

CAN YO



A person's hand is shown in the foreground, holding a white, circular device with a black grid pattern, which is the Nasal Ranger Field Olfactometer. The background shows a farm setting with a dirt field, a fence, and a large yellow building under a clear blue sky.

# DO YOU SMELL IT?

Your nose picks up odor, but specialized equipment can do it much more objectively.

**BY THOMAS QUAIFE**

**O**DOR CONTROL IS A TOP PRIORITY FOR Rod, Rick and Ron Hissong on their south central Pennsylvania dairy. They have spent hundreds of thousands of dollars on state-of-the-art equipment, including aerators for their lagoon, solid-waste separators and a pulse-irrigation system. But every year — in the late spring — a phenomenon occurs where the lagoon “turns over” and water on the bottom trades places with water on the top. This inversion can sometimes lead to odor complaints.

Once, a former faculty member at the Mercersburg Academy — an exclusive boarding school located about two miles from the Hissongs — complained. So, the Hissongs invited him out for a visit. After seeing what

The Nasal Ranger Field Olfactometer can be transported easily to different parts of the dairy — it only weighs 2 pounds. By breathing into a nasal mask and setting a dial at the other end, an operator can get an odor reading at each location.

## HOW MUCH ODOR IS “OBJECTIONABLE”?

ACCORDING TO MOST ODOR-CONTROL EXPERTS, ODOR LEVELS THAT REACH or exceed 7 dilutions-to-threshold (D/T) are considered objectionable.

Ron Sheffield, waste management engineer at the University of Idaho Research and Extension Center in Twin Falls, Idaho, says a producer should be concerned if he is getting a D/T reading of 7 or more at his property line. He says it's a “serious issue” if the D/T reading is 15 and a “significant problem” if the D/T reading is 30 or more.

the Hissongs did to control odor, the man came away impressed. In a follow-up e-mail, he told the Hissongs it was one of the most fascinating things he had seen in the 38 years he had spent in the community. He has not complained since.

The Hissongs have added even more odor-control equipment since then. But, with spring right around the corner, it might be worthwhile to invest in odor-monitoring equipment as well. That way, the farm would have some sort of benchmark to tell how much odor the lagoon inversion causes in the spring, as well as a way to tell if the extra odor-control equipment is making a difference. And, the vast majority of farms that haven't made the same investment in odor-control equipment as the Hissongs should consider this as well.

Here's how to acquire and use specialized equipment that will provide a much more objective measure of odor than simply relying on your nose or your neighbor's nose.

### Portable equipment

The first step is to zero in on the testing method you want to use. According to Wendy Powers, extension environmental specialist at Iowa State University, there are two acceptable methods for measuring odor:

- A Nasal Ranger Field Olfactometer.
- An air sample that is collected and sent to an olfactometry laboratory.

The Nasal Ranger is a portable instrument that weighs about 2 pounds. As you can see from the photo on page 24, the operator holds the instrument up to his nose and inhales through a nasal mask. He takes several sniffs and then checks for any noticeable odor. If he cannot detect an odor, he turns a dial at the other end of the instrument to the next setting. He repeats this process, sniffing

at levels with progressively fewer dilutions, until he can detect an odor. Depending on which dial setting he ends up with, the operator can determine the odor level — expressed as dilutions-to-threshold (D/T).

Dilutions-to-threshold refers to the amount of odor-free air that it takes to dilute odorous air down to the point of being non-detectable. For instance, at a level of 7 D/T, it would take seven parts of odor-free air to make one part of odorous air non-detectable. The higher the number — the D/T scale on the Nasal Ranger runs from 2 to 60 — the more odorous the air.

To ensure that the operator is breathing in odor-free air, the Nasal Ranger contains carbon filter cartridges. These provide purified, odor-free air while the operator breathes through the nasal mask. But when the operator turns the dial to different settings, thus allowing different amounts of ambient (or odorous) air in, he will detect an odor at some point.

### A few caveats

Obviously, the Nasal Ranger relies on people's sense of smell. That can pose a problem, especially when it comes to getting consistent readings, because different

Don't rely on your nose to tell if you have an odor problem. Specialized equipment provides a more objective reading. Got stink?



## HOW TO OBTAIN A NASAL RANGER

THE NASAL RANGER FIELD OLFACTOMETER MAY BE OBTAINED FROM ST. Croix Sensory, Inc., in Lake Elmo, Minn., phone: (651) 439-0177. The complete package sells for \$1,475.

St. Croix also has a commercial lab that will analyze air samples for farms.



people have different levels of odor acuity.

Powers says her recommendation is to have two to four people use the Nasal Ranger at a given location, and then average the readings to help deal with any variation between the operators and their ability to perceive odor.

She also recommends that the operators come from a “clean” area where the same odor is not present. If they have been on the farm for a while, they may become acclimated to the smell. Experts refer to this condition as “odor fatigue,” where a person becomes acclimated to an odorant to the point where he or she is no longer aware that the odor is present.

The Nasal Ranger shouldn't be used around really strong odors — those that exceed 60 D/T. Those types of odor will simply overwhelm the ability of the carbon filter cartridges to purify the air inside the nasal mask for the operator to make an informed assessment.

Therefore, consider the Nasal Ranger as a “field unit” that can be used to test air at the property line or some other reasonable distance from the main odor source. If it is necessary to measure strong odor right at the source, then the next option is to take air samples and have them analyzed by a commercial lab. (See the next section.)

Despite these caveats, the Nasal Ranger is more reliable than certain other instruments that purport to measure odor. Some of these instruments simply measure hydrogen sulfide. In Powers' opinion, hydrogen sulfide is not a good indicator of overall odor on a livestock operation. Odor on a livestock facility can contain hundreds of different compounds, all interacting with each other and their environment.

The Nasal Ranger measures an odor's strength in

general versus just hydrogen sulfide, points out Nick Kreyer, marketing associate at St. Croix Sensory Inc., manufacturer of the Nasal Ranger.

### Collect air samples

The second option to assess odor is to collect air samples and send them to a specialized lab for analysis.

You can either buy your own air-sample-collection kit or hire a consultant to do the collection for you.

The most-popularly-used kit, sold by St. Croix Sensory, allows people to take air samples through a vacuum chamber. It looks like a suitcase made out of hard plastic, with a Plexiglas window on the top. The operator places the case in the environment that he wants to sample and then activates a pump. The pump pulls air out of the case, which creates a negative-pressure situation. To fill the negative pressure, ambient air flows into the case through an inlet and tubing. Air fills a Tedlar bag until it is about three-fourths full — again, there is a Plexiglas window so that the operator can watch the progress. Usually, this takes about three to five minutes. Once the bag is three-fourths full, the operator shuts off the pump, closes the bag and sends it off to a lab — via overnight courier — for analysis.

Several universities have olfactometry labs that will do commercial testing for dairy farms, including:

Iowa State University, phone: (515) 294-2959

Purdue University, phone: (765) 494-1214

West Texas A&M University, phone: (806) 651-5281

## HYDROGEN SULFIDE IS NOT A GOOD INDICATOR OF OVERALL ODOR ON A LIVESTOCK OPERATION.

St. Croix Sensory does commercial testing as well. (For contact information, see the sidebar, “How To Obtain A Nasal Ranger” on this page.)

The labs charge between \$75 and \$200 per sample, depending on the number of samples and certain other variables. Results are expressed in terms of detection thresholds, or D/Ts.

These readings can serve as a benchmark in deciding whether you have an odor problem and if the steps you are taking to control odor have made a difference. 🐄