The State of New Jersey
Department of Environmental Protection

ECONOMIC IMPACT ANALYSIS
AND
ESTIMATED VOC EMISSION REDUCTIONS

FOR

PROPOSED AMENDMENTS TO THE GASOLINE TRANSFER OPERATION PROVISIONS AT NJAC 7:27-16.3

MARCH 28, 2002

I. INTRODUCTION

The Department is proposing amendments to N.J.A.C. 7:27-16.3 as discussed in the rule amendment proposal. This document provides additional details on the economic impact analysis and the estimated volatile organic compound (VOC) emission reductions for the rule amendments.

II. ECONOMIC IMPACT ANALYSIS FOR GASOLINE DISPENSING FACILITIES

1. Executive Summary

The proposed rule amendments are not expected to impose substantial additional costs on the affected parties and will result in economic benefits for some. Some may incur low capital costs, in complying with the proposed amendments, for items such as pressure/vacuum valves (approximately $145) and boots on the nozzles of vapor assist systems (approximately $10). In addition, the proposed amendments will encourage owners and operators to repair broken equipment in a more timely fashion. The amendments do not include a number of the more costly elements of the new standards and procedures adopted by CARB on July 25, 2001. Higher-cost measures, such as those that would entail digging up and modifying underground structures solely to meet the new requirements, are not being proposed. Rather this proposal addresses lower cost measures (measures many owners and operators have already undertaken voluntarily at their facilities) and facility maintenance. To the extent that the amendments would require the owners or operators of gasoline dispensing facilities to upgrade certain equipment, this would have a positive economic impact on equipment manufacturers and distributors who would produce and supply the equipment.

The amendments would also require annual testing to ensure that the vapor control systems are well maintained and functioning properly. This testing requirement would impose moderate costs on owners and operators of gasoline dispensing facilities. Typically these costs would be $ 700 to $ 900 annually, depending on whether the facility has a vapor balance system or a vapor assist system. For testing contractors, this requirement would have a positive impact on the level of demand for their services.

In order to assure that their facility passes these new testing requirements, some owners and operators will have to ensure that their facilities are better-maintained and that needed repairs are made. For persons who provide maintenance and repair services to gasoline dispensing stations, this requirement could have a positive impact on the level of demand for their services. Additionally, when stations are maintained so as to be more leak-free, their owners and operators will experience the positive impact of reducing inadvertent product loss, since the recaptured gasoline vapors are condensed back to liquid form and recovered, and are again available for sale.

There are approximately 3,800 retail gasoline dispensing facilities in New Jersey. It is estimated that about 10 percent of these facilities have “vacuum assist” vapor recovery systems, and that the remainder have “vapor balance” systems. In performing this analysis, the costs were estimated separately for gasoline dispensing facilities with “vapor balance” vapor control systems and those with “vapor assist” vapor control systems. Both initial capital costs and the on-going annual costs of testing were estimated for five different categories of gasoline dispensing facilities, based on the size of their gasoline throughput.

A summary of the cost analysis is shown in Table 1 and discussed below. The summary table presents the results of the cost analysis in three ways: 1. estimated total costs per facility, which include capital costs and annual testing costs, 2. estimated cost effectiveness in dollars per pound of VOC reduced, and 3. estimated cost (in cents) per gallon of gasoline dispensed.

As shown in Table 1, the Department estimates that the total cost to these facilities of implementing the gasoline transfer provision amendments at N.J.A.C. 7:27-16.3 will average less than one tenth of one penny per gallon of gasoline dispensed, and for some facilities will result in cost savings in future years. Also shown in Table 1, the Department estimates that the cost effectiveness of these amendments will average less than one half dollar per pound of VOC reduced or $720 per ton of VOC reduced in the first year, and $180 per ton of VOC reduced in the second and subsequent years.

Table 1 Cost Analysis Summary for GDFs Based on Proposed Amendments To the Gasoline Transfer Operation Provisions at NJAC 7:27-16.3 (1)							
	Gasoline Dispensing Facility Type Based on Average Gasoline Throughput					Total	Average per GDF
Throughput (gallons per year)	**GDF 1 Up to 158,796**	**GDF 2 158,796 to 450,000**	**GDF 3 450,000 to 900,000**	**GDF 4 900,000 to 1,800,00**	**GDF 5 1,800,000 to 3,600,000**		
Estimated Total Costs per Facility, first year (2)(3 (4)							
Vapor Balance Systems ($)	2,149	2,149	2,149	2,149	2,149	4,849,995	**2,149**
Vapor Assist Systems ($)	2,379	2,389	2,419	2,449	2,509	643,700	**2,429**
Total						5,493,695	
Estimated Cost Effectiveness, first year							
Estimated Cost Effectiveness ($/pound of VOC reduced)	3.81	1.23	0.53	0.18	0.01	**0.36**	
Estimated Cost per gallon of gasoline dispensed (cents/gal)	1.04	0.34	0.15	0.05	0.00	**0.10**	
Estimated Total Costs per Facility, second and subsequent years							
Vapor Balance Systems ($)	**700**	**700**	700	**700**	700	**2,383,290**	
Vapor Assist Systems ($)	**900**	900	900	**900**	900	**340,470**	
Total						**2,723,760**	
Estimated Cost Effectiveness, second and subsequent years (5)							
Estimated Cost Effectiveness ($/pound of VOC reduced)	1.81	0.53	0.18	0.00	-0.08	0.09	
Estimated Cost per gallon of gasoline dispensed (cents/gal)	0.49	0.14	0.05	0.00	-0.02	0.02	
Notes:							
(1) Calculation Methodology: CARB Enhanced Vapor Recovery Initial Statement of Reasons for Proposed Amendments to the Vapor Recovery Certification and Test Prpocedures for Gasoline Loading and Motor Vehicle Gasoline Refueling at Service Stations, Appendix E, February 4, 2000.							
(2) Total Costs include capital costs and annual testing costs. The cost estimate conservatively assumes all new equipment costs in the first year.							
(3) Estimated capital costs and annual costs per facility do not account for gasoline recovery credit							
(4) Annual testing costs conservatively assume the Dynamic Backpressure test annually, instead of once every 3 years.							
(5) Costs assumed for the second and subsequent years are for annual testing							

2. Calculation Methodology and Results

The economic impact analysis consists of several parts. First, base assumptions were established such as gasoline throughput, number of gasoline dispensing facilities, distribution of gasoline throughput by facility, number of vapor assist facilities, number of balanced facilities, number of vent pipes, dispensers, nozzles. The cost analysis assumptions and sources are shown in Table 2.

The costs were estimated for balanced facilities and vapor assist facilities separately. Total capital costs and annual costs were estimated per facility. Then the cost effectiveness of the proposal in dollars per pound of Volatile Organic Compounds (VOC) reduced was estimated. Then per gallon costs in cents per gallon were estimated.

In this analysis, the gasoline dispensing facilities were put into five categories (GDF 1 through 5) based on throughput of gasoline. The distribution of the number of facilities in each category was estimated using CARB[1] methodology. An annual gasoline recovery credit was used in the calculations. This accounts for the retail value of the gasoline recovered that would have been lost as emissions instead of sold as gasoline.

Table 3 shows the results of the cost analysis. Table 4 summarizes the costs for facilities with vapor balance systems. Table 5 summarizes the costs for facilities with vapor assist systems. Tables 4 and 5 also show estimated capital equipment costs.

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[1] CARB Enhanced Vapor Recovery Initial Statement of Reasons for Proposed Amendments to the Vapor Recovery Certification and Test Prpocedures for Gasoline Loading and Motor Vehicle Gasoline Refueling at Service Stations, Appendix E, February 4, 2000

Table 2
Cost Analysis Assumptions for
Gasoline Dispensing Facilities Based on Proposed Amendments To the Gasoline Transfer Operation Provisions at NJAC 7:27-16.3 (1)

Asumptions	Gasoline Dispensing Facility (GDF) Based on Average Gasoline Throughput						
	GDF 1	GDF 2	GDF 3	GDF 4	GDF 5	Total	Ave-rage
Nominal Monthly Average Sales per Facility (gals/month)	13,233	37,500	75,000	150,000	300,000	**575,733**	
Population Distribution %	4.7%	14.1%	45.7%	31.3%	4.2%		
Est. # of Facilities (2)	178	533	1729	1184	159	**3,783**	
Vapor Balance Systems	160	480	1556	1066	143	**3,405**	
Vapor Assist Systems (3)	18	53	173	118	16	**378**	
Total Gasoline Sold all Facilities (gals/yr)	23,704,375	201,521,343	1,306,315,654	1,789,395,184	480,221,072	**3,801,157,627**	
Est. # of Vent Pipes	3	3	3	3	3		**3**
Est. # of Drop Tubes & Spill Buckets	3	3	3	3	3		**3**
Est. # of Dispensers (EPA, 1991)	2	3	6	9	12		**6**
Est. # of Nozzles (EPA, 1991)	3	4	7	10	16		**8**
Est. Population-wtd Average Sales per Facility (gals/ month)	99,734						
Est. Sales from Assist Facilities (gals/yr)	452,754,525						
Est Stage II Gasoline Sales (gals/yr)	3,801,157,627						
1997 Total Gasoline Sales (gals) (4)	3,803,457,385						
Stage II % of Total	99.94%						
Est. Gasoline Price ($/gal) (5)	1.08						
Gasoline Density (lb/gal)	6.3						

Notes:

(1) Calculation Methodology: CARB Enhanced Vapor Recovery Initial Statement of Reasons for Proposed Amendments to the Vapor Recovery Certification and Test Prpocedures for Gasoline Loading and Motor Vehicle Gasoline Refueling at Service Stations, Appendix E, February 4, 2000.

(2) National Petroleum News, Mid-July 2001

(3) Calculations assume 10 % of the facilities use vapor assist systems

(4) Facsimile from Fuel Merchants Association of New Jersey, October 24, 2000

(5) From NESCAUM cost estimates. The lower the assumption, the more conservative the calculations because the number is used for credit purposes

(6) Calculations assume 3 vent pipes per facility which is conservative. Some facilities may have the piping manifolded together.

(7) Calculations assume one half the facilities do not have PV valves and drop tubes that meet the standards

(8) Calculations assume all vapor assist systems do not have boots on the nozzles

(9) Annual testing costs conservatively assume the Dynamic Backpressure test annually, instead of once every 3 years.

(10) Total Costs include capital costs and annual testing costs. The cost estimate conservatively assumes all new equipment costs in the first year.

(11) Estimated capital costs and annual costs per facility do not account for gasoline recovery credit

(12) Costs assumed for the second and subsequent years are for annual testing

Table 3
Cost Analysis for
Gasoline Dispensing Facilities Based on Proposed Amendments To the Gasoline Transfer Operation Provisions at NJAC 7:27-16.3

	GDF 1	GDF 2	GDF 3	GDF 4	GDF 5	Total	Average
Estimated Emission Reductions, all Facilities (tpd)	0.09	0.75	4.88	6.68	1.79	**14.2**	
Estimated Capital Costs per Facility	**GDF 1**	**GDF 2**	**GDF 3**	**GDF 4**	**GDF 5**		
Vapor Balance Systems	1,449	1,449	1,449	1,449	1,449	**2,466,705**	**1,449**
Vapor Assist Systems	1,479	1,489	1,519	1,549	1,609	**303,230**	**1,529**
Total						**2,769,935**	
Estimated Annual Costs per Facility							
Vapor Balance Systems	700	700	700	700	700	**2,383,290**	**700**
Vapor Assist Systems	900	900	900	900	900	**340,470**	**900**
Total						**2,723,760**	
Estimated Total Costs per Facility, first year (1)(2)(3)							
Vapor Balance Systems	2,149	2,149	2,149	2,149	2,149	**4,849,995**	**2,149**
Vapor Assist Systems	2,379	2,389	2,419	2,449	2,509	**643,700**	**2,429**
Total						**5,493,695**	
Estimated Cost Effectiveness, first year							
Total Costs, all facilities							
Vapor Balance Systems	227,950	683,849	2,216,448	1,518,048	203,700	**4,849,995**	
Vapor Assist Systems	29,417	88,785	292,950	204,194	28,353	**643,700**	
Annual Gasoline Recovery Credit, all facilities ($/yr)	-11,082	-94,211	-610,698	-836,536	-224,502	**-1,777,029**	
Total Costs, all facilities, after gasoline credit applied	246,285	678,424	1,898,700	885,707	7,551	**3,716,667**	
Estimated Cost Effectiveness ($/pound of VOC reduced)	3.81	1.23	0.53	0.18	0.01	**0.36**	
Estimated cost per gallon of gasoline dispensed (cents/gal)	1.04	0.34	0.15	0.05	0.00	**0.10**	
Estimated Total Costs per Facility, second and subsequent years (4)							
Vapor Balance Systems	700	700	700	700	700	**2,383,290**	
Vapor Assist Systems	900	900	900	900	900	**340,470**	
Total						**2,723,760**	
Estimated Cost Effectiveness, second and subsequent years							
Total Costs, all facilities							
Vapor Balance Systems	112,015	336,044	1,089,164	745,970	100,098	**2,383,290**	
Vapor Assist Systems	16,002	48,006	155,595	106,567	14,300	**340,470**	
Annual Gasoline Recovery Credit, all facilities ($/yr)	-11,082	-94,211	-610,698	-836,536	-224,502	**-1,777,029**	
Total Costs, all facillities, after gasoline credit applied	116,935	289,840	634,060	16,001	-110,104	**946,731**	
Estimated Cost Effectiveness ($/pound of VOC reduced)	1.81	0.53	0.18	0.00	-0.08	**0.09**	
Estimated cost per gallon of gasoline dispensed (cents/gal)	0.49	0.14	0.05	0.00	-0.02	**0.02**	

Notes:

(1) Total Costs include capital costs and annual testing costs. The cost estimate conservatively assumes all new equipment costs in the first year.

(2) Estimated capital costs and annual costs per facility do not account for gasoline recovery credit

(3) Annual testing costs conservatively assume the Dynamic Backpressure test annually, instead of once every 3 years.

(4) Costs assumed for the second and subsequent years are for annual testing

Table 4
Cost Analysis for Vapor Balance Systems for Gasoline Dispensing Facilities Based on Proposed Amendments To the Gasoline Transfer Operation Provisions at NJAC 7:27-16.3

Asumptions		**Cost $ (parts & install)**	**GDF 1**	**GDF 2**	**GDF 3**	**GDF 4**	**GDF 5**	**Total**	**Ave-rage**
	Est. # of GDFs (1)		160	480	1556	1066	143	**3405**	
	Est. # of Vent Pipes (2)		3	3	3	3	3		
	Est. # of Drop Tubes		3	3	3	3	3		
	Est. # of Dispensers (EPA, 1991)		2	3	6	9	12		
	Est. # of Nozzles (EPA, 1991)		3	4	7	10	16		
Proposed Items									
Stage I:	Increase from 90 to 98 % efficiency								
	Pressure/Vacuum Valve on vent pipes (3)	145	435	435	435	435	435		
	Drop tube with overfill protection (if needed to make efficiency requirements) (3)	338	1014	1014	1014	1014	1014		
Estimated Total Capital Costs per Facility			**1449**	**1449**	**1449**	**1449**	**1449**		**1,449**
Estimated Total Capital Costs all Facilities			**115,935**	**347,805**	**1,127,284**	**772,079**	**103,602**	**2,466,705**	
Annual testing (4)									
	Static Pressure Performance Test(all systems once a year)								
	Dynamic Backpressure Performance test(all systems once every 3 years)								
	Air to Liquid Volume Ratio Test(vapor assist systems once a year)								
Estimated Total Annual Costs per Facility		**700**	**700**	**700**	**700**	**700**	**700**		**700**
Estimated Total Annual Costs all Facilities			**112,015**	**336,044**	**1,089,164**	**745,970**	**100,098**	**2,383,290**	
Estimated Total Costs per Facility, first year (5) (6)			**2,149**	**2,149**	**2,149**	**2,149**	**2,149**		**2,149**
Estimated Total Costs all Facilities, first year			**227,950**	**683,849**	**2,216,448**	**1,518,048**	**203,700**	**4,849,995**	

Notes:

(1) Calculations assume 90 % of the facilities use vapor balance systems

(2) Calculations assume 3 vent pipes per facility which is conservative. Some facilities may have the piping manifolded together.

(3) Calculations assume one half the facilities do not have PV valves and drop tubes that meet the standards

(4) Annual testing costs conservatively assume the Dynamic Backpressure test annually, instead of once every 3 years.

(5) Total Costs include capital costs and annual testing costs. The cost estimate conservatively assumes all new equipment costs in the first year.

(6) Estimated capital costs and annual costs per facility do not account for gasoline recovery credit

Table 5
Cost Analysis for Vapor Assist Systems for Gasoline Dispensing Facilities Based on Proposed Amendments To the Gasoline Transfer Operation Provisions at NJAC 7:27-16.3

Asumptions		**Cost $ (parts & install)**	**GDF 1**	**GDF 2**	**GDF 3**	**GDF 4**	**GDF 5**	**Total**	**Ave-rage**
	Est. # of GDFs (1)		18	53	173	118	16	**378**	
	Est. # of Vent Pipes (2)		3	3	3	3	3		
	Est. # of Drop Tubes		3	3	3	3	3		
	Est. # of Dispensers (EPA, 1991)		2	3	6	9	12		
	Est. # of Nozzles (EPA, 1991)		3	4	7	10	16		
Proposed Items									
Stage I:	Increase from 90 to 98 % efficiency								
	Pressure/Vacuum Valve on vent pipes (3)	145	435	435	435	435	435		
	Drop tube with overfill protection (if needed to make efficiency requirements) (3)	338	1014	1014	1014	1014	1014		
Stage II:	Boots on assist nozzles (4)	10	30	40	70	100	160		
Estimated Total Capital Costs per Facility			**1479**	**1489**	**1519**	**1549**	**1609**		**1,529**
Estimated Total Capital Costs all Facilities			**13,415**	**40,779**	**137,356**	**97,627**	**14,053**	**303,230**	
Annual testing (5)									
	Static Pressure Performance Test(all systems once a year)								
	Dynamic Backpressure Performance test(all systems once every 3 years)								
	Air to Liquid Volume Ratio Test(vapor assist systems once a year)								
Estimated Total Annual Costs per Facility		**900**	**900**	**900**	**900**	**900**	**900**		**900**
Estimated Total Annual Costs all Facilities			**16,002**	**48,006**	**155,595**	**106,567**	**14,300**	**340,470**	
Estimated Total Costs per Facility, first year (6) (7)			**2,379**	**2,389**	**2,419**	**2,449**	**2,509**		**2,429**
Estimated Total Costs all Facilities, first year			**29,417**	**88,785**	**292,950**	**204,194**	**28,353**	**643,700**	

Notes:

(1) Calculations assume 10 % of the facilities use vapor assist systems

(2) Calculations assume 3 vent pipes per facility which is conservative. Some facilities may have the piping manifolded together.

(3) Calculations assume one half the facilities do not have PV valves and drop tubes that meet the standards

(4) Calculations assume all vapor assist systems do not have boots on the nozzles

(5) Annual testing costs conservatively assume the Dynamic Backpressure test annually, instead of once every 3 years.

(6) Total Costs include capital costs and annual testing costs. The cost estimate conservatively assumes all new equipment costs in the first year.

(7) Estimated capital costs and annual costs per facility do not account for gasoline recovery credit

The tables present the results of the cost analysis in three ways: 1. estimated total costs per facility, which include capital costs and annual testing costs, 2. estimated cost effectiveness in dollars per pound of VOC reduced, and 3. estimated cost (in cents) per gallon of gasoline dispensed.

The estimated cost per facility assumes a conservative worst case scenario that all facilities do not have complying equipment, which is not the reality. Some facilities have equipment that complies with the proposed rule. All of the calculations conservatively assume that all the equipment will be replaced in one year, when additional time is provided in the proposal.

While economic impacts have been quantified to the extent feasible, some projections are necessarily qualitative or semi-quantitative and based on general observations about the industry. This impact analysis, therefore, serves to provide a general picture of the economic impacts that typical facilities subject to the proposed regulation might encounter. Individual facilities may experience impacts different than those projected in this analysis.

III. ESTIMATED VOLATILE ORGANIC COMPOUND (VOC) EMISSION REDUCTIONS

1. Executive Summary

The VOC emission reduction calculations consist of three parts. First, VOC emission reductions were estimated for increasing the required control efficiency of Stage I vapor recovery systems from 90 to 98 percent. Next, VOC emission reductions were estimated for the requirement that vapor recovery systems must be compatible with on- board vapor recovery (ORVR) systems that car manufacturers are installing as a standard feature of new cars, beginning with model year 1998. Then, VOC emission reductions were estimated for the requirement of annual integrity testing.

In this analysis, estimated statewide VOC emission reductions from implementation of this proposed rule are 14.2 tons per day (TPD) in 2005 and 14.5 TPD in 2007. The proposed rule is estimated to result in a reduction in VOC emissions of approximately 3.5 TPD in the New Jersey portions of the Philadelphia Non-attainment Area in 2005 and 9.6 TPD in the New Jersey portion of the New York Non-attainment Area in 2007. A summary of the estimated emission reductions is shown in Table 1. The emission reduction calculations are shown in more detail below[2].

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[2] Calculation Methodology: CARB Enhanced Vapor Recovery Initial Statement of Reasons for Proposed Amendments to the Vapor Recovery Certification and Test Procedures for Gasoline Loading and Motor Vehicle Gasoline Refueling at Service Stations, Appendix D, February 4, 2000

Table 6: Estimated Emission Reductions for Gasoline Dispensing Facilities Based on Proposed Amendments To the Gasoline Transfer Operation Provisions at NJAC 7:27-16.3				
Proposed Items	New Jersey Statewide Estimated Emission Reductions 2005 tons/day	New Jersey Statewide Estimated Emission Reductions 2007 tons/day	New Jersey Portion of Philadelphia Non-attainment Area Estimated Emission Reductions 2005 tons/day	New Jersey Portion of New York Non-attainment Area Estimated Emission Reductions 2007 tons/day
Stage I	3.48	3.56		
Stage II ORVR Compatibility	0.27	0.27		
Annual Testing	10.40	10.66		
TOTAL	**14.2**	**14.5**	**3.5**	**9.6**

Notes: NJ portions of the Philadelphia and New York non-attainment areas were calculated using VMT data and growth factors used in the March 31, 2001 NJ SIP.

2. Stage I Vapor Recovery

The proposed NJ rule will increase the efficiency of the Stage I vapor recovery system from 90% to 98%.

Using 7.6 lbs/1000 gallons for uncontrolled conditions[3], the current emission factor based on the existing rule is:

(7.6 lb/1000 gal) x (1.00 - 0.90) = 0.76 lbs/1000 gallons

The proposed emission factor is:

(7.6 lb/1000 gal) x (1.00 - 0.98) = 0.152 lbs/1000 gallons

1997 gasoline sales in NJ[4] = 3,801,157,627 gallons/yr

The estimated future gasoline sales using the estimated growth factors in the March 31, 2001

[3] Ibid

[4] Fuel Merchants Association of New Jersey data, adjusted using the assumption that 99.94 % of the NJ gasoline dispensing facilities are required to have stage I and stage II controls.

State Implementation Plan (SIP)[5]:

	1997	2005	2007
Growth Factor	1	1.0955	1.1219
Gasoline sales (gallons/yr)	3,801,157,627	4,163,984,086	4,264,375,155

The 2005 estimated statewide emission reductions are:

(0.76 – 0.15) lbs/1000 gal x (4,163,984,086 gal/yr) (1 yr/365 days)(1 ton/2000 lb)=

3.48 tons/day statewide

The 2007 estimated statewide emission reductions are:

(0.76 – 0.15) lbs/1000 gal x (4,264,375,155 gal/yr) (1 yr/365 days)(1 ton/2000 lb)=

3.56 tons/day statewide

5 The State of New Jersey Department of Environmental Protection State Implementation Plan Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standard, March 31, 2001.

3. ORVR Compatibility with Vapor Assist Systems

Onboard Refueling Vapor Recovery (ORVR) is mandated by federal regulations to be phased in to the vehicle population beginning with the 1998 model year. ORVR is designed to achieve 95% recovery of vehicle gasoline tank displaced vapors by routing the displaced vapors to a carbon canister during fueling. Thus, it controls the same emissions as Stage II vapor recovery systems.

However, additional emissions at the dispensing facility may occur when fueling ORVR vehicles with vapor recovery systems for fuel dispensing. This is because the gasoline removed from the underground storage tank at the gasoline dispensing facility is no longer replaced with gasoline vapors from the vehicle and has the potential to draw in excess air which can lead to vapor growth. The concern is for assist systems, as the active vapor pump for these systems will continue to pump "air" from the nozzle/vehicle interface. The gasoline in the underground storage tank will evaporate into the air, increasing its volume, which will lead to excess fugitive and possibly vent emissions.

California's research, calculation methodology, emission factors and fleet turnover[6] are used for New Jersey, adjusting for gasoline throughput and estimated growth. This approach is conservative because New Jersey's fleet turnover is estimated to be slightly faster than California's.

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[6] Opcit note 2

The estimated ORVR penetration for the California fleet is given in Table 2 based on vehicle fleet extrapolation. Field tests for two types of assist systems generated the following emission factors for simulated ORVR penetrations:

Average ORVR Emission Factor for Gilbarco at 44.9% ORVR Simulation:

0.782 lbs/1000 gal (ORVR) -0.396 lbs/1000 gal (baseline) = 0.386

Average ORVR Emission Factor for Wayne at 38.2% ORVR Simulation:

0.289 lbs/1000 gal (ORVR) -0.026 lbs/1000 gal (baseline) = 0.263

The Gilbarco emission factor is expected to be higher based on the higher air to liquid (A/L) range (1.0 - 1.2) required for this system. The Wayne system has an A/L range of 0.9 – 1.1. This means the Gilbarco system will draw in more air into the underground storage tank than liquid removed.

The emission factors for other ORVR percentages are calculated assuming a linear relationship between ORVR fleet penetration and excess emissions.

Estimated Percentage of Vehicle Miles Traveled by ORVR Vehicles (Automobiles and Light Duty Trucks only) and Excess Emissions Estimated due to ORVR Fuelings are shown in Table 2.

Table 2. Estimated Percentage of Vehicle miles Traveled by ORVR Vehicles (Automobiles and Light Duty Trucks Only) and Excess Emissions Estimated Due to ORVR Fuelings

Year	% VMT by ORVR Vehicles	Estimated Excess Emissions	
		Gilbarco (lb/1000 gal)	Wayne (lb/1000 gal)
1998	0.43	0.004	0.003
1999	3.00	0.026	0.021
2000	7.32	0.063	0.050
2001	12.70	0.109	0.087
2002	19.00	0.163	0.131
2003	25.91	0.223	0.178
2004	32.61	0.280	0.224
2005	38.90	0.335	0.263
2006	44.86	0.386	0.309
2007	50.54	0.435	0.348
2008	56.03	0.482	0.385
2009	61.26	0.527	0.421
2010	66.28	0.570	0.456
2011	71.04	0.611	0.489
2012	75.28	0.647	0.518
2013	78.63	0.676	0.541
2014	81.23	0.699	0.559
2015	83.40	0.717	0.574
2016	85.30	0.734	0.587
2017	87.05	0.749	0.599
2018	88.67	0.763	0.610
2019	90.12	0.775	0.620
2020	91.34	0.786	0.628
	100.00	0.860	0.688

The estimated New Jersey statewide emission reductions for year 2005 are calculated as follows:

Assume 50% of assist system throughput for Gilbarco, 50% for Wayne

Estimated 1997 Stage II gasoline sales in New Jersey[7] = 3,801,157,627 gallons/yr

Estimated 1997 gasoline sales form assist systems = 452,754,525 gallons/yr

Estimated growth factor for gasoline sales from 1997 to 2005 = 1.0955

0.435 lbs/1000 gal x (0.50 x452,754,525 gal/yr) (1 yr/365 days)(1 ton/2000 lb)(1.10955)+

[7] Opcit note 4

0.348 lbs/1000 gal x (0.50 x452,754,525 gal/yr) (1 yr/365 days)(1 ton/2000 lb)(1.10955) =

0.15 + 0.12 = 0.27 tons per day

The estimated New Jersey statewide emission reductions for year 2007 are calculated as follows:

Assume 50% of assist system throughput for Gilbarco, 50% for Wayne

Estimated 1997 Stage II gasoline sales in New Jersey = 3,801,157,627 gallons/yr

Estimated 1997 gasoline sales form assist systems = 452,754,525 gallons/yr

Estimated growth factor for gasoline sales from 1997 to 2007 = 1.1219

0.435 lbs/1000 gal x (0.50 x452,754,525 gal/yr) (1 yr/365 days)(1 ton/2000 lb)(1.1219)+

0.348 lbs/1000 gal x (0.50 x452,754,525 gal/yr) (1 yr/365 days)(1 ton/2000 lb)(1.1219) =

0.15 + 0.12 = 0.27 tons per day

4. Annual Testing

The ideal emission factor based on the existing rule is[8]:

(7.6 lb/1000 gal) x (1.00 - 0.95) = 0.38 lbs/1000 gallons

"EPA guidance[9] indicates that in-use efficiencies vary with frequency of inspections as follows:

92% with semi-annual inspections

86 % with annual inspections

62% less frequent inspections"

The existing emission factor is:

(7.6 lb/1000 gal) x (1.00 - 0.62) = 2.888 lbs/1000 gallons

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[8] Opcit note 2

[9] EPA Technical Guidance-Stage II Vapor Recovery Systems for Control of Vehicle Refueling Emissions at Gasoline Dispensing Facilities, Volume I, page 4-50

The proposed emission factor is:

(7.6 lb/1000 gal) x (1.00 - 0.86) = 1.064 lbs/1000 gallons

1997 gasoline sales in NJ[10] = 3,801,157,627 gallons/yr

The estimated future gasoline sales using the estimated growth factors in the SIP:

	1997	2005	2007
Growth Factor	1	1.0955	1.1219
Gasoline sales (gallons/yr)	3,801,157,627	4,163,984,086	4,264,375,155

The 2005 estimated statewide emission reductions are:

(2.888 – 1.064) lbs/1000 gal x (4,163,984,086 gal/yr) (1 yr/365 days)(1 ton/2000 lb)=

10.40 tons/day statewide

The 2007 estimated statewide emission reductions are:

(2.888 – 1.064) lbs/1000 gal x (4,264,375,155 gal/yr) (1 yr/365 days)(1 ton/2000 lb)=

10.66 tons/day statewide

[10] Opcit note 4