

**DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Self Initiated Inspection**

U33190776949887

FACILITY: XG Sciences	SRN / ID: U331907769
LOCATION: 4215 Legion Dr., Mason	DISTRICT: Lansing
CITY: Mason	COUNTY: INGHAM
CONTACT: Trent Hinze , Manufacturing Manager	ACTIVITY DATE: 04/30/2019
STAFF: Michelle Luplow	COMPLIANCE STATUS: Compliance
SUBJECT: Self-initiated inspection to check up on new facility	SOURCE CLASS: M, A, S, R
RESOLVED COMPLAINTS:	

Inspectors:

Michelle Luplow, AQD (author), Samantha Braman (AQD LDO), and Marina Ostaszewski (AQD Permits)

Personnel Present: Trent Hinze, Manufacturing Manager (t.hinze@xgsciences.com)

Purpose: Conduct an unannounced, self-initiated compliance inspection primarily focused on the improvements that XG Sciences had made with their carbon milling process at their new Legion Drive facility, compared to their 2100 Washington Avenue facility (U331801915), which is now closed.

Facility Background/Regulatory Overview: XG Sciences is a graphite milling facility where graphite carbon is milled into nanoparticle carbon, or "graphene."

XG Sciences relocated to Legion Drive from the 2100 S Washington Avenue facility in Lansing. At the Washington Ave location the AQD received a few complaints in 2018 of black carbon dust emitting from their exhaust stack, as well as coating the neighboring businesses. Violations were issued for the black carbon dust being emitted from their exhaust stack as well as not operating an air cleaning device properly, and a Rule 201 violation. The violations have since been resolved.

Inspection: This was an unannounced, self-initiated compliance inspection. At approximately 9:00 a.m. on April 30, 2019, Samantha Braman, Marina Ostaszewski and I arrived at XG Sciences. We drove around the parking lot on the north, west and south sides to verify that black carbon was not being released from the building, as evidenced by any staining of the parking lot or sides of the building. We did not observe any signs of carbon on the external surfaces of the building, or in the parking lot.

We noted that there were 3 large, circular exhaust fans on the west side wall of the building above the entrance, which we later learned is used to vent the building. We noted that there was some black particulate buildup within the wells of the exhaust fans, and indicator that carbon black is released from the milling processes in small amounts (see attached photos taken by S. Braman).

We walked into the facility and found Trent Hinze, Manufacturing Manager, inside the office area, located in the south center side of the building. I explained to him that I was there to conduct a checkup inspection on their new processes since their arrival at this new facility and provided him with a January 2017 Permit to Install Exemptions handbook.

Todd Hinze proceeded to show us around the new facility and explain the processes.

Caged Graphite Mills

Raw graphite materials are placed inside a milling canister within an environmental control booth (several located throughout the plant) that draws air from the booth into Torit dust collectors to reduce exposure to the workers. The Torit dust collectors are not vented to the ambient air.

The canisters are then delivered to caged mills where the canisters are agitated in such a way to mill the graphite down into nanoparticle graphene. Graphite mills are completely enclosed canisters and therefore I would expect minimal, if any emissions, from this unit.

Graphene Shaker/Particulate Capture/Control

The canister is then taken to the shaker booth where the contents of the canister is removed. The shaker booth separates the milling media contained in the canister from the graphite. This process is controlled by a Torit dust collector that exhausts to the general in plant environment. The dust collector collects the graphene which is eventually removed from the baghouse and packaged for sale.

Any residual dust from the environmental control booths is disposed of as non hazardous waste. The collected particulate is placed in barrels inside the plant prior to disposal.

See Table 1 for a breakdown of all equipment and their associated exemptions.

Table 1. Exempt equipment

Emission Unit	PTI Exemption	Compliance Notes
Graphite Cage Mills	Rule 285(2)(l)(vi)(B)	Any emissions escaping from the milling canisters are vented only to the general in-plant environment.
Graphene Shaker	Rule 290	Emissions from the shaker are only directed to the in-plant environment. A Torit baghouse controls the particulate from the shaker and exhausts inside plant. Unit is essentially used for transferring material from the canister (via separation from the milling media) to the baghouse for collection. Carbon black (graphite) is not toxic or carcinogenic (ITSL of 30 ug/m ³) and would fall under Rule 290 and limited to 500 lb/month PM _{2.5} if the emissions were vented outside.
Electrically heated oven	Rule 282(2)(a)	Used to dry graphite prior to processing

Compliance Statement: XG Sciences appears to be in compliance with Michigan Air Pollution Control Rules at this time.



Image 1(Wall Exhaust Fans) : Exhaust fans above entrance - note black particulate collected in each well

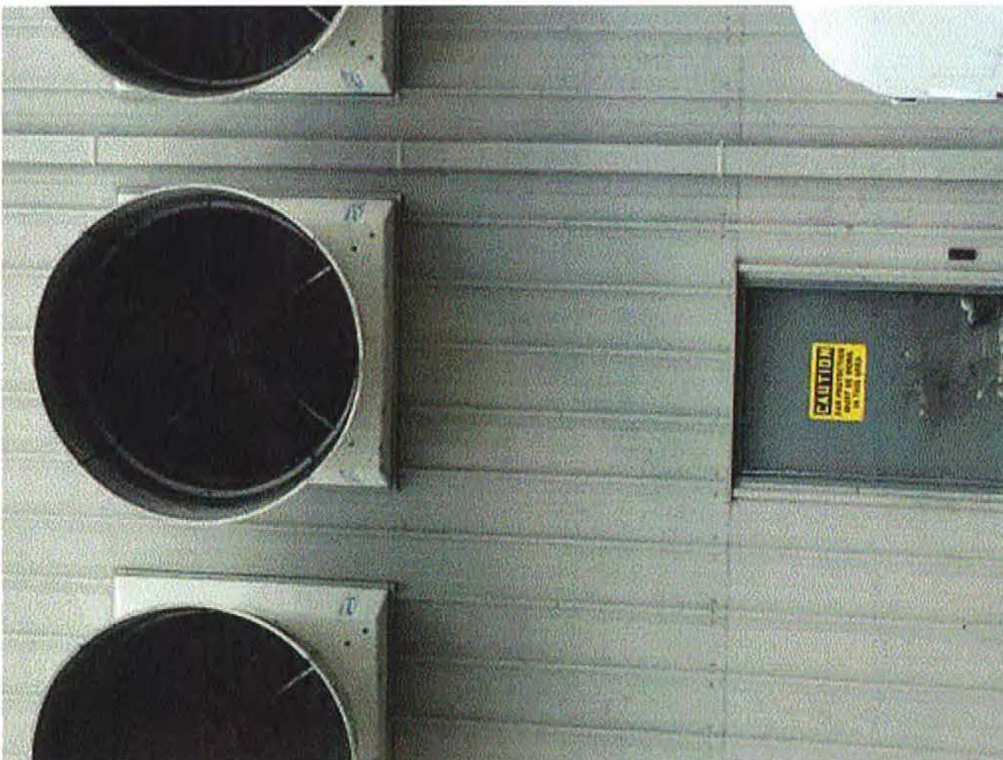


Image 2(Wall Exhaust) : Different angle of wall exhaust

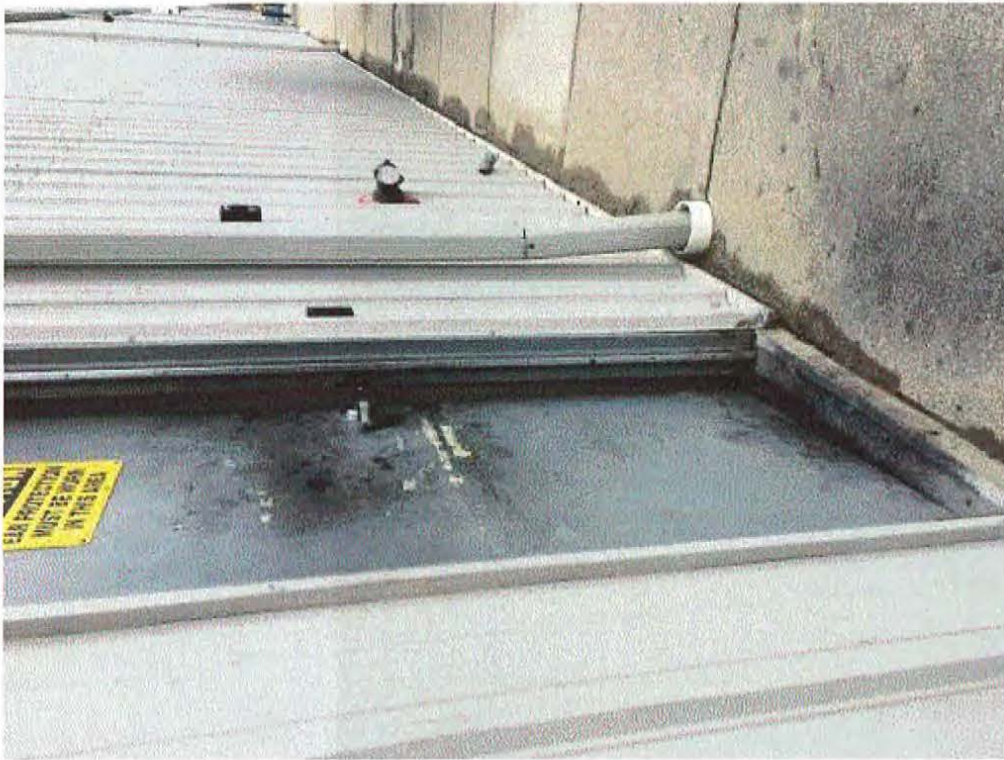


Image 3(Carbon Black) : Carbon black present on door and only on the sidewalk in front of the door - no other particulate accumulation seen throughout the perimeters of the site.

NAME Muell Galt

DATE 9/30/19

SUPERVISOR B. M.