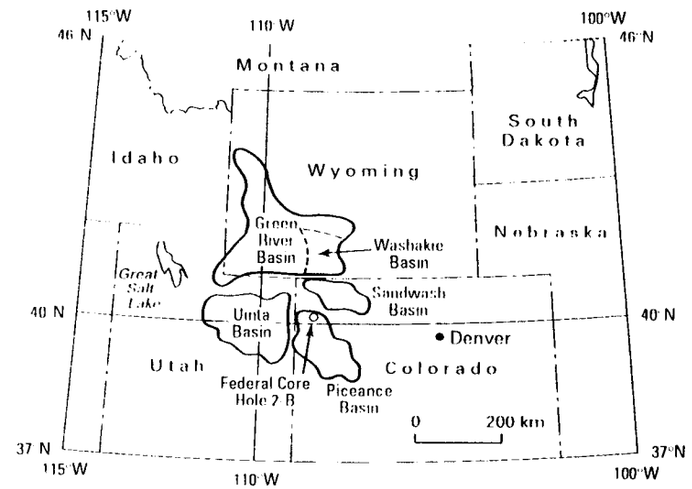
C311

Report no. WW013

BASIN SETTING OF SOURCE ROCK

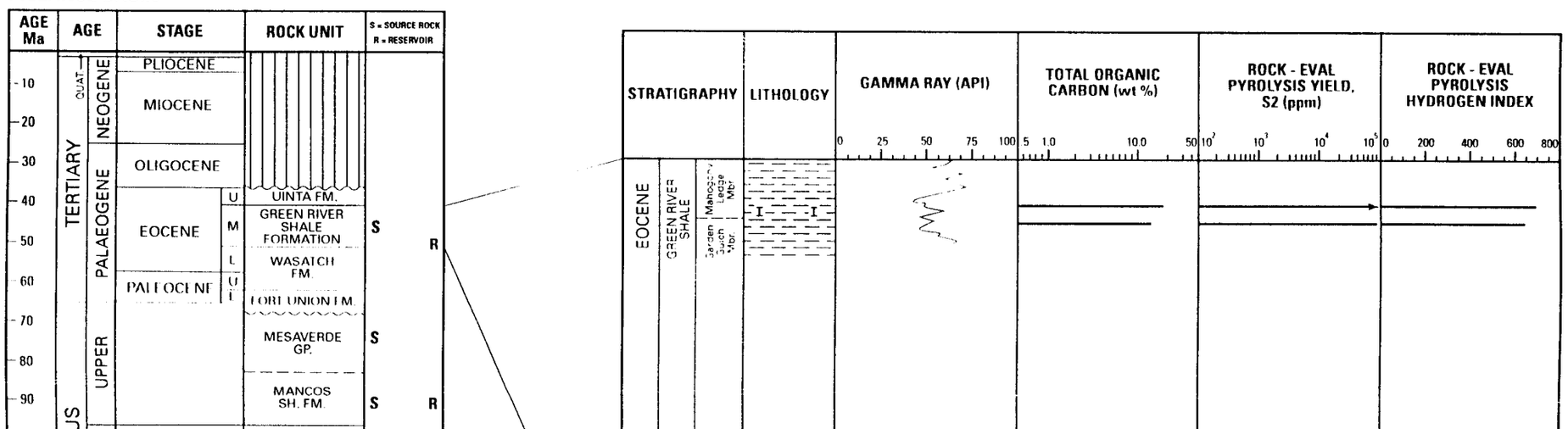
Basin name:	Piceance
Sub-basin name:	Blanco
Occurrence in other basins/sub-basins:	Green River, Sandwash, Uinta, Wind River
Tectonic regime at present:	2.2.4
Basin area (km²):	65995
Country (ies):	USA
Formation/member name:	Green River Shale Formation
Formation/member age (Ma):	45-39; Lutetian - Bartonian
Hydrocarbon reserves of basin (MMBOE):	1300
Hydrocarbon reserves attributed to source:	500?
Oil type (Tissot & Wolto):	Paraffinic
Oil gravity (range; average) (°API):	18-50; 38
Sulphur content (range; average) (%):	?; ?
Timing of hydrocarbon generation (Ma):	?29-25; Chattian
Bibliographic references:	2201, 3306, 4039, 6490, 7831, 8210, 8251, 8280, 8315, 9102, 9341, 9643, 10421, 10424, 10505

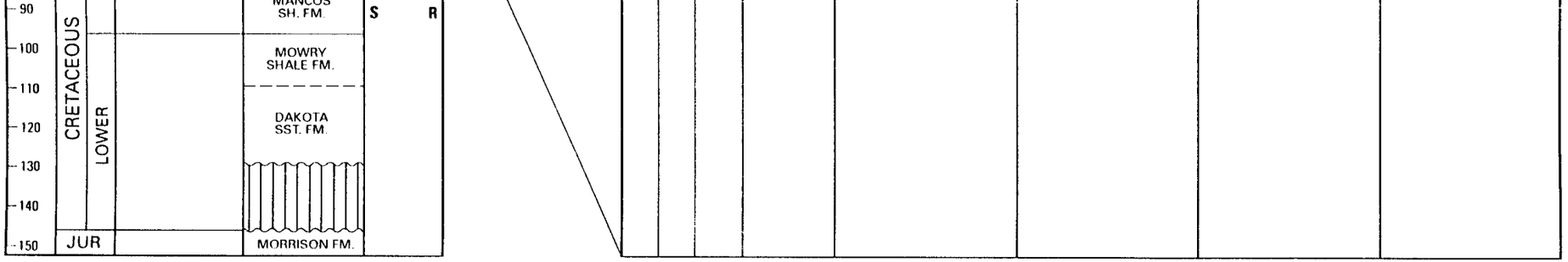
LOCATION MAP



GENERALISED BASIN STRATIGRAPHY AND GEOCHEMICAL LOG

PICEANCE BASIN





GEOLOGICAL SETTING OF SOURCE ROCK

Lithology:	Shale, bituminous, calcareous
Depositional environment:	Lacustrine
Tectonic regime:	2.1.1
Palaeolatitude:	45°N
Relative global sea level (m) or salinity:	Brackish - hypersaline
Basin morphology:	Inland drainage system
Palaeoclimate:	Hot, dry?
Carbonate/clastic dominance:	Clastic
Mineral associations:	Dolomite, silica
Lithologically homogeneous (Y/N):	N
Thickness (range; average) (m):	0-290
Radioactivity (range; average):	40-80; 60
TOC (range; average) (%):	0.2-33.7; 3.0
Pyrolysis hydrogen index (range; average):	440-1000; 820
Kerogen types:	I; A
Maturity (range; average) - SCI (1-10):	1.5-4.0; 3.0
- VR (%):	0.2-0.45; 0.35
Hydrocarbon generation:	
- Potential from pyrolysis S2 (kg/tonne):	132.6
- Generated to date (kg/tonne):	0

ANALYSED SAMPLE INFORMATION

Well/field sample name/number:	Federal Core Hole 2-B
Location:	39°40'N, 108°15'W (10-T.35., R.96W.)
Basin name:	Piceance
Sub-basin name:	Blanco
Age (Ma):	45-39; Lutetian - Bartonian
Depth (m)/sample number:	482 (1579.7 feet)
TOC (%):	19.8
Pyrolysis potential yield (kg/tonne):	132.6
Pyrolysis hydrogen index:	670
Kerogen % and type:	100S
Maturity - SCI (1-10):	3.0
- VR (%):	*
Carbon isotope data (‰ PDB):	
- Alkanes	34.9
- Aromatics	31.6
- Resenes	31.7
- Asphaltenes	30.2
Pyrolysis - gas chromatography data:	
- Group	**% Area**
C_1	3.3
C_2-C_5	12.9
C_6-C_{15}	36.1
C_{15}+	47.7
- Gas to oil yield (C_1-C_5)/C_6+	0.19

SUMMARY The Green River Shale Formation was deposited in a lake system with salinity which varied depending on climatic controls. Rising lake levels associated with wetter periods resulted in lake expansion and enhanced productivity at the surface in fresher waters overlying a halocline with saline bottom waters. In drier periods of lake contraction, carbonates and evaporites were deposited. Ranges described above are for the formation as a whole. Transgressive periods resulted in oil shales such as the Mahogany Zone (up to 60% TOC) while regressive periods have lower organic richness. The combined lacustrine basin systems contain the world's largest oil shale resource (up to 15 trillion barrels of oil equivalent). The analysed sample is a good representative of the immature Green River Shale Formation. It should be noted that the main algal input may be freshwater *Botryococcus*; the geochemical markers (pyrite, gammacerane, β-carotane) indicate hypersalinity.

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