

# SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

## **Final Socioeconomic Report For Proposed Amended Rule 1156—Further Emission Reductions from Aggregate and Cement Manufacturing**

**March 2009**

### **Deputy Executive Officer**

Planning, Rule Development and Area Sources  
Elaine Chang, DrPH

### **Assistant Deputy Executive Officer**

Planning, Rule Development and Area Sources  
Laki Tisopulos, Ph.D., P.E.

### **Director, Strategic Initiatives**

Planning, Rule Development and Area Sources  
Jill Whynot

---

**Author:** Shah Dabirian, Air Quality Specialist  
**Technical Assistance:** Tuyet-Le Pham, Air Quality Specialist  
**Reviewed By:** Sue Lieu, Program Supervisor  
Tracy A Goss, P.E, Program Supervisor  
Barbara Baird, District Counsel  
Ruby Fernandez, Deputy District Counsel I

**SOUTH COAST AIR QUALITY  
MANAGEMENT DISTRICT  
GOVERNING BOARD**

Chairman: WILLIAM A. BURKE, Ed.D.  
Speaker of the Assembly Appointee

Vice Chairman: S. ROY WILSON, Ed.D.  
Supervisor, Fourth District  
Riverside County Representative

**MEMBERS:**

MICHAEL D. ANTONOVICH  
Supervisor, Fifth District  
Los Angeles County Representative

MICHAEL A. CACCIOTTI  
Mayor, City of South Pasadena  
Cities of Los Angeles County, Eastern Region

BILL CAMPBELL  
Supervisor, Third District  
Orange County Representative

JANE W. CARNEY  
Senate Rules Committee Appointee

JOSIE GONZALES  
Supervisor, Fifth District  
San Bernardino County Representative

RONALD O. LOVERIDGE  
Mayor, City of Riverside  
Cities Representative, Riverside County

JOSEPH K. LYOU, Ph.D.  
Governor's Appointee

JAN PERRY  
Councilmember, Ninth District  
City of Los Angeles

MIGUEL PULIDO  
Mayor, City of Santa Ana  
Cities Representative, Orange County

TONIA REYES URANGA  
Councilmember, City of Long Beach  
Cities Representative, Los Angeles County, Western Region

DENNIS YATES  
Mayor, City of Chino  
Cities of San Bernardino County Representative

**EXECUTIVE OFFICER:**  
BARRY R. WALLERSTEIN, D.Env.

**EXECUTIVE SUMMARY**

The proposed amendments to Rule 1156—Further Emission Reductions from Aggregate and Cement Manufacturing—would reduce particulate matter (PM10), as well as hexavalent chromium emissions from cement manufacturing facilities. A socioeconomic assessment was conducted for the proposed amendments and a summary of the assessment and findings is presented below.

<p><b>Elements of the Proposed Amendments</b></p>	<p>Proposed Amended Rule (PAR 1156) would reduce particulate matter from clinker material storage and handling. PAR 1156 would also require ambient monitoring and sampling for hexavalent chromium and monitoring for wind speed and wind direction. PM10 ambient monitoring is only required if Rule 403 PM10 levels are violated three times within a 36-month period. Lastly, PAR 1156 requires submittal of a compliance monitoring plan.</p> <p>PAR 1156 would reduce particulate emissions from cement manufacturers by approximately 0.09 tons of total particulate matter (PM) and 0.04 tons of particulate mater (PM10) per day.</p>
<p><b>Affected Facilities</b></p>	<p>PAR 1156 will affect only two cement manufacturers. One is located in Riverside County and the other is in San Bernardino County. Both facilities belong to the industry of cement manufacturing.</p>
<p><b>Assumptions of Analysis</b></p>	<p>It is assumed that one of the two affected facilities would use wind fences and tarps for its active clinker piles to comply with the proposed amendments. Each of the two affected facilities is expected to install three pieces of ambient monitoring equipment for hexavalent chromium. For the purpose of this analysis, it is assumed that another three pieces of monitoring equipment for PM10 would be required for both facilities. Each facility is also expected to install one wind monitoring station, and submit a one-time compliance monitoring plan.</p> <p>Each facility is also assumed to conduct 122 sample analyses per year for hexavalent chromium (one sample every three days).</p>
<p><b>Compliance Costs</b></p>	<p>The average annual cost of the proposed amendments is estimated to be \$0.282 million between 2010 and 2025. The total present value of capital and operating and maintenance costs of PAR 1156 at real interest rate of four percent over 20 years period is estimated to be \$3.9 million. The overall cost-effectiveness of PAR 1156 is estimated at \$6,000 per ton of PM reduced and \$13,000 per ton of PM10 reduced.</p>

<p><b>Employment and Other Socioeconomic Impacts</b></p>	<p>The secondary and induced impacts (i.e. jobs) of PAR 1156 are analyzed using the Regional Economic Models, Inc. (REMI) model, which includes published historical (until 2005) and projected economic data in assessing impacts of a policy. Although the REMI model does not include the most recent economic statistics, the results of the model are still indicative of the underlying structure of the regional economy. Based on the above assumptions, the compliance cost of PAR 1156, and the application of the REMI model, it is projected that an average of 4 jobs could be forgone annually between 2010 and 2025. The number of jobs forgone is insignificant relative to the size of total average annual employment in the four-county area (0.00004 percent) and falls within the noise of the REMI model employment projections.</p> <p>The additional cost brought on by the proposed amendments would have few impacts on the relative cost of production and delivered price of the affected industry relative to its national counterparts and thus would have few impacts on the competitiveness of the cement manufacturing industry.</p>
--	---

## **INTRODUCTION**

Proposed Amended Rule (PAR 1156) would reduce particulate matter as well as hexavalent chromium emissions from cement manufacturing facilities. PAR 1156 would also require ambient monitoring and sampling for hexavalent chromium and monitoring for wind speed and wind directions. PM10 ambient monitoring is only required if Rule 403 PM10 levels are violated three times within a 36-month period. Lastly, PAR 1156 requires submittal of a compliance monitoring plan.

PAR 1156 would reduce particulate emissions from cement manufacturers by approximately 0.09 tons of total particulate matter (PM) and 0.04 tons of particulate matter (PM10) per day.

## **REGULATORY HISTORY**

Rule 1156, which was adopted in November 2005, required cement manufacturing facilities to control dust from open storage piles, various processes and internal roadways, including but not limited to, loading and unloading, transferring, crushing, screening and milling, and storage of materials. The average annual cost of implementing Rule 1156 for the two facilities was projected to be \$1.1 million, which included bag replacements in the baghouses, source testing, and fees related to new and modified control devices. The average cost-effectiveness of Rule 1156 was \$1,000 per ton of PM reduced (or \$2,000 per ton of PM10 reduced assuming 50 percent of PM is PM10).

## **LEGISLATIVE MANDATES**

The socioeconomic assessments at the AQMD have evolved over time to reflect the benefits and costs of regulations. The legal mandates directly related to the assessment of the proposed rules amendments include the AQMD Governing Board resolutions and various sections of the California Health & Safety Code (H&SC).

### **AQMD Governing Board Resolutions**

On March 17, 1989 the AQMD Governing Board adopted a resolution that calls for preparing an economic analysis of each proposed rule for the following elements:

- Affected Industries
- Range of Control Costs
- Cost Effectiveness
- Public Health Benefits

On October 14, 1994, the Board passed a resolution which directed staff to address whether the rules or amendments brought to the Board for adoption are in the order of cost effectiveness as defined in the AQMP. The intent was to bring forth those rules that are cost effective first.

**Health & Safety Code Requirements**

The state legislature adopted legislation that reinforces and expands the Governing Board resolutions for socioeconomic assessments. H&SC Sections 40440.8(a) and (b), which became effective on January 1, 1991, require that a socioeconomic analysis be prepared for any proposed rule or rule amendment that *"will significantly affect air quality or emissions limitations."* Specifically, the scope of the analysis should include:

- Type of Affected Industries
- Impact on Employment and the Economy of the district
- Range of Probable Costs, Including Those to Industries
- Emission Reduction Potential
- Necessity of Adopting, Amending or Repealing the Rule in Order to Attain State and Federal Ambient Air Quality Standards
- Availability and Cost Effectiveness of Alternatives to the Rule

For the items 1, 4, 5, and 6 above, please refer to Staff Report of Proposed Amended Rule 1156. Additionally, the AQMD is required to actively consider the socioeconomic impacts of regulations and make a good faith effort to minimize adverse socioeconomic impacts. H&SC Section 40728.5, which became effective on January 1, 1992, requires the AQMD to:

- Examine the type of industries affected, including small businesses; and
- Consider socioeconomic impacts in rule adoption

H&SC Section 40920.6, which became effective on January 1, 1996, requires that incremental cost effectiveness be performed for a proposed rule or amendment setting a Best Available Retrofit Control Technology (BARCT) requirement or a "feasible measure" relating to ozone, carbon monoxide (CO), oxides of sulfur (SO<sub>x</sub>), oxides of nitrogen (NO<sub>x</sub>), and their precursors. Incremental cost effectiveness is defined as the difference in costs divided by the difference in emission reductions between one level of control and the next more stringent control. This statute does not apply to PAR 1156.

**AFFECTED FACILITIES**

PAR 1156 will affect only two facilities. Texas Industries, Inc. (TXI) is located in Riverside County and California Portland Cement Company (CPCC) is in San Bernardino County. The former is headquartered in Dallas, Texas and the latter is a subsidiary of Taiheiyo Cement Company in Japan. Both facilities belong to the industry of cement manufacturing with NAICS (North American Industrial Classification System) code 327310. CPCC manufactures grey cement and TXI manufactures both grey and white cement.

**Small Businesses**

The AQMD defines a "small business" in Rule 102 as one which employs 10 or fewer persons and which earns less than \$500,000 in gross annual receipts. In addition to the AQMD's definition of a small business, the federal Small Business Administration (SBA), the federal Clean Air Act Amendments (CAAA) of 1990, and the California Department of Health Services (DHS) also provide definitions of a small business.

The SBA's definition of a small business uses the criteria of gross annual receipts (ranging from \$0.75 million to \$35.5 million), number of employees (ranging from 50 to 1,500), megawatt hours generated (4 million), or assets (\$175 million), depending on industry type (US SBA, 2008). The SBA definitions of small businesses vary by 6-digit North American Industrial Classification System (NAICS) code. For NAICS 327310 where the two affected facilities belong, 750 employees or fewer is the criterion below which a business is considered small.

The CAAA classifies a facility as a "small business stationary source" if it: (1) employs 100 or fewer employees, (2) does not emit more than 10 tons per year of either VOC or NOx, and (3) is a small business as defined by SBA.

Both TXI and Taiheiyo Cement Co. are not considered small businesses under any of the small business definitions discussed above.

**COMPLIANCE COSTS**

PAR 1156 will ensure further reduction of particulate matter, as well as hexavalent chromium emissions, from cement manufacturing facilities. The average annual cost of the proposed amendments is estimated at \$0.282 million between 2010 and 2025 as shown in Table 1. CPCC and TXI will incur 60 and 40 percent of the cost, respectively. The overall cost-effectiveness of PAR 1156 is estimated at \$6,000 per ton of PM reduced and \$13,000 per ton of PM10 reduced.

**Table 1**  
Cost by Facility by Year (in millions of dollars)

<b>Facility</b>	<b>2010</b>	<b>2011</b>	<b>2025</b>	<b>Average Annual (2010 – 2025)</b>
CPCC	\$0.171	\$0.170	\$0.170	\$0.170
TXI	\$0.112	\$0.111	\$0.111	\$0.111
<b>Total</b>	<b>\$0.283</b>	<b>\$0.282*</b>	<b>\$0.282</b>	<b>\$0.282</b>

\*Numbers may not add up due to rounding.

It is assumed that CPCC would install wind fences at the clinker barn type storage and wind fences and tarps for open active clinker piles to comply with the proposed amendments. The area of the wind fence and tarp is estimated to be 35,686 and 107,125 square feet, respectively. The cost of one square foot of wind fence and tarp is estimated to be \$15 and \$0.12, respectively. It is assumed that the two affected facilities would install three pieces of ambient monitoring equipment for hexavalent chromium with a

capital cost of \$23,000 each and another three pieces of monitoring equipment for PM10 with a capital cost of \$21,000 each. It should be noted that installation of PM10 monitoring equipment is only required if a facility receives multiple Rule 403 violation notices. The cost analysis herein assumes a worst-case scenario and includes the cost of PM10 monitoring equipment. Each facility is also expected to install one wind monitoring station with a capital cost of \$10,000, and submit a one-time compliance monitoring plan with a preparation cost of \$500 per facility.

The total annual cost of the PAR 1156 is slightly higher in 2010 due to the one-time costs of compliance plan submittal. Capital costs are annualized over 10 years for wind fence, and monitoring equipment and five years for tarping at a real annual interest rate of four percent. The average annualized capital cost of PAR 1156 is estimated at \$0.104 million.

Each facility is assumed to conduct 122 sample analyses per year for hexavalent chromium (one sample every three days) at an estimated cost of \$100 per sample. The annual cost of operating and maintaining hexavalent chromium and PM10 monitoring equipment and sample collections is estimated to be \$82,000 per facility. Lastly, it is assumed that CPCC would incur savings of about \$9,640 from not using dust suppressants on and around the clinker piles. The total additional operating and maintenance cost of PAR 1156 is estimated to be \$0.179 million.

## **JOBS AND OTHER SOCIOECONOMIC IMPACTS**

The REMI model (version 9.5.26) is used to assess the total socioeconomic impacts of a policy change. The model links the economic activities in the counties of Los Angeles, Orange, Riverside, and San Bernardino. The REMI model for each county is comprised of a five block structure that includes (1) output and demand, (2) labor and capital, (3) population and labor force, (4) wages, prices and costs, and (5) market shares. These five blocks are interrelated. Within each county, producers are made up of 165 private non-farm industries, three government sectors, and a farm sector. Trade flows are captured between sectors and borders as well as across counties and the rest of U.S. Market shares of industries are dependent upon their product prices, access to production inputs, and local infrastructure. The demographic/migration component has 160 ages/gender/race/ethnicity cohorts and captures population changes in births, deaths, and migration.

The assessment herein is performed relative to the existing Rule 1156. Direct effects of the policy change (Proposed Amendments) have to be estimated and used as inputs to the REMI model in order for the model to assess secondary and induced impacts for all the actors in the four-county economy on an annual basis and across a user-defined horizon (2010-2025). Direct effects of proposed amendments include additional costs of proposed requirements to affected industry and additional goods and services provided by local vendors at the county (or finer) level and by industry.

The proposed amendments to Rule 1156 would create an additional demand in the construction sector (NAICS 23) for the purchase and installation of wind fences on and around active barn-type storages. In addition, PAR 1156 would create additional demand for the purchase and installation of tarps on active clinker piles provided by the plastic



and rubber products manufacturing sector (NAICS 326). Furthermore, the proposed amendments would create an additional demand in the sector of machinery (NAICS 325) for the purchase of wind, PM10, and hexavalent chromium monitoring equipment). PAR 1156 would also create additional demand for services rendered by the miscellaneous professional services sector (NAICS 54) for analyzing hexavalent chromium samples and PM10 monitoring equipment. Additional revenue from compliance plan submittal would help finance AQMD expenditures for review of the plans. Lastly, PAR 1156 would reduce demand for the purchase of dust suppressants in the sector of chemical manufacturing (NAICS 325).

Additional costs of doing business to the affected facilities include the annualized cost of wind fences, tarps and monitoring equipment and additional annual cost of sample analyses for hexavalent chromium, operating and maintaining monitoring equipment, and one-time compliance plan submittal fees. The savings from not using dust suppressants results in a reduction in the cost of doing business.

Direct effects of the proposed amendments will be transmitted throughout the local economy via the interactions between industries and across counties. Secondary and induced effects will follow. The total (direct, secondary, and induced) impacts of the proposed amendments can thus be examined through a number of economic variables such as employment and cost of production.

**Employment**

The total employment impact of the proposed amendments across industries in key years is shown in Table 2. It is projected that an average of four jobs could be forgone annually from 2010 to 2025 in the local economy. This represents approximately 0.00004 percent of the average annual jobs forecasted in the four-county area from 2010 to 2025. The number of jobs forgone is insignificant relative to the size of total average annual employment in the four-county area and falls within the noise of the REMI model employment projections.

In 2010, eight additional jobs could be created in the overall economy. This is mainly due to additional spending on goods and services provided by the industries of construction, machinery, and professional and technical services.

**Table 2  
Job Impacts by Industry by Year**

Industry (NAICS)	Year			Average Annual (2010-2025)
	2010	2015	2025	
Construction (23)	4	-1	0	0
Nonmetallic Mineral Product Mfg. (327)	-1	-2	-2	-2
Retail Trade (44-45)	1	0	0	0
Professional and Technical Services (54)	2	1	0	1
Other Industries	2	-3	-3	-3
<b>Total</b>	<b>8</b>	<b>-5</b>	<b>-5</b>	<b>-4</b>

The job impacts include all the companies (affected and unaffected by PAR1156) in the respective industries.

As the additional cost of doing business kicks in and is maintained throughout the simulation period, the positive impact of spending gradually fades away, resulting in jobs forgone.

The sector of nonmetallic mineral product manufacturing where the affected cement plants belong is projected to have an average of two jobs forgone annually from 2010 to 2025. The reduction in disposable income from the overall jobs forgone dampens the demand for goods and services in the local economy, thus resulting in jobs forgone in other sectors of the economy.

### **Competitiveness**

The additional cost brought on by the proposed amendments would have few impacts on the relative cost of production and delivered price of the affected industry relative to its national counterparts and thus would have few impacts on the competitiveness of the cement manufacturing industry.

## **RULE ADOPTION RELATIVE TO THE COST-EFFECTIVENESS**

On October 14, 1994, the Governing Board adopted a resolution that requires staff to address whether rules being proposed for adoption are considered in the order of cost-effectiveness. The 2007 Air Quality Management Plan (AQMP) ranked, in the order of cost-effectiveness, all of the proposed control measures for which costs were quantified. It is generally recommended that the most cost-effective actions be taken first.

The proposed amendments to Rule 1156 are not part of a control measure in the 2007 AQMP and as such the ranking order of cost-effectiveness is not applicable here. The amendments are proposed to strengthen existing Rule 1156. The overall cost-effectiveness of PAR 1156 is estimated to be \$6,000 per ton of PM reduced and \$13,000 per ton of PM10 reduced.

**REFERENCES**

Dun & Bradstreet Information Services. 2008.

South Coast Air Quality Management District (AQMD). Proposed Amended Rule 1156—Further Emission Reductions from Aggregate and Cement Manufacturing. December 2008.

AQMD. Draft Staff Report for Proposed Amended Rule 1156—Further Emission Reductions from Aggregate and Cement Manufacturing. December 2008.

AQMD. 2007 Air Quality Management Plan (AQMP). June 2007.

Regional Economic Modeling Inc. (REMI). Policy Insight for the South Coast Region (169 sector model). Version 9.5.26.

U.S. Small Business Administration. “Small Business Size Standards.” August 2008.