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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R14-0015L
Plant ID No.:	003-00012
Applicant:	Knauf Insulation, LLC
Facility Name:	Inwood
Location:	Inwood
NAICS Code:	327993
Application Type:	Class II Administrative Update
Received Date:	March 11, 2015
Engineer Assigned:	Edward S. Andrews, P.E.
Fee Amount:	$1,300.00
Date Received:	March 18, 2015
Completeness Date:	June 17, 2015
Due Date:	August 16
Newspaper:	*The Journal*
Applicant Ad Date:	March 10, 2015
UTMs:	Easting: 7.56.55 km Northing: 4,365.50.7 km Zone: 17
Description:	Line 1 is being converted to use Knauf's fiber forming process, which includes replacing the existing knock-out boxes with wet venturi style scrubbers.

DESCRIPTION OF PROCESS

Knauf Insulation, LLC's (Knauf's) Inwood, West Virginia Facility manufactures fiberglass roll and batt insulation. As part of this application, Knauf is proposing to replace the existing wool fiberglass fiberization technology on Line 1 with Knauf fiberization technology to be consistent with other similar Knauf facilities.

The Inwood facility can produce two insulation types, a bonded product or an unbonded product. Line 1 produces only bonded products. The facility receives raw materials that are mixed into batch and the batch is then melted to form glass. The molten glass is separated into streams by use of a forehearth and fiber is spun into strands by the means of fiberizers. In bonded

fiberglass production, the fine fibers are transferred to a fiber forming section where water, wax and ECOSE binder are added and are collected to form a blanket which is then cured in a three-zone oven. Upon exiting the curing oven, the blanket is cooled via a "cooling table". The cooled blanket is then cut to size in rolls and batts of insulation per customer demand and packaged for shipment off-site. The updated production process will operate more efficiently with the ECOSE Technology Binder, which will be used exclusively at the Inwood Facility beginning in May 2015.

The proposed changes to Line 1 include:

- Increasing the production of Line 1 from 8,000 lb/hr to 9,000 lb/hr. No physical changes are required for the melter to accommodate the change;
- Modifying the fiber forming section by replacing the existing fiberizers with new Knauf technology fiberizers. The fiberizers will be fired with natural gas, rated at 14 MMBtu/hr, total;
- Replacing the existing forming/collection control devices with new wet scrubbers;
- Minor changes to tanks storage, including removing existing tanks, installing three (3) new tanks and changing storage tank contents.

No changes are being proposed for the "cold end" (i.e., packaging and sizing) or for the batch preparation area (outside of throughput increases).

SITE INSPECTION

Mr. Joseph Kreger, compliance inspector, from the Eastern Panhandle Regional Office (EPRO) last inspected the facility on June 6, 2014. Mr. Kreger found the facility to be operating in compliance with all applicable regulations and permit conditions. A compliance status code 30 (facility found in be in compliance) was issued as a result of this inspection. No site visit of this facility is necessary for this Class II Administrative Update Request.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

In 2014, Knauf Insulation brought Guardian Fiberglass Inc., which includes the Inwood Facility. Since the purchase of the Inwood Facility, Knauf has been developing a plan and evaluating the potential emissions from switching the 1st Line over to Knauf's proprietary manufacturing process.

The following is Knauf' s projected potential to emit for the 1st Line:

Table #1 Projected Emissions from the 1st Line								
Process Description	CO		NO_x		$PM/PM_{10}/PM_{2.5}$		VOC	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Line 1 Raw Material Handling	--	--	--	--	0.22	0.98	--	--
Line 1 Melting & Refining	1.13	4.95	0.03	0.13	0.28	1.22	0.78	3.43
Line1st Line Forming & Collection	3.87	16.95	0.63	2.76	7.74	33.90	1.66	7.29
Line 1 Curing & Cooling	4.23	18.53	1.76	7.69	1.53	6.70	1.39	6.09
Line1 Facing, Sizing & Packaging	--	--	--	--	0.20	0.89	1.00	4.39
Totals for Line 1	9.23	40.43	2.42	10.58	9.97	43.69	4.83	21.2

The existing permit has the emission limits in terms of pound of pollutant per ton of glass pulled. The following table is a comparison of existing emission limits and project emissions from Line 1:

Table #2 Comparison of Existing Emission Limits to Project Emissions for the 1st Line									
Emission Point	Permitted CO lb/TPG	Projected CO lb/TPG	Permitted NO_x lb/TGP	Projected NO_x lb/TGP	Permitted PM/PM_{10} lb/TPG	Projected $PM/PM_{2.5}$ lb/TPG	Permitted VOC* lb/TPG	Projected VOC* lb/TPG	NH_3 lb/TPG
EP12	0.73	0.73	0.03	0.03	0.07	0.07	--	--	
EP13	5.28	0.86	0.32	0.14	3.47	1.72	2.86	0.37	4.64[1]
EP14	1.13	0.94	3.75	0.39	0.46	0.34		0.30	

Knauf is not requesting an increase of emissions limits. Instead, Knauf is requesting an increase in the permitted production rate and to switch to their forming and collection manufacturing process. The permitted emission limits were adjusted to reflex the increase in tons of glass pulled without an increase in the permitted mass rate of the pollutant for the forming & collection and Curing & Cooling sections.

Table #3 Emission Limits for the 1st Line						
Emission Point	CO lb/TPG	NO_x lb/TGP	PM lb/TPG	PM_{10} lb/TPG	VOC lb/TPG	NH_3 lb/TPG
EP12	0.73	0.03	0.06	0.06	--	--
EP13	3.60[1]	0.28	3.08	3.08	2.54[1]	4.64[1]
EP14		3.33	0.41	0.41		

1 – Total emission limit for both emission points.

The remainder of this section will cover the applicability of the Major Source Permitting Program in 45 CSR 14. The Inwood Facility is an existing major source with a valid PSD Permit. Counting this project as Line 1, this project has a potential to be significant for NO_x, VOC, PM, PM_{10}, and $PM_{2.5}$. This is based on Line 1 being permitted for an emission rate of these pollutants above the significance threshold level, which is 40 tpy for NO and VOC; 25 tpy of PM; 15 tpy of PM_{10}; and 10 tpy of $PM_{2.5}$.

Since this is an existing major source, Knauf is allowed to go-back 10 years to establish the baseline emissions for Line 1. Knauf selected operating years 2006 through 2007 for PM, PM_{10}, $PM_{2.5}$, and NO_x. 2009 to 2010 were selected for VOCs. The following table illustrates the Actual to Projected Actual Test for the Line 1 to determine if this represents a "significant emissions increase and significant net emissions increase.

Table #4 Actual to Projected Actual Test for Line 1						
Pollutant	Projected Actual Emission (tpy)	Baseline Emissions (tpy)	Emission Increase (tpy)	Significance Emission Rate (tpy)	Trigger Major Modification (yes/no)	Percent of SER (%)
CO	40.43	69.08	-28.65	100	No	0%
NO_x	10.58	16.70	-6.12	40	No	0%
PM	43.69	36.54	7.15	25	No	29%
PM_{10}	43.69	36.54	7.15	15	No	48%
$PM_{2.5}$	43.69	36.54	7.15	10	No	72%
VOC	21.20	14.20	7.00	40	No	18%

REGULATORY APPLICABILITY

The following state regulations apply.

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

The purpose of this rule is to control particulate matter from manufacturing processes and associated operations located in West Virginia. Line 1 is currently subject to this rule. The

original permitted emission limits for PM were established to ensure compliance with the Rule 7 allowable. Only the numerical limit in the permit is being reduced to match the permitted PM rate at the increased production rate.

This rule also establishes a visual emission standard for manufacturing processes, which is 20% opacity. The new wet scrubbers should reduce actual PM emissions when compared to the existing knock out boxes. The proposed sources with the improved controls at the forming section should meet all of the applicable requirements under Rule 7.

New Source Performance Standards

New Source Performance Standards (NSPS), located in 40 CFR 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except where expressly noted. The following is a summary of applicability and non-applicability determinations for NSPS regulations of relevance to the Inwood Facility.

NSPS Subparts K, Ka, and Kb

These subparts apply to storage tanks of certain sizes constructed, reconstructed, or modified during various time periods. Subpart K applies to storage tanks constructed, reconstructed, or modified prior to 1978, and Subpart Ka applies to those constructed, reconstructed, or modified prior to 1984. Both Subparts K and Ka apply to storage tanks with a capacity greater than 40,000 gallons. Subpart Kb applies to volatile organic liquid (VOL) storage tanks constructed, reconstructed, or modified after July 23, 1984 with a capacity equal to or greater than 75 m3 (~19,813 gallons). All of the tanks at the Inwood facility have a capacity of 19,000 gallons or less. As such, Subparts K, Ka, and Kb do not apply to the storage tanks at the Inwood facility.

NSPS Subpart PPP — Standards of Performance for Wool Fiberglass Insulation Manufacturing Plants

40 CFR 60 Subpart PPP regulates PM emissions from rotary spin wool fiberglass insulation manufacturing lines which were constructed, reconstructed, or modified after February 7, 1984. Pursuant to this subpart, no owner or operator shall allow the discharge of gases, which contain particulate matter in excess of 11.0 pounds per ton of glass pulled. Furthermore, if a wet scrubber control device is used to comply with the emission standard, the owner or operator shall calibrate, maintain, and operate monitoring devices which measure the pressure drop across each scrubber and the scrubbing liquid flow rate to each scrubber. Line 1 at the Inwood facility is currently subject to the requirements of Subpart PPP, and will continue to comply with the conditions of this subpart after the completion of the proposed project. A performance test after the completion of the changes will be required to demonstrate compliance with this subpart.

Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than NSPS developed for wool fiberglass manufacturing plants (Subpart PPP) and associated equipment (Subparts D-Dc and K-Kb), the applicability of a particular NSPS to the Inwood facility can be readily ascertained based on the industrial source category covered. All other NSPS are

categorically not applicable to wool fiberglass manufacturing plants.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

Part 63 NESHAP allowable emission limits are established on the basis of a maximum achievable control technology (MACT) determination for a particular major source. A HAP major source is defined as having potential emissions in excess of 25 tpy for total HAP and/or potential emissions in excess of 10 tpy for any individual HAP. As a result of recent process changes to ECOSE Technology binder, the Inwood facility will be an Area (minor) source of HAP since its potential emissions of HAP are less than the 10/25 major source thresholds. The potentially applicable NESHAP to the production line is Subpart NNN, which is discussed below.

40 CFR 63 Subpart NNN – National Emission Standards for Hazardous Air Pollutants for Wool Fiberglass Manufacturing

Pursuant to 40 CFR 63.1381, 40 CFR 63 Subpart NNN regulates HAP emissions from various emission units at new and existing major source wool fiberglass manufacturing facilities, including: glass melting furnaces, rotary spin wool fiberglass manufacturing lines producing a bonded wool fiberglass insulation product using a phenol/formaldehyde binder. Pursuant to 40 CFR 63.2, a "major source" is any source which emits or has the potential to emit 10 tpy or more of any HAP, or 25 tpy or more of any combination of HAPs. After the conversion to ECOSE Technology non-phenol/formaldehyde binder, the Inwood facility will no longer be an applicable source by definition (i.e., it will not use a phenol/formaldehyde binder). Therefore, the requirements of 40 CFR 63, Subpart NNN will not apply. Furthermore, the facility will also no longer be a major source of HAPs (i.e., facility-wide emissions will remain below 10/25 tpy).

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 facility elected to update Permit R14-0015J to reflex these changes. The facility has met the applicable requirements of this rule by publishing a Class I Legal Advertisement in *The Journal* on March 10, 2015, paid the administrative update fee, NSPS fee, and submitted a complete permit application.

45CSR30 – Requirements For Operating Permits

The facility is currently a major source with respect to the Title V permit program. Knauf filed a minor modification application in conjunction with this application to update their current Title V Permit to reflect these changes.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The proposed changes to the Inwood facility will change the status of the Inwood facility from a Major source of hazardous air pollutants (HAPs) to an area-source of HAPs. Thus, the potential to emit of combined hazardous air pollutants will be less than 25 tons per year and

single hazardous air pollutant (formaldehyde) 10 tons per year. Therefore, no further information was provided on the toxicology of the HAPs emitted at the Inwood facility.

AIR QUALITY IMPACTS ANALYSIS

This writer deemed that an air dispersion modeling study or analysis was not necessary, because the proposed physical changes to Line 1 do not represent a major modification of an existing major source as defined in 45CSR14.

MONITORING OF OPERATIONS

The only change in monitoring due to these changes is omitting the requirement to monitor the pressure of the spray header feeding the knock-out boxes. Other changes are to omit the air/fuel ratio for the fiberizers and forehearth. Guardian operated their fiberizers fuel rich, which creates additional CO emissions. Knauf's approach will actually reduce CO emissions by 29 tpy compared to baseline emissions. In doing so, Knauf proposed a 56% reduction in the CO limit in the permit.

Knauf will be required to conduct performance testing to verify compliance after these changes have been completed for Line 1. The current permit required this testing for NO_x, CO, VOC and PM once every 5 years. The permit will be adjusted to have this testing be conducted within 180 days after restarting Line 1.

CHANGES TO PERMIT R14-0015L

Permit R14-0015L included applicable provisions of Subpart NNN to Part 63 and emission limits for formaldehyde and phenol. The Subpart NNN citations were omitted from the permit and a requirement that prohibits the use of phenol-formaldehyde binder in the manufacturing process was added to Conditions 4.1.1. (Line 1) and 4.1.2. (Line 2). This restriction eliminates the need of having formaldehyde and phenol emission limits in the respective conditions.

For the monitoring device specified in Condition 4.1.3., language was added to allow Knauf 60 days to install and calibrate the devices for the new scrubbers after re-starting Line 1.

For testing, the test methods for Subpart NNN were omitted from Condition 4.3.1. since it is no longer applicable. Under Section 4.5., the requirement of submitting reports was simplified to just semiannual reports of exceedances for the wet scrubbers, which include both lines. The requirement to submit test reports is covered in Condition 3.3.1. which replaces Condition 4.5.1. Condition 4.5.3. is no longer applicable to Line 1 and 2, which pertains to experimental production runs for Subpart NNN affected units.

In Section 5.0, the proposed changes will eliminate the need for the resin, de-dusting oil, and wax storage tanks, which eliminates the need for the requirements covering these sources.

The new resin is a non-VOC resin. Because of the switch to non-phenol/formaldehyde resin, the facility is no longer subject to 45 CSR 27. The leak detection repair requirement of 45 CSR §27.10.3 was omitted from the permit.

The permitted boiler and water heater has been removed from the facility. Thus, Condition 5.1.6 was updated and Condition 5.1.7. was omitted to reflect these changes.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application and the conditions set forth in the permit indicates the facility should meet all applicable state rules and federal regulations when operated. Therefore, the writer recommends that Knauf Insulation, LLC, should be granted a Rule 13 Administrative Update for their proposed conversion of Line 1 at their Inwood facility located in Inwood, WV.

Edward S. Andrews, P.E.
Engineer

Date: July 21, 2015