CHAPTER 4

ENVIRONMENTAL IMPACTS AND MITIGATION

INTRODUCTION

CEQA requires environmental documents to identify significant environmental effects that may result from a proposed project [CEQA Guidelines §15126.2 (a)]. Direct and indirect significant effects of a project on the environment should be identified and described, with consideration given to both short- and long-term impacts. The discussion of environmental impacts may include, but is not limited, to, the resources involved; physical changes; alterations of ecological systems; health and safety problems caused by physical changes; and other aspects of the resource base, including water, scenic quality, and public services. If significant adverse environmental impacts are identified, the CEQA Guidelines require a discussion of measures that could either avoid or substantially reduce any adverse environmental impacts to the greatest extent feasible (CEQA Guidelines §15126.4(c)].

The CEQA Guidelines state that the degree of specificity required in a CEQA document depends on the type of project being proposed (CEQA Guidelines §15146). The detail of the environmental analysis for certain types of projects cannot be as great as for others. For example, the environmental document for projects, such as the adoption or amendment of a comprehensive zoning ordinance or a local general plan, should focus on the secondary effects that can be expected to follow from the adoption or amendment, but the analysis need not be as detailed as the analysis of the specific construction projects that might follow. As a result, this Draft SEA analyzes impacts on a regional level and impacts on the level of individual industries or individual facilities where feasible.

The categories of environmental impacts recommended for evaluation in a CEQA document are established by CEQA (Public Resources Code, §21000 et seq.) and the CEQA Guidelines as promulgated by the State of California Secretary of Resources. Under the CEQA Guidelines, there are approximately 15 environmental categories in which potential adverse impacts from a project are evaluated. Projects are evaluated against the environmental categories in an environmental checklist and those environmental categories that may be adversely affected by the project are further analyzed in the appropriate CEQA document.

Pursuant to CEQA, a Notice of Preparation and an Initial Study (NOP/IS), including an environmental checklist, were prepared for the 1999 amendments to Rule 1113 (see Appendix B). Of the 15 potential environmental impact categories, it was determined that a Draft SEA should be prepared to address potential adverse effects on air quality, water resources, and public services. As a result of comments received on the NOP/IS at that time, it was further determined that potential transportation/circulation, solid/hazardous waste, hazards, and human health impacts were also analyzed in the Draft SEA for the 1999 amendments to Rule 1113. These same environmental topics are analyzed relative to the currently proposed project. The following sections include the analyses of the potential adverse environmental impacts of implementing the proposed amendments.

AIR QUALITY

The proposed amendments will implement, in part, the 1994 and the 1997 AQMP Control Measure CTS-07 for architectural coatings. While there are many types of architectural coatings currently in use, the currently proposed amendments would reduce the allowable VOC content of eleven coating categories: industrial maintenance (IM) coatings, high temperature IM coatings, non-flats, quick-dry enamels, primers/sealers/undercoaters (PSU), rust preventive coatings, floor coatings, quick-dry PSU, water-proofing wood sealers, roof coatings, and stains[1]. As noted in Table 2-1 in Chapter 2, PAR 1113 is expected to reduce VOC emissions from architectural coatings approximately 21.8 tons per day upon final compliance. ~~The foregone emissions from the higher interim VOC content limit for essential public service coatings is estimated to be 27 pounds of VOC per day (or 0.0135 tons per day).~~ The emissions reductions foregone from the extended compliance date for small businesses is negligible because of the minor amount of coatings used.

Significance Criteria

The project will be considered to have significant adverse air quality impacts if any one of the thresholds in Table 4-1 are equaled or exceeded.

TABLE 4-1

SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds		
Pollutant	**Construction**	**Operation**
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
TAC, AHM, and Odor Thresholds		
Toxic Air Contaminants (TACs)	MICR $\geq$ 10 in 1 million HI $\geq$ 1.0 (project increment) HI $\geq$ 3.0 (facility-wide)	
Accidental Release of Acutely Hazardous Materials (AHMs)	CAA §112(r) threshold quantities (see Table 5-2)	

[1] From this point forward, in many instances, these coatings, which are the target of these rule amendments, may be generically referred to as “affected coatings”.

TABLE 4-1 (CONCLUDED)

SCAQMD Air Quality Significance Thresholds

Change in Concentration Thresholds	
NO_2 1-hour average annual average	 20 ug/m^3 (= 1.0 ppm) 1 ug/m^3 (= 0.05 pphm)
PM10 24-hour annual geometric mean	 2.5 ug/m^3 1.0 ug/m^3
Sulfate 24-hour average	 1 ug/m^3
CO 1-hour average 8-hour average	 1.1 mg/m^3 (= 1.0 ppm) 0.50 mg/m^3 (= 0.45 ppm)

MICR = maximum individual cancer risk; HI = Hazard Index; ug/m^3 = microgram per cubic meter; pphm = parts per hundred million; mg/m^3 = milligram per cubic meter; ppm = parts per million; TAC = toxic air contaminant;

AHM = acutely hazardous material

Air Quality Impacts

The objective of PAR 1113 is to reduce VOC emissions from affected coating categories. Analysis of PAR 1113 indicates that the proposed project is expected to generate direct air quality benefits. The direct effect of the proposed amendments to Rule 1113 is a reduction of VOC emissions from affected sources.

Analysis of Industry Issues

The following subsections describe each of eight issues that may create significant adverse air quality impacts from amending Rule 1113. These issues were raised by industry representatives in the Industry Working Group meetings and identified in comments on the NOP/IS. These eight issues focus on two main points. The first seven issues are all contentions that the new formulations, either solvent-borne or waterborne, result in more coating use, or use of noncompliant coatings, and an overall increase in VOC emissions over a period of time. The eighth issue is the contention that low-VOC waterborne and solvent-borne coatings have a higher reactivity than high VOC coatings that use more reactive solvents than conventional coating formulations and, therefore, contribute at a greater rate to ozone formation. They also contend that under low-NOx conditions, some solvents actually have a negative reactivity.

As previously mentioned in the Executive Summary, the appellate court in 1993 has already determined that six of the eight issues asserted by industry and contractors had been adequately addressed in the previously prepared CEQA document (a Determination of No Significant Impacts - DONSI) certified in February 1990[2]. However, the lower court set aside the VOC limits for IM and PSU coatings because the court felt that the issue of thinning had not been adequately addressed in that document. The SCAQMD did not appeal this finding.

As mandated by the court judgment the thinning issue associated with the amended coating categories adopted in February 1990, as well as the other affected coating categories, has been evaluated. Staff has also reanalyzed the other six potential issues and also the substitution issue. As demonstrated in the preceding subsections, staff continues to believe those six other alleged issues as well as the substitution issue do not result in significant adverse air quality impacts

It should be noted that during the November 1996 rulemaking process, the eight issues as mentioned above were discussed in detail for flats and lacquers. Each of the aforementioned eight issues were analyzed in the Draft and Final Subsequent Environmental Assessment for the November 1996 rule amendments. In each case, it was concluded that the coating manufacturers' and contractors' claims for an increase in emissions as a result of the reformulation of low-VOC coatings were not supported by any credible or empirical evidence. The Los Angeles County Superior Court has upheld this conclusion, which was upheld by the Court of Appeal.

More Thickness

PROJECT SPECIFIC IMPACT: Industry representatives contend that reformulated compliant water- and solvent-borne coatings are very viscous (e.g., are formulated using a high-solids content) and, therefore, are difficult to handle during application, tending to produce a thick film when applied directly from the can. A thicker film indicates that a smaller surface area is covered with a given amount of material, thereby increasing VOC emissions per unit of area covered.

ANALYSIS: SCAQMD staff evaluated product data sheets for approximately 340 conventional and low-VOC coatings to compare solids content by volume, coverage area, drying time, pot life, shelf life and durability. Table 4-2 is a summary of these coating characteristics grouped by coating categories as defined by Rule 1113. Staff has asserted in the past and continues to maintain that a coating with more solids will actually cover a greater surface area. This contention is generally supported for the PAR 1113 affected coating categories. Low-VOC quick-dry enamels, PSU, quick-dry PSU, rust preventative coatings and stains, on the average, generally have a lower solids content and a lower area of coverage than conventional coatings. Low-VOC nonflats have a solids content and area of coverage comparable to conventional coatings. Low-VOC floor coatings and IM coatings, on the average, have a higher solids content with a comparable to slightly

[2] The seventh issue, substitution, was not specifically identified as an issue in the litigation. It was incorporated into the other six issues.

less area of coverage than conventional coatings.

These results demonstrate that currently available low-VOC coatings are not necessarily formulated with a higher solids content. Further, a higher solids content does not result in a significant reduction in the coverage area. The information from the coating product data sheets tends to corroborate a positive correlation between solids content and the coverage area. *Although Table 4-2 has been modified to reflect the latest update to Appendix D – Summary of Coating Characteristics, the conclusions reached in the Draft SEA have not changed.*

TABLE 4-2

Summary of Coating Characteristics

Coating Category	# of samples	Range of VOC Content (gm/l)	Average VOC Content (gm/l)	Average % Solids by Volume	Average Coverage (sq ft/gal) @ ~3 mil	Average Drying Time (hrs) Between Coats	Average Pot Life* @70 deg. (hrs)	Average Shelf Life (yrs)
Floor Coatings (420-100 g/l)	9	114-420	338	47.5	356	n/a	8.5	2.3
Floor Coatings (100-50 g/l)	~~5~~ *13*	~~76~~ *56* - 100	~~86~~ *82*	~~75.1~~ *54.8*	~~440~~ *309*	n/a	~~2.4~~ *2.2*	1.8
Floor Coatings (< 50 g/l)	~~13~~ *24*	0 - *29*	~~0~~ *2*	~~80.4~~ *79*	~~331~~ *328*	n/a	~~1.9~~ *1.5*	~~1.4~~ *1.3*
Industrial Maintenance Coatings (420-250 g/l)	47	257-420	354	58.1	352	n/a	6.3	1.6
Industrial Maintenance Coatings (250-100 g/l)	~~26~~ *45*	~~114~~ *101*-250	~~194~~ *188*	~~52.5~~ *55.2*	~~273~~ *296*	n/a	~~8~~ *7.4*	~~2.4~~ *1.9*
Industrial Maintenance Coatings (<100 g/l)	~~61~~ *114*	0-108	~~39.7~~ *24*	~~74.4~~ *82.8*	~~306~~ *391*	n/a	~~2.5~~ *1.4*	~~1.2~~ *1.3*
Nonflats (250-150 g/l)	~~10~~ *26*	~~215~~ *153*-250	~~239~~ *215*	~~39~~ *37.7*	~~400~~ *382*	~~8.5~~ *7.1*	n/a	~~2.6~~ *2.2*
Nonflats (150-50 g/l)	~~29~~ *69*	~~59-135~~ *56-150*	~~94.5~~ *106*	35	~~359~~ *346*	~~6.7~~ *7.8*	n/a	~~2.9~~ *2.7*
Nonflats (<50 g/l)	~~16~~ *37*	0-50	~~11.1~~ *4.4*	~~39.7~~ *40.6*	~~407~~ *385*	~~11.3~~ *5.7*	n/a	1
Quick Dry Enamels (400-150 g/l)	~~6~~ *11*	164-400	~~290~~ *267*	~~54.1~~ *48.3*	~~432~~ *365*	~~6.0~~ *4.9*	n/a	1
Quick Dry Enamels (<150 g/l)	4	88-154	120	35.8	407	3.2	n/a	1

TABLE 4-2 (CONCLUDED)

Summary of Coating Characteristics

Coating Category	# of samples	Range of VOC Content (gm/l)	Average VOC Content (gm/l)	Average % Solids by Volume	Average Coverage (sq ft/gal) @ ~3 mil	Average Drying Time (hrs) Between Coats	Average Pot Life* @70 deg. (hrs)	Average Shelf Life (yrs)
Primer, Sealer, Undercoater (350-200 g/l)	~~28~~ *29*	~~220~~ *209*-350	~~314~~ *310*	51.4	~~393~~ *387*	13	~~6.5~~ *7.5*	1.7
Primer, Sealer, Undercoater (200-100 g/l)	~~10~~ *14*	113-206	~~160.4~~ *151.7*	~~44.2~~ *42.4*	~~350~~ *306*	5	~~16~~ *6*	~~2.6~~ *2.4*
Primer, Sealer, Undercoater (<100 g/l)	~~29~~ *51*	0-109	~~53.7~~ *70.6*	~~42.9~~ *41.3*	~~372~~ *346*	~~7.9~~ *5.1*	2.4	~~2.3~~ *2.1*
Quick Dry Primer, Sealer, Undercoater (exempt – 200 g/l)	9	340-560	464	40.4	401	2	7	1.9
Quick Dry Primer, Sealer, Undercoater (200-100 g/l)	6	115-141	124	45.1	353	2.1	n/a	2.7
Quick Dry Primer, Sealer, Undercoater (<100 g/l)	~~17~~ *21*	0-108	67.7	39.3	370	~~1.8~~ *3.9*	n/a	~~1.0~~ *1.1*
Water Proofing Wood Sealer (400-250 g/l)	~~5~~ *6*	*282*-400	~~400~~ *380*	~~14.7~~ *13.3*	~~160~~ *175*	n/a	n/a	1.0
Water Proofing Wood Sealer (<250 g/l)	10	0-241	~~73.9~~ *71.2*	~~46.3~~ *46.8*	~~224~~ *214*	n/a	4.7	1.4
Stains (350-250 g/l)	~~3~~ *4*	350	350	~~55.6~~ *49.2*	~~367~~ *350*	~~24~~ *18.8*	n/a	5.3
Stains (<250 g/l)	~~10~~ *23*	0-250	~~148.9~~ *116.5*	25.7	~~299~~ *275*	~~6.2~~ *4.2*	n/a	~~5.0~~ *4*
Rust Preventative Coatings (350-100 g/l)	6	198-350	313	61.1	435	n/a	4	2.7
Rust Preventative Coatings (<100 g/l)	~~4~~ *5*	0-94	~~23.5~~ *24.8*	50	~~306~~ *305*	n/a	2.5	2.0

** For two-component coatings only*

As a comparison, Table 4-3 shows that the 1998 CARB Survey yielded similar results for average VOC content as the random sampling of low-VOC coatings to their conventional counterparts. The survey showed a consistent trend of a sales weighted average lower percent solids by volume in coatings with lower-VOC content.

Based upon the results of the SCAQMD and CARB surveys, staff concludes that the data do not support the industry's assertion that compliant low-VOC coatings are necessarily formulated with a higher solids content than conventional coatings. Further, the data do not support their assertion that there is an inverse correlation between solids content and coverage area.

TABLE 4-3

1998 CARB Survey

	CARB SURVEY RESULTS	
Coating Types	**Average VOC Content (gm/l)**	**Average Solids by Volume (%)**
Floor Coatings (>250 g/l)	149	83
Floor Coatings (<250 g/l)	164	34
IM Coatings (>250 g/l)	436	56
IM Coatings (<250 g/l)	124	36.6
Nonflats (>250 g/l)	331	58
Nonflats (<250 g/l)	164	36
Quick Dry Enamels (>250 g/l)	403	50
Quick Dry Enamels (<250 g/l)	n/a	n/a
PSU (>250 g/l)	384	46
PSU (<250 g/l)	101	31
Quick Dry PSU (>250 g/l)	432	45
Quick Dry PSU (>250 g/l)	136	41
Water Proofing Sealer (>250 g/l)	339	50
Water Proofing Sealer (<250 g/l)	227	30
Rust Preventive Coatings (>250 g/l)	382	48
Rust Preventive Coatings (<250 g/l)	144	39
Stains(>250 g/l)	412	47
Stains(>250 g/l)	203	30

Illegal Thinning

PROJECT SPECIFIC IMPACT: As directed by the court, the SCAQMD has extensively analyzed the alleged air quality impacts due to more thinning. In oral testimony received by the SCAQMD from a few industry representatives, it has been asserted that thinning occurs in the field in excess of what is allowed by the SCAQMD rule limits. It is asserted that, because reformulated compliant water- and solvent-borne coatings are more viscous (e.g., high-solids content), painters have to adjust the properties of the coatings to make them easier to handle and apply. In particular for solvent-borne coatings this adjustment consists of thinning the coating as supplied by the manufacturer by adding solvent to reduce its viscosity. The added solvent increases VOC emissions back to or sometimes above the level of older formulations.

ANALYSIS: It has been further asserted that manufacturers will formulate current noncompliant coatings by merely increasing the solids content, which would produce a thicker film. Industry claims that a thicker film means less coverage. Therefore, thinning will occur to get the same coverage area as current noncompliant coatings resulting in more VOC emissions per area covered. As shown in Table 4-2 (see also the "More Thickness" discussion), based upon manufacturer's claims regarding coverage, low-VOC coatings have comparable coverage area compared to conventional coatings. As a result, the data indicate that it is not true that a painter will have to thin low-VOC solvent-borne coatings to obtain the same coverage.

Many of the reformulated compliant coatings are water-borne formulations or will utilize exempt solvents, thereby eliminating any concerns of thinning the coating as supplied and increasing the VOC content as applied beyond the compliance limit. Since exempted solvents are not considered a reactive VOC, thinning with them would, therefore, not increase VOC emissions. Water based coatings are thinned with water and would also not result in increased VOC emissions.

Extensive research has been conducted the last six years prior to 1998 to determine whether or not thinning of materials beyond the allowable levels occurs in the field. As part of the AQMD's fact finding and data gathering phase of the rule amendment process, staff conducted site visits to various locations where lower-VOC, compliant coatings have been utilized, to observe on a first-hand basis, the challenges and issues related to use of the lower-VOC coatings. In addition, since January 1996, staff has conducted over 100 unannounced site visits to evaluate contractor practices relating to thinning, application, and clean up. During these site visits, samples were collected for coatings actually being utilized, as applied and as supplied, for laboratory analysis and subsequent study of impacts of thinning.

Subsequent to the most recent amendments to Rule 1113 in November 1996, actual samples were taken at 47 sites with ongoing painting operations. Of the 59 samples collected, 36 were waterborne and 23 were solvent-borne. Of the 23 solvent-borne coatings, six represented three sets, which were for the same coating as supplied and as applied. All three sets that were thinned with solvent prior to use were analyzed, with none exceeding the compliance limit. All three sets were Industrial Maintenance Coatings.

Phase II of the field study consisted of purchasing and analyzing paint samples from various retail outlets. Since January 1996, 42 samples, consisting of various coating categories, were purchased and analyzed. All of the coatings analyzed were found to be in compliance with the applicable rule limit. Laboratory tests indicated that the reported VOC content on the container was generally higher than the VOC content as tested. The difference in the actual VOC content versus the reported VOC content ranged from five percent to over 60 percent. A trend of listing a maximum VOC content at the actual compliance limit was noted to be the practice. Of the samples purchased, seven were found to be in violation of Rule 1113, mostly waterproofing sealers. The SCAQMD believes that part of the reason for these violations is confusion over the definition of waterproofing sealers, which is currently being clarified.

A number of additional studies have addressed the thinning issue. The results are detailed below:

- In mid-1991, the California Air Resources Board (CARB) conducted a field study of thinning in regions of California that have established VOC limits for architectural coatings (CARB, 1991). A total of 85 sites where painting was in progress were investigated. A total of 121 coatings were in use at these sites, of which 52 were specialty coatings. The overall result of this study was that only six percent of the coatings were thinned in excess of the required VOC limit indicating a 94 percent compliance rate.

- The SCAQMD contracted with an environmental consulting firm, to study thinning practices in the district (SCAQMD 1993a). In Phase I of the study, consumers who had just purchased paints were interviewed as they left one of a number of stores located in different areas of the district. Seventy solvent-borne paint users responded to the survey. One-third of consumers purchased solvent-borne coatings. Of those surveyed, three (four percent of all solvent-borne paint purchasers) indicated that they planned to thin their coatings before use. In Phase II of the study, the consultant contacted 36 paint contractors. The majority stated that they were using water-borne coatings. Four contractors using solvent-borne paints allowed the consultant to collect paint samples at their painting sites. None of the samples collected were thinned.

- During the 1996 rule amendments to Rule 1113, SCAQMD staff conducted over 60 unannounced site visits to industrial parks and new residential construction sites to survey contractors regarding their thinning practices, coating application techniques, and clean-up practices. Samples were also collected during these site visits for coatings as supplied and as applied, for laboratory analysis and subsequent study of thinning practices. The results of the study indicate that out of the 91 samples taken only nine were thinned with solvents. Out of the nine thinned samples, only two were thinned to the extent that the VOC content limit of the coating, as applied, would have exceeded the applicable rule limit. During pre-arranged visits, however, excessive thinning was observed at only one site at a 1:2 ratio. At this level, the coating was thinned to the point where, according to the professional contractor using it, it did not provide adequate hiding and he had to apply several coats. The practice of over-thinning is expected to inhibit hiding power, application properties, and drying time of a coating.

The SCAQMD solicited empirical data from the paint industry on a number of occasions to support their claims of increased thinning. In contrast to the empirical data acquired from the field studies detailed above, the SCAQMD has received no countervailing empirical data from other sources to indicate that thinning is occurring to a greater extent than the above data would indicate.

In summary, field investigations of actual painting sites in the district and other areas of California that have VOC limits for coatings indicate that thinning of specialty coatings exists but rarely beyond the actual compliance limits. Even in cases where thinning does occur, it is rarer still for paints to be thinned to levels that would exceed applicable VOC content limits. The conclusion is that widespread thinning does not occur often; when it does occur, it is unlikely to occur at a level that would lead to a substantial emissions increase when compared with emissions from higher VOC coatings. Professional contractors can receive Notices of Violation (NOVs) for the practice of over-thinning, as it is illegal under the current version of the rule to exceed the specified compliance limits. It is, therefore, not likely that the proposed rule amendments would increase this practice. During the numerous surprise site visits conducted by district staff over many years, inspectors did not observe excess thinning to the degree cited by the industry representatives.

CONCLUSION: Thinning should not be a problem because a majority of the coatings that would comply with future limits will be waterborne formulations. Other compliant coatings are available may be applied without thinning. Even if some thinning occurs, thinning would likely be done with water or exempt solvents. Finally, current practice indicates that coating applicators do not engage in widespread thinning, and even when thinning occurs, the coatings VOC content limits are not exceeded. As a result, claims of thinning resulting in significant adverse air quality impacts are unfounded.

More Priming

PROJECT SPECIFIC IMPACT: Conventional coatings are currently used as part of a three, four, or five part coating system, consisting of one or more of the following components; primer, midcoat, and topcoat. Coating manufacturers and coating contractors have asserted that reformulated compliant low-VOC water- and solvent-borne topcoats do not adhere as well as higher-VOC solvent-borne topcoats to unprimed substrates. Therefore, the substrates must be primed with typical solvent-borne primers to enhance the adherence quality. Industry representatives have testified that the use of water-borne compliant topcoats, could require more priming to promote adhesion. Additionally, it is has been asserted that water-borne sealers do not penetrate and seal porous substrates like wood, as well as traditional solvent-borne sealers. This allegedly results in three or four coats of the sealer per application compared to one coat for a solvent-borne sealer would be necessary, resulting in an overall increase in VOC emissions for the coating system.

ANALYSIS: Regarding surface preparation, staff evaluated this characteristic as part of the evaluation of coating product data sheets mentioned above and recent studies conducted (see the detailed tables in Appendix D and status reports in Appendix G). Information from the coating product data sheets indicated that low-VOC coatings do not require substantially different surface preparation than conventional coatings. According to the product data sheets, conventional and low-VOC coatings require similar measures for preparation of the surface (i.e. apply to clean, dry surfaces), and application of the coatings (i.e. brush, roller or spray). Both low-VOC coatings and conventional coatings for both architectural and industrial maintenance applications have demonstrated the ability to adhere to a variety of surfaces. As a part of the technology assessment, staff analyzed the product data sheets for a variety of low-VOC primers, including stain-blocking primers, primers that adhere to alkyds, and primers that have equal coverage to conventional solvent-borne primers, sealers, and undercoaters.

CONCLUSION: As a result, based on the coating manufacturer's coating product data sheets, the material needed and time necessary to prepare a surface for coating is approximately equivalent for conventional and low-VOC coatings. More primers are not needed because low-VOC coatings possess comparable coverage to conventional coatings, similar adhesion qualities and consistent resistance to stains, chemicals and corrosion. Low-VOC coatings tend not to require any special surface preparation different from what is required before applying conventional coatings to a substrate. As part of good painting practices for any coating, water-borne or solvent-borne, the surface typically needs to be clean and dry for effective adhesion. Consequently, claims of significant adverse air quality impacts resulting from more priming are unfounded.

More Topcoats

PROJECT-SPECIFIC IMPACTS: Coating manufacturers and coating contractors assert that reformulated compliant water- and low-VOC solvent-borne topcoats may not cover, build, or flow-and-level as well as the solvent-borne formulations. Therefore, more coats are necessary to achieve equivalent cover and coating build-up.

ANALYSIS: Technology breakthroughs with additives used in recent formulations of low-VOC coatings have minimized or completely eliminated flow and leveling problems. These flow and leveling agents mitigate flow problems on a variety of substrates, including plastic, glass, concrete and resinous wood. These additives even assist in overcoming flow and leveling problems when coating oily or contaminated substrates. According to the product data sheets for the sampled coatings, water-borne coatings have proven durability qualities. Comparable to conventional coatings, water-borne coatings for architectural applications are resistant to scrubbing, stains, blocking and UV exposure. Coating manufacturers, such as Dunn-Edwards, ICI, Pittsburgh Paints and Sherwin Williams, formulate low-VOC nonflat coatings (<150 g/l) with high build and excellent scrubability. Most of the coatings are mildew resistant and demonstrate excellent washability characteristics. The coverage of the coatings average around 400 square feet per gallon, which is equivalent to the coverage of the conventional nonflat coatings. Con-Lux, Griggs Paint and Spectra-Tone also formulate even lower VOC (<50 g/l) coatings that also demonstrate excellent durability, washability, scrubability and excellent hide. The coverage is again equivalent to the conventional coatings around 400 square foot per gallon. As already noted in the "More Thickness" discussion, low-VOC coatings that have a high solids content have equivalent or slightly superior coverage compared to high VOC coatings.

According the other coating manufacturer's product data sheets, water-borne coatings for IM applications are resistant to chemicals, corrosion, chalk and abrasion. Both water-based and low-VOC solvent-based IM coating formulations have passed abrasion and impact resistance tests, such as ASTM test methods D4060 and G14, respectively. Similar to their conventional counterparts, water-borne IM coatings also tend to retain gloss and color, as well as have good adhesion to a variety of substrates. A majority of the low-VOC (<250 g/l) IM coatings passed adhesion tests, such as ASTM test methods D4541, D3359-78, D2197 or D412. Low-VOC IM coatings tend to have comparable coverage (approximately 300 square feet per gallon) to conventional IM coatings.

CONCLUSION: Both low-VOC and conventional coatings have comparable coverage and superior performance. These low-VOC coatings possess scrub and stain resistant qualities, blocking and resistance to UV exposure for the exterior coatings. Both low-VOC and conventional IM coatings tend to have chemical and abrasion resistant qualities, gloss and color retention, and comparable adhesion qualities. With comparable coverage and equivalent durability qualities, additional topcoats for low-VOC coatings should not be required.

More Touch-Ups and Repair Work

PROJECT-SPECIFIC IMPACTS: Coating manufacturers and coating contractors assert that reformulated compliant water- and low-VOC solvent-borne formulations dry slowly, and are susceptible to damage such as sagging, wrinkling, alligatoring, or becoming scraped and scratched. They also claim that the high-solids solvent-borne alkyd enamels tend to yellow in dark areas, and that water-borne coatings tend to blister or peel, and also result in severe blocking problems. All of these problems they claim require additional coatings for repair and touch-up.

ANALYSIS: Extra touch-up and repair and more frequent coating applications are related to durability characteristics of coatings. Staff met with numerous resin and coatings manufacturers to discuss this issue, and also reviewed coating product data sheets and recent studies conducted (see the detailed tables in Appendix D and status reports in Appendix G) to obtain durability information for low-VOC coatings and conventional coatings. Based on information in the coating product data sheets, comparable to conventional coatings, water-borne coatings for architectural applications are resistant to scrubbing, staining, blocking and UV exposure. They were noted for excellent scrubability and resistant to mildew. The average drying time between coats for the low-VOC coatings (<150 g/l) was less than the average drying time for the conventional coatings (250 g/l). The average drying time for the lower-VOC coatings (<50 g/l) did increase more than the conventional coatings. However, with the development of non-volatile, reactive diluents combined with hypersurfactants, performance of these nearly zero-VOC coatings has equaled, and for some characteristics, outperformed traditional, solvent containing coatings.

Water-borne coatings for IM applications are resistant to chemicals, corrosion, chalk, impact and abrasion. Similar to their conventional counterparts, water-borne IM coatings also tend to retain gloss and color, as well as have good adhesion to a variety of substrates. Further, both low-VOC coatings and conventional coatings tend to be comparable with regards to passing abrasion and impact resistance tests, and are considered to have proven durability qualities. Some IM low-VOC epoxy and urethane systems perform significantly better than their alkyd-based counterparts. Examples of these coatings can be found in Appendix D and in the status reports in Appendix G.

CONCLUSION: Therefore, based on the durability characteristics information contained in the coating product data sheets, low-VOC coatings and conventional coatings have comparable durability characteristics. As a result, it is not anticipated that more touch up and repair work will need to be conducted with usage of low-VOC coatings. Consequently, claims of significant adverse air quality impacts resulting from touch-up and repair for low-VOC coatings are unfounded.

More Frequent Recoating

PROJECT-SPECIFIC IMPACT: Coating manufacturers and coating contractors assert that the durability of the reformulated compliant water- and low-VOC solvent-borne coatings is inferior to the durability of the traditional solvent-borne coatings. Durability problems include cracking, peeling, excessive chalking, and color fading, which all typically result in more frequent recoating. As a result, they claim more frequent recoating would be necessary resulting in greater total emissions than would be the case for conventional coatings.

ANALYSIS: The durability of a coating is dependent on many factors, including surface preparation, application technique, substrate coated, and exposure conditions. Again, as mentioned above, key durability characteristics, as discussed in coating product data sheets, include resistance to scrub or abrasion, corrosion-, chemicals-, impact-, stain-, and UV- resistance, are similar between conventional and low-VOC coatings. Both coating types pass abrasion and impact resistance tests, and have similar durability qualities.

According to the coating product data sheets, low-VOC coatings repeatedly would not need additional surface preparation than what needs to be done to prime the surface for conventional coatings (see also "More Priming" discussion above). The technique to applying the coatings did not significantly differ either. It is expected that if applied using manufacturers' recommendations, compliant low-VOC coatings should be as durable as conventional coatings and, therefore, no additional recoating is required from the usage of low-VOC coatings. Furthermore, overall durability is dependent on the resin used in the formulation as well as the quality of pigment, instead of just the VOC content of the coating.

The durability of a coating is governed by the nature of the binder used in its formulation, which are also known as film formers or resins. Table 4-4 shows the ~~tow~~ *two* main resin types currently in use. Acrylic resins are generally associated with low VOC coatings and alkyd resins are typically associated with high VOC coatings. These coatings are exposed to a variety of influences of daily life, including mechanical stresses, chemicals and weathering, against which they serve to protect the substrate. The major impact on the coating film is oxidation by exposure to light, causing the film to first lose color and gloss, and gradually become brittle and incoherent. This is mainly caused by a process known as photochemical degradation. This is especially the case for coatings used for exterior painting.

The coatings industry has developed a variety of additives that act as ultraviolet light (UV) absorbers or free radical scavengers that ultimately slow down the photo-oxidative process, thereby increasing the coating life. Antioxidants and sterically hindered amines are two classes of free radical scavengers, also known as hindered amine light stabilizers (HALS). These can be used with solvent-free or waterborne coatings. Other additives that have positive effect on durability of coatings include adhesion promoters, corrosion inhibitors, curing agents, reactive diluents, optical brightners, and algicides/mildewcides.

TABLE 4-4

Performance Comparison of Acrylic (Low VOC)
and Alkyd (High VOC)Resin Systems

Acrylic Coatings	Alkyd Coatings
Low-VOC and solvent-free formulations available	Higher VOC formulations

TABLE 4-4 (CONCLUDED)

Performance Comparison of Acrylic (Low VOC)
and Alkyd (High VOC)Resin Systems

Acrylic Coatings	Alkyd Coatings
Excellent exterior durability because of high degree of resistance to thermal, photooxidation, and hydrolysis – Pendant groups are ester bonds, but body is C-C bonds, which are much harder to break.	Limited exterior durability because prone to hydrolysis.
Very good color and gloss retention, and resistance to embrittlement	Embrittlement and discoloration issues with age
Require good surface preparation. Since the surface tension is high, the substrate surface needs to be cleaner before application	Minimal surface preparation requirements due to low surface tension. Relatively foolproof applications
Acrylic coatings are generally higher in cost	Lower costs
Polyurethane modified acrylics perform even better, especially in flexibility	Rapid drying, good adhesion, and mar resistance. Silicone modified alkyds have higher performance

As indicated earlier in this report, there are numerous types of binders used in the formulation of coatings. However for architectural uses, acrylics and alkyds are the two most commonly used. Table 4-4, extracted from material provided as part of the Durability and Performance of Coatings seminar held by Eastern Michigan University, describes some typical characteristics of the two main resin types and highlights strengths and weaknesses of each resin type. But, clearly the table emphasizes the superior durability of acrylic coatings. Utilizing the additives available for improving application and durability characteristics, waterborne acrylic systems have overcome their limitations, and generally outperform solvent-borne coatings, when properly formulated.

CONCLUSION: Coatings manufacturers' own data sheets indicate that the low-VOC coatings for both architectural and industrial maintenance applications are durable and long lasting. Any durability problems experienced by the low-VOC coatings are not different than those seen with conventional coatings. Recent coating technology has improved the durability of new coatings. Because the durability qualities of the low-VOC coatings are comparable to the conventional coatings, more frequent recoatings would not be necessary.

Substitution

PROJECT-SPECIFIC IMPACT: Coating manufacturers and coatings contractors assert that since reformulated compliant water- and low-VOC solvent-borne coatings are inferior in durability and are more difficult to apply, consumers and contractors will substitute better performing high VOC coatings in other categories for use in categories with low compliance limits. An example of this substitution could be the use of a rust preventative coating, which has a higher VOC content limit requirement, in place of an IM coating or a nonflat coating.

ANALYSIS: There are several reasons why widespread substitution will not occur as a result of the implementation of PAR 1113. First and foremost, based on staff research of resin manufacturers' and coating formulators' product data sheets as well as recent studies conducted, there are, generally, a substantial number of low-VOC coatings in a wide variety of coating categories that are currently available, that have performance characteristics comparable to conventional coatings (see the tables in Appendix D, status reports in Appendix G, and Table 4-2). Second, PAR 1113 prohibits the application of certain coatings in specific settings. For example, industrial maintenance coatings cannot be used in residential, commercial, or institutional setting. Also, rust preventive coatings cannot be used in industrial settings. Third, the type of performance (e.g., durability) desired in some settings would prohibit the use of certain coatings. For example, in an IM setting a coating with a life of 10 years or more is typically desired due to the harshness of the environment. Therefore, it is unlikely that an alkyd-based rust preventive coating with a typical life of five years would be used in place of an IM coating. Fourth, PAR 1113 requires that when a coating can be used in more than one coating category the lower limit of the two categories is applicable. For example, a rust preventive coating substituted for an IM coating in the interim year would have to meet the lower IM interim limit. Lastly, SCAQMD enforcement records reveal that there is greater than 99 percent compliance rate with Rule 1113. Thus, it highly unlikely that coating applicators will violate PAR 1113 by substituting higher-VOC coatings for lower-VOC coatings.

CONCLUSION: As discussed above, the SCAQMD does not expect that low-VOC coatings used for specific coating applications will be substituted for by higher-VOC coatings used for other specific types of coating applications. Currently, there are a substantial number of low-VOC coatings in a wide variety of coating categories that have performance characteristics comparable to conventional coatings. Furthermore, PAR 1113 prohibits the application of certain coatings in specific settings. Moreover, the type of performance desired in some settings would prohibit the use of certain coatings in those settings. PAR 1113 also requires that when a coating can be used in more than one coating category the lower limit of the two categories is applicable. Lastly, SCAQMD enforcement records reveal that there is greater than 99 percent compliance rate with Rule 1113.

If in the rare event that substitution does occur, PAR 1113 would still achieve overall VOC emission reductions. Substitution would only result in lesser emission reductions than expected, it would not increase emissions as compared to the existing setting. Consequently, PAR 1113 will not result in significant adverse air quality impacts from the substitution of low-VOC coatings with higher-VOC coatings.

More Reactivity

Different types of solvents have different degrees of "reactivity," which is the ability to accelerate the formation of ground-level ozone. Coating manufacturers and coating contractors assert that the reformulated compliant low-VOC water- and solvent-borne coatings contain solvents that are more reactive than the solvents used in conventional coating formulations. Furthermore, water-borne coatings perform best under warm, dry weather conditions, and are typically recommended for use between May and October. Since ozone formation is also dependent on the meteorological conditions, use of waterborne coatings during this period increases the formation of ozone.

ANALYSIS: The use of reactivity as a regulatory tool has been debated at the local, state, and national level for over 20 years. For example, CARB incorporated a reactivity-based control strategy into its California Clean Fuel/Low Emissions Vehicle regulations, where reactivity adjustment factors are employed to place regulations of exhaust emissions from vehicles using alternative fuels on an equal ozone impact basis. CARB is evaluating a similar strategy for consumer products and industrial emissions, and contracted with Dr. William Carter, University of California at Riverside, Center for Environmental Research and Technology, College of Engineering, for a two-year study to assess the reactivities of VOC species found in the consumer products emissions inventory. Dr. Carter, one of the principal researchers of reactivities of various VOC species, plans to further study VOC species, more specifically glycol ethers, esters, isopropyl alcohol, methyl ethyl ketone (MEK), and an octanol, since these are typically found in either waterborne coatings, solvent-borne coatings, or both. These specific VOCs have been prioritized based on emissions inventory estimates, mechanistic uncertainties, and lack of information in the current reactivity data. Under the current models and ozone chamber studies, however, Dr. Carter has been unable to assess the reactivity of low volatility compounds, and has not succeeded in reducing the uncertainties of key VOC species used in AIM coatings. He did identify the state of science with respect to VOC reactivity and described areas where additional work is needed in order to reduce the uncertainty associated with different approaches to assessing reactivity.

Another factor to be considered in the reactivity based approach, and probably the most important, is an accurate speciation profile of waterborne and solvent-borne coatings. CARB, in its effort to get more detailed information about the speciation profiles, required speciation profiles of all coatings included in the 1998 CARB Survey. The results of the speciation data are still under evaluation, and could potentially be used for future reactivity-based architectural coatings control.

CARB did propose an alternative reactivity-based approach in its recent proposed Aerosol Coatings rule amendment, but has delayed the reactivity-based alternative, until after a complete peer review of the modeling assumptions and reactivity data included in Dr. Carter's research.

The contention that more reactive solvents will be used in lieu of traditional less reactive solvents is somewhat misleading because the coating categories affected by these rule amendments currently contain reactive and highly toxic solvents such as toluene, xylene, MEK, etc. Furthermore, Harley, et al., (1992) noted, "The speciated organic gas emissions from use of solvent-borne architectural coatings are 24 percent more reactive than the official [VOC] inventory would suggest." This observation suggests that solvent-borne architectural coatings may actually be more reactive than low-VOC coatings especially water-based coatings. Therefore, there is a need for further study of the chemical composition of industrial surface coatings and the detailed composition of petroleum distillate solvents incorporated in surface coatings.

To date, Dr. Carter has compiled some information regarding the reactivity of VOCs and has established several different reactivity scales. However, he cautions the use of these scales due to the uncertainties involved; for example, "Deriving such numbers is not a straightforward matter and there are a number of uncertainties involved. One source of uncertainty in the reactivity scales comes from the fact that ozone impacts of VOCs depend on the environment where the VOC is emitted. A second source of uncertainty is variability in the chemical composition of the VOC source being considered. Complex mixtures such as "mineral spirits" may be more difficult to characterize and may vary from manufacturer to manufacturer though in principal the composition of a given lot can be determined and reasonably assumed to be constant regardless of how the product is used. A third source of uncertainty comes from the complexity and uncertainties in the atmospheric processes by which emitted VOCs react to form ozone (Carter, 1995).

According to Dr. Carter, reliable reactivity numbers do not currently exist from which accurate air quality policy can be derived based on reactivity and not total VOC emissions. Further, Dr. Carter, asserts that ketones are the most important class of consumer emissions for which there are no environmental chamber reactivity data suitable for evaluating reactivity predictions. He also finds no experimental reactivity data for glycols or alcohols suitable for mechanism evaluation. (Carter, 1995, page 6).

Another factor to be considered in the reactivity based approach, and probably the most important, is an accurate speciation profile of water-borne and solvent-borne coatings. Dr. Albert C. Censullo, Professor of Chemistry, California Polytechnic State University, San Luis Obispo, conducted a comprehensive assessment of species profiles for a number of sources within the general categories of industrial and architectural coating operations. The study was intended to upgrade the existing species profiles, which were last analyzed in 1991. The compositions of industrial and architectural coatings have changed significantly in the last few years due to regulatory changes at the national, state, and local levels.

As a part of the Censullo study, 52 water-borne coating samples were analyzed and species profiles were determined by using an average of at least two analyses. The four most common solvents in water-borne coatings were identified as texanol, propylene glycol, diethylene glycol butyl ether, and ethylene glycol, all of which were identified by Dr. Carter as needing further reactivity assessment.

Additionally, the Censullo study obtained emission profiles for 54 solvent-borne coating samples. The results were significantly more complex compared to the species profiles for the water-borne samples, due primarily to the various petroleum fractions used in solvent-borne coatings. Some of the species profiles resulted in several hundred components from one sample. Dr. Carter has compiled reactivity data on several of the specifies identified, but has also indicated the need to further assess the reactivity of MEK, isopropyl alcohol, other alcohols, and esters found in solvent-borne coatings. Subsequently, the 1998 CARB survey included a section to obtain specification profiles from coating manufacturers. This updated species profile is an important first step in focusing the attention of researchers in assessing overall reactivity and its contribution to ozone formation. The information in the original survey questionnaire will be used to study whether or not additional flexibility can be built into regulations based on the reactivity of the ingredients.

In spite of the studies identified above, reactivity data for VOCs, especially those compounds used to formulate consumer and commercial products, are extremely limited. This is essentially the conclusion reached by EPA in a report to Congress which states, “better data, which can be obtained only at great expense, is needed if the EPA is to consider relative photochemical reactivity in any VOC control strategy.” (USEPA, 1995). Current studies are underway with more work being planned for the future with respect to assigning reactivity numbers for various key chemical compounds found in coatings.

With respect to water-borne reformulated coatings, some members of the architectural coating industry also concurs with the SCAQMD’s technical assessment that reactivity will not significantly affect the reaction of total VOC reductions on reducing ozone formation in the Basin. At a 1991 joint SCAQMD/CARB Conference on Reactivity-Based Hydrocarbon Controls: Scientific Issues and Potential Regulatory Applications, a paper was presented by coating industry representatives entitled, *“Application of Reactivity Criteria to Architectural Coatings.”* This paper asserts that “...approximately 68% of the volume of architectural coatings made and used in California are waterborne flat coatings and waterborne primers, sealers, and undercoaters, with a weighted average VOC content of 80 g/L. This is so much lower than the VOC content of the solvent-borne flat coatings replaced...that reactivity is probably not a significant issue with regard to these coatings.”

To address the issue of reactivity of VOCs, staff is currently participating in CARB’s Reactivity Research Advisory Committee, which is monitoring the progress of the North American Research Strategy for Tropospheric Ozone with regard to evaluating research studies on reactivity conducted at the national level. In addition to the SCAQMD’s participation in the aforementioned studies, Dr. Carter has been retained by CARB to carry out an experimental and computer modeling study to investigate the atmospheric ozone formation potential of selected VOCs emitted from consumer products and industrial sources.

Although the science of VOC reactivity has matured over the past few years, more comprehensive studies are still being conducted to resolve the uncertainties of reactivity data. The experts in the field, including Dr. Carter, have indicated the need to improve estimates of atmospheric ozone reactivity factors for selected major classes of compounds in the consumer product emissions inventory. They also feel the need to improve the quantification of the uncertainty ranges of atmospheric reactivity factors for the classes of species typically found in coatings. In the near future, with funding from USEPA and private sources, a new, state-of-the-art ozone chamber will be developed and used for future studies. It was agreed at a March 1, 2001 CARB meeting that first two compounds to be modeled in the ozone chamber would be texanol ester alcohol and mineral spirits because they were at the top of the usage list from CARB's surveys. Furthermore, the architectural coatings industry is funding additional studies to further understand the mechanistic and kinetic reactivities of different VOC species. The results of all the aforementioned research and studies will be invaluable in determining the extent to which a reactivity based approach can be relied on for regulating VOC emissions from the application of coatings and the use of solvents.

Until the results of this research and studies are completed and peer reviewed, the SCAQMD believes that it would not be prudent to implement a reactivity-based ozone reduction strategy based on incomplete science. Therefore, the SCAQMD will continue to monitor and participate in all studies related to enhanced reactivity data for VOC species, including directly participating in studies pertaining to reactivity of solvents in architectural coatings.

CONCLUSION: In the absence of actual reactivity numbers for the compounds contained in "traditional" solvent formulations and compliant, low-VOC coatings, emissions must be calculated in the standard manner of total VOC per unit of coating applied manner. Based upon the current state of knowledge regarding VOC reactivity, it is speculative to conclude that the proposed amendments will generate significant adverse air quality impacts due to increased reactivity.

On June 16, 1995, the USEPA determined that acetone, PCBTF, VMS as well as other solvents have low photochemical reactivity and should be exempted from consideration as a VOC. The AQMD subsequently amended Rule 102 on November 17, 1995, to add acetone and other solvents to the definition of Group I exempt compounds, which are non-VOC by definition.

Oxsol 100 (p-chlorobenzotriflouride, PCBTF), manufactured by Occidental Chemical Corporation, was also delisted as a VOC in 1995. This solvent can be used to extend or replace many organic solvents, including toluene, xylene, mineral spirits, acetone, methyl ethyl ketone, trichloroethylene, and perchloroethylene. Toxicity data of PCBTF was assessed by OEHHA and it was not considered to have a significant toxic risk. This product is less toxic than toluene, is not considered a Hazardous Air Pollutant or an Ozone-Depleting Substance. The USEPA is also in the process of delisting t-butyl acetate, which may also help coating formulators in utilizing exempt solvents in their formulations.

Synergistic Effects of the Eight Issues

Coatings manufacturers have also alleged that not only should each of the eight issues (e.g., more thickness, illegal thinning, more priming, more topcoats, more touch-up and repair, more frequent recoating, more substitution, and more reactivity) be analyzed separately but that the synergetic effect of all issues be analyzed. As discussed above, the SCAQMD's research and analysis of resin manufacturers' and coating formulators' product information sheets concludes that on each separate issue that the low-VOC compliant coatings have comparable performance as current coatings or industry's specific assertions are unfounded. Therefore, since individually each issue does not result in a significant adverse air quality impact, the synergistic effect of all eight issues will not result in significant adverse air quality impacts. Even if it is assumed that some of the alleged activities do occur, e.g., illegal thinning, substitution, etc., the net overall effect of the proposed amendments is expected to be a reduction in VOC emissions.

Low Vapor Pressure

While not argued as one of the alleged eight issues discussed previously, coatings manufacturers have asserted that coating solvents should not be regulated as a VOC at all. These solvents currently used in consumer products and architectural coatings are considered low volatility compounds, meaning that they have a vapor pressure of less than 0.1 millimeter of mercury (mm of Hg) at 20 degrees Celsius. While CARB has included a low vapor pressure (LVP) exemption in its Consumer Products regulation, its staff indicate that the LVP exemption was placed into the proposed rule for some additives found in consumer products, such as surfactants, paraffin, and other heavier compounds that do not readily evaporate into the atmosphere and are typically washed away into the sewer. Since the VOCs in paints do and are intended to evaporate into the atmosphere, CARB does not support the LVP exemption for architectural coatings and did not include the LVP exemption into its Aerosol Coatings rule. USEPA staff also does not support an LVP exemption for the architectural coatings rule and did not include such an exemption in the National Architectural Coatings Rule. Based upon its test methodology, USEPA concludes that VOCs from architectural coatings do evaporate into the air and therefore should not be exempted. The SCAQMD concurs with USEPA and CARB decisions to not include a LVP exemption for architectural coatings. Nevertheless, the SCAQMD will continue to work with CARB staff in identifying issues, participating in future studies, and monitoring the result of any studies.

NTS Study

A study by the National Technical System (NTS) was initiated to assess application and durability characteristics of zero-VOC, low-VOC, and high-VOC coatings in order to supplement information collected by the SCAQMD, as part of a technology assessment. The laboratory testing of the NTS study is complete, and the Preliminary Test Data/Project Status Report #3 was released April 5, 1999.

The results from the NTS study are consistent with SCAQMD's own technology assessment. The results of the study show that zero-VOC coatings available today, when compared to high-VOC coatings are equal, and in some cases, superior in performance characteristics, including coverage, mar resistance, adhesion, abrasion resistance, and corrosion protection. However, the NTS results also highlight application characteristics of some zero-VOC nonflat and PSU coatings that are somewhat limited when compared to solvent-based, high-VOC coatings. Those include lower rankings for leveling, sagging and brushing properties. However, for IM coatings, zero and low-VOC coatings performed better than high-VOC coatings. In addition to the laboratory results, the NTS study was expanded with additional testing, including accelerated actual exposure, real time actual exposure, and actual field application characteristics. In sum, the results of the NTS study indicates that for the final VOC content limits, some, but not all of the zero-VOC coatings may have some application characteristics. As a result, the when originally adopted by SCAQMD, the 1999 amendments to Rule 1113 gave coating formulators seven years to reformulate their coatings to comply with the final VOC content limits and correct coating application problems. This time period is consistent with input received from resin manufacturers and coating formulators that it takes five to seven years to reformulate coatings to make them commercially available based on existing and emerging resin technologies.

PAR 1113 contains a technology assessment provision whereby approximately prior to the interim and final compliance dates the SCAQMD will perform a technology assessment of the availability of compliant nonflats; primers, sealers, and undercoaters; quick-dry primers, sealers, and undercoaters; quick-dry enamels; waterproofing wood sealers; stains; floor; rust preventative; and industrial maintenance coatings as specified in paragraph (c)(2) by July 1, 2001 and July 1, 2005. If compliant coatings are unavailable by the completion of the technology assessment to meet the final limit, the SCAQMD will report back to the Governing Board as to the appropriateness of maintaining the existing VOC content limits. The SCAQMD plans to utilize the on-going testing results from the NTS study for future technology assessments.

In support of the technology assessment requirements, the District has completed the Phase II Assessment Study discussed above. Furthermore, in a continuing effort to compare low and high-VOC coatings in order to further substantiate that available products have characteristics similar to user expectations of higher VOC based products, the District also initiated a contract to study various coatings with KTA-Tator, Inc. The selection of the contractors, the protocol for conducting the study and the coatings evaluated, resulted from discussions and a consensus between the District and the TAC.

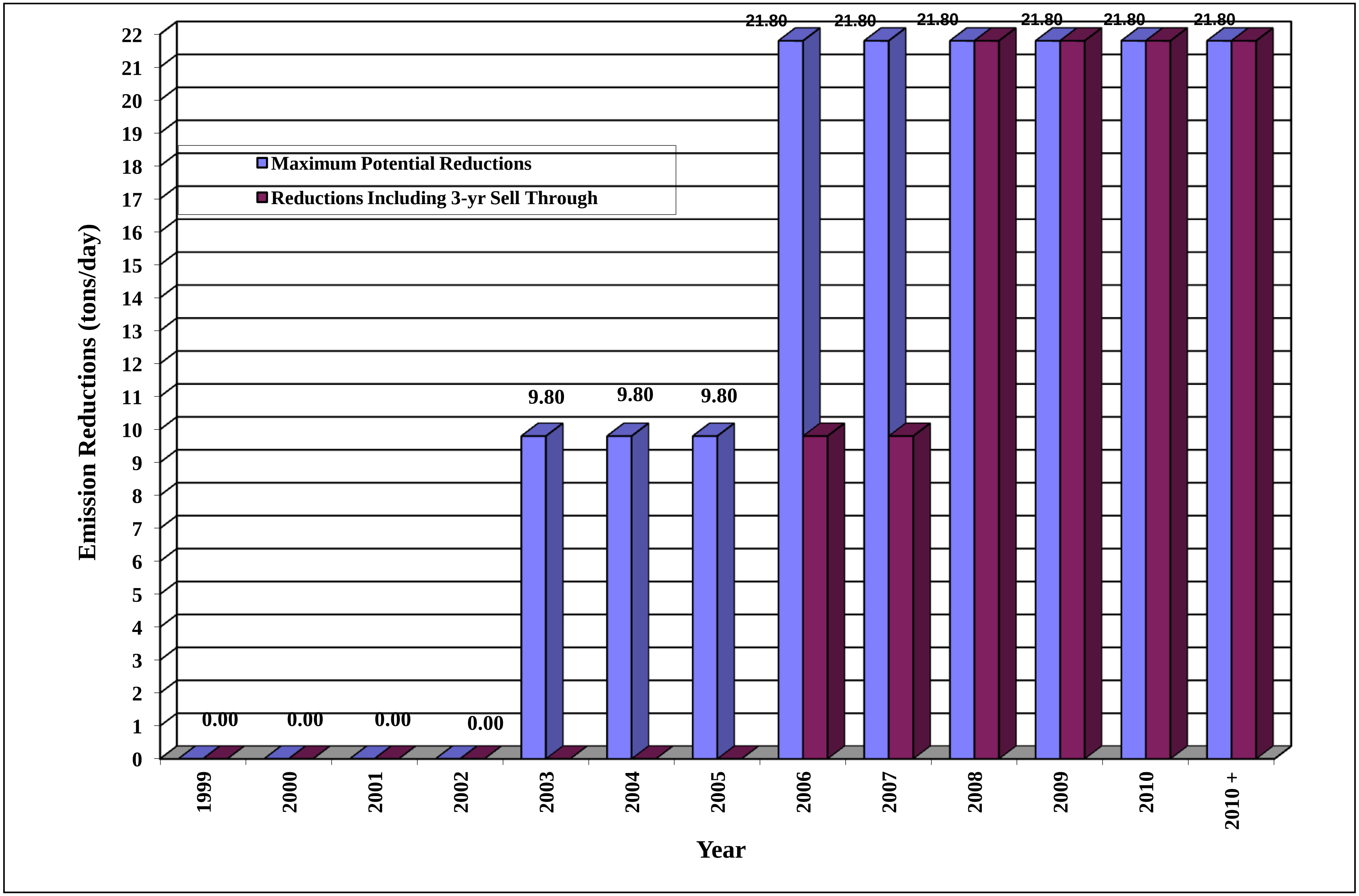
This most recent assessment compared high-, low- and zero-VOC formulations for four architectural coating categories: floor coatings, non-flat interior and exterior high gloss paints, interior and exterior primers, sealers and undercoaters and interior stains. The characteristics and performance of 31 coatings on various substrates were studied in the evaluation. Complete test results are shown in Appendix B1 of this report. Staff believes that overall, the results continue to substantiate current and future limits stated in the rule. Low-VOC products are currently available and, in all categories tested, work as well as and in some cases better than the higher-VOC counterparts. It is important to recognize that this study tested only a small portion of the low-VOC products currently available at retail and commercial outlets. While the test results do vary for some of the low-VOC products, all are currently being sold in the market, indicating acceptance by the consumer. The TAC and the District are continuing to discuss the findings of the study.

Overall Conclusion

Based on the preceding analysis of potential air quality impacts from implementing PAR 1113, it is concluded that the overall air quality effects of the PAR 1113 will be a VOC emission reduction of approximately 21.8 tons per day by the year 2010. The interim emission reduction is approximately 9.8 tons per day, including the ~~allowance of a higher interim VOC limit for essential public service coating and~~ extended compliance date for small businesses. Figure 4-1 illustrates the overall VOC emission reductions with and without the sell through provision associated with the implementation of PAR 1113.

To aid coating manufacturers in complying with the interim and final VOC continent limits, the SCAQMD has expanded the averaging provision of the current rule to cover PAR 1113 affected coating categories. In the 1996 amendments, SCAQMD staff included an "Averaging Provision" for flat coatings to provide an optional method of compliance for manufacturers of flat coatings. PAR 1113 will expand the provision and allow averaging for flats, nonflats; quick-dry enamels: IM coatings; PSU; quick-dry PSU; rust preventative coatings; and floor coatings. Effective January 1, 2001, this provision will allow manufacturers to average, on a sales-weighted basis, the VOC contents of all these coatings, and allow them to manufacture and distribute coatings that have a VOC content higher than the proposed standards. Market-based approaches have been requested by industry as an option to compliance with the standards. The overall averaging program parallels the CARB's Alternative Control Plan Regulation for Consumer Products.

FIGURE 4-1
OVERALL VOC EMISSION REDUCTIONS FROM PAR 1113



The Averaging Provision is a voluntary, flexible approach that will utilize a "bubble" concept. Under this program, manufacturers who voluntarily choose to comply with the rule under the averaging provision would select the coatings and formulate a detailed program which would demonstrate that the total actual VOC emissions under the program would not exceed the allowable emissions that would have resulted had the products been formulated to meet the VOC content limits. Once the program is approved, the manufacturers could sell products that exceed the VOC content limits specified in the rule for specific coating categories, provided that the emissions from these high-VOC products will be sufficiently offset by emissions from other coating products formulated to achieve VOC limits, below the proposed VOC content limits.

The following benefits of averaging have been noted by other similar programs, and are also appropriate under this proposal:

- Higher degree of compliance flexibility
- Equivalent emission reductions by utilizing market forces
- Lower the manufacturers' overall cost of reducing VOC emissions from categories included in the provision

PROJECT SPECIFIC MITIGATION MEASURES: None required.

REMAINING IMPACTS: Since PAR 1113 will result in an overall long-term air quality benefit (e.g., VOC reductions), no adverse impacts remain.

CUMULATIVE IMPACTS: Potential VOC emission increase of 0.08 tons per day (162 pounds per day) may result from the July 2001 amendments to PAR 1113, which delayed compliance to lower VOC content limits for clear brushing lacquers. However, the May 1996 amendments projected VOC emission reductions of 5.7 tons (11,400 pounds) per day by year 2002 and 10.6 tons per day by full implementation of the amendments by year 2008. The VOC increase from the July 2001 amendments will not result in a significant adverse cumulative impact because the 1996 amendments will provide an overall air quality benefit.

Cumulative air quality impacts from the proposed amendments, previous amendments and all other AQMP control measures considered together are not expected to be significant because implementation of all AQMP control measures is expected to result in net emission reductions and overall air quality improvement. This determination is consistent with the conclusion in the 1997 AQMP EIR that cumulative air quality impacts from all AQMP control measures are not expected to be significant (SCAQMD, 1997). Indeed, air quality modeling performed for the 1997 AQMP indicated that the Basin would achieve all federal ambient air quality standards by the year 2010 (SCAQMD, 1997). Future VOC control measures will assist in achieving the goal of ozone attainment by 2010.

Based on regional modeling analyses performed for both the 1994 and 1997 AQMPs, implementing control measures contained in the 1994 and 1997 AQMPs, in addition to the air quality benefits of the existing rules, is anticipated to bring the district into attainment with all national and most state ambient air quality standards by the year 2010. Therefore, there will be no cumulative adverse air quality impacts from implementing PAR 1113.

There are no provisions of PAR 1113 that result in either project-specific or cumulative air quality impacts. Since the proposed project is not expected to create significant adverse project-specific air quality impacts, the proposed project's contribution to significant adverse cumulative energy impacts are less than cumulatively considerable (CEQA Guidelines §15130(a)(3) and, therefore, are not significant.

CUMULATIVE IMPACT MITIGATION: No cumulative impact mitigation measures are required

WATER RESOURCES

In the NOP/IS, originally circulated prior to the adoption of the 1999 amendments to Rule 1113, the SCAQMD identified as a possible issue water resources impacts that could occur as a result of implementing PAR 1113. Specifically, PAR 1113 may result in additional water demand from the manufacturing and clean up of complaint water-borne coatings as well as the potential additional generation of wastewater that could be disposed of into storm drains and sanitary sewers.

Significance Criteria

The project will be considered to have significant adverse water demand impacts if any one of the following criteria is met by the project:

- The project increases demand for water by more than 5,000,000 gallons per day.
- The project requires construction of new water conveyance infrastructure.

The project will be considered to have significant adverse water quality impacts if any one of the following criteria is met by the project:

- The project creates a substantial increase in mass inflow of effluents to public wastewater treatment facilities.
- The project results in a substantial degradation of surface water or groundwater quality.
- The project results in substantial increases in the area of impervious surfaces, such that interference with groundwater recharge efforts occurs.

- The project results in alterations to the course or flow of floodwaters.

Water Demand Impacts

PROJECT SPECIFIC IMPACTS: Potential water demand impacts that could occur if compliant coatings are reformulated with water.

ANALYSIS: To analyze these impacts, the SCAQMD has projected what the water demand impacts would be as a result of using water to manufacture and to clean-up water-borne coatings. As a "worst-case," staff assumed that all affected coating categories associated with PAR 1113 would eventually be reformulated with water-borne technology. Staff also assumed for this "worst-case" analysis that all coatings that were and will be sold for use in the SCAQMD's jurisdiction were manufactured in the district. Additionally, staff assumed that water instead of solvent-borne clean-up material would be used to clean-up coating equipment. Thus, more water will be used in conjunction with the clean-up practices associated with the use of compliant coating categories than is presently the practice. As shown in Table 4-5, water demand impacts associated with the manufacture and clean-up of water-borne formulations (included as a "worst-case"), currently and in the future, are anticipated to create a negligible incremental water demand impact and do not exceed the SCAQMD's significant threshold of 5,000,000 gallons per day.

CONCLUSION: As shown in Table 4-5, it is within the capacity of the local water suppliers to supply the small incremental increase in water demand associated with the implementation of PAR 1113. Therefore, no significant water demand impacts are expected as the result of implementing PAR 1113.

While it is not possible to predict water shortages in the future, existing entitlements and resources in the district provide sufficient water supplies that currently exceed demand. Further, according to the Metropolitan Water District (MWD), the largest supplier of water to California, "For its part, Metropolitan expects to be able to meet 100 percent of its member agencies' water needs for the next ten years, even during times of critical drought. Metropolitan and its member agencies have identified and are implementing programs and projects to assure continued reliable water supplies for at least the next 20 years."[3] MWD is expected to continue providing a reliable water supply through developing a portfolio of diversified water sources that includes: cooperative conservation; water recycling; and groundwater storage, recovery, and replenishment programs. Other additional water supplies will be supplied in the future as a result of water transfer from other water agencies, desalination projects and state and federal water initiatives, such as CALFED and California's Colorado River Water Use Plan.

It should be noted, however, that the MWD and other water providers are currently exploring various strategies for increasing water supplies and maximizing the use of existing supplies.

[3] From Metropolitan Water District, Annual Progress Report to the California's State Legislature, February 2002.

Options include storage of water from existing sources, use or storage of water unused by other states or agricultural agencies, and advance delivery of water to irrigation districts. In an article titled "Water Exchanges Help State Through Dry Years," in the Los Angeles Times (Thursday, April 4, 2002, California Section, page B1) describes the water market created by the Department of Water Resources (DWR) in 1991 when the pressure on water projects increased when the drought struck. The DWR set up a 'drought water bank,' which is a water market with the state playing broker and setting prices, purchasing water from farmers who would sell their water to the state instead of growing a crop for a year. "Last year, a dry year, the DWR again purchased some water for the farms and cities it serves through the State Water Project. Even more water was purchased by DWR on behalf of endangered fish through an experimental $57-million program. Several other water transfers were negotiated one-on-one between water districts." According to Tim Quinn, a MWD vice president, "water transfers have helped restore reliability for Southern California." Further, according to the article, "the (water) sales amount to a near record, and even more water will be bought and sold in coming years as the state struggles to accommodate its vital agriculture industry and its growing population." These continuing and future water management programs help to assure that the area's full-service water demands will be met at all times.

The SCAQMD will conduct a technical assessment prior to each of the rule limit requirements to determine where the technology is at that time and what, if any, environmental issues are associated with the manufacture and use of such reformulated products.

PROJECT-SPECIFIC MITIGATION: None required.

REMAINING IMPACTS: None.

CUMULATIVE IMPACTS: The cumulative impacts of PAR 1113 have been fully evaluated in the Final 1997 AQMP Program EIR, which is incorporated by reference. The 1997 AQMP Final Program EIR concluded that the implementation of all control measures, including CM #97CTS-07, would not create cumulatively significant adverse water demand impacts. Additionally, the 1997 AQMP Final Program EIR found that the implementation of certain mitigation measures would further reduce the incremental impacts associated with the adoption of control measures, which are incorporated herein by reference.

There are no provisions of PAR 1113 that result in either project-specific or cumulative water demand impacts. Since the proposed project is not expected to create significant adverse project-specific water demand impacts, the proposed project's contribution to significant adverse cumulative energy impacts are less than cumulatively considerable (CEQA Guidelines §15130(a)(3) and, therefore, are not significant.

CUMULATIVE IMPACT MITIGATION: None required.

TABLE 4-5

Historical and Projected Water Demand for Reformulated Coatings

Year	Projected Population[a] (millions of people)	Projected Water Demand[b] (bgy)	Projected Water Supply[c] (bgy)	Projected Coating Sales[d] (mgy)	Projected Mfgr Demand[e] (mgy)	Projected Cleanup Demand[f] (mgy)	PAR 1113 Total Demand[g] (mgy)	Total Impacts[h] (% Increase)	Total Impacts[i] (mgd))
1996	14.42	1,108.40	1,266.97	17.56	0.00	0.00	0.00	0.000000	0.00
1997	14.71	1,129.36	1,266.97	18.96	0.00	0.00	0.00	0.000000	0.00
1998	15.00	1,150.32	1,266.97	20.48	0.00	0.00	0.00	0.000000	0.00
1999	15.29	1,171.28	1,266.97	22.12	0.00	0.00	0.00	0.000000	0.00
2000	15.58	1,192.24	1,266.97	23.89	0.00	0.00	0.00	0.000000	0.00
2001	15.88	1,213.20	1,266.97	25.80	0.00	0.00	0.00	0.000000	0.00
2002	16.17	1,234.16	1,266.97	27.87	27.87	27.87	55.73	0.004399	0.15
2003	16.46	1,255.12	1,266.97	30.09	30.09	30.09	60.19	0.004751	0.16
2004	16.75	1,276.08	1,266.97	32.50	32.50	32.50	65.00	0.005131	0.18
2005	17.04	1,297.04	1,526.97	35.10	35.10	35.10	70.21	0.004598	0.19
2006	17.34	1,318.00	1,526.97	37.91	37.91	37.91	75.82	0.004965	0.21
2007	17.63	1,338.96	1,526.97	40.94	40.94	40.94	81.89	0.005363	0.22
2008	17.92	1,359.92	1,526.97	44.22	44.22	44.22	88.44	0.005792	0.24
2009	18.21	1,380.88	1,526.97	47.76	47.76	47.76	95.51	0.006255	0.26
2010	18.50	1,401.80	1,526.97	51.58	51.58	51.58	103.15	0.006755	0.28

[a] Population projections obtained from SCAG's 1998 RTP.

[b] Water demand and supply projections obtained from MWD Web Page. MWD Fact Sheet, http://www.mwd.dst.ca.us/docs/fctsheet.htm. As a "worst-case" all of MWD's service area water demand is included.

[c] Assumes MWD provides 60% of water supply in the SCAQMD's jurisdiction. The remaining 40% is provided by other water districts or municipalities. MWD 1996 baseline figure obtained from MWD's Fact Sheet. Includes 1.3 million acre-feet per year (AF/yr) from the Colorado River, 784,000 AF/yr from State Water Project, 244,412 AF/yr for Reservoirs, 178,000 AF from recycling programs, 30,000 from water reclamation, and the construction of a 797,546 AF reservoir by 2005. AF (acre- feet) equals approximately 326,000 gallons

[d] The Draft 1998 CARB Survey sales data is used as the baseline for 1996. It is assumed that 45% of the total 1996 sales occurred in the district. It is projected that coating sales will increase by 8% (1% from individuals and 7% from contractors) per year. Reference The Coatings Agenda America 1995/1996 articles entitled "Demand Led by Do-It-Yourselfers" and "Holding on in the Face of a Blizzard."

[e] Assumes that one gallon of water will be used to manufacture one gallon of coating applied. Also assumes as a "worst-case" scenario, that all coatings used in the SCAQMD's jurisdiction were manufactured here.

[f] Assumes that one gallon of water will be used to clean-up equipment for every gallon of coating applied. Also assumes as a "worst-case" scenario, that full conversion of affected coating categories to water-borne formulations occurs in 2002.

[g] Total amount of manufacturer and clean-up water demand.

[h] The percentage increase in water demand as a result of the incremental increase due to water clean-up of water-borne coating material.

[i] The incremental increase in daily water usage associated with the implementation PAR 1113.

Acronyms: bgy = billion gallons per year; mgy = millions of gallons per year; mgd = million gallons per day

Water Quality Impacts

Groundwater and Surface Water Impacts

PROJECT-SPECIFIC IMPACT: Based upon staff research of currently available compliant coatings, to comply with PAR 1113 VOC content limits, it is likely that resin manufacturers and coating formulators will replace conventional coating formulations, which may contain toluene, xylene, mineral spirits, acetone, methyl ethyl ketone (MEK), tricholorethylene, and percholoroethylene, with either exempt solvents (e.g., acetone, Oxsol 100, t-butyl acetate) or water-borne formulations. In addition to the above-mentioned solvents, coalescing solvents such as texanol, propylene glycol, and ethylene glycol may be used more widely in low-VOC water-borne formulations as alternatives to more toxic coalescing solvents such as ethylene glycol monobutyl ether (EGBE), ethylene glycol monoethyl ether (EGEE), ethylene glycol monomethyl ether (EGME), and their acetates. Furthermore, diisocyanates (e.g., hexamethylene diisocyanate (HDI), methylene bisphenyl diisocyanate (MDI), and toluene diisocyanate (TDI)) may be used more widely in low-VOC two component, water-borne IM systems as activators to their higher-VOC solvent-borne counterparts.

Some commentators contend that with the increased use of water-borne technologies to meet the interim and final VOC content limits, there will be a greater trend of coating applicators to improperly dispose of the waste generated from these coatings into the ground, storm drains, or sewer systems. However, there is no data to support this contention. In any event, there are several reasons why there should be no significant increase over current practices for improper disposal due to greater use of water-borne coatings.

ANALYSIS: As part of the 1996 Rule 1113 amendments, SCAQMD staff conducted over 60 unannounced site visits at industrial parks and new housing construction sites in an effort to evaluate coating and cleanup practices. During these site visits, SCAQMD staff surveyed contractors regarding their thinning practices, coating application techniques, and clean-up practices. Out of 32 responses received from the contractors on their clean-up practices, seven (22 percent) indicated that they dumped their waste material into the ground, 18 (56 percent) indicated that they used a disposal company to handle waste material, and seven (22 percent) indicated that they recycled their waste material as thinner. This survey demonstrates that a majority of the contractors either dispose of the waste material properly as required by the coating manufacturer's MSDS or recycle the waste material regardless of type of coating. Based upon these results, there is no reason to expect that paint contractors will change their disposal practices, especially those that dispose of wastes properly, with the implementation of PAR 1113.

Furthermore, based on discussions with resin manufacturers and coating formulators, the trend in coating technologies is to replace toxic/hazardous solvents (e.g., EGBEs) with less toxic/hazardous solvents (e.g., texanol, ethylene glycol, and propylene glycol). Staff has verified this trend by reviewing product data sheets and MSDSs for currently available compliant low-VOC coatings. Additionally, a draft December 1995 report entitled "Improvement of Speciation Profiles for Architectural and Industrial Coating Operations" prepared by Dr. Albert C. Censullo for CARB indicates that a majority of current water based formulations (flats and non-flats) already contain less hazardous solvents.

The Censullo report, which is intended to upgrade the species profiles for a number of sources within the general categories of industrial and architectural coating operations, reported that the four most common solvents in the 52 randomly chosen water-borne coatings (flats and non-flats) were: texanol (found in 37/52); propylene glycol (31/52); diethylene glycol butyl ether (23/52); and ethylene glycol (14/52). It appears from this information that the use of solvents such as texanol and propylene glycol in water-borne coating formulations, is prevalent today and should continue into the future with the eventual replacement of more toxic and hazardous coalescing solvents such as EGBEs with less or nontoxic coalescing solvents.

Even if some of the nonflat complaint coatings were disposed of into the ground, storm drains, or sewer system, EPA would not consider it a hazardous waste. A research report released in March of 1997 demonstrated that latex (nonflat technology) paint is, in fact, not a hazardous waste product. The study, conducted by DynCorp Environmental Health and Safety Services of Reston, Virginia, included an independent laboratory analysis of 16 representative consumer latex paint samples. The results of this analysis demonstrate that these latex paint products would not be considered a "hazardous waste," according to procedures and protocols listed in Environmental Protection Agency (EPA) documentation, specifically 40 CFR, Subpart 261 20-24.

In the context of IM coatings, the SCAQMD research reveals that compliant low-VOC, two-component IM coating systems containing diisocyanate compounds (toluene diisocyanate (TDI), hexamethylene diisocyanate (HDI), or methylene bisphenyl diisocyanate (MDI)) will be used to meet the interim and final VOC content limits. Exposure to diisocyanates can cause allergic reactions (primarily asthmatic) in sensitive individuals. It is likely that the compliant water-borne two component systems may replace higher-VOC solvent-borne one component IM systems. These water-borne compliant formulations are intended as direct replacements for their higher-VOC solvent-borne two component counterparts currently being applied. However, users of these compliant coating systems are business (e.g., painting contractors) that are more sophisticated and experienced than the average consumer in the proper disposal methods and applicable disposal requirements. Furthermore, after these coatings are mixed and exceed their pot life, they become a solid mass and are disposable as solid waste rather than wastewater. Thus, it is unlikely that these users will improperly dispose of these compliant coating systems resulting in an adverse water quality impacts

It should be noted that the National Paints and Coatings Association's "Protocol for Management of Post Consumer Paint," and the SCAQMD's "Painter's Guide to Clean Air" provide the public and painting contractors with information as to the environmentally sound coating disposal practices. These public outreach programs are expected to reduce the amount of coating waste material entering the sewer systems, storm drainage systems, and being dumped on the ground. Therefore, further reducing any water quality impacts associated with the improper disposal of complaint coatings.

CONCLUSION: Thus, significant ground water and surface water quality impacts are not expected from the use of texanol, propylene glycol, and ethylene glycol as coalescing solvents in compliant water-borne coatings. Furthermore, the potential for significant adverse groundwater and surface water quality impacts from compliant IM coatings containing diisocyanates is considered unlikely since users will properly dispose of any waste generated from application of these coatings.

Water Quality Impacts to Publicly Owned Treatment Works (POTWs)

PROJECT-SPECIFIC IMPACT: As already noted, it is anticipated that future compliant AIM coatings will be formulated with water-borne technologies. As a result, more water will be used for clean-up and the resultant wastewater material could be disposed of into the public sewer system. Thus, the increased usage of water-borne compliant coatings could adversely affect local POTWs' ability to handle the projected incremental increase in waste material.

ANALYSIS: To evaluate the amount of wastewater projected to be generated, it is anticipated that current coating equipment (i.e., spray guns, rollers, and brushes) clean-up practices of using water will continue into the future. Table 4-6 illustrates the "worst-case" potential increase of waste material likely to be received by POTWs in the district as a result of implementing PAR 1113.

The results of the analysis illustrated in Table 4-6 are considered to be a "worst-case" analysis that considerably overestimate potential wastewater impacts from implementing PAR 1113. For example, the EPA in its Report to Congress entitled "Study of Volatile Organic Compound Emissions from Consumer and Commercial Products" evaluated consumer products to determine which categories were likely to be disposed of to POTWs. The study found that the likelihood of paints, primers, and varnishes being disposed of to POTWs was low. Therefore, this category was not even evaluated for its VOC emission impacts on POTWs. This suggests that the presence of solvents from this category of consumer products in wastewater streams is very low compared to the total volume of solvents being disposed of from other consumer product categories.

In addition, as discussed earlier, water-borne coatings are increasingly becoming less toxic than current coatings. To that extent, it is likely that adverse impacts to water quality will actually decrease as compared to the existing situation.

TABLE 4-6

Historical and Projected POTW Impact From Reformulated Coatings

Year	POTW Average Daily Flow[a] (mgd) [e]	POTW Capacity[b] (mgd)	Coatings Disposal Daily Flow[c] (mgd)	Total Impacts[d] (% Increase)
1996	1671.00	2005.20	0.0000	0.000000000
1997	1671.00	2005.20	0.0000	0.000000000
1998	1671.00	2005.20	0.0000	0.000000000
1999	1671.00	2005.20	0.0000	0.000000000
2000	1691.00	2029.20	0.0000	0.000000000
2001	1691.00	2029.20	0.0000	0.000000000
2002	1691.00	2029.20	0.0763	0.000003762
2003	1691.00	2029.20	0.0825	0.000004063
2004	1691.00	2029.20	0.0890	0.000004388
2005	1691.00	2029.20	0.0962	0.000004739
2006	1691.00	2029.20	0.1039	0.000005119
2007	1691.00	2029.20	0.1122	0.000005528
2008	1691.00	2029.20	0.1211	0.000005970
2009	1691.00	2029.20	0.1308	0.000006448
2010	1691.00	2029.20	0.1413	0.000006964

[a] 1990 total average daily wastewater flows handled by all POTWs in the district. Includes Eastern Municipal Water District tripling their capacity in 2000.

[b] Based on average daily flows of 80% of total POTW capacity. Does not include wet weather peak capacity.

[c] Assumes that one gallon of water will be used to clean-up equipment for every gallon of coating applied. Also assumes as a "worst-case" scenario, that full conversion of affected coating categories to water-borne formulations occurs in 2002. The figures for Coatings Disposal Flow expressed in mgy are converted to mgd by dividing by 365.

mgd = millions of gallons per day

CONCLUSION: The potential increase is considered to be well within the existing and projected capacity of POTWs in the district. Hence, wastewater impacts associated with the disposal of water-borne clean-up waste material generated from PAR 1113 affected coating categories are not considered significant. With the increasing trend toward less toxic water-borne, it is likely that there will be less adverse impacts to water quality.

Potential water quality impacts are expected to be further minimized through using the optional Averaging Provision. The Averaging Provision should help coating manufacturers comply with the proposed lower VOC limits by allowing them to manufacture and sell coatings at various VOC levels for a specific coating category assuming the category, as a whole, complies with a sales-weighted average VOC content equal to that in the rule. Since current solvents could continue to be used in the higher VOC coatings, the disposal practices associated with them would continue so no additional water quality impacts would be expected.

Overall Conclusion

Based upon the preceding analyses, PAR 1113 is not expected to create significant adverse water resource impacts for the following reasons. First, the current trend in coating technologies is to move away from using hazardous materials to using less or non-hazardous coating technologies. This trend may be the result of increasingly stringent state and federal regulations relative to hazardous materials, as well as the potential for increased liability associated with promoting or using hazardous materials. Second, experienced users are expected to properly dispose of waste generated from the use of compliant coatings. Third, public outreach programs are anticipated to further inform the public and painting contractors as to the proper disposal methods for compliant coatings. Lastly, based upon future projections, district POTWs are expected to be able to handle any incremental increase water-borne coating wastewater disposed of as part of clean-up practices associated with the use of compliant water-base coatings. As a result, water quality impacts will likely decrease over the current disposal practices.

PROJECT-SPECIFIC MITIGATION MEASURES: None required.

REMAINING IMPACTS: Since water quality impacts are not significant, no adverse impacts remain.

CUMULATIVE IMPACTS: The cumulative impacts were thoroughly analyzed in the 1997 AQMP Final Program EIR, which is herein incorporated by reference along with its adopted mitigation measures. In addition, due to the trend toward using less hazardous compounds in water-borne coatings, PAR 1113's contribution to the cumulative significant adverse water quality impacts (due primarily to Rules 1171 and 1122) found in the 1997 AQMP Final Program EIR will not be found to be cumulatively considerable and thus is not significant.

There are no provisions of PAR 1113 that result in either project-specific or cumulative water quality impacts. Since the proposed project is not expected to create significant adverse project-specific water quality impacts, the proposed project's contribution to significant adverse cumulative energy impacts are less than cumulatively considerable (CEQA Guidelines §15130(a)(3) and, therefore, are not significant.

CUMULATIVE IMPACT MITIGATION: None required.

PUBLIC SERVICES IMPACTS

In the NOP/IS, originally circulated prior to the adoption of the 1999 amendments to Rule 1113, the SCAQMD identified potential significant public services impacts that could occur as a result of implementing PAR 1113. Specifically, whether reformulated compliant coatings could lead to more demand for maintenance at public facilities because these coatings allegedly do not perform or hold-up as well as traditional solvent-borne coatings.

Additionally, based on comments received on the NOP/IS and at various public meetings the SCAQMD will also analyze other public services (e.g., fire department) impacts associated with the application of coatings reformulated with low-VOC solvents and exempt solvents (e.g., acetone).

Significance Criteria:

The project will be considered to have significant adverse public services impacts if any one of the following criteria is met by the project:

- The proposed project will result in the need for new or altered public facilities or services.

Additional Maintenance of Public Facilities

PROJECT-SPECIFIC IMPACTS: In the NOP/IS and in subsequent public forums, some commentators have asserted that because reformulated compliant coatings will not perform as well as current coatings public facility impacts will result from more frequent maintenance activities. In other words, because public facilities have limited budgets for painting activities, they will not be able to do more frequent touchups to maintain facility appearance, equipment, and in some instances safety.

ANALYSIS: As part of the analysis of PAR 1113, staff evaluated coating product information sheets and recent studies conducted for a large number of conventional coatings and currently available low-VOC coatings (see the tables in Appendix D, status reports in Appendix G, and Table 4-2). Extra touch-up and repair and more frequent coating applications are related to durability qualities of coatings. Generally, durability information is provided qualitative in the product information sheets rather than quantitatively, e.g., descriptions such as resistant or not resistant to high heat, chemicals, abrasion, etc.

~~Certain specialty IM coatings, such as protective coating used to paint specific components of power, municipal wastewater, water, bridges and other roadways for essential public services are not widely available and, therefore, allowed a slightly higher interim VOC content limit. However, the essential public service coating would be required to reach the original final compliance limit.~~

CONCLUSION: Based upon the qualitative durability descriptions in the coating product information sheets, staff concluded that low-VOC coatings have durability characteristics comparable to conventional coatings.

PROJECT-SPECIFIC MITIGATION MEASURES: No mitigation measures are required.

REMAINING IMPACTS: Since public service impacts are not significant, no adverse impacts remain.

CUMULATIVE IMPACTS: The cumulative impacts of PAR 1113 have been fully evaluated in the Final 1997 AQMP Program EIR, which is incorporated by reference. The 1997 AQMP Final Program EIR concluded that the implementation of all control measures, including CM #97CTS-07, would not create cumulatively significant adverse cumulative public service impacts.

There are no provisions of PAR 1113 that result in either project-specific or cumulative public services impacts. Since the proposed project is not expected to create significant adverse project-specific public services impacts, the proposed project's contribution to significant adverse cumulative energy impacts are less than cumulatively considerable (CEQA Guidelines §15130(a)(3) and, therefore, are not significant.

CUMULATIVE IMPACT MITIGATION: None required.

Fire Departments

PROJECT-SPECIFIC IMPACTS: Potential adverse impacts to fire departments could occur in two ways: 1) if there is an increase in accidental release of hazardous materials used in compliant coatings, fire departments would have to respond more frequently to accidental release incidences and 2) if there is an increase in the amount of hazardous materials stored at affected facilities, fire departments would have to conduct additional inspections. Table 4-7 compares the flammability characteristics of currently used solvents to replacement solvents that may be used to reformulate affected coatings to meet the PAR 1113 interim and final VOC content limits.

ANALYSIS: As illustrated in Table 4-7, the flammability classifications by the National Fire Protection Association (NFPA) are the same for acetone, t-butyl acetate, toluene, xylene, MEK, isopropanol, butyl acetate, and isobutyl alcohol. Recognizing that as a "worst-case" acetone has the lowest flashpoint, it still has the highest Lower Explosive Limit, which means that acetone vapors will not cause an explosion unless the vapor concentration exceeds 26,000 ppm.

In contrast, toluene vapors can cause an explosion at 13,000 ppm, which poses a much greater risk of explosion. The concentration of xylene vapors that could cause an explosion is even lower at 10,000 ppm. Under operating guidelines of working with flammable coatings under well-ventilated areas, as prescribed by the fire department codes, it would be difficult to achieve concentrated streams of such vapors.

Assuming as a "worst-case", although not likely, staff assumed that most affected PAR 1113 coating categories would be reformulated with acetone to meet the interim and final VOC content limits, it is anticipated that impacts to fire department would still be insignificant.

TABLE 4-7

Chemical Characteristics for Common Coating Solvents

Traditional/Conventional Solvents						
Chemical Compounds	**M.W.**	**Boiling Point (^oF)**	**Flashpoint[a] (^oF)**	**Vapor Pressure (mmHg @ 68 ^oF)**	**Lower Explosive Limit (% by Vol.)**	**Flammability Classification (NFPA)***
Toluene	92	231	40	22	1.3	3
Xylene	106	292	90	7	1.1	3
MEK	72	175	21	70	2.0	3
Isopropanol	60	180	53	33	2.0	3
Butyl Acetate	116	260	72	10	1.7	3
Isobutyl Alcohol	74	226	82	9	1.2	3
Stoddard Solvent	144	302 - 324	140	2	0.8	2
Petroleum Distillates (Naptha)	100	314 - 387	105	40	1.0	4
EGBE	118	340	141	0.6	1.1	2
EGME	76	256	107	6	2.5	2
EGEE	90	275	120	4	1.8	2
Replacement Solvents						
Chemical Compounds	**M.W.**	**Boiling Point (^oF)**	**Flashpoint[a] (^oF)**	**Vapor Pressure (mmHg @ 68 ^oF)**	**Lower Explosive Limit (% by Vol.)**	**Flammability Classification (NFPA)***
Acetone	58	133	1.4	180	2.6	3
Di-Propylene Glycol	134	451	279	30	1	1
Propylene Glycol	76	370	210	0.1	2.6	1
Ethylene Glycol	227	388	232	0.06	3.2	1
texanol	216	471	248	0.1	0.62	1
Oxsol 100	181	282	109	5	0.90	1
t-Butyl Acetate	113	208	59		1.5	3
Hexamethylene Diisocyanate (HDI)	168	415	284	0.5	1	1
Methylene Bisphenyl Diisocyanate (MDI)	250	314	385	0.5	1	1
Toluene Diisocyanate (TDI)	174	200	270	0.04	1	1

*National Fire Protection Association
0 = minimal; 1 = slight; 2 = moderate; 3 = serious; 4 = severe

Chemistry classes at all levels from grade school to universities, as well as industrial laboratories, use acetone for wiping down counter tops and cleaning glassware. Additional uses for acetone include solvent for paint, varnish, lacquers, inks, adhesives, floor coatings, and cosmetic products including nail polish and nail polish remover.

Labels and MSDSs accompanying acetone-based products caution the user regarding acetone's flammability and advises the user to **"**keep the container away from heat, sparks, flame and all other sources of ignition. The vapors may cause flash fire or ignite explosively.

Use only with adequate ventilation." All of the large coating manufacturers currently offer pure acetone for sale in quart or gallon containers with similar warnings.

Interviews with four local fire departments during the 1996 amendments to Rule 1113 revealed that all four departments would be equally concerned with any coating or solvent, which has a flashpoint below 65 degrees Fahrenheit. Currently, several conventional coatings generally have flashpoints below 65 degrees Fahrenheit. Based on inquiries from the SCAQMD, Captain Michael R. Lee, of the Petroleum-Chemical Unit for the County of Los Angeles Fire Department, submitted a letter to the SCAQMD stating that the Uniform Fire Code (UFC) treats solvents such as acetone, butyl acetate, MEK, and xylene as Class I Flammable Liquids. Further, the UFC considers all of these solvents to present the same relative degree of fire hazard. The UFC also sets the same requirements for the storage, use and handling of all four solvents. Captain Lee goes on to state, "In my opinion, acetone presents the highest degree of fire hazard of the four solvents considered, but not significantly more hazardous than the others. All four should be used with extreme caution, with proper safeguards in place."

The County of Los Angeles, Fire Department, Fire Prevention Guide #9 regulates spray application of flammable or combustible liquids. The guide requires no open flame, spark-producing equipment or exposed surfaces exceeding the ignition temperature of the material being sprayed within the area. For open spraying, as would be the case for the field application of the acetone-based coatings, no spark-producing equipment or open flame shall be within 20 feet horizontally and 10 feet vertically of the spray area. Anyone not complying with the above guidelines would be in violation of current fire codes. The fire department limits residential storage of flammable liquids to five gallons and recommends storage in a cool place. If the flammable coating container will be exposed to direct sunlight or heat, storage in cool water is recommended. Finally all metal containers involving the transfer of five gallons or more should be grounded and bonded.

CONCLUSION: Based upon the above considerations, it is not expected that PAR 1113 will generate significant adverse impacts to local fire departments requiring new or additional fire fighting resources. Similarly, as noted in the "Hazards" section, any increase in accidental releases of compliant coating materials would be expected to result in a concurrent reduction in the number of accidental releases of existing coating materials. As a result, the net number of accidental releases would be expected to remain constant, allowing for population growth in the district. Additionally, as demonstrated in the "Human Health" section, future compliant coating materials are not expected to cause significant adverse human health impacts, so accidental release scenarios would be expected to pose a lower risk to responding firefighters. Furthermore, if manufactures continue to use solvents such as Texanol, propylene glycol, ethylene glycol, etc., in their compliant water-borne coatings, fire departments would not be expected to experience adverse impacts because in general these solvents are less flammable solvents as rated by the NFPA.

PROJECT-SPECIFIC MITIGATION MEASURES: None required.

REMAINING IMPACTS: Since public service impacts are not significant, no adverse impacts remain.

CUMULATIVE IMPACTS: The cumulative impacts of PAR 1113 have been fully evaluated in the Final 1997 AQMP Program EIR, which is incorporated by reference. The 1997 AQMP Final Program EIR concluded that the implementation of all control measures, including CM #97CTS-07, would not create cumulatively significant adverse cumulative public service impacts.

There are no provisions of PAR 1113 that result in either project-specific or cumulative public services impacts. Since the proposed project is not expected to create significant adverse project-specific public services impacts, the proposed project's contribution to significant adverse cumulative energy impacts are less than cumulatively considerable (CEQA Guidelines §15130(a)(3) and, therefore, are not significant.

CUMULATIVE IMPACT MITIGATION: None required.

TRANSPORTATION/CIRCULATION

The NOP/IS originally prepared for the 1999 amendments to Rule 1113 did not identify any potential significant adverse transportation/circulation impacts associated with the proposed project. Subsequent to making the NOP/IS available to the public, comments were received indicating that PAR 1113 could generate transportation/circulation impacts as described below.

Significance Criteria

The project will be considered to have significant adverse transportation/circulation impacts if any one of the following criteria are met by the project:

- The project results in the need for 350 or more new employees.
- The project will increase heavy-duty transport truck traffic to and/or from any one facility by more than 350 truck trips per day.
- The project will increase customer traffic by more than 700 trips per day.

Transportation / Circulation Effects

PROJECT-SPECIFIC IMPACTS: In the NOP/IS and in subsequent public forums, some commentators have asserted that transportation/circulation impacts will occur as a result of implementing PAR 1113 in part because the drying times of low-VOC coatings are longer than the drying times for conventional coatings. Commentators also asserted that low-VOC coatings require more surface preparation than conventional coatings. As a result, jobs will take more than one day to complete. Other transportation/circulation issues raised in response to the NOP/IS include the assertion that low-VOC coatings contain a higher solids content, with a lower average coverage area. As a result, more transport trips would be necessary to supply the additional volumes of coatings for a given job. Finally, comments received on the NOP/IS claimed that low-VOC coatings require more touch-up and repair, which means more trips to each job site.

ANALYSIS: It is assumed here that the biggest concern regarding drying time would be for primers, sealers, and undercoaters since, by definition, these require additional topcoats. As part of the analysis of PAR 1113, staff evaluated coating product data sheets (which typically include drying times) for a large number of conventional and low-VOC coatings (see the tables in Appendix D, status reports in Appendix G, and Table 4-2). The available information from product data sheets indicates that low-VOC primers, sealers, and undercoaters have a slightly shorter drying time, on average, than conventional coatings. On average, the drying time for low-VOC quick-dry primers, sealers, and undercoaters is comparable to the drying time for the same categories of conventional coatings. Finally, the drying time for low-VOC stains is substantially shorter than the drying time for conventional stains. Consequently, the assertion that low-VOC coatings have longer drying times that will require more trips over more days is not supported by coating product information sheets.

Regarding surface preparation, staff evaluated this characteristic as part of the evaluation of coating product data sheets mentioned above and recent studies conducted (see the tables in Appendix D, status reports in Appendix G, and Table 4-2). Where information or data are provided, the information indicated that low-VOC coatings do not require substantially different surface preparation than conventional coatings. As a result, the time necessary to prepare a surface for coating is approximately equivalent for conventional and low-VOC coatings.

The issue of topcoats is related to solids content and the amount of area a coating will cover. The review of coating product data sheets indicated that for industrial maintenance floor coatings, low-VOC coatings tended to have a higher solids content, with a comparable average coverage area than conventional coatings. For most other coating categories affected by PAR 1113, the solids content and area of coverage for low-VOC coatings was, on average, comparable to conventional coatings although some categories, e.g., quick-dry primers, sealers, and undercoaters and stains, had slightly less coverage than conventional coatings in these categories. As a result, since solids content and coverage area for low-VOC coatings are comparable to conventional coatings, it is not likely that additional trips will be necessary.

Extra touch-up and repair and more frequent coating applications are related to durability qualities of coatings. Staff reviewed coating product data sheets and recent studies were conducted (see the tables in Appendix D, status reports in Appendix G and Table 4-2) to obtain durability information for low-VOC coatings and conventional coatings. Generally, durability information is provided qualitative rather than quantitatively, e.g., descriptions such as resistant or not resistant to high heat, chemicals, abrasion, etc. Based upon the qualitative durability descriptions in the coating product information sheets, staff concluded that low-VOC coatings have durability characteristics comparable to conventional coatings.

Industry has also alleged that PAR 1113 will generate solid/hazardous waste impacts which in turn, will lead to increased traffic impacts due to compliant coatings having a shorter pot life, shorter shelf life, or lesser freeze-thaw capabilities compared to existing coatings.

The SCAQMD's evaluation of resin manufacturers' and coating formulators' product data sheets, as well as recent studies conducted (see the tables in Appendix D, status reports in Appendix G, and Table 4-2) which tend to confirm the assertion that low-VOC coatings have a shorter pot life and a shorter shelf life. Information on freeze-thaw characteristics was generally not available. However, significant adverse traffic impacts are not expected from the disposal of coatings "going bad" due to pot life, shelf life, or freeze-thaw problems. First, it is improbable that any one location (e.g., selling, distributing, or applying coatings) would have a sufficient volume of coatings going bad to generate an additional 350 heavy-duty truck trips per day as a result of pot life, shelf life, or freeze-thaw problems. Second, manufacturers of low-VOC resin technology indicate that the inclusion of surfactants will help eliminate freeze-thaw and shelf-life problems. Finally, when coating applicators become familiar with appropriate low-VOC application techniques, pot life problems will decrease significantly or be eliminated since the contractors will be able to more accurately estimate the correct amount of coating to be used per job.

CONCLUSION: Based upon staff research of coating product information sheets described in the preceding paragraphs, no significant adverse transportation impacts are anticipated from implementing PAR 1113.

PROJECT-SPECIFIC MITIGATION MEASURES: No mitigation measures are required.

CUMULATIVE IMPACTS: Analysis of project-specific transportation impacts indicated that PAR 1113 is not expected to generate any significant adverse cumulative transportation/circulation impacts. Further, implementing all 1997 AQMP control measures, rules and regulations is not anticipated to have any direct or indirect significant adverse cumulative transportation impacts. This conclusion is further validated by the fact that the initial study for the 1997 AQMP did not identify any transportation/circulation impacts associated with the 1997 AQMP.

There are no provisions of PAR 1113 that result in either project-specific or cumulative transportation impacts. Since the proposed project is not expected to create significant adverse project-specific transportation impacts, the proposed project's contribution to significant adverse cumulative energy impacts are less than cumulatively considerable (CEQA Guidelines §15130(a)(3) and, therefore, are not significant.

CUMULATIVE IMPACT MITIGATION: No cumulative impact mitigation measures are required.

SOLID/HAZARDOUS WASTE IMPACTS

The NOP/IS originally prepared for the 1999 amendments to Rule 1113 did not identify any potential significant adverse hazards impacts associated with the proposed project. Subsequent to making the NOP/IS available to the public, comments were received indicating that PAR 1113 could generate solid/hazardous waste impacts as described below.

Significance Criteria

The project will be considered to have significant adverse solid/hazardous waste impacts if the following criteria are met by the project:

- The generation and disposal of nonhazardous or hazardous wastes that exceed the capacity of designated landfills.

Solid/Hazardous Waste Impacts

PROJECT-SPECIFIC IMPACTS: Industry has alleged that the implementation of PAR 1113 will generate solid/hazardous waste impacts due to the following assertions:

- Compliant lower-VOC coatings targeted by PAR 1113 will not have the same freeze-thaw capabilities as existing coatings and, therefore, may go bad during transport from mild climates to extreme climates resulting in that load being discarded into a landfill.

- Compliant lower-VOC coatings targeted by PAR 1113 will have shorter shelf lives, and therefore a percentage of the manufacturer's inventory will have to be landfilled because the coatings have gone bad in the can over time.

- As a result of the lower-VOC content limits for IM and floor coatings, manufacturers will formulate more two components systems that may have, on the average, a shorter pot life compared to conventional coatings. As a result low-VOC coatings could solidify in the can during the application process, resulting in an unusable portion of coating that would need to be discarded into a landfill.

ANALYSIS: The SCAQMD's evaluation of coatings product data sheets and recent studies conducted (see the tables in Appendix D, status reports in Appendix G, and Table 4-2) tend to confirm the assertion that low-VOC coatings have a shorter pot life and a shorter shelf life. Information on freeze-thaw characteristics was generally not available. To estimate solid waste impacts associated with implementing PAR 1113, staff assumed as a "worst-case" that, starting in the year 2003 when the interim VOC content limits become effective, solid wastes would increase as follows: five percent of all coatings affected by PAR 1113 would be landfilled due to freeze–thaw; one percent of all affected coatings would be landfilled due to a shorter shelf-life; and 10 percent of all IM and floor coatings would be landfilled as a result of having a shorter pot life. According to the resin manufacturers, solidified coatings would not be considered a hazardous waste. Therefore, for this solid waste analysis, the SCAQMD also assumed that all the landfilled material would be considered non-hazardous waste.

Table 4-8 highlights the estimated nonhazardous material that may be landfilled if industry's assertions are accurate. Table 4-8 also shows whether the landfilling of nonhazardous material associated with the implementation of PAR 1113 will be considered significant.

TABLE 4-8

Anticipated Solid Waste Impacts Associated with Implementing PAR 1113[a]

Year	Landfill Capacity tons/day	Freeze-Thaw Disposal[b] tons/day	Shelf-Life Disposal[c] tons/day	Pot life Disposal[d] tons/day	Total Disposal tons/day	Total Impact % Capacity	Significant Yes/No
2002	111,198	21	4	3	28	0.03	No
2003	111,198	22	4	4	31	0.03	No
2004	111,198	24	5	4	33	0.03	No
2005	111,198	26	5	4	36	0.03	No
2006	111,198	28	6	5	38	0.03	No
2007	111,198	30	6	5	42	0.04	No
2008	111,198	33	7	5	45	0.04	No
2009	111,198	36	7	6	48	0.04	No
2010	111,198	38	8	6	52	0.05	No

[a] The Draft 1998 CARB Survey sales data is used as the baseline for 1996. It is assumed that 45 percent of the total 1996 sales occurred in the district. It is projected that coating sales will increase by 8 percent per year. To convert gallons to tons, the SCAQMD assumed that the coatings had an average density of 10.5 pounds per gallon.
[b] Assumed that five percent of all coatings affected by PAR 1113 coatings would be landfilled.
[c] Assumed that one percent of all coatings affected by PAR 1113 coatings would be landfilled.
[d] Assumed that 10 percent of IM and floor coatings affected by PAR 1113 coatings would be landfilled.

CONCLUSION: As shown in Table 4-8, even if some compliant coatings are landfilled due to freeze-thaw, shelf life, or pot life problems, the total amount of solid waste material deposited in district landfills will not create a significant solid waste impact. It should be noted that the above analysis overestimates the actual solid waste impacts associated with the implementation of PAR 1113 for several reasons. First it is not likely that coatings manufacturers will simply dispose of all coatings damaged due to the alleged freeze-thaw, shelf-life, and pot life problems. It may be possible that some of these coatings can be reused for various other purposes, such as painting over graffiti, etc. Second, discussions with manufacturers of low-VOC resin technology have indicated that the inclusion of surfactants will help eliminate freeze-thaw and shelf-life problems. Finally, when painting contractors become familiar with appropriate application techniques required for applying low-VOC two component IM systems, pot life problems will decrease significantly or be eliminated altogether since the contractors will be able to more accurately estimate the correct amount of coating to be mixed to minimize waste. It is expected that by the time the interim limits become effective, painting contractors will have learned the proper application techniques for the low-VOC two component IM systems. Therefore, the amount of pot-life disposal shown in Table 4-8 above should drop to negligible levels starting within a year after the interim limits become effective.

PROJECT-SPECIFIC MITIGATION MEASURES: No mitigation measures are required.

CUMULATIVE IMPACTS: The cumulative impacts of PAR 1113 have been fully evaluated in the Final 1997 AQMP Program EIR, which is incorporated by reference. The 1997 AQMP Final Program EIR concluded that the implementation of all control measures, including CM #97CTS-07, would not create cumulatively significant adverse cumulative solid/hazardous waste impacts.

There are no provisions of PAR 1113 that result in either project-specific or cumulative solid/hazardous waste impacts. Since the proposed project is not expected to create significant adverse project-specific solid/hazardous waste impacts, the proposed project's contribution to significant adverse cumulative energy impacts are less than cumulatively considerable (CEQA Guidelines §15130(a)(3) and, therefore, are not significant.

CUMULATIVE IMPACT MITIGATION: No cumulative impact mitigation measures are required.

HAZARD IMPACTS

The NOP/IS originally prepared for the 1999 amendments to Rule 1113 did not identify any potential significant adverse hazards impacts associated with the proposed project. Subsequent to making the NOP/IS available to the public, comments were received indicating that PAR 1113 could generate hazards impacts as described below.

Significance Criteria

The project will be considered to have significant adverse hazards impacts if any one of the following criteria is met by the project:

- The project results in a substantial number of people being exposed to a substance causing irritation.
- The project results in one or more people being exposed to a substance causing serious injury or death.
- The project creates substantial human exposure to a hazardous chemical.

Hazard Impacts

PROJECT-SPECIFIC IMPACTS: Hazard impact concerns are related to the risk of fire, explosions, or the release of hazardous substances in the event of an accident or upset conditions. It is expected that the interim and final VOC content limits required by PAR 1113 may be achieved, in part, through the use of replacement solvents and predominantly water-borne technologies. For example, acetone, which is a flammable substance, may be used as a replacement solvent in some waterproofing sealer formulations. Overall, exempt solvents are considered to be viable alternatives to other, more toxic solvents currently found in various coatings.

Additionally, coalescing solvents such as texanol, propylene glycol, and ethylene glycol may be used more widely in low-VOC water-borne formulations as alternatives to more toxic coalescing solvents such as EGBE, EGEE, EGME, and their acetates. Furthermore, diisocyanates (e.g., hexamethylene diisocyanate (HDI), methylene bisphenyl diisocyanate (MDI), and toluene diisocyanate (TDI)) may be used more widely in low-VOC two component IM systems as activators.

To the extent that future compliant AIM coatings would be formulated with exempt solvents or other potentially hazardous materials, and to the extent that these materials could be accidentally released into the environment, PAR 1113 could create significant adverse hazard impacts.

ANALYSIS: As shown in Table 4-7 of the “Public Services” section, acetone is flammable and may result in increased risk of flammability/explosion or accidental releases of hazardous materials. Therefore, in the context of hazards impacts associated with the implementation of PAR 1113, the reformulation of coatings with acetone would constitute the “worst-case” hazards scenario.

As a result of being delisted as a VOC by the SCAQMD, acetone usage has been steadily increasing irrespective of amendments to Rule 1113. In any event, it is likely that for some AIM coating categories where acetone is already being used, e.g., waterproofing sealers, acetone usage is expected to increase. Any anticipated increase in acetone usage may increase the number of trucks or rail cars that transport acetone within the district although there would be a concurrent reduction in transport of currently used solvents. The safety characteristics of individual trucks or rail cars that transport acetone will not be affected by PAR 1113. The consequences (exposure effects) of an accidental release of acetone are directly proportional to the size of the individual transport trucks or rail cars and the release rate. Although the probability of an accidental release of acetone could increase, the severity of an incident involving acetone transport will not change as a result of the proposed amendments to Rule 1113. Similarly, the severity of an accident involving the storage of acetone is not expected to change from existing conditions.

As already noted in Table 4-7, the flammability classifications by the NFPA are the same for acetone, t-butyl acetate, toluene, xylene, MEK, isopropanol, butyl acetate, and isobutyl alcohol. Recognizing that as a "worst-case" acetone has the lowest flashpoint, it still has the highest Lower Explosive Limit, which means that acetone vapors will not cause an explosion unless the vapor concentration exceeds 26,000 ppm.

In contrast, toluene vapors can cause an explosion at 13,000 ppm, which poses a much greater risk of explosion. The concentration of xylene vapors that could cause an explosion is even lower at 10,000 ppm. Under operating guidelines of working with flammable coatings under well-ventilated areas, as prescribed by the fire department codes, it would be difficult to achieve concentrated streams of such vapors.

Furthermore, any increase in accidental releases of compliant acetone-based coatings would be expected to result in a concurrent reduction in the number of accidental releases of existing coating materials. As shown in Table 4-7 many of the solvents used in conventional solvents are as flammable as acetone, so there would be no net change or possibly a reduction in the hazard consequences from replacing some conventional solvents with acetone.

Although acetone is expected to be used to formulate some future compliant AIM coatings, current information from coating product information sheets (see the tables in Appendix D) indicates that acetone is only expected to be used in a limited amount of compliant coatings (e.g., floor coatings). The majority of the future compliant coatings are expected to be reformulated with water-borne technologies. Therefore, it is unlikely that PAR 1113 by itself will substantially increase the future usage of acetone in the district.

With regard to other possible replacement solvents, based on discussion with resin manufacturers and coating formulators, the trend in coating technologies is to replace EGBEs (e.g., glycol ethers) with less toxic/hazardous coalescing solvents such as texanol, ethylene glycol, and propylene glycol. Staff has verified this trend by reviewing product data sheets and MSDSs for currently available compliant low-VOC coatings. Additionally, a draft December 1995 report entitled "Improvement of Speciation Profiles for Architectural and Industrial Coating Operations" prepared by Dr. Albert C. Censullo for CARB indicates that a majority of current water based formulations (flats and non-flats) contain less hazardous solvents. Further, it appears from this information that the use of solvents, such as texanol and propylene glycol in water-borne coating formulations, is prevalent today and should continue into the future with the eventual replacement of more toxic and hazardous coalescing solvents such as EGBEs with less or nontoxic coalescing solvents.

As noted in the "Water Resources" section of this chapter, some future compliant two-component IM coating systems may contain diisocyanate compounds. While the trend of using less hazardous compounds is not reflected by the use of diisocyanate compounds, there should be no significant increase in the risk of upset due to the increasing use of these compounds. Like texanol, oxsol 100, propylene glycol, and ethylene glycol, diisocyanates are significantly less flammable as compared to currently used highly flammable conventional solvents. Therefore, the increased use of compliant coatings containing diisocyanates will be offset by the decrease use of more flammable solvents.

CONCLUSION: Potential hazard impacts resulting from adopting and implementing PAR 1113 are not expected to be significant for the following reasons. The increased usage of acetone as a result of implementing PAR 1113 will generally be balanced by reduced usage of other equally or more hazardous materials such as MEK, toluene, xylene, etc., which are equally or more hazardous. Further, emergency contingency plans that are already in place are expected to minimize potential hazard impacts posed by any increased use of acetone in future compliant coatings. In addition, businesses are required to report increases in the storage of flammable and otherwise hazardous materials to local fire departments to ensure that adequate conditions are in place to protect against hazard impacts.

Another reason hazard impacts from implementing PAR 1113 are not expected to be significant is that it is anticipated that resin manufacturers and coating formulators will continue the trend of using less toxic or hazardous solvents such as texanol, oxsol 100, propylene glycol, ethylene glycol, etc., in their compliant water-borne coatings. As a result, it is expected that future compliant AIM coatings will contain less or non-hazardous materials compared to conventional coatings, a net benefit.

While diisocyanates are more toxic, their flammability is significantly less than current solvents. Thus, overall hazard risks are not significantly increased as a result of using compliant coatings containing diisocyanates.

PROJECT SPECIFIC MITIGATION MEASURES: None required.

REMAINING IMPACTS: Since hazards impacts are not significant and in some respects speculative, no significant adverse impacts remain.

CUMULATIVE IMPACT: During past promulgation of amendments to various SCAQMD coating and solvent rules (e.g., 102, 1107, 1113, 1136, etc.) the SCAQMD received comments that acetone could result in a significant adverse hazards impact (e.g., risk of fire or explosion) because of its flammability. The SCAQMD has extensively analyzed the hazards impacts associated with the reformulation of coatings with acetone in EAs for 102, 1107, the November amendments to 1113, and 1136 and concluded that reformulation of products with acetone will not create significant adverse cumulative hazards. Furthermore, the cumulative impacts of PAR 1113 have been fully evaluated in the Final 1997 AQMP Program EIR, which is incorporated herein by reference.

There are no provisions of PAR 1113 that result in either project-specific or cumulative hazard impacts. Since the proposed project is not expected to create significant adverse project-specific hazard impacts, the proposed project's contribution to significant adverse cumulative energy impacts are less than cumulatively considerable (CEQA Guidelines §15130(a)(3) and, therefore, are not significant.

CUMULATIVE IMPACT MITIGATION: None required.

HUMAN HEALTH IMPACTS

The NOP/IS originally prepared for the 1999 amendment to Rule 1113 did not identify any potential significant adverse human health impacts associated with the proposed project. Subsequent to making the NOP/IS available to the public, comments were received indicating that PAR 1113 could generate significant adverse human health impacts as described below.

Significance Criteria:

The project will be considered to have a significant adverse human health impact if any of the following occur:

- The project equals or exceeds the SCAQMD's maximum individual cancer risk (MICR) thresholds for toxic air contaminants (TACs) as identified in the SCAQMD's CEQA Air Quality Handbook (SCAQMD 1993b). The MICR significance threshold for project specific and cumulative impacts is 10 in one million (10×10^{-6}).

- The project creates an excess cancer case of 0.5 or greater in a population subject to a cancer risk of greater than one in one million (1×10^{-6}).

- The project results in hazardous air pollutant emissions from the project which result in a hazard index greater than or equal to 1.0.

- The project results in hazardous air pollutant emissions that result in a facility-wide hazard index greater than or equal to 3.0.

PROJECT SPECIFIC IMPACT: Comments submitted to the SCAQMD by coating manufacturers and coating contractors on the NOP/IS and at various public meetings assert that low-VOC compliant coatings will contain compounds that are more toxic than current formulations. Based on discussions with manufacturers, exempt solvents are considered to be viable alternatives to aid coatings manufacturers in reformulating existing coatings to meet the interim and final VOC content limits proposed in PAR 1113. In the currently proposed amended rule, for example, acetone may be used as a replacement solvent for waterproofing sealer formulations. Waterproofing sealer formulators have used acetone in their coatings, but may increase the acetone content in an effort to comply with the proposed limit. The Final SEA for the 1996 amendments to Rule 1113, as well as the Final SEA for Rule 102, is referenced for an additional in-depth analysis of acetone as a substitute solvent.

Coalescing solvents such as texanol, propylene glycol, and ethylene glycol may be used more widely in low-VOC water-borne formulations as alternatives to their more toxic counterparts such as EGBE, EGEE, EGME and their acetates. Coalescing solvents act as plasticizers in certain coating formulations (e.g., nonflats) to allow the otherwise solid resin to flow together to form a film.

Diisocyanates (e.g., HDI, MDI, and TDI) may be used more widely in low-VOC two component IM systems. Comments received on the NOP/IS suggest that for some IM applications two component low-VOC systems containing isocyanates will replace existing higher-VOC two-component and one-component systems.

METHODOLOGY: Using available toxicological information to evaluate potential human health impacts associated with PAR 1113, staff has compared the toxicity of the most common currently used coating solvents to solvents expected to be used in reformulated, compliant coatings. As a measure of toxicity, staff compared: the Threshold Limit Values (TLVs) established by the American Conference of Governmental Industrial Hygiene (ACGIH), OSHA's Permissible Exposure Limits (PELs), the Immediately Dangerous to Life and Health (IDLH) levels recommended by the National Institute for Occupational Safety and Health (NIOSH), and health hazards developed by the National Safety Council.

As illustrated in Table 4-9, some of the replacement solvents have lower or less severe TLVs, PELs, IDLHs than traditional solvents. For example, acetone would be considered less toxic than all the listed traditional solvents. However, there are some replacement solvents that could have higher or more severe toxicological effects. In particular the diisocyanate group of solvents appear to have more severe toxicological effects than the listed traditional solvents. To analyze in more detail the toxic effects associated with the use of compliant low-VOC coatings, the SCAQMD conducted a health risk assessment (HRA) for the compounds listed in Table 4-9 consistent with the HRA procedures listed in the SCAQMD's Risk Assessment Procedures for Rules 1401 and 212 document. An HRA is used to estimate the likelihood of an individual contracting cancer or experience other adverse health effects as a result of exposure to toxic air contaminants (TACs). Risk assessment is a methodology for estimating the probability or likelihood of an adverse health effect occurrence.

Risks from carcinogens are expressed as an added lifetime risk of contracting cancer as a result of a given exposure. For example, if the emissions from a facility are estimated to produce a risk of one in one million (1×10^{-6}) to the most exposed individual, this means that the individual's chance of contracting cancer has been increased by one chance in one million over and above his or her chance of contracting cancer from all other factors (for example, diet, smoking, heredity and other factors). This added risk to a maximally exposed individual is referred to as a "maximum individual cancer risk" or MICR. For CEQA purposes, the SCAQMD's significance threshold for carcinogenic impacts is a MICR greater than or equal to 10 in one million (10×10^{-6}).

TABLE 4-9

Toxicity of Coating Solvents

Traditional/Conventional Solvents			
Solvents	**TLV (ACGIH) (ppm)**	**PEL (OSHA) (ppm)**	**IDLH (ppm)**
Toluene	100	200	2,000
Xylene	100	100	1,000
MEK	200	200	3,000
Isopropanol	400	400	12,000
Butyl Acetate	150	150	10,000
Isobutyl Alcohol	50	100	8,000
Stoddard Solvent	100	500	5,000
Petroleum Distillates (Naptha)	100	400	10,000
EGBE	25	50	700
EGME	5	25	Not Available
EGEE	5	200	Not Available
Acetone	750	750	20,000
Di-Propylene Glycol	Not Established	Not Established	Not Established
Propylene Glycol	Not Established	Not Established	Not Established
Ethylene Glycol	50	50	80
Texanol	Not Established	Not Established	Not Established
Oxsol 100	Not Established	Not Established	Not Established
t-Butyl Acetate	200	200	Not Available
Hexamethylene Diisocyanate (HDI)	0.005	Not Established	Not Available
Methylene Bisphenyl Diisocyanate (MDI)	0.005	Not Established	Not Available
Toluene Diisocyanate (TDI)	0.005 (0.02–STEL)	0.005	Not Available

To evaluate noncancer health effects from a TAC, exposure levels are estimated (just as with carcinogens), so that they can be compared to a corresponding Reference Exposure Level (REL). As for carcinogens, exposure is evaluated for the most exposed individual. Chronic exposures are evaluated using the same exposure assumptions described for carcinogens -- continuously for a 70-year residential lifetime or 8 to 9 hours per day and 50 weeks a year for a 46-year working (commercial or industrial) lifetime. For acute exposures, the maximum hourly airborne concentration of a TAC is estimated.

The health risk from exposure to a noncarcinogenic TAC is evaluated by comparing the estimated level of an sensitive receptor's exposure to the TAC to the TAC's REL. The ratio is expressed as a hazard index (HI), which is the ratio of the estimated exposure level to the REL:

$$\text{Hazard Index (HI)} = \frac{\text{Estimated Exposure Level}}{\text{Reference Exposure Level}}$$

A HI of one or less indicates that the estimated exposure level does not exceed the Reference Exposure Level, and that no adverse health effects are expected. For CEQA purposes, the

SCAQMD's significance threshold for noncarcinogenic impacts is a hazard index greater than or equal to one.

The ratio of the estimated acute level of sensitive receptor's exposure to a TAC to the acute REL is called an acute HI. The ratio of the estimated chronic level of exposure to a TAC to its chronic REL is called a chronic hazard index.

Based on the foregoing HRA methodologies, the SCAQMD estimated the long-term carcinogenic, long-term chronic, and short-term acute risks associated with the use of the above listed compounds where toxicity data were available. Tables 4-10 through 4-12 highlight the results of this risk analysis. These tables present the amount of each compound that can be emitted and coating usage before the SCAQMD significance thresholds are exceeded. For a more detailed discussion of how the table values where derived and the unit risk factors, chronic RELs, and acute RELs used to conduct the HRAs, the reader is referred to Appendix E of this Draft SEA.

Carcinogenic Effects

PROJECT-SPECIFIC IMPACT: Discussions with coatings manufactures and review of coating product sheets indicate that TDI may be used in some low- or zero-VOC, water-borne compliant two-component IM coating systems. TDI is the only compound listed on Table 4-11 that has a carcinogenic unit risk factor according to the SCAQMD's Rule 1401. TDI is part of a group of compounds known as diisocyanates, which are low-molecular-weight aromatic and aliphatic compounds. Also included in this group, but not considered to be carcinogenic, are HDI and MDI. These water-borne compliant formulations are intended as direct replacements for their higher-VOC solvent-borne two component counterparts currently being applied. Comments received on the NOP/IS have suggested that the compliant water-borne two-component systems may also replace higher-VOC solvent-borne one-component IM systems. Thus, there could be an incremental increase in use of coatings containing TDI.

ANALYSIS: To analyze the potential cancer risks associated with the use of compliant coatings containing TDI to downwind receptors and applicators of these coatings, the SCAQMD conducted a HRA. As "worst-case", the SCAQMD assumed that approximately one percent (by weight) of the TDI in the two component system would be emitted, although in theory these low- to zero-VOC systems should not result in any volatilization of any VOC compounds, including TDI. The results of the carcinogenic HRA for the use of coatings containing TDI are shown in Table 4-10.

TABLE 4-10

Maximum Individual Cancer Risk from Potential Exposures to TDI Coatings
(Gallons Per Day That Would Exceed A MICR Of 10 x 10^{-6})

	Downwind Receptor Distances, (in meters)					
	25		50		100	
Compound	**Emissions** lbs/day	**Usage** gals/day	**Emissions** lbs/day	**Usage** gals/day	**Emissions** lbs/day	**Usage** gals/day
TDI	0.01	0.09	0.03	0.29	0.09	0.86

As shown in Table 4-10, less than one gallon per day of coatings containing TDI can be used before the significance threshold of a MICR >10 x 10^{-6} is exceeded at a downwind receptor distance of 100 meters. At closer source receptor distances the amount of daily coatings that can be used before the SCAQMD's significance threshold is even lower.

CONCLUSION: Although the daily usage levels in Table 4-10 are low, significant adverse carcinogenic human health impacts are not expected for downwind residential or sensitive receptors for the following reasons. As explained above, the resultant MICR from a HRA estimates the probability of a potential maximally exposed individual contracting cancer as a result of continuous exposure to toxic air contaminants over a period of 70 years for residential and 46 years for worker receptor locations. Most, if not all, applications of low- or zero-VOC two component IM systems containing TDI will occur primarily in industrial settings where residential or sensitive receptors are not proximately located. Furthermore, the application of these coating systems will be for maintenance (e.g., touch-up and repair) or repaint purposes, lasting only a couple days to weeks, and occurring on an intermittent basis (e.g., once every couple of years to every ten years, or more). Therefore, downwind residential or sensitive receptors will not be exposed on a long-term basis to TDI that would result in significant adverse carcinogenic human health impacts.

In the context of worker exposure (e.g., applicators of the coatings), significant adverse impacts are not expected. Discussions with resin manufacturers and coating formulators reveal that significant carcinogenic risks are eliminated by following the coating manufacturers', OSHA's, and ACGIH's required and recommended, respectively, safety practices for handling materials containing TDI. See the "Acute Effects" section for a description of the recommended safety practices for handling materials containing TDI, as well as HDI and MDI. According to resin manufacturers and coating formulators the safety practices and application techniques associated with higher-VOC solvent-borne two component systems will be the same for the compliant water-borne two component systems, in part because some existing two-component systems also contain diisocyanates. Thus, applicators will not require additional training beyond what is currently required regarding the proper handling or proper application of these compliant coatings.

Furthermore, it appears that TDI in compliant water-borne two component systems are being phased out with HDI and MDI. Since HDI and MDI are noncarcinogenic, the replacement of TDI with HDI and MDI would eliminate all carcinogenic risk associated with the use of these compliant coatings.

Chronic Effects

PROJECT-SPECIFIC IMPACT: Comments received on the NOP/IS for PAR 1113 and during Industry Working Group meetings suggest that some of the replacement solvents that could be used to formulate future compliant low-VOC coatings could cause significant adverse chronic human health impacts.

ANALYSIS: To analyze the existing chronic health risks associated with solvents used in conventional coatings to downwind receptors and applicators of these coatings, the SCAQMD prepared a HRA for solvents used in conventional coatings (Table 4-11). Table 4-11 shows the number of gallons it would take on a daily basis to equal or exceed a chronic hazard index of 1.0. Since for most AIM coating applications no more than 25 – 30 gallons can be applied per day, solvents that take more than approximately 25 gallons per day to contribute to a chronic hazard index of 1.0 or more could create significant human health impacts. As shown in Table 4-11, the lists of both conventional solvents and replacement solvents contain compounds where typical rates of usage could contribute to a chronic hazard index greater than or equal to 1.0.

TABLE 4-11

Long-term Chronic Exposure Risk Assessment
(Gallons Per Day That Would Exceed A Chronic Hazard Index Of 1.0)

	Downwind Receptor Distances					
	25m		**50m**		**100m**	
Conventional Solvents	**Emissions** lbs/day	**Usage** gals/day	**Emissions** lbs/day	**Usage** gals/day	**Emissions** lbs/day	**Usage** gals/day
Toluene	30.060	28.628	91.141	86.801	341.122	324.878
Xylene	45.090	42.943	136.712	130.202	511.683	487.318
MEK	150.299	143.142	455.705	434.005	1705.611	1624.392
Isopropol Alcohol	300.598	286.284	911.411	868.010	3411.223	3248.784
Glycol Ethers/Acetates	3.006	2.863	9.114	8.680	34.112	32.488
EGBE	3.006	2.863	9.114	8.680	34.112	32.488
EGEE	30.060	28.628	91.141	86.801	341.122	324.878
EGME	3.006	2.863	9.114	8.680	34.112	32.488
Replacement Solvents						
Ethylene Glycol	60.120	57.257	182.282	173.602	682.245	649.757
Propylene	450.897	429.426	1367.116	1302.016	5116.834	4873.176
TDI	0.009	0.09	0.02	0.2	0.07	0.67
HDI	0.002	0.014	0.005	0.043	0.017	0.162

Like risks associated with carcinogens, risks associated with compounds that pose chronic hazard risk are based on long-term continuous exposure. AIM coatings are applied on an infrequent and intermittent basis. For first time painting or repainting situations, application of AIM coatings occurs all at one time over the course of hours or several weeks depending on the specific nature of the job. For touch-up and maintenance applications, actual application of AIM coatings takes several hours to several weeks to complete depending on the specific nature of the job and occurs periodically through-out the year or over the course of several years. Therefore, because of the intermittent and infrequent application of AIM coatings, long-term exposure of downwind residential or sensitive receptors to chronic health effects is not anticipated from the implementation of PAR 1113.

CONCLUSION: Chronic exposure of coating applicators to compliant coatings containing replacement solvents, in particular the diisocyanate compounds, is not expected to produce significant chronic risks since coating applicators will be following the coating manufacturers' and ACGIH's recommended safety practices and OSHA's required safety practices for handling materials containing both conventional and replacement solvents. The recommended safety practices for handling these materials are discussed in the "Acute Effects" section. Additionally, the safety practices and application techniques associated with higher-VOC solvent-borne coatings will be the same for the compliant water-borne coatings. Thus, applicators will not need additional training regarding the proper handling or application of compliant coatings containing TDI.

In the context of IM coatings, it appears that TDI and HDI in compliant water-borne two-component systems is being replaced in some coating formulations with MDI. This compound is currently not listed in SCAQMD's Rule 1401 as a chronic TAC. Therefore, based on current information, the replacement of TDI and HDI with MDI would further eliminate the chronic risk associated with the use of these compliant coatings containing TDI and HDI.

With regard to EGBE, the SCAQMD analyzed potential adverse chronic human health impacts associated with the use of water-borne wood coatings and flats containing EGBE in the September 1995 EA for the Rule 1136 - Wood Products Coatings, and the November 1996 SEA for Rule 1113 – Architectural Coatings. These analyses concluded that reformulated water-borne wood coatings and flats containing EGBE would not result in significant adverse chronic human health impacts. These documents can be obtained by contacting the SCAQMD Public Information Center at (909) 396-2039.

Relative to AIM coatings, EGBE is a coalescing solvent currently in use for some water-borne formulations. Based on discussions with resin manufacturers and coating formulators, the current trend in AIM coating technologies is to replace EGBEs (e.g., glycol ethers) with less toxic or hazardous coalescing solvents such as texanol, ethylene glycol, and propylene glycol. The SCAQMD has verified this trend by reviewing product data sheets and material safety data sheets (MSDSs) for currently available compliant low-VOC coatings. Additionally, a draft December 1995 report entitled "Improvement of Speciation Profiles for

Architectural and Industrial Coating Operations" prepared by Dr. Albert C. Censullo for CARB indicates that a majority of current water based formulations (flats and non-flats) contain non-HAP solvents. The report, which is intended to upgrade the species profiles for a number of sources within the general categories of industrial and architectural coating operations, identified that the four most common solvents in the 52 randomly chosen water-borne coatings (flats and non-flats) as: texanol (found in 37 of 52); propylene glycol (31 of 52); diethylene glycol butyl ether (23 of 52); and ethylene glycol (14 of 52). It appears from this information that the use of non-HAP solvents such as texanol and propylene glycol in water-borne coating formulations, is already becoming more prevalent and this trend should continue in the future with the eventual replacement of more toxic and hazardous coalescing solvents such as EGBEs with less toxic or hazardous materials.

SCAQMD research on PAR 1113 identified an article entitled "Clean Air Act Amendments" which appeared in the October 1995 edition of the <u>Painting and Coatings Industry Magazine</u>. This article indicates that current coatings containing hazardous air pollutants (HAP) such as ethylene glycol ethers or ethylene glycol ether acetates can be replaced with non-HAP solvents such as propylene glycol ethers or propylene glycol ether acetates in order to comply with the 1990 CAAA. The article further states, "Coatings that meet or surpass end-user standards can be produced using low-VOC and non-HAPs-formulating technology, which enable compliance with legislation driven by the 1990 CAAA." This implies that non-HAP solvent containing coatings can be manufactured now to meet the 1990 CAAA requirements.

Staff research on PAR 1113 identified another relevant article by the Chemical Manufacturers Association, entitled "A Review of the Uses and Health Effects of Ethylene Glycol Monobutyl Ether (EGBE)" (CMA, 1995). This article indicates that based on recent studies there is little possibility of significant adverse health effects in humans at exposure levels encountered in the typical workplace. Further, the article points out that exposures to EGBE in consumer use would be considerably lower than the ACGIH exposure limit of 25 ppm. The article provided information that workers exposed to EGBE levels twice the ACGIH exposure limit did not experience adverse health effects. To the extent that PAR 1113 accelerates the current trend away from EGBEs, human health benefits would be expected.

Acute Effects

PROJECT-SPECIFIC IMPACT: Comments received on the NOP/IS originally prepared for the 1999 amendments to Rule 1113 and during Industry Working Group meetings suggest that some of the replacement solvents that could be used to formulate future compliant low-VOC coatings could cause significant adverse acute human health impacts.

Acute Worker Health Analysis

ANALYSIS: Several of the solvents used in conventional coatings that were analyzed for chronic affects have also been analyzed for short-term acute worker health effects through short-term, high-level or "acute" exposure. Table 4-12 presents the results of the SCAQMD's acute HRA for the solvents used in conventional coatings.

As shown in Table 4-12, low usage conventional coatings formulated with EGBE, EGEE, or EGME could trigger acute human health impacts. As noted in earlier in this chapter, there is currently a trend by resin manufacturers and coating formulators of replacing currently applied coatings containing EGBE, EGEE, and EGME with less toxic coalescing solvents such as texanol, ethylene glycol, and propylene glycol. It is anticipated these less toxic coalescing solvents will be used to formulate future compliant low-VOC coatings. To a certain extent, PAR 1113 may have the beneficial effect of encouraging or accelerating the trend of formulating AIM coatings with less toxic or nontoxic solvents. Therefore, the implementation of PAR 1113 may ultimately provide human health benefits.

Discussions with coatings manufactures and coating applicators and review of coating product sheets indicates that for some IM coating applications diisocyanates (e.g. TDI, HDI, and MDI) may be used to formulate low or zero-VOC, water-borne compliant two component IM systems. These water-borne compliant formulations are intended as direct replacements for their higher-VOC solvent-borne two-component counterparts currently being used, which also contain diisocyanates. However, some commentators have asserted that the compliant water-borne two component systems may also replace higher-VOC solvent-borne one component IM systems, which predominately do not contain diisocyanates. Thus, there could be an incremental increase in the use of coatings containing TDI, HDI, and MDI.

TABLE 4-12

Short-term Acute Exposure Risk Assessment for Conventional Solvents
(Gallons Per Day That Would Exceed An Acute Hazard Index Of 1.0)

	Downwind Receptor Distances					
	25m		50m		100m	
Compound	**Emissions** lbs/hr	**Usage** gals/day	**Emissions** lbs/hr	**Usage** gals/day	**Emissions** lbs/hr	**Usage** gals/day
Toluene	20.00	152.38	39.98	304.58	107.10	815.96
Xylene	2.20	16.76	4.40	33.50	11.78	89.76
MEK	15.00	114.29	29.98	228.43	80.32	611.97
Isopropol Alcohol	1.50	11.43	3.00	22.84	8.03	61.20
Glycol Ethers & Acetates	0.77	5.84	1.53	11.67	4.10	31.27
EGBE	0.75	5.71	1.50	11.42	4.02	30.60
EGEE	0.19	1.41	0.37	2.82	0.99	7.55
EGME	0.17	1.26	0.33	2.51	0.88	6.73

Diisocyanates, including TDI, HDI, and MDI, are low-molecular-weight aromatic and aliphatic compounds. These compounds are widely used to manufacture flexible and rigid foams, fibers, coatings, and elastomers. These compounds are increasingly used in the automobile industry, autobody repair, and building insulation materials. The major route of occupational exposure to diisocyanates is inhalation of the vapor or aerosol; exposure may also occur through skin contact during the handling of liquid diisocyanates. Occupational exposure could potentially occur during the mixing and application of two-component IM coatings containing diisocyanates.

Diisocyanates are powerful irritants to the mucous membranes of the eyes and gastrointestinal and respiratory tracts. Direct skin contact with diisocyanates can also cause marked inflammation. Respiratory irritation may progress to a chemical bronchitis with severe bronchospasm.

After one or more exposures, diisocyanates can also sensitize workers, making them subject to severe asthma attacks if they are exposed again--even at concentrations below the NIOSH REL. Death from severe asthma in sensitized subjects has been reported. Additionally, sporadic cases of hypersensitivity pneumonitis (HP) have also been reported in workers exposed to diisocyanates. Individuals with acute HP typically develop symptoms four to six hours after exposure.

The main concern is when the coating is sprayed onto the substrate. During the application process it may be possible that the diisocyanates could volatilize and come into contact with the worker. Staff contacted resin manufacturers and coating formulators to obtain additional information about TDI, HDI, and MDI. Resin manufacturers indicated that there is currently a trend to replace TDI, which is also a carcinogen, with the less hazardous diisocyanate compounds, HDI and MDI. Furthermore, a resin manufacturer indicated that use of a plural spraying system would minimize the amount of diisocyanate exposure because the diisocyanate compounds bind to the coating constituents during this type of spraying application.

Although adverse human health effects from acute exposures to TDI, HDI, and MDI may occur, the California State Office of Environmental Health Hazard Assessment (OEHHA) has not finalized acute RELs for TDI, HDI, and MDI. As a result, there is currently no SCAQMD approved method for analyzing acute health impacts from these compounds. Further, even conservatively using the short-term exposure limit (STEL) of 0.02 for TDI as a surrogate REL for TDI, HDI, and MDI, coating applicators would have to apply complicated two-component IM systems at a rate of four gallons or more per hour (assuming a sensitive receptor is located at a distance of 100 meters) to exceed an acute HI of 1.0. Investigation reveals that it is not likely that painters could apply two-component systems at this rate. Further, the formulation of compliant IM coating systems not containing diisocyanate compounds and the development of spraying technology that minimizes diisocyanate emissions should be available when the interim and final compliance VOC content limits go into effect. Consequently, PAR 1113 is not expected to result in significant adverse impacts to coating applicators.

In addition, significant adverse acute health impacts are not expected to occur as a result of implementing PAR 1113 if workers applying two-component coating systems containing diisocyanates follow OSHA's required, and the coating manufacturers' and ACGIH's recommended safety practices for handling materials containing diisocyanates. The following paragraphs summarize some of the safety measure required or recommended by NIOSH and OSHA to reduce acute human health impacts associated with the use of compliant coatings containing diisocyanates.

As noted previously, there is already a trend in the coatings industry to move away from reformulating coatings with hazardous materials to less or non-hazardous materials. Therefore, when feasible, coating applicators should use coatings that contain less hazardous materials. For two component IM systems that contain diisocyanates, coating applicators can use compliant one component low-VOC or zero-VOC IM systems. Other safety measures to protect individuals against exposure to diisocyanates are described in the following paragraphs.

Worker Isolation – Areas containing diisocyanates should be restricted to essential workers. If feasible, these workers should avoid direct contact with diisocyanates by using automated equipment operated from a control booth or room with separate ventilation.

Protective Clothing and Equipment – When there is potential for diisocyanate exposure, workers should be provided with and required to use appropriate personal protective clothing and equipment such as coveralls, footwear, chemical-resistant gloves and goggles, full faceshields, and suitable respiratory equipment.

Respiratory Protection – Only the most protective respirators should be used for situations involving exposures to diisocyanates because they have poor warning properties, are potent sensitizers, or may be carcinogenic. These respirators include:

- Any self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode, and
- Any supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

  Any respiratory protection program must, at a minimum, meet the requirements of the OSHA respiratory protection standard [29 CFR 1910.134]. Respirators must be certified by NIOSH and MSHA according to 30 CFR or by NIOSH (effective July 19, 1995) according to 42 CFR 84. A complete respiratory protection program should include: (1) regular training and medical evaluation of personnel, (2) fit testing, (3) periodic environmental monitoring, (4) periodic maintenance, inspection, and cleaning of equipment, (5) proper storage of equipment, and (6) written standard operating procedures governing the selection and use of respirators. The program should be evaluated regularly. The following publications contain additional information about selection, fit testing, use, storage, and cleaning of respiratory equipment: NIOSH Guide to Industrial Respiratory Protection [NIOSH 1987a] and NIOSH Respiratory Design Logic [NIOSH 1987b].

Worker and Employer Education – Worker education is vital to a good occupational safety and health program. OSHA requires that workers be informed about:

- Materials that may contain or be contaminated with diisocyanates;
- The nature of the potential hazard [29 CFR 1910.1200]. Employers must transmit this information through container labeling, MSDSs, and worker training;
- The serious health effects that may result from diisocyanate exposures; and
- Any materials that may contain or be contaminated with diisocyanates.

Additionally, workers should take the following steps to protect themselves from diisocyanate exposure:

- Be aware that the highest diisocyanate concentrations may occur inside containment structures.
- Use appropriate respiratory protection when working with diisocyanates.
- Wash hands and face before eating, drinking, or smoking outside the work area.
- Shower and change into clean clothes before leaving the worksite.
- Participate in medical monitoring and examination programs, air monitoring programs, or training programs, offered by your employer.

According to resin manufacturers and coating formulators, the above safety practices and application techniques recommended for future compliant low-VOC coatings are currently used for conventional solvent-borne two-component systems. Thus, applicators will not require additional training regarding the proper handling or application of compliant coatings containing diisocyanates. This will further reduce the applicator's exposure to diisocyanates.

Acute Sensitive Receptor Health Analysis

In the context of downwind residential or sensitive receptors, most, if not all, applications of low- or zero-VOC two-component IM systems containing diisocyanates will occur primarily in industrial settings where residential or sensitive receptors or not proximately located (e.g., greater than 100 meters). However, some commentators have asserted that there are some applications of these coatings where the public could be exposed (e.g., bridge coating applications). The rule, however, prohibits IM coatings for residential use or facilities not exposed to extreme environmental conditions, such as office space and meeting rooms.

The SCAQMD investigated the potential for acute exposures of sensitive receptors to low or zero-VOC two-component IM systems containing diisocyanates in settings that are not strictly considered industrial settings. This investigation, which includes discussions with resin manufacturers, coating formulators, and coating applicators, as well as the review of various health-related studies, reveals that the primary route of diisocyanate exposure to the public would be through the spraying of low- or zero-VOC two component IM systems. Controlled laboratory monitoring by Mobay[4] while mixing a two component system containing HDI showed nondetectable air concentrations of HDI. Furthermore, field monitoring of hand brushing and rolling application of a single component system containing HDI conducted by CalTrans showed that HDI concentrations were not detectable. Additionally, field monitoring studies conducted by Mobay during the brushing and rolling of one component IM topcoats (one system containing HDI and the other containing MDI), as well as the spraying of a two-component IM system containing HDI, revealed that HDI and MDI concentrations were well below HDI and MDI thresholds recommended by ACGIH and OSHA. Therefore, mixing and hand brushing or rolling of the compliant one or two component systems appears not to release diisocyanates such that the general public would suffer acute significant adverse human health impacts.

It should be again noted that other water-borne technologies are in development that could be viable replacements for some applications of two component low-VOC IM systems containing diisocyanates. For example some resin manufactures and coating formulators are offering compliant low-VOC single component, water-borne acrylic, acrylic/epoxy, acrylic urethane dispersed, etc., IM coating technologies, instead of the two-component polyurethane systems that contain diisocyanates. Consequently, PAR 1113 is not expected to result in significant adverse impacts to sensitive receptors.

Rule 1113 also contains an optional averaging provision which might enable affected facilities to using IM coatings with a higher VOC content that do not contain diisocyanates by allowing them to manufacture and sell coatings at various VOC levels for a specific coating category assuming the category, as a whole, complies with a sales-weighted average VOC content equal to that in the rule. This provision would allow another mechanism to avoid potential acute human health impacts from PAR 1113.

CONCLUSION: Based upon the above considerations, significant adverse acute human health impacts are not expected as a result of implementing PAR 1113. Further, the SCAQMD will conduct a technical assessment prior to each VOC content limit going into effect for the affected coatings to determine what the state of coating technology is at that

[4] Mobay is now Bayer.

time and what, if any, environmental issues are associated with the manufacture and use of such compliant coatings.

Overall Conclusion

Based upon the preceding analyses, PAR 1113 is not expected to create significant adverse human health impacts for the following reasons. First, although TDI, which is classified as a carcinogen, could be use in future compliant two-component IM coatings, it is not expected to create significant adverse carcinogenic impacts because application of IM coatings occurs primarily in industrial settings where sufficient safety equipment and procedures are in place to prevent significant exposures. Furthermore, the application of these coating systems will be for maintenance (e.g., touch-up and repair) or repaint purposes, lasting only a couple days to weeks, and occurring on an intermittent basis (e.g., once every couple of years to every ten years, or more). No increased cancer risks are anticipated since carcinogenic effects typically require long-term exposures. Finally, coating technologies are moving away from using TDI to formulate low-VOC coatings to using non-carcinogens, such as HDI or MDI.

Second, significant adverse chronic human health impacts are not anticipated for the following reasons. Some solvents used in conventional coatings that have the potential to create chronic human health impacts (e.g., EGBE), may be replaced by compliant low-VOC coatings that do not create significant adverse human health impacts (e.g., glycol ethers). In addition, as mentioned for carcinogens, for IM coatings in particular, long-term exposures that could generate significant adverse chronic human health impacts, are not anticipated.

No significant acute human health exposures are anticipated from implementing PAR 1113 for the following reasons. It is anticipated that for some coating applications, less toxic coalescing solvents will be used to formulate future compliant low-VOC coatings than is currently the case. Also, the development of spraying technology will further reduce diisocyanate emissions. Further, to exceed an acute hazard index of 1.0, painters would have to apply complicated two-component coatings at a rate of four gallons or more per hour. Investigation reveals that it is not likely that painters could apply two-component systems at this rate. Finally, based on actual field monitoring data, the brushing, rolling, or spraying of one- or two-component low-VOC IM systems containing diisocyanate compounds should not expose the public at large to significant adverse human health impacts. The concentrations of diisocyanate compounds emitted during the application of these IM systems are below the established health protective thresholds. In the context of worker (e.g., applicator) exposure, the use of personal protective equipment should provide adequate protection to applicators during coating application.

PROJECT SPECIFIC MITIGATION MEASURES: None required.

REMAINING IMPACTS: Since human health impacts are not significant, no adverse impacts remain.

CUMULATIVE IMPACT: The cumulative impacts were thoroughly analyzed in the 1997 AQMP Final Program EIR, which is herein incorporated by reference along with its adopted mitigation measures. The 1997 AQMP Program EIR concluded that human health impacts would be cumulatively significant based upon the increased usage of acetone and glycol ether (e.g., EGBE) formulations, which was seen to be at that time the replacement solvent of choice. As noted earlier current information demonstrates an ever-increasing trend away from the use of glycol ethers and towards the use of less toxic coalescing solvents such as texanol, propylene glycol, and ethylene glycol. In regards to the potential increase use of diisocyanate compounds in compliant IM two-component formulations, carcinogenic, chronic, and acute significant adverse exposures are not expected as explained above. Consequently, PAR 1113's contribution to the cumulatively significant impacts to human health found in the 1997 AQMP Final Program EIR is less than cumulatively considerable and is thus not significant.

There are no provisions of PAR 1113 that result in either project-specific or cumulative human health impacts. Since the proposed project is not expected to create significant adverse project-specific human health impacts, the proposed project's contribution to significant adverse cumulative energy impacts are less than cumulatively considerable (CEQA Guidelines §15130(a)(3) and, therefore, are not significant.

CUMULATIVE IMPACT MITIGATION: None required.

ENVIRONMENTAL IMPACTS FOUND NOT TO BE SIGNIFICANT

An Initial Study (see Appendix B) was originally prepared for the 1999 amendments to Rule 1113, describing anticipated environmental impacts resulting from implementing PAR 1113. It was concluded in the Initial Study that the environmental areas identified in the following subsections would not be significantly adversely affected by PAR 1113. These environmental areas, therefore were not further analyzed in this Final SEA for the 1999 amendments to Rule 1113. The currently proposed amendments are not expected to generate significant adverse environmental impacts in the following environmental areas for the same reasons given in the Final SEA for the 1999 amendments to Rule 1113. A brief discussion of why PAR 1113 will not significantly adversely affect each of these environmental areas is provided in the following sections.

Land Use and Planning

Implementation of the proposed amendments will not cause significant adverse impacts to land uses or land use planning in the district. It is anticipated that any increased activities will occur at existing facilities or construction sites. Thus, no new resources or facilities are expected to be constructed which would result in any land use impacts.

No new development or alterations to existing land use designations will occur as a result of the implementation of the proposed amendments. It is not anticipated that existing land uses located in the district would require additional land to continue current operations or require rezoning as a result of implementing PAR 1113. Therefore, no significant adverse impacts affecting existing or future land uses are expected.

Population and Housing

Human population in the district is anticipated to grow regardless of implementing PAR 1113. The proposed amendments will primarily affect the formulation of architectural coatings and are not anticipated to generate any significant effects, either direct or indirect on the district's population as no additional workers are anticipated to be required to comply with the proposed amendments. Further, PAR 1113 is not expected to cause a relocation of population within the district. As a result, housing in the district is expected to be unaffected by the proposed amendments. New housing construction is not expected to be affected by the use of lower-VOC coatings, although costs of compliant coatings used for housing construction could increase two to seven dollars per gallon (see Appendix F, Addendum to Staff Report, Final Socioeconomic Impact Assessment – Proposed Amendments to Rule 1113; SCAQMD, 1999). This cost increase is not expected to result in any physical effects. Direct economic impacts are not required to be analyzed pursuant to CEQA unless they also have a significant, direct effect on physical environmental parameters.

Geophysical

Architectural coatings are applied to buildings, stationary structures, roads, etc. The proposed amendments affect coating formulators and have no effects on geophysical formations in the district. Therefore, PAR 1113 is not expected to result in additional exposure of people to potential impacts involving seismically, landslides, mudslides or erosion as no new development is anticipated to be generated by PAR 1113.

Biological Resources

Implementation of the proposed amendments will not cause impacts to sensitive habitats of plants or animals because all activities will typically occur at construction, industrial or commercial sites already in operation. No new development that could potentially adversely affect plant and animal life is anticipated. Potential impacts to aquatic life from releases of excess paint and associated wastewater disposed of in sewer and storm drains is discussed in the "Water Quality Impacts" section of Chapter 4. The analysis of water quality impacts to both groundwater and surface water concluded that PAR 1113 would not generate significant adverse water quality impacts.

Energy and Mineral Resources

Electricity

Because add-on control equipment is not expected to be used to comply with the provisions of PAR 1113, no additional energy use is expected to be required. Additionally, PAR 1113 will not substantially increase the number of businesses or amount of equipment in the district. Furthermore, energy usage associated with providing power for special spray equipment used to apply reformulated coatings, is expected to be negligible. Currently, almost 75 percent of the electricity used in the district is imported from out-of-state power plants. Thus, there is a substantial amount of unused generating capacity in the basin. Any additional electricity needed to power special spray equipment would most likely be provided by out-of-state power plants. Any incremental power generation necessary to power special spray-equipment operation would be negligible compared to overall in-district generation and could be easily met by existing in-district capacity. Therefore, no increases in energy consumption or mineral resources are expected from the implementation of PAR 1113. Consequently, energy impacts are not considered to be significant.

The SCAQMD received one comment on the NOP/IS for PAR 1113 asserting that PAR 1113 would increase the demand for electrical power to manufacture more compliant low-VOC coatings in the future than is currently necessary to manufacture. This comment is based on the assumption that low-VOC coatings have a high solids content and, therefore, lower coverage than conventional coatings and the assumption that low-VOC are less durable and need to be recited more frequently. Both of these issues, i.e., more thickness and more frequent recoating have been analyzed in the "Air Quality Impacts" section of this chapter. In general, staff evaluation of coating product data sheets for a substantial number of conventional and low-VOC coatings (see the tables in Appendix D, status reports in Appendix G and Table 4-2) produced the following results. First, low-VOC coatings have comparable solids content and coverage area compared to conventional coatings. The analysis also concluded that low-VOC coatings had comparable durability characteristics compared to conventional coating. Therefore, there is no evidence that manufacturing low-VOC coatings will increase electric energy demand. Even if energy demand increased substantially, manufacturing additional volumes of AIM coatings would not be considered and inefficient or wasteful use of energy.

Natural Gas

The consumption of natural gas in the district is not expected to increase as a result of the implementation of PAR 1113. Electricity will be the primary source of energy used to power the spraying equipment operated at various sites. As noted in the previous subsection, it is anticipated that there will be a negligible increase in electricity usage as a result of implementing PAR 1113. Consequently, natural gas energy impacts from implementing PAR 1113 are not considered to be significant.

Fossil Fuels

PAR 1113 is also expected not to substantial increase energy consumption from non-renewable resources (e.g., diesel and gasoline) above current district usage levels. Any incremental fuel usage from trips associated with more frequent application of compliant coatings are expected to be negligible. As noted in the transportation/circulation discussion in this Chapter, there is no evidence implementing PAR 1113 will require more frequent application of compliant coatings. As a result, PAR 1113 is not expected to increase transport trips. Therefore, fossil fuel energy impacts from implementing PAR 1113 are not considered to be significant.

Mineral Resources

A comment was received on the NOP/IS for PAR 1113 asserting that PAR 1113 would require the production of more compliant low-VOC coatings in the future than is currently necessary to manufacture. This would ultimately result in the disposal of more paint cans, resulting a wasteful use of a natural resource, i.e., metal for the cans. As discussed in the "Electricity" subsection above, available information on low-VOC coatings contradict the assertion that more low-VOC coatings would need to be manufactured than would otherwise be necessary with conventional coatings. Consequently, PAR 1113 is not expected to result in a wasteful use of natural resources.

Noise

No significant noise impacts are associated with the use of architectural coatings. Coating formulators within the district potentially affected by the proposed amendments are located in existing construction industrial, or commercial areas. It is assumed that these facilities are subject to and in compliance with existing community noise standards. In addition to noise generated by current operations, noise sources in each area include nearby freeways, truck traffic to adjacent businesses, and operational noise from adjacent businesses.

In general, the primary noise source at existing facilities is generated by vehicular traffic, such as trucks transporting raw materials to the facility, trucks hauling wastes away from the facility, trucks to recycle waste or other materials, and miscellaneous noise such as spray equipment (i.e. compressors, spray nozzles) and heavy equipment use (forklifts, trucks, etc.). Noise is generated during operating hours, which generally range from 6 a.m. to 5 p.m. Monday through Friday. PAR 1113 is not expected to alter noise from existing noise generating sources. It is likely that affected companies are operating in compliance with any local noise regulations that may exist in their respective communities. Therefore, no significant noise impacts are expected from the proposed amendments.

Additionally, the implementation of PAR 1113 is not expected to result in significant noise impacts in residential areas. As with industrial or commercial areas, it is assumed that these areas are subject to local community noise standards. Contractors or do-it-yourselfers applying compliant PAR 1113 coatings in residential areas are expected to comply with local community noise standards.

One comment was received on the NOP/IS asserting that noise impacts would increase because low-VOC coatings have a lower coverage area than conventional coatings so noisy spray equipment would be used for longer periods of time. As already discussed, low-VOC coatings have a coverage area comparable to conventional coatings (see the "More Thickness" discussion in the "Air Quality Impacts" section of this chapter. Further, coating application systems that rely on pressure and a power source are available that have very low noise levels associated with them. Consequently, no significant adverse noise impacts are anticipated.

Utilities and Service Systems

The proposed amendments will not substantially increase the amount of businesses or equipment in the district. Reformulation of coatings is not expected to require additional utility or service systems. In fact, PAR 1113 may actually result in fewer impacts to utilities and/or public service agencies because compliant coatings are expected to be formulated with less hazardous materials compared to current coatings. Demands on utilities or utility systems are not expected to increase and impacts to utilities are therefore, not considered to be significant.

Aesthetics

The proposed amendments do not require any changes in the physical environment that would obstruct any scenic vistas or views of interest to the public. In addition, no major changes to existing facilities or stockpiling of additional materials or products outside of existing facilities are expected to result. The reason for this determination is that any physical changes would occur at existing industrial or commercial sites. Therefore, no significant impacts adversely affecting existing visual resources such as scenic views or vistas, etc. are anticipated to occur.

One comment was received on the NOP/IS for PAR 1113 asserting that significant aesthetic impacts will result from the use of low-VOC coatings due to defects in appearance after application because the rule contains a compliance schedule insufficient for coating formulators to produce acceptable quality low-VOC products. The current compliance proposal is a modification of an earlier version of PAR 1113 and is the result of input received during the Industry Working Group meetings. The current compliance schedule should ensure that formulators have sufficient time to reformulate products that exhibit the desired performance characteristics. Also, the amendments have been in effect for three years under the 1999 amendments as manufacturers have already purchased products complying with the interim limits and should be currently developing new products that meet the final limits.

Cultural Resources

There are existing laws in place that are designed to protect and mitigate potential impacts to cultural resources. Should archaeological resources be found during the application of Rule 1113 coatings to newly constructed structures or existing structures, the application of such coating would cease until a thorough archaeological assessment is conducted. Furthermore, the application of architectural coatings, in the vast majority of situations, would occur after construction where archaeological resources would have already been disturbed. The proposed revisions to Rule 1113 are, therefore, not anticipated to result in any activities or promote any programs that could have a significant adverse impact on cultural resources in the district.

One comment was received on the NOP/IS for PAR 1113 asserting that significant cultural resource impacts will occur due to potential negative impacts on the maintenance of "historic and ethnically significant architectural structures in Southern California." First, industrial maintenance coatings are not typically used for residential use or for use in painting the outside of buildings, although some nonflat coatings may be used for a structure's exterior trim. In spite of this, based upon information on currently available compliant products, performance characteristics of existing and reformulated products should be sufficient to meet the weathering impacts on outdoor structures. Consequently, significant adverse impacts to cultural resources are not anticipated as a result of implementing PAR 1113.

Recreation

The proposed amendments will not generate additional demand for, or otherwise affect land used for recreational purposes. Further, as already explained, the proposed amendments are not expected to have adverse affects on land uses in general. No significant adverse effects on recreational facilities were identified. One comment received on the NOP indicated that recreation may be affected because demand for parks would increase due to increased job losses and unemployed workers. According to the Socioeconomic Impact Assessment prepared for the 1999 amendments to Rule 1113, PAR 1113 is expected to result in approximately 1,492 future jobs foregone annually through 2015. In an area with a population of approximately 15 million people, an average increase of 1,492 people using recreational facilities in the future in the district is considered to be a negligible effect and, therefore, not significant.

Economic Impacts

Detailed analyses of economic or social effects are necessary only when they have significant impacts on physical environmental parameters. The proposed amendments to Rule 1113 would lower the VOC content limits for some coating categories, etc. As a result of implementing PAR 1113, no significant adverse direct or indirect (secondary) environmental impacts resulting from economic impacts have been identified. There are no environmental impacts that can be traced from socioeconomic effects. A socioeconomic analysis was nevertheless prepared. The socioeconomic impact report for PAR 1113 is included in the Final Staff Report for the 1999 amendments to Rule 1113. Persons interested in obtaining copies of the Final Staff Report should contact the district Public Information Center at (909) 396-2039.

OTHER CEQA TOPICS

The following sections address various topics and issues required by CEQA such as growth inducement, short-term versus long-term effects, and irreversible changes.

Irreversible Environmental Changes

CEQA Guidelines §15126.2(c) requires an environmental analysis to consider "any significant irreversible environmental changes which would be involved if the proposed action should be implemented." The original Initial Study prepared for the 1999 amendments to Rule 1113 identified air quality, water resources, and public resources, as potential impact areas. Comments received on the Initial Study suggested that potential transportation/circulation, solid/hazardous waste, hazards, and human health impacts be evaluated.

The analysis concluded that no significant adverse project-specific or cumulative impacts would occur to any of these environmental areas. For example, the "Air Quality Impacts" analysis included an evaluation of eight issues identified by industry that might produce significant adverse air quality impacts. The results of this analysis indicated that there was no evidence supporting significant adverse air quality impacts as a result of any of the eight issues. The analysis of the substitution issued did indicate that if significant levels of substitution occurred, the potential air quality benefits of the rule could be less than anticipated, although substitution is not anticipated for a variety of reasons as explained in the "Air Quality Impacts" section. The analysis of water resource impacts indicated that an incremental increase in the amount of wastewater from cleaning coating equipment could occur, but this increase did not exceed the SCAQMD's threshold of significance. The analysis of public facilities and transportation circulation concluded that PAR 1113 would not create any significant adverse impacts to these areas. The solid/hazardous waste analysis included an evaluation of the potential for an incremental increase in solid waste impacts resulting from some types of IM coatings have a shorter pot life, a shorter shelf life, and are less able to withstand freeze-thaw conditions than conventional coatings. A "worst-case" analysis was performed and determined that there could be an incremental increase in solid waste impacts, but this increase did not exceed the SCAQMD's threshold of significance. The analysis of hazard and human health impacts indicated that future compliant low-VOC coatings could be formulated with hazardous materials. Generally, solvents used in low-VOC coatings are typically less hazardous than solvents used in conventional coatings. Therefore, hazard impacts are considered to be insignificant. Further, because AIM coatings are typically applied in industrial settings where safety equipment, training, and procedures are in place, workplace exposures to potentially hazardous coatings would be minimal. In addition, because AIM coatings are applied on an as-needed basis, continuous exposures would not occur. As a result, no significant carcinogenic or non-carcinogenic hazard impacts are anticipated.

As can be seen by the information presented in this SEA, the proposed project would not result in irreversible environmental changes or the irretrievable commitment of resources.

Potential Growth-Inducing Impacts

CEQA Guidelines §15126.2(d) requires an environmental analysis to consider the "growth-inducing impact of the proposed action." Implementing PAR 1113 will not, by itself, have any direct or indirect growth-inducing impacts on businesses in the SCAQMD's jurisdiction because it is not expected to foster economic or population growth or the construction of additional housing and primarily affects existing coating formulation companies.

CONSISTENCY

The Southern California Association of Governments (SCAG) and the SCAQMD have developed, with input from representatives of local government, the industry community, public health agencies, the USEPA - Region IX and the California ARB, guidance on how to assess consistency within the existing general development planning process in the Basin. Pursuant to the development and adoption of its Regional Comprehensive Plan Guide (RCPG), SCAG has developed an Intergovernmental Review Procedures Handbook (June 1, 1995). The SCAQMD also adopted criteria for assessing consistency with regional plans and the AQMP in its CEQA Air Quality Handbook. The following sections address consistency between PAR 1113 and relevant regional plans pursuant to the SCAG Handbook and SCAQMD Handbook.

Consistency with the Air Quality Management Plan

PAR 1113 is consistent with the AQMP since it is specifically identified as a control measure that is necessary to attain and maintain the state and national ambient air quality standards.

Consistency with Regional Comprehensive Plan and Guide (RCPG) Policies

The RCPG provides the primary reference for SCAG's project review activity. The RCPG serves as a regional framework for decision making for the growth and change that is anticipated during the next 20 years and beyond. The Growth Management Chapter (GMC) of the RCPG contains population, housing, and jobs forecasts, which are adopted by SCAG's Regional Council and that reflect local plans and policies, shall be used by SCAG in all phases of implementation and review. The subsections summarize the main policies and goals contained in the GMC and whether or not PAR 1113 is consistent with these polices and goals

Improve the Regional Standard of Living

The Growth Management goals are to develop urban forms that enable individuals to spend less income on housing cost, that minimize public and private development costs, and that enable firms to be more competitive, which would strengthen the regional strategic goal to stimulate the regional economy. Proposed amended Rule 1113 in relation to the GMC would not interfere with the achievement of these goals, nor would it interfere with any powers exercised by local land use agencies to achieve these goals. PAR 1113 will not interfere with efforts to minimize red tape and expedite the permitting process to maintain economic vitality and competitiveness.

Provide Social, Political and Cultural Equity

The Growth Management goals are to develop urban forms that avoid economic and social polarization; promote the regional strategic goals of minimizing social and geographic disparities; and reach equity among all segments of society. Consistent with the Growth Management goals, local jurisdictions, employers and service agencies should provide adequate training and retraining of workers, and prepare the labor force to meet the challenges of the regional economy. Growth Management goals also includes encouraging employment development in job-poor localities through support of labor force retraining programs and other economic development measures. Local jurisdictions and other service providers are responsible to develop sustainable communities and provide, equally to all members of society, accessible and effective services such as: public education, housing, health care, social services, recreational facilities, law enforcement, and fire protection. Implementing PAR 1113 is not expected to interfere with the goals of providing social, political and cultural equity.

Improve the Regional Quality of Life

The Growth Management goals also include attaining mobility and clean air goals and developing urban forms that enhance quality of life, accommodate a diversity of life styles, preserve open space and natural resources, are aesthetically pleasing, preserve the character of communities, and enhance the regional strategic goal of maintaining the regional quality of life. The RCPG encourages planned development in locations least likely to cause environmental impacts, as well as supports the protection of vital resources such as wetlands, groundwater recharge areas, woodlands, production lands, and land containing unique and endangered plants and animals. While encouraging the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites, the plan discourages development in areas with steep slopes, high fire, flood and seismic hazards, unless complying with special design requirements. Finally, the plan encourages mitigation measures that reduce noise in certain locations, measures aimed at preservation of biological and ecological resources, measures that would reduce exposure to seismic hazards, minimize earthquake damage, and develop emergency response and recovery plans. Proposed amended Rule 1113 in relation to the GMC is not expected to interfere with attaining these goals and, in fact, promotes improving air quality in the region.

Consistency with Regional Mobility Plan (RMP) and Congestion Management Plan (CMP)

Proposed amended Rule 1113 is consistent with the RMP and CMP since no significant adverse impact to transportation/circulation will result from the additional regulation of coke, coal, and sulfur facilities within the district. While traffic and congestion is generated from the transport offsite of wastes for disposal or recycling, the construction and operation activities at affected facilities will not require a substantial increase number of employees. Furthermore, because affected facilities will not increase their handling capacities, there will not be an increase in material transport trips associated with the implementation of APR 1113. Therefore, material transport trips are not expected to significantly adversely affect circulation patterns.