

**ALLEGHENY COUNTY HEALTH DEPARTMENT
AIR QUALITY PROGRAM**

December 10, 2015

SUBJECT: Review of Application
Synthetic Minor Source Installation Permit
McConway and Torley LLC
109 48th Street
Pittsburgh, PA 15201-2755

RE: Installation Permit File No. 0275-I0013

TO: Sandra L. Etzel
Air Pollution Control Manager

FROM: David D. Good
Air Pollution Control Engineer

FACILITY DESCRIPTION:

The McConway and Torley LLC (McConway and Torley) facility is a steel foundry that manufactures steel rail and mining castings. The types of processes conducted at the facility include steel melting, casting, heat-treating and finishing. The facility is a minor source of nitrogen oxides (NO_x), particulate matter (PM), particulate matter less than 2.5 microns in diameter (PM-2.5), sulfur dioxide (SO₂), and hazardous air pollutant (HAPs) emissions, as defined in Section 2101.20 of Article XXI. The facility is a synthetic minor source of particulate matter less than 10 microns in diameter (PM-10), volatile organic compounds (VOC), and carbon monoxide (CO), as defined in §2101.20 of Article XXI.

INSTALLATION DESCRIPTION

This installation permit is for the replacement of baghouse nos. 5 and 8 with a single baghouse dust collector designed at a nominal 180,000 ACFM with 7 modules and bags rated at 0.0022 gr/dscf, installing new sand reclamation equipment (10 ton/hr vibra-mill and two (2) rotary reclaimers), adding two (2) sand silos of 15 ton capacity each, and adding several collection hoods and ducts associated with the mold making equipment, mold punchout/shakeout and casting conveying system. There are no expected increases in actual emissions due to these installations. The allowable/potential emissions have increased due to the differences in how potential emissions and control efficiencies were estimated during the drafting of Installation Permit No. 4 and now.

PROCESS DESCRIPTION

SOURCE DESCRIPTION	CONTROL DEVICE(S)	MAXIMUM PRODUCTION	FUEL/RAW MATERIAL	STACK I.D.
Sand Handling and Preparation	New Baghouse No. 12	105 tons/hr sand	Sand	BH #12
Casting Shakeout	New Baghouse No. 12	105 tons/hr sand	Sand	BH #12
Mold Making Systems	New Baghouse No. 12	105 tons/hr sand	Sand	BH #12
Sand Reclamation – Cooler/Classifier	New Baghouse No. 12	105 tons/hr sand	Sand	BH #12
Sand Reclamation – Vibra-Mill	New Baghouse No. 12	10 tons/hr sand	Sand	BH #12
Sand Reclamation – Rotary Reclaimers	New Baghouse No. 12	10 tons/hr sand	Sand	BH #12
Two (2) 15 Ton Intermediate Sand Silos	New Baghouse No. 12	N/A	Sand	N/A
5000 ft ³ Sand Dust Silo	Bin Vent Dust Collector	N/A	Sand	N/A
Sand Lifter	None	300 SCFM	Processed Sand	N/A

Scrap metal that is stored in an open building (separate from main building) is loaded onto a rail car by a large magnet. The scrap metal is transported to the main building by a railcar and loaded into one of the two (2) electric arc furnaces (EAF). The metal is melted for approximately three hours and tapped into a ladle. An overhead crane transfers the molten steel to the pouring area to be poured into individual molds. The sand molds are shaped internally by cores and are both produced in a separate area of the facility. The molten steel cools to a desired hardness and the molds are then sent to shakeout process to break apart the molds and recover the sand. The steel castings proceed onto finishing operations and the sand is sent to a reclaiming process.

The proposed small Rotary Reclaimer is designed to scrub a single sand grain, for a prolonged period of time, with no less than fourteen (14) other sand grains that, in turn, are also being scrubbed by fourteen other grains. The sand scrubs sand, over and over again. All of this takes place under pressure that is applied by centrifugal force. No heat is added. The applied pressure is adjustable, just enough to remove the binders from the sand but without fracturing the grains themselves. The binder layers are, in effect, peeled off the sand layer after layer, rather than impacting one sand grain at a time.

The released binder fines are collected at two (2) locations. At the Reclaimer cell itself and in a Fluid Bed Classifier, which is an integral part of the unit and located beneath the Reclaimer cell. The Classifier is designed to accurately remove all particles of a given size so as to control the final grading (sizing) of the reclaimed sand itself. The reclaimed and classified sand is finally transported to the re-use points for the production of cores and molds.

EMISSION CALCULATIONS:

Particulate Stack Emissions:

The Sand Handling and Preparation, Casting Shakeout, Mold Making, Sand Reclamation and Waste Sand Roll-Off processes and the Intermediate Sand Storage Silos will all be routed to Baghouse No. 12. Baghouse No. 12 is rated at a nominal 180,000 ACFM, which is an increase from the combined ~130,000 ACFM that was measured during stack tests for Baghouse Nos. 5 & 8. The bags for the new baghouse meet BACT requirements (see below) and are guaranteed from the vendor to meet a maximum emission rate of 0.0022 gr/dscf. It is assumed that all (filterable) PM = PM10 = PM2.5, since the particle size distribution of the exhaust stream will be drastically altered after going through the baghouse.

Filterable PM, PM10, PM2.5 = $[(0.0022 \text{ gr/ACFM}) \times 180,000 \text{ DSCFM} \times 60 \text{ min/hr} \times 8760 \text{ hr/yr} \times / 7000 \text{ gr/lb}] = 29,734 \text{ lb/yr} = \mathbf{3.39 \text{ lb/hr} = 14.87 \text{ ton/yr}}$

Condensable PM (from 2008 stack tests +50%) = **1.59 lb/hr = 6.96 ton/yr**

Gaseous Stack Emissions:

The Department is currently working with McConway & Torley to develop a test protocol that will measure the actual VOC, CO and select HAPs (BTEX, phenol, etc.) from the entire facility. This was not possible in the past as not all of the processes at McConway & Torley were directly captured by a pollution control device. Since the facility building was demonstrated to be under constant negative pressure when all of the baghouses are in operation, the total facility emissions can now be measured as the sum of the emissions from the 7 baghouse emission stacks outside of the building.

In absence of that specific facility information, M&T provided pouring/cooling/shakeout test results from their vendor for VOC and HAPs emissions of a similar binder formulation. The results of these tests were used to estimate the maximum potential VOC and HAPs emissions that will be captured into Baghouse No. 12 by conservatively assuming that all of the pouring/cooling/shakeout emissions will be captured by Baghouse No. 12 and increasing the results by 25% to account for uncertainty in VOC and 100% to account for uncertainty in individual HAPs.

CO emissions data from a 2014 diagnostic test was provided by M&T and was used to estimate the CO emissions from Baghouse No. 12. Since only a single test run was performed for Baghouse Nos. 5 and 8 and the airflow for Baghouse No. 12 is higher, the results were increased by 50% to account for uncertainty. Since the previous EAF CO emission potentials were estimated through emission tests where it was unclear what amount of CO emissions from the Pouring/Cooling/Shakeout processes or Heat Treating furnaces migrated to the EAF baghouses, the CO emissions for all of those sources will need to be re-quantified through the facility emissions testing noted above.

McConway & Torley has voluntarily reduced the facility's total resin usage in the core-making (and all downstream) processes from a maximum of 1.2% to 1.0%, by weight, and requested for it to be an enforceable permit condition. The restriction has been added at the end the site level conditions since it does not impact the equipment being installed in this IP. A 2015 stack test of Baghouse No. 5 was used to convert the total hydrocarbons into non-methane, non-ethane hydrocarbons (VOC).

Pouring/Cooling/Shakeout VOC = [0.1053 lb/lb binder x 540,000 lb binder/yr x 415/609 (VOC/Total Hydrocarbons) x 1.25 uncertainty = 48,435 lb/yr = **5.53 lb/hr** = **24.22 ton/yr**

Table 1: Pouring/Cooling/Shakeout (PCS) Emission Factors

Pollutant	Process	Emission Factor	Units	Uncertainty	Reference
VOC	PCS	0.1053	Lb/lb binder	25%	Vendor testing
Benzene	PCS	0.00422	Lb/lb binder	100%	Vendor testing
Phenol	PCS	0.00944	Lb/lb binder	100%	Vendor testing
Naphthalene	PCS	0.00112	Lb/lb binder	100%	Vendor testing
CO	PCS	3.8	Lb/hr	50%	M&T diagnostic test 2014

Fugitive Emissions:

M&T conducted a Method 204 test for total building enclosure on May 12, 2015. The test was performed with all seven (7) baghouses running continuously and was witnessed by several ACHD personnel. The results of the test demonstrate that while all of the baghouses are in operation the building is under negative pressure with airflow being drawn in from all natural draft openings and directed through one of the seven (7) baghouses.

Table 2: Baghouse No. 12 Potential Emissions Limitations Summary

POLLUTANT	LBS/HR	TPY ¹
PM ²	4.98	21.83
PM ₁₀ ²	4.98	21.83
PM _{2.5} ²	4.98	21.83
PM Condensable	1.59	6.96
VOC	5.53	24.22
CO	5.70	24.97
Benzene	0.52	2.28
Phenol	1.16	5.10
Naphthalene	0.14	0.60

¹ A year is defined as any 12 consecutive months.

² Includes condensable emissions.

Differences between IP4 and IP13:

The Mold Making System, Sand Handling & Preparation, Shakeout, Sand Reclaim and Mold Pouring were all permitted under Installation Permit No. 0275-I004. The Shakeout and Sand Reclaim particulate emissions were estimated using a baghouse control efficiency applied to an AP-42 estimate of the emissions generated. Additionally, since the building is under negative pressure, a high percentage of emissions from the Pouring and Cooling processes, which were previously considered to be non-captured fugitive emissions, are expected to be captured by Baghouse No. 12 or one of the other five baghouses at the facility. These result in higher potential particulate emissions for Installation Permit No. 13, but the actual stack and fugitive particulate emissions are expected to be lower with the new baghouse.

INSTALLATION PERMIT APPLICATION COMPONENTS:

1. Application for Permit to Install (IP #13) Modification of Existing Sand Handling and Reclaim Systems. Replacement of Two Existing Baghouse Dust Collectors (BH #s 5 and 8). (Installation Permit No. 0275-I013) received August 6, 2015.
2. Information from McConway & Torley received September 22, 2015.

REGULATORY APPLICABILITY:

1. Article XXI Requirements for Issuance:

See Permit Application No. 0275-I008, Section 5. The requirements of Article XXI, Parts B and C for the issuance of minor modification installation permits have been met for this facility. Article XXI, Part D, Part E & Part H will have the necessary sections addressed individually.

2. BACT Analysis:

BACT shall be the use of a baghouse with bags rated at 0.0022 grains per dry standard cubic foot of filterable PM. These values are similar to the best rated baghouses from other facilities found in the RACT/BACT/LAER Clearinghouse. All particulate emissions from the Shakeout and Reclaim processes will be directed to the baghouse while the process is in operation.

3. Method(s) of Demonstrating Compliance:

Compliance with the emission standards set forth in this Installation Permit will be demonstrated by recording the total amount of sand and resin used in tons, raw materials consumed, the tracking of the hours of operation of the process, the monitoring/recording of the operating parameters, and stack testing consisting of three (3) runs that are each two (2) hours in length. In addition, all instances of non-compliance will be reported to the Department on a semi-annual basis. See Installation Permit No. 0275-I013 for the specific conditions for determining compliance.

4. New Source Performance Standards (NSPS)

There are no applicable NSPS for this installation.

5. National Emission Standards for Hazardous Air Pollutants (NESHAP)

National Emission Standards for Hazardous Air Pollutants for Iron and Steel Foundries Area Sources (40 CFR Part 63 Subpart ZZZZZ) applies.

6. New Source Review/Prevention of Significant Deterioration (NSR/PSD):

The installation is not subject to NSR/PSD, as the installation and facility are not a major source of pollutants.

7. Risk Management Plan; CAA Section 112(r):

The facility is not required to have a risk management plan at this time because none of the regulated chemicals exceed the thresholds in the regulation.

8. Greenhouse Gas Reporting (40 CFR Part 98):

There are presently no applicable requirements for greenhouse gases. Should the facility exceed 25,000 metric tons of actual CO₂e emissions in any 12-month period, the facility would have to submit reports in accordance with 40 CFR Part 98. See §98.2(a)(3) for applicability.

9. Air Toxics Guidelines:

There are no net increases in potential emissions of air toxics that would subject this installation to the Air Toxics Policy (approved 11/7/2012 and amended on 1/9/2013).

10. Emissions Inventory:

This facility is required to provide an annual Emission Inventory report per §2108.01.e of Article XXI since the facility has the potential to emit twenty-five (25) or more tons of several criteria pollutants per year.

NON-APPLICABLE REGULATIONS:

New Source Performance Standards (§2105.05, 40 CFR Part 60 Subpart AAa)

The requirements of 40 CFR Part 60 Subpart AAa (Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983) are not included in the permit because of the exemption for facilities classified as 'Foundries' (Letter from EPA to McConway & Torley dated 3/2/01).

RECOMMENDATION:

The facility has no current unresolved Notices of Violation issued within the last 18 months and it is recommended that Installation Permit No. 0275-I013 be issued.