THE COLLECTOR
SHARE YOUR THOUGHTS
Published Quarterly — Issue #1
April, 2001

2001 NHWPCA
22nd Annual Trade Fair
April 5, 2001
Wayfarer Inn Convention Center – Bedford, NH

The NHWPCA Annual Trade Show will once again be held at the Wayfarer Inn, Bedford, NH. Mark your calendar and be there to talk with consultants, equipment suppliers, labs, fellow operators, etc. at their booths anytime between 9:00 a.m. and 3:00 p.m.
Yearly “Poster Contest” winners will be announced in the exhibit hall at 11:00 a.m. The raffle will of course be held in the exhibit hall in the p.m.
Hope to see you there.

President’s Address
“Hello to the Membership”

First of all, I would like to thank the Nominating Committee for my nomination to the Board and secondly to the membership, thank you for your vote of confidence.
As you know, the Board of Directors has made amendments in the constitution in hopes to increase interest and participation. An association’s greatest asset are its members. In order to fulfill the needs of our members, our profession and our communities, this association needs the active participation of its members. This participation will be new ideas and problem solving to this ever-changing field of wastewater. As a technician in this field, I believe we all have some of the same goals; one would be efficiency and by networking with other technicians, information is gathered and shared. This association has a number of committees; Safety, Education and Operations Challenge, just to name a few. These committees are a perfect place to share ideas that may help others in this field. So I encourage you to get involved. It could be an rewarding for you as it has been for myself and for others who have served before me. The Board of Directors has paved the way for your involvement by the amendment to the Constitution. The commitment is up to you. I hope you will accept the challenge . . .

Thanks
Kenneth E. Lowe, President

Operators Challenge
Free Lunch

This is where it all began – Circa 1989
Operator Challenge Team – you should know their names by now.

The OPS Challenge training day will be held Saturday, May 5th at 9:30 a.m. at the Franklin WTF training facility. A free barbecue lunch is provided by the NHWPCA and you will receive 5 CEUs to boot.
This training day is set up to help perspective team members hone their skills on the 5 events that will be used for the 2001 OPS Challenge competition that will be held on June 4th and 5th in Sturbridge, Massachusetts.
Anyone interested in being on a team should attend since we will be giving out tips and trade secrets that will give you a competitive edge. COME ONE – COME ALL & JOIN THE FUN!!! If you have any questions, contact Mark Bernier or Kenneth Lowe at (603) 589-3565.
standing and other legal details will have to be worked out. In addition, high-level State approval will be necessary before anything can be finalized.

5. Next Meeting: The next meeting will be held at the Hall Street WWTF in Concord on Friday, March 23.

The Key to Preventing Accidents
by Harvey King

(Think of your dictionary)

The key to preventing accidents is to remember: they are

- by definition -

"Something that happens when nobody intended it to happen."

Ok, a loose definition. Still, it is true about all accidents. The point is... accidents happen precisely and exactly when nobody is meaning for them to happen. Of course nobody means for an accident to happen. That is the point. When you don't mean for something bad to happen, When you don't intend to have something go wrong, (when you tend to be most relaxed and complacent), - that it is precisely when accidents occur; that is what an accident is!

People assume that having good intentions should be sufficient to protect against accidents. The definition of an "accident" tells you different.

The long and the short of it?
When you are doing something risky (high possibility or high cost) ... think about the definition of an accident.

"Something that happens when nobody intended it to happen."

You will almost automatically take the extra precaution you think is necessary.

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- Assorted iron pipe meter horns
- Assorted steel curb stems

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Edward A. Kowsz Memorial Scholarship

1. Must be a member of NEWEA and/or State Association for at least two years to be eligible for consideration.

2. Must be actively employed in the field of wastewater treatment or related field. As competition for this award is growing, a priority system of selection criteria is established as follows, in descending order of importance.

1st) Operators, laboratory analysts and others, private or public, who are directly involved in the operation of wastewater treatment facilities.

2nd) Persons working for non-profit organizations who routinely provide training and/or technical assistance to wastewater personnel.

3rd) Persons working for profit making organizations who routinely provide training and/or technical assistance to wastewater personnel.

3. Must make application for the scholarship to the Personnel Advancement Committee prior to attendance at the training program. Application periods will be from July to January (closing January 1 with the awards being made by February 1) and February to June (closing on June 1 with award being made by July 1).

4. Must submit application to the Personnel Advancement Committee via the Executive Director. The Executive Director will confirm applicant's membership in NEWEA for the minimum two years.

5. A scholarship sub-committee consisting of 3 members of the Personnel Advancement Committee (PAC) will review, rank and recommend applicants and the scholarship monetary award amount for each successful applicant. A response to the applicant will be provided within 30 days following the application closing dates in #3 above. The recommendation shall be made to the PAC at the Winter and Spring NEWEA meetings.

6. The Executive Committee will establish the amount of the scholarship annually. (Historically a minimum of $1,500).

7. At the Winter and Spring meetings, the PAC will vote on the recommendations of the sub-committee. Awards increments will be whatever is necessary as determined by the PAC, but not to exceed per $300.00 application. The $300.00 award cap may be waived based on availability of funds and by vote of the PAC.

8. Award of the scholarship shall be made at the time of selection and vote of the PAC. The award shall be in the name of the applicant.

9. The applicant must return any unused portion of the scholarship. If the applicant leaves the Association after application, but prior to award, the applicant will no longer be eligible for the Award.

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2001 NEWEA Awards

Congratulations to New Hampshire Operators! NEWEA awards were given out in these categories:

EPA – New England O&M Excellence Award to Lebanon, NH WWTF

EPA – Most Improved Treatment Plant Award to Lisbon, NH WWTF

Terrence Welch of Welch’s Water and Wastewater Services

NEWEA Safety Logo Contest to Thomas I. Hastings, Keene, NH

NEWEA Operator Award to Kathleen Ann Welch of Welch’s Water and Wastewater Services

Alfred E. Peloquin Award to Joseph M. Ducharme, Jr., Turner Group

E. Sherman Chase Award to John J. Jackman, Somersworth, NH

William D. Hatfield Award to Mark Bernier, Nashua, NH

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Tibdits

☞ To drill stainless steel, use “low speed and heavy feed (high pressure)” – a drill press probably needed for the pressure.

☞ Cast iron drills like a piece of cake! Try it.

☞ Have PRVs (pressure regulating valves) on your booster system? They probably have internal screens. Try replacing the internal screens with external units along with a valve and blow down line. Open the valve occasionally to blow out the sediment and clean the screens. No more creeping pressure changes. No more hassle of pulling apart copper tubing fittings to get at the internal screens. (I suppose this could be longer and pictures would help).

☞ The key to preventing accidents (attached) actually took a long time.

— Harvey
Hydrogen Sulfide Odor Control in Wastewater Collection Systems

by Peter Churchill, Town of Bedford, MA
David M. Elmer, P.E., Weston & Sampson Engineers, Inc.

The Town of Bedford had been receiving complaints about odors coming from the sewer system in neighborhoods downstream of their Middlesex Turnpike Pumping Station. The odor complaints initiated an investigation of the sanitary collection system upstream of the neighborhoods. The layout of the collection system indicated two potential problem areas. The Middlesex Turnpike Pumping Station pumped sewerage through a 2,500-foot force main, which eventually fed a 21-inch reinforced concrete pipe with a very shallow slope. Both of these areas had the potential to produce hydrogen sulfide (H₂S). The odor that was coming from the sewer system was not only a nuisance to residents in the area but also a potential threat to the structural integrity of the sewer infrastructure. Bedford decided to install atmospheric hydrogen sulfide meters to further assess the problem.

Project Area

The Middlesex Turnpike Pumping Station collects domestic wastewater from 5,300 linear feet of gravity sewer. A substantial portion of the station flow is generated during normal work hours (8:00 a.m. to 5:00 p.m., Monday through Friday). The service area of the station is populated with numerous office parks and one major hotel/conference center with substantial dining facilities. Most of the office parks also have on-site cafeterias for their staff, which contribute to the organic load. Biochemical Oxygen Demand (BOD) in this area is strong, ranging from 300 to 320 mg/l. Soluble BOD ranged from 71 to 150 mg/l.

The Middlesex Turnpike Pumping Station has a 2,500-foot 8-inch force main which carries flow to the gravity sewer on Crosby Drive and has detention times as high as 90 minutes. The force main is the primary source of H₂S production. The gravity sewer on Crosby Drive feeds a 21-inch reinforced concrete pipe with a minimal slope on Route 62. The slow moving flow in this pipe creates another area for sulfide production. At the intersection of Route 62 and Hemlock Lane, there is a manhole with a 4-foot hydraulic drop. This location releases the highest concentration of H₂S into the atmosphere (81 ppm) and is the source of many odor complaints.

Atmospheric Hydrogen Sulfide Monitoring

The Massachusetts Water Resource Authority Community Assistance Program was utilized to install atmospheric hydrogen sulfide (H₂S) meters in three locations downstream of the Middlesex Turnpike Pumping Station suspected of having the highest H₂S concentrations. The force main discharge manhole on Crosby Drive (meter 1), the manhole at the intersection of Crosby Drive and Route 62 (meter 2), and the drop manhole at the intersection of Route 62 and Hemlock Lane (meter 3) were chosen because they had turbulent flow conditions conducive to the release of sulfides to the atmosphere. The locations of the meters are shown in Figure 1. Peak atmospheric H₂S readings at these sites were recorded at 81 ppm, 36 ppm, and 80 ppm, respectively. H₂S levels in this range cause odor problems, health risks to collective system operators, and can deteriorate the structural integrity of sewer infrastructure. The results of the monitoring program showed that corrective measures needed to be taken to eliminate residential complaints and protect the sewer system.

In response to odor complaints, the town used 25% Sodium Hydroxide to 'shock the force main' in an attempt to arrest the production of H₂S. This technique successfully decreased the atmospheric H₂S concentrations at meter #1 by killing sulfate reducing bacteria in the force main. However, the effect of the sodium hydroxide was ephemeral, and concentrations quickly returned to previous levels as shown in Figure 2. A longer lasting more effective method of controlling sulfides was required for this collection system.

Hydrogen Sulfide Production

Hydrogen Sulfide in collection systems is produced when bacteria consume sulfate oxygen for organic processes. Sulfate reducing bacteria grow in a "slime layer" that coats the wetted perimeter of the sewer. These bacteria utilize oxygen in the most readily available form. Elemental oxygen is used first, then nitrate oxygen, and then sulfate oxygen. In normal wastewater after elemental oxygen is depleted, bacteria will consume sulfate oxygen (nitrate is not a normal compo
ment of wastewater) leaving bi-sulfide ions to combine with hydrogen to form aqueous H₂S. These reactions are illustrated in Figure 3. At pH 7 the bi-sulfide ion and aqueous H₂S, in solution, are in equal proportions. The rate at which aqueous H₂S is converted to atmospheric H₂S is governed by pH, Henry’s Law, and the turbulence of the waste stream. A lower pH forces more aqueous H₂S to be formed and increases the rate of H₂S transfer to the gas phase. Turbulent wastewater also facilitates the release of H₂S to the atmosphere.

As H₂S is released into the sewer atmosphere it combines with water on the crown of the pipe to form Sulfuric Acid (H₂SO₄). This reaction is shown in Figure 3. H₂SO₄ is responsible for the corrosion of the sewer infrastructure and was one of the primary reasons to stop H₂S production in the collection system.

The dissolved oxygen in the waste decreased as the flow was pumped through the force main. The elemental oxygen was consumed and the bacteria began to utilize alternate sources of oxygen. Prior to the implementation of the pilot program, that source of oxygen was in the form of sulfate. Nitrate, even though preferred by the bacteria as an oxygen source, is rarely found in raw wastewater. During the study, we introduced calcium nitrate at the wet well for use as an oxygen source to avoid the reduction of sulfate, which is the first step in sulfide production.

Calcium Nitrate

We contacted an agricultural supply house and found that there were several nitrate-based chemicals that could be purchased. Table 1 shows a list of nitrate chemicals commonly available. Calcium nitrate was selected because of its low price and ease of handling.

<table>
<thead>
<tr>
<th>Product</th>
<th>Cost per Ton</th>
<th>Cost per Pound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrate of Soda</td>
<td>$366</td>
<td>$0.183</td>
</tr>
<tr>
<td>Potassium Nitrate</td>
<td>$646</td>
<td>$0.323</td>
</tr>
<tr>
<td>Calcium Nitrate</td>
<td>$312</td>
<td>$0.156</td>
</tr>
</tbody>
</table>

A series of bench tests were conducted to evaluate the nitrate concentrations of various mixtures of calcium nitrate and water. As indicated in Table 2, it was determined that two pounds of calcium nitrate and one gallon of water would yield a concentration of 140,000 mg/l of nitrate. By adjusting the pounds of dry chemical to water in the use tank, we could increase or decrease the nitrate level to the desired concentration.

<table>
<thead>
<tr>
<th>CaNO₃ (grams/200 ml)</th>
<th>Lab Concentration Nitrate (mg/l)</th>
<th>Pounds of CaNO₃ (needed for 1 gal.)</th>
<th>Cost of CaNO₃ ($/lb.)</th>
<th>Cost of CaNO₃ ($/gallon)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>-</td>
<td>$0.15</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>34,000</td>
<td>0.417</td>
<td>$0.15</td>
<td>$0.06</td>
</tr>
<tr>
<td>20</td>
<td>60,000</td>
<td>0.837</td>
<td>$0.15</td>
<td>$0.13</td>
</tr>
<tr>
<td>50</td>
<td>140,000</td>
<td>2.406</td>
<td>$0.15</td>
<td>$0.31</td>
</tr>
<tr>
<td>297*</td>
<td>440,000</td>
<td>12,391</td>
<td>$0.15</td>
<td>$1.86</td>
</tr>
</tbody>
</table>

* Grams of calcium nitrate at saturation

The chemical feed tank at the Middlesex Turnpike Pumping Station would use approximately 622 pounds of calcium nitrate dissolved in 298 gallons of water to discharge 45 gpd of solution with a nitrate concentration of 140,000 mg/l. This chemical solution would cost about $93 to make, would last for 6.5 days, and significantly decreased atmospheric H₂S concentrations in the collection system.

Odor Control

Sulfide odors can be controlled by manipulating the environment used by the bacteria to support their growth. For the purpose of our study, we used calcium nitrate to control odors in the force main. Nitrate is added as a supplemental source of oxygen that bacteria can utilize for the metabolism of organic matter. Bacteria will utilize oxygen in the following fashion: elemental oxygen first, nitrate second, and sulfate last. During the study, we found that the dissolved oxygen concentration in the Middlesex Station wet well averaged 4.4 mg/l. This aerobic wastewater was pumped through the force main each time the pumping station was activated.

Pilot Program

Our pilot study involved the use of a metal shed to house the equipment. A chemical pump (LMI) was used to regulate the gallons of chemical discharged each day. A 376-gallon plastic tank to hold the chemical and a ½ HP mixer were
used to dissolve the dry product. All the work to wire up the station for power and provide water was conducted by Department of Public Works staff.

Four atmospheric H₂S meters were installed at the Middlesex Turnpike Pumping Station, the forcemain discharge manhole on Crosby Drive, the manhole at the intersection of Crosby Drive and Route 62, and the drop manhole at the intersection of Route 62 and Hemlock Lane to monitor the results of the pilot program. These monitors took readings in 5-minute increments throughout the project. Grab samples were also collected from the monitoring site to supplement the atmospheric data. Two grab samples were taken at each of the monitoring locations to establish baseline data, and additional samples were taken each time the calcium nitrate concentration of feed rate was adjusted.

The amount of nitrate oxygen being introduced to the wet well was controlled by two factors, the concentration of the calcium nitrate solution and feed rate of the pump. The chemical concentration varied between 140,000 mg/l and 350,000 mg/l of nitrate. A concentration of 140,000 mg/l of nitrate was found to be the easiest to administer and the most cost-effective for controlling odors. The chemical feed rate varied from 35 gpd to 67 gpd. The best results were obtained when the feed rate was between 45 gpd and 60 gpd.

Results

Two points during the pilot program clearly illustrate the effectiveness of the treatment system. The first occurred at the beginning of the pilot program when the chemical feed system was turned on. During the eleven days prior to the system start-up, atmospheric H₂S levels were recorded as high as 68 ppm at the force main discharge manhole. On May 11, 1998 the pilot tank was turned on and the atmospheric level decreased to zero ppm over the next three days, as seen in Figure 4.

Figure 4 – Chemical Feed Start

The H₂S monitors recorded levels less than 6 ppm through June 23, when they were removed (monitors were also removed from June 3 to June 9). The second illustration of the program’s effectiveness occurred on August 14. The atmospheric monitors were reinstalled on August 11 but the pilot tank was not restarted until August 14. Figure 5 shows the atmospheric H₂S readings prior to pilot tank operation as high as 34 ppm at the force main discharge manhole and then decreasing to zero in three days after the chemical feed tank was restarted.

Calcium nitrate was less effective in reducing the atmospheric H₂S concentrations further downstream at the intersection of Crosby Drive and Route 62 and at the Hemlock Lane drop manhole. However, a noticeable decrease in H₂S concentrations can be seen at each location. Peak readings were reduced from 36 ppm to 25 ppm at Crosby Drive and Route 62 and from 80 ppm to 32 ppm at Hemlock Lane. An additional chemical feed station could be installed at Crosby Drive and Route 62 to control the release of sulfides in this section of the collection system.

Conclusions

There are many approaches to dealing with hydrogen sulfide odors. One broad approach is to change the environment where the bacteria live. We chose to change the environment using nitrate, which the bacteria will seek out as an oxygen source before utilizing sulfate, breaking the sulfide production chain. Multiple dosing stations may be required to accomplish this task, depending on the configuration of the collection system.

Nitrate addition provides an easy, cost-effective way to control Hydrogen Sulfide odors in collection systems. Bedford’s pilot program cost the town under $1,000 to implement and effectively eliminated odor complaints, arrested the corrosion of the sewer infrastructure, and provided a safer work environment for collection system operators.

If you would like additional information regarding Hydrogen Sulfide Odor Control please contact David M. Elmer, P.E. at (603) 431-3937 or Peter Churchill at (781) 275-7605.

References

Wastewater Specialists for 19 Years

- Wastewater Facilities Audits & Evaluations
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NPDES Storm Water Phase 2 Requirements and POTWs

by Jack Healey, EPA

The Federal Water Pollution Control Act of 1972 was passed to control or abate the discharge of pollutants to the water of the United States. However, polluted storm water discharges from some sources remain largely uncontrolled. For this reason, the Water Quality Act of 1987 established a two-phase approach to addressing storm water discharges.

Phase 1 of the NPDES storm water program, which became effective in 1990, requires permits for municipal separate storm water systems (MS4s) serving communities with populations over 100,000 for storm water discharges associated with industrial activity, and for construction activities disturbing at least five acres of land. These permits require the implementation of storm water management plans and programs to protect and improve water quality.

Phase 2 of the storm water program became effective on February 7, 2001 and addresses storm water discharges from small MS4s, construction projects disturbing one to five acres and municipal “industrial” operations. Municipal “industrial” operations include certain POTWs, highway maintenance garages, municipal school bus maintenance facilities, and mass transit maintenance facilities. Phase 2 affects POTWs with a minimum design flow of 1.0 million gallons per day, or those that are required to have an approved pretreatment program. Only facilities that have storm water discharges to a municipal storm sewer or to waters of the United States are required to seek permit coverage.

By March 10, 2003, POTWs affected by this rule must obtain permit coverage for the facility and comply with its requirements. EPA has developed a Multi-Sector General Permit (MSGP) which covers all POTWs, as well as other industrial groups. Facilities seeking coverage by the MSGP must send a Notice of Intent form to EPA requesting coverage. The MSGP will be mailed to the facility within a month.

The main requirement of the MSGP is that the facility develops and implements a Storm Water Pollution Prevention Plan (SWPPP). In general, a SWPPP includes a map showing all the industrial operations, the drainage system, storage of chemicals and wastes, and receiving waters or sewers. The SWPPP also includes an inspection schedule, employee training, and methods used to minimize exposing materials to storm water.

For POTWs, the specific areas of concern are:
- Grit, screenings, and other solids handling;
- Storage or disposal areas;
- Sludge drying beds;
- Dried sludge piles;
- Compost piles;
- Septage or hauled waste receiving station;
- Equipment and vehicle washwater; and
- Access roads or rail lines.

Some Good News
For facilities that keep all their materials and activities from being exposed to precipitation, there is the “No Exposure” provision of the Phase 2 rules. The intent of the No Exposure provision is to provide facilities regulated by Phase 2, whose industrial activities and materials are completely sheltered, with a simplified way of complying with the Clean Water Act. If your facility meets the No Exposure criteria, then a permit is not required for storm water discharges from the facility. To take advantage of the No Exposure exclusion a facility must submit certification to EPA indicating that materials and activities at the facility are not exposed to precipitation. Facilities must maintain their condition of No Exposure, or if conditions change, obtain coverage under the Multi-Sector General Permit.

What Are My Choices?
Some facilities are farther along than others in developing a SWPPP. For instance, if a facility already has a spill prevention or emergency preparedness plan, that information will contribute toward developing a SWPPP. Facilities that have most of their operations inside or sheltered will have fewer areas to consider when preparing the SWPPP. For facilities where many activities are outside and unsheltered, and have no site and drainage map, there is considerable work to be done. Although POTWs have until March 10, 2003 to obtain coverage under the Multi-Sector General Permit, the facility must also implement the SWPPP by March 10, 2003. Alternatively, if a POTW wants to qualify for the No Exposure provision, they must shelter all operations and materials from precipitation and submit the No Exposure certification by March 10, 2003.

What Can I Do Now?
A lot of information is available on EPA’s storm water program. Start by reading EPA’s fact sheets to increase your awareness about the storm water program (www.epa.gov/owm/sw). You can also find details on the MSGP on EPA’s website, including the requirements for a Storm Water Pollution Prevention Plan. EPA and the NHDES expect to hold one or two workshops on storm water planning later this year. Check EPA and DES’s websites for dates and locations. The NHDES website is at www.des.state.nh.us.

For More Information
Contact Jeff Andrews, NHDES, at (603) 271-2984, or Thelma Hamilton, EPA, at (617) 918-1615, or Jack Healey, EPA, at (617) 918-1844.

Joseph P. Damour
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Selling an Energy Project to Management

by Steven Bolles, Energy Services Manager
Woodward & Curran, Auburn, NH • sbolles@woodwardcurran.com

All of us have been there. We attend training workshops or read an article on reducing energy use and get some great ideas to reduce energy at our facilities by installing variable speed drives, improving equipment controls, adjusting processes to reduce peak demand, reducing fan speeds, or building temperatures during the evening hours.

So you take the initiative and do some data collection, savings calculations, and obtain cost estimates from equipment vendors or contractors. You figure you have a winner at a 2-year simple payback and will get a round of applause at the next management meeting.

What happens next is typical at many facilities.

After your presentation, the operations manager indicates that the proposed new energy-saving equipment will burden his group with the need to learn new technology and could affect system reliability. The maintenance manager adds that he heard that a similar project has caused all sorts of problems at the facility down the road and was a maintenance nightmare. Another manager points out that they may change the process in the future and would rather wait until this issue gets resolved before proceeding. He also mentions that this project is not in the capital budget this year.

What went wrong?

Developing successful energy projects begins with laying the groundwork needed for supporting the project. Ideally, it starts with a facility reward program that has a system for pursuing cost savings projects and compensates employees for their efforts. However, most of the time “laying the groundwork” is accomplished by a motivated individual who takes pride in his job and is inspired by what other facilities have done. To overcome the obstacles that are often encountered, the following “pre-presentation tasks” are recommended to increase your success rate.

1. Get support from a key member of management before you begin pursuing energy projects

The most successful facility energy evaluation/projects begins with a commitment from management that reducing energy is something they are serious about and are willing to invest time and resources to make it happen. This is why, despite “free” utility energy audits, great energy-saving projects often sit on the shelf since management may have never been committed or motivated to pursue them in the first place. It may seem obvious that some of these projects should be pursued immediately, but without some incentive or recognition, the extra work and added responsibility may not be worth it to some individuals.

Support from management should also include defining an acceptable cost/benefit ratio and identifying sources to fund the project. Ultimately, financial parameters to evaluate larger projects using a life cycle cost analysis should also be reviewed.

2. As projects are considered, include key department staff personnel for their input before presenting to management

Often discussing the projects with key maintenance or operations staff provides insight into issues that can be resolved early by modifying the project to accommodate concerns or to include features that will help solve their existing problems. Case studies can be used to show staff how similar projects were successfully implemented and to help them reach a comfort level needed to accept new technology, or even better, to enthusiastically support the project.

3. Begin with simple projects to increase your chance of success

Having several small “low-tech” projects that show measurable savings is extremely important to build management confidence in cost-saving projects. One of management’s greatest fears is having “egg on their face” after approving an expensive energy saving project that does not deliver the savings anticipated. This is especially important when considering new technologies. Facilities that have started with small energy-saving projects that have measurable results have found themselves in the enviable position of getting fast approval for future cost-saving projects.

4. Bring in outside support to validate your recommendation

I often am asked to do an energy analysis for a specific process at a facility. The operator brings me over to the system, describes what needs to be done to reduce energy use, and provides me with the data needed to calculate the savings and estimate costs. Without even asking, it is clear that he needs me to validate his idea or just fill in a few missing details to sell the project to management. Technical or financial assistance is available through electric utility programs or equipment suppliers. It is surprising how many times a project is pursued without contacting the local utility to determine what potential financial incentives are available that can help improve project cost effectiveness. Using DOE Best Practices program software such as Motor Master and Pumping System Assessment Tool (PSAT) can also help provide support for savings calculations.

5. Plan for the unexpected

The critical components used to measure success immediately after project implementation include a review of project costs and the initial savings measurement. It is interesting

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<table>
<thead>
<tr>
<th>Date</th>
<th>Course Name</th>
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<tr>
<td>MARCH 27</td>
<td>Performance Management</td>
<td>Register with NEIWPCC</td>
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<td>MARCH 28</td>
<td>Basic Global Positioning/Geographic Information Systems (Class size limited to 20)</td>
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<td>APRIL 4</td>
<td>Basic Activated Sludge</td>
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<td>APRIL 5</td>
<td>NHWPCA Annual Trade Fair</td>
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<td>APRIL 11</td>
<td>DMRs and Reporting Requirements</td>
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<td>APRIL 18</td>
<td>Whole Effluent Toxicity Testing (Class size limited to 20; second session will be held on April 19 if necessary)</td>
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<td>APRIL 25</td>
<td>Design, Installation and Maintenance of Electric Motors</td>
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<td>Flow Metering</td>
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<td>MAY 8 &amp; 9</td>
<td>Advanced Process Control for Activated Sludge</td>
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<td>MAY 16</td>
<td>Chemical Usage in Wastewater Treatment</td>
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<td>MAY 17</td>
<td>Grades 3 and 4 Math Review/ Practice Exam</td>
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<td>MAY 22</td>
<td>Introduction to Collection Systems</td>
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<td>Collection System Safety</td>
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<td>MAY 23</td>
<td>NEWEA Collection System Exam</td>
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<td>MAY 24</td>
<td>Hands-On BOD Testing</td>
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<td>MAY 30</td>
<td>Applied Wastewater Math Review</td>
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<td>JUNE 13</td>
<td>CERTIFICATION EXAMS—ALL GRADES</td>
<td>Separate Registration Required</td>
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<td>JUNE 20</td>
<td>Emerging Wet Weather Flow Issues</td>
<td>Register with NEIWPCC</td>
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<tr>
<td>NOTE:</td>
<td>See course description sheet for cost of each class.</td>
<td>NO CASH ACCEPTED!</td>
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to as an energy conservation measure or "ECM." Projects can also be identified as operational measures ("OM") when minimal investment is required, or energy supply measures ("EDM") when cogeneration, or rate schedule changes are pursued. The project profile typically includes a brief description of the project, implementation steps, and a project cost and savings summary. More in-depth calculations, equipment cut sheets, and spreadsheets should also be included or be available for review.

The above steps represent only a sample of what can be done to increase your success rate to move an energy project forward. Additional data collection, financial analysis, developing a performance contract request for proposal, and savings monitoring and verification may also be needed to fully develop a project.

Steve Bolles is an energy consultant with Woodward & Curran in Auburn, NH, and is a Pump System Assessment Tool workshop speaker for the U.S. Department of Energy. He specializes in working with municipalities and industry to reduce energy costs at water and wastewater facilities. This article originally appeared in Energy Matters, a U.S. Department of Energy publication.

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