Update

On the control of lake algae using ultrasound.

November 14, 2016

A report to **Sustainable Soil & Water Ltd**
who supplied the ultrasonic algae control equipment.
www.ultrasonicalgaecontrol.co.uk

Background Information

- We were contacted in the summer of 2016 to advise on which of our ultrasonic algae control system(s) we would recommend be installed at the lake at NSG to deal primarily with their *Oscillatoria sp* problem.
- The customer advised us that US manufacturers of ultrasonic algae control systems claimed that *Oscillatoria sp* was unaffected by ultrasound.
- Our experience was to the contrary.
- We recommended installing two Smart Sonic 200D units, each with two transducers with a range of 200m.
- NSG opted to go for three Smart Sonic 200D units
- The algae population was sampled in August 2016 – report follows.
- The units were installed in September and turned on September 28th.
- The results, post installation were dramatic!

- More information on the Smart Sonic Range can be found at:
  www.ultrasonicalgaecontrol.co.uk

Lake Algae Analysis

NSG GROUP

SRTC | SePRO Research & Technology Campus

SePRO

SeSCRIPT Analysis Report: *Pilkington*

Company: Pilkington/ NSG

Address: 13121 S. Rocky Ford Rd. Laurinburg, NC 28352

Contact Person: Rolland Waters

Phone: 910-277-2240

Email: rolland.waters@nsg.com

Water body Name: Pilkington

Surface Area: 21 acres

Average depth: 9 feet

Date Sample Received: 8/18/16

SeSCRIPT Analysis Performed: Algae Identification and Enumeration

Algae ID *Results*
Pilkington: Location #3-2

Identification	Classification	Description	Density/Biomass
Cylindrospermopsis sp. (dominant)	Cyanophyta- Blue-green algae	Filamentous, planktonic, potential toxin and taste/odor producer	1,156,000 ★★★★
Pseudanabaena sp. (much present)	Cyanophyta- Blue-green algae	Filamentous, planktonic, potential toxin and taste/odor producer	4,000

Other algae in the sample, at densities below 1,000 cells/mL, include: *Raphidiopsis, Anabaena, Microcystis* (Cyanophyta)

SeSCRIPT* ALERT INDEX	EXPOSURE RISK	CYANOBACTERIA LEVELS (cells/mL)
★	Low	<20,000
★★	Moderate	20,000 to 100,000
★★★	High	>100,000
★★★★	Extreme	>100,000 with scums/mats

See the following Cyanobacteria Alert Guide for additional information

Algae ID *Results*
Pilkington: Location #5-2

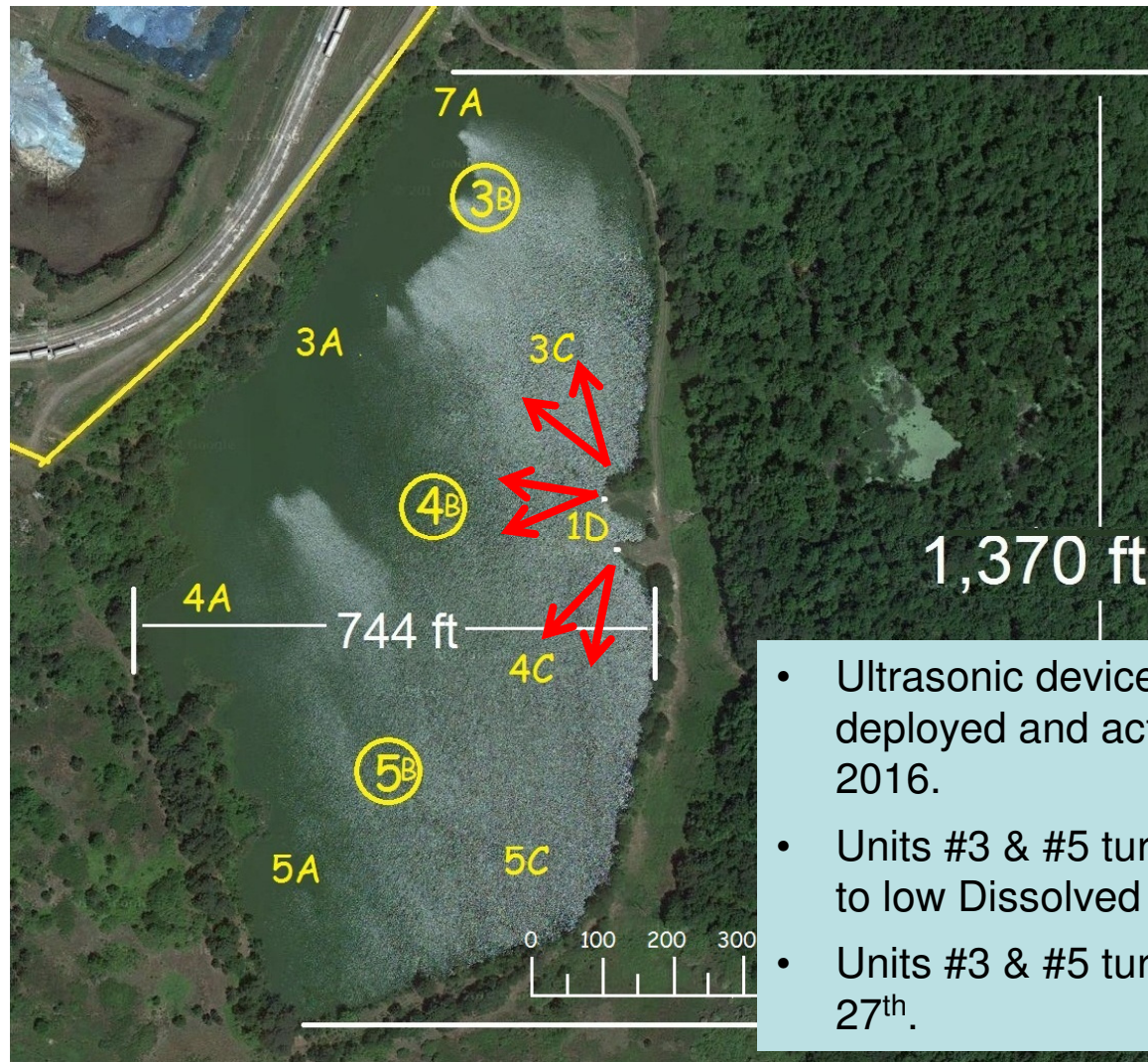| Identification	Classification	Description	Density/Biomass
Cylindrospermopsis sp. (dominant)	Cyanophyta-Blue-green algae	Filamentous, planktonic, potential toxin and taste/odor producer	1,083,000 ★★★★
Pseudanabaena sp. (much present)	Cyanophyta-Blue-green algae	Filamentous, planktonic, potential toxin and taste/odor producer	25,000

Other algae in the sample, at densities below 1,000 cells/mL, include: *Pandorina* (Chlorophyta); *Anabaena, Raphidiopsis, Oscillatoria* (Cyanophyta)

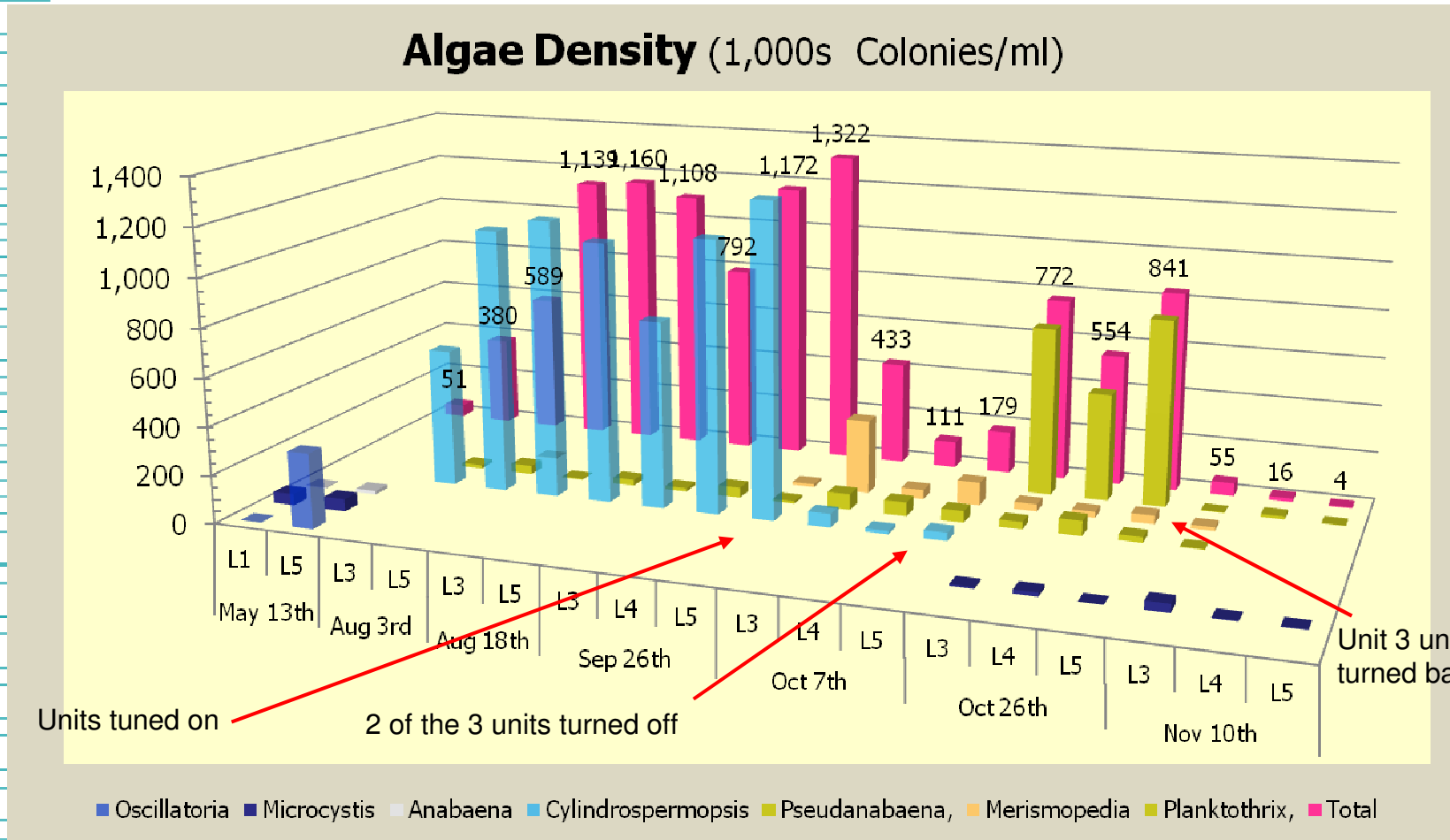| SeSCRIPT* ALERT INDEX	EXPOSURE RISK	CYANOBACTERIA LEVELS (cells/mL)
★	Low	<20,000
★★	Moderate	20,000 to 100,000
★★★	High	>100,000
★★★★	Extreme	>100,000 with scums/mats
See the following Cyanobacteria Alert Guide for additional information		

Pond: Ultra-Sonic Deployment and Sampling Locations

- Ultrasonic devices (#3, #4, #5) deployed and activated Sep 28, 2016.

- Units #3 & #5 turned off Oct 8th due to low Dissolved Oxygen ppm.

- Units #3 & #5 turned back on Oct 27th.

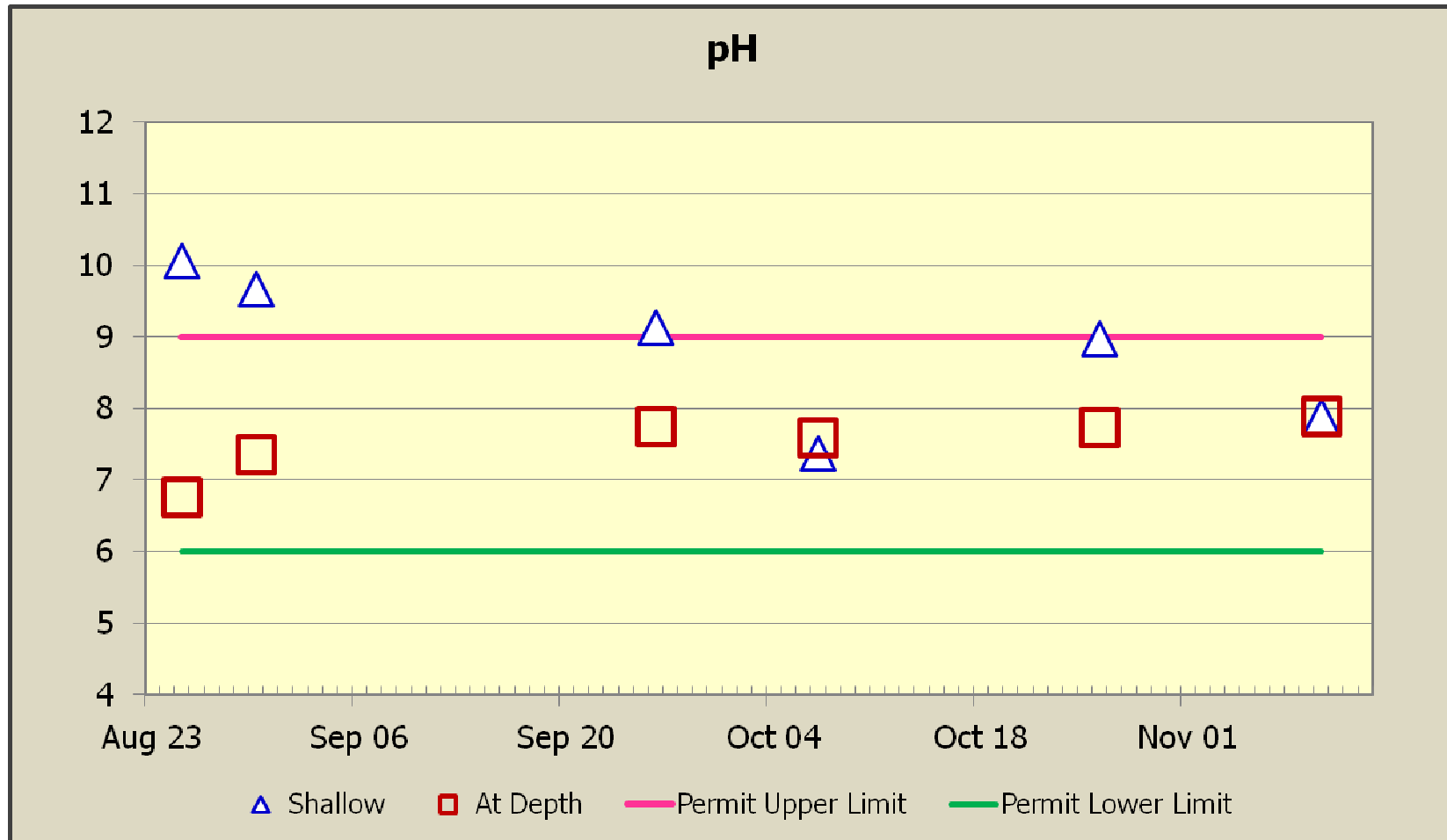# Pond: Algae Density

Algae Density (1,000s Colonies/ml)

"Healthy" density considered to be between 3K-8K colonies/ml.

Pond: Dissolved Oxygen
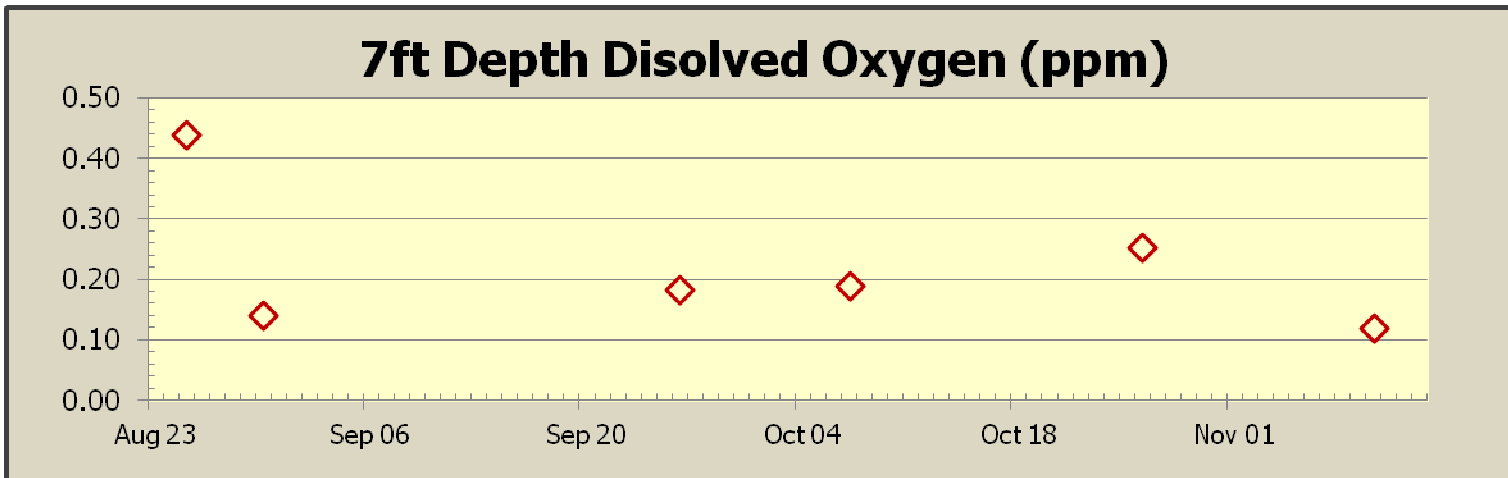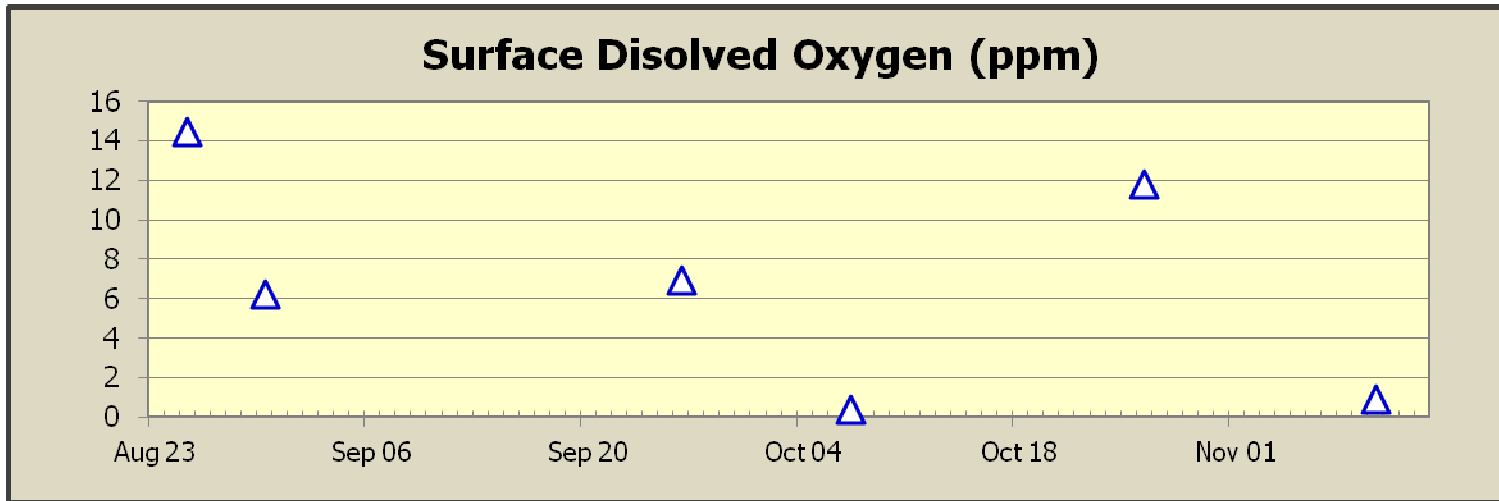
Ultrasonic sonic devices (locations 3 and 5) turned off on Oct 7th
All devices re-activated on Oct 21st.

Measured pH

Permit Limits for Pond Effluent. Effluent generally drawn from about 1 – 2 ft below surface.

Pond: Next Steps

- First set of repairs to WWTP corrected, continuing to work with the city for full inspection

- Keep all ultra-sonics on

- Continue to monitor algae density and D.O. Hope D.O. will return to normal levels (8-12ppm) by December.

- ~~Apply Algaecide in December,~~ :
  - Series of low dosages spaced weekly or more
  - Must secure effluent during this period
  - Must run Acute Toxicity Test (Fathead Minnow Test) prior to opening effluent.

- Revisit in January/February to determine if aeration is required