INTEGRITY TESTING OF DOUBLE-WALL PIPING SYSTEMS:

APPLYING EXISTING TECHNICAL CAPABILITIES TOWARD DETECTING LEAKS

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LEAK DETECTION IN DOUBLE-WALL PIPING SYSTEMS

Double-wall piping systems are used worldwide in a variety of applications, delivering valuable—and sometimes toxic—materials safely to the destinations where they will be used. The most frequently cited reasons for using double-wall piping systems are the safety of the personnel handling the material in the pipe and the safety of the environment. Due to the nature of these materials, many of them are heavily regulated, and piping systems that transport them can be required to undergo some type of leak detection procedure.

Many double-wall piping systems are designed with a built-in interstitial monitoring method of some type. Monitoring this space between the double walls ensures that in the event of a failure of the inner or primary-containment pipe, the leak will be detected before the outer or secondary-containment pipe is compromised. Double-wall pipe systems are constructed with spacers that prevent contact between the inner and outer pipes, and field personnel who install them are required to keep both the inner and outer pipes free of water and debris. Despite these precautions, interstitial monitors have been known to produce false alarms, or to produce alarms due to the wrong reasons—for example, a failure of the outer pipe or faulty assembly of the double-wall system in the field. The history of interstitial monitoring admits to the need for a "better mousetrap," one that can verify the integrity of the inner pipe independently from that of the outer pipe.

A PROPOSAL FOR INDEPENDENT VERIFICATION OF THE INNER PIPE

Reliable leak detection for complex, field-constructed double-wall piping systems is no small challenge. Vista Research has developed an alternative model for conducting integrity tests of double-wall piping systems associated with transportation pipelines, marketing terminals, airport hydrant systems, and truck loading racks. The Vista technology can be integrated into the design of a new double-wall piping system, and it can also be retrofitted onto an existing system. Vista's integrity testing technology is approved by a number of state and local regulatory agencies as an alternative to API hydrostatic pressure testing method RP 1110.

Vista proposes applying its **unique, non-invasive technology** (which has received accolades in the leak detection market for airport hydrant fuel systems) to the inner pipe during its initial "shakedown" testing. Vista conducts testing services using its own equipment and personnel. The Vista HT-100 is used on sections of pipeline with a contained volume of over 3400 gallons and the LT-100 for volumes less than 3400 gallons, including truck loading racks. If it is suspected that there is a leak in the inner pipe, Vista uses its patented Pipeline Advanced Leak Location System (PALS) to find that leak. The PALS locates a leak quickly, and typically **without expensive borings** and laboratory work. While other technologies can detect the presence of a leak, they cannot locate the leak with any reasonable degree of certainty. The PALS is the only system certified by a third party that is capable of pinpointing a leak in the inner wall of a double-wall pipe to within 1% of the distance between sensors. Furthermore, the PALS, with its patented acoustic system, locates the leak in mere

minutes. The PALS attaches to high-point vents and low-point drains along the length of the pipe—this means that the acoustic connection is solely with the inner pipe. The same method is used to test the entire pipe length, one section after another, ensuring that contact with the inner pipe is maintained. Finally, any false positives that may have been indicated by a leak *detection* method are promptly eliminated.

The Vista HT-100 and LT-100 provide assurance of pipeline integrity down to 0.0021% of pipeline volume, 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. Both the LT-100 and the HT-100 have been third-party certified according to the U.S. EPA standards for evaluating leak detection systems in their class, and both can detect leaks as small as 0.1 gallon per hour in lines as large as 12,500 gallons. If either the HT-100 or LT-100 detects a leak, 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.

In comparison to Vista's technology, other integrity-testing systems can be time-consuming and resource-intensive. They may also require advance approval from the users of whatever product the piping system contains. In some cases wastes generated as part of the testing process may require special handling and disposal.

PROCEDURE

Vista Research designs and documents a site-specific procedure for the owner's permanent records. These records can help provide a foundation for transactions such as property transfer negotiations and cost-share allocation associated with remediation efforts.

Tests can be conducted with any type of liquid in the line. The Vista HT-100 and LT-100 usually employ the extant product as part of the test; the PALS, on the other hand, requires no contact with the product, and tests can be conducted with either a liquid or a gas in the line. A test can be completed in 1.5 hours, versus days or weeks for other methods, and usually during periods of non-operation. **There is no downtime, and no water or other liquid to be disposed of.** For system owners and operators, this saves time and resources.

CONCLUSION

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, innovative applications of existing technologies. The Vista model incorporates both. Due to their speed and accuracy, Vista's non-invasive, low-risk leak detection systems (the HT-100 and LT-100) are far superior to more commonly used technologies. Vista's PALS leak location system can find a leak quickly and usually without expensive borings. **The net result is greater accuracy, lower risk and a shortened timeline.**

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