SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Final Program Environmental Assessment for:

Proposed Rules 3501 – Recordkeeping for Locomotive Idling, and 3502 - Minimization of Emissions from Locomotive Idling

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PREFACE

The Draft Program Environmental Assessment (PEA) for the Proposed Rules 3501 – Recordkeeping for Locomotive Idling, and 3502 - Minimization of Emissions from Locomotive Idling was circulated for a 30-day public review and comment period from December 22, 2005 to January 20, 2006. No public comment letters were received and minor modifications were made to the Draft PEA so it is now a Final PEA. Deletions and additions to the text of the EA are denoted using ~~strikethrough~~ and <u>underlined</u>, respectively. Changes to the project description are minor and do not change the conclusions made in the Draft PEA or worsen the environmental impact analyzed in the Draft PEA. Pursuant to CEQA Guidelines §15073.5(c)(2), recirculation is not necessary since the information provided does not result in new avoidable significant effects.

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INTRODUCTION

The South Coast Air Quality Management District (SCAQMD), as Lead Agency, has prepared this Program Environmental Assessment (PEA) to provide a comprehensive analysis of environmental impacts that may be generated by proposed Rule (PR) 3501 - Recordkeeping for Locomotive Idling and PR 3502 - Minimization of Emissions from Locomotive Idling. The South Coast Air Basin (Basin) has seen improved air quality and reduced levels of toxic exposure over the last 25 years. Despite the large reduction in emissions, exceedances of state and national ambient air quality standards still occur and the average cancer risk due to airborne toxics within the area of the SCAQMD's jurisdiction is estimated to be about 1400 in one million (Multiple Air Toxics Emissions Study II, SCAQMD, 1999).

Rail operations, characterized primarily by activities associated with operation of diesel locomotives, are a significant source of diesel particulate matter (PM) emissions and other criteria pollutants such as oxides of nitrogen (NOx), volatile organic compounds (VOC), carbon monoxide (CO), and oxides of sulfur (SOx). The 2003 Air Quality Management Plan (AQMP) contains an emission inventory for train NOx emissions 36.52 tons per day, particulate matter less than 10 microns (PM10) emissions of 1.01 tons per day and emissions of particulate matter less than 2.5 microns (PM2.5) of 0.93 ton per day.[1] Diesel exhaust is a complex mixture of gases and fine particles emitted by diesel-fueled internal combustion engines.

In 1998, the California Air Resources Board (CARB) identified diesel PM as a toxic air contaminant (TAC) based on its cancer causing potential. The SCAQMD's MATES-II study identified diesel emissions as responsible for approximately 70 percent of the carcinogenic risk from air toxics in the Basin. Diesel exhaust contains many carcinogenic compounds, including, but not limited to, arsenic, benzene, formaldehyde, 1-3-butadiene, and ethylene dibromide.[2] Accordingly, consistent with the SCAQMD's Air Toxics Control Plan (ATCP) control measure AT-MBL-09, the SCAQMD is proposing to reduce diesel PM emissions from locomotive idling.

California's 1994 State Implementation Plan (SIP) control measure M14 assumes that cleaner federally-complying locomotives will be operated in California and the Basin. As a result of measure M14, CARB staff developed a Memorandum of Understanding (MOU) with The Burlington Northern and Santa Fe Railway Company (BNSF) and Union Pacific Railroad Company (UP) and the United States Environmental Protection Agency (U.S. EPA) that was signed in July 1998. The MOU includes provisions for

[1] South Coast Air Quality Management District, 2003. 2003 Air Quality Management Plan: Appendix III – Base and Future Year Emission Inventories.

[2]California Environmental Protection Agency, Air Resources Board and Office of Environmental Health Hazard Assessment, 1998. Executive Summary for the "Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant."

early introduction of clean units, with requirements for a fleet average in the Basin equivalent to U.S. EPA's Tier 2 locomotive standard by 2010.

PR 3501 would establish a program for rail operators to keep records of locomotive idling events. PR 3502 would minimize emissions from locomotive idling by prohibiting unnecessary idling for more than 30 minutes, except under specific conditions, or allowing railroads an option to reduce an equivalent amount of emissions through implementation of other approved alternatives techniques.

Pursuant to the California Environmental Quality Act (CEQA) (California Public Resources Code §21000 et seq.), the SCAQMD prepared an Initial Study (IS) which identified environmental topic areas that may be adversely affected by the proposed project. The Initial Study was released for a 30-day public review period on September 15, 2005, closing on October 14, 2005. One comment letter was received which is included in Appendix C along with responses to the comments. Based upon an initial evaluation in the Initial Study prepared for PRs 3501 and 3502, the SCAQMD identified seven environmental topics as having the potential to be adversely affected by the adoption and implementation of the proposed rules. These environmental areas include: air quality, energy, hazards and hazardous materials, hydrology and water quality, noise, public services, and solid/hazardous waste.

An NOP/IS was initially prepared for the proposed project because it was anticipated that a substitute document pursuant to the SCAQMD's certified regulatory program equivalent t an environmental impact report would be necessary. Analysis of the proposed project concluded that no environmental topic area would be significantly adversely affected by the proposed project (see Chapter 2). As a result, this CEQA document for the proposed project is a substitute document equivalent to a negative declaration. Responses to comments received on the original NOP/IS have been prepared and are included in Appendix C.

Throughout this document, references to "proposed project" or "PRs 3501 and 3502" are one in the same and used interchangeably.

LEGISLATIVE AUTHORITY

The California Legislature created the SCAQMD in 1977 (Lewis-Presley Air Quality Management Act, California Health and Safety Code §§ 40400 et seq.) as the agency responsible for developing and enforcing air pollution control rules and regulations in the Basin and portions of the Salton Sea Air Basin and Mojave Desert Air Basin, referred to here collectively as the district. By statute, SCAQMD is required to adopt an AQMP demonstrating compliance with all state and federal ambient air quality standards for the District [California Health and Safety Code §40460(a)]. Furthermore, SCAQMD must adopt rules and regulations that carry out the AQMP [California Health and Safety

Code, §40440(a)]. According to Health and Safety Code §39656, California legislature has delegated authority to the air districts, including the SCAQMD, to establish and implement a program to regulate TACs.

The authority to regulate air pollution in California is divided between the CARB and the local and regional air pollution control districts. Under state law "local and regional authorities have the primary responsibility for control of air pollution from all sources, other than emissions from motor vehicles. The control of emissions from motor vehicles, except as otherwise provided in this division, shall be the responsibility of the State board." (Health & Safety Code §40000.) Locomotives are not motor vehicles. (California Vehicle Code §415(a)). A "vehicle" is "a device by which any person or property may be propelled, moved, or drawn upon a highway, excepting a device moved exclusively by human power or used exclusively upon stationary rails or tracks." (California Vehicle Code §670). Because they do not operate on the highway and because they operate on stationary tracks, locomotives are not "vehicles." Since they are not vehicles, they are under the jurisdiction of the air districts. (Health & Safety Code §40000.) CARB was granted authority to regulate locomotives by Health & Safety Code §43013(b), as amended in 1988. Pursuant to California state law, the air districts retain concurrent authority to regulate nonvehicular sources, including locomotives (Manaster & Selmi, California Environmental Law and Land Use Practice, §41.06 (2)).

For example, California Health & Safety Code §41511 allows the SCAQMD to adopt rules and regulations requiring railroads to gather information regarding their emissions for both criteria and toxic pollutants to determine the amount of such emissions from such source. In general, the air districts may regulate locomotives to prevent endangerment of the public's health (potential health impacts from TACs), public nuisance (annoyance to neighbors) as well as to reduce the emissions of criteria air pollutants in order to achieve and maintain state and federal ambient air quality standards [California Health & Safety Code §41700]. The California Supreme Court has upheld the air districts' authority to regulate toxic air emissions from sources within their jurisdiction (*Western Oil & Gas Assoc. v. Monterey Bay Unified Air Pollution Control Dist*. (1989) 49 Cal. 3rd 408).

CALIFORNIA ENVIRONMENTAL QUALITY ACT

The proposed rules 3501 and 3502 are a "project" as defined by the California Environmental Quality Act (CEQA) (California Public Resources Code §§21000 et seq.). The SCAQMD is the lead agency for the project and is preparing the appropriate environmental analysis pursuant to its certified regulatory program (SCAQMD Rule 110). California Public Resources Code §21080.5 allows public agencies with regulatory programs to prepare a plan or other written document in lieu of an environmental impact report once the Secretary of the Resources Agency has certified

the regulatory program. The Secretary of the Resources Agency certified the SCAQMD's regulatory program on March 1, 1989.

Type of Environmental Assessment

CEQA includes provisions for Program EIRs in connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, including adoptions of broad policy programs, from those prepared for specific types of projects (e.g., land use projects) (CEQA Guidelines §15168). As mentioned earlier, the SCAQMD has a certified regulatory program. This program codified in SCAQMD Rule 110 requires an assessment of anticipated environmental impacts as well as an analysis of feasible methods to substantially reduce any significant adverse environmental impacts (emphasis supplied). To fulfill the purpose and intent of Rule 110 and consistent with CEQA Guidelines §15168, the SCAQMD staff has prepared this Draft PEA to address the environmental areas potentially impacted by the adoption and implementation of the PRs 3501 and 3502.

Consistent with CEQA Guidelines §15168(a)(4) the SCAQMD staff has decided to prepare a PEA for the proposed locomotive idling rules since they are carried out under the same authorizing statutory or regulatory authority having generally similar environmental effects which can be mitigated in similar ways. The proposed locomotive idling rules implement the control measure AT-MBL-09 – Control of Locomotive Idling Emissions in the SCAQMD's Air Toxics Control Plan and as a result are being carried out under the same regulatory authority. Further, as indicated in Chapter 2, the proposed rules have generally similar effects. Accordingly, a PEA is the appropriate document for the proposed project.

The initial evaluation of the proposed project indicated that it had the potential to generate significant adverse environmental impacts. Based on this preliminary evaluation, the SCAQMD concluded that the appropriate CEQA document under the SCAQMD's certified regulatory program was a substitute document for an environmental impact report. Based on this conclusion, an NOP/IS was prepared and circulated for a 30-day public review period on September 15, 2005. One comment letter was received.

Subsequent comprehensive analysis of the proposed project (Chapter 2) concluded that it would not generate significant adverse environmental impacts in any environmental topic area. As a result, the SCAQMD has concluded that the appropriate CEQA document for the proposed project is a substitute document for a negative declaration. Because no significant adverse environmental impacts were identified for the proposed project (Chapter 2), pursuant to CEQA Guidelines §15252(2)(B), neither mitigation measures nor alternatives are proposed or required. Responses to comments received on the NOP/IS have, however, been prepared and are included in Appendix C.

The degree of specificity required in this PEA corresponds directly to the specificity of information available to the SCAQMD staff when analyzing the environmental impacts associated with the implementation and adoption of the proposed locomotive idling rules (CEQA Guidelines §15146). The CEQA Guidelines §15144 recognizes that a draft CEQA document involves some degree of forecasting. While foreseeing the unforeseeable is not possible, the SCAQMD has made its best efforts to discover and disclose all pertinent information that it reasonably can. As a result, some of the environmental impact analyses are general or qualitative in nature. In the instances where specific information was available, the environmental impacts are quantified to the level of detail warranted by the specificity of the information.

All comments received during the public comment period on the analysis presented in the Draft PEA will be responded to and included in the Final PEA. Before making a decision on the proposed locomotive idling rules, the SCAQMD Governing Board must review and certify the PEA as providing adequate information on the potential adverse environmental impacts of the proposed rules.

INTENDED USES OF THIS DOCUMENT

In general, this EA (e.g., CEQA document) is an informational document that informs a public agency's decision-makers and the public generally of the significant environmental effects of a project. A public agency's decision-makers must consider the information in a CEQA document before making a decision on the project. Accordingly, this Draft PEA is intended to: (a) provide the lead agency, responsible agencies, decision makers, and the general public with information on the environmental effects of the proposed project; and, (b) be used as a tool by decision makers to facilitate decision making on the proposed project.

The SCAQMD has also identified the following specific types of intended uses for this EA:

A) A list of the agencies that are expected to use the EA in their decision-making;

B) A list of permits and other approvals required to implement the project; and

C) A list of related environmental review and consultation requirements required by federal, state, or local laws, regulations, or policies.

To the extent that local public agencies, such as cities, county planning commissions, etc., are responsible for making land use and planning decisions related to the proposed locomotive idling rules, they could possibly rely on this PEA during their decision-making process. Similarly, public agencies approving projects at facilities complying with the proposed locomotive idling rules may rely on this PEA.

AREAS OF CONTROVERSY

In accordance with CEQA, the areas of controversy known to the lead agency, including issues raised by agencies and the public, are identified in the EA. Table 1-1 highlights the areas of controversy raised by the public during the comment period for the September NOP/IS.

TABLE 1-1

Areas of Controversy

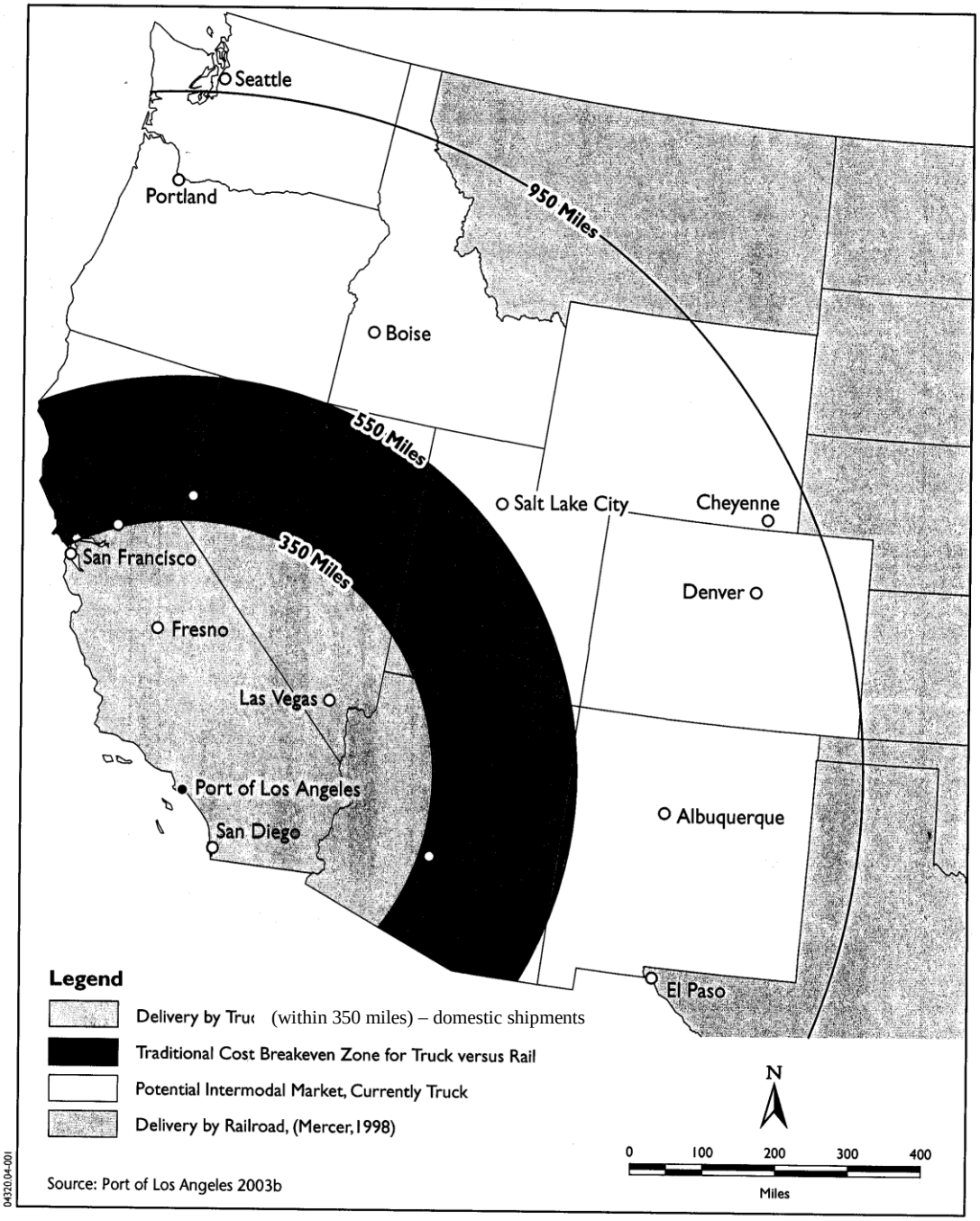
	Area of Controversy	Issues Raised by Stakeholder
1.	Intermodal Shift	To compensate for the increased cost associated with complying with the rule, the railroad industry would pass the cost onto its customers, thus, would risk losing those customers who could transport their freight via heavy-duty trucks causing an increase in emissions and potential impacts to transportation/traffic, utilities/public services and noise.
2.	CNG Usage	By using compressed natural gas (CNG) as an alternative fuel to comply with the emission equivalency option in the PR 3501 and 3502, there could be potential adverse impacts to sensitive receptors from odors and risk of upset due to CNG's explosive and flammable potential.

SCAQMD Evaluation of Intermodal Shift

According to "Port of Los Angeles Portwide Rail Synopsis," intermodal transport of containerized cargo is the standard method of moving goods worldwide accounting for 90 percent of cargo movement. (Port of Los Angeles/Jones & Stokes, July 2004) These containers are delivered outside the boundaries of the Port to both regional and national markets by various combinations of truck or rail transit to their customer or final destination. Taken from the Port study, Figures 1-1 and 1-2 demonstrate that 50 percent of the cargo coming into the Port will travel within the regional market (within 550 miles of the Port) and the remaining 50 percent of cargo is destined for the national market traveling to such cities as Chicago, Atlanta, St. Louis, Memphis, New Orleans, and New York.

According to comments received in the NOP/IS for the proposed project, the Association of American Railroads (AAR) have indicated that AAR customers, "particularly domestic inter-modal freight customers," that any increase in costs will result in the shift in business from rail to truck transport. According to Figure 1-1[3], regional or "domestic" shipments within 350 miles are transported almost exclusively

[3] "Port of Los Angeles Portwide Rail Synopsis" (Port of Los Angeles/Jones & Stokes, July 2004)



Container Delivery Methods, by Distance from Port of Los Angeles

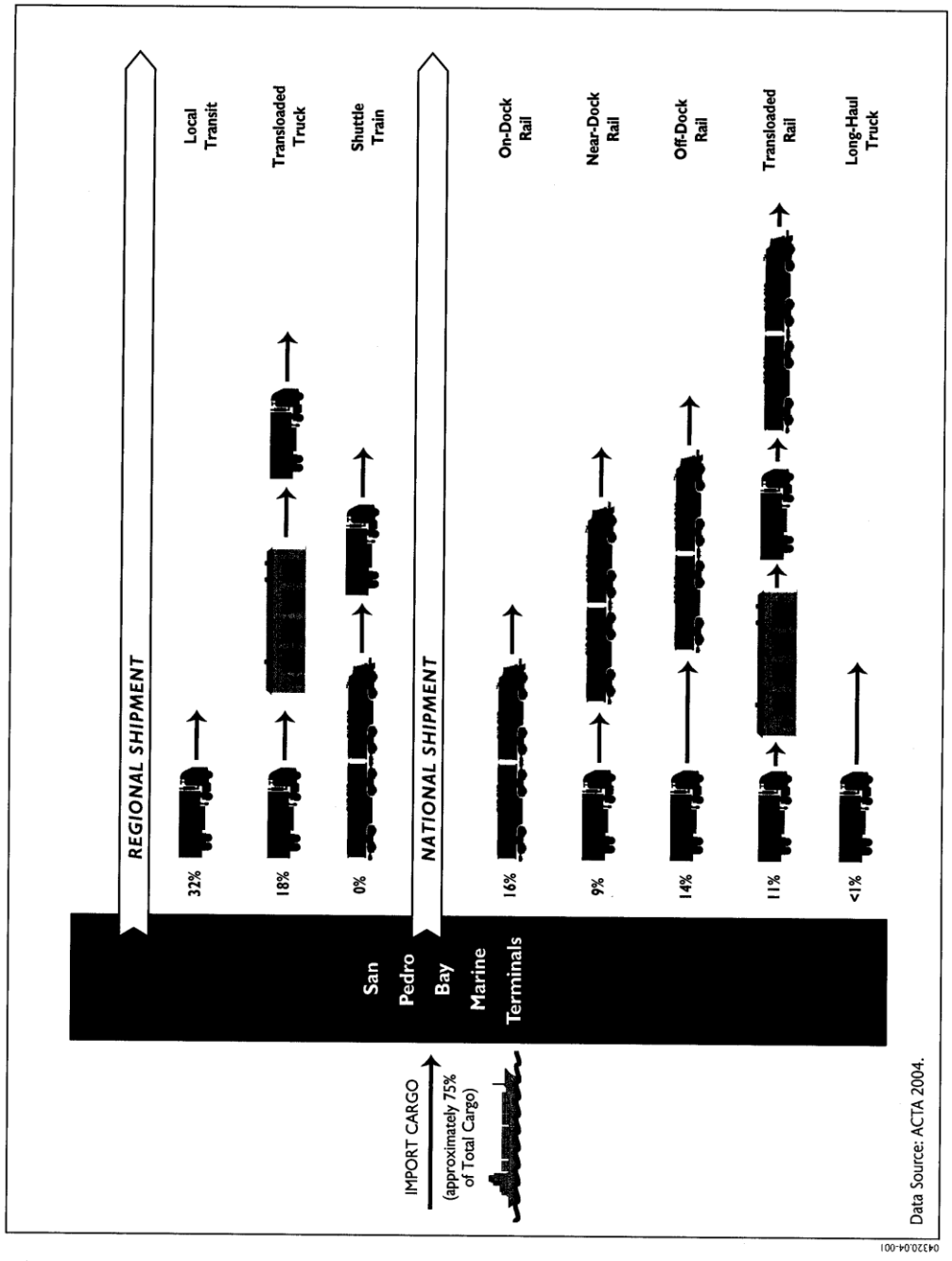
FIGURE 1-1
Modes of Transport within a Range of Distances from the Port of Los Angeles

by truck. Shipments between 350 miles to as far out as 950 miles are transported primarily by delivery truck. Therefore, a shift from "domestic" train to heavy-duty truck is not expected to occur because regional shipments are already being transported by truck. The corporate decision to transport either by truck or train is primarily based on cost and delivery time. It is practical to assume that all cargo, whether it is delivered through the Port or not will be under the same cost and delivery time restraints and, thus, cargo transported around the district and throughout most of California whether it originates through the Port or not, will most likely be delivered using the same transport methods.

For regional/domestic shipments, the method of transport to the known destination relies on a complex decision-making process that takes into account a number of factors. These factors, as illustrated in the Port study (see Figure 1-2), include whether the regional shipment can be delivered directly to the customer via truck (32 percent of total cargo) or transported to an intermediary warehouse where the cargo is unloaded and repacked before delivered by truck to its final destination (18 percent of incoming cargo). According to Figure 1-2, there is currently no regional/domestic train transport of freight so it is not expected that freight shipments would be vulnerable to an intermodal "domestic" shift to truck transport, since all freight transport already occurs by truck. For national shipments, most cargo is already being transported from the port to a train either near-dock (zero to eight miles from Port) or off-dock (eight to 22 miles from Port) or at an intermediary warehouse. It is assumed freight that is not transported through the Port would be shipped by the same methods as described by the Port study. Due to the cost and delivery time of shipping cargo across the country, it is unlikely that these shipments would shift to truck delivery because limiting unnecessary idling should not cause a price increase that cannot be absorbed by the railroad industry. According to industry representatives, there exists an intense competition in the goods movement business so it is unlikely that the locomotive industry would be willing to lose clients to the trucking transport business as a result of price increases that could be internalized. The amount of increased cost that a railroad would be willing to absorb internally before having to transfer those costs onto the customer would depend on the budget and business strategy of the individual railroad company. Such information was not provided by the railroad industry when the broad issue of potential intermodal shift was raised. However, based on the above analysis, this issue is not considered to be a likely outcome from the proposed project.

SCAQMD Evaluation of CNG Usage

SCAQMD does not believe that the operators of locomotives will choose compressed natural gas (CNG) as a feasible alternative option since liquefied natural gas (LNG) is already proven effective in locomotives and is more efficient than CNG.



Rail and Truck Shipment of Port of Los Angeles

FIGURE 1-2

Estimated Percentages of Modes of Transport from Port of Los Angeles

According to the California Energy Commission, LNG is "favored for heavy-duty applications, such as transit buses, train locomotives and long-haul semi-trucks." CNG, on the other hand, is "used in light-duty passenger vehicles, pickup trucks, medium-duty delivery trucks and in transit and school buses."[4] According to Energy Conversions, Inc., a manufacturer of alternative fuel systems for high output engines, "typically for freight locomotives, the preferred natural gas medium is LNG. Due to its density, five times more LNG can be stored in the same size container than CNG, saving space and making refueling less frequent." Accordingly, the locomotive fueled with LNG provides an 800-mile range which "far exceeds the 80-100 mile range that the same tender filled with CNG would provide."[5]

Since switcher locomotives are not as concerned with travel distances as linehaul locomotives and primarily operate within a close distance to a railyard, they could be viable candidates for CNG fuel usage. However, railyard operators that choose to fuel linehaul locomotives with LNG are unlikely to construct a different alternative fueling station to provide CNG to the switcher locomotives because it requires more capital costs, more fuel delivery trips and more employee training. Therefore, the concerns raised by the stakeholder with regards to the future use of CNG and associated impacts from the usage are not anticipated because it is not expected to be a method of compliance with PR 3501 and 3502.

PROJECT LOCATION

PRs 3501 and 3502 would apply to the SCAQMD's entire area of jurisdiction. The SCAQMD has jurisdiction over an area of 10,473 square miles (referred to hereafter as the district), consisting of the four-county South Coast Air Basin (Basin) and the Riverside County portions of the Salton Sea Air Basin (SSAB) and the Mojave Desert Air Basin (MDAB). The Basin, which is a subarea of the SCAQMD's jurisdiction, is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The 6,745 square-mile Basin includes all of Orange County and the nondesert portions of Los Angeles, Riverside, and San Bernardino counties. The Riverside County portion of the SSAB and MDAB is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley. The federal nonattainment area (known as the Coachella Valley Planning Area) is a subregion of both Riverside County and the SSAB and is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east (Figure 1-3).

[4] California Energy Commission website (http://www.consumerenergycenter.org/transportation/afv/naturalgas.html)
[5] Energy Conversions Inc. website (http://www.energyconversions.com/tender.htm)

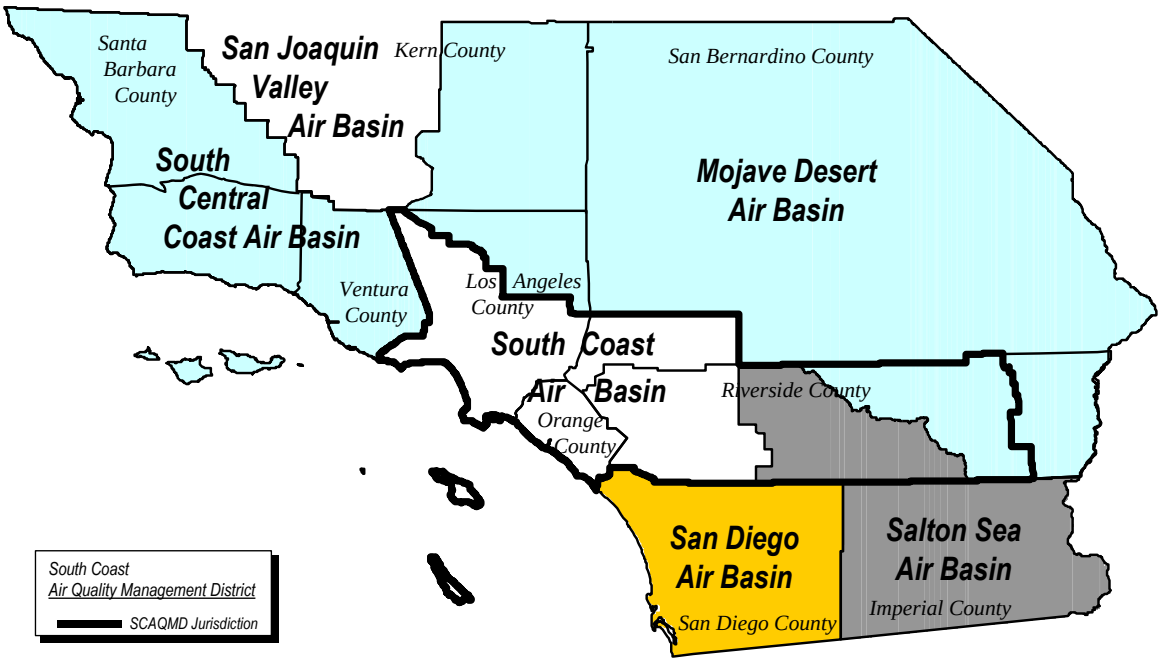


FIGURE 1-3

South Coast Air Quality Management District

PROJECT BACKGROUND

Other Railroad Regulatory Strategies

CARB MOUs

CARB staff developed a Memorandum of Understanding (MOU) with The Burlington Northern and Santa Fe Railway Company (BNSF) and Union Pacific Railroad Company (UP) and the United States Environmental Protection Agency (U.S. EPA) that was signed in July 1998. The MOU includes provisions for early introduction of clean units, with requirements for a fleet average in the Basin equivalent to U.S. EPA's Tier 2 locomotive standard by 2010.

In June 2005, CARB staff developed a statewide agreement with BNSF and UP that establishes a PM emissions reduction program at California railyards. Under this

agreement, the railroads would reduce locomotive idling by installing idling-reduction on their intrastate locomotive fleets. In addition, the railroads agreed to develop inventories of diesel emissions with CARB, in turn, conducting health risk assessments for most railyards statewide.[6] SCAQMD's proposed railroad regulations include more stringent anti-idling requirements and expand the applicability to interstate locomotives operating in the district.

Rule 3503

The SCAQMD initially proposed four railyard rules as a project for adoption by the SCAQMD Governing Board, but has now closely considered whether the contents of the four rules are so intimately related that joint consideration is necessary. Based on that evaluation, staff determined that Rule 3503 - Emissions Inventory and Health Risk Assessment for Railyards, which was approved by the SCAQMD's Governing Board on October 7, 2005, should be proposed separately. The requirements of Rule 3503 are independent of the other railroad rules, and Rule 3503 serves information-gathering and information-disseminating purposes that are quite distinct from the purposes and requirements of each of the proposed rules considered in the PEA. Rule 3503 will serve those independent, information-related purposes whether or not any other rules are adopted.

Rule 3503 is an information-gathering and information-disseminating rule that requires railroads to provide an emissions inventory and prepare a health risk assessment to estimate cancer risk, chronic and acute hazard indices, as well as cancer burden caused by emissions at railyards. In addition, Rule 3503 requires public notification if the approved health risk assessment exceeds a risk threshold level specified in the rule.

Information gathered by this rule may or may not be used in future rulemaking. At this time it is uncertain if Rule 3503 will result in future actions since no related activities have been approved, adopted or funded. Accordingly, Rule 3503 was found to be exempt from CEQA pursuant to the categorical exemption for information collection. CEQA Guidelines §15306 exempts information-gathering either for its own sake or as part of a study leading to future action which the agency has not yet taken. Further, Rule 3503 consists of basic data collection, research and resource evaluation activities and cannot result in a serious or major direct or indirect disturbance to an environmental resource.

Proposed Rule 3504

PR 3504 was also one of four railyard rules originally announced together for adoption by the Board. Based on comments from the regulated industry, the SCAQMD is withdrawing PR 3504 at this time. The decision to proceed with PR 3504 will likely be

[6] CARB/Railroad Statewide Agreement, Particulate Emission Reduction Program at California Railyards, 2005

based upon information collected through implementation of Rule 3503. In the adopting resolution for Rule 3503, the SCAQMD Governing Board "directs staff to return with a report summarizing information submitted pursuant to Proposed Rule 3503 and staff's recommendation whether to proceed with a risk reduction rule." If SCAQMD staff resumes work on PR 3504, the rule will undergo the appropriate CEQA analysis. At present, it is not possible to determine what will be the environmental effects of PR 3504 since it is uncertain if the SCAQMD staff will proceed with development of PR 3504 and if so, what the proposed rule will require; therefore any attempt at analysis would be speculative. CEQA Guidelines §15145 states that if "a lead agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact."

Criteria Pollutants

Beside diesel particulate matter, locomotives are significant sources of NOx, a precursor of PM2.5, PM10, and ozone. Since the district is designated nonattainment for these three pollutants, SCAQMD is responsible for reducing PM and NOx emissions, as well as toxic diesel particulate emissions for sources over which it has jurisdictional authority to regulate. The 2003 AQMP emission inventory for locomotives shows NOx emissions of 36.52 tons per day and PM10 emissions of 1.01 tons per day. VOC, CO, SOx, and PM2.5 emissions are estimated to be 1.82, 6.42, 3.25, and 0.93 tons per day, respectively.[7] NOx and VOC are the primary contributors to ozone formation. In addition, NOx and PM affect visibility.

Toxic Air Contaminants (TACs)

Diesel PM as TAC

Diesel PM is listed by CARB as a TAC and has the potential to cause cancer in humans. Long-term exposure to diesel PM poses the highest cancer risk of any toxic air contaminant evaluated by the Office of Environmental Health Hazard Assessment (OEHHA). The second Multiple Air Toxics Exposure Study (MATES-II), released by the SCAQMD in 2000, shows that approximately 70 percent of the cancer risk from air toxics in the Basin is due to diesel PM. Exposure to diesel exhaust can irritate the eyes, nose, throat and lungs and can cause coughs, headaches, light-headedness, and nausea. In addition to cancer risks, exposure to diesel PM has been shown to increase susceptibility to allergens, such as dust and pollen and can aggravate chronic respiratory problems such as asthma. Diesel engines are major sources of fine particle pollution and can especially affect sensitive people, such as the elderly and people with emphysema, asthma, and chronic heart and lung disease. Children, whose lungs and respiratory

[7] South Coast Air Quality Management District, 2003 Air Quality Management Plan: Appendix III – Base and Future Year Emission Inventories.

systems are still developing, are also more susceptible than healthy adults to fine particles because they have a higher breathing rate. Exposure to fine particles in general is associated with increased frequency of illness and reduced growth in lung function in children.

Studies on diesel exhaust have focused on non-cancer health effects from short-term and long-term exposure, reproductive and developmental effects, immunological effects, genotoxic effects, and cancer health effects.[8] Overall, there are insufficient data to show short- or long-term non-cancer health effects and the available literature did not determine whether exposure to diesel exhaust causes reproductive, developmental, or teratogenic effects in humans. In terms of immunological effects, studies show that diesel exhaust exposure increases antibody production and causes localized inflammation of lung and respiratory tract tissues, particularly when exposure accompanies other known respiratory allergens. Diesel exhaust particles and diesel exhaust extracts have been determined to be genotoxic and may be involved in initiation of human pulmonary carcinogenesis. In terms of cancer health effects, over 30 epidemiological studies have investigated the potential carcinogenicity of diesel exhaust[3]. The National Institute of Occupational Health and Safety recommended in 1988 that diesel exhaust be regarded as a potential occupational carcinogen based on animal and human evidence. The Health Effects Institute (1995) and the World Health Organization (1996) also evaluated the carcinogenicity of diesel exhaust and found the epidemiological data to show associations between exposure to diesel exhaust and lung cancer[3].

In 2001, OEHHA identified diesel PM as one of the TACs that may cause children or infants to be more susceptible to illness pursuant to the requirements of Senate Bill 25 (Stats. 1999, ch. 731). Senate Bill 25 also requires CARB to adopt control measures, as appropriate, to reduce the public's exposure to these special TACs [California Health & Safety Code §39669.5].

Air Toxics Control Plan

The concept for an Air Toxics Control Plan is an outgrowth of the Environmental Justice (EJ) principles and EJ Initiatives adopted by the Governing Board in October 1997. Extensive air monitoring under EJ Initiative #2 (Multiple Air Toxics Exposure Study, MATES II) and work under EJ Initiatives #7 (create incentives to clean-up or remove diesel engines in the Basin) and #10 (related to toxic rules for new and existing sources) highlighted the need for a systematic approach to reducing air toxic emissions.

In particular, based on the results from the MATES II study (see below), the SCAQMD concluded that reducing air toxic emissions from stationary sources alone would not be

[8] California Environmental Protection Agency, Air Resources Board and Office of Environmental Health Hazard Assessment, 1998. Executive Summary for the "Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant."

sufficient to address cumulative or localized toxic impacts. As a result, the SCAQMD worked with industry, environmental groups, local government, other agencies, and the public to design and conduct a systematic and integrated approach, similar to that conducted for criteria pollutants (e.g., ozone or particulates) that addresses emissions at multiple levels. The MATES II results indicate that ambient air toxic concentrations in southern California can be further reduced to protect public health.

The Air Toxics Control Plan (ATCP) adopted by the SCAQMD's Governing Board on March 17, 2000 provides guidance for reducing air toxic levels in the Basin over the following ten years. The ATCP reviewed the current air toxic levels and key toxic pollutants that contribute to the overall risk levels. It projected the future air toxics levels taking into consideration existing federal, state, local programs that potentially affect air future toxic emissions, including implementation of the AQMP. The control strategy proposed in the ATCP went beyond the ongoing toxics reduction efforts and identified control measures that are currently feasible or will be feasible over the ten years following adoption. The ATCP, in conjunction with other emission reduction programs, has resulting in significant reductions in air toxics risks from both mobile and stationary sources.

Air toxics controlled under the ATCPinclude diesel particulate, certain criteria pollutants and their related toxic compounds (e.g. benzene, 1,3 butadiene, polyaromatic hydrocarbons, etc.), and specific non-VOCs, such as perchloroethylene and hexavalent chromium. The design criteria employed in developing the control strategies were:

- to integrate and maximize concurrent emission reduction opportunities for both criteria and air toxic pollutants;
- to promote pollution prevention/elimination technologies;
- to address both regional and localized toxic exposures;
- to seek compliance flexibility to the extent feasible, and to streamline compliance requirements among various regulatory agencies; and
- to minimize adverse socioeconomic impacts while protecting public health.

Development of these strategies represented a comprehensive approach designed to further reduce air toxic emissions in the SCAQMD's jurisdiction. This approach consisted of early action measures that that had been developed, as well as mobile and stationary control strategies to be developed and implemented over the ten years following the adoption of the ATCP. Early action measures that the SCAQMD has identified as implementable based on current technically feasible technologies included:

- Fleet conversion of on-road vehicles (the fleet vehicle rules and amendments to Rule 431.2 amended September 15, 2000);

- Amend Rule 1401 for new and modified sources of air toxics (Amended August 18, 2000);
- Amend Rule 1402 for existing sources of air toxics (Amended March 17, 2000); and
- Further reductions from gasoline dispensing facilities (Rule 461 amended April 21, 2000).

Other mobile source reduction strategies identified in the ATCP to potentially be implemented in the remaining five years include:

- Control of diesel particulates through aftertreatment;
- Control of diesel particulate through engine design modifications;
- Alternatively fueled engines;
- Goods movement;
- Emission reductions from diesel engine idling;
- Locomotive operations;
- Commercial motor boats, ships, and barges;
- Mitigation of emissions at airports;
- Reduction of TACs from gasoline-powered engines through the use of catalyst; and
- Mobile source NOx emission reduction credit program.

Therefore, based on the SCAQMD's preliminary finding that diesel particulate is the primary toxic air pollutant in the SCAQMD's jurisdiction, coupled with CARB's listing of diesel exhaust as a TAC, the locomotive idling rules is a step toward reducing toxic diesel exhaust from locomotives in addition to reducing criteria pollutant emissions such as NOx. The proposed project is one of many measures in the SCAQMD's comprehensive ATCP to reduce toxic air pollution from both mobile and stationary sources. Other programs to reduce diesel emissions include SCAQMD grant programs that cover the additional costs of converting or replacing conversion of diesel equipment to clean fuels.

Multiple Air Toxics Exposure (MATES II) Study

The objectives of the MATES II study were to monitor and evaluate urban air toxics, as well as update the toxics emission inventories for the Basin and conduct air toxic dispersion modeling to simulate and confirm the monitored data. The study represented one of the most comprehensive air toxics programs ever conducted in an urban environment. The scope of the study included the monitoring of more than 30 toxic air pollutants at 24 sites over a one-year period. The SCAQMD collected more than 4,500

air samples and together with the CARB performed more than 45,000 separate laboratory analyses of these samples.

In March 2000, the SCAQMD issued a Final Report for the MATES II study. The findings of the MATES II study indicated that the cancer risk from some air toxics in the SCAQMD's jurisdiction has declined by as much as 75 percent over the last decade. However, it also showed that based upon more extensive monitoring of the variety of toxic compounds in the air, the current cancer risk from toxic air pollution averages about 1,400 in a million in the Basin. The study found that 71 percent of this cancer risk is attributable to diesel particulate. Other important toxic species contributing significantly to this cancer risk, originating from both gasoline- and diesel-powered mobile sources as well as stationary sources, are 1,3 butadiene (eight percent of risk), benzene (seven percent of risk), and carbonyls which include formaldehyde and acetaldehyde (three percent of risk)[9].

Railyard Cancer Risks

In 2004, CARB conducted a study at the Union Pacific J. R. Davis railyard in Roseville, California. According to the "Roseville Railyard Study" (October 14, 2004), diesel PM emissions from locomotive operations were estimated to be about 25 tons per year, or approximately 0.07 ton per day in 2000. Locomotive idling accounted for ten tons per year of diesel particulate at the Roseville yard amounting to approximately 45 percent of the total diesel PM emissions from the railroad operations at the facility. Average spatial cancer risk from the diesel particulate emissions at the facility from the study is outlined in Table 1-2.

TABLE 1-2

Railyard Average Spatial Cancer Risk from Roseville Study

Location to Railyard (surrounding acre area)	**Maximum Off-Site Cancer Risk** (in one-million)	**Human Population**
Adjacent	900-1000	---
40	500-1000	---
700-1600	100-500	14,000 – 26,000
46,000 – 56,000	10-100	140,000 – 155,000

The cancer risks from railyards in the Basin are not known. On October 7, 2005, the SCAQMD's Governing Board adopted a Rule 3503 that requires freight railroads to quantify emissions and health risks at railyards in the district. The railroads have issued Proposition 65 notices[10] with respect to emissions from seven railyards within the Basin.

[9] The remaining 11 percent of the risk is attributable to other TACs.

[10] Prop. 65 Warning published in Los Angeles Times on September 15, 2004 for diesel exhaust from railroad operations.

In addition, based on CARB's health risk assessment for the railyard in Roseville, the size of railyards in the Basin, and proximity of these railyards to nearby residents, the SCAQMD believes that the cancer risk from railyards in the Basin may pose health risks to a considerable number of persons significantly greater than the action risk level (25 in a million) and public notification level (10 in a million), which are applicable to traditional stationary sources.

Background on Locomotives

Locomotives and Locomotive Activity

Railroads are used to move more than 40 percent of the freight transported in the United States, on a ton-miles basis.[11] In 2002, there were 554 railroads in the United States, operating on approximately 142,000 miles of track.[12] During this same period, 30 freight railroads operated over approximately 5,900 miles of track in California.[13] Two freight railroads with operations in California, BNSF and UP, are categorized as Class I railroads by the U.S. Department of Transportation, Surface Transportation Board. Class I railroads are those with operating revenues of at least $250 million (49 CFR Part 1201 Subpart A) and primarily transport freight rather than passengers. The remainder of the railroads operating in California are classified as regional railroads (non-Class I line-haul railroads operating 350 or more miles of track and/or with revenues of at least $40 million), local railroads (railroads which are neither Class I nor a regional railroads and engaged primarily in line-haul service), or switching and terminal railroads (non-Class I railroads engaged primarily in switching and /or terminal services for other railroads). PRs 3501 and 3502 are designed to regulate Class I freight railroads as well as switching and terminal railroads.

There are currently four railroads with operations in the district, consisting of the two Class I freight railroads (BNSF and UP) and two switching and terminal railroad (Pacific Harbor Line, Inc. (PHL)) and Los Angeles Junction Railway (LAJ) which is owned by BNSF. CARB estimates that BNSF and UP operate approximately 240 locomotives exclusively in the district, while LAJ and PHL operate approximately 25 locomotives exclusively in the district,[14] thus an estimated total of 265 intra-district locomotives would be subject to PRs 3501 and 3502. Intra-district locomotives are generally switchers and road switchers that are dedicated within or between railyards. These locomotive are generally about 1500 horsepower.

[11] Association of American Railroads, 2004, Overview of U.S. Freight Railroads.

[12] Association of American Railroads, 2004, Railroad Service in the United States – 2002

[13] Association of American Railroads, 2004, Railroad Service in California – 2002.

[14] California Environmental Protection Agency, Air Resources Board, 2004, Staff Report: Initial Statement of Reasons – Public Hearing to Consider Proposed Regulatory Amendments Extending the California Standards for Motor Vehicle Diesel Fuel to Diesel Fuel Used in Harborcraft and Intrastate Locomotives.

Line-haul locomotives operating in the district would also be subject to PRs 3501 and 3502 requirements. The Class I freight railroad line-haul operations are both interstate and intrastate and do not operate exclusively in the district. Table 1-3 provides an estimate of interstate locomotives operating in the district including containership that passes through the ports within the district. This information was derived from a number of sources including the Association of American Railroads and the U.S. Department of Transportation's Bureau of Transportation Statistics and based on freight carried within California.

TABLE 1-3

Interstate and Interdistrict Locomotives Operating in the District

Approximate Number of Locomotives in U.S.	Approximate Number of Locomotives in Interstate	Approximate Number of Locomotives in Interdistrict
13,500	2,200	1,900

The proposed rules apply to locomotive owned and operated by Class I freight railroads that are used in and around railyards and on the main line. As listed in Table 1-4, there are 19 known railyards operated by the four railroads in the district affected by the proposed rules that serve Class I and switching and terminal railroads. A map of the location of the 19 railyards, as denoted by the dots, can be found in Figure 1-4 along with the network of railroad tracks used by the affected railroads. Figure 1-4 does not show sidings, which is a second track where a train idles to allow a second train to pass safely before proceeding.

TABLE 1-4

Name and Location of 19 Railyards in the SCAQMD Jurisdiction

Railyards where Affected Freight and Switcher Locomotives Could Idle and Fuel	Location of Railyard
Anaheim Yard	200 S. Adams Street, Anaheim, CA 92802
City of Industry Yard	17225 Arenth Street, City of Industry, CA 91748
Colton Yard	19100 Slover Avenue, Bloomington, CA 92316
Commerce Diesel Maintenance Facility	6300 Sheila Avenue, Commerce, CA 90040
Commerce Eastern Intermodal Facility	2818 Eastern Avenue, Commerce, CA 90040
Commerce Intermodal Facility	4341 E. Washington Blvd, Commerce, CA 90023
Dolores Yard	2442 Carson Street, Carson, CA 90810
Intermodal Container Transfer Facility	2401 Sepulveda Blvd, Long Beach, CA 90810
La Mirada Yard	14503 Macaw Street, La Mirada, CA 90638
Los Angeles Intermodal Facility	3770 Washington Blvd, Commerce, CA 90023

TABLE 1-4 (CONCLUDED)

Name and Location of 19 Railyards in the SCAQMD Jurisdiction

Railyards where Affected Freight and Switcher Locomotives Could Idle and Fuel	Location of Railyard
Los Angeles Junction Railway	4433 Exchange Ave, Los Angeles, CA 90058
Los Angeles Transportation Center Intermodal Facility	750 Lamar Street, Los Angeles, CA 90031
Meade Yard	2402 Anaheim Street, Wilmington, CA 90744
Mira Loma Auto Distribution Facility	4500 Etiwanda Avenue, Mira Loma, CA 91752
Montclair Yard	10773 Central Place, Montclair, CA 91763
Pacific Harbor Lines	340 W. Water Street, Wilmington, CA 90744
Pico Rivera Yard	7427 Rosemead Blvd, Pico Rivera, CA 90660
San Bernardino Yard	1535 W. 4th Street, San Bernardino, CA 92411
Watson Yard	1302 Lomita Blvd, Wilmington, CA 90744

Idling Behavior

Based on U.S. EPA's estimates,[15] line-haul locomotives idle for approximately 40 percent and switch engines idle for approximately 60 percent of the time they are operating. Table 1-5 shows characteristics of Class I freight or linehaul locomotives and switchers or terminal locomotives. The reasons for the continuous operation of the engine include: reducing the delay of restarting the engine and maintaining water temperature, battery voltage and brake system air pressure. In addition, locomotives provide auxiliary power to maintain heating and cooling for the crew onboard. However, there are also occasions idling is not essential to the rail operations such as extended idling due to crew change, personal breaks, etc. Idling burns fuels, creates criteria pollutant and toxic air emissions, noise, engine wear and complaints from surrounding communities.

The main train routes of UPPR and BNSF in the district are provided in Figure 1-4 (denoted by the various lines). Idling activity could take place along those tracks on the main line, sidings, at facility spurs, and in and around railyards. Such idling activity would be subject to the provisions of PR 3501 and 3502.

Locomotive Emissions Testing

SCAQMD staff hired consultants to conduct emissions testing to ensure that the idling restrictions in PR 3502 do not inadvertently create greater emissions during start-up than would occur if the train continued to idle.

[15] U.S. Environmental Protection Agency, Emission Standards for Locomotives and Locomotive Engines; Final Rule, April 16, 1998

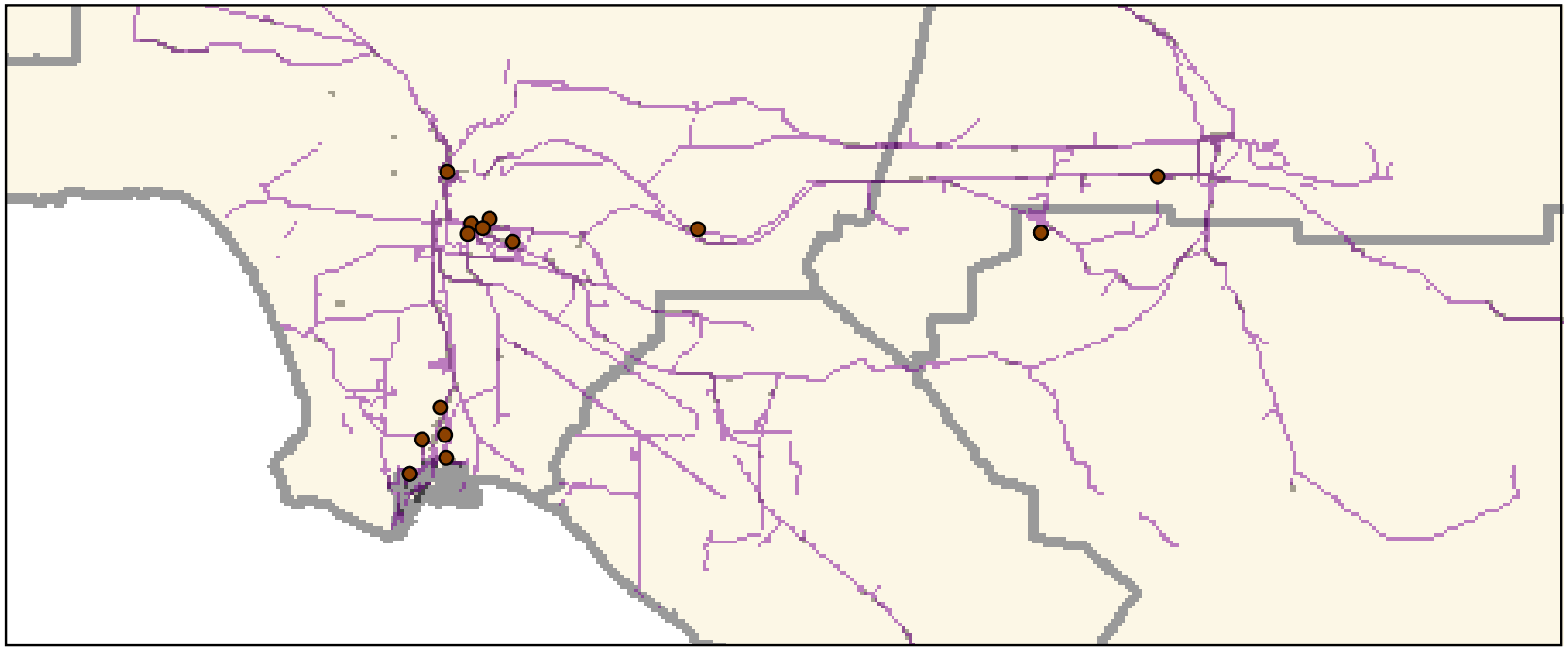


FIGURE 1-4

Map of the Location of 19 Railyards and Class I Railroad Routes in the SCAQMD Jurisdiction

TABLE 1-5

Locomotives and Locomotive Activity in Southern California

Type of Locomotive Regulated by PR 3501/3502	Purpose	Typical Freight Location Origins	Typical Transport Route	Where Does Idling Take Place?
Linehaul	A self-propelled piece of on-track equipment designed to carry freight or other equipment and transport it to a given location. Linehauls operate long distances, traveling to both intrastate and interstate locations. Because they travel outside the state of California, linehaul locomotives could be fueled outside the state and not fueled with California diesel.	1. Port of Los Angeles 2. Port of Long Beach 3. Intermediary warehouses 4. Railyards 5. Location outside the district	1. From the port directly to a national location 2. From a near-dock location to a national location 3. From an off-dock location to a national location 4. From an intermediary warehouse/railyard to a national location 5. From an origin outside the district to a private facility spur, warehouse (to be trucked locally), railyard or port.	1. Ports (on-or off-dock) 2. Railyards 3. Intermediary warehouse 4. Sidings (where trains reside while another trains passes on shared tracks) 5. Spurs at private customer's local facilities.
Switch or Terminal	"Switching" is the process of moving railcars from one track to another. Switch locomotives are a wheeled vehicle consisting of a self-propelled engine used to draw trains along railway tracks that assist with the movement and positioning of the freight locomotives traveling beyond the railyard. Yard switchers function solely within the railyard. A terminal is a facility provided by a railway or an intermediate point on its line for the handling of freight; for the breaking up, making up, forwarding and servicing trains; and interchanging cargo with other carriers.	n/a (yard switchers only operate within the railyard or terminal but road switchers may travel a short distance outside the railyard)	n/a (yard switchers only operate within the railyard or terminal but road switchers may travel a short distance outside the railyard)	1. Within a railyard 2. Within a terminal 3. Ports 4. Warehouses 5. Sidings 6. Spurs

In addition, another consultant was hired to conduct sound tests to compare noise levels between engine start-up and engine idling periods.

On July 8, 2005, the SCAQMD Governing Board approved the awarding of a contract to Southwest Research Institute (SwRI), an independent nonprofit applied research and development organization, to conduct engine testing at start-up and during idling of a locomotive to measure locomotive start-up and idling emissions. SwRI has performed over 120 locomotive exhaust emission tests at the Locomotive Technology Center (LTC) on projects for the U.S. EPA, CARB, original equipment manufacturers, engine component suppliers, the American Association of Railroads (AAR), and for individual railroads. The LTC provides a centralized location, direct access to a Class 1 main line, two U.S. EPA certification-capable locomotive emissions test tracks, and a full-time professional staff with extensive experience in locomotive exhaust emissions testing. SwRI has experience in measuring emissions from the large variety of in-use locomotives, from low-power switchers with multiple exhaust stacks and requiring an external load grid, to today's new production, electronically-controlled U.S. EPA Tier 2 locomotives.

SwRI, in cooperation with SCAQMD staff, finalized a test procedure to be used in this project, which specified locomotive models evaluated, the locomotive test procedure and test cycle, testing equipment to be used, and duration of testing. SwRI conducted emissions testing on two locomotives. One locomotive provided by UP was an EMD MP15AC, 1500 Hp, 2 stroke, 12 cylinder, 645 series engine, and the second locomotive provided by BNSF was a GE XXX. SwRI tested start-up and idling emissions of PM, NOx, CO, and hydrocarbons to compare start-up relative to idling emissions. The testing used specially designed test procedures to measure start-up emissions, since start up emissions testing does not have an accepted test procedure protocol. Following the testing phase, SwRI analyzed the data.

In addition to the SwRI study on locomotives, the SCAQMD funded another separate locomotive testing project conducted in November 2005, by Engine, Fuel, and Emissions Engineering, Inc. (EF&EE; http://www.efee.com/Our%20Company.htm) on two locomotives owned by Metrolink. The two locomotives (EMD SD 60, 3800 Hp, 2 stroke, 16 cylinder, 710 series engine; EMD F40, 3000 Hp, 2 stroke, 16 cylinder, 645 series engine), were tested using EF&EE's Ride-Along Vehicle Emission Measurement (RAVEM) System. Based upon data results from the Start-up and Idling Emissions from Two Locomotives, Draft Final Report, November 20, 2005 (Appendix E of this Draft PEA), one can ascertain that eight minutes after terminating idling a locomotive, air quality benefits begin to accrue. Based on these data, idle shutdown periods longer than about eight minutes, followed by a start-up-idle event, result in reduced emissions; the longer the shutdown, the more substantial the emission benefits based upon the idle emission rates. The data were evaluated to

estimate the amount of time locomotives can idle before generating emissions equivalent to a start-up event. In general, the test results exhibited a trend of emissions during start-up increasing sharply for a short duration, and then lowering from slightly elevated levels above idle to stabilized idle levels over approximately 30 minutes. The results from the locomotive tests show that the increase in emissions from a locomotive restart after one-half-, one-, two- and four-hour shut-down periods exhibited a spike in emissions for a period of less than three minutes. In most cases the spike lasted less than 15 seconds, at the beginning of the test, thereafter, the emission rates moved to levels that would be exhibited by a stabilized idling situation. Conservatively, looking at the emissions data shows that emissions due to start-up in relationship to stabilized idling mode are very low (i.e., start-up emissions would contribute very little to the overall emission when compared with stabilized idling). Therefore, discontinuing locomotive idling, even when combined with a start-up procedure whenever needed for work or for operational requirements, still provides an air quality benefit.

PROJECT OBJECTIVES

This section describes the objectives of the proposed project. The statement of objectives should include the underlying purpose of the proposed project. The objectives of PRs 3501 and 3502 include the following:

1. Implement the control measure AT-MBL-09 – Control of Locomotive Idling Emissions in the SCAQMD's ATCP.
2. Reduce emissions from locomotive idling.
3. Reduce public exposure to emissions from locomotive idling.
4. Improve estimates of idling emissions and identify opportunities to reduce idling.

PROJECT DESCRIPTION

The basic components of PRs 3501 and 3502 are listed in Table 1-6. The rules apply to Class I freight railroads and switching and terminal freight railroads that operate locomotives in the district. Passenger railyards operating in the District, such as Amtrak and Metrolink, would be excluded from the requirements of PR 3502 based on a preliminary data analysis indicating that they contribute less than ten percent of NOx and PM emissions from rail operations. Passenger railyard operations are sufficiently different than freight yards because they are characterized by very little, if any, switching and cargo handling activities, in addition to considerably lower traffic volumes. In addition, in most cases commuter rail has the right away over

freight locomotives. Also, passenger railroads operate on a more predictable schedule such that crew changes and breaks can occur at specified time periods and locations to avoid delays and idling associated with such activities. Due to their lower emissions, passenger railyard operations pose proportionally lower health risks than freight railyards. However, the SCAQMD will continue to evaluate passenger rail operations and idling. If warranted, passenger operations may be considered in the future. For complete versions of PRs 3501 and 3502, the reader is referred to Appendix A of this Draft PEA.

TABLE 1-6

Proposed Rules 3501 and 3502 Requirements

	Proposed Rule 3501	**Proposed Rule 3502**
Purpose	• Record idling events. • Evaluate idling related emissions • Evaluate potential areas where idling can be limited and emissions reduced.	• Minimize emissions from unnecessary idling of locomotives.
Applicability	• Class I freight railroads and switching and terminal freight railroads that operate locomotives in the district.	• Class I freight railroads and switching and terminal freight railroads operating in the district.
Definitions	• Alternative Technology • Anti-Idling Device • Class I Freight Railroad • District • Engaged • Foreign Power • Idle or Idling or Idling Event • Interdistrict Locomotive • Intradistrict Locomotive • Locomotive • Locomotive Identifier • Operator • Railroad • Switching and Terminal Railroad • Tamper or Tampered With • Uncontrolled Interdistrict Locomotive Fleet and Uncontrolled Intradistrict Locomotive Fleet and	• Anti-Idling Device • Class I Freight Railroad • Controlling or Lead Locomotive • District • Emergency • ~~Engaged~~ • Idle or Idling or Idling Event • Locomotive • Locomotive Consist • Locomotive Engine • Maintenance or Diagnostic Purposes • Operator • Railroad • Switching and Terminal Railroad • Tampered or Tampering • Trailing Locomotive • Unattended Locomotive

TABLE 1-6 (CONTINUED)

Proposed Rules 3501 and 3502 Requirements

	Proposed Rule 3501	Proposed Rule 3502
Rule Requirements	• Keep record of each idling event longer than 30 minutes (6 months after rule adoption) • Provide reason for idling event if over two hours. • Maintain recordkeeping for a period not less than two years. • Submit record of idling events occurring over last seven days. • Submit annual report providing inventory information for each locomotive operated in the District; may be sent via e-mail, storage media or U.S. Mail. • Weekly reports shall be sent via e-mail.	On and after (6 months after rule adoption): • An operator shall not idle a lead locomotive for more than 30 minutes for specific reasons such as changing of crew, queuing for fueling, or conducting diagnostic or maintenance. • An operator of an unattended locomotive not equipped with an anti-idling device shall not idle a trailing locomotive for more than 30 minutes for specific reasons such as a failure or breakdown of the locomotive. • An operator shall not move a locomotive for the sole purpose of preventing an idling event.
Requirements for Plans	• In lieu of complying with rule requirements, submit alternative compliance plan within 90 days before intended use. • Plan will be approved or disapproved 90 days after submittal. • Baseline emissions from alternative technology based on applicable U.S. EPA emissions tiers. • If disapproved, operator can appeal to Hearing Board and if denied, revised plan with corrected deficiencies should be resubmitted within 90 days of the Hearing Board's decision.	• Submit emission equivalency plan within 90 days of its intended use. • Emission equivalency plan will be approved or disapproved 90 days after submittal. • If disapproved, operator can appeal to Hearing Board and if denied, revised plan with corrected deficiencies should be resubmitted within 90 days of the Hearing Board's decision.
Fees	• Plan submittal subject to Rule 306 – Plan Fees	• The emission equivalency plan submittal subject to Rule 306 – Plan Fees
Penalties	• Failure to comply with requirements of the rule or of the plan is subject to penalties under Health and Safety Code §42400 et seq.	• Failure to comply with requirements of the rule or of the plan is subject to penalties under Health and Safety Code §42400 et seq.

TABLE 1-6 (CONCLUDED)

Proposed Rules 3501 and 3502 Requirements

	Proposed Rule 3501	Proposed Rule 3502
Exemptions	• Locomotives are exempt from rule requirements if equipped with: o anti-idling device limiting idling time to below 15 minutes o alternative technology • Railroads submitting and implementing an approved Alternative Compliance Plan are exempt from submitting idling, monitoring and reporting plans, and recording idling events.	• Exempt from requirements if: o locomotive is being used in an emergency; o ambient temperatures are 40 degrees Fahrenheit or lower; o idling needed to maintain battery charge to start engine; o implementing an approved emission equivalency plan.

METHODS OF COMPLIANCE

PR 3501 requires recordkeeping and reporting for locomotives idling. PR 3502 prohibits unnecessary idling activity for more than 30 minutes under specific situations unless an equivalent emissions plan is approved. To achieve emission equivalency, the owner/operator will need to use a control technology that will reduce NOx and PM emissions from the locomotive. Table 1-7 outlines the various achieved-in-practice compliance options that are currently available. Since the emission equivalency plan is a compliance option as an alternative to directly complying with the idling requirements, control equipment or alternative technologies currently being developed or tested but not achieved in practice are not considered viable strategies for compliance at this time and will not be further analyzed in Chapter 2.

TABLE 1-7

Compliance Options Depending on Locomotive Type

Type of Locomotive	Compliance Options
Freight/Linehaul (Class 1)	• Idling requirement / Anti-idling device set at 15 minutes • LNG alternative fuel • Ultra-Low Sulfur diesel fuel • Emulsified diesel alternative fuel
Switchers	• Idling requirement • Hybrid “Green Goat” Technology • LNG alternative fuel • Ultra-Low Sulfur diesel fuel • Emulsified diesel alternative fuel

Anti-Idling Devices

Anti-idling devices are designed to automatically shut down the main internal combustion engine on the locomotive after specified time period when specific parameters such as engine water temperature, ambient temperature, battery voltage, etc. are at acceptable levels, and will restart the engine when one or more of the parameters are not met. The process occurs with the assistance of a software/hardware package that controls the activity of the engine when meeting these conditions. The anti-idling device must be engaged where parameters such as the brakes are properly set, etc., so the anti-idling device can automatically start and stop, and to ensure a safe working environment. Some systems use audible and visual alarms to alert personnel in the area of the impending engine start to ensure a safe working environment. New locomotives are typically manufactured to include such automatic start stop idling controls. Older locomotives can be retrofitted with idle controls but would not be tamper-resistant. Although the auto start stop is not tamper resistant, these devices have mechanisms to indicate that they have been disabled such as horns and data loggers. The anti-idling device is considered an "off-the-shelf" product and would not require extensive modifications or construction activity to install. The anti-idling device can reduce locomotive emissions compared to locomotives that do not have an anti-idling device. According to Electro-Motive Diesel, Inc.[16], a locomotive manufacturer who has also developed an automatic engine start/stop system, for mainline locomotives, idling is responsible for approximately three percent of total exhaust emissions, while for switcher locomotives' idling is responsible for 14 percent of total exhaust emissions. Anti-idling devices also lower the amount of fuel used and reduce smoke and noise associated with the continual idling of an engine.

Hybrid Switch Technology

Hybrid switch technology is a variation of the conventional diesel-electric locomotive. Conventional switch locomotives have a large diesel engine (1000-2500 horsepower) that generates electric power, which drives four large electric motors to propel the locomotive. There are two types of commercial hybrids that use much smaller engines which have lower emissions and lower fuel consumption for the same amount of work performed as the conventional technology. These new hybrids are designed for light- to medium-duty switching. Because of the use of electric power, the hybrid locomotive is much quieter than the conventional diesel powered locomotive.

The battery hybrid is the first type of hybrid technology for switch locomotives otherwise known as "green goat" technology. In railroad terminology, the word

[16] Electro-Motive Diesel, Inc (http://www.emdiesels.net/en/locomotive/innovations/autostart/)

"goat" is used for a locomotive called a switch engine or a railyard switcher. It uses a large bank of batteries to power the electric motors and is able to provide maximum power for short periods of time. A small diesel engine (300 horsepower or less) is used to recharge the battery pack at a slower rate but, once the battery pack is charged, the diesel engine is automatically shut off. The combination of constant battery recharging and intermittent use of the battery pack for propulsion will provide the battery hybrid the ability to accomplish the same switch work as the conventional locomotive. NOx and PM emissions are reduced 80 to 90 percent while fuel consumption is reduced 40 to 70 percent. The size of the battery pack and diesel engine determine how much work can be accomplished on a daily basis. According to the website of RailPower, a manufacturer of this type of "green goat" technology, the batteries are a heavy weight which is a benefit because hybrid "switchers are deliberately designed to be heavy to gain maximum traction and switchers typically operate in an inefficient 'stop-go' manner that is hard on the large engines of conventional units." Unlike traditional switching locomotives, other advantages of the "green goat" technology include lower emissions from the small diesel generation sets, batteries that have a long-life and are recyclable, and the elimination of idling. Finally, the website notes that UP ordered ten low-emission, hybrid locomotives for use in its southern California rail yard operations on May 25, 2005 (http://www.railpower.com/UP10.html).

The second type of switch locomotive is the truck-engine hybrid. This locomotive uses two or three truck-type engines (600 horsepower or less) to generate electricity used to power the electric motors that assist with propulsion. The number of engines used at any one time depends upon the throttle setting. For lighter work, only one engine is used, but for heavier jobs, two or three engines are used. Because these emission-certified engines have relatively low emission levels compared to typical switcher engines, the net emissions and fuel consumption are lower than for conventional locomotives. Under the U.S. EPA switch test cycle, this type of hybrid locomotive reduces NOx and PM emissions as well as fuel consumption up to 75 percent. This type of hybrid is not limited by the size of the battery pack nor does it require any unusual maintenance. On the contrary, such engines require less specialized maintenance than regular locomotives. When the truck-engine hybrid locomotive is not needed (thus, not working), the engines are automatically shut off.

Alternative Fueling of Locomotives

Liquefied Natural Gas (LNG)

LNG stands for liquefied natural gas. LNG is natural gas cooled and condensed into a liquid. It is mostly methane with small amounts of ethane, propane and other liquefied petroleum gases and is generally handled at slightly above atmospheric pressure, which requires a very low temperature. In order to keep natural gas in a liquid state, LNG must be refrigerated to minus 260 degrees Fahrenheit.

Natural gas liquefication dates back to the 19th century, when British chemist and physicist Michael Faraday experimented with liquefying different types of gases, including natural gas. German engineer Karl van Linde built the first practical compressor refrigerator machine in Munich in 1873. The first liquefied natural gas plant was built in West Virginia in 1912, while the first commercial liquefication plant was built in Cleveland, Ohio, in 1941. The LNG was stored in insulated tanks at atmospheric pressure. Today there are 113 active LNG facilities spread across the United States, with a higher concentration of them in the northeastern states.

LNG supplies come primarily from locations where large gas discoveries have been made, such as Algeria, Trinidad, Venezuela, Nigeria, Norway, Qatar, Oman and Australia. Some LNG is produced in Alaska as well. Typically these locations are in remote areas that do not have high demand for natural gas, making LNG a very economically viable alternative. LNG is transported in large, specially designed ships. These ships are double-hulled and have a capacity of 138,000 cubic meters or more. The ship's safety systems are divided into ship handling and cargo system handling. The ship-handling safety features include sophisticated radar and positioning systems that alert the crew to other traffic and hazards around the ship. Also, distress systems and beacons automatically send out signals if the ship is in difficulty. The cargo-system safety features include an extensive instrumentation package that safely shuts down the system if it starts to operate out of predetermined parameters. Ships are also equipped with gas- and fire-detection systems. An LNG import terminal consists of docks for ships to bring LNG onshore, LNG storage tanks, vaporizers, and other equipment to turn LNG from a liquid back into natural gas.

At onshore facilities, safety features include methane detectors, Ultraviolet or Infrared (UV/IR) fire detectors, and closed-circuit TV. Other safety features include offsite monitoring, training requirements for personnel, and restricted access to terminal property. In addition, the stringent design parameters for LNG import terminals require that proper measures are in place in the unlikely event of a spill or equipment failure.

LNG freight locomotives have been developed switcher locomotives and are ready for commercialization by Energy Conversions Inc. Locally, two LNG switch locomotives have been operating for ten years in the East Los Angeles area by LA Junction Railroad (BNSF). It is expected that two additional LNG switchers will be placed in service this year. On the railroad track, the transport (tender) car is of a double walled stainless steel "thermos bottle" design to maintain such low temperatures capable of keeping the LNG cold for as long as 14 days. A heat exchanger aboard the tender car converts the LNG back to a gaseous state. Gas then flows to the locomotive through flexible hose connection between the tender and the locomotive engine. No cryogenic fuel is ever transferred onboard the engine. Safety features built in to the coupling inhibit the release of gas in the event of train-tender disconnect. These tenders are currently fueled directly from a truck owned by the LNG supplier who fuels on demand. This method of fueling might not be cost feasible in the long-term if railroad operators decide to use LNG to power their locomotives, but in the short-term, this method may provide additional time for the railroad to construct the LNG station(s) from where the locomotives will fuel their tenders.

Components of Natural Gas (percentages are approximate and will vary):

- Methane 96.0 percent
- Nitrogen less than 0.3 percent
- Ethane less than 1.5 percent
- Other hydrocarbons, each less than 0.1 percent to 1.4 percent
- Propane less than 0.3 percent

Ultra-Low Sulfur Diesel

Metrolink passenger locomotives (3500 horsepower) currently use California ultra low sulfur diesel (ULSD) which is refined to less than 15 ppm sulfur. According to CARB, California ULSD will reduce in PM and NOx compared to the typical high-sulfur non-road diesel fuel now used by railroads. In 2012, railroads will be required to comply with federal ULSD nationwide. Nonetheless, because of the logistics of fuel distribution, locomotives fueled in California are then likely to be refueled with the low-aromatic California ULSD. Under the 2005 CARB MOU, the Class-1 railroads have also committed to using California ULSD.

Local switch locomotives (1200-2500 horsepower) use about 50,000 gallons of fuel per year. There are approximately 265 switch locomotives resident in the Basin. Line-haul locomotives (4000-4400 horsepower) which travel into and out of the Basin use approximately 250,000 gallons each per year, but their emissions contribution is proportional to the time operated in the Basin. There are approximately 400 line-haul locomotives in the Basin at any one time.

Estimated benefits of California ULSD over federal non-road diesel fuel currently used in the Basin included reduced locomotive PM and NOx emissions. After 2012, the incremental cost difference and emission benefits of California ULSD over federal ULSD are expected to be nominal.

Emulsified Diesel

A commercially available alternative diesel fuel that reduces both NOx and PM emissions is an emulsion of diesel fuel and water which includes an agent to keep the fuel and water from separating. Blending water with diesel fuel lowers peak combustion temperature, thereby producing less NOx emissions. Emulsified fuel also increases fuel atomization which results in lower PM emissions. Three companies currently produce diesel fuel emulsion systems which are used by fuel marketers/distributors to produce emulsified diesel fuel. Fuel marketers/distributors blend diesel fuel, purified water and proprietary fuel additive chemistry to produce a water-in-diesel fuel emulsion. There are also storage systems that prevent the diesel-water mixture from separating.

CARB has granted alternative diesel fuel emissions certification for emulsified diesel through its fuels certification procedure. However, CARB must first complete a multi-media analysis for toxics before issuing a verification for emulsified fuel as a diesel emission control strategy. CARB staff expects that this technology will achieve a Level 2 verification, or a minimum of 50 percent PM reduction. The alternative diesel certifications for the three emulsified diesel products currently available confirm reductions of NOx and PM emissions of approximately 15 and 60 percent, respectively, compared to standard diesel. CARB has also determined that emulsified diesel will not result in an increase in toxics emissions and hydrocarbon emissions are at least 25 percent lower than any applicable diesel vehicle emission standard.

Using emulsified diesel requires no engine modifications to the engine or fuel system and, based on usage to date, there are currently no significant technical issues associated with the use of this fuel. Relative to diesel fuel, however, there is an increase in HC and CO emissions and a fuel penalty of approximately 15 percent.

Pacific Harbor Line (PHL) is currently running one switch locomotive on emulsified diesel fuel (EDF). PHL operators have not encountered any operational problems caused by this fuel. Three EDFs have been verified by CARB for diesel engines, Lubrizol Puri-NOx (also marketed by Chevron as Proformix), Total Fina Aquazole, and Clean Fuels Technology EDF 2. These fuels contain from 10-20 percent water and 1-2 percent additive, the bulk being CARB diesel. Such fuels reduce NOx emissions by 14-16 percent and PM emissions by 58-63 percent. However, because the emulsified water reduces the fuel energy content, fuel economy and peak power are reduced by 10-20 percent.

EDF is not appropriate for applications which require peak diesel power for a substantial portion of their operation (i.e., line-haul locomotives). As such, EDF is a good environmental fuel for diesel switch locomotives which very seldom need full power.

Currently, a number of end-users are using emulsified fuel in a variety of vehicles and applications such as yard tractors, school and transit buses, underground mine equipment, construction equipment, generators, port operations equipment, trucks and tractors, small equipment such as welders and air compressors. Both the Port of Long Beach and the Port of Los Angeles have programs in place to promote the use of emulsified diesel fuel in off-road mobile equipment (including yard tractors) at the ports. Two terminals at the Port of Long Beach are currently using emulsified diesel in their off-road equipment.

Compliance Strategies Not Achieved in Practice

The following control technologies may be technologically feasible and have been achieved in practice for other applications (e.g., on-road mobile sources), but are not currently commercially available for locomotive applications that would be regulated by the proposed rules. Other alternatives may become commercially available in the future and there may be attempts to encourage the use of new technology for off-road applications, such as marine and locomotives.

Advanced Locomotive Emission Control System (ALECS)

One technology currently under development involves capturing the exhaust emissions from locomotives idling in the fueling and repair service area of the railyard and sending those emissions through a scrubber and a selective catalytic reduction (SCR) unit. A mobile hood would be placed over the exhaust vent of the idling locomotive and provide a route to a network of exhaust ducts located above the locomotive. The exhaust ducts would provide an enclosed pathway through which the particulate and NOx emissions are transported to a scrubber and SCR which can control particulate and NOx emissions through careful equipment design and process control. The removal efficiencies can range from 90 to 99.9 percent, depending on the type of scrubber (wet, dry, cyclone, orifice, etc.) and the scrubbing reagent (hot gas, water, caustic solution, etc.) and size of SCR catalyst selected. The ALECS system is being demonstrated in a locomotive setting at the Roseville railyard in Placer County, but results of the testing are not anticipated until the end of 2006. The pilot project will develop locomotive-specific interfaces of an exhaust-capturing hood, test the hood capture system on stationary and slow-moving locomotives, and determine the effectiveness of the ground-mounted scrubber and SCR exhaust treatment system. Due to the need for the system to be installed at a fixed location, the option to install the hood system

would be limited to certain locations in the railyards or ports where the ALECS can be serviced.

Lean NOx Catalysts

The conversion of NOx to molecular nitrogen in the exhaust stream of diesel engines requires sufficient quantities of reductant (HC, CO or hydrogen) which under typical engine operating conditions, are not present to facilitate the conversion of NOx to nitrogen. Lean NOx catalysts add a small amount of diesel fuel or a reducing agent to the exhaust stream to facilitate catalytic conversion of NOx to nitrogen and water vapor. Since the fuel used to reduce NOx does not produce mechanical energy, lean NOx catalysts typically operate with a fuel penalty of about five percent. Currently, peak NOx conversion efficiencies typically are around 10 percent to 20 percent. Cleaire, a manufacturer of a combination lean NOx catalyst and diesel particulate filter (DPF), demonstrated NOx emission reduction of 25 percent on heavy-duty trucks and PM emission reductions of 85 percent. Lean NOx catalysts may be feasible for use by switcher locomotives, although none has been used in practice to date.

Diesel Particulate Traps (DPFs)

A diesel particulate filter (DPF) consists of a porous substrate that permits gases in the exhaust to pass through, but traps the larger particles. DPFs can be divided into two types of systems, passive and active, depending on the method by which the filter is regenerated. A passive catalyzed DPF reduces PM through filtration and reduces CO and hydrocarbon emissions through catalytic oxidation with no outside source of energy required for regeneration. The successful application of a passive DPF is primarily determined by the average exhaust temperature at the filter's inlet and the rate of PM generated by the engine. Since they regenerate themselves, passive DPFs do not contribute to landfill capacity or require a transport trip of the solid waste.

An active DPF system uses an external source of heat to oxidize the PM. Common methods of generating additional heat for oxidation involve electrical regeneration by passing a current through the filter medium, injecting fuel to provide additional heat for particle oxidation, or adding a fuel-borne catalyst or other reagent to initiate regeneration. Some active DPFs induce regeneration automatically on-board the vehicle or equipment when a specified backpressure is reached; others use an indicator to alert the operator that regeneration is needed and require the operator to initiate the regeneration process.

Numerous studies have documented the effectiveness of DPFs in both on- and off-road applications with PM reductions of 80 to 90 percent. DPFs are commercially available today with over 70,000 on-road, heavy-duty vehicles and 400,000 diesel passenger cars having been equipped with the technology. CARB and U.S. EPA

have verified a number of passive DPFs for use in on-road applications; no active DPFs have been verified. Thus, while DPFs are proven to provide high emissions reductions, further development of the technology will be required to make DPFs applicable to diesel-powered equipment and other off-road applications that do not meet the minimum engine exhaust temperature requirements of the current technology.

It is thought that in the future DPFs could be installed in an emissions tender to reduce PM emissions along with an SCR system to reduce NOx emissions, or could be installed directly on the locomotive itself, depending upon available space and needed vertical clearance. DPFs could be designed to replace the exhaust mufflers.

To successfully reduce emissions using DPFs, the diesel fuel needs to be reformulated to possess low sulfur content in order for the technology to work effectively. Currently, locomotives are allowed to use high-sulfur diesel fuel (5,000 ppm maximum) until 2007 when the maximum limit goes down to 500 ppm. U.S. EPA has set a future sulfur limit for locomotives at 15 ppm effective 2012. While locomotives are allowed to use high-sulfur diesel fuel, most of the diesel fuel purchased by the railroads in California is either U.S. EPA on-highway grade diesel fuel, with an average sulfur content of 330 ppm or California grade diesel fuel with an average sulfur content of 140 ppm. Adopted on November 18, 2004, Harbor Craft and Locomotive Fuel, requires cleaner diesel fuel requirements for tug boats, ferries, commercial fishing vessels and locomotives operating in California. Does not require interstate locomotives to meet fueling for cleaner CA fuel, only those locomotives operating in CA. Until the sulfur content standards are lowered outside of California, linehaul locomotives that travel outside of the state of California can be fueled with higher sulfur diesel rendering the DPF technology ineffective.

Selective Catalytic Reduction (SCR) Technology

SCR systems reduce exhaust gas NOx to nitrogen (N_2) and water (H_20) catalytically, using ammonia in a chemical reduction reaction. The ammonia reductant may also be supplied in the form of urea where safety is a concern. SCR has been used historically for stationary engines, turbines, and assorted high-temperature combustion processes. The European SCR manufacturer, HUG Engineering AG, uses urea as the reactant for the nitrous oxide reductions in exhaust gases. SCR technology is expected to be effective in reducing NOx emission 70 to 95 percent. It is thought that SCR technology could be installed onto a special tender which would include the storage system for the ammonia or urea. Flexible exhaust ducts could direct the locomotive exhaust to the emission controls. The tender itself would need to have a passenger-car type suspension to

insulate the ceramic or silicon carbide SCR substrate from normal railroad shock and vibration. In the future, it may be possible that new locomotives could have these emissions controls incorporated during the design and manufacturing stages. Currently, the SCR system is an "off-the-shelf" product to control emissions from stationary sources. Early estimates project that SCR systems could be cost effective for linehaul locomotives due to the high generation of NOx emissions compared to the switcher locomotives, however none have yet been demonstrated in rail service.

AIR QUALITY BENEFITS ESTIMATE

Beside diesel particulate matter, locomotives are significant sources of NOx, a precursor of PM2.5, PM10, and ozone. Since the district is in nonattainment status for these pollutants (except for NO_2), SCAQMD is responsible for demonstrating attainment of national and state air quality standards for PM10, PM2.5, and ozone as well as reducing precursor pollutants, such as NOx. The SCAQMD is responsible for reducing public exposure to air toxics emissions, as well as toxic diesel particulate emissions from railyards and locomotives. The 2003 AQMP estimates NOx emissions of 36.52 tons per day and PM10 emissions of 1.01 tons per day from locomotives. VOC, CO, SOx, and PM2.5 emissions are estimated to be 1.82, 6.42, 3.25, and 0.93 tons per day, respectively.[17] NOx and VOC are the primary contributors to ozone formation. In addition, NOx and PM affect visibility. If the SCAQMD is to obtain state and national ambient air quality standards for ozone and PM2.5, substantial NOx and PM emission reductions are necessary from all sources, including trains.

According to the U.S. EPA[18], idling switchers use three to 11 gallons of fuel per hour (depending on outside temperatures) and they can spend more than 4,000 hours idling per year. The emissions resulting from the operation of one switcher can produce 200 pounds of PM per year and three tons of NOx per year. Installing the idling control technology can reduce emissions by 90 percent.

District staff has conducted an analysis to determine the expected emissions benefits due to PR 3502. Overall, PR 3502 is estimated to result in to reductions in PM, NOx, HC, and CO. Table 1-8 summarizes the estimated emissions benefits associated with PR 3502.

TABLE 1-8

[17] South Coast Air Quality Management District, 2003 Air Quality Management Plan: Appendix III – Base and Future Year Emission Inventories.

[18] U.S. Environmental Protection Agency, "An Overview for Citizens and Solutions for Railroad Companies: Locomotive Switcher Idling and Idle Control Technology", June 2005

PR 3502 Estimated Emissions Benefits

Pollutant	**Reduction** (tons per day)	**Reduction from Baseline** (percent)
PM	0.06 to 0.08	7 to 10
NOx	1.38 to 2.00	4 to 6
HC	0.23 to 0.33	14 to 20
CO	0.70 to 1.02	11 to 17

Emissions Calculation Methodology

In the 2004 Roseville study, the CARB staff, in conjunction with UP, prepared an emissions inventory and health risk assessment of the Roseville Railyard in Northern California. Using the emissions inventory from the Roseville Study, CARB staff estimated that the idling controls proposed for the 2005 Statewide Agreement would result in reductions in idling emissions around railyards of approximately 25 percent.

The Roseville Study analyzed the specific operations at the Roseville railyard and included estimates of idling durations for each of these operations. For example, the idling duration in the Departure Yard was calculated to be 120 minutes. Since Rule 3502 requires that anti-idling devices be set at 15 minutes and that locomotives without anti-idling devices be shut down after 30 minutes of unnecessary idling, in the case of the Departure Yard, locomotive idling emissions under the rule would be expected to be reduced by 75 to 87.5 percent (e.g., instead of idling for 120 minutes, a locomotive would idle for 30 minutes; 30 minutes / 120 minutes = 25 percent, which is equivalent to a reduction of 100 minus 25 percent, or 75 percent). Using this methodology, District staff calculated that overall PR 3502 idling emissions reductions, if applied at the Roseville railyard, would be approximately 33 percent for intrastate locomotives. For interstate locomotives emissions benefits would range from 35 to 53 percent, with the low value representing locomotives without anti-idling devices meeting an idling limit of 30 minutes, and the high value representing locomotives with anti-idling devices meeting a limit of 15 minutes.

The estimated PR 3502 benefits, as calculated for the Roseville Railyard, were then applied to the locomotive emissions inventory from the 2003 AQMP for freight locomotives to determine the estimated emissions benefits expected from PR 3502.

Emissions Calculations and Results

The baseline emissions inventory for freight locomotives is summarized in Table 1-9. Table 1-9 also shows emissions from idling, using data from a 1991 study conducted for CARB by Booz-Allen and Hamilton,[19] showing that idling produces 18, 12, 38, and 33 percent of inventories for PM, NOx, HC, and CO, respectively. Baseline idling emissions were calculated by multiplying baseline emissions by the applicable percentage.

TABLE 1-9

District Freight Locomotive Baseline Emissions

Pollutant	Locomotive Service	Baseline Emissions (tons per day)	Baseline Idling Emissions (tons per day)	Baseline Non-Idling Emissions (tons per day)
PM	Intrastate	0.08	0.02	0.06
	Interstate	0.81	0.15	0.66
NOx	Intrastate	3.48	0.42	3.06
	Interstate	29.50	3.54	25.96
HC	Intrastate	0.18	0.07	0.11
	Interstate	1.51	0.58	0.93
CO	Intrastate	0.52	0.17	0.35
	Interstate	5.52	1.82	3.70

Next, percentage reductions calculated from the Roseville Study data were used to estimate the emissions inventory with PR 3502. For intrastate locomotives, the multiplier was 0.67 (1 minus 0.33), while for interstate locomotives, the multiplier was 0.47 for the low estimate and 0.65 for the high estimate. Table 1-10 shows the idling emissions inventory resulting from PR 3502.

[19] California Environmental Protection Agency Air Resources Board, 2005. Public Meeting to Consider the CARB/Railroad Statewide Agreement. October 13, 2005

TABLE 1-10

District Freight Locomotive Idling Emissions from PR 3502

Pollutant	**Locomotive Service**	**Idling Emissions with PR 3502** (tons per day)
PM	Intrastate	0.01
	Interstate	0.07 – 0.10
NOx	Intrastate	0.28
	Interstate	1.67 – 2.30
HC	Intrastate	0.05
	Interstate	0.27 – 0.37
CO	Intrastate	0.12
	Interstate	0.86 – 1.18

Table 1-11 summarizes the estimated freight locomotive emissions with PR 3502.

TABLE 1-11

District Freight Locomotive Emissions from PR 3502

Pollutant	**Baseline Non-Idling Emissions** (tons per day)	**Idling Emissions With PR 3502** (tons per day)	**Emissions with PR 3502** (tons per day)
PM	0.72	0.08 to 0.11	0.80 to 0.83
NOx	29.02	1.95 to 2.58	30.97 to 31.60
HC	1.04	0.32 to 0.42	1.36 to 1.46
CO	4.05	0.98 to 1.30	5.03 to 5.35

Table 1-12 summarizes overall emissions benefits from PR 3502.

TABLE 1-12

District Locomotive Emissions Benefits from PR 3502

Pollutant	**Baseline Emissions** (tons per day)	**Emissions with PR 3502** (tons per day)	**PR 3502 Emissions Benefits** (tons per day)	**PR 3502 Emissions Benefits** (percent)
PM	0.89	0.80 to 0.83	0.06 to 0.09	7 to 10
NOx	32.98	30.97 to 31.60	1.38 to 2.01	4 to 6
HC	1.69	1.36 to 1.46	0.23 to 0.33	14 to 20
CO	6.04	5.03 to 5.35	0.69 to 1.01	11 to 17

CHAPTER 2 - ENVIRONMENTAL CHECKLIST

Introduction

General Information

Environmental Factors Potentially Affected

Determination

General Effects of the Proposed Project

Environmental Checklist and Discussion

INTRODUCTION

The environmental checklist provides a standard evaluation tool to identify a project's adverse environmental impacts. This checklist identifies and evaluates potential adverse environmental impacts that may be created by the PRs 3501 and 3502.

GENERAL INFORMATION

Name of Proponent:	South Coast Air Quality Management District
Address of Proponent:	21865 Copley Drive Diamond Bar, CA 91765
Lead Agency Name:	South Coast Air Quality Management District
CEQA Contact Person:	Michael Krause (909) 369-2706
Rule Contact Person:	Chris Abe (909) 396-3154
Name of Project :	Proposed Rules 3501 - Recordkeeping for Locomotive Idling and 3502 - Minimization of Emissions from Locomotive Idling

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The following environmental impact areas have been assessed to determine their potential to be affected by the proposed project. Any checked items represent areas that may be adversely affected by the proposed project. An explanation relative to the determination of impacts can be found following the checklist for each area.

☐	Aesthetics	☐	Geology and Soils	☐	Population and Housing
☐	Agricultural Resources	☑	Hazards and Hazardous Materials	☑	Public Services
☑	Air Quality	☑	Hydrology and Water Quality	☐	Recreation
☐	Biological Resources	☐	Land Use and Planning	☑	Solid/Hazardous Waste
☐	Cultural Resources	☐	Mineral Resources	☐	Transportation./Traffic
☑	Energy	☑	Noise	☑	Mandatory Findings

DETERMINATION

On the basis of this initial evaluation:

☑ I find the proposed project, in accordance with those findings made pursuant to CEQA Guideline §15252, COULD NOT have a significant effect on the environment, and that an ENVIRONMENTAL ASSESSMENT with no significant impacts will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will NOT be significant effects in this case because revisions in the project have been made by or agreed to by the project proponent. An ENVIRONMENTAL ASSESSMENT with no significant impacts will be prepared.

☐ I find that the proposed project MAY have a significant effect(s) on the environment, and an ENVIRONMENTAL ASSESSMENT will be prepared.

☐ I find that the proposed project MAY have a "potentially significant impact" on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL ASSESSMENT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL ASSESSMENT pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL ASSESSMENT, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Date: December 22, 2005 **Signature:** Steve Smith

Steve Smith, Ph.D.
Program Supervisor – CEQA
Planning, Rule Development,
and Area Sources

GENERAL EFFECTS OF THE PROPOSED PROJECT

The proposed project will provide an overall air quality benefit from both the reduction of toxics and criteria pollutants that result from the idling of Class I freight railroads and switching and terminal freight railroads that operate locomotives (to be called "affected locomotives" or "locomotives" in the following analysis).

PR 3501 will require the recording of idling events and reporting idling information to the SCAQMD's Executive Office. Idling event information will then be used by the SCAQMD to help quantify emissions from such activity to establish a more precise locomotive emission inventory. Based upon information gathered under PR 3501, the SCAQMD may take additional regulatory measures including future changes to PR 3502 to further reduce emissions from unnecessary idling. Because this proposed rule is administrative in nature, i.e., only requires recordkeeping and reporting of idling events, SCAQMD staff has concluded that it will have no direct or indirect environmental impacts and, thus, will only be discussed when necessary.

PR 3502 would prohibit idling under specified circumstances, which is expedited to reduce emissions and toxic risk from unnecessary idling events from inter- and intra-district locomotives operating in the district. As noted in Chapter 1, there are achieved-in-practice compliance options which may be implemented as a result of PR 3502. The anti-idling device is considered an "off-the-shelf" product and installation would not require major construction activity. These devices are already being installed within new locomotive engines and are expected to be the primary method of complying with PR 3502. Thus, no environmental impact is expected from the installation and operation of the anti-idling devices. Hybrid switch technology ("green goat") is a completely redesigned locomotive that would be substituted for the current traditional diesel locomotive. If an existing locomotive is replaced with a hybrid technology switch locomotive before the end of its useful life cycle, it is not expected that the advanced replacement schedule would not result in any adverse environmental impact since the replaced diesel locomotive would likely be used at a location outside the state. Operators who comply with tPR 3502 using alternative diesel fuels would be able to utilize existing diesel storage and dispensing equipment so no adverse environmental impacts are expected to result from their usage. Consequently, as indicated in this discussion, operators who comply with PR 3502 using anti-idling devices; hybrid switch technology; or emulsified diesel fuels require only minor or no modifications to affected locomotives that do not adversely affect the environment in any way. These compliance options, therefore, are not further analyzed in the document. The analysis will focus on the environmental impacts from the usage of LNG as a feasible achieved-in-practice alternative compliance option.

Previously, stakeholders have expressed concern regarding potentially higher emissions from restarting the locomotive engine(s) when ready to operate compared to allowing the

locomotives to idle continuously. The SCAQMD hired contractors (see Chapter 1 and Appendix E) to quantify and compare the emissions from re-starting the locomotive engine(s) as compared to allowing the emissions from continuous idling, and it was determined the proposed idling time limitation in PR 3502 would not result in emissions from restarting the engine that are greater than if the locomotives were allowed to idle continuously.

Further, noise testing of the engine during startup and idling was conducted and the results are presented in the "Noise" section of this chapter. The results are compared to established noise ordinances at the various locations of the railyards. A comment received on an earlier version of PR 3502 regarding increases in the re-start failure rate and system delays will not be an issue since the PR 3502 only limits idling in enumerated circumstances which are not essential to the safety and efficiency of the rail operations. Also, exemptions allow idling if the locomotive is being used in an emergency, or if the temperature drops to 40 degrees Fahrenheit or lower, or if idling is required to maintain battery charge.

Finally, a comment received by the SCAQMD from stakeholders regarding a long-term shift from transporting cargo by train to transport by truck, that is, mode shift resulting in increased trucking of cargo and, therefore, increased emissions per unit of freight has been addressed in the "Areas of Controversy" in Chapter 1. As explained in Chapter 1, most domestic freight is already shipped by truck so a modal shift, as suggested by previous comments, is not anticipated. Therefore, this topic will not be further evaluated.

ENVIRONMENTAL CHECKLIST AND DISCUSSION

		Potentially Significant Impact	Less Than Significant Impact	No Impact
I.	**AESTHETICS.** Would the project:			
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☑
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☑
c)	Substantially degrade the existing visual	☐	☐	☑

	character or quality of the site and its surroundings?			
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☑

SIGNIFICANCE CRITERIA

The proposed project impacts on aesthetics would be considered significant if:

- The project will block views from a scenic highway or corridor.
- The project will adversely affect the visual continuity of the surrounding area.
- The impacts on light and glare will be considered significant if the project adds lighting which would add glare to residential areas or sensitive receptors.

DISCUSSION

a) through d) Alternative fuel stations might be constructed as a result of PR 3502, however they would be expected to be constructed at existing facilities or areas where locomotives are currently fueled. Thus, the newly constructed stations would be consistent in size and character with existing industrial structures at affected railyards, if not an improvement over the existing structures. The new structures would not be expected to worsen existing views of railyards, which to not tend to be located in or near scenic resources. The proposed project would restrict idling on affected locomotives located throughout the district operating on existing rail lines so no changes to the visual continuity of the surrounding area is expected. Since the proposed requirements are expected to reduce the time locomotives idle, emissions, including visible particulate matter from the combustion of diesel fuel used to power the locomotives, will be reduced. Thus, implementing the proposed project will improve aesthetics by reducing diesel particulate matter emissions that obstruct or damage scenic vistas thereby improving visibility of the surrounding areas. In addition, the proposed project is not expected to substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway because idling restrictions would only occur at existing railroad operations.

The proposed project does not require night operations or change any existing night operations of the locomotives. Thus, implementing idle reduction measures at night would only be necessary if an affected locomotive operates at night. In this situation, it is expected that the locomotive would be located in an area that is already lighted for safety and security. As a result the proposed project is not anticipated to create or require any

new sources of light or glare which would adversely affect day or nighttime views in any scenic areas.

Based on the above discussion, the proposed project is not expected to have a significant adverse impact on aesthetics. Since no significant adverse impacts are anticipated, no mitigation measures are required.

		Potentially Significant Impact	**Less Than Significant Impact**	**No Impact**
II.	**AGRICULTURE RESOURCES.** Would the project:			
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland mapping and Monitoring Program of the California Resources Agency, to non- agricultural use?	☐	☐	☑
b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☑
c)	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☑

SIGNIFICANCE CRITERIA

Project-related impacts on agricultural resources would be considered significant if any of the following conditions are met:

- The proposed project conflicts with existing zoning or agricultural use or Williamson Act contracts.
- The proposed project will convert prime farmland, unique farmland or farmland of statewide importance as shown on the maps prepared pursuant to the farmland mapping and monitoring program of the California Resources Agency, to non-agricultural use.

- The proposed project would involve changes in the existing environment, which due to their location or nature, could result in conversion of farmland to non-agricultural uses.

DISCUSSION

a) and c) The proposed project would reduce idling exhaust emissions from the affected locomotives operating on existing rail lines in the district. The proposed project does not, however, require the acquisition of any land for the construction of any building or structure, and do not require conversion of farmland to other uses even if alternative fueling infrastructure is built. The proposed project would not convert any existing, prime or unique farmland to a non-agricultural use; nor would the proposed project cause other changes to the existing environment which would result in the conversion of any existing, prime or unique farmland to a non-agricultural use.

b) The proposed project would reduce idling emissions from the affected locomotives operating on existing rail lines in the district, thus, reducing public exposure to locomotive idling emissions, which includes TAC emissions. The proposed project has no effect on, and would not conflict with existing zoning or any Williamson Act contracts, because the proposed project does not require acquisition of any land that may currently be subject to a Williamson Act contract.

Based on the above discussion, the proposed project is not expected to have a significant adverse impact on agricultural resources. Since no significant adverse impacts are anticipated, no mitigation measures are required.

	Potentially Significant Impact	**Less Than Significant Impact**	**No Impact**
III. AIR QUALITY. Would the project:			
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☑
b) Violate any air quality standard or contribute to an existing or projected air quality violation?	☐	☑	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an	☐	☑	☐

	applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?			
d)	Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☑
e)	Create objectionable odors affecting a substantial number of people?	☐	☐	☑
f)	Diminish an existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s)?	☐	☐	☑

SIGNIFICANCE CRITERIA

Impacts will be evaluated and compared to the significance criteria in Table 2-1. If impacts equal or exceed any of the following criteria, they will be considered significant.

TABLE 2-1

Air Quality Significance Thresholds

Mass Daily Thresholds [a]		
Pollutant	**Construction**	**Operation**
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
SOx	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Toxic Air Contaminants (TACs) and Odor Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Hazard Index ≥ 1.0 (project increment) Hazard Index ≥ 3.0 (facility-wide)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	

TABLE 2-1 (CONCLUDED)

Air Quality Significance Thresholds

Ambient Air Quality for Criteria Pollutants [b]	
NO2 1-hour average annual average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.25 ppm (state) 0.053 ppm (federal)
PM10 24-hour average annual geometric average annual arithmetic mean	 10.4 μg/m^3 (recommended for construction) [c] 2.5 μg/m^3 (operation) 1.0 μg/m^3 20 μg/m^3
Sulfate 24-hour average	 1 ug/m^3
CO 1-hour average 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) 9.0 ppm (state/federal)

[a] SCAQMD CEQA Handbook (SCAQMD, 1993)
[b] Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
[c] Ambient air quality threshold based on SCAQMD Rule 403.

KEY: lbs/day = pounds per day ppm = parts per million ug/m^3 = microgram per cubic meter ≥ greater than or equal to

DISCUSSION

(a) Ultimately, it is the responsibility of the SCAQMD under state and federal law to reduce emissions of those substances that impair public health including primary and secondary air contaminants. Pursuant to the provisions of both the state and federal Clean Air Act (CAA), the SCAQMD is required to attain the federal ambient air quality standards for all criteria pollutants, including PM10, PM2.5 and ozone. The SCAQMD's planning document which sets forth policies and measures to achieve federal and state air quality standards in the region is the AQMP. The AQMP strategy includes measures which target stationary, mobile and indirect sources. These measures are based on feasible methods of attaining ambient air quality standards. The proposed rule would assist the SCAQMD in its efforts to attain state and federal PM10, PM2.5 and ozone ambient air quality standards and ozone. Implementation of PR 3501 will assist the SCAQMD in improving its inventory of locomotives operating in the district and idling patterns. Identification of idling patterns and reasons for long duration idling will assist the SCAQMD staff in identifying future measures to further reduce emissions from locomotive idling. In addition, the proposed railroad rules implement the control measure AT-MBL-09 – Control of Locomotive Idling Emissions, as outlined in the

SCAQMD's Air Toxics Control Plan. Implementing measures in the ATCP reduces toxic risk to the public. Thus, the proposed project will not hinder implementation of the 2003 AQMP and would assist in fulfilling the goals in the 2000 ATCP.

(b) and (c) PR 3502 will reduce criteria pollutant and toxic risk emissions by limiting the amount of time a locomotive is allowed to continuously idle under specific circumstances or by using a control technology or alternative fuel. In addition, PR 3502 allows the railroads to elect to submit an Emissions Equivalency Plan to reduce NOx and PM in lieu of complying with idling requirements. The intent of the proposed project is to reduce idling and associated emissions from affected locomotives. Secondary adverse air quality impacts from the proposed project are evaluated in the following paragraphs.

Construction Phase – LNG Refueling Stations

Currently, LNG locomotives are fueled directly from LNG tanker trucks, a process referred to as "wet housing." At present, there are no railyards that have LNG fueling stations for fueling locomotives. If the railroad elects to use LNG locomotives in sufficient quantity where a refueling station is cost effective, new alternative clean-fuel refueling capacity would need to be constructed, and emissions will be generated by the construction activities. It is assumed for this analysis that only switcher locomotives would use LNG because Class I freight locomotives traveling outside of California could not guarantee finding a suitable LNG station for refueling. Onsite emission generated during construction principally consists of exhaust emissions (NOx, SOx, CO, VOC, and PM10) from mobile heavy-duty construction equipment and portable auxiliary equipment and fugitive dust (PM10) from disturbed soil. Offsite emissions during the construction phase normally consist of exhaust emissions from worker commute trips and material transport trips to and from the construction site. Based on information from the railyards and LNG distributers, if a railroad elects to construct an LNG dispensing station, it would be constructed within the confines of the existing railyard. Railroads currently maintain, service and fuel locomotives within railyards and only designated personnel are allowed to perform specific services. There are existing diesel fueling stations at each of the 19 known railyards in the district and it is assumed the LNG fueling station will constructed at the same location as the existing diesel fueling station since the fueling and delivery behavior of the locomotive is assumed to not change. Thus, areas outside the yard, such as sidings, are not suitable areas for fueling. The railyard has also more level terrain and better lighting so that slip, trip and fall hazards are better controlled in the yard reducing probability of injury while increasing safety for operations. If operators of all 19 railyards chose to construct an LNG fueling station at their site, an average of three to four stations would need to be built each month before the idling requirement takes effect six months from the date of adoption of PR 3502. This is a "worst case" scenario since there is no deadline to applying for an emission equivalency plan. Since it could take

three days to construct one LNG refueling station[20] and if three to four might be constructed 30 days (one month), the daily average number of stations being constructed on a given day is one.

Construction is anticipated to take place within three distinct phases: grading/site preparation, paving and equipment installation. The first phase of the construction activity, grading the site, will generate the highest daily exhaust emissions as demonstrated in the calculations in Appendix D. The estimated fugitive dust emissions that will be emitted during the grading phase are added to the exhaust emissions in Table 2-2 to determine the peak daily emissions from the construction of one LNG station. These peak daily emissions are less than the SCAQMD's significance thresholds and, therefore, do not contribute to a significant adverse impact to air quality if LNG stations were installed at 19 locations over a six month period of time. Up to four stations could overlap during construction and not exceed any applicable construction emission significance thresholds. Therefore, no significant air quality impact from construction will result from implementing the proposed project. Please refer to Appendix D for all the equations, assumptions and methodologies used to calculate construction impacts.

TABLE 2-2

Peak Daily Construction Emissions (pounds per day) from the Installation of One LNG Refueling Station

	CO	NOx	PM10	SOx	VOC
Exhaust Emissions	10.32	21.15	1.35	3.15	2.41
Fugitive Dust	--	--	0.01	--	--
TOTAL	**10.32**	**21.15**	**1.36**	**3.15**	**2.41**
SCAQMD CEQA Significance Thresholds for Construction	550	100	150	150	75
Significant?	**No**	**No**	**No**	**No**	**No**

Operational Phase – LNG Refueling Stations

Railyard operators subject to PR 3502 may choose to comply by replacing diesel switcher locomotives with LNG switchers. Operation of the LNG switchers may lead to increases in fuel delivery trips to the refueling terminals or stations because of differences in energy content of the alternative clean fuels compared with diesel fuel, which would lead to increased operational emissions from the delivery vehicles.

The British thermal unit (Btu) per gallon of LNG is approximately 83,000 while the Btu per gallon of diesel is approximately 128,000. Thus, the fuel equivalents for LNG is approximately 1.54 (128,000/83,000). This means it would take 1.54 gallons of LNG to

[20] Final Program Environmental Assessment for Proposed Fleet Vehicle Rules and Related Rule Amendments (SCAQMD, June 5, 2000)

equal the energy content of one gallon of diesel. Thus, operators at affected railyards using LNG could require up to 54 percent more refilling trips than a facility currently using diesel. Similarly, the vehicles using these fuels may need to return to the fueling station up to 54 percent more often or will need to be equipped with larger fuel tanks. Diesel switcher locomotives currently consume approximately 50,000 gallons of diesel per year. Using the 1.54 equivalency to LNG, an LNG switcher locomotive would require 77,000 gallons of LNG fuel per year.

To estimate the number of intra-district locomotives that are equipped and are not equipped with anti-idling devices, the District staff used the ratio of intra-state locomotives that are equipped and are not equipped with anti-idling devices and applied the ratio to the total number of intra-district locomotives. Based on the data submitted to CARB by railroads (as part of the CARB 2005 Railroad MOU), the UP and BNSF had 238 and 176 intra-state locomotives in the state of California, respectively. Based on this data, the UP had 116 diesel locomotives with anti-idling and 122 locomotives without anti-idling device. The BNSF had four LNG locomotives, nine locomotives with anti-idling device and 163 without anti-idling device systems. Based on intrastate ratio of locomotives equipped and not equipped with anti-idling devices, of the 245 total intra-district locomotives, there is about 190 intra-district locomotives operation without anti-idling device systems. Out of the 190 locomotives, 97 belong to BNSF, 73 belong to UP, and the remaining 20 belong to PHL, respectively. Any locomotive which has already installed an anti-idling device would be in compliance with PR 3502 and, therefore, would not be replaced with an LNG switcher.

Assuming the unlikely occurrence that all 190 switcher locomotives in the Basin are replaced with LNG switchers, 14.6 million gallons of LNG would need to be transported annually. Assuming a typical truck transports 10,000 gallons of LNG fuel[21] per trip, the number of trucks needed to transport the LNG fuel is four per day (14.6 million gallons/10,000 gallons per truck/365 days per year = four trucks per day). These LNG trips will replace some of the existing diesel delivery trips as the diesel for the LNG locomotive would no longer be necessary. However, to provide a "worst case" scenario, a maximum increase of four LNG truck deliveries on a given day would result if LNG was used as an alternative fuel. Due to the fact that most LNG deliveries on the West Coast are transported by truck from Arizona, it is estimated that an LNG delivery truck could travel roundtrip up to 400 miles per day from the border of California to railyard.

The LNG will replace the need for diesel fuel and, thus, there would be a reduced number of diesel fuel delivery truck trips. Using the same assumptions as presented in the analysis of LNG delivery trucks, 50,000 gallons of diesel are used in a diesel switcher per year, 190 switcher locomotives would no longer use diesel fuel and the diesel delivery trips, which transport 10,000 gallon per trip, would be eliminated. Therefore, the number

[21] "Raley's LNG Truck Fleet: Final Results" (U.S. Department of Energy/National Renewable Energy Laboratory, March 2000)

of trucks needed to transport the diesel fuel is three per day (50,000 gallons per year x 190 switchers/10,000 gallons per truck/365 days per year = 2.6 trucks per day). However, diesel fuel delivery trucks would not need to travel as far a distance as an LNG delivery truck. The assumption is that a diesel fuel delivery truck could travel roundtrip up to 100 miles per day. In order to account for the increase in delivery truck trips, the difference in the overall mileage traveled daily is calculated.

Three diesel deliver trucks each traveling 100 miles per day (300 miles/day) would be removed from the road if four LNG deliver trucks each traveling 400 miles per day (1,600 miles/day) will be added. Thus, the potential increased vehicle miles traveled is 1,300 miles per day. The operational emissions from LNG transport are calculated based on a heavy-heavy duty trucks delivering LNG fuel traveling a total of 1,300 miles per day. Using CARB's 2006 emission factors for heavy-heavy duty trucks will be a "worst-case" scenario since, due to state and federal requirements for ultra low sulfur diesel and future cleaner technology, the emission factors decrease over time as older vehicles are replaced by newer vehicles. Table 2-3 outlines the exhaust emissions from the additional LNG delivery truck trips traveling 1,300 miles and takes into account the emission benefits from PR 3502 to provide the overall operational air quality impact from the proposed project. None of the daily emissions exceed the SCAQMD operational significance thresholds and, thus, operational emissions from the proposed project are not significant.

TABLE 2-3

Operational Emissions from an Increase of LNG Fuel Delivery Trips

	CO	**NOx**	**PM10**	**SOx**	**VOC**
2006 Heavy Heavy Duty Truck Emission Factors (pounds per mile)	0.0059	0.0389	0.0007	0.0004	0.0013
Increase Daily Exhaust Emissions due to Additional 1300 Miles Traveled (pounds per day)	**7.67**	**50.6**	**0.91**	**0.52**	**1.69**
SCAQMD CEQA Significance Thresholds for Operational (pounds per day)	550	55	150	150	75
Significant?	**No**	**No**	**No**	**No**	**No**

Example equation: 2006 emission factor (pounds per mile) x 1300 miles/day = daily exhaust emissions (pounds per day)
* Brackets denote emission reductions.

Therefore, no significant air quality impact from direct operations of an LNG refueling station will result from implementing the proposed rules.

Operational Phase – Locomotive Start-Up Emissions

With regards to the potential for increased emissions from the start-up of a locomotive engine compared to continuous idling, engine tests conducted for the SCAQMD generated data results which can be found in the Start-up and Idling Emissions from Two Locomotives, Draft Final Report, November 20, 2005 (Appendix E of this Draft PEA). Based on the data results, one can ascertain that eight minutes after terminating idling a locomotive, air quality benefits begin to accrue. Also, idle shutdown periods longer than about eight minutes, followed by a start-up-idle event, result in reduced emissions; the longer the shutdown, the more substantial the emission benefits based upon the idle emission rates. The data were evaluated to estimate the amount of time locomotives can idle before generating emissions equivalent to a start-up event. In general, the test results exhibited a trend of emissions during start-up increasing sharply for a short duration, and then declining to slightly elevated levels above typical idling emission to stabilized idling levels over approximately 30 minutes. The results from the locomotive tests show that the increase in emissions from a locomotive restart after one-half-, one-, two- and four-hour shut-down periods exhibited a spike in emissions for a period of less than three minutes. In most cases the spike lasted less than 15 seconds, at the beginning of the test, thereafter, the emission rates moved to levels that would be exhibited by a stabilized idling situation. Conservatively, looking at the emissions data shows that emissions due to start-up in relationship to stabilized idling mode are very low (i.e., start-up emissions would contribute very little to the overall emission when compared with stabilized idling). Therefore, discontinuing locomotive idling, even when combined with a start-up procedure whenever needed for work or for operational requirements, still provides an air quality benefit.

d) Sensitive receptors in the district are currently exposed to daily toxic risk from diesel particulate and other train idling emissions. PM10 has been found to lodge within the lungs contributing to respiratory problems. Implementing the proposed project is intended to reduce train idling emissions, including PM10 emissions, which would reduce the exposure of surrounding neighborhoods around the facility, including sensitive receptors to PM10 concentrations. Reducing train idling emissions is expected to provide a benefit to sensitive receptors by improving public health in the vicinity of affected railroad facilities. MATES-II study concluded an average cancer risk in the district is 1400 in one-million and by reducing PM emissions from locomotive idling, exposure to TAC emissions will be reduced.

e) The proposed project is expected to reduce locomotive idling which will reduce diesel emissions from the combustion of diesel fuel. Odors are often associated with diesel emissions. Existing odor impacts at affected facilities are expected to be reduced as a result of implementing the proposed project. Therefore, the proposed project is not expected to generate any significant adverse odor impacts. .

f) Implementing PR 3502 is expected to assist the SCAQMD in its efforts to attain and maintain state and national ambient air quality standards for criteria pollutants and

improve public health through reducing exposure to air toxics. Thus, implementing the proposed project is not expected to diminish an existing air quality rule or future compliance requirements.

Based on the above discussion, the proposed project will not generate significant adverse air quality impacts. Since no significant adverse impacts are anticipated, no mitigation measures are required.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
IV.	**BIOLOGICAL RESOURCES.** Would the project:			
a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☑
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☑
c)	Have a substantial adverse effect on federally protected wetlands as defined by §404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☑
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery	☐	☐	☑

sites?

e)	Conflicting with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☑
f)	Conflict with the provisions of an adopted Habitat Conservation plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☑

SIGNIFICANCE CRITERIA

Impacts on biological resources would be considered significant if any of the following criteria apply:

- The project results in a loss of plant communities or animal habitat considered to be rare, threatened or endangered by federal, state or local agencies.
- The project interferes substantially with the movement of any resident or migratory wildlife species.
- The project adversely affects aquatic communities through construction or operation of the project.

DISCUSSION

(a) and (b) In general, the net effect of PR 3502 would be to provide a public health benefit by reducing exposure to air toxics and criteria pollutant emissions as a result of prohibiting locomotive idling to surrounding communities. There are no provisions in the proposed rules that require or result in any specific disturbance of undisturbed habitat or have a direct or indirect impact on plant or animal species. No substantial adverse effect in sensitive plant or animal species is expected to result from implementing the proposed recordkeeping or idling reduction requirements. No riparian habitat or other sensitive natural community would be affected by PRs 3501 and 3502 because the affected locomotives operate on existing rail lines. Implementing the proposed rule may improve wildlife habitats by reducing particulate matter that may obstruct or damage these areas.

(c) The proposed project does not require any direct removal, filling, hydrological interruption, or other activities in, or near, wetland areas as defined by §404 of the Clean

Water Act (CWA) since the fueling stations are expected to be constructed at railyards are established facilities. Thus, no adverse effects on these areas are expected.

(d), (e) and (f) There are no provisions in the proposed rule that conflict with any local policies or ordinances that protect biological resources. The proposed project would not interfere with the movement of any native or migratory animals, affect wildlife corridors, or impede the use of native wildlife nursery sites, because the affected locomotives operate on existing rail lines

Based on the above discussion, the proposed project is not expected to have a significant adverse impact on biological resources. Since no significant adverse impacts are anticipated, no mitigation measures are required.

	Potentially Significant Impact	**Less Than Significant Impact**	**No Impact**
V. CULTURAL RESOURCES. Would the project:			
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☑
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☑
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☑
d) Disturb any human remains, including those interred outside formal cemeteries?	☐	☐	☑

SIGNIFICANCE CRITERIA

Impacts to cultural resources would be considered significant if:

- The project results in the disturbance of a significant prehistoric or historic archaeological site or a property of historic or cultural significance to a community or ethnic or social group.
- Unique paleontological resources are present that could be disturbed by construction of the proposed project.
- The project would disturb human remains.

DISCUSSION

a) through d) In general, the net effect of PR 3502 would be to provide a public health benefit by reducing exposure to air toxics and criteria pollutant emissions as a result of prohibiting locomotive idling to surrounding communities. The proposed rule may require minor demolition and construction of buildings or structures if the alternative fuel option is chosen to comply with the proposed project. Any construction would occur at existing railyards, which are located on previously disturbed land. Since the proposed project would not require soil disturbance outside the boundaries of the affected locomotives, rail lines and railyards, it is not expected to disturb cultural resources such as historic, archaeological or paleontological resources or unique geologic features. Similarly, for the same reason, it is not anticipated that the proposed project will disturb human remains or cemeteries as a result of adopting and implementing the proposed project.

Based on the above discussion, the proposed project is not expected to have a significant adverse impact on cultural resources. Since no significant adverse impacts are anticipated, no mitigation measures are required.

		Potentially Significant Impact	**Less Than Significant Impact**	**No Impact**
VI.	**ENERGY.** Would the project:			
a)	Conflict with adopted energy conservation plans?	☐	☐	☑
b)	Result in the need for new or substantially altered power or natural gas utility systems?	☐	☑	☐
c)	Create any significant effects on local or regional energy supplies and on requirements for additional energy?	☐	☑	☐
d)	Create any significant effects on peak and base	☐	☐	☑

	period demands for electricity and other forms of energy?			
e)	Comply with existing energy standards?	☐	☐	☑

SIGNIFICANCE CRITERIA

The impacts to energy and mineral resources would be considered significant if any of the following criteria are met:

- The project conflicts with adopted energy conservation plans or standards.
- The project results in substantial depletion of existing energy resource supplies.
- An increase in demand for utilities impacts the current capacities of the electric and natural gas utilities.
- The project uses non-renewable resources in a wasteful and/or inefficient manner.

DISCUSSION

a), d) and e) In general, the net effect of PR 3502 would be to provide a public health benefit by reducing toxic risk, diesel PM and other criteria pollutant emissions from locomotive idling to surrounding communities. There are no provisions within the proposed rule that would conflict with adopted energy conservation plans, impact existing energy standards, or affect peak or base load demands for electricity. If an emission equivalency plan is chosen and if LNG is chosen as the compliance option, demand for LNG would increase. It is not reasonable to assume the line haul freight locomotives would use LNG as a compliance option because the availability LNG at rail yards across the nation is limited. However, it is possible that diesel switcher locomotives operating at a rail yard with an LNG refueling station could be replaced with LNG switcher locomotives.

Although it is unlikely that all switcher operators would chose to comply under an emission equivalency plan using LNG as the compliance method, this analysis assumes as a worst case that all switchers could be converted to LNG. There are 190 switcher locomotives in the district with each using approximately 50,000 gallons of diesel per year. As noted previously in the "Air Quality" section, the ratio of the Btu content difference between LNG and diesel is approximately 1.54. Under this scenario, each switcher conversion would require 77,000 gallons of LNG per year, which converts to six million cubic feet of gas (80 cubic feet of natural gas equals one gallon of LNG). If all switchers are converted to LNG, increased annual demand for LNG as a result of PR 3502 would be 14.6 million gallons, approximately 40,000 gallons of LNG per day.

Increased demand for natural gas that may result from implementing PR 3502 is not considered to be a significant adverse impact for the following reasons. Currently, the largest single source of LNG to California is owned by an affiliate of the El Paso Natural Gas Company. This plant near Topock, Arizona currently has a daily LNG production capacity of approximately 80,000 gallons per day and supplies California with approximately 29,000 gallons of LNG per day[22]. It is expected that in the near term this facility will be able to increase production capacity to accommodate increased demand because the economics of LNG supply indicate that it can compete effectively with domestic resources of natural gas and pipeline imports (EIA, 2005) [23]. Similarly, the facility has a sufficient source of natural gas, which is provided by long-distance interstate pipelines from reserves generally located in Texas (Permian Basin); Texas, Oklahoma, and Kansas (Anadarko Basin); and Colorado, New Mexico, and Utah (San Juan Basin)[24].

Further, according to the U.S. Energy Information Administration (EIA), LNG deliveries to the United States reached a record high in the year 2004 at 652 billion cubic feet (Bcf), which is 29 percent more than the volume received in 2003. Because the economics of LNG supply are improving, as of 2004 there were proposals for more than 40 re-gasification plants. Of the planned projects, three have begun construction and several have plans to begin construction by the end of 2005. Based on this information, future LNG infrastructure capacity is expected to increase, so LNG supplies to the United States are expected to increase.

In conclusion, based on the favorable economics of LNG supply, it is expected that the supply will increase based on market demand. Further, there are sufficient domestic supplies of natural gas that can be converted to LNG. It is also anticipated that future supplies of LNG will increase as the number of new LNG import terminals increase, as projected by the EIA. Finally, using LNG to reduce emissions from switcher locomotives is not considered to be a wasteful use of energy resources. Therefore, for all of these reasons, increased demand for LNG as a result of implementing PR 3502 is not considered to be a significant adverse energy impact.

b) and c) During the construction phase of alternative fueling stations, diesel and gasoline will be consumed in construction equipment to grade and pave the site as well as haul debris from the site and install the new equipment. The diesel and gasoline fuel needed to construct an LNG fueling station are shown in Table 2-4.

[22] California Electricity Oversight Board, August 2004. http://www.eob.ca.gov/attachments/081004NatGasReport.pdf

[23] Energy Information Agency, Office of Oil and Gas. U.S. Natural Gas Imports and Exports: 2004. December 2005.

[24] California Electricity Oversight Board, August 2004.

TABLE 2-4

Total Projected Fuel Usage from Constructing the LNG Refueling Station

Equipment	**Number of Equipment**	**Operating Hours**	**Equipment Power** (horsepower)	**Diesel Usage *** (gallons)	**Gasoline Usage** (gallons)
Backhoe	1	8	79	41.71	n/a
Grader	1	8	157	82.9	n/a
Cement Trucks	2	8	161	170.0	n/a
Paver	1	8	130	68.64	n/a
Paving Equipment	1	8	99	52.27	n/a
Generating Set	1	8	22	11.62	n/a
Welder	1	8	35	18.48	n/a
Vehicle	**Number of Vehicles**	**Total Vehicle Miles Travel**	**Vehicle Fuel Efficiency** (miles/gallon)	**Diesel Usage *** (gallons)	**Gasoline Usage** (gallons)
Cement Truck	2	100	10	10	n/a
Haul Truck	2	100	10	10	n/a
Employee Vehicle	11	440	20	n/a	22
			TOTAL FUEL USAGE – ONE STATION (gallons)	**466**	**22**
			TOTAL FUEL USAGE – 19 STATIONS (gallons)	**8854**	**418**
			2010 PROJECTED FUEL SUPPLY**	8,500,000	325,000,000
			PERCENT IMPACT	0.10	0.000

* Calculated using diesel equipment emission factor of 0.066 gallons/brake horsepower and associated horsepower (SCAQMD 1993 CEQA Handbook, Table A9-8-C)
** 2003 Air Quality Management Plan (August 2003)

The direct energy impact from the construction-related activities involved with building the LNG fueling stations (even "worst case" of constructing 19 stations) does not significantly affect the current projected supplies of diesel and gasoline and, therefore, would not be considered significant. The equipment and vehicles needed for construction-related activities are necessary and will not use energy in a wasteful manner. There will be no substantial depletion of energy resources nor will significant amounts of fuel be need when compared to existing supplies. Thus, the proposed project will not have a significant impact on local or regional energy supplies.

During operation, it is anticipated that compressors will be used at alternative clean fuel fueling stations. As shown in Table 2-5, the electricity needed to power the compressor will not have a significant impact on the current supply of electricity in the district. Therefore, the operation-related activities will also not substantial deplete energy resources or require need for new or substantially altered power or natural gas utility

systems. The operational-related activities to operating an LNG fueling station would not have a substantial effect on local or regional energy supplies or on requirements for additional energy.

The only technology identified as an alternative compliance option that uses electricity is the hybrid yard switchers called green goats. This technology replaces the large switcher diesel engine with a large battery pack, a small, 90 to 200kW, diesel generator and a computerized control module. The switcher is powered by the battery pack, which is constantly charged by the diesel generator. Consequently, power from the grid is not required so this technology is not expected to affect peak or base demands for electricity. According to one manufacturer, the green goat technology can achieve up to 80 to 90 percent NOx and diesel particulate emission reductions.

TABLE 2-5

Total Projected Electricity Usage from Operating 19 LNG Refueling Station

	Anticipated Power Needed (kWh)	**# of Compressors**	**Total kWh of Electricity Needed**	**2010 Projected Electricity Supply*** (kWh)	**Project Impact** (percent)
Electric Powered Compressor	400,000	19	7,600,000	126,510,000,000	0.006

* 2003 Air Quality Management Plan (August 2003)

Based on the above discussion, the proposed project is not expected to have a significant adverse impact on energy. Since no significant adverse impacts are anticipated, no mitigation measures are required.

	Potentially Significant Impact	**Less Than Significant Impact**	**No Impact**
VII. GEOLOGY AND SOILS. Would the project:			
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☑
• Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial	☐	☐	☑

	evidence of a known fault? • Strong seismic ground shaking?	☐	☐	☑
	• Seismic–related ground failure, including liquefaction?	☐	☐	☑
	• Landslides?	☐	☐	☑
b)	Result in substantial soil erosion or the loss of topsoil?	☐	☐	☑
c)	Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☑
d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☑
e)	Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☑

SIGNIFICANCE CRITERIA

Impacts on the geological environment would be considered significant if any of the following criteria apply:

- Topographic alterations would result in significant changes, disruptions, displacement, excavation, and compaction or over covering of large amounts of soil.
- Unique geological resources (paleontological resources or unique outcrops) are present that could be disturbed by the construction of the proposed project.
- Exposure of people or structures to major geologic hazards such as earthquake surface rupture, ground shaking, liquefaction or landslides.
- Secondary seismic effects could occur which could damage facility structures, e.g., liquefaction.

- Other geological hazards exist which could adversely affect the facility, e.g., landslides, mudslides.

DISCUSSION

a and d) The proposed project is intended to reduce toxic risk and locomotive idling diesel PM emissions. Idling activities would occur on existing rail lines, so any risks associated with ground shaking, etc., are existing risks. If alternative fuel stations are constructed to support rule compliance, the affected sources would be expected to observe relevant requirements of the Uniform Building Code and any other state, county or city building and safety codes, which account for seismic activity. As part of the issuance of building permits, local jurisdictions are responsible for assuring that the Uniform Building Code is adhered to and can conduct inspections to ensure compliance. The Uniform Building Code is considered to be a standard safeguard against major structural failures and loss of life. The basic formulas used for the Uniform Building Code seismic design require determination of the seismic zone and site coefficient, which represents the foundation condition at the site. The Uniform Building Code requirements also consider liquefaction potential and establish stringent requirements for building foundations in areas potentially subject to liquefaction. The proposed project would not alter the exposure of people or property to geological hazards such as earthquakes, landslides, mudslides, ground failure, or other natural hazards. As a result, substantial exposure of people or structures to the risk of loss, injury, or death is not anticipated.

b) If installing alternative fueling stations, minor site preparation, including grading, will occur, however, the activity is expected to comply with SCAQMD's Rule 403 which will minimize soil erosion through soil watering requirements. Similarly, affected railyard facilities are located at relatively flat locations that have been graded to accommodate railyard operators, so erosion from water runoff is also not anticipated. As a result, the proposed rule does not contain any provisions that would require disruption of soils that could result in soil erosion or loss of topsoil. The affected locomotives operated on existing rail lines which were previously disturbed to construct.

c) The proposed project would occur at existing facilities and, therefore, is not expected to alter the existing exposure of people or property to geological hazards such as earthquakes, landsides, mudslides, ground failure, or other natural hazards. Additionally, the affected areas are not envisioned to be prone to new landslide, subsidence, liquefaction impacts or have unique geologic features since the affected locomotives are operated on existing rail lines for a number of years. Finally, if an LNG fueling station is elected to be constructed, proper containment is expected.

e) The proposed project does not require or involve the installation of septic tanks or alternative wastewater disposal systems. Therefore, no impacts from failures of septic systems related to soils incapable of supporting such systems are anticipated.

Based on the above discussion, the proposed project is not expected to have an adverse impact on geology or soils. Since no significant adverse impacts are anticipated, no mitigation measures are required.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
VIII.	**HAZARDS AND HAZARDOUS MATERIALS.** Would the project:			
a)	Create a significant hazard to the public or the environment through the routine transport, use, and disposal of hazardous materials?	☐	☑	☐
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☑	☐
c)	Emit hazardous emissions, or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☑	☐
d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 and, as a result, would create a significant hazard to the public or the environment?	☐	☐	☑
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☑
f)	For a project within the vicinity of a private airstrip, would the project result in a safety	☐	☐	☑

	hazard for people residing or working in the project area?			
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☑
h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☑
i)	Significantly increased fire hazard in areas with flammable materials?	☐	☐	☑

SIGNIFICANCE CRITERIA

The impacts associated with hazards would be considered significant if any of the following occur:

- Non-compliance with any applicable design code or regulation.
- Non-conformance to National Fire Protection Association standards.
- Non-conformance to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection.
- Exposure to hazardous chemicals in concentrations equal to or greater than the Emergency Response Planning Guideline (ERPG) 2 levels.

DISCUSSION

a) through c) In general, the net effect of PR 3502 would be to provide a public health benefit by reducing exposure to air toxics and criteria pollutant emissions as a result of prohibiting locomotive idling to surrounding communities.

Compliance with recordkeeping and idling restrictions will not cause or create an issue with respect to hazards. However, if an emission equivalency plan was chosen and if the plan to comply involved the substitution of current diesel fuel operations with a clean fuel alternatives, the need for diesel fuel capacity at existing railyard fueling stations would be reduced. As diesel fuel capacity is reduced, diesel fuel production and distribution would

be reduced and the substituted alternative clean-fuel technology production and distribution would be increased. This would require the modification of some existing diesel fuel dispensing facilities and the substitution of diesel fuel refueling operations with LNG. The hazards associated with the construction of LNG fueling stations which could be used to comply with the proposed locomotive idling rule are similar to the hazards associated with the installation of diesel fuel facilities. Both involve approximately equivalent risks of upsets and worker and public exposure to physical hazards and hazardous substance, as explained in the following subsection. Potential construction-related hazards, however, are relatively well defined and commonplace and and not substantially different when compared to the overall construction activities within the SCAQMD jurisdiction and, therefore, are not considered to be significant.

Liquefied Natural Gas

Natural gas is non-toxic, however, it can cause asphyxiation if enough oxygen is displaced. Natural gas is lighter than air. Because of this, if natural gas were to be released or accidentally leaked, it would rapidly disperse. In addition to this, before the natural gas can ignite, it would have to mix with five to 15 percent air, which is unlikely.

Natural gas can be liquefied by refrigerating it to below -161.5 degrees Celsius or -259 degrees Fahrenheit at atmospheric pressure. Once liquefied, LNG is much more compact, occupying only 1/600th of its gaseous volume. This makes it more economical to ship over long distances and to use in heavy-duty vehicles. LNG is usually shipped in refrigerated trucks to user locations. LNG fueling stations consist of an above-ground storage tank and insulation systems. Typical storage tanks are 30,000 to 70,000 gallons in capacity. Suppliers usually refill them in 10,000-gallon increments. The inner tank is stainless steel and is surrounded by an outer carbon steel tank that forms about a four-inch annulus around the tank. The annulus is evacuated and filled with pearlite insulation. Two pressure safety valves (PSVs) set at 80 pounds per square inch gauge (psig) and 100 psig to protect the inner tank. The outer jacket is also protected in case of an inner jacket leak. The vacuum jacketed storage tanks can maintain the LNG for approximately two weeks before venting vapor. The specific time depends on the size of the tank and usage (vapors can be drawn down and used rather than vented). Heavy-duty vehicles typically have one or two 40- to 50-gallon insulated tanks that store LNG at 150 psig. The "shelf life" of LNG in vehicles is approximately 14 days. The energy content of a gallon of LNG is lower than a gallon of diesel fuel. This requires larger fuel tanks in an LNG-fueled vehicle to achieve the same driving range as a diesel powered vehicle. It would also require more tanker deliveries to supply refueling stations with the same available energy as diesel fuel. Since the probability of accidents is related to the miles traveled, more delivery accidents can be expected with LNG than with diesel fuel (assuming that they are delivered from similar source locations in similar sized tankers). Most LNG deliveries on the West Coast are transported by truck from Arizona, so the miles traveled are much greater than for diesel fuel deliveries. However, the national

truck accident rate is small and the accident rate involving chemical releases is even less, so this would not be a significant risk factor.

A comparison of the hazards posed by the use of LNG versus diesel fuel are described in the following bullet points:

- Diesel fuel is toxic to the skin and lungs and natural gas is not;
- Diesel fuel vapors are heavier than air (for specific gravity of air =1, diesel is greater than 4). Natural gas is lighter than air (specific gravity is 0.55) and disperses more readily in air;
- Natural gas has a higher auto ignition temperature (1,200 ^{o}F) than diesel (500 ^{o}F) or gasoline (500 ^{o}F). Natural gas is more difficult to ignite since it has a "lower flammability limit" that is higher (5.3 percent) than diesel fuel (0.5 percent);
- Cryogenic liquids have the potential risk to workers of burns (frost-bite) if they come into contact with the liquid or with surfaces that are not insulated. Proper safety equipment and training can minimize these hazards; and,
- Since LNG is a cryogenic liquid, in the event of a release from an aboveground storage tank or tanker truck, a fraction of the liquid immediately flashes off to gas while the remainder will pool and boil violently emitting dense vapor. The liquid transitions to dense vapor and the dense vapor transitions to gas as the liquid and vapor draw heat from the surroundings. If spilled, however, the vapor cloud above the LNG pool is very difficult to ignite, due to the narrow range of flammability of natural gas vapor. LNG is released into an enclosed space and a source of ignition is present, the boiling liquid, vapor cloud and gas could burn, threatening surrounding facilities and other storage vessels.

LNG is not explosive, toxic, or carcinogenic. Vaporized LNG is lighter than air. If a spill occurs, the vapor will rise and dissipate, leaving no trace in the environment. Although portions of an LNG vapor cloud may be flammable, the flame speed of an unconfined cloud is slow and it will not explode. LNG itself does not burn because it does not contain oxygen. Natural gas burns only within the narrow range of a five to 15 percent gas-to-air mixture. If the fuel concentration is lower than five percent, it cannot burn because of insufficient fuel. If the fuel concentration is higher than 15 percent, it cannot burn because there is insufficient oxygen. For LNG to burn, it must be released, vaporize, mix with air in the ignitable ratio, and ignited by a suitable ignition source. LNG will not explode because it contains no oxygen to react with the fuel. Even LNG vapors in an open environment cannot explode because there is not enough fuel to react with the oxygen. LNG spill studies have shown that high winds rapidly dissipate the LNG vapor and low winds (or no wind) keep the flammable vapor cloud very close to the source. Within an LNG facility or onboard a ship, there are various types of hazard detectors used to alert personnel to a leak or spill. These could include detectors for the

presence of gas, flame, smoke, high temperatures or low temperatures. While LNG vapors have no odor or color, if an LNG release occurred, LNG's low temperature will cause water vapor to condense in the air and form a visible white cloud that would be readily apparent.

Natural gas is a versatile form of low-polluting fuel. The most common method for transporting LNG is under high pressure in underground pipelines. Should local pipelines become damaged allowing natural gas to escape, it exhibits the following characteristics:

1. It is colorless and generally odorless, unless it contains a naturally occurring odor or has an odorant added.

2. It is lighter than air and will rise and dissipate rapidly.

3. Natural gas is neither toxic nor poisonous, but it can cause suffocation in a confined space because of its ability to displace oxygen in the blood.

4. Natural gas will burn when mixed with air and ignited. Escaping gas can be ignited from open flames, sparks from electrical switches and motors, mechanical equipment, moving rocks, etc.

Table 2-6 provides a brief comparison of the various chemical characteristics of diesel and LNG.

TABLE 2-6

Fuel Characteristics Comparison[a]

Characteristic	Diesel	LNG
Net Or Lower Heating Value	130,800 BTU / Gallon (liquid)[c]	72,900 BTU / Gallon (liquid)[c]
Toxic To Skin	Moderate	No
Toxic To Lungs	Moderate	No
Specific Gravity	>4.0	0.55 (Lighter)
Auto-Ignition Temperature, °F	500	1200
Lower Flammability Limit, %	0.5	5.3
Upper Flammability Limit, %	4.1	15.0
Luminous Flame	Yes	Yes
Source / Feedstock	Petroleum	Natural Gas

a. Source: *Natural Gas Vehicle Quick Reference Fuel Guide* (http://members.fortunecity.com/brucedp/attsv/gas_general.html)

Conventional fuels, such as diesel fuel, have been used since the introduction of the internal combustion engine, and their associated hazards are well documented. As

already note, LNG poses different hazards during storage, handling, transport, and use than conventional fuels. In general, the hazards posed by the conversion to LNG appear no greater than those posed by conventional fuels. Hazards due to fuel leakage are lower due to LNG's lower vapor densities, higher auto ignition temperatures, and higher "Lower Flammability Limits." There are various existing regulations and recommended safety procedures that, when employed by fleet operators, will reduce any slightly higher insignificant hazards associated with use of alternative clean fuels to the same or lower level as conventional fuels. Table 2-7 summarizes some of the regulations and safety procedures associated with use of LNG.

TABLE 2-7

Summary of Hazards and Existing Safety Regulations/Procedures Associated with LNG

Hazard	Regulation/Procedure
LNG is a cryogenic liquid and has the potential risk to workers of burns (frostbite) that can be suffered if workers come in contact with the liquid or with surfaces that are not insulated.	Proper safety equipment and training can mitigate these hazards.
LNG is generally stored above ground. Since it is a cryogenic liquid, in the event of a release, a fraction of the liquid immediately flashes off to gas while the majority of the remainder will pool and boil violently emitting dense vapor. If LNG is released into an enclosed spave and a source of ignition is present, the boiling liquid, dense vapor and gas could explode and burn threatening surrounding facilities and other storage vessels.	Tanks can be protected by containment dikes (required if neighboring tanks can be affected LAFC57.42.11) and physically separated LAFC57.42.10) so that they do not interact in case of a fire or explosion. Deluge systems can be installed to cool neighboring tanks in case of a fire.

Implementing the use of alternative fuels will require additional knowledge and training of owners/operators of fueling stations regarding maintaining and operating alternative fuel refueling stations and emergency responders. There are forums and classes designed to educate the end users of natural gas vehicle refueling stations. Not only does greater knowledge of natural gas refueling infrastructure improve safety, it contributes to reducing high natural gas refueling station life-cycle costs. Sources of information on natural gas vehicle fueling stations are currently available.

Therefore, when affected operators comply with existing regulations and recommended safety procedures, hazards impacts associated with the use of LNG will be equivalent to or less than those of conventional fuels. Accordingly, significant hazards impacts are not expected from the implementation of the proposed locomotive idling rules and related amendments.

d) Government Code §65962.5 refers to hazardous waste handling practices at facilities subject to the Resources Conservation and Recovery Act (RCRA). Government Code §65962.5 requires the California Environmental Protection Agency to develop at least annually an updated Cortese List. The Hazardous Waste and Substances Sites (Cortese) List is a planning document used by the State, local agencies and developers to comply with the CEQA requirements in providing information about the location of hazardous

materials release sites. The Department of Toxic Substance Control (DTSC) Site Mitigation and Brownfields Reuse Program Database (also known as "CalSites") provides DTSC's component of Cortese List data by identifying Annual Workplan and Backlog sites listed under Health and Safety Code section 25356. In addition, DTSC's Cortese List includes Certified with Operation and Maintenance sites. Accordingly, there are various listings on the DTSC's website of which none list any of the anticipated affected rail yards. The following links contain Cortese list for: 1) the County of Los Angeles; 2) the County of Orange; 3) the County of San Bernardino; the County of Riverside; and 5) the "CalSites" list, respectively.

1. http://www.dtsc.ca.gov/database/Calsites/Cortese_List.cfm?county=19
2. http://www.dtsc.ca.gov/database/Calsites/Cortese_List.cfm?county=30
3. http://www.dtsc.ca.gov/database/Calsites/Cortese_List.cfm?county=36
4. http://www.dtsc.ca.gov/database/Calsites/Cortese_List.cfm?county=33
5. http://www.dtsc.ca.gov/database/Calsites/Deed_List_Name.cfm

e) and f) The proposed project does not require or involve the use or transport of hazardous materials that could adversely affect air traffic or safety. The SCAQMD has reviewed the location of the rail yards and the relevant distance of an airport. As noted in Table 2-8 below, the closest airport to a rail yard where affected locomotives might be located is six miles. Such a distance does not constitute the need to evaluate the potential effect from the use of the alternative fuel on the nearby airport.

TABLE 2-8

Railyard Distance to Nearby Airport

Railyards where Affected Locomotives Could Idle	Location of Railyard	Nearest Airport	Distance to Nearest Airport*
Anaheim Yard	200 S. Adams Street, Anaheim, CA 92802	John Wayne Airport	15 miles
City of Industry Yard	17225 Arenth Street, City of Industry, CA 91748	Ontario International Airport (ONT)	25 miles
Colton Yard	19100 Slover Avenue, Bloomington, CA 92316	ONT	13 miles
Commerce Diesel Maintenance Facility	6300 Sheila Avenue, Commerce, CA 90040	Long Beach Airport (Daugherty Field) (LGB)	16 miles
Commerce Eastern Intermodal Facility	2818 Eastern Avenue, Commerce, CA 900??	LGB	17 miles
Commerce Intermodal Facility	4341 E. Washington Blvd, Commerce, CA 90023	LGB	17 miles

TABLE 2-8 (CONCLUDED)

Railyard Distance to Nearby Airport

Railyards where Affected Locomotives Could Idle	Location of Railyard	Nearest Airport	Distance to Nearest Airport*
Dolores Yard	2442 Carson Street, Carson, CA 90810	LGB	8 miles
Intermodal Container Transfer Facility	2401 Sepulveda Blvd, Long Beach, CA 90810	LGB	6 miles
La Mirada Yard	14503 Macaw Street, La Mirada, CA 90638	LGB	12 miles
Los Angeles Intermodal Facility	3770 Washington Blvd, Commerce, CA 90023	LGB	18 miles
Los Angeles Junction Railway	4433 Exchange Ave, Los Angeles, CA 90058	Los Angeles International Airport (LAX) / LGB	18 miles / 17 miles
Los Angeles Transportation Center Intermodal Facility	750 Lamar Street, Los Angeles, CA 90031	LAX	21 miles
Meade Yard	2402 Anaheim Street, Wilmington, CA 90744	LGB	8 miles
Mira Loma Auto Distribution Facility	4500 Etiwanda Avenue, Mira Loma, CA 91752	ONT	9 miles
Montclair Yard	10773 Central Place, Montclair, CA 91763	ONT	8 miles
Pacific Harbor Lines	340 W. Water Street, Wilmington, CA 90744	LGB	12 miles
Pico Rivera Yard	7427 Rosemead Blvd, Pico Rivera, CA 90660	LGB	15 miles
San Bernardino Yard	1535 W. 4th Street, San Bernardino, CA 92411	ONT	22 miles
Watson Yard	1302 Lomita Blvd, Wilmington, CA 90744	LGB	10 miles

* Distances obtained online from Yahoo Driving Directions

Therefore, PR 3502 is not expected to generate any new significant adverse hazards or hazardous materials impacts on air traffic or safety.

g) PR 3502 is intended to reduce toxic risk and locomotive idling diesel PM emissions and contain no provisions that could interfere with any adopted emergency response or evacuation plans. In the event that any fueling station is constructed in a different location than where existing diesel fueling stations are located, it is unlikely that rail operators would locate a station or other structure in a location that impedes emergency access. Further, railroad representatives have provided information to the SCAQMD indicating that no fueling stations would be built at sidings because of lack of space and fueling doesn't currently occur at sidings. Regardless, depending on the nature of any modifications at existing rail yards, it is possible that the business emergency response and emergency evacuation plans might need to be altered or modified to include provisions that consider the fueling station or other structure. Modifications to existing

business emergency response plans would require review and approval typically by the local fire department. So, in the event rail yard operators need to modify existing business emergency response plans, this would, in effect, facilitate emergency preparedness and response and, therefore, would not constitute a significant adverse impact.

h) and i) Minor construction might result from the implementation of PRs 3501 and 3502, however, the construction is expected to take place at existing facilities and, therefore, the construction of any building, structure or facility is not expected to be in wildlands or any location that could expose people or structures to significant loss, injury, or death involving wildland fires. Further, complying with the proposed rules by turning off the idling locomotive, using alternative fuels or operating control technology do not require or involve the use of flammable materials that could increase fire hazards in areas with flammable materials.

Based on the above discussion, the proposed project is not expected to have an adverse impact on hazards/hazardous materials. Since no significant adverse impacts are anticipated, no mitigation measures are required.

	Potentially Significant Impact	**Less Than Significant Impact**	**No Impact**
IX. HYDROLOGY AND WATER QUALITY. Would the project:			
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☑
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☑	☐
c) Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, in	☐	☐	☑

	a manner that would result in substantial erosion or siltation on- or off-site?			
d)	Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	☐	☐	☑
e)	Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☑
f)	Otherwise substantially degrade water quality?	☐	☐	☑
g)	Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☑
h)	Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☑
i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☑
j)	Inundation by seiche, tsunami, or mudflow?	☐	☐	☑
k)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☑
l)	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant	☐	☐	☑

environmental effects?

m)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☑
n)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☑	☐
o)	Require in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☑

SIGNIFICANCE CRITERIA

Potential impacts on water resources would be considered significant if any of the following criteria apply:

Water Quality:

- The project will cause degradation or depletion of ground water resources substantially affecting current or future uses.
- The project will cause the degradation of surface water substantially affecting current or future uses.
- The project would result in a violation of National Pollutant Discharge Elimination System (NPDES) permit requirements.
- The capacities of existing or proposed wastewater treatment facilities and the sanitary sewer system are not sufficient to meet the needs of the project.
- The project results in substantial increases in the area of impervious surfaces, such that interference with groundwater recharge efforts occurs.
- The project results in alterations to the course or flow of floodwaters.

Water Demand:

- The existing water supply does not have the capacity to meet the increased demands of the project, or the project would use a substantial amount of potable water.
- The project increases demand for water by more than five million gallons per day.

DISCUSSION

(a) and (f) The proposed rules do not include any provisions that would either directly or indirectly require any use of water or waste discharge and, thus, the affected locomotives are not expected to violate any water quality standards or otherwise substantially degrade water quality as a result of the proposed project.

(b) and (n) The proposed rules might result in the soil being disturbed if alternative fuel stations are built. Watering for dust suppression purposes is one option that may be used to comply with SCAQMD Rule 403 and/or local government permitting requirements. As such, water may be applied to disturbed surfaces to control the fugitive dust during grading activities to install LNG refueling stations. Thus, PR 3502 might require additional water during construction that would affect groundwater resources, groundwater supplies or groundwater recharge.

It is estimated that approximately 139 square yards per refueling station will require excavation and grading over a time period of 10 hours. Using the assumption that it takes 0.2 gallon per square yard per hour for adequate dust suppression, the "worst-case" water demand can be estimated by the following equation, (USEPA, 1992).

$$\text{Daily Water Usage} = 0.2\frac{\text{gal}}{\text{yd}^2\text{ - hr}} \times 139\frac{\text{yd}^2}{\text{site}} \times 8\frac{\text{hrs}}{\text{day}} \times = 222\frac{\text{gal}}{\text{site - day}}$$

Thus, on a "worst-case" basis, dust suppression activities would require 222 gallons of water per day per site. As discussed under the Air Quality section above, the maximum number of fueling stations that is likely to be constructed simultaneously in any one day is one. The maximum estimated daily construction-related water demand would be approximately 222 gallons per day. Accordingly, water demand impacts from the proposed locomotive idling rule are not significant since the total daily estimated construction-related water demand does not exceed the SCAQMD's significance criteria of 5,000,000 gallons per day.

It should be noted that other methods of dust suppression are available besides watering that would comply with SCAQMD Rule 403, such as chemical dust suppressants, etc. However, if water is used, the water needed for dust suppression associated with the installation of LNG fueling stations does not have to be of potable quality, but can be reclaimed water. Reclaimed water is currently available in many areas of the SCAQMD's jurisdiction. Thus, the insignificant water demand estimated for the

proposed locomotive idling rules are most likely an overestimation of the actual potable water demand impacts associated with their implementation.

(c), (d), (e) and (m) There are no provisions of the proposed rules which would alter existing drainage patterns, alter a stream or river, contribute to an increase in surface runoff, or require the construction of new storm water drainage facilities (or the expansion of existing storm water infrastructure) since the fueling stations are expected to be constructed at established railyards. It is expected that any new fueling stations constructed in response to PR 3502 would occur at the existing 19 affected rail facilities. Railroad representatives have provided information to the SCAQMD indicating that no fueling stations would be built at sidings because of lack of space and fueling doesn't currently occur at sidings. The affected facilities are generally located in flat areas that have been substantially modified and graded to allow easy ingress and egress of trains and other equipment. Installation of fueling stations might require installing a concrete pad to support tanks and controls, but this is not expected to affect or alter any drainage patterns at a site that is already flat. In addition, because the proposed project is not expected to require any modifications that will alter the course of a stream or river it is not expected that the proposed project will require modifications to existing storm water infrastructure or affect the quantity or quality of storm water drain-off.

(g), (h), (i) and (j) The proposed project does not require the construction of any new buildings or structures within a 100-year flood hazard area which could impede or redirect flood flows. Similarly, the proposed project will not expose people or structures to any new significant risk of loss, injury or death resulting from the failure of a levee or dam since any construction resulting from complying with PR 3502 would occur at an existing railyard. No housing will be subject to any potential inundation by seiche, tsunami, or mudflow, as the proposed project does not require the major construction of any new buildings or structures.

(k), (l) and (o) The proposed rules do not include any provision which will require the construction of new or additional (e.g. expanded) wastewater infrastructure, or includes activities which would cause wastewater to be generated. Since PR 3502 does not require water for compliance purposes, it is also not expected to generate wastewater, no wastewater treatment standards will be exceeded, and no effect on existing wastewater treatment capacity is expected.

Based on the above discussion, the proposed project is not expected to have an adverse impact on hydrology or water quality. Since no significant adverse impacts are anticipated, no mitigation measures are required.

	Potentially Significant Impact	**Less Than Significant Impact**	**No Impact**

X.	**LAND USE AND PLANNING.** Would the project:			
a)	Physically divide an established community?	☐	☐	☑
b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☑
c)	Conflict with any applicable habitat conservation or natural community conservation plan?	☐	☐	☑

SIGNIFICANCE CRITERIA

- Land use and planning impacts will be considered significant if the project conflicts with the land use and zoning designations established by local jurisdictions.

DISCUSSION

a) through c) The net effect of PR 3502 would be to provide a public health benefit by reducing exposure to air toxics and criteria pollutant emissions as a result of prohibiting locomotive idling to the surrounding community. Typically, land use and other planning considerations are determined by local governments. No land use or planning requirements would be altered by the proposed project. No new rail lines are required or expected to be necessary to comply with the proposed rules and, thus, no land use or other planning decisions should stem from the proposed project. Subsequent land use projects that may follow adoption of the proposed project, such as construction of LNG fueling stations, must comply with local land use, zoning and planning ordinances to receive local approval for construction. Any subsequent project that is not consistent with local land use ordinances will not receive approval and the railroad operator will need to consider other available compliance options. Finally, the proposed rules would not physically divide an established community, nor conflict with any land use, habitat conservation or natural community conservation plans because any construction will occur at existing railyards.

Based on the above discussion, the proposed project is not expected to have a significant adverse impact on land use and planning. Since no significant adverse impacts are anticipated, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XI. MINERAL RESOURCES. Would the project:			
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☑
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☑

SIGNIFICANCE CRITERIA

Project-related impacts on mineral resources would be considered significant if any of the following conditions are met:

- The project would result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.
- The proposed project results in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

DISCUSSION

a) and b) No provisions of the proposed rule are expected to result in the loss of availability of known mineral resources, such as aggregate, minerals, etc., or the loss of availability of a locally-important mineral resource site. The net effect of PR 3502 would be to provide a public health benefit by reducing toxic risk, diesel PM10 and other criteria pollutant emissions from existing locomotive idling to the surrounding community.

Based on the above, no adverse impacts on mineral resources are expected. Since no significant adverse impacts are anticipated, no mitigation measures are required.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
XII. NOISE. Would the project result in:				
a)	Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☑
b)	Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☑
c)	A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☑
d)	A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☑	☐
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☑
f)	For a project within the vicinity of a private airship, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☑

SIGNIFICANCE CRITERIA

Impacts on noise would be considered significant if:

- Construction noise levels exceed local noise ordinances or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three decibels (dBA) at the site boundary. Construction noise levels will be considered significant if they exceed federal Occupational Safety and Health Administration (OSHA) noise standards for workers.
- The proposed project operational noise levels exceed any of the local noise ordinances at the site boundary or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three dBA at the site boundary.

DISCUSSION

a), b) and c) Noise is usually defined as sound that is undesirable because it interferes with speech communication and hearing, is intense enough to damage hearing, or is otherwise annoying (unwanted noise). Sound levels are measured on a logarithmic scale in decibels (dB). The universal measure for environmental sound is the "A" weighted sound level, dBA, which is the sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. "A" scale weighting is a set of mathematical factors applied by the measuring instrument to shape the frequency content of the sound in a manner similar to the way the human ear responds to sounds.

The State Department of Aeronautics and the California Commission of Housing and Community Development have adopted the Community Noise Equivalent Level (CNEL). The CNEL is the adjusted noise exposure level for a 24-hour day and accounts for noise source, distance, duration, single event occurrence frequency, and time of day. The CNEL considers a weighted average noise level for the evening hours, from 7:00 p.m. to 10:00 p.m., increased by five dBA, and the late evening and morning hour noise levels from 10:00 p.m. to 7:00 a.m., increase by 10 dBA. The daytime noise levels are combined with these weighted levels and averaged to obtain a CNEL value. The adjustment accounts for the lower tolerance of people to noise during the evening and nighttime periods relative to the daytime period.

Federal, state and local agencies regulate environmental and occupational, as well as, other aspects of noise. Federal and state agencies generally set noise standards for mobile sources, while regulation of stationary sources is left to local agencies. Local regulation of noise involves implementation of General Plan policies and Noise Ordinance standards, which are general principles, intended to guide and influence development plans. Noise Ordinances set forth specific standards and procedures for addressing particular noise sources and activities. The Occupational Safety and Health Administration (OSHA) sets and enforces noise standards for worker safety.

No provisions of the proposed project expose persons to noise levels in excess of standards established in local general plans or ordinances, or standards of other agencies. PRs 3501 and 3502 do not include requirements which would directly expose people (either temporarily or permanently) to groundborne vibration or noise, or increase ambient noise levels. When unnecessary idling is reduced, the sound currently generated by the locomotive engines would cease.

The proposed project affects locomotives operating on existing rail lines. Permanent excessive noise levels generated around the affected locomotives, or excessive noise levels exposing people residing or working in the project area are not expected beyond what the neighborhood already experiences. There is a potential for periodic noise levels to rise (as addressed in subsection (d)) from the restarting of the locomotive engine(s), but the noise will not be permanent. The proposed project requires no additional equipment to the existing facilities which would cause operational noise levels to exceed ambient levels.

d) The noise generated by start up of the locomotives, as a result of complying with the requirements of PR 3502, could be temporarily louder than during continuous idling activity. The SCAQMD hired a consultant to conduct a noise study (see Appendix F) on different locomotive engines during start-up and during idling. The study was conducted to compare locomotive noise levels during start-up to noise levels during continuous idling activity to determine if there is a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project (i.e., continuous idling). Railyards are generally located within areas that are zoned for industrial uses. The acceptable noise level in industrial areas is 65 to 70 decibels (dBA). The results of the noise study indicate that locomotive noise during start-up (66.5 dBA) is lightly higher than regular idling (65 dBA), but less than high idle (68 dBA), and all below the 70 dBA level at 100 feet distance from the engine. Assuming a six dBA noise attenuation for every doubling distance, noise levels associated with the locomotive engines would be reduced to 65 dBA or less at about 150 feet from the sources. Therefore, the results from the noise study conclude that the temporary increase in ambient noise levels from the locomotive engine start-up in any affected vicinity are less than three decibels will not exceed acceptable levels nor be significantly above levels existing without the project, and are not significant.

e) and f) As noted in Table 2-8, the closest airport to a rail yard where affected locomotives might be located is six miles. Such a distance does not constitute the need to evaluate the potential effect from the use of the alternative fuel on the nearby airport.

	Potentially	**Less Than**	**No**

		Significant Impact	Significant Impact	Impact
XIII.	**POPULATION AND HOUSING.** Would the project:			
a)	Induce substantial growth in an area either directly (for example, by proposing new homes and businesses) or indirectly (e.g. through extension of roads or other infrastructure)?	☐	☐	☑
b)	Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☑
c)	Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☑

SIGNIFICANCE CRITERIA

The impacts of the proposed project on population and housing would be considered significant if the following criteria are exceeded:

- The demand for temporary or permanent housing exceeds the existing supply.
- The proposed project produces additional population, housing or employment inconsistent with adopted plans either in terms of overall amount or location.

DISCUSSION

a) through c) In general, the net effect of PR 3502 would be to provide a public health benefit by reducing exposure to air toxics and criteria pollutant emissions as a result of prohibiting locomotive idling to the surrounding community. No new employees would be necessary to comply with the requirements of PR 3502. Although there might be increased reliance on LNG refueling stations, this would be offset by less reliance on diesel fueling stations. Minor construction might result from the proposed project if additional control technology or alternative fuel usage is chosen to comply with PR 3502. However, construction workers needed will be temporary and can be provided by the existing local labor pool and, thus, no provision of the proposed rules will induce growth either directly or indirectly; or displace any housing or substantial numbers of people, requiring the construction of replacement housing.

Based on the above discussion, the proposed project is not expected to have a significant adverse impact on population and housing. Since no significant adverse impacts are anticipated, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XIV. PUBLIC SERVICES. Would the proposal result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:			
a) Fire protection?	☐	☑	☐
b) Police protection?	☐	☐	☑
c) Schools?	☐	☐	☑
d) Parks?	☐	☐	☑
e) Other public facilities?	☐	☐	☑

SIGNIFICANCE CRITERIA

- Impacts on public services would be considered significant if the project results in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response time or other performance objectives.

DISCUSSION

a) Fire protection services are generally provided by city and county fire departments. Fire protection services include emergency response actions, which may be adversely affected if there is an increase in hazard risks associated with the transport, storage, and use of LNG. An analysis of the hazard risks associated with the proposed project is

provided under the Hazards section, which includes a comparison of the hazard impacts posed by diesel and LNG.

Based on the findings of the hazards analysis, potential adverse fire hazards resulting from increasing use of LNG will be equivalent to or less than those posed by diesel. Fire protection services are also not expected to be significantly adversely affected by the operation of LNG -fueled locomotives and refueling facilities, as many of the potential hazards associated with the use and storage of the LNG is already found in association with some existing diesel refueling facilities. In fact, hazards posed by an accidental release of diesel are generally greater than those posed by LNG because of diesel's inherent toxicity and the unsafe condition created by spilled diesel. In addition, emergency response personnel are exposed to the hazards associated with natural gas in their routine operations and have the capabilities and equipment to handle emergencies associated with this fuel. It is therefore unlikely that the proposed locomotive idling rule will cause a significant increase in the need for fire protection services.

Fire protection services will not be affected by the recordkeeping requirements or the reduction of unnecessary idling. However, if an emission equivalency plan is chosen and if the plan involves the installation of LNG fueling stations, fire protection services may experience a minimal increase in the demand for agency permitting of aboveground storage tank and dispensing equipment oversight during the retrofitting and/or construction of the refueling facilities from diesel to clean fuels. Assuming a maximum "worst-case" district-wide station conversion rate of 19 stations over one year, and twenty staff hours per facility, the total staff time involved with the permitting is expected to be less than 380 hours per year, which is insignificant on a district-wide basis.

b) Limiting locomotive emissions through idling restrictions or alternative compliance options is not expected to require additional police protection than is currently necessary to maintain order and safety. The ability for police to respond and maintain appropriate service ratios, response times or other emergency responder performance objectives will not be altered as a result of implementing the proposed project.

c), d) and e) No provision of the proposed rules require the use of public services such as schools, parks or other public facilities. As indicated in the "Population and Housing" discussion, there are no provisions in the proposed project that would induce population growth, which would require construction of additional schools, parks, or other recreational resources. As a result, it is not expected that the proposed project would cause or require physically altered public facilities. Further, enforcement activities required by PRs 3501 and 3502 would be carried out by SCAQMD inspectors as part of their normal duties.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XV. RECREATION.			
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☑
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☑

SIGNIFICANCE CRITERIA

The impacts to recreation would be considered significant if:

- The project results in an increased demand for neighborhood or regional parks or other recreational facilities.
- The project adversely affects existing recreational opportunities.

DISCUSSION

a) and b) The net effect of PR 3502 would be to provide a public health benefit by reducing exposure to air toxics and criteria pollutant emissions as a result of prohibiting locomotive idling to the surrounding community. Because the proposed project is not expected to induce or redirect population growth, no provisions of the proposed rules would increase the need for additional parks or other recreational facilities, or cause the deterioration of existing facilities. The proposed rule does not require the development or construction of new recreational facilities or require the expansion of existing recreational facilities, which could have an adverse effect on the environment.

Based on the above discussion, the proposed project is not expected to have a significant adverse impact on recreation. Since no significant adverse impacts are anticipated, no mitigation measures are required.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XVI. SOLID/HAZARDOUS WASTE. Would the project:			
a) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☑
b) Comply with federal, state, and local statutes and regulations related to solid and hazardous waste?	☐	☐	☑

SIGNIFICANCE CRITERIA

The proposed project impacts on solid/hazardous waste would be considered significant if the following occur:

- The generation and disposal of hazardous and non-hazardous waste exceeds the capacity of designated landfills.

DISCUSSION

a) Railyard operators are not expected to demolish existing diesel fueling operations even if installing an LNG fueling station because diesel fuel will still be necessary for Class I freight trains and perhaps other railyard equipment, such as yard hostlers, etc. Since it is expected that only minor demolition, if any, may be necessary to clear space for LNG refueling stations, significant adverse solid waste impacts are not expected because any waste generated at affected railyards can be accommodated at local landfills. According to the Final Program Environmental Assessment for the 2003 AQMP (SCAQMD, 2003), total landfill waste disposal capacity for Class III landfills in the district is 101,344 tons per day as of 2002. As a result, based on this landfill disposal capacity, it is expected that any waste generated as a result of complying with PR 3502 can be accommodated by district landfills. Therefore, implementing PR 3502 is not expected to generate significant adverse solid waste impacts.

b) The net effect of PR 3502 would be to provide a public health benefit by reducing exposure to air toxics and criteria pollutant emissions as a result of prohibiting

locomotive idling to the surrounding community. Implementation of the proposed rules would not impede or hinder in any way compliance with any applicable federal, state or local statutes related to solid or hazardous waste disposal.

	Potentially Significant Impact	Less Than Significant Impact	No Impact
XVII. TRANSPORTATION/TRAFFIC. Would the project:			
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☑
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☑
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☑
d) Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☐	☐	☑
e) Result in inadequate emergency access?	☐	☐	☑
f) Result in inadequate parking capacity?	☐	☐	☑
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks)?	☐	☐	☑

SIGNIFICANCE CRITERIA

The impacts on transportation/traffic would be considered significant if any of the following criteria apply:

- Peak period levels on major arterials are disrupted to a point where level of service (LOS) is reduced to D, E or F for more than one month.
- An intersection's volume to capacity ratio increase by 0.02 (two percent) or more when the LOS is already D, E or F.
- A major roadway is closed to all through traffic, and no alternate route is available.
- There is an increase in traffic (e.g., 350 heavy-duty truck round-trips per day) that is substantial in relation to the existing traffic load and capacity of the street system.
- The demand for parking facilities is substantially increased.
- Water borne, rail car or air traffic is substantially altered.
- Traffic hazards to motor vehicles, bicyclists or pedestrians are substantially increased.

DISCUSSION

(a) and (b) The construction analysis concluded a maximum of seven vehicles from worker vehicles and construction equipment (during the grading phase) would be required at each fueling station construction project. Likewise, the LNG fuel delivery trips could result in approximately three to four additional truck trips per day (1,300 miles traveled/400 miles per day) during the operational phase of the emission equivalency plan to comply with the rule requirement. Both the temporary increase in traffic and the permanent increase from operation of the LNG fueling station would not exceed the significance threshold of 350 trips per day.

Cargo shipments between 350 miles to as far out as 950 miles are currently transported primarily by delivery truck. Therefore, a shift from regional train to heavy-duty truck is not expected to occur because regional shipments are already being transported by truck. Further, due to the cost and delivery time of shipping cargo across the country, it is unlikely that national shipments would shift to truck delivery because limiting unnecessary idling should not cause a price increase that cannot be absorbed by the railroad industry.

Based on the preceding information, it can be seen that the proposed project would not increase street traffic or load and capacity of the street system throughout the district, or

degrade the level of service ratios on a local or regional level. Thus, traffic will not significantly increase and the county congestion management plans will not be adversely affected.

c) There are no requirements in the proposed rules which would affect air traffic patterns because the proposed project does not involve transport of any individuals or materials by plane. Further, as noted in the preceding discussion, the proposed rules do not generate an increase in traffic levels or a change in location that results in substantial safety risks to local airports or airstrips.

d), e) and f) There are no provisions in the proposed rules that require construction of design features (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment) that could create traffic hazards or result in inadequate emergency access, transportation/traffic design features, emergency access, or parking capacity.

Further, the proposed rule would not create an inadequate emergency access situation or inadequate parking capacity situation because the proposed project is not expected to increase the demand for parking. There are no requirements in the proposed rule which would affect adopted policies, plans, or programs supporting alternative transportation. The proposed rule is intended to reduce toxic risk, diesel PM10 and other criteria pollutant emissions in the district.

Based on the above discussion, the proposed rule is not expected to generate a substantial number of new vehicle trips and therefore would not have a significant adverse impact on the transportation systems within the district.

		Potentially Significant Impact	Less Than Significant Impact	No Impact
XVIII.	**MANDATORY FINDINGS OF SIGNIFICANCE.**			
a)	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☑	☐
b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)	☐	☑	☐
c)	Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☑	☐

DISCUSSION

(a) In general, the net effect of PR 3502 would be to provide a public health benefit by reducing exposure to air toxics and criteria pollutant emissions as a result of prohibiting locomotive idling to the surrounding community. The analysis provided in the Draft PEA demonstrated that the adverse effects on the environment as a result of implementing the proposed project are not significant. Thus, the project does not have the potential to degrade the quality of the environment.

Based on the preceding analyses of "Biological Resources" and "Cultural Resources" impacts, the proposed project will not substantially reduce the habitat of a fish or wildlife

species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory. Affected locomotives operate on existing rail lines and in existing railyards, which have been previously graded and installed, such that the proposed project is not expected to extend into environmentally sensitive areas.

(b) Because project-specific impacts were concluded to be less than significant, the incremental impacts identified in the analysis are not considered to be cumulatively considerable. This conclusion is consistent with the CEQA Guidelines, which recognizes that if an incremental effect that is not 'cumulatively considerable,' (CEQA Guidelines §15065(a)(3)) a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable. Therefore, since the project-specific impacts from the proposed project are not significant, cumulative impacts are expected to be insignificant.

(c) Based on the foregoing analyses, PRs 3501 and 3502 are not expected to cause significant adverse effects on human beings, either directly, or indirectly. By restricting idling, the proposed project may generate air quality benefits.

APPENDIX A

PROPOSED RULES 3501 AND 3502

In order to save space and avoid repetition, please refer to the latest versions of the Proposed Rules 3501 and 3502 located elsewhere in the final rule package. The "PR 3501p and PR 3502p" versions of the proposed rules were circulated with the Draft PEA that was released on December 22, 2006 for a 30-day public review and comment period ending January 20, 2006.

Original hard copies of the Draft PEA, which include the "PR 3501p and PR 3502p" version of the proposed rules, can be obtained through the SCAQMD Public Information Center at the Diamond Bar headquarters or by calling (909) 396-2039.

APPENDIX E

START–UP AND IDLING EMISSIONS FROM TWO LOCOMOTIVES (FINAL REPORT BY ENGINE, FUEL AND EMISSIONS ENGINEERING INC)

In order to save space and avoid repetition, please refer to the latest version of this report located elsewhere in the final rule package.