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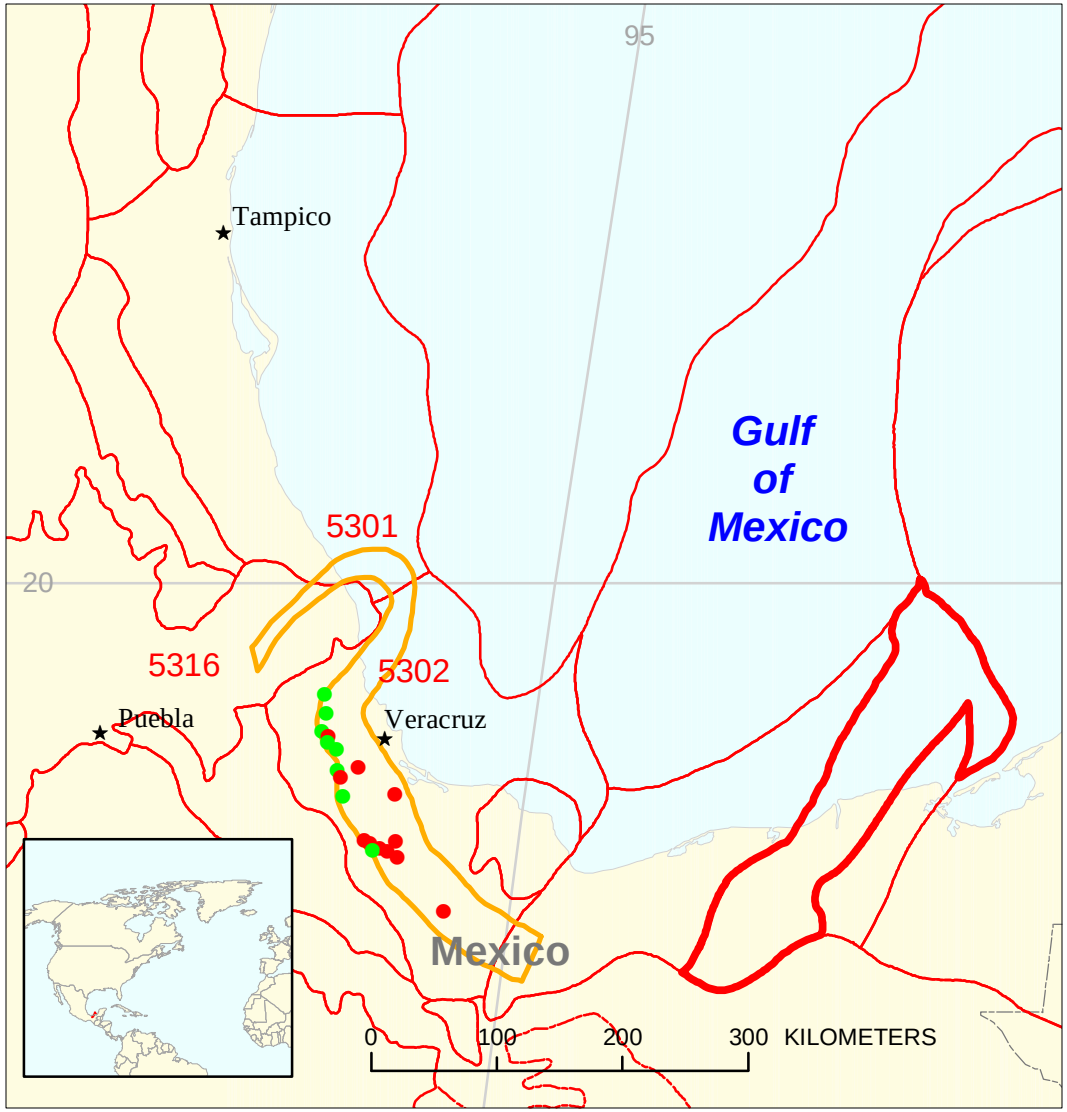
Tamabra-Like Debris-Flow-Breccia Limestone and Overlying Strata Assessment Unit 53050103



Tamabra-Like Debris-Flow-Breccia Limestone and Overlying Strata Assessment Unit 53050103

Villahermosa Uplift Geologic Province 5305

Other geologic province boundary

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 PROVINCES: Veracruz Basin (5302), Tampico-Misantla Basin (5301), Saline-Comalcalco Basin (5304), and Trans-Mexican Neovolcanic Axis (5316)

GEOLOGIST: L.B. Magoon III

TOTAL PETROLEUM SYSTEM: Pimienta-Tamabra (530501)

ASSESSMENT UNIT: Tamabra-Like Debris-Flow-Breccia Limestone and Overlying Strata (53050103)

DESCRIPTION: This assessment unit includes the traps in the Tamabralike limestone reservoir facies without underlying evaporites of the Pimienta-Tamabra total petroleum system.

SOURCE ROCK: Pimientalike shale is an organic-rich source rock that includes all the Upper Jurassic (Oxfordian, Kimmeridgian, and Tithonian) sedimentary rocks and covers the entire southern Gulf of Mexico. It is as thick as 1.5 km, has a richness of as much as 5 wt. % TOC, and whose source rock quality is as much as HI of 750 g HC/gm TOC. All oil samples from several provinces (5301, 5304, and 5305) are similar to each other and compare favorably with extracts from the Pimientalike shale.

MATURATION: The Gulf of Mexico basin whose geometry was established in Oxfordian time is still filling with sediment. This simple burial history allows that the burial depth below the sediment-water interface to the oil window be 5 km. Depending upon where the burial history chart in the southern Gulf of Mexico is located, the onset of oil generation ranges from Eocene to Miocene time.

MIGRATION: Migration of oil and dissolved gas from the Upper Jurassic source rock begins in Eocene to Miocene time after most of the reservoir and seal rocks are deposited and the structural geometry of the traps established. Although the source rock in the center of the southern Gulf of Mexico is in the gas window, there is a lack of large natural gas fields indicating that the source rock is depleted within the oil window.

RESERVOIR ROCKS (CRETACEOUS AND TERTIARY): Tamabralike limestone (Slope, Base-of-Slope and Basin Environment): Tamabralike limestone reservoirs are comprised of allochthonous carbonate sediments (debris flow breccia and turbidity current facies) that were derived from platform margins and deposited on slope, base-of-slope and basinal settings. Reservoir porosity in this facies consists of skeletal moldic, vuggy, interparticle, intercrystal, and some fracture porosity. In producing fields, porosity ranges from 8.0 percent to 25.0 percent, and permeability ranges from 0.01 millidarcies to 5.0 darcys. Most reservoir rocks are Cretaceous (64 percent) in age, followed by Tertiary (36 percent) age.

TRAPS AND SEALS: Stratigraphic and structural; basinward and lateral pinchout of debris flow breccias and turbidites into basinal pelagic lime mudstones.

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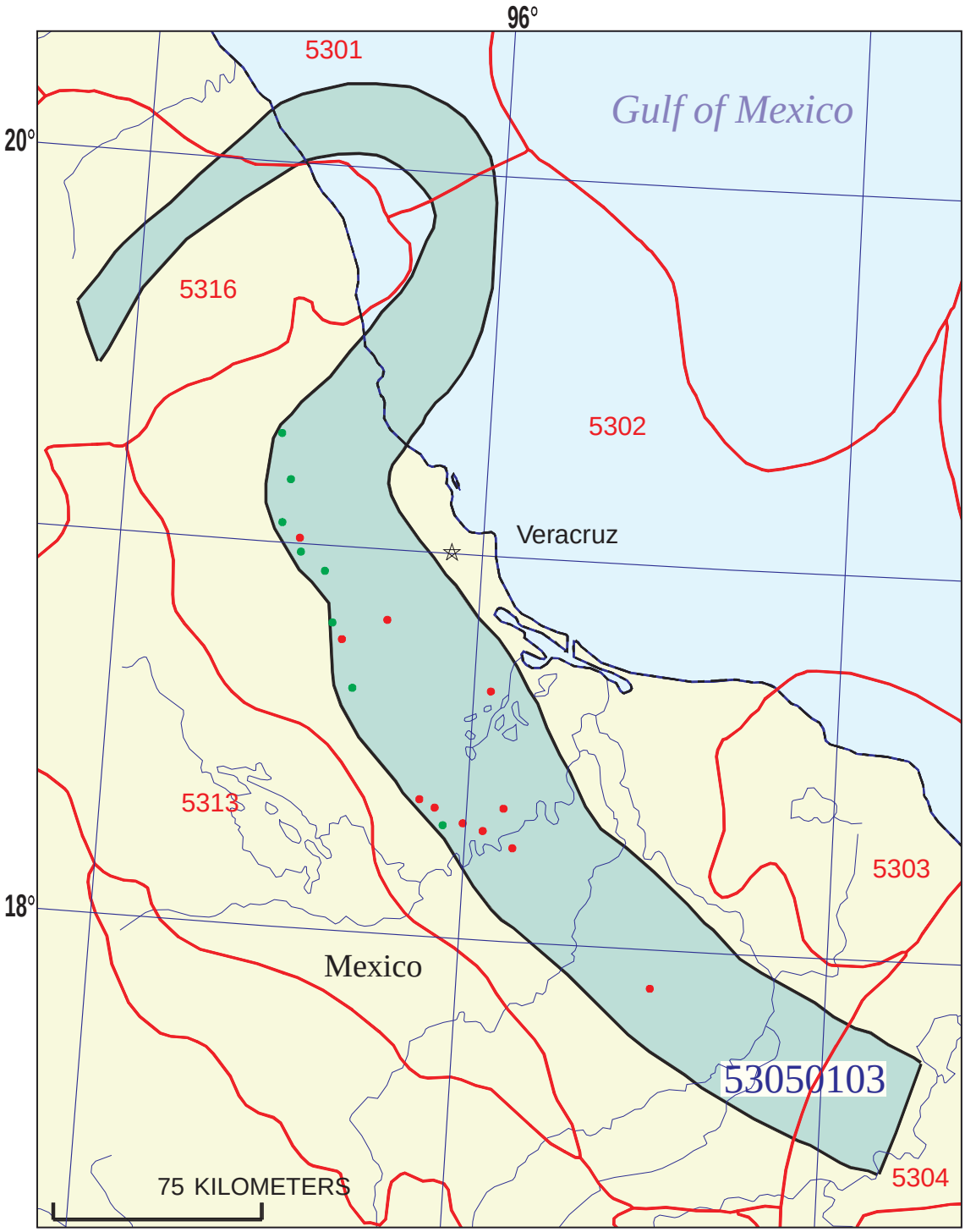


Tamabra-Like Debris-Flow-Breccia Limestone and Overlying Strata Assessment Unit - 53050103

EXPLANATION

- Hydrography
- Shoreline
- 5305 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 53050103 Assessment unit code and boundary

Projection: Lambert. Standard parallels: 49 and 77. Central meridian: -92

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

Date:……..	12/1/99		
Assessment Geologist:……..	L.B. Magoon		
Region:……..	North America	Number:	5
Province:……..	Villahermosa Uplift	Number:	5305
Priority or Boutique……	Priority		
Total Petroleum System:……	Pimienta-Tamabra	Number:	530501
Assessment Unit:……..	Tamabra-Like Debris-Flow-Breccia Limestone and Overlyi	Number:	53050103
* 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?……. 1 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: 5 Gas: 9
Established (>13 fields) X Frontier (1-13 fields) _____ Hypothetical (no fields) _____

Median size (grown) of discovered oil fields (mmboe):
1st 3rd 23 2nd 3rd 12 3rd 3rd _____
Median size (grown) of discovered gas fields (bcfg):
1st 3rd 52 2nd 3rd 56 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)	3	median no.	40	max no.	100
Gas fields:……min. no. (>0)	3	median no.	50	max no.	120

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	1	median size	6	max. size	800
Gas in gas fields (bcfg):……min. size	6	median size	30	max. size	3000

Assessment Unit (name, no.)
Tamabra-Like Debris-Flow-Breccia Limestone and Overlying Strata, 53050103

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)……	15	35	55
Sulfur content of oil (%)……	0.1	1	8
Drilling Depth (m) ……	500	3000	5500
Depth (m) of water (if applicable)……	0	200	1200

Gas Fields:	minimum	median	maximum
Inert gas content (%)……			
CO_2 content (%)……			
Hydrogen-sulfide content (%)……			
Drilling Depth (m)……	500	3000	6000
Depth (m) of water (if applicable)……	0	200	1200

Assessment Unit (name, no.)
Tamabra-Like Debris-Flow-Breccia Limestone and Overlying Strata, 53050103

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

1. Mexico 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%)……		10	

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%)……		10	

2. Province 5302 represents 79 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		86	
Portion of volume % that is offshore (0-100%)……		6	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		86	
Portion of volume % that is offshore (0-100%)……		6	

3. Province 5301 represents 9 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		5	
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):…		5	
Portion of volume % that is offshore (0-100%)……		100	

4. Province 5304 represents 6 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		6	
Portion of volume % that is offshore (0-100%)……		0	

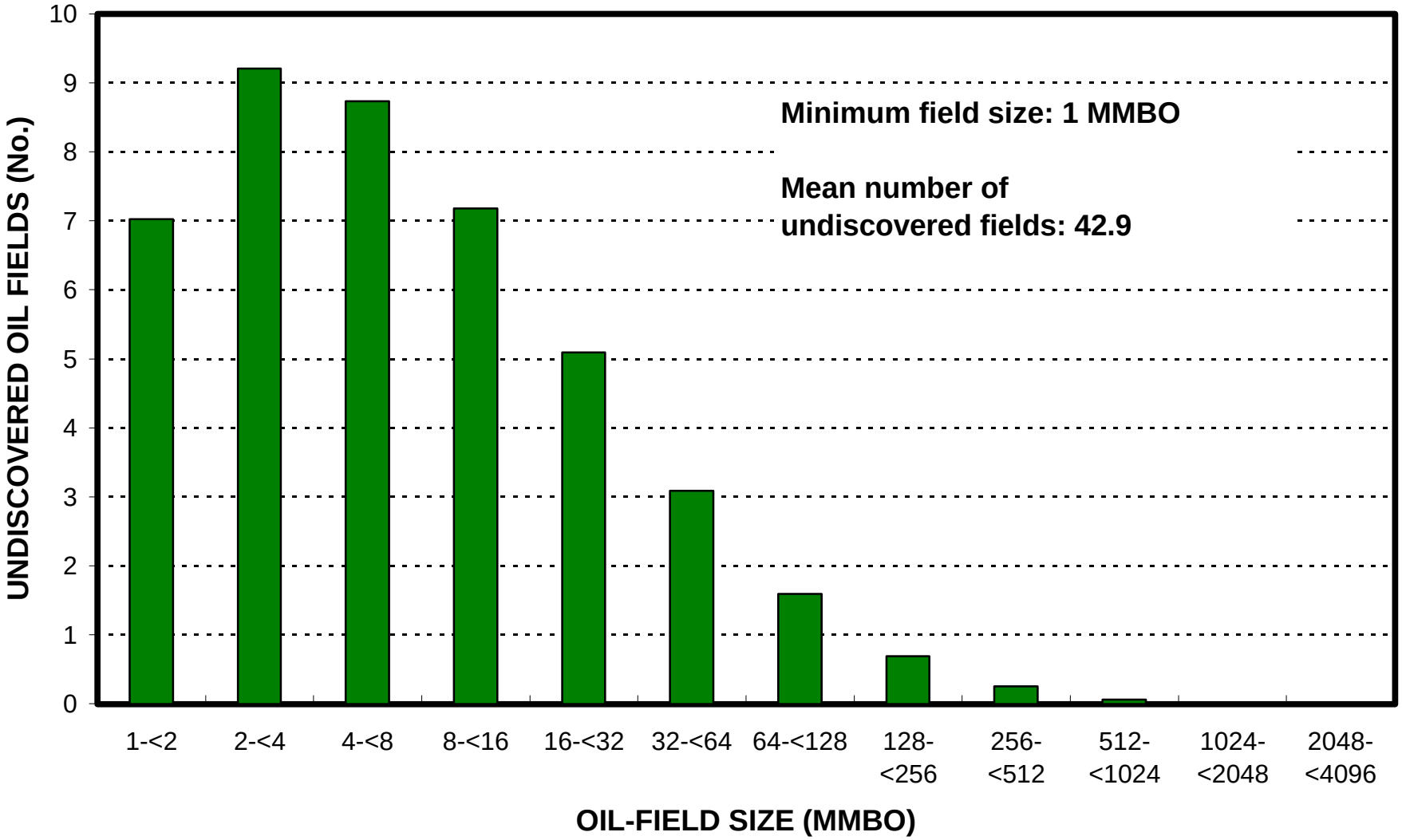
Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		6	
Portion of volume % that is offshore (0-100%)……		0	

5. Province 5316 represents 6 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		3	
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):…		3	
Portion of volume % that is offshore (0-100%)……		0	

Tambra-Like Debris-Flow-Breccia Limestone and Overlying Strata, AU 53050103, Undiscovered Field-Size Distribution



Tambra-Like Debris-Flow-Breccia Limestone and Overlying Strata, AU 53050103, Undiscovered Field-Size Distribution