Who is United Phosphorus Inc.?

- Global Pesticide Manufacturing Company
- Primary business is in Agri-Chemicals
- 3000+ Employees worldwide
- 10th Largest Agri-Chemical Company
- Dedicated to support of more than 40 AI’s
UPI – Aquatics Organization

CUSTOMER SERVICE:
1-800-438-6071

REGIONAL REPRESENTATIVES:
- Dale Carpenter  |  dale.carpenter@uniphos.com
  WA, OR, ID, MT, WY, ND, SD
- Joe Vassios     |  joevassios@uniphos.com
  AZ, NM, TX (western), CO, KS, NE, NV, UT, CA
- Jacob Meganck   |  jacob.meganck@uniphos.com
  MO, IA, MN, WI, MI, IN, IL, KY, WV, PA, MD, DE, NY, NJ, CT, RI, MA, NH, VT, ME
- Craig Smith     |  craig.smith@uniphos.com
  FL (Non-gov't), GA (eastern), SC, NC, TN (eastern), VA
- Jeremy Slade    |  jeremy.slade@uniphos.com
  FL (Gov't), GA (western), AL, TN (western), MS, LA, AR, OK, TX (eastern)
UPI – Aquatic Products

- **Current**
  - Aquatic Herbicide
  - 8% Copper Sulfate Pentahydrate
  - Liquid (EDA) Chelate

- **Symmetry NXG**
  - Algaecide
  - 8% Copper Hydroxide
  - Liquid (TEA) Complex

- **AQUASTRIKE** (Now Registered!)
  - Aquatic Herbicide
  - 1.8 ppm Endothall .37 ppm Diquat Dibromide
AQUASTRIKE - Aquatic Herbicide

- Available 6/2014
- Convenient Combination of Aquathol and Diquat
- Fast Results
- Broad Control Spectrum
- Dual Mode of Action
- Ideal for Spot Applications, Boat Lanes and Shorelines
UPI – Aquatic Products

• Dipotassium Salt of Endothall
  – **Aquathol K**  40.3%  Liquid Herbicide
  – **Aquathol Super K**  63.0%  Granular Herbicide

• Amine Salt of Endothall
  – **Hydrothol 191**  53.0%  Liquid Herbicide / Algaecide
  – **Hydrothol 191 G**  11.2%  Granular Herbicide / Algaecide
Endothall Chemistry

- Aquatic half-life is 2-14 days
- Breaks down in water by microbial degradation
  - Temperature
  - Plant Biomass
- Degrades into organic acids (i.e., acetic & maleic) used in Krebs cycle

![Endothall Chemical Structure]

- Acetic acid
- Maleic acid
Endothall Label Changes

- **No** Swimming, Fishing or Irrigation Restrictions
- **No** reference to “Domestic Uses”
- Two Use Designations:
  1. Quiescent Water Systems
  2. Flowing Water Systems
## Endothall PPE

### Mixers / Loaders / Handlers / Surface - Applications

<table>
<thead>
<tr>
<th>Item</th>
<th>Aquathol K</th>
<th>Aquathol Super K</th>
<th>Hydrothol 191</th>
<th>Hydrothol G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coveralls</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Chemical-Resistant Headgear</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Chemical-Resistant Footgear</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Chemical-Resistant Apron</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Long Sleeve Shirt</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Long Pants</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Shoes and Socks</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Chemical-Resistant Gloves</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Protective Eyewear</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>NIOSH-Approved Respirator</td>
<td>Yes-Paper</td>
<td>Yes-Half/Full</td>
<td>Yes-Paper</td>
<td>Yes-Half/Full</td>
</tr>
</tbody>
</table>

### Sub-Surface Applications

<table>
<thead>
<tr>
<th>Item</th>
<th>Aquathol K</th>
<th>Aquathol Super K</th>
<th>Hydrothol 191</th>
<th>Hydrothol G</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIOSH-Approved Respirator</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
Aquathol K (2ee)

**AQUATHOL® K AQUATIC HERBICIDE**  
**EPA Reg. No. 70506-176**

This Section 2(ee) Recommendation is not for use in the states of Delaware, Indiana, Iowa, Kansas, Kentucky, Missouri, New Hampshire, New Mexico, New York, Texas, or South Dakota.

**FOR CONTROL OF FLOATING WEEDS**

<table>
<thead>
<tr>
<th>WEEDS</th>
<th>RATE</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floating Aquatic Plants Including:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Lettuce (<em>Pistia stratiotes</em>) and Water Hyacinth (<em>Eichhornia crassipes</em>)</td>
<td>2 - 3 quarts per surface acre</td>
<td>Apply with an approved aquatic wetting agent (0.25 – 1% v/v). Apply in a manner to ensure complete and consistent coverage to the treatment area. Target plants should be wet but not to runoff. Dense infestations may require a follow-up application within 2 weeks to minimize the potential for plant escapes. The higher rate is recommended for late season applications.</td>
</tr>
<tr>
<td>Common Salvinia (<em>Salvinia rotundifolia</em>) and Giant Salvinia (<em>Salvinia molesta</em>)</td>
<td>2 - 6 quarts per surface acre</td>
<td></td>
</tr>
</tbody>
</table>
Submersed Aquatic Weed Control

Determining the Proper Rate

- Hydrilla Rates 1.0 – 4.0 ppm
- How Do You Determine Best Rate?
- Think – Concentration / Exposure Time

Perimeter Hydrilla Coverage
Submersed Aquatic Weed Control

Concentration / Exposure-Time Relationship

- Poor Control
- Spot / Strip / Flowing Water
- Good Control
- Whole Lake or Large Blocks

Herbicide Concentration vs. Exposure Time

Hours vs. Days
Aquathol Use Scenario

(50 Surface Acres)

- Hydrilla Rates 1.0 – 4.0 ppm
- Strip Application
- Short Exposure Time = Higher Rate

Perimeter Hydrilla Coverage
Aquathol K Use Scenario

(50 Surface Acres)

Apply 3 - 4 ppm Aquathol

3 - 4 ppm
Aquathol K Use Scenario

(1 Surface Acre)

• Hydrilla Rates 1.0 – 4.0 ppm
• Marginal / Strip Application
• Long Exposure Time = Lower Rate

Perimeter Hydrilla Coverage
Aquathol K Use Scenario

(1 Surface Acres)
Aquathol K Use Scenario

(1 Surface Acres)
After Dilution / Mixing
Aquathol K Use Scenario

(1 Surface Acre)

Whole Pond Coverage
Aquathol K Use Scenario

(1 Surface Acre)

Long Exposure Time - Treat at 1 ppm in Entire Pond
Treat in Sections if Heavy SAV

Whole Pond Coverage
Aquathol Super K Use Scenario

Spot Application
Aquathol Super K Use Scenario

Spot Application

• Very Short Exposure Time
• Target 3 - 4 ppm in Treatment Area
• Choose Aquathol Super K

3-4 ppm

3-4 ppm
Aquathol K - Benefits

- Fast Control
- Relatively short contact time required for control of nuisance aquatic weeds 12-24 hrs
- Broad Spectrum and Selective Aquatic Plant Control
- No restrictions on irrigation, fishing, or swimming
- Can be used in combination with other aquatic herbicides and algaecides

Caution: Dissolved oxygen (D.O.) issues can occur when water temperatures are warm and weed coverage is dense
Hydrothol 191

• Broad Spectrum for SAV and Algae

• Relatively short contact time required for control of nuisance aquatic weeds 8-24 hrs

• **No** restrictions on irrigation, fishing, or swimming

• Can be used in combination with other aquatic herbicides and algicides

**Caution:** Dissolved oxygen (D.O.) issues can occur when water temperatures are warm and weed coverage is dense
Hydrothol 191

- Rates for Algae and SAV Control:
  - Effective at low rates
  - Algae: 0.05 – 3.0 ppm
  - SAV: 0.2 - 5.0 ppm
  - **Concentrations above 0.3 Unsafe for Fish**

- May be used in combination with other aquatic herbicides and algaecides
Hydrothol 191 Use Scenario

Algae Control
Strip / Marginal Application

- *Fish-Safe* Algae Rates \(0.05 – 0.3\) ppm
- \(0.3 – 3.0\) ppm for Branched or Difficult Species
- Applications **above** \(0.3\) ppm – **Marginal Only!**
Hydrothol 191 Use Scenario

Spot Application / Algae or SAV

- Short Exposure Time
- Target 3-5 ppm in Treatment Area
- Choose Hydrothol Granular

3-5 ppb
Lyngbya Wolleii

- Cyanobacteria
- Forms benthic and surface mats
- Thick sheath
- Toxin production
Comparisons – 2 WAT through 1 MAT

Untreated

0.3 ppm Hydrothol + 50 lbs/ac-ft. Green CleanPRO

0.3 ppm Hydrothol + 5 gal/ac-ft. Green Clean
Hydrothol 191 & GreenClean Combo

GreenClean® Liquid and Hydrothol 191 Liquid Tank Mix User’s Guide

Take advantage of the synergies between GreenClean Liquid and Hydrothol 191 Liquid:

- Copper Alternative
- Longer Lasting Results
- Adds Oxygen While it Works
- Can Be Mixed as Concentrates
- Can Be Applied as a Surface Spray or via Injection
- Can Be Used for Small and Large Scale Applications

<table>
<thead>
<tr>
<th>Algae Type</th>
<th>GreenClean® Liquid</th>
<th>Hydrothol 191 Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low Density</td>
<td>Medium Density</td>
</tr>
<tr>
<td>Anabaena</td>
<td>1 Gal</td>
<td>1.5 Gal</td>
</tr>
<tr>
<td>Aphanizomenon</td>
<td>1 Gal</td>
<td>1.5 Gal</td>
</tr>
<tr>
<td>Scenedesmus</td>
<td>1.5 Gal</td>
<td>2.0 Gal</td>
</tr>
<tr>
<td>Microcystis</td>
<td>1.5 Gal</td>
<td>2.0 Gal</td>
</tr>
<tr>
<td>Pithophora</td>
<td>2.0 Gal</td>
<td>2.75 Gal</td>
</tr>
<tr>
<td>Cladophora</td>
<td>2.0 Gal</td>
<td>2.75 Gal</td>
</tr>
<tr>
<td>Hydrodictyon</td>
<td>2.0 Gal</td>
<td>2.75 Gal</td>
</tr>
<tr>
<td>Oscillatoria</td>
<td>3.5 Gal</td>
<td>4.25 Gal</td>
</tr>
<tr>
<td>Lyngbya</td>
<td>3.5 Gal</td>
<td>4.25 Gal</td>
</tr>
</tbody>
</table>

* Rates are based on per acre/foot of algae.

For more information contact your UPI Representative.
Jeremy Slade
C 662.617.4571

www.biosafesystems.com • www.upi-usa.com

GreenClean® liquid is a registered trademark of BioSafe Systems LLC. Hydrothol 191 Liquid is a registered trademark of UPI. Always read and follow label directions before use. 8.11

Built For Where Crop Protection Is Going
“Difficult” Aquatic Species

Crested Floating Heart
• 3 ppm Aquathol K
• .3 ppm Hydrothol 191

Hygrophila
• .3 ppm Hydrothol 191
• .38 ppm Diquat
Florida Reps

Jeremy Slade
662.617.4571
jeremy.slade@uniphos.com

Craig Smith
561.301.8326
craig.smith@uniphos.com
Thank-You!