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Status of ORS-Based Perimeter Air Monitoring Initiatives During the Cleanup of Former MGP Sites

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INTRODUCTION

Air monitoring programs designed to protect the downwind community during the cleanup of former MGP sites have, historically, been unable to conclusively meet this objective. Design of an effective sampling program in a medium as complex as air is so challenging that investigators seldom meet the “data representativeness” criteria necessary for demonstrating continual maintenance of acceptable off-site exposure levels. In this highly public arena, a risk of litigation to the site owner is invariably created.

To minimize such risk during the November 2004 cleanup of a former MGP site in Bristol, Tennessee, Atmos Energy Corporation chose to address the air migration pathway by employing optical remote sensing (ORS) to measure gaseous contaminants along the entire downwind portion of the site perimeter.^{1, 2} Building upon the successful results of a preliminary feasibility demonstration of this technology for the Electric Power Research Institute (EPRI), Atmos Energy’s application of the “eye that never sleeps” led to community enrollment, an environmental excellence award from the Southern Gas Association, and accolades from the Tennessee Department of Environment and Conservation (TDEC).

GTI INITIATIVE

The Gas Technology Institute (GTI) is the leading research, development, and training organization serving the natural gas industry. Because many of its more than 350 member companies have MGP sites which require cleanup over the next several years, GTI was very interested in Atmos Energy’s documented success in applying this innovative technology. Still, GTI recognized that several key areas would need to be addressed before other member companies having MGP sites would opt for this “whole-plume” alternative over the traditional point-monitoring approach typically employed. Therefore, in November 2005, through its

Operations Technology Development (OTD) group, GTI designed and initiated a 26-month, methods-development project for ORS-based perimeter air monitoring during MGP site cleanups. The following key areas were identified for project investigation:

- Monitoring methods comparison
- Data-management software enhancement
- Methods guidance development

Monitoring Methods Comparison

A comprehensive, controlled field test comparing open-path Fourier-transform infrared (FTIR) spectroscopy, ultraviolet (UV) spectroscopy, and traditional point monitoring will be performed later this year at two MGP sites during active cleanup. The intent is to compare the off-site impacts as determined by the three monitoring methods. Emphasis will be placed on the typically controlling contaminants -- benzene and naphthalene. All traditional point monitoring will be performed in compliance with existing work plans and protocols, independent of the ORS monitoring.

Data-Management Software Enhancement

For Atmos Energy's Tennessee MGP site cleanup, Minnich and Scotto employed its proprietary data-management software, PICMET-1, to enable the assessment, in real time, of compliance with 10-minute-averaged, off-site action levels (ALs). Based on an approach developed by USEPA Region 7 in the early 1990s,³ the cross-sector-averaging (CSA) technique employs cross-plume spectroscopic measurements and on-site meteorology to directly assess AL compliance, in concentration units of parts per billion (ppb), along the measurement path during site-disturbance activities. The 10-minute-averaged ALs are used as proxies for 1- or 8-hour acceptable ambient air concentrations (AAALs), either along the site perimeter or at downwind "sensitive receptors" or residences, all in real time.

Another component of the GTI project, already underway, is the completion and evaluation of the next generation of this software, PICMET-2. Included is the conversion from EXCEL to Visual Basic, automatic entry of all meteorological and spectroscopic data, and more sophisticated reporting and documentation capabilities.

Methods Guidance Development

The final project component is the development of a guidance document or standard operating procedure (SOP) for ORS-based perimeter air monitoring during MGP site cleanups. Currently, by virtue of USEPA's Toxic Organic Compendium Method 16⁴ (Method TO-16), open-path FTIR spectroscopy represents the only formally recognized ORS-based approach for air

monitoring.

EXPECTED BENEFITS

The ultimate benefit to GTI's member companies, and the industry in general, is the reduced risk of claims to MGP site owners. Development of a uniform, real-time approach to perimeter air monitoring will substantially improve the way MGP site cleanups are managed.

REFERENCES

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