2007 NHWPCA TRADE SHOW ISSUE
NHWPCA President’s Address

Well, here we are -- The 40th anniversary of NHWPCA. First, let me say how proud and honored I am to serve as your President for this banner year. The past five years have been a great experience for me. Serving three years as a Director and one year as Vice President, I've seen first-hand what it takes to organize and coordinate the training and annual events that we, as operators, get to participate in and enjoy. The Board of Directors is a dedicated group of wastewater professionals that strive for the very best for this organization and it’s members. My goals for this year are to keep the committees active through Director involvement, add a special event to celebrate the Association’s 40th anniversary, and continue to provide communication, leadership and organization to the Membership.

Our committees support the Membership through involvement. Each committee continues to meet on a regular basis and the Director liaison reports back to the board of directors at our monthly meetings. This year’s committees and Director liaisons are:

**Activities – Rick Seymour**

Communications/Newsletter – Steve Clifton
Education – George Neill
Legislative & Regulatory Affairs – Kevin MacLean
Membership – Mike Sullivan
Safety – Gerry Curran
Scholarship – Sean Greig
Ops Challenge – Ed Rushbrook

If any member is interested in joining a committee or wants more information, please contact a Director or me.

The E-news has been instrumental in disseminating information to the Membership quickly and accurately. Through efforts of the Communication Committee, members are able to stay up to date with Association happenings between formal meetings. Please keep your eyes on your Email inbox for your E-news – and contact me if we do not have your Email address!

One event that has been announced through the E-news is the Legislative Breakfast being co-sponsored with the New England Water Environment Association, slated for early March. We have invited all 424 NH Legislators to a breakfast presentation to describe wastewater, the history of wastewater treatment, what we as wastewater professionals actually DO - as well as discuss septage and biosolids issues, which concern every person in our state.

Coordination of this event has taken considerable time and effort. I would like to thank Rick Seymour for his work on this project, as well as all the other participants who were involved in organizing this very important event.

In closing, I would like to thank all of you for this opportunity to serve as your President for 2007. If anyone has any questions, comments, or suggestions regarding the Association, please feel free to contact me at 603-516-6475 or by e-mail at r.vermette@ci.dover.nh.us

Sincerely,

Raymond Vermette
2007 NHWPCA President

Three Egyptian Amigos:
LtoR Nancy McAuley Lesieur, Mario Leclerc, Gerry Ciardelli performing YOGA at the Nashua WWTF—OHMMM.
New Hampshire WWTF Open Doors for Tours

On March 9th twenty one WWTF opened up their plants for tours to hopefully educate our Legislatures and any others about wastewater treatment plants and issues around them.

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Call for Crystal Crucible (C\(^2\)) Society Nominations

The Crystal Crucible (C\(^2\)) Society recognizes and honors individuals for their outstanding contributions that promote professionalism in the wastewater laboratory field. Nominees are not required to be NEWEA members, nor are the people who nominate them. Examples of outstanding contributions are significant participation in wastewater-related analyses, education, training, safety, certification, management, and planning.

If you know of someone who you think should be honored for their contributions to the wastewater laboratory field, why not nominate them for the Crystal Crucible (C\(^2\)) Society? Nomination forms and further information can be obtained from LPC Chair Tim Loftus at (508) 949-3865, TimLoftus@msn.com or the NEWEA office at (781) 939-0908, mail@newea.org, 100 Tower Office Park, Suite K, Woburn, MA 01801. The nomination form and Society membership requirements can also be downloaded from NEWEA’s website www.newea.org. Follow the links to “NEWEA Comm” then to “Lab Practices.”

Please submit nominations by June 1, 2007.

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Broken-Down Pumps

Tim Loftus

The North Dump and Klump Wastewater Treatment Facility is badly in need of an upgrade. The raw wastewater pumps barely work and are often in need of repair. Like clockwork, the three pumps regularly break down. Raw pump #1 breaks down every five days. Raw pump #2 breaks down every four days. Raw pump #3 breaks down every three days. Most of the time they have at least one of these pumps working. However, every so often all three pumps are out of commission at the same time and the operators must rent a portable pump. Can you determine every how many days the operators need to rent a portable pump?

Answer: Every sixty days. That is the lowest common multiple of 5, 4, and 3.

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WEF Laboratory Analyst Excellence Award

The NEWEA Laboratory Practices Committee is seeking nominations for the Laboratory Analyst Excellence Award. This award is given annually to one individual for outstanding performance, professionalism and contributions to the water-quality analysis profession. The nominee must be actively employed at an educational facility laboratory, industrial, commercial or municipal laboratory which performs wastewater-related analyses, and must have direct analytical responsibilities. The nominee must also be a member of the Water Environment Federation.

Nominations must be submitted in writing by June 1, 2007. For further information and to obtain nomination forms, contact LPC Chair Tim Loftus at (508) 949-3865 timloftus@msn.com, the NEWEA office at (781) 939-0908, mail@newea.org, 100 Tower Office Park, Suite K, Woburn, MA 01801. Nomination requirements and forms may also be downloaded from the NEWEA website www.newea.org. Follow the links to “NEWEA Comm” then to “Lab Practices.”
New England Water Environment Association
Edward A. Kowcz Memorial Scholarship
(established 1970)
Application

Name: ____________________________
Address: ____________________________

Membership Information
NEWEA Membership #: ____________________________
Type of Membership (check one): □ Active □ PWO □ Student
State Association Membership (circle all that apply): CT MA ME NH RI VT
Date of Membership: ____________________________

Employment/Certification Information
Current Employer: ____________________________
Supervisor: ____________________________
Address: ____________________________
Telephone: ____________________________
Position/Title: ____________________________
Status (check one): □ Operations □ Maintenance □ Laboratory □ Other
Brief Description of Duties: ____________________________

Training Program Information
Name of training program for which scholarship will be used: ____________________________
Are you in a position to provide or share required information to others? □ Yes □ No
If yes, indicate Type: ____________________________
Grade: ____________________________
Are you certified? □ Yes □ No
wastewater laboratory analyst
collection

Estimated Cost of Training
Tuition _______ Mail to: NEWEA
Room & Board _______ 100 Tower Office Park
Travel _______ Suite K
Total _______ Woburn, MA 01801
Phone: 781/939-9008
Fax: 781/939-0907
email: mail@newea.org

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

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 that routinely provide training and/or technical assistance to wastewater personnel.

Must make application for the scholarship to the Scholarship 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).

Must submit application to the Scholarship Committee via the Executive Director. The Executive Director will confirm applicant’s membership in NEWEA for the minimum two years.

A scholarship sub-committee consisting of at least 3 members of the Scholarship Committee 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 as #1 above. The recommendation shall be made to the full Scholarship Committee at the Winter and Spring NEWEA meetings.

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

At the Winter and Spring meetings, the full Scholarship Committee will vote on the recommendations of the sub-committee. Awards will not exceed $300.00 per application. The $300.00 award cap may be waived based on availability of funds and by vote of the Scholarship Committee.

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

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.
Making Normal Solutions from Concentrated Acids

by Tim Loftus

The last article covered the concept of Normal solutions in the laboratory and how to calculate the equivalent mass of a compound. Then I described how to use the equivalent mass to make a solution of a predetermined Normality. However, the article did not address making Normal solutions from concentrated mineral acids like sulfuric acid, nitric acid, and hydrochloric acid. Unlike using powdered chemicals where the chemical is simply weighed out then diluted to volume, the use of liquid chemicals to make Normal solutions requires the addition of a few more calculations. This article will address these extra calculations.

First, it is important to describe a few aspects of concentrated mineral acids (as well as that of many other solutions). Most of us buy concentrated acids to use as stock solutions in the laboratory. None of these acids are one hundred percent pure. Sulfuric acid is only about 97% pure, nitric is about 69.5%, and hydrochloric acid is about 37.5% pure. Manufacturers of these acids simply cannot economically make these acids more concentrated than these respective percentages.

Another important aspect of these solutions is their specific gravities. The specific gravity of a liquid is, in most cases, synonymous with the more familiar term of density. Water has a specific gravity of 1. If the specific gravity of a liquid is greater than 1, then the liquid is heavier than water. Less than 1, and the liquid is lighter than water. The specific gravity for concentrated sulfuric acid is about 1.84, or 1.84 times heavier than an equal volume of water. The specific gravity of concentrated nitric acid is about 1.42 and that of concentrated hydrochloric acid is about 1.19.

Both the percent concentration and specific gravity values of the acid are required to determine the amount of concentrated acid needed when making a Normal solution. This information is usually printed on a label attached to the bottle of acid. Specific values vary depending on the manufacturer and lot of acid.

To make a solution of a predetermined Normality, you must first determine the equivalent mass of the chemical and then determine the grams needed of that chemical. These calculations were described in the last article, “Normality.” Then you must convert the number of grams into its volume equivalent. Once this volume is determined, it is a simple dilution after that.

Here is an example:

You want to make only 250 mL of a 1 N H₂SO₄ solution that will be used to adjust the pH of BOD samples prior to analysis. How many milliliters of concentrated sulfuric acid do you need to make 250 mL of a 1 N solution?

To determine how many grams of sulfuric acid you will need, you will first need to calculate the equivalent mass of H₂SO₄. This is the gram-formula weight divided by the number of acid hydrogens in the compound. It is 98/2 = 49.

Then you can calculate the amount of grams of H₂SO₄ that are needed.

The formula to calculate this is:

Grams of compound needed = (N desired)(equivalent mass)(volume in liters desired).

Substituting the above numbers into the equation, we get:

grams of compound needed = (1 N)(49)(0.250 liters) = 12.25 grams.

A 1 N solution requires 12.25 g of a pure sulfuric acid powder (if one existed) diluted to 250 mL. But the acid is a liquid and it is not one hundred percent pure active sulfuric acid. You will need to calculate what volume of the concentrated acid that contains 12.25 grams of sulfuric acid. The formula for this is:

Volume of concentrated acid needed = (grams of acid needed)/(percent concentration x specific gravity)

Continuing with the sulfuric acid example, plug into the formula the percent concentration and specific gravity from the label on the acid container. For this example, I am using those values previously mentioned in this article: volume of concentrated acid needed = (12.25 grams)/(0.97 x 1.84) = 6.9 mL

If you took 6.9 mL of concentrated sulfuric acid and diluted it to 250 mL, you would have a 1 N H₂SO₄ solution.

(Cont. on pg.)

Normal Solutions (Continued)

Important note: Always add the acid (or base) to water, in that order. Pour slowly with constant mixing. This will help prevent rapid heat generation and spattering of the mixture. Fill a container about half way or more with distilled water, add the acid, and then bring up to volume with more water. In the example above, fill a flask with about 150 mL or more with distilled water, add 6.9 mL of concentrated sulfuric acid, then continue to dilute with water to the 250 mL mark.)

Normal Solutions Cont.

As with any acid or base made from a concentrated stock solution, the resulting Normality will be an approximate value, which won’t be accurate enough for analytical work. However, it will, in conjunction with a pH meter, be good for adjusting the pH of samples. For analytical procedures where the Normality needs to be accurately known, as in alkalinity titrations, acidity titrations, and volatile acid titrations, you will need to standardize the acid or base. An overview of standardization and the shelf life of acids and bases will be covered in a future article.

The information in this article is very general. As usual, check your federal, state, and local regulations. You may have additional regulations or requirements that you must meet.

If you have any questions, suggestions, or comments, contact NEWEA Lab Practices Committee Chair Tim Loftus at (508) 949-3865 timloftus@msn.com. For more information on the NEWEA Laboratory Practices Committee, please contact Tim Loftus or 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.
Municipal Wastewater Treatment Plants (WWTP)

Permit-required Sampling and Reporting vs. Process Control Sampling

By Scott Butler

Are we as operators confusing the sampling required to be collected, analyzed and reported to the regulatory agencies by our permit with the sampling that we would normally conduct to determine if our process was running okay? How do we as operators differentiate between the two? Is it possible for a sample to be both required by our permit and also considered a process-control sample? If so, do we need to report it to the regulatory agencies?

Municipal WWTPs are governed by the requirements in their NPDES permits. The permit specifies the sampling locations (e.g. at a location which is representative of the effluent being discharged in the receiving water), the sample type to be collected and the sample frequency. Some permits have gone a step further and dictate which days and times these samples must be collected. These NPDES samples are supposed to be representative of the effluent that is being discharged into the receiving water for a particular period of time, usually 24 hours. Accordingly, if you are faced with a situation where, for a short period of time, your effluent is not as "good" as it normally is, you need to take a sample during this period, analyze it, and include it with your other permit-required samples. In these cases you may need to take grab samples, instead of permit-required composite samples. This doesn't preclude you from including this information on your DMR. It just needs to be explained as to what happened, for how long a period of time it occurred, and how you responded. Keep in mind that, when you sign your DMR, you are certifying that the sampling and analyses that you have conducted over the last month is representative of what the receiving stream has seen 7 days a week and 24 hours a day for the entire month.

Process-control samples, on the other hand, are taken to monitor the operation of the WWTP. This type of sampling allows the plant operator to check the efficiency of the process and make adjustments as needed to improve the processes. These types of samples, usually collected between unit processes, are a valuable tool to the operators and should be used as frequently as possible.

On occasion, it may be difficult to determine whether or not a sample is just a process-control sample. Maybe a good rule of thumb is that, whenever you take a final effluent sample for a parameter specified in your permit, you should always analyze it and include the test results on your DMR even if you only took it to determine the chlorine residual.

If in doubt, you can always call DES and talk to your inspectors.

Safety Corner

Lessons that can be learned from A NEAR MISS

By Chris Hipkiss

If you have been in this business long enough there most likely was at least one incident that from a safety standpoint was a near miss. These situations are normally not reported and the only value is that the operator hopefully will not make the same error again. The purpose of this article is to share with you a NEAR MISS with the hope that by passing this information along it will some day prevent an accident report.

The Situation:
A Wastewater Treatment Plant was making some improvements to their septage receiving station and the construction of the improvements required the excavation of soil abutting the concrete septage receiving tank. The excavation was rectangular in shape going away from the septage receiving tank with a depth of approximately five feet, a width of 16 feet and a length of 40 feet. The soil conditions were dry and sandy and the end of the excavation away from the tank had a slope of approximately one in six and was used by workers to enter the excavation hole.

The construction activity at the site:
In preparation for constructing a new concrete septage receiving structure a layer of stone was being placed in the bottom of the excavation. There was laborer with a shovel in the hole moving the stone around and a backhoe/loader dumping the stone into the hole. Because of the site conditions and layout the backhoe operator was not able to dump the stone exactly where he wanted thus making more work for the man in the hole with the shovel.

What happened that could have resulted in serious injury?
The equipment operator, with all of the good intentions of making the job easier for the man with the shovel, decided to take a bucket load of stone down the end slope of the excavation with the other man still in the hole. The operator did not have full control of the backhoe in the soft sandy soil and even after dumping the bucket load of stone the operator was unable, with 4 wheel drive, to back out of the hole. If the operator had lost control of the equipment while going down the slope in the soft soil serious injury to the man in the hole could have occurred.

Lessons learned
It takes more to be a safe equipment operator than just knowing what the levers control.
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.
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KEEP AN EYE OUT FOR THIS EVENT

Congratulations go out to Bruce Kudrick from Hooksett for spearheading an effort to get WMUR to do a Chronicle segment on the Wastewater Industry. The logistics are being worked out by a small committee but WMUR has agreed to air one 6-7 minute segment and 5 introductory segments during the week of June 4 – 8, 2007 (Clean Water Week). Stay tuned to Chronicle, weekdays at 7:30 on WMUR channel 9.

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NHWPCA A Few Committee Updates:

Education Committee- the Committee will be discussing the idea of coordinating a Statewide Science Teachers Training Program. The Program would provide a lesson plan for teachers to follow that provides basic principles of wastewater treatment and analysis instruction for Junior and Senior High School students.

Also under consideration is the development of a "School to Career" program as a joint venture with Doug Cullen from Wilton-Lyndeborough High School. The Committee is exploring the possibility of creating a curriculum for school age people that also offers internship opportunities at regional wastewater treatment plants. A work-study type arrangement would provide young people with the education and work experience to begin a career in the wastewater field.

More information and details will be available later this spring. Contact persons are Marie Polichronopoulos and George Neill at NH DES.

Membership Committee- the Committee plans to work closely with the Education Committee on the development of the Science Teacher Training Program and the School to Career Program, in order to attract new members into the Association. Offering membership to educators and students can bring much success to the Association in ushering new ideas and new perspectives on how to attract more people to the wastewater career field and our Association.

The Committee is considering the possibility of offering a pre-paid 1 year membership to each newly certified operator upon passing the certification exam, no matter which grade they test for. Discussion with and approval by the Board of Directors would be required.

The Committee would like to know which cities and towns in the state fund the wastewater employee's yearly Association membership dues. With this information the Association could make a pitch to other cities and towns to extend the perk to their employees as well. We are already aware that Dover, Exeter, Nashua, Portsmouth, and Warner offer this perk.
WEF Skills Builder Laboratory Questions

1. The weight of an empty container is the __________ weight?
   A. Dry
   B. Corrective
   C. Tare
   D. Zero

2. Which of the following BOD samples would most likely require seeding?
   A. Final effluent
   B. Primary influent
   C. Secondary influent
   D. Secondary effluent

3. 320 degrees C is equal to?
   A. 79 degrees F
   B. 45 degrees F
   C. 68 degrees F
   D. 90 degrees F

4. What is the common temperature for storing most laboratory samples?
   A. 20 degrees C
   B. 4 degrees C
   C. 25 degrees C
   D. 10 degrees C

5. A pipet which is graduated from a zero mark, near the top of the pipet to the tip of the pipet and must be blown out with a pipet bulb is an example of a(n) __________?
   A. Volumetric pipet
   B. Mohr pipet
   C. Serological pipet
   D. Automatic pipet

6. TSS samples should cool in a desiccator for a minimum of?
   A. 15 min
   B. 20 min
   C. Until the temperature is balanced
   D. 10 min

7. After ignition, the solids remaining on the filter are known as?
   A. Suspended
   B. Dissolved
   C. Fixed
   D. Volatile

8. An effluent coliform sample must be ___________ before analysis?
   A. pH tested
   B. Dechlorinated
   C. Filtered
   D. Sterilized

9. Each laboratory is required to establish a laboratory health and safety program by?
   A. Common sense
   B. NFPA
   C. Facility guidelines

10. The chemical solution used to dechlorinate a sample for BOD analysis is made using?
    A. NaAsO₂, sodium arsenite
    B. Na₂SO₃, sodium sulfite
    C. NaOH, sodium hydroxide
    D. NaC₂H₃O₂, sodium acetate

ANSWERS PG. 15
# COURSE ENROLLMENT FORM

**Spring 2007 NHDES Wastewater Operator Training**

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<thead>
<tr>
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<th>Course Name</th>
<th>Registrant First and Last Name(s)</th>
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</thead>
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<tr>
<td>March 28</td>
<td>Electric Motor Safety</td>
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<tr>
<td>April 11</td>
<td>SCADA System Maintenance &amp; Troubleshooting</td>
<td></td>
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<tr>
<td>April 12 &amp; 17</td>
<td>Remedial Mathematics Review- 2 Days Required</td>
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<tr>
<td>April 19</td>
<td>NHWPCA Trade Fair</td>
<td>Sheraton, 11 Tara Blvd, Nashua, NH</td>
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<tr>
<td>April 24</td>
<td>Awareness, Action &amp; Accountability</td>
<td></td>
</tr>
<tr>
<td>May 1 &amp; 2</td>
<td>Advanced Activated Sludge- North Conway, NH</td>
<td><strong>Register with NEIWPCG- enclosed form</strong></td>
</tr>
<tr>
<td>May 9</td>
<td>Leadership for Teams- 15 person limit</td>
<td><strong>Make Checks Payable to NHWPCA</strong></td>
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<tr>
<td>May 16</td>
<td>Applied Wastewater Math Review</td>
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<td>May 23</td>
<td>Flow Meter Needs and Calibration</td>
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<td>May 30</td>
<td>Odor Control &amp; Wastewater Pathogens-Hanover, NH</td>
<td><strong>Register with NEIWPCG- enclosed form</strong></td>
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<tr>
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</tr>
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<td>Introduction to Collection Systems</td>
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<tr>
<td>June 1</td>
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<td><strong>Register with NEWEA</strong></td>
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<td>June 13</td>
<td>CERTIFICATION EXAMS—ALL GRADES</td>
<td><strong>Separate Mailing &amp; Registration Required</strong></td>
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<td>June 22</td>
<td>NHWPCA Summer Outing- Ellacoya State Park</td>
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<tr>
<td>June 27</td>
<td>Developing a Collection System Management Program - Franklin, NH</td>
<td><strong>Register with NEIWPCG-enclosed form</strong></td>
</tr>
</tbody>
</table>

**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.state.nh.us/wwe/training.htm](http://www.des.state.nh.us/wwe/training.htm)

**Except where noted Make checks payable to:** TREASURER-STATE OF NEW HAMPSHIRE

**Send enrollment form w/payment to:** State of New Hampshire DES – Water Division

ATTN: Wastewater Operations Section

29 Hazen Drive, P.O. Box 95, Concord, NH 03301-0095

Facility Name: ___________________________ Facility Contact: ___________________________
Facility Phone: __________________________ Facility Fax: ___________________________
Facility E-mail: __________________________ Type of Payment: ___________________________

If your Town is to be billed for the classes at the end of the term, you may fax a copy of the course enrollment form to the Wastewater Operations Section at 603-271-4128.

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ANSWERS TO LAB QUESTIONS:
1-C 2-A 3-C 4-B 5-C 6-C 7-C 8-B 9-B 10-B
The oldest WWTF process in the State that nitrifies and denitrifies. What is the process, where is it located, and who is the operator?