



west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone (304) 926-0475 • FAX: (304) 926-0479

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-2164E
Plant ID No.: 029-00017
Applicant: The Homer Laughlin China Company
Facility Name: Newell Facility
Location: Hancock County
NAICS Code: 327110
Application Type: Class II Administrative Update
Received Date: January 25, 2016
Engineer Assigned: Steven R. Pursley, PE
Fee Amount: \$300.00
Date Received: January 26, 2016
Complete Date: January 26, 2016
Due Date: March 25, 2016
Applicant Ad Date: January 18, 2016
Newspaper: *East Liverpool Review*
UTM's: Easting: 533.25 km Northing: 4,496.7 km Zone: 17
Description: Application to add a glaze booth.

DESCRIPTION OF CHANGES

The following was taken directly from the permit application:

"The unfired clay wares are mounted on spindles, which travel on a conveyor through the spray glazing line. The conveyor travels at a variable speed from the load area into the spray booth, and then to the unloading area. The liquid glaze is automatically applied in the spray booth. The spindles rotate to ensure even application of the glaze. The spray booth is constructed of stainless steel. It is open on two sides for the pass-through conveyor and equipped with its own exhaust system. The booth is equipped with a hood in front and on top, and baffle in the back to contain the spray. Liquid glaze is returned using a pump to a supply tank.

A settling chamber is attached to the back of the spray booth. Overspray travels through a baffle system in the chamber to improve settling of glaze material from air stream. A collection tank is attached to chamber for liquid glaze to collect and returned to a tank for reuse. The exhaust system captures all overspray (i.e. extra glaze that is not captured by the ware or the baffles of the setting chamber). The exhaust system vents to wet collectors (as Listed), which controls particulate emissions to the atmosphere. The wet collector vents through emission points as listed.

From the unloading area, the conveyors pass through the spindle water wash system, returning the perfectly clean spindles to the load position. The spray booth is manually washed down approximately once per day."

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

In order to determine PM emissions from the glaze operations the following mass balance formula was used:

lb PM = glaze mix usage x density of glaze x lb solids per lb glaze x (1-transfer eff.) x (1-settling factor). Then a control efficiency of 98.9% for the filters was accounted for. All emissions were based on a 31 gallon per hour usage and a specific gravity of 1.8.

To determine HAP emissions, the PM emission rate was multiplied by the percent speciated HAP content.

PM emissions from the equipment modified by this permit should be as follows:

Source	lb/hr	tpy
005-0G	0.52	2.26

Annual HAP emissions (tpy) from the new booth should be as follows:

Source	Co	Cr	Ni	Mn	Cd	Se
005-0G	0.03	0.05	0.03	0.02	0.01	0.01

The above HAP numbers are all rounded up. The actual total HAP increase will be less than 0.13 tpy. Additionally, the existing permit simply limits HAPs to below 10 tons per year (each individual HAP) and 25 tons per year (all HAPs aggregated). This condition will not change.

PM emissions based on the existing permit (emissions taken directly from permit R13-2164D) are as follows:

lb/hr	tpy
7.85	34.12

As can be seen from the above, the facilities potential to emit PM will increase from 34.12 tons per year to 36.38 tons per year.

REGULATORY APPLICABILITY

The facility proposed to be permitted under this application No. R13-2164E is subject to the following state regulations:

45CSR7 To Prevent and Control Particulate Matter Air Pollution from Manufacturing Process Operations.

The coating operations at the facility are affected by this permitting action and are subject to the Particulate Matter emission limits of §45-7-4.1. The combined process weight rate of the (now) fourteen booths is 16.66 pounds per hour (conservatively based on the weight of the greenware alone, type a source). Total calculated emissions from the 14 combined booths is 5.55 pounds per hour.

45CSR13 Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Temporary Permits, General Permits, and Procedures for Evaluation.

HLC requested several substantive changes to its existing permit which increase PM emissions. Since these changes do not result in an increase of emissions of more than 6 pounds per hour and 10 tons per year, the changes can be made as a Class II Administrative Update. As required under §45-13-8.3 ("Notice Level A"), HLC placed a Class I legal advertisement in a "newspaper of general circulation in the area where the source is . . . located." The ad ran on January 18, 2016 in the *East Liverpool Review* and the affidavit of publication for this legal advertisement was submitted on January 25, 2016.

45CSR22 Air Quality Management Fee Program

Since the facility became a minor source in 2006 with the issuance of permit R13-2164B it is subject to 45CSR22. With the issuance of this permit, the facility remains a minor source.

Fact Sheet R13-2164E
The Homer Laughlin China Company
Newell

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

Section 112(b) of the Clean Air Act (CAA) identifies 188 compounds as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. The glazes used by the facility contain HAPs. However, the potential HAP emissions from the facility are below the levels that define a major HAP source. Therefore, the facility is considered a minor (or area) HAP source, and no source-specific major source NESHAP or MACT standards apply. The following is a list of each HAP *potentially* emitted by the equipment subject to this modification. All information comes directly from EPA's Health Effect Notebook which can be found at <http://www.epa.gov/ttn/atw/hlthef/hapindex.html> .

Cadmium Compounds:

"The main sources of cadmium in the air are the burning of fossil fuels such as coal or oil and the incineration of municipal waste. The acute (short-term) effects of cadmium in humans through inhalation exposure consist mainly of effects on the lung, such as pulmonary irritation. Chronic (long-term) inhalation or oral exposure to cadmium leads to a build-up of cadmium in the kidneys that can cause kidney disease. Cadmium has been shown to be a developmental toxicant in animals, resulting in fetal malformations and other effects, but no conclusive evidence exists in humans. An association between cadmium exposure and an increased risk of lung cancer has been reported from human studies, but these studies are inconclusive due to confounding factors. Animal studies have demonstrated an increase in lung cancer from long-term inhalation exposure to cadmium. EPA has classified cadmium as a Group B1, probable human carcinogen."

Chromium Compounds:

"Chromium occurs in the environment primarily in two valence states, trivalent chromium (Cr III) and hexavalent chromium (Cr VI). Exposure may occur from natural or industrial sources of chromium. Chromium III is much less toxic than chromium (VI). The respiratory tract is also the major target organ for chromium (III) toxicity, similar to chromium (VI). Chromium (III) is an essential element in humans. The body can detoxify some amount of chromium (VI) to chromium (III).

The respiratory tract is the major target organ for chromium (VI) toxicity, for acute (short-term) and chronic (long-term) inhalation exposures. Shortness of breath, coughing, and wheezing were reported from a case of acute exposure to chromium (VI), while perforations and ulcerations of the septum, bronchitis, decreased pulmonary function, pneumonia, and other respiratory effects have been noted from chronic exposure. Human studies have clearly established that inhaled chromium (VI) is a human carcinogen,

resulting in an increased risk of lung cancer. Animal studies have shown chromium (VI) to cause lung tumors via inhalation exposure."

Cobalt Compounds:

"Cobalt is a natural element found throughout the environment. Acute (short-term) exposure to high levels of cobalt by inhalation in humans and animals results in respiratory effects, such as a significant decrease in ventilatory function, congestion, edema, and hemorrhage of the lung. Respiratory effects are also the major effects noted from chronic (long-term) exposure to cobalt by inhalation, with respiratory irritation, wheezing, asthma, pneumonia, and fibrosis noted. Cardiac effects, congestion of the liver, kidneys, and conjunctiva, and immunological effects have also been noted in chronically-exposed humans. Cobalt is an essential element in humans, as a constituent of vitamin B12. Human studies are inconclusive regarding inhalation exposure to cobalt and cancer, and the one available oral study did not report a correlation between cobalt in the drinking water and cancer deaths. EPA has not classified cobalt for carcinogenicity."

Manganese Compounds:

"Manganese is naturally ubiquitous in the environment. Manganese is essential for normal physiologic functioning in humans and animals, and exposure to low levels of manganese in the diet is considered to be nutritionally essential in humans. Chronic (long-term) exposure to high levels of manganese by inhalation in humans may result in central nervous system (CNS) effects. Visual reaction time, hand steadiness, and eye-hand coordination were affected in chronically-exposed workers. A syndrome named manganism may result from chronic exposure to higher levels; manganism is characterized by feelings of weakness and lethargy, tremors, a mask-like face, and psychological disturbances. Respiratory effects have also been noted in workers chronically exposed by inhalation. Impotence and loss of libido have been noted in male workers afflicted with manganism.

EPA has classified manganese as a Group D, not classifiable as to carcinogenicity in humans."

Nickel Compounds:

"Nickel occurs naturally in the environment at low levels. Nickel is an essential element in some animal species, and it has been suggested it may be essential for human nutrition. Nickel dermatitis, consisting of itching of the fingers, hands, and forearms, is the most common effect in humans from chronic (long-term) skin contact with nickel.

Respiratory effects have also been reported in humans from inhalation exposure to nickel. Human and animal studies have reported an increased risk of lung and nasal cancers from exposure to nickel refinery dusts and nickel subsulfide. Animal studies of soluble nickel compounds (i.e., nickel carbonyl) have reported lung tumors. EPA has classified nickel refinery dust and nickel subsulfide as Group A, human carcinogens, and nickel carbonyl as a Group B2, probable human carcinogen. "

Selenium Compounds:

"Selenium is a naturally occurring substance that is toxic at high concentrations but is also a nutritionally essential element. Hydrogen selenide is the most acutely toxic selenium compound. Acute (short-term) exposure to elemental selenium, hydrogen selenide, and selenium dioxide by inhalation results primarily in respiratory effects, such as irritation of the mucous membranes, pulmonary edema, severe bronchitis, and bronchial pneumonia. Epidemiological studies of humans chronically (long-term) exposed to high levels of selenium in food and water have reported discoloration of the skin, pathological deformation and loss of nails, loss of hair, excessive tooth decay and discoloration, lack of mental alertness, and listlessness. Epidemiological studies have reported an inverse association between selenium levels in the blood and cancer occurrence and animal studies have reported that selenium supplementation, as sodium selenate, sodium selenite, and organic forms of selenium, results in a reduced incidence of several tumor types. The only selenium compound that has been shown to be carcinogenic in animals is selenium sulfide, which resulted in an increase in liver tumors from oral exposure. EPA has classified elemental selenium as a Group D, not classifiable as to human carcinogenicity, and selenium sulfide as a Group B2, probable human carcinogen."

AIR QUALITY IMPACT ANALYSIS

Since this is minor modification to an existing minor source, as defined in 45CSR14, no modeling was performed.

MONITORING OF OPERATIONS

Since the existing permit already requires the specific gravity and percent solids content of each glaze to be monitored and recorded no additional monitoring is deemed necessary.

CHANGES TO PERMIT R13-2164D

The main changes to the permit are as follows:

- * Table 1.0 was updated to add the new glaze booth.
- * Condition 4.1.4 was updated to add the new glaze booth, along with its operating limits.
- * Condition 4.1.6 was updated to increase HAP emission limits from the glaze booths (facility wide emission limit of 10/25 tpy was not changed) to accommodate the new glaze booth.
- * Condition 4.1.18 was updated to add the new glaze booth, along with its associated emissions.

RECOMMENDATION TO DIRECTOR

Information supplied in the application indicates that compliance with all applicable regulations will be achieved. Therefore it is the recommendation of the writer that permit R13-2164E for a dinner ware manufacturing facility in Newell, Hancock County, be granted to The Homer Laughlin China Company.



Steven R. Pursley, PE
Engineer

2-16-16

February 16, 2016

Fact Sheet R13-2164E
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