

A.1 Technology Name

Darts

A.1.1 Source

A Continuous In-Situ Dart Profiling System for Characterizing MGP Coal Tar and PAH Impacts in Sediment: A Technology Using Laser-Induced Fluorescence in Sediments. EPRI, Palo Alto, CA, Alliant Energy, Madison, WI, and Ameren, St. Louis, MO: 2007. 1014749. 13853885
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A.1.2 Summary

Media:	PAHs and NAPL in Sediments
Study Type:	Field pilot test; Comparison study
Technology:	Darts
Peer Reviewed:	Not technically, but a thoroughly vetted work product - funded by EPRI, written by the RETEC Group
Publication Date:	January 2007

A.1.3 Site Description

- Three former MGP sites were selected for the Dart Project. These sites were selected to provide a range of river sediment environments to assess the applicability of the Dart technology. All three sites had existing sediment data sets upon which a comparison could be based.
- Contaminants of concern - PAHs and NAPL in sediments
- General site conditions/deployment details
 - Lasalle, IL - low-flow conditions; sample locations in highly vegetated canal bottom; darts deployed at 29 locations at depths ranging from 2.7-13.8 ft below sediment surface
 - Fort Wayne, IN - deep water, medium energy conditions; darts deployed from boat; darts deployed in 14 locations in pairs at depths of 2 and 5 ft into the river bed (in up to 12 ft of water)
 - Meriden, CT - smaller, lower energy stream; darts deployed in 14 locations in pairs at depths (mostly duplicate depths) ranging from 1.5-4.7 ft below the sediment surface (in up to 3 ft of water)
- Sampling frequency – Darts were deployed one time in each location and retrieved after approximately 24 hours.

A.1.4 Remedial Phase

Investigation.

The objectives of this applied research project were to:

- Identify, through research and bench scale testing, the availability of a suitably robust SPE material that could be used to detect the presence or absence of PAHs in sediment;
- Demonstrate that a laser induced fluorescence (LIF)-based analyzer is capable of quantitatively and qualitatively measuring PAH concentration in a Dart sampler that has been exposed to soil or sediment;
- Develop a Dart delivery tool capable of inserting the Darts into the sediment at three test sites;
- Deploy the Dart system at three former MGP Sites where prior conventional investigations documented visual evidence of MGP residuals in sediments;
- Evaluate the ability of the Darts to replicate information and compare to existing visual, analytical, and TarGOST data;
- Determine the effectiveness of the Darts as a rapid screening tool. Determine the durability of SPE material and its ease of installation and retrieval;
- Compare existing data from each of the three sites to Dart data; and
- Compare costs and time efficiency of Dart samplers to conventional sediment sampling technologies.

A.1.5 Outcome

This was a “field pilot demonstration” exercise, where the goal was to demonstrate the overall feasibility of the Dart system based on existing former MGP site data sets. Authors conclude that the Darts detected the presence of PAHs or NAPL at most locations where prior conventional approaches detected presence of visible MGP residuals, and replicated the stratified impact horizons observed in previous investigations at the test sites. Darts also showed an absence of PAHs in most locations where residuals and additional approaches indicated an absence of significant PAHs. Further, repeatable results were achieved based on comparison of collocated Dart results and on comparison of Dart results with collocated sediment sample results.

A.1.6 References

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