NHPCA Fall Meeting in Manchester

Tom Corey and the staff of the Manchester Water Pollution Control Facility invite you to the September 21, 1995 Fall Meeting. Come see the completion of the $20.6 million upgrade which increases the average daily flow capacity from 26 MGD to 34 MGD, and encompasses virtually all areas of the plant from dewatering facilities and incineration, to odor control facilities. The entire plant instrumentation system was replaced with a new digitally distributed data acquisition and equipment status and control system. Also constructed is an on site septage receiving facility. The highlight of the upgrade is the new 1.75 dry ton per hour fluidized bed incineration system.

Tours start at 9:30 with the fall meeting being held at 11:30 at the Highlander Inn (on the way to the Manchester Airport) beginning with the attitude adjustment at 11:30 followed by the buffet luncheon at 12:30. The formal meeting begins after lunch with Robert Gaudes, Vice President of Camp Dresser & McKee, as the guest speaker.

Hope To See You There,
Mary Dowse
Ken Kessler

On Friday, June 23rd, at the annual summer outing, about 225 NHPCA members and guests enjoyed beautiful Ordione State Park in Rye, NH. A beautiful summer day, great BBQ, good music, views of the ocean and the Isles of Shoals, tasty brews, and competitive games were the ingredients for the first NHPCA Texas BBQ by the Sea.

The menu included tender grilled ribs, tasty BBQ chicken, Italian sausage, fresh corn bread, spicy chili, corn on the cob, homemade strawberry shortcake, etc., etc. The whole event was put together by the 30 members of the NHPCA Activities Committee. They cooked, grilled, served food, put up tents, sold tickets, and cleaned up! Thanks!!!

The group is hoping to make next year’s event even better!!! If that’s possible!

As always, our summer outing would not be successful without the support of our many sponsors (Thanks!):

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Past President Ken Kessler

Newsletter Committee: John Currie, Dana Clement, Beverly Drouin, Harvey King, Greg Nason, Sharon Ostrander, Tom White

Send articles to: State of New Hampshire
Department of Environmental Services
6 Hazen Drive
Concord, NH 03302-0095
Att: Tom White

NHPCA Directors Meeting
August 24, 1995


1.) MINUTES from last meeting were read and accepted.

2.) FALL MEETING. All set for September 21. Tours of the recently upgraded Manchester WWTF will be held followed by lunch at the Highlander Restaurant in Manchester. Camp, Dresser & McKee will help host it. Thanks to Mary and Ken for all the legwork and planning.

3.) WINTER MEETING. Ed Rushbrook reported on the effort put into this meeting by Lorraine Sender and himself. Another technical session will take place, again to be held at the Bed ford Wayfarer. The sessions will probably be contract operations issues and odor control concerns, and will be back to back so that everyone will be able to attend both seminars. Good work Ed and Lorraine.

4.) SOFTWARE FOR DATABASE MANAGEMENT. Keith reported on the current status of updating our database capabilities. The board moved and voted to purchase Microsoft Access software and have our accountant Harvey Bouchard use it to update our database. Keith will purchase it and forward it to Harvey.

5.) NEWEA AWARDS & UPDATE. George Laney informed us that only two nominations have been made for both NEWEA Awards. He will be placing another announcement in the newsletter calling for additional nominations.

6.) OPERATOR EXCHANGE. We are exchanging operators with Massachusetts this year. The operator will be the guest of the Directors on Tuesday evening at their annual dinner meeting and he'll be shown Concord,enniker and Claremont on Tuesday. Tours on Wednesday may include Ashland, Plymouth and Waterville Valley. On Thursday, he'll be the association's guest at the Fall Meeting in Massachusetts.

We are still looking for a volunteer to represent us in Massachusetts. This individual will be touring facilities on September 24 & 25 and will be a guest at the MWPCA Annual Trade Fair on the 26th. Any takers?

7.) MEMBERSHIP ISSUES. Moe Gauthier submitted a memo outlining various ideas on expanding membership roles. One primary approach will be targeting past members who have dropped out and also contacting other environmental organizations which may have interested people. Much discussion ensued on this issue. The membership committee will be meeting to expand on these ideas on September 8 in Franklin.

8.) OTHER BUSINESS. Ken mentioned the fact that a number of Past Presidents would like to meet occasionally in order to generate ideas and discuss issues. The immediate Past President who sits on the board will be a conduit of information. The board didn't see a problem with this and in fact may be a good source of input of ideas.

Ken also handed out a draft of general procedures written by Past President Mike Butler. The board will review this document and comment on it.

New Faces in New Places:

- Phil Maltais left the Manchester WWTF to be Chief Operator at the new Seabrook WWTF.
- Brian Fleming left the Cheshire Cty. Home to work for the Water and Wastewater Dept. in Sunapee, NH

† Frank Lester — long time operator of the Cheshire Cty. Home WWTF recently passed away — He will be missed by us all.

For Sale

1975 GMC 6500 6 wheel Load Lugger w/4, 3 cu. yd. hoppers & other attachments. V-8 427, 5 speed, 2 speed rear end. 47,500 miles. Currently inspected & in use. $2500 or B.O.

1971 Dodge 10 wheeler. CT800 automatic, 413 V-8, 14,500 miles. Currently inspected & in use. $1000 or B.O.

For more information contact Bruce Kudrick @485-7000 - Town of Hooksett WWTP
Welcome to the wonderful world of BOD's! Just when you believe that you've got them figured out, your blanks don't come in. Unfortunately, that happens to everyone who does BOD tests. I've come up with a few guidelines to follow that helps with the success rate of BOD's. It's not fool proof (yet) but I now have close to 90% success with my BOD's. Below I share my methods and discoveries. They might not work for everyone, but let's face it, if you do BOD's you're desperate for any helpful information. I hope some of these suggestions work for you.

Let's start at the beginning of the process. Your bottles must be extremely clean before you can begin. I use a 12.15% sodium hypochlorite solution (nothing less than 12% will work) to wash my bottles. The bottles and stoppers are submerged in hypo for 24 hours then rinsed three times in hot tap water and three more times with distilled (DI) water. This rinsing process takes about 20 minutes. If you do not have access to a sodium hypochlorite solution, wash bottles with soap and water and again rinse three times with DI water. Washing bottles this way will probably add a few extra bogus blank readings per month. Once the BOD bottles have been cleaned, store them upside down to keep airborne contaminants to a minimum.

Because all wastewater plants have different waste stream strengths, BOD sample concentrations will vary from plant to plant. However, if you use a chlorinated effluent sample you must dechlorinate before you use it. To adequately dechlorinate a given amount of sample (such as 500 ml) a chlorine residual must be performed. As soon as a residual is determined, the amount of 10% sodium thiosulfate (Na₂S₂O₃) needed can be found in table 1.1.

### Table 1.1
Amount of 10% Na₂S₂O₃ needed for a 500 ml sample.

<table>
<thead>
<tr>
<th>Cl₂ resid. mg/L</th>
<th>Na₂S₂O₃ microriters</th>
<th>Cl₂ resid. mg/L</th>
<th>Na₂S₂O₃ microriters</th>
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</tr>
<tr>
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<td>4.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Once the right amount of sample has been added to the bottles, aerated (also called dilution) water can then be added. The dilution water bottle should be cleaned of contaminants or any remaining residuals from previous uses. I do this by rinsing the dilution bottle thoroughly in tap water followed by DI water and placing it in a UV cabinet for 15 minutes. Not all plants will have a UV cabinet so a thorough tap water rinse followed by a good rinsing of DI water should be sufficient. Once the dilution bottle is cleaned fill it with water. I suggest you use distilled water, since tap water has too many constituents which will interfere or ruin your BOD test. If you must use tap water that contains chlorine, remember to dechlorinate it.

After the dilution bottle has been filled with water it must be aerated (I use an aquarium air pump and air stone -- these are cheaply priced at Wal-Mart). I aerate for six minutes; however, during certain times of the year, our waste streams change and, therefore so does the aeration time. When the time is manipulated it need only be by 15-30 seconds at a time. Also, when you are timing the water this should be done with a timer and not a clock because 15 seconds can make a huge difference in the outcome of the initial DO's. A magnetic stirring rod may be used but I prefer the air stone. The water shouldn't be aerated longer than 10 minutes as it will get supersaturated and can take up no more oxygen. Once aerated, place the dilution bottle in the incubator (20 ± 1°C) for stabilization. The dilution water should be incubated for at least 3 days; however, 5-7 days will give you better results. If you decide to cover the bottle, use something permeable such as cheesecloth.

Before you begin to read your BOD's always check your meter and probe. The meter should hold its calibration and the probe should have no air bubbles. If you use the YSI 5906 probe, air bubbles are acceptable -- providing they do not cover the gold cathode. If the cathode is covered by any bubbles, then the membrane needs to be changed (for all other probe users, contact your local YSI dealer for trouble shooting terms). If your membrane does need to be replaced, change it after you've done your readings. I'd chalk that day's work up as a loss and read BOD's with the bad membrane because if you change the membrane it should be left alone for at least 12 hours (preferably 24 hours) so that all the little air bubbles that were incurred while filling the membrane can diffuse out. Try to keep a regular maintenance schedule for your membrane. I find that after two weeks my readings start to drift higher. Changing the membrane bi-monthly and making up fresh KCL every 2 months prevents this. Also, before you calibrate the meter, use a kimwipe to blot off any water that may be on the surface of the membrane.

Before I begin to fill the BOD bottles with dilution water, I add the nutrient buffer pillow, swirl the water around, and drain approximately 50 ml through the tubing and dispose of it. Doing this makes a significant difference in my BOD results. It gets rid of any "stale" water in the tube that had not been aerated or equalized because of the impermeability of the tubing.

After filling my blanks, I do not top them off with DI water from another source if I have run out of stabilized dilution water. I stopped doing this because the blanks' oxygen level seemed to drop too much, perhaps because DI water (used to top off the BOD bottle) was not aerated.

The standard rule of thumb is that the initial DO of blanks should be between 7-9 mg/L. I believe this window should be more narrow. I can usually tell from my initial readings whether or not my final readings will be within the 0.20 mg/L window. If my blanks are greater than 8 mg/L initially, I always recalibrate the meter before continued readings, and 9 times out of 10 after recalibration the initial readings are lower. I don't understand why this happens but I believe it could be that the meter was not warmed up enough or maybe there was water on the bottom of the membrane when it was calibrated.

(BODacious! — continued on page 7)
The Tory Pines Resort is located in Franconch, NH and it primarily functions as an 18 hole golf course in a beautifully wooded location. There are also a number of permitted Hotel units and a restaurant that contribute wastewater to the Resort's Wastewater Treatment Lagoons.

Treatment consists of screening and flow measurement, followed by aerated lagoons and storage of treated effluent prior to use for spray irrigation on 9 holes of the golf course.

Jim Cruthers is contracted part time as the certified wastewater operator to operate and maintain the facility. Jim works closely with the Course Superintendent Jack O'Donnel and the Course Assistant Superintendent Rob Horn.

Wastewater treatment consists of two 0.57 M.gal. aerated lagoons with detention times of 20 days each followed by storage in a lagoon capable of storing 6.8 M. gallons of treated sewage.

The very unique aspect of this treatment system is the reuse of the wastewater plant's effluent to spray irrigate 47 acres or 9 holes of the Tory Pines golf course. The average annual demand for spray irrigation is 6.3 M. gals. The Resort holds a Groundwater Release Detention/Discharge Permit with a permitted daily flow allowed being 14,700 G.P.D.

Jim Cruthers obviously has to maintain a quality effluent with no odors for this kind of reuse and he does an excellent job of it. Jack O'Donnel and Rob Horn operate the spray irrigation system at the course, through programmable controllers at each green which allows them to time on/off cycles for each individual spray header. Jack feels that the greens using treated effluent water require considerably less fertilizer and look very nice. The golfers also apparently enjoy the course.

Drop in and try nine or eighteen holes and see if you can tell which greens are which.
Composting Sewage Sludge at Dover, NH
Harvey King & Steve Deinstadt

The Dover WWTP produces approximately 10,000 cubic yds of EQ (Exceptional Quality) compost a year. We use the aerated static pile process with one 3 hp blower per pile for positive aeration and two 15 hp blowers and associated valving for negative mode aeration. Negative mode air goes to three interconnected biofilters for odor control. There is room for 16 piles and temperatures are monitored by two RTD probes in each. Blower operation and valving is controlled by a SCADA system that coordinates pile temperature setpoints and blower on/off cycles that operates a program via a PC. The compost piles are inside a large building open on one side. The area for amendment storage is also covered. Material is moved with a front end loader and is mixed in a Reel Augier – a truck mounted 14.7 yd mixer. We use Andritz two meter gravity belt thickeners and belt filter presses to dewater blended primary and secondary sludge.

Plant start-up was in June of ’91. The first test pile was built August 1st. The mix was half wood chips and half sludge and composted successfully. By mid September we were building piles on a regular basis. Everything looked good – mostly.

The mixture evolved to 1 part new chips, 1 part recycled chips, 1 part cured compost, 1 part sludge. Two problems became apparent: 1) we were running out of room and 2) the recycled wood chips were becoming increasingly odorous.

The room problem was serious enough. With only one part sludge to 3 parts amendment there were times when the compost operator had to tell the other operators to stop the dewatering – there was no place to put it! This delay in dewatering caused increased age or increased septicity in the sludge (depending on how much we aerated the holding tanks) both of which made subsequent dewatering more difficult. Our average solids coming off the press are 15 to 17% but go as low as 13.9% with old or septic sludge.

The “odor” – that’s putting it lightly – was knocking us out. At one point, one of the operators smelled the “odor” of putrefaction almost a mile away. The piles were composting well; the culprit was the recycled wood chips. We screened them out of the compost (using a 50 foot long Royer rotating drum screen – a story in itself – with ¾ mesh) and with each use they became increasingly odorous.

The piles usually start to heat up in a couple of days and for several days give off a fair amount of ammonia. Although the ammonia smell is strong, it dissipates in a short distance. A considerably more rank odor comes from the leachate but that is recycled to the head of the plant and in the composting area also dissipates before becoming a nuisance to neighbors.

Moisture content of the initial mix is critical. Though book values suggest a minimum of 40% solids, but as a simple matter of economics – higher solids % requires more amendment – we often run in the 30 to 36% range. Any lower than that and the pile will not “take off” and has to be rebuilt with more amendment. Permit requires that the pile temperatures reach and stay above 55°C for three days for pathogen reduction and greater than 45°C for 14 days for vector attraction reduction. We test for coliform in-house but send out for metals analysis.

Experimenting with initial mixes in terms of amounts and types of amendments is ongoing as is the constant search for ways to get higher solids concentrations off the filter presses to lessen the amount of amendment needed. Conquering odor and the need to screen associated with wood chips was a great success. Another issue we have wrestled with was the size of the aeration tubes. Initially 8” tubes were specified but visits to other plants convinced us that 4” was sufficient for air flow. It is also considerably easier to handle. We drilled our own aeration holes and switched to fernco’s for tube connection instead of the more costly and difficult Victaulic connectors.

A problem that still plagues us is pigeons. They have found our open compost building an “open house” invitation to nest, proliferate, and excrete everywhere. Their droppings and feathers make an incredible mess and may be a source of parasites and diseases that we prefer – iron in as it may seem as wastewater personnel – not to be exposed to. We also have starlings that nest in, and destroy, our ceiling insulation. We have tried ultrasonics, a plastic owl (didn’t last a day), water hosing, and netting. All had little or no success. A future possibility is stringing up clear monofilament fishing line; that was reportedly successful with seagulls at another plant.

There is one other problem… lightning and our SCADA system. In four years that system has twice been completely wiped out during lightning storms at a total cost of almost $16,000. We have checked the building ground, panel bonding, and our UPS surge suppressor. The second time the system suffered major failure it was actually physically disconnected from the power supply. What remains is surges from input/output lines or data communication cables. We have been assured that this is not an unavoidable weakness of SCADA systems but… we currently take pile temperatures and turn on fans manually. Advantages of the SCADA system are (were) fast temperature status feedback/documentation and programmable control of blowers and valves. It is definately more time consuming to do manually but until we can clear up the lighting problem – and get our new/repaired system components back – manual mode is how we will run things.

The solution to both problems came when one of our operators went to a compost workshop that recommended the use of wood ash and sawdust (softwood only) as an amendment. February of ’92 was our first test with wood ash – ½ ash, ½ sludge – and it was a resounding success. The ash absorbed sludge odors (and served as a carbon source) and allowed us to double the ratio of sludge in each pile. Additionally, we no longer were required to screen to get a good end product. With our screener, compost and chips were designed to come out at designated points; the reality was that they came out at numerous points necessitating constant clean-up. Mechanical maintenance was equally time consuming.

Several points about wood ash. It is more expensive than chips but besides increasing sludge ratio, reducing odors, and reducing/eliminating screening, it also saved us blower energy costs. With wood chips we could not use positive aeration (the smaller 3 hp blowers) during the first two weeks of each pile because of the odor that would be driven off. We had to use the 15 hp blowers instead because the negative mode air went to the biofilters. There were also four overhead fans that we had to keep going for odor dispersion with wood chips and positive mode aeration.

(Composting — continued on page 7)
Hooksett WWTF —  
A Quarter Century of Good Effluent —  
Over 100 Billion Bugs Grown

This September the Hooksett WWTF will have treated sewage to a secondary level for 25 years.

Superintendent Bruce Kudrick, currently in charge, tells us that this was the first secondary treatment activated sludge facility built to discharge into the Merrimack River back in 1968–69. Ralph Page, who many of us remember, was the first Superintendent at the facility.

Congratulations to the Town of Hooksett for supplying the food, to the plant staff, past and present, for properly pumping and wasting bugs and caring about effluent quality, and to the Merrimack River for showing us what nature can do if treated properly.

Quality Education    
Greg Nason

Having worked in the wastewater field for over 10 years, I have seen many advancements in the information available to operations, maintenance and management personnel. New technology combined with a more complete understanding of treatment processes has directly enhanced effluent quality.

One key element for my perspective is the quality of educational courses being offered at the Franklin Training Center. During the past several years the curriculum content and value has vastly improved. Attending these training sessions has proven to be very beneficial to me, as an operator. Not only do the classes provide operators with recent concepts and theories but they also supply a medium for open discussions and the benefits of shared ideas.

Operational difficulties can often be corrected by comparing what has been demonstrated to be successful at a similar facility. Therefore, I believe considerable credit is due to the Educational Committee and the N.H.D.E.S. staff. Their continued support is essential to the future advancement of operator education and training throughout the State. The knowledge available at the D.E.S. is of great worth to me as an operator. My experiences with this department have been both positive and educational. The personnel are always willing to lend a hand with technical assistance or practical advice as needed.

I would like to encourage other operators to take advantage of this valuable resource and to remind them to thank the people whose dedication has helped us to better understand our profession.

Savory Mix: Horseradish & Pollution

It’s a case of condiments to the rescue. Pennsylvania State University researchers have demonstrated that minced horseradish root, long used as a seasoning on meats, also can be used to remove phenols from industrial wastewater. Phenols — toxic byproducts of steel and iron manufacturing, paper bleaching, pesticide production and other industries — can jeopardize human health when flushed into the environment.

An enzyme in the condiment — horseradish peroxidase — when added with peroxide to wastewater caused phenols to precipitate, allowing them to be removed by filtration. The enzyme can be extracted from horseradish, but extraction is expensive, making the cost of purifying 66,000 gallons of wastewater about $2.5 million. Using minced horseradish, which the researchers discovered works as well, costs only $920. Jean-Marc Bollag, head of the research team, says that studies on potatoes and radishes suggest that other plant materials also may help in wastewater treatment.

GEORGE W. BURKE JR.    
FACILITY SAFETY AWARD APPLICATION

DESCRIPTION
The WEF George W. Burke, Jr. Facility Safety Award is presented through NEWEA to a selected municipal or industrial wastewater facility in recognition of a documented illustrated safety program and safety record. The award is presented to the selected facility at the annual NEWEA meeting.

PURPOSE
To encourage an active and effective safety program in wastewater facilities and to stimulate the collection and reporting of injury data.

SELECTION
The award applicants are evaluated and selected according to the following criteria. An on-site visit by the NEWEA Safety Committee may be included during the evaluation process.

CRITERIA
1. Personal Safety Awareness Program
2. Orientation Program
3. On-going Training Program
4. Inventory of Safety Equipment
5. Injury Occurrence Statistics
6. Personnel Check-off System of Skills
7. Program Which Extends Beyond the Plant
8. Any articles/publications/presentations done by facility workers on safety topics to organizations outside the facility
9. Member Affiliation with WEF
10. An Outstanding Feature
11. Highlights of the current Safety Program
12. Safety Committee Minutes for previous year (1995)
13. Evidence of worker participation in the Safety Program

APPLICATION PROCEDURE
Applications must be contained in a single binder no larger than 4" wide.

Send applications to:
NEWEA Safety Committee
C/O Victoria Abbey, Chair
P.O. Box 347
Sunapee, NH 03782

Applications must be received by January 24, 1996
NHWPCA Sponsor’s List

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(603) 253-8418

WRIGHT-PIERCE ENGINEERS
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(207) 725-8721

NEWEA AWARDS

Nominations for Operator of the Year and Alfred E. Pelopequin Award are needed. In July nomination criteria and forms were sent to all NHWPCA members for their recommendations.

If you know of a deserving candidate for either award, please submit a completed nomination form by September 30, 1995.

If you need nomination forms and/or have questions, please call me at (603) 659-3093.

Please mail recommendations to:
NHWPCA Awards Committee
c/o George Lane
Newmarket WWTF
186 Main Street
Newmarket, NH 03857

(Composting — continued from page 5)

Another point about wood ash is that there is high carbon and low carbon wood ash. The former is blacker and fluffier, the latter is more gray and lumpy. Guess which we used . . . "fluffier" gives it away. Actually, we didn't know the difference at first when we were given a load of low carbon ash except that it looked a little different. When we found that it mixed poorly, didn't control odors as well, and made piles harder to take off, we demanded the high carbon ash. Apparently low carbon wood ash is ash that has been reburned for any residual heat values. It is cheaper but was not effective for us.

A typical pile for us is 60' long, 12' wide and 12' high and contains about 230 cubic yards. The piles are stacked up against or "piggy backed" on the previous pile. First, two 4" polyethylene aeration tubes are laid down about 4' apart going through the cement pushwall to the blowers. They have 1/8" holes every several feet and are capped at the end away from the blowers. The area they are laid on is blacktopped and slopes toward the blowers for drainage of leachate. Approximately 6" of sawdust is put over the tubes with the loader, the mix is piled on top and a covering layer of approximately 6" of cured compost is added to the top.

(BODacious! — continued from page 3)

I hope some of these suggestions help you with your BOD results. As I stated before, you may not be able to use all of my ideas, but perhaps they will get you thinking and you'll be able to come up with a better solution to address your problem. The most important thing about BOD's is getting to know your numbers! You can tell a lot about the future of your BOD's when you understand the patterns and trends of both your readings and results. Good Luck!
## COURSE ENROLLMENT FORM

Print name(s) below:

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<td>Communication Skills Workshop (Limit 25)</td>
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<td>SEP 27</td>
<td>Basic First Aid (Limit 15)</td>
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<td>Basic Wastewater Sampling</td>
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<td>NOV 15</td>
<td>&quot;Sealing Dynamics&quot;</td>
</tr>
<tr>
<td>NOV 16</td>
<td>Certification Exam Review – All Grades</td>
</tr>
<tr>
<td>NOV 29</td>
<td>Wastewater Disinfection Alternatives</td>
</tr>
<tr>
<td>DEC 06</td>
<td>Wastewater Math Review</td>
</tr>
<tr>
<td>DEC 13</td>
<td>** CERTIFICATION EXAMS – ALL GRADES **</td>
</tr>
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<td></td>
<td>(Contact the NH DES Wastewater Operations Section at 603-271-2586 for an application.)</td>
</tr>
</tbody>
</table>

**NOTE:** See course description sheet for cost of each class. No cash accepted!

Make checks payable to: **TREASURER – STATE OF NEW HAMPSHIRE**

Send enrollment form w/payment to: **State of New Hampshire, DES, WS&PCD**  
P.O. Box 95, Concord, NH 03302-0095  
ATTN: Wastewater Operator Training

Facility Name: ____________________________  Facility Sept: ____________________________

Date: ____________________________  Type of Payment: ____________________________

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*Good Bye from Ordione Point*