TEXAS GULF TERMINALS INC
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VIA Email: Magee.Melanie@epa.gov

June 26, 2019

Ms. Melanie Magee
US EPA Region 6
1445 Ross Avenue
Suite 1200
Dallas, TX 75202

RE: TGT DWP Application Emissions Update

Dear Ms. Magee:

Texas Gulf Terminals LLC (TGT) submitted several air permit applications as part of the TGT project to obtain a license for the operation of a Deepwater Port (DWP) in Federal waters of the U.S. Gulf of Mexico. Since the original submittal, TGT has worked with EPA to refine the scope of the potential emissions from the proposed single point mooring (SPM) buoy system. Through these efforts, TGT has gained additional information on the composition of crude that the SPM buoy system will handle. The additional information provides a more complete picture of the air emissions hazardous air pollutants (HAP) composition from the vessel loading operations. TGT is providing this submittal to update the estimates of potential HAP emissions from the proposed SPM buoy system.

This HAP emissions provided in this submittal will supersede the HAP emissions information provided in the following DWP application submittals:

- NSR Air Permit Application – Submitted July, 2018
- 112(g) Case-By-Case MACT Application – Submitted July, 2018
- Title V Application – Submitted July, 2018
- Environmental Alternatives Analysis – Submitted July, 2018

It should be noted that this update does not affect the following submittals, which originally incorporated the updated HAP speciation information when submitted.

- Crude Assay HAP Speciation Analysis – Submitted April 18, 2019
- Dispersion Modeling Addendum – Overwater Health Effects – Submitted May 13, 2019
- Control Cost Analysis – Submitted May 14, 2019

The following section provides details on the changes and the corresponding effects to the previous submittals.

What is TGT Updating?

TGT is updating the potential emissions estimates of HAP emissions from the proposed SPM buoy system. At the time of the original DWP application submittal, the best information available to TGT suggested the worst-case percentage of HAP in the vessel loading emissions stream was 1.93%. TGT has since conducted speciation tests on representative crude samples that indicate a more representative worst-case HAP composition is 5% of the VOC emissions.

TGT arrived at this revised estimate based on the aggregate of profiles for crude oil and laboratory analytical data of site-specific crude samples. TGT has provided a summary of this information in Table 1 below. The individual composition profiles are provided in the attachment to this response.

Table 1 – HAP Speciation Summary

CAS Number	Component Name	Maximum Content		Average Content		Maximum Annual Emissions
		(Liquid wt%)	(Vapor wt%)	(Liquid wt%)	(Vapor wt%)	(tpy)
110-54-3	hexane	3.1400%	3.9012%	1.0887%	2.4186%	421.6
71-43-2	Benzene	0.7557%	0.3140%	0.3237%	0.1658%	33.94
540-84-1	2,2,4-trimethylpentane	0.0100%	0.0042%	0.0035%	0.0026%	0.449
108-88-3	toluene	2.7443%	0.4500%	1.0077%	0.1917%	48.63
100-41-4	ethylbenzene	0.2130%	0.0181%	0.0892%	0.0139%	1.952
108-38-3	m-xylene	0.6390%	0.0426%	0.5327%	0.0375%	4.605
106-42-3	p-xylene	0.2260%	0.0170%	0.1940%	0.0141%	1.840
95-47-6	o-xylene	0.2810%	0.0153%	0.2537%	0.0140%	1.650
103-65-1	propylbenzene	0.1030%	0.0033%	0.0883%	0.0028%	0.360
13732-80-4	1-methyl-3,4-diethylbenzene	0.2300%	0.0007%	0.2300%	0.0007%	0.072
300-57-2	2-propenylbenzene	0.0070%	0.0002%	0.0070%	0.0002%	0.022
95-63-6	1,2,4-trimethylbenzene	0.3570%	0.0073%	0.1508%	0.0057%	0.788
98-06-6	tert-butylbenzene	0.1020%	0.0022%	0.0517%	0.0011%	0.239
538-93-2	isobutylbenzene	0.0370%	0.0006%	0.0313%	0.0005%	0.069
135-98-8	sec-butylbenzene	0.0150%	0.0003%	0.0110%	0.0002%	0.029
526-73-8	1,2,3-trimethylbenzene	0.1070%	0.0016%	0.1020%	0.0015%	0.178
98-82-8	cumene	0.0060%	0.0003%	0.0012%	0.0002%	0.027
14411-75-7	1,3-dimethyl-2-isopropylbenzene	0.0910%	0.0004%	0.0910%	0.0004%	0.039
4132-72-3	1,4-dimethyl-2-isopropylbenzene	0.0390%	0.0002%	0.0390%	0.0002%	0.019
4132-77-8	1,2-dimethyl-4-isopropylbenzene	0.0150%	0.0001%	0.0150%	0.0001%	0.006
25340-17-4	diethylbenzene	0.0040%	0.0000%	0.0030%	0.0000%	0.003
61827-87-0	1,2,4-trimethyl-3-ethylbenzene	0.1860%	0.0003%	0.1730%	0.0003%	0.031
61827-86-9	1,2,3-trimethyl-4-ethylbenzene	0.0890%	0.0001%	0.0825%	0.0001%	0.012
3982-67-0	1,3,5-trimethyl-2-ethylbenzene	0.0140%	0.00004%	0.0110%	0.00003%	0.004
17059-44-8	1,2-dimethyl-3-propylbenzene	0.1040%	0.0002%	0.1000%	0.0002%	0.021
3982-66-9	1,2-dimethyl-4-propylbenzene	0.0370%	0.0001%	0.0315%	0.0001%	0.008
17059-45-9	1,3-dimethyl-2-propylbenzene	0.0170%	0.0000%	0.0140%	0.0000%	0.004
4701-36-4	(1-ethyl-1-propenyl)benzene	0.0090%	0.00003%	0.0090%	0.00003%	0.003
1330-20-7	Xylenes (total)	2.2610%	0.1304%	0.3658%	0.0710%	14.09
92-52-4	Biphenyl	0.4500%	0.00008%	0.0775%	0.00004%	0.008
91-20-3	Naphthalene	0.1200%	0.0001%	0.0388%	0.0001%	0.009
106-99-0	1,3-Butadiene	0.0100%	0.1767%	0.0038%	0.1738%	19.09
	Total	12.42%	5.09%	5.22%	3.12%	

The table above shows the maximum and average content of each HAP in the composition profiles that TGT reviewed. As shown, the worst-case aggregate vapor wt% of HAP when combining the worst-case individual HAP compositions is 5.09 wt% and the average vapor wt% of HAP is 3.12%. Note that because the average in Table 1 only considers profiles in which a specific component was seen in the testing (e.g., if the % was 0, then that profile was not counted in the average), the average value in Table 1 is higher than the average of each profile's total HAP wt% combined. For comparison, the average of each profile's total HAP wt% is 1.91%, consistent with the original assumption for HAP%.

When estimating long-term emission rates such as annual emissions, use of an average value is an appropriate approach as the composition of crude is expected to fluctuate throughout the year. However, to maintain a conservative estimate of the potential HAP emissions, TGT is revising the estimated HAP composition to 5 wt% of the VOC emissions. This assumption is conservative for the annual emissions estimate because it is higher than the average value HAP concentration for all profiles (3.12 wt%) and is higher than any single crude profile analyzed (4.93 wt% - see table in Attachment A). TGT is updating the short-term emissions to utilize an estimated HAP composition of 5.09 wt%. TGT is updating the potential emissions estimates of HAP to reflect this analysis. Note that in this update, TGT is not updating emissions estimates for any criteria pollutants. The revised potential to emit (PTE) for HAPs from the proposed SPM buoy system is provided in Table 2 below.

Table 2 – Potential HAP Emissions Summary

Emission Unit ID	VOC Emissions		Total HAP Emissions[1]		Maximum Individual HAP[2]	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Marine Loading	7,774	10,808	396	540.4	303.3	421.6
SPM Fugitives	0.05	0.22	0.0025	0.011	0.0020	0.0004

[1] Total HAP emissions estimated assuming 5% total HAP for long-term emissions and 5.09% for short-term emissions.

[2] Maximum individual HAP is hexane

The HAP updates also affect the alternatives analysis for comparison of the cumulative potential emissions from the proposed SPM buoy system and lightering. Table 3 below shows the comparison of HAP emissions from the two different activities upon updating the HAP content to 5 wt%.

Table 3 - Alternative Analysis HAP Emissions Summary

Emission Unit ID	Total HAP Emissions[1]
	(tpy)
SPM Buoy System	541.4
Lightering	661.6
Emissions Reductions from SPM	**120.2**

[1]Total HAP emissions include those from non-stationary sources that are required for each process (i.e., tug boats, propulsion, etc).

If you have any questions or comments about the information presented in this letter, please do not hesitate to call me at (832) 203-6493.

Sincerely,

Texas Gulf Terminals LLC

Denise Rogers

Denise Rogers
Regulatory Compliance Manager – North America

Attachment

cc: Mr. Jeff Robinson (EPA Region 6)
Mr. Brian Burdorf (Trinity Consultants)
Mr. AJ Hansborough (Trinity Consultants)

TEXAS GULF TERMINALS INC
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ATTACHMENT 1 - DETAILED CRUDE SPECIATION PROFILES

Table A1 - TGTI Crude Assay - HAP Speciation Analysis

CAS	Component	Trafigura Crude 1 (API Grav 41.6) (RVP 8.8)		Trafigura Crude 2 (API Grav 60.88) (RVP 8.0)		Trafigura Crude 3 (API Grav 42.89) (RVP 6.7)		Trafigura Crude 4 (API Grav 40.60) (RVP 7.7)	
Number	Name	(Liquid wt%)	(Vapor wt%)*	(Liquid wt%)	(Vapor wt%)*	(Liquid wt%)	(Vapor wt%)*	(Liquid wt%)	(Vapor wt%)*
110-54-3	hexane	--	--	--	--	--	--	--	--
71-43-2	Benzene	0.216%	0.099%	0.649%	0.237%	0.756%	0.314%	0.150%	0.061%
540-84-1	2,2,4-trimethylpentane	--	--	--	--	--	--	--	--
108-88-3	toluene	0.613%	0.101%	2.744%	0.361%	0.315%	0.047%	1.370%	0.200%
100-41-4	ethylbenzene	--	--	--	--	--	--	--	--
108-38-3	m-xylene	--	--	--	--	--	--	--	--
106-42-3	p-xylene	--	--	--	--	--	--	--	--
95-47-6	o-xylene	--	--	--	--	--	--	--	--
103-65-1	propylbenzene	--	--	--	--	--	--	--	--
13732-80-4	1-methyl-3,4-diethylbenzene	--	--	--	--	--	--	--	--
300-57-2	2-propenylbenzene	--	--	--	--	--	--	--	--
95-63-6	1,2,4-trimethylbenzene	--	--	--	--	--	--	--	--
98-06-6	tert-butylbenzene	--	--	--	--	--	--	--	--
538-93-2	isobutylbenzene	--	--	--	--	--	--	--	--
135-98-8	sec-butylbenzene	--	--	--	--	--	--	--	--
526-73-8	1,2,3-trimethylbenzene	--	--	--	--	--	--	--	--
98-82-8	cumene	--	--	--	--	--	--	--	--
14411-75-7	1,3-dimethyl-2-isopropylbenzene	--	--	--	--	--	--	--	--
4132-72-3	1,4-dimethyl-2-isopropylbenzene	--	--	--	--	--	--	--	--
4132-77-8	1,2-dimethyl-4-isopropylbenzene	--	--	--	--	--	--	--	--
25340-17-4	diethylbenzene	--	--	--	--	--	--	--	--
61827-87-0	1,2,4-trimethyl-3-ethylbenzene	--	--	--	--	--	--	--	--
61827-86-9	1,2,3-trimethyl-4-ethylbenzene	--	--	--	--	--	--	--	--
3982-67-0	1,3,5-trimethyl-2-ethylbenzene	--	--	--	--	--	--	--	--
17059-44-8	1,2-dimethyl-3-propylbenzene	--	--	--	--	--	--	--	--
3982-66-9	1,2-dimethyl-4-propylbenzene	--	--	--	--	--	--	--	--
17059-45-9	1,3-dimethyl-2-propylbenzene	--	--	--	--	--	--	--	--
4701-36-4	(1-ethyl-1-propenyl)benzene	--	--	--	--	--	--	--	--
1330-20-7	Xylenes (total)	--	--	--	--	--	--	--	--
92-52-4	Biphenyl	--	--	--	--	--	--	--	--
91-20-3	Naphthalene	--	--	--	--	--	--	--	--
108-95-2	Phenol	--	--	--	--	--	--	--	--
106-99-0	1,3-Butadiene	--	--	--	--	--	--	--	--
	HAP Speciated Content (wt%)	***0.83%***	***0.20%***	***3.39%***	***0.60%***	***1.07%***	***0.36%***	***1.52%***	***0.26%***
	Speciated Content Accounted for (wt%)	***99%***	***99%***	***90%***	***95%***	***95%***	***97%***	***94%***	***97%***

*Vapor weight percent calculated using Raoult's law and Henry's law based on the liquid weight percent for components in the speciation analysis for each assay.

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Table A1 - TGTI Crude Assay - HAP Speciatio

CAS	Component	Trafigura Crude 5 (API Grav 49.18) (RVP 8)		Plains Pipeline EFL Crude TK 1521 (TGTI Sample 1) (API Grav 54) (RVP 7.67)		Plains Pipeline WTI Crude TK 1523 (TGTI Sample 2) (API Grav 48) (RVP 7.25)		Plains Pipeline WTI Crude TK 1524 (TGTI Sample 3) (API Grav 43.8) (RVP 8.59)	
Number	Name	(Liquid wt%)	(Vapor wt%)*	(Liquid wt%)	(Vapor wt%)*	(Liquid wt%)	(Vapor wt%)*	(Liquid wt%)	(Vapor wt%)*
110-54-3	hexane	--	--	3.140%	3.901%	1.900%	2.305%	1.570%	1.900%
71-43-2	Benzene	0.240%	0.082%	0.360%	0.247%	0.160%	0.107%	0.220%	0.147%
540-84-1	2,2,4-trimethylpentane	--	--	0.010%	0.004%	0.010%	0.004%	0.010%	0.004%
108-88-3	toluene	0.470%	0.058%	1.824%	0.450%	0.686%	0.165%	0.644%	0.155%
100-41-4	ethylbenzene	--	--	0.142%	0.012%	0.132%	0.011%	0.213%	0.018%
108-38-3	m-xylene	--	--	--	--	--	--	--	--
106-42-3	p-xylene	--	--	--	--	--	--	--	--
95-47-6	o-xylene	--	--	--	--	--	--	--	--
103-65-1	propylbenzene	--	--	--	--	--	--	--	--
13732-80-4	1-methyl-3,4-diethylbenzene	--	--	--	--	--	--	--	--
300-57-2	2-propenylbenzene	--	--	--	--	--	--	--	--
95-63-6	1,2,4-trimethylbenzene	--	--	0.308%	0.006%	0.208%	0.004%	0.161%	0.003%
98-06-6	tert-butylbenzene	--	--	--	--	--	--	--	--
538-93-2	isobutylbenzene	--	--	--	--	--	--	--	--
135-98-8	sec-butylbenzene	--	--	--	--	--	--	--	--
526-73-8	1,2,3-trimethylbenzene	--	--	--	--	--	--	--	--
98-82-8	cumene	--	--	--	--	--	--	--	--
14411-75-7	1,3-dimethyl-2-isopropylbenzene	--	--	--	--	--	--	--	--
4132-72-3	1,4-dimethyl-2-isopropylbenzene	--	--	--	--	--	--	--	--
4132-77-8	1,2-dimethyl-4-isopropylbenzene	--	--	--	--	--	--	--	--
25340-17-4	diethylbenzene	--	--	--	--	--	--	--	--
61827-87-0	1,2,4-trimethyl-3-ethylbenzene	--	--	--	--	--	--	--	--
61827-86-9	1,2,3-trimethyl-4-ethylbenzene	--	--	--	--	--	--	--	--
3982-67-0	1,3,5-trimethyl-2-ethylbenzene	--	--	--	--	--	--	--	--
17059-44-8	1,2-dimethyl-3-propylbenzene	--	--	--	--	--	--	--	--
3982-66-9	1,2-dimethyl-4-propylbenzene	--	--	--	--	--	--	--	--
17059-45-9	1,3-dimethyl-2-propylbenzene	--	--	--	--	--	--	--	--
4701-36-4	(1-ethyl-1-propenyl)benzene	--	--	--	--	--	--	--	--
1330-20-7	Xylenes (total)	--	--	2.261%	0.130%	1.029%	0.058%	0.734%	0.041%
92-52-4	Biphenyl	--	--	0.450%	0.000%	0.120%	0.000%	0.050%	0.000%
91-20-3	Naphthalene	--	--	0.110%	0.000%	0.080%	0.000%	0.120%	0.000%
108-95-2	Phenol	--	--	--	--	--	--	--	--
106-99-0	1,3-Butadiene	--	--	0.010%	0.177%	0.010%	0.172%	0.010%	0.172%
	HAP Speciated Content (wt%)	***0.71%***	***0.14%***	***8.62%***	***4.93%***	***4.34%***	***2.83%***	***3.73%***	***2.44%***
	Speciated Content Accounted for (wt%)	***95%***	***98%***	***100%***	***100%***	***100%***	***100%***	***100%***	***100%***

*Vapor weight percent calculated using Raoult's law and Henry's l

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Table A1 - TGTI Crude Assay - HAP Speciatio

CAS	Component	1519 Crude Oil		1520 Crude Oil		1523 Crude Oil	
Number	Name	(Liquid wt%)	(Vapor wt%)*	(Liquid wt%)	(Vapor wt%)*	(Liquid wt%)	(Vapor wt%)*
110-54-3	hexane	1.671%	2.055%	1.677%	2.073%	2.018%	2.278%
71-43-2	Benzene	0.257%	0.174%	0.230%	0.157%	0.322%	0.200%
540-84-1	2,2,4-trimethylpentane	0.005%	0.002%	0.002%	0.001%	0.001%	0.000%
108-88-3	toluene	0.687%	0.168%	0.775%	0.190%	0.956%	0.214%
100-41-4	ethylbenzene	0.185%	0.016%	0.149%	0.013%	0.160%	0.013%
108-38-3	m-xylene	0.390%	0.028%	0.569%	0.042%	0.639%	0.043%
106-42-3	p-xylene	0.134%	0.010%	0.226%	0.017%	0.222%	0.015%
95-47-6	o-xylene	0.212%	0.012%	0.268%	0.015%	0.281%	0.015%
103-65-1	propylbenzene	0.103%	0.003%	0.074%	0.002%	0.088%	0.003%
13732-80-4	1-methyl-3,4-diethylbenzene	0.230%	0.001%	--	--	--	--
300-57-2	2-propenylbenzene	0.007%	0.000%	--	--	--	--
95-63-6	1,2,4-trimethylbenzene	0.277%	0.006%	0.348%	0.007%	0.357%	0.007%
98-06-6	tert-butylbenzene	0.025%	0.001%	0.102%	0.002%	0.028%	0.001%
538-93-2	isobutylbenzene	0.037%	0.001%	0.022%	0.000%	0.035%	0.001%
135-98-8	sec-butylbenzene	0.015%	0.000%	0.009%	0.000%	0.009%	0.000%
526-73-8	1,2,3-trimethylbenzene	0.107%	0.002%	0.098%	0.002%	0.101%	0.001%
98-82-8	cumene	0.003%	0.000%	0.006%	0.000%	0.004%	0.000%
14411-75-7	1,3-dimethyl-2-isopropylbenzene	0.091%	0.000%	--	--	--	--
4132-72-3	1,4-dimethyl-2-isopropylbenzene	0.039%	0.000%	--	--	--	--
4132-77-8	1,2-dimethyl-4-isopropylbenzene	0.015%	0.000%	--	--	--	--
25340-17-4	diethylbenzene	0.004%	0.000%	0.003%	0.000%	0.002%	0.000%
61827-87-0	1,2,4-trimethyl-3-ethylbenzene	--	--	0.186%	0.000%	0.160%	0.000%
61827-86-9	1,2,3-trimethyl-4-ethylbenzene	--	--	0.089%	0.000%	0.076%	0.000%
3982-67-0	1,3,5-trimethyl-2-ethylbenzene	--	--	0.008%	0.000%	0.014%	0.000%
17059-44-8	1,2-dimethyl-3-propylbenzene	--	--	0.096%	0.000%	0.104%	0.000%
3982-66-9	1,2-dimethyl-4-propylbenzene	--	--	0.026%	0.000%	0.037%	0.000%
17059-45-9	1,3-dimethyl-2-propylbenzene	--	--	0.011%	0.000%	0.017%	0.000%
4701-36-4	(1-ethyl-1-propenyl)benzene	--	--	--	--	0.009%	0.000%
1330-20-7	Xylenes (total)	--	0.050%	--	0.074%	--	0.073%
92-52-4	Biphenyl	--	--	--	--	--	--
91-20-3	Naphthalene	--	--	--	--	--	--
108-95-2	Phenol	--	--	--	--	--	--
106-99-0	1,3-Butadiene	--	--	--	--	--	--
	HAP Speciated Content (wt%)	***4.49%***	***2.53%***	***4.97%***	***2.60%***	***5.64%***	***2.86%***
	Speciated Content Accounted for (wt%)	***37%***	***100%***	***32%***	***100%***	***42%***	***100%***

*Vapor weight percent calculated using Raoult's law and Henry's l

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