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 2007 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; and (7) hydrology/water quality impacts associated with long-term strategies.

4.4.2 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 of 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.
- Alter~~n~~ations to the course of flow of floodwaters.

4.4.3 2007 AQMP CONTROL MEASURES WITH POTENTIAL HYDROLOGY AND WATER QUALITY IMPACTS

Table 4.4-1 lists the 2007 AQMP control measures with potential adverse hydrology and water quality impacts.

TABLE 4.4-1

Control Measures with Potential Hydrology/Water Quality Impacts

Control Measures	Control Measure Description (Pollutant)	Control Methodology	Water Quality Impact
MEASURES TO BE IMPLEMENTED BY THE SCAQMD			
CTS-01	Emission Reduction from Lubricants	Reduce VOC emissions from lubricants. Low-VOC lubricants.	Potential increased use of water based formulations.
CTS-04	Emission Reductions from the Reduction of VOC Content of Consumer Products not Regulated by the State Board	Reduce VOC emissions from reformulated, lower VOC content products	Potential increased use of water based formulations.
FUG-03	Further Emission Reductions from Cutback Asphalt	Reduce emissions from asphalt paving applications by limiting the use of cutback asphalt and /or replacing it with emulsified asphalt.	Potential increase~~d~~ in water demand associated with making emulsified asphalt.
BCM-01	PM Control Devices (Baghouses, Wet Scrubbers, Electrostatic Precipitators, Other Devices)	Install Continuous Opacity Monitor System or Bag Leak Detection System for top process emitters. Baghouse filter; ventilation/hood systems.	Potential impact on water demand for air pollution control equipment (e.g., wet scrubbers) and water quality.
BCM-02	PM Emission Hot Spots-Localized Control Program	Supplement the regional approach to address PM hot spots. Soil stabilization; street sweeping.	Potential impact on water demand and water quality due to the use of soil stabilizers.
MCS-01	Facility Modernization	Equipment retrofitted or replaced with BACT at the end of a pre-determined lifespan & use of super compliant materials/process change.	Potential increased use of water based formulations.
MCS-05	Emission Reductions from Livestock Waste	Air pollution control devices for larger facilities, reductions from smaller facilities. (use of belt/drying system); enclosures; VOC/odor control (i.e. afterburner).	Potential impact on water demand and water quality due to water from wash down.
EGM-01	Emission Reductions from New or Redevelopment Projects	Mitigate impacts new/redevelop projects. Dust control; alternative fuel; diesel PM filter; low-emitting engines; low VOC coatings; energy conservation; mitigation fee.	Potential impact on water demand and water quality. Potential increased use of water based formulations.

Control Measures	Control Measure Description (Pollutant)	Control Methodology	Water Quality Impact
MOB-03	Backstop Measure for Indirect Sources of Emissions from Ports & Port-Related Facilities	Address emissions stationary & mobile sources at ports & related facilities. PM filter/catalysts; use of non-diesel equipment (i.e., electrical, fuel cells, LNG, CNG, etc); alternative diesel fuel (i.e. low sulfur, emulsified, etc); hoods, shoreside power (SCR); vessel speed reduction.	Potential impact on water demand and water quality associated with use of wet scrubbers. Alternative fuels and additives can readily dissolve in water and impact ground and surface water.
MEASURES FOR SOURCES UNDER STATE AND FEDERAL JURISDICTION			
ARB-ONRD-03 SCFUEL-01	CA Phase 3 Reformulation Gasoline Modifications	Offset impacts of ethanol in low level blended gasoline through gasoline reformulation; remove ethanol.	Potential impact on water demand and water quality due to refinery modifications.
SCFUEL-02	Greater use of Diesel Fuel Alternatives and Diesel Fuel Reformulation	Two-phase approach to achieve additional emissions from diesel fuel engines. Fuel reformulation; diesel alternatives (Fischer-Tropsch, biodiesel, emulsified).	Potential impact on water demand and water quality. Alternative formulations and additives can readily dissolve in water and impact ground and surface water.
ARB-OFFRD-01	Auxiliary Ship Engine Cold Ironing and Other Clean Technology. Cleaner Main Ship Engines and Fuel.	Reduce emissions from ships at berth cold ironing (electrical power) and other clean technologies. Further reduce emissions from main engines through added retrofits. Accelerate use of cleaner ships and rebuilt engines. Use low sulfur diesel fuel in main engines when operating within 24 nautical miles of shore.	Potential impact on water demand and water quality due to refinery modifications.
OFFRD-08 SCOFFRD-02	Further Emission Reductions from Cargo Handling Equipment	Additional emission reductions from cargo handling equipment beyond the state regulation. Accelerated retirement/retrofit (i.e., catalysts, PM traps, alt fuel-emulsified diesel)	Potential impact on water demand and water quality. Alternative fuels and additives can readily dissolve in water and impact ground and surface water.
OFFRD-11 SCLTM-02	Emission Reductions from Aircraft	Federal government to establish more stringent emissions for aircraft engines. New emission standards; cleaner fuel; emission fees	Potential impact on water demand and water quality. Alternative formulations and additives can readily dissolve in water and impact ground and surface water.
ARB-CONS-01 SCLTM-03	Further Emission Reductions from Consumer Products	Achieve the maximum technologically & commercially feasible VOC emission reductions from consumer products. Ultra low VOC products.	Potential increased use of water based formulations.

Control Measures	Control Measure Description (Pollutant)	Control Methodology	Water Quality Impact
LONG TERM ("BLACK BOX") MEASURES			
SCLTM-02	Further Emission Reductions from Off-Road Mobile Sources	Further Reductions from Off-Road Mobile Sources through 1) accelerated turn-over of existing equipment and vehicles and replacement with new equipment meeting the new engine standards; 2) retrofit of existing vehicles and equipment with add-on controls such as SCR; and 3) develop new engine standards (e.g., aircraft, ships)	Potential impact on water demand and water quality. Alternative formulations and additives can readily dissolve in water and impact ground and surface water.
SCLTM-03	Further Emission Reductions from Consumer Products	Implement low-VOC technologies from stationary sources into categories with similar uses in consumer products. Use of lower reactive VOC compounds could achieve equivalent reductions.	Potential increased use of water based formulations.

Reformulated Coatings, Solvents and Consumer Products

PROJECT-SPECIFIC IMPACTS: Several of the control measures in the 2007 AQMP could include controlling VOC emissions through the reformulation of coatings, solvents and consumer products including industrial lubricants (CTS-01), coatings and solvents (MCS-01, and SCLTM-03), and consumer products (ARB-CONS-01/SCLTM-03). Emission reductions are expected to be achieved through the use of near-zero and zero VOC formulations.

Under the proposed 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.

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.

For past projects evaluating the transition to aqueous based reformulated products, the SCAQMD has identified situations where some vendors advertised their aqueous reformulated products as sewer safe. That is, they have told customers and potential customers that the cleaning solution can be safely disposed of in the sewer system because it is non-hazardous and biodegradable. Because the solution will often become contaminated with hazardous materials during the cleaning process, proper disposal would often be required. Illegal dumping of hazardous material to the sewer system may thus increase as facilities increase their use of aqueous cleaners.

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 significant adverse 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 reformulated 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 discharged 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 (SCAQMD, 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. The California Air Resources Board (CARB) and the SCAQMD have taken steps to mitigate and limit the use of these compounds. 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.

Finally, although methylene chloride and perchloroethylene are included in the list of exempt compounds in Rule 102, they are included in the list of Group II compounds, which means they are toxic or potentially toxic. In addition, both methylene chloride and perchloroethylene are listed in Table I of Rule 1401, which means they are regulated as a toxic air contaminant. With the exception of small niche applications, such as small adhesive categories in Rule 1168 for methylene chloride, it is not expected that either of these compounds will be used widely in reformulated products in the future.

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 products are expected to be minimal since: (1) compliance with state and federal waste disposal regulations would substantially limit adverse impacts; (2) “turn-key” services are available for aqueous cleaners; (3) some solvent cleaning operators may currently be disposing of spent material illegally, so one illegal activity would be replaced with another legal activity; and (4) the amount of wastewater which may be generated from reformulated solvents is well within the projected receiving capacity of the Publicly Owned Treatment Works (POTWs) in the SCAQMD’s jurisdiction. It is estimated that reformulating solvents may generate approximately six million gallons per year of wastewater (approximately 16,440 gallons per day) (SCAQMD, 2003). The capacity of the POTWs in the region is about 2,000 million gallons per day (see Table 3.4-3) so that sufficient capacity is expected to be available 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 or about 394,521 gallons per day (SCAQMD, 2003). CARB estimated that the increase in wastewater discharges associated with reformulated coatings was about 24,115 gallons per day (CARB, 2000).

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 2,000 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.

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 region's POTWs. Consequently, wastewater impacts from coating reformulation are not considered significant.

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.

<u>Dust Suppression</u>

PROJECT-SPECIFIC IMPACTS: Several of the control measures in the 2007 AQMP would propose to control particulate matter emissions through dust suppression measures including BCM-02. An increase in the use of chemical dust suppressants is expected to be limited because chemical dust suppressants are already used to comply with existing dust control rules, e.g., Rule 403, 1156, 1157, etc., while other control measures (e.g., dust suppression using water) are available and more commonly used. Further, dust suppressants that may be used in connection to BCM-02 will be limited geographically to PM hotspots.

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, 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 (SCAQMD, 2003).

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 (SCAQMD, 2003).

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. 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; used for drinking water or domestic purposes; or if the table is near the area of application, near a low-volume stream or pond used for domestic water supply (SCAQMD, 2003).

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 Liquid Calcium Chloride from Lee Chemical, Inc. 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. 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-02 and EGM-01 may result in an incrementally increased use of chemical dust suppressants for PM10 and PM2.5 control. Any increase is expected to be relatively limited for four 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 that are less expensive; 3) chemical dust suppressants are already used for fugitive dust control and required from existing rules, regulations and local programs; and 4) application would, in many cases, be confined geographically to PM hotspot areas such as Rubidoux in Riverside County.

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-02 and EGM-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, etc., 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 2007 AQMP is not expected to generate significant adverse impacts to water quality associated with the use of chemical dust suppressants.

PROJECT-SPECIFIC MITIGATION: No significant hydrology/water quality impacts were identified from the use of dust suppressants as part of the 2007 AQMP. Therefore, no mitigation measures are required.

Alternative Transportation Fuels

PROJECT-SPECIFIC IMPACTS: Control measures in the 2007 AQMP may contribute to the increased use of alternative fuels in the SCAQMD's jurisdiction including MOB-03, ARB-ONRD-03/SCFUEL-01, SCFUEL-02, ARB-OFFRD-01, and SCOFFRD-02. The control measures would generally require the increased use of low sulfur diesel (for ocean going vessels) and reformulated fuels (e.g., emulsified diesel fuels, biodiesel fuels, compressed natural gas and liquefied natural gas.

The SCAQMD approved Rule 431.2 in September 2002, which required that the sulfur content in diesel fuel used in stationary sources be limited to 15 ppm by weight after January 1, 2005. Federal Law extended this same requirement to diesel fuel used by mobile sources, which became effective June 1, 2006. The control measures identified in the 2007 AQMP would increase the use of low sulfur diesel fuels by potentially requiring their use in marine engines (main and auxillary) 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 are not expected to have additives or materials that would be expected to readily dissolve in water and adversely affect ground or surface waters because materials that are covalently bonded (diesel) are not miscible in materials with polar bonds (water). 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 future of emulsified diesel fuels in California is not clear at this time because of uncertainties in its availability. For example, Aquazole, produced by Total Final Elf, is used primarily in Europe. Although it has been verified as an alternative diesel fuel by CARB, it is not generally available in North America. PuriNOx, manufactured by Lubrizol, has also been verified as an alternative diesel fuel by CARB. Although it has been available for use in California and has been used in a number of applications, Lubrizol discontinued manufacturing PuriNOx as of January 1, 2007.

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 from the use of alternative fuels as part of the 2007 AQMP so no mitigation measures are required.

<u>Electric and Hybrid Vehicles</u>

PROJECT-SPECIFIC IMPACT: Implementation of the 2007 AQMP could contribute to increased use of electric vehicles. Control Measure ONRD-06 projects that an additional 2.5 million electric vehicles will be put into use in the district by 2020.

The batteries used in hybrid vehicles are different from the batteries used in traditional cars or 100 percent electric cars. The battery for the EDrive Prius hybrids is about 150 pounds as compared to an electric battery pack of about 75 pounds. The EDrive system on a Prius replaces the existing Prius NiMH battery with a larger advanced lithium-ion battery and a proprietary battery monitoring and control system. The new system allows the Prius to be charged at home using a standard 110/120V home outlet. Testing indicates that the batteries should last over five years, with 10 or more years being possible (www.edrivesystems.com). 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 interest in 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, 2003).

- 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).

- As of February 8, 2006, household wastes such as batteries, electronic devices and fluorescent light bulbs may not be disposed of in a landfill by anyone.

Existing battery recovery and recycling programs are expected to substantially limit potential water quality impacts that may occur from processing spent batteries. For example, 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 (DTSC, 2006) 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.

Similarly, 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, 2000a).

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 from improper disposal, increasing use of EVs and HVs 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 as explained in the following paragraphs, since electric motors do not employ oil as a lubricant.

Approximately 524,805 tons per year of waste oil were generated in the Basin in 2005 and about 932,000 tons were generated in California in 2005 (see Chapter 3.5, Solid/Hazardous Waste). 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, 2007). In addition, a substantial amount of motor oil leaks onto the highways from vehicles each year. This motor oil is washed into storm drains and eventually ends up in the ocean.

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. For example, a 50 percent penetration of light-duty electric vehicles will result in a corresponding 50 percent reduction in the release of these contaminants to the environment due to illegal disposal (50 percent of 20 million gallons is 10 million gallons). Release of contaminants due to engine oil that burns up in, or leaks from engines or due to burning of recover*ed* engine oil for energy generation will also be correspondingly reduced. Additional use of electric and hybrid vehicles is expected to have a beneficial environmental impact by reducing the amount of motor oil used, recycled, potentially illegally disposed, or washed into storm drains and ending up in the ocean.

Illegal disposal of electric batteries has the potential to 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 spent batteries have economic value and the fact that ~~these~~ *there* are 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: Encourage and incentivize 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: Encourage spent battery exchange for battery replacement. Provide incentives to service stations that sell or install new batteries 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.

Add-On Pollution Control Equipment

PROJECT-SPECIFIC IMPACT: EIRs for previous AQMPs and environmental assessments for certain source-specific rule adoptions/amendments analyzed add-on control technologies for potential water resource impacts, including water quality and water demand from condensers, carbon adsorbers, wet scrubbers, and SCRs. The individual analyses determined that add-on control technologies would normally not result in significant adverse water resource impacts. As indicated in Table 4.4-1, the 2007 AQMP includes stationary sources that may require add-on control equipment with the potential for hydrology/water quality impacts (BCM-01, MCS-05, EGM-01, and MOB-03). The 2007 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.

The possible control methods for BCM-05, Emission Reductions from Under-fired Charbroilers, ~~has~~ *have* yet to be determined as cost-effective controls for the majority of under-fired charbroilers ~~has~~ *since cost effective control measure have* not been developed. BCM-05 is aimed at PM10 and PM2.5 emission controls and could involve water scrubbing or filtering devices as ~~ass-~~*add* on controls. An alternative to these control technologies is the replacement of under-fired charbroilers with a smokeless broiler, which would prevent grease from the broiling food from dripping onto hot burner components. A smokeless broiler 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. It is expected that compliance with this control measure would be achieved by replacing older broilers with newer, more efficient broilers, which 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. There are typically several control technologies which could be used for compliance with any given control measures. BCM-01 would generally control emissions by methods, which have no water resource impacts, principally baghouses, electrostatic precipitators, ventilation systems and new equipment. MCS-05 is expected to control emissions from livestock waste through the use of collection systems, enclosures and afterburners. EGM-01, Emission Reductions from New or Redevelopment Projects, could require additional use of water for dust control, which is currently used as a mitigation for construction activities. However, EGM-01 is expected to allow for a variety of other control methods (mitigation fees, alternative fuels, diesel filters, etc.) and would not just rely on water use. MOB-03, Backstop Measure for Ports could use water for particulate control (e.g., wet gas scrubbers). However, MOB-03 is expected to rely primarily on the use of a variety of other control methods, including cold ironing, alternative fuels, PM filters, etc. Therefore, the use of add-on control technologies to implement the 2007 AQMP is not expected to result in significant adverse hydrology/water quality impacts because control technologies or strategies are expected to rely on control approaches that do not use water or are not water intensive uses.

PROJECT-SPECIFIC MITIGATION: No significant hydrology/water quality impacts were identified for the use of add-on control technologies as part of the 2007 AQMP so no mitigation measures are required.

<u>Water Demand</u>

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

Dust Suppression: Control measures BCM-01, BCM-02, and EGM-01 consider watering as one of a number of potential control options for dust suppression. These control measures would reduce windblown dust from fugitive dust sources and from top PM emitters.

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, 403.1, 1156, and 1157. With the exception of unpaved roads and parking lots, the most frequent method of control for facilities or operations in the above rules is watering.

Implementation of BCM-01, BCM-02, and EGM-01 could create additional incremental 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. In addition, water demand anticipated from implementing Rule 1156 (cement manufacturing facilities), and Rule 1157 (aggregate facilities) is also shown in the analysis for Rules 403 and 403.1 and Rules 1156 and 1157 concluded that water demand impacts from implementing these rules was less than significant. Since these activities are relatively consistent over time, the water demand estimates in Table 4.4-2 are expected to be accurate.

TABLE 4.4-2

Estimated Water Demand
Due to SCAQMD Rules 403, 403.1, 1156, and 1157

Activity	Acre-Feet Per Year	Acre-Feet Per Day
[1]403 & 403.1 Dust Supression	-	-
Landfill	15,039	57.8
Bulk Materials	12,968	49.9
Unpaved Roads	572	2.2
1156[2] Dust Suppression	-	0.07
1157[3] Dust Suppression	-	5.7
Total	-	115.67

[1]Source: SCAQMD, 1997
[2]Source: SCAQMD, 2005 (Final EA for Proposed Rule 1156)
[3]Source: SCAQMD, 2005 (Final EA for Proposed Rule 1157) and SCAQMD 2006 (Final EA for Prop. Amended Rule 1157)

To be conservative, it is estimated that BCM-01, BCM-02 and EGM-01 could result in a 10 percent increase over current water demand for those dust control methods affected by the control measure. Though BCM-01, BCM-02, and EGM-01 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 is approximately ~~115.67~~ *11.6* acre-feet per day (10 percent x 115.67 = 11.6) or about 3,779,990 gallons per day. 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.

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 and would only be used in limited applications in the future. It is expected that implementation of the 2007 AQMP would result in a relatively minor, incremental increase in the use of chemical stabilizers as compared to current use.

Based on the above analysis, implementing control measures may increase future water demand by approximately 3,778,990 gallons per day. This projected water demand is less than the SCAQMD's water demand significance threshold of five million gallons per day. Therefore, water demand impact from implementing dust suppression control measures is considered to be less than 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 2007 AQMP would propose to control VOC emissions through the reformulation of coatings, solvents, and consumer products including CTS-01, FUG-03, and SCLTM-03.

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 2007 AQMP is proposing additional control measures that would regulate additional categories of solvents, coatings, and consumer products. Using the 1997 AQMP water demand estimate for this category of control measures may not be appropriate because, since that time, a number of rule or rule amendments have been adopted for coating/solvents and consumer products requiring low VOC content, which has resulted in most of these products complying by using reformulated formulations. The potential water demand estimated in the 1997 AQMP for the reformulation of coatings and solvents was 153 million gallons by the year 2010.

More recent, and therefore, more appropriate water demand estimates were developed by CARB, which estimated that about 56,684 gallons per day of water (about 20.6 million gallons per year) would be required in the South Coast Air Basin for reformulated coatings (CARB, 2000). Since the CARB water demand is the more recent estimate, it likely is a more accurate projection of water demand impacts and therefore, will be used for the analysis of water demand impacts for implementing 2007 AQMP control measures.

Based on the preceding analyses, implementing control measures in the 2007 AQMP could increase water demand impacts by as much as 3.84 million gallons per day. This total projected water demand estimate does not exceed the SCAQMD's water demand significan~~t~~*ce* threshold and therefore, water demand impacts from implementing the 2007 AQMP control measures are considered to be less than significant.

PROJECT SPECIFIC MITIGATION: No significant water demand impacts were identified from implementing 2007 AQMP control measures related to dust control and reformulated projects, so no mitigation measures are required.

4.4.4 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 2007 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 2007 AQMP from the use of chemical dust suppressants ~~was~~ *were* 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. Water quality impacts from the use of alternative fuels is expected to be equivalent to or less than adverse water quality impacts from the use of petroleum fuels and, therefore is considered to be less than significant.

- Electric and Hybrid Vehicles: Illegal disposal of 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 2007 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 2007 AQMP is determined not to result in significant adverse hydrology/water quality impacts.

- Water Demand: The control measures that may require the use of water are generally not expected to result in significant adverse impacts on water demand, as the demand is expected to be less than the SCAQMD's water demand significance threshold of five million gallons per day. Therefore, no significant impacts on water demand are expected due to implementation of the 2007 AQMP.