Environmental Compliance

Washwater Treatment Secondary Phase

By Carey Krefft
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In last month's article, we left off describing the **primary** treatment phase: the separation of large, heavy materials (sand & grit) that settles naturally in a wash pad sump.

We now move on to what's considered the **secondary** treatment phase. If your goal is to treat in order to meet sanitary discharge standards or recycle the stuff, this is the phase for you.

There are as many treatment methods as there are days in a year. Here are a few of the main methods used in the secondary treatment phase:

- COALESCING: gathering oil droplets
- FILTRATION: particle segregation, element type, earth media type
- PRECIPITATION: chemical assisted coagulation, flocculation, and settling
- OZONE (O^3): disinfection, gas injection
- CHLORINE: disinfection, addition to ≤5 ppm

Most systems today offer several concurrent technologies all-in-one. In this issue we will cover the first three: Coalescing, Filtration and Precipitation.

Coalescing

This process is designed to coalesce (gather) the oil droplets that are present in a wastewater. When oil of any quantity is in agitated wastewater, the droplets sizes are anywhere from microscopic to very visible (0.5-1000 microns). Detergent can greatly contribute to this problem.

Coalescing is a mechanical process that involves streaming an oil-bearing wastewater over a series of plastic media. There are a variety of media types used today: multiple parallel plates, beads, molded mazes, etc. The plastic can attract the oil droplets, forcing them to grow large. Once they have grown to sufficient size, they will break free and float to the surface where they will be skimmed off.

Filtration Method

Filtration systems accomplish "particle segregation." That is, they separate particles based on the size in relation to the filter media.

The typical filter systems are capable of particle separation in the range of 1-5 microns. They only trap particles larger than the filter element opening size. Any pollutants that are soluble, or really small, pass through. Toxic metals, when in water, exist in the sub-micron and the soluble form. Therefore, filtration systems will miss these important pollutants.

Filter systems are a practicle "pre-treatment" device that contribute to the secondary treatment phase. They prepare a wastewater stream for further processing very nicely. If filtration is the MAIN treatment method, it will produce "grey water," and may not remove all the pollutants you are after, leaving spots when dry.

When considering a filter system, one should consider the filter replacement frequency, the element cost, and spent element disposal costs. Every wastewater treatment/recycling system creates some form of waste that must be disposed of. Filter element crushing may also be required.

Precipitation

This is an interesting chemistry-based technology that was developed in the 1950s. Many improvements in the technology have been made since.

The precipitation method is based on the formation of precipitates of organic matter, suspended solids, and toxic metals, based on the pH of the solution. Generally speak-

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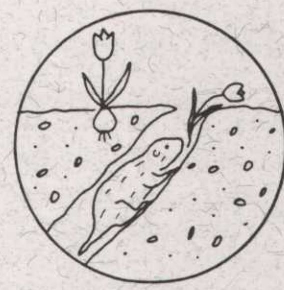

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ing, acid creates solubility, and caustic creates precipitates.

In practice, the pH is controlled to a point around 8.5-9.5 pH using caustic soda, the precipitates then form immediately.

A specialized electrically charged chemical or two, called **polymers**, are then added at about the 2-10ppm range and mixed in.

Polymers have many molecular receptacles that are designed to attract and coagulate the microscopic precipitates into visible particles (called *pin floc*) that are increasingly heavier than water. This coagulant (*sludge*) then rapidly settles to the bottom and clear water exist at the top.

The precipitate and settling method is generally considered to be ≥99% efficient, so the sludge will contain most of the pollutants present. The resulting treated water is generally *very* clean.

The small quantity of sludge produced is poured out and dried for easy handling and economical disposal. Typically, a sludge is poured into a bag filter and allowed to further dry by gravity.

If you are considering this treatment method, you should consider the cost of treatment chemicals and of sludge disposal. If you are treating a hazardous wastewater (not expected at a typical golf course), then you would also have state permitting requirements.

In next month's article we will cover the rest of the treatment methods: Ozone and Chlorine.

Making a Point About Change

Having trouble persuading your staff that incremental change is worth the effort -- and that change doesn't have to be immediate, dramatic and sweeping?

If so, try this exercise suggested by Richard Ruhe, a consultant with Blanchard Training and Development:

Tell staff members to imagine they've just been told they have won a state lottery and they have one minute to choose between two payment methods:

- **$250,000** a day for 30 days.
- **One cent** the first day and double the amount each day for 30 days.

To make it easier for you: The first method totals $7.5 million, the second method totals, $10,737,128.23!

Tips from the USGA
Know Your Limits

by Paul Vermeulen, USGA Agronomist

With spring just around the corner it won't be long before the grass starts growing faster than most maintenance crews can cut it. To the delight of many golfers, such miraculous growing conditions make it possible to increase the putting green speed by simply lowering the height of cut below normal limits.

Unfortunately, spring eventually turns into summer. It is at this point in time that a lack of understanding on part of many golfers meets with the Superintendent's reality of working with an uncooperative Mother Nature. The result is one of golf's biggest controversies - Putting Green Speed.

In the midst of controversy many individuals often look for someone to blame. Golfers naturally blame Superintendents, as I have heard on occasion someone say, *"The greens are always faster at the course down the street and they NEVER have problems. I think our Superintendent is just making excuses."* Superintendents, on the other hand, have a tendency to blame the PGA TOUR or the USGA, as I have also heard on occasion someone tell me where I can shove my Stimpmeter!

Looking for someone to blame, however, will never resolve the issue. It's not the fault of Augusta National that golfers believe the greens are always faster somewhere else. And it's not the fault of the PGA TOUR, nor the USGA that golfers believe greens should roll 10 feet 6 inches.

In an imperfect world the only way to address controversy is by providing all parties with the facts. In other words, we need to educate golfers, so they themselves can appreciate the realities, or rather the limits, of putting green maintenance.

A good education should start with an understanding of the past; the fact is that green speed has increased dramatically since the turn of the century. What evidence is there you ask? First, let us take a look at the equipment. On a tour through the museum at Golf House in Far Hills, New Jersey, golfers can examine putters from each decade and see that the slope of the face has dropped from 10 degrees in the early 1900s to 3 degrees in 1994. Why? Because improvements in mower technology have allowed the height-of-cut on greens to drop from above a 1/4" to below a 1/8".

Second, let us take a look at records kept by William Bengeyfield, former Western Region Director, USGA. On average, the putting green speed across California was below 7 feet in 1977 and 1978 when a survey was taken by

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