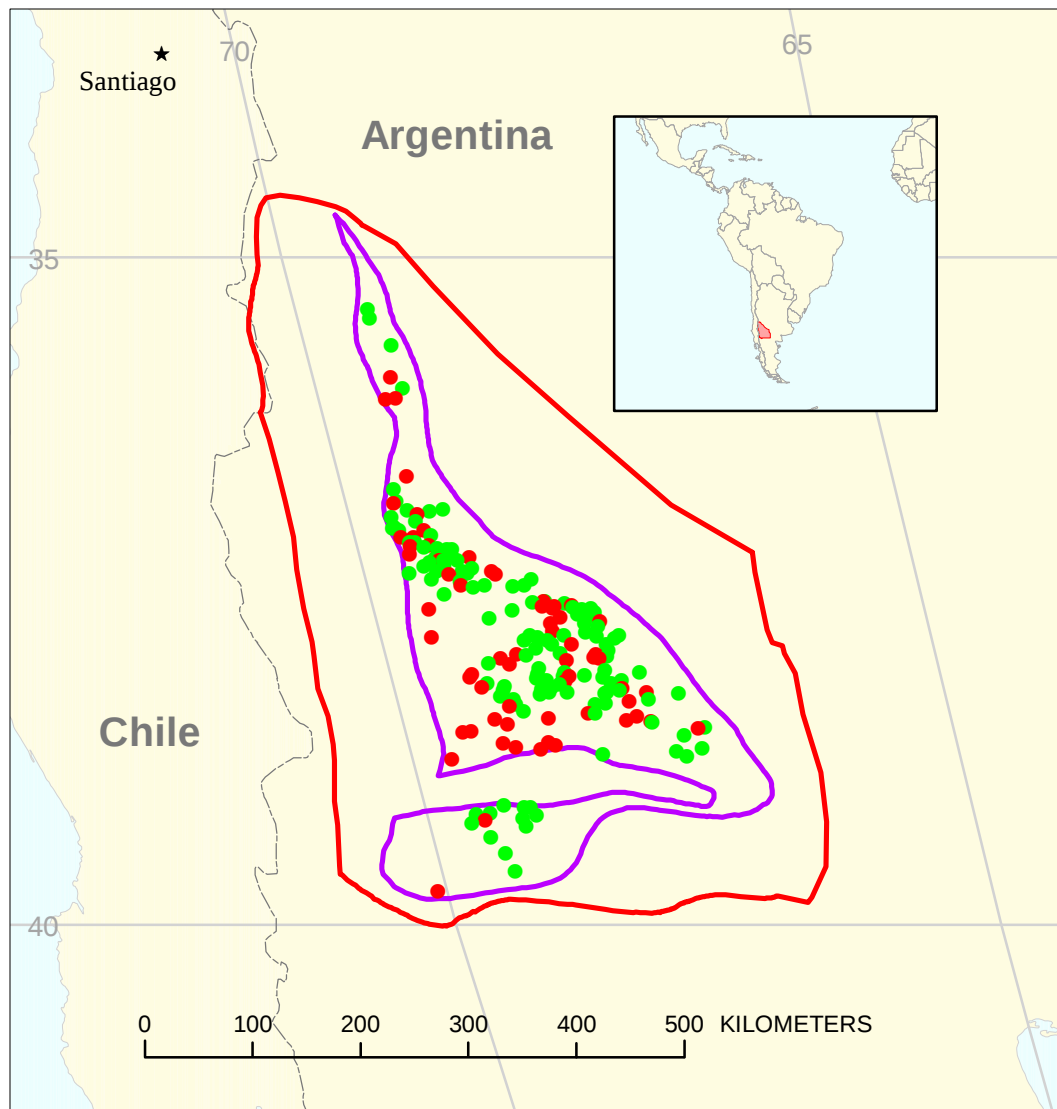


Neuquen Extensional Structures Assessment Unit 60550101



 Neuquen Extensional Structures Assessment Unit 60550101

 Neuquen Basin Geologic Province 6055

USGS PROVINCE: Neuquen Basin (6055)

GEOLOGIST: C.J. Schenk

TOTAL PETROLEUM SYSTEM: Neuquen Hybrid (605501)

ASSESSMENT UNIT: Neuquen Extensional Structures (60550101)

DESCRIPTION: This assessment unit is defined by structural, stratigraphic, and combination traps in the Northwest Platform, Anelo Trough, Malarque sub-basin, and the Picun-Leufu sub-basin of the Neuquen Basin, areas that were undeformed by Andean tectonism. Mixing of oils from three source rocks led to the definition of a composite petroleum system in the basin.

SOURCE ROCKS: Source rocks include mudstones of the Lower Jurassic Los Molles Formation, Upper Jurassic-Lower Cretaceous Vaca Muerta Formation, and Lower Cretaceous Agrio Formation.

MATURATION: Lower Jurassic Los Molles mudstones matured in the Cretaceous; Vaca Muerta mudstones (most important) matured in the Late Cretaceous-Early Tertiary, as did the Agrio Formation mudstones.

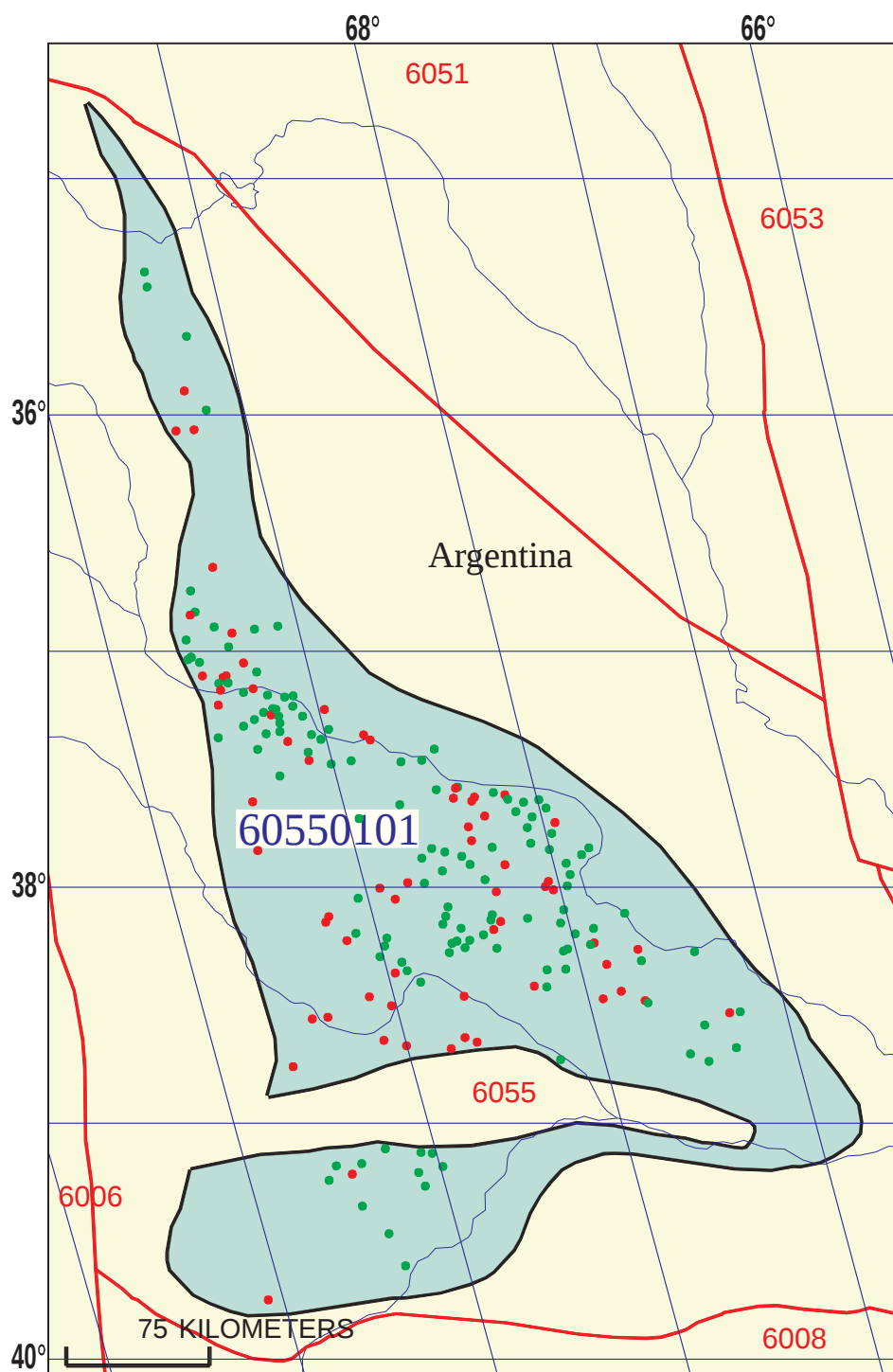
MIGRATION: Hydrocarbons migrated laterally and vertically along carrier beds and faults from the deep basinal areas to the basin margin and platform areas.

RESERVOIR ROCKS: Major reservoirs are Lower Cretaceous Quintuco Formation and Loma Montosa carbonates; Upper Jurassic-Lower Cretaceous Catriel Formation and Sierras Blancas sandstones, and Malarque Group sandstones.

TRAPS AND SEALS: Permo-Triassic rifting produced north-south and northwest-southeast normal faults that were reactivated; stratigraphic/structural traps with turbidite reservoirs may be present in basinal areas. Seals are regional mudstones and local intraformational mudstones, evaporites, and carbonate diagenetic and facies change seals.

REFERENCES:

- Petroconsultants, 1993, Neuquen Basin–Basin Monitor: Geneva, Switzerland, Petroconsultants International, chapter paginated.
- Urien, C.M., and Zambrano, J.J., 1994, Petroleum systems in the Neuquen Basin, Argentina, *in* Magoon, L.B., and Dow, W.G., eds., The petroleum system—from source to trap: American Association of Petroleum Geologists Memoir 60, p. 513-535.
- Vergani, G.D., Tankard, A.J., Belotti, H.J., and Welsink, H.J., 1995, Tectonic evolution and paleogeography of the Neuquen Basin, Argentina, *in* Tankard, A.J., Suarez, R., and Welsink, H.J., eds., Petroleum basins of South America: American Association of Petroleum Geologists Memoir 62, p. 383-402.



Neuquen Extensional Structures Assessment Unit - 60550101

EXPLANATION

- Hydrography
- Shoreline
- 6055 Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 60550101 — Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

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

Date:.....	<u>2/3/99</u>	
Assessment Geologist:.....	<u>C.J. Schenk</u>	
Region:.....	<u>Central and South America</u>	Number: <u>6</u>
Province:.....	<u>Neuquen Basin</u>	Number: <u>6055</u>
Priority or Boutique:.....	<u>Priority</u>	
Total Petroleum System:.....	<u>Neuquen Hybrid</u>	Number: <u>605501</u>
Assessment Unit:.....	<u>Neuquen Extensional Structures</u>	Number: <u>60550101</u>
* Notes from Assessor	<u>Lower 48 growth factor. Turbidite potential.</u>	

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: <u>67</u>	Gas: <u>45</u>
Established (>13 fields) <u>X</u>	Frontier (1-13 fields) _____	Hypothetical (no fields) _____

Median size (grown) of discovered oil fields (mmboe):	1st 3rd <u>30</u>	2nd 3rd <u>3.7</u>	3rd 3rd <u>5.6</u>
Median size (grown) of discovered gas fields (bcfg):	1st 3rd <u>77</u>	2nd 3rd <u>37</u>	3rd 3rd <u>34</u>

Assessment-Unit Probabilities:

<u>Attribute</u>	<u>Probability of occurrence (0-1.0)</u>
1. CHARGE: Adequate petroleum charge for an undiscovered field ≥ minimum size.....	<u>1.0</u>
2. ROCKS: Adequate reservoirs, traps, and seals for an undiscovered field ≥ minimum size.....	<u>1.0</u>
3. TIMING OF GEOLOGIC EVENTS: Favorable timing for an undiscovered field ≥ minimum size	<u>1.0</u>

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.....	<u>1.0</u>
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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)	<u>10</u>	median no.	<u>70</u>	max no.	<u>150</u>
Gas fields:.....min. no. (>0)	<u>6</u>	median no.	<u>70</u>	max no.	<u>150</u>

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	<u>1</u>	median size	<u>5</u>	max. size	<u>350</u>
Gas in gas fields (bcfg):.....	min. size	<u>6</u>	median size	<u>30</u>	max. size	<u>2100</u>

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

<u>Oil Fields:</u>	minimum	median	maximum
Gas/oil ratio (cfg/bo).....	1500	3000	4500
NGL/gas ratio (bngl/mmcf).....	10	20	30
<u>Gas fields:</u>	minimum	median	maximum
Liquids/gas ratio (bngl/mmcf).....	5	15	25
Oil/gas ratio (bo/mmcf).....			

SELECTED ANCILLARY DATA FOR UNDISCOVERED FIELDS

(variations in the properties of undiscovered fields)

<u>Oil Fields:</u>	minimum	median	maximum
API gravity (degrees).....	20	35	50
Sulfur content of oil (%).....			
Drilling Depth (m)	500	2000	4000
Depth (m) of water (if applicable).....			
<u>Gas Fields:</u>	minimum	median	maximum
Inert gas content (%).....			
CO ₂ content (%).....			
Hydrogen-sulfide content(%).....			
Drilling Depth (m).....	500	2500	5000
Depth (m) of water (if applicable).....			

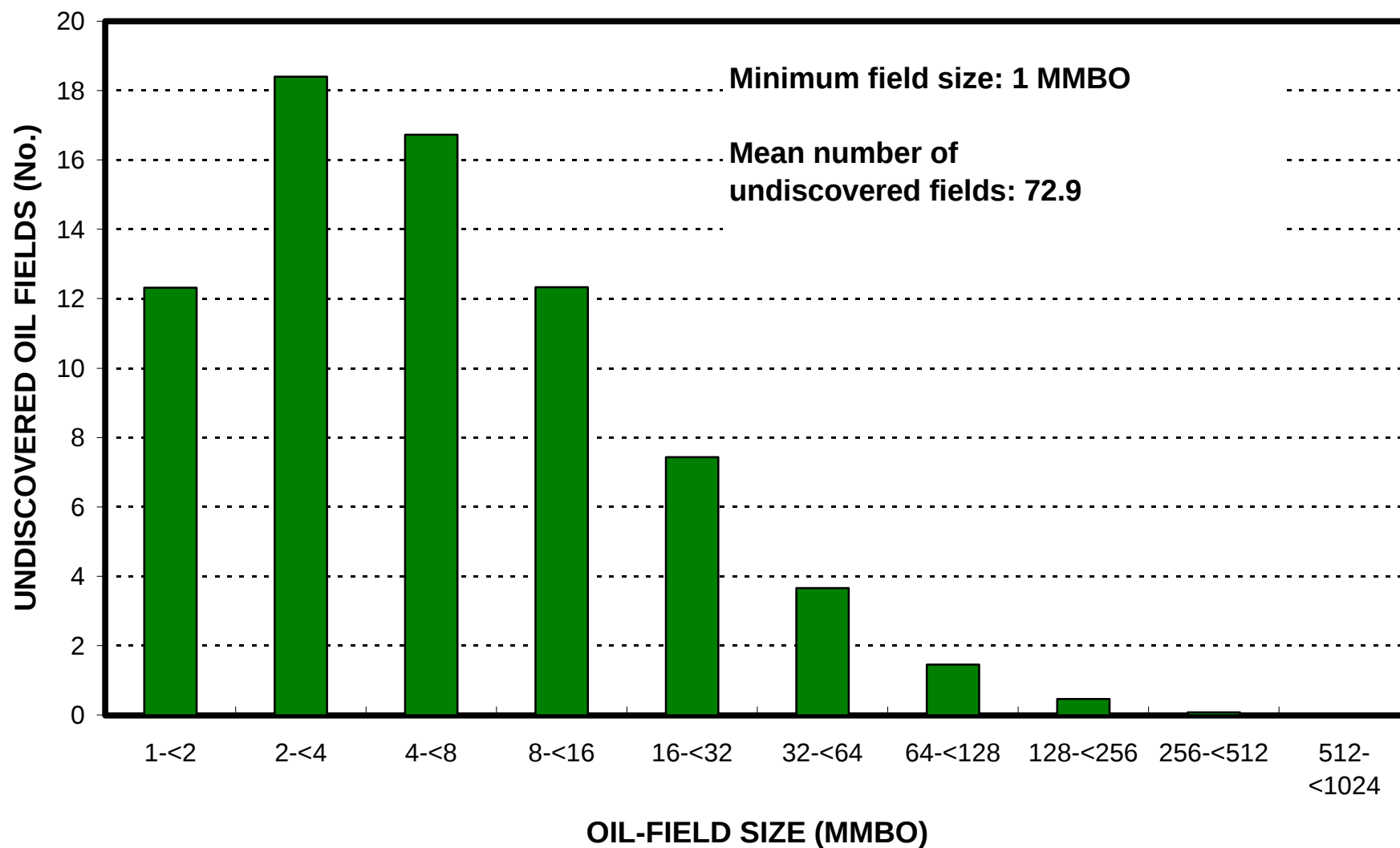
**ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT
 TO COUNTRIES OR OTHER LAND PARCELS** (uncertainty of fixed but unknown values)

1. Argentina represents 100 areal % of the total assessment unit

<u>Oil in Oil Fields:</u>	minimum	median	maximum
Richness factor (unitless multiplier):.....	_____	_____	_____
Volume % in parcel (areal % x richness factor):...	_____	<u>100</u>	_____
Portion of volume % that is offshore (0-100%).....	_____	<u>0</u>	_____
<u>Gas in Gas Fields:</u>	minimum	median	maximum
Richness factor (unitless multiplier):.....	_____	_____	_____
Volume % in parcel (areal % x richness factor):...	_____	<u>100</u>	_____
Portion of volume % that is offshore (0-100%).....	_____	<u>0</u>	_____

Neuquen Extensional Structures, AU 60550101

Undiscovered Field-Size Distribution



Neuquen Extensional Structures, AU 60550101

Undiscovered Field-Size Distribution

