

**Texas Commission on Environmental Quality
New Technology Implementation Grant (NTIG) Program**

Operation Phase Annual/Final Status Report

Contract Number: 582-15-53907-1471
Grantee: Southwest Research Institute
Report for the Annual period: 2017-2018 –Second Annual Report **Date Submitted:** 7/13/2018

Section I. Accomplishments

*Provide a bulleted list of operations of the facility during the past year.
Include exact numbers and/or estimates.*

Southwest Research Institute (SwRI) Fire Technology Department (FTD) installed a pollution abatement system (PAS). The start-up date of this system occurred on March 24, 2016. The PAS is a fabric-filter baghouse paired with a dry scrubbing soda ash system and an activated carbon chemical adsorption system. The purpose of this PAS is to capture and control emissions of particulate matter, as well as toxic and hazardous air pollutants from three buildings collocated in the FTD area. A schematic of the area where the system is servicing three buildings is shown in Figure 1. Current pictures of the system and its major components are shown in Figures 2 through 6.

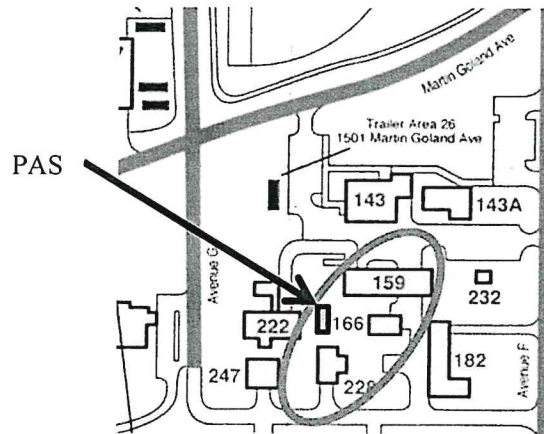


Figure 1. FTD area showing the location of the three buildings and PAS (red oval).

Testing activities performed in all three buildings associated with this PAS have been recorded. A close estimate of the emitted and abated emissions is logged in a per-occurrence basis; an aggregate report of the testing activities in each building is submitted in a monthly basis. However, a completely accurate emissions determination is not feasible due to the frequent changing nature of research projects and/or the unknown composition of some testing materials. The

following bulleted lists indicate the facts associated with the three buildings (B159, B166, and B228) connected to the PAS during the period of July 2017-June 2018:

- The total number of tests performed in this period for this group of buildings was 142, of which:
 - 19 tests were performed in B159, representing 13% of the total tests.
 - A variety of fire resistance test were conducted, many in support of the wood industry.
 - 4 tests were performed in B166, representing 3% of the total tests.
 - The majority of the testing conducted was in support of massive wood structure testing, battery testing, and pipe testing.
 - 119 tests were performed in B228, representing 84% of the total tests.
 - A record number of plastic fuel tank tests were conducted.
- Cumulative particulate matter (PM) emissions to the atmosphere were 50.94 pounds (0.025 ton).
 - The abated amount was 5093.98 lb (2.547 ton).
- Cumulative sulfur dioxide (SO₂) emissions to the atmosphere were 5.5921 pounds (0.0028 ton).
 - The abated amount was 50.33 lb (0.0252 ton).
- Cumulative emissions to the atmosphere of acid gases, including hydrogen bromide (HBr), hydrogen chloride (HCl), and hydrogen fluoride (HF) were 0.870 pounds (0.00044 ton).
 - The abated amount was 2.913 lb (0.0014 ton).
- The pressure drop across the baghouse remained constant throughout the entire period, with a value of 1.5 inches of water, due to the system's reverse-pulsed mechanism that injects air to remove the constituents captured in the filter bags. That mechanism allows maintaining the proper pressure and flow rate of the system for optimal operation.

Section II. Key Events and Issues

Report any key events that occurred during this reporting period. Please include any major project updates that impacted operations.

The 8-ft by 19-ft canopy hood that was installed two years ago and that is directly connected to the existing 24-in building exhaust connection to the pollution abatement system (PAS) continues to work as expected. The time needed to capture smoke coming from testing activities was minimized without the need to modify the air exchange rate of the PAS.

Another key event was the incorporation of a project that required the abatement capacity of the system, without being inside the any of the three buildings connected to the PAS. This addition was done last year and continues to be available for use. This addition is located adjacent to Building 166. The exhaust is funneled into the PAS (via additional ductwork). Testing in this configuration is not continuous. A recent view of the external test enclosure is depicted in Figure 2.

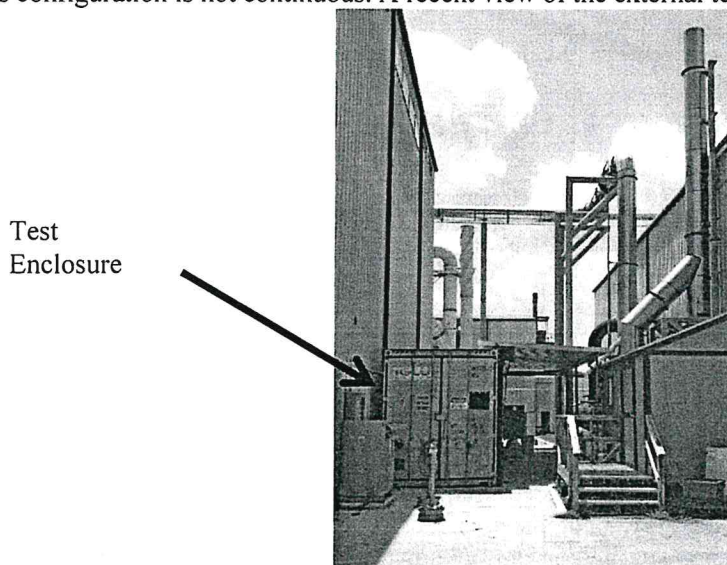


Figure 2. View of the external test enclosure adjacent to Building 166.

A new event was the modification of duct work leaving Building 166 to allow for measurement of oxygen, carbon monoxide, and carbon dioxide. The purpose of this modification is to use that facility to measure the heat release rate of items. The results of this attempt are currently under evaluation.

Report any anticipated or unanticipated problem(s).

SwRI's FTD currently does not anticipate any problem with the proper functioning of the system. Routine checks and maintenance keep the system and its components operating at an adequate level. Nonetheless, due to the varied types of materials that comprise test specimens, a level of uncertainty exists as to how a particular specimen performs during a test.

Most recently, it was empirically discovered that the "chop" motor at the bottom of the bag house should be left running at all times in order to eradicate moisture formation. It has been learned that the slightest bit of moisture can cause any buildup in the system to solidify.

An unanticipated problem occurred during the past winter season, when the backflow preventer on the water softener to the quench system began to leak.

Proposed Solution(s): Report any possible solution(s) to the anticipated or unanticipated problem(s).

The protocol operate the PAS has been changed and includes the procedure to allow for continuous operation of the motor, in order to eradicate moisture formation. FTD staff has been trained on the new PAS protocol.

The back flow preventer was repaired by SwRI's Facilities Operations plumbers. Periodic visual inspections will continue to allow identifying any other leaks associated with this device.

Action(s) Conducted and Results: Describe the action(s) taken to resolve the anticipated or unanticipated problem(s). Were the actions successful in resolving the problem?

- By leaving the chop motor running, the issue of hardened material within the system has been minimized.
- The repair to the backflow prevent solved the leaking issue.
- The PAS has been operating properly and no problems, other than the minor issue described at the beginning of this section, have been observed during the 2017-2018 period.

Section III. Provide a summary of the overall state of the facility and grant funded equipment.

The PAS has been working properly during the 2017-2018 cycle. The system has experienced no downtime in the last 12 months. Routine checks and maintenance has been conducted, as recommended by the manufacturer.

This system has enabled the FTD to expand its capabilities to include high-smoke products, fiberglass-reinforced plastic, penetration sealants, electrical cables and lithium-ion storage batteries. Figures 2 through 6 show the current physical state of the system.

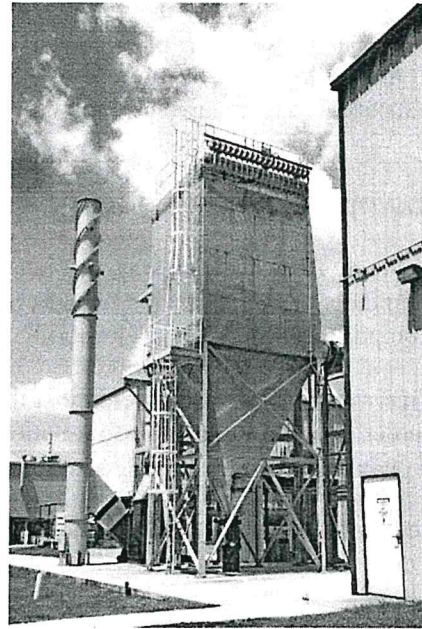
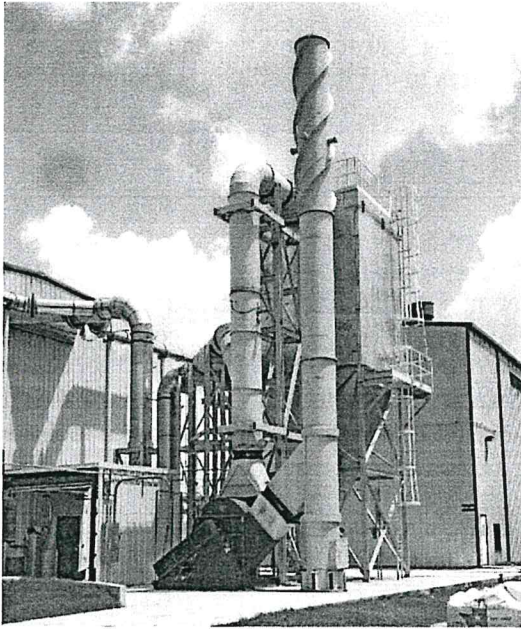


Figure 3 . Photographs of Pollution Abatement System and its components looking south (left photo) and looking northeast (right photo).

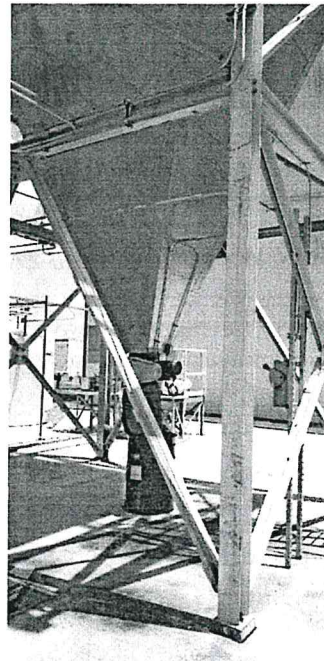
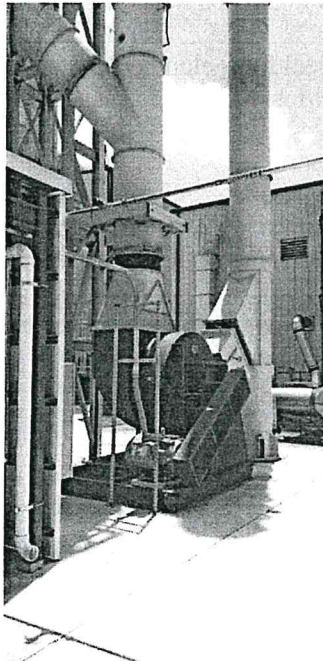


Figure 4. Photographs of the fan and hopper.



Figure 5. Photographs of the supplementary ductwork, dampers, and valves.



Figure 6. Photograph of ancillary building and enclosure with quench water conditioning system.


Section IV. Goals and Issues for Upcoming Period

Provide a brief description of the project goal(s) you hope to realize during the next reporting period.

The overarching goal is to keep the system operating at optimal condition. For this, an assessment of the components will be performed to identify any potential issues.

An important goal for the system is to ensure that preventive maintenance is being performed on a scheduled basis. This will be done to ensure that unintended downtime is avoided and extend the life of the system as long as possible.

MICHAEL J. LEWIS JR.
Authorized Official/ Project Representative's Printed name
(blue ink)

 Date: 7/13/2018
Authorized Official Signature/ Project Representative's name
(blue ink)

NOTE: Please attach any additional information that you feel should be a part of your report.

This form may be submitted via e-mail to your Grant Coordinator or a paper copy may be sent to the following address:

Texas Commission on Environmental Quality
Air Quality Division
Implementation Grants Section (NTIG), MC-204
P.O. Box 13087
Austin, Texas 78711-3087