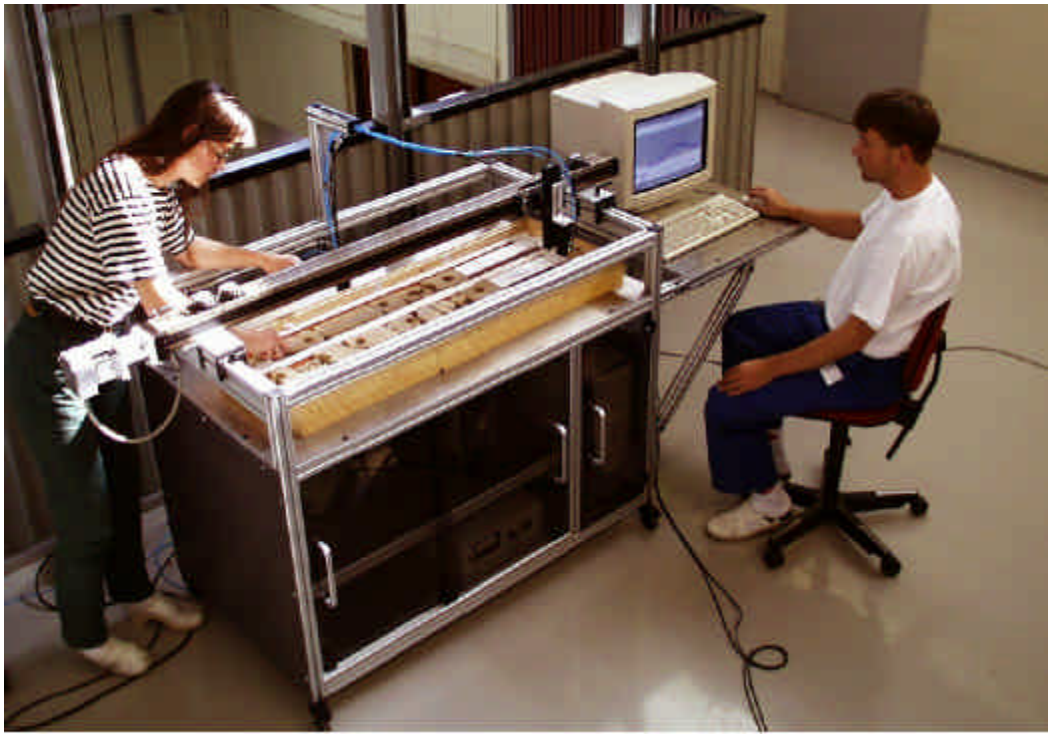
HYDROCARBON CORE SCANNER™
for *In-situ* Residual Fluid Analysis



The Hydrocarbon Core Scanner™, (HCS™), invented and developed by Institute for Energy Technology (IFE) in Norway, provides a new, Patented means of rapid, continuous, non-destructive, non-evasive, and quantitative logging of hydrocarbon in convention slabbed cores. Using ultraviolet light, the user is able to measure a 1 cm (0.4 inch) diameter spot on the slabbed core sample. When the ultraviolet light contacts the sample, sorbed hydrocarbons fluoresce, or emit light. This emitted light is detected and recorded.

Benefits:

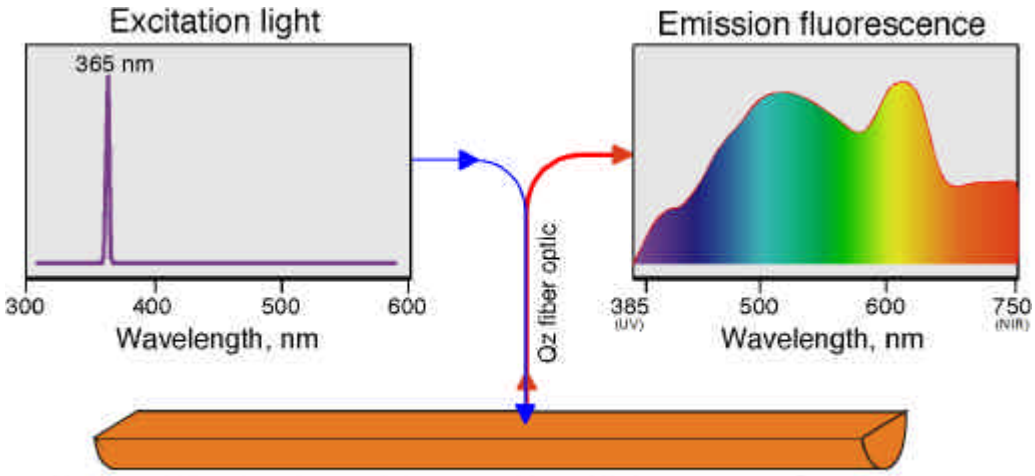
- Greatly Improved Hydrocarbon sample description
- Continuous, quantitative, sample logging
- Non-destructive analysis
- Non-evasive analysis
- High Sample Resolution
- Cost Effective

Data Uses

- Detection of Hydrocarbons
- Location of the Top of the Reservoir
- Composition variations of Hydrocarbons
- Detection of Main Hydrocarbon Zone
- Precise Locations of Oil/Water contacts
- Detection of Tar Mats
- Detection of Barriers and Baffles
- Screening tool for future testing

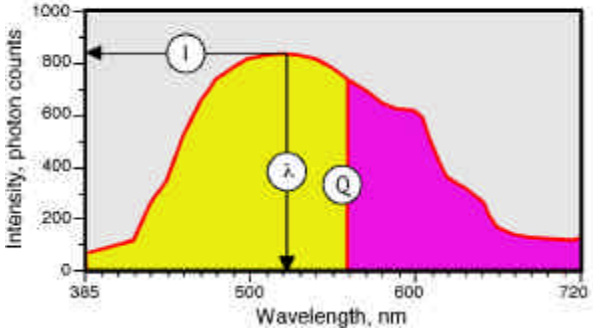
Principals of the Hydrocarbon Core Scanner™

Hydrocarbons sorbed onto core material emit fluorescence in the ultraviolet (UV), visible, or near-infrared part of the spectrum. The Hydrocarbon Core Scanner™ utilizes a coherent monochromatic ultraviolet light source at a wavelength of 365 nm. This light is projected, using fiber optics, onto a 1 cm (0.4 inch) diameter spot on the slabbed core sample. This ultraviolet light causes any sorbed hydrocarbons present in the measurement sample to fluoresce, or emit light at longer wavelengths. The emission signal is directed through another optic fiber into a cooled, single photon array detector and recorded in terms of absolute intensity and spectral distribution. From the fluorescence intensity data, the quantitative residual hydrocarbon saturation can be determined. From the ratio between the fluorescence flux integrals from 580-700 nm to the integral from 400 to 580 nm (Q_{580} quotient), subtle variations in the hydrocarbon fluid composition can be determined.



Sketch showing the principles of the Hydrocarbon Core Scanner

HCS™ Spectral Fluorescence Parameters



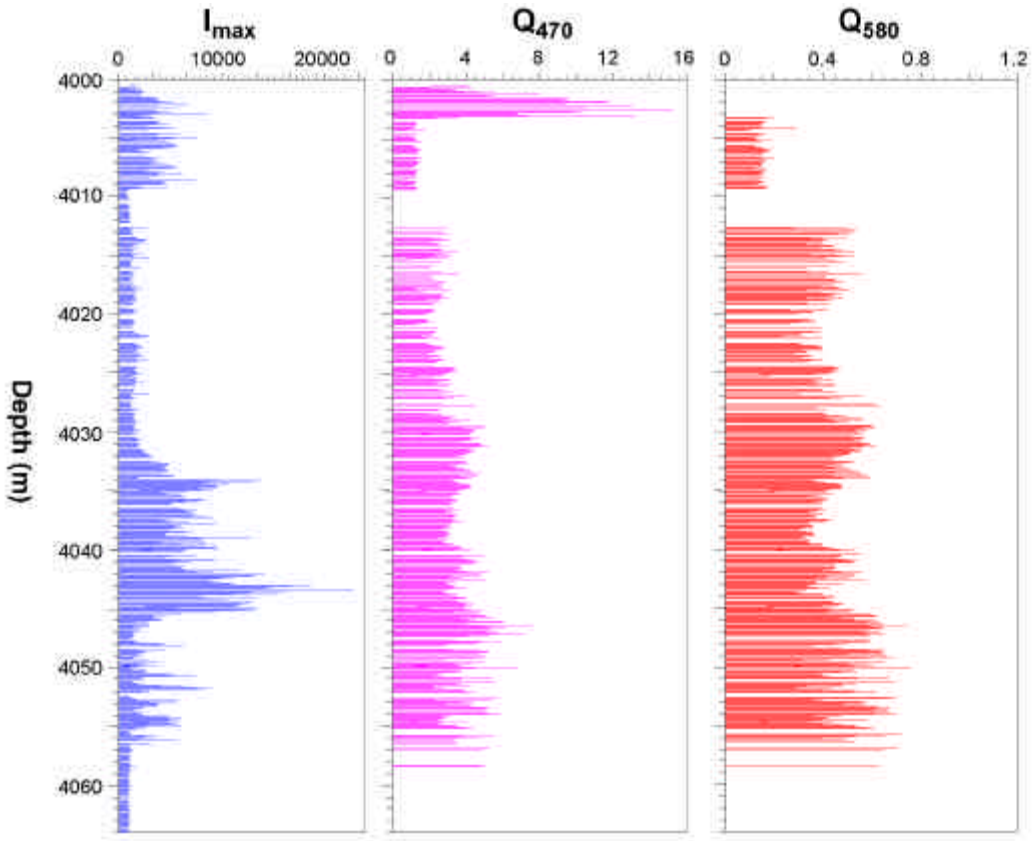
I
Peak intensity (I_{max})

λ
Wavelength at peak intensity (λ_{max})

Q
Ratio Q_{580} of fluorescence flux (580-700 nm) to (400-580 nm) and Q_{470} of fluorescence flux (470-700 nm) to (400-470 nm)

Institute for Energy Technology, P.O. Box 40, N-2027 Kjeller, Norway
Tel.: +47 63 80 60 00, Fax.: +47 63 81 55 53, E-mail: jan.kihle@ife.no, Web: www.ife.no

Sample Data Using the Hydrocarbon Core Scanner™



The sample logs above illustrate large scale and small scale hydrocarbon fluid zonation patterns. Indications for disconnected infilling are revealed by contrasting groups of Q-factors above and below a narrow coal seam at 4010 m, thus pointing towards the barrier effect of this coal bed. Above 4010m: condensate; 4011-4030m: Poor res. qual.; 4030-4045m: Good pay zone, light oil; 4045-4056m: Heterogeneous zone, slightly heavier oil than above, OWC at 4056.2m; No HC detected below 4056.2m.

Institute for Energy Technology, P.O. Box 40, N-2027 Kjeller, Norway
Tel.: +47 63 80 60 00, Fax.: +47 63 81 55 53, E-mail: jan.kihle@ife.no, Web: www.ife.no

Ordering Information:

Hydrocarbon Core Scanner™ Model Number: HCS-100

Major Components:

- Scanning Table
- Computer, Monitor, Printer
- Data Analysis and Control Software

Specifications:

- Electrical: 220-240 VAC 50/60 Hz 1 Phase
- Dimensions: 1500 mm x 700 mm x 1200 mm (60” x 30” x 48”) (WxDxH)
- Weight: 120 kg (265 lbs)

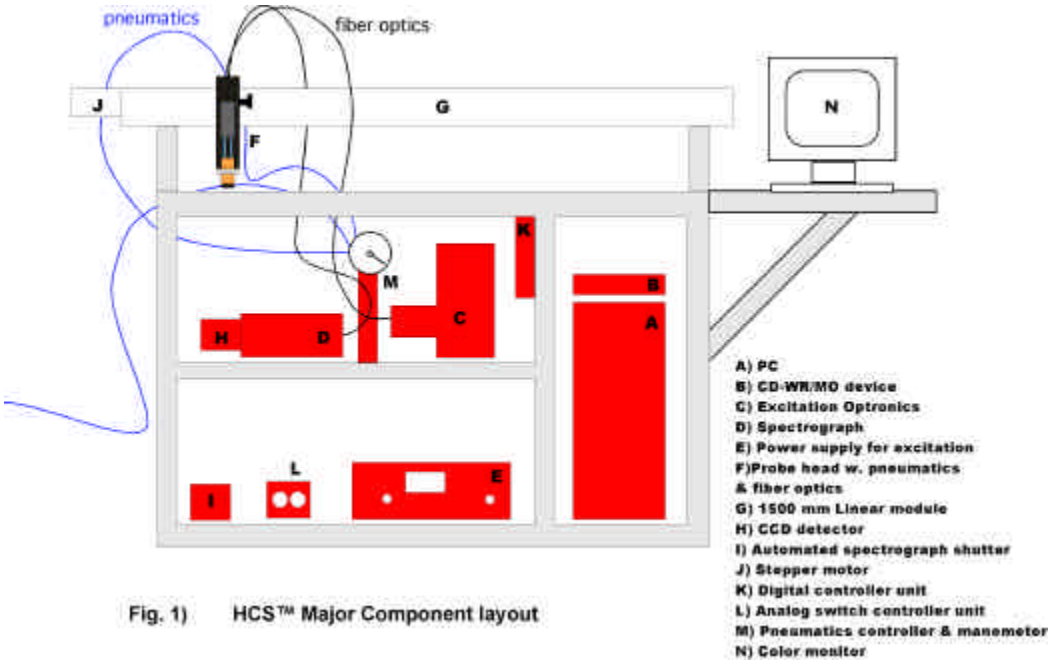


Fig. 1) HCS™ Major Component layout

Institute for Energy Technology, P.O. Box 40, N-2027 Kjeller, Norway
Tel.: +47 63 80 60 00, Fax: +47 63 81 55 53, E-mail: jan.kihle@ife.no, Web: www.ife.no