HERON INNOVATORS
The Clear Advantage

SAF®

A New Pretreatment Technology
Case Study: Suspended Air® Flotation

Presentation by Simmons®

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* A New Pretreatment Technology Case Study: Suspended Air® Flotation

Simmons Foods in Siloam Springs, Arkansas

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*What is SAF®?

* SAF® = Suspended Air® Floatation
* Uses froth made from an anionic surfactant, water, and air instead of air bubbles for flotation.
* One gallon of froth = 0.8 ml soap =
  0.6 gal water and 0.4 gal ($0.05 ft^3$) air.
* Bubbles have an anionic charge so are attracted to the floc.
* Increases flotation rate so units can float 20-40 lbs (spec'ed at 30lbs) of solids per square foot per hour ($lbs/hr/ft^2$).
* Decreases the size of the unit vs. DAF; no lamella style plates
* Less Maintenance
* More Highly Dewatered Skimmed Solids
* Better Results - Water Clarity

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* Installed two new units in *Siloam Springs*
  * One primary
  * One Secondary
* Installed one new unit in *Van Buren*
  * Primary treatment.
* Converted two existing DAF units to SAFs in *Southwest City*.
  * One primary
  * One Secondary

* Simmons has gone SAF®

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*New SAF® Units for Siloam Springs.

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ClearFloater Model CF250

* 35ft^2 Float Cell – rated for 700 gpm @ 3000Mg/L TSS
* 350 gpm – current actual flow
* From Secondary SAF.
* Influent flow contained 3000 mg/L MLSS.

*Siloam Springs SAF® Effluent

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*Froth Generator

Model F-200 Froth Generator Shown

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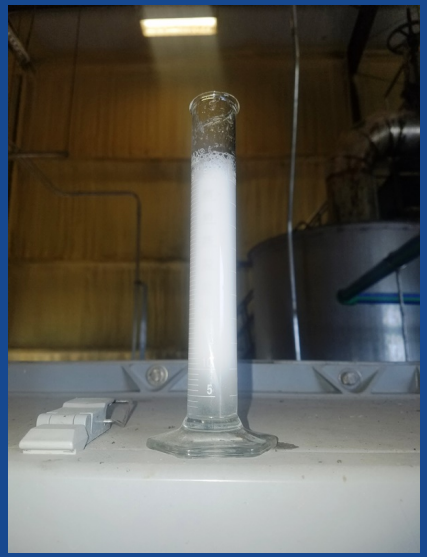

*Froth Flow Meter and Froth.

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* Tote of Anionic Surfactant.
* Froth Generator.
  * Surfactant metering pump.
  * Water line.
  * Froth pump.
  * Holding tank.
  * Flow meter.
  * Flow control valve.
* Floc Mixer – Active Mixing Chamber.

*Froth Generation Summary.

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* DAF to SAF Conversion: Froth Generator & Floc Mixer

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* Secondary DAF
* 216 ft2 of surface area.
* At 1.8 MGD before SAF conversion it could handle 1500 mg/L influent suspended solids.
* It now handles 3500 mg/L with no carry over Average effluent TSS = 15 mg/L.
* Specified Maximum Flow @ Current Loading ~3500 gpm

*Secondary SAF®

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*Secondary SAF® Effluent.

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* Secondary DAF to SAF® Cost Comparison

Secondary DAF	*SAF® Retrofit*
* 60 HP Recirculation Pump $31,367/yr @ $0.08/KWHR	Equivalent – 10HP; $5,230/yr @ $0.08/KWHR
N/A	Frothing Agent Consumption @ 25 GPM Output; (1)-tote/6wks; $38,780/yr
Coagulant Consumption: $350,000/yr	Coagulant Consumption: $140,000
Cationic Polymer Consumption: 120Lbs/Day; $87,600/yr	Cationic Polymer Consumption: 60Lbs/Day; $43,800/yr
Total O&M Costs/yr: $468,967	Total O&M Costs/yr: $227,810
	Net Savings/yr: $241,157

*Difficult to quantify savings associated with directly reclaiming water vs requiring additional treatment

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* Converted Primary DAF.
* It was maxed out at 1250 gpm and 2000 – 2500 mg/L influent solids.
* It now treats an additional 700 gpm.
* Specified to treat a maximum 2400 gpm.
* Cost effective way to increase capacity.

* Primary DAF to SAF® Conversion.

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Primary DAF	*SAF® Retrofit*
40 HP Recirculation Pump $20,920/yr @ $0.08/KWHR	Equivalent – 10HP; $5,230/yr @ $0.08/KWHR
N/A	Frothing Agent Consumption @ 25 GPM Output; (1)-tote/6wks; $38,780/yr
Organic Coagulant Consumption: 700Lbs/Day; $130,000/yr	Organic Coagulant Consumption: 350Lbs/Day; $65,000/yr
Cationic Polymer Consumption: 120Lbs/Day; $87,600/yr	Cationic Polymer Consumption: 120Lbs/Day; $87,600/yr
Anionic Polymer Consumption: 110Lbs/Day; $50,000/yr	Anionic Polymer Consumption: 0-Lbs/Day; $0.00/yr
Total O&M Costs/yr: $288,540	Total O&M Costs/yr: $196,610
	Net Savings/yr: $91,930

*Primary DAF to SAF® Cost Comparison

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Conclusions

* SAF is mechanically simpler than a DAF:
  * Removes recirculation pump, header, compressor, and air lines. (No more air lines plugging in header which would also cause packing to blow out on recirc pump.)
  * No requirement for lamella style plates
  * Less maintenance

* It's operator friendly.
  * It's 6 times more efficient than a DAF (20-40 lbs/hr/ft^2 vs. 5 lbs/hr/ft^2).
  * You can adjust the froth flow (i.e. floatation air) to the loading.
  * Feed less chemical (less polymer mixing).
  * Better results
  * Thicker Solids