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Carboniferous and Permian Coalbed Methane (Continuous) Assessment Unit 31280202

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Ordos Basin Geologic Province 3128

Geologic Summary

Detailed map of this assessment unit

Assessment Input Data

Assessment Results

This assessment unit was not assessed quantitatively.

USGS PROVINCE: Ordos Basin (3128) **GEOLOGIST:** R.T. Ryder

TOTAL PETROLEUM SYSTEM: Taiyuan/Shanxi-Majiagou/Shihezi (312802)

ASSESSMENT UNIT: Carboniferous and Permian Coalbed Methane (Continuous) (31280202)

DESCRIPTION: The assessment unit is characterized by gas-bearing Carboniferous and Permian coal beds along the shallow eastern flank of the Ordos basin. These coal beds are part of the pod of mature Carboniferous and Permian coal source rocks that underlie most of the Ordos basin. Most of the coal-bed reservoirs are normally pressured but locally they may show either abnormally high or low pressures.

SOURCE ROCKS: The source rocks are coal beds in the Upper Carboniferous Taiyuan Formation and Lower Permian Shanxi Formation. The net thickness of the coal beds ranges from about 8 to 20 m. Vitrinite contitutes from 30 to 60 percent of the coal-bed macerals.

MATURATION: The coalbed methane is thermogenic. Coal beds in the Taiyuan and Shanxi Formations have been mature with respect to gas generation since about Early Cretaceous time. Typically, vitrinite reflectance (%Ro) values for the coal beds range from about 1.00 to 1.60. A geothermal gradient of about 25°C/km probably accompanied gas generation.

MIGRATION: After being generated from coal-bed macerals, the methane gas was sorbed onto internal surfaces of micropores and microfractures in the coal beds. Large-scale desorption of methane probably occurred during regional uplift and erosion in the Late Cretaceous and early Cenozoic. Most of the desorbed gas accumulated as free and dissolved gas in water-filled fractures but some of it escaped to the atmosphere.

RESERVOIR ROCK: Coal beds in the Upper Carboniferous Taiyan Formation and the Lower Permian Shanxi Formation are the reservoir rocks. Natural fractures (cleats) provide the permeability necessary to produce the coalbed methane.

TRAPS AND SEALS: Sorbed methane gas is pervasively trapped in micropores and microfractures in the coal beds. Both the sorbed methane and the free and dissolved methane that has desorbed into fracture (cleat) systems are retained by high-water saturation. Dewatering of the coal beds is required before appreciable gas is produced.

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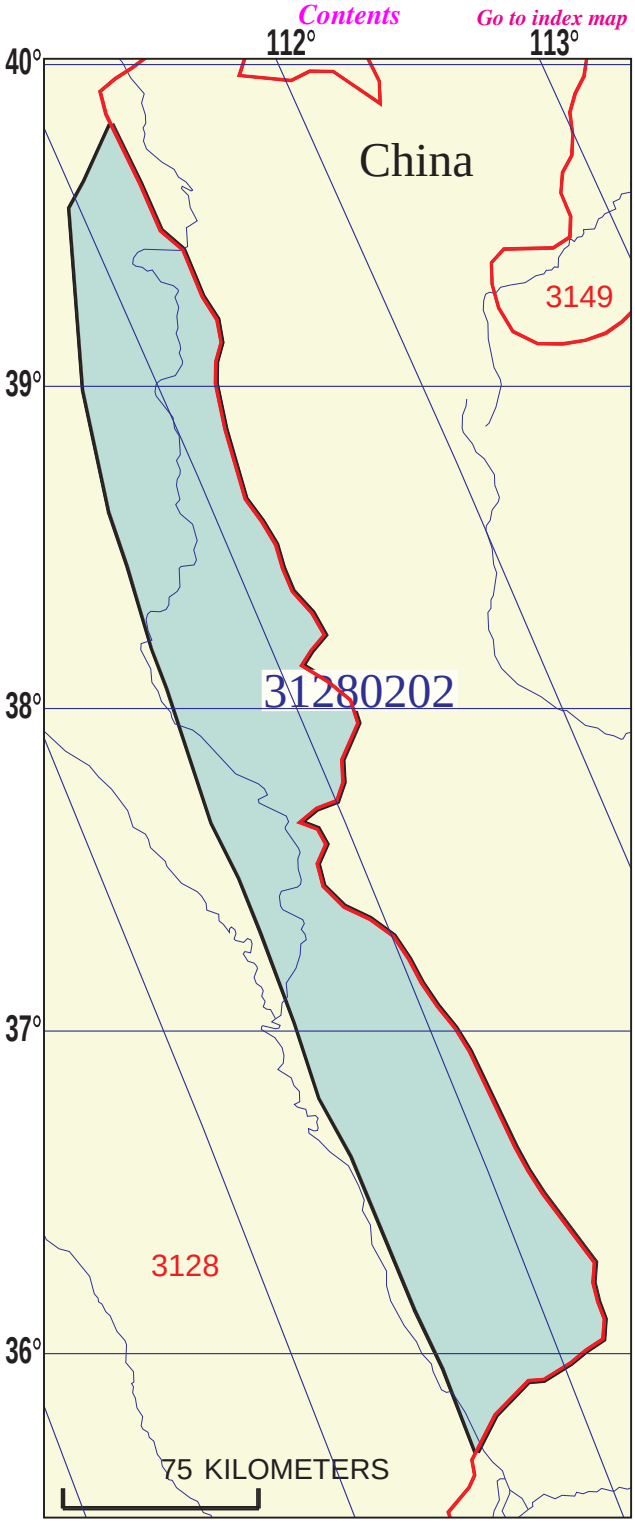

Carboniferous and Permian Coalbed Methane (Continuous) Assessment Unit - 31280202

EXPLANATION

- Hydrography
- Shoreline
- 3128 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 31280202 Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

SEVENTH APPROXIMATION
NEW MILLENNIUM WORLD PETROLEUM ASSESSMENT
DATA FORM FOR CONVENTIONAL ASSESSMENT UNITS

Date:…….. 9/29/99
Assessment Geologist:…….. R.T. Ryder
Region:…….. Asia Pacific Number: 3
Province:…….. Ordos Basin Number: 3128
Priority or Boutique…… Boutique
Total Petroleum System:…… Taiyuan/Shanxi-Majiagou/Shihezi Number: 312802
Assessment Unit:…… Carboniferous and Permian Coalbed Methane (Continuou Number: 31280202
* Notes from Assessor

CHARACTERISTICS OF ASSESSMENT UNIT

Oil (<20,000 cfg/bo overall) **or** Gas (≥20,000 cfg/bo overall):… _____

What is the minimum field size?……. _____ mmboe grown (≥1mmboe)
(the smallest field that has potential to be added to reserves in the next 30 years)

Number of discovered fields exceeding minimum size:…… Oil: _____ Gas: _____
Established (>13 fields) _____ Frontier (1-13 fields) _____ Hypothetical (no fields) _____

Median size (grown) of discovered oil fields (mmboe):
1st 3rd _____ 2nd 3rd _____ 3rd 3rd _____
Median size (grown) of discovered gas fields (bcfg):
1st 3rd _____ 2nd 3rd _____ 3rd 3rd _____

Assessment-Unit Probabilities:

Attribute	Probability of occurrence (0-1.0)
1. **CHARGE:** Adequate petroleum charge for an undiscovered field ≥ minimum size……	
2. **ROCKS:** Adequate reservoirs, traps, and seals for an undiscovered field ≥ minimum size……	
3. **TIMING OF GEOLOGIC EVENTS:** Favorable timing for an undiscovered field ≥ minimum size	
Assessment-Unit GEOLOGIC Probability (Product of 1, 2, and 3):……	
4. **ACCESSIBILITY:** Adequate location to allow exploration for an undiscovered field ≥ minimum size……	

UNDISCOVERED FIELDS

Number of Undiscovered Fields: How many undiscovered fields exist that are ≥ minimum size?:
(uncertainty of fixed but unknown values)

Oil fields:……min. no. (>0) _____ median no. _____ max no. _____
Gas fields:……min. no. (>0) _____ median no. _____ max no. _____

Size of Undiscovered Fields: What are the anticipated sizes (**grown**) of the above fields?:
(variations in the sizes of undiscovered fields)

Oil in oil fields (mmbo)……min. size _____ median size _____ max. size _____
Gas in gas fields (bcfg):……min. size _____ median size _____ max. size _____

Assessment Unit (name, no.)

_____

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……			
NGL/gas ratio (bngl/mmcfg)……			

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……			
Oil/gas ratio (bo/mmcfg)……			

SELECTED ANCILLARY DATA FOR UNDISCOVERED FIELDS

(variations in the properties of undiscovered fields)

Oil Fields:	minimum	median	maximum
API gravity (degrees)……			
Sulfur content of oil (%)……			
Drilling Depth (m) ……			
Depth (m) of water (if applicable)……			

Gas Fields:	minimum	median	maximum
Inert gas content (%)……			
CO_2 content (%)……			
Hydrogen-sulfide content (%)……			
Drilling Depth (m)……			
Depth (m) of water (if applicable)……			

Assessment Unit (name, no.)

_____

ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT TO COUNTRIES OR OTHER LAND PARCELS (uncertainty of fixed but unknown values)

1. _____ represents _____ areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…			
Portion of volume % that is offshore (0-100%)……			

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…			
Portion of volume % that is offshore (0-100%)……			