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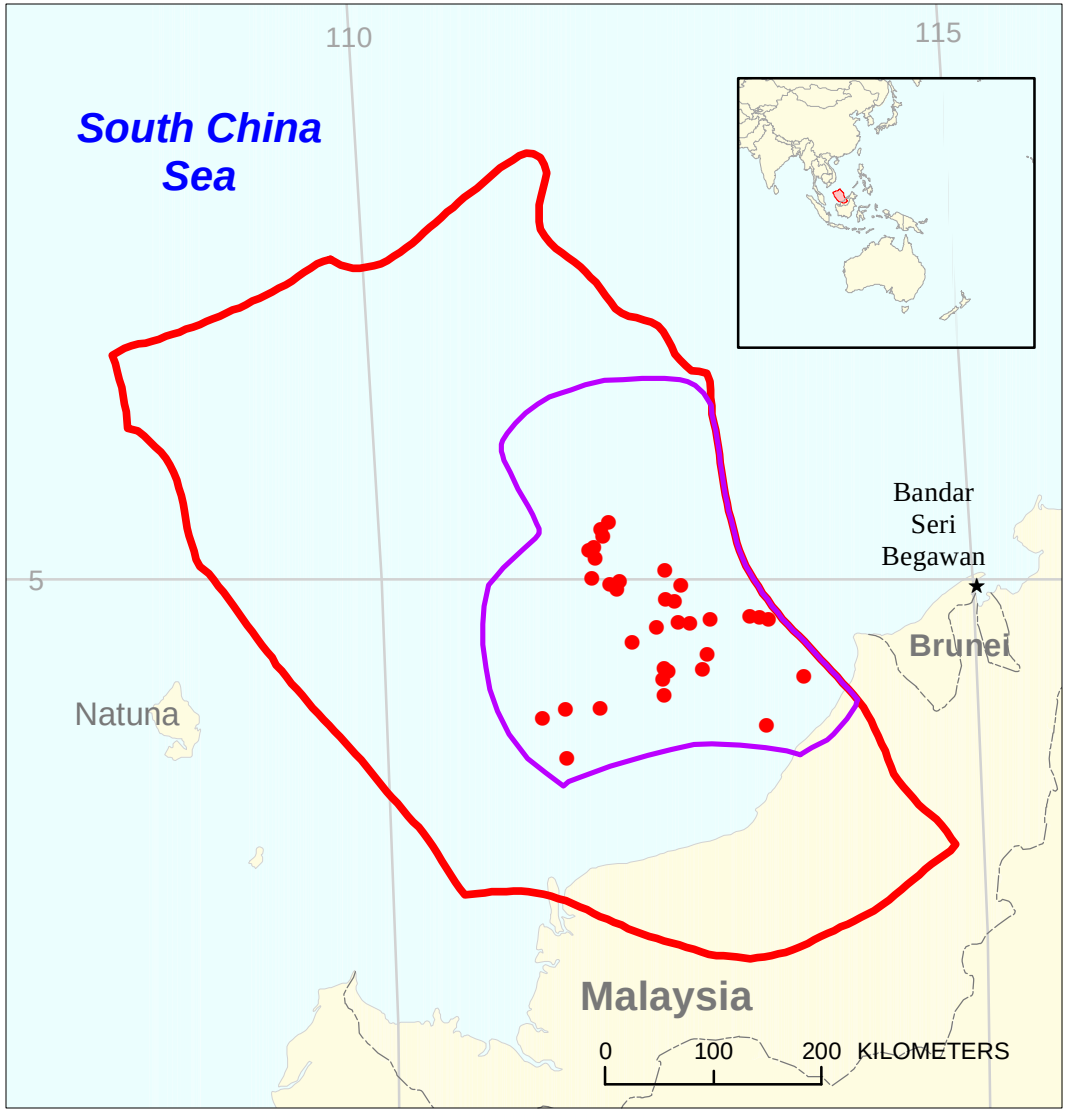
Central Luconia
Assessment Unit 37020101



Central Luconia Assessment Unit 37020101

Greater Sarawak Basin Geologic Province 3702

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: Greater Sarawak Basin (3702) **GEOLOGIST:** P.J. McCabe

TOTAL PETROLEUM SYSTEM: Sarawak Basin (370201)

ASSESSMENT UNIT: Central Luconia (37020101)

DESCRIPTION: The reservoirs are in Middle to Late Miocene pinnacle reefs and are predominantly gas bearing. The reefs are underlain and surrounded by the Balingian Late Oligocene to Middle Miocene deltaic strata. The reefs are present over basement highs and carbonate accumulation was generally able to keep up with subsidence whereas the Balingian deltaics reflect an overall transgression of the coastline towards the west and south. The reefs were eventually buried by fine clastics of the Baram delta complex (Late Miocene-Recent) that prograded from the southeast.

SOURCE ROCKS: Geochemistry indicates that the hydrocarbons were derived from terrigenous organic matter. Coals and marine condensed intervals in the underlying and surrounding Balingian deltaics are probable source rocks.

MATURATION: The area is still undergoing subsidence but most of the overburden was deposited by the mid-Pliocene at least in the southern and central parts of the region. The area has a high geothermal gradient, averaging 43.6^{o} C/km.

MIGRATION: It is probable that upward migration of hydrocarbons was along faults associated with Miocene strike slip movement. Migration through facies in an updip direction from condensed intervals in the surrounding deltaics is also likely.

RESERVOIR ROCKS: The reservoirs are present in zones in the pinnacle reefs that have secondary moldic and vuggy porosity. These zones are associated with dolomitization of reefs during lowstands in sea level.

TRAPS AND SEALS: Mudrocks of the Baram Delta cover the reefs and provide a regional seal, but the reefs are compartmentalized by zones of tight argillaceous limestone separating the dolomitized zones.

PETROLEUM INDUSTRY ACTIVITY: Interest in the area commenced in the 1950s and accelerated during the late 1960s. Natural gas produced in the area is shipped to Japan and Korea as LNG.

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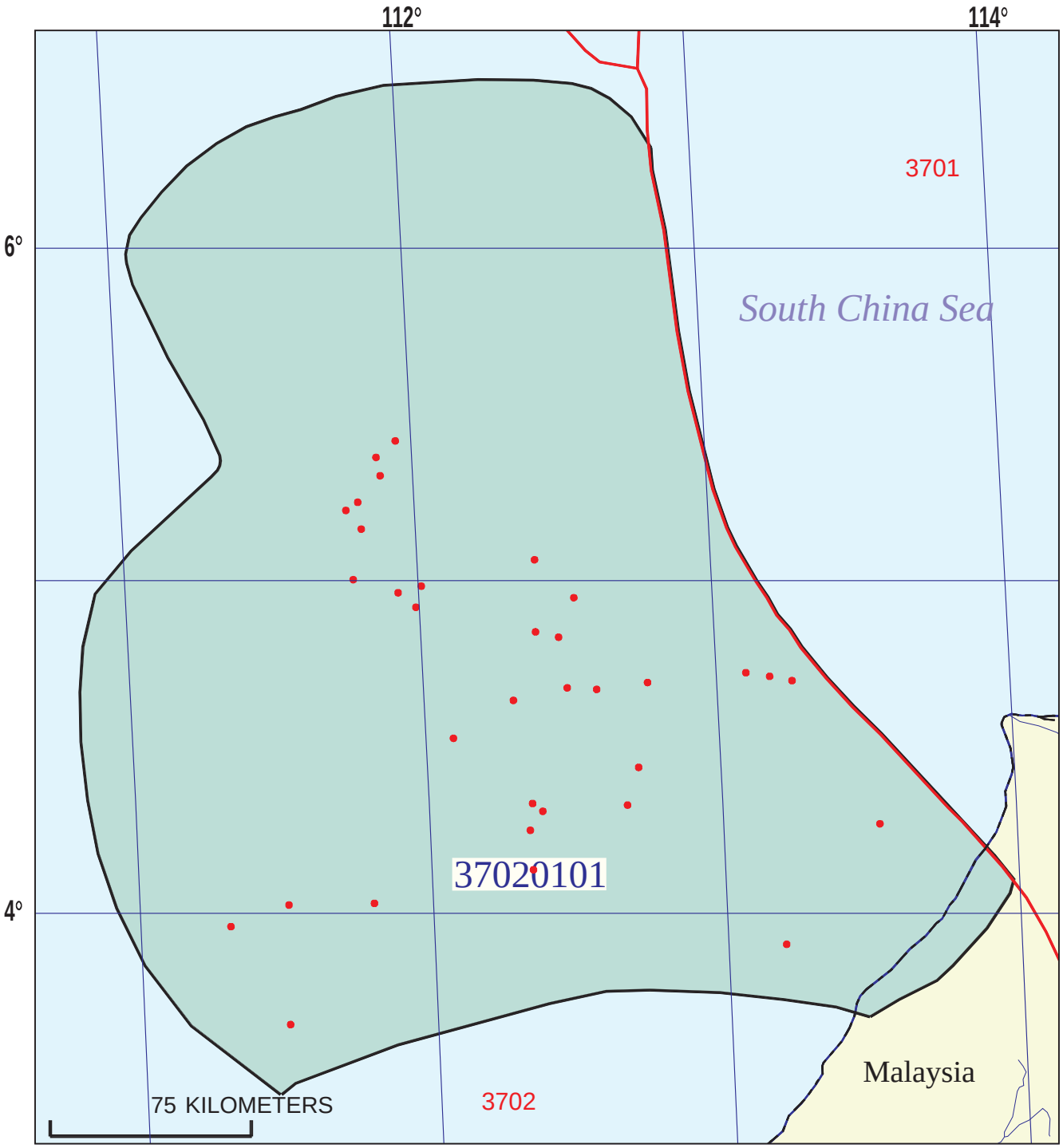

Central Luconia
Assessment Unit - 37020101

EXPLANATION

- Hydrography
- Shoreline
- 3702 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 37020101 Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

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

Date:……..	8/17/99		
Assessment Geologist:……..	P.J. McCabe		
Region:……..	Asia Pacific	Number:	3
Province:……..	Greater Sarawak Basin	Number:	3702
Priority or Boutique……	Priority		
Total Petroleum System:……	Sarawak Basin	Number:	370201
Assessment Unit:……	Central Luconia	Number:	37020101
* Notes from Assessor	MMS growth function.		

CHARACTERISTICS OF ASSESSMENT UNIT

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

What is the minimum field size?……. 5 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: 28
Established (>13 fields) X 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 2087 2nd 3rd 359 3rd 3rd 1394

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)	_____	median no.	_____	max no.	_____
Gas fields:……min. no. (>0)	10	median no.	60	max no.	135

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	30	median size	125	max. size	5000

Assessment Unit (name, no.)
Central Luconia, 37020101

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)……	9	17	25
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 (%)……	1	2.5	5
CO_2 content (%)……	1	3.5	75
Hydrogen-sulfide content (%)……	0	0	0
Drilling Depth (m)……	1000	1700	4000
Depth (m) of water (if applicable)……	50	100	200

Assessment Unit (name, no.)
Central Luconia, 37020101

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

1. Malaysia 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%)……		100	

Central Luconia, AU 37020101
Undiscovered Field-Size Distribution