The North Balhaf Block (28) occupies an area of 4465 km² on the Balhaf Basin and partially on the Shabwah (Sab'atayn) Basin near the southern coast of Yemen.

Block (28) lies on the onshore area. It is bordered on:
- The north by Exploration Blocks (3 and 49) with many discoveries.
- The south by the Block (76).
- The east and north-east by the Jahi – Mukalla High and Aswad Ridge.
- The west by Mahfid Massif and open Block 1.
Block's Location on the Oil Producing – SAB'ATAYN and Balhaf Sedimentary Basins
**GENERALS**

<table>
<thead>
<tr>
<th>Block Name</th>
<th>North Balhaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block N°</td>
<td>(28)</td>
</tr>
<tr>
<td>Province</td>
<td>Shabwah</td>
</tr>
<tr>
<td>Basin</td>
<td>Balhaf, Sab'atayn Basins</td>
</tr>
<tr>
<td>Area (Km²)</td>
<td>4,465</td>
</tr>
</tbody>
</table>

**PREVIOUS EXPLORATION ACTIVITIES**

<table>
<thead>
<tr>
<th>Company</th>
<th>Period</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>PED</td>
<td>83</td>
<td>2D seismic</td>
</tr>
<tr>
<td>IPG, Elf, Procan and YEPCO</td>
<td>83-89</td>
<td>2D seismic, Drilling 1 well</td>
</tr>
<tr>
<td>Total</td>
<td>87-92</td>
<td>2D seismic, Drilling 1 well</td>
</tr>
<tr>
<td>MOL</td>
<td>98-03</td>
<td>2D seismic</td>
</tr>
</tbody>
</table>

**DRILLED WELLS**

<table>
<thead>
<tr>
<th>WELL NAME</th>
<th>COMPANY</th>
<th>DATE</th>
<th>TD</th>
<th>SHOWS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balhaf#2</td>
<td>YEPCO</td>
<td>88</td>
<td>4095 m</td>
<td>Basement</td>
</tr>
<tr>
<td>Hufair#1</td>
<td>Total</td>
<td>89-90</td>
<td>4022 m</td>
<td>Basement</td>
</tr>
</tbody>
</table>
The Balhaf Basin occupies the Balhaf Graben and the adjacent part of the Gulf of Aden. The Balhaf Graben is a relatively narrow deeply subsided structure lying between the Mahfid Massif and both the Mukalla High and the Aswad Ridge. The northeast and southwest boundaries of the graben are formed by faults trending from the northwest to the southeast. The basement lies at a depth of 6,000m in the southeastern and the deepest of the graben.

The Balhaf Graben is a primarily Cretaceous basin, with pronounced Late Tertiary, Miocene? - Pliocene reactivation. It was isolated from the Marib Al Jawf - Shabwa Rift System during the Kimmeridgian - Tithonian rifting episode by right lateral, strike slip faults defining the northern margin of the Imad High.

It is the northern continuation of the Berbera Basin in northern Somalia, which has hydrocarbon discoveries.

The Shabwah depression is a part, together with the Wadi Hajar basin to the E and the Marib al Jawf basin to the NW, of a NW-SE trending sedimentary basin (about 560 km long and up to 140 km wide) generally referred to as Sab'atayn Basin.

The Sab'atayn Basin formed as a consequence of a Late Jurassic (Kimmeridgian-Tithonian) extensional phase related to the initiation of spreading that led to separation of India-Madagascar from Afro-Arabia.
PETROLEUM SYSTEM
TRAPS AND PLAY FAIRWAYS
- Horst and tilted fault blocks dominate traps.

SOURCE ROCKS
- Hufair#1 well prove the presence of source prone mudstones within the pre-Sabatayn fm stratigraphy within Block 28.
- The possible source rock the Madbi Formation might be present in the Balhaf Graben, because it was found in the Jurassic outcrops in the west of the Balhaf Graben. Other potential source might be the coal and mudstone of the Tawila Group.
- It is possible that the source rock sequences may be found in the Upper Jurassic and Lower Cretaceous strata in deeper lows of the Balhaf area.

RESERVOIRS
- Fractured Basement
- Kohlan Fm sandstone sealed by the Shuqra Fm
- Shuqra Fm, Naifa Fm and Qishn Formation Carbonate Member shallow marine limestone
- Lam Clastics sealed by Sabatayn Salt
- Qishn Clastics sealed by Qishn shale and limestones
- Harshiyat Fm and Mukalla Fm sandstones sealed by The intra-formational mudstone or limestone
Conclusions

- The Block (28) lies on two sedimentary basins (Balhaf and Sab'atayn) and would have the petroleum systems for those basins.
- Many oil and gas fields have been discovered in the Sab'atayn Basin.
- The Balhaf basin deepening (basement sinks) northeastward.
- The sedimentary filling of the two basins consists of the Mesozoic (Jurassic and Cretaceous) and Cenozoic rock-types.
- The proved mature source rock is the Madbi Formation.
- Balhaf-1 well (Balhaf Basin) confirm the presence of good reservoirs:
  - Tawilah sandstone.
  - Kohlan sandstone.
  - The Naifa and Shuqra limestones are porous and possibly fractured.
- Gas and condensate were discovered by Hufair-1 well (Sab'atayn Basin) in non-commercial quantities, and the well confirm the presence of reservoirs in:
  - Qishn, Lam and Kuhlan clastics.
  - Intra Sab'atayn Salt fractured dolerites.