

CleanConnections

Pollutant of the Month: Chemical Oxygen Demand (COD)

By Dan Parnell

All commercial and industrial facilities have limits on the concentration of pollutants they can discharge to the sewer. To understand the reasons for these limits you must understand the effect these pollutants have on the Publicly Owned Treatment Works (POTW).

The Pollutant of the Month (yes, it is a quarterly newsletter, but Pollutant of the Quarter?) will be a series of articles that discuss various pollutants and their effects on the POTW.

In general, the purpose of the Industrial Pretreatment Program is to control industrial pollutants to prevent:

- Interference - inhibition or disruption of the treatment processes.
- Pass-through - a discharge that exits (not fully treated) the POTW and causes a violation of the POTW's discharge permit or exceedance of the receiving stream's water quality standards.
- Endangerment - to the public or POTW worker's health or the environment.

To understand COD, you don't need to be a chemist, but a little knowledge about the treatment process at the POTW helps. Removing pollutants from the water is a difficult job and the POTW enlists the help of some very hard little workers - bacteria.

At the wastewater treatment plant a population of microbes are sustained in in-ground basins or tanks. These mighty microbes convert organic pollutants to carbon dioxide and water. The bacteria consume pollutants (it's their food) then use dissolved oxygen in the basins to convert the pollutants to energy. This process is called respiration, and our cells obtain energy in the same fashion (see Illustration I). Other types of bacteria convert ammonia to nitrate, a process called nitrification (see Illustration II).

Illustration I - Respiration

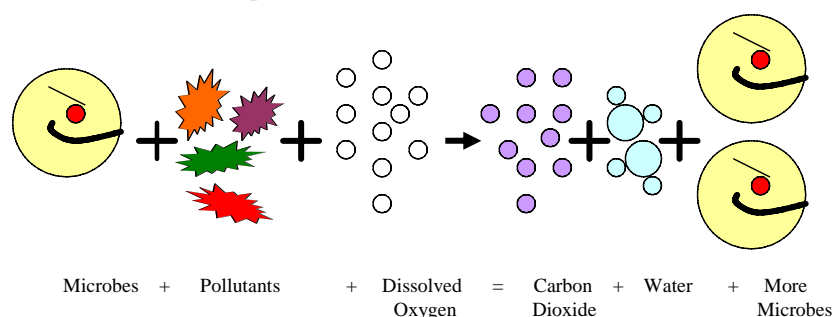
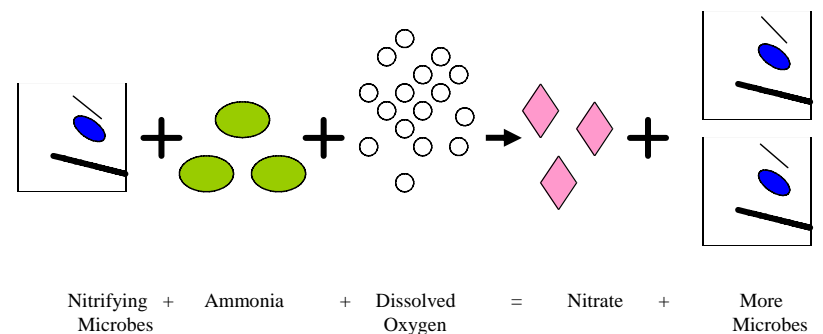


Illustration II - Nitrification



So, the bacteria derive their food from the wastewater and then process or metabolize this food using the dissolved oxygen. The treatment plant uses blowers to diffuse air into the wastewater as the source of oxygen for respiration and nitrification. The more food in the wastewater the more oxygen is required for respiration. Higher oxygen demand for respiration means the blowers must be increased to meet that demand, thus more power is consumed.

Chemical Oxygen Demand measures the strength of an industry's waste stream. It gives us an idea of the oxygen demands a particular industrial waste stream will have on the treatment plant.

COD is considered a conventional pollutant and for a treatment plant it's generally not a problem. However, problems can arise when an industry or combination of industries discharge large amounts of COD over a short period of time (called slug discharges). The treatment plant may become overloaded with food (COD) such that it can not supply enough oxygen for the microbes to remove all of the pollutants. In this situation, pollutants are not fully treated and can pass-through to the river. JEA's Buckman Water Reclamation Facility (WRF) had a history of this problem. High oxygen demand wastewater reduced the plant's ability to fully treat pollutants.

Upgrades in the ability of the plant to deliver dissolved oxygen and a reduction in peak COD loads contributed by industries have helped the Buckman WRF to completely treat the pollutant loads before discharge.

P2 Opportunity

Chris Bodin, the local P2 coordinator, will be speaking at the July 17th First Coast Manufacturers Meeting (FCMA). This meeting is held at the Northeast Florida Safety Council located at 1725 Art Museum Drive at 12:00 pm. You are encouraged to attend and learn first hand what they have to offer. Lunch (\$5.00) is included so please RSVP to Debbie Warren at 296-9664.

Is P2 4 U?

By Karen Foreman

P2. Is that P squared? Actually it stands for Pollution Prevention. P2 is the reduction of all forms of waste through prevention as opposed to treatment after it is produced. An effective way to control the expenses and liabilities associated with solid waste, air emissions or wastewater is to eliminate the processes and raw materials that create them in the first place. It includes practices that reduce the use of hazardous and nonhazardous materials, energy, water, or other resources. Steps are taken to eliminate or reduce pollution before it is discharged into the environment. P2 is accomplished through source reduction, waste minimization, or on-site recycling. In addition to the reduction in pollution, P2 can also offer significant reductions in operation costs.

If you are not sure how to get involved in P2, the Florida Department of Environmental Protection (FDEP) sponsors the Florida P2 Program. This program provides non-regulatory technical assistance in the form of on-site assessments and individual consultations. The purpose of the assessment is to identify the specific processes at a facility that generate pollution and then their findings are presented in a report that is typically completed within 30-45 days from the site visit. The entire service is provided at no cost to the company.

P2 Program staff have backgrounds in engineering and management. They also have a program employing retired engineers, scientists, and managers who bring experience in industrial practices. They work part-time with the P2 Program engineers to assist with on-site waste assessments and research.

There are numerous success stories dealing with many different types of facilities. One example involves replacing an organic solvent based degreaser with aqueous

parts washers. One facility found they could replace most of their 1,1,1-trichloroethane vapor degreaser used in parts washers with aqueous detergents. The combined savings from reduced raw material purchases and avoided disposal costs was \$116,000 per year. These changes also prevented the release and reporting of more than 25,000 pounds of ozone-depleting CFCs into the environment per year.

Give the folks at P2 a call and see if they have best management practices for your industry or to schedule a site assessment. They might find ways to modify your processes to recycle or reduce waste. Who knows, it could save your company a lot of money, help protect our environment and make you employee of the month!

For more information or if you'd like a free and confidential on site assessment, please contact:

Chris Bodin, Northeast District P2 Coordinator, (904) 807-3300 ext. 3370.

You can also contact the main office at:

Florida Pollution Prevention Program
Florida Department of Environmental Protection
2600 Blair Stone Road, MS4570
Tallahassee, FL 32399-2400
(850) 245-8707 / toll free: (800) 741-4337
P2info@dep.state.fl.us

The Florida Pollution Prevention Program is not associated with JEA.

Compliance Tip: Failure to Report Self Monitoring Violation

Now here's one that can give you the ol' double whammy if you're not careful! Let's say you are reviewing the lab results required for your Industrial User Discharge Permit periodic compliance report. You notice that you exceeded the discharge limit for copper. What do you do next? Two possible scenarios:

- You self report the violation by promptly completing a 24-Hour Notification Form and fax it to the IP office (665-8334).
- You add the data to the self-monitoring report (SMR) and send it in by the 28th.
- We could throw in a third scenario: You are so ashamed of the copper violation that you quit your job and leave Jacksonville forever. [OK, it's not that bad: violations happen!]

Let's now see what the consequences are from each scenario:

- The IP program waits (30 days from notification) to receive the required compliant resample data as well as a written explanation detailing causes and corrective actions to prevent a recurrence. Once compliance is demonstrated, you will receive a closure letter for the violation. Now if it's a recurring violation, we may be required to initiate escalating enforcement.
- You receive two notice of violations from the IP program. One is for the limit excursion and the other for Failure to Report Self Monitoring Violation (FRSMV). You are required by your permit (see section 3) to notify JEA within 24 hours of becoming aware of a violation resulting from sampling. Notification is accomplished using a fax form that was included with your permit.
- Fortunately, we've never known this scenario to occur.

If you identify a violation and are unsure of the requirements or you need a 24-Hour Notification Fax Form, please call your compliance officer.

Wastewater Treatment Plant Update- Going For the Gold!

Three of JEA's regional wastewater reclamation facilities (WRF) received 2002 Gold Awards from the Association of Metropolitan Sewerage Agencies (AMSA):

- Buckman WRF
- Mandarin WRF
- Southwest WRF

The Gold Award is given to member treatment facilities that achieve 100% compliance with their National Pollutant Discharge Elimination System (NPDES) permit limits. Congratulations to the facility operators and thank you to the industries for managing your pollutant discharges.

The Buckman WRF continues to pass its whole effluent toxicity tests and meet its NPDES permit limits. On the morning of June 20, the plant received a slug load of high oxygen demand wastewater. While the operators were able to make adjustments to meet the demand, the load came close to exceeding Buckman's blower capacity. If you suspect you have problematic waste stream, the Industrial Pretreatment department would like to work with you to alleviate its effects.

IP Staff Changes

The JEA Industrial Pretreatment program has gone through a few personnel changes this spring. Paul Steinbrecher has been designated to head JEA's Environmental Permitting, and Regulatory Conformance department. Dan Parnell has taken the position of Industrial Pretreatment manager. Dave English has come aboard as a new inspector/compliance officer.

Clean Connections is published quarterly by the JEA Industrial Pretreatment Program. 21 West Church Street Jacksonville, FL 32202. (904) 665-4796.

For More information about our program, forms, and past issues, please visit the JEA Industrial Pretreatment Website
<http://www.jea.com/business/services/industrialpre/index.asp>