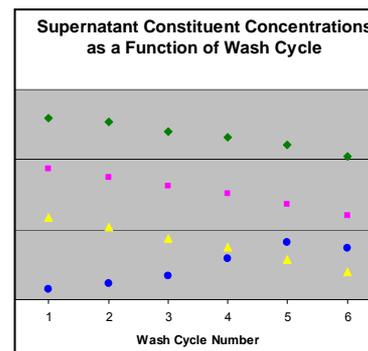
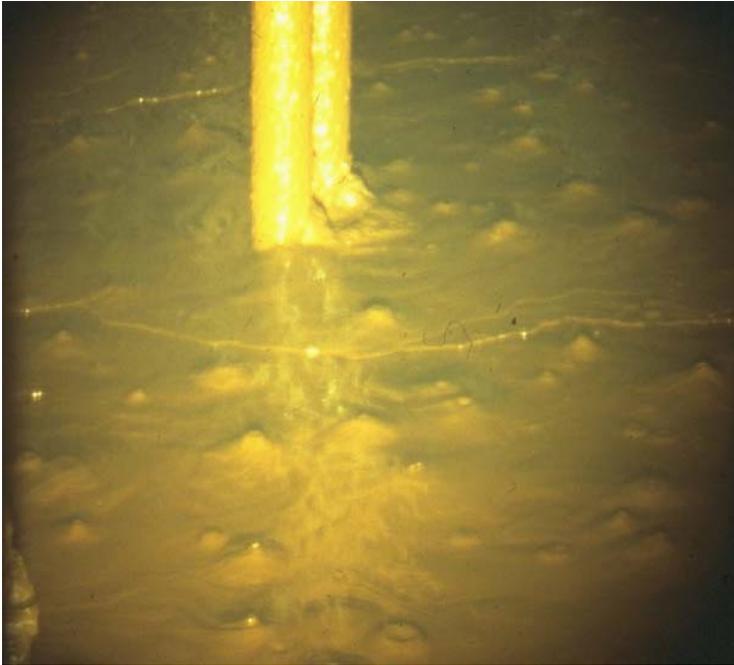


# Sludge Batch 7 (SB7) Washing and Settling Demonstration

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## SB7 blend:

- Tank 12 – slow settling
- Tank 7 – high oxalate
- Tank 4 – high sulfate

# Objectives

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## Identify washing/settling trends

- Oxalate & sulfate removal
- Settling rates
- Sludge compaction
- Composition & properties



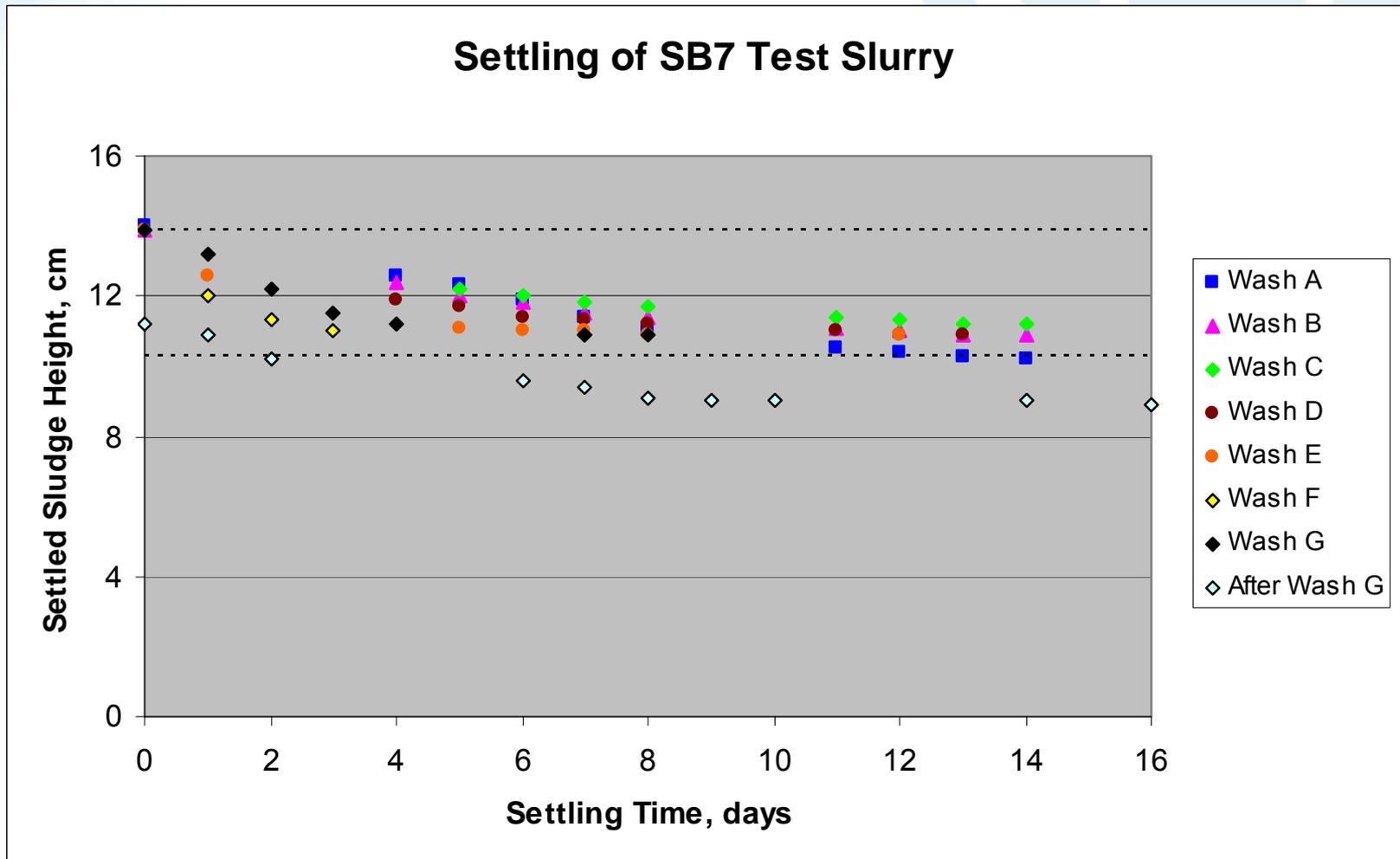
# Methodology

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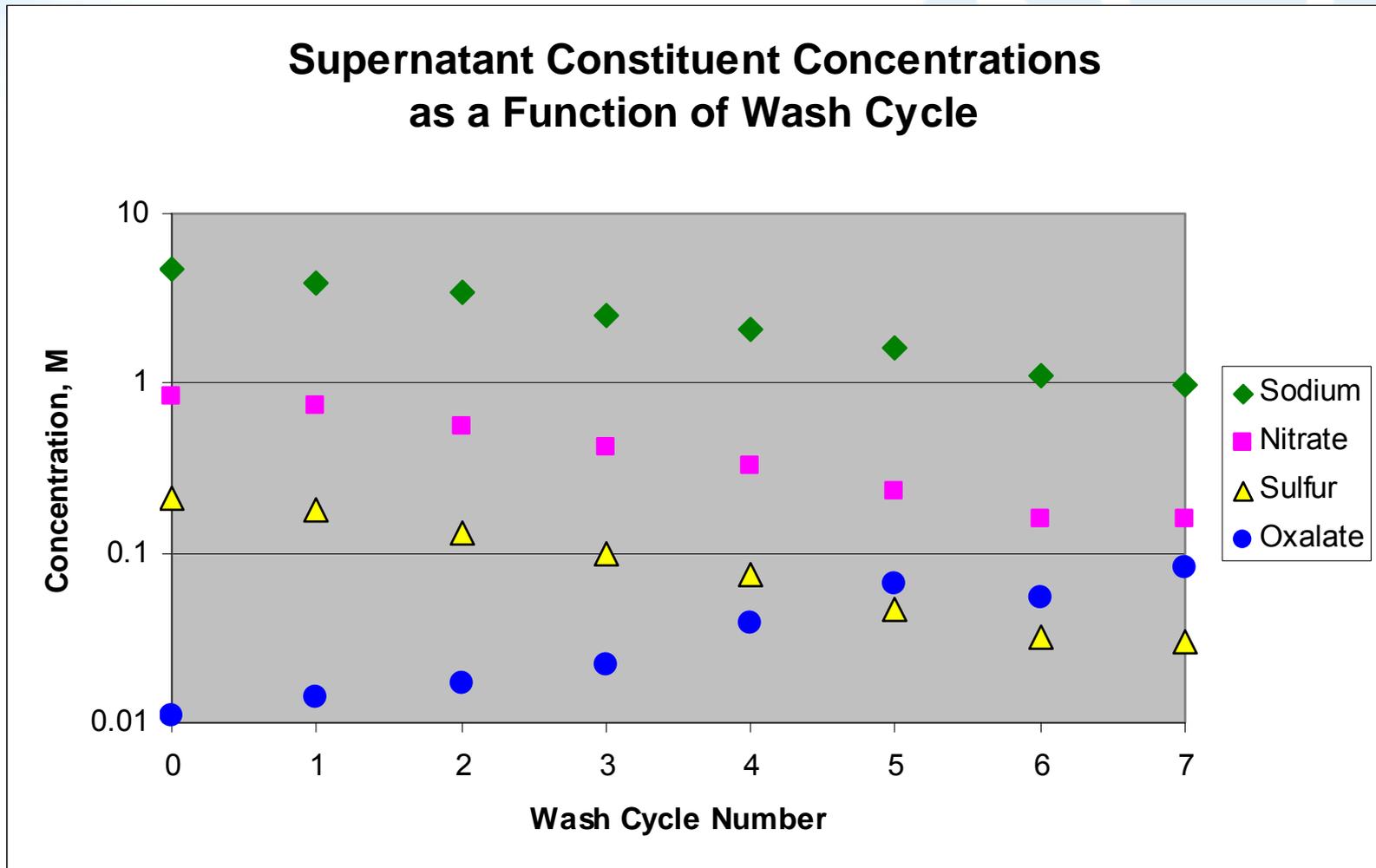
- Generate test slurry
- Wash per SB7 plan
- Quantify settling vs wash cycle and time
- Sampling and analysis



# Settling Behavior



# Washing Effects



# Key Constituent Concentrations – Initial vs Final

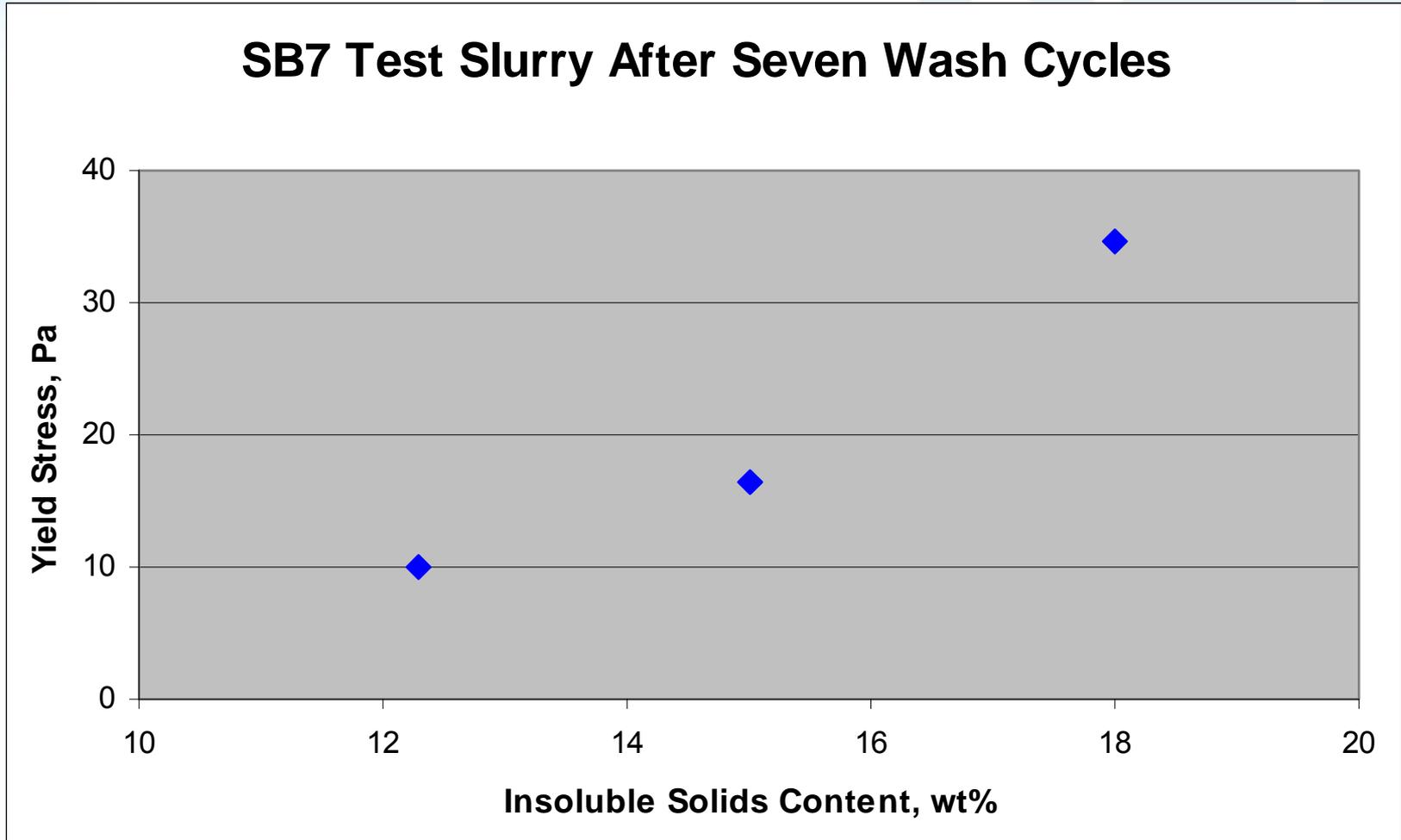
<b>Constituent</b>	<b>Unwashed</b>	<b>Washed</b>
Oxalate, mg/kg slurry	8700	9900
Sulfur, wt% of TS	1.5	0.45
Sodium, wt% of TS	30	12

TS  $\equiv$  total solids

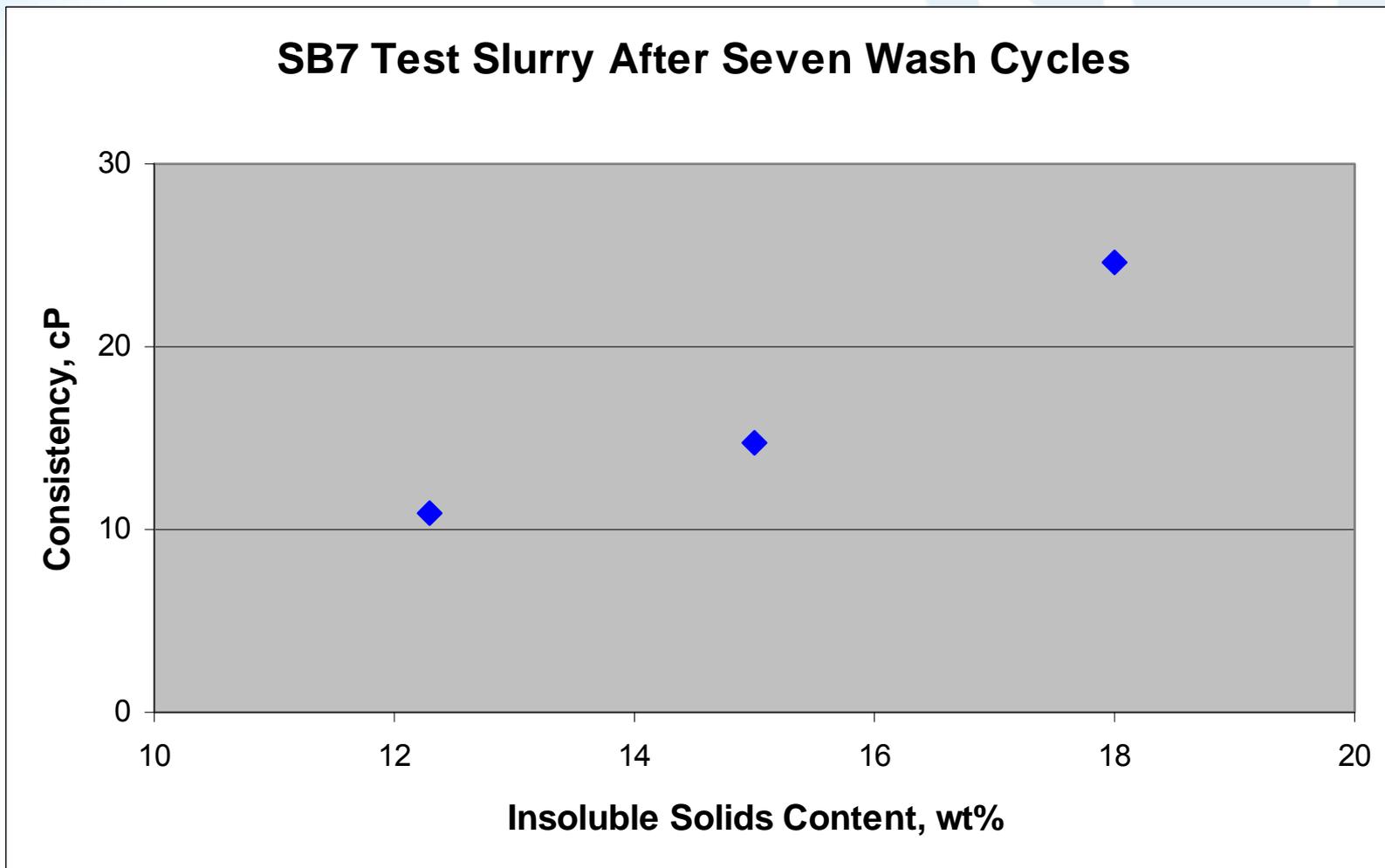
# Impacts of Washing

Parameter	Unwashed	Washed	Delta
Volume of test slurry, mL	1030	530	- 50%
Wt% total solids	30	24	- 20%
Wt% insoluble solids	8.1	18	+ 120%
Slurry density, g/mL	1.26	1.22	- 3%
Supernatant density, g/mL	1.21	1.06	- 10%
Oxalate in slurry, g	11.3	6.4	- 45%
Sulfur in slurry, g	5.8	0.7	- 90%
Sodium in slurry, g	117	19	- 85%
Yield stress, Pa	4.1	35	+ 740%
Consistency, cP	12	25	+ 110%

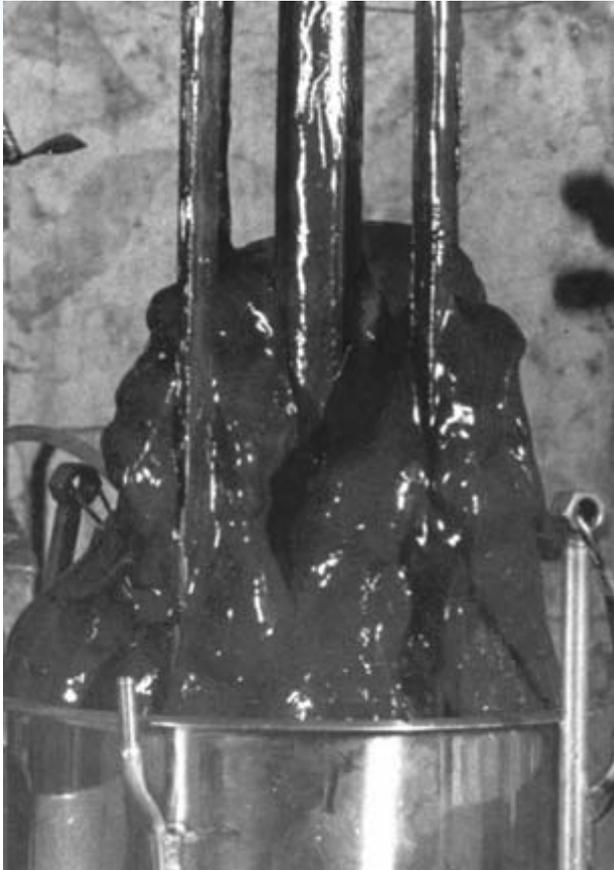
# Yield Stress vs Insoluble Solids



# Consistency vs Insoluble Solids



# Options for Managing Rheology at End of Washing



- Reduce final decant volume
  - Decreases oxalate removal
- Maximize decant volume and dilute or wash again
  - Increases oxalate removal but affects Na

# Summary

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- Several “small/slow” wash cycles needed
- Moderate oxalate removal
- High sulfate removal
- Choose final wash cycle strategy to balance chemical and physical requirements

# Questions?

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