PE&T *interviews Ken Wilcox*

Candid Comments *from a* Leak Detective

by Kally Fraser

Ken Wilcox, president of KWA

Editor's Note: Ken Wilcox, Ph.D., is the founder and president of Ken Wilcox Associates, Inc. (KWA), a third-party evaluation laboratory. KWA evaluated most of the methods on the list of the National Work Group on Leak Detection Evaluations (see page 16). Since its founding in 1990, KWA has evaluated some 200 different leak detection methods.

Who established the evaluation process you use?

The U.S. EPA turned out seven sets of standard methods. We use those guidelines as much as we can.

What is the purpose of this evaluation process?

EPA has set up a standard that says you must detect a leak 95 percent of the time with no more than a 5 percent false alarm rate. The testing establishes whether or not the leak detector meets this standard.

How does the evaluation process meet this purpose?

KWA has some USTs that are nearly identical to those at a service station. We install the manufacturer's leak detection equipment on the tanks and induce a leak by pumping a small amount of fuel out of the tank. Then we compare the induced leak rate with the leak rate that the manufacturer reports. If the two rates are close to being the same, the manufacturer passes. If they don't match very well, he won't pass. There are statistical calculations to determine whether the tank passes or not. Sometimes it's harder to do the calculations than to do the tests.

What is your role in this process?

We test leak detectors from manufacturers to make sure the leak detectors meet the EPA compliance requirements for all 50 states. KWA has done testing for manufacturers in about half a dozen countries. The testing itself is done in the US—as much of it as possible here at the laboratory. We also build test equipment and check the calibration of our equipment here.

It doesn't sound like the enormously high science that I expected.

Well, it's not as high tech as some people imagine. The EPA expects us to do some calibration work, but the testing itself is a fairly simple procedure.

Are there any situations in which you might not use these guidelines?

Yes, when dealing with new equipment that's not covered by these seven EPA guidelines, they are no longer applicable. There are many of pieces of equip-

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Aerial view of the KWA test laboratory

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ment out there for which there are no official EPA test procedures.

That's when you come up with the test itself?

Right, that's probably the most fun.

Do the EPA guidelines have any other drawbacks?

The general industry consensus is that they are very good, and I would agree. There are some deficiencies, but most not serious. However, there is no easy way to get these deficiencies corrected. Take the method of statistical inventory reconciliation (SIR). On that particular protocol, there have been ways that the people taking the test could have determined the answers without going through the leak detection process. We've known about the problem for a long time and have even written a new protocol to prevent the incompetent vendor from passing.

Developing a new protocol seems like it would be simple enough.

Using it would require substituting one test for another test document, and the EPA seems unwilling to make that change. We did make some changes unofficially; but some state regulators wouldn't accept the results because they said the test wasn't done properly.

We may have finally corrected the problem just by not giving people the data any more. We used to send it to them, which meant they had plenty of opportunity to figure out the calculations without taking the test. Now, the people taking the test come to our office, or if they can't come here, I go to their office to monitor the test. Monitoring can add a few thousand dollars to the bill, what with travel costs. However, it protects both our clients and us—we can honestly say they have taken the test correctly.

Why did you decide to open a testing company?

I was at an engineering firm that was the wrong fit for me. I also knew a lot of people in the field, and had been doing leak detection tests for a few companies in an earlier job, so I decided to take the risk. We've had the lab now since 1990, and every year I think it's going to be our last. I'm a pessimist. But we're busier now than we've ever been—partially, I think because of the 1998 deadlines. Although after the deadlines pass, we think there will still be plenty of testing to do.

What is your favorite part of your work?

I like to do the testing and build test equipment. My son, Jeff, and I really like to figure out better ways to do testing. We have to proceed very carefully here because its the EPA's job to figure out how to define the testing, not us. Sometimes, however, a new piece of equipment comes in, and there's no test method that fits that particular device; in that case, we try to develop a description that fits the equipment. We then submit it to the National Work Group on Leak Detection Evaluations to see if they'll accept it (see page 16). Sometimes NWGLDE suggests modifications, but they usually accept our recommendations. They have been very helpful in keeping all of us honest.

For example?

The federal EPA failed to provide test procedures for interstitial monitors. We have developed simple methods for conducting these tests

What other testing procedures would you like to develop?

Testing procedures for very big bulk USTs, from 100,000 gallons on up to 12 million gallons. The mil-

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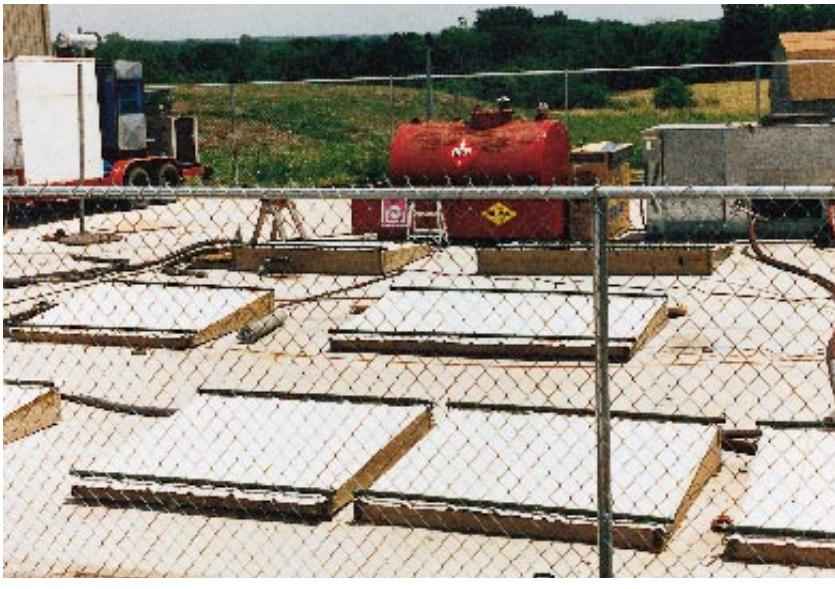
KWA's tank pits where the leak detectors are installed



Kathy Wilcox, the secretary/treasurer of KWA

Craig Wilcox, installing a leak detector in a pipeline

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itary calls them "gigantic underground storage tanks" (GUSTs). There aren't many 12 million gallon tanks, so they are not much of an issue, although there are a fair number of 1 to 3 million gallon tanks. We've tested leak detectors installed on tanks up to 2 million gallons.

From an environmental standpoint, GUSTS need some kind of leak detection, but it isn't easy. Testing for GUSTs is very expensive and puts the tanks out of commission for as long as two months while the testing is going on. Also, regulators don't want to relax the standard leak rate (1/10 of a gallon per hour) for GUSTs. However, the smallest detectable leak could be several gallons per hour, and if this kind of performance is unacceptable to the regulatory community, there is no point in doing the tests. However, right now there are only two options for in-tank monitors: you can have a higher detectable leak rate than 1/10 of a gallon per hour for GUSTs, or you can have nothing for them at all. Otherwise, you have to go to external monitoring—which can be difficult, depending on the site characteristics.

When will the procedures for GUST testing be decided on?

Before the end of the year, the U.S. EPA will decide on them. There are leak detection systems being tested right now on the 12 million gallon systems, but not by us.

What are the major challenges in testing a tank over 100,000 gallons?

Just finding one to work with uninterrupted. Most of the time GUSTs are on military bases; therefore, you need to find a base that permits you to take a tank out of its service for at least one month. Well, this is the military; if they need that tank, they're going to take it. We were on one job site for more than four months, just trying to get 12 tests completed. Leaks are another challenge. You can't do an accurate test of a GUST if it has a leaky valve because the valve lets fuel drain into the tank during the test. Therefore, the source of any leaks must be discovered. On a GUST, these leaks can be hard to find.

What other tests do you run that pose a challenge?

Tests for new continuous monitors. A continuous monitor is one that collects data when the dispenser is not being used. A continuous monitor can get quite a bit of data even when the station is in operation. The advantage is that the station doesn't need to close to get a test. The problem is that it's hard to get the right kind of data for evaluation purposes.

Why?

The test results are all based on field collected data. Therefore, to get the right data, you have to find the right combination of a station owner who is willing to put the test in his site, large tanks and a busy station. The owner of a busy station has no incentive to let you use his station to test leak detection equipment if he already has a leak detection system in place. Many times, as an incentive, the manufacturer gives the equipment to the station owner where it has been tested.

With continuous monitoring systems, not only is it hard to get the data, but you must develop a system that will process the data after you have it. That's the whole area of electronics. You get the data, but the system still doesn't pass because the leak detector is not engineered properly—it still isn't able to detect the leak.

How would you correct this problem?

Some engineering changes would need to be made. You might even have to change the electronic process and put in different electronic filtering equipment to get rid of interfering influences. Or, it could

Jeff Wilcox, setting up to do a fuel transfer between tanks

affect the test if you have voltage fluctuations. The line voltage out of the wall is just one kind of potential interference a station has to worry about.

What is necessary to do a third-party evaluation?

Six things, and the first five are essential: (1) A test tank of some kind—the more like a gasoline station tank, the better; (2) the capability to heat and cool fuel so temperature effects can be monitored as part of the evaluation; (3) the capacity to transfer fuel around easily—that's the most basic thing; (4) a pipeline (if you're going to do pipeline testing); (5) a leak (you must also be able to make a leak—that seems obvious, but it's not as easy as people think); and (6) some sort of data acquisition system (you could get by without this, but it's just so much easier to do automatically). With these six basic components, you could do an evaluation.

However, experience is also important. For instance, even under the best laboratory conditions, a storm usually messes up a test. We didn't know that for a while, but now we watch for storms. Weather needs to be factored in, but not by us. We are hired to do a test under controlled situations. It's probably safe to say that no tank would pass in the middle of a thunderstorm.

What is your educational background? Does it help you do your work?

I have a Ph.D. in chemistry, but that's not much of a qualification for this occupation, although a person should have some kind of a technical degree (i.e., physics, math or engineering). Actually, you could do it without a degree at all, but you'd have to know the physical principles (i.e., water table effects; principles of trapped air; barometric pressure changes).

What is most important to you in life?

My family. I have two sons, both of whom work here at the lab. Jeff, 27, is an engineer. Craig, 25, is a lab technician. My wife, Kathy, does all of the paperwork/accounting and bookkeeping. We've had the lab seven years, and for five years we've run it as a family—with all the problems and the pluses. (Right now, KWA has five employees—four of whom are family. My kids got into the business several years ago. First, Kathy started working for me. She's threatened to quit several times, and I've fired her several times. But she's still here. The downside of a family run business is that it sometimes feels like we're together 24 hours a day—it's very hard to get away from it.

What's the upside?

Well, I know where they're at. It's not like Kathy and I see our sons only a few times a year.

How would you describe yourself?

I'm a hands-on kind of a person who needs to see something happen. I've noticed over the years that a lot of things that should work, don't. Based on calculations, particular leak detection systems have been claimed to work in particular ways. However, when installed, the leak detection systems didn't perform as expected. According to the theory, these leak detec-

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tions should have had a lot of false alarms; but, as our experience in the field showed, they didn't.

How has KWA made a difference to the petroleum equipment industry?

I think KWA has kept some leak detectors off of the market that didn't work. I guess we've flunked about 25 percent of the equipment we've tested. When a third-party evaluator determines that a number of pieces of equipment don't meet EPA specs, the equipment is not allowed to be sold for compliance purposes.

Out of the systems you've evaluated, what's the most frustrating part of the job for you?

If I could do it over again, I'd help write some of the protocols, certify some laboratories, and give them some leeway. Although the government doesn't question UL, we get questioned and receive demands to send additional information all the time. Most of the time we are able to persuade regulators on the correctness of what we've done. Sometimes, however, we are strongly opposed. For instance, we've written a new protocol that we expect will make some SIR vendors very unhappy because it is much tougher than the old one, and some of them won't pass it. If we give that test, and 25 percent flunk, that 25 percent will be very vocal. It hasn't happened yet because the protocol hasn't been approved.

What pressures do you face as a third-party certifier?

The bottom line is that the people who pay me may flunk sometimes, so there is a certain pressure on us that wouldn't be there if we could get paid some other way. I think third party labs such as mine have to admit that we like to see people pass, because it's easier.

Now if an industry organization such as API or PEI were to collect the money, and contract the job to KWA or Midwest Research, for instance, the third party laboratory would be in an easier position. I know I could then report back to API without feeling any pressure at all. But, overall, my only real regret comes when a manufacturer has passed EPA evaluations, but we felt that the system wasn't designed properly. (Luckily, this situation has only occurred 2 or 3 times out of 200—less than 1 percent.)

Do you expect the use of government-enforced third-party evaluation to change? Why?

No, because there is no reasonable mechanism to change it. And, it's easy to enforce the certification. For the most part, if you're not on the list, nobody's going to buy the equipment.

Additional assistance on this profile was provided by Erin Felvey.