Graphic Packaging INTERNATIONAL

1500 N Pitcher St
Kalamazoo, MI 49009

September 28, 2022

Rex Lane
District Supervisor
Michigan Department of the Environment, Great Lakes, and Energy (EGLE)
Air Quality Division
Kalamazoo District
7953 Adobe Road
Kalamazoo, MI 49009-5026

RE: Graphic Packaging International, LLC (SRN B1678)
Response to Violation Notice dated September 8, 2022

Dear Mr. Lane,

On behalf of Graphic Packaging International, LLC ("GPI"), this letter responds to EGLE's Violation Notice dated September 8, 2022 ("VN"). The alleged violations included in the VN are repeated below for convenience.

EUBOILER#9

EGLE Comments

Records showed 37 hours of non-compliance with 13.6 pph NOx limit and two non-compliance periods for 0.06 lb/MMBTU NOx limit (24-hour average) during period of August 20, 2022 to August 21, 2022. During this time period, reported emissions ranged from 14.2 pph to 26.6 pph and 0.074 lb/MMBTU to 0.126 MMBTU.
Records also showed non-compliance with 0.06 lb/MMBTU NOx limit (24-hour average) for July 15, 2021. Records show that on July 15, 2021, the 24-hour average lb/MMBTU for NOx was 0.08 lb/MMBTU. The July 15, 2021 exceedance was also not reported in an Excess Emissions Report or an ROP Certification Report.

GPI Response

First, the malfunction at Boiler 9 on August 20, 2022, was addressed in the notification letter (per Rule 912) submitted to EGLE on August 31, 2022 (see attached). As we explained in our letter, the higher emission rates were caused by an equipment malfunction. Once this problem was identified, GPI immediately implemented corrective actions to complete repairs, and the work was completed on August 21, 2022, around 12:30 PM. This resolved the issue.

To prevent a reoccurrence, GPI is performing a full evaluation of its alarm system on the boiler to better manage alarms and ensure that alarms associated with environmental compliance are given the highest priority. This evaluation was completed by September 27, 2022. Additionally, an immediate change was implemented to the monitoring of the CEM system to ensure alarms are addressed more promptly. This includes input of the daily averages calculated by the CEM into a daily report that will immediately flag an exceedance. GPI is engaging in a multi-phase plan to further address this issue. First, the NOx ppm is now on the boiler operator computer screens. As long as the oxygen is constant, it is an excellent indicator. In addition, the FGR fan which was the cause of the exceedance now has an alarm that will sound and give visual indication of its inoperable status. The rest of the critical alarms will be installed during the next 6 months or less to provide additional information to the operators. Additional GPI operator training on the alarms will be completed in the first quarter of 2023. In addition, text messages will be sent to management staff as the NOx emissions approach the limits. When these updates are complete, GPI will review and update the Malfunction Abatement Plan, if necessary.

Secondly, the alleged exceedance of the NOx limit on July 15, 2021, was related to startup of Boiler 9. The boiler started during the hour of 10:00 PM on July 15, 2021, but the data cited for July 15, 2021, included only two hours of data flagged by the CEMS system as startup hours. The DAHS automatically generates Excess Emission Reports ("EER") and the DAHS did flag the average from July 15, 2021 as excess emissions. GPI previously reviewed the data when preparing the 3rd quarter EER report and determined that it was not a true exceedance.

The DAHS looks only at each calendar day for the daily average and averages only the hours of operation with valid CEMs readings. Appendix 1.7 of the ROP states the following:

> *The permittee may use the following calculations and methods or an alternative method, as approved by the district supervisor, for determining compliance with the emission limits the as described for EUBOILER#9.*
>
> 1. *The permittee shall calculate the 24-hour average pounds of NOx emitted per million BTUs of heat input for EUBOILER#9 by dividing the total of the hourly lb/MMBTU by 24 hours per day*

When preparing the EER, GPI reviewed the hourly data associated with this exceedance and recalculated the lb/MMBtu utilizing the methodology described in the ROP as follows:

$$(0.077 + 0.084)/24 = 0.0067 \text{ lb/MMBTU}$$

For the reasons stated above, GPI does not believe the 24-hour average emission limit was exceeded on July 15, 2021. Accordingly, GPI did not believe there was a basis to

include an exceedance in the relevant quarterly EER or the semi-annual ROP deviation report.

EUBOILER#10

EGLE Comments

Stack test report from testing that occurred on June 8, 2022, showed non-compliance with 0.004 lb/MMBtu emission limit for PM10/PM2.5. Based on the test report, the PM10/2.5 emission rate for EUBOILER#10 was 0.0046 lb/MMBTU.

GPI Response

In August 2022, GPI notified EGLE of the results of the particulate matter stack test that occurred on June 8, 2022. This letter questioned the reported test results because natural gas-fired boilers have low particulate matter emissions and GPI received a 0.004 lb/MMBtu emissions guarantee for particulate matter from the boiler manufacturer, Rentech. Subsequently, GPI conducted significant research and investigation of the underlying equipment operations, the emissions test methods, the execution of the testing in the field. The GPI investigation included:

- Discussions with the boiler manufacturer (Rentech) and GPI's own boiler subject matter experts to identify potential sources of particulate matter in the exhaust or reasons for elevated emission rates.
- A boiler inspection performed by a third-party expert to identify any leaks or foreign material that could have contributed to additional particulate matter in the exhaust.
- Analysis by stack testing experts to determine if testing protocols or in-field procedures could have contributed to results that appear higher than expected.

In addition to working with Montrose and RWDI, GPI also consulted Mr. Lee Carlson, senior project leader for stack testing from National Council for Air and Stream Improvement (NCASI), a resource and research group for the pulp and paper industry. He stated that one explanation for the abnormally high results in June was the low flue gas sample volumes collected, which yielded highly variable results for both filterable and condensable particulate matter samples. He also concluded that unusually high masses for these 1-hour runs seems to point to a potential sample contamination issue. However, there was not enough information in the test report to determine residue concentration in the acetone and hexane field blanks collected. NCASI recommends a longer sampling runtime (4 hours or 8 hours) for particulate matter stack testing to eliminate effects from the train blank bias, which is a significant contributor in measured values.

After reviewing operating data and test data with these experts, GPI was advised to lengthen the test run times to ensure that representative sampling occurs. GPI was advised that it is unusual to perform one-hour test runs on natural gas-fired boilers when using USEPA Method 202 due to the relatively low emissions being measured and the nature of the test method itself, which uses impingers to capture and quantify condensable particulate matter as a simulation of what may occur in the atmosphere.

GPI was further advised that the difference between passing and failing the June test was only 2 milligrams of material, which is a very small amount. Thus, the GPI investigation concluded that a longer sampling period is required for a reliable compliance stack test.

As a result, on August 22-23, 2022, GPI conducted an engineering test on Boiler 10 with two 4-hour run times for and a single 2-hour run. The attached results in Table 2 summarize the measured PM10 emissions from Boiler 10 at 0.0022 lb/MMBtu, which is well below the permit limit of 0.004 lb/MMBtu and more consistent with the expectations and the performance guarantee. GPI has scheduled an official compliance test for the week of October 17, with a minimum sample time of two hours for each test run. GPI has also offered to test both boilers with the longer test runs.

Therefore, GPI does not believe that the testing completed in June 2022 for $PM_{10}/PM_{2.5}$ emissions was representative of both the operation and emissions, due to both shorter sampling time periods and potential sample contamination. We are confident that if we use longer sampling times and avoid sampling errors/contamination, Boiler 10 test results will demonstrate compliance. GPI notified EGLE in a letter of the retest planned for the week of October 17

EUK1MACHINE

EGLE Comments

Records were insufficient to demonstrate compliance with this material usage limitation.

GPI Response

These records for EUK1MACHINE have been maintained onsite, and GPI inadvertently left these records off of the correspondence with EGLE after the air inspection because of the large number of records requested. Please note these similar coating records have been provided to EGLE in the past.
GPI has been operating in compliance with 0.5 pounds VOC per gallon (minus water) limit for all coatings used. In fact, the actual value for coatings used in EUK1MACHINEare approximately 1% or less of the limit.

See Table 3 for more detail.

EUK3MACHINE

EGLE Comments

Records were insufficient to demonstrate compliance with this material usage limitation.

GPI Response

Similar to the response for EUK1MACHINE, these records for EUK3MACHINE have been maintained onsite, and were inadvertently left out of the correspondence with EGLE after the air inspection because of the large number of records requested. Please note these similar coating records have been provided to EGLE in the past.

GPI has been operating in compliance with 0.5 pounds VOC per gallon (minus water) limit for all coatings. The actual value for coatings used in Paper Machine 3 are approximately 10% or less of the limit.

See Table 4 for more detail.

EUCALENDARHEAT1

EGLE Comments

Facility installed EUCALENDARHEAT1 with a maximum heat capacity of 5.46 MMBtu/hr, which exceeds limit of 2.8 MMBtu/hr.

GPI Response

GPI submitted a permit-to-install application to EGLE on August 18, 2022, to address and correct this issue. It is not surprising for a project of this size and complexity to have some installed equipment that deviates slightly from the specifications in the detailed air permit. As EGLE is aware, the permit application must be filed even before equipment is ordered, because of the need to have an issued permit before any installation.

It is important to note that EUCALENDARHEAT1 is one of nine separate emission units listed as part of FGK2MACHINE at Special Condition VI.1 in PTI #133-19A. Further, while the actual heat input capacity for EUCALENDARHEAT1 was greater than the associated 2.8 MMBTU/hr capacity listed in Special Condition VI.1, the actual heat input capacities for each of the other eight emission units are less than the permitted capacities. When summing the one higher capacity with the eight lower ones, the overall installed capacity is actually lower than what was permitted.

In the pending PTI application, GPI has requested an update to the listed heat input capacities for the installed dryers for FGK2MACHINE in Permit No. PTI 133-19A. Further, GPI is not requesting an increase to the combined NOx emissions limit for FGK2MACHINE because the change for EUCALENDARHEAT1 will not result in any emissions increase from the K2 machine.

EUK2COOLINGTW1

EGLE Comments

Facility installed three stacks for EUCOOLINGTW1 with a maximum exhaust diameter over 144-inch limit.

GPI Response

GPI submitted the permit application to EGLE on August 18, 2022, to address and correct this issue. Please be aware that while this unit as installed has a larger stack diameter it is significantly taller than the permitted minimum height. The actual stack diameter is 144 inches at 80 feet which is above the permitted minimum height of 66

feet. The stack then flairs to the larger exit diameter of 160 inches, which is customary for cooling tower stacks.

If you have any questions or require additional information, please contact me via email Tom.Olstad@graphicpkg.com.

Sincerely,

Tom Olstad

Graphic Packaging International, LLC

By email and FedEx

Copy: Monica Brothers – EGLE (By email only)
Steven Smock – GPI (By email only)
Susan L. Kuieck, PE – Fishbeck (By email only)
Jenine Camilleri, Enforcement Unit Supervisor at EGLE (By FedEx),
P.O. Box 30260, Lansing, Michigan 48909-7760.

Table 1 Boiler #9 NOx emissions July 15 & 16, 2021

	NOx lb/mmBtu	NOX lb/hr	NOx lb/mmBtu	NOx lb/mmBtu
interval	hourly	hourly	24-hours averaged	Daily Sum divided by 24
7/15/2021 0:00				
7/15/2021 1:00				
7/15/2021 2:00				
7/15/2021 3:00				
7/15/2021 4:00				
7/15/2021 5:00				
7/15/2021 6:00				
7/15/2021 7:00				
7/15/2021 8:00				
7/15/2021 9:00				
7/15/2021 10:00				
7/15/2021 11:00				
7/15/2021 12:00				
7/15/2021 13:00				
7/15/2021 14:00				
7/15/2021 15:00				
7/15/2021 16:00				
7/15/2021 17:00				
7/15/2021 18:00				
7/15/2021 19:00				
7/15/2021 20:00				
7/15/2021 21:00				
7/15/2021 22:00	0.077	2.4		
7/15/2021 23:00	0.084	2.9		0.0067
7/16/2021 0:00	0.03	1		
7/16/2021 1:00	0.024	0.7		
7/16/2021 2:00	0.021	0.6		
7/16/2021 3:00	0.028	0.9		
7/16/2021 4:00	0.027	0.8		
7/16/2021 5:00	0.028	0.9		
7/16/2021 6:00	0.028	1.3		
7/16/2021 7:00	0.025	0.9		
7/16/2021 8:00	0.025	0.9		
7/16/2021 9:00	0.027	1.2		
7/16/2021 10:00	0.029	1.7		
7/16/2021 11:00	0.036	1.6		

	NOx lb/mmBtu	NOX lb/hr	NOx lb/mmBtu	NOx lb/mmBtu
interval	hourly	hourly	24-hours averaged	Daily Sum divided by 24
7/16/2021 12:00	0.031	1.6		
7/16/2021 13:00	0.031	1.6		
7/16/2021 14:00	0.029	1.3		
7/16/2021 15:00	0.027	1.1		
7/16/2021 16:00	0.027	1.1		
7/16/2021 17:00	0.027	1.7		
7/16/2021 18:00	0.027	2.5		
7/16/2021 19:00	0.027	2.6		
7/16/2021 20:00	0.028	2.3		
7/16/2021 21:00	0.029	2.5	0.032	
7/16/2021 22:00	0.026	2.6	0.030	
7/16/2021 23:00	0.029	2.4	0.028	

Table 2 Boiler #10 August 22 & 23, 2022 Engineering Study

Company		GPI		
Source		Boiler 10		
Date	22-Aug-22	23-Aug-22	23-Aug-22	
Test Number	Test 1	Test 2	Test 3	Average
Stack Information				
Flow ft3 (Actual)	78,205	81,017	80,299	79,840
Flow ft3 (Standard Wet)	54,893	56,839	56,354	56,029
Flow ft3 (Standard Dry)	45,271	47,106	46,724	46,367
Flow m3 (Standard Dry)	1,282	1,334	1,323	1,313
Percent Moisture	17.5	17.1	17.1	17.2
Pressure Ps ("Hg)	29.16	29.14	29.14	29.14
Average Stack Temperature Ts (F)	273.1	272.9	272.7	272.9
Molecular Weight of Stack Gas dry (Md)	29.84	29.77	29.79	29.8
Molecular Weight of Stack Gas wet (Ms)	27.77	27.76	27.78	27.8
Stack Gas Specific Gravity (Gs)	1.0	1.0	1.0	1.0
Water Vapor Volume Fraction	0.2	0.2	0.2	0.2
Average Stack Velocity Vs (ft/sec)	62.7	64.9	64.4	64.0
Area of Stack (ft2)	20.8	20.8	20.8	20.8
Percent Carbon Dioxide	10.6	10.1	10.3	10.3
Percent Oxygen	3.9	3.8	3.7	3.8
Percent Carbon Monoxide	0.0	0.0	0.0	0.0
Percent Excess Air at Test Location	20.7	19.8	19.5	20.0
Meter Info				
Isokinetic Variation I	100.8	99.0	98.3	99.4
Meter Pressure Pm ("Hg)	29.3	29.4	29.4	29.4
Meter Temperature Tm (F)	92.8	89.7	96.7	93.0
Measured Sample Volume Vm	174.66	113.80	226.95	171.80
Sample Volume (Vm St ft3)	164.10	107.76	212.23	161.36
Sample Volume (Vm St m3)	4.65	3.05	6.01	4.57
Total Weight of Sampled Gas (m g lbs) wet	14.28	9.33	18.38	13.99
Total Weight of Sampled Gas (m g lbs) dry	12.66	8.29	16.34	12.43
Gas Density Ps wet	0.07	0.07	0.07	0.07
Gas Density Ps dry	0.08	0.08	0.08	0.08
Condensate Volume	34.88	22.26	43.75	33.63
Nozzle Size	0.00031	0.00040	0.00040	0.0004
Impinger Gain	712.0	445.2	894.2	683.8
Silica Gel Gain	27.7	27.0	33.6	29.4
Total Gas Sampled (vm st ft3 + condensate volume)	198.97	130.02	255.98	194.99
Particulate Results				
Nozzle/Probe/Filter Weight (mg)	13.1	4.3	4.8	7.4
Organic Condensible Particulate (mg)	3.1	1.9	1.7	2.2
Inorganic Condensible Particulate (mg)	7.5	6.7	6.8	7.0
Condensible Blank Correction (mg)	2.0	2.0	2.0	2.0
Total Particulate (mg)	21.7	10.9	11.3	14.6
lb/hr	0.79	0.63	0.33	0.59
gr/dscf	0.002	0.002	0.001	0.001
lb/MMBtu	0.0030	0.0024	0.0012	0.0022
Process Conditions				
Natural Gas Consumption (KSCFH)	260.1	261.2	261.2	260.8
Heat Input (MMBTU)	265.3	266.4	266.4	266.0
Steam Load (lb/hr)	211,615	212,179	211,435	211,743

Table 3 EUK1MACHINE VOC lb/gal minus water

Total VOC Emissions - K1 Machine Report for month of: **Aug-22**

Permit Number: MI-ROP-B1678-2015
Emission Group: EGK1MACHINE

Permit Conditions/Limitations:

Coater VOC emission rate: </ =0.5 lb/gal of coating, minus water, as applied

Curtain Coating

Ingred.	lbs./batch	Density lb/gal	gals/batch	VOC, wt%	Water, wt%	VOCs, lbs.	TOTALS Water, lbs.
water	921	8.34	110.43	0.00000%	100.00%	0.000	921.00
KAOMAX Clay	7,008	14.20	493.52	0.00000%	34.00%	0.000	2,382.72
Zenix DZ1040	5.7	10.19	0.56	0.00000%	65.00%	0.000	3.71
TiO2	0	15.02	0.00	0.00000%	28.50%	0.000	0.00
Chupa 763 (Surfactant)	15.1	9.17	2.90	4.00000%	64.00%	0.604	9.66
DOW 2981	42.8	10.01	4.28	0.12000%	90.00%	0.051	38.52
KZCote	0.0	13.09	0.00	0.00000%	57.00%	0.000	0.00
EXP 6346	2,072	8.84	234.38	0.02280%	51.00%	0.472	1,056.72
	10064.6		846.07			1.128	4,412.33
							529.06

TOTAL VOC LBS./BATCH	1.13
BATCH SIZE, GALS.	846.07
WATER/BATCH, GALS.	529.06
Coating VOC, lbs/gal, minus water	0.004

Bar Coating

Ingred.	lbs./batch	Density lb/gal	gals/batch	VOC, wt%	Water, wt%	VOCs, lbs.	TOTALS Water, lbs.
Water	302	14.20	21.27				
KAOMAX Clay	7,278	14.20	512.54	0.00000%	33.50%	0.000	2438.13
Zenix DZ1040	5	10.19	0.49	0.00000%	65.00%	0.000	3.25
Solenis Advantage 1529	15	8.17	1.84	0.00000%	0.00%	0.000	0.00
Sodium alginate	0	7.34	0.00	0.00190%	0.00%	0.000	0.00
EXP 6346	2,420	8.84	273.76	0.02280%	50.00%	0.552	1210.00
	9,718		788.62			0.55	3651.38
							437.82

TOTAL VOC LBS./BATCH	0.55
BATCH SIZE, GALS.	788
WATER/BATCH, GALS.	437.82
Coating VOC, lbs/gal, minus water	0.002

Top Curtain Coating

Ingred.	lbs./batch	Density lb/gal	gals/batch	VOC, wt%	Water, wt%	VOCs, lbs.	TOTALS Water, lbs.
water	923	8.34	110.67	0.00000%	100.00%	0.000	923.00
KAOMAX Clay	6,481	14.20	456.41	0.00000%	34.00%	0.000	2,203.54
Zenix DZ1040	5.8	10.19	0.57	0.00000%	65.00%	0.000	3.77
TiO2	670	15.02	44.61	0.00000%	28.50%	0.000	190.95
Chupa 763 (Surfactant)	24.1	9.17	2.90	4.00000%	64.00%	0.964	15.42
DOW 2981	175.0	10.01	17.49	0.12000%	90.00%	0.210	157.50
KZCote	0.0	13.09	0.00	0.00000%	57.00%	0.000	0.00
EXP 6346	2,026	8.84	229.18	0.02280%	50.00%	0.462	1,013.00
	10304.9		861.82			1.636	4,507.18
							540.43

TOTAL VOC LBS./BATCH	1.64
BATCH SIZE, GALS.	861.82
WATER/BATCH, GALS.	540.43
Coating VOC, lbs/gal, minus water	0.005

Table 4 EUK3MACHINE VOC lb/gal minus water

Total VOC Emissions - K3 Machine Report for month of: **Aug-22**

Permit Number: MI-ROP-B1678-2015

Emission Group: EGK3MACHINE

Permit Conditions/Limitations:

Coater VOC emission rate: </ =0.5 lb/gal of coating, minus water, as applied

A/K Coating

							TOTALS
Ingred.	lbs./batch	Density lb/gal	gals/batch	VOC, wt%	Water, wt%	VOCs, lbs.	Water, lbs.
water	2,046	8.34	245.36	0.00000%	100.00%	0.000	2,046.33
KAOMAX Clay	2,142	14.20	150.87	0.00000%	34.00%	0.000	728.40
Busperse 275	4.0	10.09	0.40	0.00000%	81.00%	0.000	3.24
TiO2	626	15.02	41.68	0.00000%	28.50%	0.000	178.41
Defoamer 4418	2.0	8.34	0.24	0.00000%	0.006%	0.000	0.00
NaAlginate S-160	6.5	9.26	0.70	0.00190%	0.00%	0.000	0.00
KZCote	26.0	13.09	1.99	0.00000%	57.00%	0.000	14.82
Polyco 3103	935	8.84	105.76	0.38900%	51.00%	3.637	476.85
	5788.17		**547.00**			**3.637**	3448.04
							413.43

Updated by Tim S. 9/8/22

TOTAL VOC LBS./BATCH	3.64
BATCH SIZE, GALS.	547.00
WATER/BATCH, GALS.	413.43
Coating VOC, lbs/gal, minus water	0.027

Bar Coating

							TOTALS
Ingred.	lbs./batch	Density lb/gal	gals/batch	VOC, wt%	Water, wt%	VOCs, lbs.	Water, lbs.
water	398	8.34	47.67	0.00000%	100.00%	0.000	397.55
KAOMAX Clay	3,658	14.20	257.62	0.00000%	34.00%	0.000	1,243.81
Busperse 275	5.1	10.09	0.51	0.00000%	81.00%	0.000	4.13
Bubreak 4418	3.5	8.34	0.42	0.00000%	0.006%	0.000	0.00
NaAlginate S-160	2.0	7.34	0.27	0.00190%	0.000%	0.000	0.00
Polyco 3103	1,019	8.84	115.29	0.38900%	50.00%	3.965	509.60
	5,086		**421.78**			**3.965**	2155.09
							258.40

Updated by Tim S.9/8/22

TOTAL VOC LBS./BATCH	3.96
BATCH SIZE, GALS.	422
WATER/BATCH, GALS.	258.40
Coating VOC, lbs/gal, minus water	0.024