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## Socio-Economic Impact Study of the Proposed Bay Area 2010 Clean Air Plan, Control Measure SSM-5, BAAQMD Regulation 8, Rule 53: Vacuum Truck Operations

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## EXECUTIVE SUMMARY

The Bay Area Air Quality Management District (BAAQMD) proposes to enact Regulation 8, Rule 53 (Rule 8-53) to limit organic vapor emissions from vacuum truck operations at petroleum refineries, petroleum bulk plants, and petroleum bulk terminals. Until now, vacuum truck operations have been exempt from District requirements. The proposed Rule would limit emissions applied at the outlet of the vacuum truck or associated equipment, as well as from vapor and/or liquid leaks from vacuum truck equipment, and would potentially reduce emissions by up to 1.05 tons per day.

### **Socio-Economic Impacts**

In order to estimate the economic impacts of enacting Rule 8-53 on the affected industries, this report compares the affected industries' annualized compliance costs with their profit ratios. The analysis uses data from the BAAQMD, US Census County Business Patterns, the IRS, and the 2007 US Economic Census.

#### ***Economic Profile of Affected Industries***

The BAAQMD identifies the affected industries as Petroleum Refineries (SIC 2911) and Petroleum Bulk Stations and Terminals (SIC 5171). According to BAAQMD records, there are five petroleum refinery establishments, 17 bulk terminal establishments, and 18 bulk plant establishments in the Bay Area that would be subject to the proposed rule.

#### ***Economic Impacts to Affected Industries***

IRS data indicate that firms in the petroleum refinery sector, which includes the affected industry, earn 6.3 percent profits on total revenue, resulting in total annual industry net profits of \$1.7 billion. According to BAAQMD data, the total annualized compliance costs to refinery establishments would be approximately \$1.1 million. Dividing the compliance costs (\$1.1 million) by annual profits (\$1.7 billion) shows that the proposed Rule would result in a 0.06 percent reduction in establishments' profits, which is well below the California Air Resources Board's (ARB's) 10 percent threshold used to determine cost burden.

IRS data also indicate that firms in the wholesale trade, petroleum and petroleum related products sector, which includes both the bulk terminals and bulk plants (termed stations in IRS data) industries, earn 1.5 percent profits on total revenue, resulting in total annual bulk terminal industry net profits of \$1.1 billion and bulk plant industry profits of \$4.5 million.

According to BAAQMD data, the total annualized compliance costs for the bulk terminals establishments would be approximately \$98,534. Dividing the compliance costs (\$98,534) by annual profits (\$1.1 billion) shows that the proposed Rule would result in a 0.01 percent reduction in bulk terminals establishments profits. BAAQMD estimates that the annualized compliance costs to bulk plant establishments would be \$247. Dividing compliance costs (\$247) by annual profits (\$4.5 million) shows that the proposed Rule would result in a 0.01 percent impact to bulk plant establishments. Thus, the compliance costs as a share of profits for both industries fall well below the ARB's 10 percent threshold used to determine cost burden.

***Regional Employment, Indirect, and Induced Impacts***

Since on average, the proposed Rule 8-53 would not result in significant economic impacts to establishments within the affected industries, the proposed rule would not impact the affected industries or regional employment. In addition, adoption of the proposed Rule would not result in any additional regional spinoff, or multiplier, impacts.

**Impacts to Small Businesses**

Using the California Government Code 14835's definition of a small business, approximately 37 percent of affected bulk plant establishments are small businesses. However, as the ARB and this analysis both assume that compliance costs are small enough not to significantly impact profitability, adopting Rule 8-53 would not adversely impact small businesses.

## DESCRIPTION OF PROPOSED RULE

The Bay Area Air Quality Management District (BAAQMD) proposes to enact Regulation 8, Rule 53 (Rule 8-53) to limit organic vapor emissions from vacuum truck operations at certain facilities that handle materials likely to produce ozone-forming emissions, effective January 1, 2013. Until now, vacuum truck operations have been exempt from District requirements. The proposed Rule would reduce total organic compound (TOC) emissions within the BAAQMD's District through an organic emissions limit applied at the outlet of the vacuum truck or associated equipment, an emissions limit for vapor and/or liquid leaks from vacuum truck equipment, monitoring requirements, and reporting requirements. The implementation of Rule 8-53 would potentially reduce emissions by up to 1 ton per day as per staff estimate. Table 1 shows the proposed emissions limits under Rule 8-53.

**Table 1: Proposed TOC Emissions Limits, Regulation 8, Rule 53**

<u>Operation</u>	<u>TOC Emissions Limits</u>
Exhaust Emissions (vacuum truck pump, blower exhaust, or control device)	500 ppmv
Equipment Liquid Leaks (hoses, connectors, flanges, lines, and stingers)	3 drops per minute
Equipment Vapor Leaks (hoses, connectors, flanges, lines, and stingers)	500 ppmv

Sources: BAAQMD; BAE, 2011.

The proposed emissions limits would be consistent with the South Coast Air Quality Management District's (SCAQMD) Rule 1149 that limits organic vapor emissions from vacuum trucks used in conjunction with tank degassing and the Texas Commission on Environmental Quality (TCEQ) under Title 30 of the Texas Administrative Code, Chapter 101, Subchapter F.

Rule 8-53 would apply to commercial facilities that use vacuum trucks to load materials containing organic compounds and are capable of emissions of at least 500 parts per million by volume (ppmv) measured as methane for those high vapor pressure materials subject the proposed rule (and already subject to other District refinery rules; Regulation 8, Rule 5: Storage of Organic Liquids, and Regulation 8, Rule 8: Wastewater (Oil-Water) Separators, or Regulation 8, Rule 44: Marine Tank Vessel Operations). However, emissions from vacuum trucks responding to oil spills or other environmental emergencies would be exempt.

## REGIONAL TRENDS

This section provides background information on the demographic and economic trends for the San Francisco Bay Area, which represents the BAAQMD's District. The San Francisco Bay Area includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties. Regional trends are compared to statewide demographic and economic patterns since 2000, in order to show the region's unique characteristics relative to the State.

### Regional Demographic Trends

Table 2 shows the population and household trends for the nine county Bay Area and California between 2000 and 2010. During this time, the Bay Area's population increased by 5.4 percent, compared to 10 percent in California. Likewise, the number of Bay Area households grew by 5.8 percent, compared to a 9.3 percent statewide increase.

**Table 2: Population and Household Trends, 2000-2010**

<b>Bay Area (a)</b>	<b>2000</b>	<b>2010</b>	<b>Total Change 2000-2010</b>	<b>Percent Change 2000-2010</b>
<b>Population</b>	6,784,348	7,150,739	366,391	5.4%
<b>Households</b>	2,466,020	2,608,023	142,003	5.8%
<b>Average Household Size</b>	2.7	2.7		
<b>California</b>				
<b>Population</b>	33,873,086	37,253,956	3,380,870	10.0%
<b>Households</b>	11,502,871	12,577,498	1,074,627	9.3%
<b>Average Household Size</b>	2.9	2.9		

Notes:

(a) Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.

Sources: California, Department of Finance; US Census; BAE 2011.

The slower growth in the Bay Area is related to its relatively built out environment, compared to the state overall. While Central Valley locations, such as the Sacramento region, experienced large increases in the number of housing units, the Bay Area, which was relatively built out before the housing boom, only experienced moderate increases in housing units.

## **Regional Economic Trends**

In the five-year period, between 2005 and 2010, the Bay Area's economic base shrank by 4.4 percent, decreasing from 3.23 million jobs to 3.09 million jobs. This represents slightly slower job loss than the State, where the number of jobs shrank by nearly six percent.

Manufacturing, Retail Trade, Professional, Scientific, and Technical Services, and Healthcare and Social Assistance, the largest private (non-government) sectors in the Bay Area's economy, each constituted 10 percent of the region's total jobs in 2010. Over the five-year period the Manufacturing sector lost 13 percent of its jobs, while the Retail Trade sector lost nine percent of its jobs. However, during this period, the Professional, Scientific, and Technical Services sector grew by 10 percent, while the Healthcare and Social Assistance sector grew by nearly 14 percent. Statewide, the Manufacturing and Retail Trade sectors declined by 17 and nine percent, respectively. However, the Professional, Scientific, and Technical Services and Healthcare and Social Assistance sectors grew by five and 13 percent, respectively. Overall, the Bay Area's economic base reflects the state's base, sharing a similar distribution of employment across sectors. Table 3 shows the jobs by sector in 2005 and 2010.

The affected industries, Petroleum Refineries and Petroleum Bulk Plants (referred to as Bulk Stations) and Terminals, fall into the Manufacturing, and Wholesale Trade sectors, respectively. The Manufacturing sector represents 9.9 percent of the region's job base, while the Wholesale Trade sector represents 3.7 percent of the region's jobs base. Although both sectors' employment contracted between 2005 and 2010, the Wholesale Trade sector's share of the region's jobs remained constant, while the Manufacturing sector's share of the region's jobs decreased one percent.



**Table 3: Jobs by Sector, 2005-2010** (a)

Industry Sector	Bay Area					California				
	2005 (b)		2010 (c)		% Change 2005-2010	2005 (b)		2010 (c)		% Change 2005-2010
	Jobs	% Total	Jobs	% Total		Jobs	% Total	Jobs	% Total	
Agriculture	20,400	0.6%	19,000	0.6%	-6.9%	378,200	2.5%	381,600	2.7%	0.9%
Mining and Logging	800	0.0%	500	0.0%	-37.5%	23,600	0.2%	26,800	0.2%	13.6%
Construction	74,800	2.3%	50,100	1.6%	-33.0%	905,300	6.0%	559,800	3.9%	-38.2%
Manufacturing	350,400	10.8%	305,400	9.9%	-12.8%	1,502,600	9.9%	1,242,400	8.7%	-17.3%
Wholesale Trade	123,000	3.8%	113,200	3.7%	-8.0%	675,800	4.5%	643,200	4.5%	-4.8%
Retail Trade	336,700	10.4%	305,900	9.9%	-9.1%	1,659,300	10.9%	1,508,800	10.6%	-9.1%
Transportation, Warehousing, and Utilities	100,300	3.1%	90,200	2.9%	-10.1%	487,100	3.2%	464,900	3.3%	-4.6%
Information	112,900	3.5%	110,800	3.6%	-1.9%	473,600	3.1%	429,000	3.0%	-9.4%
Finance and Insurance	151,000	4.7%	118,200	3.8%	-21.7%	636,600	4.2%	511,900	3.6%	-19.6%
Real Estate and Rental and Leasing	55,600	1.7%	47,900	1.6%	-13.8%	283,600	1.9%	247,900	1.7%	-12.6%
Professional, Scientific, and Technical Services	289,100	8.9%	318,800	10.3%	10.3%	970,200	6.4%	1,020,600	7.1%	5.2%
Management of Companies and Enterprises	52,500	1.6%	54,200	1.8%	3.2%	222,100	1.5%	190,500	1.3%	-14.2%
Administrative and Waste Services	182,100	5.6%	167,100	5.4%	-8.2%	968,300	6.4%	858,300	6.0%	-11.4%
Educational Services	73,000	2.3%	81,700	2.6%	11.9%	272,200	1.8%	307,900	2.2%	13.1%
Health Care and Social Assistance	284,500	8.8%	324,100	10.5%	13.9%	1,321,200	8.7%	1,479,000	10.4%	11.9%
Arts, Entertainment, and Recreation	47,600	1.5%	37,200	1.2%	-21.8%	239,000	1.6%	241,200	1.7%	0.9%
Accommodation and Food Services	261,300	8.1%	209,600	6.8%	-19.8%	1,236,200	8.1%	1,252,500	8.8%	1.3%
Other Services, except Public Administration	108,800	3.4%	108,800	3.5%	0.0%	505,500	3.3%	484,700	3.4%	-4.1%
Government (d)	446,300	13.8%	430,200	13.9%	-3.6%	2,420,200	15.9%	2,427,100	17.0%	0.3%
<b>Subtotal (e)</b>	<b>3,071,100</b>	<b>95.1%</b>	<b>2,892,900</b>	<b>93.7%</b>	<b>-5.8%</b>	<b>15,179,500</b>	<b>100.0%</b>	<b>14,278,000</b>	<b>100.0%</b>	<b>-5.9%</b>
Additional Suppressed/Confidential Employment (f)	159,800	4.9%	195,900	6.3%	22.6%	n/a	n/a	n/a	n/a	
<b>Total, All Employment</b>	<b>3,230,900</b>	<b>100.0%</b>	<b>3,088,800</b>	<b>100.0%</b>	<b>-4.4%</b>	<b>15,179,500</b>	<b>100.0%</b>	<b>14,278,000</b>	<b>100.0%</b>	<b>-5.9%</b>

## Notes:

(a) Includes all wage and salary employment covered by unemployment insurance.

(b) Represents employment for calendar year, 2005.

(c) Represents employment for calendar year, 2010.

(d) Government employment includes workers in all local, state and Federal sectors, not just public administration. For example, all public school staff are in the Government category.

(e) Totals may not add due to independent rounding.

(f) County employment for some industries were suppressed by EDD due to the small number of firms reporting in the industry for a given county.

Sources: California Employment Development Department, BAE, 2011.

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## Affected Industries

The proposed rule would affect vacuum truck operations, which are part of the truck transportation sector. However, the responsibility of compliance would fall on the refineries, bulk terminals, and bulk plants (or stations). BAAQMD staff stated that vacuum truck operators would be able to fully pass compliance costs on to the refineries, bulk terminals, and bulk stations. Thus, this analysis focuses on the impacts to the petroleum refinery, and petroleum bulk terminals, and petroleum bulk stations industries.

According to the US Census, in 2009, the Bay Area had 7 Petroleum Refinery establishments that accounted for 4,210 jobs, averaging 601 jobs per establishment. However, BAAQMD staff indicated that there are five major petroleum refineries in the Bay Area, and one re-refiner. Inaccurate self-coding and reporting can result in Census data including inaccurate entries, which could account for the differences between BAAQMD and Census petroleum refinery counts.

Census data also states that there were also 57 Petroleum Bulk Stations and Terminals establishments that accounted for between 1,064 jobs, averaging 19 workers per establishment (See Table 4). Because the bulk terminals and bulk stations industries share a common six-digit NAICS code (424710, Petroleum Bulk Stations and Terminals), data from the County Business Patterns does not distinguish between these industries. However, the analysis calculates the impacts of the proposed Rule on each industry, individually.

The BAAQMD provided data to establish the distribution of establishments by size for the Bulk Terminals and Bulk Stations industries. BAAQMD staff indicated that Bulk Terminals tend to be large establishments, and Bulk Stations tend to be smaller. Because some bulk terminal establishments are co-located with refineries, the County Business Patterns data may have excluded or mis-categorized some bulk terminal establishments, which could explain the underrepresentation of larger establishments in the County Business Patterns data. The analysis uses establishment counts and sizes from the BAAQMD to estimate industry impacts.

Although the proposed Rule could also affect marine terminals and organic liquid pipeline facilities, this analysis does not consider their impacts. BAAQMD staff indicates that firms in these industries use vacuum trucks infrequently enough, or load materials regulated by the rule in small enough quantities, that their share of vacuum truck usage would be close to zero; therefore, they are excluded from the analysis.

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**Table 4: Profile of Affected Industries, 2009**

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<b>Industry</b>	<b>Petroleum Refineries (a)</b>	<b>Petroleum Bulk Stations and Terminals (b)</b>
Employment (c)	4,210	1,084
Average Employment per Establishment	601	19
Number of Establishments (by workforce size)		
1-4	0	24
5-9	1	9
10-19	0	11
20-49	0	9
50-99	1	2
100+	<u>5</u>	<u>2</u>
Total	7 (d)	57 (e)

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**Notes:**

- (a) The petroleum refinery industry is defined as NAICS 324110, Petroleum Refineries.
- (b) The bulk terminals and bulk stations industry is defined as NAICS 424710, Petroleum Bulk Stations and Terminals.
- (c) In cases where the actual employment number is not disclosed for confidentiality purposes, the analysis uses the midpoint employment number for each size cohort.
- (d) BAAQMD estimates that the Bay Area has six establishments in this sector will be affected by the proposed Rule.
- (e) BAAQMD estimates that the Bay Area has 35 establishments in this sector will be affected by the proposed Rule.

Sources: U.S. Census County Business Patterns, 2009; BAE, 2011.

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## **SOCIO-ECONOMIC IMPACTS**

This section discusses the methodology, economic profile of the affected industry, annualized compliance costs, and estimates the economic impacts associated with the proposed adoption of Rule 8-53.

### **Methodology**

In order to estimate the economic impacts of amending Rule 8-53 on the affected industries, this report compares the affected industries' annualized compliance costs with their profit ratios. The analysis uses data from the BAAQMD, US Census County Business Patterns, the IRS, and the 2007 US Economic Census.

The BAAQMD identifies the affected industries as Petroleum Refineries (SIC 2911) and Petroleum Bulk Stations and Terminals (SIC 5171). According to BAAQMD records, there are five petroleum refinery establishments, 17 bulk terminal establishments, and 18 bulk plant establishments in the Bay Area that would be subject to the proposed rule.

### **Economic Profile of Affected Industries**

As shown in Table 5, according to 2007 US Economic Census data, the average California firm in the Petroleum Refinery sector has average annual sales per employee of approximately \$7.4 million. Multiplying the average statewide revenues per employee by the County Business Pattern's estimated regional average employees per establishment (601 workers) shows that on average, Bay Area petroleum refineries have total annual revenues of \$4.5 billion per establishment.

The Economic Census also provides average revenues per employee data for the Bulk Terminals and Bulk Stations industries, individually. According to the data, the average California Bulk Terminals establishment has average revenues per employee of \$26.3 million, while the average California Bulk Stations establishment has average revenues per employee of \$1.5 million. Multiplying average revenues per employee figures by the average number of employees per Bay Area establishment shows that on average, bulk terminal establishments receive total annual revenues of \$4.6 billion, while the average bulk station establishment receives total annual revenues of \$17 million.

BAAQMD staff and US Economic Census data indicate that all of the bulk terminal operators are large multinational energy firms, while the bulk station firms tend to be smaller. Thus, the analysis distributes the bulk terminals establishments into the largest establishment size cohort. The bulk stations establishments are primarily distributed according to the County Business Pattern's distribution of smaller establishments by size. Table 5 shows the average number of employees and sales of all affected industries.

**Table 5: Petroleum Refinery, Bulk Terminal, and Bulk Station Industries, Sales**

<b>Petroleum Refinery Industry</b>					
<b>Number of Employees</b>	<b>Number of Businesses (a)</b>	<b>Average # of Employees (b)</b>	<b>Average Annual Sales (c)</b>	<b>Total Sales</b>	<b>Total Employees</b>
1-4	0	0	\$0	\$0	0
5-9	0	0	\$0	\$0	0
10-19	0	0	\$0	\$0	0
20-49	0	0	\$0	\$0	0
50-99	0	0	\$0	\$0	0
<u>100+</u>	<u>6</u>	<u>601</u>	<u>\$4,465,560,946</u>	<u>\$26,793,365,674</u>	<u>3,608</u>
<b>Total</b>	<b>6</b>	<b>601</b>	<b>\$4,465,560,946</b>	<b>\$26,793,365,674</b>	<b>3,608</b>
<b>Petroleum Bulk Terminals Industry</b>					
<b>Number of Employees</b>	<b>Number of Businesses (a)</b>	<b>Average # of Employees (d)</b>	<b>Average Annual Sales (e)</b>	<b>Total Sales</b>	<b>Total Employees</b>
1-4	0	0	\$0	\$0	0
5-9	0	0	\$0	\$0	0
10-19	0	0	\$0	\$0	0
20-49	0	0	\$0	\$0	0
50-99	0	0	\$0	\$0	0
<u>100+</u>	<u>17</u>	<u>175</u>	<u>\$4,596,795,497</u>	<u>\$78,145,523,444</u>	<u>2,967</u>
<b>Total</b>	<b>17</b>	<b>175</b>	<b>\$4,596,795,497</b>	<b>\$78,145,523,444</b>	<b>2,967</b>
<b>Petroleum Bulk Stations Industry</b>					
<b>Number of Employees</b>	<b>Number of Businesses (f)</b>	<b>Average # of Employees (d)</b>	<b>Average Annual Sales (g)</b>	<b>Total Sales</b>	<b>Total Employees</b>
1-4	8	3	\$3,798,668	\$30,962,727	20
5-9	3	7	\$10,636,270	\$32,510,863	21
10-19	4	15	\$22,032,274	\$82,309,249	54
20-49	3	35	\$52,421,617	\$160,232,113	105
50-99	0	0	\$0	\$0	0
<u>100+</u>	<u>0</u>	<u>0</u>	<u>\$0</u>	<u>\$0</u>	<u>0</u>
<b>Total</b>	<b>18</b>	<b>11</b>	<b>\$17,000,831</b>	<b>\$306,014,953</b>	<b>201</b>

## Notes:

- (a) The number and sizes of businesses affected for each industry comes from BAAQMD data.  
 (b) Based on 2009 Census County Business Patterns Data for Refineries in the Bay Area.  
 (c) Based on 2007 Economic Census data for petroleum refinery businesses in California. 324110, Petroleum Refineries.  
     Average revenues per employee      \$7,425,805  
 (d) Based on 2009 Census County Business Patterns Data for Bulk Stations and Terminals in the Bay Area.  
 (e) Based on 2007 Economic Census data for petroleum bulk terminal businesses in California. 42471012, Petroleum Bulk Terminals.  
     Average revenues per employee      \$26,342,668  
 (f) The number of firms comes from BAAQMD data. The distribution of firms by size comes from 2009 County Business Patterns data for Bulk Stations and Terminals establishments in the Bay Area, and information from BAAQMD.  
 (g) Based on 2007 Economic Census data for petroleum bulk station businesses in California. 42471011, Petroleum Bulk Stations.  
     Average revenues per employee      \$1,519,467

Sources: Economic Census, 2007; BAAQMD, 2011; BAE, 2011.

The IRS provides data on total sales and net income for the Petroleum Refineries and Wholesale Trade, Petroleum and Petroleum Related Products sectors, which includes both the bulk terminals and bulk stations industries. According to IRS data, petroleum refinery firms average a 6.3 percent rate of return on total sales, while wholesale trade firms that sell petroleum and petroleum related products average a 1.5 percent rate of return on total sales. Table 6 presents the profits for petroleum refinery, petroleum bulk terminals, and petroleum bulk stations firms of varying sizes.

**Table 6: Petroleum Refinery, Bulk Terminals, and Bulk Stations Profits**

<b>Petroleum Refinery Industry</b>						
<b>Number of Employees</b>	<b>Number of Businesses</b>	<b>Average Annual Sales (a)</b>	<b>Average Return on Sales (b)</b>	<b>Average Profits</b>	<b>Total Profits</b>	
1-4	0	\$0	6.3%	\$0	\$0	
5-9	0	\$0	6.3%	\$0	\$0	
10-19	0	\$0	6.3%	\$0	\$0	
20-49	0	\$0	6.3%	\$0	\$0	
50-99	0	\$0	6.3%	\$0	\$0	
<u>100+</u>	<u>6</u>	<u>\$4,465,560,946</u>	<u>6.3%</u>	<u>\$281,276,100</u>	<u>\$1,687,656,600</u>	
<b>Total</b>	<b>6</b>	<b>\$4,465,560,946</b>	<b>6.3%</b>	<b>\$281,276,100</b>	<b>\$1,687,656,600</b>	
<b>Petroleum Bulk Terminals Industry</b>						
<b>Number of Employees</b>	<b>Number of Businesses</b>	<b>Average Annual Sales (c)</b>	<b>Average Return on Sales (d)</b>	<b>Average Profits</b>	<b>Total Profits</b>	
1-4	0	\$0	1.5%	\$0	\$0	
5-9	0	\$0	1.5%	\$0	\$0	
10-19	0	\$0	1.5%	\$0	\$0	
20-49	0	\$0	1.5%	\$0	\$0	
50-99	0	\$0	1.5%	\$0	\$0	
<u>100+</u>	<u>17</u>	<u>\$4,596,795,497</u>	<u>1.5%</u>	<u>\$66,830,300</u>	<u>\$1,136,115,100</u>	
<b>Total</b>	<b>17</b>	<b>\$4,596,795,497</b>	<b>1.5%</b>	<b>\$66,830,300</b>	<b>\$1,136,115,100</b>	
<b>Petroleum Bulk Stations Industry</b>						
<b>Number of Employees</b>	<b>Number of Businesses</b>	<b>Average Annual Sales (e)</b>	<b>Average Return on Sales (d)</b>	<b>Average Profits</b>	<b>Total Profits</b>	
1-4	8	\$3,798,668	1.5%	\$55,200	\$449,932	
5-9	3	\$10,636,270	1.5%	\$154,600	\$472,551	
10-19	4	\$22,032,274	1.5%	\$320,300	\$1,196,592	
20-49	3	\$52,421,617	1.5%	\$762,100	\$2,329,438	
50-99	0	\$0	1.5%	\$0	\$0	
<u>100+</u>	<u>0</u>	<u>\$0</u>	<u>1.5%</u>	<u>\$0</u>	<u>\$0</u>	
<b>Total</b>	<b>18</b>	<b>\$17,000,831</b>	<b>1.5%</b>	<b>\$247,200</b>	<b>\$4,448,513</b>	

**Notes:**

- (a) Based on 2007 Economic Census data for petroleum refinery businesses in California. 324110, Petroleum Refineries.  
 (b) Based on net income and total receipts for petroleum refineries (including integrated) businesses in 2008 as reported by the IRS.  
 (c) Based on 2007 Economic Census data for petroleum bulk terminal businesses in California. 42471012, Petroleum Bulk Terminals.  
 (d) Based on net income and total receipts for wholesale trade, petroleum and petroleum related products businesses in 2008 as reported by the IRS.  
 (e) Based on 2007 Economic Census data for petroleum bulk station businesses in California. 42471011, Petroleum Bulk Stations.

Sources: Economic Census, 2007; IRS, 2008; BAE, 2011.

As Table 6 shows, petroleum refinery firms have average annual net profits of approximately \$281.3 million per establishment, and bulk terminals firms have average annual profits of approximately \$66.8 million, per establishment. Bulk station establishments have profits that range from \$55,200 to \$762,100, depending on the size of the establishment, with the average establishment netting approximately \$247,200 in annual profits.

## Description of Compliance Costs

There are several methods by which firms can comply with the proposed Rule 8-53. According to the BAAQMD's Workshop Report, firms can use one or more of three primary methods to reduce emissions at the vacuum truck's outlet or the outlet from connected control equipment:

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- Carbon adsorption,
  - Thermal incineration, or
  - A positive displacement pump or gravity feed.

While each method has its drawbacks, BAAQMD estimates that due to costs and familiarity, firms will use carbon absorption 40 percent of the time, thermal incineration 10 percent of the time, and positive displacement pumps and gravity feed 50 percent of the time. BAAQMD also estimates that 3.6 trucks per day on average will require the use of compliance equipment.

As Table 7 shows, compliance costs can average between \$2,694 and \$3,222 per day for 3.6 trucks. However, these costs may be higher than firms would likely encounter. The analysis uses daily rental rates for abatement equipment. However, extended rental periods generally cost less per day, resulting in lower per day rental costs than Table 7 shows. To the extent that firms would rent equipment for periods longer than one day at a time, the stated compliance costs are likely higher than actual compliance costs.

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**Table 7: Compliance Costs by Industry**

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	<b>Cost Per Day</b>	<b>Percentage Using Technology</b>
<b>Control Technology</b>		
Carbon Adsorption	\$400 - \$515	40% (a)
Thermal Incineration	\$4,900 - \$5,780	10% (a)
Positive Displacement Pump	\$80 - \$105	50% (a)
<b>Control Technology</b>		
Ongoing Monitoring Cost	\$85	100%
Monitoring Device (b)	\$19	
<b>Total Cost Per Day, 3.6 Trucks (c)</b>		
Low Estimate	\$2,694	
High Estimate	\$3,222	
<b>Share of Costs per Industry (a)</b>		
Petroleum Refineries	91.6%	
Bulk Terminals	8.38%	
Bulk Plants	0.02%	
<b>Number of Trucks Affected</b>		
Petroleum Refineries	3.30	
Bulk Terminals	0.30	
<u>Bulk Stations</u>	<u>0.00</u>	
Total	3.60	
<b>Total Annual Costs, Oil Refineries (d)</b>		
Low Estimate	\$900,855	
High Estimate	\$1,077,186	
<b>Total Annual Costs, Bulk Terminals (d)</b>		
Low Estimate	\$82,405	
High Estimate	\$98,534	
<b>Total Annual Costs, Bulk Plants (d)</b>		
Low Estimate	\$207	
High Estimate	\$247	

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**Notes:**

(a) Based on BAAQMD information of vacuum truck throughputs.

(b) Monitoring Device Daily Costs:

Cost of Device	\$2,500
Number of Devices	14
Lifespan of Device	5 years
Daily Amortized Cost, using Straight Line Depreciation Method	\$19 per day

(c) Per BAAQMD, assumes monitoring would occur on 4.5 trucks per day.

(d) Assumes trucks operate 365 days of the year.

Sources: BAAQMD; BAE, 2011.

Table 7 also shows that the BAAQMD anticipates that petroleum refineries would be responsible for 91.6 percent of compliance costs, with bulk terminals responsible for 8.38 percent, and bulk stations responsible for the remaining 0.02 percent. This translates into refineries using 3.3 of the total trucks requiring regulation, bulk terminals using 0.3 trucks, and bulk stations using a negligible number of trucks, only a few per year. Annually, compliance would cost petroleum refineries



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between \$990,855 and \$1,077,186, would cost bulk terminals between \$82,405 and \$98,534, and would cost bulk plants between \$207 and \$247, collectively.

As previously stated, although the bulk plants and terminals are included in the same NAICS and SIC categories, the BAAQMD distinguishes between their potential impacts based on relative material throughputs. The BAAQMD estimates that of the total 8.4 percent of compliance costs applicable to the bulk terminals and plants establishments, 99.75 percent will apply to bulk terminals, with bulk plants responsible for the remaining 0.25 percent.

## **Affected Industries Economic Impacts Analysis**

In order to determine the impacts to establishments of various sizes, this analysis compares each establishment size cohort's annualized compliance costs to annual profits. The analysis estimates compliance costs using an average cost per truck methodology, where the number of trucks per establishment are determined by the BAAQMD's knowledge of each establishment's truck usage and the distribution of establishments by size. Average revenue estimates come from the 2007 US Economic Census' revenues, in conjunction with IRS profit ratios.

The analysis then calculates the compliance costs as a percentage of profits to determine the level of impact. The BAAQMD uses the ARB's 10 percent threshold as a proxy for burden. Annualized compliance costs resulting in profit losses of 10 percent or more indicate that the proposed Rule has the potential for significant adverse economic impacts. Table 8 shows the annualized compliance costs as a share of total profits for the petroleum refinery, bulk terminals, and bulk plant industries.

**Table 8: Rule 8-53 Compliance Cost as Share of Profit**

<b>Petroleum Refinery Industry</b>									
<b>Number of Employees</b>	<b>Number of Businesses</b>	<b>Average Annual Sales</b>	<b>Average Return on Sales</b>	<b>Average Profits</b>	<b>Total Profits</b>	<b>Number of Trucks by Firm Size</b>	<b>Compliance Cost (a)</b>	<b>Share of Annual Profit</b>	
1-4	0	\$0	6.3%	\$0	\$0	0	\$0	0.00%	
5-9	0	\$0	6.3%	\$0	\$0	0	\$0	0.00%	
10-19	0	\$0	6.3%	\$0	\$0	0	\$0	0.00%	
20-49	0	\$0	6.3%	\$0	\$0	0	\$0	0.00%	
50-99	0	\$0	6.3%	\$0	\$0	0	\$0	0.00%	
100+	6	\$4,465,560,946	6.3%	\$281,276,100	<u>\$1,687,656,600</u>	3.3	\$1,077,186	0.06%	
<b>Total</b>	<b>6</b>	<b>\$4,465,560,946</b>	<b>6.3%</b>	<b>\$281,276,100</b>	<b>\$1,687,656,600</b>	<b>3.3</b>	<b>\$1,077,186</b>	<b>0.06%</b>	
<b>Petroleum Bulk Terminals Industry</b>									
<b>Number of Employees</b>	<b>Number of Businesses</b>	<b>Average Annual Sales (a)</b>	<b>Average Return on Sales</b>	<b>Average Profits</b>	<b>Total Profits</b>	<b>Number of Trucks by Firm Size (c)</b>	<b>Compliance Cost (a)</b>	<b>Share of Annual Profit</b>	
1-4	0	\$0	1.5%	\$0	\$0	0.0	\$0	0.00%	
5-9	0	\$0	1.5%	\$0	\$0	0.0	\$0	0.00%	
10-19	0	\$0	1.5%	\$0	\$0	0.0	\$0	0.00%	
20-49	0	\$0	1.5%	\$0	\$0	0.0	\$0	0.00%	
50-99	0	\$0	1.5%	\$0	\$0	0.0	\$0	0.00%	
100+	17	\$4,596,795,497	1.5%	\$66,830,300	<u>\$1,136,115,100</u>	0.3	\$98,534	0.01%	
<b>Total</b>	<b>17</b>	<b>\$4,596,795,497</b>	<b>1.5%</b>	<b>\$66,830,300</b>	<b>\$1,136,115,100</b>	<b>0.3</b>	<b>\$98,534</b>	<b>0.01%</b>	
<b>Petroleum Bulk Plant Industry</b>									
<b>Number of Employees</b>	<b>Number of Businesses</b>	<b>Average Annual Sales (a)</b>	<b>Average Return on Sales</b>	<b>Average Profits</b>	<b>Total Profits</b>	<b>Number of Trucks by Firm Size (c)</b>	<b>Compliance Cost (a)</b>	<b>Share of Annual Profit</b>	
1-4	8	\$3,798,668	1.5%	\$55,200	\$449,932	0.0	\$112	0.02%	
5-9	3	\$10,636,270	1.5%	\$154,600	\$472,551	0.0	\$42	0.01%	
10-19	4	\$22,032,274	1.5%	\$320,300	\$1,196,592	0.0	\$51	0.00%	
20-49	3	\$52,421,617	1.5%	\$762,100	\$2,329,438	0.0	\$42	0.00%	
50-99	0	\$0	1.5%	\$0	\$0	0.0	\$0	0.00%	
100+	0	\$0	1.5%	\$0	\$0	0.0	\$0	0.00%	
<b>Total</b>	<b>18</b>	<b>\$17,000,831</b>	<b>1.5%</b>	<b>\$247,200</b>	<b>\$4,448,513</b>	<b>0.0</b>	<b>\$247</b>	<b>0.01%</b>	

Note:

(a) Assumes high compliance costs.

Sources: US Census County Business Patterns, 2009; US Economic Census, 2007; BAAQMD, 2011; BAE, 2011.

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Overall, annualized compliance costs represent approximately 0.06 percent of profits for all petroleum refinery establishments, 0.01 percent for bulk terminals establishments, and 0.01 percent for bulk plant establishments. Thus, compliance costs are well below the 10 percent threshold. In addition, to the extent that these establishments would rent compliance equipment on a longer-term basis than per day or buy their own equipment, these impacts are likely overstated.

## **Affected Industries and Regional Employment Impacts**

Since on average, the proposed Rule would not result in significant economic impacts to establishments within the affected industries, implementing the proposed Rule would not impact the affected industries or regional employment.

## **Regional Indirect and Induced Impacts**

Indirect and induced impacts refer to regional multiplier effects of increasing or decreasing regional economic activity. If the Rule were to significantly impact local businesses, any closures would result in direct regional economic losses. Firms would no longer buy goods from local suppliers, thereby resulting in reduced indirect impacts, or business-to-business expenditures. In addition, firms would no longer employ regional residents, resulting in reduced induced impacts, or household spending.

However, since the proposed Rule is not expected to result in significant direct impacts, its adoption would not result in any indirect or induced impacts either.

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## IMPACT ON SMALL BUSINESSES

According to California Government Code 14835, a small business is any business that meets the following requirements:

- Must be independently owned and operated;
- Cannot be dominant in its field of operation;
- Must have its principal office located in California;
- Must have its owners (or officers in the case of a corporation) domiciled in California; and
- Together with its affiliates, be either:
  - A business with 100 or fewer employees, and an average annual gross receipts of \$10 million or less over the previous three tax years, or
  - A manufacturer with 100 or fewer employees.

Using these definitions, none of the petroleum refineries or bulk terminal establishments would qualify as small businesses. Approximately 45 percent of all affected bulk plant establishments would qualify as small businesses. However, this analysis has shown that establishments with lower revenues will not necessarily experience higher impacts on return on profits as a result of the proposed rule. In addition, on average, the impacts of the proposed Rule fall under the ARB's 10 percent threshold of burden, which indicates that the proposed rule would not adversely impact establishments.