What's Been Happening in the World of Sludge?

by Shelagh Connelly

History

Up until the day before last Thanksgiving, sludge landspreading and composting in New Hampshire fell under the jurisdiction of the federal sludge standards promulgated by the US-EPA since 1993. These standards, called the 503’s, were based on over fifteen years of research and a risk assessment which established conservative standards protective of human health and the environment. The NH-DES had been in the process of developing their own rules at the time the 503’s came out, but decided not to duplicate efforts and instead chose to defer sludge activities to the federal rules in lieu of state rules.

The 503’s worked well in New Hampshire for the first two years of implementation. However, the 503’s did not ultimately solve New Hampshire’s septage and sludge management issues. Rather, the 503’s made things a bit worse for the granite state. The problem stems not from what the 503’s say, but instead from what the 503’s do not say. In particular, the 503’s do not Nuisance ordinances and public health laws were invoked to shut down projects, either temporarily until concerns could be addressed, or permanently through an outright ban on sludge.

Emergency Rules

On November 22, 1995 the NH-DES adopted emergency septage and sludge management rules in response to pressure from communities around the state. Concerns had been raised about odor, lack of notification to both towns and abutters to sites, potential for spread of disease, material being stabilized on site, and out-of-state sludge dumping in New Hampshire. The emergency rules effectively put a halt to what winter would soon do anyway, spreading of most sludge stopped. The emergency rules would be in place for 120 days, providing the time necessary to address the overall situation and to formulate permanent rules for adoption by the state.

Technical Advisory Committee

The Technical Advisory Committee (TAC) was convened by the NH-DES on December 7, 1995 and met five times to discuss Sludge? — Continued on page 5
President Keith Gilbert
Vice President Dave Brennan
Secretary George Neill
Treasurer Rich Roy
State Director George Laney
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 P.O. Box 95 Concord, NH 03302-0095 Att: Tom White

HWHPCA Directors' Meeting

December 14, 1995

Attendees: Mr. Keith Gilbert presiding; Mary Dowse, Ed Rushbrook, George Laney, Rich Roy, Moe Gauthier, George Neill and Ron Hoffman

1.) Minutes from the last Director’s meeting of September 19, 1995 were read and approved.

2.) Biosolids Committee: Keith and George Neill discussed the recent promulgation of DES’ emergency sludge rules and the formation of a Biosolids Committee within NHWPCA. This committee will be involved in the current development of permanent sludge rules which will be ongoing until late January. Additionally, the intention is to increase public awareness of biosolids issues and to deal with technical issues as they effect the wastewater industry. It was moved and voted unanimously to establish this committee and to establish a budget for this group.

3.) Winter Meeting: Ed Rushbrook reported that the Winter Meeting was a reasonable success in spite of a late mailing which was compounded by the proximity of the Thanksgiving holiday. The meeting content was very good and it was well received by the membership. The format was good and we will consider staying with it for next year’s Winter Meeting. Next year, however, we may have to get Aunt Henrietta to do the raffle!

4.) NEWEA Update: Annual Meeting on January 28–31, 1996. The President and Vice President were invited to both the Executive Committee meeting and the State Association Presidents dinner. They both represented our Association at this important annual meeting. George Laney was responsible for setting up our Association’s booth at the meeting.

5.) Trade Fair: Due to the lack of availability of the Center of NH in late March, we have had to move the date of the Trade Fair to April 4, 1996. We have sent out a postcard reminder in January to notify people of the change from the norm. Vendor notifications have also gone out in January. Much discussion ensued about a speaker and subject matter. The idea of the recent development in biosolids rules came up, so we will

Awards to Our Members

DONNA TRASK
Keene WWTF N.E.W.E.A. Alfred E. Peloquin Award
This annual award is given to an individual who has demonstrated a high level of performance in W.W. operations or a related activity. We all know Donna has presented talks, been on Committees, and written articles for our Association. Congratulations Donna.

SYNERGETICS
Ken Kessler, Sharon Ostrander, Mark Bernier, Ken Lowe and Vicki Abbey.

LORRAINE SANDER
Nashua WWTF N.E.W.E.A. E. Sherman Chase Award
This annual award is given to an individual demonstrating notable achievements in management, public relations or O&M useful to the profession. Lorraine has “pioneered” many new programs for our Association.

NASHUA WWTF
EPA Region 1 “O&M Excellence Award”
To the staff for their commitment to clean water through excellence in O&M and effluent quality.

NASHUA WWTF
W.E.F. George W. Burke, Jr. Award
For an excellent safety program, one that includes training and reporting of injuries, etc.

SUNAPEE WWTF
EPA Region 1 “Most Improved Treatment Plant” Award
For their exceptional efforts working in conjunction with DES Operations section staff, to return the facility to compliance.

New Faces in New Places

Tom Burt — hired to assist in operation of the Henniker WWTF.

Vicki Abbey — has moved from Sunapee to Exeter to manage the Water & Wastewater Department there. Good luck Vicki.

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seek out an appropriate individual. Keith and Dave will pass out vendor notifications at the annual NEWEA meeting.

6.) Budget: The upcoming Association Operation budget for 1996 was reviewed and discussed at length; ultimately, it was voted on and passed.

7.) The next Directors’ Meeting is scheduled for February 8, 1996 at the DES Training Center in Franklin.
Contract Operations
After the Dust Settles — Three Perspectives

by Harvey King

The choice between Private Contract Operations (Con-Ops) or Public (municipal) Operation of a municipality’s WWTF is a difficult one due to the complexity of this issue. Emotions run high on both sides and people’s perceptions of the Pros and Cons are varied.

An effort has been undertaken by EPA, Consultants, Municipalities, and State and Regional Environmental Protection Agencies to diagnose and to clarify the issues and recommend how a municipality may go about making an informed decision — Con-Ops or not?

On October 16, 1995, a “Contract Operation Workshop” was conducted at the Urban Forestry Center in Portsmouth, NH and was attended by those parties mentioned above. With input from all, a list of perceptions of advantages and disadvantages of both Public and Private Con-Ops of WWTF’s was generated.

Other issues such as 1) who is responsible for what 2) what is a good contract, and 3) what should be included in a RFP were discussed.

As a follow up to this workshop, the NHWPCA winter meeting hosted three excellent speakers on this subject matter. Chuck Conway, EPA, a seasoned veteran in the wastewater field who has been in most WWTF’s in New England at one time or another and knows his E-coli. Randy Monti, Administrator, Winnipesaukee River Basin WWTF, a quiet but very analytical and effective force during the recent evaluation of Con-Ops for that facility. Mike Bobinsky, an experienced public works administrator who has had past experience with Con-Ops in other areas and who recently coordinated an RFP process for the Dover WWTF — a facility that has been run by a Con-Ops firm for a little over 3 years.

CONWAY’S EXPERIENCE:

Chuck Conway, the EPA representative, made his first point that EPA policy states that the party who holds the permit is responsible for violations no matter who happens to be operating the WWTF.

He went on to say that there are about 67 WWTF Con-Ops in NE and together they were run by about 20 different firms. On one hand, he said that plant operation under Con Ops is “pretty comparable” to municipal operations. Of the approximately one dozen plants in NE last year that had compliance problems, about half were operated by Con-Ops. Of the two plants chosen for awards by the EPA in N.H. this year, one was run by a municipality and the other by Con-Ops.

On the other hand, he said that if he were to list the best run 20 WWTF’s in NE, “probably all of them are publicly operated plants”. He further said that “if you have public employees who have the resources and are able to work with the community, [public operation] is still probably the best way to go”. Jokingly Conways said “In every organization there is invariably one person who knows what is going on. It is imperative that you seek that person out and fire him.” Chuck went on to say that decisions about plant operation are often made outside of the plant. His moral: If the community has a well run facility, take advantage of the expertise you have on hand.

SURVEY:

He then went on to discuss an informal survey of about 30 municipalities where he talked with municipal officials and asked them both why they went with Con-Ops and what problems, if any, they had. The answers he got were the following:

Reasons for going to Contract Operations:
► access to more sophisticated capabilities.
► less costly O&M.
► flexible financing and a way to deal with a strong union.
► delegation of responsibility & risk.
► guaranteed cost.

Problems:
► due to competition, there was a tendency to low ball costs; costs that had to be recouped later in the contract period.

Chuck said that in general public officials were more concerned/interested in school and public safety than WWTF’s. This, despite the fact that municipalities actually spend more money overall on water and wastewater treatment facilities! Nationwide last year costs of water/wastewater operations totaled $43.5 billion.

FRANKLIN’S EXPERIENCE:

Randy Monti, the WRB administrator, like Chuck, said that Contract Operations was a “viable alternative”. Initially, when Con-Ops were establishing a presence in the state several Con-Ops approached plants as if in a “feeding frenzy” . . . each Con-Ops firm saying they could run any particular plant with less people than the previous firm. That mentality seems to have faded however as Con-Ops has matured.

CAN’T SIGN & FORGET:

Even more than Chuck, Randy maintained that the town has a lot of continuing responsibilities and supervisory tasks even if Con-Ops is chosen. He cautioned that the municipality “can’t just put [the WWTF] in a black box and forget about it”. A list of such responsibilities can include:
► meeting and enforcing regulatory standards in IPP and collections systems use.
► take care of reporting requirements (such as for the collections system) for areas not in the contract.
► decide on and find funding for capital costs for equipment repairs, replacements not covered in the contract.
► municipality is responsible for O&M records when contract is completed.
► unexpected operational costs such as replacement of large equipment, permit changes, loading changes.
► liability issues as defined by the contract.

COMPARISON:

Randy listed the pros of both municipal and con ops — the key ones, he felt, from the Oct. 16 meeting generated lists.

Con-Ops — Continued on next page
Con-Ops — Continued from previous page

Municipal: 1) keeps profit and overhead within the community.
2) keeps 100% of cost savings for any improvement within community.
3) no [extra] contractual issues to deal with.
4) sole [and therefore clearer] responsibility for all permit and compliance issues.
5) potential for better employee morale because of civil service protections. May hurt morale though also.

Con-Ops: 1) procurement [within contract limits] is easier.
2) more flexible work rules for greater productivity, easier to deal with problem employees.
3) can reward exceptional employees for excellence.
4) greater potential talent pool and resources. They have that “big office”, many plants & many employees with much combined experience.
5) Takes WWTF operation out of political control and allows access to top level decision makers.

DES SURVEY:
DES, in connection with Franklin’s investigation of Con-Ops, did a phone survey of 17 plants run by two different Con-Ops in the NE area:
   ▶ 82% positive, 18% negative.
   ▶ main reason for going to Con-Ops: 1) no qualified staff or salary structure not high enough for qualified staff; 2) less regulatory & personnel hassles for Public Works department; 3) high level of technical assistance is available.
   ▶ saving money was not cited as a major reason for Con-Ops.
   ▶ main problem source was lack of contract clarity and specificity. Key issues were openness of financial records and disagreement about relative responsibility for various financial costs or savings.

FRANKLIN’S RFP RESULTS:
Several notes: 1. Franklin went through a full RFP and Con-Ops review process with the avowed intent of choosing one of the Con-Ops firms over municipal operation if there were clear operational and cost advantages. 2. Franklin used the consulting services of a separate Con-Ops firm to review their current plant status, make recommendations for improvement, and help with the RFP development. 3. Despite efforts to reassure employees, the process was “brutal” on them.

Findings:
   ▶ savings and services varied inversely: the more savings, the less service. “you get what you pay for” sense.
   ▶ best proposals showed no great cost [or operational] advantage for their municipalities.
   ▶ visits to 2 different plants run by the same Con-Ops firm showed significant qualitative differences. Though both were running fine operationally, one was “a showplace” and the other was not worth showing.
   ▶ decision was to stay with public operation.

DOVER’S EXPERIENCE:
Mike Bobinsky, a public works administrator for the City of Dover, talked from the perspective of a city that has had a Con-Ops firm running their WWTP for a little over three years. Although Mike said that Dover had a good experience with the firm, Dover did decide to solicit competing proposals both from other Con-Ops firms and from the city’s Public Works Department as the current contract term was ending.
Like Franklin, they used the consulting services of an outside firm to help develop the proposals. They did not request operational recommendations. Mike felt that with the limited funds available, the RFP was the most important element to focus on. This is especially true, in his opinion, because it is the basis of the contract which is, as Mike put it, “very important to avoid future conflict” and in many ways “the cause of all the bad things you hear about Con-Ops”.
Mike offered the following comments:
   ▶ he described the function of Con-Ops as overseeing day to day operations but otherwise still felt the need for the municipality’s close involvement in various significant financial and policy decisions. For example, in Dover’s case there were decisions to make about odor control measures, dealing with an undersized UV system, and how to use the composting operations – all significant financial and management issues for the city.
   ▶ there is also the continuing need for the city to maintain an oversight role in terms of assuring the Con-Ops’ accountability in living up to the terms of the contract.

Asked after the presentation to give some pros and cons of Con-Ops, Mr. Bobinsky offered the following.

Pros for Con-Ops . . .
   ▶ cost reduction/containment
   ▶ flexibility . . . in terms of what can be included or excluded in the contract.
   ▶ access to new technology.
   ▶ staff development.
   ▶ economies of scale in terms of cost for benefits and supplies.
   ▶ scope of service – expectations and performance standards can be written into the contract.

Cons . . .
   ▶ cost . . . potential profits lost.
   ▶ lack of flexibility once the contract is signed.
   ▶ personal touches . . . allegiance of the staff is not to the city.
   ▶ impact on personnel . . . the transition process is hard on the staff. It makes you "sharpen your pencil", but at a loss of job stability and security.
   ▶ control . . . to some degree is lost.

OVERALL CONCLUSIONS:
— While all presenters described Con-Ops as a potentially viable alternative, there is a clear consensus that the municipality should not expect economic guarantees or total freedom from responsibility and need for oversight. Ultimate regulatory liability, IPP enforcement, broader policy decisions, and the larger financial expenditures are some of the thorny issues the municipality must still contend with. A clear contract is crucial to a satisfactory Contract Ops/Municipal relationship.
— The reality seems to be that the competition that is part of the Contract Operations industry provides both a challenge and/or opportunity to municipalities. While unsettling, these
the emergency rules and to suggest modifications for incorporation into the permanent rules. The TAC was comprised of more than thirty individuals representing a broad spectrum of interests ranging from selectmen and abutters, to Conservation Districts, farmers, the Municipal Association, and biosolids management companies. The NHPCA was represented alternately by Bruce Kudrick of Hooksett and Mike Hanscom of Concord. The views of the Association were coalesced by a group of Members of the Biosolids Committee who met several times to discuss the rules and their impact to WWTFs around the state. The comments and recommendations of the NHPCA Biosolids Committee were submitted to the NH-DES. The final report with recommendations from the TAC was submitted to Commissioner Varney for consideration when writing the permanent rules. A copy of this document is available from Selina Makofsky or Mike Rainey upon request (271-2457).

Permanent Rules

A revised version of the emergency rules, now called the “permanent rules” was submitted to the Joint Legislative Committee on Administrative Rules (JLCAR) on January 23, 1996. The permanent rules incorporated many of the recommendations of the TAC, as well as comments the NH-DES received during the public comment period, the public hearing, and at a day-long seminar hosted by the NH-DES on January 13th. Since the submittal to the JLCAR, the NH-DES recognized the need for additional modifications to the rule, and filed for a preliminary objection at the JLCAR hearing on February 16th. The most significant modification requested was for “incorporating provisions for sludge site permits and corresponding fees, as discussed with the Environment and Agriculture (E&A) Committee”. This modification is significant in that it is predicated on the need for two additional NH-DES staff members to implement the request. However, as it stands, these staff are not currently in the budget. For this reason, legislation is concurrently being pursued which would fund the positions and ensure that site permit system is, in fact, included in the permanent rules.

Legislation

Originally legislation was filed by state representatives who were concerned about sludge landsaping projects that took place last summer and caused terrible odors and complaints from local constituents. HB 1399 dealt with the “treatment [stabilization] of sludge prior to its deposit in local communities” and HB 1323 dealt with notification of abutters “before spreading [human] manure”. The bills were presented to the E&A committee and it became apparent that both of these issues had already been addressed through the emergency rules. It was decided then by the E&A committee to use the bills as a vehicle for other issues not adequately addressed in the rules, namely a permit system, funding, and staffing for the program by NH-DES.

After several work sessions with the sludge and septage subcommittee of the E&A Committee, HB 1399 was amended to establish two positions to carry out the “provisions of RSA 485-A:4, VI-authorizing the department [NH-DES] to regulate and issue permits for the disposal of septage and sludge” passed into law back in 1990. It was agreed that the fees to cover these positions could come through the rules. Possible fees recommended include a site permit fee ($300-$500 per site) and an on-going annual fee of $1 per wet ton landsparse in New Hampshire.

As of today, HB 1323 has not yet been amended, but the E&A committee is considering modifying the bill to possibly address several issues including a ban on all unstabilized sludge, an interim study on sludge impacts, an outright moratorium of sludge spreading, and some expanded ideas for notification. Many of the extreme proposals come from two Committee members. Representatives Derek Owen from Hopkinton and Betty Hall from Brookline, who are opposed to sludge land-spraying. Indeed, Representative Owen has been very active in a campaign to ban sludge altogether.

Opposition

The opposition to sludge spreading has always been present in New Hampshire, though it is typically the result of folks who are not familiar with the concepts, or they were not notified and found out the hard way about odor problems. This past summer, however, opposition grew at an alarming rate. The rate paralleled the number of landspraying sites around the state, and the scope of activity being proposed, such as the forest spreading proposal for over 2,000 acres in the Whitefield/Twin Mountain area. In late November things came to a head with the allegation that the death of a young man in Greenfield, NH was the direct result of a sludge spreading project nearby. Following this, a group was formed called the “Citizens for a Future NH” which teamed up with the NH Organic Farmers Association. Their primary goal is to stop all sludge landspraying in New Hampshire. They have been very effective in attracting the media and have made sensational headlines about the dangers of sludge. For much of the public, their case is convincing and compelling.

Local Ordinances

As a direct fallout from these events, many towns have decided to pass local ordinances which either severely curtail the potential to spread sludge, or ban the activity completely. At last count Alexandria, Chester, Derry, Loudon, Whitefield, Lebanon, Twin Mountain, Sandown, Hopkinton, Jaffrey, Windham, Auburn, Rochester, Bristol, Salem, Deerfield, and Plaistow had all drafted language or passed local ordinances. It is anticipated that several more towns will have warrant articles addressing sludge and septage landspraying at town meetings this spring. It is critical that NHPCA Members contact their municipalities (both where you work and where you live) to find out if such a warrant article is being proposed in your town. If so, it is important that some outreach and education be done immediately to try and turn this situation around.

Schedule of Upcoming Events and What You Can Do

The NH-DES must file a response to the JLCAR by March 1, 1996. The response must show any changes proposed to the rule from the original submittal, and address any of the issues raised by the JLCAR hearing on February 16th. At that time, the “amended permanent rules” will be available for review by the public. If there are items which the NHPCA has concerns with, then comments may be submitted in writing and there may be opportunity to speak at the next JLCAR hearing on March 15th. The final rules are expected to then be adopted by March 19, 1996.
I decided to write this article because I know what management style works for me and I was curious what other people think. So feel free to write The Collector with your thoughts.

Management style can be a sensitive subject but as you know a most important one. In discussions with fellow employees we all agreed that the bottom line is that management style affects everything, right down to your final effluent. So let's look at a couple of styles.

Let's start with Micromanagement, my least favorite. If you've ever experienced this firsthand you know how difficult this can be. Micromanagement checks on every detail and aspect of daily work, instead of letting people do their jobs without someone looking over their shoulder. This style is highly involved in the plant process and maintenance—whether management is knowledgeable or not. This style of management does not have to be used by your direct supervisor, it can be your selectmen or your commissioners. Under this management style employees are not allowed to show their strengths or make decisions. Micromanagement tends to breed an atmosphere of mistrust. I am fortunate at this time to have a good boss and good commissioners who allow me to grow and make decisions. To those of you who are not as lucky, hang in there.

Let's move on to another style, the manager that doesn't get involved at all. You start to ask yourself does this person care at all about the job we are doing. With this layed-back approach to managing you wonder if this person is fighting for the equipment that's needed, and are they budgeting for improvements and upgrades. You start looking for input and guidance and they're just not there.

Then finally there is the management style that finds a middle ground. This manager allows you to make decisions and to grow as an employee. This person fights for needed supplies and upgrades, and will value your input and opinions and does not feel threatened by your skills. If you are in a management position you cannot be all things to all people, nor can you possibly oversee every job on an everyday basis. Surround yourself with good people and trust and help them to reach their potential as well as your own. Manage people the way you would like to be treated. As I said earlier, I am lucky enough to work with great people at this time but have also been in those tough places.

Arthur Boudreau
Does Winchester Proud

by Sharon Ostrander

Art Boudreau is commended for his accomplishments as the Chief Operator of the Winchester Wastewater Treatment Facility, not once, but twice.

Art was awarded the newly established Operator Safety Award by the NEWA Safety Committee for his frugal safety improvements to his daily operation. Art has been able to make some great improvements to his bar rack cleaning, despite a tight budget, by using some ingenuity and local help. These changes now eliminate weekend cleaning by the lone operator. He has been diligent at convincing his selectmen to purchase the necessary safety equipment for confined space entry as well as life preservers and a manhole lifter.

The Operator of the Year Award was also presented to Mr. Boudreau. This Award is given annually by NEWA to one operator in each of the six New England States to recognize them for their contributions to excellence in plant operations. Art operates his oxidation ditches tightly, producing an average effluent TSS of 8 mg/L and BOD of 13 mg/L. He has made cost-savings changes to his sludge pumps which resulted in better control of his RAS/WAS pumping rates. He made cost-effective changes to his bar rack cleaning, as noted above, and has been on top of his sludge disposal options, choosing one that has allowed him more flexibility than the drying beds, alone, would permit.

Art commented that the two awards made him feel great, giving him recognition for his intellectual accomplishments. He has been working for the town of Winchester for nine years and he felt that this was a wonderful way to be recognized for all that he has done over that time span. He hoped that the town's governing body would now trust his judgement more. After this, they probably will!

Let Your Voice Be Heard!

The land application of sludge has become a hotly debated issue of late. The importance of out of state sludge, general mistrust of the EPA and the 503 reg's, and numerous odor problems at land application sites have thrust this issue into the spotlight. There exists a small contingent of well organized and vocal people citing health concerns as the overriding reason for general support for an outright ban on sludge land spreading or at the very least a moratorium until additional research can be conducted. This message is being heard loud and clear throughout the state. Many towns were considering passing ordinances banning the use of sludge or severely restricting its use. The far reaching impacts of this can be significant.

What do you think? Now is the time to let your voice be heard. Contact your Selectmen, Commissioners, and state representatives and make your opinions known!

Con-Ops — Continued from page 4

options undoubtedly create a push for increased efficiency. Which option works out best for a municipality undoubtedly depends on the specifics of the individual plant's situation and the ability of any particular Con-Ops firm to deliver what they promise.

RESOURCES:

NHDES has copies of the perceived pros and cons that have been generated in the two workshops mentioned above. Those interested in these or other materials can contact Tom White in the Wastewater Operations Section.

The EPA and NE Interstate Environmental Training Center are also working on guidelines to help communities 1) decide if Con-Ops is suitable for them and 2) give advice on related issues such as financial options, how to develop a contract, how to do an RFP, and in general how to make a choice and a contract that keeps both sides — the municipality and the Con-Ops firm — satisfied.
NHWPCA Wastewater Treatment Technology Tradefair 1996

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Copper, How Low Can You Go?
by Donna Trask

In 1992 the City of Keene knew that lead and copper would become important, in both its water and wastewater in the coming years. The activated sludge WWTP, designed to treat 6 MGD, has a dilution factor of 1.7 into its receiving water, the Ashuelot River. Preliminary information from EPA suggested low discharge limits for lead, copper, and zinc based on water quality criteria. At about the same time, EPA also passed regulations governing the amount of lead and copper in a community’s drinking water. As a result of EPA’s Surface Water Treatment Rule, Keene was required to build a water treatment facility (WTF).

With these concerns in mind, the City designed its new WTF to minimize the amount of lead, copper and zinc received at the WWTP. This precluded the use of any zinc-containing compounds for corrosion control. As a category, phosphate containing chemicals were not considered because NHDES had already been discussing phosphate discharge limits for the WWTP. The WTF was designed to use sodium bicarbonate as an alkalinity source with sodium hydroxide for pH adjustment.

The WWTP received its new NPDES permit in May 1994, and a comparison of the NPDES discharge limits with the WWTP’s records showed that the City would be in compliance with the zinc monthly average of 56 parts per billion (ppb). Lead concentrations were difficult to judge because the new limit of 0.9 ppb was far below the previous detection limit. However, initial analysis showed the biggest difficulty would be with contamination during the analytical process, and that the WWTP would likely be in compliance with this limit. Copper would be the metal of concern. Although pH adjustment of the City’s potable water had lowered the WWTP’s effluent copper concentration from an average of 170 ppb in 1989 to an average of 21 ppb in 1993, the new monthly limit was 6 ppb.

In an attempt to identify the sources of copper in the WWTP influent, plant personnel turned to the industrial pretreatment records. Keene’s domestic wastewater accounts for 90 percent of the WWTP flow, industrial dischargers make up the rest. Samples were collected from manholes in several non-industrial areas of town, septage was analyzed, and the historical records of the industry were reviewed. Drinking water sources were also evaluated — but contained no copper.

It was calculated that domestic wastewater and septage account for 2.8 pounds of copper and industrial flow only 0.28 pounds daily in the WWTP headworks. The influent had been measured at 2.91 pounds of copper per day. It was felt that a difference of 6 percent between the calculated and actual loadings meant all sources had been well evaluated.

Although the City’s local limits were being re-evaluated, it was clear that even removing the entire industrial flow would not put the WWTP into compliance. With the WTF on line, the WWTP’s influent copper concentration dropped from about 200 ppb, to less than 100. It was hoped the WWTP’s effluent would show a proportional change. Although the trend is generally the same (see graph), the actual change in the effluent was less than 20 percent, the 1995 average effluent concentration was 17 ppb.

During the past year, Keene has looked at other factors which might affect its effluent copper concentration. No correlation has been drawn with the effluent copper concentration and the number of pounds in the secondary system, or with the concentration of ammonia present in the effluent. The City plans to implement a water effects ratio study during the summer of 1996 to evaluate the impact of copper on the Ashuelot River.
NITRIFICATION

by Tim Mulder

Nitrification is an extremely important treatment process in terms of effluent treatment to reduce the nitrogen oxygen demand on receiving water. The conversion of ammonia to nitrate in a treatment plant requires significant amounts of oxygen which would have to be supplied by receiving water if an effluent contains ammonia instead of nitrate. For nitrogen to be removed from an effluent the process must consist of both Nitrification and Denitrification.

Nitrification is a biological process accomplished primarily by two types of bacteria, Nitrosomonas and Nitrobacter. Unlike most of the common organisms found in a wastewater treatment facility, these microorganisms derive energy from inorganic compounds such as ammonium nitrogen. The first step in this process is the conversion of ammonium to nitrite by Nitrosomonas bacteria.

The second step is conversion of nitrite to nitrate by Nitrobacter. In wastewater treatment the proper conditions must exist for Nitrosomonas to be able to separate the nitrogen from the hydrogen in the ammonium molecule and replace the hydrogen with oxygen molecules. Sufficient oxygen, appropriate temperature and microbiological food must be present to accomplish this process. Nitrobacter also rely on oxygen to complete the stabilization of the nitrite molecule into the more stable nitrate substance. Again, adequate amounts of free oxygen and food sources as well as optimal temperature and bacteria population along with other conditions are required to complete this reaction.

Nitrifying organisms are present to some extent in all domestic wastewaters. However, some wastewaters are not nitrified in existing plants because the plants are designed for the higher growth rate of bacteria responsible for carbonaceous removal. As the SRT is increased, nitrification generally takes place. A longer SRT prevents nitrifying organisms from being lost from the system when wasting occurs or more accurately, the longer SRT permits the build up of an adequate population of nitrifiers. The oxygen demand for complete nitrification is high. For most domestic wastewater, nitrification will increase the required oxygen supply and power requirements by 30 to 40% of that required for carbonaceous BOD removal alone. Complete nitrification requires from 4.3 to 4.6 lb. of ammonia nitrogen converted into nitrate, and wastewater generally contain 10 to 30 mg/L of reduced nitrogen.

Nitrifiers are aerobic and adequate Dissolved Oxygen levels which must be maintained to sustain nitrification. Minimum acceptable DO concentrations should range between 2 to 3 mg/L. This means that the two types of bacteria, Nitrosomonas and Nitrobacter, must have oxygen to nitrify. As a result, when mixed liquor DO levels drop below 2 mg/L, nitrification will begin to be inhibited. Once below 2 mg/L, the lower the DO concentration, the lower the nitrification rate. At a DO concentration of about 0.5 mg/L, almost no nitrification will occur.

Nitrifiers must have oxygen to convert ammonia to nitrate, but they can survive short periods without oxygen such as during peak flows.

The growth rate of nitrifying bacteria increases as the wastewater temperature increases and conversely it decreases as the wastewater temperature decreases. The maximum growth rate of the bacteria occurs at 30°C but nitrification can still proceed at reduced rates anywhere from 5-35°C.

In many wastewaters there is insufficient alkalinity initially present to leave a sufficient residual for buffering the wastewater during the nitrification process. The significance of pH depression in the process is that nitrification rates are rapidly depressed as the pH is reduced below 6.0. Because of the effect of pH on nitrification rate, it is especially important that there be sufficient alkalinity in the wastewater to balance the acid produced by nitrification. A pH of between 7.5 and 8.5 is considered optimal. Approximately 7.2 pounds of alkalinity are destroyed per pound of ammonia nitrogen oxidized.

The time required for nitrification is directly proportional to the amount of nitrifiers present in the system. Because the rate of oxidation of ammonia nitrogen is essentially linear or constant, short-circuiting must be prevented.

To achieve the desired degree of nitrification, the Mean Cell Residence Time must be long enough to allow the nitrifying bacteria sufficient time to grow. Nitrifying bacteria grow much more slowly than the bacteria using the carbonaceous compounds. It is possible to waste the nitrifying bacteria from the system at a higher rate than their growth rate.

The reason I have chosen the topic of Nitrification for discussion is because the last four years the Sunapee Wastewater Treatment Plant has participated in toxicity testing, passing some but failing more. After review of our last four years of testing, it appeared that if the ammonia was 18 mg/L or higher in the effluent, we would fail our test. For the last year or so by changing the process to enhance nitrification, we have had four good tests. Even though Sunapee passed the test, I wasn't able to fully nitrify for ammonia removal. One of the reasons we can't nitrify properly, is due to problems with filamentous bacteria. Because of that, the wasting rate is high. Knowing that I had another test coming up in October and the average ammonia rate going out was in the high teens, I decided to try adding hydrated lime to enhance nitrification. This process proved it to be the key factor in bringing the Sunapee Plant into full nitrification with 95% ammonia removal. Even though this process brought us to full nitrification, it does have its drawbacks:

1. high electrical costs,
2. high chemical cost for lime,
3. high chlorine demand which related to high Cl₂ costs.

I realize this process is only a short term solution to our long term problem.
Deadline for CSO Nine Minimum Controls is Fast Approaching

Many communities in the Northeast are served by combined sewer systems, which are wastewater collection systems designed to carry domestic, commercial and industrial wastewater, and stormwater in a single pipe to a treatment facility. During dry weather all of the wastewater is conveyed to the treatment facility. However, in periods of rain or snow melt, total wastewater flows can exceed the capacity of the sewer system or treatment facility. When this occurs, the combined sewer system is designed to overflow directly to surface waters, such as lakes, rivers, or the ocean. These overflows, called combined sewer overflows (CSOs), can be a major source of water pollution in communities served by combined sewer systems.

To address these challenges, EPA issued a national Combined Sewer Overflow Control Strategy in August 1989. This strategy affirmed that CSOs are point sources of water pollution and subject to regulation under the National Pollutant Discharge Elimination System (NPDES). The strategy outlined a program for communities to assess the activity of their CSOs and develop a long term plan for elimination or abating the overflows.

Although the strategy was successful in focusing increased attention on CSOs, it fell short in resolving many fundamental issues, including identifying improvements communities could do in the short-term to reduce the impacts from the CSOs. Therefore, EPA began the process of revising the national CSO policy, with the participation of the regulated community, state agencies, and environmental groups. In April, 1994, EPA published the National CSO Control Policy, which includes implementing the Nine Minimum Controls (NMCs) by January 1, 1997.

The NMCs are controls that can reduce CSOs and their effects on receiving water quality, do not require significant engineering studies or construction, and can be implemented in a relatively short period (usually two years or less). Implementation of the NMC is among the first steps a municipality is expected to take in response to EPA's CSO Control Policy.

The 1994 National CSO Control Policy established a January 1, 1997 deadline for CSO communities to submit documentation of compliance with the "nine minimum control" requirements of the policy. These controls, which the CSO policy establishes as technology-based controls pursuant to Section 301 (b) of the Clean Water Act are;
1. Proper operation and regular maintenance programs for the sewer system and the combined sewer overflows.
2. Maximum use of the collection system for storage.
3. Review and modification of the pretreatment program to assure CSO impacts are minimized.
5. Prohibition of dry weather overflows from CSOs.
6. Control of solid and floatable materials in CSOs.
7. Pollution prevention programs that focus on contaminant reduction activities.
8. Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts.
9. Monitoring to effectively characterize CSO impacts and efficacy of CSO controls.

In May, 1995, EPA issued the guidance document "Guidance for Nine Minimum Controls". This document gives examples of actions that might be considered for each of the nine minimum controls and also lists information to be included in documentation. Documentation is expected to include the following:
1. Alternatives considered for each minimum control.
2. Actions selected and the reasons for their selection.
3. The selected actions already implemented.
4. A schedule showing additional steps to be taken.
5. The effectiveness of the minimum controls in reducing/eliminating water quality impacts.

It is important to recognize that the policy and guidance do not establish specific levels of implementation of the minimum control measures but rather look to the community to select its own appropriate level of implementation and justify that selection in the documentation report.

EPA–New England believes that much benefit can be attained through implementation of the nine minimum controls. We have seen dramatic reductions in predicted and realized CSO frequency and volume from implementation of minimum controls, especially those involving improvements in operation and maintenance of regulators and tidegates, optimization of regulators, and elimination of bottlenecks in the sewer systems.

EPA–New England plans to review the documentation reports to confirm that the community has made a detailed evaluation of its combined sewer system, seriously considered a range of alternatives for implementing the minimum controls, and convincingly documented the selection of activities to implement the minimum controls. For further information on the nine minimum controls or the CSO program contact Greg Comstock at the NH-DES at 603/271-2457, or Brian Pitt, EPA CSO Coordinator at 617/565-4179.

Educational Assistance Available

In order to encourage the advancement of knowledge in all aspects of water pollution control, the New England Water Environment Association (NEWEA) has established the Edward A. Kowisz Educational Assistance Grant Program. Under this program, selected applicants may be eligible for reimbursement for tuition, registration and other related costs for training (or courses) in wastewater treatment, collection, disposal, management or other relevant topics. Grants usually average $300.00 per application but may vary depending on the number of requests.

This program is administered by the Personnel Advancement Committee of NEWEA. Grants may be awarded for self-study training programs, courses at accredited colleges and universities, technical schools or specialty schools approved by the Committee. Applicants must be either NEWEA members or members of any of the six New England operators' associations for at least two years to be eligible.

To find out more about this program or for copies of criteria and applications, please contact Elizabeth Haffner, NEWEA Executive Director, at 508-658-4048 or George Neill, PAC Chair, at 603-271-3325. Applications are due by July 31, 1996.
In the meantime, the E&A Committee will be working on HB 1323. It is uncertain if provisions for a moratorium would be passed by the whole Committee, but certainly there is a faction which will be lobbying hard to prohibit sludge landspreading activities. At town meetings across the state it is expected there will be many warrant articles proposed to limit sludge and septage landspreading.

It is important that you meet with your local representatives and elected officials to explain the benefits of biosolids recycling, especially as it relates to your operation. Additionally, there has been some discussion among Association Members about limiting septage into wastewater treatment facilities, or perhaps charging an increased fee if it comes from a town which prohibits landspreading. Imagine the impact if a septage hauler has to pass on a disposal fee of $1.00 per gallon to a homeowner in a town that banned sludge landspreading.

It is also important to get some positive news coverage on wastewater treatment in general, and biosolids recycling specifically. Take the time to call your local newspaper and ask for an article to be done on your WWTF. Write editorial responses to any negative articles you see in the press. It is important that this effort be shared by all NHWPCA Members so the media gets some feedback from people other than the “ban sludge” groups. Technical and public relations assistance is available through the Biosolids Committee, the Residuals Committee of NEWEA and the staff at NH-DES.

For more information about the NHWPCA Biosolids Committee, or specific details of the septage and sludge rules, contact Bruck Kudrick (485-7000), Mike Hanscom (225-8691), Wes Ripple (271-3503), or Shelagh Connelly (253-8418).

**SUMMARY OF PROPOSED PERMANENT RULES**

**Env-Ws 800 Septage and Sludge Management Rules**

**ODOR**
- No stockpiling of unstabilized sludge allowed at land application sites
- Stockpiling of sludge limited to 6 months
- Stockpiles must be covered if remaining for greater than 1 week
- Setbacks increased from residences, roads, etc.
- Transportation vehicles must be covered
- Sludge must be incorporated within 48 hours of spreading unless used for topdressing
- Odor control plan must be in place with detailed procedures as to how to handle odor complaints

**NOTIFICATION/PUBLIC INFORMATION MEETING**
- Notification of DES, abutters, and municipalities, 30 days in advance of stockpiling/land application activities
- Public informational hearings required

**INCREASED OVERSIGHT/MONITORING**
- Facilities without a NH discharge permit must obtain a sludge quality certification
- Operating plans with detailed management of site required
- Use of agronomic uptake calculations as specified in the UNH Cooperative Extension Service Best Management Practices document required
- Increased setback restrictions, slope requirements, etc.

- Soils required to be tested for metals prior to land application and at end of activity or permit term
- Impose additional requirements, including notification and setbacks, on all septage land application activities
- Municipal sludge combined with industrial sludge classified as industrial sludge and requires site permits.

**SEPTAGE HAULER PERMITS**
- Permit term increased to a 2 year cycle with renewals in January
- Require identification on both sides of vessel displaying company name, municipality, and telephone number (minimum height of 3 inches)

**GENERAL**
- Non-preemption clause included
- Exempts “Exceptional Quality Sludge” as defined by 40 CFR Part 503

For further information contact Selina Makofsky or Mike Rainey at 271-2457.

**Laboratory Hazardous Waste Management Training Certificate Workshop**

A Train-the-Trainer workshop on laboratory hazardous waste management will be held in conjunction with NEWEA’s Spring/Summer Conference in Portland, ME on Monday, June 3, 1996. This two day long program is designed to meet the training requirements of RCRA Hazardous Waste Regulations with emphasis on laboratory application and compliance assurance. Topics that will be covered in this seminar are:
- Identification of Hazardous Wastes
- Applicable Regulations
- Laboratory Waste Management Practices
- EPA and Administrative Requirements
- Off-Site Transportation/Disposal Requirements
- Enforcement and Liability

This is the first time that this program is being offered on the East Coast. Certificates will be issued and training contact hours will be awarded.

More information regarding this workshop will be available along with the Conference announcement from NEWEA in the near future. Or you can call Paul Fitzgibbons, Laboratory Practices Committee Vice Chairman, at (401) 277-6780 ext. 18.
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Now we can call in sick!
(Students at Franklin Training Center Safety Course)
15th Annual
NHWPCA Trade Fair

NHWPCA is sponsoring our fifteenth annual Wastewater Treatment Trade Fair on Thursday, April 4 at the Center of New Hampshire, Holiday Inn, 700 Elm Street in Manchester. This date is a change from our traditional date of the last Thursday in March. The date change was due to scheduling conflicts with the hotel.

Exhibits will be displayed in the Armory Exhibit Area of the Holiday Inn and the show opens at 9:00 AM and continues until about 1:30 PM. Last year the show featured about 80 exhibitors and we anticipate another great show for 1996. In addition to the opportunity to view many products and meet with representatives who provide service to our industry, attendees will be eligible for CEUs. As always our famous raffle will be conducted during the show.

Following the show will be a luncheon and Association meeting. The meal choices this year are Chicken Marsala or Baked Haddock. The meeting will feature award presentations to the Poster Contest Winner and NEWEA and NHWPCA awards. There will also be an election of officers for the ensuing years. The features speaker is Shelagh Connelly of White Mountain Resource Management, Inc. who will provide us with information on current biosolids issues.

** COURSE ENROLLMENT FORM **
Spring 1996 DES Wastewater Operator Training
Print name(s) below

<table>
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<tr>
<th>Date</th>
<th>Course Description</th>
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<tr>
<td>MAR 20</td>
<td>Advanced Personal Computer Spreadsheets (Limit 18)</td>
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<td>MAR 26</td>
<td>Centrifugal Pump Seminar (Limit 20)</td>
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<td>MAR 27</td>
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<td>APR 03</td>
<td>Managing Budgets for Wastewater Utilities</td>
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<td>APR 10</td>
<td>Biosolids: Soil Science/Land Application Rules Update</td>
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<td>APR 17</td>
<td>Wastewater Disinfection Alternatives</td>
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<td>APR 23</td>
<td>APPLICATION DEADLINE FOR JUNE 12 EXAMS **</td>
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<td>APR 24</td>
<td>Laboratory OA/OC, Hosted by Keene POTW</td>
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<td>APR 30</td>
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<td>Collection Systems Review (am) &amp; NEWEA Exam (pm)</td>
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<td>Reducing Energy Costs for Wastewater Facilities</td>
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<td>MAY 15</td>
<td>Certification Exam Review - All Grades</td>
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<td>MAY 22</td>
<td>Effective Communication and Conflict Resolution</td>
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<td>Odor Control - Issues &amp; Answers</td>
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<td>Applied Wastewater Math Review - Grades 0, I, II</td>
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<td>JUN 05</td>
<td>Applied Wastewater Math Review - Grades III &amp; IV</td>
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<td>JUN 12</td>
<td>** CERTIFICATION EXAMS - ALL GRADES **</td>
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NOTE: See course descriptions for cost of class. No cash accepted
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