


Control of VOC Emissions from Gasoline Dispensing Facilities (Stage I and Stage II)

Air Quality Technical Advisory Committee

April 11, 2019

Harrisburg, PA

Tom Wolf, Governor

Patrick McDonnell, Secretary

Overview

- Adds § 129.61a to describe requirements for system leak testing and monitoring options.
  - Requires gasoline dispensing facilities (GDFs) to complete annual leak testing.
  - Requires leak testing every 6 months if a test fails.
  - Allows GDFs to resume 12-month testing when two 6-month tests do not require a corrective action.
  - Offers option to GDFs to forego annual leak testing if a continuous pressure monitor is installed and operated.
- Requires Enhanced Hoses and Nozzles

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Overview

Proposes changes to § 129.82, “Control of VOCs from gasoline dispensing facilities (Stage II)”:

- Removes requirements from subsection (a) to install and operate Stage II vapor recovery systems.
- Includes test procedures for vapor balance vapor recovery systems.

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Overview

- Adds § 129.82a regarding decommissioning procedures.
  - Requires decommissioning of vacuum-assist Stage II systems by December 31, 2022. Until decommissioned, the system must meet Stage II requirements.
  - Requires decommissioning to follow industry, and EPA recognized, standard in Petroleum Equipment Institute's procedures in PEI/RP300-09.
  - Requires a GDF owner to decommission to industry standard, PEI/RP300-09, when a vapor balance system is removed.

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Changes Between Preliminary and Proposed

- Added Rotatable Adapter Test for Stage I systems equipped with rotatable adapters.
- Referenced UMX and UMI storage tank certified installer categories defined in Chapter 245.
- Referenced specific tests required to complete decommissioning.

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Three Types of Emissions

- Refilling – Emissions derived from a delivery truck making a fuel delivery (7.01 lb./1,000 gal. delivered)
- Breathing Loss – Emissions derived from pressure changes in the underground tanks (1.0 lb./1,000 gal. pumped)
- Refueling – Emissions derived from motorists filling vehicles (7.6 lb./1,000 gal. pumped)

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Stage I Control Effectiveness

	Control Efficiency	*	Rule Penetration	*	Rule Effectiveness	=	Control Effectiveness
PA SIP	96%	*	96%	*	80%	=	74%
CCCCCC	95%	*	70%	*	68%	=	45%
129.61a for medium and large GDFs	95%	*	96%	*	90%	=	82%

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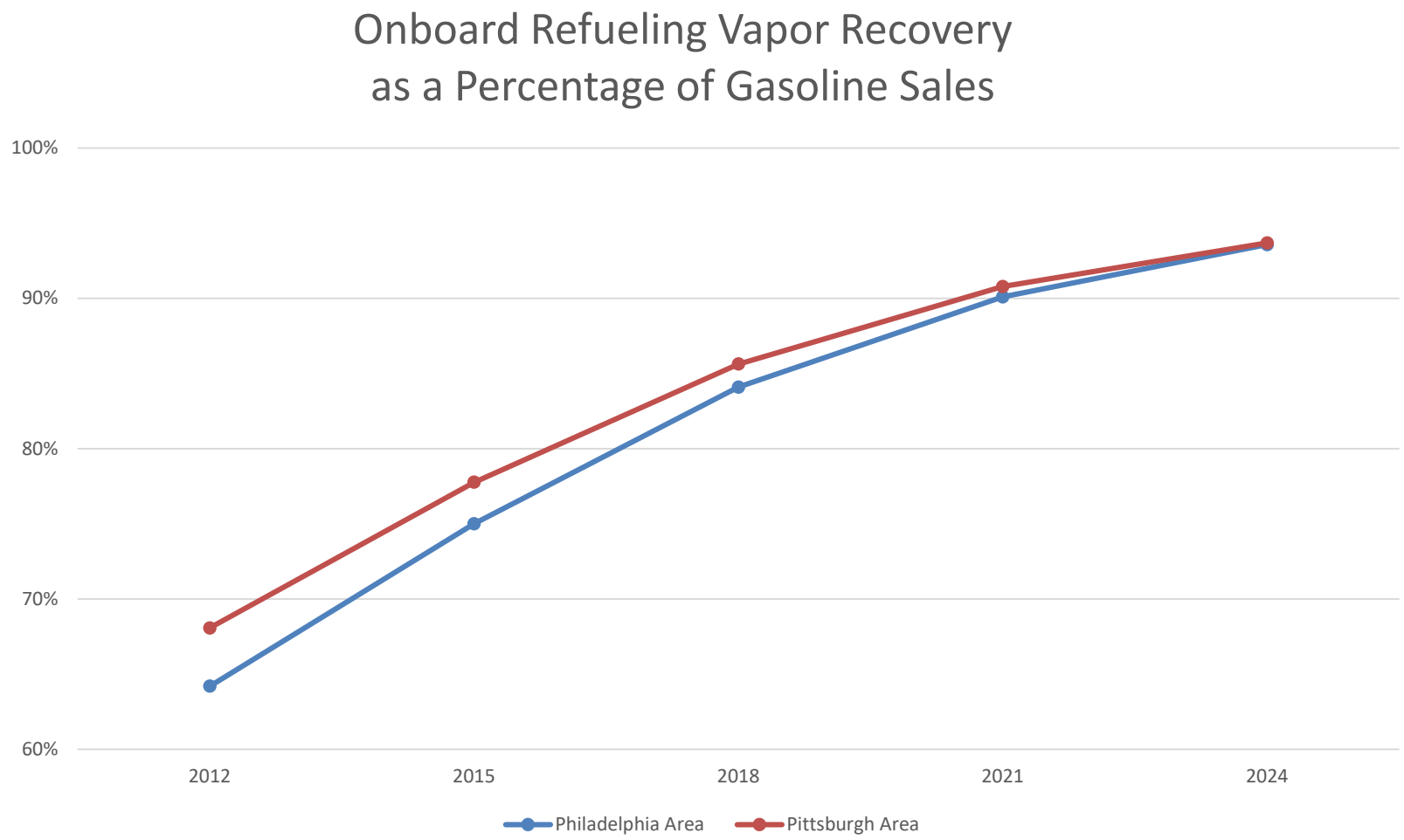
ORVR Penetration in Subject Areas



Based on 76% control

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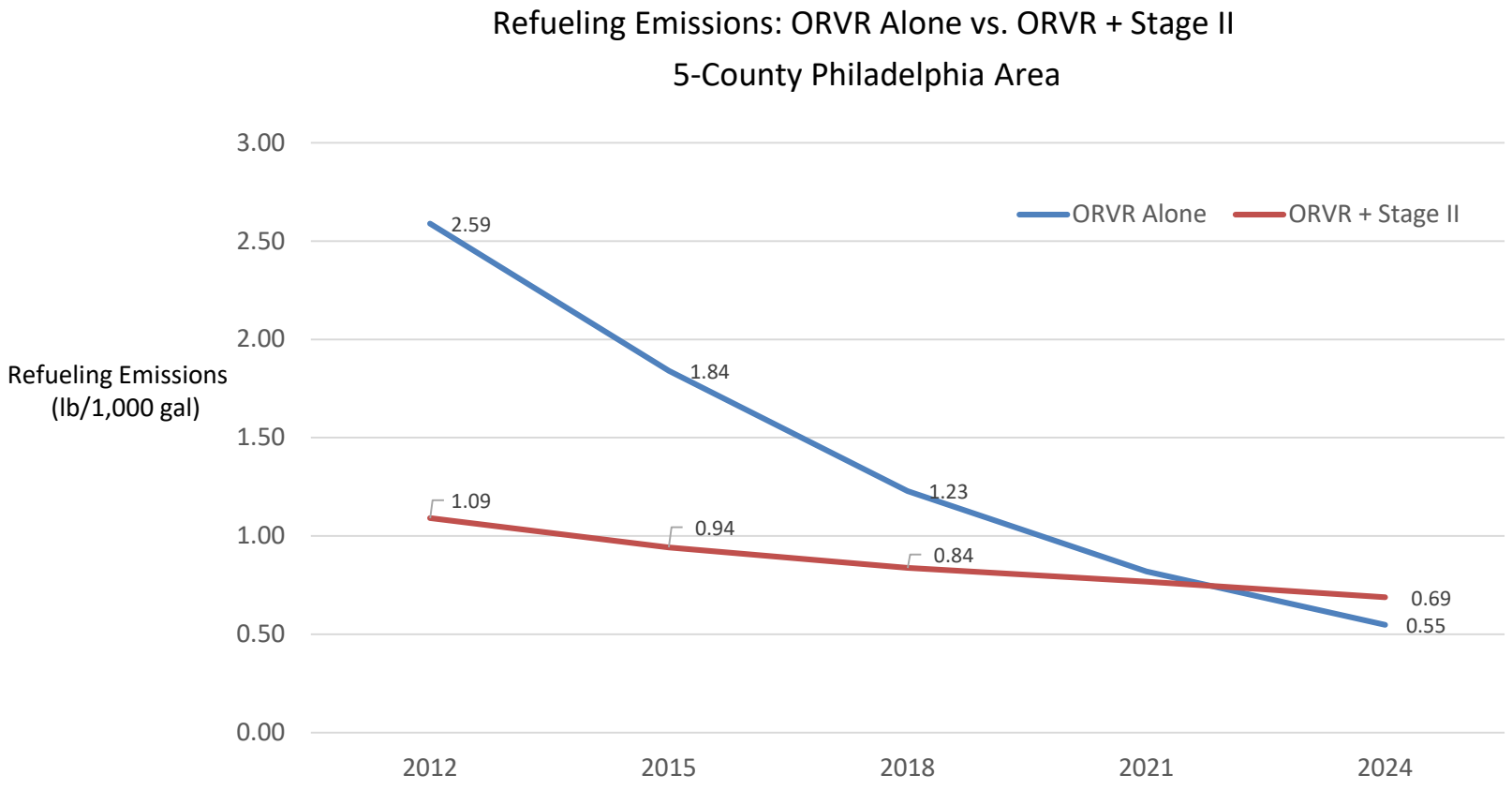
Trending Effects of Refueling Vapor Recovery



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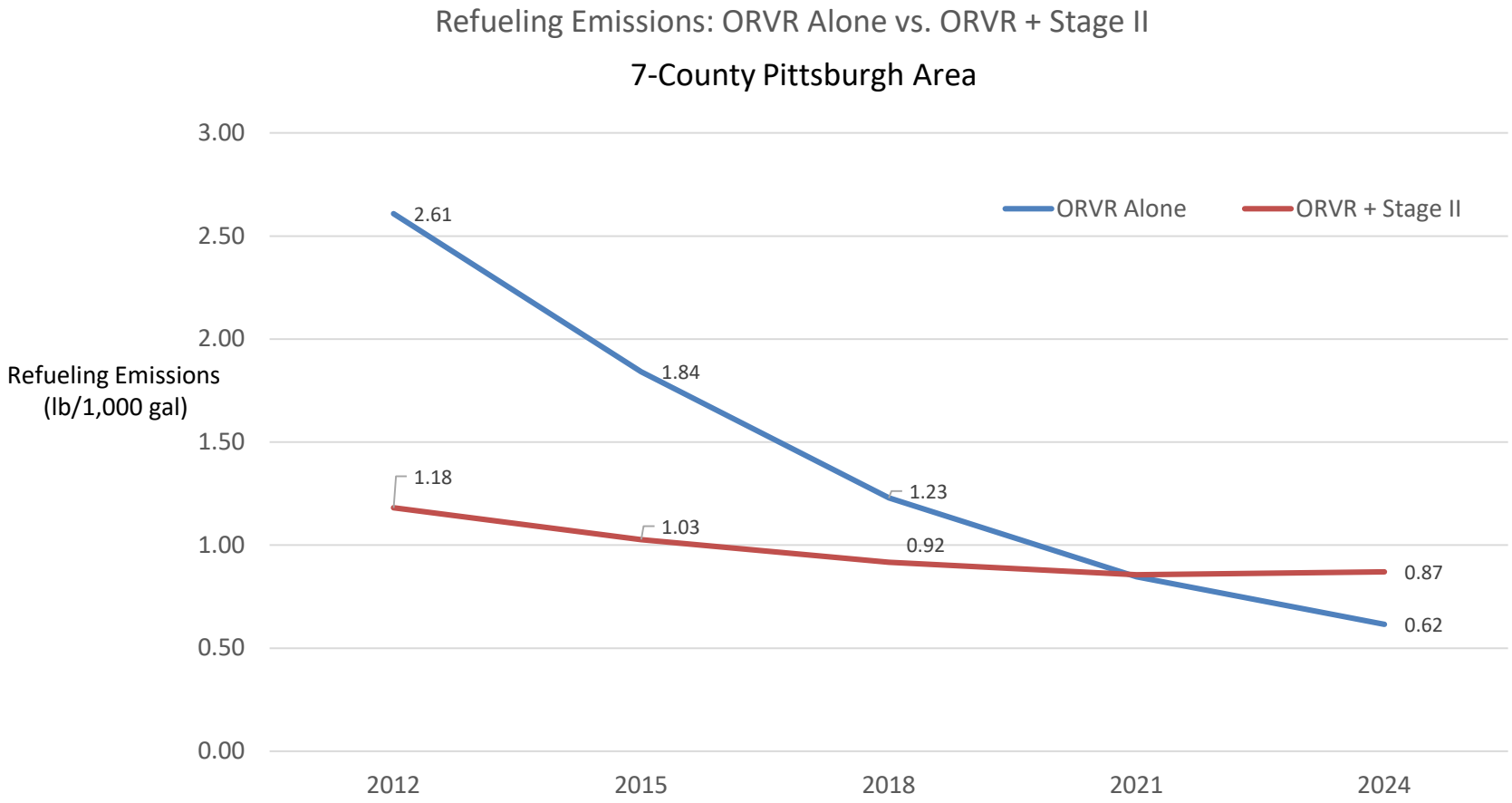

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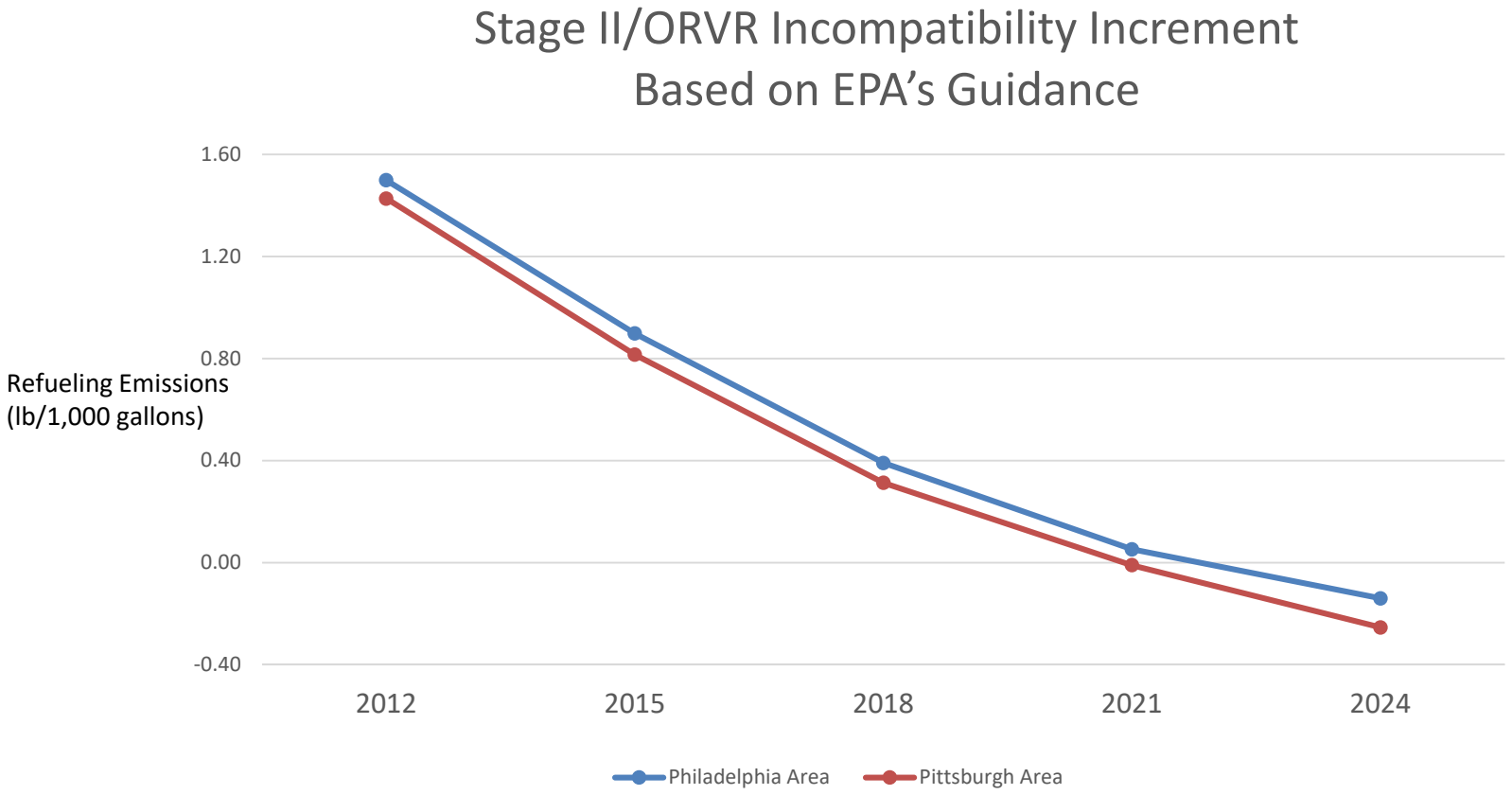
Differential Between ORVR and ORVR + Stage I



Based on 76% control

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Emissions

- Examined three sizes of GDFs based on throughputs based in part on requirements in GDF NESHAP 40 CFR subpart CCCCCC:
  - < 120,000 gallons per year
  - ≥ 120,000 gallons and < 1,200,000 gallons per year
  - ≥ 1,200,000 gallons per year

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Emissions (continued)

Philadelphia Area (2019)	Number of GDFs	Percentage of Throughput
Throughput < 120,000	610	1.6%
120,000 ≤ Throughput < 1,200,000	589	26.8%
Throughput ≥ 1,200,000	364	71.6%

Pittsburgh Area (2019)	Number of GDFs	Percentage of Throughput
Throughput < 120,000	627	2.0%
120,000 ≤ Throughput < 1,200,000	525	33.1%
Throughput ≥ 1,200,000	250	64.9%

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Emissions (continued)

2021 Summer Day VOC Emissions*				
	Philadelphia		Pittsburgh	
	CCCCCC	129.61a	CCCCCC	129.61a
Throughput < 120,000	0.10-0.29	0.10-0.29	0.08-0.24	0.08-0.24
120,000 ≤ Throughput < 1,200,000	1.66-4.76	0.69	1.39-3.98	0.58
Throughput ≥ 1,200,000	4.45	1.85	2.73	1.13

2024 Summer Day VOC Emissions				
	Philadelphia		Pittsburgh	
	CCCCCC	129.61a	CCCCCC	129.61a
Throughput < 120,000	0.09-0.27	0.09-0.27	0.07-0.22	0.07-0.22
120,000 ≤ Throughput < 1,200,000	1.55-4.43	0.64	1.28-3.65	0.53
Throughput ≥ 1,200,000	4.15	1.72	2.51	1.04

*All emissions in tons per day without considering hoses and nozzles

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Emissions (continued)

2021 Annual VOC Emissions*				
	Philadelphia		Pittsburgh	
	CCCCCC	129.61a	CCCCCC	129.61a
Throughput < 120,000	30 - 85	30 - 85	26 - 74	26 - 74
120,000 ≤ Throughput < 1,200,000	483 - 1379	200	422 - 1206	175
Throughput ≥ 1,200,000	1292	535	828	343

2024 Annual VOC Emissions*				
	Philadelphia		Pittsburgh	
	CCCCCC	129.61a	CCCCCC	129.61a
Throughput < 120,000	28 - 79	28 - 79	24 - 68	24 - 68
120,000 ≤ Throughput < 1,200,000	449 - 1284	186	387 - 1106	160
Throughput ≥ 1,200,000	1202	498	760	315

*All emissions in tons per year without considering hoses and nozzles

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Emissions (continued)

Gasoline Hose VOC Emissions *				
			Emissions	
	GDFs	Hoses	Enhanced Conventional	Conventional
Philadelphia Area				
120,000 ≤ Throughput < 1,200,000	589	5890	7	55
Throughput ≥ 1,200,000	364	5824	7	54
Pittsburgh Area				
120,000 ≤ Throughput < 1,200,000	525	5250	6	49
Throughput ≥ 1,200,000	250	4000	5	37

*All emissions in tons per year

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Emissions (continued)

Gasoline Nozzle VOC Emissions*				
			Emissions (tons/year)	
	GDFs	Nozzles	Enhanced Conventional	Conventional
Philadelphia Area				
120,000 ≤ Throughput < 1,200,000	589	5890	10	51
Throughput ≥ 1,200,000	364	5824	27	136
Pittsburgh Area				
120,000 ≤ Throughput < 1,200,000	525	5250	9	44
Throughput ≥ 1,200,000	250	4000	17	87

*All emissions in tons per year

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Decommissioning Costs

Philadelphia Area Costs*						
	Dispenser	Hose Kit	With ECO Nozzle	Adapter	Leak Testing	Fees
120,000 ≤ Throughput < 1,200,000	$600	$2,200	$700	$100	$300	$45
Throughput ≥ 1,200,000	$575	$2,200	$700	$100	$200	$30

Pittsburgh Area Costs*						
	Dispenser	Hose Kit	With ECO Nozzle	Adapter	Leak Testing	Fees
120,000 ≤ Throughput < 1,200,000	$500	$2,000	$630	$100	$275	$40
Throughput ≥ 1,200,000	$400	$1,500	$500	$75	$125	$20

*All costs are in thousands of dollars

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Annualized Costs

Philadelphia Area Costs*					
	CCCCCC		129.61a		Gasoline Saved by 129.61a
	Testing	Repairs	Testing	Repairs	
120,000 ≤ Throughput < 1,200,000	$0	$0	$442	$862	$297-$1,014
Throughput ≥ 1,200,000	$61	$252	$273	$735	$730

Pittsburgh Area Costs*					
	CCCCCC		129.61a		Gasoline Saved by 129.61a
	Testing	Repairs	Testing	Repairs	
120,000 ≤ Throughput < 1,200,000	$0	$0	$394	$769	$260-$887
Throughput ≥ 1,200,000	$42	$173	$188	$505	$474

*All dollar amounts are in thousands of dollars

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Cost Effectiveness (129.61a vs. 6C)

Philadelphia Area Costs Effectiveness (2021)						
	Emission Reduction excluding Hoses and Nozzles (tons)	Costs excluding Hoses and Nozzles* ($)	Cost Effectiveness excluding Hoses and Nozzles ($/ton)	Emission Reduction including Hoses and Nozzles (tons)	Costs including Hoses and Nozzles ($)	Cost Effectiveness including Hoses and Nozzles ($/ton)
Philadelphia						
120,000 ≤ Throughput < 1,200,000	283-1,179	-184k - 534k	1,887 to Net Savings	371-1,268	290k – 1,000k	229 to 2,700
Throughput ≥ 1,200,000	756	-303k	Net Savings	912	110k	120
Pittsburgh						
120,000 ≤ Throughput < 1,200,000	247-1,031	-147k - 480k	1,943 to Net Savings	325-1109	275k - 902k	248 – 2,775
Throughput ≥ 1,200,000	485	-181k	Net Savings	592	103k	173

*Negative number denotes cost benefit

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