

# Pilot Testing of a Real-Time Permeability Monitor



RPM tool prototype

## Background, Objectives, and New Learnings

One of the challenges facing baghouse operators is determining the impact of flue gas conditions (such as high sulfur trioxide [SO3] and temperature), baghouse operation (load cycling, startup, and shutdown), and impact of co-firing alternative fuels on their current filter bags. Currently to monitor fabric filter performance over a period of time, users of fabric filters have to establish a regimented program of removing selective representative fabric filters (bags) and shipping them to testing laboratories for permeability and strength analysis. While *in situ* "drag" or permeability testers are available in the industry, the process tends to provide a single permeability value for the entire bag, not discrete locations along the length of the bag.

EPRI, with funding from the Fabric Filter Working Group (FFWG), have developed a real-time permeability monitoring (RPM) apparatus that allows permeability measurements at distinct locations within the bag length thus providing further insights in localized permeability not currently available in the industry.

This project plans to test the feasibility of the RPM as a novel assessment tool to allow fabric filter operators to conduct better characterization of their bag permeability along the length of the bags at key intervals. The RPM tool may also allow improved measurement without disturbing the filter dust layer and filter media which can result from the bags being removed for laboratory testing.

- Provide improved assessment tool that may assist in fabric filter performance evaluations
- Allow quicker feedback from adjusting cleaning logic and operational changes
- Improved data efficiency leading to better bag replacement planning

# **Benefits**

Demonstrating this novel tool may provide more insightful operation data leading to increased bag house reliability, lower potential environmental impacts, and may reduce maintenance costs.

Determining how permeable the bags remain, can improve performance by adjusting cleaning logic, may provide improved accuracy compared to laboratory tests in regards to operational impacts on filtration, permeability losses from fouling, sintering, and acid attack on bags, and provide insights needed for bag replacement strategies.

#### **Project Approach and Summary**

This multi-funder project plans to evaluate the potential use of this novel tool to measure real-time permeability along different locations in the filter bag while the filter compartment is isolated. A test matrix will be developed for the host site and discussed among project funders. The host site will be evaluated in context of site support, and previously history of permeability measurements data from bag samples using ASTM D737-96 and sample preparations according to ASTM D1776. Field measurements will then be compared to removed samples sent for laboratory analysis.

If successful, the RPM tool may provide faster and more accurate insights in cleaning efficiency and operational impacts affecting baghouse performance.

## Deliverables

- A webcast will be conducted with project funders that summarizes host site project test results
- A Technical Update report will be prepared that summarizes project approach, test results, and capabilities of the RPM tool.

## **Price of Project**

Cost of participation is \$30,000. Project is also looking for host site sponsorship. This project qualifies for tailored collaboration (TC) and self-directed funding (SDF).

## **Project Status and Schedule**

Currently the FFWG is exploring additional modifications to the RPM tool to increase value of field tests. It is anticipated that once a host site is selected for testing a schedule to conduct permeability measurements will be coordinated and executed with the host site utility. Upon conclusion of the RPM measurement assessment tests, data analysis will be completed with results summarized in a technical update report.

## Who Should Join

Power companies with fabric filters seeking ways to maximize performance, improve reliability, and reduce costs.

#### **Contact Information**

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (<u>askepri@epri.com</u>).

#### **Technical Contact**

Sylvio Cardoso at 650.564.2820 (scardoso@epri.com)

Project ID: 1-115355

#### EPRI

3420 Hillview Avenue, Palo Alto, California 94304-1338 • USA • 800.313.3774 • 650.855.2121 • askepri@epri.com • www.epri.com © 2022 Electric Power Research Institute (EPRI), Inc. All rights reserved. Electric Power Research Institute, EPRI, and TOGETHER...SHAPING THE FUTURE OF ENERGY are registered marks of the Electric Power Research Institute, Inc. in the U.S. and worldwide.