Go to Table of Contents

Go to index map

Orinoco Delta and Offshore Assessment Unit 60980202

Orinoco Delta and Offshore Assessment Unit 60980202

East Venezuela Basin Geologic Province 6098

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: East Venezuela Basin (6098) **GEOLOGIST:** C.J. Schenk

TOTAL PETROLEUM SYSTEM: Upper Cretaceous/Tertiary (609802)

ASSESSMENT UNIT: Orinoco Delta and Offshore (60980202)

DESCRIPTION: This hypothetical assessment unit encompasses the area of the Orinoco delta and the offshore area to depths of about 2000 m. The northern boundary is marked by the deformed sediments of the Barbados Accretionary Prism.

SOURCE ROCKS: The main source rocks are postulated to be mudstones equivalent to the Upper Cretaceous Querecual Formation, but a less probable source may be in Miocene prodelta mudstones. Another source may be mudstones of the Cenomanian/Turonian in the northeast and east part of the basin.

MATURATION: Given the sediment thickness (as much as 6 to 7 sec TWT), maturation probably began in the Pliocene and extended into the Pleistocene. The Upper Cretaceous source rock would have reached maturation first, and may be in the gas window in the deeper part of the assessment unit.

MIGRATION: Migration is postulated to have been mainly from the source rocks up growth faults and into the Tertiary sandstone reservoirs. Numerous growth faults cut the Tertiary section, and the faults sole into the Upper Cretaceous section.

RESERVOIR ROCKS: Reservoirs are postulated to be mainly lowstand sandstones, including shelf-edge deltas, slope-channel sandstones, and basin-floor turbidite sandstones.

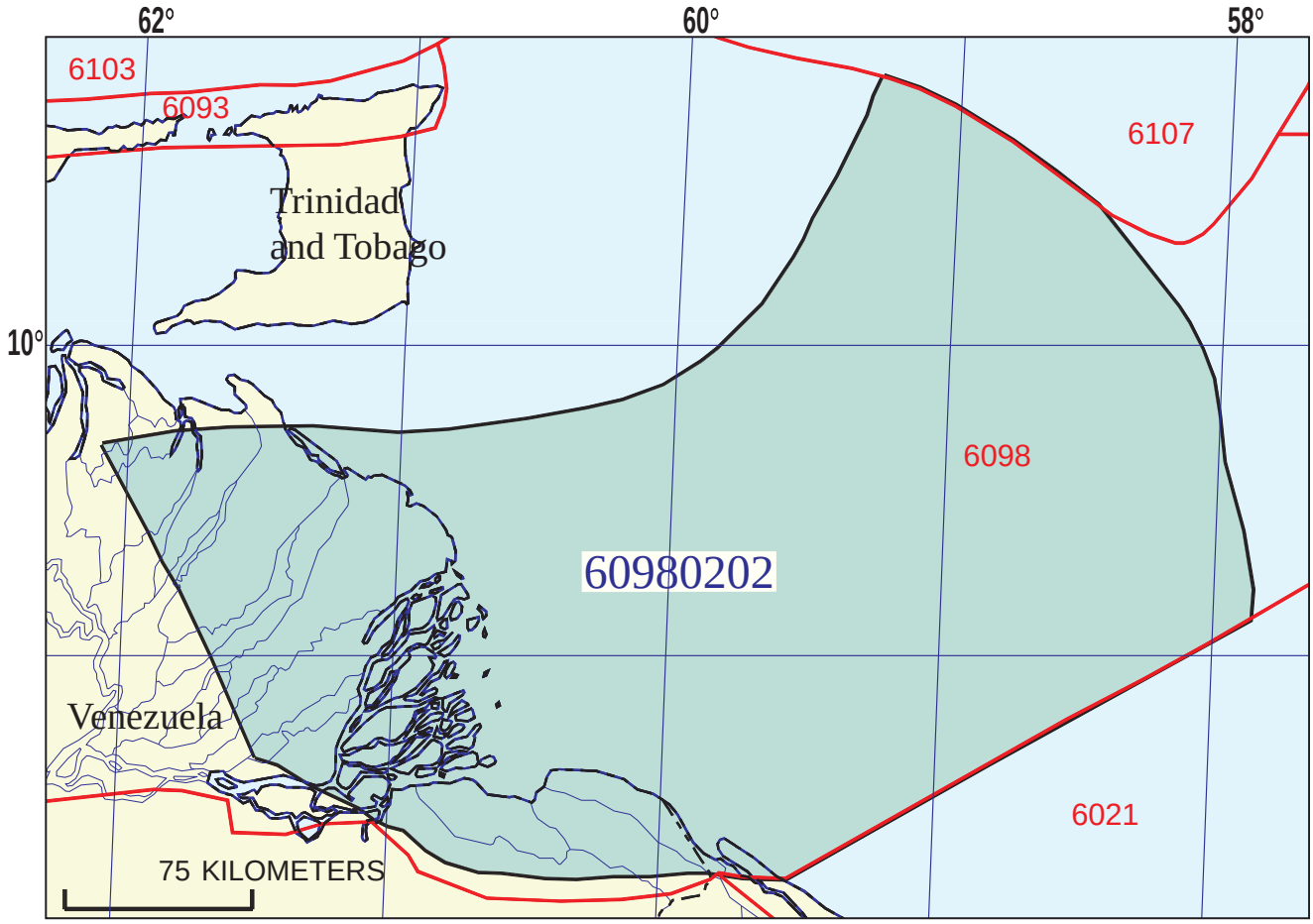
TRAPS AND SEALS: Traps are postulated to be mainly associated with the numerous growth faults and related antithetic faults in the offshore Tertiary section. Seals are mainly intraformational mudstones within the Tertiary section, and by facies changes from sandstones to shales.

REFERENCES:

Di Croce, J., 1995, Eastern Venezuela Basin–sequence stratigraphy and structural evolution: Houston, Texas, Rice University, unpublished PhD dissertation 225 p.

Lugo, J., and Audemard, F., 1997, Petroleum geology of Venezuela: American Association of Petroleum Geologists Short Course, Dallas, Texas, April 5-6, 1997, unpaginated.

Zamora, L.G., Gonzalez S., L., and Linares, L.M., 1982, The Orinoco Delta, a future exploratory province for heavy and extra heavy oils: Fourth UNITAR/UNDP International Conference on Heavy Crude and Tar Sands, p. 191-197.



Orinoco Delta and Offshore Assessment Unit - 60980202

EXPLANATION

- Hydrography
- Shoreline
- 6098 — Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 60980202 — Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

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

Date:……..	7/7/99		
Assessment Geologist:……..	C.J. Schenk		
Region:……..	Central and South America	Number:	6
Province:……..	East Venezuela Basin	Number:	6098
Priority or Boutique……	Priority		
Total Petroleum System:……	Upper Cretaceous/Tertiary	Number:	609802
Assessment Unit:……..	Orinoco Delta and Offshore	Number:	60980202
* Notes from Assessor			

CHARACTERISTICS OF ASSESSMENT UNIT

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

What is the minimum field size?……. 6 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……	0.8
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):…….. 0.8

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)	1	median no.	70	max no.	200
Gas fields:……min. no. (>0)	1	median no.	70	max no.	200

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	6	median size	20	max. size	3500
Gas in gas fields (bcfg):……min. size	36	median size	120	max. size	12000

Assessment Unit (name, no.)
Orinoco Delta and Offshore, 60980202

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	1000	2000	3000
NGL/gas ratio (bngl/mmcfg)……	30	60	90

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)……	20	35	50
Sulfur content of oil (%)……			
Drilling Depth (m) ……	1000	2500	7000
Depth (m) of water (if applicable)……	0	600	3000

Gas Fields:	minimum	median	maximum
Inert gas content (%)……			
CO_2 content (%)……			
Hydrogen-sulfide content (%)……			
Drilling Depth (m)……	1000	2500	7000
Depth (m) of water (if applicable)……	0	600	3000

Assessment Unit (name, no.)
Orinoco Delta and Offshore, 60980202

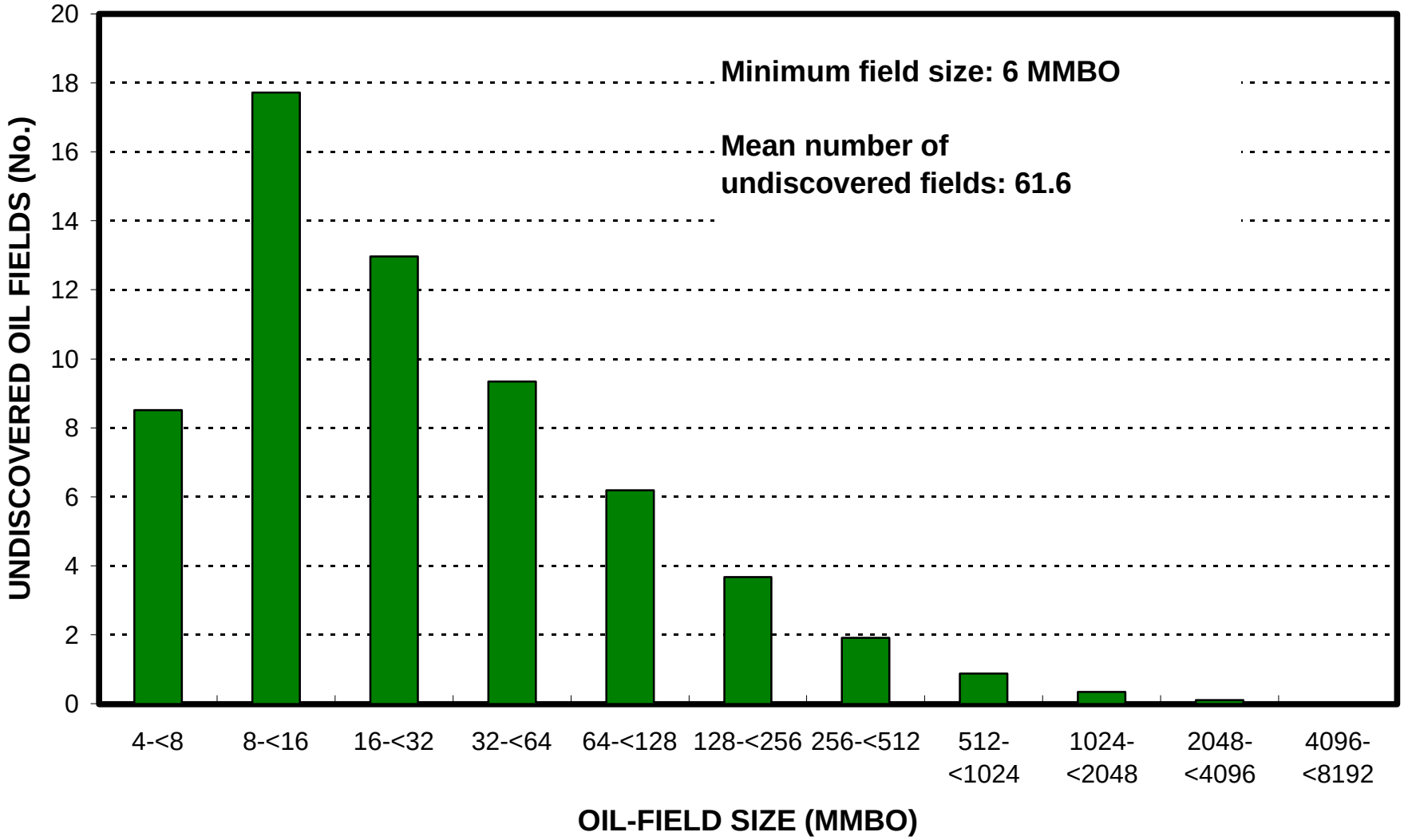
ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT TO COUNTRIES OR OTHER LAND PARCELS (uncertainty of fixed but unknown values)

1. Venezuela 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%)……		95	

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%)……		95	

Orinoco Delta and Offshore, AU 60980202
Undiscovered Field-Size Distribution



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Undiscovered Field-Size Distribution