

KEEPING THE PLANTS IN GOOD HANDS

Maintaining a Well-Trained, High-Caliber Wastewater Workforce is Essential but No Small Challenge in Era of Tight Budgets, Increasingly Sophisticated Facilities, Underappreciation of Industry and Profession, and Graying of Staff

by Stephen Hochbrunn, NEIWPC

For weeks this past summer, the Department of Public Works in Manchester, New Hampshire, ran ads for an opening at its wastewater treatment plant. But few candidates responded, and those who did, didn't fit the bill. Finally, the plant's chief operator traveled to another wastewater facility to attempt to convince an operator there to leave his job and take the position in Manchester. The operator eventually took the new job. But to Frank Thomas, head of Manchester's DPW and a NEIWPC Commissioner, the act of near-desperation was a sign of the wastewater industry's times. "It's becoming more of a problem to find qualified candidates," Thomas said. "What we're seeing is people are just not going into the wastewater field."

Thomas is hardly the only one who believes the supply of qualified wastewater workers isn't meeting the demand. Eric Teittinen, who's managed complex wastewater treatment facilities for more than 30 years and now works for the environmental consulting firm Woodard and Curran, is unequivocal in his assessment of the situation. "There's definitely a shortage of skilled, trained people in the wastewater industry," Teittinen said. "There's no question about it."

The presence of such a shortage is perhaps the clearest sign that the long underappreciated wastewater treatment industry is entering a profoundly challenging era—where much is at stake. Consider the investment: More than \$113 billion in

federal, state, and local monies have been spent building the nation's municipal wastewater treatment plants. Companies have also spent countless millions on

ment in wastewater facilities continues to reap benefits, the plants must be in good hands. A competent, reliable workforce must be attained and maintained.



A Kid by Comparison: Bob Protivansky may be 31 years old, but he's the youngest operator at the wastewater treatment plant in Rutland, Vermont. At treatment plants across the region, much of the staff is rapidly approaching retirement age, prompting the question: Who will fill their shoes?

industrial wastewater plants, which pre-treat the waste generated by manufacturing facilities before sending it into the municipal system. The reward: Rivers that only 25 years ago ran black and foul are now clearer, cleaner, and less of a threat to public health. Swimmers frolic in lakes and bays that were once woefully and shamefully polluted. But to continue to protect these waters, to ensure that the massive invest-

It won't be easy. While industry experts observe labor shortages, plants are becoming increasingly sophisticated, meaning wastewater workers need a much higher level of skills and knowledge. "Education and training have now become vastly more important," said Don Pottle, a private training consultant who developed and, for years, coordinated the wastewater treatment program at UMass-Lowell.



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Established by an Act of Congress in 1947, the New England Interstate Water Pollution Control Commission is a not-for-profit interstate agency that utilizes a variety of strategies to meet the water-related needs of its member states—Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. NEIWPCC coordinates activities and forums that encourage cooperation among the states, educates the public about key water issues, supports scientific research projects, trains environmental professionals, and provides overall leadership in water management and protection.

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Where will the training come from? NEIWPCC and others offer important programs, but the federal government no longer plays any direct role in wastewater training, many states are reducing their involvement, and wastewater programs at community colleges have all but disappeared. All this while waves of workers at wastewater plants throughout New England and New York State prepare to head into retirement, creating more job openings, more need for qualified workers.

Long gone are the days when a dignitary's wayward nephew could be found running a town's plant because that's where he could be hidden and do the least harm. The industry has come a long, long way. But the story isn't over. And the next chapter may not be an easy read.

A REVEALING LOOK

A visit in September 2004 to the wastewater treatment plant in Rutland, Vt., revealed much about the workforce issues facing the industry. No road signs pointed to the facility, which lay behind worn barbed wire and ragged hedges on a road just off the main highway. In a large room filled with tables, chairs, several annoying flies, and 18 students, NEIWPCC's Chuck Conway conducted a two-day session entitled "Basic Wastewater Treatment with Applied Math." Conway kept the mood light as he posed tough math questions to the group.

"You guys work on the answers to numbers two and three. I'll show you how to do number one, the easy one," said Conway, NEIWPCC's manager of training operations. "When you get to my age, you have to get some gimmes."

The class chuckled, then listened as Conway performed his mathematical gyrations. Before joining NEIWPCC in 1998, Conway spent 28 years with the U.S. Environmental Protection Agency, and coordinated the development of its 104(g) program, which provides on-site technical support to operators at small publicly-owned wastewater treatment plants. (The name is derived from Section 104(g) of the Clean Water Act, which authorizes funding for the program.)

Conway's not surprised that many people aren't aware of the field, let alone

the good job opportunities within it. "Look, even town officials sometimes don't have any idea of where their wastewater treatment plant is," Conway said. "This, despite it being probably the most expensive piece of municipal infrastructure. It costs more than schools, fire houses, or anything else."

Most young people are similarly unfamiliar with the wastewater field. Conway said his students are seldom young—in some cases, "they're almost as old as me," he joked. (He's 61.) At the Rutland class, though, two seats were taken by two indisputably young persons: Eddie Bartlett, 20, and A.J. Wright, 21. Both are working at wastewater treatment plants in Vermont, and said they're doing so in part because the work "runs in the family," as Bartlett put it.

Being young didn't hurt their job prospects either. Wright works at a small plant in Wilmington, and he said the managers there clearly wanted to add a fresher face. "They were looking for someone willing to stay for a while," Wright said. "They wanted someone who was trainable."

The need for young, trainable talent is real. Visit any wastewater treatment plant in NEIWPCC's member states and you'll most likely find operators who grew up listening to Elvis, not Eminem. The majority of the plants were built or significantly upgraded shortly after the passage of the Clean Water Act in 1972, which required municipal wastewater treatment plants to provide increased secondary treatment of pollutants. The boom in construction led to a surge in hiring of people to run the plants.

Once on the job, many operators stayed. Several decades later, they're deciding it's time to go. "A lot of those folks hired to run plants in the 1970s and '80s are retiring, and there's not enough qualified people coming up to fill those vacancies," Woodard and Curran's Teittinen said.

Even if they're not ready to retire, older workers may prefer the "old ways" and be less than enthusiastic about embracing and learning new computer-driven equipment. That's what Teittinen's firm encountered while looking into

working with Lawrence, Mass., on upgrading its plant. “When we talked to the operators there, who’d been there for some 30 years, they were basically overwhelmed by the thought of the new technologies,” Teittinen said. “I suspect what’s going to happen is a lot of these people are going to say ‘Hey, I’m going to transfer to the high-way group’ rather than be faced with upgrading their skills.”

At the plant in Rutland, much of the workforce is going or has already gone gray, with one exception. Sitting in a break room across from the training room was Bob Protivansky, an assistant chief operator. He’s been working at the facility for five years. At 31 years old, he’s the plant’s youngest operator. “He’s the baby,” said Gregg Casey, 56, a colleague of Protivansky’s who was working with him that day.

Unlike Bartlett and Wright, Protivansky has no family connection to the industry. “When the city of Rutland hired me, I assumed I’d be a truck driver,” he said. Instead Protivansky found himself working at the wastewater plant as a custodian, and he’s been climbing the organizational ladder ever since. He seemed content, and for good reason. The benefits that come with a municipal job—the health insurance, overtime, holiday pay, etc.—have long been one of the major appeals of working in wastewater.

The pay isn’t bad either. According to the U.S. Department of Labor’s latest Occupational Outlook Handbook, the median annual earnings of water and liquid waste treatment plant and system operators were \$33,390 in 2002, with the highest 10 percent earning more than \$52,110. Of course, the handbook also states that operators “may be exposed to noise from machinery and to unpleasant odors.” In Rutland, an acrid smell permeated even the classroom, and there was no escaping its presence when walking around the complex of tanks and channels flowing with murky brown, bubbling water. But operators say you get used to it, and they prefer to focus on the positives.

“They can’t outsource these jobs. They would if they could, but they can’t, so they won’t,” Casey said. No doubt, the job security is attractive—once hired, seldom

fired. And while the new technologically sophisticated equipment may be disliked by some veteran operators, it also further enhances job security—master a plant’s SCADA (supervisory control and data acquisition) system and your shoes are that much harder to fill.

The complex equipment also means many plants can run on an automated basis overnight, meaning new employees are less likely to be stuck working overnight, one of the traditional drawbacks to the occupation among young people. “It’s hard to raise a family while working a third shift,” Casey said.

According to a U.S. Department of Labor report, the median annual income of the top 10 percent of water and wastewater treatment plant operators exceeds \$52,000.

Despite the benefits of the job, the two Rutland operators understand it’s not for everyone. And they, like so many other industry experts, claim there’s a shortage in qualified workers. “Almost everybody else here was hired 19 years ago,” Protivansky said. When asked whether the plant could possibly replace those older workers with current staff, Protivansky slowly shook his head from side to side. “We’re going to have a problem here in six or seven years,” he said.

MAKING THE GRADE (OR NOT)

Casey’s concern stems in part from his awareness of the work—and study—that it takes to learn his trade and progress within the field. After the sudden increase in plant construction in the 1970s, all of NEIWPCC’s member states developed wastewater operator certification programs. The programs require operators to pass rigorous exams and meet education and experience requirements to achieve various certification grades.

In Vermont, as in other states, individuals’ grade levels have a direct bearing on what type of plant they can work at, what they can do at a facility, and how much they’re paid for it. That’s because the same scale that applies to operators applies to plants; facilities that treat a minimal flow

of wastewater with simple processes are Grade 1s, while at the other end of the scale are Grade 5s—ultra-complex, high-flow plants. To be a chief operator at a facility, you must have the same level license as the grade of the facility. In other words, unless you have a Grade 3 certificate, you can’t run the show at a Grade 3 plant.

The process helps ensure plants are in qualified hands. It also means that those aspiring to enter the field, or climb within it, must be willing to hit the books, put in the hours at a plant, and be patient. Nobody becomes a plant manager overnight. Protivansky has his Grade 3 license, but he’ll need a Grade 5 before he can be a chief operator in Rutland, a Grade 5 plant. As for Bartlett and Wright—the young students in Conway’s class—they were already certified in Vermont as Grade 1 operators, and were taking Conway’s class to prepare for the exam for Grade 2, the next step up the certification ladder. They didn’t like their chances.

“Neither of us passed the first time we took the Grade 1 exam,” Wright said. “My boss basically says ‘We’re going to send you to the exam, but we know you’re probably not going to pass. We’re sending you so you can get a handle on what you need to know.’”

This expectation of failure is not surprising when you look at wastewater exam passing rates. Consider the case in Massachusetts, where NEIWPCC recently assumed responsibility for conducting the tests. The exams are held twice a year, with ten different tests being offered. (In grades 1-4, municipal and industrial operators take separate tests, while in grades 5-6, there is one combined exam for both.) In November 2004, a total of 452 people took the tests, with 201 passing or 49 percent. In May 2004, the overall passing rate was slightly lower—48 percent. A law school with that kind of passing rate on bar exams would be in deep trouble. Massachusetts officials say they aren’t worried.

“We’ve always been in and around 50 percent,” said Tom Bienkiewicz, an environmental engineer with the Massachusetts Department of

Environmental Protection and executive secretary to the state’s Board of Certification of Wastewater Treatment Plant Operators. “Usually on the lower levels we do see a good passing rate. It’s when they get to the higher levels, things change.”

An analysis of recent results in Massachusetts shows that Bienkiewicz is right on both counts (see chart). Typically, about half the people who take the exams

Industry experts insist the low passing rate is not an indication of the caliber of people that the field attracts. “Certification did two things,” Pottle said. “It greatly enhanced the job of working at a treatment plant and at the same time the salary went up dramatically. It is no longer looked on with disfavor to work at a wastewater treatment plant. It takes a dedicated, skilled person to understand the complexities and nuances.” Others point out that, because it’s

level training to advanced lab analysis. But many centers, including those in Connecticut, Maine, and Vermont, have been closed by cash-strapped states that perceive more urgent priorities. In Massachusetts, courses continue to be held at the training center in Milbury, but only because it’s now being run by the Upper Blackstone Water Pollution Abatement District in Milbury; the state no longer provides any support. Even in those states that continue to operate the centers, such as New Hampshire, the money for programs is limited.

“We try to keep it cheap, and we use a lot of volunteers,” said George Neill, head of the operations section at the N.H. Department of Environmental Services’ Wastewater Engineering Bureau. “For example, we’ll find engineers who are willing to lead training sessions for free, because it helps them meet their training credit requirements. If it’s a five-hour course they’re leading, we’ll give them ten hours worth of training credits to do it, as a little incentive.” (This practice of doubling trainers’ credits is actually common in many professions; it’s assumed that trainers put in at least as many hours preparing for a class as they do in conducting it.)

But volunteer help and cost-cutting measures are not always enough, and states increasingly are pulling out of the training game. Connecticut hasn’t offered training courses for years, and has long since closed the doors on its exemplary and much-envied training center in Bethany. In Vermont, the Department of Environmental Conservation no longer offers classroom training for operators. In Maine, the Joint Environmental Training Coordinating Committee (JETCC), which coordinates wastewater training throughout the state, was cut completely out of last year’s Department of Environmental Protection budget; only aggressive lobbying by the wastewater community and several DEP employees allowed JETCC to receive monies from the state’s general fund, although the amount was just 25 percent of the previous year’s allotment. And in January 2004, Massachusetts began shifting its wastewater operator certification and training program to a

Massachusetts Wastewater Operator Exams Percentage Passing Rates				
	May 2003	Nov. 2003	May 2004	Nov. 2004
Grade 2 – Municipal	60	81	42	74
Grade 4 – Municipal	59	72	44	43
Grade 6 – Combined (Industrial and Municipal)	28	27	34	40
All Grades	51	54	48	49

pass, and often—though not always—the passing rate drops as operators tackle the tougher tests at higher grades.

“The exams are very challenging,” said Don Pottle, who not only started the UMass-Lowell wastewater program, but was also on the committee that put together Massachusetts’s certification program in 1974. “Yes, the questions are multiple choice, but they are not easy. For a person coming in off the street with just a high school degree, or even with a college degree, and not having specific training, the chances of passing are very low.”

For an industry in need of qualified help, though, the low passing rate in Massachusetts and in other states cannot be seen as a good sign—unless you assume that the people who aren’t passing are those who would be better off not entering the field at all or at least not progressing beyond their current grade. True, some may be taking the same approach as Wright—taking an exam to find out what to know for the next time. But is that efficient? There’s a fee for each exam, and whoever’s picking up the tab would probably rather not pay for repeat performances.

such an unusual field to get into—even bizarre, as one put it—only a person very committed to it would even try.

If that’s the case, why did five of the seven people who took Massachusetts’ Grade 1 exam in November fail to pass? Tom Bienkiewicz is hardly losing sleep searching for the answer. But when asked how to raise the passing rate, without making the exams any easier, he offered a simple, plainspoken observation. “I think additional training opportunities for operators are a big need.” Few would disagree.

NEW ERA, NEW NEED

Not long ago, anyone looking for training in wastewater treatment could turn to federal and state government-sponsored programs that emerged after the passing of the Clean Water Act in 1972. In one of the more significant and symbolic government investments in wastewater training, EPA provided funds for the construction of state training centers, including \$2.5 million for centers in five New England states. Courses offered at the centers, some of which were built at existing treatment plants, include everything from basic entry-

NEIWPCC-led consortium of training organizations. By July 2005, the consortium will be running the program without any assistance from state staff.

The trend is also seen at the federal level. EPA's once vast Operations and Maintenance Program, which worked to build and support a comprehensive training capability within states, has all but vanished. EPA continues to fund its 104(g) technical assistance program, which provides states with monies used to pay for personnel to visit small plants and provide on-site technical advice to operators on how to run their facilities more effectively and efficiently. But even those monies have been shrinking.

Twenty years ago, EPA's Region 1 (New England) received \$360,000 in 104(g) funds. Ten years ago, the funding dropped to \$225,000. It now stands at \$141,000. "The funding used to help pay for one full-time employee [in each New England state], but not anymore," said David Chin, EPA Region 1's 104(g) coordinator. "Unfortunately, the funding has dwindled over the years."

There are, of course, some exceptions to the trend. The Northeast Rural Water Association, which provides training and other support services to smaller water and wastewater systems in Massachusetts, New Hampshire, and Vermont, reports an increase in federal support that's allowed it to approximately double its course offerings over the past three years. But the overall drop in government support is a growing concern for NEIWPCC's Chuck Conway.

"State and federal assistance for wastewater training and plants in general is less now than it was when the Clean Water Act was enacted in 1972," Conway said. "This is happening while the need to provide a support system for operators is probably greater than ever."

EPA does indirectly support training in New England and New York State, because a fair share of its general grant to NEIWPCC goes to support the programs offered by NEIWPCC's Environmental Training Center. The Center offers a diverse array of courses every spring and fall, ranging from one-day classes on spe-

cific topics, such as "Biological Nutrient Removal," to multi-day courses on basic wastewater treatment operation.

Wastewater programs are disappearing at community colleges. "For somebody who wants to get started in the field and get a certificate or an associate's degree in New England, there is not much opportunity."

KIRK LAFLIN, PARTNERSHIP FOR
ENVIRONMENTAL TECHNOLOGY EDUCATION

In fact, looking at the array of courses offered by NEIWPCC and other organizations such as Northeast Rural Water, you couldn't be blamed for concluding that the reduction in government involvement hasn't reduced the training options. Operators can even opt for the growing amount of training being offered by for-profit consulting and engineering enterprises (although these firms tend to be motivated in part by the opportunity to expose a captive audience to the value of their products and services).

But many industry experts say it's not enough—at least not enough of the kind of training desperately needed by an industry in need of fresh talent.

"I'm not discounting the training that NEIWPCC and others offer or anything like that," said Kirk Laflin, executive director of the Partnership for Environmental Technology Education (PETE) in South Portland, Maine. "It's just that, for somebody who wants to get started in the field and get a certificate or an associate's degree in New England, there is not much opportunity. We're missing that baseline—those baseline programs that provide the general science, some of the math, and the general wastewater background. Right now, you have facilities that, if they want to replace operators, often have to hire untrained people and then the communities bear the burden of trying to identify where and how they're going to get training for them. In five to 10 years, we are going to lose a big number of operators to retirement—and we're going to have a problem."

CLASS CANCELLED

A number of community colleges in NEIWPCC's member states have traditionally offered wastewater programs leading to certificates or Associate in Science degrees. But it's a tradition that's dying. The program at Southern Maine Community College—gone. The same goes for the programs at the Community College of Rhode Island, New Hampshire Community Technical College at Berlin/Laconia, and Tunxis Community College in Farmington, Conn.

Since most community colleges are heavily subsidized by state funds, they've felt the squeeze from state budget woes. All programs have been examined to determine whether enrollment justifies existence, and wastewater programs, more often than not, have fared poorly under the scrutiny.

"We were limping along for several years in terms of trying to get enrollments, to get maybe 12 students in these courses to break even," said Dr. Karen Wosczyzna-Birch, who developed and coordinated the program at Tunxis. "And it just seemed like we could never pull enough together."

At the community college in Berlin, N.H., Professor Sheldon Towne once had as many as 16 freshmen in his water and wastewater program. In the early 1990's, the program's enrollment of full-time students began to fall, forcing Towne to start offering night classes at locations throughout the state in an effort to keep the program alive. That worked—for a while.

"I figured, 'Hey, if I can fill the program up with part-timers, as long as the revenue is the same as full-time students, the program will be OK,'" Towne said. "But the officials looked and said, 'If you don't have eight full-time or equivalent students, it's not financially viable. The program's gone.'"

"I just wish they'd hung on and weathered this slowdown to see if it picked up again. Enrollment is real cyclic, and we were in a down cycle," Towne said. "I have a file full of letters from operators, superintendents, people from the Department of Environmental Services, people from New Hampshire Water Works, all saying

‘We need this program, we’ve got to have it.’ I even talked to the governor. I agreed to move the program to Manchester, where there are so many more people and potential students. But it made no difference in the decision.”

In speaking with coordinators of community college wastewater programs, it became clear that building a program is just the first step. Effective recruitment that emphasizes the positive aspects of the industry is critical, because students, like most everybody else, seldom think about working in wastewater.

“The problem is the field is underappreciated,” says Manchester’s Frank Thomas. “Once you flush the toilet, nobody worries about what happens to it.”

When people, especially young people, do think about working in the industry, their natural response is usually negative. “In the summer, I work with a high school program to get kids interested ultimately in teaching math and science, but they also look at other careers,” said Tunxis’s Wosczyzna-Birch. “One place we always visit is a wastewater treatment plant, and they say it smells and just don’t like the idea of it. We’re trying to get them to look at it as a career option, and they right away turn up their noses. They don’t understand that if you do it right with the technology, you shouldn’t have an odor problem. They truly, truly have a perception that it’s not something they want to do.”

Overcoming this perception—or misperception—is one of the keys to attracting new people to the field. But understaffed, overworked community college recruiting departments aren’t likely to be saviors. “The people that go out recruiting don’t know anything about it,” said Berlin’s Towne. “They get that sneer in their voice when they talk about wastewater treatment.”

In some people’s minds, the true savior of basic wastewater education may be the innovation that has helped so many businesses cut overhead dramatically—the Internet.

ONLINE OPTIONS

“I think what we’ll see in the future is a blend of academic programs at communi-

ty colleges and online instruction,” said Laflin, PETE’s executive director. “What I am looking at is, in some cases, a blended program. You’ll go to college in the wastewater area and maybe 20 or 30 percent of the courses are offered right there at the campus. The rest are all delivered online from different parts of the country, and it will be seamless. You won’t even know where they come from.”

This prediction is already coming true in some parts of the country. Kirkwood Community College in Cedar Rapids, Iowa, began offering water and wastewater classes just four years ago, but already more than 2,400 students from around the nation have taken its online courses. Kirkwood attracts students partly by advertising in trade magazines, but it’s also established training partnerships with other community colleges and educational institutions. Kirkwood’s main partner is the University of Florida’s Center for Training, Research and Education for

“I’m learning from a guy who’s been in the field longer than I’ve been alive.”

EDDIE BARTLETT, 20, A VERMONT OPERATOR WHO ATTENDED NEIWPPC’S TRAINING SESSION IN RUTLAND

Environmental Occupations. The TREEO Center provides its students with Kirkwood’s Internet-based, technologically sophisticated courses, then sends them to local sessions to learn about state-specific regulations.

“Colleges can supplement an existing general education coursework and drop in these Internet classes at little or no expense to the school,” said Doug Elam, program manager of Kirkwood’s Environment Technology Online program. “It’s a way to keep a program viable.”

Kirkwood itself has kept costs low, since it didn’t even develop the wastewater course content that it offers. The college provides the online instruction developed and distributed by the Office of Water Programs at California State University, Sacramento, which has its own successful Internet-based operation utilizing material from its popular operations manuals. (If

you take the courses directly from CSU Sacramento, however, you don’t earn community college credits, as you do if you take the classes through Kirkwood.)

Other online educational alternatives exist and appear to be growing in popularity—a fact that worries some wastewater training veterans.

“When the Sacramento manuals first came out, pilot programs were conducted throughout the country to see how well people did taking the courses on their own,” Don Pottle said. “It became fairly clear, at least in New England, that people are not generally motivated enough to do it. They are much more successful when they can sit in a classroom, with an instructor, away from a work site with a competent instructor.”

Pottle feels online training is helpful for keeping up with new technologies and for allowing those in remote areas to get the education they couldn’t get otherwise. But his feelings about the greater value of in-person training are hardly unique. At the class in Rutland, Eddie Bartlett said he’d driven a long way to get there—and it was worth it.

“You pick up a lot from your bosses,” he said. “But it’s amazing how much this training helps. I’m learning from a guy who’s been in the field longer than I’ve been alive.”

Watching Eddie and the other students during breaks in the class pointed to another benefit of convening in a classroom rather than online—informal information exchange. Aside from a passion for the Boston Red Sox, the one thing they all had in common was wastewater work, so they talked about it. They talked about their jobs, about the different way they did things. They learned from each other. And when they returned to the class, Conway was there, lecturing at times but also working with small groups with specific needs or working one-on-one with students stuck on thorny questions.

Online training has its place, and may in fact be the savior for community colleges struggling to provide the basic education that industry experts such as Laflin says is lacking and so necessary. But the in-person version has its own merits,

especially for operators who've moved beyond the basics and need higher level training to advance in the field and fill the void left by retiring upper level operators and managers. The issue is: How best to provide it?

TRAINING STATES: THE GRANITE STATE'S WAY

In conversations with industry veterans, one state in the region tends to get high marks for its approach to wastewater training—New Hampshire. By utilizing funding from a variety of sources (including the Clean Water State Revolving Fund, through which EPA grants low-interest loans to states for wastewater construction projects), the state has maintained effective training programs, visiting facilities directly and also offering 10-15 courses every spring and fall. The state continues to operate its training center in Franklin, where NEIWPCC frequently conducts courses.

New Hampshire gets praise for developing the entire content of its wastewater exams, which require operators to not only pick the right answers on math questions but also show their work. State staff and industry experts regularly scrutinize the exams and modify them to reflect changing needs for knowledge. Most other states utilize the standard exams developed by the Association of Boards of Certification, and customize them by adding a small number of state-specific questions.

New Hampshire also earns plaudits for the unusually close, cooperative relationship between staff at the Department of Environmental Services and the New Hampshire Water Pollution Control Association, which represents wastewater operators, engineers, equipment suppliers, and others involved in the industry. When state staff, for example, conduct their annual sessions with science teachers to enlighten them about the technical and scientific aspects of wastewater treatment (with the hopes that the teachers will in turn enlighten their students), it is the association that pays for the expensive test kits used by the teachers. The association also has an education committee, which

meets twice a year to discuss training needs. The committee includes George Neill, who oversees the state's training efforts as head of the Operations Section of New Hampshire's Wastewater Engineering Bureau.

In New Hampshire, the emphasis is on education, not enforcement. "I could educate 30 people in the time it takes to chase after one bozo."

GEORGE NEILL, NEW HAMPSHIRE DES

"When I first cut my teeth in this business, my boss at the time—who had the job I have now—was very involved with the association," Neill said. "I just grew up seeing how they cooperated and encouraged training. It just worked well."

Neill is not immune to the fiscal pressures faced by all government agencies. At one time, he had eight people on his staff; he now has four. But Neill said he feels lucky to have that many, and emphasized that he and his staff, no matter how many they number, will always maintain an open door to facilities and operators in need of help.

"I don't see that happening in a lot of other states," he said. "It's more 'us versus them.' Here, if someone wants to come in and review their exam after they've failed, we'll sit down with them and go over where they went wrong." In Neill's mind, it is far more efficient to show operators the right way to do things rather than to punish a person whose wrong practices have led to non-compliance with environmental regulations.

"I could educate 30 people in the time it takes to chase after one bozo," he said. "We keep our compliance people bored—or at least we try to."

The collaborative spirit in New Hampshire on wastewater training extends to the state's cities and towns as well. Almost every municipality pays the fees for their operators to attend training sessions. More than a few also pay their operators' association dues. "Good training in the long run saves everybody time and money," Neill said.

TRAINING STATES: OTHER APPROACHES

Look east from New Hampshire and you'll find another example of the benefits of collaboration. In the early 1980s, members of Maine's wastewater community—operators, state staff, engineers, and consultants—saw the need for a more extensive, unified training effort. Working together, they succeeded in getting state backing and funding for the creation of JETCC, which was established in 1985. JETCC, which is managed by NEIWPCC, conducts regular meetings of the state's wastewater experts to determine training needs and then coordinates courses designed to deliver the necessary education.

Operating out of a small office in South Portland, JETCC's tiny staff keeps costs low by turning for help from those who have a stake in maintaining a well-trained workforce. State environmental employees, municipal facilities, even private companies pitch in.

"We have a strong network of volunteers who give us the ideas, help develop the agendas and topics, and actually do the work out in the field—working in their communities to get us training sites and carrying out the teaching and instruction," said Leeann Hanson, JETCC's coordinator.

The system is working, and has worked for 20 years. But volunteers can't help even a low-cost operation cover all its expenses, and JETCC's annual struggles for state funding illustrate the precariousness of its existence. Still, it survives. Is it a coincidence that the two states—Maine and New Hampshire—in which collaboration has played a major part in the success of a training effort are also lightly populated, by Northeast standards, and free of the influence of powerful unions found in large urban centers? Probably not, according to Hanson.

"I think JETCC has been a really successful model for doing a lot with limited resources," she said. "But the key has always been that grassroots support. People feel a part of this, and know their contributions, however small, make a difference. It would be harder to do in a more populous, larger area where people don't have that identification with the group."

In far more densely populated Massachusetts, the decision to turn the state's wastewater training program over to the NEIWPCC-led consortium has put the state on a fresh collaborative track. Organizations involved in the consortium include the New England Water Environment Association, Massachusetts Water Pollution Control Association, Northeast Rural Water Association, and the former operator of the program—the state's Department of Environmental Protection. Early results are encouraging.

"We've actually been able to maintain the quality of the programs while bringing in new courses and instructors," said Tom Groves, NEIWPCC's director of wastewater and onsite programs. "We're also increasing the number of courses being held throughout the state while maintaining the core courses at the training center in Milbury."

Placing responsibility for a state's training efforts with an organization outside the state government apparatus means the coordinators can do their job on a daily basis free of influence from the shifting political and fiscal winds that can buffet priorities; a state program is inherently sensitive to signals from above that may indicate, for example, a preference for enforcement over education. The breaking of the embryonic cord to state funds also leads to a more independent budgeting mindset. Groves hopes to have the Massachusetts program entirely self-sustaining through course and certification fees.

The Massachusetts model may, in time, prove to be one that other states can follow. Connecticut's approach is another option. It boasts a wastewater licensing program with particularly strict requirements for training, but the state has long since relinquished any role in providing training courses. Fair?

"I don't know that there is a fairness issue here at all," said Rowland Denny, senior sanitary engineer with Connecticut's Bureau of Water Management and a long-time member of the state's Wastewater Operators Certification Advisory Committee. "There are many other professions that require training, and the state doesn't pay a dime for it."

Denny added, however, that the state is now considering funding *some* portion of *some* courses. But he strongly defended his state's stringent licensing approach enacted four years ago that has been criticized in some corners for setting the bar too high and preventing newcomers from joining the state's wastewater workforce. The March 2001 Connecticut Wastewater Operator Certification Guidelines contain very clear educational and experience requirements to even *sit* for each of the four levels of exams. For example, the guidelines state that the minimum experience requirement to take the Grade 1 exam in Connecticut is one year in the operation

verifying they've put in the necessary hours at their plant. But the guidelines, as printed, are not terribly clear on the matter, and it's not hard to imagine a prospective industry entrant being confused and even deterred by the seemingly rigid requirements.

Massachusetts DEP's Tom Bienkiewicz feels his neighboring state has taken the wrong approach. "Connecticut is almost like a closed shop," he said. "In Massachusetts, we have a multiple-entry system, where you can come into the field at almost any level as long as you pass the exam. But in states where you have a sequential approach—where after you get



Passing on the Knowledge: NEIWPCC's Chuck Conway helps Eddie Bartlett, 20, work through a complicated math problem during NEIWPCC's training session on Sept. 28-29, 2004, in Rutland, Vt.

of a Grade 1 or higher wastewater plant (with no substitution of education for experience).

To many, that sounds like the proverbial Catch-22: If you're a career changer and need at least a Grade 1 license to get a decent job, you can't get the job until you have the experience to take the exam that allows you to get the license, and you can't get the experience that allows you to take the exam until you get the job. Denny said it's not quite so restrictive; he said plant employees can be designated as operators-in-training and take an exam before meeting the experience requirement. If they pass, they are awarded their certificate after

your Grade 1 license, you have to work so long before taking your Grade 2 exam, and then if you pass, work so long before taking your Grade 3—it controls the availability of operators."

Denny, not surprisingly, doesn't see it quite that way. He said the main change in the new guidelines was an increase in the education required to take the Grade 1 and Grade 2 exams—a decision he vehemently supports. "We have seen time and time again where people with limited education have trouble passing exams," he said. "It behooves them to get the required education in place so they can pass the exam. Otherwise, it costs them \$190 each

time they fail. If people honestly want to get into the field, they can do it. There's no doubt in my mind they can get it done."

CONTINUING EDUCATION?

However the training's provided, there's no dispute within the industry about the absolute necessity of it for educating newcomers or those wishing to advance within the field. There's less consensus about the value of the common practice of requiring certified wastewater operators to take additional training to simply maintain their license at their existing grade level. Go to almost any wastewater class in the region, and a number of the students will be there not because they want to be, but because *they have to be*.

"I'm here to get the credits," said Wally Allen, 45, a student in Conway's class in Rutland. Allen has a Grade 1 wastewater certificate, which he had to get to do his job at the Shelburne Farms environmental education center in Shelburne, Vt. But like all of the state's wastewater certificates, it's only good for five years. It can be renewed at the end of the five-year period, but only if Allen can provide evidence to the state that he's completed at least 20 training contact hours of courses, short courses, or seminars related to wastewater treatment and approved by the state for credit. Advocates of such programs say it's not a lot to ask. With a value of 12 hours, the two-day Rutland class alone got Allen more than halfway to his goal.

Virtually all of NEIWPCC's member states have programs similar to Vermont's, which the states developed to help ensure that operators keep their skills sharp and stay on top of changes in technology, processes, and safety issues. They are laudable goals, but not everyone is convinced the programs achieve them.

In Rhode Island, the regulations of the state's Board of Certification of Operators of Wastewater Facilities include language authorizing the operation of such a program, but with the provision that the board will decide if and when to start one. The board has yet to decide the time is right.

"We have to make sure that what we do is done so that it's actually working and

people are getting something out of it," said Bill Patenaude, a principal engineer with Rhode Island's Department of Environmental Management and the chair of the certification board. "I've been to enough training sessions where you see operators come in, sign in, and walk out. There's no information transfer. I'm also not comfortable with somebody taking the same course every two years and having it count."

In most states, mandatory training doesn't end when a wastewater operator gets a license. More training is required to get that license renewed. A good idea? Rhode Island officials aren't so sure.

Patenaude's desire to carefully consider what he's getting into is understandable, particularly so right now. With most states playing less of a role in training or no role at all, other organizations, including private firms, have increased their offerings of courses that operators can take to earn training contact hours. According to Jon Jewett, a former trainer with Vermont's Department of Environmental Conservation who now leads courses for NEIWPCC, the result has been fewer directly relevant, technically demanding courses such as "Activated Sludge with Math" and more computer classes and other "feel good" training, as he calls it.

"Operators go to these classes, they get their training hours, but they're not really advancing themselves professionally or taking courses that might help them keep their facility in compliance," Jewett said. "When we wrote Vermont's certification rules in 1984, we said that at least 75 percent of the required training had to be in the field of wastewater treatment. But these days, [state officials] feel that good training is limited enough, they'll approve any training that operators take."

That's a charge that strikes at the very validity of the system—if the courses don't help, why bother? To be fair, it must be pointed out that NEIWPCC and the majority of other training providers have established systems to ensure that students who leave a class early don't get credit for

the contact hours, and they've worked arduously to develop courses that deliver necessary knowledge. "We certainly stand behind all the training we offer as being valuable and well done," said Northeast Rural Water's executive director Michael Wood-Lewis.

And in Vermont, Paul Olander, the head of the state's operator certification program, said Jewett—his friend and former colleague at Vermont's DEC—is guilty of a little exaggeration. Olander determines which training classes are approved for credit, and he pointed out several recent examples of courses for which he denied approval. Still, he conceded that Jewett's overall point has some legitimacy.

"I don't think we see a lot of operators that take just fluff courses, but there are some," Olander said. It's his view, however, that operators aren't always looking for the easy way out; sometimes, he said, they take less demanding courses because they cost less than a more technical class and their plant's training budget is limited. He also said he sees value in some of the softer classes.

"We approve first aid/CPR courses, for example, because of the hazards involved with these jobs," Olander said. "Blueprint reading is also important. But is it more important than getting a good activated sludge class? Well, some of these guys could really use an activated sludge class much more than blueprint reading. So I want to see them attend both. There needs to be a balance."

In an effort to ensure that balance, Olander is seeking to have Vermont's certification rules rewritten to stipulate the minimum amount of technical wastewater courses that operators must take to meet their license renewal requirements. The new rules would also require more training overall.

But even if the rules are changed, the fact remains that no current training organization has the resources to screen all course enrollees to make sure they need what they've signed up for. Courses such as "Intermediate Microsoft Access" need to be offered, particularly for aspiring managers, but there are no guarantees that

the class won't include an operator getting credit for learning skills he'll never use and quickly forget.

It's an imperfect system, to be certain. And in Rhode Island, the board of certification has concerns beyond the actual value of some of the classes that operators can take to get their required contact hours. Will communities, many already in a cash crunch, have to pay overtime to an employee covering for a colleague away at a training session? Will operators have to pay high course fees? (Rhode Island currently subsidizes classes so operators pay just \$25 for a NEIWPCC training session; Patenaude warns that level of subsidy couldn't continue in an expanded mandatory program.) How will the state's already limited wastewater staff find the time and resources to oversee a significant new undertaking?

They are legitimate questions that other states have had to confront. Most, in the end, have found the benefits of requiring continuing education outweigh any burdens imposed by the program and any inherent limitations. Whether Patenaude and his board colleagues ultimately reach the same conclusion may be irrelevant, as proponents of retraining in Rhode Island are expected to finally succeed this year in their efforts to get state lawmakers to pass legislation forcing the board to initiate a program. It's the only solution, the program's advocates say, to a palpable problem.

"When wastewater operators first start their job, they are adequately trained, but as time goes on, I think they get very lax," said Joe LaPlante of the Narragansett Bay Commission. "I also think the plants' management gets lax in trying to retrain them. We're simply trying to get a very well-trained professional workforce. That's the bottom line of what we're trying to do."

NEXT STEPS

What LaPlante wants—a very well-trained professional workforce—is what all of NEIWPCC's member states need. But having such a workforce in place when the next decade begins is far from a certainty in the current environment.

During many conversations over the past few months, industry experts offered

suggestions and possible solutions to the problem. Most suggested minor tweaks to existing systems. Massachusetts DEP's Tom Bienkiewicz would like to see the state's lower level certification exams offered more than twice a year, and to allow students in basic courses to take an exam right after the class is finished, as NEIWPCC frequently does. "We need to make it easier for the lower level folks to come into the system," Bienkiewicz said.

Others would like to see a change in the union rules that govern hiring in big cities such as New York and Hartford. Those rules can require plants to hire people based not on experience or education, but rather their union status. A plant with a job opening may have to bypass applicants with extensive wastewater training in favor of a plumber with no wastewater background but with something the others don't have—a union card. Changing the entrenched rules of powerful unions takes time, however, if it can happen at all.

One idea drew unanimous support—more publicity. More people need to know about the need for good operators and about the positive aspects of the job. In 2003, NEIWPCC and the New England

An effort is underway to get the U.S. Department of Labor to take a close look at the growing need for wastewater operators. The result could be a new infusion of government funds for training.

Water Environment Association led an effort to create a brochure that folded out into a poster and encouraged readers to be "Be a Water Quality Professional." It conveyed the rewards of being an operator and the wide range of skills that plants are looking for, and it drew praise and heavy demand. NEIWPCC went to a second printing after quickly distributing the initial run to a variety of organizations, including the region's wastewater associations, who were partners in the effort.

NEIWPCC also works each summer with the wastewater treatment plant in Lowell, Mass., to conduct a "Youth and the

Environment" program, which introduces disadvantaged inner-city high school students to opportunities in the field. The success of these efforts only increases the call for more. Industry experts talked about the need for a greater presence at job fairs and career events. "The wastewater industry has got to do a better job promoting itself," said PETE's Kirk Laflin.

A little help from Washington wouldn't hurt either. In a move aimed at increasing the talent flow into the field, Laflin and PETE have taken their case directly to the U.S. Department of Labor. They've asked the department to fund a demonstration project that already has the backing of Maine's congressional delegation and its Department of Environmental Protection. The project would include pilot testing of online wastewater training as well as an assessment in New England to determine the status of the wastewater workforce and what the employment needs will be in the coming years.

If, as Laflin expects, the assessment were to show the needs to be great, he'll ask for funding to conduct the same survey nationwide. The ultimate goal of the process is to get the Labor Department's career centers to recognize wastewater treatment operation as a "high need job." That recognition would free up a whole new source of government funds to be used to provide wastewater training and job-hunting assistance for displaced or otherwise unemployed workers. The Labor Department has yet to comment on the proposal, other than to say it's under review.

Another idea under consideration at the Labor Department comes from NEIWPCC, which has asked the department's Office of Youth Programs and Job Corps in Boston to consider partnering with NEIWPCC to establish and administer a wastewater operator training program that would be offered through the Job Corps branches in the region. Like Laflin's proposal, the idea is to bring the jobs and the training to people who need the work. And as with Laflin's proposal, there's no indication yet whether the Labor Department will back the plan.

While programs designed to bring new people into the profession are under-

standably a top priority, some experts caution against the danger of overlooking the training needs of those operators who've climbed the organizational ladder to new and unfamiliar heights. "Management training is very important," said Woodard and Curran's Eric Teittinen. "It's very often that you have a very competent technical operator or maintenance person who all of a sudden finds himself promoted to a point where he has to manage people and he or she doesn't like it or doesn't do it well. It becomes a problem."

Those on the top rung of the ladder not only must manage subordinates, they must also manage the delicate process of securing support for the plant from city and town officials. With limited federal and state funding available for treatment plant operation and maintenance, almost the entire financial burden falls on municipalities—and it's the plant managers who must convince them to provide the necessary resources.

"Managers at treatment plants have to be more skilled these days," NEIWPC's Conway said. "And training at the management level is something that we could significantly improve."

GOOD HELP WANTED

The growing need for qualified help and sufficient, effective training at all levels is a pressing issue not just for municipal wastewater treatment plants, but also their industrial counterparts. Some industry experts say the demand for skilled operators may be even greater on the industrial side, where the plants may be smaller but no less advanced technologically.

"It's an effort for us to keep people trained to the level we require," said Randy Boles, who manages a wastewater facility in Bedford, Mass., for Millipore, a maker of membrane filters used by pharmaceutical companies. "They have to have the experience that the regulations require, but that's only part of it. The second thing is, do they have enough hands-on experience? Can they actually do the job? You can't just hire anybody. You have to hire someone who has very specific skills."

Boles said that, 15 years ago, he would have hired somebody with a high

school degree and a wastewater license. Not anymore.

"I think they need at least an associate's degree," Boles said. "In fact, our operator right now has a bachelor's degree in chemistry."

"There are so many pluses to the field, and the only negative is the perception of the job that people have. We don't work in sewage. It's much more scientific and professional."

BOB PARISEAU, AMHERST (MASS.) DPW

Wastewater industry boosters point out that being an operator anywhere these days is more about chemistry and computers than about doing society's dirty work. But you can't escape the fact that it's wastewater. Today's kids grow up dreaming of doing bizarre touchdown celebrations, winning *Survivor*, or rapping their way to a Miami mansion, not treating waste, whether it's generated by a factory or the family down the street. It would be folly to expect even the most effective publicity or recruitment program to succeed in attracting enough young people to meet the industry's need for new talent.

Industry veterans say that recruiting efforts should target those in the middle of their career, people who've reached a stage where their primary need is a stable, challenging, reasonably well paying job that can't be exported to China or automated out of existence.

"It's a maintenance intensive career and robots really haven't learned how to do maintenance yet," said Bob Pariseau, director of water resources at the Amherst (Mass.) Department of Public Works. "There's also an awful lot of judgment and common sense involved. It's too bad. There are so many pluses to the field and the only negative is the perception of the job that people have. That's really not the way it is. We don't work in sewage. It's really not the way the job operates. It's much more scientific and professional."

Amherst has established an operator-in-training program at its wastewater treatment plant, which allows it to hire

people who have potential and worry later about getting them the licenses and the skills. Through in-house training, and the programs that are available through NEIWPC, the plant has managed to maintain a full, qualified staff. But it hasn't been easy. "The job applicants haven't been that good," Pariseau said.

Still, he's not convinced that the field is on the road to a crisis unless changes are made to attract newcomers. "I think everybody has that feeling that after we retire, everything will fall apart," Pariseau said. "But it won't."

Many others are not so sure. When older workers leave, they take with them their wisdom in the ways of wastewater, which only increases the need to effectively train their replacements to operate increasingly sophisticated facilities. But before you can teach and train, you must *have* somebody to teach and train—no small challenge for an industry that's often unfairly overlooked or spurned by the type of committed, capable workers it needs.

The two young men at the class in Rutland are not quite convinced they've found their niche in life. Eddie Bartlett and A.J. Wright are keeping their career options open, but they weren't ashamed of working in wastewater—far from it.

"It doesn't really affect me, when it comes to girls," Bartlett said. "I would come home dirtier from my previous jobs." To them, the field offers tangible benefits. "I never expected to get full medical and dental coverage right out of high school," Wright said.

Two months after the Rutland class, Bartlett and Wright revealed their scores on the Grade 2 test for which they'd been preparing. Wright said he failed with a 56, but he's determined to pass the next time around. Bartlett passed with a 76 and, as a result, received a \$0.50 raise in his hourly pay. Perhaps that raise, and the lure of it for Wright, will be enough to keep them from straying to another, potentially more lucrative, field.

It would be nice if they stuck around. 💧

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