Welcome to The Moss

Commercial Pools and Spas

Presenter: Dan Cook

Conservation Solutions Corporation

Water Treatment Division
Moss
Pool Applications
Agenda

• The founders
• Science behind the products
• The products
• Real world examples
• Compatibilities and incompatibilities
• Water parameters
• Installation and care
• Questions
Founders

• David (left)
  – Retired vascular surgeon and expert in wound care
  – Trained in chemistry
  – Successful inventor and entrepreneur
  – Published author
  – Pilot
  – Fly fisherman and outdoorsman

• Vance (right)
  – Biochemist, cellular biologist, and microbiologist
  – Expert in applied science
  – Successful inventor and entrepreneur
  – Fly fisherman and outdoorsman
This is Sphagnum Moss

- Made from one of over 250 species of Sphagnum moss
- Green and Sustainable
- Harvested by hand
- Patented
Sphagnum Moss Bog
Sphagnum Moss Leaves

- Leaves are dried, harvested and cleaned
- Leaves are not alive
- CWS product is made from compressed moss leaves
Sphagnum Moss

- Sphagnum moss for commercial pool and spas
- Select species
- Patented
PoolNaturally® Plus System

- PoolNaturally® Plus and SpaNaturally® Plus treated pools and spas have remarkable water clarity, air quality, and swimming comfort
- Swimmers and bathers report fewer breathing issues, burning eyes and skin discomfort, swimsuit degradation, and more enjoyable swimming
PoolNaturally® Plus System Surge Tank Application

- PoolMoss® Pro is exposed to water using a contact chamber
- Contact chamber is submerged inside the surge/balance tank
- Natural flow within the tank allows exposure of PoolMoss® Pro to the water
CC-STL/STS Installation
What is an Offline Contact Chamber

• A Contact Chamber is the apparatus used to expose PoolMoss® Pro to the water
• The CC-140 (shown here) allows water to flow over and through PoolMoss® Pro
CC-80/90/140/150
NSF 50 Listed
Installation of CC-80/90/140/150 Contact Chambers – Option 1
Installation of CC-80/90/140/150 Contact Chambers – Option 2
PoolMoss® Pro and SpaMoss® Pro
Benefits and Results

KEY RESULTS
– Improved Water Quality
– Improved Air Quality
– Stabilized pH and Alkalinity
– Reduced Scale and Staining
– Reduced Corrosion

KEY BENEFITS
– Reduced Chemical Usage
– Reduced Water Usage
– Reduced Energy Usage
– Reduced Maintenance
– More Enjoyment
Science Behind the Products: Organic Contamination

- Bacteria
- Microbes
- Parasites

- Micro-Environment

- Extra-Cellular Matrix

- Corrosion
- Scale
- Probes
- Liners/Membranes
Science Behind the Products: Surfaces and Organic Contamination
Science Behind the Products: Cooling Tower Example

Organic Contamination without Moss
Science Behind the Products: Cooling Tower Example

Organic Contamination with ProMoss™
Science Behind the Products: Effect of Sphagnum Moss on Scale

- Demonstrated removal of staining and scale from pool and spa surfaces
- Reduced scaling in heat exchangers and salt generation systems
- Laboratory studies show the ability of moss to inhibit and remove scale
Science Behind the Products: Effect of Sphagnum Moss on Scale Removal

Figure 2. Effect of Sphagnum moss on scale removal. Blue bars represent the amount of scale remaining (as calcium, after solubilisation with HCL in 500mls distilled water) in beakers after 7 days of treatment. Control vs Moss Treated, p<0.001. Red bars represent the amount of calcium in the water portion of the system prior to the addition of distilled water and solubilisation of the scale portion. Control vs Moss Treated, p<0.05. The pH of the water in both control and moss treated beakers was periodically monitored during the course of the studies and remained within 0.1-0.2 units of each other.
Science Behind the Products: Scale Reduction

Heat Exchanger from Indoor Pool

Typical pool heat exchanger

Pool Treated with PoolNaturally® Plus for 4 years
Science Behind the Products: Filters and Surfaces

Infrastructure as a Bioreactor

- Pipes
  Conduits
  Coated with OC Scale Corrosion

- Heaters
  Heat Exchangers
  Coated with OC Scale Corrosion

- Filters
  Remove Particulates
  Largest Surface for Organic Contamination
  Form Stone

- Walls
  Liners / Membranes
  Coated with OC Scale / Perforation / Deterioration

- Pumps
  Seals/Impellers
  Source of OC Corrosion
Science Behind the Products: Cooling Tower Example
90% Reduction in Copper Corrosion

Cooling Tower without Moss

Cooling Tower with Moss

MPY

Date

MPY

Date

Probe 1
Probe 2
Linear (Probe 1)
Linear (Probe 2)

Probe 1
Probe 2
coupon
Linear (Probe 1)
Linear (Probe 2)
Linear (coupon)
Science Behind the Products: Disinfection By Products (DBP)

DBP

- Volatile
- Causes: Asthma, Skin/Eye Irritation, Headaches, Carcinogens
- Chloramines
- Trihalomethane

Causes:
- Asthma
- Skin/Eye Irritation
- Headaches
- Carcinogens
Science Behind the Products: Disinfection By-Products (DBP) Measurements in Two Commercial Pools

Effect of PoolNaturally® Plus System on DBP Levels in Pool Water

- Lap Pool
- Leisure Pool

Pool was drained/refilled

Creative Water Solutions © 2014
Science Behind the Products: Chloroform Measurements (DBP) in Two Commercial Pools

- Chloroform Levels in the Air Reduced by 55%
  - Before: 0.15 +/- 0.020 mg/m³
  - After: 0.067 +/- 0.008 mg/m³; p<0.001
Science Behind the Products: Disinfection By-Product (DBP) Measurements in 13 Commercial Pools
The Products: Breakaway® Flush

- Breakaway® Flush was developed to remove organic contamination from pool and spa surfaces, pipes and filter media.
- It removes 70-90% of the organic contamination in one hour.
- It “breaks” organic contamination “away” from the surface.
The Products: 
Breakaway® Flush For Spas

• Use CWS Breakaway® Flush to remove organic contamination from spa surfaces
• Helps prepare spas for treatment with SpaMoss® Pro
• Is an integral component of the CWS treatment system
The Products:
Organic Contamination Removed From a New Spa
The Products
Air Scouring Kit

• Attaches air blower to outflow pipe of the filter
• Allows Breakaway® Flush to be effectively delivered to the filter media
• Quick connect remains in place for future treatments
• Installs and attaches quickly
Air Scouring/Breakaway® Flush Setup for Media Filters
PoolMoss® Pro and SpaMoss® Pro are Compatible with:

- **Biocides**
  - Chlorine
    - Liquid
    - Calcium hypochlorite
  - Dichlor
  - Trichlor
  - Gas
  - Salt generation
  - Bromine
  - Ozone
  - Silver ions
  - Copper ions

- **Monopersulfate used intermittently as a shock**

- **pH control chemicals**
  - Hydrochloric acid
  - Sulphuric acid
  - Bicarb

- **Clarifiers**

- **Chlorine stabilizers**

- **Cyanuric acid up to 25 ppm**
PoolMoss® Pro and SpaMoss® Pro are Compatible with:

• Filters
  – Paper cartridge filters
  – Media filter
    • Glass
    • Sand
    • Diatomaceous earth
    • Synthetic media for regenerative filters
PoolMoss® Pro and SpaMoss® Pro are Incompatible with:

- Biocides
  - Biguanides like Baquacil
  - Monopersulfate fed continuously
  - Free available chlorine levels above 5 ppm
  - Combined chlorine levels above 2 ppm
  - Direct contact with solid cyanuric acid
  - Direct contact with concentrated acid of any kind
  - Direct contact with most cleaning solutions
  - Concentrated ammonia

- Filter media over 3 years old unless Breakaway®
  Flush media cleaning performed
PoolMoss® Pro and SpaMoss® Pro
Target Water Values

• **ORP and CHLORINE**
  - Clean ORP probe
  - Change ORP by 10 mV increments to achieve 1-2 ppm FAC
  - Stop when 1-2 ppm FAC is achieved
• **Set FAC probe to state minimum**
• **pH**
  - Recommended pH 7.2-7.4
• **Alkalinity**
  - May fluctuate—keep at state minimum
• **Calcium Hardness**
  - May fluctuate—do not adjust
PoolMoss® Pro and SpaMoss® Pro
Target Filter Values

• Backwashing
  – Only when differential is greater than 10 psi
  – Record differential when finished
  – Record flow when finished

• Air Scour and clean filter with Breakaway® flush when backwashing is required more than twice a week or flow drops more than 10 gpm
PoolMoss® Pro and Cyanuric Acid

• We recommend using cyanuric acid after the outdoor pool is filled with fresh untreated water
• Maintain cyanuric acid concentration below 25 ppm for two weeks after filling
• Discontinue cyanuric acid after two weeks
• Cyanuric acid is denser than water
• Deep end of the pool has 2-3 X surface level
• High cyanuric acid levels inhibit formation of hypochlorous acid
Spring Valley YMCA Spa

• Spa 3,800 gallons
• Dump and fill:
  – WAS once a week (15,200 gallons per/month)
  – NOW once a month (3,800 gallons per/month)
• SAVINGS 11,400 gallons per/month
Spring Valley YMCA Pool

• Pool 174,000 gallons
• Backwashing:
  – WAS three times a week (12,000 gallons per/month
  – NOW once a week (4,000 gallons per/month)
• SAVINGS 8,000 gallons per/month
University of MD/ERC Natatorium
1.2 Million Gallons
University of MD/ERC Natatorium Student Sustainability Project

• CWS/UMD aquatic facilities personnel worked together – submitting a proposal for the 1.2 million gallon aquatic center
• Funded by: UMD Students and Office of Sustainability Campus Green Fund
• PoolNaturally® Plus system installed on September 1, 2011
• Water managed by students and UMD staff – according to state guidelines and CWS recommendations
University of MD/ERC Natatorium
Student Sustainability Project

• Chemical levels are maintained at state required minimums
• Improved air quality with reduction in DBP
• Positive recreational swimmer, polo and swim team feedback regarding smell, taste, clarity, and performance
• Reduction in reports of skin and eye irritation, swim suit fading, and other user complaints
• Moss as an attraction
• Increased paying membership by 15%
University of MD/ERC Natatorium Student Sustainability Project

First Year Results – improvement over prior year
• SAVED 750,000 gallons of water
• SAVED $44,000 in chemicals, water and heat
• INCREASED memberships by 15%

Second Year Results – improvement over Year 1
• Saved an additional $2,505 in chemicals
• Saved an additional 48,000 gallons of water
Fina World Championships 2013
Fina World Championships 2013

- 1.4 million gallons
- New Myrtha pool
- Used 25% of budgeted chlorine and acid
- Clear water throughout the competition in the main and practice pools
- No DBP smell in the arena
- Set 8 world records
PoolMoss® Pro and SpaMoss® Pro Benefits and Results

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- Reduced Water Usage
- Reduced Energy Usage
- Reduced Maintenance
- More Enjoyment
THANK YOU!

Implementation, Installation, and Care
Commercial Pools and Spas

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