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Lower Paleozoic of Southeastern Fold Belt
Assessment Unit 31420402

Lower Paleozoic of Southeastern Fold Belt Assessment Unit 31420402

Sichuan Basin Geologic Province 3142

Geologic Summary

Detailed map of this assessment unit

Assessment Input Data

Assessment Results

- Assessment Unit Summary
- Detailed Assessment Results
- Undiscovered Field-Size Distributions

USGS PROVINCE: Sichuan Basin (3142) **GEOLOGIST:** R.T. Ryder

TOTAL PETROLEUM SYSTEM: Cambrian/Silurian Marine Shale-Dengying/Lower Paleozoic (314204)

ASSESSMENT UNIT: Lower Paleozoic of Southeastern Fold Belt (31420402)

DESCRIPTION: This hypothetical assessment unit is characterized by structurally controlled gas fields in Cambrian and Ordovician carbonate reservoirs in the southeastern foldbelt of the basin. The gas was derived from a deeply buried pod of mature Cambrian and Silurian source rocks that extends across the entire basin. The gas fields are probably overpressured and most reside at drilling depths of 4 to 7 km.

SOURCE ROCKS: The dominant source rocks are marine shelf black shale of Early Cambrian and Early Silurian age. The 100- to 400-m-thick Lower Cambrian source rock sequence has total organic carbon (TOC) values that range from 0.1 to 2.0 percent and average about 0.7 percent. Lower Silurian graptolitic black shale source rocks are as thick as 650 m. The TOC values for the Silurian black shale range from 0.5 to 2.0 percent and average about 0.8 percent. Type I and II varieties of kerogen characterize both source rocks.

MATURATION: The Cambrian and Silurian source rocks have been mature with respect to gas generation since about the Middle Jurassic. Oil that was initially generated from the source rocks has been converted to gas. A geothermal gradient of about 20 to 25°C/km probably accompanied oil and gas generation.

MIGRATION: Because of an absence of carrier beds, most gas that was generated in the Middle Jurassic to Early Cretaceous remained in or near the source rock until widespread folding and tectonic fracturing occurred during Late Cretaceous (Yenshanian) to early Cenozoic (Himalayan) compression. After fracturing, gas either remained in place and filled existing fractures or was involved in limited vertical migration toward the crestal regions of faulted detachment anticlines. Oil had converted to gas before significant vertical migration occurred.

RESERVOIR ROCK: Reservoirs have not been identified but probably consist of tectonically fractured Cambrian and Ordovician vuggy limestone and dolomite. Reservoir quality is probably poor. Secondary porosity controlled by intracrystalline pores, dissolution pores and vugs, and open tectonic fractures along crestal zones of anticlines would provide the better reservoirs.

TRAPS AND SEALS: The major traps are large faulted anticlines of thin-skin decollement origin. Cambrian shale, Ordovician shale and argillaceous limestone, Lower and Middle Silurian shale, and Lower Permian argillaceous Limestone are the best regional seals.

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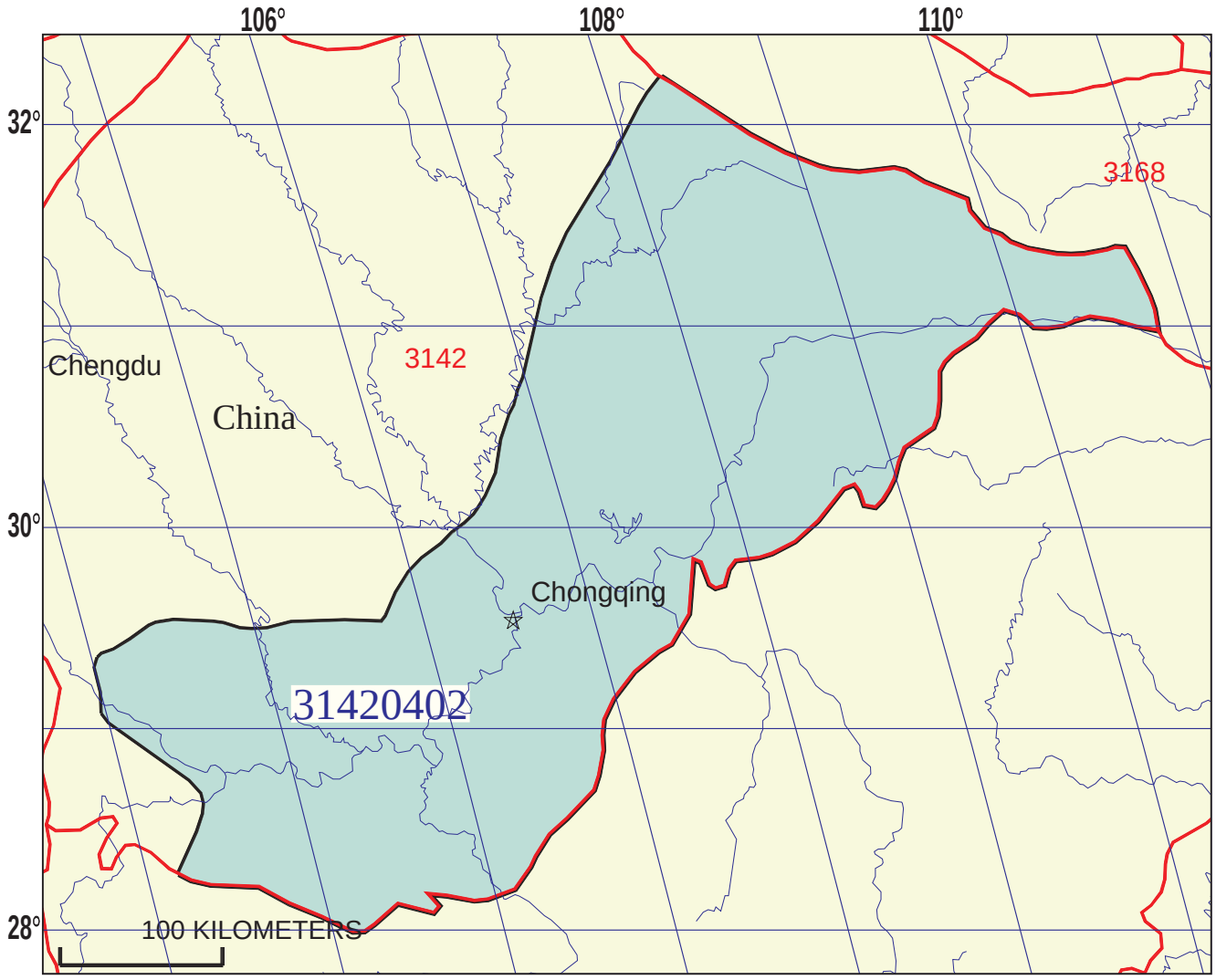

Lower Paleozoic of Southeastern Fold Belt
Assessment Unit - 31420402

EXPLANATION

- Hydrography
- Shoreline
- 3142 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 31420402 Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

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

Date:……..	12/16/99		
Assessment Geologist:……..	R.T. Ryder		
Region:……..	Asia Pacific	Number:	3
Province:……..	Sichuan Basin	Number:	3142
Priority or Boutique……	Boutique		
Total Petroleum System:……	Cambrian/Silurian Marine Shale-Dengying/Lower Paleozoic	Number:	314204
Assessment Unit:……	Lower Paleozoic of Southeastern Fold Belt	Number:	31420402
* Notes from Assessor			

CHARACTERISTICS OF ASSESSMENT UNIT

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

What is the minimum field size?……. 3 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: 0 Gas: 0
Established (>13 fields) _____ Frontier (1-13 fields) _____ Hypothetical (no fields) X

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……	1.0
2. **ROCKS:** Adequate reservoirs, traps, and seals for an undiscovered field ≥ minimum size……	0.7
3. **TIMING OF GEOLOGIC EVENTS:** Favorable timing for an undiscovered field ≥ minimum size	1.0

Assessment-Unit GEOLOGIC Probability (Product of 1, 2, and 3):…….. 0.7

4. **ACCESSIBILITY:** Adequate location to allow exploration for an undiscovered field ≥ minimum size…… 1.0

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)	1	median no.	20	max no.	50

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	18	median size	50	max. size	1500

Assessment Unit (name, no.)
Lower Paleozoic of Southeastern Fold Belt, 31420402

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)……	22	44	66
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 (%)……	4	6.5	10
CO_2 content (%)……	2	5	10
Hydrogen-sulfide content (%)……	0.5	1.3	2
Drilling Depth (m)……	3000	5000	7500
Depth (m) of water (if applicable)……			

Assessment Unit (name, no.)
Lower Paleozoic of Southeastern Fold Belt, 31420402

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

1. China represents 100 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):…		100	
Portion of volume % that is offshore (0-100%)……		0	

Lower Paleozoic of Southeastern Fold Belt , AU 31420402
Undiscovered Field-Size Distribution