NEWPORT'S GEO-TUBE DEWATERING OF THEIR PRIMARY LAGOON
By Arnold Greenleaf WWTF Supt.

Since the startup of the primary treatment plant in 1971 until late 1988 when the new secondary aerated lagoons were put online, the TOWN OF NEWPORT WWTF had always dewatered sludge on a weekly basis. Granted it was done using a Komline-Sanderson coil filter, but we were able to keep up with our process and dewater about 8 cubic yards a week of primary sludge for shipment to a local landfill.

Beginning in January 1989 dewatering had stopped and the flow as well as the solids were now going straight into the two new lagoons. Solids were monitored on an annual basis, but it was not until 2000 (11 years later) that we started experiencing problems with the ever increasing amounts of solids that were starting to ooze up around the outside edge of the primary lagoon. It seemed at times that we were developing beach front property at an alarming rate and several times early in the summer it did not have a pretty aroma, so the neighbors told me! I knew the time had come to do something about it, but the expense would be a hard sell! The Town had several streets that needed serious rebuilding and to add another $500,000 expense to dewater the lagoons, would be more than we could afford to do in such a short span of time.

The old rectangular primary basins had been left empty and intact in the backyard after their shutdown in 1988, teasing me for years with a possible use for sludge handling. Regrettably, the options never seem to present themselves until I saw the ad for the Geo-Tubes. Once I saw what the bags could do and realized that we had the perfect spot for them, the possibilities were looking up. Now it was all a matter of getting some demolition work done to the ends of the tanks to open them up so we could walk right into them.

It was essential that we have the capability to run equipment down into them so that we could not only set up the bags, but could have access to clean them out once they were full and required removal. Unfortunately, I have no pictures of the old sedimentation basins before our work, but the picture below shows them with the ends and most of the outside retaining wall removed. The actual demolition work itself was quick and easy as we hired Maine Drilling & Blasting for $2,800 and they took one day to break it all apart. It then took us the better part of 5 months, with some help from the Highway Dept. to clean up and landscape the area so that we could use it.

In the spring of 2003, the demolition was finished and the area landscaped so we can now start getting the bags installed to begin the dewatering process.

In the spring of 2003 when we set up the first two bags we laid 4” drain pipe underneath them at the suggestion of the supplier to facilitate the drainage from them. It was not a practical solution and when we set them up in the summer of 2006 we plan to put up to 4” of wood chips into the basins and lay the bags over that.

Once we had the basins ready, it was just a matter of moving the bags into the basins and rolling them out as you can see in the photo. After the installation of the 4” PVC Continued on pg.3

Farewell—After 30 yrs Cam Cadarette is leaving as the Operator of the Merrimack Cty. Home WWTF. Cam has seen his plant through a recent major upgrade as well as earlier upgrades to remove sludge and improve aeration. Cam is very knowledgeable in lagoon operation and maintenance and has openly shared this knowledge with other operators by hosting two Lagoon Operator Roundtables at his facility. Cam is a respected and skilled operator and mechanic and we all will miss him. Cam would like to thank Al Costigan-Derry WWTF and NHDES Staff.
President: Rick Seymour  1st Director: Ed Rushbrook
V. President: Ray Vernette  2nd Director: Scott Butler
Secretary: George Neill  3rd Director: Mike Sullivan
Treasurer: Steve Clifton  Dir. at Large: Gerald Curran
NEWEA Dir: Sarah Goyette  Dir. at Large: Kevin MacLean
Past President: John Grout

Newsletter Committee: Ernest Barham, Chris Hipkiss,
Mario Leclerc, Stephanie Rochefort, Thom Steele

COLLECTOR articles to: Tom White, Editor
State of New Hampshire
Dep. Of Environmental Services
P.O. Box 95 Concord, NH 03302-0095

NHPCWA Directors Meeting  6/2/06

Attendees:  Rick Seymour presiding, Kevin MacLean, Ray
Vernette, Mike Sullivan, George Neill, Sarah
Goyette, and Wes Ripple representing the
Communications Committee

1. Minutes: The minutes of the May 5, 2006 meeting were not
written up in time, so they will be voted on in the next
meeting or e-mailed to the Board.

2. Committee Reports: Activities Committee: The outing is
still on for June 23. Sponsors and tickets are trickling in. All
jobs have been delegated so we should be all set. Communications Committee: Wes reported that new addresses have been
added to the NHPCWA E-Mail News so total subscribers are up
to 198. They are experimenting with an on-line Operators Roundtable to allow people to discuss various relevant topics.

Education Committee: George reported that the Spring sched-
ule is moving along and has been well attended. He made a motion
to pay the cost of a recent CPR class. It was seconded and
voted in the affirmative. Legislative Affairs Committee and
Membership Committee—No report. Safety Committee:
Ray said that the last scheduled meeting was cancelled, due to
floods. It has been rescheduled for June 22.

Scholarship Committee: Tom White has awarded the NH High School scholarship to a deserving student who is a daughter of one of our members. Sarah is currently processing applicants for the NEWEA State Scholarship. A decision will be made within the month.

Operators Challenge Committee: The Seacoast Sewer Snakes will be competing after all, at the NEWEA Spring meeting. We
wish them all the best!

3. Golf Tournament: Planned for August 10th at the Canterbury Woods golf course. Sarah will contact Fred McNeill to
start drafting the announcement which we’d like to have
available by the outing. Terry Campbell and George
Neill will be assisting with this event.

signed a proclamation recognizing the efforts of our indus-
try in using biosolids beneficially. There were tours of the Dover Composting project and also of a septage
land application site. Our hats off to all the profession-
als out there who help the planet and protect public
health every day in the proper and beneficial handling of residuals.

5. Website Improvements: Steve Clifton and Rick Cantu are
working with the consultant to help upgrade our website.
There are currently some program issues which are be-
ing resolved but hopefully will lead to improvements
and updates.

6. Association Name Change: Much discussion ensued about a
prospective name change. It was decided that the direc-
tors will perform a “straw poll” with the membership to
see how everyone feels about it. Paper ballots will be
available at the June 23 outing and Wes will e-mail it out
to those subscribers. The choices will be as follows:

1. No change
2. NHClean Water Association

After we get a sense of what the Association would like,
we’ll mail out a paper ballot to the entire membership
to get a final vote, as required by the constitution.

7. Plant of the Year Award: We have two submittals so far and
may get more in the near future. It was decided that the
Selection Committee will consist of the President, Rick
Seymour, Mike Sullivan, Sarah Goyette, Fred McNeill
(if available) and a representative from last year’s First
Place winner—Nashua WWTF. Tours and evaluations
will hopefully be completed by the end of July so that
the presentation can occur at the Fall Meeting.

8. President’s Duties: Proposed changes to the President’s du-
ties were discussed and presented to the Board. Some
modifications were done to them but the major jist was
to assure that a comprehensive End-of-Year report
would be given to members at the Annual Meeting.

9. Fall Meeting: After much discussion, it was decided to ap-
proach the staff at Waterville Valley to see if they would
host tours for our fall meeting. A tentative date is

10. Winter Meeting: We will be contacting the folks in Somers-
worth if we can have tours of their newly upgraded treat-
ment facility next December 7th. This plant features bi-
ological nitrogen removal.

11. NEWEA Update: Our NEWEA Director representative,
Sarah, will be heading down to the Annual Spring meet-
ing in Mystic, Connecticut. She will report on our As-
SOACTIONS activities to the Executive Board. She is dis-
cussing the possibility of starting up a statewide Science
Fair which could lead to participation in the National
Stockholm Water Prize. New Hampshire is the only
New England state that does not have a state-wide fair.
She will be working with NEWEA Public Education
Committee members to follow up on this.

12. Next meeting is scheduled for Friday, July 7, either in Nashua
or Concord.
Close-up shot of a newly installed bag with the 4 inch pipe installed for the fill port. We suspended the pipe off the bag until we had partially filled the bag so it would be self-supporting with an empty bag.

In 2004 we started pumping in late May and continued through till late November. This time we were pumping as much as 3 full days a week, 8 hours a day and we still never experienced any problems with the recycled filtrate. As long as we maintained our PAC levels correctly we had no problems with the filtrate impacting the process.

The amount of sludge we pumped in 2005 was minor as we only were able to pump for about 12-14 days during July into one of the old bags leftover from 2004 pumping. It was a good test as it did show us that we can let the bags sit over the winter, freeze and drain, then pump additional sludge into them and they will still work for us. As I mentioned earlier, we plan to set up two new bags in the summer of 2006 with the better under drain system using the woodchips. We will experiment further with doing multiple year pumping to see just how well we can refill the bags so that we can get as much into them as possible.

The filtrate runs by gravity from the lower end of the basins into the old sludge lines and into the basement where we pump the filtrate back up into the wet well so that it can return to the lagoons for treatment. It is at this point in the journey, just before it reaches the wet well, where we will pull out samples to test it for solids and phosphorus.

THE SLUDGE PUMPING PROCESS

Anyone who has visited us while we were doing the actual sludge pumping will realize that this is not an easy process by any means. As you can see by the picture to the right it takes a fair amount of manual labor and hoses to pump the material from the slopes. The 3"-16 hp. gas powered pump works perfect for this application.

When we started the pumping in 2003 our only intentions were to simply suck the solids from the slopes where the majority of it was showing up. It was also the easiest material to access. We had experienced severe odor problems that spring and we simply wanted to pull as much of the visible material out of the lagoons and into the bags as we could, so that we would not have a repeat of the odor problems in 2004. It worked as we were odor free in 2004, but with our sludge depth checks in the spring of 2004 we found plenty of sludge further out in the lagoon than we could access with our long suction tube. So in 2004 we not only continued our aggressive pumping of the slopes, but we also built a small pontoon float to take a submersible pump out into the lagoon. It worked well as it allowed us to remove a fairly substantial amount of sludge from the lagoon during the summer of 2004. We were able to fill up four Geo-Tubes that year, now giving us a total of 6 bags full of sludge to dispose of when the time came.
SLUDGE DISPOSAL

Our original plan was to pull out the material from 3 bags at a time and mix it on-site with wood ash, after it had gone through 2 freeze-thaw cycles. We would then have it trucked off-site as a Class A product. The company that we were dealing with had a place to dispose of the product and felt that it was a good use for it. Unfortunately, 2005 would prove to be a tough year to expect any amount of dry weather.

We were not able to actually start digging any of the material out until early September. We knew that it would be a major project to excavate the bags, but never anticipated that it would take us as long as it did. The removal of the solids from the bags was done as time permitted between our regular work at the plant. Had I ever known what was in store for us for weather in those next 3 months, I would have approached the project differently. It took us the entire month of September and into October to clean out the 3 bags. In the meantime we were stock-piling it at the end of the basin and covering it with tarps to keep the occasional rainstorm from soaking it. Needless to say we had just finished with the last of the excavation work 2 days before we got blitzed with the “Flood of 2005”. As we started digging out the bags so late into the year, I was glad that I had changed my disposal options earlier.

Fortunately, we had the material covered, but the site that we would have used to mix the biosolids and ash was inundated with over 4 feet of water. What a beautiful mess we would have had! In between storms toward the end of October, we did manage to get 2 loads hauled offsite and it was not until early November that we were finally able to get the rest of the material trucked to the landfill. As a final tally, it took 4 tractor-trailer loads to remove all of the biosolids that we removed from the bags. It was 133 wet tons of product at about 28% solids when it left the plant.

The 3 bags that currently reside in the basins will be removed as soon as time permits during the summer of 2006. We plan to dedicate ourselves to removing the entire volume as quickly as we can in the shortest time possible. It will then be loaded up and hauled away as fast as the contractor can supply us with the trucks. I do not want a repeat of the sloppy mess that we had with the first 3 bags.

PROJECT EXPENSES

I have provided a table of our expenses to date for the lagoon dewatering project. Much of what we have spent to this point has been for the bags themselves, chemicals and the disposal of the first 133 tons of biosolids. A great deal of the equipment that we purchased to do this project with can be used for various other projects within the plant or outside in the collection system. We now have two good size pumps and almost a thousand feet of 3 and 4" hose that we can use almost anywhere. As you can see by the table below we have only spent a little over $48,500 to accomplish what we have done so far.

Currently as we move forward with this project our expenses should remain fairly constant. We have no further equipment to purchase other than what will wear out and need replacing. We will only have to plan on the expense of purchasing additional bags, more PAC and paying for the disposal of the additional dewatered biosolids. My goal when I started this project was to keep it as simple and inexpensive as possible with no more disruption to our treatment process than necessary.

<table>
<thead>
<tr>
<th>COSTS FOR DEWATERING LAGOON #1</th>
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</thead>
<tbody>
<tr>
<td>10 HP ELECTRIC PUMP</td>
<td>$ 6,100.00</td>
</tr>
<tr>
<td>REMODELING BACK BASINS</td>
<td>$ 2,800.00</td>
</tr>
<tr>
<td>FLOTATION BARRELS</td>
<td>$ 90.00</td>
</tr>
<tr>
<td>HOSE</td>
<td>$ 2,700.00</td>
</tr>
<tr>
<td>MISC. PIPE FITTINGS, VALVES, CPLGS.</td>
<td>$ 1,424.00</td>
</tr>
<tr>
<td>PONTOON BOAT</td>
<td>$ 4,665.00</td>
</tr>
<tr>
<td>GEO BAGS</td>
<td>$ 10,735.00</td>
</tr>
<tr>
<td>CHEMICALS</td>
<td>$ 6,600.00</td>
</tr>
<tr>
<td>SLUDGE DISPOSAL &amp; TRANSPORT-2005</td>
<td>$ 13,443.10</td>
</tr>
<tr>
<td></td>
<td>$ 48,557.10</td>
</tr>
<tr>
<td>TOTAL COSTS:</td>
<td></td>
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</tbody>
</table>


It is the spring of 2006 and the left side of the basin is now clear of biosolids, once we get our chips spread in the bottom of that side we will be able to install a new bag. As soon as time permits we will begin removing the bags and solids from the right side.

SUMMARY

I feel that we have met our goals even though it has taken quite a lot of labor on our part to do it. After we had finished pumping in late 2004 Tom White, from NHDES and I did the sludge readings on the first lagoon. We found that we had reduced the level of sludge in the lagoon by half from when we did the initial readings in May 2004. Hopefully we can remove the remainder of the solids that are impacting the lagoon for no more cost than what we have already spent and it will have been a project well worth the effort. We will have saved a tremendous amount of money as well as disruption to our neighbors, ‘read’ odors. They would have been impacted tremendously had we shutdown and drained the lagoons to allow a contractor to dredge the solids. We were able to keep the lagoon full and operational throughout the whole time.

We have learned a lot throughout the project, making changes and improvements to the bags, equipment and the process as we have gone along:

➢ I would not put drain pipe or fabric underneath the bags ever again, I will use wood chips instead. Why generate more trash to have to dispose of later?

➢ We have 2 bags remaining from an earlier purchase that have two fill ports, one at each end. When I purchase new ones they will be with only one fill port, as the extra one is only a weak spot to break apart once the bags start to reach capacity.

➢ Due to our odor issues in 2003-04 we were in a hurry to pull as much sludge as possible so we pumped as many bags full as we could. This resulted in the stacking of the bags in the basins, not a good idea and certainly not one I will repeat, as it just added to the work needed to cut them apart and remove them once they were filled.

➢ To make the bags work their best they must go through at least one freeze-thaw cycle, two is better. It really does make a big difference in the amount of water removed from the sludge to freeze the bags solid over the course of a winter. We proved that by measuring the slump in the bags from the fall till the next spring when they had thawed out. The solids are dry and powdery when they come out of the bag, almost 50% dry.

The bags have many beneficial applications for our industry and I hope that this article has provided you with the information needed to put them to good use for the benefit of your own plant. Anyone with more questions or who would like to see our application is welcomed to call us to set up an appointment to visit.
The Association's Annual Summer Cookout
by Stephanie Rochefort (OMI/Somersworth)

"Hey, did you bring your bike today?" asked one operator to another. "Heck, no" was the reply, "It was pouring at my plant, how about you?" It may have been pouring in the morning across most of New Hampshire, but by 10:30 a.m. it was sunny and warm at Ellacoya State Park for the Annual Summer Cookout. By afternoon, it was even hot enough for me to be tempted to test the water and I found the large, shallow area to be surprisingly warm. This year's Cookout featured a "50's" theme and several fun-loving individuals even dressed from the Happy Days Era. Appropriate music played in the background and it was easy to get yourself by knowing the words to the songs. The classic menu of hamburgers, hotdogs and chicken was delicious thanks to all the hard work of the committee that makes this event possible each year. The main topic of conversation was the May rainstorms and flooding. It was amazing to hear how well all the plants did under adverse conditions. New Hampshire really does have well-trained and talented operators who are all quite deserving of a sunny day at Ellacoya State Park.

NH TRADE SHOW AND EXPOSITION

The 2006 NH Drinking Water Exposition and Trade Show co-sponsored by the NHWWA and the NH Department of Environmental Services will be held on Wednesday, November 1, 2006. The annual event will take place at the Center of New Hampshire / Radisson Inn on Elm Street in Manchester, NH. NHWWA anticipates that over 110 vendors will exhibit their products and talk about their services. Product demonstrations will also be held in the Exposition Hall. Close to three dozen 30 minute seminars are scheduled to take place with topics to include: security issues, source assessment, arsenic, iron and manganese, distribution topics and much more! This event is designed for operators, managers, water commissioners, system owners, engineers, consultants, and other professionals, and all those interested in drinking water issues, products and services. Exhibitors are very excited about displaying and talking about their proven products and services, as well as new and innovative products and services. Speakers are looking forward to telling you about important water works issues of the day. As always, operators will be awarded continuing education credits for attending seminars, and also for attending Expo demonstrations. If you are interested in exhibiting your product or service line and would like to secure your booth, or if you have any questions, contact Patricia Beavers, Expo Coordinator, at 802.763.3937, or Email at beavers@sover.net (please but NH Expo in subject line). Notices and registration forms will be sent to NHWWA members and NH certified operators during September. If you are not on the NHWWA mailing list, you may request a registration form in September by contacting NHWWA at 18 North Main Street, Suite 308, Concord, New Hampshire 03301, or by calling 603.415.3959 or by e-mailing NHWWA at nhwwa@worldpath.net.

TENTATIVE Course Offering

Fall 2006 NHIDES Wastewater Operator Training
All Classes Held at Franklin Training Center Unless Noted

<table>
<thead>
<tr>
<th>Date</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>SEPT 12-14</td>
<td>Confined Space Entry- registration limit 10 people</td>
</tr>
<tr>
<td>SEPT 27</td>
<td>Lab Instrumentation &amp; Calibration</td>
</tr>
<tr>
<td>SEPT 28</td>
<td>NHWPCA Fall Meeting</td>
</tr>
<tr>
<td>OCT 3</td>
<td>Fat Oil Grease- at DES Auditorium</td>
</tr>
<tr>
<td>OCT 4 &amp; 10</td>
<td>Remedial Mathematics Review- 2 Days Req.</td>
</tr>
<tr>
<td>OCT 19</td>
<td>Laboratory Practices Review &amp; NEWEA Laboratory Practices Exam</td>
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<tr>
<td>OCT 24</td>
<td>Biological Nutrient Removal</td>
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<tr>
<td>OCT 25</td>
<td>Wastewater Lagoon Operation and Maintenance</td>
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<tr>
<td>OCT 31-NOV 3</td>
<td>Basic Wastewater Operator Training (4 days)</td>
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<td>NOV 8</td>
<td>Leadership Skills</td>
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<tr>
<td>NOV 15</td>
<td>Applied Wastewater Math Review</td>
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<tr>
<td>NOV 29</td>
<td>Air &amp; Vacuum Release Valves</td>
</tr>
<tr>
<td>DEC 6</td>
<td>CERTIFICATION EXAMS—ALL GRADES</td>
</tr>
<tr>
<td>DEC 7</td>
<td>NHWPCA Winter Meeting</td>
</tr>
</tbody>
</table>

CONGRATULATIONS TO LISA GILBERT--
NHWPCA 2006 H. S. Scholarship Recipient

This year's NHWPCA graduating senior scholarship award goes to Lisa Gilbert. Lisa plans on majoring in Environmental Studies when she attends college this fall. She has traveled to and lived with needy families in Nicaragua and experienced first hand how families there try to survive on very limited potable water supplies. Lisa's well written essay about her experiences in Nicaragua as well as her genuine concern for clean water earned her this years award. Good luck in your future endeavors Lisa.

The 34 MGD Manchester WWTF has several entry level openings. They are eagerly looking for NH Grade I and NH Grade I OITs for IMMEDIATE hire. No experience necessary. Starting pay is $15.53/hour with excellent benefits, including medical with very low employee contributions. Call Tom Corey at 624-6526 or his cell phone at 235-6627 to get you processed through the HR Department and an interview at the WWTF.
State to Study FOG Issues
By Ray Gordon, DES Septage Coordinator

Is Fat, Oil and Grease (FOG) a problem at your facility and pump stations? How do you deal with it? Would you like to spend less operator hours pumping scum? How can you prevent it? How do you dispose of the grease? These are issues the state of New Hampshire is going to study. Governor Lynch signed House Bill 1373 on June 6, 2006, this bill establishes a commission to study ways to encourage the proper recycling and disposal of grease trap wastes and to determine ways to develop additional disposal capacity.

In the next 45 days the commission will begin its work. The commission will include members of the state legislature, as well as representatives from the Department of Environmental Services, New Hampshire Association of Septage Haulers, New Hampshire Lodging and Restaurant Association, New Hampshire Water Pollution Control Association and biodiesel experts from the University of New Hampshire.

These appointed individuals are tasked with studying:
1. Ways to ensure the proper recycling and disposal of grease trap wastes.
2. Systems for managing grease trap wastes currently used in the United States and Canada.
3. The status of the in-state and regional markets available for handling grease trap wastes and methods for future development of in-state disposal capacity.
4. The ability of the department of environmental services to assist municipalities in regards to rules, regulations, penalties, and best management practices for grease trap sizes, cleaning cycles, standards, and pumping.

The New Hampshire Water Pollution Control Association has appointed Fred McNeil Phone: (603) 624-6341 and Eric Swope Phone: (603) 357-9836 to this commission. These individuals will represent you on this commission and it is important that they know your thoughts. Please feel free to contact them.

Additionally, Pat Hannon and Ray Gordon have been nominated as the NH DES members. I have volunteered to bring the concerns of the wastewater community to the commission so feel free to share you positive or negative FOG experiences with me. I can be reached at rgordon@des.state.nh.us or by phone at 271-3571.

Operator Challenge Update -

Here's a little diddy just to give you more info on how the Seacoast Sewer Snakes wrapped up their NEWEA Ops Challenge event in Mystic earlier this month. The team finished first overall, winning the process control test / jeopardy round, collection systems, and pump maintenance events. They finished second in safety and third in laboratory. Congratulations once again to Dave Lovely, Rochester WWTF; Mike Carle, Hampton WWTF, Sean Greig, Newmarket WWTF; Geoff Howe, Portsmouth WWTF; and team coach Ed Rushbrook, Underwood Engineers.
Attention Waste Water Operators and Employees!  This Article Pertains to You!!

Over the past seven years we have heard time and time again that there is a shortage of operators, correct? Well this article is intended to address the apparent dilemma that faces those of us in the Waste Water Operations field.

Having been in the Waste Water field for the past twenty years several issues have exposed themselves. My immediate supervisor, who I have worked with throughout the last twenty years, and I have discussed these issues on several occasions. Both he and I believe it is past time for these issues to be brought to light. Through this article we are hoping that we may be able to present the initial step in solving some of these dilemmas.

One of the most apparent issues we face is the title of “Waste Water Treatment.” The title of Waste Water Operator in itself is unappealing and needs to be changed. Many of us in this field are tired of people turning up their nose and making comments such as, “Doesn’t all that stuff just go through filters and come out clean?” Some possible changes for the title could be, Waste Reclamation Operations, Environmental Water Reclamation Operations, Disease Control and Water Reclamation Operations, or something along those lines.

Another issue that Waste Water Operation employees face is the wages we receive. The wages in many New Hampshire communities and other states are very low, especially for those just getting started in the field. When comparing the challenge of operations, discharge, permits, staffing requirements, courses required to be promoted, and the possible exposures, many will find that this field is lacking and unappreciated. More and more Chief Operators are forced into maximum efficiency with less than a minimum staff. If you were to couple that with the lack of qualified applicants and low wages we are faced with a severe problem for operations staffing of facilities with qualified personnel. When you reach this point low wages are not the only thing that can cause problems, benefits also need to be factored in. In this field benefits seem to be consistently cut back. Some communities offer only two weeks of vacation time per year for the first ten years. On top of that, many communities also require their employees to pay as much as 30% of their health insurance as well. When you think about health insurance that no problem right? Wrong. Think about all of the possible exposures that come with this field or work.

The exposure that one faces working in this particular field may very well be one, if not the one, of the largest downfalls. In all treatment facilities exposures vary chemically, which can often offer their own unique issues. Many of the chemicals that we are exposed to are extremely hazardous yet they are a daily part of our lives. The one exposure that does not vary from each facility is the Micro-Biological hazards.

All employees in the Waste Treatment facilities have the potential of being exposed to “Biological Hazards”. With communities placing more and more burden on all employees to pay for a portion of their medical insurance while still knowing of all of these exposures. It basically boils down to the fact that we all expose ourselves on a daily basis to chemicals and biohazards to protect our environment and the health of our community, yet no consideration is given to these hazards that we face within the town or city government that we are protecting.

Having stated this, my immediate supervisor and I have drafted up a proposed legislation to try to bring our field into perspective. Our hope is to possibly make this field slightly more appealing to new operators and at the same time giving all “Waste Water Treatment Facilities” some sense of worth and security.

The following is the proposed legislation that we have drafted up:

Any state, municipal or private employer whom has waste water treatment, collections or distribution employees that are exposed to any micro-biological hazards i.e.: sewage or septage, as part of their fulltime employment, will have their health insurance paid in full by said employer.

Micro-biological hazard will be defined as follows: any agent(s) that may involve exposures to pathogenic micro-organisms or viruses that may produce human disease(s).

SCOPE: This legislation is designed to assist groups of workers who subject themselves to potential health hazards/diseases in their workplace, while having to contribute towards their insurance in their workplace.

Some potential hazards I speak of are: HIV, Hepatitis (Jaundice), Salmonella, Shigella, E-Coli A Bacillus, Campylo Bacteria, Yersenia Enterocolitica, Typhoid, Cholera, Dysentery, Polio and a whole hose of parasites.

The groups of workers whom are potentially exposed to these are, but are not limited to: Department of Public Works (provided they are responsible for collections systems and or Waste Treatment Facilities), Water & Sewer Departments, Sanitation Collections Systems Maintenance & Treatment Organizations, Departments or Facilities.

It is our hope that this legislation will bring this all to light and get our field where it should be. I appreciate any direction that can assist us in our attempt to see this through to fruition!

Bob Bagley, and Peter LaBonte — N. Conway WWTP

The Department of Environmental Services is looking for Pictures of Fat, Oil and Grease (FOG). These pictures should show the cause and effects of FOG on your wastewater infrastructure. Submitted pictures may be used in future Wastewater Operator Training Programs on FOG. Please send your pictures and short text description of the picture to Ray Gordon, DES Septage Coordinator at raygordon@des.state.nh.us.
Colorimetry
By Tim Loftus

Do you test for phosphorus, residual chlorine, or ammonia-nitrogen in your laboratory? If so, you most likely use colorimetric procedures to analyze for some of, if not all of them. The principles of colorimetric analysis can also be used to determine many other parameters in the wastewater and water field, including metal analyses and the nitrate/nitrite series.

The idea behind colorimetry is very simple. But first here is a simplistic review of color: most substances absorb at least a little bit of light. Black objects absorb all the colors of the rainbow and reflect little light. White objects absorb almost no color and reflect all the colors of the rainbow (called white light). In between, most objects absorb some light and reflect the rest. That is how we see different colors—a red object absorbs all the light except the red wavelength, which reflects off the subject and appears red to us. Similarly, a blue object absorbs all the light except the blue wavelength. In reality, though, most colors we see are blends of several wavelengths being reflected back to us.

We can use this principle of color reflection and absorption to determine the concentration of a chemical in solution (like residual chlorine in water). There are two ways this has typically been done; one uses Nessler tubes (these look like test tubes) or a color wheel and the other uses a spectrophotometer. In both cases the substance you want to determine the concentration of needs to be color-enhanced by reacting it with a specific chemical. In the case of phosphorus analysis, the phosphorus is reacted with ammonium molybdate, potassium antimony tartrate, and ascorbic acid to form a blue color; residual chlorine is reacted with DPD to form a red color; and ammonia-nitrogen is reacted with Nessler reagent for form a yellow to brownish-yellow color.

While each procedure has its own specific limitations, the intensity of the color for each parameter is proportional to its concentration. Here's a simplified example to make this point clear: if a phosphorus sample has twice the blue color intensity as another sample of phosphorus, the first sample has twice the concentration of phosphorus as the second sample.

In using Nessler tubes, a series of standard solutions is made and reacted with its specific color-enhancing chemical. Then the sample in question is color-enhanced and compared to the standards. From this the concentration of the sample is determined. Note that the color wheels of years ago worked on this same idea. Rather than making a series of standards to compare color intensity, these colors were printed on a wheel or card to which the liquid sample would be compared. Both of these were very subjective tests, although easy and quick to use in the field. Today, neither the use of Nessler tubes nor color wheels are approved for NPDES reporting purposes.

A spectrophotometer works by a similar principle. But rather than measuring the intensity of the reflected light (the color you see) as with Nessler tubes, it measures the amount of a particular wavelength that is absorbed by the sample. Usually the best wavelength to use is the visible color's complement. For example, if a color-enhanced sample is red, a wavelength in the green part of the spectrum is used in a spectrophotometer. The amount of this wavelength that is absorbed by the sample is proportional to its concentration.

There are, however, limitations to colorimetry. Samples must be diluted or occasionally concentrated so that a valid measurement can be made since the workable range often falls within only a few milligrams per liter. Sometimes non-target substances react with the color-enhancing chemicals to create a false positive reading, although test procedures are generally good at listing these interferences and describe ways to counteract or reduce their effects. Other interferences include bubbles in the sample cells or tubes, turbidity of the sample, and sample color (the wastewater from a textile dyeing process, for example, is nearly impossible to analyze using colorimetric methods). Fingerprints on the sample cells and optically mismatched sample cells will also give erroneous readings.

Despite the challenges of colorimetry, it remains an easy-to-use and accurate test if care is taken to match the sample with the method limitations, the equipment is clean and in proper working order, and a good quality assurance plan is in place to indicate that the results are accurate.

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, cutone@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 Laboratory Practices

Immunization Information For Sanitation and Sewage Workers

Operators should have proof of all of their childhood immunizations. You should have an annual influenza immunization and a Tetanus/diphtheria, Td, booster every ten years. The recommended vaccine now is Tetanus/diphtheria/ and pertussis, Tdap booster. (Hepatitis A is not recommended for persons who work in liquid or solid waste management (e.g. sewer workers or plumbers). Hepatitis B also is not recommended for liquid or solid waste management. These vaccines would only be recommended for persons who are at risk for some other reason. For more information on recommended adult vaccinations go to www.cdc.gov/nip/recs/adult-schedule.htm

For More Information: Contact a Public Health Nurse at the DPHS Immunization Program (603) 271-4482
Three of NH's municipal wastewater treatment facilities are taking part in a year long study using solar powered pond circulators in their wastewater lagoons to enhance mixing and aeration and effluent quality. These mixers have successfully been used in other parts of the country and world. Operators at the three facilities - Exeter, Pittsfield and Rochester - researched the potential benefits for wastewater lagoon applications offered by the SolarBee manufacturer. SolarBee mixers claim to reduce energy consumption, improve sludge digestion, reduce short circuiting, improve dissolved oxygen and pH levels, provide consistent odor control, and improve treatment by reducing BOD, ammonia, phosphorus, TSS and Algae growth.

SolarBee technology takes a different approach to aeration by creating constant, controlled movement of the wastewater in the lagoon. The movement causes low to no dissolved oxygen wastewater to come in contact with surface air resulting in more oxygen transfer by the mixing action. These mixers create both horizontal and vertical circulation patterns in the wastewater resulting in improved distribution of oxygen, bacteria, algae and nutrients. The depth of the intake tube can be adjusted to conform to variable lagoon depths. During the day the solar panels absorb and convert the sun’s energy to electricity to power the mixers. Excess energy is stored in batteries that can be used for energy to power the mixers at night or on cloudy days. Each facility has installed shore power to the lagoons where the mixers are in use to supplement the energy and guarantee consistent operation.

Exeter installed six units in each of their three aerated lagoons, while reducing the number of aerators on-line, in order to attain energy cost savings. Pittsfield is using four units to supplement the existing aerators currently operating in their lagoons in order to create better mixing. Rochester placed five units into their two aerated lagoons that serve as sludge storage/equalization. The existing aeration units were turned off completely and the mixers are being tested as the aeration source, to reduce energy costs associated with their failing Hinde aeration system, to reduce odors and sludge accumulation in the lagoons.

During the pilot the facilities are collecting and recording data and submitting the results on a monthly basis to NH DES. At the end of the year, the facilities will prepare a report to analyze the results of their pilot study. The key parameters to be evaluated include energy savings; sludge blanket reduction and even distribution in the lagoons; the effects on lagoon DO, BOD, TSS levels and algae levels in the WWTF effluent.

Look for future articles featuring the progress of the lagoon aeration pilot study results.

Hi all! My name is Marie Polichronopoulos and I am the newest addition to the DES, Water Division, Wastewater Engineering Bureau-Operations Section. Yes, that is a mouth full, and I am not talking about where I work, I am talking about my last name. I wanted to formally introduce myself to you since I am the primary contact person for all training and certification related business. I join the ranks of the DES having worked for 6 years as a high school science teacher and about 3 other years in the biotech industry. I am very excited to involve myself in the certification and training processes and I look forward to meeting you all in the future.
WHAT WOULD YOU DO?

if your supervisor handed you an SOP and told you to run a laboratory test that you had never done before? You'd politely tell him that you weren't comfortable with the situation, of course. But what if he insisted that you run the test and told you not to worry because he'd be responsible? This was one of several scenarios discussed at the June 8th Laboratory Association of New Hampshire (LANH) meeting and ethics training. LANH a group that was formed in 1999 as a response to New Hampshire becoming a NELAC state. New Hampshire commercial and municipal labs met and shared information in order to help each other navigate the NELAC standards and become accredited. In the following years, the group has evolved and now our purpose statement is "to provide a means of cooperation, communication, education and other benefits of interaction to laboratories, and other interested parties." If you have heard about the group in the past and think that it is all about commercial labs and lobbying - think again! LANH tries to schedule training sessions that are of interest to everybody and has even been known to plan meetings around BOD schedules. Contact membership committee chair Stephanie Rochefort at 603-692-2418 or steph_rochefort@comcast.net to learn more and to get on the mailing list for our September meeting. Or, check out our web-site - https://home.comcast.net/~lanh/index.html
Rochester WWTF — This is what a SolarBee Mixer looks like floating in the lagoons at the Rochester WWTF. Dave Green and Crew will monitor several key parameters to test the effect of these mixers in their sludge holding lagoons.