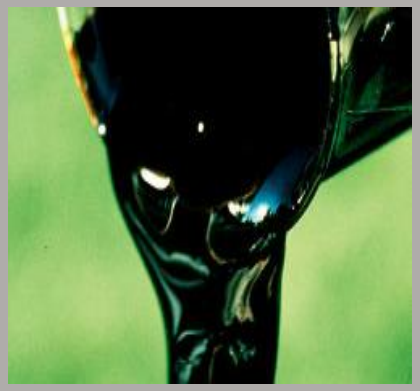

Increasing Throughput & Easier to Use: Refinery Support Laboratory Experience with micro and Fast Gas Chromatography

Brian Rohrback, Infometrix, Inc.

GCC 2014

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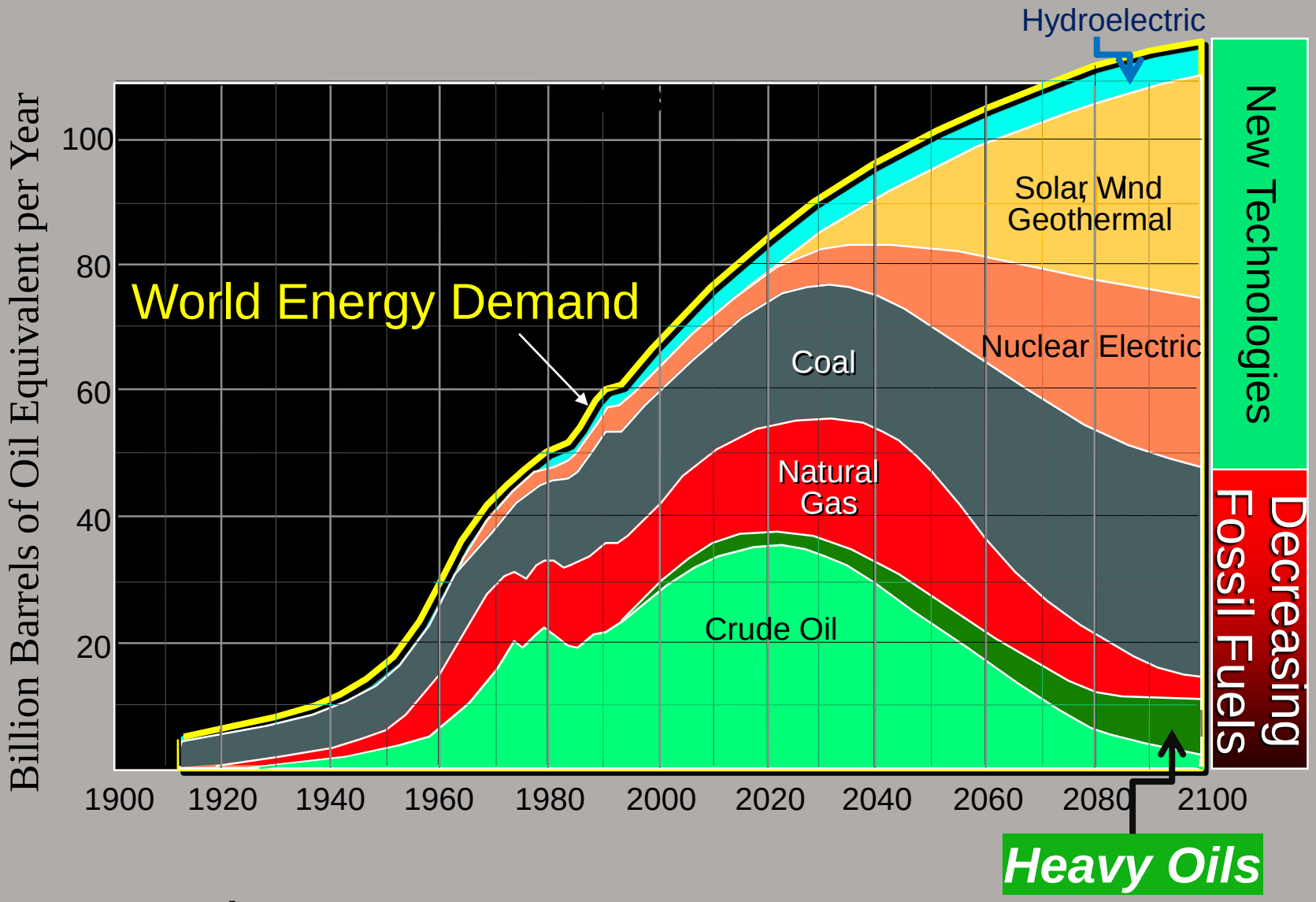
Heavy Oils & Sands

Heavy oil offers a possible solution to our need for a constant supply of new and secure energy supplies, but its production is characterized by low recovery, so the industry faces the conundrum of how to convert these giant resources into easily produced supplies.

News Update: October 10, 2014

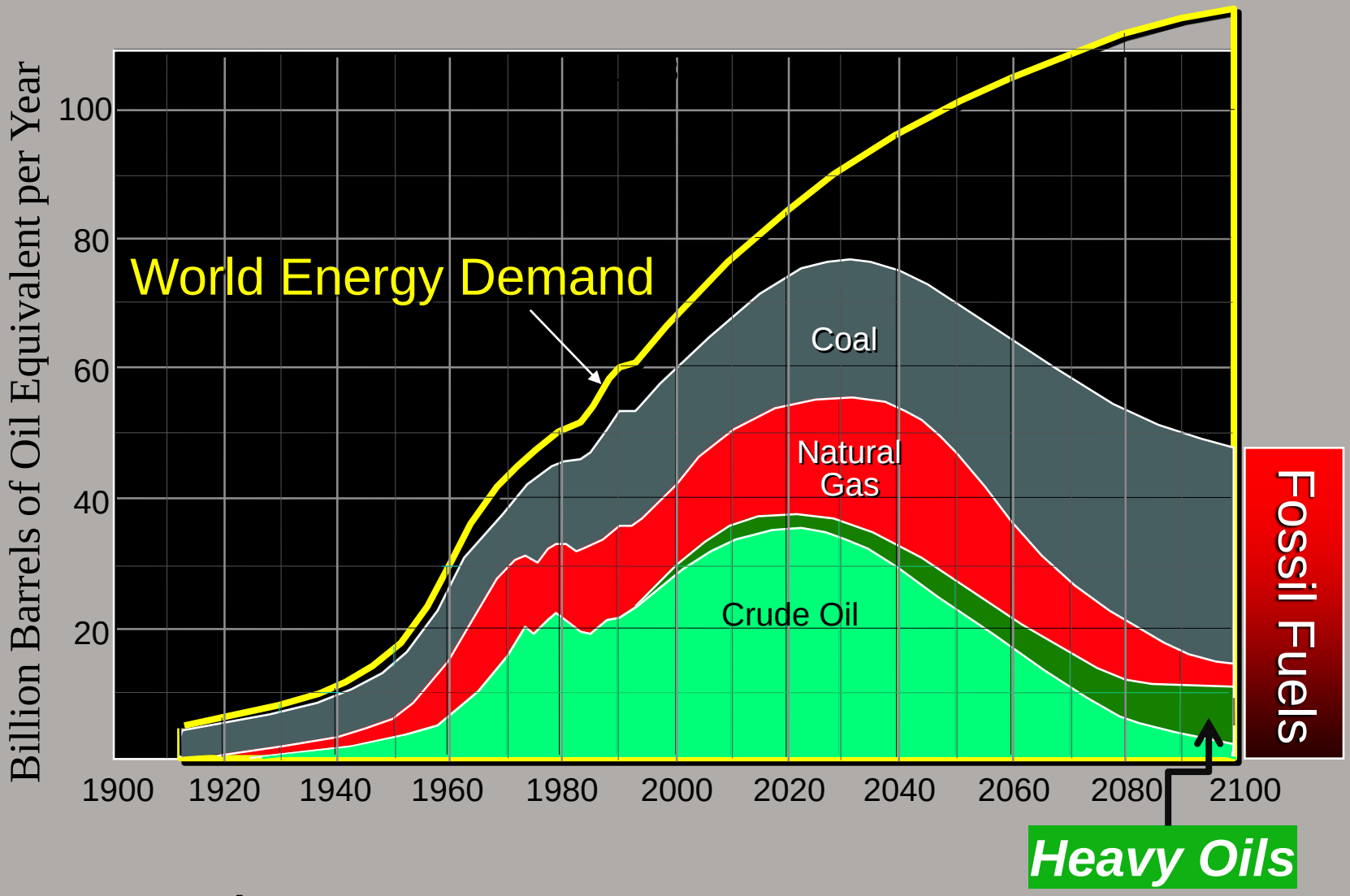
CB&I, Chevron to upgrade Bapco Bahrain refinery to process heavy oils

Projected World Energy Supplies



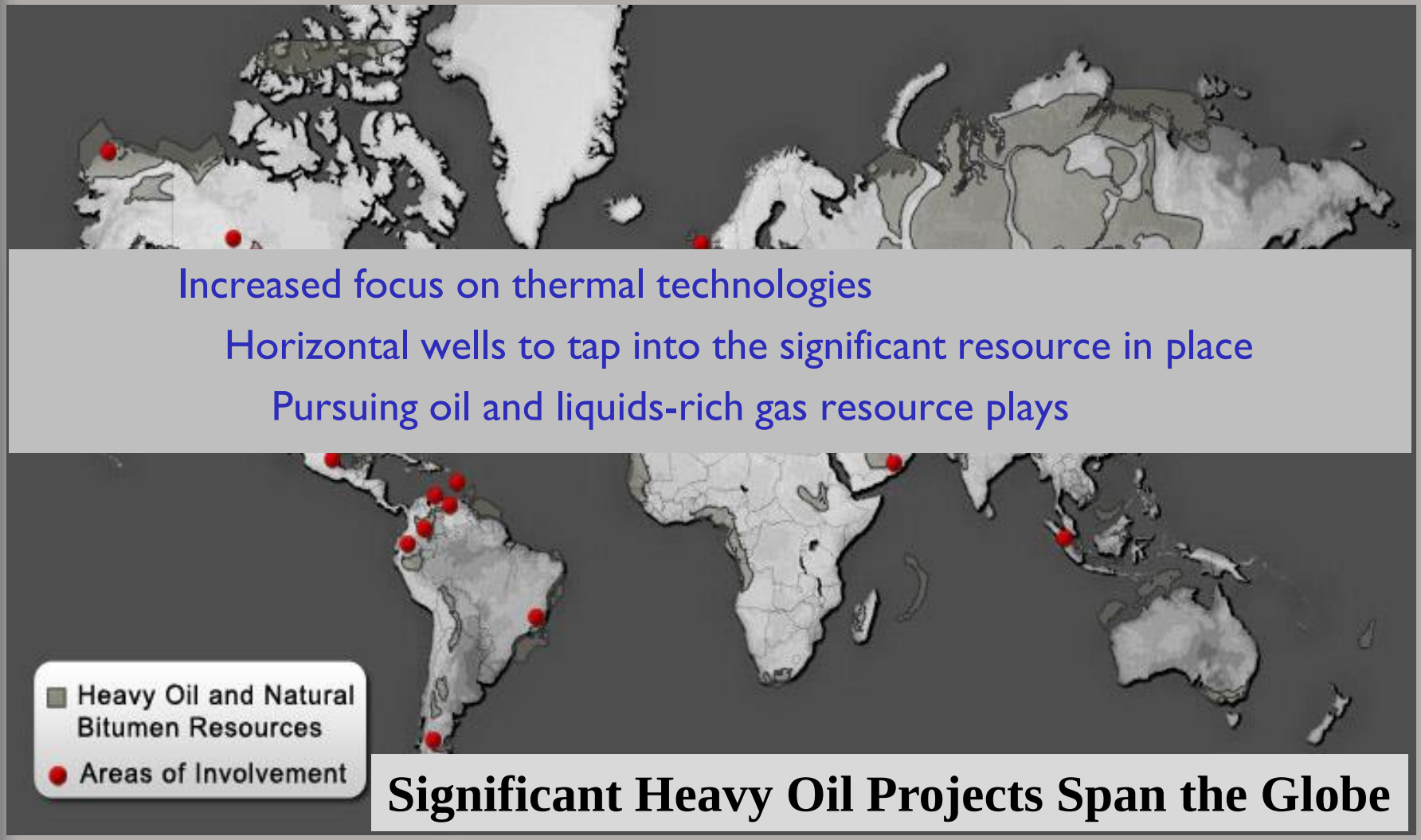
Rechsteiner 2007

Projected World Energy Supplies



Rechsteiner 2007

Rejuvenating Heavy Oil



Increased focus on thermal technologies

Horizontal wells to tap into the significant resource in place

Pursuing oil and liquids-rich gas resource plays

Significant Heavy Oil Projects Span the Globe

Plant Lab Situation

- Many analyses are performed by gas chromatography
  - Boiling range distributions
  - Refinery gas composition
  - Sulfur speciation
- Both instrumentation and the methods decades old
  - Equipment is being replaced
  - Presenting the opportunity for method upgrades

Increasing GC Throughput

– The D7798 Inter Laboratory Study validates external equivalency with D2887

- Faster analyses… < 5 minute cycles
- Easier operations… automation
- Data equivalency from an internal perspective
- Data equivalency from an external perspective

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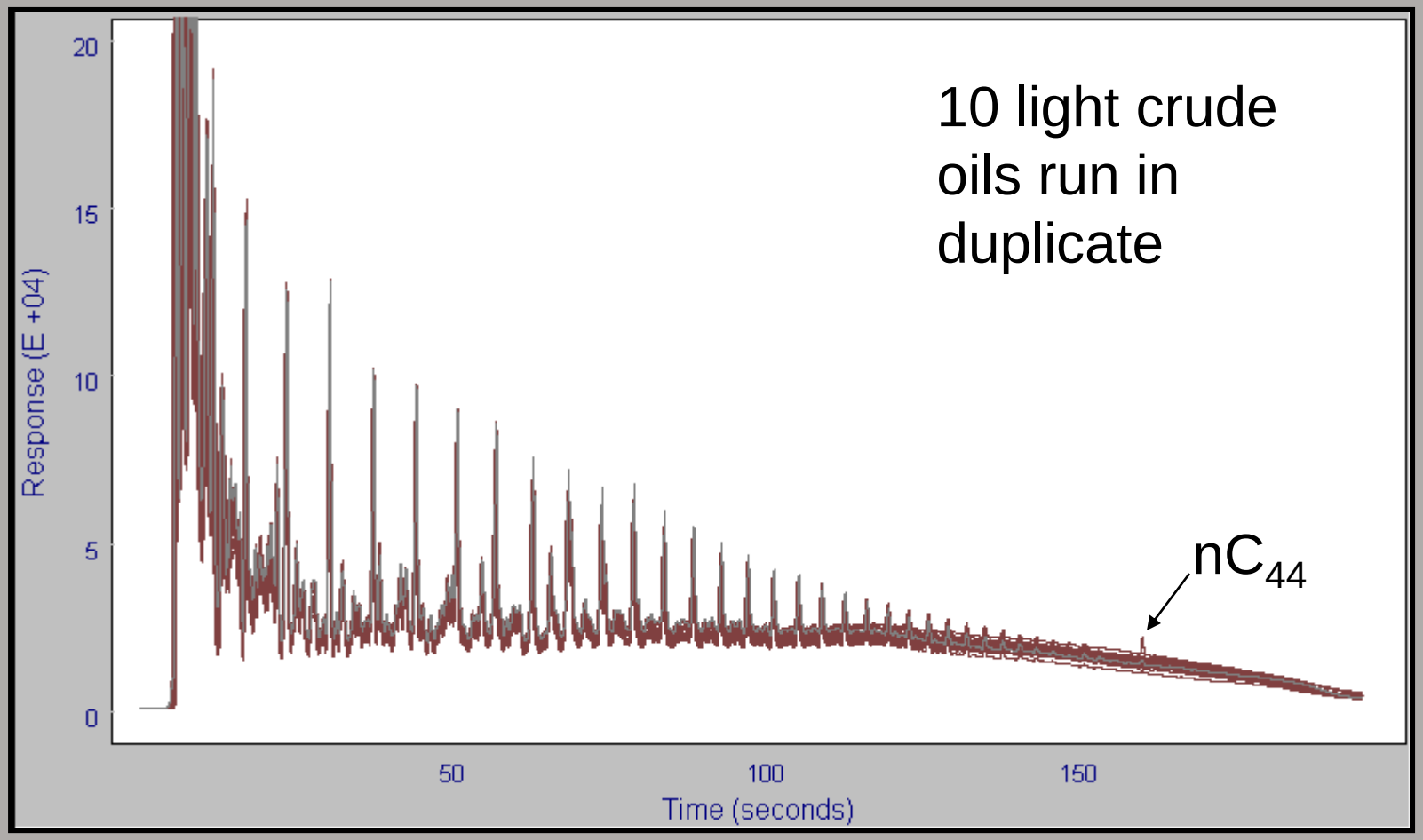
C_5 to C_{50}: 3 minute run



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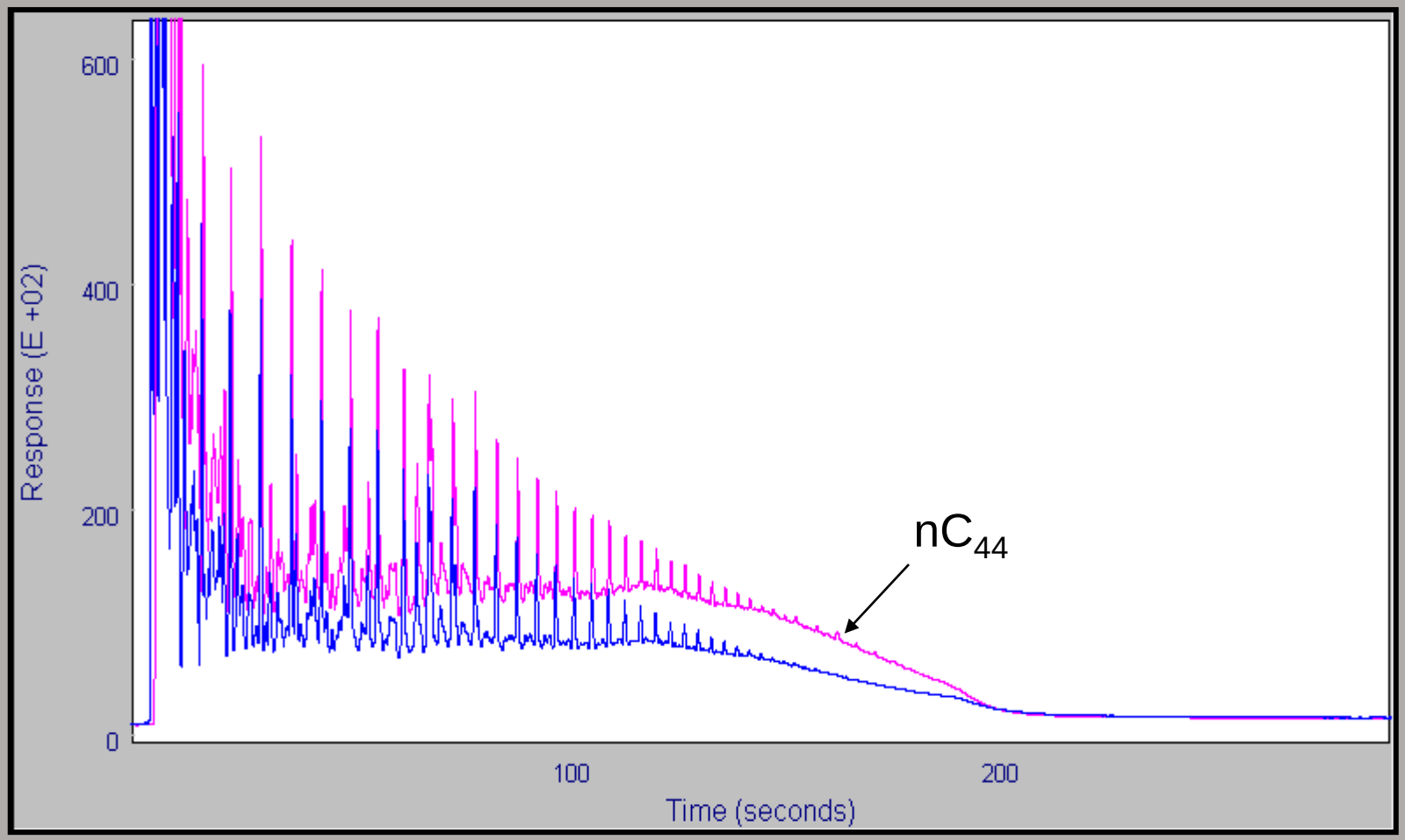
First Pass on Heavy Oils



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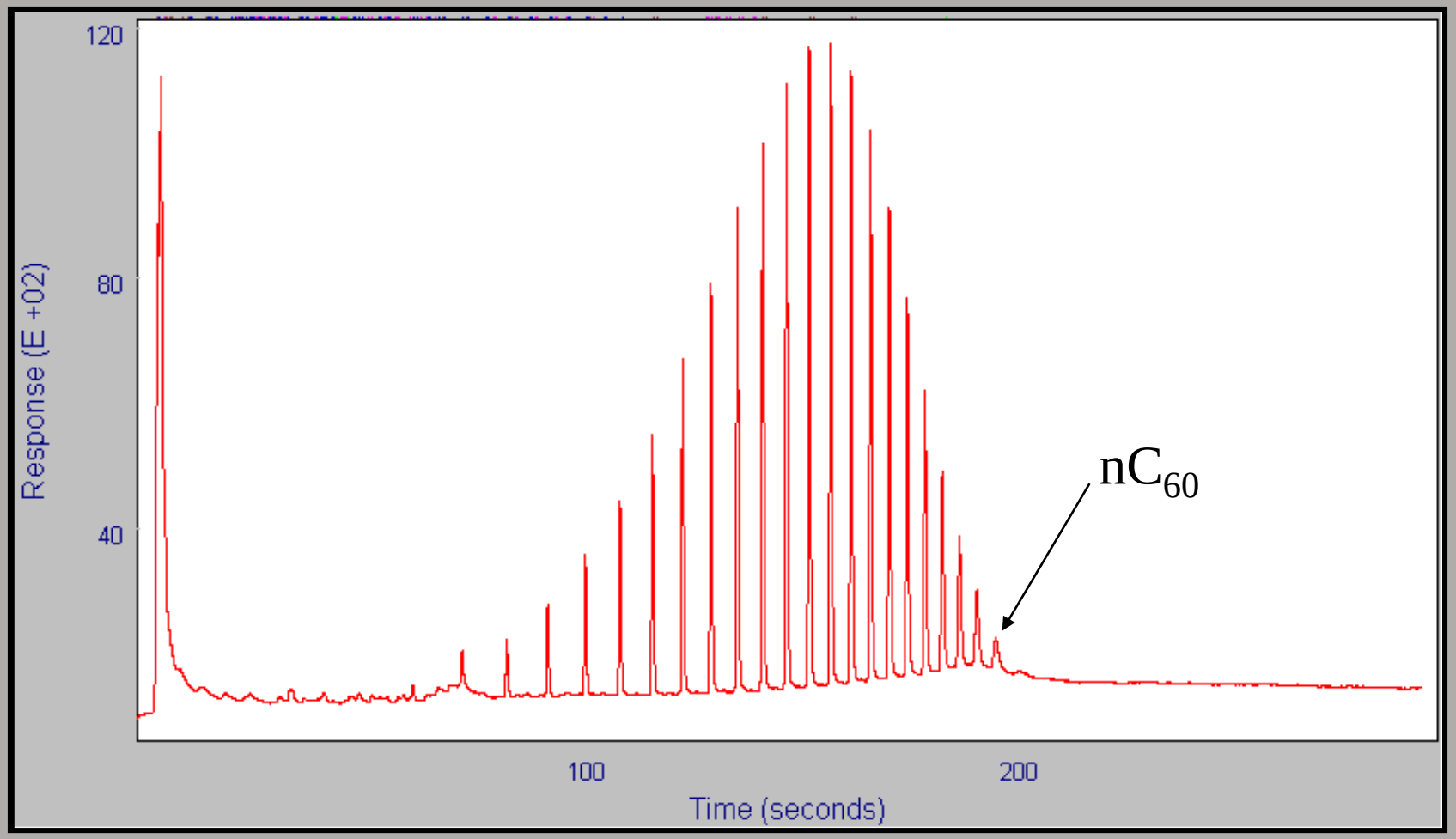
Polywax



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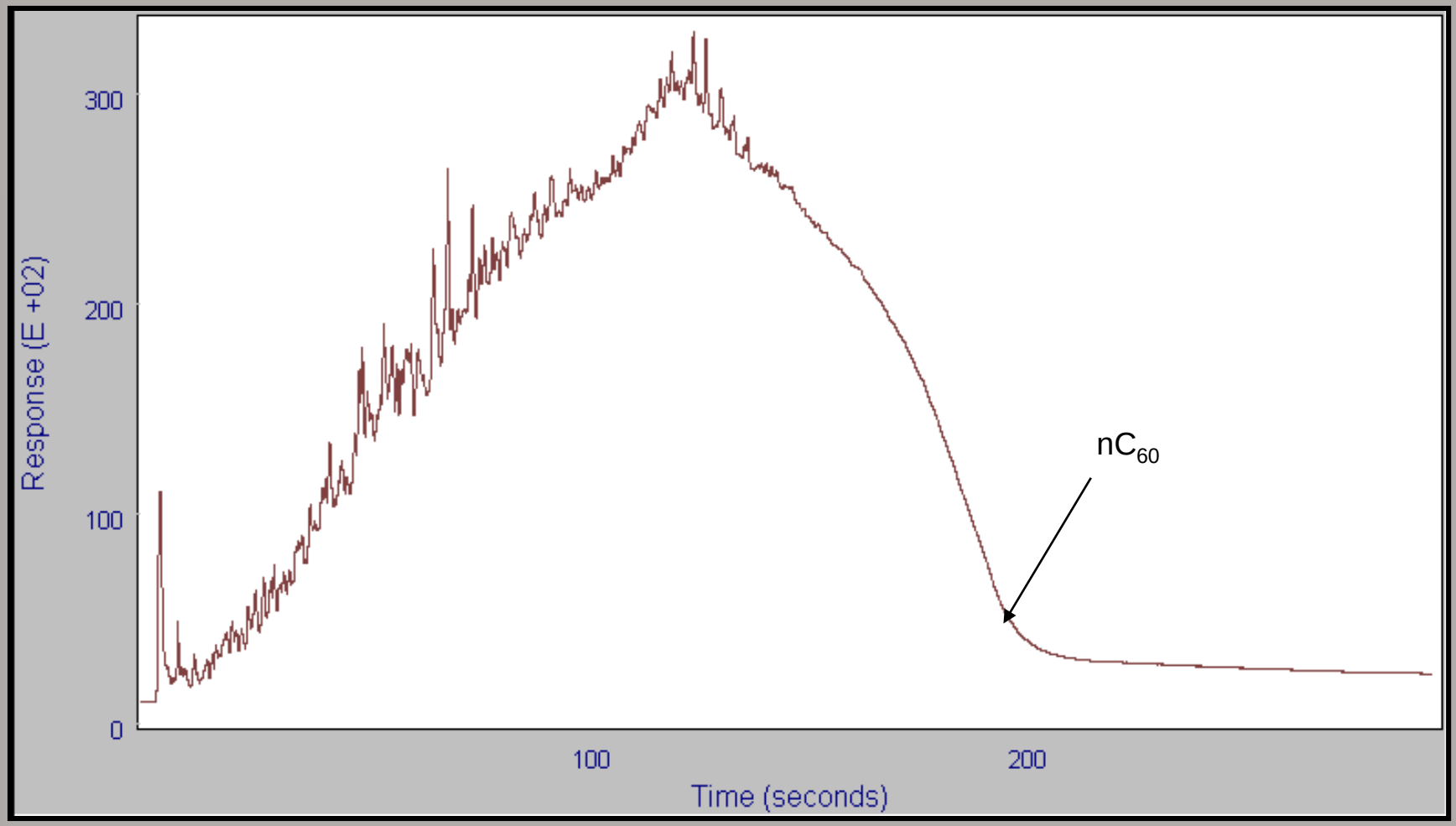
Heavy Oils Can Look Like Speed Bumps



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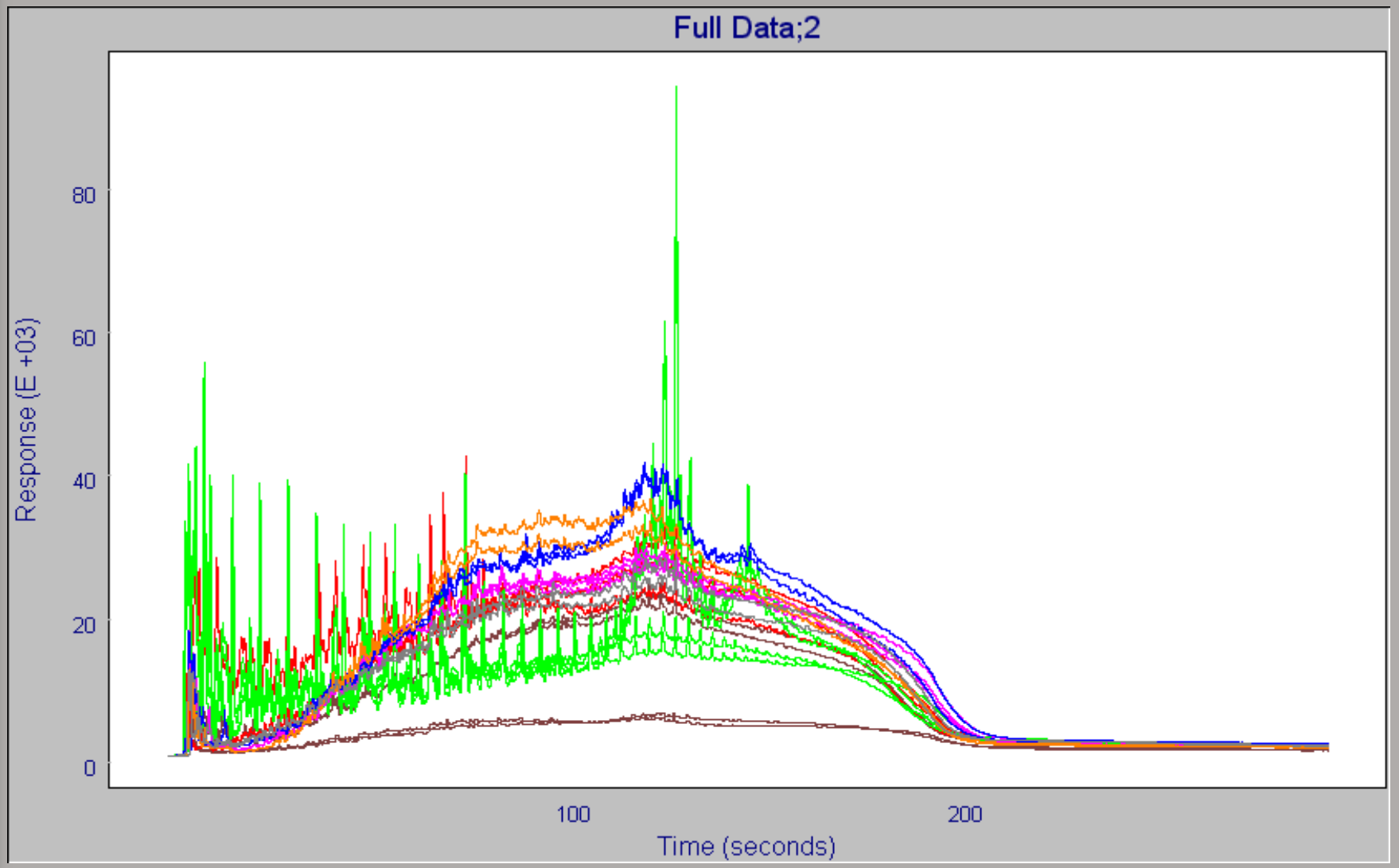
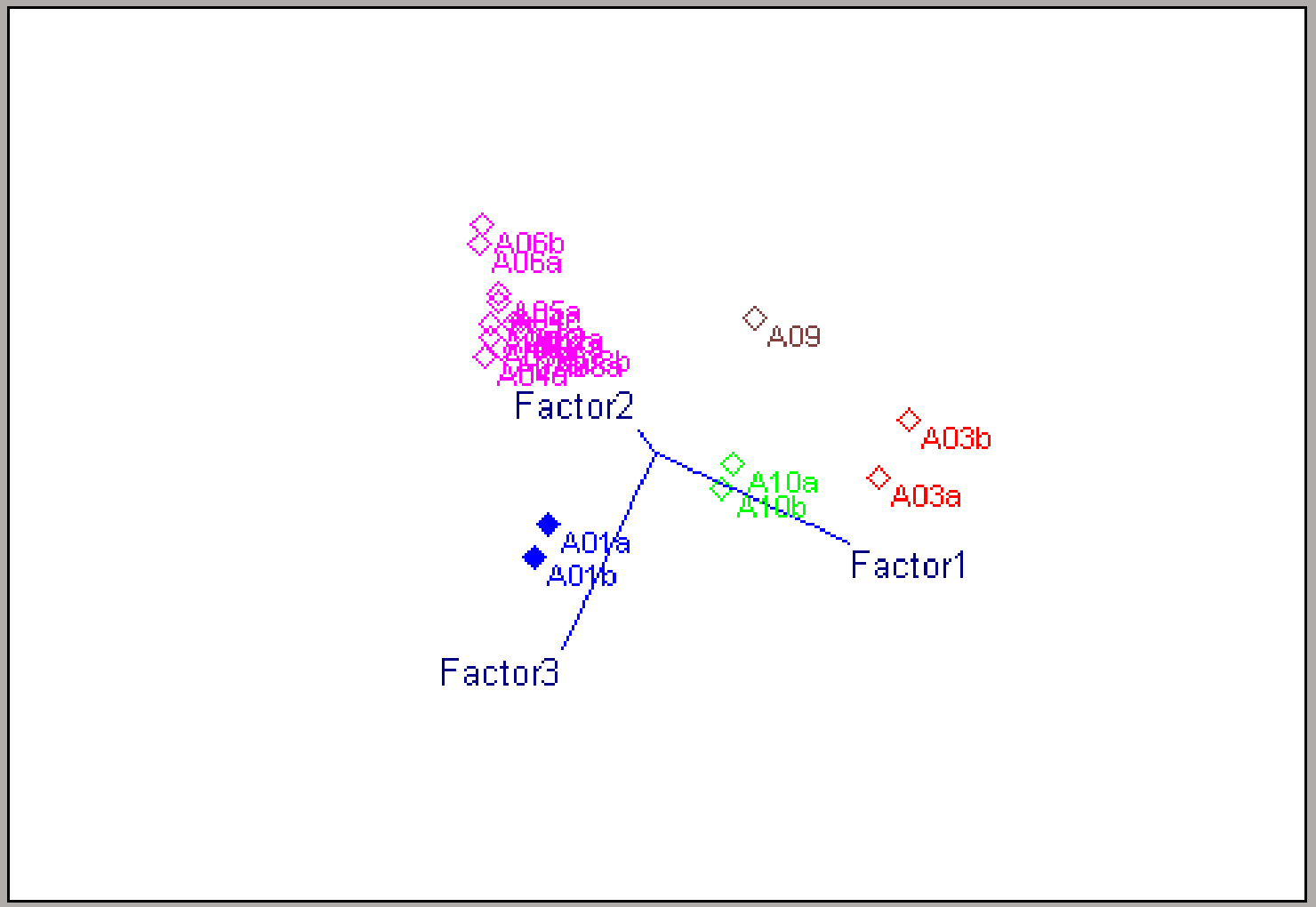
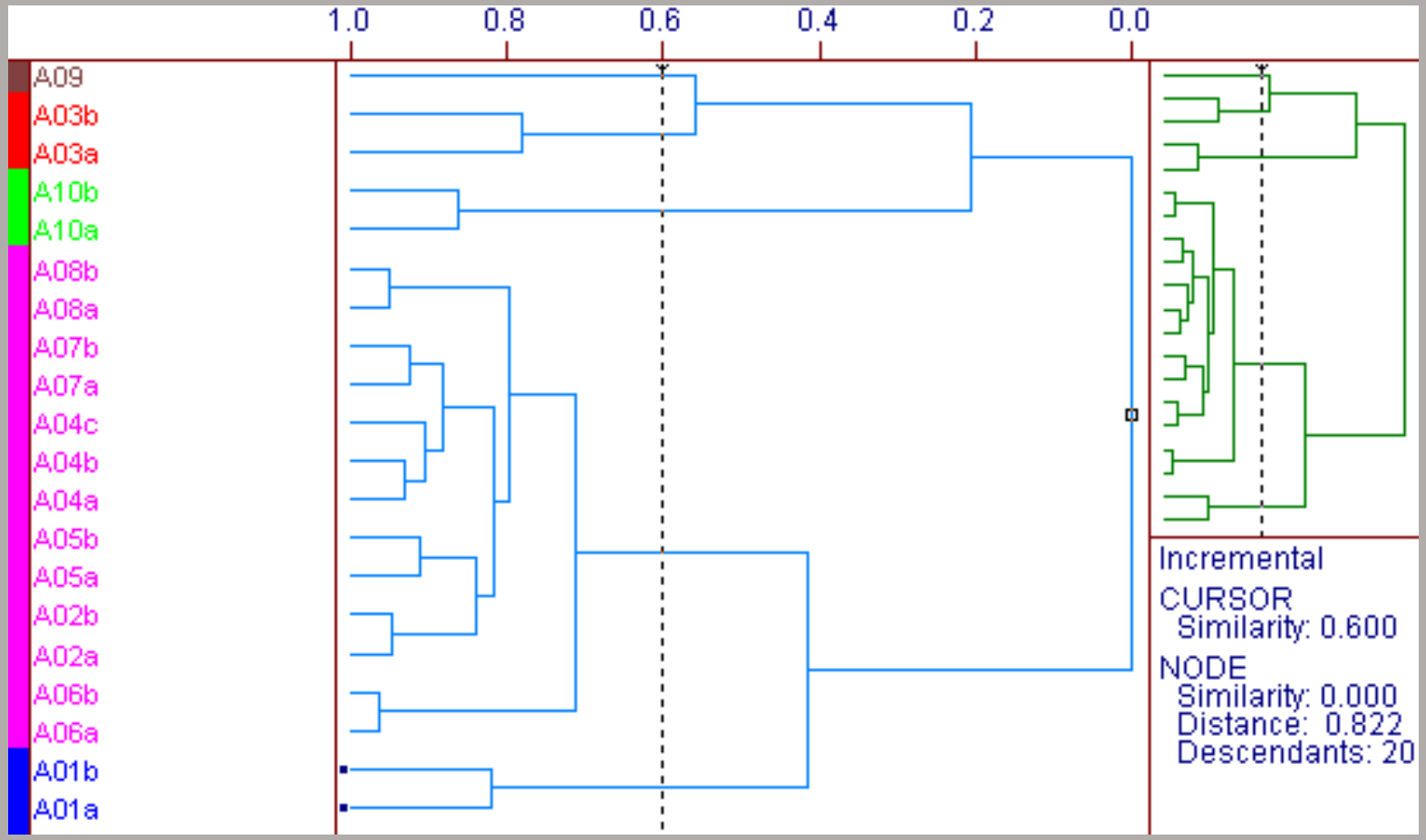
Variability in Heavy Oils



Oils Can Be Easily Classified



Hierarchical Cluster Analysis



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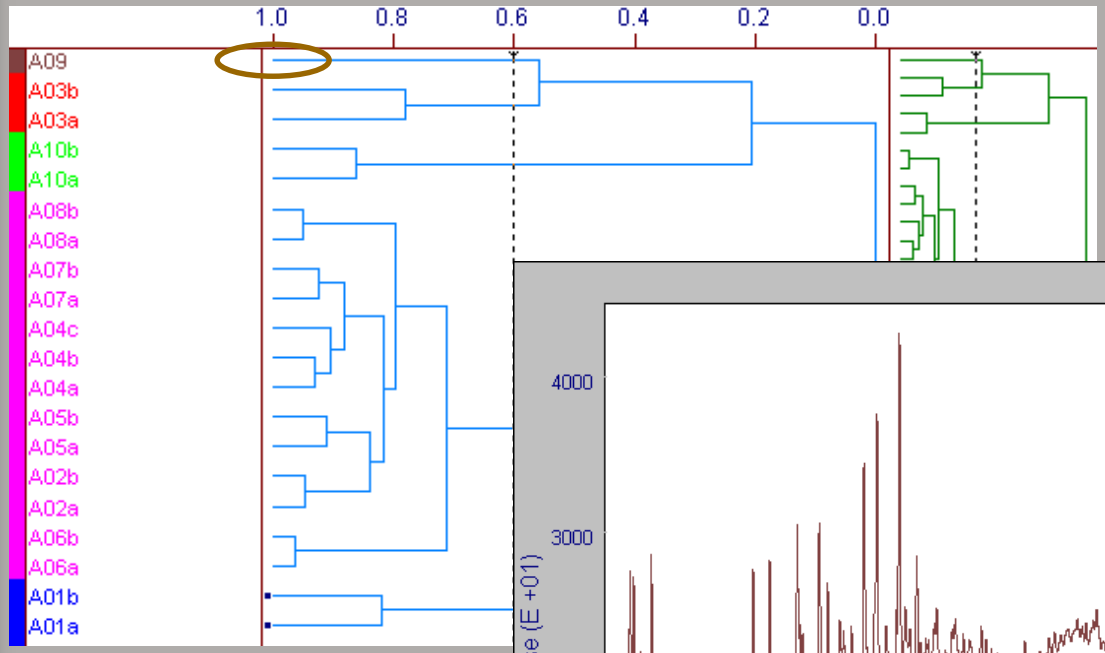
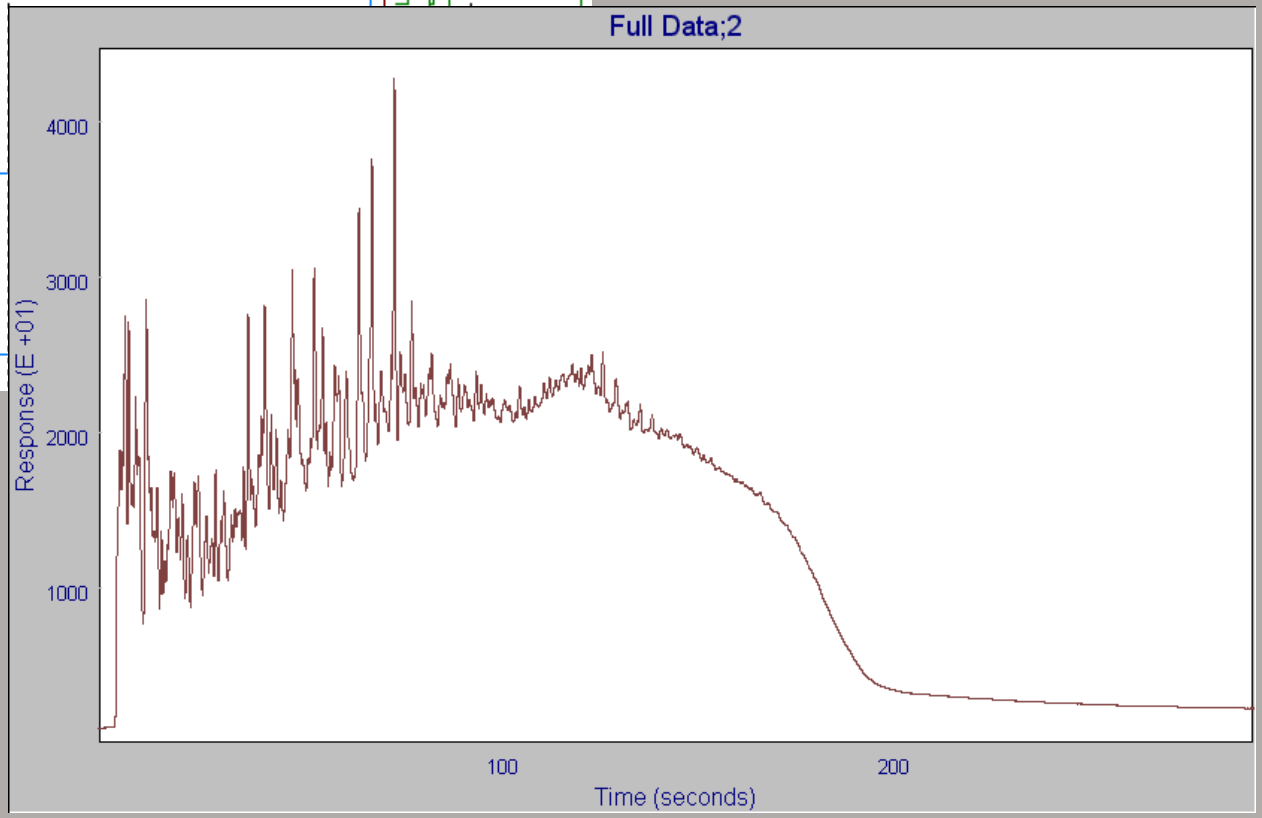
Group I





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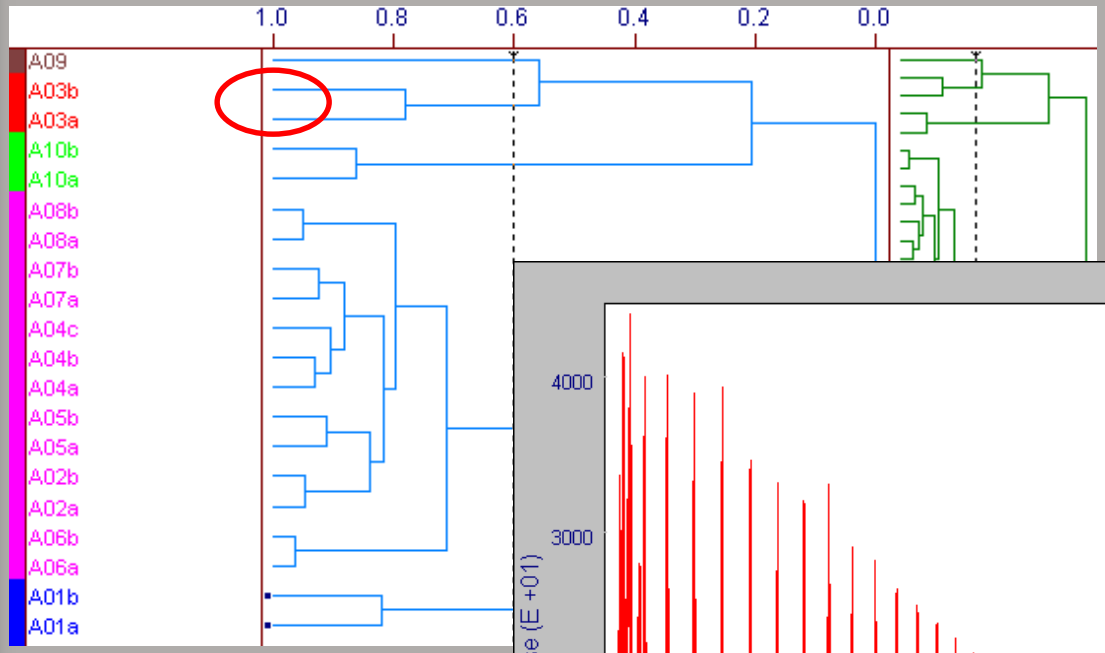

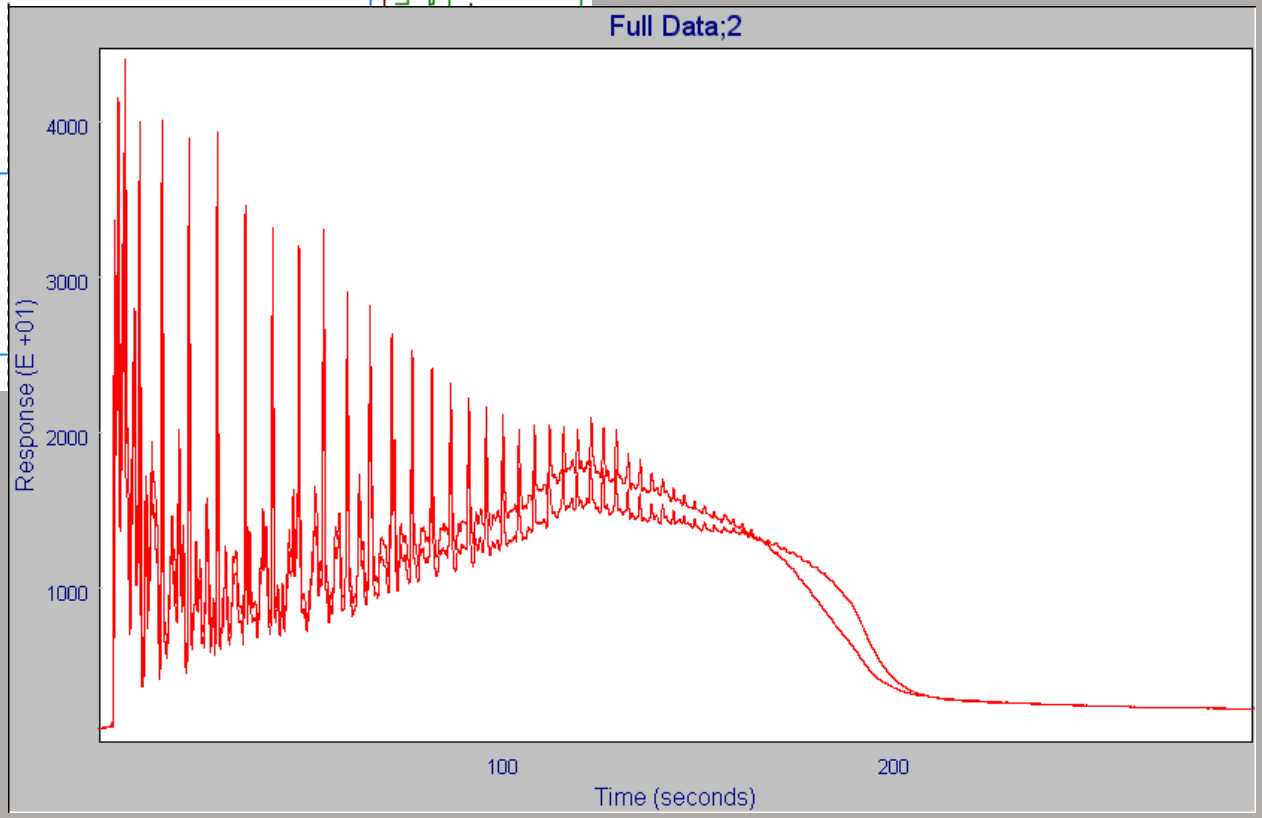

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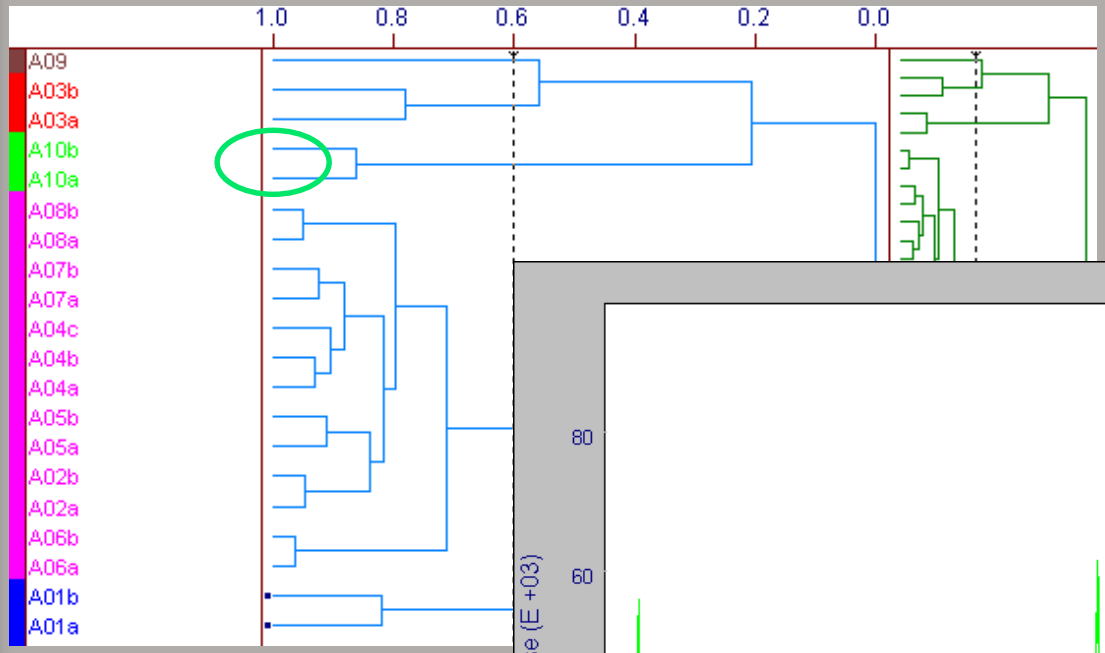
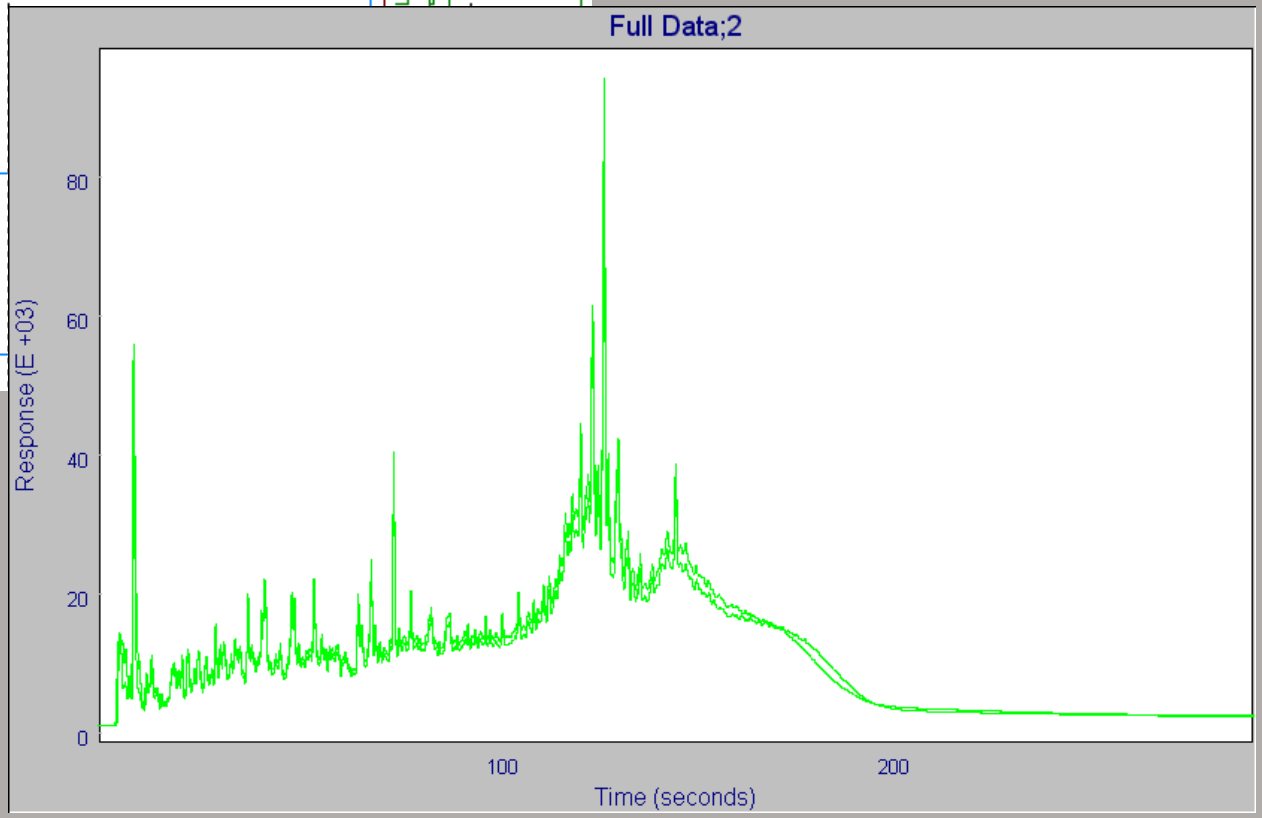
Group 3





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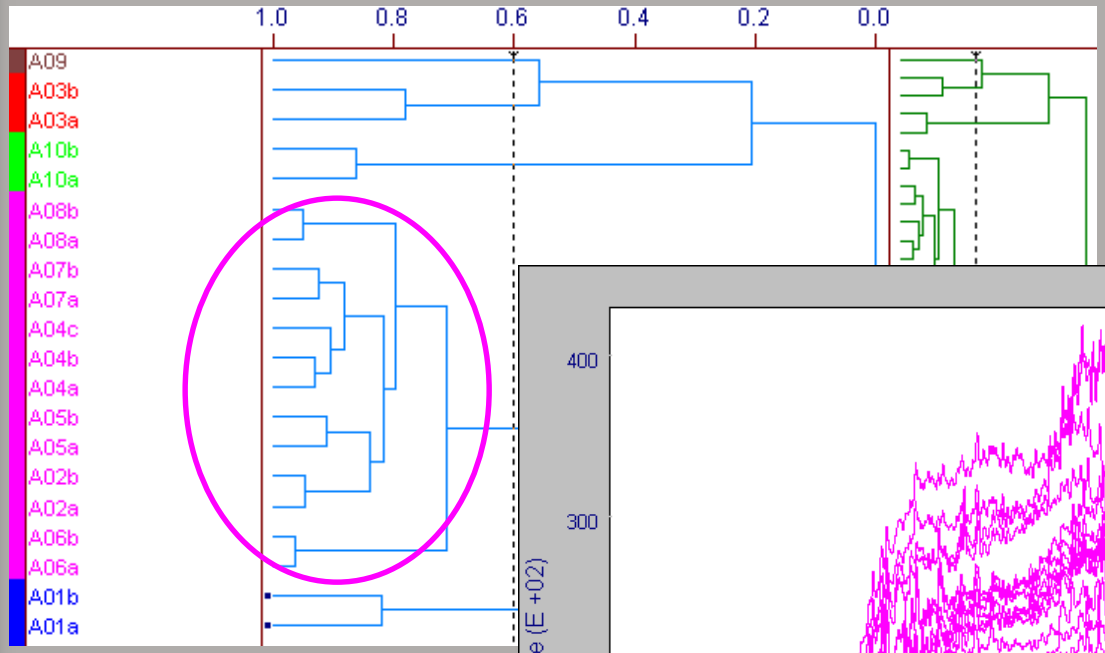
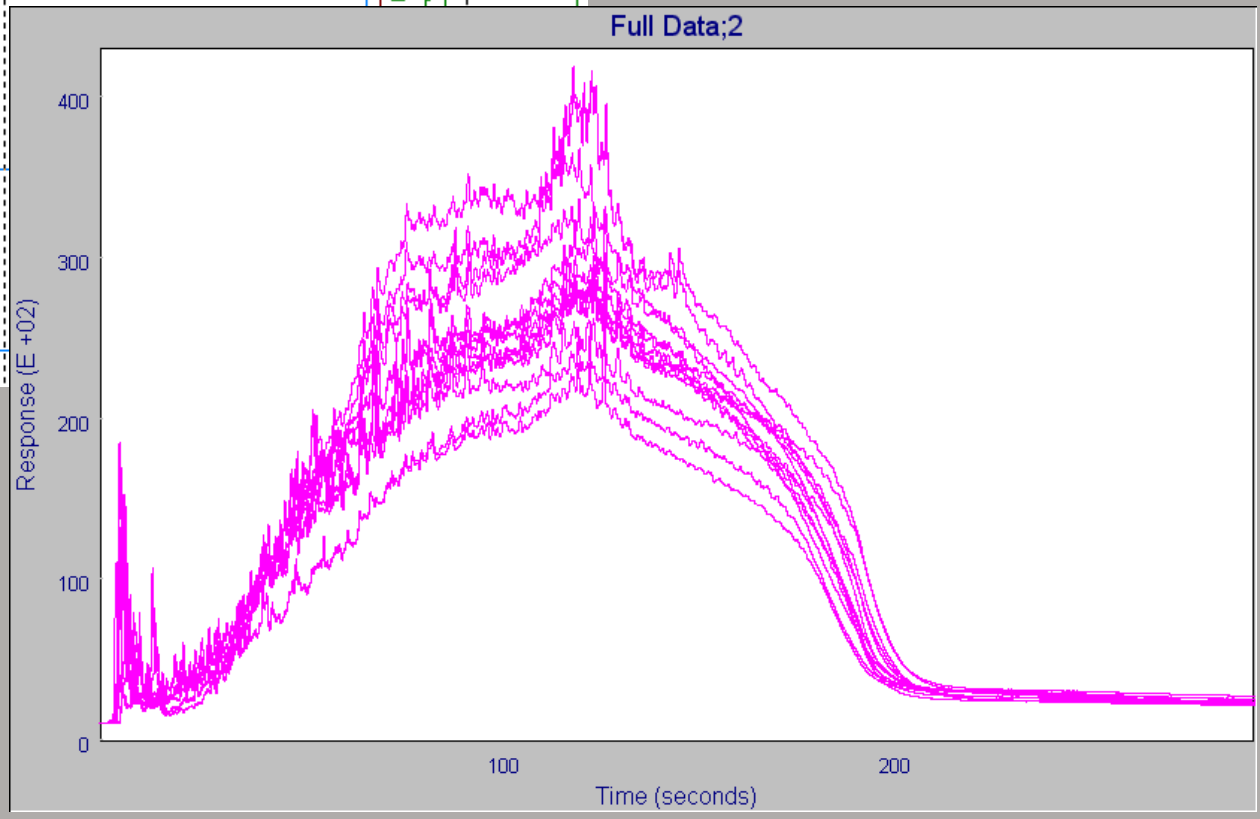
Group 4





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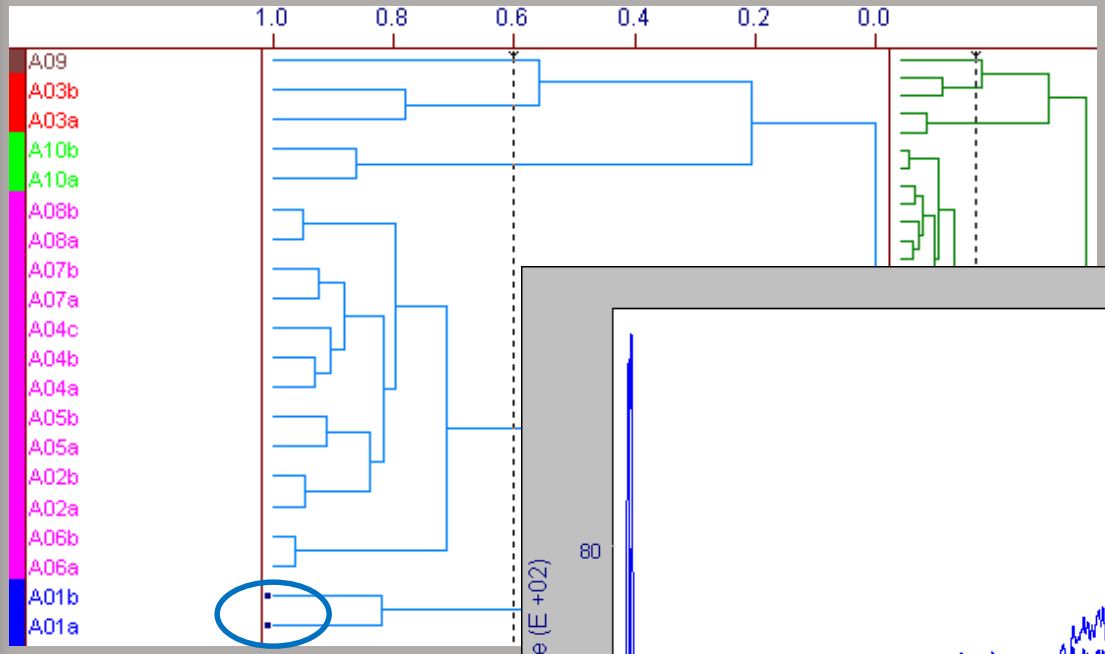
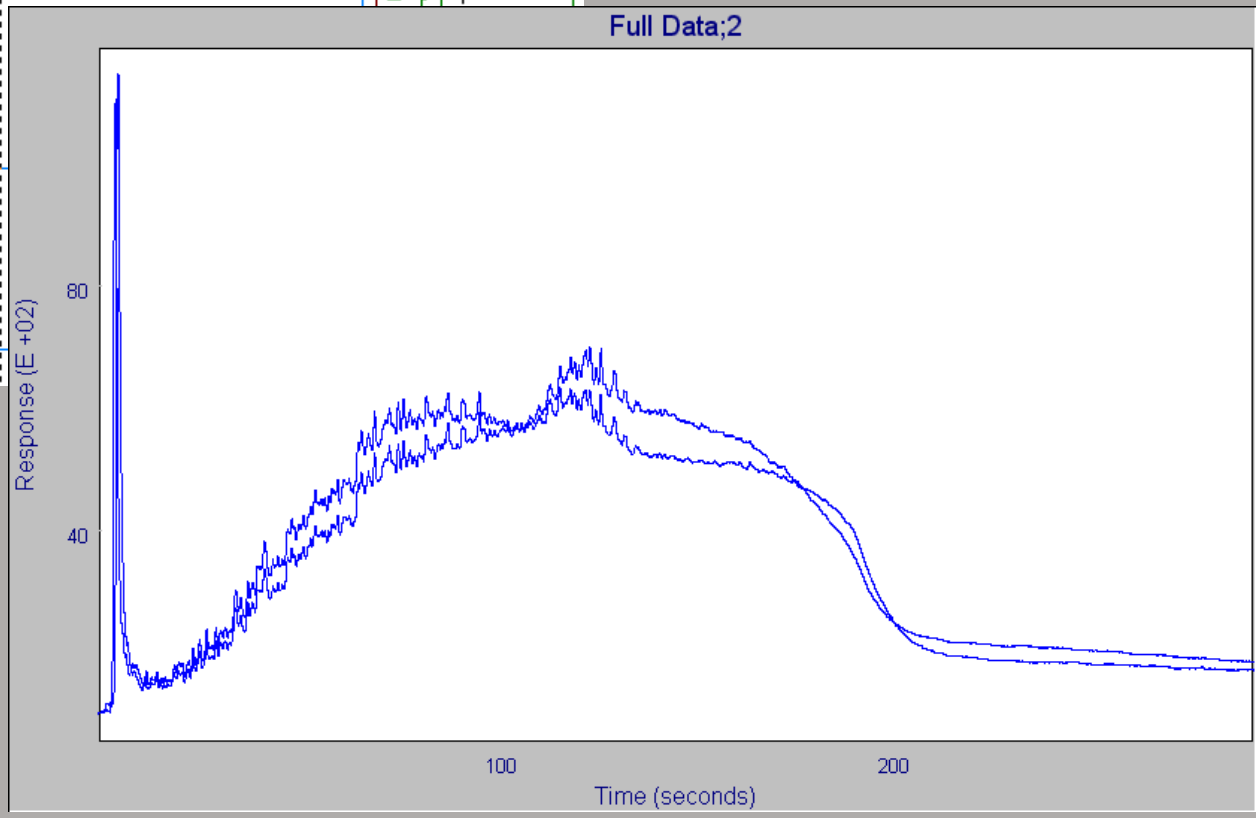
Group 5





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Going Forward

- The so-called micro GCs are clearly not just for gases and there may be significant advantages in applications that are found in heavy oil.

Easier, Faster, Smaller, Smarter and using Low power

- The ability to place a GC nearly anywhere and be able to process data quickly will allow both better understanding and better control of the extraction and transport of these important feedstocks.

Acknowledgements

- Dean Alcorn, Husky Lima Refinery
- Carl Rechsteiner, Chevron Energy & Technology Company
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- Ned Roque, Falcon Instruments

Husky LOW SULPHUR DIESEL

Chevron

Schlumberger

FALCON Fast Analytical Solutions & Technologies

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