UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Preliminary lithologic and mineralogical data from the Delhi-Taylor Oil Company, Cane Creek No. 1 corehole, Grand County, Utah.

By
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Open File Report 91-324

This report is preliminary and has not been edited or reviewed for conformity with U. S. Geological Survey standards and stratigraphic nomenclature.

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INTRODUCTION

The Delhi-Taylor Oil Company, Cane Creek No. 1 core hole (CC-1) was drilled near the crest of the Cane Creek anticline, Grand County, Utah in section 25, T26S, R20E, (fig. 1). The total depth of the hole was 2805 ft (855 m), and the cored interval included four of the upper five evaporite cycles of the Paradox Member of the Hermosa Formation of Middle Pennsylvanian (Desmoinesian) age. Coring started at 1840 ft (561 m) in limestone of the Honaker Trail Member of the Hermosa Formation.

Each complete evaporite cycle in the upper part of the Paradox Member of the Hermosa Formation in the Cane Creek core contains a halite bed underlain by a sequence of penesaline and siliciclastic rocks that we refer to collectively as interbeds. Twenty nine cycles have been identified and numbered from top to bottom of the Paradox Member by R. J. Hite (Hite, 1960, p. 86-89). The cycles are separated by erosional or dissolution disconformities that are characterized by sharp, "knife-edge" contacts at the base of the interbeds and the top of the halite beds (Hite, 1970; Hite and Buckner, 1981).

GENERAL CORE DESCRIPTION

The rocks of cycle 1 are represented in this core hole by anhydrite, silty dolomite, organic carbon-rich carbonate shale (black shale), and some limestone, above the halite bed of cycle 2. The halite bed of cycle 1, which is present in the northeast part of the basin (depocenter), is absent at this location.

The upper part of cycle 2 contains a bed of halite that is 171.3 ft (52.2 m) thick and is underlain by interbed units that are 110.2 ft (33.6 m) thick. The vertical distribution of the lithologies in the interbeds is remarkably symmetrical and complete. This interval contains anhydrite, silty dolomite, and black shale. The basal anhydrite contains a thin unit of black shale.

The upper part of cycle 3 contains a bed of halite that is 133.8 ft (40.8 m) thick which is underlain by interbeds that are 106 ft (32.3 m) thick. Like cycle 2, these interbeds are vertically symmetrical with respect to lithology. The base of this interval is anhydrite, overlain successively by silty dolomite, black shale, silty dolomite, and anhydrite.

The halite bed at the top of cycle 4 is 179.5 ft (54.7 m) thick. It overlies interbeds that are only 37 ft (11.3 m) thick. In addition to being thin, this interval does not have the regular vertical symmetry as those of cycles 2 and 3. The beds of these lithologies are thin and repetitious.

The halite bed of cycle 5, and only 1 m of anhydrite in the underlying interbed was drilled in this core hole. The halite bed is 127.3 ft (38.8 m) thick. A bed of sylvinite (crystalline intergrowth of sylvite and halite), approximately 11.8 ft (3.6 m) thick, occurs near the top of this halite bed. The Texasgulf Corporation has been mining this potash deposit near Moab, Utah, since 1964.

Figure 2 is a generalized stratigraphic column of the Cane Creek No. 1 core hole.

Figure 3 is a lithologic column of the Cane Creek No. 1 core, at a scale of 10 ft / inch, with a brief description of the lithologies. Details of the lithologies have been generalized somewhat to accomodate the scale.

Figure 4 illustrates the mineralogic composition of the rocks in the interbeds in the Cane Creek No. 1 core. Mineralogy was determined semiquantitatively by X-ray diffraction. Quantities of the minerals were determined by comparing major peak heights to peak heights of prepared standards.

Bromine distribution studies have been made on the four halite beds in this core (Raup, 1966). Studies of the chemistry of the various lithologies in this core as well as studies of textures and their interpretations will be published in papers that are now in preparation.

REFERENCES

Hite, R. J., 1960, Stratigraphy of the saline facies of the Paradox Member of the the Hermosa Formation of southeastern Utah and southwestern Colorado, in Four Corners Geological Society 3rd Field Conference Guidebook, Geology of the Paradox fold and fault belt, 1960: p. 86-89.

_____1961, Potash-bearing evaporite cycles in the salt anticlines of the Paradox basin, Colorado and Utah: Art. 337 in U. S. Geological Survey Professional Paper 424-D, p. D135-D138.

_____1970, Shelf carbonate sedimentation controlled by salinity in the Paradox Basin, southeast Utah, in Third Symposium on Salt, Northern Ohio Geological Society, v. 1, p. 48-66.

Hite, R. J., and Buckner, D. H., 1981, Stratigraphic correlations, facies concepts, and cyclicity in Pennsylvanian rocks of the Paradox basin: Rocky Mountain Association of Geologists - 1981 Field Conference, p. 147-159.

Raup, O. B., 1966, Bromine distribution in some halite rocks of the Paradox Member, Hermosa Formation, in Utah, in Second Symposium on Salt: Northern Ohio Geological Society, v. 1, p. 236-247.

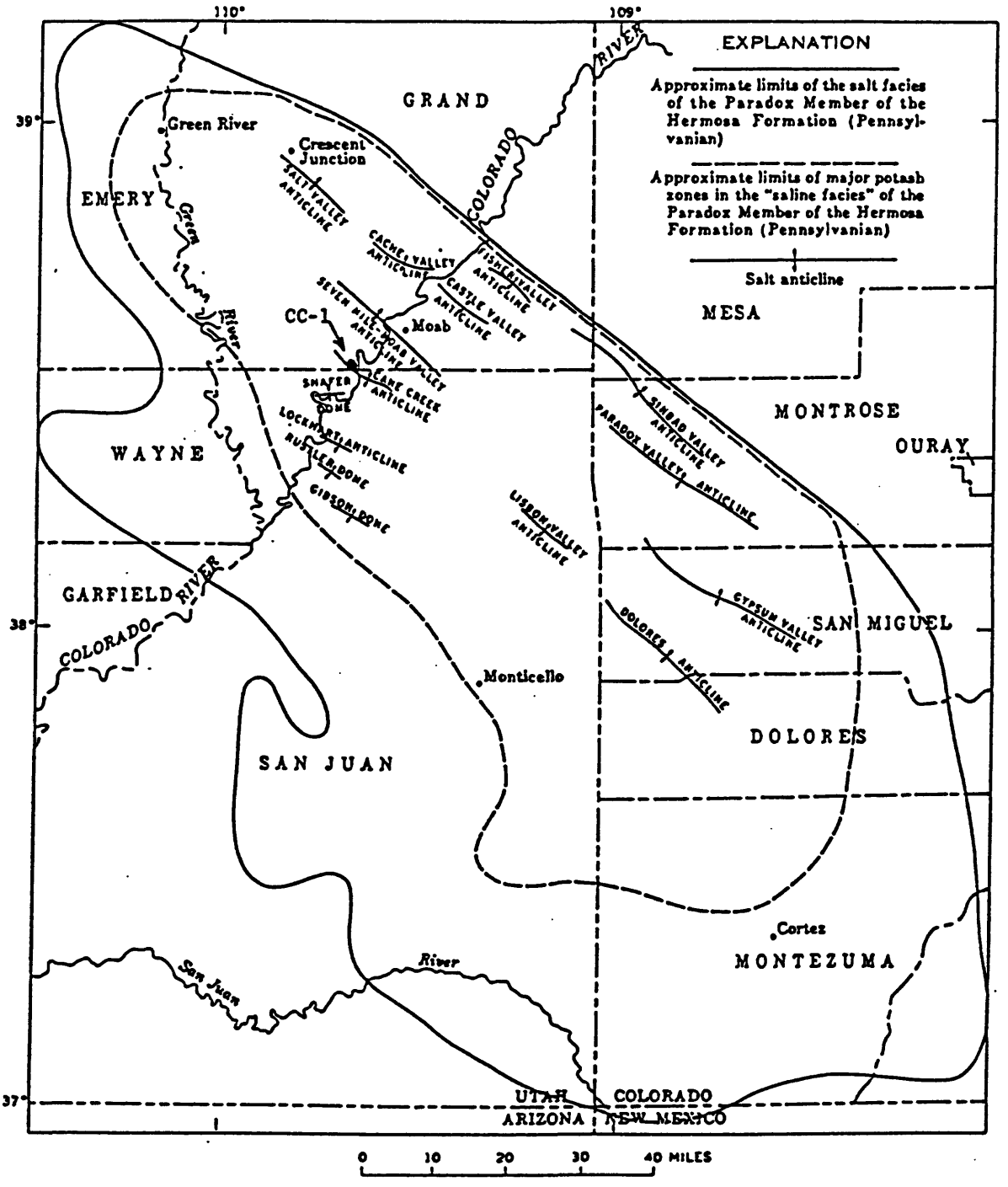


Figure 1. Index map of the Paradox basin, southwestern Colorado and southeastern Utah, showing the location of the Delhi-Taylor Oil Company, Cane Creek No. 1 (CC-1) core hole. Limits of salt and potash from Hite (1961).

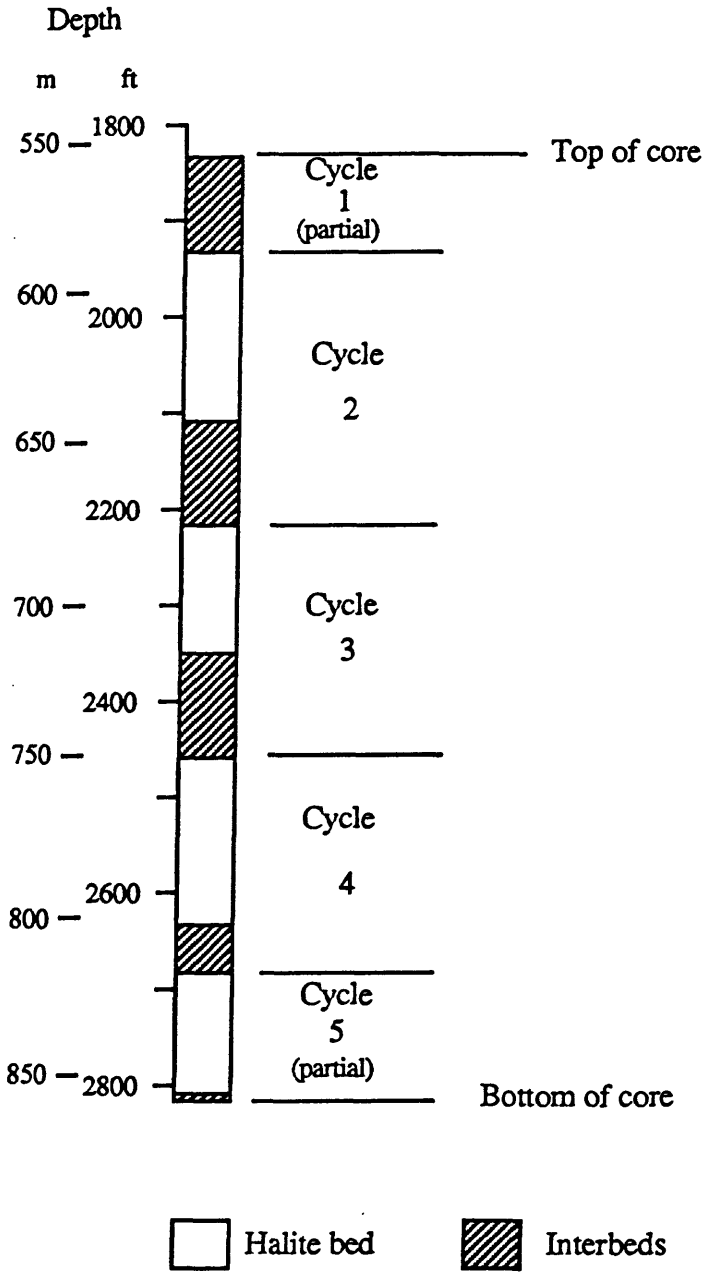
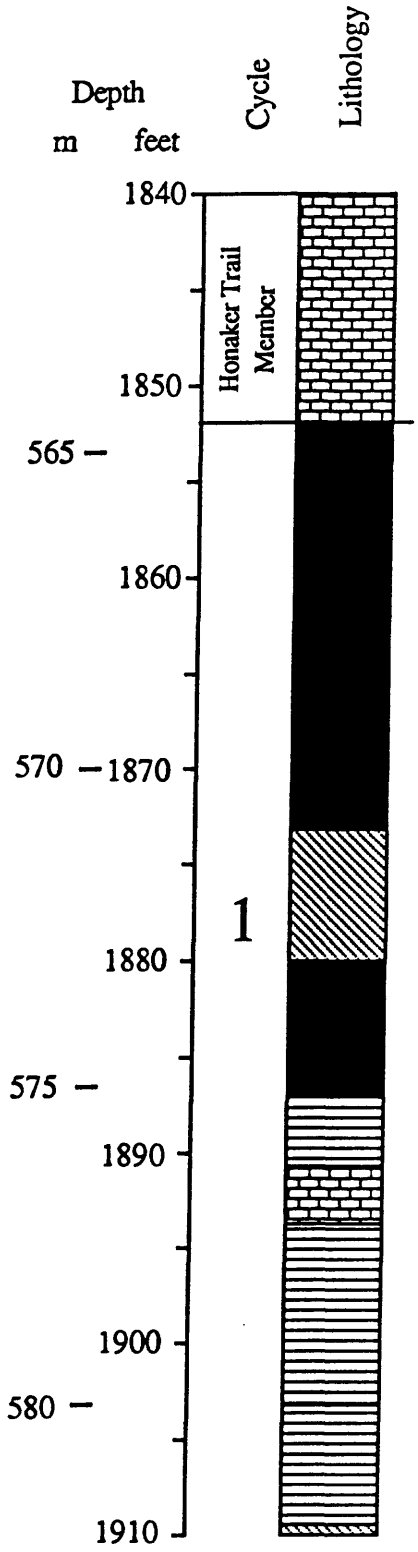


Figure 2. Generalized stratigraphic column of the Cane Creek No. 1 core at a scale of 200 ft / inch.

Figure 3. Lithologic column of the Cane Creek No. 1 core at a scale of 10 ft / inch, with a brief description of the lithologies.

Cane Creek No. 1 core 10 ft / in.



Description

Limestone - medium gray, dense, homogeneous, very argillaceous,indistinct bedding, few fossil fragments, occasional chert nodules. grades downward into black shale.

Shale - dark gray to black, somewhat fissile, dense homogeneous, very calcareous, scattering of thin shell fragments.

Anhydrite - very light gray, nodular in a matrix of black calcareous shale. Some nodules have remnants of original thin laminations. Abrupt contact with underlying black shale.

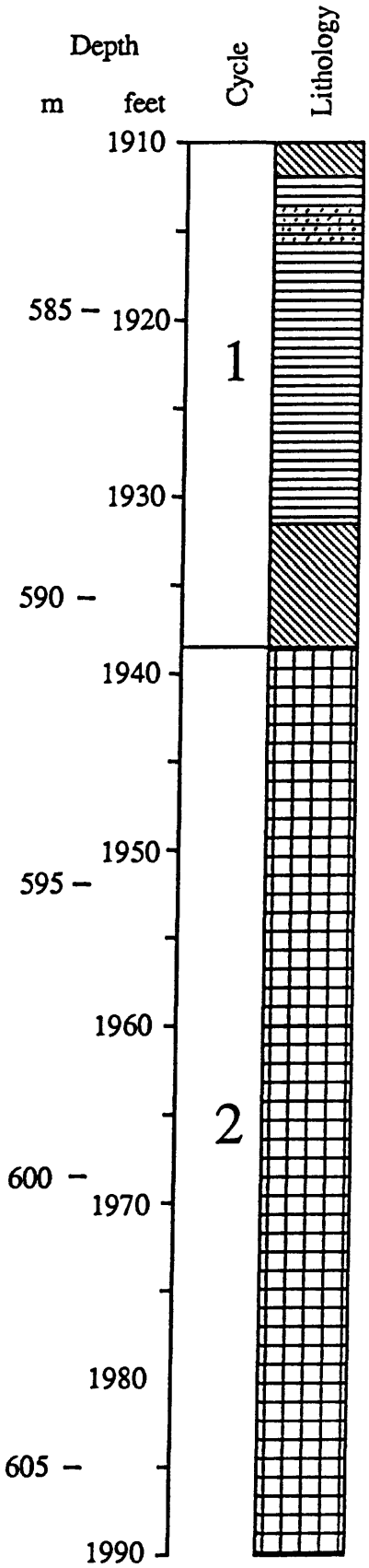
Shale - dark gray to black, very dense, homogeneous, very calcareous, scattered shell fragments.

Dolomite - light gray, finely crystalline, some silt.

Limestone - medium to light gray, homogeneous, dolomitic.

Dolomite - light to medium gray, dense, homogeneous, some silt and anhydrite. A few layers of black shale near the base.

Anhydrite - gray, nodular, dense, interbedded with dolomite and argillaceous limestone.



Description

Anhydrite - gray, nodular, dense, interbedded with dolomite and argillaceous limestone.

Siltstone - light gray, dense, sucrosic, dolomitic.

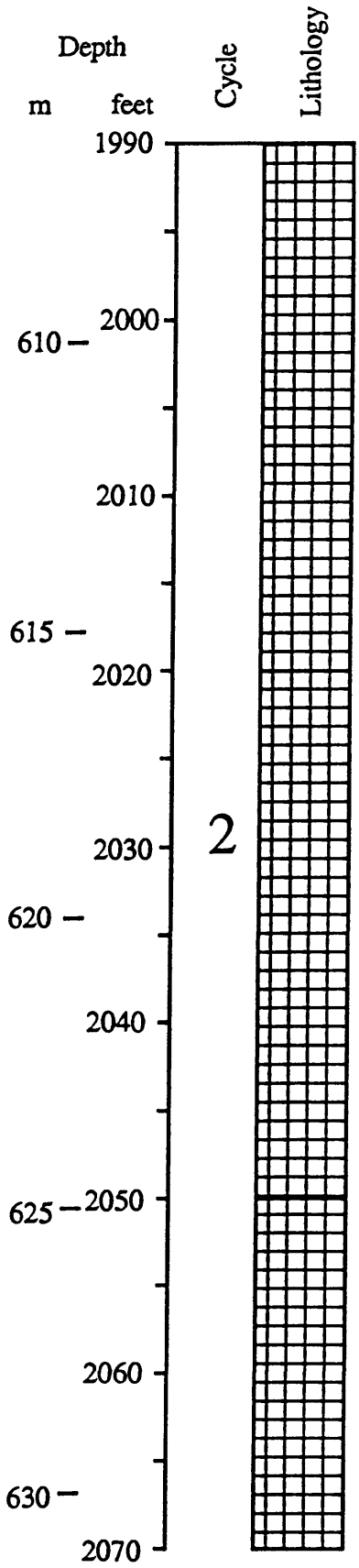
Dolomite - light to medium gray, dense, slightly arenaceous with paper-thin laminations of dark gray shale, especially in the lower 2 feet.

Anhydrite - light gray, dense, sucrosic, indistinct bedding. Sharp contact at the base of the anhydrite which appears to be a dissolution surface with the underlying halite bed.

Halite - clear, buff to smoky gray, medium to coarsely crystalline (3 to 6 mm). Thin anhydrite laminations spaced approximately 3 inches (8 cm) apart.

Organic matter is concentrated adjacent to anhydrite laminae.

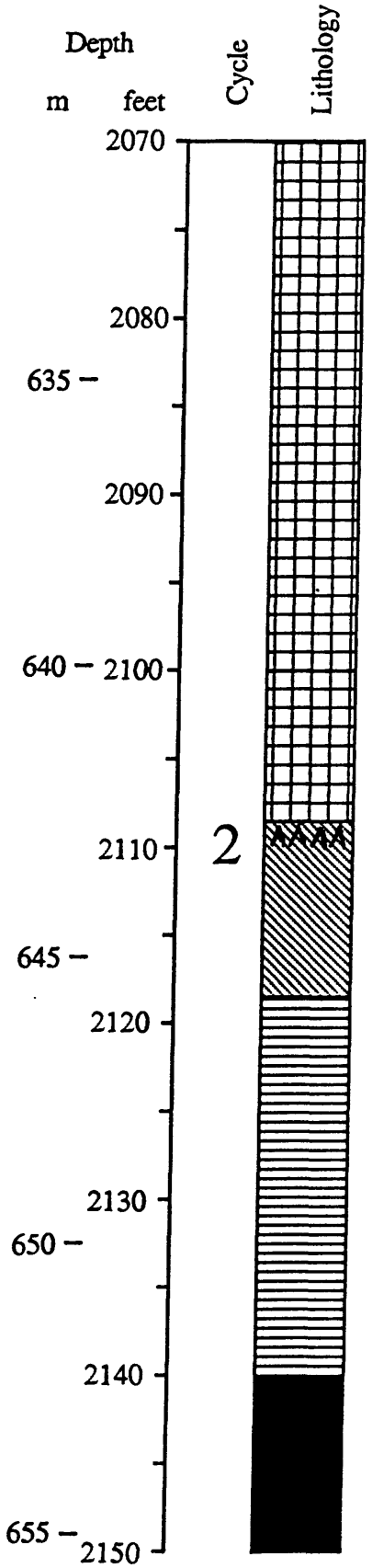
Anhydrite laminations become more widely spaced near 1955 feet (595 m) where they are 6 inches (15 cm) apart. From this point downward, the laminae become closer spaced; near the base they area about 1 inch (2.5 cm) apart.



Description

Halite - clear, buff to smoky gray, coarsely crystalline. Thin anhydrite laminations spaced approximately 3 inches (8 cm) apart. Organic matter is concentrated adjacent to anhydrite laminae.

Anhydrite laminations become more widely spaced near 1955 feet (595 m) where they are 6 inches (15 cm) apart. From this point downward, the laminae become closer spaced; near the base they are about 1 inch (2.5 cm) apart.



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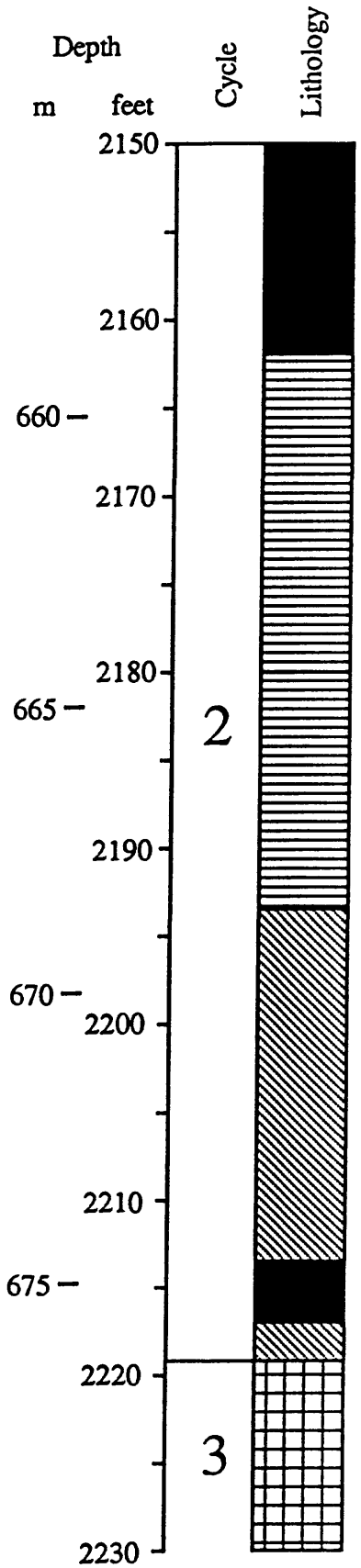
Halite - clear, buff to smoky gray, coarsely crystalline. Thin anhydrite laminations spaced approximately 3 inches (8 cm) apart. Organic matter is concentrated adjacent to anhydrite laminae.

Anhydrite laminations become more widely spaced near 1955 feet (595 m) where they are 6 inches (15 cm) apart. From this point downward, the laminae become closer spaced; near the base they are about 1 inch (2.5 cm) apart.

Anhydrite - white to medium gray. Coarse pseudomorphous texture of anhydrite and halite after gypsum at top, nodular in middle, laminated at base.

Dolomite - medium gray to buff. Gradational contact with overlying anhydrite. Slightly argillaceous and arenaceous. Lower 3 feet (1 m) is very shaley.

Shale - black, very dense, numerous fossil fragments, pyritic.



Description

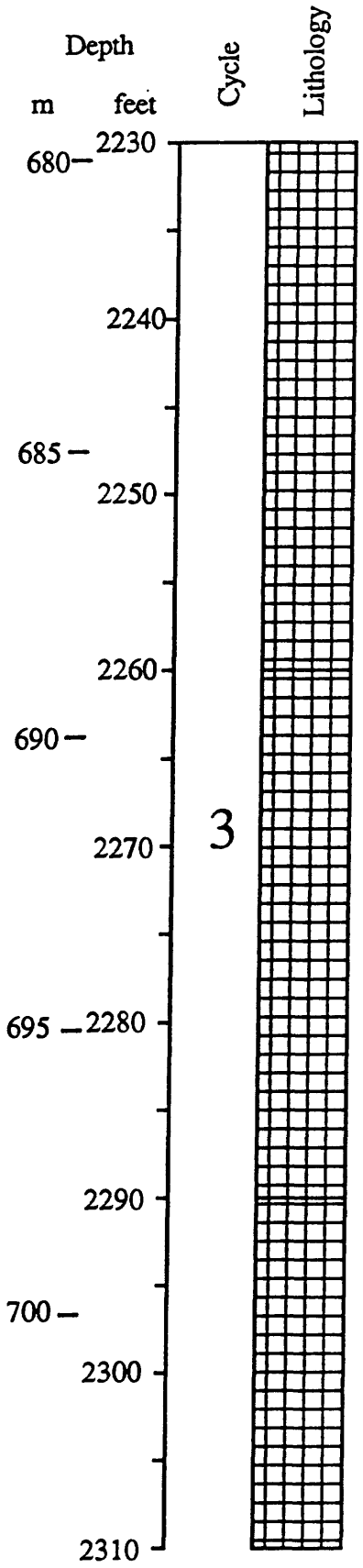
Shale - black, very dense, numerous fossil fragments, pyritic.

Dolomite - light to medium gray, dense, arenaceous. Contains minor amounts of interbedded shale.

Anhydrite - mottled white to gray, nodular, dense, with some interbedded gray dolomite. Marble-like pseudomorphic textures of anhydrite and halite after gypsum in the upper two-thirds of the interval, laminated in the lower third.

Three foot (1 m) bed of black shale near base. Basal contact is very sharp with the underlying halite bed.

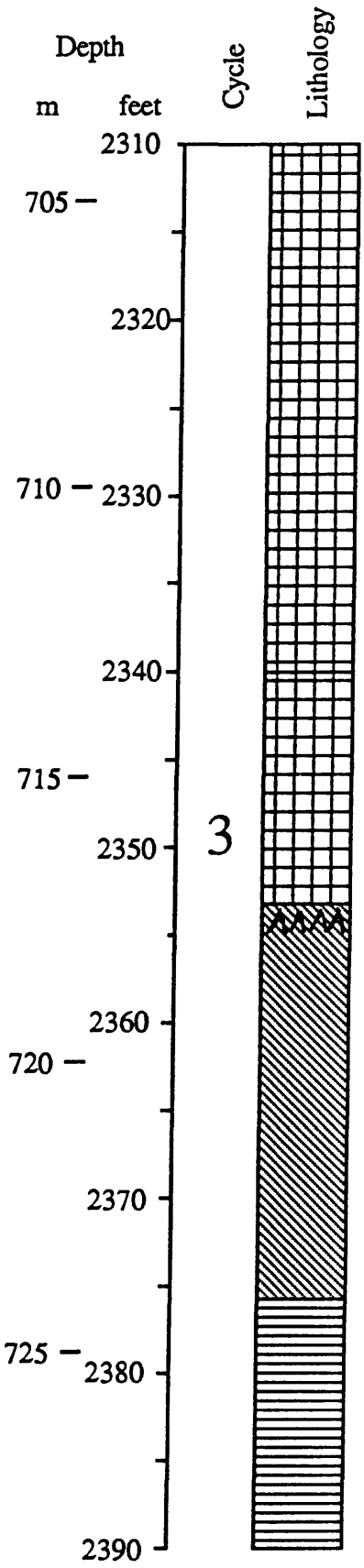
Halite - smoky gray, crystal size 3 to 6 mm.



Description

Halite - smoky gray, crystal size 3 to 6 mm.

Anhydrite laminations are well defined and spaced about 6 inches (15 cm) apart at the top of the halite bed. Downward the laminations become closer spaced and more diffuse. Near the base they are about 2 inches (5 cm) apart.



Description

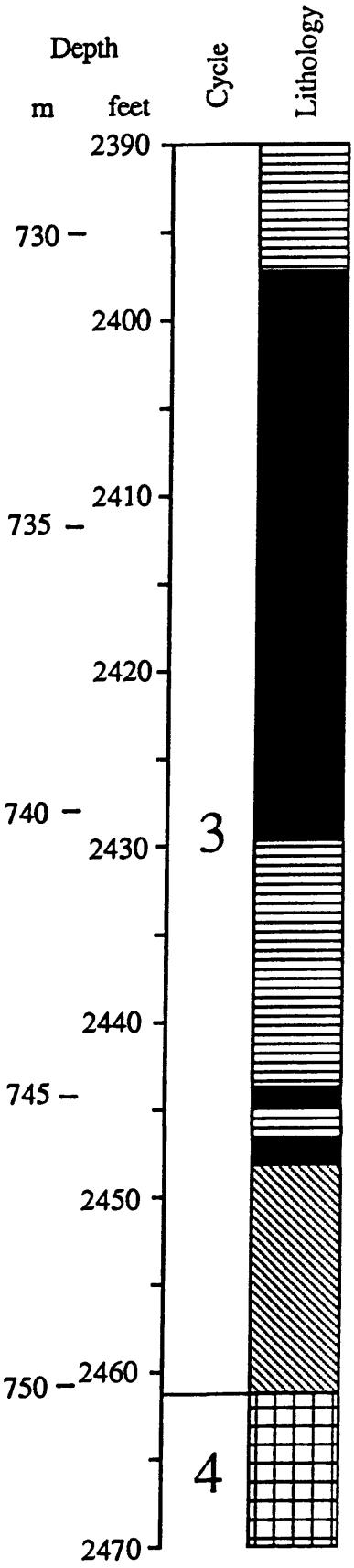
Halite - smoky gray, crystal size 3 to 6 mm. Anhydrite laminations are well defined and spaced about 6 inches (15 cm) apart at the top of the halite bed. Downward the laminations become closer spaced and more diffuse. Near the base they are about 2 inches (5 cm) apart.

Several anhydrite laminations near the base of the halite bed contain pseudomorphs of anhydrite and halite after gypsum.

Anhydrite - bluish gray to white, dense. A coarse pseudomorphic texture of anhydrite and halite after gypsum occurs in the top few feet of this unit. This anhydrite is gradational with the overlying halite bed. Becomes thinly laminated downward.

Transition zone between anhydrite and dolomite. Fine (small) pseudomorphic texture. Interbedded thin layers of anhydrite and dolomite.

Dolomite - light to medium gray. Minor silt and some interbedded paper-thin laminations of dark gray to black shale.



Description

Dolomite - shaley and silty. Very fine grained.
Gets progressively more shaley downward.
Downward increase in organic matter.
Occasional nodules of anhydrite.

Gradational contact between dolomite and black shale.

Shale - medium gray to black, dense, homogeneous, dolomitic. Sawed surfaces have a waxy luster, probably due to the large amount of organic matter.

Scattered nodules of anhydrite that range from 0.25 to 10 mm.

Numerous vertical fractures filled with halite.
At 2405.6' a vein, containing chalcedony, halite, and pyrite, cuts the black shale.

Dolomite - medium to light gray, dense, homogeneous, indistinct bedding, silty and argillaceous.

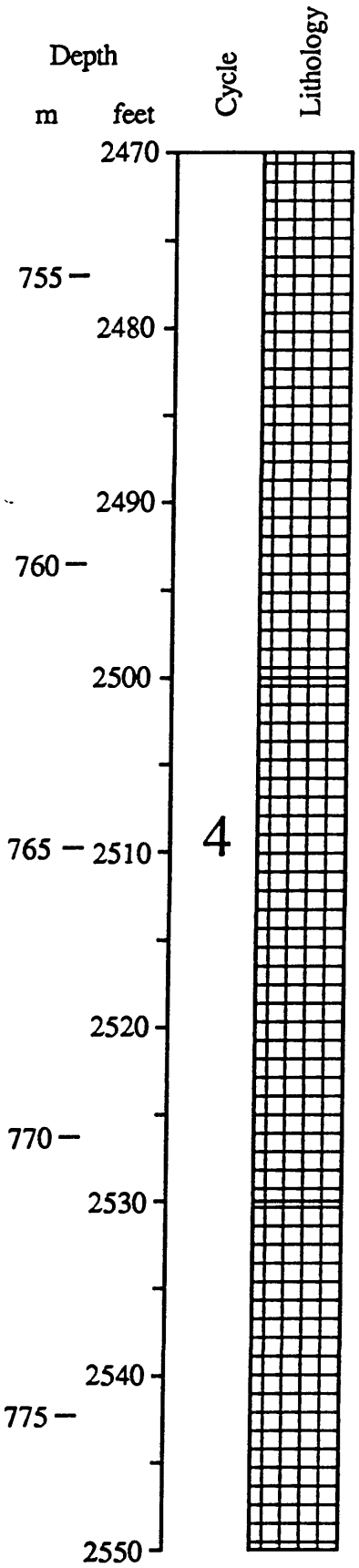
A few interbeds of shale near base.

Shale - medium gray to black, dense, interbedded with light gray silty dolomite.

Anhydrite - white to bluish gray, very dense, indistinct bedding. Upper two-thirds has a coarsely nodular "chicken-wire" texture. Lower third is finely laminated.

Sharp contact with the underlying halite bed.

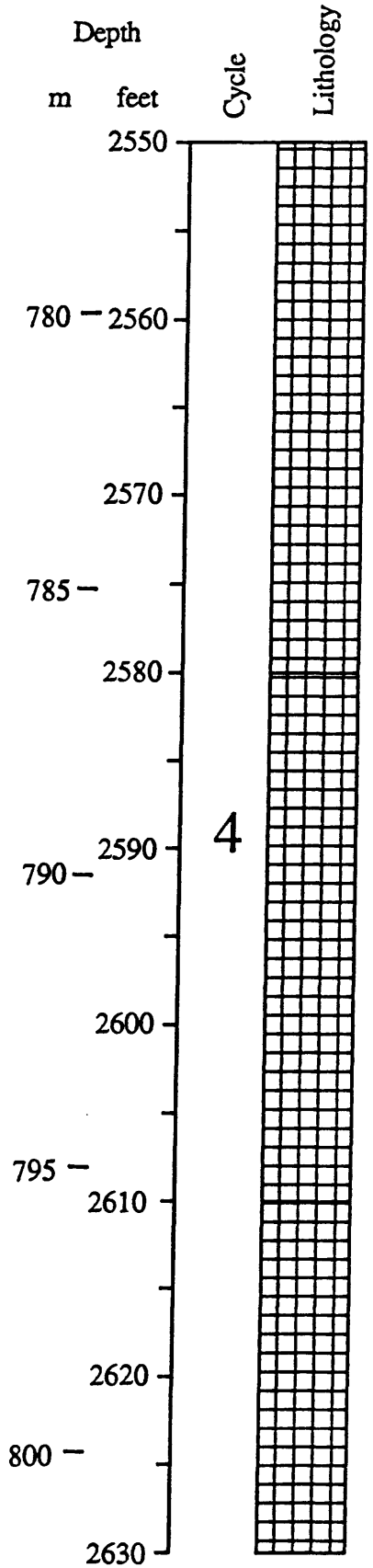
Halite - light to medium gray, smoky, coarsely crystalline.



Description

Halite - light to medium gray, smoky, coarsely crystalline.

Anhydrite laminations are well defined and spaced about 8 inches (20 cm) apart at the top of the halite bed. Downward, the laminations become less distinct and closer spaced, 2 to 3 inches (5 to 8 cm).

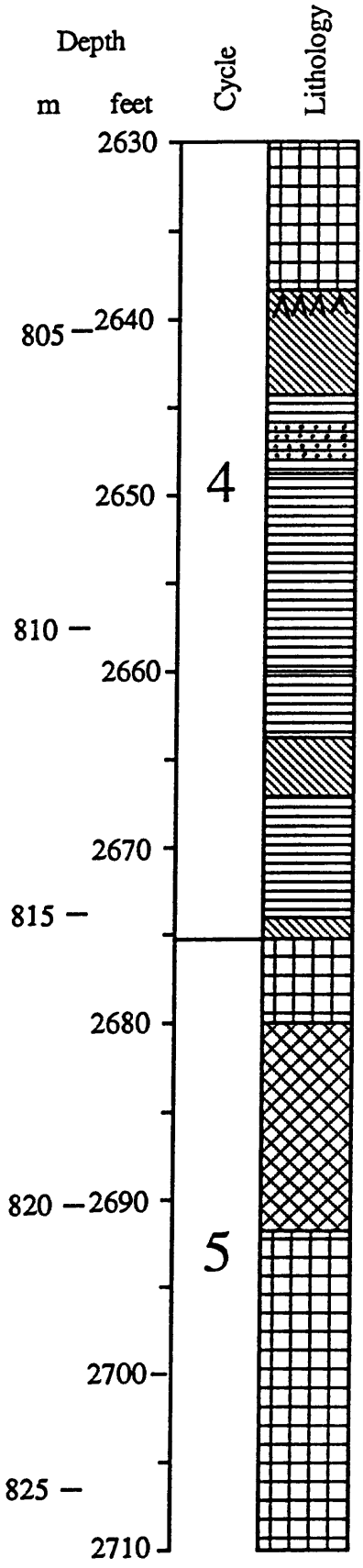


Description

Halite - light to medium gray, smoky, coarsely crystalline.

Halite has a reddish-brown to pink color in the interval 2551.8 to 2628.9 ft. Color is caused by minute hematite crystals in sylvite that is scattered throughout the halite.

Anhydrite laminations are well defined and spaced about 8 inches (20 cm) apart at the top of the halite bed. Downward the laminations become less distinct and closer spaced, 2 to 3 inches (5 to 8 cm).



Description

Halite - light gray to pink, medium crystal size.

Anhydrite laminations are indistinct and are spaced 0.5 to 1.5 inches (1 to 4 cm) apart.

Anhydrite - gray. Upper part has coarse pseudomorphic texture, middle is laminated, bottom is nodular.

Siltstone - dolomitic, shaley, dark gray to tan. Numerous layers of very dark shale.

Dolomite - silty medium gray to tan. Some nodular anhydrite.

Anhydrite - gray to brown, some interbedded dolomite.

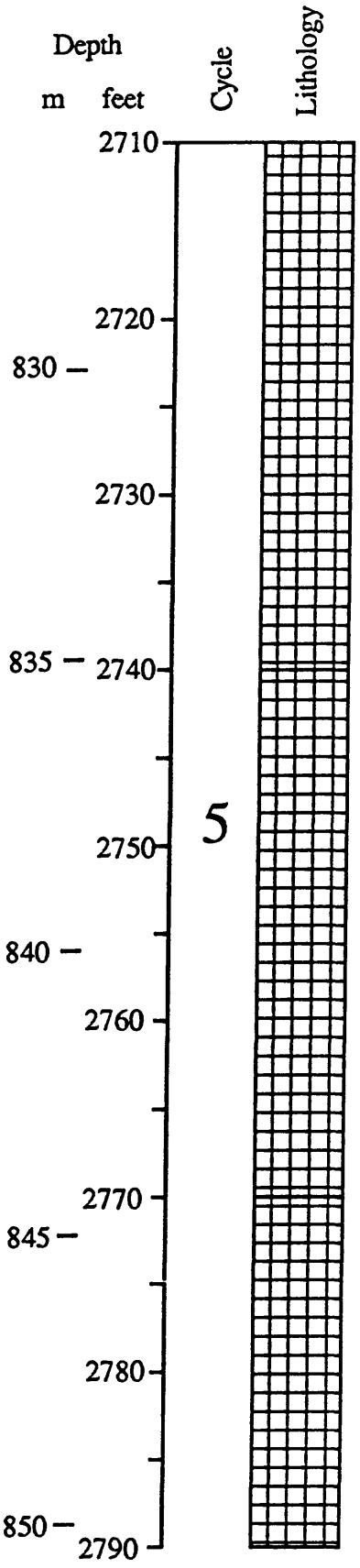
Dolomite - silty, some small nodules of anhydrite, few layers of black shale.

Anhydrite - shaley, dolomitic. Faintly laminated.

Halite - dark gray, with poorly defined laminae of anhydrite, giving an overall smoky appearance.

Zone of sylvite mineralization occurs between 2678.8 and 2692.9 feet (816.5 and 820.8 m).

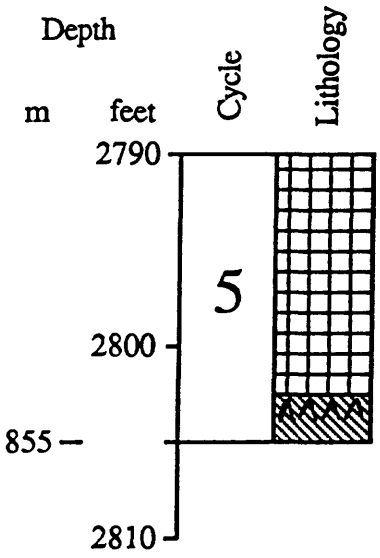
Halite - pink, with scattered blebs of sylvite.



Description

Halite - light gray to pink, with scattered blebs of sylvite. Well developed anhydrite laminations that average 0.1 inch (3 mm) thick and are spaced 2 to 8 inches (5 to 20 cm) apart.

Anhydrite laminations are indistinct and are spaced 0.5 to 1.5 inches (1 to 4 cm) apart.



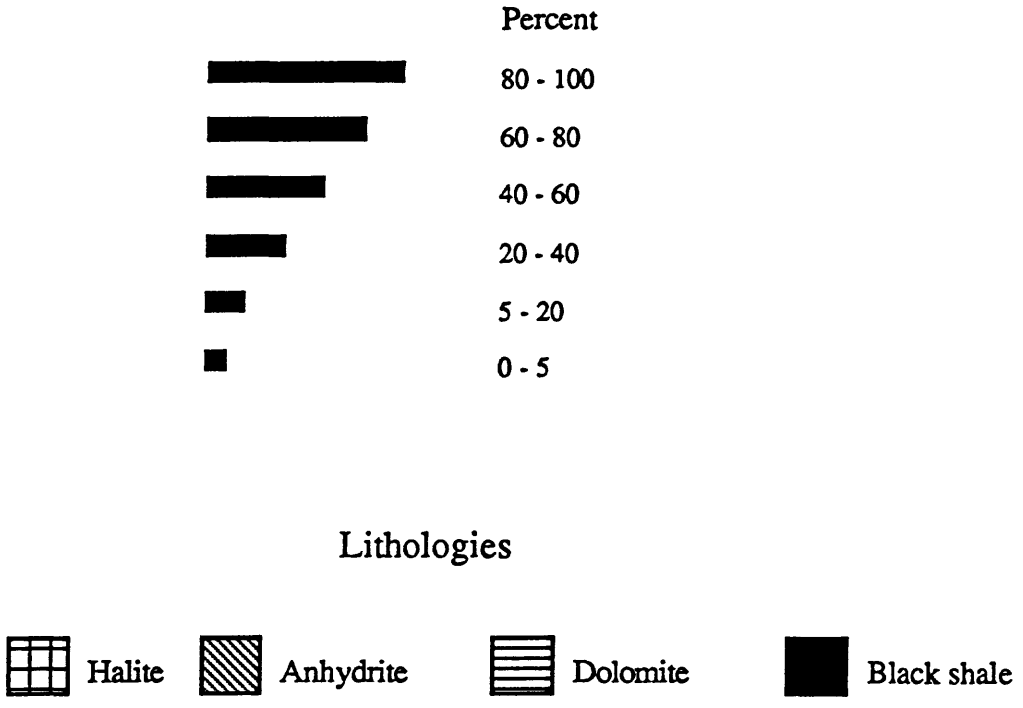
Description

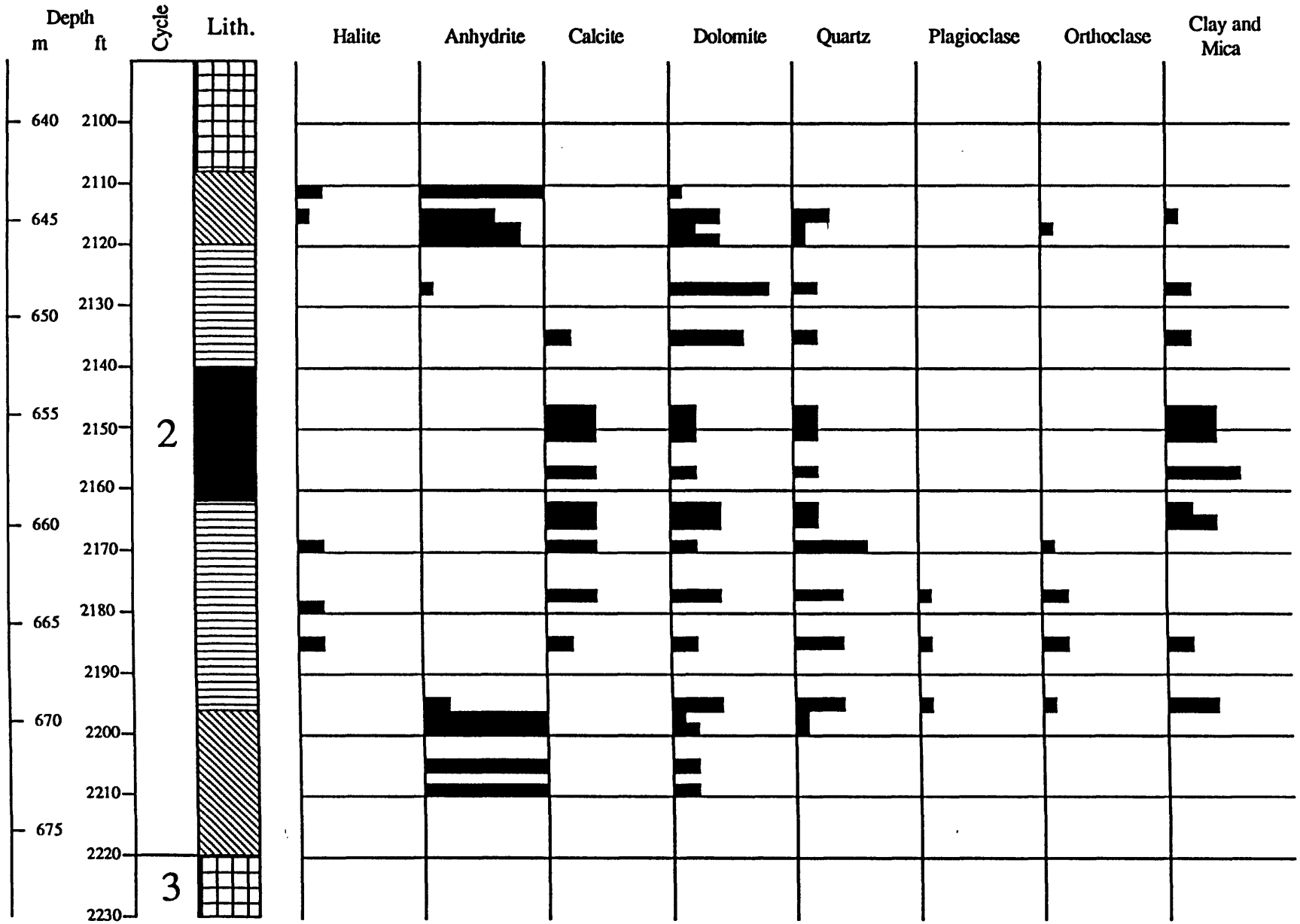
Halite - pink with scattered blebs of sylvite. Well developed anhydrite laminations that average 0.1 inch (3 mm) thick, and are spaced 2 to 8 inches (5 to 20 cm) apart.

Anhydrite - light bluish gray. Coarse pseudomorphic texture of anhydrite and halite after gypsum.

Bottom of core at 2805 ft (855 m).

Figure 4. Mineral composition of the penesaline and clastic intervals in the Cane Creek No. 1 core determined by X-ray diffraction. Quantities of the minerals were determined semiquantitatively by comparing major peak heights to peak heights of prepared standards. The length of the histogram bars represent the ranges in amounts of the mineral components.




Depth
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Halite
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Dolomite
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Clay and Mica
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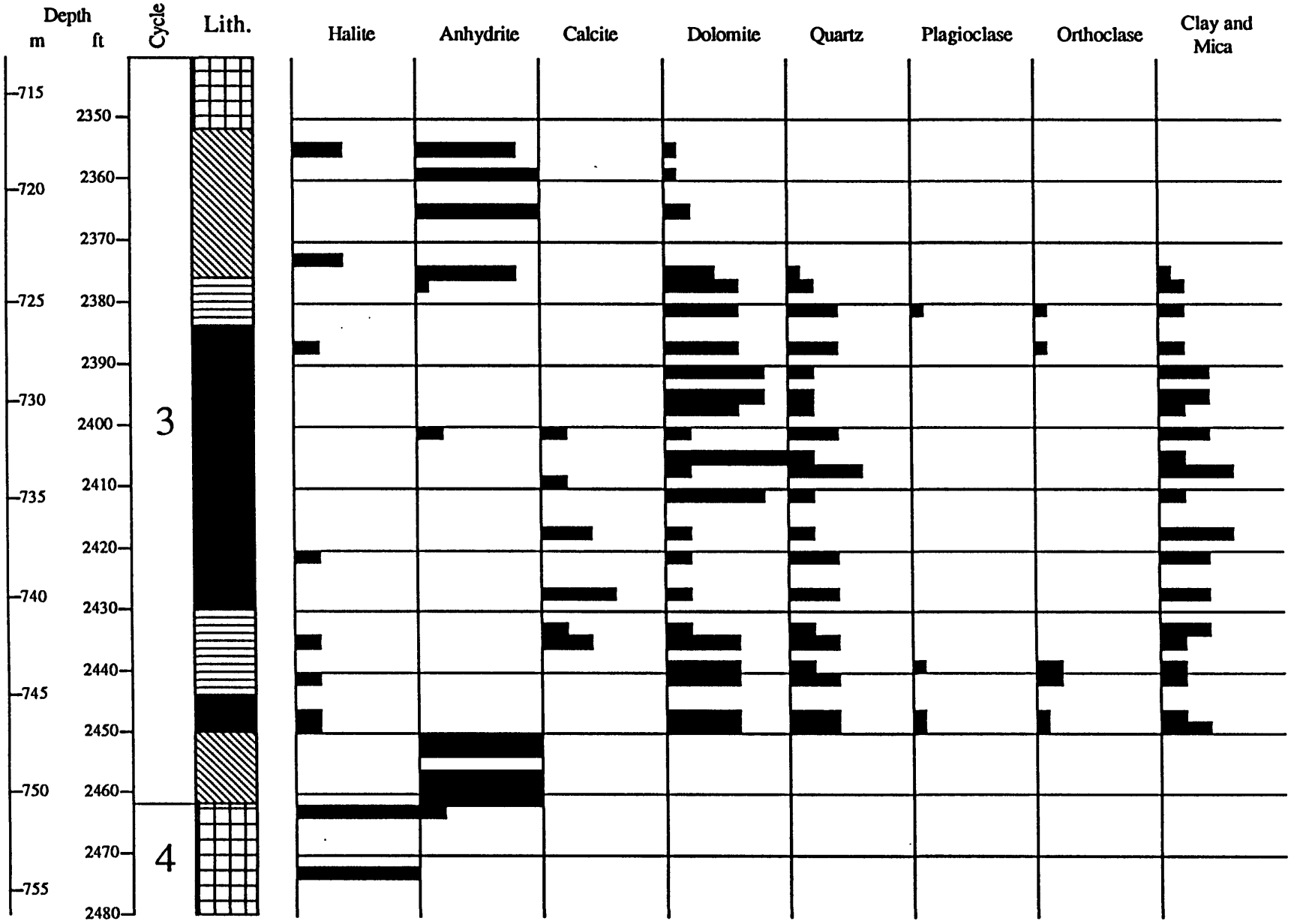
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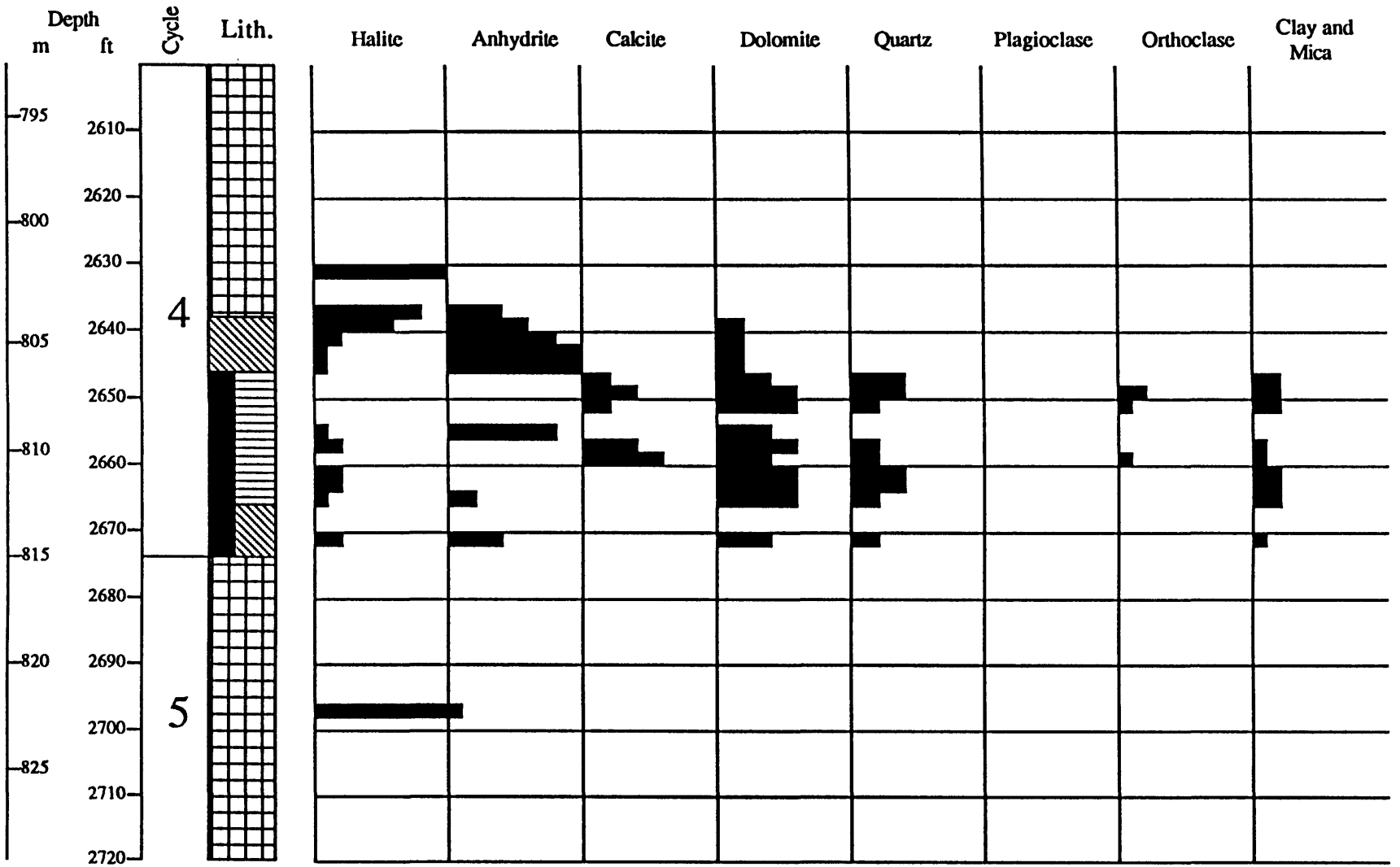
Depth
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