kTech Wellsite Logging Technologies and Petrophysics using the Drilling Cuttings Analysis.

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OPAL System.
Petrophysical Logs in R/T return drilling mud flow.

Overview kTech - Wellsite Logging Technologies and Drilling Cuttings Analysis

Petrophysics Log Reconstruction

Shale Stability

Component-Analysis

OPAL - Hardware

Digital Geological Analysis

Time transient Analysis

Oil Flow – Permeability

Differential Gas
Detection Oil Water Contact
Commercial Products groups Sub-Divisions of kTech System

1. **OPAL System.** Real Time Field Petrophysical Logging Applications with proprietary **Differential Gas Detection** and quantitative Petrography.

2. **kLab System.** Drilling cuttings analysis with proprietary measured parameters and **Geo-Algorithm to Petrophysics.**

3. **Reservoir Engineering** and new Petrophysics analysis with proprietary principals and tools.

4. **Hardware, sensors** and analytical tools manufacturing.

5. **kTech Training** courses on all the above

<table>
<thead>
<tr>
<th>20+ Apps &amp; Products</th>
<th><strong>ROI</strong> $3M for $50M</th>
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<tr>
<td>Digital Petrography and New Petrophysics</td>
<td><strong>ROI</strong> $3M / $50M</td>
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<tr>
<td>Wellsite and Lab Engineering Tools and Tests</td>
<td><strong>ROI</strong> $3M / $50M</td>
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<tr>
<td>Sensors and Tools Manufacturing</td>
<td><strong>ROI</strong> $3M / $50M</td>
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<td>Implementation in Oil and Gas Industry</td>
<td><strong>ROI</strong> $2M / $50M</td>
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kTech is a Set of technologies for Oil and Gas Industry

- **All Tools** are well calibrated and **producing repeatable results**.

- **All Methodologies** are **field tested** and well documented allow any associates to create reproducible results on Services and correlate the logs.

- All Tools are designed to produce a human independent measurements; **repeatable, reproducible, and correlatatable**.

- **Industrial Manufacturing Drawings** and Documentations.

- **Industrial Electronic PCB** Manufacturing Drawings and Documentations.
Business Models and Stages for Implementing the kTech

- **Model 1. Merging the kTech with Surface Logging Company,**
  - Stage 1: transferring the technologies,
  - Stage 2: gaining competitive edge and Increase the Client Base / Income,

- **Model 2. Develop the technologies to Advance Petrophysics Service,**
  - Stage 1: place additional patents,
  - Stage 2: bring the new petrophysics log interpretation to the University Ms. And Ph.D programs,
  - Stage 3: bring the services to Oil companies Petrophysics and Reservoir Engineering Departments.

- **Model 3. Privet investment for University R&D and R&D tax credit,**
  - Stage 1: Get government involvement to support the additional in house R&D and
  - Stage 2: University R&D grants based on kTech patents.
  - Stage 3: Develop the advanced petrophysical log interpretation using drilling cuttings component and time transient analysis.

- **Model 4. Privet Re-Sale,**
  - Stage 1: Commercializing the products,
  - Stage 3: Re-Sale to an Industrial Service company with Manufacturing, and R&D department.
kTech System Business Context

Strengths.
1. No Direct Competition,
2. Proven Concept with working Technology,
4. High ROI on low Investment

Weaknesses.
1. Big Volume of Innovations
2. Current Low volume of Sales of working Technology,

Opportunity.
1. Wide area of application of kTech in Oil&Gas, Nuclear Storage, Agricultural, etc.
2. Rapid expansion in all departments of Oil and Gas Industry
3. Immediate CASH GENERATION from start.
DTG – Differential Gas Detector with Turbine Gas Trap

Constant Performance
No Problems.

Turbine Gas Input Pump

Turbine Generate Diffusion Gas Bubbles

Gas Dryer - Dual Floating Bubble Jar

Differential Total Gas

Total Gas

Oil

Water
Using kTech.
Application Gas Detection in Horizontal Well crossing the fracture Zone with water influx, Real Time chart.

Blind Fault, Water Bearing
Well testing using Swab Test.

Well Swab Test – WST is defining the Oil Producing Zones while drilling and eliminating numerus of problems in Petrophysical log interpretation. The application of WST immediately after the zone is drilled and before the well damage is occurred will give the best indication of reservoir potential.

Get the Most from Your Wells Use Prospector's International
Coarsely Crystalline Limestone

Oil Zone

Fine Crystalline Zone

CORE like Automatic Sampling, OPAL
OPAL-Well cleaning, Hazard Prevention, BHA and tools lost Cost prevention.

From 2104m to 2135m, 31m of borehole cutting are lost in the well.
OPAL Logging vs Open Hole logging

Open hole GR

OPAL Gamma

Mud Flow

Sandstone

Shale Sandy

Base of Fish Scales Formation

Shale Sandy

Sandstone

Base of Fish Scales

Formation
kTech - Wellsite Equipment, **Liquid Loss System**

**kTech is another Silver Bullet in your gun**
kLab System Log Reconstruction Case Studies in Carbonates Iraq.
Transient Draw Down Analysis. Oil Flow from Cuttings
(kLab – Post Well Laboratory Analysis)

Flow1 25 mD
Q1=1.2k
Produces 1st

Flow2 4.2 mD
Q2=15.3k
Produce 2nd „recharge”

Flow3 0.3 mD
Q3=27.4k

Final FLOW – “micro”-pores & fractures

Transient Drawdown Analysis (TDA)

- Measuring multi-flow permeability & porosity parameters

Benefits:
- Evaluate Oil flow potential (permeability & storage)
- Evaluating best rate to flow well to maximize drainage
Component Distribution and Matrix Density Analysis.

Matrix Density from kLab Component Analysis on Drilling Cutting

**Bulk Density kRhoB = 2.61**

- **Pyrite**
  - RhoM = 5.1
  - RhoM = 0.1

- **Quartz**
  - RhoM = 2.65
  - RhoM = 0.265

- **Clay_Mnrl**
  - RhoM = 2.70
  - RhoM = 0.135

- **CaCO3**
  - RhoM = 2.71
  - RhoM = 1.355

- **CaMg(CO3)2**
  - RhoM = 2.87
  - RhoM = 0.66

- **PoreVol**
  - RhoM = 10%
  - RhoM = 0.1

- **Water Vol**
  - RhoM = 45%
  - RhoM = 1.0

- **Oil Vol**
  - RhoM = 55%
  - RhoM = 0.85

**Matrix Density kRhoM = 2.796**

\[ kRhoM = q1 \cdot \text{RhoQtz} + q2 \cdot \text{RhoCaCO3} + q3 \cdot \text{RhoCaMg(CO3)2} + q4 \cdot \text{RhoClay} + q5 \cdot \text{RhoPyret} + \ldots + qi \cdot \text{RhoXXX} \]
Shale stability and compartmentalization Case Study using SAT.

Stress & strain parameters manifested in the SAT.
Fracture Count to Fracture Volume Porosity

CS16-19 WHR21-4 -6760-Fract-1-Capture

Chip Vol um3= \( L \times h \times W = 37,500,000 \text{um}^3 = 37.5 \text{mm}^3 \)

Fracture Vol um3= \( 2 \times L \times h \times a = 450 \text{um}^3 = 0.450 \text{mm}^3 \)

This Chip Fracture Vol = 0.450/37.5

1.2% Fracture Porosity
kTech
be Part of Oil & Gas Future
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OPAL - OIL INDUSTRY FUTURE

Flow1 is 25 mD
Q1=1.2k
Oil Production 1st FLOW