

Component	Service	Number	Total Annual Cost (\$/yr)	Regulated PSD Pollutant Emissions (tons/yr)				
				VOM	CO	H2S	CO2	CH4
Valves	Gas	3,138	520,938	82.89	75.66	12.13	469.95	97.57
	Lt. Liq.	1,195	198,381	20.97	19.14	3.07	118.89	24.68
	Heavy Liq.	1,536	254,991	0.32	0.29	0.05	1.79	0.37
Pumps	Lt. Liq.	47	247,598	5.15	4.70	0.75	29.20	6.06
	Heavy Liq.	45	237,062	0.89	0.81	0.13	5.03	1.04
Compressors	Gas	20	526,804	11.69	10.67	1.71	66.26	13.76
Connectors	Gas	12,147	0	3.02	2.75	0.44	17.11	3.55
	Lt. Liq.	3,283	0	2.65	2.42	0.39	15.04	3.12
	Heavy Liq.	3,368	0	1.66	1.51	0.24	9.40	1.95
TOTALS		24,779	1,985,773	129.24	117.96	18.91	732.67	152.11

(a) Cost per component and lifetime from Ap., v. 1, p. D-8 and KY NewGas Ap., p. 7-46, Table 7-3

Total Emissions (ton/yr)	Cost Effect Mass (\$/ton)	Cost Effect GHGe (\$/ton)
738.21	706	194
186.75	1,062	292
2.81	90,827	24,929
45.87	5,398	1,481
7.90	29,990	8,231
104.09	5,061	1,389
26.87	0	0
23.62	0	0
14.77	0	0
1,151	1,725	474

EMISSION FACTOR (lb/hr/component)

Gas Valves
Lt Lq

GASIFICATION/SYNGAS CONDITION/METHANATION PROCESS AREA (ELC1)

Table C-24.1	Low VOM Components without an LDAR Program	615	147
Table A-15.1	Application (ton/yr)	23.97	2.25
	Average SOCMI Factor (ton/yr)	35.5510	5.7214
	TCEQ High Ethylene (ton/yr)	69.4861	29.5071
	Average Refinery (ton/yr)	176.6778	17.1643

Table C-24.2	TEG Service with LDAR	82	
	Application (ton/yr)	3.196667	
	Average SOCMI Factor (ton/yr)	4.7411	
	TCEQ High Ethylene (ton/yr)	9.2667	
	Average Refinery (ton/yr)	23.5619	

AGR PROCESS AREA (ELC2)

Table C-25.1	Low VOM Components without an LDAR Program	88	40
Table A-16.1	Application (ton/yr)	3.43	0.61
	Average SOCMI Factor (ton/yr)	5.0872	1.5511
	TCEQ High Ethylene (ton/yr)	9.9431	7.9997
	Average Refinery (ton/yr)	25.2818	4.653429

Table C-25.2	High VOM and H2S Fraction Process Streams with LDAR	77	409
Table A-16.2	Application (ton/yr)	3	6.333333
	Average SOCMI Factor (ton/yr)	4.4494	16.1048
	TCEQ High Ethylene (ton/yr)	8.696629	83.05714
	Average Refinery (ton/yr)	22.1124	48.3143

SRU PROCESS AREA (ELC3)

Table C-26.1	Low VOM Components without an LDAR Program	471	547
Table A-17.1	Application (ton/yr)	18.36	8.39
	Average SOCMI Factor (ton/yr)	27.2306	21.3346
	TCEQ High Ethylene (ton/yr)	53.2234	110.0289
	Average Refinery (ton/yr)	200.7107	162.7523

Table C-26.2	High VOM Fraction Process Streams with LDAR Program	116	
Table A-17.2	Application (ton/yr)	4.666667	
	Average SOCMI Factor (ton/yr)	6.9213	
	TCEQ High Ethylene (ton/yr)	13.5281	
	Average Refinery (ton/yr)	34.3970	

MISCELLANEOUS MINOR PROCESS AREA (ELC4)

Table C-27.1	Low VOM Components without an LDAR Program	1539	5
Table A-18.1	Application (ton/yr)	59.99	0.85
	Average SOCMI Factor (ton/yr)	88.9739	2.1614
	TCEQ High Ethylene (ton/yr)	173.9036	11.1471
	Average Refinery (ton/yr)	442.1735	6.4843

Table C-27.2	High VOM Fraction Process Streams with LDAR Program	29	40
	Application (ton/yr)	1.13	0.613333
	Average SOCMI Factor (ton/yr)	1.6760	1.5596

TCEQ High Ethylene (ton/yr)	3.2757	8.0434
Average Refinery (ton/yr)	8.3290	4.6789

GHG-ONLY FUGITIVE EQUIPMENT LEAKS (ELC5)

Table A-19.1 Low VOM Components without an LDAR Program

	121	7
Application (ton/yr)	4.72	0.11
Average SOCMI Factor (ton/yr)	7.0004	0.2797
TCEQ High Ethylene (ton/yr)	13.6827	1.4426
Average Refinery (ton/yr)	34.7901	0.8391
TOTAL NUMBER	3,138	1,195
TOTAL EMISSIONS (tons/yr)	122.46	19.16
Total Emissions: Average SOCMI Factor (tons/yr)	181.63	48.71
Total Emissions: With TCEQ High Ethylene TCEQ Factor (ton/yr)	355.01	251.23
Total Emissions: Refinery Factor (ton/yr)	968.03	244.89

Number of Components by Type

COMPONENTS WITH LDAR (not vented to flare)	304	449
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Emission Factors Application, Appx. C	0.0089	0.0035
TCEQ Guidance Without Ethylene	0.0089	0.0035
EPA Average SOCMI (EPA 11/95, Table 2-1)	0.0132	0.0089
EPA Average Refinery (EPA 11/95, Table 2-2)	0.0656	0.0267
TCEQ Guidance High Ethylene	0.0258	0.0459

EMISSION FACTOR (lb/hr/component)		Valves
	Gas	Lt Lq

Exhibit --- Application Emission with LDAR Control Efficiency Removed

Heavy Lq	Pumps		Cmprssrs Gas	PRVs Gas	Connectors			Sam Con All	Op Ln All
	Lt Lq	Heavy Lq			Gas	Lt Lq	Heavy Lq		
1337	5	33	4	20	2409	524	3039	23	
4.1	0.85	2.33	8.81		30.6	1.15	0.93	3.32	
2.9871	0.9667	2.7497	8.8100		42.2069	9.2000	37.2000	3.3200	
2.9286	3.1710	0.6657	8.8100		55.9241	11.9600	0.6510	3.3200	
3.2800	6.1438	7.3807	27.3045		6.4366	1.4030	5.6730	3.7224	
71		4		14	175		148		2
0.217667		0.281429			2.223333		0.045333		0.035
0.1586		0.3321			3.0667		1.8133		0.0350
0.1555		0.0804			4.0633		0.0317		0.0656
0.1741		0.8915			0.4677		0.2765		0.0490
	3		2	8	404	106		15	
0.51			4.4		5.13	0.23		2.17	
0.5800			4.4000		7.0759	1.8400		2.1700	
1.9026			4.4000		9.3755	2.3920		2.1700	
3.686269			13.63676		1.079069	0.2806		2.43303	
20				8	419	1417		14	
3.4					5.333333	3.103333		2.023333	
3.8668					7.3563	24.8267		2.0233	
12.68394					9.747126	32.27467		2.023333	
24.5751					1.1218	3.7861		2.2686	
128	14	8	5	7	2771	1185	181		
0.39	2.37	0.56	11.01		35.2	2.6	0.055		
0.2841	2.6954	0.6609	11.0100		48.5517	20.8000	2.2000		
0.2786	8.8415	0.1600	11.0100		64.3310	27.0400	0.0385		
0.2273	19.4824	2.0934	34.1229		10.2126	25.3760	13.4200		
					432				
					5.333333				
					7.3563				
					9.7471				
					1.1218				
				48	4952			7	5
			9		62.9			1.01	0.0876
			19.82		86.7586	0.0000	0.0000	1.0100	0.0876
			19.8200		114.9552	0.0000	0.0000	1.0100	0.1643
			61.4274		13.2307	0.0000	0.0000	1.1324	0.1226
				10					
	5				139	31		2	
0.866667					1.766667	0.068		0.289	
0.9857					2.4368	0.5440	0.0000	0.2890	

3.2332		3.2287	0.7072	0.0000	0.2890
6.2642		0.3716	0.0830	0.0000	0.3240

	11	446	20	6
	11.05	5.67	0.04	0.11
	11.0500	7.8207	0.3200	0.1100
	11.0500	10.3624	0.4160	0.2063
	18.8857	1.1927	0.0488	0.1540

1,536	47	45	20	126	12,147	3,283	3,368	61	13
4.71	8.00	3.17	44.04	11.05	154.16	7.19	1.03	8.81	0.23
3.43	9.09	3.74	44.04	11.05	212.63	57.53	41.21	8.81	0.23
3.36	29.83	0.91	44.04	11.05	281.73	74.79	0.72	8.81	0.44
3.68	60.15	10.37	136.49	18.89	35.23	30.98	19.37	9.88	0.33

5,869 92 20 18,798 61 13

45.5868 12.78707

71 25 4 0 0 1,165 1,448 148 16 2

EMISSION FACTOR (lb/hr/component)

0.0007	0.0386	0.0161	0.5027	0.2293	0.0029	0.0005	0.0001	0.033	0.004
0.0007	0.0386	0.0161	0.5027	0.2293	0.0029	0.0005	0.00007	0.033	0.004
0.00051	0.0439	0.019	0.5027	0.2293	0.0040	0.0040	0.0040	0.033	0.004
0.00056	0.279	0.051	1.558	0.3919	0.00061	0.00061	0.00061	0.037	0.0056
0.0005	0.144	0.0046	0.5027	0.2293	0.0053	0.0052	0.00007	0.033	0.0075

	Pumps	Cmprssrs	PRVs		Connectors	Sam Con	Op Ln	
Heavy Lq	Lt Lq	Heavy Lq	Gas	Gas	Lt Lq	Heavy Lq	All	All

TOTALS	VOM	CO	H2S	MeOH	COS	CO2	CH4
8156							
78.31	0.0445	13.89	0.26	0.00663	0.0341	8.73	33.44
148.7129	0.0892	26.3817	0.4908	0.0119	0.0595	16.5815	63.5004
186.4236	0.1119	33.0715	0.6152	0.0149	0.0746	20.7862	79.6029
255.1861	0.1531	45.2700	0.8421	0.0204	0.1021	28.4532	108.9644

496							
6.00	0.19	3.91E-07	0	0	0	0	0
10.1468	10.0504	0	0	0	0	0	0
13.6633	13.5335	0	0	0	0	0	0
25.4208	25.1793	0	0	0	0	0	0

666							
16.48	0.0529	2.59	0.19	0.0173	0.0357	11.47	0.000329
22.7042	0.0727	3.5646	0.2611	0.0227	0.0499	15.79079	0.000454084
38.1830	0.1222	5.9947	0.4391	0.0382	0.0840	26.55625	0.000763659
51.0510	0.1634	8.0150	0.5871	0.0511	0.1123	35.50594	0.001021019

2364							
23.19333	0.84	0.00111	0.0659	0.73	0.00727	0.181	2.89E-08
58.6274	44.9261	0.0586	3.5176	39.1338	0.3869	9.68524	1.75882E-06
148.4828	113.7824	0.1485	8.9090	99.1123	0.9800	24.52936	4.45449E-06
102.1783	78.2992	0.1022	6.1307	68.2040	0.6744	16.87985	3.06535E-06

5317							
78.94	0.38	6.09	0.65	0.0036	0.38	36.55	0
134.7673	0.6469	10.3906	1.1051	0.0067	0.6469	62.41073	0
274.9518	1.3198	21.1988	2.2546	0.0137	1.3198	127.3302	0
468.3976	2.2483	36.1135	3.8409	0.0234	2.2483	216.9149	0

548							
10	0.0292	0.0168	0.0608	0.0216	0.00763	0.14	0
14.2777	1.3892	0.7981	2.8898	1.0264	0.3627	6.721927	0
23.2752	2.2647	1.3011	4.7109	1.6733	0.5912	10.95797	0
35.5188	3.4560	1.9855	7.1890	2.5534	0.9022	16.72227	0

6565							
144.66	0.66	7.93	0.19	0.0683	0.59	116.51	0
198.8116	0.9145	10.8949	0.2585	0.0994	0.8151	160.1228	0
321.0002	1.4766	17.5908	0.4173	0.1605	1.3161	258.5335	0
524.5709	2.4130	28.7465	0.6819	0.2623	2.1507	422.4894	0

256							
4.73	0.24	0	0	0.15	0	0	0
7.4910	7.4026	0	0	4.7223	0	0	0

18.7773	18.5557	0	0	11.8372	1.0000	0	0
20.0507	19.8141	0	0	12.6400	2.0000	0	0

611	0	0	0	0	0		
21.70						3.81	17.87
26.5809						4.6729	21.9079
37.1599						6.5327	30.6272
55.9104						9.8291	46.0814

24,979							
384.01	2.44	30.52	1.42	1.00	1.05	177.39	51.31
622.12	65.49	52.09	8.52	45.02	2.32	52.40	85.41
1061.92	151.17	79.31	17.35	112.85	5.37	132.09	110.23
1538.28	131.73	120.23	19.27	83.75	8.19	746.79	155.05

24,979 **VOM** **CO** **H2S** **MeOH** **COS** **CO2** **CH4**
384.01

3,632 7,264

Adjusted to TOC basis, assuming 10% methane composition based on original study (EPA 11/95, p. 216).

TOTALS VOM CO H2S MeOH COS CO2 CH4

CO Valves/Pump	CO Connector	CO2 Valves/Pump	CO2 Connector	CH4
4.802218	10.59965	3.01776401	44899.78	11.55945345
7.493225148	23.212089	4.70966519	8154.462	18.0361169
18.12392814	30.282062	11.3913077	23557.18	43.62411115
35.47748463	37.874611	22.298419	19802.15	85.39394553
0.000213111	0.0003644	0	0	0
0.000316075	0.0006414	0	0	0
0.000617783	0.0008908	0	0	0
0.001570797	0.0016204	0	0	0
0.71435	1.55587	3.16677791	0.003794	9.08343E-05
1.133282485	2.5330728	5.02036922	0.009695	0.000144367
3.115735811	4.963236	13.8025112	0.049998	0.000396909
5.278574833	5.4920429	23.3837503	0.029084	0.00067243
0.424444444	0.7056667	0.09937051	2.18E-07	1.59E-08
0.81403465	1.8868009	4.03435572	6.3E-07	7.33E-07
3.481256996	4.8819834	17.2531097	3.25E-06	3.13E-06
3.166725827	3.3303227	15.6942932	1.89E-06	2.85E-06
2.245152	5.1637725	13.4837018	0	0
3.95218823	9.4688262	23.7387597	0	0
13.26842263	20.316098	79.6965826	0	0
29.52508725	33.303651	177.341996	0	0
8.695555556	18.633333	0.06533333	0	0
12.89677903	26.604059	3.25857079	0	0
25.20734082	43.369486	6.36902472	0	0
64.09308365	66.183444	16.1941094	0	0
3.334032	6.780952	49.0017006	0	0
4.994217791	9.7485902	73.4004199	0	0
10.14078046	16.440324	149.039865	0	0
24.58644573	25.311488	361.348967	0	0
0.00E+00	0.00E+00	0	0	0
0.00E+00	0.00E+00	0	0	0

0.00E+00	0.00E+00
0.00E+00	0.00E+00
20.22	43.44
31.28	73.45
73.34	120.25
162.13	171.50

0	0
0	0
68.83	44899.78
114.16	8154.47
277.55	23557.23
616.26	19802.18

11.56
18.04
43.62
85.39

0.84803226
1.27985278
2.65902212
6.26362307

85.39

25.74

Component	Service	Number		Emissions (ton/yr)			
		Total	w/LDAR	TCEQ SOCMI w/out C2 Ap., ApxC	EPA SOCMI Average	TCEQ SOCMI w/C2	EPA Refinery Average
Valves	Gas	3,138	304	122.46	181.63	355.01	968.03
	LL	1,195	449	19.16	48.71	251.23	244.89
	HL	1,536	71	4.71	3.43	3.36	3.68
Pumps	LL	47	25	8.00	9.09	29.83	60.15
	HL	45	4	3.17	3.74	0.91	10.37
Compressors	Gas	20	0	44.04	44.04	44.04	136.49
PRVs	Gas	126	0	11.05	11.05	11.05	18.89
Connectors	Gas	12,147	1,165	154.16	212.63	281.73	35.23
	LL	3,283	1,448	7.19	57.53	74.79	30.98
	HL	3,368	148	1.03	41.21	0.72	19.37
Sample Connectors	All	61	16	8.81	8.81	8.81	9.88
Open-Ended Lines	All	13	2	0.23	0.23	0.44	0.33
TOTAL		24,979	3,632	384.01	622.12	1061.92	1538.28

		Emissions (ton/yr)				
Emission Source		H2S	Total H2S	COS	Total COS	TRS
All Except Eqp.Leaks		7.37	7.37	3.06	3.06	10.43
Equipment Leaks	Ap.	1.41	8.78	1.05	4.11	12.89
	EPA SOCM I	2.34	9.71	1.60	4.66	14.37
	TCEQ w/C2	4.23	11.60	3.85	6.91	18.51
	EPA Refinery	6.53	13.90	6.68	9.74	23.64

Based on Ap., v. 1, Table 3-2 and Ex. --

EMISSION FACTOR (lb/hr/component)

Gas

Valves

Lt Lq

GASIFICATION/SYNGAS CONDITION/METHANATION PROCESS AREA (ELC1)

Table C-24.1	Low VOM Components without an LDAR Program	615	147
Table A-15.1	Application (ton/yr)	23.97	2.25
	Average SOCMI Factor (ton/yr)	35.5510	5.7214
	TCEQ High Ethylene (ton/yr)	69.4861	29.5071
	Average Refinery (ton/yr)	176.6778	17.1643
Table C-24.2	TEG Service with LDAR	82	
	Application (ton/yr)	0.0959	
	Average SOCMI Factor (ton/yr)	0.1422	
	TCEQ High Ethylene (ton/yr)	0.2780	
	Average Refinery (ton/yr)	0.7069	

AGR PROCESS AREA (ELC2)

Table C-25.1	Low VOM Components without an LDAR Program	88	40
Table A-16.1	Application (ton/yr)	3.43	0.61
	Average SOCMI Factor (ton/yr)	5.0872	1.5511
	TCEQ High Ethylene (ton/yr)	9.9431	7.9997
	Average Refinery (ton/yr)	25.2818	4.653429
Table C-25.2	High VOM and H2S Fraction Process Streams with LDAR	77	409
Table A-16.2	Application (ton/yr)	0.09	0.19
	Average SOCMI Factor (ton/yr)	0.1335	0.4831
	TCEQ High Ethylene (ton/yr)	0.260899	2.491714
	Average Refinery (ton/yr)	0.6634	1.4494

SRU PROCESS AREA (ELC3)

Table C-26.1	Low VOM Components without an LDAR Program	471	547
Table A-17.1	Application (ton/yr)	18.36	8.39
	Average SOCMI Factor (ton/yr)	27.2306	21.3346
	TCEQ High Ethylene (ton/yr)	53.2234	110.0289
	Average Refinery (ton/yr)	200.7107	162.7523
Table C-26.2	High VOM Fraction Process Streams with LDAR Program	116	
Table A-17.2	Application (ton/yr)	0.14	
	Average SOCMI Factor (ton/yr)	0.2076	
	TCEQ High Ethylene (ton/yr)	0.4058	
	Average Refinery (ton/yr)	1.0319	

MISCELLANEOUS MINOR PROCESS AREA (ELC4)

Table C-27.1	Low VOM Components without an LDAR Program	1539	5
Table A-18.1	Application (ton/yr)	59.99	0.85
	Average SOCMI Factor (ton/yr)	88.9739	2.1614
	TCEQ High Ethylene (ton/yr)	173.9036	11.1471
	Average Refinery (ton/yr)	442.1735	6.4843
Table C-27.2	High VOM Fraction Process Streams with LDAR Program	29	40
	Application (ton/yr)	0.0339	0.0184
	Average SOCMI Factor (ton/yr)	0.0503	0.0468

TCEQ High Ethylene (ton/yr)	0.0983	0.2413
Average Refinery (ton/yr)	0.2499	0.1404

GHG-ONLY FUGITIVE EQUIPMENT LEAKS (ELC5)

Table A-19.1 Low VOM Components without an LDAR Program

	121	7
Application (ton/yr)	4.72	0.11
Average SOCMI Factor (ton/yr)	7.0004	0.2797
TCEQ High Ethylene (ton/yr)	13.6827	1.4426
Average Refinery (ton/yr)	34.7901	0.8391

TOTAL NUMBER	3,138	1,195
TOTAL EMISSIONS (tons/yr)	110.83	12.42
Total Emissions: Average SOCMI Factor (tons/yr)	164.38	31.58
Total Emissions: With TCEQ High Ethylene TCEQ Factor (ton/yr)	321.28	162.86
Total Emissions: Refinery Factor (ton/yr)	882.29	193.48

Number of Components by Type

COMPONENTS WITH LDAR (not vented to flare)	304	449
---	-----	-----

Emission Factors Application, Appx. C	0.0089	0.0035
TCEQ Guidance Without Ethylene	0.0089	0.0035
EPA Average SOCMI (EPA 11/95, Table 2-1)	0.0132	0.0089
EPA Average Refinery (EPA 11/95, Table 2-2)	0.0656	0.0267
TCEQ Guidance High Ethylene	0.0258	0.0459

EMISSION FACTOR (lb/hr/component)		Valves
	Gas	Lt Lq

Heavy Lq	Pumps		Cmprssrs Gas	PRVs Gas	Connectors			Sam Con All	Op Ln All
	Lt Lq	Heavy Lq			Gas	Lt Lq	Heavy Lq		
1337	5	33	4	20	2409	524	3039	23	
4.1	0.85	2.33	8.81		30.6	1.15	0.93	3.32	
2.9871	0.9667	2.7497	8.8100		42.2069	9.2000	37.2000	3.3200	
2.9286	3.1710	0.6657	8.8100		55.9241	11.9600	0.6510	3.3200	
3.2800	6.1438	7.3807	27.3045		6.4366	1.4030	5.6730	3.7224	
71		4		14	175		148		2
0.00653		0.0197			0.0667		0.00136		0.00105
0.0048		0.0232			0.0920		0.0544		0.0011
0.0047		0.0056			0.1219		0.0010		0.0020
0.0052		0.0624			0.0140		0.0083		0.0015
3			2	8	404	106		15	
0.51			4.4		5.13	0.23		2.17	
0.5800			4.4000		7.0759	1.8400		2.1700	
1.9026			4.4000		9.3755	2.3920		2.1700	
3.686269			13.63676		1.079069	0.2806		2.43303	
20				8	419	1417		14	
0.51					0.16	0.0931		0.0607	
0.5800					0.2207	0.7448		0.0607	
1.902591					0.292414	0.96824		0.0607	
3.6863					0.0337	0.1136		0.0681	
128	14	8	5	7	2771	1185	181		
0.39	2.37	0.56	11.01		35.2	2.6	0.055		
0.2841	2.6954	0.6609	11.0100		48.5517	20.8000	2.2000		
0.2786	8.8415	0.1600	11.0100		64.3310	27.0400	0.0385		
0.2273	19.4824	2.0934	34.1229		10.2126	25.3760	13.4200		
					432				
					0.16				
					0.2207				
					0.2924				
					0.0337				
			9	48	4952			7	5
			19.82		62.9			1.01	0.0876
			19.8200		86.7586	0.0000	0.0000	1.0100	0.0876
			19.8200		114.9552	0.0000	0.0000	1.0100	0.1643
			61.4274		13.2307	0.0000	0.0000	1.1324	0.1226
	5			10	139	31		2	
	0.13				0.053	0.00204		0.00867	
	0.1478				0.0731	0.0163	0.0000	0.0087	

0.4850		0.0969	0.0212	0.0000	0.0087
0.9396		0.0111	0.0025	0.0000	0.0097

	11	446	20	6
	11.05	5.67	0.04	0.11
	11.0500	7.8207	0.3200	0.1100
	11.0500	10.3624	0.4160	0.2063
	18.8857	1.1927	0.0488	0.1540

1,536	47	45	20	126	12,147	3,283	3,368	61	13
4.50	4.37	2.91	44.04	11.05	139.94	4.12	0.99	6.57	0.20
3.28	4.97	3.43	44.04	11.05	193.02	32.92	39.45	6.57	0.20
3.21	16.30	0.83	44.04	11.05	255.75	42.80	0.69	6.57	0.37
3.51	33.94	9.54	136.49	18.89	32.24	27.22	19.10	7.37	0.28
5,869		92	20				18,798	61	13

1.3676 0.544429

71	25	4	0	0	1,165	1,448	148	16	2
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EMISSION FACTOR (lb/hr/component)

0.0007	0.0386	0.0161	0.5027	0.2293	0.0029	0.0005	0.0001	0.033	0.004
0.0007	0.0386	0.0161	0.5027	0.2293	0.0029	0.0005	0.00007	0.033	0.004
0.00051	0.0439	0.019	0.5027	0.2293	0.0040	0.0040	0.0040	0.033	0.004
0.00056	0.279	0.051	1.558	0.3919	0.00061	0.00061	0.00061	0.037	0.0056
0.0005	0.144	0.0046	0.5027	0.2293	0.0053	0.0052	0.00007	0.033	0.0075

Pumps		Cmprssrs		PRVs	Connectors			Sam Con	Op Ln
Heavy Lq	Lt Lq	Heavy Lq	Gas	Gas	Gas	Lt Lq	Heavy Lq	All	All

TOTALS	VOM	CO	H2S	MeOH	COS	CO2	CH4
8156							
78.31	0.0445	13.89	0.26	0.00663	0.0341	8.73	33.44
148.7129	0.0892	26.3817	0.4908	0.0119	0.0595	16.5815	63.5004
186.4236	0.1119	33.0715	0.6152	0.0149	0.0746	20.7862	79.6029
255.1861	0.1531	45.2700	0.8421	0.0204	0.1021	28.4532	108.9644
496							
0.19	0.19	3.91E-07	0	0	0	0	0
0.3177	0.3147	0	0	0	0	0	0
0.4131	0.4092	0	0	0	0	0	0
0.7983	0.7907	0	0	0	0	0	0
666							
16.48	0.0529	2.59	0.19	0.0173	0.0357	11.47	0.000329
22.7042	0.0727	3.5646	0.2611	0.0227	0.0499	15.79079	0.000454084
38.1830	0.1222	5.9947	0.4391	0.0382	0.0840	26.55625	0.000763659
51.0510	0.1634	8.0150	0.5871	0.0511	0.1123	35.50594	0.001021019
2364							
1.1038	0.84	0.00111	0.0659	0.73	0.00727	0.181	2.89E-08
2.2228	1.7034	0.0022	0.1334	1.4837	0.0147	0.367213	6.66852E-08
5.9766	4.5798	0.0060	0.3586	3.9894	0.0394	0.987327	1.79297E-07
6.0144	4.6088	0.0060	0.3609	4.0146	0.0397	0.993573	1.80431E-07
5317							
78.94	0.38	6.09	0.65	0.0036	0.38	36.55	0
134.7673	0.6469	10.3906	1.1051	0.0067	0.6469	62.41073	0
274.9518	1.3198	21.1988	2.2546	0.0137	1.3198	127.3302	0
468.3976	2.2483	36.1135	3.8409	0.0234	2.2483	216.9149	0
548							
0.3	0.0292	0.0168	0.0608	0.0216	0.00763	0.14	0
0.4283	0.0417	0.0239	0.0867	0.0308	0.0109	0.201658	0
0.6983	0.0679	0.0390	0.1413	0.0502	0.0177	0.328739	0
1.0656	0.1037	0.0596	0.2157	0.0766	0.0271	0.501668	0
6565							
144.66	0.66	7.93	0.19	0.0683	0.59	116.51	0
198.8116	0.9145	10.8949	0.2585	0.0994	0.8151	160.1228	0
321.0002	1.4766	17.5908	0.4173	0.1605	1.3161	258.5335	0
524.5709	2.4130	28.7465	0.6819	0.2623	2.1507	422.4894	0
256							
0.25	0.24	0	0	0.15	0	0	0
0.3430	0.3390	0	0	0.2162	0	0	0

0.9513	0.9401	0	0	0.5997	1.0000	0	0
1.3532	1.3373	0	0	0.8531	2.0000	0	0

611	0	0	0	0	0		
21.70						3.81	17.87
26.5809						4.6729	21.9079
37.1599						6.5327	30.6272
55.9104						9.8291	46.0814

24,979							
341.92	2.44	30.52	1.42	1.00	1.05	177.39	51.31
534.89	4.12	51.26	2.34	1.87	1.60	2.34	85.41
865.76	9.03	77.90	4.23	4.87	3.85	9.48	110.23
1364.35	11.82	118.21	6.53	5.30	6.68	714.69	155.05

24,979 **VOM** **CO** **H2S** **MeOH** **COS** **CO2** **CH4**
341.92

3,632 7,264

Adjusted to TOC basis, assuming 10% methane composition based on original study (EPA 11/95, p. 216).

TOTALS VOM CO H2S MeOH COS CO2 CH4

CO Valves/Pump	CO Connector	CO2 Valves/Pump	CO2 Connector	CH4
4.802218	10.59965	3.01776401	44899.78	11.55945345
7.493225148	23.212089	4.70966519	8154.462	18.0361169
18.12392814	30.282062	11.3913077	23557.18	43.62411115
35.47748463	37.874611	22.298419	19802.15	85.39394553
6.39333E-06	1.093E-05	0	0	0
9.48225E-06	1.924E-05	0	0	0
1.85335E-05	2.672E-05	0	0	0
4.71239E-05	4.861E-05	0	0	0
0.71435	1.55587	3.16677791	0.003794	9.08343E-05
1.133282485	2.5330728	5.02036922	0.009695	0.000144367
3.115735811	4.963236	13.8025112	0.049998	0.000396909
5.278574833	5.4920429	23.3837503	0.029084	0.00067243
0.026333333	0.03477	0.1295434	6.54E-09	2.07E-08
0.039888397	0.0720714	0.1976869	1.89E-08	3.59E-08
0.155173461	0.1971953	0.76903967	9.75E-08	1.40E-07
0.193302293	0.1982102	0.95800616	5.67E-08	1.74E-07
2.245152	5.1637725	13.4837018	0	0
3.95218823	9.4688262	23.7387597	0	0
13.26842263	20.316098	79.6965826	0	0
29.52508725	33.303651	177.341996	0	0
0.260866667	0.559	0.06533333	0	0
0.386903371	0.7981218	0.09775712	0	0
0.756220225	1.3010846	0.19107074	0	0
1.922792509	1.9855033	0.48582328	0	0
3.334032	6.780952	49.0017006	0	0
4.994217791	9.7485902	73.4004199	0	0
10.14078046	16.440324	149.039865	0	0
24.58644573	25.311488	361.348967	0	0
0.00E+00	0.00E+00	0	0	0
0.00E+00	0.00E+00	0	0	

0.00E+00	0.00E+00
0.00E+00	0.00E+00
11.38	24.69
18.00	45.83
45.56	73.50
96.98	104.17

0	0
0	0
68.86	44899.78
107.16	8154.47
254.89	23557.23
585.82	19802.18

11.56
18.04
43.62
85.39

0.84803226
1.27985278
2.65902212
6.26362307

85.39

21.96

OVA Frequency Physical Inspection Leak Definition		EPA			TCEQ 28 VHP			
		Monthly ?	Quarterly ?	HON	Quarterly Weekly 2,000 ppm	Quarterly Weekly 500 ppm	Quarterly None	Quarterly Weekly
		10,000 ppm	10,000 ppm					
Valves	Gas	88	70	96		97		
Valves	LL	76	61	95		97		
	HL							
Pumps	LL	68	45	88	85			
	HL							
Connectors	All	NA	NA	81			30	97
Open- Ended Lines								
Sample Connectors								

EPA 1995, Table 5-3.

TCEQ 10/2000, pp. 52-53.

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97
97
93 97
97
97

												Regulated PSD Pollutant Emissions (tons/yr)					Total Emissions	Cost Effect Mass	Cost Effect GHGe
		Number	Capital Cost (\$/comp)	Total Capital Cost (\$)	Lifetime (yr)	CRF	Freight & Taxes	Total Annual Cost (\$/yr)	Total Emissions (ton/yr)	(\$/ton)	VOM	CO	H2S	CO2	CH4				
Valves	Gas	3,138	1400	4393200	15	0.109795	351,456	520,938	968.03	538	82.89	75.66	12.13	469.95	97.57	738.21	706	194	
	Lt. Liq.	1,195	1400	1673000	15	0.109795	133,840	198,381	244.89	810	20.97	19.14	3.07	118.89	24.68	186.75	1,062	292	
	Heavy Liq.	1,536	1400	2150400	15	0.109795	172,032	254,991	3.68	69,264	0.32	0.29	0.05	1.79	0.37	2.81	90,827	24,929	
Pumps	Lt. Liq.	47	20,000	940000	5	0.243891	75,200	247,598	60.15	4,116	5.15	4.70	0.75	29.20	6.06	45.87	5,398	1,481	
	Heavy Liq.	45	20,000	900000	5	0.243891	72,000	237,062	10.37	22,870	0.89	0.81	0.13	5.03	1.04	7.90	29,990	8,231	
Compressors	Gas	20	100,000	2000000	5	0.243891	160,000	526,804	136.49	3,860	11.69	10.67	1.71	66.26	13.76	104.09	5,061	1,389	
Connectors	Gas	12,147	0	0	20	0.094393	0	0	35.23	0	3.02	2.75	0.44	17.11	3.55	26.87	0	0	
	Lt. Liq.	3,283	0	0	20	0.094393	0	0	30.98	0	2.65	2.42	0.39	15.04	3.12	23.62	0	0	
	Heavy Liq.	3,368	0	0	20	0.094393	0	0	19.37	0	1.66	1.51	0.24	9.40	1.95	14.77	0	0	
		24,779		12056600				1,985,773	1509.19		129.24	117.96	18.91	732.67	152.11	1150.89	1,725	474	

(a) Cost per component and lifetime from Ap., v. 1, p. D-8 and KY NewGas Ap., p. 7-46, Table 7-3