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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2864B
Plant ID No.:	035-00049
Applicant:	Armstrong World Industries, Inc.
Facility Name:	Millwood Facility
Location:	Jackson County
NAICS Code:	327993
Application Type:	Modification
Received Date:	February 13, 2015
Engineer Assigned:	Steven R. Pursley, PE
Fee Amount:	$1,000.00
Date Received:	February 23, 2015
Complete Date:	April 30, 2015
Due Date:	July 29, 2015
Applicant Ad Date:	February 17, 2015
Newspaper:	*The Jackson Herald*
UTM's:	Easting: 427.2 km Northing: 4,307.0 km Zone: 17
Description:	Application to increase the allowable CO emissions from the EAF, increase storage pile size and decrease the operating hours from the emergency generator.

DESCRIPTION OF PROCESS

The facility consists of one furnace and two slag wool production lines, and other associated operations dedicated to manufacturing slag wool.

The proposed slag wool production facility utilizes slag as a raw material input. Slag from external sources is delivered to the Millwood Plant via truck or railcar and unloaded into slag storage piles. The slag is conveyed from storage to the furnace via a series of raw material conveyors and hoppers, which are all controlled by the furnace dust collector.

Upon feeding the slag to the furnace, the furnace melts the slag. The molten metallics are tapped from the furnace bottom periodically, cooled and sold externally.

Emissions of SO_2 from the furnace, which evolve through the oxidation of sulfur impurities contained in the slag, are controlled by a dry scrubber. The scrubber reagent is fed to the scrubber from a storage silo equipped with a bin vent filter. Particulate emissions from the furnace are controlled by the furnace dust collector located downstream from the dry scrubber.

The upper layer of molten slag is continuously discharged into spinners to produce slag wool fiber. The spinning lines discharge the wool fibers to collection chambers. The slag wool fibers are then processed through a series of fiber conditioning equipment.

Many of the operations in the slag wool production lines are designed to remove a significant portion of shot from the slag wool fiber stream. Particulate emissions from each of the duplicate fiber lines are controlled by a separate dust collector. The dust collectors, however, share a single exhaust stack.

This permit modification does not involve any construction or alter the operation of the plant. The application requests revisions to the CO emission limits of the EAF (based on stack testing required by the original permit) and to several recordkeeping and monitoring requirements. Specifically, the applicant proposes to install CO and SO_2 CEMS. Therefore, several of the monitoring and recordkeeping requirements designed to monitor those pollutants will be rendered obsolete.

SITE INSPECTION

No site inspection was deemed necessary as the writer is familiar with the facility's location. Additionally, a compliance inspection of the facility was performed by James Robertson of DAQs Compliance and Enforcement Section on May 5, 2015. The facility is out of compliance. This permit application was submitted, in part, to get the facility back in compliance. The facility is located in the Jackson County Maritime and Industrial Center near Millwood, WV. To get to the facility drive north on Interstate 77 to the Ripley exit. Turn left on State Route 62 and go approximately 9 miles until Route 62 dead ends at State Route 2. Turn right and go approximately 1.3 miles and the entrance to the Jackson County Maritime and Industrial Center is on the left. Turn left into the Industrial Center and go approximately 0.4 miles. Then veer right and go approximately 0.25 miles and the plant will be on the left.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The following emissions change due to this application:

* CO emissions from the EAF (1S). The new emissions are based CEMS data collected at the stack.

* All annual emissions from the emergency generator are now based on 500 hours per year instead of 8,760 hours per year.

* PM and Mn emissions from the slag storage and handling system increase due to the requested throughput increase from 115,740 tons per year to 175,200 tons per year.

* Additionally, some emissions changed slightly due to rounding.

Emissions from the existing facility are as follows (taken directly from permit R13-2864A):

Source	PM		PM_{10}[1]		NO_x		VOC		SO_2		CO	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1S	2.6	11.4	2.60	11.4	5.0	21.9	5.0	21.9	55.94	245	5.0	21.9
3S	7.1	31.1	7.1	31.1	--	--	0.05	0.2	--	--	--	--
4S	7.1	31.1	7.1	31.1	--	--	0.05	0.2	--	--	--	--
5S	0.34	1.5	0.34	1.5	--	--	--	--	--	--	--	--
6S	0.53	2.3	0.53	2.3	--	--	--	--	--	--	--	--
7S	0.26	1.1	0.26	1.1	6.47	28.3	0.21	0.9	0.01	0.04	4.37	19.1
9S	--	1.2	--	0.6	--	--	--	--	--	--	--	--
10S	0.78	3.4	0.78	3.4	--	--	--	--	--	--	--	--
11S	--	0.1	--	0.04	--	--	--	--	--	--	--	--
12S	--	--	--	--	--	--	0.01	0.04	--	--	--	--
13S	--	--	--	--	--	--	0.01	0.04	--	--	--	--
14S	--	--	--	--	--	--	0.01	0.04	--	--	--	--
15S 16S	2.4	10.5	2.4	10.4	--	--	--	--	--	--	--	--
17S	0.42	1.8	0.42	1.8	--	--	--	--	--	--	--	--
Total	**21.53**	**95.5**	**21.53**	**94.74**	**11.47**	**50.2**	**5.34**	**23.32**	**55.95**	**245**	**9.37**	**41**

[1]All PM_{10} is assumed to be $PM_{2.5}$ and all PM, PM_{10}, $PM_{2.5}$ emission limits include both filterable and condensable Particulate matter .

Source	Mn		VOC HAP		Total HAP	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1S	0.28	1.25	--	--	0.28	1.25
3S	0.78	3.4	--	--	0.78	3.4

4S	0.78	3.4	--	--	0.78	3.4
5S	0.04	0.16	--	--	0.04	0.16
7S	--	--	0.01	0.04	0.01	0.04
9S	--	0.13	--	--	--	0.13
11S	--	0.01	--	--	--	0.01
12S	--	--	0.01	0.04	0.01	0.04
13S	--	--	0.01	0.04	0.01	0.04
15S	0.26	1.15	--	--	0.26	1.15
16S						
Total	**2.14**	**9.5**	**0.03**	**0.12**	**2.17**	**9.62**

Emissions from the modified facility will be as follows:

Source	PM		PM_{10}[1]		NO_x		VOC		SO_2		CO	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1S	2.60	11.39	2.60	11.39	5.00	21.90	5.00	21.90	55.94	245.00	55.00[2]	240.90
3S	7.09	31.06	7.09	31.06	--	--	0.04	0.17	--	--	--	--
4S	7.09	31.06	7.09	31.06	--	--	0.04	0.17	--	--	--	--
5S	0.34	1.50	0.34	1.50	--	--	--	--	--	--	--	--
6S	0.51	2.25	0.51	2.25	--	--	--	--	--	--	--	--
7S	0.25	0.07	0.25	0.07	6.47	1.62	0.20	0.05	0.02	0.01	4.36	1.09
9S	--	1.98	--	0.97	--	--	--	--	--	--	--	--
10S	0.77	3.37	0.77	3.37	--	--	--	--	--	--	--	--
11S	0.02	0.1	0.01	0.05	--	--	--	--	--	--	--	--
12S	--	--	--	--	--	--	0.01	0.04	--	--	--	--
13S	--	--	--	--	--	--	0.01	0.04	--	--	--	--
14S	--	--	--	--	--	--	0.01	0.04	--	--	--	--
15S	2.39	10.47	2.39	10.47	--	--	--	--	--	--	--	--
16S												
17S	0.41	1.80	0.41	1.80	--	--	--	--	--	--	--	--
Total	**21.47**	**95.05**	**21.46**	**93.99**	**11.47**	**23.52**	**5.31**	**22.41**	**55.96**	**245.01**	**59.36**	**241.99**

[1]All PM_{10} is assumed to be $PM_{2.5}$ and all PM, PM_{10}, $PM_{2.5}$ emission limits include both filterable and condensable particulate matter .

[2] Hourly CO emissions limits from the EAF are 55 pounds per hour based on a 30 day average and 100 pounds per hour on a rolling 24 hour average.

Source	Mn		VOC HAP		Total HAP	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1S	0.28	1.25	--	--	0.28	1.25
3S	0.78	3.4	--	--	0.78	3.40
4S	0.78	3.4	--	--	0.78	3.40
5S	0.04	0.16	--	--	0.04	0.16
7S	--	--	0.01	0.01	0.01	0.01
9S	0.02	0.22	--	--	0.02	0.22
11S	0.01	0.01	--	--	0.01	0.01
12S	--	--	0.01	0.04	0.01	0.04
13S	--	--	0.01	0.04	0.01	0.04
15S	0.26	1.15	--	--	0.26	1.15
16S						
Total	**2.17**	**9.59**	**0.03**	**0.09**	**2.20**	**9.68**

From the above tables, the change in potential emissions due to this modification will be as follows:

PM		PM_{10}		NO_x		VOC		SO_2		CO	
lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
-0.06	-0.45	-0.07	-0.75	0.00	-26.68	-0.03	-0.91	0.01	-0.03	49.99	200.99

Mn		VOC HAP		Total HAP	
lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
0.03	0.09	0.00	-0.03	0.03	0.06

REGULATORY APPLICABILITY

The following state and federal rules apply to the modification:

STATE RULES:

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. The following sources are subject to the process weight rate based emission limitations (all are "type a" sources):

Source	Proc. Weight Rate (lb/hr)	Rule 7 Limit (lb/hr)	Permit Limit (lb/hr)
1S (Raw material transfer and EAF)	40,000	28.0	2.60
3S (Spinner collection chamber #1)	34,500	24.70	14.18
4S (Spinner collection chamber #2)			
15S (Slag wool processing line #1)	28,000	20.8	2.39
16S (Slag wool processing line #2)			

The facility is also subject to a twenty (20) percent opacity limit on all process source operations and must have a plan to minimize fugitive emissions. Armstrong proposes to meet these requirements mainly through the use of baghouses and water sprays.

The facility is also subject to the fugitive particulate matter control systems requirement of section 5.1 of 45CSR7.

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).

Because the increase in CO emissions from the furnace exceed 6 pounds per hour and 10 tons per year Armstrong is required to submit a modification permit under 45CSR13. Therefore, the applicant was required to place a class I legal ad per 45CSR§13-11.2.a. The required ad ran in the *Jackson Herald* on February 17, 2015 and the affidavit of publication was received on April 17, 2015.

45CSR14 Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration (Non Applicability)

The existing facility is not major for any pollutant under 45CSR14. Therefore the increase in CO emissions of 200.99 tons per year does not trigger PSD review. Additionally, since the modified facility will not emit 250 tons per year or more of any criteria pollutant, the facility will remain a non major source per 45CSR14.

45CSR30 Requirements for Operating Permits.

The facility is an existing Title V major source with an issued Title V permit which will have to be modified.

FEDERAL RULES:

40 CFR 60 Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

The following comes directly from the engineering evaluation for R13-2864:

"The emergency engine is a 565kw diesel fired backup generator. 40 CFR 60 Subpart IIII requires that subject engines meet specific emission standards and fuel specifications. Specifically, the engine will have to meet the following emission limits:

NO_x+NMHC (g/hp-hr)	*CO (g/hp-hr)*	*PM (g/hp-hr)*
6.4	*3.5*	*0.20*

Additionally, Armstrong will be required to use nonroad diesel fuel that has a sulfur content of less than 15 ppm."

40 CFR 63 Subpart ZZZZ National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart ZZZZ. As the facility is defined as an areas source of HAPs, the facility is subject to applicable requirements of Subpart ZZZZ.

Armstrong only needs to comply with 40 CFR 60 Subpart IIII to comply with 40 CFR 63 Subpart ZZZZ.

NONAPPLICABILITY DETERMINATION

The proposed modification is **not** subject to the following state and federal rules:

40 CFR 63 Subpart DDD — National Emission Standards for Hazardous Air Pollutants for Mineral Wool Production.

40 CFR 63 Subpart DDD does not apply because the facility will remain a minor source of Hazardous Air Pollutants.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The main non-criteria regulated pollutant that is emitted from this facility is Manganese (the only other HAPs come from the trivial amounts produced by the combustion of fuel oil in the backup generator and from the diesel storage tanks). The following comes from EPAs Air Toxics Website:

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.

The proposed modification increases permitted levels of Manganese by 0.1 tons per year to 9.6 tons per year. Therefore, because of the limits in the Manganese content of the raw material that are in the permit, the facility will remain a synthetic minor source of HAPs. EPA has classified Manganese as a Group D, not classifiable as to carcinogenicity in humans.

AIR QUALITY IMPACT ANALYSIS

Because Armstrong is not an existing major source and this modification itself is not a major modification as defined in 45CSR14, no modeling was required

MONITORING OF OPERATIONS

Armstrong has proposed installing a CEMS for CO and SO_2 at the EAF exhaust. This system will render several monitoring requirements in the existing permit moot. Therefore the requirements to monitor the dry lime scrubber operation and lime injection rate and the slag and product sulfur content will be removed. Additionally, the sulfur based throughput limit in condition 4.1.9 will be replaced by a simple numerical production limit.

The CEMS proposal also makes the requirement for stack testing the EAF for CO and SO_2 unnecessary. Therefore, those requirements will be removed.

The permit will include conditions requiring said CEMS be installed, operated and maintained in accordance with 40 CFR Part 60, Appendix B.

It should be noted that Armstrong also requested that the monitoring requirements for Mn be removed due to low levels detected during testing. However, Armstrong did not propose to lower the Mn emission limit. And given that the permit limit (9.6 tons per year) is close to the major source level (10 tons per year), removing the Mn monitoring requirements is not appropriate.

CHANGES TO PERMIT R13-2864A

The following changes will be made to R13-2864A:

* The permit was put into the most recent boilerplate.

* Table 1.0 of the permit was updated to reflect the increased storage pile capacity and the actual design capacities of the spinner collection chambers and slag wool processing lines.

* Table 4.1.1.1 was updated to include the new emission limits.

* Table 4.1.1.2 was updated to include the new emission limits.

* Condition 4.1.3 was changed to remove specific limit injection rates since CEMs will ensure compliance with the SO_2 emission rates.

* Old condition 4.1.8 was removed since it becomes obsolete with the installation of SO_2 CEMS. All subsequent conditions in section 4.1 were renumbered.

* Old condition 4.1.9 (new condition 4.1.8) was changed to a flat 175,200 ton per year limit since the sulfur based limit becomes obsolete with the installation of SO_2 CEMS.

* The Manganese limit in old condition 4.1.13 (new condition 4.1.12) was changed from 9.5 tpy to 9.6 tpy as a result of the increased storage pile capacity.

* The lime injection requirement of Condition 4.2.4 was replaced with a requirement to install an SO_2 CEMS.

* New condition 4.2.6 was added. All subsequent conditions in section 4.2 were renumbered.

* Old Condition 4.2.6 (new Condition 4.2.7) was changed to require the usage of SO_2 CEMS instead of mass balance.

* Old Condition 4.2.9 was deleted since old Condition 4.1.8 was deleted.

* New Condition 4.2.10 was added.

* Condition 4.3.1.1 was changed to remove the requirement to stack test for CO and SO_2 since a CEMS will be installed.

* Old Condition 4.4.4 was deleted since the lime injection requirements of Condition 4.1.3 were removed. All subsequent conditions in section 4.4 were renumbered.

* Old Condition 4.4.10 was removed since old Conditions 4.1.8 and 4.2.9 were deleted.

RECOMMENDATION TO DIRECTOR

Information supplied in the application indicates that compliance with all applicable rules will be achieved. Therefore it is the recommendation of the writer that permit R13-2864B for the modification of a slag wool manufacturing facility near Millwood, Jackson County, be granted to Armstrong World Industries, Inc.

Steven R. Pursley, PE
Engineer

July 6, 2015