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Inner Forearc Deformation Belt Assessment Unit 61070101

Inner Forearc Deformation Belt Assessment Unit 61070101

Lesser Antilles Deformed Belt Geologic Province 6107

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: Lesser Antilles Deformed Belt (6107) **GEOLOGIST:** C.J. Schenk

TOTAL PETROLEUM SYSTEM: Tobago Trough Paleogene (610701)

ASSESSMENT UNIT: Inner Forearc Deformation Belt (61070101)

DESCRIPTION: This assessment unit is defined by structural traps along the extent of the north-south trending Inner Forearc Deformation Belt immediately east of the Tobago Trough and south of the St. Lucia Ridge. The structures were formed as the wedge of sediment of the accretionary prism was thrust eastward into the undeformed Paleogene strata of the Tobago Trough.

SOURCE ROCKS: Source rocks are postulated to be organic-bearing mudstones of the Upper Cretaceous-Paleogene that were deposited in the narrow, possibly anoxic marine trough that existed north of the margin of South America and east of the Antilles fold belt. Source rocks are the largest source of uncertainty in this assessment unit.

MATURATION: Given the thickness of the Tertiary section in the Tobago trough (10 to 12 km) and the low thermal gradient, maturation is estimated to have begun in Late Miocene and Pliocene, and probably continues today.

MIGRATION: Migration is postulated to have occurred from the Paleogene sediments in the undeformed Tobago Trough to the east, updip into the folded forearc and accretionary prism strata.

RESERVOIR ROCKS: Major reservoir sandstones (quartz arenites) were deposited as turbidites into the Tobago Trough from the south by the fluvial-deltaic system of the ancestral Rio Orinoco. These sands have excellent reservoir properties; some sandstones on Barbados are unconsolidated.

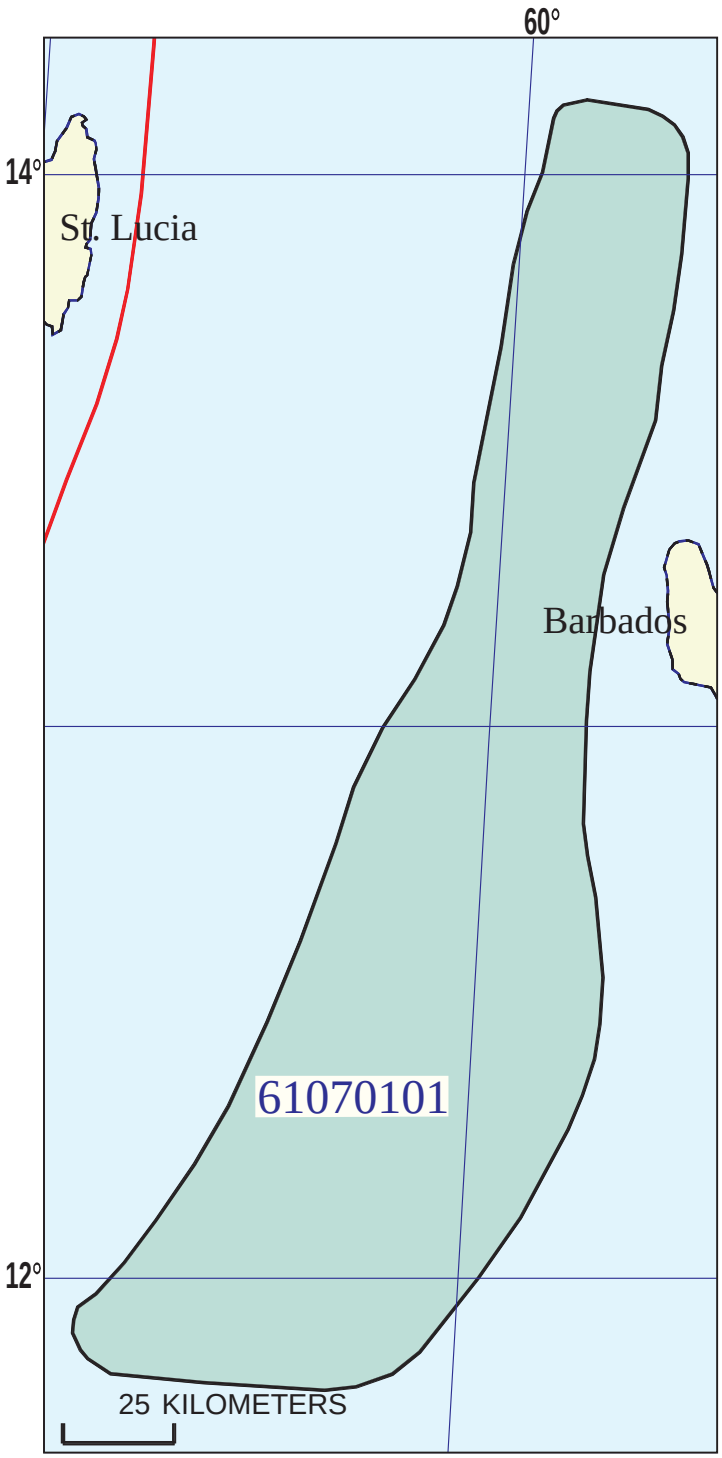
TRAPS AND SEALS: Traps include anticlines, folds, and fault-tip folds formed during compression as the wedge of accretionary sediment was thrust westward during the Miocene. Seals are generally intraformational mudstones within the Eocene and Miocene section.

REFERENCES

Kasper, D.C., and Larue, D.K., 1986, Paleogeographic and tectonic implications of quartzose sandstones of Barbados: Tectonics, v. 5, no. 6, p. 837-854.

Speed, R., Torrini, R., and Smith, P.L., 1989, Tectonic evolution of the Tobago Trough forearc basin: Journal of Geophysical Research, v. 94, no. B3, p. 2913-2936.

Speed, R., Barker, L.H., and Payne, P.L.B., 1991, Geologic and hydrocarbon evolution of Barbados: Journal of Petroleum Geology, v. 14, no. 3, p. 323-342.



Inner Forearc Deformation Belt Assessment Unit - 61070101

EXPLANATION

- Hydrography
- Shoreline
- 6107 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 61070101 Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

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

Date:……..	11/19/99		
Assessment Geologist:……..	C.J. Schenk		
Region:……..	Central and South America	Number:	6
Province:……..	Lesser Antilles Deformed Belt	Number:	6107
Priority or Boutique……	Boutique		
Total Petroleum System:……	Tobago Trough Paleogene	Number:	610701
Assessment Unit:……..	Inner Forearc Deformation Belt	Number:	61070101
* 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?……. 15 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……	0.5
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):…….. 0.5

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.	15	max no.	40
Gas fields:……min. no. (>0)	1	median no.	15	max no.	40

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	15	median size	75	max. size	6000
Gas in gas fields (bcfg):……min. size	90	median size	450	max. size	30000

Assessment Unit (name, no.)
Inner Forearc Deformation Belt, 61070101

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	1100	2200	3300
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)……	25	38	50
Sulfur content of oil (%)……			
Drilling Depth (m) ……	2500	3500	6000
Depth (m) of water (if applicable)……	1000	1600	2400

Gas Fields:	minimum	median	maximum
Inert gas content (%)……			
CO_2 content (%)……			
Hydrogen-sulfide content (%)……			
Drilling Depth (m)……	2500	3500	7000
Depth (m) of water (if applicable)……	1000	1600	2400

Assessment Unit (name, no.)
Inner Forearc Deformation Belt, 61070101

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

1. Barbados represents 75 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		75	
Portion of volume % that is offshore (0-100%)……		100	

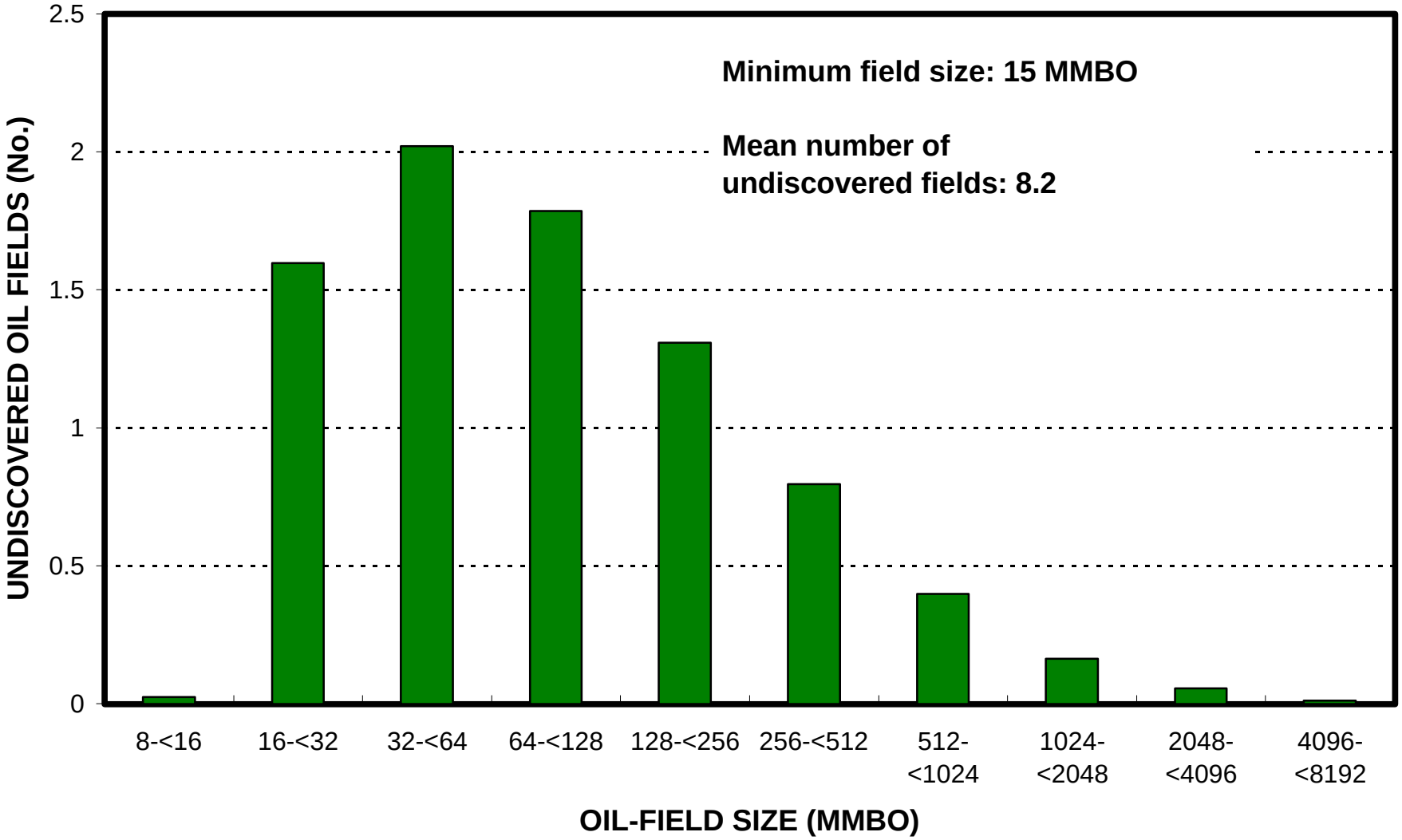
Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		75	
Portion of volume % that is offshore (0-100%)……		100	

2. Trinidad and Tobago represents 25 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		25	
Portion of volume % that is offshore (0-100%)……		100	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		25	
Portion of volume % that is offshore (0-100%)……		100	

Inner Forearc Deformation Belt, AU 61070101
Undiscovered Field-Size Distribution



Inner Forearc Deformation Belt, AU 61070101
Undiscovered Field-Size Distribution