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TN. DIV. OF
AIR POLLUTION CONTROL



2012 OCT 25 AM 11:19

October 24, 2012

Mr. Barry R. Stephens, Director
Division of Air Pollution Control
Tennessee Department of Environment & Conservation
9th Floor, L&C Annex
401 Church Street
Nashville, TN 37243-1531
Tel: 615-532-0554

RECEIVED

**RE: Request for Insignificant Activity Determination
East Tennessee Natural Gas, LLC
Wacker M&R Station #59223 – Bradley County**

Dear Mr. Stephens:

East Tennessee Natural Gas, LLC ("ETNG") is proposing to expand its pipeline system in Tennessee to bring natural gas supplies to Wacker Polysilicon North America LLC's ("Wacker") Polysilicon Plant, which is under construction in Bradley County, Tennessee. The Project involves construction of a new natural gas metering facility, M&R 59223 (Wacker M&R Station), in Bradley County and a new pressure limiting device ("PLD") within ETNG's existing mainline valve sites ("MLVs") 3205-1/3205-2A on its existing Line 3200-1 and Line 3200-2 system in Maury County.

The Wacker M&R Station will allow natural gas flow measurement from ETNG's existing Line 3200-1 to an interconnection with the Wacker Polysilicon Plant. The M&R station will be located approximately 0.3 miles from the Wacker Polysilicon Plant (Please see Attachment 3 for evaluation) and will consist of a 12-inch MLV, an electronic gas measurement ("EGM") building, a meter skid, and an 8-inch launcher. As shown in Table A-1 in Attachment 1, emissions from the M&R station will be comprised of gas releases, fugitive emissions from piping components, and flash and loading emissions resulting from loading pipeline liquids to drums. Any collected pipeline liquids will be placed into fifty-five (55) gallon drums and shipped offsite. There are no heaters, filter/separators, or storage tanks associated with the project.

ETNG is requesting a determination of agreement from the Tennessee Department of Environment and Conservation ("TDEC") with the designation of the flash emissions and truck loading activities at the Wacker M&R Station as insignificant activities and therefore exempt from obtaining a construction permit, pursuant to Tennessee Air Pollution Control Rule (TAPCR) 1200-03-09-.04(4)(a). Table 1, along with the attached supporting potential to emit calculations, are the basis for this request.

Gas releases and fugitive emissions from piping components at the M&R station are exempt from obtaining a construction permit and do not require a determination of agreement from the TDEC. Tables G-1 and G-2 in Attachment 2 are included for the purpose of documenting that these emission sources meet the criteria for exemption pursuant to TAPCR 1200-3-9-.04(4)(c) and (4)(d).

The PLD site is not part of the M&R station and is addressed separately through appropriate internal documentation demonstrating that associated sources of emissions are exempt from obtaining a construction permit and do not require a determination of agreement from the TDEC.

Table 1
Wacker M&R Station #59223
TAPCR 1200-3-9-.04
Construction and Operating Permit
Exemptions

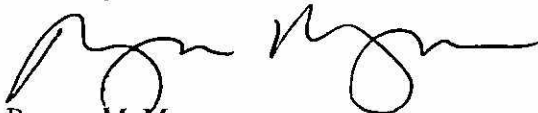
Emission Source		Exemption	Action Required
Description	ID		
Vessel - Flash	M&R_Wacker-TK01	1200-3-9-.04(4)(a) Potential to emit less than 5 tons per year of each regulated air pollutant that is not a hazardous air pollutant, and less than 1,000 pounds per year of each hazardous air pollutant.	Written notification must be submitted to Agency requesting determination of agreement with designation as an "insignificant activity" or "insignificant emissions unit".
Truck Loading Area	M&R_Wacker-TL01	1200-3-9-.04(4)(a) Potential to emit less than 5 tons per year of each regulated air pollutant that is not a hazardous air pollutant, and less than 1,000 pounds per year of each hazardous air pollutant.	Written notification must be submitted to Agency requesting determination of agreement with designation as an "insignificant activity" or "insignificant emissions unit".
Gas Releases	M&R_Wacker-GR-ST M&R_Wacker-GR-PL	1200-3-9-.04(4)(c) & 1200-3-9-.04(5)(g)26. Natural gas pressure regulator vents, excluding venting at oil and gas production facilities.	Notification is not required and such emissions units and activities are not required to be listed in the construction or operating permit applications for the facility. Maintain internal documentation of compliance with exemption.
		1200-3-9-.04(4)(d)4. Equipment used exclusively to store, hold, or distribute natural gas or propane excluding all associated fuel burning equipment not specifically exempted.	Notification is not required and such emissions units and activities are not required to be listed in the construction or operating permit applications for the facility. Maintain internal documentation of compliance with exemption.

Table 1
Wacker M&R Station #59223
TAPCR 1200-3-9-.04
Construction and Operating Permit
Exemptions

Emission Source		Exemption	Action Required
Piping Components	M&R_Wacker-PC	1200-3-9-.04(4)(d)4. Equipment used exclusively to store, hold, or distribute natural gas or propane excluding all associated fuel burning equipment not specifically exempted.	Notification is not required and such emissions units and activities are not required to be listed in the construction or operating permit applications for the facility. Maintain internal documentation of compliance with exemption.

If you have any questions, please feel free to call Owen McManus at 713-989-8329.

Sincerely,



Reagan M. Mayces
Manager, Air compliance, US Operations

Overnight Delivery

Attachments

Attachment 1 - Emission Calculations

Attachment 2 - Exemption Documentation for Gas Releases and Piping Components

Attachment 3 - Source Aggregation Evaluation

ATTACHMENT 1

**Table A-1
Potential to Emit
Basis and Emissions**

Emission Source		Rated Capacity	Operational Limits							
ID	Description		Short-Term -- Material Flow		Short-Term -- Capacity		Annual Material Flow		Annual Utilization	
M&R_Wacker-TK01	Vessel - Flash	0 gal	Pipeline Liquids	220 gal/hr			Pipeline Liquids	220 gal/yr	Runtime	N/A
M&R_Wacker-TL01	Truck Loading Area	150 gpm	Pipeline Liquids	55 gal/hr			Pipeline Liquids	220 gal/yr	Runtime	N/A
M&R_Wacker-PC	Piping Components	Natural Gas	Valves: 90	Connectors: 0	Flanges: 353	Open-ended Lines: 20	Pump Seals: 2	Other (blowdown valves, relief valves, and compressor seals): 0		
		Pipeline Liquids	Valves: 0	Connectors: 0	Flanges: 0	Open-ended Lines: 0	Pump Seals: 0	Other (blowdown valves, relief valves, and compressor seals): 0		
M&R_Wacker-GR-ST	Gas Releases	Station	Natural Gas	0 scfh			Natural Gas	0 scf/yr	Runtime	N/A
M&R_Wacker-GR-PL	Gas Releases	Pipeline	Natural Gas	148,924 scfh			Natural Gas	1,044,390 scf/yr	Runtime	N/A

**Table A-1
Potential to Emit
Basis and Emissions**

Emission Source		Rated Capacity	Emissions (tpy)														
ID	Description		CO _{2e}	CO ₂	Methane	NO _x	CO	PM ₁₀	SO ₂	VOC (Total)	HAP (Total)	Benzene	Formaldehyde	Hexane (n-)	Methanol	Toluene	Xylenes
M&R_Wacker-TK01	Vessel - Flash	0 gal	0.5775	0.0034	0.0273					0.0276	0.0016	0.0003		0.0012		0.0004	0.0002
			0.0000	0.0000	0.0000					0.0000	0.0000	0.0000		0.0000		0.0000	0.0000
M&R_Wacker-TL01	Truck Loading Area	150 gpm	0.0250	0.0000	0.0012					0.0006	0.0000	0.0000		0.0000		0.0000	
M&R_Wacker-PC	Piping Components	Natural Gas	96.9564	0.1866	4.6081					0.5561	0.0474	0.0068		0.0110		0.0085	0.0108
		Pipeline Liquids	0.0000	0.0000	0.0000					0.0000	0.0000	0.0000		0.0000		0.0000	0.0000
M&R_Wacker-GR-ST	Gas Releases	Station	0.0000	0.0000	0.0000					0.0000	0.0000	0.0000		0.0000		0.0000	
M&R_Wacker-GR-PL	Gas Releases	Pipeline	563.5235	1.0848	26.7828					3.2319	0.2756	0.0394		0.0640		0.0492	
TOTAL			661.0823	1.2749	31.4194	0.0000	0.0000	0.0000	0.0000	3.8160	0.3247	0.0466	0.0000	0.0762	0.0000	0.0581	0.0111

TABLE C-1
Flash Analysis
Summary of Laboratory Analysis

	FEED Pressurized Liquid	VAPOR Flash Gas	LIQUID Residual Liquid
Pressure	575.000 psig	0.034 psig	0.034 psig
	589.696 psia	14.730 psia	14.730 psia
Temperature	72 °F	60 °F	60 °F
API Gravity at 60°F	73.960 n.d.	788.526 n.d.	61.227 n.d.
Specific Gravity at 60°F	0.6887 n.d. (water)	0.1538 n.d. (water)	0.7342 n.d. (water)
	3.3880 n.d. (air)	0.9301 n.d. (air)	4.4320 n.d. (air)
Molecular Weight	98.125 lb/lb-mol	26.938 lb/lb-mol	128.362 lb/lb-mol
Density at 60°F and 14.730 psia	5.747 lb/gal	1.283 lb/gal	6.126 lb/gal
	0.2593 lb/ft ³	0.0712 lb/ft ³	0.3392 lb/ft ³
	22.1622 ft ³ /gal	18.0282 ft ³ /gal	18.0610 ft ³ /gal
	930.8120 ft ³ /bbl	757.1853 ft ³ /bbl	758.5600 ft ³ /bbl
	378.4123 ft ³ /lb-mol	378.4123 ft ³ /lb-mol	378.4123 ft ³ /lb-mol
	17.0747 gal/lb-mol	20.9900 gal/lb-mol	20.9520 gal/lb-mol
	2.4598 lb-mol/bbl	2.0010 lb-mol/bbl	2.0046 lb-mol/bbl
Density at 68°F and 14.696 psia	947.3299 scf/bbl	770.6220 scf/bbl	772.0211 scf/bbl
	385.1275 scf/lb-mol	385.1275 scf/lb-mol	385.1275 scf/lb-mol
	2.4598 lb-mol/bbl	2.0010 lb-mol/bbl	2.0046 lb-mol/bbl
Vapor to Liquid Mole Ratio (V/L)	0.4249 n.d. (lb-mol _{VAPOR} /lb-mol _{LIQUID})		
Mole Balance	1.0000 bbl	0.3666 bbl	0.8612 bbl
	2.4598 lb-mol	0.7335 lb-mol	1.7263 lb-mol
	947.3299 scf	282.4903 scf	664.8396 scf
Flash Factor (FF)	328.0318 scf _{VAPOR} /bbl _{LIQUID}		

NOTES

1. Sample Data:	Location:	Atlanta, TX	
	Date:	04/15/09	
	Time:	Not Recorded	
2. Reference Conditions:		SPL	Standard
	T =	60 °F	68 °F
	P =	14.730 psia	14.696 psia
	Water	8.344 lb/gal	8.338 lb/gal
	Air	0.0765 lb/ft ³	0.0752 lb/ft ³
3. $V + L = F \Rightarrow F = (1 + V/L)L$ {Overall Mole Balance}.			

TABLE C-2
Flash Analysis
Extrapolation of Specie Mole Percentages

Component							Liquid Dump Flash Data				
							Input		Output		
							Liquid	Scaled	Calculated	Vapor	Liquid
Name (i)	GC Position	SPL Class	Formula	Type	HAP		z_i (mol _{i,p} /mol _p)		z_i (mol _{i,p} /mol _p)	y_i (mol _{i,v} /mol _v)	x_i (mol _{i,l} /mol _l)
Nitrogen	1		N2				0.034%	0.034%	0.030%	0.101%	0.000%
Carbon Dioxide	3		CO2	GHG			0.968%	0.968%	0.970%	3.163%	0.038%
Methane	2		C01H04	GHG			20.922%	20.922%	20.921%	69.445%	0.303%
Ethane	4		C02H06				3.391%	3.391%	3.390%	10.467%	0.383%
Propane	5		C03H08	VOC			2.183%	2.183%	2.180%	5.339%	0.838%
Butane (i-)	6		C04H10	VOC			1.232%	1.232%	1.230%	2.126%	0.849%
Butane (n-)	7		C04H10	VOC			1.721%	1.721%	1.720%	2.495%	1.391%
Pentane (i-)	8		C05H12	VOC			2.354%	2.354%	2.350%	1.895%	2.543%
Pentane (n-)	9		C05H12	VOC			1.622%	1.622%	1.620%	1.056%	1.859%
Dimethylbutane (2,2-)	10	Hexanes	C06H14	VOC			0.174%	0.174%	0.174%	0.050%	0.227%
Dimethylbutane (2,3-)	11	Hexanes	C06H14	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Cyclopentane	12	Hexanes	C05H10	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Methylpentane (2-)	13	Hexanes	C06H14	VOC			1.218%	1.218%	1.218%	0.352%	1.586%
Methylpentane (3-)	14	Hexanes	C06H14	VOC			0.912%	0.912%	0.912%	0.264%	1.187%
Hexane (n-)	15	Hexanes	C06H14	VOC	X		1.937%	1.937%	1.937%	0.561%	2.522%
Dimethylpentane (2,2-)	16	Heptanes	C07H16	VOC			0.311%	0.311%	0.311%	0.032%	0.430%
Methylcyclopentane	17	Heptanes	C06H12	VOC			1.134%	1.134%	1.134%	0.116%	1.566%
Dimethylpentane (2,4-)	18	Heptanes	C07H16	VOC			0.128%	0.128%	0.128%	0.013%	0.177%
Trimethylbutane (2,3-)	19	Heptanes	C07H16	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Benzene	20	Heptanes	C06H06	VOC	X		1.713%	1.713%	1.713%	0.175%	2.366%
Dimethylpentane (3,3-)	21	Heptanes	C07H16	VOC			0.221%	0.221%	0.221%	0.023%	0.305%
Cyclohexane	22	Heptanes	C06H12	VOC			1.106%	1.106%	1.106%	0.113%	1.528%
Methylhexane (2-)	23	Heptanes	C07H16	VOC			2.292%	2.292%	2.292%	0.235%	3.166%
Dimethylpentane (2,3-)	24	Heptanes	C07H16	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Dimethylcyclopentane (1,1-)	25	Heptanes	C07H14	VOC			0.603%	0.603%	0.603%	0.062%	0.833%
Methylhexane (3-)	26	Heptanes	C07H16	VOC			2.379%	2.379%	2.379%	0.244%	3.286%
Dimethylcyclopentane (1,1,3-)	27	Heptanes	C07H14	VOC			0.163%	0.163%	0.163%	0.017%	0.225%
Dimethylcyclopentane (1,3-3-)	28	Heptanes	C07H14	VOC			0.266%	0.266%	0.266%	0.027%	0.367%
Ethylpentane (3-)	29	Heptanes	C07H16	VOC			0.029%	0.029%	0.029%	0.003%	0.040%
Dimethylcyclopentane (1,1,2-)	30	Heptanes	C07H14	VOC			0.222%	0.222%	0.222%	0.023%	0.307%
Trimethylpentane (2,2,4-)	31	Heptanes	C08H18	VOC	X		0.021%	0.021%	0.021%	0.002%	0.029%
Heptane (n-)	32	Heptanes	C07H16	VOC			3.742%	3.742%	3.742%	0.383%	5.169%
Methylcyclohexane	33	Octanes	C07H14	VOC			3.301%	3.301%	3.301%	0.136%	4.646%
Trimethylcyclopentane (1,1,3-)	34	Octanes	C08H16	VOC			0.225%	0.225%	0.225%	0.009%	0.317%
Dimethylhexane (2,2-)	35	Octanes	C08H18	VOC			0.095%	0.095%	0.095%	0.004%	0.134%
Dimethylcyclopentane (1,3-2-)	36	Octanes	C07H14	VOC			0.848%	0.848%	0.848%	0.035%	1.193%
Dimethylhexane (2,5-)	37	Octanes	C08H18	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Dimethylhexane (2,4-)	38	Octanes	C08H18	VOC			0.143%	0.143%	0.143%	0.006%	0.201%
Ethylcyclopentane	39	Octanes	C07H14	VOC			0.464%	0.464%	0.464%	0.019%	0.653%
Trimethylpentane (2,2,3-)	40	Octanes	C08H18	VOC			0.028%	0.028%	0.028%	0.001%	0.039%
Trimethylcyclopentane (1,1,2,3-4-)	41	Octanes	C08H16	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Dimethylhexane (3,3-)	42	Octanes	C08H18	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Trimethylcyclopentane (1,1,2,3-3-)	43	Octanes	C08H16	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Trimethylpentane (2,3,4-)	44	Octanes	C08H18	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Dimethylhexane (2,3-)	45	Octanes	C08H18	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Toluene	46	Octanes	C07H08	VOC	X		4.444%	4.444%	4.444%	0.183%	6.255%
Trimethylcyclopentane (1,1,2-)	47	Octanes	C08H16	VOC			0.371%	0.371%	0.371%	0.015%	0.522%
Dimethylhexane (3,4-)	48	Octanes	C08H18	VOC			3.505%	3.505%	3.505%	0.144%	4.933%
Methylheptane (2-)	49	Octanes	C08H18	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Methylheptane (4-)	50	Octanes	C08H18	VOC			2.896%	2.896%	2.896%	0.119%	4.076%
Dimethylhexane (3,4-)	51	Octanes	C08H18	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Methylheptane (3-)	52	Octanes	C08H18	VOC			0.416%	0.416%	0.416%	0.017%	0.585%
Ethylhexane (3-)	53	Octanes	C08H18	VOC			0.111%	0.111%	0.111%	0.005%	0.156%
Trimethylcyclopentane (1,3-2,1-4-)	54	Octanes	C08H16	VOC			0.028%	0.028%	0.028%	0.001%	0.039%
Dimethylcyclohexane (1,3-3-)	55	Octanes	C08H16	VOC			0.170%	0.170%	0.170%	0.007%	0.239%
Trimethylcyclopentane (1,3-2,1-3-)	56	Octanes	C08H16	VOC			0.170%	0.170%	0.170%	0.007%	0.239%
Dimethylcyclohexane (1,1,4-)	57	Octanes	C08H16	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Trimethylhexane (2,2,5-)	58	Octanes	C09H20	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Dimethylcyclohexane (1,1-)	59	Octanes	C08H16	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Ethylcyclopentane (1-methyl-1-3-)	60	Octanes	C08H16	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Ethylcyclopentane (1-methyl-3-3-)	61	Octanes	C08H16	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Ethylcyclopentane (1-methyl-1-2-)	62	Octanes	C08H16	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Trimethylhexane (2,2,4-)	63	Octanes	C09H20	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Ethylcyclopentane (1-methyl-1-1-)	64	Octanes	C08H16	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Cycloheptane	65	Octanes	C07H14	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Octane (n-)	66	Octanes	C08H18	VOC			4.372%	4.372%	4.372%	0.180%	6.153%
Trimethylhexane (2,4,4-)	67	Nonanes	C09H20	VOC			0.190%	0.190%	0.190%	0.003%	0.269%
Tetramethylpentane (2,2,4,4-)	68	Nonanes	C09H20	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Dimethylcyclohexane (1,1,3-)	69	Nonanes	C08H16	VOC			0.053%	0.053%	0.053%	0.001%	0.075%
Dimethylcyclohexane (1,3-4-)	70	Nonanes	C08H16	VOC			0.053%	0.053%	0.053%	0.001%	0.075%
Trimethylcyclopentane (1,3-2,3-3-)	71	Nonanes	C08H16	VOC			0.053%	0.053%	0.053%	0.001%	0.075%
Propylcyclopentane (i-)	72	Nonanes	C08H16	VOC			0.348%	0.348%	0.348%	0.006%	0.493%
Trimethylhexane (2,3,5-)	73	Nonanes	C09H20	VOC			0.006%	0.006%	0.006%	0.000%	0.009%
Dimethylheptane (2,2-)	74	Nonanes	C09H20	VOC			0.000%	0.000%	0.000%	0.000%	0.000%
Dimethylheptane (2,4-)	75	Nonanes	C09H20	VOC			0.158%	0.158%	0.158%	0.003%	0.224%
Methylcyclopentane (1-ethyl-2-2-)	76	Nonanes	C08H16	VOC			0.181%	0.181%	0.181%	0.003%	0.257%
Trimethylhexane (2,2,3-)	77	Nonanes	C09H20	VOC			0.000%	0.000%	0.000%	0.000%	0.000%

TABLE C-2
Flash Analysis
Extrapolation of Specie Mole Percentages

Component						Liquid Dump Flash Data				
						Input		Calculated	Output	
						Liquid z_i (mol _{i,F} /mol _F)	Scaled	z_i (mol _{i,F} /mol _F)	Vapor y_i (mol _{i,V} /mol _V)	Liquid x_i (mol _{i,L} /mol _L)
Name (i)	GC Position	SPL Class	Formula	Type	HAP					
Dimethylcyclohexane (1,c-2-)	78	Nonanes	C08H16	VOC		0.510%	0.510%	0.510%	0.009%	0.723%
Dimethylheptane (2,6-)	79	Nonanes	C09H20	VOC		0.112%	0.112%	0.112%	0.002%	0.159%
Propylcyclopentane (n-)	80	Nonanes	C08H16	VOC		0.000%	0.000%	0.000%	0.000%	0.000%
Trimethylcyclohexane (1,c-3,c-5-)	81	Nonanes	C09H18	VOC		0.000%	0.000%	0.000%	0.000%	0.000%
Ethylcyclohexane	82	Nonanes	C08H16	VOC		1.365%	1.365%	1.365%	0.023%	1.935%
Dimethylheptane (2,5-)	83	Nonanes	C09H20	VOC		0.067%	0.067%	0.067%	0.001%	0.095%
Dimethylheptane (3,5-)	84	Nonanes	C09H20	VOC		0.067%	0.067%	0.067%	0.001%	0.095%
Trimethylcyclohexane (1,1,3-)	85	Nonanes	C09H18	VOC		0.077%	0.077%	0.077%	0.001%	0.109%
Trimethylhexane (2,3,3-)	86	Nonanes	C09H20	VOC		0.038%	0.038%	0.038%	0.001%	0.054%
Dimethylheptane (3,3-)	87	Nonanes	C09H20	VOC		0.038%	0.038%	0.038%	0.001%	0.054%
Trimethylcyclohexane (1,1,4-)	88	Nonanes	C09H18	VOC		0.000%	0.000%	0.000%	0.000%	0.000%
Tetramethylpentane (2,2,3,3-)	89	Nonanes	C09H20	VOC		0.261%	0.261%	0.261%	0.004%	0.370%
Ethylbenzene	90	Nonanes	C08H10	VOC	X	0.406%	0.406%	0.406%	0.007%	0.576%
Trimethylhexane (2,3,4-)	91	Nonanes	C09H20	VOC		0.007%	0.007%	0.007%	0.000%	0.010%
Trimethylcyclohexane (1,t-2,t-4-)	92	Nonanes	C09H18	VOC		0.000%	0.000%	0.000%	0.000%	0.000%
Dimethylheptane (2,3-)	93	Nonanes	C09H20	VOC		0.000%	0.000%	0.000%	0.000%	0.000%
Trimethylcyclohexane (1,c-3,t-5-)	94	Nonanes	C09H18	VOC		0.000%	0.000%	0.000%	0.000%	0.000%
Xylene (m-)	95	Nonanes	C08H10	VOC	X	2.462%	2.462%	2.462%	0.042%	3.490%
Xylene (p-)	96	Nonanes	C08H10	VOC	X	2.462%	2.462%	2.462%	0.042%	3.490%
Dimethylheptane (3,4-)	97	Nonanes	C09H20	VOC		0.092%	0.092%	0.092%	0.002%	0.130%
Methyloctane (2-)	98	Nonanes	C09H20	VOC		0.782%	0.782%	0.782%	0.013%	1.109%
Methyloctane (4-)	99	Nonanes	C09H20	VOC		0.782%	0.782%	0.782%	0.013%	1.109%
Dimethylheptane (3,4-)	100	Nonanes	C09H20	VOC		0.000%	0.000%	0.000%	0.000%	0.000%
Methyloctane (3-)	101	Nonanes	C09H20	VOC		0.000%	0.000%	0.000%	0.000%	0.000%
Butylcyclopentane (t-)	102	Nonanes	C09H18	VOC		0.000%	0.000%	0.000%	0.000%	0.000%
Trimethylcyclohexane (1,t-2,c-3-)	103	Nonanes	C09H18	VOC		0.231%	0.231%	0.231%	0.004%	0.327%
Trimethylcyclohexane (1,t-2,c-4-)	104	Nonanes	C09H18	VOC		0.231%	0.231%	0.231%	0.004%	0.327%
Xylene (o-)	105	Nonanes	C08H10	VOC	X	0.547%	0.547%	0.547%	0.009%	0.775%
Trimethylcyclohexane (1,1,2-)	106	Nonanes	C09H18	VOC		0.000%	0.000%	0.000%	0.000%	0.000%
Trimethylcyclohexane (1,c-2,t-4-)	107	Nonanes	C09H18	VOC		0.200%	0.200%	0.200%	0.003%	0.284%
Trimethylcyclohexane (1,c-2,c-4-)	108	Nonanes	C09H18	VOC		0.000%	0.000%	0.000%	0.000%	0.000%
Nonane (n-)	109	Nonanes	C09H20	VOC		2.884%	2.884%	2.884%	0.050%	4.088%
Unknowns	110	Decanes+	C10+	VOC		10.753%	10.753%	10.753%	0.079%	15.288%
TOTAL						100.001%	100.000%	99.984%	100.001%	99.976%
TOC (Total)						98.999%	98.998%	98.984%	96.737%	99.938%
VOC (Total)						74.686%	74.685%	74.673%	16.825%	99.252%
Hexanes						4.241%	4.240%	4.241%	1.227%	5.521%
Heptanes						14.330%	14.310%	14.330%	1.468%	19.795%
Octanes						21.587%	21.610%	21.587%	0.888%	30.382%
Nonanes						14.663%	14.660%	14.663%	0.252%	20.786%
Decanes+						10.753%	10.770%	10.753%	0.079%	15.288%
HAP (Total)						13.992%	13.992%	13.992%	1.022%	19.503%
Xylenes						1.209%	1.209%	1.209%	0.021%	1.714%

NOTES		
1. Sample Data	Location:	Atlanta, TX
	Date:	04/15/09
	Time:	Not Recorded
2. $v_i + l_i = f_i$, $y_i = v_i/V$, $x_i = l_i/L$, $z_i = f_i/F \Rightarrow y_i V + x_i L = z_i F \Rightarrow y_i (V/L) + x_i L = z_i (1 + V/L) \Rightarrow z_i = [y_i (V/L) + x_i] / [1 + (V/L)]$ (Mole Balance)		
3. $V/L =$	0.4249	$1 + V/L =$ 1.4249
4. z_i is refined to the same number of significant digits as y_i and x_i using the component mole balance and laboratory results for V/L .		
5. z_i is scale using the hydrocarbon (e.g., hexanes+) z_i percentage in the flash analysis results, with the exception of HAP species.		
6. $[y_i, x_i]$ mole percent for species of hydrocarbons is estimated using scaled lab mole percent results for z_i and $[y, x]_{HIC}$ for the hydrocarbon. (assumes v_i/l_i is same for all hydrocarbon species)		
$y_{hexanes} =$	1.227%	
$x_{hexanes} =$	5.520%	$z_{hexanes} =$ 4.240%
$y_i = z_i(y/z)_{hexanes}$	$= 0.2894 z_i$	
$x_i = z_i(x/z)_{hexanes}$	$= 1.3019 z_i$	
$y_{heptanes} =$	1.466%	
$x_{heptanes} =$	19.767%	$z_{heptanes} =$ 14.310%
$y_i = z_i(y/z)_{heptanes}$	$= 0.1024 z_i$	
$x_i = z_i(x/z)_{heptanes}$	$= 1.3814 z_i$	
$y_{octanes} =$	0.889%	
$x_{octanes} =$	30.414%	$z_{octanes} =$ 21.610%
$y_i = z_i(y/z)_{octanes}$	$= 0.0411 z_i$	
$x_i = z_i(x/z)_{octanes}$	$= 1.4074 z_i$	
$y_{nonanes} =$	0.252%	
$x_{nonanes} =$	20.782%	$z_{nonanes} =$ 14.660%
$y_i = z_i(y/z)_{nonanes}$	$= 0.0172 z_i$	
$x_i = z_i(x/z)_{nonanes}$	$= 1.4176 z_i$	
$y_{decanes+} =$	0.079%	
$x_{decanes+} =$	15.313%	$z_{decanes+} =$ 10.770%
$y_i = z_i(y/z)_{decanes+}$	$= 0.0073 z_i$	
$x_i = z_i(x/z)_{decanes+}$	$= 1.4218 z_i$	

TABLE C-3a
Flash Analysis
Estimation of Specie Weight Percentages
Pressurized Liquid

Component			Molecular Weight (lb/mol) _i	Density (lb/scf) _i	Mole Percent (mol _i /mol _T)	Weight Percent (lb _i /lb _T)
Name (i)	Type	HAP				
Nitrogen			28.013	0.0727	0.030%	0.009%
Carbon Dioxide	GHG		44.010	0.1143	0.970%	0.435%
Methane	GHG		16.042	0.0417	20.924%	3.421%
Ethane			30.069	0.0781	3.391%	1.039%
Propane	VOC		44.096	0.1145	2.181%	0.980%
Butane (i-)	VOC		58.122	0.1509	1.230%	0.729%
Butane (n-)	VOC		58.122	0.1509	1.720%	1.019%
Pentane (i-)	VOC		72.149	0.1873	2.350%	1.728%
Pentane (n-)	VOC		72.149	0.1873	1.620%	1.191%
Dimethylbutane (2,2-)	VOC		86.175	0.2238	0.174%	0.153%
Dimethylbutane (2,3-)	VOC		86.175	0.2238	0.000%	0.000%
Cyclopentane	VOC		70.133	0.1821	0.000%	0.000%
Methylpentane (2-)	VOC		86.175	0.2238	1.218%	1.070%
Methylpentane (3-)	VOC		86.175	0.2238	0.912%	0.801%
Hexane (n-)	VOC	X	86.175	0.2238	1.937%	1.701%
Dimethylpentane (2,2-)	VOC		100.202	0.2602	0.311%	0.318%
Methylcyclopentane	VOC		84.159	0.2185	1.134%	0.973%
Dimethylpentane (2,4-)	VOC		100.202	0.2602	0.128%	0.131%
Trimethylbutane (2,2,3-)	VOC		100.202	0.2602	0.000%	0.000%
Benzene	VOC	X	78.112	0.2028	1.713%	1.364%
Dimethylpentane (3,3-)	VOC		100.202	0.2602	0.221%	0.226%
Cyclohexane	VOC		84.159	0.2185	1.106%	0.949%
Methylhexane (2-)	VOC		100.202	0.2602	2.292%	2.341%
Dimethylpentane (2,3-)	VOC		100.202	0.2602	0.000%	0.000%
Dimethylcyclopentane (1,1-)	VOC		98.186	0.2549	0.603%	0.603%
Methylhexane (3-)	VOC		100.202	0.2602	2.379%	2.430%
Dimethylcyclopentane (1,1,3-)	VOC		98.186	0.2549	0.163%	0.163%
Dimethylcyclopentane (1,3-)	VOC		98.186	0.2549	0.266%	0.266%
Ethylpentane (3-)	VOC		100.202	0.2602	0.029%	0.030%
Dimethylcyclopentane (1,1,2-)	VOC		98.186	0.2549	0.222%	0.222%
Trimethylpentane (2,2,4-)	VOC	X	114.229	0.2966	0.021%	0.024%
Heptane (n-)	VOC		100.202	0.2602	3.743%	3.822%
Methylcyclohexane	VOC		98.186	0.2549	3.302%	3.304%
Trimethylcyclopentane (1,1,3-)	VOC		112.213	0.2914	0.225%	0.257%
Dimethylhexane (2,2-)	VOC		114.229	0.2966	0.095%	0.111%
Dimethylcyclopentane (1,3,2-)	VOC		98.186	0.2549	0.848%	0.849%
Dimethylhexane (2,5-)	VOC		114.229	0.2966	0.000%	0.000%
Dimethylhexane (2,4-)	VOC		114.229	0.2966	0.143%	0.166%
Ethylcyclopentane	VOC		98.186	0.2549	0.464%	0.464%
Trimethylpentane (2,2,3-)	VOC		114.229	0.2966	0.028%	0.033%
Trimethylcyclopentane (1,1,2,3-)	VOC		112.213	0.2914	0.000%	0.000%
Dimethylhexane (3,3-)	VOC		114.229	0.2966	0.000%	0.000%
Trimethylcyclopentane (1,1,2,3-)	VOC		112.213	0.2914	0.000%	0.000%
Trimethylpentane (2,3,4-)	VOC		114.229	0.2966	0.000%	0.000%
Dimethylhexane (2,3-)	VOC		114.229	0.2966	0.000%	0.000%
Toluene	VOC	X	92.138	0.2392	4.445%	4.174%
Trimethylcyclopentane (1,1,2-)	VOC		112.213	0.2914	0.371%	0.424%
Dimethylhexane (3,4-)	VOC		114.229	0.2966	3.506%	4.081%
Methylheptane (2-)	VOC		114.229	0.2966	0.000%	0.000%
Methylheptane (4-)	VOC		114.229	0.2966	2.896%	3.372%
Dimethylhexane (3,4-)	VOC		114.229	0.2966	0.000%	0.000%
Methylheptane (3-)	VOC		114.229	0.2966	0.416%	0.484%
Ethylhexane (3-)	VOC		114.229	0.2966	0.111%	0.129%
Trimethylcyclopentane (1,3,2,4-)	VOC		112.213	0.2914	0.028%	0.032%
Dimethylcyclohexane (1,3-)	VOC		112.213	0.2914	0.170%	0.194%
Trimethylcyclopentane (1,3,2,1-)	VOC		112.213	0.2914	0.170%	0.194%
Dimethylcyclohexane (1,1,4-)	VOC		112.213	0.2914	0.000%	0.000%

TABLE C-3a
Flash Analysis
Estimation of Specie Weight Percentages
Pressurized Liquid

Component			Molecular Weight (lb/mol) _i	Density (lb/scf) _i	Mole Percent (mol/mol) _i	Weight Percent (lb _i /lb _T)
Name (i)	Type	HAP				
Trimethylhexane (2,2,5-)	VOC		128.255	0.3330	0.000%	0.000%
Dimethylcyclohexane (1,1-)	VOC		112.213	0.2914	0.000%	0.000%
Ethylcyclopentane (1-methyl-t-3-)	VOC		112.213	0.2914	0.000%	0.000%
Ethylcyclopentane (1-methyl-c-3-)	VOC		112.213	0.2914	0.000%	0.000%
Ethylcyclopentane (1-methyl-t-2-)	VOC		112.213	0.2914	0.000%	0.000%
Trimethylhexane (2,2,4-)	VOC		128.255	0.3330	0.000%	0.000%
Ethylcyclopentane (1-methyl-t-1-)	VOC		112.213	0.2914	0.000%	0.000%
Cycloheptane	VOC		98.186	0.2549	0.000%	0.000%
Octane (n-)	VOC		114.229	0.2966	4.373%	5.090%
Trimethylhexane (2,4,4-)	VOC		128.255	0.3330	0.190%	0.248%
Tetramethylpentane (2,2,4,4-)	VOC		128.255	0.3330	0.000%	0.000%
Dimethylcyclohexane (1,t-3-)	VOC		112.213	0.2914	0.053%	0.061%
Dimethylcyclohexane (1,c-4-)	VOC		112.213	0.2914	0.053%	0.061%
Trimethylcyclopentane (1,c-2,c-3-)	VOC		112.213	0.2914	0.053%	0.061%
Propylcyclopentane (i-)	VOC		112.213	0.2914	0.348%	0.398%
Trimethylhexane (2,3,5-)	VOC		128.255	0.3330	0.006%	0.008%
Dimethylheptane (2,2-)	VOC		128.255	0.3330	0.000%	0.000%
Dimethylheptane (2,4-)	VOC		128.255	0.3330	0.158%	0.207%
Methylcyclopentane (1-ethyl-c-2-)	VOC		112.213	0.2914	0.181%	0.207%
Trimethylhexane (2,2,3-)	VOC		128.255	0.3330	0.000%	0.000%
Dimethylcyclohexane (1,c-2-)	VOC		112.213	0.2914	0.510%	0.583%
Dimethylheptane (2,6-)	VOC		128.255	0.3330	0.112%	0.146%
Propylcyclopentane (n-)	VOC		112.213	0.2914	0.000%	0.000%
Trimethylcyclohexane (1,c-3,c-5-)	VOC		126.239	0.3278	0.000%	0.000%
Ethylcyclohexane	VOC		112.213	0.2914	1.365%	1.561%
Dimethylheptane (2,5-)	VOC		128.255	0.3330	0.067%	0.088%
Dimethylheptane (3,5-)	VOC		128.255	0.3330	0.067%	0.088%
Trimethylcyclohexane (1,1,3-)	VOC		126.239	0.3278	0.077%	0.099%
Trimethylhexane (2,3,3-)	VOC		128.255	0.3330	0.038%	0.050%
Dimethylheptane (3,3-)	VOC		128.255	0.3330	0.038%	0.050%
Trimethylcyclohexane (1,1,4-)	VOC		126.239	0.3278	0.000%	0.000%
Tetramethylpentane (2,2,3,3-)	VOC		128.255	0.3330	0.261%	0.341%
Ethylbenzene	VOC	X	106.165	0.2757	0.406%	0.439%
Trimethylhexane (2,3,4-)	VOC		128.255	0.3330	0.007%	0.009%
Trimethylcyclohexane (1,t-2,t-4-)	VOC		126.239	0.3278	0.000%	0.000%
Dimethylheptane (2,3-)	VOC		128.255	0.3330	0.000%	0.000%
Trimethylcyclohexane (1,c-3,t-5-)	VOC		126.239	0.3278	0.000%	0.000%
Xylene (m-)	VOC	X	106.165	0.2757	2.462%	2.664%
Xylene (p-)	VOC	X	106.165	0.2757	2.462%	2.664%
Dimethylheptane (3,4-)	VOC		128.255	0.3330	0.092%	0.120%
Methyloctane (2-)	VOC		128.255	0.3330	0.782%	1.022%
Methyloctane (4-)	VOC		128.255	0.3330	0.782%	1.022%
Dimethylheptane (3,4-)	VOC		128.255	0.3330	0.000%	0.000%
Methyloctane (3-)	VOC		128.255	0.3330	0.000%	0.000%
Butylcyclopentane (i-)	VOC		126.239	0.3278	0.000%	0.000%
Trimethylcyclohexane (1,t-2,c-3-)	VOC		126.239	0.3278	0.231%	0.297%
Trimethylcyclohexane (1,t-2,c-4-)	VOC		126.239	0.3278	0.231%	0.297%
Xylene (o-)	VOC	X	106.165	0.2757	0.547%	0.592%
Trimethylcyclohexane (1,1,2-)	VOC		126.239	0.3278	0.000%	0.000%
Trimethylcyclohexane (1,c-2,t-4-)	VOC		126.239	0.3278	0.200%	0.257%
Trimethylcyclohexane (1,c-2,c-4-)	VOC		126.239	0.3278	0.000%	0.000%
Nonane (n-)	VOC		128.255	0.3330	2.884%	3.770%
Unknowns	VOC		283.704	0.7366	10.755%	31.094%
Pressurized Liquid			98.125	0.2548	100.000%	100.000%
TOC (Total)			98.677	0.2562	99.000%	99.556%
VOC (Total)			124.943	0.3244	74.685%	95.096%
HAP (Total)			92.449	0.2400	7.356%	6.931%
Xylenes			106.165	0.2757	5.472%	5.920%

NOTES

1. Normalized mole percentages from TABLE C-2 to make total 100.000%.
2. Determined molecular weight of unknowns via iteration to match TABLE C-1.

MW = 98.125 lb/lb-mol

TABLE C-3b
Flash Analysis
Estimation of Specie Weight Percentages
Flash Gas

Component			Molecular Weight (lb/mol) _i	Density (lb/scf) _i	Mole Percent (mol _i /mol _T)	Weight Percent (lb/lb _T)
Name (i)	Type	HAP				
Nitrogen			28.013	0.0727	0.101%	0.105%
Carbon Dioxide	GHG		44.010	0.1143	3.163%	5.167%
Methane	GHG		16.042	0.0417	69.444%	41.356%
Ethane			30.069	0.0781	10.467%	11.683%
Propane	VOC		44.096	0.1145	5.339%	8.739%
Butane (i-)	VOC		58.122	0.1509	2.126%	4.587%
Butane (n-)	VOC		58.122	0.1509	2.495%	5.383%
Pentane (i-)	VOC		72.149	0.1873	1.895%	5.075%
Pentane (n-)	VOC		72.149	0.1873	1.056%	2.828%
Dimethylbutane (2,2-)	VOC		86.175	0.2238	0.050%	0.161%
Dimethylbutane (2,3-)	VOC		86.175	0.2238	0.000%	0.000%
Cyclopentane	VOC		70.133	0.1821	0.000%	0.000%
Methylpentane (2-)	VOC		86.175	0.2238	0.352%	1.128%
Methylpentane (3-)	VOC		86.175	0.2238	0.264%	0.844%
Hexane (n-)	VOC	X	86.175	0.2238	0.561%	1.793%
Dimethylpentane (2,2-)	VOC		100.202	0.2602	0.032%	0.119%
Methylcyclopentane	VOC		84.159	0.2185	0.116%	0.363%
Dimethylpentane (2,4-)	VOC		100.202	0.2602	0.013%	0.049%
Trimethylbutane (2,2,3-)	VOC		100.202	0.2602	0.000%	0.000%
Benzene	VOC	X	78.112	0.2028	0.175%	0.509%
Dimethylpentane (3,3-)	VOC		100.202	0.2602	0.023%	0.084%
Cyclohexane	VOC		84.159	0.2185	0.113%	0.354%
Methylhexane (2-)	VOC		100.202	0.2602	0.235%	0.873%
Dimethylpentane (2,3-)	VOC		100.202	0.2602	0.000%	0.000%
Dimethylcyclopentane (1,1-)	VOC		98.186	0.2549	0.062%	0.225%
Methylhexane (3-)	VOC		100.202	0.2602	0.244%	0.907%
Dimethylcyclopentane (1,t-3-)	VOC		98.186	0.2549	0.017%	0.061%
Dimethylcyclopentane (1,c-3-)	VOC		98.186	0.2549	0.027%	0.099%
Ethylpentane (3-)	VOC		100.202	0.2602	0.003%	0.011%
Dimethylcyclopentane (1,t-2-)	VOC		98.186	0.2549	0.023%	0.083%
Trimethylpentane (2,2,4-)	VOC	X	114.229	0.2966	0.002%	0.009%
Heptane (n-)	VOC		100.202	0.2602	0.383%	1.426%
Methylcyclohexane	VOC		98.186	0.2549	0.136%	0.495%
Trimethylcyclopentane (1,1,3-)	VOC		112.213	0.2914	0.009%	0.039%
Dimethylhexane (2,2-)	VOC		114.229	0.2966	0.004%	0.017%
Dimethylcyclopentane (1,c-2-)	VOC		98.186	0.2549	0.035%	0.127%
Dimethylhexane (2,5-)	VOC		114.229	0.2966	0.000%	0.000%
Dimethylhexane (2,4-)	VOC		114.229	0.2966	0.006%	0.025%
Ethylcyclopentane	VOC		98.186	0.2549	0.019%	0.070%
Trimethylpentane (2,2,3-)	VOC		114.229	0.2966	0.001%	0.005%
Trimethylcyclopentane (1,t-2,c-4-)	VOC		112.213	0.2914	0.000%	0.000%
Dimethylhexane (3,3-)	VOC		114.229	0.2966	0.000%	0.000%
Trimethylcyclopentane (1,t-2,c-3-)	VOC		112.213	0.2914	0.000%	0.000%
Trimethylpentane (2,3,4-)	VOC		114.229	0.2966	0.000%	0.000%
Dimethylhexane (2,3-)	VOC		114.229	0.2966	0.000%	0.000%
Toluene	VOC	X	92.138	0.2392	0.183%	0.625%
Trimethylcyclopentane (1,1,2-)	VOC		112.213	0.2914	0.015%	0.064%
Dimethylhexane (3,4-)	VOC		114.229	0.2966	0.144%	0.611%
Methylheptane (2-)	VOC		114.229	0.2966	0.000%	0.000%
Methylheptane (4-)	VOC		114.229	0.2966	0.119%	0.505%
Dimethylhexane (3,4-)	VOC		114.229	0.2966	0.000%	0.000%
Methylheptane (3-)	VOC		114.229	0.2966	0.017%	0.073%
Ethylhexane (3-)	VOC		114.229	0.2966	0.005%	0.019%
Trimethylcyclopentane (1,c-2,t-4-)	VOC		112.213	0.2914	0.001%	0.005%
Dimethylcyclohexane (1,c-3-)	VOC		112.213	0.2914	0.007%	0.029%
Trimethylcyclopentane (1,c-2,t-3-)	VOC		112.213	0.2914	0.007%	0.029%
Dimethylcyclohexane (1,t-4-)	VOC		112.213	0.2914	0.000%	0.000%

TABLE C-3b
Flash Analysis
Estimation of Specie Weight Percentages
Flash Gas

Component			Molecular Weight (lb/mol) _i	Density (lb/scf) _i	Mole Percent (mol/mol) _T	Weight Percent (lb/lb) _T
Name (i)	Type	HAP				
Trimethylhexane (2,2,5-)	VOC		128.255	0.3330	0.000%	0.000%
Dimethylcyclohexane (1,1-)	VOC		112.213	0.2914	0.000%	0.000%
Ethylcyclopentane (1-methyl-t-3-)	VOC		112.213	0.2914	0.000%	0.000%
Ethylcyclopentane (1-methyl-c-3-)	VOC		112.213	0.2914	0.000%	0.000%
Ethylcyclopentane (1-methyl-t-2-)	VOC		112.213	0.2914	0.000%	0.000%
Trimethylhexane (2,2,4-)	VOC		128.255	0.3330	0.000%	0.000%
Ethylcyclopentane (1-methyl-t-1-)	VOC		112.213	0.2914	0.000%	0.000%
Cycloheptane	VOC		98.186	0.2549	0.000%	0.000%
Octane (n-)	VOC		114.229	0.2966	0.180%	0.763%
Trimethylhexane (2,4,4-)	VOC		128.255	0.3330	0.003%	0.016%
Tetramethylpentane (2,2,4,4-)	VOC		128.255	0.3330	0.000%	0.000%
Dimethylcyclohexane (1,t-3-)	VOC		112.213	0.2914	0.001%	0.004%
Dimethylcyclohexane (1,c-4-)	VOC		112.213	0.2914	0.001%	0.004%
Trimethylcyclopentane (1,c-2,c-3-)	VOC		112.213	0.2914	0.001%	0.004%
Propylcyclopentane (i-)	VOC		112.213	0.2914	0.006%	0.025%
Trimethylhexane (2,3,5-)	VOC		128.255	0.3330	0.000%	0.000%
Dimethylheptane (2,2-)	VOC		128.255	0.3330	0.000%	0.000%
Dimethylheptane (2,4-)	VOC		128.255	0.3330	0.003%	0.013%
Methylcyclopentane (1-ethyl-c-2-)	VOC		112.213	0.2914	0.003%	0.013%
Trimethylhexane (2,2,3-)	VOC		128.255	0.3330	0.000%	0.000%
Dimethylcyclohexane (1,c-2-)	VOC		112.213	0.2914	0.009%	0.037%
Dimethylheptane (2,6-)	VOC		128.255	0.3330	0.002%	0.009%
Propylcyclopentane (n-)	VOC		112.213	0.2914	0.000%	0.000%
Trimethylcyclohexane (1,c-3,c-5-)	VOC		126.239	0.3278	0.000%	0.000%
Ethylcyclohexane	VOC		112.213	0.2914	0.023%	0.098%
Dimethylheptane (2,5-)	VOC		128.255	0.3330	0.001%	0.005%
Dimethylheptane (3,5-)	VOC		128.255	0.3330	0.001%	0.005%
Trimethylcyclohexane (1,1,3-)	VOC		126.239	0.3278	0.001%	0.006%
Trimethylhexane (2,3,3-)	VOC		128.255	0.3330	0.001%	0.003%
Dimethylheptane (3,3-)	VOC		128.255	0.3330	0.001%	0.003%
Trimethylcyclohexane (1,1,4-)	VOC		126.239	0.3278	0.000%	0.000%
Tetramethylpentane (2,2,3,3-)	VOC		128.255	0.3330	0.004%	0.021%
Ethylbenzene	VOC	X	106.165	0.2757	0.007%	0.028%
Trimethylhexane (2,3,4-)	VOC		128.255	0.3330	0.000%	0.001%
Trimethylcyclohexane (1,t-2,t-4-)	VOC		126.239	0.3278	0.000%	0.000%
Dimethylheptane (2,3-)	VOC		128.255	0.3330	0.000%	0.000%
Trimethylcyclohexane (1,c-3,t-5-)	VOC		126.239	0.3278	0.000%	0.000%
Xylene (m-)	VOC	X	106.165	0.2757	0.042%	0.167%
Xylene (p-)	VOC	X	106.165	0.2757	0.042%	0.167%
Dimethylheptane (3,4-)	VOC		128.255	0.3330	0.002%	0.008%
Methyloctane (2-)	VOC		128.255	0.3330	0.013%	0.064%
Methyloctane (4-)	VOC		128.255	0.3330	0.013%	0.064%
Dimethylheptane (3,4-)	VOC		128.255	0.3330	0.000%	0.000%
Methyloctane (3-)	VOC		128.255	0.3330	0.000%	0.000%
Butylcyclopentane (i-)	VOC		126.239	0.3278	0.000%	0.000%
Trimethylcyclohexane (1,t-2,c-3-)	VOC		126.239	0.3278	0.004%	0.019%
Trimethylcyclohexane (1,t-2,c-4-)	VOC		126.239	0.3278	0.004%	0.019%
Xylene (o-)	VOC	X	106.165	0.2757	0.009%	0.037%
Trimethylcyclohexane (1,1,2-)	VOC		126.239	0.3278	0.000%	0.000%
Trimethylcyclohexane (1,c-2,t-4-)	VOC		126.239	0.3278	0.003%	0.016%
Trimethylcyclohexane (1,c-2,c-4-)	VOC		126.239	0.3278	0.000%	0.000%
Nonane (n-)	VOC		128.255	0.3330	0.050%	0.236%
Unknowns	VOC		473.700	1.2300	0.079%	1.387%
Flash Gas			26.938	0.0699	100.000%	100.000%
TOC (Total)			26.379	0.0685	96.736%	94.728%
VOC (Total)			66.745	0.1733	16.825%	41.688%
HAP (Total)			88.115	0.2288	0.762%	2.492%
Xylenes			106.165	0.2757	0.094%	0.371%

NOTES

1. Normalized mole percentages from TABLE C-2 to make total 100.000%.
2. Determined molecular weight of unknowns via iteration to match TABLE C-1, unless value negative.
MW = 26.938 lb/lb-mol

TABLE C-3c
Flash Analysis
Estimation of Specie Weight Percentages
Residual Liquid

Component			Molecular Weight (lb/mol) _i	Density (lb/scf) _i	Mole Percent (mol _i /mol _T)	Weight Percent (lb _i /lb _T)
Name (i)	Type	HAP				
Nitrogen			28.013	0.0727	0.000%	0.000%
Carbon Dioxide	GHG		44.010	0.1143	0.038%	0.013%
Methane	GHG		16.042	0.0417	0.303%	0.038%
Ethane			30.069	0.0781	0.383%	0.090%
Propane	VOC		44.096	0.1145	0.838%	0.288%
Butane (i-)	VOC		58.122	0.1509	0.849%	0.385%
Butane (n-)	VOC		58.122	0.1509	1.391%	0.630%
Pentane (i-)	VOC		72.149	0.1873	2.544%	1.430%
Pentane (n-)	VOC		72.149	0.1873	1.859%	1.045%
Dimethylbutane (2,2-)	VOC		86.175	0.2238	0.227%	0.152%
Dimethylbutane (2,3-)	VOC		86.175	0.2238	0.000%	0.000%
Cyclopentane	VOC		70.133	0.1821	0.000%	0.000%
Methylpentane (2-)	VOC		86.175	0.2238	1.586%	1.065%
Methylpentane (3-)	VOC		86.175	0.2238	1.188%	0.797%
Hexane (n-)	VOC	X	86.175	0.2238	2.522%	1.693%
Dimethylpentane (2,2-)	VOC		100.202	0.2602	0.430%	0.335%
Methylcyclopentane	VOC		84.159	0.2185	1.567%	1.027%
Dimethylpentane (2,4-)	VOC		100.202	0.2602	0.177%	0.138%
Trimethylbutane (2,2,3-)	VOC		100.202	0.2602	0.000%	0.000%
Benzene	VOC	X	78.112	0.2028	2.367%	1.440%
Dimethylpentane (3,3-)	VOC		100.202	0.2602	0.305%	0.238%
Cyclohexane	VOC		84.159	0.2185	1.528%	1.002%
Methylhexane (2-)	VOC		100.202	0.2602	3.167%	2.472%
Dimethylpentane (2,3-)	VOC		100.202	0.2602	0.000%	0.000%
Dimethylcyclopentane (1,1-)	VOC		98.186	0.2549	0.833%	0.637%
Methylhexane (3-)	VOC		100.202	0.2602	3.287%	2.566%
Dimethylcyclopentane (1,1,3-)	VOC		98.186	0.2549	0.225%	0.172%
Dimethylcyclopentane (1,1,3-)	VOC		98.186	0.2549	0.368%	0.281%
Ethylpentane (3-)	VOC		100.202	0.2602	0.040%	0.031%
Dimethylcyclopentane (1,1,2-)	VOC		98.186	0.2549	0.307%	0.235%
Trimethylpentane (2,2,4-)	VOC	X	114.229	0.2966	0.029%	0.026%
Heptane (n-)	VOC		100.202	0.2602	5.170%	4.036%
Methylcyclohexane	VOC		98.186	0.2549	4.647%	3.555%
Trimethylcyclopentane (1,1,3-)	VOC		112.213	0.2914	0.317%	0.277%
Dimethylhexane (2,2-)	VOC		114.229	0.2966	0.134%	0.119%
Dimethylcyclopentane (1,1,2-)	VOC		98.186	0.2549	1.194%	0.913%
Dimethylhexane (2,5-)	VOC		114.229	0.2966	0.000%	0.000%
Dimethylhexane (2,4-)	VOC		114.229	0.2966	0.201%	0.179%
Ethylcyclopentane	VOC		98.186	0.2549	0.653%	0.500%
Trimethylpentane (2,2,3-)	VOC		114.229	0.2966	0.039%	0.035%
Trimethylcyclopentane (1,1,2,3-)	VOC		112.213	0.2914	0.000%	0.000%
Dimethylhexane (3,3-)	VOC		114.229	0.2966	0.000%	0.000%
Trimethylcyclopentane (1,1,2,3-)	VOC		112.213	0.2914	0.000%	0.000%
Trimethylpentane (2,3,4-)	VOC		114.229	0.2966	0.000%	0.000%
Dimethylhexane (2,3-)	VOC		114.229	0.2966	0.000%	0.000%
Toluene	VOC	X	92.138	0.2392	6.256%	4.491%
Trimethylcyclopentane (1,1,2-)	VOC		112.213	0.2914	0.522%	0.457%
Dimethylhexane (3,4-)	VOC		114.229	0.2966	4.934%	4.391%
Methylheptane (2-)	VOC		114.229	0.2966	0.000%	0.000%
Methylheptane (4-)	VOC		114.229	0.2966	4.077%	3.628%

TABLE C-3c
Flash Analysis
Estimation of Specie Weight Percentages
Residual Liquid

Component			Molecular Weight (lb/mol) _i	Density (lb/scf) _i	Mole Percent (mol _i /mol _T)	Weight Percent (lb _i /lb _T)
Name (i)	Type	HAP				
Dimethylhexane (3,4-)	VOC		114.229	0.2966	0.000%	0.000%
Methylheptane (3-)	VOC		114.229	0.2966	0.586%	0.521%
Ethylhexane (3-)	VOC		114.229	0.2966	0.156%	0.139%
Trimethylcyclopentane (1,c-2,t-4-)	VOC		112.213	0.2914	0.039%	0.034%
Dimethylcyclohexane (1,c-3-)	VOC		112.213	0.2914	0.239%	0.209%
Trimethylcyclopentane (1,c-2,t-3-)	VOC		112.213	0.2914	0.239%	0.209%
Dimethylcyclohexane (1,t-4-)	VOC		112.213	0.2914	0.000%	0.000%
Trimethylhexane (2,2,5-)	VOC		128.255	0.3330	0.000%	0.000%
Dimethylcyclohexane (1,1-)	VOC		112.213	0.2914	0.000%	0.000%
Ethylcyclopentane (1-methyl-t-3-)	VOC		112.213	0.2914	0.000%	0.000%
Ethylcyclopentane (1-methyl-c-3-)	VOC		112.213	0.2914	0.000%	0.000%
Ethylcyclopentane (1-methyl-t-2-)	VOC		112.213	0.2914	0.000%	0.000%
Trimethylhexane (2,2,4-)	VOC		128.255	0.3330	0.000%	0.000%
Ethylcyclopentane (1-methyl-t-1-)	VOC		112.213	0.2914	0.000%	0.000%
Cycloheptane	VOC		98.186	0.2549	0.000%	0.000%
Octane (n-)	VOC		114.229	0.2966	6.155%	5.477%
Trimethylhexane (2,4,4-)	VOC		128.255	0.3330	0.269%	0.269%
Tetramethylpentane (2,2,4,4-)	VOC		128.255	0.3330	0.000%	0.000%
Dimethylcyclohexane (1,t-3-)	VOC		112.213	0.2914	0.075%	0.066%
Dimethylcyclohexane (1,c-4-)	VOC		112.213	0.2914	0.075%	0.066%
Trimethylcyclopentane (1,c-2,c-3-)	VOC		112.213	0.2914	0.075%	0.066%
Propylcyclopentane (i-)	VOC		112.213	0.2914	0.493%	0.431%
Trimethylhexane (2,3,5-)	VOC		128.255	0.3330	0.009%	0.009%
Dimethylheptane (2,2-)	VOC		128.255	0.3330	0.000%	0.000%
Dimethylheptane (2,4-)	VOC		128.255	0.3330	0.224%	0.224%
Methylcyclopentane (1-ethyl-c-2-)	VOC		112.213	0.2914	0.257%	0.224%
Trimethylhexane (2,2,3-)	VOC		128.255	0.3330	0.000%	0.000%
Dimethylcyclohexane (1,c-2-)	VOC		112.213	0.2914	0.723%	0.632%
Dimethylheptane (2,6-)	VOC		128.255	0.3330	0.159%	0.159%
Propylcyclopentane (n-)	VOC		112.213	0.2914	0.000%	0.000%
Trimethylcyclohexane (1,c-3,c-5-)	VOC		126.239	0.3278	0.000%	0.000%
Ethylcyclohexane	VOC		112.213	0.2914	1.935%	1.692%
Dimethylheptane (2,5-)	VOC		128.255	0.3330	0.095%	0.095%
Dimethylheptane (3,5-)	VOC		128.255	0.3330	0.095%	0.095%
Trimethylcyclohexane (1,1,3-)	VOC		126.239	0.3278	0.109%	0.107%
Trimethylhexane (2,3,3-)	VOC		128.255	0.3330	0.054%	0.054%
Dimethylheptane (3,3-)	VOC		128.255	0.3330	0.054%	0.054%
Trimethylcyclohexane (1,1,4-)	VOC		126.239	0.3278	0.000%	0.000%
Tetramethylpentane (2,2,3,3-)	VOC		128.255	0.3330	0.370%	0.370%
Ethylbenzene	VOC	X	106.165	0.2757	0.576%	0.476%
Trimethylhexane (2,3,4-)	VOC		128.255	0.3330	0.010%	0.010%
Trimethylcyclohexane (1,t-2,t-4-)	VOC		126.239	0.3278	0.000%	0.000%
Dimethylheptane (2,3-)	VOC		128.255	0.3330	0.000%	0.000%
Trimethylcyclohexane (1,c-3,t-5-)	VOC		126.239	0.3278	0.000%	0.000%
Xylene (m-)	VOC	X	106.165	0.2757	3.491%	2.887%
Xylene (p-)	VOC	X	106.165	0.2757	3.491%	2.887%
Dimethylheptane (3,4-)	VOC		128.255	0.3330	0.130%	0.130%
Methyloctane (2-)	VOC		128.255	0.3330	1.109%	1.108%
Methyloctane (4-)	VOC		128.255	0.3330	1.109%	1.108%

TABLE C-3c
Flash Analysis
Estimation of Specie Weight Percentages
Residual Liquid

Component			Molecular Weight (lb/mol) _i	Density (lb/scf) _i	Mole Percent (mol _i /mol _T)	Weight Percent (lb _i /lb _T)
Name (i)	Type	HAP				
Dimethylheptane (3,4-)	VOC		128.255	0.3330	0.000%	0.000%
Methyloctane (3-)	VOC		128.255	0.3330	0.000%	0.000%
Butylcyclopentane (i-)	VOC		126.239	0.3278	0.000%	0.000%
Trimethylcyclohexane (1,t-2,c-3-)	VOC		126.239	0.3278	0.328%	0.322%
Trimethylcyclohexane (1,t-2,c-4-)	VOC		126.239	0.3278	0.328%	0.322%
Xylene (o-)	VOC	X	106.165	0.2757	0.776%	0.641%
Trimethylcyclohexane (1,1,2-)	VOC		126.239	0.3278	0.000%	0.000%
Trimethylcyclohexane (1,c-2,t-4-)	VOC		126.239	0.3278	0.284%	0.279%
Trimethylcyclohexane (1,c-2,c-4-)	VOC		126.239	0.3278	0.000%	0.000%
Nonane (n-)	VOC		128.255	0.3330	4.089%	4.086%
Unknowns	VOC		283.170	0.7353	15.292%	33.734%
Residual Liquid			128.362	0.3333	100.000%	100.000%
TOC (Total)			128.394	0.3334	99.962%	99.987%
VOC (Total)			129.116	0.3353	99.276%	99.859%
HAP (Total)			92.587	0.2404	10.159%	7.327%
Xylenes			106.165	0.2757	7.757%	6.416%

NOTES

1. Normalized mole percentages from TABLE C-2 to make total 100.000%.
2. Determined molecular weight of unknowns via iteration to match TABLE C-1.

$$MW = 128.362 \text{ lb/lb-mol}$$

TABLE C-4
Flash Analysis
Maximum Hourly and Annual Emission Estimates

Station ID	M&R Wacker-TK01				
Service	Pipeline Liquids				
Liquids Holding Capacity	0 gal			0 gal	
Liquids Input Rate	220 gal/yr			220 gal/hr	
Flash Gas Density	0.0769 lb/scf			0.0769 lb/scf	
Flash Factor	328.03 scf/bbl			328.03 scf/bbl	
Flash Gas Rate	1,718 scf/yr			1,718 scfh	
Flash Losses	132 lb/yr	Average	Maximum	132 lb/hr	Maximum
Flash Gas	100.00% by weight	0.0151 lb/hr	0.0661 tpy	100.00% by weight	132.2027 lb/hr
CO ₂ -e	873.65% by weight	0.1318 lb/hr	0.5775 tpy	873.65% by weight	1,154.9857 lb/hr
CO ₂	5.17% by weight	0.0008 lb/hr	0.0034 tpy	5.17% by weight	6.8315 lb/hr
TOC (Total)	94.73% by weight	0.0143 lb/hr	0.0626 tpy	94.73% by weight	125.2324 lb/hr
Methane	41.36% by weight	0.0062 lb/hr	0.0273 tpy	41.36% by weight	54.6740 lb/hr
Ethane	11.68% by weight	0.0018 lb/hr	0.0077 tpy	11.68% by weight	15.4458 lb/hr
VOC (Total)	41.69% by weight	0.0063 lb/hr	0.0276 tpy	41.69% by weight	55.1125 lb/hr
HAP (Total)	2.49% by weight	0.0004 lb/hr	0.0016 tpy	2.49% by weight	3.2948 lb/hr
Benzene	0.5089% by weight	0.0001 lb/hr	0.0003 tpy	0.5089% by weight	0.6727 lb/hr
Ethylbenzene	0.0275% by weight	0.0000 lb/hr	0.0000 tpy	0.0275% by weight	0.0364 lb/hr
Hexane (n-)	1.7932% by weight	0.0003 lb/hr	0.0012 tpy	1.7932% by weight	2.3707 lb/hr
Methanol					
Naphthalene					
Toluene	0.6253% by weight	0.0001 lb/hr	0.0004 tpy	0.6253% by weight	0.8267 lb/hr
Trimethylpentane (2,2,4-)	0.0091% by weight	0.0000 lb/hr	0.0000 tpy	0.0091% by weight	0.0121 lb/hr
Xylenes	0.3706% by weight	0.0001 lb/hr	0.0002 tpy	0.3706% by weight	0.4900 lb/hr

NOTES

1. Separator Characteristics:

Orientation	Horizontal
Height/Length	ft
Diameter	ft
Capacity (physical)	gal
Capacity (liquid)	gal

2. Liquid input rates:

- | | |
|--|---------|
| a. maximum hourly based on operator experience; | 220 gal |
| b. maximum annual based on operating experience and safety factor; and | 220 gal |
| c. average hourly is just the maximum annual divided by 8,760 hrs/yr. | |

3. Flash gas density is 110% of the value extracted from TABLE C-3b.

Density (TABLE C-3b):	0.0699 lb/scf	Safety Factor:	110%
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4. Flash factor extracted from TABLE C-1.

5. Speciated emissions vapor weight percentages extracted from TABLE C-3b.

6. Liquids from the M&R are collected in a drum. Flash emissions from the drum are estimated here.

TABLE D-1
Volatile Organic Liquid Storage Tanks
Vapor Physical Property and Composition Estimates
Raoult's Law

Component Data												Liquid Data		Vapor Data		
Component			MW (lb/mol) _i M _i	Yaws Vapor Pressure Coefficients						VP Datum		mol% (mol/mol) _{L,i} f _{v,i}	wt% (lb/lb) _{L,i} f _{m,i}	y _i (mol/mol) _v	wt% _i (lb/lb) _v	
Name (i)	Type	HAP		A	B	C	D	E	T _{Min} (°F)	T _{Max} (°F)	T (°F)					P _i (psia)
Nitrogen			28.013	3.7362	2.6465E+02	-6.7880E+00	0.0000E+00	0.0000E+00	-345.75	-232.60	68.00		0.000%	0.000%	0.000%	0.000%
Carbon Dioxide	GHG		44.010	35.0169	-1.5119E+03	-1.1334E+01	9.3368E-03	1.7136E-09	-68.80	87.80	68.00	833.1743	0.038%	0.013%	1.087%	2.183%
Methane	GHG		16.042	14.6667	-5.7097E+02	-3.3373E+00	-2.1999E-09	1.3096E-05	-295.60	-115.60	68.00	7,889.8148	0.303%	0.038%	82.053%	60.088%
Ethane			30.069	20.6973	-1.1341E+03	-5.2514E+00	-9.8774E-11	6.7329E-06	-297.40	89.60	68.00	546.5426	0.383%	0.090%	7.185%	9.862%
Propane	VOC		44.096	21.4469	-1.4627E+03	-5.2610E+00	3.2820E-11	3.7349E-06	-306.40	206.60	68.00	121.5870	0.838%	0.288%	3.497%	7.039%
Butane (i-)	VOC		58.122	31.2541	-1.9532E+03	-8.8060E+00	8.9246E-11	5.7501E-06	-254.20	275.00	68.00	44.2751	0.849%	0.385%	1.290%	3.423%
Butane (n-)	VOC		58.122	27.0441	-1.9049E+03	-7.1805E+00	-6.6845E-11	4.2190E-06	-216.40	305.60	68.00	30.1688	1.391%	0.630%	1.440%	3.821%
Pentane (i-)	VOC		72.149	29.2963	-2.1762E+03	-7.8830E+00	-4.6512E-11	3.8997E-06	-256.00	368.60	68.00	11.1082	2.544%	1.430%	0.970%	3.193%
Pentane (n-)	VOC		72.149	33.3239	-2.4227E+03	-9.2354E+00	9.0199E-11	4.1050E-06	-202.00	386.60	68.00	8.1938	1.859%	1.045%	0.523%	1.722%
Dimethylbutane (2,2-)	VOC		86.175	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.227%	0.152%	0.039%	0.155%
Dimethylbutane (2,3-)	VOC		86.175	33.6319	-2.5524E+03	-9.3142E+00	1.4759E-10	3.9140E-06	-223.60	500.00	68.00	3.6998	0.000%	0.000%	0.000%	0.000%
Cyclopentane	VOC		70.133	29.1547	-2.3512E+03	-7.6965E+00	-1.6212E-10	3.1250E-06	-137.20	462.20	68.00	5.0181	0.000%	0.000%	0.000%	0.000%
Methylpentane (2-)	VOC		86.175	30.7477	-2.4888E+03	-8.2295E+00	-2.3723E-11	3.2402E-06	-243.40	437.00	68.00	3.3041	1.586%	1.065%	0.180%	0.707%
Methylpentane (3-)	VOC		86.175	35.2848	-2.6773E+03	-9.8546E+00	2.2352E-11	4.0277E-06	-261.40	447.80	68.00	2.9617	1.188%	0.797%	0.121%	0.475%
Hexane (n-)	VOC	X	86.175	69.7378	-3.6278E+03	-2.3927E+01	1.2810E-02	-1.6844E-16	-139.00	453.20	68.00	2.3626	2.522%	1.693%	0.204%	0.804%
Dimethylpentane (2,2-)	VOC		100.202	6.2875	-2.1682E+03	2.6936E+00	-1.5525E-02	1.0917E-05	-191.20	478.40	68.00	1.6191	0.430%	0.335%	0.024%	0.109%
Methylcyclopentane	VOC		84.159	32.4766	-2.6434E+03	-8.7933E+00	2.0749E-11	3.2158E-06	-223.60	500.00	68.00	2.1257	1.567%	1.027%	0.114%	0.439%
Dimethylpentane (2,4-)	VOC		100.202	35.9436	-2.8460E+03	-9.9938E+00	8.0693E-11	3.6419E-06	-182.20	476.60	68.00	1.5074	0.177%	0.138%	0.009%	0.042%
Trimethylbutane (2,2,3-)	VOC		100.202	32.3633	-2.6614E+03	-8.7743E+00	-7.6870E-10	3.2006E-06	-11.20	496.40	68.00	1.5789	0.000%	0.000%	0.000%	0.000%
Benzene	VOC	X	78.112	31.7718	-2.7254E+03	-8.4443E+00	-5.3534E-09	2.7187E-06	42.80	552.20	68.00	1.4495	2.367%	1.440%	0.118%	0.420%
Methylpentane (3,3-)	VOC		100.202	30.2570	-2.6313E+03	-7.9839E+00	4.6848E-13	2.7170E-06	-209.20	505.40	68.00	1.2681	0.305%	0.238%	0.013%	0.061%
Cyclohexane	VOC		84.159	48.5529	-3.0874E+03	-1.5521E+01	7.3830E-03	6.3563E-12	44.60	537.80	68.00	1.5112	1.528%	1.002%	0.079%	0.304%
Methylhexane (2-)	VOC		100.202	54.1075	-3.3785E+03	-1.7547E+01	8.2594E-03	-3.4967E-14	-180.40	494.60	68.00	0.9987	3.167%	2.472%	0.109%	0.496%
Dimethylpentane (2,3-)	VOC		100.202	39.7737	-2.9050E+03	-1.2012E+01	5.1334E-03	-2.3807E-14	-171.40	507.20	68.00	1.0467	0.000%	0.000%	0.000%	0.000%
Dimethylcyclopentane (1,1-)	VOC		98.186	58.1943	-3.4151E+03	-1.9294E+01	9.6704E-03	-2.4361E-15	-94.00	525.20	68.00	1.1616	0.833%	0.637%	0.033%	0.149%
Methylhexane (3-)	VOC		100.202	35.2535	-2.9310E+03	-9.6667E+00	-5.2026E-11	3.2107E-06	-182.20	503.60	68.00	0.9291	3.287%	2.566%	0.105%	0.479%
Dimethylcyclopentane (1,1,3-)	VOC		98.186	53.1912	-3.3121E+03	-1.7277E+01	8.3107E-03	5.0896E-14	-209.20	536.00	68.00	0.9791	0.225%	0.172%	0.008%	0.034%
Dimethylcyclopentane (1,1,3-)	VOC		98.186	35.4255	-2.7286E+03	-1.0444E+01	4.6608E-03	1.7565E-14	-209.20	532.40	68.00	1.0075	0.368%	0.281%	0.013%	0.057%
Ethylpentane (3-)	VOC		100.202	8.5463	-2.2979E+03	1.5503E+00	-1.2233E-02	8.2670E-06	-180.40	514.40	68.00	0.8755	0.040%	0.031%	0.001%	0.006%
Dimethylcyclopentane (1,1,2-)	VOC		98.186	36.8109	-2.9536E+03	-1.0275E+01	-4.6212E-12	3.6730E-06	-178.60	536.00	68.00	0.9713	0.307%	0.235%	0.010%	0.046%
Trimethylpentane (2,2,4-)	VOC	X	114.229	50.3422	-3.2789E+03	-1.6111E+01	7.4260E-03	-9.1804E-14	-160.60	519.80	68.00	0.7453	0.029%	0.026%	0.001%	0.004%
Heptane (n-)	VOC		100.202	65.0257	-3.8188E+03	-2.1684E+01	1.0387E-02	1.0206E-14	-130.00	512.60	68.00	0.6808	5.170%	4.036%	0.121%	0.552%
Methylcyclohexane	VOC		98.186	38.0955	-3.0738E+03	-1.0684E+01	-5.1766E-11	3.5282E-06	-194.80	570.20	68.00	0.6925	4.647%	3.555%	0.110%	0.495%
Trimethylcyclopentane (1,1,3-)	VOC		112.213	11.0144	-2.9801E+03	-2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.317%	0.277%	0.000%	0.001%
Dimethylhexane (2,2-)	VOC		114.229	38.7670	-3.1841E+03	-1.0857E+01	1.9275E-12	3.4797E-06	-185.80	530.60	68.00	0.5066	0.134%	0.119%	0.002%	0.012%
Dimethylcyclopentane (1,1,2-)	VOC		98.186	36.3623	-3.0025E+03	-1.0070E+01	-1.0435E-09	3.3726E-06	-65.20	557.60	68.00	0.7110	1.194%	0.913%	0.029%	0.131%
Dimethylhexane (2,5-)	VOC		114.229	40.0260	-3.2647E+03	-1.1282E+01	-6.5408E-10	3.6200E-06	-131.80	530.60	68.00	0.4490	0.000%	0.000%	0.000%	0.000%
Dimethylhexane (2,4-)	VOC		114.229	56.2877	-3.6225E+03	-1.8225E+01	8.1864E-03	8.7232E-12	30.20	537.80	68.00	0.4499	0.201%	0.179%	0.003%	0.016%
Ethylcyclopentane	VOC		98.186	36.3631	-3.0448E+03	-1.0038E+01	3.5007E-11	3.2347E-06	-216.40	566.60	68.00	0.5963	0.653%	0.500%	0.013%	0.060%
Trimethylpentane (2,2,3-)	VOC		114.229	35.9540	-3.0569E+03	-9.8896E+00	-7.2916E-11	3.1060E-06	-169.60	555.80	68.00	0.4788	0.039%	0.035%	0.001%	0.003%
Trimethylcyclopentane (1,1,2,2,3-)	VOC		112.213	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.000%	0.000%	0.000%	0.000%
Dimethylhexane (3,3-)	VOC		114.229	38.0712	-3.1736E+03	-1.0617E+01	6.3090E-11	3.3817E-06	-194.80	552.20	68.00	0.4250	0.000%	0.000%	0.000%	0.000%
Trimethylcyclopentane (1,1,2,2,3-)	VOC		112.213	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.000%	0.000%	0.000%	0.000%
Trimethylpentane (2,3,4-)	VOC		114.229	34.1565	-3.0232E+03	-9.2267E+00	2.7691E-11	2.7828E-06	-164.20	559.40	68.00	0.4029	0.000%	0.000%	0.000%	0.000%

TABLE D-1
Volatile Organic Liquid Storage Tanks
Vapor Physical Property and Composition Estimates
Raoult's Law

Component Data												Liquid Data		Vapor Data		
Component			MW (lb/mol) _i M _i	Yaws Vapor Pressure Coefficients					VP Datum		mol% (mol/mol _L) f _{m,i}	wt% (lb/lb _L) f _{m,i}	y _i (mol/mol _V)	wt% _i (lb/lb _V)		
Name (i)	Type	HAP		A	B	C	D	E	T _{Min} (°F)	T _{Max} (°F)					T (°F)	P _i (psia)
Dimethylhexane (2,3-)	VOC		114.229	57.3778	-3.7143E+03	-1.8599E+01	8.2907E-03	-2.8441E-12	30.20	554.00	68.00	0.3451	0.000%	0.000%	0.000%	0.000%
Toluene	VOC	X	92.138	34.0775	-3.0379E+03	-9.1635E+00	1.0289E-11	2.7035E-06	-139.00	606.20	68.00	0.4219	6.256%	4.491%	0.091%	0.381%
Trimethylcyclopentane (1,1,2-)	VOC		112.213	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.522%	0.457%	0.000%	0.001%
Dimethylhexane (3,4-)	VOC		114.229	38.6119	-3.2685E+03	-1.0752E+01	3.6386E-09	3.2771E-06	30.20	564.80	68.00	0.3186	4.934%	4.391%	0.054%	0.281%
Methylheptane (2-)	VOC		114.229	37.6930	-3.2611E+03	-1.0391E+01	-1.0524E-12	3.0560E-06	-164.20	548.60	68.00	0.3028	0.000%	0.000%	0.000%	0.000%
Methylheptane (4-)	VOC		114.229	40.2080	-3.3661E+03	-1.1279E+01	-8.7855E-11	3.4055E-06	-185.80	552.20	68.00	0.3001	4.077%	3.628%	0.042%	0.219%
Dimethylhexane (3,4-)	VOC		114.229	38.6119	-3.2685E+03	-1.0752E+01	3.6386E-09	3.2771E-06	30.20	564.80	68.00	0.3186	0.000%	0.000%	0.000%	0.000%
Methylheptane (3-)	VOC		114.229	52.8828	-3.6231E+03	-1.6804E+01	7.1828E-03	7.4077E-14	-184.00	555.80	68.00	0.2869	0.586%	0.521%	0.006%	0.030%
Ethylhexane (3-)	VOC		114.229	40.2079	-3.3651E+03	-1.1285E+01	-5.4180E-09	3.4199E-06	30.20	557.60	68.00	0.2931	0.156%	0.139%	0.002%	0.008%
Trimethylcyclopentane (1,c-2,t-4-)	VOC		112.213	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.039%	0.034%	0.000%	0.000%
Dimethylcyclohexane (1,c-3-)	VOC		112.213	32.4775	-3.0067E+03	-8.5896E+00	7.0258E-11	2.1739E-06	-103.00	604.40	68.00	0.3176	0.239%	0.209%	0.003%	0.013%
Trimethylcyclopentane (1,c-2,t-3-)	VOC		112.213	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.239%	0.209%	0.000%	0.001%
Dimethylcyclohexane (1,t-4-)	VOC		112.213	32.5731	-2.9872E+03	-8.6494E+00	-2.1355E-09	2.2946E-06	-34.60	602.60	68.00	0.3364	0.000%	0.000%	0.000%	0.000%
Trimethylhexane (2,2,5-)	VOC		128.255	7.8816	-2.6422E+03	2.3902E+00	-1.5376E-02	9.7931E-06	-158.80	563.00	68.00	0.2426	0.000%	0.000%	0.000%	0.000%
Dimethylcyclohexane (1,1-)	VOC		112.213	33.1329	-3.0084E+03	-8.8498E+00	-4.3621E-10	2.3704E-06	-27.40	604.40	68.00	0.3361	0.000%	0.000%	0.000%	0.000%
Ethylcyclopentane (1-methyl-t-3-)	VOC		112.213	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.000%	0.000%	0.000%	0.000%
Ethylcyclopentane (1-methyl-c-3-)	VOC		112.213	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.000%	0.000%	0.000%	0.000%
Ethylcyclopentane (1-methyl-t-2-)	VOC		112.213	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.000%	0.000%	0.000%	0.000%
Trimethylhexane (2,2,4-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.000%	0.000%	0.000%	0.000%
Ethylcyclopentane (1-methyl-t-1-)	VOC		112.213	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.000%	0.000%	0.000%	0.000%
Cycloheptane	VOC		98.186	54.0858	-3.6109E+03	-1.7331E+01	7.5272E-03	1.7553E-12	17.60	627.80	68.00	0.3185	0.000%	0.000%	0.000%	0.000%
Octane (n-)	VOC		114.229	29.0948	-3.0114E+03	-7.2653E+00	-2.2696E-11	1.4680E-06	-70.60	564.80	68.00	0.2040	6.155%	5.477%	0.043%	0.225%
Trimethylhexane (2,4,4-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.269%	0.269%	0.047%	0.275%
Tetramethylpentane (2,2,4,4-)	VOC		128.255	-3.8184	-2.2442E+03	7.0671E+00	-1.9644E-02	1.1435E-05	-86.80	568.40	68.00	0.2957	0.000%	0.000%	0.000%	0.000%
Dimethylcyclohexane (1,t-3-)	VOC		112.213	32.4384	-3.0550E+03	-8.5372E+00	2.2892E-10	2.0099E-06	-130.00	617.00	68.00	0.2590	0.075%	0.066%	0.001%	0.003%
Dimethylcyclohexane (1,c-4-)	VOC		112.213	31.9151	-3.0253E+03	-8.3613E+00	5.7055E-12	1.9673E-06	-124.60	617.00	68.00	0.2640	0.075%	0.066%	0.001%	0.003%
Trimethylcyclopentane (1,c-2,c-3-)	VOC		112.213	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.075%	0.066%	0.000%	0.000%
Propylcyclopentane (i-)	VOC		112.213	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.493%	0.431%	0.000%	0.001%
Trimethylhexane (2,3,5-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.009%	0.009%	0.001%	0.009%
Dimethylheptane (2,2-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.000%	0.000%	0.000%	0.000%
Dimethylheptane (2,4-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.224%	0.224%	0.039%	0.228%
Methylcyclopentane (1-ethyl-c-2-)	VOC		112.213	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.257%	0.224%	0.000%	0.001%
Trimethylhexane (2,2,3-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.000%	0.000%	0.000%	0.000%
Dimethylcyclohexane (1,c-2-)	VOC		112.213	32.1635	-3.0728E+03	-8.4344E+00	6.8943E-10	1.9558E-06	-58.00	631.40	68.00	0.2121	0.723%	0.632%	0.005%	0.027%
Dimethylheptane (2,6-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.159%	0.159%	0.028%	0.162%
Propylcyclopentane (n-)	VOC		112.213	33.9220	-3.2097E+03	-8.9914E+00	-3.2992E-11	2.0684E-06	-178.60	626.00	68.00	0.1793	0.000%	0.000%	0.000%	0.000%
Trimethylcyclohexane (1,c-3,c-5-)	VOC		126.239	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.000%	0.000%	0.000%	0.000%
Ethylcyclohexane	VOC		112.213	32.7090	-3.1283E+03	-8.6023E+00	-3.9268E-11	1.9935E-06	-167.80	636.80	68.00	0.1870	1.935%	1.692%	0.012%	0.064%
Dimethylheptane (2,5-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.095%	0.095%	0.017%	0.097%
Dimethylheptane (3,5-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.095%	0.095%	0.017%	0.097%
Trimethylcyclohexane (1,1,3-)	VOC		126.239	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.109%	0.107%	0.000%	0.000%
Trimethylhexane (2,3,3-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.054%	0.054%	0.009%	0.055%
Dimethylheptane (3,3-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.054%	0.054%	0.009%	0.055%

TABLE D-1
Volatile Organic Liquid Storage Tanks
Vapor Physical Property and Composition Estimates
Raoult's Law

Component Data												Liquid Data		Vapor Data		
Component			MW (lb/mol), M _i	Yaws Vapor Pressure Coefficients						VP Datum		mol% (mol/mol _L) f _{i-L}	wt% (lb/lb _L) f _{m-L}	y _i (mol/mol _V)	wt% _i (lb/lb _V)	
Name (i)	Type	HAP		A	B	C	D	E	T _{Min} (°F)	T _{Max} (°F)	T (°F)					P _i (psia)
Trimethylcyclohexane (1,1,4-)	VOC		126.239	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.000%	0.000%	0.000%	0.000%
Tetramethylpentane (2,2,3,3-)	VOC		128.255	35.4216	-3.2760E+03	-9.5678E+00	9.0298E-10	2.4355E-06	14.00	640.40	68.00	0.1369	0.370%	0.370%	0.002%	0.010%
Ethylbenzene	VOC	X	106.165	36.1998	-3.3402E+03	-9.7970E+00	-1.1467E-11	2.5758E-06	-139.00	651.20	68.00	0.1388	0.576%	0.476%	0.003%	0.013%
Trimethylhexane (2,3,4-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.010%	0.010%	0.002%	0.010%
Trimethylcyclohexane (1,t-2,t-4-)	VOC		126.239	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.000%	0.000%	0.000%	0.000%
Dimethylheptane (2,3-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.000%	0.000%	0.000%	0.000%
Trimethylcyclohexane (1,c-3,t-5-)	VOC		126.239	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.000%	0.000%	0.000%	0.000%
Xylene (m-)	VOC	X	106.165	34.6803	-3.2981E+03	-9.2570E+00	-4.3563E-10	-2.4103E-06	-54.40	649.40	68.00	0.0468	3.491%	2.887%	0.006%	0.027%
Xylene (p-)	VOC	X	106.165	60.0531	-4.0159E+03	-1.9441E+01	8.2881E-03	-2.3647E-12	55.40	649.40	68.00	0.1277	3.491%	2.887%	0.015%	0.074%
Dimethylheptane (3,4-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.130%	0.130%	0.023%	0.133%
Methyloctane (2-)	VOC		128.255	6.0191	-2.8579E+03	3.4068E+00	-1.6572E-02	9.8047E-06	-112.00	597.20	68.00	0.0881	1.109%	1.108%	0.003%	0.020%
Methyloctane (4-)	VOC		128.255	11.2012	-2.9467E+03	1.2133E+00	-1.4423E-02	9.1770E-06	-171.40	599.00	68.00	0.0974	1.109%	1.108%	0.004%	0.022%
Dimethylheptane (3,4-)	VOC		128.255	33.1285	-2.4527E+03	-9.2016E+00	-4.7077E-10	4.1755E-06	-146.20	420.80	68.00	5.0720	0.000%	0.000%	0.000%	0.000%
Methyloctane (3-)	VOC		128.255	9.8147	-2.9609E+03	1.9061E+00	-1.5675E-02	9.7961E-06	-160.60	602.60	68.00	0.0889	0.000%	0.000%	0.000%	0.000%
Butylcyclopentane (i-)	VOC		126.239	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.000%	0.000%	0.000%	0.000%
Trimethylcyclohexane (1,t-2,c-3-)	VOC		126.239	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.328%	0.322%	0.000%	0.001%
Trimethylcyclohexane (1,t-2,c-4-)	VOC		126.239	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.328%	0.322%	0.000%	0.001%
Xylene (o-)	VOC	X	106.165	37.2413	-3.4573E+03	-1.0126E+01	9.0676E-11	2.6123E-06	-13.00	674.60	68.00	0.0946	0.776%	0.641%	0.003%	0.012%
Trimethylcyclohexane (1,1,2-)	VOC		126.239	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.000%	0.000%	0.000%	0.000%
Trimethylcyclohexane (1,c-2,t-4-)	VOC		126.239	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.284%	0.279%	0.000%	0.001%
Trimethylcyclohexane (1,c-2,c-4-)	VOC		126.239	11.0144	-2.9801E+03	2.7007E-01	-6.7946E-03	3.5409E-06	-63.40	734.00	68.00	0.0130	0.000%	0.000%	0.000%	0.000%
Nonane (n-)	VOC		128.255	8.8817	-2.8042E+03	1.5262E+00	-1.0464E-02	5.7972E-06	-63.40	613.40	68.00	0.0627	4.089%	4.086%	0.009%	0.051%
Unknowns	VOC		283.170	116.5157	-8.0140E+03	-3.8799E+01	1.3398E-02	-4.4444E-13	50.00	813.20	68.00	0.0000	15.292%	33.734%	0.000%	0.000%
Residual Liquid	Liquid		128.362 lb/lb-mol	Vapor	68.00 °F			29.1420 psia	21.907 lb/lb-mol				100.000%	100.000%	100.000%	100.000%
TOC (Total)			128.394 lb/lb-mol		68.00 °F			28.8362 psia	21.664 lb/lb-mol				99.962%	99.987%	98.913%	97.817%
VOC (Total)			129.116 lb/lb-mol		68.00 °F			2.8403 psia	63.095 lb/lb-mol				99.276%	99.859%	9.676%	27.868%
HAP (Total)			97.838 lb/lb-mol		68.00 °F			0.5616 psia	89.399 lb/lb-mol				16.565%	12.626%	0.319%	1.303%
Xylenes			106.165 lb/lb-mol		68.00 °F			0.0880 psia	106.165 lb/lb-mol				7.757%	6.416%	0.023%	0.114%

NOTES

1. Liquid composition of residual liquid based on SPL flash analysis (see TABLE C-3c).
2. Vapor pressure data for unknowns based on: Pentadecane (n-)

TABLE D-2
Volatile Organic Liquids Loading (Tanker Trucks)
Hourly and Annual Emission Estimates

Source	M&R_Wacker-TL01				
Supply Vessel	M&R_Wacker-TK01				
	Pipeline Liquids				
	55 gal			55 gal	
Tanker Truck Service	Dedicated Normal			Dedicated Normal	
Loading Method	Submerged			Submerged	
Saturation Factor	0.60 n.d.			0.60 n.d.	
Vapor Molecular Weight	66.00 lb/lb-mol			66.00 lb/lb-mol	
Bulk Liquid Temperature	60.09 °F			86.56 °F	
	520.09 R			546.56 R	
Vapor Pressure	5.2712 psia			8.4647 psia	
Loading Loss Factor	5.0009 lb/kgal			7.6417 lb/kgal	
Pumping Rate				150 gpm	
Throughput	4.00 turnover/yr				
	220 gal/yr			55 gal/hr	
Loading Losses	1.1002 lb/yr	Average	Maximum	0.4203 lb/hr	Maximum
Residual Liquid	358.84% by weight	0.0005 lb/hr	0.0020 tpy	358.84% by weight	1.5082 lb/hr
CO _{2,e}	4535.80% by weight	0.0057 lb/hr	0.0250 tpy	4535.80% by weight	19.0637 lb/hr
CO ₂	7.83% by weight	0.0000 lb/hr	0.0000 tpy	7.83% by weight	0.0329 lb/hr
TOC (Total)	351.00% by weight	0.0004 lb/hr	0.0019 tpy	351.00% by weight	1.4752 lb/hr
Methane	215.62% by weight	0.0003 lb/hr	0.0012 tpy	215.62% by weight	0.9062 lb/hr
Ethane	35.39% by weight	0.0000 lb/hr	0.0002 tpy	35.39% by weight	0.1487 lb/hr
VOC (Total)	100.00% by weight	0.0001 lb/hr	0.0006 tpy	100.00% by weight	0.4203 lb/hr
HAP (Total)	4.67% by weight	0.0000 lb/hr	0.0000 tpy	4.67% by weight	0.0196 lb/hr
Benzene	1.5063% by weight	1.89E-06 lb/hr	8.29E-06 tpy	1.5063% by weight	6.33E-03 lb/hr
Ethylbenzene	0.0477% by weight	5.99E-08 lb/hr	2.62E-07 tpy	0.0477% by weight	2.00E-04 lb/hr
Hexane (n-)	2.8866% by weight	3.63E-06 lb/hr	1.59E-05 tpy	2.8866% by weight	1.21E-02 lb/hr
Methanol					
Naphthalene					
Toluene	1.3668% by weight	1.72E-06 lb/hr	7.52E-06 tpy	1.3668% by weight	5.74E-03 lb/hr
Trimethylpentane (2,2,4-)	0.0139% by weight	1.74E-08 lb/hr	7.64E-08 tpy	0.0139% by weight	5.84E-05 lb/hr
Xylenes	0.4073% by weight	5.12E-07 lb/hr	2.24E-06 tpy	0.4073% by weight	1.71E-03 lb/hr

NOTES

1. Emissions calculated using methods provided in USEPA, AP-42 Section 5.2 dated 1/95. ✓ $L_L = 12.46[(S)M_v P/T]$
2. Physical property, throughput and speciation data based data from supply vessel emission calculation spreadsheet. ✓
3. Any drained liquids from the M&R is stored in drums and shipped off-site. Drum loading emissions are included for conservatism. ✓

TABLE E-1
Piping Components
Hourly and Annual Emission Estimates

Source			M&R Wacker-PC01			
Service			Gas			
			Natural Gas			
Minimum hours when component purged with inert gas			0 hrs/yr			
Component	Valves	Count	90 components			
		Emission Factor	4.50E-03 kg/hr/component			
	Connectors	Count	0 components			
		Emission Factor	2.00E-04 kg/hr/component			
	Flanges	Count	353 components			
		Emission Factor	3.90E-04 kg/hr/component			
	Open-Ended Lines	Count	20 components			
		Emission Factor	2.00E-03 kg/hr/component			
	Pump Seals	Count	2 components			
		Emission Factor	2.40E-03 kg/hr/component			
Other	Count	0 components	Emissions			
	Emission Factor	8.80E-03 kg/hr/component	Avg. Hourly	Max. Annual	Max. Hourly	
Speciation	CO _{2-c}		1709.19% by weight	22.1362 lb/hr	96.9564 tpy	26.5634 lb/hr
	CO ₂		3.29% by weight	0.0426 lb/hr	0.1866 tpy	0.0511 lb/hr
	TOC (Total)		95.60% by weight	1.2382 lb/hr	5.4232 tpy	1.4858 lb/hr
	Methane		81.233% by weight	1.0521 lb/hr	4.6081 tpy	1.2625 lb/hr
	Ethane		4.568% by weight	0.0592 lb/hr	0.2591 tpy	0.0710 lb/hr
	VOC (Total)		9.802% by weight	0.1270 lb/hr	0.5561 tpy	0.1523 lb/hr
	HAP (Total)		0.836% by weight	0.0108 lb/hr	0.0474 tpy	0.0130 lb/hr
	Benzene		0.120% by weight	1.55E-03 lb/hr	6.78E-03 tpy	1.86E-03 lb/hr
	Ethylbenzene		0.048% by weight	6.19E-04 lb/hr	2.71E-03 tpy	7.43E-04 lb/hr
	Hexane (n-)		0.194% by weight	2.51E-03 lb/hr	1.10E-02 tpy	3.02E-03 lb/hr
	Methanol					
	Naphthalene					
	Toluene		0.149% by weight	1.93E-03 lb/hr	8.47E-03 tpy	2.32E-03 lb/hr
	Trimethylpentane (2,2,4-)		0.000% by weight	0.00E+00 lb/hr	0.00E+00 tpy	0.00E+00 lb/hr
	Xylenes		0.191% by weight	2.48E-03 lb/hr	1.08E-02 tpy	2.97E-03 lb/hr

NOTES

1. Emission factors obtained from Table 2-4 (Oil & Gas Production Operations) of Protocol for Equipment Leak Emission Estimates (EPA 453/R-95-017). The average SOCFI w/o ethylene emission factor is used for pumps in heavy oil service (Table 2-1) since an emission factor isn't provided in Table 2-4. ✓
2. Piping component counts based on design drawings (P3). ✓
All connection are counted as flanges regardless of whether they are welded, screwed, or flanged in an effort to be conservative. ✓
All terminus valves are counted open-ended lines regardless of whether they are equipped with an end-cap in an effort to be conservative. ✓
3. The component type "Other" includes all components that are not valve, flange, OEL, or connector, and/or compressor seals. ✓
4. Weight percents based on gas analysis used to estimate gas release annual emissions (TABLE F-1). ✓
5. Maximum hourly emissions are based on 120% of the hourly emissions estimated in an effort to be conservative. ✓

TABLE F-1
Gas Releases
Hourly and Annual Emission Estimates

Category Source	Station/Pipeline Operations					
	M&R Wacker-GR-ST			M&R Wacker-GR-PL		
	Avg. Hourly	Max. Annual	Max. Hourly	Avg. Hourly	Max. Annual	Max. Hourly
Gas Release	0 scfh	0 scf/yr	0 scfh	119 scfh	1,044,390 scf/yr	148,924 scfh
	0 lb/hr	0 lb/yr	0 lb/hr	8 lb/hr	65,941 lb/yr	9,403 lb/hr
NO _x						
CO						
SO ₂						
PM ₁₀						
CO _{2-e}	0.0000 lb/hr	0.0000 tpy	0.0000 lb/hr	128.6583 lb/hr	563.5235 tpy	147,434.7740 lb/hr
CO ₂	0.0000 lb/hr	0.0000 tpy	0.0000 lb/hr	0.2477 lb/hr	1.0848 tpy	309.3823 lb/hr
TOC (Total)	0.0000 lb/hr	0.0000 tpy	0.0000 lb/hr	7.1965 lb/hr	31.5206 tpy	8,989.3355 lb/hr
Methane	0.0000 lb/hr	0.0000 tpy	0.0000 lb/hr	6.1148 lb/hr	26.7828 tpy	7,005.9710 lb/hr
Ethane	0.0000 lb/hr	0.0000 tpy	0.0000 lb/hr	0.3438 lb/hr	1.5060 tpy	393.9375 lb/hr
VOC (Total)	0.0000 lb/hr	0.0000 tpy	0.0000 lb/hr	0.7379 lb/hr	3.2319 tpy	1,589.4269 lb/hr
HAP (Total)	0.0000 lb/hr	0.0000 tpy	0.0000 lb/hr	0.0629 lb/hr	0.2756 tpy	135.5421 lb/hr
Acetaldehyde						
Acrolein						
Benzene	0.00E+00 lb/hr	0.00E+00 tpy	0.00E+00 lb/hr	9.00E-03 lb/hr	3.94E-02 tpy	1.94E+01 lb/hr
Butadiene (1,3-)						
Carbon Tetrachloride						
Chlorobenzene						
Chloroethane						
Chloroform						
Dichloroethane (1,2-)						
Dichloropropane (1,2-)						
Dichloropropene (1,3-)						
Ethylbenzene	0.00E+00 lb/hr	0.00E+00 tpy	0.00E+00 lb/hr	3.60E-03 lb/hr	1.58E-02 tpy	7.75E+00 lb/hr
Ethylene Dibromide						
Formaldehyde						
Hexane (n-)	0.00E+00 lb/hr	0.00E+00 tpy	0.00E+00 lb/hr	1.46E-02 lb/hr	6.40E-02 tpy	3.15E+01 lb/hr
Methanol						
Methylene Chloride						
Methylnaphthalene (2-)						
Naphthalene						
PAH						
Phenol						
Propylene Oxide						
Styrene						
Tetrachloroethane (1,1,2,2-)						
Toluene	0.00E+00 lb/hr	0.00E+00 tpy	0.00E+00 lb/hr	1.12E-02 lb/hr	4.92E-02 tpy	2.42E+01 lb/hr
Trichloroethane (1,1,2-)						
Trimethylpentane (2,2,4-)	0.00E+00 lb/hr	0.00E+00 tpy	0.00E+00 lb/hr	0.00E+00 lb/hr	0.00E+00 tpy	0.00E+00 lb/hr
Vinyl Chloride						
Xylenes	0.00E+00 lb/hr	0.00E+00 tpy	0.00E+00 lb/hr	1.44E-02 lb/hr	6.31E-02 tpy	3.10E+01 lb/hr

NOTES

1. Data extracted from TABLE F-2.

2. Gas density is 110% of the value extracted from physical property estimation spreadsheet, based on an extended gas analysis at a site in Texas.

Density (TABLE F-6): 0.0460 lb/scf Safety Factor: 137%

3. As it will be assumed that this gas is representative, the following is used to scaled the extended analysis based on GC data for Knoxville, TN.

			<u>Average</u>	<u>Maximum</u>	<u>VOC Specie Scaling:</u>
VOC (TABLE F-6):	0.00283 lb/scf	VOC (GC Data):	0.00451 lb/scf	0.00778 lb/scf	average 160%
	6.14% wt%		9.80% wt%	16.90% wt%	maximum 275%
Methane (TABLE F-6):	84.70% wt%		81.23% wt%	74.51% wt%	
Ethane (TABLE F-6):	4.76% wt%		4.57% wt%	4.19% wt%	

TABLE F-2
Summary of Gas Release Volumes

Category	Event Information					Gas Release		
	Description		Gas Release (scf/event)	Frequency		Release Point	Hourly (scf/hr)	Annual (scf/yr)
	Type	ID		(hr ⁻¹)	(yr ⁻¹)			
Blowdown	Pipeline	Pipeline - Wacker - M&R	143,839	1	6	Pipeline - Wacker - M&R	143,839	863,037
Purge	Pipeline	Pipeline - Wacker - M&R	19,919	1	6	Pipeline - Wacker - M&R	19,919	119,515
Drain	Pipeline	M&R Pipeline - Drain - Wacker: M&R LPD	2,513	2	24	Wacker: M&R LPD	5,026	60,315
Actuation	Pipeline	Wacker: MR A	5	4	104	Wacker: MR A	20	508
Actuation	Pipeline	Wacker: MR B	5	4	104	Wacker: MR B	20	508
Actuation	Pipeline	Wacker: MR C	5	4	104	Wacker: MR C	20	508
Station Operations							0	0
Pipeline Operations							148,924	1,044,390

NOTES

1. Data extracted from TABLE F-3, TABLE F-4, and TABLE F-2.
2. For pipeline and station yard blowdowns and purges it is assumed that only a blowdown or purge can take place in any 1-hour period.

Pipeline Blowdown
Purge

TABLE F-3
Blowdown

TABLE F-3 Blowdown												
Firing Description												
Firing Description		Initial Conditions		Final Conditions		Event ²		Gas Release Data		Release Point		
Location Description		Diameter (in)	Length (ft)	Volume (ft ³)	Press (psig)	Temp (°F)	Temp (psig)	Press (°F)	Volume ¹ (scf)	Frequency (hr ⁻¹)	Hourly (scf/hr)	Annual (scf/yr)
General	Location	From	To	nom	act							
Pipeline	Wacker	M&R		30	29.00	0.00	0	823	50	0	68	0
Pipeline	Wacker	M&R		24	23.00	0.00	0	823	50	0	68	0
Pipeline	Wacker	M&R		20	19.00	0.00	0	823	50	0	68	0
Pipeline	Wacker	M&R		16	15.00	0.00	0	823	50	0	68	0
Pipeline	Wacker	M&R		12	11.75	130.00	98	823	50	0	68	6.749
Pipeline	Wacker	M&R		10	9.75	140.00	73	823	50	0	68	5.005
Pipeline	Wacker	M&R		8	7.63	5,860.00	1,858	823	50	0	68	128.119
Pipeline	Wacker	M&R		6	5.76	110.00	20	823	50	0	68	1.373
Pipeline	Wacker	M&R		4	3.83	420.00	34	823	50	0	68	2.312
Pipeline	Wacker	M&R		2	1.94	70.00	1	823	50	0	68	99
Pipeline	Wacker	M&R		1	0.96	400.00	2	823	50	0	68	138
Pipeline	Wacker	M&R		0.5	0.55	400.00	1	823	50	0	68	45
Pipeline - Wacker - M&R	TOTAL					7,530.00	2,086	823	50		143,839	143,839
Pipeline - Wacker - M&R						2,086					6	6
Pipeline - Wacker - M&R											1	1
Pipeline - Wacker - M&R											6	6
Pipeline - Wacker - M&R											863,037	863,037

[illegible]

TABLE F-5
Pneumatic

Description				Pneumatic Device				Power Gas				Event			Gas Release Data		
Location Description		Dia	ID	Vendor	Description		Detail	Pressure		Gas per 90° Stroke	Flow	Frequency		Duration	Hourly	Annual	Release
General	Location	(in.)			Major	Minor		(psig)	(psia)			(scf/psia)	(scf)				
Pipeline	Wacker: MR A	16	Wacker: MR A	Bettis	Actuator	Ball Valve	CBA52	823	837.70	0.0058	5	4	104		20	508	Wacker: MR A
Pipeline	Wacker: MR B	17	Wacker: MR B	Bettis	Actuator	Ball Valve	CBA52	823	837.70	0.0058	5	4	104		20	508	Wacker: MR B
Pipeline	Wacker: MR C	18	Wacker: MR C	Bettis	Actuator	Ball Valve	CBA52	823	837.70	0.0058	5	4	104		20	508	Wacker: MR C

NOTES

1. Vendor literature to support the estimation of gas consumption and event duration. A 90° stroke is sufficient to open or close a valve.
2. For regulators that are the spring and diaphragm type, gas venting would only occur if spring tears diaphragm.
3. The frequency of events is based on operator experience as to what would reasonably constitute a worst-case scenario.

TABLE F-6
Natural Gas
Physical Property Estimations

Component				Molecular Weight M_i (lb/lb-mol) _i	Vapor Density ρ_i (lb/scf) _i	Stream		
Name (i)	Formula	Type	HAP			Mole Fraction $f_{n,i}$ (lb-mol/lb-mol _T)	Weight Fraction $f_{m,i}$ ($f_{n,i}M_i$)/ $\sum(f_{n,i}M_i)$ (lb/lb _T)	Volume Fraction $f_{v,i}$ $f_{m,i}(\rho_i/\rho_T)$ (scf/scf _T)
Nitrogen	N2			28.013	0.0727	0.700%	1.106%	0.700%
Carbon Dioxide	CO2	GHG		44.010	0.1143	1.325%	3.290%	1.325%
Methane	C01H04	GHG		16.042	0.0417	93.569%	84.699%	93.569%
Ethane	C02H06			30.069	0.0781	2.807%	4.763%	2.807%
Propane	C03H08	VOC		44.096	0.1145	0.669%	1.665%	0.669%
Butane (i-)	C04H10	VOC		58.122	0.1509	0.143%	0.469%	0.143%
Butane (n-)	C04H10	VOC		58.122	0.1509	0.186%	0.610%	0.186%
Pentane (i-)	C05H12	VOC		72.149	0.1873	0.078%	0.318%	0.078%
Pentane (n-)	C05H12	VOC		72.149	0.1873	0.060%	0.244%	0.060%
Dimethylbutane (2,2-)	C06H14	VOC		86.175	0.2238	0.004%	0.019%	0.004%
Dimethylbutane (2,3-)	C06H14	VOC		86.175	0.2238	0.003%	0.015%	0.003%
Cyclopentane	C05H10	VOC		70.133	0.1821	0.004%	0.016%	0.004%
Methylpentane (2-)	C06H14	VOC		86.175	0.2238	0.022%	0.107%	0.022%
Methylpentane (3-)	C06H14	VOC		86.175	0.2238	0.013%	0.063%	0.013%
Hexane (n-)	C06H14	VOC	X	86.175	0.2238	0.025%	0.122%	0.025%
Dimethylpentane (2,2-)	C07H16	VOC		100.202	0.2602	0.001%	0.006%	0.001%
Methylcyclopentane	C06H12	VOC		84.159	0.2185	0.007%	0.033%	0.007%
Dimethylpentane (2,4-)	C07H16	VOC		100.202	0.2602	0.002%	0.011%	0.002%
Benzene	C06H06	VOC	X	78.112	0.2028	0.017%	0.075%	0.017%
Cyclohexane	C06H12	VOC		84.159	0.2185	0.008%	0.038%	0.008%
Methylhexane (2-)	C07H16	VOC		100.202	0.2602	0.010%	0.057%	0.010%
Dimethylpentane (2,3-)	C07H16	VOC		100.202	0.2602	0.003%	0.017%	0.003%
Methylhexane (3-)	C07H16	VOC		100.202	0.2602	0.010%	0.057%	0.010%
Dimethylcyclopentane (1,c-3-)	C07H14	VOC		98.186	0.2549	0.001%	0.006%	0.001%
Ethylpentane (3-)	C07H16	VOC		100.202	0.2602	0.000%	0.000%	0.000%
Dimethylcyclopentane (1,t-2-)	C07H14	VOC		98.186	0.2549	0.001%	0.006%	0.001%
Trimethylpentane (2,2,4-)	C08H18	VOC	X	114.229	0.2966	0.000%	0.000%	0.000%
Heptane (n-)	C07H16	VOC		100.202	0.2602	0.018%	0.102%	0.018%
Methylcyclohexane	C07H14	VOC		98.186	0.2549	0.013%	0.072%	0.013%
Trimethylcyclopentane (1,1,3-)	C08H16	VOC		112.213	0.2914	0.001%	0.006%	0.001%
Dimethylhexane (2,2-)	C08H18	VOC		114.229	0.2966	0.000%	0.000%	0.000%
Dimethylcyclohexane (1,c-2-)	C08H16	VOC		112.213	0.2914	0.002%	0.013%	0.002%
Dimethylhexane (2,5-)	C08H18	VOC		114.229	0.2966	0.003%	0.019%	0.003%
Dimethylhexane (2,4-)	C08H18	VOC		114.229	0.2966	0.000%	0.000%	0.000%
Ethylcyclopentane	C07H14	VOC		98.186	0.2549	0.001%	0.006%	0.001%
Toluene	C07H08	VOC	X	92.138	0.2392	0.018%	0.094%	0.018%
Trimethylcyclopentane (1,1,2-)	C08H16	VOC		112.213	0.2914	0.018%	0.114%	0.018%
Methylheptane (2-)	C08H18	VOC		114.229	0.2966	0.012%	0.077%	0.012%
Methylheptane (3-)	C08H18	VOC		114.229	0.2966	0.003%	0.019%	0.003%
Dimethylcyclohexane (1,c-3-)	C08H16	VOC		112.213	0.2914	0.001%	0.006%	0.001%
Trimethylcyclopentane (1,c-2,t-4-)	C08H16	VOC		112.213	0.2914	0.001%	0.006%	0.001%
Octane (n-)	C08H18	VOC		114.229	0.2966	0.033%	0.213%	0.033%
Dimethylcyclohexane (1,t-2-)	C08H16	VOC		112.213	0.2914	0.002%	0.013%	0.002%
Unknown C9 Aromatic	C09H12	VOC		120.192	0.3121	0.003%	0.020%	0.003%
Dimethylcyclohexane (1,t-3-)	C08H16	VOC		112.213	0.2914	0.003%	0.019%	0.003%
Dimethylcyclohexane (1,c-4-)	C08H16	VOC		112.213	0.2914	0.003%	0.019%	0.003%
Trimethylcyclopentane (1,c-2,c-3-)	C08H16	VOC		112.213	0.2914	0.003%	0.019%	0.003%
Dimethylheptane (2,2-)	C09H20	VOC		128.255	0.3330	0.010%	0.072%	0.010%
Dimethylheptane (2,4-)	C09H20	VOC		128.255	0.3330	0.001%	0.007%	0.001%
Ethylcyclopentane (1-methyl-c-3-)	C08H16	VOC		112.213	0.2914	0.002%	0.013%	0.002%

TABLE F-6
Natural Gas
Physical Property Estimations

Component				Molecular Weight M_i (lb/lb-mol) _i	Vapor Density ρ_i (lb/scf) _i	Stream		
Name (i)	Formula	Type	HAP			Mole Fraction f_{m-i} (lb-mol/lb-mol) _T	Weight Fraction f_{m-i} ($f_{m-i}M_i$)/ $\sum(f_{m-i}M_i)$ (lb _i /lb _T)	Volume Fraction f_{v-i} ($f_{m-i}(\rho_i/\rho_T)$) (scf/scf) _T
Ethylcyclohexane	C08H16	VOC		112.213	0.2914	0.002%	0.013%	0.002%
Dimethylheptane (2,5-)	C09H20	VOC		128.255	0.3330	0.000%	0.000%	0.000%
Dimethylheptane (3,5-)	C09H20	VOC		128.255	0.3330	0.000%	0.000%	0.000%
Ethylbenzene	C08H10	VOC	X	106.165	0.2757	0.005%	0.030%	0.005%
Trimethylheptane (2,3,4-)	C10H22	VOC		142.282	0.3694	0.000%	0.000%	0.000%
Trimethylcyclohexane (1,t-2,t-4-)	C09H18	VOC		126.239	0.3278	0.013%	0.093%	0.013%
Dimethylheptane (2,3-)	C09H20	VOC		128.255	0.3330	0.004%	0.029%	0.004%
Xylene (m-)	C08H10	VOC	X	106.165	0.2757	0.014%	0.084%	0.014%
Xylene (p-)	C08H10	VOC	X	106.165	0.2757	0.014%	0.084%	0.014%
Dimethylheptane (3,4-)	C09H20	VOC		128.255	0.3330	0.000%	0.000%	0.000%
Methyloctane (3-)	C09H20	VOC		128.255	0.3330	0.016%	0.116%	0.016%
Trimethylcyclohexane (1,t-2,c-3-)	C09H18	VOC		126.239	0.3278	0.001%	0.007%	0.001%
Xylene (o-)	C08H10	VOC	X	106.165	0.2757	0.006%	0.036%	0.006%
Trimethylcyclohexane (1,1,2-)	C09H18	VOC		126.239	0.3278	0.001%	0.007%	0.001%
Trimethylcyclohexane (1,t-2,c-4-)	C09H18	VOC		126.239	0.3278	0.003%	0.021%	0.003%
Trimethylcyclohexane (1,c-2,c-4-)	C09H18	VOC		126.239	0.3278	0.001%	0.007%	0.001%
Nonane (n-)	C09H20	VOC		128.255	0.3330	0.049%	0.355%	0.049%
Unknown C9 Naphthene	C09H18	VOC		126.239	0.3278	0.001%	0.007%	0.001%
Trimethylheptane (2,5,5-)	C10H22	VOC		142.282	0.3694	0.001%	0.008%	0.001%
Unknown C9 Paraffin	C09H20	VOC		128.255	0.3330	0.004%	0.029%	0.004%
Trimethylcyclohexane (1,c-2,t-3-)	C09H18	VOC		126.239	0.3278	0.006%	0.043%	0.006%
Trimethylcyclohexane (1,c-2,c-3-)	C09H18	VOC		126.239	0.3278	0.001%	0.007%	0.001%
Propylbenzene (i-)	C09H12	VOC		120.192	0.3121	0.010%	0.068%	0.010%
Propylcyclopentane (i-)	C08H16	VOC		112.213	0.2914	0.001%	0.006%	0.001%
Propylcyclopentane (n-)	C08H16	VOC		112.213	0.2914	0.001%	0.006%	0.001%
Unknown C10 Naphthene	C10H20	VOC		140.266	0.3642	0.001%	0.008%	0.001%
Unknown C10 Paraffin	C10H22	VOC		142.282	0.3694	0.002%	0.016%	0.002%
Propylbenzene (n-)	C09H12	VOC		120.192	0.3121	0.006%	0.041%	0.006%
Methylnonane (2-)	C10H22	VOC		142.282	0.3694	0.005%	0.040%	0.005%
Methylnonane (3-)	C10H22	VOC		142.282	0.3694	0.003%	0.024%	0.003%
Trimethylbenzene (1,2,4-)	C09H12	VOC		120.192	0.3121	0.003%	0.020%	0.003%
Butylbenzene (t-)	C10H14	VOC		134.218	0.3485	0.001%	0.008%	0.001%
Decane (n-)	C10H22	VOC		142.282	0.3694	0.006%	0.048%	0.006%
Natural Gas				17.722	0.0460	100.000%	100.000%	100.000%
TOC (Total)				17.293	0.0449	97.975%	95.603%	97.975%
VOC (Total)				68.065	0.1767	1.599%	6.141%	1.599%
HAP (Total)				93.750	0.2434	0.099%	0.524%	0.099%
Xylenes				106.165	0.2757	0.020%	0.120%	0.020%

NOTES

- Vapor density is estimated using the ideal gas law ($PV = nRT = (m/M)RT$ OR $\rho = RPT/M$), where $R = 10.73164$ (psia ft³)/(lb-mol °R).
- Standard conditions
68 °F
14.696 psia
- Mole percentages are based on analysis by SPL of samples taken at 10:00 AM on November 3, 2005 at Meter Station (MS) JO-11S.
MS JO-11S is a TET facility that is located in Joquin, TX. MS JO-11S handles gas with a higher VOC content as it's closer to producers.

ATTACHMENT 2

TABLE G-1
New Installation of Sources of Gas Releases
Analysis of Potentially Applicable Tennessee Air Regulations

Citation	Applicable	Requirement/s
1200-3-5 Visible Emissions	Yes	.01 <i>General Standards (effective 11/06/88)</i> <u>Requirement:</u> Opacity ≤ 20%, except for aggregate of 5 minutes during any 1 hour period.
1200-3-9 Construction and Operating Permits	No	.01 <i>Construction Permits (effective 11/27/11)</i> (1)(a) <u>Requirement:</u> Except as specifically exempted in Rule 1200-3-9-.04, no person shall begin construction of a new air contaminant source or the modification of an air contaminant source which may result in the discharge of air contaminants without first having applied for and received a construction permit. <u>Exempt in Rule 1200-3-9-.04</u> from obtaining a construction permit. See 1200-3-9-.04(d) and (5)(g) below.
	No	.02 <i>Operating Permits (effective 11/27/11)</i> (1) <u>Requirement:</u> Any person planning to operate an air contaminant source constructed or modified in accordance with a construction permit issued in Rule 1200-3-9-.01 shall apply for an operating permit not more than thirty (30) days after initial start-up. <u>Exempt from obtaining a construction permit in Rule 1200-3-9-.01</u> (2) <u>Requirement:</u> No person shall operate an air contaminant source without first obtaining an operating permit except as specifically exempted in Rule 1200-3-9-.04. <u>Exempt in Rule 1200-3-9-.04</u> from obtaining an operating permit. See 1200-3-9-.04(d) and (5)(g) below. (7) <u>Requirement:</u> For change in air pollution control equipment, change in stack height or diameter, and/or change in exit velocity or exit temp., that would not be a modification requiring a construction permit, notification required thirty (30) days before the change is made. <u>Facility will not be making any of the changes listed.</u> (11) <i>Major Stationary Source Operating Permits</i> <u>Requirement:</u> Applies to major stationary sources; PTE ≥ 100 tpy of any air pollutant subject to regulation, or PTE ≥ 10 tpy of any HAP, or ≥ 25 tpy of any combination of HAP. Thresholds differ for nonattainment areas. <u>Facility is not a major stationary source.</u>
	Yes	.04 <i>Exemptions (effective 08/15/09)</i> (1) <u>Requirement 1:</u> Exemptions listed in 1200-3-9-.04(4) do not apply if subject to 1200-3-11, 1200-3-18, 1200-3-19, 1200-3-22, 1200-3-27, or 1200-3-31.05(2). <u>Requirement 2:</u> Exemptions provided in 1200-3-9-.04(4) do not exempt them from inclusion in determining if a major stationary source or major modification permit is required under 1200-3-9-.01(4) and (5). <u>Facility is not subject to 1200-3-11, 1200-3-18, 1200-3-19, 1200-3-22, 1200-3-27, or 1200-3-31-.05 and facility is not a major stationary source when exempt activities are included.</u>
	Yes	(2)(b) <u>Requirement:</u> No person shall discharge, from any source whatsoever, such quantities of air contaminants or other materials which cause or have a tendency to cause injury, detriment, annoyance, or adverse effect to the public. <u>Emissions do not cause or have a tendency to cause injury, detriment, annoyance, or adverse effect to the public.</u>
	Yes	(2)(c) <u>Requirement:</u> No emission unit or activity subject to a federally enforceable applicable requirement shall qualify as an insignificant emission unit or activity. <u>Gas Releases are not subject to any federally enforceable requirements.</u>
	Yes	(2)(e) <u>Requirement:</u> Emissions from any exempt air contaminant source shall comply with all applicable rules and regulations of the Tennessee Air Pollution Control Board. <u>Emissions comply with all applicable rules and regulations of the TN Air Pollution Control Board.</u>
	Yes	(4) <i>Exemptions - Construction and State Operating Permits</i> <u>Requirement:</u> List of exempted air contaminant sources in this paragraph shall not be used as "insignificant activities" or "insignificant emission units" when applying for a major source operating permit under paragraph 1200-3-9-.02(11). <u>Facility is not applying for a major source operating permit, so may use any of the listed air contaminant sources in this paragraph as "insignificant activities" or "insignificant emission units".</u>
	No	(4)(a) <i>"Insignificant Activity" or "Insignificant Emissions Units"</i> <u>Requirement 1:</u> Emissions unit or activity has PTE < 5 tons/yr of each air contaminant and each regulated air pollutant that is not a HAP.

TABLE G-1
New Installation of Sources of Gas Releases
Analysis of Potentially Applicable Tennessee Air Regulations

Citation	Applicable	Requirement/s
		<u>Requirement 2:</u> Emissions unit or activity has PTE <1,000 lb/yr of each HAP. <u>Requirement 3:</u> Written notification submitted to Agency requesting determination of agreement with designation as an "insignificant activity" or "insignificant emissions Gas Releases qualify for exemption under 1200-3-9-.04(4)(c) and (4)(d).
	No	(4)(b) <i>"Categorically Insignificant Activity" or "Categorically Insignificant Emissions Units"</i> <u>Requirement 1:</u> Emissions unit or activity is listed at 1200-3-9-.04(5)(f). <i>See 1200-3-9-.04(5)(f) below.</i> <u>Requirement 2:</u> Such emissions units and activities are not required to be listed in the construction or operating permit applications for the facility. Gas Releases qualify for exemption under 1200-3-9-.04(4)(c) and (4)(d).
	Yes	(4)(c) <u>Requirement 1:</u> Emissions unit or activity is listed at 1200-3-9-.04(5)(g). <i>See 1200-3-9-.04(5)(g) below.</i> <u>Requirement 2:</u> Such emissions units and activities are not required to be listed in the construction or operating permit applications for the facility.
	Yes	(4)(d) <u>Requirement 1:</u> Emissions unit or activity is listed in this subparagraph. <u>Requirement 2:</u> Such emissions units and activities are not required to be listed in the construction or operating permit applications for the facility. Gas Releases qualify for exemption at 1200-3-9-.04(4)(d)4. as 'Equipment used exclusively to store, hold, or distribute natural gas or propane excluding all associated fuel burning equipment not specifically exempted'.
	No	(5) Exemptions - Major Source Operating Permits Facility is not a major stationary source, but is allowed to use 1200-3-9-.04(5)(f) and/or (5)(g) below as exemptions from construction and state operating permit requirements per 1200-3-9-.04(4)(b) and (4)(c).
	No	(5)(a)4. <i>"Insignificant Activity" or "Insignificant Emissions Units"</i> <u>Requirement 1:</u> Emissions unit or activity has PTE <5 tons/yr of each regulated air pollutant that is not a HAP. <u>Requirement 2:</u> Emissions unit or activity has PTE <1,000 lb/yr of each HAP. <u>Requirement 3:</u> Such emissions units and activities must be listed in the Title V operating permit application. For modifications to existing Title V source, submit form APCV02 to Agency listing such new emissions units and activities. OR <u>Requirement 4:</u> Emissions unit or activity is listed at 1200-3-9-.04(5)(f). OR <u>Requirement 5:</u> Emissions unit or activity is listed at 1200-3-9-.04(5)(g). OR <u>Requirement 6:</u> Emissions unit or activity with PTE of radionuclides which result in a dose to the most exposed member of the public of <0.1 millirem/yr. <u>Requirement 7:</u> Such emissions units and activities must be listed in the Title V operating permit application. For modifications to existing Title V source, submit form APCV02 to Agency listing such new emissions units and activities. OR <u>Requirement 8:</u> Emissions unit or activity considered by the Agency to be insignificant and approved by EPA. <u>Requirement 9:</u> Such emissions units and activities must be listed in the Title V operating permit application. For modifications to existing Title V source, submit form APCV02 to Agency listing such new emissions units and activities.
	No	(5)(c) <u>Requirement:</u> Not subject to any federally enforceable requirements.
	No	(5)(e) <u>Requirement:</u> Provide agency with documentation of compliance with exemption upon request. 1. Copy of Table A-1 (Emission Calculations) 2. Copy of Table A-2 (Regulatory Analysis)
	No	(5)(f) <u>Requirement 1:</u> Emissions unit or activity is listed in this subparagraph. <u>Requirement 2:</u> Emissions unit or activity has PTE <5 tons/yr of each air contaminant and each regulated air pollutant that is not a HAP.

TABLE G-1
New Installation of Sources of Gas Releases
Analysis of Potentially Applicable Tennessee Air Regulations

Citation	Applicable	Requirement/s
		<u>Requirement 3:</u> Emissions unit or activity has PTE <1,000 lb/yr of each HAP. <u>Requirement 4:</u> Such emissions units and activities are not required to be included in a Title V permit application.
	Yes	(5)(g) <u>Requirement 1:</u> Emissions unit or activity is listed in this subparagraph. <u>Requirement 2:</u> Such emissions units and activities are not required to be included in a Title V permit application. Gas Releases qualify for exemption at 1200-3-9-.04(5)(g)26. as 'Natural gas pressure regulator vents, excluding venting at oil and gas production facilities'.
		Note: Previously, TDEC has authorized any gas releases that did not qualify for exemption under (5)(g)(26), under (4)(d)(4) [or if major stationary source, under (5)(f)(16)].
1200-3-11 Hazardous Air Contaminants	No	.06 "Equipment Leaks (Fugitive Emission Sources)" (effective 11/06/88) (1)(a) <u>Requirement 1:</u> Applies to sources of equipment leaks (i.e. piping component category) listed. <u>Requirement 2:</u> Applies to equipment in VHAP service (i.e. equipment containing liquid and/or gas that is ≥10% by weight volatile hazardous air pollutants). Sources of Gas Releases do not include the sources of equipment leaks (i.e. piping component category) listed and sources of gas releases are not in VHAP service (i.e. equipment does not contain liquid and/or gas that is ≥10% by weight volatile hazardous air pollutants).
	No	.07 "Equipment Leaks (Fugitive Emission Source) of Benzene" (effective 11/06/88) (1)(a) <u>Requirement 1:</u> Applies to sources of equipment leaks (i.e. piping component category) listed. <u>Requirement 2:</u> Applies to equipment in benzene service (i.e. equipment containing liquid and/or gas that is ≥10% by weight benzene). Sources of Gas Releases do not include the sources of equipment leaks (i.e. piping component category) listed and sources of gas releases are not in benzene service (i.e. equipment does not contain liquid and/or gas that is ≥10% by weight benzene).
1200-3-18 Volatile Organic Compounds	No	.06 "Handling, Storage, Use, and Disposal Volatile Organic Compounds (VOC's)" (effective 07/30/97) (1)(a) <u>Requirement 1:</u> Facilities located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County. <u>Requirement 2:</u> Facilities subject to any standards or requirements in 1200-3-18-.11 through .21 or .24 through .79. Facility is not located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County and is not subject to any standards in 1200-3-18-.11 through .21 or .24 through .79.
	No	.30 "Leaks from Natural Gas/Gasoline Processing Equipment" (effective 07/30/97) (1)(a) <u>Requirement 1:</u> Facilities located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County. <u>Requirement 2:</u> Facilities meeting definition of on-shore natural gas processing plant: "Natural gas processing plant" (gas plant) means any processing site engaged in the extraction of natural gas liquids from field gas, fractionation of mixed natural gas liquids to natural gas products, or both. Facility does not meet definition of on-shore natural gas processing plant and is not located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County.
	No	.48 "Volatile Organic Liquid Storage Tanks" (effective 08/02/96) (1)(a) <u>Requirement 1:</u> Facilities located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County. <u>Requirement 2:</u> Potential VOC emissions of ≥100 tons/yr from volatile organic liquid storage tanks. Facility is not located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County and does not have volatile organic liquid storage tanks with potential VOC emissions of ≥100 tons/yr.
	No	.78 "Other Facilities that Emit Volatile Organic Compounds (VOC'S) of Fifty Tons Per Year" (effective 10/25/95) (1)(a) <u>Requirement 1:</u> Facilities located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County. <u>Requirement 2:</u> Aggregate potential VOC emissions from the sources at the facility total ≥45.4 megagrams (Mg) (50 tons) per calendar year on or after November 15, 1996. Facility is not located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County and does not have aggregate potential VOC emissions of ≥50 tons/yr.
	No	.79 "Other Facilities that Emit Volatile Organic Compounds (VOC'S) of One Hundred Tons Per Year" (effective 08/04/97) (1)(a) <u>Requirement 1:</u> Facilities located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County. <u>Requirement 2:</u> Aggregate potential VOC emissions from the sources at the facility total ≥90.7 megagrams (Mg) (100 tons) per calendar year. Facility is not located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County and does not have aggregate potential VOC emissions of ≥100 tons/yr.
1200-3-19 Standards for Additional Control	No	.03 "Particulate and Sulfur Dioxide Additional Control Areas within Tennessee" (effective 11/06/88) (1) <u>Requirement:</u> Particulate Additional Control Areas: Sullivan, Campbell, Davidson, Hamilton, and Shelby County.

TABLE G-1
New Installation of Sources of Gas Releases
Analysis of Potentially Applicable Tennessee Air Regulations

Citation	Applicable	Requirement/s
Areas		Facility is not located in any of the Particulate Additional Control Areas. (2) <u>Requirement:</u> Sulfur Dioxide Additional Control Areas: Polk, Humphreys, and Benton County. Facility is not located in any of the Sulfur Dioxide Additional Control Areas.
1200-3-31 Case-by-Case Determinations of HAP Control Requirements	No	.05 "Standard for New Sources" (effective 02/25/98) (1) <u>Requirement 1:</u> Major sources of HAP shall utilize MACT. <u>Requirement 2:</u> MACT shall be prescribed on the source's construction permit and transferred to the source's operating permit upon start-up. Facility is not a major source of HAP and is not required to have a construction or operating permit. (2) <u>Requirement 1:</u> Area sources of HAP that are NOT exempt from obtaining a permit according to 1200-3-9-.04 shall utilize GACT. <u>Requirement 2:</u> GACT shall be prescribed on the source's construction permit and transferred to the source's operating permit upon start-up. Facility is an area source of HAP, but is exempt from obtaining a permit according to 1200-3-9-.04

NOTES

1. The citations that are not included are not applicable and/or are general and for informational purposes only.
2. Qualifying exemption from permit requirements.

TABLE G-2
New Installation of Piping Components
Analysis of Potentially Applicable Tennessee Air Regulations

Citation	Applicable	Requirement/s
1200-3-5 Visible Emissions	Yes	.01 <i>General Standards (effective 11/06/88)</i> <u>Requirement:</u> Opacity ≤ 20%, except for aggregate of 5 minutes during any 1 hour period.
1200-3-9 Construction and Operating Permits	No	.01 <i>Construction Permits (effective 11/27/11)</i> (1)(a) <u>Requirement:</u> Except as specifically exempted in Rule 1200-3-9-.04, no person shall begin construction of a new air contaminant source or the modification of an air contaminant source which may result in the discharge of air contaminants without first having applied for and received a construction permit. <u>Exempt in Rule 1200-3-9-.04 from obtaining a construction permit. See 1200-3-9-.04(d) below.</u>
	No	.02 <i>Operating Permits (effective 11/27/11)</i> (1) <u>Requirement:</u> Any person planning to operate an air contaminant source constructed or modified in accordance with a construction permit issued in Rule 1200-3-9-.01 shall apply for an operating permit not more than thirty (30) days after initial start-up. <u>Exempt from obtaining a construction permit in Rule 1200-3-9-.01</u> (2) <u>Requirement:</u> No person shall operate an air contaminant source without first obtaining an operating permit except as specifically exempted in Rule 1200-3-9-.04. <u>Exempt in Rule 1200-3-9-.04 from obtaining an operating permit. See 1200-3-9-.04(d) below.</u> (7) <u>Requirement:</u> For change in air pollution control equipment, change in stack height or diameter, and/or change in exit velocity or exit temp., that would not be a modification requiring a construction permit, notification required thirty (30) days before the change is made. <u>Facility will not be making any of the changes listed.</u> (11) <i>Major Stationary Source Operating Permits</i> <u>Requirement:</u> Applies to major stationary sources; PTE ≥ 100 tpy of any air pollutant subject to regulation, or PTE ≥ 10 tpy of any HAP, or ≥ 25 tpy of any combination of HAP. Thresholds differ for nonattainment areas. <u>Facility is not a major stationary source.</u>
	Yes	.04 <i>Exemptions (effective 08/15/09)</i> (1) <u>Requirement 1:</u> Exemptions listed in 1200-3-9-.04(4) do not apply if subject to 1200-3-11, 1200-3-18, 1200-3-19, 1200-3-22, 1200-3-27, or 1200-3-31.05(2). <u>Requirement 2:</u> Exemptions provided in 1200-3-9-.04(4) do not exempt them from inclusion in determining if a major stationary source or major modification permit is required under 1200-3-9-.01(4) and (5). <u>Facility is not subject to 1200-3-11, 1200-3-18, 1200-3-19, 1200-3-22, 1200-3-27, or 1200-3-31-.05 and facility is not a major stationary source when exempt activities are included.</u>
	Yes	(2)(b) <u>Requirement:</u> No person shall discharge, from any source whatsoever, such quantities of air contaminants or other materials which cause or have a tendency to cause injury, detriment, annoyance, or adverse effect to the public. <u>Emissions do not cause or have a tendency to cause injury, detriment, annoyance, or adverse effect to the public.</u>
	Yes	(2)(c) <u>Requirement:</u> No emission unit or activity subject to a federally enforceable applicable requirement shall qualify as an insignificant emission unit or activity. <u>Piping Components are not subject to any federally enforceable requirements.</u>
	Yes	(2)(e) <u>Requirement:</u> Emissions from any exempt air contaminant source shall comply with all applicable rules and regulations of the Tennessee Air Pollution Control Board. <u>Emissions comply with all applicable rules and regulations of the TN Air Pollution Control Board.</u>
	Yes	(4) <i>Exemptions - Construction and State Operating Permits</i> <u>Requirement:</u> List of exempted air contaminant sources in this paragraph shall not be used as "insignificant activities" or "insignificant emission units" when applying for a major source operating permit under paragraph 1200-3-9-.02(11). <u>Facility is not applying for a major source operating permit, so may use any of the listed air contaminant sources in this paragraph as "insignificant activities" or "insignificant emission units".</u>
	No	(4)(a) <i>"Insignificant Activity" or "Insignificant Emissions Units"</i> <u>Requirement 1:</u> Emissions unit or activity has PTE < 5 tons/yr of each air contaminant and each regulated air pollutant that is not a HAP.

TABLE G-2
New Installation of Piping Components
Analysis of Potentially Applicable Tennessee Air Regulations

Citation	Applicable	Requirement/s
		<u>Requirement 2:</u> Emissions unit or activity has PTE <1,000 lb/yr of each HAP. <u>Requirement 3:</u> Written notification submitted to Agency requesting determination of agreement with designation as an "insignificant activity" or "insignificant emissions unit". Piping Components qualify for exemption under 1200-3-9-.04(4)(d).
	No	(4)(b) <i>"Categorically Insignificant Activity" or "Categorically Insignificant Emissions Units"</i> <u>Requirement 1:</u> Emissions unit or activity is listed at 1200-3-9-.04(5)(f). <i>See 1200-3-9-.04(5)(f) below.</i> <u>Requirement 2:</u> Such emissions units and activities are not required to be listed in the construction or operating permit applications for the facility. Piping Components qualify for exemption under 1200-3-9-.04(4)(d).
	No	(4)(c) <u>Requirement 1:</u> Emissions unit or activity is listed at 1200-3-9-.04(5)(g). <i>See 1200-3-9-.04(5)(g) below.</i> <u>Requirement 2:</u> Such emissions units and activities are not required to be listed in the construction or operating permit applications for the facility.
	Yes	(4)(d) <u>Requirement 1:</u> Emissions unit or activity is listed in this subparagraph. <u>Requirement 2:</u> Such emissions units and activities are not required to be listed in the construction or operating permit applications for the facility. Piping Components qualify for exemption at 1200-3-9-.04(4)(d)4. as <i>Equipment used exclusively to store, hold, or distribute natural gas or propane excluding all associated fuel burning equipment not specifically exempted</i>.
	No	(5) <i>Exemptions - Major Source Operating Permits</i> Facility is not a major stationary source, but is allowed to use 1200-3-9-.04(5)(f) and/or (5)(g) below as exemptions from construction and state operating permit requirements per 1200-3-9-.04(4)(b) and (4)(c).
	No	(5)(a)4. <i>"Insignificant Activity" or "Insignificant Emissions Units"</i> <u>Requirement 1:</u> Emissions unit or activity has PTE <5 tons/yr of each regulated air pollutant that is not a HAP. <u>Requirement 2:</u> Emissions unit or activity has PTE <1,000 lb/yr of each HAP. <u>Requirement 3:</u> Such emissions units and activities must be listed in the Title V operating permit application. For modifications to existing Title V source, submit form APCV02 to Agency listing such new emissions units and activities. OR <u>Requirement 4:</u> Emissions unit or activity is listed at 1200-3-9-.04(5)(f). OR <u>Requirement 5:</u> Emissions unit or activity is listed at 1200-3-9-.04(5)(g). OR <u>Requirement 6:</u> Emissions unit or activity with PTE of radionuclides which result in a dose to the most exposed member of the public of <0.1 millirem/yr. <u>Requirement 7:</u> Such emissions units and activities must be listed in the Title V operating permit application. For modifications to existing Title V source, submit form APCV02 to Agency listing such new emissions units and activities. OR <u>Requirement 8:</u> Emissions unit or activity considered by the Agency to be insignificant and approved by EPA. <u>Requirement 9:</u> Such emissions units and activities must be listed in the Title V operating permit application. For modifications to existing Title V source, submit form APCV02 to Agency listing such new emissions units and activities.
	No	(5)(c) <u>Requirement:</u> Not subject to any federally enforceable requirements.
	No	(5)(e) <u>Requirement:</u> Provide agency with documentation of compliance with exemption upon request. 1. Copy of Table A-1 (Emission Calculations) 2. Copy of Table A-2 (Regulatory Analysis)
	No	(5)(f) <u>Requirement 1:</u> Emissions unit or activity is listed in this subparagraph. <u>Requirement 2:</u> Emissions unit or activity has PTE <5 tons/yr of each air contaminant and each regulated air pollutant that is not a HAP.

TABLE G-2
New Installation of Piping Components
Analysis of Potentially Applicable Tennessee Air Regulations

Citation	Applicable	Requirement/s
	No	<u>Requirement 3:</u> Emissions unit or activity has PTE <1,000 lb/yr of each HAP. <u>Requirement 4:</u> Such emissions units and activities are not required to be included in a Title V permit application. (5)(g) <u>Requirement 1:</u> Emissions unit or activity is listed in this subparagraph. <u>Requirement 2:</u> Such emissions units and activities are not required to be included in a Title V permit application.
1200-3-11 Hazardous Air Contaminants	No	.06 "Equipment Leaks (Fugitive Emission Sources)" (effective 11/06/88) (1)(a) <u>Requirement 1:</u> Applies to sources of equipment leaks (i.e. piping component category) listed. <u>Requirement 2:</u> Applies to equipment in VHAP service (i.e. equipment containing liquid and/or gas that is ≥10% by weight volatile hazardous air pollutants). Piping Components are not in VHAP service (i.e. equipment does not contain liquid and/or gas that is ≥10% by weight volatile hazardous air pollutants).
	No	.07 "Equipment Leaks (Fugitive Emission Source) of Benzene" (effective 11/06/88) (1)(a) <u>Requirement 1:</u> Applies to sources of equipment leaks (i.e. piping component category) listed. <u>Requirement 2:</u> Applies to equipment in benzene service (i.e. equipment containing liquid and/or gas that is ≥10% by weight benzene). Piping Components are not in benzene service (i.e. equipment does not contain liquid and/or gas that is ≥10% by weight benzene).
1200-3-18 Volatile Organic Compounds	No	.06 "Handling, Storage, Use, and Disposal Volatile Organic Compounds (VOC's)" (effective 07/30/97) (1)(a) <u>Requirement 1:</u> Facilities located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County. <u>Requirement 2:</u> Facilities subject to any standards or requirements in 1200-3-18-.11 through .21 or .24 through .79. Facility is not located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County and is not subject to any standards in 1200-3-18-.11 through .21 or .24 through .79.
	No	.30 "Leaks from Natural Gas/Gasoline Processing Equipment" (effective 07/30/97) (1)(a) <u>Requirement 1:</u> Facilities located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County. <u>Requirement 2:</u> Facilities meeting definition of on-shore natural gas processing plant: "Natural gas processing plant" (gas plant) means any processing site engaged in the extraction of natural gas liquids from field gas, fractionation of mixed natural gas liquids to natural gas products, or both. Facility does not meet definition of on-shore natural gas processing plant and is not located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County.
	No	.48 "Volatile Organic Liquid Storage Tanks" (effective 08/02/96) (1)(a) <u>Requirement 1:</u> Facilities located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County. <u>Requirement 2:</u> Potential VOC emissions of ≥100 tons/yr from volatile organic liquid storage tanks. Facility is not located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County and does not have volatile organic liquid storage tanks with potential VOC emissions of ≥100 tons/yr.
	No	.78 "Other Facilities that Emit Volatile Organic Compounds (VOC'S) of Fifty Tons Per Year" (effective 10/25/95) (1)(a) <u>Requirement 1:</u> Facilities located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County. <u>Requirement 2:</u> Aggregate potential VOC emissions from the sources at the facility total ≥45.4 megagrams (Mg) (50 tons) per calendar year on or after November 15, 1996. Facility is not located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County and does not have aggregate potential VOC emissions of ≥50 tons/yr.
	No	.79 "Other Facilities that Emit Volatile Organic Compounds (VOC'S) of One Hundred Tons Per Year" (effective 08/04/97) (1)(a) <u>Requirement 1:</u> Facilities located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County. <u>Requirement 2:</u> Aggregate potential VOC emissions from the sources at the facility total ≥90.7 megagrams (Mg) (100 tons) per calendar year. Facility is not located in Davidson, Rutherford, Shelby, Sumner, Williamson, or Wilson County and does not have aggregate potential VOC emissions of ≥100 tons/yr.
1200-3-19 Standards for Additional Control Areas	No	.03 "Particulate and Sulfur Dioxide Additional Control Areas within Tennessee" (effective 11/06/88) (1) <u>Requirement:</u> Particulate Additional Control Areas: Sullivan, Campbell, Davidson, Hamilton, and Shelby County. Facility is not located in any of the Particulate Additional Control Areas.
	No	(2) <u>Requirement:</u> Sulfur Dioxide Additional Control Areas: Polk, Humphreys, and Benton County. Facility is not located in any of the Sulfur Dioxide Additional Control Areas.
1200-3-31 Case-by-Case Determinations of	No	.05 "Standard for New Sources" (effective 02/25/98) (1) <u>Requirement 1:</u> Major sources of HAP shall utilize MACT.

TABLE G-2
New Installation of Piping Components
Analysis of Potentially Applicable Tennessee Air Regulations

Citation	Applicable	Requirement/s
HAP Control Requirements		<u>Requirement 2:</u> MACT shall be prescribed on the source's construction permit and transferred to the source's operating permit upon start-up. Facility is not a major source of HAP and is not required to have a construction or operating permit. (2) <u>Requirement 1:</u> Area sources of HAP that are NOT exempt from obtaining a permit according to 1200-3-9-.04 shall utilize GACT. <u>Requirement 2:</u> GACT shall be prescribed on the source's construction permit and transferred to the source's operating permit upon start-up. Facility is an area source of HAP, but is exempt from obtaining a permit according to 1200-3-9-.04

NOTES

1. The citations that are not included are not applicable and/or are general and for informational purposes only.
2. Qualifying exemption from permit requirements.

ATTACHMENT 3

TABLE H-1 M&R 59223 and Wacker Polysilicon Plant Source Aggregation Evaluation		
Question	Answer	Comment
<i>Do the facilities share a common owner? Provide the owners identity and the percentage of ownership of each facility on a separate sheet.</i>	NO	The ETNG pipeline and M&R (ETNG pipeline/M&R) share common ownership, but do not share a common ownership with the Wacker Polysilicon facility.
<i>Do all of the pollutant-emitting activities in the facilities belong to the same industrial grouping, i.e. the same Standard Industrial Classification (SIC) code? Please specify the classification.</i>	NO	ETNG: 4922 - Natural Gas Transmission Wacker Polysilicon: 2821 - Plastics Materials, Synthetic Resins, and Nonvulcanizable Elastomers
<i>Are facilities contiguous or adjacent properties?</i>	YES	The ETNG pipeline/M&R is located approximately 0.3 miles from Wacker Polysilicon facility's property. ETNG M&R includes a launcher/receiver, with the receiver located on Wacker Polysilicon facility's property.
<i>Are these facilities connected with a conveyor, pipeline, dedicated train line or any similar arrangement?</i>	YES	The ETNG pipeline/M&R is connected by a lateral pipeline to the Wacker Polysilicon facility.
<i>Was the location of the new facility chosen primarily because of its proximity to the existing facility to integrate the operation of the two facilities?</i>	NO	The location of the ETNG pipeline/M&R was not chosen to allow for integration of its operations with Wacker Polysilicon facility.
<i>Will materials be routinely transferred between the facilities? If yes, list amount of transfer and how often transfers will take place. State the percentage of output that goes to other facilities.</i>	YES	The ETNG pipeline/M&R allows Wacker Polysilicon facility access to the ETNG pipeline. The Wacker Polysilicon facility is not the only customer with access to the ETNG pipeline. The ETNG pipeline/M&R is NOT the only deliver point option for the Wacker Polysilicon facility.
<i>Will the production process itself be split in any way between the facilities with associated air pollutant emissions? i.e., will one facility produce an intermediate product that requires further processing at the other facility.</i>	NO	The ETNG pipeline/M&R will not produce an intermediate that will be further processed at the Wacker Polysilicon facility.
<i>Do the facilities share common workforces, plant managers, security forces, corporate executive officers or board executives?</i>	NO	ETNG pipeline/M&R and Wacker Polysilicon facility do not share common workforces, plant managers, security forces, corporate executive officers or board executives.
<i>Will managers or other workers frequently shuttle back and forth to be involved actively in both facilities?</i>	NO	ETNG pipeline/M&R and Wacker Polysilicon facility managers or other workers will not frequently shuttle back and forth to be involved actively in both facilities.
<i>Do the facilities share common payroll activities, employee benefits, health plans, retirement funds, insurance coverage, or other administrative functions?</i>	NO	ETNG pipeline/M&R and Wacker Polysilicon facility do not share common payroll activities, employee benefits, health plans, retirement funds, insurance coverage, or other administrative functions.
<i>Does one facility operation support the operation of the other facility?</i>	NO	The ETNG pipeline/M&R does not support the operation of Wacker Polysilicon facility, it allows Wacker Polysilicon access to the gas in the ETNG pipeline. Wacker Polysilicon facility does not support the operation of the ETNG pipeline.
<i>Is one facility dependent on the other, i.e., if one shuts down, what are the limitations on the other to pursue outside business interests?</i>	NO	The ETNG pipeline/M&R is NOT the only deliver point option for the Wacker Polysilicon facility. The ETNG pipeline is accessible by other customers. The ETNG pipeline/M&R and Wacker Polysilicon facility are not dependant on one and other.
<i>Are there any financial arrangements between the two entities?</i>	YES	ETNG has a contract with Wacker Polysilicon facility to allow access to the ETNG pipeline.
<i>Are there any legal or leased agreements between the facilities?</i>	YES	ETNG has a contract with Wacker Polysilicon facility to allow access to the ETNG pipeline.
<i>Are there any contracts for service activities?</i>	YES	ETNG has a contract with Wacker Polysilicon facility to allow access to the ETNG pipeline.
<i>Do the facilities share intermediates, products, byproducts, or other manufacturing equipment?</i>	NO	The ETNG pipeline/M&R and Wacker Polysilicon facility do not share intermediates, products, byproducts, or other manufacturing equipment.
<i>Are there any contractual arrangements for providing goods and services?</i>	YES	ETNG has a contract with Wacker Polysilicon facility to allow access to the ETNG pipeline.
<i>Do the facilities share equipment, other property, or pollution control equipment? Do you have a contract with another facility or operator for any pollution control equipment at your facility? If yes, state the contract terms.</i>	NO	ETNG pipeline/M&R and Wacker Polysilicon facility do not share equipment, other property, or pollution control equipment.
<i>Does the facility influence production levels or compliance with environmental regulations at other facilities? Who accepts the responsibility for compliance with air quality control requirements?</i>	NO	The ETNG pipeline/M&R is merely a conduit to allow the Wacker Polysilicon facility access to ETNG pipeline. ETNG accepts responsibility for compliance with air quality control requirements for its M&R.