BAY AREA AIR QUALITY MANAGEMENT DISTRICT

APPENDIX F

Socioeconomic Impact Analysis

bae urban economics

Final

Socio-Economic Impact Study of the Proposed Amendments to Regulation 2: Permits, Rule 1: General Requirements and Regulation 2: Permits, Rule 5: New Source Review of Toxic Air Contaminants

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DESCRIPTION OF PROPOSED RULE AMENDMENTS

The Bay Area Air Quality Management District ("Air District" or "BAAQMD") proposes to amend its permitting regulation (Regulation 2). Regulation 2 includes the District's rules that govern New Source Review ("NSR"), which is a comprehensive permitting program that applies to entities when they install new equipment or make modifications to existing equipment that will increase air pollution emissions. This section describes the proposed amendments to two permitting rules, Regulation 2, Rule 1 (Rule 2-1) and Regulation 2, Rule 5 (Rule 2-5), largely repeating the description found in the Staff Report describing the proposed amendments.[1]

Rule 2-1: General Requirements

The proposed changes to Rule 2-1 would include a new definition to identify areas that experience relatively high levels of cumulative impacts (areas where air pollution levels are higher and that are also more vulnerable to environmental, socioeconomic, and health stressors). Areas that experience high levels of cumulative impacts are called "Overburdened Communities" in the Proposed Amended Rule 2-1. Overburdened Communities are defined as census tracts that score at or above the 70th percentile in the California Communities Environmental Health Screening Tool (CalEnviroScreen), Version 4.0, as well as areas that are within one thousand feet of the boundaries of census tracts that score at or above the 70th percentile in CalEnviroScreen 4.0.

There are two additional significant changes to Rule 2-1. First, there is a new requirement for projects to notify surrounding addresses if the project will require a health risk assessment because of toxic air contaminant (TAC) emissions and the project will be located within or near an Overburdened Community. The proposed changes would also extend the Air District's permit application action times. The completeness review period will be increased from 15 working days (21 calendar days) to 30 days. The final action period (from date of completeness to the date of the Air Pollution Control Officer's decision) is currently 35 working days (49 calendar days) for all permit applications, except those subject to California Environmental Quality Act (CEQA) review, major facility review, or public notice requirements. Staff is proposing to replace this time period with two possible final action periods: 90 days, which will apply to most applications, and 180 days for more complex applications, unless the application is subject to CEQA review. Applications subject to CEQA review will continue to require approval of CEQA certification documents before the Air District may make a decision on the application. Staff is also proposing to increase the time period allowed for responding to public comments on applications from 30 days to 60 days.

These changes are meant to provide additional transparency and information to the public on active permit applications in communities that face environmental and health burdens. By making information more accessible to the public through physical mailing of information to residents and

[1] BAAQMD, 2021. Staff Report: Proposed Amendments to Regulation 2, Rule 1 (Permits—General Requirements) and Proposed Amendments to Regulation 2, Rule 5 (Permits—New Source Review of Toxic Air Contaminants). October.

posting notifications on the Air District website, the Air District would provide more awareness of permit applications and the proposed projects. Additionally, this change would include a written public comment period, which could enable members of the public to provide additional information for the Air District to consider in evaluating permit applications.

Rule 2-5: New Source Review of Toxic Air Contaminants

There are three overarching changes to the Air District's Air Toxics New Source Review Rule. First, the cancer risk limit in Rule 2-5 would be made more stringent in Overburdened Communities. To accomplish this, Rules 2-1 and 2-5 would utilize CalEnviroScreen as described above to identify areas where cumulative impacts are high in the Bay Area. The permit applications for projects that would be located within the high-scoring census tracts or in the one-thousand-foot area from the census tract boundary would be required to comply with the more stringent cancer risk requirement in Rule 2-5. The purpose of this amendment is to reduce exposure to toxic air contaminants from new and modified sources of air pollution in communities that are overburdened by pollution or face health vulnerabilities at the community level that could contribute to residents being more susceptible to the detrimental health effects from air pollution.

Second, proposed revisions to the Air District's Health Risk Assessment (HRA) Guidelines incorporate updates to the health risk assessment procedures for gasoline dispensing facilities, to be consistent with other permitted sources/facilities. In 2015, OEHHA approved and adopted updated Health Risk Assessment Guidelines (2015 Guidelines) that are used in the Air District's Health Risk Assessment Guidelines. Under this proposed change, the Air District would update and incorporate the 2015 Guidelines to its evaluation of new and modified gas dispensing facility projects. The 2015 Guidelines adjusted multiple additional factors used to prepare health risk assessments, including breathing rate assumptions, exposure frequency, and exposure duration, that in combination will result in higher calculated risks. Fully incorporating all the 2015 OEHHA health risk calculation procedures will result in cancer risk estimates for residents that are about 40 percent higher than the current procedures and will add a new limit on acute impacts. While these changes would not prevent gas stations from renewing permits, they could result in some existing gas stations being unable to increase throughput, or they could reduce the amount of gasoline throughput that might otherwise be allowed for a new station.

Third, the proposed amendments will update Table 2-5-1, the Toxic Air Contaminant Trigger Levels table, including updated trigger levels based on new and revised health effects values developed and approved by the California Office of Environmental Health Hazard Assessment (OEHHA).

METHODOLOGY

This report was prepared to meet the provisions Section 40728.5 of the California Health and Safety Code, which requires an assessment of the socioeconomic impacts of proposed air quality rules. The analysis begins with an overview of current demographic and economic conditions in the Air District region, to provide context for the impact analysis that follows. Following that overview, BAE provides more detail on specific industries that might have been affected by the rule revisions if they were in place when past projects were assessed. BAE's analysis includes data on the size of establishments as classified by number of employees, estimated revenues, and net profits for each affected industry. This analysis is not a prediction of the exact types of projects that will be affected in the future, rather, it shows the types of projects and industries that might have been affected by the proposed rule amendments if they were in already in place. The costs and economic impacts analyzed in this report are not costs associated with the compliance with a retrofit control requirement but are instead the potential cost of installing new equipment that is not already in place or modifying existing equipment.

This report relies on data from a number of sources, including County Business Patterns, the 2017 Economic Census, the State of California's Employment Development Department (EDD) Labor Market Information Division and Department of Finance, the Internal Revenue Service, and the Air District itself.

Using this information, BAE generated an overview of regional demographic and economic trends, developed a profile of potentially affected industries, and estimated net income as a percent of revenues for potentially impacted business establishments. These figures were then compared to the compliance costs associated with the revised Rules to determine the potential for these costs to be a significant portion of estimated profits (using a 10 percent impact threshold). Then, to the extent that the impacts on profit could result in job losses, direct and indirect job losses using the IMPLAN input-output model were estimated. Finally, the potential for impacts on small businesses was assessed.

REGIONAL TRENDS

Regional Demographic Trends

Table 1 shows the population and household trends for the nine county Bay Area and California between 2010 and 2020. During this time, the Bay Area's population increased by 8.6 percent, compared to 6.5 percent for California as a whole. The number of Bay Area households grew by 5.6 percent, compared to 5.4 percent growth statewide. Average household sizes increased in both geographies during this period.

Table 1: Population and Household Trends, 2010-2020

			2010-2020 Change	
Bay Area (a)	**2010**	**2020**	**Number**	**Percent**
Population	6,998,464	7,596,982	598,518	8.6%
Households	2,606,288	2,752,510	146,222	5.6%
Average Household Size	2.69	2.76		
California				
Population	36,412,191	38,796,056	2,383,865	6.5%
Households	12,568,167	13,246,622	678,455	5.4%
Average Household Size	2.90	2.93		

Note:
(a) Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.
Sources: California State Department of Finance; BAE 2021.

Regional Economic Trends

Table 2 shows jobs by sector in 2010 and 2020 for the Bay Area and California. In the period between 2010 and 2020, the Bay Area's employment base grew by 18.7 percent, increasing from 3.2 million jobs to 3.7 million jobs. The state saw somewhat smaller job growth, increasing by 12.8 percent from 14.7 million jobs in 2010 to 16.5 million jobs in 2020.

The largest non-government sectors in the Bay Area economy are Professional & Business Services; Education & Health Services; Manufacturing; and Retail Trade. Combined these sectors constituted approximately 53.5 percent of the region's total jobs in 2020. Overall, the Bay Area's economic base largely reflects the state's base, sharing a similar distribution of employment across sectors. One noteworthy variation is the high employment in the Professional & Business Services, which makes up 20.2 percent of employment in the Bay Area compared to only 14.2 percent statewide. The Information sector also makes up a higher share of jobs in the Bay Area (6.5 percent) than in California as a whole (2.9 percent).

Most industry sectors showed an increase in employment in the Bay Area between 2010 and 2020, with increases of greater than 20 percent in Information; Professional & Business Services; Transportation, Warehousing, and Utilities; and Educational & Health Services. Statewide growth

was also over 20 percent in all four of these sectors, in addition to the Mining, Logging, and Construction sector.

Table 2: Jobs by Sector, 2010-2020 (a)

	Bay Area			California		
Industry Sector	**2010** (b)	**2020** (c)	**% Change**	**2010** (b)	**2020** (c)	**% Change**
Agriculture	19,200	19,000	-1.0%	382,900	407,300	6.4%
Mining, Logging, and Construction	131,500	152,100	15.7%	584,600	874,900	49.7%
Manufacturing	305,400	353,300	15.7%	1,247,800	1,261,700	1.1%
Wholesale Trade	112,200	108,600	-3.2%	629,200	643,400	2.3%
Retail Trade	308,200	299,500	-2.8%	1,516,500	1,523,600	0.5%
Transportation, Warehousing & Utilities	88,300	116,900	32.4%	466,800	727,800	55.9%
Information	113,900	243,000	113.3%	428,500	529,000	23.5%
Financial Activities	168,000	193,300	15.1%	760,900	815,300	7.1%
Professional & Business Services	545,800	757,300	38.8%	2,084,300	2,595,200	24.5%
Educational & Health Services	474,200	593,400	25.1%	2,131,900	2,731,600	28.1%
Leisure & Hospitality	324,800	295,000	-9.2%	1,500,800	1,477,600	-1.5%
Other Services, except Public Admin.	108,100	103,500	-4.3%	483,600	473,200	-2.2%
Government (d)	455,200	459,500	0.9%	2,448,400	2,487,100	1.6%
Total, All Employment (e)	**3,154,400**	**3,743,100**	**18.7%**	**14,666,200**	**16,547,900**	**12.8%**

Notes:
(a) Includes all wage and salary employment.
(b) Represents annual average employment for calendar year 2010.
(c) Represents annual average employment for calendar year 2020.
(d) Government employment includes workers in all local, state and Federal workers, not just those in public administration. For example, all public school staff are in the Government category.
(e) Totals may not sum from parts due to independent rounding.
Sources: California Employment Development Department; BAE, 2021.

SOCIOECONOMIC IMPACTS

This section of the report analyzes socioeconomic impacts stemming from changes to Rule 2-1 and Rule 2-5. The Air District has identified a range of possible compliance measures as well as typical compliance costs for the types of projects that could potentially be impacted by the rule revisions. In order to estimate the direct impacts of the changes to the rules, this analysis compares the affected industries' annualized compliance costs with their profit ratios. The analysis relies on data from the Air District, 2019 US Census County Business Patterns, the Internal Revenue Service (IRS), and the 2017 US Economic Census.

Staff reviewed information from past permitting projects to identify the types of potentially impacted projects and contextualize how the changes might have impacted these projects had the proposed amendments been in place at that time. The list of potentially impacted projects includes facilities operated by both public and private sector entities across a broad range of industries, however public sector entities were omitted from the analysis because they would not generate any revenues. Detail on the types of projects and the industries affected can be found below.

In addition to direct impacts, any decline in revenues for the directly affected industries may result in a "ripple effect" through the regional economy. These effects are analyzed by utilizing the IMPLAN input-output model, as discussed in the section on regional indirect and induced impacts below.

Rule 2-5

The proposed amendments to Rule 2-5 would increase the stringency of the Air District's Air Toxics New Source Review Program in areas that currently experience relatively high levels of cumulative impacts as defined in the rule. Based on a review of permitting trends between February 2017 and February 2021, Air District staff identified the number and types of projects that might have been affected by the new reduced cancer risk limit if it had already been in place, as summarized in Table 3. This table also shows the potential modifications and controls available to meet the new revised rule and the industry or industries associated with each type of project based on permitting data. The Air District's lookback analysis of permitted projects between February 2017 and February 2021 examined projects in Bay Area census tracts that scored at or above the 70th percentile in Draft CalEnviroScreen 4.0. Final CalEnviroScreen 4.0 was subsequently released by OEHHA in October 2021. Air District staff reviewed the updates and changes included in the Final CalEnviroScreen 4.0 version, and determined that these updates do not result in substantial changes to the lookback analysis, nor do they result in additional affected projects or project types. While this lookback analysis is not a prediction of the exact types of projects that will be affected in the future, the analysis provides information on how past projects might have been affected by the proposed amendments.

Table 3: Summary of New or Modified Permits that Potentially Could Require Modifications and/or Controls with Revised Rule 2-5 (a)

Project Type	**Industry or Industries Associated w/ Project Type** (a)	**Typical Control Measure(s)**
Standby Diesel Engines	Lessors of Residential Buildings and Dwellings (NAICS 531110) Colleges, Universities, and Professional Schools (NAICS 611310) Lessors of Nonresidential Buildings (NAICS 531120) Wired and Wireless Telecommunications Carriers (NAICS 51731) Nursing and Residential Care Facilities (NAICS 623) Data Processing, Hosting, and Related Services (NAICS 518210)	Limit Throughput Rate / Operating Time, Increase Stack Height, Diesel Particulate Filters
Prime Diesel Engines	Fertilizer (Mixing Only) Manufacturing (NAICS 325314) Petroleum Bulk Stations and Terminals (NAICS 424710)	Limit Throughput Rate / Operating Time, Increase Stack Height, Diesel Particulate Filters
Soil Vapor Extraction	Lessors of Nonresidential Buildings (NAICS 531120) Remediation Services (NAICS 562910)	Limit Throughput Rate / Operating Time, Thermal or Catalytic Oxidizers, Carbon Adsorbers, Increase Stack Height
Crematory Project	Cemeteries and Crematories (NAICS 812220)	Limit Throughput Rate or Operating Time, Increase Stack Height
Metal Casting Facility Project	Foundries (NAICS 3315)	Limit Throughput or Operating Time, Enclosures/Baghouses, Carbon Adsorbers
Conveyors/Stockpiles at Waste Facility	Waste Treatment and Disposal (NAICS 56221)	Enclosures/Baghouses, Water Spray System
Concrete Manufacturing Facility Project	Cement and Concrete Product Manufacturing (NAICS 3273)	Limit Throughput Rate or Operating Time, Water Spray System,
Gas Station Project	Gasoline Stations (NAICS 4471)	Limit Throughput Rate or Operating Time, Revise Source Location (New Facilities)

Notes:
(a) Based on permitting trends between February 2017 and February 2021. All publicly owned facilities are excluded, regardless of sector. Note that some uses have an annual average occurrence of <1, but are shown here to show all impacted industries.
Sources: BAAQMD; BAE, 2021.

Table 4 below shows the characteristics of the average facility in each industry affected by the changes to Rule 2-5. The specific characteristics of future impacted facilities could differ from the averages shown below.

Table 4: Profile of Industries Affected by Revisions to Rule 2-5

NAICS	Industry Sector	Average per Establishment				Establishments by Size	
		Number of Employees	Annual Revenue	Profit Margin	Annual Profit	< 10 Employees	< 100 Employees
325314	Fertilizer (Mixing Only) Manufacturing	24	$8,743,704	9.09%	$795,012	44%	98%
3273	Cement and Concrete Product Manufacturing	31	$11,569,884	2.90%	$335,895	37%	94%
3315	Foundries	39	$9,164,326	7.97%	$730,159	41%	87%
424710	Petroleum Bulk Stations and Terminals	17	$92,056,060	1.02%	$935,441	52%	99%
4471	Gasoline Stations	9	$6,812,928	1.19%	$80,792	67%	100%
51731	Wired & Wireless Telecommunications Carriers	17	$10,134,191	7.09%	$718,939	68%	97%
518210	Data Processing, Hosting, and Related Services	37	$14,547,939	8.55%	$1,244,023	63%	92%
531110	Lessors of Residential Buildings and Dwellings	4	$1,944,132	23.83%	$463,287	93%	100%
531120	Lessors of Nonresidential Buildings	5	$3,534,984	23.83%	$842,387	90%	99%
56221	Waste Treatment and Disposal	23	$8,506,621	6.66%	$566,365	51%	97%
562910	Remediation Services	21	$3,991,996	6.66%	$265,784	54%	96%
611310	Colleges, Universities, and Professional Schools	290	$26,819,495	8.86%	$2,375,139	41%	77%
623	Nursing and Residential Care Facilities	30	$2,446,060	4.28%	$104,745	53%	90%
812220	Cemeteries and Crematories	13	$2,467,298	7.11%	$175,335	62%	99%

Sources: Economic Census, 2017; County Business Patterns 2019; Internal Revenue Service, 2009-2018; BAE, 2021.

Compliance Cost Impacts on Affected Industries

Since it is not possible to determine specific compliance measures and costs associated with particular facilities, BAE estimated compliance cost impacts based on available information from BAAQMD on typical compliance measures and a range of costs by type of project. While the potential compliance measures may not necessarily represent the costs any given facility would incur under the revised rule, they are analyzed here to provide an order of magnitude of compliance costs relative to the estimated revenues and profit levels for potentially affected facilities based on the available data. The findings and assumptions are discussed by project type below.

Standby Diesel Engines

The Air District estimates that in a given year, an average of five standby diesel engine projects will require potential modifications and/or controls to meet the more stringent cancer risk limit in Overburdened Communities. As can be seen above in Table 3, many types of facilities use emergency generators, ranging from owners of office buildings and residential buildings to nursing and residential care facilities to data centers.

Table 5 below shows potential impacts on profits estimated based on the assumption that users would be required to install diesel particulate filters, which is likely the highest cost solution for these projects. In 2016, District staff compiled data on control costs for diesel particulate filters and estimated typical annualized costs for these controls to be within the range of $3,500 and $11,400,

in 2016 dollars.[2] District staff also identified a maximum annualized control cost of $63,681 based on data from a specific project. After adjusting for inflation, typical annualized compliance costs for diesel particulate filters are estimated to range from $4,000 to $13,000 per engine, with maximum annualized control costs of up to $72,000 per engine for facilities needing to retrofit older model engines or larger engines.

Table 5 shows impacts on profits for the affected industries under the typical low, typical high, and maximum control cost scenarios described above. As shown, on average, typical compliance costs for diesel particulate filters are below the level of significance for most facilities in the affected industries. One possible exception is the nursing and residential care sector, which would incur costs equal to 12.4 percent of profits under the typical high-cost scenario. The analysis also shows that lessors of residential buildings could also potentially face impacts on profits greater than the 10 percent threshold under the maximum control cost estimated by staff. However, as detailed in Appendix A, this is due to the business data including a substantial number of establishments with only one to four employees; these are not likely to be the businesses undertaking this type of large residential project.

Table 5: Cost Impacts of Installing Diesel Particulate Filters for Diesel Engine Users

				Compliance Costs as % of Profits		
User Type	Avg. Annual Revenue per Establishment	Avg. Profit Margin 2009-2018	Avg. Annual Profit per Establishment	Typical Low Cost $4,000	Typical High Cost $13,000	Maximum Control Cost $72,000
Residential	$1,944,132	23.83%	$463,287	0.86%	2.81%	15.54%
Office/Retail Center	$3,534,984	23.83%	$842,387	0.47%	1.54%	8.55%
Educational Services	$26,819,495	8.86%	$2,375,139	0.17%	0.55%	3.03%
Telecommunications Carriers	$10,134,191	7.09%	$718,939	0.56%	1.81%	10.01%
Nursing and Residential Care	$2,446,060	4.28%	$104,745	3.82%	12.41%	68.74%
Data Center	$14,547,939	8.55%	$1,244,023	0.32%	1.04%	5.79%
Fertilizer Mixing Facility	$8,743,704	9.09%	$795,012	0.50%	1.64%	9.06%
Marine Oil Terminal	$92,056,060	1.02%	$935,441	0.43%	1.39%	7.70%

Sources: Economic Census, 2017; County Business Patterns 2019; Internal Revenue Service, 2009-2018; BAAQMD; BAE, 2021.

Prime Diesel Engines

Particulate filters are also the typical mitigation measure for prime diesel engines. Although these projects could have a variety of use types, there were only two facilities that had cancer risk greater than or equal to six in one million that would have required modifications and/or controls to comply with the lower cancer risk limit over the four-year period analyzed. The first project was a screening operation at a soil yard and the second project was a fuel storage facility at a marine oil terminal. Table 5 shows potential impacts on profits for these two industries based on the range of costs for

[2] BAAQMD, 2016. Regulation 2, Rule 5 Staff Report. September.

diesel particulate filters summarized above. As shown, annualized maximum control costs are below the level of significance for average businesses in both industries.

Soil Vapor Extraction (SVE) Projects

The companies conducting SVE projects can include a mix of business types, including owners of commercial and industrial sites, gas stations, refineries, and environmental remediation firms. For the purposes of the analysis here, the impacted industries are based on information from two past permitting projects with cancer risk greater than or equal to six in one million. The first project consisted of a soil remediation project to remediate contaminated soil at a retail center. In that particular case, the permit applicant for the project was a large national real estate investment trust specializing in shopping center ownership, management, and redevelopment. The second project was initiated by an environmental remediation firm with extensive experience managing and operating SVE projects within the district.

The possible controls for SVE projects include limiting throughput rate or operating time, carbon adsorbers, thermal or catalytic oxidizers, and increasing stack height/revising source location. The assumed control measure for this analysis is a thermal oxidizer, which is likely the highest cost solution. Annualized cost estimates were provided by District staff and are estimated to be within the range of $35,000 to $688,000. As shown below, for the average lessor of commercial buildings, impacts on profits are below the threshold of significance under the low-cost scenario. Impacts on profits would be significant under the average-cost and high-cost scenarios for the average business in this sector.

For remediation services businesses, impacts would be significant if these businesses had to absorb the increased compliance costs from the rule changes. However, these businesses are typically larger full-service firms that are hired to complete remediation projects for other parties and the increased compliance costs would be passed through to those clients. Thus, remediation service businesses would not be negatively impacted.

Table 6: Compliance Cost Impacts for Soil Vaper Extraction (SVE) Projects

SVE Project Type	Avg. Annual Revenue per Establishment	Avg. Profit Margin 2009-2018	Avg. Annual Profit per Establishment	Compliance Costs as % of Profits		
				Low Cost	Avg. Cost	High Cost
				$35,000	$361,000	$688,000
Remediation Firm	$3,991,996	6.66%	$265,784	13.2%	135.8%	258.9%
Owner of Retail Property	$3,534,984	23.83%	$842,387	4.2%	42.9%	81.7%

Sources: Economic Census, 2017; County Business Patterns 2019; Internal Revenue Service, 2009-2018; BAAQMD; BAE, 2021.

Crematory Projects

The two options presented for projects that might need to make project modifications or add controls are limiting operating time or increasing stack height. There were two projects with cancer risk greater than or equal to six in one million in the four-year period that would have been impacted by

the rule changes had they been in place during that time. Both of these projects reduced overall exposures by increasing stack heights. For the purposes of this analysis, it is assumed that the same control measure would be employed to meet the revised risk limit. Annualized compliance costs are estimated at $1,700. Overall, the compliance costs for crematories are well below the threshold of significance, at less than 1.0 percent of profits.

Table 7: Compliance Cost Impacts for Crematory Projects

Project Type	Avg. Annual Revenue per Establishment	Avg. Profit Margin 2009-2018	Avg. Annual Profit per Establishment	Compliance Costs per Establishment	Compliance Costs as % of Profits
Crematory	$2,467,298	7.11%	$175,335	$1,700	0.97%

Sources: Economic Census, 2017; County Business Patterns 2019; Internal Revenue Service, 2009-2018; BAAQMD; BAE, 2021.

Metal Casting Facility

For this type of project, possible controls include baghouses with HEPA filters and carbon adsorbers. The assumed control measure for this analysis is a baghouse. Staff provided estimates of the range of possible control costs for this option. Annualized control costs for this type of control mechanism can range from $76,000 to $2.3 million. Low-, average-, and high-cost estimates are assessed below in Table 8 to show the full range of potential impacts to these facilities.

Based on the control cost estimates provided by staff and summarized in Table 8, the impacts on profits are slightly above the threshold of significance for the average metal casting establishment under the low-cost scenario, at 10.4 percent of profits. Assuming a facility chooses to install equipment at the average cost ($1.2 million per year) or high cost ($2.3 million per year) levels estimated by staff, the impacts on profits would be fairly significant, ranging from 162.2 percent of profits under the average-cost scenario to 313.9 percent of profits under the high-cost scenario. However, it is important to note that some facilities might be able to undertake no- or lower-cost alternatives such as increased stack height or reduced operating hours to meet the revised rule. Thus, the percentages below likely reflect the "worst-case" compliance cost impacts on these businesses.

Table 8: Compliance Cost Impacts for Metal Casting Facilities

Project Type	Avg. Annual Revenue per Establishment	Avg. Profit Margin 2009-2018	Avg. Annual Profit per Establishment	Compliance Costs as % of Profits		
				Low Cost	Avg. Cost	High Cost
				$76,000	$1,184,000	$2,292,000
Metal Casting Facility	$9,164,326	7.97%	$730,159	10.4%	162.2%	313.9%

Sources: Economic Census, 2017; County Business Patterns 2019; Internal Revenue Service, 2009-2018; BAAQMD; BAE, 2021.

Waste Facility

Between February 2017 and February 2021, the District saw one waste facility project in a high-scoring area with a cancer risk greater than or equal to six in one million. For this particular project,

emissions from conveyors and stockpiles were abated through the use of a water spray system. The analysis here assumes that this type of facility would be able to install an additional water spray system to meet the new cancer risk limit. Based on cost data assessed by District staff, annualized compliance costs can range from $31,000 for a stockpile spray system to $130,000 for a mobile truck system.[3] Low and high-cost estimates are assessed below to show the full range of potential impacts. On average, compliance costs for a stockpile spray system are below the level of significance for this type of business. However, for the higher cost mobile truck system option, compliance costs would be above the level of significance for the average business in this industry, at 23.0 percent.

Table 9: Compliance Cost Impacts for Other Facilities

Project Type	Avg. Annual Revenue per Establishment	Avg. Profit Margin 2009-2018	Avg. Annual Profit per Establishment	Compliance Costs as % of Profits	
				Low Cost	High Cost
				$31,000	$130,000
Waste Facility	$8,506,621	6.66%	$566,365	5.5%	23.0%
Concrete Batching	$11,569,884	2.90%	$335,895	9.2%	38.7%

Sources: Economic Census, 2017; County Business Patterns 2019; Internal Revenue Service, 2009-2018; BAAQMD; BAE, 2021.

Concrete Batching

There was one project at a concrete batching facility that had a cancer risk greater than or equal to six in one million during the four-year period analyzed. Typically, options for modifications and controls for this type of project include limiting throughput rate or operating time, enclosures and baghouses, water spray systems, and increasing stack height or revising source location. The analysis here assumes the use of an additional water spray system, which is consistent with past permitting trends. Like the analysis for waste facilities, low- and high-cost estimates are assessed to show the full range of potential impacts. The resulting analysis shows profit impacts slightly below the significance threshold under the low-cost scenario, at 9.2 percent. Under the high-cost scenario, the average impacts on profit are estimated at 38.7 percent, which is above the threshold of significance for the average business in this industry.

[3] BAAQMD, 2018. Regulation 6, Rule 1 Staff Report. June.

Gasoline Dispensing Facilities

Gasoline dispensing facilities will be affected by updates to Rule 2-5 as well as the updates to the health risk calculation procedures for gas stations being considered in the District's Health Risk Assessment (HRA) Guidelines. The revisions to the HRA procedures for gasoline dispensing facilities would apply to all gasoline dispensing facilities within the District that are subject to Rule 2-5. Gas stations that are located in areas that receive higher CalEnviroScreen scores would be subject to the more stringent cancer risk standard of six in one million. The cancer risk limit for gasoline dispensing facilities located outside of Overburdened Communities would remain ten in one million.

Rather than requiring new emission-control technology or equipment, gasoline dispensing facilities impacted by the proposed changes will either be prevented from expanding capacity or will be allowed to expand capacity by a certain amount specified by Rule 2-5 and the new Health Risk Assessment Guidelines. Based on an evaluation of permit applications submitted between February 2017 and February 2021, staff identified a total of eleven permitted facilities in Overburdened Communities that would have had a cancer risk greater than or equal to six in one million under the revised HRA Guidelines. These facilities were identified based on health risks from previously approved HRAs and the estimated increase in cancer risk using the revised guidelines, assuming that each facility had a primary residential receptor.[4] If the new cancer risk for a project was calculated to be higher than the allowable limit of six in one million, then it was determined that the facility (or a similar future facility), would be potentially impacted by the proposed changes.

According to estimates published by the California Energy Commission, there are approximately 1,775 retail fuel outlets in the Bay Area with combined annual retail gasoline sales of approximately 2.7 billion gallons.[5] Based on this data, the average Bay Area retail fuel outlet sells approximately 1.5 million gallons of gasoline per year. Table 10 provides a summary of the eleven gasoline dispensing facilities that would have exceeded the cancer risk limit if the new HRA procedures had been in place throughout the four-year analysis period. The table shows that current permitted throughput levels for potentially affected facilities vary considerably, ranging from a low of 1.5 million gallons to a high of 36.0 million gallons for the sample of eleven facilities. The average current permitted throughput is approximately 16.8 million gallons per year, while the median is 10.0 million gallons per year.

[4] For gas dispensing facilities, maximum cancer risk is a function of maximum permitted throughput, type of primary receptor, distance to the nearest receptor, and other site-specific factors. Each facility was assumed to have a primary residential receptor in order to provide a more conservative estimate of the number of potentially impacted facilities.

[5] California Energy Commission, 2019 California Retail Fuel Outlet Annual Reporting (CEC-A15) Results.

Table 10: Summary of Gas Dispensing Facilities Potentially Requiring Modifications in Overburdened Communities Between February 2017 and February 2021

Facility	Current Permitted Throughput (Gallons/yr)	Draft New Throughput Limit	Net Change in Maximum Throughput		Actual Throughput (a)
			Number	Percent	
A	1,490,000	646,700	-843,300	-57%	335,271
B	2,500,000	2,287,500	-212,500	-9%	Unknown
C	2,560,000	1,111,040	-1,448,960	-57%	698,701
D	2,670,000	1,158,780	-1,511,220	-57%	789,134
E	3,000,000	1,791,000	-1,209,000	-40%	1,734,973
F	10,000,000	6,140,000	-3,860,000	-39%	N/A (b)
G	28,500,000	12,369,000	-16,131,000	-57%	813,623
H	29,800,000	12,814,000	-16,986,000	-57%	17,127,653
I	31,800,000	13,674,000	-18,126,000	-57%	12,207,344
J	36,000,000	16,632,000	-19,368,000	-54%	817,000
K	36,000,000	35,172,000	-828,000	-2%	14,420,000
Total	**184,320,000**	**103,796,020**	**-80,523,980**	**-44%**	**48,943,699**
Average	**16,756,364**	**9,436,002**	**-7,320,362**	**-44%**	**9,788,740**
Median	**10,000,000**	**6,140,000**	**-1,511,220**	**-57%**	**817,000**

Notes:
(a) Actual throughput data is shown for the most recent year for which this data was available. Data may not accurately reflect current operating conditions at each facility.
(b) Facility has Authority to Construct permit; it is not yet permitted to operate.

Sources: BAAQMD; BAE, 2021.

Since the control measure for gasoline dispensing facilities is limited to reducing throughput, there are no compliance costs to estimate as a share of profits for these facilities. Assuming that the proposed revisions were in place during the four-year analysis period, the impacts on actual and permitted throughput for the facilities in Table 10 would be summarized as follows:

- Compared to current permitted throughput levels, the new throughput limits under the revised guidelines are approximately 44 percent lower, on average, for the potentially impacted facilities. Most (seven) of the eleven facilities have new throughput limits equal to less than fifty percent of their current permitted limits. By volume, impacts on maximum annual throughput range from a decrease of 828,000 gallons per year for Facility K to a decrease of 19.4 million gallons per year for Facility J.

- One of the eleven facilities (Facility H) has a current actual throughput level that is higher than the throughput limit calculated for the facility using the new HRA procedures. Based on the most current data available, this facility dispenses more than 17.1 million gallons per year (2018 data). The calculated new throughput limit for Facility H is roughly 12.8 million gallons, meaning that if this facility applied for a permit for a modification with the new HRA procedures in place, it would need to reduce its actual throughput by approximately 4.3 million gallons per year, or 25 percent, assuming no other modifications could be made to

reduce cancer risk.[6] Facility E, which has a current actual throughput equal to approximately 97 percent of its new throughput limit, could also be adversely impacted by the new rules and procedures assuming it was prevented from expanding via additional throughput.

- Aside from the significant negative impacts to Facility H and the potential impacts to Facility E, the new throughput limits do not appear to inhibit existing throughput capacity for any of the other facilities that have actual throughput data. Of the remaining facilities with actual throughput data, four would be able to expand actual throughput by more than one million gallons per year with the new throughput limits in place. However, it is important to note that these stations are extremely high-volume facilities that already have current permitted throughput levels well above the average. [7]

- Five of the eleven facilities have current permitted throughput limits below 3.6 million gallons per year. Actual throughput averages 890,000 gallons per year at the four facilities with actual throughput data. Currently all four of these facilities would be able to expand annual throughput by more than one million gallons under the current permitted throughput limits. The potential reductions in additional throughput capacity under the new throughput limits could be significant for these facilities, with new growth capacity ranging from just 56,000 gallons per year at Facility E to 412,000 gallons per year at Facility C based on the new throughput limits.

Table 11 summarizes the twenty gasoline dispensing facilities that would have exceeded the cancer risk limit of ten in one million outside of Overburdened Communities if the new HRA procedures had been in place throughout the four-year analysis period. As shown, current permitted throughput ranges from 600,000 gallons per year to 36.6 million gallons per year at these facilities. The average current permitted throughput is approximately 15.9 million gallons per year, while the median is 6.5 million gallons per year.

[6] A closer look at recent permit applications for this facility shows that its maximally exposed receptor is actually a worker. Since the new throughput limits were calculated based on the assumption that every project has a maximally exposed residential receptor, the impacts on maximum throughput for this facility are very likely overstated.

[7] According to the California Air Resources Board, a typical gas dispensing facility in California dispenses under 3.6 million gallons of gasoline per year. See: California Environmental Protection Agency California Air Resources Board, 2005. Air Quality and Land Use Handbook: A Community Health Perspective. April.

Table 11: Summary of Gas Dispensing Facilities Potentially Requiring Modifications Outside of Overburdened Communities, February 2017 through February 2021

Facility	Current Permitted Throughput (Gallons/yr)	Draft New Throughput Limit	Net Change in Maximum Throughput		Actual Throughput (a)
			Number	Percent	
AA	600,000	510,000	-90,000	-15%	Unknown
BB	1,560,000	1,113,840	-446,160	-29%	912,430
CC	2,100,000	1,562,500	-537,500	-26%	1,118,721
DD	3,000,000	2,164,502	-835,498	-28%	404,054
EE	3,000,000	2,676,000	-324,000	-11%	650,000
FF	3,000,000	2,490,000	-510,000	-17%	2,878,305
GG	3,000,000	2,856,000	-144,000	-5%	2,214,381
HH	3,730,000	2,663,220	-1,066,780	-29%	N/A (b)
II	5,090,000	3,634,260	-1,455,740	-29%	Unknown
JJ	6,450,000	4,605,300	-1,844,700	-29%	N/A (b)
KK	6,450,000	4,650,450	-1,799,550	-28%	N/A (b)
LL	16,000,000	11,424,000	-4,576,000	-29%	N/A (b)
MM	20,000,000	14,280,000	-5,720,000	-29%	11,059,778
NN	29,750,000	21,241,500	-8,508,500	-29%	Unknown
OO	34,500,000	24,633,000	-9,867,000	-29%	N/A (b)
PP	35,300,000	25,204,200	-10,095,800	-29%	15,130,000
QQ	36,000,000	28,260,000	-7,740,000	-22%	14,310,000
RR	36,000,000	25,704,000	-10,296,000	-29%	17,020,000
SS	36,000,000	32,536,709	-3,463,291	-10%	15,250,000
TT	36,600,000	27,221,250	-9,378,750	-26%	15,701,237
Total	**318,130,000**	**239,430,731**	**-78,699,269**	**-25%**	**96,648,906**
Average	**15,906,500**	**11,971,537**	**-3,934,963**	**-24%**	**8,054,076**
Median	**6,450,000**	**4,627,875**	**-1,822,125**	**-28%**	**6,969,042**

Notes:
(a) Actual throughput data is shown for the most recent year for which this data was available. Data may not accurately reflect current operating conditions at each facility.
(b) Facilities are under authority to construct, but are not yet permitted to operate.

Sources: BAAQMD; BAE, 2021.

Following is a summary of how the new HRA procedures would have affected these gasoline dispensing facilities if the procedures had been in place throughout the four-year analysis period.

- Compared to current permitted throughput levels, the calculated new throughput limits are approximately 25 percent lower for the affected gasoline dispensing facilities outside of Overburdened Communities during the four-year analysis period. Permitted allowable throughput ranges from a low of 510,000 gallons per year for Facility AA to a high of roughly 32.5 million gallons per year for Facility SS. On average, facilities outside of Overburdened Communities would see their maximum permitted throughputs decrease by approximately 3.9 million gallons per year with the new procedures in place.

- One of the twenty facilities (Facility FF) likely has a current actual throughput rate that is greater than its new permitted limit. Based on the most current data available (2016), this

facility dispenses more than 2.8 million gallons per year and operates at approximately 96 percent of its current permitted throughput limit. Assuming the new HRA procedures had been in place throughout the four-year period, this facility would have needed to reduce actual throughput by approximately 388,300 gallons per year (13 percent) to meet the cancer risk limit of ten in one million outside of Overburdened Communities, assuming no other modifications could have been made to reduce cancer risk.

- Aside from the significant impacts to Facility FF, the new throughput limits do not appear to significantly inhibit throughput capacity for the other facilities outside of Overburdened Communities that have actual throughput data. Most (seven) of the facilities would be able to expand actual throughput by more than one million gallons per year with the new limits in place. For the remaining three facilities with actual throughput data, expansion potential would range from 201,400 gallons per year at Facility BB to 641,600 gallons per year at Facility GG.

- Five of the twenty affected facilities outside of Overburdened Communities are facilities that have obtained authority to construct permits but have not yet been permitted to operate. These new facilities have an average current permitted throughput of approximately 13.4 million gallons per year and a median permitted throughput of roughly 6.5 million gallons per year. Compared to current throughput levels, their new throughput limits with the revised procedures would be 28.5 percent lower, averaging 9.6 million gallons per year.

Summary of Potential Economic Impacts on Gasoline Dispensing Facilities

A comparison of actual and permitted throughput levels for the 21 facilities with actual throughput data shows that actual throughput levels can vary widely with respect to maximum permitted throughput limits for potentially affected gasoline dispensing facilities. Thus, it is not possible to predict actual throughput and the potential impacts on profits for future facilities that might be subject to the new HRA procedures. Based on a detailed analysis of the data for the facilities shown in Table 10 and Table 11 above, BAE was able to identify at least two facilities that would have potentially needed to reduce actual throughput as a direct result of the proposed changes during the four-year analysis period. The potential impacts on gasoline sales and associated profits from gasoline sales are summarized in Table 12 below.[8]

[8] It is important to note that potential impacts shown in Table 12 are limited to gasoline sales at these two facilities. Most retail fuel outlets have convenience stores and generate additional revenues from in-store sales of consumable products or other services. For retail outlets with convenience stores, in-store sales can be significant. See: National Association of Convenience Stores, 2019. Convenience Stores and Their Communities. April.

Table 12: Estimated Net Impacts on Gasoline Sales and Profits of Impacted Gasoline Dispensing Facilities

	Facility H (Table 10)	Facility FF (Table 11)
Facility Located in Overburdened Community?	Yes	No
Most Recent Actual Annual Throughput (a)	17,127,653	2,878,305
Est. Annual Revenues from Gasoline Sales (b) (c)	$61,228,395	$10,289,442
Est. Annual Profits from Gasoline Sales (c)	$726,082	$122,018
Draft New Throughput Limit	12,814,000	2,490,000
Required Actual Throughput Reduction w/ Draft Limit	-4,313,653	-388,305
Estimated Net Impact on Profits	**-$182,866**	**-$16,461**
Net Impact as a % of Existing Profits from Gasoline Sales (d)	-25.2%	-13.5%

Notes:
(a) Actual throughput for the most recent year available for Facility H (2018) and Facility F (2016). Data may not reflect current operating conditions.
(b) Gasoline sales based on the average retail gasoline price for unbranded gasoline in California during the months of September 2020 through August 2021.
(c) Estimate of existing revenues and profits associated with gasoline sales at each facility. Most retail fuel outlets generate additional revenues from convenience store sales or other services. For retail fuel outlets with convenience stores, in-store sales can be significant and would typically drive profits.
(d) Reflects net impacts as a share of existing profits associated with gasoline sales. Total revenues and profits at each facility could be higher than shown here.

Sources: BAAQMD; California Energy Commission; Internal Revenue Service, 2009-2018; BAE, 2021.

Rule 2-1

The revised Rule 2-1 requires some projects in Overburdened Communities to provide public notice. The rule would only apply to projects that require health risk assessments and are located in areas that have high CalEnviroScreen scores. The language would require the same type of notification that is currently required for projects that will result in an increase in toxic air contaminant emissions that are proposed to be located near K-12 schools. Applicants that propose projects that will require a Health Risk Assessment would be required to distribute the notice to surrounding addresses located within one thousand feet of the proposed source.

The proposed amendments to Rule 2-1 would affect businesses in a variety of industries and businesses are expected to vary significantly in terms of size, revenue, and profits. Based on permitting trends, the industries shown in Table 13 would be generally affected.

Compliance costs for the enhanced notification requirement would be one-time costs and average annualized compliance costs would be minimal. The impacts on profits would be negligible for the average affected business.

Table 13: Summary of Required Public Notifications by Affected Industry, February 2017 – February 2021

Industry Sector	Total Permits Requiring Public Notifications (a) Total	Percent	Estimated Notifications per Year
Utilities	5	1.9%	1.25
Construction	1	0.4%	0.25
Manufacturing	42	15.8%	10.5
Wholesale Trade	17	6.4%	4.25
Retail Trade	30	11.3%	7.5
Transportation and Warehousing	11	4.1%	2.75
Information	19	7.1%	4.75
Real Estate and Rental and Leasing	57	21.4%	14.25
Professional, Scientific, and Technical Svcs	3	1.1%	0.75
Admin. & Waste Mgmt and Remediation	18	6.8%	4.5
Educational Services	4	1.5%	1
Health Care and Social Assistance	7	2.6%	1.75
Arts, Entertainment, and Recreation	1	0.4%	0.25
Accommodation and Food Services	5	1.9%	1.25
Other Services (exc. Public Admin.)	6	2.3%	1.5
Government (b)	39	14.7%	9.75
Unknown	1	0.4%	0.25
All Industries	**266**	**100.0%**	**66.5**

Notes:
(a) Based on permitting trends between February 2017 and February 2021.
(b) Government includes all publicly owned facilities, regardless of sector.
Sources: BAAQMD; BAE, 2021.

Regional Impacts

IMPLAN was used to assess direct impacts on employment, indirect impacts, and induced impacts from compliance costs under the revised rules. The IMPLAN analysis is based on average permitting activity in a typical year and models the impacts based on the highest cost scenarios for each of the industries and types of projects summarized in Table 3 above.

It is assumed that the costs of new control equipment would result in equivalent lower total revenues, and that the expenditures for additional abatement equipment would not circulate through the local economy. Actual impacts would be lower than shown here, since some equipment could be purchased and/or produced locally, and costs would not necessarily translate to a decline in gross revenues, e.g., the costs could be expensed to lower taxes. Furthermore, the analysis is based on the highest control cost scenario assumed for each industry and type of project, even though less expensive control options would be available. While the particular facilities to be affected are not necessarily known, the overall cost impacts as estimated by sector are assumed to occur somewhere in the local economy and thus have a direct effect on jobs and the impact equivalent to a decline in output (total revenues).

In addition to these direct impacts, there would be indirect and induced impacts on the regional

economy. Indirect and induced impacts refer to regional multiplier effects of increasing or decreasing regional economic activity. If the rules 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 induced impacts due to decreases in household spending. Because there is the potential for the proposed rules to result in significant direct impacts for the sectors listed above, the analysis uses the IMPLAN input-output model to estimate the indirect or induced impacts.

Economic Impacts of Increased Costs in Impacted Industries

Table 14 shows the direct, indirect, and induced regional impacts due to the decline in operating revenues for affected businesses. Taken together, total impacts on annual economic output are estimated to equal $2.1 million with a related annual loss of 8.1 jobs. It should be noted that this is based on specific assumptions regarding the different combinations of potential controls, compliance costs, and affected industries as grouped into different project types.

Table 14: Regional Economic Impacts

High Cost Scenario	Employment	Output
Direct (a)	-4.52	-$1,306,850
Indirect (b)	-1.97	-$492,737
Induced (c)	-1.61	-$345,320
Total	**-8.09**	**-$2,144,907**

Notes:
(a) Based on the initial decline in revenues (increase in costs), direct impacts measure the reduction of dollars available to then flow through the local economy.
(b) Indirect impacts refer to business-to-business impacts.
(c) Induced impacts occur when workers spend their household incomes throughout the local economy.
Sources: IMPLAN; BAAQMD; BAE, 2021.

Impacts 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 average annual gross receipts of $15 million or less over the previous three tax years, or
    - A manufacturer with 100 or fewer employees

All of the rule changes will be forward-looking and will not apply to specific facilities or previously issued permits. Although it is not possible to predict how many future affected projects would be classified as small businesses, based on the permits that were issued between February 2017 and February 2021, small businesses in the following industries would have been affected by the reduced cancer risk limit in high-scoring areas:

- Fertilizer (Mixing Only) Manufacturing (NAICS 325314)
- Cemeteries and Crematories (NAICS 812220)
- Remediation Services (NAICS 562910)
- Nursing and Residential Care Facilities (NAICS 623)
- Gasoline Stations (NAICS 4471)

Based on the analysis detailed in Appendix A and Appendix B, at the assumed compliance costs, it is possible that some small businesses in affected industries would be significantly impacted as measured by a 10 percent or greater impact on net income. Following is a brief discussion of the potential impacts on small businesses in each of the affected industries.

- Lessors of Residential Buildings. These users are listed due to their potential use of diesel backup generators. Small businesses are not likely to be the businesses undertaking these types of large projects, but assuming that they were affected, it is possible that a small business with less than ten employees would be impacted in a "worst-case" scenario with maximum control costs of $72,000 per year. If compliance costs were within the typical range estimated, no small businesses would be impacted.

- Colleges, Universities, and Professional Schools. These institutional users are also listed due to their potential use of diesel backup generators. The analysis shows that small businesses with less than 100 employees would be significantly impacted if maximum annualized control costs were $72,000. For extremely small businesses with less than five employees, these businesses would experience significant impacts even if compliance costs were at the low end of the typical range. However, based on permitting data since 2017, the use of backup generators is associated with much larger institutions with a total number of

employees much greater than the 100+ employment threshold. Some of these users are non-profit universities.

- Telecommunications Carriers. Based on permitting data since 2017, businesses with standby diesel engines in this sector have overwhelmingly consisted of large corporations with well over 100 employees. Assuming a small business in this sector was affected by the rule change, businesses with less than twenty employees would experience significant impacts on profits if compliance costs were at the maximum level estimated by staff. If compliance costs were within the typical range estimated, only extremely small businesses with less than five employees would be impacted. As mentioned, these are not likely the types of businesses that will be undertaking this type of project.

- Data Processing, Hosting, and Related Services. Data center users are listed due to their frequent use of diesel backup generators. Although the size of data centers can vary, most permits since 2017 have been for large facilities owned by major cloud providers or multi-tenant colocation facilities developed by large real estate investment firms. Many of these facilities have more than one backup generator. Although it would be an unlikely scenario, the analysis shows that a small business in this sector with less than 20 employees would be significantly impacted assuming "worst-case" scenario control costs.

- Nursing and Residential Care. During the four-year period, there were two smaller (<350 bhp) diesel engine projects in this sector that would have needed additional controls to meet the reduced risk limit in high-scoring areas. According to website descriptions and publicly available data, it is possible that one of these businesses would be defined as a small business.[9] All small businesses in this sector would see substantial impacts on net income under the "worst-case" control costs scenario. However, less expensive control options would be available for smaller diesel engine users. Assuming compliance costs were somewhere within the typical range, businesses with less than 50 employees would be significantly impacted. Based on permitting data, these are not likely to be the types of businesses undertaking this type of project.

- Lessors of Nonresidential Buildings. Based on permitting data, some of the firms associated with SVE projects fall in this industry. As shown in Appendix B, small businesses with less than fifty employees would see significant impacts on net income assuming worst-case control costs. Assuming average control costs, businesses with less than twenty employees would be significantly impacted. Extremely small businesses with less than five employees would see significant impacts on their net income even under the low-cost scenario.

[9] According to Dun and Bradstreet data, this facility has 50 total employees and estimated sales of approximately $3.3 million. However, data from Infogroup indicate that the business employs between 100 and 250 workers.

- **Fertilizer (Mixing Only) Manufacturing.** There was one permitted facility in this sector that would have needed to install additional controls during the four-year period. It is likely that this facility would be classified as a small business based on available data.[10] Based on the analysis shown in Appendix B, small businesses with less than twenty employees would see significant impacts on net income assuming worst-case control costs. If control costs were within the typical range, only extremely small businesses with less than five employees would be impacted.

- **Petroleum Bulk Stations and Terminals.** Based on a review of past permitting data, these projects include facilities at bulk stations and terminals that support existing large refineries in the Bay Area. None of these are small businesses as considered here.

- **Remediation Services.** This industry includes the firms that would be associated with SVE projects. Based on permitting data, businesses in this industry include full-service remediation and environmental firms. While some of these firms have less than 100 employees total, they are hired by other entities to complete cleanup projects and would not be absorbing any increased costs. The compliance cost impacts on net income would thus be zero for small businesses in this sector.

- **Crematories.** There was one permitted crematory project that would be classified as a small business that would have needed to install additional controls during the period analyzed. Annualized control costs are expected to be low, at $1,700 per year. Based on the analysis, the impacts on profits would be less than significant for all businesses, including small businesses, in this sector.

- **Foundries.** Based on the analysis shown in Appendix B, small businesses in this sector would see substantial impacts on net income even under the low-cost scenario. There were no permitted projects for small businesses in this sector during the four-year period.

- **Waste Treatment and Disposal.** Although there were no permitted projects for small businesses in this sector during the four-year period, the analysis shows that small businesses in this sector with less than fifty employees would be significantly impacted under the high-cost scenario. Under the low-cost scenario, compliance cost impacts would be significant for businesses with less than ten employees.

- **Cement and Concrete Product Manufacturing.** The analysis shows that small business impacts would be significant under the high-cost scenario. Under the low-cost scenario, businesses with less than twenty employees would be see compliance cost impacts above the level of significance. The facility that was permitted in this sector during the four-year

[10] According to website descriptions, the facility is owned by a company that operates three material supply locations in Sonoma County. The company employs 18 workers across the three locations according to Dun and Bradstreet data.

period is owned by a larger corporation and would not be considered a small business under the definition above.

- **Gas Stations.** Given that so many gasoline dispensing facilities are independently owned small businesses, it is likely that small businesses will be affected by the new HRA procedures. One of the two impacted gasoline dispensing facilities shown in Table 12 is an independently owned business and would be considered a small business based on the annual sales estimate shown in the table.

APPENDICES

Appendix A: Detailed Cost Impacts of Diesel Particulate Filters for Diesel Engine Users

Residential NAICS 531110

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Average Annual Sales per Establishment	Average Annual Profit per Establishment	Compliance Costs as % of Profits: Typical Low Cost $4,000	Typical High Cost $13,000	Maximum Control Cost $72,000
1-4	78.1%	1.7	$772,954	$184,195	2.17%	7.06%	39.09%
5-9	14.6%	6.4	$2,859,404	$681,396	0.59%	1.91%	10.57%
10-19	5.0%	12.9	$5,755,735	$1,371,592	0.29%	0.95%	5.25%
20-49	1.6%	28.7	$12,785,046	$3,046,677	0.13%	0.43%	2.36%
50-99	0.5%	69.9	$31,112,830	$7,414,188	0.05%	0.18%	0.97%
100+	0.3%	202.9	$90,297,710	$21,517,946	0.02%	0.06%	0.33%
Total/Average	**100.0%**	**4.4**	**$1,944,132**	**$463,287**	**0.86%**	**2.81%**	**15.54%**

Based on 2017 Economic Census data for NAICS 531110, Lessors of Residential Buildings and Dwellings
Average revenues per employee $445,022
Average Profit Margin, 2009-2018 23.83%

Office/Retail Centers NAICS 531120

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Avg. Annual Revenue per Establishment	Avg. Annual Profit per Establishment	Compliance Costs as % of Profits: Typical Low Cost $4,000	Typical High Cost $13,000	Maximum Control Cost $72,000
1-4	75.0%	1.7	$1,101,635	$262,520	1.52%	4.95%	27.43%
5-9	14.6%	6.4	$4,239,079	$1,010,173	0.40%	1.29%	7.13%
10-19	6.5%	13.0	$8,552,090	$2,037,963	0.20%	0.64%	3.53%
20-49	2.7%	30.6	$20,178,056	$4,808,431	0.08%	0.27%	1.50%
50-99	0.7%	74.1	$48,902,542	$11,653,477	0.03%	0.11%	0.62%
100+	0.5%	199.9	$131,941,414	$31,441,642	0.01%	0.04%	0.23%
Total/Average	**100.0%**	**5.4**	**$3,534,984**	**$842,387**	**0.47%**	**1.54%**	**8.55%**

Based on 2017 Economic Census data for NAICS 531120, Lessors of Nonresidential Buildings (except Miniwarehouses)
Average revenues per employee $659,982
Average Profit Margin, 2009-2018 23.83%

Educational Services NAICS 611310

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Average Annual Sales per Establishment	Average Annual Profit per Establishment	Compliance Costs as % of Profits: Typical Low Cost $4,000	Typical High Cost $13,000	Maximum Control Cost $72,000
1-4	28.6%	2.1	$191,944	$16,999	23.53%	76.48%	423.57%
5-9	12.4%	7.2	$662,489	$58,670	6.82%	22.16%	122.72%
10-19	10.1%	14.0	$1,292,766	$114,488	3.49%	11.35%	62.89%
20-49	17.4%	32.9	$3,048,216	$269,951	1.48%	4.82%	26.67%
50-99	8.6%	69.5	$6,436,846	$570,048	0.70%	2.28%	12.63%
100+	22.9%	1,200.2	$111,080,812	$9,837,335	0.04%	0.13%	0.73%
Total/Average	**100.0%**	**289.8**	**$26,819,495**	**$2,375,139**	**0.17%**	**0.55%**	**3.03%**

Based on 2017 Economic Census data for NAICS 611, Educational Services
Average revenues per employee $92,554
Average Profit Margin, 2009-2018 8.86%

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Appendix A: Detailed Cost Impacts of Diesel Particulate Filters for Diesel Engine Users (continued)

Telecommunications Carriers NAICS 51731

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Average Annual Sales per Establishment	Average Annual Profit per Establishment	Compliance Costs as % of Profits: Typical Low Cost $4,000	Typical High Cost $13,000	Maximum Control Cost $72,000
1-4	44.5%	2.0	$1,221,293	$86,641	4.62%	15.00%	83.10%
5-9	23.6%	6.8	$4,151,790	$294,536	1.36%	4.41%	24.45%
10-19	17.1%	13.6	$8,329,214	$590,890	0.68%	2.20%	12.19%
20-49	8.7%	31.5	$19,304,168	$1,369,474	0.29%	0.95%	5.26%
50-99	3.6%	71.9	$44,045,761	$3,124,689	0.13%	0.42%	2.30%
100+	2.5%	254.6	$155,907,335	$11,060,359	0.04%	0.12%	0.65%
Total/Average	**100.0%**	**16.6**	**$10,134,191**	**$718,939**	**0.56%**	**1.81%**	**10.01%**

Based on 2017 Economic Census (United States) data for NAICS 51731, Wired and Wireless Telecommunications Carriers

Average revenues per employee $612,266

Average Profit Margin, 2009-2018 7.09%

Data Centers NAICS 518210

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Average Annual Sales per Establishment	Average Annual Profit per Establishment	Compliance Costs as % of Profits: Typical Low Cost $4,000	Typical High Cost $13,000	Maximum Control Cost $72,000
1-4	48.9%	1.6	$630,013	$53,874	7.42%	24.13%	133.65%
5-9	13.7%	6.7	$2,656,718	$227,181	1.76%	5.72%	31.69%
10-19	12.1%	13.4	$5,264,796	$450,203	0.89%	2.89%	15.99%
20-49	11.8%	31.9	$12,552,805	$1,073,416	0.37%	1.21%	6.71%
50-99	5.5%	69.6	$27,426,033	$2,345,255	0.17%	0.55%	3.07%
100+	8.0%	327.6	$128,989,417	$11,030,144	0.04%	0.12%	0.65%
Total/Average	**100.0%**	**36.9**	**$14,547,939**	**$1,244,023**	**0.32%**	**1.04%**	**5.79%**

Based on 2017 Economic Census data for NAICS 518210, Data Processing, Hosting, and Related Services

Average revenues per employee $393,798

Average Profit Margin, 2009-2018 8.55%

Nursing and Residential Care NAICS 623

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Average Annual Sales per Establishment	Average Annual Profit per Establishment	Compliance Costs as % of Profits: Typical Low Cost $4,000	Typical High Cost $13,000	Maximum Control Cost $72,000
1-4	32.2%	1.9	$152,993	$6,551	61.05%	198.43%	1098.99%
5-9	20.7%	6.9	$558,212	$23,904	16.73%	54.38%	301.21%
10-19	17.4%	13.4	$1,086,834	$46,540	8.59%	27.93%	154.70%
20-49	12.3%	30.9	$2,507,352	$107,370	3.73%	12.11%	67.06%
50-99	7.8%	71.7	$5,810,970	$248,837	1.61%	5.22%	28.93%
100+	9.5%	171.9	$13,937,919	$596,849	0.67%	2.18%	12.06%
Total/Average	**100.0%**	**30.2**	**$2,446,060**	**$104,745**	**3.82%**	**12.41%**	**68.74%**

Based on 2017 Economic Census data for NAICS 623, Nursing and Residential Care Facilities

Average revenues per employee $81,074

Average Profit Margin, 2009-2018 4.28%

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Appendix A: Detailed Cost Impacts of Diesel Particulate Filters for Diesel Engine Users (continued)

Fertilizer Mixing Facility NAICS 325314

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Average Annual Sales per Establishment	Average Annual Profit per Establishment	Compliance Costs as % of Profits: Typical Low Cost $4,000	Typical High Cost $13,000	Maximum Control Cost $72,000
1-4	26.7%	2.3	$854,036	$77,652	5.15%	16.74%	92.72%
5-9	17.8%	6.3	$2,287,597	$207,997	1.92%	6.25%	34.62%
10-19	13.3%	14.8	$5,429,230	$493,647	0.81%	2.63%	14.59%
20-49	22.2%	28.0	$10,248,434	$931,828	0.43%	1.40%	7.73%
50-99	17.8%	66.8	$24,431,535	$2,221,411	0.18%	0.59%	3.24%
100+	2.2%	94.0	$34,405,457	$3,128,280	0.13%	0.42%	2.30%
Total/Average	**100.0%**	**23.9**	**$8,743,704**	**$795,012**	**0.50%**	**1.64%**	**9.06%**

Based on 2017 Economic Census data for NAICS 325314, Fertilizer (Mixing Only) Manufacturing
Average revenues per employee $366,016
Average Profit Margin, 2009-2018 9.09%

Fuel Storage NAICS 424710

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Average Annual Sales per Establishment	Average Annual Profit per Establishment	Compliance Costs as % of Profits: Typical Low Cost $4,000	Typical High Cost $13,000	Maximum Control Cost $72,000
1-4	28.6%	2.1	$11,232,093	$114,136	3.50%	11.39%	63.08%
5-9	23.3%	6.9	$37,557,503	$381,646	1.05%	3.41%	18.87%
10-19	20.5%	13.3	$72,325,589	$734,947	0.54%	1.77%	9.80%
20-49	20.8%	29.7	$161,590,298	$1,642,023	0.24%	0.79%	4.38%
50-99	5.3%	68.9	$375,178,816	$3,812,432	0.10%	0.34%	1.89%
100+	1.4%	151.8	$826,719,051	$8,400,822	0.05%	0.15%	0.86%
Total/Average	**100.0%**	**16.9**	**$92,056,060**	**$935,441**	**0.43%**	**1.39%**	**7.70%**

Based on 2017 Economic Census data for NAICS 424710, Petroleum Bulk Stations and Terminals
Average revenues per employee $5,447,901
Average Profit Margin, 2009-2018 1.02%

Sources: Economic Census, 2017; County Business Patterns 2019; Internal Revenue Service, 2009-2018; BAAQMD; BAE, 2021.

Appendix B: Detailed Cost Impacts for Other Projects by Industry

SVE Project - Remediation Services NAICS 562910

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Average Annual Sales per Establishment	Average Annual Profit per Establishment	Compliance Costs as % of Profits Low Cost $35,000	Avg. Cost $361,000	High Cost $688,000
1-4	38.5%	1.9	$364,444	$24,264	144.2%	1487.8%	2835.4%
5-9	15.7%	7.1	$1,360,633	$90,590	38.6%	398.5%	759.5%
10-19	18.5%	14.3	$2,731,286	$181,847	19.2%	198.5%	378.3%
20-49	16.4%	31.4	$5,997,860	$399,333	8.8%	90.4%	172.3%
50-99	6.7%	64.9	$12,398,919	$825,512	4.2%	43.7%	83.3%
100+	4.3%	162.2	$30,984,788	$2,062,946	1.7%	17.5%	33.4%
Total/Average	**100.0%**	**20.9**	**$3,991,996**	**$265,784**	**13.2%**	**135.8%**	**258.9%**

Based on 2017 Economic Census data for NAICS 562910, Remediation Services
Average revenues per employee $191,068
Average Profit Margin, 2009-2018 6.66%

SVE Project - Retail Center NAICS 531120

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Average Annual Sales per Establishment	Average Annual Profit per Establishment	Compliance Costs as % of Profits Low Cost $35,000	Avg. Cost $361,000	High Cost $688,000
1-4	75.0%	1.7	$1,101,635	$262,520	13.3%	137.5%	262.1%
5-9	14.6%	6.4	$4,239,079	$1,010,173	3.5%	35.7%	68.1%
10-19	6.5%	13.0	$8,552,090	$2,037,963	1.7%	17.7%	33.8%
20-49	2.7%	30.6	$20,178,056	$4,808,431	0.7%	7.5%	14.3%
50-99	0.7%	74.1	$48,902,542	$11,653,477	0.3%	3.1%	5.9%
100+	0.5%	199.9	$131,941,414	$31,441,642	0.1%	1.1%	2.2%
Total/Average	**100.0%**	**5.4**	**$3,534,984**	**$842,387**	**4.2%**	**42.9%**	**81.7%**

Based on 2017 Economic Census data for NAICS 531120, Lessors of Nonresidential Buildings (except Miniw arehouses)
Average revenues per employee $659,982
Average Profit Margin, 2009-2018 23.83%

Metal Casting Facility Project NAICS 3315

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Average Annual Sales per Establishment	Average Annual Profit per Establishment	Compliance Costs as % of Profits Low Cost $76,000	Avg. Cost $1,184,000	High Cost $2,292,000
1-4	27.1%	1.9	$433,816	$34,564	219.9%	3425.5%	6631.2%
5-9	14.3%	6.5	$1,521,254	$121,204	62.7%	976.9%	1891.0%
10-19	17.3%	14.1	$3,283,603	$261,618	29.1%	452.6%	876.1%
20-49	17.3%	30.7	$7,165,147	$570,876	13.3%	207.4%	401.5%
50-99	11.3%	70.3	$16,394,370	$1,306,205	5.8%	90.6%	175.5%
100+	12.8%	173.6	$40,476,314	$3,224,911	2.4%	36.7%	71.1%
Total/Average	**100.0%**	**39.3**	**$9,164,326**	**$730,159**	**10.4%**	**162.2%**	**313.9%**

Based on 2017 Economic Census data for NAICS 3315, Foundries
Average revenues per employee $233,095
Average Profit Margin, 2009-2018 7.97%

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Appendix B: Detailed Cost Impacts for Other Projects by Industry (continued)

Crematories NAICS 81222

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Average Annual Sales per Establishment	Average Annual Profit per Establishment	Compliance Costs per Establishment	Compliance Costs as % of Profits
1-4	38.3%	2.4	$456,391	$32,433	$1,700	5.24%
5-9	24.2%	7.1	$1,363,418	$96,889	$1,700	1.75%
10-19	21.9%	14.4	$2,778,831	$197,473	$1,700	0.86%
20-49	11.5%	29.3	$5,642,983	$401,010	$1,700	0.42%
50-99	3.3%	67.2	$12,950,825	$920,331	$1,700	0.18%
100+	0.7%	188.5	$36,315,827	$2,580,729	$1,700	0.07%
Total/Average	**100.0%**	**12.8**	**$2,467,298**	**$175,335**	**$1,700**	**0.97%**

Based on 2017 Economic Census data for NAICS 81222, Crematories
Average revenues per employee $192,657
Average Profit Margin, 2009-2018 7.11%

Conveyors/Stockpiles at Waste Facility NAICS 56221

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Average Annual Sales per Establishment	Average Annual Profit per Establishment	Compliance Costs as % of Profits	
					Low Cost	High Cost
					$31,000	$130,000
1-4	31.5%	1.8	$670,033	$44,610	69.5%	291.4%
5-9	19.2%	6.9	$2,594,713	$172,754	17.9%	75.3%
10-19	14.6%	14.0	$5,281,437	$351,635	8.8%	37.0%
20-49	25.4%	31.6	$11,925,150	$793,968	3.9%	16.4%
50-99	6.1%	70.7	$26,668,356	$1,775,561	1.7%	7.3%
100+	3.3%	191.7	$72,323,356	$4,815,240	0.6%	2.7%
Total/Average	**100.0%**	**22.5**	**$8,506,621**	**$566,365**	**5.5%**	**23.0%**

Based on 2017 Economic Census data for NAICS 56221, Waste Treatment and Disposal
Average revenues per employee $377,246
Average Profit Margin, 2009-2018 6.66%

Concrete Manufacturing Facility Project NAICS 3273

Number of Employees	Percent of Establish-ments	Average Employees per Establishment	Average Annual Sales per Establishment	Average Annual Profit per Establishment	Compliance Costs as % of Profits	
					Low Cost	High Cost
					$31,000	$130,000
1-4	21.4%	1.9	$694,563	$20,164	153.7%	644.7%
5-9	15.5%	7.0	$2,599,792	$75,477	41.1%	172.2%
10-19	23.1%	14.1	$5,224,595	$151,680	20.4%	85.7%
20-49	24.0%	30.2	$11,174,258	$324,409	9.6%	40.1%
50-99	9.5%	67.4	$24,927,091	$723,679	4.3%	18.0%
100+	6.4%	201.4	$74,447,237	$2,161,341	1.4%	6.0%
Total/Average	**100.0%**	**31.3**	**$11,569,884**	**$335,895**	**9.2%**	**38.7%**

Based on 2017 Economic Census data for NAICS 3273, Cement and Concrete Product Manufacturing
Average revenues per employee $369,639
Average Profit Margin, 2009-2018 2.90%

Sources: Economic Census, 2017; County Business Patterns 2019; Internal Revenue Service, 2009-2018; BAAQMD; BAE, 2021.