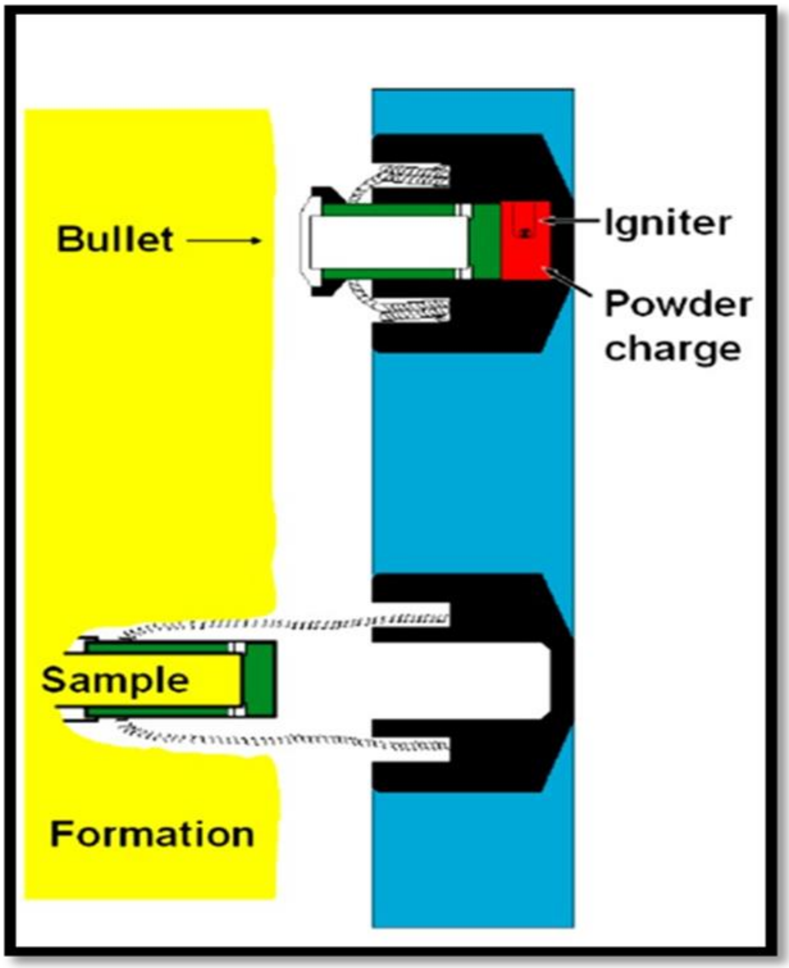
Sidewall Coring:-

Sidewall sampling is another means of obtaining reservoir rock samples if borehole conditions do not allow full-diameter continuous coring. It is also cheaper than continuous axial coring. Rock samples are obtained either by firing hollow cylindrical bullets into the borehole wall, which is called percussion sidewall coring ,or by drilling a small horizontal core in the same way as plugs are cut from full-diameter core, which is called rotary sidewall coring. (Fig 5) shows the schematics of a sidewall sample gun, which is used to obtain percussion sidewall cores, and a rotary sidewall coring tool.



The advantages:-

of this technique to obtain sidewall core material is quick and relatively inexpensive, the exact depth of coring is known and recovered samples are much larger than drill cuttings, which enable better evaluation of geological variations and quantitative petro physical analysis.

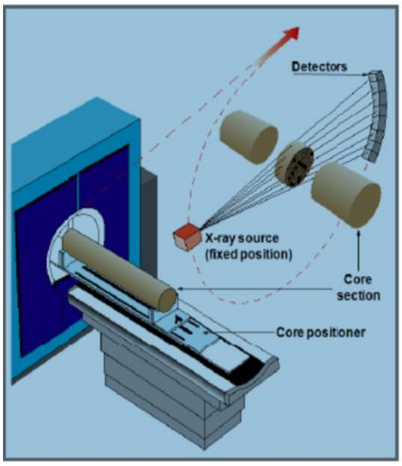
Disadvantages:-

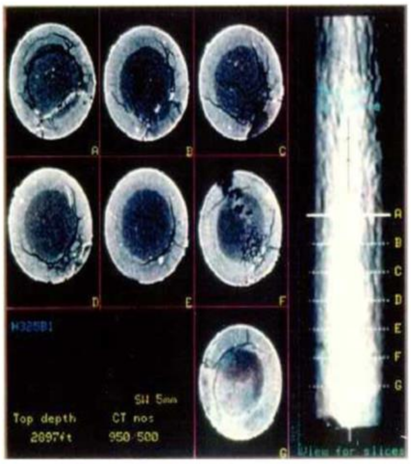
Disadvantages of sidewall coring are samples (especially percussion cores) are often damaged hence they may be unsuitable for laboratory tests. Moreover, sample volumes are usually insufficient for performing advanced studies such as multi-phase flow and relative permeability measurements.

Core Description and Imaging:-

Once the core is retrieved to the surface, gamma ray logging is performed as the first step towards to core analysis. The core gamma ray logger is a portable device that provides gamma ray logs immediately after the core has been cut and retrieved to the surface. This analysis can be conducted either at the well site or in the laboratory. The main purpose of it is to correlate the depth of the cored sections with anticipated lithology by delineating the shale sections from the non-shale (reservoir) intervals. Reliable on-site analysis enables operators to make quick, real time decisions on further coring, testing and well completion activities.

X-ray computed tomography (CT):-





is one of the most widely used imaging techniques, which permits visualization of internal rock features. It was first introduced as a radiological imaging technique by Hounsfield in 1972.

A CT scanner is a non-destructive imaging tool which allows a core to be scanned whilst still contained in the fibre glass barrels and the plastic liner materials.It reveals not only the internal structures of the core but also the damage done by various coring and core handling actions prior to the laboratory measurements. The results can be used to determine slabbing directions or even optimize the planning of core plug positions. Furthermore, a statistically representative sampling strategy is required for heterogeneous formations where CT scanning can be used to assess the degree of heterogeneity figer shows a schematic of computer-aided scanning of a core material using X-ray tomography and CT images obtained from a whole core scanning study.

Sample Selection:-

Basic Core Analysis Sampling:-

Basic core analysis is usually done on every foot (~30 cm). If too many plugs fall in regions of poor quality core material, plugs may be taken at different positions (a few inches away from the predetermined locations). In general, emphasis should be paid to the cutting of plugs as close to the one foot spacing as possible without any regard for variations in lithology. Otherwise a bias towards apparently better formation properties may be unwittingly introduced, which can lead to improper log calibration [5]. However, plugs which represent two different lithologies (on the border of different lithologies) should be avoided as the experimental data obtained on these core plugs can be significantly misleading. Core plugs can be cut both in parallel and in perpendicular orientations to the bedding. This would help to evaluate anisotropic reservoir parameters such as permeability.

Special Core Analysis Sampling:-

As the name suggests, some special precautions should be taken while sampling for special core analysis laboratory (SCAL) measurements. Unlike basic core analysis, samples are not taken at regular intervals for SCAL measurements. Most attention is often placed on rock type within the formation. The location and number of samples chosen for SCAL measurements should be representative of rock type under consideration. A core that first appears completely uniform

may actually be highly heterogeneous with respect to petrophysical parameters. Therefore, while making the sample selection, use of a non-destructive imaging technique such as CT scanning is highly recommended. It is also recommended that twice as many samples to be taken for a given measurement for the purpose of maximizing representativeness of the samples, or repeat measurements may be needed [5]. However, the number of SCAL samples is usually much smaller than that in basic core analysis.

Practical:-

Constant head permeability test

D= 13.78 cm^2

L=16 cm

T1= 8 sec Q1=304.7

T2= 13sec Q2= 506.9

T3= 19 sec Q3= 696.9

Total head at the top monometer 49.8 cm

Total head at the bottom monometer 11.3 cm

Vertical distance between monometer 16.0 cm

Calculate: K1,K2,K3

K Average