



Process wastewater treatment results just not good enough? . . .

Then **retrofit your DAF with a SAF™ Generator** by Heron Innovators.

That's what a major Midwestern meat packer did at their western Kansas beef packing plant.

This plant generates approximately 3.2 to 3.8 million gallons per day (mgd) of wastewater from beef slaughter, fabrication and rendering operations. Approximately two thirds of this flow, containing a significant quantity of recoverable fats, oils, and greases (FOG), is treated through two DAF units prior to discharge to the local municipal wastewater treatment plant. Timely FOG recovery is an important revenue source for this plant, as it allows blending into the bleachable tallow refining operation. This is particularly important due to the higher value of bleachable tallow versus brown tallow (from 15¢/lb to 35¢/lb spread depending on market conditions).

At this facility, the majority of the process wastewater flows in series, first through DAF #1, a 40 ft. dia. circular unit originally fitted with a 100-Hp pressurization pump. This unit treats about 1500 gpm of raw wastewater containing up to 4,700 mg/L total suspended solids (TSS). An additional 600 – 900 gpm of raw wastewater is blended with the treated effluent from DAF #1 and further treated in DAF #2, an FRC Model P180 rectangular unit originally fitted with two 45-Hp Edur air-aspirating pressurization pumps. A cationic polymer treatment regimen is applied in the FRC treatment cell.



After successfully pilot testing the SAF™ process in mid-2007, this packer purchased **two Model F200 Suspended Air™ Emulsion Generators**, each producing over 50 gpm of emulsion, to replace both of the DAF pressurization systems.

Post-retrofit removal efficiencies for both units have increased by 40% on average, using less polymer. Connected horsepower was reduced from 190 Hp to 20 Hp, and the savings in power cost is enough to more than offset the cost of frothing agent for the SAF™ Generators. Polymer cost savings attributable to the SAF™ Generator retrofit are between \$100,000 and \$140,000 per year.

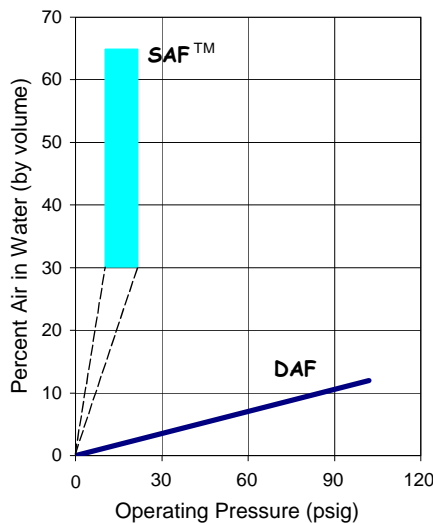
Most impressive, though, is the dramatic increase in recovery of bleachable tallow, due to the much faster rise rate of solids in the retrofitted DAF units. This packer expects to realize from 2 to 5 lb. additional FOG recovery per head due to retrofitting their DAFs with SAF™ Generators.

A packer reference can be provided on request.

WHY SAF™ REPLACES DAF

SAF™ (Suspended Air™ Flotation) by Heron Innovators uses an externally-generated bubble suspension with high air content. Each bubble is covered with a chemically active film which strongly attaches to the flocculated solids in the wastewater, achieving high rate and efficient flotation. DAF (Dissolved Air Flotation) uses high pressure to dissolve a small amount air in water with no chemically active agent, and depends on physical entrapment and a weak surface bond to float the flocculated solids.

SAF™ is re-writing the book on flotation technology, replacing DAF as the method of choice for removal of suspended solids from wastewater.



Here's why:

1. **SAF™ is smaller than DAF.**

Small equipment footprint is highly desirable, even necessary, in most applications. SAF™ flotation tanks are less than 20% as large as DAF tanks for the same treatment rate. This is because the SAF™ process operates at 10 times the hydraulic loading rate *and* 10 times the solids loading rate of DAF – 10 gpm per square foot hydraulic loading rate *and* 10 lb/hr per square foot solids flux. Two factors account for this:

- The volume fraction of air contained in the SAF™ air emulsion is **40%**, 20 times the volume fraction of air in typical DAF recycle flow (see chart at left); and
- The chemically active film on the SAF™ air bubbles attaches much more strongly to flocculated wastewater particles than plain air bubbles.

2. **SAF™ uses less power than DAF.**

Using a frothing agent in the process of generation of the Suspended Air™ Emulsion radically reduces the power consumption per unit of air delivered to the flotation tank. One gpm of Suspended

Air™ Emulsion generated at approximately 20 psi contains as much air by weight as about 8.5 gpm of DAF recycle flow pressurized to 60 psi. Furthermore, because SAF™ flotation requires half (or less) as much air as DAF, a SAF™ can be just as effective as a DAF using only 2% of the power used by DAF for air generation.

3. **SAF™ removes more solids than DAF.**

Each SAF™ bubble is a working bubble, with an electrically-charged film ready to attach and stick to oppositely-charged floc particles. SAF™ removes many more small size flocs than DAF could ever do.

4. **SAF™ floated solids can be dewatered more easily than DAF solids.**

One of the most remarkable things about SAF™ flotation is the gelatin-like consistency of the floated solids. SAF™ floated solids, with firmly attached air bubbles entrained inside, appear “rubbery” as though high doses of polymer were added. This makes it possible to remove all free-draining water by simple gravity drainage on a Heron Innovators Model DWC slowly-moving plastic chain belt.

5. **SAF™ operation is more flexible than DAF.**

In virtually all industrial wastewater treatment applications, shutdowns of various durations are inevitable. SAF™ handles these with ease, but DAF always falters. Starting a SAF™ takes less than a minute of automatically timed “warmup” for the generator and NO operator attention is required. When a SAF™ stops, the floated solids all stay on top of the tank, ready to be scraped off during the next run period.

6. **SAF™ is more cost-effective than DAF.**

In case after case, SAF™ installations have soundly trounced DAF in cost-effectiveness over the life cycle of the installation, with simple payback periods commonly 2 years or less.

***Don't be fooled by imitators - always ask for
Suspended Air™ Flotation - by Heron Innovators, Inc.***