

Gulf Coast Conference 2013

*Fast & Micro Gas Chromatography and its use in
Advanced Automated Technologies in the Upstream World*

Graham Mullings

16 October, 2013



- Founded in 1878 in Rouen, France
- World's leading inspection, verification, testing and certification company
- Over 1250 offices and laboratories
- 80,000 employees including:
 - Scientists, engineers, doctors, chemists, auditors and inspectors
- 80,000 customers in 137 countries
- 11 business lines



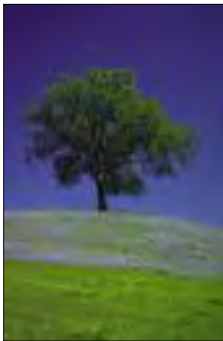
Agricultural Services



Automotive Services



Consumer Testing Services



Environmental Services



Industrial Services



Life Science Services



Minerals Services



Oil, Gas & Chemicals Services



Systems and Certification Services



Technical Staffing Services



Trade Assurance Services

APPLIED TECHNOLOGY AND INNOVATIONS CENTER

DEVELOPING NEW TECHNOLOGIES AND SERVICES



Started in 2008:

- Spring, Texas
- Staff: 5 scientists and engineers
- 2,000 ft²
- Developed:
 - FluidPro PAL™
 - Mini-PVT™
 - GC-GOR™



November 2011:

- The Woodlands, Texas
- Staff: 28 scientists and engineers (Oct 2013)
- 15,000 ft²
 - 3,000 ft² pilot plant and machine shop
 - 4 x 1,000 ft² laboratories
 - 30 offices



Goals:

1. Lab quality data in the field
2. Reduce costs and turn around time for our client
3. Support geographically remote locations
4. Reduce demand on field technicians



Strategies:

- ▶ Improve portability & reduce footprint
- ▶ Automate analyses and calculations
- ▶ Reduce human intervention

1. Rapid Deployment in Remote Locations



FluidPro PAL™

2. Automated Analyzers in Hazardous Locations



Rapid Deployment in Remote Locations

Scenario:

- FluidPro PAL™ in Israel
- Analyzing gas and condensate
- GC complication causes delays
- Two weeks backlog natural gas samples

Challenge:

- Need fast, reliable solution
- Portable and small
- Easy to install and train onsite technicians



Rapid Deployment in Remote Locations

Solution:

- Hand carry Calidus micro GC on airplane
- Natural Gas Analyzer with FID and TCD
- 6 minute analysis (C₁-C₁₄, CO₂, air)
- Minimal cross training, utilizes *ChromPerfect*

Results:

- Arrived onsite from Houston within 48 hours
- Calidus calibrated and analyzing samples within 6 hours
- Cleared backlog of 30+ natural gas samples within 48 hours

Total Time: 102 hours (~4 days)



1. Rapid Deployment in Remote Locations



2. Automated Analyzers in Hazardous Locations



Automated Analyzers in Hazardous Locations



AutoGOR™

Automated pressurized well stream fluid analyzer

Sample

Max pressure: 1,800 psig

Max temperature: 160°F

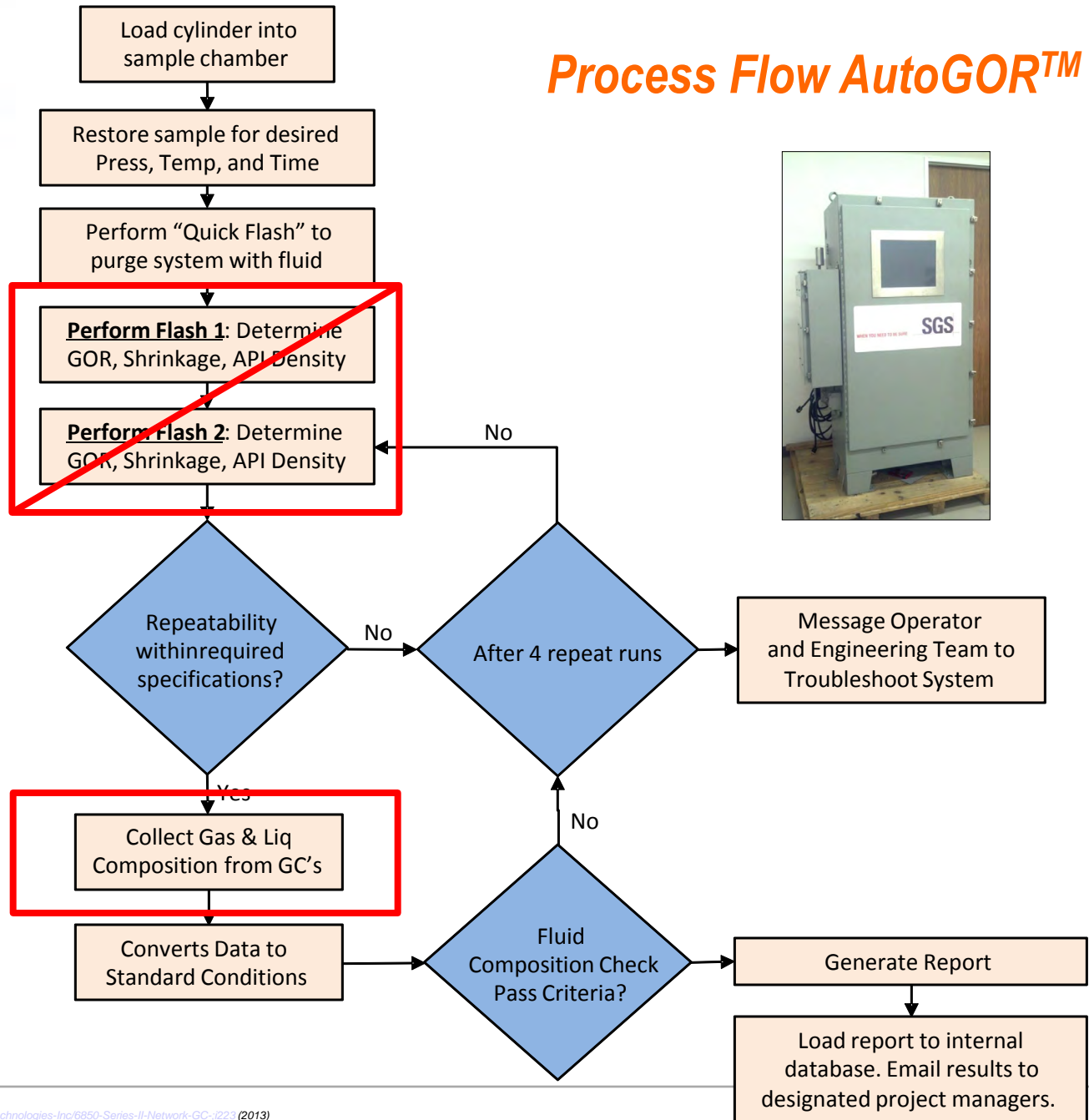
Physical

Gas/Oil Ratio (GOR), Shrinkage Factor, API Density

Chemical

Gas Composition (C_1 to C_{14+})

Oil Composition (C_1 to C_{15+})



GAS
6 minutes



LIQUID
45 minutes



1. Investigate market for Rapid Deployment Kits (RDK™)
2. Work with Falcon Analytical towards a online crude oil liquid analyzer
3. Portable Micro GCMS (1st Detect)
4. Research new applications for portable GC's

Questions?



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