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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.: R13-3200
Plant ID No.: 079-00183
Applicant: FLSmidth USA Inc.
Facility Name: Charleston Operation
Location: Putnam County
NAICS Code: 333131
Application Type: Construction
Received Date: July 11, 2014
Engineer Assigned: Steven R. Pursley, PE
Fee Amount: \$1,000.00
Date Received: July 17, 2014
Complete Date: August 8, 2014
Due Date: November 6, 2014
Applicant Ad Date: July 17, 2014
Newspaper: *The Hurricane Breeze*
UTM's: Easting: 415.2437 km Northing: 4,268.2455 km Zone: 17
Description: After the fact application for the construction of a steel fabrication facility.

DESCRIPTION OF PROCESS

FLSmidth USA Inc.'s Charleston Operations is a steel fabrication facility. The facility manufactures and refurbishes equipment for the mining industry (e.g. screens, etc.) The facility starts with the metal stock, cuts the metal stock to size and then fabricates the required shapes/equipment pieces via welding the parts together. After fabrication, the items may be blasted in a blast booth to clean the surface prior to applying the required coating/paint. Emission sources at the facility include the painting operation (including a heater), a blast booth, three stationary plasma cutters, two portable plasma cutters, parts cleaners, aerosol can use, welding and grinding and miscellaneous metal working activities.

SITE INSPECTION

A site inspection of the facility was performed on August 27, 2014 by the writer. As stated above, this is an after the fact application. The facility began operations in August of 2013. The facility is located in a mixed commercial, residential, industrial, and rural area. There are numerous homes and businesses adjacent to the facility. To get to the facility take I-64 west to exit 40. Then take US Route 35 north approximately 5.6 miles and turn right on County Route 817/2. Go approximately 0.3 miles until County Route 817/2 dead ends at State Route 817. Next, turn left and proceed north for approximately 3 miles and the facility is on the right. GPS coordinates taken at the time of the site inspection were 38.559 north and 81.9745 west. A photo of the building is included below.



ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The facility has ten sources of emissions:

Plasma Cutting

Emission calculations from plasma cutting are based on a document referenced in

Fact Sheet R13-3200
FLSmith USA Inc.
Charleston Operation

AP-42 (Emissions of Fume, Nitrogen Oxides and Noise in Plasma Cutting of Stainless and Mild Steel). Per that document, control efficiencies of 90% for PM and 50% of NOx were taken for the use of a water table utilizing semi-dry cutting (where appropriate). Additionally, an 80% PM control was taken for a full enclosure on cutter 2S.

Grinding and Cutting

The 45CSR7 PM limit was used to conservatively estimate emissions from grinding and cutting. PM10 is assumed to be PM divided by 2.1 and PM2.5 is assumed to equal PM10.

Welding

Welding emissions were based on AP-42 Table 12.19-1 and assume worst case electrode type.

Use of Bonding Cement and Miscellaneous Compounds.

Emissions from the use of bonding cement and other VOC and HAP containing compounds were calculated using mass balances and assuming all VOCs and HAPs are emitted to the atmosphere.

Blast Booth

Emissions from the blast booth are based on AP 42 Table 13.2.6-1. The calculations use the emission factor for blasting controlled with a fabric filter. All PM emissions were assumed to be PM 2.5.

Painting Operations

VOC and HAP emissions from the painting operations are based on mass balances and assume all VOCs and HAPs are emitted to the atmosphere. PM emissions from the painting operations are also based on a mass balance. It should be noted that the calculations submitted by the applicant are based on the total mass of the coatings and not upon the solids content. Therefore the calculations should be overly conservative. The calculations use a 50% transfer efficiency and a 98% control efficiency for the exhaust filter.

Heaters

Emissions from the natural gas fired paint booth heaters are based on AP-42 Chapter 1.4. PM10 and PM2.5 emissions were assumed to equal PM emissions.

Parts Washer

Emissions from the parts washer are based on AP-42 Table 4.6-2. A control efficiency of 13% was taken for the use of a cover per AP-42 Table 4.6-3 Footnote E.

Aerosol Use

VOC and HAP emissions from the aerosol use are based on mass balances and assume all VOCs and HAPs are emitted to the atmosphere.

Haul Roads

Haul roads were calculated in the usual way per AP-42 Section 13.2.1 (paved haulroads.)

Controlled criteria emissions from the facility will be as follows:

Source	PM		PM ₁₀ /PM _{2.5}		SO ₂		CO		NO _x		VOC	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Plasma Cutter 1	1.64	4.27	1.64	4.27	--	--	--	--	2.55	6.62	--	--
Plasma Cutter 2	0.90	2.33	4.49	11.67	--	--	--	--	1.55	4.02	--	--
Plasma Cutter 3	0.30	0.79	0.30	0.79	--	--	--	--	1.00	2.60	--	--
Grinding	5.00	10.95	2.38	5.21	--	--	--	--	--	--	--	--
Metal-Rubber Bonding	--	--	--	--	--	--	--	--	--	--	19.07	18.82
Welding	0.24	0.82	0.24	0.82	--	--	--	--	--	--	--	--
Blast Booth	0.17	0.18	0.17	0.18	--	--	--	--	--	--	--	--
Paint Booth	2.36	3.30	1.12	1.57	--	--	--	--	--	--	52.79	39.38
Paint Booth Heater	0.03	0.14	0.03	0.14	0.01	0.01	0.35	1.54	0.42	1.84	0.02	0.10

Parts Washer	--	--	--	--	--	--	--	--	--	--	0.07	0.29
Area Heaters	0.04	0.16	0.04	0.16	0.01	0.01	0.41	1.78	0.48	2.11	0.03	0.12
Aerosol Cans	--	--	--	--	--	--	--	--	--	--	4.42	4.48
Port. Plasma Cutter	3.64	1.89	3.64	1.89	--	--	--	--	1.85	0.96	--	--
Haul roads	0.37	0.49	0.07	0.09	--	--	--	--	--	--	--	--
Total	14.69	25.32	14.12	26.79	0.02	0.02	0.76	3.32	7.85	18.15	76.40	63.19

Controlled annual HAP emissions from the facility will be as follows:

HAP	Tons per Year
Cr	0.03
CR(VI)	0.02
Mn	0.24
Ni	0.02
Pb	0.002
Xylenes	6.23
Ethylbenzene	2.93
Hexane	2.49
MIBK	1.76
Trichloroethylene	5.45
Toluene	0.08
Chlorobenzene	0.01
Cumene	0.01
Total HAPs	19.35¹

¹Total HAP is the sum of the speciated non-combustion HAPs in the table plus 0.08 tons per year of total HAPs from combustion sources.

REGULATORY APPLICABILITY

45CSR7 *To Prevent and Control Particulate Matter Air Pollution From Manufacturing Processes and Associated Operations*

The main requirement of 45CSR7 is the process weight rate based PM stack emission rate in section 4 of the rule. As can be seen in the table below the sources meet this requirement.

Source	Permit Limit (lb/hr)	Rule 7 Limit (lb/hr)
Plasma Cutters ¹	2.84 (combined)	5.00
Blast Booth ²	0.17	0.30
Paint Booth ³	2.36	10.00

¹Rule 7 limit based on type a source and an applicant estimated process weight rate of 5,000 pounds per hour. Excludes portable plasma cutter as it doesn't have "stack emissions".

²Rule 7 limit based on type a source and a process weight rate that conservatively only includes the blast media.

³Rule 7 limit based on type a source and an applicant estimated process weight rate of 10,000 pounds per hour.

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

The FLSmidth facility emits VOCs, PM and NO_x in excess of 6 pounds per hour and 10 tons per year. Additionally, the facility emits total Hazardous Air Pollutants in excess of two (2) lbs/hour and five (5) TPY on an aggregated basis and, therefore, pursuant to §45-13-2.24, the facility is defined as a "stationary source" under 45CSR13. Pursuant to §45-13-5.1, "[n]o person shall cause, suffer, allow or permit the construction . . . and operation of any stationary source to be commenced without . . . obtaining a permit to construct." Therefore, FLSmidth is required to obtain a permit under 45CSR13 for the construction and operation of the apparel manufacturing facility.

Since this application is a synthetic minor under 45CSR34, it must undergo the public review procedures of "Notice Level C". The facility will be a synthetic minor mainly because the facility would be major without the usage limits proposed in the application and that will be required in the permit. Those usage limits will also make the facility a synthetic minor source for HAPs under Title V. As required under §45-13-8.5 ("Notice Level C"), FLSmidth placed a Class I legal advertisement in a "newspaper of general

circulation in the area where the source is . . . located.” The ad ran on July 17, 2014 in the *Hurricane Breeze* and the affidavit of publication for this legal advertisement was submitted on July 29, 2014. Pursuant to §45-13-8.5 and §45-13-8.5.a, upon issuance of the draft permit, the applicant will be required to publish a commercial display ad and place a sign at the entrance to the facility.

45CSR21: To Prevent and Control Air Pollution from the Emission of Volatile Organic Compounds

Because the facility will be located in Putnam County and coats “Miscellaneous Metal Parts”, it is subject to §45-21-19. The main requirement of the rule (that is applicable to the facility) is the VOC content limit of §45-21-19.3.a.3. This limits the VOC content of any coating used to 3.5 pounds per gallon. The facility uses a few coatings that do not meet this limit, however, §45-21-19.4 allows the facility to comply with the rule by using a daily-weighted average.

45CSR22 Air Quality Management Fee Program

The facility’s potential to emit will be less than the 45CSR30 threshold of 100 TPY for any criteria pollutant and will be less than 10 tons per year of any individual HAP and less than 25 tons per year of all combined HAPs by taking a synthetic minor limitation. Additionally, no NSPS or MACT appears to apply to the facility. Therefore, the facility will not be subject to 45CSR30. Since it is not subject to 45CSR30, it is subject to 45CSR22.

NON-APPLICABILITY DETERMINATION

The facility is potentially subject to 40 CFR 63 Subpart HHHHHH should it begin using coatings that contain one of the rules targeted HAPs (currently they do not use any coatings containing any of those HAPs). However, WV has not accepted delegation of this area source GACT and has no plans to accept delegation in the near future.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The facility will emit the following HAPs:

The following information comes directly from EPA’s Air Toxics Website:

Hexane

Hexane is used to extract edible oils from seeds and vegetables, as a special-use solvent, and as a cleaning agent. Acute (short-term) inhalation exposure of humans to high levels of hexane causes mild central nervous system (CNS) effects, including dizziness, giddiness, slight nausea, and headache. Chronic (long-term) exposure to hexane in air is associated with polyneuropathy in humans, with numbness in the extremities, muscular weakness, blurred vision, headache, and fatigue observed. Neurotoxic effects have also been exhibited in rats. No information is available on the carcinogenic effects of hexane in humans or animals. EPA has classified hexane as a Group D, not classifiable as to human carcinogenicity.

Toluene

Toluene is added to gasoline, used to produce benzene, and used as a solvent. Exposure to toluene may occur from breathing ambient or indoor air. The central nervous system (CNS) is the primary target organ for toluene toxicity in both humans and animals for acute (short-term) and chronic (long-term) exposures. CNS dysfunction and narcosis have been frequently observed in humans acutely exposed to toluene by inhalation; symptoms include fatigue, sleepiness, headaches, and nausea. CNS depression has been reported to occur in chronic abusers exposed to high levels of toluene. Chronic inhalation exposure of humans to toluene also causes irritation of the upper respiratory tract and eyes, sore throat, dizziness, and headache. Human studies have reported developmental effects, such as CNS dysfunction, attention deficits, and minor craniofacial and limb anomalies, in the children of pregnant women exposed to toluene or mixed solvents by inhalation. Reproductive effects, including an association between exposure to toluene and an increased incidence of spontaneous abortions, have also been noted. However, these studies are not conclusive due to many confounding variables. EPA has classified toluene as a Group D, not classifiable as to human carcinogenicity.

Xylene

Commercial or mixed xylene usually contains about 40-65% m-xylene and up to 20% each of o-xylene and p-xylene and ethylbenzene. Xylenes are released into the atmosphere as fugitive emissions from industrial sources, from auto exhaust, and through volatilization from their use as solvents. Acute (short-term) inhalation exposure to mixed xylenes in humans results in irritation of the eyes, nose, and throat, gastrointestinal effects, eye irritation, and neurological effects. Chronic (long-term) inhalation exposure of humans to mixed xylenes results primarily in central nervous system (CNS) effects, such as headache, dizziness, fatigue, tremors, and incoordination; respiratory, cardiovascular, and kidney effects have also been reported. EPA has classified mixed xylenes as a Group D, not classifiable as to human carcinogenicity.

MIBK

Methyl isobutyl ketone is used as a solvent for gums, resins, paints, varnishes, lacquers, and nitrocellulose. Acute (short-term) exposure to methyl isobutyl ketone may irritate the eyes and mucous membranes, and cause weakness, headache, nausea, lightheadedness, vomiting, dizziness, incoordination, narcosis in humans. Chronic (long-term) occupational exposure to methyl isobutyl ketone has been observed to cause nausea, headache, burning in the eyes, weakness, insomnia, intestinal pain, and slight enlargement of the liver in humans. Lethargy and kidney and liver effects have been observed in rats and mice chronically exposed by gavage (experimentally placing the chemical in the stomach), ingestion, and inhalation. EPA has classified methyl isobutyl ketone as a Group D, not classifiable as to human carcinogenicity.

Ethylbenzene

Ethylbenzene is mainly used in the manufacture of styrene. Acute (short-term) exposure to ethylbenzene in humans results in respiratory effects, such as throat irritation and chest constriction, irritation of the eyes, and neurological effects such as dizziness. Chronic (long-term) exposure to ethylbenzene by inhalation in humans has shown conflicting results regarding its effects on the blood. Animal studies have reported effects on the blood, liver, and kidneys from chronic inhalation exposure to ethylbenzene. Limited information is available on the carcinogenic effects of ethylbenzene in humans. In a study by the National Toxicology Program (NTP), exposure to ethylbenzene by inhalation resulted in an increased incidence of kidney and testicular tumors in rats, and lung and liver tumors in mice. EPA has classified ethylbenzene as a Group D, not classifiable as to human carcinogenicity.

Cumene

Cumene is used in a variety of petroleum products. Acute (short-term) inhalation exposure to cumene may cause headaches, dizziness, drowsiness, slight incoordination, and unconsciousness in humans. Cumene has a potent central nervous system (CNS) depressant action characterized by a slow induction period and long duration of narcotic effects in animals. Cumene is a skin and eye irritant. No information is available on the chronic (long-term), reproductive, developmental, or carcinogenic effects of cumene in humans. Animal studies have reported increased liver, kidney, and adrenal weights from inhalation exposure to cumene. EPA has classified cumene as a Group D, not classifiable as to human carcinogenicity.

Chlorobenzene

Chlorobenzene is used primarily as a solvent, a degreasing agent, and a chemical intermediate. Limited information is available on the acute (short-term) effects of chlorobenzene. Acute inhalation exposure of animals to chlorobenzene produced narcosis, restlessness, tremors, and muscle spasms. Chronic (long-term) exposure of humans to chlorobenzene affects the central nervous system (CNS). Signs of neurotoxicity in humans include numbness, cyanosis, hyperesthesia (increased sensation), and muscle spasms. No information is available on the carcinogenic effects of chlorobenzene in humans. EPA has classified chlorobenzene as a Group D, not classifiable as to human carcinogenicity.

Trichloroethylene

Most of the trichloroethylene used in the United States is released into the atmosphere from industrial degreasing operations. Acute (short-term) and chronic (long-term) inhalation exposure to trichloroethylene can affect the human central nervous system (CNS), with symptoms such as dizziness, headaches, confusion, euphoria, facial numbness, and weakness. Liver, kidney, immunological, endocrine, and developmental effects have also been reported in humans. A recent analysis of available epidemiological studies reports trichloroethylene exposure to be associated with several types of cancers in humans, especially kidney, liver, cervix, and lymphatic system. Animal studies have reported increases in lung, liver, kidney, and testicular tumors and lymphoma.

Following U.S. EPA (2005b) Guidelines for Carcinogen Risk Assessment, TCE is characterized as "carcinogenic to humans" by all routes of exposure.

AIR QUALITY IMPACT ANALYSIS

Because this is a construction of a minor stationary source, as defined in 45CSR14, no modeling was performed.

MONITORING OF OPERATIONS

The permit will require the applicant to monitor and record the following:

- * The number of hours of use of each plasma cutter on a daily basis.

- * The type and amount of each glue, cement, compound, solvent, aerosol and paint used. Additionally, the permit will require FLSmith to calculate emissions of all VOCs and each HAP emitted from said substances on a monthly basis.
- * Media usage in the blast booth.

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 R13-3200 for the construction of a steel fabrication facility near, Fraziers Bottom, Putnam County, be granted to FLSmith USA Inc.



Steven R. Pursley, PE
Engineer

9-25-14

September 25, 2014