Evaluation of Hybrid Slurry Resulting from the Introduction of Additives to Mineral Slurry

Grip 2010

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Project Overview

- The mechanism by which mineral slurries and polymer slurries performs is quite different
- With the use of a hybrid slurry that shares traits from both mineral and polymer it is unclear on which set of specifications should be applied

Project Overview

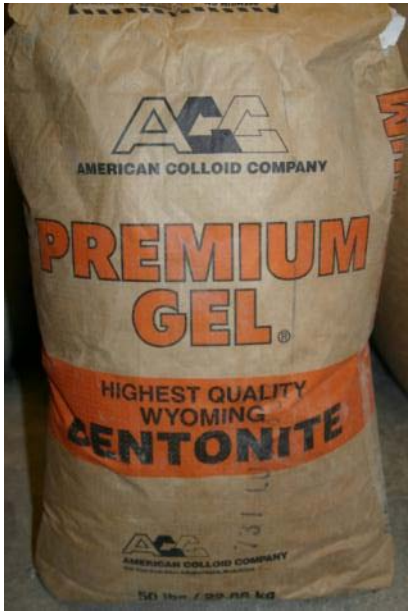
- Assess performance of hybrid slurry products as it pertains to state specifications
- Develop a baseline to which hybrid slurry combinations will be compared
- Evaluate how changes to pH and applied pressure affect the results of the API Filtrate Press and other slurry tests

Materials Evaluated

- Under API Specification 13A various mineral and blended slurry products are categorized
- Three sections pertain to this project: Section 9, 10, and 11

Materials Evaluated

- Section 9 – Some Polymer Added
  - Small amount of treatment
  - Estimated that 90% of bentonite products fall in this category
  - Must Produce 90 bbl yield



Materials Evaluated

- Section 10 – No Additives
  - No amount of treatment
  - Must Produce 90 bbl yield

Materials Evaluated

- Section 11 – Meets Neither Section 9 or 10
  - High concentration of additives

Testing Apparatus

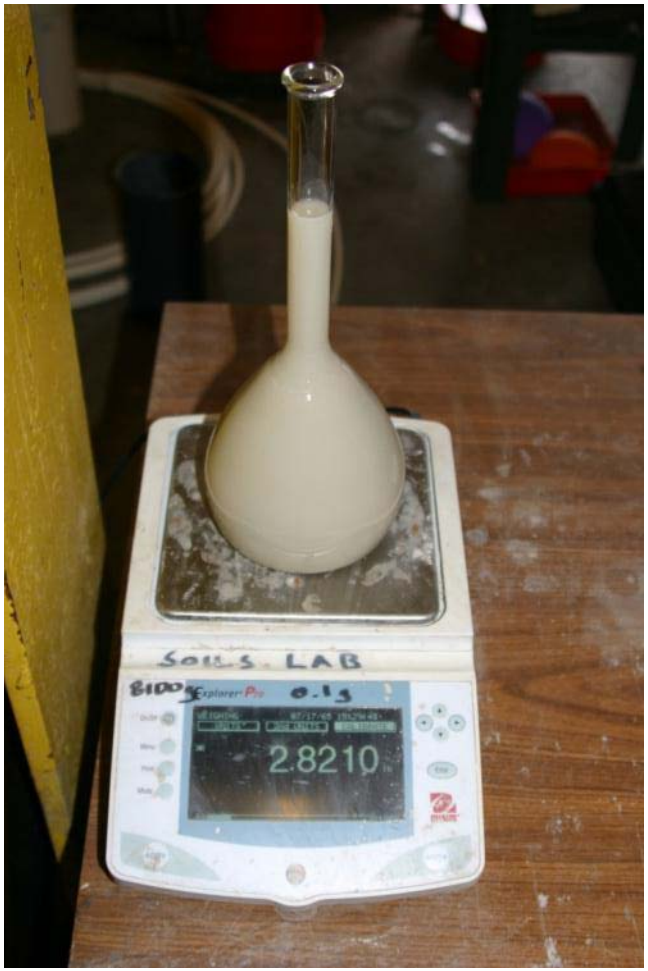
- Mixing
  - Batches were prepared in a drill blender, 24 hours before testing and re-mixed prior to testing. A small angle was clamped to the edge to agitate the slurry

Testing Apparatus

- API Filter Press
  - Specifications indicated to use dead weight / plunger system to achieve a constant 100 psi pressure
  - 100 psi never achieved, used in-house air system at a reliable 80 psi

Testing Apparatus

- Density
  - 1000 mL volumetric flask and a digital scale used to obtain accurate density measurements

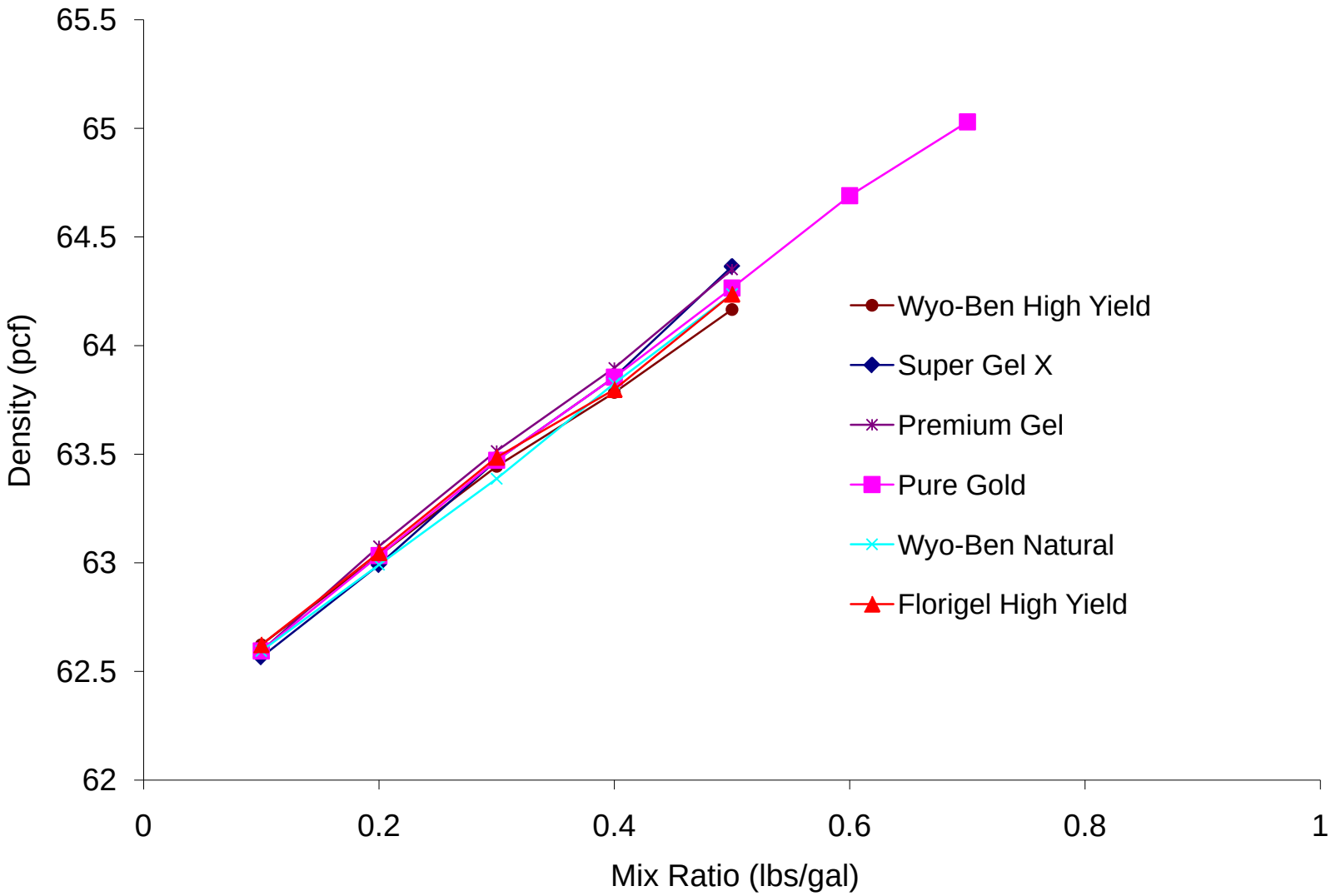


Testing Apparatus

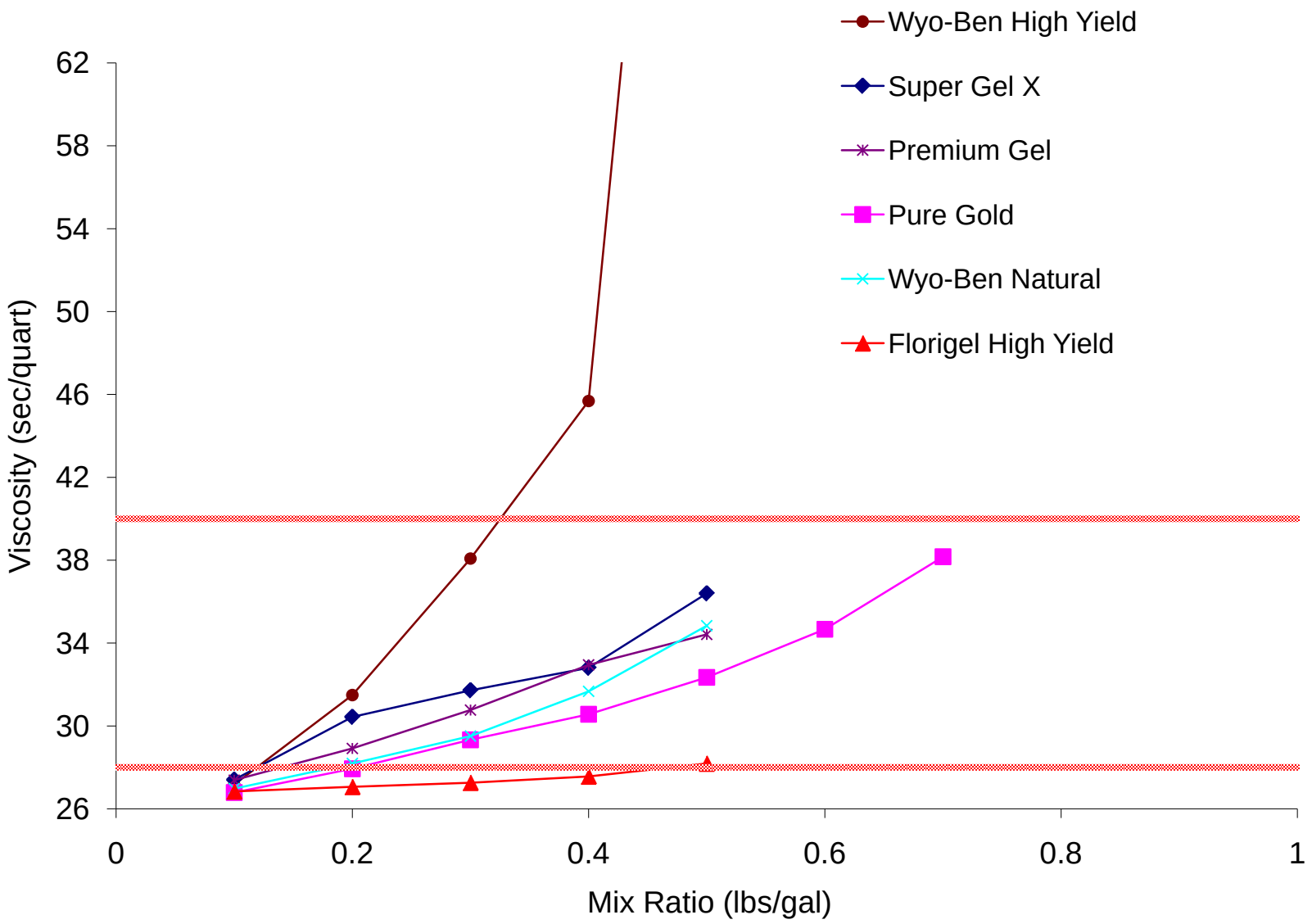
- Viscosity
  - Marsh funnel used to fill a smaller cross section container that provides consistent results between experimentalists

Preliminary Results

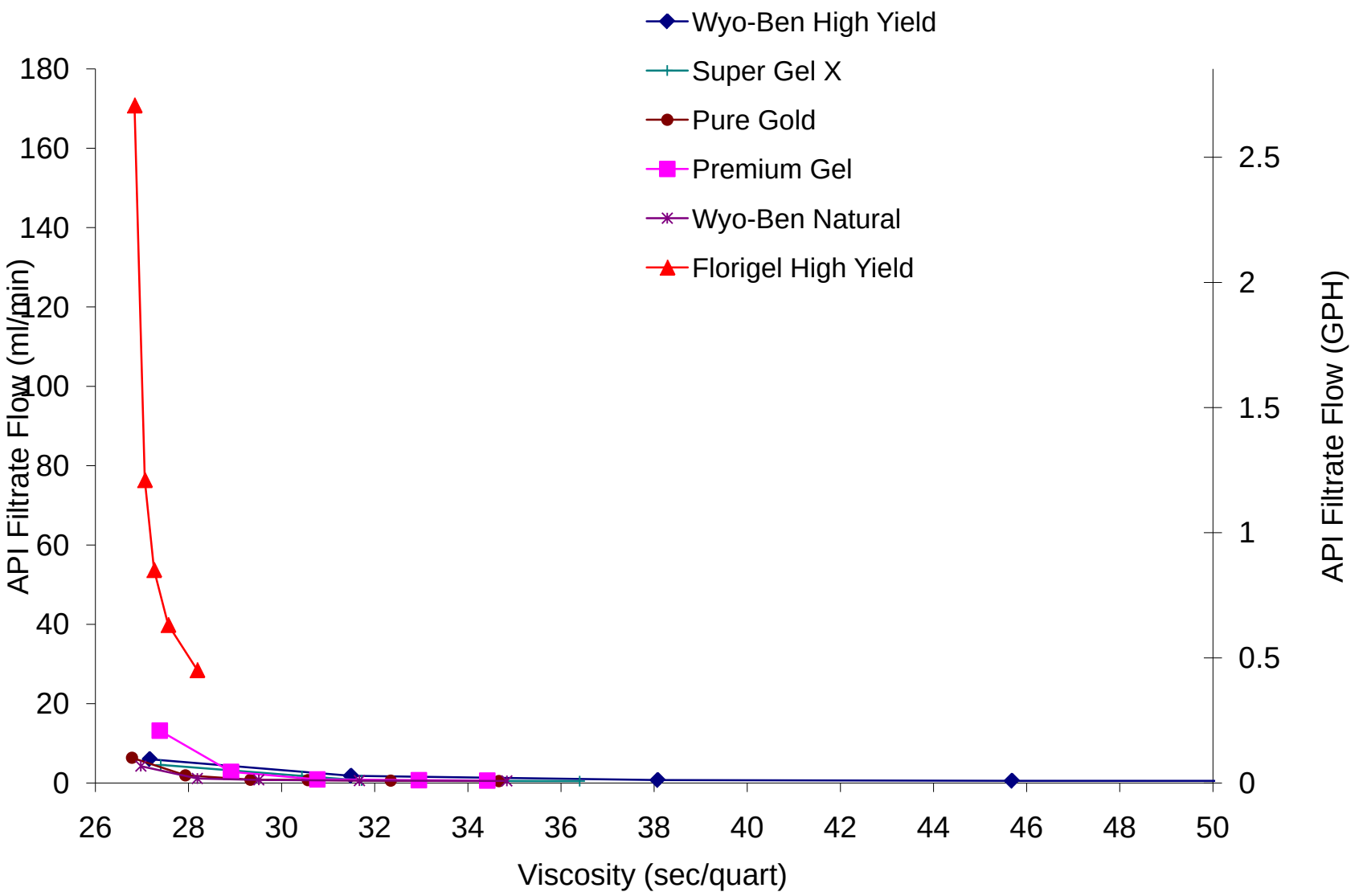
- Density, viscosity and API filtrate flow rates have been collected for the 5 slurry products
- All products have been tested up to a mix ratio of at least 0.5 lbs of slurry powder per 1 gallon of water



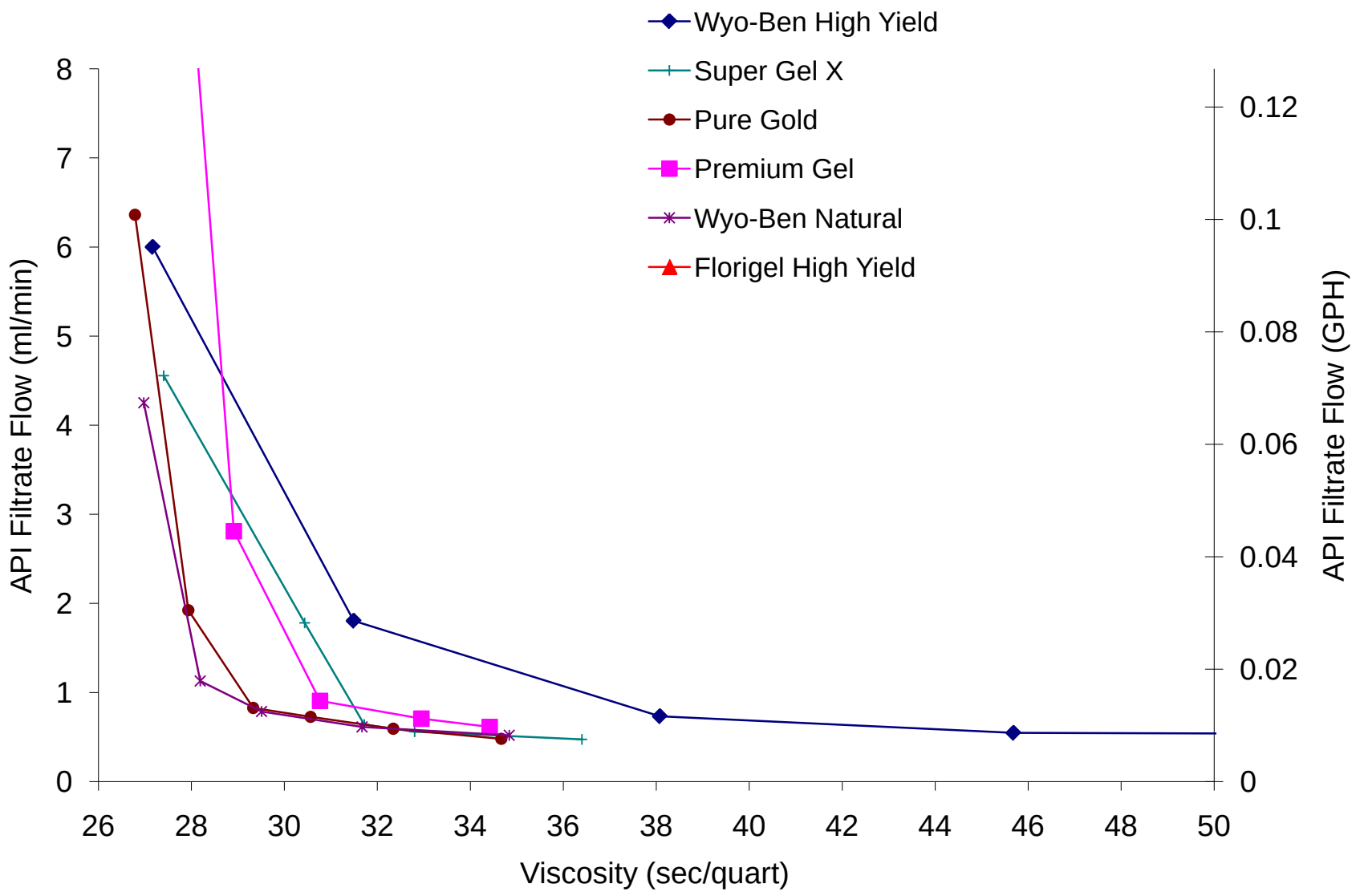
Slurry density results



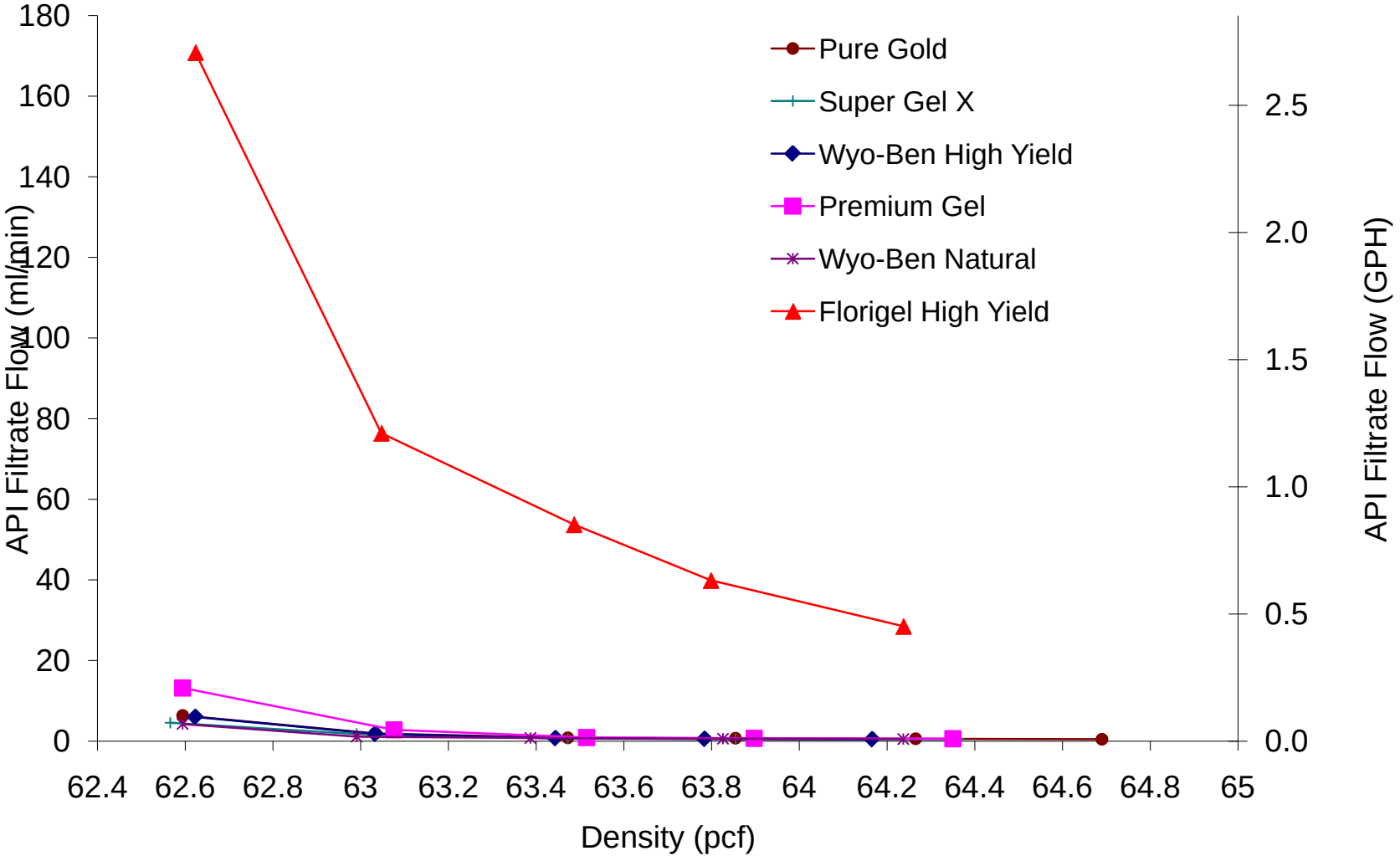
Slurry viscosity results



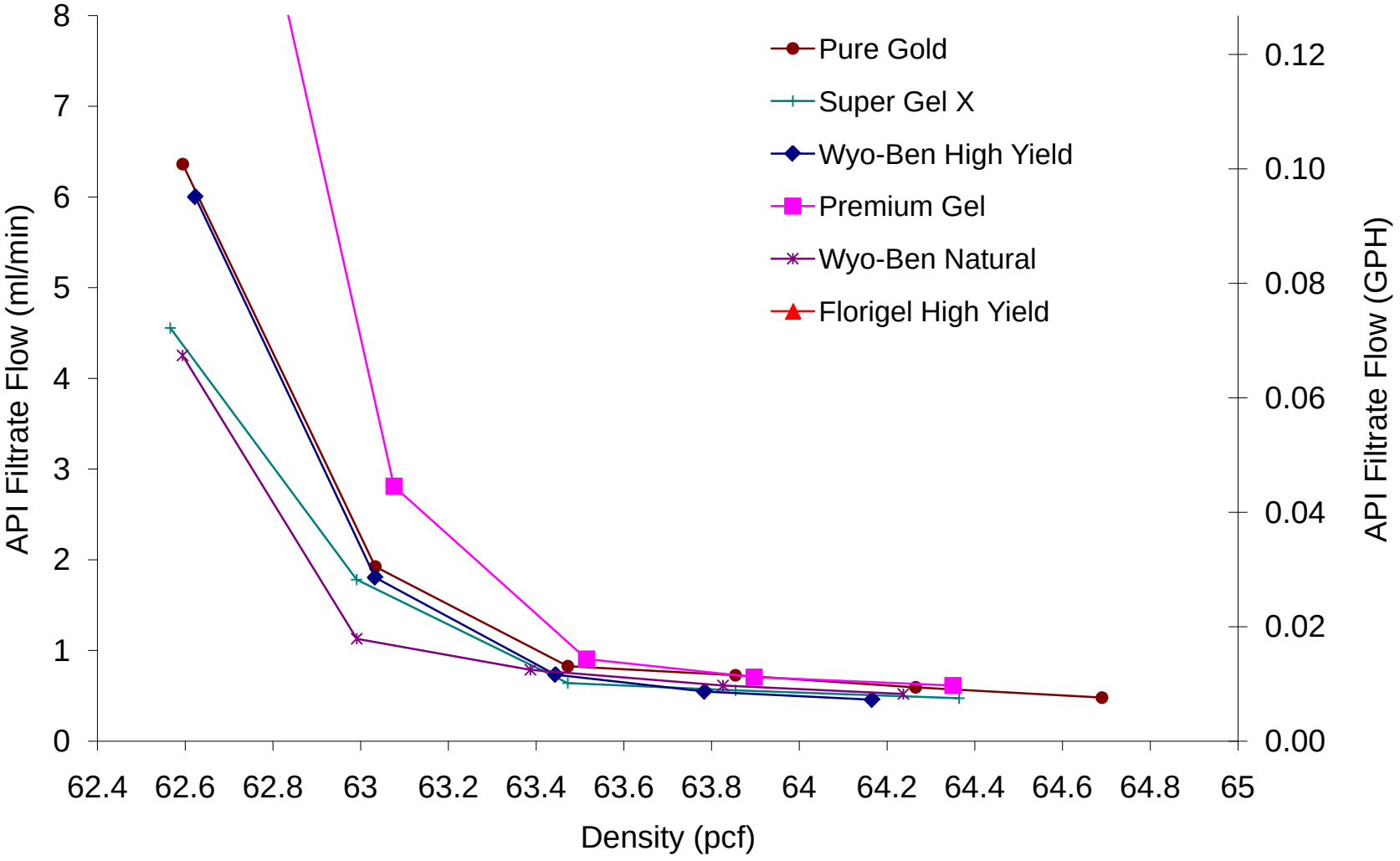
API filter press flow rate versus viscosity (including attapulgite)



API filter press flow rate versus viscosity (excluding attapulgite)

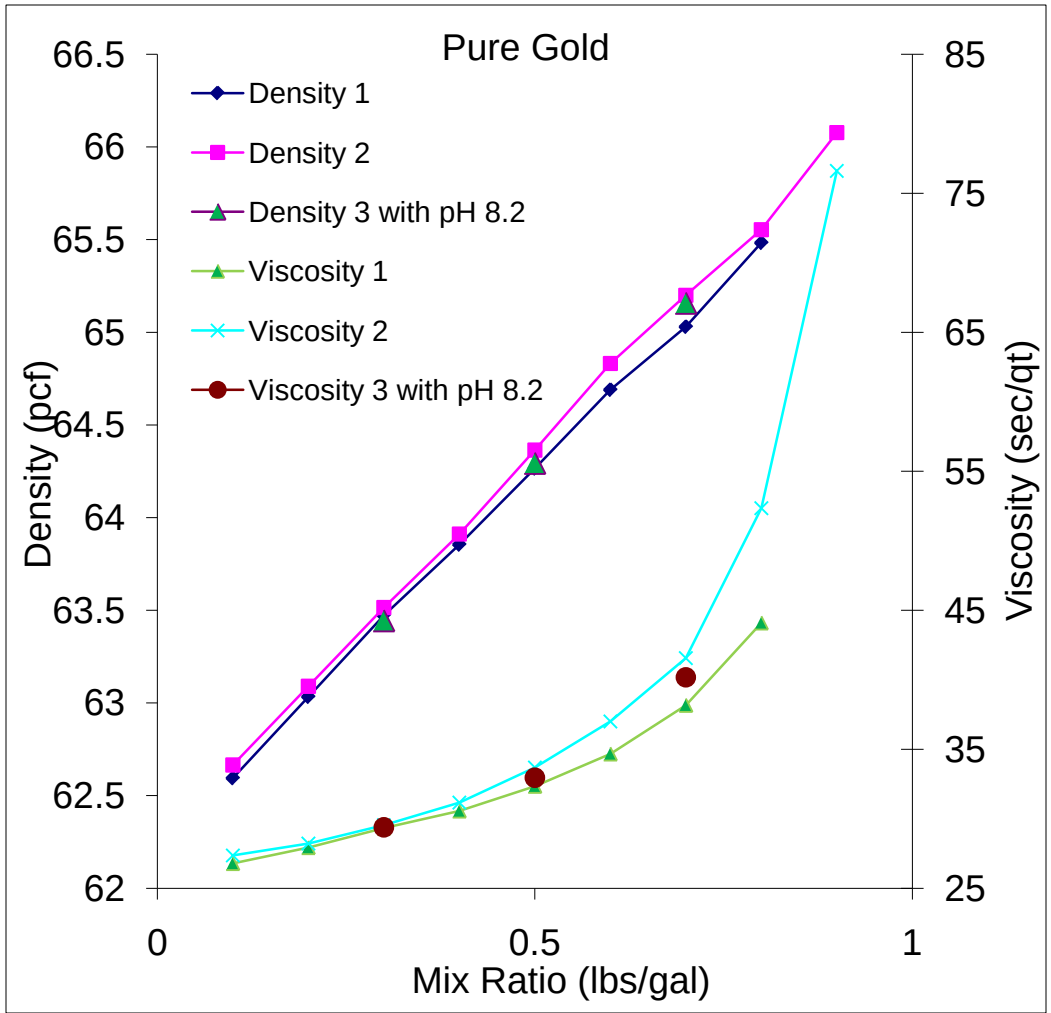


API filter press flow rate versus density (including attapulgite)



API filter press flow rate versus density (excluding attapulgite)

Future Work

- Vary the pH of mixing water used in slurry preparation to determine the role of pH in slurry performance
- Modify the constant pressure applied during the API Filter Press test
- Use of a settling column to assess the sand content tolerance of the slurry products

Initial pH Results