

Lithological Description of Drill Core C-133 Mayes County, Oklahoma

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Subject: Lithological Description of drill core C-133

August 1, 2025

Location: Mayes County, Oklahoma

Lat/long: 36.2943823, -95.4248914

Archival location: Oklahoma Geological Survey

This memo provides a detailed lithological description and photographic documentation of a portion of drill core C-133, spanning footages 336.0' and 441.0' (boxes 34-44). This core was described as part of the U.S. Department of Energy (DOE) Office of Fossil Energy and Carbon Management (FECM)'s Carbon Ore, Rare Earth and Critical Minerals (CORE-CM) Initiative for U.S. Basins (DE-FOA-0002364). The core was selected to evaluate Pennsylvanian strata in support of critical mineral potential, coal-related stratigraphy, and carbon ore systems in the Midcontinent. Core C-133 was measured and described by KGS Assistant Scientist Dr. Stephan Oborny and contributes to the geologic and geochemical characterization of the Cherokee-Forest City Basin.

This core was previously evaluated by Hemish (1989, p. 101-107) and designated in that work as C-RM-1.

Reference:

Hemish, L., A., 1989, Coal Geology of Rogers County and western Mayes County, Oklahoma. Oklahoma Geological Survey, Bulletin 144, 122 p. <http://ogs.ou.edu/docs/bulletins/B144.pdf>

C-133 Lithological Description and Details

Note: Core is non-effervescent unless stated otherwise in description. No PO⁴ was observed in the described interval.

336.0'-343.2' Black fissile shale. No effervescence.

343.2'-343.6' Weakly developed coal.

343.6'-346.0' Argillaceous siltstone. Fractured. More silty in lower foot. Some localized Fe cementation and sulfur along what appear to be rhizoliths.

346.0'-354.0' Shale. No effervescence. Top 3' gray with very fine silt. Lower 5' black. Basal 4" is moderately effervescent with invertebrate fossil debris (Brachiopoda). Basal foot has cm scale siderite.

354.0-360.65' Fine sand. Bar deposit (?). Tan in color. Bottom 2' is burrowed. Coal/plant material mixed into basal 6". Between 354.0' and 354.85' fine grained and dark in color due to reworking with overlying black shale.

360.65'-361.3' Coal

361.3'-378.0' Shallowing upward package.

~365.75'-378.0' Fissile black shale. 1" thick siderite at top.

2" siderite between 371.65 and 371.85. ~3" siderite between 376.75' and 377.0'.

361.3'-~365.75' very fine-to-fine sand. Upper 2' rhizolith and burrowed. Trough-cross bedding in upper half-to-2/3rds. Wavy-to-lenticular in bottom 6" with horizontal burrows.

378.0'-379.9' Tidal. Flaser-to-wavy in upper half. Lenticular in lower half. Silt drapes effervesce with HCl

379.9'-400.2' Black fissile shale. Siderite with septarian calcite veining between 381.55 and 382.0. Weakly developed cm scale siderite coloration is observed between 386.0 and 399.9.

399.9'-400.3' Highly effervescent tongue of very fine-to-fine fossil debris. Small 3-5mm fossil invertebrates visible.

400.3'-423.4' Shallowing upward package. Burrowed, very fine sand-to-silt with effervescent calcite cement(?) between 400.3' and 400.5'. Wavy bedded tidal, gray, between 400.5 and 401.7.

401.7'-402' Sideritic/Fe cemented lime. Fossiliferous and effervescent. Thin ~1" thick siderite at base (i.e., ~402').

402'-~405.6' Gray shale. Laminar tidal in top half

~405.6'-423.4' Black shale, fissile like. Highly effervescent laminar flows above 417'.

423.4'-~426.3' Fining upward very fine sand. Gray in color. Fe cementation between 425.65' and 426'. Top foot is more argillic.

~426.3'-432.9' Black fissile shale. Siderite with sulfur stain between 428.2'-428.45'. Siderite with septarian calcite veining between 431.5' and 431.85'.

432.9'-~434.6' Argillic silt-to-sand. Between ~434.6' and 439' more lenticular tidal with gray-green color in upper half; black color in lower half.

439.0'-441.0' Silt-to very fine sand. Sub-cm scale intraclasts are observed in a few spots. A thin <3mm thick coal drape is observed in the top inch. Highly effervescent below 439.6'. Can not discern if effervescence is due to calcite cement. The lower 6" is bluish in color; possibly fossiliferous with some moldic porosity in hand loop.

C-133 Drill Core Photos

See box details within accompanying image captions. Images are in order from box 34 through box 44.



Boxes: 34-36 (336'-366')



Boxes: 37-39 (366'-396')



Boxes: 40-42 (396'-426')



Boxes: 43-44 (426'-441')