SACRAMENTO METROPOLITAN
AIR QUALITY MANAGEMENT DISTRICT

TRIENNIAL REPORT AND AIR QUALITY PLAN REVISION

APPENDICES

May 28, 2015

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Stationary Source Control Measure

Control Measure: Stationary IC Engines (Rule 412)

Control Measure Description

This control measure reduces emissions of NO_X from stationary internal combustion (IC) engines larger than 50 horsepower. Stationary IC engines are used in a variety of applications, such as electrical power generation, liquid pumping, and gas compression. Emission reductions will be obtained through more stringent NO_X emission limits for prime power (i.e., other than emergency standby) engines.

Currently, Rule 412 regulates only stationary IC engines that are located at major sources of NO_X. In addition to lowering the emission limits for these engines, the control measure will set standards for engines located at non-major sources of NO_X. Emission standards for this control measure are based on emission standards in SCAQMD Rule 1110.2 and SJVAPCD Rule 4702.

Emission Inventory

EIC	EIC Description	NO_X Planning Inventory (tons/day)		
		2012	2016	2016 without ERC adjustments[1]
010-040-0142-0000	IC Engines, Electric Utilities - Landfill Gas	0.27	0.39	0.31
030-040-0100-0000	IC Engines, Oil and Gas Production – Gaseous Fuel (Unspecified)	0.07	0.07	0.06
050-040-0110-0000	IC Engines, Mfg. and Industrial - Natural Gas	0.29	0.35	0.28
050-040-0142-0000	IC Engines, Mfg. and Industrial – Landfill Gas	0.18	0.23	0.18
050-040-1200-0000	IC Engines, Mfg. and Industrial – Diesel	0.11	0.14	0.11
052-042-0110-0000	IC Engines, Food and Ag Processing - Natural Gas	0.14	0.17	0.14
052-042-1200-0010	IC Engines, Ag. Irrigation -Diesel	0.11	0.04	0.03
060-040-1200-0000	IC Engines, Service and Commercial – Diesel	0.03	0.04	0.03
099-040-1200-0000	IC Engines, Other – Diesel	0.39	0.40	0.32
Total		1.59	1.83	1.46

Note: CARB CEPAM: NORCAL 2012 $PM_{2.5}$ SIP Baseline Emission Projections - Tool Panel, Section 1.a, Sacramento Nonattainment Area 2012 Ozone Ver. 1.02 (accessed 03/07/14) for avg. summer day.

[1] The 2012 planning inventory is the baseline inventory and when the future inventories were projected an ERC adjustment was made to those future inventories. The controls would not apply to the ERC adjustment so to correct for this the 2016 planning inventory has been reduced by the ERC adjustment factor. The ERC adjustment factor had not been applied to the 2012 planning inventory.

Emission Reductions

EIC Description	Adoption Date	Implementation Date	NO_X Emission Reduction[2] (tons/day)
			2016
IC Engines	2015	2016	0.01

Cost Effectiveness

The cost effectiveness of the measure is based on Staff estimates of the cost for engines with District permits to retrofit or replace engines and comply with other potential requirements, including testing. The cost effectiveness is estimated to range from $3.30 to $5.40 per pound of NO_X reduced.

Implementation

This control measure will be implemented by the SMAQMD.

Authority

SMAQMD is authorized to implement this control measure by the California Health and Safety Code, Sections 40001, 40702, and 41010.

References

CARB. *2012 $PM_{2.5}$ SIP Baseline Emission Projection for Northern California SIPS, Version 1.02 (RF #2004 July 12, 2012)*. California Air Resources Board: Sacramento, CA. 12 July 2012.

CARB. *Determination of Reasonably Available Control Technology and Best Available Retrofit Control Technology for Stationary Spark-Ignited Internal Combustion Engines.* California Air Resources Board: Sacramento, CA. November 2001.

SCAQMD. *Revised Draft Staff Report: Proposed Amended Rule 1110.2 – Emissions from Gaseous- and Liquid-Fueled Engines.* South Coast Air Quality Management District: Diamond Bar, CA. August 2012.

SCAQMD. *Rule 1110.2 – Emissions from Gaseous- and Liquid Fueled Engines.* South Coast Air Quality Management District: Diamond Bar, CA. *7* September 2012.

SJVAPCD. *Final Staff Report: Revised Proposed Amendments to Rule 4702 (Internal Combustion Engines).* San Joaquin Valley Air Pollution Control District: Fresno, CA. 14 November 2013.

SJVAPCD. *Rule 4702 – Internal Combustion Engines.* San Joaquin Valley Air Pollution Control District: Fresno, CA. 14 November 2013.

[2] If the measure were fully implemented prior to 2016, this would be the estimate of the emission reductions in 2016.

Stationary Source Control Measure

Control Measure: NO_X from Miscellaneous Combustion Sources (Rule 419)

Control Measure Description

Combustion equipment is used by wide variety of businesses in the manufacturing, industrial, commercial, and service sectors. The combustion of fuel emits oxides of nitrogen (NO_X). While the District regulates NOx emissions from boilers, water heaters, process heaters, engines and turbines, there are many other types of combustion equipment for which the District has not established emission standards. Types of equipment that are not currently subject to specific regulations in SMAQMD include: dryers, dehydrators, heaters, kilns, calciners, furnaces, crematories, incinerators, heated pots, cookers, roasters, heated tanks, evaporators, distillation units, afterburners, degassing units, vapor incinerators, catalytic or thermal oxidizers, and remediation units. Industries that may be subject to the rule include, but are not limited to, food products preparation, printing, textile processing, product coating, and material processing. The control measure would not apply to solid fuel combustion equipment, internal combustion engines, turbines, charbroilers, fan-type central furnaces, water heaters (residential or commercial), boilers, thermal fluid heaters or enclosed process heaters subject to SMAQMD Rule 411.

This control measure reduces NO_X emissions from this miscellaneous combustion equipment by establishing emission limits, dependent upon device type and process temperature, and phasing in the emission limits based on the age of an existing unit. Emissions limits similar to those adopted in SCAQMD Rule 1147 – NO_X Reductions from Miscellaneous Sources would be considered for this control measure.

Emission Inventory

The total emissions from the EIC codes that may include emissions from equipment subject to this control measure are presented in the table below. The fraction of the emissions that are attributable to the subject equipment is unknown; therefore, this inventory represents an upper bound. The upper bound of the emission reductions has been calculated assuming the entire planning inventory for these EIC codes would be controlled by this measure. Further inventory work will be performed during rule development to estimate more precisely the emission inventory and reductions attributable only to subject equipment types.

EIC	EIC Description	NO_X Planning Inventory (tons/day)		
		2012	2016	2016 w/o ERC adjustment[3]
050-012-0110-0000	Manufacturing and Industrial - Oven Heaters - Natural Gas	0.01	0.01	0.01
050-995-0110-0000	Manufacturing and Industrial - Other - Natural Gas	0.05	0.06	0.05
050-995-0120-0000	Manufacturing and Industrial - Other - Liquefied Petroleum Gas	0.01	0.01	0.01
050-995-1220-0000	Manufacturing and Industrial - Other - Distillate Oil	0.00	0.00	0.00
060-012-0110-0000	Service and Commercial - Oven Heaters - Natural Gas	0.00	0.00	0.00
060-995-0110-0000	Service and Commercial - Other - Natural Gas	0.31	0.39	0.31
060-995-0120-0000	Service and Commercial - Other - Liquefied Petroleum Gas	0.00	0.00	0.00
130-130-0110-0000	Incinerators - Natural Gas	0.01	0.01	0.01
430-424-7006-0000	Mineral Process - Asphaltic Concrete Production	0.08	0.12	0.09
430-995-7012-0000	Mineral Process - Other - Bricks	0.00	0.01	0.01
430-995-7020-0000	Mineral Process - Other - Ceramics	0.00	0.00	0.00
Totals		**0.47**	**0.61**	**0.49**

Note: CARB CEPAM: NORCAL 2012 $PM_{2.5}$ SIP Baseline Emission Projections - Tool Panel, Section 1.a, Sacramento Nonattainment Area 2012 Ozone Ver. 1.02 (accessed 3/7/14) for avg. summer day.

Emission Reductions

EIC Description	Adoption Date	Implementation Date	NO_X Emission Reduction[4] (tons/day)
			2016
Miscellaneous Combustion Sources	2016	2016	0.19

Cost Effectiveness

In the November 2008 final socioeconomic report for proposed SCAQMD Rule 1147 – NO_X Reductions from Miscellaneous Sources, SCAMQD staff estimated a cost effectiveness range from $2.50 to $4.00 per pound of NO_X reduced. The cost effectiveness depends upon device type, burner size, and NO_X emission limit. The cost effectiveness in the SMAQMD is expected to be similar.

Implementation

This control measure will be implemented by the SMAQMD.

[3] The 2012 planning inventory is the baseline inventory and when the future inventories were projected an ERC adjustment was made to those future inventories. The controls would not apply to the ERC adjustment so to correct for this the 2016 planning inventory has been reduced by the ERC adjustment factor. The ERC adjustment factor had not been applied to the 2012 planning inventory.

[4] If the measure were fully implemented prior to 2016, this would be the estimate of the emission reductions in 2016.

Authority

SMAQMD is authorized to implement this control measure by the California Health and Safety Code, Sections 40001, 40702, and 41010.

References

CARB. *2012 $PM_{2.5}$ SIP Baseline Emission Projection for Northern California SIPS, Version 1.02 (RF #2004 July 12, 2012)*. California Air Resources Board: Sacramento, CA. 12 July 2012.

SCAQMD. *Final Socioeconomic Report for Proposed Rule 1147 – NO_X Reductions from Miscellaneous Sources.* South Coast Air Quality Management District: Diamond Bar, CA. November 2008.

SCAQMD. *Staff Report Proposed Rule 1147 – NO_X Reductions from Miscellaneous Sources.* South Coast Air Quality Management District: Diamond Bar, CA. 5.December 2008.

SCAQMD. *Staff Report Proposed Rule 1147 – NO_X Reductions from Miscellaneous Sources.* South Coast Air Quality Management District: Diamond Bar, CA. 9 September 2011.

SJVAPCD. *Rule 4309 – Dryers, Dehydrators, and Ovens.* San Joaquin Valley Air Pollution Control District: Fresno: CA. 15 December 2005.

SJVAPCD. *Final Staff Report Revised Proposed Rule 4309 – Dryers, Dehydrators, and Ovens.* San Joaquin Valley Air Pollution Control District: Fresno: CA. 15 December 2005.

Stationary Source Control Measure

Control Measure: Architectural Coatings (Rule 442)

Control Measure Description

This control measure regulates the ROG content in coatings applied to stationary structures and their appurtenances (e.g., general use flats, general use non-flats, and specialty coatings such as industrial maintenance coatings, lacquers, floor coatings, roof coatings, stains, etc.). The control measure also regulates the sale of coatings within the district by prohibiting manufacturers and suppliers of coatings from selling coatings that do not comply with the strategy. The standards in this control measure are based on California Air Resources Board's (CARB) 2007 Suggested Control Measure for Architectural Coatings.

Emission Inventory

EIC	EIC Description	ROG Planning Inventory (tons/day)		
		2012	2016	2016 without ERC adjustments [5]
520-520-9100-0000	9100-OIL BASED (ORGANIC SOLVENT BASED) COATINGS (UNSPECIFIED)	0.14	0.16	0.15
520-520-9105-0000	9105-OIL BASED PRIMERS, SEALERS, AND UNDERCOATERS	0.05	0.05	0.05
520-520-9106-0000	9106-OIL BASED QUICK DRY PRIMERS, SEALERS, AND UNDERCOATERS	0.05	0.06	0.05
520-520-9108-0000	9108-OIL BASED SPECIALTY PRIMER, SEALER, AND UNDERCOATER	0.29	0.34	0.31
520-520-9109-0000	9109-OIL BASED BITUMINOUS ROOF PRIMER	0.01	0.01	0.01
520-520-9112-0000	9112-OIL BASED SANDING SEALERS	0.02	0.02	0.02
520-520-9113-0000	9113-OIL BASED WATERPROOFING SEALERS	0.03	0.03	0.03
520-520-9118-0000	9118-OIL BASED WATERPROOFING CONCRETE/MASONRY SEALERS	0.11	0.13	0.12
520-520-9122-0000	9122-OIL BASED FAUX FINISHING	0	0	0
520-520-9126-0000	9126-OIL BASED RUST PREVENTATIVE	0.42	0.48	0.44
520-520-9131-0000	9131-OIL BASED STAINS - CLEAR/SEMITRANSPARENT	0.29	0.33	0.31
520-520-9136-0000	9136-OIL BASED STAINS - OPAQUE	0	0	0
520-520-9141-0000	9141-OIL BASED VARNISH - CLEAR/SEMITRANSPARENT	0.2	0.23	0.21
520-520-9153-0000	9153-OIL BASED QUICK DRY ENAMEL COATINGS	0.15	0.18	0.16
520-520-9157-0000	9157-OIL BASED LACQUERS (UNSPECIFIED)	0.16	0.19	0.17
520-520-9159-0000	9159-OIL BASED FLAT COATINGS	0	0	0
520-520-9160-0000	9160-OIL BASED NONFLAT - LOW GLOSS/MEDIUM GLOSS	0.02	0.02	0.02
520-520-9161-0000	9161-OIL BASED HIGH GLOSS NONFLAT COATINGS	0.01	0.01	0.01
520-520-9164-0000	9164-OIL BASED BITUMINOUS ROOF COATINGS	0.02	0.02	0.02
520-520-9165-0000	9165-OIL BASED CONCRETE CURING COMPOUNDS	0.01	0.01	0.01
520-520-9166-0000	9166-OIL BASED DRY FOG COATINGS	0.03	0.04	0.04
520-520-9169-0000	9169-OIL BASED FLOOR COATINGS	0.01	0.01	0.01
520-520-9170-0000	9170-OIL BASED FORM RELEASE COATINGS	0.04	0.04	0.04

[5] The 2012 planning inventory is the baseline inventory and when the future inventories were projected an ERC adjustment was made to those future inventories. The controls would not apply to the ERC adjustment so to correct for this the 2016 planning inventory has been reduced by the ERC adjustment factor. The ERC adjustment factor had not been applied to the 2012 planning inventory.

520-520-9171-0000	9171-OIL BASED HIGH TEMPERATURE COATINGS	0	0	0
520-520-9172-0000	9172-OIL BASED INDUSTRIAL MAINTENANCE COATINGS	0.17	0.19	0.17
520-520-9173-0000	9173-OIL BASED METALLIC PIGMENTED COATINGS	0.1	0.12	0.11
520-520-9174-0000	9174-OIL BASED ROOF COATINGS	0.01	0.01	0.01
520-520-9176-0000	9176-OIL BASED TRAFFIC COATINGS	0.02	0.02	0.02
520-520-9177-0000	9177-OIL BASED WOOD PRESERVATIVES	0.03	0.03	0.03
520-520-9200-0000	9200-WATER BASED COATINGS (UNSPECIFIED)	0.03	0.03	0.03
520-520-9205-0000	9205-WATER BASED PRIMERS, SEALERS, AND UNDERCOATERS	0.27	0.31	0.28
520-520-9206-0000	9206-WATER BASED QUICK DRY PRIMERS, SEALERS, AND UNDERCOATERS	0	0	0
520-520-9208-0000	9208-WATER BASED SPECIALTY PRIMER, SEALER, AND UNDERCOATER	0.01	0.01	0.01
520-520-9209-0000	9209-WATER BASED BITUMINOUS ROOF PRIMER	0	0	0
520-520-9212-0000	9212-WATER BASED SANDING SEALERS	0	0	0
520-520-9213-0000	9213-WATER BASED WATERPROOFING SEALERS	0.04	0.05	0.04
520-520-9218-0000	9218-WATER BASED WATERPROOFING CONCRETE/MASONRY SEALERS	0.03	0.03	0.03
520-520-9222-0000	9222-WATER BASED FAUX FINISHING	0.02	0.02	0.02
520-520-9223-0000	9223-WATER BASED FORM RELEASE COMPOUNDS	0	0	0
520-520-9226-0000	9226-WATER BASED RUST PREVENTATIVE	0	0.01	0
520-520-9231-0000	9231-WATER BASED STAINS - CLEAR/SEMITRANSPARENT	0.02	0.02	0.02
520-520-9236-0000	9236-WATER BASED STAINS - OPAQUE	0.02	0.02	0.02
520-520-9241-0000	9241-WATER BASED VARNISHES - CLEAR/SEMITRANSPARENT	0.01	0.02	0.02
520-520-9257-0000	9257-WATER BASED LACQUERS (UNSPECIFIED)	0.01	0.01	0.01
520-520-9259-0000	9259-WATER BASED FLAT COATINGS	0.67	0.75	0.7
520-520-9260-0000	9260-WATER BASED NONFLAT - LOW GLOSS/MEDIUM GLOSS	0.88	1.01	0.93
520-520-9261-0000	9261-WATER BASED HIGH GLOSS NONFLAT COATINGS	0.06	0.07	0.06
520-520-9264-0000	9264-WATER BASED BITUMINOUS ROOF COATINGS	0	0	0
520-520-9265-0000	9265-WATER BASED CONCRETE CURING COMPOUNDS	0.02	0.02	0.02
520-520-9266-0000	9266-WATER BASED DRY FOG COATINGS	0.01	0.01	0.01
520-520-9269-0000	9269-WATER BASED FLOOR COATINGS	0.03	0.03	0.03
520-520-9272-0000	9272-WATER BASED INDUSTRIAL MAINTENANCE COATINGS	0.03	0.04	0.03
520-520-9273-0000	9273-WATER BASED METALLIC PIGMENTED COATINGS	0	0	0
520-520-9274-0000	9274-WATER BASED ROOF COATINGS	0.01	0.02	0.01
520-520-9276-0000	9276-WATER BASED TRAFFIC COATINGS	0.06	0.07	0.07
520-520-9277-0000	9277-WATER BASED WOOD PRESERVATIVES	0	0	0
Totals		**4.6**	**5.3**	**4.9**

Note: CARB CEPAM: NORCAL 2012 $PM_{2.5}$ SIP Baseline Emission Projections - Tool Panel, Section 1.a, Sacramento Nonattainment Area 2012 Ozone Ver. 1.02 (accessed 3/7/14) for avg. summer day.

Emission Reductions

Description	Adoption Date	Implementation Date	ROG Emission Reduction (tons/day)
			2016
Architectural Coating Categories	2015	2015	1.1

Cost Effectiveness

The cost effectiveness calculations are based on CARB's 2007 Suggested Control Measure for Architectural Coatings. The estimated overall cost effectiveness is estimated to be $1.24 per pound of ROG reduced.

Authority

SMAQMD is authorized to implement this control measure by the California Health and Safety Code, Sections 40001, 40702, and 41010.

References

CARB. *Ozone SIP Planning Inventory, Version 1.06, Sacramento NAA (RF#980)*. California Air Resources Board: Sacramento, CA. 16 November 2006.

CARB. *Suggested Control Measure for Architectural Coatings*. California Air Resources Board: Sacramento, CA. 25 October 2007.

SCAQMD. *Staff Report for Proposed Amended Rule 1113 (Architectural Coatings).* South Coast Air Quality Management District: Diamond Bar, CA. 14 May, 1999.

SCAQMD. *Staff Report for Proposed Amended Rule 1113 (Architectural Coatings).* South Coast Air Quality Management District: Diamond Bar, CA. 6 December 2002.

SCAQMD. *Staff Report for Proposed Amended Rule 1113 (Architectural Coatings)*. South Coast Air Quality Management District: Diamond Bar, CA. 5 December 2003.

SCAQMD, *Staff Report for Proposed Amended Rule 1113 (Architectural Coatings)*. South Coast Air Quality Management District: Diamond Bar, CA. 9 June 2006.

SCAQMD. *Rule 1113 (Architectural Coatings)*. South Coast Air Quality Management District: Diamond Bar, CA. 9 June 2006.

SMAQMD. *Rule 442 (Architectural Coatings).* Sacramento Metropolitan Air Quality Management District: Sacramento, CA. 24 May 2001.

SMAQMD, *Control Measure SMAQMD – 442.* Sacramento Metropolitan Air Quality Management District: Sacramento, CA. 28 November 2006.

SMAQMD, *Control Measure SMAQMD - 442 Calculation Spreadsheet.* Sacramento Metropolitan Air Quality Management District: Sacramento, CA. 14 May 2008.

SMAQMD et al. *2013 Revision to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan, Appendix C*. Sacramento Metropolitan Air Quality Management District: Sacramento, CA. 2013.

U.S. Department of Labor, Bureau of Labor Statistics, *Consumer Price Index 1996-2006*. Web. 16 April 2014. <http://www.bls.gov/cpi/>

Stationary Source Control Measure

Control Measure: Adhesives and Sealants (Rule 460)

Control Measure Description

Adhesives are used to bond one surface to another by attachment. A variety of adhesives are available for applications including, but not limited to, architectural applications such as carpet, flooring, and roofing, as well as adhesives for plastic, tires, traffic marking tape, metal, fiberglass, and marine applications. Contact adhesives, for example, provide a quick bond between two surfaces by applying pressure without requiring fastening. Large quantities of adhesives are used in manufacturing furniture, automotive industry, and in the construction industry.

Sealants have adhesive properties and are generally used to fill, seal, waterproof, or weatherproof gaps or joints between two surfaces. They are used heavily in the construction industry.

This control measure would reduce emissions of reactive organic gases (ROG) from adhesives and sealants and associated solvents. The controls for the adhesives and sealants control measure are based on the 2010 amendments to SJVAPCD (San Joaquin Valley Air Pollution Control District) Rule 4653 – Adhesives and Sealants.

Emission Inventory

EIC[6]	EIC Description	ROG Planning Inventory (tons/day)		
		2012	2016	2016 w/o ERC external adjustment[7]
250-292-8200-0000	Adhesives and Sealants (Unspecified)	0.01	0.01	0.01
250-292-8202-0000	Organic Solvent Based Adhesives and Sealants	0.11	0.11	0.10
250-292-8250-0000	Water Based Adhesives and Sealants	0.26	0.29	0.27
220-204-0500-0000[8]	Cold Cleaning – Petroleum Naptha	0.03	0.03	0.03
Totals		**0.41**	**0.44**	**0.41**

Note: CARB CEPAM: NORCAL 2012 $PM_{2.5}$ SIP Baseline Emission Projections - Tool Panel, Section 1.a, Sacramento Nonattainment Area 2012 Ozone Ver. 1.02 (accessed 3/7/14) for avg. summer day.

6 Emissions Inventory Code

7 The 2012 planning inventory is the baseline inventory and when the future inventories were projected an emissions reduction credit (ERC) adjustment was made to those future inventories. The controls would not apply to the ERC adjustment so to correct for this the 2016 planning inventory has been reduced by the ERC adjustment factor. The ERC adjustment factor had not been applied to the 2012 planning inventory.

8 The solvent related EIC code shows only the solvent portion associated with adhesives and sealant operations (5.5 percent of the total ROG emissions for this EIC code).

Emission Reductions

Description	Adoption Date	Implementation Date	ROG Emission Reduction (tons/day)
			2016
Adhesives and Sealants	2016	2016	0.02

Cost Effectiveness

The cost effectiveness of switching to low ROG adhesives and sealants was estimated by SJVAPCD in the 2010 amendments of Rule 4563 – Adhesive and Sealant Applicants at no cost. Products are readily available in stores for several years at similar price points as higher ROG adhesives and sealants.

Implementation

This control measure will be implemented by the SMAQMD (Sacramento Metropolitan Air Quality Management District).

Authority

SMAQMD is authorized to implement this control measure by the California Health and Safety Code, Sections 40001, 40702, and 41010.

References

SCAMQD. *1999 Amendment to the 1997 Ozone SIP Revision for the South Coast Air Basin.* South Coast Air Quality Management District: Diamond Bar, CA. December 1999.

SCAQMD. *Staff Report Proposed Amended Rule 1168 – Adhesives and Sealant Applications.* South Coast Air Quality Management District: Diamond Bar, CA. September 2000.

SCAQMD, 2003 Air Quality Management Plan. South Coast Air Quality Management District: Diamond Bar, CA. 29 December 2005. Web. <http://www.aqmd.gov/aqmp/AQMD03AQMP.htm>.

SCAQMD. *Rule 1168 – Adhesive and Sealant Applicants.* South Coast Air Quality Management District: Diamond Bar, CA. 7 January 2005.

SJVAPCD. *2001 Amendment to the 1994 Ozone ADP.* San Joaquin Valley Air Pollution Control District: Fresno, CA. 16 April 2014. <http://www.valleyair.org/busind/plans/sip_amendment.pdf>

SJVAPCD, *2002 and 2005 Rate of Progress Plan.* San Joaquin Valley Air Pollution Control District: Fresno, CA 16 May 2002. Web. <http://www.valleyair.org/busind/plans/rate_of_progress_plan_adopted.pdf>

SJVAPCD, *Rule 4653 Final Draft Staff Report*. San Joaquin Valley Air Pollution Control District: Fresno, CA. 16 September 16 2010.

SJVAPCD, *Rule 4653 – Adhesives and Sealants.* San Joaquin Valley Air Pollution Control District: Fresno, CA. 16 September 2010.

Control Measure: Metalworking Fluids and Direct-Contact Lubricants (Rule 467)

Control Measure Description

Metalworking fluids and direct-contact lubricants are used in a variety of metalworking industries. These ROG-containing materials are used in metal manufacturing processes at machine shops using methods such as metal stamping, drilling, forging, grinding, honing, milling, threading, and wire drawing. Metalworking fluids and direct-contact lubricants include vanishing oils, rust inhibitors, and honing oils. A majority of sources using metalworking fluids and direct-contact lubricants are unpermitted by the District.

This control measure would reduce emissions of ROGs from metalworking fluids and direct-contact lubricants. The controls for metalworking fluids and direct-contact lubricants are based on SCAMQD Rule 1144 – Metalworking Fluids and Direct-Contact Lubricants.

Emission Inventory

EIC	EIC Description	ROG Planning Inventory (tons/day)	
		2012	2016
499-907-6700-000[9]	Other – Industrial Use – Multi-Purpose Lubricants	0.13	0.13
Totals		**0.13**	**0.13**

SMAQMD 2012 Area Source Methodology – Multi-Purpose Lubricants. November 6, 2013.

Emission Reductions

Description	Adoption Date	Implementation Date	ROG Emission Reduction[10] (tons/day)
			2016
Other – Industrial Use – Multi-Purpose Lubricants	2016	2017	0.06

Cost Effectiveness

The cost effectiveness of switching to lower ROG metalworking fluids and direct-contact lubricants was estimated by SCAQMD in the 2009 adoption of Rule 1144 – Metalworking Fluids and Direct-Contact Lubricants. The cost effectiveness was estimated to be $1.43 per pound of ROG reduced. Cost effectiveness is SMAQMD is expected to be similar.

[9] The ROG Planning inventory did not include the EIC code for industrial use – multi-purpose lubricants. The inventory for metalworking fluids and direct-contact lubricants was calculated based on the methodology used in SCAQMD 2010 amendments of Rule 1144 – Metalworking Fluids and Direct-Contact Lubricants. The SMAQMD inventory was apportioned using business patterns and employment surrogates.

[10] If the measure were fully implemented prior to 2016, this would be the estimate of the emission reductions in 2016.

Implementation

This control measure will be implemented by the SMAQMD.

Authority

SMAQMD is authorized to implement this control measure by the California Health and Safety Code, Sections 40001, 40702, and 41010.

References

SCAQMD. *Final Staff Report for Proposed Amended Rule 1144 – Metalworking Fluids and Direct-Contact Lubricants.* South Coast Air Quality Management District: Diamond Bar, CA. May 2010.

SCAQMD. *Rule 1144 Metalworking Fluids and Direct-Contact Lubricants.* South Coast Air Quality Management District: Diamond Bar, CA. 9 July 2010.

SMAQMD. *2012 Area Source Methodology, Multi-Purpose Lubricants.* Sacramento Metropolitan Air Quality Management District: Sacramento, CA. 6 November 2013.

VCAPCD. *Draft Staff Report, Rule 74.31, Metalworking Fluids and Direct-Contact Lubricants and Proposed Amendment to Rule 23, Exemptions from Permit.* Ventura County Air Pollution Control District: Ventura, CA. September 23, 2013.

Stationary Source Control Measure

Control Measure: Composting Operations (Rule 489)

Control Measure Description

This control measure would reduce emissions of ROG from new and existing composting operations. The purpose of the control measure is to limit the emissions of ROGs with best management practices and/or ROG emission control technology (for larger composting operations) such as enclosures, aerated static piles, or other emission control devices. SMAQMD does not have a rule covering this category.

The controls for the composting operations control measure are based on SCAQMD (South Coast Air Quality Management District) Rule 1133.3 - Emission Reductions from Green waste Composting Operations. SCAQMD Rule 1133.3 defines green waste composting as composting operations having up to 20% percent manure content. The rule has various levels of controls depending on the throughput of organic material and/or green waste at the composting facility. Rule 1133.3 requires cover (with screened or unscreened finished compost) on each active phase compost pile within 24 hours of formation and the application of water as necessary to the top of the compost pile within six hours prior to turning, such that the top half of the pile is wet to a depth of three inches. Under Rule 1133.3, only one composting facility in Sacramento County would be subject to similar requirements.

This control measure will also evaluate potential controls on anaerobic digesters. Anaerobic digesters are not subject to controls under any of the composting rules in SJVAPCD or SCAQMD. The District currently has three anaerobic digesters in Sacramento County.

Emission Inventory

EIC	EIC Description	ROG Planning Inventory (tons/day)	
		2012	2016
199-170-0260-0000	Composting – Biological Waste (Unspecified)	0.21	0.24

Note: CARB CEPAM: NORCAL 2012 $PM_{2.5}$ SIP Baseline Emission Projections - Tool Panel, Section 1.a, Sacramento Nonattainment Area 2012 Ozone Ver. 1.02 (accessed 3/7/14) for avg. summer day.

Emission Reductions

Description	Adoption Date	Implementation Date	ROG Emission Reduction[11] (tons/day)
			2016
COMPOSTING – BIOLOGICAL WASTE (UNSPECIFIED)	2016	2017	0.05

Cost Effectiveness

Using the cost estimates from the SCAQMD staff report for Rule 1133.3, the estimated cost effectiveness of implementing a similar rule in Sacramento County ranges from $0.72 to $0.96 per pound of ROG reduced.

Implementation

This control measure will be implemented by the SMAQMD.

Authority

SMAQMD is authorized to implement this control measure by the California Health and Safety Code, Sections 40001, 40702, and 41010.

References

CARB. *8-Hour Ozone SIP Planning Inventory, Version 1.06 Sacramento NAA (RF#980. November 16, 2006).* California Air Resources Board: Sacramento, CA. 16 November 2006.

CARB. *2012 $PM_{2.5}$ SIP Baseline Emission Projection for Northern California SIPS, Version 1.02 (RF #2004 July 12, 2012)*. California Air Resources Board: Sacramento, CA. 12 July 2013.

SCAQMD. *Final Staff Report, Proposed Rule 1113 – Composting and Related Operations – General Administrative Requirements, Proposed Rule 1113.1 – Chipping and Grinding Activities, Proposed Rule 1113.2 – Emission Reductions from Co-Composting Operations.* South Coast Air Quality Management District: Diamond Bar, CA. 10 January 2003.

SCAQMD. *Rule 1113 – Composting and Related Operations – General Administrative Requirements.* South Coast Air Quality Management District: Diamond Bar, CA. 10 January 2003.

SCAQMD, *Technology Assessment for Proposed Rule 1113 – Emission Reductions from Composting and Related Operations.* South Coast Air Quality Management District: Diamond Bar, CA. 22 March 2002.

[11] If the measure were fully implemented prior to 2016, this would be the estimate of the emission reductions in 2016.

SCAQMD. *Rule 1113.2 – Emission Reductions from Co-Composting Operations.* South Coast Air Quality Management District: Diamond Bar, CA. 10 January 2003.

SCAQMD. *Rule 1113.3 – Emission Reductions from Green waste Composting Operations.* South Coast Air Quality Management District: Diamond Bar, CA. 8 July 2011.

SJVAPCD. *Rule 4566 (Organic Material Composting Operations).* San Joaquin Valley Air Pollution Control District: Fresno, CA. 18 August 2011.

SJVAPCD. *Final Draft Staff Report with Appendices for Revised Proposed New Rule 4566.* San Joaquin Valley Air Pollution Control District: Fresno, CA. 18 August 2011.

Stationary Source Control Measure

Control Measure: Liquid Petroleum Gas Transfer and Dispensing (Rule 490)

Control Measure Description

This control measure would reduce emissions of ROG from the transfer and dispensing of liquid petroleum gas (LPG) into cargo tanks, stationary storage tanks, and portable containers. This category is not covered by current SMAQMD rules.

The controls for LPG transfer and dispensing are based on SCAMQD Rule 1177 and Control Measure FUG-02 in SCAQMD's 2012 Air Quality Management Plan. Rule 1177 requires controls for both transfer of LPG into bulk loading facilities, as well as smaller LPG transfer and dispensing operations. For LPG bulk loading facilities, vapor recovery or an equalization system is required to capture displaced vapors. LPG transfer into stationary storage tanks and small portable containers should employ fixed liquid level gauges or filling techniques/technology to prevent overfilling without the use of traditional bleeder valves.

Emission Inventory

EIC	EIC Description	ROG Planning Inventory (tons/day)	
		2012	2016
330-319-0120-0000[12]	LPG Transfer and Dispensing Losses	0.55	0.55
Totals		**0.55**	**0.55**

SMAQMD 2012 Area Source Methodology, December 10, 2013.

Emission Reductions

Description	Adoption Date	Implementation Date	ROG Emission Reduction[13] (tons/day)
			2016
LPG Transfer and Dispensing Losses	2016	2017	0.3
Totals			**0.3**

[12] The ROG planning inventory did not include the EIC code for LPG transfer and dispensing losses. The inventory for this EIC code was calculated based on the methodology used in SCAQMD 2012 amendments of Rule 1177 – Liquefied Petroleum Gas Transfer and Dispensing. The SMAQMD inventory was apportioned from the 2009 California LPG sales usage by market sector using population and emission surrogates (Sacramento fraction of California).

[13] If the measure were fully implemented prior to 2016, this would be the estimate of the emission reductions in 2016.

Cost Effectiveness

In the June 2012 staff report for Rule 1177, SCAMQD staff estimated the cost effectiveness of Rule 1177 to be $0.85 per pound of ROG reduced. Cost effectiveness in SMAQMD is expected to be similar.

Authority

Authority to implement this control measure by the SMAQMD is in accordance with California Health and Safety Code, Sections 40001, 40702, and 41010.

Implementation

This control measure will be implemented by SMAQMD.

References

SCAQMD. *Final Staff Report Proposed Rule 1177 – Liquefied Petroleum Gas Transfer and Dispensing.* South Coast Air Quality Management District: Diamond Bar, CA. June 2012.

SCAQMD. *Final 2012 Air Quality Management Plan.* South Coast Air Quality Management District: Diamond Bar, CA. February 2013.

SMAQMD. *2012 Area Source Methodology, LPG Transfer and Dispensing Losses*. Sacramento Metropolitan Air Quality Management District: Sacramento, CA. 10 December 2013.

Mobile Source Control Measure:

Control Measure: Vehicle and Engine Technology Market-Based Incentive Program

Control Measure Description

The Vehicle and Engine Technology Program uses market-based incentive programs to promote the accelerated introduction of lower emission technologies into the Sacramento Federal Ozone Nonattainment Area. The Program focuses on reducing the emissions from heavy-duty diesel engines, primarily NO_X. There are five major strategies for achieving the desired NO_X emission reductions:

1. Introducing new, low-emission, heavy-duty vehicles when older vehicles are being replaced or when new vehicles are being added to a fleet;
2. Replacing an older existing engine with a newer, lower emission engine, referred to as repowering;
3. Replacing an older truck with a newer truck when the older truck owner would not otherwise purchase a newer truck (Fleet Modernization);
4. Retrofitting an older engine to operate at a lower emission level;
5. Using a lower emission fuel.

Targeted engines generally fall into one of the following categories:

1. On-road vehicles with a gross vehicle weight rating greater than 14,000 pounds;
2. Off-road self-propelled vehicles with a diesel engine greater than 50 horsepower;
3. Agricultural engines used for pumping water greater than 50 horsepower.

Engines that meet the criteria are eligible to receive an incentive to use a lower emission technology. Eligibility requirements include:

1. A minimum of at least 30% NO_X reduction for new vehicle/engine projects compared to baseline emissions. Retrofit projects must show a minimum of 15% NO_X reduction;
2. NO_X reductions must not be required by any existing regulation, memoranda of understanding/agreement, or other legally binding documents;
3. Reduced emission engines and technologies must be certified for sale in California and must comply with durability and warranty requirements;
4. Projects must operate for a minimum of five years and meet the contracted vehicle usage requirements for SFNA;
5. Projects must meet a lifetime cost-effectiveness criterion of $15,700 per ton of NO_X reduced.

Project emission reductions are determined by subtracting the lower NO_X emission level from the NO_X emission level of the base engine. For new vehicles, the reduction is the difference between the certified NO_X emission level of the new heavy-duty engine meeting an optional NO_X emission credit standard from the NO_X emission level of the new engine meeting the current standard. For engine repower projects, the reduction is the difference between the certified NO_X emission standard of the new engine from the NO_X emission level of the older engine. For

engine retrofit projects, the reduction is the difference between the certified NO_X emission rate of the retrofitted engine and the original NO_X emission certification for that engine.

The basic formula used to determine project emission reductions is based on how much cleaner the replacement engine is than the baseline engine, how the engine is operated, and how much the engine operates:

[baseline NO_X level – replacement NO_X level] × [engine load] × [usage]

Because many of the incentive measures in the categories below target the same vehicles or engines, it is difficult to predict in advance what portion of the benefits should be assigned to each of the individual strategies. Therefore, the benefits from the collection of measures have been estimated, and all or any portion of the measures may be implemented to achieve those benefits. Some measures noted may likewise not be implemented if cost effective reductions are not available.

Individual Measure Descriptions

Implement a variety of incentive programs for on-road vehicles and off-road equipment. The programs include:

On-road Vehicles:

Light Duty Early Retirement - Implement an incentive based light-duty vehicle early retirement program. The program is focused on accelerating retirement of non-OBD-II vehicles.

SECAT-Like Program - The measure implements an incentive program for NO_X reduction in heavy-duty vehicles similar to that created by the Sacramento Emergency Clean Air Transportation (SECAT) program.

Off-road Equipment:

Zero Emission Lawn and Garden Incentive (Residential) - This measure implements a year-round continuous incentive program for the replacement of residential spark ignited gasoline-powered mowers with electric or zero emission alternatives.

Off-road CI Incentive Program - This measure implements an incentive program for NO_X reductions through after-treatment retrofits, engine replacement, and fleet modernization in off-road heavy-duty compression ignition (CI) equipment.

Emissions Inventory

The planning inventory emissions for the nonattainment area were broken out for the on-road and off-road segments. On-road segments include EIC codes 710, 722, and 723. Off-road segments include EIC codes 860 and 870. The impact on various part of the EIC categories differ based on difference between old and new vehicle emissions rates. Evaporative EIC categories will have different percent effectiveness than exhaust categories.

The targeted inventory baselines have been adjusted to reflect the impact of ARB's On-road Private Truck and Off-Road Fleet Rules. Based on ARB's State Implementation Plan (Chapter 5 "Proposed New SIP Measures"), reduction percentages were estimated using an average

percentage reduction from the South Coast and the San Joaquin Valley estimates and then applying these estimates to the targeted inventory. These reductions were assumed to be achieved through the new ARB regulations, which included both Carl Moyer Memorial Air Quality Standards Attainment Program and Goods Movement Emission Reduction Program incentive funding.

EIC Code	EIC Description	Nonattainment Planning Inventory	
		2016	
		NO_X (tpd)	ROG (tpd)
710	LIGHT DUTY PASSENGER (LDA)	3.91	5.06
722	LIGHT DUTY TRUCKS - 1 (LDT1)	1.24	2.00
723	LIGHT DUTY TRUCKS - 2 (LDT2)	2.55	2.54
744	MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	4.56	0.24
746	HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	10.72	0.59
860	OFF-ROAD EQUIPMENT	7.48	6.94
870	AGRICULTURAL EQUIPMENT	6.31	1.19
	Total	36.76	18.56

Note: Data Sources: 2013 SIP Revisions to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan Appendix C. (SMAQMD, 2013, pC-9) 2016 emissions inventory is interpolated from 2014 and 2017 data.

Emission Reductions

The expected future emission reductions are based on a variety of actions taken for all on- and off-road applications. The following table provides aggregate emission reductions and percentages for 2016.

2016

Category	NO_X		ROG	
	tpd	%	tpd	%
On-road Measures	0.45	1.96%	0.05	0.48%
Off-road Measures	0.22	1.60%	0.06	0.58%
Total	0.67	1.82%	0.11	0.59%

During 2014-2016, about $9 million annually is expected to be available for on-road and off-road mobile projects. Anticipated funding sources include SECAT program ($3 million annually), local district Department of Motor Vehicle fees ($2 million annually), and the Carl Moyer Program ($4 million annually). The resulting emission reduction benefits will be approximately 0.45 ton per day NO_X and 0.05 ton per day ROG for on-road mobile projects and 0.22 ton per day NO_X and 0.06 ton per day ROG for off-road mobile projects on a region-wide basis for the Sacramento Federal Ozone Nonattainment area.

Cost Effectiveness

Cost-effectiveness of individual projects is calculated for each vehicle/engine and is based on emission reduction, usage, engine load, and a reasonable capitol recovery factor. The greater the emission reductions, the greater amount of incentive a particular project may qualify. The incentive amount is capped either by the incremental cost of the introduction of the lower emission technology or the cost-effectiveness calculation. In no case can the incentive exceed the incremental cost of the project.

Factors used to estimate the expected program cost-effectiveness are based on CARB's documents (CARB, 2003; CARB, 2011). The assumed cost effectiveness from the Moyer Program is $17,724 per ton NO_X reduced for this triennial period.

Authority

SMAQMD has the authority to conduct a voluntary program to implement reductions of heavy-duty NO_X emissions from mobile sources. Programmatic funding is required.

Funding Needs and Sources	Funding is required for program costs, costs for public outreach and the incentive dollars needed to run program.
Authority Origin	California Health and Safety Code §§41014, 41062, 41081, & 41082
Implementation Location	Sacramento Federal Ozone Nonattainment Area

References

CARB. *The Carl Moyer Guidelines, Approved Revisions 2011*. California Air Resource Board: Sacramento, CA. 28 April 2011 Web 27 August 2014 <http://www.arb.ca.gov/msprog/moyer/guidelines/2011gl/2011cmpgl_07_11_14.pdf>.

CARB. *Carl Moyer Memorial Air Quality Standards Attainment Program (CMP) guidelines California Air Resource Board: Sacramento, CA.* September, 2003.

SMAQMD et al. *2013 SIP Revision to the Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan, Appendix C*. Sacramento Metropolitan Air Quality Management District: Sacramento, CA. 26 September 2013.

Land Use Control Measure:

Control Measure: CEQA Construction Mitigation Program

Control Measure Description

SMAQMD established standard construction mitigation requirements for all land use and transportation project construction activities that exceed the District's adopted 85 lbs/day of NO_X threshold of significance under the California Environmental Quality Act (CEQA). Construction mitigation requires a developer to reduce 20 percent of NO_X and 45 percent of particulate matter from the off-road mobile construction equipment used on the project, such as scrapers, graders, dozers, excavators, and other equipment. The emission reduction standards are measured against the statewide average for all off-road mobile construction equipment, based on data provided by the California Air Resources Board.

The standard mitigation becomes a legally enforceable requirement when the lead agency adopts the construction mitigation as a mitigation measure (usually in an Environmental Impact Report) and incorporates that mitigation in the Mitigation Monitoring and Reporting Program (MMRP) for the project. The types of lead agencies for which the District frequently recommends construction mitigation include the County of Sacramento, incorporated cities, and state and federal agencies.

Despite their temporary nature, off-road mobile construction equipment produces approximately 3,500 tons of NO_X emissions each year in Sacramento County, predominantly during the summer ozone season. The construction mitigation program targets emissions created during the construction of commercial, industrial, retail, and residential projects.

Emissions Inventory

EIC Codes	Description	Category	2016 Inventory*	
			NO_X (tpd)	ROG (tpd)
860-887	Off-road Equipment	Construction and Mining	2.32	0.33

*Data source: CARB CEPAM: NORCAL 2012 $PM_{2.5}$ SIP Baseline Emissions Projections – Tool Panel, Section 1.a, Sacramento Nonattainment Area 2012 Ozone Ver 1.02 (accessed 06/18/2014) for average summer day.

The inventories above do not include the on-road vehicle emissions related to construction activities. Most of the EIC Code 860-887 emissions and emission reductions are expected to result from off-road construction equipment.

Emission Reductions

Emission reductions due to the District's CEQA construction mitigation program are estimated using the actual construction mitigation plans submitted for projects during prior years. During calendar years 2009-2013, construction mitigation plans for an annual average of 26 projects were received by the District. All mitigated projects must achieve a minimum of 20 percent NO_X reduction from diesel construction equipment compared to a calculated statewide average emission rate. The construction mitigation plans identify actual equipment used during construction, and the total emission reduction associated with the equipment averaged 0.32 ton

per day NO_X during 2009-2013. The mitigated projects for the next triennial period through 2016 are expected to result in an average daily NO_X reduction of about 0.27 ton per day.

2016

EIC Codes	Description	Category	NO_X Reduction	ROG Reduction
			tpd	tpd
860-887	Off-road	Construction and Mining	0.27	0.00

Cost and Cost Effectiveness

Cost effectiveness for NO_X is based on Carl Moyer guidelines. Actual cost effectiveness varies from project to project depending on the age and type of existing construction fleet, and the amount and type of emission reduction strategies chosen for implementation.

	2016 ($/ton)
Pollutant	**Cost Effectiveness**
NO_X	17,720
ROG	n/a
NO_X + ROG	17,720

Authority

The Air District is a CEQA reviewing agency for projects in Sacramento County. If a project exceeds the District's adopted threshold of significant, the District will request the lead agency to incorporate mitigation measures into the CEQA document. Once the lead agency chooses to implement the recommend measures and adopts the CEQA document, these mitigated measures become legally enforceable.

Also, California Health and Safety Code §40716 allows air districts to "adopt and implement regulations to…reduce or mitigate emissions from indirect and areawide sources of air pollution."

Land Use Control Measure:

Control Measure: CEQA Land Use Operational Mitigation Program

Control Measure Description

SMAQMD continues to implement an operational mitigation program for major land use projects that are considered significant under the California Environmental Quality Act (CEQA). Any land use project that creates operational emissions equal to or greater than 65 pounds per day of ROG or 65 pounds per day of NO_X is considered significant by SMAQMD, and is subject to CEQA mitigation requirements. In most cases, the project is required to identify mitigation that will reduce a minimum 15 percent of the operational ROG and NO_X emissions.

SMAQMD provides a comprehensive menu of over 30 recommended operational mitigation measures that can be used to reduce emissions. District staff updated the menu of operational mitigation measures in June 2014 to reflect the latest research and quantification methods. The general types of mitigation measures include:

(1) land use, neighborhood, and site enhancement,
(2) parking policy/pricing,
(3) transit improvement,
(4) school and commute vehicle trip reduction,
(5) low VOC architectural coatings and other consumer products,
(6) landscape equipment,
(7) clean efficient energy use for buildings and hearths,
(8) water supply and use efficiency,
(9) solid waste recycling and composting.

Land use project proponents select measures from the SMAQMD menu, and in some cases identify other emission reduction measures that are specific to the project.

Generally, the operational mitigation plan is adopted as part of the CEQA document (environmental impact report, mitigated negative declaration, etc.). The CEQA lead agency is responsible for monitoring and enforcing operational mitigation plans, and SMAQMD staff often provides assistance and support in that effort. SMAQMD uses a database to track all significant land use projects, the adopted mitigation measures that apply to the project, and the resulting emission reductions.

Emissions Inventory

EIC Codes	Description	Category	SMAQMD Inventory* (2016)	
			NO_X (tpd)	ROG (tpd)
710	LDA, Light Duty Passenger	All	2.52	3.39
722	LDT1, Light Duty Trucks 1	All	0.76	1.25
723	LDT2, Light Duty Trucks 2	All	1.58	1.62
TOTAL			**4.85**	**6.26**

*Data source: CARB CEPAM: NORCAL 2012 $PM_{2.5}$ SIP Baseline Emissions Projections – Tool Panel, Section 1.a, Sacramento Nonattainment Area 2012 Ozone Ver 1.02 (accessed 06/18/2014) for average summer day.

Emission Reductions

Emission reductions from land use projects are calculated based on an analysis of the total project emissions using CalEEMod (CAPCOA, 2013). The construction phase of many large projects may last several years, and emission reductions only occur on the occupied portion of a project. The total emissions are scaled down based on the amount of the project that is constructed and occupied and the measures selected for the project mitigation plan.

The emission reductions expected for the triennial period 2014-2016 are based on the estimated reductions for the prior years of 2012 and 2013, which averaged about 0.30 ton per day of ROG and 0.30 ton per day of NO_X each year. The following major land use projects with mitigation plans that are currently in construction phases include:

- American River College Campus Master Plan
- Capital Village
- Continental Plaza
- Elverta Specific Plan
- Laguna Ridge Specific Plan
- Natomas Central
- North Watt Avenue Corridor Plan
- Northwest Land Park
- Suncreek
- Sunridge Specific Plan
- Walker Park and Quail Hollow Elementary School
- Wal-Mart Supercenter in North Highlands
- Folsom Blvd Transit Area Plans

2016

EIC Codes	Description	Category	ROG Reduction (tpd)	NO_X Reduction (tpd)
710	LDA, Light Duty Passenger	All	0.30	0.30
722	LDT1, Light Duty Trucks 1	All	0.00	0.00
723	LDT2, Light Duty Trucks 2	All	0.00	0.00
TOTAL			**0.03**	**0.03**

Note: Emission reductions will occur from light duty passenger cars and trucks, however the ratio of affected inventory categories is unknown. Most of the reduced trips will be from light duty passenger cars. Given the relatively small daily emission reduction, all benefits are allocated to light duty passenger cars.

Cost and Cost Effectiveness

Cost effectiveness cannot be quantified for this measure. Actual cost effectiveness depends on the project specific emission reduction measures selected by the developer. In some cases, there is no cost or potentially a cost savings. For example, reducing street widths and providing a system of connected streets may reduce the cost of paving, while resulting in operational emission benefits. In other cases, the cost of a measure may depend on the rate negotiated by the developer/builder and a product supplier.

Authority

The Air District is a CEQA reviewing agency for projects in Sacramento County. If a project exceeds the District's adopted threshold of significant, the District will request the lead agency to incorporate mitigation measures into the CEQA document. Once the lead agency chooses to implement the recommend measures and adopts the CEQA document, these mitigated measures become legally enforceable.

Also, California Health and Safety Code §40716 allows air districts to "adopt and implement regulations to…reduce or mitigate emissions from indirect and areawide sources of air pollution."

References

CAPCOA. *CalEEMod.* California Air Pollution Control Officer Association: Sacramento, CA. 2013. Web 17 June 2014. <http://www.caleemod.com>

Community Education Program Control Measure:

Control Measure: Spare The Air Program

Control Measure Description

SMAQMD's "Spare The Air" Program is a public education program with an episodic ozone reduction element during the summer ozone season, plus general awareness throughout the rest of the year. It is designed to inform people when air quality is unhealthy and achieve voluntary emission reductions by encouraging them to reduce vehicle trips on high ozone days. The Spare The Air Program has operated in the Sacramento region since 1995 and has been funded largely by Congestion Mitigation and Air Quality funds and air districts' local matching funds.

Highlights of the program include:

- A Web site (www.SpareTheAir.com) with daily regional air quality forecasting, historical air quality data, pollutant health effects, transportation tips to drive less, and other ways to reduce pollution.
- Episodic Spare The Air advisories with free Air Alert notifications, consisting of an e-mail, text pager, and digital cellular phone notification system that alerts subscribers when air quality reaches certain unhealthy AQI (Air Quality Index) levels.
- Mapping of real time air quality data ("ozone maps"), updated hourly between 8 a.m. and 10 p.m. from May through October, and featured on local newscasts.
- Production and airing of television and radio commercials.
- Development of educational computer software programs, brochures, and other printed materials distributed to the public, schools, and business community.
- Participation in school and community events throughout the region.

The Spare The Air Program also commits to conduct an annual awareness survey to determine the program's effectiveness and quantify associated emission reductions from the decrease in light duty vehicle activity. The current Spare The Air Program is a transportation control measure (TCM) included in the recently revised 2013 Revision of the federal 8-hour ozone attainment plan for the Sacramento region and in SACOG's Metropolitan Transportation Plan (MTP2035).

Evaluation Survey Methodology

As a result of extensive research conducted by the U.S. EPA and ARB, enhanced procedures to adequately quantify participation in the Spare The Air program were developed. That methodology has been incorporated into Spare The Air surveys conducted by the Aurora Research Group. In case there is a tendency for the individuals to overstate their driving reduction on Spare The Air days, the use of control (non-Spare The Air) day interviewing provides a means of calculating an adjustment factor to derive results attributed only to the Spare The Air day program. Annual telephone interviews are conducted with Sacramento region drivers. In order to be counted as trip reducers, respondents have to:

1) be aware of the Spare The Air episode the previous day (using the ARB-worded question), and
2) consciously reduce the number of driving trips they took on the Spare The Air day, and
3) do so specifically for air quality reasons.

Overall, the results and conclusions will tend to be conservative and are not likely to overestimate the impact of the Spare The Air program.

Emissions Inventory

This measure discourages vehicle use for light-duty vehicles. These 10-digit codes have been summarized into 3-digit EIC summary codes where most sub-codes are equally affected by the measure. The resting and diurnal ROG evaporative emissions categories are not affected by the measure to the same degree. However, due to the small size of this portion of the inventory, the inclusion of EICs from the third column (reflecting resting and diurnal evaporative emissions) is unlikely to significantly reduce the accuracy of the emission reduction results.

3-digit EIC	10-digit EICs equally affected by the measure	10-digit EICs unaffected
710	7107011100, 7107061100, 7107081100, 7107121100, 7107141100, 7107180248, 7107205410, 7107311100, 7107341100, 7107361100, 7107401100, 7107421100, 7107440248, 7107465410, 7107611210, 7107641210, 7107660248, 7107685410	7107101100, 7107381100
722	7227011100, 7227061100, 7227081100, 7227121100, 7227141100, 7227180248, 7227205410, 7227311100, 7227341100, 7227361100, 7227401100, 7227421100, 7227440248, 7227465410, 7227611210, 7227641210, 7227660248, 7227685410	7227101100, 7227381100
723	7237011100, 7237061100, 7237081100, 7237121100, 7237141100, 7237180248, 7237205410, 7237311100, 7237341100, 7237361100, 7237401100, 7237421100, 7237440248, 7237465410, 7237611210, 7237641210, 7237660248, 7237685410	7237101100, 7237381100
750	7507011100, 7507061100, 7507081100, 7507121100, 7507141100, 7507180248, 7507205410, 7507311100, 7507341100, 7507361100, 7507401100, 7507421100, 7507440248, 7507465410, 7507611210, 7507641210, 7507660248, 7507685410	7507101100, 7507381100

2016 – Sacramento County

EIC Code	EIC Description	Fuel	Trips	Planning Inventory*	
				ROG (tpd)	NO_X (tpd)
710	Light Duty Passenger	All	2,971,213	3.39	2.52
722	Light Duty Truck 1	All	410,588	1.25	0.76
723	Light Duty Truck 2	All	1,020,950	1.62	1.58
750	Motorcycle	All	53,593	1.08	0.29
		Total	4,456,344	7.34	5.14

*Data source: CARB CEPAM: NORCAL 2012 $PM_{2.5}$ SIP Baseline Emissions Projections – Tool Panel, Section 1.a, Sacramento Nonattainment Area 2012 Ozone Ver 1.02 (accessed 06/18/2014) for average summer day.

Emission Reductions

Future emission reductions are estimated for the Spare The Air Program based on previous participant survey results. The number of daily trips avoided due to the Spare The Air Program is estimated by assuming 1% of projected 1 million total Sacramento County licensed drivers will participate and each participating driver will reduce an average 3 trips per STA day in 2016. The STA emissions benefits are estimated based on the program's avoided daily trips compared to total daily trips, and applying this ratio to the appropriate emission events (exhaust

emissions and hot soak/running evaporative emissions). Emission reductions are shown below for 2016 for light duty passenger vehicles, light duty trucks 1, light duty trucks 2, and motorcycles.

2016

EIC Code	EIC Description	Daily Trips Reduced		ROG Reductions	NO_X Reductions
		trips	%	tpd	tpd
710	Light Duty Passenger	20,002	0.50%	0.018	0.012
722	Light Duty Truck 1	2,764	0.50%	0.007	0.004
723	Light Duty Truck 2	6,873	0.50%	0.009	0.008
750	Motorcycle	361	0.50%	0.006	0.001
	Total	**30,000**	**0.50%**	**0.039**	**0.025**

The Sacramento County emission reductions on STA days during the next triennial period through 2016 are expected to be about 0.04 ton per day of ROG and 0.03 ton per day of NO_X. The following table summarizes the District's Spare The Air Program commitment for the next triennial period.

SMAQMD Spare The Air Program

Control Measure/Program Categories	Proposed Action and Schedule	Expected Emission Reductions* (tons/day)	
		ROG	NO_X
Spare The Air (on-going)	To be implemented through 2016	0.04	0.03

*Emission reductions estimated for Sacramento County for 2016 on average Spare The Air day.

Cost Effectiveness

The cost effectiveness of the Spare The Air program can be estimated for the next triennial period. This program currently costs approximately $600,000 per year. There is a commitment to continue the program funding.

Assuming 1% of projected 1.6 million Sacramento Federal Ozone Nonattainment licensed drivers each reducing 3 trips per STA day in 2016, and assuming that a typical ozone season has 6 STA days per year at a projected annual cost of about $600,000 for the STA Program, the cost effectiveness is approximately $953,000 per ton of combined ROG and NO_X emission reductions for the Sacramento region. The cost effectiveness will actually vary from year to year due to the variable emission reductions that are dependent on the number of Spare The Air days and public response.

Pollutant	Cost Effectiveness ($/ton)
ROG	**$ 1,788,000**
NO_X	**$ 2,040,000**
ROG + NO_X	**$ 953,000**

Note that this cost effectiveness is much higher than would generally be acceptable. This measure provides other valuable benefits including;

1) education to motivate behavior changes which result in longer term benefits that aren't quantified here,
2) protection of public health by providing tools to media, businesses, and individuals to take action during high pollution episodes, and
3) building and maintaining public support for other emission-reducing measures such as Blueprint, rules and ordinances that air district Boards, the SACOG Board, and local jurisdictions will consider to fulfill their SIP obligations.

Authority

Potential Implementing Agency	Agency Type	Authority Origin
SMAQMD	Local	Coordinates the program on behalf of the air districts in the Sacramento Federal Nonattainment Area (SFNA). **§ 41014. Programs or projects to control transportation emission** The Sacramento district may conduct public education, marketing, demonstration, monitoring, research, and evaluation programs or projects with respect to transportation emission control measures. www.arb.ca.gov/bluebook/bb06/hea41014/hea_41014.htm
All SFNA districts and SACOG	Local/Regional	These agencies provide funding for the program. SACOG is the regional agency that coordinates flow of federal transportation funding (currently Congestion Management and Air Quality) that supports this program. Air districts provide the local match funding required by the funding source.

References

SMAQMD et al. 2013 Revision to the *Sacramento Regional 8-Hour Ozone Attainment and Reasonable Further Progress Plan, Appendix D*. Sacramento Metropolitan Air Quality Management District: Sacramento, CA. 26 September, 2013

Description of SMAQMD

"Further Study Measures"

Transportation Control Measure:

Further Study Measure: Additional Transit: Light Rail and Bus Rapid Transit

Control Measure Description

Vehicle trips and vehicle miles traveled continue to increase at a rate of approximately double the rate of population growth. These increases in vehicle use can lessen the benefits that have been achieved through technology. Transit, particularly light rail transit and bus rapid transit, can assist in reducing vehicle trips and associated emissions. All transit programs being developed or implemented continue to be evaluated to determine whether they can be included actual control measures.

Constraints on operating funds have limited the ability to implement new service, and unfortunately, many transit operators have underserved communities. The need to continually address a variety of service requirements to maintain service limits the amount of growth in these types of facilities that can be accommodated.

The SMAQMD will work with Regional Transit and the Sacramento Area Council of Governments to support new light rail facilities and bus rapid transit routes.

Additional Transit

The Additional Transit further study control measure is a continuous process. The District is currently tracking light rail extension projects.

Sacramento Regional Transit plans to extend the light rail transit system 13 miles from downtown Sacramento through Natomas to the Sacramento International Airport (known as the DNA project). The extension to Richards Boulevard (Township 9) was completed in June 15, 2012 as part of the “Downtown, Natomas, Airport Green Line”, and added 1.1 miles to the Regional Transit Rail system at a cost of $44 million. The DNA project would result in a daily VMT reduction from the regional fleet of 17,232 miles when it is completed in 2027.

The South Line Phase II project, a 4.3 mile extension of the Blue line to Cosumnes River College is under construction and anticipates beginning revenue service in September 2015.

The West Sacramento to Sacramento Downtown Streetcar project is currently unfunded and does not have a projected opening date.

Recommendation

SMAQMD will continue to help identify and promote the air quality benefits of new transit projects. District staff will also track and compile information on additional transit projects from transit agencies and local jurisdictions during the next triennial period through 2016.

References

SacRT. *Final Environmental Impact Report. DNA Light Rail Transit MOS-1 Project.* Sacramento Regional Transit: Sacramento, CA. April, 2009. Web. 4 June 2014. < http://www.sacrt.com/dna/news/default.html>

Transportation Control Measure:

Further Study Measure: Promote Bicycle and Pedestrian Programs

Control Measure Description

Bicycle and Pedestrian Master Plans have been or are being developed for many of the jurisdictions within the Sacramento area. The goal of these plans is to create a regional bicycle and pedestrian system with an emphasis on improving conditions for both bicycling and walking in the area. The District has been involved in the development of these plans and has worked to ensure their consistency and interconnectivity.

Implementation of the projects identified in the plans improve air quality by encouraging people to walk or ride a bicycle rather than use a vehicle for some trips. Considered cumulatively, the projects can result in a considerable reduction in emissions. However, it is not currently feasible to quantify specific emission reductions in this report due to considerable staff resources that would be necessary to track the construction and use of individual bicycle and pedestrian projects.

Bicycle and Pedestrian Programs in Sacramento County

Bicycle and pedestrian programs continue to be implemented throughout the District, primarily through the implementation of Bicycle Master Plans and Pedestrian Master Plans adopted by each local jurisdiction as listed in the following table.

In 2011, the Cities of Sacramento, Rancho Cordova, Citrus Heights, and Galt updated their Bicycle Master Plans. County of Sacramento and Sacramento Area Council of Governments (SACOG) updated their Bicycle Master Plans in 2012 and 2013 respectively. City of Citrus Height and SACOG adopted and updated their Pedestrian Master Plans in June 2011 and March 2013 respectively.

Jurisdictions with Bicycle Master Plans in Sacramento County (SACOG, 2013)

Jurisdiction	Bicycle Master Plan
County of Sacramento	Adopted 1991. Updated April 2011. Amended January 2012
City of Sacramento	Adopted 1991. Updated 2011.
City of Rancho Cordova	Adopted March 2011.
City of Elk Grove	Adopted July 2004. Update expected 2014 (Joint Bicycle/Pedestrian Plan).
City of Citrus Heights	Adopted December 2008. Updated March 2011.
City of Folsom	Adopted November 2002. Updated July 2007.
City of Galt	Adopted May 2002. Updated March 2011.
SACOG	Regional Bicycle, Pedestrian, and Trails Master Plan adopted November 2004. Amended July 2007 and August 2009. Updated June 2013.

Jurisdictions with Pedestrian Master Plans in Sacramento County

Jurisdiction	Pedestrian Master Plan
County of Sacramento	Adopted 2007.
City of Sacramento	Adopted July 2006 Updated in February 2008
City of Rancho Cordova	Adopted March 2011.
City of Elk Grove	Adopted July 2004. Update expected 2014 (Joint Bicycle/Pedestrian Plan).
City of Folsom	Adopted 2007.
SACOG	Regional Bicycle, Pedestrian, and Trails Master Plan adopted November 2004. Amended July 2007 and August 2009. Updated June 2013.

Bike Share Program

In 2012, the Sacramento Metropolitan Air Quality Management District partnered with a variety of agencies to create Bike Share Business Plan for a bike share system in the Sacramento area. Bike share is a non-motorized transportation service structured to provide users point-to-point transportation for short distance trips (0.5 to 3 miles). It provides users the ability to pick up a bicycle at any self-serve bike share station in the network and return it to any other bike share station. The pilot bike share system will serve areas of Sacramento, West Sacramento, and Davis with an approximate total of 88 stations, 1,320 docking points, and 616 bike share bicycles. The Business Plan demonstrates that a Bike Share system is feasible for the Sacramento Area. The District used this plan to apply for Federal Funding through SACOG in 2013. This application was successful and the District was allocated approximately $4.0 million dollars in combined funding to launch a bike share system. The District is currently working with SACOG, CALTRANS, and others to utilize the federal funding allocation to implement the System.

Recommendation

As these bicycle and pedestrian programs are implemented and specific funding commitments are made, they will continue to be examined for inclusion into the ozone planning effort towards progress to attainment.

References

SACOG. *Regional Bicycle, Pedestrian, and Trails Master Plan*. Sacramento Area Council of Governments: Sacramento, CA. 20 June 2013.

Appendix B
Exposure Indicators

Exposure Indicators

The exposure indicators are the population-weighted exposure (PWE) indicator and the area-weighted exposure (AWE) indictor. These indicators provide an indication of the potential for chronic adverse health impacts. Unlike the EPDC, which tracks progress at individual locations, the population-weighted and area-weighted exposure indicators consolidate hourly ozone measurements from all sites within the district into a single exposure value. The resulting value represents the average potential exposure in an area, which in this case, is a district. The term "potential" is used, because daily activity affects an individual's exposure. For example, being indoors during the hours of peak ozone concentration will decrease a person's exposure to outdoor concentrations.

The population-weighted exposure indicator characterizes the potential average annual outdoor exposure per person, to concentrations above the level of the State ozone standard. The population-weighted exposure indicator represents a composite of exposures at individual locations that have been weighted to emphasize equally, the potential exposure for each individual in the district. In contrast, the area-weighted exposure indicator characterizes the potential average annual outdoor exposure per unit area. The area-weighted exposure indicator represents a composite of exposures at individual locations that have been weighted to emphasize equally, the potential exposure in all parts of the district.

Both exposure indicators are based solely on ambient (outdoor) ozone data. The calculation methodology assumes that an "exposure" occurs when a 1-hour ozone measurement is higher than 0.09 ppm, the level of the State 1-hour ozone standard. The PWE and AWE consider both the level and the duration of hourly ozone concentrations above the State standard. The resulting annual exposure indicator is the sum of all the hourly exposures during the year and presents the results as an average per exposed person (PWE indicator) or average per exposed unit of land area (AWE indicator).

Overview of Calculation Methodology for the Population-Weighted and Area-Weighted Exposure Indicators

- **The Time Period:** The population-weighted and area-weighted exposure indicators are computed as an annual value for each year.
- **Air Quality Data:** Hourly ozone data are used for computing the exposure indicators. All available data for sites in the district are used, regardless of whether the data are complete and representative. Because the individual exposure values are interpolated from data for several monitoring sites, it is not critical that the data for all the sites be complete for all hours.
- **Census Data:** The exposure computations utilize census data collected by the federal government. Indicators for 1999 and earlier reflect 1990 census data,

indicator values for 2000 through 2009 reflect 2000 census data, and indicator values for 2010 and 2011 reflect 2010 census data. The federal government has divided the nation into census tracts for the purpose of counting population and obtaining demographic information. Each of these census tracts has the following associated data: (1) the centroid of the census tract, (2) the population residing within the census tract, and (3) the land area of the census tract. The population within each census tract is used in computing population-weighted exposure, whereas, the land area of the census tract is used in computing area-weighted exposure. The centroid of the census tract is used in computing both exposure indicators.

- **Calculation Procedure for Population-Weighted Exposure:** Hourly ozone concentrations are interpolated to each census tract centroid. Hourly ozone exposures are then computed for each centroid by subtracting the value of the State 1-hour ozone standard (0.09 ppm) from each interpolated hourly concentration. If negative, the result is set equal to zero, and there is no exposure. The hourly exposures for each census tract are multiplied by the number of people residing in the census tract. These hourly exposures are then added together and divided by the total population of all of the census tracts for which interpolated exposure values are available. The result represents an hourly population-weighted exposure for the district. The hourly exposures are aggregated into a daily population-weighted exposure. The daily exposures are then aggregated into an annual population-weighted exposure.
- **Calculation Procedure for Area-Weighted Exposure:** The procedure for computing the area-weighted exposure indicator is similar. In this case, the hourly exposures for each census tract are multiplied by the square kilometer land area of the census tract. Again, exposures below the level of the State 1-hour ozone standard are set to zero. The hourly exposures are added together and divided by the total land area of all of the census tracts for which interpolated exposure values are available. The result represents an hourly area-weighted exposure for the district. The hourly exposures are aggregated into a daily area-weighted exposure. The daily exposures are then aggregated into an annual area-weighted exposure. This is done for each year for which data are available.