

**Blacks Ford WRF: Replacing Acetic Acid with MicroCg™ - One year Operating History**



Sequencing Batch Reactor at Blacks Ford WRF, Jacksonville, FL

**Municipality:** Jacksonville, Florida  
**Facility Owner:** JEA  
**Facility:** Blacks Ford Water Reclamation Facility  
**Contract Operator:** United Water Florida Operations, LLC  
**Flow Design / Actual:** 3 MGD / 1.5 MGD  
**Treatment Technology:** Sequencing Batch Reactor (SBR)  
**2009 TN Discharge permit:** 3 mg/L – Annual basis  
**Conversion From Acetic to MicroCg™:** Feb. – April 2009  
**Project Follow-up:** January – February 2010  
**Previous Carbon Source:** 20% Acetic Acid Solution  
**Current Carbon Source:**



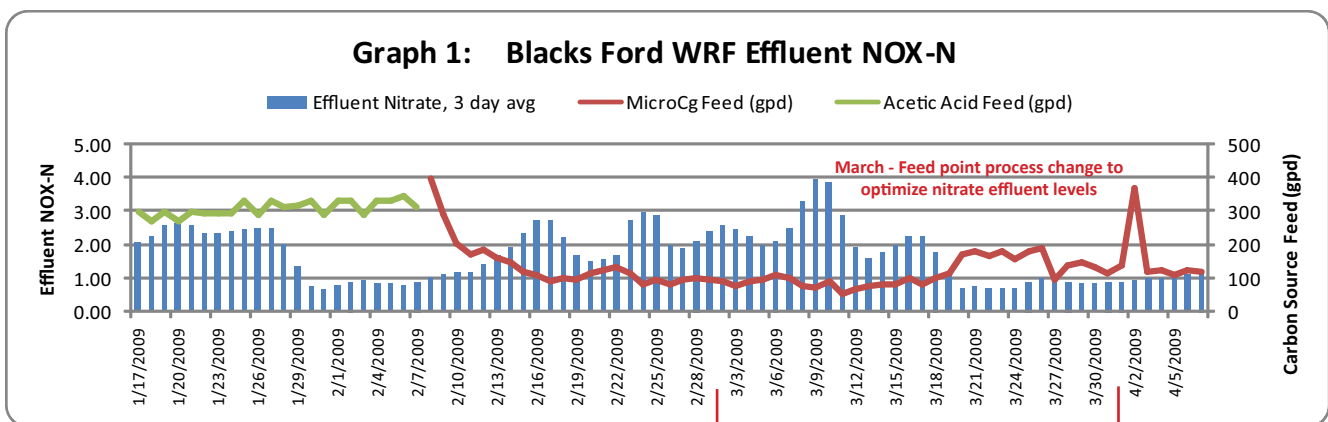
**Background**

Blacks Ford WRF is a 3 MGD (current 1.5 MGD) sequencing batch reactor (SBR) plant that discharges into the St. Johns River Basin in northeast Florida. The plant was designed to use a 20% acetic acid solution as their supplemental carbon source to comply with an annual total nitrogen (TN) discharge limit of 3 mg/L.

In an effort to reduce chemical costs, the facility operator researched MicroC™ Premium Carbon Sources. It was concluded that MicroCg™ could reduce costs considerably, and is manufactured to exacting specifications with consistent physical and chemical properties, including COD value. Additionally, MicroCg™ is a non-flammable, non-hazardous chemical, which eliminates many safety and handling concerns associated with acetic acid and other external carbon sources.

**Challenge: Conversion from Acetic Acid to MicroCg™**

This Case Study provides initial results for the removal of nitrates using both carbon sources. Initially, the carbon source was fed into the first SBR mixing cycle and the effluent nitrate levels were monitored using a Hach Nitratax® nitrate analyzer. Graph 1, below, illustrates the transition period from acetic acid to MicroCg™. As a process improvement, plant operators changed the MicroCg™ feed point to the SBR's second anoxic cycle during the month of March. The process was further optimized by adjusting the MicroCg™ feed rate until the lowest dosage that gained the desired NOX-N removals was determined.



Your authorized MicroC™ Distributor:



# Case Study: Blacks Ford WRF - Replacing Acetic Acid with MicroCg™ - One year Operating History

## Successful Conversion

The Blacks Ford WRF is a well-operated SBR, which was able to readily convert from a 20% acetic acid carbon source to MicroCg™ with no disruption in effluent nitrate performance and overall plant performance. Rapid acclimation was observed as the endogenous microbial community quickly transitioned to the MicroCg™ carbon source. The existing bulk storage tanks, piping, manifolds, and feed pumps were used without modifications.

## Economics

Once the process was optimized, the average feed rate for MicroCg™ was 170 gpd with an average effluent nitrate of 0.91 mg/L. Past operating data for the 20% acetic acid showed an average dosage of 320 gpd with slightly higher average effluent nitrate discharge. The transition to MicroCg™ saved the facility approximately \$40,000 in annual operating costs.

## Summary

MicroCg™ provides Blacks Ford with a cost-effective, nonflammable, non-hazardous electron donor for wastewater denitrification capable of meeting stringent Total Nitrogen Limits of 3 mg/L.

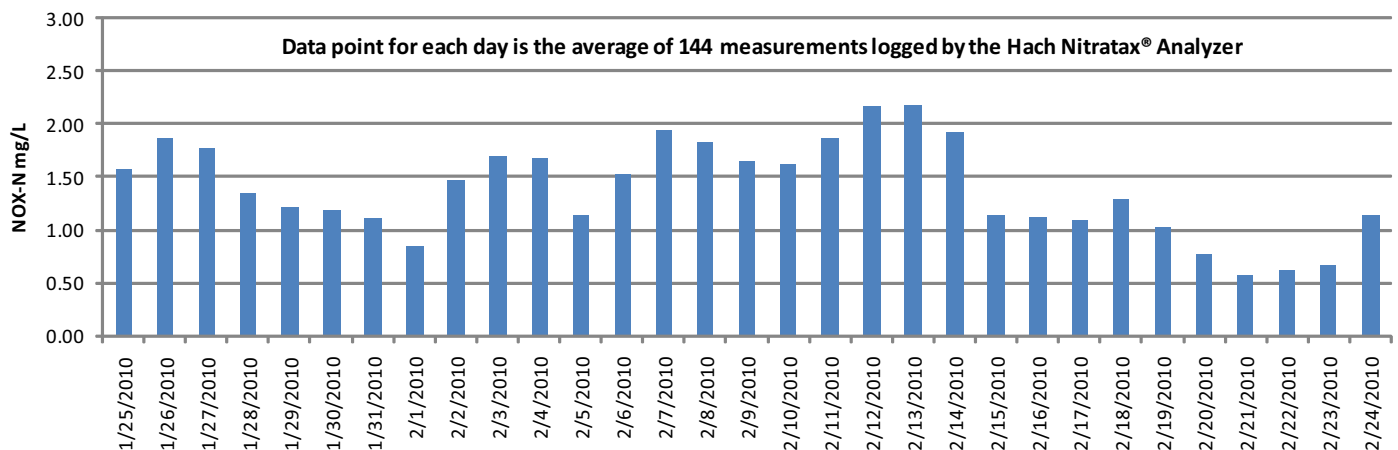


Supplemental Carbon Storage Tanks at Blacks Ford WRF

## Project Update

The Blacks Ford WRF has been using MicroCg™ as the external carbon source for over one year. MicroCg™ has proven to rapidly enhance denitrification performance as the plant cycles between discharging to surface water and reuse water requiring different degrees of nitrogen removal. Graph 2, below, shows a one-month period in early 2010 during which the Jacksonville area received heavy rainfall, requiring discharge to surface water with limits of 3 mg/L TN. Average NOX-N discharge during this period was 1.39 mg/L.

Graph 2: Hach Nitratex® Effluent NOX-N



## Acknowledgement

Environmental Operating Solutions, Inc. would like to thank Robert Parks, Manager – Operations & Maintenance, Blacks Ford WRF, for his participation and support in this study.

