

# the WAVE

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## American Proteins, Inc. Wins AWEA's Category III Industrial Excellence Award

By Fred Cespedes and Ed Becker

Fred Cespedes would say the second time is a charm, after being nominated two years in a row for AWEA's Excellence in Industrial Wastewater Treatment Award for a Physical/Biological Treatment Processes. The competition for the AWEA award in this category for the year ending October 30, 2001 was intense and the field had several firms with outstanding performance records, facilities and personnel. After competing the prior year and just missing the prize the staff at American Proteins became particularly focused during the year and gave that extra effort to position itself to be a winner.

For those of you that have not be familiar with American Proteins, the division in Hanceville is the largest poultry product recycling (rendering) facility in the world. They recycle inedible poultry products into usable protein and fat. There are two plants at the Hanceville site, one is dedicated to the production of pet food-grade poultry meals and fat and a second that produces feed-grade poultry meal, hydrolyzed feather meal and fat for the livestock industry. So, American Proteins has been successfully reclaiming an otherwise waste product to provide food for the animals that become food for us. Amazing!



Figure 1. Side view of Reactor 1.

In case you want to start your own rendering operation, American Proteins has agreed to share their formula for success. First, the water in the inedible poultry products is evaporated forming water vapor. The vapor is condensed and it forms more than 50% of the wastewater. Condensate from the cooking process has a high COD and ammonia content. The remaining water comes from plant washdown, the draining and cleaning of in-bound raw material trailers and discharges from the vast amount of odor control equipment required at the site. American Proteins also treats waste from a neighbor, American Dehydrated Foods, who has a SID permit to discharge to their treatment plant.

The wastewater treatment facility at American Proteins consists of various collection systems, a pretreatment facility, an anaerobic lagoon, two aerobic lagoons, an activated sludge system, a disk filter and an ultra-violet disinfection system. The high quality water produced by American Proteins is discharged into the Mulberry Fork of the Warrior River. For operation purposes the treatment facility is divided into two process areas; pretreatment or physical treatment and biological treatment.

The pretreatment processes include a surge pit, a Hycor fine mesh drum screen, two dissolved air flotation (DAF) units



Figure 2. American Protein final clarifier.

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and a flow equalization basin (FEB). These physical treatment processes start after the flow is collected in the surge basin. From the surge basin the flow is pumped to the Hycor screen where the separated solids are collected and conveyed to a trailer for recycling back to the rendering plant. The water passing the Hycor flows by gravity to the #1 DAF where the floating solids (mainly fats) are captured and pumped to a tanker for recycling; the settled solids are also sent back to the rendering plant. The supernatant from the #1 DAF is pumped to the FEB. Water from the FEB is pumped through an acid injection port to a flocculation tube where cationic and anionic polymers are added and mixed prior to the flow entering the #2 DAF. The floatables or top skimmings (more fats and proteins) are collected and are pumped to the tanker, which takes it to the rendering plant to be mixed with other inbound loads. The high strength supernatant from the #2 DAF is pumped to the anaerobic lagoon to begin the biological processing.

In addition to the DAF flow, the anaerobic lagoon receives plant condensate, that does not require pretreatment because of its low solids content, and waste activated sludge from the secondary clarifier. Effluent from the large anaerobic lagoon can be directed to either the aerobic lagoons or to the activated sludge process. In 1966 when the waste treatment facility was first built, American Proteins had only the anaerobic and aerobic lagoons. Now, particularly in the summer, the aerobic lagoons are used to not only provide biological destruction and odor reduction but they also reduce the temperature of the waste before it enters the activated sludge system. In the cooler winter weather, the effluent from the anaerobic lagoon is fed directly to Reactor #1 of the activated sludge process.

The activated sludge process consists of two basins approximately 1.5 million gallons each. Reactor 1 (shown in Figure 1) is operated with an anoxic zone to denitrify the waste stream. Reactor 2 uses a jet aeration system to maintain the dissolved oxygen above



Figure 3. A portion of the fresh water pond with treatment plant in back right of photo.

3 mg/l for BOD reduction and nitrification. About 50 % of the effluent from Reactor 2 is recycled back to Reactor 1 to achieve denitrification while the remainder of the Reactor 2 effluent flows to the final clarifier (shown in Figure 2). All the return activated sludge goes to Reactor 1, the waste activated sludge is pumped to the anaerobic lagoon and the clarified effluent flows by gravity to the disc filter and then to the ultra-violet disinfection unit prior to being released through a submerged diffuser for dispersion in the river. The average discharge to the Mulberry Fork during the year was about 420,000 gallons per day.

The wastewater treatment plant recycles 3.5 MGD of high quality effluent, dramatically reducing the need for potable water.

Part of the wastewater treatment plant effluent is recycled back to a 'fresh water' pond (shown in Figure 3) at the rendering plant. The fresh water pond provides cooling water for the rendering plant condensers to collapse vapors from the cooking process into condensate water.

Between 1996 and 2001 American Proteins made numerous additions and modifications to the wastewater treatment system to improve effluent quality, mitigate operating problems, reduce odors, and cut costs. An indicator of how effective the staff of eight (8) operators at this facility controls this treatment process is the reduction of ammonia across the plant. The effluent from the anaerobic lagoon has an average ammonia concentration in excess of

2500 mg/l while the ammonia in the final effluent released to the Mulberry Fork has averaged less than 0.5 mg/l.

From the staff's operating experience and facility modifications, the wastewater treatment plant recycles around 3.5 MGD of high quality effluent for use at the rendering plant, which has dramatically reduced the need for potable water. Interestingly, the wastewater treatment facility produces no waste that requires disposal. All 'waste' products generated by the wastewater treatment system have a value and are recycled back to the rendering plant for processing into poultry and livestock food products. The economic benefits of these improvements by the staff are impressive. The waste material collected from pretreatment alone amounts to over 400,000 pounds per week and over a 12-month period has a value of over \$500,000 with a cost avoidance in waste disposal costs of about \$350,000.

In addition to the physical plant modifications, management and operation personnel have made numerous safety improvements at the plant and implemented a comprehensive safety program over the past several years.

The management and operations team at American Proteins takes permit compliance very seriously but have gone beyond simply operating the system to meet permit limits, they have taken the next step to improve the bottom-line economic performance of the rendering and wastewater treatment plants. You can see why American Proteins caught our attention and is very deserving of AWEA's Category III Excellence Award for the best Physical/Biological Industrial Wastewater Treatment System in Alabama in 2001. Congratulations!