FAQs from the NWGLDE

…All you ever wanted to know about leak detection, but were afraid to ask.

What's All the Fuss about Equivalency?

This installment of the National Work Group on Leak Detection Evaluations' (NWGLDE's) FAQs focuses on continuing questions about automatic line-leak detectors and line-tightness tests. Please note: the views expressed in this column represent those of the work group and not necessarily those of any implementing agency.

Q. Some of the automatic electronic line-leak-detector listings in the List of Leak Detection Systems (the List) talk about "equivalent leak rates." What does that mean?

A. "Equivalent leak rates" are explained and demonstrated in *Standard Test Procedures for Evaluating Leak Detection Methods: Pipeline Leak Detection Methods*, EPA/530/UST-90/010, September, 1990. This protocol is one of a series of test procedures that cover most of the methods commonly used for UST system leak detection. According to the protocol, "Since leak rate varies as a function of pressure, the leak-detection test can be conducted at different pressures provided that the determinable leak rate at the specified test pressure is equivalent to or more stringent than the one mandated in the regulation."

For example, the automatic line-leak-detection hourly performance standard requires that a leak of 3 gal/h or larger at 10 psi must be detected within one hour with a probability of detection (P_D) of 95 percent and a probability of false alarm (P_{FA}) of 5 percent. Using Table 1.1 on page 4 of the protocol, the equivalent leak rate for an evaluation of an automatic line-leak detector at 20 psi would be 4.25 gal/h. This could also be calculated using the formula in Section 4.2 of the protocol.

Using this process correctly means that the third-party evaluator establishes a known equivalent leak rate at a known pressure, such as 4.25 gal/h at 20 psi, and performs the evaluation. If the evaluation results show that the equipment is capable of finding the equivalent leak rate with a P_D of 95 percent and a P_{FA} of 5 percent, then the protocol says that this equipment will be able to detect the hourly performance standard leak of 3 gal/h leak at 10 psi.

Another example is the annual line-test performance standard, which requires that a leak of 0.1 gal/h be detected at 1.5 times the operating pressure (which we will assume to be 45 psi). The measured equivalent leak rate would be 0.07 gal/h at 20 psi as shown in Table 1.1 of the protocol. If the results of the evaluation show that the equipment can find a leak this size 95 percent of the time with a false alarm rate of no more than 5 percent, then the protocol says that this equipment will detect the annual line-test performance standard leak rate.

Whether or not a third-party test used equivalent leak rates may be a crucial issue for implementing agencies as they determine if a specific piece of equipment satisfies the regulatory performance requirement for hourly, monthly, or annual release detection. Implementing agencies can often determine whether or not the evaluation used equivalent leak rates by reviewing the "Overview of Evaluation Method" section of the final report of a given third-party evaluation. Statements in the report that talk about "rates equivalent to 3 gal/h at 10 psi, 0.20 gal/h at 30 psi, and 0.10 gal/h at 45 psi" validate that the testing used equivalent leak rates. Another place to look is in the summary of the testing procedure where similar wording can be found.

Only recently did the work group begin to use the "equivalent leak rate" terminology in its list. We are at present reviewing the reports for previously listed line-leak detectors to make sure the language for each listing is appropriate. We anticipate the review will be complete by this summer. In the interim, each regulator should be able to make an accurate determination by referring to the third-party evaluation document discussed above.

About NWGLDE

NWGLDE is an independent work group comprising 10 members, including (8) state and (2) U.S. EPA members. This column provides answers to frequently asked questions (FAQs) NWGLDE receives from regulators and people in the industry on leak detection. If you have questions for the group, please contact them at *questions@nwglde.org*.

NWGLDE's mission:

- Review leak detection system third-party evaluations to determine if each evaluation was performed in accordance with an acceptable leak detection test method protocol and ensure that the leak detection system meets EPA and/or other applicable regulatory performance standards
- Review only draft and final leak detection test method protocols submitted to the work group by a peer review committee to ensure they meet equivalency standards stated in the U.S. EPA standard test procedures
- Make the results of such reviews available to interested parties ■