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ESTE Project Brief
Environmental Technology Verification Program
ETV

Environmental and Sustainable Technology Evaluations (ESTE): Verification of Products and Technologies for Rehabilitation of Drinking Water Distribution and Wastewater Collection Systems

Impact Statement

Approximately two million miles of water pipelines and infrastructure exist in the United States, many of which are reaching the end of their serviceable lives. There is growing concern that our aging infrastructure does not have the ability to sustain our future water needs. It is estimated that one out of every six gallons of water in drinking and wastewater distribution systems is lost through leaky pipes before reaching consumers. The U.S. Geological Survey estimates that leaky water and wastewater utility pipes result in a loss of 1.7 trillion gallons of water per year at a national cost of $2.6 billion per year in the United States alone (USGS).

This project will provide valuable information on the performance characteristics of new and innovative technologies for use in infrastructure rehabilitation. The use of new technologies has historically been viewed as a risk, especially by state and municipal governments. Limited budget and other than favorable experiences with new technologies in the past by public works professionals have made it difficult for manufacturers of innovative products to penetrate the marketplace.

These verifications will provide performance information to help private utility companies as well as government and other municipalities make informed decisions on the purchase and use of current infrastructure rehabilitation technologies.

ETV Program

The ETV Program operates as a public-private partnership mainly through cooperative agreements between EPA and private nonprofit testing and evaluation organizations. These ETV verification organizations work with EPA technology experts to create efficient and quality-assured testing procedures that verify the performance of innovative technologies. ETV operates six centers which cover a broad range of environmental technology categories. Vendors and others in the private sector, as well as federal, state and local government agencies, cost-share with EPA to complete priority ETV protocols and verifications. In 2005, a new element of ETV was initiated, Environmental and Sustainable Technology Evaluations (ESTE), in which the most important technology categories for meeting EPA needs are verified through contracts with verification organizations. As an Agency priority, EPA has developed an ESTE project to verify the performance of chemical grouting materials, coatings, and liners. See http://www.epa.gov/etv/este.html for more information.

Background

This research supports EPA's Office of Research and Development's (ORD) National Risk Management Research Laboratory (NRMRL) Water Supply and Water Resources Division's (WSWR) Aging Water Infrastructure (AWI) Research Program. Verification testing is being conducted on three chemical grouting materials used for reducing or eliminating infiltration of storm water to sanitary sewer systems. This work will be followed by other verifications of other technologies determined by a stakeholder group.

A large percent of infiltration and inflow (I/I) into sanitary sewer systems is due to leaks and cracks in existing water infrastructure. I/I into sanitary sewer systems have burdened treatment facilities with frequent overflows, causing public health concerns. Chemical grouting is a trenchless method that is used to control leaks in underground water systems to restore them to normal operation.

The chemical grouting materials being tested include acrylimaide, polyurethane, and a new polymer mastic. Testing is being conducted on (1) pipe joints, (2) manhole joints, (3) pipe lateral connections, and (4) concrete surface repair. The evaluation also includes the following:

- Evaluation of the properties (working, physical, mechanical, durability, and leachability) of grouts and grouted sands;
- Characterization of the bonding properties of the grout–substrate interaction;
- Verification of the performance of grouted joints and repaired concrete cracks under hydrostatic pressure up to 5 psi (10 feet of water) and wet/dry cycles over a period of three months.

Objectives

The expected outcomes and impacts of this project are to enhance acceptance of new and innovative infrastructure rehabilitation technologies by those who issue permits, or regulate, specify, or advise others in purchase or use of new technologies. The project will help utilities to more effectively implement comprehensive asset management, provide reliable service to their customers, and meet their Clean Water Act and Safe Drinking Water Act requirements.

Status

A stakeholder meeting consisting of the EPA Office of Water, WERF, AWWARF, NASSCO, consulting firms, vendors, and municipal utility companies met in June 2008. The selected target areas for primary consideration were chemical grouts, coatings, and liners.

ETV's Water Quality Protection Center (WQP), along with National Sanitation Foundation International (NSF) and the Center for Innovative Grouting Materials and Technology (CIGMAT) at the University of Houston, developed a protocol for verification of grouting materials in 2004. The protocol is available on ETV's website at http://www.epa.gov/nrmrl/std/etv/pubs/600r04183.pdf.

Using the WQP grouting materials protocol as a template, individual test quality assurance plans (TQAPs) were developed by ETV's ESTE program under a STREAMS contract by Research Triangle Institute (RTI) with a sub-contract to NSF for three grouting materials vendors: Avanti International, Inc., Separations Systems Consultants, Inc., and Warren Environmental, Inc. Verification testing is being conducted at CIGMAT; verification reports and statements are expected in September of 2011.

Related to this work, in September, 2010 ETV's WQP Center completed verifications for three coating products used for infrastructure rehabilitation. The three participating vendors were Epoxytec International, Inc., Protective Liner Systems, Inc., and Standard Cement Materials, Inc. The verification reports and statements are available on ETV's website at: http://www.epa.gov/nrmrl/std/etv/vt-wqp.html#irt.

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References

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