

# AMPE14 WELL LOGGING

## UNIT-1 AIMS AND OBJECTIVES OF WELL LOGGING

- 1.1 Reservoir formations. Borehole conditions.
- 1.2 Fundamental concepts in borehole geophysics physical properties of reservoir rocks.
- 1.3 Formation parameters and their relationships: formation factor, porosity, permeability, resistivity, water and hydrocarbon saturations, and movable oil.
- 1.4 Archie's and Humbles equations.

## UNIT-2 PRINCIPLES, INSTRUMENTATION, OPERATIONAL PROCEDURES AND APPLICATIONS OF DIFFERENT GEOPHYSICAL LOGS

- 2.1 S.P, electrical, induction, nuclear, sonic, caliper, temperature, dip and direction.
- 2.2 Natural gamma ray spectrometry log, nuclear magnetic log, litho density log, neutron activation technique, thermal neutron decay time log, chlorine and oxygen logs.

## UNIT-3 RECORDING, TRANSMISSION AND PROCESSING OF LOG DATA.

- 3.1 Formation evaluation for hydrocarbons.
- 3.2 Qualitative and quantitative interpretations of well log data. Overlays and cross-plots.
- 3.3 Determination of reservoir parameters- porosity, resistivity, permeability, water and hydrocarbon saturation, movable oil.
- 3.4 Lithology determination by neutron, density and sonic cross-plots,
- 3.5 Dual mineral method, triporosity method, litho porosity cross-plot (M-N plot),
- 3.6 Clean sand and shaly sand interpretations.

## UNIT-4 SUB-SURFACE CORRELATION AND MAPPING FROM LOG DATA.

- 4.1 Delineation of fractures from logs. Production logging.
- 4.2 Well logging for metallic and non-metallic minerals: radioactive and nonradioactive evaporates, coal, sulphur.
- 4.3 Borehole geophysics for groundwater exploration.
- 4.4 Effective pay thickness of an aquifer. Saline water-fresh water interface from log data.
- 4.5 Determination of groundwater flow direction by logs.

## UNIT-5 THEORETICAL COMPUTATIONS OF NORMAL AND LATERAL LOG RESPONSES

- 5.1 Identification and delineation of sub-surface formations from well log data.
- 5.2 Calculation of reservoir parameters: formation factor, porosity, permeability, resistivity, water and hydrocarbon saturations, and movable oil.
- 5.3 Sub-surface correlation of formations and interpretation of field data.

### References Book:

1. Serra.O 'Fundamentals of Well log Interpretation' Volume1. Elsevier Science Publisher, New York, 1984,ISBN 04441327.