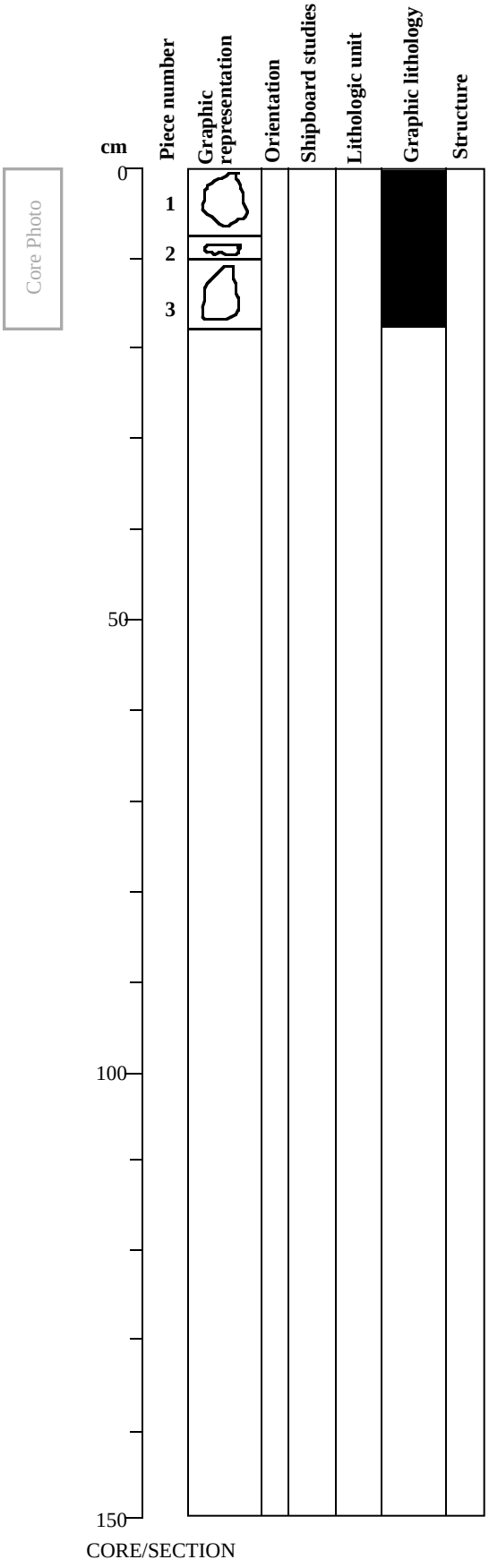
Major Lithologies:
This core consists of interbedded hemipelagic SILTY CLAYSTONE and turbiditic SILTSTONE and FINE SANDSTONE. Parallel laminations, Chondrites burrows, mottled textures (burrowing), and soft sediment deformation are common throughout. Alteration is probably silver-gray chlorite or smectite. Silicification is probably minimal. No sulfides are present. The color changes from gray (N5) to greenish gray (5G 6/1) in Section 169-1035H-26R-2. In that section, the FINE SANDSTONE is probabily chlorite-altered.

SITE 1035 HOLE H CORE 27R Recovery 20% CORED 238.3 - 247.9 mbsf



SILTY CLAYSTONE, FINE SANDSTONE, and SILTSTONE

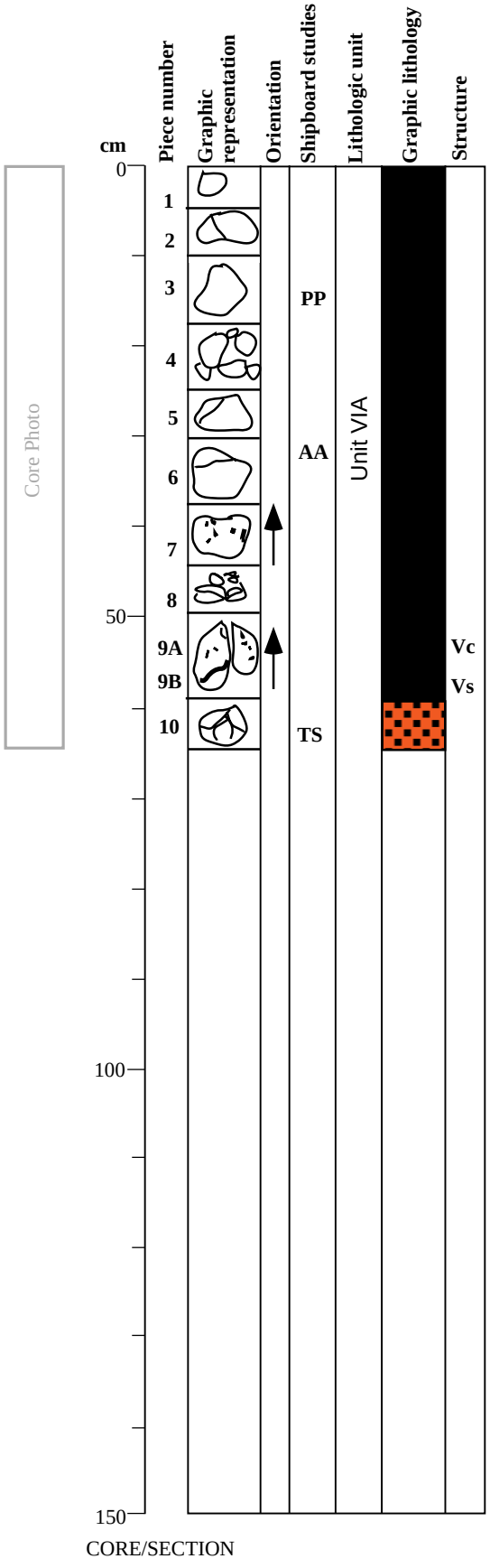
Major Lithologies:
Indurated, chlorite-altered, greenish gray (5GY 5/1), turbiditic FINE SANDSTONE with parallel and cross laminations is interbedded in this core with light gray (N7) to gray (N6) turbiditic SILTSTONE and hemipelagic SILTY CLAYSTONE. The SILTY CLAYSTONE is typically convolute laminated and bioturbated and the SILTSTONE is typically parallel laminated and bioturbated. Minor disseminated pyrite is present in the SILTY CLAYSTONE in the top of Section 169-1035H-27R-1, but sulfide mineralization is otherwise absent form this core.



169-856H-18W-1
(Wash Core-- no sub-bottom depth)

Pieces 1-3

ROCK TYPE: MASSIVE SULFIDE
CONTACTS: None
COLOR: Dark bronze
MAJOR MINERALS:
Pyrrhotite, 40% - 50%
Pyrite, 40% - 50%
Magnetite, 10%
MINOR MINERALS:
Chalcopyrite, 2%
TEXTURE: Massive, fine grained
VEINS: 2 mm vein of carbonate and pyrite along the edge of Pieces 1 to 3.
ADDITIONAL COMMENTS: Separate diffuse zones of pyrite and pyrrhotite give the core a mottled appearance.



CORE/SECTION

169-856H-19R-1
Top of Core 19R - 93.8 mbsf

Pieces 1-6

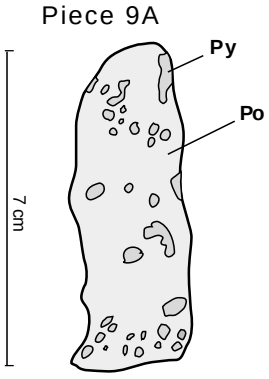
ROCK TYPE: MASSIVE SULFIDE
CONTACTS: None
COLOR: Dark bronze
MAJOR MINERALS:
Pyrrhotite, 60% - 90%
Pyrite, 5% - 20%, in veins
Magnetite, 1% - 5%,
Carbonate
MINOR MINERALS:
Chalcopyrite, sphalerite, isocubanite, oxides
TEXTURE: Massive pyrrhotite with pyrite veins 1 - 3 mm wide, compact and fine grained.
VEINS: Pyrite veins 1-3 mm wide; carbonate veins.

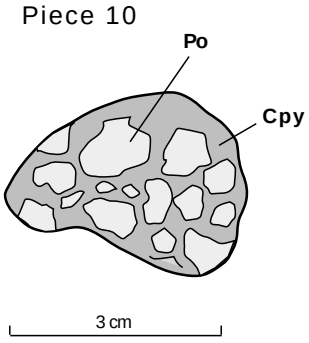
Pieces 7-9

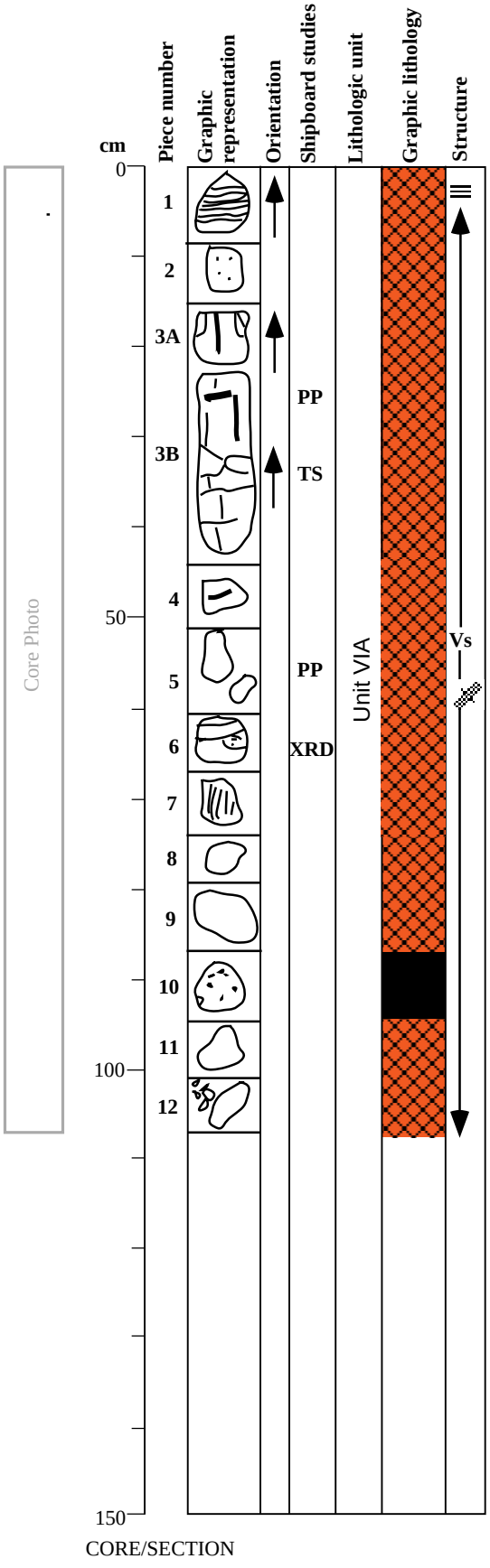
ROCK TYPE: MASSIVE SULFIDE
CONTACTS: None
COLOR: Dark bronze
MAJOR MINERALS:
Pyrrhotite, 50% - 70%
Pyrite, 20% - 30%, in veins
Magnetite, 10% - 25%, carbonate
TEXTURE: Pyrite is more blebby, mainly a textural change from Pieces 1-6. Massive, compact, and fine grained.

Piece 10

ROCK TYPE: SULFIDE BRECCIA
CONTACTS: None
COLOR: Dark bronze with green gold chalcopyrite
MAJOR MINERALS:
Pyrrhotite, 50% - 70%
Chalcopyrite, 20% - 40%, in veins
MINOR MINERALS: Anhydrite with chalcopyrite and silica (?).
TEXTURE: Clasts of pyrrhotite are variably rounded. Massive and compact, chalcopyrite is interstitial and forms web texture.







169-856H-20R-1
Top of core 20R - 103.6 mbsf

Pieces 1-3, 8-9, 11-12

ROCK TYPE: SULFIDE-VEINED SILTSTONE
COLOR: Bleached gray white with bronze veins and layers (N6/N7)
HOST ROCK:
Silica, 70% - 75%
Clay minerals, 15% - 20%
Green, translucent clay, 2% - 5%
VEINS:
Pyrrhotite, 7%
Pyrite, 2%
Piece 2, two orientations: bedding parallel and subvertical 1-2 mm wide pyrrhotite veins with 1-2 mm wide bleached halo selvages.
SULFIDE %: 10 - 30, moderate
TEXTURE: Relict sediment layering (good contact in Piece 1) variably replaced and veined by sulfides.
ADDITIONAL COMMENTS: Pieces 1 and 2 are more mineralized than Pieces 3 to 12 which contain only minor veins and disseminated iron sulfides.

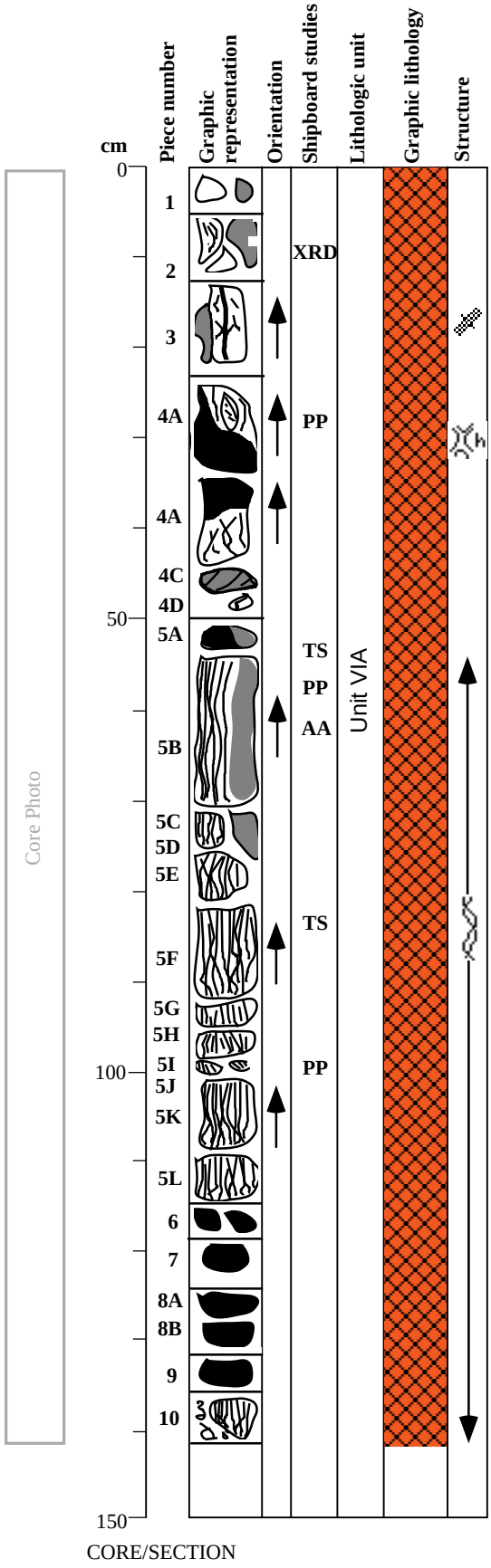
Pieces 4-7

ROCK TYPE: SULFIDE-VEINED CLAYSTONE
COLOR: Dark green to bronze with white patches (N6/N7)

HOST ROCK:
Clay, 5-15%
Silicate minerals, 2% - 5%
VEINS:
Pyrrhotite, 35% - 60%
Pyrite, 5% - 10%
SULFIDE %: 40 - 70, high
TEXTURE: Variable mm to cm scale swirls and discontinuous, irregular bands of pyrrhotite ± pyrite in a dull green, soft, clay-rich matrix.
ADDITIONAL COMMENTS: Different from upper pieces in abundance of sulfide veins. Piece 4 contains a 1-2 mm white carbonate vein with a narrow, fine-grained pyrite selvage which crosscuts the pyrrhotite veins (two vein generations).

Piece 10

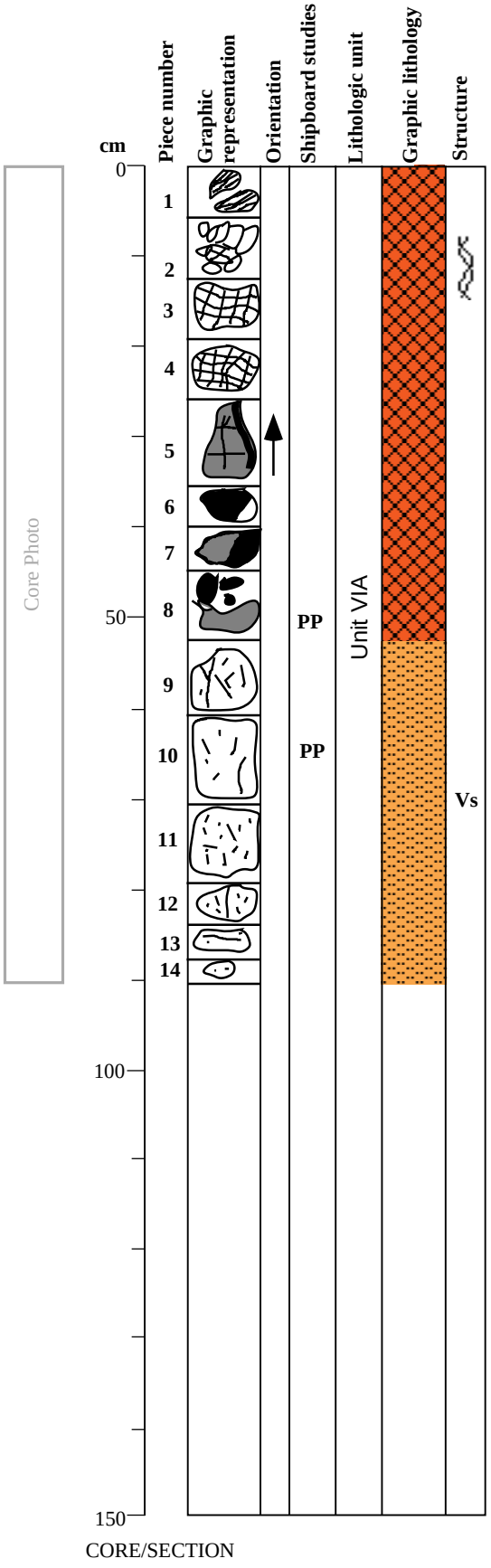
ROCK TYPE: MASSIVE SULFIDE
COLOR: Brassy with bronze mottling
MAJOR MINERALS:
Pyrrhotite, 30%
Pyrite, 30%
Chalcopyrite, 15%
Clays, 25%
SULFIDE %: 75, very high
TEXTURE: 1 to 3 mm rounded pyrrhotite blebs in massive pyrite-chalcopyrite matrix.
ADDITIONAL COMMENTS: 0.5 to 5 mm diameter clasts of altered, baked, cream colored sediment.



169-856H-21R-1
Top of Section 21R-1 - 113.4 mbsf

Pieces 1-10

ROCK TYPE: SULFIDE-VEINED SILTSTONE
COLOR: Light gray to brassy and bronze
HOST ROCK:
Silicate alteration products and clay minerals, 30%
VEINS:
Pyrrhotite, 24%
Pyrite, 15%
Chalcopyrite, 24%
Magnetite, 5%
Hematite, 1% -2%
SULFIDE %: 30-75, high
TEXTURE: Predominantly vertical sulfide veining crosscuts primary sedimentary bedding.
ADDITIONAL COMMENTS: Crack and seal texture common. Pyrite is paragenetically later than other minerals (replacing).



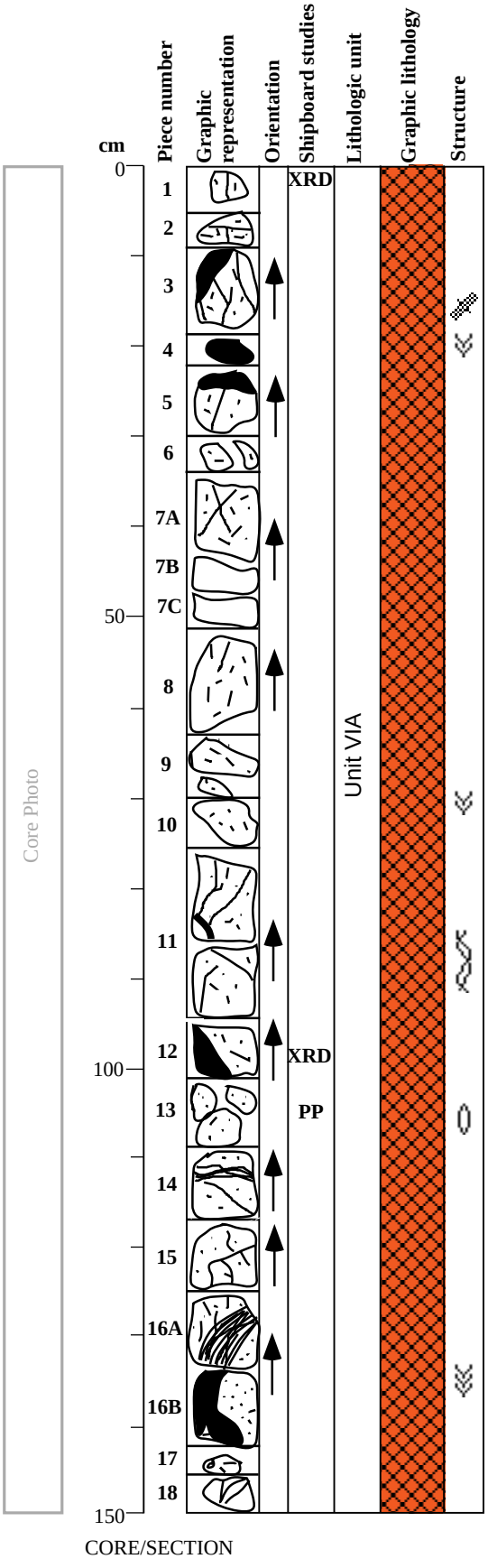
169-856H-21R-2
Top of Section 21R-2 - 114.82 mbsf

Pieces 1-8

ROCK TYPE: SULFIDE-VEINED SILTSTONE and MUDSTONE
COLOR: Light gray to brassy to bronze (N6 to N7)
HOST ROCK:
Clay (?), 50% - 60%
VEINS:
Pyrrhotite, 20%
Chalcopyrite, 20%
Pyrite, 2% -3%
Several generations of subvertical and random <1 to 2 mm pyrrhotite-chalcopyrite-pyrite veins.
SULFIDE %: 10 - 30, moderate
TEXTURE: Predominantly complexly veined (pyrrhotite-chalcopyrite-pyrite), bleached, fine-grained sediment.
ADDITIONAL COMMENTS: Piece 6 is massive chalcopyrite (55%), pyrrhotite (30%), magnetite (15%) interlaced with fine altered sediment (5%). Piece 3 has a 1 mm subvertical anhydrite vein.

Pieces 9-14

ROCK TYPE: SILTSTONE
COLOR: Medium gray (N6 to N7)
HOST ROCK:
SILTSTONE (fine-grained sediment), 80%
Pyrrhotite, 7 - 10%
Chalcopyrite, trace
Chlorite, trace to 3%
SULFIDE %: 7-10, low
TEXTURE: Massive and nonbedded, with micro to macro-veinlets and disseminated blebs of pyrrhotite, chalco-pyrite, and chlorite.
ADDITIONAL COMMENTS: Piece 11 has a 1 cm wide alteration halo of disseminated sulfides.

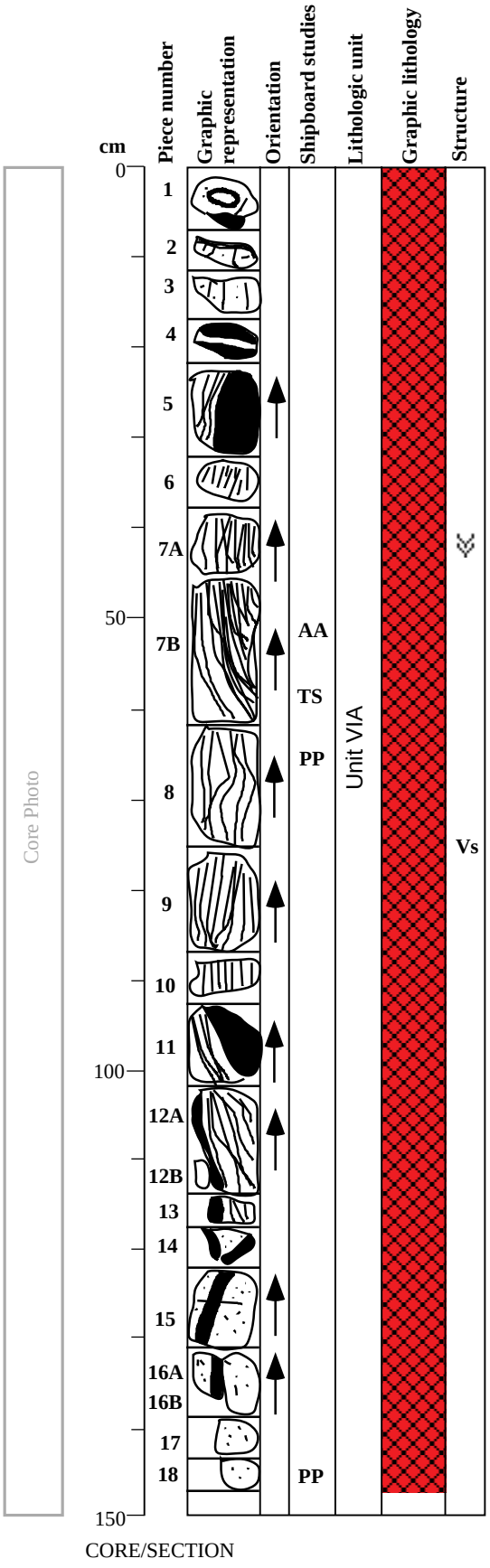


CORE/SECTION

169-856H-22R-1
Top of Section 22R-1 - 117.10 mbsf

Pieces 1-18

ROCK TYPE: SULFIDE-VEINED SILTSTONE and MUDSTONE
COLOR: Medium to light gray with bronze and brassy blebs (N6/N7)
HOST ROCK:
Mixed layer clay, 60%
VEINS:
Pyrrhotite, 5-10%
Chalcopyrite, 5% -7%
Comprise 5 to 10% of the core. Multiple generations of <1 to 3 cm wide, randomly oriented, sulfide veins. Some veins are ribboned.
SULFIDE %: 30-75, moderate
TEXTURE: Predominantly fine-grained disseminated sulfides with subordinate <1 to 3 cm wide veins.
ADDITIONAL COMMENTS: Piece 1 is a milky white, extremely fine-grained, intensely altered, bleached smectite MUDSTONE with a 1 to 2 mm wide chalcopyrite and pyrrhotite vein. Smectite (or illite) is slippery to feel. Piece 3 has chlorite filling a fracture in a chalcopyrite-rich vein; the chlorite is deep green to black. Pieces 3, 12, and 16A and B have 1 to 3 mm wide bleached halos around veins.

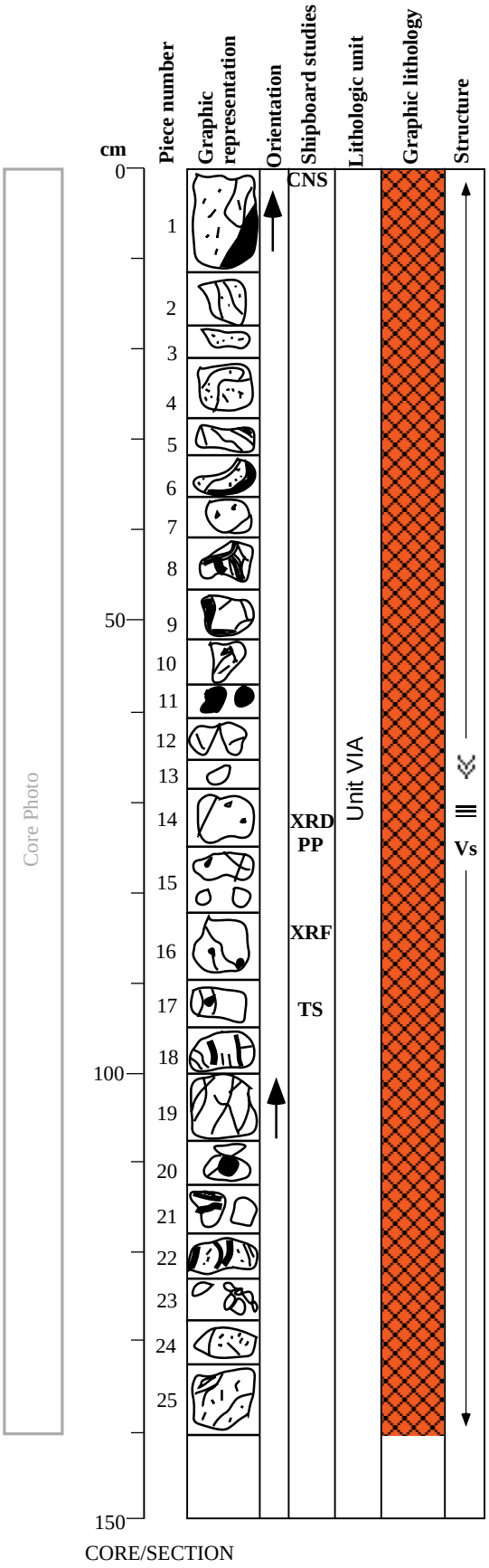


169-856H-22R-2

Top of Section 22R-2 - 118.6 mbsf

Pieces 1-18

ROCK TYPE: SULFIDE-VEINED SILTSTONE
COLOR: Light gray with brassy veins and bronze blebs (N7)
HOST ROCK:
Clay (silty MUDSTONE), 70%
Chalcopyrite, 25%
Pyrrhotite, 5%
VEINS:
Veins occur on two scales. 1) Macro (1 to 5 cm wide) and 2) discontinuous, subparallel to 1, <1 to 1 mm wide, filled with chalcopyrite and lesser pyrrhotite. These comprise 25% to 30% of the core. Late minor pyrite is also present, as well as ~1 mm wide carbonate and anhydrite veinlet which occur within coarse mineralized veins.
SULFIDE %: 30 - 75, high
TEXTURE: Massive with a trace of relict bedding, contains disseminated sulfide blebs and numerous veins.
ADDITIONAL COMMENTS: Sulfide dominated by chalcopyrite or isocubanite (the latter more likely due to rapid oxidation and less yellow color) below ~60 cm in the section.



169-856H-23R-1
Top of Section 23R-1 - 124.10 mbsf

Pieces 1-25

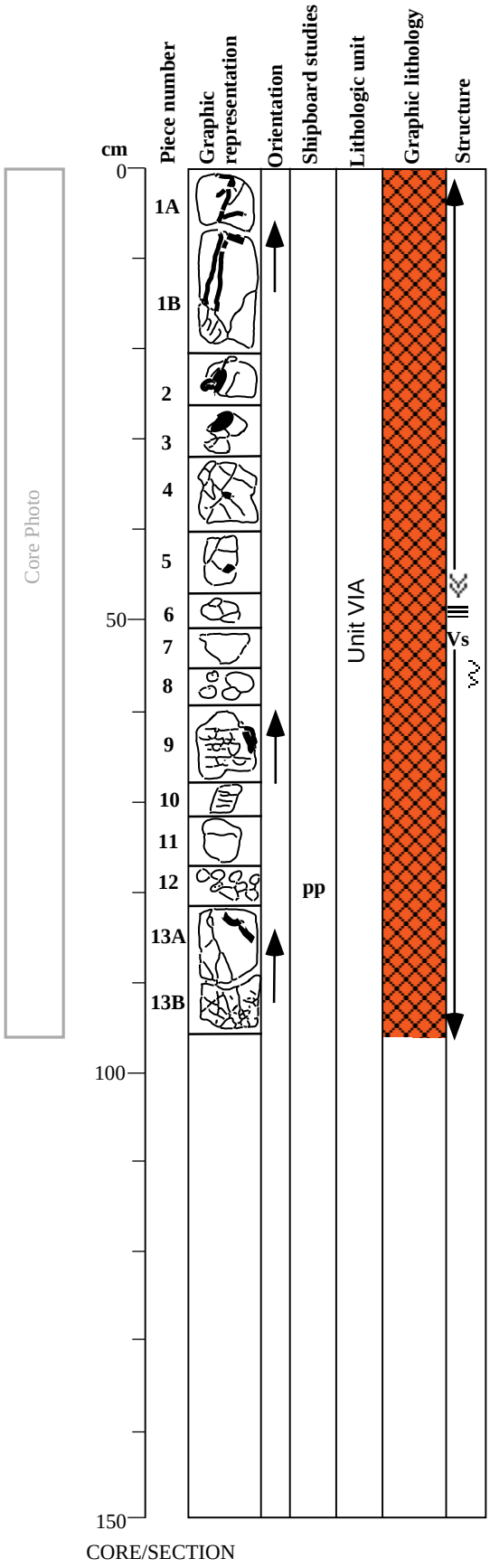
ROCK TYPE: SULFIDE-VEINED MUDSTONE and SILTSTONE
COLOR: Pale gray (2.5Y 6/0 - 2.5Y 5/0)
HOST ROCK:

Highly altered interbedded hemipelagic MUDSTONE and turbiditic silt. Layering locally preserved but mostly overprinted by sulfide veins and associated alteration. The sediment is mottled pale to medium gray, variably silicified, and altered to clay minerals.

VEINS:

Multiple generations of subvertical veins of dominantly chalcopyrite with variable but generally minor pyrite. Veins range in size from microscopic veinlets to veins as wide as the core. Veins are generally linear, display very sharp contacts with thin (<1 mm) selvages of medium green gray phyllosilicates(?). Sulfides are typically fine grained, uniform in appearance across the veins except for fining near the margins. Veins are cut by fractures perpendicular to the veins.

SULFIDE %: 10 - 30, moderate



169-856H-23R-2

Top of Section 23R-2 - 125.50 mbsf

Pieces 1-13

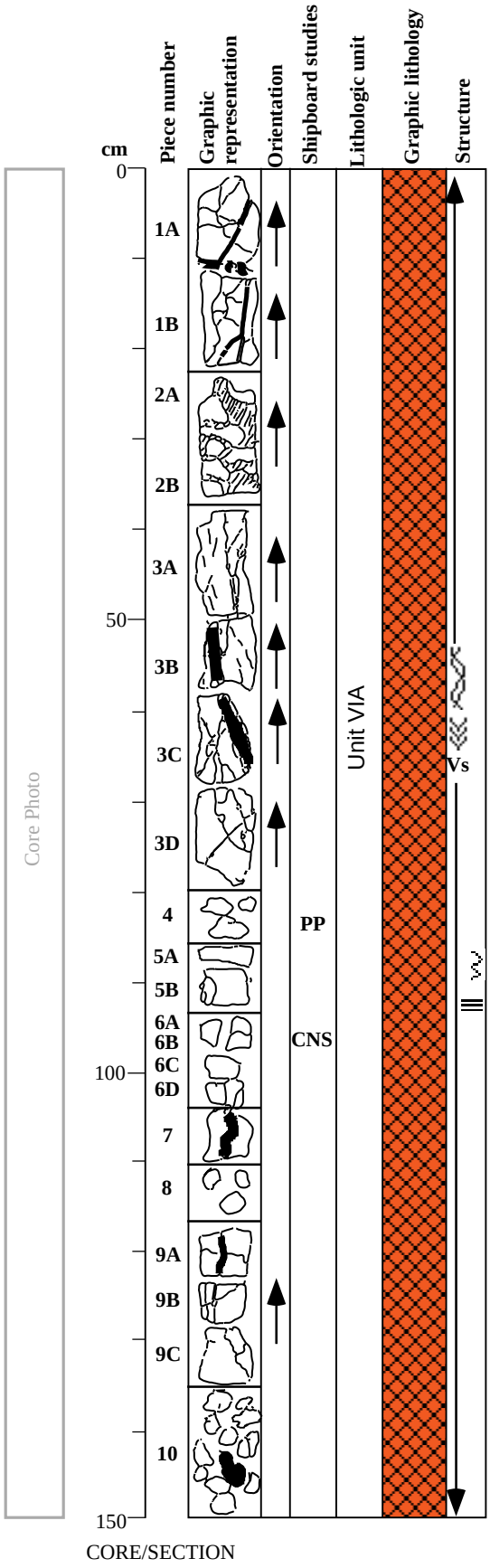
ROCK TYPE: SULFIDE-VEINED MUDSTONE and SILTSTONE
COLOR: Pale to medium gray (2.5Y 6/0 - 2.5Y 5/0)
HOST ROCK:

Altered, indurated, hemipelagic MUDSTONE and silty turbidites. Fine laminations preserved locally. Bioturbated (Piece 9) at 1 - 3 mm scale. Some burrows (Piece 2) completely replaced by chalcopyrite. Disseminated, fine-grained sulfide minerals common. Moderately silicified, probably chlorite and clay minerals. Pervasive silicification near veins (Piece 3).

VEINS:

Occur as a subvertical, submillimetric to >2 cm wide, crosscutting network of anastomosing veinlets. Both simple and complex veins with multiple generations of sulfide minerals. Veins are dominantly chalcopyrite with minor pyrite. Pyrrhotite is more abundant in Piece 13, which has abundant disseminated sulfide minerals. Many veins have a thin (1 - 2 mm) black selvage that may be magnetite or pyrrhotite.

SULFIDE %: 10 - 30, moderate.



169-856H-24R-1
Top of Section 24R-1 - 133.70 mbsf

Pieces 1-10

ROCK TYPE: SULFIDE-VEINED MUDSTONE and SILTSTONE
COLOR: Pale to medium gray (2.5Y 6/0 - 2.5Y 5/0)
HOST ROCK:

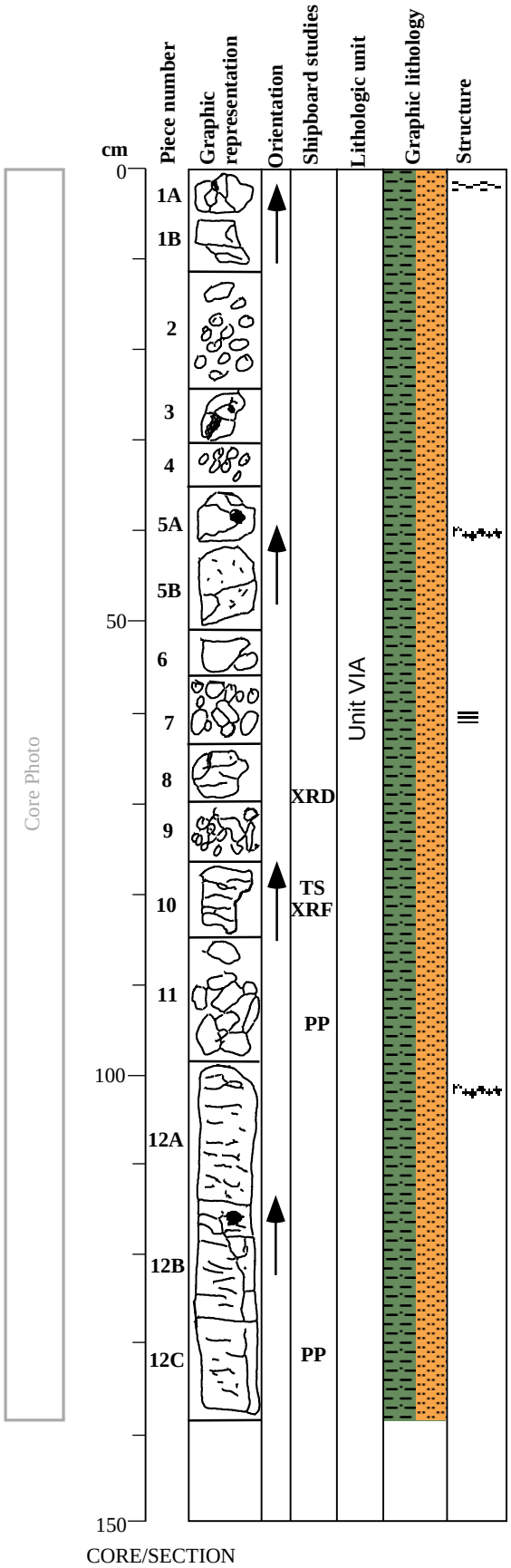
Altered, indurated hemipelagic MUDSTONE and silty turbidites. Fine laminations are common, especially in Pieces 4 - 10 (from 80 cm). Bioturbation (Pieces 4 - 6) at 1 - 3 mm preserved locally. Some disseminated sulfides are present throughout. Moderately silicified down to 104 cm, less silicifiied below 104 cm. Pervasive silcification along sulfide veins in Pieces 1D, 2A and B. Patchy silicification in Pieces 3A to D, not related to sulfide veins.

VEINS:

Subvertical, less than 1 mm to 2 cm wide, in a branching and anastomosing irregular network, particularly in Pieces 2A and B. Multiple generations of sulfide are present. Vein mineralogy is dominated by chalcopyrite, except the thicker veins which are dominated by pyrrhotite with less chalcopyrite. Wurtzite or sphalerite is present in thin veinlets in Pieces 3B and C (50 - 70 cm). Anhydrite is present in thicker veins. Thin (less than 0.5 mm) selvages of magnetite and pyrrhotite are typical along the veins. Vein density decreases down section.

SULFIDE %: 10 - 30, moderate

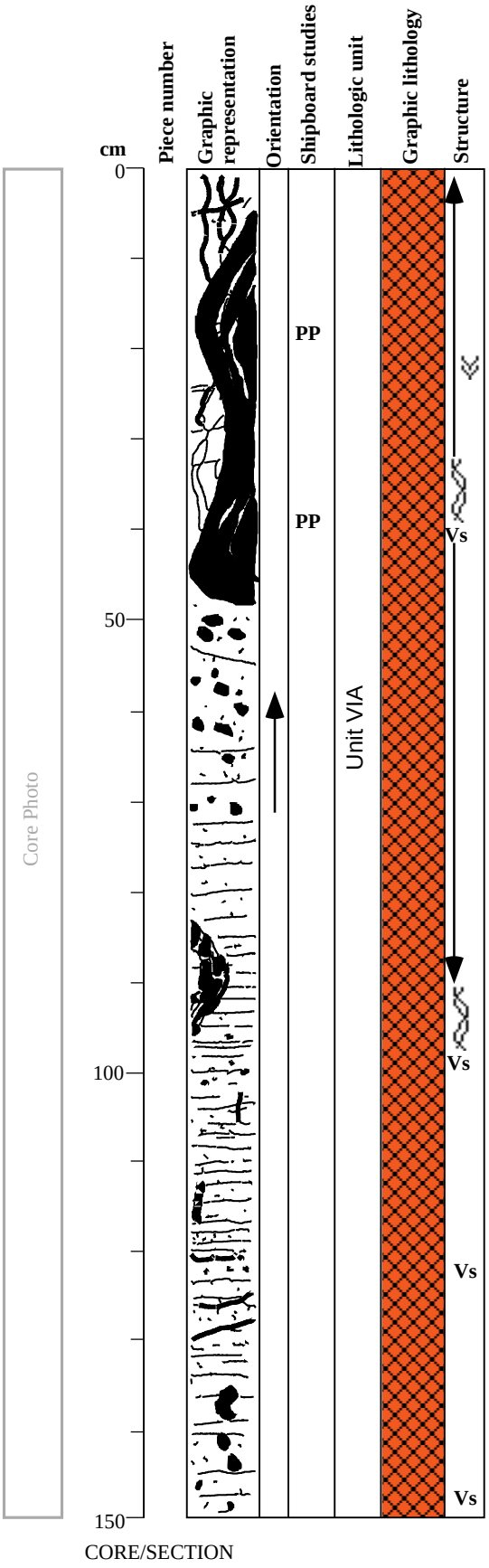
169-856H-24R-2
Top of Section 24R-2 - 135.20 mbsf



CORE/SECTION

Pieces 1-12

ROCK TYPE: MUDSTONE and SILTSTONE
COLOR: Light gray (N6 - N7)
HOST ROCK:
Fine-grained hemipelagic MUDSTONE and silty turbidites. Altered, indurated, fine horizontal laminae in most pieces. Moderately silicified, with probable altered clays. Lighter color than Cores 169-856H-22R and 23R.
VEINS:
Sulfide minerals (pyrrhotite and chalcopyrite) in wavy, horizontal laminae below 30 cm. Chalcopyrite-rich stringers in upper 30 cm which have dark selvages.
SULFIDE %: 2 - 10, low



CORE/SECTION

169-856H-25R-1

Top of Section 25R-1 - 143.30 mbsf

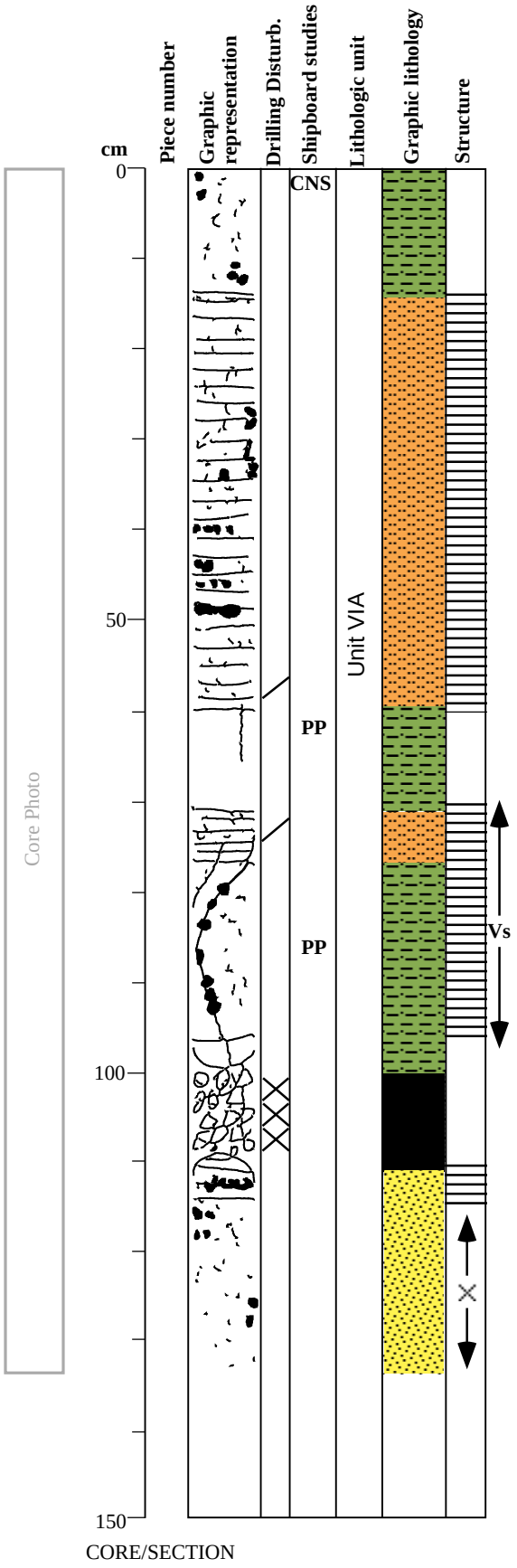
ROCK TYPE: SULFIDE-VEINED SILTSTONE and MUDSTONE
COLOR: Pale to medium gray (N7 and N6)
HOST ROCK:

Highly altered and delicately layered hemipelagic CLAYSTONE and turbiditic silts.

VEINS:

Massive, medium- to coarse-grained pyrrhotite with variable chalcopyrite and sphalerite which appears to post-date pyrrhotite. Pyrrhotite veins are generally subvertical although pyrrhotite also forms veins aligned along bedding planes, subrounded blebs up to 1 cm across, and disseminations distributed throughout the sediment. Euhedral voids are common throughout the core. Veins typically displays sharp contacts with very thin silicate selvage.

SULFIDE %: 10 - 30, moderate



169-856H-25R-2
Top of Section 25R-2 - 144.80 mbsf

ROCK NAME: CLAYSTONE and SILTSTONE with SULFIDE IMPREGNATIONS

COLOR: Gray (N6 to N7)

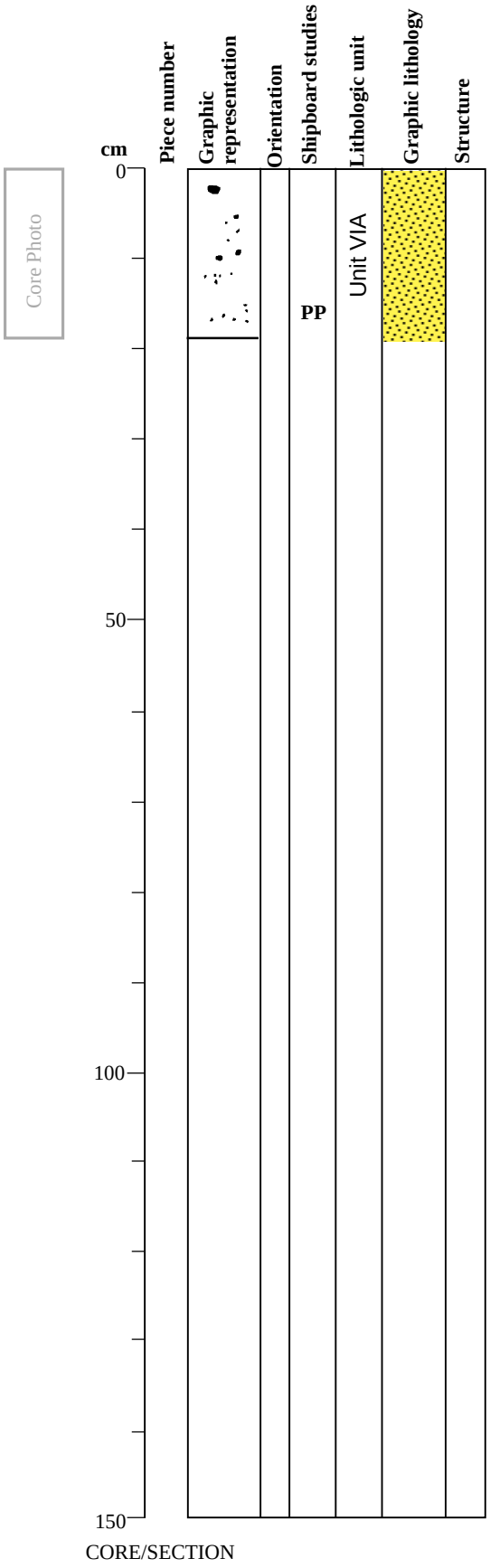
HOST ROCKS:

1-14 cm - slightly bioturbated gray (N6) CLAYSTONE
14-60 cm - Planar-laminated light gray (N7) SILTSTONE
60-71 cm - gray (N6) CLAYSTONE
71- 76 cm - light gray (N7) SILTSTONE
76-98 cm - gray (N6) CLAYSTONE
98-100 cm - CLAYSTONE
100-110 cm - drilling breccia (gray fragments in light gray matrix)
110-133 cm - light greenish gray (5GY 7/1) fine-grained SANDSTONE; finely laminated at top
All lithologies contain small (0.1 to 3 mm diameter) blebs of pyrrhotite; more common in silts and sands than in clays.

VEINS:

Long fracture filled with beads of pyrrhotite at 74-103 cm.
Small pyrrhotite fracture are also present at 14, and 60-68 cm.

SULFIDE %: 2 -10, low

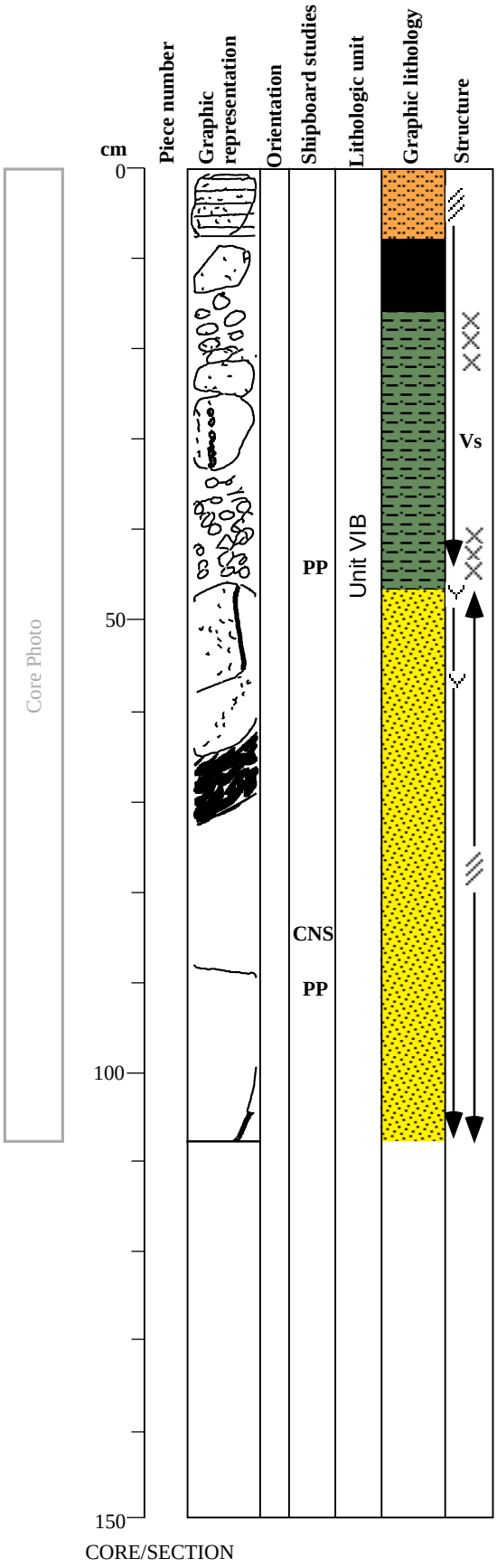


169-856H-25R-3
Top of Section 25R-3 - 146.12 mbsf

ROCK TYPE: FINE-GRAINED SANDSTONE with MINOR SULFIDE
COLOR: Greenish gray (5G 6/1)
HOST ROCK:

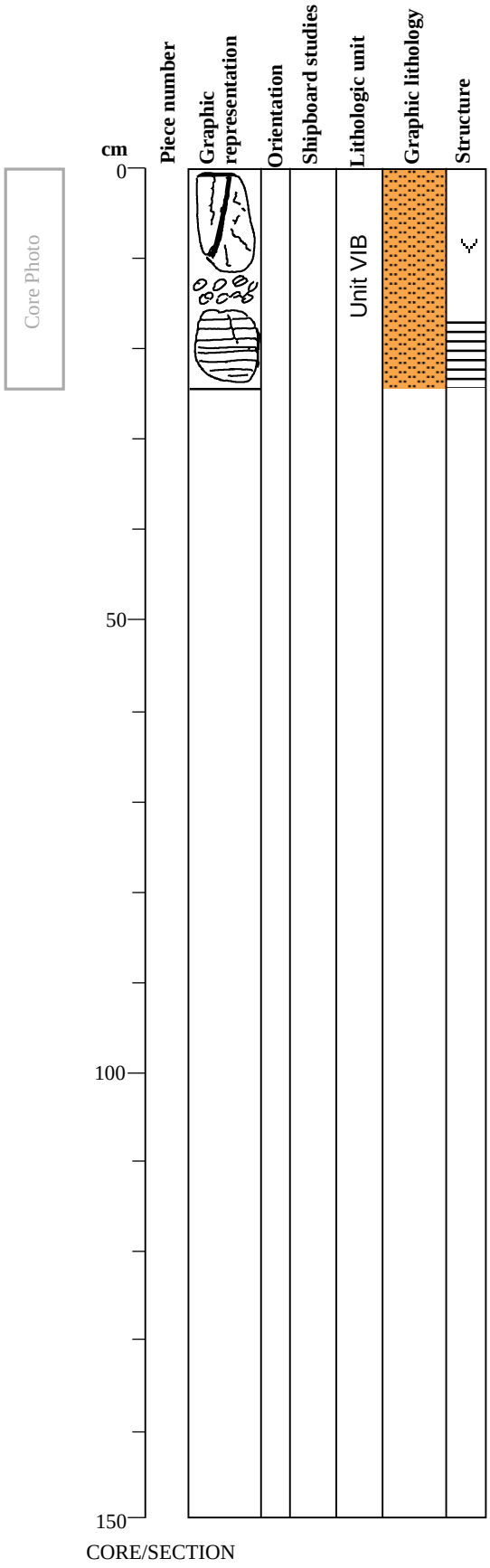
Fine-grained SANDSTONE with a very diffuse, mm-scale lamination. Grain size is less than 0.5 mm. Weak, randomly distributed impregnation of pyrrhotite (<1%) is present throughout the section.

SULFIDE : 2 -10, low



169-856H-26R-1
Top of Core 26R - 152.90 mbsf

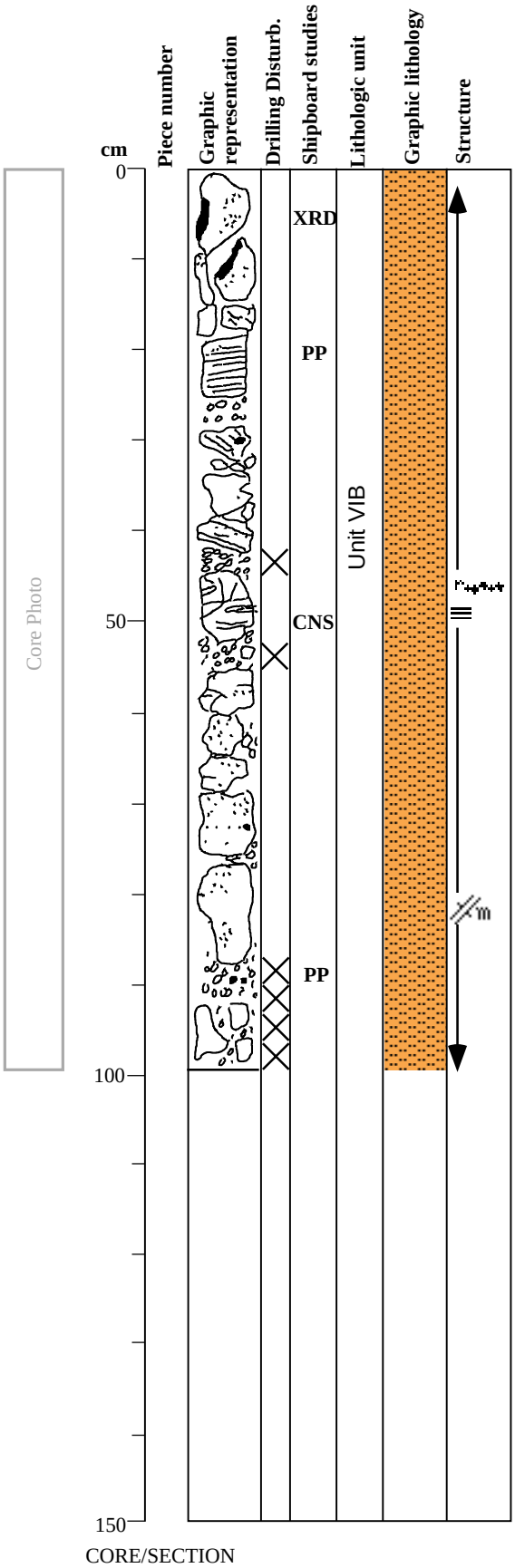
ROCK TYPE: MUDSTONE and SILTSTONE with SULFIDE BLEBS and VEINS
COLOR: Light greenish gray (5GY 7/1)
HOST ROCK:
0-7 cm - laminated SILTSTONE
7-14 cm - drilling breccia
14-45 cm - MUDSTONE. Drilling breccia with pyrite, pyrrhotite, and sphalerite at 33-45 cm
45-108 cm - SILTSTONE to VERY FINE-GRAINED SANDSTONE
Unlaminated siltstone with some small (generally <1 mm diameter) blebs of pyrite and pyrrhotite(?)
VEINS: Some pyrrhotite filling subvertical fractures. A thick pyrrhotite-filled fracture at 63-71 cm. Thin pyrrhotite-filled fractures at 87 cm, and a subvertical pyrrhotite-filled fracture at 97-108 cm.
SULFIDE %: 2 - 20, low to moderate



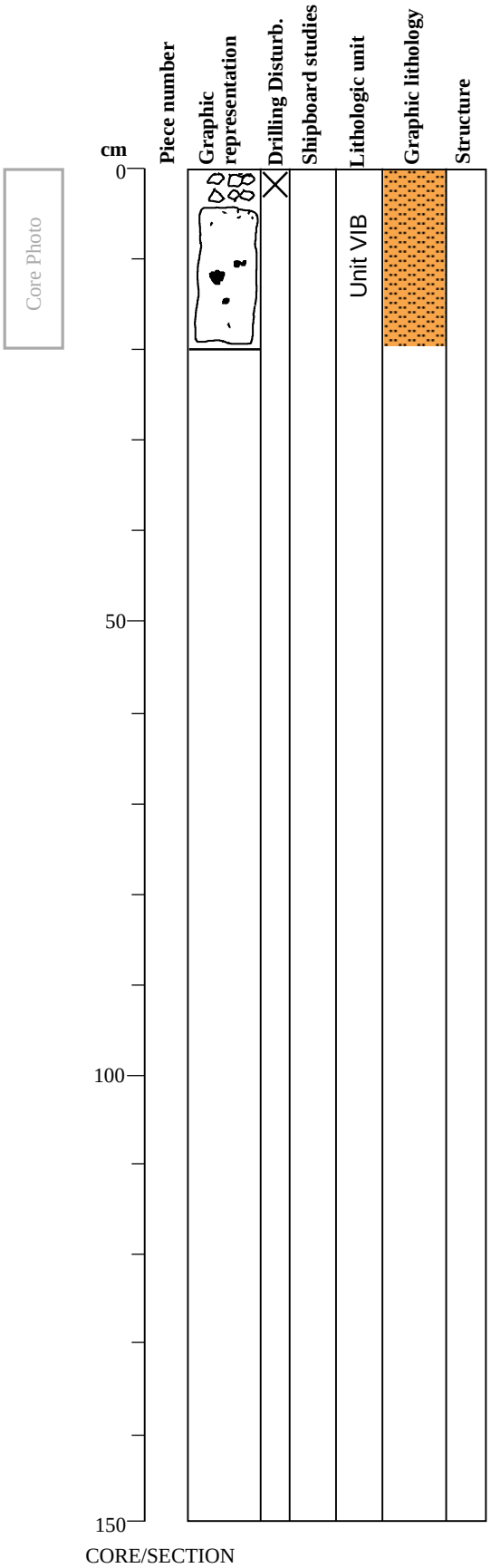
169-856H-26R-2
Top of Section 26R-2 - 153.96 mbsf

ROCK TYPE: SILTSTONE AND SANDSTONE
COLOR: Light greenish gray (5GY 7/1)
HOST ROCK:
0-15 cm - unlaminated SILTSTONE or very fine-grained SANDSTONE with pyrrhotite filled fractures and small (<1 mm) blebs of pyrrhotite
15-23 cm - laminated SILTSTONE with minor pyrrhotite filled fractures
SULFIDE %: 2 -10, low

169-856H-27R-1
Top of Section 27R-1 - 162.50 mbsf



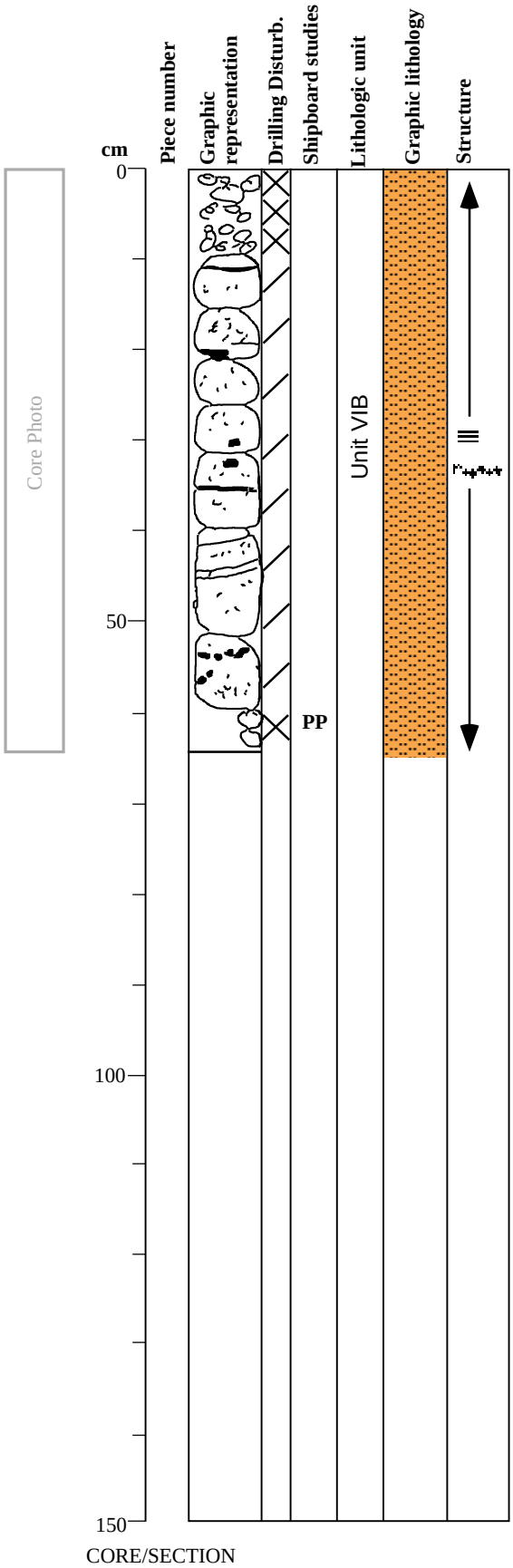
ROCK TYPE: SILTSTONE with MINOR SULFIDES
COLOR: Light greenish gray (5GY 7/1)
HOST ROCK:
Unlaminated siltstone with small (<1-2 mm) blebs of pyrrhotite. The blebs locally form bands. Locally pyrrhotite and hematite(?) form mm-thick lamina. Pyrrhotite is also found in irregular fractures. Laminated siltstone occurs at 18-25 cm, 30-33 cm, 38-42 cm, and 44-52 cm. Drilling breccia is at 42-44 cm, 52-55 cm, 86-98.5 cm.
SULFIDE %: 2 -10, low



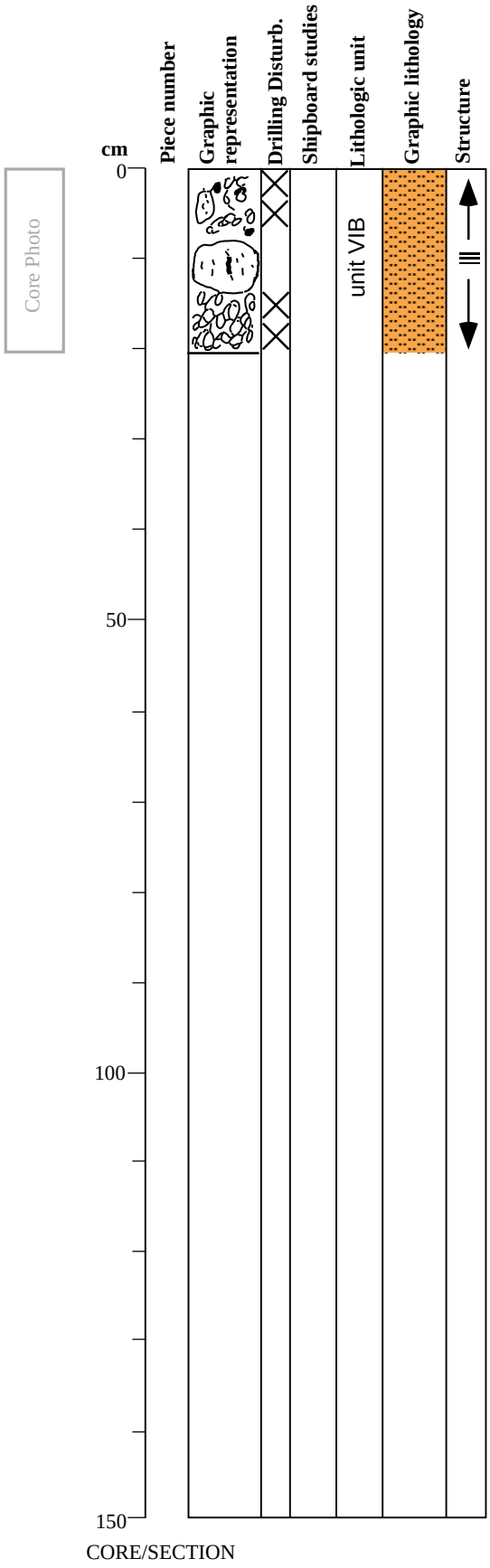
169-856H-27R-2
Top of Section 27R-2 - 163.42 mbsf

ROCK TYPE: SILTSTONE with MINOR SULFIDE
COLOR: Light greenish gray (5GY 7/1)
HOST ROCK:
Unlaminated SILTSTONE with some <1 to 1 cm blebs of pyrrhotite.
SULFIDE %: 2 - 10, low

169-856H-28R-1
Top of Section 28R-1 - 172.10 mbsf



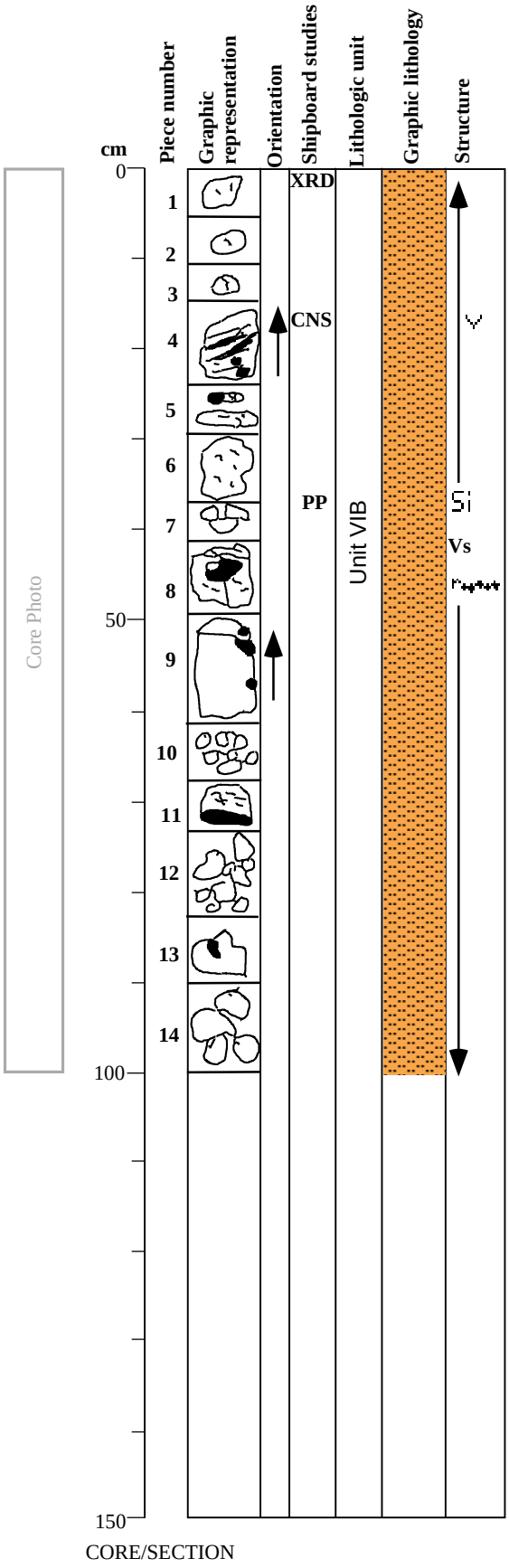
ROCK TYPE: SILTSTONE with MINOR SULFIDES
COLOR: Light greenish gray (5GY 7/1)
HOST ROCK:
Weakly laminated SILTSTONE with slightly darker gray (N6) stringers.
VEINS:
Subhorizontal, bedding-parallel pyrrhotite lamination is common. These may also contain hematite. Very small (<0.5 mm diameter) blebs of pyrrhotite(?) are pervasive.
SULFIDE %: 2 -10, low



169-856H-28R-2
Top of Section 28R-2 - 172.76 mbsf

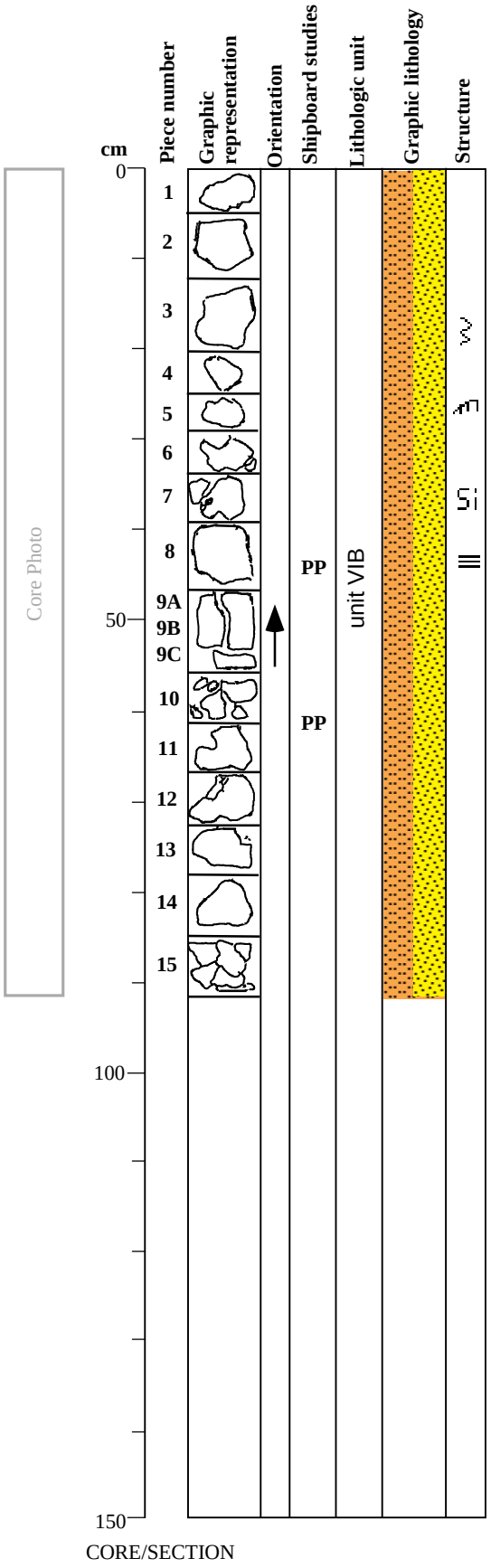
ROCK TYPE: SILTSTONE with MINOR SULFIDES
COLOR: Light greenish gray (5GY 7/1)
HOST ROCK:
Faintly laminated SILTSTONE with abundant small (<0.5 mm diameter) blebs of pyrrhotite(?).
SULFIDE %: 2 -10, low

169-856H-29R-1
Top of Core 29R - 181.70 mbsf



Pieces 1-14

ROCK TYPE: SILTSTONE with MINOR SULFIDES
COLOR: Gray (6N)
HOST ROCK:
Altered, indurated SILTSTONE with subhorizontal (≈20°) veins. Pieces 1, 2, and 3 have significant clay. The rock is also silicified, probably with altered clays. It is also laminated in some pieces.
VEINS: Very thin to 2 mm veins dominated by pyrrhotite with quartz (10%-20%). Also small vugs (1-4 mm) with euhedral pyrrhotite and quartz. Large replaced blob in Piece 8.
SULFIDE %: 2 -10, low



169-856H-30R-1
Top of Core 30R - 191.40 mbsf

Pieces 1-15

ROCK TYPE: SILTSTONE to FINE-GRAINED SANDSTONE with DISSEMINATED SULFIDES

COLOR: Light greenish gray (3.8GY 5.0/0.3)

HOST ROCK:

Altered SILTSTONE to FINE-GRAINED SANDSTONE with sparse 1 mm crosscutting veins and moderately fine-grained disseminations of pyrrhotite (non-magnetic) and chalcopyrite. Fine disseminations comprise 5% of core and range from <1 mm to 5 mm. Alteration is moderate (most common) to intense silicification. Intensity increases down core. Pieces 11 through 14 have prominent milky silica patches.

PRIMARY SEDIMENTARY STRUCTURES:

Piece 2 - bioturbation

Piece 6 - thin parallel lamination

Piece 9 - parallel lamination; small scale cross lamination; bioturbation

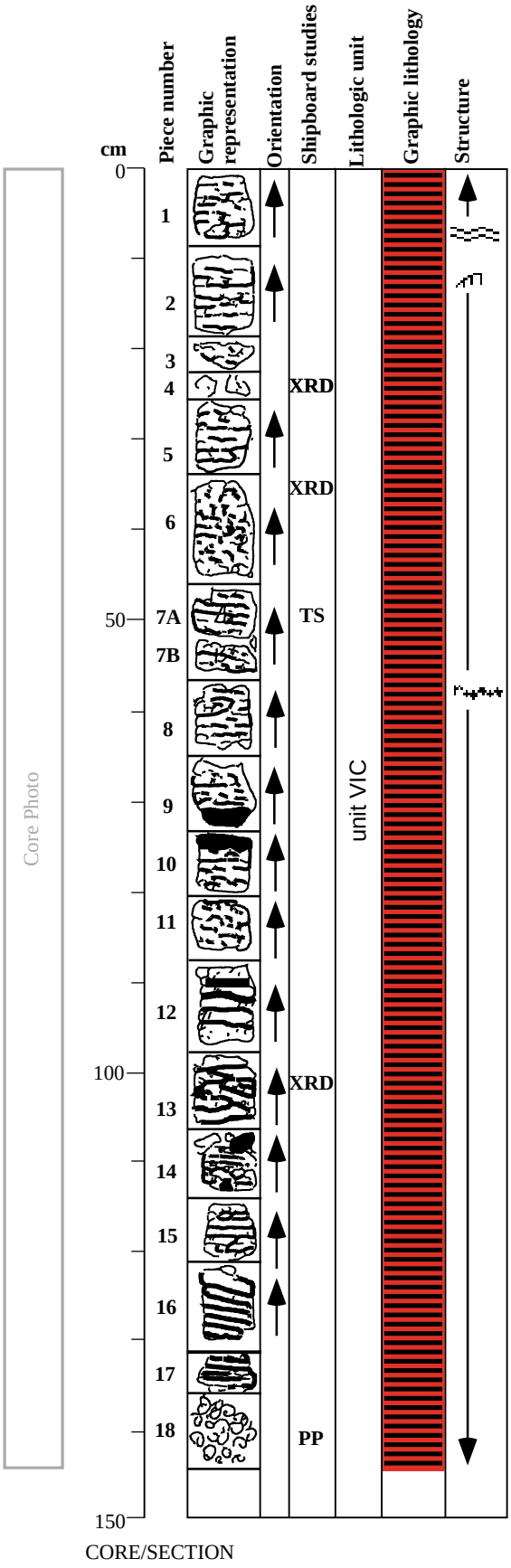
Piece 13 - starved ripples

VEINS:

Rare <1 mm to 1 mm bedding parallel to subvertical fracture fillings containing pyrrhotite (non-magnetic) and chalcopyrite (chalcopyrite predominates by far).

SULFIDE %: 2 - 10, low

169-856H-31R-1
Top of Section 31R-1 - 201.00 mbsf

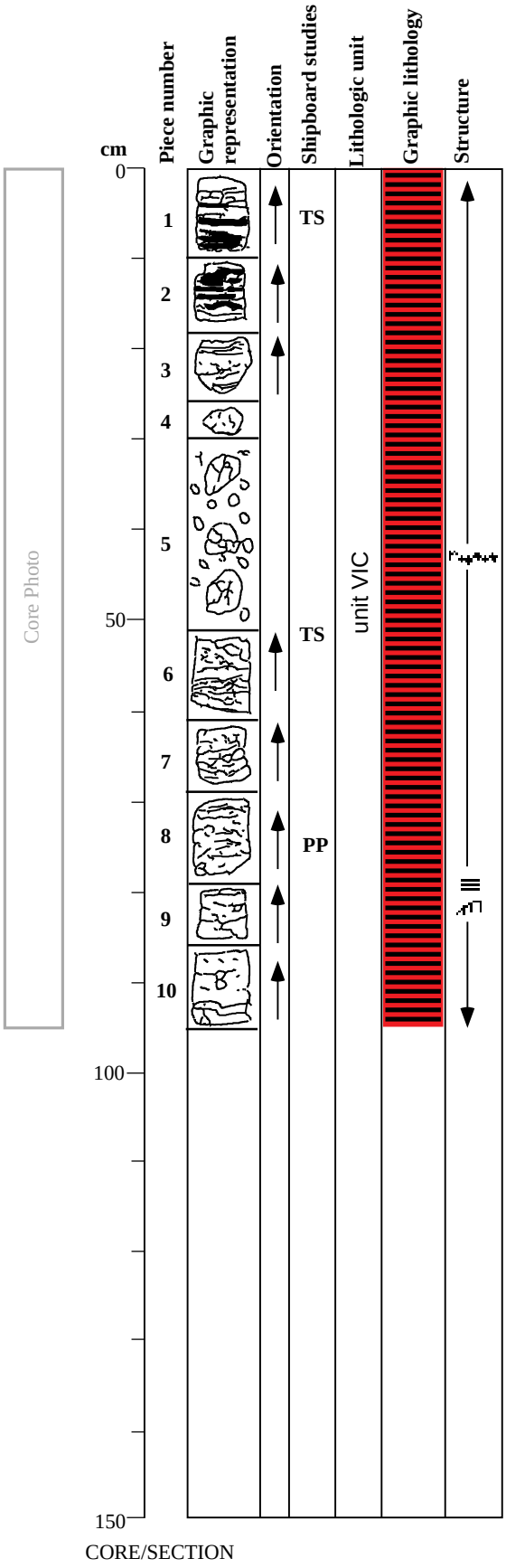


Pieces 1-18

ROCK TYPE: SULFIDE-BANDED SANDSTONE
COLOR: Gray, striped with bronze and brassy yellow
HOST ROCK:

Partially to almost completely replaced turbiditic sequence (A-C). Sandy layers are preferentially replaced by pyrite with minor chalcopyrite ± pyrrhotite. Sulfides replace sedimentary structures such as beds, burrows, etc. Also seen are cross laminated layers replaced by pyrite (Pieces 5 and 13). Ripple laminations are seen in Pieces 12, 14, and 17. Piece 6 is texturally different. It consists of round white spots that have a radial structure (soft mineral--Mg smectite?); sulfide appear to fill space between these structures. Both minerals are hydrothermal/recrystallized possibly from a fine-grained clay-rich protolith(?). Some sulfides appear to be infiltating into the radial structures. Piece 7 is also similar but on a coarser scale. The silicate blebs do not show the radial texture in all places.

SULFIDE %: 30 -75, high



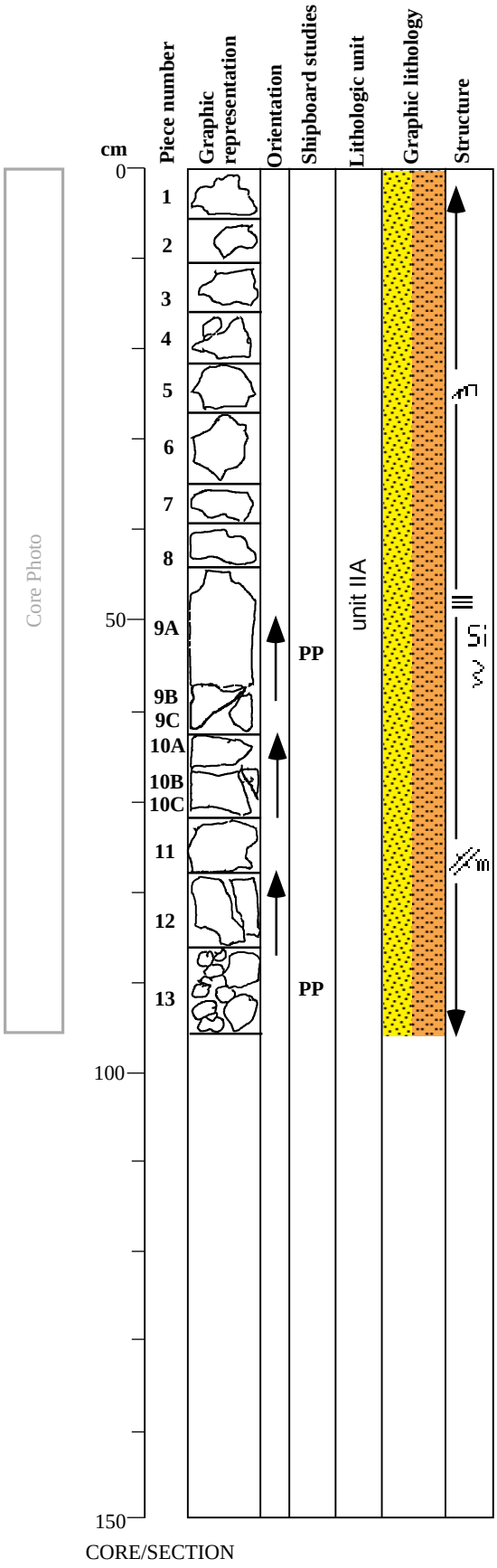
169-856H-31R-2
Top of Section 31R-2 - 202.44 mbsf

Pieces 1-10

ROCK TYPE: SULFIDE-BANDED SILTSTONE
COLOR: Light to dark gray with brassy yellow layers
HOST ROCK:

Basically similar to Section 169-856-31R-1 except some pieces have a higher content of clay/silt-sized grains and have a darker gray color (Pieces 1 to 4). Very soft matrix. Sulfides replacing the sediments as in Section 31R-1, but in this section the sulfide component appears in hand specimen to be monomineralic and possibly isocubanite(?). It appears too yellow to be pyrite and the has wrong fracture habit, but it does not look like chalcopyrite. Sedimentary structures include parallel and cross thin laminae (Pieces 1, 2, 3, 9, and 10). Sedimentary structures are lacking in Pieces 6, 7, and 8. The pieces have a blobby texture with more sulfide than clay. Piece 5 is rubble. The proportion of sulfide is markedly lower in Pieces 9 and 10 which are finely laminated siltstones with decreasing amounts of mineralization down core. Sulfides in Pieces 6, 7, and 8 commonly form in spherical crusts armoring radiating spheroidal clays.

SULFIDE %: 30 - 75, high



169-856H-32R-1
Top of Core 21R - 210.60 mbsf

Pieces 1-13

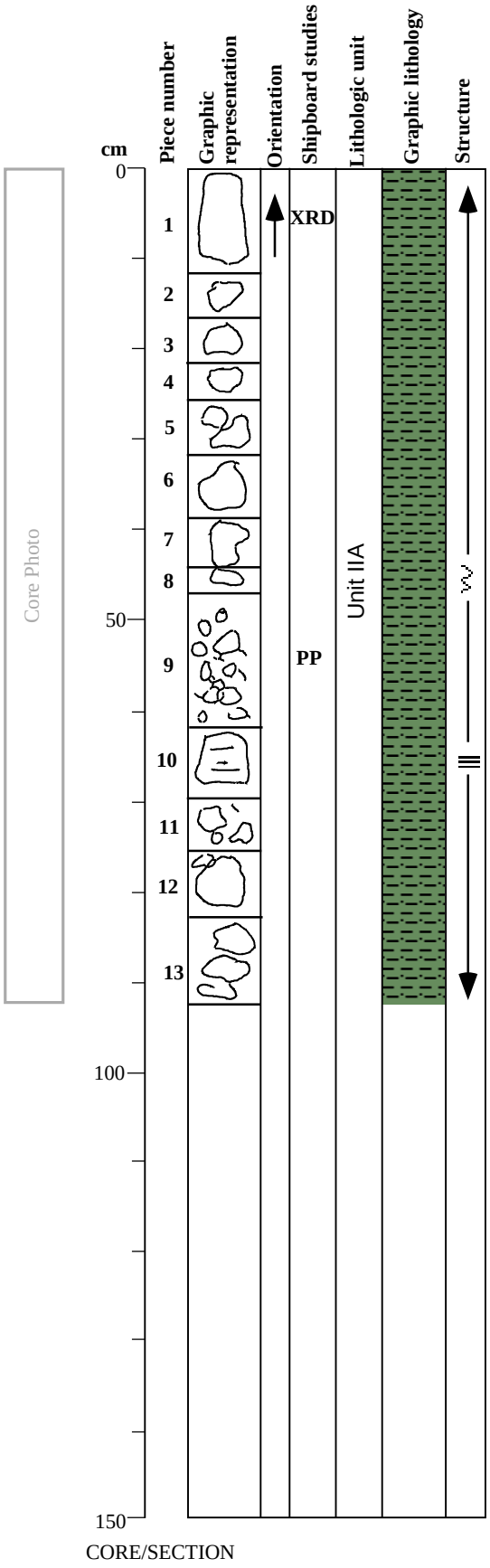
ROCK TYPE: FINE-GRAINED SANDSTONE to SILTSTONE
COLOR: Greenish gray
HOST ROCK:

Finely laminated and indurated fine-grained sandstone to siltstone with parallel cross laminations and small ripples in places (Pieces 8 and 12). *Chondrites* trace fossils are present in Piece 12. Sulfides are relatively absent except as traces in thin silicified laminations and veinlets of quarts (see below). Rock is pervasively silicified and indurated.

VEINS:

Pieces 1 and 12A have narrow (1 to 2 mm wide) subvertical veinlets of quartz and trace pyrite.

SULFIDE %: <2, negligible



CORE/SECTION

169-856H-33R-1
Top of Core 33R - 220.2 mbsf

Pieces 1-13

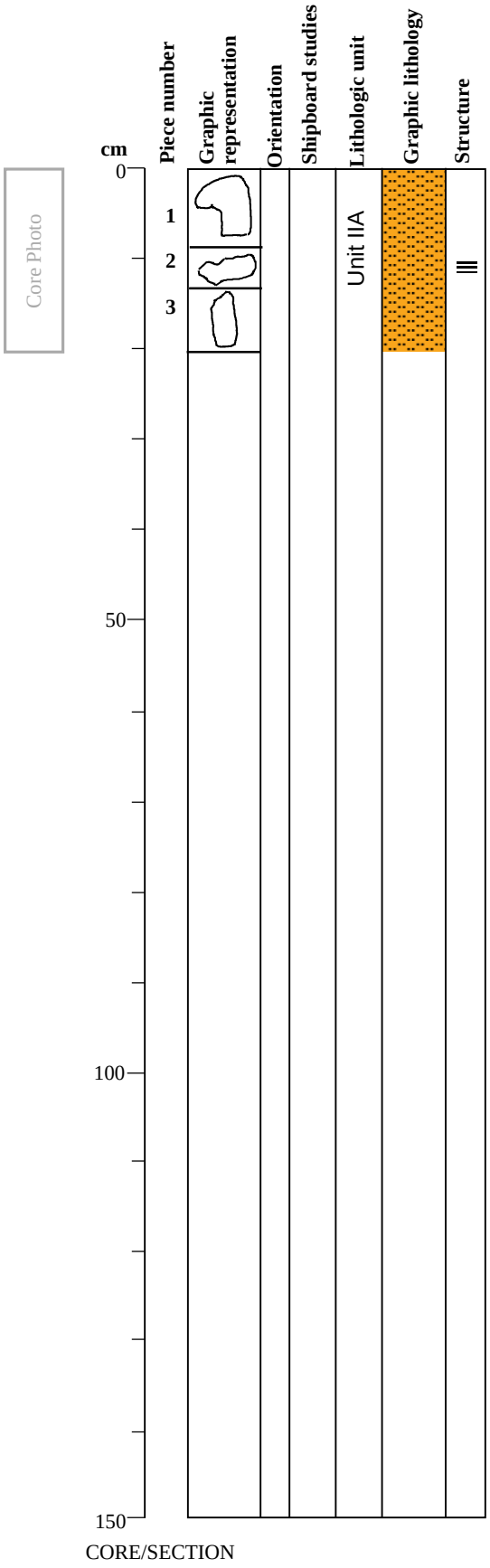
ROCK TYPE: MUDSTONE
COLOR: Gray (N5)
HOST ROCK:

Finely laminated, poorly indurated, strongly bioturbated (*Chondrites*) throughout the section. Ball and pillow structure in Piece 12, and ripple structure in Piece 4. No sulfides are observed except in fracture in Piece 1 (see below). Not notably silicified in hand specimen.

VEINS:

Joint coating of pink titanite (XRD) and possible arsenopyrite(?) or loellingite(?) or possible isocubanite(?) in Piece 1.

SULFIDE %: <2, negligible



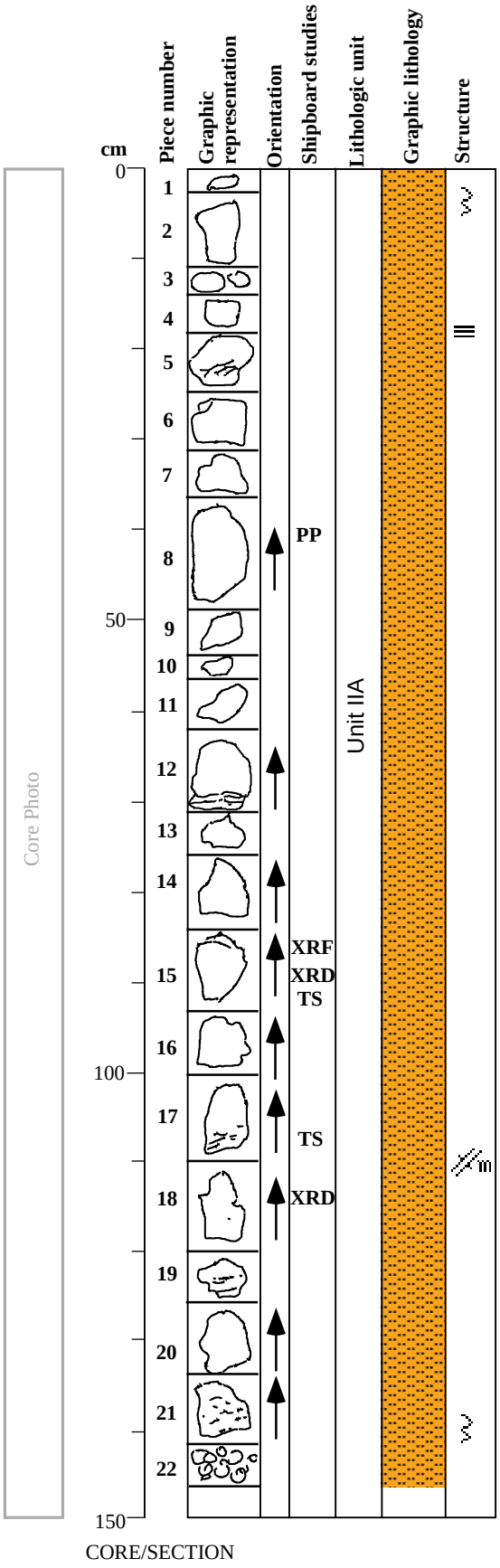
169-856H-34R-1
Top of Core 34R - 229.8 mbsf

Pieces 1-3

ROCK TYPE: SANDY SILTSTONE
COLOR: Gray (N5)
HOST ROCK:

Moderately indurated with fine horizontal laminations. Moderately silicified. Piece 2 has thin (0.1 mm) vein of dark material with associated disseminated sulfides in and around. Quartz crystals are growing into a cavity on surface of the piece. Piece 1 has a 15-mm subspherical concretion in thin laminae.

SULFIDE %: <2, negligible



169-856H-35R-1
Top of Section 35R-1 - 239.40 mbsf

Pieces 1-22

ROCK TYPE: CLAYEY SILTSTONE with MINOR FINE-GRAINED SANDSTONE

COLOR: Gray (N6)

HOST ROCK:

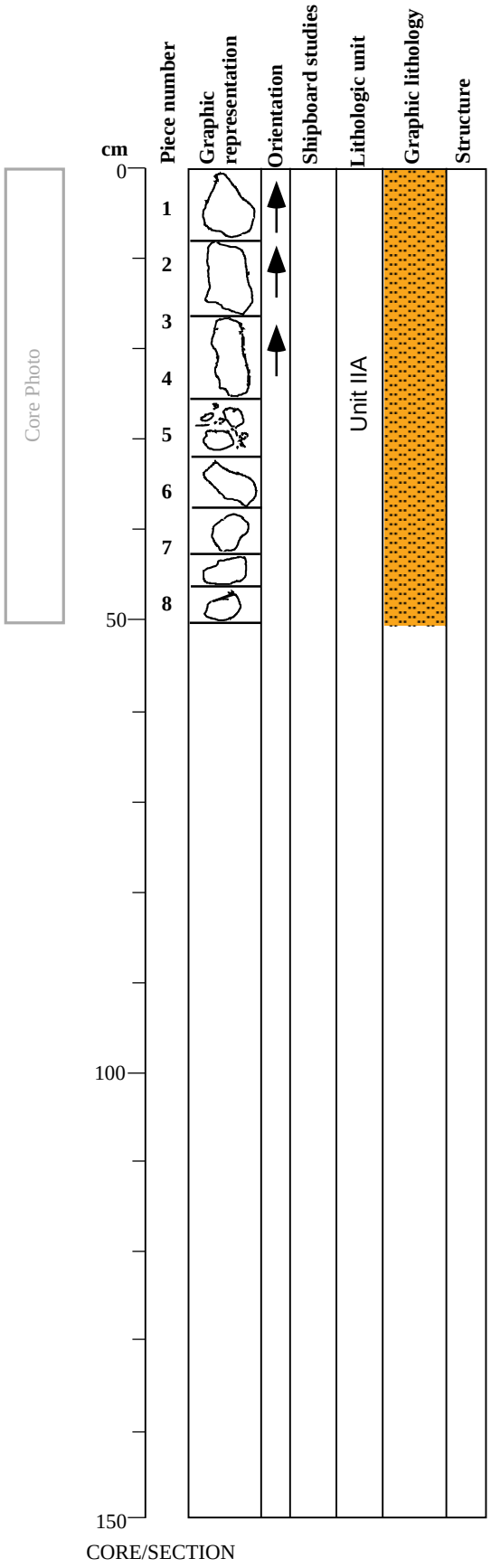
Finely laminated, parallel to undulated laminations. Piece 21 is intensively bioturbated and indurated. Rare finely disseminated fine-grained pyrrhotite or pyrite is in a few places. Rare sub-mm irregular fractures with dark colorations (too narrow to identify). Several 1-mm wide fracture coatings of white, fine-grained anhydrite occurs in Pieces 17 and 18.

VEINS:

Rare 1-mm wide anhydrite veinlets with random orientation are in Pieces 17 and 18.

NOTE: Piece 1 is atypical/foreign to the rest of the core and may have fallen into the hole from further up hole. It is massive, “spongy” isocubanite and anhydrite that appears to be recrystallized.

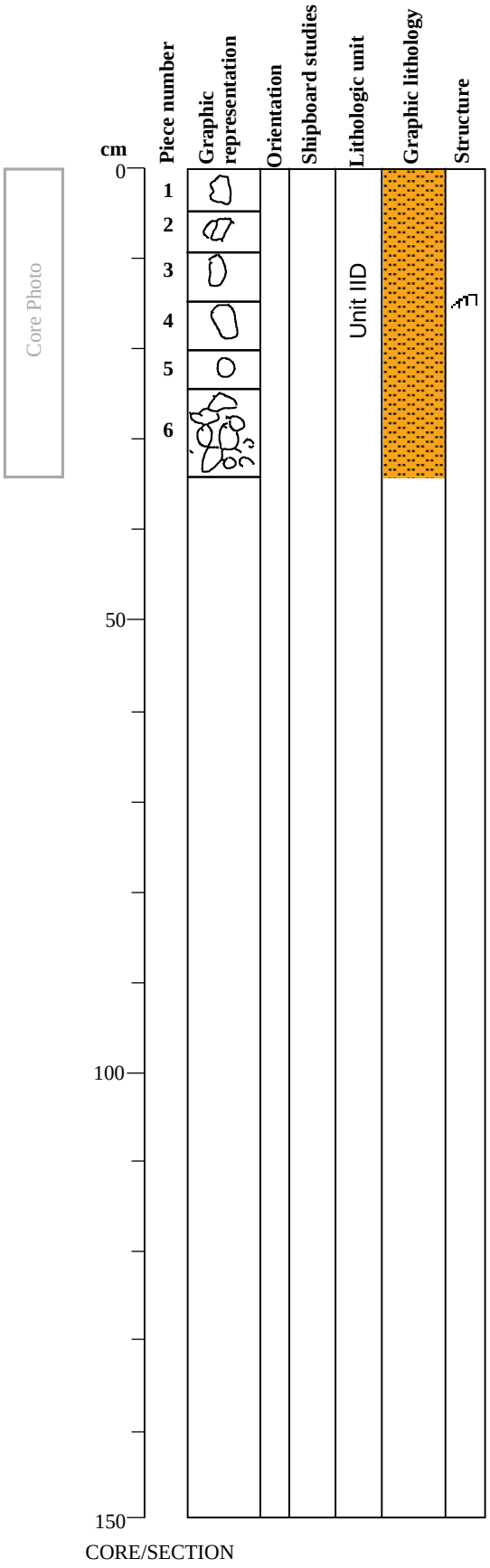
SULFIDE %: <2, negligible



169-856H-35R-2
Top of Section 35R-2 - 240.87 mbsf

Pieces 1-8

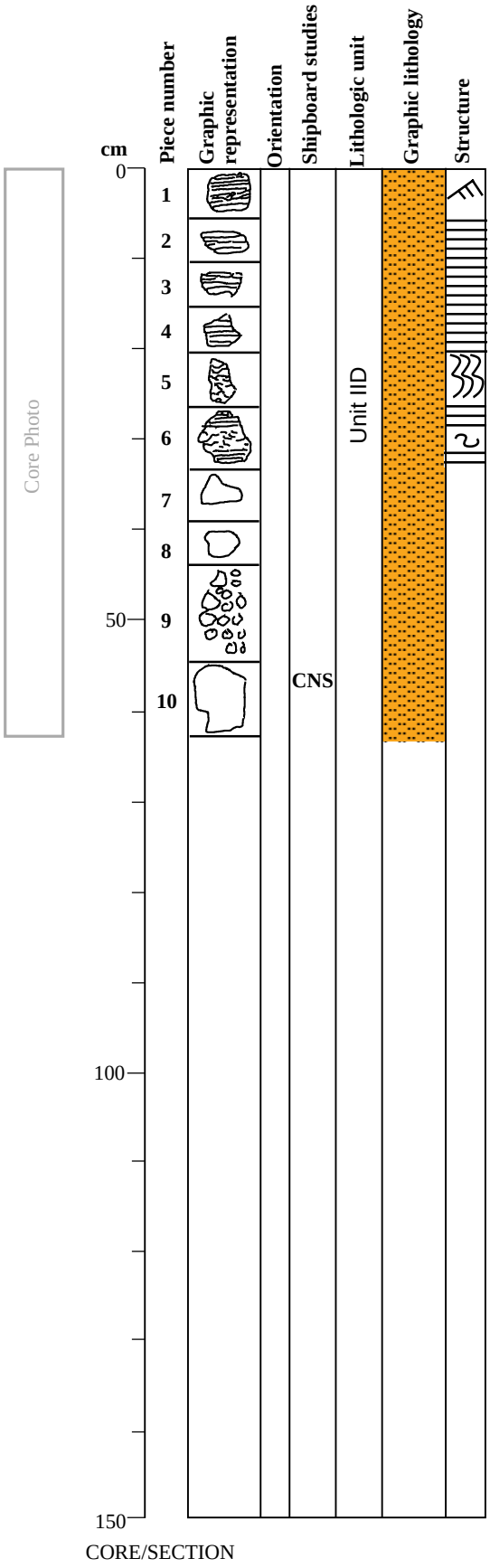
ROCK TYPE: CLAYEY SILTSTONE with MINOR FINE-GRAINED SANDSTONE
COLOR: Gray (N6)
HOST ROCK: Identical to Section 169H-856H-35R-1
VEINS: None
SULFIDE %: <2, negligible



169-856H-36R-1
Top of Core 36R - 249.00 mbsf

Pieces 1-6

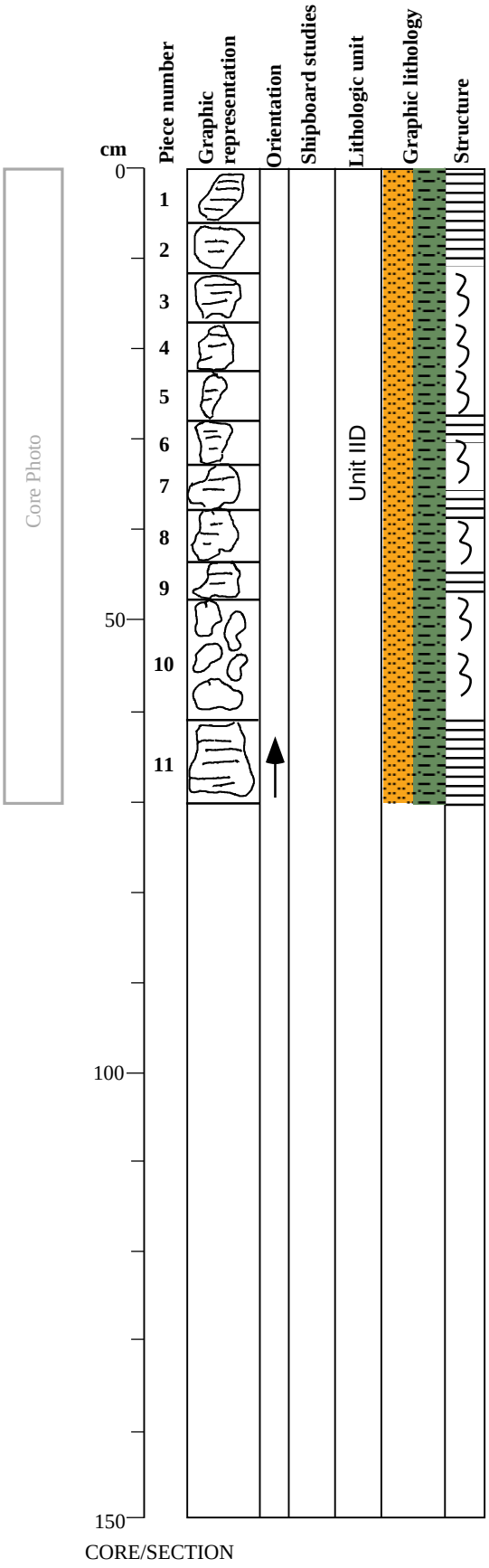
ROCK TYPE: CLAYEY SILTSTONE
COLOR: Greenish gray (5GY 6/1)
HOST ROCK: Finely parallel cross-laminated. No sulfides are present. No veins are present. Pieces are indurated, but not altered.
SULFIDE %: <2, negligible
ADDITIONAL COMMENTS: Becoming green downcore, because of an increasing proportion of chlorite.



169-856H-37R-1
Top of Core 37R - 258.7 mbsf

Pieces 1-10

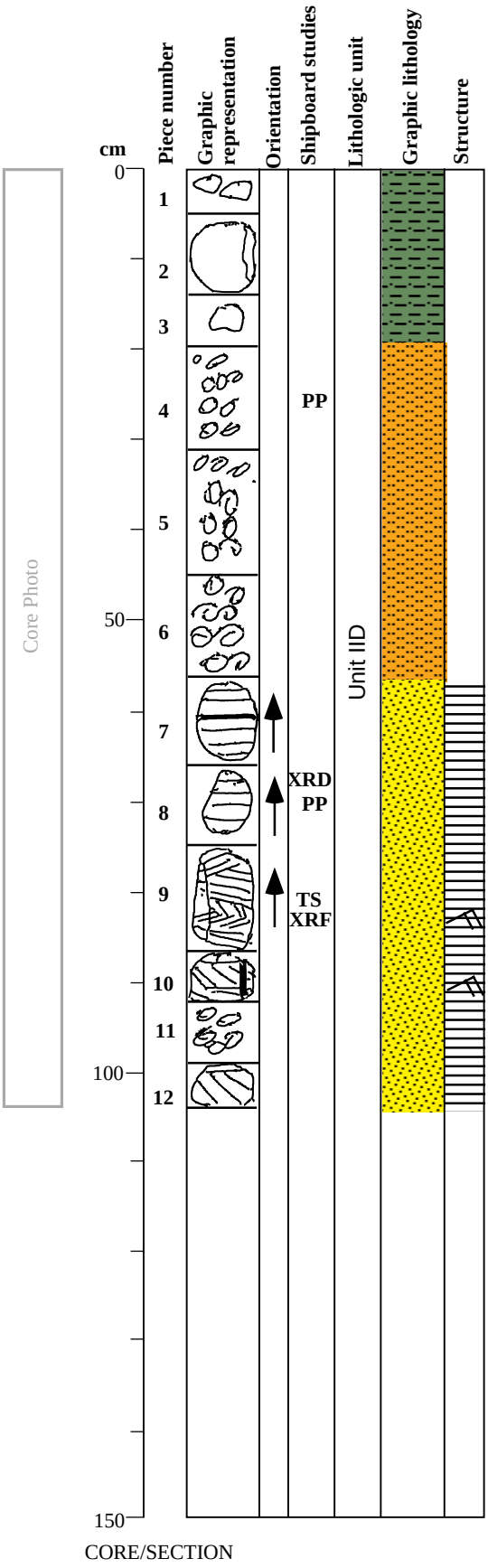
ROCK TYPE: SILTSTONE
COLOR: Greenish gray (5G 6/1)
HOST ROCK:
Finely laminated in upper part (0-33 cm), cross-laminated in Piece 1 (0-5 cm); soft slumping features are present in Piece 6 (26-33 cm); bioturbation (*Chondrites*) in Piece 5 (20-26 cm); homogeneous and unlaminated in lower part of section (33-62.8 cm).
SULFIDE %: <2, negligible
ADDITIONAL COMMENTS: Green color appearing down core.



169-856H-38R-1
Top of Core 38R - 268.3 mbsf

Pieces 1-11

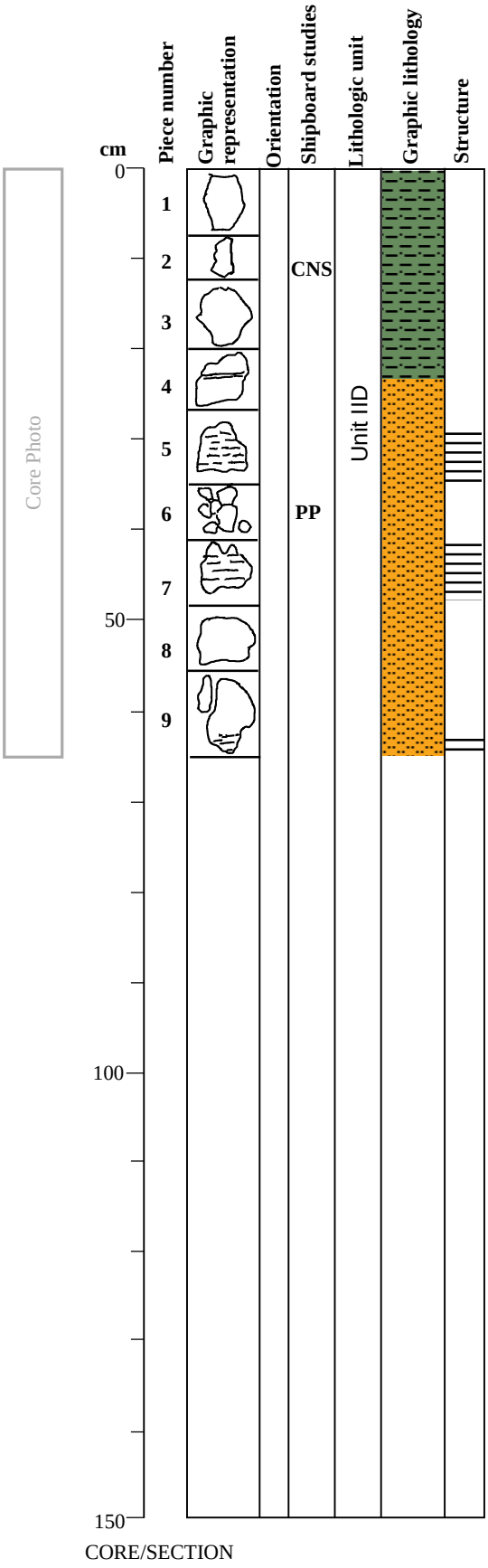
ROCK TYPE: SILTSTONE and CLAYSTONE
COLOR: Greenish gray (5G 6/1)
HOST ROCK: Moderately indurated, and weakly to strongly laminated. The rock is mottled in places because of bioturbation. Black specks are probably magnetite. Sulfides are absent.
SULFIDE %: <2, negligible
ADDITIONAL COMMENTS: Darker green color becomes apparent in bottom fine-grained mudstone and continues downhole.



169-856H-39R-1
Top of Core 39R - 278.0 mbsf

Pieces 1-12

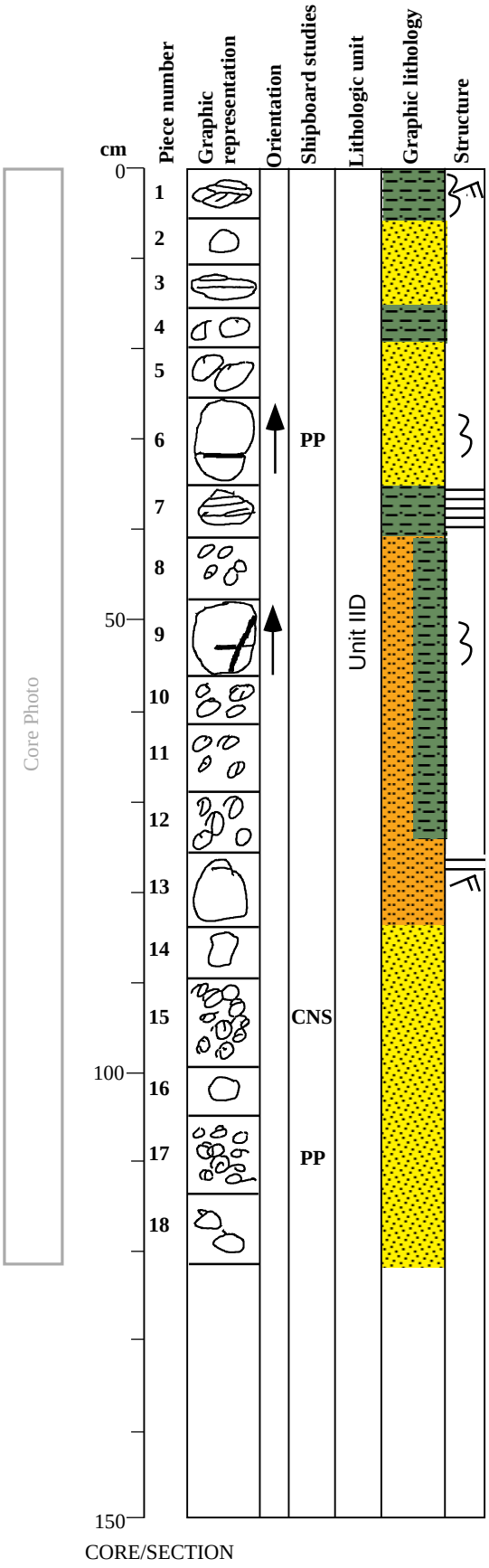
ROCK TYPE: MUDSTONE, SILTSTONE, and FINE-GRAINED SANDSTONE
COLOR: Greenish gray (5GY 6/1)
HOST ROCK:
Pieces 1 to 3 - MUDSTONE with anhydrite vein.
Pieces 4 to 6 - faintly laminated SILTSTONE
Pieces 7 and 8 - FINE-GRAINED SANDSTONE, laminated and cross-laminated.
Piece 9 - Cross-laminated FINE-GRAINED SANDSTONE with subvertical anhydrite veinlet.
Piece 10 - Cross-laminated FINE-GRAINED SANDSTONE with subvertical anhydrite veinlet.
Piece 12 - Cross-laminated FINE-GRAINED SANDSTONE with anhydrite on fracture surface.
VEINS: Common, thin horizontal to subvertical anhydrite veinlets in 0-5, 5-15, and 60 cm.
SULFIDE %: <2, negligible
ADDITIONAL COMMENTS: Greener than Cores 169-856H-35R and above.



169-856H-40R-1
Top of Core 40R - 287.6 mbsf

Pieces 1-9

ROCK TYPE: MUDSTONE to SILTSTONE
COLOR: Greenish gray (5BG 6/1)
COMMENTS: MUDSTONE in upper part (0-35 cm) and SILTSTONE in lower part (35-65.5 cm). Unlaminated to very weak mm-scale lamination, slightly indurated by soft-sediment deformation. A mm-sized concretion of anhydrite is present in Piece 1 and a thin (0.5 cm wide) lamina with some anhydrite is observed in Piece 4.
SULFIDE %: 0

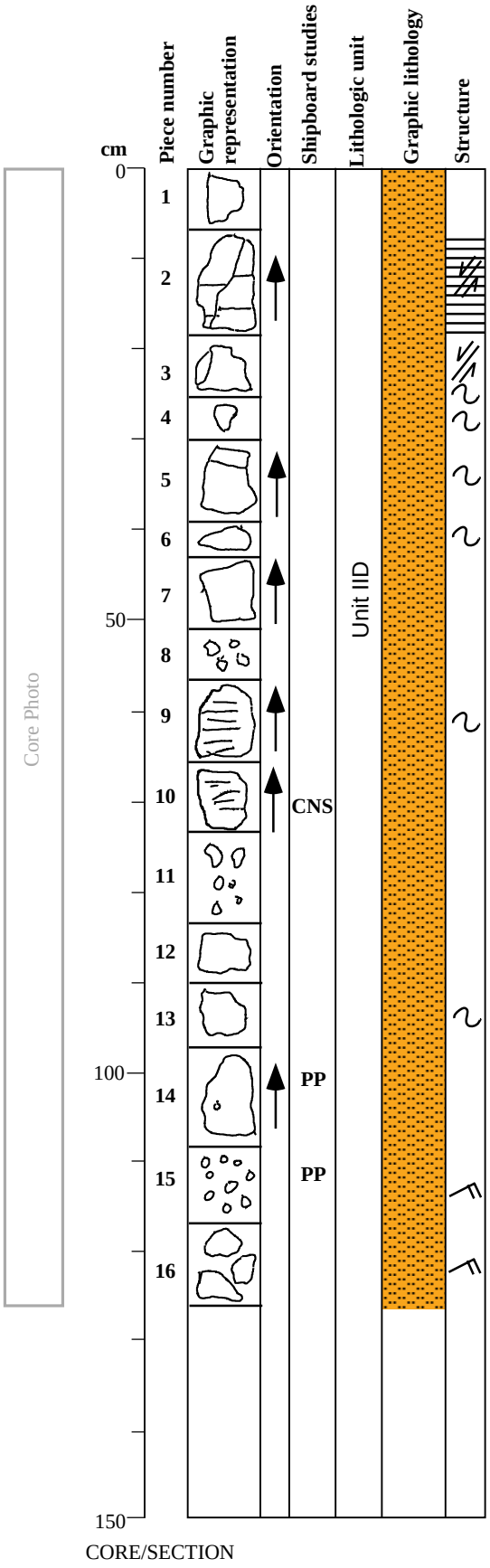


CORE/SECTION

169-856H-41R-1
Top of Core 41R - 297.3 mbsf

Pieces 1-18

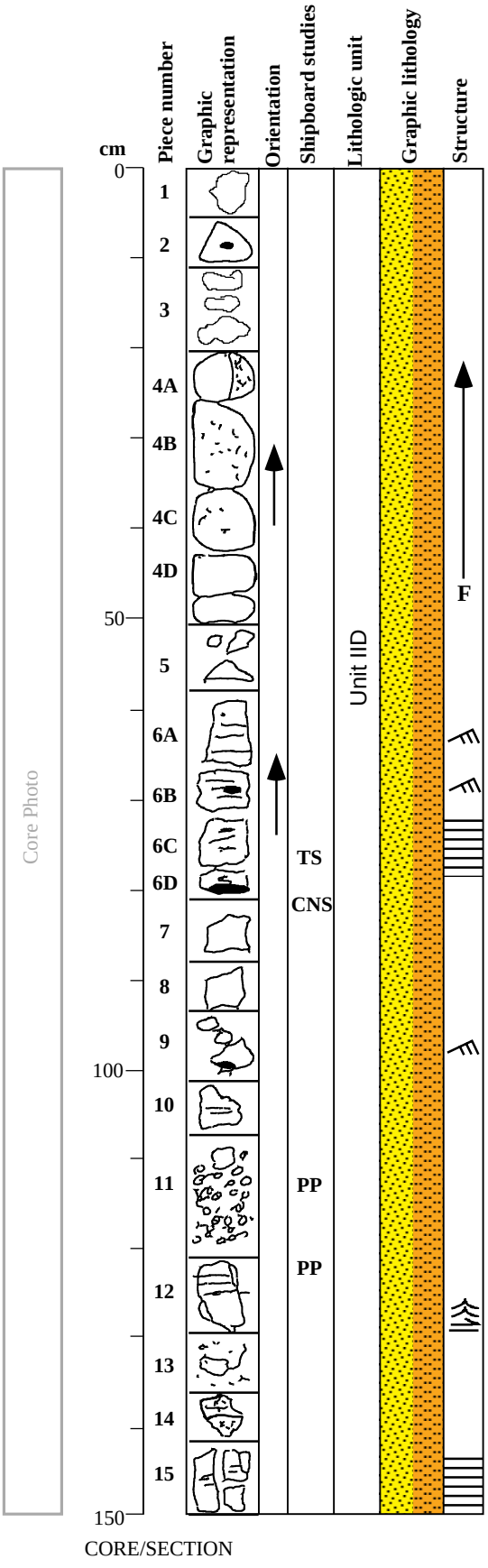
ROCK TYPE: MUDSTONE to FINE-GRAINED SANDSTONE
COLOR: Greenish gray (5BG 5/1)
COMMENTS Some quartz recrystallized along bedding planes and anhydrite along fractures. Plane-parallel lamination is common in many pieces.
Piece 1 - MUDSTONE, cross-laminated
Piece 2 - VERY FINE-GRAINED SANDSTONE, no lamination
Piece 3 - interbedded silt/FINE-GRAINED SANDSTONE; faintly laminated
Piece 4 - MUDSTONE
Piece 5 - FINE-GRAINED SANDSTONE; abundant recrystallized quartz
Piece 6 - FINE-GRAINED SANDSTONE, bioturbated, quartz vugs along bedding plane
Piece 7 - MUDSTONE, laminated and bioturbated
Piece 8 - SILTSTONE
Piece 9 to 12 - interbedded SILTSTONE, and MUDSTONE. Anhydrite in subvertical fracture cutting vuggy quartz along bedding plane.
Pieces 10 to 12 contains anhydrite vein.
Piece 13 - SILTSTONE, laminated in part; abundant quartz
Piece 14 - non-laminated VERY FINE-GRAINED SANDSTONE
Piece 15 - SANDSTONE
Piece 16 - VERY FINE-GRAINED SANDSTONE
Piece 17 - FINE-GRAINED SANDSTONE with anhydrite vein
Piece 18 - cross-laminated FINE-GRAINED SANDSTONE
SULFIDE %: 0



169-856H-42R-1
Top of Core 42R - 306.9 mbsf

Pieces 1-16

ROCK TYPE: SILTSTONE
COLOR: Greenish gray to dark greenish gray (5BG 5/1 - 5BG 4/1)
COMMENTS: Generally laminated with weak soft sediment deformation.
Piece 1 - MUDSTONE
Piece 2 - laminated SILTSTONE with fault offset 3 mm
Piece 3 - 2-mm anhydrite vein
Piece 4 - SILTSTONE
Pieces 5 and 6 - MUDSTONE
Piece 7 - SILTSTONE; quartz veinlet with fine-grained quartz crystals; anhydrite vein
Piece 8 - SILTSTONE with anhydrite vein
Piece 9 - laminated SILTSTONE with soft sediment deformation
Piece 10 - laminated SILTSTONE
Piece 11 - SILTSTONE with laminations; anhydrite
Piece 12 - laminated SILTSTONE; anhydrite vein
Piece 13 - laminated SILTSTONE
Piece 14 - laminated SILTSTONE; quartz vugs
Pieces 15 and 16 - SILTSTONE
SULFIDE %: 0



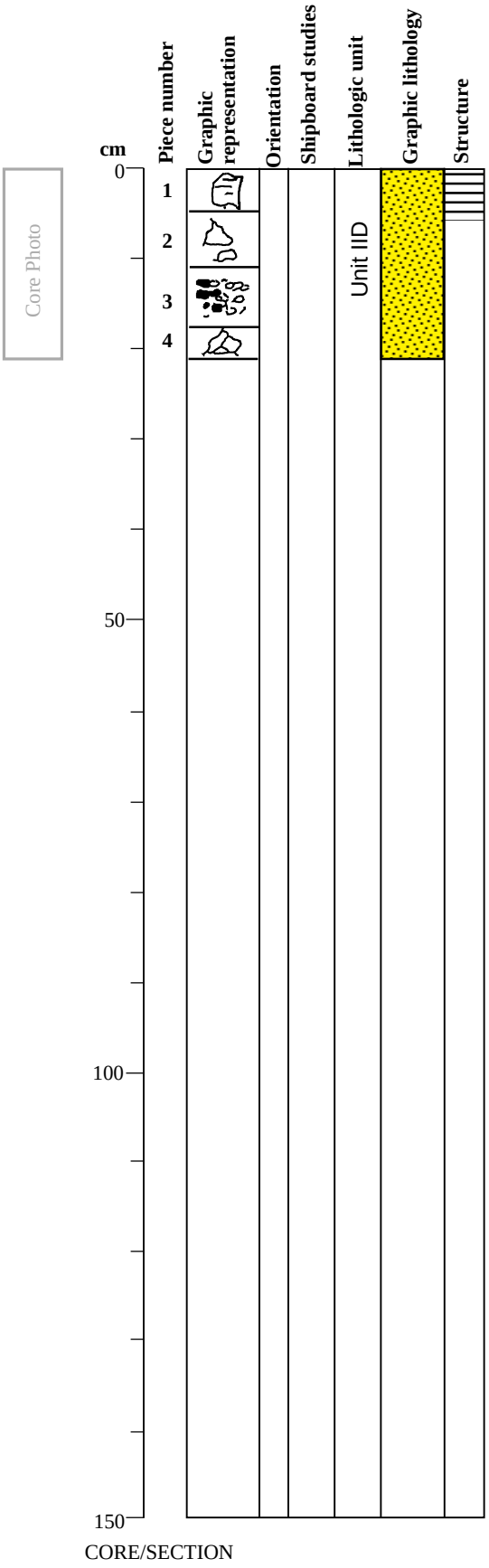
169-856H-43R-1
Top of Section 43R-1 - 316.5 mbsf

Pieces 1-15

ROCK TYPE: SANDSTONE and MUDSTONE
COLOR: Greenish gray (5G 6/1)
COMMENTS:

Interbedded fine-grained SANDSTONE and somewhat darker gray MUDSTONE; a few pockets of crystalline quartz (8 cm)
Piece 2 - quartz pocket
Piece 4 and 5 - water escape pipe/SANDSTONE dike
Piece 6 - FINE- to MEDIUM-GRAINED SANDSTONE, silty base; fine turbidites; ripples deformed by soft sediment deformation
Pieces 7 and 8 - SILTSTONE
Piece 9 - SILTY SANDSTONE; small (1 cm) patch of anhydrite(?)
Piece 10 - FINE SANDSTONE
Piece 11 - rubble
Piece 12 - fine- and medium-grained SANDSTONE. Deformed parallel and cross-lamination
Piece 13 - rubble
Piece 14 - fine-grained sand to SILTSTONE
Piece 15 - parallel laminated SILTSTONE

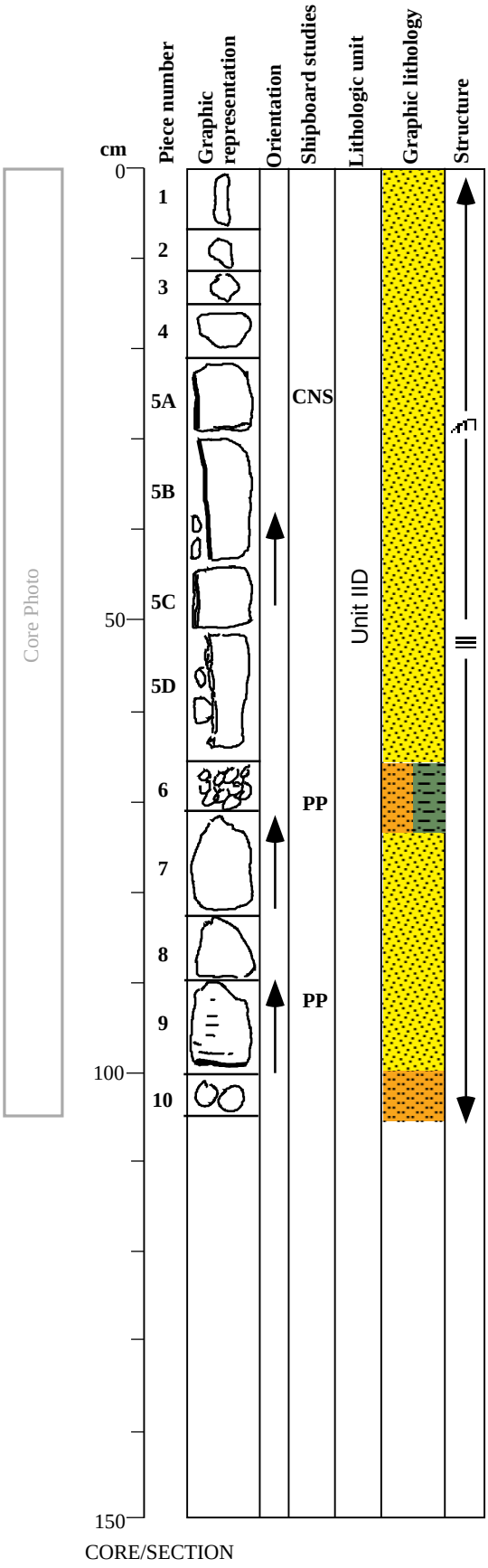
SULFIDE %: 0



169-856H-43R-2
Top of Section 43R-2 - 318.0 mbsf

Pieces 1-4

ROCK TYPE: FINE-GRAINED SANDSTONE
COLOR: Greenish gray (5G 6/1)
COMMENTS: Parallel laminated FINE-GRAINED SANDSTONE
SULFIDE %: 0



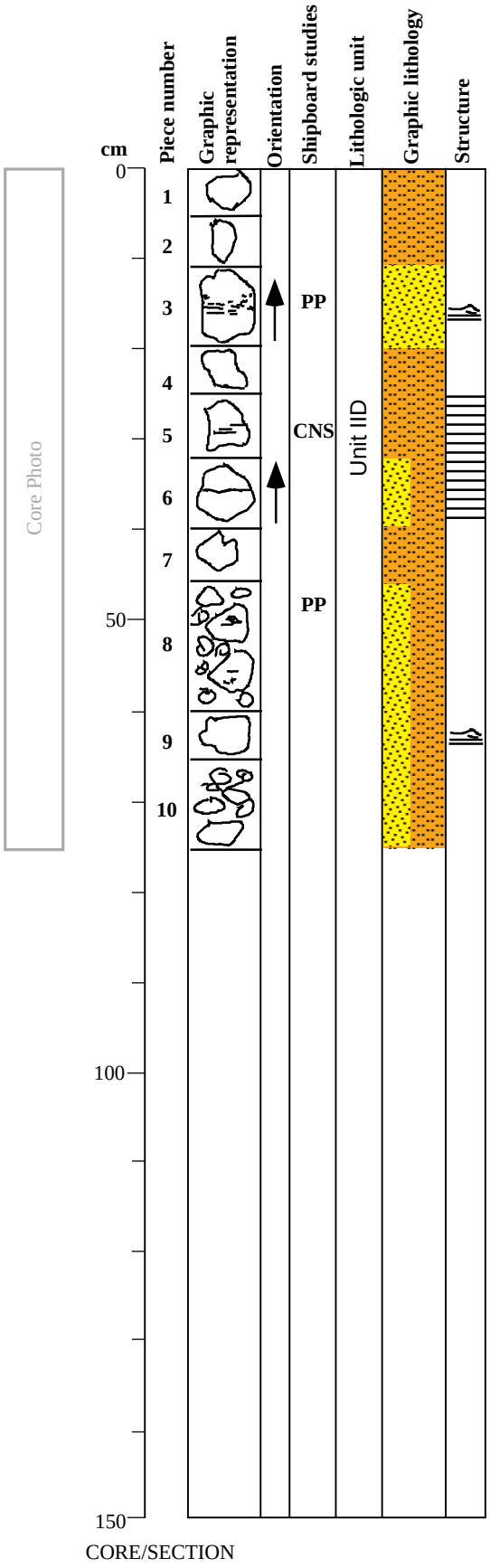
169-856H-44R-1
Top of Core 44R - 326.2 mbsf

Pieces 1-10

ROCK TYPE: SANDSTONE and SILTSTONE
COLOR: Greenish gray (5G 5/1)
COMMENTS:

Thin bedded turbidites showing frequent soft deformation.
Piece 1 - fine-grained parallel-laminated SANDSTONE
Piece 2 - fine-grained parallel-laminated SANDSTONE with 6 mm sandy interval
Pieces 3 and 4 - VERY FINE-GRAINED SANDSTONE
Pieces 5A and 5B - parallel- to cross-laminated fine-grained SANDSTONE
Piece 5C - parallel-laminated FINE-GRAINED SANDSTONE with coarser-grained sand lenses due to soft sediment deformation.
Piece 5D - parallel- to cross-laminated FINE- to MEDIUM-GRAINED SANDSTONE (mainly cross laminated); ≈1-mm subvertical anhydride vein
Piece 6 - homogeneous CLAYEY SILTSTONE
Piece 7 - parallel-laminated FINE-GRAINED SANDSTONE
Piece 8 - cross-laminated FINE-GRAINED SANDSTONE
Piece 9 - cross- to parallel-laminated FINE-GRAINED\ SANDSTONE (2-mm anhydride vein parallel to bedding)
Piece 10 - SILTSTONE

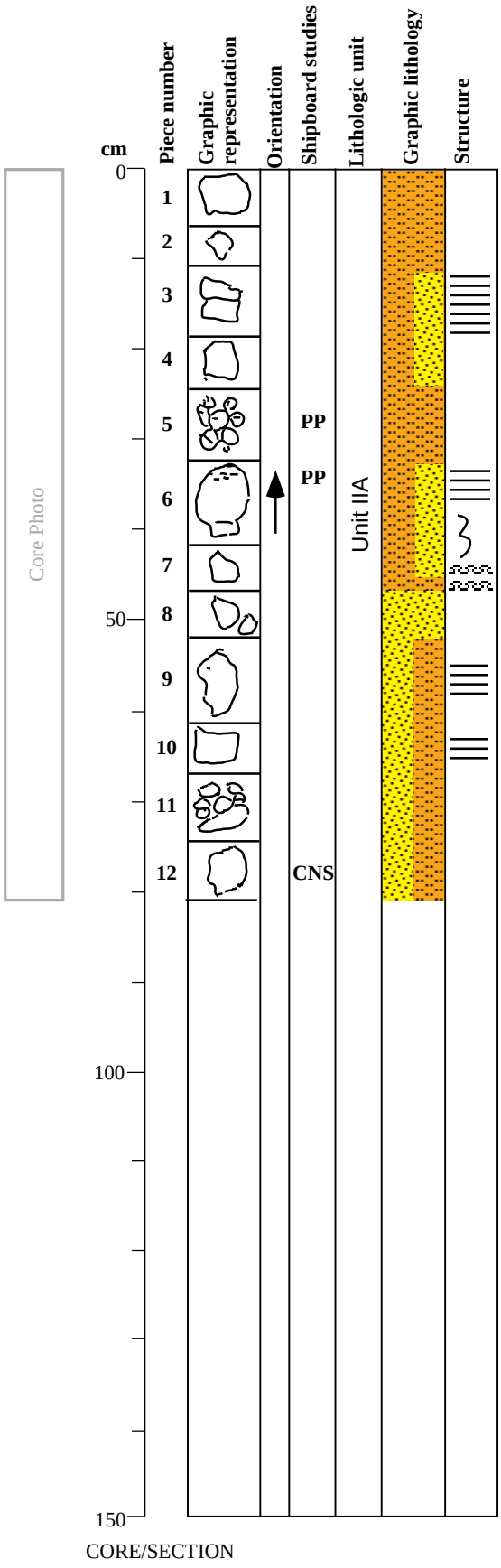
SULFIDE %: 0



169-856H-45R-1
Top of Core 45R - 335.8 mbsf

Pieces 1-10

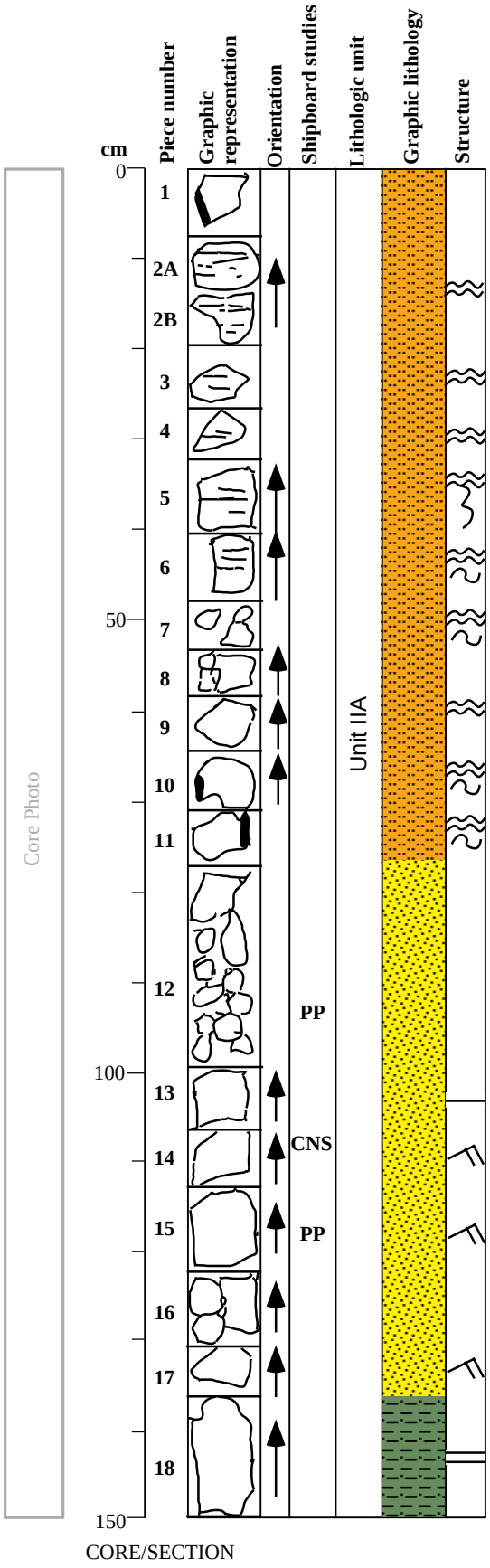
ROCK TYPE: SILTSTONE and SANDSTONE
COLOR: Greenish gray (5BG 6/)
COMMENTS: Probably thin bedded turbidites. Sharp contacts between muds and sands in some pieces.
Fining upward sequences (graded beds) in Piece 3
Pieces 1 and 2 - SILTSTONE
Piece 3 - fine-grained cross-laminated SANDSTONE; spots of diagenetic pyrite
Pieces 4 and 7 - SILTSTONE
Piece 5 - SILTSTONE with faint lamination
Piece 6 - FINE-GRAINED SANDSTONE to SILTSTONE; diagenetic bard of dark minerals (pyrite?)
Piece 8 - FINE-GRAINED SANDSTONE and SILTSTONE
Piece 9 - cross- and parallel-laminated FINE-GRAINED SANDSTONE
Piece 10 - rubble
SULFIDE %: 0



169-856H-46R-1
Top of Core 46R - 345.5 mbsf

Pieces 1-12

ROCK TYPE: SILTSTONE to FINE-GRAINED SANDSTONE
COLOR: Gray (5Y 6/1)
COMMENTS: Thin bedded turbidites with only parallel laminations. Color is progressively graying from Core 169-856H-45R.
Piece 1 - SILTSTONE
Piece 2 - SILTSTONE with 5-mm thick convoluted fine-grained ribbon
Piece 3 - interbedded SILTSTONE and FINE-GRAINED SANDSTONE laminae and/or thin beds
Piece 4 - same as Piece 3, with some soft deformation of sand layers
Piece 5 - rubble of fine-grained arenites and siltites
Pieces 6 and 7 - parallel-laminated silty SANDSTONE with bioturbated intervals
Piece 8 - rubble of FINE-GRAINED SANDSTONE
Piece 9 - parallel-laminated silty FINE-GRAINED SANDSTONE
Piece 10 - parallel-laminated silty FINE-GRAINED SANDSTONE with scattered sulfides (pyrite)
Piece 11 - rubble of FINE-GRAINED SANDSTONE and SILTSTONE
Piece 12 - faint parallel-laminated FINE-GRAINED SANDSTONE
SULFIDE %: Trace

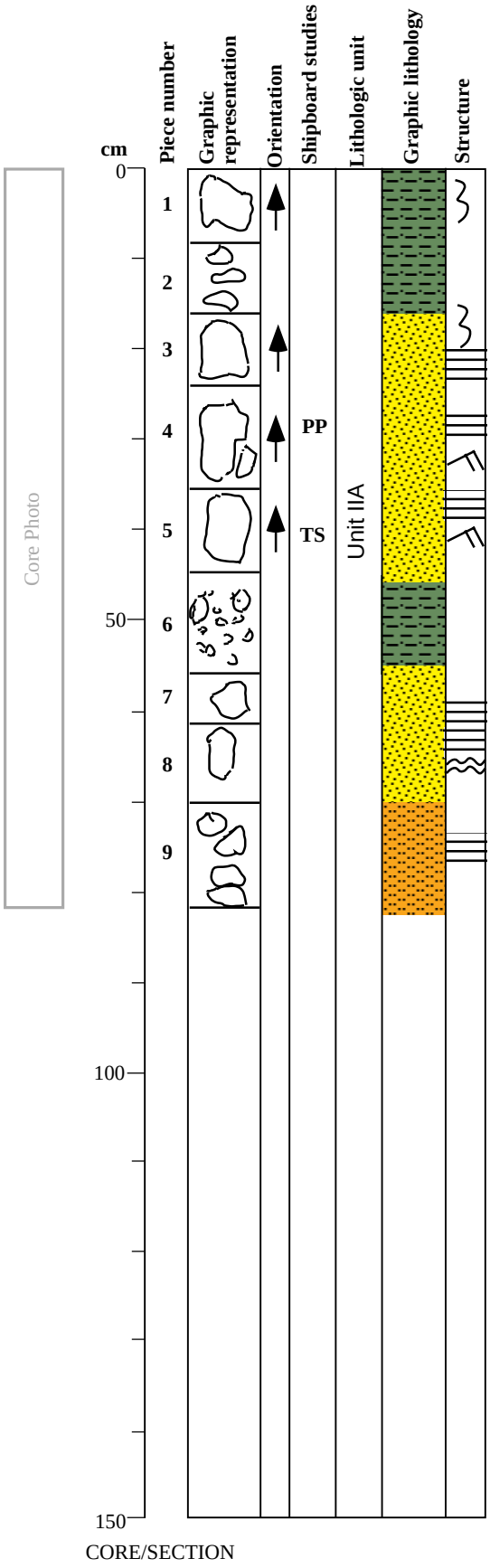


CORE/SECTION

169-856H-47R-1
Top of Section 47R-1 - 355.1 mbsf

Pieces 1-18

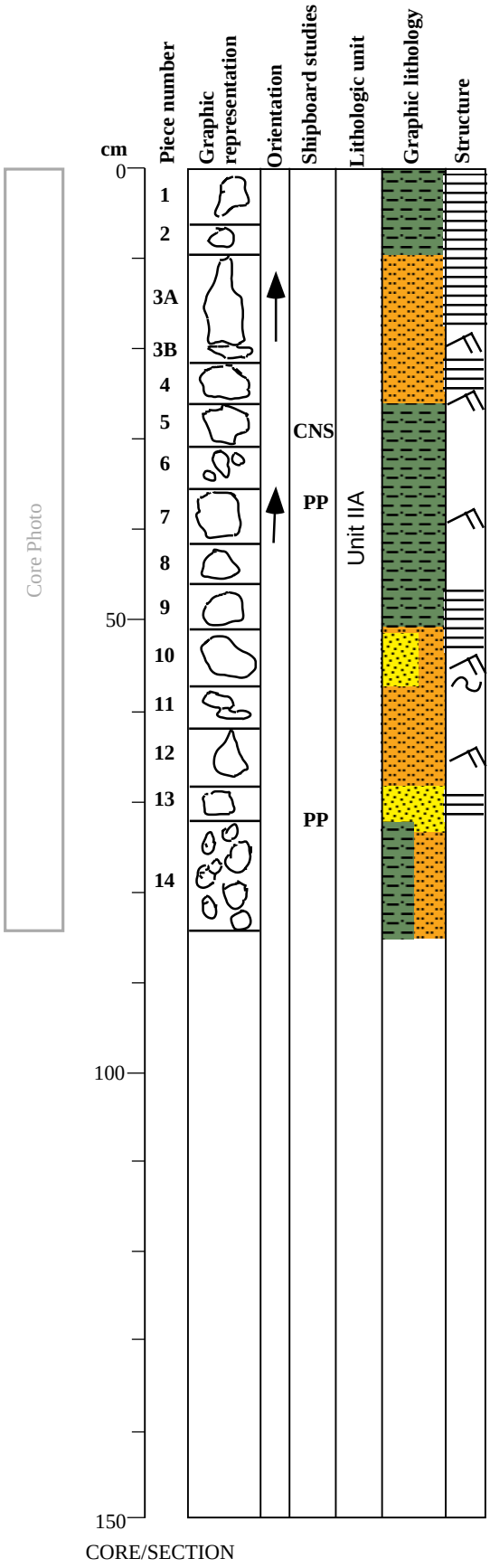
ROCK TYPE: SILTSTONE and SANDSTONE
COLOR: Greenish gray to gray (5GY 5/1 - 5Y 6/1)
COMMENTS: Sandy and silty thin bedded turbidites with intervals of possibly hemipelagic beds.
Pieces 1 to 11 - SILTSTONE with 1-mm anhydride veins
Piece 12 - FINE-GRAINED SANDSTONE; massive
Pieces 13 to 17 - FINE- to MEDIUM-GRAINED SANDSTONE
Piece 18 - MUDSTONE with discontinuous laminations
SULFIDE %: 0



169-856H-47R-2
Top of Section 47R-2 - 356.6 mbsf

Pieces 1-9

ROCK TYPE: SANDSTONE, MUDSTONE, and SILTSTONE
COLOR: Gray (5G 6/1 to 5G 5/1)
COMMENTS: Sandy and silty thin bedded turbidites with intervals of possible hemipelagic beds.
Piece 1 - bioturbated MUDSTONE
Pieces 2 and 6- MUDSTONE
Pieces 3, 4, 7, and 8 - FINE-GRAINED SANDSTONE
Piece 5 - MEDIUM-GRAINED SANDSTONE
Piece 9 - SILTSTONE
SULFIDE %: 0



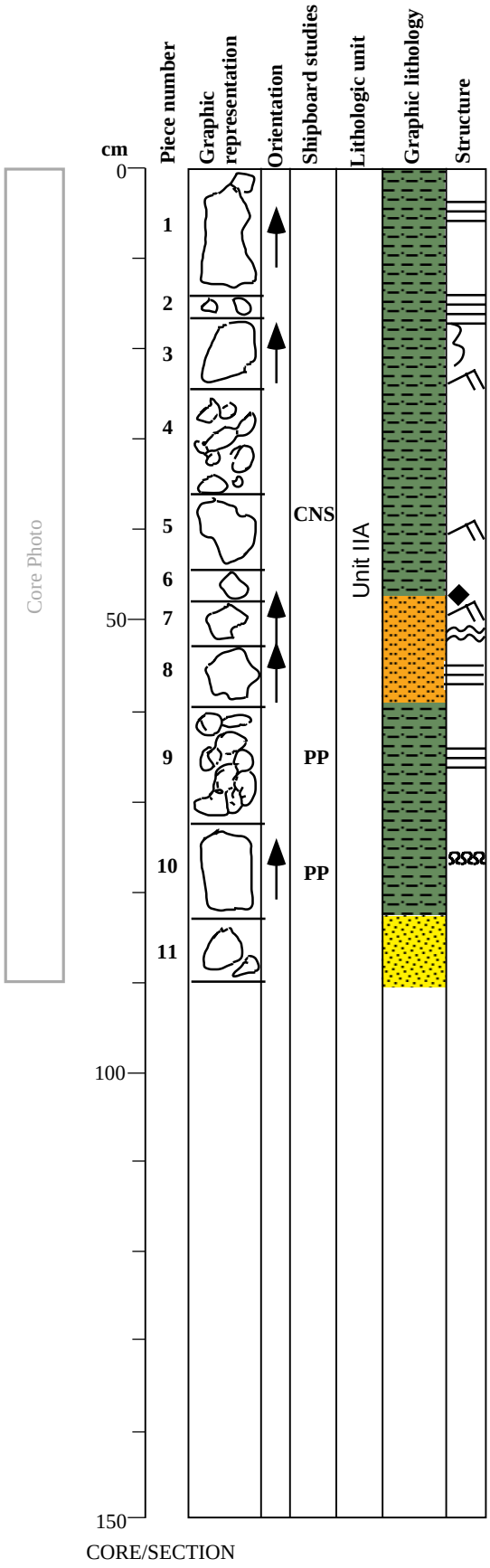
169-856H-48R-1
Top of Core 48R - 364.6 mbsf

Pieces 1-14

ROCK TYPE: MUDSTONE and SILTSTONE
COLOR: Gray (5G 5/1)
COMMENTS:

Pieces 1, 2, and 9 - MUDSTONE with thin silty parallel-laminae
Pieces 3 and 4 - SILTSTONE; parallel- to cross-laminated; thin laminae
Pieces 5, 6, and 8 - homogeneous MUDSTONE
Piece 7 - MUDSTONE with silty cross-laminated interval
Piece 10 - cross- and parallel-laminated fine-grained SANDSTONE to SILTSTONE; convoluted ripples
Piece 11 - homogeneous SILTSTONE
Piece 12 - cross-laminated SILTSTONE
Piece 13 - parallel-laminated FINE-GRAINED SANDSTONE
Piece 14 - rubble of MUDSTONE and SILTSTONE

SULFIDE %: 0



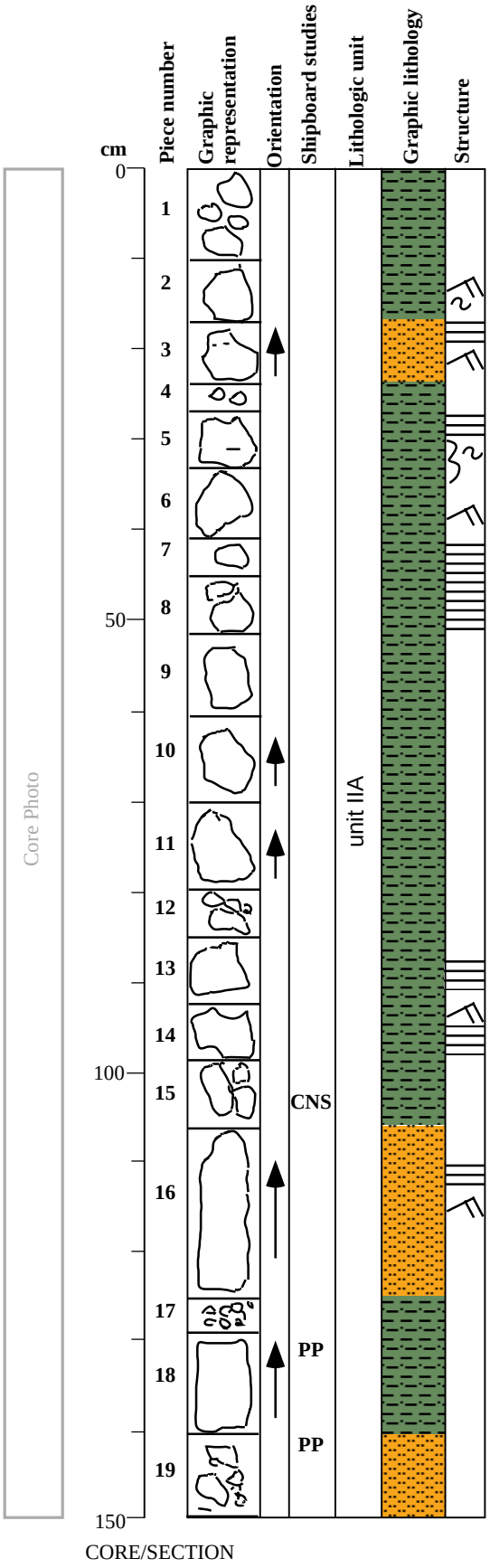
169-856H-49R-1
Top of Core 49R - 374.2 mbsf

Pieces 1-11

ROCK TYPE: MUDSTONE, SILTSTONE and SANDSTONE
COLOR: Gray (N5)
COMMENTS:

Pieces 1 and 2 - faintly laminated MUDSTONE
Piece 3 - cross- and parallel-laminated MUDSTONE
Piece 4 - MUDSTONE rubble
Piece 5 - faintly cross-laminated MUDSTONE
Piece 6 - MUDSTONE
Piece 7 - cross-laminated SILTSTONE
Piece 8 - parallel-laminated SILTSTONE
Piece 9 - MUDSTONE and SILTSTONE rubble
Piece 10 - MUDSTONE with an undulated laminae interval
Piece 11 - FINE-GRAINED SANDSTONE

SULFIDE %: 0

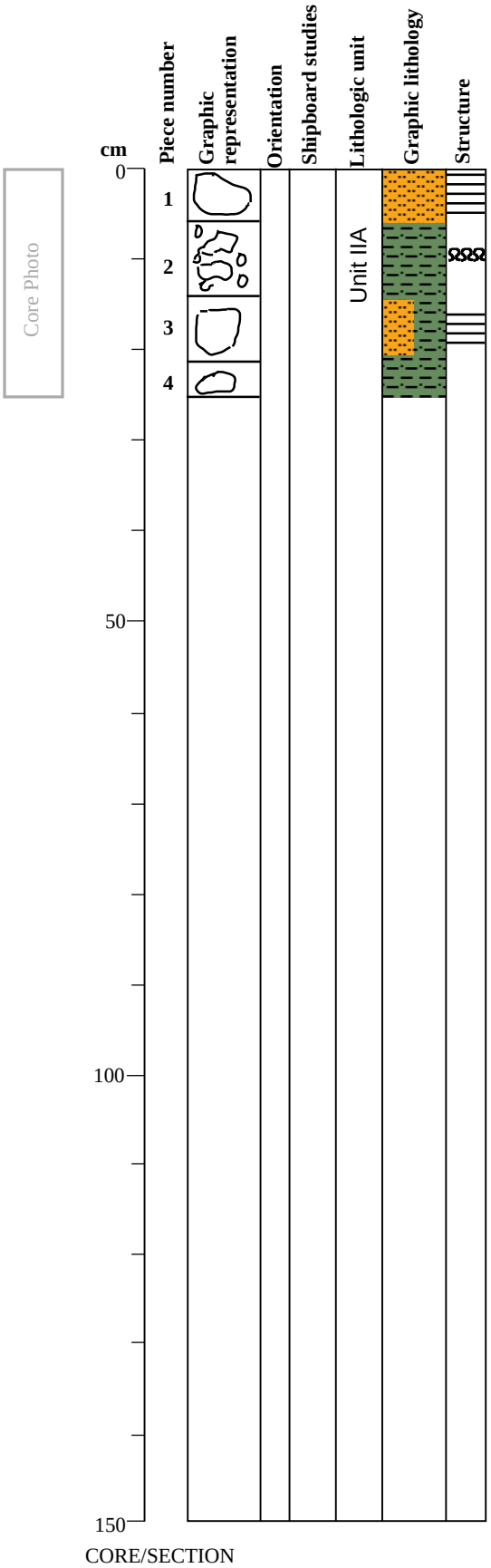


CORE/SECTION

169-856H-50R-1
Top of Section 50R-1 - 383.8 mbsf

Pieces 1-19

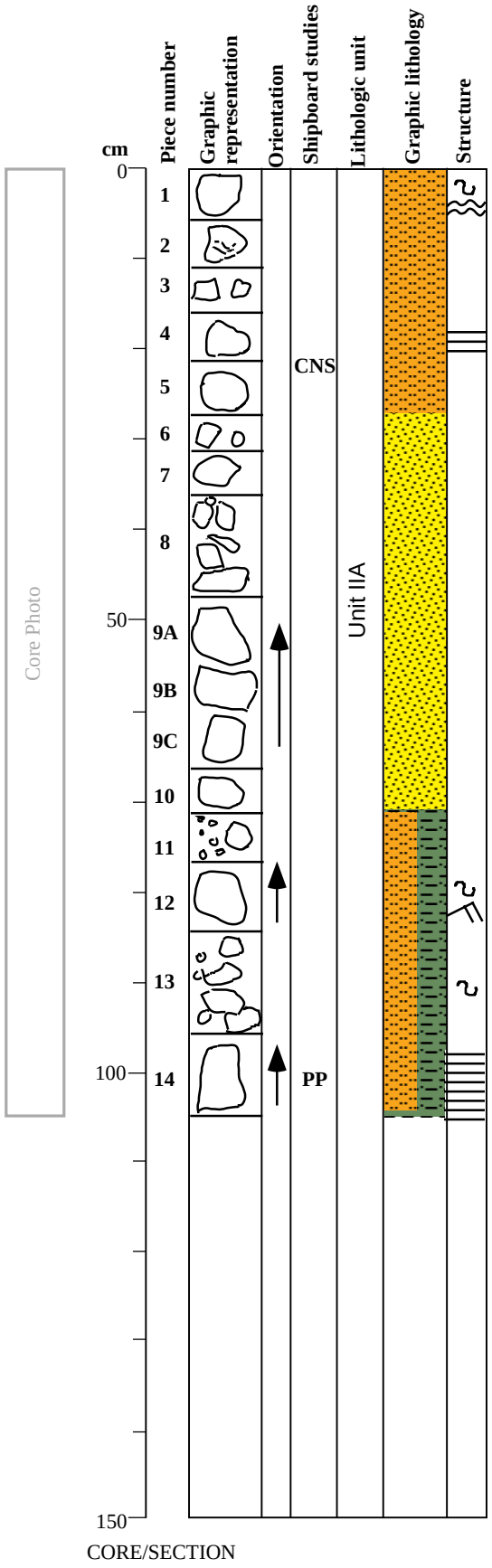
ROCK TYPE: MUDSTONE
COLOR: Gray (N6)
COMMENTS: Piece 1 is atypical of rest of core and likely fell from above. Color is whiter than the rest.
Piece 2 - MUDSTONE with deformed strings of FINE-GRAINED SANDSTONE
Piece 3 - parallel- and cross-laminated SILTSTONE
Pieces 4, 9 to 12, and 19 - homogeneous MUDSTONE
Piece 5 - MUDSTONE with silty interval
Piece 6 - MUDSTONE with faint cross-lamination, some pyrite on vertical fracture surfaces
Piece 7 - fine-grained parallel-laminated SANDSTONE-MUDSTONE; pyrite in vertical surfaces
Piece 8 - MUDSTONE
Pieces 13 to 15 - MUDSTONE
Piece 16 - thinly bedded, parallel-laminated, locally cross-laminated SILTSTONE; sharp contact at base with mudstone
Piece 17 - MUDSTONE rubble
Piece 18 - thinly bedded, parallel-laminated, locally cross-laminated SILTSTONE; sharp contact at base with MUDSTONE
SULFIDE %: Trace



169-856H-50R-2
Top of Section 50R-2 - 385.3 mbsf

Pieces 1-4

ROCK TYPE: MUDSTONE
COLOR: Gray (N6)
COMMENTS:
Piece 1 - fine-grained, parallel-laminated SILTSTONE
Piece 2 - MUDSTONE
Piece 3 - SILTSTONE with parallel MUDSTONE laminae in upper part; laminae are discontinuous in lower part
Piece 4 - MUDSTONE
SULFIDE %: 0



CORE/SECTION

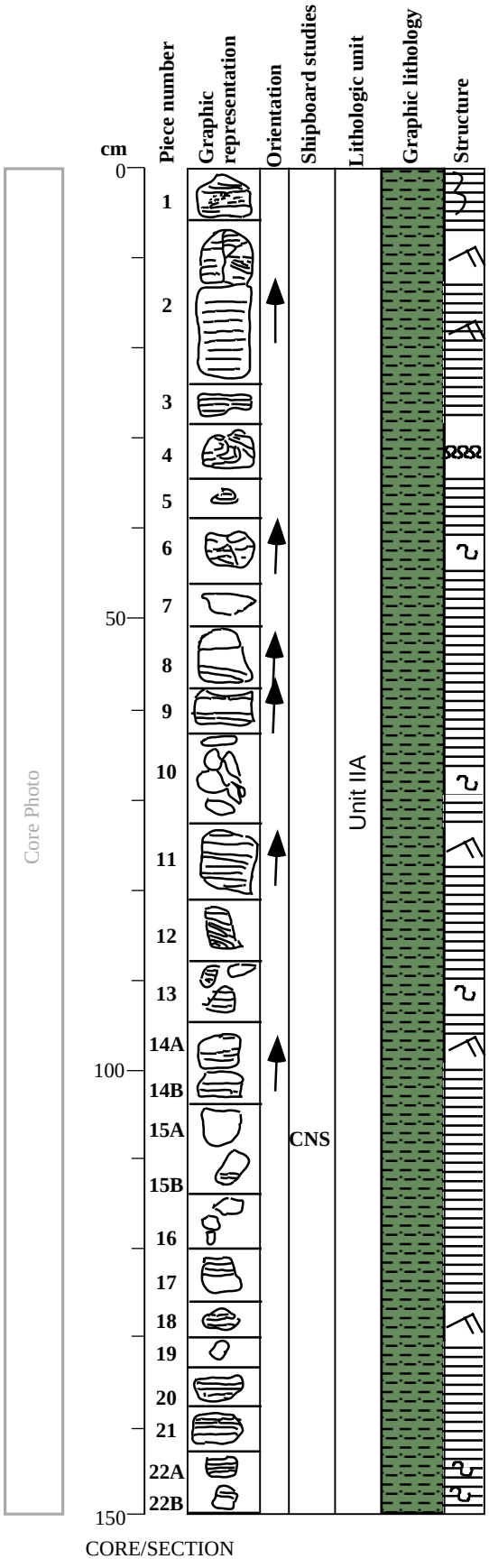
169-856H-51R-1
Top of Core 51R - 393.4 mbsf

Pieces 1-14

ROCK TYPE: MUDSTONE, SANDSTONE, and SILTSTONE
COLOR: Gray (5Y 6/1)
COMMENTS:

Piece 1 - siltstone
Pieces 2 to 4 - laminated SILTSTONE; anhydrite(?) in coarser layers and in fracture surfaces
Piece 5 - SILTSTONE
Pieces 6 to 8 - FINE-GRAINED SANDSTONE
Piece 9A to 9C - FINE-GRAINED SANDSTONE; burrows(?) filled with quartz in Piece 5A
Piece 10 - FINE-GRAINED SANDSTONE
Piece 11 - MUDSTONE
Piece 12 - cross-laminated and MUDSTONE with soft sediment deformation
Piece 13 - soft sediment deformation in silty MUDSTONE
Piece 14 - SILTSTONE with MUDSTONE laminae

SULFIDE %: None



169-856H-52R-1
Top of Section 52R-1 - 403.0 mbsf

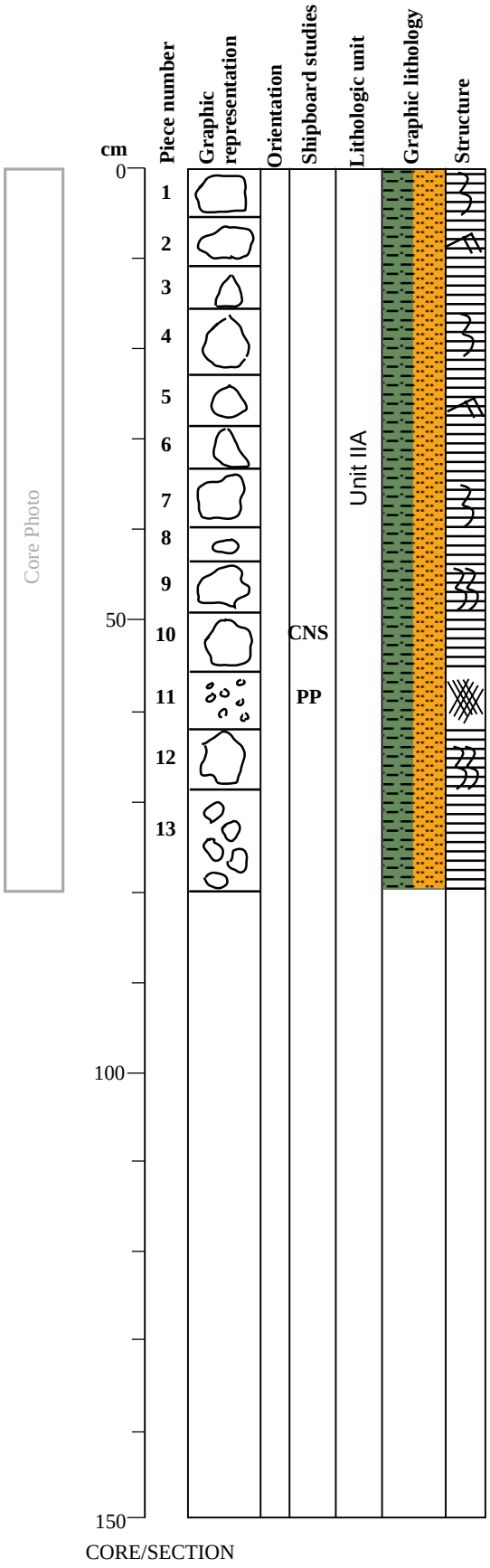
Pieces 1-22

ROCK TYPE: MUDSTONE
COLOR: Gray (N6)
COMMENTS: Generally laminated MUDSTONE, locally with cross-bedding and soft sediment deformation; convoluted bedding is present in Piece 4.
SULFIDE %: 0

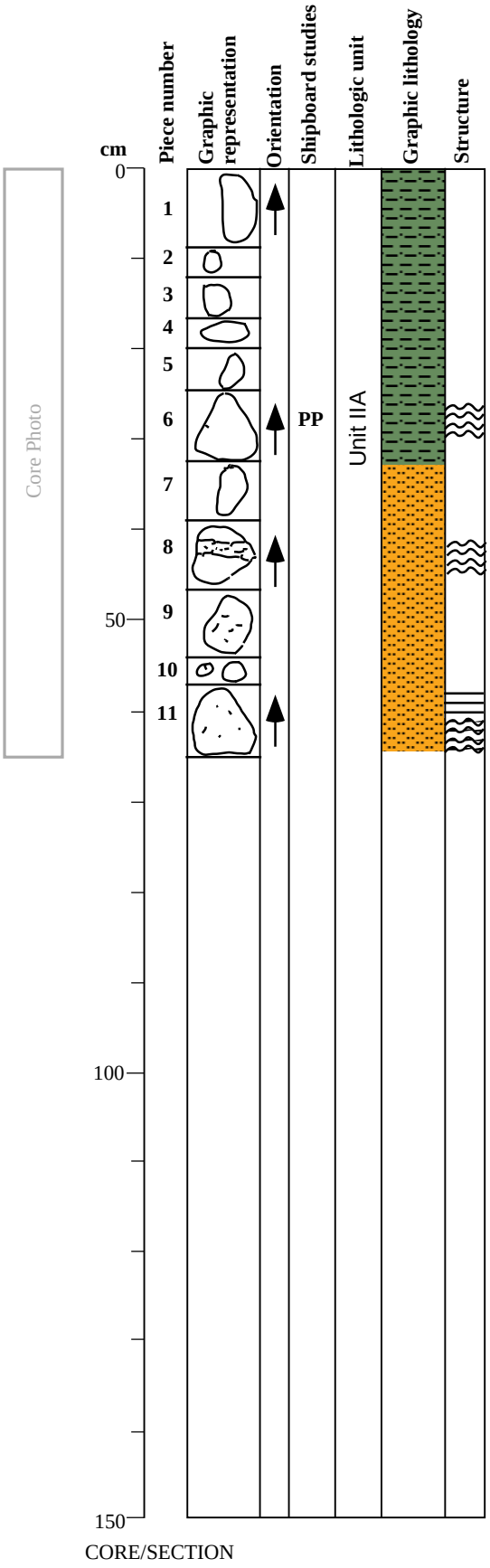
169-856H-52R-2
Top of Section 52R-2 - 404.5 mbsf

Pieces 1-13

ROCK TYPE: MUDSTONE to SILTSTONE
COLOR: Gray to light gray (N6 - N7)
COMMENTS: Generally laminated and bioturbated; some cross-bedding.
SULFIDE %: 0



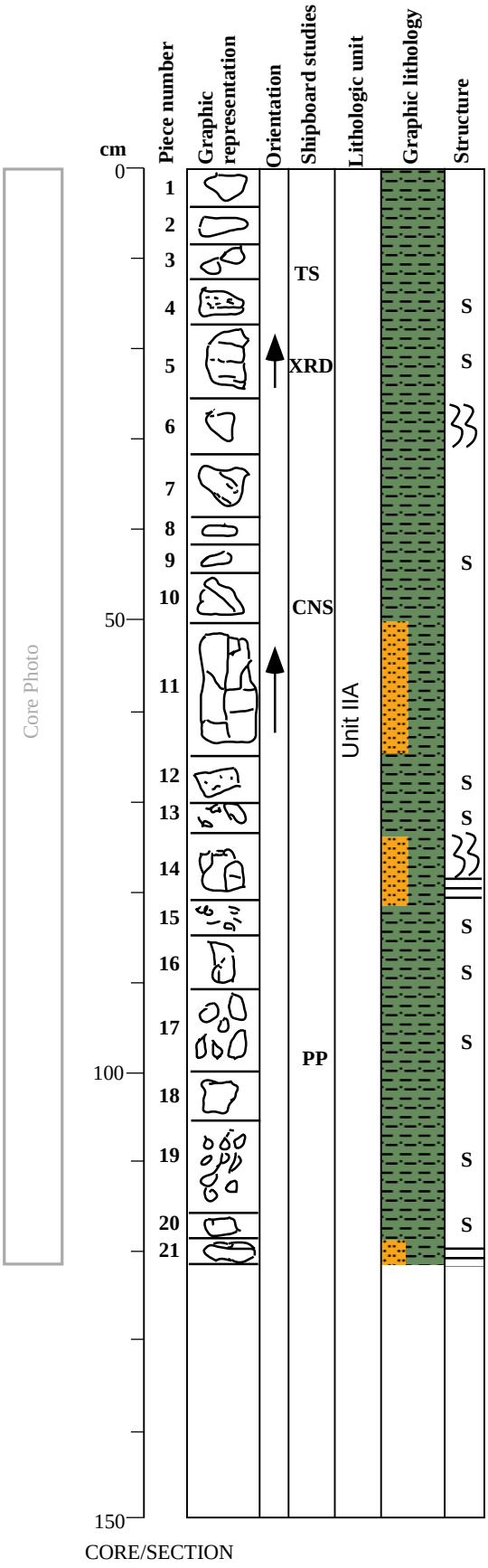
CORE/SECTION



169-856H-53R-1
Top of Core 53R - 412.6 mbsf

Pieces 1-11

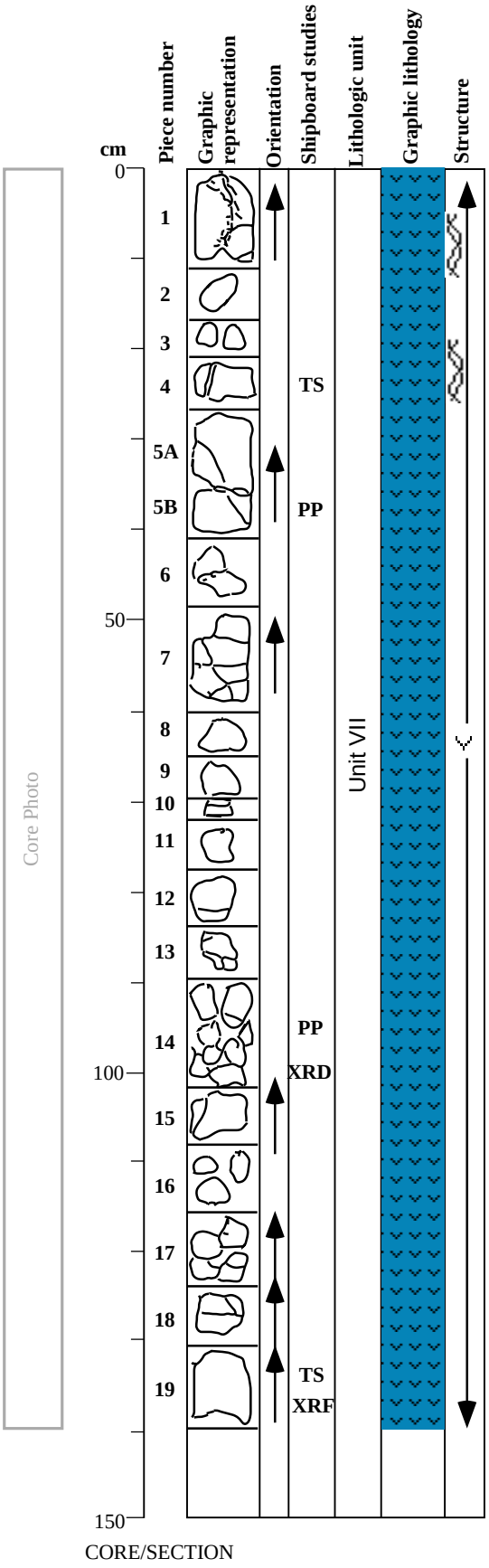
ROCK TYPE: MUDSTONE to SILTSTONE
COLOR: Gray to light gray (N6 - N7)
COMMENTS: Pyrite speckles in bottom 3 pieces.
Pieces 1 to 5 - MUDSTONE; some silt laminations
Piece 6 - MUDSTONE with wavy parallel laminations
Piece 7 - SILTSTONE
Piece 8 - SILTSTONE with wavy laminations; a thin bed of SILTSTONE coarser SILTSTONE in middle.
Piece 9 - unlaminated SILTSTONE; sparsely speckled with pyrite (<0.5 mm diameter)
Piece 11- parallel- to wave-laminated SILTSTONE; speckled with small (<0.5 mm diameter) pyrite
SULFIDE %: <2%, negligible



169-856H-54R-1
Top of Core 54R - 422.2 mbsf

Pieces 1-21

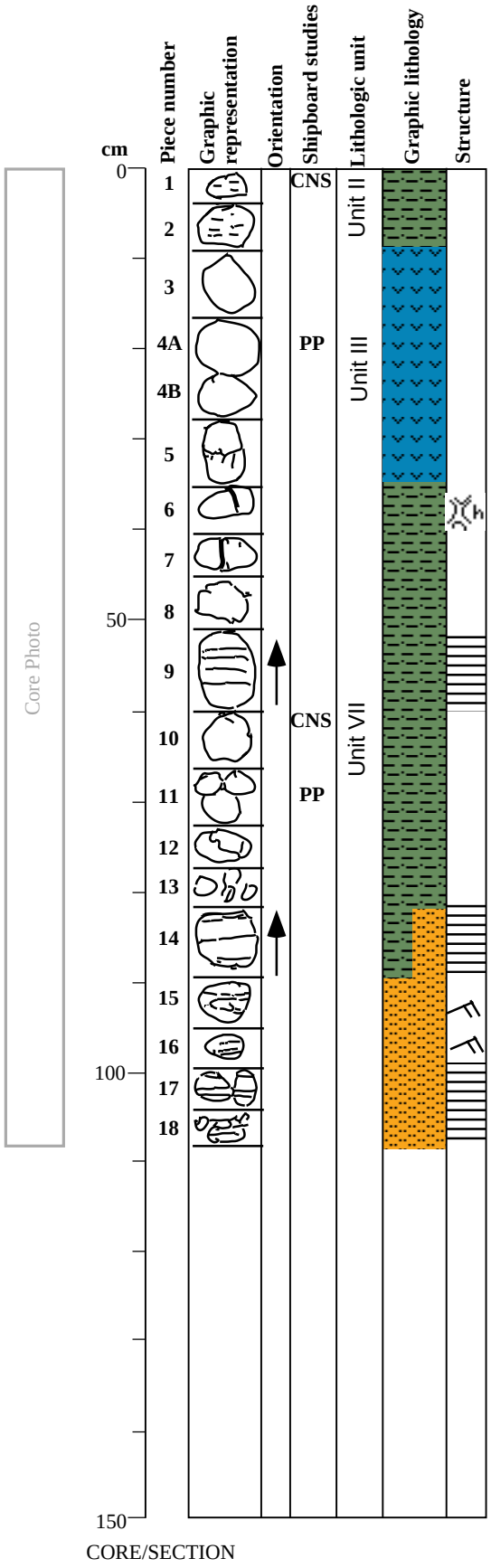
ROCK TYPE: MUDSTONE to SILTSTONE
COLOR: Light gray (N7) to bluish gray (5B 5/1)
COMMENTS: Locally disseminated sulfide and sulfide/epidote(?) buds; locally laminated and bioturbated. Yellow green minerals and patches were logged as epidote but T/S and XRD show there to be clay/chlorite.
Pieces 1 to 3, 6, 8, 10, 15, 16, 18, and 20 - light gray MUDSTONE; locally mottled texture
Pieces 4 and 7 - slight gray MUDSTONE, locally mottled texture with minor (<2%) disseminated sulfide
Pieces 4, 5, and 9 - banded epidote(?)+pyrrhotite (10%) in bluish gray MUDSTONE
Pieces 13, 15, 17, and 19 - pyrrhotite-bearing (~2%) light gray MUDSTONE
Pieces 11, 14, and 21 - bluish gray, faintly laminated SILTSTONE to MUDSTONE (mostly MUDSTONE); locally bioturbated
SULFIDE %: <2, negligible



169-856H-55R-1
Top of Core 55R - 434.3 mbsf

Pieces 1-19

ROCK TYPE: DIABASE
COLOR: Greenish gray (5BG 6/1)
MAJOR MINERALS:
Plagioclase and pyroxene (0.5 to 2.0 mm grains); intersertel texture; pyroxene is fresh; plagioclase may be altered to clay; soft.
TEXTURE: Fine-grained, intersertal texture (<1 to 2 mm grains)
VEINS: 1 to 4 mm linear chlorite veins with quartz, epidote (clinozoisite), pyrrhotite, and chalcopyrite; possible wairakite.
ADDITIONAL COMMENTS: Piece 1 has a quenched rind; possibly related to the sill margin. Grain size increases downward throughout this core.



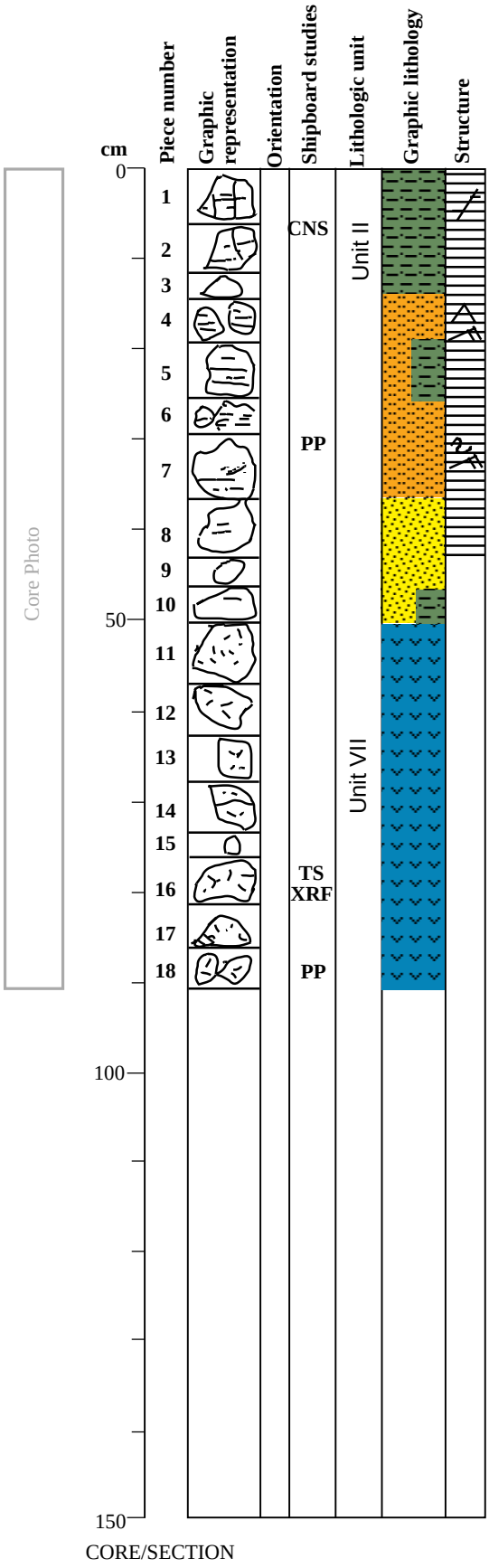
169-856H-56R-1
Top of Core 56R - 434.3 mbsf

Pieces 1-2, and 6-18

ROCK TYPE: MUDSTONE, and SILTSTONE
COLOR: Greenish gray (5G 6/1, 5GY 6/1), and gray (N7)
COMMENTS:
Pieces 1 and 2 - Gray MUDSTONE; ilmenite elongated along bedding plane
Piece 6 - MUDSTONE; fracture with quartz crystalline fill
Piece 7 - MUDSTONE; fracture with quartz and pyrrhotite; vuggy
Piece 8 - silicified MUDSTONE
Piece 9 - MUDSTONE; pyrrhotite; minor fractures
Pieces 10 and 11 - fractureless MUDSTONE
Pieces 12 - MUDSTONE; network of minor fractures
Piece 14 - planer laminated MUDSTONE/SILTSTONE
Piece 15 - wavy cross-laminated SILTSTONE
Pieces 16 to 18 - cross-laminated SILTSTONE
SULFIDE %: <2, negligible

Pieces 3-5

ROCK TYPE: DIABASE
COLOR: Bluish gray (5B 6/1)
COMMENTS: DIABASE sill (9 to 35 cm); 27 to 35 cm chill zone with quartz(?), pyrrhotite, chlorite vein; dispersed magnetite; pervasively altered.



169-856H-57R-1
Top of Core 57R - 441.3 mbsf

Pieces 1-10

ROCK TYPE: MUDSTONE, and SILTSTONE
COLOR: Greenish gray (5Y 6/1)
COMMENTS:

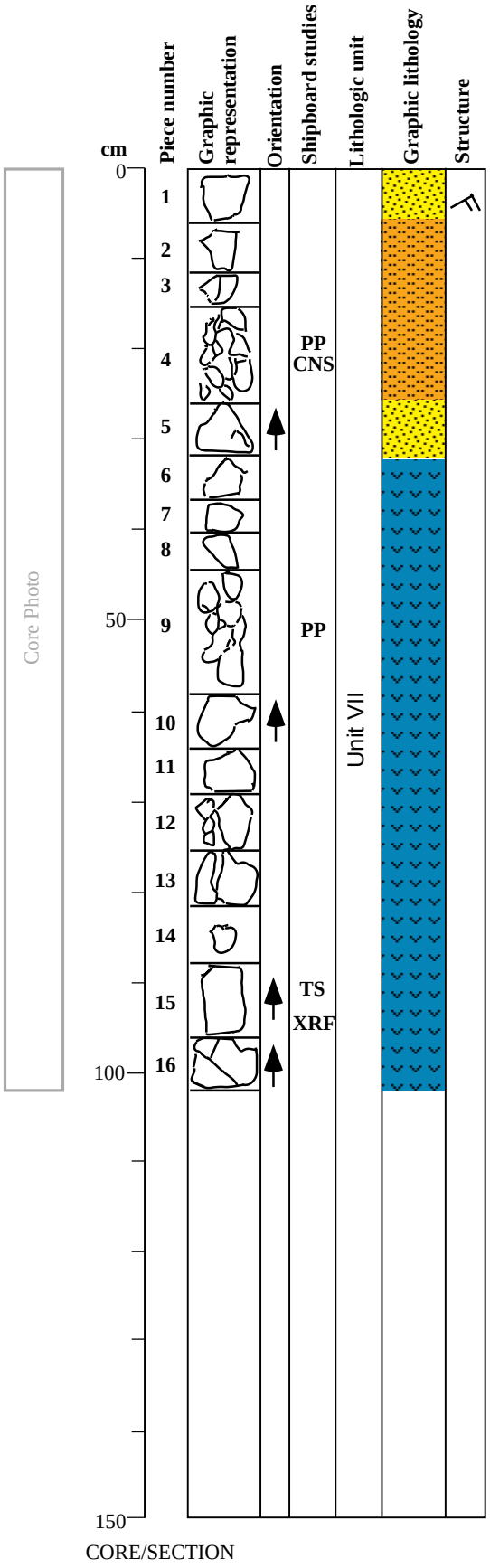
Piece 1 - thin parallel-laminated MUDSTONE with <1 mm wide «1 mm anhydrite(?) fracture fills
Piece 2 - same as Piece 1 with 2 mm separation along microfault
Piece 3 - parallel-laminated MUDSTONE
Pieces 4 and 6 - parallel-laminated SILTSTONE
Piece 5 - thinly laminated SILTSTONE and MUDSTONE; graded interval with Bouma sequence.
Piece 7 - SILTSTONE with deformed cross-laminations
Piece 8 - FINE-GRAINED SANDSTONE with parallel-laminations
Piece 9 - FINE-GRAINED SANDSTONE
Piece 10 - SANDSTONE grading to MUDSTONE

SULFIDE %: <2, negligible

Pieces 11-18

ROCK TYPE: PHYRIC BASALT
COLOR: Green gray
COMMENTS:

Pieces 11 to 18 - Pervasively altered moderately plagioclase phyric BASALT
Phenocrysts completely altered to clay(?). Clinopyroxene altered to chlorite(?)
Piece 11 finer grained than others (chilled margin?)
Piece 14 has 1 mm chlorite veinlet
Piece 17 has 1 mm pyrrhotite+quartz(+?)+chlorite veinlet with 5 mm bleached margin.



CORE/SECTION

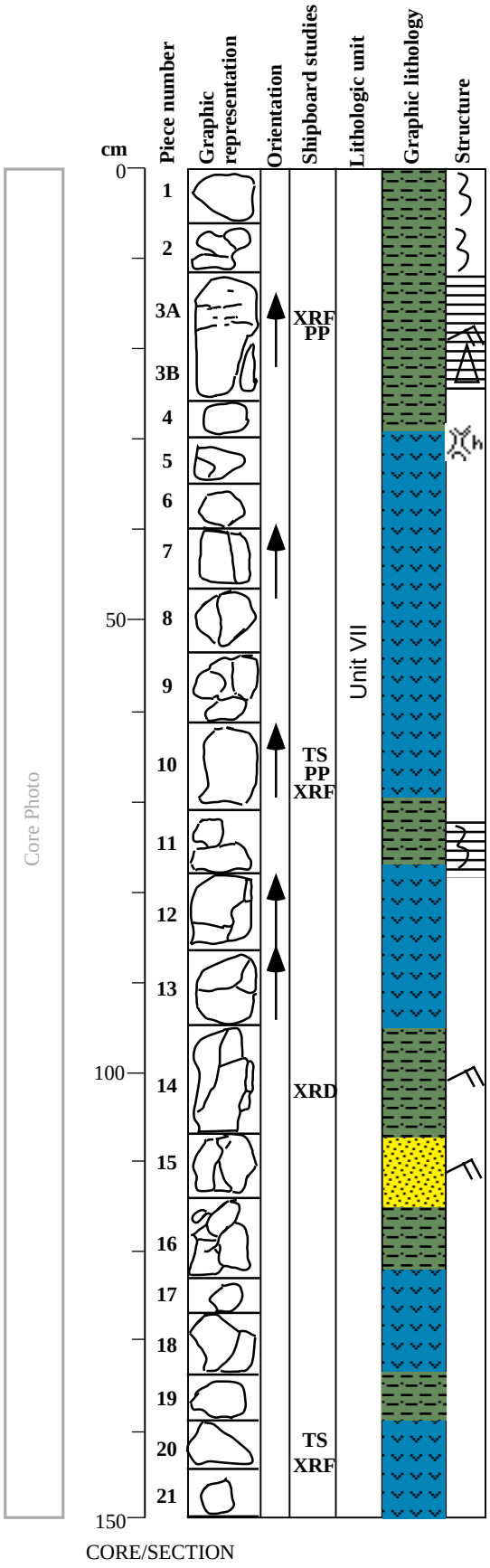
169-856H-58R-1
Top of Core 21R - 451.0 mbsf

Pieces 1-5

ROCK TYPE: SANDSTONE and SILTSTONE
COLOR: (N6) Gray
COMMENTS:
Piece 1 - laminated FINE-GRAINED SANDSTONE
Pieces 2 to 4 - SILTSTONE with pyrrhotite along fractures; bottom of Piece 4 is rubble with biotite joints
Piece 5 - FINE-GRAINED SANDSTONE with pyrrhotite along fractures
SULFIDE %: <2, negligible

Pieces 6-16

ROCK TYPE: DIABASE
COLOR: Gray
COMMENTS:
Grain size varies from fine-grained diabase to medium-grained diabase/microgabbro. Pervasively altered.
Piece 16 contains 1-2 mm vein, white with dark green selvage.



169-856H-59R-1
Top of Core 59R - 460.7 mbsf

Pieces 1-4, 11, 14-16, and 19

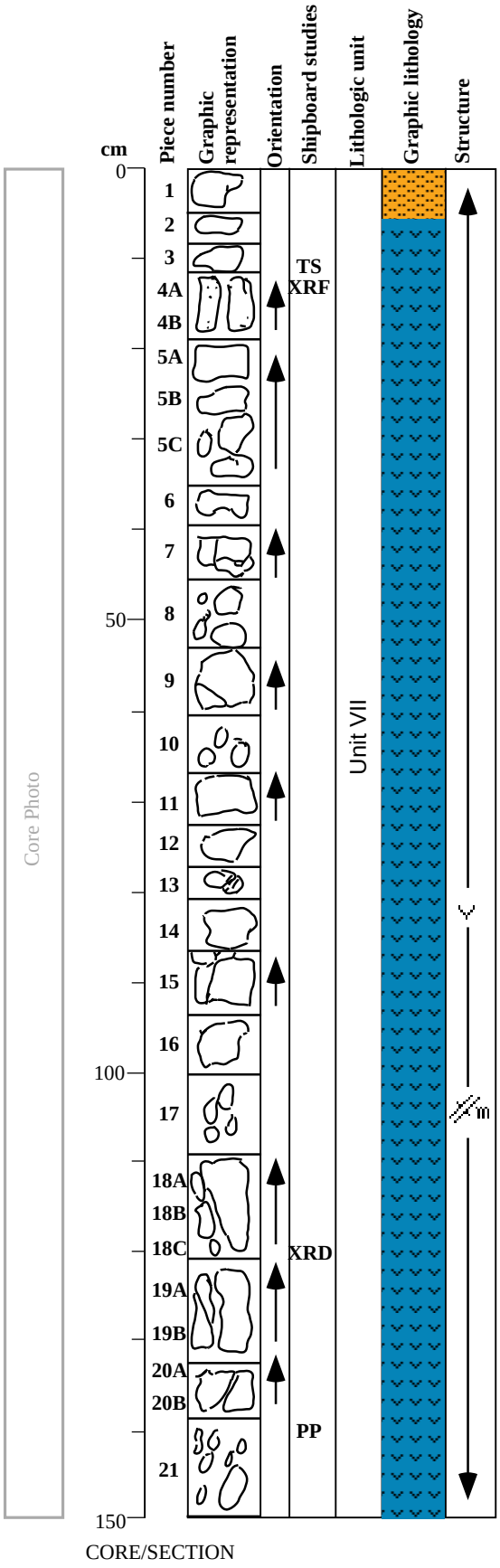
ROCK TYPE: MUDSTONE and SANDSTONE
COLOR: Greenish gray (5GB 5/1)
COMMENTS:

Pieces 1 and 2 - slightly bioturbated MUDSTONE
Piece 3 - parallel- and cross-laminated MUDSTONE; one graded bed.
Piece 4 - parallel-laminated MUDSTONE
Piece 11 - MUDSTONE
Piece 14 - greenish gray cross-laminated MUDSTONE with 1 mm wide fracture fills of dusky quartz, pinkish titanite(?), and pyrrhotite
Piece 15 - cross-laminated, FINE-GRAINED SANDSTONE with similar vein to Piece 14
Piece 16 - fine-grained homogeneous MUDSTONE
Piece 19 - MUDSTONE (may have come from uphole)

Pieces 5-10, 12-13, 17-18, and 20-21

ROCK TYPE: PHYRIC BASALT
COLOR: Gray to greenish gray
COMMENTS:

Pieces 5 to 10, 12 to 13 and 17 to 18 - sparsely to moderately phyric (plagioclase and clinopyroxene) pervasively altered basalt. Phenocrysts 1-2 mm long. Plagioclase phenocrysts are altered to clays; clinopyroxene is altered to chlorite; groundmass is strongly bleached. Color is generally greenish gray. Pieces are crosscut by 0.1 to 1.5 mm quartz+pyrrhotite; quartz is dusky, in rare 1 mm-diameter open spaces.
Pieces 20 and 21 - moderately altered moderately plagioclase phyric basalt. Minor (0.2 mm) chlorite veins. Plagioclase phenocrysts are altered to clay; a trace of 1-2 mm pyrrhotite blebs is present.



CORE/SECTION

169-856H-60R-1
Top of Section 60R-1 - 465.7 mbsf

Piece 1

ROCK TYPE: SILTSTONE
COLOR: Greenish gray
COMMENTS: Possible fall in from uphole?

Pieces 2-21

ROCK TYPE: DIABASE
COLOR: Greenish gray
COMMENTS:

Pieces 2 to 11 are spotted with dark green small (0.5-2 mm) chlorite(?); some are well rounded (seen in sills from Leg 139)

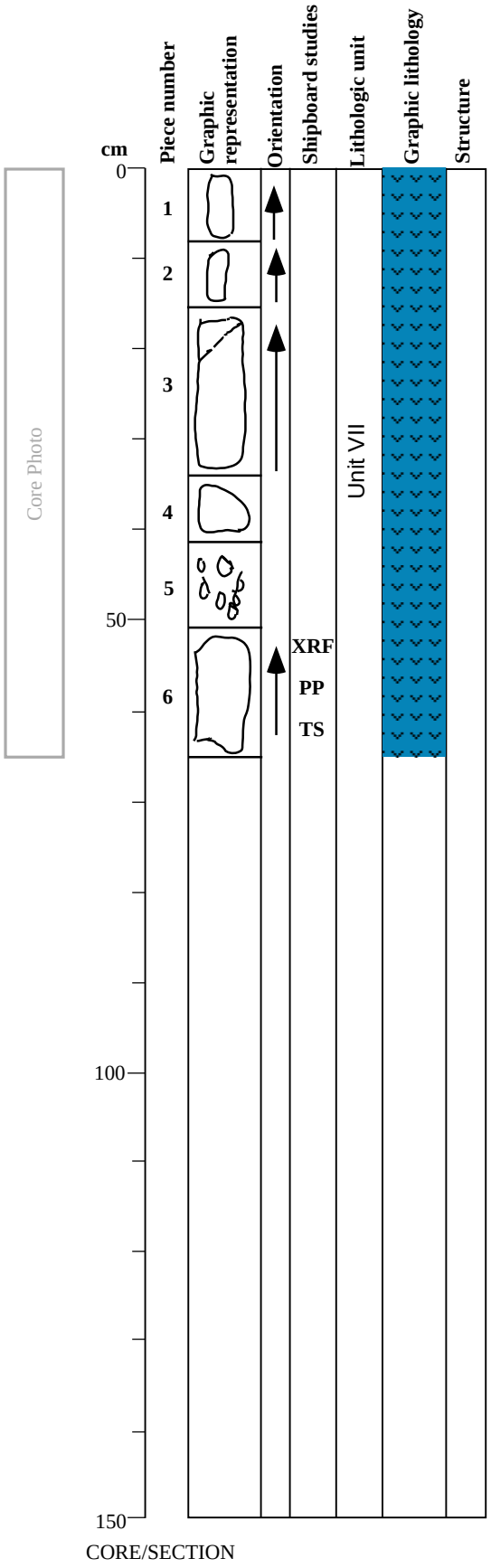
Piece 4b - has a thin chlorite filled fracture. Clinopyroxene crystals up to 3 mm long are present in places

Piece 9 - has thin (0.1 mm) ~45-degree chlorite vein; some disseminated pyrite/chalcopyrite in groundmass; subophitic plagioclase texture.

Pieces 12 to 16 are more mottled texture than the other pieces, i.e., pinky patches in darker purplish "groundmass"; are finer grained than Pieces 2 to 11.

Piece 19 - has subvertical vein 5 mm thick crosscutting; vein is filled with quartz+pyrite+calcite with a thin (0.1 mm) chloritic selvage (+ clinozoisite(?))

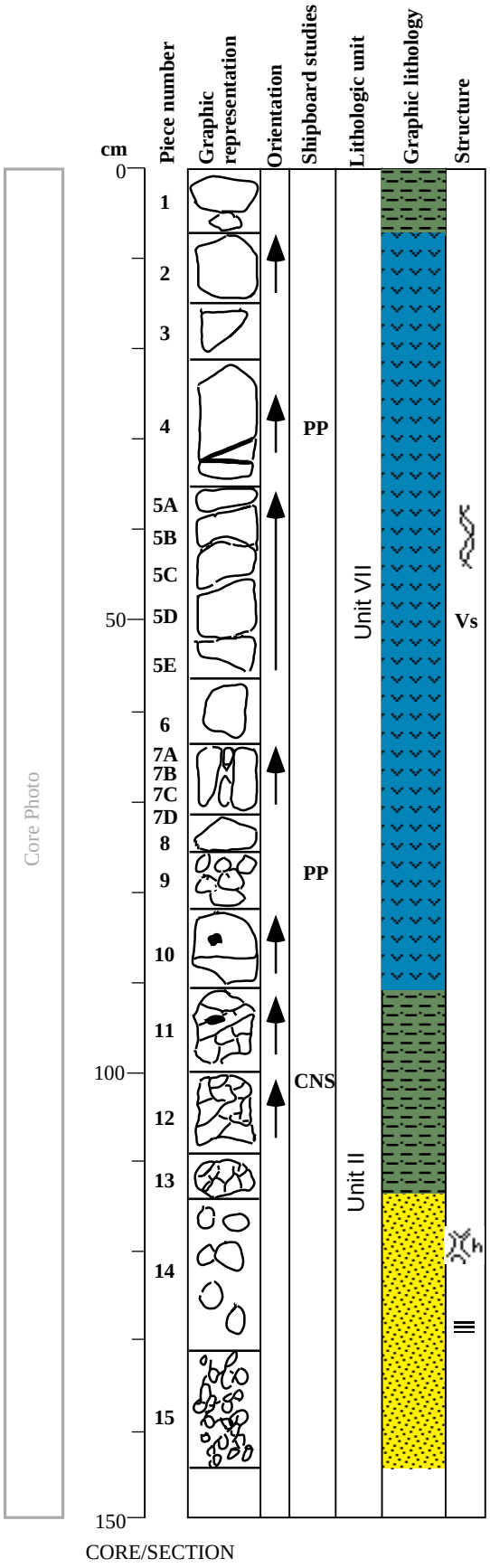
Pieces 20 and 21 - have disseminated sulfide (pyrite+chalcopyrite) in groundmass



169-856H-60R-2
Top of Section 60R-2 - 467.2 mbsf

Pieces 1-6

ROCK TYPE: DIABASE
COLOR: Purplish green
COMMENTS: Pervasively altered diabase with minor disseminated sulfides. Some plagioclase pseudomorphs apparent. Piece 3 - has 1 mm chlorite vein dipping about 20 degrees.



169-856H-61R-1
Top of Section 61R-1 - 468.2 mbsf

Pieces 1, and11-15

ROCK TYPE: MUDSTONE and SANDSTONE
COLOR: Gray (N6)
COMMENTS**:** Highly indurated and silicified, spidery fractures to SILTSTONE and very fine-grained bluish green SANDSTONE with laminations at base of section.
Piece 1 - MUDSTONE; probably fallen from upcore.
Pieces 11 to 13 - fractured MUDSTONE; pyrrhotite filled "spider" fractures
Pieces 14 and 15 - VERY FINE-GRAINED SANDSTONE; pyrrhotite in fractures.

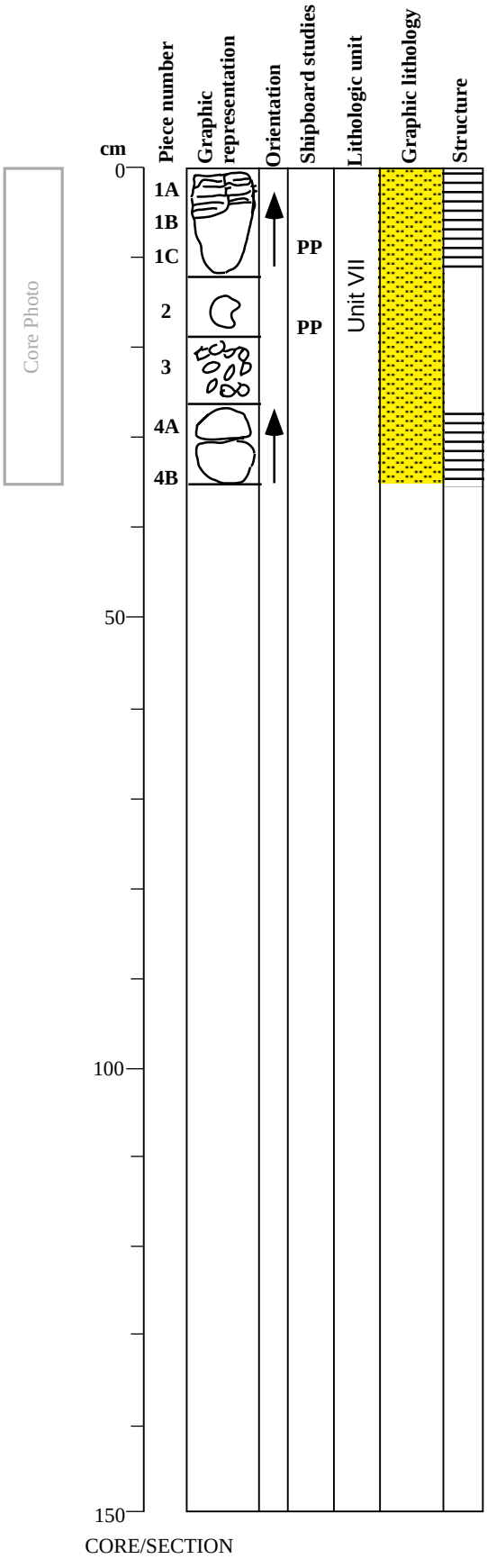
Pieces 2-10

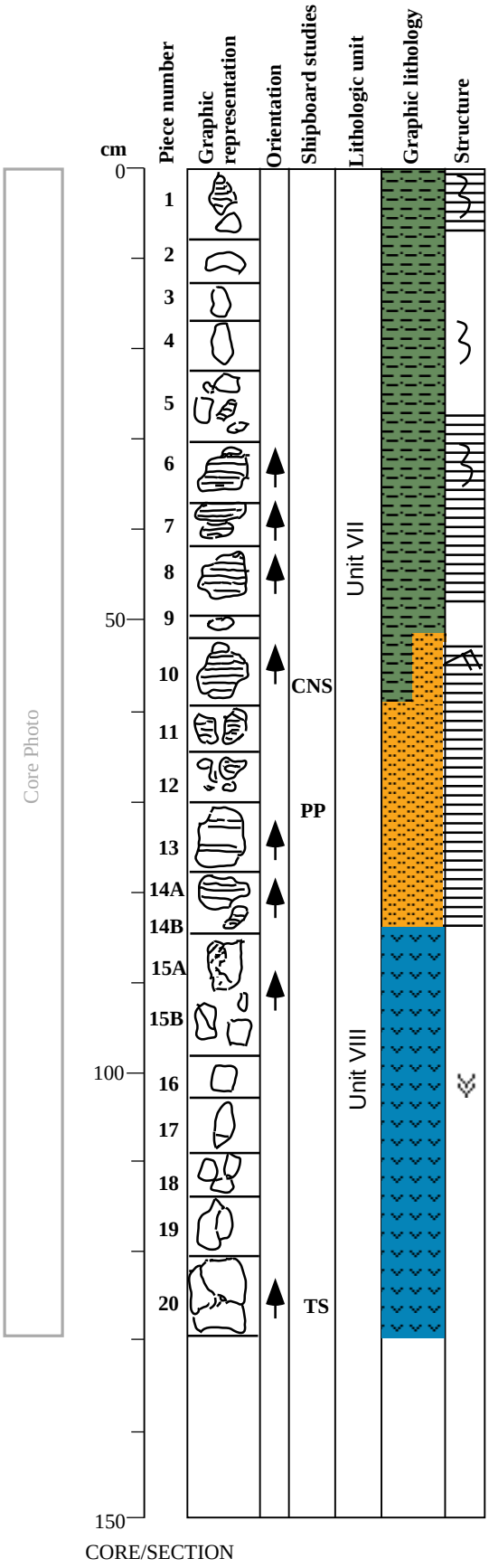
ROCK TYPE: DIABASE
COLOR: Greenish gray
COMMENTS: Phenocrysts of pyroxene are 15% of rock; matrix is 50% plagioclase and 50% chlorite/amphibole; pyroxene crystals are euhedral to subhedral up to 3 to 4 mm diameter; small chalcopyrite and pyrrhotite crystals occur in matrix and pyroxene phenocrysts. Pervasively altered.
Pieces 2 to 10 - plagioclase and pyroxene phyric DIABASE; plagioclase/chlorite/amphibole(?) matrix; pyroxene is euhedral to subhedral, 3 to 4 mm in diameter; veining of chlorite/quartz in Piece 4
Piece 10 - chilled zone, DIABASE with sparse (few percent) phenocrysts of feldspar.

169-856H-61R-2
Top of Section 61R-1 - 469.63 mbsf

Pieces 1-4

ROCK TYPE: SILTSTONE
COLOR: Greenish gray (5GY 6/1)
COMMENTS: SILTSTONE, laminated with muddy stringers.





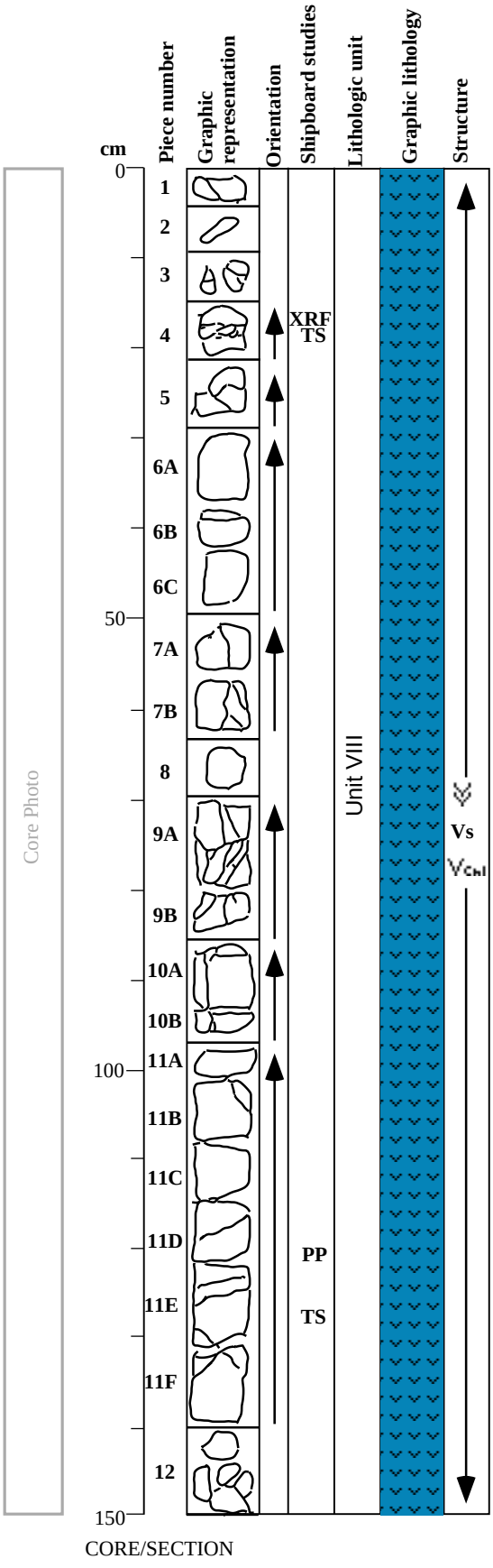
169-856H-62R-1
Top of Core 62R - 470.3 mbsf

Pieces 1-14

ROCK TYPE: MUDSTONE AND SILTSTONE
COLOR: Greenish gray (5GY 5/1)
COMMENTS: Generally laminated MUDSTONE to SILTSTONE; locally bioturbated and cross bedded.
Pieces 1 and 6 - laminated and bioturbated MUDSTONE
Pieces 2, 3 and 9 - MUDSTONE
Pieces 4, 5, 7, and 8 - laminated MUDSTONE
Piece 10 - laminated, cross bedded MUDSTONE to SILTSTONE
Pieces 11 to 14 - laminated SILTSTONE

Pieces 15-20

ROCK TYPE: DIABASE
COLOR: Greenish gray
COMMENTS: Medium-grained and pervasively altered. Pyroxene phenocrysts, otherwise altered to epidote with actinolite(?) needles. Some chlorite veins 1- to 3-mm-wide, with chlorite and minor quartz and pyrrhotite.



169-856H-63R-1
Top of Section 63R-1 - 479.9 mbsf

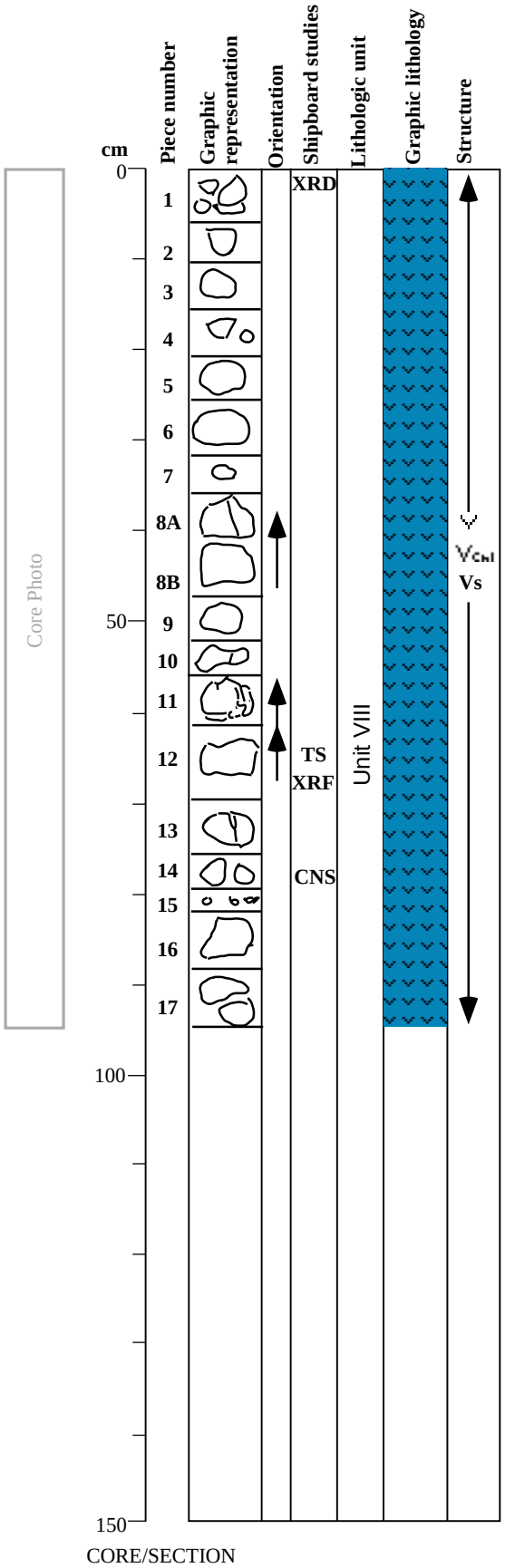
Pieces 1-12

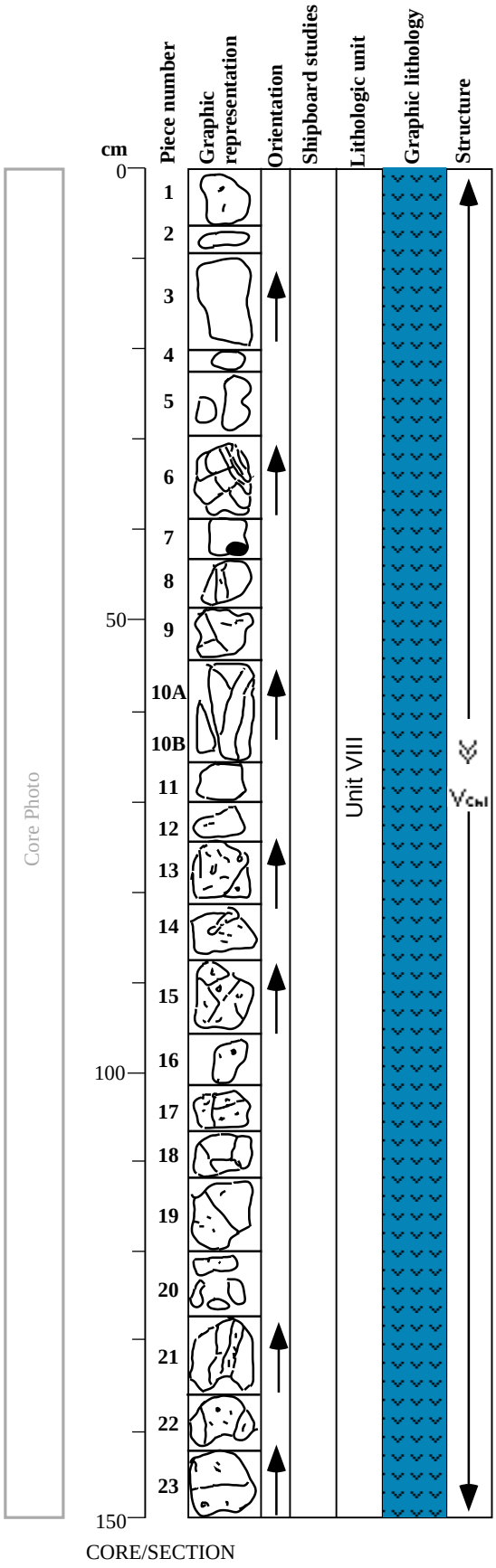
ROCK TYPE: DIABASE
COLOR: Greenish gray
COMMENTS: Moderately to intensely altered fine-grained DIABASE or BASALT. Thin (1 to 3 mm) chlorite+quartz+chalcopyrite vein cuts many pieces. Veins have dark halos around them. Piece 4 displays a texture of chloritized and altered glass pieces. Pieces 10 and 11 have a mottled alteration texture consisting of light green and dark green spots with a purplish halos (variolitic?) suggesting an altered fine-grained quench zone.

169-856H-63R-2
Top of Section 63R-2 - 481.4 mbsf

Pieces 1-17

ROCK TYPE: DIABASE/BASALT
COLOR: Greenish gray
COMMENTS: Fine-grained, moderately to strongly altered pyroxene phyric DIABASE/BASALT. Piece 1 has altered glass fragments; Piece 11 has chill margin on bottom side. Thin chlorite veins (1 to 3 mm) cut many pieces. Rare chalcopyrite veinlets and clots are present. Quench (chill) zones may be dike, sill, or pillow margins.



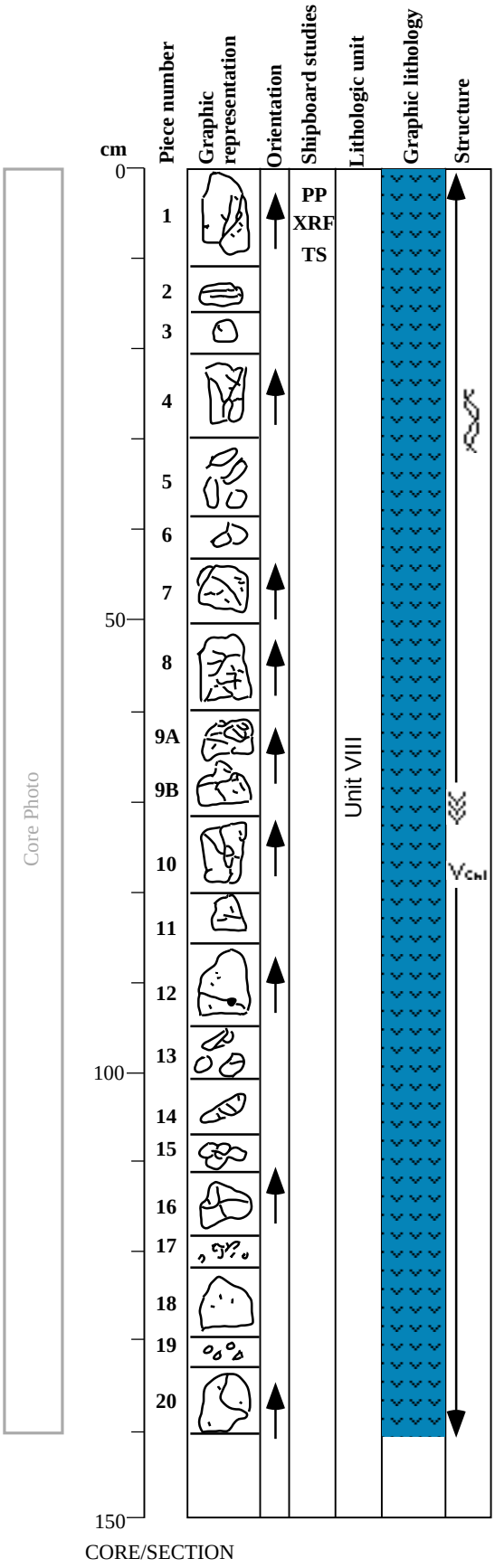


CORE/SECTION

169-856H-64R-1
Top of Section 64R-1 - 489.5 mbsf

Pieces 1-23

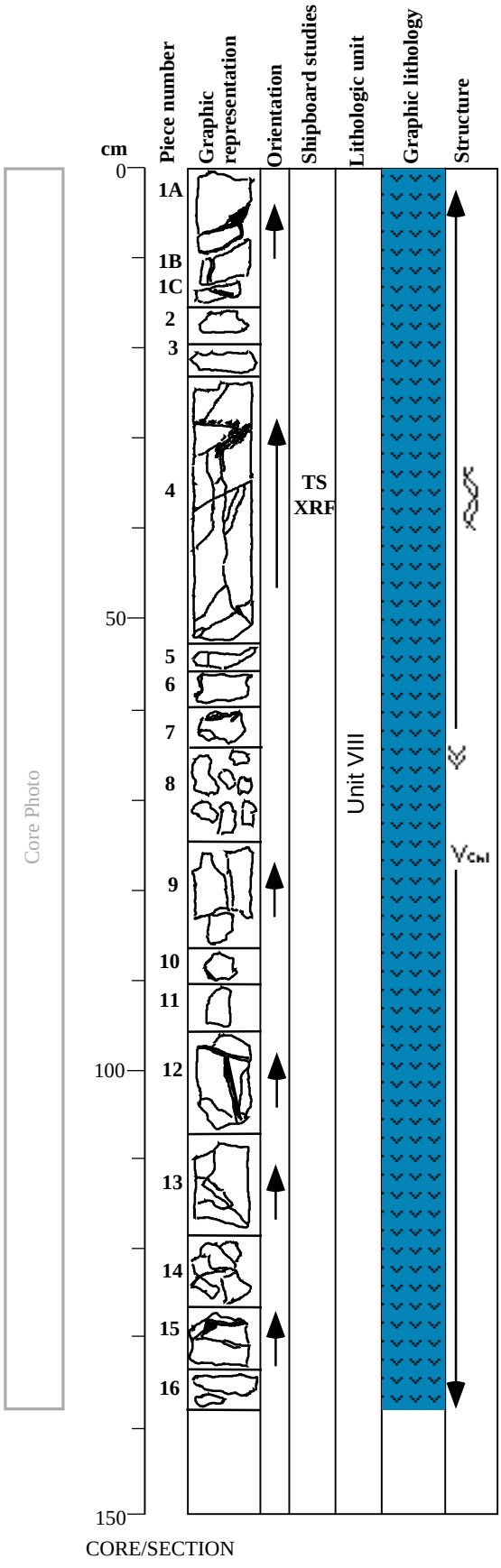
ROCK TYPE: BASALT
COLOR: Greenish gray
COMMENTS: Fine-grained greenish gray pillow BASALT with a variolitic texture. Variolites consist of chlorite. BASALT is cut by chlorite/quartz veins containing chalcopyrite, and commonly porphyritic with phenocrysts of white altered plagioclase and chloritized pyroxene. Matrix is highly chloritized. Blebs and disseminated chalcopyrite also occurs.



169-856H-64R-2
Top of Section 64R-2 - 491.0 mbsf

Pieces 1-20

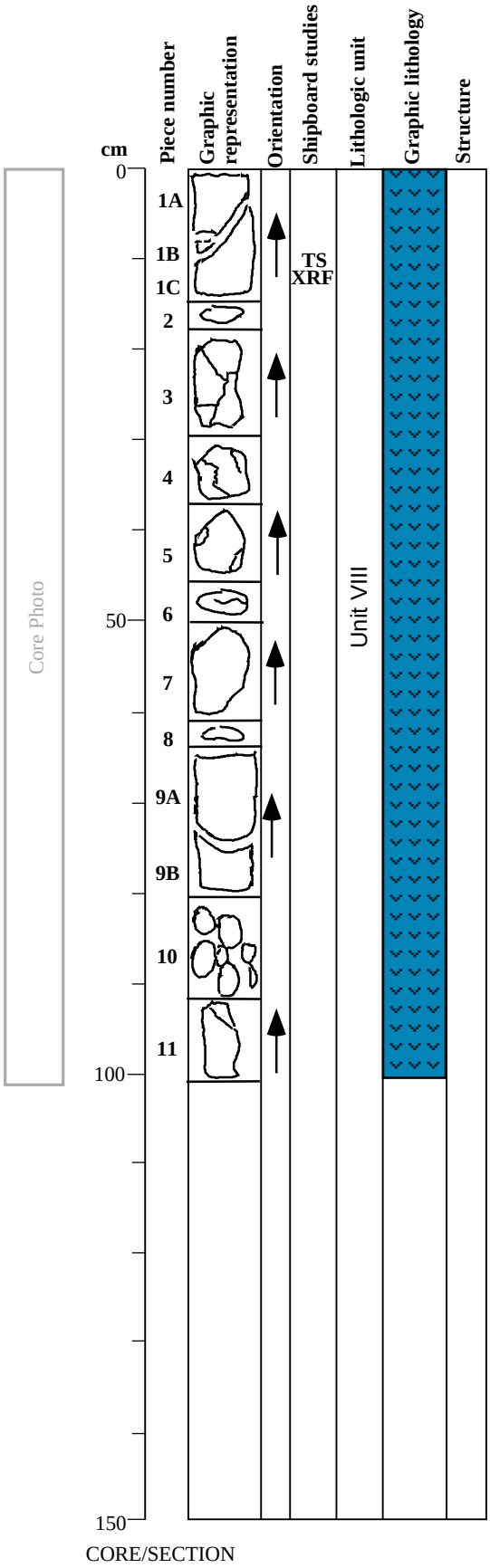
ROCK TYPE: PORPHYRITIC BASALT
COLOR: Pale to medium green
COMMENTS: Pale to medium green, fine-grained porphyritic BASALT locally with variolites giving the rock a spotted texture. Phenocrysts consist of both plagioclase and pyroxene, both of which are partly altered to clay and chlorite, respectively. BASALT is cut by chlorite/silica veins with chalcopyrite. Chalcopyrite also occurs in blebs and disseminations. Veins are surrounded by altered BASALT. Piece 9 displays a banded appearance, due presumably to chilling on the margins of a pillow.



169-856H-65R-1
Top of Section 65R-1 - 494.2 mbsf

Pieces 1-16

ROCK TYPE: BASALT
COLOR: Greenish gray
COMMENTS: Highly altered cryptocrystalline BASALT. Color of the groundmass is greenish gray and chloritic halos are dark greenish gray. Grain size is cryptocrystalline to fine-grained. Possible altered clinopyroxene on chlorite filled vesicles. Gray groundmass is intensely altered to dark green chloritic halo around numerous subhorizontal to vertical quartz+chlorite+chalcopyrite veins. Halos are more intensely developed (i.e., wider) around quartz-bearing veins. Halo width is nearly proportional to vein width. Groundmass is altered to irregular chloritic patches (≈3 mm) particularly in cryptocrystalline BASALT (Pieces 4 to 8).



169-856H-65R-2
Top of Section 65R-2 - 495.58 mbsf

Pieces 1-11

ROCK TYPE: BASALT
COLOR: Purplish green (cryptocrystalline); purplish green gray (fine-grained)
COMMENTS: Highly altered cryptocrystalline and fine-grained BASALT. Color of cryptocrystalline rock is purplish green and fine-grained BASALT is purplish green gray. BASALT is altered to a greener color around veins. Mottled texture is indicative of alteration (chloritization?). Many pieces are crosscut by numerous veins that dip subhorizontal to 45 degrees. Veins are infilled with chlorite+quartz+ pyrrhotite and have fine-grained chloritic selvage.

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