Annex. 2

**Laboratory Core Analysis Program**

| No. | Types of work | Units | Rumaila | Nahr Umr | Ratawi | Yamama | Gotnia | Najmah | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | | Carb. | Terr. | Carb. | Carb. | Carb. | Carb. | |
| **1.** | **Core treatment (at the drilling site before transportation)** | | | | | | | | |
| 1.1. | Cross-sectional cutting of the cores (segmentation). Photography of the cut-off core face including that in UV-light. Brief lithological description of the cut-off core face. | lin m | 58 | 18 | 24,2 | 9 | 26,1 | 35,5 | 170,8 |
| 1.2. | Boxing of cores in Contractor boxes, approximately 37 pcs, marking of boxes | lin m | 58 | 18 | 24,2 | 9 | 26,1 | 35,5 | 170,8 |
| **2.** | **Core treatment (in laboratory conditions)** | | | | | | | | |
| 2.1. | Receipt and photography of the boxes containin core materials | lin m | 58 | 18 | 24,2 | 9 | 26,1 | 35,5 | 170,8 |
| 2.2. | Core Gamma-ray spectral log | lin m | 58 | 18 | 24,2 | 9 | 26,1 | 35,5 | 170,8 |
| 2.3. | X-ray tomography of a full-size core with tomogram interpretation | lin m | 58 | | 24,2 | 9 | 26,1 | 35,5 | 152,8 |
| 2.4. | Photography of a core in daylight and UV-light | lin m | 58 | 18 | 24,2 | 9 | 26,1 | 35,5 | 170,8 |
| 2.5. | Core slabbing | lin m | 58 | 18 | 24,2 | 9 | 26,1 | 35,5 | 170,8 |
| 2.6. | Photography of the core face in daylight and UV-light after slabbing | lin m | 58 | 18 | 24,2 | 9 | 26,1 | 35,5 | 170,8 |
| 2.7. | All-around photoshooting of core column in dayligth with further 360 evolvent | lin m | 58 | 18 | 24,2 | 9 | 26,1 | 35,5 | 170,8 |
| **3.** | **Core preparation** | | | | | | | | |
| 3.1. | Make standard-size thin sections (1 thin section per 1 lin m of core) | thin section | 64 | 20 | 27 | 10 | 29 | 40 | 190 |
| 3.2. | Make core plug (30 mm in diameter) (3 plugs per 1 lin m of core) | sample | 174 | 54 | 73 | 27 | 78 | 107 | 512,8 |
| 3.3. | Extract core plug (30 mm in diameter) | sample | 174 | 54 | 73 | 27 | 78 | 107 | 512,8 |
| 3.4. | Wash off salts from core plug (30 mm in diameter) | sample | 174 | 54 | 73 | 27 | 78 | 107 | 512,8 |
| **4.** | **Standard core analysis** | | | | | | | | |
| 4.1. | Determine Klinkenberg-corrected absolute permeability to gas, effective porosity and matrix density by gas vumetric method | sample | 192 | 60 | 81 | 30 | 87 | 118 | 568 |
| 4.2. | Determine effective porosity to water, bulk and matrix density by calculation | sample | 192 | 60 | 81 | 30 | 87 | 118 | 568 |
| 4.3. | To develop a porosity parameter/porosity tie, determine true resistivity in a 100% water saturation under weathering conditions | sample | 33 | 33 | 33 | 33 | 33 | 33 | 198 |
| **5.** | **Lithology and sedimentology analysis** | | | | | | | | |
| 5.1. | Layer-by-layer core description after slabbing | lin m | 58 | 18 | 24,2 | 9 | 26,1 | 35,5 | 170,8 |
| 5.2. | Standard thin sections petrographical analysis (description) | thin section | 64 | 20 | 27 | 10 | 29 | 40 | 190 |
| 5.3. | Grain composition | sample | | 21 | | | | | 21 |
| 5.4. | Prepare core samples for X-ray diffraction analysis | sample | 18 | 6 | 8 | 3 | 8 | 11 | 54 |
| 5.5. | X-ray diffraction analysis | sample | 18 | 6 | 8 | 3 | 8 | 11 | 54 |
| 5.5. | Prepare samples for X-ray diffraction analysis of clay fraction (carb.) | sample | 10 | 10 | 10 | 10 | 10 | 10 | 60 |
| 5.7. | X-ray diffraction analysis of clay fraction composition | sample | 10 | 10 | 10 | 10 | 10 | 10 | 60 |
| **6.** | **Special core analysis** | | | | | | | | |
| 6.1. | Obtain a capillary pressure curve including determination of residual water saturation by semi-permeable membrane method (at least 8 points) including determination of true resistivity under standard condition at the last stage to find the relation of Resistivity Index - Water Saturation. | sample | 25 | 25 | 25 | 25 | 25 | 25 | 150 |
| 6.2. | Determine true resistivity in 100% water saturated samples under reservoir-simulating conditions | sample | 20 | 20 | 20 | 20 | 20 | 20 | 120 |
| 6.3. | Nuclear magnetic resonance analysis of core samples under weathering conditions | sample | 15 | 15 | 15 | 15 | 15 | 15 | 90 |
| **7.** | **Geomechanics studies** | | | | | | | | |
| 7.1. | Determine ultimate rock pseudo-triaxial compression stress including reservoir temperature modeling | sample | 6 | 0 | 0 | 0 | 0 | 6 | 12 |
| 7.2. | Determine elastic moduli by static and dynamic methods under pseudo-triaxial compression including reservoir temperature modeling | sample | 6 | 0 | 0 | 0 | 0 | 6 | 12 |
| 7.3. | Determine rock strength certificate with possible reservoir temperature modeling (Mohr's stress circles) | sample | 6 | 0 | 0 | 0 | 0 | 6 | 12 |
| **8** | **Physical and hydrodynamical studies** | | | | | | | | |
| 8.1. | Determine residual oil saturation and oil displacement factor | test | 2 | 2 | 2 | 2 | 2 | 2 | 12 |
| 8.2. | Determine relative phase permeability in oil-water and oil-gas systems | test | 2 | 2 | 2 | 2 | 2 | 2 | 12 |