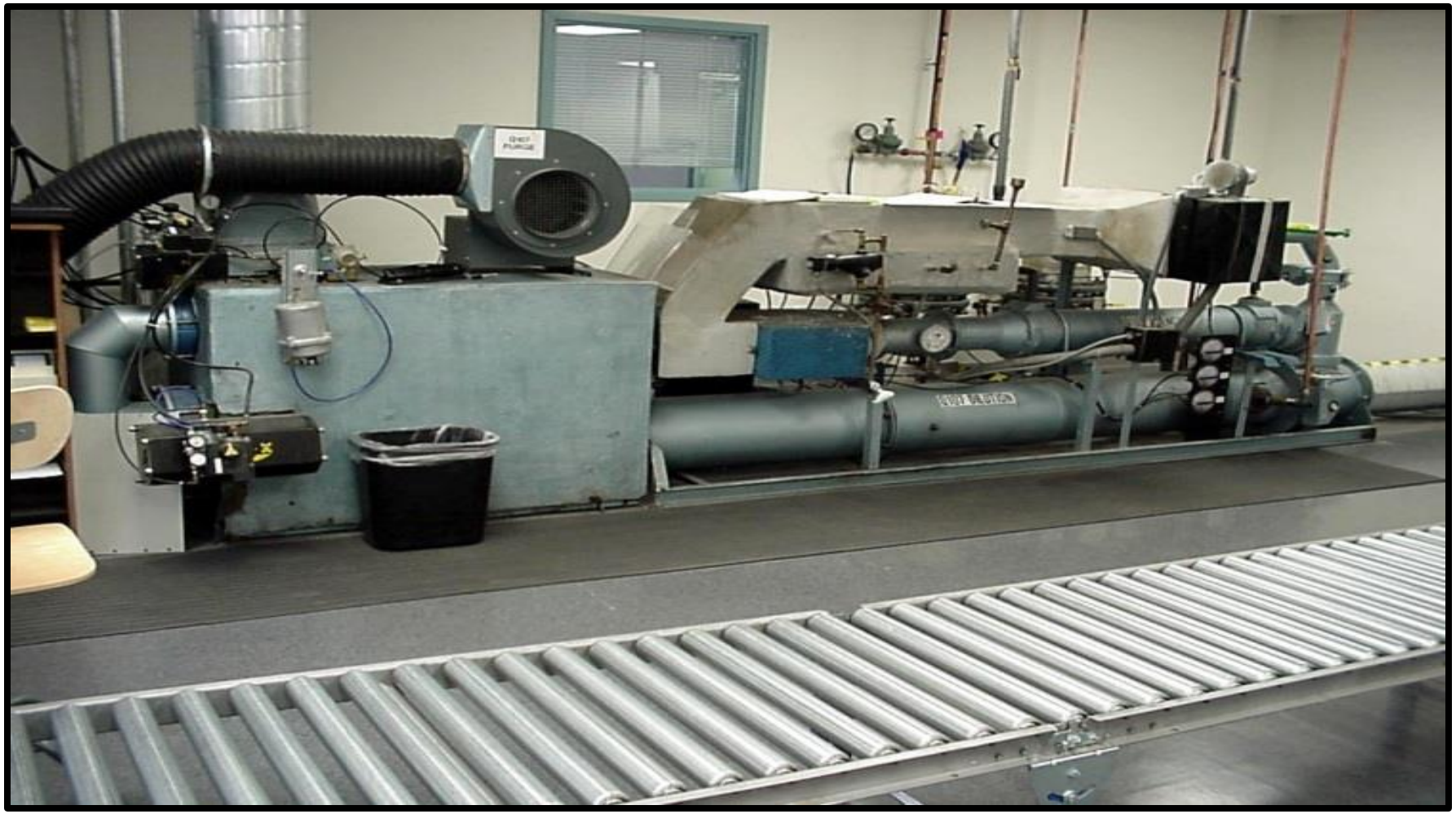
ATI Test Lab Fire 2015
Prior to Fire Event



ATI Test Lab Fire 2015

- The Fire at the test lab occurred 04/13/2015 and was the result of an upset condition of the Q-107
- The Q-107 heats DOP (DioctylPhthlate) to ~196°C to create an oil vapor, which is then quenched in a controlled fashion to create an aerosol size of 0.3µm.
- DOP, the accelerant in this case, is an oil with an Open Cup Flash Point of 215°C

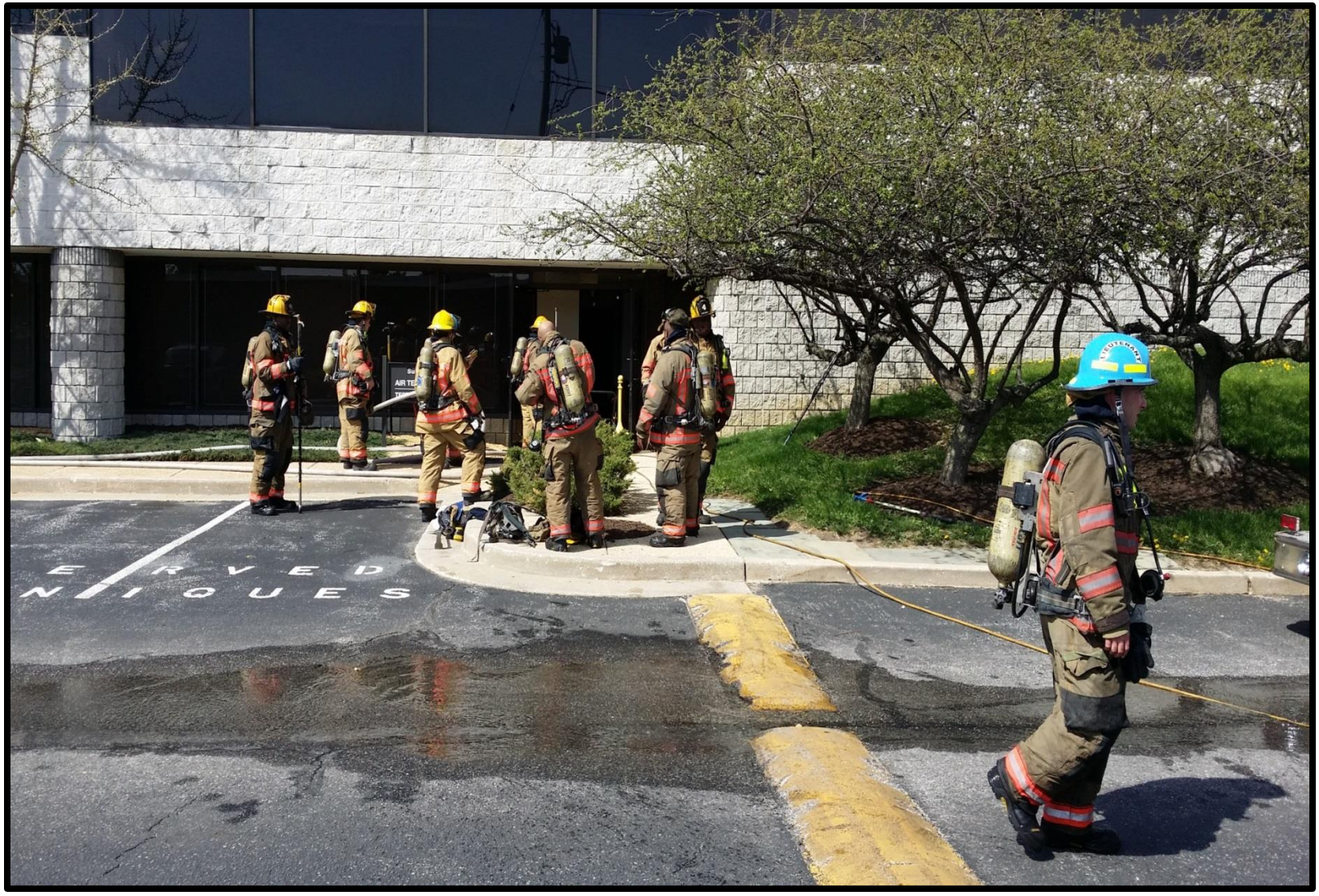
ATI TEST LAB FIRE 2015

- An infrequent, yet routine maintenance and service event of the oil pan transpired the prior week
  - Immersion Heaters Replaced
  - Pan Gasket Replaced
  - DOP Bubbler/Agitator Cleaned
  - DOP Replaced
- Q-107 was powered on
  - Oil Temperature was only 57°C
  - Smoke became visible upstream of the oil pan
- Fire extinguisher was ~ 15 feet away
  - Too far as flames had already started burning the insulation

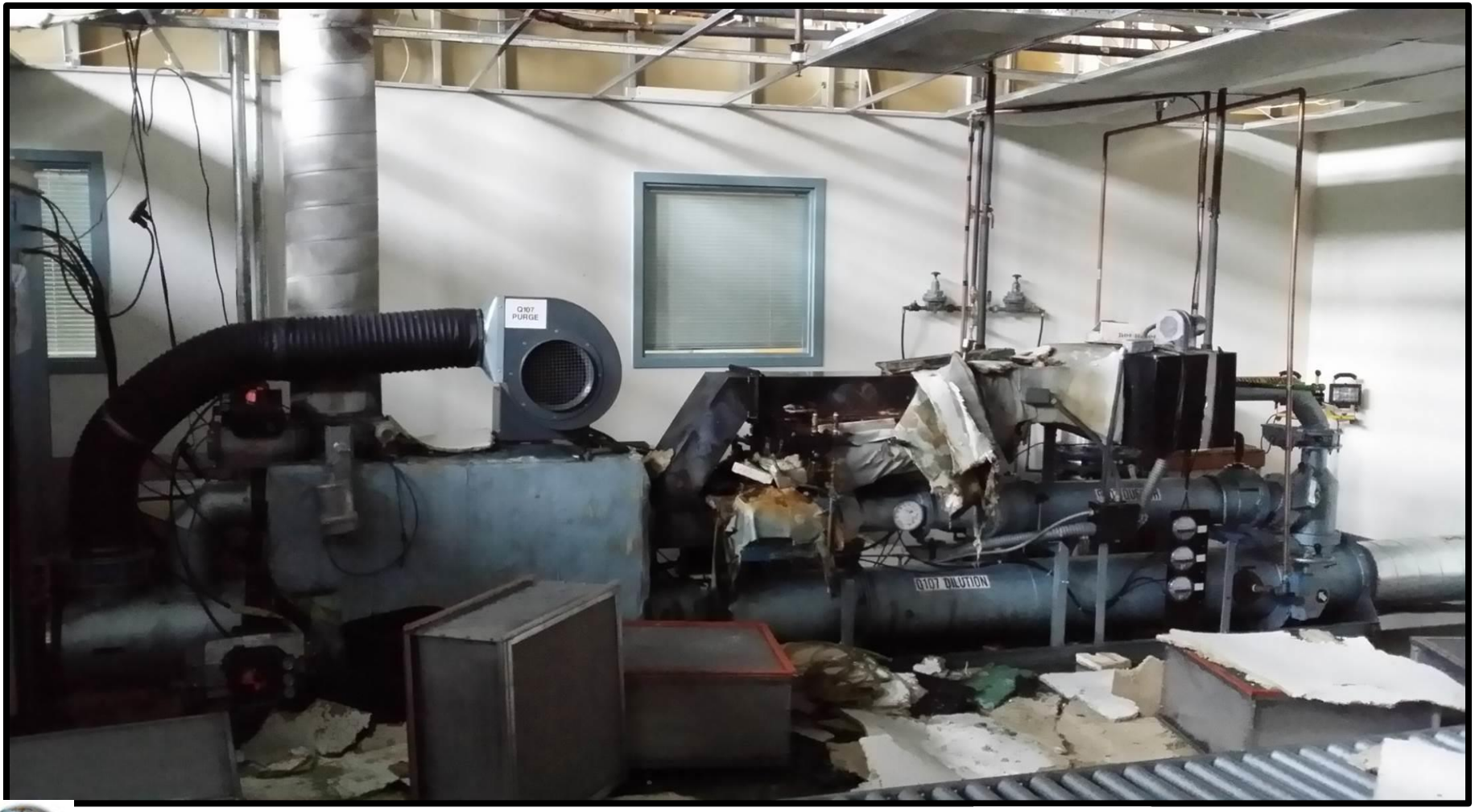
Oil pan and heaters full of carbon buildup

THE CALL

- 911 Operator could not obtain a response from any local fire house.
  - Fire Department arrived……25 MINUTES LATER!
  - Coincidentally, there was a six alarm fire elsewhere.



The Aftermath

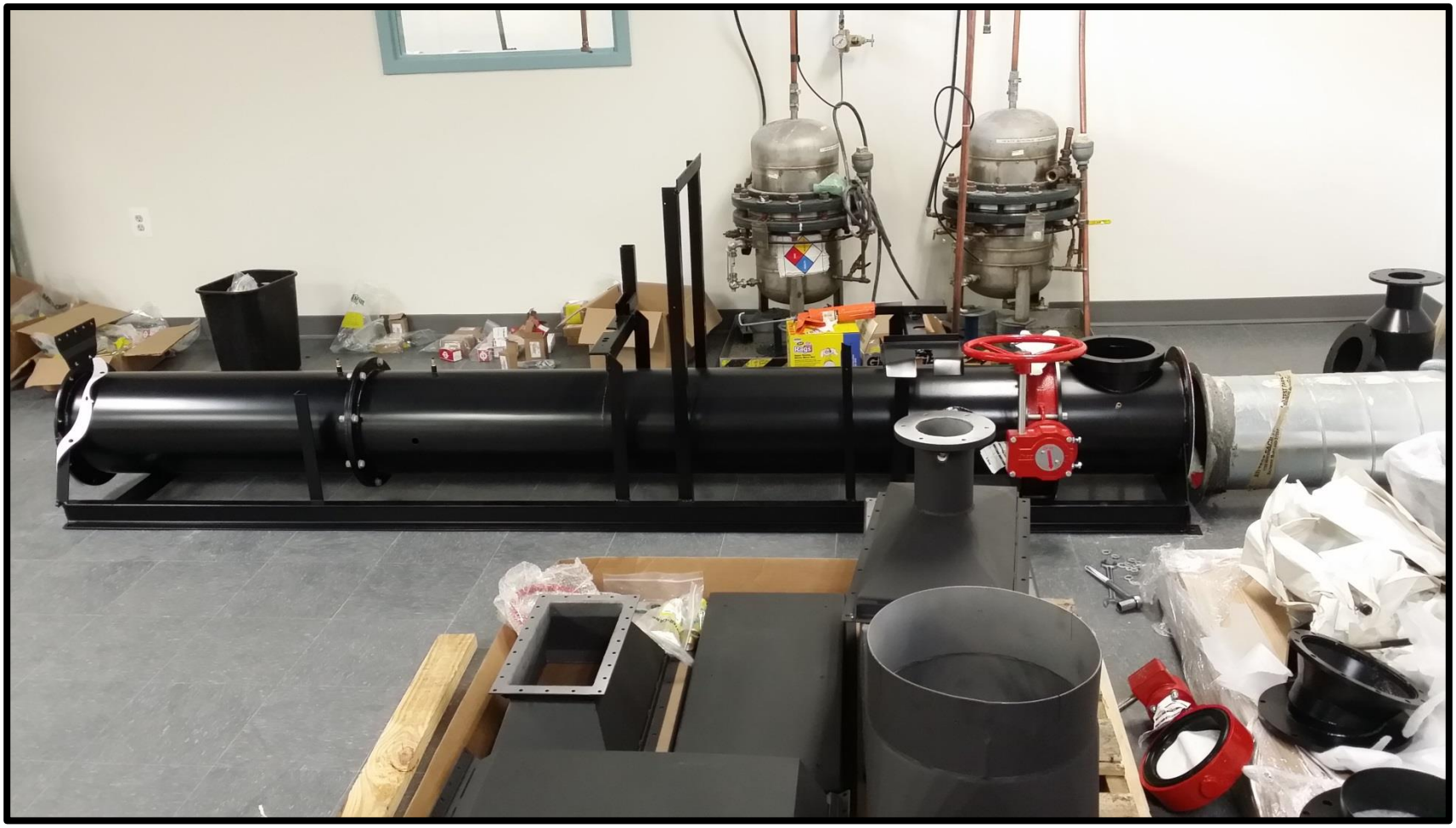


The fire migrated through the entire exhaust duct and out of the stack located on the roof

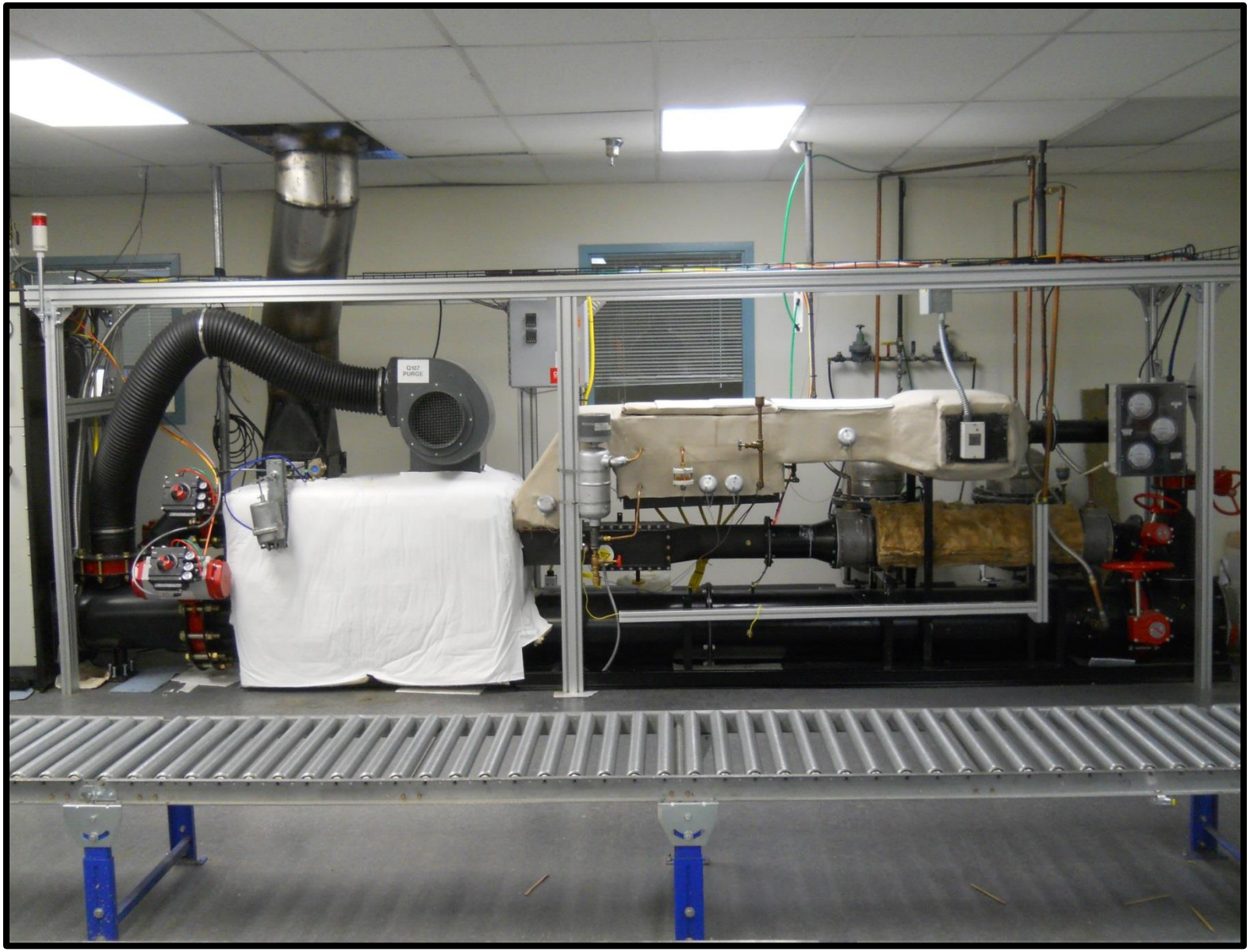
ATI Test Lab 2015
Restoration Begins

1st Floor Installation

Almost all of the components from the blower exhaust to the roof, less the control panel & test fixture, were replaced or refurbished



New immersion & strip heaters, heater controls, bubbler/agitator, quench line heat exchanger, liquid level sensor



What Happened?

- The newly cleaned and serviced oil pan allowed DOP liquid droplets to
  - Carry over the oil pan/reservoir lip
  - Pool onto the vapor duct bottom panel
  - Migrate upstream, due to a slight tilt of the unit
  - Come in contact with the vapor duct air heater
    - Heats ~ 100CFM of Air in 16” of distance to ~ 175°C – the heater operates at significantly higher temperature - ABOVE THE FLASH POINT!

Lessons Learned

- Design of Oil Pan modified to allow for
  - Increased PM
  - Easy Visual Inspection (access port)
  - More torturous path for oil droplets
  - Damming should oil droplets reach the vapor duct
- Other additional safety features
  - Oil Heater Thermal Overload Cutout
  - Quench Temperature Alarm (trips if a fire present)
  - Additional sensors added to closely monitor oil and vapor temps

Q-107 Restoration Team

- Don Largent – Director, Apps Eng. & Tech Serv.
- Tim McDiarmid – Application Engineer
- Gary McCurdy – Application Engineer
- Sylvain Masset – Instrument Design Engineer
- Christopher Hart – ATI Test Lab Manager
- Benita Nicholson – ATI Test Lab Filter Technician
- Heidy Landry – Buyer/Materials Control