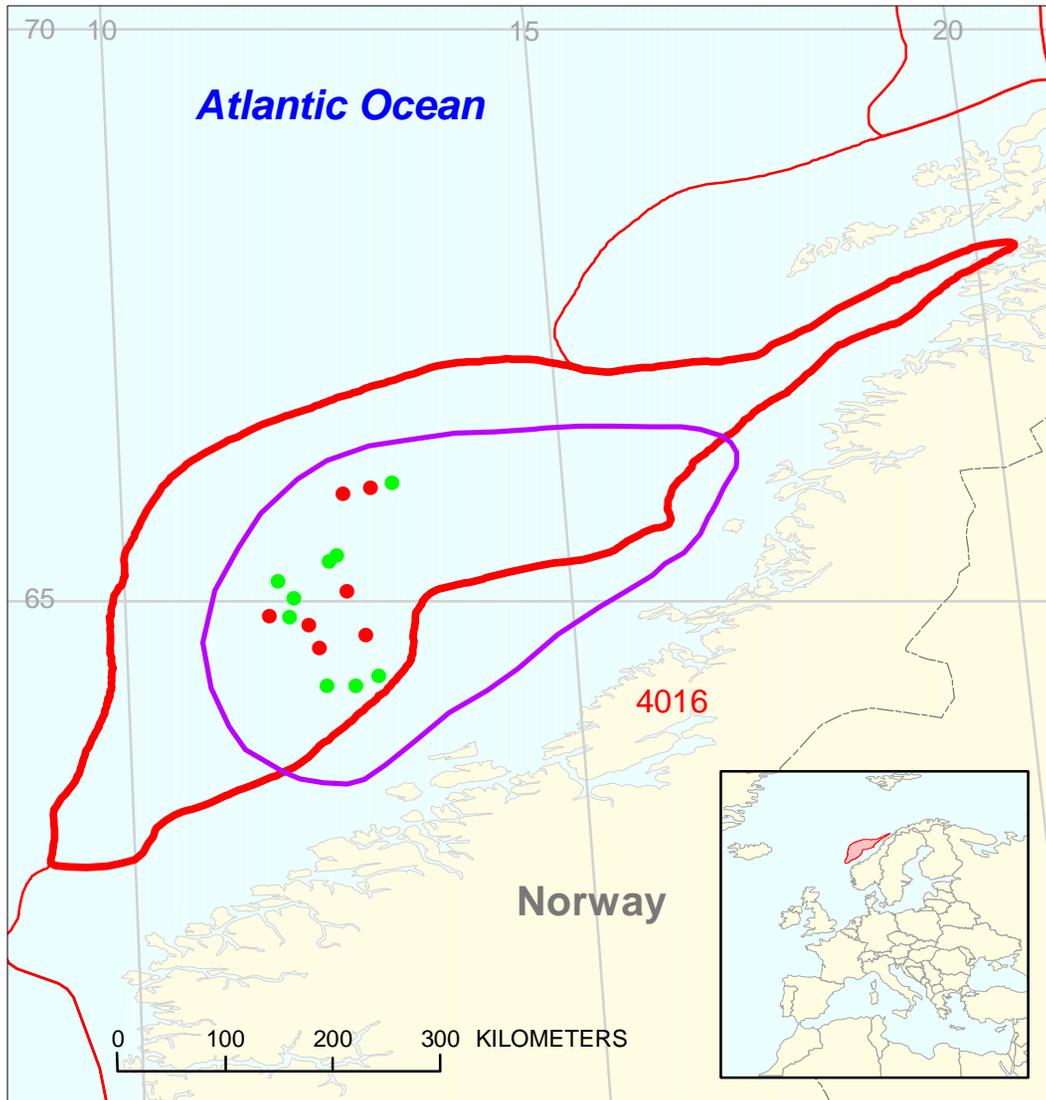


# Halten Terrace-Trondelag Platform Assessment Unit 40170101



-  Halten Terrace-Trondelag Platform Assessment Unit 40170101
-  Vestford-Helgeland Geologic Province 4017
-  Other geologic province boundary

**USGS PROVINCE:** Vestford-Helgeland (4017)

**GEOLOGIST:** D.L. Gautier

**TOTAL PETROLEUM SYSTEM:** Upper Jurassic Spekk

**ASSESSMENT UNIT:** Halten Terrace-Trondelag Platform (40170101)

**DESCRIPTION:** This total petroleum system and corresponding assessment unit includes the area of explored and developed oil and gas accumulations on the mid-Norway Continental Shelf and includes some lateral extension of exploration concepts.

**SOURCE ROCKS:** Upper Jurassic Kimmeridge clay-equivalent shales of the Spekk Formation probably generated the vast majority of petroleum in the Haltenbanken-Trondelag area. Other organic carbon-rich rocks that may have sourced oil and gas occur in the Paleocene, Lower Cretaceous, Jurassic and Permian sequences.

**MATURATION:** The mid-Norway shelf has a burial history different from the adjacent Viking Graben and Barents Sea. In particular, source rocks have been rapidly buried in the late Neogene as a result of glaciation of the adjacent Scandinavian shield. Source rocks are probably immature with respect to oil on the Trondelag Platform itself, but in adjacent basin margins, source rocks are of appropriate maturity for oil generation. Elsewhere in most of offshore mid-Norway, Upper Jurassic rocks are thermally mature with respect to natural gas rather than oil.

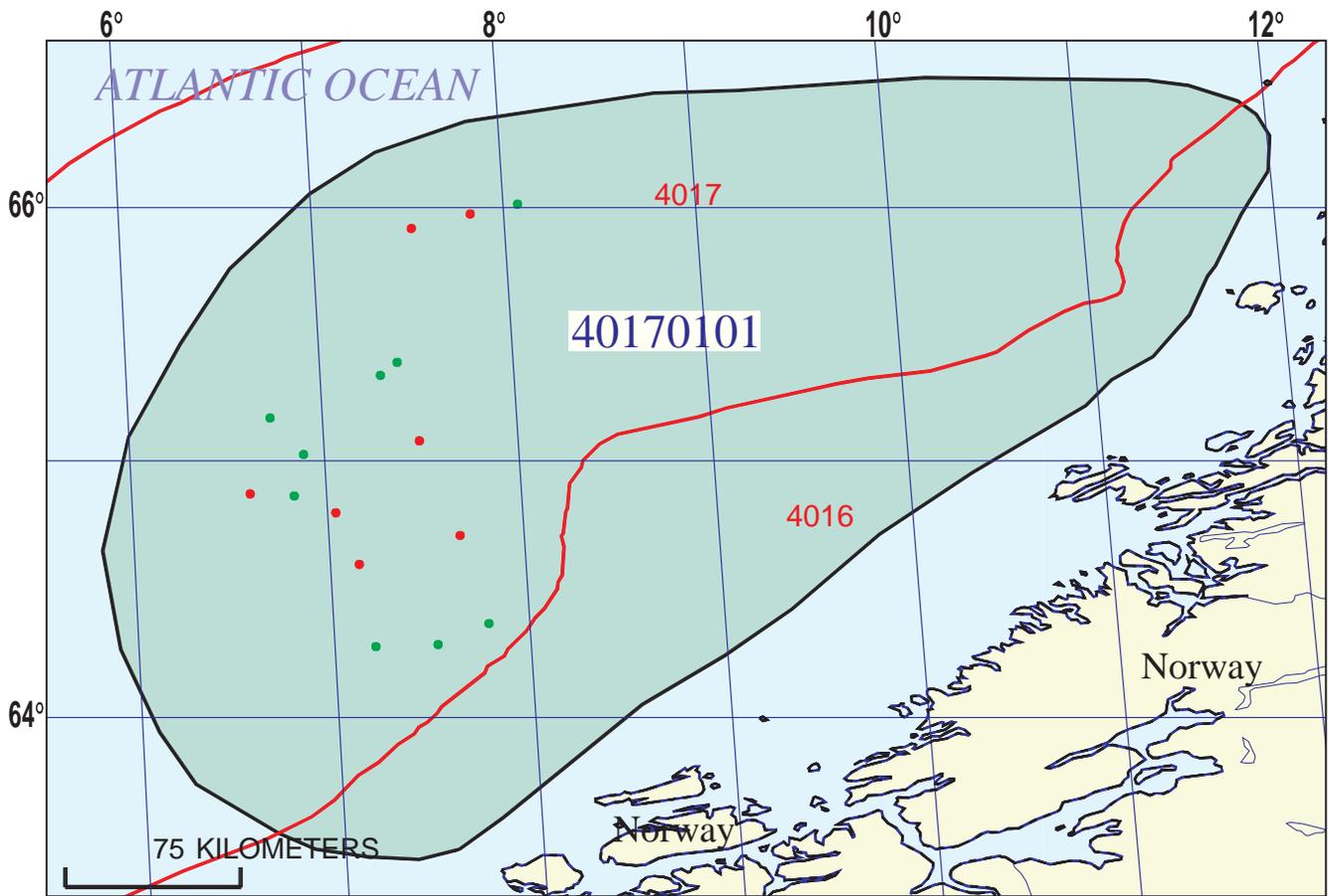
**MIGRATION:** Migration has probably followed faults formed mainly during Mesozoic rifting, with relatively long distances of hydrocarbon movement. Accumulations of oil or gas on the Trondelag Platform have probably migrated upward and laterally from the Halten Terrace.

**RESERVOIR ROCKS:** Many reservoir rocks are related to Mesozoic rifting. Most productive pre-rift reservoirs are included in fault blocks are of mid-Jurassic age. Other possible pre-rift reservoirs include deeply buried Devonian rocks of various lithologies and Permian carbonates. In addition, syn-rift sequences, deposited as lateral equivalents to the Kimmeridgian source rocks, may serve as reservoir facies. Possible post-rift reservoirs are various sandstones of Cretaceous and Paleogene age.

**TRAPS AND SEALS:** Traps are mainly in fault blocks with complex seals in adjacent fine-grained marine lithologies. Thick sequences of fine-grained Tertiary sediments provide effective regional seals for major structures.

#### **REFERENCES:**

- Spencer, A.M., Birkeland, O., and Koch, J.-O, 1993, Petroleum geology of the proven hydrocarbon basins, offshore Norway: *First Break*, v. 11, no. 5, p. 161-176.
- Swiecki, T., Gibbs, P.B., Farrow, G.E., and Coward, M.P., 1998, A tectonostratigraphic framework for the Mid-Norway region: *Marine and Petroleum Geology*, v. 15, 245-276.
- Steele, R.J., 1993, Triassic-Jurassic megasequence stratigraphy in the northern North Sea—rift to post-rift evolution, *in* J.R. Parker, ed., *Petroleum Geology of Northwest Europe*: London, Geological Society Proceedings of the 4<sup>th</sup> Conference, p. 299-315.



## Halten Terrace-Trondelag Platform Assessment Unit - 40170101

### EXPLANATION

- Hydrography
- Shoreline
- 4017 — Geologic province code and boundary
- Country boundary
- Gas field centerpoint
- Oil field centerpoint
- 40170101 — Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

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

Date:..... 10/22/99  
 Assessment Geologist:..... D.L. Gautier  
 Region:..... Europe Number: 4  
 Province:..... Vestford-Helgeland Number: 4017  
 Priority or Boutique:..... Priority  
 Total Petroleum System:..... Upper Jurassic Spekk Number: 401701  
 Assessment Unit:..... Halten Terrace-Trondelag Platform Number: 40170101  
 \* 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?..... 10 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: 8 Gas: 6  
 Established (>13 fields) X Frontier (1-13 fields) Hypothetical (no fields)

Median size (grown) of discovered oil fields (mmboe):  
 1st 3rd 658.2 2nd 3rd 230.2 3rd 3rd  
 Median size (grown) of discovered gas fields (bcfg):  
 1st 3rd 1394 2nd 3rd 835 3rd 3rd

**Assessment-Unit Probabilities:**

<u>Attribute</u>	<u>Probability of occurrence (0-1.0)</u>
1. <b>CHARGE:</b> Adequate petroleum charge for an undiscovered field ≥ minimum size.....	<u>1.0</u>
2. <b>ROCKS:</b> Adequate reservoirs, traps, and seals for an undiscovered field ≥ minimum size.....	<u>1.0</u>
3. <b>TIMING OF GEOLOGIC EVENTS:</b> 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..... 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. 35 max no. 100  
 Gas fields:.....min. no. (>0) 3 median no. 35 max no. 100

**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 10 median size 95 max. size 2500  
 Gas in gas fields (bcfg):.....min. size 60 median size 600 max. size 15000

**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).....	40	80	120
<u>Gas fields:</u>	minimum	median	maximum
Liquids/gas ratio (bngl/mmcf).....	35	70	105
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	40	50
Sulfur content of oil (%).....	0.05	0.14	0.4
Drilling Depth (m) .....	1000	3000	6000
Depth (m) of water (if applicable).....	200	350	500
<u>Gas Fields:</u>	minimum		maximum
Inert gas content (%).....			
CO <sub>2</sub> content (%).....			
Hydrogen-sulfide content (%).....			
Drilling Depth (m).....	1000	3000	6000
Depth (m) of water (if applicable).....	200	350	500

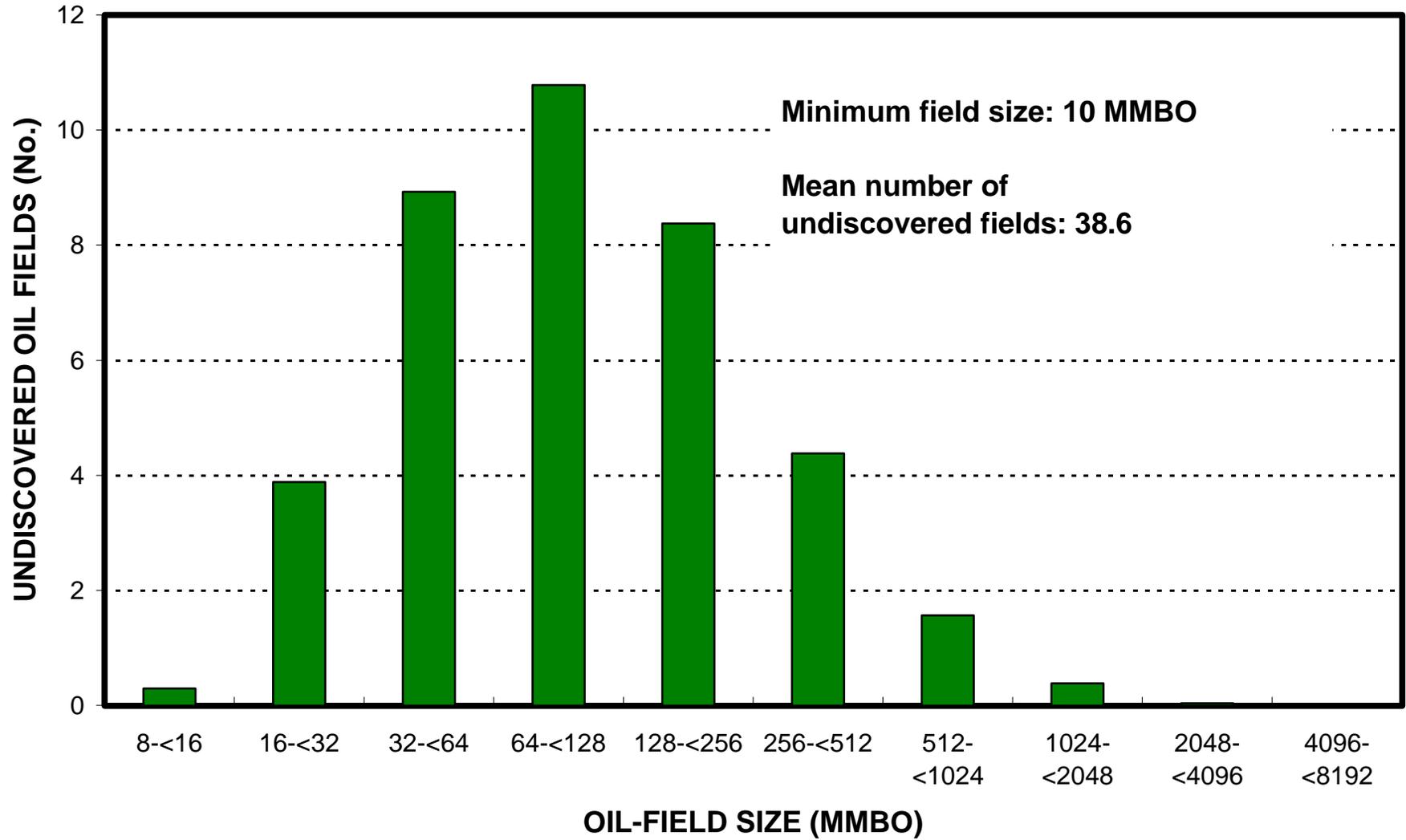
**ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT  
 TO COUNTRIES OR OTHER LAND PARCELS** (uncertainty of fixed but unknown values)

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

# Halten Terrace-Trondelag Platform, AU 40170101

## Undiscovered Field-Size Distribution



# Halten Terrace-Trondelag Platform, AU 40170101

## Undiscovered Field-Size Distribution

