GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

**Richard E. Dunn, Director**

**Air Protection Branch**
4244 International Parkway
Suite 120
Atlanta, Georgia 30354
404-363-7000

# NARRATIVE

TO: Manny Patel

FROM: Ginger Payment

DATE: December 18, 2017

| | |
|---|---|
| Facility Name: | **VMC Specialty Alloys** |
| AIRS No.: | 015-00115 |
| Location: | Adairsville, GA (Bartow County) |
| Application #: | 26284 |
| Date of Application: | November 7, 2017 |

## Background Information

VMC Specialty Alloys is an existing facility which treats and recycles scrap aluminum and aluminum alloys by melting and casting the metal into billets and ingots. The facility is located at 800 Martin Luther King Jr. Drive in Adairsville (Bartow County). The facility was issued Permit No. 3341-015-B-02-0 on September 29, 2015 for the operation of the facility and for the construction and operation of two new natural gas fired metal treating furnaces.

The scrap aluminum is loaded into the tilting, metal melting furnaces. After the furnace is filled, the charging is stopped and the alloy is checked for product quality and then the ingot casting is started. Chlorine may be used to remove impurities from the molten aluminum. After the melting and casting operations, billets are directed to one of the homogenizing furnaces for heat treatment. The homogenizing furnaces operate at a constant temperature during the setting process to maintain uniformity throughout the cast billets. No aluminum melting occurs at the homogenizing furnaces. The aluminum and aluminum alloys treated at the facility are limited to clean charge in order to avoid the requirements of 40 CFR 63 Subpart RRR - *National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum Production*.

## Purpose of Application

Application No. 26284 was received on November 9, 2017 to request the construction and operation of an additional homogenizing furnace (HO7) and for the construction and operation of another cast house which will include two metal melting furnaces (FCE8 and FCE9), two homogenizing furnaces (HO8 and HO9) and one pre-heater (Pre5). A public advisory (PA1217-1) was issued on December 4, 2017 and will expire on January 5, 2018.

## Updated Equipment List

| Emission Units | | | Associated Control Devices | |
|---|---|---|---|---|
| **Source Code** | **Description** | **Installation Date** | **Source Code** | **Description** |
| FCE1 | Melting Furnace 1 (16 MMBtu/hr) | 2010 | -- | -- |
| FCE2 | Melting Furnace 2 (16 MMBtu/hr) | 2010 | -- | -- |
| FCE3 | Melting Furnace 3 (16 MMBtu/hr) | 2012 | -- | -- |
| FCE4 | Melting Furnace 4 (16 MMBtu/hr) | 2014 | -- | -- |
| FCE5 | Melting Furnace 5 (16 MMBtu/hr) | 2014 | -- | -- |
| FCE6 | Melting Furnace 6 (16 MMBtu/hr) | 2015 | -- | -- |
| FCE7 | Melting Furnace 7 (16 MMBtu/hr) | 2015 | -- | -- |
| FCE8* | Melting Furnace 8 (16 MMBtu/hr) | 2018* | -- | -- |
| FCE9* | Melting Furnace 9 (16 MMBtu/hr) | 2018* | -- | -- |
| HO1 | Homogenizing Furnace 1 (12.4 MMBtu/hr) | 2010 | -- | -- |
| HO2 | Homogenizing Furnace 2 (12.4 MMBtu/hr) | 2010 | -- | -- |
| HO3 | Homogenizing Furnace 3 (12.4 MMBtu/hr) | 2011 | -- | -- |
| HO4 | Homogenizing Furnace 4 (12.4 MMBtu/hr) | 2012 | -- | -- |
| HO5 | Homogenizing Furnace 5 (12.4 MMBtu/hr) | 2014 | -- | -- |
| HO6 | Homogenizing Furnace 6 (12 MMBtu/hr) | 2015 | -- | -- |
| HO7* | Homogenizing Furnace 7 (12 MMBtu/hr) | 2018* | -- | -- |
| HO8* | Homogenizing Furnace 8 (12 MMBtu/hr) | 2018* | -- | -- |
| HO9* | Homogenizing Furnace 9 (12 MMBtu/hr) | 2018* | -- | -- |
| Pre1 | Pre-Heater 1 (4 MMBtu/hr) | 2014 | -- | -- |
| Pre2 | Pre-Heater 2 (4 MMBtu/hr) | 2014 | -- | -- |
| Pre3 | Pre-Heater 3 (4 MMBtu/hr) | 2014 | -- | -- |
| Pre4 | Pre-Heater 4 (4 MMBtu/hr) | 2015 | -- | -- |
| Pre5* | Pre-Heater 5 (4 MMBtu/hr) | 2018* | -- | -- |

*proposed within current application

The proposed melting furnaces are similar to the existing, tilting melting furnaces. Each 60,000 pound melting furnace is natural gas fired with a maximum heat input capacity of 16 MMBtu/hr. Each has ultra-low NOx burners (15.2 MMBtu/hr) and an auxiliary burner (0.8 MMBtu/hr).

The proposed homogenizing furnaces are similar to the existing, homogenizing furnaces. Each 200,000 pound homogenizing furnace will have a maximum heat input capacity of 12 MMBtu/hr, consisting of two 6 MMBtu/hr, zones per furnace.

The proposed pre-heater is similar to the existing preheaters and is natural gas fired with a maximum temperature rating of 500F. The pre-heater will have a 4 MMBtu/hr burner.

**Emissions Summary**

The facility calculated the emissions, except NOx emissions, using the maximum heat input rating of each furnace and emission factors from South Coast Air Quality Management (SCAQMD). The emission factor for NOx emissions is based on manufacturer's specifications.

The manufacturer of the metal melting furnaces has stated that the NOx emissions will not exceed 59 ppmv, corrected to 3% oxygen. The manufacturer of the homogenizing furnaces has stated that the NOx emissions will not exceed 45 ppmv, corrected to 3% oxygen. The manufacturer of the pre-heater burners has stated that the NOx emissions will not exceed 30 ppmv, corrected to 3% oxygen.

Particulate matter emissions include emissions from natural gas combustion and emissions from smelting, pouring and casting. A source test performed in May 2007 on a similar-sized billet furnace provided the emission rate for smelting operations. AP-42 Section 12.11 emission factors were used to calculate the emissions from pouring and casting. The PM emissions from pouring and casting are based on a process rate of 20 tons/hr of metal throughput for a melting furnace.

Chlorine is used in the process to remove impurities in the metals. The chlorine is injected below the metal and promotes separation of the aluminum oxide dross layer that forms on the surface of the melt from the molten metal. It is believed that the chlorine is fully consumed as the drossing fluxes react with aluminum oxides to recover the metal intermingled in the dross layer and often results in the formation of zinc chloride in the dross. Hydrochloric acid emissions of are not expected as a result of the operation of the melting furnaces.

Because the facility operates 24 hours per day, seven days per week, the actual emissions are approximately equal to the potential emissions.

The table below includes the NOx emissions calculated using the manufacturer's emission factors. However, the NOx emissions from combustion were also calculated by the Division using AP-42 emission factors and the potential NOx emissions were 114 tpy. Due to the variable of these emissions, the facility will be required to test a melting furnace and a homogenizing furnace in order to verify the manufacturer's emission factors and that the potential NOx emissions will remain under 100 tpy. If the performance tests show that NOx emissions exceed the major source threshold, the facility will be required to submit another application for a change in operating status.

**Facility-Wide Emissions**
(in tons per year)

| Pollutant | Potential Emissions | | |
|---|---|---|---|
| | Before Mod. | After Mod. | Emissions Change |
| $PM/PM_{10}/PM_{2.5}$ | 33.76 | 44.29 | 10.53 |
| NOx | 55.46 | 77.64 | 22.18 |
| $SO_2$ | 0.51 | 0.72 | 0.21 |
| CO | 29.49 | 41.76 | 12.27 |
| VOC | 5.9 | 8.35 | 2.45 |

| Pollutant | Potential Emissions | | |
|---|---|---|---|
| | Before Mod. | After Mod. | Emissions Change |
| Max. Individual HAP | 0.52 | 0.75 | 0.23 |
| Total HAP | 0.603 | 0.867 | 0.264 |

## Regulatory Applicability

There are no changes to the applicable rules for this application.

The facility will continue to be subject to Georgia Rule (b) for Visible Emissions and Georgia Rule (e) for Particulate Emissions from Manufacturing Processes.

The facility will continue to avoid the requirements of 40 CFR 63 Subpart RRR - *National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum Production* by limiting the aluminum and aluminum alloys treated at the facility to only clean charge.

The proposed furnaces in addition to the existing furnaces will be limited to natural gas; therefore avoiding the requirements of Georgia Rule (g) for Sulfur Dioxide.

The furnaces are not subject to Georgia Rule (d) – Fuel Burning Equipment or Georgia Rule (lll) – NOx Emissions from Fuel Burning Equipment because they do not meet the definition of fuel burning equipment.

## Permit Conditions

All conditions of Permit No. 3341-015-0115-B-02-0 will remain valid for the proposed equipment.

Condition 2.6 is a new condition which limits the NOx emissions from the metal melting furnaces, homogenizing furnaces and the preheaters to the emission factors stated in the application. Because these emission factors were used to determine that the potential NOx emissions are below 100 tpy and are less than AP-42 emission factors, these were included in the permit amendment.

Condition 6.2 is a new condition which requires the facility to test one homogenizing furnace and one metal melting furnace in order to verify the manufacturer's NOx emission factor and to verify that the potential NOx emissions are below 100 tpy. Because all of the homogenizing furnaces are the same and all of the metal melting furnaces are the same, only one of each type of furnace will need to be tested. The facility is also required to recalculate the potential NOx emissions if the test shows a higher emission factor than provided by the manufacturer. If the calculated potential NOx emissions exceed 100 tpy, the facility is also required to submit an application due to a change in operating status.

**Toxic Impact Assessment**

The potential emissions of acrolein after the proposed construction exceeded the MER (minimum emission rate) as described in the *Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions*; therefore, a Toxic Impact Assessment (TIA) was performed for this pollutant. This was the only pollutant to exceed the MER. The Division preformed a TIA using SCREEN3. Though there are several stacks at the facility, all of the emissions from acrolein were assumed to be vented from one stack for convenience of the TIA. This is a worst-case scenario. The TIA showed that the maximum ground level concentration (MGLC) of acrolein was below the acceptable ambient concentration (AAC).

**Summary & Recommendations**

I recommend issuance of Permit Amendment No. 3341-015-0115-B-02-1 to VMC Specialty Alloys for the construction and operation of an additional homogenizing furnace (HO7) and for the construction and operation of another cast house which will include two metal melting furnaces (FCE8 and FCE9), two homogenizing furnaces (HO8 and HO9) and one pre-heater (Pre5). VMC Specialty Alloys is located at 800 Martin Luther King Jr. Drive in Adairsville (Bartow County). The facility will continue to be a minor source unless the required performance test for NOx emissions indicates otherwise. The Mountain District – Cartersville Office will continue to be responsible for compliance of this facility. A public advisory was issued and will expire January 5, 2018.