South Coast Air Quality Management District

BOARD MEETING DATE: July 20, 2001 AGENDA NO. 26

PROPOSAL:

Annual Status Report on Rule 1113 – Architectural Coatings

SYNOPSIS:

At its August 13, 1999 meeting, the Board approved a workplan for implementing the amendments to Rule 1113. This report summarizes the activities of AQMD staff, the Working Group, Averaging/Niche Markets Sub-Group, and the Technical Advisory Committee. Progress made relative to the Essential Public Service Coating and other technology assessments are also reported.

COMMITTEE:

Stationary Source, June 22, 2001, Reviewed

RECOMMENDED ACTION:

1. Receive and file this report

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Executive Officer

Background

On May 14, 1999, the Governing Board approved amendments to Rule 1113 – Architectural Coatings, directing staff to work with industry to discuss certain concerns raised at the public hearing, and to report back to the Board in 90 days. On August 13, 1999, the Board approved staff's workplan to implement the May 1999 amendments. The workplan required annual status reports to be submitted to the Board that summarized all the issues and activities regarding the implementation of Rule 1113. The first report was submitted on July 21, 2000. This is the second annual report. In addition, this report also satisfies the technology assessment required by Rule 1113, paragraph (f)(3).

Between the May 1999 adoption and the August 1999 approved workplan, three lawsuits were filed challenging the amendments. The lawsuits were brought by Sherwin-Williams, the National Paint Coatings Association ("NPCA"), and the California Paint Alliance (incorporated as EL RAP). The AQMD has prevailed in all three lawsuits.

A number of regulatory actions have taken place since the last status report in July 2000. The California Air Resources Board (CARB) has successfully adopted a Suggested Control Measure (SCM) for Architectural Coatings, which includes the first tier lower limits adopted by the AQMD in May 1999, as well as the Averaging Compliance Option. However, CARB did adopt slightly higher limits for a few coating categories, even within the first tier. These are: high gloss non-flat coatings, specialty primers (including blocking stains), and floor coatings. (CARB's SCM did not include the second tier limits adopted by the AQMD to go into effect in July, 2002.) Subsequently, on May 24, 2001, the Sacramento Metropolitan AQMD amended its architectural coatings rule to implement the SCM.

The AQMD also held its second Architectural Coatings Technology Conference on July 12, 2000. Topics discussed included development of low-VOC wood coatings, reactivity issues relating to architectural coatings, less-polluting spray technology, low-VOC industrial maintenance coatings, and the status of exempt solvents. The conference was attended by over 80 individuals representing a wide variety of industries, including end-users.

This second annual report highlights staff's efforts in executing the workplan to implement the amendments. Specifically, it summarizes the activities of the various work groups and provides a status report on the on-going technology assessments. In the current technology assessment, the Technical Advisory Committee (TAC) chose to evaluate the following coating categories: non-flat coatings, specialty primers, floor coatings, and interior stains because of the higher limits in the CARB SCM for the first 3 categories, and the interest in performance characteristics unique to interior stains.

R1113 Working Group

Pursuant to the workplan approved by the Board, the objective of the working group is to provide a forum for discussion of technological advancements in coatings material, market trends, and product performance as it relates to Rule 1113 – Architectural Coatings.

Staff held four meetings with the working group during the first six months of 2001. In these meetings, staff provided: updates on the Phase II Assessment Study for Architectural Coatings, status reports on the program, updates on the Essential Public Service Coating and NTS technology assessments, and discussed the development of the technology assessment for high gloss non-flats, specialty primers, floor coatings, and interior stains. Various other topics, such as technical conference and reactivity issues were also discussed.

Averaging/Niche Market Subgroup

Pursuant to the workplan approved by the Board, the objective of the averaging/niche market subgroup was to implement the averaging compliance option program, as well as monitor and address issues related to niche markets. The averaging compliance option allows manufacturers to meet the rule requirements by selling some paints having lower VOC content than required, while other paints exceed the levels otherwise required. Staff met with the averaging/niche market subgroup on June 6, 2000, July 11, 2000, August 10, 2000, September 21, 2000, October 24, 2000, and November 21, 2000. In these meetings, staff worked with interested industry members on developing the averaging implementation Guidance Document. That document, issued on December 14, 2000, covered recordkeeping methodology, shipment tracking, and overall reporting requirements for companies selecting the averaging compliance option under Section (c)(6) of Rule 1113.

During the working group meetings, a question arose concerning whether companies using the averaging option are required to comply with limits in effect prior to the new future-effective limits, the May 1999 amendments, or whether they may use the averaging plans to "rollback" existing limits.

Sacramento AQMD included in its rule adoption the concept of a "ceiling" or maximum VOC limit for coatings included in the averaging plan. While the requirement of a ceiling or maximum VOC content limit of a particular coating category was not contained in the rule language or final guidance document, AQMD staff believes the ceiling concept is intended to be a key element of the compliance averaging option in order to prevent rollback of existing technology. The ceiling limits are those VOC content limits found in Rule 1113 that were in effect in May of 1999. Staff used these limits to evaluate the three averaging plans for flat coatings that were submitted and approved for implementation on July 1, 2001. Staff intends to propose ceiling limits for the averaging compliance option in future amendments to Rule 1113.

To date, three manufacturers have submitted plans under the Averaging Compliance Option to retain their ability to sell flat coatings that are below the ceiling limit, but higher than the otherwise applicable VOC limit. They do so by offsetting those increases through the sale of coatings that are below the current VOC limit. All three plans have been approved and will go into effect on July 1, 2001.

In order to streamline the modification process for the averaging plans, subsequent to the approval of the averaging plan, modifications to the plan are allowed and prior written approval is required. Staff recommends that modifications be requested by a letter, signed by a responsible party, listing new and deleted products with a demonstration of how compliance with the averaging criteria is to be achieved. Staff will review the modification and, if approved, notify the manufacturer that the new product distribution will become part of the current averaging plan.

The AQMD staff offers manufacturers flexibility in the exact method of reporting sales. They can choose to report by zip code or county for instance. A question was raised recently concerning instances where district boundaries intersected within zip codes. Manufacturers, each with different internal distribution and sales organizations, stated that their systems may have difficulty in sorting compliant and non-compliant products in these zip codes. Staff decided that each manufacturer with current plans on file would submit a written description of their methodology for handling the distribution to avoid the sale of non-compliant products within AQMD boundaries. These plans would then be reviewed by compliance staff and, if approved, would be incorporated into the compliance averaging plans as amendments. Staff will modify the averaging guidelines over the course of the next year while evaluating the existing plans so that clear guidance can be provided on reporting product sales where district boundaries intersect within zip codes.

Technical Advisory Committee (TAC)

Pursuant to the workplan approved by the Board, the objective of the TAC is to provide technical oversight of the Phase II Assessment Study designed to compare the performance of zero-, low-, and high-VOC coatings. Specifically, this study was designed to evaluate the performance of the selected coatings using a variety of established laboratory test methods, followed by accelerated outdoor exposure, and finally by a real-time exposure evaluation. The TAC is also responsible for future technology assessments, including selection of coatings, relevant testing, and the reporting formats. Additionally, the TAC will evaluate data to identify links, if any, between performance characteristics and emission potential of architectural coatings.

Prior to the May 1999 amendments, in conjunction with the TAC, staff reviewed the results of the laboratory portion of the Phase II Assessment Study for Architectural Coatings, which was followed by the accelerated outdoor exposure study. In early April 2000, after a series of discussions with the TAC and with their concurrence, the National Technical Systems (NTS) initiated a 2-year real-time exposure study to evaluate performance of the zero-, low-, and high-VOC coatings in ambient conditions by placing coated panels on exposure racks in El Segundo and Saugus. The two sites selected provide

differing climates, with El Segundo as the cooler, more humid marine environment, and Saugus as the hotter, drier inland climate. The TAC has reviewed the 3-month, 6-month, and 9-month results of the exposed panels. The TAC members have also, in conjunction with AQMD and CARB staff, visited the two test sites (at the 3, 6 and 12-month exposure intervals) to personally conduct visual inspection of the exposed panels.

To date, detailed data analyses of the real time exposure results show that some zero- and low-VOC coatings are failing and some are performing well, as is the case for the high-VOC solvent-based coatings. Both the visual inspection observations and the empirical laboratory data further corroborate the findings and conclusions from the laboratory and the accelerated outdoor exposure tests. Visual inspections will be conducted again in October 2001 and May 2002. The TAC has met on four occasions this year and, to date, no final conclusions have been reached or published from the real time exposure phase of the NTS study because the 2-year exposure study is not yet complete. The study will continue for an additional year, at which time staff will evaluate all data and observations and report the final findings of the study.

There have been two issues raised with the real time exposure assessments. First, in order to maintain a consistent film thickness, as recommended by the coating manufacturer, the NTS staff used a draw-down bar for coating the substrate instead of brushing, rolling or spraying the coating. This method of application is allowed under the established approved test methods (ASTMs). However, some newer members of the TAC had concerns with this method of coating application. Secondly, the TAC has recently noted that some panels have appeared to have increased in gloss after exposure which is atypical, and may warrant additional investigation. Staff is currently working with NTS and the TAC to evaluate the possible cause of this phenomenon.

Essential Public Service Coating – Technology Assessment

In connection with the May 14, 1999 amendments to Rule 1113 – Architectural Coatings, the Board directed staff to provide technical oversight and contribute funding to the Essential Public Service Agency technology assessment. In response to this directive, as of September 1999, staff formed a committee to accomplish the separate technology assessment for the Essential Public Service Agencies. This committee is comprised of representatives from Metropolitan Water District (MWD), Department of Water Resources, Cal Trans, Department of Water and Power, as well as the Southern California Association of Publicly Owned Treatment Works (SCAP).

Of the agencies listed above, the Southern California Association of Publicly Owned Treatment Works chose to conduct a separate study to address specific service conditions found in wastewater treatment facilities. This study is discussed in further detail below.

The Essential Public Service Coating Committee met on a quarterly basis to develop the technology assessment. The AQMD has signed a service agreement with MWD to co-fund this technology assessment. To date, test protocols have been finalized, product selections have been made, and product application has been initiated onto substrates. MWD is currently in the process of conducting various laboratory and field exposure tests on the selected coatings.

The MWD study consists of a three phase testing program designed to evaluate new compliant coating chemistries to meet the new construction and infrastructure maintenance requirements of large and small public works organizations. Short term and long term performance tests will be conducted on approximately 100 industrial maintenance (IM) coatings over a 3-year period. The coating types selected for this study include zinc primers, coat tar enamel repair coatings, chemical containment coatings, immersion coatings, traffic paints, roofing coatings, and other miscellaneous coatings. A list of coatings

and their associated chemistries are provided in Attachment A.

The test program will consist of ASTM standard test methods. The ASTM methods and procedures are accepted by the construction and coating industries and are designed to evaluate coating performance under a variety of harsh environmental conditions that are commonly found at essential public service agency facilities and structures. A list of the ASTMs and other test protocol data used in this study are provided in the attachment.

Phase 1 of the test program consists of 20 VOC compliant immersion-coating systems and six VOC compliant atmospheric coating systems. The coating systems have been applied and placed into various test environments as prescribed by the particular ASTMs and testing is currently underway. All coating systems are being tested in multiple venues to achieve a high level of confidence in judgements being made on performance. Thus, interpretation of preliminary results is considered premature at this time. Test results for each individual coating system will be evaluated at the end of Phase 1 test period for interpretation and distribution.

Phase 2 coating selections and applications are approximately 30% complete. Phase 2 consists of a total of 15 atmospheric exposure coatings, five immersion service coatings, five chemical containment coatings, and four roof coating systems.

2001 Technology Assessment

During the rulemaking process staff performed its own technology assessment of these zero-and low-VOC coatings and gained sufficient information pertaining to their performance characteristics. Based on its own assessment, staff was confident that both the proposed compliance limits and deadlines are achievable. Nonetheless, the AQMD committed to a product availability (technology) assessment one year prior to the future rule limits for the affected categories. It should be noted, however, that the proposed limits are principally based on currently available and marketed coatings.

During the May 1999 amendments to Rule 1113, the Board provided for a technology assessment for non-flat, primers, sealers, and undercoaters, industrial maintenance, stains, and floor coatings prior to implementation of future limits. Based on discussions with the TAC, and the adoption of the CARB SCM, this technology assessment is limited to the following specific coating categories that have lower limits than the Rule 1113 limit SCM, scheduled for implementation in July 2002:

Category	VOC Limit	
	Rule 1113	SCM
High-Gloss Non-Flats	150 g/l	250 g/l
Floor Coatings	100 g/l	250 g/l
Primers, Sealers, & Undercoaters (Stain-Blocking)	200 g/l	350 g/l
Stains	250 g/l	250 g/l

SCM adopted by CARB represents the minimal requirements throughout the state, taking into consideration emission reduction needs and enforcement resources. In conducting this technology assessment for the above coatings, staff is relying on a number of sources of test results and other information as described below.

1998 CARB Architectural Coating Survey

As a first step in the technology assessment, staff evaluated the 1998 CARB Survey of Architectural Coatings. This comprehensive survey, used for establishing an emissions baseline, relied upon sales of architectural coatings in 1996 from over 150 manufacturers. (CARB will soon distribute a new survey designed to cover 50 coatings categories found in their SCM. This is discussed in further detail below.)

The following summary highlights data extracted from the CARB survey, as well as staff's analyses of the data for the categories listed above. A summary of the survey data is compiled in Table 1 and discussed below.

a. Non-Flats

Non-flats include coatings having low, medium, and high gloss. However, Rule 1113 does not specify gloss categories for non-flats but requires all non-flats (low, medium, and high gloss) to have a VOC content of 150 g/l by July 2002. The CARB SCM does distinguish gloss categories for non-flats and specifies a VOC content of 250 g/l for high gloss non-flats. Since the CARB survey data distinguishes non-flats by gloss levels, the high-gloss non-flat can be directly examined. (Non-high gloss non-flats are readily available and have proven performance characteristics.)

Nearly 800 different high-gloss non-flat coatings were reported in the CARB survey (See Table 1). Of these, 46 (5.8%) have met the July 2002 VOC content requirement of 150 g/l, which represent 2.6% of the total volume of high-gloss non-flats sold. Though these figures may seem relatively low, one must consider that the figures presented are from 1996 data and at the time, the 150 g/l requirement was not in existence. Nonetheless, low-VOC formulations indeed existed. There is no doubt that further low-VOC high-gloss coatings have been formulated since, especially in light of the fact that a 150 g/l limit was adopted in 1999. CARB is currently conducting another survey to update the latest sales data, including high gloss non-flat coatings, which can be used in the next annual report. Furthermore, manufacturers can use the averaging provisions to demonstrate compliance with Rule 1113. In short, staff is confident that the 150 g/l limit for high-gloss non-flat coatings is feasible and the CARB survey data clearly shows (both in the number of products and volumes sold) that formulations currently exist that meet future Rule 1113 requirements.

b. Floor Coatings

Table 1 shows that 578 different floor coatings were reported in the CARB survey of which 128, or 22.1%, meet the July 2002 VOC content of 100 g/l. From a sales volume perspective, 34.9% meet the 100 g/l requirement. These percentages are significant and clearly exhibit the fact that such coatings are available and being used that meet Rule 1113 future requirements.

TABLE 1

1998 CARB Survey of Architectural Coatings
(1996 Sales Data)

Coating Category	Total No. of Products Reported	VOC Content Range (g/l)	Total No. of Products Complying With Year	Percent of Products Complying with Year 2002 VOC	Total Volume of Product Sold*	Total Volume of Product Sold* Complying	Percent of Product Sold Complying With Year

			2002 VOC Content Limits	**Content Limits**	**(gals)**	**with Year 2002 VOC Content (gals)**	**2002 VOC Content Limits**
Non-Flat (Hi-Gloss)	796	0 to 547	46	5.8%	2,150,818	55,318	2.6%
Floor Coatings	578	0 to 800	128	22.1%	1,150,961	401,495	34.9%
Primers, Sealers, & Undercoaters	915	0 to 836	423	46.2%	7,873,822	5,048,169	64%
Stains	1323	12 to 838	337	25.47%	2,960,976	1,563,527	52.8%

* Includes quarts

c. Primers, Sealers, and Undercoaters (Stain-blocking Primers)

The specific coating category of interest is stain-blocking primers, which is included under the primers, sealers, and undercoaters category of Rule 1113. It has a 200 g/l VOC limit by July 2002. CARB's SCM sets the VOC content at 350 g/l for stain-blocking primers as part of its specialty primers category.

CARB survey reports stain-blocking primers under the primers, sealers, and undercoaters (PSUs) category. The data for PSUs in Table 1 indicated that 46.2% of all PSU products surveyed meet the 200 g/l limit set forth in Rule 1113 and 64% meet the requirement based on sales volume alone. Specialty stain-blocking primers have not been specifically surveyed and there is no one database of all commercially-available stain-blocking primers. However, as shown in Attachment B-Part 3, a large number of paint manufacturers have compliant primers specifically for stain blocking available at this time to meet Rule 1113 requirements.. Therefore, 200 g/l specialty primers recommended for stain blocking are currently available and in use.

d. Stains

In viewing the CARB survey in Table 1 for stains, one finds that 25.47% of the products comply with the Rule 1113 limit of 250 g/l adopted for July 2002. From a sales volume standpoint, 52.8% of gallons sold comply. Again, these numbers sufficiently support the proposed limit as to the availability and use of such stains. Recently, there has been some discussion as to the feasibility of such a limit with regards to interior stain. The KTA-Tator portion of the technology assessment will examine this issue by testing both interior stains. (Discussed below.)

In summary, the CARB survey data for all four categories (non-flat high gloss, floor coatings, specialty primers, and stains) has shown that coatings are available and in-use that meet the VOC requirements proposed for July 2002 in Rule 1113. The KTA-Tator portions of the technology assessment (discussed below) will further assess the characteristics and performance of various formulation of these coatings.

It should also be noted that CARB has been working with AQMD staff and TAC members to complete a new survey of architectural and industrial maintenance coatings sold and distributed in California. There are 50 coating categories covered in the survey including: fire retardants, bituminous roof, industrial maintenance, non-flat, quick dry enamels and specialty primer, sealer and undercoater coatings. The new survey will be mailed to manufacturers and distributors this month and the surveys will be expected to be returned by mid-October 2001.

MPI Data

In order to supplement the information extracted from the CARB survey and the Phase II Assessment Study conducted by National Technical Systems, staff researched and contacted various groups that are working on developing performance standards for architectural coatings. One such group in Master Painters Instituteâ (MPI), founded in 1996. MPI, in conjunction with paint manufacturers and paint technologists, has developed universal performance-based standards. Additionally, MPI conducts all laboratory testing to assess the performance characteristics of the different paint categories. Products that meet the performance standards are included in the approved products list, which is made available via the internet or hardcopy. The approved products list is updated periodically, as manufacturers submit their paint samples for analyses. MPI indicates that not all available products from all manufacturers are included in their analysis.

Over one year ago, the U.S. Navy announced their intention to use MPI Product Standards and the approved products list for all of their architectural and industrial maintenance coatings use. The U.S. Air Force and General Services Administration are currently evaluating the universal performance-based standards for inclusion into their coatings programs.

The following MPI categories were assessed in this evaluation:

Primers (Stain-Blocking)	**MPI # 39**	**Interior Latex-Based Wood Primers**
Floor Coatings	**MPI # 60**	**Interior/Exterior Latex Porch and Floor Enamel – Low Gloss**
	MPI # 93	**Water-base Epoxy Paint**
Semi-Transparent Stains	**MPI # 90**	**Interior Wood Stain, Semi-Transparent**
High-Gloss Non-Flat	**MPI # 114**	**Interior Latex, Gloss**
	MPI # 119	**Exterior Latex, High Gloss**

An evaluation of MPI's universal performance based standards indicates that MPI specifications are equivalent to the federal specifications. MPI's Detailed Performance specifications for the above categories are included in Attachment B of this report. It should be noted, however, that MPI does not conduct the VOC analysis, but records the VOC information as reported by the manufacturer.

As the summary of approved products illustrates, there are compliant coatings available in each of the categories, with the exception of interior semi-transparent stains. Additionally, staff has compiled product data sheets for commercially available products for each of the coating categories, including interior semi-transparent stains. The product data sheets, which are in no way all-inclusive of compliant coatings available, represent some of the

largest architectural coating manufacturers. The following table summarizes the lists found in Attachment B to this report, including the MPI approved products:

Part One	Primers (Stain Blocking)
Part Two	Floor Coatings
Part Three	High Gloss Non-flat coatings (Interior & Exterior)
Part Four	Interior Semi-Transparent Stains

Field Application

Staff contacted a number of coating manufacturers, consultants and end-users who have provided information on the successful formulation and use of low-VOC coatings. Staff is aware of at least two successful case studies at theme parks in the Los Angeles area. One such project is the California Adventure Disney Park, which used low-VOC coatings from a wide range of coating categories to various substrates over the past two years during the construction of this new park.

According to the project engineer, the coatings have performed as expected and they have found no failures thus far.

1. Frazee Paint: Interior/Exterior Acrylic Stain-blocking Primer/Sealer: VOC 54 g/l
2. DuPont: Water-Reducible Polyurethane: VOC 100 g/l
3. Aquatek DTM Industrial Acrylic Enamel: VOC 143 g/l
4. Aquatek High Gloss Acrylic Enamel: VOC 84 g/l
5. Vanex Breakthrough Water-Based industrial maintenance acrylic paint: VOC 180 g/l
6. Artex Nova Water-Based acrylics (various gloss levels): VOC ranges from 0 to 120 g/l

Ongoing Contract Study

Another source of valuable information will be obtained from an AQMD contract study currently being conducted by KTA-Tator. The KTA-Tator study will test multiple formulations of the four coatings categories shown in Table 2. The properties and performance characteristics to be used by KTA-Tator are shown in Table 2. The contractor is scheduled to complete the study and provide a report in December of this year comparing coating performance and rating the coatings with regards to all of the key performance and applications properties. The study was originally targeted for completion in June of 2001. However, more time was spent than originally planned on obtaining the full set of products. We are continuing to work with manufacturers so that testing can begin by mid-July. The results of the KTA study will be used to help evaluate whether any changes to existing Rule 1113 will be required prior to implementation of lower limits for the coating categories included in the study. These limits are scheduled to go into effect in July 2002.

Table 2 – Example of Typical Test

Coating Properties and Performance Characteristics Testing of Architectural and Industrial Maintenance Coatings	
General Properties – Tested for each coating category	
Total non-volatile	Coverage
Specific Gravity	Dry Time
Viscosity	Film Thickness
Percent Water	Stability
VOC	Appearance
Freeze thaw resistance (for water-based coatings)	Gloss
Specific Properties – Tested for Individual Coating Categories	
Floor Coatings	
Abrasion Resistance ASTM D 4060	Accelerated Weathering – UV
Adhesion – ASTM 3359 & 2197	Chemical Resistance
Efflorescence	Impact Resistance
Non-Flat High Gloss	
Open Time – Lapping Properties*	Blocking Resistance – ASTM D4946 (Room Temp. and Elevated Temp.)
Yellowness	Accelerated Weathering – UV
Scrub Resistance	
Primer, Sealer, & Undercoaters- Interior	
Stain-blocking – Interior Stains (coffee, catsup, mustard, lipstick, marking pens, etc.)	Adhesion
Grain Raising*	Sandability
Primer, Dealer, & Undercoaters - Exterior	
Grain Raising *	Adhesion
Stain-blocking Tannins	
Interior Wood Stains	
Lapping*	Grain Raising*

*Alternative test methods available from Staff

Category	**No. of Samples**
Floor Coatings	8
Non-Flats – High Gloss	8
Primer, Sealer, and Undercoater	10
Interior Stains	6

SCAP Studies

As mentioned earlier, SCAP decided to separate from the EPSA study and initiated an independent study of coatings to be applied at wastewater treatment plants. Participants in this study include the Los Angeles County Sanitation District, the Eastern Municipal Water District, Las Virgenes Municipal Water District and the City of Los Angeles. In September 2000, SCAP contracted with KTA-Tator to initiate a 2-year laboratory and field study of low-VOC coatings. This study is expected to be completed by February 2003. Performance tests will evaluate atmospheric and immersion coating systems. Laboratory tests have been completed and SCAP has recently begun the actual field testing to evaluate the effects of outdoor exposure of the coatings. The test results are expected to be available next year. The field results will then be compared to the laboratory results to assess the effectiveness of each coating as applied by SCAP. The AQMD will evaluate the results of the SCAP study upon completion.

Conclusions and Recommendations

Staff expresses appreciation to the members of the Working Group, the Technical Advisory Committee, the Essential Public Services Committee, and others who have contributed to the development of the Averaging Implementation Guidance Document and the technology assessments. The review of technical data and test panels have represented a significant commitment of time and resources on the part of committee members, consultants such as KTA-Tator, and other stakeholders.

In summary, the data contained in this report illustrates product availability relative to low-VOC materials (i.e., those identified through the Architectural Coatings Technology Conference, additional review of available technology, the CARB survey, MPI Data, as well as the on-going technology-proving efforts of KTA-Tator and the EPSC Committee). There is considerable work ahead for these same members and consultants. The KTA-Tator technology assessment should be completed by December of this year. The National Technical Systems field evaluations will be completed within a year. In addition, staff will be receiving and evaluating the results from a number of field applications being conducted by manufacturers and users. The results up to now are promising and confirm the performance of many low-VOC coatings on a variety of substrates and under different environmental conditions. Further field testing that is now underway will provide additional information on product performance. Therefore, the staff recommends to continue the implementation of Rule 1113 and will report back to the Board any new information at the conclusion of the field testing, including the KTA-Tator Study.

ATTACHMENT A

Essential Public Service Coating – Scope

The Essential Public Service Agencies Technical Assessment (EPSA TA) consists of a 3-phase testing program designed to evaluate new compliant coating chemistries to meet the new construction and infrastructure maintenance requirements of large and small public works organizations.

The program will conduct short term and long term performance tests on approximately 100 industrial maintenance (IM) coatings over a 3-year period. The coating types selected for this study include:

Coating Types for EPSA TA

COATING TYPES	COATING CHEMESTRIES
1. Zinc primers (for steel substrates in atmospheric storage exposure).	100% epoxy resin zinc rich primers. Waterborne epoxy resin zinc rich primers. Inorganic (silicate based) zinc rich primers
2. Zinc primers, epoxy intermediate, polyurethane top coat system (for steel substrates in immersion and buried service exposure).	Solvent borne epoxy and polyurethane coatings (using exempt solvents).
3. Coal Tar enamel repair coatings (for coated steel substrates in immersion and buried service exposure).	Polyurethane resin and bitumen based coatings 100% epoxy resin coatings 100% resin polyurethane coatings
4. Chemical containment coatings (for asphalt, concrete and steel substrates).	100% epoxy resin and 100% resin polyurethane coatings.
5. Immersion coatings (for steel and concrete substrates in low and high velocity immersion exposure.	100% epoxy resin coatings Fusion bonded powder coatings Plural component polyurethane coatings.
6. Traffic paints (coatings for asphalt and concrete substrates in atmospheric exposure.	Water based acrylics and polyurethane coatings.
7. Roofing coatings (coatings for urethane foam over concrete roofs)	100% polyurethane coatings
8. Miscellaneous coatings	Quick dry primers, high temperature coatings.

Essential Public Service Coating – Test Protocols

The Essential Public Service Agencies Technical Assessment (EPSA TA) test program will consist of American Society for Testing and Materials (ASTM) standard test methods. These ASTM methods and procedures are accepted by the construction and coating industries and are designed to evaluate coating performance under a variety of harsh environmental conditions that are commonly found at EPSA facilities and structures.

Test Protocols for EPSA TA

Test Protocols for Water Immersion Coatings - Immersion	
ASTM G-8	20 day – cathodic disbonding test
ASTM D-2247	2000 hrs – 100% humidity @ 100F
ASTM B-117	2000 hrs – Salt Fog
ASTM D-870	2 years–Raw, Filtered, and Finished Waters
Cavitation	24 hr exposure

Test Protocols for Architectural Coatings – Atmospheric Weathering	
ASTM G-26	1600 hrs – Weatherometer
ASTM D-2247	1600 hrs – 100% Humidity @ 100F
ASTM D-5894	1000 hrs – Cyclic UV & Salt Fog
ASTM B-117	2000 hrs- Salt Fog
ASTM G-7	1 year - Atmospheric

Test Protocols for All Coatings: Mechanical Strength and Physical Properties	
ASTM D-4060	Tabor Abrasion
ASTM D-2369	% Solids by wt.
ASTM D-2697	% Solids by Vol.
ASTM D-4212	Viscosity
ASTM D-1475	Wt./Gallon
ASTM D-1475	Specific Gravity
ASTM E-932	Infrared Spectroscopy

Essential Public Service Coating – Program Status for Phase 1 and 2

Phase 1 consists of 20 VOC compliant immersion-coating systems and 6 VOC compliant atmospheric coating systems. The coating systems have been applied and placed into test environments (see Tables 1 and 2 above).

Phase 2 coating selections and applications are approximately 30% complete. Phase 2 consists of a total of 15 atmospheric exposure coatings, 5 immersion service coatings, 5 chemical containment coatings, 4 roofing coating systems.

Essential Public Service Coating – Preliminary Test Data

Testing for the Phase 1 coating systems is currently under way. All coating systems are being tested in multiple venues. Thus, interpretation of preliminary results is considered premature at this time. All testing results for each individual coating system will be evaluated at the end of Phase 1 test period for interpretation and distribution.

Test Protocols for Water Immersion Coatings

1. Immersion

	Water Immersion	Coating Performance
1.	ASTM G-8 (120 day-cathodic disbonding test)	Tests performance of: 1. Coating adhesion. 2. Compatibility of coating with cathodic protection.

2.	ASTM D-2247 (4000 hrs – High Humidity)	Tests performance of: 1. Coating adhesion. 2. Resistance of rust creep. 3. Resistance to osmotic blistering. Permeability resistance.
3.	ASTM D-870 (2 years- Raw, Filtered, and Finished Waters).	Tests performance of: 1. Coating adhesion. 2. Resistance to osmotic blistering ie. Permeability resistance.
4.	ASTM D-4541 (85)	Tests performance of: 1. Coating adhesion.

	Water Immersion	**Coating Performance**
1.	ASTM D-4060 (Tabor Abrasion)	Tests performance of: 1. Coating adhesion. 2. Resistance of rust creep. 3. Resistance to osmotic blistering ie. Permeability resistance.
2.	Cavitation (24 hr exposure)	Tests performance of: 1. Coating adhesion. 2. Resistance to osmotic blistering ie. Permeability resistance.

Immersion Coating Systems

ASTM D-870	Raw, Filtered, and Finished Waters @ MWD
ASTM G-8	120 day-cathodic disbonding test @ MWD
ASTM D-2247	High Humidity @ MWD
ASTM B-117	Salt Fog @ DWP

Weathering Coating Systems

ASTM D-2565	Weatherometer @ MWD
ASTM G-7	Atmospheric @ DWP, DWR, & MWD
ASTM D-5894	Prohesion @ Caltrans

Mechanical Strength

ASTM D-4060	Tabor Abrasion @ MWD
Cavitation	@ MWD

Physical and Chemical Properties

ASTM D-2369	% Solids by wt @ MWD
ASTM D-2697	% Solids by vol. @ MWD
ASTM D-4212	Viscosity @ MWD
ASTM D-1475	Wt./gallon @ MWD
ASTM D-1475	Specific gravity @ MWD
ASTM E-932	Infrared Spectrosocopy @ MWD

Test Protocols for Immersion Coatings

Phase 1: Critical Prescreening Tests	
1. ASTM G-8	120 day Cathodic Disbonding Test: this test is designed to evaluate a products adhesion strength, resistance to osmotic blistering (resistance to moisture permeability), and compatibility with cathodic protection.
2. ASTM D-2247	120 day High Humidity Test: this test is designed to evaluate a product adhesion strength, resistance to osmotic blistering (resistance to moisture permeability), and resist rust creep under conditions of 100% humidity and 100 degrees F.
3. Cavitation	24 hour High Velocity and Cavitation Test: This test is designed to evaluate a coatings adhesion strength, resistance to erosion and attack by high velocity water.
Phase 2: Long Term Testing	
4. ASTM D-870	Long term low flow immersion testing in process stream environment, or raw, filtered, and finished waters: this test is designed to evaluate adhesion strength and resistance to moisture permeability under actual immersion conditions.
Phase 3: Physical Properties	
• ASTM D-2369 • ASTM D-2697 • ASTM D-4212 • ASTM D-1475 • ASTM D-1475 • ASTM E-932	• % Solids by wt. • % Solids by vol. • Viscosity • Wt./gallon • Specific gravity • Infrared Spectroscopy

Test Protocols for Exterior Architectural Coatings

Critical Prescreening Test	

1. ASTM D-2526	2000 hr Weatherometer Test: this test is designed to evaluate a product adhesion strength under cyclic wet/dry conditions, resistance to osmotic blistering (resistance to moisture permeability), gloss and color retention, and resistance to UV degradation.
2. ASTM D 5894	2000 hr. Prohesion Test (Alternating wet-dry cyclic salt fog w/UV): this test is designed to evaluate a products adhesion strength under cyclic wet/dry conditions, resistance to osmotic blistering (resistance to moisture permeability), gloss and color retention, and resistance to UV degradation.
3. ASTM D-2247	120 day High Humidity Test: this test is designed to evaluate a product adhesion strength, resistance to osmotic blistering (resistance to moisture permeability), and resist rust creep under conditions of 100% humidity and 100 degrees F.
Secondary Long Term Testing	
1. ASTM G-7	1 yr. Atmospheric Testing: this test is designed to evaluate a product performance under actual cyclic wet/dry/& alternating UV and thermal cycles. The following performance characteristics will be evaluated: resistance to osmotic blistering, gloss, and color retention, and resistance to UV degradation.
Phase 3: Physical Properties	
• ASTM D-2369 • ASTM D-2697 • ASTM D-4212 • ASTM D-1475 • ASTM D-1475 • ASTM E-932	• % Solids by wt. • % Solids by vol. • Viscosity • Wt./gallon • Specific gravity • Infrared Spectroscopy

ATTACHMENT B

PART ONE
STAIN BLOCKING PRIMERS

Primers (Stain Blocking):

Rule 1113 limit (July 2002): 200 g/l

MANUFACTURER	PRODUCT	VOC g/l
Kelly-Moore	Stain Resistant Acrylic Primer	140
Insl-x	Aqualock Waterbase Primer/Sealer/Stain Killer	118

Flex Bon Paints	Flex Bon Exterior 100% Acrylic Latex Primer	70
Coronado Paint	Grip & Seal Latex Stain Killer Supreme Acrylic Bonding Primer	83 83
Dunn-Edwards Paints	E-Z Prime Exterior Acrylic Wood Primer	115
Sherwin Williams	PrepRite ProBlock Interior/Exterior Latex Prime Sealer	101
Frazee Paint	172 Grip-N-Seal Interior/Exterior Acrylic All-Purpose Primer 168 Prime+Plus: Interior/Exterior Acrylic Primer/Sealer/Stain Killer	96 66
Dulux Paint Centers	Dulux Professional Exterior 100% Acrylic Latex Primer Ultra-Hide Aquacrylic GRIPPER Stain Killer Primer-Sealer	95 95
Pittsburgh Paints	Seal Grip Interior/Exterior Acrylic Latex Stain Blocking Primer	96

PART TWO

FLOOR COATINGS

Floor Coatings:

Rule 1113 limit (July 2002): 100 g/l

MANUFACTURER	PRODUCT	VOC g/l
Devran	122 Multi-Purpose Floor Coating	71
Insl-x	Sure-Step Anti-Slip Coating SU-Series	97
Sherwin Williams	Acrylic Latex Floor Enamel A24 Series	72
Thoro	Thorosheen Water-based 100% Acrylic Paint Thorocoat Water-Based, High-Build 100% Acrylic Waterproof Coating	81 66

PART THREE

INTERIOR/EXTERIOR NON-FLAT HIGH GLOSS

Interior/Exterior Non-Flat High Gloss:

Rule 1113 limit (July 2002): 150 g/l

MANUFACTURER	PRODUCT	VOC g/l
Coronado Paint	Super Kote 5000 Acrylic High Gloss Enamel	83
Dunn-Edwards Paints	Latex Gloss Paint W 6220	125
	Latex Gloss Paint W 5852	100
Sherwin Williams	Interior Acrylic Gloss Enamel B21 Series	157*
	Exterior High Gloss Latex Enamel A85 Series	118
	Interior Latex Gloss B21W400 Series	89
Frazee Paint	041 Latex Gloss Enamel: Interior Latex Gloss Finish	162*
Pittsburgh Paints	Manor Hall Int/Ext Gloss Acrylic Latex	149
	Brilliant Reflections Int/Ext. Gloss Latex	120

* Within the 10% error of Method 24.

PART FOUR

INTERIOR STAINS

Interior Stains:

Rule 1113 limit (July 2002): 250 g/l

MANUFACTURER	PRODUCT	VOC g/l
ADCO	Interior Wood Stain WST-5	-0-
VISTA Paint	WN11 Interior Wiping Stain	250
PPA Technologies	Interior Semi-Transparent Stain	-0-
Fahr Research Laboratories	Interior Stain	-0-
Varathane	Elite Diamond	249
Alternative Materials Technology	Interior Wiping Stain	< 60 g/l
Sansin	Enviro Stain – Purity	200 g/l

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