

### **Presentation key points**

Qatar – country in Arabia – petroleum discovered in Paleozoic age sediment

- 3 wells drilled Matbakh A (first well), Dukham A, and B
- Received evidence on pre – khuff formations (Tayma, Qalibah, and Huj)

Tayma – deposited before the late Ordovician with 4 formations within

- Sig, Quweira, Sag, and Qasim (only one in Qatar) – consists of shallow marine clastic. Gamma logs show high (Shale) and low (Sandstone) radiation – Renamed Qasim formation

Qalibah Group – deposited Silurian – consists of 3 formations

- Silurian Uqlah (Not in Qatar), Sharawra, and Qusaiba – shows the FDC – Formation density log. Sandstone is denser than the shale – indicates a good source rock

Huj Group – 3 formations found within

- Jauf, Jubah, and Tawil (only one found in Qatar) – Tawil further divided into 3 groups
  - Lower, middle (lower porous zone), and upper (Upper Tawil) there are no major fossils making the age controversial – underlays the Middle Devonian Jauf formation – Shallow marine and continental depositional environment – low gamma rays with high porosity
- Stratigraphic sequence – Tectono Stratigraphic sequence (TMSs) and Maximum flood surface (MFS)
  - AP2 Megasequence – Early Cambrian, Qasim formation – 2 maximum flooding surfaces (O30 – base of Qasim – Basel shale) O40 (Middle shale) – during deposition – broad / shallow water shelf – received continental clastic material
  - AP3 Megasequence – Upper Ordovician to upper Devonian – placed above Ashgill unconformity – consists of Qalibah and Tawil formation – 2 MFS – S10 (base of Qusaiba – second order deposition) S20 (base of Tawil)

Source rocks of Qatar – Qusaiba and Sharawra formation

- Grey-black sandstone and claystone's, intervals containing sapropelic organic matter – the total organic carbon ranges up to 7.3% weight
  - Qusaiba – generated oil until late Jurassic – then begun gas and condensates – still going today
- Sharawra - Contains organic matter -Ranges up to 7.3% rate -Good porosity and permeability (mouldic) -Organic material weathered away leaving holes in the rock -Porosity 3 to 21% (average 10%)
  - Upper (3330-3630m) - Shale volume 2 to 40% (average 12%) -Matrix volume between 52 and 92% - Almost 0 water saturation - Movable hydrocarbons vary from 0 - 2%
  - Middle (3630-4080m) -Shale volume 1 to 95% (average 21%) - Matrix volume 0 - 69% - Water saturation almost 0 - Movable hydrocarbon constituent 15%
- Lower (4080-4668m) - Shale values 4 to 99% (average 32%) - Matrix 0 - 88% - Movable hydrocarbon reach 15% - Water saturation 0
- Reservoir rocks - Qasim formation -Deposited in shallow marine - Locally deltaic setting
  - Upper section (4668-4710m) -Matrix between 1 and 88 (average 67%) -Water saturation between 1 and 6% (average 3%) -Movable hydrocarbons volume rangers from 6 to 13% (average 9%)
  - Middle section (4710 -4800m) - Shale volumes between 4 and 34% - Matrix average around 84% - Water saturation about 3% - Movable hydrocarbons average 8%
  - Lower section (4800-48630) - Shale volume average 10% - Matrix average 91% - Water saturation between 1 and 6% - Movable hydrocarbon averages 10%
  - Porosity ranges from 4 to 14% (average 9%) -Permeability 0.5mD - Pores small in size & not connected
- Poor reservoir characteristics due to thin laminations of sandstone beds (<5cm thick)