STAGE II BREAK-EVEN CALCULATION FOR DELAWARE

Federal Highway Administration 2012 Data

Motor Fuel Use - Gasoline - Table MF-21 (July 2013)

(thousands of gallons)

2012 TABLE MF-21

	COMBINED GASOLINE AND GASOHOL											SPECIAL FUEL	SUMMARY OF TOTAL USE			
	HIGHWAY USE					NONHIGHWAY USE							HIGHWAY			
		PUBLIC USE														
STATE	PRIVATE AND COMMERCIAL	FEDERAL CIVILIAN	STATE, COUNTY AND MUNICIPAL	TOTAL	TOTAL	PRIVATE AND COMMERCIAL	STATE, COUNTY, AND MUNICIPAL	TOTAL	TOTAL USE	LOSSES ALLOWED FOR EVAPORATION, HANDLING, ETC. 2/	TOTAL CONSUMPTION	PRIVATE AND COMMERCIAL HIGHWAY USE	AMOUNT	PERCENT CHANGE FROM PRIOR YEAR	NON-HIGHWAY (GASOLINE ONLY)	TOTAL
Delaware	398,897	452	6,610	7,062	405,959	27,705	272	27,977	433,936	2,770	436,706	60,644	466,603	0.9	27,977	494,580

MONTHLY GASOLINE REPORTED BY STATES - 2012

COMPILED FOR THE CALENDAR YEAR — TABLE MF-33GA

FROM STATE FUEL-TAX REPORTS — (THOUSANDS OF GALLONS) — July 2013

STATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL 2/	CHANGE FROM 2008	
														GALLONS	PERCENT
Delaware	33,156	32,954	32,954	37,035	36,229	38,180	39,578	39,241	39,917	35,636	36,570	35,513	436,963	(1,715)	(0.4)

Seasonal Adjustment Fac 0.267754936

Estimated Occupied Housing Data from the DPC

Year	Kent	from Previous year	New Castle	Growth from Previous year	Sussex	Growth from Previous year	Statewide	Growth from Previous year		
2009	58053		196192		73007		327252			
2010	59124	0.018448659	198173	0.01009725	74901	0.02594272	332198	0.015113735		
2011	60197	0.018148298	200175	0.01010228	76810	0.02548698	337182	0.015003101		
2012	61100	0.015000748	202155	0.00989135	78444	0.02127327	341699	0.013396326		
2013	62003	0.014779051	204066	0.00945314	80110	0.02123808	346179	0.013110954		
2014	62867	0.01393481	205927	0.0091196	81768	0.02069654	350562	0.01266108		
2015	63727	0.013679673	207723	0.00872154	83427	0.02028911	354877	0.012308807		
2016	64565	0.013149842	209449	0.00830914	85095	0.01999353	359109	0.011925259		
2017	65392	0.012808797	211155	0.00814518	86777	0.01976614	363324	0.011737383		
2018	66228	0.012784438	212837	0.00796571	88455	0.01933692	367520	0.011548921		
2019	67023	0.012003986	214402	0.00735304	90141	0.01906054	371566	0.011008925	0.13541247	10 year growth

Annual fuel thruput 10 year growth based on statewide housing growth

STATE	Year	
Delaware	2009	420,681
Delaware	2010	425,326
Delaware	2011	409,634
Delaware	2012	405,959
Delaware	2013	411,282
Delaware	2014	416,489
Delaware	2015	421,615
Delaware	2016	426,643
Delaware	2017	431,651
Delaware	2018	436,636
Delaware	2019	441,443

Gasoline dispensed through ORVR-equipped vehicles using EPA Widespread Use Final Rule analysis of % ORVR-equipped vehicles and gasoline dispensed for years 2009 through 2019 adjusted using 2011 DE DMV vehicle registration data.

Year	ORVR Pene	DE DMV % vehicles ORVR-equipped	EPA % vehicles ORVR-equipped	EPA% gasoline dispensed in ORVR-equipped vehicles
2009	62.8%	55.9%	57.7%	64.8%
2010	67.3%	60.5%	62.4%	69.5%
2011	71.6%	65.012%	67.1%	73.9%
2012	75.3%	69.2%	71.4%	77.7%
2013	78.5%	73.0%	75.3%	81.0%
2014	81.4%	76.3%	78.7%	84.0%
2015	83.8%	79.3%	81.8%	86.5%
2016	85.8%	81.9%	84.5%	88.6%
2017	87.5%	84.1%	86.8%	90.3%
2018	89.0%	86.0%	88.8%	91.9%
2019	90.3%	87.7%	90.5%	93.2%
2020	91.4%	89.1%	92.0%	94.3%

Incompatibility Excess Emission Factors							#VOC/1000 gal			
CARB Gilbarco test at V/L Ratio of 1.0-1.2							0.86			
CARB Gilbarco test at V/L Ratio of 1.0-1.2 as adjusted by API for 100% ORVR penetration and lower RVP							0.78			
CARB Wayne-Dresser test at V/L Ratio of 0.9-1.1							0.06			
CARB Wayne-Dresser test at V/L Ratio of 0.9-1.1 as adjusted by API for 100% ORVR penetration and lower RVP							0.08			
Weighted thruput average of two tests (53.8% Gilbarco/46.2% Wayne-Dresser)							0.46			
Incompatibility Excess Emissions										
								Additional	UST Cont	Additional
	Annual Thrupı	EF (#/1K gal)	Stage II RP	Vac Assist %	ORVR	IEE	IEE	Emissions w/o	Benefit N	Emissions w/o
Year				of S2 Systems	Penetration	tons/year	tons/day	Stage II (tpd)	to Break	Stage II (tpy)
2008								1.402		
2009	420,681	0.46	0.985	0.951	0.628	56.48	0.164			
2010	425,326	0.46	0.985	0.951	0.673	61.25	0.178			
2011	409,634	0.46	0.985	0.951	0.716	62.72	0.183			
2012	405,959	0.46	0.985	0.951	0.753	65.36	0.190			
2013	411,282	0.46	0.985	0.951	0.785	69.03	0.201	0.803	0.602	275.9
2014	416,489	0.46	0.985	0.951	0.814	72.49	0.211	0.684	0.473	235.0
2015	421,615	0.46	0.985	0.951	0.838	75.57	0.220	0.565	0.345	194.1
2016	426,643	0.46	0.985	0.951	0.858	78.32	0.228	0.446	0.218	153.2
2017	431,651	0.46	0.985	0.951	0.875	80.76	0.235	0.327	0.092	112.4
2018	436,636	0.46	0.985	0.951	0.890	83.14	0.242	0.296	0.054	101.8
2019	441,443	0.46	0.985	0.951	0.903	85.25	0.248	0.266		91.3
2020					0.914			0.235		80.7

MOVES MODEL RUNS FOR DEVELOPING STAGE II INCREMENTAL BENEFIT

2008

yearId	iterationId	countyId	processName	VOC
2008	W	10001	Refueling Displacement Vapor Loss	4.31
			Refueling Spillage Loss	2.23
		10001 Total		6.54
		10003	Refueling Displacement Vapor Loss	11.91
			Refueling Spillage Loss	6.73
		10003 Total		18.64
		10005	Refueling Displacement Vapor Loss	6.54
			Refueling Spillage Loss	3.27
		10005 Total		9.81
	W Total			34.99
	WO	10001	Refueling Displacement Vapor Loss	28.73
			Refueling Spillage Loss	4.46
		10001 Total		33.18
		10003	Refueling Displacement Vapor Loss	79.41
			Refueling Spillage Loss	13.45
		10003 Total		92.86
		10005	Refueling Displacement Vapor Loss	43.60
			Refueling Spillage Loss	6.54
		10005 Total		50.13
	WO Total			176.18

2013

yearId	iterationId	countyId	processName	VOC
2013	W	10001	Refueling Displacement Vapor Loss	2.08
			Refueling Spillage Loss	2.22
		10001 Total		4.30
		10003	Refueling Displacement Vapor Loss	7.80
			Refueling Spillage Loss	7.97
		10003 Total		15.77
		10005	Refueling Displacement Vapor Loss	3.15
			Refueling Spillage Loss	3.17
		10005 Total		6.32
	W Total			26.39
	WO	10001	Refueling Displacement Vapor Loss	13.87
			Refueling Spillage Loss	4.44
		10001 Total		18.31
		10003	Refueling Displacement Vapor Loss	52.02
			Refueling Spillage Loss	15.94
		10003 Total		67.96
		10005	Refueling Displacement Vapor Loss	20.99
			Refueling Spillage Loss	6.34
		10005 Total		27.33
	WO Total			113.60

2017

yearId	iterationId	countyId	processName	VOC
2017	W	10001	Refueling Displacement Vapor Loss	1.06
			Refueling Spillage Loss	2.00
		10001 Total		3.05
		10003	Refueling Displacement Vapor Loss	2.53
			Refueling Spillage Loss	6.11
		10003 Total		8.65
		10005	Refueling Displacement Vapor Loss	1.72
			Refueling Spillage Loss	3.04
		10005 Total		4.76
	W Total			16.46
	WO	10001	Refueling Displacement Vapor Loss	7.06
			Refueling Spillage Loss	3.99
		10001 Total		11.05
		10003	Refueling Displacement Vapor Loss	16.88
			Refueling Spillage Loss	12.23
		10003 Total		29.11
		10005	Refueling Displacement Vapor Loss	11.46
			Refueling Spillage Loss	6.08
		10005 Total		17.53
	WO Total			57.69

2020

yearId	iterationId	countyId	processName	VOC
2020	W	10001	Refueling Displacement Vapor Loss	0.78
			Refueling Spillage Loss	2.02
		10001 Total		2.80
		10003	Refueling Displacement Vapor Loss	1.81
			Refueling Spillage Loss	5.86
		10003 Total		7.67
		10005	Refueling Displacement Vapor Loss	1.22
			Refueling Spillage Loss	2.97
		10005 Total		4.19
	W Total			14.67
	WO	10001	Refueling Displacement Vapor Loss	5.23
			Refueling Spillage Loss	4.04
		10001 Total		9.27
		10003	Refueling Displacement Vapor Loss	12.05
			Refueling Spillage Loss	11.73
		10003 Total		23.78
		10005	Refueling Displacement Vapor Loss	8.14
			Refueling Spillage Loss	5.94
		10005 Total		14.08
	WO Total			47.12

SUMMARY

tpd peak ozone season daily (7 days/wk operation)						
					Stage 2	S2 benefit
	displacement		spillage		benefit	for disp &
Year	with S2	w/o S2	with S2	w/o S2	disp only	spillage
2008	0.247	1.649	0.133	0.266	1.402	1.535
2013	0.142	0.944	0.145	0.290	0.803	0.948
2017	0.058	0.385	0.121	0.242	0.327	0.448
2020	0.041	0.276	0.118	0.236	0.235	0.353
	Model Inputs:					
	Displacement					
	Stage II overall control efficiency				**85.06%**	
		Thruput covered by Stage II			98.5%	
		RE for annual insp. program			90.9%	
		Stage II control efficiency			95%	
	Spillage CE (used model default)				50%	

LOST BENEFIT FOR NEW STATIONS w/o STAGE II

Emission Increases Due to Waiving Stage 2 Requirement for New Facilities Starting in 2014

Year	% ORVR Thruput	Daily non-Stage 2 Thruput (in Kgals)	Daily non-Stage2, non-ORVR Thruput	Excess Emissions w/o S2 (tons/day)	Avoided Incompat-ibility (tons/day)	Net loss w/o Stage 2
2014	84.4	100	15.6	0.0585	0.018	0.0405
2015	87.1	200	25.8	0.0942	0.0373	0.0569
2016	89.6	300	31.2	0.1139	0.0575	0.0564
2017	91.6	400	33.6	0.1226	0.0784	0.0442
2018	93.2	500	34	0.1241	0.0997	0.0244
2019	94.7	600	31.8	0.1161	0.1215	-0.0054

Assumptions:

7 new stations per year; 5 large stations, 2 medium stations; based on past 5 years of new permits issued.