INTEGRITY TESTING OF SYSTEMS CONTAINING DE-ICING FLUIDS:

A PROPOSAL TO APPLY EXISTING TECHNICAL CAPABILITIES TOWARD DETECTING LEAKS IN STORAGE AND DISPENSING SYSTEMS

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REGULATIONS REGARDING DE-ICING FLUIDS

Every year hundreds of millions of gallons of de-icing fluids are used at airports worldwide to eliminate ice from aircraft exteriors as a safety precaution before flight. De-icing fluids have as a major component either propylene glycol or ethylene glycol (PG or EG, respectively), the latter of which is currently subject to a number of state and federal regulations. Some state and local pressure has been applied to airlines to restrict, and in some instances effectively ban, the use of EG-based de-icing fluids at certain airports in the U.S. Where EG fluids are still in use, their storage, use and fate are monitored and tracked as required by applicable regulations. The management process for EG fluids may require extensive record keeping of fluid use as well as integrity testing not only of the underground storage tanks where EG fluids are kept but also of the dispensing systems through which EG fluids are delivered to the aircraft.

CURRENT TESTING PROCEDURES

There is generally some provision for periodic testing of storage and dispensing systems that contain EG (and even PG) de-icing fluid. Some integrity testing protocols currently in use employ chemicals as "markers." The lines containing EG fluids are injected with the marker and, after a period ranging from a few days to two weeks (after the chemical marker has had a chance to evaporate into gas form), soil gas samples are taken and an analysis is conducted in the laboratory. This process can be expensive and time-consuming. To complicate matters, EG fluids are sometimes found to contain traces of gas from previous tests on a line, and the presence of residual amounts of the gas additive can be grounds for barring the use of the EG fluid on aircraft, at least until the additive has been approved by the Original Equipment Manufacturers (OEM) and others, including the airline. Even with these approvals, the pilot in command of the aircraft has the final say.

Moreover, if the tanks and lines have been filled with water while hydrostatic tests are conducted, that water may require special handling or permits before it can be disposed of. It may also be necessary to rinse the storage tanks and lines before they are returned to service.

A PROPOSAL TO FACILITATE THE MANAGEMENT OF EG-BASED DE-ICING FLUIDS

There is a demonstrable need for a sensible, cost-effective and precision means of integrity testing for the storage tanks, piping systems and truck racks associated with the use of EG fluids. Vista Research has developed an alternative model for conducting integrity tests of storage tanks, piping systems and truck racks that, if applied to EG fluid use, would greatly facilitate the EG fluids management process.

Vista proposes to apply to EG systems the same **unique, non-invasive technology** that has received accolades in the leak detection market for airport hydrant fuel systems. Vista's line of products, each

targeting a specific aspect of the storage and distribution system, assures a complete profile of the EG fluids management process: the Vista HT-100 to determine the integrity of lines with contained volumes exceeding 3400 gallons; the LT-100 for lines with contained volumes less than 3400 gallons (including loading racks); the LRDP for underground and aboveground storage tanks (USTs and ASTs); and the PALSystem for locating a leak *after a pipeline has failed a leak detection test*. Vista conducts testing services using its own equipment and personnel.

The Vista technologies assure the integrity of both pipelines and tanks. The HT-100 can detect a leak as small as 0.0021% of pipeline volume (down to two-tenths of a gallon per hour) with a probability of detection (P_D) of 95% and a probability of false alarm (P_{FA}) of 5%—an industry-leading leak detection rate. The LT-100, with its detection capability of 0.1 gallon per hour, has been third-party certified according to EPA standards for evaluating leak detection systems in its class. The LRDP, designed for bulk storage tanks, has a detectable leak rate that is a function of tank diameter; it has a precision of 0.0002 inches when making a single level measurement and, like the LT-100 and HT-100, has been third-party certified according to EPA and ASTM standards. If either the HT-100 or LT-100 detects a leak in a pipeline, Vista's PALSystem can locate the leak quickly and accurately, within 1.5% or better of the distance between sensors, usually a matter of several feet. The PALS works without injecting gases or waiting days or weeks for diffusion to occur, and typically **without expensive borings or excavations** and without laboratory work.

PROPOSED TESTING PROCEDURE

Vista will design and document a site-specific integrity testing procedure that would become part of the permanent records of the storage and dispensing system's owner. These records can provide the foundation for permitting and property transfer negotiations, and other legal or regulatory procedures.

The integrity tests can be conducted with any type of de-icing fluid in the tanks and lines. The Vista HT-100, LT-100 and LRDP are compatible with EG fluids, and the PALS does not require contact with the fluids in any way.

The optimal time for testing is during warmer months, when de-icing fluids are not used. With the Vista technology, testing is conducted in a matter of hours, as opposed to the days or weeks required by other methods. That means **no down time for owners and operators, and no need to dispose of water or fluid**—and that in turn saves time and resources.

ANALYSIS

As is the case with many other environmental management systems, the best approach to designing a logical and cost-effective integrity testing program is to examine the latest technology as well as the latest application of existing technologies. The Vista model incorporates both. Vista's non-invasive, low-risk leak detection systems (the HT-100, LT-100 and LRDP) are far superior to methods that require chemical additives or over-pressurization of pipelines and tanks. Vista's PALS leak location system can find a leak without the need for purging the line, without waiting for indicator gases to diffuse into the surrounding soil, and without laboratory analysis of the collected soil samples. **The net result is greater accuracy, lower risk and a shortened timeline—and, in the case of systems containing EG fluids, no need to waste either EG fluids or other resources.**

To explore Vista's product line or to obtain background information and technical details about the underlying concepts, visit www.vistaleakdetection.com.