

**ALLEGHENY COUNTY HEALTH DEPARTMENT  
AIR QUALITY PROGRAM**

February 28, 2005

**SUBJECT:** Review of Application  
Title V Operating Permit Amendment  
Pittsburgh Terminals, Corp.  
Coraopolis Terminal  
9 Thorn Street  
Moon Township, PA 15108-0191

**RE:** Operating Permit File No. 0041a  
Operating Permit Amendment for two additional roof  
landings each for four gasoline and two gasoline/distillate storage tanks.

**TO:** Sandra L. Etzel  
Chief Engineer

**FROM:** Erin J. O'Brian, P.E.

**AMENDMENT DESCRIPTION:**

This amendment is to add an additional two roof landings per tank for six gasoline and distillate/gasoline storage tanks, no.27511, 29490, 29491, 29492, 29497 & 29518. These roof landings are for RVP changes and for inspection and maintenance. The original permit did not address roof landings and no allowable emissions exist for these events. The roof landings are part of normal operation and are not a new events or new emissions. No new or increased actual or potential emissions result in this permit amendment. The allowable VOCs and HAPs from the storage tanks will be increased by 7.96 tpy and 0.43 tpy, respectively to incorporate these previously overlooked potential emissions.

**AMENDED EMISSION CALCULATIONS:**

**Gasoline, distillate & additive tanks potential emissions:**

1. VOC emissions were calculated using the US EPA TANKS 4.09b program. HAP emissions were calculated by applying the vapor weight percent to the total VOCs from each tank. Gasoline HAP vapor weight fractions are from EPA's Gasoline Distribution Industry (Stage I) – Background Information for Promulgated Standards (EPA-453/R-94-002b), Table 11.3-2. Distillate HAP estimates are from EPA's TANKS 4.09b computer program using kerosene as the stored distillate. RVP values change during the year and have been entered into the tanks program on a monthly basis. Tanks T29492 and T29518 retain the ability to store gasoline at any time therefore potential emissions for these tanks are based on gasoline. The storage of gasoline in these tanks would not have any effect on other emission sources at the facility. See Tanks 4.09b runs in operating permit amendment application 0041a.

2. Tank data and emissions: \*Indicates revised estimated emissions due to updated TANKS program.

Tank no.	Size (gallons)	Max Turnovers	VOCs (tons/yr)	Contents
27511	1,705,704	86.8	4.65	gasoline*
29490	3,689,616	40.0	5.83	gasoline*
29491	3,688,566	39.0	5.83	gasoline*
29492	3,696,614	39.0	5.83	gasoline*
29497	1,693,272	85.0	3.42	gasoline*
29518	1,306,116	110.0	1.96	gasoline*
30593	2,225,454	55.0	1.03	distillate*
30594	2,225,580	55.0	1.03	distillate*

Total VOCs = 29.57 tpy

Total gasoline VOCs = 27.51 tpy, previous potential emissions were 29.00 tpy

Total distillate VOCs = 2.06 tpy, previous potential emissions were 1.98 tpy

#### Internal Floating Roof Gasoline Storage Tanks – Working & Breathing Emissions

HAP (tons/yr)	27511	29490	29491	29492	29497	29518	Total
VOCs	4.65	5.83	5.83	5.83	3.42	1.96	<b>27.51</b>
2,2,4 Trimethyl-pentane	0.037	0.047	0.047	0.047	0.027	0.016	0.221
Benzene	0.042	0.052	0.052	0.052	0.031	0.018	0.247
Ethyl Benzene	0.005	0.006	0.006	0.006	0.003	0.002	0.028
Hexane	0.074	0.093	0.093	0.093	0.055	0.031	0.439
POM	0.002	0.003	0.003	0.003	0.002	0.001	0.014
Toluene	0.060	0.076	0.076	0.076	0.044	0.025	0.357
Xylenes	0.023	0.029	0.029	0.029	0.017	0.010	0.137
Total HAPs	0.244	0.306	0.306	0.306	0.179	0.103	<b>1.444</b>

#### Fixed Roof Distillate Tanks - Working & Breathing Emissions

HAP (tons/yr)	30593	30594	Total
VOCs	1.03	1.03	<b>2.06</b>
Benzene	0.008	0.008	0.016
Ethyl Benzene	0.021	0.021	0.042
Hexane	0.016	0.016	0.032
Toluene	0.069	0.069	0.138
Xylenes	0.043	0.043	0.086
Total HAPs	0.157	0.157	<b>0.314</b>

2. Tank landing emissions: due to changes in RVP tank landing must be done in tanks no.27511, 29490, 29491, 29492, 29497 & 29518 once per year. Due to maintenance and inspections an extra landing on from one to four tanks per year is required. Emissions from an additional landing for tanks 27511, 29490, 29491 & 29492, have been added to account for potential annual maintenance and inspections. See Appendix A for tank landing calculations.

**Internal Floating Roof Gasoline Storage Tanks – Combined Roof Landing Emissions**

Tank	TPY - VOC	TPY HAPs
27511	1.33	0.069
29490	2.35	0.124
29491	2.35	0.124
29492	2.35	0.124
29497	0.61	0.032
29518	0.46	0.024
<b>Totals</b>	<b>9.45</b>	<b>0.497</b>

VOC and HAP emissions from RVP landings = 5.92 tpy and 0.311 tpy

VOC and HAP emissions from maintenance & inspection landings = 3.53 tpy and 0.186 tpy

**AMENDED POTENTIAL EMISSIONS SUMMARY:**

Pollutant	Loading Racks & VRU		Gasoline Storage Tank Losses		Distillate Storage Tanks	Total
			Working	Landings		
	lbs/hr	tons/yr <sup>1</sup>	tons/yr <sup>1</sup>	tons/yr <sup>1</sup>	tons/yr <sup>1</sup>	tons/yr <sup>1</sup>
VOCs	39.43	32.72	27.51	9.45	2.06	71.74
Total HAPs	2.05	1.69	1.44	0.50	0.31	3.94

<sup>1</sup>a year is defined as any consecutive twelve-month period

**OPERATING PERMIT AMENDMENT APPLICATION COMPONENTS:**

1. Amendment Application dated December 13,2004.

**RECOMMENDATIONS:**

The permit amendment is in compliance with all applicable regulations of Article XXI and it is recommended that the Operating Permit Amendment No. 0041a be issued.

**APPENDIX A**  
**Roof Landing Emission Calculations**

**Coraopolis Terminal  
Roof Landing Emissions**

**Due to Product Change**

**Tanks 29490, 29491, 29492, 27511, 29497 and 29518**

Tank No.	29490	29491	29492	27511	29497	29518	
Roof landing date	L_DATE 09/20/2004	09/20/2004	09/20/2004	09/20/2004	09/20/2004	09/20/2004	facility data
Was tank drained dry & clingage dissipated?	No	No	No	No	No	No	facility data
Take-off date	T_DATE 09/23/2004	09/23/2004	09/23/2004	09/23/2004	09/23/2004	09/23/2004	facility data
Type of product or vapor in tank	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	facility data
Number of days tank is idle	ND 3	3	3	3	3	3	= T_DATE - L_DATE
Tank diameter (ft)	D 120	120	120	90	80	70	facility data
Height of landed roof above tank bottom (ft)	H_ROOF 3.50	3.50	3.50	3.50	3.50	3.50	facility data
Effective height of stock liquid (ft)	H_LE 0.00	0.00	0.00	0.00	0.00	0.00	facility data
Height of vapor space under roof (ft)	H_V 3.50	3.50	3.50	3.50	3.50	3.50	= H_ROOF - H_LE
Volume of vapor space (ft3)	V_V 39,584	39,584	39,584	22,266	17,593	13,470	= ((H_V * pi * (D^2)) / 4)
Vapor space expansion factor	K_E 0.23	0.23	0.23	0.23	0.23	0.23	= ((DELTA T_V) / T) * ((1 + ((0.5 * B * P) / (T * (P_A - P))))
Normal height of vapor space under roof (ft)	H_VROOM 0.00	0.00	0.00	0.00	0.00	0.00	facility data
Volume of vapor expelled during filling (ft3)	V_VV 39,584	39,584	39,584	22,266	17,593	13,470	= (((H_V - H_VROOM) * pi * (D^2)) / 4)
Stock liquid density (lb/gal)	W_L 6.45	6.45	6.45	6.45	6.45	6.45	facility analytical data
Reid vapor pressure (psia)	RVP 13.5	13.5	13.5	13.5	13.5	13.5	facility data
True vapor pressure of liquid (psia)	P 6.99	6.99	6.99	6.99	6.99	6.99	= EXP (A - (B / T_LA))
Stock vapor molecular weight (lb/lb-mole)	MW_V 61.3	61.3	61.3	61.3	61.3	61.3	est.
Ambient temp. - daily range (R)	DELTA T_A 20.8	20.8	20.8	20.8	20.8	20.8	from TANKS program
Vapor temp. - daily range (R)	DELTA T_V 21.3	21.3	21.3	21.3	21.3	21.3	from TANKS program
Ambient temp. - daily avg. (F)	T_AMB 63.9	63.9	63.9	63.9	63.9	63.9	from TANKS program
(R)	523.6	524	523.6	523.6	523.6	523.6	from TANKS program
Liquid surface temp. - daily avg. (F)	58.1	58.1	58.1	58.1	58.1	58.1	from TANKS program
(R)	T_LA 517.8	517.8	517.8	517.8	517.8	517.8	from TANKS program
Vapor & liquid temp. below roof - avg. (R)	T 523.6	523.6	523.6	523.6	523.6	523.6	= T_AMB + 459.67
Vapor pressure equation constant "A"	A 11.63	11.63	11.63	11.63	11.63	11.63	= 15.64 - (1.854 * SLOPE * 0.5) - (0.8742 - 0.328 * SLOPE * 0.5) * (LN(RVP))
Vapor pressure equation constant "B"	B 5,016	5,016	5,016	5,016	5,016	5,016	= 8742 - (1042 * SLOPE * 0.5) - (1049 - 179.4 * SLOPE * 0.5) * (LN(RVP))
Stock ASTM-D86 distillation slope	SLOPE 3	3	3	3	3	3	from AP-42, Table 7.1-4
Atmospheric pressure (psia)	P_A 14.11	14.11	14.11	14.11	14.11	14.11	from TANKS program
Ideal gas constant (psia ft3/lb-mole R)	R 10.731	10.731	10.731	10.731	10.731	10.731	
Standing idle saturation factor	K_S 0.44	0.44	0.44	0.44	0.44	0.44	= 1 / (1 + (0.053 * P * H_V))
Standing idle loss per episode (lb)	L_S 916	916	916	515	407	312	= ND * K_E * (P * V_V / (R * T)) * MW_V * K_S
L_S max	0	0	0	0	0	0	< 5.9 * (D^2) * H_LE * W_L
Loss due to clingage (drain dry only) (lb)	L_S 0	0	0	0	0	0	= 0.0063 W_L * pi * (D^2) / 4
Filling saturation factor	S 0.60	0.60	0.60	0.60	0.60	0.60	from Table 1 of "Tentative Method for Determining Storage Tank Evaporative Losses from Floating Roof Landings, American Petroleum Institute, January 2002"
Filling loss per episode (lb)	L_F 1,812	1,812	1,812	1,019	805	617	= (P * V_V / (R * T)) * Mv * S
Total loss per episode (lb)	L_T 2,728	2,728	2,728	1,535	1,213	928	= L_S + L_F

**Coraopolis Terminal  
Roof Landing Emissions**

**Due to Inspection, Maintenance, or Emergency  
Tanks 29490, 29491, 29492, 27511, 29497 and 29518**

Tank No.	29490	29491	29492	27511	29497	29518	
Roof landing date	L-DATE	09/20/2004	09/20/2004	09/20/2004	09/20/2004	09/20/2004	facility data
Was tank drained dry & clingage disappated?		Yes	Yes	Yes	Yes	Yes	facility data
Take-off date	T-DATE	09/23/2004	09/23/2004	09/23/2004	09/23/2004	09/23/2004	facility data
Type of product or vapor in tank		Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	facility data
Number of days tank is idle	ND	3	3	3	3	3	= T-DATE - L-DATE
Tank diameter (ft)	D	120	120	120	90	80	facility data
Height of landed roof above tank bottom (ft)	H <sub>ROOF</sub>	6.50	6.50	6.50	6.50	6.50	facility data
Effective height of stock liquid (ft)	H <sub>LE</sub>	0.00	0.00	0.00	0.00	0.00	facility data
Height of vapor space under roof (ft)	H <sub>V</sub>	6.50	6.50	6.50	6.50	6.50	= H <sub>ROOF</sub> - H <sub>LE</sub>
Volume of vapor space (ft <sup>3</sup> )		73,513	73,513	73,513	41,351	32,673	= ((H <sub>V</sub> * pi * (D * D)) / 4)
Vapor space expansion factor	K <sub>E</sub>	0.23	0.23	0.23	0.23	0.23	= ((DELTA T <sub>v</sub> ) / T) * ((1 + ((0.5 * B * P) / (T * (P <sub>A</sub> - P))))
Normal height of vapor space under roof (ft)	H <sub>Vnom</sub>	0.00	0.00	0.00	0.00	0.00	facility data
Volume of vapor expelled during filling (ft <sup>3</sup> )	V <sub>V</sub>	73,513	73,513	73,513	41,351	32,673	= (((H <sub>V</sub> - H <sub>Vnom</sub> ) * pi * (D * D)) / 4)
Stock liquid density (lb/gal)	W <sub>L</sub>	6.45	6.45	6.45	6.45	6.45	facility analytical data
Reid vapor pressure (psia)	RVP	13.5	13.5	13.5	13.5	13.5	facility data
True vapor pressure of liquid (psia)	P	6.99	6.99	6.99	6.99	6.99	= EXP (A - (B / T <sub>LA</sub> ))
Stock vapor molecular weight (lb/lb-mole)	MW <sub>V</sub>	61.3	61.3	61.3	61.3	61.3	est.
Ambient temp. - daily range (R)	DELTA T <sub>A</sub>	20.8	20.8	20.8	20.8	20.8	from TANKS program
Vapor temp. - daily range (R)	DELTA T <sub>V</sub>	21.3	21.3	21.3	21.3	21.3	from TANKS program
Ambient temp. - daily avg. (F)	T <sub>AMB</sub>	63.9	63.9	63.9	63.9	63.9	from TANKS program
(R)		523.6	523.6	523.6	523.6	523.6	from TANKS program
Liquid surface temp. - daily avg. (F)		58.1	58.1	58.1	58.1	58.1	from TANKS program
(R)	T <sub>LA</sub>	517.8	517.8	517.8	517.8	517.8	from TANKS program
Vapor & liquid temp. below roof - avg. (R)	T	523.6	523.6	523.6	523.6	523.6	= T <sub>AMB</sub> + 459.67
Vapor pressure equation constant "A"	A	11.63	11.63	11.63	11.63	11.63	= 15.64 - (1.854 * SLOPE * 0.5) - (0.8742 - 0.328 * SLOPE * 0.5) * (LN(RVP))
Vapor pressure equation constant "B"	B	5.016	5.016	5.016	5.016	5.016	= 8742 - (1042 * SLOPE * 0.5) - (1049 - 179.4 * SLOPE * 0.5) * (LN(RVP))
Stock ASTM-D86 distillation slope	SLOPE	3	3	3	3	3	from AP-42, Table 7.1-4
Atmospheric pressure (psia)	P <sub>A</sub>	14.11	14.11	14.11	14.11	14.11	from TANKS program
Ideal gas constant (psia ft <sup>3</sup> /lb-mole R)	R	10.731	10.731	10.731	10.731	10.731	10.731
Standing idle saturation factor	K <sub>S</sub>	0.29	0.29	0.29	0.29	0.29	= 1 / (1 + (0.053 * P * H <sub>v</sub> ))
Standing idle loss per episode (lb)	L <sub>S</sub>	1,147	1,147	1,147	645	390	= ND * K <sub>E</sub> * (P * V <sub>V</sub> / (R * T)) * MW <sub>V</sub> * K <sub>S</sub>
L <sub>S</sub> max		0	0	0	0	0	< 5.9 * (D * D) * H <sub>LE</sub> * W <sub>L</sub>
Loss due to clingage (drain dry only) (lb)	L <sub>C</sub>						= 0.0063 W <sub>L</sub> * pi * (D * D) / 4
Filling saturation factor	S	0.15	0.15	0.15	0.15	0.15	from Table 1 of "Tentative Method for Determining Storage Tank Evaporative Losses from Floating Roof Landings, American Petroleum Institute, January 2002"
Filling loss per episode (lb)	L <sub>F</sub>	841	841	841	473	286	= (P * V <sub>V</sub> / (R * T)) * M <sub>v</sub> * S
Total loss per episode (lb)	L <sub>T</sub>	1,988	1,988	1,988	1,118	884	= L <sub>S</sub> + L <sub>F</sub>