

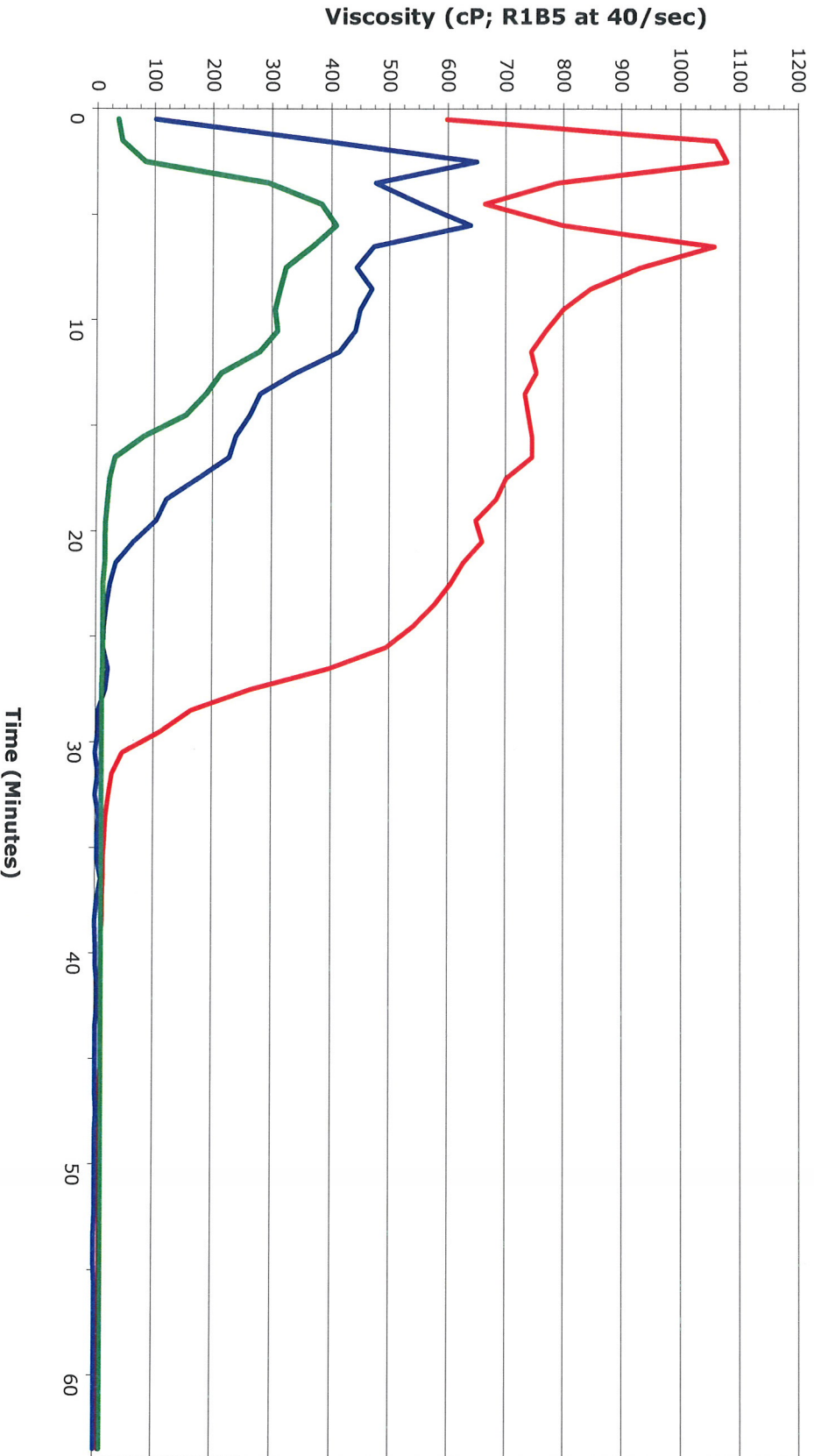
ABBREVIATION REFERENCE CHART

WGA-1A	Liquid Guar Slurry	SI-1	Scale Inhibitor
I-2L	Acetic Acid	CSA-3	Clay Stabilizer
EC-101	Instant Cross Linker	S-4	Surfactant
EM3	Delay Cross Linker	Buf	Synthetic Caustic- Mud Safe CR®
CX-14	Delay Cross Linker	AmBorMax	Gel System Name - UPP

AmBorMax at 250F

4 minute hydration;

- 30 # WGA-1A+.2gpt I-2L + 2gpt Buffer-11L+.7gpt CX-14+ .9gpt EC-101; XL pH = 12.25;Base Viscosity=27; Base pH=6.9
- 25 # WGA-1A+.2gpt I-2L + 2gpt Buffer-11L+.7gpt CX-14+ .9gpt EC-101; XL pH = 12.3;Base Viscosity=22;Base pH=6.9
- 20 # WGA-1A+.2gpt I-2L + 2gpt Buffer-11L+.7gpt CX-14+ .9gpt EC-101; XL pH = 12.29;Base Viscosity=15;Base pH=6.9



Chandler 5550 System Analysis

High Temperature Fracturing System Analysis

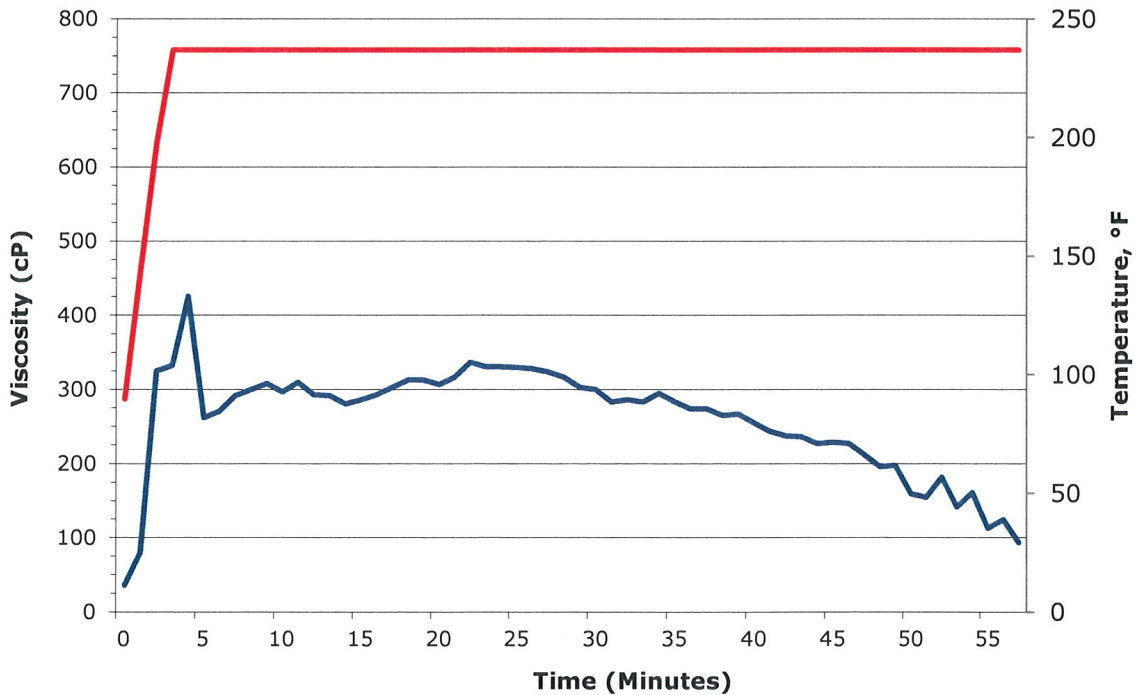
Customer:	Date: 11/8/2012
Well:	Requested By:
Zone(s):	Technician:
Depth:	Pump Time:
BHT: 237°F	Pump Rate:
District:	Hydration Time: 4 min

Base Fluid System Name

Additives

— 20# 5gpt WGA-1A + 1.5gpt EM3 + .5gpt S-4 + .25gpt SI-1 + 3.5gpt Buff + .5 CSA-3

— Temp.



Fluid Specifications

Breaker Type:	
Base Gel Viscosity:	12cP
Base Gel pH:	7.7pH
After Crosslink pH:	11.97pH

Comments: Tests were ran using R1B5 at 40 sec⁻¹ shear rate.

The information contained in this document is based on the most current and best information, testing procedures, available equipment, and materials. No liability is expressed or implied.

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CX-14	Delay Cross Linker	AmBorMax	Gel System Name - UPP

Chandler 5550 System Analysis

High Temperature Fracturing System Analysis

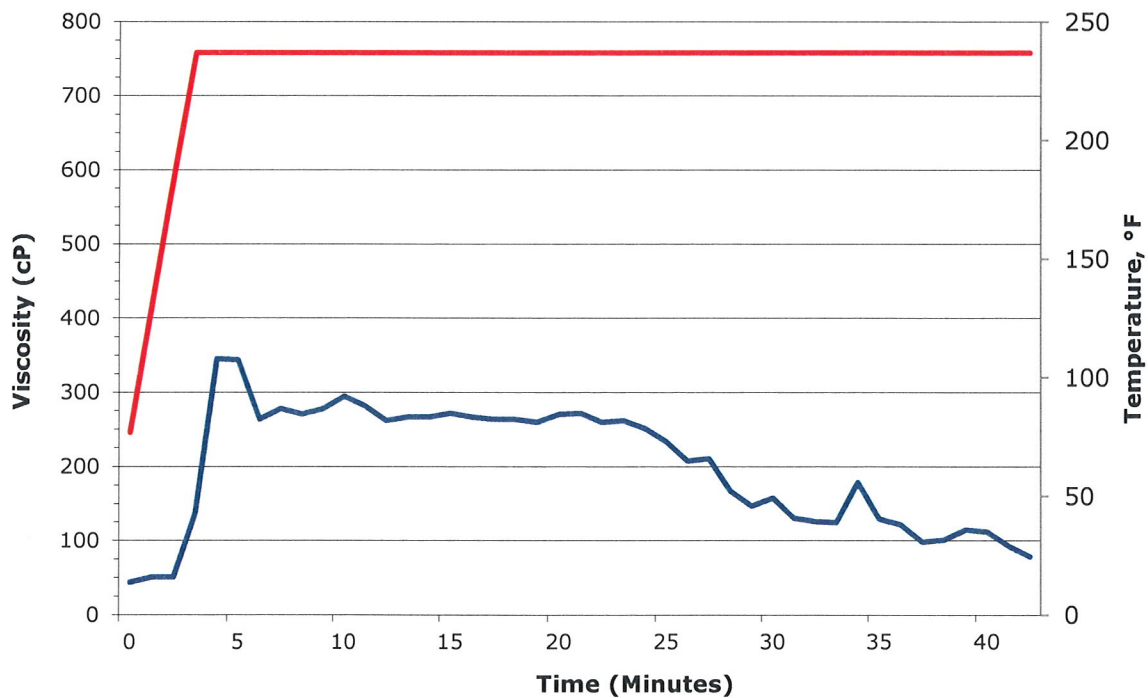
Customer:	Date: 11/8/2012
Well:	Requested By:
Zone(s):	Technician:
Depth:	Pump Time:
BHT: 237°F	Pump Rate:
District:	Hydration Time: 4 min

Base Fluid System Name

Additives

— 20# 5gpt WGA-1A + 1.5gpt EM3 + .5gpt S-4 + .25gpt SI-1 + 3gpt Buff + .5 CSA-3

— Temp.



Fluid Specifications

Breaker Type:	
Base Gel Viscosity:	12cP
Base Gel pH:	7.7pH
After Crosslink pH:	11.89pH

Comments: Tests were ran using R1B5 at 40 sec⁻¹ shear rate.

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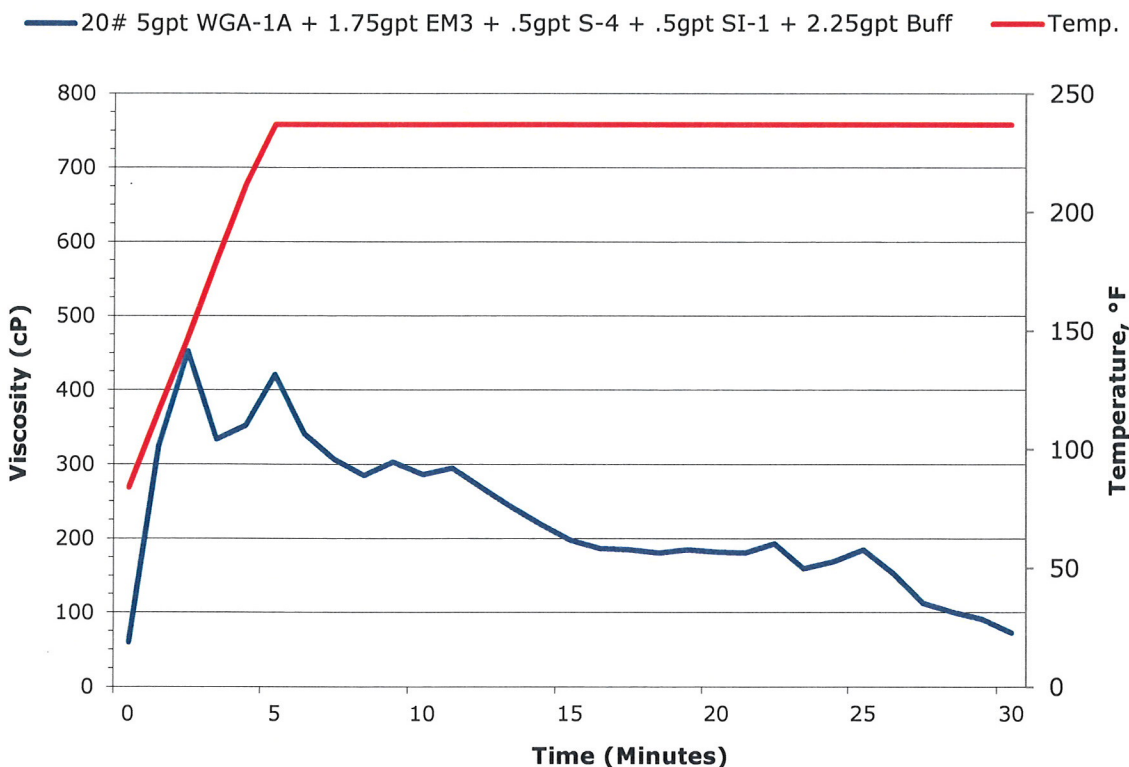
Chandler 5550 System Analysis

High Temperature Fracturing System Analysis

Customer:	Date: 11/8/2012
Well:	Requested By:
Zone(s):	Technician:
Depth:	Pump Time:
BHT: 237°F	Pump Rate:
District:	Hydration Time: 3 min

Base Fluid System Name

Additives



Fluid Specifications

Breaker Type:	
Base Gel Viscosity:	12cP
Base Gel pH:	7.7pH
After Crosslink pH:	11.5pH

Comments: Tests were ran using R1B5 at 40 sec⁻¹ shear rate.

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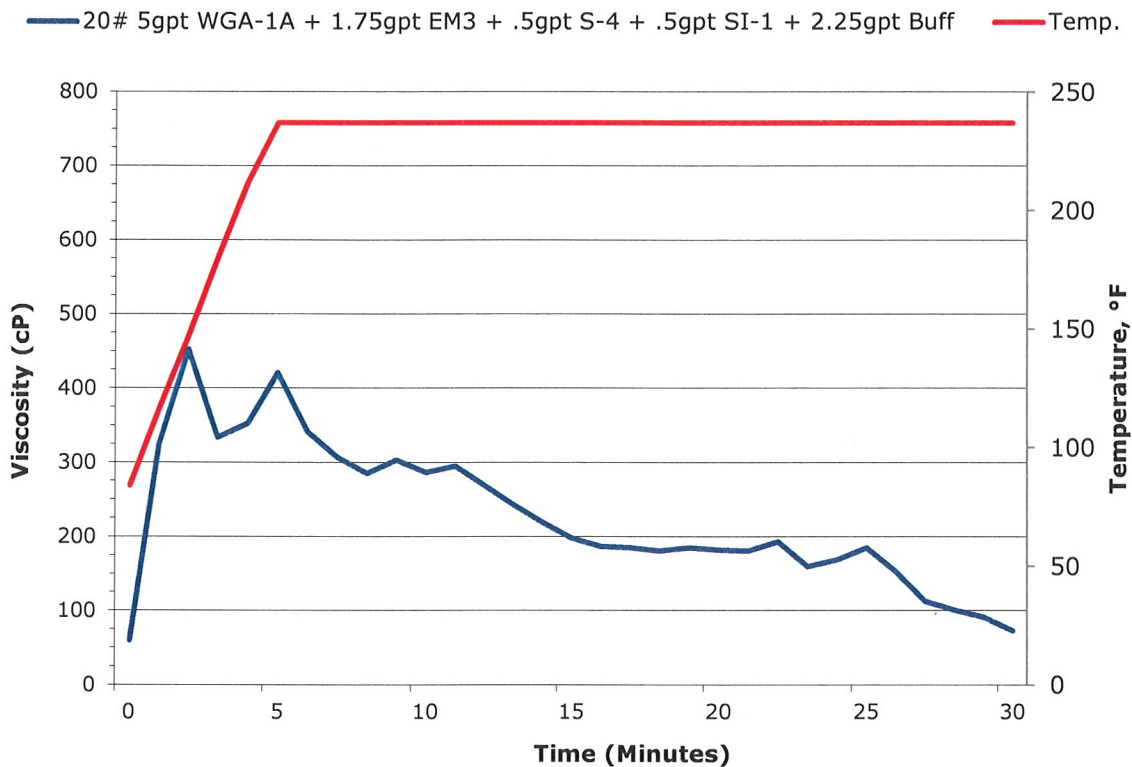
Chandler 5550 System Analysis

High Temperature Fracturing System Analysis

Customer:	Date: 11/8/2012
Well:	Requested By:
Zone(s):	Technician:
Depth:	Pump Time:
BHT: 237°F	Pump Rate:
District:	Hydration Time: 3 min

Base Fluid System Name

Additives



Fluid Specifications

Breaker Type:	
Base Gel Viscosity:	12cP
Base Gel pH:	7.7pH
After Crosslink pH:	11.5pH

Comments: Tests were ran using R1B5 at 40 sec⁻¹ shear rate.

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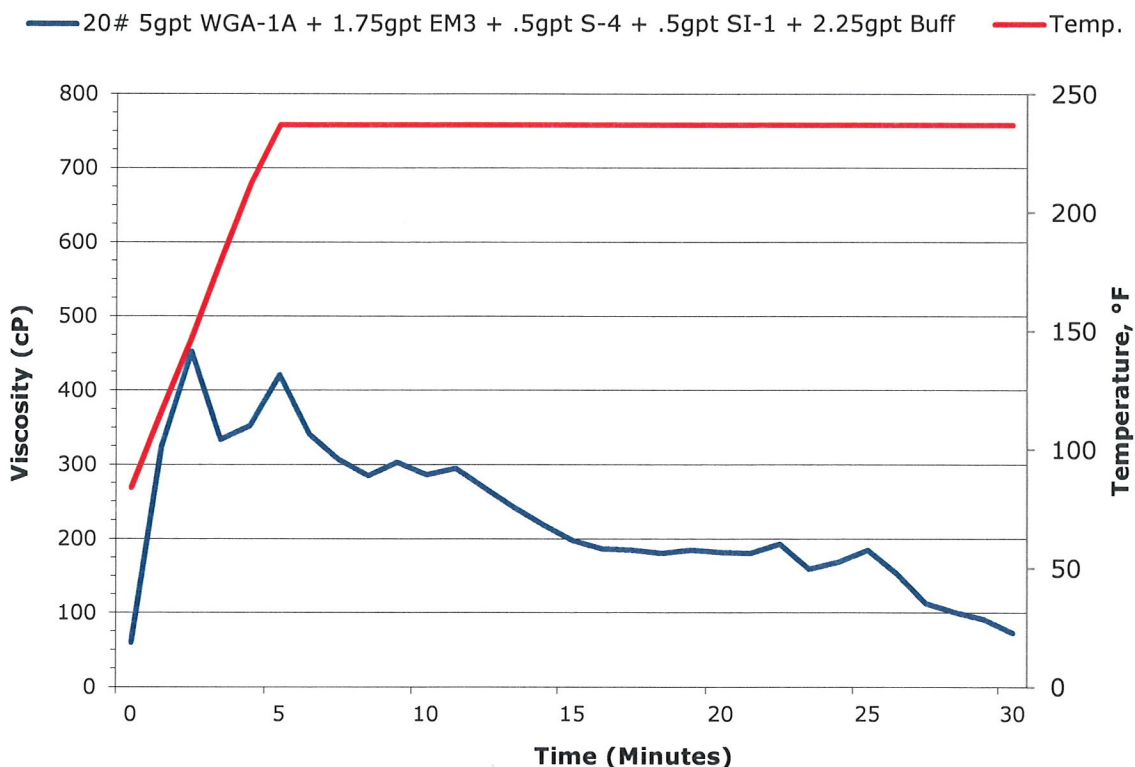
Chandler 5550 System Analysis

High Temperature Fracturing System Analysis

Customer:	Date: 11/8/2012
Well:	Requested By:
Zone(s):	Technician:
Depth:	Pump Time:
BHT: 237°F	Pump Rate:
District:	Hydration Time: 3 min

Base Fluid System Name

Additives



Fluid Specifications

Breaker Type:	
Base Gel Viscosity:	12cP
Base Gel pH:	7.7pH
After Crosslink pH:	11.5pH

Comments: Tests were ran using R1B5 at 40 sec⁻¹ shear rate.

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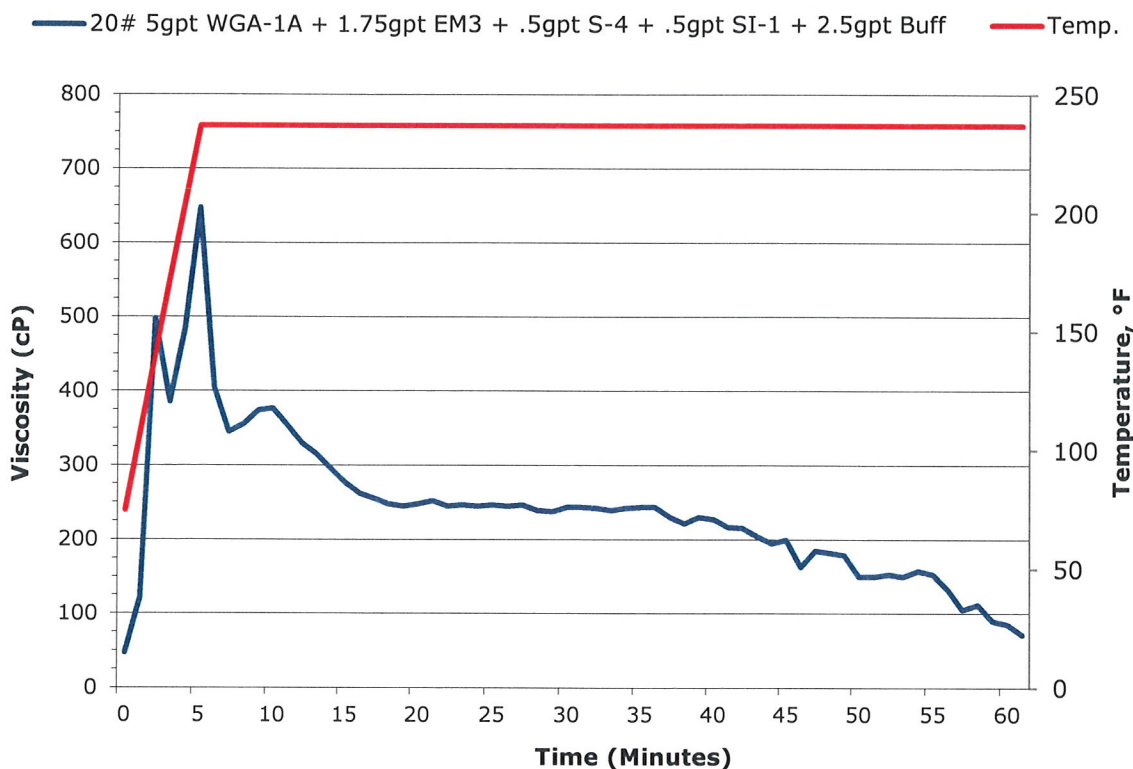
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High Temperature Fracturing System Analysis

Customer:	Date: 11/8/2012
Well:	Requested By:
Zone(s):	Technician:
Depth:	Pump Time:
BHT: 237°F	Pump Rate:
District:	Hydration Time: 3 min

Base Fluid System Name

Additives



Fluid Specifications

Breaker Type:	
Base Gel Viscosity:	12cP
Base Gel pH:	7.7pH
After Crosslink pH:	11.6pH

Comments: Tests were ran using R1B5 at 40 sec⁻¹ shear rate.

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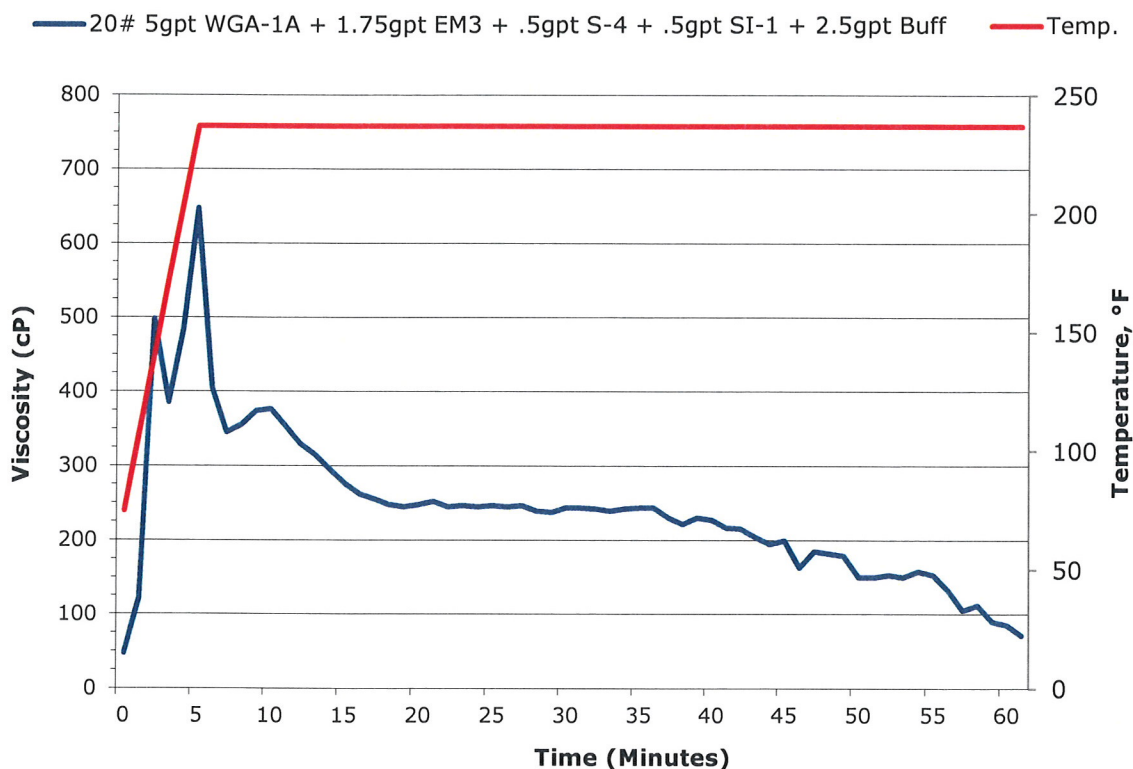
Chandler 5550 System Analysis

High Temperature Fracturing System Analysis

Customer:	Date: 11/8/2012
Well:	Requested By:
Zone(s):	Technician:
Depth:	Pump Time:
BHT: 237°F	Pump Rate:
District:	Hydration Time: 3 min

Base Fluid System Name

Additives



Fluid Specifications

Breaker Type:	
Base Gel Viscosity:	12cP
Base Gel pH:	7.7pH
After Crosslink pH:	11.6pH

Comments: Tests were ran using R1B5 at 40 sec⁻¹ shear rate.

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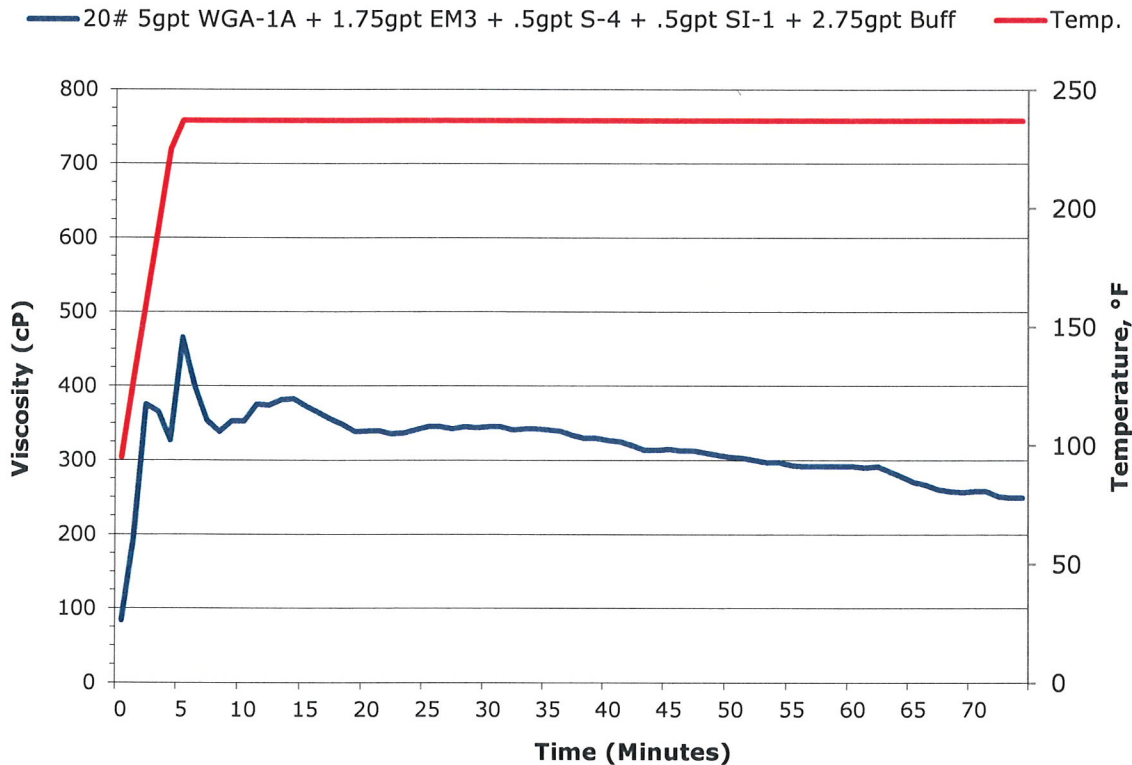
Chandler 5550 System Analysis

High Temperature Fracturing System Analysis

Customer:	Date: 11/8/2012
Well:	Requested By:
Zone(s):	Technician:
Depth:	Pump Time:
BHT: 237°F	Pump Rate:
District:	Hydration Time: 3 min

Base Fluid System Name

Additives



Fluid Specifications

Breaker Type:	
Base Gel Viscosity:	12cP
Base Gel pH:	7.7pH
After Crosslink pH:	11.71pH

Comments: Tests were ran using R1B5 at 40 sec⁻¹ shear rate.

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