3.0 VOC ANALYSIS METHODS

This Section describes the analysis of the 2009/2010 OTC control measures to reduce VOC emissions from four source categories:

1. Stationary Above Ground Storage Tanks
2. Consumer Products/CARB 2006 Amendments
3. Motor Vehicle and Mobile Equipment Non-assembly Line Coating Operations
4. Architectural, Industrial and Maintenance Coatings.

For each of the categories, there are separate subsections that discuss existing Federal and state rules, summarize the requirements of the model OTC control measures, and describe the methods used to quantify the emissions reduction benefit, provide an estimate of the anticipated costs of the control measure, and identify other emissions reduction benefits.

3.1 Stationary Above Ground Storage Tanks

The OTC model rule addresses high vapor pressure volatile organic compounds (VOCs), such as gasoline, stored in large aboveground stationary storage tanks, which are typically located at refineries, terminals and pipeline breakout stations. On June 3, 2010, the OTC adopted a Resolution, wherein member states agreed to pursue, as necessary and appropriate, state-specific rulemakings to update state rules in accordance with the 2009 OTC Stationary Above Ground Storage Tanks Model Rule.

The available control measures can be grouped into five categories: deck fittings and seals, domes, roof landings, degassing and cleaning, and inspection and maintenance. These are described below:

- **Deck fittings**: Evaporative losses can occur from deck fittings, particularly slotted guidepoles, and rim seal systems. Control measures include gasketing deck fittings, installing pole sleeves and floats on slotted guidepoles, and gap requirements for rim seals.
- **Domes:** Wind blowing across external floating roof tanks causes evaporative losses. The proposed control measure is to install domes on external floating roof tanks that have contents with vapor pressure greater than 3 psia at 70 degrees F, excluding crude oil, slop oil, and wastewater.
- **Roof landing Controls:** When enough liquid is removed from a floating roof tank such that the roof is lowered to the height at which it is lowered no further (i.e., the roof rests on its legs or suspended by cables or hangers), the contact between the floating roof and the liquid VOC is broken as the remaining liquid is removed. This is referred to as a "roof landing." A vapor space is created between the floating roof and the liquid surface, which enables vapors from the VOC remaining in the tank to accumulate. These vapors escape from the vapor space as the tank is sitting idle and when they are displaced during refilling. Also, some of the liquid VOC being used to refill the tank may evaporate and be expelled from the tank during refilling. For gasoline storage tanks, emissions generally range from 0.25 tons to 3 tons or more per roof landing. Control options include requiring use of lowest lander height setting for in-service roof landings (to minimize the vapor space) and, for tanks with landing emissions over 5 tons/year, installation of vapor recovery/control for use when roof is landed or modifying the tank to reduce the landed height less than one foot (implemented over 10-year period).

- **Degassing and Cleaning:** VOC stationary storage tanks must be cleaned periodically. Before a tank is cleaned, it must be degassed (which is the removal of gases, such as gasoline vapor) so personnel can safely enter to clean the tank and remove accumulated sludge. The sludge removed from the tank can contain residual VOC liquid that may evaporate when exposed to the atmosphere. Measures include control of emissions during degassing and controlling exhaust from sludge receiving vessels (such as vacuum trucks). In New Jersey's adopted rule, the control measures are only required during ozone season (beginning 2010).
- **Inspection and Maintenance:** An inspection and maintenance program to reduce VOC emissions by assuring that tank components are in good condition and operating properly.

3.1.1 Federal Standards

Certain storage tanks are subject to Federal Standards, such as New Source Performance Standards (NSPS) Subparts K, Ka, and Kb, as well as Maximum Available Control Technology (MACT) Subpart R (Gasoline Terminals and Pipeline Breakout Stations), 40 CFR 63 Subpart BBBBBB (Area Source Gasoline Terminals and Pipeline Breakout Stations), Subpart WW (Storage Tanks), and MACT Subpart CC (Petroleum Refineries). There is some overlap between the model rule and these Federal standards, particularly with regard to deck fitting, seal, and tank inspection requirements, but the Federal standards don't generally address roof landings and tank cleaning, and they don't require external floating roof tanks to be covered with domes, as the model rule does.

3.1.2 The OTC Measure

The OTC model rule has proposed the following controls by category:

- **Deck fittings, seals:** Gap width requirements for deck fitting gaskets and rim seals, pole sleeves and floats on slotted guidepoles (based on South Coast Air Quality Management District [SQAMD] Rule 1178, similar to MACT WW). Can result in up to 80% reduction in standing loss emissions on external floating roof tanks.
- **Domes:** Installing domes on external floating roof tanks can result in about 60% reduction of emissions remaining after deck fittings upgraded.
- **Roof Landing Controls:** Options include use of a vapor recovery and control system for roof landings, or minimizing the vapor space by reducing the lander height to one foot or less. The vapor recovery/control option in the model rule requires 90% control until the floating roof is within 90% by volume of being refloated for a total of 81% control. Lowering landing height to one foot or less can result in 60% to 100% reduction in roof landing cycle emissions, depending on how tank is operated (drained dry or heal remaining).
- **Cleaning and Degassing:** The model rule requires 95 percent control of emissions during degassing, until concentration level in tank is 5,000 ppm as methane, and control of exhaust from receiving vessel (e.g. vacuum truck). The model rule requires compliance with this provision ten years from adoption. However, it can be reasonable to require compliance sooner, within one to two years after adoption, as this provision does not require physical modifications to a tank. This time frame is sufficient to give facilities time to arrange for control contractors and obtain necessary permits. In New Jersey, the requirement, which only applies during ozone season, began in 2010.

- **Inspection and Maintenance:** For external floating roof tanks, the rule includes full inspection of gap widths for deck fittings and secondary seals annually and of primary seals every five years. For internal floating roof tanks, the model rule includes annual visual inspection (without entering tank) and full inspection of deck fitting and seal gaps each time the tank is emptied and degassed (no less than every 10 years).

3.1.3 Emissions Reduction Benefit

AP-42 (TANKS) can estimate reductions from deck fitting, seal, and doming requirements. The methodology in AP-42 Chapter 7.1.3.2.2 (added November 2006) is used to estimate losses from uncontrolled floating roof landings. Estimated reductions for New Jersey, which the OTC rule was based on, total approximately 2,000 tons per year by 2020. Projected reductions include 1,400 tons per year from roof landings, 265 tons per year from controlling tank cleaning and degassing, 187 tons per year from the deck fitting and seal measures, and 130 tons per year from installing domes on external floating roof tanks. Roof landing emissions in New Jersey totaled over 2,000 tons in 2006. Some facilities did not report roof landing emissions prior to that year.

The reductions in New Jersey come from 860 floating roof tanks, with an average capacity of about 3.4 million gallons. This works out to a reduction of 2.3 tons/tank, or 0.68 tons per million gallons of tank capacity. These figures might be used to extrapolate reductions to other states.

3.1.4 Control Cost Estimate

In its August 4, 2008 rule proposal, NJDEP estimated the cost of the various measures to range from $3,000/ton of VOC reduced to $29,000/ton of VOC reduced.

The New Jersey Department of Environmental Protection (NJDEP) estimated that retrofitting guidepoles and upgrading other deck fittings on external floating roof tanks storing an applicable VOC has a cost-effectiveness, in 2001 dollars, of $29,000 per ton of VOC emissions reduced, based on a cost of $10,000 to retrofit a slotted guidepole with pole sleeves, cover and wipers, and $500.00 per fitting to upgrade other deck fittings (South Coast 2001 Report). Installing gasketed covers or flexible fabric sleeves on each roof column or well and upgrading the other deck fittings on an internal floating roof tank has a cost-effectiveness of $6,000 per ton of VOC removed in 2001 dollars (South Coast 2001 Report). NJDEP estimates that upgrading the seals on any floating roof tank storing an applicable VOC has a cost-effectiveness of $13,200 per ton of VOC reduced as the tank is filled an emptied, in 2001 dollars (South Coast 2001 Report). However, NJDEP expects that most floating roof tanks are already in compliance with the proposed seal requirements.

For doming external floating roof tanks, the NJDEP estimated the cost-effectiveness at $12,036 per ton of VOCs reduced in 2001 dollars, based on a SCAQMD 2001 report. American Petroleum Institute comments on the OTC model rule claim that doming costs $47,000 per ton. A BP refinery in Carson, CA reported that it spent $15.4 million dollars to dome 32 external floating roof tanks. Improved deck fittings and installing domes provide additional benefits that would affect a tank's operating expenses by protecting floating roofs from the weather, reducing maintenance, reducing wastewater, reducing risk of product contamination, and reducing risk of tank fires.

One possible modification to address roof landings is to include replacing an existing floating roof with one that has an opening to accommodate a vapor recovery line that would go to a vapor control device. This is currently being done in parts of California, such as in the SCAQMD, and in Texas. Also, there are now several floating roof tanks so equipped in New Jersey. Another possible modification is to retrofit a tank to meet the landing height requirement. This might be cost prohibitive if this would require piping, sumps or other hardware to be placed underneath the tank. The remaining tanks will not be required to be modified because their roof landing emissions are below five tons per year.

Cost-effectiveness estimates for performing these modifications and operating the installed controls varies from $2,288 to $20,000 per ton of VOC reduced based on tank size, based on the SCAQMD 1987 report and the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) 2005 Report. Smaller tanks have a higher cost-effectiveness, while larger tanks have lower cost effectiveness figures. The South Coast 1987 Report estimated the cost-effectiveness to be $4,000 to $20,000 per ton of VOC reduced; the San Joaquin 2005 Report estimated the cost-effectiveness to be $2,288 to $4,290 per ton of VOC reduced; and the Bay Area Air Quality Management District (BAAQMD) 1997 Report estimated the cost-effectiveness to be $3,000 per ton of VOC reduced. The BAAQMD 1997 Report estimate included the cost of converting an external floating roof tank to an internal floating roof tank, as well as the cost of vapor control. Its low cost estimate resulted from the estimate being performed on a large tank, approximately five million gallons.

The estimated cost to control emissions during a degassing operation is $6,283 to $11,781 for a 62,832-barrel floating roof tank, with a cost-effectiveness of $2,288 to $4,290 per ton of VOC emissions reduced (San Joaquin 2005 Report). There will be additional cost for tank cleaning that can vary significantly depending upon tank size, contents stored, liquid heel height, sludge level and solids content. The proposed degassing amendments will affect tanks greater than 40,000 gallons in size that store primarily gasoline, ethanol or methyl-tertiary-butyl-ether (MTBE). The larger the tank and the higher the vapor pressure of the stored contents, the lower the cleaning cost per ton of emissions.

In New Jersey, NJDEP expects costs for inspections to be minimal because most owners or operators are already required to perform inspections under Federal NSPS regulations and/or MACT regulations. The proposed inspection requirements can be performed concurrently with the other inspections.

The proposed new rules and amendments may have a small affect on gasoline prices at the pump. In New Jersey, NJDEP estimated that the overall annualized compliance cost-effectiveness to this industry in its entirety would be a maximum of $58,000,000 for 2,000 tons per year of VOC reductions in 2018. Throughput of gasoline in these tanks in 2006 exceeded ten billion gallons. Based on that figure, if owners or operators of VOC stationary storage tanks pass on compliance costs to distributors and retailers, the Department would expect gasoline prices at the pump to increase less than $0.01 per gallon. Some tank owners or operators may not choose to pass some or all of these costs on to distributors and retailers. Distributors and retailers may be

impacted if the potential increase in costs of gasoline increases their expenses and dampens demand.

3.1.5 Emissions Reduction Benefits for Other Pollutants

The OTC model rule will also reduce other VOC Hazardous Air Pollutants (HAPs), such as Benzene. VOC can also be a precursor to PM-2.5, so levels of that pollutant may be reduced as well.

3.2 Consumer Products/2006 CARB Amendments

The OTC revised model rule for consumer products is based on the California Air Resources Board's (CARB) 2006 Consumer Products Regulatory Amendments that were adopted by CARB on November 17, 2006. The majority of the 2006 amendments had an effective date of December 31, 2008, while the remainder had an effective date of December 31, 2010. On June 3, 2010, the OTC adopted a Resolution, wherein member states agreed to pursue, as necessary and appropriate, state-specific rulemakings to update state rules in accordance with the OTC Consumer Products Model Rule with the 2006 CARB Amendments.

The CARB 2006 amendments have more restrictive VOC limits for 13 existing consumer product categories (including subcategories) and three new categories (disinfectant, sanitizer and temporary hair color; including subcategories) will be regulated for the first time with VOC limits. Hand sanitizers were not included in CARB's amendments because representatives from the Centers for Disease Control (CDC), California Department of Health Services (DHS), and the Food and Drug Administration (FDA) indicated that regulating hand sanitizers would not be appropriate. The amendments also clarified or modified previously defined or regulated categories including prohibiting the use of chlorinated toxic compounds in certain consumer product categories (Construction, Panel, and Floor Covering, Oven Cleaner, General Purpose Cleaner, and Bathroom and Tile Cleaner).

3.2.1 Federal Standards

Not applicable to this rule.

3.2.2 The OTC Model Rule

The revised model rule would achieve VOC reductions through reformulation of the affected product categories by the manufacturers. This may involve switching to a water based formulation, using an exempt solvent, increasing product solids, or formulating with a non-VOC propellant. Manufacturers can still comply with the proposed model rule through the use of the Innovative Products Exemption (IPE) or the Alternate Control Plan (ACP).

The revised model rule for consumer products would apply to anyone who sells, supplies, offer for sale, or manufactures consumer products for use in an OTC member jurisdiction. The rule applies across a vast range of consumer products that are used across the OTC.

3.2.3 Emissions Reduction Benefit

CARB's 2006 amendments partially fulfill CARB's commitment for CONS-2 and will achieve 11.5 tons per day (TPD) in VOC emission reductions statewide by 2010. New York State's (NYS) VOC emission reductions in 2010 would be estimated at 5.8 TPD, which is based on the projected population for both California and NYS in 2010 by the U. S. Census Bureau.

3.2.4 Control Cost Estimate

CARB estimated the cost effectiveness of the proposed VOC limits to be about $2.35 per pound of VOC reduced and the total cost incurred by industry to comply with this regulation to be about $20 million per year. CARB expects most manufacturers to be able to absorb the added costs without an adverse impact on their profitability and the estimated average increase in cost per unit to the manufacturer to be about $0.06.

3.2.5 Emissions Reduction Benefits for Other Pollutants

The OTC is proposing to prohibit the use of Methylene Chloride, Perchloroethylene and Trichloroethylene in the following consumer product categories: 1.) construction, panel, and floor covering adhesive, 2.) oven cleaner, 3.) general purpose cleaner, 4.) bathroom and tile cleaner.

3.3 Motor Vehicle and Mobile Equipment Non-assembly Line Coating Operations

The 2009 OTC model rule for Motor Vehicle and Mobile Equipment Non-assembly Line Coating Operations (2009 OTC MVME Model Rule) seeks to limit the VOC content in coatings and cleaning solvents used in motor vehicle and mobile equipment non-assembly line coating operations. Implementation of the 2009 OTC MVME Model Rule will reduce VOC emissions by limiting the VOC content of coatings and cleaning solvents, and will provide work practice standards for preventing emissions from equipment cleaning and cleaning supply storage. On November 5, 2009, the OTC adopted a Resolution, wherein member states agreed to pursue, as necessary and appropriate, state-specific rulemakings to update state rules in accordance with the 2009 OTC MVME Model Rule.

3.3.1 Federal Standards

Federal standards for autobody refinishing facilities were finalized in 1998 and can be found at 40 CFR Part 59, Subpart B. The 1998 federal standards apply only to manufacturers and importers of automobile refinish coatings or coating components which are manufactured for sale or distribution in the United States. The VOC content limits in the federal standards for automobile refinish coatings and coating components were estimated to result in a 37% emissions reduction from uncontrolled 1998 emissions at an estimated cost of $118 per ton of VOC emissions reduced in 1990 dollar figures.

3.3.2 The OTC Model Rule

3.3.2.1 The 2002 OTC MERR Model Rule

The 2002 OTC Mobile Equipment Repair and Refinishing (MERR) Model Rule was developed from the Pennsylvania regulation found at Title 25 Pa. Code § 129.75, relating to mobile

equipment repair and refinishing, which was effective November 27, 1999 (29 Pa.B. 6003) and had a compliance date of November 27, 2000. The 2002 OTC MERR Model Rule has been adopted by most states across the OTR.

The 2002 OTC MERR Model Rule applies to people who apply mobile equipment repair and refinishing or color matching coatings to mobile equipment or mobile equipment components. The estimated control cost for the 2002 OTC MERR Model Rule was $1,534 per ton of VOC emissions reduced across the OTR.

3.3.2.2 The 2009 OTC MVME Model Rule

The 2009 OTC MVME Model Rule is an update of the 2002 OTC MERR Model Rule. The OTC developed the 2009 OTC MVME Model Rule using the CARB 2005 Suggested Control Measure (SCM) for Automotive Coatings as a guideline.

The 2009 OTC MVME Model Rule applies to people who supply, sell, offer for sale, distribute, manufacture, use or apply automotive coatings and associated cleaning solvents subject to the Model Rule. The new model rule limits the VOC content of coatings used in non-assembly line coating operations and limits the VOC content of cleaning solvent to 25 g/l. The 2009 OTC MVME Model Rule allows the use of higher VOC content cleaning solutions for special uses and sets lower VOC content limits for many of the formulations used which results in switching from solvent-based formulations to water-based formulations. Additionally, the new model rule continues the requirements for the use of high transfer-efficiency painting methods found in the 2002 OTC MERR Model Rule. The 2009 OTC MVME Model Rule has a recommended compliance date of January 1, 2012. The estimated control cost for the 2009 OTC MVME Model Rule is $2,680 per ton of VOC emissions reduced across the OTR.

3.3.3 Emissions Reduction Benefit

3.3.3.1 Emissions Reduction Benefit

The control measures in the 2002 OTC MERR Model Rule were estimated to result in emission reductions of 38% from 2002 OTC baseline emissions (post-1998 federal standard emissions). From a 2002 OTC baseline of 28,483 tons, this measure resulted in a VOC emission reduction of approximately 10,824 (38% x 28,483) tons across the OTR.

The 2009 OTC MVME Model Rule incorporates control measures from the CARB 2005 SCM. The CARB 2005 SCM estimates a 65% reduction in VOC emissions from 2002 CARB baseline emissions, which are post-1998 federal standard emissions. Unlike California, most of the OTC states adopted the 2002 OTC MERR Model Rule, which provided additional emission reductions from the 1998 federal standards baseline, with all reductions achieved by January 1, 2009. Similar reductions of 65% are expected from implementation of the 2009 OTC MVME Model Rule. The emission reductions expected from implementation of the 2009 OTC MVME Model Rule are based on the 2009 OTC remaining emissions that resulted after implementation of the 2002 OTC MERR Model Rule. From the 2009 OTC remaining emissions of 17,659 tons, the 2009 OTC MVME Model Rule is estimated to provide a VOC emission reduction of approximately 11,478 (65% x 17,459) tons across the OTR after implementation by the OTC states.

The 2005 CARB SCM recommends a VOC content limit of 25 g/l for solvent used for surface preparation and cleanup. Emission reduction estimates resulting from this limit were not quantified by CARB because usage data for this category was not collected by CARB during the development of the SCM.

3.3.3.2 Emission Reduction Estimation Methodology

The 2002 baseline emissions are calculated using data from the 2002 MANE-VU inventory (http://www.marama.org/visibility/Inventory%20Summary/2002EmissionsInventory.htm). The 2002 OTC baseline emission estimate of 28,483 tons is the total of the emissions reported for SCC 2401005-xxx by the District of Columbia and the following states: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. Emissions from the northern Virginia counties included in the OTC were not included in this calculation because emissions from Virginia were not included in the 2002 MANE-VU Inventory.

The emission reduction estimate for the 1998 federal standards and the uncontrolled OTC emissions prior to 2002 were calculated inversely from the 2002 OTC baseline emissions. The uncontrolled OTC emissions were calculated using the following equation:

(2002 OTC Baseline) / ((100 - the percent reduction)/100) = Uncontrolled OTC emissions prior to 2002

28,483 tons / ((100 - 37)/100) = 45,211 tons

The 2002 OTC emission reduction due to implementation of the 1998 federal standards was calculated by finding the difference between the 2002 OTC baseline emissions and the uncontrolled OTC emissions prior to 2002.

Uncontrolled OTC emissions - 2002 OTC Baseline = 2002 OTC Reduction
45,211 tons – 28,483 tons = 16,728 tons

The 2002 OTC MERR Model Rule estimated a 38% reduction from 2002 OTC baseline emissions. The 2009 OTC reduction from implementation of the 2002 OTC MERR Model Rule was calculated using the following equation:

(2002 OTC Baseline) * (the percent reduction / 100) = 2009 OTC Reduction
28,483 tons * (38 / 100) = 10,824 tons

The 2009 OTC remaining emissions are calculated using the following equation:

(2002 OTC Baseline) – (2009 OTC Reduction) = 2009 OTC Remaining
28,483 tons – 10,824 tons = 17,659 tons

The CARB 2005 SCM estimates a 65% reduction in VOC emissions. The 2009 OTC MVME Model Rule is very similar to the CARB 2005 SCM, so a 65% reduction in VOC emissions from the 2009 OTC remaining emissions is expected in the OTR after implementation of the 2009 OTC MVME Model Rule, which has a recommended compliance date of January 1, 2012. The

2012 emission reduction from implementation of the 2009 OTC MVME Model Rule is calculated using the following equation:

(2009 OTC Remaining) * (the percent reduction / 100) = 2012 OTC Reduction
17,659 tons * (65 / 100) = 11,478 tons

The 2012 OTC remaining emissions are calculated using the following equation:

(2009 OTC Remaining) – (2012 OTC Reduction) = 2012 OTC Remaining
17,659 tons – 11,478 tons = 6,181 tons

3.3.4 Control Cost Estimate

The control cost estimate for the 2009 OTC MVME Model Rule, as estimated in the CARB 2005 SCM Staff Report, is $2,680 per ton of VOC emissions reduced. The EPA issued a final rule for National Emission Standards for Hazardous Air Pollutants: Paint Stripping and Miscellaneous Surface Coating Operations at Area Sources, referred to as the H6 MACT, on January 9, 2008. The H6 MACT requires training for coating applicators, identifies approved spray application techniques and specifies minimum equipment requirements. The CARB 2005 SCM estimate includes costs for training and equipment that may already be required under the H6 MACT rule. Actual costs may be significantly lower than the CARB 2005 SCM estimate. However, there is currently no way to quantify the difference without additional information about each potentially affected facility's compliance with the requirements of the H6 MACT.

3.3.5 Emissions Reduction Benefits for Other Pollutants

The proposed measure does not directly reduce other criteria pollutants. However, some VOCs are also considered hazardous air pollutants (HAP). The 2009 OTC MVME Model Rule would decrease HAP emissions through coating reformulation and solvent substitution, and increased coating application efficiency.

3.4 Architectural, Industrial and Maintenance Coatings

The OTC developed its 2002 Architectural and Industrial Maintenance (AIM) Coatings model rule based upon the 2000 CARB Suggested Control Measure (SCM). In 2007, CARB proposed an updated SCM for Architectural Coatings, which generally lowers VOC emissions through product reformulation and improves definitions of many categories from the 2000 SCM. Of the 47 coating categories regulated in the 2000 SCM, 15 categories have been eliminated (replaced by new categories or deemed unnecessary), 10 categories were added, and 19 have stricter VOC limits. The updated SCM also contains some revised compliance and reporting requirements.

The OTC reviewed the 2007 CARB SCM and found that most of the changes were appropriate for the OTC. Although, there are some categories which are specific to the ozone transport region (OTR) which are added, as well as some categories which the OTC assigned different limits. On June 3, 2010, the OTC adopted a Resolution, wherein member states agreed to pursue, as necessary and appropriate, state-specific rulemakings to update state rules in accordance with the 2009 OTC Architectural, Industrial and Maintenance Model Rule.

3.4.1 Federal Standards

CARB originally approved an SCM for architectural coatings in 1977 and has amended it in 1985, 1989 and 2000. On August 14, 1998, EPA issued the final version of their National Volatile Organic Compound Emission Standards for Architectural Coatings under Section 183(e) of the Clean Air Act. This final rule applied only to manufacturers and importers of architectural coatings, and set VOC content limits for 61 coating categories. This rule specifically allowed states or local governments to adopt more stringent coating limits.

The OTC adopted an AIM Model Rule in 2002—more stringent than the national rule, and based primarily on the 2000 CARB SCM. This model rule has presently been adopted by nearly every OTC state. EPA plans to finalize an updated national AIM regulation, which is expected to incorporate the limits of the 2002 OTC Model Rule.

3.4.2 The OTC Model Rule

The OTC model rule is an update of the 2002 Model Rule that has been adopted by most states across the OTR. The 2007 CARB Suggested Control Measure, which served as the basis for this model rule, has compliance dates of 1/1/2010 for 40 of 42 categories, and 1/1/2012 for the remaining 2 (though some of these limits have not changed from the 2000 SCM).

The OTC model rule shows an effective date of January 1, 2014. It includes all the new categories which were defined in the 2007 CARB SCM as well as the following 8 specialty coating categories which are specific to the Ozone Transport Region:

- Calcimine Recoaters
- Conjugated Oil Varnish (new addition)
- Concrete Surface Retarders
- Conversion Varnish
- Impacted Immersion coatings
- Nuclear Coatings
- Reactive Penetrating Carbonate Stone Sealer (new addition)
- Thermoplastic Rubber Coatings and Mastics

Six of the above eight coating categories were added into the 2002 AIM model rule Preamble and the justification for these coatings can be found there. Two are new to the AIM rule for this proposal, Conjugated Oil Varnish and Reactive Penetrating Carbonate Stone Sealer. After lengthy discussions with stakeholders these two categories were added with the following justifications:

<u>Conjugated Oil Varnish</u>

Used in high end floor restoration/renovation and results in a unique finish which matches older varnish. This is a small volume niche category primarily applied by contractors and is generally more expensive compared to other consumer applied floor finish products (2007 CARB SCM, P5-211).

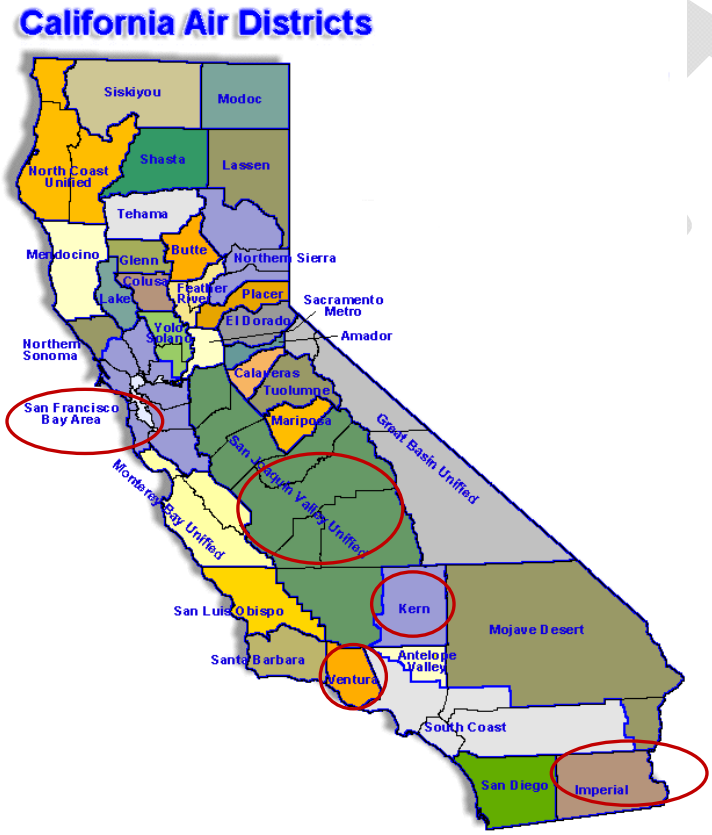
<u>Reactive Penetrating Carbonate Stone Sealer</u>

Carbonate stone is widely used in the Northeast as exterior and façade components to commercial and institutional construction. The Northeast United States has an estimated inventory of 50,000 buildings, 10,000 memorials and tens of millions of grave markers constructed of carbonate stone subject to acid rain degradation. This sealer is another small volume niche category which has a specific OTR use and the OTC recognizes the need for this category for historical preservation/renovation.

In addition, the following 3 specialty coating categories have higher limits in the OTC model rule when compared to the 2007 CARB SCM:

- Aluminum Roof
- Bituminous Rood
- Roof

The OTC has set higher limits than the 2007 CARB SCM on the above 3 roof coating categories. After lengthy discussions with stakeholders, CARB staff and careful review of the CARB SCM, OTC decided that lowering the VOC limit of these roof coatings at this time was not appropriate. Although the lower limit is listed in the 2007 CARB SCM, at the time of this review, only five California Air Districts had adopted the roof coating limits and they were all in warmer climates, Bay Area AQMD, San Joaquin Valley APCD, Ventura County APCD, Imperial County APCD, and Kern County APCD (see figure below). In addition, stakeholders felt that they could not, at this time, formulate roof coatings which would be effective. This category will be reviewed in the future and we anticipate lower limits at that time.



An item of note in consideration of this latest OTC AIM rule is the issue of quart exemptions. It was reported to the OTC that there were serious concerns about the exploitation of the quart exemption in the existing AIM regulation. OTC considered the complete elimination of the quart exemption, but after extensive stakeholder comment, did not completely eliminate the quart exemption. Although OTC felt that the language was clear, more emphasis was placed on what is meant by the quart exemption and the limitations. The new language makes it more clear that AIM coatings may not be bundled in quart containers and sold and marketed as a bundle. While the OTC understands that manufacturers will ship their quart containers to the resellers and end users with more than one container per shipment, they may not be bundled together and sold as a bundled unit.

The OTC model rule also contains transitional language which shows the new coating categories with their corresponding limits. This will allow manufacturers to develop products meeting the definition and limits of the new categories before the effective date of the rule.

3.4.3 Emissions Reduction Benefit

CARB performed an emissions reductions estimate to go along with its proposed SCM. The estimations were based on survey data of 2004 sales in California. CARB estimates that its proposed SCM will result in a 28 percent VOC emission reduction in the architectural coatings sector in areas of California that are affected by the SCM. Ninety-five percent of these VOC reductions result from more stringent limits on the nine largest coating categories (flat; non-flat; non-flat high gloss; concrete/masonry sealer; dry fog; primer/sealer/undercoater; rust preventative; specialty primer/sealer/undercoater; and wood coatings).

The 28 percent VOC emission reduction predicted by CARB equates to a reduction of 15.2 tons of VOC per day in California. By assuming a similar per-capita reduction, the adoption of these VOC limits throughout the OTR would yield reductions of approximately 50.3 tons per day.

The OTC also considered and included lowering the VOC limit of the Industrial Maintenance (IM) coating category. CARB proposed a strengthened limit of 250 g/L in its 2000 SCM, but the OTC has retained the previous limit of 340 g/L due to concerns about the ability to comply in the colder northeast. Because of the success of implementing the revised limit throughout California and the advent of t-butyl acetate as a delisted solvent, OTC believes a 250 g/L VOC limit is now feasible and has included this new lowered limit to the proposed model rule. Incorporating this 250 g/L limit yielded a VOC reduction of approximately 10 tons per day in the OTR, in addition to the previously discussed 50.3 tons per day. This estimated 60.3 ton per day overall VOC reduction equates to a per-capita reduction of 0.68 lbs on an annual basis.

3.4.4 Control Cost Estimate

For the proposed SCM, CARB did a study of affected businesses to determine the control costs that would be incurred. CARB estimates a per-limit cost-effectiveness ranging from a net savings to $13.90 per pound of VOC reduced, with an overall cost-effectiveness of $1.12 per pound of VOC reduced (2007 dollars). These values were based on the assumption that companies absorbed all costs (i.e., none were passed down to consumers) and may therefore be slightly inflated. CARB computed an average 2.1 percent decline in return on owner's equity (ROE—calculated by dividing net profit by net worth), and used this to gauge economic impact.

CARB felt that this should not significantly impact the profitability of most businesses, although it may have serious effects on the smallest operations. Overall, business profitability and job opportunities would not be significantly affected.

In addition to CARB's estimated costs related to the 2007 SCM, companies that sell coatings in OTC states will incur costs associated with lowering the VOC limit of the IM coating category. The 2000 CARB SCM calculated the cost-effectiveness of lowering the IM coating VOC limit from 340 g/L to 240 g/L to be $5.59 per pound of VOC reduced. Because companies have had to reformulate their IM coatings to comply with this standard in California, however, costs to reformulate in OTC states can be expected to be lower.

For the OTC, costs may be slightly minimized because the companies with nationwide sales will have already reformulated their products to meet the standards in California.

3.4.5 Emissions Reduction Benefits for Other Pollutants

VOC emissions are a precursor to PM. Some VOCs can also be categorized as toxic air contaminants.