SUBCHAPTER 4.4

HYDROLOGY/WATER QUALITY

4.4 HYDROLOGY AND WATER QUALITY

4.4.1 INTRODUCTION

This subchapter identifies potential hydrology and water quality impacts that may be generated by implementing the 2003 AQMP. The project-specific impacts are divided into two major impact categories – water quality and water demand. The following types of control measures were identified as having potentially significant hydrology and water quality impacts: (1) use of reformulated coatings, solvents, and consumer products; (2) dust suppression; (3) alternative transportation fuels; (4) electric vehicles; (5) add-on control equipment; (6) water demand; (7) hydrology/water quality impacts associated with long-term strategies; and (7) cumulative impacts.

4.4.2 2003 AQMP CONTROL MEASURES WITH POTENTIAL HYDROLOGY AND WATER QUALITY IMPACTS

Table 4.4-1 lists the 2003 AQMP control measures with potential adverse hydrology and water quality impacts.

4.4.3 SIGNIFICANCE CRITERIA

Hydrology/water quality impacts will be considered significant if any of the following occur:

- The project increases water demand by more than 5,000,000 gallons per day.
- The existing water supply is insufficient to handle project-related increases in water demand.
- The project requires construction of new water conveyance infrastructure.
- Substantial increases in mass inflow of effluents to public wastewater treatment facilities.
- Substantial degradation off surface water or ground water quality.
- Changes in absorption rates, drainage patterns or the rate and amount of surface runoff.
- Substantial increases in the area of impervious surfaces, such that interference with ground water recharge efforts occurs.
- Alternations to the course of flow of floodwaters.

TABLE 4.4-1

Control Measures with Potential Hydrology/Water Impacts

Control Measures	Control Measure Description (Pollutant)	Control Methodology	Impact
MEASURES TO BE IMPLEMENTED BY THE SCAQMD			
CMB-10	Additional Reductions for NOx RECLAIM	Add on control equipment, process changes, purchase RTCs	Potential impact on water demand and quality
CTS-07	Further Emission Reductions from Architectural Coating and Cleanup Solvents	Reformulated low-VOC coatings/solvents	Potential increased use of water based formulations
CTS-10	Miscellaneous Industrial Coatings and Solvent Operations	Reformulation/Alternative Applications, Innovative implementation mechanism	Potential increased use of water based formulations
PRC-03	Emission Reductions from Restaurant Operations	Add on ctrl. Equip. Equipment modification	Potential impact on water demand and quality
BCM-07	Further PM10 Reductions from Fugitive Dust Sources	Improved test methods, soil stabilization, work practices, track-out control devices	Potential impact on water demand and quality
BCM-08	Further Emission Reductions from Aggregate and Cement Plant Manufacturing Operations	Dust suppression, covering of conveyors, wheel washing system	Potential impact on water demand and quality
MSC-01	Promotion of Lighter Color Roofing and Road Materials and Tree Planting Programs	Lighter color roofing/paving material, tree plantings	Potential impact on water demand
FSS-06	Further Emission Reductions From In-Use Off-Road Vehicles and Equipment	Add on control equipment and use of alternative fuels	Alternative fuels and additives readily dissolve in water and can impact ground and surface waters
TCB-01	Transportation Conformity Budget Backstop Control Measures	Fugitive dust reduction, add on control equipment, VMT reduction strategies, vehicle emission controls	Potential impact on water demand and quality
LTM-ALL	Long-Term Control Measures	Near-zero or zero VOC coating and solvent formulations, add-on controls, inspection & maintenance, process changes	Potential increased use of water based formulations
MEASURES TO BE CONSIDERED BY OTHER AGENCIES			
ON-RD HVY DUTY-3	Pursue Approaches to Clean Up the Existing Truck/Bus Fleet	Reduce emissions from existing heavy-duty diesel vehicles through a mix of strategies.	Alternative diesel fuel formulations and additives readily dissolve in water and can impact ground and surface waters
OFF-RD CI-1	Pursue Approaches to Clean Up the Existing Heavy Duty Off-Road Equipment Fleet (Compression Ignition Engines) – Retrofit Controls	Engine modifications, add on control equipment., alternative clean fuels	Alternative diesel fuel formulations and additives readily dissolve in water and can impact ground and surface waters

TABLE 4.4-1 (Continued)

Control Measures with Potential Hydrology/Water Impacts

Control Measures	Control Measure Description (Pollutant)	Control Methodology	Impact
MARINE-1	Pursue Approaches to Clean Up the Existing Harbor Craft Fleet – Cleaner Engines and Fuels	Retrofit crtl. Tech., Add on control devices, Alternative Clean Fuels, Electrification	Emulsified diesel fuel or additives may disperse into surface water easily
MARINE-2	Pursue Approaches to Reduce Land-Based Emissions at Ports – Alternative Fuels, Cleaner Engines, Retrofit Controls, Electrification, Education Programs, Operational Controls	Retrofit control technology, alternative clean fuels, electrification of diesel equipment, operational changes	Alternative formulations and additives readily dissolve in water and can impact ground and surface waters
CONS-1	Set New Consumer Product Limits for 2006	Reformulation/alternative applications	Potential increase in water use
CONS-2	Set New Consumer Product Limits for 2008 – 2010	Reformulation/alternative applications	Potential increase in water use
PEST-1	Pesticide Measure	Reformulation/alternative applications	Potential impact on water quality
LONG TERM	On-Road Heavy Duty Vehicles - Provide incentives for cleaner trucks and buses, including school buses, on-board diagnostics, in-use testing	Reduce emissions through a mix of strategies	Alternative formulations and additives readily dissolve in water and can impact ground and surface waters
	Off-Road Class 1 Vehicles - Provide incentives for cleaner off-road equipment	Engine modifications, add on control technology, alternative clean fuels, lower emission standards	Alternative formulations and additives readily dissolve in water and can impact ground and surface waters
LONG TERM (cont.)	Ports/Marine – Pursue advanced technologies and innovative strategies – alternatives for dockside power and propulsion in/out of port, operational controls, clean up existing ship fleet	Operational controls, cleaner fuels, electrification, retrofit controls	Alternative formulations and additives readily dissolve in water and can impact ground and surface waters
	Airports - Pursue approaches to reduce emissions from vehicles traveling to and from airports, reduce jet aircraft emissions and standards for non-tactical military aircraft	Alternative fuels, particulate filters, infrastructure for alternative fuel/ electric vehicles, entry fees, increased transport options, retrofit controls, new standards	Alternative formulations and additives readily dissolve in water and can impact ground and surface waters
	Railroad Locomotives	Accelerate intro. of new, lower emitting locomotive engines, add on controls, alternative fuels, standards for new engines	Alternative formulations and additives readily dissolve in water and can impact ground and surface waters
	Diesel Engines – Set toxics standard for stationary and portable diesel engines; Set toxics standard for diesel fueled refrigeration units on trucks	Retrofit technology, electrification, use of alternate fuels, particulate filters	Alternative formulations and additives readily dissolve in water and can impact ground and surface waters

TABLE 4.4-1 (Concluded)

Control Measures with Potential Hydrology/Water Impacts

Control Measures	Control Measure Description (Pollutant)	Control Methodology	Impact
	Consumer Products – Future consumer products regulations	Reformulation/alternative applications.	Potential increase in water use
	Pesticides	Reformulation/alternative applications	Potential impact on water quality
CONTINGENCY MEASURES			
CTY-14	Emission Reductions from Misc. Sources (weed abatement)	Require mowing vs. discing, lower vehicle speeds, watering	Potential increase in water use for dust control
CONCEPTUAL IDEAS FOR POSSIBLE CONSIDERATION AS LONG-TERM MEASURES			
Conceptual Control Measures	Control of Emissions from Port Operations	Cold-ironing, electrification, diesel truck retrofit, low sulfur diesel	Alternative formulations and additives readily dissolve in water and can impact ground and surface waters
	Consumer Products	Regulate additional consumer products, reformulation	Potential increase in water use

4.4.4 POTENTIAL HYDROLOGY/WATER QUALITY IMPACTS AND MITIGATION MEASURES

<u>Reformulated Coatings, Solvents and Consumer Products</u>

PROJECT-SPECIFIC IMPACTS: Several of the control measures in the 2003 AQMP would include controlling VOC emissions through the reformulation of coatings, solvents and consumer products including CTS-07, CTS-10, CONS-1, CONS-2, and some of the long-term and conceptual long-term control measures. Emission reductions are expected to be achieved through the use of near-zero and zero VOC formulations.

Under these control measures, petroleum-based solvents, coatings and products are expected to be reformulated to aqueous-based solvents, coatings and products to comply with specified VOC emission reduction requirements. Like petroleum-based materials, aqueous materials may lead to adverse impacts to water resources if contaminated solvents, coatings or products are not handled properly. However, the use of water to reformulate coatings, solvents and products would generally lead to products that would be less toxic than petroleum based materials and generate fewer impacts to water quality.

The use of aqueous based solvents, coatings and products may lead to adverse impacts to water resources if contaminated solvents are not handled properly. If the aqueous cleaning operation does not substantially increase the amount of hazardous wastewater generated, then disposing of the wastewater will generally be considered a relatively small incremental addition to the wastewater stream and no adverse impacts would be expected. If, however, the material becomes contaminated with hazardous materials during the manufacturing or cleaning process, then the solution must be disposed of properly after its useful life. Proper disposal may be accomplished by use of wastewater treatment equipment or by shipping to a waste treatment, recycling or disposal site that accepts hazardous materials.

In the event that untreated solvent baths are discharged to the sewer system, adverse impacts could occur at the treatment plants. Potential impacts could include pass-through of untreated material or toxicity to biological treatment systems. The magnitude of the impact would depend on the quantity of the discharge and the species discharged, but in most instances, the adverse impact would derive from the contaminants mixed with the solvent and not the solvent itself. While it is unlikely that a single user of aqueous solvents would pose adverse significant water quality impacts, district-wide application of aqueous solvents with general discharge of emulsifying agents and contaminants may exceed the concentration limits of the receiving wastewater treatment plants. Further, it is possible that existing operations which currently hire a "turn-key" service (i.e., a service which delivers clean solvent and removes spent material for off-site redistillation and reuse) may discontinue such service and discharge used aqueous cleaners as wastewater, thereby resulting in an incremental increase in wastewater discharged as compared to petroleum-based solvents.

In connection with potential water quality impacts associated with past SCAQMD rules or rule amendments, the LACSD performed a study in response to the 1996 amendments to SCAQMD Rules 1171 - Solvent Cleaning Operations, and the 1997 amendments to SCAQMD Rule 1122 - Solvent Degreasers. The CEQA analysis for these previous rule amendments concluded that they would result in a widespread conversion to the use of aqueous materials for cleaning operations. Four categories of pollutants – metals, conventional pollutants, toxic volatile organics, and surfactants – were monitored in four sampling episodes from August 1998 to June 1999 and compared with baseline concentrations dating back to at least 1995 (LACSD, 1999).

Six metals – cadmium, chromium, copper, lead, nickel, and zinc – were also studied. These six metals' average concentrations in the wastewater stream showed no appreciable change from the baseline concentrations. Three conventional pollutants – TDS, chemical oxygen demand (COD), and TSS – were studied. Conventional pollutant concentrations also showed no appreciable change from the baseline concentrations. A number of toxic VOCs were studied including perchloroethylene and toluene. Perchloroethylene and toluene were monitored because they are commonly found in automotive repair cleaners and could contaminate the aqueous-based cleaners that are discharges to the sewer. The study found that perchloroethylene concentrations are increasing. The increase in the influent to the treatment plant is believed to be from consumer products used by home auto maintenance as well as a potential contribution from aqueous-based cleaners used by automotive repair facilities. Surfactants are used in personal care and cleaning products and are measured in wastewater as methylene blue active substances (MBAS). MBAS concentrations are increasing from the baseline concentrations (LACSD, 1999).

Although concentrations increased for perchloroethylene and MBAS, it is not believed that aqueous-based cleaners are the major source since the SCAQMD has continuing public outreach programs that educate the public to minimize contamination of aqueous-based cleaners. Subsequent to the conversion to, and use of aqueous-based cleaners, the LACSD has not experienced water quality issues related to aqueous-based cleaners and has not seen increasing trends in any measured pollutants due to the use of aqueous-based cleaners (Heil, 2003).

There is the potential for the increased use of methylene chloride and perchloroethylene in reformulation of consumer products, which are specifically exempt from the definition of VOCs in recognition of their very low ozone forming capabilities. Some manufacturers could use methylene chloride or perchloroethylene in their formulations to reduce the VOC content to meet future limits. CARB and the SCAQMD have taken steps to mitigate and limit the use of these compounds in recent Board actions. These actions include the Air Toxic Control Measure for automotive maintenance and repair activities, aerosol adhesives limits in the consumer products regulation; and reactivity limits in the aerosol coating regulations. CARB also tracks the use of methylene chloride and perchloroethylene in regulated consumer products through yearly manufacturer reporting requirements. Further, CARB staff has proposed VOC limits in the past that were achievable without the increased use of TACs (CARB, 2002). When the SCAQMD amended Rule 1168 – Adhesive and Sealant Applications, it included a provision prohibiting the manufacture, sale, use, etc. of sealant and adhesives containing perchloroethylene, methylene chloride, chloroform, etc. Further recent amendments to Rule 1421 – Control of Perchloroethylene Emissions from Dry Cleaning Systems, phase out the use of perchloroethylene in dry cleaning systems by the year 2020. Also, Proposition 65 labeling requirements discourage manufacturers from reformulating consumer products with listed materials (which include methylene chloride and perchloroethylene).

As with solvent based materials, the illegal disposal of spent cleaning materials could result in significant adverse water quality impacts. Potential adverse wastewater impacts associated with reformulated solvents are expected to be minimal since: (1) compliance with state and federal waste disposal regulations would preclude adverse impacts; (2) “turn-key” services are available for aqueous cleaners; (3) some solvent cleaning operators may currently be disposing of spent material illegally; and (4) the amount of wastewater which may be generated from reformulated solvents is well within the projected receiving capacity of the POTWs in the SCAQMD ’s jurisdiction. It is estimated that reformulating solvents may generate approximately six million gallons per year of wastewater (SCAQMD, 1997). The capacity of the POTWs in the region is about 1,700 million gallons per day (SCAG, 2001) (see Table 3.4-5) so that sufficient capacity exists to handle the minor increase.

Impacts to water quality from reformulated coatings (i.e., water-based coatings) would be due to the increased use of water for clean-up and the resultant increased discharge into the sewer system. Previous CEQA analyses completed for rules that require reformulated coatings, estimated that the use of reformulated coatings to comply with the proposed control measures would be about 144 million gallons per year of wastewater by 2010 (SCAQMD, 1997).

POTWs in the region are expected to be able to accommodate the potential increase in wastewater associated with reformulated coating. (The POTWs have an overall capacity of about 1,700 million gallons per day.) Further, state and federal regulations are expected to promote the development and use of coatings formulated with non-hazardous solvents. Wastewater which may be generated from reformulated coatings is expected to contain less hazardous materials than the wastewater generated for solvent-based coating operations, thereby reducing toxic influent to the POTWs.

The potential effects of reformulating coatings to water-based formulation differ from that for solvent cleaning operations. The significance determination for reformulated solvents (see above) is due to the concern that current cradle-to-grave operations may largely be replaced by practices which generate wastewater. The wastewater generated from solvent cleaning operations could contain contaminants at levels exceeding regulatory limits. The POTWs and other responsible agencies may not have sufficient resources to adequately inspect and monitor the effluent from the large number of solvent cleaning operations in the region.

Unlike the reformulation of solvent cleaning materials, coating operations currently generate wastewater. As discussed above, the reformulation of coatings could have a beneficial effect by reducing the levels of contaminants currently found in the wastewater from these operations. The amount of increased wastewater generated from coating operations would be well within the capacity of the regions POTWs. Consequently, wastewater impacts from coating reformulation are not considered significant.

One pesticide measure would reduce organic gas emissions by potentially requiring reformulation to reduce VOC content. A number of chemicals currently used in pesticide formulations have been identified as toxic. When a product is reformulated to meet new VOC limits, a manufacturer could use other chemicals, not used before, that may be toxic or to otherwise detrimental to water quality. Measures should be developed to assure the use of less toxic chemicals is used in the reformulation of pesticides.

PROJECT-SPECIFIC MITIGATION: The following mitigation measures are recommended:

HWQ1: To ensure that users of reformulated solvents are aware of the proper disposal methods for reformulated solvents, the SCAQMD will provide an outreach and education program for affected parties. The SCAQMD will coordinate the outreach program with POTWs, the DTSC, and other appropriate agencies.

HWQ2: The Sanitation Districts and other sewage agencies must increase their surveillance programs to quantify measurable effects resulting from this control measure and take appropriate action as necessary.

HWQ3: CARB will monitor the use and limit or prohibit the use of toxic air contaminants, including perchloroethylene and methylene chloride, in reformulated consumer products.

Based on water quality analyses of wastewater streams, no water quality issues related to the use of aqueous-based cleaners have been identified by local POTWs. Therefore, in light of these data and the above mitigation measures, no significant impacts are expected.

Dust Suppression

PROJECT-SPECIFIC IMPACTS: Several of the control measures in the 2003 AQMP would propose to control particulate matter emissions through dust suppression measures including BCM-07, BCM-08, and TCB-01. Chemical dust suppressants could be used in some cases, e.g., BCM-08 for the control of fugitive emissions at cement plants where the use of water could present a problem. An increase in the use of chemical dust suppressants is expected to be limited because chemical dust suppressants are already used and other control measures are available.

The following paragraphs describe the characteristics of three categories of chemical dust suppressant and their potential to adversely affect groundwater or surface water. (The SCAQMD does not endorse any particular product, but does encourage the use of environmentally safe chemical dust suppressants.)

Petroleum-Based Dust Suppressants: Witco, the manufacturer of petroleum-based chemical dust suppressants COHEREX and COHEREX-PM, has stated "Although COHEREX has been used for more than forty years and COHEREX-PM is a polymer modified version of this product, we have not experienced any problems of groundwater contamination by the application of COHEREX or COHEREX-PM." The manufacturer goes on to state that the deepest penetration into the soil's surface ranges from 1 3/4 inches to 2 inches. According to the manufacturer, this would be true even if the product were over-applied because of the ability of the product to create a barrier that limits deeper penetration into the treated soil (Escobar, 1991).

Chloride-Based Dust Suppressants: The manufacturer of a magnesium chloride-based product, Leslie Salt, has indicated that its product, “Dust-Off”, is a moderately concentrated salt solution containing certain trace metals such as cadmium, chromium (III and VI), lead, etc. However, these metals are present in amounts that are several orders of magnitude below the Total Threshold Limit Concentration Level (Title 22, List of Organic and Bioaccumulative Substances and Their Total Threshold Limit Concentration Values) for each metal. In a report prepared for Leslie Salt by McLaren Engineering in 1989 (Leslie Salt, 1989), it was noted that "The behavior and environmental fate of “Dust-Off” following any given application is site-specific ... The potential for migration of “Dust-Off” is a function of site characteristics including climate (wind and rain), soil type, topography (slope or exposed surface and surrounding area), proximity to surface drainage (streams and intermittent drainage), depth to bedrock and depth to groundwater." Leslie Salt has reported results of the application of "Dust-Off" in terms of vertical migration through soil, migration in runoff and deposition to surface water, and aerial migration.

The report concludes that "the salt concentration in the leachate percolating through the soil becomes significantly diluted due to dispersive transport. Therefore, the amount of dissolved salts from "Dust-Off" that could potentially enter a groundwater system depends on the location of the water table, the quantity of "Dust-Off" applied, and the number of years of application." The report further concludes that water tables more than 26 feet deep would not be affected by application of this product; however, very shallow water tables could be affected if they are below the application area.

Leslie Salt reported that for a worst-case scenario concerning migration in runoff and deposition to surface water involving a 20-cubic-feet-per-second stream, chloride concentrations would be about 274.5 ppm in a 24-hour period, or slightly above the drinking water standard of 250 ppm. It should be noted that this analysis is based on a modeling scenario that included an application of 1.0 gallon per square yard, which is twice the typical application found in the field (Leslie Salt, 1989).

For aerial migration, predicted salt concentrations away from the area of application are very small, ranging from 0.0592 ug/m^2 at 25 meters to 0.00070 ug/m^2 at 500 meters (Leslie Salt, 1989). The manufacturer concludes that "Dust-Off" would not adversely affect groundwater, migrate into surface water runoff, or be deposited through aerial migration. However, the manufacturer specifically noted that very shallow water tables - less than 25 feet - could be affected after long periods of repeated application, especially in porous soils. Concentrations entering such groundwater could be significant in areas directly below application; thus, the manufacturer recommended that its product not be used in soils where the water table is very shallow, or used for drinking water or domestic purposes; or if the table is near the area of application or near a low-volume stream or pond used for domestic water supply (Leslie Salt, 1989).

Another manufacturer of a magnesium chloride product, South Western Sealcoating, Inc., indicated that magnesium chloride has been used for years by the mining industry on haul roads and provided documentation of permission to use magnesium chloride from the Colorado River Basin RWQCB (Khan, 1991). The Arizona Department of Environmental Quality, Office of Water Quality gave similar permission for the use of magnesium chloride dust suppressants (Sobchak, 1989).

A study of magnesium chloride dust suppressants done for the Camp Pendleton Military Base found no evidence of magnesium chloride solution leaching below the application level (EMCON, 1989a and 1989b).

The RWQCB for the Colorado River Basin - Region 7, reviews applications for use of brine-based chemicals (i.e., calcium chloride and magnesium chloride) for dust control on a case-by-case basis (Gruenberg, 1994). This RWQCB has conditionally approved the use of Lee Chemical, Incs'. Liquid Calcium Chloride in Colorado River Basin, Region 7, provided the Best Management Practices identified by Lee Chemical, Inc. are adhered to (Gruenberg, 1996).

Lignosulfonate Dust Suppressants: Lignosulfonate is a dust suppressant derived from the sulfite pulping process. One product, Raybinder, produced by ITT Rayonier, is a water soluble sodium lignosulfonate with very low phytotoxicity (ITT Rayonier, Inc., 1992). The water toxicology characteristics of lignosulfonates were briefly examined by Reintjes (1992). Reintjes determined the LC_{50} to be 2400 milligrams of solids per liter (mg solids/L). The LC_{50} is a measurement of the lethal concentration at which 50 percent of the exposed organisms die. For comparison, laundry detergents have LC_{50s} in the range of 40 to 85 mg solids/L.

An earlier report (Acres International, Ltd., 1988) for Environment Ontario in Canada acknowledged that the literature available on the environmental effects of lignosulfonates is limited. However, the study noted the following:

- Research indicates that lignosulfonates and their spent liquor could reduce dissolved oxygen, increase the color and quantity of suspended solids in water, and adversely affect fish.

- One lignosulfonate product applied to a road showed no measurable environmental effects even after a heavy rainfall.

- U.S. EPA found that a commercial lignosulfonate road stabilizer was moderately toxic to rainbow trout. However, another study found no clear relationship between lignosulfonate concentrations and growth retardation in rainbow trout.

The Environment Ontario study thus concluded, "it would be prudent to recommend avoiding application of lignosulfonate as a dust suppressant in the vicinity of spawning sites and cold water streams supporting trout."

Control Measures BCM-07, BCM-08, and TCB-01 may result in increased use of chemical dust suppressants for PM10 control. Any increase is expected to be relatively limited for three reasons: 1) chemical dust suppressants are often used only near or at the end of projects; 2) in most cases, other control methods are available, and 3) chemical dust suppressants are already used for fugitive dust control and required from existing rules, regulations and local programs.

As the background information provided above indicates, some products have the potential to adversely affect nearby groundwater supplies by migrating to an aquifer or surface body of water, or become a part of surface runoff or storm water. Thus, potential users of chemical dust suppressants should contact local RWQCBs to determine whether or not a product is environmentally safe. RWQCBs evaluate MSDS and other information as appropriate and examine the area to be sprayed if necessary. RWQCBs do not typically maintain a list of chemical dust suppressants, but evaluate the use of chemical dust suppressants on a case-by-case basis. Users are required to ensure that runoff does not migrate to a surface body of water, or if the dust suppressant is used in liquid form, that it does not flow from the use-area.

While there are a number of strategies besides chemical dust suppressants for complying with the provisions of BCM-07, BCM-08, and TCB-01, an adverse impact to water quality could occur if improper use of chemical dust suppressants occurs. However, according to the California RWQCB, Colorado River Basin, Region 7 (from Phil Gruenberg, Executive Officer) in a November 10, 1994 letter to the SCAQMD, "the chemical and physical properties of the non-brine products indicate that the risk to water quality may be minimal." In addition, as currently required in Rule 403 and 403.1, local RWQCB's should be consulted before use of any chemical dust suppressant to ensure that the product has not been prohibited. Users must apply chemical dust suppressants in accordance with manufacturers' and RWQCB recommendations to ensure that water quality is protected. Therefore, the 2003 AQMP control strategy is not expected to not generate significant adverse impacts to water quality associated with the use of chemical dust suppressants.

<u>Alternative Transportation Fuels</u>

PROJECT-SPECIFIC IMPACTS: Control measures in the 2003 AQMP may contribute to the increased use of alternative fuels in the SCAQMD's jurisdiction including FSS-06, ON-RD HVY DUTY-3, OFF-RD CI-1, MARINE-1, MARINE-2, , and some of the long-term and conceptual long-term control measures. The control measures would generally require the increased use of low sulfur diesel and reformulated fuels (e.g., reformulated jet fuels). Other options include the use of emulsified diesel fuels, biodiesel fuels, compressed natural gas and liquefied natural gas.

The SCAQMD has approved Rule 431.2 in September 2002, which requires that the sulfur content in diesel fuel be limited to 15 ppm by weight after January 1, 2005. The control measures identified in the 2003 AQMP would increase the use of low sulfur diesel fuels by potentially requiring their use in marine engines and possibly jet engines. The increased use of low sulfur diesel fuels would not be expected to result in any greater water quality impacts since the only difference in the diesel fuels is in the concentration of sulfur. Low sulfur diesel fuels would not have additives or materials that would be expected to readily dissolve in water and adversely affect ground or surface waters. Therefore, no significant adverse water quality impacts associated with the use of low sulfur diesel fuels would be expected.

On January 31, 2001, CARB issued formal verification of emission reductions associated with emulsified diesel fuels. CARB indicates that the use of emulsified diesel fuels is expected to result in a 14 percent reduction in NOx and a 63 percent reduction in particulate matter in off-road engines.

The emulsified diesel fuel is comprised of an additive package, purified water and diesel fuel. These components are mixed in a blending unit to produce a finished fuel. The encapsulation process produces a fuel blend that does not allow the water to contact metal engine parts, allowing the fuel to perform as effectively as conventional diesel fuel. The water content also promotes an atomization of the mixture during fuel injection and improves combustion, while lowering combustion temperatures, reducing NOx emissions.

The water emulsion diesel fuels have been approved for use by the CARB. The alternative diesel formulations and additives could readily dissolve in water and potentially impact ground and surface water. Spilled emulsified diesel is more soluble in water than diesel fuel, therefore, releases of the emulsified diesel fuel would be more likely to dissolve in water, migrate with the water and be more difficult to remediate than diesel fuel that will tend to remain separate from water. The additives in alternative fuels are required to be evaluated for toxic effects during the health effects evaluation that is required before the fuel receives federal registration. This approval process requires evaluation of air quality impacts, water quality impacts, fuel benefits, health effects and so forth to demonstrate that no significant adverse impacts would occur.

The use of these alternative fuels is not expected to result in greater adverse water quality impacts than the use of regular diesel fuels. A number of rules and regulations are currently in place to minimize the potential impacts from underground leaking storage tanks, and spills from fueling activities, including requirements for the construction of the storage tanks, requirements for double containment, and installation of leak detection systems. These regulations are currently in place and minimize the potential for additional leaks from the use of diesel fuels or alternative fuels.

PROJECT-SPECIFIC MITIGATION: No significant hydrology/water quality impacts were identified for the use of alternative fuels as part of the 2003 AQMP so no mitigation measures are required.

<u>Electric Vehicles</u>

PROJECT-SPECIFIC IMPACT: Implementation of the 2003 AQMP could contribute to increased use of electric vehicles. The electric batteries that could power these vehicles have useful lives similar to or less than the life of a conventional fossil fuel vehicle. Since some batteries contain toxic materials, water impacts are possible if they are disposed of in an unsafe manner, such as by illegal dumping or by disposal in a landfill.

The battery technologies have been developing as the use of electric vehicles has increased. Most technologies employ materials that are recyclable or non-toxic. Both regulatory requirements and market forces encourage recycling. The current state regulation of battery waste is presented below.

California laws and regulations create the following incentives and requirements for disposal of recycling of batteries.

- Under CARB regulations, to certify either a new or retrofit ZEV, automakers must complete CARB's certification application, which must include a battery disposal plan. Thus current regulations require ZEV manufacturers to take account for the full life-cycle of car batteries and to plan for safe disposal or recycling of battery materials (SCAQMD, 1997).

- California law requires the recycling of lead-acid batteries (California Health & Safety Code §25215). Spent lead-acid batteries being reclaimed are regulated under 22 CCR §66266.80 and 66266.81, and 40 CFR part 266, Subpart G.

- California law requires state agencies to purchase car batteries made from recycled material (Public Resources Code §42440).

The recycling of lead-acid and nickel-cadmium batteries is already a well established activity. Two secondary lead smelters (facilities that recycle lead-bearing materials) are located within the district including the Quemetco facility in the City of Industry and the Exide facility in the City of Vernon. Exide recycles about 16.5 million batteries annually (Exide, 2000) and Quemetco recycles about 10 million batteries annually (DTSC, 2001). Both of these facilities receive spent lead-acid batteries and other lead bearing material and process them to recover lead and polypropylene (from the battery casings). Acid is collected and is recycled as a neutralizing agent in the wastewater treatment system. The availability of secondary lead smelters for battery recycling reduces the potential for the illegal disposal of batteries. However, there is still the potential that used batteries could end up in landfills resulting in the potential release of heavy metals and acid to the environment.

NiCad batteries are 100 percent recyclable and recycling operations already exist in North America, Europe and Japan. NiCad batteries have long lives, so the battery waste stream from NiCad batteries will be relatively low (SCAQMD, 2000). In 1992, about 10,000 tons of NiCads were recycled, including 80 percent of used industrial NiCads (SCAQMD, 2000).

Recycling is already well established for the battery technologies that are currently in wide use. The development of other battery technologies are encouraging in that promising technology includes nickel-metal-hydride batteries and other types of batteries that are expected to be less hazardous and completely recyclable (SCAQMD, 2000).

While the switch to electric batteries has the potential to create water quality impacts, increasing use of ZEVs will result in a concomitant decrease in the use of internal combustion engines and a reduction in the impacts of such engines. For instance, decreased use of internal combustion engines will also result in a decreased generation of used engine oil, since electric motors do not employ oil as a lubricant.

Approximately 307,872 tons per year of waste oil was generated in the Basin in 2001 (see Chapter 3.5, Solid/Hazardous Waste). The CIWMB estimates that about 306.5 million gallons of lubricating and industrial oil were sold in California in 2001 and about 93 million gallons of oil were recycled (CIWMB, 2002b). Because of the widespread use and volume of waste oil, a portion of waste oil is illegally disposed of via sewers, waterways, on land, and disposed of in landfills. Waste oil that is illegally disposed can be released to the environment (water, land or air). The CIWMB has estimated that about 20 million gallons of used motor oil is disposed each year in an unknown manner (CIWMB, 2002b).

Since electric motors do not require motor oil as a lubricant, replacing internal combustion engines with electric engines will eliminate the impacts of motor oil use and disposal. Specifically, a 22 percent penetration of ZEVs among light-duty vehicles will result in a corresponding 22 percent reduction in the release of these contaminants to the environment due to illegal disposal (22 percent of 20 million gallons is 4.4 million gallons). Release of contaminants due to engine oil that burns up in, or leaks from engines or due to burning of recover engine oil for energy generation will also be correspondingly reduced. Additional use of electric vehicles is expected to have a beneficial environmental impact by reducing the amount of motor oil used, recycled and potentially illegally disposed.

Illegal disposal of electric batteries could result in significant water quality impacts by allowing toxic metals or acids to leach into surface or ground waters. While the feasibility of recycling or safe disposal is promising, especially considering that two secondary lead recycling facilities are located within the Basin, increased use of electric batteries will require greater efforts at preventing disposal of spent batteries in unlined municipal landfills or via illegal dumping.

PROJECT-SPECIFIC MITIGATION: The following incentives will ensure that recycling of batteries occurs.

HWQ 4: Require leasing, deposit or rebate programs for electric batteries. Leasing and rebate programs can both be effective measures to increase the rate or recovery of spent batteries, and both types of measures are already proven in practice. Deposit programs can also achieve the same goals.

HWQ 5: Require spent battery exchange for battery replacement. Require that ZEV service stations sell or install new batteries only on condition that they receive the spent batteries in exchange.

The above mitigation measures are expected to minimize any increase in illegal disposal of batteries by requiring the exchange of old batteries for new batteries and reducing the potential for increased illegal disposal to less than significant.

<u>Add-On Pollution Control Equipment</u>

PROJECT-SPECIFIC IMPACT: The 1994 AQMP EIR and environmental assessments for certain source-specific rule adoptions/amendments analyzed add-on control technologies with potential water resource impacts, including water quality and water demand, including condensers, carbon adsorbers, wet scrubbers, and SCR. The analyses determined that add-on control technologies would not result in significant adverse water resource impacts. As a result of those analyses, the information specific to the 2003 AQMP which is presented below, and the fact that there are less control measures in the 2003 AQMP that may result in the use of add-on control equipment, the use of add-on control technologies to implement the 2003 AQMP is determined not to result in significant adverse hydrology and water quality impacts.

As indicated in Table 4.4-1, the 2003 AQMP includes two stationary sources that may require add-on control equipment with the potential for hydrology/water quality impacts (CMB-10 and PRC-03). The 2003 AQMP also includes control measures that may require add-on control equipment for mobile sources, but the add-on controls for mobile sources are not expected to result in significant adverse impacts to water resources.

CMB-10 would seek further reductions in NOx allocations at RECLAIM facilities from 2003 through 2010. Such reductions could be across-the-board reductions of the ending or source-specific allocations. Similar to the existing RECLAIM program, facilities have the following options to meet their allocation: install pollution control equipment, make process or other changes or purchase RTCs. The installation of additional air pollution control equipment could include various equipment such as electrostatic precipitators, air filters, wet scrubbers, catalyst oxidizers/reactors, and thermal oxidizers.

The possible control methods for PRC-03, Emission Reductions from Restaurant Operations, include microwave ceramic filters, cyclonic air scrubbing devices, and process modifications. The microwave ceramic filter is based on the concept of filtering out the harmful emissions in the ventilation system and periodically regenerating the loaded filters using microwave energy. The results of emission testing of the microwave technology were poor. The cyclonic air scrubbing device employs water and filters to remove PM10 and carbon beds to remove VOC. Initial testing of the cyclonic air scrubbing device showed an 88 percent reduction in PM10 emissions and a 44 percent reduction in VOC emissions. An alternative to these control technologies is the replacement of under-fired charbroilers with a Smokeless[TM broiler]. The Smokeless[TM broiler] is designed to prevent grease from the broiling food from dripping onto hot burner components and is estimated to result in a 75 percent reduction in PM10 emissions and a 71 percent reduction in VOC emissions. Of these control methods, only the cyclonic air scrubbing device may affect water resources. The use of the Smokeless[TM broiler] is the most promising method of control due to its cost and control efficiency relative to other control equipment. The use of the Smokeless[TM broiler] would not impact water resources.

The control measures that may require add-on control equipment are generally not expected to result in significant adverse water resource impacts from their use. As discussed above, there are typically several control technologies which could be used for compliance with any given control measures. CMB-10 and PRC-03 would generally control emissions by methods, which have no water resource impacts, principally combustion and equipment modifications. Therefore, the use of add-on control technologies to implement the 2003 AQMP is determined not to result in significant adverse hydrology/water quality impacts.

PROJECT-SPECIFIC MITIGATION: No significant hydrology/water quality impacts were identified for the use of add-on control technologies as part of the 2003 AQMP so no mitigation measures are required.

Water Demand

PROJECT-SPECIFIC IMPACT: The following water demand analysis is divided into three subsections: dust suppression, tree planting and reformulated low-VOC content materials.

Dust Suppression: Control measures BCM-07, BCM-08, and TCB-01 consider watering as one of a number of potential control options for dust suppression. These control measures are aimed at reducing windblown dust from fugitive dust sources and from aggregate and cement plant manufacturing operations.

Water is currently being used as one of a number of dust suppression methods for construction and demolition sites, unpaved roads and parking lots, storage piles, landfills, and bulk material facilities under SCAQMD Rules 403 and 403.1. With the exception of unpaved roads and parking lots, the most frequent method of control for the types of facilities listed above is watering.

Implementation of BCM-07, BCM-08, and TCB-01 could create additional demand for water as a dust suppression method. Water could be used by itself for wet suppression, in conjunction with certain chemical dust suppression, for ground covers, or to maintain tree wind breaks.

An estimate of the water demand for fugitive dust control was made in the 1997 AQMP EIR and is included in Table 4.4-2. This estimate was developed from information obtained during the development of Rules 403 and 403.1. Since these activities are relatively consistent over time, the water demand estimates in Table 4.4-2 are expected to be accurate.

It is estimated that BCM-07 could result in a 10 percent increase over current water demand for those dust control method affected by the control measure. Though BCM-07 would affect only a subset of the activities listed in Table 4.4-2, it is estimated that the incremental increase in water demand due to implementation of BCM-07 is approximately 6,350 acre feet per year (10 percent x 63,479 = 6,347) or about 2,070 million gallons per year. This estimate is conservative because it assumes an additional 10 percent over the entire Rules 403 and 403.1 water use inventory and that water will be the only means used for dust control.

TABLE 4.4-2

Estimated Water Demand
Due to SCAQMD Rules 403 AND 403.1

Activity	Acre-Feet Per Year
Construction	35,472
Landfill	15,039
Bulk Materials	12,968
Unpaved Roads	572
Total	63,479

Source: SCAQMD, 1997

The quantity of water which might be used for implementation of BCM-08 (cement and aggregate plants) is assumed to be minor as most aggregate plants already use water for dust control and the use of water at cement plants is limited (water at cement plants can start the reaction to form solidified cement). In addition, TCB-01 would consider enhancements to existing AQMD BACM regulations that would further reduce PM10 emissions from fugitive dust sources. These enhancements would be based on those described in BCM-07. Therefore, the water increases estimated for BCM-07 are assumed to include the potential increase in water associated with implementation of BCM-08 and TCB-01.

The quantity of water, which may be used to apply chemical stabilizers is considered negligible for two reasons. As opposed to water, chemical stabilization as a dust control method is not performed on a continuous basis. Additionally, chemical stabilization is already used as one of the possible methods of dust suppression for existing regulations. It is expected that implementation of the 2003 AQMP would result in only a minor, incremental increase in the use of chemical stabilizers as compared to current use. As discussed in Chapter 3.4, total water demand within the district was approximately 3.8 million acre feet (about 1.2 trillion gallons) in 2000, and the potential increased demand due to dust suppression is not considered significant

Reformulated Low-VOC Content Materials: Increased water consumption may occur due to the reformulation of solvents and coatings to aqueous-based materials. Several of the control measures in the 2003 AQMP would propose to control VOC emissions through the reformulation of coatings, solvents, and consumer products including CTS-07, CTS-10, CONS-1, CONS-2, and some of the long-term and conceptual long-term control measures. The increase in water demand for these control measures has been estimated from the EIR for the 1997 AQMP. The 1997 AQMP resulted in control measures that would require reformulated solvents and coatings. The 2003 AQMP is proposing additional control measures that would regulate additional categories of solvents, coatings, and consumer products. Using the 1997 AQMP estimate is expected to be conservative because many of the sources that would use reformulated coatings/solvents have already reformulated some of the coatings/solvents, and the estimate assumes that the only method for compliance would be reformulation. The potential water demand estimated for the 1997 AQMP for the reformulation of coatings and solvents was 153 million gallons by the year 2010. This potential water demand is within the capacity of water suppliers (about 1.2 trillion gallons in 2000) and is not considered significant compared with current and projected future demand and supply (see Chapter 3.4).

Tree Planting: Increased water consumption may occur due to maintenance of trees planted as part of control measure MSC-01 – Promotion of Lighter Color Roofing and Road Materials and Tree Planting Programs. The quantity of water which may be required to implement this control measure is unknown since it is not clear whether or not trees would be planted to comply with the measure because of local ordinances or requirements to landscape new developments.

PROJECT-SPECIFIC MITIGATION: The following mitigation measure is proposed to minimize water consumption for the maintenance of planted trees.

HWQ 6: Require the use of species that are drought tolerant or require only moderate watering, and encourage use of native species in tree planting programs, where appropriate, to minimize water consumption. Educate the pubic on water conservation strategies when planting trees, such as organic mulch, deep watering, water berms/wells, and visual monitoring.

The above mitigation measures are expected to minimize any increase in water demand impacts to less than significant.

Hydrology/Water Quality Impacts Associated with Long-Term Strategies

PROJECT-SPECIFIC IMPACT: Additional control measures and hydrology and water quality impacts associated with the long-term strategy or long-term measures may also be expected. The long-term control measures are expected to include aggressive development and commercialization of advanced mobile source control technologies.

Implementation of the long-term control measures would be expected to result in additional hydrology/water quality impacts. The specific details of the long-term control measures have not yet been developed and will need to be developed as part of the rulemaking process. Therefore, the impacts related to the long-term control measures are discussed qualitatively since detailed information for a quantitative analysis is not available. The potential hydrology/water quality impacts from the long-term measures for each of the resources discussed in this subchapter are evaluated below.

- Reformulated Coatings, Solvents and Consumer Products: Under the short-term control measures it was concluded that reformulation of solvents may result in an incremental increase in the discharge of wastewater received by POTWs so that potential water quality impacts are not considered to be significant. To help ensure that water quality impacts remain less than significant, mitigation measures were identified. Under the long-term control measures additional reformulation of consumer products and solvents could occur, thus potentially increasing the incremental impacts on wastewater treatment plants. Similar to short-term measure water quality impacts, long-term water quality impacts are not expected to be significant, but the mitigation measures identified for the short-term measures would also apply to the long-term measures to help ensure that water quality impacts remain insignificant.

- Dust Suppression: The potential water quality impacts associated with implementation of the short-term control measures from the use of chemical dust suppressants was expected to be less than significant. Implementation of the long-term measures is not expected to result in any additional controls associated with dust suppression. Therefore, no increase in the use of chemical dust suppressants are expected due to implementation of the long-term control measures and the overall impacts are expected to remain less than significant.

- Alternative Transportation Fuels: The use of these alternative fuels under the short-term control measures is not expected to result in greater adverse water quality impacts than the use of regular diesel fuels. Implementation of the long-term control measures is expected to result in an increase in the use of alternative fuels, displacing greater quantities of petroleum fuels. Therefore, the additional use of alternative fuels associated with the long-term control measures are expected to be less than significant and not greater adverse water quality impacts than the use of petroleum fuels.

- Electric Vehicles: Illegal disposal of electric batteries could result in significant water quality impacts associated with the short-term control measures by allowing toxic metals or acids to leach into surface or ground waters. Mitigation measures were developed that are expected to minimize any increase in illegal disposal of batteries by requiring the exchange of old batteries for new batteries and reducing the potential for increased illegal disposal to less than significant. Implementation of the long-term control measures is expected to result in an increase in the use of electric vehicles and increased generation of batteries. The additional need for batteries associated with the long-term control measures are expected to be less than significant, since the mitigation measures would also apply to the long-term control measures and require the exchange of old batteries for new batteries.

- Add-On Pollution Control Equipment: The short-term control measures that may require add-on control equipment are generally not expected to result in significant adverse water resource impacts from their use, since the control measures would principally require combustion and equipment modifications. Implementation of the long-term control measures is expected to require additional pollution control equipment. As with the short-term control measures, the long-term control measures are expected to control emissions by methods, which have no water resource impacts. Therefore, the use of add-on control technologies to implement the 2003 AQMP is determined not to result in significant adverse hydrology/water quality impacts.

- Water Demand: The short-term control measures that may require add-on control equipment are generally not expected to result in adverse impacts on water demand, as the demand is expected to be within the capacity of water suppliers. Implementation of the long-term control measures is not expected to result in an increased water demand. Therefore, no increase in water use is expected due to implementation of the long-term control measures and the overall impacts are expected to remain less than significant.

PROJECT-SPECIFIC MITIGATION: No significant adverse hydrology/water quality impacts were identified for the long-term measures as part of the 2003 AQMP, so no additional mitigation measures are required. The mitigation measures identified for the short-term measures would apply to the long-term control measures.

4.4.5 CUMULATIVE HYDROLOGY/WATER QUALITY IMPACTS

Wastewater generated as a result of implementing 2003 AQMP control measures related to reformulated coatings, solvents and consumer products could have an incremental impact on sewer systems, but this affect is not expected to cause significant adverse cumulative impacts. In addition, the impact specific mitigation measures are expected to further minimize the potential for significant impacts.

The impact of dust suppression measures on water quality is not expected to create significant adverse water quality impacts after mitigation. Chemical dust suppressants must be products that have not been prohibited by water or air quality agencies or the U.S. EPA. Further, the impact specific mitigation measure should ensure that application of such products is appropriate for the area to be treated and that migration to surface or groundwater should not occur. Also, chemical dust suppressants are only one of several types of dust control techniques that may be used to comply with the proposed control measures.

The use of these alternative fuels is not expected to result in greater adverse water quality impacts than the use of regular diesel fuels. Therefore, the use of alternative fuels is expected to be less than significant and not greater adverse water quality impacts than the use of petroleum fuels.

Electric batteries could displace gasoline-powered engines resulting in a reduction in releases of used motor oil to surface and ground water. Electric batteries can be effectively recovered and recycled with leasing, deposit and rebate programs. This use of alternative transportation fuels is not expected to result in significant adverse water quality impacts.

Implementation of the 2003 AQMP will have only minor incremental impacts on water quality and water demand compared to water demand impacts due to population growth and is not considered significant. Mitigation measures were proposed to minimize the potential adverse on water and hydrology associated with the 2003 AQMP. No other cumulative impacts have been identified.

CUMULATIVE HYDROLOGY/WATER QUALITY MITIGATION: The project specific mitigation measures described above will help reduce the cumulative water quality impacts of the 2003 AQMP. One additional measure is included to ensure potential water demand impacts are not significant.

HWQ 7: Require the use of reclaimed water where available and feasible. Reclaimed water should be used as availability permits while existing conservation measures should be continued.

The above mitigation measure is expected to minimize any increase in the cumulative water quality impacts to less than significant.

4.4.6 SUMMARY OF HYDROLOGY/WATER QUALITY IMPACTS

The following is the summary of the conclusions of the analysis of hydrology/water quality impacts associated with implementation of the 2003 AQMP.

- Reformulated Coatings, Solvents and Consumer Products: Reformulation of solvents may result in an incremental increase in the discharge of wastewater to POTWs, but potential water quality impacts are considered insignificant. To ensure that impacts remain insignificant, mitigation measures were identified. Impacts are expected to be less than significant.

- Dust Suppression: The potential water quality impacts associated with implementation of the 2003 AQMP from the use of chemical dust suppressants was expected to be less than significant.

- Alternative Transportation Fuels: The use of these alternative fuels is not expected to result in greater adverse water quality impacts than the use of regular diesel fuels. Therefore, the use of alternative fuels is expected to be less than significant and not greater adverse water quality impacts than the use of petroleum fuels.

- Electric Vehicles: Illegal disposal of electric batteries could result in significant water quality impacts by allowing toxic metals or acids to leach into surface or ground waters. Mitigation measures were developed that are expected to minimize any increase in illegal disposal of batteries by requiring the exchange of old batteries for new batteries and reducing the potential for increased illegal disposal to less than significant.

- Add-On Pollution Control Equipment: The 2003 AQMP control measures that may require add-on control equipment are generally not expected to result in significant adverse water resource impacts from their use, since the control measures would principally require combustion and equipment modifications. Therefore, the use of add-on control technologies to implement the 2003 AQMP is determined not to result in significant adverse hydrology/water quality impacts.

- Water Demand: The control measures that may require add-on control equipment are generally not expected to result in adverse impacts on water demand, as the demand is expected to be within the capacity of water suppliers. Therefore, no significant impacts on water demand are expected due to implementation of the 2003 AQMP.

- Hydrology/Water Quality Impacts Associated with Long-Term Control Strategies: Additional hydrology/water quality impacts are possible due to implementation of the long-term control measures (over and above those discussed in other portions of the EIR). The increase in hydrology/water quality impacts are expected to be controlled with the mitigation measures identified above for each water resource category. No additional significant hydrology/water quality impacts (over and above those discussed above) are expected.

- Cumulative Hydrology/Water Quality Impacts: Implementation of the 2003 AQMP will have only minor incremental impacts on water quality and water demand compared to water demand impacts due to population growth and is not considered significant. These project-specific impacts would be expected to be minimized by the impact specific mitigation measures identified for each resource category. One additional mitigation measures is included to ensure that cumulative water demand impacts are not significant.