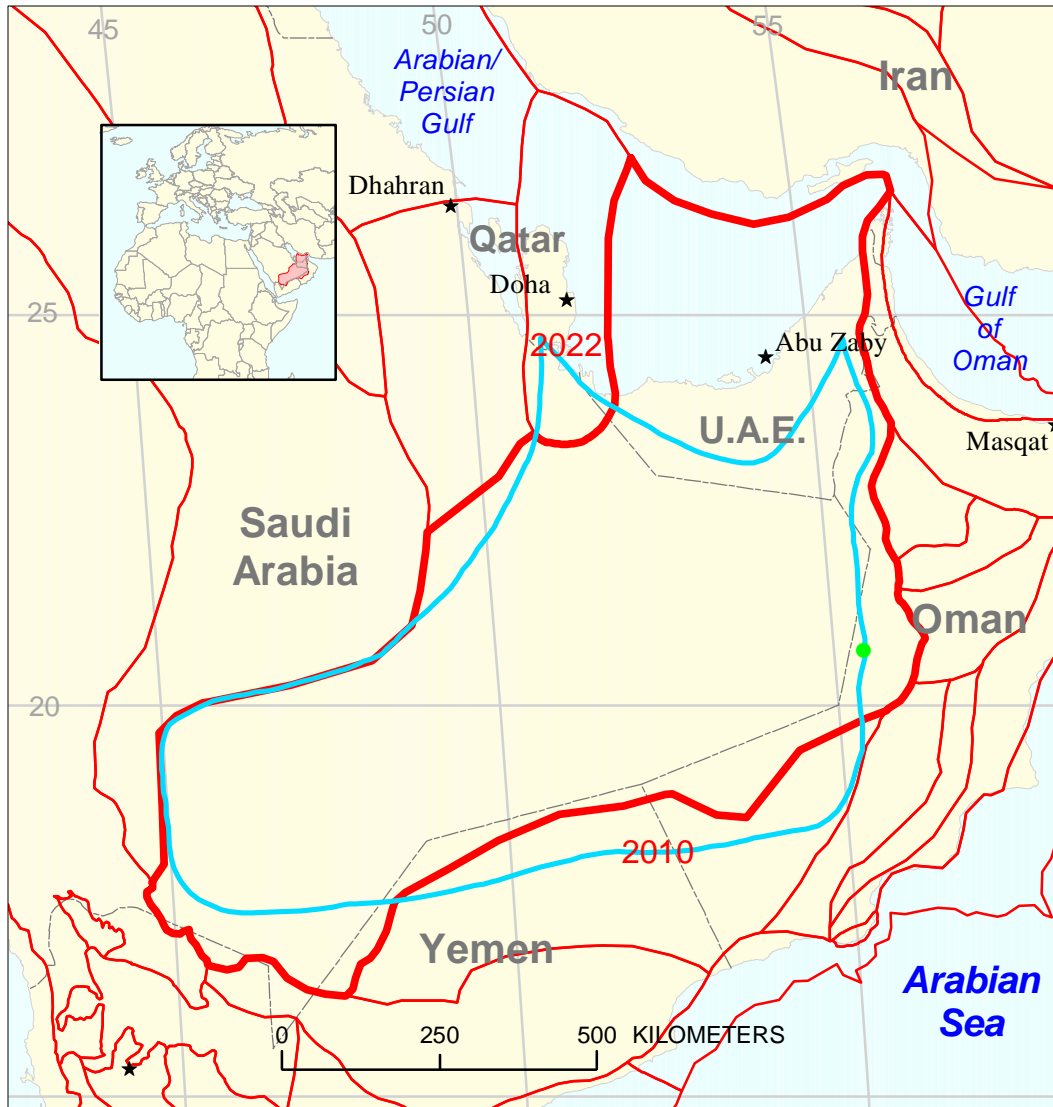





Paleozoic Reservoirs Assessment Unit 20190302



-  Paleozoic Reservoirs Assessment Unit 20190302
-  Rub Al Khali Basin Geologic Province 2019
-  Other petroleum system boundary

USGS PROVINCE: Rub Al Khali Basin (2019)

GEOLOGIST: C.J. Schenk

TOTAL PETROLEUM SYSTEM: Silurian Qusaiba (201903)

ASSESSMENT UNIT: Paleozoic Reservoirs (20190302)

DESCRIPTION: This assessment unit encompasses most of the Rub al Khali Basin in Saudi Arabia, Oman, and Yemen where structures are related to extensive regional wrench fault systems and faults related to salt structures.

SOURCE ROCKS: Source rocks are hot shales of the basal Qusaiba Member of the Lower Silurian Qalibah Formation, which occurs throughout the Rub al Khali Basin. The basal Qusaiba is as thick as 75 m, with TOC values as high as to 20 percent, averaging 4 percent.

MATURATION: Qusaiba mudstones in this assessment unit are in the dry gas window over much of the central part of the basin, but are in the oil and wet gas window along the basin margins to the west, south, and east.

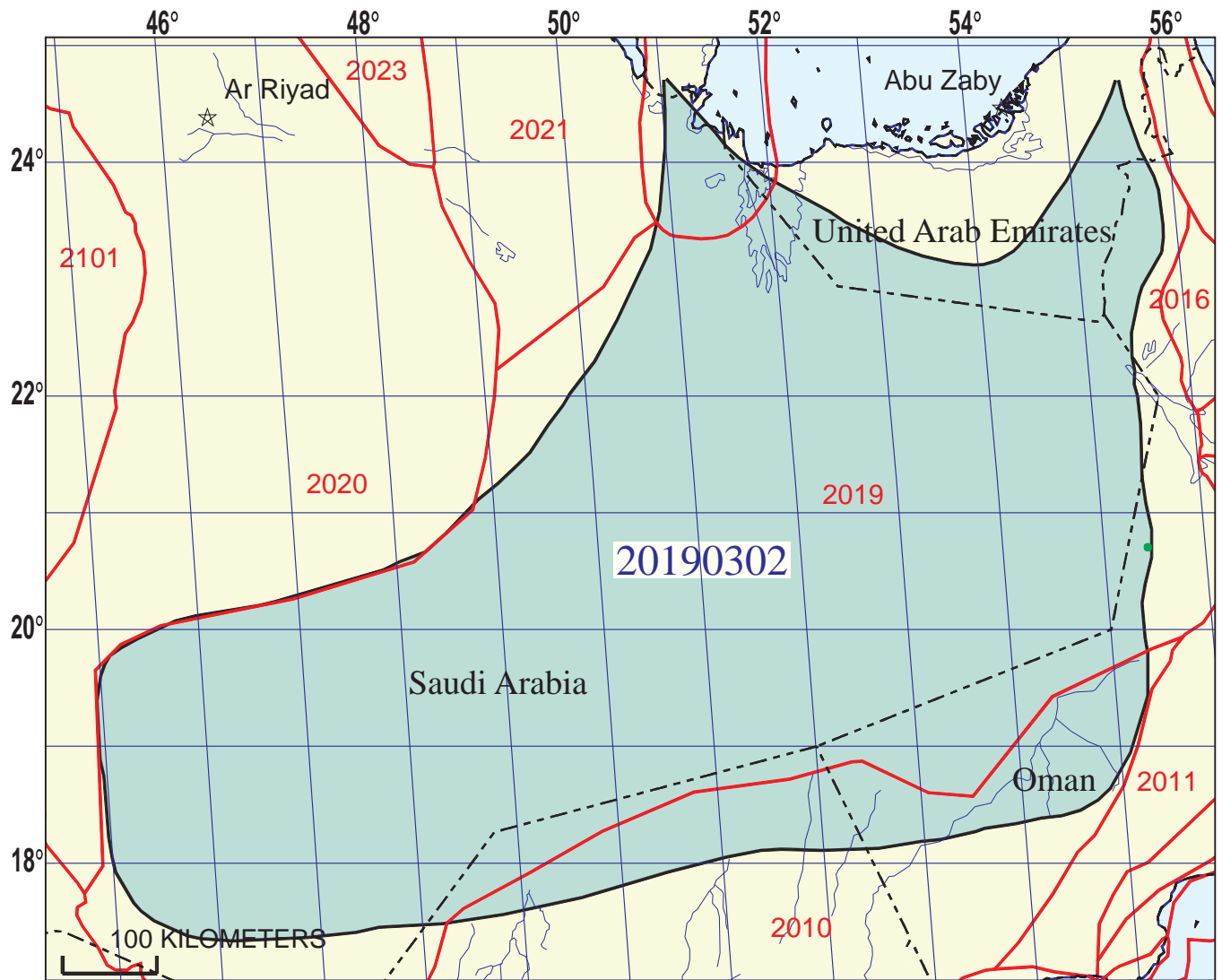
MIGRATION: Migration of Qusaiba hydrocarbons is considered to be mainly vertical in basement-involved structures in the central part of the basin, and moderate to long distance lateral migration is inferred along the basin margins with Unayzah sandstones as the major carrier beds.

RESERVOIR ROCKS: Reservoir rocks are mainly alluvial, fluvial, and eolian sandstones of the Permian Unayzah Formation and the basal Khuff Formation. Potential reservoirs may also be in fluvial and deltaic sandstones of the Cambro-Ordovician section. Porosity in Unayzah sandstones is as much as 30 percent, and permeabilities as high as 4 D.

TRAPS AND SEALS: Traps range from stratigraphic and structural traps along the margins of the basin to structural traps in the central part of the basin related to the major fault systems that extend across the basin. Seals are mainly anhydrites of the Khuff Formation.








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- Jones, P.J., and Stump, T.E., 1999, Depositional and tectonic setting of the Lower Silurian hydrocarbon source facies, central Saudi Arabia: *American Association of Petroleum Geologists Bulletin*, v. 83, p. 314-332.
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Paleozoic Reservoirs Assessment Unit - 20190302

EXPLANATION

-  Hydrography
-  Shoreline
- 2019  Geologic province code and boundary
-  Country boundary
-  Gas field centerpoint
-  Oil field centerpoint
- 20190302  Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

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 (bnl/mmcf).....	30	60	90
 <u>Gas fields:</u>	 minimum	 median	 maximum
Liquids/gas ratio (bnl/mmcf).....	40	80	120
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).....	35	46	55
Sulfur content of oil (%).....	0.02	0.07	0.9
Drilling Depth (m)	1000	2000	5000
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).....	1000	3000	6500
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. Saudi Arabia represents 85 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):...	_____	89	_____
Portion of volume % that is offshore (0-100%):.....	_____	0	_____
 <u>Gas in Gas Fields:</u>	 minimum	 median	 maximum
Richness factor (unitless multiplier):.....	_____	_____	_____
Volume % in parcel (areal % x richness factor):...	_____	94	_____
Portion of volume % that is offshore (0-100%):.....	_____	0	_____

2. Yemen represents 4 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):...	_____	4	_____
Portion of volume % that is offshore (0-100%):.....	_____	0	_____
 <u>Gas in Gas Fields:</u>	 minimum	 median	 maximum
Richness factor (unitless multiplier):.....	_____	_____	_____
Volume % in parcel (areal % x richness factor):...	_____	1	_____
Portion of volume % that is offshore (0-100%):.....	_____	0	_____

3. Oman represents 7 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):...	_____	3	_____
Portion of volume % that is offshore (0-100%):.....	_____	0	_____
 <u>Gas in Gas Fields:</u>	 minimum	 median	 maximum
Richness factor (unitless multiplier):.....	_____	_____	_____
Volume % in parcel (areal % x richness factor):...	_____	3	_____
Portion of volume % that is offshore (0-100%):.....	_____	0	_____

4. United Arab Emirates represents 4 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):...	_____	4	_____
Portion of volume % that is offshore (0-100%):.....	_____	0	_____
 <u>Gas in Gas Fields:</u>	 minimum	 median	 maximum
Richness factor (unitless multiplier):.....	_____	_____	_____
Volume % in parcel (areal % x richness factor):...	_____	2	_____
Portion of volume % that is offshore (0-100%):.....	_____	0	_____

5. Province 2019 represents 90 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>92</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>98</u>	_____
Portion of volume % that is offshore (0-100%).....	_____	<u>0</u>	_____

6. Province 2010 represents 8 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>7</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>1</u>	_____
Portion of volume % that is offshore (0-100%).....	_____	<u>0</u>	_____

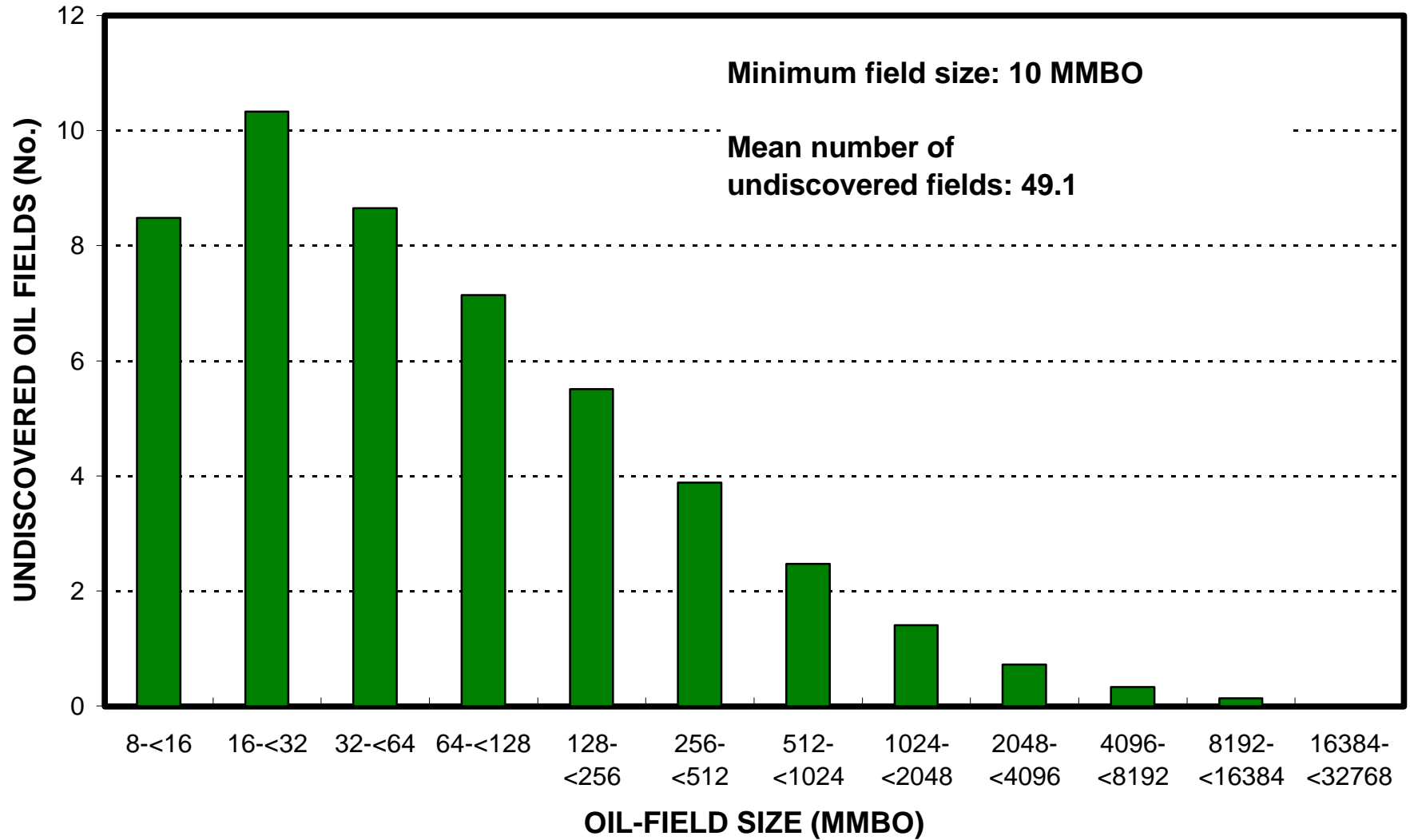
7. Province 2022 represents 2 areal % of the total assessment unit

<u>Oil in Oil Fields:</u>	minimum	median	maximum
Richness factor (unitless multiplier):.....	_____	_____	_____
Volume % in parcel (areal % x richness factor):...	_____	<u>1</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>1</u>	_____
Portion of volume % that is offshore (0-100%).....	_____	<u>0</u>	_____

Paleozoic Reservoirs, AU 20190302

Undiscovered Field-Size Distribution



Paleozoic Reservoirs, AU 20190302

Undiscovered Field-Size Distribution

