Go to Table of Contents

Go to index map

Orinoco Heavy Oil and Tar Belt
Assessment Unit 60980104

Orinoco Heavy Oil and Tar Belt Assessment Unit 60980104

East Venezuela Basin Geologic Province 6098

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

- ☐
- ☐ This assessment unit was not
- ☐ assessed quantitatively.

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

TOTAL PETROLEUM SYSTEM: Querecual (609801)

ASSESSMENT UNIT: Orinoco Heavy Oil and Tar Belt (60980104)

DESCRIPTION: This assessment unit encompasses the four major areas of the Orinoco heavy oil and tar belt, including the Machete, Hamaca, Cerro Negro, and Zuata. The Orinoco belt is considered the largest single hydrocarbon accumulation in the world, with as much as 1.8 trillion barrels in place.

SOURCE ROCKS: The main source rocks are mudstones of the Upper Cretaceous Querecual Formation, a stratigraphic equivalent of the La Luna Formation.

MATURATION: Mudstones of the Querecual Formation matured in the lower Tertiary (Oligocene) in the northern part of the basin.

MIGRATION: Migration of Querecual oil from the northern part of the basin involved long-distance migration (~300 km), and is considered the classic example of long-distance migration. Migration was mainly through Upper Cretaceous through Miocene sandstones that served as long-distance conduits before major structures developed in the foreland.

RESERVOIR ROCKS: Reservoir rocks are mainly Lower Miocene fluvial deltaic channel sandstones of the Ofacina Group. Reservoirs in this area are generally considered viable if net thickness is greater than 50 m.

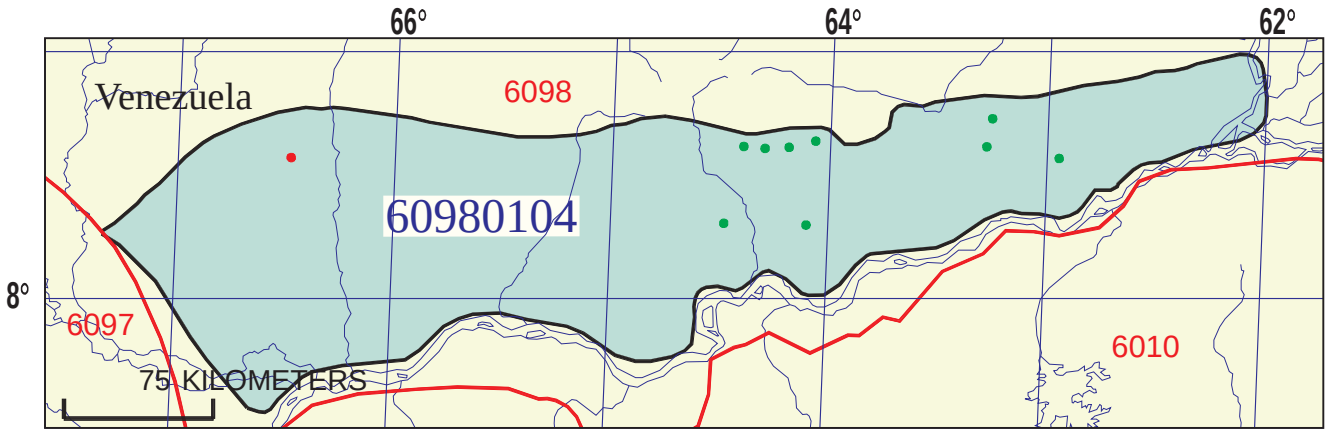
TRAPS AND SEALS: Much of the Orinoco heavy oil is trapped by stratigraphic pinch out of the Miocene Ofacina sandstones against basement lithologies of the Guyana shield. Seals are largely mudstones in the Miocene section.

REFERENCES:

Gutierrez, F.J., Vasquez, E., and Santos C., A., 1977, Formation and crude oil characteristics of oil reservoirs in the Orinoco petroleum belt as related to the geology, *in* Redford, D.A., and Winestock, A.G., eds., The oil sands of Canada-Venezuela, 1977: Canadian Institute of Mining Special Volume 17, p.69-77.

Oil and Gas Journal, 1998, Orinoco–an integrated effort: Oil and Gas Journal, October 19, 1998, p. 49-72.

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 Heavy Oil and Tar Belt Assessment Unit - 60980104

EXPLANATION

- Hydrography
- Shoreline
- 6098 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 60980104 Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

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

Date:…….. 7/6/99
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:…… Querecual Number: 609801
Assessment Unit:…… Orinoco Heavy Oil and Tar Belt Number: 60980104
* 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.)
Orinoco Heavy Oil and Tar Belt, 60980104

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.)
Orinoco Heavy Oil and Tar Belt, 60980104

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%)……			