**THE COLLECTOR**

**SHARE YOUR THOUGHTS**

**DECEMBER, 1993**

*Merry Christmas*

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**SYNERGETICS RECEIVE 2ND IN PROCESS CONTROL IN ANAHEIM.**

*L to R* Ken Lowe, Sharon Ostrander, Mark Bernier & Ken Kessler.

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**NHWPCA GOES TO ANAHEIM!**

*by Vicki Abbey*

This is the first year N.H. has been represented in the Water Environment Federation Operations Challenge. It was most impressive to see all that is involved for the Challenge at the national level. Operations Challenge is a great promotion of wastewater operators. We appreciate the support from our associations to make this event possible.

Our associations, NHWPCA and NEWEA, view us as professionals and understand the importance and value of our day-to-day work. Through the associations, our profession is promoted and recognized. The Operations Challenge is an excellent way of supporting our work. It shows the diversity of skills needed. The teamwork in the competition closely resembles what we strive for in our daily work.

Operations Challenge consists of five events. Events are scored on team safety, speed and precision. Each event involves participation by all members.

The Lab event includes each member of the team working independently on a specific lab procedure. The Safety Event simulates rescuing someone from a manhole. Proper procedures for confined space entry, use of a man-hoist, and CPR must be performed. The Collection Event requires installing a sewer service in an 8-inch PVC pipe with water flowing through it. The Maintenance Event is performing preventive maintenance on a progressive cavity pump. The Process Control Event is a team effort working on multiple choice and trouble-shooting problems.

For the National Competition the teams are split into two divisions. Division I is composed of teams that have competed nationally before and placed in the top ten positions in any of the Challenge events. All other competitors compete in Division II.

Teams from Division II may request to compete in Division I. The N.H. Synergetics were confident of their skills and chose to move into Division I. This made for an exceptionally difficult competition.

The Synergetics are definitely Division I material. NHWPCA and NEWEA are proud to have our team return home with a trophy! The Synergetics greatly appreciate the tremendous support from NHWPCA and NEWEA for this event.
Town of Newport
Water & Sewer Department
Position Openings

Water & Sewer Department Foreman
Responsible for maintaining drinking water quality per regulations under his certification.
Performs physical work and also provides direction to laborers, equipment operators, and semi-skilled workers on the operations, maintenance, repair and construction of the municipal water and wastewater systems except the sewage treatment plant.

Minimum qualifications required are: a) possession of a high school diploma or equivalent, b) possession of a valid State of NH Motor Vehicle Operator’s License, c) possession of State of NH Grade II Distribution and Grade II Treatment Certifications or higher and d) at least three years experience in construction and equipment operation in collection and distribution systems or any equivalent combination or education and experience which demonstrates possession of the required knowledge, skills and abilities. Associates Degree in Civil Engineering, Sanitary Engineering or related field desired but not required.

Water & Sewer Department Utilities Technician
Works under the direction of the Water & Sewer Department Foreman and performs physical and technical work involving the operations and maintenance of the Water and Sewer distributions systems.
Minimum qualifications required are: High school diploma or equivalent. At least two years experience in plumbing, pump repair, or in the operations and maintenance of heavy duty trucks and heavy equipment. Possession of a valid NH Commercial Operator’s License. Possession of a valid NH Grade I Treatment and/or Distribution Certifications or ability to obtain required state certifications in distribution and treatment systems; OR any equivalent combination of education and experience which demonstrates possession of the required knowledge, skills and abilities.

The Town of Newport has approximately 1,500 water services and has recently completed construction of a 700,000 gpd slow sand filtration facility.

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NHWPCA OFFICERS

President Bryce Fletcher
Vice President Ken Kessler
Secretary George Neill
Treasurer Richard Roy
State Director John Bush

Director Herb Halevy
Director Mike Martin
Director Mike Nolin
Director Keith Gilbert
Director Dave Brennan
Past President Vicki Abbey

Newsletter Committee: John Currie, Dana Clement, Bryce Fletcher, Mario Leclerc, Greg Nason, Doug Parker, Tom White
Hooksett Wastewater Treatment Facility
1 Egawes Drive, Hooksett, NH 03106
603-485-7000

NHWPCA
Directors Meeting 9/21/93


1. Operations Challenge. Vicki reported that the Synergetics have been training three times per week in preparation for Anaheim. Keith Gilbert and Ken Levesque, from Henniker, have been observing and coaching the team. Fiscally, we have received $400 up til now from donations. We could use more, but the Association should be able to cover the costs of the team’s trip. All arrangements have already been made.

2. National O&M Excellence Award. The Town of Henniker has been awarded second place nationwide in their treatment category for EPA’s O&M Excellence category. The Town of Henniker has requested that the association consider subsidizing a trip for plant personnel so that they may attend the awards ceremony at the annual WEF meeting in Anaheim. This has been done with previous second place winners. It was moved, seconded, and unanimously voted to send a $200 check to the Town of Henniker toward the trip (Keith Gilbert abstained).

3. NEWPCA. The subsidizing of operators’ registration cost to attend the annual NEWPCA meeting in Boston was discussed. The idea was that this may encourage more operators to attend this worthwhile seminar. It was voted to subsidize up to $500 to pay for wastewater operators to attend this meeting on a first come first serve basis.

4. Science Teachers Program. The New England Interstate Water Pollution Control Commission has written to this association to request that we consider donating “Adopt A School” education packages. As in past years, these were given out to junior high school teachers at the annual Science Teachers Education Program which is held at various locations throughout the state. NEIWPC plans to hold the next program on March 25, 1994, at the Berlin, N.H. WWTF. This program has been extremely well received by teachers throughout the Granite State. The Board voted to purchase ten of these kits for donation to this effort.

5. December Meeting. To be held at the Dover WWTF with lunch at the New England Center in Durham on December 9, 1993.
NEWEA Awards For 1993

by John Bush

Every year the New England Water Environment Association (NEWEA) solicits from the state associations nominees for the Alfred E. Peloquin and Plant Operator of the Year awards.

One of the responsibilities of the NEWEA state director is to serve as the chairman of the state selection committee. As chairman this year, I decided a five member committee would be adequate to decide on the two nominees. In addition to the chairman, the committee consisted of Lorraine Sander, Vicki Abbey, George Neill, and Dale Sprague.

I felt it important that all members of the state association have an opportunity to provide input regarding candidates for the two nominations, so a request for names was mailed out with the fall meeting notice. Due to a delay in mailing, only a very short period of time was provided for input from the membership. However, we did receive three nominations each for the two awards and the committee met on October 1st to determine this year’s nominees. Nominations received from state association members were:

- **Operator of the Year**
  - Robert Cote
  - Roger Pinard
  - Terry Welch

- **Alfred E. Peloquin**
  - George Lane
  - Wesley Ripple
  - Nelson Thibault

The Alfred E. Peloquin award is given annually to a person involved in the operations of wastewater treatment facilities from each of the six New England States. This award is to recognize an individual whose personal service has contributed to excellence in plant operations either directly at a treatment plant, or indirectly through assistance to plant operations personnel.

It is our pleasure to announce that this year’s nominee for the Alfred E. Peloquin award is George Lane of the Newmarket Wastewater Treatment Plant.

The Operator of the Year award is given annually to a person directly assigned to and routinely involved in the day to day operations, maintenance, laboratory and/or related functions of a wastewater collection, pretreatment or treatment facility. The nominee must demonstrate outstanding performance in one or more of twelve areas related to the wastewater field or association contributions.

This year we are pleased to announce that Terry Welch of Welch’s Water and Wastewater Service will receive the Operator of the Year award.

Congratulations to George and Terry for these years awards.

I would like to thank all those that were involved this year, from the committee members to those association members that submitted nominations. Next year I intend to provide a longer response time and urge more members to get involved.

NHWPCA
Heads To The Coast

The next regular meeting of the Association will be held in the coastal region of the Granite State. In the morning of December 9th at 9:30, tours of the Dover WWTF will commence. This new plant which went on line in 1991 is a fine bubble aeration plug flow activated sludge plant. Other interesting features include computer assisted static pile composting and a unique array of ultraviolet disinfection lights. Tours, coffee and doughnuts will all be courtesy of OMI, the facility's contract operation company.

Subsequent to the tour, we will head over to Durham, NH for a bit of Christmas cheer at The New England Center where we will also be enjoying their buffet. After dining, there will be a business meeting featuring Mr. Al Firman, Vice President of Camp Dresser & McKee Engineers, who will discuss a variety of current operational topics of interest to our group. Our annual Christmas raffle will then take place. (We are hoping that our friends out there will bring items for this.) Who will be master of ceremonies this year?

This should prove to be another interesting and enjoyable meeting. Happy Holidays to all!

Where is Brian

(Find Brian Carroll in this picture . . .
Win a free Reed Starter Kit)

Believe it or not, but Brian Carroll grew these 12-14 ft. reeds on sludge in his drying beds this summer at the Woodsville WWTF. He also designed, purchased and installed a belt press in an existing garage at very little cost to the town. Want details — next issue of The Collector hopefully will tell the whole story.
Plant Profile
Epping WWTF

by John Currie

TOWN PROFILE: Epping is a small residential community located approximately 15 miles west of Hampton, and 20 miles east of Manchester. "Home of Three Governors" states a sign as you enter the town on Rte. 125. The town, like many others in the state, is actively seeking industrial and commercial growth.

PLANT STARTUP: The original plant began operating in 1970.

SERVICE POPULATION: Approximately 320 sewer and 310 water connections.

FLOW: Design .265 MGD
Current ADF .1 MGD

PLANT PROFILE: The plant was upgraded from stabilization ponds to Lasalle-based aerated lagoons in 1985. It is a three-cell system, with approximately 30 days detention time per cell at current flows. One cell was stocked with humpout last year to try and minimize sludge accumulation, but it is too early to judge their effectiveness. The plant has an aerated septage receiving station; screening and grit removal; and disinfection by sodium hypochlorite. The receiving water is the Lamprey River, and in the summer its flow must be monitored — if it drops too low, discharge from the plant is prohibited.

The town has one pump station which serves a large portion of the sewered population. It was upgraded in 1989, using submersible Davis EMU pumps in a drywell installation. The control panel was brought above ground, eliminating the need for Confined Space Entry for routine operation. Also in 1989, a new lab, office and garage were constructed. Future plans may include an aeration system upgrade, as well as expansion of septage receiving capabilities.

OPERATIONS STAFF: Norman Dionne is Epping's only full-time operator and has been at the plant since November 1987. In addition to O&M of the wastewater plant and collection system, Norm operates and maintains the town’s water distribution system, and occasionally lends a hand at the Highway Department. Norm does get help with the grounds and weekend shifts from two seasonal part time employees, but takes the rest of the workload. A supportive town administration lightens the weight of this load, and though he’s very busy, he enjoys his position and is gratified by the consistently good performance of the plant.

Farewell Linda

by Bryce Fletcher

The New Hampshire Water Pollution Control Association suffered a great loss in November, when our Secretary (Linda Grimard) from the Hooksett WWTF relinquished her Secretary responsibilities for the NHWPCA. Linda has been our Secretary since 1989, and her services were a tremendous asset to our Association. Since taking over the secretary position, Linda has performed all mailings and maintained all computer tracking for members, sponsors, voting members, trade fair participants and more. Her skills in computer wizardry are leaving the Association with a very sound computerized tracking system that all of us should be proud of. In addition, Linda is providing training for the Association’s new Secretary which is making this transition as smooth as possible. As an innocent bystander during some initial training, I was very impressed with the tremendous effort Linda put into making the computerized tracking system an efficient tool for our Association. Linda’s dedication and efforts are exemplary and on behalf of the NHWPCA, I am extending our appreciation and, gratitude for her work. We hope Linda will remain active in our Association and look forward to seeing her at future gatherings.

The Association has hired Jane Frost to replace Linda as the Association Secretary. Jane lives right in Concord, and is very enthusiastic. Welcome aboard Jane.
Getting To Know Your “Bugs”
Part II

by Wes Ripple, NHDES

In the last issue we talked in general terms about the role of protozoa in the activated sludge process and their value as process indicators. In this issue, we are going to discuss in greater detail why each particular protozoan group may be found at any given time and what they do or do not do to enhance treatment.

Amoebas — There are actually two types of these free flowing organisms. The most familiar form is the blob like creature that lacks a definite shape. These are referred to as the “naked” amoeba. They move about very slowly by shifting protoplasm from one portion of their body to another. This shifting of protoplasm produces an appendage called a pseudopod, or false leg. This is a temporary extension of the body that is also used to gather and engulf food in a process called phagocytosis. If you accidentally bumped the microscope slide the amoeba may become disturbed and roll itself into a ball or may assume a rayed shape. These may be defense mechanisms.

Naked amoeba are frequently found in the raw influent but usually perish once inside the aeration basin. They can tolerate very low D.O. levels. Their source of food is small, solid, particulate organic matter. It is not unusual to see one or two per sample, but an abundance would indicate problems. They are associated with organically overloaded plants and low MLSS concentrations. They may sometimes appear after a process upset. A substantial number of these organisms would indicate an effluent high in BOD and TSS. Naked amoebas do nothing beneficial for the process.

The other type of amoeba are of the testate variety. They live inside a shell (testa) similar to a hermit crab. The shell is made of secreted organic compounds and is sometimes reinforced with sand grains. The two most observed types are arcella and diffugia. If you looked at one under the microscope all you may see is the shell. The amoeba itself is not noticeable unless it happens to be protruding from underneath. Testate amoebas are good process indicators. Their presence is found in lightly loaded plants operating at high MLSS concentrations with low effluent BOD and NH₃-N levels. Arcella has a fondness for eating nitrifying bacteria.

Flagellates — Flagellates appear along with or slightly after the amoeba. They move about by the beating action of long, whip-like tails called flagella. They have a tendency to move in odd movements resembling a corkscrew motion due to the whipping action of the tail. Under diverse conditions, the flagella may be lost, only to regenerate when conditions improve. The smaller flagellates are often mistaken for free swimming bacteria, so observation under 400 x is often required to verify the existence of the flagella. Many species utilize soluble organic matter for food. They are highly inefficient eaters, utilizing a chase and capture technique. This expends a lot of energy, which requires a large amount of food. They compete with the more important floc forming bacteria for this food. Flagellates are often found under high organic loadings or after a process upset. A large number of them would indicate an effluent high in TSS and BOD. They contribute little to the process.

Free Swimming Ciliates — Ciliates appear soon after the flagellates. They are round to oval in shape and move about by the beating action of hairlike cilia. Their movement is much smoother than that of the flagellates. All of them like to indulge on free swimming bacteria. A few species are carnivorous. Chilodonella sp. has even been observed to eat filamentous bacteria. The free swimmers graze around the floc looking for food. This requires energy and necessitates a large food supply. Their population tends to peak when the bacteria population is at its peak. At this point, floc formation has begun and settling has improved. The ciliates help to regulate the numbers of bacteria and may help form the floc by secreting slime material. A preponderance of these organisms would indicate a sludge on the young side but one that would produce a satisfactory effluent.

Crawling ciliates — These are considered free swimming ciliates. The only difference is that their cilia are fused together to form spikes on the underneath of their body. They use these spikes to crawl around on the outside surface of the floc grazing for bacteria. They appear along with and slightly after the free swimmers. The species observed most often are Aspidisca. Crawlers are good indicators of a properly treated effluent.

Suctoria — Suctoria are related to the stalked ciliates and appear in between the free swimmers and stalked ciliate stage. They attach themselves to the floc particle with a stalk, but instead of cilia they have hollow tubes projecting out from their head. They are a predator and eat protozoa as large as themselves. The prey get stuck to the end of the tubes and an enzyme is injected into the prey which breaks down its internal organs. The suctoria then proceeds to suck out the prey’s bodily fluids. This process takes about 1/2 hour. Suctoria aid in settling by adding weight to the floc.

Stalked Ciliates — The stalked ciliates appear soon after the free swimming ciliates and when the free swimming bacteria population is on the decline. These ciliates are the most efficient feeders of all the protozoa. They attach themselves to the floc and wait for the food to come to them. The free swimming bacteria are drawn into the mouth of the ciliate by a current created by the beating action of the cilia. These ciliates can filter as much as 500 MLS per hour.

The stalks are classified according to single or colonial growers and contractile non-contraction forms. The colonial forms accrue at the higher MCRT’s. A lack of a beating action by the cilia may be a sign of possible toxicity.

Some stalked ciliates can produce a free swimming form called a telotroch. This may occur during period of reproduction or as a response to unfavorable environmental conditions.

Stalk ciliates reduce turbidity by eating stray bacteria and are good indicators of a well stabilized sludge.

In the next issue and the final part of this article, we will talk about some of the higher life forms and their significance. Did you know that there may be some organisms living within your mixed liquor that actually have claws?
Operations Challenge

News Article

This is a report from the national Operations Challenge competition that was held on October 5, 1993 at the Water Environment Federation convention in Anaheim, California. The article is written from the perspective of the New Hampshire team members that participated in the competition.

The National Operations Challenge is quite an amazing event. It is part of the annual wastewater convention that is much larger than we had ever realized. Rumor said that approximately 16,000 people were attracted to this year's convention. The competition is likewise very large with 35 teams participating and literally hundreds of people involved when judges, and organizers are included. All of the teams are outfitted in distinctive uniforms, like athletic teams, and the top teams have come truly amazing specialty performers on their side. In general, the teams are very friendly, encouraging, and helpful and are sympathetic with the "intimidation factor" that accompanies a team that is participating in the challenge for the first time. In spite of diligent attempts at the state and regional competitions to duplicate the national events, there are always things that are a little bit different which make last minute adjustments necessary. These little nuances can really throw a team off and make a disaster out of an event considered to be a team's strength.

What is involved with this competition? It is really about 4-5 days in length. At least three days before the event, one must plan to arrive in the city in which the competition is being held, because a full day (9 a.m. to 4 p.m.) of review for the process control event is conducted two days before the competition day. During this session, the teams get an idea of the format in which the mathematical questions will be asked and the various hints and tricks used in the statement of the questions. Multiple choice questions are not discussed, probably because there are no limits to the subject matter that can be covered with these questions. There are 25 multiple choice questions which are assembled by the ABC national testing and safety equipment is set up in the arena, which is open for the team's inspection. This is each team's chance to discover the differences between what they've practiced with and what will be used in the following day's competition, and to formulate last minute strategy changes.

The day of the competition is nerve-wracking and can be intimidating. The team wants very badly to do its best in the events but, while waiting to start, worries begin to creep into the mind about making mistakes and simply not performing well. Finally, the time to start the first event arrives:

We started with the Safety Event and everything went smoothly. We recorded our best base time ever — we were almost 60 seconds faster than the time we registered in New England challenge. We were ecstatic and gained a lot of confidence that we belonged here. However, the judges took a long time to arrive at a final time because of possible mistakes. Our captain discussed the situation with the judges but the result was a 50 second penalty. This made our time good but not nearly as impressive at its potential.

Another wait for the next event — Pump Maintenance. This is the most complicated of the "physical" events but one that we had worked hard on and felt that we had mastered. We were "ready for this one" and as we got started things were going slick. Our progress was on target with our best practice times but about six minutes into the frenzy, disaster over- took us. We couldn't get one piece of the pump to align properly. Sweat began to pour, uncomplimentary language began to flow, communication broke down, and minutes flew by without the pump going back together. After an inordinate length of time, we gave up to suffer the embarrassment of our worst time ever. Did the hype of the "big event" blind us, did we suddenly go blind, or did George Laney give us the "trick pump" that all the judges were talking about? (only kidding George).

Our next opportunity was in the Laboratory. The event really generates shaking hands and nervous fingers as judges lean over the contestants anatomy to check "technique" and accuracy of the procedures. It feels like high school study hall when compared with the fury of the Safety, Pump Maintenance, and Collection events. Each of the four team members does a separate lab procedure independent of the other teammates. The judges do not reveal a lot of clues about each person's performance, so the team exits the laboratory area without any inclination about the outcome. This is really the case with all fo the events but in the other four, at least the raw time score is known. The laboratory event leaves the total time an unknown. That was good because we had one less thing to worry about. We all felt reasonably
confident about our procedures so we thought that we must have done well overall. As we found out much later, we finished about in the middle of the pack of fifteen teams.

Fast on the heals of the laboratory work was the Collection System repair. We had a lot more difficulty with this event than we anticipated. Of all the events, the top teams in this event left the biggest impression. It was almost unfathomable how quickly some teams were able to cut through 8" diameter PVC pipe. It was as if they were using power assisted machinery to help the cutting process. We did not have the overall cutting speed of some teams, with the exception of our team captain who was a powerhouse, and we had big trouble seating the saddle and positioning the Fernco couplings. Also we received a penalty because a saw was returned to the tool box from a horizontal distance of about 15 feet. This may be the only arena in which Michael Jordan moves are not acceptable. On the positive side, our repair was water tight which gave us some consolation — quality work over speed always proves to be more cost effective in the long run. Unfortunately, cost effectiveness was not one of the judging criteria used to score the event.

The grand finale for us was the Process Control event. The team was escorted out of the main competition arena and quashed into a room that was partitioned off with curtains similar to a hospital ward. Either relaxation or a sense of frustration over weak performances in the pump maintenance and collection system events must have caused us to enter the most cerebral event with the right "frame of mind". The stop watch started and we worked at a feverish pace to complete the multiple choice and calculation questions. This is another difficult event in which to assess performance because it is the only event in which other teams cannot be observed. We powered our way through the answers and turned in the answer pages and our first national operations challenge was finished.

Certainly a feeling of relief existed among us but it was a dissatisfied or, maybe better, an unfulfilled feeling because we knew that we didn’t perform up to our capability in at least two of the events. All that remained was the awards ceremony and the relaxation that follows participation in such a competition. Teams were relieved and a lot looser. Playful banter and wise cracks flowed like water. The genuine character of other teams came out at this time and invitations to join post competitions celebrations were flying freely. Perhaps the strongest sense for the brotherhood of wastewater operators was felt at this time. It was really neat to have been a part of such an event.

Then came the big moment, the announcements of the winners. They started with Division 2 teams, awarding first and second place trophies for each event, and finally, first, second, and third place trophies for over-all placement. We had entered the First Division and knew, after our performance, that there was a slim chance of walking with anything. We listened, while team after team was called forward. Then, for the first time that day, our team’s name was pronounced correctly as we were called up to receive the second place award for the Process Control Event! We had only missed first place by six seconds. We proudly went forward to receive the first trophy ever to be awarded to any New England team.

To be a part of an event as grand as the Water Environment Federation Operations Challenge is truly an experience, with all the hype and the level of competition at hand. Just to be able to even make it to the Nationals is an accomplishment in itself. Placing in the top three in one of the events made the hard work and many hours of preparation worth the effort our team put in to the competition.

We are grateful for the support we received from the members of the association, our employers, and our families. This support helped to ease some of the nervousness we were all feeling as we competed in our first National tournament, and we would like to send a special note of “thanks” to all of you.

In closing, the New England Synergetics are very proud to have represented the State of New Hampshire in the 1993 Operations Challenge in Anaheim, California.

Thanks again for all of your support
Ken Kessler, Sharon Ostrander, Kenneth Lowe and Mark Bernier
THE NEW ENGLAND SYNERGETICS
(Coach Victoria Abbey)
A Fish Story

by Thomas Hastings, Swanzey WWTF

The idea of introducing hornpout into an aerated lagoon facility to reduce sludge blankets seemed like a wild idea at the time, but facing approximately two and one-half feet of sludge in my primary lagoon in West Swanzey and investigating the cost of mechanical removal, hornpout may be the way to go. Although this method of sludge removal is new in this part of the country, I imagine the Japanese have been doing it for a long time.

During the summer of 1992, we found after taking sludge blanket levels in the three lagoons in West Swanzey that we needed to consider a method of sludge removal in the near future. The primary lagoon contained two and one-half feet of sludge, and the two smaller lagoons each contained a foot. Roughly speaking, the system contained 260,000 gallons of sludge. Initially, I called a couple of companies that deal in sludge removal using a tank truck which then is taken to a site out-of-state for the sludge to be processed and disposed of. Much of this work would involve plant personnel and since the West Swanzey facility is manned part-time, almost the entire job would have to be done by a hired crew. With prices ranging from 13¢/gal. to 17¢/gal. to haul the sludge off-site and truck it to a processing plant, the total cost for removal would be between $35,000 and $40,000. Most of the cost depended upon the distance the sludge was hauled to the processing facility. At one time, the idea of applying sludge to the land surrounding the facility which is presently used as a hay field, was considered, but after reading the regulations involved in sludge application, that method was no longer considered.

During the summer of 1992, I had a chance to visit Terry Welch at his Bretton Woods aerated lagoon facility in the White Mountains. Prior to the visit, I had heard that Terry had stocked his ponds with brown bull-head hornpout approximately four years ago. His sludge levels were in the two to three foot range, and in that four year time, his sludge blankets were reduced to approximately two inches. He said his hornpout had multiplied in great number, had grown to in some cases a foot in length, and were surviving very well.

With this information and many conversations with Terry, I set out to try and find a fish hatchery that could supply me with the fish. It was either that or fish for them myself. With fall and winter fast approaching, the fish addition to the lagoons would have to be made the following spring.

During early spring of 1993, I called the Fish & Game Department and talked to Carol Henderson, the resident biologist. She was very interested in this project because it had never been done to her knowledge and like a lot of people that I have talked to, they find it hard to believe that fish will eat sludge. She sent me a great deal of information on the brown bull-head hornpout, the most common native of New Hampshire. With this information, I was able to locate a fish hatchery in Center Barnstead, New Hampshire. Ed Keefe of Beauty Hill Farm Hatchery and Pond Management, raised the hornpout. He said they would probably be ready to be delivered sometime in May or the first part of June. He would charge me $1.25 per fish and we settled on 300 as a trial. The State of New Hampshire Fish & Game Department requires a permit to complete this transfer of fish. A Permit to Release Wildlife was the appropriate permit. With the delivery date fast approaching, the Fish & Game Department stressed a number of times to not let the fish enter the receiving waters of the Ashuelot River. To avoid this occurrence, Scott built a sluice gate with holes cut in it small enough to not allow fish to go through that gate, but to allow plant flow to exit as usual.

Beginning in April, I began to monitor the pH, D.O., ammonia, temperatures and sludge levels in the lagoons. From the information Carol Henderson had supplied me with, I soon realized the hornpout could live in the lagoons. The hornpout can withstand great changes in water conditions and survive where other fish die.

On June 12 Ed Keefe called me and said he would be bringing the fish down early Saturday morning, June 15. Three hundred hornpout, approximately six inches long, were delivered with 100 being put into the primary lagoon and 50 each in the other two smaller lagoons. At a cost of $375, this experiment in sludge removal would be worth every penny. Saturday, I took two fish and froze them so they could be given to Walter Henderson, a Fish & Game Biologist in Concord. He told me he would test them for metals. Sunday the 16th, Scott found two dead fish near the point of entry into the primary lagoon. Because their gills were wide open, they probably died from lack of oxygen. I also sent these two to Concord to be studied. Since that day in June, we have not seen any sign of the fish in any shape or manner. Every other month I take a sludge blanket reading with the sludge judge. Although the blankets remain the same, I strongly feel that there will be a difference in the spring of 1994.

The idea of adding hornpout to lagoons to reduce sludge blankets is spreading very rapidly among aerated lagoon facilities in New Hampshire and Vermont. If it does work, it will save a small fortune and also prevent the sludge blankets from ever getting any higher than a few inches. Much more research needs to be done with this idea.

Sludge & Septage Management Symposium

NH Department of Environmental Services Auditorium
Concord, New Hampshire
December 13, 1993

The New Hampshire Department of Environmental Services, (NHDES), in conjunction with New England Interstate Water Pollution Control Commission/New England Interstate Environmental Training Center, will be sponsoring a one day symposium entitled "Complying with Sludge and Septage Regulations—Options to Consider". We will be introducing two new audiovisual presentations developed to provide municipalities with an overview of the use and disposal options. The symposium will include presentations by state and federal officials to explain the current regulatory requirements and also case studies with New Hampshire examples. A session concentrating on sludge management will be held from 8:30 a.m. to noon. The afternoon session, from 1 p.m. to 4:30 p.m., will concentrate on septage use and disposal alternatives.

The symposium will be located in the NHDES Office Building auditorium on 6 Hazen Drive in Concord, NH. There is no charge, however, space is limited, therefore preregistration is required. To register, please contact Kirk Laflin, NEIETC, at (207) 767-2539. For further information contact Selina J. Makofsky, NHDES, at (603) 271-2457.
I recently had the good fortune to be selected to participate in the Operator Exchange Program. This year the exchange was between Vermont and New Hampshire. I spent three days in September touring a half dozen wastewater facilities across the State of New Hampshire.

On Tuesday morning, September 21, I met Bryce Fletcher, New Hampshire Water Pollution Control Association President. Our first stop was Hanover WWTP, where Don Elder walked us through that facility. Hanover (upgraded to secondary treatment in 1988) is a conventional activated sludge process with anaerobic digesters, UV disinfection, and a sludge belt press. An average 1.3 MGD is treated and discharged to the Connecticut River. Hanover is quite similar to the Springfield, Vermont, facility where I was first employed.

On to Henniker where Keith Gilbert toured us around the Charles E. Damour Wastewater Facility. This facility, built in 1976, discharges to the Contoocook River. This facility received a 1993 EPA Operations and Maintenance Excellence Award and, at the time of my visit, the staff was hopeful about raising the funds to travel to the WEF Conference in Anaheim, CA, to accept that award.

The third stop of the day was the Concord WWTP. Two staff members familiarized us with the layout and process flow of this 10-MGD plant (3.8-4.3 MGD average flow) and proudly described their successful industrial pretreatment and public relations programs. Operations chief Mike Hanscom gave us a tour. Here they have two-step secondary treatment. After the aeration tanks the mixed liquor goes through biocells (or bio-towers) where, through a sprinkler distribution system, it is trickled down through tanks filled with a media of redwood pallets, then on to the clarifiers. Very similar to the RBC or circular trickling filter process.

By this time I was tired and my head was spinning with shop talk. Bryce checked me in at a nearby motel where I relaxed poolside for a while. That evening I attended a Board of Directors business/dinner meeting and met my tour guide for the following day.

Wednesday morning Tom White, State of NH D.E.S. Operations Section, picked me up and took me to the Manchester WWTP. I was awestruck! This is the largest facility I have ever visited, and they were under construction from one end to the other! They are a 23 MGD design, typically treating 10-15 MGD but see stormwater flows in excess of 50 MGD and still meet permit. The upgrade construction includes new clarifiers, aeration tanks, computer telemetry, odor control systems, a third filter press, and a fluidized bed sludge incinerator to replace a multiple hearth. Mark Saltmarsh, Chief Lab Technician, provided us with a very comprehensive tour.

From Manchester Tom and I traveled to the Milford facility. There, Steve Hodges showed us around that 12-year-old facility that discharges an average 1.2 MGD to the Souhegan River. I was particularly impressed with Steve’s description of the nitrification/denitrification controls employed in the step-feed aeration system enabling them to meet their 6.5 mg/l ammonia limits.

I was returned to my motel and had the evening free to discover Concord’s nightlife on my own, which was, pleasantly, uneventful.

Day three. I traveled on my own to Canaan, NH, for a tour of that one-year-old 55,000 GPD design lagoon facility operated by Lee Hennessey. This was the only indirect discharge facility I visited. The lagoons treat septic tank effluent which is pumped to the plant from the 150 tanks installed by the town at individual homes. The lagoon effluent discharges to sand infiltration beds from which it eventually leaches to the Indian River a half mile away.

After that tour, I attended New Hampshire’s Fall Business Meeting and buffet dinner at the Canaan Fairgrounds. Then after an hour (or two) social gathering, traveled home.

The trip was great! I’ve operated a small RBC facility in Sherburne for nine years and I really enjoyed getting out to see, and be reminded of, what is “out there.” Meeting with my New Hampshire colleagues was educational and a morale boost. I was greeted warmly at every facility, wined and dined along the way, and had a really grand tour. My sincerest thanks to the NHWPCA, the GMWPCA, the Sherburne Fire District #1, the folks I met at each facility, and especially to Bryce Fletcher and Tom White.
Be Kind To Your Spine

by Larry Untiet

If you are like most people, you chose picture "C". C is incorrect, as is A. B is the correct lifting posture.

Why is C incorrect? Well, we have been taught to lift with our legs, right? When our hips are below the level of our knees, as in C, our back must initiate the lift. Our legs will take over when our hips are at, and then above, knee level.

So then, why is A incorrect? The woman's hips are above knee level. Consider this: A 180-pound man who lifts a 70-pound box causes over 1,000 pounds of pressure in his lower back discs. Muscles and ligaments are designed to protect the disc structures which cannot protect themselves. If the back is rounded, as in pictures A and C, the muscles and ligaments which are designed to protect the back, are stretched and cannot do their job. Thus, the back is at risk for injury.

Now consider a weight lifter who lifts 600–700 pounds. He takes a wide stance with hips above the level of the knees; his lower back is curved in; his head is up; then he lifts. By lifting with his back curved in, the muscles and ligaments are working from their strongest position to protect his back. The curved in position is the back's normal and strongest position.

This makes sense, doesn't it? Your back is strongest in its normal position with its three natural curves. To prevent back injuries from occurring when lifting, you should:

1. keep you head up;
2. keep your lower back curved in;
3. assume a wide stance with your hips above knee level; and
4. keep the load close to your body.

But, did you know that many back injuries are not caused by lifting and many people who suffer back pain (eight out of ten Americans) cannot recall the incident which caused it? Look back at the lifting pictures. Which picture of the spine looks most like how you sit or stand? If you drive for two hours or sit at your job for eight and your spine looks like pictures A or C, you could be setting yourself up for a back injury.

To prevent this, try to keep you back in its normal curved position whether you are sitting at a desk, driving, standing, sleeping, lifting or performing repetitive tasks such as raking, shoveling snow or vacuuming. By keeping your lower back curved in, your muscles and ligaments are strongest and can best protect themselves from injury.

TIP: If you have a "bad back", sit and/or drive a lot and do not have a chair or driver's seat with good lumbar support, use a "roll". A "roll" can be a small pillow, your jacket or a rolled up t-shirt (put masking tape around the rolled up t-shirt to secure it). Sit all the way back in the seat, placing your "roll" in the area of your lower back between you and the seat. The "roll" will help you back to maintain its curve by letting the supporting structures relax while you sit or drive.
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We are grateful to the many operators for their help with training sessions:
Rick Seymour, Nancy McAuley-Lesieur, Lorraine Sander from Nashua WWTF,
Ken Levesque, Keith Gilbert and Mary Dowse from Henniker WWTF,
Cris Hipkiss from Pittsfield WWTF
Bob Urban, Dufresne-Henry
Tom White and Wes Ripple, NHDES
Thanks to Concord WWTF, Coca-Cola USA WWTF,
Sunapee WWTF and Warner WWTF for donation of equipment for training.

Tremendous appreciation goes to John Bush, our NEWEA State Director, for his work, dedication, perserverance and support to the team for this competition. We certainly couldn't have managed as smoothly without him.

The Synergetics want to acknowledge their co-workers at Nashua, Coca-Cola and Sunapee WWTF for their support. The team members want to especially thank their families for their patience and understanding for the time spent on this event.

The essence of Operation Challenge is TEAMWORK and that includes all of you. Thanks for being part of the team!!!