Taylor Creek Algal Turf Scrubber®

Nutrient Recovery Facility

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov

DEPARTMENT OF ENVIRONMENTAL PROTECTION
FLORIDA

GREAT SEAL OF THE STATE OF FLORIDA
IN GOD WE TRUST

FLORIDA DEPARTMEN OF AGRICULTURE
AND CONSUMER SERVICES
CHARLES H BRONSON
COMMISSIONER

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WATER TREATMENT TECHNOLOGIES

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Problem Statement

1. **Mandate to Achieve Phosphorus Load Reductions in Lake Okeechobee and Taylor Creek to meet TMDL**

2. **Increasing Land Costs Resulting in Increased Costs of Regional Treatment Systems**

3. **Land Availability for Regional Treatment Systems Limited in Areas**

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Algal Turf Scrubber® Pilot – S154 Basin

Post-Project Findings – S154 Pilot

1. **Pilot Algal Turf Scrubber® in S154 Basin Demonstrated Cost Effective Phosphorus Control.**

   Project Funded by SFWMD, FDEP, FDACS & HydroMentia

2. **Application of a Full-Scale Algal Turf Scrubber® Systems Should be Investigated in the Taylor Creek Basin**

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TC-ATS™ Project Assumptions

1. **Assuming historical water quality conditions, a 15 MGD Taylor Creek Algal Turf Scrubber® should remove an estimated 4,000 pounds per year of phosphorus upon full system stabilization**

2. **Algal Turf Scrubber® technology will achieve cost-effective phosphorus removal thereby providing a treatment option in applications where land resources are limited or cost prohibitive.**

TC-ATS™ Budget & Schedule

- **Capital Cost**
  - *Pump Station and Water Conveyance……$1,020,000*
  - *Algal Turf Scrubber® Treatment System……$2,030,000*
- **Annual Operating Costs (2008)**
  - *Energy……$140,000*
  - *Operations……$115,000*
  - *Lab……45,000*
  - *TOTAL……$300,000*
- **Taylor Creek ATS™ Design and Construction Schedule**
  - *Notice to Proceed……Aug 15, 2005*
  - *Complete Construction……Dec 12, 2006*
- **Taylor Creek ATS™ Operations Schedule - Years 1 & 2**
  - *Year 1 Operations, Maintenance and System Enhancement……Feb 1, 2007 – Feb 1, 2008*
  - *Year 2 Operations, Maintenance and System Enhancement……Feb 1, 2008 – Feb 1, 2009*

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Algal Turf Scrubber® Biomass Recovery – Compost and Energy Production

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TC-ATS™ Findings to Date

- As a biological system, the Algal Turf Scrubber® requires a start-up period to establish algal growth before yielding significant phosphorus removal performance
- Drought conditions during the early months of start-up demonstrated effectiveness of the ATS™ in reducing phosphorus concentrations to very low levels utilizing some recycling into the system
- Post-drought runoff and dramatic shift to very high phosphorus concentrations during start-up (Months 6 and 7) had a positive effect on algal production but water analysis demonstrated only minimal P removal to date
- Current conditions indicate the presence of unidentified substance in Taylor Creek water that is having a negative impact on algae growth and nutrient removal
- Nitrogen removal exceeded 800 pounds per acre during Year 1

TC-ATS™ - Proposed System Adjustments and Investigations

- **Evaluate Hydraulic Loading Rate**
  - *Parallel Flows at Varying Hydraulic Loading Rates*
- **Investigate Inhibiting Compounds**
  - *Ongoing Bioassay Studies*
  - *Laboratory Investigations*
- **Investigate Inhibiting Compounds Treatment Methods**
  - *Mobile Pilot Unit*

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Algal Turf Scrubber® - Projections to the Future

- **Load Reduction in Low Phosphorus Concentration Applications**
  - *Everglades*
- **Nitrogen and Phosphorus Control in Urban Applications**
  - *Powell Creek_Lee County*
  - *Lake Lawne_Orange County*
  - *Indian River Lagoon_ Indian River County*
- **Gravity Flow Applications – Post Reservoir**

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Questions

Opportunity

"In the middle of every difficulty lies opportunity."

Albert Einstein