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Jurassic/Triassic
Fluvial and Lacustrine Sandstone
Assessment Unit 31280101

Jurassic/Triassic Fluvial and Lacustrine Sandstone Assessment Unit 31280101
Ordos Basin Geologic Province 3128

Geologic Summary

Detailed map of this assessment unit

Exploration/Discovery-History Data
- Plots of Known Field Sizes
- Plots of Grown Resources
- Tables

Assessment Input Data

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

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

TOTAL PETROLEUM SYSTEM: Yanchang-Yanan (312801)

ASSESSMENT UNIT: Jurassic/Triassic Fluvial and Lacustrine Sandstone (31280101)

DESCRIPTION: The assessment unit is characterized by oil fields trapped in stratigraphic traps and compaction anticlines. Upper Triassic and Lower Jurassic sandstone are the dominant reservoirs. The fields are concentrated in a pod of mature Upper Triassic source rocks that occupies the southwestern and south-central parts of the basin. Most of the fields are trapped on the gently westward-dipping homoclinal flank of the basin but several are trapped in anticlines along the thrust-faulted, western margin of the basin.

SOURCE ROCKS: Lacustrine shale and mudstone in the Upper Triassic Yanchang Formation is the dominant source rock. The composite thickness of the Yanchang source rock sequence is as much as several hundred meters. Typically, source rocks in the Yanchang Formation range in total organic carbon (TOC) from 1.2 to 4.4 percent and contain largely Type II kerogen.

MATURATION: The Yanchang Formation has been mature with respect to oil generation in the southern part of the basin since about Early Cretaceous time whereas the Yanchang source rocks are immature with respect to oil in the northern part of the basin. A geothermal gradient of about 25°C/km probably accompanied oil generation but a Middle to Late Jurassic heat pulse caused by a brief period of volcanism may have assisted maturation. The Yanchang Formation is immature with respect to gas generation.

MIGRATION: Most oil in the assessment unit has migrated laterally less than about 10 km from the pod of mature Upper Triassic source rocks before entrapment. Vertical oil migration of several hundred meters probably occurred through thick stacks of composite fluvial sandstone.

RESERVOIR ROCK: The majority of reservoir rocks consist of sandstone and conglomeratic sandstone of fluvial origin in the Lower Jurassic Yanan and Fuxian Formations. Locally, where the sandstones are coarse grained and conglomeratic, the reservoir quality is good. However, mostcommonly the reservoir quality of the sandstone is fair to poor. Secondary reservoir rocks consist of fluvial, lacustrine deltaic, and lacustrine turbidite sandstone in the Yanchang Formation. Typically these reservoirs have very low permeability values largely because of their fine to very-fine grain size and high feldspathic content.

TRAPS AND SEALS: Stratigraphic traps (facies-change and valley–fill varieties) and compaction anticlines formed over buried hills account for most of the traps. Thin, moderately continuous lacustrine shale and mudstone of the Upper Triassic and Lower and Middle Jurassic sequences are the best seal rocks.

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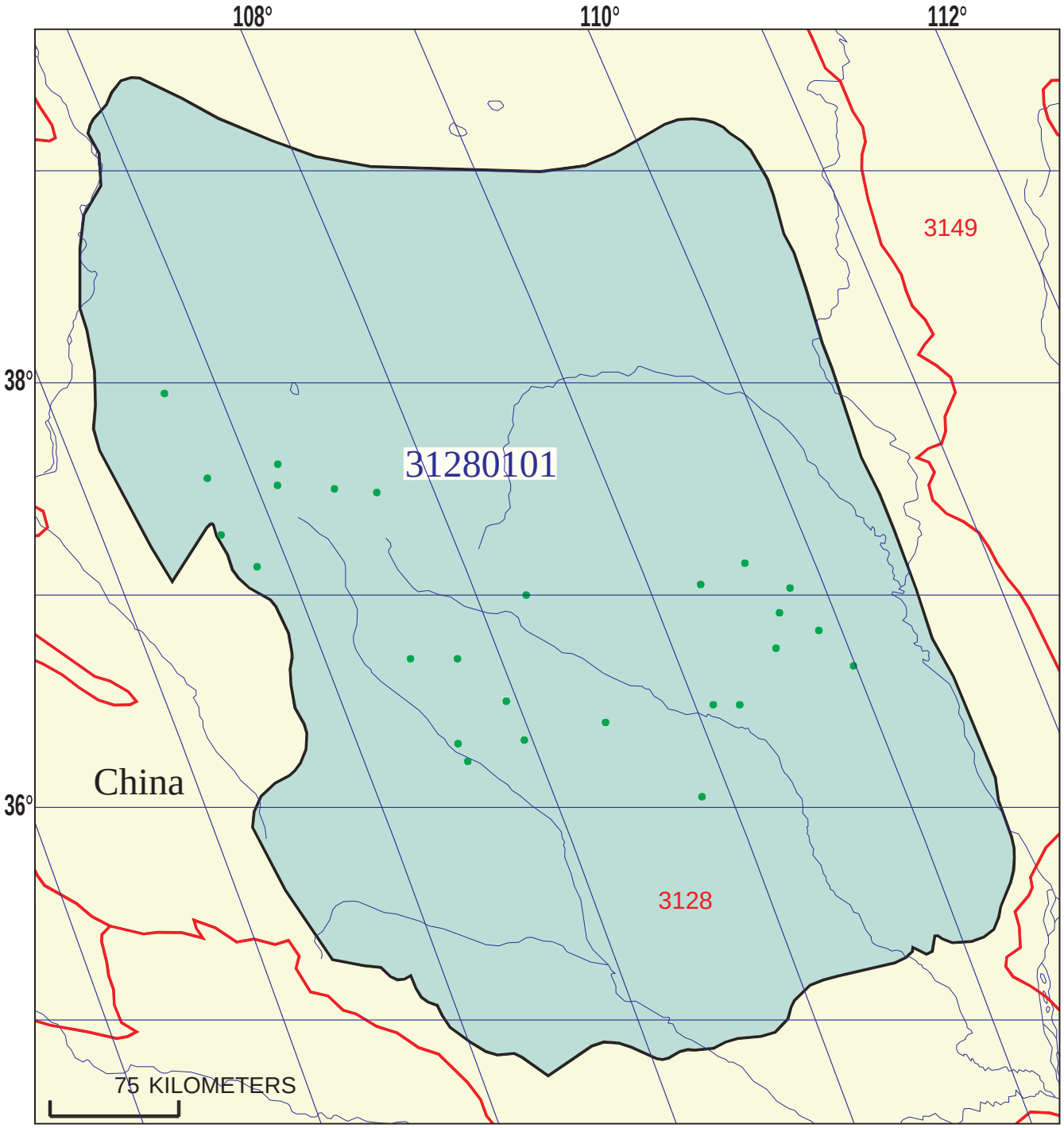

Jurassic/Triassic Fluvial and Lacustrine Sandstone Assessment Unit - 31280101

EXPLANATION

- Hydrography
- Shoreline
- 3128 — Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 31280101 — 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:……	Yanchang-Yanan	Number:	312801
Assessment Unit:……	Jurassic/Triassic Fluvial and Lacustrine Sandstone	Number:	31280101
* Notes from Assessor	MMS growth function.		

CHARACTERISTICS OF ASSESSMENT UNIT

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

What is the minimum field size?……. 2 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: 24 Gas: 0
Established (>13 fields) X Frontier (1-13 fields) _____ Hypothetical (no fields) _____

Median size (grown) of discovered oil fields (mmboe):
1st 3rd 9 2nd 3rd 24 3rd 3rd 26
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……	1.0
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):…….. 1.0

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)	2	median no.	20	max no.	50
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	2	median size	5	max. size	50
Gas in gas fields (bcfg):……min. size	_____	median size	_____	max. size	_____

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AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	60	140	250
NGL/gas ratio (bngl/mmcfg)……	30	60	90

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)……	23	36	50
Sulfur content of oil (%)……	0.01	0.1	5.5
Drilling Depth (m) ……	200	1200	2500
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)……			

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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):…		100	
Portion of volume % that is offshore (0-100%)……		0	

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%)……			

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Undiscovered Field-Size Distribution