Our longtime editor of The Collector, Tom White, has retired as editor of the association’s newsletter with his retirement from the Department of Environmental Services this spring. At the annual Trade Fair, President Ed Rushbrook presented a few words in appreciation of Tom White’s contributions to the NHWPCA during his career as a wastewater professional.

First, a little background on Tom: He graduated from Fitchburg State College in 1970 with a BS degree in Education. He taught High School Math and Physics for two years. He began his career in the wastewater field in MA. He earned his MA Class 5 license in March 1976. He worked in MA at the Wareham, Foxboro, Wrentham and Bellingham WWTFs over a period of four years.

Tom and his wife, Nancy, with their two sons then moved to NH in 1976. Tom is one of the elite class of Certified Operators in NH who earned a Grade 5 Operator’s License in March 1977. His NH work experience in the field of wastewater treatment includes twelve years as the senior operator for the Penacook WWTF.

Tom began his career with the State of NH twenty years ago, working in the Wastewater Engineering Bureau’s Operations Section. He has received top honors from US EPA on a number of occasions, and most recently the 2007 State Wastewater On-Site Technical Assistance Provider Award. He is a past-recipient of the New England Water Environment Association’s Alfred E. Peloquin Award. He has earned the professional respect of not only his peers, but most importantly, the WWTF superintendents and operators throughout NH. He believes in sharing the knowledge he gains and has participated regularly in providing training to wastewater operators on a wide variety of topics.

(Continued on page 2)

SUCCESSFUL DAY—Biological Nutrient Removal Seminar

The NHWPCA and NHDES sponsored a one-day BNR seminar with two leading experts in the field. Dr. Clifford Randall and Dr. James Barnard came to the NHDES Auditorium on July 30th to offer an intense one-day seminar on nitrogen and phosphorus removal. Handouts of all the presentation information can be found on the Associations website www.nhwPCA.org on the Education Committee page.
(Continued from page one)

His enthusiasm for teaching the principles of wastewater treatment has extended to the student outreach programs at Great Brook School, Antrim Elementary with Monadnock Paper and the annual Water Fair. Over the span of his career he has been an active member of the NHWPCA. He served as President in 1986. He received the NHWPCA Operator of the Year Award in 1988. He has served on many Committees including Water Week Poster, Certification, Education, Scholarship, and most notably The Collector Newsletter. Tom has served as The Collector’s Writer, Editor, Reporter, Publisher, Marketing Chief, Layout and Designer, you name it he’s done it….for 18 years.

He enjoys spending time outdoors. He enjoys skiing in every form and fashion. He and his wife Nancy are embarking on a new chapter as they relocate to Westport, MA. We all wish you the best of luck and want to express our sincere thanks for your service and contributions to our Association.

**Safety Corner**

**SHOULD YOU TRACK NEAR MISSES**

By Chris Hipkiss

Should you track near misses at your place of employment? That is a good question and if you don’t track near misses why not? A near miss is a warning sign that something is wrong and should be investigated with a corrective action taken. So your boss may not like the term near miss, well one large company I read about, Alcoa, uses the term “Injury-free events (IFEs)” but no matter what it is called it is an advance warning that an accident is waiting to happen. According to the National Safety Council seventy five percent of all accidents are preceded by one or more near misses or in other words a near miss should be a wake-up call.

Some workers may not want to admit to a near miss for fear that it may reflect in their performance evaluation and this is where a good management environment must be developed to encourage the reporting and tracking of near misses and not in laying blame. It should be the responsibility of everyone in the workplace to recognize and take action to prevent that “close call” from reoccurring and becoming an accident.

The following is a list of question taken from a publication “Construction Business Owner” that you should ask when a near miss occurs.

- How do you handle these incidents in your workplace?
- What is your attitude toward a near miss?
- Do you feel momentarily relieved that what happened wasn’t any worse?
- Do you just return to your routine after a near miss occurs?
- Do you simply tell yourself that you should be more careful next time?
- Do you have a plan for preventing a repeat performance?

In closing, the danger in ignoring near misses that do not hurt, harm or damage is that they are a sign that something is wrong. Do you have a near-miss story to share? All story material is anonymous and you can reach me at (603)-934-2809 or e-mail me at chipkiss@des.state.nh.us.
Matters of Perspective (Part 2 – ppm, ppb, and ppt)

By Tim Loftus

In matters of chemical concentration in water, just how much is one part per million (ppm)? How does that compare to parts per billion (ppb) or to parts per trillion (ppt)? To many people, especially non-technical people who read the test results of their drinking water or see references to environmental results in their local newspapers, the ppm, ppb, and ppt units of measurement may not be understood at all. Not only may the math not be understood, but the concepts of these measurements may not be grasped either. This became especially evident to me years ago when someone took the oil from his truck’s backyard oil change and dumped it out in the woods. “How much harm can such a small amount of oil do?” I was asked. A lot, actually.

In the right circumstances, a small amount of oil can contaminate a drinking well from years to almost forever. This is just one example; there are thousands of others. It doesn’t take much of a pollutant to create health or environmental problems, and the levels of concern are usually in a concentration range of ppm or less.

Parts per million, ppb, and ppt can easily be visualized when compared to amount of time.

Parts per million (ppm) is often written as milligrams per liter (mg/L). While these two terms are not absolutely the same by definition, they are frequently used interchangeably in the water and wastewater fields.

One million seconds is about eleven and a half days. Pick one second out of 11 ½ days and that will be 1 ppm. Drinking water limits for copper are usually measured in the ppm range. In Massachusetts, the copper limit for drinking water is 1.3 ppm. If a liter of tap water were 11 ½ days long, and 1.3 seconds of it was copper, then your public water drinking supply would be in violation of a health limit.

Most NPDES permit limits are also measured in ppm. The most common parameters are total suspended solids (TSS), BOD, ammonia-nitrogen, and phosphorus.

Parts per billion (ppb) is often written as micrograms per liter (μg/L). Likewise, ppb and μg/L are often used interchangeably in the water and wastewater fields.

About 32 years contains a billion seconds. Pick one second out of 32 years and that will be 1 ppb. Organic pollutants like MTBE (used years ago as a gasoline additive), trichloroethylene (once widely used as a degreaser), and pesticides residues, are usually measured in the ppb range. Some NPDES permits are starting to get total residual chlorine and metal discharge limits in the ppb range too.

Parts per trillion (ppt), or nanograms per liter (ng/L), is the equivalent of one second out of about thirty-two thousand years. This is the level at which mercury is measured to in some environmental samples.

At levels such as these, it isn’t hard to exceed environmental or health-related limits. Whether it is from oil poured in the woods, copper leaching from household pipes, a leaking underground gas tank, or a pesticide that is washed off bolts of cloth in a textile mill, it doesn’t take much of a pollutant to create a problem.

If you have any questions, suggestions, or comments, contact Tim Loftus at (508) 949-3865 tim-loftus@msn.com, NEWEA Lab Practices Committee Chair Paul Fitzgibbons LIGtrain@cox.net. For more information on the NEWEA Laboratory Practices Committee, please contact Elizabeth Cutone, NEWEA Executive Director, 100 Tower Office Park, Woburn, MA 01801, (781) 939-0908, ecutone@newea.org.

All past articles are posted on our website. Go to www.NEWEA.org and follow the link to the Committee Pages then to the Laboratory Practices page.

Answers to skills builder questions. from page 7

1b, 2d, 3b, 4c, 5c, 6c
NHDES Hosts Stressed Wastewater Treatment Plant Seminars
By Steve Clifton

The New Hampshire Department of Environmental Services hosted a series of seminars for local officials in Littleton, Keene and Concord regarding stressed wastewater treatment facilities last November. A follow-up seminar was held for Municipal Officials and Consultants on April 15th of this year. The seminars provided the public, local officials, municipalities, wastewater operators and consultants an opportunity to hear firsthand, the issues surrounding the complicated nature of planning for the timely expansion of their wastewater treatment facility.

Clearly the title chosen by the NHDES for the seminars said it all - such that it could have been changed it to “Seminar for Local Officials for Communities with Stressed Wastewater Treatment Plant Operators”. The source of the stress was a certified letter sent out in early 2007 to any wastewater facility that was at or near 70% design capacity.

A wastewater treatment plant that is at 70% or greater of it’s design capacity must jump through many hoops in order to assure the regulators that their receiving stream will meet water quality. I attended Concord seminars on November 8, 2007 and April 15, 2008 and here is what I got out of the seminars.

Water Quality – It is all about water quality. Is the receiving stream that you discharge into meeting water quality, will it meet water quality with your discharge and will it meet water quality if you increase your discharge? If you are in an impaired river, expect stringent permit requirements and expect to pay for the evaluation yourself, rather than have the NHDES do the work. Those facilities discharging to the Connecticut River Watershed, Great Bay Watershed and several reaches of the Merrimack River Watershed may want to cry a river, although your tears would not meet water quality due to the high chloride content!

Wastewater Treatment Facility Capacity – Here is where you can make great strides in understanding the issues. Investigate whether your facility has excessive infiltration/inflow and whether it can be reduced; look at where future sewer extensions would go and estimate the associated flow increases; ask whether nitrogen and phosphorus limits will be under your Christmas tree in the future; see if you can hold your mass loadings and get better treatment in order to gain those valuable flow increases to allow more sewer connections.

Planning and Implementing – As our President Ed Rushbrook is known to say from time to time - “Plan your work and work your plan”. The planning for the expansion of your wastewater treatment plant requires engineering reports, design and construction activities, all of which take time to perform. With energy prices hitting everyone hard, new ideas should be considered to reduce your energy needs, reduce your carbon footprint and provide a sustainable project that will offer the best life-cycle costs for the sewer user. All projects that are eligible for State Revolving Loans and State Aid Grants require a qualifications-based engineering selection process, a report phase for determining cost effective alternatives, preparation of design plans and specifications, and a competitive bidding process for selection of a general contractor for construction.

Assistance – The NHDES has been very helpful in identifying the issues associated with your aging facility and the efforts needed to get you through another twenty years of successful operations. Through consultation with the appropriate staff member, you have an opportunity to discuss the future of your facility, what issues you may have to deal with and how you can obtain funding. New Hampshire is one of the very few states that have continued to fund a grant program for eligible wastewater and solid waste projects. I was impressed with the level of effort made by the NHDES to present all aspects of the problem to the public and provide the appropriate staff member to deal with. Kudos to Commissioner Tom Burack, Paul Currier, Paul Heirtzler and Stergios Spanos for a well thought out public outreach program. Now it is up to you to follow up with your individual needs.
Sewer User Rates
by Steve Clifton

Let’s dispense with the formalities right away. None of us are lawyers, accountants or experts in the financial field. We are charged with operating and maintaining our wastewater facilities and advising our Selectmen, Councilors or Board of Trustees on setting user rates that pay the bills. This article and subsequent articles on user rates is for the average wastewater operator only so that we can talk openly and honestly about user rates. So this column will be just for you and me. My intention is to make this column a routine article and maybe answer a few questions you may throw my way as we go along.

Introduction

The NHDES publishes a Residential Sewer User Charge. You probably have received a form in the past from Brad Foster or Beth Malcolm asking to fill out a survey on your user costs. The NHDES uses 12,000 cubic feet per year as a yardstick so that all sewer bills are based on the same amount of flow. Now 12,000 cubic feet of water is 90,000 gallons and adjusted for a daily flow is 246 gallons per day. Some of you may be surprised that most of your residential customers are using only 130 gallons per day. Don’t panic though, I asked Grandpa John how the number came about and he said back in the day, it seemed like a good idea. Grandpa John is getting old and grumpy though.

Anyways, fill out the survey, get some bucks! The survey establishes the average and threshold user rate measurement that sets grant monies for eligible projects. These grants are 20% for most of us and 30% for those lucky enough to be paying greater than 20% more than the state average. Bonus points for higher rates! The latest survey is underway and the one I could put my hands on was from 2006, which had the state average at $468.95 and a threshold of $562.00 for 12,000 cubic feet of water per year.

But I am deviating from my real intent here, and that is to discuss how you generate the revenue. Some bills are a fixed amount sent to each account quarterly, semi-annually or annually. Other bills may have a demand charge based on meter size and a usage charge based on consumption. There are numerous ways to generate revenue and each system is unique. That is why the NHDES survey is a basic question of what would you charge for 12,000 cubic feet of water used per year.

Let’s take a typical user rate that is $60 per quarter. There is no water meter installed at the sewer connections, so a fixed fee is appropriate. If there were 1,000 accounts, you would generate $60,000 per quarter and $240,000 per year. That money would pay for the operation and maintenance of the plant and collection system and also the debt service on any money the sewer department has borrowed.

Now consider a fairly large system that has both water and sewer utilities. The water system bills out water at a demand charge based on water meter size and a usage charge based on consumption. Since the water system reads all the water meters monthly, the data is available for the sewer bills. The bill may be a combination of water and sewer and the bill may go out monthly or quarterly. Now you have a demand charge based on meter size and a usage charge to generate the revenue you need to operate and maintain the sewerage system. The demand charge is usually set so that the typical residential water meter is the base cost and the larger meters pay a proportionally large amount based on the flow ratio of the larger meter to the residential meter. I believe that the demand charges should pay for the fixed costs of the sewer system and the usage fee should cover the variable costs. There are big arguments about what are fixed costs, so I welcome your input on this question. I think that it is fairly typical to have approximately 1/3 of the revenue generated from demand charges and 2/3 of the revenue generated from usage based charges. My bottom line is that the operation and maintenance charges must be based on actual strength and volume, no subsidies allowed. Put everyone into user classes and charge by user class!

Well, I am out of space, so I should wrap it up for now. I have several ideas to include in this column: System development charges for new or improved user connections, cost of service calculations, borrowing money to pay for capital projects, grants, industrial user rate recovery, miscellaneous fees and surcharges for high strength wastewater. Send me an email on what you want addressed first. Keep a look out for the Sewer User Rate articles in future issues of The Collector, and say high to Grandpa John when you see him.
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<th>Date</th>
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<td>GSRWA’s Operator Field Day &amp; Exhibit Show at Mount Sunapee, Newbury, NH</td>
<td>Register with Granite State Rural Water</td>
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<td>Sept 17</td>
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<td>Sept 24</td>
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<td>Oct 1 AM</td>
<td>Laboratory Practices Review</td>
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<td>Oct 1 PM</td>
<td>Laboratory Practices Exam- Register with NEWEA</td>
<td>Separate Registration Form Enclosed</td>
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<td>NHWPCA Fall Meeting in Franklin at WRBP</td>
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<td>Oct 14-17</td>
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<td>Dec 3</td>
<td>NEIWPCC PVC Valves, Connections &amp; Joining</td>
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<td>Dec 10</td>
<td>CERTIFICATION EXAMS—ALL GRADES</td>
<td>Separate Mailing &amp; Registration Required</td>
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NOTE: See course description sheet for cost of each class. NO CASH ACCEPTED!

This form and the course description are available on line at www.des.nh.gov/wwe/training.htm

**Except where noted Make checks payable to: TREASURER-STATE OF NEW HAMPSHIRE
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The 19th annual NHWPCA Golf Tournament was held on August 7th at the historical Beaver Meadows Golf Course in Concord. The Association was happy to support the City of Concord’s 100 year old municipal course. In return, we were treated to a beautifully manicured course, exceptional services from all their hardworking staff, and a delicious meal both before, and after, our tournament.

We had the largest turnout in the tournament's history as 100 wastewater professionals descended on the course for a beautiful day of golf, laughs, and fellowship. Twenty five teams battled it out over 18 challenging holes and ultimately Vitalaic/Methuen Construction triumphed winning the tournament by a whopping four strokes, Wright-Pierce grabbed second place honors, and CDM finished a strong third. Awards were also presented for closest-to-the-pin, longest drive, straightest drive, and team putting.

Through the generosity of our sponsors, we were able to provide a raffle prize to all participants. As usual, our master of ceremonies George Neill provided a hilarious monologue lampooning all participants as we distributed the prizes. In addition, we had a special raffle that included tickets to the Patriots, Red Sox, and Bruins. As a result of our large turnout, we were able to make a substantial contribution to New Hampshire's Ops Challenge team and NHWPCA's scholarship fund from the proceeds of the tournament. We will be returning to the historic Beaver Meadows Golf Course next year for our 20th annual tournament on Thursday August 6th, be sure to mark it on your calendars.

Lastly, we would like to thank our sponsors for their extremely generous support of our tournament. They are the ones that make the tour-

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### Skills Builder Questions from the WEF web-site:

1) A “dewatering beach” is a component of a(n) __________.
   a. anaerobic digester, b. centrifuge, c. belt filter press, d. aeration basin

2) Reasons for flow equalization include all of the following, EXCEPT __________.
   a. BOD load fluctuation control, b. flow variation damping c. pH variation damping, d. temperature fluctuation control

3) For preventive maintenance of a comminutor, how often should the channel be drained and the unit cleaned?
   a. weekly b. monthly, c. daily, d. annually

4) Predominance of free-swimming ciliates and flagellates in activated sludge indicate?
   a. Low F/M, Low SRT, b. High F/M, Low SRT, c. Low F/M, High SRT, d. High F/M, High SRT

5) Which of the following is a sign your trickling filter is organically overloaded and hydraulically underloaded?
   a. bulking, b. snails, moss, and roaches, c. ponding, d. filter flies

6) A flow of 3700 gpd of sludge is pumped to a 37 000 cu ft digester. The solids concentration of the sludge is 6% with a volatile solids concentration of 75%. If the digester reduces volatile solids by 55%, how many lbs/day volatile solids are destroyed per cu ft of digester capacity. Assume the sludge weighs 8.34 lbs/gal. Round to the nearest hundredth.
   a. 0.06 lbs VS destroyed/cu ft, b. 0.1 lbs VS destroyed/cu ft, c. 0.02 lbs VS destroyed/cu ft, d. 0.04 lbs VS destroyed/cu ft
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