APPENDIX D

Socioeconomic Analysis for Rule 4204 (Cotton Gins)

February 17, 2005

SOCIOECONOMIC ANALYSIS OF DRAFT RULE 4204: COTTON GINNING (DRAFT VERSION)

7 October 2005

Prepared for

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CONTENTS

FIGURES

TABLES

1. EXECUTIVE SUMMARY

The San Joaquin Valley Unified Air Pollution Control District ("District") seeks to adopt Draft Rule 4204 to meet certain United States Environmental Protection Agency (EPA) mandates and timelines with regards to improved air quality in the region. This section of the report summarizes the findings of the socioeconomic analysis of new Draft Rule 4204: Cotton Ginning. The percentage ratio of annual cost of compliance and net profits is approximately 2 percent, and since it is less than the 10 percent threshold of significance, the analysis concludes that the economic impact on cotton growers will not lead to drastic business operational changes.

The analysis shows that in the San Joaquin Valley, there are 41 cotton ginning establishments operating 65 cotton gins and employing 796 workers. The numbers of ginning facilities declined from 299 active gins in 1963 to 65 active gins in 2001. Remaining gins have increased their capacities and efficiencies, as economic rationalization continues to consolidate smaller gins into larger ginning operations. Overall employment decreased by 10 percent between 1997 and 2002—from 880 to 796 jobs.

The District's cost of compliance indicates that, overall, cotton ginning facilities would experience $1.8 million in annual costs for ten years. Under a scenario that maintains the original retrofit schedule of most cotton gins but extends the compliance deadline for cotton gins still using older technology that can be replaced with 1D2D cyclones, the annual compliance costs is estimated at $1.6 million. Cotton growers operate the ginning facilities either directly, as part of their cotton production, or indirectly, as part of a cooperative of members, and they ultimately bear the compliance costs that ginning operations will incur as a result of Rule 4204.

There are 1,289 cotton growers in the San Joaquin Valley Air Basin. In the 2001 to 2002 season, growers generated $728 million in value, with estimated net profits of $75 million. The analysis shows that the annual compliance costs represent approximately 2 percent of profits generated by cotton growers as an aggregate group, a level at which no job losses occur due to increased expenditures. Since the proportion of business that is done with the ginning facility determines how to distribute any money left after paying for expenses, small farms and large farms are similarly affected by the compliance costs.

To address the concern of ginners whose operations have lagged behind in terms of more efficient means of PM10 control and thus face larger compliance costs, the analysis evaluated the effect of annual compliance costs on growers who utilize these gins. For growers using these facilities, the annual costs amount to 3.6 percent to 5.6 percent of annual profits. Although these levels are below the 10 percent threshold of significance, after which serious economic effects occur, affected ginners requested moving back compliance deadlines, so that costs can be spread over a longer time period. This scenario was considered in this analysis.

The final section discusses the likely increase in manufacturing activity of two valley-based metal works businesses, which have been providing the cotton ginning industry with services related to the engineering, fabrication, and installation of PM10 control equipment. The conversion of compliance costs incurred by the cotton ginning industry to revenue for the metal fabrication industry may partially mitigate the economic impact of Rule 4204 on the region's economy. The final section indicates that the manufacture and sale of equipment by the metal fabrication industry will support about ten new jobs temporarily during the three-year compliance phase-in period.

2. INTRODUCTION

This report describes the socioeconomic impacts of new Draft Rule 4204. Following this introduction, the report summarizes Draft Rule 4204 and describes the methodology for the socioeconomic analysis. In Section 5, the report describes the economic characteristics of sources affected by the new rule. The sixth section analyzes the socioeconomic impacts of compliance costs on the regional economy.

The report is prepared pursuant to the provisions of AB2051 (Section 40728.5 of the California Health and Safety Code), which requires an assessment of socioeconomic impacts of proposed air quality rules. The findings in this report can assist District staff in understanding the socioeconomic impacts of Draft Rule 4204, and can assist staff in preparing a refined version of the rule. A final draft report will be presented at a workshop conducted by District staff in late Summer 2004.

For consistency, this report refers to stakeholders and their respective sites and facilities subject to the new rule as "sources," "affected sources," "affected industries," or "impacted industries affected by Draft Rule 4204." In short, a "source" is an industry subject to the rule.

Figure 1 is a map of the eight-county region that comprises the San Joaquin Valley Air Basin. As indicated in the map, Kern County is not completely in the District.

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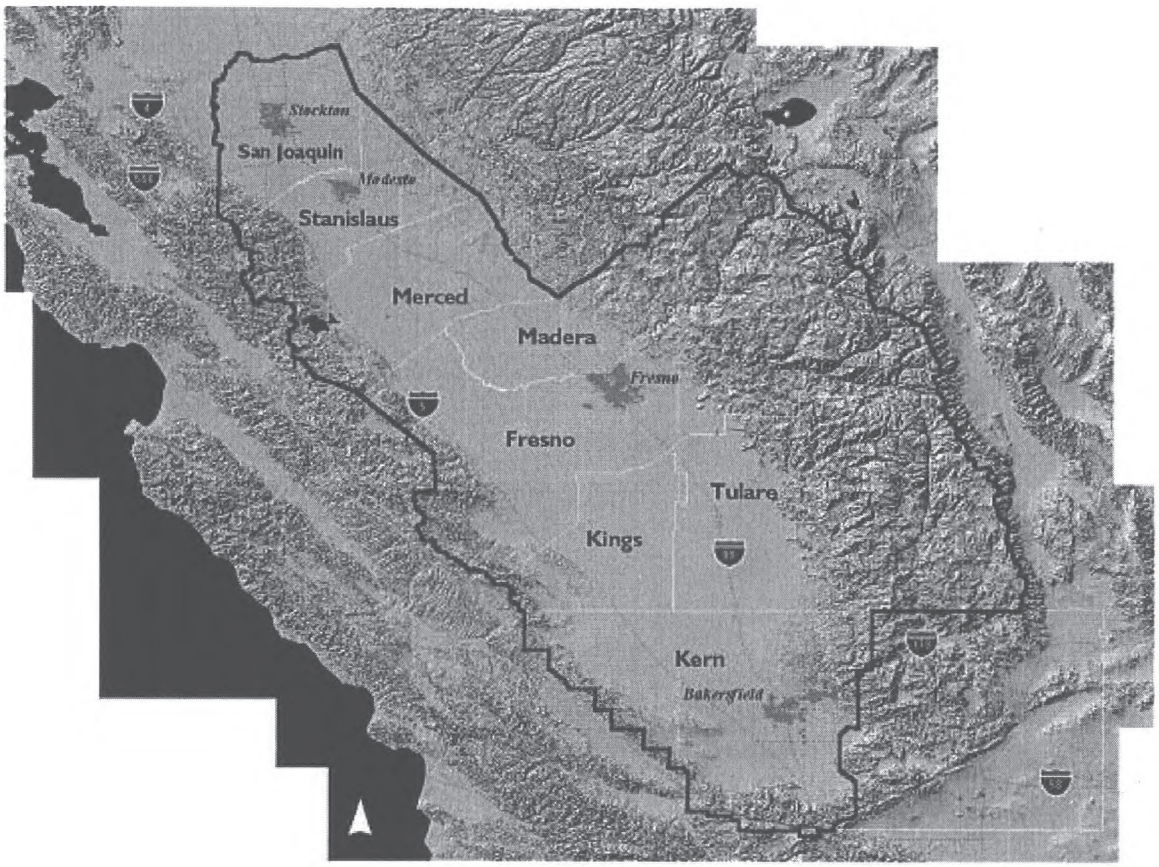
FIGURE 1
Map of the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Air Basin



3. DESCRIPTION OF DRAFT RULE 4204

The SJVAB is home to 41 cotton ginning facilities operating approximately 65 cotton gins, which had a combined production of 2.1 million bales in 2001. Modern ginning facilities use what is known as pneumatic conveyance, or fans blowing air, to move the cotton gin material. Particulate matter emissions are the unwanted by-products of this otherwise very efficient means of transferring massive quantities of cotton gin material from one process to the next process, such as from unloading to drying and cleaning. The 2001 emission inventory for District cotton gins adds up to 1,039 tons of PM10, equivalent to an average of 2.84 tons/day, or 10.4 tons/day during the operating season. The emissions occur mostly during the three-month period from October to December, the time of year during which PM10 levels pose the highest risk to public health.

In terms of controlling PM10, cotton gins within the District are not currently regulated by a source specific, cotton gin prohibitory rule. Cotton gins are regulated through a combination of permit conditions and other prohibitory rules. Permit conditions cite Rules 1070, 2201, 4101, 4102, 4201, and 4202 as the regulatory basis for cotton gins:

- Rule 1070 requires the keeping of daily records, such records being available for District inspection upon request
- Rule 2201 covers the following areas:
  a. Type of cyclones or other control devices for specific exhaust points
  b. Allowable PM10 emission rate for the gins as an integrated system and allowable PM10 emission rate for specific exhaust points
  c. Bale throughput in bales/day or bales/season
- Rule 4101 prohibits the discharge into the atmosphere of air contaminants for a period or periods aggregating more than three minutes in any one hour, which is as dark as or darker than Ringelmann one or 20 percent opacity
- Rule 4102 prohibits the release of air contaminants that causes a public nuisance
- Rule 4201 limits particulate matter emissions concentration to 0.1 grains/dscf or less
- Rule 4202 limits particulate matter emissions by establishing allowable emission rates based on process weights.

Although many gins in the SJVAB have retrofitted with equipment known as 1D3D high-efficiency cyclones, which are considered as "best available control technology" (BACT), federal law requires the District to devise a strategy to assure that all gins are at full BACT levels at the earliest practicable date. As a result, the District proposes Draft Rule 4204, which is summarized below.

Draft Rule 4204 proposes to continue requiring 1D3D cyclones as the BACT-level technology for existing gins. Standard inlets and outlets of existing 1D3D cyclones will have to be converted to the enhanced inlet and outlet configurations when worn-out or damaged 1D3D cyclones are replaced. In addition, the District proposes to allow the use of alternative control devices that have comparable emission rates as 1D3D cyclones. This makes possible the use of 1D2D cyclones, which were designed to control PM10 in exhaust systems with high lint content such as lint cleaners and battery condensers. More importantly, it does not hinder the adoption of innovative control strategies, such as mechanical conveyors, which have been used successfully to significantly reduce PM10 emissions in new cotton ginning facilities. In addition, the draft rule imposes certain requirements with respect to monitoring, record keeping, and source testing.

4. METHODOLOGY

The socioeconomic analysis involves the use of information provided by affected sources, as well as the use of secondary data to describe the industries affected by the proposed new rule. The approach is briefly described below.

ADE began the analysis by preparing a statistical description of the industry groups of which the affected sources are part, and analyzing data on the number of jobs, sales levels, typical profit ratios and other economic indicators for each industry.

This report relies heavily on the most current data available from a variety of sources, such as the Bureau of Census' 1997 Economic Census and the California Agricultural Statistical Service's report, "The County Agricultural Commissioners' Data." In addition, the report relies on data from the US Census' 1997 Agricultural Census, the 2002 Agricultural Census, the Minnesota IMPLAN Group (MIG), and the State of California's Employment Development Department Labor Market Information Division.

In calculating net income, profit ratios, and industry profits, ADE employed the following methodology and relied on the following sources of information. Net income is the difference between gross revenues and costs.[1] Also known as rate of return, profit ratio is the ratio between net income and gross revenues.[2] The first document ADE reviewed was the California Department of Food and Agriculture's 2002 Resource Directory, "California Agriculture: A Tradition of Innovation." This document yielded information on revenues, costs and net income for the agricultural sector as a whole. ADE also reviewed publications of the University of California Cooperative Extension to obtain gross revenue and net income figures for a variety of types of cotton grown in California. With this information, ADE was able to calculate profit ratios for the cotton industry in particular. ADE calculated industry profits by multiplying cotton industry profit ratios against aggregate revenues generated by the cotton industry.[3] The result of the socioeconomic analysis shows what proportion of profits the compliance costs represent. Based on an assumed threshold of significance, ADE discusses in the report whether the affected sources are likely to reduce jobs as a means of recouping the cost of rule compliance or as a result of reducing business operations. To the extent that such job losses appear likely, the indirect multiplier effects of the jobs losses are estimated using a regional IMPLAN input-output model.

[1] net income = (gross revenues per acre $_{\text{cotton type "a"}}$) − (cost per acre $_{\text{cotton type "a"}}$)

[2] profit ratio (i.e. rate of return) = (net income per acre $_{\text{cotton type "a"}}$) / (gross revenues per acre $_{\text{cotton type "a"}}$)

[3] cotton industry profits = (profit ratio $_{\text{cotton industry average}}$) x (aggregate revenues $_{\text{cotton only}}$)

5. IMPACTED SOURCES SUBJECT TO DRAFT RULE 4204

This section of the socioeconomic analysis describes demographic and economic trends in the San Joaquin Valley region. The first part of this section compares the San Joaquin Valley region against California as a whole, and provides a context for understanding demographic and economic changes that occurred within the San Joaquin Valley region between 1997 and 2002. Starting with sub-section 5.2, the second part of this section narrows the focus of the socioeconomic analysis to industries affected by Draft Rule 4204. The second part of this section describes the economic characteristics of impacted sources subject to the draft rule.

In this report, the San Joaquin Valley region is defined as Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus and Tulare counties. Data for Kern County in Tables 1 and 2 are for all of Kern County, although Kern County is only partially in the San Joaquin Valley Air Basin. Starting with Table 3, data for Kern County are for the part of Kern County that is in the San Joaquin Valley Air Basin.

5.1 REGIONAL DEMOGRAPHIC AND ECONOMIC TRENDS

Regional Demographic Trends

The San Joaquin Valley region experienced tremendous population growth during the 1990s. Many came to this area because of affordable housing. As a result, population increased significantly. The eight-county region's population increased by 19 percent, from 2.9 million in 1992 to 3.4 million in 2002. While the State of California's population increased by 13 percent, all the counties in the region experienced faster rates of growth, and two counties grew at rates that were double the State's growth rate, as Table 1 shows. While by many standards Madera County continues to be a small county– at 130,373 residents according to the Department of Finance–it still experienced a 36 percent growth in population during the last decade. Kings County grew by 25 percent. As demonstrated in the following section on regional economic trends, the demographic changes that occurred in the San Joaquin Valley region during the 1990s significantly influenced the economy of this eight-county region.

TABLE 1
Population Growth: San Joaquin Valley Region
1992 – 2002

	1992	1997	2002	Distribution 2002	Percent Change 92-97	Percent Change 97-02	Percent Change 92-02
California	30,844,728	32,670,019	34,999,827		6%	7%	13%
SJV Region	2,896,031	3,147,776	3,445,018	10%	9%	9%	19%
Fresno	706,096	774,208	827,310	24%	10%	7%	17%
Kern	578,997	629,227	688,875	20%	9%	9%	19%
Kings	106,940	116,727	133,553	4%	9%	14%	25%
Madera	96,085	111,892	130,373	4%	16%	17%	36%
Merced	188,060	200,169	219,554	6%	6%	10%	17%
San Joaquin	499,913	537,669	596,907	17%	8%	11%	19%
Stanislaus	392,058	421,946	469,969	14%	8%	11%	20%
Tulare	327,882	355,938	378,477	11%	9%	6%	15%

Source: Applied Development Economics, based on data from California Department of Finance

Regional Economic Trends

Economic development practitioners and planners have traditionally divided economies into two broad industrial categories—the economic base and local support industries. Economic base industries are the drivers of local and regional economies in that these industries draw income into a local economy by selling products outside of the local economy, much like the export industries of a national economy. Accrued earnings then circulate throughout the local area in the form of wages and salaries, investments, purchases of fixed assets, and goods and services, generating more jobs and wealth.

The economic base is typically comprised of industries within the manufacturing, minerals-resource extraction, and agricultural sectors. There are also the "local support industries" such as retail or service sectors, the progress of which is a function of the economic base and demographic changes, and more so the latter than the former. As population increases in a given area, demand for services–such as realtors, teachers, and healthcare–increases, as does demand for basic retail items like groceries, gas for commuting, or clothing at the local apparel shops.

Agriculture continues to serve as the economic base of the San Joaquin Valley region, exporting goods and produce throughout the nation and the globe. Fourteen percent of all workers in the region are employed by industries within agriculture, as Table 2 shows. However, in 1997 the proportion of workers in agriculture was 19 percent. In fact, over the five year period between 1997 and 2002, employment in agriculture declined by 25 percent.

Between 1997 and 2002, local support industries gained in prominence within the San Joaquin Valley region. The service sector employed the most workers as a proportion of total employment in the region. As Table 2 shows, the service sector is the largest employment sector in the region, at 250,640 or 21 percent of all jobs. In 1997, services also represented 19 percent of all jobs. Between 1997 and 2002, the proportion of people employed in the services-based sector surpassed the proportion employed by agriculture, the other major sector, which today is a clear second to services. In 1997, these two sectors were in a virtual tie in terms of their respective share of private sector jobs.

Local support industries of construction, retail and F.I.R.E. (finance, insurance, and real estate) increased by 46 percent, 14 percent, and 11 percent, respectively, between 1997 and 2002. Increases in employment in these industries are consistent with the growth in population in the region.

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TABLE 2
Employment Profile Of The San Joaquin Valley Region
1997 – 2002

MAJOR SECTORS	San Joaquin Valley Region Employment 1997	San Joaquin Valley Region Employment 2002	San Joaquin Valley Region Employment Distribution 2002	San Joaquin Valley Region Percent Change 1997 to 2002	California Employment Distribution 2002	California Percent Change 1997 to 2002
Agriculture	209,733	158,278	14%	-25%	2%	-24%
Mining	10,252	9,381	0.8%	-8%	0.2%	-19%
Construction	41,579	60,520	5%	46%	5%	36%
Manufacturing	115,667	109,280	9%	-6%	12%	-7%
Transportation/Communication/Utilities	45,391	49,400	4%	9%	5%	7%
Wholesale	43,738	44,760	4%	2%	5%	4%
Retail	175,901	200,865	17%	14%	18%	17%
Finance, Insurance and Real Estate	39,273	43,560	4%	11%	6%	12%
Services	211,479	250,640	21%	19%	31%	16%
Government	204,754	240,854	21%	18%	16%	17%
Total Employment	**1,097,767**	**1,167,538**	**100%**	**6%**	**100%**	**11%**

Source: Applied Development Economics, based on data from Minnesota IMPLAN Group and California Employment Development Department LMID

The emergence of local support industries in the San Joaquin Valley region mirrors statewide trends, as Table 2 shows. Statewide, retail, construction, and services grew by 17 percent, 36 percent, and 16 percent, respectively, between 1997 and 2002. Between 1997 and 2002, total employment in the San Joaquin Valley region increased by six percent. Total employment in California grew by 11 percent, which, while positive, was somewhat behind the 1995-2000 statewide total employment growth rate of 18 percent. In summary, the San Joaquin Valley region's economy has become more diverse, with the growth occurring within population-driven local support industries rather than the export-focused economic base industries of manufacturing and agriculture.

5.2 COTTON INDUSTRY TRENDS

Cotton is a unique crop in that it is both food and fiber.[4] According to the California Cotton Ginners and Growers Association, California's San Joaquin Valley cotton—characterized by long, strong fibers—is among the highest quality in the world. Among US grown varieties, California's Acala and Pima cottons are preferred for fine fabrics and used in high quality table linens, sheets, bath towels, and dress shirts, among other fabric products. Approximately 85 percent of all cotton is exported to other countries.[5]

This section of the report provides an overview of economic trends of the cotton industry in the state, nation, and world, placing the data and analysis in the following sections into a larger context. As Table 3 shows, in 2002 California cotton growers produced approximately 2.2 million bales, about 13 percent of all cotton produced in the nation. In the nation, cotton growers produced 17.2 million bales in 2002, compared to 88 million bales worldwide.

[4] Cottonseed is used as a supplement for dairy feed and is also processed into oil. Cotton fibers are used in heavy industry to produce fine fabrics. [Ca. Cotton Ginner and Growers Assoc. (//www.ccgga.org/cotton_information/cotton.html)]

[5] Ca. Cotton Ginners and Growers Assoc (//www.ccgga.org/cotton_information/cotton.html)

TABLE 3
Cotton Production Trends: US and World
Unit : 480 Lbs. Bale
1992 - 2002

CA	CA Production (million)	US Production (million)	World Production (million)
1992	3.1	16.2	82.3
1997	2.6	18.8	92.0
2002	2.2	17.2	88.0
'92-'02	-29%	6%	7%

Source: Applied Development Economics based on data from the USDA Economic Research Service

Table 3 also shows that cotton production in California declined between 1992 and 2002, from 3.1 million bales in 1992 to 2.6 million in 1997, and from the 1997 amount to the 2002 figure of 2.2 million bales. This represents 29 percent decline between 1992 and 2002. For the nation and world, cotton production increased during the ten-year period, growing by six and seven percent, respectively.

Table 4 presents data on the price of cotton on a per pound basis. Figures are adjusted for inflation. As the table shows, the price per pound of California cotton declined by 19 percent between 1992 and 2002. The value of cotton grown by growers throughout the nation declined even more precipitously, dropping by 61 percent. Perhaps the quality of California's cotton prevented this commodity from dropping in value as precipitously as the value of cotton grown throughout the nation. The value of American cotton sold in European markets also declined, going from $0.85 per pound in 1992 to $0.56 per pound in 2002.

TABLE 4
Cotton Price Trends: US and World
Unit: Price Per Pound
1992 - 2002

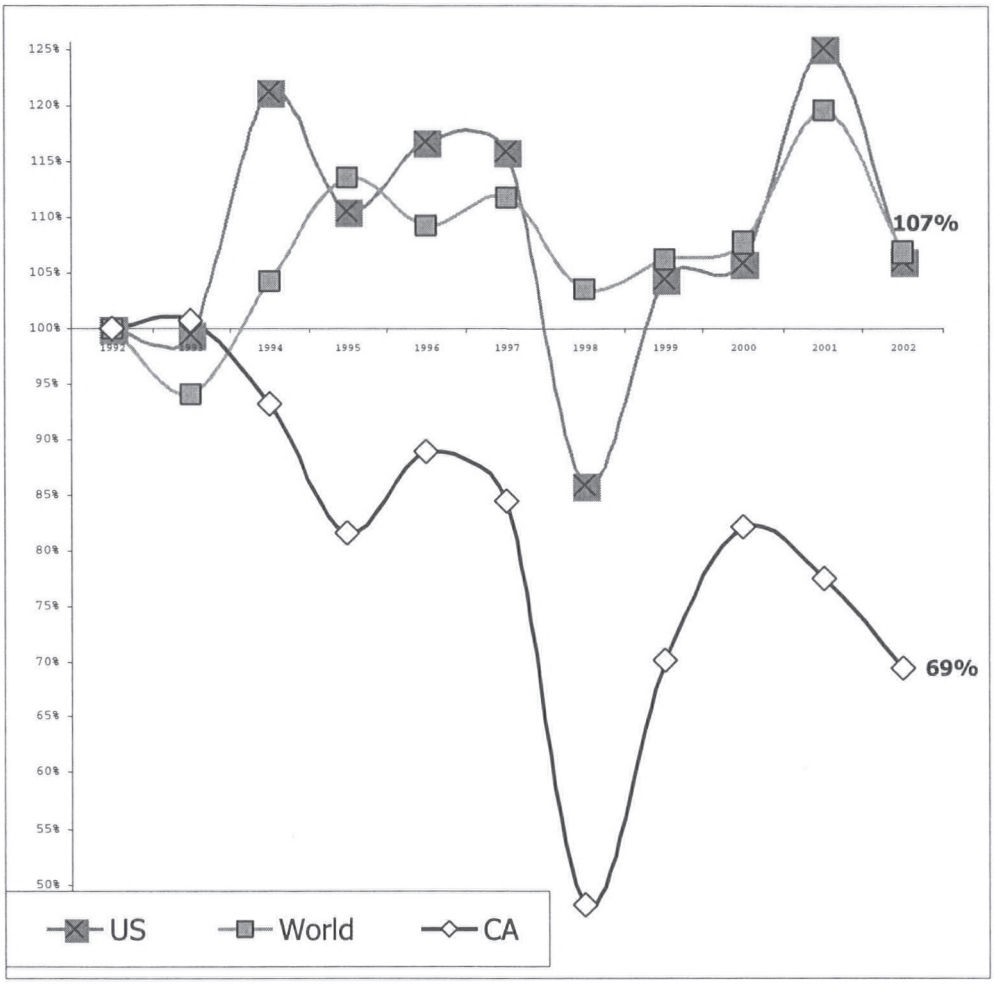
Year	CA Cotton	US Cotton	US Cotton in Europe
1992	$0.93	$0.82	$0.85
1997	$0.92	$0.83	$0.85
2002	$0.75	$0.32	$0.56
'92-'02	-19%	-61%	-34%

Source: Applied Development Economics, based on data from the USDA Economic Research Service

The overall decline in value may be attributable to a number of factors, especially the global nature of the cotton industry. Since 85 percent of California's cotton is sold overseas, California cotton growers are especially affected by global competition. A combination of increased world supply, currency exchange rate differences, and factors related to the World Trade Organization (WTO) could make cotton grown in California and the nation less competitive in world markets, in turn forcing lower prices on cotton growers.

Figure 2 tracks cotton production on an annual basis, comparing production in a given year against the amount of cotton produced in 1992. This figure shows that California growers today produce approximately 69 percent of what they did in 1992. More importantly, the trajectory of output for California growers describes a downward path each year after 1992—meaning that compared to 1992, California growers have been producing less and less cotton from one year to the next. By contrast, cotton growers in the nation and world, produced cotton in excess of the 1992 baseline amount in most years after 1992, as Figure 2 shows.

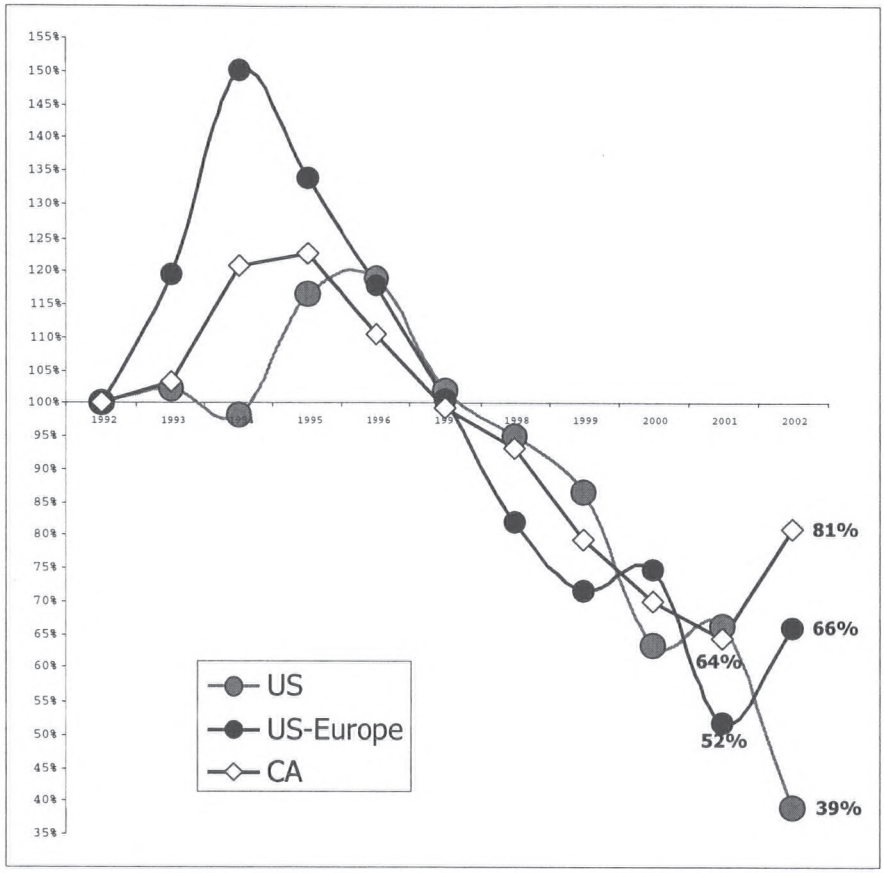
FIGURE 2
Cotton Production Trends Index: California, US, and World
Annual Comparison Against 1992 Baseline
1992 – 2002



Source: Applied Development Economics, based on data from the USDA Economic Research Service

In 1992, the value of California cotton, in inflation-adjusted dollars, was $0.93 per pound, compared to $0.75 per pound in 2002. Since reaching its high-point in 1994 and 1995, the trajectory of cotton prices has taken a downward path each year after 1995, meaning that compared to the 1992 baseline price, growers received less value per pound in inflation-adjusted dollars from one year to the next. It is worth noting that the value for both California cotton in general and US cotton sold in Europe have inched upward slightly between 2001 and 2002. In 2001, the price of California cotton was 64 percent of what it was in 1992, whereas in 2002 it was 81 percent of the 1992 price. In 2001, the value of US cotton sold in Europe was 52 percent of the 1992 price, whereas a year later, in 2002, the value improved to 66 percent of the 1992 figure.

FIGURE 3
Cotton Price Trends Index: California, US, and World
Annual Comparison Against 1992 Baseline (Inflation-adjusted)
1992 – 2002



Source: Applied Development Economics, based on data from the USDA Economic Research Service

In summary, cotton growers in the nation and the world are producing more cotton now than they did in 1992, and since 1992 their respective output trend has been toward increasing the supply of cotton on the world market. Unlike their counterparts across the nation and world, California cotton growers have produced less and less cotton since 1992. At the same time, the value of cotton on a per pound basis in inflation-adjusted dollars has declined considerably for all growers.

5.3 DESCRIPTION OF AFFECTED INDUSTRIES

Draft Rule 4204 would affect primarily two industries—cotton ginning facilities and cotton growers. The analysis below is based on data for the year 2002, the most current data available. The data comes from sources such as the Minnesota IMPLAN Group (MIG), the California Employment Development Department/ Labor Market Information Division, the US Census 1997 Agricultural Census, and the 2002 Agricultural Census. In estimating revenues for cotton ginning facilities, the consultant relied on reports produced by the UC Cooperative Extension, checking findings against revenue estimates derived from Dun and Bradstreet.

Table 5 identifies economic trends for cotton ginning sources subject to the new rule, and it provides a comparison between two points in time—1997 and 2002. As Table 5 shows, overall employment in affected cotton gins in the region decreased by 10 percent during the five-year period—from 880 to 796 jobs. Statewide, employment in the cotton ginning industry decreased by 25 percent.

As Table 6 shows, employment in the affected cotton gins in the region comprises less than one percent of all jobs in the region. In other words, of the approximately 1,160,313 public and private sector jobs in the region, 0.1 percent–or 796–are in cotton gins affected by Draft Rule 4204. While the 796 workers are a small fraction of all workers in the region, these workers represent practically all cotton ginning workers in the State. Approximately 96 percent of all cotton ginning workers are employed by cotton gins operating in the San Joaquin Valley Air Basin, as Table 6 shows.

TABLE 5
Employment In Affected Sources Subject to Draft Rule 4204: the San Joaquin Valley Region and California Cotton Gins: 1997 – 2002

		San Joaquin Valley Region			California		
Industry	SIC	Employment 1997	Employment 2002	Employment Change, 97-02	Employment 1997	Employment 2002 (est)	Employment Change, 97-02
Cotton ginning	0724	880	796	-10%	1,106	829	-25%

Source: Applied Development Economics, based on data from Minnesota IMPLAN Group and California EDD

TABLE 6
Comparison of Employment In Affected Sources Versus the Region and State 1997 – 2002

Industry	SIC	SJV Employment 2002	State Employment 2002 (est)	Affected Industries As % of Total California Employment (n = 12,388,691)	Affected Industries As % of Total Regional Employment (n = 1,160,313)	Affected Industries As % of California Employment In Same Industries
Cotton ginning	0724	796	829	0.01%	0.10%	96%

Source: Applied Development Economics, based on data from Minnesota IMPLAN Group and California EDD

Table 7 identifies economic trends for cotton farms operating in the San Joaquin Valley Air Basin. As this table shows, overall employment on cotton farms in the region decreased by an estimated 29 percent between 1997 and 2002—from 6,421 to 4,537 jobs.[6] Statewide, employment on cotton farms decreased by 25 percent during the same time period, as Table 7 shows.

As Table 8 shows, affected cotton growers in the region employ less than one percent of all workers in the region. In other words, of the approximately 1,160,313 public and private sector jobs in the region, 0.39 percent–or 4,537–are on cotton farms affected by Draft Rule 4204. While the 4,537 jobs are a small fraction of all jobs in the region, these jobs represent practically all cotton farm jobs in the State. Approximately 85 percent of all cotton farm jobs in the state work on cotton farms operating in the San Joaquin Valley Air Basin, as Table 8 shows.

[6] The employment data comes from the Minnesota IMPLAN Group and the California EDD, whose data, in turn, comes from a near universal count of employment derived from unemployment insurance tax records collected by the state and federal governments. This dataset is known as "ES202" of the US Bureau of Labor Statistics. The ES202 dataset are for workers who earn wages and salaries, and are collected on a "place of work" basis, meaning that self-employed, unpaid family workers, and private household employees are not included in the ES202 dataset.

TABLE 7
Employment In Affected Sources Subject to Draft Rule 4204: the San Joaquin Valley Region and California
Cotton Growers: 1997 – 2002

		San Joaquin Valley Region			California		
Industry	SIC	Employment 1997	Employment 2002 (est)	Employment Change, 97-02	Employment 1997	Employment 2002 (est)	Employment Change, 97-02
Cotton growers	0131	6,421	4,537	-29%	7,037	5,309	-25%

Source: Applied Development Economics, based on data from Minnesota IMPLAN Group and California EDD.

TABLE 8
Comparison of Employment In Cotton Farms Versus the Region and State
1997 – 2002

Industry	SIC	SJV Employment 2002 (est)	State Employment 2002 (est)	Affected Industries As % of Total California Employment (n = 12,388,691)	Affected Industries As % of Total Regional Employment (n = 1,160,313)	Affected Industries As % of California Employment In Same Industries
Cotton growers	0131	4,537	5,309	0.04%	0.39%	85%

Source: Applied Development Economics, based on data from Minnesota IMPLAN Group and California EDD

5.3.1 CHARACTERISTICS OF COTTON GINNING INDUSTRIES AFFECTED BY DRAFT RULE 4204

Table 9 identifies the economic characteristics of the cotton ginning industry in the San Joaquin Valley region. This table shows that 41 establishments employ 796 workers. In total, the affected industry has an estimated aggregate payroll of $21.2 million.

Cotton growers do not actually pay a dollar amount to cotton ginning facilities. Typically, cotton growers let gins keep the seeds that are produced via the cotton ginning process. As Table 10 shows, the value of the seed is approximately $118.35 per acre. Given the availability of data on the amount of acreage devoted to cotton production, we can estimate the aggregate value of seeds transferred from growers to cotton ginning facilities.

TABLE 9
Economic Characteristics of Cotton Ginning Industry
in San Joaquin Valley Air Basin, 2002

Industry	SIC	Sources	Employment	Aggregate Wages
Cotton ginning	0724	41	796	$21,126,532

Source: ADE, based on data from SJVUPACD and Minnesota IMPLAN Group

TABLE 10
Revenue to Cotton Ginning Facilities, 2002

	Seed Value ($ per acre)	Compressing Lint ($ per bale)
Organic Cotton (No. San Joaquin Valley)	$110.26	
30-inch Row Acala (San Joaquin Valley)	$126.44	$8.18
40-inch Row Acala (San Joaquin Valley)	$126.44	$8.18
Pima Varieties (San Joaquin Valley)	$126.44	$8.18
Transgenic, Herb-resistant (San Joaquin Valley)	$63.22	
Cotton (Sacramento Valley)	$107.00	
Industry Average	$109.97	$8.18
Industry Median	**$118.35**	**$8.18**

Source: Applied Development Economics, based on data from the UC Cooperative Extension Service

Cotton ginning facilities, in turn, sell the cottonseed—which can be put to a variety of uses, such as fertilizer, livestock feed and as oil that is used in a variety of foods for human consumption. Of the approximately 850,000 tons of cottonseed produced annually in California, nearly all–or 95 percent– is fed to dairy cattle. Much of the remainder is used to plant the next season's crop.[7] In addition to generating revenues via cottonseeds, ginning facilities also charge a fee to bale cotton, which is approximately $8.18 per bale.

5.3.2 CHARACTERISTICS OF COTTON GROWERS AFFECTED BY DRAFT RULE 4204

According to the 2002 Agricultural Census, there are 1,289 cotton growers in the San Joaquin Valley Air Basin (SJVAB). These farms harvest cotton on 640,078 acres, for an average farm size of 497 acres. However, 50 percent of the farms are 269 acres or less. Table 11 provides background information on cotton growers in the SJVAB. Between 1997 and 2002, the number of cotton growers declined from 1,732 to 1,289, or by 26 percent. The decline in the number of cotton growers occurred across the board. The decline in the number of growers of less than 24 acres was as pronounced as the decline in the number of growers over 500 acres.

TABLE 11
Distribution Of Cotton Growers By Size of Farms, 1997 - 2002

Size Categories	SJVAB Cotton Growers 1997		SJVAB Cotton Growers 2002		Change 1997 - 2002	
SUM	**1,732**		**1,289**		**-443**	**-26%**
1 to 24 acres	70	4%	46	4%	-24	-34%
25 to 99 acres	282	16%	207	16%	-75	-27%
100 to 249 acres	403	23%	348	27%	-55	-14%
250 to 499 acres	417	24%	328	25%	-89	-21%
500 acres or more	560	32%	360	28%	-200	-36%
Average	580		497			
Median	286		269			

Compiled by: Applied Development Economics, based on data from 1997 Ag. Census and 2002 Ag Census

[7] http://www.calcot.com/ourcotton.asp?flag=ourcotton

6. SOCIOECONOMIC IMPACTS

Ownership of many cotton ginning facilities in the San Joaquin Valley is consistent with the arrangement in the rest of the United States, whereby growers are members of cooperatives that operate these facilities. In cases when gins are not functioning as cooperatives, growers run these facilities as an integral part of their cotton farming business, thus shouldering the expenses of its operation and maintenance. In both cases, the ginning operation provides a service and is not operated as a separate business for profit. For cooperatively organized gins, any money left after paying for business expenses are returned to grower members in proportion to the amount of business that was done with the cotton ginning facility.

The growers who operate cotton gins, whether organized cooperatively or not, ultimately bear the full impact of the compliance costs. The impact can be looked at in two different ways: one way is to consider the cooperatively-organized gin separately, in terms of ginning costs and returns, and the other way is to directly analyze the impact in terms of grower costs and returns, with the ginning facility as an integral part of producing marketable bales of cotton lint, from growing to ginning.

6.1 COMPLIANCE COST ESTIMATES

The District cost estimates are based in part on data provided by the affected sources and in part on District analysis. The District's cost of compliance analysis indicates that, overall, the affected industry would incur $1.8 million in annual costs, as shown in Table 12. This table groups cotton ginning facilities subject to Draft Rule 4204 according to their current control devices that have to be retrofitted. The groupings are as follows:

Group A: Facilities with a mix of screen baskets and slot skimmers, 2D-2D cyclones, and standard 1D-3D cyclones

Group B: Facilities with a mix of 2D-2D cyclones and standard 1D-3D cyclones

Group C: Facilities with only standard 1D-3D cyclones

As Table 12 shows, under the original cost allocation a greater amount of costs will be borne per facility in Group A. Cotton ginning facilities in Group A stated that their facilities would face serious economic hardship unless the cost was spread over a longer period. Taking this into consideration, District staff included a cost scenario in which costs borne by Group A ginning facilities are extended over a longer period of time.

TABLE 12
Annual Cost of Compliance

Industry	Group	Facilities	District Estimate (original)	District Estimate (extended)
Cotton ginning	Group A	10	$647,820	$400,041
	Group B	19	$433,826	$433,826
	Group C	36	$726,516	$726,516
			$1,808,162	$1,560,383

Source: San Joaquin Valley Unified Air Pollution Control District

6.2 BUSINESS RESPONSES TO COMPLIANCE COSTS

Cotton ginning sources impacted by the draft rule may respond in a variety of ways when faced with new regulatory costs. These responses may range from simply absorbing the costs and accepting a lower rate of return to shutting down the business operation altogether. Sources may also seek to pass the costs on to cotton growers, or they may renew efforts to increase productivity and reduce costs elsewhere in their operation in order to recoup the regulatory costs and maintain profit levels.

These options were discussed with the businesses that participated in the Focus Group session in May 2004. While some affected sources said they could attempt to absorb the costs if they are not substantial, agricultural representatives in attendance voiced concern, pointing out that the agricultural sector in general is what is referred to as a "price taker." In other words, commodities such as cotton and ginned cotton are established in the global marketplace and, as such, there is little room for scaling the price upwards to accommodate regulatory costs associated with Draft Rule 4204. According to the California Cotton Ginning and Growers Association, approximately 85% of all California cotton is exported.[8]

6.3 OVERVIEW OF NET INCOME, PROFIT RATIOS AND IMPACT ANALYSES

In calculating net income, profit ratios, and industry profits, ADE employed the following methodology and relied on the following sources of information. Net income is the difference between gross revenues and costs.[9] Also known as rate of return, profit ratio is the ratio between net income and gross revenues.[10] The first document ADE reviewed was the California Department of Food and Agriculture's 2002 Resource Directory, "California Agriculture: A Tradition of Innovation." This document yielded information on revenues, costs and net income for the agricultural sector as a whole. Based on information in the Department of Food and Agriculture's "California Agriculture", ADE estimated that California's agricultural sector experienced an annual rate of return of 19 percent between 1997 and 2002. ADE also reviewed publications of the University of California Cooperative Extension to obtain gross revenue and net income figures for a variety of types of cotton. With this information, ADE was able to calculate profit ratios for the cotton industry. ADE identified various rates of return for different types of cotton. This information served as the basis for the rate of return employed in this report for purposes of analysis, or 10.3 percent.

Using the cost estimates developed by the District and affected stakeholder industries, ADE calculated the socioeconomic impacts of the proposed Draft Rule 4204. In particular, we compared cost estimates against industry profits. ADE calculated industry profits by multiplying cotton industry profit ratios against aggregate revenues generated by the cotton industry.[11]

The businesses' responses to increased compliance costs hinge on the effect of the costs on the profits generated by the affected sources. An impact on estimated profits greater than 10 percent implies that the source would experience serious economic effects because of the compliance cost. When compliance costs are greater than 10 percent of estimated profits, companies typically respond to the impact by laying off some workers, closing parts of manufacturing or agricultural facilities or, in the most drastic case, possibly closing the affected facilities.

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[8] http://www.ccgga.org/cotton_information/cotton.html

[9] net income = (gross revenues per acre $_{\text{cotton type "a"}}$) − (cost per acre $_{\text{cotton type "a"}}$)

[10] profit ratio (i.e. rate of return) = (net income per acre $_{\text{cotton type "a"}}$) / (gross revenues per acre $_{\text{cotton type "a"}}$)

[11] cotton industry profits = (profit ratio $_{\text{cotton industry average}}$) x (aggregate revenues $_{\text{cotton only}}$)

TABLE 13
Rate of Return for Cotton Industry

	Gross Rev. Per Acre	Total Cost Per Acre	Rate of Return
Organic Cotton (No. San Joaquin Valley)	$970	$872	10.1%
30-inch Row Acala (San Joaquin Valley)	$1,033	$884	14.4%
40-inch Row Acala (San Joaquin Valley)	$969	$920	5.1%
Pima Varieties (San Joaquin Valley)	$1,070	$942	12.0%
Transgenic, Herb-resistant (San Joaquin Valley)	$969	$917	5.4%
Cotton (Sacramento Valley)	$1,111	$996	10.4%
Cotton (Riverside County)	$930	$834	10.3%
Industry Average			9.7%
Industry Median			10.3%

Source: Applied Development Economics, based on data from the UC Cooperative Extension Service.

6.4 IMPACTS ON COTTON GROWERS

Table 14 describes the economic characteristic of the cotton growing industry, as well as the socioeconomic impacts of Draft Rule 4204 on cotton growers. Cotton growers generated $728 million in value in 2002 and, from this amount, they generated an estimated return of $75 million.[12] As previously mentioned, cotton growers ultimately bear the full impact of the compliance costs, whether in the form of reduced share of the cooperatives' returns or as increased expenditures to keep operating the ginning facility. As shown on Table 14, the compliance costs amount to 2.1 percent to 2.4 percent of grower returns. Analyzed as belonging to the three compliance groups, growers in group A incur compliance cost which is 3.5 percent to 5.6 percent of profits, and growers belonging to Groups B and C bear compliance costs which are, respectively, 2.0 percent and 1.7 percent of profits. Thus, Draft Rule 4204 will not impact cotton growers in a significant manner, since the compliance cost of the rule as a percent of profits is below the threshold of significance.

[12] Cotton value of $728 million is for pima, uplands, and unspecified lint, and excludes the value of cotton seed and cotton seed planting (Source: Ca. Ag. Stat. Svcs., County Agricultural Commissioners' Data [www.nass.usda.gov/ca/bul/agcom/indexcac.htm])

TABLE 14
Socioeconomic Impact of New Draft Rule 4204 On Cotton Growers, 2002

Cotton Growers (Farms)	Acreage	Total Value (Cotton only)	Returns	Original Amount Passed On to Growers	Original Amount As Percent of Grower Returns	Extended Compliance Deadline Amount Passed On to Growers	Extended Amount As Percent of Grower Returns
1,289	**640,078**	**$728,446,500**	**75,194,477**	**$1,808,162**	**2.4%**	**$1,560,383**	**2.1%**
Group A	98,474	$112,068,692	$11,568,381	$647,820	5.6%	$400,041	3.5%
Group B	187,100	$212,930,515	$21,979,924	$433,826	2.0%	$433,826	2.0%
Group 3	354,504	$403,447,292	$41,646,172	$726,516	1.7%	$726,516	1.7%

Source: Applied Development Economics, based on data from SJVUAPCD, 2002 Ag. Census, and California Ag. Commissioners' Annual Report

6.5 IMPACT ON SMALL BUSINESSES AND SMALL FARMS

In addition to analyzing the employment impacts of Draft Rule 4204, state legislation requires that the socioeconomic analysis assess whether small businesses are disproportionately affected by air quality rules. First, this section profiles the affected cotton ginners and growers by size categories. Second, this section briefly summarizes how the federal government defines small farms for the purposes of qualifying certain businesses for various farm-related programs. Finally, this section concludes with a discussion as to whether the affected industries are disproportionately impacted by Draft Rule 4204.

According to the California Cotton Ginning Association, the cotton ginning industry has undergone a process of industrial rationalization over a period of several decades, whereby small cotton ginning facilities have been consolidated into larger and larger concerns. In 1963, there were 299 active cotton gins in California, the highest ever. In 2001-2002, there were 65 active gins (of the 77 gins with District permits to operate, 12 were dormant). As the California Cotton Ginners Association states, "Although the numbers are declining, the capacities and efficiencies of the remaining facilities are being increased accordingly."[13] Since cotton ginning facilities are not small businesses, the state requirement to analyze small businesses does not apply.

According to the District, the SJVAB is home to 41 cotton ginning facilities operating approximately 65 cotton gins, which had a combined production of 2.1 million bales during the 2001-2002 season. Thus, on average a cotton gin will produce approximately 25,300 bales of cotton. As Table 15 shows, the bulk of cotton gins produce between 10,000 and 42,500 bales per year. Small cotton gins producing less than 10,000 bales represent only six percent of cotton gins, or five gins.

[13] http://www.ccgga.org/cotton_information/calif_cotton.html

TABLE 15
Distribution of Cotton Ginning Facilities By Capacity

Average Yearly Production In Bales	Nos. of Cotton Gins	Distribution
<10,000	5	6%
10,000 - 42,500	45	58%
>42,500	15	19%
Dormant	12	16%
TOTAL	77	
Average Bales Per Cotton Gin	25,300	
Median Bales Per Cotton Gin	33,910	

Source: San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Permits Database

In the same way that cotton ginning sources tend to be large businesses, cotton growers tend to be large-sized farms. As Table 11 showed (see page 21), cotton growers in the San Joaquin Valley work on relatively large areas of land. The average size of cotton farm is 497 acres, while the median size is 296 acres. By comparison, according to the Agricultural Census, farms in general in the Central Valley are, on average, 194 acres, versus the average size of farms across the state of 154 acres. The median size of farms in general is less than 25 acres in the SJVAB and the State as a whole.

Definition Of A Small Farm

According to the United States Department of Agriculture (USDA), a small farm is any farm that earns less than $250,000 in sales.[14] Until the late 1990s, the threshold was $100,000—farms selling less than this amount were, by definition, small farms.[15] Although not a part of how the federal government currently defines small farms, the Food and Agricultural Act of 1977 employed a more stringent definition of small farms for the purpose of qualifying farms for particular programs related to that legislation, calling small farms any farms that earn less than $20,000 in sales.[16]

Table 16 compares average revenues per cotton grower by specific farm size categories. Based on the definition of small farms, cotton growers smaller than 100 acres tend to be small farms. The typical cotton grower that is smaller than 100 acres will generate, on average, $59,243 in cotton revenues, which is below the $250,000 threshold. The typical cotton grower who harvests cotton on land between 100 and 249 acres will generate, on average, $266,352 in cotton revenues, which is above the $250,000 threshold. Thus, cotton growers harvesting cotton on at least 100 acres are not small farms.

[14]Dan Looker and Cheryl Tevis, "Not so small or insignificant. (National Commission on Small Farms report)," Successful Farming, March 15, 1998 (http://www.findarticles.com/ cf_dls/ m1204/ n5_v96/ 20510331/ p5/ article.jhtml?term=)

[15]University of California Cooperative Extension, "Family Farms in Fresno California" Miolinar and Yang, December, 2000 (http://ucce.ucdavis.edu/files/filelibrary/742/4900.pdf)

[16] Cheryl J. Steel, "Why US Agriculture and Rural Areas Have A Stake in Small Farms" (Rural Development perspective, vol. 12 number 2, 1997) (http://www.ers.usda.gov/publications/rdp/rdp0297/rdp0297e.pdf)

TABLE 16
Distribution Of Cotton Growers By Size of Farm and Value
2002

Size Categories	Cotton Growers	Cotton Acreage	Total Value (Cotton only)	Average Value
SUM	1,289	656,106	$728,446,500	$565,125
1 to 24 acres	46	565	$627,560	$13,643
25 to 99 acres	207	11,045	$12,263,288	$59,243
100 to 249 acres	348	83,486	$92,690,626	$266,352
250 to 499 acres	328	108,194	$120,123,028	$366,229
500 acres or more	360	452,815	$502,741,999	$1,396,506

Source: Applied Development Economics, based on 2002 Ag. Census

Small Grower Impact Analysis

Since the large capitalization of building and operating a cotton gin precludes its ownership by growers with relatively small acreages, small farms are likely to be part of ginning cooperatives. In cooperative ownership of cotton gins, cost and remittances are distributed in proportion to the business that members conduct with the ginning facility. The business that growers conduct with gins is dependent on their harvest, which, in turn, directly depends on their acreage. In this way, small farms are not disproportionately affected since compliance costs are passed on to growers based on the same proportional method for allocating compliance costs to larger farm operations. Table 12 above showed that annual compliance costs amounting from $1.6 million to $1.8 million represent from 2.1 to 2.4% of growers' annual profits.

6.6 IMPACT ON CONTROL EQUIPMENT MANUFACTURERS

There are cases in environmental regulation when a portion of the compliance costs represents a transfer from one industry sector to another within the same region. Such is the case with proposed Rule 4204, in which affected stakeholders in the San Joaquin Valley use the services of two valley-based, metal works companies for engineering, fabrication, and installation of PM10 emission control systems. The representatives of both companies have consistently participated in Rule 4204 workshops, specifically assisting the stakeholders in providing compliance cost data that were used for this socioeconomic analysis. The retrofit requirements of Rule 4204 will spur increases in manufacturing activity of the metal fabrication industry within the San Joaquin Valley, thereby offsetting some potentially negative regional impacts emanating from the compliance costs borne by the cotton industry.

TABLE 17
Total Cost of Compliance

Industry	Group	Facilities	District Estimate (original)	District Estimate (extended)
Cotton ginning	A-B-C	65	$10,748,200	$9,364156

Source: San Joaquin Valley Unified Air Pollution Control District

Based on the figures in Table 17, ADE calculated the number of jobs created as a result of the economic transactions occurring in either the "original compliance schedule" or the "extended compliance schedule." In calculating the number of jobs created, ADE used multiplier-effect estimates calculated by the IMPLAN Input-Output model, and these estimates were adjusted for the eight county District region. In addition, the purchases would occur over a three-year period, even though the cotton growers may finance the purchases over a longer period of time. Therefore, the impact to the sheet metal industry is limited to the three years during which the additional equipment would be manufactured and sold.

The sale of $10.7 million worth of equipment to affected sources in the "original compliance schedule" will directly result in 10-11 new jobs, while the $9.4 million cost associated with the "extended compliance schedule" would support 9-10 new jobs during the three year period. This direct employment would have indirect multiplier effects as well, supporting approximately 15-16 indirect and induced jobs. However, as with the direct employment in the sheet metal industries, these jobs would be temporary. These temporary job gains would likely occur against a backdrop of continued consolidation and job reductions in the cotton industry. As noted in Table 7 above, over the past five years the industry has lost more than 300 jobs per year. While not the result of air quality compliance costs, these jobs losses certainly have affected the San Joaquin Valley economy.

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