

Title:

Mineralogical Layering within the Mahogany Zone of the Green River Formation, Piceance Basin, Colorado

Abstract: (Your abstract must use 10pt Arial font and must not be longer than this box)

Preliminary petrographic and mineralogical analyses of oil shale outcrop samples from the uppermost part of the Parachute Creek Member (Mahogany Zone) of the Eocene Green River Formation were conducted. Petrological and mineralogical data indicate at least two types of textural features and three dominant types of mineral assemblages in the oil shale samples. Most samples exhibit alternating laminations of foliated black to orange organic matter interbedded with layers of light brownish gray fine-grained inorganic mineral phases dominated by clays mixed with minute organic clasts. These textural features are consistent with primary bedding features. Two other samples exhibit tightly folded and sheared layers of alternating black to orange organic matter and light to medium brown crystal-rich inorganic mineral assemblage. The folding and faulting of the organic and inorganic layers are post-diagenetic features probably related to local soft-sediment deformation or slumping. Samples from underlying sediments do not show such structures.

Three distinct types of inorganic mineral assemblages characterize the oil shale samples from the Mahogany Zone. A sample from the uppermost oil shale unit contains abundant clays, dolomite, dawsonite, calcite, quartz, feldspar, analcime, and pyrite. Analcime and albite with no other diagenetic minerals represent the second mineral assemblage. These minerals occur in discrete light brownish gray zones characterized by pinch and swell structures interbedded within the organic-rich layers. The analcime and albite minerals probably formed in altered vitric ash layers. The lowermost oil shale outcrop contains abundant smectite and illite/mica and substantially reduced dolomite and trace amounts of analcime, K-feldspar, and dawsonite. Paragenetic relations suggest clays as the earliest diagenetic phases. Dawsonite predates dolomite and pyrite crystallized on dolomite grains. Gypsum is the latest mineral to form and it occurs in cavities and along fractures in weathered oil shale outcrops. Although some gypsum minerals may be from the alteration of organic matter, most of the superficial crystal aggregates in fractures are recent and probably unrelated to the oil shale units. The layering and variation of authigenic mineral phases with depth are attributed to burial diagenetic processes.

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