Appendix
LAX Master Plan Final EIS

A-2a. Final Clean Air Act General Conformity Determination

January 2005

Prepared for:

Los Angeles World Airports

U.S. Department of Transportation
Federal Aviation Administration

Prepared by:

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U.S. DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Clean Air Act
Final General Conformity Determination

Los Angeles International Airport
Proposed Master Plan Improvements
Alternative D

Los Angeles, Los Angeles County, California

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EXECUTIVE SUMMARY

A demonstration of conformity with the purpose of the State Implementation Plan (SIP) must be made for a proposed federal action in a federal nonattainment or maintenance area when incremental emission rates attributable to the proposed federal action would exceed the general conformity applicability thresholds. For the LAX Master Plan, Alternative D--Enhanced Safety and Security Plan--is the preferred project subject to federal action. The criteria pollutants potentially subject to general conformity in the South Coast Air Basin include ozone (evaluated for the precursors volatile organic compounds and oxides of nitrogen), carbon monoxide, nitrogen dioxide, and particulate matter because the South Coast Air Basin is in nonattainment or maintenance status for these criteria pollutants. Alternative D is not subject to the general conformity requirements for the criteria pollutants sulfur dioxide or lead.

FAA coordinated the general conformity evaluation with public agencies having responsibility for air quality management and control in the South Coast Air Basin. Before beginning the evaluation, FAA prepared a protocol to document how it would follow all regulatory criteria and procedures, and it invited the U.S. Environmental Protection Agency, California Air Resources Board, South Coast Air Quality Management District, and Southern California Association of Governments to review and comment on the protocol. FAA maintained contact with these agencies throughout the evaluation process, including responding to comments received on the draft general conformity determination.

Alternative D as designed incorporates a variety of air quality mitigation measures to satisfy requirements of the California Environmental Quality Act. As a condition of approval of Alternative D, FAA will require Los Angeles World Airports to implement and enforce these measures on an on-going basis. All of the mitigation measures that FAA has relied upon in this final general conformity determination are CEQA-related mitigation measures that have been expressly adopted by LAWA and the City in approving Alternative D. As such, those mitigation measures are fully enforceable under Cal. Pub. Res. Code § 21081.6. California regulations also require compliance with mitigation requirements as stated in a mitigation monitoring and reporting program (MMRP); see 14 C.C.R. §§ 15091(d) and 15097(c)(3).

The incremental emissions of volatile organic compounds (VOC, as an ozone precursor) and of carbon monoxide (CO) under Alternative D are less than the general conformity de minimis threshold emission rates and Alternative D is not regionally significant for either of these pollutants. For these reasons, the general conformity requirements do not apply to these pollutants, and there was no further evaluation of them for general conformity purposes. Because the incremental emissions of oxides of nitrogen (NOx, as an ozone precursor), nitrogen dioxide (NO2), and particulate matter (PM10) would exceed the respective general conformity de minimis threshold emission rates, the general conformity requirements do apply to these pollutants and the detailed evaluation focused on them.

FAA published its the draft general conformity determination for this proposed action on January 9, 2004, and provided opportunity for a 30-day public review. A total of four comment letters were received, all from public agencies. As revised to address public comments, this final general conformity determination notes the following findings.

- *Alternative D conforms to the purpose of the SIP for NOx (and NO2 by equivalency) because the net emissions associated with Alternative D, taken together with all other NOx emissions in the South Coast Air Basin, would not exceed the emissions budgets in the approved SIP for the years required for the general conformity evaluation.*
- *Alternative D conforms to the purpose of the SIP for PM10 because the predicted peak concentrations for combined operational and construction emissions for Alternative D as designed, when added to the future background concentrations, would be less than the annual and 24-hour PM10 national ambient air quality stan*dards for the years required for the general conformity evaluation.

In a follow-up letter to FAA in August 2004, the South Coast Air Quality Management District stated its revised finding on the draft general conformity determination that "the baseline aircraft inventories would serve as the emission budgets for general conformity purposes…[i]n addition, with respect to categories other than aircraft, the emissions estimates for Alternative D are below the applicable budgets in the SIPs." The aircraft emissions inventories for Alternative D are below the baseline aircraft emission budgets in the applicable SIPs, as shown in Section 5 of this general conformity determination and confirmed in a followup telephone conversation with SCAQMD (SCAQMD 2005).

Therefore, FAA herewith concludes that Alternative D, as proposed, conforms to the purpose of the approved SIP and is consistent with all applicable SIP requirements.

1. INTRODUCTION

Section 176 (c) of the Clean Air Act (42 U.S.C. 7506(c)) requires any entity of the federal government that engages in, supports, or in any way provides financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) required under Section 110 (a) of the Clean Air Act (42 U.S.C. 7410(a)) before the action is otherwise approved. In this context, conformity means that such federal actions must be consistent with a SIP's purpose of eliminating or reducing the severity and number of violations of national ambient air quality standards (NAAQS) and achieving expeditious attainment of those standards. Each federal agency (including the Federal Aviation Administration [FAA]) must determine that any action that is proposed by the agency and that is subject to the regulations implementing the conformity requirements will, in fact, conform to the applicable SIP before the action is taken.

At issue for the Los Angeles International Airport (LAX) Master Plan is the approval by FAA of a new airport layout plan (ALP) and directly associated improvements for LAX as well as the approval by FAA of certain funding mechanisms under the Airport Improvement Program (AIP) and Passenger Facility Charges (PFC). This final general conformity determination documents the evaluation of this proposed action with the requirements of the Clean Air Act and incorporates revisions made in response to comments received from the public on the draft general conformity determination.

The remainder of Section 1 discusses the background of the regulatory requirements. Section 2 discusses the proposed action (project) to be approved by FAA. Section 3 describes how applicability of the conformity requirements to the proposed action was analyzed. Section 4 discusses the regulatory procedures for the conformity evaluation. Section 5 presents the methods and criteria that were used to evaluate the conformity of the proposed action. Section 6 discusses the concepts of mitigation required under conformity regulations. Section 7 presents the reporting process to be followed to formalize the conformity determination. Section 8 offers FAA's findings and conclusions. Section 9 provides references for the evaluation. Appendix A includes the protocol prepared by FAA to perform the general conformity evaluation. Appendix B provides a detailed discussion of the methods actually applied during the general conformity evaluation, and notes where refinements to protocol methodology occur. Appendix C includes the comments received on the draft general conformity determination during the 30-day public comment period, FAA's responses to those comments, and follow-up letters from two public agencies.

1.1 Transportation Conformity Requirements

The U.S. Environmental Protection Agency (EPA) promulgated two regulations to address the conformity requirements of the Clean Air Act. On November 24, 1993, EPA promulgated final transportation conformity regulations at 40 CFR 93 Subpart A to address federally assisted transportation plans, programs, and projects. These regulations have been revised several times since they were first issued to clarify and simplify them. On September 14, 1994, the South Coast Air Quality Management District (SCAQMD), which oversees air quality management in the South Coast Air Basin (SCAB) of California, adopted these regulations by reference as part of Rule 1902. The SCAQMD rule has also been amended since its original issuance. Although, in general, an airport development project may require or rely on improvements in roadway or transit infrastructure, a determination of transportation conformity related to such improvements would typically be addressed by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) as part of a regional transportation plan or regional transportation improvement program and not as a stand-alone project. If it could have been confirmed that the regional (i.e., off airport) emissions associated with the proposed action are included with those from the conforming Regional Transportation Improvement Program (RTIP) and the conforming Regional Transportation Plan (RTP) prepared by the Southern California Association of Governments (SCAG), the regional metropolitan planning organization (MPO), then it would not have been necessary to include these regional emissions in the general conformity evaluation. Since this cannot be confirmed, then those regional emissions were addressed in the general conformity evaluation.

1.2 General Conformity Requirements

On November 30, 1993, EPA promulgated final general conformity regulations at 40 CFR 93 Subpart B for all federal activities except those covered under transportation conformity. On September 14, 1994,

SCAQMD adopted these regulations by reference as part of Rule 1901. The general conformity regulations apply to a proposed federal action in a nonattainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutants caused by the proposed action equal or exceed certain de minimis amounts, thus requiring the federal agency to make a determination of general conformity. Regardless of the proposed action's exceedance of de minimis amounts, if this total represents 10 percent or more of the area's total emissions of that pollutant, the action is considered regionally significant and the federal agency must make a determination of general conformity. By requiring an analysis of direct and indirect emissions, EPA intended the regulating federal agency to make sure that only those emissions that are reasonably foreseeable and that the federal agency can practicably control subject to that agency's continuing program responsibility will be addressed.

The general conformity regulations incorporate a stepwise process, beginning with an applicability analysis. According to EPA guidance (EPA 1994), before any approval is given for a proposed action to go forward, the regulating federal agency must apply the applicability requirements found at 40 CFR 93.153(b) to the proposed action and/or determine the regional significance of the proposed action to evaluate whether, on a pollutant-by-pollutant basis, a determination of general conformity is required. The guidance states that the applicability analysis can be (but is not required to be) completed concurrently with any analysis required under the National Environmental Policy Act (NEPA). If the regulating federal agency determines that the general conformity regulations do not apply to the proposed action, no further analysis or documentation is required. If the general conformity regulations do apply to the proposed action, the regulating federal agency must next conduct a conformity evaluation in accord with the criteria and procedures in the implementing regulations, publish a draft determination of general conformity for public review, and then publish the final determination of general conformity.

2. DESCRIPTION OF THE PROJECT SUBJECT TO FEDERAL ACTION

In accordance with applicable general conformity regulations and guidance, FAA is only required to conduct a general conformity evaluation for a specific proposed action, i.e., the selected alternative for a project or program (EPA 1994), and FAA must issue a positive conformity determination before the proposed action may proceed or is otherwise approved. Each federal agency is responsible for determining conformity of those proposed actions over which it has jurisdiction. This final general conformity determination is related only to those actions proposed by FAA with respect to the LAX Master Plan alternative selected by the Los Angeles World Airports (LAWA) and approved by the City of Los Angeles (City) and by FAA. If any other federal agency has jurisdiction over any emissions from this project, it must conduct its own general conformity evaluation or adopt the FAA determination by reference (EPA 1994).

The general conformity requirements only apply to actions proposed in nonattainment areas (i.e., areas where one or more NAAQS are not being achieved at the time of the proposed action and requiring SIP provisions to demonstrate how attainment will be achieved) and in maintenance areas (i.e., areas recently reclassified from nonattainment to attainment and requiring SIP provisions to demonstrate how attainment will be maintained). The attainment status in the vicinity of LAX will be discussed in Section 3.

2.1 LAX Master Plan LAWA-Staff Preferred Alternative

The City is preparing the Master Plan for LAX to identify facilities needed through the year 2015. As part of the environmental review for the LAWA staff-preferred alternative (Alternative D - Enhanced Safety and Security Plan), FAA, in coordination with the City, has prepared this final general conformity determination to demonstrate compliance with the general conformity requirements in support of FAA's approval of the new ALP, directly associated improvements, and any funding mechanisms for the LAX Master Plan. For purposes of this final general conformity determination, Alternative D, including the air quality mitigation measures proposed in the LAX Master Plan Final EIR (Final EIR) (LAWA 2004a), is the LAWA-preferred project subject to federal action[1]. FAA will identify the FAA-preferred alternative in the Final EIS. The airport layout in 2015 for Alternative D is presented in **Figure 1** Alternative D - 2015 Enhanced Safety and Security Plan.

LAWA has prepared an extensive list of mitigation measure components that it proposes to implement as part of Alternative D to satisfy requirements of the California Environmental Quality Act (CEQA), and for the general conformity evaluation they are considered part of Alternative D as designed. These mitigation components were developed from reviews of mitigation measures and plans used at other airports, extensions of ongoing LAWA environmental policies, and public comments received on the Draft EIS/EIR and the Supplement to the Draft EIS/EIR. These mitigation measures include the following general approaches to reduce air quality impacts:

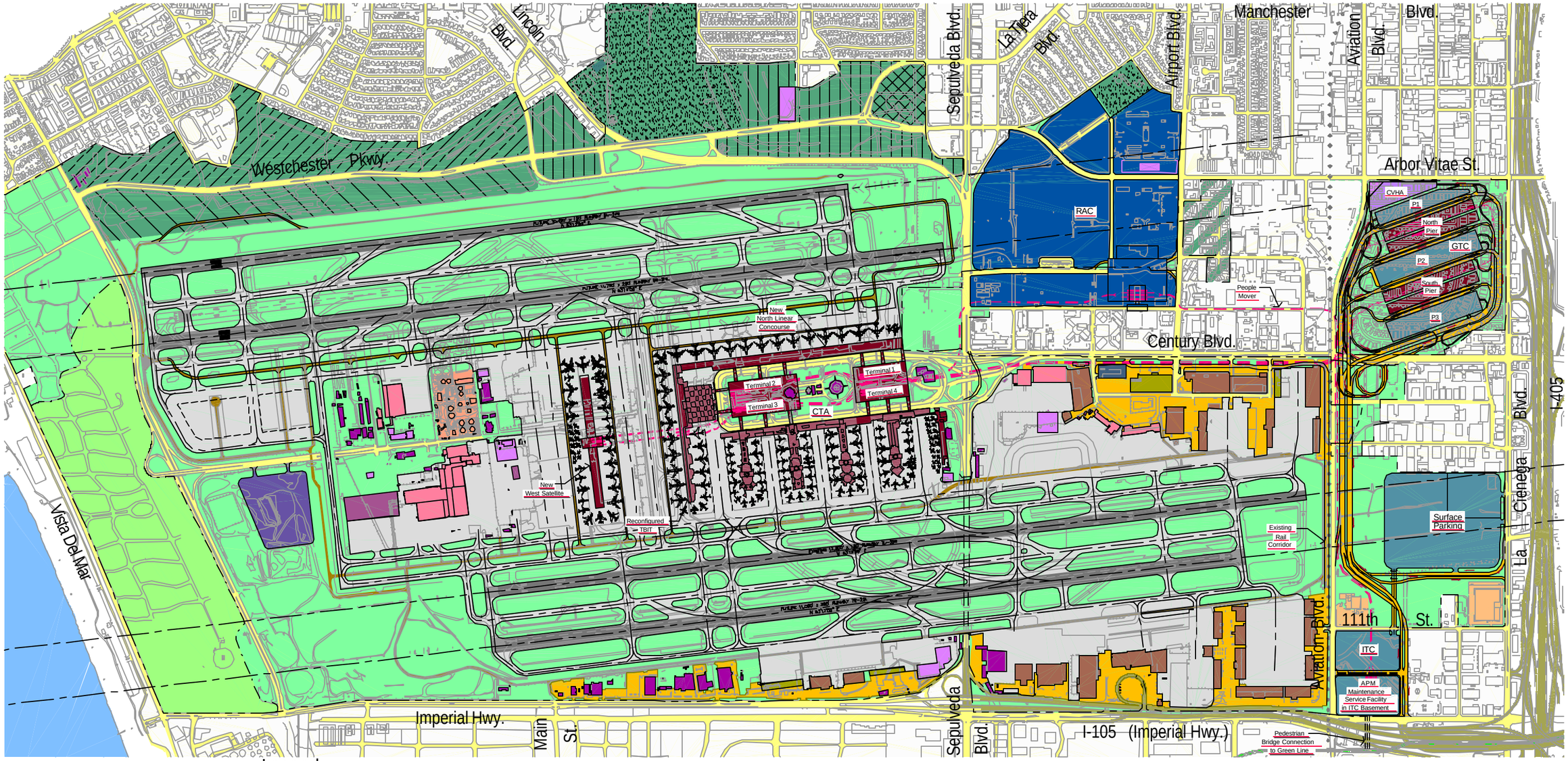
- *LAX Master Plan Mitigation Plan for Air Quality* to expand and revise the existing air quality mitigation programs at LAX in consultation with FAA, EPA, the California Air Resources Board (CARB), and SCAQMD.
- *Transportation-Related Measure* to develop and construct at least eight additional FlyAway service terminals; other components may be included.
- *Operations-Related Measure* to convert ground support equipment to extremely low emission technology such as electric power, fuel cells, or future technology developments; other components may be included.
- *Construction-Related Measure* to reduce construction equipment and activity emissions. LAWA would implement steps to reduce fugitive dust and engine emissions from construction activities. These steps would include, but are not limited to: requiring the use of emissions-reduction engine and fuel technology; requiring watering or soil stabilization; paving on-site construction routes;

[1] Section 2.7.1 of the Final EIS contains a listing of the federal actions applicable to this project.

covering truck beds; requiring construction-vehicle wheel washing facilities at entrances to public roads; minimizing the use of portable generators; specifying clean diesel technology with emission control devices for all portable generators; and using an on-site rock crushing facility to reuse rock/concrete, thus reducing off-site haul truck trips.

All of the mitigation measures that FAA has relied upon in this final general conformity determination are CEQA-related mitigation measures that have been expressly adopted by LAWA and the City in approving Alternative D. As such, those mitigation measures are fully enforceable under Cal. Pub. Res. Code § 21081.6. California regulations also require compliance with mitigation requirements as stated in a mitigation monitoring and reporting program (MMRP); see 14 C.C.R. §§ 15091(d) and 15097(c)(3). The LAX Master Plan MMRP (LAWA 2004b), which incorporates all of the mitigation measures that FAA has relied upon in this final general conformity determination, describes LAWA's lead responsibility for administering the program, the timing of implementation, monitoring frequency, and actions indicating compliance. These provisions ensure that the measures will be properly implemented. Also, the LAX Specific Plan, approved by the City pursuant to 7 C.G.C. §§ 65450 et seq. to establish zoning and development regulations and standards based on the land use plan proposed for LAX, requires in each specific project approval a finding that indicates the appropriate mitigation measures are being adopted as a condition of approval. Further, the LAX Specific Plan requires that LAWA prepare and submit to the City Council, among others, annual reports indicating the status of implementation of the LAX Master Plan MMRP. FAA will require, as a condition of its final approval in the Record of Decision, that LAWA and the City implement the mitigation measures as contemplated in the adopted LAX Master Plan MMRP. If FAA approves Alternative D, it will also include the foregoing condition as a special grant assurance in grant agreements entered into with the City for Alternative D.

Table 1, List of Construction Projects in Alternative D, presents the list of major construction projects included in Alternative D.



Legend

- Airport Property Boundary Line
- El Segundo Blue Butterfly Preserve
- Airfield/Airport Open Space
- Runways
- Taxiways/Aircraft Aprons
- Existing Terminal Buildings
- Existing Cargo Building
- Existing Maintenance Facility
- Existing Collateral Development
- Existing Light Rail Transit
- Existing Ancillary Facility
- Existing Roadways
- Existing Commercial Use
- Existing Off-Airport Use
- Existing Employee Parking
- Existing Fuel Farm
- Proposed Terminals
- Existing MTA Right-of-Way
- Proposed Cargo Building
- Proposed Maintenance Facility
- Proposed Ancillary Facility
- Proposed Airside Service Roads
- Proposed Public Parking
- Proposed Commercial Vehicle Staging Area
- Proposed Employee Parking
- Airport Landside
- Proposed People Mover
- Proposed Rental Car Facility
- High Density Mixed Use (Hotel, Office, Retail)
- Medium Density Commercial (Hotel, Office, Retail)
- R/D Business Park
- Airport Related
- Golf Course/Open Space/Recreation
- ANMP Acquisition Area

375' 750' 2,250'
750' 0 1,500'

Prepared by: Landrum & Brown, April 2003

LAX Master Plan - General Conformity Determination

Alternative D - 2015 Enhanced Safety and Security Plan

Figure
1

Table 1

List of Construction Projects in Alternative D

Construction Projects	Project Description
North Airfield Modifications	- extend north runway 6L/24R; - extend, relocate and widen north runway 6R/24L; - construct new center taxiway between runway 6L/24R and 6R/24L; - modify existing taxiway E, E17 and D;
South Airfield Modifications	- Relocate runway 7R/25L; - construct new center taxiway between runway 7L/24R and 7R/24L.
Reconfiguration of Central Terminal Area	- provide four new terminals (Terminal 1 to 4); - construct new north linear concourse; - reconfigure the Tom Bradley International Terminal; - reconfigure the existing terminal 4 to 7; - construct new West Satellite Concourse; - construct new Ground Transportation Center (GTC); - construct Intermodal Transportation Center (ITC); - consolidate Rental Car Facility (RAC).
Modifications of Ground Access Roads and Parking Facilities	- on-airport road access; - off-airport public road access; - transit, a walkway between Green Line station and ITC; - public parking GTC, ITC and expanded Lot B; - employee parking.
Construction of Automated People Mover (APM)	- landside APM system; - airside APM system.
Cargo Facilities	- construct new cargo facilities; - reconfigure existing cargo facilities.
Modification of Ancillary Facilities	- reconfigure airline maintenance facilities; - construct two new Ground Run-up Enclosure (GRE); - modify existing fuel farm; - expand fire stations 51 and 80.

2.2 Relationship to Other Environmental Analyses

Both NEPA and CEQA require that the air quality impacts of the LAX Master Plan implementation be analyzed and disclosed. Regulatory guidance implementing these statutes requires that the air quality impacts from the project alternatives be determined by identifying the associated project incremental emissions and air pollutant concentrations and comparing them respectively to emissions thresholds and state and national ambient air quality standards. For CEQA purposes, the impacts of the build alternatives (Alternatives A, B, C, and D) were compared to the impacts of the environmental baseline and an adjusted environmental baseline to determine environmental significance to develop appropriate mitigation measures. The impacts of the build alternatives (Alternatives A, B, C, and D) were also compared to the No Action/No Project Alternative impacts for NEPA purposes of public disclosure. FAA is the lead agency for the NEPA analysis documented in an Environmental Impact Statement (EIS). The City is the lead agency for the CEQA analysis documented in an Environmental Impact Report (EIR). A joint Draft EIS/EIR was published for public review and comment in January 2001 (FAA/LAWA 2001) providing an analysis of three build alternatives (Alternatives A, B, and C). A joint Supplement to the Draft EIS/EIR was published in July 2003 (FAA/LAWA 2003) providing an analysis of a new build

alternative (Alternative D). LAWA published the Final EIR in April 2004 (LAWA 2004a) documenting the integrated analysis of all alternatives considered. FAA will publish the Final EIS at a later date.

The Airport and Airway Improvement Act (AAIA) of 1982, as amended, is an applicable federal law. The AAIA has required, in pertinent part, that, as a necessary condition of approval by the Secretary of the Department of Transportation of an application for an airport development project involving the location of an airport or runway or a major runway extension, the governor of the state in which the project will be located must certify in writing that there is reasonable assurance that the project will be located, designed, constructed, and operated in compliance with applicable air and water quality standards. On December 12, 2003, President Bush signed into law the FAA reauthorization bill known as Flight 100--Century of Aviation Reauthorization Act. This Act eliminates the requirement for the governor's certificate previously required under the AAIA.

3. REGULATORY PROCEDURES

The general conformity regulations establish certain procedural requirements that must be followed when preparing a general conformity evaluation. This section addresses the major procedural issues and specifies how these requirements are met for the evaluation of Alternative D. The procedures required for the general conformity evaluation are similar but not identical to those for conducting an air quality impact analysis under NEPA regulations.

3.1 Use of Latest Planning Assumptions

The general conformity regulations require the use of the latest planning assumptions for the area encompassing the proposed federal action, derived from the estimates of population, employment, travel, and congestion most recently approved by the MPO (40 CFR 93.159(a)). It should be noted that the latest planning assumptions available from the MPO at the time of this evaluation may differ from the planning assumptions used in establishing the applicable SIP emissions budgets. The approved 1997/1999 AQMP was developed with data similar to that used in the 1998 RTP. However, the approved 2001 RTP assumes a lower activity level at LAX than the 1998 RTP, which it supersedes.

As noted previously, SCAG is the MPO for the region encompassing LAX. The SCAG region covers an area of over 38,000 square miles and includes the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. To support the 2001 RTP, SCAG prepared the *2001 Social Economic Forecast Report* and conducted the 2001 *Travel and Congestion Survey* (SCAG 2001). The growth forecast for the 2001 RTP estimated a region-wide population growth rate of 1.4 percent per year between 1997 and 2025 and a region-wide employment growth rate of 1.5 percent per year for the same period. The growth rates for population and employment in Los Angeles County were forecast to be approximately half those for the region as a whole over the forecast period, as people and jobs are expected to shift eastward within the region over the forecast period.

The Alternative D planning assumptions reflected in the Final EIR are based on the airport accommodating 78.9 million annual passengers and 3.1 million annual tons of cargo in 2015, and the activity level will be constrained by airside gate access for aircraft. The 2001 RTP explicitly assumes that the airport will accommodate 78 million annual passengers and 3 million annual tons of cargo in 2025. In a letter dated November 6, 2003, addressed to Mr. Jim Ritchie of LAWA from Mr. Jeffrey Smith of SCAG providing comments on the Supplement to the Draft EIS/EIR, Mr. Smith noted that the forecast activity levels of Alternative D are generally consistent, but not specifically consistent, with the adopted forecast for LAX in the 2001 RTP. In its analysis to support the 2001 RTP, SCAG assumed that when the constrained capacity at LAX is reached, it will not be exceeded, but the analysis did not predict when the constrained capacity level would be reached (Armstrong 2003a). Alternative D is consistent with the policy framework of the 2001 RTP, which calls for no expansion of LAX, and, instead, shifts the accommodation of future aviation demand to other airports in the region.

In a letter dated February 4, 2004, with comments on the draft general conformity determination, SCAG noted that Alternative D is consistent with both the 2001 RTP and the Draft 2004 RTP and that the LAX Master Plan meets general conformity requirements (see Appendix C).

It should be noted that SCAG adopted its 2004 RTP in April 2004 (SCAG 2004). Information developed to support the 2004 RTP which was provided by SCAG (Armstrong 2003b) indicates that LAX is expected to reach a passenger demand level of 63 to 64 MAP in 2005 and 78 MAP in 2015, based on predictions of the SCAG RADAM 9.11 model based on the Service Brokerage Concept including the Incentive Package designed to boost demand at outlying airports. This model prediction is generally consistent with the market forecasts developed by the LAX Master Plan team to support Alternative D in 2015.

3.2 Use of Latest Emission Estimation Techniques

The general conformity regulations require the use of the latest and most accurate emission estimation techniques available, unless such techniques are inappropriate (40 CFR 93.159(b)). Prior written approval from SCAQMD or EPA is required to modify or substitute emission estimation techniques. It should be noted that the latest and most accurate emission estimation techniques available at the time of

this evaluation may differ from the emission estimation techniques used in establishing the applicable SIP emissions budgets. The details of emissions estimating are described in Appendix B. The emission estimation techniques used in this evaluation are generally consistent with those used in preparing the Final EIR (LAWA 2004a) and Final EIS (FAA).

For on-road motor vehicle emissions, the general conformity regulations require the use of the most current version of the motor vehicle emission factor model specified by EPA and available for use in the preparation or revision of the SIP. In California, this model is CARB's EMFAC model, and the most current version available at the time this evaluation commenced was EMFAC2002, approved by EPA in 2003 (68 FR 15720).

FAA requires the use of the Emissions and Dispersion Modeling System (EDMS) to evaluate emissions from aviation sources at airports (63 FR 18068). The most current version of EDMS available from FAA at the time this evaluation commenced was EDMS 4.11. One exception is the fact that EDMS does not currently incorporate emission factors for particulate matter from aircraft and auxiliary power units because such data are not readily available. For this general conformity evaluation, the methods introduced in the LAX Master Plan Draft EIS/EIR (Draft EIS/EIR) (FAA/LAWA 2001), and further described by Whitefield et al. (Whitefield et al. 2001), were used to estimate particulate emissions from aircraft for the No Action/No Project Alternative and Alternative D, consistent with the guidance for using the best available information (EPA 2002). Particulate emissions from APUs were considered negligible and were not quantified for this evaluation.

Emission factors for stationary point and area sources were based primarily on EPA's Compilation of Air Pollutant Emission Factors AP-42 (EPA 2003) unless more representative data were identified at SCAQMD's website (http://www.aqmd.gov) under annual emission reports.

For nonroad mobile emissions, the most current emission factors were taken from CARB's OFFROAD emissions model or the CEQA Air Quality Handbook (SCAQMD 1993), whichever is more relevant. Emissions from GSE were calculated based on emission factors from the OFFROAD model which had been entered into EDMS.

3.3 Use of Applicable Dispersion Models

The general conformity regulations require the use of the applicable air quality models, databases, and other requirements in the most recent version of EPA's Guideline on Air Quality Models (40 CFR 51, Appendix W), unless such techniques are inappropriate (40 CFR 93.159(c)). Prior written approval from SCAQMD or EPA is required to modify or substitute dispersion models. The FAA EDMS model, Version 4.11 (EDMS 4.11) was used to conduct PM_{10} dispersion modeling of all airport sources for this evaluation. The use of EDMS 4.11 was included in the Protocol for General Conformity Evaluation (see Appendix A) developed for this analysis and reviewed by SCAQMD, EPA, and CARB. See Section 4 below for additional information on the protocol and the acceptability of the methodologies used. The details of dispersion modeling are described in Appendix B.

3.4 Emission Scenarios

The general conformity regulations require that the evaluation must reflect certain emission scenarios (40 CFR 93.159(d)). Specifically, these scenarios must include emissions from the proposed federal action for the following years: (1) for nonattainment areas, the year mandated in the Clean Air Act for attainment and for maintenance areas, the farthest year for which emissions are projected in the approved maintenance plan; (2) the year during which the total of direct and indirect emissions for the proposed action are projected to be the greatest on an annual basis; and (3) any year for which the applicable SIP specifies an emissions budget. These emission scenarios will be described in more detail in Section 5. **Table 2**, Emission Scenario Years for General Conformity Evaluation, lays out the years for which the general conformity evaluation was performed.

Table 2

Emission Scenario Years for General Conformity Evaluation

Pollutant	Attainment/ Maintenance Year	Greatest Emissions Year	Emissions Budget Years
Nitrogen Dioxide	2010	2005	Not Applicable
Ozone (VOC or NO_x)	2010	2005	2005, 2008
Carbon Monoxide	2000	2005	Not Applicable
Particulate Matter	2006	2013	2003

Source: Camp Dresser & McKee Inc., 2003.

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4. APPLICABILITY ANALYSIS

Prior to conducting the general conformity evaluation, FAA prepared a draft protocol and submitted it to EPA, CARB, SCAG, and SCAQMD for review and comment. On February 27, 2003, U.S. Transportation Secretary Norman Y. Mineta announced a list of six transportation construction projects nationwide that included the LAX Master Plan and EIS/EIR that would receive accelerated environmental review under President Bush's Executive Order 13274 on environmental stewardship. Further coordination with EPA, CARB, SCAG, and SCAQMD on the analysis protocols and the development of the general conformity evaluation were undertaken by FAA pursuant to Executive Order 13274. FAA prepared the final protocol by addressing comments received from these agencies, and it served as the basis for this final general conformity determination (see Appendix A for the final protocol, including reviewing agencies' specific comments on the draft protocol and FAA's responses to those comments). In a letter to FAA dated August 12, 2004, SCAQMD stated that the methodologies used in calculating emissions and air quality modeling presented in the draft general conformity determination were acceptable (see Appendix C).

As previously noted, FAA requires the use of EDMS for airport air quality analysis of aviation sources. FAA's recent guidance document (FAA/USAF 1997) does allow that supplemental methodology and models for more refined analysis of non-aviation sources would be permitted in consultation with the appropriate FAA regional program office. FAA's recent guidance document supports early consultation and coordination with other agencies (e.g., state/regional air quality agencies, EPA) for proposed actions with potentially significant air quality impacts, and where the general conformity regulations apply to a proposed project FAA will issue a conformity determination following review and comment on a draft by the public (including other interested agencies).

As stated previously, the first step in a general conformity evaluation is an analysis of whether the requirements apply to a federal action proposed to be taken in a nonattainment or a maintenance area. Unless exempted by the regulations or otherwise presumed to conform, a proposed federal action requires a general conformity determination for each pollutant where the total of direct and indirect emissions caused by the proposed action would equal or exceed an annual de minimis emission rate. Notwithstanding the de minimis emission rate, if a proposed action is identified to be regionally significant, the federal agency must make a general conformity determination.

4.1 Attainment Status of South Coast Air Basin

LAX is located within Los Angeles County in the SCAB of southern California. The regulatory agencies with primary responsibility for air quality management in the SCAB include SCAQMD and CARB, with oversight by EPA. Pursuant to the Clean Air Act, EPA established primary NAAQS to protect the public health with an adequate margin of safety and secondary NAAQS to protect the public welfare for seven air pollutants. These pollutants are known as criteria pollutants: particulate matter with an equivalent aerodynamic diameter less than or equal to 10 micrometers (µm) in diameter (PM_{10}), particulate matter with an equivalent aerodynamic diameter less than or equal to 2.5 µm in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), and lead (Pb). EPA has delegated authority to SCAQMD to implement and enforce the NAAQS in the SCAB.

That portion of the SCAB encompassing LAX is in an area that is designated as being in nonattainment of the NAAQS for O_3 (one-hour average), CO, and PM_{10}. In addition, the severity of the nonattainment status for this area has been classified as "extreme" for O_3, "serious" for CO, and "serious" for PM_{10}. On July 24, 1998, this area was redesignated from nonattainment to attainment/maintenance status for NO_2 by EPA (63 FR 39747). The area is in attainment of the NAAQS for SO_2 and Pb. On April 15, 2004, EPA designated that portion of the SCAB encompassing LAX as a severe nonattainment area for O_3 (eight-hour average), effective June 15, 2004; however, no general conformity determination is required to address the eight-hour average O_3 NAAQS until after June 15, 2005 (69 FR 23951), and thus it is not relevant to this final general conformity determination. The attainment status of the area for $PM_{2.5}$ was not established at the time of this evaluation[2]. Thus, for purposes of the general conformity requirements, this evaluation addresses NO_2, O_3 (one-hour average), CO, and PM_{10}.

[2] The USEPA announced the designation of the South Coast Air Basin as a nonattainment area for the fine particulate matter ($PM_{2.5}$) NAAQS on December 17, 2004. However, neither the currently applicable SIP nor the 2003 AQMP address control

4.2 Exemptions from General Conformity Requirements

As noted previously, the general conformity requirements apply to a proposed federal action if the net project emissions equal or exceed certain de minimis emission rates. The only exceptions to this applicability criterion are the topical exemptions summarized below. However, the emissions attributable to Alternative D do not meet any of these exempt categories.

- Actions which would result in no emissions increase or an increase in emissions that is clearly below the de minimis levels (40 CFR 93.153(c)(2)). Examples include administrative actions and routine maintenance and repair.
- Actions where the emissions are not reasonably foreseeable (40 CFR 93.153(c)(3)).
- Actions which implement a decision to conduct or carry out a conforming program (40 CFR 93.153 (c)(4)).
- Actions which include major new or modified sources requiring a permit under the New Source Review (NSR) program (40 CFR 93.153(d)(1)).
- Actions in response to emergencies or natural disasters (40 CFR 93.153(d)(2)).
- Actions which include air quality research not harming the environment (40 CFR 93.153(d)(3)).
- Actions which include modifications to existing sources to enable compliance with applicable environmental requirements (40 CFR 93.153(d)(4)).
- Actions which include emissions from remedial measures carried out under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) that comply with other applicable requirements (40 CFR 93.153(d)(5)).

In addition to these topical exemptions, the general conformity regulations allow each federal agency to establish a list of activities that are presumed to conform (40 CFR 93.153(f)). Although FAA has signaled its intention to publish such a list, to date, no official list is available. FAA may publish such a list in the future (Plante 2004).

4.3 De Minimis Emission Rates

The general conformity requirements will apply to LAX Master Plan Alternative D for each pollutant for which the total of direct and indirect emissions caused by Alternative D (i.e., the net, or incremental, emissions between the projected emissions for Alternative D and the projected emissions for the No Action/No Project Alternative) equal or exceed the de minimis emission rates shown in **Table 3,** De Minimis Emission Rates for Determining Applicability of General Conformity Requirements to LAX Master Plan Alternative D. These emission rates are expressed in units of tons per year (tpy) and are compared to the total of direct and indirect emissions caused by Alternative D for the calendar year during which the net emissions are expected to be the greatest. It should be noted that, because O_3 is a secondary pollutant (i.e., it is not emitted directly into the atmosphere but is formed in the atmosphere from the photochemical reactions of volatile organic compounds, VOC, and oxides of nitrogen, NO_x, in the presence of sunlight), its de minimis emission rate is based on primary emissions of its precursor pollutants - VOC and NO_x. The designation "oxides of nitrogen" (NO_x) includes several distinct but related compounds, primarily nitric oxide (NO), nitrogen dioxide (NO_2), and nitrous oxide (N_2O), although others such as dinitrogen pentoxide (N_2O_5) also exist. As a conservative assumption for this evaluation, it was assumed that all NO_x was emitted as NO_2, therefore, NO_x and NO_2 are considered equivalent in this document. Most NO_x is emitted from anthropogenic sources as NO, but due to the atmospheric conditions extant as each molecule moves through the air (e.g., temperature, insolation, and types and

measures for demonstrating attainment of the $PM_{2.5}$ NAAQS. The SCAQMD will formally address $PM_{2.5}$ control measures in the next AQMP (currently scheduled for 2006 or 2007). The on-site and Hawthorne air quality monitoring stations used to characterize existing conditions at LAX did not include measurements of $PM_{2.5}$, thus representative background $PM_{2.5}$ concentrations in the vicinity of the airport are not available. In addition, the CEQA-related mitigation measures included in the Mitigation Monitoring & Reporting Program (MMRP, discussed in Section 2.1 of this final general conformity determination) that control PM_{10} also control $PM_{2.5}$; the $PM_{2.5}$ attainment status does not change measures or add measures to those already planned for implementation. Finally the SCAQMD has not yet issued guidance on $PM_{2.5}$ analysis methodology for use in the South Coast Air Basin. Therefore, a general conformity evaluation for $PM_{2.5}$ was not conducted.

concentrations of other chemical species such as various VOC) as well as the time following emission, NO_x exists in the lower troposphere in a dynamic equilibrium of its various component compounds, the most abundant of which are NO and NO_2. Due to perturbations in this equilibrium of NO_x species caused by the introduction of other photochemically reactive compounds into the surrounding atmosphere, only in a well aged air mass is NO_2 the predominant species of NO_x. Therefore, assuming that NO_x is 100 percent NO_2 overestimates the NO_2 emissions. For purposes of this evaluation, the discussion related to ozone will utilize the designation "NO_x," whereas the discussion related to nitrogen dioxide will utilize the designation "NO_2." If the net emissions of either VOC or NO_x exceed the de minimis emission rate for O_3 (EPA 1994), then Alternative D is subject to a general conformity evaluation for O_3.

Table 3

De Minimis Emission Rates for Determining Applicability of General Conformity Requirements to LAX Master Plan Alternative D

Pollutant	SCAB Attainment Status Designations	De Minimis Emission Rate (tons/year)
Nitrogen Dioxide	Attainment/Maintenance	100
Ozone (VOC or NO_x)	Nonattainment/Extreme	10
Carbon Monoxide	Nonattainment/Serious	100
Particulate Matter	Nonattainment/Serious	70

Source: 40 CFR 93.153 and 40 CFR 81.305

4.4 Regional Significance

Even if a proposed federal action is less than the applicable de minimis emission rate for a given pollutant, the general conformity requirements state that a regionally significant action must undergo a conformity evaluation. A regionally significant action is one for which the total of direct and indirect emissions represent 10 percent or more of the nonattainment or maintenance area's emissions inventories for all sources (as identified in the applicable SIP for stationary point, mobile, and area sources) for that pollutant. EPA guidance also indicates that any milestone emissions inventory in the applicable SIP should also be considered when evaluating regional significance (EPA 1994).

4.5 Applicability for Proposed Federal Action

The applicability of the general conformity requirements to Alternative D were evaluated by comparing the total of direct and indirect emissions (calculated as discussed in Appendix B) for the calendar year of greatest emissions to the de minimis emission rates in **Table 3**. Where the total of direct and indirect emissions attributable to Alternative D were found to be excluded from the general conformity requirements because they are below the de minimis emission rates for a pollutant, the total of direct and indirect emissions for that pollutant were compared to the nonattainment or maintenance area's emission inventory for that pollutant to determine whether it is regionally significant. Those pollutants that could not be excluded from applicability by one of these mechanisms underwent a complete general conformity evaluation consistent with the procedures in Section 3 above using the methods in Appendix B and the criteria in Section 5 below.

4.5.1 Methodology

Appendix A contains a discussion of the planned approach for estimating emissions for this general conformity evaluation. Appendix B contains explicit details on the significant assumptions and calculational methods used to estimate emissions for both the No Action/No Project Alternative and for Alternative D. In the event that data or methods referenced in Appendix A were updated or revised following the publication date of Appendix A, the updated or revised information was incorporated into this evaluation as reflected below and in Appendix B.

4.5.2 Estimated Emissions

Emissions were calculated for VOC, CO, NO_x, and PM_{10} for on-airport activities (operations), construction activities, and off-airport activities (regional) associated with both the No Action/No Project Alternative and Alternative D. For purposes of this evaluation, emissions of NO_2 are assumed to equal emissions of NO_x. These emissions are associated with stationary point, mobile, and area sources forecasted to exist for these two alternatives across the planning horizons developed for the LAX Master Plan.

4.5.2.1 No Action/No Project Alternative

The No Action/No Project Alternative represents the no-build scenario, i.e., the configuration and activity levels expected for LAX in the absence of approval of the LAX Master Plan. Emissions for this alternative were developed for two planning horizons, 2005 and 2015, as presented in the Final EIR, Appendix G, *Air Quality Impact Analysis*, Section 4 (LAWA 2004a). Non-Master Plan and previously locally approved projects would, however, be constructed under the No Action/No Project Alternative which include LAX Northside and Continental City. The Northside Development Project assumes build out of approximately 4.5 million square feet of local government approved improvements including but not limited to office space, hotel space, retail space, and a golf course in an area of approximately 340 acres of land that straddles both sides of the Westchester Parkway north of LAX. The Continental City Development Project assumes build out of approximately 3 million square feet of local government approved improvements including but not limited to office space, hotel space, and retail space in an area of approximately 28.5 acres of land situated along Aviation Boulevard between 111th Street and Imperial Highway. Construction of these projects would have emissions occurring in the time periods considered for this evaluation.

The on-airport operations emissions and off-airport (regional) emissions estimated for year 2005 as presented in the Draft General Conformity Determination (FAA 2004) were adjusted (reduced) to allow a more realistic comparison to emissions from expected aviation activity levels. The No Action/No Project Alternative as developed in the LAX Master Plan was forecast at a passenger activity level of 71.2 MAP in 2005. Using data provided by SCAG (Armstrong 2003b), the operations for 2005 passenger aviation sources (aircraft, APUs, and GSE) and motor vehicle sources were multiplied by a factor of 64/71.2 (=0.899) to provide a planning estimate of projected activity in 2005. Then, on-airport and off-airport operational emissions for 2005 were estimated using the revised passenger related activity combined with the cargo aircraft activity determined for the Draft General Conformity Determination (FAA 2004). Emissions in the interim years between 2005 and 2015 were estimated following a linear interpolation approach. The off-airport (regional) emissions associated with operations at LAX were added to the on-airport operations emissions. The estimated No Action/No Project construction emissions by year, as presented in the Draft General Conformity Determination (FAA 2004), were adjusted (reduced) to incorporate the same level (percent) of air quality mitigation assumed for construction emissions under Alternative D. It is assumed that, in the absence of approval of the LAX Master Plan, on-going projects and other entitled projects (as noted above) would be constructed. The year-by-year operations, regional, and construction emissions were then added together. These data are summarized in **Table 4**, LAX Master Plan Emissions for No Action/No Project Alternative Interim Years.

Table 4

LAX Master Plan Emissions for No Action/No Project Alternative Interim Years

	2005	2006	2008	2010	2013	2015
VOC						
Aircraft, tpy[1]	901	933	998	1,063	1,160	1,224
APU[2], tpy	8	8	8	9	9	9
GSE[3], tpy	166	139	85	31	27	24
Stationary, tpy	82	83	84	86	89	91
MV[4] On Airport, tpy	372	354	318	282	228	192
MV Off Airport, tpy	2.512	2,421	2,240	2,059	1,787	1,606
Construction, tpy	883	525	203	123	0	0
Total, tpy	**4,924**	**4,464**	**3,937**	**3,652**	**3,299**	**3,145**
CO						
Aircraft, tpy	5,312	5,445	5,711	5,977	6,376	6,642
APU, tpy	165	169	175	182	191	198
GSE, tpy	2,362	2,237	1,988	1,738	1,364	1,114
Stationary, tpy	112	112	113	114	115	116
MV On Airport, tpy	2,805	2,665	2,384	2,103	1,682	1,402
MV Off Airport, tpy	27,968	26,690	24,134	21,578	17,744	15,188
Construction, tpy	654	490	307	104	0	0
Total, tpy	**39,377**	**37,807**	**34,811**	**31,795**	**27,472**	**24,659**
NO_x and NO_2						
Aircraft, tpy	4,315	4,400	4,570	4,741	4,996	5,167
APU, tpy	84	86	90	94	99	103
GSE, tpy	1,116	935	573	211	188	172
Stationary, tpy	199	200	202	204	208	210
MV On Airport, tpy	365	351	323	295	253	225
MV Off Airport, tpy	4,193	4.011	3,646	3,281	2,733	2,368
Construction, tpy	311	218	131	55	0	0
Total, tpy	**10,583**	**10,201**	**9,535**	**8,880**	**8,477**	**8,245**
PM_{10}						
Aircraft, tpy	46	47	51	54	59	63
APU, tpy	0	0	0	0	0	0
GSE, tpy	38	35	30	25	17	12
Stationary, tpy	34	34	35	35	36	37
MV On Airport, tpy	49	49	50	51	52	53
MV Off Airport, tpy	1,454	1,486	1,552	1,617	1,715	1,780
Construction, tpy	47	40	27	9	0	0
Total, tpy	**1,667**	**1,692**	**1,744**	**1,791**	**1,879**	**1,944**

1 tpy = tons per year
2 APU = auxiliary power unit
3 GSE = ground support equipment
4 MV = motor vehicles

Source: Camp Dresser & McKee Inc., 2003.

It should be noted that the GSE emissions for horizon years 2005 and 2015 were remodeled from those presented in the draft general conformity determination (FAA 2004) to better account for the full implementation of the Memorandum of Understanding (MOU) signed in December 2002 (see Section 5.2.2 below). Also, although the APU emissions are listed separately from other source categories herein, it should be noted that APU emissions are combined with aircraft emissions in the SIP emissions inventories developed by SCAQMD.

4.5.2.2 Alternative D

Alternative D represents the build scenario, i.e., the configuration and activity levels expected for LAX with approval of the LAX Master Plan. Emissions for this alternative were developed for two planning horizons, 2013 and 2015, as presented in the Final EIR, Section 4.6.8.1, *Mitigated Airport Emissions Inventory* (LAWA 2004a).

Using as a starting point the on-airport operations and off-airport (regional) emissions estimated for year 2005 for the No Action/No Project Alternative as discussed in subsection 4.5.2.1 above, on-airport operations emissions for interim years out to 2015 for Alternative D were estimated following a linear interpolation approach; emissions from aircraft, APUs, and stationary sources in 2013 were conservatively assumed to be the same as those in 2015. The off-airport (regional) emissions associated with operations at LAX, based on a linear interpolation between the 2005 estimate for the No Action/No Project Alternative and the 2015 estimate for Alternative D, were added to the on-airport operations emissions. To these emissions were also added the estimated construction emissions by year as presented in the Final EIR, Appendix F-B, *Air Quality Appendix,* Attachment 1 (LAWA 2004a), to build out Alternative D. The year-by-year operations, regional, and construction emissions were added together to identify the year of highest emissions. These data are summarized in **Table 5**, LAX Master Plan Emissions for Alternative D Interim Years. The year of highest emissions for each pollutant are summarized in **Table 2**.

Table 5

LAX Master Plan Emissions for Alternative D Interim Years

	2005	2006	2008	2010	2013	2015
VOC						
Aircraft, tpy[1]	901	927	981	1,034	1,168	1,168
APU[2], tpy	8	8	8	9	9	9
GSE[3], tpy	166	140	88	35	14	0
Stationary, tpy	82	83	84	86	89	91
MV[4] On Airport, tpy	372	360	335	310	259	248
MV Off Airport, tpy	2,512	2,370	2,086	1,802	1,365	1,091
Construction, tpy	86	78	65	32	72	0
Total, tpy	**4,127**	**3,966**	**3,647**	**3,308**	**2,976**	**2,607**
CO						
Aircraft, tpy	5,312	5,412	5,613	5,813	6,314	6,315
APU, tpy	165	168	172	177	189	189
GSE, tpy	2,362	2,126	1,653	1,181	518	0
Stationary, tpy	112	113	115	117	120	122
MV On Airport, tpy	2,805	2,692	2,465	2,238	1,965	1,672
MV Off Airport, tpy	27,968	26,488	23.527	20,567	16,719	13,166
Construction, tpy	556	526	461	252	547	0
Total, tpy	**39,279**	**37,524**	**34,007**	**30,346**	**26,372**	**21,464**
NO_x and NO_2						
Aircraft, tpy	4,315	4,402	4,577	4,752	5,190	5,190
APU, tpy	84	86	90	93	102	102
GSE, tpy	1,116	940	588	236	94	0
Stationary, tpy	199	202	209	216	226	233
MV On Airport, tpy	365	357	342	326	327	287
MV Off Airport, tpy	4,193	3,984	3,566	3,147	2,628	2,102
Construction, tpy	1,141	999	819	365	905	0
Total, tpy	**11,413**	**10,971**	**10,191**	**9,136**	**9,473**	**7,914**
PM_{10}						
Aircraft, tpy	46	47	50	52	59	59
APU, tpy	0	0	0	0	0	0
GSE, tpy	38	34	26	19	8	0
Stationary, tpy	34	35	35	36	38	39
MV On Airport, tpy	49	52	58	64	79	79
MV Off Airport, tpy	1,454	1,474	1,515	1,556	1,752	1,658
Construction, tpy	335	205	155	76	272	0
Total, tpy	**1,955**	**1,846**	**1,839**	**1,803**	**2,208**	**1,835**

1 tpy = tons per year
2 APU = auxiliary power unit
3 GSE = ground support equipment
4 MV = motor vehicles

Source: Camp Dresser & McKee Inc., 2003.

It should be noted that for purposes of developing the interim-year emission estimates, the on-airport operations emissions and off-airport (regional) emissions for Alternative D in 2005 were assumed to be equal to the on-airport operations emissions and off-airport (regional) emissions for the No Action/No Project Alternative in 2005. The rationale for this assumption is that none of the early construction projects under Alternative D would be sufficiently advanced by 2005 to change the operations, meaning that from an operational (i.e., nonconstruction) standpoint, LAX would operate much the same with or without the LAX Master Plan in 2005.

4.5.3 Comparison to De Minimis Emission Rates

The total of direct and indirect emissions for the proposed federal action is taken to be the difference between the emissions of the build and the no-build scenarios. To identify the year that the total of direct and indirect emissions is greatest, the year-by-year emissions for the No Action/No Project Alternative were subtracted from the emissions for Alternative D for each pollutant over the period from 2005 to 2015 and compared to the general conformity de minimis emission rates; see **Table 6**, LAX Master Plan Alternative D Total Direct and Indirect Emissions (tpy). As mentioned above, it is assumed that airport operations would be essentially the same for the two alternatives in 2005, so no differences in operational emissions would be expected before that time.

Table 6

LAX Master Plan Alternative D Total Direct and Indirect Emissions (tpy)

Pollutant	2005	2006	2008	2010	2013	2015	De Minimis
VOC	-797	-498	-290	-344	-323	-538	10
CO	-98	-284	-805	-1,450	-1,100	-3,195	100
NO_x	830	770	655	256	996	-332	10
NO_2	830	770	655	256	996	-332	100
PM_{10}	288	154	95	12	234	-109	70

Source: Camp Dresser & McKee Inc., 2003.

As one can see in **Table 6**, in the year of greatest emissions under Alternative D, the difference in emissions is negative for VOC and CO and positive for NO_x, NO_2, and PM_{10}. This indicates that the total of direct and indirect emissions of VOC and CO are less than the de minimis emission rates. In the year of greatest emissions from Alternative D, the totals of direct and indirect emissions of NO_x, NO_2, and PM_{10} exceed their respective de minimis threshold emission rates.

4.5.4 Regional Significance

The total of direct and indirect emissions of VOC and CO for the proposed federal action are next compared to the regional emissions inventories of these pollutants prepared by SCAQMD for the SCAB for the project year for which this total is greatest. Two comparisons are presented, using data taken from the 1997 Air Quality Management Plan (AQMP) (SCAQMD 1996) and from the 2003 AQMP (SCAQMD 2003). The results of this comparison are summarized in **Table 7**, Comparison of Emissions in 2005 and 2008 for Regional Significance. As one can see, the project totals are much less than 10 percent of the SCAB emissions inventories, therefore, the proposed federal action is not regionally significant for VOC or CO.

Table 7

Comparison of Emissions in 2005 and 2008 for Regional Significance

Pollutant	Net Project Emissions (tpy)	Approved SIP Emissions[1] (tpy)	Percent of Approved SIP	2003 AQMP Emissions[2] (tpy)	Percent of 2003 AQMP
VOC	-290	286,718	-0.10	240,046	-0.12
CO	-98	1,368,130	-0.01	1,496,569	-0.01

[1] Based on data in 1997 AQMP Appendix III Attachment A Table A-9 (2005 for CO) and Table A-12 (2008 for VOC).
[2] Based on data in 2003 AQMP Appendix III Attachment A Table A-6 (2005 for CO) and Table A-9 (2008 for VOC).

Source: Camp Dresser & McKee Inc., 2003.

4.5.5 Applicability Determination

The total of direct and indirect emissions of VOC and of CO are less than the general conformity de minimis threshold emission rates and Alternative D is not regionally significant for either VOC or CO. Therefore, the general conformity requirements do not apply to these pollutants, and there will be no further evaluation of these pollutants herein.

Because the total of direct and indirect emissions of NO_x, of NO_2, and of PM_{10} exceed the respective general conformity de minimis threshold emission rates, the general conformity requirements do apply to these pollutants. Subsequent sections of this document will address the general conformity evaluation of these pollutants as they apply to Alternative D of the LAX Master Plan.

5. GENERAL CONFORMITY EVALUATION

For federal actions subject to a general conformity evaluation, the regulations delineate several criteria that can be used to demonstrate conformity (40 CFR 93.158). In fact, a combination of these criteria may be used to support a positive general conformity determination (EPA 1994). The approach to be taken to evaluate Alternative D relies on a combination of these available criteria, and the remainder of this section summarizes the findings to make the determination.

5.1 Designation of Applicable SIP

Section 110(a) of the Clean Air Act (42 U.S.C. 7410(a)) requires each state to adopt and submit to EPA a plan which provides for the implementation, maintenance, and enforcement of each NAAQS. This plan is known as the state implementation plan (SIP). Over time, states have made and continue to make many such submittals to EPA to address issues as they arise related to the various NAAQS. As EPA reviews these submittals, it can either approve or disapprove them in whole or in part. The compilation of a state's approved submittals constitutes that state's applicable SIP. In California, the state agency responsible for preparing and maintaining the SIP is CARB.

5.1.1 SIP Process in the South Coast Air Basin

CARB designates both air quality management districts and air pollution control districts within California for the purpose of implementing and enforcing ambient air quality standards on a regional or airshed basis. These district agencies must prepare regional plans (Air Quality Management Plans [AQMPs]) to support the broader SIP, as well as to meet the goals of the California Clean Air Act.

Every three years, SCAQMD must prepare and submit to CARB an AQMP to demonstrate how the SCAB will attain and maintain the NAAQS and the California ambient air quality standards. The AQMP contains extensive emissions inventories of all emission sources in the SCAB as well as various control measures applicable to most of these sources. Once CARB approves the AQMP, it is submitted to EPA for approval into the SIP. The approved SIP for the SCAB is based on the AQMP which SCAQMD submitted to CARB in 1997 (SCAQMD 1996) and supplemental information as discussed in Appendix A Section 5.1.2. In August 2003, SCAQMD submitted to CARB the final 2003 AQMP (SCAQMD 2003), and this formed the basis of a proposed SIP revision submitted by CARB to EPA on January 9, 2004.

5.1.2 Status of Applicable SIP and Emissions Budgets by Pollutant

The Clean Air Act requires attainment of the NAAQS as expeditiously as practicable, but no later than the statutory dates listed below for those criteria pollutants for which the SCAB is nonattainment and for which a finding of general conformity must be determined. Upon redesignation of an area from nonattainment to attainment for each standard, the area will be considered to be a maintenance area for that standard, and as such, must meet all applicable requirements to maintain the standard.

- Extreme O_3: November 15, 2010 (one-hour NAAQS only).
- Serious CO: December 31, 2000.
- Serious PM_{10}: December 31, 2006 (On April 18, 2003, EPA approved this new attainment date (68 FR 19315)).

To support the general conformity determination for Alternative D, FAA demonstrates herein that the emissions of NO_x (as an O_3 precursor) and NO_2 from the proposed action either will result in a level of emissions which, together with all other emissions in the nonattainment (or maintenance) area, will not exceed the emissions budgets specified in the approved SIP (criterion at 40 CFR 93.158(a)(5)(i)(A)) or in the alternative will not exceed the emissions budgets specified in the 2003 AQMP, see Section 5.2 below, and, by way of local (i.e., nonregional) air quality modeling, PM_{10} and its precursors will not cause or contribute to any new violation of the NAAQS (criteria at 40 CFR 93.158(a)(3) or 40 CFR 93.158(a)(4)(i)), see Section 5.3 below. See Appendix A for a more detailed discussion identifying the applicable SIP for each pollutant and the relevant emissions budgets. The currently approved SIPs are summarized below.

- O_3: SIP approved by EPA on April 10, 2000 (65 FR 18903), based on the 1997 AQMP and a 1999 amendment to the 1997 AQMP.
- CO: SIP approved by EPA on April 21, 1998 (63 FR 19661), based on 1997 AQMP. The attainment demonstration lapsed in 2000. The 2003 AQMP provides the basis for a future maintenance plan pending submission of a petition to EPA for redesignation to attainment status.
- PM_{10}: SIP approved by EPA on April 18, 2003 (68 FR 19315), based on the 1997 AQMP, amendments to the 1997 AQMP submitted in 1998 and 1999, and further modifications to the 1997 AQMP submitted in a status report to EPA in 2002.
- NO_2: SIP approved by EPA on July 24, 1998 (63 FR 39747), based on the 1997 AQMP. In this SIP approval, EPA also redesignated the SCAB from nonattainment to attainment/maintenance for NO_2.

On February 24, 2003, SCAQMD released the Draft 2003 AQMP for public review. SCAQMD released the final 2003 AQMP on August 1, 2003. This evaluation will make comparisons both to applicable emissions inventories in the current EPA-approved SIPs and to applicable emissions inventories contained in the 2003 AQMP. For purposes of the general conformity determination, the applicable SIP will be the most recent EPA-approved SIP at the time of the release of the final general conformity determination.

5.2 Comparison to SIP Emissions Inventories

As noted in the preceding section, the most recent EPA-approved SIP at the time of the release of the final general conformity determination must be used for emission budget analyses. The 1997 AQMP together with supplemental information form the basis for the current, EPA-approved O_3, CO, PM_{10}, and NO_2 SIPs. However, the EPA may approve all or part of the 2003 AQMP for one or more of these pollutants before the final general conformity determination is published. Therefore, to avoid revisions to and/or recirculation of the draft and final general conformity determination, emissions for the proposed action presented in this section are compared to both the currently approved SIP emissions budgets and to the 2003 AQMP emissions budgets.

The emissions inventories developed by SCAQMD and fully documented in the AQMPs are delineated by source types. **Table 8**, Relationship of LAX Master Plan Source Categories and AQMP Source Types, provides a concordance between the emission source categories that characterize the LAX Master Plan alternatives and the emission source types in the AQMPs. In the following discussion, the term "NO_x" should be understood to represent both NO_x and NO_2 (see discussion in Section 4.3).

Table 8

Relationship of LAX Master Plan Source Categories and AQMP Source Types

LAX Master Plan Source Category	1997 AQMP Source Type	2003 AQMP Source Type
Aircraft	Aircraft - Government Aircraft - Other	Aircraft
Auxiliary Power Unit	Aircraft - Government Aircraft - Other	Aircraft
Ground Support Equipment	Mobile Equipment	Off-Road Equipment
Motor Vehicles	On-Road Vehicles Entrained Road Dust - Paved	On-Road Motor Vehicles Paved Road Dust
Stationary	Other Service and Commerce	Service and Commercial
Construction	On-Road Vehicles Entrained Road Dust - Paved Off-Road Vehicles Entrained Road Dust - Unpaved Other Service and Commerce Fugitive Windblown Dust Construction and Demolition	On-Road Motor Vehicles Paved Road Dust Off-Road Equipment Unpaved Road Dust Service and Commercial Fugitive Windblown Dust Construction and Demolition

Source: Camp Dresser & McKee Inc., 2003.

The source types "Aircraft - Government" and "Aircraft - Other" in the 1997 AQMP and "Aircraft" in the 2003 AQMP include emissions from both aircraft and APUs, and the baseline inventories are based on special analyses prepared for SCAQMD (EEA 1999). Data provided by SCAQMD (Hsiao 2003a and Hsiao 2003b) itemize the emissions inventories prepared for the 1997 AQMP and the 2003 AQMP for these aircraft source types attributable to LAX in future years. Because EDMS was used to generate the emissions inventories for aircraft in the special analyses prepared for SCAQMD, and EDMS as noted above does not contain emission indices for PM_{10} for aircraft or APUs, very small PM_{10} emissions inventories were developed by SCAQMD for aircraft and APUs based on limited data (EPA 1992).

5.2.1 NO_x Emissions From Aircraft and APUs Under Alternative D

Milestone years in both the approved SIP and the 2003 AQMP for O_3 and NO_2 are 2005, 2008, and 2010. Emissions of NO_x from both these plans for aircraft, which include emissions from APUs, in the milestone years are listed in **Table 9**, Comparison of Alternative D NO_x Emissions for Aircraft and APUs to Regulatory Emissions Inventories Attributable to LAX for Aircraft and APUs. Emissions of NO_x for Alternative D for aircraft, including APUs, are also listed in **Table 9** for comparison. The aircraft plus APU NO_x emissions for Alternative D are less than their respective allocations in the approved SIP and in the 2003 AQMP for all emission budget years. Therefore, the aircraft NO_x emissions for Alternative D, taken together with NO_x emissions for all other aircraft in the SCAB, would not exceed the NO_x emissions budgets for aircraft specified in the approved SIP, or alternatively in the 2003 AQMP (CARB 2004, SCAQMD 2004, included in Appendix C).

Table 9

Comparison of Alternative D NO_x Emissions for Aircraft and APUs to Regulatory Emissions Inventories Attributable to LAX for Aircraft and APUs

Year	Alternative D Emissions (tpy)	Approved SIP Emissions (tpy)[1]	2003 AQMP Emissions (tpy)[1]
2005	4,399	4,546	6,686
2008	4,667	4,869	6,754
2010	4,845	5,084	6,800

[1] These values represent uncontrolled (baseline) emissions.

Source: Camp Dresser & McKee Inc., 2003 and Hsiao 2003a and Hsiao 2003b.

5.2.2 NO_x Emissions From GSE Under Alternative D

The major commercial airlines servicing LAX signed a MOU with CARB in December 2002 in which they voluntarily agreed to reduce emissions from GSE. The MOU does not specify the elimination of emissions from GSE, but LAWA does propose the virtual elimination of GSE emissions under Alternative D, which it will effect through the LAX Master Plan Mitigation Plan for Air Quality and CEQA-related air quality mitigation measure MM-AQ-4 (LAWA 2004a); see subsection 2.1 for more information on the CEQA-related mitigation measures. For purposes of the general conformity evaluation, it is assumed that the signatory GSE operators will comply with the conditions of the MOU and that under Alternative D, emissions from GSE will be eliminated at LAX by 2015. It should be noted that the MOU will affect GSE emissions at LAX with or without the Master Plan until the year 2010 when the MOU is considered complete, i.e., GSE emissions between 2005 and 2010 will be reduced by the MOU under both the No Action/No Project Alternative and Alternative D. GSE emissions for both the No Action/No Project Alternative and Alternative D were calculated for both 2005 and 2015 using an emission factor of 2.5 grams of NO_x per brake horsepower per hour, then linear interpolation was used to estimate emissions in 2010. From 2010 to 2015 under Alternative D, the GSE NO_x emissions would decrease to zero, whereas under the No Action/No Project Alternative GSE NO_x emissions are expected to remain essentially the same.

Under the terms and conditions of the MOU, the signatory GSE operators agreed that, by 2010, they will have done the following: (1) replaced at least 30 percent of the 1997 GSE fleet with zero-emissions equipment; (2) acquired at least 45 percent of new GSE as zero-emissions equipment; (3) achieved an industry average combined VOC and NO_x emission rate of 2.65 grams per brake horsepower per hour; and (4) reduced diesel particulates using CARB-verified diesel control technology on selected GSE. The terms and conditions of the MOU have been represented to result in an approximate 80 percent reduction in NO_x emissions from GSE in the SCAB by 2010 (Honcoop 2003).

Emissions from GSE are included in the broad source types "Mobile Equipment" in the 1997 AQMP and "Off-Road Equipment" in the 2003 AQMP and an allocation of GSE emissions within these source types cannot be apportioned to LAX based on available data. However, because neither the 1997 AQMP nor the 2003 AQMP accounted for the GSE MOU noted above, the NO_x emissions from GSE included in these source types in both the approved SIP and the 2003 AQMP are expected to overestimate these emissions in years following 2004 when the MOU will begin to be implemented. Therefore, it can be inferred that the GSE NO_x emissions for Alternative D, taken together with NO_x emissions for all other off-road equipment in the SCAB, would not exceed the NO_x emissions budgets for off-road equipment specified in the approved SIP or alternatively in the 2003 AQMP (SCAQMD 2004, included in Appendix C).

5.2.3 NO_x Emissions from Stationary Point Sources Under Alternative D

Emissions from stationary point sources at LAX are included primarily in the broad source type "Other Service and Commerce" in the 1997 AQMP and "Service and Commercial" in the 2003 AQMP. These stationary point sources are owned and operated not only by LAWA but by tenants at LAX. These sources are significant sources for which their owners hold permits to operate them in the SCAB. It is

reasonable to assume that emissions from these sources are accounted for in the AQMPs. Therefore, it can be inferred that the stationary point source NO_x emissions for Alternative D, taken together with NO_x emissions for all other stationary point sources in the SCAB, would not exceed the NO_x emissions budgets for stationary point sources specified in the approved SIP or alternatively in the 2003 AQMP (SCAQMD 2004, included in Appendix C).

5.2.4 NO_x Emissions From Motor Vehicles Under Alternative D

The emissions inventories for motor vehicles included in both the approved SIP and the 2003 AQMP were developed with data supplied to SCAQMD by CARB, the California Department of Motor Vehicles (DMV), the California Department of Transportation (Caltrans), and SCAG. CARB is responsible for developing the composite emissions factors for motor vehicles with its EMFAC model. DMV maintains a count of registered vehicles. Caltrans provides traffic counts and road capacity data. SCAG exercises its Travel Demand Model for the SCAB by forecasting trip generation, defining trip distribution (destination choice), determining mode choice, and making travel assignments to estimate the vehicle miles traveled and associated speeds on roadways in the SCAB.

Within the analyses used by SCAQMD to generate estimates of emissions from regional motor vehicles, LAX cannot be readily isolated as an origin or destination of motor vehicle trips. This is due to the lack of specific trip generation data for LAX and the fact that the airport is located near two Federal Interstate Highways (I-405, and I-105) in addition to several surface arterial streets where vehicles pass near the airport without stopping at the airport. While the estimates of motor vehicle emissions are generated on a gridded basis within the SCAB, and the motor vehicle emissions in the grid or grids enclosing LAX may be largely attributable to LAX, the attribution of motor vehicle emissions in grids farther removed from LAX becomes more problematic. This impediment to disaggregation of the regional motor vehicle emissions renders it technically infeasible as a practical matter to develop a quantitative evaluation of motor vehicle emissions associated with Alternative D to that portion of the emissions inventories in either the approved SIP or the 2003 AQMP that might reasonably be associated with LAX.

As demonstrated above in Sections 5.2.1, 5.2.2, and 5.2.3, operational emissions estimated for aviation sources (aircraft, APUs, GSE) and for stationary sources at LAX under Alternative D are within the respective emissions budgets of the applicable SIP. By making the reasonable assumption that motor vehicle activity which has LAX as a source or destination is directly related to the level of aircraft operations at LAX, together with the knowledge that the aircraft activity levels under Alternative D are generally consistent with those in the RTP, it is reasonable to assume that SCAG has modeled the requisite motor vehicle trips in the SCAB and SCAQMD has modeled the associated motor vehicle emissions to support the activity levels represented by the emissions estimates for aviation sources at LAX in both the approved SIP and the 2003 AQMP. Therefore, it can be inferred that the motor vehicle NO_x emissions for Alternative D, taken together with NO_x emissions for all other motor vehicle sources in the SCAB, would not exceed the NO_x emissions budgets for motor vehicle sources specified in the applicable SIP or alternatively in the 2003 AQMP (SCAQMD 2004, included in Appendix C).

5.2.5 NO_x Emissions From Construction Sources Under Alternative D

At the time that SCAQMD prepared the 1997 AQMP, LAWA and FAA had only recently announced their intentions to prepare a new Master Plan for LAX. For this reason, it is evident that the 1997 AQMP does not contain specific estimates of emissions for construction activities under any of the LAX Master Plan build alternatives, including Alternative D. On the other hand, SCAQMD prepared the 2003 AQMP after release of the Draft EIS/EIR, and as a responsible agency SCAQMD reviewed that Draft EIS/EIR and provided comments to LAWA and FAA. For that reason, it would be reasonable to assume that SCAQMD allowed for an accommodation for such a major construction program within the 2003 AQMP.

As noted in the Final EIR, Section 4.6.8, *Mitigated Airport Emissions Inventory*, and Appendix S-E, *Supplemental Air Quality Impact Analysis*, Section 2.3 (LAWA 2004a), construction activities will comply with all applicable requirements and are designed to incorporate multiple components of the CEQA-related air quality mitigation measure for construction activities under Alternative D.

Table 10, Comparison of Alternative D NO_x Emissions for Construction in 2005 to Regulatory Emissions Inventories for Construction-Related Source Types, **Table 11**, Comparison of Alternative D NO_x

Emissions for Construction in 2008 to Regulatory Emissions Inventories for Construction-Related Source Types, and **Table 12**, Comparison of Alternative D NO_x Emissions for Construction in 2010 to Regulatory Emissions Inventories for Construction-Related Source Types, summarize a comparison of estimated NO_x emissions from construction activities under Alternative D in 2005, 2008, and 2010, respectively, to the applicable source types under both the approved SIP and the 2003 AQMP. It should be noted that the emissions for those source types taken from the approved SIP and the 2003 AQMP may represent more than construction-related emissions since these source types are not exclusive to construction equipment and activities. Because the SIP for the SCAB has to accommodate many planned and some unplanned construction projects, the construction-related emissions inventories included in the AQMPs are very substantial. Despite the fact that Alternative D will require a fairly large program of construction, one can note that the construction emissions from Alternative D are small compared to the emissions inventories in the AQMPs. For that reason, it is reasonable to assume that the emissions from construction activities under Alternative D can be accommodated in future emissions growth from the construction sector within the approved SIP or alternatively within the 2003 AQMP. Therefore, it can be inferred that the construction NO_x emissions for Alternative D, taken together with NO_x emissions for all other construction sources in the SCAB, would not exceed the NO_x emissions budgets for construction-related source types specified in the approved SIP, or alternatively in the 2003 AQMP (SCAQMD 2004, included in Appendix C).

Table 10

Comparison of Alternative D NO_x Emissions for Construction in 2005 to Regulatory Emissions Inventories for Construction-Related Source Types

Source Type	Alternative D Emissions (tpy)	Approved SIP Emissions (tpy)	2003 AQMP Emissions (tpy)
Heavy-Duty Diesel Trucks	220	54,078	NA
Heavy Heavy Duty Diesel Trucks	220	NA	79,139
Mobile Equipment	860	45,943	NA
Off-Road Equipment	860	NA	60,773
Other Service and Commerce	83	2,818	NA
Service and Commercial	83	NA	2,533

Source: Camp Dresser & McKee Inc., 2003 and 1997 AQMP Appendix III Attachment A Table A-9 and 2003 AQMP Appendix III Attachment A Table A-6.

Table 11

Comparison of Alternative D NO_x Emissions for Construction in 2008 to Regulatory Emissions Inventories for Construction-Related Source Types

Source Type	Alternative D Emissions (tpy)	Approved SIP Emissions (tpy)	2003 AQMP Emissions (tpy)
Heavy-Duty Diesel Trucks	182	54,316	NA
Heavy Heavy Duty Diesel Trucks	182	NA	68,109
Mobile Equipment	471	44,599	NA
Off-Road Equipment	471	NA	53,994
Other Service and Commerce	166	2,734	NA
Service and Commercial	166	NA	2,562

Source: Camp Dresser & McKee Inc., 2003 and 1997 AQMP Appendix III Attachment A Table A-12 and 2003 AQMP Appendix III Attachment A Table A-9.

Table 12

Comparison of Alternative D NO_x Emissions for Construction in 2010 to Regulatory Emissions Inventories for Construction-Related Source Types

Source Type	Alternative D Emissions (tpy)	Approved SIP Emissions (tpy)	2003 AQMP Emissions (tpy)
Heavy-Duty Diesel Trucks	100	55,874	NA
Heavy Heavy Duty Diesel Trucks	100	NA	58,484
Mobile Equipment	185	43,493	NA
Off-Road Equipment	185	NA	47,797
Other Service and Commerce	80	2,653	NA
Service and Commercial	80	NA	2,139

Source: Camp Dresser & McKee Inc., 2003 and 1997 AQMP Appendix III Attachment A Table A-13 and 2003 AQMP Appendix III Attachment A Table A-10.

5.3 Comparison to the National Ambient Air Quality Standards

Conformity means that a proposed federal action will not cause or contribute to any new violation of any NAAQS; not increase the frequency or severity of any existing violation of any NAAQS; and not delay timely attainment of any NAAQS or any required interim emission reductions or other milestones (42 U.S.C. 7506(c)(1)(B)). The general conformity regulations allow that local and/or areawide air quality modeling may be used to demonstrate that these requirements are met in support of a positive conformity determination (40 CFR 93.158(a)(3) and 40 CFR 93.158(a)(4)(i)). This approach is particularly suitable for the evaluation of PM_{10}, since Alternative D emissions exceed the applicable SIP budgets for this pollutant (for aircraft). This evaluation used dispersion modeling to predict the impacts of primary PM_{10} emissions and a proportioning technique to estimate the impacts of secondary PM_{10} emissions (i.e., effects of PM_{10} precursors) following the Protocol for General Conformity Evaluation finalized in July 2003 (see Appendix A, with refinements noted in Appendix B), and considered acceptable to the SCAQMD (SCAQMD 2004, included in Appendix C). Input and output data for specified dispersion model runs are available upon request.

5.3.1 Predicted Impacts of Primary PM_{10} Emissions

Dispersion modeling of primary PM_{10} emissions was performed as proposed in Appendix A and as described in detail in Appendix B. Because the LAX Master Plan was neither approved nor an alternative selected as of 2003, FAA did not conduct an evaluation of PM_{10} impacts for the emission budget year of 2003. **Table 13**, Combined Predicted Operations and Construction PM_{10} Concentrations in 2013 (Including Background), summarizes the predicted peak concentrations from combined operations and construction emission sources for 2013, the year during which the total of direct and indirect emissions of PM_{10} attributable to Alternative D is expected to be the greatest. **Table 14**, Combined Predicted Operations and Construction PM_{10} Concentrations in 2006 (Including Background), summarizes the estimated peak concentrations from combined operations and construction emission sources for 2006, the mandated attainment year for PM_{10} in the SCAB. Concentrations were combined by adding the peak concentration for each receptor from the operations source evaluation to the peak concentration from the same location/receptor in the construction source evaluation. While the locations of the peak concentrations from the operations source evaluation and the construction source evaluation do not necessarily coincide, these peak concentrations were found in the general vicinity of LAX. **Table 13** and **Table 14** present the highest combined totals, including background, at any receptor location, making this a conservative estimate of the combined impacts. It should be noted that for Alternative D in 2013 and in 2006, the 24-hour and annual PM_{10} concentrations are all predicted to be below the NAAQS.

Table 13

Combined Predicted Operations and Construction PM_{10} Concentrations in 2013 (Including Background)

Averaging Period	NAAQS ($\mu g/m^3$)	Future Background ($\mu g/m^3$)	Alternative D ($\mu g/m^3$)	Alternative D plus Background ($\mu g/m^3$)
Annual	50	25	17	42
24 Hours	150	47	42	89

Source: Camp Dresser & McKee Inc., 2003.

Table 14

Combined Predicted Operations and Construction PM_{10} Concentrations in 2006 (Including Background)

Averaging Period	NAAQS ($\mu g/m^3$)	Future Background ($\mu g/m^3$)[1]	Alternative D ($\mu g/m^3$)[2]	Alternative D plus Background ($\mu g/m^3$)
Annual	50	28	15	43
24 Hours	150	61	33	94

[1] Future background concentration was conservatively estimated for 2005.
[2] PM_{10} impacts for Alternative D were predicted for year 2005, the year of peak construction emissions; operational emissions for 2006 are substantially similar to those in 2005 (see Table 5).

Source: Camp Dresser & McKee Inc., 2003.

5.3.2 Estimated Impacts of Secondary PM_{10} Formation

Emissions of some gaseous contaminants, notably NO_x, SO_x, VOC, and ammonia (NH_3) can contribute to the secondary formation of components of PM_{10} through such atmospheric processes as nucleation and chemical reactions on dry particle surfaces. To estimate the potential contributions of VOC, NO_x, SO_x, and NH_3 to regional PM_{10} concentrations, Alternative D emissions were scaled to SCAB emissions of these contributing compounds reported in the 2003 AQMP for 1995, the baseline year modeled for the impacts of each component of PM_{10} (see SCAQMD 2003 at Appendix V Chapter 2). The SCAQMD concurred with this approach to estimating secondary PM_{10} formation (SCAQMD 2004, included in Appendix C). Additional discussion of secondary PM_{10} formation is provided in Section 3.4 of Appendix B.

Table 15, Estimated Annual PM_{10} Concentrations From Precursor Compounds Attributable to Alternative D, summarizes the results for the estimate of annual concentrations. Based on this evaluation, the maximum expected annual impact attributable to Alternative D in 2013 (the year during which the total of direct and indirect emissions of PM_{10} attributable to Alternative D is expected to be the greatest) at Rubidoux, the site of the highest predicted speciated PM_{10} concentrations, is approximately 0.49 $\mu g/m^3$. On the conservative assumption that the 24-hour concentration is approximately ten times the annual concentration, the maximum expected 24-hour impact attributable to Alternative D in 2013, also at Rubidoux, is approximately 4.9 $\mu g/m^3$. Expected concentrations of PM_{10} from precursors at the location of the modeled maximum primary PM_{10} impacts presented in **Table 13** and **Table 14** will be less than the estimated maximum secondary PM_{10} impacts presented in **Table 15**. Adding these concentrations to the results of primary PM_{10} dispersion modeling in **Table 13** and **Table 14,** bearing in mind that the locations of these peak concentrations are different and that adding them together represents a conservative estimate of peak impact**,** demonstrates that the PM_{10} NAAQS will be protected. Based on this evaluation, Alternative D will not cause or contribute to exceedances of the PM_{10} NAAQS in the surrounding area.

Table 15

Estimated Annual PM_{10} Concentrations From Precursor Compounds Attributable to Alternative D

PM_{10} Precursor Species	SCAB Emissions in 1995 (tpd)	Alternative D Emissions in 2013 (tpd)	Modeled PM_{10} Components	Predicted Annual Concentration at Rubidoux, CA in 1995 ($\mu g/m^3$)	Estimated Annual Concentration From Alternative D in 2013 ($\mu g/m^3$)
VOC	1306.7	7.8	Organic carbon	7.0	0.04
NO_x	1440.1	25.9	Nitrate	18.9	0.34
SO_x	107.9	1.4	Sulfate	2.8	0.04
NH_3	33.2[1]	0.36	Ammonium	6.2	0.07

[1] For on-road mobile sources only for year 2000 (data available).

Source: Camp Dresser & McKee Inc., 2003 and 2003 AQMP Appendix V Chapter 2 Tables 2-10 and 2-12 and Final 1997 Gridded Ammonia Emission Inventory update for the SCAB (AVES 2000).

5.4 Consistency with Requirements and Milestones in Applicable SIP

The general conformity regulations state that notwithstanding the other requirements of the rule, a proposed action may not be determined to conform unless the total of direct and indirect emissions from the action is in compliance or consistent with all relevant requirements and milestones in the applicable SIP (40 CFR 93.158(c)). This includes but is not limited to such issues as reasonable further progress schedules, assumptions specified in the attainment or maintenance demonstration, prohibitions, numerical emission limits, and work practice standards. This section briefly addresses how Alternative D was assessed for SIP consistency for this evaluation.

5.4.1 Applicable Requirements from EPA

EPA has already promulgated, and will continue to promulgate, numerous requirements to support the goals of the Clean Air Act with respect to the NAAQS. Typically, these requirements take the form of rules regulating emissions from significant new sources, including emission standards for major stationary point sources and classes of mobile sources as well as permitting requirements for new major stationary point sources. Since states have the primary responsibility for implementation and enforcement of requirements under the Clean Air Act and can impose stricter limitations than EPA, the EPA requirements often serve as guidance to the states in formulating their air quality management strategies.

5.4.2 Applicable Requirements from CARB

In California, to support the attainment and maintenance of the NAAQS, CARB is primarily responsible for regulating emissions from mobile sources. In fact, EPA has delegated authority to CARB to establish emission standards for on-road and some nonroad vehicles separate from the EPA vehicle emission standards, although CARB is preempted by the Clean Air Act from regulating emissions from many nonroad mobile sources, including aircraft.

5.4.3 Applicable Requirements from SCAQMD

To support the attainment and maintenance of the NAAQS in the SCAB, SCAQMD is primarily responsible for regulating emissions from stationary sources. As noted above, SCAQMD develops and updates its AQMP regularly to support the California SIP. While the AQMP contains rules and regulations geared to attain and maintain the NAAQS, these rules and regulations also have the much more difficult goal of attaining and maintaining the California ambient air quality standards.

5.4.4 Consistency with Applicable Requirements

In operating LAX, LAWA already complies with, and will continue to comply with, a myriad of rules and regulations implemented and enforced by federal, state, regional, and local agencies to protect and

enhance ambient air quality in the SCAB. In particular, due to the long persistence of challenges to attain the ambient air quality standards in the SCAB, the rules and regulations promulgated by CARB and SCAQMD are among the most stringent in the U.S. LAWA will continue to comply with all existing applicable air quality regulatory requirements for activities over which it has direct control and will meet in a timely manner all regulatory requirements that become applicable in the future. Likewise, LAWA actively encourages all tenants and users of its facilities to comply with applicable air quality requirements.

The nature and extent of the requirements with which LAWA complies and will continue to comply include, but are not limited to, the following.

- EPA Rule 40 CFR 61 Subpart M, National Emission Standard for Asbestos: requires containment and proper disposal of asbestos encountered during demolition and renovation of buildings and structures (Cf. SCAQMD Rule 1403, Asbestos Emissions from Demolition/Renovation Activities).
- CARB Rule 13 CCR 1956.8, California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles: requires significant reductions in emissions of NO_x, particulate matter, and nonmethane organic compounds using exhaust treatment on heavy-duty diesel engines manufactured in model year 2007 and later years.
- SCAQMD Rule 403, Fugitive Dust: identifies the minimum particulate controls for construction-related fugitive dust. For example, Rule 403 requires twice daily watering of all active grading or construction sites. Haul trucks leaving the facility must be covered and maintain at least two feet of freeboard (CVC Section 23114). Low emission street sweepers must be used at the end of each construction day if visible soil is carried onto adjacent public paved roads, as required by SCAQMD Rule 1186.1, Less-Polluting-Sweepers. Wheel washers must be used to clean off the trucks, particularly the tires, prior to them entering the public roadways. (For the LAX Master Plan construction, wheel washers will be installed at every entrance and exit to the construction site where an unpaved area connects to a paved area.)
- SCAQMD Rule 431.2, Sulfur Content of Liquid Fuels: requires that, after January 1, 2005, only low sulfur diesel fuel (containing 15 parts per million by weight sulfur) will be permitted for sale in the SCAB for any stationary- or mobile-source application.
- SCAQMD Rule 1134, Emissions of Oxides of Nitrogen from Stationary Gas Turbines: requires stringent limits on emissions of NO_x.
- SCAQMD Rule 1146, Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters: requires stringent limits on emissions of NO_x.
- SCAQMD Rule 1146.1, Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters: requires stringent limits on emissions of NO_x.
- SCAQMD Rule 1146.2, Emissions of Oxides of Nitrogen from Large Water Heaters and Boilers: requires stringent limits on emissions of NO_x.
- SCAQMD Rule 2202, On-Road Motor Vehicle Mitigation Options: requires employers in the SCAB with more than 250 employees to implement an approved rideshare program and attain an average vehicle ridership of at least 1.5.
- Los Angeles City Council directive on diesel engine particulate traps, approved by the Mayor on December 2, 2002: requires that all existing City-owned and City-contracted diesel-fueled vehicles be retrofitted with particulate traps, which engines would henceforth be required to use ultra low sulfur diesel fuel (15 parts per million by weight or less); some exceptions include emergency vehicles and off-road vehicles.

6. MITIGATION

As part of a conformity evaluation, it may be necessary for the federal agency to identify mitigation measures and mechanisms for their implementation and enforcement. For example, if a proposed action does not initially conform to the applicable SIP, mitigation measures could be pursued. If mitigation measures are used to support a positive conformity determination, the federal agency must obtain a written commitment from the entity required to implement these measures and the federal agency must include the mitigation measures as conditions in any permit or license granted for the proposed action (40 CFR 93.160). Mitigation measures may be used in combination with other criteria to demonstrate conformity. Alternative D as evaluated herein incorporates various air quality mitigation measures as described in the Final EIR (LAWA 2004a) to meet CEQA requirements. Based on CEQA provisions that mitigation measures be required in, or incorporated into, the project (14 C.C.R. Section 15091(a)(1)), the City will implement and enforce these CEQA-related air quality mitigation measures as a condition of project approval by FAA; see Section 2.1 for more information on the CEQA-related mitigation measures. As such, this "mitigated" Alternative D is considered the proposed project as designed, and no mitigation as defined under the general conformity regulations (40 CFR 93.160) or guidance (EPA 1994) are required to support a positive general conformity determination.

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7. REPORTING

To support the approval of the new ALP, directly associated improvements, and any funding mechanisms for Alternative D at LAX, FAA previously issued a draft general conformity determination for public review and comment. FAA is now issuing its final general conformity determination for this action.

7.1 Draft General Conformity Determination

FAA published its draft general conformity determination for this proposed action on January 9, 2004, providing opportunity for a 30-day public review (FAA 2004).

7.2 Final General Conformity Determination

At a minimum, FAA is providing copies of its final general conformity determination to the appropriate regional offices of EPA, FHWA, FTA, and to any affected federal land manager as well as to CARB, SCAQMD, and SCAG, within 30 days of its promulgation. FAA is also placing a notice in a daily newspaper of general circulation in the SCAB announcing the availability of its final general conformity determination within 30 days of its promulgation. As part of the general conformity evaluation, FAA has documented its responses to all comments received on the draft general conformity determination, and these responses, along with the actual comments received during the public-review period, are included in Appendix C.

To request additional information about the final general conformity determination and supporting documentation, contact:

Mr. David B. Kessler, AICP

U.S. Department of Transportation

Federal Aviation Administration

Post Office Box 92007

Los Angeles, California 90009-2007

Phone: (310) 725-3615

7.3 Frequency of General Conformity Determinations

The general conformity regulations state that the status of a specific conformity determination lapses five years after the date of public notification for the final general conformity determination, unless the action has been completed or a continuous program has been commenced to implement the action (40 CFR 93.157(a)). Because the new LAX Master Plan envisions a development program extending beyond five years, it is important to note that the final general conformity determination will remain active only under this "continuous program to implement."

As part of a phased program, the implementation of each element of the development of Alternative D does not require separate conformity determinations, even if they are begun more than five years after the final determination, as long as those elements are consistent with the original program which was determined to conform (EPA 2002). However, if this original conforming program is changed such that there is an increase in the total of direct and indirect emissions above the de minimis threshold levels, FAA will conduct a new general conformity evaluation.

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8. FINDINGS AND CONCLUSIONS

As part of the environmental review of the LAWA staff-preferred alternative (Alternative D – Enhanced Safety and Security Plan) under the new Master Plan for LAX, FAA conducted a general conformity evaluation pursuant to 40 CFR 93 Subpart B. The general conformity regulations apply at this time to any actions at LAX requiring FAA financial support or approval because the SCAB where LAX is situated is a nonattainment area for O_3, CO, and PM_{10} and a maintenance area for NO_2. FAA conducted the general conformity evaluation following all regulatory criteria and procedures and in coordination with EPA, CARB, SCAQMD, and SCAG. FAA published a draft general conformity determination for public review in January 2004 which proffered the proposition that Alternative D as designed will conform to the approved SIP. As revised to address public comments, this final general conformity determination notes the following findings.

- Alternative D is not subject to a general conformity determination for CO or VOC because the net emissions associated with Alternative D are less than the general conformity de minimis thresholds and they are not regionally significant.
- Alternative D conforms to the purpose of the SIP for NOx (and NO_2 by equivalency) because the net emissions associated with Alternative D, taken together with all other NOx emissions in the South Coast Air Basin, would not exceed the emissions budgets in the approved SIP for the years required for the general conformity evaluation.
- Alternative D conforms to the purpose of the SIP for PM_{10} because the predicted peak concentrations for combined operational and construction emissions for Alternative D as designed, when added to the future background concentrations, would be less than the annual and 24-hour PM10 NAAQS for the years required for the general conformity evaluation.

Of particular note, FAA received a letter from SCAQMD dated August 12, 2004 (see Appendix C), which states in pertinent part "the baseline aircraft inventories would serve as the emission budgets for general conformity purposes…[i]n addition, with respect to categories other than aircraft, the emissions estimates for Alternative D are below the applicable budgets in the SIPs." The aircraft emissions inventories for Alternative D are below the baseline aircraft emission budgets in the applicable SIPs, as shown in Section 5.2.1 of this general conformity determination and confirmed in a followup telephone conversation with the SCAQMD (SCAQMD 2005).

Therefore, FAA herewith concludes that Alternative D as designed conforms to the purpose of the approved SIP and is consistent with all applicable requirements.

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9. REFERENCES

40 CFR 93 Subpart B, "Determining Conformity of General Federal Actions to State or Federal Implementation Plans," July 2003.

40 CFR 51 Appendix W, "Guideline on Air Quality Models," July 2003.

63 FR 18068, "Emissions and Dispersion Modeling System Policy for Airport Air Quality Analysis; Interim Guidance to FAA Orders 1050.1D and 5050.4A," April 13, 1998.

63 FR 19661, "Approval and Promulgation of State Implementation Plans; California South Coast Air Quality Management District-Final Rule," April 21, 1998.

63 FR 39747, "Approval and Promulgation of State Implementation Plans and Area Redesignation; California South Coast Air Quality Management District-Final Rule," July 24, 1998.

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Appendix
LAX Master Plan
Final
General Conformity Determination

A. Protocol for General Conformity Evaluation

July 2003

(Attachments A-1 and A-2 Added January 2005)

Prepared for:

Los Angeles World Airports

U.S. Department of Transportation
Federal Aviation Administration

Prepared by:

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1. INTRODUCTION

Section 176 (c) of the Clean Air Act (42 U.S.C. 7506(c)) requires any entity of the federal government that engages in, supports, or in any way provides financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable state implementation plan (SIP) required under Section 110 (a) of the Clean Air Act (42 U.S.C. 7410(a)) before the action is otherwise approved. In this context, conformity means that such federal actions must be consistent with a SIP's purpose of eliminating or reducing the severity and number of violations of national ambient air quality standards (NAAQS) and achieving expeditious attainment of those standards. Each federal agency (including the Federal Aviation Administration [FAA]) must determine that any action that is proposed by the agency and that is subject to the regulations implementing the conformity requirements will in fact conform to the applicable SIP before the action is taken.

At issue for the Los Angeles International Airport (LAX) Master Plan is the approval by FAA of a new airport layout plan (ALP) and directly associated improvements for LAX as well as the approval by FAA of certain funding mechanisms under the Airport Improvement Program (AIP) and Passenger Facility Charges (PFC). This protocol sets forth the assumptions and methods for evaluating the conformity of this proposed action with the requirements of the Clean Air Act and documenting this evaluation in a written conformity determination for public review. The remainder of Section 1 discusses the background of the regulatory requirements. Section 2 discusses the proposed action (project) to be approved by FAA. Section 3 describes how applicability of the conformity requirements to the proposed action will be analyzed. Section 4 discusses the regulatory procedures for the conformity evaluation. Section 5 presents the methods and criteria that will be used to evaluate the conformity of the proposed action. Section 6 discusses the concepts of mitigation required under conformity regulations. Section 7 presents the reporting process to be followed to formalize the conformity determination. Section 8 provides references for the evaluation.

1.1 General Conformity Requirements

The U.S. Environmental Protection Agency (EPA) promulgated two regulations to address the conformity requirements of the Clean Air Act. On November 24, 1993, EPA promulgated final transportation conformity regulations at 40 CFR 93 Subpart A to address federally assisted transportation plans, programs, and projects. These regulations have been revised several times since they were first issued to clarify and simplify them. On September 14, 1994, the South Coast Air Quality Management District (SCAQMD), which oversees air quality management in the South Coast Air Basin (SCAB) of California, adopted these regulations by reference as part of Rule 1902. The SCAQMD rule has also been amended since its original issuance. Although in general an airport development project may require or rely on improvements in roadway or transit infrastructure, a determination of transportation conformity related to such improvements would typically be addressed by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) as part of a regional transportation plan or regional transportation improvement program and not as a stand-alone project. If it can be confirmed that the regional (i.e., off airport) emissions associated with the proposed action being evaluated under this protocol are included with those from the conforming Regional Transportation Improvement Program (RTIP) and the conforming Regional Transportation Plan (RTP) prepared by the Southern California Association of Governments (SCAG), the regional metropolitan planning organization (MPO), then it will not be necessary to include these regional emissions in the general conformity evaluation. If this cannot be confirmed, then those regional emissions that are not included in the RTP will be addressed in the general conformity evaluation.

On November 30, 1993, EPA promulgated final general conformity regulations at 40 CFR 93 Subpart B for all federal activities except those covered under transportation conformity. On September 14, 1994, SCAQMD adopted these regulations by reference as part of Rule 1901. The general conformity regulations apply to a proposed federal action in a nonattainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursors to the criteria pollutants caused by the proposed action equal or exceed certain de minimis amounts, thus requiring the federal agency to make a determination of general conformity. Regardless of the proposed action's exceedance of deminimis amounts, if this total represents 10 percent or more of the area's total emissions of that pollutant, the action is considered regionally significant and the federal agency must make a determination of general conformity. By requiring an analysis of direct and indirect emissions, EPA

intended the regulating federal agency to make sure that only those emissions that are reasonably foreseeable and that the federal agency can practicably control subject to that agency's continuing program responsibility will be addressed.

The general conformity regulations incorporate a stepwise process, beginning with an applicability analysis. According to EPA guidance (EPA 1994), before any approval is given for a proposed action to go forward, the regulating federal agency must apply the applicability requirements found at 40 CFR 93.153(b) to the proposed action and/or determine the regional significance of the proposed action to evaluate whether a determination of general conformity is required. The guidance states that the applicability analysis can be (but is not required to be) completed concurrently with any analysis required under the National Environmental Policy Act (NEPA). If the regulating federal agency determines that the general conformity regulations do not apply to the proposed action, no further analysis or documentation is required. If the general conformity regulations do apply to the proposed action, the regulating federal agency must next conduct a conformity evaluation in accord with the criteria and procedures in the implementing regulations, publish a draft determination of general conformity for public review, and then publish the final determination of general conformity.

1.2 FAA Responsibilities

Current FAA guidelines for the assessment of environmental impacts (FAA 1986) predate the general conformity regulations. More recent guidance is provided in "Air Quality Procedures For Civilian Airports & Air Force Bases" (FAA/USAF 1997).

FAA's policy reflected in its recent guidance document affirms the agency's responsibility to assure that its actions conform to the applicable SIP and supports the approach that, before FAA can fund or support in any way any activity, it must address the conformity of the action with the applicable SIP using the criteria and procedures in the general conformity regulations.

FAA requires the use of the Emissions and Dispersion Modeling System (EDMS) for airport air quality analysis of aviation sources (63 FR 18068). FAA's recent guidance document does allow that supplemental methodology and models for more refined analysis of non-aviation sources would be permitted in consultation with the appropriate FAA regional program office. FAA's recent guidance document supports early consultation and coordination with other agencies (e.g., state/regional air quality agencies, EPA) for proposed actions with potentially significant air quality impacts, and where the general conformity regulations apply to a proposed project FAA will issue a conformity determination following review and comment on a draft conformity determination by the public (including other interested agencies).

2. DESCRIPTION OF PROPOSED FEDERAL ACTION

In accordance with applicable general conformity regulations and guidance, FAA is only required to conduct a general conformity evaluation for a specific proposed action, i.e., the selected alternative for a project or program (EPA 1994), and FAA must issue a positive conformity determination before the proposed action may proceed or is otherwise approved. Each federal agency is responsible for determining conformity of those proposed actions over which it has jurisdiction. The general conformity evaluation for which this protocol is being developed is related only to those actions proposed by FAA with respect to the LAX Master Plan. If any other federal agency has jurisdiction over any emissions from this project, it must conduct its own general conformity evaluation or adopt the FAA evaluation by reference (EPA 1994).

The general conformity requirements only apply to actions proposed in nonattainment areas (i.e., areas where one or more NAAQS are not being achieved at the time of the proposed action and requiring SIP provisions to demonstrate how attainment will be achieved) and in maintenance areas (i.e., areas recently reclassified from nonattainment to attainment and requiring SIP provisions to demonstrate how attainment will be maintained). The attainment status in the vicinity of LAX will be discussed in Section 3.

2.1 LAX Master Plan Preferred Alternative

The City of Los Angeles (City) is updating the Master Plan for LAX to identify facilities needed through the year 2015. As part of the environmental review for the preferred alternative (Alternative D - Enhanced Safety and Security Plan), FAA, in coordination with the City, will develop emissions inventories, conduct dispersion modeling, and prepare appropriate documentation to demonstrate compliance with the general conformity requirements in support of FAA's approval of the new ALP and other related actions directly associated improvements for the LAX Master Plan.

2.2 Relationship to Other Environmental Analyses

Both NEPA and the California Environmental Quality Act (CEQA) require that the air quality impacts of the LAX Master Plan implementation be analyzed and disclosed. Regulatory guidance requires that the air quality impacts from the project alternatives be determined by identifying the associated project incremental emissions and air pollutant concentrations and comparing them respectively to emissions thresholds and state and national ambient air quality standards. For CEQA purposes, the impacts of the build alternatives (Alternatives A, B, C, and D) were compared to the impacts of the environmental baseline and an adjusted environmental baseline. The impacts of the build alternatives (Alternatives A, B, C, and D) were also compared to the No Action/No Project Alternative impacts for NEPA purposes. FAA is the lead agency for the NEPA analysis documented in an Environmental Impact Statement (EIS). The City is the lead agency for the CEQA analysis documented in an Environmental Impact Report (EIR). A joint Draft EIS/EIR was published for public review and comment in January 2001. A joint Supplement to the Draft EIS/EIR was published in July 2003 providing an evaluation of a new build alternative (Alternative D).

The Airport and Airway Improvement Act (AAIA) of 1982, as amended, is an applicable federal law. The AAIA requires, in pertinent part, that, as a necessary condition of approval by the Secretary of the Department of Transportation of an application for an airport development project involving the location of an airport or runway or a major runway extension, the governor of the state in which the project will be located must certify in writing that there is reasonable assurance that the project will be located, designed, constructed, and operated in compliance with applicable air and water quality standards. While this requirement for a governor's certification is somewhat redundant with the NEPA and CEQA processes and the general conformity requirements (for air quality), it is a separate and distinct requirement that must be completed before FAA approves any funding for the LAX Master Plan through the Airport Improvement Program administered under the AAIA.

3. APPLICABILITY ANALYSIS

As stated previously, the first step in a general conformity evaluation is an analysis of whether the requirements apply to a federal action proposed to be taken in a nonattainment or a maintenance area. Unless exempted by the regulations or otherwise presumed to conform, a proposed federal action requires a general conformity determination for each pollutant where the total of direct and indirect emissions caused by the proposed action would equal or exceed an annual de minimis emission rate. Notwithstanding the de minimis emission rate, if a proposed action is identified to be regionally significant, the federal agency must make a general conformity determination.

3.1 Attainment Status of South Coast Air Basin

LAX is located within Los Angeles County in the South Coast Air Basin (SCAB) of southern California. The regulatory agencies with primary responsibility for air quality management in the SCAB include SCAQMD and the California Air Resources Board (CARB), with oversight by EPA. Pursuant to the Clean Air Act, EPA established primary NAAQS to protect the public health with an adequate margin of safety and secondary NAAQS to protect the public welfare for seven air pollutants (40 CFR 50). These pollutants are known as criteria pollutants: particulate matter with an equivalent aerodynamic diameter less than or equal to 10 micrometers (µm) in diameter (PM_{10}), particulate matter with an equivalent aerodynamic diameter less than or equal to 2.5 micrometers (µm) in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), and lead (Pb). As of the time of

preparation of this draft general conformity determination, EPA has not fully implemented the NAAQS for $PM_{2.5}$ and designation of attainment and nonattainment areas for this pollutant is not expected to occur until 2004 at the earliest. EPA has delegated authority to SCAQMD to implement and enforce the NAAQS in the SCAB.

That portion of the SCAB encompassing LAX is in an area that is designated as being in nonattainment of the NAAQS for O_3 (one-hour average), CO, and PM_{10}. In addition, the severity of the nonattainment status for this area has been classified as "extreme" for O_3, "serious" for CO, and "serious" for PM_{10}. On July 24, 1998, this area was redesignated from nonattainment to attainment/maintenance status for NO_2 by EPA (63 FR 39747). The area is in attainment of the NAAQS for SO_2 and Pb. The attainment status of the area for O_3 (eight-hour average) and $PM_{2.5}$ has not been established at the time of this protocol. Thus, for purposes of the general conformity requirements, this evaluation will address NO_2, O_3, CO, and PM_{10}.

3.2 Exemptions from General Conformity Requirements

As noted previously, the general conformity requirements apply to a proposed federal action if the net project emissions equal or exceed certain de minimis emission rates. The only exceptions to this applicability criterion are the topical exemptions laid out in the regulations. Therefore, before attempting to estimate the emissions attributable to Alternative D, it will be evaluated to assess whether it, or any portion of it, as proposed meets one or more of these exempt categories. The following regulatory exemptions exclude a proposed action from a conformity evaluation.

- Actions which would result in no emissions increase or an increase in emissions that is clearly below the de minimis levels (40 CFR 93.153(c)(2)). Examples include administrative actions and routine maintenance and repair.
- Actions where the emissions are not reasonably foreseeable (40 CFR 93.153(c)(3)).
- Actions which implement a decision to conduct or carry out a conforming program (40 CFR 93.153 (c)(4)).
- Actions which include major new or modified sources requiring a permit under the New Source Review (NSR) program (40 CFR 93.153(d)(1)).
- Actions in response to emergencies or natural disasters (40 CFR 93.153(d)(2)).
- Actions which include air quality research not harming the environment (40 CFR 93.153(d)(3)).
- Actions which include modifications to existing sources to enable compliance with applicable environmental requirements (40 CFR 93.153(d)(4)).
- Actions which include emissions from remedial measures carried out under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) that comply with other applicable requirements (40 CFR 93.153(d)(5)).

In addition to these topical exemptions, the general conformity regulations allow each federal agency to establish a list of activities that are presumed to conform (40 CFR 93.153(f)). Although FAA has signaled its intention to publish such a list, to date, no official list is available. FAA may publish such a list in 2003 (FAA 2003). Should FAA publish a list of presumed-to-conform activities before the draft conformity determination for the LAX Master Plan is made available for public review, the proposed action will be evaluated against this list to assess whether any portion of Alternative D can be presumed to conform, subject to the exception at 40 CFR 93.153(j); see Section 3.4 below.

3.3 De Minimis Emission Rates

The general conformity requirements will apply to LAX Master Plan Alternative D if the total of direct and indirect emissions caused by Alternative D (i.e., the net, or incremental, emissions between the projected emissions for Alternative D and the projected emissions for the No Action/No Project Alternative) equal or exceed the de minimis emission rates shown in **Table 1**, De minimis Emission Rates for Determining Applicability of General Conformity Requirements to LAX Master Plan Alternative D. These emission rates are expressed in units of tons per year (tpy) and will be compared to the total of direct and indirect emissions caused by Alternative D for the calendar year during which the net emissions are expected to

be the greatest. It should be noted that, because O_3 is a secondary pollutant (i.e., it is not emitted directly into the atmosphere but is formed in the atmosphere from the photochemical reactions of volatile organic compounds, VOC, and oxides of nitrogen, NO_x, in the presence of sunlight), its de minimis emission rate is based on primary emissions of its precursor pollutants - VOC and NO_x. If the net emissions of either VOC or NO_x exceed the de minimis emission rate for O_3 (EPA 1994), then Alternative D is subject to a general conformity evaluation for O_3.

Table 1

De minimis Emission Rates for Determining Applicability of General Conformity Requirements to LAX Master Plan Alternative D

Pollutant	De Minimis Emission Rate (tons/year)
Nitrogen Dioxide	100
Ozone (VOC or NO_x)	10
Carbon Monoxide	100
Particulate Matter	70

Source: 40 CFR 93.153

Section 182(f) of the Clean Air Act (42 U.S.C. 7511a(f)) allows EPA to exempt any O_3 nonattainment area from requirements applicable to NO_x emissions, such as the general conformity requirements, on a finding that net air quality benefits are greater in the absence of reductions of NO_x from the sources concerned. The process for this exemption is known as a NO_x waiver. While a NO_x waiver has neither been approved nor requested for the SCAB, should EPA publish a final NO_x waiver for the SCAB before the draft conformity determination for the LAX Master Plan is made available for public review, the proposed action will be evaluated in light of such waiver.

3.4 Regional Significance

Even if a proposed federal action is less than the applicable de minimis emission rate for a given pollutant, the general conformity requirements state that a regionally significant action must undergo a conformity evaluation. A regionally significant action is one for which the total of direct and indirect emissions represent 10 percent or more of the nonattainment or maintenance area's emission inventory for all sources (as identified in the applicable SIP for stationary point, mobile, and area sources, see Section 5) for that pollutant and its precursors. EPA guidance also indicates that any milestone emissions inventory in the applicable SIP should also be considered when evaluating regional significance (EPA 1994).

It should also be noted that any federal action which has been identified by the relevant federal agency as being presumed to conform will still require a general conformity evaluation if it is found to be regionally significant (40 CFR 93.153(j)). However, a federal action that was declared by EPA to be exempt from the general conformity requirements because it would result in no emissions increase or an increase in emissions that is clearly below the de minimis levels, as specified at 40 CFR 93.153(c)(2), is considered a non-rebuttable de minimis determination (EPA 1994).

3.5 Applicability for Proposed Federal Action

First, Alternative D will be evaluated to determine if the project in its entirety, or any portion of it, may be exempt from the general conformity requirements by meeting any exempt or presumed-to-conform categories. Second, the applicability of the general conformity requirements to Alternative D will be analyzed by comparing the total of direct and indirect emissions (calculated as discussed in Section 5) for the calendar year of greatest emissions to the de minimis emission rates in **Table 1**. Third, if Alternative D is found to be excluded from the general conformity requirements because its emissions are below the de minimis emission rates for any pollutant or it or any portion of it is found to meet an exempt or presumed-to-conform category, the total of direct and indirect emissions for that pollutant will be compared to the nonattainment or maintenance area's emission inventory for that pollutant to determine

whether it is regionally significant. Any portion of the project for any pollutant that cannot be excluded from applicability by one of these mechanisms will undergo a complete general conformity evaluation consistent with the procedures in Section 4 and using the methods and criteria in Section 5.

4. REGULATORY PROCEDURES

The general conformity regulations establish certain procedural requirements that must be followed when preparing a general conformity evaluation. This section will address the major procedural issues and specify how these requirements will be met for the evaluation of Alternative D.

Based on the nature of the procedural requirements, it is clearly advisable for FAA to establish contact with the appropriate air quality agencies (SCAQMD, CARB) and the MPO (SCAG) early in the process to form a consultative and working relationship to facilitate the evaluation. At a minimum, FAA should seek review and comment on this protocol from SCAQMD, with particular attention to the appropriate SIP emission budgets, emission estimation techniques, and dispersion models. Likewise, FAA should seek review and comment on this protocol from SCAG, with particular attention to the latest planning assumptions used to characterize population, employment, travel, and congestion in the SCAB over the planning horizon for Alternative D.

4.1 Use of Latest Planning Assumptions

The general conformity regulations require the use of the latest planning assumptions for the area encompassing the proposed federal action, derived from the estimates of population, employment, travel, and congestion most recently approved by the MPO (40 CFR 93.159(a)). It should be noted that the latest planning assumptions from the MPO may differ from the planning assumptions used in establishing the applicable SIP emissions budgets. The approved 1997/1999 AQMP was developed with data similar to that used in the 1998 RTP. However, the approved 2001 RTP assumes a lower activity level at LAX than the 1998 RTP.

As noted previously, SCAG is the MPO for the region encompassing LAX. The SCAG region covers an area of over 38,000 square miles and includes the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. To support the 2001 RTP, SCAG prepared the *2001 Social Economic Forecast Report* and conducted the *2001 Travel and Congestion Survey* (SCAG, 2001). The growth forecast for the 2001 RTP estimated a region-wide population growth rate of 1.4 percent per year between 1997 and 2025 and a region-wide employment growth rate of 1.5 percent per year for the same period. The growth rates for population and employment in Los Angeles County were forecast to be approximately half those for the region as a whole over the forecast period, as people and jobs are expected to shift eastward within the region over the forecast period.

The Alternative D planning assumptions reflected in the Supplement to the Draft EIS/EIR are based on the airport handling 78.9 million annual passengers in 2015, and the activity level will be constrained by landside access to the airport. The 2001 RTP assumes that the airport will handle 78 million annual passengers in 2025. In its analysis to support the 2001 RTP, SCAG assumed that when the constrained capacity at LAX is reached, it will not be exceeded, but the analysis did not predict when the constrained capacity level would be reached (Armstrong 2003). Alternative D is consistent with the policy framework of the 2001 RTP, which calls for no expansion of LAX, and, instead, shifts the accommodation of future aviation demand to other airports in the region.

4.2 Use of Latest Emission Estimation Techniques

The general conformity regulations require the use of the latest and most accurate emission estimation techniques available, unless such techniques are inappropriate (40 CFR 93.159(b)). Prior written approval from SCAQMD or EPA is required to modify or substitute emission estimation techniques. It should be noted that the latest and most accurate emission estimation techniques available may differ from the emission estimation techniques used in establishing the applicable SIP emissions budgets. The details of emissions estimating will be described in Section 5. The emission estimation techniques will be consistent with those used in preparing the Supplement to the Draft EIS/EIR.

For on-road motor vehicle emissions, the general conformity regulations require the use of the most current version of the motor vehicle emission factor model specified by EPA and available for use in the preparation or revision of the SIP. In California, this model is CARB's EMFAC model, and the most current version is EMFAC2002, approved by EPA in 2003 (68 FR 15720).

As noted previously, FAA requires the use of the EDMS model to evaluate emissions from aviation sources at airports (e.g., aircraft, ground support equipment, auxiliary power units). The most current version of EDMS available from FAA at the time of this protocol is EDMS 4.11. One exception is the fact that EDMS does not currently incorporate emission factors for particulate matter from aircraft because such data are not readily available. For this general conformity evaluation, the method introduced in the Draft EIS/EIR (FAA/LAWA 2001) will be used to estimate PM emissions from aircraft for Alternative D, consistent with the approach of using the best available information (EPA 2002).

Emission factors for stationary point and area sources will be based on source-specific outlet emission test data, if available. Otherwise, appropriate emission factors will be taken from SCAQMD databases or be taken from EPA's *Compilation of Air Pollutant Emission Factors AP-42* (EPA 2003). The most current version of these data can be found, respectively, at SCAQMD's website at http://www.aqmd.gov under annual emission reports and at EPA's website at http://www.epa.gov/ttn/chief.

For nonroad mobile emissions, the most current emission factors will be taken from CARB's OFFROAD emission model or the *CEQA Air Quality Handbook* (SCAQMD 1993), whichever is more relevant.

4.3 Use of Applicable Dispersion Models

The general conformity regulations require the use of the applicable air quality models, databases, and other requirements in the most recent version of EPA's *Guideline on Air Quality Models* (40 CFR 51, Appendix W), unless such techniques are inappropriate (40 CFR 93.159(c)). Prior written approval from SCAQMD or EPA is required to modify or substitute dispersion models. The details of dispersion modeling will be described in Section 5.

As noted previously, FAA requires the use of the EDMS model to evaluate dispersion from aviation sources at airports (e.g., aircraft, ground support equipment, auxiliary power units). The EDMS model is identified in the *Guideline on Air Quality Models* as a preferred model. The most current version of EDMS available from FAA at the time of this protocol is EDMS 4.11. One exception is the fact that EDMS does not currently incorporate algorithms to treat the dispersion of particulate matter from aircraft, since particulate matter emission data are not readily available.

The Industrial Source Complex - Short Term (ISCST3) model will be used to evaluate dispersion of particulate matter from aircraft as well as to evaluate dispersion of all pollutants from construction-related sources. The ISCST3 model is identified in the *Guideline on Air Quality Models* as a preferred model. The most current version of ISCST3 available from EPA at the time of this protocol is ISCST3 (Julian Date 02035).

Local "hot-spot" modeling of emissions from motor vehicles due to queuing and delays at selected signalized intersections will use the CAL3QHCR model. The CAL3QHCR model is identified in the *Guideline on Air Quality Models* as a screening model.

4.4 Emission Scenarios

The general conformity regulations require that the evaluation must reflect certain emission scenarios (40 CFR 93.159(d)). Specifically, these scenarios must include emissions from the proposed federal action for the following years: (1) for nonattainment areas, the year mandated in the Clean Air Act for attainment and for maintenance areas, the farthest year for which emissions are projected in the approved maintenance plan; (2) the year during which emissions are projected to be the greatest on an annual basis; and (3) any year for which the applicable SIP specifies an emissions budget. These emission scenarios will be described in more detail in Section 5. **Table 2**, Emission Scenario Years for General Conformity Evaluation, lays out the years for which the general conformity evaluation will be performed.

Table 2

Emission Scenario Years for General Conformity Evaluation

Pollutant	Attainment/Maintenance Year	Greatest Emissions Year	Emissions Budget Years
Nitrogen Dioxide	2010	2013	Not Applicable
Ozone (VOC or NO_x)	2010	2013	2005, 2008
Carbon Monoxide	2000	2013	Not Applicable
Particulate Matter	2006	2013	2003

Source: Camp Dresser & McKee Inc., 2003.

5. METHODOLOGY AND CRITERIA

For federal actions subject to a general conformity evaluation, the regulations delineate several criteria that can be used to demonstrate conformity (40 CFR 93.158). In fact, a combination of these criteria may be used to support a positive general conformity determination (EPA 1994). The approach to be taken to evaluate Alternative D will rely on a combination of these available criteria, and the remainder of this section will discuss the methods that will be used to make the final demonstration.

5.1 Designation of Applicable SIP

Section 110(a) of the Clean Air Act (42 U.S.C. 7410(a)) requires each state to adopt and submit to EPA a plan which provides for the implementation, maintenance, and enforcement of each NAAQS. This plan is known as the state implementation plan (SIP). Over time, states have made and continue to make many such submittals to EPA to address issues as they arise related to the various NAAQS. As EPA reviews these submittals, it can either approve or disapprove them in whole or in part. The compilation of a state's approved submittals constitutes that state's applicable SIP. In California, the state agency responsible for preparing and maintaining the SIP is CARB.

5.1.1 SIP Process in the South Coast Air Basin

CARB designates both air quality management districts and air pollution control districts within California for the purpose of implementing and enforcing ambient air quality standards on a regional or airshed basis. These district agencies must prepare regional plans (Air Quality Management Plans [AQMPs]) to support the broader SIP, as well as to meet the goals of the California Clean Air Act.

Every three years, SCAQMD must prepare and submit to CARB an AQMP to demonstrate how the SCAB will attain and maintain the NAAQS and the California ambient air quality standards. The AQMP contains extensive emissions inventories of all emission sources in the SCAB as well as various control measures applicable to most of these sources. Once CARB approves the AQMP, it is submitted to EPA for approval into the SIP. SCAQMD last submitted an AQMP to CARB in 1997 (with an amendment in 1999) and has prepared a draft 2003 AQMP that has been released for public review (SCAQMD 2003a).

5.1.2 Status of Applicable SIP and Emissions Budgets by Pollutant

The Clean Air Act requires attainment of the NAAQS as expeditiously as practicable, but no later than the statutory dates listed below for those criteria pollutants for which the SCAB is nonattainment. Upon redesignation of an area from nonattainment to attainment for each standard, the area will be considered to be a maintenance area for that standard, and as such, must meet all applicable requirements to maintain the standard.

- Extreme O_3: November 15, 2010 (one-hour NAAQS only).
- Serious CO: December 31, 2000.
- Serious PM_{10}: December 31, 2006 (On April 18, 2003, EPA approved this new attainment date (68 FR 19315)).

To support the general conformity determination for Alternative D, FAA intends to demonstrate that the emissions from the proposed action will result in a level of emissions which, together with all other emissions in the nonattainment (or maintenance) area, will not exceed the emissions budgets specified in the applicable SIP (criteria at 40 CFR 93.158(a)(5)(i)(A)), see Section 5.2 below, or, by way of local (i.e., nonregional) air quality modeling, will not cause or contribute to any new violation of the NAAQS (criteria at 40 CFR 93.158(a)(3) or 40 CFR 93.158(a)(4)(i)), see Section 5.3 below. The following discussion will identify the applicable SIP for each pollutant and the relevant emissions budgets. As used in the context of general conformity, the term "emissions budget" represents those portions of the applicable SIPs projected emission inventories that describe the levels of emissions that provide for meeting reasonable further progress milestones, attainment, and/or maintenance for any criteria pollutant or its precursors (40 CFR 93.152). As part of the general conformity evaluation for Alternative D, the SCAB emissions inventories will be apportioned to identify those contributions to LAX-related activities.

On February 24, 2003, SCAQMD released the Draft 2003 AQMP for public review. In response to public comments, SCAQMD released modifications to the Draft 2003 AQMP on June 6, 2003. Due to the timing of the general conformity evaluation, it is unknown at the time of this protocol development whether EPA will approve any portion of a SIP revision based on a 2003 AQMP prior to FAA's release of the final general conformity determination on the LAX Master Plan. For that reason, the evaluation will make comparisons both to applicable emissions inventories in the current EPA-approved SIPs and to applicable emissions inventories contained in the Draft 2003 AQMP (or a Final 2003 AQMP if available prior to release of the draft general conformity determination). For purposes of the general conformity determination, the applicable SIP will be the most recent EPA-approved SIP at the time of the release of the final general conformity determination.

5.1.2.1 Ozone

On April 10, 2000, EPA approved a SIP revision submitted by CARB to provide for attainment of the one-hour O_3 NAAQS in the SCAB (65 FR 18903). This approved SIP revision was based on the 1997 AQMP and a 1999 amendment to the 1997 AQMP. In addition to approving commitments by SCAQMD to implement various control measures with this SIP revision and a revised attainment demonstration, EPA also approved projected emissions inventories as well as a revised rate-of-progress (ROP) plan for the milestone years 1999, 2002, 2005, 2008, and 2010.

As noted previously, O_3 is a secondary pollutant, so emissions reductions to control O_3 focus on its precursors, VOC and NO_x. **Table 3**, SCAB Emissions Budgets in EPA-approved SIP for O_3 Precursors by Milestone Year (tons/day), presents the emissions budgets for VOC and NO_x for the ROP milestone years, as adopted in the 1999 amendment to the 1997 AQMP and approved by EPA. The emissions are based on the summer planning inventories.

Table 3

SCAB Emissions Budgets in EPA-approved SIP for O_3 Precursors by Milestone Year (tons/day)

Year	Stationary VOC	Stationary NO_x	On-Road VOC	On-Road NO_x	Nonroad VOC	Nonroad NO_x	Total VOC	Total NO_x
1999	435.2	115.7	354.0	526.8	137.3	292.6	926.5	935.1
2002	402.4	96.7	273.1	447.1	125.1	270.7	800.6	814.5
2005	334.4	91.4	206.0	369.1	116.6	234.0	657.0	694.5
2008	305.1	89.7	145.4	310.1	106.7	209.2	557.2	609.0
2010	267.6	88.3	80.7	277.8	65.1	164.3	413.4	530.4

Sources: 65 FR 18903 and 1997 AQMP Appendix V Chapter 4 Table 4-9 and 1999 amendment Chapter 2 Table 2-7.

Table 4, SCAB Emissions Budgets in Draft 2003 AQMP for O_3 Precursors by Milestone Year (tons/day), presents the emissions budgets for VOC and NO_x (summer planning inventory) for the rate-of-progress milestone years, as proposed in the Draft 2003 AQMP.

Table 4

SCAB Emissions Budgets in Draft 2003 AQMP for O_3 Precursors by Milestone Year (tons/day)

Year	Stationary VOC	Stationary NO_x	On-Road VOC	On-Road NO_x	Nonroad VOC	Nonroad NO_x	Total VOC	Total NO_x
2000	395.5	120.6	414.3	695.1	188.5	312.3	998.2	1117.9
2002	353.5	107.0	349.6	633.4	169.6	309.5	872.8	1049.8
2005	316.2	95.2	278.3	540.3	131.9	293.9	726.4	929.4
2008	308.4	92.9	238.6	463.7	114.6	275.9	661.6	832.5
2010	314.7	85.5	208.1	398.7	106.0	255.8	628.8	740.1

Source: Draft 2003 AQMP Appendix III Attachment B.

5.1.2.2 Carbon Monoxide

On April 21, 1998, EPA approved a SIP revision submitted by CARB to provide for attainment of the one-hour and eight-hour CO NAAQS in the SCAB (63 FR 19661). This approved SIP revision was based on the 1997 AQMP. In addition to approving projected emissions inventories, EPA also granted interim approval to the reasonable further progress and attainment demonstration portions of the plan.

Table 5, SCAB Projected CO Emissions in EPA-approved SIP by Year (tons/day), presents the projected emissions for CO for the projected attainment year (2000) and two future years (2006 and 2010) as adopted in the 1997 AQMP and approved by EPA. The emissions are based on the winter planning inventories.

Table 5

SCAB Projected CO Emissions in EPA approved SIP by Year (tons/day)

Year	Stationary	On Road	Nonroad	Total
2000	293	3125	1550	4968
2006	329	1889	938	3157
2010	337	1483	605	2425

Sources: 63 FR 19661 and 1997 AQMP Appendix III Chapter 2 Tables 2-11 and 2-13 and personal communication with Tom Chico (2003).

Table 6, SCAB Projected CO Emissions in Draft 2003 AQMP by Year (tons/day), presents the emissions inventories for CO (winter planning inventory) for milestone years, as proposed in the Draft 2003 AQMP.

Table 6

SCAB Projected CO Emissions in Draft 2003 AQMP by Year (tons/day)

Year	Stationary	On Road	Nonroad	Total
2000	340	3778	715	4834
2006	379	2311	655	3345
2010	387	1771	626	2784

Sources: Draft 2003 AQMP Appendix III Attachment C.

5.1.2.3 Particulate Matter

On April 18, 2003, EPA approved a SIP revision submitted by CARB to provide for attainment of the 24-hour and annual PM_{10} NAAQS in the SCAB (68 FR 19315). This approved SIP is based on the 1997 AQMP, amendments to the 1997 AQMP submitted in 1998 and 1999, and further modifications to the 1997 AQMP submitted in a status report to EPA in 2002. In addition to approving an attainment date extension to December 31, 2006, with this SIP revision, EPA also approved projected emissions inventories as well as approved the reasonable further progress and attainment demonstration portions of the plan.

PM_{10} is not only a primary pollutant, but it is also a secondary pollutant, so emissions reductions to control PM_{10} must focus not only on the primary emissions but also on its precursors which include VOC, NO_x, and oxides of sulfur (SO_x). **Table 7**, SCAB Emissions for PM_{10} and Precursors in EPA-approved SIP by Milestone Year (tons/day), presents the emissions inventories for PM_{10}, VOC, NO_x, and SO_x for the reasonable further progress milestone years, as adopted in the 1997 AQMP, modified by the 2002 status report, and approved by EPA. These emissions are based on the average annual inventories for each pollutant.

Table 7

SCAB Emissions for PM_{10} and Precursors in EPA-approved SIP by Milestone Year (tons/day)

Year	PM_{10}	VOC	NO_x	SO_x
2003	310	747	748	64
2006	301	623	635	67

Source: 68 FR 19315.

Table 8, SCAB Emissions for PM_{10} and Precursors in Draft 2003 AQMP by Milestone Year (tons/day), presents the emissions inventories for PM_{10}, VOC, NO_x, and SO_x (annual average day) for milestone years as proposed in the Draft 2003 AQMP.

Table 8

SCAB Emissions for PM_{10} and Precursors in Draft 2003 AQMP by Milestone Year (tons/day)

Year	PM_{10}	VOC	NO_x	SO_x
2006	310.6	638.0	920.0	58
2010	299.5	291.7	623.3	57.5

Source: Draft 2003 AQMP Appendix V Chapter 2 Table 2-10.

5.1.2.4 Nitrogen Dioxide

On July 24, 1998, EPA approved a SIP revision submitted by CARB for NO_2 attainment and maintenance plans and a request to redesignate the SCAB from nonattainment to attainment of the annual NO_2 NAAQS (63 FR 39747). This approved SIP revision was based on the 1997 AQMP. Data presented in the 1997 AQMP demonstrated that the last year with an NO_2 violation of the NAAQS in the SCAB was 1991. EPA pointed out in its approval that redesignation to attainment requires that improvements in air quality must be shown to have occurred because of enforceable controls. Because the SCAB NO_x emissions inventory (NO_x includes NO_2 and other oxides of nitrogen which are its precursors, primarily nitric oxide, NO) showed increases in activity levels for most of the significant source categories (including motor vehicle use) during the years with no NO_2 violations, EPA concluded that this demonstrates that the

reductions in NO_x emissions were not due to an economic recession, but were associated with the impact of permanent and enforceable CARB controls on mobile source emissions and SCAQMD regulations on stationary point and area sources.

EPA also noted that it approved the NO_2 maintenance plan because it demonstrates that the future year inventory will not exceed the inventory that existed at the time of the request for redesignation, notwithstanding new control measures. Therefore, EPA concluded that the California SIP already included fully adopted regulations, prior to consideration of the 1997 AQMP, which will generate reductions in NO_x emissions in future years that will provide an ample margin of safety to ensure maintenance of the NO_2 NAAQS. **Table 9**, SCAB Actual (1993) and Projected NO_x Emissions in EPA-approved SIP by Year (tons/day), presents the emissions inventories for NO_x for the SCAB, as approved by EPA, based on the uncontrolled inventories adopted in the 1997 AQMP. These emissions are based on the winter planning inventory.

Table 9

SCAB Actual (1993) and Projected NO_x Emissions in EPA-approved SIP by Year (tons/day)

Year	NO_x
1993	1284
2000	960
2010	759

Sources: 63 FR 39747 and 1997 AQMP Appendix V chapter 1 Table 1-1.

Table 10, SCAB Actual (1995) and Projected NO_x Emissions in Draft 2003 AQMP by Year (tons/day), presents the emissions inventories for NOx (winter planning inventory) for milestone years as proposed in the Draft 2003 AQMP.

Table 10

SCAB Actual (1995) and Projected NO_x Emissions in Draft 2003 AQMP by Year (tons/day)

Year	NO_x
1995	1465
2000	1244
2010	793

Source: Draft 2003 AQMP Appendix III Attachment C Tables C-1, C-4, and C-11.

5.2 Total of Direct and Indirect Emissions Caused by Proposed Federal Action

The general conformity regulations state that a conformity determination is required for each pollutant where the total of direct and indirect emissions in a nonattainment or maintenance area caused by a federal action would equal or exceed the de minimis emission rates listed in 40 CFR 93.153(b). These total emissions are the sum of the direct and indirect emissions increases and decreases (i.e., the net change in emissions) caused by the federal action. Any emissions which are exempt or presumed to conform are not to be included in these total emissions, and the total emissions must include not only

criteria pollutants but also precursors of the criteria pollutants and only those pollutants for which the area is in nonattainment or maintenance. The application of these concepts to Alternative D is addressed in the following discussion.

5.2.1 Meaning of "Direct" Emissions

Direct emissions are those emissions of a criteria pollutant or its precursors that are caused or initiated by the federal action and that occur at the same time and place as the federal action, subject to the exclusions noted above. For Alternative D, this includes not only the permanent emissions associated with and contributing to on-airport operations resulting from the implementation of the new LAX Master Plan but also the temporary emissions associated with the construction of the various facets of the new LAX Master Plan.

Direct emissions include those from airside activities (e.g., aircraft, ground support equipment, emergency electrical generators) and on-airport landside activities (e.g., ground access vehicles, central utility plant, heavy construction vehicles). Emissions calculations should incorporate the impact of emission controls designed into the new facilities as well as the impacts of any mitigation required for general conformity purposes.

EPA guidance does not allow segmentation, or tiering, of projects that could circumvent the applicability of general conformity (EPA 1994). Further EPA guidance states that, for airport development, if projects or actions are combined together for NEPA, then generally they should be kept together for general conformity unless there are specific reasons to separate the projects or actions (EPA 2002). While Alternative D envisions multiple elements, taken together (as is being done for the EIS evaluation required under NEPA) these elements constitute a long-term continuing program of construction to achieve a new unified airport layout. Emissions associated with Alternative D will be calculated based on the planning assumptions identified in the LAX Master Plan documentation and the Supplement to the Draft EIS/EIR for the planning horizons and any necessary interim years.

5.2.2 Meaning of "Indirect" Emissions

Indirect emissions are those emissions of a criteria pollutant or its precursors that are caused or initiated by the federal action but may occur later in time and/or may be further removed in distance from the federal action, are reasonably foreseeable, and can be practicably controlled by the federal agency through its continuing program responsibility. The meaning of indirect emissions is necessarily more vague than that of direct emissions.

The question of what a federal agency has control over may seem clear: an agency in its executive capacity will issue rules and regulations to place boundaries on those activities under its jurisdiction, and the agency can then enforce those limitations to ensure control. Under EPA guidance, the concept of control also implies the effect on emission units from the authority an agency exercises such as through conditions it places on the nature of the activity that may be established in permits or approvals or by the design of the action (EPA 1994). When FAA approves an ALP or provides funding through the AIP, emissions which are reasonably foreseeable as a consequence of these actions are under the control of FAA. Conversely, emissions which are not reasonably foreseeable or which cannot be practicably controlled by the FAA are excludable from a general conformity evaluation.

For example, if the planned action is an airport expansion that is expected to increase the motor vehicle traffic of passengers and employees to and from the airport, the sum of the on-road mobile source emissions resulting from new passenger and employee traffic for an average commute trip while off airport would be considered indirect emissions. On the other hand, if such off-airport emissions are accounted for as part of a conforming transportation plan or transportation improvement program, they are excludable from the general conformity evaluation (EPA 2002).

5.2.3 Meaning of "Caused by"

In the context of the general conformity regulations, the term "caused by" means those direct and indirect emissions that would not otherwise exist in the absence of the federal action. Therefore, the total emissions attributable to the federal action are the net, or incremental, emissions due to the action. To determine these net emissions at any point in time, it becomes necessary to estimate not only the total of direct and indirect emissions that would occur when the action is implemented but also the total of direct and indirect emissions that would exist at the same point in time in the absence of the proposed action.

Thus, the general conformity evaluation is always a "build/no-build" ("but for") test. For this evaluation, the emissions associated with Alternative D will be netted against the emissions associated with the No Action/No Project Alternative.

5.2.4 Emission Sources

As part of the general conformity evaluation, all on- and off-airport emission sources associated with Alternative D and the No Action/No Project Alternative were identified. The evaluation will address all sources that are not excludable as noted above, including those that are on airport property, motor vehicles carrying passengers and cargo to or from LAX, and construction activity. These sources are divided into two general categories: operations-related sources and construction-related sources.

5.2.4.1 Operations-Related Sources

The operations-related sources include all the nonconstruction-related sources that generate emissions under Alternative D or under the No Action/No Project Alternative either on or off airport. In general, these include mobile sources and stationary sources.

For purposes of the general conformity evaluation, the operations-related mobile sources include both on-road and nonroad vehicles. These on-road vehicles include the automobiles, trucks, buses, and other motor vehicles that operate on the public roadways and in the parking areas at and near LAX. The on-road vehicles are further characterized as either on-airport (direct) or off-airport (indirect). Nonroad vehicles include aircraft, ground support equipment, and auxiliary power units that operate in the nonpublic access areas (airport operations area [AOA]) of LAX. (An exception to this is the determination of aircraft emissions which are calculated from ground level to the height above ground level where the lower tropospheric mixing height terminates, a distance that goes beyond the LAX property boundaries.) Engine exhaust emissions as well as reentrained dust from mobile-source activities is included with the mobile source emissions.

Stationary sources consist of point and area sources. Point sources include fixed combustion equipment (e.g., boilers, electrical power generators, aircraft engine test cells), coating- and solvent-use facilities (e.g., paint-spray booths), organic liquid storage and transfer activities, and miscellaneous activities. Area sources include numerous small sources such as commercial/residential combustion equipment.

5.2.4.2 Construction-Related Sources

The construction-related sources include all the nonoperations-related sources that generate emissions under Alternative D or under the No Action/No Project Alternative either on or off airport. In general, these include mobile sources and stationary sources.

For purposes of the general conformity evaluation, the construction-related mobile sources include both on-road and nonroad vehicles. These on-road vehicles include the haul trucks, construction-worker vehicles, and other motor vehicles involved in specific construction activities that will operate on the public roadways at and near LAX. The on-road vehicles are further characterized as either on-airport (direct) or off-airport (indirect). Nonroad vehicles include primarily heavy construction equipment (e.g., scrapers, bulldozers, cranes) involved in specific construction activities that will operate on airport. Engine exhaust emissions as well as reentrained dust from mobile-source activities is included with the mobile source emissions.

Stationary sources consist of point and area sources. Point sources include primarily fixed combustion equipment (e.g., temporary electrical power generators). Area sources include wind-blown dust and outdoor coating and solvent use (e.g., architectural coating evaporation).

5.2.5 Emissions Estimates

As noted above, the pollutants of concern for the general conformity evaluation include O_3,(represented by its precursors, VOC and NO_x), CO, PM_{10}, and certain gaseous pollutants (notably NO_x, SO_x, and VOC) which can contribute significantly to secondary formation of PM_{10} and NO_2. All emissions calculations will utilize the latest and most accurate emission estimating techniques and take into consideration all applicable air quality control standards, limitations, and work practices, as described below. Input data and calculations used in estimating emissions will be summarized in both the draft and final general conformity determinations.

5.2.5.1 Operations-Related Emissions

Emissions for all operations-related sources will be calculated taking into account the latest LAX Master Plan descriptions and assumptions of Alternative D and the No Action/No Project Alternative, as presented in the Supplement to the Draft EIS/EIR.

5.2.5.1.1 Mobile Sources

Usually, the largest number and range of types of emission sources at an airport are the mobile sources. These mobile sources consist of on-road sources (e.g., light-duty cars, buses) and nonroad sources (e.g., aircraft, ground support equipment).

5.2.5.1.1.1 On-Road Sources

On-road mobile sources consist of those vehicles which are registered and licensed for use on public roadways. Emissions from these types of sources can occur on paved roadways and in parking facilities both on and off airport property.

5.2.5.1.1.1.1 Roadway Emissions

Emissions from on-road, or ground access vehicles, will be calculated using CARB mandated methodology. Only on-airport ground access vehicles will be included in the emissions inventories. Ground access vehicles include, but are not limited to, privately owned vehicles, government owned vehicles, rental cars, shuttles, buses, taxicabs, and trucks. Vehicle emissions will be estimated using the emission factors from the latest version of CARB's motor vehicle emission factor model, EMFAC2002 (CARB 2003, EPA 2003). It should be noted that SCAQMD used an earlier version of the EMFAC model (EMFAC7G) to generate roadway emissions when preparing the emissions inventory used to support the 1997 AQMP and the 1999 amendment to the 1997 AQMP.

Vehicle trip distances, idle times, hot start vs. cold soak, and average travel speeds will be based on specific roadway segments analyzed in the traffic impact studies conducted for the LAX Master Plan. The CARB mandated default values will be used where appropriate. Temporal data for on-airport traffic will be determined from the project's transportation analysis.

Entrained road dust will also be estimated. Emission factors from the SCAQMD CEQA Air Quality Handbook (SCAQMD 1993) will be used to calculate emissions of entrained dust from major roads and highways.

Because regional traffic volumes and patterns consistent with the assumptions of Alternative D are included in the conforming 2001 RTP (within one percent), emissions inventories for off-airport ground access vehicles will not be prepared for this evaluation for comparison to the SIP budgets (40 CFR 93.158(a)(5)(ii)). However, local air quality modeling of emissions at selected off-airport intersections affected by LAX-related traffic will be performed.

5.2.5.1.1.1.2 Parking Emissions

Methodologies similar to those used to estimate on-road emissions will be used to estimate emissions from vehicles in on-airport parking facilities. EMFAC2002 will be used and site-specific data will be incorporated. Resting evaporation emissions will be included for parking facility emissions.

Emissions will be calculated for each on-airport parking lot or garage. Estimates and assumptions made by the LAX Master Plan traffic consultants about the idle time, the average distance traveled, and the vehicle mix within each parking facility will be used. Temporal files for parking facilities will be provided by the project's transportation analysis.

5.2.5.1.1.2 Nonroad Sources

Nonroad mobile sources consist of those vehicles which are neither registered nor licensed for use on public roadways. Emissions from these types of sources occur only on airport property, primarily in the AOA. (Emissions from nonroad mobile area sources, such as fossil fuel-powered landscaping equipment, occurring on airport property are not included in the inventory.)

5.2.5.1.1.2.1 Aircraft Emissions

Aircraft emissions will be calculated using EDMS 4.11, consistent with methodology accepted by the EPA (EPA 1992) and the FAA (FAA/USAF 1997, FAA 2001). Emissions produced by LAX activity during five aircraft operational modes (approach, taxi/idle in, taxi/idle out, takeoff, and climbout) will be calculated for Alternative D. Two types of modal data may be used when modeling airport emissions: default times-in-mode representing an average airport, or airport-specific times-in-mode. Since LAX handles more operations than a typical airport, LAX-specific times-in-mode will be used. Taxi/in, taxi/out and queue (idle) times in mode will be developed from the LAX Master Plan airport simulation modeling (SIMMOD) results for Alternative D. The EDMS 4.11 (FAA 2001) default times in mode for each airframe will be the basis for climbout, approach, landing roll, and takeoff times; however, climbout and approach times will be adjusted according to the average mixing height adjustment parameters contained in EDMS (FAA 2001). An average mixing height of 625 meters (approximately 2,050 ft) will be used to calculate the adjustments to approach and climbout times in mode. A mixing height of 2,050 ft was used in the aircraft emission inventory calculations for LAX in support of the 1997 AQMP and the 1999 amendment to the 1997 AQMP as well as the Draft 2003 AQMP using EDMS (EEA 1999). The FAA approved model EDMS (Version 4.11) will be used to calculate aircraft emission inventories assuming the model default engines assigned to the mix of airframes. If emission factors for specific engines forecast for use at LAX are not available in EDMS, factors for other engines that can be used with the given airframe will be substituted. Fleet mix data and airport operations (LTOs) will be taken from the Master Plan forecasts. A list of the aircraft/engine combinations that will be included in the emissions and dispersion analysis is presented in **Table 11**, Aircraft and Engine Combinations Assumed for Emissions and Dispersion Modeling.

EDMS 4.11 does not contain emission indices for PM_{10} from aircraft since there is a dearth of generally available data, therefore, the model cannot be used to calculate PM_{10} mass emissions from aircraft or to disperse PM_{10} emissions attributable to aircraft. The PM_{10} emission indices used for this general conformity evaluation will be developed from three primary sources: (1) an analysis of existing aircraft emissions data collected for upper atmosphere research by University of Missouri Professors Philip Whitefield and Donald Hagen (Whitefield and Hagen 1999); (2) correlations of smoke number versus PM_{10} concentration; and (3) pre-1980 emission factors for several aircraft engines. The PM_{10} emission indices used for the general conformity evaluation are summarized in the Draft EIS/EIR, Technical Report 4, *Air Quality Technical Report,* Attachment H (FAA/LAWA 2001).

Table 11

Aircraft and Engine Combinations Assumed for Emissions and Dispersion Modeling

Aircraft Type	No. of Engines	Engine Type	Engine Model
Airbus A300B	2	Turbofan	CF6-80C2A5
Airbus A300-C4-200	2	Turbofan	CF6-50E2
Airbus A310-200	2	Turbofan	JT9D-7R4E1
Airbus A310-200C	2	Turbofan	CF6-80CB42
Airbus A319	2	Turbofan	CFM56-5B6/P
Airbus A320	2	Turbofan	V2527-A5
Airbus A330	2	Turbofan	PW4168
Airbus A340-200	4	Turbofan	CFM56-5C4
ATR42	2	Turboprop	PW120
ATR72-200	2	Turboprop	PW124-B
Boeing B737-200C	2	Turbofan	JT8D-17
Boeing B737-300	2	Turbofan	CFM56-3-B1
Boeing B737-400	2	Turbofan	CFM56-3B-2
Boeing B737-500	2	Turbofan	CFM56-3C-1
Boeing B747-200	4	Turbofan	CF6-50E2
Boeing B747-200C	4	Turbofan	CF6-50E2
Boeing B747-200F	4	Turbofan	JT9D-7F
Boeing B747-400	4	Turbofan	PW4056
Boeing B747-400F	4	Turbofan	CF6-80C2B1F
Boeing B747-SP	4	Turbofan	JT9D-7A
Boeing B757-200	2	Turbofan	PW2037
Boeing B757-200F	2	Turbofan	RB211-535E4
Boeing B767-200	2	Turbofan	CF6-80A (A1)
Boeing B767-300	2	Turbofan	CF6-80A2
Boeing B767-300F	2	Turbofan	PW4056
Boeing B777-200	2	Turbofan	PW4077
BH-1900	2	Turboprop	PT6A-67B
BH-1900C	2	Turboprop	PT6A-65B
Canadair Reg-700	2	Turbofan	CF34-8C1
Canadair RJ50	2	Turbofan	CF34-3A1
Cessna 150	1	Piston	O-200
Cessna 208 Caravan	1	Turboprop	PT6A-114
CITATION V	2	Turbofan	JT15D-5 (A & B)
Dash 7	4	Turboprop	PT6A-50
DC10-30F	3	Turbofan	CF6-50C2
EMB-110KQ1	2	Turboprop	PT6A-27
EMB-120	2	Turboprop	PW118
Fokker 100	2	Turbofan	TAY650-15
Fokker 50	2	Turboprop	PW127-A
Fokker 70	2	Turbofan	TAY620-15
Jetstream 31	2	Turboprop	TPE331-3
MD-11	3	Turbofan	CF6-80C2D1F
MD-11-11F	3	Turbofan	CF6-80C2D1F
MD-80	2	Turbofan	JT8D-219
MD-80-87	2	Turbofan	JT8D-219
MD-90-10	2	Turbofan	V2525-D5
MD-95	2	Turbofan	BR700-715C1-30
Saab2000	2	Turboprop	AE2100A
SF-340-A	2	Turboprop	CT7-5
Shorts 360	2	Turboprop	PT6A-65AR
Swearingen Metro 2	2	Turboprop	TPE331-3

Source: Camp Dresser & McKee Inc., 2003.

5.2.5.1.1.2.2 Ground Support Equipment/Auxiliary Power Unit Emissions

Emissions from ground support equipment (GSE) and auxiliary power units (APU) will also be calculated using the latest version of EDMS, as required by FAA (63 FR 18068). The GSE are nonroad surface vehicles that operate primarily on the airfield apron, near the terminal gate, which are used to service a flight. The APU is a small, on-board engine that operates to provide power to an aircraft while it is parked at the gate. The GSE and APU used at terminal buildings are typically owned and operated by the airlines using the equipment. Assignments of appropriate GSE and APU to aircraft and associated usage

times will be made based on site-specific data developed for Alternative D. Default values for GSE and APU assignments to aircraft and activity rates included in EDMS will be used to supplement the site-specific data as needed.

It should be noted that the default settings in the current version of EDMS calculate emissions from GSE based on emission factors and equipment operating assumptions used in the EPA NONROAD model. The EDMS model does allow the user to specify alternative emission factors for GSE to those used in the default settings and consideration has been given to substituting GSE emission factors from the CARB OFFROAD model. Because SCAQMD estimated emissions attributable to GSE for the 1997 AQMP and the Draft 2003 AQMP using the OFFROAD model, the general conformity evaluation will use EDMS with GSE emission factors from the OFFROAD model. To support the 1997 AQMP, the 1999 amendment to the 1997 AQMP, and the Draft 2003 AQMP, emissions inventories for APUs were developed using EDMS.

The major commercial airlines servicing LAX signed a memorandum of understanding (MOU) with CARB in December 2002 in which they voluntarily agreed to reduce emissions from GSE. The MOU does not specify the elimination of emissions from GSE, but LAWA does propose the virtual elimination of GSE emissions under Alternative D, which it will effect through incentives and tenant lease requirements. For purposes of the general conformity evaluation, it is assumed that the signatory airlines will comply with the conditions of the MOU and that under Alternative D, emissions from GSE will be eliminated at LAX by 2015.

The penetration of alternatively fueled and electric powered GSE will be developed from studies conducted for the City (CALSTART 1999) as well as from the conditions of the MOU cited above. In addition to the factors identified by CARB for GSE fueled by compressed natural gas (CNG) and liquefied petroleum gas (LPG) (CARB 1994), literature searches will be conducted to identify other appropriate emission factors for alternatively fueled GSE (CALSTART 1998). Emissions will be based on the equipment fuel type, brake horsepower, and/or time in mode. Zero direct emissions will be assumed for electric powered GSE. Indirect emissions estimated to occur within the SCAB attributable to the use of electric powered GSE will also be included in the analysis following the approach used to calculate secondary emissions from electricity production in the Supplement to the Draft EIS/EIR for the LAX Master Plan (FAA/LAWA 2003). (That approach assumes that 17.3 percent of the electricity needed at LAX would be generated locally from electric generating plants utilizing natural gas as fuel.) A central gate power system replacing a ground power unit (GPU - a ground vehicle with a portable generator that can be used to provide power to aircraft parked at a gate) as well as most aircraft APU[1] usage at terminal gates will be assumed for Alternative D as well as future No Action/No Project conditions (LADOA 1997). The gate electrification is assumed to be completed by the year 2005.

Pollutant emissions will be calculated using methodology accepted by EPA (EPA 1992, EPA 2003) and FAA (FAA/USAF 1997) for emergency generators, air-start units (ASU - a ground unit used to start aircraft turbofan engines), and air conditioning units (ACU) holding SCAQMD permits. Emissions will be calculated based on the generator or engine/turbine power rating, usage rate, and pollutant emission indices (based on power output and fuel type). Any air pollution control equipment in use, or emission standards required in the future as identified in SCAQMD, CARB, or EPA rules and regulations, will be incorporated into the calculations.

The equipment capacities, typical operating hours, and pollution controls will be based on the existing conditions survey (see Attachment C of Technical Report 4, *Air Quality Technical Report*, of the Draft EIS/EIR). Future condition emissions will be based on the number of aircraft operations for Alternative D and the No Action/No Project Alternative. Control efficiencies will be applied to those units with control devices/technologies. A central cooling system replacing portable ACU at terminal gates will be assumed (LADOA 1997). Cargo and general aviation gates will be assumed to have power connections also, which run on-board ACU.

[1] APU's will operate approximately 7 minutes per LTO: 5 minutes during departure for initial flight checks and main engine starts, and 2 minutes during arrival to provide power after the main engines are shutdown while the aircraft is being connected to central power and air.

5.2.5.1.2 Stationary Sources

Stationary sources include a variety of types of equipment operated in fixed and permanent locations, primarily on airport property. These stationary sources consist of point sources (e.g., boilers, surface coating facilities) and area sources (e.g., commercial combustion equipment).

5.2.5.1.2.1 Point Source Emissions

Point sources include larger sources that emit pollutants from a single stack or vent. Point sources considered in this evaluation are located primarily on airport property.

5.2.5.1.2.1.1 Utility Plants

Emissions from on-site power plants and heating facilities will be calculated using EPA and FAA accepted methodologies (EPA 2003, FAA/USAF 1997), assuming that natural gas is the primary fuel. Natural gas is the primary fuel for the existing Central Utility Plant (CUP) and SCAQMD Best Available Control Technology Guidelines (BACT Guidelines) (SCAQMD 2003b) require that natural gas be used on any new utility boilers and turbines to minimize PM_{10} and SO_2 emissions. Emissions for individual sources can be calculated based on the source's fuel consumption and pollutant emission factors:

$$E_{Ti} = \sum [F \times EI_i]$$

where: E_{Ti} = total emissions of pollutant i emitted from the source during the inventory period (grams),

F = total amount of fuel consumed during the inventory period (million cubic meters of natural gas),

EI_i = emission index for pollutant i (grams of pollutant per million cubic meters of fuel).

The emission index for each pollutant is based on the fuel type and combustion equipment type (e.g., boiler, turbine), and any air pollution control equipment in operation at the source. In addition, the SO_2 emission index is affected by the fuel sulfur content and the PM emission index is affected by the fuel ash content. The emission index can be calculated as follows:

$$EI_i = UI_i \times (1 - CF / 100) \times FM_i$$

where: EI_i = emission index for pollutant i (grams of pollutant per million cubic meters of fuel),

UI_i = uncontrolled emission index for pollutant i (grams of pollutant per million cubic meters of fuel),

CF = air pollution control factor (%)

FM_i = fuel modifier (fuel weight percent sulfur for SO_2 emission index and fuel weight percent ash for PM emission index).

Fuel consumption and air pollution control information will be based on the existing conditions survey and future year forecasts of fuel usage and SCAQMD control requirements. Utility plant fuel usage will be based on the ratio of existing fuel usage to existing terminal area (in square feet). This ratio will be applied to both Alternative D and the No Action/No Project Alternative. Emission factors will be obtained primarily from available information, and controlled or permitted emission limits for these sources.

5.2.5.1.2.1.2 Fuel Storage Tanks

Emissions from fuel storage tanks will be calculated using algorithms developed by SCAQMD and similar to Version 4.06 of EPA's TANKS emissions estimation program. Emission estimates for both Alternative D and the No Action/No Project Alternative will consider storage tank type (floating or fixed roof), fuel type, fuel throughput, and tank-specific characteristics (color, breather vent settings, etc.). Climatic data contained in the TANKS database will be used to calculate evaporative emissions. Storage tank requirements in the SCAQMD Rules and Regulations and BACT Guidelines will be addressed in the emission estimates.

Fuel transfer losses will be accounted for using methods presented in EPA 2003. These transfer losses primarily occur during the filling of aircraft and GSE.

5.2.5.1.2.1.3 Surface Coating Facilities

Surface coating operations emit volatile hydrocarbons (VOC or HC) into the atmosphere through evaporation of the paint vehicle, thinner, or solvent used to facilitate the application and clean up of the coatings. Emissions of VOC will be calculated using methods recommended in *Air Quality Procedures for Civilian Airports and Air Force Bases* (FAA/USAF 1997), taking into account requirements in the SCAQMD Rules and Regulations and BACT Guidelines:

$$E_{VOC} = \Sigma \; [Q_i \times VOC_i \times (1 - CF / 100)]$$

where: E_{VOC} = total volatile organic compound emissions from painting operations (g)

Q_i = total quantity of coating type i used in inventory period (kiloliters)

VOC_i = VOC content for coating type i (g VOC/kiloliter)

CF = air pollution control factor (%)

Information regarding the types and quantities of coatings used at on-site facilities, in addition to any air pollution control information, will be based on the existing conditions survey. VOC contents of coatings will be obtained from Material Safety Data Sheets (MSDS), or default values from *Air Quality Procedures for Civilian Airports and Air Force Bases* (FAA/USAF 1997) will be substituted if the MSDS information is unavailable. The VOC limits specified in SCAQMD Rules and Regulations and BACT Guidelines will also be accounted for when developing these emission inventories.

5.2.5.1.2.1.4 Solvent Degreasers

The use of organic solvents such as chlorinated hydrocarbons, petroleum distillates, ketones, and alcohols results in the evaporation of VOC or other hydrocarbons. The quantity of VOC allowed to be emitted from degreasing operations is limited by SCAQMD Rule. Emissions are based on the assumption that the total amount of solvent used will be either recaptured and disposed of as waste liquid, or released into the atmosphere as evaporated VOC. Emissions from solvent degreasing will be calculated using methods recommended in *Air Quality Procedures for Civilian Airports and Air Force Bases* (FAA/USAF 1997):

$$E_{VOC} = D \times (QC - QD)$$

where: E_{VOC} = volatile organic compound emissions from the solvent degreasing unit (grams)

QC = quantity of solvent consumed during a given time period (kiloliter)

QD = quantity of solvent disposed of as liquid in a given time period (kiloliter)

D = density of the solvent (g/kiloliter)

Quantities of solvent consumed and disposed will be estimated for each alternative based on data from the existing conditions survey, taking into account the size of areas to be used for maintenance activities. If water-based or other inorganic degreasers are used, evaporation of VOC or hydrocarbons will not occur. The VOC limits specified in SCAQMD Rules and Regulations and BACT Guidelines will also be accounted for when developing these emission inventories.

5.2.5.1.2.1.5 Deicing/Anti-Icing Operations

Due to the airport location in Southern California, and the mild winter climate that accompanies the area, deicing/anti-icing operations are minimal. Some deicing fluid is used on a small portion of aircraft arriving from the east coast that have over-the-wing fuel tanks. However, the emissions of volatile hydrocarbons from deicing/anti-icing fluid are minor and will not be estimated.

5.2.5.1.2.1.6 Training Fires

Air pollutants from the burning of training fires include PM, CO, NO_X, SO_X, and VOC. The emissions depend on the type of fuel burned and the duration of the burn (quantity of fuel burned). Emissions from the burning of training fires will be calculated using EDMS 4.11, consistent with methods recommended by the FAA (FAA/USAF 1997). The training frequency and quantity of fuel burned will be obtained from the aircraft rescue and fire fighting department at LAX for existing conditions. This frequency and quantity will be used to estimate training fire impacts for the No Action/No Project Alternative only, in 2005, 2015,

and any interim year analyzed for this evaluation. Emissions from the burning of training fires can be calculated as follows:

E_{Ti} = $QF \times EF_i$

where:

E_{Ti} = Total emissions of pollutant i from the training fire for the inventory period (g)

QF= = quantity of fuel burned in the fire (kiloliters)

EF_i = emission factor for pollutant i (g/kiloliter)

The LAX Master Plan proposes that future training fire operations be located off-airport and outside of the SCAB. Therefore, no emissions from training fires will be assumed for Alternatives D in 2005, 2015, or any interim year analyzed for this evaluation.

5.2.5.1.2.1.7 Aircraft Engine Testing

In addition to standard operations, engine testing or run-up emissions will also be estimated using EDMS. The emission rates will be based on the aircraft or engine type being tested, the duration of the test and the thrust setting for the test. The engine type, test duration and thrust setting will be provided by LAWA operations personnel.

5.2.5.1.2.2 Area Source Emissions

Several areas within the airport property line may be developed for non-airport related activities, such as general commercial or light industrial facilities. These areas include the LAX Northside and any new acquisition areas not used for airport operations. Emissions from these areas will be estimated following methodology in SCAQMD 1993.

5.2.5.2 Construction-Related Emissions

Emissions for all construction-related sources will be calculated taking into account the latest LAX Master Plan descriptions and assumptions of Alternative D and the No Action/No Project Alternative, as presented in the Supplement to the Draft EIS/EIR.

5.2.5.2.1 Mobile Sources

Mobile construction sources include a large number and range of types of emission sources. These mobile sources consist of on-road sources (e.g., light-duty cars, heavy-duty trucks) and nonroad sources (e.g., scrapers, bulldozers, cranes). Engine exhaust emissions as well as reentrained dust from mobile-source activities are included with these mobile source emissions.

5.2.5.2.1.1 On-Road Sources

On-road mobile construction-related sources consist of those vehicles which are registered and licensed for use on public roadways, even though some of these construction-related sources may operate both on-road and off-road. On-road mobile construction-related sources will include on-road, off-airport vehicle traffic. Such traffic will include construction employee traffic, construction material delivery trucks, and construction debris haul trucks. On-road mobile construction-related sources will also include on-road, on-airport vehicle traffic, such as vehicle traffic on internal roads to construction site locations as well as off-road, on-airport vehicle traffic, such as vehicle traffic off internal roads to construction site locations. The emission factors used for this activity will be taken from the CARB EMFAC2002 model. The parameters needed to construct the on- and off-road emission inventory (such as vehicle miles traveled (VMT), cold soak and hot start percentages, vehicle mix, and average vehicle speeds) will be taken from either SCAQMD 1993 or will be generated in the various traffic studies prepared for the LAX Master Plan. The City will seek concurrence from EPA and SCAQMD for any parameter values not included in EMFAC2002 or the CEQA Air Quality Handbook. Off-airport emissions from this category of construction-related sources will be limited to those emissions which are reasonably foreseeable and are subject to FAA's continuing program responsibility.

5.2.5.2.1.2 Nonroad Sources

Nonroad mobile construction-related sources consist of those vehicles which are neither registered nor licensed for use on public roadways, even though some of these construction-related sources may operate both on-road and off-road. Nonroad mobile construction-related equipment emissions will be quantified using the construction schedule and activity levels developed by the project engineering team, and correlated with equipment types from the Caterpillar Performance Handbook (Caterpillar 1993) and the National Construction Estimator (Kiley 1995). Construction equipment usage will be based on common practices for the types of construction to be undertaken. Emissions based on these activity levels will then be calculated using emission factors from the CARB OFFROAD model, SCAQMD CEQA Air Quality Handbook, and specific equipment manufacturer supplied data.

5.2.5.2.2 Stationary Sources

Stationary construction-related sources include a variety of types of equipment operated in fixed but temporary locations on airport property. These stationary sources consist of point sources (e.g., electrical generators) and area sources (e.g., fugitive dust).

5.2.5.2.2.1 Point Source Emissions

Point source construction-related equipment emissions will be quantified using the construction schedule and activity levels developed by the project engineering team. Construction equipment usage will be based on common practices for the types of construction to be undertaken. Emissions based on these activity levels will then be calculated using emission factors from the *Compilation of Air Pollutant Emission Factors (AP-42)*, SCAQMD CEQA Air Quality Handbook, and specific equipment manufacturer supplied data.

5.2.5.2.2.2 Area Source Emissions

The category of fugitive dust incorporates all sources of dust production during construction. These fugitive dust sources include but are not limited to: grading and excavation, concrete plant operations, and demolition. Emissions from these sources will be quantified using emission factors from the *Compilation of Air Pollutant Emission Factors (AP-42)*, the SCAQMD CEQA Air Quality Handbook, and available documentation addressing fugitive dust. Measures required under SCAQMD Rule 403 (Fugitive Dust) will be accounted for in the emission calculations.

The emissions from construction materials, including but not limited to asphalt paving and striping and architectural coating operations, will be calculated using activity levels and emission factors from the project engineering team and assumptions provided in the *Compilation of Air Pollutant Emission Factors (AP-42)* and the SCAQMD CEQA Air Quality Handbook.

5.2.5.3 Uncertainties and Sensitivities of Methods

The methods described herein and used to calculate the emissions are sensitive to the values used to represent the numerous variables (e.g., assignment of a specific APU to a specific airframe). Consequently, the emissions values calculated using these methods are estimates, based on the various assumptions discussed above regarding forecasted future activities, and are therefore subject to the uncertainties inherent in developing the project input information. Different assumptions and values of variables would result in different emissions estimates. The emissions calculations developed for the general conformity evaluation will be based on well-accepted methods in a consistent manner to develop the best estimates of emissions, based on those particular assumptions discussed above.

5.2.6 Comparison of Emissions Caused by Proposed Federal Action to Applicable SIP Budgets

The emissions caused by the build out of Alternative D will be compared to the those portions of the applicable SIP emissions budgets which are attributable to LAX to assess whether or not they will exceed the budgets. For each pollutant of concern for which the portion of the applicable budget is not exceeded in all milestone years, a positive conformity determination is made.

The determination of the applicable SIP emissions budgets allowable to LAX is a nontrivial exercise and will require the concurrence of SCAQMD and CARB, and possibly of EPA. The difficulty arises from the

pooled nature of the emissions inventories that form the bases of the budgets. Because emissions are determined on a categorical basis within the SCAB (e.g., all on-road mobile sources, all nonroad mobile sources) and not necessarily for specific sources, the emissions attributable to any subset of such categories (e.g., on-road mobile sources on LAX property) is not clearly defined. The complex nature of the emission sources at LAX (multiple source types under the control of multiple owners and operators) further complicates the issue. For SIP development purposes, future emissions are often based on best estimates of actual emissions for some baseline point in time then projected to a later time using regional macroeconomic growth assumptions.

Aircraft and APU emissions may be a special case, since it is known that in developing the SCAB emissions inventories for the 1997 AQMP, SCAQMD commissioned a special study to estimate all aircraft emissions in the SCAB (EEA 1999). These data were also used in developing the aircraft and APU emissions inventories for the Draft 2003 AQMP. On the other hand, emissions due to other source categories are not so easily separated from the pooled inventories. For example, emissions from GSE are part of the nonroad, nonconstruction inventories.

The City and FAA will work directly with SCAQMD and CARB to identify and confirm in writing those portions of the applicable SIP emissions budgets that are allowable to LAX operations and construction activities for all milestone years. The incremental emissions due to Alternative D will then be compared to these subsets of the budgets to assess whether they are within allowable amounts.

5.3 Local Air Quality Modeling

Conformity means that a proposed federal action will not cause or contribute to any new violation of any NAAQS; not increase the frequency or severity of any existing violation of any NAAQS; and not delay timely attainment of any NAAQS or any required interim emission reductions or other milestones (42 U.S.C. 7506(c)(1)(B)). The general conformity regulations allow that local air quality modeling may be used to demonstrate that these requirements are met in support of a positive conformity determination (40 CFR 93.158(a)(3) and 40 CFR 93.158(a)(4)(i)). This approach may be particularly suitable for the evaluation of CO and PM_{10}, in the event that Alternative D emissions exceed the applicable SIP budgets for these pollutants. It is assumed herein that areawide air quality modeling (as defined at 40 CFR 93.152) for the evaluation of either CO or PM_{10} for Alternative D is not practical. Input and output data for specified dispersion model runs will be made available upon written request to FAA following publication of both the draft and final general conformity determinations.

5.3.1 Model Selection

As noted previously, the general conformity regulations require the use of the applicable air quality models identified in the most recent version of EPA's *Guideline on Air Quality Models*. The following discussion addresses the selection of models to support the local air quality modeling portion of this evaluation.

5.3.1.1 Operations-Related Sources

The on-airport pollutant emissions will be generated from both mobile and stationary sources. The on-airport dispersion analysis of operations-related sources will be conducted using EDMS 4.11 (FAA 2001) and the Industrial Source Complex - Short Term (ISCST3) version 02035 (U.S. EPA 1995).

5.3.1.1.1 All Sources Except Primary PM from Aircraft

As noted previously, EDMS is the FAA-required model for airport air quality analysis of aviation sources and will be used to compare concentrations associated with Alternative D relative to the NAAQS. The EDMS 4.11 model will be used to predict CO concentrations from aircraft engines, APUs, GSE, stationary sources, and ground access vehicles (on-road and parking) as well as PM_{10} concentrations from on-airport sources other than aircraft engines.

While for purposes of this draft general conformity evaluation NO_x, SO_x, and VOC can be considered precursors to PM_{10} (40 CFR 93.152, definition of "precursors of a criteria pollutant;" see also 62 FR 38652) since they are considered by SCAQMD as significant contributors to PM_{10} levels, it is not practical to model activities associated with Alternative D to predict PM_{10} impacts attributable to these precursor compounds (Servin 2003; Ryan 2003). Although there are no models approved by EPA to model secondary PM_{10} emissions, SCAQMD used the UAMAERO-LT model for the Draft 2003 AQMP to predict

PM_{10} concentrations throughout the SCAB due to precursor compounds. The UAMAERO-LT model is a photochemical grid model which is used to estimate the regional impacts of PM_{10} precursors using complex chemical mechanisms applied to emission sources across a regional airshed (such as the SCAB) arrayed in five-kilometer-by-five-kilometer girds. As an alternative to regional modeling of PM_{10} precursors, it is proposed to scale the UAMAERO-LT modeling results performed for the Draft 2003 AQMP relative to the Alternative D precursor emissions from all sources (including aircraft) to predict the potential PM_{10} impacts for the general conformity evaluation. This approach provides a measure of consistency between the PM_{10} impacts attributable to Alternative D and the basis of PM_{10} impacts predicted in the Draft 2003 AQMP.

5.3.1.1.2 Primary PM from Aircraft

When and if appropriate and applicable PM_{10} emission factors for aircraft engines have been identified, the ISCST3 model will be used to predict PM_{10} concentrations from aircraft engines, the one potential PM_{10} source not included in the EDMS 4.11 model. ISCST3 is a steady-state Gaussian dispersion model capable of estimating the short-term and annual concentrations from point, area or volume sources (EPA 1995). ISCST3 is an EPA-preferred dispersion model (40 CFR 51, Appendix W) and is identified as an available model by the FAA (FAA/USAF 1997).

5.3.1.2 Construction-Related Sources

Construction sources typically include construction equipment and motor vehicle engines as well as fugitive dust. The ISCST3 model will be used to predict dispersion from construction emission sources. As previously indicated, the ISCST3 model is capable of analyzing various source types (EPA 1995) and is an EPA-preferred model (40 CFR 51, Appendix W). The FAA has indicated that ISCST3 is acceptable for modeling construction sources at the airport (FAA 1997).

5.3.1.3 Induced Sources: CO "Hot-Spot" Analysis

The off-airport emission sources will be nonconstruction-related mobile vehicles. The modeling conducted for off-airport dispersion will be the local CO intersection analysis. The analysis will be conducted following the "Transportation Project-Level Carbon Monoxide Protocol, Revised December 1997" (CalTrans 1997) developed for the California Department of Transportation Environmental Program. The latest version of the CAL3QHCR model will be used to model CO concentrations at street intersections due to vehicle traffic. CAL3QHCR is an EPA-recommended model for analyzing CO concentrations at intersections (40 CFR 51, Appendix W). The CAL3QHCR model allows the use of annual meteorological data, and one-week temporalized vehicle flow data. Additionally, it will provide one-hour and running eight-hour CO concentrations for intersections and roadway links. The specific intersection and roadway links will be selected based on results of the off-airport transportation analyses being conducted by the City. Up to 19 intersections will be included in the air quality analysis.

5.3.2 Model Inputs and Assumptions

The following discussion addresses the model inputs and assumptions that will be used to exercise the models introduced above to conduct this evaluation.

5.3.2.1 Source Parameters

The correct representation of each source type in each model is critical to the accuracy of the results.

5.3.2.1.1 EDMS Modeling

FAA requires the use of EDMS 4.11 for all airport air quality analyses of aviation sources. A very detailed model, EDMS requires the user to input information regarding all air pollutant emissions sources typically found at an airport. These sources include aircraft, GSE, APU, ground vehicular traffic, and stationary sources.

5.3.2.1.1.1 On-Road Sources

The on-airport roadways are modeled as area sources in EDMS. Roadway locations will be determined from site drawings. In recognizing that the Central Terminal Area (CTA) has a second level roadway, all emissions from both levels will be modeled as emanating from the lower level. This assumption puts the CTA emission sources at approximately the same elevation as the receptors, providing a conservative

(high) estimate of impacts in the CTA. The on-airport parking lots are modeled as area sources in EDMS. The approximate parking lot dimensions and locations will determined from site drawings.

5.3.2.1.1.2 Aircraft

Aircraft/engine combinations and LTOs:

As noted previously and shown in **Table 11**, an appropriate engine for each airframe will be included in the analysis. The engines will accurately represent those available for the fleet for each study year. Yearly landing and takeoff (LTO) operations for each aircraft type as forecast by the SIMMOD runs conducted for Alternative D will be used and appropriate temporal distributions will be incorporated to reflect the hourly, daily, and monthly variations.

Runway/taxiway/queue/gate locations:

Runway coordinates will be obtained from site layout drawings and input into EDMS. Since EDMS 4.11 uses only a portion of the runway for takeoff based on aircraft speeds and takeoff TIM, the full length of the runways will be input. Takeoff and landing roll times are the EDMS default values, and climbout and approach values are based on EDMS defaults values, adjusted for mixing height.

Taxiway segment coordinates will also be obtained from site drawings. Full taxiways will be subdivided to allow EDMS to accurately account for reasonable movement of aircraft from gates to runways. Using the segment length and assuming a constant aircraft taxi speed, taxiway times will be calculated by dividing the taxiway segment length by the aircraft speed.

The coordinates defining the queue segments will be obtained from SIMMOD data and site drawings. The first queue endpoint will always coincide with the runway endpoint. Since EDMS allows only one linear segment to define a runway's queue, the second endpoint will usually be located on a nearby taxiway. The maximum length of the modeled queue segment will be calculated by assuming 225 feet per aircraft for the peak number of aircraft in queue for each runway. The SIMMOD data indicate that approximately 40 aircraft (maximum) can depart from the main departure runways (7L/25R and 6R/24L) each hour, which is equivalent to an average departure interval of 1.5 minutes per aircraft. Therefore, queue times will be calculated assuming 1.5 minutes per aircraft for the peak number of aircraft in queue for each runway. Temporal distributions are also allowed and will be developed to incorporate the hourly variability of the queue into the analyses.

The EDMS model allows each defined aircraft/engine combination to be assigned to one gate, and multiple taxiways and runways. However, the SIMMOD runs analyze over 200 gates and many more aircraft/gate/taxiway/runway combinations than can reasonably be accounted for in EDMS. Therefore, representative gate locations, taxiways and runways for each defined aircraft type will be selected based on providing each terminal with an appropriate number of aircraft operations developed from the SIMMOD data. The consolidation of all gates into a representative gate (or gates) at each terminal conservatively combines the GSE emissions for the dispersion analysis.

Aircraft runway/taxiway/gate assignments:

To accurately incorporate the spatial variations of the emitting sources, the aircraft's path from the gate to the runway must be determined. Since takeoff runways are located on both the northern and southern sides of the airport, duplicate user-created aircraft will be created to allow the user to assign a given aircraft type to more than one gate/taxiway/runway combination.

The gate and runway assignments for each aircraft type will be obtained from an objective inspection of the SIMMOD data. The most common northern (24) and southern (25) runway will be identified for and assigned to each aircraft type. Since the majority of takeoffs occur from east to west on the innermost runways, runways 24L and 25R are expected to be the most commonly used runways for takeoffs.

Again, the SIMMOD data will be inspected for each aircraft type, and the terminal associated with the most common gate(s) will be assigned to the aircraft. Following assignment of the runway and gate for each aircraft type, up to three taxiways will be assigned to each aircraft type to create a travel path from the gate to the runway.

Aircraft temporal factors:

Temporal factors are used in EDMS to determine the annual number of LTOs from peak hourly LTOs for each aircraft in the modeled fleet. Temporal factors are a set of load factors that, taken together, profile the activity of a given source over the course of an entire year on an hour-by-hour basis. A series of three temporal factors are used in EDMS for each source which gives the temporal variation in operations by (1) hour-of-the-day, (2) day-of-the-week, and (3) month-of-the-year. The hour-of-the-day temporal factors are specific for each source and alternative and are determined from the SIMMOD runs for aircraft. The day-of-the-week and month-of-the-year temporal factors are also developed from actual operations in 1996 and are assumed to be the same for all aircraft and all alternatives. The day-of-the-week and month-of-the-year temporal factors are presented in **Table 12**, Month-of-the-Year and Day-of-the-Week Temporal Factors Used in EDMS Aircraft Modeling.

Table 12

Month-of-the-Year and Day-of-the-Week Temporal Factors Used in EDMS Aircraft Modeling

Month	Temporal Factor	Day	Temporal Factor
January	0.9	Monday	1.0
February	0.9	Tuesday	1.0
March	1.0	Wednesday	1.0
April	1.0	Thursday	1.0
May	1.0	Friday	1.0
June	1.0	Saturday	0.9
July	1.0	Sunday	0.9
August	1.0		
September	1.0		
October	1.0		
November	0.9		
December	0.9		

Source: FAA/LAWA 2001 Attachment D to Technical Report 4.

5.3.2.1.1.3 GSE and APUs

GSE associated with individual aircraft types are discussed in the calculation of aircraft-related emissions above. EDMS assumes emissions from aircraft-associated GSE emanate from a point located at the representative gate for each terminal at which the aircraft is assigned. EDMS assumes an APU is collocated with its assigned aircraft.

5.3.2.1.1.4 Stationary Sources

Stationary sources are modeled as point sources in EDMS 4.11. In addition to training fires, these sources will include flight kitchens, aircraft maintenance operations (coating and degreasing), airport utility boilers and turbines.

Engine testing emissions will be modeled as stationary point sources in EDMS. The engine test locations will be provided by LAWA operations personnel.

5.3.2.1.2 ISCST3 Modeling

Because the EDMS model cannot treat the dispersion of PM_{10} emissions from aircraft (including engine testing) nor the dispersion of any pollutants from construction-related sources, the ISCST3 model will be used to perform the evaluation of these sources.

5.3.2.1.2.1 Aircraft

Aircraft are modeled as multiple volume sources distributed in equal emission increments for each of the five engine modes (taxi/idle in, taxi/idle out, approach, climbout, takeoff) and each of three aircraft sizes. Volume sources using plume height and initial dispersion parameters based on preliminary findings of a recent Light Detection and Ranging (LIDAR) study conducted for the FAA (Wayson, et al 2002) will be

used to model dispersion of PM_{10} from aircraft. The initial dispersion parameters used in the dispersion model are shown in **Table 13**, Volume Source Parameters Used to Model PM10 Dispersion from Aircraft.

Table 13

Volume Source Parameters Used to Model PM10 Dispersion from Aircraft

Parameter	Horizontal Dispersion Coefficient, meters	Vertical Dispersion Coefficient, meters	Plume Height, meters
Aircraft Volume Source Parameter Values	10.5	4.1	12.0

Source: Wayson, et al. (2002).

The number of point sources to be used for each engine mode and each aircraft size is as follows:

Taxi/Idle	Queue	Approach	Climbout	Takeoff
60	1 to 25	5	5	15

The annual emissions are sorted by aircraft type (i.e. heavy, large, small, as defined in EDMS) and by engine mode, divided by the number of volume sources used for each engine mode and converted from tons/year into annual average emissions in grams/second. The annual average emissions are then converted into maximum hourly emissions using temporal files calculated from the SIMMOD model data. Temporal files for takeoff, climbout, and approach are based on the actual time of departure/arrival data as appropriate for each aircraft type. The taxi temporal file is a combination of the departure and arrival temporal files. The queue temporal files are calculated, for each queue position, using the hourly number of each aircraft type that passes through each queue and the average hourly depth of queue that was determined through analysis of the SIMMOD model results. Monthly and daily temporal files are not used in the ISCST3 airport modeling.

Engine Testing

Engine testing, like the other aircraft operations, are modeled as volume sources. Engine testing is assumed to be performed with engine exhaust pointed towards blast gates. The source parameters are consistent with those used for ground-based aircraft volume sources.

5.3.2.1.2.2 Construction-Related Sources

Construction activities typically occur over a sizeable construction site; therefore, area sources will be used in ISCST3 to model dispersion from all on-airport construction activities, both mobile and stationary.

5.3.2.2 Meteorological Data

The EPA *Guideline on Air Quality Models* states that five years of National Weather Service meteorological data or at least one year of site-specific meteorological data is required when predicting concentrations with an air quality model. In pertinent part, the Guideline states "[I]f one year or more (including partial years), up to five years, of site specific data is available, these data are preferred for use in air quality analyses" (40 CFR 51 Appendix W, Section 9.3.1.2 b). One 12-month period of hourly meteorological data collected on site by SCAQMD at LAX will be used for final dispersion modeling. The SCAQMD has indicated that upper air data (mixing heights) it recently collected at LAX should be used in the dispersion models (SCAQMD 1998b). Therefore, the meteorological data file will consist of hourly surface and upper air data from the LAX meteorological observation stations operated by SCAQMD for the 12-month period beginning March 1, 1996, and ending February 28, 1997 (SCAQMD 1998c). The surface data set consists of hourly values of wind speed, wind direction, surface air temperature, and atmospheric stability. The upper air data consists of hourly mixing heights. This data set contains the most recent set of representative (surface and upper air) data collected on site at LAX. It should be noted that the surface data set includes calm wind conditions.

5.3.2.3 Urban/Rural Land Use Determination

Appendix W of 40 CFR Part 51, Section 8.2.8 provides guidance on the selection of urban or rural dispersion coefficients to be used in dispersion modeling. The land use character of an area is determined based on a categorical classification scheme proposed by Auer (1978). Descriptions of each land use classification are presented in **Table 14**, Auer Land Use Classification Scheme. If land use types I1, I2, C1, R2, and R3 account for 50 percent or more of the area circumscribed by a 3 km radius circle about the source, then urban dispersion coefficients (Briggs-McElroy-Pooler curves) should be used. Otherwise, rural dispersion coefficients (Pasquill-Gifford curves) should be used. Inspection of a 3 km area surrounding LAX indicates that the local land use is predominantly compact residential/commercial. Therefore, urban dispersion coefficients will be used in the air dispersion modeling analysis.

Table 14

Auer Land Use Classification Scheme

Type	Description	
	Use and Structures	**Vegetation**
I1	Heavy Industrial Major chemical, steel, and fabrication industries; general 3-5 story buildings, flat roofs	Grass and tree growth extremely rare; < 5% vegetation
I2	Light-Moderate Industrial Rail yards, truck depots, warehouses, industrial parks, minor fabrications; generally 1-3 story buildings, flat roofs	Very limited grass, trees almost total absent; < 5% vegetation
C1	Commercial Office and apartment buildings, hotels; >10 story heights, flat roofs	Limited grass and trees; <15% vegetation
R1	Common Residential Single family dwelling with normal easements; generally one story, pitched roof structures; frequent driveways	Abundant grass lawns and light-moderately wooded; >70% vegetation
R2	Compact Residential Single, some multiple, family dwelling with close spacing; generally < 2 story, pitched roof structures; garages via alley, no driveways	Limited lawn sizes and shade trees; <30% vegetation
R3	Compact Residential Old multi-family dwellings with close (<2 m) lateral separation; generally 2 story, flat roof structures; garages (via alley) and ashpits, no driveways	Limited lawn sizes, old established shade trees; <35% vegetation
R4	Estate Residential Expansive family dwelling on multi-acre tracts	Abundant grass lawns and lightly wooded; >80% vegetation
A1	Metropolitan Natural Major municipal, state, or federal parks, golf courses, cemeteries, campuses; occasional single story structures	Nearly total grass and lightly wooded; >95% vegetation
A2	Agricultural Rural	Local crops (e.g., corn, soybean); >95% vegetation
A3	Undeveloped Uncultivated; wasteland	Mostly wild grasses and weeds, lightly wooded; >90% vegetation
A4	Undeveloped Rural	Heavily wooded; >95% vegetation
A5	Water Surfaces Rivers, lakes	

Source: Auer 1978.

5.3.2.4 Receptors

Pollutant concentrations produced from airport sources will be predicted at sufficient publicly accessible receptor locations to identify the maximum ambient air quality impacts from the airport sources. Up to 300 receptors will be used in each initial EDMS dispersion modeling scenario and approximately 1000 receptors will be used in each ISCST3 modeling scenario. Receptors will be located along the property line defined for Alternative D, and spaced a maximum of 300 meters and a minimum of 100 meters from the next property line receptor. An overlaying receptor grid (with receptors spaced a maximum of 500 meters and a minimum of 100 meters apart in EDMS and a maximum of 250 meters and a minimum of 100 meters apart in ISCST3) will also be included in each modeling scenario. The grid will be centered approximately on the LAX Theme Building and extend 4.5 km to both the east and west and 5 km to both the north and south. Grid receptors falling within the property line but not in areas accessible to the public will be removed from the analyses. The height of all receptors will be 1.8 m (EDMS default), the approximate breathing height of persons standing on the ground. The receptor locations will be submitted to the SCAQMD, FAA, and EPA prior to completing the air quality impact analysis.

Receptors will also be placed at locations sensitive to the public interest. These locations include schools, hospitals, nursing homes, and day-care facilities. Pollutant concentrations will be predicted at all readily identifiable sensitive locations within a radius of at least 3 km from the LAX Theme Building.

A discrete receptor will also be placed at the SCAQMD Hawthorne Monitoring Station, for comparison to previously measured ambient air pollutant concentrations. Discrete receptors will also be placed at the Tier I roadway intersections modeled with CAL3QHCR and at the project air quality monitoring station east of Runway 25R.

Since the area around the airport has relatively flat terrain, receptor terrain elevations will not be considered.

5.3.2.5 Aerodynamic Downwash and Cavity Effects

Aircraft operations occurring on the runways and taxiways are expected to be the main contributor to NO_X and CO emissions. These sources are far enough from airport structures to avoid being influenced by building downwash. Downwash occurs when the exhaust plume from an emission source is trapped in the recirculation (eddy) zone on the leeward side of a building or structure. Since the impacts from other emission sources are expected to be located well within the airport boundaries, any aerodynamic effects on stack emissions due to nearby structures would be insignificant at publicly accessible receptor locations. Therefore, analyses of building downwash and cavity impacts will not be performed.

5.3.3 <u>Integrating Results</u>

Since various dispersion models (EDMS, ISCST3, and CAL3QHCR) will be used for differing sources (on-airport, off-airport and construction), results from parallel dispersion modeling of various sources must be integrated to obtain cumulative impacts in the vicinity of the project. A future background concentration for each pollutant will be added to the maximum of the sum of the predicted concentrations of all other sources (from the three models) to obtain a conservative estimate of total concentrations for comparison to the NAAQS.

5.3.3.1 Future Background Concentrations

The modeling that will be undertaken for the LAX Master Plan cannot reflect all pollutant sources in the area that contribute to total air pollutant levels. Therefore, background concentrations must be defined which reflect the emissions from all nearby and distant major sources. Background concentrations, when added to the airport modeling results, will reflect the total pollutant concentrations at a specific site.

The background concentrations of CO near LAX in 2005 and 2015 will be estimated using a linear rollback approach. This approach assumes that changes in emission inventories will change the background concentrations proportionally. The rollback equation can be written as (SCAQMD 1996c):

$$C_p = [(C_b - k) \times Q_p / Q_b] + k$$

Where C_p and C_b are the future year and existing concentrations, respectively, Q_p and Q_b are the future year and existing emission rates, and k denotes natural background. The value of k is assumed to be negligible for CO based on the composition of natural (clean) air (SCAQMD 1996b, Prinn 1992). The

presence of these compounds in the SCAB is primarily from human (anthropogenic) activities (SCAQMD 1996a).

The winter planning inventories will be used for estimating future year CO concentrations. Existing emission rates are taken from Appendix III of the 1997 AQMP (SCAQMD 1996a) for the 1997 year. The future year emission rates will be the controlled levels presented in Appendices III and V of the 1997 AQMP (SCAQMD 1996a, SCAQMD 1996b). The 2015 controlled emission rates will be estimated from linear interpolation of the controlled emission rates for 2010 and 2020. The calculated future background concentrations are presented in **Table 15**, Existing Ambient Air Quality and Projected Future Background Concentrations (Based on the 1997 AQMP) in the Vicinity of LAX for Pollutants Relevant to General Conformity in the SCAB.

Table 15

Existing Ambient Air Quality and Projected Future Background Concentrations (Based on the 1997 AQMP) in the Vicinity of LAX for Pollutants Relevant to General Conformity in the SCAB

Pollutant	Avg. Time	Existing[1] Air Quality	Future Background[2] 2005	Future Background[2] 2015	NAAQS
O_3 (ppm)	1-Hr	0.15[3]	<0.09[4]	<0.09[4]	0.12
CO (ppm) [5]	8-Hr	8.5[6]	5.0	3.5	9
	1-Hr	10.6[6]	6.2	4.4	35
PM_{10} (µg/m³)	AAM[7]	37[3]	28	24	50
	24-Hr	82.3[6]	61	43	150

Note: Existing conditions reflect actual measurements undertaken at LAX for the Master Plan. Where pollutants were not measured (O_3 and annual averages) data collected by the SCAQMD at Monitoring Station 094 (about 2.4 miles southeast of the LAX Theme Building) were used, as noted below.

1 Existing ambient air quality includes the contribution from airport and non-airport sources.
2 Future background concentrations are estimated using a linear rollback approach and the current and future year controlled CO emission inventories from Appendices III and V of the 1997 AQMP (SCAQMD 1996a, 1996b). Future background concentrations are assumed to exclude contribution from airport sources. However, the projected background is based on existing ambient air quality and, therefore, does include some contribution from airport sources. Consequently, this approach represents a very conservative method for estimating future background concentrations.
3 Highest reported 1999 through 2001 concentrations from SCAQMD Monitoring Station 094, SW Coastal Los Angeles County (SCAQMD 1999, 2000, 2001).
4 Ozone concentrations with or without the LAX Master Plan. Although regional O_3 modeling predicts exceedances of the O_3 NAAQS at some locations in the SCAB in 2005, that modeling predicts O_3 concentrations below the NAAQS in the immediate vicinity of LAX in 2005 (SCAQMD 1996b; SCAQMD 2003a).
5 1 ppm CO = 1145 µg/m³ CO
6 Highest measured concentration from on-site monitoring station (LAWA 1998, AeroVironment 1998).
7 AAM = Annual Arithmetic Mean

Source: Camp Dresser & McKee Inc., 2003.

The future year background concentration of PM_{10} at LAX will be estimated from the ratio of future year to existing PM_{10} concentrations for downtown Los Angeles multiplied by the current PM_{10} concentrations at the airport. This approach assumes that changes in PM_{10} concentrations at downtown locations are equivalent to changes in background concentrations in the LAX vicinity. The future year PM_{10} concentrations for downtown Los Angeles will be those values presented in Appendix V of the 1997 AQMP (SCAQMD 1996b) for the years 2000, 2006 and 2010. The estimated value for 2005 will be interpolated and the estimated value for 2015 will be extrapolated. The downtown Los Angeles monitoring station is the nearest station to LAX for which existing and future year PM_{10} concentrations are available.

The approach that will be used in this evaluation to estimate future background will be based on existing ambient air quality measurements, which include the current contribution from LAX sources. Therefore, this methodology is conservative since airport sources are implicitly included in the calculated future background concentrations. Modeled airport contributions will be added to the background values and then compared to the NAAQS. Refinements to the background concentration calculation may be

developed if the double counting of airport contributions significantly impacts the estimated future air quality values. Any proposed refinements to the calculation will be coordinated with the FAA, SCAQMD, and EPA.

The estimates of future year O_3 concentrations have been presented in Appendix V of the 1997 AQMP (SCAQMD 1996b) and in Appendix V of the Draft 2003 AQMP (SCAQMD 2003a). These estimates are based on regional modeling and indicate that the project area is not predicted to exceed the one-hour O_3 NAAQS through the year 2020. Therefore, the future year O_3 concentrations are estimated to remain below the standards with or without the LAX Master Plan (SCAQMD 1998a).

5.3.3.2 Predicted Ambient Concentrations

The EPA model CALMPRO (EPA 1984) will be used to post-process the EDMS raw results. The final CALMPRO results will be used to demonstrate compliance with air quality standards and regulations. The ISCST3 model already includes the CALMPRO algorithms and EPA calculation methods for multiple-hour averaging. Background concentrations will be added to the airport contributions and the sum will be compared to the NAAQS.

5.3.4 Uncertainties and Sensitivities of Methods

Dispersion models to be used in this general conformity evaluation represent the state of the art in modeling methodology and guidance extant at the time of the evaluation, and therefore, the results provided by exercising these models offer the best estimates available to predict future ambient concentrations, given the accuracy of the input data. That is not to say that these models are without limitations. Studies of model accuracy have consistently confirmed the following conclusions: (1) dispersion models are more reliable for predicting long-term concentrations than for estimating short-term concentrations at specific locations; and (2) dispersion models are reasonably reliable in predicting the magnitude of the highest concentrations occurring, without respect to a specific time or location. We refer the reader to the Guideline on Air Quality Models (40 CFR 51 Appendix W) for additional discussion of dispersion modeling uncertainties and sensitivities.

5.4 Consistency with Requirements and Milestones in Applicable SIP

The general conformity regulations state that notwithstanding the other requirements of the rule, a proposed action may not be determined to conform unless the total of direct and indirect emissions from the action is in compliance or consistent with all relevant requirements and milestones in the applicable SIP (40 CFR 93.158(c)). This includes but is not limited to such issues as reasonable further progress schedules, assumptions specified in the attainment or maintenance demonstration, prohibitions, numerical emission limits, and work practice standards. This section briefly addresses how Alternative D will be assessed for SIP consistency for this evaluation.

5.4.1 Compliance with Applicable Requirements from EPA

EPA has already promulgated, and will continue to promulgate, numerous requirements to support the goals of the Clean Air Act with respect to the NAAQS. Typically, these requirements take the form of rules regulating emissions from significant new sources, including emission standards for major stationary point sources and classes of mobile sources as well as permitting requirements for new major stationary point sources. Since states have the primary responsibility for implementation and enforcement of requirements under the Clean Air Act and can impose stricter limitations than EPA, the EPA requirements often serve as guidance to the states in formulating their air quality management strategies. As part of this evaluation, and in consultation with EPA, FAA will identify all EPA requirements in support of the NAAQS which are applicable to Alternative D and will confirm that, within the limit of its continuing program responsibility, Alternative D will be consistent with those requirements.

5.4.2 Compliance with Applicable Requirements from CARB

In California, to support the attainment and maintenance of the NAAQS, CARB is primarily responsible for regulating emissions from mobile sources. In fact, EPA has delegated authority to CARB to establish emission standards for on-road and some nonroad vehicles separate from the EPA vehicle emission

standards, although CARB is preempted by the Clean Air Act from regulating emissions from many nonroad mobile sources. As part of this evaluation, and in consultation with CARB, FAA will identify all CARB requirements in support of the NAAQS which are applicable to Alternative D and will confirm that, within the limit of its continuing program responsibility, Alternative D will be consistent with those requirements.

5.4.3 Compliance with Applicable Requirements from SCAQMD

To support the attainment and maintenance of the NAAQS in the SCAB, SCAQMD is primarily responsible for regulating emissions from stationary sources. As noted above, SCAQMD develops and updates its AQMP regularly to support the California SIP. While the AQMP contains rules and regulations geared to attain and maintain the NAAQS, these rules and regulations also have the much more difficult goal of attaining and maintaining the California ambient air quality standards. As part of this evaluation, and in consultation with SCAQMD, FAA will identify all SCAQMD requirements in support of the NAAQS which are applicable to Alternative D and will confirm that, within the limit of its continuing program responsibility, Alternative D will be consistent with those requirements.

6. MITIGATION

As part of a conformity evaluation, it may be necessary for the federal agency to identify mitigation measures and mechanisms for their implementation and enforcement. For example, if a proposed action does not initially conform to the applicable SIP, mitigation measures could be pursued. If mitigation measures are used to support a positive conformity determination, the federal agency must obtain a written commitment from the entity required to implement these measures and the federal agency must include the mitigation measures as conditions in any permit or license granted for the proposed action (40 CFR 93.160). Mitigation measures may be used in combination with other criteria to demonstrate conformity.

6.1 Identification of Mitigation Measures

According to EPA guidance, mitigation measures within the framework of the general conformity requirements are used to reduce the impact of emission increases from a proposed action and are generally emissions reductions that occur at the site of the proposed action and which are not specifically related to the proposed action (i.e., are not part of the project design) but are needed to demonstrate conformity (EPA 2002). It is important to differentiate elements of the proposed action that, by design, incorporate low-emitting infrastructure or practices from measures added to the proposed action which are unrelated to the project but that reduce emissions to support the demonstration of conformity.

This is important because conformity guidance requires that if mitigation measures (as defined in the guidance) are used to support a conformity demonstration, they should be used to reduce emissions from the action to zero (i.e., no incremental emissions attributable to the action would be allowed) and not just to below the de minimis levels (EPA 1994). Thus, if conformity cannot be demonstrated for Alternative D (as described and analyzed in the Supplement to the Draft EIS/EIR) using the regulatory criteria in 40 CFR 93.158, it may be necessary to identify and describe mitigation measures to support the conformity determination.

6.2 Commitment to Implement Mitigation Measures

If mitigation measures are needed to support a positive conformity determination for the new ALP, directly associated improvements, and any funding mechanisms for Alternative D at LAX, prior to issuing a positive conformity determination, FAA will obtain written commitments from the City, and other relevant entities as necessary, to implement those measures. Furthermore, FAA will condition approval of the new ALP, directly associated improvements, and any funding mechanisms for Alternative D at LAX on the City meeting the mitigation measures specified in the conformity evaluation. The general conformity regulations allow that committed mitigation measures may be modified "when necessary because of changed circumstances" so long as the modified measures continue to support a positive conformity determination, subject to the public participation requirements (40 CFR 93.160(e)).

7. REPORTING

To support the approval of the new ALP, directly associated improvements, and any funding mechanisms for Alternative D at LAX, FAA will issue a draft general conformity determination for public review and comment. FAA will also make public its final general conformity determination for this action.

7.1 Draft General Conformity Determination

At a minimum, FAA will provide copies of its draft general conformity determination to the appropriate regional offices of EPA, FHWA, FTA, and any affected federal land manager as well as to CARB, SCAQMD, and SCAG, providing opportunity for a 30-day review. FAA will also place a notice in a daily newspaper of general circulation in the SCAB announcing the availability of its draft general conformity determination and requesting written public comments for a 30-day period. For any member of the public requesting a copy of this draft general conformity determination, FAA will provide such person a copy.

7.2 Final General Conformity Determination

At a minimum, FAA will provide copies of its final general conformity determination to the appropriate regional offices of EPA, FHWA, FTA, and any affected federal land manager as well as to CARB, SCAQMD, and SCAG, within 30 days of its promulgation. FAA will also place a notice in a daily newspaper of general circulation in the SCAB announcing the availability of its final general conformity determination within 30 days of its promulgation. As part of the general conformity evaluation, FAA will document its responses to all comments received on the draft general conformity determination and will make both the comments and responses available upon request by any person within 30 days of the promulgation of the final general conformity determination.

7.3 Frequency of General Conformity Determinations

The general conformity regulations state that the status of a specific conformity determination lapses five years after the date of public notification for the final general conformity determination, unless the action has been completed or a continuous program has been commenced to implement the action (40 CFR 93.157(a)). Because the new LAX Master Plan envisions a development program extending beyond five years, it is important to note that the final general conformity determination will remain active only under this "continuous program to implement."

As part of a phased program, the implementation of each element of the development of Alternative D does not require separate conformity determinations, even if they are begun more than five years after the final determination, as long as those elements are consistent with the original program which was determined to conform (EPA 2002). However, if this original conforming program is changed such that there is an increase in the total of direct and indirect emissions above the de minimis levels, FAA will conduct a new general conformity evaluation.

8. REFERENCES

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Attachment A-1A

SOUTHERN CALIFORNIA

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Printed on Recycled Paper 559-1/16/03

February 20, 2003

John R. Pehrson, P.E.
CDM
18581 Teller Avenue, Suite 200
Irvine, California 92612

Re: SCAG's Comments on the Preliminary Draft Conformity Protocol for the LAX Master Plan

Dear Mr. Pehrson,

Per our discussion on February 6, 2003, SCAG is submitting its comments on the Preliminary Draft Conformity Protocol for the Los Angeles International Airport (LAX) Master Plan.

The protocol appears to be relatively thorough in identifying issues to be considered in a general conformity determination. After review of the protocol, it is not evident that there would be a problem conforming to the 2001 RTP in relation to ground access emissions. This assumption is based on Alternative D's proposed capacity of 78 million annual passengers (MAP) and its encouraged use of public transit.

Outlined below are some key issues that we discussed during the February 6, 2003 teleconference. These issues should be considered when performing your general conformity determination.

Airport Capacity (top of page 6) - Alternative D assumes 78.8 MAP in 2015 and the 2001 RTP assumes 78.0 MAP in 2025. At this time it is not known if 78.8 MAP will be reached by 2015. However, SCAG is currently reassessing its modeling for interim years and will have a better assessment on MAP for 2015 in the next few months.

Use of latest emission estimation techniques (bottom of page 6) - The last sentence in the second paragraph under Section 4.2 states that the most current version of EMFAC is EMFAC2000. CARB has recently submitted EMFAC2002 to EPA for approval. EPA's approval is likely to occur at the end of March 2003, which would be before the completion of general conformity analysis for the LAX Master Plan.

Roadway Emissions (top of page 13) - The use of AP-42 to compute entrained road dust suggests the use of national default levels for silt loading (combination of total soil loading and silt content), etc. These variables should be configured to represent conditions in the South Coast to the extent that data are available to do that.

Aircraft engines listed in Table 6 (page 14) - Are the selected engines the default values from EDMS or the most common on those airframes?

GSE/APU (page 15) - The assumptions about gate electrification appear somewhat optimistic, particularly for cargo and general aviation; documentation should be provided to show that the funds, etc. are in place in order to support these assumptions.

Local Air Quality Modeling (page 20) - It is not clear how background values from other activities at the airport will be handled. Also, it is not clear how the traffic estimates for the Induced CO Hot Spot Analysis will be prepared – if SCAG numbers are used, it could be problematic since the RTP assumptions do not exactly match the Alternative D assumption.

Aircraft Temporal Factors (page 22) – It is unclear why temporal factors from 1996 are considered representative of operations in 2015 under a different configuration.

Future Background Concentrations (page 27) - Winter planning inventories from the 1997 AQMP will be inconsistent with inventories produced using EMFAC2000 (or 2002). The same issue applies to PM10. The 1997 AQMP inventories cannot be used to project the change in the background concentrations, because of the EMFAC inconsistencies (particularly since on-road vehicles are the dominant source of CO).

Ozone Concentrations (page 28) - The second paragraph references the ozone concentration predictions of the 97 AQMP which will most likely be inconsistent with current AQMP developments. This raises a point about the applicable SIP - the 2003 AQMP may be submitted to EPA by the time the LAX conformity analysis has been completed. Is there any chance that the time frame of the airport conformity analysis and the AQMP could converge so that the 2003 AQMP becomes binding?

If you have any questions, or would like clarification on any of the issues involved, please contact Molly Hoffman, Senior Air Quality Planner, at (213) 236-1804, or at hoffman@scag.ca.gov.

Sincerely,

Hasan Ikhrata
Director
Planning and Policy

Attachment A-1B

Pehrson, John

From: Zorik Pirveysian [zpirveysian@aqmd.gov]
Sent: Thursday, February 27, 2003 1:26 PM
To: Pehrson, John
Cc: Tom Chico; Kathy Hsiao
Subject: Comments on Preliminary Draft LAX EIS Conformity Protocol

John

Here are the comments from Tom Chico and Kathy Hsiao which I am forwarding to you:

Tom Chico
(1) Table 2
- I could not verify the Stationary VOC totals for any of the years.
- The source/reference for the data should be provided.
(2) Table 3
- For 2006, the winter planning CO emissions are 329, 1889, 938, 3157 tpd for the Stationary, On Road, Nonroad, and Total categories, respectively.

- The source/reference for the data should be provided.
(3) Table 4
- For 2003, I believe the PM10 and VOC emissions are 303 and 746 tpd. All other emission totals look okay.
- The source/reference for the data should be provided.
(4) Table 5
- The emission totals look okay.
- The source/reference for the data should be provided.
(5) Section 5.2.5.1.1.2.1 Aircraft Emissions
- Make sure the mixing height of 542 meters is consistent with what we assume in the 1997 AQMP (and hopefully the 2003 AQMP).

(6) Table 6
- Try to adjust the fleet mix for the future year addressed in the general conformity determination (2015?).
(7) Equations
- “3” appears in the equation where a Greek summation is supposed to occur.
(8) Section 5.3.2.4 Receptors
- SCAQMD modeling guidance requires that the peak be identified with at least 100 m grid spacing. That may not be reasonable due to limited public access on the airport.

Kathy Hsiao
Bullet points:
1) use both 1997AQMP/1999 Amendments and Draft 2003 AQMP for conformity demonstration.
2) need to get consensus regarding correct MAP and emission budget for determination.

District is working on the 2003 AQMP (Plan). This Plan would turn into a new SIP (State Implementation Plan) as soon as it’s approved by U.S. EPA. This Plan uses CARB’s EMFAC2002 for estimating the on-road mobile sources. CARB’s EMFAC2002 is currently submitted to U.S. EPA for approval.

To comply with General Conformity determination requirements, it’s required to apply the most current U.S. EPA adopted SIP and emission factors. As of today, the most current adopted SIP is District's 1997 AQMP/1999 Amendments. The most current U.S. EPA adopted on-road emission factors are CARB’s EMFAC7G which were used in the 1997 AQMP/1999 Amendments. EMFAC2000 quoted in their document is an error.

District is expecting to have the Plan approved by U.S. EPA later this year, and

EMFAC2002 be approved by U.S. EPA shortly. To avoid future confusion and delay, I suggest consultants use both budgets (1997 AQMP/1999 Amendments and Draft 2003 AQMP) to demonstrate the general conformity.

In the conference call on February 6, 2003, discussion came up regarding the LAX emission budget in the 1997 AQMP/1999 Amendments and the 2015 LAX MAP (million annual passengers) adopted by SCAG. We need to reach consensus regarding these issues before we can start to evaluate conformity demonstration.

Please contact Tom, Kathy, or me with any questions.

Zorik Pirveysian
Planning and Rules Manager
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, CA 91765
(909) 396-3133
zpirveysian@aqmd.gov

Attachment A-1C

Pehrson, John

From: Dave.Kessler@faa.gov
Sent: Friday, February 28, 2003 2:24 PM
To: Pehrson, John; RogJohnson@lawa.org
Subject: LAX EIS Conformity Protocol Final Comments

LaxEisProtocolFinal CommentsLtr...

Roger and John - Here is EPA's response on the conformity protocols.

Dave.

David B. Kessler, AICP
Environmental Protection Specialist
Telephone: 310/725-3615
FAX: 310/725-6848
----- Forwarded by Dave Kessler/AWP/FAA on 02/28/2003 02:23 PM -----

Lo.Doris@epamail.epa.gov
02/28/2003 02:08 PM

To: Dave Kessler/AWP/FAA@FAA
cc: Howard Yoshioka/AWP/FAA@FAA, Tomsovic.David@epamail.epa.gov, Moyer.Robert@epamail.epa.gov, Kaplan.Eleanor@epamail.epa.gov
Subject: LAX EIS Conformity Protocol Final Comments

Dave,

We have reviewed the LAX Conformity Protocol referenced in the email below and find the protocol acceptable. We look forward to reviewing the draft conformity determination.

Doris Lo
EPA Region 9
(415) 972-3959
----- Forwarded by Doris Lo/R9/USEPA/US on 02/28/2003 02:05 PM -----

Howard.Yoshioka@faa.gov
02/07/2003 03:52 PM

To: dquilliam@lawa.org, PehrsonJR@cdm.com, Doris Lo/R9/USEPA/US@EPA, ghoncoop@arb.ca.gov, hhogo@aqmd.gov, ikhrata@scag.ca.gov
cc: Dave.Kessler@faa.gov, mia.Ratcliff@faa.gov, rogjohnson@lawa.org, tchico@aqmd.gov, alan_murphy@urscorp.com, zpirveysian@aqmd.gov
Subject: LAX EIS Conformity Protocol Final Comments

All,

Thanks for participating in the conference call yesterday on the review of the preliminary draft air quality conformity protocol. Attached is a reminder that final comments is due on the protocol on or before Feb.
21,
2003.

Thanks,

Howard
Howard S Yoshioka
Special Projects Officer, AWP-603
Phone: (310) 725-3614
Fax: (310) 725-6848

(See attached file: LaxEisProtocolFinalCommentsLtrs.doc)

(See attached file: LaxEisProtocolFinalCommentsLtrs.doc)
(See attached file: LaxEisProtocolFinalCommentsLtrs.doc)

Attachment A-1D

Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman
1001 I Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov

Winston H. Hickox
Agency Secretary

Gray Davis
Governor

March 3, 2003

Mr. David B. Kessler, AICP
Federal Aviation Administration
P.O. Box 92007
Los Angeles, California 90009-2007

Dear Mr. Kessler:

Thank you for providing the Air Resources Board (ARB) the opportunity to review and comment on the preliminary draft air quality general conformity protocol for the proposed improvements to the Los Angeles International Airport (LAX). We also appreciate your arranging the conference call on February 6, 2003 that gave us the opportunity to confer with project staff and staff of other regulatory agencies on this project.

On the February 6, 2003 conference call, we provided a number of comments orally as an early signal of our questions and concerns relative to the preliminary draft air quality general conformity protocol. At that time we had a number of specific, detailed comments that we are including here as an attachment. Our objective is to ensure that all required air quality analyses for the project are technically sound and anticipate future benchmarks in order to remain relevant and appropriate throughout the life of the anticipated analyses. Our major comments follow:

- The South Coast's air quality and transportation plans either are currently being or have been revised since the release of the November 2000 Draft LAX Master Plan Update Environmental Impact Statement/Environmental Impact Report. Therefore, we strongly encourage you to work closely with the South Coast Air Quality Management District (District) and ARB staff to ensure that you use the most recent information and emissions data, and that you assess the conformity of the proposed project with both the currently approved 1997/1999 Ozone State Implementation Plan (SIP), the 2002 PM10 SIP, and the 2003 SIP currently under development. We recommend that you coordinate with Mr. Doug Thompson, Manager of ARB's Motor Vehicle Assessment Section, on use of the motor vehicle emission estimation tools that reflect the most recent activity. Because emission estimation tools and results have changed since November 2000, we recommend that you reassess the "No Project" alternative to ensure that the "No Project" and the "Preferred Project" alternatives use consistent information where appropriate.

We understand that there is some uncertainty whether the off-airport and on-airport on-road motor vehicle emissions may have already been subject to a conformity analysis in the Southern California Association of Governments 2001 Regional Transportation Plan (RTP). In the interest of fully disclosing all the emissions associated with the airport, we encourage you to include in the conformity analysis the on-road emissions associated with LAX. We also suggest that you include an assessment of whether the proposed project would conform to the emission forecasts being developed for the 2004 RTP. As noted above, motor vehicle emission estimates have changed recently and the information being gathered for use in the 2004 RTP will be differ from the estimates in the 2001 RTP.

- We note that you propose to use models (EDMS and ISCST3) and emissions estimation tools (EMFAC 2000) that have since been replaced with updated versions. We recommend that you consult with the Federal Aviation Administration, the U.S. Environmental Protection Agency, and ARB on the latest approved versions of these tools for use in your analyses. We also recommend that you use the District's emissions information for stationary and area sources and ARB's Off-Road Model for emissions estimates for off-road equipment.

- Finally, we recommend that you clearly list airport-specific emissions budget data to ensure that reviewers can more easily determine that basinwide aviation related budgets have not or will not be exceeded.

If you have any questions, please contact me at (916) 322-8474.

Sincerely,

Gary Honcoop

Gary Honcoop, Manager
Strategic Analysis and Liaison Section

Attachment

---

cc: See next page.

cc: Mr. Henry Hogo
South Coast Air Quality
Management District
21865 Copley Drive
Diamond Bar, California 91765-4178

Ms. Doris Lo
US Environmental Protection
Agency, Region IX
75 Hawthorne Street
San Francisco, California 94105

John Pehrson, P.E.
Camp Dresser & McKee, Inc.
18581 Teller Avenue, Suite 200
Irvine, California 92612

Mr. Dennis Quilliam
City of Los Angeles
Los Angeles World Airports
1 World Way
P.O. Box 92216
Los Angeles, California 90009-2216

ARB Staff Comments
Preliminary Draft Protocol for General Conformity Evaluation (GCE)
Los Angeles International Airport Proposed Master Plan Improvements

1. General Comment: We strongly encourage you to include a separate appendix(ces) in which you specify and fully document the methodologies, input data, calculations, and uncertainties associated with the emissions determinations and impact analyses.

2. Use of Latest Planning Assumptions – Emissions Budgets (Section 4.1, page 6): The issue of "latest planning assumptions" is potentially complex; however, it is critical to explicitly address it to ensure the appropriate comparisons of emissions. Specifically, the conformity evaluation needs to address the differences in emission budgets in the 2001 Southern California Association of Governments (SCAG) Regional Transportation Plan (RTP), the 1997/1999 Ozone State Implementation Plan (SIP), the 2002 PM10 SIP, and the proposed 2003 SIP.

3. Use of Latest Planning Assumptions – Passengers Served (Section 4.1, page 6): We note that Alternative D is based on the "planning assumption" that the capacity of Los Angeles International Airport (LAX) will be constrained to 78.7 million annual passengers (MAP) in 2015. The preliminary draft protocol also states that the SCAG 2001 RTP assumes LAX will serve 78 MAP in 2025. The conformity evaluation should clarify whether this discrepancy in dates is an error or whether the 2001 SCAG RTP also assumes 78 MAP in 2015 and a flat trend out to 2025. Furthermore, the conformity evaluation should explain how 78 MAP was derived and what will ensure that 78 MAP will not be exceeded. If 78 MAP is only theoretical and not based on real physical constraints, the conformity analysis should be based on the impacts associated with the MAP projected in the most recently published Federal Aviation Administration's "Terminal Area Forecasts."

4. Use of Latest Emission Estimation Techniques – Motor Vehicle Emission Inventory Model (Section 4.2, page 6): The preliminary draft protocol references EMFAC 2000 as the most current version of the motor vehicle emission factor model. Please note that ARB has replaced EMFAC 2000 with EMFAC 2002; therefore, we recommend that you use EMFAC 2002 for the conformity evaluation. ARB staff can provide the customized version being used for SIP development that includes the latest local data on vehicle types and travel.

5. Status of Applicable SIP and Emissions Budgets for Pollutants – Ozone Precursors (Section 5.1.2.1, page 8, Table 2) Table 2 provides the emissions budgets for VOC and NOx for SIP milestone years. However, these budgets are basinwide numbers and do not reflect the portion that is attributable to LAX. The conformity evaluation should provide and use for comparison the emissions numbers that were assumed in the SIP specifically for LAX. We also encourage you to assess whether projects at other airports have exceeded or are anticipated to exceed their respective budgets such that the combined totals for all airport projects will exceed the basinwide budget.

6. Particulate Matter (Section 5.1.2.3, page 9): As noted in the preliminary draft protocol, the U.S. Environmental Protection Agency (U.S. EPA) has proposed to approve the South Coast PM10 SIP. Because we understand that U.S. EPA is planning to approve the PM10 in the near future, we recommend that you prepare an analysis of the project's conformity to the PM10 SIP. We recognize that aircraft PM emissions data are problematic, but encourage you to incorporate the best data available with PM emissions data from other sources.

7. On-Airport and Off-Airport Roadway Emissions (Section 5.2.5.1.1.1.1, page 13): As noted in the cover letter, we recommend that you include off-airport and on-airport on-road motor vehicle emissions in the conformity analysis and to make a conformity analysis for both the 1977/1999 Ozone SIP, the 2002 PM10 SIP, and the proposed 2003 SIP. The conformity evaluation should include a comprehensive analysis of airport ground access vehicle emissions (both on-airport and off-airport) and an explanation of how you selected an emissions budget with which to compare ground access vehicle and parking emissions.

8. Aircraft Emissions – Mixing Height (Section 5.2.5.1.1.2.1, page 13): The preliminary draft protocol states that an average mixing height of 542 meters will be used in calculating aircraft emissions. We note that while the mid-morning mixing height for LAX is 542 meters (Holzworth, 1972), the afternoon value is 1,000 meters. Thus, an annual average daytime mixing height would be approximately 770 meters. However, the South Coast Air District used 625 meters as the mixing height for LAX in its baseline emission inventory for 1997. To resolve these discrepancies, we recommend that you consult with the South Coast Air District on the most appropriate mixing height to use or use the same values in the 1997/1999 SIP. We ask that you clearly document the basis for whichever mixing height you select.

9. Aircraft and Engine Combinations Assumed for Emissions and Dispersion Modeling (Section 5.2.5.1.1.2.1, page 14, Table 6): In reviewing the aircraft-engine combinations in this table, we question whether they correctly represent aircraft – engine combinations expected to be operating at LAX in the 2005 – 2015 timeframe. For example, we note that Boeing 727 and MD-80 aircraft are listed, while recent information made available to us indicate that many of these aircraft have already been taken out of the air carriers' fleets. We recommend that you check with appropriate sources to ensure that you have the most up-to-date data and use aircraft-engine combinations expected to be in use during the time frame of the analysis.

10. Ground Support Equipment/Auxiliary Power Unit Emissions (Section 5.2.5.1.1.2.2, page 15): We recommend that you use ARB's Off-Road Model for estimating GSE and APU emissions. Your GSE emissions calculations for both the "No Project" and the "Preferred" alternatives should also reflect the emissions reductions required by the recently-approved GSE – MOU for the five South Coast Commercial airports, including LAX.

11. Stationary Sources (Section 5.2.5.1.2, page 15-17): We recommend that you consult with the South Coast Air District staff to obtain the most recent data for process rates and emission factors in order to compute stationary and area source emissions on the airport.

12. Comparison of Emissions Caused by Proposed Federal Action to Applicable SIP Budgets (Section 5.2.6, page 19): Based on our review of the data for the 1997 baseline aircraft emission inventory, NOx emissions at LAX represented about 78 percent of total aircraft emissions in the air basin. (Source: "South Coast Aircraft Emission Inventory Baseline for 1997", prepared for SCAQMD by Energy and Environmental Analysis, Inc., December, 1999). However, the preliminary draft protocol states, "In developing the SCAB (aircraft) emission inventories, SCAQMD assumed that LAX accounts for 94 percent of all aircraft emissions in the SCAB." Furthermore, we note that in the draft 2003 Ozone SIP, the aircraft NOx emissions inventory at LAX will drop to about 67 percent of basinwide aircraft emissions in 2010 and to 55 percent in 2020. The conformity evaluation should address these apparent inconsistencies and document the basis for assumptions of the LAX share of basinwide aircraft emissions.

13. Local Air Quality Modeling (Section 5.3, page 19): Please clarify the basis for following statement: "While it is assumed herein that area-wide air quality modeling for the evaluation of either CO or PM-10 for Alternative D is not needed, this assumption must be confirmed in writing from CARB and/or SCAQMD."

14. PM Emissions from Aircraft (Section 5.3.1.1.2, page 20): We agree that appropriate PM emission factors for aircraft PM are problematic. Should they become available, we support your proposal to estimate the potential concentrations. We understand that there are several models that could be used: ISCST3, which is an U.S. EPA approved model; a newer, possibly better model, AERMOD, that U.S. EPA has indicated is acceptable for use; and the model used in the LAX Master Plan DEIS/DEIR, which is described in detail in Attachment H to the Air Quality Technical Report (#4), "Aircraft Engine Particulate Matter Emissions Data Technical Memorandum." We recommend that you state clearly the reasons for selecting whatever model is used in the analysis. Finally, we request that for any modeling analysis, the assumptions be clearly documented and that uncertainties of the simplifying assumptions be addressed.

    We also disagree with the sentence in this section that states ". . . the quantitative relationships between precursor emissions and ambient concentrations of PM10 are not well defined." We recommend that you consult with ARB and the South Coast Air District staff to obtain recent models that will enable you to model the dispersion and resulting ambient concentrations of PM10 precursor emissions.

15. Meteorological Data (Section 5.3.2.2, page 25): The text states that the most recent set of complete one-year period of hourly meteorological data from LAX from March 1996 through February 1997 will be used. We prefer to use a three to five year period of record data, although one year may be used in special cases. If you decide to use only one year of data, please explain why one year of data are better or as good as three to

five years of data. We note that the upper air data for this year period consists of hourly mixing heights. We recommend that you compute average mixing heights using these data and compare the results with the mid-morning mixing height values and annual daytime mixing height values based on Holzworth (1972).

16. Future Background Concentrations (Section 5.3.3.1., page 28): The text and Table 10 on page 28 show estimates of existing ambient and projected background air pollutant concentrations of ozone in the vicinity of LAX. We question the data indicating that in 2005 background ozone concentrations in that location will be <0.09 ppm. The area air quality modeling performed for the 1997/1999 Ozone SIP indicated that ozone concentrations would be greater than 0.09 ppm near LAX. In addition, area air quality modeling was also performed for the current (2003) SIP development. Modeling analysis for the conformity analysis should be consistent with the latest ozone modeling used in the 2003 SIP. We recommend that you also consider modeling to determine the project's impact on the area's ability to attain the federal 8-hour ozone and PM2.5 standards.

Attachment A-2A

LAX Master Plan General Conformity Determination Overview

Presented to the
California Air Resources Board
October 14, 2003

Agenda

- Protocol Comment Responses
- General Conformity Determination Highlights

Protocol Comment Responses

- *General Comment, Provide Appendix with Detailed Methods, Assumptions* – Revisions made to Protocol Sections 5.2.5, 5.2.5.3, and 5.3.4. Appendix B added to Conformity Determination with detailed calcs and assumptions.
- *Use of Latest Planning Assumptions – Emissions Budgets, need to address 2001 RTP, 1997/1999 Ozone SIP, 2002 PM10 SIP, proposed 2003 SIP budgets* – Noted that Conformity Determination will be made for current and proposed SIPs (Protocol Section 5.1.2), added tables with proposed 2003 SIP budgets (Protocol Tables 4, 6, 8, & 10).

Protocol Comment Responses (continued)

- *Use of Latest Planning Assumptions – Passengers Served, need to address planning assumptions and constraints* – Added discussion of planning assumptions and constraints to Protocol Section 4.1.
- *Use of Latest Emission Estimation Techniques – Motor Vehicle Emission Inventory, should use EMFAC2002* – EMFAC2002 is now listed in Protocol Sections 4.2, 5.2.5.1.1.1.1, 5.2.5.1.1.1.2, & 5.2.5.2.1.1.
- *Status of Applicable SIP and Emissions Budgets for Pollutants – Ozone Precursors, should provide LAX-specific emissions assumed in SIP budgets* – LAX-specific budgets will be identified, where possible (Protocol Section 5.1.2).

Protocol Comment Responses (continued)

- *Particulate Matter, should include conformity with 2002 PM10 SIP* – Revisions made to Protocol Sections 4.2, 5.1.2, and 5.2.5.1.1.2.1. PM10 Analysis included in determination.
- *On-Airport and Off-Airport Roadway Emissions, should determine conformity with 1997/1999 Ozone SIP, 2002 PM10 SIP, and 2003 SIP* – Revised Protocol Section 1.1 to describe approach for roadway emission conformity determination.
- *Aircraft Emissions – Mixing Height, should resolve differences in mixing heights used in 1997/1999 SIP and Conformity Determination* – Revised Protocol Section 5.2.5.2.1.1, now consistent with height in 1997/1999 SIP.

Protocol Comment Responses (continued)

- *Aircraft and Engine Combinations Assumed for Emissions and Dispersion Modeling, should verify which aircraft and engines will represent 2005 and 2015 fleets* – Revisions made to Protocol Section 5.2.5.1.1.2.1. Note: Aircraft operations by runway are included in the Supplement to the Draft EIS/EIR, Technical Report S-4, Attachment E.
- *GSE/APU Emissions, should use ARB's OFFROAD Model for estimating GSE and APU emissions* – Revised Protocol Section 5.2.5.1.1 to incorporate OFFROAD Model. Note: Admin Draft GCD uses NONROAD emissions in EDMS.
- *Stationary Sources, should consult SCAQMD for most recent airport stationary and areas source emissions* – Revised Protocol Section 4.2.

Protocol Comment Responses (concluded)

- *Comparison of Emissions Caused by Proposed Federal Action to Applicable SIP Budgets, should address LAX share of basin-wide aircraft emissions* – Revisions made to Protocol Section 5.2.6.
- *Local Air Quality Modeling, confirm whether evaluation of CO or PM10 is required* – Revised Protocol Section 5.3.
- *PM Emissions from Aircraft* – Revised Protocol Sections 4.2, 5.2.5.1.1.2.1, and 5.3.1.1.2.
- *Meteorological Data, should explain why one of met data is used* – Revised Protocol Section 5.3.2.2.
- *Future Background Concentrations, ozone* – Revised Protocol Table 15 (footnote e).

General Conformity Determination Highlights

- Federal Action Emissions (direct + indirect) are defined as the Proposed Alternative D Emissions minus the No Action Alternative Emissions in each future year.
- Federal Action Emissions of CO and VOC are less than the *de minimis* Emission Rates, and are NOT regionally significant – No Further Analysis of CO or VOC.
- Federal Action Emissions of NOx, NO2, and PM10 exceed the *de minimis* Emission Rates – General Conformity Evaluation completed for these pollutants.

General Conformity Determination Highlights (continued)

- NOx Emissions:
  - LAX Aircraft and GSE – Less than 1997/9 SIP and 2003 AQMP Budgets.
  - LAX Stationary Sources – Included in SIP and AQMP Budgets.
  - LAX Motor Vehicles – Included in SCAG/SCAQMD modeling for SIPs and RTPs.
  - Construction Emissions – Available budgets in SIP and AQMP Budgets.

General Conformity Determination Highlights (concluded)

- PM10 Emissions:
  - Emission Budgets non-existent for aircraft.
  - Modeled concentrations of PM10 from LAX sources are Less Than NAAQS (24-hour and Annual stds).
  - Assessment of PM10 Precursors is included in Section 5.3.2.

Attachment A-2B

LAX Master Plan
General Conformity Determination Overview

Presented to the
Southern California
Association of Governments

October 16, 2003

Agenda

- **Protocol Comment Responses**
- **General Conformity Determination Highlights**

Protocol Comment Responses

- ***Airport Capacity - 78.8 MAP (Alt D in 2015), 78.0 MAP (2001 RTP in 2025), 2015 MAP modeling by SCAG* – Revised Protocol Subsection 4.1. Note that Draft Supplement to the EIS/EIR predicts 78.9 MAP for Alt D and 78.7 MAP for NA/NP in 2015.**
- ***Use of latest emission estimation techniques – EMFAC2002 may be approved soon* – EMFAC2002 now used in Draft Supplement to the EIS/EIR and Conformity Determination, revised Protocol Subsections 4.2, 5.2.5.1.1.1.1, 5.2.5.1.1.1.2, and 5.2.5.2.1.1.**

Protocol Comment Responses (continued)

- ***Roadway Emissions – Entrained Road Dust silt loading* - Revised Protocol Subsection 5.2.5.1.1.1.1. (MRI 1996 instead of AP-42).**
- ***Aircraft engines listed in Table 6* – Revised Protocol 5.2.5.1.1.2.1, EDMS 4.11 Default Engines are used, and are the most common for each airframe based on the BACK Assoc. database.**

Protocol Comment Responses (continued)

- ***GSE/APU – Documentation should be provided to show that funds are available to support assumptions*** **– Revised Protocol Subsection 5.2.5.1.1.2.2. Note: Admin Draft GCD uses EDMS 4.11 Emission Factors, Draft GCD will use CARB OFFROAD EFs.**
- ***Local Air Quality Modeling – background values and CO Hot Spots*** **– Protocol Subsection 5.3.2 describes LAX sources and Subsection 5.3.3 describes integration of modeling results.**

Protocol Comment Responses (continued)

- ***Aircraft Temporal Factors – 1996 representative of 2015?*** **– Hour-of-Day temporal factors are scenario- and year-specific. Day-of-Week and Month-of-Year temporal factors are not expected to change from 1996 values.**
- ***Future Background Concentrations – inconsistencies between 1997 AQMP, EMFAC2002*** **– Revised Protocol Subsection 5.1.2 and added Tables 4, 6, 8, 10.**

Protocol Comment Responses (continued)

- ***Ozone Concentrations – 1997 AQMP versus 2003 AQMP*** **– Revised Protocol Subsection 5.1.2 and added Tables 4, 6, 8, 10. Note: GCD provides comparisons to the 1997/9 SIP <u>AND</u> to the 2003 AQMP budgets.**

General Conformity Determination Highlights

- **Federal Action Emissions (direct + indirect) are defined as the Proposed Alternative D Emissions minus the No Action Alternative Emissions in each future year.**
- **Federal Action Emissions of CO and VOC are less than the *de minimis* Emission Rates, and are NOT regionally significant – No further analysis of CO and VOC.**
- **Federal Action Emissions of NOx, NO2, and PM10 exceed the *de minimis* Emission Rates – General Conformity Evaluation completed for these pollutants.**

General Conformity Determination Highlights (continued)

- **NOx Emissions:**
  - **LAX Aircraft and GSE – Less than 1997/9 SIP and 2003 AQMP Budgets.**
  - **LAX Stationary Sources – Included in SIP and AQMP Budgets.**
  - **LAX Motor Vehicles – Included in SCAG/SCAQMD modeling for SIPs and RTPs.**
  - **Construction Emissions – Available budgets in SIP and AQMP Budgets.**

General Conformity Determination Highlights (continued)

- **PM10 Emissions:**
  - **Emission Budgets non-existent for aircraft.**
  - **Modeled concentrations of PM10 from LAX sources, plus background, are Less Than NAAQS.**
  - **Assessment of PM10 Precursors is included in Section 5.3.2.**

Attachment A-2C

LAX Master Plan General Conformity Determination Overview

Presented to
U.S. EPA Region 9
October 28, 2003

Agenda

- Protocol Comment Responses
  - Air Resources Board
  - Southern California Association of Governments
  - Air Quality Management District
- General Conformity Determination Highlights

Protocol Comment Responses - ARB

- *General Comment, Provide Appendix with Detailed Methods, Assumptions* – Revisions made to Protocol Sections 5.2.5, 5.2.5.3, and 5.3.4. Appendix B added to Conformity Determination with detailed calcs and assumptions.
- *Use of Latest Planning Assumptions – Emissions Budgets, need to address 2001 RTP, 1997/1999 Ozone SIP, 2002 PM10 SIP, proposed 2003 SIP budgets* – Noted that Conformity Determination will be made for current and proposed SIPs (Protocol Section 5.1.2), added tables with proposed 2003 SIP budgets (Protocol Tables 4, 6, 8, & 10).

Protocol Comment Responses - ARB (continued)

- *Use of Latest Planning Assumptions – Passengers Served, need to address planning assumptions and constraints* – Added discussion of planning assumptions and constraints to Protocol Section 4.1.
- *Use of Latest Emission Estimation Techniques – Motor Vehicle Emission Inventory, should use EMFAC2002* – EMFAC2002 is now listed in Protocol Sections 4.2, 5.2.5.1.1.1.1, 5.2.5.1.1.1.2, & 5.2.5.2.1.1.
- *Status of Applicable SIP and Emissions Budgets for Pollutants – Ozone Precursors, should provide LAX-specific emissions assumed in SIP budgets* – LAX-specific budgets will be identified, where possible (Protocol Section 5.1.2).

Protocol Comment Responses - ARB (continued)

- *Particulate Matter, should include conformity with 2002 PM10 SIP* – Revisions made to Protocol Sections 4.2, 5.1.2, and 5.2.5.1.1.2.1. PM10 Analysis included in determination.
- *On-Airport and Off-Airport Roadway Emissions, should determine conformity with 1997/1999 Ozone SIP, 2002 PM10 SIP, and 2003 SIP* – Revised Protocol Section 1.1 to describe approach for roadway emission conformity determination.
- *Aircraft Emissions – Mixing Height, should resolve differences in mixing heights used in 1997/1999 SIP and Conformity Determination* – Revised Protocol Section 5.2.5.2.1.1, now consistent with height in 1997/1999 SIP.

Protocol Comment Responses - ARB (continued)

- *Aircraft and Engine Combinations Assumed for Emissions and Dispersion Modeling, should verify which aircraft and engines will represent 2005 and 2015 fleets* – Revisions made to Protocol Section 5.2.5.1.1.2.1. Note: Aircraft operations by runway are included in the Supplement to the Draft EIS/EIR, Technical Report S-4, Attachment E.
- *GSE/APU Emissions, should use ARB's OFFROAD Model for estimating GSE and APU emissions* – Revised Protocol Section 5.2.5.1.1 to incorporate OFFROAD Model. Note: Admin Draft GCD uses NONROAD emissions in EDMS.
- *Stationary Sources, should consult SCAQMD for most recent airport stationary and areas source emissions* – Revised Protocol Section 4.2.

Protocol Comment Responses - ARB (concluded)

- *Comparison of Emissions Caused by Proposed Federal Action to Applicable SIP Budgets, should address LAX share of basin-wide aircraft emissions* – Revisions made to Protocol Section 5.2.6.
- *Local Air Quality Modeling, confirm whether evaluation of CO or PM10 is required* – Revised Protocol Section 5.3.
- *PM Emissions from Aircraft* – Revised Protocol Sections 4.2, 5.2.5.1.1.2.1, and 5.3.1.1.2.
- *Meteorological Data, should explain why one of met data is used* – Revised Protocol Section 5.3.2.2.
- *Future Background Concentrations, ozone* – Revised Protocol Table 15 (footnote e).

Protocol Comment Responses - SCAG

- *Airport Capacity - 78.8 MAP (Alt D in 2015), 78.0 MAP (2001 RTP in 2025), 2015 MAP modeling by SCAG* – Revised Protocol Subsection 4.1. Note that Draft Supplement to the EIS/EIR predicts 78.9 MAP for Alt D and 78.7 MAP for NA/NP in 2015.
- *Use of latest emission estimation techniques – EMFAC2002 may be approved soon* – EMFAC2002 now used in Draft Supplement to the EIS/EIR and Conformity Determination, revised Protocol Subsections 4.2, 5.2.5.1.1.1.1, 5.2.5.1.1.1.2, and 5.2.5.2.1.1.

Protocol Comment Responses – SCAG (continued)

- *Roadway Emissions – Entrained Road Dust silt loading* - Revised Protocol Subsection 5.2.5.1.1.1.1. (MRI 1996 instead of AP-42).
- *Aircraft engines listed in Table 6* – Revised Protocol 5.2.5.1.1.2.1, EDMS 4.11 Default Engines are used, and are the most common for each airframe based on the BACK Assoc. database.

Protocol Comment Responses – SCAG (continued)

- *GSE/APU – Documentation should be provided to show that funds are available to support assumptions* – Revised Protocol Subsection 5.2.5.1.1.2.2. Note: Admin Draft GCD uses EDMS 4.11 Emission Factors, Draft GCD will use CARB OFFROAD EFs.
- *Local Air Quality Modeling – background values and CO Hot Spots* – Protocol Subsection 5.3.2 describes LAX sources and Subsection 5.3.3 describes integration of modeling results.

Protocol Comment Responses – SCAG (concluded)

- *Aircraft Temporal Factors – 1996 representative of 2015?* – Hour-of-Day temporal factors are scenario- and year-specific. Day-of-Week and Month-of-Year temporal factors are not expected to change from 1996 values.
- *Future Background Concentrations – inconsistencies between 1997 AQMP, EMFAC2002* – Revised Protocol Subsection 5.1.2 and added Tables 4, 6, 8, 10.
- *Ozone Concentrations – 1997 AQMP versus 2003 AQMP* – Revised Protocol Subsection 5.1.2 and added Tables 4, 6, 8, 10. Note: GCD provides comparisons to the 1997/9 SIP AND to the 2003 AQMP budgets.

Protocol Comment Responses - AQMD

- *Comment No. 1 (TC) – Table 2, Need to Verify Stationary VOC Inventories and Provide Reference for Data* – Added References to Protocol Table (new Table 3), Confirmed data obtained from 1997/9 AQMP/SIP.
- *Comment No. 2 (TC) – Table 3, 2006 CO Planning Inventories for Stationary, On-Road, Nonroad, and Total Provided by AQMD* – Revised Table (new Table 5) with AQMD Data and added References to Table.

Protocol Comment Responses - AQMD (continued)

- *Comment No. 3 (TC) – Add References to Table, Confirm PM10 and VOC Inventories* – Added References to Table (new Table 7), and Confirmed Data from Federal Register Notice (68 FR 19315).
- *Comment No. 4 (TC) – Add References to Table* – Added References to Table (new Table 9).
- *Comment No. 5 (TC) – Ensure Mixing Height is the same as used in the 1997 AQMP and 2003 AQMP* – Revised Mixing Height in Section 5.2.5.1.1.2.1 (to 2050 ft), consistent with 1997 AQMP.

Protocol Comment Responses - AQMD (continued)

- *Comment No. 6 (TC) – Consider Adjusting Fleet Mix for Future Years* – Revisions made to Protocol Section 5.2.5.1.1.2.1. Note – Fleet Mix does change with time in the analysis, reduced or eliminated operations of older aircraft.
- *Comment No. 7 (TC) – Correct typo in Equation* – Revised Protocol Section 5.2.5.1.2.1.1 to correct equation.
- *Comment No. 8 (TC) – Modeling Receptor Spacing Guidance* – Revised Protocol Section 5.3.2.4 to clarify resolution of receptor grids.

Protocol Comment Responses - AQMD (concluded)

- *Comment No. 9 (KH) – Should Use Both 1997/9 AQMP/SIP and Draft 2003 AQMP for Conformity Determination –* Revisions made to Protocol Section 5.1.2 and Added New Tables 4, 6, 8, and 10. Both Inventories Provided in Protocol.
- *Comment No. 10 (KH) – Should Verify Future Year MAP Levels with SCAG –* Revised Protocol Section 4.1. SCAG Verbally Concurred (10/16/03) that MAP Level in 2015 is within the Parameters SCAG used in RTP Planning.

General Conformity Determination Highlights

- Federal Action Emissions (direct + indirect) are defined as the Proposed Alternative D Emissions minus the No Action Alternative Emissions in each future year.
- Federal Action Emissions of CO and VOC are less than the *de minimis* Emission Rates, and are NOT regionally significant – No Further Analysis of CO or VOC.
- Federal Action Emissions of NOx, NO2, and PM10 exceed the *de minimis* Emission Rates – General Conformity Evaluation completed for these pollutants.

General Conformity Determination Highlights (continued)

- NOx Emissions:
  - LAX Aircraft and GSE – Less than 1997/9 SIP and 2003 AQMP Budgets.
  - LAX Stationary Sources – Included in SIP and AQMP Budgets.
  - LAX Motor Vehicles – Included in SCAG/SCAQMD modeling for SIPs and RTPs.
  - Construction Emissions – Available budgets in SIP and AQMP Budgets.

General Conformity Determination Highlights (concluded)

- PM10 Emissions:
  - Emission Budgets non-existent for aircraft.
  - Modeled concentrations of PM10 from LAX sources are Less Than NAAQS (24-hour and Annual stds).
  - Assessment of PM10 Precursors is included in Section 5.3.2.

Attachment A-2D

LAX Master Plan General Conformity Determination Overview

Presented to the
South Coast AQMD

October 29, 2003

Agenda

- Protocol Comment Responses
- General Conformity Determination Highlights

Protocol Comment Responses

- *Comment No. 1 (TC) – Table 2, Need to Verify Stationary VOC Inventories and Provide Reference for Data* – Added References to Protocol Table (new Table 3), Confirmed data obtained from 1997/9 AQMP/SIP.
- *Comment No. 2 (TC) – Table 3, 2006 CO Planning Inventories for Stationary, On-Road, Nonroad, and Total Provided by AQMD* – Revised Table (new Table 5) with AQMD Data and added References to Table.

Protocol Comment Responses (continued)

- *Comment No. 3 (TC) – Add References to Table, Confirm PM10 and VOC Inventories* – Added References to Table (new Table 7), and Confirmed Data from Federal Register Notice (68 FR 19315).
- *Comment No. 4 (TC) – Add References to Table* – Added References to Table (new Table 9).
- *Comment No. 5 (TC) – Ensure Mixing Height is the same as used in the 1997 AQMP and 2003 AQMP* – Revised Mixing Height in Section 5.2.5.1.1.2.1 (to 2050 ft), consistent with 1997 AQMP.

Protocol Comment Responses (continued)

- *Comment No. 6 (TC) – Consider Adjusting Fleet Mix for Future Years* – Revisions made to Protocol Section 5.2.5.1.1.2.1. Note – Fleet Mix does change with time in the analysis, reduced or eliminated operations of older aircraft.
- *Comment No. 7 (TC) – Correct typo in Equation* – Revised Protocol Section 5.2.5.1.2.1.1 to correct equation.
- *Comment No. 8 (TC) – Modeling Receptor Spacing Guidance* – Revised Protocol Section 5.3.2.4 to clarify resolution of receptor grids.

Protocol Comment Responses (continued)

- *Comment No. 9 (KH) – Should Use Both 1997/9 AQMP/SIP and Draft 2003 AQMP for Conformity Determination* – Revisions made to Protocol Section 5.1.2 and Added New Tables 4, 6, 8, and 10. Both Inventories Provided in Protocol.
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General Conformity Determination Highlights

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- Federal Action Emissions of CO and VOC are less than the *de minimis* Emission Rates, and are NOT regionally significant – No Further Analysis of CO or VOC.
- Federal Action Emissions of NOx, NO2, and PM10 exceed the *de minimis* Emission Rates – General Conformity Evaluation completed for these pollutants.

General Conformity Determination Highlights (continued)

- NOx Emissions:
  - LAX Aircraft and GSE – Less than 1997/9 SIP and 2003 AQMP Budgets.
  - LAX Stationary Sources – Included in SIP and AQMP Budgets.
  - LAX Motor Vehicles – Included in SCAG/SCAQMD modeling for SIPs and RTPs.
  - Construction Emissions – Available budgets in SIP and AQMP Budgets.

General Conformity Determination Highlights (concluded)

- PM10 Emissions:
  - Emission Budgets non-existent for aircraft.
  - Modeled concentrations of PM10 from LAX sources are Less Than NAAQS (24-hour and Annual stds).
  - Assessment of PM10 Precursors is included in Section 5.3.2.

Appendix
LAX Master Plan
Final
General Conformity Determination

B. Air Quality Impact Methodologies

January 2005

Prepared for:

Los Angeles World Airports

U.S. Department of Transportation
Federal Aviation Administration

Prepared by:

Camp Dresser & McKee Inc.

Table of Contents

List of Tables

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List of Acronyms

AAM - annual arithmetic mean

ACU - air conditioning unit

ADT - average daily trip

AP - Airport peak hour

AERMOD – AMS/EPA Regulatory Model

APU - auxiliary power unit

AQMP - Air Quality Management Plan

ARFF – Aircraft Rescue and Fire Fighting

ASU - air start unit

AvGas - aviation gasoline

BACT - best available control technology

bhp - brake horsepower

CALINE - California Line Source Model

CALMPRO - Calms Processing Model

Caltrans - California Department of Transportation

CARB - California Air Resources Board

CDM - Camp Dresser & McKee Inc.

CEQA - California Environmental Quality Act

CFR - Code of Federal Regulations

CNG - compressed natural gas

CO - carbon monoxide

CT - cooling tower

CTA - Central Terminal Area

CUP - Central Utility Plant

EDMS - Emissions and Dispersion Modeling System

EIR - Environmental Impact Report

EIS - Environmental Impact Statement

EMFAC - California Emission Factor Model

EPA – United States Environmental Protection Agency

FAA - Federal Aviation Administration

FAEED - FAA Aircraft Engine Emission Database

FR - Federal Register

g - gram

GAV - ground access vehicles

GPU - ground power unit

GRE - ground run-up enclosure

GSE - ground support equipment

GTC - Ground Transportation Center

GVW - gross vehicle weight

HAP - hazardous air pollutant

HC - hydrocarbon

HHDT - heavy heavy diesel truck

ICAO - International Civil Aviation Organization

ISCST3 - Industrial Source Complex Short Term Model

ITC - Intermodal Transportation Center

kg - kilogram

LADWP - Los Angeles Department of Water and Power

LAWA - Los Angeles World Airports

LAX - Los Angeles International Airport

LDA - light duty automobile

LDT - light duty truck

LEV - low emission vehicle

LHDT – light heavy diesel truck

LHGT - light heavy gasoline truck

LNG - liquefied natural gas

LTO - landing and takeoff operation

m – meter

MAP – million annual passengers

MCY - motorcycle

MDT - medium duty truck

$\mu g/m^3$ - microgram per cubic meter

MHDT - medium heavy diesel truck

MHGT - medium heavy gasoline truck

mmBtu - millions of British thermal units

MOU - Memorandum of Understanding

MPO - Metropolitan Planning Organization

MVEI - California Motor Vehicle Emissions Inventory Model

MSDS – material safety data sheet

NAAQS - National Ambient Air Quality Standard

NA/NP - No Action/No Project Alternative

NEPA - National Environmental Policy Act

NO_2 - nitrogen dioxide

NO_x -oxides of nitrogen

O_3 - ozone

PAH - polynuclear aromatic hydrocarbon

$PM_{2.5}$ - particulate matter with an equivalent aerodynamic diameter of 2.5 micrometers or less

PM_{10} - particulate matter with an equivalent aerodynamic diameter of 10 micrometers or less

ppm - parts per million

ppmw - parts per million, weight

RAC – rent-a-car

ROG - reactive organic gases

RTIP - Regional Transportation Improvement program

RTP - Regional Transportation Plan

SCAB - South Coast Air Basin

SCAG – Southern California Association of Governments

SCAQMD - South Coast Air Quality Management District

SCE – Southern California Edison

SIMMOD - Simulation Model

SIP - state implementation plan

SO_2 - sulfur dioxide

SO_x - sulfur oxides

SULEV - super ultra low emission vehicle

SUV - sport utility vehicle

TIM - time in mode

TSD – treatment, storage, and disposal

UBD - urban bus diesel

ULEV – ultra low emission vehicle

V/C - volume-to-capacity ratio

VFR - visual flight rules

VHT – vehicle hours traveled

VMT - vehicle miles traveled

VOC - volatile organic compounds

WTA - West Terminal Area

ZEV - zero emission vehicle

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1. INTRODUCTION

This Appendix B is provided in support of the Final General Conformity Determination for the LAX Master Plan. It provides summaries of the methodologies used to develop the quantitative evaluations presented in that document.

The following sections discuss and identify the categories and types of emission sources inventoried, the calculation procedures and sources of data used to complete the emissions inventories, and the assumptions for dispersion modeling. The air quality evaluation was performed for the No Action/No Project Alternative (no-build scenario) and for Alternative D (build scenario) for both an interim year and the 2015 horizon year.

The year 2015 represents build out of the LAX Master Plan. An interim year was defined for each alternative as the year predicted to have the highest combined, or total, emissions from both operational sources and construction sources. The interim year for any individual alternative is not necessarily the same year as the peak year of operation emissions or the peak year of construction emissions. The interim year for the No Action/No Project Alternative is 2005. The interim year for the evaluation of air quality impacts from on- and off-airport sources under Alternative D is 2013. Operational emissions for Alternative D in 2005 were assumed to be the same as the operational emissions for the No Action/No Project Alternative in 2005 because development projects under Alternative D would not be significantly advanced to warrant an appreciable difference at that point in time. Interim year emissions for both the No Action/No Project Alternative and Alternative D were estimated using linear interpolation.

Prior to preparing the emissions inventories and conducting the dispersion modeling, the *Protocol for General Conformity Evaluation* (see Appendix A to this Final General Conformity Determination) was prepared. This protocol was submitted to the South Coast Air Quality Management District (SCAQMD), the U.S. Environmental Protection Agency (EPA), the California Air Resources Board (CARB), the Southern California Association of Governments (SCAG), and the Federal Aviation Administration (FAA) for review and comment. The protocol was revised to address comments from these agencies. The protocol provides a discussion of the basic approach used in this report. The analysis completed for this final general conformity determination included several refinements as compared to the protocol, including:

- Wherever the protocol referenced reliance on the Draft 2003 AQMP for data, the general conformity evaluation used data taken from the Final 2003 AQMP which was approved by SCAQMD and submitted to CARB prior to the publication of the Draft GCD.
- Emissions of VOC from architectural coatings, solvents, hot-mix asphalt paving, and runway striping were considered insignificant relative to overall project emissions, primarily due to SCAQMD regulations governing the use of coating applications without control devices. Additional discussion of VOC from coating operations is provided in Section 2.1 of this Appendix.
- The time in mode for auxiliary power units was increased to 15 minutes per LTO based on manufacturer information. Additional discussion of time in mode is presented in Section 2.2.1 of this Appendix.
- The assumptions regarding which alternatives and which years will include fire training have changed since the protocol was developed. Additional discussion of these assumptions is provided in Section 2.2.2 of this Appendix.
- SCAQMD emission inventory methodology for organic liquid storage tanks was used instead of the EPA TANKS program. Additional discussion of the selection of methodology is presented in Section 2.2.2 of this Appendix.
- Wherever the protocol referenced dispersion modeling of PM_{10} with ISCST3, the general conformity determination used AERMOD - the air dispersion model used in EDMS. This modification to the proposed approach was made so that the analysis of PM_{10} was conducted in close accordance with FAA policy (63 FR 18068). Additional discussion of PM_{10} modeling is presented in Section 3 of this Appendix.
- In determining secondary PM_{10} formation, the general conformity determination also includes ammonia as a PM_{10} precursor; this was not explicitly noted in the protocol. Additional discussion of secondary PM_{10} formation is presented in Section 3.4 of this Appendix.

The following sections provide additional details and explanations of specific data. The methodologies used in this analysis are based on an extensive body of literature; the LAX Master Plan Final EIR (Final EIR), Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment A (LAWA, 2004) contains the bibliography developed to support this effort.

2. EMISSIONS ESTIMATES

The emissions estimates were developed using emission factors from a number of agencies, including EPA, FAA, CARB, and SCAQMD. Several different emission source categories and source types at the airport generate air pollutant emissions. The emission source categories include construction activities, airport operations, on- and off-airport vehicle traffic, and miscellaneous airport-related area sources. The emission source types include aircraft (which is comprised of four operating modes), auxiliary power units (APUs), aircraft engine testing, ground support equipment (GSE), ground access vehicles (GAV), construction equipment, the Central Utility Plant (CUP), and food preparation, which are described in detail in this section.

The following source types generate the majority of emissions at the airport: aircraft, GSE, GAV, and construction equipment. Other emission source categories at the airport include fuel storage and aircraft refueling, flight kitchens, aircraft and GSE maintenance, surface coating, cooling towers, and restaurants.

The emission potential of each source type is dependent upon the number of emission sources, the level of source activity, and the frequency of use. Temporal factors are used in the emissions calculations to account for sources that operate below maximum activity levels and those sources that have intermittent activity. Temporal factors provide the level of activity of operations within a given time frame such as hour of the day, day of the week, or month of the year. Temporal factors for both mobile and stationary emission sources were used to calculate annual emissions. The temporal factors used were developed for the LAX Master Plan and are presented in the Final EIR, Technical Report 4, *Air Quality Technical Report,* and Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment B.

Emission inventories have been developed for the following criteria pollutants and criteria pollutant precursors: carbon monoxide (CO), oxides of nitrogen (NO_x), nitrogen dioxide (NO_2), volatile organic compounds (VOC), and particulate matter with an equivalent aerodynamic diameter less than 10 micrometers (PM_{10}).

2.1 Construction

An air pollutant emissions inventory was compiled for construction activities associated with Alternative D of the LAX Master Plan. These emissions estimates were based on the type, magnitude, and duration of the planned construction activities, with emission factors obtained primarily from regulatory sources.

Construction activity data used to develop the construction emissions inventory for Alternative D is presented in the Final EIR Appendix F-B, Attachment 1. This document presents order-of-magnitude estimates for the construction equipment and the construction schedule necessary to develop Alternative D by the horizon year 2015. Construction activity data for the No Action/No Project Alternative is presented in the Final EIR Appendix F-B Attachment 1 and Technical Report 4 Attachment G. Equipment types, sizes, manufacturers, and quantities were identified for the construction phases, which included demolition, earthwork and foundation, utilities, structures, pavement, and support. Construction equipment data, such as brake horsepower and fuel consumption estimates, were based on manufacturer's published information and SCAQMD's CEQA Air Quality Handbook (SCAQMD Handbook) (SCAQMD, 1993).

The various construction crews were grouped together to determine the weekly emissions generated by development of the project component. The weekly emissions were multiplied by 13 weeks per quarter to obtain quarterly emissions in tons per quarter. These quarterly emissions were then distributed over the duration for which they occur along the time line of the LAX Master Plan. Emissions from each project component were calculated and placed along this time line to obtain a temporal profile for all construction activities. Construction activity start and end dates were used to take into account construction activity occurring in a partial quarter. Emissions from all project components occurring within the same quarter were then summed to calculate construction emissions on a quarterly basis for the LAX Master Plan construction time line. Finally, annual emissions were calculated from the quarterly estimates.

Combustion emission factors (CO, VOC, NO_x, and PM_{10}) for off-road construction equipment were revised based on the CARB OFFROAD Model (CARB 2003). Diesel is the primary fuel used by off-road construction equipment, though some on-road vehicles are assumed to use gasoline. Fugitive PM_{10} emissions (vehicle travel on paved and unpaved roads, grading, loading and unloading) from on-site construction activities were calculated using EPA's *Compilation of Air Pollutant Emission Factors*, Volume 1, AP-42, (AP-42) (EPA, 2003) and the SCAQMD Handbook. Fugitive PM_{10} emission factors depend on various inputs such as soil moisture content, silt loading, and construction equipment type, weight, speed, and performance characteristics. The fugitive PM_{10} emissions estimates assume that water is applied to control fugitive dust, as required by SCAQMD Rule 403, with additional controls applied as needed. For on-road equipment (e.g., on-site automobiles, pickup trucks, haul trucks), exhaust emissions factors were based on CARB's on-road emission factor model, EMFAC2002 (CARB 2002). The same types of CEQA mitigation measures were applied to construction emissions for both the No Action/No Project Alternative and Alternative D.

Emission rates were adjusted using load factors from the SCAQMD Handbook (SCAQMD, 1993) and a 0.83 usage factor, which accounts for breaks and lunch during a typical workday. Fuel combustion and fugitive emission rates were summed to obtain the total daily emissions per piece of equipment. Individual construction equipment daily emissions were then summed to determine crew emission rates, which in turn were used to calculate emissions for each activity. Daily, quarterly, and annual project emissions were then calculated based on each activity's start date and duration, assuming construction activities occur during a single 10-hour daily work shift on weekdays only.

Due to the order-of-magnitude nature of the construction emissions inventory, activities deemed to be insignificant relative to overall project emissions were not quantified. Types of activities deemed to be insignificant include VOC emissions from architectural coatings, solvents, hot-mix asphalt paving, and runway/taxiway striping. Most surface coatings by 2005 are assumed to be water-based coatings, in accordance with SCAQMD rules and regulations governing the use of coating applications without control devices (direct release into the atmosphere) (SCAQMD, 2003), thus minimizing VOC emissions.

2.2 Operations

This analysis included an identification of all on- and off-airport emission sources associated with LAX. These sources can be divided into three general categories: mobile, stationary, and area.

2.2.1 Mobile Sources

Mobile sources associated with future activities at LAX include both on-road vehicles and nonroad vehicles. On-road vehicles, also referred to as GAV, include those vehicles such as automobiles, trucks, and buses that operate on the public roadways, as well as within public parking lots and garages on LAX property. These public-access areas on airport property are referred to as "landside." Nonroad vehicles include aircraft, on-board APUs, and GSE that operate in the nonpublic access areas on LAX property. These nonpublic access areas on airport property are referred to as "airside." The GSE are surface vehicles used to service a flight while an aircraft is parked at a gate (e.g., baggage tugs, lavatory carts, push-back tractors). The APU is an on-board engine that operates primarily to provide power to an aircraft while it is parked at the gate when the main engines are off. This analysis does not address all mobile sources which may operate on the airside of the airport and which do not directly service aircraft, such as vehicles owned and operated by LAWA, since such vehicles operate on irregular schedules and they represent a relatively small number of the total airside vehicles. However, the analysis does include airside buses that transport passengers from the main terminals to remote or hard-stand aircraft gate locations, in direct service of aircraft.

Aircraft Operations

Emissions calculations presented in the Final General Conformity Determination for aircraft were developed primarily using the Emissions and Dispersion Modeling System (EDMS) (FAA 2002), the FAA-required model for airport air quality analysis (FR, 1998). EDMS 4.11 was used to determine emissions of CO, NO_X, and VOC from aircraft. EDMS 4.11 does not calculate emissions of PM_{10} from aircraft, so these emission rates were calculated as described below. Emission rates were estimated for four aircraft operational modes (taxi/idle, takeoff, climbout, and approach). Emissions associated with the use of reverse thrust on aircraft engines were not quantified. Currently emission factors have not been

developed for reverse thrust. The relative time that aircraft use reverse thrust compared to the time spent in other operational modes is minimal, thus emissions for this mode are assumed to have minimal impact on the emission inventories.

The most recent major upgrade to EDMS (EDMS 4.12) was released in October 2003, although this evaluation was performed using EDMS 4.11 which was released in December 2002. The use of EDMS 4.11 was chosen to maintain consistency with the Supplement to the Draft EIS/EIR that was published in July 2003. The Supplement to the Draft EIS/EIR was the first document to present environmental impacts associated with Alternative D.

Aircraft and Aircraft Engine Assumptions

SIMMOD, FAA's airport and airspace simulation model, is a comprehensive planning tool for airport designers and managers, air traffic planners, and airline operations analysis. SIMMOD addresses design and procedural aspects of all air traffic operations and produces measures of airport capacity, aircraft travel time, aircraft delay, and aircraft fuel consumption. The simulation model uses information about the facilities and operations to predict specific timing, volume, and location (e.g., runway used) for future aircraft operations.

SIMMOD data were developed for the No Action/No Project Alternative for 2005 and 2015 and for Alternative D for 2013 and 2015. Aircraft-specific landing and takeoff operations (LTO) values were developed from these datasets and formatted for use in EDMS. Specific taxi and queue times for each forecast year were also calculated from the SIMMOD data for each aircraft size category (heavy, large, and small).

The aircraft/engine assignments used in EDMS 4.11 for passenger and cargo aircraft are shown in **Table 1**, LAX Passenger Aircraft Database Assumptions (EDMS 4.11), and **Table 2**, LAX Cargo Aircraft Database Assumptions (EDMS 4.11), respectively.

Table 1

LAX Passenger Aircraft Database Assumptions (EDMS 4.11)

SIMMOD Aircraft (abbreviation)	EDMS Aircraft	# of Engines	Engine
Fokker 100 (100)	Fokker 100	2	TAY650-15
Airbus A310 (310)	A310-200	2	JT9D-7R4E1
Airbus A319 (319)	A319	2	CFM56-5B6/P
Airbus A320 (320/32S)	A320	2	V2527-A5
Airbus A330 (330)	A330	2	PW4168
Airbus A340 (340)	A340-200	4	CFM56-5C4
Boeing 737-300 (733)	B737-300	2	CFM56-3-B1
Boeing 737-400 (734)	B737-400	2	CFM56-3B-2
Boeing 737-500 (73S, 735)	B737-500	2	CFM56-3C-1
Boeing 747-400 (744)	B747-400	4	PW4056
Boeing 747-200 (747/74E/743)	B747-200	4	CF6-50E2
Boeing 747 Combo (74M)	B747-200C	4	CF6-50E2
New Large Aircraft (74X)	B747-SP	4	JT9D-7A
Boeing 757-200 (757)	B757-200	2	PW2037
Boeing 767-300 (763)	B767-300	2	CF6-80A2
Boeing 767-200 (767)	B767-200	2	CF6-80A (A1)
Boeing 777 (777)	B777-200	2	PW4077
Airbus A300 (AB3)	A300B	2	CF6-80C2A5
Avions de Transport Régional ATR72 (AT7)	ATR72-200	2	PW124-B
Avions de Transport Régional ATR42 (ATR)	ATR42	2	PW120
Beech (BE1)	BH-1900	2	PT6A-67B
Canadair RJ50 (C50)	Canadair RJ50[1]	2	CF34-3A[2]
Canadair RJ70 (C70)	Canadair Reg-700	2	CF34-8C1
General Aviation Prop (CNA)	Cessna 150	1	O-200
de Havilland Dash 7 (DS7)	Dash 7	2	PT6A-50
Embraer 120 (EM2)	EMB-120	2	PW118
Embraer 110 (EMB)	EMB-110KQ1	2	PT6A-27
Fokker 50 (F50)	Fokker 50	2	PW127-A
Fokker 70 (F70)	Fokker 70	2	TAY620-15
General Aviation Jet (GAJ)	CITATION V	2	JT15D-5 (A & B)
Jetstream 31 (J31)	Jetstream 31[1]	2	TPE331-8[2]
McDonnell Douglas MD-11 (M11/MIM)	MD-11	3	CF6-80C2D1F
McDonnell Douglas MD-80 (M80)	MD-80	2	JT8D-219
McDonnell Douglas MD-87 (M87)	MD-80-87	2	JT8D-219
McDonnell Douglas MD-90 (M90)	MD-90-10	2	V2525-D5
McDonnell Douglas MD-95 (M95)	MD-95	2	BR700-715C1-30
Saab 2000 (S20)	Saab2000[1]	2	AE3700A[2]
Shorts 360 (S36)	Shorts 360	2	PT6A-65AR
Saab Fairchild 340 (SF3)	SF-340-A	2	CT7-5
Swearingen Metro (SWM)	Swearingen Metro 2	2	TPE331-3

Note: Listed aircraft are from all SIMMOD analyses for 2013 and 2015 horizon years for Alternative D. Times in mode for added aircraft are ICAO defaults.

[1] Aircraft are not included in EDMS. Assumed by CDM.
[2] Chosen for comparable thrust production.

Source: Camp Dresser & McKee Inc., 2003.

Table 2

LAX Cargo Aircraft Database Assumptions (EDMS 4.11)

SIMMOD Aircraft (Abbreviation)	EDMS Aircraft	# Of Engines	Engine
Airbus A300 C4 (300)	A300-C4-200	2	CF6-50E2
Airbus A310 (310)	A310-200C	2	CF6-80CB42
Boeing 737-200C (737)	B737-200C	2	JT8D-17
Boeing 747-400 (744)	B747-400F	4	CF6-80C2B1F
Boeing 747-200 (747)	B747-200F	4	JT9D-7F
Boeing 757-200 (757)	B757-200F	2	RB211-535E4
Boeing 767-200 (767)	B767-300F	2	PW4056
Beech (BE1)	BH-1900C	2	PT6A-65B
General Aviation Prop (CNA)	Cessna 208 Caravan	1	PT6A-114
Douglas DC10 (D10)	DC10-30F	3	CF6-50C2
McDonnell Douglas MD-11 (M11)	MD-11-11F	3	CF6-80C2D1F

Note: Cargo aircraft included for LAX Master Plan air quality impact analysis.
Listed aircraft are from all SIMMOD analyses for 2013 and 2015 horizon years for Alternative D. Times in mode for added aircraft are ICAO defaults.

Source: Camp Dresser & McKee Inc., 2003.

EDMS 4.11 does not contain emission indices for PM_{10} from aircraft or APUs and, therefore, it cannot be used to calculate PM_{10} mass emissions from aircraft or APUs or to disperse PM_{10} emissions attributable to aircraft or APUs. The PM_{10} emission indices used in the general conformity evaluation for aircraft were developed using the methodology described in the Final EIR, Technical Report 4, *Air Quality Technical Report*, Attachment H. Emissions of PM_{10} from APUs are considered negligible.

Aircraft LTO Data Assumptions

Aircraft LTO data for Alternative D were obtained from SIMMOD data developed for the LAX Master Plan. **Table 3**, Aircraft Landing/Takeoff Operations (LTO) Summary for Alternative D, presents a summary of the total annual LTOs forecasted for Alternative D for the two forecast years. The annual LTO data for each aircraft type were then entered into EDMS 4.11 for each forecast year.

Table 3

Aircraft Landing/Takeoff Operations (LTO) Summary

Alternative / Forecast Year	Annual Passenger Aircraft LTOs	Annual Cargo Aircraft LTOs	Annual Total LTOs
No Action/No Project / 2005	370,889	20,244	391,133
No Action/No Project / 2015	371,241	20,244	391,485
Alternative D / 2013	371,577	20,243	391,820
Alternative D / 2015	371,577	20,243	391,820

Source: Camp Dresser & McKee Inc., 2000.

Detailed descriptions of annual LTOs for each aircraft type and runway breakdown by alternative and horizon year are included in the Final EIR, Technical Report 4, *Air Quality Technical Report*, Attachment I and Technical Report S-4, *Supplemental Air Quality Technical Report*, Attachment E .

Aircraft Time-In-Mode Assumptions

In EDMS 4.11, aircraft times-in-mode (TIM) for approach and climbout are calculated based on aircraft type classification and mixing height. Takeoff time in mode is based on aircraft weight category. Taxi/idle TIM is the sum of the average taxi and queue times produced by SIMMOD for each aircraft size category and the default landing roll time contained in EDMS 4.11. **Table 4**, EDMS 4.11 Aircraft Time in Mode, presents the TIM in EDMS 4.11 for approach, climbout, takeoff, and taxi that were used to estimate aircraft emissions for both alternatives in both horizon years.

Table 4

EDMS 4.11 Aircraft Time in Mode

		Time in Mode (minutes)					
					User-Entered Taxi/Queue Time		
Aircraft List	**Aircraft Engine**	**Adjusted Approach[4]**	**Adjusted Climbout[4]**	**Adjusted Takeoff**	**Alt D & NA/NP 2005**	**NA/NP 2015**	**Alt D 2013 & 2015**
A310-200	JT9D-7R4E1	2.28	0.41	0.95		34.5	30.9
A319	CFM56-5B6/P	2.20	0.47	1.01	26.9	28.1	29.0
A330	PW4168	2.28	0.41	0.95	31.5	34.5	30.9
A340-200	CFM56-5C4	2.21	0.47	1.15	31.6	34.7	31.0
B737-300	CFM56-3-B1	2.29	0.32	0.79	27.2	28.4	29.3
B737-400	CFM56-3B-2	2.29	0.32	0.79	27.2	28.4	29.3
B737-500	CFM56-3C-1	2.35	0.36	0.90	27.2	28.5	29.3
B747-400	PW4056	2.09	0.65	1.22	31.6	34.7	31.0
B747-200	CF6-50E2	2.24	0.96	1.62	31.6	34.6	31.0
B747-200C (747 Comb)	CF6-50E2	2.13	0.70	1.21		34.6	31.0
B747-SP (747X)	JT9D-7A	2.41	0.64	1.14	31.6	34.6	31.0
B757-200	PW2037	2.41	0.45	0.84	27.2	28.5	29.3
B767-300	CF6-80A2	2.32	0.51	1.06	31.5	34.5	30.9
B767-200	CF6-80A (A1)	2.32	0.51	1.06	31.5	34.5	30.9
B777-200	PW4077	2.87	0.58	1.04	32.0	35.0	31.4
A300B	CF6-80C2A5	2.31	0.48	1.01	31.5	34.6	29.3
ATR72-200	PW124-B	3.51	0.81	1.08	23.3	26.9	29.2
ATR42	PW120	3.57	0.43	0.72	23.2	26.9	29.2
BH-1900	PT6A-67B	5.09	0.44	0.74	23.0	26.7	26.5
Canadair Reg-700 (CRJ70)	CF34-8C1	2.32	0.27	0.85		26.8	29.1
Cessna 150 (GenAvProp)	O-200	5.54	1.49	1.68	23.0		26.5
EMB-120	PW118	2.32	0.27	0.85	23.2	26.8	26.6
EMB-110KQ1	PT6A-27	5.09	0.44	0.74	26.1	26.7	26.5
CITATION V (GenAvJet)	JT15D-5 (A & B)	2.76	0.39	0.83	23.0		26.6
MD-11	CF6-80C2D1F	2.11	0.48	1.22	31.6	34.7	31.0
MD-80	JT8D-219	2.25	0.53	1.04	27.2	28.5	29.3
MD-80-87	JT8D-219	2.25	0.53	1.04	27.2	28.5	29.3
MD-90-10	V2525-D5	2.27	0.26	0.94	27.1	28.4	29.2
MD-95	BR700-715C1-30	2.27	0.25	0.84	27.1	28.4	29.2
SF-340-A	CT7-5	2.74	0.44	0.76	23.2	26.9	26.7
Swearingen Metro 2	TPE331-3	5.09	0.44	0.74	23.0	26.7	26.5
A300-C4-200 (Cargo)	CF6-50E2	2.31	0.48	1.01	31.5	34.6	29.3
A310-200C (Cargo)	CF6-80CB42	2.28	0.41	0.95		34.5	30.9
B737-200C (Cargo)	JT8D-17	2.33	0.38	0.83		28.4	29.2
B747-200F (Cargo)	JT9D-7F	2.13	0.70	1.21	31.6	34.6	31.0
B747-400F (Cargo)	CF6-80C2B1F	2.09	0.65	1.22	31.6	34.7	31.0
B757-200F (Cargo)	RB211-535E4	2.40	0.38	0.71	27.2	28.5	29.3
B767-300F (Cargo)	PW4056	2.34	0.47	0.85		34.5	30.9
BH-1900C (Cargo)	PT6A-65B	5.09	0.44	0.74	23.0	26.7	26.5
Cessna 208 Caravan (GenAvProp Cargo)	PT6A-114	5.09	0.44	0.74	23.0		26.5
DC10-30F (Cargo)	CF6-50C2	2.12	0.49	1.18	31.5	34.5	30.9
MD-11-11F (Cargo)	CF6-80C2D1F	2.11	0.48	1.22	31.6	34.7	31.0
A320	V2527-A5	2.20	0.47	1.01	26.9	28.1	29.0
B737-500 (73S)	CFM56-3C-1	2.35	0.36	0.90	27.2	28.5	29.3
Canadair RJ50 [1]	CF34-3A	2.40	0.88	0.70	23.0	52.6	54.9
Jetstream 31 [2]	TPE331-8	2.70	0.88	0.50	52.0	52.6	54.9
Saab2000 [3]	AE3007A	2.40	0.88	0.70	23.0	52.6	52.0
Fokker 100	TAY650-15	2.39	0.44	0.81	27.2	28.5	29.3
Fokker 50	PW127-A	2.96	0.53	0.86	23.2	26.9	29.2
Fokker 70	TAY620-15	2.42	0.44	0.87	23.3	27.0	29.3
Dash 7	PT6A-50	3.30	0.58	0.91	23.1	26.5	26.5
Shorts 360	PT6A-65AR	3.57	0.43	0.72	23.2	26.9	26.7

[1] User-created aircraft with emission factors and TIM based on flight profile of CL601-3R aircraft with CF34-3A engines.
[2] User-created aircraft with emission factors and TIM based on flight profile of Cessna 441 Conquest 2 aircraft with TPE331-8 engines.
[3] User-created aircraft with emission factors and TIM based on flight profile of Embraer ERJ 145 aircraft with AE3007A engines.
[4] Climbout TIM based on a mixing height of 625 m (2,050 ft).

Source: Camp Dresser & McKee Inc., 2004.

Aircraft Emissions

Using aircraft engine emission indices from EDMS 4.11, supplemented as noted above, emissions were calculated for each aircraft type. The following algorithm included in EDMS 4.11 was used.

$$E_{ij} = NE_j * \Sigma [(TIM_{jk}) * (FF_{jk}) * (EI_{ijk})]$$

Where:

E_{ij} = total emissions of pollutant i produced by aircraft type j per LTO cycle (g/LTO)

NE_j = number of engines used on aircraft type j

TIM_{jk} = time in mode k for aircraft type j (s/LTO)

FF_{jk} = fuel flow for mode k for each engine used on aircraft type j (kg/s)

EI_{ijk} = emission index of pollutant i in mode k for engines used on aircraft type j (g/kg)

The total emissions for all aircraft types over the inventory period were calculated using the following procedure (USEPA, 1992).

$$E_{Ti} = \Sigma [(E_{ij}) \times (LTO_j)]$$

Where:

E_{Ti} = total emissions of pollutant i from aircraft operating at LAX (grams)

LTO_j = total number of LTO cycles for aircraft type j during the inventory period

Estimates for dust entrained from aircraft runways and taxiways were also included, using emission factors from the SCAQMD Handbook and AP-42 Volume 1 to calculate fugitive dust emissions.

Fleet mix data and airport operations were taken from the LAX Master Plan forecasts.

Ground Support Equipment / Auxiliary Power Units

The GSE types and APU sizes used in emissions calculations vary depending upon the aircraft size and capacity, and whether the aircraft is used for the transportation of cargo or passengers. The GSE and APU emissions inventories were developed using LAX related data and the default GSE and APU assignments included in the EDMS 4.11 model for various types of aircraft. The APU time in mode was assumed to be 15 minutes per LTO for gates with preconditioned air and 400 Hz power, based on information provided to EPA by an APU manufacturer (Honeywell, 2000). This duration is longer by 8 minutes than indicated in the protocol (Appendix A). The gates at LAX for both alternatives were assumed to all have preconditioned air and 400 Hz power based on a previous commitment by LAWA (LAWA, 1997).

The GSE include push-back tractors, baggage tugs, belt loaders, cabin service, cargo loaders, container loaders, food trucks, fuel trucks, lavatory carts, and water trucks. The use of GSE, such as Ground Power Units (GPUs), Air Conditioning Units (ACUs), Air Starter Units (ASUs), and their respective transporters, was limited to the No Action/No Project Alternative, since gate modifications under the Master Plan would make such equipment obsolete at LAX.

The LAX Master Plan team conducted studies to estimate existing conditions and the market penetration of alternative-fueled and electric-powered GSE for each alternative (CALSTART, 1998; CALSTART, 1999). The GSE fleet compositions were estimated using projections of future LAX purchasing trends that incorporate new clean vehicle technologies developed by manufacturers and introduced to the market. The fleet compositions were developed using available data and information on the existing GSE fleet, annual vehicle retirement and replacement rates, growth factors, regulatory authorities, fleet managers, and the current commitments of manufacturers. For modeling purposes, the vehicle technologies were categorized by fuel type including diesel, gasoline, natural gas, propane, electric, and hybrid vehicles. The findings from these studies were used to calculate GSE emissions using FAA and EPA accepted procedures.

In December 2002, CARB and most major domestic air carriers serving the South Coast Air Basin (SCAB) executed a Memorandum of Understanding (MOU) regarding ground support equipment. This MOU requires signatory airlines that operate ground support equipment at commercial-service airports in the SCAB to reduce NO_x emissions from this equipment. While LAWA is not a signatory party to the MOU, in preparing the draft general conformity evaluation for the LAX Master Plan, it was assumed that, for the No Action/No Project Alternative and Alternative D, the airlines will comply with the MOU.

Emission factors contained in the CARB OFFROAD model were used for GSE emissions from gasoline, diesel, propane, and natural gas fueled equipment. Zero emissions were assumed for electric powered GSE. Emission factor data for GSE are presented in Appendix F-B, *Air Quality Appendix*, Attachment 3, of the Final EIR.

Assignments of appropriate GSE to aircraft and associated usage times were based on site-specific data developed for the LAX Master Plan. Default assignments of GSE included in EDMS 4.11 were used to supplement the site-specific data as needed.

Assignments of GSE to aircraft types were made in two steps: assignment of the GSE type to specific aircraft type, and the assignment of fuel usage to the GSE type. For the 2005 and 2015 No Action/No Project Alternative, GSE assignments were made based on EDMS 4.11 default GSE assignments and the following assumptions:

- No GSE are required for either the passenger or cargo General Aviation Propeller aircraft.
- GPUs, ACUs, ASUs, and their respective equipment transporters were not assigned to passenger aircraft assigned an APU and located at modified terminal gates with central power hookups.
- GPUs and ACUs were only assigned to cargo aircraft and to small aircraft not assigned an APU. Cargo turboprops, specifically the BH-1900 Cargo aircraft, were not assigned GPUs or ACUs. All aircraft assigned GPUs were also assigned GPU transporters.
- ASUs were only assigned to cargo aircraft. All aircraft assigned ASUs were also assigned ASU transporters.
- Fuel trucks were assigned to all small commuter passenger and cargo jets.
- Hydrant trucks were assigned to all passenger and cargo aircraft not assigned fuel trucks.

For 2015 Alternative D, all GSE were assumed to have zero emissions.

Once specific GSE vehicle types were assigned, the fleet composition was determined. Fuel types were assigned according to the predicted penetration of alternative fuels (CALSTART, 2000; CALSTART, 1999). The following assumptions were used when determining the fleet composition:

- Although an airline may have identical GSE powered by different fuels servicing a single aircraft type, this level of information was not available. Therefore, each aircraft type was assigned one fuel type per GSE type.
- Cabin service or food truck vehicle fleet compositions were not available. Fleet compositions for step vans (CALSTART, 1999) were used for both of these types of GSE.
- Fleet compositions were unavailable for water truck vehicles. The fleet composition for pickup trucks was used for this type of GSE.
- At LAX, it was determined that lavatory carts and not lavatory trucks are used. As these more closely resemble pickup trucks, the fleet composition for pickup trucks was used for this type of GSE.
- Under the No Action/No Project Alternative, the MOU was considered to be complete by 2010 and that fleet composition would be maintained through 2015. It was further assumed that this fleet would be approximately 30 percent zero-emission equipment.
- Under Alternative D, the MOU was considered to be complete by 2010. GSE emissions were assumed to decrease linearly to zero between 2010 and 2015 under Alternative D.

Specific assignments of GSE to aircraft by project alternative horizon year are included in Technical Report 4, *Air Quality Technical Report,* Attachment L and Technical Report S-4, *Air Quality Technical Report,* Attachment H, of the Final EIR. Assignments of APUs to aircraft types for both alternatives in each horizon year were based on EDMS 4.11 default APU assignments.

Ground Access Vehicles

Ground access vehicle (GAV) trips generated to and from LAX have regional and local air quality impacts. Both a regional off-airport and a local on-airport GAV air quality analysis were conducted using regional traffic and on-airport traffic data developed for the LAX Master Plan for Alternative D 2013 and 2015. GAV emissions for on-road and parking area sources were calculated using the CARB methodology, and site-specific data developed for the LAX Master Plan.

On-Airport

The on-airport GAV analysis includes emissions estimates for on-road traffic and parking structure/area sources. On-road vehicles that access on-airport facilities include privately owned vehicles, government-owned vehicles, rental cars, shuttles, buses, taxicabs, and trucks. The on-airport access ramps connect to on-airport roadway links that lead on-road traffic to and from the proposed Ground Transportation Center (GTC), the proposed Intermodal Transportation Center (ITC) and the Central Terminal Area (CTA), and the commercial cargo and ancillary facilities. The methodology used to calculate emissions from on-road vehicles operated during construction are addressed in Section 2.1, *Construction,* of this appendix.

The on-road vehicle and parking facility emissions were calculated using site-specific data developed for the LAX Master Plan and emission factors generated from EMFAC2002, Version 2.2. The site-specific data used to estimate emissions include trip generation, vehicle trip distances, idle and soak times (time between engine starts), vehicle fleet mix, and average travel speeds based on specific roadway segments and parking facilities. CARB methodologies and SCAQMD data were used for unavailable on-site data (e.g., fugitive dust from roadways). The EMFAC2002 emission factors used are presented in Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment I, of the Final EIR.

Traffic data for on-road vehicle and parking facility activity were developed, including trip generation information for acquisition areas and commercial cargo and ancillary facilities, in the horizon years for the No Action/No Project Alternative and Alternative D. The on-airport traffic and parking data used to develop emission estimates include hourly traffic volumes, vehicle fleet mix, and peak hour vehicle counts. The peak hour for on-airport traffic volumes generally occurs between 11:00 AM and 12:00 noon. Exceptions to this peak hour include employee parking areas and the west side on-airport access areas, which have a peak hour between 12:00 noon and 1:00 PM.

Due to varying vehicle emissions characteristics, CARB divides GAV into distinct vehicle classes based upon vehicle weight and fuel type. The GAV categories used in the traffic analysis, such as privately owned vehicles, buses, taxicabs, etc., are categorized under one of the 13 specified vehicle classes used in the CARB mobile-source emission models.

The GAV fleet mixes for airport roadway links and parking facilities were calculated using site-specific data developed for the LAX Master Plan. The GAV category fractions were determined by area for the GTC, ITC, CTA, and World Way West for Alternative D in the 2013 and 2015 horizon years. A 65/35 percent breakdown is used between autos (LDAs) and SUVs, pickup trucks and vans (LDTs). The EMFAC2002 output provides the percent distribution of technology type under each vehicle class (i.e., non-catalyst, catalyst, and diesel). The CARB regulations and forecasts for alternative-fuel vehicle use, including low-emission vehicles (LEV), ultra low emission vehicles (ULEV), super ultra low emission vehicles (SULEV), and zero-emission vehicles (ZEV) are incorporated into the EMFAC2002 model.

Roadway Traffic

The vehicle fleet mix was estimated for each roadway link within the airport boundary. The on-airport vehicle fleet mix for roadway traffic for Alternative D in the 2013 and 2015 horizon years is presented in Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment J, of the Final EIR. The vehicle fleet mixes for 2013 and 2015 are not noticeably different. Light duty autos and light duty trucks with catalysts generally make up the majority of the on-airport vehicle fleet mix in the GTC, the ITC, and the CTA. Cargo ramps are predicted to have a higher percentage of medium and heavy duty vehicles than the passenger ramps.

The CARB mobile source emission model was used to generate emission factors for each vehicle class in grams per unit (i.e., hour, mile, or trip) for each criteria pollutant for both alternatives for each horizon year. The model was used to generate emission factors for the following types of emissions: running

exhaust emissions, variable start emissions, and evaporative emissions, which consist of diurnal, hot soak, running, and resting losses. Diurnal and resting evaporative emissions were not included for CTA roadway traffic. The average emission factors were determined for the on-airport GAV fleet mix using the average of the summer (75°F) and winter (50°F) emission factors. Emission factors for entrained road dust from a study developed for the SCAQMD (MRI 1996) were used to estimate fugitive dust emissions from major roads and highways. The emissions produced by GAV activity on on-airport roadways were calculated using the following equation:

$$E_t = {}_r\Sigma(E_r)$$

Where:

E_t = total on-airport roadway pollutant emissions (grams/year)

E_r = total link r pollutant emissions (grams/year)

${}_r\Sigma$ = summation through roadway links r

and

$$E_r = {}_v\Sigma[T_r]x[F_{vr}]x\{[L_r]x([EF_{rsv}]+[EF_{ersv}]+[EF_{tw}]+[EF_{bw}]+[EF_{rd}])+[EF_{iv}]x[T_{ivr}]+[EF_{svst}]x[F_{vsr}]+[EF_{hsv}]x[F_{vsr}] +[EF_{dv}]x[ST_{vr}]xF_{vsr}]+[EF_{rstv}]x[ST_{vr}]x[F_{vsr}]\}$$

Where:

${}_v\Sigma$ = summation through vehicle types v

T_r = annual vehicle trips for the roadway link r (trips/year)

F_{vr} = vehicle type v fraction for the roadway link r

L_r = length of roadway link r traveled per vehicle trip (miles/trip)

EF_{rsv} = running emission factor at the road link speed rs for the vehicle type v (grams/mile)

EF_{ersv} = evaporative running emission factor at the road link speed rs for the vehicle type v (grams/mile), for VOC emissions only

EF_{tw} = tire wear tw emission factor (grams/mile), for PM10 emissions only

EF_{bw} = brake wear bw emission factor (grams/mile), for PM10 emissions only

EF_{rd} = road dust rd emission factor (grams/mile), for PM10 emissions only

EF_{iv} = idle i emission factor for the vehicle type v (grams/minute)

T_{ivr} = idle i time for the vehicle type v at the roadway link r (minutes)

EF_{svst} = variable start s emissions for each vehicle type v for the designated soak time st (grams/start), for VOC, CO, and NO_x emissions only

F_{vsr} = fraction of vehicle type v that has variable starts s at the roadway link r

EF_{hsv} = hot soak hs emission factor (grams/trip) for vehicle type v, VOC emissions only

EF_{dv} = diurnal emission rates (grams/hour) for vehicle type v, VOC emissions only

ST_{vr} = soak time (hr) for vehicle type v on roadway link r

EF_{rstv} = resting losses (grams/hour) for vehicle type v, VOC emissions only

Vehicle trips, trip distances, idle times, time between engine starts, and average travel speeds were based on specific roadway segments analyzed in the traffic impact studies conducted for the LAX Master Plan EIS/EIR. The specific information on roadway links and vehicles used to calculate on-road vehicular traffic emissions is presented in Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment L, and Appendix F-B, *Air Quality Appendix*, Attachment 5, of the Final EIR, by alternative and horizon year.

Parking Facilities

The vehicle fleet mix was calculated for each on-airport parking facility. The parking facilities are for short-term parking, long-term parking, employee parking, commercial vehicle holding areas (staging), and rent-a-car (RAC) facilities. The on-airport vehicle fleet mix for parking facilities by alternative and horizon year are presented in Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment K, of the Final EIR.

In estimating GAV emissions for on-airport parking facilities, CDM used a similar methodology to the one used to estimate GAV roadway emissions. The CARB mobile-source emission models factors were used, incorporating site-specific data and resting evaporative emissions for the parking structure/areas. Fugitive emissions from road dust are considered to be negligible due to low vehicle speeds in the parking structure/areas; however, particulate emissions due to tire and brake wear are included. The emissions produced by GAV within the on-airport parking facilities were calculated as follows:

$$E_t = {}_p\Sigma(E_p)$$

Where:

E_t = total on-airport parking pollutant emissions (grams/year)

E_p = pollutant emissions per parking structure/area p (grams/year)

${}_p\Sigma$ = summation through parking facilities p

and

$$E_p = {}_v\Sigma[T_p]x[F_{vp}]x\{[L_p]x([EF_{psv}]+ [EF_{epsv}]+ [EF_{tw}]+ [EF_{bw}])+ [EF_{iv}]x[T_{ivp}]+[EF_{svst}]x[F_{vsp}]+[EF_{hsv}]x[F_{vsp}] +[EF_{dv}]x[ST_{vp}]x[F_{vsp}]+[EF_{rstv}]x[ST_{vp}]x[F_{vsp}]\}$$

Where:

${}_v\Sigma$ = summation through vehicle types v

T_p = annual vehicle trips for the parking structure/area p (trips/year)

F_{vp} = vehicle type v fraction for the parking structure/area

L_p = length of distance traveled in the parking structure/area per trip p (miles/trip)

EF_{psv} = running emission factor at the parking structure/area link speed ps for the vehicle type v (grams/mile)

EF_{epsv} = evaporative running emission factor at the parking structure/area speed ps for the vehicle type v (grams/mile), for VOC emissions only

EF_{tw} = tire wear tw emission factor (grams/mile), PM10 emissions only

EF_{bw} = brake wear bw emission factor (grams/mile), PM10 emissions only

EF_{iv} = idle i emission factor for the vehicle type v (grams/minute)

T_{ivp} = idle i time for the vehicle type v at the parking structure/area p (minutes)

EF_{svst} = variable start s emissions for each vehicle type v for the designated soak time st (grams/start), VOC, CO, and NO_x emissions only

F_{vsp} = fraction of vehicle type v that has variable starts s at the parking structure/area p

EF_{hsv} = hot soak hs emission factor (grams/trip) for vehicle type v, VOC emissions only

EF_{dv} = diurnal emission rate (grams/hour) for vehicle type v, VOC emissions only

ST_{vp} = soak time (hrs) for vehicle type v at parking structure p

EF_{rstv} = resting losses (grams/hour) for vehicle type v, VOC emissions only

The specific parking facility data used to estimate emissions from parking sources are given in Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment K, and Appendix F-B, *Air Quality Appendix*, Attachment 5, of the Final EIR, by alternative and horizon year.

Off-Airport

The off-airport (regional traffic) emissions were calculated for three separate regional areas: (1) the "Tier 1 Area" surrounding the airport; (2) the South Coast Air Basin, including the Tier 1 Area; and (3) outside the South Coast Air Basin (i.e., Ventura County, Palmdale, Lancaster).

The regional traffic emission calculations were performed based on vehicle miles traveled (VMT) and average-daily trip (ADT) data developed for the LAX Master Plan. This analysis included emissions associated with vehicles of airport passengers, employees, cargo and ancillary operations, and collateral development.

Emissions were estimated for:

- Reactive Organic Gases (ROG), assumed to be equal to VOC emissions
- NO_x
- CO
- PM_{10} for:
  - Exhaust (PMEX)
  - Tire Wear (PMTW)
  - Brake Wear (PMBW)
  - Fugitive Dust from paved roads
- Sulfur oxides (SO_x)

The peak hourly AM, PM, and airport peak (AP) VMT and VHT traffic numbers were developed for the No Action/No Project Alternative for 2005 and 2015 (see the Final EIR, Technical Report 4. *Air Quality Impact Report*, Attachment P) and for Alternative D for the year 2015, (see Technical Report S-4, *Supplemental Air Quality Technical Report,* Attachment L, of the Final EIR). Traffic values for Alternative D in 2013 were approximately equal to those developed for Alternative D in 2015 and, therefore, 2015 VMT, VHT, and ADT values were used for the 2013 off-airport traffic analysis. The fleet mix and average emission factors for 2013 and 2015 per VMT and VHT were calculated using the VMT, VHT, ADT, and vehicle speed mix data, in addition to the regional fleet mix and emission defaults for 2015 developed for the LAX Master Plan.

The AM peak, PM peak, and AP hourly VMT data for Alternative D were converted to daily VMT based on conversion factors provided for the LAX Master Plan (Parsons Transportation Group, 1998).

The EMFAC2002 model was used in the emissions analysis. An EMFAC run adjusts the base emission rates for non-standard driving conditions, which are referred to as correction factors. These correction factors include driving conditions such as speed, temperature, fuel type, and driving cycles. Data input into the model include both VMT and vehicle speeds (Parsons Transportation Group, 1999). The model then calculates emissions for PM_{10}, CO, NO_x, SO_x, and ROG.

The BURDEN model, within the EMFAC2002 suite, combines emission factors with county-specific activity data, including the population of vehicles, the VMT, and the number of vehicle starts. The corresponding emission rates are expressed as grams per vehicle, grams per mile, and grams per start. An inventory is then calculated by multiplying the emission factor by its associated activity. Emissions were evaluated for each county for the 13 vehicle classes previously noted.

These models also account for the penetration of alternative fuels (e.g., natural gas and electricity). California law regulates technology group sales fractions required for each vehicle model year. These vehicle model year sales fractions are implicit in the base emission rates used in the EMFAC2002 model. For example, by 2005, two percent of sales by major motor vehicle manufacturers are required to be ZEVs. The regulated market penetration for each alternative fuel and alternative technology vehicle is provided in Technical Report 4, *Air Quality*, Attachment R, of the Final EIR.

Regional emissions were calculated by multiplying the emission factor for each vehicle class by its associated activity (e.g., VMT). Emissions were calculated for running exhaust, variable starts, and evaporative emissions, which consist of diurnal, hot soak, running, and resting losses. Brake wear and tire wear emissions were also estimated.

Other parameters that are accounted for by the emission models include:

- Non-catalyst-equipped vehicles (NCAT)
- Catalyst-equipped vehicles (CAT)
- Diesel-fueled vehicles (DSL)

EMFAC2002 was run for the No Action/No Project Alternative and Alternative D using these parameters:

- Temperatures (°F): 60, 75, and 85
- Miles per hour (mph): 5, 15, 25, 30, 35, 45, 55, and 65
- Percent relative humidity (RH): 70 percent
- Auto Model Years: 1980-2015

The emission factors for the SCAB in 2005 and 2013 were calculated using the same temperature, mph, and RH data. However, the auto model years were revised to 1970 through 2005 for year 2005 emission factors and 1978 through 2013 for year 2013 emission factors. Fugitive dust from paved roads were calculated using methodologies developed by Midwest Research Institute (MRI) for SCAB roadways (MRI 1996). Off-airport, on-road vehicle emissions are presented in Appendix F-B, *Air Quality Appendix*, Attachment 6 of the Final EIR.

2.2.2 Stationary Point Sources

Stationary point sources that contribute to air quality in the vicinity of LAX exist on and off airport property. Available data and a comprehensive survey of Los Angeles World Airports (LAWA) and tenant facilities were used to develop an environmental baseline emissions inventory identifying existing stationary point sources at LAX; see Technical Report 4, *Air Quality Technical Report,* Attachment C, of the Final EIR. The environmental baseline emissions inventory details equipment capacities, typical operating hours, existing control equipment, and emissions data. The existing stationary sources at LAX consist of a variety of source types such as fuel combustion units, coating and solvent activities (maintenance), organic liquid storage and transfer activities, and miscellaneous activities. The source types for the existing stationary sources are listed in **Table 5**, Stationary Sources at LAX. Large stationary sources off airport and near LAX that contribute to the air quality in the area are discussed qualitatively below.

Table 5

Stationary Sources at LAX

Source Category	Source classification	Future Year Multiplier
Central Utility Plant (CUP)	Boilers Gas Turbines Internal Combustion Engines	Same as existing conditions (Existing CTA CUP is assumed to stay at current capacity)
CUP Cooling Tower (CT)	Cooling Tower	Same as existing conditions (Existing CTA CUP is assumed to stay at current capacity)
Engine Test Facilities	Jet Engine Testing	Future activity levels and parameter data provided by LAX Master Plan team.
Fire Training Facility	Training Fires	Training fires will not be conducted on site in the future.
Flight Kitchens	Boilers Charbroiling Cooking Cooling Towers Heaters Internal Combustion Engine	Ratio of future MAP to 1996 MAP
Fueling Facilities	Jet A Storage and Refueling/Gasoline Storage and Refueling	Future throughput and tank parameter data provided by LAX Master Plan team.
Maintenance Facilities	Boilers Degreasing Operations Furnaces Heaters Internal Combustion Engines Surface Coating	Ratio of future LTOs to 1996 LTOs
Restaurants	Charbroiling Cooking	Ratio of future MAP to 1996 MAP

Source: Camp Dresser & McKee Inc., 2000.

Fuel combustion units include external combustion equipment, internal combustion equipment, and fire-fighting training fires. Internal combustion engines are used to produce electrical power, such as turbine generators, emergency generators, and GPUs. External combustion equipment is used in boilers, water heaters, and food preparation equipment. Coating and solvent activities include the operation of spray painting booths and associated clean up of coating equipment with solvents, such as degreasing. Organic liquid storage and transfer includes primarily the storage of petroleum products, such as aircraft fuels (Jet A, AvGas), motor vehicle fuels (gasoline, diesel), and lubricants (oil), and handling of these materials, such as loading and unloading fuels.

CDM developed emissions estimates for individual source types based on methodologies accepted by EPA (EPA, 1992) and the FAA's *Air Quality Procedures for Civilian Airports & Air Force Bases* (herein referred to as Air Quality Procedures) (FAA, 1997). Where appropriate, the current version of the SCAQMD Best Available Control Technology (BACT) Guideline requirements (herein referred to as the SCAQMD BACT Guideline) were incorporated into the emission estimates. The uncontrolled emission factors were obtained primarily from AP-42 Volume 1. Control efficiencies were applied to those units with control devices/technologies. The total stationary source emissions were calculated by taking the sum of the emissions calculated for each source type identified at the stationary source location.

The configurations of stationary sources at LAX for the alternatives in the horizon years were based upon the environmental baseline adjusted to future airport activity levels. In estimating future year emissions, environmental baseline emissions were multiplied by an appropriate growth factor for that source category. Future capacity and hours of operation for stationary sources were scaled based upon future-to-baseline ratios of either aircraft operations, number of passengers, or terminal area for each alternative. Future activity levels for fuel storage and refueling operations were based on specific data provided for the LAX Master Plan. For example, flight kitchens prepare the onboard aircraft food consumed by passengers; therefore, to determine future year emissions, the 1996 flight kitchen emissions levels were multiplied by the increase in annual passengers projected for horizon year 2015. The future year multiplier for each stationary source category is listed in **Table 5**. The stationary source emission calculation methodology for future years is as follows:

$E_{oc} = E_{oc1996} \times M_{oc}$

Where

E_{oc} = future year operating category oc emissions (grams)

E_{oc1996} = 1996 operating category oc emissions (grams)

M_{oc} = future year operating category oc multiplier

Several emission sources were deleted from the 1996 emission inventory for the purpose of emission forecasting. Stationary internal combustion engines that are also GSE (i.e., ACUs, ASUs, and GPUs) were eliminated from the stationary point source inventory to avoid double counting these emission source types. Specific sources that were identified in the LAX Master Plan to be replaced/decommissioned due to the reconstruction or elimination of their associated facilities were deleted from the estimates for the alternatives. The specific sources that are assumed to be replaced/removed from airport property include rental car facility gasoline storage tanks, inefficient old cooling towers (i.e., Delta Airlines cooling tower, US Post Office cooling tower), and the 96th Street Burger King.

Combustion Sources

Fuel combustion sources generate both criteria pollutants as well as toxic air pollutants (metals and polynuclear aromatic hydrocarbons, PAHs). Combustion is the primary source of CO, NO_x, PM_{10}, and SO_2 emissions from stationary sources located on airport property. The combustion sources resident at LAX include gas turbines, boilers, heaters, cooking and charbroiling equipment, and stationary internal combustion engines. The fuels used to power combustion equipment include natural gas, propane, gasoline, wood, and fuel oil. The type of fuel used for each type of combustion source is listed in **Table 6**, Combustion Source Fuel Type.

Table 6

Combustion Source Fuel Type

Combustion Source	Fuel Type
Gas Turbines	Natural Gas, Fuel Oil Backup
Boilers/Heaters	Natural Gas, Fuel Oil Backup
Cooking/Charbroiling	Natural Gas, Wood
Internal Combustion Engines	Diesel, Gasoline, Propane, Natural Gas

Source: Camp Dresser & McKee Inc., 2000.

Emissions for each source type were calculated based on fuel consumption and pollutant emission factors. Emissions calculations for stationary internal combustion engines are also based on the engine power rating (bhp), usage rate, and pollutant emission indices determined from power output and fuel type developed from the available information collected during the baseline survey. Air pollution control equipment in use, or required in the future as identified in SCAQMD, CARB, or EPA rules and regulations, has been incorporated into the calculations. The emissions from combustion sources are calculated using emission factors from AP-42 Volume 1 as follows:

$$E_n = \sum_i \left[F x EI_i \right]$$

Where:

E_n = total emissions of pollutant i emitted from the source during the inventory period (grams)

$_i\Sigma$ = summation through pollutants i

F = total amount of fuel consumed during the inventory period (million cubic meters of natural gas or propane or kiloliters of diesel/fuel oil or metric tons of wood)

EI_i = emission index for pollutant i (grams of pollutant per unit of fuel)

Central Utility Plants

Emissions from CUPs which house on-site power plants and heating and cooling facilities were calculated using natural gas as the primary fuel. Natural gas is the primary fuel for the existing CUP. The SCAQMD BACT Guideline requires that natural gas be used on any new utility boilers and turbines to minimize PM_{10} and SO_2 emissions. Several miscellaneous LAWA combustion emission sources (e.g., building comfort heating) were included as part of the existing CUP combustion source emission category.

The environmental baseline emissions inventory for the existing CUP includes continuous emissions monitoring data for NO_x and CO. The existing CUP is currently operating at or near peak load. For both alternatives in future years, it is assumed that the existing CUP will continue to operate at peak load and maintain the environmental baseline emissions levels. The SCAQMD will require that the total RECLAIM emissions from the existing CUP be reduced in the future; however, it is assumed that these reductions will be accomplished through emission offsets rather than modifying the equipment/emissions at the CUP.

Fire Training Facility

Air pollutants from training fires used in emergency fire fighting drills include PM_{10}, CO, NO_x, SO_2, and VOC. The emissions depend upon the type of fuel burned and the duration of the burn (quantity of fuel burned). Emissions from training fires were calculated for the No Action/No Project Alternative and Alternative D for 2005 only using the methodology described previously in this section for combustion sources. The training frequency and quantity of fuel burned was obtained from the Aircraft Rescue and Fire Fighting (ARFF) department at LAX. The inclusion of fire training for Alternative D in 2005 reflects the general assumption that implementation of LAX Master Plan projects will not be sufficiently advanced at that time to change operational emissions. The removal of the training fires from the 2015 No Action/ No Project inventories reflects the assumption that ARFF training at LAX would be phased out in the future. Both of the above assumptions differ from the protocol assumptions (fire training would occur for only the No Action/No Project Alternative in 2005 and 2015).

Engine Test Facilities

Run-up testing of aircraft engines can occur at various locations around the airside portion of the airport property. For both alternatives, engine testing is assumed to be performed from aircraft on the ground at fixed locations with engine exhaust pointed toward blast gates. For Alternative D, ground run-up enclosures (GRE) are also constructed for engine maintenance and testing. Emissions for these facilities were determined following the methodology described for aircraft emissions using activity levels and TIM data provided for the LAX Master Plan.

Other Sources

Combustion source types at the on-airport flight kitchens and restaurants include the boilers, cooking facilities, emergency engines, and one power-producing natural gas-fired stationary internal combustion engine. The emissions from boiler/heater/cooking facilities were calculated based on the environmental baseline emissions inventory, assuming growth that is representative of their assigned source category. In addition to the natural gas combustion emissions, restaurants and flight kitchens have PM_{10} and VOC emissions from charbroiling and deep fat frying. On-airport restaurants are grouped separately from flight kitchen facilities due to their physical separation on the airport and because they are the only source to use wood as fuel for charbroiling, which requires a specific emission calculation procedure. The PM_{10} and VOC emissions from charbroiling and deep fat frying were estimated using SCAQMD emission factors (SCAQMD, 1997a).

Combustion source types found in maintenance facilities included emergency engines, miscellaneous non-GSE engines, and boilers/heaters.

Organic Liquid Storage and Transfer

Large quantities of organic liquids, primarily fuels, are stored and handled at LAX. Activities that contribute VOC emissions include those associated with tank filling and emptying (working losses), changes in ambient temperature/pressure (breathing losses) at each storage tank, and equipment fueling (fugitive losses). By volume, the main organic liquid handled at LAX is Jet A fuel. Storage facilities consist of large above ground tanks and numerous smaller above ground and underground tanks. These

tanks are filled either by an underground pipeline or by tanker truck. Fueling of aircraft from these tanks is either by transfer through the underground pipeline to the hydrant system or by tanker truck. Aviation gasoline (AvGas) is also stored and handled at LAX. Storage facilities for AvGas consist of a single aboveground tank. This tank is filled by tanker truck. AvGas is used by piston-driven general aviation aircraft at LAX. Fueling of piston-driven aircraft is generally by tanker truck.

Gasoline and diesel are stored on the airport in numerous aboveground and underground tanks, which are considerably smaller than the tanks used to store Jet A fuel. Tanker trucks typically fill these tanks. Fueling of on-road and nonroad vehicles, including GSE, with gasoline or diesel is generally accomplished from permanent fuel dispensing stations.

The fuel storage and transfer operations include the main aircraft fuel storage and refueling operations, as well as on-airport maintenance facility and rental car facility gasoline tank storage and refueling. Storage tank requirements in the SCAQMD Rules and Regulations (SCAQMD, 1997) and the SCAQMD BACT Guidelines were addressed in the emissions estimates for this air quality analysis.

Emissions from the large aboveground jet fuel storage tanks (i.e., LAXFUEL Fuel Farm) were calculated using SCAQMD's emission inventory calculation procedure for internal floating roof tanks (SCAQMD, 2000), which is almost identical to EPA's TANKS emissions estimation program (EPA, 2000). Although the protocol (Appendix A) indicated that TANKS would be used, the use of SCAQMD emission inventory methods is considered applicable and more appropriate for tank sources located in the South Coast Air Basin. Fuel farm related transfer losses were accounted for using methods presented in AP-42 Volume 1. These transfer losses primarily occur during the filling of fuel tanks, fuel tank trucks, aircraft, and GSE. Emissions from underground or small aboveground gasoline tanks were calculated using CARB-approved emission factors for Stage I and Stage II vapor control.

The emissions estimates for future years consider storage tank type (floating or fixed roof), fuel type, fuel throughput, and tank-specific characteristics (diameter, color, breather vent settings, etc.). A number of gasoline tanks found during the environmental baseline survey, including all on-airport rental car facility tanks, were assumed to be removed under the build alternatives.

Surface Coating and Solvent Usage

Surface coating and solvent degreasing are performed in maintenance areas, as necessary, for the repair and upkeep of aircraft/aircraft parts, motor vehicles/GSE, and miscellaneous airport-related equipment. Additionally, architectural coatings are used for the repair and upkeep of signs and buildings.

Surface coating operations emit VOC into the atmosphere through evaporation of the vehicle paint, thinner, or solvent used to facilitate the application and through clean up of the coatings. PM_{10} emissions are assumed to be minimal due to paint booth filter control in spray booths and high efficiency application methods used for outdoor/architectural painting. Emissions of VOC from surface coating operations were calculated using methods recommended in FAA's Air Quality Procedures, taking into account requirements in the SCAQMD Rules and Regulations and the SCAQMD BACT Guideline:

$$E_{VOC} = {}_i\Sigma[Q_i \times VOC_i \times (1-CF/100)]$$

Where:

E_{VOC} = total VOC emissions from painting operations (grams)

${}_i\Sigma$ = summation through coating types i

Q_I = total quantity of coating type i used in inventory period (kiloliters)

OC_i = VOC content for coating type i (grams VOC/kiloliter)

CF = air pollution control factor (%)

Information regarding the types and quantities of coatings used at on-site facilities, in addition to any air pollution control information, was based on the environmental baseline emissions inventory survey. The VOC contents of coatings and solvents were obtained from Material Safety Data Sheets (MSDS), with default values from FAA's Air Quality Procedures used when MSDS information was unavailable. The VOC limits specified in SCAQMD Rules and Regulations and SCAQMD BACT Guideline were also accounted for during the emission inventory development. The inventory does not account for any architectural coating applications or runway/taxiway striping at LAX performed during construction.

The use and storage of organic degreasing solvents, such as chlorinated hydrocarbons, petroleum distillates, ketones, and alcohols, results in the evaporation of VOC or other hydrocarbons. Spent degreasing fluids are generally collected and disposed of at a properly licensed treatment, storage and disposal (TSD) facility. Emissions from solvent degreasing operations were based on the assumption that the total amount of solvent used would either be disposed of as waste liquid, or released into the atmosphere as evaporated VOC. Emissions from solvent degreasing were calculated using methods recommended in FAA's Air Quality Procedures:

$$E_{VOC} = D \times (QC-QD)$$

Where:

E_{VOC} = VOC emissions from the solvent degreasing unit (grams)

D = density of the solvent (grams/kiloliter)

QC = quantity of solvent consumed during a given time period (kiloliter)

QD = quantity of solvent disposal of as liquid in a given time period (kiloliter)

Quantities of consumed and disposed solvent were estimated for each alternative based on data from the environmental baseline emissions inventory survey. Sources and solvents that are not compliant with SCAQMD and EPA regulations were eliminated from emissions inventories for 2005 and 2015. For water-based or other inorganic degreasers, it was assumed that evaporation of VOC does not occur. The VOC limits specified in SCAQMD Rules and Regulations and the SCAQMD BACT Guideline were accounted for when developing these emissions inventories.

Cooling Towers

Cooling towers (CT), used to remove heat from process cooling water, are sources of PM_{10}. The two largest CTs would be located at the existing CUP. A number of smaller cooling towers are found in the maintenance and commercial facilities. Emissions calculations for cooling towers were based on the cooling tower re-circulation rate, water solids content, the particulate drift fraction, and the cooling tower type. AP-42 Volume 1 default factors were used when equipment/site-specific data were not available. The emission calculation methodology is as follows:

$$E_{PM_{10}} = {}_i\Sigma[(Q_i x SC_i x D_i x H_i x 8.34 \text{ lbs/gallon}/1{,}000{,}000)]$$

Where:

$E_{PM_{10}}$ = total PM_{10} emissions from cooling towers (lbs/year)

${}_i\Sigma$ = summation through cooling towers i

Q_i = water re-circulation rate of cooling tower i (gallons/hour)

SC_i = water solids content for cooling tower i (ppm)

D_i = drift fraction of cooling tower i

H_i = hours of operation per year of cooling tower i (hours)

Emissions from smaller CTs found at facilities that are not classified as CUPs (e.g., maintenance facilities, flight kitchens) were included in the emission totals for those source categories, unless that source was scheduled for removal from LAX.

Off-Airport Stationary Sources

Four major stationary sources located in the vicinity of LAX are the Chevron El Segundo Refinery, the Los Angeles Department of Water and Power (LADWP) Scattergood Generating Station, Southern California Edison (SCE) El Segundo Generating Station, and the Hyperion Treatment Plant. These four major sources are located along the Dockweiler State Beach shoreline in Los Angeles and El Segundo and are within a two-mile radius of the airport boundary. The refinery is a source of fugitive hydrocarbon emissions and combustion by-products during petroleum distillation. The Scattergood and El Segundo Generating Stations use natural gas as the primary fuel and No. 2 fuel oil as a backup, and the primary natural gas fuel is augmented by anaerobic digester biogas fuel piped from the Hyperion Treatment Plant. Criteria pollutants and toxic air pollutants are emitted during fuel combustion. Pollutants such as PM_{10}

and disinfection byproducts are emitted from the Hyperion Treatment Plant and are transferred into the air at the air-water interface. Emissions from these sources are not included in this air quality analysis.

The consumption of electrical power at LAX would increase in the future. Although the LADWP distributes this electrical power to LAX, only approximately 17 percent of LADWP's electricity is generated from in-basin utility plants (Tucker). The emissions associated with electricity consumed at LAX are widely distributed due to the practice of "wheeling" used by the electric utility industry. Also, the energy mix includes generation by hydroelectric, coal, renewable, and nuclear. The in-basin emissions from local generating stations (assumed to be natural gas fired systems with emission controls) are estimated for conversion of GSE to electric power and can be found in Section 4.6.10, *Secondary Air Emissions - Electricity Production*, of the Final EIR.

2.2.3 Area Sources

Area sources associated with existing and future activities at LAX are composed of small emission sources. Area emissions are generated from commercial/residential natural gas consumption, nonroad engines used in landscaping applications, and deicing/anti-icing applications. Fugitive dust emissions from construction related activities and re-entrained dust from vehicular activity, generally treated as area sources, are discussed above.

Natural Gas Combustion

Emissions attributed to natural gas combustion were estimated using emission factors and the methodology outlined in the SCAQMD Handbook. The emission factors from this reference were applied to areas to be acquired under the LAX Master Plan and to existing area sources (residential and commercial units) that would be acquired and removed under the LAX Master Plan.

Some land owned by LAWA adjacent to LAX is part of an approved LAX Northside development that has not yet been commercially developed. It is assumed that under the No Action/No Project Alternative in the 2005 and 2015 horizon years, commercial development in this area would progress under the approved LAX Northside EIR project (the EIR was approved in 1984).

Landscaping Equipment

Nonroad engines at LAX that are associated with area sources are used primarily in landscaping applications. The equipment used in landscaping applications include lawn mowers, weed trimmers, and leaf blowers. Some of these equipment are fitted with small gasoline-fueled engines with low horsepower while the rest are electric and are used intermittently. Emissions from these engines are considered negligible and are not included quantitatively in the emissions inventory.

Deicing/Anti-Icing

Since the climate at LAX is usually mild and the chance of frozen precipitation is extremely rare, it is assumed that icing of aircraft and runways/taxiways does not occur. In some instances deicing fluid is used on a small portion of aircraft arriving from the East Coast that have ice over the wing fuel tanks. For emissions estimation purposes, however, emissions attributed to the application of deicing/anti-icing materials are considered negligible.

2.3 Uncertainties and Sensitivities of Methods

The methods described herein and used to calculate the emissions presented below are sensitive to the values used to represent the numerous variables (e.g., assignment of a specific APU to a specific airframe). Consequently, the emissions values calculated using these methods are estimates, based on the various assumptions discussed above regarding forecasted future activities, and are therefore subject to the uncertainties inherent in developing the project input information. Different assumptions and values of variables would result in different emissions estimates. For this general conformity evaluation, well-accepted methods have been used in a consistent manner to develop the best estimates of emissions, based on those particular assumptions discussed above.

3. DISPERSION MODELING

Air dispersion modeling is used to predict ground-level ambient air concentrations of pollutants from known emission sources. Emissions estimates for each source category at LAX, discussed in Section 2 above, were input into an air dispersion model to predict ambient ground-level concentrations at LAX and in the areas surrounding the airport.

EDMS is the FAA-required (63 FR 18068) model for airport air quality analysis. The air dispersion model incorporated within EDMS 4.11 is AERMOD. The AERMOD model is a steady-state Gaussian dispersion model capable of estimating the short-term and annual concentrations from point, area, and volume sources (EPA 1998). AERMOD was developed by EPA as a replacement for the Industrial Source Complex (ISC) model and though it is currently a fully functional model it is still undergoing performance testing by EPA. EDMS also provides a direct interface (invisible to the user) between the EDMS emissions component and its dispersion model. However, EDMS 4.11 does not include emission calculations for PM_{10} from aircraft engines or APUs, nor for any pollutant from construction sources. Therefore, the EDMS-generated AERMOD input files (which include PM_{10} dispersion parameters for GSE, on-road mobile, and stationary sources) were modified to include PM_{10} dispersion parameters for aircraft engines and construction sources; PM_{10} emissions from APUs are considered negligible and are not included in the dispersion analysis. The source dimensions for aircraft were the same as those generated by EDMS for gaseous pollutants. Construction activities were modeled as area sources.

While ISCST3 could be used to model PM_{10} from aircraft and construction sources as noted in the protocol (Appendix A), the use of AERMOD allows for a complete simultaneous analysis of all sources in a manner that more closely matches the intent of FAA policy.

3.1 Meteorological Data

Modeling was performed using meteorological data collected at LAX and obtained from the SCAQMD. At the time of preparation of the Final General Conformity Determination, the most recent set of complete meteorological data (surface and upper air) collected at LAX consisted of hourly surface and upper air data from the LAX meteorological observation station operated by the SCAQMD for the 12-month period beginning March 1, 1996 and ending February 28, 1997 (SCAQMD, 1998). The location of the meteorological station is shown on Figure F4.6-1, Meteorological Station and Air Quality Monitoring Station Locations, in Section 4.6, *Air Quality*, of the Final EIR. The SCAQMD provided this meteorological dataset to LAWA specifically for use in analyzing air quality impacts associated with the LAX Master Plan.

The meteorological data set includes hourly values of air, dew point, and virtual temperatures; wind speed and direction; pressure; stability class; and mixing height. Meteorological data were extracted from the database, and rearranged to create a full calendar year (January 1 to December 31) compatible with the ISCST3 meteorological data input formats. Unit conversions were performed as needed. Where missing data occurred, the previous hour's data were used to fill in data gaps.

3.2 Receptors

The receptors used in the air dispersion modeling analysis consisted of two types: grid receptors and discrete receptors. The grid receptors help define the model area and are evenly spaced within the airport boundary and in the area surrounding the airport. The grid receptors provide a concentration matrix that locates concentration peaks and the direction of air contaminant dispersion from the LAX emission sources. Discrete receptor points are individually placed receptors identifying contaminant concentrations at critical points beyond the LAX boundary. For the air dispersion modeling analysis critical points include locations sensitive to the public interest, air quality monitoring stations, and major traffic intersections. The goal in selecting receptor locations in the air dispersion models was to cover enough space for the models to predict pollutant concentrations at a sufficient number of publicly accessible locations and to supply enough detail to identify the maximum ambient air quality impacts associated with airport operations. The height of all receptors was set to 1.8 meters above ground level, the approximate breathing height of adults standing on the ground. Since the area around the airport has relatively flat terrain, all receptor terrain elevations were set to zero (0) meter.

Approximately 1,100 to 1,400 receptors were used in each AERMOD PM_{10} dispersion modeling scenario. A 250-meter spacing was used for the coarse receptor grid in the AERMOD model runs. The AERMOD PM_{10} modeling grid extended 4 kilometers to the west, 5.5 kilometers to the east, and 2.5 kilometers to the north and south of the LAX Theme Building. For the AERMOD modeling analyses additional fine grids, spaced every 80 meters, were added to the northeast and east airport fence line. These additional fine grids were located off-airport based on the fence line of each alternative, and were developed to identify the maximum ambient off-airport concentration locations for PM_{10}.

Discrete receptors were placed at sensitive receptor locations within approximately 3 kilometers to the north and south, 8 kilometers to the east, and 6 kilometers to the west of the LAX Theme Building. The sensitive receptors include schools, hospitals, nursing homes, the SCAQMD Hawthorne and on-site LAX air monitoring stations, and at selected roadway intersections. A listing of all discrete receptors modeled for the alternatives is presented in **Table 7**, Discrete Receptors used in the Air Quality Dispersion Modeling Analysis. The coordinates for all discrete receptors used in dispersion modeling are included so that the modeling results can be matched with the receptor name.

Table 7

Discrete Receptors used in the Air Quality Dispersion Modeling Analysis

Discrete Receptor Names	Receptor Locations, meters X	Y	Discrete Receptor Names	Receptor Locations, meters X	Y
Public and Private Schools			Trinity Lutheran Church Of Hawthorne	3,867	-3,245
Acacia Baptist School	4,039	-3,069	Visitation Catholic School	-117	1,555
Arena High School	-929	-2,157	Warren Lane Elementary School	7,227	819
Bennet-Kew Elementary School	6,464	-1,914	Washington School	4,779	-3,153
Boulah Payne Elementary School	4,145	829	Westchester High School and Magnet Center	-2,465	1,496
Buford Elementary School	3,351	-762	Westchester Lutheran Church	628	2,792
Center Street Elementary School	-93	-2,145	Westpoint Heights Elementary School	1,310	2,551
Centinela Elementary School	3,719	3,116	Whelan Elementary School	5,128	-337
Century Park Elementary School	7,644	-881	Worthington Elementary School	6,169	-1,109
Chabad of the Marina	-4,165	1,766	York School	5,373	-1,985
Clyde Woodworth Elementary / Albert Monroe Middle	6,838	-491	**Hospitals**		
Cowan Avenue Elementary School	-319	3,177	Robert F. Kennedy Medical Center	4,418	-1,851
Crozier Middle School	4,287	2,159	Catholic Healthcare West Southern California	4,303	-1,738
El Segundo High School	-1,423	-2,191	Crippled Children's Society	6,668	2,390
El Segundo Middle School	-1,523	-2,190	Desco Health Care Inc	5,324	1,012
Escuela De Montessori	744	1,375	Daniel Freeman Memorial Hospital	5,268	2,532
Eucalyptus School	4,048	-2,436	Golden West Convalescent Hospital	3,832	-2,001
Faith Lutheran Church School	6,749	1,805	Centinela Hospital Medical Center	5,017	674
Felton Elementary School	3,301	-354	**Convalescent and Nursing Homes**		
Hawthorne High School	3,589	-2,900	C & H Health Care	4,843	3,196
Hillcrest Continuation School	3,681	1,485	Carewest Nursing Center	-2,686	1,677
Hilltop Christian School	-524	-2,714	Centinela Valley Care Center	5,177	697
Hudnall Elementary School	3,881	1,869	Hawthorne Convalescent Center	4,431	-1,733
Imperial Ave. School Special Education Facility	-696	-1,578	Klokke Corp	4,091	1,850
Ingelwood Christian School	4,597	1,589	Mount Zion Baptist Church Of Los Angeles	4,374	3,483
Inglewood High School	4,291	1,816	Saint Erne Healthcare Center	3,442	2,311
Jefferson Elementary School	4,113	-175	Terrace Inglewood Brierwood	5,047	2,885
Juan De Anza Elementary School	2,893	-2,405	Urban Healthcare Project Inc	6,559	1,784
K-Anthony's Middle School	5,310	804	**Traffic Intersection Receptors**		
Kelso Elementary School	5,322	1,440	Airport Blvd. and Century Blvd.	1,524	132
Kentwood Elementary School	-243	1,986	Aviation Blvd. and Century Blvd.	2,225	120
La Southside Christian Church	5,510	-236	La Cienega Blvd. and Arbor Vitae St.	3,017	919
Lennox Middle School	3,435	-1,119	La Cienega Blvd. and Century Blvd.	3,007	113
Lindgren Partnership 1	3,686	1,981	La Cienega Blvd. and I-405 Ramps N/O Century Blvd	3,007	388
Loyola Village Elementary School	-1,709	1,504	La Cienega Blvd. and Florence Ave.	2,993	2,105
Moffet Elementary School	4,929	-977	La Cienega Blvd. and Manchester Ave.	3,029	1,911
Morningside High School	6,245	-663	Lincoln Blvd. and Manchester Ave.	-1,528	1,746
Morningside United Church of Christ	7,097	1,531	Lincoln Blvd. and 83rd St.	-1,761	2,081
Musical Hart Evangelistic Assn	6,972	1,881	Lincoln Blvd. and La Tijera Blvd.	-1,227	1,383
Oak Street Elementary School	3,238	1,235	Sepulveda Blvd. and Imperial Hwy.	571	-1,446
Orville Wright Junior High School	-125	2,622	Sepulveda Blvd. and I-105 Off Ramp N/O Imperial Hwy	581	-1,250
Paseo Del Rey Magnet School	-2,899	1,446	Sepulveda Blvd. and Manchester Ave.	603	1,729
Saint Anthony's Catholic School	-546	-2,852	Sepulveda Blvd. and La Tijera Blvd.	595	1,440
South Bay Lutheran High School	6,163	-1,540	Sepulveda Blvd. and Mariposa Ave.	543	-2,286
St Eugene's Catholic School	7,913	632	Sepulveda Blvd. and Rosecrans Ave.	519	-4,685
St Joseph's Catholic Church School	4,772	-2,037	Vista Del Mar and Imperial Hwy.	-3,039	-1,416
St Mary's Academy of L A	5,289	2,757	**Monitoring Station Receptors**		
St. Anastasia School	-2,137	1,622	SCAQMD Hawthorne Monitoring Station	2,942	-2,354
St. Bernard High School	-2,783	1,120	Project Ambient Monitoring Station	2,708	-409

Source: Camp Dresser & McKee Inc., 2000.

3.3 Land Use Classification

EPA's Guideline on Air Quality Models, Section 8.2.8, provides guidance on the selection of urban or rural dispersion coefficients to be used in dispersion modeling. The categorical classification scheme proposed by Auer (Auer, 1978) was used to determine the land use character in and around LAX. Descriptions of the urban land use classifications are provided in **Table 8**, Auer Land Use Classification Scheme. If land use types I1, I2, C1, R2, and R3 account for 50 percent or more of the area

circumscribed by a 3-kilometer radius circle about the source, then urban dispersion coefficients (Briggs-McElroy-Pooler curves) are used. Rural dispersion coefficients (Pasquill-Gifford curves) are used when the urban land use is less than 50 percent. LAX itself is classified as I2, light-moderate industrial, which would correspond to the use of urban dispersion coefficients. Additionally, an objective inspection of a 3-kilometer radius surrounding LAX indicates that the local land use is predominantly compact residential/commercial. Therefore, the urban dispersion coefficients were used in the air dispersion modeling analysis.

Table 8

Auer Land Use Classification Scheme

Type	Use and Structures	Vegetation
I1	Heavy Industrial	
	Major chemical, steel, and fabrication industries; general 3-5 story buildings, flat roofs	Grass and tree growth extremely rare; < 5% vegetation
I2	Light-Moderate Industrial	
	Rail yard, truck depots, warehouses, industrial parks, minor fabrications; generally 1-3 story buildings, flat roofs	Very limited grass, trees almost absent; <5% vegetation
C1	Commercial	
	Office and apartment buildings, hotels; >10 story heights, flat roofs	Limited grass and trees; <15% vegetation
R2	Common Residential	
	Single family dwelling with normal easements; generally one story, pitched roof structures; frequent driveways	Limited grass and trees; <15% vegetation
R2	Compact Residential	
	Single, some multiple, family dwelling with close spacing; generally < 2 story, pitched roof structures; garages via alley, no driveways	Limited lawn sizes and shade trees; <30% vegetation
R3	Compact Residential	
	Old multi-family dwellings with close (<2m) lateral separation; generally 2 story, flat roof structures; garages (via alley) and ashpits, no driveways	Limited lawn sizes, old established shade trees; <35% vegetation
R4	Estate Residential	
	Expansive family dwelling on multi-acre tracts	Abundant grass lawns and lightly wooded; >80% vegetation
A1	Metropolitan Natural	
	Major municipal, state, or federal parks, golf courses, cemeteries, campuses; occasional single story structures	Nearly total grass and lightly wooded; >95% vegetation
A2	Agricultural Rural	Local crops (e.g. corn, soy bean); >95% vegetation
A3	Undeveloped	
	Uncultivated; wasteland	Mostly wild grasses and weeds, lightly wooded; >90% vegetation
A4	Undeveloped Rural	Heavily wooded; >95% vegetation
A5	Water Surfaces	Rivers and Lakes

Source: Auer, August H., Jr., Correlation of Land Use and Cover with Meteorological Anomalies, Journal of Applied Meteorology, 1978.

3.4 Modeling of PM_{10}

Final modeling of PM_{10} was conducted using the U.S. EPA AERMOD model, which is the dispersion model contained in EDMS. EDMS 4.11 does not explicitly calculate PM_{10} from aircraft, nor is it specifically configured to address dispersion of construction emissions. However, AERMOD can be used independently from EDMS to address all PM_{10} emission sources at the airport.

Emissions of some gaseous contaminants, notably NO_x, SO_x, VOC, and ammonia (NH_3) can contribute to the secondary formation of components of PM_{10} through such atmospheric processes as nucleation and chemical reactions on dry particle surfaces. For example, NO_x can lead to the generation of particulate nitrates, SO_x can lead to the generation of particulate sulfates, VOC can lead to the generation of particulate organic carbon, and NH_3 can contribute to both nitrate and sulfate formation. For reasons noted in Appendix A Section 5.3.1.1.1, areawide modeling of PM_{10} associated with LAX is not practical.

For the 1997 AQMP, SCAQMD did not estimate the contributions of gaseous PM_{10} precursors (VOC, NO_x, SO_x, and NH_3) to predicted component PM_{10} concentrations. However, for the 2003 AQMP, SCAQMD used the UAMAERO-LT regional photochemical model to estimate these contributions in future

years. This model takes into account emissions throughout the SCAB, and the speciated impacts are relatively small. The highest measured and modeled concentrations of speciated PM_{10} in the SCAB are found in Rubidoux, California (approximately 90 kilometers east, generally downwind, of LAX); this is due to the time required for the processes in the atmosphere to convert precursor compounds into particulate components. To estimate the potential contributions of VOC, NO_x, SO_x, and NH_3 to regional PM_{10} concentrations, Alternative D emissions were scaled to SCAB emissions of these contributing compounds reported in the 2003 AQMP for 1995, the baseline year modeled for the impacts of each component of PM_{10} (see SCAQMD 2003 at Appendix V Chapter 2). The SCAQMD concurred with this approach to estimating secondary PM_{10} formation (SCAQMD 2004, included in Appendix C).

3.4.1 Construction

This discussion addresses the methods used in the air dispersion modeling for the construction emissions associated with Alternative D. Dispersion modeling was conducted to assess concentrations of PM_{10} produced during construction activities related to Alternative D. The dispersion modeling used the results from the construction emissions inventory, the proposed development areas for LAX, and meteorological information available from SCAQMD to estimate pollutant concentrations resultant from the construction activities. The results of this construction dispersion modeling were combined with other on-airport and off-airport modeling results to address the cumulative air quality impacts associated with Alternative D.

Construction activities create potential air pollutant impacts related to exhaust emissions and soil disturbance. Dispersion modeling was also conducted for PM_{10} from construction vehicle exhaust and soil disturbance by construction vehicles. SCAQMD Rule 403 provides a framework for PM_{10} control during substantial construction projects.

A receptor grid composed of 635 receptors extending 2 kilometers from the fence line with a grid spacing of 250 meters was used in the modeling. Additionally, 56 discrete fence-line receptors were established, and 3 school receptors were included in the model runs. These receptors were used to assess the potential impact of construction for PM_{10} for comparison to the NAAQS.

The AERMOD model was used for the dispersion of PM_{10} emissions from the construction and demolition activities. The model was used to estimate 24-hour and annual PM_{10} concentrations at defined receptor locations. Emissions were modeled using the meteorological data supplied by SCAQMD from its LAX station. The data includes a full year of wind speed, wind direction, atmospheric stability, and mixing height information.

Construction emission estimates were allocated for the construction source areas for Alternative D. Emissions were modeled based on the worst-case quarterly emission rate.

3.4.2 Operations

The impacts of operational emissions from mobile, stationary, and area sources were modeled as described below.

Mobile Sources

The emissions from the LAX operations discussed in Section 2.2 above were used in the dispersion modeling analysis.

Aircraft

Aircraft were modeled in AERMOD as multiple area sources for PM_{10}, using the same model parameters, except emission rates, that EDMS creates for modeling other pollutants from aircraft. The EDMS-created input file for AERMOD was modified by incorporating aircraft PM_{10} emission rates for each operating mode.

The PM_{10} emissions used for each aircraft source were calculated as noted in Section 2.1 above for each Alternative D horizon year. The units are converted from tons/year (tpy) into annual average emissions in grams/second. Temporal factors, calculated from the SIMMOD data for Alternative D, were used to convert the annual average emissions to maximum hourly emissions.

The temporal factors used in AERMOD modeling for taxi/idle, approach, takeoff, and climbout are based on the actual hourly data for departures and arrivals as appropriate for each aircraft type. The hourly

temporal factors are used for aircraft operation modes in the AERMOD modeling since AERMOD allows only one set of scaling factors per run.

Ground Support Equipment

Emissions from GSE actually occur over a broad area of the airport as the emissions calculated for many of the service equipment types include emissions incurred from travel from a support facility to the gate being serviced. GSE emissions were modeled in AERMOD using the EDMS-generated AERMOD input files.

Ground Access Vehicles

On-road vehicles on roadway links at the GTC, ITC, CTA, and cargo areas were modeled as area sources as created for AERMOD by EDMS. The on-airport roadway link lengths used are presented in Appendix F-B, *Air Quality Appendix*, Attachment 6, of the Final EIR.

Stationary Point Sources

Dispersion modeling of the stationary source emissions discussed in Section 2 above was performed based on the project source configurations and the source types found during the environmental baseline survey. Conservatively, and for simplification of dispersion modeling, emissions were combined into a single source (e.g., maintenance, flight kitchens, restaurants) for smaller source types found at single source facilities. Source locations were determined from a review of the proposed airport layouts for Alternative D. Typical stack dimensions and heights were used for the specific source types and these stacks were then compared to assumed building heights at each stationary source location to assure engineering consistency of their relative heights. The stationary source modeling parameters used in AERMOD are shown in **Table 9**, AERMOD Stationary Source Modeling Parameters. The engine testing sites are included in the table since they were modeled as stationary point sources.

Table 9

AERMOD Stationary Source Modeling Parameters

Source Category	Number of Sources	Height, m	Temperature, ^{o}K	Velocity, m/s	Diameter, m
CUP CT	1	15	293	2	10
CUP (East, CTA)	1	12	450	14	1.5
GRE	1	12	561	0.5	10
Flight Kitchens	1	10	422	5	0.6
Maintenance	3	20	422	10	0.6
Restaurants	4	15	320	5	2

Source Camp Dresser & McKee Inc., 2000.

Engine testing sources, like the other aircraft operations, were modeled with AERMOD as stationary sources. The location and type of GRE is unique to Alternative D. The vertical exit velocity after deflection from the blast gates has been conservatively estimated at 0.5 meter per second. The stack diameter is assumed to be 10 meters after deflection from the blast gate. The "stack" temperature is assumed to be the same as other aircraft engine sources (561°K). The release height for dispersion is assumed to be height of the GRE (12 meters) for Alternative D.

Area Sources

The deicing/anti-icing and landscaping equipment area sources discussed in Section 2.2.3 above were not modeled in ISCST3 since the emissions from these sources were considered to be negligible.

3.5 Uncertainties and Sensitivities of Methods

The dispersion model used in this analysis represents the state of the art in modeling methodology and guidance extant at the time of the analysis, and therefore, the results provided by exercising this model offer the best estimates available to predict future ambient concentrations, given the accuracy of the input

data. That is not to say that this model is without limitations. Studies of model accuracy have consistently confirmed the following conclusions: (1) dispersion models are more reliable for predicting long-term concentrations than for estimating short-term concentrations at specific locations; and, (2) dispersion models are reasonably reliable in predicting the magnitude of the highest concentrations occurring, without respect to a specific time or location. A comparison of modeled versus monitored data over a two-week period at LAX indicated that short-term (one-hour) impacts may be substantially over-estimated using approved airport modeling techniques. An approach to address this over-estimation was developed and included in Technical Report 4, *Air Quality Technical Report,* of the Final EIR. Refer to the *Guideline on Air Quality Models* (40 CFR 51, Appendix W) for additional discussion of dispersion modeling uncertainties and sensitivities.

4. MITIGATION MEASURES

Alternative D has been developed by incorporating various air quality mitigation measures as required under the California Environmental Quality Act (CEQA) to reduce project-related air quality impacts both in and around LAX and throughout the SCAB, and as such these measures are considered part of the design of Alternative D for purposes of this final general conformity evaluation. Proposed mitigation measures include measures to reduce construction-related impacts as well as operational mitigation measures that seek permanent air quality reductions from the daily activities at LAX. Those mitigation measures were developed through the extensive public participation process that included comments received from federal, state and regional government agencies as well as members of the public and environmental organizations.

Under CEQA, mitigation measures must meet the following criteria in order to be considered feasible and quantifiable (SCAQMD, 1993a).

- The mitigation should coincide with the environmental impact.
- Adequate resources should be available to ensure implementation of mitigation.
- Mitigation should be enforceable.
- Standards should be defined for monitoring and enforcement.
- Mitigation should be accomplished within a reasonable timeframe.
- Public agencies' permit conditions should be verified when identified as mitigation.

The air quality mitigation measures are discussed in detail in Section 4.6.8, *Mitigation Measures*, and Appendix S-E, *Supplemental Air Quality Impact Analysis,* Section 2.3, of the Final EIR. Those CEQA-related mitigation measures will be enforced through a mitigation monitoring and reporting program established by LAWA for that purpose and assured under grant conditions established by FAA for federal purposes. Alternative D as evaluated herein incorporates various air quality mitigation measures as described in the Final EIR (LAWA 2004a) to meet CEQA requirements. Based on CEQA provisions that mitigation measures be required in, or incorporated into, the project (14 C.C.R. Section 15091(a)(1)), the City will implement and enforce these CEQA-related air quality mitigation measures as a condition of project approval by FAA; see Section 2.1 of this Final General Conformity Determination for more information on the CEQA-related mitigation measures. As such, this "mitigated" Alternative D is considered the preferred project subject to federal action as designed, and no mitigation as defined under the general conformity regulations (40 CFR 93.160) or guidance (EPA 1994) are required to support a positive general conformity determination.

Mitigation as defined in the general conformity regulations (40 CFR 93.160) and general conformity guidance (EPA 1994) is not required for this evaluation.

5. FUTURE BACKGROUND CONCENTRATIONS

The modeling undertaken for the LAX Master Plan could not reflect all pollutant sources that contribute to total air pollutant levels in the area. Therefore, it was necessary to estimate future background concentrations that reflect the emissions from nearby and distant off-airport sources. These background concentrations, when added to the airport modeling results, reflect the predicted total ambient concentrations at a specific site.

The future background concentration of PM_{10} at LAX was estimated by multiplying the current PM_{10} concentrations at the airport by the ratio of the future-year PM_{10} concentrations to the existing-year PM_{10} concentrations for downtown Los Angeles (nearest station for which future year PM_{10} concentrations had been estimated). This approach assumes that changes in PM_{10} concentrations at downtown locations are equivalent to changes in background concentrations in the LAX vicinity. For the future-year PM_{10} concentrations for downtown Los Angeles the values developed by SCAQMD (SCAQMD, 1996) for the years 2000, 2006, and 2010 were used. The estimated value for 2005 was interpolated from data for 2000 and 2006, while the estimated value for 2015 was extrapolated using the least squares method from the available data. The calculated future background concentrations are presented in **Table 10**, Future Background Concentrations.

Table 10

Future Background Concentrations

Pollutant	Averaging Period	Future Background Concentration[1]		
		2006	2013	2015
PM_{10} (µg/m³) [2]	AAM[3]	28	25	24
	24 Hour	61	47	43

1 Future background concentrations of PM_{10} were estimated using the ratio of future year (SCAQMD 1996c) to current year PM_{10} concentrations for downtown Los Angeles applied to the current year PM_{10} concentration at LAX. Future background concentrations are based on monitored ambient air quality and therefore already include contributions from airport sources. Predicted future airport contributions were added to calculated future background concentrations to estimate future total concentrations. Consequently, this approach represents a conservative method for estimating future total concentrations. The future background concentrations for 2006 was conservatively assumed to equal those estimated for 2005.

2 $\mu g/m^3$ = micrograms per cubic meter

3 AAM = Annual Arithmetic Mean.

Source: Camp Dresser & McKee Inc., 2003.

Future background concentrations were estimated based on monitored ambient air quality measurements, which include the current contribution from LAX sources. Therefore, this methodology is conservative since airport sources are implicitly included in the calculated future background concentrations. To evaluate predicted ambient concentrations, the modeled airport contributions were added to the future background values and then these future total concentrations were compared to the NAAQS.

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Appendix
LAX Master Plan
Final
General Conformity Determination

C. Comments and FAA Responses on the Draft General Conformity Determination

January 2005

Prepared for:

Los Angeles World Airports

U.S. Department of Transportation
Federal Aviation Administration

Prepared by:

Camp Dresser & McKee Inc.

Table of Contents

Attachments

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1. COMMENT AND INFORMATIONAL LETTERS RECEIVED ON THE DRAFT GENERAL CONFORMITY DETERMINATION

Four (4) comment letters were received on the LAX Master Plan Draft General Conformity Determination for Alternative D, published January 9, 2004. The letters were received from the following:

- Southern California Association of Governments (SCAG), February 4, 2004
- County of Los Angeles, February 5, 2004
- City of El Segundo (Shute Mihaly & Weinberger), February 6, 2004 (received February 10, 2004)
- South Coast Air Quality Management District (SCAQMD), February 9, 2004

A copy of each comment letter is included in this appendix to the Final General Conformity Determination for Alternative D. Although one letter was received after February 9, 2004, the close of the public comment period, all letters received have been included in this appendix.

FAA also received two (2) informational letters regarding the Draft General Conformity Determination after the 30-day public comment period, and a copy of each comment letter is included in this appendix. These letters do not require responses. The letters were received from the following:

- California Air Resources Board (CARB), July 23, 2004
- South Coast Air Quality Management District (SCAQMD), August 12, 2004

Finally, the SCAQMD provided clarification on the letter of August 12, 2004, to the FAA consultant on January 5, 2005. The telephone call report for this conversation is included in this appendix following the letters.

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February 4, 2004

RECEIVED
FEB - 9 2004
AIRPORTS DIVISION
AWP-610

Mr. David B. Kessler, AICP
Federal Aviation Administration
Western Pacific Region, Airports Division
AWP – 611.2
Post Office Box 92007
Los Angeles CA 90009-2007

Subject: SCAG's Comments On the Draft General Conformity Determination for the Los Angeles International Airport Proposed Master Plan Improvements – Alternative D

Dear ~~Mr. Kessler~~ David:

Thank you for the opportunity to comment on the above cited document, based on the 2001 Regional Transportation Plan (RTP) and on the Draft 2004 RTP, which is expected to be approved for adoption on April 1, 2004.

As you are aware, several components of the regional aviation system have changed since the adoption of the 2001 RTP—most notably, the elimination of the proposed airport at El Toro. These changes are reflected in the Draft 2004 RTP. A major result of these changes is an expected redistribution of passenger traffic, both through the proposed airline brokerage concept to encourage a decentralization of aviation activities, and through implementation of the MagLev project which is intended to improve access to outlying airports in the region. These interventions are expected to result in a reduction in airline operation and vehicle miles traveled (VMT) by passengers using the regional aviation system.

In this light, the proposed Master Plan, Alternative D, is consistent with both the 2001 RTP and the Draft 2004 RTP. Therefore, we find that the proposed Master Plan meets General Conformity Requirements.

We look forward to working with the Los Angeles World Airports (LAWA) in taking all the steps necessary to effectively implement the Master Plan.

DOCS 95326

If we can provide any further information or if there are any questions, please contact me at 213/236-1944 or Sylvia Patsaouras of my staff at 213/236-1806.

Sincerely,

Hasan Ikhrata, Director
Planning and Policy Department

cc.: Mr. Jim Ritchie, Deputy Executive Director, LAWA

County of Los Angeles
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DAVID E. JANSSEN
Chief Administrative Officer

VIA FACSIMILE AND U.S. MAIL

February 5, 2004

David B. Kessler, AICP
Federal Aviation Administration
Western Pacific Region, Airports Division
AWP 611.2
P.O. Box 92007
Los Angeles, CA 90009-2007

Dear Mr. Kessler:

DRAFT CLEAN AIR ACT GENERAL CONFORMITY DETERMINATION OF LAX MASTER PLAN ALTERNATIVE D

The County of Los Angeles recently received notice of the Federal Aviation Administration's (FAA's) Draft Clean Air Act General Conformity Determination of the Los Angeles International Airport's Proposed Alternative D – Enhanced Safety and Security Plan. Your Agency's General Conformity Determination appears premature since the County has submitted substantial comments on the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for Alternative D that have not been addressed by either Los Angeles World Airports or the FAA. Since the County's comments may result in significant revisions to the environmental analysis leading to changes to Alternative D, it is suggested that the FAA withhold Clean Air Act General Conformity Determination on Alternative D until responses to all public comments on the Draft EIS/EIR have been provided and a final draft of Alternative D is proposed.

Enclosed is a copy of the County's comments on the Draft EIS/EIR for Alternative D. If you have any questions regarding this matter, please call Lari Sheehan of my staff at (213)-974-1174.

Sincerely,

DAVID E. JANSSEN
Chief Administrative Officer

DEJ:LS
MKZ:JR:nl

Enclosure

c: Each Member, Board of Supervisors **(w/o enclosure)**
Executive Officer, Board of Supervisors **(w/o enclosure)**
County Counsel **(w/o enclosure)**
Director and Chief Medical Officer of Health Services **(w/o enclosure)**
Director of Public Works **(w/o enclosure)**
Director of Planning **(w/o enclosure)**
A.C. Lazzaretto and Associates **(w/o enclosure)**

special projects\airport\faa determination letter

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February 6, 2004

BY OVERNIGHT MAIL

David B. Kessler, AICP
Federal Aviation Administration
Western Pacific Region, Airports Division
Post Office Box 92007
Los Angeles, CA 90009-2007

Re: Comments Submitted on Behalf of the City of El Segundo on the Draft General Conformity Determination for the Los Angeles International Airport Proposed Master Plan Improvements, Alternative D

Dear Mr. Kessler:

On behalf of the City of El Segundo, we submit these comments on the Clean Air Act Draft General Conformity Determination for LAX Proposed Master Plan Improvements, Alternative D ("DCD") pursuant to Title 40 of the Code of Federal Regulations, section 93.156(b). After carefully reviewing the DCD, we have determined that it fails to comply with the requirements of section 176(c) of the Clean Air Act, 42 U.S.C. § 7506(c) and Title 40 of the Code of Federal Regulations, Part 93, Subpart B.

Section 176(c) of the Clean Air Act requires federal agencies to demonstrate that a proposed project or action "conforms" to an approved state implementation plan ("SIP") prior to permitting, approving, or providing assistance for that project or action. "A full conformity determination on all aspects of an activity must be completed before any portion of the activity is commenced." 58 Fed. Reg. 63214, 63240 (Nov. 30, 1993) (preamble to regulations). Together with the technical report on the draft general conformity determination completed by Dr. J. Phyllis Fox, PE and Dr. Petra Pless on behalf of El Segundo ("technical report") (*attached hereto* as Exh. A), this letter demonstrates that the analysis of the Federal Aviation Administration ("FAA") has not adequately demonstrated that Alternative D conforms with the applicable SIP. Moreover, given the data before the agency, conformity will require either a SIP

revision, or a commitment by FAA and Los Angeles World Airports ("LAWA") to mitigation or other measures to fully offset Alternative D emissions. Failing that, Alternative D cannot be shown to conform.

Specifically, the DCD underestimated emissions associated with Alternative D by inaccurately calculating the baseline, failing to use the most recent emissions estimation techniques, applying improper planning assumptions, and employing a legally and technically flawed analysis. Moreover, the DCD provides inadequate explanation of its conclusions, even where the evidence generally supports conclusions different from those reached by FAA. Inaccurate and misleading assumptions minimize the increment between baseline and Alternative D emissions. All this results in the erroneous conclusion that Alternative D conforms with the applicable SIP.

The DCD is invalid because it does not "articulate[] a rational connection between the facts found and the choice made." *See Sierra Club v. EPA*, 346 F.3d 955, 961 (9th Cir. 2003); *Nat'l Ass'n of Home Builders v. Norton*, 340 F.3d 835, 841 (9th Cir. 2003). Because the DCD's analysis "runs counter to the evidence before the agency," it is arbitrary and capricious and must be substantially revised. *Sierra Club*, 346 F.3d at 961.

I. GENERAL ISSUES

The conformity regulations include procedural requirements intended to ensure an accurate estimate of project emissions. *See, e.g.*, 40 CFR § 93.159. If these foundational requirements are not followed, then the credibility of the entire analysis is undermined. Because it fails to follow even the most basic of these requirements, the DCD for Alternative D cannot serve as a basis for demonstrating conformity as required by section 176(c) of the Clean Air Act.

A. The DCD Failed to Use the Latest Planning Assumptions

Conformity determinations must be based on the latest planning assumptions. 40 CFR § 93.159(a). The DCD for Alternative D is not. Most importantly, the DCD relies on incorrect assumptions for its baseline. The "latest planning assumptions" means those assumptions most recently approved by the MPO. 40 CFR § 93.159(a)(1). As the conformity determination acknowledges, the MPO responsible for predicting levels of operations at airports in the region is the Southern California Association of Governments ("SCAG"). DCD at 1-1. SCAG projects airport operations in terms of millions of annual passengers ("MAP"). SCAG has estimated that LAX is physically constrained to a maximum future capacity of 78.0 MAP and 2.98 million tons of air cargo under its current configuration, which represents LAX's "no project" capacity, i.e., the baseline. SCAG, 2001 Regional Transportation Plan (April 2001).

SCAG's activity level assumptions were confirmed by a record of a telephone conversation produced in response to the City of El Segundo's Freedom of Information Act ("FOIA") request,[1] which indicates that SCAG assumes passenger activity levels of 62.7 MAP in 2005, 73.7 MAP in 2010, and 78.0 MAP in 2015. John R. Pehrson, personal communication with Mike Armstrong (Dec. 9, 2003). Indeed, these projections form the basis for the SIP itself.

Disregarding the MPO's assumptions and the conformity regulations, the DCD apparently assumes for its baseline emission calculation that the airport will operate at 78.7 MAP in 2013, and interpolates activity levels and emissions for intervening years. FAA is not the MPO, and cannot dictate the applicable planning assumptions. As a result of ignoring SCAG's activity level assumptions, the DCD overstates the overall baseline airport-related emissions by up to 14%. *See* Exh. A, comment II.A.I.

B. The DCD Failed to Use the Latest Emissions Techniques

Conformity regulations also require the use of the latest and most accurate emission estimation techniques available. 40 CFR 93.159(b). The DCD used version 4.11of the Emissions and Dispersion Modeling System (EDMS) released in May 2001. However, a more recent version, EDMS version 4.12, was released in October 2003. Therefore, the FAA should have used EDMS version 4.12. Further, instead of consistently using EDMS version 4.11, the DCD relies on ratios between version 3.2, an even earlier EDMS version, and version 4.11. *See* Exh. A, comment II.C. The DCD provided no explanation for its reliance on outdated models nor did it provide any documentation indicating that it obtained permission to do so from the EPA as required by section 93.159(b). Because the FAA failed to act "in accordance with law," and did not articulate a reason for this choice, the DCD is invalid. *See Nat'l Ass'n of Home Builders*, 340 F.3d at 841.

C. The Draft Conformity Determination Makes Unrealistic Assumptions

The DCD also makes foundational assumptions throughout its analysis that are not supported by any facts and bear no relation to reality. First, the DCD baseline includes emissions from the Northside and Continental City projects. DCD 4-4. As described in El Segundo's comments on the January 2001 FAA and LAWA Joint Draft Environment Impact Statement/Environmental Impact Report for LAX Master Plan Improvements ("Draft

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[1] FOIA request is attached hereto as Exh. G.

EIS/EIR"),[2] future construction of the Northside and Continental City projects is speculative, at best. These projects were authorized in the early 1980s, and commencing construction has not seriously been considered since. Therefore, these projects do not qualify as "growth that would occur even if [Alternative D] were not constructed," and must not be included in the "No Project" calculation. *See* Letter from Environmental Protection Agency ("EPA") to David B. Kessler (Jan 25, 1996). These flaws, along with other problems described in the attached technical report (Exh. A, comments I.A, II.A.1), artificially inflate the baseline against which Alternative D emissions are compared.

Second, in both the July 2003 FAA/LAWA Supplement to the Draft EIS/EIR for the LAX Master Plan ("Supplement") and the DCD, the FAA assumes that Alternative D will accommodate 78.9 million annual passengers ("MAP") and 3.1 million tons of cargo in 2015. However, as the City of El Segundo demonstrated in its comments on the Supplement,[3] this 78.9 MAP prediction vastly underestimates LAX's actual capacity under Alternative D. An independent evaluation by an airport design and capacity expert of the capacity of Alternative D established that a more realistic, though still conservative, capacity estimate for Alternative D, based on a methodical analysis of the proposed terminal and gate configurations, would be 87 MAP. A. Kanafani, Capacity Analysis of Aircraft Gate Positions, LAX Master Plan Alternative D (2003), *attached hereto as* Exh. B. By substantially underestimating Alternative D activity levels, the DCD fails to adequately report reasonably expected future emissions.

The DCD has thus underestimated Alternative D emissions and overestimated the baseline emissions against which Alternative D is compared. Therefore, the actual Alternative D net emissions are in reality greater than disclosed by the DCD for every pollutant evaluated.

II. APPLICABILITY ANALYSIS

The first step in a conformity determination is to determine whether net emissions of any pollutant for which the area is designated nonattainment or maintenance exceed *de*

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[2] El Segundo's comments on the 2001 Draft EIS/EIR included a September 18, 2001 letter from Shute, Mihaly & Weinberger and numerous technical reports submitted as attachments. These comments were sent to LAWA and to David Kessler of the FAA, are part of the record on the LAX Master Plan Improvements, and are incorporated herein by this reference.

[3] El Segundo's comments on the 2003 Supplement included a November 4, 2003 letter from Shute, Mihaly & Weinberger and numerous technical reports submitted as attachments. These comments were sent to LAWA and to David Kessler of the FAA, are part of the record on the LAX Master Plan Improvements, and are incorporated herein by this reference.

minimis thresholds set forth in the regulations. 40 CFR § 93.153. If emissions are below threshold levels, the federal agency need not perform a full conformity analysis for those pollutants. 40 CFR § 93.153(c)(1). The DCD determined that Alternative D emissions of CO and VOC, as well as NOx in year 2015, would fall below *de minimis* thresholds. Therefore, no conformity analysis for these pollutants was performed. However, a careful review of the DCD reveals that these emissions were underestimated and the baselines overestimated. If proper analyses had been performed, they would demonstrate that a conformity analysis of these pollutants is necessary.

First, as demonstrated in the attached technical report (Exh. A, comments I.A, II.A.1), and as described above, the DCD artificially inflates the baseline emissions by failing to rely on SCAG's estimated future activity levels, as required by the regulations. If baseline emissions had been properly calculated, then net emissions of VOCs in 2005, and CO in 2005 and 2008, would exceed the *de minimis* thresholds, thus requiring a conformity analysis.

Second, as described in the attached technical report and above, the DCD underestimates future Alternative D activity levels. *See* Exh. A, comment II.A.2. If the more realistic future activity estimation of 87 MAP were used, net Alternative D emissions of CO in 2013 and NOx in 2015 would exceed *de minimis* thresholds. *See* Exh. A, Table 9.

Because Alternative D emissions of CO and VOCs, as well as NOx in 2015, actually exceed the *de minimis* thresholds in 40 CFR § 93.153(b), the DCD should have performed a full conformity analysis on those pollutants. Because it did not, the DCD cannot demonstrate conformity for those pollutants, as required by Clean Air Act section 176(c).

III. CONFORMITY ANALYSIS

The DCD does perform a conformity analysis for NOx/NO_2 and PM10, and reaches a conclusion of conformity. Numerous legal and technical flaws pervade this demonstration of conformity and render the entire analysis inadequate. A proper technical evaluation of Alternative D NOx and PM10 emissions discloses that the project emissions greatly exceed the emissions budgets in the applicable 1997 SIP, and that the project does not, and likely cannot, conform as required by Clean Air Act section 176(c).

A. The Draft Conformity Determination Relies on Impermissible Methods of Demonstrating Conformity

The DCD states that the FAA may base its conformity determination on the 2003 AQMP, which has not been certified, which it treats as a "written commitment from the state" to

revise the SIP under 40 CFR § 93.158(a)(5)(i)(B). DCD 5-1. This assertion is dubious at best; the analysis is required to rely on the applicable SIP. 40 CFR § 93.158(a)(5)(i)(A). Even if reliance on the uncertified AQMP were permissible, the regulations would require the FAA to demonstrate that certain appropriate steps were followed under the regulation in order to justify such reliance. The regulations require that the "state Governor or the Governor's designee for SIP actions makes a written commitment to EPA which includes" items such as "[a] demonstration that all existing applicable SIP requirements are being implemented in the area for the pollutants affected by the Federal action" and "a determination [from SCAQMD] that the responsible Federal agencies have required all reasonable mitigation measures associated with their action." *Id.* § 93.158(a)(5)(i)(B)(3), (4). There is no evidence in the DCD that any of these requirements has been satisfied. The FAA cannot avail itself of this method of demonstrating conformity because it has not satisfied the regulatory prerequisites.

B. The Conformity Analysis is Flawed

The DCD makes numerous assumptions and conclusions that have no empirical or logical basis and, in most cases, does not even attempt to explain its rationale. For example, as described above, the Alternative D emissions are based on the future activity level assumption of 78.9 MAP. In contrast, both the SIP and the 2003 AQMP base their emissions estimates on SCAG's assumption of 78.0 MAP. The DCD does not explain how the emissions associated with 900,000 additional air passengers can possibly conform with the SIP. Because almost all airport emissions are tiered to the airport's operational activity level, these conflicting assumptions represent facial nonconformity, which the DCD does not satisfactorily rebut.

Facts and logic lead naturally to very different conclusions than those reached in the DCD. As explained in this section, the DCD runs counter to the evidence before the agency. It is therefore invalid. *See Sierra Club*, 346 F.3d at 961.

1. NOx/NO_2

a. Net NOx/NO_2 Emissions

First, the DCD evidences no attempt to evaluate whether overall NOx/NO_2 Alternative D emissions conform with the total NOx/NO_2 emission budget for LAX. The plain language of 40 CFR 93.158(a)(5)(i)(A) requires that the "total of direct and indirect emissions from the action" plus "all other emissions in the nonattainment (or maintenance) area" shall not exceed the emissions budgets in the applicable SIP. Therefore, the DCD should have evaluated whether total Alternative D NOx/NO_2 emissions conform, rather than relying solely on the source-by-source analysis.

The total NOx/NO_2 emissions budget for LAX and the quantity of "all other emissions" can be derived from available data, as demonstrated in the attached technical report. *See* Exh. A, comment I.B.2, Table 1. The total Alternative D NOx/NO_2 emissions reported in the DCD, together with "all other" NOx/NO_2 emissions derived from available data, greatly exceeds the LAX NOx/NO_2 emissions budget for every relevant year. *See id.,* Table 2. Therefore, the net Alternative D NOx/NO_2 emissions cannot be shown to conform.

b. Aircraft/APU Emissions

The regulations require agencies undertaking a conformity determination to demonstrate that "the total of direct and indirect emissions from the action. . . together with all other emissions in the nonattainment (or maintenance) area, would not exceed the emissions budgets specified in the applicable SIP." 40 CFR § 93.158(a)(5)(i)(A) (emphasis added). However, the DCD makes no attempt to estimate "all other emissions" in the area from aircraft and APUs. *See* DCD at 5-3. As described in the technical analysis and report submitted with this letter, it is possible to calculate "all other emissions" from aircraft and APUs in the area, given available information. *See* Exh. A, comment I.B.2. Once those other emissions are added to Alternative D emissions, the total emissions in the nonattainment area exceeds emissions budgets in both the 1997 SIP and the 2003 AQMP. *Id.*

Furthermore, the DCD omits any analysis of aircraft reverse thrust emissions. Engine thrust reversal is a commonly used method of slowing down taxi speed. The FAA's own guidance document states that "[r]everse thrust is now considered by EPA as an official mode and should be included in calculation procedures." FAA, *Air Quality Procedures for Civilian Airports and Air Force Bases* (April 1997). As described in the attached technical report, reverse thrust emissions can be modeled by adding 15 seconds to the total takeoff time. If the DCD's analysis of NOx emissions had included reverse thrust emissions, as required by its own guidance document, it would have reported Alternative D NOx emissions that would not conform with emissions budgets in the applicable 1997 SIP. *See* Exh. A, comment II.B.

Even without the above analysis, the DCD's conclusion is necessarily illogical. This is because airport emissions in both the 1997 SIP and the 2003 AQMP are based on activity levels predicted by SCAG, i.e. 78 MAP and 2.98 million tons of air cargo. Therefore, Alternative D emissions, estimated in the DCD based on higher activity levels (78.9 MAP and 3.1 million tons of cargo in 2015), exceed the emissions budget in the SIP and 2003 AQMP. Any other result is unsupportable.

c. GSE Emissions

The DCD improperly relies on the Supplement's proposed measure of accelerating conversion of LAX ground service equipment ("GSE") to zero-emissions equipment faster than the goals set by the November 2002 "South Coast Ground Service Equipment Memorandum of Agreement" between the California Air Resources Board and certain domestic air carriers. As described in the 2003 technical air quality analysis and report attached to El Segundo's comments on the Supplement (*attached hereto* as Exh. C), this proposed measure does not contain adequate performance standards or assurances of enforceability. Neither the Supplement nor the DCD quantifies the number of units that would be involved or the time frame over which the action would occur. Moreover, neither document describes the proposed measure with enough specificity to allow it to be implemented, let alone reviewed by the public or enforced if eventually adopted. Therefore, it is inappropriate to rely on reductions resulting from this speculative measure as part of the project design. While it may be appropriate to offset Alternative D emissions in the mitigation section of the conformity determination with an *enforceable written commitment* to implement this measure, 40 CFR § 93.158(a)(5)(iii), this is not the approach the DCD employs. The DCD tacitly assumes that GSE emissions will be reduced to zero in 2015, a wholly unsupported and unsupportable assumption. Therefore, reliance on accelerated GSE emissions reductions is wholly inappropriate.

d. Stationary Source Emissions

The DCD contends that because owners of stationary sources obtain permits for their operation, it is "reasonable to assume that emissions from these sources are accounted for in the AQMPs." DCD at 5-4. In this way, the DCD purports to comply with 40 CFR § 93.158(a)(1) to demonstrate conformity. However, that provision requires that "the total of direct and indirect emissions from the action are specifically identified and accounted for in the applicable SIP's attainment or maintenance demonstration." *Id.* The DCD provides no support for its "assumption" that Alternative D stationary source NOx emissions are contained within the approved SIP or the 2003 AQMP. In fact, these emissions are not "specifically identified and accounted for" in the SIP or 2003 AQMP. Therefore, Alternative D stationary source NOx emissions do not conform under section 93.158(a)(1).

Additionally, the DCD evidences no attempt to estimate the fraction of basin-wide stationary source emissions attributed to LAX. As demonstrated in the attached technical report, it is possible to estimate the LAX stationary source emissions by using the same proportional technique the DCD proposes (but does not use) to estimate LAX emissions for motor vehicles. Exh. A, comment I.B.3.b. Using this approach, analysis reveals that the Alternative D stationary source emissions are verifiably higher than the LAX emissions budgets in the applicable 1997 SIP and 2003 AQMP, and thus do not conform under sections 93.158(a)(5)(i)(A) or (B). *See id.*

e. Motor Vehicle Emissions

First, as described above and in the attached technical report, the DCD underestimated Alternative D motor vehicle emissions because it underestimated airport activity under Alternative D and the number of trips for a given level of activity. *See* Exh. A, comment I.B.3.c.

Second, the DCD's assertion that it is technically infeasible to determine the proportion of basin-wide motor vehicle emissions that are caused by operations at LAX is undermined by the DCD's own reasoning. If the ratio of motor vehicle emissions to aviation source emissions is the same in the DCD and applicable plans, as claimed in the DCD, then Alternative D motor vehicle NOx/NO_2 emissions can be determined by applying that ratio to basin-wide motor vehicle NOx/NO_2 emissions, as done in the attached technical report. *See* Exh. A, comment I.B.3.c. Using the DCD's own methodology, the attached technical report demonstrates that Alternative D motor vehicle emissions exceed the LAX budget for such emissions in the applicable 1997 SIP, and therefore do not conform. *See id.*

f. Construction Emissions

The DCD demonstration of conformity for NOx emissions from construction employs a "drop-in-the bucket" strategy that is not condoned by the regulations. DCD 5-5, 5-6. The analysis purports to demonstrate that Alternative D emissions are well within the SIP budget for construction related emissions. However, the relevant budget is not the entire "construction" category, but the subset of each category that is allocated to the airport in the SIP. Joint guidance from the EPA and the FAA on general conformity determinations for airports states that "[i]f the airport source emissions are not readily identifiable in the SIP inventory, the airport operator should work with the State or local air quality agency to determine what, if any portion of a category could or would be allocated to the airport." FAA & EPA, *General Conformity Guidance for Airports* 16 (September 25, 2002). Because the FAA apparently has made no attempt to ascertain the appropriate construction-related emissions budget for LAX, it has not adequately demonstrated conformity for NOx emissions from construction sources generated by Alternative D.

Any attempt to compare Alternative D emissions to the entire SIP emissions budget for construction-related source types must account for "all other emissions" in the nonattainment area. 40 CFR § 93.158(a)(5)(i)(A). Alternative D construction emissions only conform if, when added to these other emissions, they fall within the emissions budget. As demonstrated in the attached technical report, Alternative D construction emissions far exceed

the emissions budget, and therefore do not conform under section 93.158(a)(5)(i)(A). *See* Exh. A, comment I.B.3.d.

Section 5.2.5 of the conformity determination also asserts that it is "reasonable to assume that SCAQMD allowed for an accommodation for such a major construction program [as Alternative D] within the 2003 AQMP." DCD at 5-5. Once again, however, the FAA provides no support for this statement. In fact, SCAQMD reviews draft environmental documents for innumerable construction projects in the South Coast Air Basin and it is not reasonable to assume that it accommodates each of those projects in its plans. This is especially true of projects that have not yet received final agency approval. Moreover, these emissions are not "specifically identified and accounted for in the applicable SIP's attainment or maintenance demonstration." 40 CFR § 93.158(a)(1). Therefore, Alternative D construction emissions also fail to comply under section 93.158(a)(1).

2. PM10

The DCD is also flawed in its demonstration of PM10 conformity. First, the DCD does not apply all appropriate criteria. The DCD analyzes PM10 emissions using only local air quality modeling, and omits areawide air quality modeling. However, it is SCAQMD, not the FAA, that must determine whether areawide air quality modeling is necessary. *See* 40 CFR § 93.158(a)(4). Neither the DCD nor the documents produced pursuant to the City of El Segundo's FOIA request indicate that the appropriate State agency made such a determination. Therefore, the DCD cannot rely on section 93.158(a)(4), and instead must comply with section 93.158(a)(3), which requires a demonstration of both local and areawide conformity.

Under section 93.158(a)(3), when, as here, areawide air quality modeling is not done for PM10 and the appropriate State agency has not determined it to be unnecessary, the federal agency must satisfy the requirements of both section 93.158(a)(5) and section 93.158(b). 40 CFR § 93.158(a)(3)(ii). Because the DCD does not comply with section 93.158(a)(5), it cannot demonstrate areawide conformity for Alternative D PM10 emissions. Indeed, the DCD acknowledged that it could not demonstrate conformity for PM10 under section 93.158(a)(5), since "Alternative D emissions exceed the applicable SIP budgets for [PM10]." DCD, at 5-6.

Neither does the DCD comply with section 93.158(b), which requires a demonstration that an action does not: "(i) Cause or contribute to any new violation of any standard in any area; or (ii) Increase the frequency or severity of any existing violation of any standard in any area." The DCD conducts this localized analysis in section 5.3.1, however, as discussed in the attached technical report, it contains numerous flaws that render the entire PM10 analysis inadequate. *See* Exh. A, comment I.C.3. For example, the DCD employed an

inappropriate method of calculating "future background" for primary PM10, omitted PM10 emissions from various sources (including reverse thrust operations), and calculated net Alternative D emissions from an inflated baseline. *See id.* Because the Alternative D plus background emissions come very close to the NAAQS under the DCD calculations, even small errors in the PM10 analysis could hide an exceedance. For all of the reasons described in the attached technical report, Alternative D PM10 emissions do not conform.

IV. MITIGATION

The DCD fails to demonstrate conformity for all of the pollutants for which the South Coast Air Basin is designated nonattainment, and therefore must either commit to revising the SIP to include specific measures that will result in a level of emissions that are within the emissions budget, 40 CFR § 93.158(a)(5)(i)(B), or fully offset Alternative D emissions within the nonattainment area so there is no net increase of that pollutant, 40 CFR § 93.158(a)(5)(iii).

Because, as described above, the activity level for Alternative D assumed by FAA is 78.9 MAP and the applicable 1997 SIP and the 2003 AQMP only account for emissions associated with 78.0 MAP, it is highly unlikely that, as proposed, Alternative D can be shown with adequate analysis to conform without offsets or mitigation pursuant to 40 CFR § 93.158(a)(5)(iii). In the City of El Segundo's view, the most logical method of demonstrating conformity would be the adoption by FAA and LAWA of a concrete and enforceable mitigation measure that constrains future LAX activity to 78.0 MAP.

In addition, other feasible mitigation measures exist that the FAA should propose and adopt to ensure conformity for all pollutants. One such feasible mitigation measure would be to electrify gates to provide parked aircraft with centrally produced electric power, thereby reducing aircraft emissions.

Additional feasible mitigation measures are discussed in detail in the technical air quality report attached to the City of El Segundo's July 2001 comments on the Draft EIS/EIR. *See* Exh. D, at 24-40.

V. CONCLUSION

Our review and the analysis by our expert air quality consultants have identified innumerable erroneous assumptions, methodological problems, and legal errors in the DCD that cause it to understate the emissions associated with LAX Alternative D. Moreover, the attached technical report demonstrates that, with proper analysis, Alternative D emissions do not conform

to the applicable SIP, as required by Clean Air Act section 176(c). Therefore, the DCD cannot serve as the basis for demonstrating conformity.

Very truly yours,

SHUTE, MIHALY & WEINBERGER LLP

Christy H. Taylor

Jenny K. Harbine

[P:\ELSEGUN\MAT1\jkh003v3 (conformity comments).wpd]

LIST OF EXHIBITS

Exhibit A	J. Phyllis Fox, Ph.D., P.E., DEE, QEP, REA I/II and Petra Pless, D.Env., Comments on Clean Air Draft General Conformity Determination, Los Angeles International Airport Proposed Master Plan Improvements, Alternative D (Feb. 6, 2004)
Exhibit B	Adib Kanafani, Comments on 2003 LAX Master Plan Addendum & Supplement to the DEIS/DEIR (Nov. 2003)
Exhibit C	J. Phyllis Fox, Ph.D., P.E., DEE, QEP, REA I/II and Petra Pless, D.Env., Comments on Air Quality and Human Health and Safety, LAX Master Plan Supplement to the Draft Environmental Impact Statement/ Draft Environmental Impact Report (Nov. 2003)
Exhibit D	J. Phyllis Fox, Ph.D., QEP, REA I/II, Comments on Air Quality and Human Health and Safety, LAX Master Plan Draft EIR/EIS (July 13, 2001)
Exhibit E	Letter from Barry Wallerstein, SCAQMD, to David Kessler, Federal Aviation Administration, Regarding Supplement to the Draft Environmental Impact Statement/Report for the Los Angeles International Airport Proposed Master Plan (Nov. 7, 2003)
Exhibit F	Final Environmental Impact Report No. 573 For the Civilian Reuse of MCAS El Toro and the Airport System Master Plan for John Wayne Airport and Proposed Orange County International Airport, Sch. No. 98101053 (August 2001) (excerpts)
Exhibit G	Letter from Shute, Mihaly & Weinberger on Behalf of the City of El Segundo to David Kessler, Federal Aviation Administration, Regarding Freedom of Information Act Request (Jan. 13, 2004)

Comments

On

Clean Air Act
Draft General Conformity Determination

LOS ANGELES INTERNATIONAL AIRPORT PROPOSED MASTER PLAN IMPROVEMENTS ALTERNATIVE D

Prepared by

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February 6, 2004

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COMMENTS

The Federal Aviation Administration ("FAA") has prepared a Draft General Conformity Determination[1] ("DCD") pursuant to the requirements of 40 CFR Part 93, Subpart B to document the conformity of the proposed Alternative D for the modernization of Los Angeles International Airport ("LAX") ("Project") with the applicable California State Implementation Plan ("SIP").

The DCD first compared net emissions from Alternative D with the de-minimis thresholds in 40 CFR 93.153 to determine if a conformity determination was required for each criteria pollutant. This analysis concluded that a conformity determination was required only for nitrogen oxides/nitrogen dioxide ("NOx/NO_2") and particulate matter with an aerodynamic diameter less than 10 microns ("PM10"), but not for volatile organic compounds ("VOCs") or carbon monoxide ("CO"). (DCD, Sec. 4.) Our analyses in Comment II indicate that VOCs and CO are not exempt from an applicability analysis under the regulations and a conformity determination is required for those contaminants as well as NOx and PM10. The failure of FAA to analyze VOC and CO emissions of the LAX Master Plan Alternative D renders the conformity determination inadequate.

The DCD then presented its conformity analysis for NOx/NO_2 pursuant to 40 CFR 93.158(a)(5)(i)(A) and (B) and PM10 pursuant to 40 CFR 93.158(a)(3) and 40 CFR 93.158(a)(4)(i). These analyses concluded that the emissions of NOx/NO_2 and PM10 from Alternative D conform with the applicable SIP and the proposed modifications thereto, the 2003 Air Quality Management Plan ("2003 AQMP"). (DCD, Sec. 5.) Our analyses in Comment I indicate that NOx and PM10 do not conform with either the applicable SIP or the proposed amendment thereto.

I. ALTERNATIVE D DOES NOT CONFORM

The DCD concluded that NOx and NO_2 emissions in 2005, 2006, 2008, 2010, and 2013, and PM10 emissions in all evaluation years exceed the de-minimis thresholds at 40 CFR 93.153(b) and thus required a conformity determination. (DCD, Table 5 and pp. 4-7/8.) The DCD then presented analyses to demonstrate that the emissions from Alternative D conform. However, as explained below, both the applicability analyses and the conformity analyses in the DCD are inconsistent with applicable regulations. If the DCD had followed 40 CFR 93 Subpart B, it would have found that a conformity analysis is required for VOC and CO emissions and

[1] Federal Aviation Administration, Clean Air Act Draft General Conformity Determination, Los Angeles International Airport Proposed Master Plan Improvements, Alternative D, January 2004.

that emissions of NO_x/NO_2 and PM10 do not conform, requiring either offsets or a revision to the SIP.

I.A Applicability Analysis Is Flawed

The DCD determines if a conformity analysis is required by comparing the increase in emissions due to Alternative D with the emissions from the no action/no project ("NA/NP") alternative. This is referred to as an "applicability analysis" in the DCD. The DCD then concludes that a conformity analysis is not required for VOC or CO in any analysis year, nor NOx in 2015 because the net increase in emissions for those contaminants and years is less than the thresholds in 40 CFR 93.153(b). (DCD, Sec. 3.)

The DCD's analysis is flawed because it uses the NA/NP alternative as the baseline against which to calculate Project emissions. However, as explained in the City of El Segundo's comments on the Draft EIS/EIR, the NA/NP alternative is artificially inflated and includes emissions that are not part of the baseline for purposes of a conformity analysis. (Letter to David Kessler and Jim Ritchie from Shute, Mihaly & Weinberger on Behalf of the City of El Segundo, pp. 24-41 (September 18, 2001), incorporated here by reference.)

A conformity analysis must evaluate the "total of direct and indirect emissions from the action." 40 CFR 93.159(d). The "total of direct and indirect emissions" means the "sum of direct and indirect emissions increases and decreases caused by the Federal action: *i.e.*, the "net" emissions considering "all direct and indirect emissions." 40 CFR 93.152. The DCD has hidden a portion of the Alternative D emissions from view by including projects in the baseline that would not occur, are not related to the airport, and are inconsistent with planning assumptions of responsible agencies.

First, the NA/NP alternative would not happen in practice. Two major projects (and perhaps more) were included in the NA/NP alternative, Continental City and Northside. These projects were authorized in the early 1980s and have languished ever since. It is not creditable that they would suddenly be dusted off and build particularly give the absence of any evidence to the contrary. We are not aware of any activity, less than one year from the date the DCD assumes as the start of construction, *e.g.*, permitting, budget authorization, that would be required to build them.

Second, many of the emissions included in the NA/NP are independent of the operation of LAX and thus do not provide a realistic baseline for Alternative D. Northside, for example, is a commercial/residential development project not related

to the operation of LAX. Such proposed projects should not be included in the baseline for purposes of calculating "net emissions" from this Federal action.

Third, the emissions from the NA/NP alternative are based on assumptions that are inconsistent with the latest planning assumptions of other agencies. The capacity of LAX, for example, is assumed to be 78.9 MAP and 3.12 million tons of cargo, compared with a maximum capacity of 78 MAP and 3.0 millions tons of cargo assumed by the South Coast Association of Governments ("SCAG"). See Comment I.B.1.b.

The analyses required for purposes of a conformity determination "must be based on the latest planning assumptions... Any revisions to these estimates used as part of the conformity determination, including projected shifts in geographic location or level of population, employment, travel, and congestion, must be approved by the MPO or other agency authorized to make such estimates for the urban area." 40 CFR 93.159. As explained in Comment II.A.1, the emissions are not based on the most recent planning assumptions. Further, the applicable regulations indicate that emissions "must reflect emission scenarios that are expected to occur..." 40 CFR 93.159(d). The emissions are not likely to occur, as explained in Comment II.F and the City of El Segundo's comments on the Draft EIS/EIR.

I.B NOx/NO_2 Emissions Do Not Conform

The DCD claims that the emissions of NOx and NO_2 from Alternative D conform because emissions from Alternative D "either will result in a level of emissions which, together with all other emissions... will not exceed the emissions budgets specified in the approved SIP or in the alternative will not exceed the emissions budgets specified in the 2003 AQMP" (DCD, p. 5-1), citing as its authority 40 CFR 93.158(a)(5)(i)(A) or 40 CFR 93.158(a)(5)(i)(B). (DCD, Sec. 5.1.2, p. 5-1.) However, the analyses presented in the DCD are inconsistent with the requirements of these two sections.

I.B.1 General Approach Is Flawed

The analyses presented in the DCD are inconsistent with the regulations at 40 CFR 93.158. The DCD claims that it is relying on 40 CFR 93.158(a)(5)(i)(A) and (B) to determine conformity for NOx/NO_2 emissions. (DCD, p. 5-1, Sec. 5.1.2.) However, the procedures it follows to demonstrate conformity are inconsistent with both the plain language of these regulations and FAA and U.S. Environmental Protection Agency ("EPA") guidance. In fact, NOx/NO_2 emissions from Alternative D do not conform under any of the requirements laid out in 40 CFR 93.158(a), requiring offsets or a revision of the SIP.

I.B.1.a No Documentation Is Provided

First, the plain language of sections (A) and (B) requires the State agency primarily responsible for the applicable SIP to determine and *document* that the action results in emissions which together with all other emissions would not exceed the emission budgets specified in the applicable SIP. If the emissions exceed the budget, the State must make a written commitment to revise its SIP to include the emissions.

This is confirmed by general conformity guidance for airports issued jointly by the FAA and EPA ("9/25/02 Guidance").[2] The guidance is clear that the determination must be in *writing* by the responsible agency. For conformity according to 40 CFR 93.158(a)(5)(i)(A), "A *written* determination from the State/local air quality agency stating that the project emissions, together with all other emissions in the non-attainment or maintenance area, would not exceed the emissions budget in the SIP, is required. For conformity under 40 CFR 93.158(a)(5)(i)(B), "A *written* commitment from the Governor, or the Governor's designee for SIP actions, to include the emissions in a revised SIP…" is required. (9/25/02 Guidance, p. 9, emphasis added.)

The DCD does not cite any responsive "written" correspondence or documentation from any party, let alone the responsible agencies, that Alternative D emissions together with all other emissions in the attainment area would not exceed the emission budgets in the SIP and the 2003 Air Quality Management Plan ("AQMP"). The only attempt at documentation is for aircraft emissions, as reported in DCD, Table 8. And even this falls short.

DCD Table 8 cites two personal communications with Hsiao as support for the approved SIP and 2003 AQMP NOx/NO_2 emissions from aircraft. The response to our FOIA request[3] indicates that the first, Hsiao 2003a, is an 11/12/03 note of a telephone conversation by FAA's consultant, regarding approved SIP NOx/NO_2 emissions due to aircraft. Thus, it is not agency documentation nor an agency determination. The second, Hsiao 2003b, is an 11/21/03 e-mail from Hsiao attaching aircraft NOx/NO_2 emissions for LAX for 1997, 2000, 2010, 2015, and 2025 from the 2003 AQMP. Both of these are from a South Coast Air Quality

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[2] Federal Aviation Administration and U.S. Environmental Protection Agency, General Conformity Guidance for Airports, Questions and Answers, September 25, 2002.

[3] Freedom of Information Act Request for Materials Relating to the Clean Air Act Draft General Conformity Determination for the Los Angeles International Airport Proposed Master Plan Improvement, Alternative D, submitted to Federal Aviation Administration by Shute, Mihaly & Weinberger, January 12, 2004; attached as Exhibit G to Comments on the Draft General Conformity Determination submitted by Shute, Mihaly & Weinberger on behalf of the City of El Segundo.

Management District ("SCAQMD") employees. It would appear the State agency primarily responsible for the SIP is the California Air Resources Board ("CARB"). The record contains no information from CARB.

Further, these communications do not constitute an agency determination that the "total of direct and indirect emissions from the action... together with all other emissions in the nonattainment area, would not exceed the emissions budgets specified in the applicable SIP." They only report 1997 and 2003 AQMP aircraft emissions that are due to LAX and thus do not constitute the requisite "determination." The DCD makes no attempt whatsoever to document agency concurrence that Alternative D NOx/NO_2 emissions from other components – ground support equipment ("GSE"), on- and off-airport mobile sources, stationary sources, construction – are included in the 1997 or 2003 AQMP.

Thus, on its face, the DCD does not comply with 40 CFR 93.158(a)(5)(i)(A) or 40 CFR 93.158(a)(5)(i)(B) and thus fails to demonstrate conformity.

I.B.1.b Wrong Emissions Are Evaluated

Second, the regulations explicitly require that "the total of direct and indirect emissions from the action... together with *all other emissions* in the nonattainment (or maintenance) area would not exceed the emissions budgets specified in the applicable SIP." 40 CFR 93.158(a)(5)(i)(A), emphasis added. Instead, for NOx emissions from aircraft and auxiliary power units ("APUs"), the DCD (section 5.2.1) compares the "total of direct and indirect emissions from the action" with the *portion* of the emissions budget estimated (with no support) to be due to LAX, rather than adding them to "all other emissions in the nonattainment area."

The DCD does not estimate "all other emissions in the nonattainment area," as explicitly required by 40 CFR 93.158(a)(5)(i)(A) and 40 CFR 93.158(a)(5)(i)(B). See, for example, DCD, Table 8, which compares Alternative D NOx emissions for aircraft and APUs to that portion of the emission budget attributable to LAX for aircraft and APUs. This is wholly inconsistent with the plain language of 40 CFR 93.158(a)(5)(i)(A) and 40 CFR 93.158(a)(5)(i)(B).

The analysis in the DCD, Section 5.2.1 – comparing Alternative D emissions to LAX emissions in the SIP and 2003 AQMP – is similar to that called for in 40 CFR 93.158(a)(1), which is nowhere mentioned in the DCD. The plain language of 40 CFR 93.158(a)(1) requires that the total of direct and indirect emissions from the action "are specifically identified and accounted for in the applicable SIP's attainment or maintenance demonstration." This requirement is not satisfied here.

DCD Section 5.2.1 cannot demonstrate conformity pursuant to 40 CFR 93.158(a)(1) because this regulation is not applicable here. To qualify under this section, the emissions must be "specifically identified" in the SIP or the underlying activity levels must be comparable. (9/25/02 Guidance, p. 12, Sec. 17.1.) The emissions from LAX are not specifically identified in either the SIP or the 2003 AQMP. Further, the future underlying activity levels assumed for Alternative D in the DCD are higher than those assumed in either the SIP or the 2003 AQMP. The Supplement to the Draft Environmental Impact Statement/Environmental Impact Report ("Supplement") assumes that Alternative D will serve 78.9 million annual passengers ("MAP") and 3.12 million tons of air cargo. (Supplement, Table ES-1.)

Airport emissions in the SIP and 2003 AQMP are not specifically identified, but are based on "SCAG" activity levels. The 2001 SCAG Regional Transportation Plan ("RTP") reports that LAX is "legally or physically" constrained to 78 MAP and projects 2.98 million tons of air cargo in 2025. (RTP 4/01,[4] Tables 5.14, 5.15.) Thus, conformity cannot be determined pursuant to 40 CFR 93.158(a)(1) because LAX emissions are not specifically identified in either the SIP or the 2003 AQMP and the underlying assumptions regarding activity levels at LAX differ. See also discussion of activity levels in Comment I.A.1.

Regardless, the DCD apparently did not elect this route, even though it followed the analytical procedure that is required by 40 CFR 93.158(a)(1). The DCD states: "FAA demonstrates herein that the emissions of NOx (as an O_3 precursor) and NO_2 from the proposed action either will result in a level of emissions, which, together with all other emissions in the nonattainment (or maintenance) area, will not exceed the emissions budgets specified in the approved SIP (criterion at 40 CFR 93.158(a)(5)(i)(A)) or in the alternative will not exceed the emissions budgets specified in the 2003 AQMP (where the 2003 AQMP represents a written commitment from the state of California as a basis to revise the SIP for the SCAB pursuant to the criterion at 40 CFR 93.158(a)(5)(i)(B)...)" (DCD, p. 5-1, Sec. 5.1.2.)

I.B.1.c Conformity Analyses Are Incomplete

The general conformity regulations require that the analyses reflect emission scenarios that are expected to occur under: (a) the mandated attainment year; (b) the year during which emissions are expected to be greatest; and (c) any year for which the applicable SIP specifies an emission budget. 40 CFR 93.159(d). Thus, NOx conformity analyses should have been conducted for 2010 (attainment year), 2005

[4] Southern California Association of Governments, 2001 Regional Transportation Plan, adopted April 2001.

(greatest emissions year) (DCD, Table 1), and 2006, 2007, 2008, and 2020 (SIP emission budget years). They were not. Explicit conformity analyses (comparison of Alternative D emission budgets with approved SIP budgets) were only presented for aircraft plus APU emissions in 2005, 2008, and 2010. (DCD, Table 8.) Thus, the conformity analyses are incomplete. Conformity analyses should be prepared for 2006, 2007, and 2020 as well as other components of the total Alternative D emissions—GSE, stationary source, motor vehicles, and construction. (DCD, Table 8.)

I.B.2 NOx/NO_2 Emissions From Alternative D Plus All Other Emissions Do Not Conform

As discussed above, the DCD argued that NOx/NO_2 emissions from each component of Alternative D were less than emissions from the comparable LAX component in the SIP and 2003 AQMP. This approach is inconsistent with the regulations the DCD relies on. If the DCD had followed the approach outlined in 40 CFR 93.158(a)(5)(i)(A), as it claims to have done, it would have found that Alternative D does not conform. We present an analysis that is responsive to the legal requirements of 40 CFR 93.158(a)(5)(i)(A) below.

Section 40 CFR 93.158(a)(5)(i)(A) requires that the emissions from the action together with all other emissions in the area, not exceed the emission budgets. The DCD made no attempt to determine "all other emissions." Instead, it asserts that the emissions from each component of the total emissions—aircraft and APUs; ground support equipment; stationary point sources; motor vehicles; and construction— are comparable to the budget for their unquantified counterparts in the SIP and the 2003 AQMP. (DCD, Sec. 5.2.1 to 5.2.5) However, as demonstrated below, in no case has the DCD succeeded in demonstrating that the emissions from Alternative D together with all other emissions will not exceed the emission budgets in the SIP and the 2003 AQMP. In fact, as demonstrated below, if a proper analysis had been conducted under 40 CFR 93.158(a)(5)(i)(A) and (B), the DCD would have been forced to conclude that NOx/NO_2 emissions do not conform. This is evident from two lines of evidence.

First, the emissions in both the SIP and the 2003 AQMP assume that LAX is physically constrained to 78 MAP and 3.0 M tons of air cargo. See also discussion of activity levels in Comment I.A.1. Alternative D, on the other hand, is based on 78.9 MAP and 3.12 M tons of cargo by 2015. (Supplement, Table ES-1.) Therefore, regardless of the specific section of 40 CFR 93.158(a) that is relied upon, the emissions from Alternative D must exceed the emissions assumed in the SIP and 2003 AQMP at full capacity.

Second, the emissions from Alternative D, together with all other emissions in the nonattainment area, exceed the emission budget in the applicable SIP, which is the 1997 AQMP. (DCD, p. 5-2.) This is clearly stated in the 2003 AQMP, which notes: "Despite rules and regulations adopted by SCAQMD, CARB and U.S. EPA as of October 31, 2002, the projected future emissions are still above the levels required for achieving federal state air quality standards. The main reason is that the region as a whole is projected to continue to grow in population, housing, employment and vehicle miles traveled (VMT)." (2003 AQMP, p. III-2-24.)

The emission levels required to achieve federal air quality standards are the levels in the EPA-approved SIP. The levels in the SIP are the levels in the 1997 AQMP, which states: "The 1997 AQMP provides updated technical information relative to baseline emission inventories and control measures to achieve the federal ozone and particulate matter (PM10) air quality standards." (1997 AQMP, pp. ES-1, 1-2.)

The 2003 AQMP presents a current estimate of all emissions in the nonattainment area, including LAX. Thus, "all other emissions" can be estimated by subtracting the DCD's estimate of LAX NO_x/NO_2 emissions in the 2003 AQMP from the total NOx/NOx emissions from all sources as reported in the 2003 AQMP:

Table 1
NO_x/NO_2 Emissions (ton/day)
Calculation of "All Other Emissions"
40 CFR 93.158(a)(i)(A)

Year	LAX Emissions 2003 AQMP[a] (DCD, Table 8)	Total Emissions 2003 AQMP (Tables A-6, A-9, A-10)	"All Other Emissions" Total Emissions – LAX
2005	49.28	975.30	926.02
2008	42.21	873.11	830.90
2010	37.00	780.42	743.42

[a] Estimated from LAX emissions from the 2003 AQMP, as reported in Table 8 of the DCD for aircraft and APU, extrapolated to total LAX emissions using emissions in Table 4 of the DCD
For 2005: (6,686 ton/year)(12,160 ton/year/4,520 ton/year)/365 day/yr = 49.28 ton/day
For 2008: (6,754 ton/year)(10,973 ton/year/4,810 ton/year)/365 day/yr = 42.21 ton/day
For 2010: (6,800 ton/year)(9,934 ton/year/5002 ton/year)/365 day/yr = 37.00 ton/day

The plain language of 40 CFR 93.158(a)(5)(i)(A) and (B) requires that the "total of direct and indirect emissions from the action" plus "all other emissions in the nonattainment (or maintenance) area" not exceed the emissions budgets in the applicable SIP. This calculation, presented below, indicates that NO_x/NO_2 emissions exceed the emissions budgets in the applicable SIP:

Table 2
NOx/NO_2 Emissions
(ton/day)
Conformity Determination
40 CFR 93.158(a)(i)(A)

Year	Direct + Indirect Alt. D Emissions (DCD, Table 4)	All Other Emissions (Table 1)	Total Emissions (Alt D+ All Other)	SIP Emissions (1997 AQMP)
2005	33.32	926.02	959.34	750.13
2008	30.06	830.90	860.96	712.09
2010	27.22	743.42	770.64	696.79

Table 2 indicates that the "total of direct and indirect emissions" of NOx/NO_2 from Alternative D plus "all other emissions in the nonattainment area" based on the 2003 AQMD exceed the emissions included in the approved SIP based on the 1997 AQMP for all analysis years. Thus, under 40 CFR 93.158(a)(i)(A), Alternative D does not conform and offsets must be required or the SIP modified.

The DCD cannot demonstrate conformity by relying on the 2003 AQMP as a commitment to revise a SIP pursuant to 40 CFR 93.158(a)(5)(i)(B) because it does not meet those procedural requirements. The DCD also may not rely on the 2003 AQMP as an approved SIP pursuant to 40 CFR 93.158(a)(5)(i)(A), since it is unlikely that the 2003 AQMP will be approved before the conformity determination on this project is complete. Further, since the 2003 AQMP explicitly acknowledges that the proposed emission budgets in the 2003 AQMP will not bring the region into compliance with federal air quality standards (2003 AQMP, p. III-2-24), it is unlikely that EPA will approve the 2003 AQMP emission budget.

Even if the DCD could legally rely on the 2003 AQMP emission budgets to demonstrate conformity, the DCD's attempt to do so also fails. The Alternative D NOx/NO_2 emissions in 2010 plus all other emissions (743 ton/day) exceed the 2003 AQMP total NOx/NO_2 emissions (537 ton/day). (2003 AQMP, Table A-11.)

Thus, Alternative D does not conform unless the emissions are fully offset (40 CFR 93.158(a)(2)) or the State revises the SIP to include the emissions. 40 CFR 93.158(a)(5)(b). The DCD does not propose either of these courses of action, but instead, proclaims that Alternative D conforms, when, in fact, the DCD has failed to follow any of the valid approaches set out in 40 CFR 93.158 to demonstrate compliance.

I.B.3 Component-By-Component Comparison Is Flawed

The DCD compares the emissions from each component of Alternative D to the comparable emissions in the SIP and 2003 AQMP. The DCD argues that if the emissions from Alternative D for each component are less than the emissions budget for that component in the SIP and the 2003 AQMP, then the emissions conform. As discussed in Comment I.A.1, this approach is inconsistent with the requirements of 40 CFR 93.158. In addition to the fact that this approach is inconsistent with the conformity regulations, it fails on the merits. The attempted comparisons are unsupported and inaccurate.

I.B.3.a NOx/NO_2 Emissions From Aircraft

The DCD compares emissions from aircraft plus APUs for Alternative D with those in the approved SIP and 2003 AQMP. This comparison shows that Alternative D NOx/NO_2 emissions are slightly lower than assumed in the approved SIP, 26 ton/year in 2005; 59 ton/year in 2008; and 82 ton/year in 2010. (DCD, Table 8.) The DCD presents no support for the approved SIP emissions or the 2003 AQMP emissions, citing them to a personal communication from K. Hsiao. See discussion of these communications in Comment I.B.1.a. We are skeptical that the Alternative D aircraft plus APU emissions are an accurate representation.

First, in the SIP-approved emission budgets, the SCAQMD assumed that EPA would adopt new regulations to control aircraft engine emissions below the existing limits. The 1997 AQMP emission budgets for aircraft reflect these assumed reduced emission levels. Because EPA did not adopt any aircraft regulations, and because commercially available aircraft engine technologies are not capable of meeting the SCAQMD-assumed reductions, the 1997 AQMP inventories for airports *underestimate* emissions. Alternative D assumes about the same activity level at LAX (78+ MAP) as assumed in the SIP-approved emission budgets. Therefore, it would appear that the DCD has underestimated aircraft and APU emissions by assuming emissions controls that do not exist.

Second, the capacity of Alternative D is estimated at 78.9 MAP. (DCD, p. 3-1.) However, a more reasonable estimate of the actual capacity of Alternative D is 87 MAP. See Comment II.A below. If LAX operated at the 87 MAP capacity under Alternative D, aircraft and related emissions would be about 10 percent higher than assumed in the DCD in the buildout year and less than 10 percent in earlier years. See Comment II.A.2 and Table 9. A 10 percent increase in aircraft plus APU emissions would exceed the aircraft plus APU emissions in the approved SIP:

Table 3
Aircraft and APU NOx/NO_2 Emissions
Revised to 87 MAP
(ton/year)

Year	DCD Table 8	Revised to 87 MAP[a]	Approved SIP[b]
2005	4,520	4,520	4,546
2008	4,810	4,685	4,869
2010	5,002	5,342	5,084

[a] Table 9
[b] DCD, Table 8

Thus, the NOx/NO_2 emissions from aircraft and APUs in 2010 exceed the emissions in the approved SIP and thus do not conform.

I.B.3.b NOx/NO_2 Emissions From Stationary Point Sources

The DCD argues that NOx/NO_2 emissions from stationary point sources under Alternative D, "taken together with NOx emissions for all other fuel combustion sources in the SCAB, would not exceed the NOx emissions budgets for fuel combustion sources specified in the approved SIP or alternatively in the 2003 AQMP." (DCD, p. 5-4, Sec. 5.2.3.) The rationale for this position is that owners would get permits and therefore it is "reasonable to assume that the emissions are accounted for in the AQMPs." *Ibid.*

However, the DCD is assuming a fact that is not in evidence. The DCD is arguing that the emissions must be accounted for in the SIP because owners would get permits. However, if the emissions are not included in the SIP, the owners would not get permits. The DCD must demonstrate that the emissions are in the SIP. It cannot rely on a fact not in evidence. A review of emissions data indicates that Alternative D stationary source emissions are much higher than assumed in the SIP and 2003 AQMP and therefore do not conform, even under the DCD's reasoning.

Further, the DCD makes no effort to document that Alternative D stationary source emissions are actually included in the SIP. The plain language of 40 CFR 93.158(a)(5)(i)(A) and (B) requires that the State agency primarily responsible for the applicable SIP "document" the emissions attributable to the action. Thus, the DCD in effect admits that its analysis is inconsistent with the applicable regulation.

The DCD asserts that emissions from LAX stationary sources are included under "other service and commerce" in the emission inventories in the 1997 AQMP

and under "service and commercial" in the emission inventories in the 2003 AQMP. (DCD, p. 5-4, Sec. 5.2.3.) The DCD made no attempt to estimate the fraction of these total South Coast Air Basin (SCAB) -wide emissions due to LAX and thus did not demonstrate what it set out to do.

However, the fraction of the SCAB-wide emissions due to LAX can be estimated from information in the DCD, assuming that the emissions from all sources are proportional to the aircraft emissions. (DCD, Table 4.) This is consistent with the approach used by the DCD for motor vehicles, *viz.*, "By making the reasonable assumption that motor vehicle activity which has LAX as a source or destination is directly related to the level of aircraft operations at LAX…") (DCD, p. 5-4, Sec. 5.2.4.) Activities at the airport are generally all directly related to aircraft activity. Based on this proportional approach, the Alternative D stationary source NOx/NO_2 emissions are much greater than LAX stationary source NOx/NO_2 emissions in the SIP and 2003 AQMP, and thus do not conform. This is demonstrated by Table 4:

Table 4
Comparison of Stationary Source NOx/NO_2 Emissions
Alternative D
With 1997 and 2003 AQMP Emissions
(ton/year)

Year	1997 AQMP[a] (Appx. III)[b]	2003 AQMP[a] (Appx. III, Attach. A)[c]	Alternative D (DCD, Table 4)
2005	27	29	198
2008	31	32	206
2010	34	27	212

a Stationary source emissions from LAX in AQMPs: [(ton/day for stationary sources from the applicable AQMP)(365 day/yr)][(LAX aircraft emissions in the applicable AQMP, as reported in the DCD, Table 8)/(total aircraft emissions from the applicable AQMP)] [(Alternative D stationary source emissions from DCD, Table 4)/(Alternative D total emissions, DCD, Table 4)]

b For 2005: [(7.72 ton/day)(365 day/yr)](4546/7738)(198/12,160) = 27.0 ton/year
For 2008: [(7.49 ton/day)(365 day/yr)](4869/8191)(206/10,793) = 31.0 ton/year
For 2010: [(7.27 ton/day)(365 day/yr)](5084/8494)(212/9934) = 33.9 ton/year

c For 2005: [(6.94 ton/day)(365 day/yr)](6686/9683)(198/12,160) = 28.5 ton/year
For 2008: [(7.02 ton/day)(365 day/yr)](6754/10,257)(206/10,793) = 32.2 ton/year
For 2010: [(5.86 ton/day)(365 day/yr)](6800/11,344)(212/9934) = 27.4 ton/year

Thus, even under the DCD's reasoning, the NOx/NO_2 emissions from Alternative D stationary sources are much greater than those assumed in the SIP or the 2003 AQMP and thus do not conform.

I.B.3.c NOx/NO_2 Emissions From Motor Vehicles

The DCD argues that it is technically infeasible to determine the portion of motor vehicle emissions in the SIP and 2003 AQMP that are due to LAX. The plain language of 40 CFR 93.158(a)(5)(i)(A) and (B) requires the State agency primarily responsible for the applicable SIP to "document" the emissions attributable to the action. Thus, the DCD has admitted that its analysis is inconsistent with the applicable regulation.

Regardless, the DCD has underestimated motor vehicle emissions because it has underestimated airport activity and thus the number of trips for a given level of activity. The DCD estimates the capacity of Alternative D at 78.9 MAP. (Supplement, Table ES-1.) However, a more realistic capacity for Alternative D has been determined to be 87 MAP. (*See* Comment II.A below) Thus, aircraft and related emissions, including from motor vehicles, are about 10 percent higher than assumed in the DCD. Further, an independent traffic analysis of Alternative D by a traffic expert demonstrated that vehicle traffic based on the assumed 78.9 MAP is also substantially underestimated. (*See* Brohard 2003[5].)

If the motor vehicle emissions are revised to account for greater airport activity than assumed in the DCD, they do not conform with the approved SIP. The DCD argues that since operational emissions for other aviation sources conform and since motor vehicle activity is directly related to the level of aircraft operations, that therefore motor vehicle emissions must also conform. However, this is true only if the DCD's erroneously low motor vehicle emissions are used. If a more accurate estimate of vehicle trips and airport activity are used, Alternative D NOx/NO_2 motor vehicle emissions exceed levels assumed in the approved SIP.

The fraction of the SCAB-wide motor vehicle emissions due to LAX can be estimated from information in the DCD, assuming that the ratio of motor vehicle emissions to aviation source emissions (aircraft plus APU) is the same in the DCD and the applicable plans, as claimed in the DCD. The calculations are included in Table 5 and indicate that Alternative D motor vehicle NOx/NO_2 emissions in the DCD are much greater than LAX NOx/NO_2 motor vehicle emissions in the SIP and thus do not conform.

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[5] Tom Brohard, Review of the Traffic Impacts of the Los Angeles International Airport Master Plan "Alternative D – Enhanced Safety and Security Plan," Attachment 2 to November 3, 2003 Comments submitted on behalf of the City of El Segundo by Shute, Mihaly & Weinberger, incorporated here by reference.

Table 5
Comparison of Motor Vehicle NO_x/NO_2 Emissions, Alternative D With 1997 and 2003 AQMP Emissions (ton/year)

Year	1997 AQMP[a] (Appx. III)[b]	2003 AQMP[a] (Appx. III, Attach. A)[c]	Revised Alternative D[d] (DCD, Table 4)
2005	5, 101	7,501	5,592
2008	4,331	6,007	4,717
2010	3,811	5,097	4,134

[a] Motor vehicle emissions from LAX in AQMPs: [(on-airport + off-airport motor vehicle emissions based on DCD, Table 4, but adjusted to assume higher activity levels and vehicle trips)/(aircraft + APU emissions from DCD, Table 4)](AQMP aircraft emissions from DCD, Table 8)

[b] For 2005: (5071/4520)(4546) = **5, 100.7** ton/year
For 2008: (4278/4810)(4869) = **4,330.5** ton/year
For 2010: (3749/5002)(5084) = **3,810.5** ton/year

[c] For 2005: (5071/4520)(6686) = **7,501.0** ton/year
For 2008: (4278/4810)(6754) = **6,007.0** ton/year
For 2010: (3749/5002)(6800) = **5096.6** ton/year

[d] Motor vehicle emissions in DCD, Table 4 revised to 87 MAP as follows: (on-airport + off-airport motor vehicle emissions)(87/78.9)

Thus, if motor vehicle emissions are revised based on more reasonable airport activity levels, the NO_x/NO_2 emissions from Alternative D motor vehicles are greater than those assumed in the SIP and thus do not conform.

I.B.3.d NOx/NO₂ Emissions From Construction

The DCD admits that the 1997 AQMP does not contain construction emissions from Alternative D, *viz.*, "it is evident that the 1997 AQMP does not contain specific estimates of emissions for construction activities under any of the LAX Master Plan build alternatives, including Alternative D" because, at the time SCAQMD prepared the 1997 AQMP, LAWA and FAA had only recently announced their plans to prepare a new Master Plan. (DCD, pp. 5-4/5.) The 1997 AQMP is the applicable SIP. The plain language of 40 CFR 93.158(a)(5)(i)(A), which the DCD relies upon, requires that the total of direct and indirect emissions from the action (or portion thereof) not exceed those in the applicable SIP. Thus, the DCD has demonstrated that construction emissions do not conform.

However, instead of admitting that construction NO_x/NO_2 emissions do not conform and consequently imposing offsets, the DCD proceeds to argue that "it would be reasonable to assume that SCAQMD allowed for an accommodation for

such a major construction program within the 2003 AQMP" because the Draft EIS/EIR was prepared before the 2003 AQMP. (DCD, p. 5-5.) The DCD presents no evidence whatsoever in support of this conclusory statement, again in violation of the plain language of the regulation it relies on, which requires "documentation." 40 CFR 93.158(a)(5)(i)(A). Further, both the 1997 AQMP and the 2003 AQMP contain a category specifically labeled "construction and demolition" which shows *zero* emissions for NOx/NO_2. Thus, clearly, neither plan considered NOx/NO_2 from construction per se. Further, the SCAQMD, in its comments on the Draft EIS/EIR and Supplement, complained that it could not recreate the claimed construction emissions,[6] which are identical to those claimed in the DCD

Finally, in an attempt to overcome these obvious problems, the DCD compares Alternative D NOx/NO_2 construction emissions to what it calls "construction-related source types," completely ignoring the category called "construction and demolition." (DCD, p. 5-5.) This comparison is inconsistent with the conformity regulations. Further, it is technically flawed, even for what it purports to be. It compares three categories of emissions—heavy-duty diesel trucks, mobile equipment, and other service and commerce. This comparison is invalid for three reasons.

First, these categories are much broader than construction and include many sources other than construction. It is not even clear that construction emissions per se are included in any of these categories.

Second, these categories are not broken out in Table 4, which summarizes Alternative D emissions by category. The DCD does not explain how Alternative D emissions were subdivided into these categories. Thus, the Alternative D emissions claimed within each category are unsupported. We requested, in our January 2004 FOIA request, that the FAA provide documentary support for all emission calculations, but received nothing that supports these emissions. (DCD, Table 9).

Third, this comparison deviates from the approach used for other emission categories in the DCD—aircraft, stationary sources, and motor vehicles—where Alternative D emissions as reported in Table 4 were compared with their counterpart in the SIP and 2003 AQMP. With respect to construction emissions, the DCD compares Alternative D emissions from a category other than reported in

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[6] Letter from Barry R. Wallerstein, SCAQMD, to David B. Kessler, Federal Aviation Administration, Re: Supplement to the Draft Environmental Impact Statement/Report (DEIS/R) for the Los Angeles International Airport Proposed Master Plan, November 7, 2003; attached as Exhibit E to Comments on the Draft General Conformity Determination submitted by Shute, Mihaly & Weinberger on behalf of the City of El Segundo.

Table 4 and the one of interest (construction) to the total emissions in the SIP and 2003 AQMP from the same category in an attempt to argue that Alternative D emissions are a small fraction of the total. However, when the total either does not include the component of interest, or the component of interest is de minimis, as here, the comparison is nonsensical. There is no support for such an approach in the conformity regulations or guidance. Thus, the analysis of the construction component of Alternative D does not support the claim that construction emissions conform with the applicable SIP.

I.C PM10 Emissions Do Not Conform

Particulate matter consists of two components, primary particulate matter which is directly emitted as particles and secondary particulate matter, which is emitted as a gas and is converted to particles in the atmosphere through photochemical reactions. The general conformity regulations require that both components be evaluated. See 40 CFR 93.152, definition of "precursors of a criteria pollutant."

The DCD used separate analytical methods to evaluate these two components. It used a dispersion model for primary PM10, summarizing the results in Tables 12 and 13, and an approximation for secondary PM10, summarizing the results in Table 14. We were unable to comprehensively evaluate either analysis because the FAA did not produce the necessary files in response to our FOIA request. We, for example, did not receive the dispersion modeling input files that support Tables 12 and 13.[7] The following comments are based on the limited and incomplete information in the DCD.

The PM10 emissions from Alternative D do not conform to emissions in the SIP. Therefore, the DCD elected an alternate approach to demonstrate conformity. The DCD used dispersion models to estimate ambient air quality concentrations of primary and secondary PM10 due to Alternative D, pursuant to 40 CFR 93.158(a)(3) and 40 CFR 93.158(a)(4)(i). (DCD, p. 5-6.) This analysis does not appear to be consistent with the general conformity regulations and substantially underestimates ambient PM10 concentrations for the reasons outlined below.

I.C.1 Areawide Modeling Was Not Performed

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[7] We received two output files from AERMET. One of these files (sfc) contained surface meteorological data with temperatures recorded at 2 meters and wind data at 6.1 meters. The other (pfl) contained only 6.1-meter meteorological data. This appears to be typical airport meteorological data. However, we were not provided any files that show receptor locations, modeled emission rates, or other modeling assumptions, *e.g.*, urban versus rural, source locations, etc.

The DCD performed a "local air quality modeling analysis" using the Industrial Source Complex ("ISC") model. (DCD, p. 3-2.) However, the regulations require that an "areawide air quality modeling analysis *and* local air quality modeling analysis" be performed (40 CFR 93.158(a)(3)(i), emphasis added) unless the requirements of 40 CFR 93.158(a)(5) are satisfied or "the State agency primarily responsible for the applicable SIP determines that an areawide air quality modeling analysis is not needed." 40 CFR 93.158(a)(4)(i).

The requirements of 40 CFR 93.158(a)(5) are not met because PM10 emissions from Alternative D "exceed the applicable SIP budgets..." (DCD, p. 5-6.) Further, the information produced in response to our FOIA request does not contain any determination by a responsible agency that areawide modeling is not required for PM10. In fact, the produced correspondence suggests that CARB, "the State agency primarily responsible for the applicable SIP," recommended the use of a photochemical grid model, an areawide model, to determine the contribution of secondary PM10 to the total PM10. (Siple 4/7/03.[8]) The DCD largely ignored this suggestion and instead scaled the results from modeling prepared for the 2003 AQMP. (DCD, p. 5-8.) The record contains no evidence that a responsible agency determined that areawide modeling was not required for primary PM10, even though LAX is the largest source of NOx emissions in the SCAB and NOx is a PM10 precursor.

I.C.2 Conformity Analyses Are Incomplete

The general conformity regulations require that the analyses reflect emission scenarios that are expected to occur under: (a) the mandated attainment year; (b) the year during which emissions are expected to be greatest; and (c) any year for which the applicable SIP specifies an emission budget. 40 CFR 93.159(d). Thus, PM10 conformity analyses should have been conducted for 2006 and 2013 (DCD, Table 1), as well as 2005, 2007, 2008, 2010, and 2020, respectively. The primary PM10 modeling analyses were performed for 2006 (DCD, Table 13) and 2013 (DCD, Table 12), and the secondary PM10 analysis for 2013 (DCD, Table 14). Thus, the conformity analyses are incomplete.

I.C.3 Modeled Primary PM10 Concentrations Are Underestimated And Do Not Conform

The increase in ambient concentrations of primary PM10 was modeled using ISC for 2006 and 2013. These increases were added to the estimated future background to calculate the total ambient primary PM10 concentrations. The totals

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[8] George W. Siple, personal communication with Pat Ryan, STI, Telephone Call Report, Re: Use of UAMAERO-LT to Model PM10 Precursors for Operations at LAX, April 7, 2003.

were then compared to the 24-hour and annual national ambient air quality standards ("NAAQSs"). (DCD, Tables 12, 13.)

These analyses suggest that the modeled increases in concentration due to Alternative D plus the future background are less than the NAAQSs. However, the total concentrations are close to the applicable standards, particularly the annual results. In 2006, the annual predicted Alternative D plus background concentration is 48 $\mu g/m^3$, compared to the NAAQS of 50 $\mu g/m^3$. In 2013, the annual predicted Alternative D plus background concentration is 40 $\mu g/m^3$, compared to the NAAQS of 50 $\mu g/m^3$. Because modeled ambient concentrations are directly related to emissions, a small underestimate in Alternative D emissions or overestimate in NA/NP emissions would result in exceedances of the annual, and perhaps, the 24-hour NAAQS for primary PM10 alone.

We note that the modeled PM10 concentrations in the DCD are significantly lower than their counterparts in the Supplement. The results reported in the Supplement in Table S4.6-22 for 2005 and 2015 plus the future background exceed the annual average NAAQS for PM10 in both 2006 and 2013, when adjusted for the difference in emissions between the DCD and the Supplement.

I.C.3.a Primary PM10 Emissions Are Underestimated

The emissions used in the ISC modeling are likely underestimated. Modeled ambient concentrations are directly proportional to emissions. Thus, if emissions are underestimated, ambient concentrations are proportionately underestimated. The specific primary PM10 emissions that were modeled are unknown because the FAA did not produce the ISC input files. However, the general conformity regulations require that the "total of direct and indirect emissions from the action" be modeled. 40 CFR 93.158(a)(3) and (4). These are defined as "net" emissions under 40 CFR 93.152. Thus, presumably, the net PM10 emissions in Table 5 were modeled.

The net emissions in Table 5 substantially underestimate actual emissions because they are calculated relative to an inflated baseline, as explained in Comment I.A. Further, Alternative D emissions in Table 4, which were used to calculate net emissions in Table 5, exclude a number of emission sources, e.g., reverse thrust, are based on incorrect airport activity levels, and contain a number of errors, as explained in Comment II. Thus, it is likely that the modeled primary PM10 increments, if estimated with accurate emission data, would be greater than reported in Tables 12 and 13. A 5 percent increase, which is all that would be required to cause a violation of the annual NAAQS for PM10, is certainly likely, given the many flaws in the DCD's emission estimates documented in Comment II. Thus, we believe Alternative D PM10 emissions would cause or contribute to a violation of both the 24-hour and annual PM10 NAAQS.

I.C.3.b Future Concentration Rollback Procedure Is Invalid For Conformity

The primary PM10 modeling analysis compared the increase due to Alternative D plus future background with the NAAQS. (DCD, Tables 12, 13.) The future ambient background concentrations were estimated by multiplying existing PM10 concentrations by the ratio of future to current emissions based on the SIP. (DCD, p. A-30.) The FAA did not provide any supporting calculations for these future background concentrations, which we were unable to reproduce. This rollback procedure underestimates future background and thus underestimates the total PM10 concentrations, as explained in our previous comments on both the Draft EIS/EIR and Supplement.

The use of "future" background concentrations instead of current background concentrations assumes that the SCAB will come into compliance with NAAQS by the stipulated date, 2006. History indicates that this is not a good assumption for PM10, which originates from sources that are difficult to control. The 2003 AQMP itself admits that compliance is unlikely due to growth alone.

The use of "future" background concentrations calculated using the rollback procedure is inconsistent with the *Guideline on Air Quality Models*, which must be followed in air quality analyses prepared for conformity determinations. 40 CFR 93.159(c). The background concentration should be based on actual measured data for existing conditions or appropriate modeling. (U.S. EPA 2/03,[9] Sec. 9.2.) If existing background concentrations reported in the DCD were used, which are 37 $\mu g/m^3$ annual average and 82.3 $\mu g/m^3$ 24-hour average (DCD, Table 15, p. A-30), Alternative D plus the background concentrations would cause violations of the annual PM10 NAAQS and thus would not conform under 40 CFR 93.158(a)(4) and (b).

Finally, the current background concentrations, which are the starting point for future years, are based on actual measurements made at LAX for the Master Plan. (DCD, Table 15.) Worst-case conditions must be used to determine if Alternative D would "cause or contribute to any new violation." 40 CFR 93.158(b)(2)(i). The LAX measurements are based on a relatively short record, August 1997 through March 1998, and thus do not represent worst case conditions. Monitoring data for other nearby sites and years indicate that PM10 concentrations can be substantially higher than assumed in the DCD.

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[9] U.S. EPA, 40 CFR Part 51, Revision to the Guideline on Air Quality Models: Adoption of a Preferred Long Range Transport Model and Other Revisions, Final Rule, Federal Register Vol. 68, No. 72, Tuesday, April 15, 2003.

Thus, the DCD has underestimated ambient air quality impacts by using an unreasonably low background PM10 concentration.

I.C.4 Secondary PM10 Concentrations Are Underestimated

The DCD estimated the contribution of secondary PM10 to the total PM10 impact by scaling the results of UAMAERO-LT modeling analyses prepared by SCAQMD for the 2003 AQMP using the ratio of Alternative D precursor emissions (VOC, NOx, SO_2) to the approved SIP precursor emissions. (DCD, pp. 5-7/8.) Notwithstanding the fact that this approach is not consistent with the general conformity regulations, as explained in Comment I.C, the analyses are inaccurate and underestimate impacts.

First, the DCD analysis only considered a portion of the secondary PM10 that would be formed by Alternative D emissions. The SCAQMD study indicates that ammonium and elemental carbon also contribute to secondary PM10. Alternative D, for example, would emit ammonia, from vehicle and aircraft exhaust. Ammonia would also be emitted from stationary sources if NOx is controlled by SCR, which is likely. Thus, ammonium also should have been included.

Second, the 2013 Alternative D emissions used to scale the UAMAERO-LT results are inconsistent with the emissions reported in the DCD, Table 4. The 2013 emissions should be 8.1 ton/day of VOC (DCD, Table 4); 26.4 ton/day of NO_2 (DCD, Table 4); and 1.4 ton/day for SO_2. (Supplement, Tables S4.6-9 to S4.6-11.) This would increase the predicted secondary PM10 from 0.25 $\mu g/m^3$ in the DCD (DCD, Table 14) to 0.43 $\mu g/m^3$. This increase, coupled with increases due to underestimating emissions as discussed in Comment I.C.3.a, would result in violations of the PM10 NAAQSs.

I.C.5 Primary PM10 ISC Modeling Is Flawed

The DCD used the ISC model to estimate the increase in ambient PM10 concentrations. The input files were not provided in response to our FOIA request. However, based on the description of the modeling in Appendix B to the DCD, the modeling is based on assumptions that underestimate the impacts.

I.C.5.a One Year Of Meteorological Data Is Insufficient

The DCD used one year of meteorological data for modeling air pollutant dispersion. This is insufficient. The critical factor is whether the chosen data set is representative of the area's conditions. While one year of on-site data is certainly representative of that year, the record is too short to capture year-to-year variations.

Clearly, a longer-term data set will present a more accurate picture of the area's actual conditions than a shorter-term set.

The U.S. EPA *Guideline on Air Quality Models* states that "[t]he model user should acquire enough meteorological data to ensure that worst-case meteorological conditions are adequately represented in the model result," concluding that "five years of representative meteorological data should be used when estimating concentrations with an air quality model." (U.S. EPA 2/03, p. 18464.) The procedure for conformity determinations requires that the air quality modeling analyses are based on "the applicable air quality models, data bases, and other requirements specified in the most recent version of the "Guideline on Air Quality Models [], including supplements." 40 CFR 93.159(c).

I.C.5.b Modeling Fenceline Excludes Ambient Air

The ISC modeling only calculated ambient concentrations outside of the fenceline. (DCD, p. B-29.) We do not have the ISC input files and thus cannot determine precisely what fenceline was assumed. However, based on the modeling for the Supplement, we presume that the DCD modeled areas outside of the boundary of LAX, as shown on DCD Figure 1.

However, "ambient air" is defined at 40 CFR 50.1(e) as "that portion of the atmosphere, external to buildings, to which the general public has access." The modeling must demonstrate compliance with NAAQS for all ambient air. U.S. EPA policy generally requires that receptors be located everywhere outside of buildings that are not fenced. The DCD, Figure 1, indicates that there are areas within LAX that are accessible to the public, including parking structures and Westchester Parkway. We are uncertain what was actually modeled. However, if the boundaries shown on DCD Figure 1 or other similar boundaries were modeled, the PM10 ambient concentrations were likely underestimated because the highest impacts for PM10 normally occur close to the source. In general, areas within the boundary would be closer to the source of PM10 emissions than areas outside of the boundary. Thus, the modeling may have failed to find the point of highest impact.

II. EMISSION MODELING IS FLAWED

The DCD calculated the total of direct and indirect emissions from Alternative D compared to the baseline "as the difference between the emission of the build and the no-build scenarios." For this purpose, the year-by-year emissions for the NA/NP alternative (DCD, Table 3) were subtracted from the emissions for Alternative D (DCD, Table 4) for each pollutant over the period from 2005 to 2015. These values were then compared to the de-minimis emission rates set forth in 40 CFR 93.153 and 40 CFR 81.305 (DCD, Table 5). According to the DCD's emission

estimates, Alternative D appears to have lower emissions for VOC and CO than the NA/NP alternative for all analysis years and therefore does not exceed the respective de-minimis thresholds. Thus, no conformity analysis was prepared for VOC and CO. The net increases in NOx and PM10 emissions, on the other hand, exceed the respective de minimis thresholds, requiring a conformity determination. (DCD, pp. 4-7/8.)

For the NA/NP alternative, emissions differ considerably between the Supplement and the DCD for interim year 2005 and horizon year 2015. See attached Table 8a. Likewise, with the exception of construction emissions, mitigated emissions for Alternative D differ considerably between the Supplement and the DCD in interim years 2005 and 2013 and in 2015 after completion of construction. See attached Table 8b. While the DCD claims to have made some changes to the emission modeling, it does not provide sufficient details to fully document and understand, let alone reproduce, the emission modeling results. We were unable to fully explore these differences because the FAA did not produce all of the necessary files in response to our FOIA, including EDMS input files for the NA/NP alternative, construction emission spreadsheets, and all of the EDMS input values for Alternative D. Thus, we were unable to reproduce any of the emissions reported in the DCD. We may supplement these comments if the FAA produces additional requested files.

However, based on comparison of the results presented in the DCD and the Supplement as well as the provided emission modeling files, we conclude that the DCD has considerably underestimated emissions for Alternative D and overestimated emissions from the NA/NP alternative. If accurate emissions had been used, the DCD would have concluded that a conformity determination is required for VOC and CO and that emissions of NOx and PM10 do not conform, requiring offsets or a revision of the applicable SIP.

We have previously submitted comments on the air quality modeling section of the Draft EIS/EIR and the Supplement. Most of those comments are equally applicable to the DCD air quality modeling and are herewith incorporated by reference. See Draft EIS/EIR Comments Fox 2001 and Supplement Comments Fox & Pless 2003.[10]

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[10] J. Phyllis Fox and Petra Pless, Comments on Air Quality and Human Health and Safety, LAX Master Plan Supplement to the Draft Environmental Impact Statement/Draft Environmental Impact Report; Attachment 3 to November 3, 2003 Comments submitted on behalf of the City of El Segundo by Shute, Mihaly & Weinberger; attached as Exhibit C to Comments on the Draft General Conformity Determination submitted by Shute, Mihaly & Weinberger on behalf of the City of El Segundo.

In addition, the comments below demonstrate that the DCD's emissions modeling is flawed because: (a) the NA/NP alternative airport capacity in 2005 and other years was overestimated, (b) Alternative D airport capacity in 2015 was underestimated, (c) emissions from the NA/NP alternative were artificially inflated, and (d) emissions from Alternative D were underestimated. Further, the emissions modeling did not follow procedures for general conformity determination in 40 CFR 93.159 and excluded some emission sources.

Consequently, if emissions for both cases were remodeled using accurate assumptions and a revised estimate of airport capacity, the total of direct and indirect emissions from Alternative D compared to the NA/NP alternative would require a conformity determination for pollutants and years not analyzed. Further, such an analysis would demonstrate that Alternative D emissions do not conform and thus must be offset or the SIP revised.

The following sections address these issues, one at a time. If all of these issues were addressed in a single calculation, which we were unable to perform because the FAA did not produce all of the EDMS input assumptions, conformity analyses would be required for additional pollutants and/or years. Further, Alternative D would not conform, requiring offsets or a revision of the SIP.

II.A Assumed Airport Capacities Are Wrong

The airport capacities assumed in the NA/NP alternative are inconsistent with those assumed by responsible planning agencies who provide the input assumptions for the SIP.

II.A.1 NA/NP Alternative Activity Levels Are Inconsistent With SCAG Estimates

The DCD apparently assumed that passenger activity levels were 71.2 MAP in 2005 under the NA/NP alternative. (Draft EIS/EIR, p. 3-25.) The DCD also assumed that the airport would reach its full capacity of 78.7 MAP in 2013. Activity levels and emissions for intervening years were interpolated between these two points. The activity level in 2015 was assumed to equal that for 2013, or 78.7 MAP for the NA/NP alternative and 78.9 for Alternative D.

The NA/NP activity levels are inconsistent with those used by the Southern California Association of Governments ("SCAG"). The SCAG provides activity levels to the SCAQMD, who uses them to estimate emission budgets used in the SIP A record of a telephone conversation produced in response to our FOIA request indicates that SCAG assumes that passenger activity levels in 2005 would be

62.7 MAP; 73.7 MAP in 2010; and 78 MAP in 2015. (Pehrson 2003[11].) The DCD assumes levels in intervening years increase linearly.

The analyses required for purposes of a conformity determination "must be based on the latest planning assumptions... Any revisions to these estimates used as part of the conformity determination, including projected shifts in geographic location or level of population, employment, travel, and congestion, must be approved by the MPO or other agency authorized to make such estimates for the urban area." (40 CFR 93.159.)

Thus, the activity levels for the NA/NP alternative assumed in the DCD are inconsistent with local planning agency estimates and therefore inconsistent with the regulations. No explanation for increasing activity levels above those assumed by SCAG is provided in the DCD. The result is that the DCD has overstated NA/NP airport-related emissions in 2005 by about 14 percent (71.2/62.7), in 2006 by 12 percent (72.1/64.4), in 2008 by 8 percent (74.0/68.4), and in 2010 by 3 percent (75.9/73.7) by assuming buildout of LAX at a more rapid rate than assumed by local planning agencies, thus inflating the baseline used to calculate net emission increases. Reducing the NA/NP emissions to be consistent with SCAG estimates, the net emissions of VOC in 2005 (4,532–3,915 = 617 ton/year) exceed the de-minimis threshold of 10 ton/year. Further, the net CO emissions in 2005 (43,488–37,808 = 5,680 ton/year) and in 2008 (36,978–34,633 = 2,345 ton/year) exceed the de-minimis threshold of 100 ton/year. Thus, a conformity determination is required for VOC in 2005 and CO in 2005 and 2008. The DCD does not include any conformity analyses for VOC or CO and is thus deficient.

II.A.2 Alternative D Airport Capacity In 2015 Is Underestimated

The DCD states that "Alternative D planning assumptions reflected in the Supplement to the Draft EIS/EIR are based on the airport accommodating 78.9 MAP in 2015, consistent with the Supplement." (DCD, p. 3-1.) This estimated airport capacity – already exceeding the maximum allowable MAP under the SCAQMD's air quality management plan ("AQMP") and the maximum capacity assumed for regional transportation planning by SCAG – appears to be a substantial underestimate.

An independent evaluation of the capacity of Alternative D by an eminent expert in airport design and capacity determined that LAWA never conducted a proper capacity analysis of the proposed terminal and gate configuration.

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[11] John R. Pehrson, personal communication with Mike Armstrong, Telephone Call Report Re: LAX MAP Levels – SCAG Assumptions, December 9, 2003.

(Kanafani 2003[12].) The Supplement's and the DCD's capacity assumption was not based on the physical gate configuration but on a variety of market assumptions. Obviously, such an estimate cannot be used as a suitable representation of the capacity of Alternative D. The airport design expert concluded that a more realistic, though still conservative, estimate of the capacity of Alternative D, based on the proposed configuration, would be 87 MAP.

The DCD indicates that it is a "reasonable assumption that motor vehicle activity which has LAX as a source or destination is directly related to the level of aircraft operations at LAX." (DCGD, p. 5-4.) Similarly, all other sources of emissions from Alternative D (DCD, Table 4), except construction, would be expected to scale linearly with MAP. Thus, we used the same "reasonable assumption" approach and scaled operational emissions from Alternative D for the years 2013 and 2015 from the DCD's assumed 78.9 MAP to 87 MAP and followed the DCD's linear interpolation approach between years 2013 and 2005. Our calculations are summarized in attached Table 9.

Table 9 demonstrates that if Alternative D emissions are increased to a level consistent with airport operations at a capacity of 87 MAP, the net emissions of CO in 2013 and NO_x/NO_2 in 2015 (column labeled "Alternative D minus No Action/No Project Alternative" in Table 9) would exceed the de-minimis thresholds of 100 ton/year and 10 ton/year, respectively. This would require a conformity determination for CO in 2013 and NOx in 2015. The DCD does not contain the requisite analyses.

II.B Reverse Thrust Is Not Included

The DCD estimates emission rates for four aircraft operational modes, taxi/idle, takeoff, climbout, and approach. The DCD omits emissions associated with aircraft reverse thrust operations from its air quality analysis due to a lack of adequate emission factors and short usage time. The DCD maintains that "emissions for this mode are assumed to have minimal impact on the emission inventories." (DCD, p. B-3.) We disagree with this speculative statement.

Engine thrust reversal is typically used after aircraft landing to slow the aircraft to taxi speed and occasionally to "power-back" away from a boarding bridge (a practice not employed at LAX because of the lack of space between terminal

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[12] A. Kanafani, Capacity Analysis of Aircraft Gate Positions, Los Angeles International Airport, Master Plan Alternative D; submitted as Attachment 7 to November 3, 2003 Comments submitted on behalf of the City of El Segundo by Shute, Mihaly & Weinberger; attached as Exhibit B to Comments on the Draft General Conformity Determination submitted by Shute, Mihaly & Weinberger on behalf of the City of El Segundo.

buildings.) Reverse thrust describes the practice of setting the engines to full power in the reverse direction and is essentially a high-thrust operating mode. High-thrust operating modes, such as aircraft takeoff, generate very high NOx emissions per unit time relative to other operating modes such as aircraft taxi. While the time in mode ("TIM") for reverse thrust operations is, in fact short, approximately 15 to 20 seconds, it can nevertheless be responsible for an additional 15 percent or more of the on-airport NOx emissions. (Rice & Walton 2003.[13])

Perplexingly, the FAA does not follow its own official guidance on this matter. The FAA recognizes the importance of including reverse thrust operations in air quality assessments in its Air Quality Handbook,[14] which provides guidance, procedures and methodologies for use in carrying out air quality assessments for proposed Federal actions that are required for compliance with the National Environmental Policy Act, the CAA and other environment-related regulations and directives. This guidance was relied on in preparing the DCD and produced in response to our FOIA request.

The Air Quality Handbook, published well before this DCD was conducted, unambiguously states that "[r]everse thrust is now considered by EPA as an official mode *and should be included in calculation procedures...*" [Emphasis added.] It continues "[s]ince reverse thrust engine operating conditions are similar to takeoff, time spent in reverse thrust should be combined with takeoff mode emission indices and fuel flow as a means of accounting for reverse thrust mode emissions. Aircraft reverse thrust typically is applied for 15-20 seconds[15] on landing." It explicitly specifies that "[t]akeoff emission indices and fuel flow should be used as inputs for calculating emissions from reverse thrust (as well as takeoff) mode." (Air Quality Handbook, Appendix D[16], pp. D-5/6.) Further, reverse thrust operations were recently included in the EDMS modeling in environmental documents analyzing two other airports in the South Coast Air Basin—John Wayne and El Toro—by adding 15 seconds to the total takeoff time. (MCAS El Toro FEIR,[17] p. 4.5-26.)

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[13] Colin Rice and C. Michael Walton, Restricting the Use of Reverse Thrust as an Emissions Reduction Strategy, Research Report SWUTC/03/167231-1, Southwest Regional University, Center for Transportation Research, University of Texas, Austin, TX, revised July 2003.

[14] Federal Aviation Administration, Air Quality Procedures for Civilian Airports and Air Force Bases, April 1997.

[15] A recent study on reverse thrust usage at Bergstrom International Airport in Austin, Texas, demonstrated an average TIM for reverse thrust during landing of 16.0 seconds. (Rice & Walton 2003.)

[16] Federal Aviation Administration, Air Quality Procedures for Civilian Airports and Air Force Bases, Appendix D, Aircraft Emission Methodology, April 1997.

[17] County of Orange, Final Environmental Impact Report No. 573 for the Civilian Reuse of MCAS El Toro and the Airport System Master Plan for John Wayne Airport and Proposed Orange County

Of the four phases of the aircraft landing/takeoff operations ("LTO") cycle typically included in aircraft emissions modeling, the greatest NOx emissions are attributable to the takeoff mode. Thus, increasing the amount of time in takeoff mode will considerably increase NOx emissions. (NESCAUM[18], p. II-13.) We analyzed the DCD's EDMS emissions estimates to confirm that a large proportion of NOx emissions from aircraft operations are attributable to takeoff.[19] We analyzed Alternative D year 2015 emissions as an example because year 2015 and year 2013 were the only modeling results provided in response to our FOIA. All other years were interpolated between year 2005 and 2013 or 2015, respectively. The results, summarized in Table 6 below, in fact, demonstrate that 48 percent of the total aircraft NOx emissions are attributable to takeoff.

Table 6
DCGD Estimated Aircraft Emissions for Alternative D, Year 2015

LTO	VOC (ton/year)	CO (ton/year)	NOx (ton/year)
Approach	15.5	192.7	643.6
Climbout	3.6	31.7	1,063.9
Taxi	1,044.8	6,044.7	993.4
Takeoff	6.8	45.3	2,488.9
Total	**1,070.7**	**6,314.4**	**5,189.8**
Approach	1.4%	3.1%	12.4%
Climbout	0.3%	0.5%	20.5%
Taxi	97.6%	95.7%	19.1%
Takeoff	0.6%	0.7%	48.0%
Total	**100.0%**	**100.0%**	**100.0%**

The average assumed takeoff time for aircraft under Alternative D for the year 2015 assumed in the DCD's EDMS input files is 0.96 minutes.[20] Increasing this takeoff time by 15 seconds, or 0.25 minutes, to account for emissions from reverse

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International Airport, SCH No. 98101053, August 2001; attached as Exhibit F to Comments on the Draft General Conformity Determination submitted by Shute, Mihaly & Weinberger on behalf of the City of El Segundo.

[18] Northeast States for Coordinated Air Use Management ("NESCAUM") and Center for Clean Air Policy, Controlling Airport-related Air Pollution, June 2003.

[19] EDMS File "AltD2015M.edm" provided on CD by FAA on January 19, 2004.

[20] EDMS File "AIR_POP.dbf" (MODE 3 = takeoff TIM) for Alternative D in 2015 provided on CD-ROM by FAA on January 19, 2004. Average TIM for the NA/NP alternative in 2015 is 0.94 minutes.

thrust, increases the total takeoff TIM by 26 percent. Aircraft NOx emissions are directly proportional to the TIM for each LTO. Consequently, an increase of 26 percent in the takeoff TIM results in an increase of 26 percent in NOx emissions attributable to takeoff and reverse thrust. As illustrated in the Table 7 below, this increases aircraft NOx emissions attributable to takeoff and reverse thrust by 648 tons per year to 53.7 percent of total NOx aircraft emissions in the year 2015.

Table 7
DCD Estimated Aircraft Emissions for Alternative D, Year 2015
Adjusted for Reverse Thrust

LTO	VOC (ton/year)	CO (ton/year)	NOx (ton/year)
Approach	15.5	192.7	643.6
Climbout	3.6	31.7	1,063.9
Taxi	1,044.8	6,044.7	993.4
Takeoff	8.6	57.1	3,137.1
Total	**1,072.5**	**6,326.2**	**5,838.0**
Approach	1.4%	3.0%	11.0%
Climbout	0.3%	0.5%	18.2%
Taxi	97.4%	95.5%	17.0%
Takeoff	0.8%	0.9%	53.7%
Total	**100.0%**	**100.0%**	**100.0%**

Thus, aircraft LTO NOx emissions from Alternative D in year 2015 increase from 5,190 ton/year to 5,838 ton/year or by 12.5 percent, simply due to the inclusion of reverse thrust in the emission modeling. Total aircraft VOC and CO emissions only slightly increase by 0.2 percent, as more than 95 percent of VOC and CO emissions are attributable to aircraft taxi.

Assuming that a 12.5 percent increase in aircraft LTO NOx emissions would also occur in other analysis years, the total aircraft emissions, including APUs, increase to 5,072 ton/year in 2005; 5,399 ton/year in 2008; and 5,614 ton/year in 2010. The comparable applicable SIP emissions, as reported in the DCD, Table 8, are 4,546 ton/year in 2005; 4,869 ton/year in 2008; and 5,084 ton/year in 2010. Thus, the revised Alternative D NOx/NO_2 emissions exceed those in the approved SIP for each analysis year. (DCD, Table 8.) Therefore, if reverse thrust emissions had been included, NOx emissions would not conform under the DCD's interpretation of a conformity determination (which is inconsistent with the plain language of the regulations), requiring offsets or a revision to the SIP.

Since neither the DCD nor the Draft EIS/EIR or its Supplement propose any measures restricting reverse thrust operations, there is no supportable rationale for

excluding reverse thrust emissions from the DCD. The inclusion of reverse thrust increases total emissions and thus has the potential of causing nonconforming emissions.

II.C Aircraft Emissions And Dispersion Modeling Software Is Outdated

The conformity regulations require that "the analyses required under this subpart must be based on the latest and most accurate emission estimation techniques available..." 40 CFR 93.159(b). The DCD did not use the most recent emission estimation techniques.

The DCD states that "[t]he most current version of EDMS available at the time of this protocol is EDMS 4.11." (DCD, Appx. A, p. A-7.) It is true that at the time the protocol for the DCD was completed in July 2003, the most recent version of EDMS was 4.11. However, the FAA released version 4.12 in October of 2003, three months before publication of the DCD.[21] Three months should have provided ample time for modeling the air quality impacts of Alternative D and of the NA/NP alternative with the most recent EDMS version.

Instead of consistently using either of the two most recent EDMS versions 4.11 or 4.12, the DCD relies on the same flawed methodology used in the Supplement, which developed ratios between the aircraft operational emissions modeled with EDMS versions 3.2 and 4.11 for each criteria pollutant for Alternative D for 2015. These ratios were then used to scale emission estimates modeled with EDMS 3.2 for all other alternatives, including the NA/NP alternative. We previously submitted comments on the problems associated with this methodology. See Supplement Comments Fox & Pless 2003, Comment I.A.

II.D Emissions Interpolation Is Flawed

The DCD maintains that "on-airport operations emissions for interim years out to 2015 for Alternative D were estimated following a linear interpolation approach," "[u]sing as a starting point the on-airport operations emissions estimated for year 2005 for the No Action/No Project Alternative as presented in the Draft EIS/EIR..." Off-airport (regional) emissions operations at LAX are also based on a linear interpolation approach between years 2005 and 2015 estimates for Alternative D. Construction emission estimates for Alternative D were performed by year and added to the off-airport and on-airport emissions and summarized in DCD, Table 4. (DCD, p. 4-6/7.) Interpolation, even if followed, which it was not, does not

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[21] Federal Aviation Administration, Office of Environment and Energy, Emissions and Dispersion Modeling System Updates, http://www.aee.faa.gov/emissions/edms/edms_Updates/Updates.htm, accessed January 31, 2004.

represent "the latest and most accurate emission estimation techniques." The emissions should have been estimated with EDMS for each analysis years. See our comments on the Supplement. However, there are two problems with this approach.

II.D.1 Wrong Planning Horizon

Contrary to the DCD's assertion that on-airport operations emissions were interpolated between 2005 and 2015, analysis of the DCD, Table 4, shows identical results for aircraft operations, APUs, and stationary sources for years 2013 and 2015. (DCD, p. 4-7.) Inspection of the modeling files provided in response to our January 2004 FOIA request indeed reveals that emission estimates for aircraft, APU, and stationary sources for 2015 were assumed to be equal to 2013 and interim year emission estimates were interpolated between years 2005 and 2013. Similarly, emission estimates for on-airport and off-airport motor vehicles for 2015 were assumed to be the same as 2013 but year-specific EMFAC2002 factors were applied. (*See* Exhibit 1.[22]) This is clearly not correct because the construction schedule shows that construction of some components of Alternative D take place in 2014.

The DCD does not provide any rationale whatsoever for using the year 2013 as a planning horizon and interpolation endpoint rather than the year 2015, which was used as the planning horizon endpoint in both the Draft EIS/EIR and the Supplement. Using the year 2013 as a planning horizon endpoint is further inconsistent with the conceptual summary schedule provided in the Supplement, which clearly shows that Alternative D will not be completely built out until the end of 2014. Runway 24R and the center taxiway as well as the North CTA aprons, taxiways, and concourses are still under construction throughout the year 2014. (Supplement, Figure S3-15.) Thus, it is not clear how the airport can be fully built out in 2013 when components of Alternative D are not constructed until after 2013.

It can be reasonably expected that Alternative D will not be operating at full capacity until all improvements have been implemented and until all its structures are fully functional. Therefore, emission estimates are expected to increase between interim year 2013 and final buildout year 2015. Using interim year 2013 as an endpoint for emissions modeling appears to underestimate actual emissions from Alternative D. In particular, following the trend of increasing emissions from 2005

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[22] File "FederalEmissions.xls, Alternative D," Table 4, LAX Master Plan Emissions for Alternative D Interim Years, created by John R. Pehrson, Camp Dresser & McKee Inc, January 9, 2004; provided on CD-ROM in response to Freedom of Information Act Request for Materials Relating to the Clean Air Act Draft General Conformity Determination for the Los Angeles International Airport Proposed Master Plan Improvement, Alternative D, submitted to Federal Aviation Administration by Shute, Mihaly & Weinberger, January 2004.

through 2015 in DCD, Table 4, emission estimates for aircraft, APUs, stationary sources, and motor vehicles would be expected to be higher for 2015 compared to 2013 while construction emissions would decrease.

II.D.2 Wrong Mixing Height in 2005

Total Alternative D emissions generally decrease from 2005 through 2015. (DCD, Table 4.) As discussed above, emissions in 2006, 2008, and 2010 in Table 4 were interpolated between 2005 and 2013. This means that these emissions were estimated by subtracting an annual increment[23] from the 2005 emissions. If the 2005 emissions are underestimated, the future years emissions estimated by interpolation are also underestimated.

The EDMS modeling files indicate that a mixing height of 2,050 feet was assumed for 2013 and 2015, while 1,800 feet was assumed for 2005. The lower mixing height in 2005 would underestimate 2005 emissions, compared to future years, especially NOx emissions. The takeoff mode extends from the initial aircraft roll to a certain height above the airport elevation, at which point climbout begins and lasts until the mixing height elevation has been reached. Takeoff time is calculated as the length of time required to reach a given elevation. Thus, the higher the mixing height, the greater the takeoff emissions. Table 6 indicates that takeoff is the major source of NOx emissions. Thus, the DCD has underestimated 2005 emissions and thus 2006, 2008, and 2010 NOx emissions by using a lower mixing height in 2005 than in 2013.

II.E GSE Emission Reductions For Alternative D Are Overestimated

In December 2002, the California Air Resources Board ("CARB") and major commercial airlines signed a non-binding Memorandum of Understanding ("MOU") designed to reduce emissions from GSE at commercial service airports in the SCAB.[24] Most commercial airlines servicing LAX were signatories to this MOU. Major elements of the MOU include a fleet average emission target, an accelerated GSE turnover rate, the use of electric equipment where feasible, reductions in diesel particulate matter, and enforceable agreements that are creditable under the SIP. Full implementation of the MOU is expected to reduce fleet-average hydrocarbon plus NOx ("HC + NOx") GSE emissions of 12 grams per break horsepower hour

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[23] Interpolated emissions in 2006, 2008, and 2013: (2005 emissions) - (number of years between 2005 and future year of interest)[(2005 emissions -2013 emissions/8)].

[24] South Coast Ground Service Equipment Memorandum of Understanding, November 27, 2002.

("g/bhp-hr") by 80 percent by the year 2010 relative to the year 1997 GSE fleet average. (Siple 2003[25].)

For the NA/NP alternative, the DCD assumed full implementation of the MOU by 2010. The DCD further assumed that fleet composition would be maintained through 2015 and that this fleet would be approximately 30 percent zero-emission equipment. (DCD, p. B-13.) For Alternative D, the DCD assumed full implementation of an incentives-based program as proposed by LAWA in the Supplement f or Alternative D (Supplement, pp. 4-388/392) and assumed that all GSE would have zero emissions by the year 2013. (DCD, pp. 4-5 and B-13.)

These assumptions are unreasonable and unsupported. First, the MOU is not binding and its full implementation and realization of an 80 percent reduction cannot be relied upon. Second, the DCD assumed that the remaining emissions after full implementation of the MOU under Alternative D would be fully reduced to zero due to the implementation of an incentives-based program and tenant lease requirements that is not required as mitigation in either the Draft EIS/EIR or the Supplement. See, for example, Table S4.6-18 in the Supplement, which only requires that GSE be converted to low-emission technology. However, as we discussed in detail in our previous comments on the Supplement, the proposed measures do not include specific performance standards that would allow these measures to be implemented, let alone allow their effectiveness to be evaluated. (Supplement Comments Fox and Pless 2003, Comment V.A.)

II.F VOC Emissions From Architectural Coatings And Asphalt Emissions Are Not Included

The DCD states that construction emissions such as VOC emissions from architectural coatings, solvents, hot-mix asphalt paving, and runway/taxiway striping were not quantified because they were "deemed to be insignificant relative to overall project emissions." The DCD's rationale for excluding architectural coating emissions is that most surface coatings are assumed to be water-based by 2005 in accordance with SCAQMD rules and regulations, thus minimizing VOC emissions. (DCD, p. B-2.) No rationale is given in either the DCD or the Supplement for excluding asphalt paving emissions.

Even though most architectural coatings will likely be water-based by 2005, they will still contain a certain amount of VOCs. If applied over large surfaces, *e.g.* runway stripes or exteriors and interiors of new buildings, VOC emissions could be substantial and should be modeled. Emissions from asphalt paving not only

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[25] George W. Siple, Camp, Dresser & McKee, personal communication with Gary Honkoop, California Air Resources Board, Telephone Call Report, Re: GSE MOU, August 18, 2003.

include direct emissions from hot asphalt, but also associated combustion emissions from asphalt paving equipment.

Asphalt paving has the potential to produce VOC emissions. Roadbed preparation, such as for new runways, requires the use of either cutback or emulsified asphalts. The EPA emission estimating report, *Compilation of Air Pollutant Emission Factors* ("AP-42"), indicates that cutback asphalt is a major source of VOC emissions, while hotmix asphalts have much lower VOC emissions. (AP-42, Sec. 4.5.) The Draft EIS/EIR and the Supplement do not require the use of hotmix asphalt. Therefore, paving emissions could be substantial and should have been included in the emission inventories.

Considering the extensive construction activities associated with Alternative D, the deliberate exclusion of emissions from architectural coatings and asphalt paving appears to intentionally underestimate actual construction VOC emissions from Alternative D compared to the NA/NP alternative.

II.G Construction Emissions Are Not Verifiable

The Draft EIS/EIR, the Supplement, and the DCD contain no support for the construction emissions. The emissions are presented, but spreadsheets containing supporting calculations and assumptions (type and number of pieces of equipment, load for each engine, engine size, emission factors, fuel use, operating hours, detailed construction schedule) are missing.

This is an important issue as these documents claim that construction emissions from the NA/NP alternative for all analysis years except 2015 are greater than from Alternative D, which includes considerable new construction. Compare Tables 3 and 4 of the DCD. We are frankly skeptical that this conclusion is correct. See our previous comments on the Supplement. (Fox and Pless 2003, Comment III.)

This counterintuitive result is apparently based on the assumption that projects that are not related to airport activity and are unlikely to be built are, in fact, built, thus artificially inflating the NA/NP compared to Alternative D. Further, even if these projects were built, they would trigger CEQA and require construction and operational mitigation, thus reducing their emissions compared to those claimed in the DCD. Alternative D, for example, includes standard mitigation measures required by all new projects in the SCAQMD. However, the construction assumed in the NA/NP apparently does not include comparable construction mitigation, even though the NA/NP construction projects would go through CEQA review. The DCD must document the assumptions that led to this counterintuitive result to afford the public a reasonable opportunity to comment.

For analysis year 2005, for example, all operational emissions are the same for the NA/NP alternative and Alternative D. (Compare DCD, Tables 3 and 4.) The only difference between these two alternatives in 2005 is construction emissions, which are substantially higher in the NA/NP alternative than Alternative D. Apparently, the NA/NP assumes the construction of LAX Northside and Continental City in 2005. (Draft EIS/EIR, p. 4-511; Supplement, p. 3-6.) However, this is unreasonable.

First, these projects were entitled in the early 1980s and thus would require CEQA review to address the substantial change in the air quality regulatory framework and existing environment. (Letter to David Kessler and Jim Ritchie from Shute, Mihaly & Weinberger On Behalf of the City of El Segundo, pp. 31, 33 (Sept. 18, 2001), incorporated here by reference.) This would result in much the same suite of mitigation measures assumed in the Supplement for Alternative D, substantially reducing emissions, especially of VOC and CO, compared to those claimed in DCD, Table 3. Second, 2005 is only one year away. It is not feasible to complete CEQA review and secure the necessary permits and authorizations to proceed with such large projects in only one year. Thus, it would appear that construction emissions in 2005 for the NA/NP alternative should be zero.

If construction emissions were higher under Alternative D, as we suspect, a conformity determination would be required for both VOC and CO in at least 2005 and perhaps other years. Further, all criteria pollutant emissions would be nonconforming, requiring offsets or a revision of the applicable SIP. (*See* Comment I.A.3.d.) Thus, absent an explanation as to why construction emissions are higher under the NA/NP alternative than Alternative D, a conformity determination should be completed for CO and VOC for at least 2005.

In response to a previous Freedom of Information Act ("FOIA") request relating to the Supplement[26], LAWA provided us with a Microsoft Excel workbook, purportedly containing the construction emissions estimates. However, this Microsoft Excel workbook did not include construction emissions for the NA/NP alternative and the results for the other alternatives were inconsistent with the results presented in both the Supplement and the DCD. We therefore requested from the FAA a copy of the workbook used to calculate the construction emissions results for the DCD. The CD-ROM we were provided on January 22, 2004 in response to this request did *not* contain any construction emission modeling files. We were therefore unable to verify the construction emissions for either the NA/NP alternative or Alternative D.

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[26] Letter to David Kessler from Shute, Mihaly & Weinberger (Jan. 13, 2004), ; attached as Exhibit G to Comments on the Draft General Conformity Determination submitted by Shute, Mihaly & Weinberger on behalf of the City of El Segundo.

The SCAQMD has commented similarly, *viz.*, "The SCAQMD previously submitted a comment letter dated 9/21/01 on the original Draft EIS/R, which noted that it was difficult to recreate construction emission estimates in the associated technical document because the emission estimate tables provided only total emissions without a breakdown of emissions by emissions sources *i.e.*, piece of equipment or construction task. The letter requested that a table, for example, be included providing peak daily emissions by emissions source showing equations used, assumptions made, etc. Review of the Draft Supplemental EIS/R (SEIS/R) indicates that his same problem persists. The SCAQMD again requests that this information be provided in the Final EIS/R." (SCAQMD 11/7/03[27].)

We cannot provide comments on the construction emissions without access to the information that we and the SCAQMD have repeatedly requested. There is ample reason to suspect that the construction emission estimates are flawed and fail to accurately disclose actual construction emissions. Thus, we reserve our rights to file additional comments on the DCD when the FAA produces the requested information.

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[27] South Coast Air Quality Management District, Supplement to the Draft Environmental Impact Statement / Report (DEIS/R) for the Los Angeles International Airport Proposed Master Plan, November 7, 2003.

Table 8a:
Comparison of Emissions (ton/year)
No Action/No Project Alternative

	Draft General Conformity Determination[a]		Supplement to Draft EIS/EIR[b]		Supplement to Draft EIS/EIR, Technical Report S-4[d]
	2005	2015	2005[c]	2015	2015
VOC					
Aircraft	*996*	*1,252*			*1,204*
APU	*9*	*9*			*4*
GSE	*182*	*40*			*240*
Stationary	*50*	*51*			*91*
MV on Airport	*414*	*192*			*236*
Total on Airport	1,651	1,544	6,063	5,748	1,775
MV off Airport	2,795	1,606	2,794	1,606	-
Construction	909	0	909	0	0
Total	**5,355**	**3,150**	**9,766**	**7,354**	**1,775**
CO					
Aircraft	*5,817*	*6,692*			*6,669*
APU	*183*	*198*			*99*
GSE	*2,588*	*1,114*			*5,686*
Stationary	*112*	*120*			*116*
MV on Airport	*3,120*	*1,402*			*1,844*
Total on Airport	11,820	9,526	19,438	17,269	14,413
MV off Airport	31,114	15,188	31,114	15,188	-
Construction	667	0	667	0	0
Total	**43,601**	**24,714**	**51,219**	**32,457**	**14,413**
NOx and NO_2					
Aircraft	*4,428*	*5,169*			*5,155*
APU	*92*	*103*			*54*
GSE	*1,229*	*331*			*619*
Stationary	*198*	*220*			*210*
MV on Airport	*406*	*225*			*242*
Total on Airport	6,353	6,048	6,816	7,039	6,279
MV off Airport	4,665	2,368	4,665	2,368	-
Construction	405	0	405	0	0
Total	**11,424**	**8,416**	**11,886**	**9,407**	**6,279**
PM10					
Aircraft	*51*	*63*			*70*
APU	*0*	*0*			*0*
GSE	*41*	*12*			*24*
Stationary	*34*	*39*			*37*
MV on Airport	*54*	*53*			*39*
Total on Airport	180	167	243	256	170
MV off Airport	1,617	1,780	319	314	-
Construction	68	0	69	0	0
Total	**1,866**	**1,947**	**631**	**570**	**170**

Notes

a Los Angeles International Airport, Proposed Master Plan Improvements, Alternative D, Clean Air Act Draft General Conformity Determination, January 4, 2004, Table 4

b LAX Master Plan Supplement to the Draft EIS/EIR, Tables S4.6-9, S4.6-10, and Appendix S-E, Table S-31

c 2005 and 2015 construction emissions from LAX Master Plan Supplement to the Draft EIS/EIR, Technical Appendix G, Air Quality Impact Analysis, Table 31

d LAX Master Plan Supplement to the Draft EIS/EIR, Technical Report S-4, Supplemental Air Quality Technical Report, Table N1

Abbreviations

APU = Auxiliary power unit

GSE = Ground support equipment

MV = Motor vehicles

Table 8b:
Comparison of Mitigated Emissions (ton/year)
Alternative D

	General Conformity Determination[a]			Supplement to Draft EIS/EIR[b]			Supplement to Draft EIS/EIR, Technical Report S-4[c]		
	2005	2013	2015	2005	2013	2015	2005	2013	2015
VOC									
Aircraft	*996*	*1,167*	*1,167*				*1,156*	*1,118*	*1,096*
APU	*9*	*9*	*9*						
GSE	*182*	*36*	*0*				*253*	*4*	*4*
Stationary	*50*	*51*	*51*				*50*	*51*	*51*
MV on Airport	*414*	*259*	*248*				*446*	*239*	*330*
Total on Airport	1,651	1,522	1,475	-	2,698	1,369			
MV off Airport	2,795	1,365	1,091	-	1,365	1,091			
Construction	86	72	0	86	72	0	226	215	0
Total	**4,532**	**2,960**	**2,567**		**4,135**	**2,460**	**2,132**	**1,627**	**1,481**
CO									
Aircraft	*5,817*	*6,314*	*6,314*				*5,987*	*6,275*	*6,197*
APU	*182*	*189*	*189*						
GSE	*2,588*	*518*	*0*				*6,312*	*98*	*96*
Stationary	*112*	*120*	*120*				*112*	*120*	*120*
MV on Airport	*3,120*	*1,965*	*1,672*				*3,856*	*1,846*	*1,337*
Total on Airport	11,819	9,106	8,295	-	8,968	7,690			
MV off Airport	31,114	16,719	13,166	-	16,719	13,166			
Construction	556	547	0	553	547	0	592	592	0
Total	**43,488**	**26,372**	**21,461**		**26,234**	**20,856**	**16,860**	**8,931**	**7,749**
NOx and NO_2									
Aircraft	*4,428*	*5,190*	*5,190*				*4,840*	*5,178*	*5,160*
APU	*92*	*102*	*102*						
GSE	*1,229*	*246*	*0*				*653*	*56*	*53*
Stationary	*198*	*220*	*220*				*198*	*220*	*220*
MV on Airport	*406*	*327*	*287*				*386*	*152*	*123*
Total on Airport	6,353	6,085	5,799	-	5,590	5,254			
MV off Airport	4,665	2,628	2,102	-	2,628	2,102			
Construction	1,141	905	0	1,131	905	0	1,128	902	0
Total	**12,160**	**9,618**	**7,900**		**9,123**	**7,356**	**7,205**	**6,508**	**5,556**
PM10									
Aircraft	*51*	*59*	*59*				*55*	*60*	*61*
APU	*0*	*0*	*0*						
GSE	*41*	*8*	*0*				*24*	*31*	*31*
Stationary	*34*	*39*	*39*				*34*	*39*	*39*
MV on Airport	*54*	*80*	*79*				*46*	*60*	*60*
Total on Airport	180	186	177		101	99			
MV off Airport	1,617	1,752	1,658		294	278			
Construction	335	272	0	330	272	0	330	273	0
Total	**2,133**	**2,210**	**1,835**		**667**	**377**	**489**	**462**	**190**

Notes

a Los Angeles International Airport, Proposed Master Plan Improvements, Alternative D, Clean Air Act Draft General Conformity Determination, January 4, 2004, Table 4

b LAX Master Plan Supplement to the Draft EIS/EIR, Tables S4.6-19, S4.6-20, S4.6-21

c LAX Master Plan Supplement to the Draft EIS/EIR, Technical Report S-4, Supplemental Air Quality Technical Report, Attachment O; 2005 construction emissions from LAX Master Plan Supplement to the Draft EIS/EIR, Technical Report S-4, Supplemental Air Qual

Abbreviations

APU = Auxiliary power unit

GSE = Ground support equipment

MV = Motor vehicles

Table 9:
Alternative D Emissions Based On 87 Million Annual Passengers

110.3%	LAX Master Plan Emissions No Action/No Project Alternative Interim Years[a,c] (ton/year)						LAX Master Plan Emissions Alternative D Interim Years[b,c] (ton/year)						Alternative D minus No Action/No Project Alternative Interim Years (ton/year)					
	2005	2006	2008	2010	2013	2015	2005	2006	2008	2010	2013	2015	2005	2006	2008	2010	2013	2015
VOC Emissions																		
Aircraft	996	1,022	1,073	1,124	1,201	1,252	996	1,032	1,105	1,178	1,287	1,287	0	10	32	54	86	35
APU	9	9	9	9	9	9	9	9	9	10	10	10	0	0	0	1	1	1
GSE	182	168	140	111	69	40	182	159	114	68	40	0	0	-9	-26	-43	-29	-40
Stationary	50	50	50	50	50	51	50	51	52	54	56	56	0	1	2	4	6	5
MV On Airport	414	392	347	303	236	192	414	396	361	326	286	273	0	4	14	23	50	81
MV Off Airport	2,795	2,676	2,438	2,200	1,843	1,606	2,795	2,596	2,198	1,800	1,505	1,203	0	-80	-240	-400	-338	-403
Construction	909	566	222	136	0	0	86	78	65	32	72	0	-823	-488	-157	-104	72	0
Total VOC	**5,355**	**4,883**	**4,279**	**3,933**	**3,408**	**3,150**	**4,532**	**4,322**	**3,905**	**3,468**	**3,255**	**2,829**	**-823**	**-561**	**-374**	**-465**	**-153**	**-321**
CO Emissions																		
Aircraft	5,817	5,904	6,079	6,254	6,517	6,692	5,817	5,960	6,246	6,533	6,962	6,962	0	56	167	279	445	270
APU	183	184	187	190	195	198	182	185	192	199	208	208	-1	1	5	9	13	10
GSE	2,588	2,440	2,146	1,851	1,409	1,114	2,588	2,265	1,618	971	571	0	0	-176	-529	-881	-838	-1,114
Stationary	112	113	114	116	118	120	112	115	120	125	132	132	0	2	6	9	14	12
MV On Airport	3,120	2,948	2,605	2,261	1,745	1,402	3,120	2,960	2,641	2,322	2,167	1,844	0	12	36	61	422	442
MV Off Airport	31,114	29,522	26,336	23,151	18,373	15,188	31,114	29,039	24,890	20,741	18,435	14,518	0	-483	-1,446	-2,410	62	-670
Construction	667	512	324	110	0	0	556	526	461	252	547	0	-111	14	137	142	547	0
Total CO	**43,601**	**41,623**	**37,791**	**33,833**	**28,357**	**24,714**	**43,489**	**41,050**	**36,168**	**31,142**	**29,023**	**23,664**	**-112**	**-573**	**-1,623**	**-2,791**	**666**	**-1,050**
NOx Emissions																		
Aircraft	4,428	4,502	4,651	4,799	5,021	5,169	4,428	4,590	4,914	5,237	5,723	5,723	0	88	263	438	702	554
APU	92	93	95	98	101	103	92	95	100	105	112	112	0	2	5	7	11	9
GSE	1,229	1,140	960	780	511	331	1,229	1,075	768	461	271	0	0	-65	-192	-319	-240	-331
Stationary	198	200	205	209	215	220	198	204	215	226	243	243	0	4	10	17	28	23
MV On Airport	406	388	352	316	261	225	406	395	372	350	361	316	0	7	20	34	100	91
MV Off Airport	4,665	4,435	3,976	3,517	2,827	2,368	4,665	4,372	3,785	3,198	2,898	2,318	0	-63	-191	-319	71	-50
Construction	405	291	178	74	0	0	1,141	999	819	365	905	0	736	708	641	291	905	0
Total NOx and NO_2	**11,423**	**11,049**	**10,417**	**9,793**	**8,936**	**8,416**	**12,159**	**11,729**	**10,972**	**9,942**	**10,512**	**8,712**	**736**	**680**	**555**	**149**	**1,576**	**296**
PM10 Emissions																		
Aircraft	51	52	54	57	60	63	51	53	56	60	65	65	0	1	2	3	5	2
APU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GSE	41	38	32	27	18	12	41	36	26	15	9	0	0	-2	-6	-12	-9	-12
Stationary	34	35	36	37	38	39	34	35	37	40	43	43	0	0	1	3	5	4
MV On Airport	54	54	54	54	53	53	54	58	66	75	88	87	0	4	12	21	35	34
MV Off Airport	1,617	1,634	1,666	1,699	1,747	1,780	1,617	1,643	1,696	1,749	1,932	1,828	0	9	30	50	185	48
Construction	68	60	41	12	0	0	335	205	155	76	272	0	267	145	114	64	272	0
Total PM10	**1,865**	**1,873**	**1,883**	**1,886**	**1,916**	**1,947**	**2,132**	**2,030**	**2,037**	**2,014**	**2,409**	**2,023**	**267**	**157**	**154**	**128**	**493**	**76**

Notes

a Draft General Conformity Determination, Table 3

b Draft General Conformity Determination, Table 4

c Year 2013 and year 2015 aircraft, APU, GSE, Stationary, MV on-airport, and MV off-airport emissions scaled from results presented in DCD, Tables 3 and 4, by (87 MAP/78.9 MAP) = 110.3%; years 2006, 2008, and 2013 interpolated between years 2005 and 2013.

Abbreviations

APU = Auxiliary power unit

GSE = Ground support equipment

MV = Motor vehicles

MAP = Million annual passengers

Exhibit 1:
Printout from File "FederalEmissions.xls, Alternative D," Table 4, LAX Master Plan Emissions for Alternative D Interim Years
Provided by FAA in Response to Shute, Mihaly, Weinberger January 2004 FOIA Request

Table 4

LAX Master Plan Emissions for Alternative D Interim Years.

	2005	2006	2008	2010	2013	2015	
VOC							
Aircraft, tpy	996	1,018	1,060	1,103	1,167	1,167	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated.
APU, tpy	9	9	9	9	9	9	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated.
GSE, tpy	182	164	128	91	36	0	Assumes 2005 NANP = 2005 Alt D; Interpolated from 2005 NANP and 2015 Alt D Mitigated.
Stationary, tpy	50	50	50	50	51	51	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated.
Motor Vehicles On-Airport, tpy	414	395	356	317	259	248	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated; Year-specific EMFAC2002 factors applie
Motor Vehicles Off-Airport, tpy	2,795	2,616	2,258	1,901	1,365	1,091	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated; Year-specific EMFAC2002 factors applie
Construction, tpy	86	78	65	32	72	0	Final Construction Emission Estimates (Mitigated), September 2003.
Total, tpy	**4,532**	**4,329**	**3,927**	**3,504**	**2,960**	**2,567**	
CO							
Aircraft, tpy	5,817	5,879	6,003	6,128	6,314	6,314	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated.
APU, tpy	182	182	184	186	189	189	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated.
GSE, tpy	2,588	2,329	1,811	1,294	518	0	Assumes 2005 NANP = 2005 Alt D; Interpolated from 2005 NANP and 2015 Alt D Mitigated.
Stationary, tpy	112	113	115	117	120	120	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated.
Motor Vehicles On-Airport, tpy	3,120	2,976	2,687	2,398	1,965	1,872	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated; Year-specific EMFAC2002 factors applie
Motor Vehicles Off-Airport, tpy	31,114	29,315	25,716	22,117	16,719	13,166	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated; Year-specific EMFAC2002 factors applie
Construction, tpy	556	526	461	252	547	0	Final Construction Emission Estimates (Mitigated), September 2003.
Total, tpy	**43,488**	**41,320**	**36,978**	**32,492**	**26,372**	**21,461**	
NOX							
Aircraft, tpy	4,428	4,524	4,714	4,904	5,190	5,190	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated.
APU, tpy	92	93	96	98	102	102	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated.
GSE, tpy	1,229	1,106	861	615	246	0	Assumes 2005 NANP = 2005 Alt D; Interpolated from 2005 NANP and 2015 Alt D Mitigated.
Stationary, tpy	198	201	206	212	220	220	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated.
Motor Vehicles On-Airport, tpy	406	396	377	357	327	287	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated; Year-specific EMFAC2002 factors applie
Motor Vehicles Off-Airport, tpy	4,665	4,410	3,901	3,392	2,628	2,102	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated; Year-specific EMFAC2002 factors applie
Construction, tpy	1,141	999	819	365	905	0	Final Construction Emission Estimates (Mitigated), September 2003.
Total, tpy	**12,160**	**11,730**	**10,973**	**9,943**	**9,618**	**7,900**	
PM10							
Aircraft, tpy	51	52	54	56	59	59	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated.
APU, tpy	0	0	0	0	0	0	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated.
GSE, tpy	41	37	29	21	8	0	Assumes 2005 NANP = 2005 Alt D; Interpolated from 2005 NANP and 2015 Alt D Mitigated.
Stationary, tpy	34	35	36	37	39	39	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated.
Motor Vehicles On-Airport, tpy	54	57	64	71	80	78	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated; Year-specific EMFAC2002 factors applie
Motor Vehicles Off-Airport, tpy	1,617	1,634	1,668	1,701	1,752	1,658	Assumes 2005 NANP = 2005 Alt D, and 2015 Alt D Mitigated = 2013 Alt D Mitigated; Interpolated from 2005 NANP and 2013 Alt D Mitigated; Year-specific EMFAC2002 factors applie
Construction, tpy	335	205	155	76	272	0	Final Construction Emission Estimates (Mitigated), September 2003.
Total, tpy	**2,133**	**2,021**	**2,006**	**1,962**	**2,210**	**1,835**	

COMMENTS

2003 LAX MASTER PLAN ADDENDUM & SUPPLEMENT TO THE DEIS/EIR

Prepared for Shute Mihaly and Weinberger

By
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November 2003

INTRODUCTION

The following comments analyze several elements of the 2003 LAX Master Plan Addendum (Addendum) and Supplement to the DEIS/EIR (Supplement). We have conducted an extensive analysis of the gate capacity of Alternative D, which is summarized in these comments and more fully documented in the attached report, "Capacity Analysis of Aircraft Gate Positions", (Appendix A). The comments below also discuss additional aspects of Alternative D relating to its physical capacity, including airfield configuration and sequencing of the Master Plan. In addition, we have analyzed the proposed alterations to the Runway 25 complex. We have identified numerous uncertainties regarding the proposed changes to this southern runway complex and concluded that additional information must be provided before we can fully evaluate its effects on El Segundo.

1. ALTERNATIVE D CAPACITY ISSUES

The Master Plan Addendum's Alternative D proposes to limit LAX to approximately 78 MAP by limiting the total number and size of gate positions to a figure that is below the other alternatives; and below the current values. This, 78 MAP is a limit on passenger traffic; it does not limit the total number of aircraft operations. According to the Addendum and the Supplement, the total number of aircraft operations remains about the same for Alternative D as for Alternative C and the No Action/No Project Alternative. The Addendum's stated conclusion that Alternative D will serve no more than 78 MAP, i.e., substantially less than the 89 MAP served by Alternative C, is based on the assumption that by limiting the number and size of gates, it will force airlines to make specific anticipated adjustments to their markets and to shift services around between categories (international, domestic air carrier, commuter, etc.), and between aircraft types, and between airports in the Southern California region, which, according to The Addendum's projections, would result in approximately the target number of passengers served. The published documents provide no discussion on specific actions LAWA or other regional authorities propose to take in order to cause such market-driven adjustments to occur, nor do they provide any meaningful basis for concluding that The Addendum's assumptions are accurate or that the airlines would make the assumed adjustments to types of services offered. This is particularly problematic since the airfield and other elements of the airport under Alternative D have capacities that exceed the target 78 MAP.

The following sections summarize our analysis of capacity issues related to the airfield configuration, terminal and gate positions. *Our conclusion, based on this analysis and on our full analysis of the gate capacity of Alternative D (Appendix A to this report), is that the gate positions as currently proposed by Alternative D do not limit future passenger levels to 78 MAP, especially since the airfield and other airport elements can accommodate larger numbers.*

1.1 Airfield Capacity

The airfield improvements proposed in Alternative D include runway relocation to increase the distance between parallel runways as well as runway length extensions. The increased separation allows the addition of centerline parallel taxiways between each pair of runways (24L/R and 25L/R). While these improvements are aimed primarily at enhancing runway safety by improving the runway crossing and reducing the potential for runway incursions, they will to some extent reduce delays, improve the overall operation and thus have a generally positive impact on runway capacity.

The DEIS/EIR Supplement (see p. ES 1-3) uses the concept of practical capacity as constraining the traffic at the airport, defining it on the basis of flight delays, expressed in minutes of delay per operation. But then the analysis in the Supplement goes on to show that Alternative D will have lower delay rates. This means that Alternative D will provide an increase in practical capacity, using the Master Plan's own definition. Fig. E-17 of the Addendum, Appendix E, shows this reduction in average delay for Alternative D compared to both the NA/NP alternative and to Alternative C.

The table below lists the improvements to the airfield planned in Alternative D and as shown in Table ES-2 of the Supplement. Comparing the various alternatives, each of these improvements has an effect on capacity, and that effect can be either positive or negative. From the comparisons available it is clear that all the airfield improvements in Alternative D enhance capacity over the baseline, leading to the conclusion that the airfield configuration proposed in Alternative D will have a capacity that is greater than, or at least equal to, that of the existing baseline or to the NA/NP alternative

Furthermore, based on The Addendum's analysis Alternative D even appears to have a capacity equivalent to, and possibly even higher than, Alternative C. The airfield analysis shown in Tables E-4 through E-7 of the Addendum, Appendix E, shows Alternative D operating with an all-weather average peak hour throughput of 141 operations as compared to 138 for Alternative C and 140 for the NA/NP alternative.

Based on this comparison, the airfield configuration proposed in Alternative D does not preclude traffic from reaching levels well beyond the baseline volumes, and can accommodate levels that exceed those projected for Alternative C of the Master Plan.

Airfield Improvements and Capacity Comparisons

Existing Baseline	Master Plan Alternative C	Alternative D	Effect on Airfield Capacity of Alternative D Compared to:	
			Baseline	Alt. C
Outboard North Runway 24R				
8,925 ft.	9,400 ft	10,420	≥	≥
Inboard North Runway 24L				
10,285 ft.	12,000 ft	11,700	≥	≤
	Shorten west end by 2,900 ft.	Relocate 340 ft. south	≥	=
	Extend 2,900 ft. east	Extend 715 ft.	≥	=
	Add centerline taxiway	Add centerline taxiway	≥	=
Outboard South Runway 25R				
12,091 ft.	12091 ft.	12091 ft.	=	=
Outboard South Runway 25L				
11,096	11,096	11,096	=	=
	Move Runway 50 ft. South	Move Runway 50 ft. South	≥	=
	Add centerline taxiway	Add centerline taxiway	≥	=
		Add cross-field taxiway, N-S	≥	≥

1.2 Terminal and Gate Position Capacity

The LAX Master Plan Addendum proposes a configuration for Alternative D that includes 153 nominal aircraft gate positions, and a distribution of gate sizes that results in about 179 narrow body equivalents (NBEG). However, neither the Addendum nor the Supplement to the DEIS/EIR contains a capacity analysis of the proposed terminal and gate position system. Instead, the Addendum calculates a flow of 78.8 million annual passengers (MAP) on the basis of a series of market assumptions and forecasts.

Our review and analysis of the proposed terminal and gate configuration for Alternative D leads to the conclusion that the capacity of the system exceeds 78 MAP, and is close to 87 MAP. (See Attachment A to this Report, Capacity Analysis of Aircraft Gate Positions.) The analysis on which this capacity estimate is based accepts the majority of the assumptions of the Master Plan and is considered a fairly conservative estimate of the system's ability to handle traffic.

The Addendum's calculation of passenger traffic flow is based on a number of market assumptions. These assumptions do not represent a capacity analysis of the gate positions, but an estimate of what traffic volumes might be under assumed market conditions. We consider these market assumptions to be fairly conservative, and result in an underestimation of possible traffic volume. The traffic volumes used in the Addendum cannot be used as a representation of the capacity of the system.

In the following paragraphs, we list the assumptions used by the Addendum and we provide comments on them, pointing out discrepancies, errors, and inaccuracies. The assumptions of the Addendum that underlie the estimation of traffic are summarized in Table 1 below, which shows the excerpts from Table 3.3-1 of the Master Plan Addendum, comparing the NA/NP alternative with Alternatives C and D. (Table 1 here contains corrections to some numbers that were erroneous in the Addendum)

Table 1. LAX Master plan Assumptions for Alternatives

Alternative	NA/NP	C	D
Annual Passengers	78715200	89553200	78864100
Annual Operations	712500	714000	713100
Design Day Operations	2058	2058	2058
Design Day Passengers	262329	298588	262758
Design Day Enplanements per Departure	127.47	145.09	127.68
Annual Enplanements per Departure	110.48	125.43	110.59
Annual Conversion Factor	300	300	300
Nominal Gates 2015	163.00	168.00	153.00
NBEG 2015	188.20	222.20	178.90

1. Total Airport Traffic

As seen in Table 1 above, the Addendum indicates that Alternative D is designed to handle about the same total annual and Design Day aircraft operations in 2015 as the No Action/No Project Alternative and Alternative C. Despite this, the Addendum concludes that annual passenger flows will differ dramatically between the alternatives. This is based on assumed distributions of these operations among types of operations, aircraft, and gate position sizes. The basic premise of the Addendum is that airlines will respond to the number and size of gates by downsizing fleets and will thereby end up carrying fewer passengers per operations. The Addendum quantifies these effects by making extensive assumptions regarding airline operation and markets. There is no justification or validation of the vast number of market assumptions used in the Addendum to arrive at the traffic flow numbers presented. A detailed review of some of these assumptions also raises doubt about their viability. For example the Addendum predicts that the number of domestic air carrier passengers will actually drop at LAX between 2000 and 2015 (from 47 MAP to 45 MAP). Some of that drop is taken up by growth in commuter passengers (about 0.7 MAP). The implication is that the rest of the traffic demand will move to other regional airports. There is no reason to believe that this shift will occur, especially in the absence of specific policies that make it happen, and certainly not with the proposed number and configuration of gate positions proposed in Alternative D.

2. Fleet mix and aircraft sizes

The Addendum makes assumptions about the fleet mix that it considers to be a market response to the limited number and size distribution of gates provided in Alternative D. The Addendum further assumes that each aircraft carries what it refers to as a "typical" number of seats.

There are several assumptions regarding fleet mix used that we believe are questionable. The first concern is with the accuracy of assumed seating for each aircraft considered in the analysis. In the attached capacity report we show that the assumed aircraft seating sizes are not realistic for capacity comparison, and while they might reflect current market conditions, they do not reflect what the practical capacity of gates are, especially given the current developments in the fleet and the types of aircraft that airlines using LAX are ordering.

The second concern deals with some of the aircraft types used, where older versions are retained in the analysis and some of the newer aircraft versions are not taken into account. For example, B-737-800 and B-737-900, are overlooked even though a fair number of those aircraft have been ordered by the major airlines operating at LAX. These types have significantly higher number of seats compared to the earlier versions of the same type. Also, the Master Plan's fleet mix includes some of the older aircraft types that are likely to be phased out of the operations by 2015 (i.e. F-100, ATR-42), either because they are fairly old and not compatible with the noise (and other) standards, or because they have already been out of production for some time (examples include F-100, F-70, ATR-42).

The GA, military, cargo and air carrier fleet mix used in the Alternative D is not clearly described in the Addendum. In many places the Addendum refers to the fleet mix assumptions of LAX Master Plan Draft, but the data and information differ between the two, and there are no explanations of these differences.

3. Traffic Operations by Type of Service

The Addendum assumes a mix of total design day operations by carrier type: domestic, international, Hawaiian, and commuter. These operations split assumptions are shown in Table 3.3-1 of the Addendum. The Addendum bases these assumptions on the following market analysis as stated (Addendum Section 3.3.3 Air Service Changes):

- *"Commuter operations would likely be reduced from 1996 levels, consistent with the forecasts for No Action/No Project and Alternative C, in order to maximize the number of passengers that could be served with a limited number of operations. It is also projected that some of the forecast commuter O&D demand would be served by domestic air carrier flights.*
- *Domestic air carrier connecting passengers would decrease from 2015 forecast levels to reflect the projected loss of connecting passengers from commuter flights."*

According to these assumptions, one would expect the number of commuter operations not to be as high as it is projected in Alternative D. So while all three alternatives (NA/NP, Alternative C and Alternative D) are projected to show a drop in commuter operations from the 1996 level of 644 during the design day, Alternative D seems to have dropped the least. In fact, Alternative D forecasts that the commuter traffic will actually grow from today's level. In Table 3.3-1 of LAX Master Plan Addendum we see that there were 644 commuter operations in 1996, then 474 commuter operations in 2000. Alternative D assumes that these operations will grow to 532 in 2015, which does not agree with the Master Plan assumptions. The table below shows the Addendum's questionable assumption that commuter operations in Alt D will exceed the NA/NP alternative.

Commuter Operations, Design Day and Annual Passengers

	1996 Actual	2000 Actual	2015 NA / NP	2015 Alt. D
Operations	644	474	467	532
Passengers	7595	8232	10147	11937
Total Passengers	186512	215645	262329	262758
Percentage	4.1%	3.8%	3.9%	4.5%
Annual Passengers	2759991	2918282	3115400	3664900
Annual Total Passengers	57974559	67303182	78715200	78864100
Percentage	4.8%	4.3%	4.0%	4.6%

4. Seasonal patterns

Another of the Master Plan assumptions that we believe is flawed is the adopted Annual Conversion Factor of 300. (Annual Conversion Factor = Annual Passengers/Design Day Passengers). The LAX Draft Master Plan correctly assumes that as traffic grows in the face of limited facility expansion, de-peaking of both operations and passengers will occur. This should result in a rise rather than a decline of the Annual Conversion Factor. Table 2 below shows the actual operations and Annual Conversion Factors for 1996 and 2000, and the Addendum's forecasted values for 2015. We can see that even in year 2000 when the number of operations declined, the Annual Conversion Factor was 312. In 1996 it was 310. If alternative D involves de-peaking due to the capacity constraint then we should expect these factors to increase and not to decrease to the 300 level assumed in the Master plan.

Table 2. Annual Conversion Factors

	Design Day Passengers	Annual Passengers	Annual Conversion Factor	Design Day Operations	Annual Operations	Annual Conversion Factor
1996 Actual	186,512	57,974,559	310.83	2055	712,206	346.57
2000 Actual	215,645	67,303,182	312.10	2054	710,791	346.05
NP Action 2015	262,329	78,715,200	300.06	2058	712,500	346.21
Alternative C 2015	298,588	89,553,200	299.92	2058	714,000	346.94
Alternative D 2015	262,758	78,864,100	300.14	2058	713,100	346.50

It is also curious that the same conversion factor of 300 is used for all alternative A through D and the NA/NP alternative. If there were a basis for changing the factor depending on market response to the different alternatives, then one would have expected it to vary among such vastly differing alternative as A and D. But it does not. Nor do the annual factors used to convert design daily operations, which appear to be the same for all alternatives, and the same for the base years of 1996 and 2000 as well as 2015. The Addendum's estimate of annual passenger flows as based on these conversion factors is therefore considered questionable and not a sound basis for estimating system capacity, not in the terminal, and not in the airfield for that matter.

5. Mix of Gates and Computation of Narrow-Body Equivalents (NEBG's)

The Addendum uses the concept of narrow-body equivalents (NBEG's) to characterize the size of different gate types. This is a sound concept in principle, but needs to be used with caution when analyzing the capacity of a gate position system. The reason is that for the same wingspan, or gate position size, aircraft come in a fairly wide

variety of seating configurations. A one narrow-body equivalent gate, for example, can accommodate aircraft with seating configurations as low as 100 and as high as 200. Furthermore, the capacity can be altered significantly by converting smaller gates into larger ones, losing numbers of gates, but gaining seating capacities and passenger flows.

It is therefore important from the capacity control perspective to ensure that a gate mix proposed and approved in the Master Plan not be altered, even if the total number of NBEG's remains unchanged. We note that there are some mistakes in the computation of the number of NBEG's as presented in the Addendum. These are described and corrected in the attached capacity analysis report.

1.3 Terminal Building Square Footage

There are discrepancies in the total available square footage ASF of the terminal building in Alternative D as presented in various locations in the Addendum and the Supplement. Figures of 6.55 million available square feet appear commonly, but so do other figures such as 6.8 million in Table S3-2 and 7.24 million in the Land Use analysis. THE ADDENDUM needs to clarify the actual figures envisaged in the Master Plan.

In any case, assuming here that the smallest of the figures that appear, 6.55 million sq. ft. is the correct one, there remains the question as to why this figure is needed. This figure is significantly higher than that of the NP/NA alternative, which has 3.99 million sq. ft. and they are both presumably serving presumably the same traffic volume. While some of that difference can be explained by the increased security requirements that are accommodated in Alternative D, the total figure remains unexplained. The same is true of the available square footage for gate lounge areas, which also exceed the figures for the base NP/NA alternative. The available square footage in the terminal system in total, and related to annual passenger volumes is compared in the table below for the three alternative, NP/NA, C, and D.

Comparison of Terminal Space Available in the Various Alternatives

Alt.	Total Terminal Sq. Ft.	Gate Lounge Area Sq. Ft.	Annual Pax per Lounge Sq. Ft.	Annual Pax per Terminal sq. ft.
NA/NP	3,997,700	360,000	218.65	19.69
Alt. C	7,319,000	518,000	172.88	12.24
Alt. D	6,550,000	416,000	189.58	12.04

This comparison raises the question as to why Alt D enjoys such a significantly higher level of service than the others. The increased terminal size would be consistent with an airport serving more than 78 MAP. A reduction in terminal square footage from the proposed major increase should be considered as a secondary means of ensuring that passenger levels under Alt D do not exceed the asserted goal of 78 MAP.

1.4 Airport parking

It is unclear why Alternative D provides a public parking capacity similar to Alternative C, when the latter is planned for a much higher level of traffic. The Addendum shows Alt. D with 35,002 stalls compared to 35,636 for Alt. C and 33,926 for the NA/NP alternative. If Alternative D has a capacity of 78 MAP, then the amount of parking provided should be less than that required for Alternative C, which is designed to serve 89 MAP. An airport whose capacity is limited to 78 MAP would generate less congestion and landside traffic, so that the amount of parking should also be reduced.

1.5 Additional Concerns Related to Capacity and Traffic Assumptions

Discrepancies in Air Traffic Assumptions Used in Noise Analysis:

Table S7 of S-C1. *Supplemental Aircraft Noise Technical Report* shows the 2015 Average Annual Day Operations and Fleet Mix for the Alternative D. The fleet mix used in this table differs from that used in the Master Plan Addendum Fleet Mix. There are several aircraft in the Table S7 that are not used in the Design Day schedule of the Master Plan Addendum: Boeing 717, British Aerospace 146, Challenger 601, Learjet 35, Fairchild SA227. There needs to be an explanation as why these aircraft types are used here and whether they represent others used in the rest of the Addendum as equivalent noise generators. Moreover, it is said that the SIMMOD outputs are used to build the input for the noise model. Presumably these SIMMOD outputs were also used to load the airfield and the gate positions, so there needs to be a clarification of these variations in fleet mix and of any necessary adjustments to the noise analysis that may result.

Another inconsistency is about the total number of the operations considered in the Average Annual Day. The total number of operations is stated as 2121, but it is actually 2123. Even so, if this is the Average Annual Day, then if we multiply this number by the number of the days in the year we should get the number of Annual Operations. In both cases (of 2121 and 2123 operations) the yearly number obtained is lower than the number of Annual Operations of the Alternative D for the year 2015, which is shown in the Table below.

Comparison of 2015 Annual Operations
Used in Master Plan Addendum and Noise Analysis

Alt. D Annual Operations	784,000	
Figures Used in Noise Analysis	Average Annual Day Operations	Corrected Average Annual Day Operations
	2121	2123
	774165	774895

2. The Sequencing of the Master Plan

The Addendum describes a phasing scheme for the development of Alternative D. The scheme is far too lumpy and does not illustrate the evolution of provision of airport elements in sufficient detail to ascertain capacity and other operational impacts at the intermediate stages to 2015. The proposed phasing does not guarantee that at some transitional phase during build-out of this plan, e.g. between phases II and III, the availability of gate positions and terminal facilities will not exceed the amount that limit the capacity to 78 MAP. For example, the phasing plan should ensure that opening of the West Terminal, in Phase III should not proceed before the decommissioning of the North Terminal elements.

The current phasing shown in the Addendum (sect. 2-10 of the Addendum) shows the construction of the West Satellite Concourse as occurring during phase II. The demolition of part of TBIT building and the conversion of the north terminals to a linear facility occur in phase III. Should there be a period between the completion of phase II and the start of Phase III, such a period would entail a system with a much higher capacity than intended.

This is especially true since there is no mention in the sequencing plan of the point in time at which the remote gate positions will be eliminated. If the conditions that permit capacity to exceed 78 MAP are to never arise, then a clear time plan of when the remote gate positions will be decommissioned and eliminated.

Addendum should therefore be modified to provide a very specific step-by-step phasing that would ensure that such a violation does not become possible.

3. The Runway 25 Complex

According to the text in the Addendum the proposed modifications to the runway 25L/R complex entail the relocation of runway 25L "approximately 50 ft. south of the existing runway centerline" and the insertion of a 11,096 ft. taxiway centered between the two runways 25L and 25R. No other modifications of this runway system are described in the available documents, although the plans and drawings show additional modifications such as the introduction of high-speed exit taxiways to connect the inserted center taxiway to the two runways. Although it is not described in the text, some of the drawings show that the southern taxiway (Taxiway A) will also be shifted south, presumably in order to maintain its current 500 ft. separation to runway 25L. The following comments discuss the gaps in the THE ADDENDUM'S analysis and the need for additional information and clarity regarding the proposed reconfiguration of the southern runway complex.

- Presumably the (approximate) 50 ft shift is 55.42 ft., which is the shift needed to provide space for 400 ft. separation between the center taxiway and the two runways 25L And 25R. The EIS/EIR should be corrected to include the correct number of feet of intended shift of runway 25L.

- There is no reason why taxiway A needs to move south in order to maintain its 500 ft. distance from runway 25L, since the remaining 444 ft. separation is adequate and exceeds the 400ft. separation used for the center taxiway. THE ADDENDUM needs to clarify this and to confirm that taxiway A will not be moved.

- There is no clear description in the Addendum of any further modifications to taxiways, especially any possible extensions to Taxiway A. The Addendum needs to clarify that under Alternative D the need for an end-round taxiway is eliminated and that no further westward extension of Taxiway A will be made. In the same vein, there should be no need for the taxiway bypass to connect between A and B Taxiways.

- The documents do not provide adequate analysis comparing the "centerline taxiway" alternative proposed for this runway complex and the alternative of continuing the use of left exits from runway 25L with an end-round taxiway back to the terminal area. Such a comparison, especially from the point of view of noise impacts, is critical to provide a meaningful evaluation of the noise impacts of the reconfiguration on the City of El Segundo and its residents. A published study by NASA Ames [CITE] investigates air traffic control procedures necessary to reduce runway incursions with and without the southward shifting of runway 25L but does not address the issue of noise impacts.

- While the insertion of a center taxiway between the two runways 25L and 25R may be a desirable action from the point of view of airfield operations and safety, it must be evaluated in the context of a comparative noise analysis analyzing this option and the end-around option, along with the development of the appropriate noise mitigation measures specifically designed to deal with the impact of the shifting of the runway southward on the communities immediately to the South of the airport.

- With the proposed modification in Alternative D the need to use Taxiway A for exits of aircraft landing on Runway 25L will be reduced greatly, especially after the removal of the remote gate pads in the Northwestern portion of the airfield. LAWA should adapt the taxiway system loading accordingly to ensure minimal use of this taxiway, in order to minimize its noise impact on the surrounding communities.

- Temporary use during the first phase of the plan by new large aircraft (NLA) runway 25L and the left exit into taxiway A should be restricted in order to minimize the noise impact to the south of the airport.

Conclusion regarding the Runway 25R/L Complex

Based on the publicly available documents, there is not a sufficient basis for favoring the centerline taxiway configuration of the southern runway complex, especially from the perspective of the communities south of the airport. Additional detailed analysis of the noise impacts, the operational characteristics, and the engineering requirements, is needed. Of particular importance is the articulation of specific mitigation measures that are necessary to compensate for the noise impacts.

APPENDIX A

CAPACITY ANALYSIS of AIRCRAFT GATE POSITIONS

Los Angeles International Airport
Master Plan Alternative D

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November 2003

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1. INTRODUCTION

The following is an analysis of the annual passenger capacity of the aircraft gate position system as proposed in Alternative D of the Los Angeles International Airport Master Plan Addendum of July 2003. The analysis is limited to a study of the capacity of the gate configuration to serve passengers, and does not, for purposes of this analysis, dispute the market-based forecasts and assumptions of the LAX Master Plan Addendum (Addendum).

Alternative D as presented in the LAX Master Plan Addendum has a stated goal of limiting the annual capacity at LAX to about 78 million passengers. It proposes to accomplish that by limiting the number and size distribution of aircraft gate positions to 153 gate positions and a corresponding 178.9 narrow body-equivalents (NBEG's). The Addendum does not include a capacity analysis of the gate configuration proposed, showing how it can limit the traffic volume to about 78 MAP. Instead it contains a market analysis based on a set of assumptions regarding how airlines might adjust to the proposed gate positions provided by shifting traffic among categories (international, domestic air carrier, commuter, etc.), by shifting the fleet mix, and by diverting traffic to other regional airports. The analysis presented here calculates the annual passenger capacity of the proposed gate positions. It shows that the capacity significantly exceeds 78 MAP.

2. REVIEW OF THE ADDENDUM'S DESIGN AND MARKET ASSUMPTIONS

The LAX Master Plan Addendum calculates a flow of 78.8 million annual passengers (MAP) on the basis of a series of market assumptions and forecasts. Most of these assumptions are used in the capacity analysis conduced here in order to ascertain the capacity of the system, as designed and envisaged in the Master Plan Addendum. This does not mean acceptance of these assumptions. The assumptions and how they are treated in this capacity analysis are listed below:

1. *Annual & Design Day Aircraft Operations*: The Addendum assumes that Alt. D will handle approximately the same number of annual passenger operations and the same number of design day passenger operations as Alternative C and the No Action/No Project Alternative. These forecast numbers are not modified by this capacity analysis. They are shown in Table 1 below.

2. *Fleet Mix and Aircraft Sizes*: The Addendum makes assumptions about the fleet mix that are considered to be the airlines' response to the number and size distribution of gates provided in Alternative D. In addition each aircraft is assumed to carry a "typical" number of seats. The Master Plan's fleet mix assumption is shown in Table F-9 of LAX Master Plan Addendum. The aircraft size ranges assumed in the Master Plan are shown in Table IV-2.3 of LAX Draft Master Plan.

The fleet mix forecast is not modified in this capacity analysis. However, the aircraft seating capacities are revised on the basis of a review of actual seating configurations used by airlines using LAX, seating capacity ranges as offered by the

manufacturers, and seating configurations of aircraft currently on order by airlines using LAX. This is described in more detail further on.

3. *Operations By Type of Service*: The Addendum assumes a mix of the total Design Day Operations by service type: air carrier, international, Hawaiian, and commuter. The operations split assumptions in the Master Plan are shown in Table 3.3-1 of the LAX Master Plan Addendum. The Addendum forecasts a drop in air carrier operations and an increase in commuter operations between the base year and 2015. Although questionable, these market forecast assumptions are retained in the capacity analysis. They are discussed again in the next section.

4. *Load Factors*: The Addendum projects the load factors by carrier type and uses them to convert design day operations and aircraft sizes to passengers. Forecasted load factors for year 2015 are shown in Table IV-2.8[1]. Projections are made by type of operation (air carrier, international, Hawaiian, commuter), and a presumably weighted average of all commercial operations is also used. The load factor assumptions and calculations found in the Addendum are not questioned and are used in this capacity analysis. A sensitivity analysis is made to show the range of capacities that result from the range of load factors used in the Addendum.

5. *Seasonal Patterns*: The conversion of the Design Day Operations and passenger flow to annual figures is based on the assumed annual conversion factors that are intended to reflect seasonal variations in traffic demand. Annual Conversion Factor of 300 is inferred from Table 3.3-1 of the LAX Master Plan Addendum. This factor is used to calculate the Annual Passengers by multiplying the Design Day Passengers with the Annual Conversion Factor. Design day flows are considered the average weekday of the peak month. Wednesday in August is used by the Master plan. The Addendum uses a conversion factor of 300 to convert the Design Day Passengers to Annual. It uses a factor of 346 to convert Design Day Operations to Annual Operations. These same factors are used for all the alternatives of the Master Plan: NA/NP, A, B, C, and D. They differ from the historic and current factors at LAX in one important way, and that is the current and recent historic figures for passenger ratios at LAX have been consistently around 310. The implication of the Addendum's assumption that the capacity constraint will cause traffic peaks to spread rather than accentuate is that these factors should rise and not decline. Therefore the conversion factor of 300 for passengers is considered wrong and is replaced by the more correct value of 310 for this capacity analysis. A sensitivity analysis is used to show the implication of the de-peaking assumed in the Addendum by considering a range from 300 up to 320. The current, histories, and assumed values of these conversion factors, for both passengers and operations are summarized in the next section.

[1] According to the LAX Master Plan Addendum, the load factors and aircraft size assumptions were taken from Chapter V of Master Plan, but that information is not available in Chapter V, so we assume that the information from Chapter IV is used.

6. *Mix of Gates*: The Master Plan Addendum's gate mix for Alternative D is shown in the Table E-2. This mix results in a ratio of 1.16 between gates and narrow body equivalent gates NBEG's. (153 gates = 178.9 NBEG's). The capacity is estimated for the gate mix as given in the Addendum.

7. *Flight Schedules and Gate Position Loading*: The flight schedule is shown in Table F-9 of the Addendum. This assignment represents a certain gate position loading and implies a certain level of gate utilization. The capacity analysis presented here uses this assumed loading and schedule and does not question whether the gate utilization level achieved from the assignments can be increased, which would increase the capacity. By using the schedule used in the Addendum this analysis also implicitly accepts the daily peaking patterns assumed in the Master Plan.

2.1 Summary of the Master Plan Assumptions

Table 1 below shows excerpts from Table 3.3-1 from the Addendum, comparing the NP/NA, with Alternatives C and D. This table contains corrected numbers of NBEG's as obtained from Table V-3.3 (Lax Draft Master Plan) and Table 2.2-3. [2]

Table 1. LAX Master Plan Assumptions for Different Alternatives

Alternative	NA/NP	C	D
Annual Passengers	78715200	89553200	78864100
Annual Operations	712500	714000	713100
Design Day Operations	2058	2058	2058
Design Day Passengers	262329	298588	262758
Design Day Enplanements per Departure	127.47	145.09	127.68
Annual Enplanements per Departure	110.48	125.43	110.59
Annual Conversion Factor	300	300	300
Nominal Gates 2015	163.00	168.00	153.00
NBEG 2015	188.20	222.20	178.90

It should be noted, again, that as seen in Table 1, the LAX Master Plan Addendum assumed that Alternative D is designed to handle about the same total Annual aircraft Operations and Design Day Operations in 2015 as alternatives NA/NP and C. The difference in the annual passenger flow between these alternatives is attributed to the assumed distributions of these operations among types of operations, aircraft, and gate position sizes. Again, the basic assumption is that by limiting the number and size of gates, airlines will

[2] There are several mistakes concerning the number of NBEG's in the original report:

- The number of NBEG for existing gates in 2000 from Table 2.2-1 of LAX Master Plan Addendum is not calculated properly. The number of existing gates is 165 and according to the gate mix (Table 2.2-3 of LAX Master Plan Addendum) and the conversion table (Table IV-4.3 of the LAX Draft Master Plan) it is not 184.6, it is 190.9.
- Also, in Table V-3.3 of LAX Draft Master Plan, the number of NBEG for the NA/NP Alternative is stated to be 203.4, which is not the case if the gate distribution is the one shown in the Table 2.2-3 of Lax Master Plan Addendum. The correct number should be 188.20 instead.

respond by downsizing fleets and will thereby end up carrying fewer passengers per operation.

Design-Day to Annual Conversion Factors: As mentioned earlier, the number of annual passengers in Alternative D is also brought to 78 million by using an Annual Conversion Factor (ratio of annual number to design-day number) of 300, which is lower than the numbers observed at LAX today. Table 2 shows the actual 1996, 2000 and the forecasted values.

Table 2. Annual Conversion Factors

	Design Day Passengers	Annual Passengers	Annual Conversion Factor	Design Day Operations	Annual Operations	Annual Conversion Factor
1996 Actual	186,512	57,974,559	310.83	2055	712,206	346.57
2000 Actual	215,645	67,303,182	312.10	2054	710,791	346.05
NP/NA 2015	262,329	78,715,200	300.06	2058	712,500	346.21
Alternative C 2015	298,588	89,553,200	299.92	2058	714,000	346.94
Alternative D 2015	262,758	78,864,100	300.14	2058	713,100	346.50

One of the assumptions in the Master Plan is that the de-peaking of both operations and passengers will occur, which should result in a rise rather than a decline of the Annual Conversion Factor. We can see that even in year 2000 when the number of operations went down, the Annual Conversion Factor was 312. In 1996 it was 310. If Alternative D involves de-peaking due to the capacity constraint then we should expect these factors to increase.

3. CAPACITY ANALYSIS

Two methods are used to calculate the capacity of the gate position system as proposed for Alternative D. The first is an aggregate method based on the Addendum's projection of operations by service type and using the Addendum's fleet assumptions of the service type. The second more detailed analysis is based on the Addendum's projected flight schedule and gate assignment on an aircraft by aircraft basis. In both cases the Addendum's assumptions and forecasts are treated as described above. Aircraft seating sizes and Annual Conversion Factors are adjusted as described before, and load factors are assumed as in the Master Plan. Both of these methods yield similar results, and also corroborate the flow numbers estimated in the Addendum under the Addendum's assumptions.

3.1 PRELIMINARY CAPACITY ANALYSIS

A preliminary capacity analysis is shown in Tables 3 and 4. In this method, the Design Day Operations by service category, as obtained from Table 3.3-1 of the Addendum are used and assigned to the assumed typical aircraft for each service category. These typical aircraft are shown in Table 3. Two seating configurations (also shown in Table 3) are used to calculate total design day seats. First are the typical seating sizes as declared by the

manufacturers for the assumed aircraft types (shown later in Table 8), and second are the typical seats for the aircraft group as assumed by the Master Plan and can be found in the LAX Draft Master Plan Table IV-4.7.

Table 3. Assumed Aircraft Types, Seats and Load Factors.

Operation Type	Aircraft Type	Manufacturer Seats Assumed	"Typical" Seats Assumed in Master Plan	Load Factors*
Air Carrier	Boeing 757	200	185	0.6981
Commuter	Commuter	50	40.25[1]	0.5675
Hawaii	Boeing 757	200	185	0.8988
International	MD 11	285	280	0.8076

* Load factors have been taken from the Draft LAX Master Plan, Table IV-2.8, LAX Draft Master Plan: Design Day forecasted load factors for year 2015.
[1]Weighted average seats, for 12 class I and 20 class II commuter aircraft.

The seats are multiplied by load factors as assumed for each service category in the LAX Draft Master Plan. These numbers are also shown in Table 5 here. The Design Day Passengers are then obtained by multiplying number of operations by number of seats and the load factors. The Annual Passengers are obtained by multiplying the Design Day Passengers by the Annual Conversion Factor of 300.

The results of this analysis, using the Addendum's annual conversion factor of 300 are shown in Tables 4 and 5. Table 4, with the Addendum's assumed aircraft sizes and the annual conversion of 300 represents the passenger flows that result from the unmodified Addendum assumptions.

Table 4. Design Day & Annual Passengers, "Typical Seats" Assumed in Master Plan

Alternative	No Action/No Project	Alternative C	Alternative D
Design Day Operations Split*	1069 AC, 467 C, 54 H, 468 I	1120 AC, 317 C, 57H, 564 I	975 AC, 532 C, 53 H, 498 I
Design Day Passengers	263633	288969	259609
Annual Passengers	79089960	86690608	77882808
Design Day Passengers/NBEG	1400.81	1300.49	1451.14
Design Day Operations per NBEG	10.94	9.26	11.50

* AC: Air Carrier, C: Commuter, H: Hawaii, I: International operations.

Next in Table 5 we see the effect of adjusting aircraft seating capacities by using manufacturer specified figures for the aircraft categories assumed for each service type. The annual passenger flows are now higher. Such higher numbers reflect the capacity of the gates in the various categories, while the low numbers in Table 4 represent flows based on market assumptions of what airlines are assumed to use. In both cases these tables do not represent annual capacity since they are based on the Addendum's assumed conversion factor between design day and annual of 300, which is incorrect.

Table 5. Design Day Passengers, Manufacturer Seats Assumed

Alternative	No Action/No Project	Alternative C	Alternative D
Design Day Operations Split*	1069 AC, 467 C, 54 H, 468 I	1120 AC, 317 C, 57 H, 564 I	975 AC, 532 C, 53 H, 498 I
Design Day Passengers	279930	306262	275375
Annual Passengers	83978890	91878697	82612484
Design Day Passengers/NBEG	1487.41	1378.32	1539.27
Design Day Operations Per NBEG	10.94	9.26	11.50

* AC: Air Carrier, C: Commuter, H: Hawaii, I: International operations.

The figures shown in Table 4, completely reflecting the unmodified Master Plan assumptions corroborate the Addendum's estimation of the flow rates for the various alternatives. Under these assumptions all three alternatives C, D, and NA/NP have the same number of Design Day Operations, 2058, but as seen in Tables 4 and 5 these alternatives differ in the operations split. In the Alternative D projections, we can see that air carrier operations are significantly lower compared to Alternative C and to the NA/NP alternative assumptions. We can also see that the number of commuter operations is assumed to be the highest in Alternative D.

A Note on Addendum Assumptions of Operations By Service Type: These traffic assumptions seem to contradict the Master Plan's own market assumptions as stated in the Addendum (3.3.3 Air Service Changes) namely:

- *"Commuter operations would likely be reduced from 1996 levels, consistent with the forecasts for No Action/No Project and Alternative C, in order to maximize the number of passengers that could be served with a limited number of operations. It is also projected that some of the forecast commuter O&D demand would be served by domestic air carrier flights.*

- *Domestic air carrier connecting passengers would decrease from 2015 forecast levels to reflect the projected loss of connecting passengers from commuter flights."*

According to these assumptions, one would assume the number of commuter operations not to be as high as it is projected in Alternative D. So while all three alternatives are projected to have a drop in commuter operations from the 1996 level of 644 during the design day, Alternative D seems to have dropped the least. Instead we see the Design Day air carrier operations dropping measurably from 1096 in NA/NP and 1120 in Alternative C. to 975 in Alternative D.

Before subjecting the numbers obtained in tables 4 and 5 to sensitivity analysis a more detailed analysis of Design Day flows is conducted using the Master Plan Addendum's projected hourly operations by aircraft type. Given the importance of fleet mix and aircraft size assumptions, a detailed look at the assumed flights, aircraft type by aircraft type is more accurate than the numbers assumed on the basis of service category.

3.2 DETAILED PASSENGER CAPACITY AND SENSITIVITY ANALYSIS

Passenger capacity analysis involves calculation of passenger flow following the Master Plan assumptions of the fleet mix. The Design Day aircraft fleet mix was obtained from Table F-9 in the LAX Master Plan Addendum. This fleet mix contains all the flights in the Design Day: commercial, cargo, GA and military. In order to obtain the fleet mix for commercial passenger operations, cargo, general aviation and military flights are taken out according to the forecast in Tables IV-2.4 and IV-2.5 of the Draft LAX Master Plan. In the Draft Master Plan forecasted cargo, and GA operations are higher than the ones for Alternative D (i.e. 157 compared to 117 for cargo). Therefore, to obtain the cargo fleet mix for the Alternative D a pro-rated reduction of total operations is made using the percentage of each aircraft type in the projected cargo and GA fleets. The numbers are also adjusted to retain the projected distribution among service categories in the commercial operations flow[3]. These numbers are shown in Table 6.

Table 6. Cargo Fleet Mix.

Aircraft Type	Number of Forecasted Operations	Percentage of Operations	Percentage* Total Operations	Rounded Operations	Operations Alternative D	Percentage of Operations
B747-400	18	0.1146	13.41	13	13	0.1111
B747-100/200	18	0.1146	13.41	13	13	0.1111
MD11	15	0.0955	11.18	11	10	0.0854
DC10	16	0.1019	11.92	12	12	0.1025
A300	9	0.0573	6.71	7	6	0.0513
B767	15	0.0955	11.18	11	11	0.0940
B757	12	0.0764	8.94	9	8	0.0684
A310	10	0.0637	7.45	7	7	0.0598
B737	20	0.1274	14.90	15	15	0.1282
BE1	6	0.0382	4.47	4	6	0.0513
Small TP	18	0.1146	13.41	13	16	0.1367
Total	157			115	117	

The GA and military operations are shown in Table 7. By taking these out of the total in Table F-9, we obtain the Design Day fleet mix for passenger operations.

Table 7. GA and Military Fleet Mix.

Aircraft Type	MP Forecasted Operations	Alternative D Operations
Turboprop	81	76
Jet	29	28
Total	110	104

[3] Operations by aircraft type in Alt. D are chosen to be lower than if we round the numbers we have from column 4. The reason is that simply rounding the numbers, will leave too many operations with larger aircraft (B737 to B747-400), thereby distorting the Addendum's assumed operations by commuter.

Having obtained the hourly Design Day commercial operations by aircraft type the next step is to perform a sensitivity analysis on aircraft seating capacities. For this sensitivity analysis two different seating analyses are made. In the first analysis, resulting in *Lower Range Seats* we use lower end of seats as shown in Table IV-2.3 (3 of 3) of LAX Draft Master Plan. The second analysis, resulting in *Higher Range Seats*, takes into account the number of seats for each aircraft type based on a combination of three sources:

1. Aircraft manufacturer specification.
2. Current fleet seating by the major US carriers serving LAX. (Obtained from major airlines' websites.)
3. Aircraft orders and options by the major US Carriers (As obtained from *Aviation Week and Space Technology 2003 Aerospace Source Book seating (Order/Options column)*

Conservatively, we use the mid-range values rather than the high ends of the ranges shown from each source. All these numbers, the Master Plan's range, the manufacturer's range as well as the numbers used in the sensitivity analysis are shown in Table 8.

For each seating case the number of operations of each aircraft type, as projected in the Master Plan Addendum, is multiplied by its seats yielding the number of the Design Day seats. Table 9 shows the number of Design Day Offered Seats for Lower and Higher seat ranges respectively. The total Design Day Seats are shown in bold letters at the bottom of each table.

Table 8. Aircraft Type Seating Assumptions
Manufacturer's Seating Range, Master Plan Assumptions and Range Used in this Analysis

Aircraft	Manufacturer Seat Range	Master Plan Assumption	Lower Range Used	Higher Range Used	Current Fleet	Order/ Options**
F100*	98	98	98	98	87	
A-300	266/298	270-285	275	280	250/251	
A-310	240/247	220-237	220	240		
A-318						107 (15)
A-319	124/134	120	120	124	120-124	124 (386)
A-320	150/164	144-150	144	150	138-150	150 (162)
A-321					169	185 (18)
A-330	295/335	300-335	300	300	266-298	253-440 (57)
A-340	380/419	303-335	303	380		
737-300	128/134	118-134	128	130	120-134	
737-400	146/159	138-146	138	146	144	
737-500	108/122	102-110	102	115	104-116	
737-700	126/149	118-134	120	135	124	126 (223)
737S*	102-110	102-110	105	110	107-113	
737-800					134-155	162 (158)
737-900					167	177 (5)
747-400	416/496	390-436	390	410	347-403	416-568 (2)
747*	366-496	260-410	366	416	353-430	
74M*	366-497	234	234	416		
74X	600	600	600	600		
757	200-280	185-188	185	220	168-224	200-243 (47)
767-300*	261/290	220-240	220	250	174-204	181-218 (15)
767*	226-375	172-203	181	226	168-204	
767-400					256-287	245 (37)
777	305-370	305-375	305	360	224-348	301-368 (55)
A-300	266/298	270-285	280	280	250-251	
DC-10*	250-380	260-310	280	275	273	
MD-11*	285/410	284-375	285	300	268	
MD80*	155/172	142-147	143	150	129-141	
MD87*	130/139	125	125	140	142	
MD90*	153/172	150	150	150	150	
MD90-50*	153/172	104	104	153		
ATR72*	66-72	68	64	68	64	
ATR42*	46/48/50	46	46	46	46	
BE1	19	19	19	19	19	
C50	50	50	50	50	40-50	
C70	64-75	70	70	75	64-70	
C90					80	
CAN	19	n/a	19	19	N/a	
DS7*	50/54	48	48	50	N/a	
DS8*					37-50	
EM2		30	30	40	30-44	
EMB	50	50	50	50	50	
Bae-146*					88-100	

F50*	50	50	50	50	N/a	
F70*	70/80	70	70	70	N/a	
GAJ	19	n/a	19	19	N/a	
J31*	18/19	19	19	19	N/a	
J41*					29-30	
S20*	50/58	50	50	50		
S36	20-39	36	36	36		
SF3*	34	34	34	34	34	
SWM	19	19	19	19		

*Production ended or terminated.

** Orders/Options for AAL, AWE, COA, DAL, USA, UAL, NWA, SWA, JetBlue. Number in brackets represents the number of aircraft on order/options for mentioned airlines.

Table 9. Design Day Seats Offered, Lower and Higher Range Seating

Aircraft Type	Design Day Operations	Aircraft Size Lower Range	Aircraft Size Higher Range	D. Day Seats Lower Range	D. Day Seats Higher Range
100	4	98	98	392	392
300	5	280	275	1400	1375
310	14	220	240	3080	3360
319	3	120	124	360	372
320	50	144	150	7200	7500
330	21	300	300	6300	6300
340	19	303	380	5757	7220
733	163	128	130	20864	21190
734	52	138	146	7176	7592
735	45	102	115	4590	5175
737	16	120	135	1920	2160
73S	22	105	110	2310	2420
744	122	390	410	47580	50020
747	9	366	416	3294	3744
74M	17	234	416	3978	7072
74X	27	600	600	16200	16200
757	386	185	220	71410	84920
763	73	220	250	16060	18250
767	72	181	226	13032	16272
777	55	305	360	16775	19800
AB3	110	280	280	30800	30800
D10	0	280	275	0	0
M11	95	285	300	27075	28500
M80	76	143	150	10868	11400
M87	2	125	140	250	280
M90	34	150	150	5100	5100
M95	34	104	153	3536	5202
AT7	25	64	68	1600	1700
ATR	53	46	46	2438	2438
BE1	38	19	19	722	722
C50	47	50	50	2350	2350
C70	5	70	75	350	375
CAN	43	19	19	817	817
DS7	63	48	50	3024	3150
EM2	22	30	40	660	880
EMB	31	50	50	1550	1550
F50	20	50	50	1000	1000
F70	8	70	70	560	560
GAJ	0	19	19	0	0
J31	43	19	19	817	817
S20	34	50	50	1700	1700
S36	6	36	36	216	216
SF3	36	34	34	1224	1224
SWM	58	19	19	1102	1102
Total	2058			347437	383217

Having the number of the Design Day Seats for both seating ranges, a sensitivity analysis is next conducted on Annual Passengers, using different load factors and Annual Conversion Factors. The load factor of **0.7346** is the forecasted total commercial load factor, as obtained from Table IV-2.8 of the Draft Master Plan. Annual Passenger sensitivity analysis is presented in Tables 10 and 11, for lower and higher seat ranges, along with the design day passengers and design day passengers per operation. Bolded numbers are those exceeding 78.5 MAP.

Table 10. Annual Passenger Sensitivity Analysis, Lower Range Seats

Load Factor	0.7	0.72	0.7346	0.74	0.76
D. Day Passengers per Operation	118.2	121.6	124.0	124.9	128.3
Design Day Passengers	243206	250155	255227	257103	264052
Annual Conversion Factor	**Annual Passengers**				
300	72961770	75046392	76568166	77131014	79215636
305	74177800	76297165	77844302	78416531	**80535897**
310	75393829	77547938	**79120438**	**79702048**	**81856157**
315	76609859	**78798712**	**80396574**	**80987565**	**83176418**
320	77825888	**80049485**	**81672710**	**82273082**	**84496678**

Table 11. Annual Passenger Sensitivity Analysis, Higher Range Seats

Load Factor	0.7	0.72	0.7346	0.74	0.76
D. Day Passengers per Operation	130.3	134.1	136.8	137.8	141.5
Design Day Passengers	268252	275916	281511	283581	291245
Annual Conversion Factor	**Annual Passengers**				
300	**80475570**	**82774872**	**84453462**	**85074374**	**87373476**
305	**81816840**	**84154453**	**85860919**	**86492027**	**88829401**
310	**83158089**	**85534034**	**87268375**	**87909680**	**90285325**
315	**84499349**	**86913616**	**88676832**	**89327883**	**91742250**
320	**85840608**	**88293197**	**90083587**	**90745786**	**93198374**

Figures 1 and 2 show the numbers presented in Tables 10 and 11 in graphical form. Values that exceed 78.5 MAP are shown in gray, and the ones under are shown in white, thus making it easier to see influence of each assumption (load factor and annual conversion factor).

Figure 1. MAP Sensitivity Analysis, Lower Seat Range

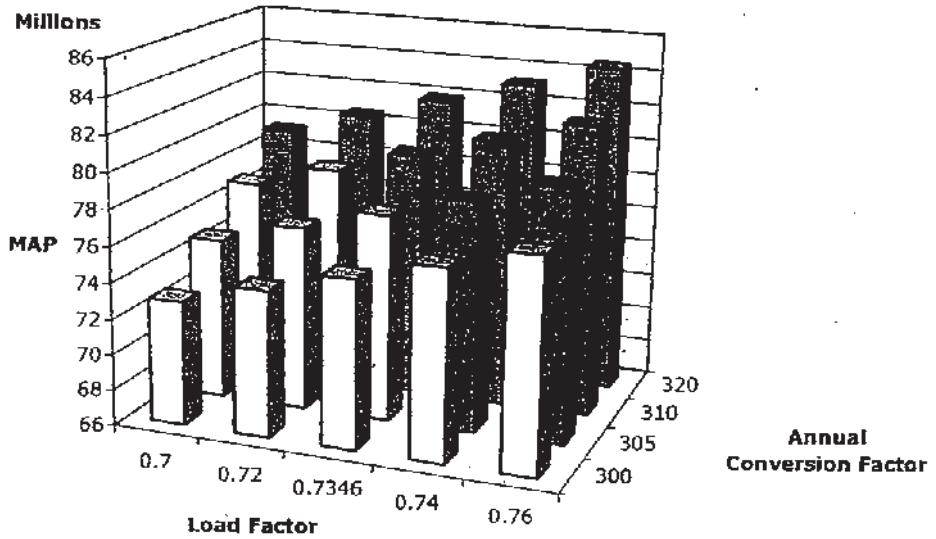
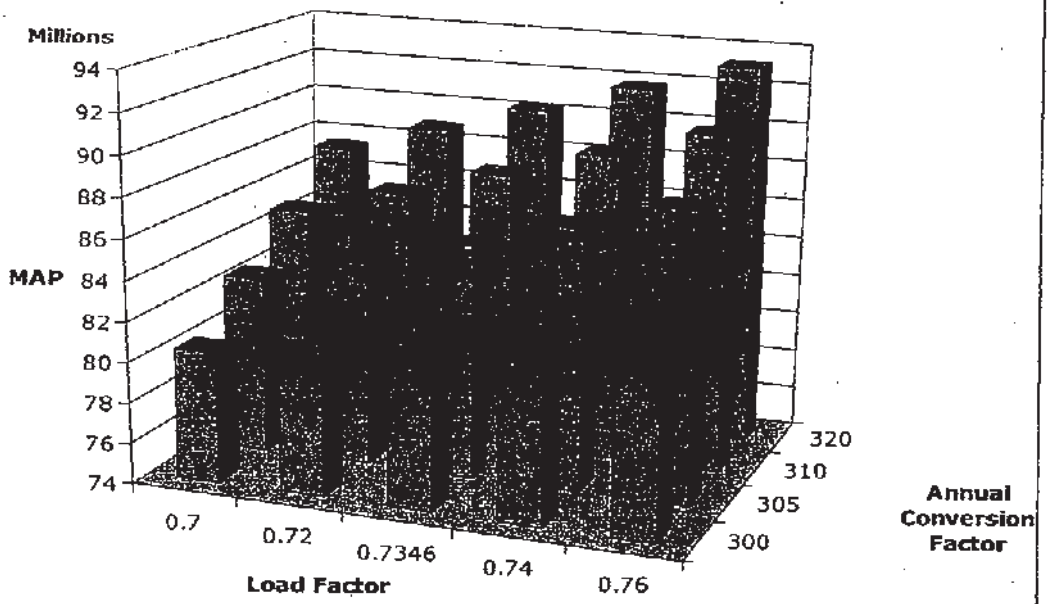


Figure 2. MAP Sensitivity Analysis, Higher Seat Range



3.3 Capacity of Alternative D

To conclude regarding the capacity of the 153 gates as configured in Alternative D into 178.9 NBEG's we adopt the Master Plan's assumed average load factors of 73.46%. We also adopt LAX's prevailing Annual Conversion Factor of 310, and conservatively do not increase is to reflect possible spreading of the peak as traffic grows in face of capacity constraints. We also adopt the higher range seating of aircraft as described in the previous section as a better representation of the capacity of the gate positions, noting that it too is conservatively kept within the range of possible seating configurations rather than its top values. With that the capacity is estimated to be 87.24 MAP, as shown by the italicized number in Table 11.

3.4 Capacity Analysis for a Range of Gate Positions

The next step is to perform the capacity analysis for a range of gate positions in order to ascertain the number that would limit the capacity to 78 million. As shown in the results below, a significant reduction in gates or NBEG's would be needed to limit the capacity to 78 MAP. This question is addressed in this section.

To do this analysis, first the *Gate Passenger Flow Rate* is computed. This rate is the number of the Design Day Passengers divided by the number of NBEG's. Since it is the size as well as the number of gates that determines capacity, passenger flow per NBEG is used to calculate the capacity and then map it back on to the number of gates using the Master Plan Addendum's conversion assumptions, or gate mix. Table 12 shows Passenger Gate Flows for both Lower and Higher range seats and for each load factor used.

Table 12. Gate Passenger Flow: Design Day Passengers per NBEG

Load Factor	0.70	0.72	0.7346	0.74	0.76
Gate Passenger Flow-Lower Seat Range	1359	1398	1427	1437	1476
Gate Passenger Flow-Higher Seat Range	1499	1542	1574	1585	1628

We assume that Gate Passenger Flow is NBEG capacity in each load factor case. We also assume that the gate mix will not change. Right now the ratio between the nominal gates and NBEG's is 1.169. Sensitivity analysis can now be used to determine the change in capacity as the number of gates varies. Design Day Passengers are obtained by multiplying the average flow figures in Table 12 with the number of NBEG's. Annual capacity is then obtained by applying the conversion factor. The following tables (13-22) and figures (3-12) show the Annual Passengers served, for each load factor and number of NBEG's. We also show the number of nominal gates involved, following Alternative D ratio between nominal gates and NBEG's. As shown in Table 18 the figure of 87.24 MAP appears again as the capacity estimate.

Table 13. Annual Passenger Capacity: Lower Seat Range
Annual Conversion Factor = 300

NBEG	Gates	0.70	0.72	0.7346	0.74	0.76
179	153.0	72961770	75046392	76568166	77131014	79215636
178	152.2	72594718	74668853	76182971	76742988	78817122
177	151.4	72186883	74249365	75754977	76311847	78374330
176	150.5	71779047	73829877	75326983	75880707	77931537
175	149.7	71371212	73410389	74898989	75449567	77488744
174	148.8	70963376	72990901	74470994	75018426	77045951
173	148.0	70555541	72571413	74043000	74587286	76603158
172	147.1	70147705	72151925	73615006	74156145	76160366
171	146.2	69739870	71732437	73187012	73725005	75717573
170	145.4	69332034	71312949	72759017	73293865	75274780
169	144.5	68924199	70893461	72331023	72862724	74831987
168	143.7	68516363	70473973	71903029	72431584	74389194

Table 14. Annual Passengers Capacity: Higher Seat Range
Annual Conversion Factor = 300

NBEG	Gates	0.70	0.72	0.7346	0.74	0.76
179	153.0	80475570	82774872	84453362	85074174	87373476
178	152.2	80070718	82358433	84028499	84646188	86933922
177	151.4	79620883	81895765	83556429	84170647	86445530
176	150.5	79171047	81433077	83084359	83695107	85957137
175	149.7	78721212	80970389	82612289	83219567	85468744
174	148.8	78271376	80507701	82140218	82744026	84980351
173	148.0	77821541	80045013	81668148	82268486	84491958
172	147.1	77371705	79582325	81196078	81793945	84003566
171	146.2	76921870	79119637	80724008	81317405	83515173
170	145.4	76472034	78656949	80251937	80841865	83026780
169	144.5	76022199	78194261	79779867	80366324	82538387
168	143.7	75572363	77731573	79307797	79890784	82049994
167	142.8	75122528	77268886	78835726	79415243	81561601
166	142.0	74672692	76806198	78363657	78939703	81073209
165	141.1	74222857	76343510	77891586	78464163	80584816
164	140.3	73773021	75880822	77419516	77988622	80096423
163	139.4	73323186	75418134	76947446	77513082	79608030
162	138.5	72873350	74955446	76475376	77037542	79119637

Figure 3. Lower Seat Range, Annual Conversion Factor 300

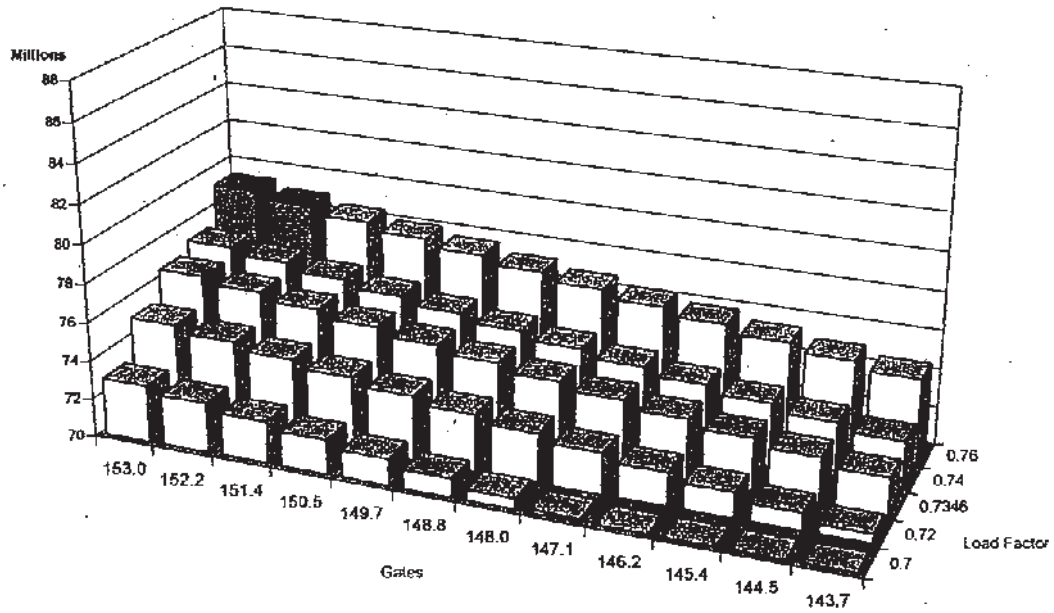


Figure 4. Higher Seat Range, Annual Conversion Factor 300

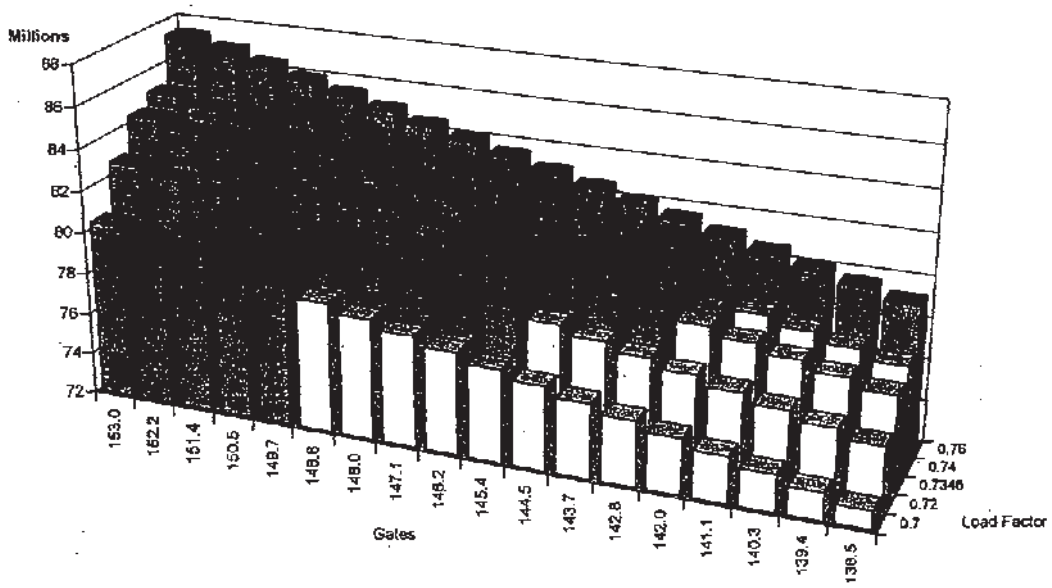


Table 15. Annual Passengers Capacity: Lower Seat Range
Annual Conversion Factor = 305.

NBEG	Gates	0.70	0.72	0.7346	0.74	0.76
179	153.0	74177800	76297165	77844302	78416531	80535897
178	152.2	73804630	75913334	77452687	78022037	80130741
177	151.4	73389997	75486854	77017560	77583711	79680568
176	150.5	72975365	75060375	76582433	77145385	79230396
175	149.7	72560732	74633896	76147305	76707059	78780223
174	148.8	72146099	74207416	75712178	76268733	78330050
173	148.0	71731466	73780937	75277050	75830407	77879878
172	147.1	71316834	73354457	74841923	75392081	77429705
171	146.2	70902201	72927978	74406795	74953755	76979532
170	145.4	70487568	72501499	73971668	74515429	76529360
169	144.5	70072935	72075019	73536540	74077103	76079187
168	143.7	69658302	71648540	73101413	73638777	75629014

Table 16. Annual Passengers Capacity: Higher Seat Range
Annual Conversion Factor = 305.

NBEG	Gates	0.70	0.72	0.7346	0.74	0.76
179	153.0	81816880	84154453	85860919	86492077	88829701
178	152.2	81405230	83733094	85428974	86056957	88382821
177	151.4	80947897	83260694	84949036	85573491	87886288
176	150.5	80490565	82790295	84469098	85090025	87389756
175	149.7	80033232	82319896	83989160	84606559	86893223
174	148.8	79575899	81849496	83509222	84123093	86396690
173	148.0	79118566	81379097	83029284	83639627	85900158
172	147.1	78661234	80908697	82549346	83156161	85403625
171	146.2	78203901	80438298	82069408	82672695	84907093
170	145.4	77746568	79967899	81589470	82189229	84410560
169	144.5	77289235	79497499	81109532	81705763	83914027
168	143.7	76831902	79027100	80629594	81222297	83417494
167	142.8	76374570	78556700	80149656	80738831	82920961
166	142.0	75917237	78086301	79669718	80255365	82424429
165	141.1	75459904	77615901	79189780	79771899	81927896
164	140.3	75002571	77145502	78709841	79288433	81431363
163	139.4	74545239	76675103	78229903	78804967	80934831
162	138.5	74087906	76204703	77749965	78321501	80438298

Figure 5. Lower Seat Range, Annual Conversion Factor 305

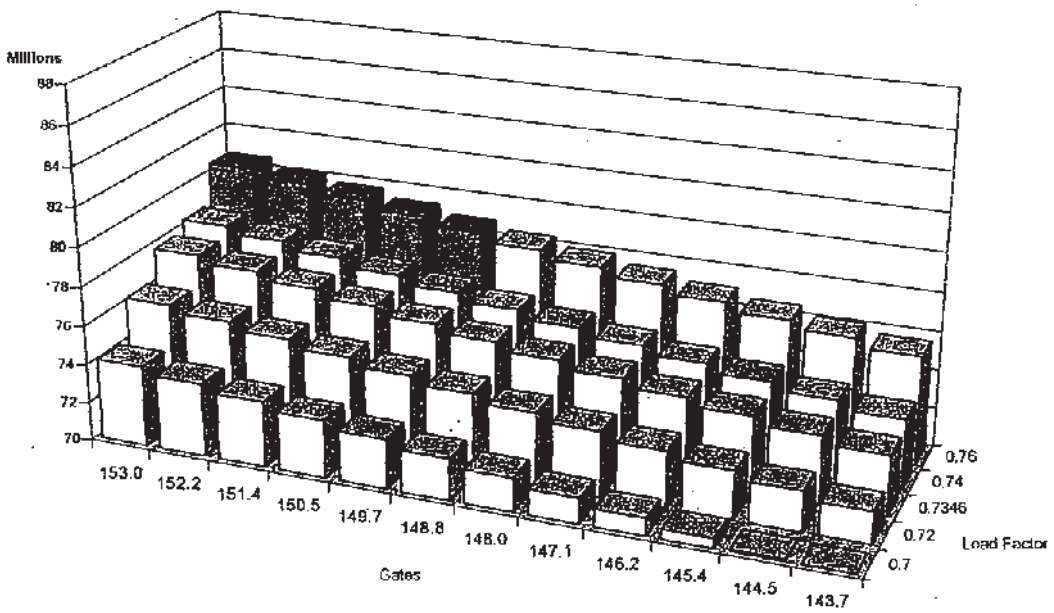


Figure 6. Higher Seat Range, Annual Conversion Factor 305

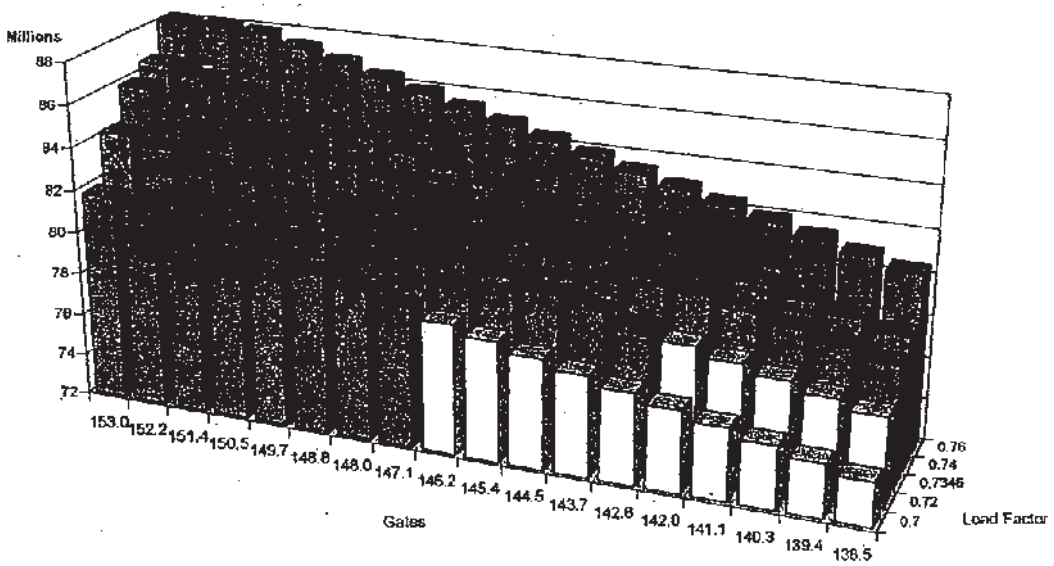


Table 17. Annual Passengers Capacity: Lower Seat Range
Annual Conversion Factor = 310.

NBEG	Gates	0.70	0.72	0.7346	0.74	0.76
179	153.0	75393829	77547938	79120438	79702048	81856157
178	152.2	75014542	77157815	78722404	79301087	81444360
177	151.4	74593112	76724344	78280143	78855576	80986807
176	150.5	74171682	76290873	77837882	78410064	80529255
175	149.7	73750252	75857402	77395622	77964552	80071702
174	148.8	73328822	75423931	76953361	77519040	79614150
173	148.0	72907392	74990460	76511100	77073529	79156597
172	147.1	72485962	74556989	76068839	76628017	78699044
171	146.2	72064532	74123519	75626579	76182505	78241492
170	145.4	71643102	73690048	75184318	75736993	77783939
169	144.5	71221672	73256577	74742057	75291482	77326387
168	143.7	70800242	72823106	74299797	74845970	76868834

Table 18. Annual Passengers Capacity: Higher Seat Range
Annual Conversion Factor = 310.

NBEG	Gates	0.70	0.72	0.7346	0.74	0.76
179	153.0	83158089	85534034	87268475	87909980	90285925
178	152.2	82739742	85103735	86829449	87467727	89831720
177	151.4	82274912	84625624	86341643	86976336	89327047
176	150.5	81810082	84147513	85853837	86484944	88822375
175	149.7	81345252	83669402	85366032	85993552	88317702
174	148.8	80880422	83191291	84878226	85502160	87813030
173	148.0	80415592	82713180	84390420	85010769	87308357
172	147.1	79950762	82235069	83902614	84519377	86803684
171	146.2	79485932	81756959	83414808	84027985	86299012
170	145.4	79021102	81278848	82927002	83536593	85794339
169	144.5	78556272	80800737	82439196	83045202	85289667
168	143.7	78091442	80322626	81951390	82553810	84784994
167	142.8	77626612	79844515	81463584	82062418	84280321
166	142.0	77161782	79366404	80975779	81571027	83775649
165	141.1	76696952	78888293	80487973	81079635	83270976
164	140.3	76232122	78410182	80000167	80588243	82766304
163	139.4	75767292	77932072	79512361	80096851	82261631
162	138.5	75302462	77453961	79024555	79605460	81756959

Figure 7. Lower Seat Range, Annual Conversion Factor 310

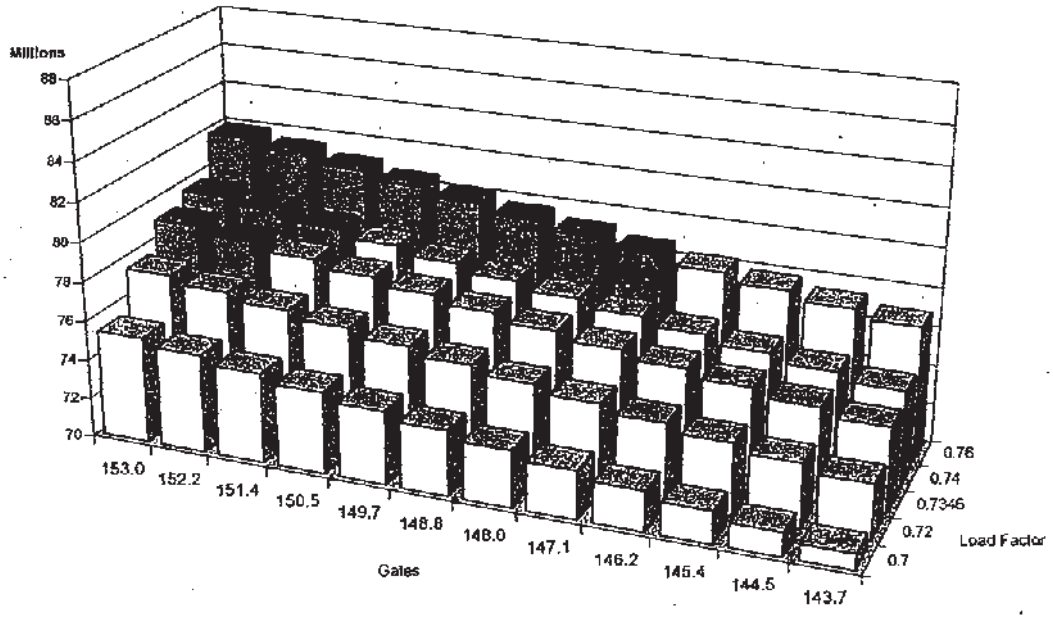


Figure 8. Higher Seat Range, Annual Conversion Factor 310

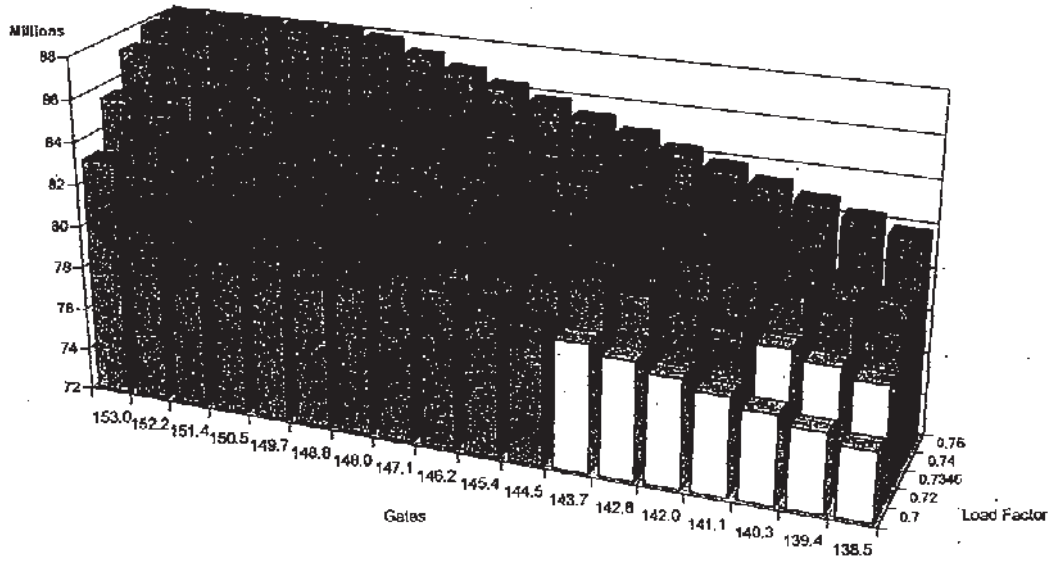


Table 19. Annual Passengers Capacity: Lower Seat Range
Annual Conversion Factor = 315.

NBEG	Gates	0.70	0.72	0.7346	0.74	0.76
179	153.0	76609859	78798712	80396574	80987565	83176418
178	152.2	76224454	78402295	79992120	80580137	82757979
177	151.4	75796227	77961833	79542726	80127440	82293046
176	150.5	75367999	77521371	79093332	79674742	81828114
175	149.7	74939772	77080908	78643938	79222045	81363181
174	148.8	74511545	76640446	78194544	78769347	80898249
173	148.0	74083318	76199984	77745150	78316650	80433316
172	147.1	73655090	75759521	77295756	77863953	79968384
171	146.2	73226863	75319059	76846362	77411255	79503451
170	145.4	72798636	74878597	76396968	76958558	79038519
169	144.5	72370409	74438134	75947574	76505860	78573586
168	143.7	71942181	73997672	75498181	76053163	78108654

Table 20. Annual Passengers Capacity: Higher Seat Range
Annual Conversion Factor = 315.

NBEG	Gates	0.70	0.72	0.7346	0.74	0.76
179	153.0	84499349	86913616	88676031	89327883	91742150
178	152.2	84074254	86476375	88279924	88878497	91280619
177	151.4	83601927	85990553	87734250	88379180	90767806
176	150.5	83129599	85504731	87238577	87879862	90254994
175	149.7	82657272	85018908	86742903	87380545	89742181
174	148.8	82184945	84533086	86247229	86881227	89229369
173	148.0	81712618	84047264	85751556	86380910	88716556
172	147.1	81240290	83561441	85255882	85882593	88203744
171	146.2	80767963	83075619	84760208	85383275	87690931
170	145.4	80295636	82588797	84264534	84883958	87178119
169	144.5	79823309	82103974	83768861	84384640	86665306
168	143.7	79350981	81618152	83273187	83885323	86152494
167	142.8	78878654	81132330	82777513	83386006	85639681
166	142.0	78406327	80646507	82281839	82886688	85126869
165	141.1	77933999	80160685	81786166	82387371	84614057
164	140.3	77461672	79674863	81290492	81888053	84101244
163	139.4	76989345	79189040	80794818	81388736	83588432
162	138.5	76517018	78703218	80299145	80889419	83075619

Figure 9. Lower Seat Range, Annual Conversion Factor 315

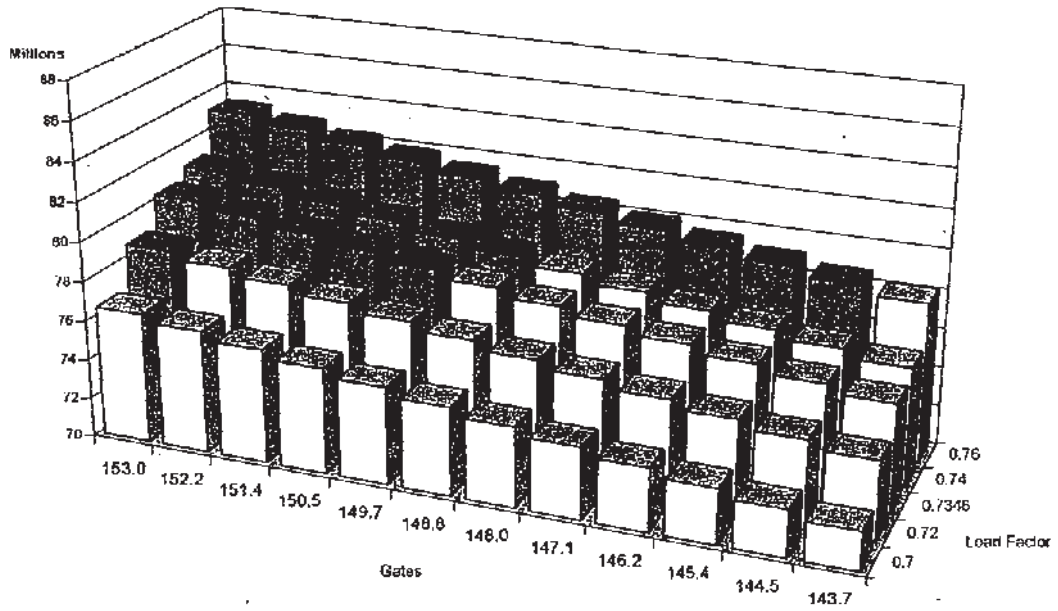


Figure 10. Higher Seat Range, Annual Conversion Factor 315

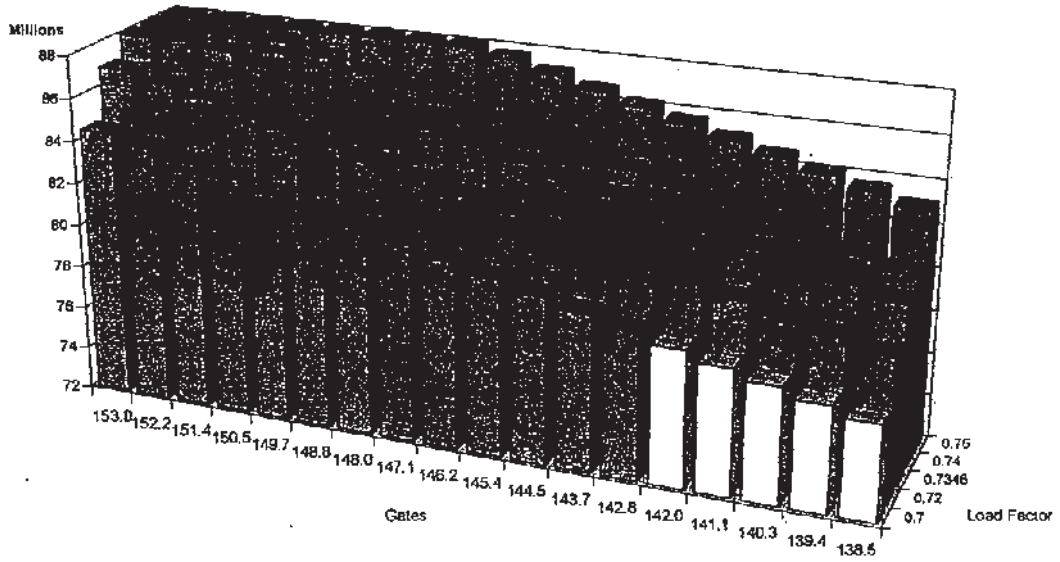


Table 21. Annual Passengers Capacity: Lower Seat Range
Annual Conversion Factor = 320.

NBEG	Gates	0.70	0.72	0.7346	0.74	0.76
179	153.0	77825888	80049485	81672710	82273087	84496678
178	152.2	77434366	79646776	81261836	81859187	84071597
177	151.4	76999341	79199323	80805309	81399304	83592285
176	150.5	76564317	78751869	80348782	80939421	83126973
175	149.7	76129292	78304415	79892255	80479538	82654600
174	148.8	75694268	77856961	79435727	80019655	82182348
173	148.0	75259243	77409507	78979200	79559771	81710036
172	147.1	74824219	76962054	78522673	79099888	81237723
171	146.2	74389194	76514600	78066146	78640005	80765411
170	145.4	73954170	76067146	77609619	78180122	80293099
169	144.5	73519145	75619692	77153091	77720239	79820786
168	143.7	73084121	75172238	76696564	77260356	79348474

Table 22. Annual Passengers Capacity: Higher Seat Range
Annual Conversion Factor = 320.

NBEG	Gates	0.70	0.72	0.7346	0.74	0.76
179	153.0	85840608	88293197	90083587	90745786	93198374
178	152.2	85408766	87849016	89630399	90289267	92729517
177	151.4	84928941	87355483	89126858	89782024	92208565
176	150.5	84449117	86861949	88623316	89274781	91687613
175	149.7	83969292	86368415	88119775	88767538	91166660
174	148.8	83489468	85874881	87616233	88260295	90645708
173	148.0	83009643	85381347	87112691	87753051	90124756
172	147.1	82529819	84887814	86609150	87245808	89603803
171	146.2	82049994	84394280	86105608	86738565	89082851
170	145.4	81570170	83900746	85602067	86231322	88561899
169	144.5	81090345	83407212	85098525	85724079	88040946
168	143.7	80610521	82913678	84594984	85216836	87519994
167	142.8	80130696	82420145	84091442	84709593	86999042
166	142.0	79650872	81926611	83587900	84202350	86478089
165	141.1	79171047	81433077	83084359	83695107	85957137
164	140.3	78691223	80939543	82580817	83187864	85436184
163	139.4	78211398	80446009	82077276	82680621	84915232
162	138.5	77731573	79952476	81573734	82173378	84394280

Figure 11. Lower Seat Range, Annual Conversion Factor 320

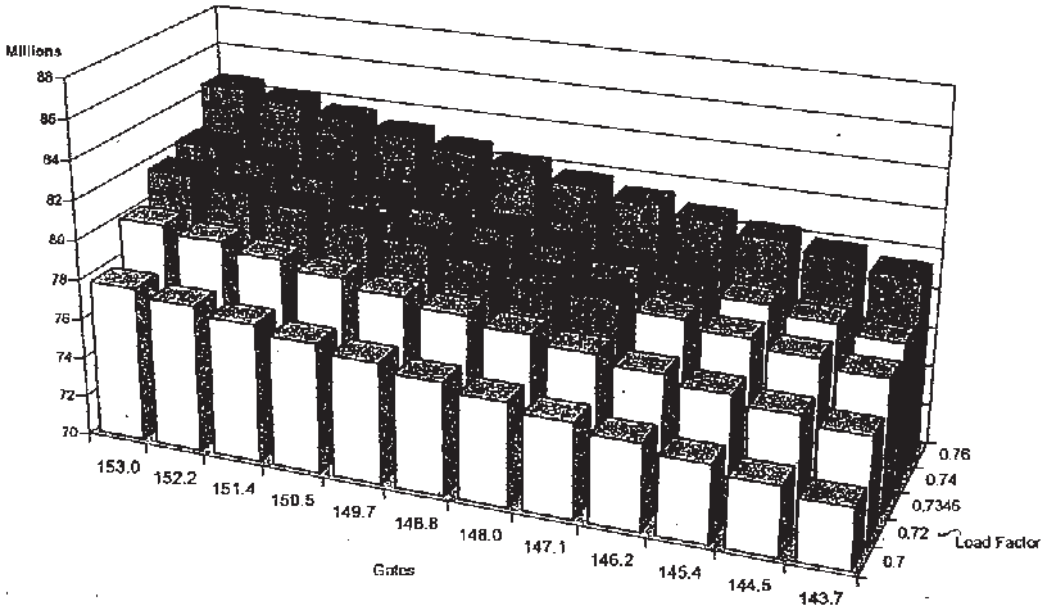
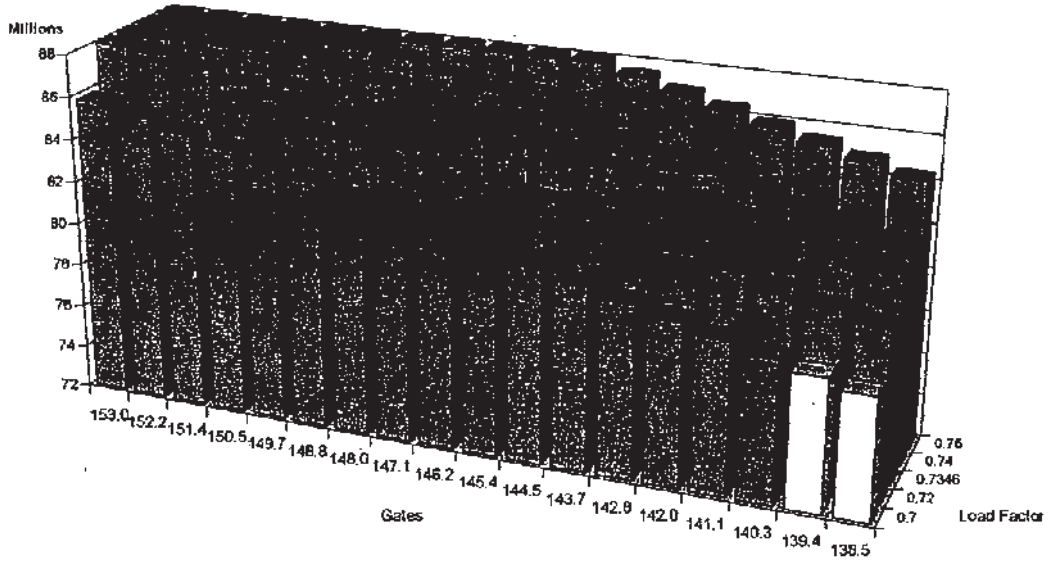


Figure 12. Higher Seat Range, Annual Conversion Factor 320



3.5 Gate Capacity Analysis

The previous analysis showed the capacity of the current plan to be about 87 MAP. It also showed the relation between capacity and the number of gates or NBEG's, while maintaining the gate mix as it is presently proposed in Alternative D, and hence the same ratio between gates and NBEG's. In this section we calculate the capacity on the basis of the mix of gates proposed in Alternative D using the parameters defined in the Addendum for each gate design group. This permits the evaluation of the impact on capacity of reduction in gates of different size groups rather than simply number of gates and NBEG's as would be obtained from the previous section.

The gate mix proposed in the Addendum is found in Table E-2 of the Addendum. From the Table E-2 we see the gate mix and the gate assignment to airline operators. This information is used in the analysis, which is described in the following text.

Table 23 shows the range of load factors used in the sensitivity analysis. Bold-faced load factors are the Master Plan forecasted load factors for the 2015 Design Day, which can be found in the Table IV-2.8, LAX Draft Master Plan. Only the first row of bold face load factors has different values for different operations. The other bold-faced load factors are the LAX Master Plan's average load factors for all operation types. Hawaiian operations are not separated from the Air Carrier Operations, since from the Table E-2 and the airline definitions it was not possible to discern which gates would be used for Hawaiian operations.

Table 23. Range of Load Factors Used

Air Carrier	Commuter	International
0.7000	0.7000	0.7000
0.7100	0.7100	0.7100
0.6981*	**0.5675***	**0.8076***
0.7200	0.7200	0.7200
0.7346	**0.7346**	**0.7346**
0.7400	0.7400	0.7400

* The Master Plan's load factors by carrier group

The number of Design Day Operations for each gate design group is obtained by dividing the number of operations in each group by the number of gates in that group. The aircraft are grouped by gate size according to the Addendum's Table IV-4.7, and the number of gates in each design (or size) group is taken from the Addendum's Table E-2. The Design Day number of Operations for each gate size group is obtained from the Design Day fleet mix as shown in Table 9. The aircraft types are grouped according to the wing span range for each Aircraft Wing Span Group. The results are shown in Table 24. As before, the Design Day Passengers are calculated by multiplying for each gate in the gate size group the typical seats for that group by the corresponding load factor, and then multiplying that number by Design Day Operations per Gate.

Table 24. Operations per Gate for Proposed Gate Sizes and Fleet Mix

Gate Size	Aircraft Wing Span Group	Typical Seats	Number of Gates	Number of Operations	Design Day Operations per Gate
74X	VI	600	6	27	4.50
747	V	400	22	243	11.05
MD11, DC10, 767	IV	280	30	369	12.30
757	IIIa	185	23	386	16.78
MD80, 737	III	145	40	501	12.53
Commuter	I-III	40*	32	532	16.63

* Weighted average of typical seats for commuter I and II gates.

By considering the load factors discussed in the Master Plan we convert these operations into Design Day passenger flows, as shown in Table 25. The table shows the flows in passengers per NBEG as well, in order to facilitate sensitivity analysis.

Table 25. Design Day Passengers and Gate Passenger Flow.

Load Factors	Design Day Passengers	Passengers per NBEG
0.70	267596	1495.78
0.71	271418	1517.15
DD Load Factors*	272392	1522.60
0.72	275241	1538.52
0.7346	280823	1569.72
0.74	282887	1581.26

The Master Plan's load factors by carrier group

Table 26 shows the sensitivity analysis of load factor and NBEG number changes, with the Annual Conversion Factor of 300. Table 27 shows the same sensitivity analysis for the Annual Conversion Factor of 310. In both tables besides the NBEG number we show the number of physical gates. The number of nominal gates is calculated assuming that the current Alternative D gate mix. By using the data in Tables 24 and 25 it is possible to study the effect of gate reductions in various mixes of gate design groups on capacity.

The results shown in Table 27 suggest that if the gate, or fleet group mix is not altered, and if the Master Plan's Design Day load factors are used then a reduction of about 10 gates would be necessary to limit the capacity to the 78.9 MAP. Different, higher or lower degrees of reduction can be also used if these reductions are articulated by specific design groups. Clearly a reduction by one NLA group VI gate would reduce the capacity considerably more than a reduction by one commuter Class I or II gate.

Table 26. Annual Passengers Sensitivity Analysis: Annual Conversion Factor = 300.

NBEG	Gates	0.70	0.71	DD LF	0.72	0.7346	0.74
180.0	154.0	**80772325**	**81926216**	**82220189**	**83080106**	**84764786**	**85387887**
178.9	153.0	**80278717**	**81425556**	**81717732**	**82572394**	**84246779**	**84866072**
178.0	152.3	**79874855**	**81015925**	**81306631**	**82156994**	**83822955**	**84439133**
176.0	150.6	**78977385**	**80105633**	**80393074**	**81233882**	**82881124**	**83490378**
174.0	148.8	78079915	**79195342**	**79479516**	**80310769**	**81939293**	**82541624**
172.0	147.1	77182444	78285051	**78565958**	**79387657**	**80997462**	**81592870**
170.0	145.4	76284974	77374759	77652401	78464545	**80055631**	**80644115**
168.0	143.7	75387504	76464468	76738843	77541432	**79113800**	**79695361**
167.0	142.9	**74938769**	76009322	76282064	77079876	**78642885**	**79220984**
166.0	142.0	74490034	75554177	75825285	76618320	78171969	**78746607**
165.0	141.1	74041298	75099031	75368507	76156764	77701054	78272230
164.0	140.3	73592563	74643886	74911728	75695208	77230138	77797853
163.0	139.4	73143828	74188740	74454949	75233652	76759223	77323475
162.0	138.6	72695093	73733594	73998170	74772096	76288308	76849098
161.0	137.7	72246358	73278449	73541391	74310539	75817392	76374721
160.0	136.9	71797623	72823303	73084613	73848983	75346477	75900344
159.0	136.0	71348888	72368157	72627834	73387427	74875561	75425967
158.0	135.2	70900152	71913012	72171055	72925871	74404646	74951590
157.0	134.3	70451417	71457866	71714276	72464315	73933730	74477213
156.0	133.4	70002682	71002720	71257497	72002759	73462815	74002835
155.0	132.6	69553947	70547575	70800718	71541203	72991899	73528458

Table 27. Annual Passengers Sensitivity Analysis: Annual Conversion Factor = 310.

NBEG	Gates	0.70	0.71	DD LF	0.72	0.7346	0.74
180.0	154.0	83464736	84657090	84960862	85849443	87590279	88234150
178.9	153.0	82954674	84139741	84441657	85324808	87055005	87694941
178.0	152.3	82537350	83716455	84016852	84895560	86617054	87253770
176.0	150.6	81609964	82775821	83072843	83941678	85643828	86273391
174.0	148.8	80682578	81835187	82128833	82987795	84670603	85293012
172.0	147.1	79755193	80894552	81184824	82033912	83697378	84312632
170.0	145.4	78827807	79953918	80240814	81080030	82724152	83332253
168.0	143.7	77900421	79013284	79296805	80126147	81750927	82351873
167.0	142.9	77436728	78542967	78824800	79649206	81264314	81861683
166.0	142.0	76973035	78072649	78352795	79172264	80777702	81371494
165.0	141.1	76509342	77602332	77880790	78695323	80291089	80881304
164.0	140.3	76045649	77132015	77408785	78218381	79804476	80391114
163.0	139.4	75581956	76661698	76936781	77741440	79317864	79900925
162.0	138.6	75118263	76191381	76464776	77264499	78831251	79410735
161.0	137.7	74654570	75721064	75992771	76787557	78344638	78920545
160.0	136.9	74190877	75250746	75520766	76310616	77858026	78430355
159.0	136.0	73727184	74780429	75048761	75833675	77371413	77940166
158.0	135.2	73263491	74310112	74576757	75356733	76884800	77449976
157.0	134.3	72799798	73839795	74104752	74879792	76398188	76959786
156.0	133.4	72336105	73369478	73632747	74402851	75911575	76469597
155.0	132.6	71872412	72899161	73160742	73925909	75424962	75979407

These numbers are shown graphically in Figures 13 and 14.

Figure 13. Gate Capacity, Annual Conversion Factor 308

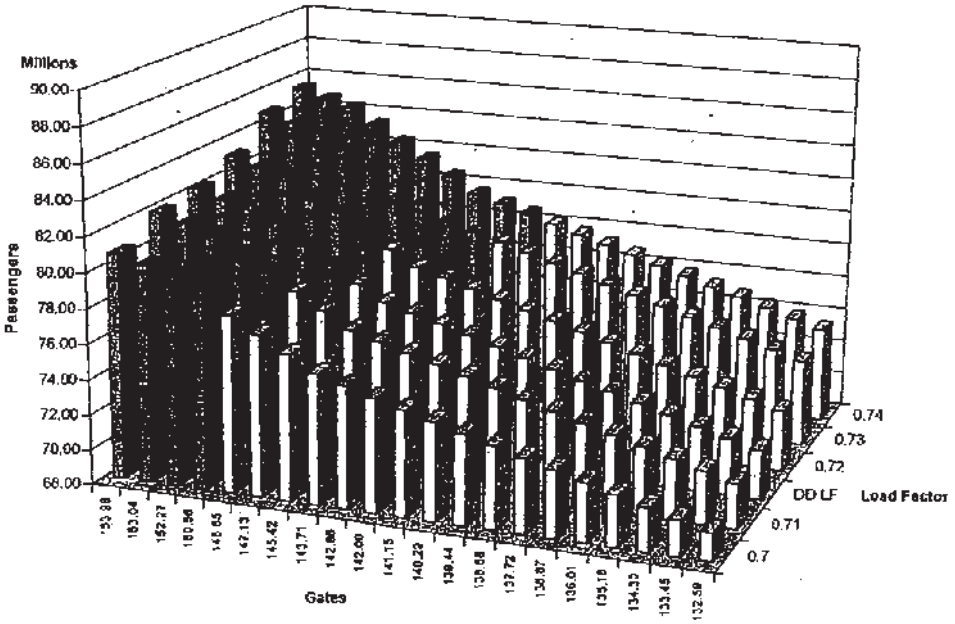
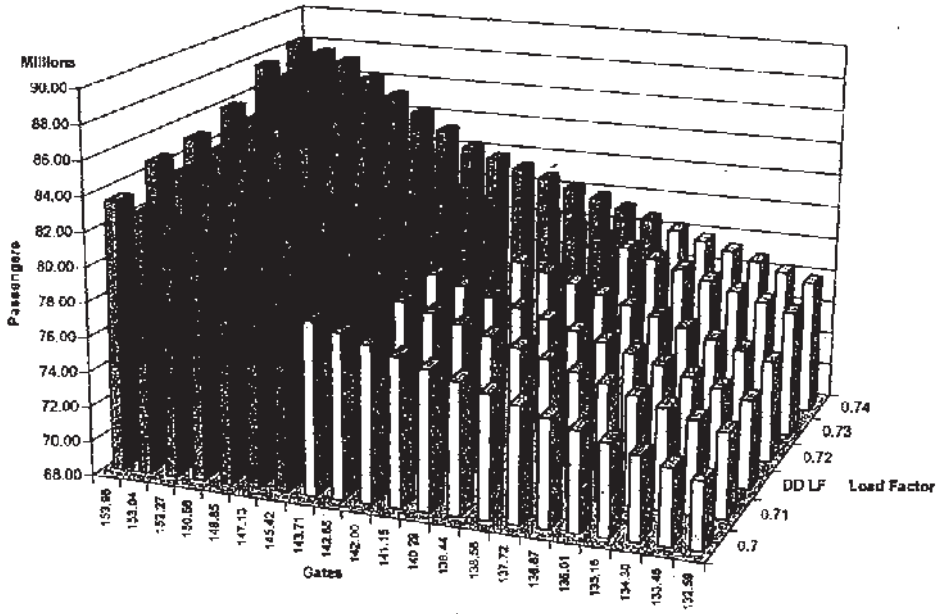


Figure 14. Gate Capacity, Annual Conversion Factor 310



4. GENERAL CONCLUSIONS

We conclude that the capacity of the gate position system proposed in Alternative D and described in the Addendum: the 153 gates, or 178.9 NBEG's, will have a capacity conservatively estimated at 87 MAP. This capacity analysis is performed on the basis of most of the planning and forecast assumptions made in the Addendum. It is a conservative estimate because it does not allow for possible spreading of the peaks either daily or seasonally. The analysis uses the Master Plan's assumed hourly traffic patterns. It uses LAX's current seasonal traffic patterns. Adjusting either of these assumptions to reflect any possible de-peaking would result in a higher capacity estimate. The analysis uses the same aircraft fleet mix and gate size mix proposed in the Master Plan Addendum. However, it uses higher aircraft seating capacities that are considered more realistic and reflective of the capacity of the system. The Master Plan Addendum's figures appear to be based on market considerations rather than on the actual capacity possibilities.

A number of strategies are possible to limit the capacity to about 78 MAP as is the intended aim of Alternative D. All of these would entail a reduction in the number of gates provided. The actual number of gates to be reduced depends on how they are allocated among the different design groups. The analysis provided in this report permits exploring alternative ways of accomplishing the goal of limiting the capacity to about 78 MAP.

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Adib Kanafani has been professor in the Civil and Environmental Engineering Department at the University of California at Berkeley since 1970. During this period he has taught and conducted research on air transportation, airport planning and design, and transportation systems, demand analysis and transportation economics. He was Director of Berkeley's Institute of Transportation Studies from 1983 to 1998 and Chairman of Berkeley's Department of Civil and Environmental Engineering from 1998 to 2002. He is a member of the National Academy of Engineering.

Kanafani's made contributions to air transportation including demand analysis, airport capacity analysis methods, and airline network analysis. He was a member of the research team that developed airport capacity analysis methods that are in widespread application in airport planning and design. He has also consulted extensively on airport planning and design for a number of agencies worldwide. In 1997 he was founding Co-Director of the National Center of Excellence in Aviation Operations Research, NEXTOR, a University/Industry partnership funded by the Federal Aviation Administration and headquartered at Berkeley.

Kanafani has had a long and distinguished public service record. He has served on a number of national and international advisory panels to Government and industry dealing a variety of aviation topics. He was a member of the FAA-Industry Task Force on Airport Capacity and Delay. He was also a member of a number of national Research Council study panels and committees including the Special Committee on Airport Landside Capacity, the Committee on Long-Term Airport Capacity Needs, and the Committee on Air Passenger Service and Safety Since Deregulation. He served the American Society of Civil Engineers as Chairman of the Air Transport Division, and the Transportation Research board, TRB as a member of the Special Committee on Air Transport Activities that helped usher air transportation into the scope of that organization, and where he is currently a member of the Executive Committee.

Comments

On

AIR QUALITY

AND

HUMAN HEALTH AND SAFETY

LAX Master Plan Supplement To The Draft Environmental Impact Statement/ Draft Environmental Impact Report

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November 2003

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COMMENTS

Los Angeles World Airports ("LAWA" or "the Applicant"), the operator of the Los Angeles International Airport ("LAX"), has published a Draft Master Plan Addendum[1] ("DMPA"), a Supplement to the Draft Environmental Impact Statement/Environmental Impact Report[2] ("Supplement"), and Airport Layout Plans Package on the modernization of LAX ("Project"). These documents supplement the Draft Environmental Impact Statement/Environmental Impact Report[3] ("Draft EIS/EIR") and add discussion of Alternative D to the previously discussed Master Plan alternatives.

The comments below provide an analysis of the Supplement's failure to meet the requirements of CEQA and NEPA. These comments expand upon our previous comments on the Draft EIS/EIR and address new issues raised by the Supplement. (Comments on Air Quality and Human Health and Safety, LAX Master Plan Draft EIS/EIR (July 13, 2001) by J. Phyllis Fox, Ph.D., Attachment C to September 18, 2001 Comments Submitted on Behalf of the City of El Segundo by Shute, Mihaly & Weinberger ("2001 Fox Comments").)

The documents do not supply the data required for us to verify the calculations and modeling used to determine air quality impacts. El Segundo submitted requests to LAWA and the Federal Aviation Administration ("FAA") under the California Public Records Act and the Federal Freedom of Information Act in October 2003, seeking this important information. Although we have been informed that some or all of the information will be provided, we have not received it in time to prepare these comments. After receiving the requested data, we intend to review them and reserve the right to submit additional comments based on this review.

AIR QUALITY

I. THE BASELINE IS UNSUPPORTED AND FLAWED

The environmental baseline is the heart of a CEQA or NEPA analysis because the significance of environmental impacts is measured by the change

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[1] LAX Master Plan Addendum, July 2003.

[2] LAX Master Plan, Supplement to the Draft Environmental Impact Statement/Environmental Impact Report, July 2003.

[3] LAX Master Plan, Draft Environmental Impact Statement/Environmental Impact Report, January 2001.

from the baseline. Neither the Draft EIS/EIR nor the Supplement contains sufficient information to allow a subject matter expert to evaluate the accuracy of the air quality data for the 1996/1997, 2000, or No Action/No Project ("NA/NP") baseline conditions used in these documents. Supporting calculations are not included in the Draft EIS/EIR, the Supplement, or technical reports and appendices. Further, our requests to LAWA and FAA to produce the data necessary for a review of these calculations have not been responded to in time. However, a number of factors suggest, based on our careful review, that the baseline is flawed.

We previously pointed out discrepancies between the baseline emissions in the Draft EIS/EIR and the supporting technical appendices. (2001 Fox Comments, II.A, pp. 7-8.) The Supplement does not resolve these discrepancies. We previously commented that it is improper to evaluate off-airport emissions against future baselines. (2001 Fox Comments, II.B, pp. 8-9.) The Supplement continues to evaluate off-airport emissions against future baselines. (Supplement Table S4.6-10.) We previously commented that the NA/NP alternative does not fairly reflect future conditions because it assumes the airport can grow nearly unrestrained. The Supplement is silent on this issue. We previously noted that it was not possible to evaluate the projected NA/NP emissions because supporting calculations were not provided. The Supplement does not contain the supporting calculations. In addition to failing to address our previous comments on the baseline, the Supplement introduces a new problem by using an invalid ratio method to adjust baseline emissions.

I.A The Ratio Method Is Invalid

The on-site Project impacts for CEQA purposes are evaluated relative to the 1996 baseline emission inventory, which is stated to represent activity levels at LAX in 1996 and facilities as of 1997. (Draft EIS/EIR, p. 4-462.) The Supplement updated this baseline using ratios between emission model results from EDSM 3.2 and 4.11 for Alternative D.

Since publication of the Draft EIS/EIR in January 2001, the FAA has released an updated version of the Emissions and Dispersion Modeling System ("EDMS") used to develop airport emission inventories. The Supplement calculated emissions and concentrations resulting from Alternative D with both the old model version, EDMS 3.2, and with the new version, EDMS 4.11, for the year 2015. From these model runs for Alternative D, the Supplement developed ratios between the predicted emissions for each criteria pollutant. Rather than running the updated model version for the baseline, the Supplement used these ratios to develop revised baseline (1997) emissions and to quantify year 2000 emissions. The Supplement also applied this ratio method to estimate impacts

for Alternatives A through C and the NA/NP Alternative, previously analyzed using EDMS 3.2 in the Draft EIS/EIR. (Supplement, pp. 4-357/358 and Supplement Appx. S-E[4], p. 4.)

As discussed in the following, this approach is scientifically flawed, does not yield comparable emissions data for the alternatives, and is therefore unacceptable. Compared to the old version, EDSM 3.2, the updated version EDSM 4.11 incorporates several technical changes that affect modeled emissions inventories including an updated emission factor database for aircraft; updated ground support equipment emission factors based on model year, power output, and fuel type; additional assessment of emissions from aircraft landing roll time-in-mode; inclusion of aircraft flight profile to model dispersion after takeoff and on approach; use of the most current dispersion modeling methods; and an improved characterization of aircraft plume dispersion behavior. (Supplement Appx. S-E, pp. 3/4 and 15/16.)

Obviously, differences among the alternatives in the annual number of aircraft, the fleet-mix, etc., will affect the results of modeled emissions and ambient concentrations. The evaluated alternatives are based on greatly differing airport capacities and/or regional distributions and, thus, the corresponding annual number of aircraft and fleet mix are substantially different. For example, the modeling for the NA/NP alternative and Alternative D assume a much lower number of annual aircraft operations (~780,000 flights/year) than either Alternatives A and B (~935,000 flights/year). (Supplement, p. 3-14.) Thus, using a constant ratio to adjust emissions for all alternatives would result in errors in emissions and invalidate the inter-alternative comparisons using this methodology. Consequently, emissions from all alternatives need to be remodeled using EDSM 4.11.

Further, while the Supplement states that ratios were developed for each criteria pollutant in year 2015 for Alternative D, these ratios are nowhere to be found in either the Supplement, the Supplement's extensive Technical Report[5] ("TRS-4"), or its appendices. (Supplement, pp. 4-357/358 and Supplement Appx. S-E, pp. 3/4.) The Supplement also does not provide the modeling input/output files from the two EDSM versions, which supposedly form the basis for the calculation of these ratios. Clearly, the information provided in the Supplement is deficient and inadequate to verify any calculations.

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[4] LAX Master Plan Supplement to the Draft Environmental Impact Statement/Environmental Impact Report, Appendix S-E: Supplemental Air Quality Impact Analysis, June 2003.

[5] LAX Master Plan Supplement to the Draft Environmental Impact Statement/Environmental Impact Report, Technical Report S-4: Air Quality, Attachment N: Incremental Emissions by Alternative and Year, July 2003.

Finally, the ratios between unmitigated operational emissions in the Draft EIS/EIR, Table 4.6-8 and the Supplement, Table S4.6-9, are not constant, nor even nearly so. For example, the ratios for VOC, SO_2, and PM10 between the baseline and the NA/N Alternative, the baseline and Alternatives A through C, are drastically different. For VOC and SO_2 they are further different between the horizon years for each alternative. The ratios for PM10 between the horizon years remain constant, however, they are different for the baseline, the NA/NP alternative and the Alternatives A through C. (*See* Table 1, attached to this document.) In a word, with the exception of the CO and NOx ratio, it appears that none of the ratios for the other pollutants was applied consistently to derive operational emissions for the alternatives and year combinations. The Supplement has not fully disclosed the procedure that it used to revise the emissions calculations. In addition, it appears that errors were made in revising the emissions with the ratio method. We are unable to check the Supplements calculations because adequate information was not provided.

I.B Underlying Data Set Questionable

In addition to the ratio method being scientifically flawed, it is unclear from the description provided in the Supplement, Section 4.6.3.4, which dataset was used to update calculations. As we pointed out in our earlier comments on the Draft EIS/EIR, the 1996 environmental baseline emissions for all criteria pollutants reported in Tables 4.6-6 of the Draft EIS/EIR differ substantially from those reported in the corresponding Draft EIS/EIR Air Quality Technical Report ("TR4"), Attachment C, which supposedly provides the support for emission estimates. (2001 Fox Comments, II.A, pp. 7-8.) The emission estimates reported in the Draft EIS/EIR are 14% to 47% lower than those indicated in the TR4. The Supplement does not comment on these discrepancies, nor does it specify which dataset the updated calculations are based on.

The Supplement does not contain any information to resolve the noted discrepancies. Thus, there is no creditable support for the baseline emissions used to evaluate the significance of impacts under CEQA. These discrepancies should be resolved and the Supplement and supporting technical reports of the Draft EIS/EIR recirculated for public review.

II. AIR QUALITY IMPACT ANALYSIS IS INADEQUATE

II.A New PM10 And PM2.5 Standards Not Acknowledged

The Supplement did not analyze PM2.5 impacts and evaluated PM10 impacts against the existing PM10 standard of 30 $\mu g/m^3$. We previously

commented on the Draft EIS/EIR's failure to evaluate PM2.5 impacts. (2001 Fox Comment, III.D, pp. 18/19.) The Supplement declined to analyze PM2.5 impacts despite the fact that it was known during the preparation of this document that a PM2.5 standard would be established and a lower PM10 standard of 20 $\mu g/m^3$ would go in effect in summer 2003. In fact, the Supplement states in Footnote 5 to Table S4.6-3 and Footnote 9 to Table 4.6-12 that "[o]n June 20, 2002, CARB approved the recommendation to revise the PM10 annual average standard to 20 $\mu g/m^3$ and to establish an annual average standard for PM2.5 of 12 $\mu g/m^3$" and continues "[t]hese standards will take effect upon final approval by the Office of Administrative Law, which is expected in summer 2003." (Supplement, pp. 4-363 and 4-374.)

In fact, the Office of Administrative Law ("OAL") approved the amendments to the regulations for the State Ambient Air Quality Standards ("CAAQS") for particulate matter ("PM") on Thursday, June 5, 2003, before the publication of the Supplement in July 2003. The new standards became effective on July 5, 2003.[6] These new standards should have been used to determine the significance of impacts from the proposed Project alternatives. The Supplement, in the face of clearly acknowledged indications that the standards would become effective before an alternative would be selected, still declined to analyze PM2.5 impacts and continued to evaluate PM10 impacts against the old standard.

The Supplement justifies this questionable approach by arguing that "[u]ntil USEPA issues guidance on the implementation of the PM2.5 ambient air quality standards, that agency has recommended that compliance with the PM10 standards be considered as a surrogate for compliance with the PM2.5 standards, and the analysis in this document follows that guidance," citing 1997 U.S. Environmental Protection Agency ("U.S. EPA") guidance. (Supplement, p. 4-363 and footnote 116.) This guidance is irrelevant to the instant case for a large number of reasons.

First, the cited EPA guidance memo was intended as an interim guidance "for meeting new source review (NSR) requirements under the Clean Air Act (Act), including the permit programs for prevention of significant deterioration

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[6] California Air Resources Board, Ambient Air Quality Standards for Suspended Particulate Matter (PM) and Sulfates, Rulemaking To Consider Amendments To Regulations For The State Ambient Air Quality Standards For Suspended Particulate Matter (PM) And Sulfates, June 20, 2002 Hearing, http://www.arb.ca.gov/regact/aaqspm/aaqspm.htm; accessed October 27, 2003.

of air quality (PSD)." (U.S. EPA 10/97.)[7] It was *not* intended to be used as guidance for CEQA or NEPA purposes.

Second, the guidance was intended to be valid until the "significant technical difficulties that now exist with respect to PM2.5 monitoring, emissions estimation, and modeling" were resolved. Some of these issues were never applicable to CEQA or NEPA review. Further, since publication of the guidance memo in 1997, most of these technical difficulties have been addressed. A large body of information has been developed, incorporated into methodologies, and tested in practice since publication of the guidance memo six years ago.[8] For example, a nationwide monitoring network for PM2.5 has been implemented. As of 2001, a total of 82 twenty-four-hour mass monitors and 21 continuous mass monitors ("CMM") had been deployed and 15 new CMM sites were planned.[9]

Third, there are two sets of standards, federal and state. The cited EPA guidance does not apply to state standards, which were adopted before the Supplement was released.

Fourth, PM10 and PM2.5 are separate and distinguishable pollutants with separate and distinguishable effects, including serious health effects. To address this issue, the U.S. EPA in 1997 promulgated a new national ambient air quality standard for PM2.5 of 15 $\mu g/m^3$ annual average. (62 FR 38652[10].) The ambient air quality standards for PM2.5 are much lower than for PM10. By using the higher PM10 ambient air quality standards, the Supplement has substantially underestimated the impacts of all alternatives.

Finally, essentially 100% of the Project's operational emissions originate from combustion sources, *e.g.*, aircraft, ground support equipment, passenger cars. The major fraction of the particulate matter emissions from combustion sources is typically smaller than 2.5 microns in size, *i.e.* PM2.5, rather than PM10. For example, the PM2.5 fraction of particulate matter emissions is 92% for diesel

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[7] U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Interim Implementation of New Source Review Requirements for PM2.5, Memorandum from John S. Seitz, Director Office of Air Quality Planning and Standards, October 21, 1997.

[8] *See* U.S. Environmental Protection Agency, Technology Transfer Network, Ambient Monitoring Technology Information Center, PM 2.5 Monitoring Information, http://www.epa.gov/ttn/amtic/amticpm.html, accessed October 28, 2003.

[9] California Environmental Protection Agency, Air Resources Board, 2001 California PM2.5 Monitoring Network Description, August 2001; http://www.arb.ca.gov/aqd/pm25/pmfnet01.htm, accessed October 28, 2003.

[10] National Ambient Air Quality Standards for Particulate Matter: Final Rule, Federal Register, v. 62, no. 138, July 18, 1997.

vehicle exhaust, 93% for gasoline vehicle with catalysts exhaust, and 99% for aircraft exhaust. The PM2.5 fraction of particulate matter emissions from stationary internal combustion engines firing gasoline or diesel, *e.g.*, heaters, typically range from 87% to 99%.[11] Thus, well over 90% of the operational particulate matter emissions from the Project are PM2.5. PM 10 standards are therefore an inadequate substitute for evaluation of compliance with PM 2.5 standards. PM 2.5 must be properly analyzed, and standards appropriate to this more prevalent pollutant should be used, to assure that the adverse environmental and health impacts of PM 2.5 emissions are properly disclosed.

II.B The Air Quality Analysis Is Piecemealed

The Supplement used EDMS to convert the emissions into projected ambient air quality concentrations. These were compared to ambient air quality standards to determine if the various alternatives would cause new violations of or significantly contribute to existing violations of ambient air quality standards. The resulting ambient concentrations for unmitigated emissions are included in Table S4.6-12 and their significance summarized in Tables S4.6-15 and S4.6-17. The resulting ambient concentrations for mitigated emissions are included in Table S4.6-22 and their significance summarized in Tables S4.6-24 and S4.6-26.

Inspection of these tables indicates that the Supplement, and the Draft EIS/EIR as a whole, has improperly piecemealed the air quality analysis. The tables that report significance report it separately for modeled ambient air concentrations resulting (a) from on-airport operational plus construction emissions and (b) from off-airport operational emissions. This is an impermissible approach. Pollutant concentrations and their significance should be reported for the Project as a whole, to disclose the cumulative effects of on-airport, off-airport, and construction emissions.

The Supplement, and the Draft EIS/EIR, should have evaluated ambient air concentrations resulting from the combined emissions of the Project, *i.e.* on-airport operations plus off-airport operations plus construction, for every single year for every alternative. In other words, emissions from on-airport and off-airport operations plus the construction emissions should have been modeled for every year of the Project. The off-airport emissions cannot be separately modeled from the operational emissions, as they occur simultaneously and affect the ambient air quality.

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[11] California Air Resource Board (CARB), Determination of Particle Size Distribution and Chemical Composition of Particulate Matter from Selected Sources in California, NTIS Report PB89-232805, June 30, 1989, Figure 5.2-2.

By failing to do this, the Supplement, and Draft EIS/EIR have failed to disclose the full impacts of the Project. Further, had all parts of the Project been combined into a single analysis, the air quality impacts would have likely been much higher than disclosed in the Supplement.

II.C Future Background Concentrations Are Invalid

The standard approach to evaluating air quality impacts uses dispersion models to convert project emissions into increases in ambient concentrations of each pollutant. These incremental concentrations are then added to background ambient concentrations to estimate ambient concentrations after the project is built. These projections are then compared with ambient air quality standards to determine if the project would cause a significant air quality impact.

It is standard practice to use the maximum measured existing ambient concentration at the nearest monitoring station as the background in these calculations. The Draft EIS/EIR and Supplement, however, deviate substantially from the accepted approach and estimate future background concentrations using a linear rollback approach. This approach was used in the 1997 AQMP for a different purpose to determine if the proposed region-wide controls would bring the basin into compliance with standards. (Draft EIS/EIR, Appx. G[12], p. 45.) This approach assumes that changes in emissions will change ambient air concentrations proportionally. We previously commented on the inappropriate use of this methodology in the Draft EIS/EIR, noting that it resulted in very substantial reductions in future background concentrations that hide significant ambient air quality impacts. In particular, it reduces the background carbon monoxide ("CO") concentration by nearly a factor of two and hides what would otherwise, using a standard and more accurate analysis, be identified as violations of ambient air quality standards on CO. (2001 Fox Comments, II.B, pp. 8/9.)

In fact, the CEQA Guidelines published by the South Coast Air Quality Management District ("SCAQMD") contain a section on developing EIR baseline information, which clearly states that "[m]onitoring station data should be used to provide background concentration levels of criteria pollutants." (SCAQMD CEQA Guidelines 04/93[13], p. 8-2) Also, SCAQMD recently published a methodology which is intended as assistance for other public agencies in using the mass daily significance thresholds for construction and operation published

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[12] LAX Master Plan Supplement to the Draft Environmental Impact Statement/Environmental Impact Report, Appendix G: Air Quality Impact Analysis, June 2003.

[13] South Coast Air Quality Management District, CEQA Air Quality Handbook, April 1993.

in the District's 1993 CEQA Air Quality Handbook. (SCAQMD 06/03[14].) These significance thresholds are used to determine a project's significant adverse regional effects on air quality when preparing an air quality analysis for CEQA or NEPA analyses. The methodology is based on the use of the peak measured existing ambient concentration at the nearest monitoring station over a period of three years to determine whether or not construction activities create significant adverse localized air quality impacts. While this methodology is intended for projects smaller than 5 acres, it nonetheless demonstrates SCAQMD's standard practice of using the peak ambient concentration of a pollutant at the nearest monitoring station as the background concentration for modeling.

We further note that the future background concentrations of CO used in the Supplement are inconsistent with the SCAQMD estimate of average annual day CO emissions for the South Coast air basin and projected future 1-hour and 8-hour CO concentrations. (SCAQMD Table 1 through 3[15].) SCAQMD Table 1 indicates that CO emissions are projected to decrease by 24% between the year 2000 and the year 2020. SCAQMD Table 2 indicates that 1-hour CO concentrations in Los Angles are projected to decrease by 24%. SCAQMD Table 3 indicates that 8-hour CO concentrations in Los Angeles are projected to decrease by 22% to 24%. In comparison, the air quality analyses in the Supplement assume the year 2015 8-hour CO background concentration would decrease from 9.4 ppm in the year 2000 (Supplement, Table S4.6-5) to 3.4 ppm in the year 2015 (Supplement, Table S4.6-2) or by 64%. Similarly, the Supplement assumes the year 2000 1-hour CO background concentration would decrease from 11 ppm in the year 2000 to 4.2 ppm in the year 2015, or by 61%. Thus, the Supplement has underestimated ambient CO impacts by using an anomalously low future background concentration.

III. CONSTRUCTION EMISSIONS ESTIMATES ARE FLAWED

The Supplement presents a revised construction impact analysis, which results in substantially lower construction emissions and ambient impacts. The main text of the Supplement, Section 4.6, does not alert the reader to this substantial reduction. It must be discovered, for example, by comparing Table 4.6-10 in the Draft EIS/EIR with Table S4.6-11 in the Supplement. The Supplement provides no explanation or justification for the dramatic decrease in CO, volatile organic compounds ("VOC"), sulfur oxides ("SOx"), and PM10 and increase in nitrogen oxides ("NOx) emissions in the Supplement, compared to

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[14] South Coast Air Quality Management District, Draft Localized Significance Threshold Methodology, June 19, 2003; http, accessed October 28, 2003.

[15] *See* www.aqmd.gov/ceqa/hdbk.html, CO Concentrations, Tables 1-3, accessed October 28, 2003.

the Draft EIS/EIR. As detailed below, even though we have not yet received the data needed to review the modeling, there is ample reason to suspect that the construction emission estimates are flawed and fail to disclose the impacts of the proposed construction.

III.A Construction Emissions Estimates Are Unsupported

The Supplement contains no support for the new construction emission estimates beyond a few conclusory and summary paragraphs in Appendix S-E, Section 2.1.2. Hundreds of individual factors and assumptions go into a construction emission estimate. Construction exhaust emissions are estimated from an inventory of equipment that will be deployed as a function of time. This is referred to as activity data. For each piece of equipment, *e.g.*, loader or scraper, an emission factor in grams per brake horsepower hour ("bhp-hr"), equipment size in horsepower, a load factor, a usage factor, and fuel type must be specified. Construction fugitive dust emissions are typically estimated from disturbed area, control efficiencies, and emission factors in pounds per acre ("lb/acre") disturbed per unit time. This information should be provided in a comprehensive and complete manner; it has not been.

The new analysis of the Supplement employs the same ratio method used in the Draft EIS/EIR to calculate emissions from construction equipment, and a new model, CARB's OFFROAD Model, to estimate construction emissions. (Supplement, Appx. S-E, p. 3.) First, emission factors for off-road construction equipment were revised based on CARB's OFFROAD model and emission factors for on-road equipment were revised based on CARB's EMFAC 2002 model. Alternatives C and D were then analyzed using the updated emission factors. The ratio of old Alternative C emissions to new Alternative C emissions was then calculated and used to adjust old Alternatives A and B emissions to the new basis. (Supplement, Appx. S-E, p. 3.) Specifically, "[c]onstruction duration and activity levels were developed for Alternative C. Construction emission estimates for Alternatives A and B were based on ratios of construction areas for Alternatives A and B to those areas for Alternative C. (Draft EIS/EIR, Appx. G, p. 4.)

None of this information is provided in a comprehensive manner in the documents, and some critical information has been omitted. For example, nowhere in the air quality section can the above quoted "ratio of construction areas" or even the construction areas themselves be found. When information is provided, it is scattered throughout various documents, *i.e.* the Draft EIS/EIR, the Supplement, and their various technical appendices and technical reports. Because no comprehensive overview is provided regarding where the various pieces to the analysis can be found, the reader can only piece together the

information gleaned from the various documents with painstaking detective work. Some of the information is mislabeled and, consequently hard to find. For example, construction activity data used to develop the construction emissions inventory for Alternative D is presented in Attachment C to Technical Report S-4 of the Draft EIS/EIR in instead of in Attachment D as claimed by the Supplement. (Supplement, Appx. S-E, p. 2.) Further, some of the information provided in appendices is illegible due to poor scanning and reproduction. See, for example, the "Resource Calculations (Truck Trips)" in Appendix E to TR4 of the Draft EIS/EIR.

This combination of errors, omissions, illegible documents, and the lack of a clear methodology description makes it impossible to comprehensively review and comment on the construction emissions and related air quality impact analysis. El Segundo has requested supporting calculations and data files from LAWA and FAA, but we have not received the necessary information in time to utilize them in our comments.

III.B Ultra-low Sulfur Diesel Not Required As Mitigation

The Supplement claims that SOx emissions were estimated from sulfur limits set by SCAQMD Rule 431.2[16], which requires that all liquid fuels sold in the SCAQMD district are low sulfur fuels that contain no more than 500 parts per million by weight ("ppmw") sulfur through June 1, 2006 and 15 ppmw thereafter. However, low sulfur fuel is more expensive than high sulfur fuel. Thus, there is an economic incentive for contractors to import less expensive high sulfur fuel from outside of the SCAQMD, *e.g.*, from Nevada, unless a mitigation measure for the Project specifically requires the use of low sulfur fuel with the sulfur contents assumed in the construction emission calculations. The proposed mitigation measures, however, do not require the use of low sulfur fuel in construction equipment. (Supplement, Table S4.6-18.) In fact, one of the construction mitigation measures contemplates the use of Lubrizol fuel (PuriNOx™), which is an alternative diesel formulation blended from 500 ppmw diesel. Thus, there is no assurance that low sulfur fuel would be used for Project construction.

Further, the Supplement quoted January 1, 2005 as the effective date for the reduction of fuel sulfur content to 15 ppmw sulfur. In fact, the effective date has been extended to match a later compliance date adopted by the California Air Resources Board, *i.e.* no later than June 1, 2006, which is also applicable to refiners and importers in the South Coast District. Thus, 500 ppmw sulfur diesel

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[16] South Coast Air Quality Management District, Rule 431.2. Sulfur Content of Liquid Fuels, Amended September 15, 2000.

will be locally available for another 18 months for construction activities. The DEIS/EIR and Supplement assume that construction emissions for Alternatives A through C and the NA/NP alternative would peak in 2004 and for Alternative D in 2005. Thus, by assuming the effective date for the reduction of diesel fuel sulfur content to 15 ppmw to be January 1, 2005, construction emissions for Alternative D will be substantially underestimated, because the use of ultra-low sulfur diesel will not be mandated for another 18 months beyond the assumed date. Only during the later phases of construction will ultra-low (15 ppmw) sulfur diesel be the only fuel available in California. However, this also does not preclude construction companies to import diesel with higher sulfur content from Nevada, which has no such regulation.

The construction SOx emissions should be revised to use higher sulfur fuel, or the mitigation measures expanded to specifically require the use of ultra-low sulfur fuel, meeting the 500 ppmw and 15 ppmw limits assumed in the emission calculations.

We also note that ultra-low sulfur diesel fuel is currently available within the South Coast. SOx emissions from Alternatives A, B, and C remain significant after mitigation. (Supplement, Table S4.6-23.) Thus, all feasible SOx mitigation is required. It is feasible to use only ultra-low sulfur diesel (15 ppmw) for Project construction. Thus, the list of construction mitigation measures in Table S4.6-18 should be expanded to require the use of only ultra-low sulfur diesel fuel.

III.C Assumed Fugitive Dust Control Efficiency For Watering Not Revealed

The Draft EIS/EIR proposed watering as a mitigation measure for dust control. (Draft EIS/EIR, Table 4.6-16.) We previously commented that SCAQMD Rule 403 requires implementation of best available dust suppression control measures and thus the proposed project cannot claim credit for this measure as mitigation. (2001 Fox Comments, IV.A, pp. 21-22.) In response, the Supplement removed this measure from the list of required mitigation measures, listed it as an applicable requirement (Supplement, p. 4-364), and estimated fugitive dust PM10 emissions assuming "water is applied to control dust, as required by SCAQMD Rule 403." (Supplement, Appx. S-E, p. 2.)

However, watering is not the only dust control measure required in SCAQMD Rule 403. It is unclear whether only watering is assumed in the emission calculations, or the complete list of mitigation measures required by SCAQMD Rule 403. We presume the former for purposes of these comments because other requirements of SCAQMD Rule 403, *e.g.*, use of soil stabilizers, are still listed as mitigation in Table S4.6-18. (*See* Comment V.B.4.)

The Draft EIS/EIR assumed that watering would reduce PM10 by 90% to 95%. (Draft EIR/EIS, Table 4.6-16, p. 4-516.) This control range is unrealistic. If the Supplement likewise assumed 90% to 95% control, it has substantially underestimated both unmitigated and mitigated fugitive PM10 emissions. Typical control efficiencies of watering at construction sites have been estimated at 50%.[17] For example, the SCAQMD in its CEQA Guidelines for dust control during grading assumes control efficiency ranges for watering from 34 to 68% during grading and 45 to 85% for unpaved roads, parking areas, and staging areas. (SCAQMD 04/93,[18] Table 11-4.)

The Supplement does not indicate how much water would be applied, or, alternatively, establish any criteria, such as opacity limits, to assure that dust is effectively controlled. Large amounts of water would be required for dust control. This would potentially result in significant water impacts that have not be identified or evaluated. Further, even if large amounts of water are applied, it is not possible to achieve high control efficiencies using only water on these types of soil.

Thus, it is not clear that the (undisclosed) assumption as to fugitive dust control efficiency would actually achieve the assumed control efficiency. The Supplement is silent on mitigation effectiveness and the methods that would be used to monitor the implementation and effectiveness of the assumed, but not disclosed, control effectiveness. The Supplement should be revised to include the fugitive dust calculations and all assumptions used in preparing them, most notably, the dust control efficiency, watering frequency, and amount of applied water. The assumptions that fugitive dust calculations were based on should be stated in the Supplement, required as conditions of Project approval, and noted directly on all final construction drawings.

III.D Emission Reductions Not Supported

The Supplement estimates reductions in construction emissions that would be achieved for the peak year. (Supplement, Table S4.6-18.) However, the Supplement is silent on how these reductions were estimated. They appear to be inconsistent with the mitigation measures that are proposed.

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[17] PEDCo Environmental Specialists, Investigations of Fugitive Dust Sources - Emissions and Control. Prepared for the Environmental Protection Agency, OAQPS, Contract No. 68-02-044, May 1977.

[18] South Coast Air Quality Management District ("SCAQMD"), CEQA Air Quality Handbook, April 1993.

III.D.1 NOx Reductions

The Supplement assumes that the proposed mitigation measures would reduce 300 to 1,100 ton/yr of NOx. (Supplement, Table S4.6-18.) This amounts to 22% of the total NOx from construction activities.[19] However, only one of the proposed mitigation measures, a requirement to specify a combination of construction equipment using "cleaner burning diesel" fuel and exhaust emission controls, would reliably reduce NOx emissions. The various controls included in this measure -- catalytic oxidizers, particulate traps, exhaust gas circulation, alternate fuel -- are not capable of achieving a fleet-wide 22% NOx reduction, even if every single measure were required on every single piece of construction equipment.

This is an important issue because the air quality analysis in Table S4.6-22 indicates that the mitigated, combined operational and construction air pollutant ambient concentrations for annual average NOx in 2015 are very close to the significance threshold of 0.053 ug/m^3. If construction NOx emissions were substantially higher than claimed, and we believe they likely are, the Project would result in new, unidentified violations of the annual average NO_2 ambient air quality standard for all alternatives in 2015.

Catalytic oxidizers remove VOCs and CO, not NOx. Particulate traps remove PM10, not NOx. Lubrizol fuel, which is presumably PuriNOx™, the only alternative Lubrizol fuel we are aware of, does remove NOx. However, it was verified by CARB on January 31, 2001[20] as achieving only a 14% reduction in NOx compared to CARB diesel. Thus, even if it were used in 100% of the diesel-fueled construction equipment, it would remove less than 14% of the overall NOx emissions because a portion of the construction emissions are from gasoline-fueled construction vehicles, delivery trucks, and commuting workers who predominately drive gasoline-fueled vehicles.

Finally, the Supplement proposes the use of diesel engines with exhaust gas recirculation ("EGR") for NOx control. (Supplement, Table S4.6-18.) However, EGR-equipped, diesel-fueled, off-road construction equipment is not commercially available. EGR retrofit systems are being introduced, but thus far, only for on-road trucks. Currently, a large number of diesel passenger cars use EGR under some operating conditions (low speeds and low loads).

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[19] Estimated as [(Table S4.6-21 emissions) - (Table S4.6-11 emissions)]/(Table S4.6-11 emissions).

[20] Letter from Dean C. Simeroth, Chief, Criteria Pollutants Branch, to Thomas J. Sheahan, Lubrizol, January 31, 2001.

(Guibet 1999[21].) There are also several hundred systems operating on Volvo and Cummins on-road engines in Europe and Asia and several demonstrations are under way in the U.S. (MECA 01/03[22].) EGR works well for highway trucks because they have a constant supply of air as they move down the road but off-road equipment does not. Thus, enhanced fuel delivery, *i.e.* electronic injection, is more feasible for off-road applications such as construction equipment, because of their duty cycle. We are not aware that this technology is commercially available for the type of equipment that would be used to construct the Project.

Further, EGR technology results in secondary impacts that were not addressed in the Supplement. EGR can cause increases in particulate emissions and is a potential source of deposits in the intake system and in the combustion chamber of diesel engines. Thus, the large-scale use of EGR for construction of this project cannot occur without the use of detergent additives. See, for example, discussion in Guibet 1999 at page 463.

The majority of the other mitigation measures in Table S4.6-18 would only reduce fugitive PM10, not construction NOx exhaust emissions. The only other mitigation measure that would reduce NOx is the use of electricity from power poles rather than diesel-powered generators. Emissions from these generators are a tiny fraction of construction NOx emissions, less than 1% of the total construction NOx emissions, and even so the Supplement concedes that it cannot succeed in eliminating these emissions ("cannot completely eliminate need for portable generators"). (Supplement, Table S4.6-18, p. 4-389.) The proposed mitigation fails to specify either a specific fraction of electrical demand that would be power pole versus diesel-generator or any specific percent reduction in NOx for the diesel-powered portion of the electrical demand.

Thus, it is not clear how the Supplement proposes to achieve the 22% reduction in NOx emissions assumed in the mitigated construction emission analysis in Section 4.6.8.5. The assumed 22% is unsupported and unrealistic and results in the understating of impacts.

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[21] J.C. Guibet and E. Faure-Birchem, Fuels and Engines: Technology, Energy, Environment, Editions TECHNIP, Paris, France, 1999.

[22] Manufacturers of Emission Controls Association, Retrofit Emission Control Technologies for On- and Off-Road Diesel Engines, January 16–17, 2003.

III.D.2 CO and VOC Reductions

The mitigated construction emissions assume that only 2 to 3% of the CO and 2 to 6% of the VOCs emissions would be reduced by the proposed mitigation program.[23] This is inconsistent with the post-combustion control mitigation measure, which includes the use of catalytic oxidizers, unless the Supplement has assumed that catalytic oxidizers would only be used on a very few pieces of equipment.

Catalytic oxidizers can remove up to 90% of both the CO and VOC. (MECA 01/03.) Catalytic oxidizers can be used on virtually all equipment that will be used to construct the Project. However, the Supplement has apparently assumed than only about 2 to 3% of the equipment would use catalytic oxidizers. The Supplement should be revised to require the use of catalytic oxidizers on all equipment, where feasible. A registered professional engineer should be required to certify that the use of an oxidizer is infeasible, where claimed.

IV. OPERATIONAL EMISSIONS ESTIMATES ARE FLAWED

The operational air quality impact analysis suffers from a number of problems including the overestimate of the baseline (*see* Comment I.A), the use of the wrong baseline (*see* Comment II.C), overestimates of control efficiencies that can be achieved with implementation of mitigation measures (*see* Comments III.D, IV.A, and IV.B), and substantially underestimates off-airport emissions because traffic assumptions are seriously flawed (*see* Comment IV.C).

We suspect that the combination of these factors resulted in substantial underestimates of mitigated incremental emissions from on-and off-airport operations. The Supplement now concludes that in 2015 NO_2 and SO_2 ambient air quality concentrations for all alternatives and CO for Alternatives A, B, and C would be less-than-significant. (Supplement S4.6-26.) Had the Supplement used more realistic assumptions for traffic emissions and mitigation control efficiencies and compared the incremental operational emissions to the correct baseline emissions, more air quality impacts would likely be significant after implementation of the proposed mitigation.

IV.A Claimed Emissions Reductions Are Flawed And Unsupported

We previously commented that many of the estimated emissions reductions were unsupported in the record and demonstrated this lack of data

[23] Estimated as [(Table S4.6-21 emissions) - (Table S4.6-11 emissions)]/(Table S4.6-11 emissions).

for the conversion of ground support equipment ("GSE") to electric power. However, as we pointed out, all other mitigation measures had similar problems. (2001 Fox Comment, II.D, p. 11/12.) The Supplement contains very limited additional information to address these problems.

For example, the Supplement added two short paragraphs on the conversion of GSE and proposes "the virtual elimination of GSE emissions" beyond the "requirements of the memorandum of understanding ("MOU") with CARB" through "incentives and tenant lease requirements." (Supplement, TRS-4, Appx. SE, p. 40.) The Supplement does not specify what these incentives and lease requirements would be, when they would be implemented, and how many vehicles they would affect.

Presumably, the assumptions that went into estimating the emission reductions attributable to the conversion of GSE to electric power have not changed, yet the range of potential emission reductions has changed considerably for most pollutants. The Draft EIS/EIR previously reported ranges of potential emissions reductions in 2015 of 250–450 tons per year ("ton/year") for NOx, 100–130 ton/year for VOC, and 2000–2500 ton/year for CO. The Supplement now reports 400–600 ton/year for NOx, 1600–1900 ton/year for VOC, and 2300–2800 ton/year for CO. (Draft EIS/EIR, p. 4-514; Supplement, p. 4-389.) The Supplement fails to provide an explanation what caused these considerable differences or why the proportion of potential emission reduction between the pollutants has changed so drastically. Further, it is unclear which end of the control range was applied to calculate the mitigated emissions.

An EIR must be transparent enough to allow a subject matter expert to evaluate the accuracy of its estimates. The Supplement is silent on the assumptions that went into these calculations. Thus, the air quality analysis is entirely inadequate and must be revised.

IV.B ITC Emissions Reductions Are Overestimated For Alternative D And Not Applicable To Alternatives A Through C

The Supplement claims that substantial emission reductions can be achieved through the construction of five additional intermodal transportation centers ("ITCs"), so-called "flyaways." The Supplement further maintains that each of these ITCs would reduce traffic – and associated air emissions – by 750,000 vehicle round trips per year. (Supplement, TRS-4, Appx. S-E, p. 40.) The Supplement further claims that this mitigation measure is applicable to and proposed for all four alternatives and specifically lists the measure as "quantifiable." (TRS-4, Appx. S-E, p. 40.)

However, review of the description of alternatives shows that no such ITCs are planned for Alternatives A, B, and C and only one ITC is planned for Alternative D. (Draft Master Plan[24], Chapter 3 and DMPA, Section 2.2.) Obviously, the Supplement can only claim emission reduction credits for mitigation measures that will be implemented, not for some hypothetically feasible measures, yet it appears that the Supplement has applied the control efficiency of this measure to all four alternatives. (TRS-4, Appx. S-E, p. 44.)

The Supplement estimates potential emissions reductions from ITCs of 80–100 ton/year NOx, 50–60 ton/year VOCs, 1000–1200 ton/year CO, 1–2 ton/year SO_2, and 15–20 ton/year PM10. (Supplement, p. 4-392.) The Supplement does not provide information on how the annual reduction of 750,000 vehicle round trips per ITC was derived, nor how these round trips were converted to emissions.

Application of these potential emission reductions to unmitigated traffic emissions results in substantially underestimated mitigated emissions and resulting modeled ambient air quality concentrations from on-airport and off-airport traffic for all alternatives. The measure should not have been applied to Alternatives A through C at all, and only one fifth of these potential emissions reductions should have been applied to Alternative D, as only one ITC will be built and not five. This would have substantially increased emissions for all criteria pollutants and likely resulted in more significant ambient air quality impacts than were found by the Supplement.

IV.C Traffic Emissions Are Underestimated

The air quality analysis includes estimates of on-airport and off-airport operational emissions associated with traffic based on the number of vehicle trips associated with airport operations. Review of both the Draft EIS/EIR's and the Supplement's traffic analyses reveals that LAWA substantially underestimated traffic associated with all alternatives. (*See* comments by Tom Brohard and Associates, Attachment B to September 18, 2001 El Segundo comment letter, and Attachment 2 to the current comment letter.) Thus, LAWA has also underestimated operational emissions associated with traffic.

V. PROPOSED MITIGATION PROGRAM IS INADEQUATE

The construction and operational air quality mitigation program proposed in the Supplement are inadequate because the measures are not enforceable, the

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[24] LAX Draft Master Plan, November 10, 2000.

proposed measures would reduce very little of the emissions, and all feasible mitigation measures have not been identified. The descriptions of the mitigation measures in the Supplement are too general to assure that they will actually be implemented. Enforceability is normally achieved by including mitigation measures in the requests for bids and resulting construction contracts, posting bonds, drawing up legal agreements, or recording conditions of approval on property titles or in agency permits. None of the proposed mitigation measures include any legally binding commitments or methods to ensure implementation and enforcement.

The study area is classified as nonattainment for three National Ambient Air Quality Standards ("NAAQS"): ozone, CO, and PM10. Further, the study area is classified by EPA as "extreme" nonattainment for ozone under the Federal Clean Air Act. Because of the air basin's nonattainment status, it is particularly important to reduce emissions of these nonattainment pollutants to the greatest extent feasible. The Draft EIS/EIR and the Supplement do not reduce operational or construction emissions to the greatest extent feasible.

V.A Mitigation Measures Are Not Enforceable

In our previous comments on the Draft EIS/EIR, we pointed out that several of the proposed mitigation measures were not enforceable. The same comment is valid for the numerous additional mitigation measures proposed by the Supplement.

First, many measures do not include specific performance standards that would allow these measures to be implemented, let alone allow their effectiveness to be evaluated. Three of the proposed operational mitigation measures would only "encourage" or "promote" participation, *viz.*, the LAWA telecommuting program, the LAWA carpool and rideshare program, and the promotion of alternative-fueled vehicles or SULEV/ZEV engines in commercial and rental vehicles.

Second, none of the proposed measures quantify the number of units that would be involved, the time frame over which the action would occur, nor describe the proposed measure with enough specificity to allow it to be implemented, let alone reviewed by the public or enforced if eventually adopted. The measures only require generic "acceleration," "promotion," "conversion," and "implementation." For example, the first operational measure proposes the conversion of GSE to electric power. The comment associated with this measure requires LAWA to [a]ccelerate full conversion, beyond the requirements of the GSE MOU" and to "provide incentives or tenant lease requirements." The range of potential emission reductions assumed for this measure is considerable yet the

Supplement fails to describe what kind of incentives or requirements should bring about these reductions that are not already included in CARB's GSE MOU, nor in what timeframe these incentives are supposed to be implemented, or what the term "acceleration" constitutes. (*See* Comment V.D.)

To be enforceable, the mitigation measures must be quantifiable. Thus, the description of a measure must specifically state what the performance goal is, when it would be provided, and how compliance would be verified.

V.B The Proposed Construction Mitigation Is Inadequate

The construction mitigation program has been expanded to include 18 mitigation measures. (Supplement, Table S4.6-18.) However, many of the measures that are listed are too general to review, let alone implement. Further, many of them are not enforceable as a practical matter as the measures as drafted do not include any emission reduction targets or any means of assuring compliance. Some of the more egregious examples are discussed below. However, all of the measures listed in the Supplement should be expanded to include emission reduction targets that can be quantified, compliance procedures, and recordkeeping and reporting provisions.

V.B.1 Construction Equipment Controls

The first listed construction mitigation measure in Table S4.6-18 would "[s]pecify combination of construction equipment using "cleaner burning diesel fuel" and exhaust emission controls." The comments to the table indicate that these mitigation measure "[o]ptions include: diesel engines with catalytic oxidizers (CO, VOC), diesel engines with particulate traps (PM), diesel engines with particulate traps (PM), diesel engines with exhaust gas circulation (NOx), diesel engine with Lubrizol fuel + catalytic oxidizer (PM, CO, VOC, NOx)."

This description is too general to evaluate. The construction activity data for Alternatives A through C in the Draft EIS/EIR in TR4 and for Alternative D in the Supplement, TRS-4 indicate that a large number of different types of equipment will be used. Efficacy of this mitigation measure and emission reductions that it can achieve can only be determined if one knows which specific measures from this list will actually be applied to which pieces of equipment in each alternative.

Clearly, the preparers of the Supplement made assumptions as to the particular mix of these controls that would be implemented for each option and control efficiencies for each in order to calculate emission reductions. The public cannot comment on the adequacy or efficacy of this measure without knowing

what particular mix of controls was assumed to derive the claimed emission reductions. Further, this measure cannot be implemented unless the specific mix of controls is clearly specified. The place to do this is in the Supplement. The total emission reductions for the entire construction mitigation program suggests that limited use is made of many of these options, while unrealistic control assumptions are made for others. (*See* Comment III.D.)

V.B.2 Generators

The second listed construction mitigation measure in Table S4.6-18 would "[s]pecify combination of electricity from power poles and portable diesel- or gasoline-fueled generators using 'cleaner burning diesel' fuel and exhaust emission controls." The measure does not divulge the assumed mix of electric and diesel-fueled generators, specify any emission targets for the "cleaner burning diesel" fuel, identify the exhaust emission controls that would be used, or divulge the assumed emission reductions for the exhaust emission controls. Thus, the measure is not enforceable as a practical matter and cannot be reviewed by the public.

V.B.3 Off-Peak Hours

The third listed construction mitigation measure in Table S4.6-18 requires construction employees to "work" during off-peak hours. However, it is not clear what is meant by "off-peak hours." This term is generally applied to traffic and emissions therefrom, not on-site construction "work" per se. Thus, this measure should be reworded to identify the peak hours and to require that construction workers travel to and from the site during off-peak traffic hours. If another meaning is intended, the measure should be expanded to clarify the intent and define "off-peak hours."

V.A.4 Use Of Non-toxic Soil Stabilizers

The fourth and fifth listed construction mitigation measures in Table S4.6-18 require the use of non-toxic soil stabilizers in all inactive construction areas and on outdoor storage piles, respectively. (Supplement, p. 4-390.) A note to the table referring to these measures indicates that reductions in particulate emissions can be 90% to 95%. (Supplement, p. 4-392, note 4.) A comment applicable to this measure further states that an "[e]mission reduction credit for this measure would only account for control efficiency beyond that provided by watering required by SCAQMD Rule 403." (Supplement, Table S4.6-18, p. 4-390, Comments column.)

However, the Supplement does not state what control efficiency was actually assumed in estimating emission reductions from this measure. It also does not state what baseline control efficiency was assumed from implementing SQAMD Rule 403. It further fails to mention to which portion of the construction emissions the emissions reduction is applied. Thus, it is impossible to evaluate the efficacy of this measure. The specific control efficiency assumed in the emission reduction calculations should be stated and required as part of the mitigation measure.

We note that 90% to 95% control for this measure is high and if assumed in the emission reduction calculations, reductions have been overestimated and actual air quality impacts understated. The SCAQMD CEQA Guidelines, for example, report a control range for the use of non-toxic soil stabilizers on inactive areas of 30 to 65% and on exposed storage piles with greater than 5% silt content of 30 to 74%. (SCAQMD 4/93, Table 11-4.)

V.B.5 <u>SCAQMD Rule 403 Measures</u>

The Project would qualify as a "large operation" under SCAQMD's Rule 403. The requirements for large operations include implementation of mitigation measures in SQAMD Rule 403 Tables 1 and 2 for each source of fugitive dust *or* obtaining an approved fugitive dust emissions control plan. (SQAMD Rule 403(f).) The mitigation measures listed in the Supplement do not include obtaining a SQAMD Rule 403 Control Plan. Further, even if they did, the measures included in this plan should be set out in the Supplement for public review.

Two of the measures listed as mitigation measures in Supplement Table S4.6-18 are listed in SCAQMD Rule 403 Tables 1 and 2 and thus are regulatory requirements and cannot be treated as mitigation measures — applying dust suppression in sufficient quantity and frequency to maintain a stabilized surface to disturbed areas and active storage piles. These measures are comparable to SCAQMD Rule 403 measures 2a, 2b, and 2c in Table 2. Thus, they are not valid mitigation, but part of the baseline. We previously commented that SCAQMD Rule 403 requires implementation of best available dust suppression control measures and that soil stabilization and watering cannot be claimed as mitigation. (2001 Fox Comments, IV.A, pp. 21/22.) In response, the Supplement removed watering from the list of proposed mitigation measures but inexplicably left soil stabilization of inactive construction areas and of storage piles listed as mitigation measures. (Supplement, Appx. S-E, p. 2 and Supplement, p. 4-390.)

Further, SCAQMD Rule 403 requires certain additional mitigation that is not listed in Table S4.6-18 and was not mentioned as included in the unmitigated baseline calculations. These include the trackout provision of SCAQMD Rule 403(d)(5) and the best available control measures for high wind conditions in SCAQMD Rule 403, Table 1. The Supplement must be revised to clarify and documentation of the assumptions underlying the unmitigated baseline as well as the mitigated scenarios.

V.C All Feasible Construction Mitigation Not Required

The Supplement indicates that the revised mitigated construction emissions are significant for all alternatives and all pollutants in the interim year and in 2015, except for sulfur dioxide ("SO_2") in the interim year for Alternative D and SO_2 for all alternatives in 2015. (Supplement, Tables S4.6-23, S4.6-25.) The Supplement also indicates that these construction emissions would variously cause or contribute to violations of ambient air quality standards on CO, NO_2, and PM10 in the interim and horizon year. (Supplement, Table S4.6-22.) Therefore, all feasible construction mitigation must be required for all pollutants. The Supplement has not required all feasible construction mitigation.

Mitigated construction emissions are substantially higher than significance thresholds, running into many hundreds of tons (for VOC, SOx, PM10) to many thousands of tons per year (NOx) of pollutants. (Supplement, Table S4.6-21.) In spite of these huge emissions and the severe ozone and PM10 nonattainment problems in the South Coast, this Project is proposing to mitigate only a small fraction of its emissions. The Supplement indicates that the proposed construction mitigation would reduce CO emissions by 2% to 3%; VOC emissions by 2% to 6%; NOx emissions by 22%; SOx emissions by 3%; and PM10 emissions by 31%.[25] As discussed in Comment III.D.1, the claimed NOx and PM10 reductions appear to be unrealistic, given the proposed mitigation program.

These construction emissions for the Project are not included in the current State Implementation Plan ("SIP") and thus have not been considered by SCAQMD in its efforts to come into compliance with ambient air quality standards. (Draft EIS/EIR, pp. 4-476/478.) Because the South Coast is required by law to come into compliance with federal and state ambient air quality standards, these emissions must be reduced by somebody. Therefore, the Supplement by failing to propose adequate mitigation, in effect, has placed the burden on other parties to mitigate emissions from the expansion of LAX.

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[25] Percentage reductions in emissions estimated from [(Table S4.6-21 emissions) - (Table S4.6-11 emissions)]/(Table S4.6-11 emissions).

We listed a large number of feasible construction mitigation measures in our comments on the Draft EIS/EIR. (2001 Fox Comments, IV.E, pp. 24-31.) Some of these were incorporated into the Supplement. However, many were not. The Supplement contains no explanation for its particular choice of construction mitigation measures from the list we proposed. Since our previous comments, a number of additional construction mitigation measures have been suggested and become feasible. Thus, we recommend that the Supplement be revised to require the additional feasible mitigation measures identified below. If these measures are not adopted, the Final EIS/EIR should explain with specificity why these measures are not feasible for this Project.

V.C.1 Fugitive Dust Mitigation Measures

The identification of the type and amount of construction mitigation for PM10 requires that the source of the emissions be separately calculated. However, the Supplement (and the Draft EIS/EIR) aggregate construction emissions, precluding meaningful analysis and evaluation. Thus, it is not possible to determine the amount of the total PM10 emissions that originate from fugitive dust sources (*e.g.*, wind blown dust, drop operations, earth moving) and the amount that originates from equipment exhaust. Hence, it is not possible to determine the amount of fugitive dust mitigation versus engine exhaust mitigation that is required.

However, typically, 80% to 90% of the PM10 emissions from a construction Project originate from fugitive sources. Thus, fugitive PM10 emissions remain highly significant after imposition of the mitigation measures in the Supplement. (Supplement, Table S4.6-21.) There are numerous additional feasible mitigation measures that should be required. We believe the implementation of the following measures could significantly reduce fugitive dust PM10 emissions and they should be required as mitigation for this project:[26]

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[26] The following acronyms are used in this listing of mitigation measures: ADEQ = Arizona Department of Environmental Quality; BCAQMD = Butte County Air Quality Management District; BAAQMD = Bay Area Air Quality Management District; CCHD = Clark County (Nevada) Health Department; MBUAPCD = Monterey Bay Unified Air Pollution Control District; SBCAPCD = Santa Barbara County Air Pollution Control District; SCAQMD = South Coast Air Quality Management District; SJVUAPCD = San Joaquin Valley Unified Air Pollution Control District; SLOCAPCD = San Luis Obispo County Air Pollution Control District; VCAPCD = Ventura County Air Pollution Control District. The mitigation measures from air pollution control agencies are taken from their respective CEQA guidelines. The references to these guidelines were provided in our previous comments. (*See* 2001 Fox Comments, IV.E.1, pp. 25 *ff.*)

- For backfilling during earthmoving operations, water backfill material or apply dust palliative to maintain material moisture or to form crust when not actively handling; cover or enclose backfill material when not actively handling; mix backfill soil with water prior to moving; dedicate water truck or large hose to backfilling equipment and apply water as needed; water to form crust on soil immediately following backfilling; and empty loader bucket slowly; minimize drop height from loader bucket. (CCHD)[27]
- During clearing and grubbing, prewet surface soils where equipment will be operated; for areas without continuing construction, maintain live perennial vegetation and desert pavement; stabilize surface soil with dust palliative unless immediate construction is to continue; and use water or dust palliative to form crust on soil immediately following clearing/grubbing. (CCHD)
- While clearing forms, use single stage pours where allowed; use water spray to clear forms; use sweeping and water spray to clear forms; use industrial shop vacuum to clear forms; and avoid use of high pressure air to blow soil and debris from the form. (CCHD)
- During cut and fill activities, prewater with sprinklers or wobblers to allow time for penetration; prewater with water trucks or water pulls to allow time for penetration; dig a test hole to depth of cut to determine if soils are moist at depth and continue to prewater if not moist to depth of cut; use water truck/pull to water soils to depth of cut prior to subsequent cuts; and apply water or dust palliative to form crust on soil following fill and compaction. (CCHD)
- For large tracts of disturbed land, prevent access by fencing, ditches, vegetation, berms, or other barrier; install perimeter wind barriers 3 to 5 feet high with low porosity; plant perimeter vegetation early; and for long-term stabilization, stabilize disturbed soil with dust palliative or vegetation or pave or apply surface rock. (CCHD)
- In staging areas, limit size of area; apply water to surface soils where support equipment and vehicles are operated; limit vehicle speeds to 15 mph; and limit ingress and egress points. (CCHD)
- For stockpiles, maintain at optimum moisture content; remove material from downwind side; avoid steep sides or faces; and stabilize material following stockpile-related activity. (CCHD)

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[27] Clark County [Nevada] District Board of Health, Construction Activities Notebook Including the Section 94 Handbook, August 24, 2000.

- To prevent trackout, pave construction roadways as early as possible; install gravel pads; install wheel shakers or wheel washers, and limit site access. (CCHD)
- When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least six inches of freeboard space from the top of the container shall be maintained (BAAQMD, SJVUAPCD, SCAQMD Rule 403 Handbook,[28] ADEQ[29]).
- Trucks transporting fill material to and from the site shall be tarped from the point of origin. (SBCAPCD, SCAQMD Rule 403 Handbook)
- Where feasible, use bedliners in bottom-dumping haul vehicles. (SCAQMD Rule 403 Handbook)
- Install wind breaks at windward side(s) of construction areas (BAAQMD, SJVUAPCD).
- Grade each phase separately, timed to coincide with construction phase or grade entire project, but apply chemical stabilizers or ground cover to graded areas where construction phase begins more than 60 days after grading phase ends (SCAQMD Rule 403 Handbook).
- All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operations are occurring. (BAAQMD) The SJVUAPCD adds: The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden. (SJVUAPCD).
- Cover inactive storage piles. (BAAQMD, BCAQMD, SBCAPCD, MBUAPCD)
- Cover active storage piles. (SCAQMD Rule 403 Handbook)
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than 1% (BAAQMD, SJVUAPCD).
- Limit areas subject to excavation, grading, and other construction activity at any one time (BAAQMD, SJVUAPCD).

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[28] South Coast Air Quality Management District (SCAQMD), Rule 403 Implementation Handbook, January 1999.

[29] Arizona Department of Environmental Quality ("ADEQ"), Air Quality Exceptional and Natural Events Policy PM10 Best Available Control Measures, June 5, 2001.

- During initial grading, earth moving, or site preparation, projects 5 acres or greater may be required to construct a paved (or dust palliative treated) apron, at least 100 ft in length, onto the project site from the adjacent site if applicable. (BCAQMD)
- Replant vegetation in disturbed areas as quickly as possible. (BAAQMD)
- Gravel pads must be installed at all access points to prevent tracking of mud on to public roads. (SBCAPCD)
- The contractor or builder shall designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. (SBCAPCD, SLOCAPCD)
- Prior to land use clearance, the applicant shall include, as a note on a separate informational sheet to be recorded with map, these dust control requirements. All requirements shall be shown on grading and building plans. (SBCAPCD, SLOCAPCD)
- Use 3- to 5-foot barriers with 50% or less porosity located adjacent to roadways or urban areas to reduce windblown material leaving site (SCAQMD Rule 403 Handbook).
- Barriers with 50% or less porosity located adjacent to roadways to reduce windblown material leaving a site. (SCAQMD Rule 403 Handbook)
- During high wind conditions, cease all land clearing and earth moving operations or apply water within 15 minutes to any soil surface that is being moved or otherwise disturbed. (SCAQMD Rule 403 Handbook, CCHD)
- Limit fugitive dust sources to 20% opacity. (ADEQ)
- Require a dust control plan for earthmoving operations. (ADEQ)
- Limit speed on unpaved roads. (SCAQMD, ADEQ)
- All demolition materials shall be wet crushed. (El Toro FEIR)[30]
- Increase watering from twice a day to four times daily during initial storage pile placement and maximize application of non-toxic soil binders according to manufacturer's specification to exposed stock

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[30] County of Orange, Final Environmental Impact Report No. 573 for the Civilian Reuse of MCAS El Toro and the Airport System Master Plan for John Wayne Airport and Proposed Orange County International Airport, SCH No. 98101053, August 2001.

piles (*i.e.* gravel, sand, dirt) with 5% or greater silt content. (El Toro FEIR)

- All grading equipment will be mounted with TrueFog dust suppression technology or comparable technology. This technology sprays a very fine mist of water around the construction equipment. This combines with the fugitive dust in the air causing it to fall back to the ground. (El Toro FEIR)
- All locations where scrapers, dozers and compactors will be traveling on exposed earth shall be watered four times per day and soil binders shall be used daily as necessary, consistent with manufacturers' directions. (El Toro FEIR)
- All demolition materials shall be wet crushed. (El Toro FEIR)

These measures have been widely used and required as CEQA mitigation in numerous EIRs. See, for example, the fugitive dust control program for the Big Dig (Kasprak and Stakutis 2000[31]), for the El Toro Reuse Final EIR, and for the Padres Ballpark Final EIR[32].

V.C.2 Construction Exhaust Mitigation Measures.

The CO, VOC, NOx, and SOx construction emissions originate solely from the combustion of fuel in engines of construction equipment. About 10% to 20% of the PM10 emissions also originate from engine exhaust. The mitigated construction emissions as disclosed in the Supplement and Draft EIS/EIR exceed the significance thresholds by substantial amounts in all years and for all alternatives for CO, VOC, and NOx and in 2004 for alternatives A through C. Nonetheless, the Supplement only proposes three measures with the potential to significantly reduce these emissions — the use of "cleaner burning fuels," the use of post-combustion controls and/or exhaust gas recirculation, and the use of electricity from power poles, where available. However, the emission reductions assumed in the mitigated air quality analyses suggest that these measures would not be used to the extent feasible. (*See* Comment III.D.) Further, there are

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[31] A. Kasprak and P.A. Stakutis, A Comprehensive Air Quality Control Program for a Large Roadway Tunnel Project, Proceedings of the Air & Waste Management Association's 93rd Annual Conference 7 Exhibition, June 18-22, 2000.

[32] City of San Diego, Final Subsequent Environmental Impact Report to the Final Master Environmental Impact Report for the Centre City Redevelopment Project and Addressing the Centre City Community Plan and Related Documents for the Proposed Ballpark and Ancillary Development Projects, and Associated Plan Amendments, V. IV. Responses to Comments, September 13, 1999, pp. IV-254 to IV-256.

additional feasible mitigation measures that could be implemented to further reduce exhaust emissions. These include:

- Configure construction parking to minimize traffic interference. (SCAQMD)
- Provide temporary traffic control during all phase of construction activities to improve traffic flow (*e.g.*, flagperson). (SCAQMD)
- Develop a construction management plan that includes but is not limited to rerouting construction of congested streets, consolidating truck deliveries, providing dedicated turn lanes for movement of construction trucks and equipment on-site and off-site, and minimizing use of construction vehicles and equipment. (SCAQMD)
- Use alternative fueled (*e.g.*, LNG, natural gas) construction equipment. (SJVUAPCD)
- Limit the idling time to 2 minutes (SCAQMD), instead of the proposed 10 minutes.
- Limit the hours of operation of heavy duty equipment and/or the amount of equipment in use. (SJVUAPCD)
- Implement activity management (*e.g.*, rescheduling activities to reduce short-term impacts). (SJVUAPCD)
- Construction equipment operating onsite shall be equipped with two to four degree engine timing retard or pre-combustion chamber engines. (SBCAPCD, SLOCAPCD)
- Install high pressure injectors on diesel construction equipment. (SLOCAPCD)
- Install catalytic converters on gasoline-powered equipment, where feasible. (SBCAPCD, SLOCAPCD)
- Minimize construction worker trips by requiring carpooling or use of public transit. (SBCAPCD)
- During smog season (May through October), the construction period should be lengthened so as to minimize the number of vehicles and equipment operating at the same time. (VCAPCD)
- Construction would take place over an extended period of time, from 2004 through 2015. Thus, require the use of new technologies to control emissions as they become available and feasible. (VCAPCD)

- Require the use of catalytic oxidizers and particulate traps on all equipment where feasible, rather than the rather low percentage usage assumed in the Supplement. *See* Comment III.D.
- Require the recalibration (reflash) of engine software on applicable 1993 to 1998 electronically controlled engines to reduce NOx emissions.
- Require the use of ultra-low sulfur diesel (5 to 15 ppmw) in all diesel-fueled on-site construction equipment and all delivery trucks.
- If PuriNOx™ or equivalent diesel formulation is used, require that it be formulated from ultra-low sulfur diesel.
- Replace fuel injectors.
- Use closed loop crankcase filtration.
- Use lean NOx catalysts (MECA)
- Use enhanced combustion modifications, *e.g.*, cams, coating, supercharger, engine rebuild kids (MECA)
- Use selective catalytic reduction ("SCR") and oxidation system combinations on construction equipment to control PM (20-50% reduction, CO and VOCs (up to 90% reduction), and NOx (50-90%) reduction. (MECA)
- For all emissions above the significance thresholds not otherwise reduced, require emission offsets. (SLOCAPCD).
- All off-road construction equipment shall comply with the requirements of 40 CFR (9, 86, 89) Tier 2 emission requirements, which provide for strict emission limits for construction vehicles. (El Toro FEIR)
- All off-road construction equipment shall comply with the requirements of AQMP Measures M9 and M10, limiting NOx emissions to 2.5 g/bhp-hr, beginning the first day of construction. (El Toro FEIR.)
- Set CO, VOC, NOx, PM10, and SOx emission reduction goals for the construction fleet that require a minimum overall 80% reduction in emissions.
- All on-site mechanic and foreman trucks and vehicles will be required to meet Super Ultra-low Emission Vehicle ("SULEV") or Zero Emission Vehicle ("ZEV") emission standards. (El Toro FEIR)
- To the maximum extent permitted by law and regulations, the County and its contractors shall require that construction workers be housed

(Monday through Friday) on-site in trailers/mobile homes/RVs or reused military housing, and shall provide rail/bus/metro passes or clean vehicle shuttle service for those construction workers that will not be housed on-site. (El Toro FEIR)

- LAWA and its contractors shall provide clean-fleet shuttles to major transit stations and multi-modal centers during construction phases of the Project.
- The construction contractors shall use emulsified asphalts that do not contain volatile hydrocarbons in lieu of cutback asphalts to avoid VOC emissions associated with cutback asphalts. (El Toro FEIR)
- The amount of architectural coatings shall be minimized by using spray equipment that has high transfer efficiencies, such as the electrostatic spray gun and manual paint applicators. (El Toro FEIR)
- Pre-coated materials or materials that have natural surfaces shall be used to the maximum extent feasible to avoid the use of VOC emissions from architectural coatings. The building surface areas used for the project shall be at least 70 percent precoated or composed of natural surfaces. (El Toro FEIR)
- The county shall use low or zero VOC content paints wherever feasible to reduce VOC emissions from architectural coatings. (El Toro FEIR)

These measures have been widely used and required as CEQA mitigation in numerous EIRs. *See*, for example, the exhaust emissions reduction program for the El Toro Reuse Final EIR.

V.D Operational Mitigation Measures Are Inadequate

The operational mitigation program has also been revised and now includes 19 mitigation measures. (Supplement, Table S4.6-18.) Again, many of the proposed measures are too general to review or implement because they do not include any emission reduction targets, timeline for their implementation, or any means of assuring compliance. (*See* Comment V.A.)

As discussed earlier, the Supplement's analyses of operational emissions and resulting projected ambient air quality concentrations are seriously flawed. (*See* Comment IV.) However, even with the Supplement's flawed results, mitigated PM10 air quality impacts remain significant for all alternatives in both the interim year and in the year 2015. Consequently, all feasible mitigation must be implemented.

In our previous comments on the Draft EIS/EIR, we recommended a number of additional feasible mitigation measures, such as reduction of existing sources at LAX, reducing emissions from sources outside of LAX, and offsetting emissions with Reclaim credits. (2001 Fox Comment, IV.F.) The Supplement ignored most of these recommendations. Because air quality impacts remain significant after mitigation, LAWA must adopt all feasible mitigation.

V.D.1 Heat Island Effect And Energy Conservation Not Adequately Addressed

We previously commented on the fact that the Draft EIS/EIR ignored the urban heat island effect generated by the hot surfaces of dark pavements and roofs in its air quality analysis, and recommended the implementation of mitigation that requires the use of "cool surfaces" for paving and roofs. (2001 Fox Comments, III.E, p. 20.). We further commented on the lack of commitment to the measures described in the Master Plan's energy conservation and efficiency program, the absence of specific measures and performance goals, and the fact that the plan is not applicable to existing structures. We recommended a long list of potential mitigation measures to address these issues, including the use of energy star roof products, energy-efficient air conditioners (*e.g.*, water-cooled, rather than air-cooled), high-efficiency lighting and glass, daylighting (*e.g.*, skylights), high-efficiency motors, automatic controls for lighting and equipment, photocell dimming, higher insulation levels than required by code, reflective roofs, and photovoltaics, among others. (2001 Fox Comments, IV.G, pp. 33 *ff.*)

The Supplement addressed our comments by including a single mitigation measure that appears to combine these issues, the "Energy Conservation" measure, which proposes to "[c]over any parking structures that receive direct sunlight to reduce volatile emissions from vehicle gasoline tanks and install solar panels on these roofs where feasible to supply electricity or hot water." It adds that this measure would "potentially apply to surface lots and the top deck of parking garages" and that "[i]nstallation of solar panels may only be feasible in decentralized structures." (Supplement, p. 4-391.)

This measure does not contain a commitment to implement this measure, as it is only "potentially" applicable and "may only be feasible in decentralized structures." In addition, the measure as drafted would apply only to parking structures and only marginally reduce the heat island effect by reducing VOC emissions from vehicle gasoline tanks. The Supplement does not provide an explanation how it intends to further address the heat island effect. It does not commit to installing "cool surfaces" on either the parking structures or any buildings. The use of solar panels on the numerous airport buildings was also

not required and there is no explanation of why none of the many other proposed energy conservation measures were adopted. Clearly, this measure is window-dressing at best and does not adequately address LAWA's obligation to implement energy conservation and efficiency measures to mitigate the significant impacts from its operation.

V.D.2 Establishment Of ITCs Not Valid Mitigation

The Supplement claims that substantial emission reductions can be achieved through the construction of five additional intermodal transportation centers ("ITCs"), so-called "flyaways." As discussed above in Comment IV.B above, only one such ITC is proposed in Alternative D and none for Alternatives A through C. Consequently, the potential emissions reductions need to be reduced to a fifth of their present values for the calculation of mitigated emissions from Alternative D. No emission reduction credits for ITCs can be applied to Alternatives A through C.

VI. DOCUMENTS UPDATED AFTER INITIAL PUBLICATION

The documents pertaining to the Supplement that were provided to us on a CD-ROM by LAWA are inconsistent with the documents presented on LAWA's LAX Master Plan internet homepage[33]. For example, Attachments I and N to the Technical Report S-4, Air Quality, contained only headers on otherwise empty pages in the CD-ROM copy we were provided with. The document provided on the internet on the other hand contains complete tables with data. We have not been notified by LAWA that changes were made to the Supplement and its associated documents. The LAWA Master Plan homepage itself also does not contain any notification that documents have been updated nor do the documents themselves contain any note to alert the reader to the fact.

We were unable to verify whether the content of other documents had also been updated or changed from the version we were provided with by LAWA. LAWA and FAA have a legal obligation under CEQA and NEPA to make their environmental analysis readily accessible to the public. This was a problem with the publication of the Draft EIS/EIR as well as the Supplement. The publication of inconsistent, incomplete, and altered documents in different locations fails to satisfy the agencies' legal obligation, renders the documents confusing and difficult to understand, and requires an explanation of the discrepancies and publication of corrected documents.

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[33] LAX Master Plan, http://www.laxmasterplan.org, accessed October 29, 2003.

VII. PUBLIC HEALTH IMPACTS ARE UNDERESTIMATED

We previously commented on the serious inadequacy of the Draft EIS/EIR's human health risk assessment ("HHRA"), which resulted from the use of inappropriate thresholds of significance, the lack of an assessment of non-cancer acute health risks, the underestimation of acrolein chronic health impacts, the inadequate assessment of lead, the lack of an assessment of health impacts from construction emissions, the inappropriate use of high instead of low load factors to estimate aircraft engine emissions, the lack of an assessment of health risk to terminal passengers, and the lack of a cumulative health risk assessment. Further, the proposed mitigation program, identical to the air quality mitigation program discussed in Comment IV, is inadequate for human health impacts for the same reasons discussed above. Additionally, the proposed mitigation program fails to recognize the differences in approaches that are required to mitigate air quality versus human health impacts. (2001 Fox Comments, V., pp. 40 *ff.*)

The Supplement addressed only a few of these issues. Consequently, our previous comments remain applicable, and are applicable to the evaluation of Alternative D as well. In addition, the Supplement has introduced some new problems, which are discussed below.

VII.A Health Risk Assessment Is Inadequate

The conclusions drawn in the Supplement's HHRA regarding the — mostly insignificant — impacts of proposed expansions of LAX, particularly with respect to Alternative D, are questionable. Neither the Draft EIS/EIR, nor the Supplement or their associated technical reports provide detailed enough information to comprehend or reproduce the steps taken in the HHRA to estimate acute and chronic noncancer health risks and cancer health risks from Project emissions. However, there are a number of indications that the HHRA is substantially flawed.

The methodology and data sets used by both the Draft EIS/EIR and Supplement results in substantial underestimates of the toxic air pollutant ("TAP") emissions inventories for the Project. This, in turn, results in considerable underestimates of ambient air TAP concentrations and, consequently, in erroneous conclusions regarding the significance of Project impacts. A number of reasons contribute to this substantial underestimate, as discussed in the following.

VII.A.1 TAP Emissions Estimates Unsupported

A HHRA, *i.e.* the assessment of acute and chronic noncancer health risks and cancer health risks, relies on modeled ambient air TAP concentrations due to a project, which are based on an accurate emissions inventory for TAPs. The Supplement, following the Draft EIS/EIR's general approach and methodology, follows the standard approach to estimate emissions of TAPs from mobile and stationary sources, calculated by multiplying the VOC or PM emissions by the percent mass composition of the exhaust gas, called a speciation profile: "[t]he toxic air pollutant emissions will be calculated by multiplying the appropriate criteria pollutant (VOC or particulate matter) emissions by the relative toxic pollutant emission factor." (Supplement, p. 4-616 and Draft EIS/EIR, TR14a, Attachment B, p. 10.)

The Draft EIS/EIR's Technical Report 14a[34] ("TR14a"), Attachment F, Air Quality Modeling Protocol for Toxic Air Pollutants, asserts that "[a]ll such references will be discussed and emission factors justified. In cases where different emission factors in different reference documents are found for the same emission source, the reference most appropriate for operations in Southern California will be used." (TR14a, Attachment F, p. 2.)

However, beyond disclosure of names of the databases used to determine TAP emission factors, neither the Draft EIS/EIR nor the Supplement or their associated technical reports and attachments contain a summary of those "relative toxic pollutant emission factors" that were selected to estimate TAP emissions from the myriad of stationary and mobile sources at LAX. The Supplement does not disclose which emission factors were chosen from which database for which source nor does it provide a justification for the selected factor.

Without this information it is impossible to verify whether the Draft EIS/EIR or the Supplement selected appropriate emission factors for the various sources. Further, other pertinent information in the Supplement is missing. For example, the associated Technical Report 9a[35] ("TR9a"), Attachment A, Risk Calculations for Maximally Exposed Resident and Child, only contains a header on an otherwise empty page. Thus it impossible to verify the Supplement's calculations of TAP emissions resulting from the Project alternatives, the

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[34] LAX Master Plan Draft Environmental Impact Statement/Environmental Impact Report, Technical Report 14a: Human Health Risk Assessment, January 2001.

[35] LAX Master Plan Supplement to the Draft Environmental Impact Statement/Environmental Impact Report, Technical Report 9a: Supplemental Human Health Risk Assessment, June 2003.

incremental ambient air TAP concentrations, and in turn their associated health risks.

VII.A.2 TAP Emission Factors Are Inadequate

It appears that the Supplement relied on the same outdated sources listed in the Draft EIS/EIR for determining the TAP emission factors. The Supplement does not contain any indication that it used updated versions for any of these sources. The reader must therefore assume that the sources for speciation profiles or TAP emission factors are the same as those used in the Draft EIS/EIR. The Draft EIS/EIR's TR14a, Attachment B, Screening Level Human Health Risk Assessment, specifies that "TAP emissions were estimated using VOC and PM emission estimates and combined with speciation data from SPECIATE, FIRE, and XATEF, and USEPA Guidance on Mobile Source HAPs." (Draft EIS/EIR, TR14a, Attachment B, p. 14.)

Inspection of the respective references reveals that the Draft EIS/EIR used the 1993 version of FIRE and SPECIATE, and the 1992 version of XATEF to determine TAP emission factors. (Draft EIS/EIR, TR14a, Attachment B, p. 14.) The XATEF database has long been retired by U.S. EPA and some of its emission factors incorporated in its FIRE database.[36] The latest version of FIRE, version 6.23, was released in October, 2000, and, thus, would have been available for the Supplement's HHRA. The U.S. EPA's SPECIATE database has also been updated several times and is currently available as version 3.2. Release notes to the preceding version, released in October 1999 and thus available to both the Draft EIS/EIR and Supplement, state that "SPECIATE v3.0 contains 262 new TOC profiles and 13 new PM profiles."[37]

While the Draft EIS/EIR claims that "[t]he HHRA used well-accepted methods and best available emission factor data to develop estimates of emissions, and estimates and assumptions are reasonable and appropriate," this is clearly not the case. (Draft EIS/EIR, p. 76.) The HHRA must be revised using the most recent available TAP speciation profiles or emission factors.

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[36] United States Environmental Protection Agency, Technology Transfer Network, Clearinghouse for Inventories & Emission Factors, Factor Information Retrieval System (FIRE), Frequently Asked Questions, http://www.epa.gov/ttn/chief/faq/firefaq.html, accessed November 3, 2003.

[37] United States Environmental Protection Agency, Technology Transfer Network, Clearinghouse for Inventories & Emission Factors, SPECIATE Version 3.2; http://www.epa.gov/ttn/chief/software/speciate/spec32_rel_notes.txt, accessed November 3, 2003.

VII.A.3 TAP Emissions Are Underestimated

The Supplement's TAP emission estimates are based on emissions of VOCs and PM from mobile and stationary sources, calculated by multiplying the VOC or PM emissions by the TAP relative emission factor. As discussed above in the air quality section of this comment letter, the Supplement has substantially underestimated unmitigated VOC and PM emissions from the Project and substantially overestimated the control efficiency of its proposed mitigation program. Consequently, the estimated mitigated emissions from the Project are grossly underestimated and should be revised. Consequently, TAP emissions that are based on these underestimated VOC and PM emissions are also substantially underestimated.

The Supplement concludes that most health risks for Alternative D would be lower in both the interim year and the horizon year 2015 than they would be if no Master Plan improvements were undertaken, *i.e.* the NA/NP alternative. These conclusions are unsupported. We expect that an HHRA that evaluates TAP impacts from the Project based on current TAP relative emission factors and accurate estimates of air pollutant emissions will be significant for all alternatives including Alternative D. The HHRA must be revised and the Draft EIS/EIR recirculated for public review.

VII.B Significance Thresholds

VII.B.1 Chronic Hazard Index

We previously commented on the Draft EIS/EIR's inappropriate and unsupported significance thresholds for the incremental hazard index used in the HHRA to evaluate chronic and acute noncancer health impacts. (2001 Fox Comments, V.A, p. 41). The Draft EIS/EIR used a total incremental hazard index of "greater than 5 for any target organ system at any receptor location" as the significance threshold for both noncancer chronic and acute health impacts. (Draft EIS/EIR, p. 4-1009.)

We commented that the appropriate significance threshold for both the chronic and acute health hazard index is 1. This threshold was established in 1993 CARB guidelines,[38] is routinely used in HHRAs conducted for EIRs and by every air district in the State that has established significance thresholds for noncancer health risks for purposes of CEQA. We previously provided excerpts

[38] California Air Resources Control Board, Risk Management Guidelines for New and Modified Sources of Toxic Pollutants, July 1993.

from CEQA guidelines as well as excerpts from EIRs prepared for other projects in the SCAQMD. (2001 Fox Comments, Ex. 2 and 3.)

In response, the Supplement appropriately reduced the significance threshold for the total incremental *acute* hazard index from 5 to 1 "to conform to SCAQMD policies." However, the Supplement left the significance threshold for the *chronic* hazard index at 5, citing SCAQMD Rule 1402 as a reference. (Supplement, p. 4-620.) This is inappropriate. While SCAQMD Rule 1402 in fact cites a chronic hazard index of 5, it is not applicable in the instant case, as explained below. Its mere existence, thus, does not provide justification for not using the lower significance threshold of 1, which is routinely used in HHRAs and recommended by most (all?) air districts in their CEQA Guidelines as well as SCAQMD guidance.

Further, SCAQMD Rule 1402 is intended to reduce the health risk associated with "existing facilities" to implement risk reduction plans as required by the Air Toxics Information and Assessment Act, the so-called "Hot Spots Act" of 1987. LAX in its present configuration is an already existing facility and SCAQMD Rule 1402 indeed applies. However, the modernization of LAX as proposed by the Draft EIS/EIR and Supplement is further subject to SCAQMD Rule 1401[39], which applies to new and modified sources. Modifications are defined as "any physical change in, change in method of operation, or addition to an existing permit unit that requires an application for a permit to construct and/or operate." (SCAQMD Rule 1401, c(9).) Clearly, the modernization of LAX classifies as a modification. SCAQMD Rule 1401 specifies a chronic hazard index of 1. Consequently, if LAWA relies on SCAQMD guidance and rules to justify its choice of a hazard index, it must take all applicable regulations into consideration and consequently set the chronic hazard index significance threshold at 1, rather than 5.

Further, the Supplement claims that its CEQA thresholds of significance are "based on recent SCAQMD policies" and are "consistent with the SCAQMD CEQA Handbook for assessing impacts of new developments as well as recent, publicly available correspondence from SCAQMD." The SCAQMD CEQA Guidelines themselves do not contain a significance threshold for the hazard index. However, the guidelines rely on "Rule 1401, with which the project proponent must comply before the project can be constructed and put into operation." Clearly, SCAQMD Rule 1401 would be the applicable rule that the Supplement should have consulted, not SCAQMD Rule 1402.

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[39] South Coast Air Quality Management District, Rule 1401 – New Source Review of Toxic Air Contaminants, amended May 2, 2003.

Although SCAQMD Rule 1401 does not apply to aircraft emissions at LAX because the SCAQMD does not have jurisdiction over mobile source emissions, the choices for significance thresholds in this rule reflect the general state-wide consensus on this issue. As a practical matter, the significance of health impacts does not depend on the source of the emissions – mobile sources versus stationary sources – only on the specific chemicals and their impacts on humans. Thus, jurisdiction is irrelevant for purposes of CEQA.

CARB issued risk management guidelines in 1993 recommending an even lower significance threshold of 0.2 for the non-cancer chronic hazard index. If the index exceeds 0.2, best available control technology for toxics ("TBACT") is required. The Bay Area Air Quality Management District ("BAAQMD") is currently in the process of lowering its recommended threshold for requiring T-BACT to 0.2.[40]

Clearly, the choice of a chronic hazard index of 5 flies in the face of every relevant regulatory guidance as well as state-wide standard practice. At a minimum, the Supplement should have chosen a hazard index of 1, if not lower. By selecting the higher significance threshold of 5, the Supplement and Draft EIS/EIR have failed to find significant impacts that should have been mitigated.

VII.B.2 Cancer Risk

The Supplement, as the previous Draft EIS/EIR, uses a significance threshold of 10 in one million for the incremental cancer risk. The Supplement does not provide a reference for this threshold beyond its claim that its CEQA thresholds of significance are "based on recent SCAQMD policies" and are "consistent with the SCAQMD CEQA Handbook for assessing impacts of new developments as well as recent, publicly available correspondence from SCAQMD." (Supplement, p. 4-620.) The cited recent correspondence is a comment letter from SCAQMD on the El Toro DEIR.[41] This comment letter refers back to the SCAQMD CEQA Guidelines as being the applicable guidance for determining the significance threshold for incremental cancer risk.

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[40] Bay Area Air Quality Management District, Workshop Notice, Re: Proposed Changes To District Air Toxics New Source Review Program, May 2, 2003, http://www.baaqmd.gov/pln/ruledev/2-5/r0205ws1.htm, accessed November 2, 2003; and Bay Area Air Quality Management District, Draft Staff Report, Appendix D, CEQA Initial Study, April 2003.

[41] South Coast Air Quality Management District, Comments of the AQMD, Draft Environmental Impact Report No. 573, Civilian Reuse of MCAS El Toro and the Airport System Master Plan for John Wayne Airport and Proposed Orange County International Airport, Letter from Steve Smith, SCAQMD, to Bryan Speegle, County of Orange, Master Development Program, February 22, 2000.

The SCAQMD CEQA Guidelines specify the significance threshold for incremental cancer risk as follows:

"Any project involving the emission or threatened emission of a carcinogenic or toxic air contaminant identified in District Rule 1401 that exceeds the maximum individual cancer risk of *one in one million* or *10 in one million if the project is constructed with best available control technology for toxics* (T-BACT) using the procedures in District Rule 1401." [Emphasis added.]

Considering the substantial emissions of air toxics from the Project and the absence of any proposed T-BACT measures, the HHRA should have used a cancer significance threshold of one in one million.

VIII. MITIGATION OF HEALTH IMPACTS IS INADEQUATE

As we discussed in our previous comments, The Draft EIS/EIR did not impose any mitigation specifically for health impacts, instead relying exclusively on air quality mitigation. (2001 Fox Comments, VI., pp. 46/47.) The Supplement failed to propose any additional mitigation measures that would substantially reduce VOC and PM emissions, the surrogates used for estimating TAP emissions. As discussed above in Comment V, the air quality mitigation program is entirely inadequate for mitigating air quality impacts. This program is likewise inadequate to mitigate health impacts, for the same reasons discussed in Comment V. The air quality mitigation program would only marginally reduce the emissions of VOCs and PM. Thus, TAP emissions, which are based on VOC and PM emissions, would likewise be high.

Further, the proposed mitigation program fails to recognize the differences in approaches that are required to mitigate air quality versus human health impacts. It is not sufficient to rely solely on air quality mitigation to mitigate public health impacts. Other types of mitigation measures should be considered to prevent exposure and thus protect public health. These might include measures such as upgrading the LAX ventilation system, installing efficient charcoal filters on the LAX intake air to remove TAPs, and improving the ventilation systems and treating the intake air of nearby sensitive receptors who would be most affected by TAP emissions from the Project.

Table 1: Unmitigated Operational Emissions Inventories for On-airport Sources (tons/year)

Horizon Year 2005

Draft EIS/EIR, Table 4.6-8

	1996 Baseline	NA/NP 2005	A 2005	B 2005	C 2005
CO	16,589	16,446	12,835	12,739	12,858
VOC	2,069	1,968	1,756	1,750	1,754
NOX	5,175	6,100	5,728	5,727	5,767
SO_2	183	233	223	223	223
PM10	159	164	140	138	144

Supplement, Table 4.6-9

	1996 Baseline	NA/NP 2005	A 2005	B 2005	C 2005
CO	19,325	19,438	14,806	14,712	14,836
VOC	5,317	6,063	5,068	5,062	5,077
NOX	5,601	6,816	6,064	6,063	5,767
SO_2	382	503	426	426	426
PM10	204	243	160	158	169

Ratio Supplement/Draft EIS/EIR

	1996 Baseline	NA/NP 2005	A 2005	B 2005	C 2005
CO	1.2	1.2	1.2	1.2	1.2
VOC	2.6	3.1	2.9	2.9	2.9
NOX	1.1	1.1	1.1	1.1	1.0
SO_2	2.1	2.2	1.9	1.9	1.9
PM10	1.3	1.5	1.1	1.1	1.2

Horizon Year 2015

Draft EIS/EIR, Table 4.6-8

	1996 Baseline	NA/NP 2015	A 2015	B 2015	C 2015
CO	16,589	14,530	11,014	11,500	11,140
VOC	2,069	1,789	1,638	1,769	1,711
NOX	5,175	6,308	7,175	7,270	6,767
SO_2	183	252	286	297	283
PM10	159	173	172	175	166

Supplement, Table 4.6-9

	1996 Baseline	NA/NP 2015	A 2015	B 2015	C 2015
CO	19,325	17,269	11,904	12,375	11,880
VOC	5,317	5,748	3,419	3,514	3,194
NOX	5,601	7,039	7,136	7,225	6,695
SO_2	382	770	526	544	522
PM10	204	256	176	179	170

Ratio Supplement/Draft EIS/EIR

	1996 Baseline	NA/NP 2015	A 2015	B 2015	C 2015
CO	1.2	1.2	1.1	1.1	1.1
VOC	2.6	3.2	2.1	2.0	1.9
NOX	1.1	1.1	1.0	1.0	1.0
SO_2	2.1	3.1	1.8	1.8	1.8
PM10	1.3	1.5	1.0	1.0	1.0

COMMENTS

ON

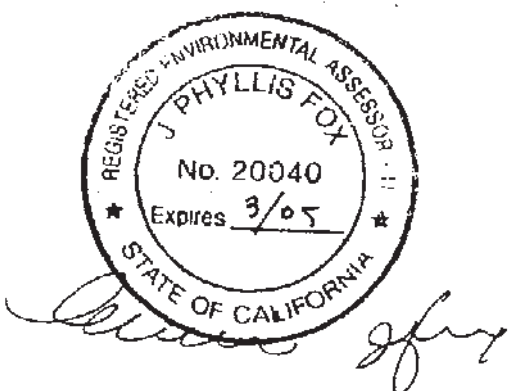
AIR QUALITY

AND

HUMAN HEALTH AND SAFETY

LAX Master Plan Draft EIR/EIS

July 13, 2001



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AIR QUALITY

The Draft Environmental Impact Report ("DEIR") does not contain an adequate analysis of air quality impacts. Criteria pollutant emissions are internally inconsistent and generally underestimated. Air quality impacts were underestimated by using a speculative rollback procedure. Sulfate and PM10 impacts were not evaluated. The alternative analysis does not include any alternative that would substantially lessen air quality impacts. The DEIR does not contain the conformity analysis, as it must. Finally, the proposed mitigation program only requires that a small percentage of the very substantial increase in emissions be mitigated and fails to impose all feasible mitigation measures. The air quality analysis and mitigation program need to be substantially revised, and the DEIR recirculated for public review.

I. THE AIR QUALITY ANALYSIS DOES NOT COMPLY WITH CEQA

I.A. The Project Is Inconsistent With The AQMP

The California Environmental Quality Act ("CEQA") requires that an EIR "discuss any inconsistencies between the proposed project and applicable general plans and regional plans. Such regional plans include, but are not limited to, the conformity analysis and applicable air quality attainment or maintenance plan or State Implementation Plan..." (§ 15125(d).) The DEIR does not contain the conformity analysis and only discusses consistency with land use plans. (DEIR, Technical Report 1.) However, it fails to discuss the consistency of the project with applicable air quality plans. As discussed below, the project's emissions are not consistent with applicable air quality plans.

The applicable air quality plan for LAX is the 1997 Air Quality Management Plan, and amendments thereto ("AQMP"). Although the DEIR acknowledges the existence of this plan (DEIR, p. 4-476), it makes no pretense of evaluating the consistency of the project with the AQMP. In fact, the word "consistency" is not even used in the air quality section of the DEIR. (DEIR, § 4.6.)

The South Coast Air Quality Management District ("SCAQMD") CEQA Guidelines set forth two criteria that must be met to demonstrate consistency with the AQMP:

1. Whether the project will result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.

2. Whether the project will exceed the assumptions in the AQMP in 2010 or increments based on the year of project buildout and phase.

As demonstrated below, both of these criteria are violated. Therefore, the project is not consistent with applicable plans. The SCAQMD CEQA Guidelines caution that before a lead agency trades off social, economic, or other benefits for significant impacts on air quality that it should recognize that "the region will not be able to achieve the air quality standards within the time frame specified in law," resulting in potential restrictions on federal funding, imposition of federal plans and regulations, federal sanctions and/or the need for regulation of additional sources in order to make up the emission reductions lost. (SCAQMD CEQA Guidelines, p. 12-3.)

I.A.1. Project Would Violate Air Quality Standards

These guidelines require that the first criterion be addressed by performing an air quality modeling analysis. "In order to be found consistent, the analysis will need to demonstrate that the project's emissions will not increase the frequency or the severity of existing violations, or contribute to a new violation at the project. The violations that are referred to are the state and federal criteria pollutant ambient air quality standards." (SCAQMD CEQA Guidelines, p. 12-3.)

The air quality modeling analysis in the DEIR demonstrates that mitigated operational emissions from all three alternatives would cause new exceedances of the State 1-hour NO_2 standard and increase the frequency and severity of existing violations of the State annual PM10 standard (in 2005 only) and State 24-hour PM10 standard. (DEIR, Table 4.6-20.) Mitigated construction emissions were not modeled. However, unmitigated construction emissions from all three alternatives would cause new exceedances of the federal annual NO_2 standard, the State 1-hour NO_2 standard, the federal annual PM10 standard, and the federal 24-hour PM10 standard. In addition, project construction would increase the frequency and severity of existing violations of the State annual and 24-hour PM10 standards. (DEIR, Table 4.6-13.) As discussed below, these impacts would be more severe than indicated because all project emissions were not included. Further, the project would additionally cause new exceedances of the federal and State annual NO_2 standard and aggravate existing exceedances of the federal and State 8-hour CO standard. (Comment III.A.) Therefore, the project does not meet the first criterion and thus does not conform to the AQMP.

I.A.2. Project Would Exceed Emissions in AQMP

The SCAQMD guidelines also require that mitigated emissions be compared with emissions in the AQMP in 2010 and increments based on the year of project buildout. As a practical matter, the emission estimates in future years in the AQMD have already been exceeded because the 1997 AQMP assumed that EPA would adopt new regulations to control aircraft engine emissions below then-existing levels. Because EPA did not adopt such regulations, and since commercially available aircraft engines are not capable of meeting the SCAQMD-assumed reductions, the 1997 AQMP emissions underestimate projected future airport emissions. (Orange 4/01,[1] p. 2-39.) Therefore, the project would aggravate this situation, making it even more difficult for the South Coast to come into compliance with federal ambient air quality standards. Additionally, as demonstrated below, the project alone would exceed some of the aircraft emissions assumed in the AQMP.

First, the mitigated aircraft PM10 emissions in 2010 are 0.17 ton/day.[2] These emissions exceed the 2010 emissions assumed in the AQMP for non-government aircraft of 0.05 ton/day. (AQMP, Table A-13, p. III-A-39). Second, the project would increase mitigated NOx aircraft emissions by 10.1 ton/day[3] between the baseline year of 1996 and buildout year of 2005 under Alternative C (the only alternative with sufficient data to make a calculation). The AQMP assumed that NOx emissions would only increase by 5.40 ton/day over roughly this same period.[4] Thus, this project would consume over 100% of the increase allowed by the AQMP.

I.B. Alternative Analysis Is Not Adequate

CEQA requires that the "discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these

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[1] County of Orange, Draft Environmental Impact Report No. 573 for the Civilian Reuse of MCAS, El Toro and the Airport System: Master Plan for John Wayne Airport and Proposed Orange County International Airport, Draft Supplemental Analysis, April 2001.

[2] Mitigated aircraft emissions estimated from DEIR, TR 4, Attach. W and Table 4.6-18 as: (67 ton/yr - 6 ton/yr)/365 day/yr = 0.17 ton/day.

[3] Increase in mitigated NOx emissions between 1996 and 2020 (DEIR, TR 4, Attach. W, Table 4.6-18): 6,190 ton/yr - 3,722 ton/yr - 101 ton/yr - 305 ton/yr)/365 = 5.65 ton/day.

[4] Increase in NOx emissions between 1997 and 2020 (AQMP, Tables A-4 and A-14): 19.99 ton/day - 14.59 ton/day = 5.40 ton/day.

alternatives would impede to some degree the attainment of the project objectives, or would be more costly." (14 CCR 15126.6(b).)

The buildout operational emissions for all criteria pollutants (DEIR, Tables 4.6-8/9) from both alternatives are slightly higher than the emissions from the proposed action, Alternative C. Similarly, the construction emissions from both alternatives are indistinguishable from those of the proposed action. Therefore, the alternatives analysis has failed to include an alternative that avoids or substantially lessens the highly significant air quality impacts and is thus inadequate.

I.C. Impacts From Increased Electricity Demand Not Evaluated

CEQA requires that indirect impacts of a project be evaluated. In this case, these include the generation of electricity to support the project. The DEIR did not evaluate the air quality impacts of generating additional electricity to support the project.

Most power in California is generated by power plants that burn natural gas. The cleanest and newest plant operated by Los Angeles Department of Water and Power ("LADWP") is the 80-MW Harbor Cogeneration Facility, which was started up in 1994 and emits 1.3 ton of NOx,[5] 1.2 ton of CO, 0.2 ton of PM10, and 0.4 ton of SOx[6] per megawatt-year ("MW-yr") of power produced.[7] The other in-basin plants owned by LADWP are substantially older, 28 to 46 years old (LADWP 8/15/00,[8] Table B-1) and emit substantially more pollution. Older plants that have not been repowered, such as those operated by LADWP, can produce well over 100 times more pollution than the newer plants.

The unmitigated project will significantly increase the demand for electricity. Alternative B, for example, the most energy-intensive alternative, would increase the electricity demand by 386,693 megawatt hours per year ("MWH/yr") in 2015 compared to the environmental baseline and by 258,860 MWH/yr compared to the no action/no project alternative. These represent

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[5] Carnot, Source Test Report, Unit 2, Harbor Generating Station, Los Angeles Department of Water and Power, November 1995.

[6] ROG = reactive organic gases; CO = carbon monoxide; NOx = nitrogen oxides; SOx = sulfur oxides; PM10 = particulate matter with an aerodynamic diameter less than 10 microns.

[7] U.S. EPA Region 9 Electronic Permit Submittal System, Permit No. 106325, Harbor Cogeneration Co.

[8] Los Angeles Department of Water and Power, 2000 Integrated Resource Plan, As Amended and Adopted by the Board of Water and Power Commissioners and the Los Angeles City Council, August 15, 2000.

increases of 234% and 62%, respectively. (DEIR, Table 4.17.1-2.) This amounts to about 44 MW of additional demand under baseline conditions and 30 MW under the NA/NP option.

This electricity would be generated by LADWP. Assuming that LADWP's cleanest plant produced the increased electricity, the generation of electricity would produce an additional 57 ton/yr of NOx, 53 ton/yr of CO, 9 ton/yr of PM10, and 18 ton/yr of SO_2 under baseline conditions and 39 ton/yr of NOx, 36 ton/yr of CO, 6 ton/yr of PM10, and 12 ton/yr of SO_2 under NA/NP conditions. The increase in SO_2 emissions offsets 100% of the reductions achieved by the DEIR's proposed mitigation program. (DEIR, Table 4.6-18.)

Actual emissions could be substantially higher, over 100 times higher, if this electricity is generated by the dirtier plants that make up the majority of LADWP's generation capacity. Although LADWP proposes to repower some of these plants (DEIR, p. 4-782), it is not clear that these upgrades will either supply the project or be on-line in the 2005 to 2015 planning horizon.

The DEIR declined to evaluate this impact because only about 27% of LADWP's electricity is generated within the LA basin and the emissions would be widely distributed due to the practice of "wheeling". (DEIR, Attach. G, p. 23.) However, the emissions from electricity generation, wherever they may occur, are potentially large, at least as large or larger than other sources of emissions that were included in the air quality analyses. Under 14 CCR § 15126.2(a), an EIR is required to evaluate secondary, indirect impacts.

The LADWP currently produces 52% of its power from coal. This share is projected to decline to 39% by 2010, due to the proposed divestiture of the Mohave Generating Station. (LADWP 8/15/00, p. 13.) The merchant power provider AES has offered to buy 100% of Mohave GS, but the deal has run into snags, namely the reneging of Nevada Power. Thus, its future is uncertain. The EIR cannot rely on divestiture until it is final. Further, divestiture does not mean that LADWP will cease to rely on power from Mohave. LADWP will continue to own shares in other out-of-basin coal plants, including the Intermountain Generating Station and the Navajo Generation Station. (*Id.*, p. B-1.) The LADWP also wheels power from other coal-fired units, located along California's border. (*Id.*, Fig. F-1.)

The emissions from these coal-fired units are substantially higher than from the Harbor Cogeneration Facility, LADWP's cleanest facility. The Intermountain Generating Station, located in Delta, UT, is the largest coal-fired power plant in the U.S., and LADWP owns a 67% "take-or-pay" entitlement to 1095 MW during summers and 1108 MW during winters. (LADWP 8/15/00, p.

B-1.) The Intermountain GS emits 23 ton/MW-yr of NOx and 7 ton/MW-yr of SOx.[9]

If the electricity to supply LAX came from this or other similar or dirtier coal-fired plants owned by LADWP or that otherwise supply LADWP's power demand, the project would increase emissions of NOx by 1,012 ton/yr and SOx by 308 ton/yr relative to baseline conditions, and NOx by 690 ton/yr and SOx by 210 ton/yr relative to NA/NP conditions. These increases amount to 90% of the proposed reductions in NOx and 400% of the reductions in SOx under the DEIR's mitigation program, exporting a significant air quality impact to another state. (DEIR, Table 4.6-18.)

Although all of the coal-fired plants that LADWP relies on are outside of California, there are at least two coal-fired plants near the California border in Nevada and Arizona that are tied into LADWP's transmission system - Reid Gardner and Mohave. These two plants are about 70 and 2 miles, respectively, from the California border. Thus, emissions from these coal-fired plants contribute to regional ozone and visibility problems in California and thus impact air quality in California due to their proximity.

In addition, many of the proposed air quality mitigation measures will substantially increase the regional demand for electricity. The air quality mitigation program relies heavily on the conversion of mobile sources and fuel-fired equipment to electric power. Ground support equipment would be converted to electric power. Incentives would be offered to promote the use of electric engines in commercial vehicles that use the terminal areas, in cargo vehicles entering the airport, and in rental cars using on-airport RAC facilities. Ground power and preconditioned air systems would be electrified. Free parking, charging stations and preferential parking would be provided for electric vehicles. (DEIR, § 4.6.8.)

The DEIR recognizes that these measures increase electricity demand (DEIR, p. 4-522) and admits that "the additional increase in electricity would exacerbate the additional load to the electrical power distribution system that would occur under the build alternatives under the unmitigated condition." (DEIR, p. 4-523.) However, the DEIR does not require any mitigation for the energy impacts (DEIR, p. 4-806) and fails to evaluate the air quality consequences of this additional demand and to take it into account in calculating the reduction in emissions and impacts achieved by the various mitigation measures. (DEIR,

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[9] State of Utah, Title V Operating Permit, No. 2700010001, Intermountain Power Service Corporation, January 9, 1998, Revised February 25, 2000.

Tables 4.6-16/20.) Thus, the actual air quality benefits of those mitigation measures that increase electricity demand are smaller than claimed. Further, CEQA requires that the impacts of proposed mitigation measures be evaluated. The DEIR has not evaluated the secondary air quality impacts from its proposed mitigation program.

II. THE EMISSION ESTIMATES ARE FLAWED

Emission estimates are the heart of an air quality analysis. I was unable to verify the emission estimates in the DEIR because necessary supporting information is missing from the DEIR, and LAWA was unable to provide the required information in response to our Public Record Act and Freedom of Information Act requests.

The relevant supporting emission information supposedly was presented in the Air Quality Technical Report. However, this Report was scanned in backwards and was thus illegible when printed out. After acquiring a legible copy, I discovered that many of the assumptions and procedures used to calculate the emissions that the DEIR relied on are not in the Air Quality Technical Report. In response to a formal request for electronic copies of the spreadsheets on April 4, 2001, I finally received on June 26, 2001, a compact disk alleged to contain the emission spreadsheets.

However, this disk only contains partial information for construction and off-airport emission estimates. No information is provided for on-airport sources. Further, all of the spreadsheets on this disk are use-protected, preventing me from inspecting the formulas that were used to make the calculations, the very thing I need to verify the calculations. Therefore, the files on this disk provide no more information than what is already available in the Air Quality Technical Report.

In sum, it is impossible to verify the emission estimates that the DEIR's air quality analyses are based on. This is a serious matter because it is evident, based on inspection of the emission summaries, that the DEIR's emission estimates are riddled with errors and should be subjected to independent peer review. The problems that I was able to identify, based on incomplete information, are discussed below.

II.A. The 1996 On-Site Environmental Baseline Emissions Are Contradicted

The on-site project impacts for CEQA purposes are evaluated relative to the 1996 baseline, which is stated to represent activity levels at LAX in 1996 and facilities as of 1997. (DEIR, p. 4-462.) The emissions for this case are discussed in

Section 4.6.3.5 and summarized in Table 4.6-6. These emissions are then included in Table 4.6-8 and used to evaluate the significance of project emissions under CEQA.

However, the 1996 environmental baseline emissions in Tables 4.6-6 and 4.6-8 differ rather substantially from those reported in the Air Quality Technical Report ("TR 4"), Attachment C, which supposedly provides the support for emission estimates. The following inset table summarizes these discrepancies:

	EMISSIONS (ton/yr)	
	Table 4.6-6/8	TR 4
CO	16,589	20,216
VOCs	2,069	3,041
NOx	5,175	5,903
SOx	183	210
PM10	159	191

The DEIR does not contain sufficient information to resolve the noted discrepancies. Thus, there is no creditable support for the baseline emissions used to evaluate the significance of impacts under CEQA. These discrepancies should be resolved and the EIR and supporting technical report recirculated for public review.

II.B. The Wrong Baseline Is Used To Evaluate Off-Airport Emissions

CEQA requires that an EIR evaluate impacts relative to the existing baseline, as correctly noted in the DEIR. (DEIR, p. 4-7.) The correct CEQA baseline was used to evaluate emissions from on-airport sources. (DEIR, Table 4.6-8.) However, the off-airport sources were evaluated relative to future baselines, rather than the existing baseline required under CEQA. The off-airport impacts in the year 2005 were evaluated relative to a "2005 adjusted environmental baseline." Off-airport impacts in the year 2015 were evaluated relative to a "2015 adjusted environmental baseline." (DEIR, Table 4.6-9.) This violates CEQA.

The increase in emissions due to the project is the difference between the year 2005 or year 2015 emissions and the existing 1996 baseline. This increment must be reduced below the significance threshold by imposing mitigation measures. Because peak hour on- and off-airport traffic for Alternative C is projected to increase by 16% to 33% in 2005 and by 54% to 84% in 2015, relative to 1996 (DEIR, p. 2-94, Table 4.3.2-4), the adjusted environmental baselines used in the DEIR are much higher than the proper CEQA baseline of 1996. Therefore,

the DEIR has substantially underestimated an already staggering increase in off-airport emissions caused by the project. This, in turn, results in underestimating the amount of mitigation required to reduce these emissions.

This is a very serious fundamental flaw in the air quality analyses that must be corrected before a reasonable mitigation program can be designed. The corrected EIR should be recirculated for public review.

II.C. The No Action/No Project Emissions Are Unreasonable And Unsupported

The emissions from each alternative are evaluated relative to the No Action/No Project ("NA/NP") alternative to comply with both the National Environmental Protection Act ("NEPA") and CEQA requirement to allow decision makers to compare the impacts of approving the project with the impacts of not approving the project. Therefore, it is very important that the emissions from the NA/NP alternative accurately reflect future no project conditions. The NA/NP alternative does not appear to fairly reflect future conditions without the project.

First, the no project alternative appears to assume that the airport can grow nearly unrestrained. (DEIR, Tables 3-1 to 3-4.) However, the Master Plan[10] notes many facilities are currently at capacity, *viz.*, "Nearly all major airport facilities are at or near their practical capacities." (Master Plan, p. ii.) "The region's airport system, however, does not currently have the ability to meet this rapidly climbing demand." (*Id.*, p. i-i.9.) Based on a simulation analysis of current operations, "This indicates that the airport was operating near its practical capacity at the lower delay boundary." (*Id.*, p. i-2.2.) The DEIR is wholly silent on how the acknowledged limit on capacity was addressed in constructing the NA/NP alternative. The NA/NP emissions assume nearly unconstrained future growth, without regard to airside or landside capacity limitations or regulatory constraints. (DEIR, Tables 3-1 to 3-4.) Thus, their magnitude is not an accurate reflection of the no action/no project alternative and would lead to a biased weighting of the merits of building the project.

Second, the NA/NP emissions suggest that all three alternatives would *reduce* the emissions of CO and VOC from on-airport sources in the years 2005 and 2015, but *increase* the emissions of NOx, SO_2, and PM10. (DEIR, Table 4.6-8.) The NA/NP emissions also suggest that all three alternatives would reduce the emissions of CO and VOC from off-airport sources during the year 2005 (except

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[10] Los Angeles World Airports, Los Angeles International Airport Master Plan, Draft, November 7, 2000.

Alternative B for CO), but increase the emissions of NOx, SO_2, and PM10. (DEIR, Table 4.6-9.)

This is not believable. The vast majority of project emissions derive from on-road and off-road mobile sources. It is reasonable to expect that all criteria pollutants from mobile sources would move in harmony, either uniformly increasing or decreasing relative to the NA/NP alternative, absent an explanation to the contrary. The distinct patterns for CO and VOC compared to NOx, SO_2 and PM10 suggest a fundamental flaw in the emission calculations, or underlying NA/NP assumptions. Further, all three alternatives represent substantial increases in airport activity and hence off-airport traffic. The changes due to the project are in addition to future changes under the NA/NP. Therefore, all three alternatives should result in increases in all criteria pollutants. It is impossible to evaluate these apparent discrepancies because the NA/NP emissions themselves are not adequately supported in the DEIR.

The assumptions and calculations used to arrive at the NA/NP emissions in Tables 4.6-8 and 4.6-9 are missing from the DEIR or if present, cannot be readily identified as such. The only discussion of the NA/NP alternative is a brief description on pages 4-8 and 4-9 and summaries of activity levels (DEIR, Table 3-1, 3-2) and facilities (DEIR, Table 3-3, 3-4), which are not useful for estimating emissions.

The NA/NP alternative is "based on reasonable projections of future activity levels that are anticipated to occur." (DEIR, p. 4-9.) How were these projections converted into emissions? How were the acknowledged airside and landside capacity limitations factored in, if at all? The DEIR goes on to explain that "the airlines are expected to modify their fleet mix by scheduling more larger aircraft that can accommodate more passengers and cargo." (*Ibid.*) However, the DEIR does not reveal what modified fleet mix was assumed in estimating NA/NP emissions. The DEIR states that the NA/NP includes "contemplated development of the Continental City and LAX Northside project," but never tells the reader what that development is or quantifies it in a way that is meaningful for estimating emissions in any of the materials dealing with air quality.

Without this type of detailed information it is impossible to evaluate whether the NA/NP emissions are reasonable. The Air Quality Technical Report does not contain any of this information in a form that can be used to estimate emissions by a knowledgeable person. Therefore, it is impossible to make any meaningful comments on the emissions that would result from the NA/NP alternative.

II.D. Claimed Emission Reductions Are Not Supported In The Record

The estimated emission reductions for each alternative are tabulated by control option and pollutant in Table 4.6-17. The voluminous, 2-inch-thick air quality technical appendix does not contain any supporting calculations for these claimed reductions. The only support for these claimed reductions is a cryptic description of the measures on Table 4.6-16 and an equally cryptic footnote listing some, but not all, assumptions.

This cryptic information is not adequate to allow an expert in emission estimating procedures to verify and reproduce the calculations. For example, reductions of 2,907 ton/yr of CO, 167 ton/yr of VOC, and 243 ton/yr of NOx are claimed for conversion to electric GSE in Alternative C. (DEIR, Table 4.6-17.) The only description provided of the measure is "convert GSE to electric power (or extremely low emission technology, such as fuel cells.)" (DEIR, Table 4.6-16.) A footnote declares that 70% of GSE would be converted to battery electric, or equivalent technology by 2005. (DEIR, p. 4-517, note 1.)

The DEIR does not reveal the actual number and type of GSE that would be converted. Thus, one is left wondering, "70% of what?" Further, the DEIR provides no basis whatsoever for the assumed 70% conversion. What is this based on, and is it a reasonable goal? The DEIR admits that the conversion is "partially in-place" and would be accelerated. (DEIR, Table 4.6-16.) However, one is left to puzzle over whether the already in-place conversion and "accelerated" conversion that would otherwise take place over a longer time period are counted as mitigation and included in the emission reduction calculation. They should not be, but the reviewer cannot figure this out and thus cannot make meaningful comments.

The DEIR does not indicate what emission factors (unmitigated and mitigated) were used to estimate the reduction in emissions. Thus, even if one knew how many and what type of GSE were involved, one would not be able to calculate a reduction and verify the emissions in Tables 4.6-16 and -17. Finally, the DEIR claims that GSE would be converted to "battery electric" or "equivalent." However, the DEIR does not explain what constitutes "equivalent," or how many "equivalent" units would be involved. Some alternatives to battery electric, such as natural gas, LNG, fuel cells, or combined electric-gas vehicles emit criteria pollutants, unlike "battery electric," requiring a different calculation that would yield a different answer.

Each mitigation measure included in the estimated emission reductions in Table 4.6-16 and -17 has similar problems, which prevent a knowledgeable person from verifying the emissions and preparing meaningful comments.

Therefore, the claimed emission reductions are not supported and the efficacy of the proposed mitigation program cannot be verified. The DEIR should be revised to include documented emission spreadsheets, similar to those now included in Technical Report 4 for project emissions, and be recirculated for public review.

II.E. Claimed Emission Reductions Are Incorrect

It is evident that the claimed emission reductions in Table 4.6-17 and -18 contain errors. However, due to the lack of technical support discussed in Comment II.E, it is not possible to correct these errors or figure out which set of conflicting values is correct. Thus, the effectiveness of the proposed mitigation program cannot be adequately assessed, requiring recirculation. Errors that can be readily identified by inspection of tables in Section 4.6 are discussed below.

II.E.1. On-Airport Operational Emissions

Tables 4.6-17 (2005) and 4.6-18 (2015) summarize the claimed emission reductions by mitigation option for on-airport and off-airport sources. The on-airport reductions in Table 4.6-17 should equal the difference between the unmitigated on-airport operational emissions in Table 4.6-8 and the mitigated on-airport operational emissions in Table 4.6-19. There are major discrepancies for both 2005 and 2015. The following inset tables summarize the discrepancies without comment, as the DEIR does not contain sufficient information to allow a knowledgeable individual to figure out which set of estimates, if either, is correct:

	2005 ON-AIRPORT EMISSION REDUCTIONS (ton/yr)	
	Table 4.6-17	Table 4.6-19 minus Table 4.6-8
CO	4,370	4,346
NOx	616	622
VOC	659	445
PM10	6	10
SOx	24	23

	2015 ON-AIRPORT EMISSION REDUCTIONS (ton/yr)	
	Table 4.6-18	Table 4.6-19 minus Table 4.6-8
CO	2,968	3,434
NOx	567	620
VOC	396	472
PM10	11	10
SOx	12	30

II.E.2. Construction Emissions

The construction emission reductions presented in Table 4.6-18 are inconsistent with those presented in Table 4.6-16 for the same mitigation measure, use of low-emission trucks. The following inset table summarizes the discrepancies without comment, as the DEIR does not contain sufficient information to allow a knowledgeable individual to figure out which set of estimates, if either, is correct:

	PEAK YEAR CONSTRUCTION EMISSION REDUCTIONS (ton/yr)	
	Table 4.6-16	Table 4.6-18
CO	up to 150	(465) to (518)
NOx	up to 125	877 to 911
VOC	up to 60	(4,703 to 5,198)

Further complicating any meaningful review of construction emission reductions (and hence mitigation) is the use of parentheses for the CO and VOC reductions, but not for the NOx reductions. Normally, parentheses are used to indicate negative values. A negative reduction would be an increase. Thus, Table 4.6-18 suggests that the use of low emission trucks would cause a large increase in both CO and VOC emissions. If this is correct, either the basic emission estimating methodology is flawed, or the proposed low-emission engine is not acceptable and should be rejected as mitigation. The SCAQMD is nonattainment for both CO and ozone. The reduction in NOx is not a reasonable tradeoff for substantial increases in CO, a nonattainment pollutant, and VOC, an ozone precursor like NOx. Thus, if this interpretation of Table 4.6-18 is correct, the proposed use of low-emission trucks of the type evaluated can hardly be classified as mitigation due to its adverse collateral impacts.

The construction emission reductions are also confusing because Table 4.6-17 (for the year 2005) and Table 4.6-18 (for the year 2015) both report peak year construction emission reductions. The peak year is reported to be year 2004. Therefore, the peak year construction emission reductions in these two tables should be identical, but they are not. They differ by substantial amounts.

In sum, the claimed emission reductions in the DEIR are in a state of disarray. The actual reductions that would be achieved by the proposed mitigation program cannot be readily ascertained. Based on analyses presented elsewhere in these comments, the DEIR appears to substantially overestimate the claimed benefits and reductions achieved by its proffered mitigation program.

III. AIR QUALITY IMPACTS ARE UNDERESTIMATED

III.A. Rollback Procedure Is Not Warranted

Air quality impacts are evaluated by using dispersion models to convert project emissions into increases in ambient concentrations of each pollutant. These incremental concentrations are then added to background ambient concentrations to estimate ambient concentrations after the project is built. These projections are then compared with ambient air quality standards to determine if the project would cause a significant air quality impact. See more detailed discussion in DEIR, Appendix G, Section 2.2, Dispersion Modeling.

It is standard practice to use the maximum measured existing ambient concentration at the nearest monitoring station as the background in these calculations. The DEIR, however, deviated substantially from the accepted approach and estimated future background concentrations using a linear rollback approach used in the 1997 AQMP to determine if the proposed region-wide controls would bring the basin into compliance with standards. (DEIR, Appx. G, § 2.4.) This approach assumes that changes in emissions will change ambient air concentrations proportionally. The use of this approach resulted in very substantial reductions in future background concentrations, nearly a factor of two for CO and 50% for NOx. (DEIR, p. 4-470, Table 4.6-2, Table 4.6-5.)

The use of this questionable approach obscured the two major air quality impacts of this project. If this approach were not used, both the federal and State 8-hour CO air quality standard and the federal and State annual NO_2 standard would be exceeded by substantial amounts. These impacts are not discussed in the DEIR. These are serious impacts. The South Coast is currently in compliance with the federal annual NO_2 standard. Thus, the project could trigger a reclassification of the South Coast to nonattainment for NO_2. The South Coast currently violates the federal and State 8-hour CO standard. This project would

cause new violations of this standard, preventing the South Coast from coming into compliance and resulting in serious economic and other penalties.

The use of any rollback procedure is not warranted for at least three reasons.

First, many of the reductions that are forecast to occur in the region are based on rules that have not been adopted and control technologies that do not yet exist and may never exist. Thus, they are speculative and not acceptable for use in a CEQA analysis.

Second, the appropriate amount of rollback, if any, depends on the emission reductions achieved by the AQMP in a specific region. The AQMP itself states: "A linear rollback approach is used to evaluate future nitrogen dioxide concentrations. It assumes the ambient concentrations above background levels are directly proportional to the emissions *in the immediately adjacent areas*." (AQMP, Chpt. 5, p. 2, emphasis added.)

The DEIR relied on an extrapolation from the 1997 AQMP for downtown Los Angeles. (DEIR, Appx. G, p. 46.) The DEIR has made no showing that the projected reductions assumed in the rollback calculations would occur in the area around LAX. The vicinity of LAX contains a number of very large stationary sources, e.g., the Chevron El Segundo Refinery, which would not be substantially affected by the proposed AQMP control measures. Thus, downtown Los Angeles is not a reasonable surrogate for the immediate vicinity of LAX. In fact, the NA/NP alternative projects a substantial increase in emissions at and around LAX, which more than offset the reductions proposed in the 1997 AQMP. Therefore, there is no basis for concluding that the projected 1997 AQMP emission reductions would improve the air quality around LAX in the future, compared to the 1996 baseline. In fact, it appears that future increases in emissions without the project would *increase* baseline air quality in the vicinity of LAX.

Third, as noted above, the AQMP underestimated future emissions from aircraft because it assumed that EPA would adopt regulations requiring cleaner aircraft engines. These regulations were not adopted. Thus, emissions in the vicinity of LAX would be much higher than projected in the 1997 AQMP, offsetting any reductions that may occur nearby or elsewhere.

In sum, a rollback procedure is not warranted. Thus, the project would cause new violations of federal standards, significant impacts that were not discussed in the DEIR.

III.B. All Emissions Were Not Included In Air Quality Analysis

The air quality dispersion analysis did not include any off-airport emissions of NOx, SOx, and PM10 nor any off-airport stationary source emissions of CO. (DEIR, Appx. G, § 2.4.) Because the majority of the emissions occur off-airport, the dispersion analyses have substantially understated the true air quality impacts of the project.

III.C. Sulfate Omitted

California has an ambient air quality standard for sulfate of 25 $\mu g/m^3$ based on a 24-hour average. (DEIR, Table 4.6-3.) Sulfate is a toxic air pollutant that is recognized by OEHHA and is normally included in health risk assessments. Sulfate can cause changes in lung function and damage to lung tissue. Sulfates also impair the defense mechanisms of the lung. Health effects studies have shown an increase in respiratory illness from exposure to sulfates.[11]

In contrast to other State standards, the sulfate standard was set at a "critical harm" level rather than the usual "threshold with a margin of safety" health effects level (CCR, Title 17, § 70200.) The threshold health effects level of ambient sulfates is estimated to be in the range of 8 to 10 $\mu g/m^3$. Thus, the State standard for sulfates of 25 $\mu g/m^3$ has a negative margin of safety.

The DEIR proposes a significance threshold for sulfate of 1 $\mu g/m^3$ (DEIR, Table 4.6-7). However, the DEIR does not determine whether this threshold is exceeded. In fact, the DEIR does not evaluate either air quality or public health sulfate impacts, instead arguing that "All sulfur emitted by airport-related sources included in this analysis was assumed to be released and to remain in the atmosphere as SO_2. Therefore, no sulfate inventories or concentrations were estimated." (DEIR, pp. 4-482, 4-495.) Elsewhere, the DEIR argues that there are no significant sources of sulfate at LAX. (DEIR, Table 4.6-2, note 1 and Appx. G, p. 2.)

This is incorrect as amply demonstrated in numerous CARB staff reports. There are two types of sulfate, primary and secondary. Primary sulfate is directly emitted from cooling towers, cars, trucks, and stationary combustion sources such as boilers and heaters. In fact, cooling tower emissions commonly contain enough sulfate by themselves to violate the sulfate standard. Secondary sulfate, on the other hand, forms when oxides of sulfur (SO_2) are transformed

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[11] California Air Resources Board (CARB), Regulations Concerning a 24-hour Sulfate Ambient Air Quality Standard, Staff Report #77-20-3, February 20, 1976; CARB, Review of 24-hour Sulfate Ambient Air Quality Standard, Staff Report #77-20-3, September 29, 1977.

into sulfate particles through physical and chemical processes in the atmosphere.[12] Ambient conversion of SO_2 to sulfates is especially intense in the humid or foggy conditions found along the California coast, particularly in spring.[13] Essentially 100% of emitted SO_2 will eventually be oxidized to sulfate in the atmosphere. The DEIR incorrectly assumed that 100% of the fuel sulfur is emitted as SO_2 and remains as SO_2 in the atmosphere.

The current ambient sulfate levels in the South Coast are high and exceed the levels CARB considers safe near the project (e.g., see West Los Angeles: VA Hospital, North Main Street; North Long Beach; Hawthorne). The maximum reported concentration in the vicinity of LAX was 18.4 $\mu g/m^3$ between 1996 and 1998. (DEIR, table 4.6-5.) The South Coast violated the sulfate standard up until very recently. The standard was exceeded in August 2000 at North Long Beach. Emissions from this project are high enough to again cause exceedances of the ambient sulfate standard. They are also high enough to exceed the significance threshold of 1 $\mu g/m^3$ established in the DEIR for sulfates.

The State sulfate standard is 50 $\mu g/m^3$, averaged over 24 hours. Using the modeling completed for unmitigated operational SO_2 emissions (Table 4.6-11) and assuming that 100% of the SO_2 is converted into sulfate in the atmosphere, the increase in sulfate concentration in 2005 would be about 50 $\mu g/m^3$,[14] or nearly two times higher than the State standard and over five times the levels considered by CARB to pose a health hazard. When this increment is added to the maximum background ambient concentration of 18.3 $\mu g/m^3$, the ambient concentrations of sulfate could reach 68 $\mu g/m^3$, nearly seven times higher than the threshold health levels identified by CARB. Similarly, the project would cause the sulfate concentration in 2015 to increase by 63 $\mu g/m^3$ and ambient concentrations would increase up to 81 $\mu g/m^3$.

The DEIR did not model construction SO_2 emissions, which would likely also cause the State sulfate standard to be exceeded. The DEIR also did not model mitigated operational SO_2 emissions, but mitigated ambient sulfate

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[12] California Air Resources Board (CARB), Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, March 1991.

[13] CARB, Proposed Amendments to the Designation Criteria and Amendments to the Area Designations for State Ambient Air Quality Standards and Proposed Maps of the Area Designations for the State and National Ambient Air Quality Standards, August 1998, p. 30.

[14] The project would increase the 24-hr SO_2 concentration from a current background level of 0.007 ppm to 0.019 ppm, or by 0.019 - 0.007 = 0.012 ppm in the year 2005. (DEIR, Table 4.6-11.) Converting this to $\mu g/m^3$ of sulfate: (0.012 ppm)(105 $\mu g/m^3$/0.04 ppm)(96/64) = 47 $\mu g/m^3$.

concentrations would remain significant because the proposed mitigation measures would reduce SO_2 emissions by less than 10%.

Therefore, the DEIR failed to evaluate whether the project would comply with a State ambient air quality standard and ignored a significant health impact of the project. Sulfate emissions from the project would cause the State sulfate standard to be exceeded and ambient concentrations of sulfate in the region to exceed threshold health levels. This is a significant impact that was not discussed in the DEIR.

III.D. PM2.5 Omitted

Historically, health impacts due to particulate matter ("PM") were regulated through ambient air quality standards on particulate matter with an aerodynamic diameter of less than or equal to 10 microns ("PM10"). However, a substantial amount of important new health effects information has been published documenting new health impacts at much lower concentrations and for different size fractions of particulate matter than previously known. (U.S. EPA 4/96.[15])

This new research documented that the inhalation of particulate matter, particularly the smallest particles, those with an aerodynamic diameter of less than or equal to a nominal 2.5 microns ("PM2.5"), causes premature mortality, aggravation of respiratory (e.g., cough, shortness of breath, wheezing, bronchitis, asthma attacks) and cardiovascular disease, declines in lung function, changes to lung tissues and structure, altered respiratory defense mechanisms, and cancer, among other effects. (U.S. EPA 4/96; 61 FR 65638.[16])

The U.S. EPA, in its review and analysis of this new information, concluded that coarse and fine particles have fundamentally distinct physical and chemical properties and health effects and thus are separate classes of pollutants that should be separately regulated and measured so that effective control strategies can be developed. (U.S. EPA 4/96, pp. 13-93.) To address this issue, a new national ambient air quality standard for PM2.5 was promulgated in 1997 (62 FR 38652[17]).

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[15] U.S. Environmental Protection Agency; Air Quality Criteria for Particulate Matter, Report EPA/600/P-95-001af through 001cF, April 1996.

[16] National Ambient Air Quality Standards for Particulate Matter: Proposed Decision, Federal Register, v. 61, no. 241, December 13, 1996, pp. 65638-65675.

[17] National Ambient Air Quality Standards for Particulate Matter: Final Rule, Federal Register, v. 62, no. 138, July 18, 1997.

This new PM2.5 standard was challenged by industry (*American Trucking Associations, Inc. v. United States Environmental Protection Agency*, No. 97-1440 (D.C. Cir., May 14, 1999)) and subsequently appealed to the Supreme Court. Thus, the DEIR declined to evaluate PM2.5 impacts because, at the time that the DEIR was prepared and published, the status of the PM2.5 standard was uncertain. (DEIR, Appx. G, pp. 49-50.) However, although the status of the PM2.5 standard itself was somewhat ambiguous, the court found ample scientific basis for the PM2.5 standard itself. (*See* Opinion, § IV.C.)

Thus, the substantial new information on health effects of PM2.5 should have been evaluated in the DEIR. Nearly 100% of the project's operational emissions are combustion emissions. According to CARB and EPA, combustion emissions are PM2.5.[18] The new health studies reviewed above indicate that an increase in 24-hr average PM2.5 concentrations of 10 $\mu g/m^3$ increases the daily acute mortality by 0.8% to 2.2%. (U.S. EPA 7/96,[19] Table V-14.) An increase in the 24-hr average PM2.5 concentration of 25 $\mu g/m^3$ increases the relative risk of hospitalization by 3% to 16% and of respiratory symptoms by 5% to 82%. (U.S. EPA 7/96, Table V-12.)

The dispersion modeling for unmitigated operational impacts (DEIR, Table 4.6-11) indicates that the preferred option would increase PM2.5 in 2005 by 14 $\mu g/m^3$ and in 2015 by 13 $\mu g/m^3$.[20] Based on EPA's research, this corresponds to an up to 3.1% increase in daily acute mortality, an increase in the relative risk of hospitalization of up to 9.0%, and an increase in the relative risk of respiratory symptoms up to 46%. These impacts would decline somewhat to 11 $\mu g/m^3$ and 10 $\mu g/m^3$, respectively, for the mitigated scenario (DEIR, Table 4.6-20), but would nevertheless remain significant.

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[18] For example, 99.2% of gasoline PM combustion emissions, 96.7% of jet fuel PM combustion emissions, and 100% of natural gas combustion emissions is less than 2.5 microns. CARB, PM Size Fractions from the California Emission Inventory Development and Reporting System (CEIDARS), Updated March 24, 1999.

[19] U.S. EPA, Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information, OAQPS Staff Paper, Report EPA-452/R-96-013, July 1996.

[20] The increase in PM2.5 is based on the annual arithmetic mean (AAM) and assumes that 100% of the PM10 is PM2.5 because it is derived from combustion sources. The increment is calculated as the difference between the unmitigated operational concentrations including background in Table 4.6-11 and the future background concentrations in Appendix G, Table 22. For example, for the year 2005 for Alternative C, 42 $\mu g/m^3$ -28 $\mu g/m^3$ = 14 $\mu g/m^3$.

Therefore, the project will certainly cause or significantly contribute to exceedances of the new PM2.5 standards. Further, there is no longer any reason not to evaluate PM2.5 because the Supreme Court has upheld the PM2.5 standard itself. Thus, the DEIR should be revised to include PM2.5 analyses and recirculated for review.

III.E. Urban Heat Island Effect Ignored

The hot surfaces of black pavements and roofs quickly warm the air over urban areas, leading to the creation of summer urban "heat islands." On a clear summer afternoon, the air temperature in urban areas can be 2°F to 9°F hotter than the surrounding rural area. The maximum daily temperatures in downtown Los Angeles are now 7°F higher than they were in 1880. The elevated temperature increases cooling energy demand, accelerates the rate of smog production, and increases evaporative losses of organic compounds from gasoline tanks of vehicles parked over the hot surfaces.

The project would significantly expand the area of potentially black roofs and pavements at LAX, thus contributing to the well-documented heat island effect in Los Angeles.[21] This effect would increase local concentrations of ozone due to elevated ambient air temperatures and increased evaporative emissions of vehicles visiting LAX. These impacts were not discussed in the DEIR, but can be reduced by requiring cool surfaces for paving and roofs.[22]

III.F. Benefits Do Not Outweigh Costs

The project includes a number of stationary sources that will require permits from the SCAQMD. These include fuel storage tanks, boilers, gas turbines, internal combustion engines, cooling towers, and heaters. (DEIR, Appx. G, Table 5.) In nonattainment areas, the federal Clean Air Act provides that permits to construct and operate may only be issued if "an analysis of alternative sites, sizes, production processes and environmental control techniques for such proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or modification." (42 U.S.C. § 7503(a)(5).)

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[21] H. Akbari, M. Pomerantz, and H. Taha, Cool Surfaces and Shade Trees to Reduce Energy Use and Improve Air Quality in Urban Areas, Solar Energy Journal, 2000.

[22] H. Taha, Ozone Air Quality Implications of Large-Scale Albedo and Vegetation Modifications in the Los Angeles Basin, Energy Analysis Program 1995 Annual Report, LBNL Energy & Environment Division, August 1996.

The DEIR does not contain any demonstration that the benefits of the proposed project significantly outweigh the environmental and social costs imposed as a result of its location. The environmental costs of this project are huge. Thus, the project should be denied on this basis alone, similar to the recent decision in Washington on the Sumas Energy Facility.[23]

IV. THE PROPOSED MITIGATION PROGRAM IS INADEQUATE

The proposed mitigation program is technically and legally flawed, as documented below. The problems identified below should be corrected and the EIR recirculated for public review.

IV.A. Regulations And Plans Inappropriately Included As Mitigation

The proposed mitigation measures appear to include a number of measures that are mandated by existing regulations or would be implemented anyway under existing plans.

Fugitive dust from construction activities would be reduced using soil stabilization or watering. (DEIR, pp. 4-513, -516.) However, SCAQMD Rule 402 requires implementation of best available dust suppression control measures to assure that dust is not visible beyond the property line. Therefore, this measure is already required and cannot be claimed as mitigation. The EIR must be expanded to include additional construction fugitive dust mitigation, not specifically required by SCAQMD Rule 402. Some suitable measures that have been found technically feasible by both the SCAQMD and other air districts are discussed below in Comment IV.E.

Most of the mitigation measures proposed for this project are already being implemented as part of an existing Air Quality Mitigation Program. The DEIR does not explain what this existing program is or its basis—e.g., required to mitigate impacts from another project, required as part of a use permit, etc. However, it is abundantly clear that this is an on-going program. The DEIR proposes "expanding" this program to mitigate the impacts of the proposed LAX Master Plan. (DEIR, p. 4-512.) This expanded program would "expand and revise" the existing Mitigation Program. (DEIR, p. 4-513.)

The individual mitigation measures included in this existing Program include: "continued conversion of ground support equipment;" "continued use

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[23] State of Washington, Energy Facility Site Evaluation Council, Application No. 99-01, Sumas Energy 2, Inc., Council Order No. 754, February 16, 2001, www.efsec.wa.gov/Sumas2/adj/se2adj.html.

and encouragement of the LAWA carpool and rideshare program;" "ongoing implementation of the traffic management program;" "ongoing expansion of the FlyAway Bus service;" "continued addition of 400-Hertz electrical ground power and preconditioned air;" and "continued conversion of GSE to alternative fuels."

Table 4.6-16 clarifies that those measures which represent a continuation of current policy and requirements would be "accelerated" by including infrastructure in the Master Plan. (DEIR, Table 4.6-16.) Therefore, the DEIR is apparently taking credit for actions that would occur anyway, under an existing Program, although over a longer period of time. Acceleration of an action that would occur anyway is not valid mitigation. Further, it appears that emission reductions due to this existing Program are already included in the project baseline and NA/NP alternatives against which impacts are evaluated. Thus, the DEIR has double counted these emissions and has failed to include bona fide mitigation.

IV.B. The Mitigation Program Would Be Prepared Out of Public View

The DEIR includes "an extensive list of potential Mitigation Measures" in Technical Report 4, Appendix X. (DEIR, p. 4-514.) Nearly 150 mitigation measures were identified. However, the DEIR analyzed only 30 of these. (DEIR, p. 4-461.) The DEIR does not commit to even these 30, arguing that they must be approved by the implementing agency and thus are "considered preliminary." Further, the DEIR claims that "Some of these measures may not be implementable for a variety of technical reasons or may be preempted by the federal government." (DEIR, p. 4-513/514.)

The DEIR never reveals which measures it has absolutely committed to, instead noting that "These measures will be further analyzed in terms of feasibility of implementation and cost-effectiveness, along with additional Mitigation Measures suggested through public and agency comments." (DEIR, p. 4-461.) This is exactly the type of information that should be included in the EIR, not sprung on the public for the first time in the FEIR, where there is no opportunity for comment. The DEIR even states that the evaluation of mitigation measures is ongoing and that a comprehensive Environmental Action Plan for air quality will be published in the Final EIS/EIR. It proclaims, for example, that "all mitigation options are still under consideration." (DEIR, p. 4-473.)

Thus, it appears that the bulk of the mitigation program will be assembled out of public view, precluding any meaningful review. This violates the requirement to propose meaningful mitigation in the DEIR and compromises the public review process. The measures that will be implemented should be fully

described in the DEIR and reasons for rejecting mitigation measures should likewise be clearly stated in the DEIR.

IV.C. Mitigation Measures Are Not Enforceable

The 30 mitigation measures that were evaluated in the DEIR (p. 4-513) are not enforceable for two reasons.

First, they do not include specific performance standards that would allow them to be implemented, let alone allow their effectiveness to be evaluated. Four of the measures would only "encourage" participation, *viz.*, the LAWA carpool and rideshare program, promoting alternative-fueled vehicles or SULEV/ZEV engines in commercial vehicles, reduced-engine taxiing, and single vehicle trips.

Second, none of the proposed measures quantify the number of units that would be involved, the time frame over which the action would occur, nor describe the proposed measure with enough specificity to allow it to be implemented, let alone reviewed by the public or enforced if eventually adopted. The measures only require generic "acceleration," "promotion," "conversion," and "implementation."

To be enforceable, the mitigation measures must be quantifiable. Thus, the description of the measure must specifically state what infrastructure would be provided, when it would be provided, and how compliance would be verified.

IV.D. All Feasible Mitigation Measures Not Required

The South Coast Air Basin where LAX is located is acknowledged to have the worst air quality in the nation. The severity of its nonattainment is classified as "extreme" for ozone and "serious" for CO and PM10. In fact, it has the most serious ozone nonattainment problem in the United States. It alone is classified as an "extreme" ozone nonattainment area. This project would aggravate this serious problem by emitting huge amounts of the ozone precursors, NOx and VOCs. Most of these emissions would not be mitigated. Further, the area where LAX is located is the only area in all of California and one of the few areas in the entire United States that is nonattainment for CO. This project would aggravate this serious problem by emitting huge amounts of unmitigated CO.

Alternative C would increase operational NOx emissions by 3,719 ton/yr in 2015 compared to the baseline, of which only 1,126 ton/yr or 30% would be mitigated. Similarly, construction would increase NOx emissions by 4,152 ton in the peak year, of which only 125 tons or 3% would be mitigated. Alternative C

would additionally increase operational VOC emissions by 3,563 ton/yr of which only 27% would be mitigation. Construction would increase VOC emissions by 645 ton in the peak year, of which only 9% would be mitigated. (Fig. 1.) The conclusions are similar when evaluated relative to the NA/NP condition, except for CO and VOC, which appear to have been incorrectly estimated, as discussed above in Comment II.C. (Fig. 2.) The actual increases in emissions could be substantially higher than reflected in Figures 1 and 2 due to errors in emissions estimates and incorrect baselines, as discussed in Comment II.

In spite of these huge emissions and the severe ozone nonattainment problem in the South Coast, this project is proposing to mitigate only a small fraction of its emissions. The EIR admits that construction and operational impacts would remain significant after mitigation. (DEIR, pp. 4-525 to 4-529.) These emissions are not included in the current State Implementation Plan ("SIP") and thus have not been considered by SCAQMD in its efforts to come into compliance with ambient air quality standards. (DEIR, pp. 4-476/478.) Because the South Coast is required by law to come into compliance with federal and state ozone standards, these emissions must be reduced by somebody. Therefore, the DEIR by failing to propose adequate mitigation, in effect, has placed the burden on other parties to mitigate emissions from the expansion of LAX.

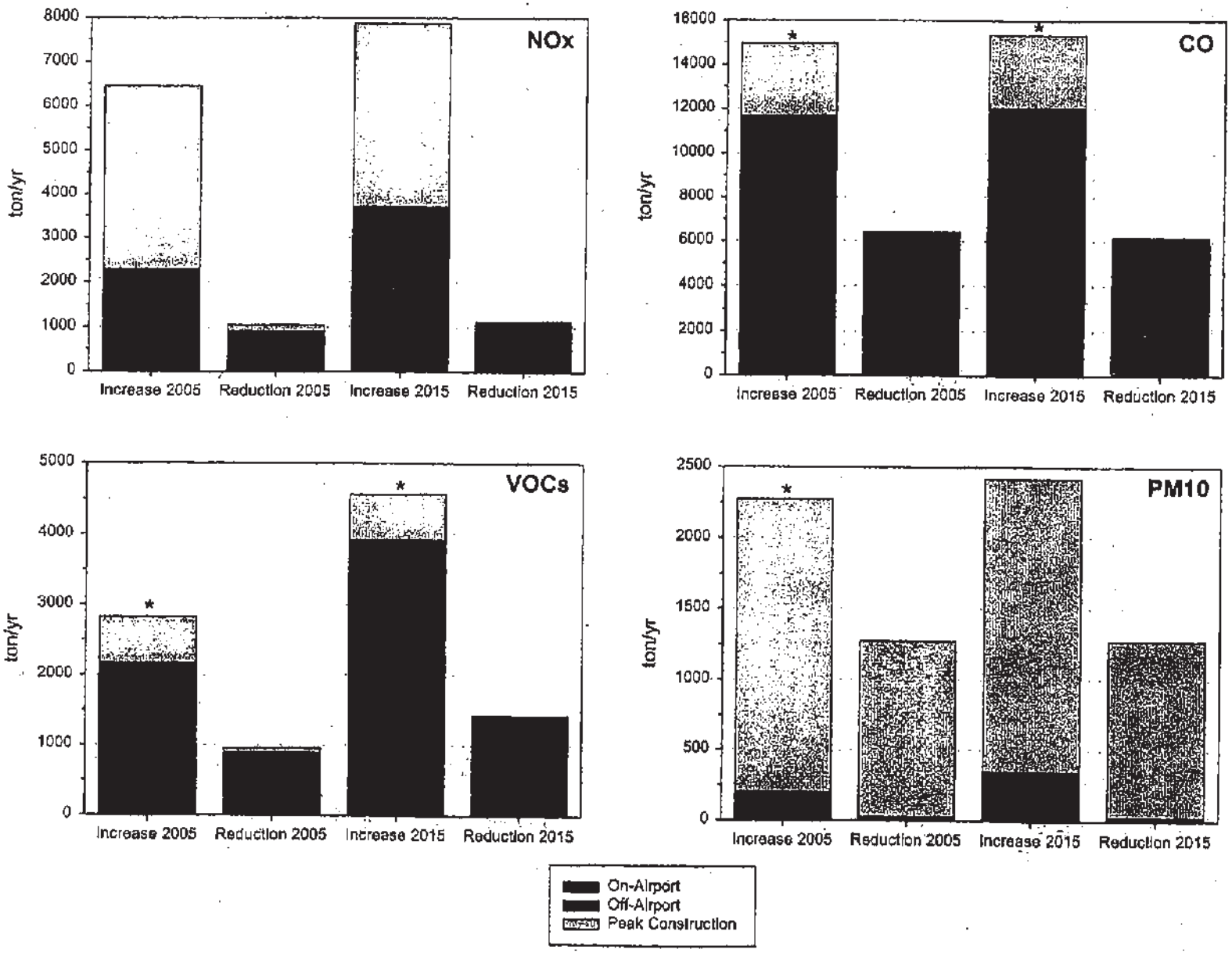
Because of the severe air quality problems in the region, this project should not be approved unless these emissions are reduced to insignificance. It is not clear that this is feasible. However, there are numerous additional feasible air quality mitigation measures that were not identified or evaluated in the EIR. (TR4, Attach. X.) There are also numerous additional feasible mitigation measures that are routinely recommended by other agencies and that are included in other airport EIRs. All of these measures must be adopted.

The following sections discuss additional feasible measures that should be evaluated. These should be evaluated, additional feasible measures adopted, and the revised EIR recirculated.

IV.E. Additional Feasible Construction Mitigation Measures

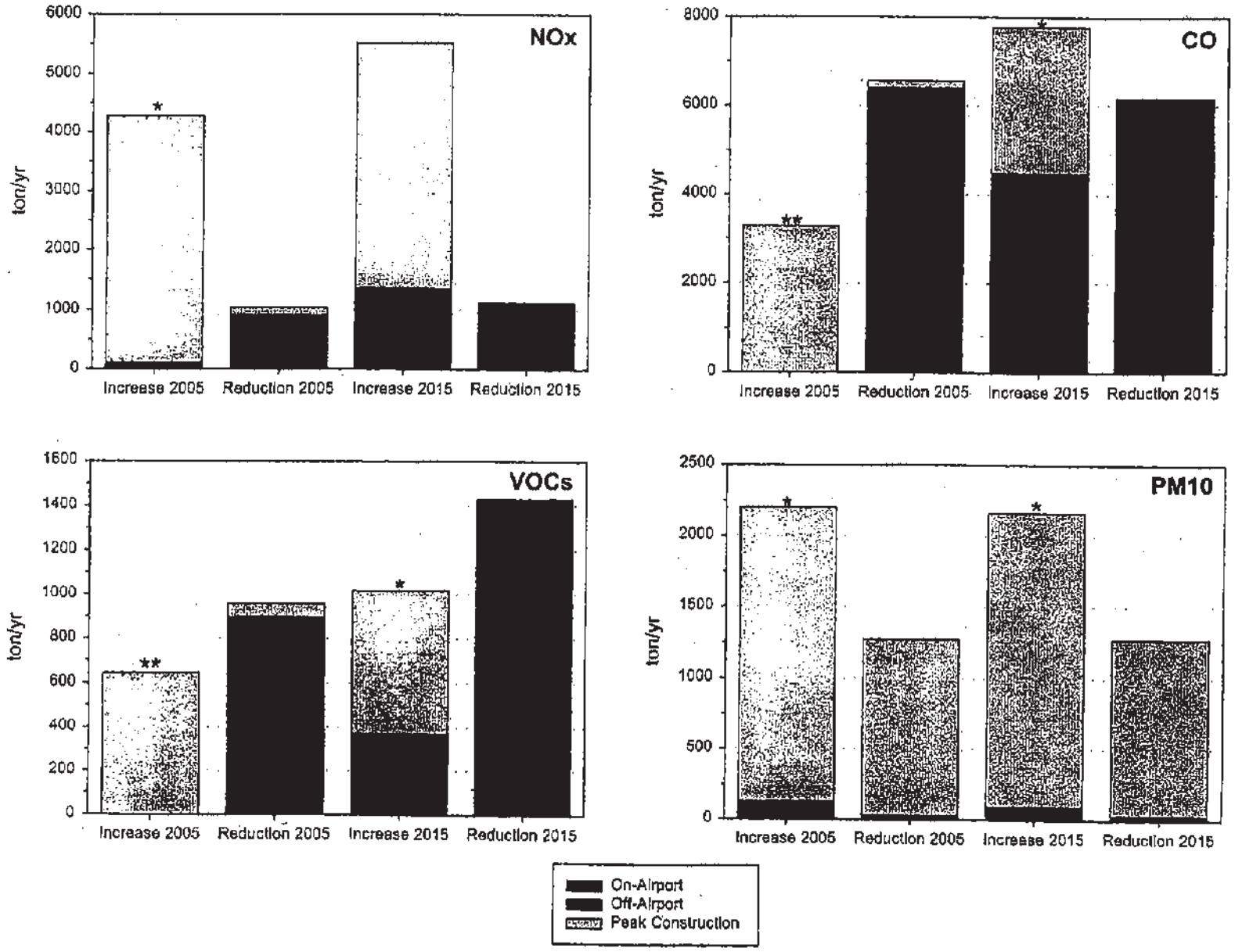
Construction of the project would take place over a 14-year period and emit up to 4,152 ton/yr of NOx; 3,279 ton/yr of CO; 2,071 ton/yr of PM10; 582 ton/yr of SOx; and 645 ton/yr of VOC. (DEIR, Table 4.6-10.) In spite of these huge emissions, the DEIR only requires three mitigation measures: (1) requiring all construction deliveries to be made with clean fuel vehicles; (2) using soil stabilization and/or watering to reduce fugitive dust; and (3) using an on-site rock crushing facility to minimize truck haul trips. These three measures would

Figure 1
Increase in Emissions Relative to Environmental Baseline, Alternative C



* *On-airport emissions calculated as negative number and not shown*

Figure 2
Increase in Emissions Relative to No Action/No Project Alternative



* *On-airport (**and off-airport) emissions calculated as negative number and not shown*

reduce emissions of NOx by up to 125 ton/yr (3%), VOC by 60 ton/yr (9%), CO by 150 ton/yr (5%), and PM10 by 543 ton/yr (26%). (DEIR, p. 4-516, 517.) Construction air quality impacts remain significant after mitigation. (DEIR, pp. 4-525 to 4-529.) Therefore, all feasible mitigation measures must be implemented. There are many feasible mitigation measures that are routinely required as CEQA mitigation in other areas that have not even been considered here. These broadly fall into two categories, fugitive dust measures and engine exhaust measures. Each is discussed below.

IV.E.1. Fugitive Dust Mitigation Measures

Fugitive dusts arise from excavating, grading, and wind erosion of storage piles and other disturbed areas. These PM10 emissions can be readily reduced using a wide range of technically feasible and economic mitigation measures, as discussed below. The only fugitive dust mitigation measure that apparently would be used by the Project is water/stabilizer application. The DEIR assumes that this application would reduce fugitive dust by 60%. (DEIR, Table 4.6-17/18.) However, the DEIR fails to describe the details of the water/stabilizer application, such as frequency of application and areas that would be watered (e.g., haul roads, storage piles) and to indicate how it would be monitored, if at all. Therefore, it is not possible to determine whether it would achieve the claimed reductions.

PM10 reductions can be significantly increased beyond the claimed 60% using numerous other fugitive dust mitigation measures that are routinely required and implemented as CEQA mitigation for other projects. These include measures contained in the CEQA guidelines of several air districts including the Bay Area Air Quality Management District (BAAQMD 1996, pp. 12-14),[24] the South Coast Air Quality Management District (SCAQMD 1993, pp. 11-3, 11-4, 11-13 to 11-15),[25] the Monterey Bay Unified Air Pollution Control District (MBUAPCD 1995, pp.),[26] the Ventura County Air Pollution Control District (VCAPCD 1989, pp. 7-2 to 7-4),[27] the San Luis Obispo County Air Pollution

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[24] Bay Area Air Quality Management District, BAAQMD CEQA Guidelines. Assessing the Air Quality Impacts of Projects and Plans, April 1996.

[25] South Coast Air Quality Management District, CEQA Air Quality Handbook, April 1993.

[26] Monterey Bay Unified Air Pollution Control District ("MBUAPCD"), CEQA Air Quality Guidelines, October 1995.

[27] Ventura County Air Pollution Control District ("VCAPCD"), Guidelines for the Preparation of Air Quality Impact Analyses, October 24, 1989.

Control District (SLOCAPCD 1995, pp. 23-27),[28] the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD 1998, pp. 22, 62, 63),[29] the Sacramento Metropolitan Air Quality Management District (SMAQMD 1994, pp. 10, 20),[30] the Santa Barbara County Air Pollution Control District (SBCAPCD 1997, pp. 16-18),[31] Butte County Air Quality Management District (BCAQMD 1997),[32] and the Yolo-Solano Air Quality Management District (YSAQMD 1996, Appx. D).[33] All of these measures should be implemented for the project by requiring them as standard contract language. These measures include:

- All disturbed areas, including storage piles, which are not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizers/suppressant, or vegetative ground cover (BAAQMD, SJVUAPCD).
- All on-site unpaved roads and off-site unpaved access roads shall be effectively stabilized of dust emissions using water or chemical stabilizer/suppressant (BAAQMD, SJVUAPCD).
- All land clearing, grubbing, scraping, excavation, land leveling, grading, cut & fill, and demolition activities shall be effectively controlled of fugitive dust emissions utilizing application of water or by presoaking (BAAQMD, SJVUAPCD).
- When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, or at least six inches of freeboard space from the top of the container shall be maintained (BAAQMD, SJVUAPCD).
- All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours

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[28] San Luis Obispo Air Pollution Control District ("SLOAPCD"), CEQA Air Quality Handbook, August 1995.

[29] San Joaquin Valley Unified Air Pollution Control District ("SJVUAPCD"), Guide for Assessing and Mitigating Air Quality Impacts, August 20, 1998.

[30] Sacramento Metropolitan Air Quality Management District ("SMAQMD"), Air Quality Thresholds of Significance, 1994.

[31] Santa Barbara County Air Pollution Control District ("SBCAPCD"), Scope and Content of Air Quality Sections in Environmental Documents, September 1997.

[32] Butte County Air Quality Management District ("BCAQMD"), Indirect Source Review Guidelines, March 20, 1997.

[33] Yolo-Solano Air Quality Management District, Air Quality Handbook, May 1996 (Construction mitigation is identical to SMAQMD).

when operations are occurring. (BAAQMD) *(The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions.) (Use of blower devices is expressly forbidden.)* (SJVUAPCD).

- Following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant (SJVUAPCD).
- Limit traffic speeds on unpaved roads to 15 mph (BAAQMD, SJVUAPCD).
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than 1% (BAAQMD, SJVUAPCD).
- Install wheel washers for all exiting trucks, or wash off all trucks and equipment leaving the site (BAAQMD, SJVUAPCD).
- Install wind breaks at windward side(s) of construction areas (BAAQMD, SJVUAPCD).
- Suspend excavation and grading activity when winds exceed 20-25mph (BAAQMD, SJVUAPCD).
- Limit areas subject to excavation, grading, and other construction activity at any one time (BAAQMD, SJVUAPCD).
- Water all active construction sites at least twice daily. (BAAQMD, BCAQMD, SBCAPCD, SMAQMD, SCAQMD)
- Cover inactive storage piles. (BAAQMD, BCAQMD, SBCAPCD, MBUAPCD)
- During initial grading, earth moving, or site preparation, projects 5 acres or greater may be required to construct a paved (or dust palliative treated) apron, at least 100 ft in length, onto the project site from the adjacent site if applicable. (BCAQMD)
- Hydroseed or apply soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more). (BAAQMD)
- Replant vegetation in disturbed areas as quickly as possible. (BAAQMD)
- Post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 24 hrs. (BCAQMD, MBUAPCD)

- Prior to final occupancy, the applicant demonstrates that all ground surfaces are covered or treated sufficiently to minimize fugitive dust emissions. (BCAQMD)
- Gravel pads must be installed at all access points to prevent tracking of mud on to public roads. (SBCAPCD)
- Trucks transporting fill material to and from the site shall be tarped from the point of origin. (SBCAPCD)
- The contractor or builder shall designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. (SBCAPCD, SLOCAPCD)
- Prior to land use clearance, the applicant shall include, as a note on a separate informational sheet to be recorded with map, these dust control requirements. All requirements shall be shown on grading and building plans. (SBCAPCD, SLOCAPCD)
- All roadways, driveways, sidewalks, etc. to be paved should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used. (SLOCAPCD)
- Pave, apply water three times daily, or apply soil stabilizers on all unpaved access roads, parking areas and staging areas. (BAAQMD)
- Sweep streets at the end of each day (or as needed) if visible soil material is carried onto adjacent paved roads. Water sweepers with reclaimed water should be used where feasible. (BAAQMD, SLOCAPCD, VCAPCD, MBUAPCD, BAAQMD, SCAQMD)
- Pave all roads on construction site. (MBUAPCD, SCAQMD)

Many of these measures are routinely required elsewhere. See, for example, the construction mitigation program proposed for the El Toro Airport in Exhibit 1.

IV.E.2. Engine Exhaust Measures

Internal combustion engines, such as those used in most construction equipment, burn fossil fuels, primarily diesel. The combustion process is always somewhat inefficient, creating byproducts such as NOx, CO, SOx, ROG, and PM10. The vast majority of the project's construction emissions -- 100% of the NOx, CO, SOx, and ROG -- arise from the combustion of fuel in engines. The only mitigation measure required for these emissions is the use of clean fuel

delivery vehicles (DEIR, p. 4-513, Table 4.6-16), which comprise a very tiny fraction of the total construction exhaust emissions and a Master Plan Commitment to use low-NOx construction equipment (DEIR, § 4.6.5). There are numerous other technically feasible measures identified in the CEQA guidelines of air districts and/or routinely required by other agencies. These are as follows:

- Use alternative fueled construction equipment. (SJVUAPCD)
- Minimize idling time (2-10 min maximum). (SJVUAPCD, SCAQMD)
- Limit the hours of operation of heavy duty equipment and/or the amount of equipment in use. (SJVUAPCD)
- Replace fossil-fueled equipment with electrically driven equivalents (provided they are not run via a portable generator set). (SJVUAPCD)
- Curtail construction during periods of high ambient pollutant concentrations; this may include ceasing construction activity during the peak-hour of vehicular traffic on adjacent roadways. (SJVUAPCD)
- Implement activity management (e.g., rescheduling activities to reduce short-term impacts). (SJVUAPCD)
- The engine size of construction equipment shall be the minimum practical size. (SBCAPCD)
- Construction equipment operating onsite shall be equipped with two to four degree engine timing retard or precombustion chamber engines. (SBCAPCD, SLOCAPCD)
- Install high pressure injectors on diesel construction equipment. (SLOCAPCD)
- Catalytic converters shall be installed on gasoline-powered equipment, if feasible. (SBCAPCD, SLOCAPCD)
- Diesel catalytic converters shall be installed, if available. (SBCAPCD)
- Construction worker trips should be minimized by requiring carpooling and by providing for lunch onsite. (SBCAPCD)
- During smog season (May through October), the construction period should be lengthened so as to minimize the number of vehicles and equipment operating at the same time. (VCAPCD)
- Construction activities should utilize new technologies to control ozone precursor emissions as they become available and feasible. (VCAPCD)
- Use electricity from power poles rather than temporary diesel power generators. (SCAQMD)

- Emission offsets if ROG or NOx emissions exceed 6.0 tons/quarter. (SLOCAPCD)

Post-combustion controls have recently been widely required as CEQA mitigation. These include oxidation catalysts, which remove 90% of the CO, 40% to 60% of the VOCs, and 20+% of the PM10 and soot filters that remove 90% of the PM10. Thus, these measures are cost-effective and technically feasible and must be used here to comply with the obligation to impose all feasible mitigation.

The Port of Oakland has proposed to substantially expand its facilities and recently adopted and allocated about $9 million for mobile source CEQA mitigation. This mitigation package included soot filters and catalytic converters to control exhaust emissions from cargo-handling equipment (e.g., cranes, loaders) and on-highway container transport trucks.[34]

These controls were also required as CEQA mitigation by the San Luis Obispo Air Pollution Control District for the Avila Beach remediation project, and are now routinely required by SLOAPCD as CEQA mitigation for construction impacts. The City of San Diego required oxidizing soot filters on all equipment larger than 100 hp, except cranes as CEQA mitigation for the Padres Ball Park.

The California Energy Commission requires the use of oxidizing soot filters on equipment used to construct power plants that it licenses. Several 500+MW power plants are currently under construction or have been constructed, successfully using these controls, including High Desert, Elk Hills, Midway-Sunset, and Sunrise.

Post-combustion controls are also in use at the "Big Dig," the massive, 5-year $10 billion-plus Central Artery road project in Boston's North End and one of the largest infrastructure construction projects in history.

IV.E.3. Low Emission Trucks Would Increase VOC Emissions

The DEIR proposes to require that all construction deliveries be made with clean fuel vehicles. (DEIR, p. 4-516.) The reductions achieved by this measure as reported on Table 4.6-16, page 4-516, are substantially different from those claimed on Tables 4.6-17 and 4.6-18. In the latter two tables, the DEIR

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[34] Port of Oakland, Berths 55-58 Project Final Environmental Impact Report, April 8, 1999.

appears to claim that this measure would reduce NOx, PM10, and SO_2 emissions, but substantially increase CO and VOC emissions. See Table 4.6-18, page 4-519.

The CO and VOC emission reductions are in parentheses, which generally means the reductions are negative. Negative reductions represent an increase. This interpretation is likely if these reductions include implementation of the MOU between EPA, CARB and engine manufacturers to make low-NOx engines available by 2005. If this low NOx construction equipment (DEIR, p. 4-467) meets the stipulated NOx limit by lowering the engine combustion temperature, this would reduce NOx, but increase VOCs and CO. If this interpretation is correct, the EIR is proposing to mitigate NOx emissions from construction by using engines that would roughly triple the VOC emissions, thus effectively canceling its ozone benefits.

IV.F. Operational Mitigation Measures

In the buildout year of 2015, Alternative C would increase emissions up to 6,613 ton/yr of CO; 3,563 ton/yr of VOCs; 3,719 ton/yr NOx; 184 ton/yr of SO_2, and 348 ton/yr of PM10. (DEIR, Tables 4.6-8/9.) In spite of these huge emissions and the severe air quality problems in the region, the DEIR only requires that 12% of the CO, 9% of the VOCs, 8% of the NOx, 8% of the SO_2, and 4% of the PM10 to be mitigated. (DEIR, Tables 4.6-19/21.) Operational air quality impacts remain significant after mitigation. (DEIR, pp. 4-525 to 4-529.)

Mitigation measures can take a variety of forms. They may avoid the impact altogether; minimize the impact by limiting its degree or magnitude; rectify the impact by repairing, rehabilitating, or restoring; reduce or eliminate the impact; or compensate for the impact by replacing or providing substitute resources or environments. (14 CCR § 15370; SCAQMD CEQA Guidelines, § 20.22.) There are many feasible mitigation measures that fall into these categories of acceptable mitigation that were not considered in the DEIR. Many of these are routinely required as CEQA mitigation in other areas.

IV.F.1. <u>Measures That Compensate</u>

There are at least three obvious examples of feasible mitigation measures that compensate for the impacts of this project that were not considered and which would reduce project emissions. There are: (1) reducing emissions from existing sources within LAX; (2) reducing emissions from sources outside of LAX; and (3) offsetting emissions with Reclaim credits.

IV.F.2. Reducing Emissions At LAX

There are many opportunities to reduce emissions from current activities and sources of emissions at LAX. The DEIR suggests that in-airport stationary sources are already well regulated, limiting opportunities for reductions. (DEIR, p. 4-513.) The DEIR does not support this claim with actual inventory information. Most existing sources at LAX predate the development of and widespread application of control technologies such as SCONOx, SCR, oxidation catalysts, and soot filters. Some examples of feasible measures to reduce emissions at existing (as well as new) sources at LAX include the following:

- retrofit existing boilers, gas turbines, furnaces, and heaters with SCR, SCONOx, and/or oxidation catalysts to control NOx, VOCs, and PM10;
- retrofit existing internal combustion engines with oxidation catalysts to control VOCs, soot filters to control PM10, and SCR to control NOx;
- mandate the use of 15 ppm diesel fuel in all airport-related fleets that do not use an alternative, lower-emitting fuel;
- implement energy conservation programs in existing terminal and auxiliary facilities (e.g., photovoltaics, cool roofs, etc.);
- install ozone destruction catalysts such as PremAir on existing air conditioning systems;
- contract with commercial landscapers who operate equipment that complies with the most recent CARB certification;
- contract with delivery and waste hauling companies that use CARB certified or other low-emission vehicles;
- provide free transit passes to all employees;
- equip cooling towers with high efficiency drift eliminators to control PM10 and sulfate emissions;
- cover any parking structures that receive direct sunlight to reduce volatile emissions from vehicle gasoline tanks;

See also the list of additional measures included in the El Toro DEIR in Exhibit 1.

IV.F.3. Reducing Emissions Elsewhere

There are numerous opportunities to reduce emissions from stationary sources elsewhere in the South Coast Air Basin. In Los Angeles County alone, combustion sources (e.g., boilers, heaters, and turbines in refineries and power

plants) emit 494 ton/day of NOx and 41 ton/yr of VOCs.[35] These emissions could be reduced by installing state-of-the art pollution control equipment on these existing sources. The regulations of the SCAQMD, for example, require that most of these sources meet a NOx limit of 30 ppm or higher and a CO limit of 100 ppm or higher. There is currently technically feasible and cost effective technology that can meet NOx limits of 1 to 2 ppm and reduce VOCs and CO up to 90% on most types of combustion sources, including heaters, boilers, furnaces, generators, and turbines. For example, both SCONOx and selective catalytic reduction (SCR) can reduce NOx by over 95%. Similarly, oxidation catalysts and SCONOx can reduce VOCs and CO by 90% or more. Therefore, LAWA could retrofit large combustion sources in other industries in the general region with SCR, SCONOx, and/or oxidation catalysts (as well as other technologies) and meet its mitigation obligation.

IV.G. Energy Conservation Measures

Air quality impacts can be mitigated by reducing the demand for electricity at the existing airport as well as in the proposed new facilities. The Master Plan includes an energy conservation and efficiency program for the proposed new facilities. However, this plan does not apply to existing facilities. Further, it is only very generally described in the DEIR as a "commitment" to "design new facilities to meet or exceed the prescriptive standards required under Title 24." (DEIR, p. 4-792.) It is not clear what this "commitment" entails. Specific energy efficiency goals are not established, and no commitment is made to any specific measures beyond those required in Title 24. Other energy conservation programs that have been implemented in California establish specific goals relative to Title 24.

The Sacramento Municipal Utility District ("SMUD") has implemented an energy conservation program that the SMAQMD requires as CEQA mitigation for large commercial projects. This program requires that new commercial projects be designed and built to exceed California Title 24 energy requirements. The Tier 1 program requires that new commercial projects be designed to exceed the requirements of CCR Title 24 building standards by 25% and the Tier 2 program requires that Title 24 is exceeded by 35%.[36] A minimum goal of 35% should be required for new LAX facilities because of its large increase in electricity demand and huge unmitigated air emissions.

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[35] www.arb.ca.gov/app/emisinv/emssumcat_query.php.

[36] CCR Title 24 is the California Building Code. Part 6 is the California Energy Code, promulgated by the California Energy Commission and adopted by the City of Elk Grove. The newest revisions to Title 24 become effective June 1, 2001. See www.energy.ca.gov/title24/.

These reductions can be achieved by using a number of measures, including energy-efficient air conditioners (e.g., water-cooled, rather than air-cooled), high-efficiency lighting and glass, daylighting (e.g., skylights), high-efficiency motors, automatic controls for lighting and equipment, photocell dimming, higher insulation levels than required by code, reflective roofs, and photovoltaics, among others. The DEIR does not contain any commitment to any specific efficiency goals (e.g., 35% greater than Title 24) or measures beyond complying with Title 24 for new facilities. It also does not contain a commitment to implement these types of measures for existing facilities. Therefore, any increases in efficiency of existing facilities and increases beyond Title 24 for new facilities can be required as air quality mitigation. Three specific measures that are feasible and thus should be required as air quality mitigation are further described below.

IV.G.1. Fuel Cells

The project includes a number of diesel generators that emit carcinogenic diesel exhaust. See, for example, discussion of fuel farm generators in the Master Plan, page V-K.35. These, and other existing generators could be replaced by fuel cells, which produce energy from hydrogen and have no emissions. They are supported by the California Energy Commission and the South Coast Air Quality Management District. These cells are more expensive than an equivalent diesel generator, costing about $600,000 for a 200 kw unit. However, the U.S. EPA refunds $200,000 of the cost of a fuel cell, making its life cycle costs quite attractive.

IV.G.2. Photovoltaic Energy Systems

Photovoltaic energy systems generate electricity using solar panels, and reduce air pollution by reducing conventional electric power generation. These types of systems are required as CEQA mitigation by the SMAQMD and thus can be presumed to be feasible. A number of buildings in Sacramento have recently included photovoltaics as CEQA mitigation, including 30 kw on the roof of the Cal EPA office tower, a 75-kw system on the roof of the Cal Expo parking structure, and the Sacramento Zoo. Photovoltaic systems have been installed in many large office buildings elsewhere. These include 4 Times Square in New York, the Thoreau Center for Sustainability in the Presidio National Park, San Francisco, the National Air and Space Museum in Washington, D.C., and the State University of New York in Albany, among many others.[37]

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[37] P. Eiffert and G.J. Kiss, Building-Integrated Photovoltaic Designs for Commercial and Institutional Structures. A Source Book for Architects, U.S. DOE, 2000.

A wide variety of photovoltaic systems are available in today's markets. Most of them can be grouped into two main categories – facade systems and roofing systems. Facade systems include curtain wall products, spandrel panels, and glazings. Roofing systems include tiles, shingles, standing seam products, and skylights. Individual solar cells are interconnected and encapsulated on various materials to form a module. Modules are strung together in an electrical series with cables and wires to form an array. Direct or diffuse light, usually sunlight, shining on the solar cells induces the photovoltaic effect, generating unregulated DC electric power. This DC power can be used, stored in a battery system, or fed into an inverter that transforms and synchronizes the power into AC electricity. The electricity can be used in the building or exported to a utility through a grid interconnection.

Photovoltaic systems require negligible maintenance. They are typically guaranteed for 90% of design output for 20 years by the manufacturer. Systems are commercially available to provide 1 kw to 1 MW of electricity at 10 net watts per square foot and are able to meet the peak load of most large businesses. The systems are lightweight, weighing only about 4 pounds per square foot, less than half the weight of a conventional ballasted roof.[38] Improved manufacturing has substantially reduced the cost of these systems since the 1970s, and numerous providers are available.[39] However, BIPV electricity still costs more per kilowatt-hour ("kWh") than utility-supplied electricity. The higher cost is primarily due to the initial capital cost of the system, which typically ranges from $6 to $8 per watt installed. Assuming this cost is amortized for 20 years at 10% interest, this amounts to about $0.08 to $0.10 per kWh[40] or about 15% to 40% more than usual commercial electric rates.

IV.G.3. Energy Star Roof Products

Most commercial and residential buildings have dark roofs. Dark roofs absorb 80% to 90% of the incident sunlight, heating the roof and plenum space. Because the air distribution system is typically installed in the plenum space between the roof deck and the dropped ceiling over the finished interior space, this raises the summertime cooling demand. In addition, heating the roof heats the air that passes over the roof. Thus, the entire region around a dark roof becomes warmer.

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[38] See www.powerlight.com and www.epv.net.

[39] James & James, The World Directory of Renewable Energy, Suppliers & Services with Market Overview, 2000.

[40] Cost of photovoltaic electricity = (0.12)($6000/kw)/(8,760 hr/yr) = $0.08/kwh.

Dark roofs (and parking lots) quickly warm the air over urban areas, leading to the creation of summer urban "heat islands." The additional air conditioning demand created by this temperature effect is responsible for 5% to 10% of urban peak electric demand. The increased power demand leads to higher emissions from power plants. This increase in temperature causes a 10% to 20% increase in urban ozone, and in some cases, has been estimated to generate as much ozone as all on-road motor vehicles in the Los Angeles area.[41] Measures to reverse the heat island effect and reduce electricity demand include planting shade trees and other vegetation and incorporating reflective roofs and pavements into urban landscapes. These measures have been required by SMAQMD as CEQA mitigation and thus are feasible.

Intercepting the sunlight before it heats a building keeps its surface cooler and reduces the heat flow into the building. This reduces the demand for air conditioning. This can be accomplished by using light-colored, reflective roofs. A light-colored roof can reduce the amount of energy needed for cooling by 20% to 70%, depending on the amount of insulation under the roof and design of the air ducting system. This is achieved by reflecting most of the energy, rather than absorbing it. The difference between the roof surface and ambient air temperatures may be as high as 90°F, while for reflective roofs, the difference is only about 18°F. This reduces peak cooling demand, cooling costs, the size of the HVAC system, and the rating and amount of insulation required in a building, and increases the lifetime of the roof. This also reduces air pollution by reducing the amount of external power that must be produced and the amount of ambient ozone that is formed in the vicinity of the development from the heat island effect.

Normal asphalt-based roofing products typically have a reflectivity of 10% to 20%. Energy Star-labeled roof products are roofing products certified to achieve at least 65% reflectivity and to maintain a reflectivity of 50% under normal conditions for 3 years after installation. The program is sponsored by the U.S. EPA and the Department of Energy. There are currently over 115 manufacturers enrolled in the program. Reflective roofing is also recognized as an acceptable design option in the latest edition of the American Society of Heating, Refrigerating and Air-Conditioning Engineers ("ASHRAE") Standards 90.1[42] and 90.2 on energy-efficient buildings.

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[41] Hashem Akbari, Cool Roofs Save Energy, ASHRAE Transactions, v. 104, Pt. 1, 1998; H. Taha, Modeling the Impacts of Large-Scale Albedo Changes on Ozone Air Quality in the South Coast Air Basin, Atmospheric Environment, v. 31, no. 11, 1997, pp. 1667-1676.

[42] American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Energy Standard for Buildings Except Low-Rise Residential Buildings, Standard 90.1-1999.

Energy Star roof products are economical to apply and maintain and are frequently cheaper than or comparable to conventional roofing products, which cost from $1.50 to $2.50 per square foot installed.[43] Cool roofs come in a variety of styles, including reflective coatings, reflective membranes, or metal roofs made of galvanized or other coated metal. Coatings have a consistency of thick paint and cost from $0.75 to $1.50 per square foot installed. Membranes are single-ply, pre-fabricated sheets applied in a single layer, typically made of PVC (poly vinyl chloride), TPO (tripolymer olefin), Hypalon, or CPA (copolymer alloy) and cost from $1.50 to $3.00 per square foot. A reflective roof can be installed or applied over almost any type of roof material, including directly on a plywood deck in place of asphalt.

Cools roof have been widely used in California, including on the American Airlines airport terminal in San Jose, on control towers at the Stockton and Palmdale airports, at the 300,000 ft^2 Honda distribution warehouse in Stockton, the 200,000 ft^2 JC Penny warehouse in Buena Park, and numerous buildings in Silicon Valley. Their performance has been extensively documented in both field studies and computer simulations[44]

At a one-story school in Sacramento, increasing the reflectivity of the roof from 8% to 68% by painting with a white coating reduced the cooling energy use over the June to October period by 34% and peak power by 32%.[45] In another Sacramento study, daily air conditioning savings of 17%, 26%, and 39% were documented in an office, museum, and hospice with high reflectivity roofs.[46] At a one-story, 31,700-ft^2 Kaiser medical office building in Davis, increasing the reflectivity of an R-19 flat roof from 24% to 60% reduced summertime average weekday air conditioning by 18%. At another one-story, 23,800-ft^2 Kaiser medical office building in Gilroy, increasing the reflectivity of an R-7 flat roof from 25% to 65% reduced the summertime average weekday air conditioning by 13%. At a 33,000-ft^2 drug store in San Jose, increasing the reflectivity of a foil barrier flat roof from 18% to 28% reduced the summertime average daytime air

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[43] R.S. Means, Square Foot Costs, 21st Ed., 2000, Division 5, Roofing.

[44] See, for example: H. Akbari, S. Konopacki, C. Eley, B. Wilcox, M. Van Geem and D. Parket, Calculations for Reflective Roofs in Support of Standard 90.1, ASHRAE Transactions, v. 104, no. 1, 1998, pp. 984-996; L. Gartland, S. Konopacki, and H. Akbari, Modeling the Effects of Reflective Roofing, ACEEE 1996 Summer Study on Energy Efficiency in Buildings, v. 4, 1996, pp. 117-124.

[45] H. Akbari, S. Bretz, D. Kurn, and J. Hanford, Peak Power and Cooling Energy Savings of High-Albedo Roofs, Energy and Buildings, v. 25, 1997, pp. 117-126.

[46] E.W. Hildebrandt, W. Bos, and R. Moore, Assessing the Impacts of White Roofs on Building Energy Loads, ASHRAE Technical Data Bulletin, v. 14, no. 2, 1998.

condition by 2%.[47] A high-reflective coating on an office building in Mississippi reduced cooling energy demands by 22%.[48] Reflective coatings reduced cooling energy costs by 12% to 18% in two other commercial buildings in California.[49]

The reflectivity of a conventional unsurfaced galvanized corrugated metal roof of seven retail stores in a strip mall in Florida was increased from 29% to 75% with a white coating. This reduced the summer space cooling energy use by 25%, with a range in savings of 13% to 48%, depending on the temperature maintained in the shops. Those maintaining the lowest interior temperatures saved the least on a percentage basis. The cost of the application was $0.53/ft^2 with a payback period of about 9 years.[50]

At a single family residence in Sacramento, increasing the reflectivity of the roof from 18% to 79% by painting with a white coating reduced the cooling energy use over the June to October period by 66% and the peak power by 17%. In nine Florida homes, daily air conditioning energy use was reduced by 2% to 43% and peak demand was reduced by an average of 22%. The amount of energy savings was inversely correlated with the amount of ceiling insulation and duct system location, with the largest savings in poorly-insulated homes and those with duct systems in the attic space and smaller savings in well-insulated homes.[51]

The best candidates for cool roofs are air-conditioned buildings that have large roof surface areas compared to the overall size of the facility and reside in a hot, sunny location with more cooling-degree days than heating-degree days. Thus, reflective roofs would be very cost effective for terminals and ancillary airport facilities. The average energy savings in the Davis medical center was 193 kwh per day during the June to September period for 31,700 ft^2 of space

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[47] H. Akbari, L. Gartland, and S. Konopacki, Measured Energy Savings of Light-Colored Roofs: Results from Three California Demonstration Sites, Proceedings of the 1998 ACEEE Summer Study on Energy Efficiency in Buildings, v. 3, no. 1, 1998.

[48] C. Boutwell and Y. Salinas, Building for the Future - Phase I: An Energy Saving Materials Research Project, Mississippi Power Co., Rohm and Haas Co and the University of Mississippi, 1986.

[49] S. Konopacki, H. Akbari, L. Gartland, and L. Rainer, Demonstration of Energy Savings of Cool Roofs, LBNL Report 40673, 1998.

[50] D. Parker, J. Sonne, and J. Sherwin, Demonstration of Cooling Savings of Light Colored Roof Surfacing in Florida Commercial Buildings: Retail Strip Mall, Florida Solar Energy Center Report FSEC-CR-964-97, 1997. (www.fsec.ucf.edu/Bldg/pubsonline.htm)

[51] D.S. Parker and others, Measured and Simulated Performance of Reflective Roofing Systems in Residential Buildings, ASHRAE Proceedings (Winter Meeting), Atlanta, GA, 1998. (www.fsec.ucf.edu/Bldg/pubsonline.htm)

cooled with a reciprocating air-cooled chiller. Assuming the same savings for LAX (and much higher savings have been documented), the energy use for the 5.7 million square feet of new buildings planned for Alternative C (Master Plan, Appx. K) would be reduced by 4,234 MWH and the cooling bills by $296,000[52] over the June to September period. Much higher savings could be achieved by coating the roofs of existing buildings currently at LAX.

In sum, this measure would save a substantial amount of money over the life of the project and would cost no more than a standard roof. It would also reduce pollution by reducing the generation of power and the formation of ozone from the heat island effect. Therefore, Energy Star roofing should be required for existing and new facilities, where appropriate.

IV.G.4. Alternative Diesel Fuel

The construction of the project will consume 31.6 million gallons of diesel fuel. (DEIR, p. 4-799.) On-airport vehicles will consume another 1.13 million gallons per year in 2005 and 0.55 million gallons in 2015. (DEIR, Table 4.17.1-2, p. 4-795.) Diesel exhaust is the major contributor to health risks in the South Coast and a major contributor to the health risk of this project. Requiring the use of alternative, low-emission diesel fuels for 100% of the on-airport demand would reduce the emissions of NOx and PM10 and reduce health impacts. This measure has been required by the SMAQMD on all CalTrans construction projects in the greater Sacramento area and is thus feasible.

CARB verified the first alternative diesel fuel, PuriNOx, on January 31. This fuel was jointly developed by Caterpillar and Lubrizol, the word's largest independent manufacturer of specialty chemicals. This fuel is an emulsion of diesel and water, which is certified to reduce NOx by 14% and PM10 by 63%. Other similar fuels, such as blends of diesel and ethanol or soybean oil, are currently being demonstrated and may be certified and locally available within the timeframe of this project

PuriNOx can be used in any direct-injection heavy-duty compression ignition engine. It is compatible with existing engines and existing storage, distribution, and vehicle fueling facilities. It has been successfully used in Sacramento school bus and county off-road equipment fleets and at construction sites in the Sacramento area as well as elsewhere. Operational experience indicates little or no difference in performance and startup time, no discernable

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[52] LAX cooling bill savings = [193 kwh/day/31,700 ft^2](122 days)($5.7x10^6$ ft^2)($0.07/kwh) = $296,368 for the June to September period.

operational differences, no increased engine noise, significantly reduced visible smoke, and substantial reductions of objectionable diesel exhaust odors.

The fuel can be either manufactured on-site in a vendor-supplied, self-contained, automated PuriNOx blending system from commercial diesel fuel, tap water, and a special additive package. The 10% to 20% water that is added improves combustion efficiency and lowers peak combustion temperatures, reducing emissions. The blending unit can be leased or purchased in sizes to meet volume requirements and applications and typically measures about 20 feet by 8 feet by 8 feet. The blending unit is located at the fuel rack, distributor's facilities, or end user's on-site location.

The additive package and blending results in a net increase in cost of about 10 cents per gallon, which can be offset using incentives administered by the SCAQMD. The water has no energy content and thus reduces peak horsepower and torque by around 12%, after correcting for increased thermal efficiency due to better fuel atomization and flame spread characteristics, but requires more frequent refueling. The increased operating costs range from negligible for lower output applications to as high as 15%, depending on the age of the engine, equipment design, and operating conditions.

HUMAN HEALTH AND SAFETY

The DEIR does not contain an adequate human health analysis. Public health impacts were underestimated by using an unusually high significance threshold for chronic impacts, excluding acute impacts, excluding impacts to terminal passengers, excluding impacts due to construction, and underestimating toxic air pollutant ("TAP") emissions by ignoring the influence of engine power settings on emission rates and improperly assessing lead and acrolein emissions. The proposed mitigation program, identical to the air quality mitigation program discussed in Comment IV, is inadequate for human health impacts for the same reasons discussed above. Additionally, the proposed mitigation program fails to recognize the differences in approaches that are required to mitigate air quality versus human health impacts.

V. PUBLIC HEALTH IMPACTS ARE UNDERESTIMATED

The public health consequences of this project are large and appear to have been underestimated through a number of omissions and adjustments to standard risk assessment protocols.

V.A. Significance Thresholds

The DEIR uses an incremental hazard index of 5 as the significance threshold for noncancer health impacts. (DEIR, p. 4-1009.) It provides no justification for this unusual choice, beyond citing a SCAQMD letter that does not address noncancer health impacts. (DEIR, p. 4-1009, note 684.) By selecting a high significance threshold, the DEIR has failed to find significant impacts that should have been classified as significant and mitigated.

A hazard index is the ratio of the sum of concentrations of pollutants emitted by the project to the concentrations deemed by the State to be safe. (DEIR, p. 4-1009, note 679.) A noncancer significance threshold of 5 means the project can cause the concentrations of toxic substances to be five times higher than the State has determined will result in significant health impacts before the DEIR declares the impact to be significant.

The significance of noncancer health risks is routinely evaluated using guidelines established by CARB in 1993. These guidelines recommend a hazard index of one as the significance threshold for noncancer health impacts. (CARB 7/93.[53]) These guidelines have been adopted in CEQA guidelines and regulations by air districts throughout the State that are routinely used to assess noncancer health impacts in EIRs. Every air district in the State that has established significance thresholds for noncancer health risks for purposes of CEQA has established a significance threshold of 1 for these impacts. Excerpts from CEQA guidelines of air districts are included in Exhibit 2.

The SCAQMD's CEQA Guidelines do not contain any recommendation for significance thresholds for noncancer impacts. Other EIRs prepared for project in the SCAQMD have routinely used a significance threshold for noncancer health impacts of 1. See typical excerpts in Exhibit 3. Further, SCAQMD Rule 1401 requires that noncancer hazard indices not exceed 1.0 for new permit units, relocations, or modifications to existing permit units that emit TAPs. (Rule 1401(d)(2) and 1401(d)(3).) Although this rule does not apply to aircraft emissions at LAX because the SCAQMD does not have jurisdiction over mobile source emissions, the choices for significance thresholds in the rule reflect the general state-wide consensus on this issue. As a practical matter, the significance of health impacts does not depend on the source of the emissions -- mobile sources versus stationary sources -- only on the specific chemicals and their impacts on humans.

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[53] CARB, Risk Management Guidelines for New and Modified Sources of Toxic Air Pollutants, July 1993.

V.B. Acute Health Impacts

There are two types of noncancer health impacts: those which result from exposures to low concentrations for long periods of time (chronic) and those which result from short exposures to high concentrations (acute). The noncancer health analyses presented in the DEIR are only for chronic impacts.

The DEIR establishes a significance threshold for acute health impacts (DEIR, p. 4-1009), but does not conduct any analyses of acute health impacts. (TR14, Table 6.) Acute impacts are those caused by short-duration exposures, typically one hour or less. It is standard practice to include acute impacts in a public health analysis. Regulatory guidance requires these analyses.

These impacts will be highly significant because all of the major emission sources involved in the expansion emit acrolein, which has a very low acute reference exposure level. Based on my rough calculations, the acrolein concentrations will be high enough to exceed the safe exposure level of 0.19 $\mu g/m^3$ by factors of 20 to 200 or more, posing a significant health hazard. Acrolein is an eye and respiratory irritant and will cause burning eyes in the most sensitive individuals. This is a significant impact that was not evaluated in the DEIR and which would not be reduced to a less than significant level by the proposed mitigation measures.

V.C. Acrolein Chronic Health Impacts Underestimated

The DEIR concluded that for chronic health impacts, "acrolein would contribute over 98.6 percent (Phase I emissions) and 93.8 percent (Phase II emissions) of the cumulative relative impact of all TAPs [toxic air pollutants] evaluated." (TR14, p. 12.) Elsewhere, "acrolein is the only chemical for which the HQ exceeds one. Acrolein contributes more than 95 percent to the total His for all alternatives." (*Id.*, p. 36.) Therefore, acrolein is the most important constituent emitted by the project. However, the actual impacts of acrolein are far more significant than revealed in the DEIR.

Acrolein emissions were estimated by multiplying VOC emissions by the weight fraction of acrolein present in aircraft (and other) exhaust. These weight fractions were measured using a standard test procedure that is now widely recognized to significantly underestimate acrolein.

In this test method, acrolein is reacted with 2,4-dinitrophenylhydrazine ("DNPH") acidified with hydrochloric acid, which converts the acrolein into its hydrazone derivative. The hydrazone derivative is then analyzed by high performance liquid chromatography.

However, research over the last decade has demonstrated that this method substantially underestimates the emissions of acrolein and other similar double-bonded aldehydes. The California Air Resources Board ("CARB"), for example, has recently published an advisory that states: "any data or results, based on the use of M430 to determine acrolein... are suspect and should be flagged as nonquantitative wherever they appear." (CARB 4/28/00.[54]) CARB considers acrolein emission factors estimated from source tests in which a DNPH method is used to be a lower bound estimate. The EPA also cautions against the use of this method for acrolein. (EPA Method TO-11.) References documenting these problems are contained in Exhibit 4.

Therefore, the DEIR has underestimated acrolein emissions by at least a factor of 10. All of the chronic health hazard indices summarized in Tables 4.24.1-3 and 4.24.1-4 should be at least ten times higher than shown.

V.D. Lead

Lead was evaluated by comparing modeled ambient concentrations with the ambient air quality standard for lead. (TR 14, p. 12.) This is not a reasonable way to assess lead health impacts. The ambient lead standard was promulgated many decades ago before the health impacts of lead were understood and is too high to protect public health. This standard does not reflect current knowledge of lead toxicity. Lead is both a carcinogen and a potent neurotoxin, causing well-documented learning disabilities in children.

The public health risks of lead are virtually never evaluated in this fashion in California. The carcinogenic health risks of lead are normally evaluated by including lead in the risk assessment along with other carcinogens. The noncarcinogenic health risks are normally evaluated by estimating the increase in blood lead levels using a program such as DTSC's "Lead Spread," which takes into account the cumulative impact of multiple sources of lead, e.g., drinking water and food.

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[54] Letter from William V. Loscutoff, Chief, Monitoring and Laboratory Division, to All Air Pollution Control Officers/Executive Officers, Re: Advisories to Limit the Use of ARB Method 430 (M430) Determination of Formaldehyde and Acetaldehyde in Emissions from Stationary Sources, April 28, 2000.

In addition to failing to include lead in the risk analysis, the lead emission inventory does not appear to include lead emissions from piston aircraft. Very high concentrations of lead are found in aviation gasoline, as discussed in my comments on Hazardous Materials.

V.E. Health Impacts Of Construction

The acute health impacts of construction are virtually always significant due to emissions of diesel exhaust and acrolein. It does not appear that the health impacts of constructing the project have been evaluated or if evaluated, they certainly have not been properly evaluated. The risk assessment technical report mentions construction emissions on pages 1, 2 and 26 and notes that "Year 2005 was chosen as a reasonable interim date during implementation of the LAX Master Plan where human health impacts during construction could be evaluated." (TR14, p. 26.) However, the documentation for the risk assessment is silent on how this might have been done and contains no evidence that construction emissions were actually included in the emissions and hence, risk estimates. This issue could not be resolved because the detailed emission spreadsheets were not received.

V.F. Low Load Emission Factors Were Not Used

Aircraft operate in five modes -- taxi, queue, takeoff, climbout, and approach. The gas turbines that propel aircraft operate at different power settings during these various operational modes. The DEIR estimated toxic emissions by multiplying VOC emissions estimated by EDMS by speciation data (i.e., concentrations, expressed percent of each compound as percent of total VOCs), apparently for full load operation. (TR14, p. 14.) However, the speciation profile for an engine and resulting toxic emission rate are very strong functions of the power setting.

It is well documented that gas turbine performance, in terms of combustion efficiency, degrades as load decreases. Turbines are designed to run efficiently at full load where fuel combustion is nearly 100% efficient. During low power setting, when loads fall below 50% (e.g., queue, taxi), turbine combustors are extremely inefficient,[55] which results in incomplete combustion.[56]

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[55] R. H. Kehlhofer, J. Warner, H. Nielsen, and R. Bachmann, Combined-Cycle Gas Steam Turbine Power Plants, 2nd Ed., PennWell, Tulsa, OK, 1999, Chapter 8: Operating and Part Load Behavior.

[56] A. H. Lefebvre, Gas Turbine Combustion, 2nd Ed., Taylor & Francis, Philadelphia, PA, 1998, Sec. 9-4, Mechanisms of Pollutant Formation.

Reduced turbine efficiency increases products of incomplete combustion, such as carbon monoxide ("CO"), aldehydes, and hydrocarbons. This has been amply demonstrated in several studies. The Gas Research Institute ("GRI") and the Electric Power Research Institute ("EPRI") characterized TAP emissions from a variety of gas-fired power generation units as a function of load, including several aeroderivative turbines.[57] The Federal Aviation Administration ("FAA") maintains a database consisting of aircraft engine (both turbine and piston engine) vendor performance test data that is collected as part of the FAA engine certification process.[58] Finally, research scientists have published speciation data for several aircraft engines as a function of power settings. (Ex. 5.[59])

These studies uniformly demonstrate that TAP emissions are dramatically higher at low power setting that would be experienced while aircraft are on the ground, compared to takeoff and airborne emissions. The largest impact on public health occurs while aircraft are on the ground. This, the DEIR has substantially underestimated the health risks of the project.

V.G. Passengers Not Evaluated

The DEIR evaluated the health risks to on-airport workers and off-airport adults and children, but did not evaluate the health risks to passengers. (TR14, p. 20.) Passengers represent the most highly exposed individuals. They would be exposed entering and existing terminals, boarding aircraft, and waiting within terminals. The DEIR is wholly silent on the exposure of these receptors. The DEIR should be modified to evaluate the health impacts that the expansion would pose to passengers.

V.H. Cumulative Health Impacts Not Properly Evaluated

A cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the DEIR together with other projects causing related impacts. (Guidelines, § 15130(a).)

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[57] Gas Research Institute ("GRI") and Electric Power Research Institute ("EPRI"), 1996. Gas-Fired Boiler and Turbine Air Toxics Summary Report. Prepared by Carnot Technical Services for GRI and EPRI, August 1996.

[58] Federal Aviation Administration ("FAA"), FAA Aircraft Engine Emission User Guide and Database, FAA Office of Environment and Energy.

[59] C.W. Spicer and others, Chemical Composition of Exhaust from Aircraft Turbine Engines, Journal of Engineering for Gas Turbines and Power, v. 114, 1992, pp. 111-117; C.W. Spicer and others, Chemical Composition and Photochemical Reactivity of Exhaust from Aircraft Turbine Engines, Annales Geophysicae, v. 12, 1994, pp. 944-955.

Section 15355 in turn defines "cumulative impact" as follows:

> "The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related *past, present,* and reasonably foreseeable probable future projects." (CEQA Guidelines, § 15355(b); emphasis added.)

Thus, for purposes of a cumulative impacts analysis, lead agencies must evaluate a proposed project's impacts in conjunction with related impacts from related past and present projects, in addition to future projects. "Past projects" may have already caused impacts that are cumulative significant. (*EPIC v. Johnson, supra,* at 624-625.) Thus, even where a current project would add only a small increment to an existing problem, the current project's effects may nonetheless be considered significant. (*Los Angeles Unified School District v. City of Los Angeles* (1997) 58 Cal.App.4th 1019, 1025-1026.)

The DEIR does not contain a responsive analysis. The DEIR only estimated the incremental increase in health risk, substantially underestimating the total risk. A responsive cumulative analysis would evaluate the health impacts of the 1996 baseline plus the increment due to the project plus reasonably anticipated project. Instead, the DEIR compares the increment due to the project to the NA/NP baseline and a study (MATES II). (DEIR, § 4.24.1.7.2, Fig. 4.24.1-2.) The NA/NP baseline is the wrong baseline. Further, the DEIR itself concedes that the MATES II study "does not have sufficient resolution to determine the fractional contribution of current LAX operations to TAPs in the airshed." (DEIR,j p. 4-1007.) Thus, even though the DEIR concluded cumulative impacts are significant, it has substantially underestimated those impacts, thus limiting its ability to mitigate those impacts.

VI. MITIGATION OF HEALTH IMPACTS IS INADEQUATE

The DEIR does not impose any mitigation specifically for health impacts, instead relying exclusively on air quality mitigation for VOCs. (DEIR, p. 4-1021.) As discussed in Comment IV, the air quality mitigation program is inadequate for air quality impacts. This program is likewise inadequate to mitigate health impacts, for the same reasons discussed in Comment IV. The air quality mitigation program would only reduce the emissions of VOCs by 8%, the surrogate used by the DEIR for TAPs. This is *de minimis* compared to the magnitude of the health impacts.

Further, the proposed mitigation program fails to recognize the differences in approaches that are required to mitigate air quality versus human

health impacts. It is not sufficient to rely solely on air quality mitigation to mitigate public health impacts. Other types of mitigation measures should be considered to prevent exposure and thus protect public health. These might include measures such as upgrading the LAX ventilation system, installing efficient charcoal filters on the LAX intake air to remove TAPs, and improving the ventilation systems and treating the intake air of nearby sensitive receptors who would be most affected by TAP emissions from the project.

South Coast
Air Quality Management District
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FAXED: NOVEMBER 7, 2003

November 7, 2003

Mr. David B. Kessler, AICP
U.S. Department of Transportation
Federal Aviation Administration
P. O. Box 92007
World Way Postal Center
Los Angeles, CA 90009-2007

Supplement to the Draft Environmental Impact Statement / Report (DEIS/R) for the Los Angeles International Airport Proposed Master Plan

Dear Mr. Kessler:

The South Coast Air Quality Management District (SCAQMD) appreciates the opportunity to comment on the above-mentioned document. The following comments are meant as guidance for the state and federal Lead Agencies and should be incorporated in the Final Environmental Impact Statement / Environmental Impact Report.

Pursuant to Public Resources Code §21092.5, please provide the SCAQMD with written responses to all comments contained herein before the certification of the Final Environmental Impact Report. The SCAQMD would be happy to work with the Lead Agency to address these issues and any other questions that may arise. Please contact Susan Nakamura Planning and Rules Manager at 909 396-3105 if you have any questions regarding these comments.

Sincerely,

Barry R. Wallerstein, D.Env.
Executive Officer

cc Mr. Jim Ritchie, Los Angeles World Airports, LAX Master Plan / Room 218, P. O. Box 92216, Los Angeles, CA 90009-2216

EC:SN:SS:CB: LAC030709-01, Control Number
(e:/ceqa/laxmaster/LAXMasterPlan2003)

Supplement to the Draft Environmental Impact Statement / Environmental Impact Report (SEIS/R) for the Los Angeles International Airport Master Plan

1. **Construction Emissions Analysis:** The SCAQMD previously submitted a comment letter dated 9/21/01 on the original Draft EIS/R, which noted that it was difficult to recreate construction emission estimates in the associated technical document because the emission estimate tables provided only total emissions without a breakdown of emissions by emissions source i.e., piece of equipment or construction task. The letter requested that a table, for example, be included providing peak daily emissions by emissions source showing equations used, assumptions made, etc. Review of the Draft Supplemental EIS/R (SEIS/R) indicates that this same problem persists. The SCAQMD again requests that this information be provided in the Final EIS/R.

2. **Rock Crushing Emissions:** On page 39 of Appendix S-E it is stated that rock crushing will eliminate some haul truck trips to transport debris offsite and that rock crushing emissions are accounted for in the construction analysis. Since emissions from specific emission sources have not been broken down by equipment or construction task, this statement could not be confirmed.

3. **Exclusion of Architectural Coatings and Asphalt Emission:** On page 3 of Appendix S-E it is stated that the construction analysis does not quantify architectural coating or asphalt emissions. The rationale for excluding architectural coating emissions is that they will be water based coatings. No rationale is given for excluding asphalt emissions. Although it is likely that most architectural coatings will likely be water based coatings by 2005, they are still expected to contain VOCs. If substantial volumes of coatings are applied on a daily basis, to paint the exteriors and interiors of new structures, stripe runways and roadways, etc., VOC emissions could be substantial. Further, architectural coatings applied in remote locations, such as runways, may not have access to electricity and may require generators to supply power to the coating application equipment. Similarly, paving roadways, runways, parking lots, etc., requires heavy-duty equipment to haul asphalt to the site (haul trucks), unload the asphalt (loaders), lay asphalt (asphalt pavers), etc. It is recommended the NEPA/CEQA lead agencies include architectural coating, asphalt, and associated equipment emissions in the analysis of construction emissions.

4. **CARB OFFROAD Model Emission Factors:** Additional clarification is needed to ensure that emission factors from CARB's OFFROAD Model were appropriately applied to construction equipment to calculate emissions. Section 4.6.2.2 Emission Estimates of the Draft SEIS/R indicates on Page 4-538 that emission factors used to estimate construction emission inventories have been updated based on CARB's OFFROAD Model. Appendix D of CARB's

OFFROAD model contains emission factors for off-road engines, based on engine size and model year. These emission factors are not composite emission factors that are representative of all off-road equipment in the year indicated in Appendix D, the emission factors should be used only for the equipment manufactured for that model year. Emission factors presented in CARB's OFFROAD Model, Appendix D can be applied to construction equipment provided, that the equipment is representative of that model year. If the NEPA/CEQA lead agencies intend to use new equipment each year, additional information is needed to clarify how this will be implemented. If, however, the NEPA/CEQA lead agencies will be using a mix of model years for construction equipment, it is recommended that off-road mobile source emissions be calculated using composite emission factors for specified years, which can be obtained by contacting CARB.

5. **Errors in Table S4.6-19:** Footnote 2 of Table S4.6-19 on page 4-393 of the Supplement indicates that the baseline, interim, and horizon year inventories that were originally calculated using EDMS 3.2 have been recalculated for the Draft SEIS/R using EDMS 4.11. It appears, however, that the percent reductions associated with each alternative have not been adjusted to reflect the revised inventories. This apparent discrepancy should be explained or corrected in the Final EIS/R.

6. **Overlapping Phases and Peak Emissions:** Section 4.20.3 on pages 4-539 and 4-540 of the Draft SEIS/RR describes the three phases of construction that Alternative D, the preferred Alternative, would go through. It is projected that construction of the Alternative D master plan improvements will start in the 3rd quarter of 2004 and end by December 2014. Phase II will commence in 2007, one year before the end of Phase I in 2008. Similarly, Phase III will commence in 2010 one year before Phase II ends. Phase III will end in 2014. It appears therefore that the three phases will overlap one another during different stages of construction. These overlapping construction emissions dodo not appear to be reflected in the discussion or in the emissions tables. Similarly, the mass daily emission estimates do not appear to consider emissions from early phases of the project that begin operation overlapping with ongoing construction phases. For example, Tables S4.6-9 through S4.6-11 on pages 4-371 through 4-373 of the Supplement present the operational and construction emissions data for each of the project alternatives as discrete non-overlapping phases for 2004, 2005, 2013 and 2015. These tables do not reflect the emissions that will be occurring during the overlapping phases. As a result, emission estimate may underestimate peak day emissions. It is recommended that the NEPA/CEQA lead agencies identify all overlapping phases, both construction and operation, and show the peak daily emissions for each of these overlapping.

7. **Ground Service Equipment:** In Table S4.6-18 on page 4-389 of the Supplement, the lead agency claims that the conversion of the airport's ground service equipment to electric power or fuel cells will reduce NO_X, VOC and CO emissions by up to 600 tons, 1,900 tons and 2,800 tons respectively per year by 2015. Comparing these emissions reductions to the 2000 emissions inventory in

Table S4.6-7 on page 4-368 shows very substantial reductions from the base year. To achieve these emissions reductions, the lead agency proposes to accelerate full conversion of the ground service equipment fleet through incentives or tenant lease requirements. The lead agency needs to describe some of these incentives and also demonstrate quantitatively how these very substantial emissions can be achieved. Further, on pages 35 and 40 of Appendix S-E, the lead agency refers to the non-binding memorandum of understanding (MOU) signed in December 2002 between California Air Resources Board and the major domestic air carriers to reduce NO_X emissions from ground service equipment. Since the MOU is non-binding, the lead agency needs to demonstrate how it proposes to achieve those emission reductions and those beyond what is described in the MOU. If documentation already exists elsewhere in the Supplement, relating to how these emission reductions will be achieved, it is suggested that specific reference be made as part of the footnotes to the table to facilitate review.

8. **Ongoing Measures to Improve Air Quality:** Pages 34 through 37 in Appendix S-E list a number of programs, both regulatory and voluntary, implemented by LAWA to improve air quality. The SCAQMD is pleased that LAWA is maintaining its commitment to implement voluntary programs, in particular the energy saving measures, listed on page 36, such as the use of double-paned glass or accousti-glass tempered and shaded windows, high efficiency metal halide lights in parking areas, lighting controls and energy efficient lighting in indoor areas, energy efficient and automated controls for air conditioning, increased wall and ceiling insulation beyond existing regulatory requirements, alternative and low emission vehicles, etc, which could provide substantial air quality benefits. The SCAQMD is pleased that LAWA will be implementing a series of innovative mitigation measures such as incentives for SULEV/ZEV emission engines in commercial vehicles, electrical ground power and preconditioned air systems to existing aircraft at passenger gates, continued conversion of ground support equipment to alternative fuels, and specification of clean-fueled construction equipment to name a few. The SCAQMD also agrees that the NEPA/CEQA lead agencies should continue to implement the mitigation measures in Table S23 beginning on page 41 of Appendix S-E, even though emission reduction control efficiencies are not specifically identified for these measures. In addition, to the programs and mitigation measures identified in the Draft SEIS/R, it is also recommended that the NEPA/CEQA lead agencies also incorporate other programs such as the Leadership in Energy and Environmental Design (LEED) system developed by the U.S. Green Building Council into the list of mitigation measures identified in Table S4.6-18.

Other mitigation measures for consideration by the NEPA/CEQA lead agencies include the following:

- Provide temporary traffic control during all phases of construction activities to improve traffic flow, e.g., flag person;
- Suspend all grading when wind speeds exceed 25 miles per hour;
- Traffic speeds on all unpaved roads should be reduced to 15 miles per hours or less;

- Cover all haul trucks hauling dirt, sand, soil, or other loose materials;
- Sweep streets with AQMD Rule 1186-certified street sweepers whenever visible dust accumulates on roadways;
- Install wheel washers where vehicles enter and exit unpaved roads onto paved roads or wash off trucks and any equipment leaving the site each trip,, etc.;
- Investigate using cleaner burning aircraft fuels, perhaps through a pilot program; and
- Use light-colored roofing materials, which reflect sunlight and, therefore, heat away from buildings.

The SCAQMD is willing to work with the NEPA/CEQA lead agencies to develop the above measures and other measures to mitigate air quality impacts from the proposed project.

9. **Control Efficiencies of Mitigation Measures:** The SCAQMD previously commented on the Draft EIS/R that the NEPA/CEQA lead agencies were taking emission reduction credit for programs required by regulation that relied on future approvals, or were voluntary. In response the Draft SEIS/R has removed required or duplicative measures. Further, the NEPA/CEQA lead agencies are no longer claiming emission reduction credit for unquantified or voluntary programs. Table 4.6-16, however, identifies several mitigation measures with associated emission reductions. The Draft SEIS/R does not appear to provide any supporting documentation regarding the methodology used to calculate the range of potential emission reductions, including assumptions, equations, emission factors, specific emission reduction control efficiencies by equipment, the source of the control efficiencies used, etc. The Final EIS/R should provide documentation to support the emission reductions shown in Table 4.6-16. Further, in some cases, emission reductions claimed may overestimate actual emission reductions that may result from applying the mitigation measure. For example, substantial emission reductions are identified for measures related to diesel powered construction equipment, such as catalytic oxidizers, particulate traps with exhaust gas recirculation, use of emulsified diesel fuels, etc. The NEPA/CEQA lead agencies should be aware that, with the exception of catalytic oxidizers certified at a control efficiency of 25 percent, these control technologies have not been certified for use on heavy-duty off-road mobile sources. The NEPA/CEQA lead agencies are encouraged to use these control technologies, but associated emission reductions may not be as great as claimed. Information certified control equipment for mobile sources can be found at the CARB website at the following internet address: http://www.arb.ca.gov.

10. **NO_X to NO_2 Conversion:** Pollutant emissions are expressed as NO_X, i.e., the sum of NO and NO_2. However, the ambient air quality standards are for NO_2. So a method is required to convert the NO_X emissions into NO_2 concentrations. In the Draft SEIS/RR two methods are used to estimate the maximum one-hour NO_2 concentrations, that is, the ozone limiting method (OLM) and the NO_2/NO_X ratio method. OLM, as described in Attachment P of Technical Report S-4, is an acceptable method for estimating 1-hour NO_2 impacts to demonstrate compliance

to District Rules. The NO_2/NO_X ratio method, as described in Attachment Q of Technical Report S-4, is not an approved method to demonstrate compliance with SCAQMDSCAQMD Rules, in particular modeling requirements contained in SCAQMD Rule 1303.. However, the method appears to be reasonable and conservative for the application of determining localized significance for CEQA environmental analyses

11. **Total One-Hour NO2 Concentrations:** In Attachment P of Technical Report S-4, it is stated that "the modeled NO_2 concentrations were assumed as the actual NO_2 ambient concentrations." In other words, the project impacts are not added to local background concentrations to determine the total NO_2 concentrations for comparisons to ambient air quality standards. The NO_2 concentrations from the proposed project must be added to the local background NO_2 concentrations and the resulting total concentration compared to the ambient air quality standard to determine project significance. Since the background concentrations are not included, the project impacts are underestimated.

12. **Calm Wind Processing:** Based on the dispersion model input files provided as part of the review package, the calm wind processing option was applied in the model application. This has the effect of excluding many hours of light wind speeds and potentially high concentrations from dispersion modeling. This deviates from SCAQMD modeling procedures, which require that calm wind processing be turned off. The annual concentrations for all pollutants, including the cancer risks and the chronic non-cancer risks, may be underestimated.

13. **Human Health Risk Assessment (HHRA):** Based on the emission speciation profile in the HHRA, it is not clear whether the risk estimates include emissions from the future increase in the number of aircraft landing at LAX. Please clarify whether or not aircraft emissions are included in the HHRA and, if not, it is recommended that the HHRA be revised to include future aircraft emissions.

14. **Health Risk Assessment for Mobile Sources:** Because heavy-duty truck trips do not appear to be specifically identified in the Draft SEIS/R, it is unclear whether or not operational emissions include a substantial increase in the number of heavy-duty truck trips to the airport, especially the container cargo portion of LAX. If there is a substantial increase in future heavy-duty truck trips to LAX, a health risk assessment for mobile sources may be warranted. Guidance for such an analysis can be found on the SCAQMD's CEQA web pages at the following internet address: http://www.aqmd.gov/ceqa/handbook/diesel_analysis.doc.

15. **Program EIS/R and Subsequent Projects:** It is understood that the EIS/R is a program document to analyze impacts from a long-term ongoing program to upgrade and enhance security at LAX. Further, it is understood that various components or phases of the proposed project will undergo subsequent project-specific environmental analyses under NEPA and CEQA. Please provide a list of the specific future projects that will undergo environmental analyses so that the SCAQMD can evaluate whether components of the proposed project that are not

specifically analyzed in future documents are adequately analyzed in the program EIS/R.

16. **Toxics Analysis:** The SCAQMD has reviewed the air toxics analysis prepared by the NEPA/CEQA lead agencies and believes that the modeling approach used for the human health risk assessment is not consistent with the FAA's LIDAR study regarding plume heights during jet queuing and taxi periods. The assumed plume heights in the toxics modeling analysis are higher than those observed in the LIDAR study and, therefore, the impacts in the human health risk assessment may be underestimated. The SCAQMD recommends that the toxics analysis be revised to be consistent with the LIDAR study recommendations regarding the effective plume heights of the jet exhaust.

FINAL ENVIRONMENTAL IMPACT REPORT NO. 573
FOR THE CIVILIAN REUSE OF MCAS EL TORO
AND THE
AIRPORT SYSTEM MASTER PLAN FOR
JOHN WAYNE AIRPORT AND
PROPOSED ORANGE COUNTY INTERNATIONAL AIRPORT

SCH NO. 98101053

EIR TEXT VOLUME 1

August 2001

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4.5.7 Methodology for Emissions Inventories

An emissions inventory has been prepared for sources within the project sites and includes aircraft operations, ground support equipment, motor vehicles, natural gas usage, and fuel storage facilities. An emissions inventory has also been prepared on a regional basis for aircraft activity and vehicle miles traveled (VMT) related to regional aviation demand. Regional VMT was used to calculate vehicular emissions from airport related trips.

The emissions inventories were developed using emission factors from various EPA, FAA, CARB, and SCAQMD references. The FAA's Emissions and Dispersion Modeling System – Version 4.0 (EDMS 4.0) was used as the primary model in developing airport emissions inventories. CAL3QHC and URBEMIS 7G models were used for other mobile sources.

4.5.7.1 Aircraft

Aircraft criteria pollutant emissions were calculated using the FAA-approved model EDMS 4.0. EDMS is an air quality model that estimates emissions from airport sources based on information input to the model, and considers the sources and meteorological conditions to estimate "dispersion" – how the pollutants behave and what the pollutant concentrations will be at specified locations. Particulate matter emission estimates were calculated using particulate matter emission indices (mass of pollutant emitted per mass of fuel consumed). Project specific aircraft type and aircraft engine emission certification values were used for purposes of modeling. These project specific assignments were also used for purposes of the regional airport analyses.

EDMS defines four distinct modes of aircraft operation: approach, taxi idle (combination of taxi/idle in, delays, and taxi idle out), takeoff, and climbout. Together, these four modes constitute one landing and takeoff (LTO) cycle. Aircraft activity for the Proposed Project was used to determine the number of annual LTO cycles for each aircraft type.

Approach Time In Mode

The approach mode extends from the mixing height to ground level and along the runway until the aircraft turns onto a taxiway. Approach time in modes for each aircraft were calculated using Integrated Noise Model (INM) profiles, a standard three-degree glideslope, and a mixing height of 2,400 ft above field elevation (afe) consistent with CARB guidance.

Takeoff/Climbout Mode

The takeoff mode extends from the initial roll to a certain height above the airport elevation, at which point the climbout mode begins and lasts until the mixing height elevation has been reached. Takeoff time is calculated as the length of time required to reach an elevation of 1,000 vertical ft AFE, consistent with ICAO Noise Abatement Procedure B recently adopted by the FAA. Takeoff and climbout mode times for each aircraft were calculated using INM profiles according to average annual operations per stage length.

Taxi Mode

Taxi time in mode is the total amount of time spent taxiing from the runway to the gate, taxiing back to the runway for takeoff, and queue time on the runway. The taxi time in modes at OCX and JWA were obtained from SIMMOD reports per aircraft type (general aviation or non-general aviation). For alternatives not analyzed by the SIMMOD model, taxi times were assumed to be equivalent to an alternative with similar operational data. EDMS default taxi times were used in the 1998 MCAS El Toro analysis and for all regional airports analyses due to the different operating conditions at each airport.

A SIMMOD model calibration for JWA was completed in 1998 (Working Paper 5, JWA/OCA Simmod Model Calibration) to verify the accuracy of the SIMMOD model against actual operations at JWA. The results indicated that the model produced results that realistically represent actual operations at JWA.[1]

Reverse Thrust Mode

During the approach mode, many pilots perform reverse thrust operations to slow the aircraft down on the runway. EDMS does not account for the reverse thrust mode and the emissions associated with it, nor are there any published emission factors. A study was done in 1994 for the EPA (Technical Support Document, Civil and Military Aviation, California FIP NPRM) where results showed that by adding 15 seconds to the takeoff mode (since takeoff mode is 100% thrust or power) more than accounted for these reverse thrust emissions. Although this is a technical document, and not EPA guidance, these results were incorporated into the EDMS analysis for OCX, JWA, and the regional airports analysis. A time of 15 seconds is added to the takeoff time for all commercial jet aircraft. Therefore, the analysis provided is a worst case analysis.

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1 All taxi times entered were used for emission inventory purposes only. For dispersion purposes, EDMS calculates a taxi time based on the aircraft traveling at 30 mph on each taxiway assigned. This value cannot be changed by the user.

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January 13, 2004

VIA OVERNIGHT MAIL

Mr. David B. Kessler, AICP
U.S. Department of Transportation
Federal Aviation Administration
Western Pacific Region, Airports Division
AWP-611.2
P.O. Box 92007
Los Angeles, CA 90009-2007

Re: Freedom of Information Act Request for Materials Relating to the Clean Air Act Draft General Conformity Determination for the Los Angeles International Airport Proposed Master Plan Improvement, Alternative D.

Dear Mr. Kessler:

Thank you for providing a copy of the FAA's Clean Air Act Draft Conformity Determination for the LAX Proposed Master Plan, Alternative D, ("Draft Conformity Determination"), published for a public comment period of January 9 to February 9, 2004. We appreciate the opportunity to review it. However, we need more back-up documentation in order to adequately review the analysis of the Draft Determination. Therefore, on behalf of the City of El Segundo ("City"), we are submitting this request pursuant to the Freedom of Information Act, 5 U.S.C. § 552, for the release and production of the records and materials identified below, used in the preparation of the Draft Conformity Determination. Review of these documents is necessary for the City and its expert technical consultants to complete their analysis of the Draft Conformity Determination. We are therefore requesting that you expedite your response, to allow our expert consultants a reasonable time to review the materials before the close of the comment period.

In October 2003, the City submitted two FOIA requests for data and documentation regarding the air quality modeling and analysis of the Supplement to the Draft EIS/EIR for the Proposed LAX Master Plan ("Supplement"); as well as parallel requests to LAWA under the California Public Records Act. We received responsive materials from LAWA, including:

- Construction emissions Microsoft Excel workbook (*results inconsistent with those presented in Draft Conformity Determination*);
- Off-airport traffic emissions input/output files, including EMFAC files;
- Health risk assessment input/output files;
- EDMS 3.2 and 4.11, CALINE, and AERMOD input/output files;
- ISC-OLM input/output files for Alternative D;
- ISCST3 aircraft input/output files for particulate matter;
- SCAQMD air quality data sheets for 1999-2000;
- LAX monitoring data August 1997-March 1998.

Based on our preliminary review of the Draft Conformity Determination, it appears that some additional modeling was performed and certain assumptions have been updated since the air quality analysis of the Supplement was completed. We therefore now request that you provide us with copies of all supporting documentation and modeling input/output files used to calculate the estimates for ambient air quality concentrations and emissions set forth in the Draft Conformity Determination, beyond the modeling and other materials provided in response to our previous requests. Because the previously provided version of the Microsoft Excel workbook containing the construction emissions calculations is inconsistent with the results presented in both the Supplement and the Draft Conformity Determination, we also request a copy of the workbook used to calculate the results presented in the Draft Conformity Determination. We request that these materials be provided in electronic format where available (modeling input/output files, spreadsheets to estimate emissions) and otherwise in a form that will allow the City's expert technical consultants to access the data and check the calculations of the modeling.

In addition, please provide copies of the following documents and other sources cited in the Draft Conformity Determination:

- Notes from personal communications cited in the references at pages 8-1, A-34, A-35, B-38, and B-39: Armstrong 2003a, Armstrong 2003b, Hsiao 2003a, Hsiao 2003b, Honcoop 2003, Plante 2003, Armstrong 2003, Chico 2003, Ryan 2003, SCAQMD 1998a, Servin 2003, CALSTART 2000, Tucker;
- CALSTART 1998 and CALSTART 1999 (cited p. B-38);
- Chico, Wong, and Schuler, 1998 (p. A-34);
- Energy & Environmental Analysis, 1999 (p. A-34);
- FAA, 11/24/1997, Meeting Summary (p. A-34);
- FAA, 1997, Air Quality Procedures for Civilian Airports & Air Bases (p. A-34);
- LADOA 1997 (p. A-35);
- Parsons Transportation Group Inc. 1998, 1999 (p. B-39);
- SCAQMD 1998b, SCAQMD 1998c (p. A-35);
- Wayson et al. 2002 (p. A-36);
- Whitefield and Hagen 1999 (p. A-36).

We request that these materials be provided by means that will facilitate their use by our consultants. Specifically, we request that the data be provided without use-protection, to allow our consultants to complete their analysis.

If you determine to withhold any responsive records, please provide us with a log that describes such records and the basis for your determination that such records are exempt from mandatory disclosure.

FOIA provides for a waiver or reduction of fees if disclosure "is in the public interest because it is likely to contribute significantly to public understanding of the operations or activities of the government and is not primarily in the commercial interest of the requester." 5 U.S.C. § 552(a)(4)(iii); 49 C.F.R. § 7.97(e). We ask that you waive all search and duplication fees because the parties making this request meet the criteria set forth in these sections and in 49 U.S.C. § 7.97(f). The LAX Master Plan is unquestionably a topic of great public interest in southern California; making these documents available to the public will enhance the public's understanding of the proposed project and its background. The City of El Segundo has no commercial interest that would be furthered by the requested disclosure.

We appreciate your assistance in this matter. Please contact me as soon as possible to let me know when we can expect to receive the requested documents. If you have any questions about this request, please do not hesitate to give me a call.

Very truly yours,

SHUTE, MIHALY & WEINBERGER LLP

Christy Taylor (by CKA)
CHRISTY H. TAYLOR

cc: Carlette Young, Regional FOIA Coordinator
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February 9, 2004

Mr. David B. Kessler, AICP
U.S. Department of Transportation
Federal Aviation Administration
P. O. Box 92007
World Way Postal Center
Los Angeles, CA 90009-2007

Draft General Conformity Determination -
Los Angeles International Airport
Proposed Master Plan Improvements Alternative D

Dear Mr. Kessler:

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-referenced document. The Los Angeles International Airport (LAX) is currently the largest commercial airport in the South Coast Air Basin (SCAB), and with the proposed improvements, LAX will accommodate significantly higher levels of passengers and cargo by 2015.

Background

As you know, the SCAB is classified as a nonattainment area for the national ambient air quality standards (NAAQS) for particulate matter (PM10) and ozone, and is required to demonstrate attainment with these standards by 2006 and 2010, respectively. General Conformity Determination (40 CFR Part 93, Subpart B) is the formal process and documentation required when the totals of direct and indirect emissions from any federal action/project (such as LAX Master Plan Improvements) in a nonattainment or maintenance area are at or above de minimis levels. Accordingly, for any pollutant which is at or above de minimis level, general conformity requirements would apply. Table 5 of the draft general conformity determination document indicates that the totals of direct and indirect emissions for NOx and PM10 exceed their respective de minimis threshold emission levels. Therefore, conformity demonstration and analysis are required for the LAX Proposed Master Plan Improvements.

Under the general conformity requirements, the emissions associated with the proposed LAX Master Plan Improvements project must conform with the emission budgets

specified in the latest approved State Implementation Plan (SIP) for SCAB, which is currently the 1997/99 SIP. Also, as you know, the 2003 AQMP for the SCAB was approved by SCAQMD and California Air Resources Board last year and was recently submitted for EPA's approval. The 2003 SIP budgets will become operable for general conformity determination purposes once EPA approves the 2003 SIP and are provided here for reference. Attached to this letter, we have delineated the emissions assumed in both the 1997/99 SIP and 2003 AQMP for the aircraft, GSE, and ground access categories for the year 2010.

Comments

Some of our concerns on the proposed project have been provided in our prior communications as well as in our letter, entitled "Supplement to the Draft Environmental Impact Statement/Report (DEIS/R) for the Los Angeles International Airport Proposed Master Plan" (LAX DEIS/R), dated November 7, 2003. Specific areas of concern addressed on the LAX DEIS/R included, but were not limited to, providing detailed information for the construction emissions, overlapping phases of construction and peak emissions, ground service equipment emission reduction, and modeling assumption issues. In addition to these items, staff has the following comments regarding the draft general conformity determination document:

1) There appears to be a discrepancy in the passenger demand level in million annual passengers (MAP) for LAX between the draft general conformity document and the SIPs. According to the Southern California Association of Governments' (SCAG) latest adopted 2001 Regional Transportation Plan (RTP), LAX would accommodate 78 MAP in 2025, whereas the draft conformity document assumes 78.9 MAP in 2015. Based on correspondence received from SCAG staff regarding the 2001 RTP, the projected LAX passenger demand level in 2015 is 75.65 MAP. This was the basis for calculating LAX aircraft emissions in the 2003 AQMP. Therefore, the MAP assumption for LAX in the draft general conformity document is not consistent with the adopted 2001 RTP. We recognize SCAG's recent correspondence with you indicating 78 MAP for LAX in 2015 (your letter dated December 19, 2003), but this change to MAP needs to be incorporated into the RTP/AQMP through a public process before being used as the basis for emission calculations in a conformity finding.

2) The draft conformity document states that the general conformity requirements for this project only apply to NOx and PM10, and not VOC and CO. However, in order to support this conclusion and to demonstrate conformity with the SIP budgets, sufficient details must be provided to substantiate the projected LAX emissions under the No Project and the proposed project (Alternative D) scenarios. The draft conformity document does not provide such sufficient detail. In particular, the document does not provide an adequate basis to conclude that VOC and CO will not significantly increase, thereby triggering the conformity requirement for those pollutants. It is particularly important that the amount of VOC and CO emission estimates be adequately substantiated since, as is shown in the attached table, it appears that emissions of these compounds could exceed applicable SIP allowances.

For instance, it is unclear why aircraft emissions will be less under Alternative D than under the No Project scenario. Also, the anticipated changes in emissions for stationary sources as well as motor vehicles on and off the airport require further clarification and explanation. In addition, Table 4 shows zero emissions for ground support equipment (GSE) in 2015 under the proposed project. The Memorandum of Understanding (MOU) between the California Air Resources Board and most major domestic air carriers is stated as the reason for reducing projected GSE emissions. However, safeguards must be included to ensure that the reductions claimed or assumed under Alternative D are enforceable and achieved at LAX. Furthermore, detailed documentation needs to be provided to demonstrate how GSE emissions will be completely eliminated since the MOU will not result in complete conversion of all GSE to zero-emission units. Finally, the basis for quantifying the construction emissions and the reason for higher construction emissions for the No Project alternative vs. the Alternative D must be provided.

3) The general conformity determination has to be conducted based on the latest adopted SIP emission budgets. As shown in the attached table, we have identified a number of discrepancies between the 1997/99 SIP (and 2003 AQMP) budgets and the proposed project emissions. Specifically, aircraft emissions under the proposed project exceed the SIP emission allocations for LAX that were assumed in the attainment demonstration for this area. Allowing emissions in excess of these emission allocations would undermine the area's attainment demonstration—a result that general conformity requirements were specifically designed to prevent. For categories, other than aircraft, we will need additional details on emission calculation assumptions to make a determination regarding SIP budget conformity. Any exceedances of the SIP budgets must be offset through implementation of enforceable mitigation measures or mitigation fee programs to achieve equivalent reductions. Accordingly, the general conformity document must explain and document the conformity determination with the applicable SIP budgets and incorporate specific strategies for achieving additional reductions, to the extent they are needed. In addition, enforceable mechanisms must also be included to ensure that all necessary emission limitations and reductions assumed in the conformity determination are achieved. SCAQMD staff is available to provide technical assistance on identification and implementation of additional control strategies, if necessary.

4) With respect to the PM10 conformity determination, Tables 12 and 13 of the draft conformity document indicate that the combined predicted construction and operations PM10 concentrations (including future background) in 2013 and 2006, respectively, will not exceed the PM10 national ambient air quality standards. However, we are concerned over the combined predicted PM10 concentration in 2006 (attainment year) which shows a near exceedance of the PM10 annual average standard (i.e., 48 ug/m3). In order for us to be able to fully evaluate the potential PM10 impact of the proposed project, as we have mentioned earlier, you must provide detailed documentation on all emission calculations as well as the modeling assumptions and input parameters. If Alternative D is expected to result in such high

PM10 concentration in 2006, the region's PM10 attainment demonstration could be jeopardized. Therefore, the project must include additional mitigation measures during construction and operational phases in order to provide a safety margin and to completely eliminate the possibility of exceeding the standard. For reference, in the attached table, we have also disaggregated the ground access emissions inventory using the AQMP modeling assumptions and have found that for the 9 grid cells surrounding LAX, the Alternative D emissions exceed the AQMP emission assumptions.

5) The draft document states that it is reasonable to assume that construction emissions associated with Alternative D were accommodated in the AQMP. AQMP relies on SCAG's growth projections for the construction industry to estimate future year emissions. However, as mentioned earlier, detailed information on construction emissions would be needed to confirm or reject this assumption.

Enclosed is a copy of SCAQMD's comments on the Draft Environmental Impact Statement/Report for the Los Angeles International Airport Proposed Master Plan dated November 7, 2003. We request that all comments contained in that letter as well as the additional comments in this letter be addressed and reflected in the Final Environmental Impact Statement/Report and Final General Conformity Determination documents.

SCAQMD staff is available to work with the Lead Agencies to address the issues indicated in this letter and any other questions that may arise. Please feel free to contact Dr. Elaine Chang, Deputy Executive Officer, at (909) 396-3186 with any concerns and questions regarding this matter.

Sincerely,

Barry R. Wallerstein

Barry Wallerstein, D.Env.
Executive Officer, SCAQMD

Attachment

Comparison of 1997/99 SIP and 2003 AQMP Baseline Emissions with Alternative D [1]
(Tons/Year)

	Aircraft (2010)				GSE [2] (2010)				Ground Access [3] (2010)			
	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO
1997/99 SIP	5084	3468	4	12792	1497	620	182	13196	3335	1746	197	19671
2003 SIP	6800	605	NA	4346	482	62	28	1167	4161	2472	215	22899
Alternative D	5002	1112	56	6314	615	91	21	1294	3749	2218	1772	24515

Short-Term Reductions [1]
(Tons/Year)

	Aircraft (2010)				GSE [2] (2010)				Ground Access [3] (2010)			
	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO
1997/99 SIP	1322	729	0	0	619	382	0	11225	720	327	2	5311
2003 SIP	0	0	0	0	268	50	26	204	441	410	11	2979

Long-Term Reductions [1]
(Tons/Year)

	Aircraft (2010)				GSE [2] (2010)				Ground Access [3] (2010)			
	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO
1997/99 SIP	66	592	0	0	16	52	0	0	57	444	0	0
2003 SIP	1784	78	0	0	0	0	0	0	1098	1233	2	227

Comparison of 1997/99 SIP and 2003 AQMP Budgets with Alternative D [1]
(Tons/Year)

	Aircraft (2010)				GSE [2] (2010)				Ground Access [3] (2010)			
	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO
1997/99 SIP	3696	2147	4	12792	862	186	182	1971	2558	975	195	14360
2003 SIP	5016	527	NA	4346	214	12	2	963	2622	829	202	19693
Alternative D	5002	1112	56	6314	615	91	21	1294	3749	2218	1772	24515

Notes:

(1) For GSE and ground access categories, emissions and reductions from nine 5 by 5 kilometer grid cells around the LAX airport area in the SIP are provided in these tables.

(2) GSE emissions are included in the total light-industrial and heavy-non-farm equipment in the 1997/99 SIP.

(3) SIP ground access emissions represent the total on-road emissions.
Alternative D ground access emissions represent the total from on-airport and off-airport motor vehicles.

Air Resources Board

Terry Tamminen
Agency Secretary

Alan C. Lloyd, Ph.D.
Chairman
1001 I Street • P.O. Box 2815
Sacramento, California 95812 • www.arb.ca.gov

Arnold Schwarzenegger
Governor

July 23, 2004

Mr. Mark McClardy
Division Manager
Federal Aviation Administration
Western Pacific Region, Airports Division
AWP – 600
Post Office Box 92007
Los Angeles, California 90009-2007

Dear Mr. McClardy:

In response to your staff's request, the Air Resources Board (ARB) is providing clarification on the appropriate aircraft emissions inventory to use in the general conformity determination for the Los Angeles International Airport Master Plan Update. The U.S. Environmental Protection Agency's (U.S. EPA) regulations require emissions resulting from this kind of project to conform to the emission budgets established by the applicable State Implementation Plan (SIP). The benchmark for emissions of nitrogen oxides (NOx) from commercial aircraft in the South Coast in 2010 is defined by the approved 1997/1999 South Coast Ozone SIP for the federal 1-hour ozone standard.

The SIP forecasts 2010 aircraft emissions in the region based on adopted national and international emission standards (known as the 2010 baseline). We understand that there is a question about whether the goal that California set for the federal government to reduce aircraft emissions with new national standards (known as 1994 SIP Measure M-15) should be reflected in the allowable emission budgets. Based on the approved 1997/1999 SIP, it should not. There are no enforceable commitments from U.S. EPA in the applicable SIP to reduce emissions specifically from aircraft. Thus, the regional emission budgets for general conformity purposes are the 2010 baseline inventories for non-military aircraft for each contributing pollutant – 21.36 tons per day (tpd) of NOx and 14.97 tpd of volatile organic compounds in the summer ozone season.

Background

The 1997/1999 Ozone SIP for the South Coast carried forward the State and federal control strategy approved as part of the 1994 California Ozone SIP. The 1994 SIP that ARB submitted to U.S. EPA included enforceable State commitments to adopt specified new measures. It also identified a series of possible measures that the federal government could pursue to control emissions from sources under its jurisdiction,

including out-of-state trucks, off-road equipment, marine vessels, locomotives, and aircraft.

When it approved the 1994 SIP, U.S. EPA did not commit to implementing specific federal measures. Instead, U.S. EPA established a public consultative process to identify possible measures to achieve emission reductions from sources under federal jurisdiction. U.S. EPA and ARB jointly committed to ensure that the appropriate measures were adopted to achieve the total reductions expected from the sources under federal jurisdiction.

The agencies have fulfilled the commitment for NOx reductions from federal sources for purposes of the currently enforceable SIP. As documented in the *2003 State and Federal Strategy for the California State Implementation Plan* (Table I-5), the reductions are occurring from a different mix of control strategies than expected in the 1994 SIP. For example, although U.S. EPA did not pursue the aircraft emission standards described in Measure M-15, the agency did set new emission limits for new heavy diesel trucks that achieved substantial emission reductions that were used to fulfill the joint ARB/U.S EPA NOx commitment.

As future SIPs are developed for the new 8-hour ozone and PM2.5 air quality standards, we expect to pursue additional reductions from all sources including airport related emissions. We look forward to working with all the involved agencies in this process, including the establishment of new conformity budgets.

If you have any questions, please contact Ms. Cynthia Marvin, Chief, Air Quality and Transportation Planning Branch, at (916) 322-7236.

Sincerely,

Catherine Witherspoon
Executive Officer

cc: See next page.

cc: Mr. Jim Ritchie
Deputy Director
Long Range Planning and
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Los Angeles World Airports
1 World Way
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Dr. Barry Wallerstein
Executive Officer
South Coast Air Quality
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Mr. David B. Kessler, AICP
Federal Aviation Administration
Western Pacific Region, Airports Division
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Ms. Cynthia Marvin
Air Resources Board

South Coast
Air Quality Management District
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August 12, 2004

Mr. David B. Kessler, AICP
U.S. Department of Transportation
Federal Aviation Administration
P. O. Box 92007
World Way Postal Center
Los Angeles, CA 90009-2007

Follow-Up Comments on Draft General Conformity Determination -
Los Angeles International Airport
Proposed Master Plan Improvements Alternative D

Dear Mr. Kessler:

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to submit this letter as a follow-up to our previous letter dated February 9, 2004 regarding the Federal Aviation Administration (FAA) Draft General Conformity Determination for the Los Angeles International Airport (LAX) Master Plan Improvements Alternative D. During the last few months, SCAQMD staff have met and worked with the representatives of the FAA and Los Angeles World Airport in order to address the concerns raised in our letter. Based on these meetings and the additional information provided by the FAA and its consultants, we are making the following findings and recommendations:

1) Methodologies and Emissions Estimates - The methodologies used in calculating emissions and air quality modeling as well as the emissions estimates presented in the Draft General Conformity Document for LAX Master Plan Improvements Alternative D are acceptable.

2) SIP Emission Budgets - In accordance with CARB's letter to FAA, dated July 22, 2004, the overall 1997/99 SIP NOx commitment for sources under federal jurisdiction has been fulfilled based on the joint regulatory efforts of CARB and U.S. EPA. We reached this conclusion for the following reasons: U.S. EPA did not approve Control Measure M15 into the SIP; rather, it established a public consultative process to identify possible reduction opportunities for sources under federal jurisdiction. Pursuant to this process, U.S. EPA and ARB jointly committed to and adopted a number of rules for sources other than aircraft which resulted in total NOx reductions in excess of those committed to in 1997/99 SIP.

Consequently, because of these unique circumstances, the baseline aircraft inventories would serve as the emission budgets for general conformity purposes and such determination does not need to consider the reductions allocated to aircraft in the 1997/99 SIP. In addition, with respect to categories other than aircraft, the emissions estimates for Alternative D are below the applicable budgets in the SIPs.

3) Implementation of Mitigation Measures/Control Strategies - The LAX Draft General Conformity Determination assumes the implementation of control strategies and mitigation measures in order to demonstrate conformity. These measures are necessary to ensure that the SIP budgets and the applicable air quality standards are not exceeded in the South Coast Air Basin as a result of the proposed LAX Master Plan Improvements. Examples include measures to reduce construction-related and operational impacts of the proposed project and electrification of ground support equipment. FAA must include enforceable mechanisms in its final general conformity determination (e.g., Record of Decision) to ensure that all necessary reductions assumed in the conformity determination are achieved. Specifically, such provisions must entail performance monitoring requirements for quantifying the emission reductions at various construction and operational phases of the project and binding enforcement mechanisms as well as safeguards (i.e., contingency measures) to offset any shortfalls in emission reductions.

We cannot emphasize enough the importance of incorporating the above provisions on mitigation/control measures for the LAX Master Plan Improvements project in your conformity determination, especially in view of the latest decision by Los Angeles World Airport (LAWA) to award a Van Concession Agreement that was inconsistent with its stated policy of environmental protection and contrary to mitigating potential adverse impacts of LAX expansion. These provisions would ensure that a positive conformity determination would be maintained throughout the life of the project without adversely affecting the air quality.

We appreciate your efforts and cooperation. Please feel free to contact Dr. Elaine Chang, Deputy Executive Officer, at (909) 396-3186 with any questions regarding this matter.

Sincerely,

Barry Wallerstein, D.Env.
Executive Officer, SCAQMD

cc: Catherine Witherspoon
Jim Ritchie (Los Angeles World Airport)

CDM Telephone Call Report

CDM.

2151 River Plaza Drive, Suite 200
Sacramento, CA 95833
Tel: 916-567-9900
Fax: 916-567-9905

Project:	LAX Master Plan	**Client:**	LAWA/FAA
Job No.		**Date:**	January 5, 2005

☐ **Phone in** ☑ **Phone out** ☐ **Current Project** ☐ **Prospective Project/Marketing** ☐ **Administrative** ☐ **Other**

Made by/Received by: Roger Johnson

Talked with: **Dr. Elaine Chang , South Coast Air Quality Management District (SCAQMD)**

Subject: LAX General Conformity/SCAQMD August 12, 2004 letter

Distribution: Tony Skidmore (CDM); Dave Kessler (FAA); File

● **Discussion: I called Dr. Chang to discuss the August 12, 2004 letter from the SCAQMD to Dave Kessler regarding the Draft General Conformity Determination. I explained to Dr. Chang that the FAA's Counsel was concerned that the language in the letter could be misinterpreted. The FAA's concern was that the statement, "In addition, with respect to categories other than aircraft, the emissions estimates for Alternative D are below the applicable budgets in the SIP." could be misconstrued as indicating that the aircraft emissions discussed above were not below the applicable SIP budget.**

Dr. Chang responded that SCAQMD felt the letter clearly stated the appropriate aircraft inventories to use for purposes of the conformity analysis due to the special circumstances surrounding the U.S. EPA and ARB's commitment to reduce NO_x emissions in excess of those committed to in the 1997/99 SIP. The subsequent statement regarding non-aircraft emissions was intended to clarify SCAQMD's determination that aircraft and non-aircraft emissions were below the applicable SIP budget.

I indicated to Dr. Chang that the FAA would like a letter of clarification from the District clearly stating the above understanding. As an alternative, the FAA would be satisfied with a statement in the Final Conformity document indicating that we had discussed the potential misunderstanding with the SCAQMD and the SCAQMD concurred that the intent of the letter was to indicate their conclusion that the Alternative D aircraft emissions were within the appropriate SIP. Dr. Chang indicated that we could write this statement in the document.

January 6, 2005

- **Action Required:** None

2. RESPONSES TO COMMENT LETTERS RECEIVED ON THE DRAFT GENERAL CONFORMITY DETERMINATION

In this Section, FAA provides responses to each of the four (4) comment letters received on the Draft General Conformity Determination.

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2.1 Response to Southern California Association of Governments Comment Letter dated February 4, 2004

Comments noted.

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2.2 Response to County of Los Angeles Comment Letter dated February 5, 2004

The comment letter received from the County of Los Angeles refers to County comments on the Draft EIS/EIR for Alternative D. Since the Draft EIS/EIR was published before Alternative D was developed, it is assumed that the letter refers to comments on the Supplement to the Draft EIS/EIR published to address impacts from Alternative D. Responses to County of Los Angeles comments on the Supplement to the Draft EIS/EIR were provided in the Final EIR published in April 2004. sSee the Final EIR for Responses to Comments on Letters SAL00004, SAL00005, SAL00006, SAL00008, SAL0010, SAL00011, SAL00013, SAL00014, and SAL00019, and , regarding comments on the Supplement to the Draft EIS/EIR.

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2.3 Response to City of El Segundo Comment Letter dated February 6, 2004

Cover Letter

Response to El Segundo Comment I.A.:

As mentioned in subsection 3.1 of the Draft General Conformity Determination, SCAG has noted that the forecast activity levels of Alternative D are generally consistent, but not specifically consistent, with the adopted forecast for LAX in the 2001 RTP (Letter dated February 4, 2004 elsewhere in this Appendix C). The discussion in subsection 3.1 further points out that Alternative D is consistent with the policy framework of the 2001 RTP, which calls for no expansion of LAX, and, instead, shifts the accommodation of future aviation demand to other airports in the region. The commenter indicates that the passenger activity level assumed by SCAG for LAX in 2015 of 78 million annual passengers (MAP) "forms the basis for the SIP itself." Whereas the activity level of 78 MAP forecast by SCAG is inherent in the 2001 RTP and the 2003 AQMP, the approved SIP is based on data included in the 1997 AQMP and the 1999 amendment to the 1997 AQMP which were developed at the same time as the 1998 RTP (see Attachment C-1). In turn, SCAG forecast a range of activity levels for LAX in 2020 in the 1998 RTP of 90.7 MAP (low forecast), 94.2 MAP (medium forecast), and 101.0 MAP (high forecast). While the 1998 RTP does not include estimates of the passenger activity level at LAX in 2015, linear interpolation between 1995 (53.9 MAP) and 2020 indicates that in 2015 LAX would have been expected by SCAG to reach between 83.3 and 91.6 MAP. Clearly, the Alternative D 2015 MAP level (78.9) is less than the MAP assumptions for LAX in the 2015 timeframe that would have been considered reasonable by SCAG at the time that the 1997 AQMP was developed and that presumably are reflected in the approved SIP.

The evaluation presented in the Draft General Conformity Determination was based on a passenger activity level for the No Action/No Project Alternative at LAX in 2005 of 71.2 MAP, a passenger activity level for the No Action/No Project Alternative at LAX in 2015 of 78.7 MAP, and the assumption that aviation operations will be the same for Alternative D and the No Action/No Project Alternative in 2005. For the evaluation presented in the Final General Conformity Determination, the operations-related emissions for both alternatives in 2005 have been adjusted to relate more closely to the passenger activity level of 64 MAP forecast by SCAG (see Attachment C-2). Emissions of interim years are calculated based on a linear interpolation between 2005 and 2015.

Please see Response to Comment A.I.B.2. and A.II.A.1. regarding the latest planning assumptions.

Response to El Segundo Comment I.B.:

As mentioned in Section 4 of the Draft General Conformity Determination, prior to conducting the general conformity evaluation, FAA prepared a draft protocol and submitted it to EPA, CARB, SCAG, and SCAQMD for review and comment. FAA prepared the final protocol by addressing comments received from these agencies, and that protocol (included in the Draft General Conformity Determination as Appendix A) provided the basis for methods and procedures used in the technical evaluation. Any deviation from the protocol was noted in the Draft General Conformity Determination.

Please see Response to Comment A.II.C. regarding emission modeling.

Response to El Segundo Comment I.C.:

The commenter argues that the LAX Northside and Continental City projects "must not be included in the 'No Project' calculation." LAWA received approval for the LAX Northside development in 1983. Shortly thereafter, LAWA initiated an EIR addressing improvements to LAX to accommodate projected growth. Prior to its completion, LAWA decided to engage in the LAX Master Plan to address projected growth in a broader context. LAWA appropriately chose to reconsider the LAX Northside project in this broader context. If the Master Plan were not approved, it is reasonably expected that LAWA would pursue its

original plan for the development of LAX Northside. Likewise, LAWA purchased the Continental City property with the intention of using it for future airport development. As stated in its Airport Improvement Program grant application, it was LAWA's intent to define the future uses of the Continental City property during the Master Plan process. LAWA has fulfilled this commitment. The Draft Master Plan and Master Plan Addendum fully describe the facilities associated with the four Master Plan build alternatives under consideration, including proposed uses for the Continental City property. If the Master Plan were not approved, it is reasonably expected that LAWA would pursue development of the Continental City property in accordance with its approved land uses and entitlements. Therefore, inclusion of the original LAX Northside and Continental City projects in the No Action/ No Project Alternative was reasonable and appropriate.

The commenter also argues that the capacity of Alternative D in 2015 to accommodate 78.9 MAP "vastly underestimates LAX's actual capacity under Alternative D" and that a more realistic capacity for Alternative D would be 87 MAP. However, the number of passengers that would be accommodated by Alternative D is constrained to 78.9 MAP based on the design of the Alternative D gate facilities and the projected airline response to the constrained facilities. The ability to increase aircraft size, thereby increasing passenger levels, was limited by the number and type of gates available under the Alternative D terminal design.

Please see Response to Comment A.I.A., Response to Comment A.I.B.3.c., and Response to Comment A.II.A.1. regarding the general conformity evaluation assumptions.

Response to El Segundo Comment II:

The commenter argues that the emissions for Alternative D were underestimated and the emissions for the No Action/No Project Alternative were overestimated, and therefore carbon monoxide (CO), volatile organic compounds (VOC), and oxides of nitrogen (NOx) in 2015 were improperly determined to fall below the de minimis threshold emission rates and incorrectly excluded from the general conformity evaluation. First, it should be noted that the applicability of the general conformity requirements must be examined for a number of emission scenarios which are described in subsection 3.4 of the Draft General Conformity Determination. Because emissions of NOx (and NO2) were determined to exceed the de minimis thresholds, a full general conformity evaluation was performed for NOx (and NO2). Second, because the de minimis thresholds are applied to the net emissions between Alternative D and the No Action/No Project Alternative to determine applicability of the requirements and the activity levels are very similar for these alternatives, the net emissions for CO and VOC are below the de minimis thresholds. Third, the capacity of Alternative D is constrained by the number of aircraft gates, which are fewer than the number of aircraft gates for the No Action/No Project Alternative. Therefore, because Alternative D is physically constrained, the design capacity represents a realistic level of activity.

Please see Response to Comment A.I.A., Response to Comment A.II.A.1., and Response to Comment A.II.A.2. regarding the general conformity applicability analysis.

Response to El Segundo Comment III.A.:

The general conformity regulations delineate several criteria that can be used to demonstrate conformity, and as noted in Section 5 of the Draft General Conformity Determination, a combination of these criteria may be used to support a positive general conformity determination. Subsection 5.1.2 of the Draft General Conformity Determination identifies the bases for the approved SIPs relevant to the proposed action. On January 9, 2004, CARB submitted to EPA a proposed revision to the SIP which is based on the 2003 AQMP. As noted in subsection 5.2 of the Draft General Conformity Determination, the total of direct and indirect emissions attributable to the proposed action are compared to the emissions budgets not only in the approved SIPs but also in the 2003 AQMP to avoid revisions to and/or recirculation of the Draft General Conformity Determination in the event that EPA should approve all or part of the proposed revision to the SIP which is based on the 2003 AQMP before the general conformity evaluation is complete. However, as noted in subsection 5.1.2 of the Draft General Conformity Determination, the applicable SIP will be the most recent EPA-approved SIP at the time of the release of the Final General Conformity Determination. While the recent proposed revision to the SIP based on the 2003 AQMP was

not submitted by CARB to EPA to satisfy the specific requirements of 40 CFR 93.158(a)(5)(i)(B) in support of the general conformity determination for Alternative D, FAA believes the proposed revision to the SIP likely meets all the procedural requirements for a SIP submittal under Section 110 of the Clean Air Act and that the emissions budgets underlying this proposed revision to the SIP can accommodate the proposed action.

Response to El Segundo Comment III.B.1.a.:

Because the emissions budgets for the South Coast Air Basin are generally developed by SCAQMD using a "top down" approach rather than a "bottom up" approach, the SIP neither contains nor is supported by emissions budgets for LAX proper (except for emissions from aircraft and auxiliary power units, APUs). Due to the difficulty in disaggregating the emissions budgets into distinct contributing sources rather than broad source categories, a comparison of the total of direct and indirect emissions attributable to the proposed action to the emissions budgets is necessarily inferential in nature. The SCAQMD has determined that the approach is acceptable and emissions are within SIP budgets (see SCAQMD Letter dated August 12, 2004 elsewhere in this Appendix C).

Please see Response to Comment A.I.B.2. regarding the NOx/NO2 emissions.

Response to El Segundo Comment III.B.1.b.:

The commenter argues that the responsible federal agency, in conducting a general conformity evaluation, is required to utilize the criterion listed at 40 CFR 93.158(a)(5)(i)(A). As noted above in Response to Comment III.A, the general conformity regulations delineate several criteria that can be used to demonstrate conformity, and a combination of these criteria may be used to support a positive general conformity determination. In the Draft General Conformity Determination, FAA chose to rely on the criterion at 40 CFR 93.158(a)(5)(i)(A) to determine conformity for NOx and NO2. Because the emissions calculations that underlie both the SIP emissions budgets and the emissions budgets in the proposed revision to the SIP based on the 2003 AQMP contain identifiable emissions assigned to aircraft and APUs at specific installations throughout the South Coast Air Basin, FAA sought to demonstrate in the Draft General Conformity Determination that the future emissions of NOx/NO2 for aircraft and APUs at LAX estimated for Alternative D are less than those attributed by SCAQMD to LAX in the emissions budgets. The unstated assumption in the Draft General Conformity Determination is that the emissions estimates of NOx and NO2 attributable to aircraft and APUs for all installations other than LAX in the South Coast Air Basin remain as estimated by SCAQMD in the emissions calculations that underlie both the SIP emissions budgets and the emissions budgets in the proposed revision to the SIP based on the 2003 AQMP. Therefore, with respect to aircraft and APUs, the emissions estimated for Alternative D at LAX and for all other installations in the South Coast Air Basin will be less than that portion of the emissions budgets assigned to aircraft and APUs. The SCAQMD has determined that the approach is acceptable and emissions are within SIP budgets (see SCAQMD Letter dated August 12, 2004 elsewhere in this Appendix C).

The commenter is correct that emissions associated with the use of reverse thrust were not explicitly quantified. However, the time-in-mode for takeoff and climbout thrust settings (those settings most representative of reverse thrust operations) has been overestimated for all operations. The modeled time-in-mode (and corresponding emissions) assumes that every aircraft departs LAX at the maximum recorded weight for each airframe. This maximum weight results in the longest takeoff and climbout time for each departure. The time corresponds linearly with the emission for each airframe. Reviewing the potential range of takeoff weights for four common airframes (A-320, B737-500, B747-400, and B757-200) and associated takeoff and climbout times found in EDMS 4.11 indicates that a 10 percent decrease in takeoff weight would result in the a 14 percent decrease in takeoff and climbout time. For these airframes the decrease time represents 11 to 16 seconds, about the same length of time that reverse thrust might be used. Therefore, assuming all aircraft depart LAX at the maximum recorded takeoff weight implicitly includes the calculation of reverse thrust emissions in the airport emission inventory.

As noted above in Response to Comment I.A, the approved SIP is based on a passenger activity level for LAX considerably greater than 78 MAP in 2015. If the emissions of NOx/NO2 attributable to aircraft and APUs are assumed to be linearly proportional to passenger activity level, then the passenger activity level of 78.9 MAP in 2015 under Alternative D implies lower emissions than those estimated for LAX in the approved SIP.

Please see Response to Comment A.I.B.2. and Response to Comment A.II.B. regarding NOx/NO2 emissions from aircraft/APU.

Response to El Segundo Comment III.B.1.c:

Please see Response to Comment A.II.E regarding GSE emissions. Alternative D as defined in the LAX Master Plan Final EIS/EIR includes a measure for the conversion of ground support equipment (GSE) to extremely low emission technology, such as electric power, fuel cells, or other future technological developments. The conversion is planned as a phased program that must be completed at build out in 2015. Because this measure was developed as part of the mitigation program for Alternative D required under CEQA, it is an integral part of Alternative D and is part of the project design for purposes of the general conformity evaluation. The measure is included in the Mitigation Monitoring and Reporting Program (MMRP) published along with the LAX Master Plan Final EIS/EIR in April 2004. The MMRP is a program by which compliance with the proposed mitigation measures identified in the Final EIR is ensured. The MMRP describes the method and timing of implementation, monitoring frequency, and actions indicating compliance. Oversight will be conducted by way of annual reports submitted to the Board of Airport Commissioners and the City Planning Department. The MMRP will be approved by the Los Angeles City Council as part of the Final EIR environmental review process.

All of the mitigation measures that FAA has relied upon in this final general conformity determination are CEQA-related mitigation measures that have been expressly adopted by LAWA and the City in approving Alternative D. As such, those mitigation measures are fully enforceable under Cal. Pub. Res. Code § 21081.6. California regulations also require compliance with mitigation requirements as stated in a mitigation monitoring and reporting program (MMRP); see 14 C.C.R. §§ 15091(d) and 15097(c)(3). The LAX Master Plan MMRP, which incorporates all of the mitigation measures that FAA has relied upon in this final general conformity determination, describes LAWA's lead responsibility for administering the program, the timing of implementation, monitoring frequency, and actions indicating compliance. These provisions ensure that the measures will be properly implemented. Also, the LAX Specific Plan, approved by the City pursuant to 7 C.G.C. §§ 65450 et seq. to establish zoning and development regulations and standards based on the land use plan proposed for LAX, requires in each specific project approval a finding that indicates the appropriate mitigation measures are being adopted as a condition of approval. Further, the LAX Specific Plan requires that LAWA prepare and submit to the City Council, among others, annual reports indicating the status of implementation of the LAX Master Plan MMRP. FAA will require, as a condition of its final approval in the Record of Decision, that LAWA and the City implement the mitigation measures as contemplated in the adopted LAX Master Plan MMRP. If FAA approves Alternative D, it will also include the foregoing condition as a special grant assurance in grant agreements entered into with the City for Alternative D.

Response to El Segundo Comment III.B.1.d.:

It is expected that owners and operators of all but the insignificant stationary point sources located at LAX will hold a permit from SCAQMD. According to the General Conformity Guidance for Airports issued by FAA and EPA on September 25, 2002, to issue such a permit, the state must determine that the emissions are in conformity with the SIP. Thus, “the FAA/airport operator can generally rely on the permit as evidence of a determination and documentation that the emissions are included in the SIP.” Regarding stationary sources, it was not the intention of FAA to apply the criterion at 40 CFR 93.158(a)(1) but rather the criterion at 40 CFR 93.158(a)(5)(i)(A). Since in preparing an AQMP, SCAQMD is able to keep track of currently permitted stationary sources and allow for unpermitted insignificant stationary sources as well as growth in future stationary sources, FAA maintains that the NOx emissions for Alternative D, taken together with NOx emissions for all other stationary point sources in the SCAB, will not exceed the NOx emission budgets in the approved SIP. Given this reasoning, it is unnecessary to

estimate the fraction of basin-wide stationary source emissions attributed to LAX in the approved SIP. The SCAQMD has determined that the approach is acceptable and emissions are within SIP budgets (see SCAQMD Letter dated August 12, 2004 elsewhere in this Appendix C).

Please see Response to Comment A.I.B.3.b. regarding NOx/NO2 emissions from stationary sources.

Response to El Segundo Comment III.B.1.e.:

In evaluating the emissions contributions from motor vehicles, FAA assumed that SCAG properly estimated motor vehicle transportation demand driven by airport activity levels and that SCAQMD properly used the outputs of this demand modeling to estimate the associated emissions. Contrary to the assertion of the commenter, it is not reasonable to assume that the ratio of motor vehicle emissions to aviation source emissions for LAX will represent the ratio of these two types of source categories across the SCAB. At each airport or airfield in the SCAB, the ratio of motor vehicle emissions to aviation source emissions may be expected to be unique, and there is likely a significant amount of motor vehicle emissions in the SCAB that is not associated with any airport or airfield activity. The evaluation of motor vehicle emissions by FAA is based on the reasonable assumption that emissions from motor vehicles that may be associated in the approved SIP with travel demand at LAX is appropriate to the projected level of aviation activity at LAX. The SCAQMD has determined that the approach is acceptable and emissions are within SIP budgets (see SCAQMD Letter dated August 12, 2004 elsewhere in this Appendix C).

Please see Response to Comment A.I.B.3.c. regarding NOx/NO2 emissions from motor vehicle emissions.

Response to El Segundo Comment III.B.1.f.:

Because SCAQMD cannot be expected to have knowledge of all construction projects planned in the SCAB at future points in time, in developing emissions budgets for construction-related activities, it must rely on predictions of growth in economic activities, relationships between various source types, and other factors. Therefore, SCAQMD does not develop emissions budgets for construction-related activities from the bottom up but rather from the top down. The portion of the SIP emission budgets which includes emissions from construction-related activities is not based on the myriad of possible construction projects in the SCAB, but on more general principles and policies. On the other hand, it would be irresponsible of SCAQMD to ignore, as the commenter suggests it should, the public knowledge of a major construction project until it has received final approval. FAA issued its Notice of Intention (NOI) to prepare an EIS for the LAX Master Plan on June 11, 1997, although there were no estimates of environmental impacts included with the NOI. Among other responsibilities, it is incumbent on SCAQMD to enforce applicable emission standards and environmental protection policies that may apply to construction projects when they are proposed to obtain a reasonable expectation of compliance. Because the construction activities associated with Alternative D will comply with, and may even out perform, all applicable emission standards and work practices, there is no reason to believe those emissions, together with all other construction-related emissions in the SCAB, will exceed the emissions budgets in the approved SIP. The SCAQMD has determined that the approach is acceptable and emissions are within SIP budgets (see SCAQMD Letter dated August 12, 2004 elsewhere in this Appendix C).

Please see Response to Comment A.I.B.3.d. regarding NOx/NO2 emissions from construction.

Response to El Segundo Comment III.B.2:

As noted in Section 4 of the Draft General Conformity Determination, prior to conducting the evaluation, FAA prepared a draft protocol to guide the evaluation and submitted it to CARB, EPA, SCAG, and SCAQMD for review and comment. A final protocol was prepared by addressing the comments received from these agencies. That final protocol is included in the Draft General Conformity Determination as Appendix A. Because the protocol described the type of dispersion modeling expected to be performed as part of the general conformity evaluation, the protocol was consistent with the comments received from the reviewing agencies, and the dispersion modeling followed the protocol, FAA believes that the type of

dispersion modeling actually performed meets the general conformity criteria for dispersion modeling. With respect to the method of developing future background concentrations, it should be noted that the method used in the general conformity evaluation follows the method used by SCAQMD in developing future background concentrations for the attainment demonstrations in both the 1997 AQMP and the 2003 AQMP. By implication, EPA's approval of the SIP revisions for the SCAB based on the 1997 AQMP and the 1999 amendment to the 1997 AQMP validates the acceptability of this method to estimate future background concentrations. The SCAQMD has determined that the approach is acceptable and emissions are within SIP budgets (see SCAQMD Letter dated August 12, 2004 elsewhere in this Appendix C).

Please see Response to Comment A.I.C.3.a. regarding PM10.

Response to El Segundo Comment IV:

Alternative D as designed includes four distinct air quality mitigation measures, each containing multiple components, to meet compliance with the requirements of the California Environmental Quality Act. Because the Draft General Conformity Determination demonstrates conformity for Alternative D as designed, there is no need to require mitigation as identified under 40 CFR 93.160. Neither FAA nor LAWA have the legal authority to constrain LAX activity to 78 MAP (or any other activity level), as suggested by the commenter. The commenter has suggested that one feasible mitigation measure that should be considered for LAX is to electrify terminal gates to provide parked aircraft with centrally produced electric power. In fact, LAWA has previously committed to have all of its aircraft gates equipped with 400-Hz power and preconditioned air in the near future, regardless of approval of the Master Plan; therefore, this feature is not only part of Alternative D but of the No Action/No Project Alternative as well. Please see the Final EIS/EIR Appendix S-E for additional details of the on-going commitment by LAWA to environmental improvements at LAX.

All of the mitigation measures that FAA has relied upon in this final general conformity determination are CEQA-related mitigation measures that have been expressly adopted by LAWA and the City in approving Alternative D. As such, those mitigation measures are fully enforceable under Cal. Pub. Res. Code § 21081.6. California regulations also require compliance with mitigation requirements as stated in a mitigation monitoring and reporting program (MMRP); see 14 C.C.R. §§ 15091(d) and 15097(c)(3). The LAX Master Plan MMRP, which incorporates all of the mitigation measures that FAA has relied upon in this final general conformity determination, describes LAWA's lead responsibility for administering the program, the timing of implementation, monitoring frequency, and actions indicating compliance. These provisions ensure that the measures will be properly implemented. Also, the LAX Specific Plan, approved by the City pursuant to 7 C.G.C. §§ 65450 et seq. to establish zoning and development regulations and standards based on the land use plan proposed for LAX, requires in each specific project approval a finding that indicates the appropriate mitigation measures are being adopted as a condition of approval. Further, the LAX Specific Plan requires that LAWA prepare and submit to the City Council, among others, annual reports indicating the status of implementation of the LAX Master Plan MMRP. FAA will require, as a condition of its final approval in the Record of Decision, that LAWA and the City implement the mitigation measures as contemplated in the adopted LAX Master Plan MMRP. If FAA approves Alternative D, it will also include the foregoing condition as a special grant assurance in grant agreements entered into with the City for Alternative D.

Response to El Segundo Comment V:

For the reasons noted above, as well as for the letters received from SCAG (letter dated February 4, 2004, elsewhere in this Appendix C), CARB (letter dated July 23, 2004, elsewhere in this Appendix C), and SCAQMD (letter dated August 12, 2004, elsewhere in this Appendix C), FAA believes that Alternative D proposed for LAX does conform to the California SIP.

Exhibits

Response to El Segundo Comment A.I.A.:

Please see Response to Comment II. regarding the applicability analysis. The commenter argues that the Draft General Conformity Determination is flawed due to its use of the "No Action/No Project Alternative as the baseline against which to calculate Project emissions." As noted in the Draft General Conformity Determination Appendix A subsection 5.2.3, a general conformity evaluation represents a "build/no-build" test.

First, the commenter argues that the No Action/No Project Alternative "would not happen in practice." With respect to LAX Northside, LAWA received approval for the LAX Northside development in 1983. Shortly thereafter, LAWA initiated an EIR addressing improvements to LAX to accommodate projected growth. Prior to its completion, LAWA decided to engage in the LAX Master Plan to address projected growth in a broader context. LAWA appropriately chose to reconsider the LAX Northside project in this broader context. During the planning stages for the LAX Master Plan, it became apparent that the LAX Northside project should be reconsidered for a variety of reasons. Under some of the concepts under consideration, some of the land area originally included in the LAX Northside development was needed for airfield uses and ground access facilities. LAWA also elected to modify the land uses associated with the original LAX Northside project to provide a location for retail, commercial, industrial, and other uses displaced under the LAX Master Plan. The planning LAWA has undertaken for the Westchester Southside project is evidence of its commitment to develop the LAX Northside property, not its abandonment of the previously-approved project. LAWA's pursuit of an administration facility within LAX Northside is also not an abandonment of the original project, as an administration facility would not be inconsistent with the previously-approved land uses.

Unlike Alternatives A, B, and C, Alternative D would not require the use of a portion of the LAX Northside development for airfield uses or ground access facilities. Moreover, Alternative D would displace a fraction of the businesses that would be displaced under the other build alternatives (38 businesses under Alternative D compared to 239 under Alternative C and 330 under Alternative A). For these reasons, Alternative D does not include the Westchester Southside development. Rather, under Alternative D, LAX Northside would be implemented, but at a lower intensity than under the No Action/No Project Alternative. Under Alternative D, the existing vehicle trip cap for LAX Northside would be reduced to limit vehicle trips to a level comparable to that of the Westchester Southside project. As such, full development of the 4.5 million square feet of uses currently entitled for LAX Northside would not occur under Alternative D.

Disapproval of the LAX Master Plan or, more specifically, disapproval of Alternatives A, B, or C, would eliminate the need to redesign the LAX Northside project. If the LAX Master Plan were not approved, it is reasonably expected that LAWA would pursue its original plan for the development of LAX Northside. Therefore, inclusion of the original LAX Northside project in the No Action/No Project Alternative was reasonable and appropriate.

With respect to Continental City, LAWA purchased the Continental City property with the intention of using it for future airport development. As stated in its Airport Improvement Program grant application, it was LAWA's intent to define the future uses of the Continental City property during the LAX Master Plan process. LAWA has fulfilled this commitment. The Draft LAX Master Plan and Master Plan Addendum fully describe the facilities associated with the four Master Plan build alternatives under consideration, including proposed uses for the Continental City property. As stated in these documents, under Alternative A, the Continental City property would be used to expand air cargo facilities and to provide ancillary facilities. Under Alternative B, it would be used for air cargo, employee parking, and ancillary facilities. The site would be used for aircraft aprons, maintenance facilities, and ancillary facilities under Alternative C, and for an Intermodal Transportation Center and Automated People Mover Maintenance Service Facility under Alternative D.

Notwithstanding these intentions, if the LAX Master Plan were not approved, it is reasonably expected that LAWA would pursue development of the Continental City property in accordance with its approved land uses and entitlements in order to gain a return on its investment. The Continental City project has an approved subdivision entitlement, Development Agreement, and Final EIR to permit construction of the Continental City project with 3 million square feet of office space and 100 million square feet of retail

uses. These land uses are compatible with the airport uses at LAX. It should be noted that the Tentative Tract Map for Continental City was recorded as Final Tract Map #36729 on September 29, 1988, and the City Council approved a Development Agreement for Continental City under Contract C-65716 signed by Mayor Bradley on October 29, 1986.

Any changes in the start date of the Continental City or LAX Northside projects would simply result in a shift of the No Action/No Project Alternative year of peak emissions to coincide with the Alternative D year of peak emissions. Please see Response to Comment I.C. regarding the general conformity evaluation assumptions.

Second, the commenter argues that the LAX Northside and Continental City projects are independent of the operation of LAX. As stated above, this assumption is incorrect.

Third, the commenter argues that the emissions for the No Action/No Project Alternative are based on assumptions that are not consistent with the latest planning assumptions. While million annual passengers (MAP) and million annual tons of cargo (MAT) may be convenient metrics with which to describe an airport's capacity, they are not necessarily the best metrics to relate to emissions. Please see Response to Comment I.A. regarding use of the latest planning assumptions.

Response to El Segundo Comment A.I.B.1.a:

The general approach was presented in a draft Protocol for General Conformity Evaluation for review and comment by the USEPA/Region 9, CARB, SCAQMD, and SCAG. Comments from these agencies were incorporated into the final protocol (see Appendix A of the Draft General Conformity Determination). Neither CARB nor USEPA/Region 9 provided comments on the Draft General Conformity Determination during the public-comment period, which strongly suggests that these agencies believe methodology issues had been addressed through the process of protocol development and discussions held with the agencies in October of 2003. Comments received from SCAG on the Draft General Conformity Determination during the public-comment period (letter dated February 4, 2004, elsewhere in this Appendix C) indicate that Alternative D is consistent with both the 2001 RTP and the Draft 2004 RTP and state "we find that the proposed Master Plan meets the General Conformity Requirements." Responses to written comments received from SCAQMD on the Draft General Conformity Determination during the public-comment period are included with this Final General Conformity Determination, Appendix C.

Response to El Segundo Comment A.I.B.1.b:

The commenter is incorrect in statements made concerning the activity levels of Alternative D in relation to the activity levels presented in the 2003 AQMP. Please see Response to Comment I.A. regarding activity levels and MAP levels of Alternative D. Please also refer to Table 7 of the Draft General Conformity Determination for a listing of the emission source types in the 1997 AQMP and 2003 AQMP.

The commenter is also incorrect that airport emissions generally and LAX emissions specifically are not identified in either the approved SIP or the 2003 AQMP. The 2003 AQMP Appendix III Attachment D lists LAX as the largest source of NOx in the SCAB. While this distinction is based on emissions from aircraft and APU only, the "source" of these emissions is generated by the activities of many owners and operators at LAX, which is distinctly identified in the 2003 AQMP. SCAQMD did develop emission inventories for aircraft and APU for each airport in the SCAB to support both its 1997 AQMP and its 2003 AQMP. Since the only available estimate of future emissions from aircraft and APU at airports other than LAX are these estimates developed by SCAQMD, it was assumed that as long as the estimate of emissions for Alternative D were less than those developed by SCAQMD for LAX, then the emissions from aircraft and APU for LAX, together with those emissions estimated for aircraft and APU from all other airports in the SCAB, will be less than the total emission inventory from aircraft and APU for all airports in the SCAB combined.

Response to El Segundo Comment A.I.B.1.c:

The NOx/NO2 conformity evaluation was performed for the years 2005, 2008, and 2010 as noted by the commenter. The general conformity regulations at 40 CFR 93.159(d) require emission scenarios during the mandated attainment year (or in a maintenance area the furthest year for which emissions are estimated in the SIP), the year of peak emissions, and for SIP milestone years. The years of analysis used were appropriate for this general conformity evaluation, as noted in the Draft General Conformity Determination Appendix A subsection 5.1.2.1.

Response to El Segundo Comment A.I.B.2:

Please see Response to Comment I.A. regarding the MAP levels used in the general conformity determination as well as Response to Comment III.B.1.a. and Response to Comment III.B.1.b. regarding NOx/NO2 emissions.

Total emissions from Alternative D have been presented in Table 4 of the Draft General Conformity Determination. The extrapolation presented in Table 1 of Comment A.I.B.2 is not accurate as it assumes the Draft General Conformity Determination uses the same aircraft fleet mix as the 2003 AQMP.

According to the commentor's own analysis, regional emissions from the 2003 AQMP exceed the approved SIP budget with or without the LAX Master Plan project. The commentor's Table 2 incorrectly compares 2003 AQMP-based emission calculations against 1997 AQMP budgets. Not only were the two budgets created using different methodologies and control strategies, but the data cited by the commenter from the 2003 AQMP represent the baseline (uncontrolled) scenario. By using a consistent methodology and consistent AQMP budgets for the analysis, NOX/NO2 emissions are found to conform as described in the Draft General Conformity Determination

The commenter incorrectly points to AQMP 2003 Table A-11 for the 2010 NOX/NO2 emissions. The 2010 NOX/NO2 emissions can be found in Table A-10 of the 2003 AQMP.

Response to El Segundo Comment A.I.B.3.a:

Please see Response to Comment I.A and Response to Comment A.II.A.2. for additional information regarding MAP levels in both the 1997 AQMP and Alternative D. The commenter incorrectly assumes the 1997 AQMP is based on a 78 MAP level at LAX in 2015. The 1997 AQMP is the basis for the currently approved State Implementation Plan (SIP) for the South Coast Air Basin, and it was developed at a time (1995 to 1996) when the SCAQMD assumed growth at LAX would match closely with the unconstrained demand. At that time, the expected growth in travel demand at LAX was in line with MAP levels presented in SCAG's 1998 RTP. The 1998 RTP MAP levels for LAX ranged from 90.7 to 101.0 in 2020. Linear interpolation between 1995 (53.9 MAP) and 2020 indicates that in 2015 LAX would have been expected by SCAG to reach between 83.3 and 91.6 MAP. Clearly, the Alternative D 2015 MAP level (78.9) is less than the MAP assumptions for LAX in the 2015 timeframe that would have been considered reasonable by SCAG at the time the 1997 AQMP was developed and that presumably are reflected in the approved SIP. As noted in the 2003 AQMP Chapter 1 Table 1-3, state and federal control measures have been adopted since 1994 which produced more NOx emission reductions than were committed to in the 1997/99 SIP submittal. The excess reductions were achieved without controls on aircraft emissions. Therefore, assuming uncontrolled aircraft emissions combined with the reductions achieved in other sources, indicates that the approved SIP budgets for NOx would still be met. The California Air Resources Board (ARB) sent a letter to the FAA, dated July 23, 2004 (elsewhere in this Appendix C), specifically indicating that baseline (i.e., uncontrolled) non-military aircraft emissions are the appropriate SIP budgets in the approved SIP to be used in this conformity determination. Therefore, the aircraft emissions in the LAX Master Plan Alternative D conform to the currently approved SIP budgets for aircraft as demonstrated in the Draft General Conformity Determination subsection 5.2.1.

Response to El Segundo Comment A.I.B.3.b:

Please see Response to Comment III.B.1.d. regarding NOx/NO2 emissions from stationary sources. As noted in USEPA's "General Conformity Guidance for Airports: Questions and Answers" (September 25, 2002) at page 7, to issue permits to stationary sources, the state must determine that the emissions are in conformity with the SIP and thus, "the FAA/airport operator can generally rely on the permit as evidence of a determination and documentation that the emissions are included in the SIP."

The numbers presented by the commenter in Table 4 were arrived at by using a different approach from that which the commenter presented in Tables 1 and 2 of their comments. Using a consistent approach without mixing values from the 1997 and 2003 AQMPs will show that estimates of emissions from stationary sources do, indeed, conform to the approved SIP budget.

It should also be noted that the commenter incorrectly assumes that a ratio method can be applied to the stationary sources. Not all stationary sources change in direct proportion to airport activity. The general conformity evaluation conservatively assumed that all stationary sources operate at full capacity all the time, rather than at a level which is proportional to aircraft activity level.

Response to El Segundo Comment A.I.B.3.c:

Please see Response to Comment I.C. regarding the capacity of LAX under Alternative D and Response to Comment III.B.1.e. regarding NOx/NO2 emissions from motor vehicles. The methodology used for analyzing the surface transportation was appropriate and followed CEQA/NEPA guidelines and requirements. Using a consistent approach without mixing values from the 1997 and 2003 AQMPs will show that estimates of emissions from motor vehicles do, indeed, conform to the SIP budget.

The number of passengers that would be accommodated by Alternative D is constrained to 78.9 MAP based on the design of the Alternative D gate facilities and the projected airline response to the constrained facilities. The ability to increase aircraft size, thereby increasing passenger levels, was limited by the number and type of gates available under the Alternative D terminal design.

Trip generation for all alternatives was based on the design day passenger schedules for each alternative. The design day trip generation for ground transportation forecasts for each alternative were based on 1) the proposed flight schedules, including percent of enplanements and deplanements that are originating, terminating and connecting, 2) the number of visitors associated with each originating and terminating passenger, and 3) the lead and lag times associated with the flight activity. Because of these variables, there is not a direct correlation between the number of originating passengers per day and the number of hourly vehicle trips made during the AM Peak, PM Peak, and Airport Peak hours. The significant impacts for Alternative D are based on these peak time periods, and not based on daily traffic volumes.

Response to El Segundo Comment A.I.B.3.d:

Please see Response to Comment III.B.1.f. regarding NOx/NO2 emissions from construction. The line item "Construction and Demolition" the commenter references from the AQMPs only addresses PM10 fugitive dust emissions. Engine emissions (including NOx/NO2) from construction sources are included in a variety of emission line items, including "Off-Road Vehicles/Equipment" and "On-Road Vehicles" among others. Construction emissions were compared against the appropriate SIP budgets.

As mentioned in Section 4 of the Draft General Conformity Determination, prior to conducting the general conformity evaluation, FAA prepared a draft protocol and submitted it to EPA, CARB, SCAG, and SCAQMD for review and comment. FAA prepared the final protocol by addressing comments received from these agencies, and that protocol (included in the Draft General Conformity Determination as Appendix A) provided the basis for methods and procedures used in the technical evaluation. Any deviation from the protocol was noted in the Draft General Conformity Determination.

Response to El Segundo Comment A.I.C.1:

As mentioned in Section 4 of the Draft General Conformity Determination, prior to conducting the general conformity evaluation, FAA prepared a draft protocol and submitted it to EPA, CARB, SCAG, and SCAQMD for review and comment. FAA prepared the final protocol by addressing comments received from these agencies, and that protocol (included in the Draft General Conformity Determination as Appendix A) provided the basis for methods and procedures used in the technical evaluation. Any deviation from the protocol was noted in the Draft General Conformity Determination.

Please see the Draft General Conformity Determination Appendix A subsection 5.3.1.1.1 which describes in further detail the calculation of secondary PM10 emissions and provides the references for the approach used.

Response to El Segundo Comment A.I.C.2:

For PM10, the mandated attainment year is 2006, the year during which emissions are expected to be the greatest under Alternative D is 2013, and the only year for which the approved SIP specifies an emission budget is 2003. Because Alternative D was not expected to affect emissions in 2003, that year is irrelevant for the general conformity evaluation. Therefore, the Draft General Conformity Determination properly addressed impacts of PM10 in 2006 and 2013 only.

Response to El Segundo Comment A.I.C.3.a:

Please see Response to Comment III.B.2. regarding PM10. As stated above, PM10 emission calculations included a level of conservatism and were not underestimated.

As previously stated, the baseline was not inflated and, therefore, net emissions have not been underestimated. Please see Response to Comment I.A. regarding calculation of the baseline. Regarding the dispersion modeling of PM10, net emissions were, in fact, not modeled, rather all emissions attributable to Alternative D were modeled, providing additional conservatism to the evaluation. Therefore, modeled ambient concentrations of PM10 were likely over predicted.

The commenter is correct that emissions associated with the use of reverse thrust on aircraft engines were not explicitly quantified. However, the generally conservative methodology used to estimate emissions for the standard aircraft modes (approach, taxi/idle in, taxi/idle out, take off, and climbout), it is believed that emissions from the entire LTO cycle are adequately accounted for in the general conformity evaluation without specifically assigning emissions to a reverse thrust mode. Please see Response to Comment III.B.1.b. regarding reverse thrust.

Response to El Segundo Comment A.I.C.3.b:

Please see Response to Comment III.B.2. regarding the methodology for estimating future background concentrations. As noted in Appendix A of the General Conformity Determination, PM10 monitoring data from the SCAQMD Hawthorne monitoring station were used for the evaluation.

Response to El Segundo Comment A.I.C.4:

Emissions of elemental carbon (EC) are most often associated with combustion of fossil fuels, particularly diesel fuel where EC represents a solid core of the diesel exhaust particulate matter. Since the EC is typically emitted as primary, not secondary, particulate, it is already accounted for in the primary PM10 emission factors for combustion sources. The FAA is not aware of any reliable data demonstrating that aircraft engines emit quantifiable amounts of ammonia. On the other hand, it is well known that the exhaust from fossil-fueled motor vehicles, particularly those using gasoline and equipped with a catalytic converter, can emit small quantities of ammonia. While the current version of the EMFAC2002 model does not address ammonia emissions from motor vehicles, the evaluation in the Final General Conformity Determination attempts to include an allowance for secondary formation of PM10 associated with

ammonia emissions from motor vehicles. The quantity of ammonia that would be emitted as "slip" by any SCR-controlled stationary sources located at LAX is a small amount and considered negligible for purposes of this evaluation.

The commenter is correct that emissions of pollutants contributing to secondary formation of components of PM10 presented in the Draft General Conformity Determination were underestimated. Emissions of these pollutants from construction sources and motor vehicle sources were inadvertently left out of the evaluation. All emissions of these pollutants have been accounted for in the Final General Conformity Determination; although the predicted concentration of secondary PM10 increased from those levels presented in the Draft General Conformity Determination, taken together with the modeled primary PM10 concentrations, the NAAQS are still not predicted to be exceeded.

The formation of secondary air pollutants would be very difficult to assess on a project basis. Atmospheric chemical reactions typically occur over periods of time ranging from minutes to days and are affected by regional emissions, not just the local air quality. To accurately assess secondary pollutant formation would require the analysis of all air emission sources in the South Coast Air Basin as well as determining wind patterns across the basin. The resolution (the ability to identify the location of sources and receptors) of regional models is typically less than the resolution required in local scale models (such as ISCST3 and EDMS). For example, the resolution of a regional model (such as the Urban Airshed Model, UAM) is typically on the order of several kilometers between grid nodes; the resolution of local models is typically on the order of 10 to 100 meters between grid nodes. In addition, including a regional secondary pollutant analysis would not provide any substantial change in the comparison between alternatives in the LAX Master Plan. Please see Response to Comment A.I.C.1. regarding the methodology to predict secondary PM10 impacts.

Response to El Segundo Comment A.I.C.5.a:

USEPA's Guideline on Air Quality Models (40 CFR Part 51 Appendix W) states under Paragraph 9.3.1.2.b. that if one year or more of site-specific data is available, these data are preferred for use in air quality dispersion modeling. As outlined in the agency-reviewed air quality modeling protocol for the Draft General Conformity Determination, modeling was appropriately performed with one year of on-site meteorological data.

Response to El Segundo Comment A.I.C.5.b:

The commenter is incorrect that only areas outside the LAX fenceline were modeled. Receptors for dispersion modeling of PM10 were placed in publicly accessible areas of LAX including the Central Terminal Area, as noted in the Draft General Conformity Determination Appendix A subsection 5.3.2.4. FAA provided model input and output files to Shute, Mihaly & Weinberger LLP on a CD-ROM on January 21, 2004.

Response to El Segundo Comment A.II.A.1:

Please see Response to Comment I.A. regarding MAP levels for the LAX Master Plan, Response to Comment I.C. regarding general conformity determination assumptions, and Response to Comment II. regarding the general conformity applicability analysis. The horizon year for the No Action/No Project Alternative and for Alternative D has always been 2015, whereas the interim analysis year for the No Action/No Project Alternative has always been 2005 and for Alternative D has always been 2013. Because it was not expected that construction of Alternative D would be far enough progressed by 2005 to affect LAX operations, operational activity levels in 2005 were assumed to be the same for the No Action/No Project Alternative and for Alternative D. Operational activity levels of aircraft for Alternative D in 2013 were conservatively assumed to equal those in 2015. During the evaluation supporting the Draft General Conformity Determination, the operational emissions for the interim years of Alternative D were inadvertently interpolated between 2005 and 2013, which had the unintended consequence of increasing emissions in those interim years above what they should have been. For the Final General Conformity Determination, operational emissions in the interim years for the No Action/No Project Alternative and for

Alternative D have been correctly interpolated between 2005 and 2015. Construction emissions for both the No Action/No Project Alternative and for Alternative D were calculated for each year of construction and linear interpolation was not used to estimate construction emissions in any year.

Because the operational activity levels in 2005 for the No Action/No Project Alternative and Alternative D were assumed to be the same, the net emissions in 2005 represent solely the difference between the construction emissions for these two alternatives.

Response to El Segundo Comment A.II.A.2:

Please see Response to Comment I.A regarding the capacity of Alternative D and Response to Comment II. regarding the general conformity applicability analysis.

Alternative D is designed to serve 78.9 MAP in 2015, the approximate level of passenger activity identified by SCAG for LAX in the 2001 Regional Transportation Plan (RTP). Alternative D would encourage the development and use of regional airports to serve local demand by constraining the facility capacity at LAX to approximately the same aviation activity levels identified in the No Action/No Project Alternative. The passenger activity that would be expected in 2015 with Alternative D was determined based on the design of the Alternative D gate facilities and the project airline response to the constrained facilities.

Gate capacity analysis has been conducted to determine the physical capacity of the airport configuration being proposed in Alternative D. Please see Section 3.3 of the Final EIS/EIR for a more detailed discussion.

Market factors influence airport activity. The analysis conducted for the LAX Master Plan process acknowledges this fact and clearly articulates a reasonable market-based activity scenario that is consistent with the LAX Master Plan forecast and design day activity forecasts used to evaluate the impacts of each alternative.

As described in the Final EIS/EIR, commuter operations would likely be reduced from 1996 levels, consistent with the forecasts for No Action/No Project Alternative and Alternative C, in order to maximize the number of passengers that could be served with a limited number of operations.

The commenter focuses only on the number of operations in the market segment while ignoring the corresponding fleet changes and associated passenger levels. In the case of the commuter activity, there was a significant decrease in the number of operations between 1996 and 2000. The commenter fails to acknowledge that during the same time period, commuter passengers increased from 2.7 million in 1996 to 2.92 million in 2000. This change resulted from the abandonment of the LAX market by 19 seat aircraft.

The constrained activity level of 78.9 MAP forecast for Alternative D in 2015 remains within the range in each table and charge presented in Professor Kanafani's report referred to by this commenter.

Ultimately, the conclusions drawn by Professor Kanafani's report are arbitrary and based on invalid predictive use of select portions of data presented in the Draft LAX Master Plan Addendum. However, the report's results, in every case, conclude that a possible outcome is the same as presented in the Draft LAX Master Plan Addendum. The report arbitrarily continues to highlight the upper limit of potential passenger activity in the aforementioned report without acknowledging its own results showing a range of possible outcomes that include the number presented in the Draft LAX Master Plan Addendum and, additionally, activity levels even lower than those forecast in the Draft LAX Master Plan Addendum.

It appears that the report's results validate the constrained forecast passenger activity level of 78.9 MAP for LAX Master Plan – Alternative D's 153-gate airport presented in the Draft LAX Master Plan Addendum and Final EIS/EIR.

Response to El Segundo Comment A.II.B:

Please see Response to Comment III.B.1.b. regarding reverse thrust. As the commenter notes, emissions associated with the use of reverse thrust are not included in the Draft General Conformity

Determination. The relative time that aircraft at LAX are expected to use reverse thrust compared to the time spent in other operational modes is minimal, thus emissions for this mode are assumed to have minimal impact on emission inventories. In addition, since runway lengths at LAX are able to accommodate even the largest aircraft, use of reverse thrust would be expected to be minimal. The methodology (specifically times in mode) used to estimate emissions for the standard aircraft modes (approach, taxi/idle out, take-off, and climbout) may be considered generally conservative enough to account for potential emissions from use of reverse thrust.

Response to El Segundo Comment A.II.C:

Please see Response to Comment I.B. regarding use of the latest emission techniques. EDMS 4.11 was used in the general conformity evaluation for emission calculations only to provide consistency with the associated Final EIS/EIR and in accordance with the protocol (see Draft General Conformity Determination Appendix A).

For the Final General Conformity Determination, emissions from aviation sources for both the No Action/No Project Alternative and Alternative D were modeled using EDMS 4.11.

Response to El Segundo Comment A.II.D.1:

Please see Response to Comment A.II.A.1. regarding the correct planning horizons.

Response to El Segundo Comment A.II.D.2:

The commenter is correct that a mixing height of 2050 feet should have been assumed for all years of the general conformity evaluation, whereas a mixing height of 1800 feet was inadvertently assumed for 2005 in the evaluation presented in the Draft General Conformity Determination. The evaluation has been revised to apply a mixing height of 2050 feet for all years in the Final General Conformity Determination.

Response to El Segundo Comment A.II.E:

Please see Response to Comment III.B.1.c. regarding GSE emissions. The GSE emission calculations are based on the selection by Los Angeles World Airports (LAWA) of an air quality mitigation measure in the Final EIS/EIR to move to a zero-emission GSE fleet by 2015. If zero emissions are not achieved through that effort, the mitigation program for the LAX Master Plan provides for the implementation of other measures for which the amount of emissions reductions was not quantified in the Final EIS/EIR. Subject to the feasibility of such additional measures, their implementation can provide emissions reductions necessary to make up for any shortfall in emissions reductions associated with GSE. Implementation and monitoring of the GSE mitigation program will be accomplished through the Mitigation Monitoring and Reporting Plan required under the California Environmental Quality Act.

The GSE emissions were estimated using the FAA EDMS model with CARB OFFROAD model emission factors for the LAX Master Plan. Since LAWA has committed to achieving emissions reductions beyond the levels that will be achieved with the South Coast GSE MOU at LAX, and since the GSE MOU had not been finalized at the time the 1997 AQMP was developed, the emissions allocable to LAX GSE in the nonroad emission budget of the approved SIP should be sufficient to accommodate LAX GSE emissions under Alternative D. Again note that, according to SCAG planning forecasts prepared at the time the 1997 AQMP emission budgets were developed, LAX was assumed to have a much higher level of future activity than that assumed under Alternative D.

While SCAQMD, a non-signator of the South Coast GSE MOU, may consider the MOU to be non-binding, the agreement is essentially a contract between CARB and the various signatory airlines. The MOU is binding on the airlines to achieve emissions reductions, since the MOU describes a “compliance process” (Section IV.C of the MOU) and “remedies” (Section IV.D of the MOU) including liquidated damages payable to CARB in the event of failure to meet the conditions of the MOU.

Response to El Segundo Comment A.II.F:

The general conformity evaluation assumed that hot-mix asphalt would be used during construction of runways, taxiways, and gate apron areas, which is the common practice for this type of construction work at LAX. Therefore, VOC emissions from the asphalt material are expected to be minimal. Exhaust emissions from the heavy construction paving equipment were included in the evaluation.

For hot-mix asphalt, the organic components have high molecular weights and low vapor pressures. Therefore, hot-mix asphalt use produces minimal emissions of VOCs (see Emission Inventory Improvement Program, Asphalt Paving, Volume III, Chapter 17, page 17.2-3, USEPA, January 2001). The VOC emission factor for hot-mix asphalt is estimated to be ~0 lb VOC emitted per 100 lbs of asphalt cement (asphalt pavement refers to the paving mixture of asphalt cement plus aggregate, with aggregate typically comprising 92-99 wt % of the mixture (see "VOC Emissions from Asphalt Paving," Research Triangle Institute, 28 March 2000).

Similarly, the use of architectural coatings is expected to result in negligible VOC emissions due to the abundance of low- and zero-VOC coatings currently available on the market. Further advances in coating formulations are expected throughout the construction period for either the No Action/No Project Alternative or Alternative D.

Response to El Segundo Comment A.II.G:

The evaluation contained in the Draft General Conformity Determination utilized conservative assumptions and methodologies. First, Alternative D requires significantly less construction activities than the previously proposed alternatives. Therefore, Alternative D requires fewer pieces of construction equipment, which in turn, reduces emissions. The current construction analysis is based on CARB OFFROAD model emission factors for each actual piece of equipment assumed to be working at the site throughout all phases of project construction.

The same assumptions relative to hours of operation are contained in all alternatives. All equipment is assumed to be operating five days per week, eight and one-half hours per day for the most conservative approach possible.

Please see the Final EIS/EIR Appendix S-E for a more detailed explanation of construction-related air quality impacts associated with Alternative D. FAA has discussed the details of the construction emission calculations for the Draft General Conformity Determination with SCAQMD, which agrees that those calculations are based on conservative assumptions.

Response to El Segundo Comment B:

Responses to the City of El Segundo on the 2003 LAX Master Plan Addendum & Supplement to the Draft EIS/EIR were provided in the Final EIS/EIR published in April 2004 (see Responses to Comments for Letter SAL00015 regarding comments on the LAX Master Plan Addendum and the Supplement to the Draft EIS/EIR).

Response to El Segundo Comment C:

Responses to the City of El Segundo on the air quality and human health and safety analyses in the Supplement to the Draft EIS/EIR were provided in the Final EIS/EIR published in April 2004 (see Responses to Comments for Letter SAL00015 regarding comments on the Supplement to the Draft EIS/EIR).

Response to El Segundo Comment D:

Responses to the City of El Segundo on the air quality and human health and safety analyses in the Draft EIS/EIR were provided in the Final EIS/EIR published in April 2004 (see Responses to Comments for Letter AL00033 regarding comments on the Draft EIS/EIR).

Response to El Segundo Comment E:

Responses to SCAQMD on the Supplement to the Draft EIS/EIR were provided in the Final EIS/EIR published in April 2004 (see Responses to Comments for Letter SAR00004 regarding comments on the Supplement to the Draft EIS/EIR).

Response to El Segundo Comment F:

Exhibit F was included in the letter from the City of El Segundo with comments on the Draft EIS/EIR. Responses to the City of El Segundo on the Draft EIS/EIR were provided in the Final EIS/EIR published in April 2004 (see Responses to Comments for Letter AL00033 regarding comments on the Draft EIS/EIR).

Response to El Segundo Comment G:

Exhibit G does not contain comments on the Draft General Conformity Determination.

2.4 Response to South Coast Air Quality Management District Comment Letter Dated February 9, 2004

Responses to the SCAQMD comment letter dated February 9, 2004, were developed through a series of discussions between FAA, LAWA, and SCAQMD. These discussions began in February 2004 and ended in July 2004. After the last meeting of these agencies, the SCAQMD transmitted a letter to the FAA indicating that the methodologies used in the conformity evaluation were acceptable and the evaluation demonstrated conformance with the applicable SIPs (Letter from SCAQMD dated August 12, 2004, elsewhere in this Appendix C).

Response to SCAQMD Comment - Background:

The comment is not correct in stating that under the General Conformity regulations the emissions associated with the proposed LAX Master Plan must conform with the emission budgets specified in the latest approved State Implementation Plan (SIP). The General Conformity regulations identify multiple criteria that can be met to demonstrate conformity (40 CFR 93.158). One of those criteria is a showing that the total of direct and indirect emissions associated with the proposed LAX Master Plan would not exceed the emission budgets specified in the applicable SIP. However, any single criterion or combination of criteria can be used to demonstrate conformity.

Response to SCAQMD Comment 1):

The comment states that the LAX Master Plan Alternative D activity level in terms of million annual passengers (MAP) is inconsistent with the 2001 Regional Transportation Plan (RTP) developed by the Southern California Association of Governments (SCAG). However, SCAG provided comments to the Draft GCD dated February 4, 2004, clearly stating that Alternative D was consistent with both the 2001 RTP and the Draft 2004 RTP (letter dated February 4, 2004, elsewhere in this Appendix C). Further, the SCAG comments stated that it found the proposed Master Plan met the General Conformity Requirements.

The comment also implies that because the LAX MAP level in 2015 projected by SCAQMD for use in the 2003 Air Quality Management Plan (AQMP) is lower than the LAX Master Plan MAP projection for 2015, the emissions in the LAX Master Plan would also be inconsistent with the emissions estimated by SCAQMD for LAX for use in the 2003 AQMP. MAP level per se is a non-specific and imprecise indicator of actual aircraft emissions when other parameters are not considered. Changes in these other parameters (such as aircraft load factors, fleet mix, engine technology, taxi/idle time, etc.) will have substantial impacts on estimated emissions.

Finally, the 1997 AQMP is the basis for the currently approved State Implementation Plan (SIP) for the South Coast Air Basin, and it was developed at a time (1995 to 1996) when the SCAQMD assumed growth at LAX would match closely with the unconstrained demand. At that time, the expected growth in travel demand at LAX was in line with MAP levels presented in SCAG's 1998 RTP (see Attachment C-1). The 1998 RTP MAP levels for LAX ranged from 90.7 to 101.0 in 2020. Linear interpolation between 1995 (53.9 MAP) and 2020 indicates that in 2015 LAX would have been expected by SCAG to reach between 83.3 and 91.6 MAP. Clearly, the Alternative D 2015 MAP level (78.9) is less than the MAP assumptions for LAX in the 2015 timeframe that would have been considered reasonable by SCAG at the time the 1997 AQMP was developed and that presumably are reflected in the approved SIP.

Response to SCAQMD Comment 2):

Detailed calculations and information were submitted directly to the SCAQMD, including CD-ROMs provided to the District on April 14, 2004 (see Attachment C-3, on CD only), and on or about May 19,

2004 (see Attachment C-4, on CD only); emails sent to the District on February 4, April 28, May 19, May 21, May 25, May 26, July 6, and July 9, 2004 (see Attachment C-5); and hardcopy information provided in meetings held with the District on April 14, May 11, May 26 (Environmental Compliance Solutions, Erin Sheehy), and July 29, 2004 (see Attachment C-6).

As discussed in meetings between the SCAQMD and representatives of the FAA and LAWA on April 14 and May 11, aircraft emissions of VOC and CO are highly dependent on the taxi/idle time (time aircraft spend on the ground moving along taxiways, waiting to move into or away from the terminal gates, and waiting to move on or off the runways). Alternative D provides a more efficient airfield for aircraft ground movement relative to the No Action/No Project Alternative. This efficiency translates into shorter taxi/idle times and lower VOC and CO emissions. On the other hand, NOx is directly related to thrust setting and temperature which are higher during takeoff and climbout. Therefore, NOx emissions are less affected by taxi/idle time and more dependent on the number of operations. PM10 emissions from aircraft are related to fuel flow which is somewhat lower under Alternative D due to reduced taxi/idle times.

The CD-ROMs provided to SCAQMD included stationary and mobile source information. The stationary source assumptions do not change substantially from those presented in the Draft EIS/EIR and the Supplement to the Draft EIS/EIR (January 2001 and July 2003, respectively). On-road mobile source information was supplemented with the regional traffic vehicle miles traveled (VMT) and vehicle hours traveled (VHT) files emailed to SCAQMD on May 21, 2004, and other information emailed on July 6 and July 9, 2004.

The ground support equipment (GSE) emission calculations are based on Los Angeles World Airport's (LAWA's) selection of an air quality mitigation measure in the Final EIS/EIR to move to a zero-emission GSE fleet by 2015. If zero emissions are not achieved, the mitigation program for the LAX Master Plan provides for the implementation of other measures for which the amount of emissions reductions was not included in the Final EIS/EIR but, based on confirmation of the feasibility of such additional measures, implementation of those measures can provide emission reductions necessary to make up for any shortfall in emission reductions associated with GSE. Implementation and monitoring of the GSE mitigation program will be accomplished through the Mitigation Monitoring and Reporting Plan required under the California Environmental Quality Act (CEQA).

Detailed construction emission calculations and information were provided to the SCAQMD in a CD-ROM on or about May 19, 2004. Additional information was provided in an email from Ms. Erin Sheehy (Environmental Compliance Solutions) on May 25, 2004; and Ms. Sheehy met with Ms. Kathy Hsiao on May 26, 2004, to review the calculations. Please note that the construction emissions for the No Action/No Project Alternative were based on previously approved projects, and that these emissions end in 2010. Also note that the No Action/No Project Alternative emissions are not always higher than the Alternative D emissions. In particular, Alternative D construction emissions of NOx and PM10 are always higher, CO emissions are higher in all but one year, and VOC emissions are higher in one year, than the No Action/No Project Alternative construction emissions.

Response to SCAQMD Comment 3):

As noted in the 2003 AQMP Chapter 1 Table 1-3 (see Attachment C-7), state and federal control measures have been adopted since 1994 which produced more NOx emission reductions than were committed to in the 1997/99 SIP submittal. The excess reductions were achieved without controls on aircraft emissions. Therefore, assuming uncontrolled aircraft emissions combined with the reductions achieved in other sources, indicates that the approved SIP budgets for NOx would still be met. The California Air Resources Board (ARB) sent a letter to the FAA, dated July 23, 2004 (elsewhere in this Appendix C), specifically indicating that baseline non-military aircraft emissions are the appropriate SIP budgets in the approved SIP to be used in this conformity determination. Therefore, the aircraft emissions in the LAX Master Plan Alternative D conform to the currently approved SIP budgets for aircraft as demonstrated in the Draft General Conformity Determination subsection 5.2.1. It should be noted that, while mitigation measures may be used to support a finding of conformity, a mitigation fee program is not an available criterion to demonstrate conformity.

The table of airport emissions in 2010 prepared by SCAQMD and included in the comment letter has a number of inconsistencies with on-road mobile source and GSE emissions. The table footnotes indicate

that SCAQMD has estimated LAX traffic emissions based on a set of grid points located on and around LAX. This is inconsistent with the methodology used to develop LAX-related traffic and GSE emissions in the LAX Master Plan which support the general conformity evaluation.

The LAX Master Plan identified LAX-specific trips (trips that began or ended at LAX) and determined the distance to the other end of each trip. The method SCAQMD employed to develop the table provided with its comments does not account for the distances that many of the trips cover in traveling to/from LAX. In the meeting held on April 14, 2004, SCAQMD acknowledged that the traffic analysis provided for the LAX Master Plan is a better method for estimating LAX-specific traffic emissions. Furthermore, because SCAG determined that the LAX Master Plan Alternative D is consistent with the 2001 RTP and Draft 2004 RTP, traffic emissions for the proposed LAX Master Plan are already included in the Transportation Conformity Determinations made for these regional plans.

The GSE emissions were estimated using the FAA EDMS model with ARB OFFROAD model emission factors for the LAX Master Plan. Since Los Angeles World Airports has committed to achieving emission reductions beyond the levels that will be achieved with the South Coast GSE MOU at LAX, and since the GSE MOU had not been finalized at the time the 1997 AQMP was developed, the emissions allocable to LAX GSE in the nonroad emission budget of the approved SIP should be sufficient to accommodate LAX GSE emissions under Alternative D. Again note that the LAX Master Plan was assumed to include a much more expanded airport at the time the 1997 AQMP budgets were prepared. Also, GSE emissions developed by the ARB for the 2003 AQMP were provided to the SCAQMD at the May 11, 2004, meeting with FAA and LAWA. The 2003 AQMP emissions for GSE appear to include sufficient budgets to accommodate LAX Master Plan Alternative D GSE emissions.

Based on the clarification of the Draft General Conformity Determination emission estimates provided by FAA and LAWA, and on clarification regarding the appropriate aircraft emissions budgets in the SIP by CARB in a July 23, 2004, letter to FAA, the SCAQMD concluded on August 12, 2004 (see Attachment C-9included elsewhere in this Appendix C), that the methodologies and emission inventories for Alternative D are below the applicable budgets in the SIPs.

Response to SCAQMD Comment 4):

Detailed analyses of PM10 emissions and concentrations have been provided to the SCAQMD in the CD-ROMs on April 14 and May 19, 2004. In addition, the method developed to estimate PM10 emissions from aircraft was provided in an email on April 28, 2004. A spreadsheet of PM10 dispersion modeling results was provided via email on May 26, 2004, demonstrating the conservative nature of the PM10 concentration calculations. Finally, Ms. Erin Sheehy of Environmental Compliance Solutions (the CDM subconsultant responsible for analyzing construction emissions and dispersion) met with SCAQMD to review the construction emission spreadsheet. The SCAQMD noted to Ms. Sheehy that the construction emission assumptions were conservative. Taking into account the conservative nature of the PM10 emission estimates, the general conformity evaluation overestimates PM10 concentrations. These overestimated PM10 concentrations were below the PM10 NAAQS.

As noted in the Response to Comment 3 above, the SCAQMD used a method that is inconsistent with LAX Master Plan methodology for estimating emissions from ground access vehicles. SCAQMD has noted that the approach used in the Master Plan analysis is better for identifying airport-related traffic emissions. Again, traffic emissions for the LAX Master Plan Alternative D have been included in the Transportation Conformity Determinations made for the 2001 and 2004 RTPs.

Response to SCAQMD Comment 5):

The detailed emission spreadsheet for construction emission calculations (on CD-ROM) was provided to SCAQMD on April 14 and May 19, 2004, and the calculation methods and assumptions were reviewed with SCAQMD on May 26, 2004.

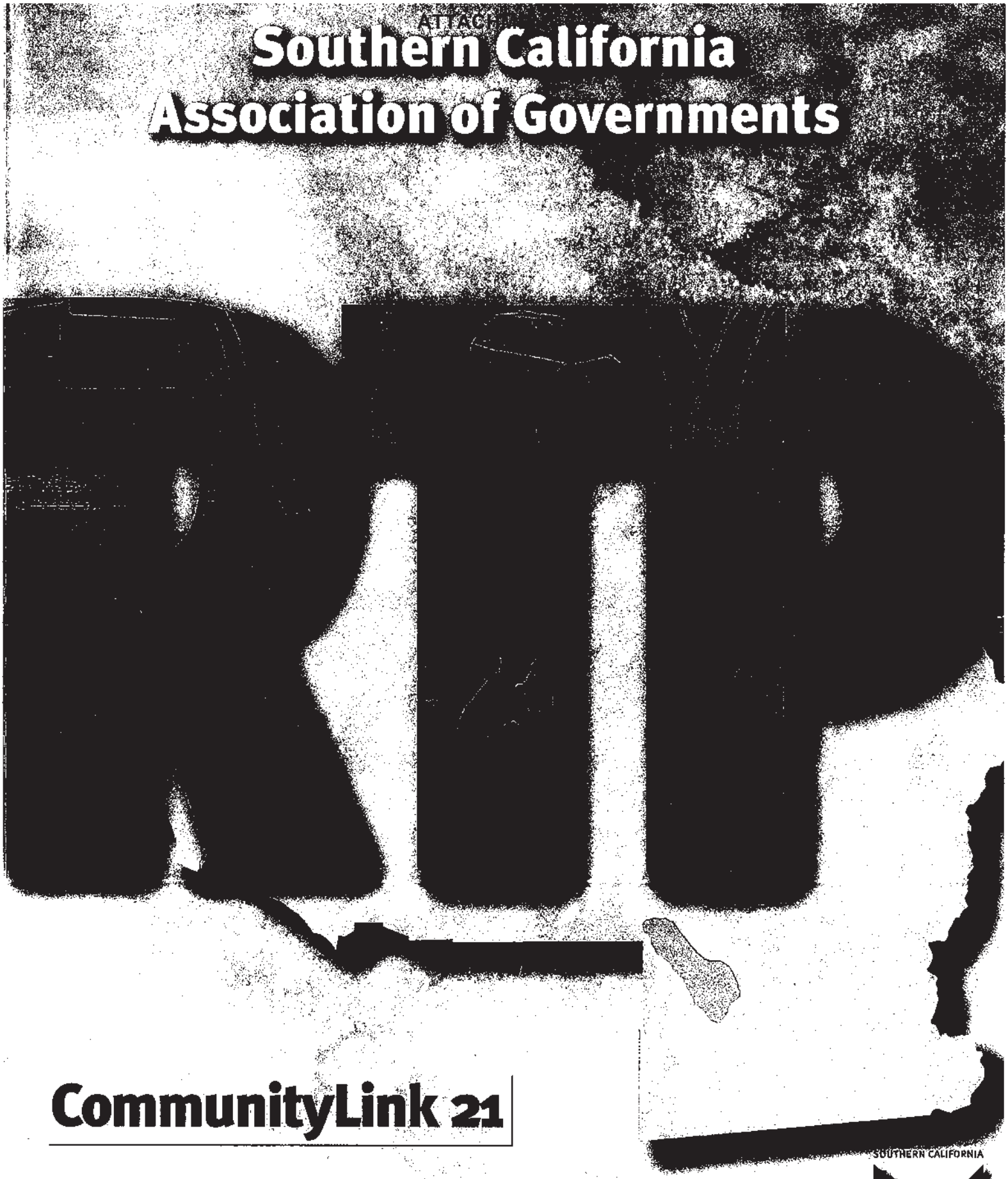
Response to SCAQMD Comment - Closing:

Responses to SCAQMD comments on the Supplement to the Draft EIS/EIR were provided in the Final EIS/EIR for the LAX Master Plan published in April 2004 (see Responses to Comments for Letter AR00004 regarding comments on the Draft EIS/EIR and Responses to Comments for Letter SAR0004 regarding comments on the Supplement to the Draft EIS/EIR). Comments pertinent to general conformity are reflected in the Final General Conformity Determination.

Attachment C-1

ATTACH

Southern California Association of Governments



CommunityLink 21

SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

'98 Regional Transportation Plan

Adopted April 16, 1998

portation control measures, trip reduction programs, growth management strategies, ozone action programs and targeted public outreach. These programs attempt to gain additional emission reductions beyond mandatory Clean Air Act programs by encouraging the public to make changes in activities that will result in reducing mobile source emissions.

In order to receive credit, the emission reduction must be quantifiable, permanent and adequately supported by data. This later requires monitoring by a government agency.

The EPA thinks that these programs are potentially cost-effective. Voluntary actions may be taken by individuals, cities or private parties. Programs can apply to ongoing, seasonal or episodic emission problems.

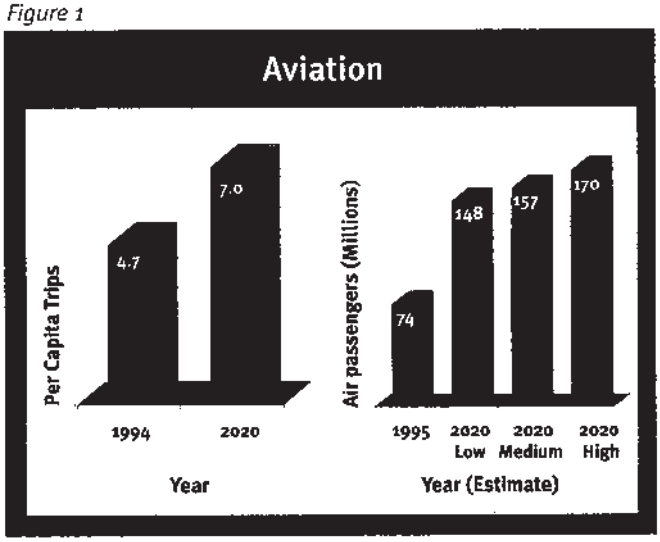
ACTION - SCAG and the Southern California Economic Partnership work together with public and private organizations to develop approaches, agreements and institutional arrangements for implementation of the SCAG Telecommunications Strategy, Smart Shuttles, Livable Communities, ATIS and alternative fuels as well as for possible inclusion in future SIPs for attainment demonstration.

Aviation

Airport System Recommendations

CommunityLink 21 displays a range of forecast demand for passengers from 148 to 170 million annual passengers (MAP), as shown in Figure 1. The recommended forecast is the medium forecast.* It will also contain an allocation of these ranges to individual airports. (See Table 11.) One major limitation in

Figure 1



* Other passenger allocations (Sensitivity Scenarios #1, #2, #3 and a fourth scenario proposed by the TCC Aviation Subcommittee) are shown in the Technical Appendix. These four scenarios are not a part of the Plan, but are included as information for further technical analysis.

Table 11

Aviation
Million Annual Passengers

	1995 Actual	2020 Low	2020 Medium*	2020 High
Burbank	4.9	8.4	9.2	9.7
Imperial County	0	0.1	0.1	0.1
John Wayne	7.2	6.4	7.0	7.3
Long Beach	0.4	2.6	2.8	3.6
Los Angeles	53.9	90.7	94.2	101.0
Ontario	6.4	13.9	15.3	17.2
Oxnard	0.1	0.1	0.2	0.2
Palmdale	0	0.1	0.1	0.2
Palm Springs	1.0	1.7	1.7	1.8
El Toro	0	20.1	22.2	23.6
George (SCI)	0	0.1	0.1	0.1
March	0	0.7	0.9	1.3
Norton (SBI)	0	1.6	1.8	1.9
Point Mugu	0	1.6	1.8	2.0
Totals	**73.9**	**148.1**	**157.4**	**170.0**

* Recommended

these allocations is that capacity cannot be estimated at two important facilities (LAX and El Toro) due to lack of air traffic simulation modeling ability. Consequently, these two airports are unconstrained in the passenger allocations and must await definitive capacity modeling analysis from their respective master plans presently under way. However, modeling analyses indicate that substantial growth constraints on these two facilities through 2020 will result in redistribution of air passenger demand to other airports in the regional system, but will also likely result in significant loss of air service and regional economic benefits. The capacity of the existing airports system is approximately 100 million annual passengers, so the system will experience a passenger capacity shortfall of one-third by 2020. Over the same period of time, air cargo is expected to grow from 3.0 million tons in 1995 to 8.9 million tons in 2020, which represents a capacity shortfall of approximately two-thirds. This growth in air passenger and air cargo demand will require the judicious expansion of existing commercial airports and the addition of military air bases if the economic benefits of air commerce are to be fully captured by the Region. However, the potential adverse impacts of airport expansion require the development of regional strategies and policies to maximize passenger and cargo utilization of outlying airports in less populated areas. In addition, expansion of existing airports and conversion of military air bases must account for the impact on population growth and job expansion in the Region so that regional trip-making is reduced and community impacts are minimized. Further, as ground access systems are developed, such as high speed rail, the effect they have on trip reduction and airport utilization needs to be assessed.

The guiding principles for air passenger allocation targets should be:

- Provide for regional capture of the economic development opportunities and job growth created by the prospect of significant growth in air traffic in the Region between now and 2020.
- Reflect environmental, environmental justice and local quality of life constraints to existing airports where those airports operate in built-out urban environments.
- Distribute maximum opportunity to Southern California airports where population and job growth over the next two decades are expected to be strong and where local communities desire the air traffic for economic development reasons.
- Reflect that each county should have both the obligation and the opportunity to meet its own air traffic needs where feasible.

ACTION - Support expansion of capacity at major existing and potential regional airports to handle anticipated increases in both passenger and freight volume.

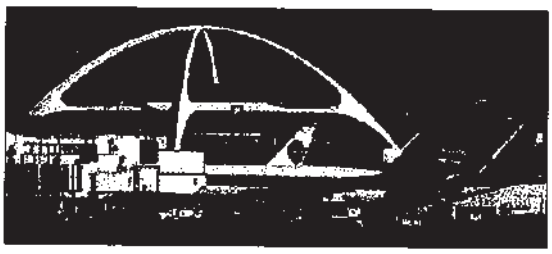
ACTION - Mitigate effects of expanding existing airports and adding military air bases so that community impacts are minimized.

ACTION - Maximize air passenger and air cargo utilization of outlying airports in less populated areas.

ACTION - Create a task force to include elected officials from the Regional Council, airport operators and the airlines to further examine aviation issues.

Ground Access

Freight and passengers for regional commercial airports are expected to increase dramatically through 2020. Analyses show that airport traffic impacts are concentrated near the airports but that background congestion affects both airports and local communities. For example, while alternatives to increase LAX capacity are under evaluation in the LAX Master Plan, current ground access improvements are insufficient to accommodate existing and projected airport traffic and regional background traffic in the airport area. Other existing commercial airports and new airports (military air bases) in the Region will also encounter similar congestion impacts and shortfalls in ground access capacity. It is recognized that additional ground access improvements and funding needs will be identified in the future.

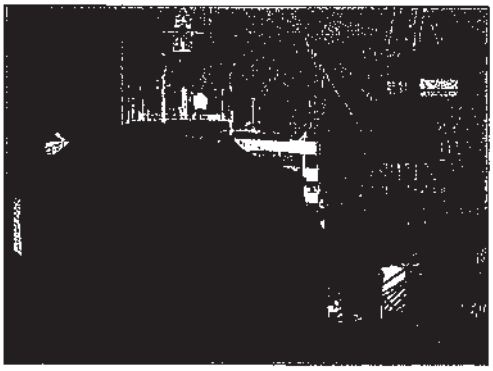


ACTION - Construct improvements on arterials, highways and rail lines to accommodate added freight and passenger movements to and from airports.

ACTION - Support Subregions in obtaining funding for ground access studies.

Maritime

Hueneme, Long Beach and Los Angeles Seaports



These three seaports, whose national and international commerce is linked to the existing and proposed changes in the regional transportation system, have programs designed to double cargo volume by 2020. During that period, an estimated $8 billion will be spent by the three ports on their facilities as well as on landside access. Within those investments, for example, the Port of Hueneme is implementing $20 million improvements on the recently conveyed 33-acre US Naval Civil Engineering Laboratory and on public streets with access to the port. Collectively, these investments are intended to position the SCAG Region as the primary load center for sea cargo in the Western Hemisphere.

ACTION - Support improvements at the seaports and local government roadways as shown in the respective port plans. (These expenditures are funded from maritime sources which are not included in the Transportation Checkbook.)

ACTION - Support roadway investments that improve access to the seaports of Port Hueneme, Long Beach and Los Angeles.

Attachment C-2

CITIGROUP TECHNOLOGIES CORPORATION

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MEMORANDUM

TO: MICHAEL ARMSTRONG, LEAD AVIATION PLANNER

SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

December 9, 2003

We have completed preliminary RADAM 9.11 modeling of the "2010 Preferred Regional Scenario" (2010 MGT3) for the SCAG airport system based on the Service Brokerage Concept including the Incentive Package designed to boost demand at outlying airports. Preliminary results (iteration P077) indicate that LAX would reach a passenger demand level of 73.7 MAP in 2010, 78 MAP in 2015 and 78 MAP through 2030, as directed by the Taskforce. In 2005 LAX is expected to continue its recovery from 9-11 with approx. 63-64 MAP.

This allocation occurs in a constrained system environment in which LAX is constrained to 78 MAP and several other airports are also constrained based on physical capacity, legal action or air quality restrictions.

Attachment C-5A1

Attachment C-5A.1

From: Pehrson, John
Sent: Wednesday, February 04, 2004 11:30 AM
To: Kathy Hsiao (E-mail)
Cc: David Kessler (E-mail)
Subject: FW: LAX Fleet Mix
Confidential - Preliminary Draft Material for Deliberative Purposes.

Kathy,

We apologize for any confusion created with the analysis you are reviewing. We thought that we had conveyed the approach and received guidance on what information to use in the general conformity determination from SCAQMD. Before the public comment period on the conformity determination ends (Monday, February 9th) we would like to meet with (in person or via conference call) the SCAQMD once more to review several issues regarding conformity and LAX. Specifically, we would like to discuss:

1. The possible use of 40 CFR 93.158 (a)(5)(i)(B) and the adoption of the 2003 AQMP by the State of California to represent the Governor's commitment to revise the SIP to demonstrate compliance with state emission budgets.
2. The analysis conducted for LAX sources in the Draft General Conformity Determination uses updated models and methods compared to the analysis conducted for the 1997 AQMP.
3. The 1999 Amendments to the 1997 AQMP, and the effect on federally regulated sources.
4. The comparison of the No Action/No Project Alternative to the 1997 AQMP budgets.

Below is the email sent to Gary Honcoop at ARB which addressed current and future aircraft fleet mix.

Please let me know if it possible to set up this meeting sometime this week. I will be available tomorrow and Friday.

Thank you,
John R. Pehrson, P.E.
Principal
CDM
18581 Teller Avenue, Suite 200
Irvine, California 92612
(949) 752-5452 voice
(949) 752-1307 fax
PehrsonJR@cdm.com

-----Original Message-----
From: Pehrson, John
Sent: Wednesday, January 28, 2004 5:42 PM
To: Gary Honcoop (E-mail)
Cc: Jim Lerner (E-mail); David Kessler (E-mail)
Subject: LAX Fleet Mix

Gary,

The attached file compares the daily operations for the 1996 Baseline and 2015 Alternative D scenarios in the LAX Master Plan and Draft General Conformity Determination. A number of

older aircraft disappear completely (B727, BAE146, DC8, DC9), and others have substantially reduced operations (B737-300, DC10, MD80/MD80-87) in 2015. While the LAX 2015 Fleet Mix does not include B737-700, 800, or 900 airframes, the analysis actually assumed that the B757-200 would be used on many of the routes that the newer B737s could fly. The attached file also contains a worksheet which compares the NOx emissions for B737-700, B737-800 and B737-900 to those for the B757-200. The B757-200 NOx emissions were almost 80% higher than the B737-700s and over 30% higher than the B737-800/900s. Therefore, we believe the increase in B757-200 between 1996 and 2015 (215 ops per design day ~ 73,400 ops/year) conservatively reflects the change in overall aircraft emissions between the 1996 and 2015 fleets.

Please let me know if this answers your concerns regarding the 2015 aircraft fleet.

Regards,

John R. Pehrson, P.E.
Principal
CDM
18581 Teller Avenue, Suite 200
Irvine, California 92612
(949) 752-5452 voice
(949) 752-1307 fax
PehrsonJR@cdm.com

96_15FleetMix.xls
(27 KB)

Attachment C-5A2

Attachment C-5A.2

1996 Baseline and Alternative D Comparison of the Fleet Mix

	Acft Code	Modeled Acft Type	No. & Type of Engines	Daily Operations - Design Day 1996 Ops	2015 Alt D Ops
Air Carrier Operations	100	Fokker 100	2 Turbofan	0	4
	146	BAE 146	4 Turbofan	16	0
	300	Airbus A-300	2 Turbofan	0	5
	310	Airbus A-310	2 Turbofan	0	21
	319	Airbus A-319	2 Turbofan	0	3
	320	Airbus A-320	2 Turbofan	0	50
	32S	Airbus A-320	2 Turbofan	90	0
	330	Airbus A-330	2 Turbofan	0	21
	340	Airbus A-340	4 Turbofan	0	19
	72S	Boeing 727-200	3 Turbofan	91	0
	733	Boeing 737-300	2 Turbofan	350	178
	734	Boeing 737-400	2 Turbofan	10	52
	735	Boeing 737-500	2 Turbofan	135	45
	737	Boeing 737-200	2 Turbofan	8	16
	73S	Boeing 737-500	2 Turbofan	26	22
	743	Boeing 747-200	4 Turbofan	2	0
	744	Boeing 747-400	4 Turbofan	53	135
	747	Boeing 747-200	4 Turbofan	35	22
	74E	Boeing 747-200	4 Turbofan	6	0
	74M	Boeing 747-400	4 Turbofan	0	17
	74X	Boeing 747-400	4 Turbofan	0	27
	757	Boeing 757-200	2 Turbofan	179	394
	763	Boeing 767-300	2 Turbofan	28	73
	767	Boeing 767-200	2 Turbofan	65	83
	777	Boeing 777-200	2 Turbofan	4	55
	AB3	Airbus A-300B	2 Turbofan	4	116
	D10	DC10-30	3 Turbofan	76	12
	D9S	DC9-50	2 Turbofan	6	0
	DC8	DC8-70	4 Turbofan	20	0
	DC9	DC9-50	2 Turbofan	14	0
	L10	L1011-500	3 Turbofan	41	0
	L15	L1011-500	3 Turbofan	2	0
	M11	McDonnell Douglas MD11	3 Turbofan	14	105
	M1M	McDonnell Douglas MD11	3 Turbofan	2	0
	M80	McDonnell Douglas MD80	2 Turbofan	174	76
	M87	McDonnell Douglas MD80-87	2 Turbofan	16	2
	M90	McDonnell Douglas MD90-10	2 Turbofan	0	34
	M95	McDonnell Douglas MD90-95	2 Turbofan	0	34
			Subtotal:	1,467	1,621

	Acft Type	# of Ops	# of Ops
Commuter Operations	AT7	0	25
	ATR	0	53
	BE1	144	47
	C50	0	47
	C70	0	5
	CNA	86	102
	DS7	0	63
	EM2	194	22
	EMB	0	31
	F50	0	20
	F70	0	8
	GAJ	18	18
	J31	172	43
	S20	0	62
	S36	0	6
	SF3	100	36
	SWM	52	70
	F28	6	0
	Subtotal:	772	658
	Total:	2,239	2,279

Source Tables: Draft LAX Master Plan
1996 Total Operations by Aircraft Type
Table V-F.2 (5 of 6) & (6 of 6)

Draft LAX Master Plan Addendum
Hourly Design Day Total Operations by Aircraft Type
2015 Alternative D
Table F-3 (5 of 6) & (6 of 6)

Attachment C-5A.2

Relative Emissions of B757-200, B737-700, B737-800, and B737-900.

Airframe	Engine	Assumed LTO/Yr	Emissions (tpy)				Emissions rate (lbs/LTO)				NOx
			CO	HC	NOx	SOx	CO	HC	NOx	SOx	
B757-200	PW2037	8760	109.174	9.225	130.046	10.128	24.926	2.106	29.691	2.312	---
B737-700	CFM56-7B22	8760	78.070	8.415	72.740	6.650	17.824	1.921	16.607	1.518	78.8%
B737-800	CFM56-7B26	8760	68.126	6.958	99.399	7.477	15.554	1.589	22.694	1.707	30.8%
B737-900	CFM56-7B26	8760	68.126	6.958	99.399	7.477	15.554	1.589	22.694	1.707	30.8%

Taxi/Idle time in mode assumed to by 26 minutes per LTO for all aircraft.

Engines selected are default engines in EDMS 4.11
B757-200 engine is the same as the engine selected for the LAX Master Plan Draft EIS/EIR and Draft General Conformity Determination.
B757-200 NOx emissions are over 30% higher than B737-800/900 and almost 80% higher than B737-700 NOx emissions.
In the LAX Master Plan, B757-200 are assumed to fly routes that could be flown by B737-700/800/900s.

Attachment C-5B1

Attachment C-5B.1

From: Pehrson, John
Sent: Wednesday, April 28, 2004 9:42 AM
To: Zorik Pirveysian (E-mail)
Cc: David Kessler (E-mail)
Subject: Aircraft PM Tech Memo and SCAG Comment Letter

Zorik,

Per our conversation yesterday, please find attached the Aircraft Particulate Matter Emissions Data technical memo (also found in the LAX Master Plan Draft EIS/EIR, Technical Report 4, Attachment H), and the SCAG's comment letter on the Draft General Conformity Determination.

Please call me if you have questions about either of these documents

Regards,

John R. Pehrson, P.E.
Principal
CDM
18581 Teller Avenue, Suite 200
Irvine, California 92612
(949) 752-5452 voice
(949) 752-1307 fax
PehrsonJR@cdm.com

SCAG omments.pdf (58 KE

Aircraft PM Tech Memo.pdf (344...

Attachment C-5B2

Attachment C-5B.2

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February 4, 2004

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AIRPORTS DIVISION
AWP-610

Mr. David B. Kessler, AICP
Federal Aviation Administration
Western Pacific Region, Airports Division
AWP – 611.2
Post Office Box 92007
Los Angeles CA 90009-2007

Subject: SCAG's Comments On the Draft General Conformity Determination for the Los Angeles International Airport Proposed Master Plan Improvements – Alternative D

Dear ~~Mr. Kessler~~ David:

Thank you for the opportunity to comment on the above cited document, based on the 2001 Regional Transportation Plan (RTP) and on the Draft 2004 RTP, which is expected to be approved for adoption on April 1, 2004.

As you are aware, several components of the regional aviation system have changed since the adoption of the 2001 RTP—most notably, the elimination of the proposed airport at El Toro. These changes are reflected in the Draft 2004 RTP. A major result of these changes is an expected redistribution of passenger traffic, both through the proposed airline brokerage concept to encourage a decentralization of aviation activities, and through implementation of the MagLev project which is intended to improve access to outlying airports in the region. These interventions are expected to result in a reduction in airline operation and vehicle miles traveled (VMT) by passengers using the regional aviation system.

In this light, the proposed Master Plan, Alternative D, is consistent with both the 2001 RTP and the Draft 2004 RTP. Therefore, we find that the proposed Master Plan meets General Conformity Requirements.

We look forward to working with the Los Angeles World Airports (LAWA) in taking all the steps necessary to effectively implement the Master Plan.

DOCS 95326

If we can provide any further information or if there are any questions, please contact me at 213/236-1944 or Sylvia Patsaouras of my staff at 213/236-1806.

Sincerely,

Hasan Ikhrata, Director
Planning and Policy Department

cc.: Mr. Jim Ritchie, Deputy Executive Director, LAWA

Attachment C-5B3

LAX Master Plan EIS/EIR

Aircraft Engine Particulate Matter Emissions Data

June 1999

Prepared for:

Los Angeles World Airports

Prepared by:

Camp Dresser & McKee Inc.
18881 Von Karman Avenue, Suite 650
Irvine, California 92612

Table of Contents

Attachments

1. INTRODUCTION

Attachment C-5B.3

Camp Dresser & McKee Inc. (CDM) has developed this technical memorandum to support the preparation of the Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) for the Los Angeles International Airport (LAX) Master Plan. This technical memorandum documents the sources of aircraft engine emission indices for particulate matter with an equivalent aerodynamic diameter less than 10 μm (PM_{10}). Specifically, turbofan aircraft engine PM_{10} data sources are identified in this technical memorandum.

1.1 PROJECT BACKGROUND

The City of Los Angeles (the City) is preparing a Master Plan for the Los Angeles International Airport (LAX) to identify facilities needed through the year 2015. As part of the environmental review for this project, emissions inventories are being developed for various criteria air pollutants and their precursors including carbon monoxide (CO), nitrogen dioxide (NO_2), oxides of nitrogen (NOx), ozone (O_3), PM_{10}, and sulfur dioxide (SO_2). This technical memorandum identifies sources of PM_{10} emissions data from aircraft engines. A comparison of the available emission indices are presented.

1.2 PURPOSE OF ANALYSIS

The purpose of the analysis documented in this technical memorandum is to provide the necessary and sufficient air quality technical details regarding air pollutants with ambient air quality standards to support the LAXMP EIS/EIR and to ensure compliance with all applicable federal, state, and local requirements, including the National Environmental Policy Act, the California Environmental Quality Act, Section 176 of the Clean Air Act, and Section 509 of the Airport and Airways Improvement Act.

The current, primary data sources for estimating aircraft engine emissions include the International Civil Aviation Organization (ICAO) Engine Exhaust Emissions Databank, U.S. FAA Engine Emissions Database (FAEED), and U.S. FAA Emissions and Dispersion Modeling System (EDMS) program. However, none of these sources contain emissions data for PM_{10}. While older sources of total suspended particulate (TSP) data exists, no direct measurements of aircraft engine PM_{10} mass emissions have been conducted recently. This technical memorandum lists the existing sources of particulate matter data for aircraft engines and presents, in Attachment A, some recent findings developed at the University of Missouri – Rolla, Cloud and Aerosol Sciences Laboratory.

Attachment C-5B.3

2. AIRCRAFT ENGINE PARTICULATE MATTER EMISSIONS SOURCES

This section lists the primary sources of aircraft engine particulate matter emissions.

2.1 SOURCES OF AVAILABLE DATA

To identify available sources of aircraft engine particulate matter emissions, CDM conducted a literature review. The primary references for the data identified in this technical Memorandum are presented below:

- "Compilation of Air Pollutant Emission Factors, Volume II: Mobile Sources," AP-42, Fourth Edition, U.S. EPA, Motor Vehicle emission Laboratory, Ann Arbor, MI, September 1985.
- "Characterization of Particulate Emissions from the J79-GE-15A Engine, McClellan Air Force Base, California," AESO Report No. 2-87, U.S. Navy, Aircraft Environmental Support Office, San Diego, CA, April 1987.
- "Particulate Emissions from Aircraft Engines," AESO Report No. 2-90, U.S. Navy, Aircraft Environmental Support Office, San Diego, CA, June 1990.
- "Summary Tables of Gaseous and Particulate Emissions from Aircraft Engines," AESO Report No. 6-90, U.S. Navy, Aircraft Environmental Support Office, San Diego, CA, June 1990.
- "A Field Sampling of Jet Exhaust Aerosols," D.E. Hagen, M.B. Trueblood, and P.D. Whitefield, *Particulate Science and Technology*, **10**: 53-63, 1992.
- "American Airlines, Inc.'s Proposed Commercial Aviation Operations Emissions Rule for the South Coast Air Quality Management District," 1994 California FIP, Docket A-94-09, IV-E-49, U.S. EPA, National Vehicle and Fuel Emissions Laboratory, Ann Arbor, MI, November 1994.
- "Effect of Altitude Conditions on the Particle Emissions of a J85-GE-5L Turbojet Engine," J.E. Rickey, NASA-TM-106669, NASA, Lewis Research Center, Cleveland, OH, February 1995.
- "Particulate Emissions in the Exhaust Plume from Commercial Jet Aircraft Under Cruise Conditions," D.E. Hagen, P.D. Whitefield, and H. Schlager, *Journal of Geophysical Research*, **101**(D4): 19551-19557, August 27, 1996.
- "Experimental Characterization of Gas Turbine Emissions at Simulated Flight Altitude Conditions," R.P. Howard, R.S. Hiers, Jr., P.D. Whitefield, D.E. Hagen, J.C. Wormhoudt, R.C. Miake-Lye, and R. Strange, AEDC-TR-96-3, USAF, Arnold Engineering Development Center, Arnold AFB, TN, September 1996.
- "*In Situ* Observations of Air Traffic Emission Signatures in the North Atlantic Flight Corridor," H. Schlager, P. Konopka, U. Schumann, H. Ziereis, F. Arnold, M. Klemm, D.E. Hagen, P.D. Whitefield, and J. Ovarlez, *Journal of Geophysical Research*, **102**(D9): 10739-10750, May 20, 1997.
- "Particulate Sizing and Emission Indices for a Jet Engine Exhaust Sampled at Cruise," D. Hagen, P. Whitefield, J. Paladino, M. Trueblood, and H. Lilenfeld, *Geophysical Research Letters*, **25**(10): 1681-1684, May 15, 1998.
- "Particle Concentration Characterization for Jet Engine Emissions Under Cruise Conditions," J. Paladino, P. Whitefield, D. Hagen, A.R. Hopkins, and M. Trueblood, *Geophysical Research Letters*, **25**(10): 1697-1700, May 15, 1998.
- "National Air Pollutant Emission Trends, Procedures Document, 1900-1996," U.S. EPA, Office of Air Quality Planning and Standards, Research Triangle Park, NC, May 1998.
- "Engine Gaseous, Aerosol Precursor and Particulate Emissions at Simulated Flight Altitude Conditions," C.C. Wey, C. Wey, D.J. Dicki, K.H. Loos, D.E. Noss, D.E. Hagen, P.D. Whitefield, M.B. Trueblood, M.E. Wilson, D. Olson, J.O. Ballenthin, T.M. Miller, A.A. Viggiano, J. Wormhoudt, T. Berkoff, and R.C. Miake-Lye, NASA/TM-1998-208509, NASA, Lewis Research Center, Cleveland, OH, October 1998.

2.2 DATA DEVELOPED FOR THE LAX MASTER PLAN

In reviewing the available data on particulate matter emissions from aircraft engines, it was determined that the more recent emission indices in the literature were given in terms of the number of particles per mass of fuel consumed. Additional information was needed to convert the number-based (or particle count) emission indices to mass-based indices. Drs. Whitefield and Hagen at the Cloud and Aerosol Sciences Laboratory, University of Missouri, Rolla, were contracted to provide the additional information and develop mass-based emission indices. Their final report is included as Attachment A to this technical memorandum.

3. COMPARISON OF AIRCRAFT ENGINE PARTICULATE EMISSION INDICES

The review of particulate matter emission indices indicates that some data does exist for aircraft engines. However, most of the available emission indices are for military turbojets. Since these engines are substantially different than the high bypass turbofans in today's commercial airline fleet, the military engine indices were not considered directly useable for the LAX Master Plan EIS/EIR. Particulate mass-based emission indices for turbofan engines come primarily from three sources: 1) the Fourth Edition of AP-42, Volume II (U.S. EPA 1985), 2) the 1994 California FIP Docket (see Attachment B), and 3) the Whitefield and Hagen study (Attachment A).

Figure 1 plots the particulate emission indices for these three data sources under all aircraft operating modes. The particulate emission indices plotted are directly emitted soot (non-volatile) mass, and do not consider secondary particulate formation. Figures 2 through 5 are plots of these emission indices for each of four operating modes: takeoff, climbout, approach, and taxi/idle, respectively.

Visual inspection of the takeoff and climbout data indicated a slight trend with engine size. That is, the larger the engine, the lower the index. No such trend was obvious from inspection of the approach and taxi/idle data. Therefore, exponential functions of fuel flow are recommended for estimating the PM index for a given engine in takeoff and climbout modes. Average values for all engines are recommended for approach and taxi/idle modes. The functions and average values are included in the legends of Figures 2 through 5.

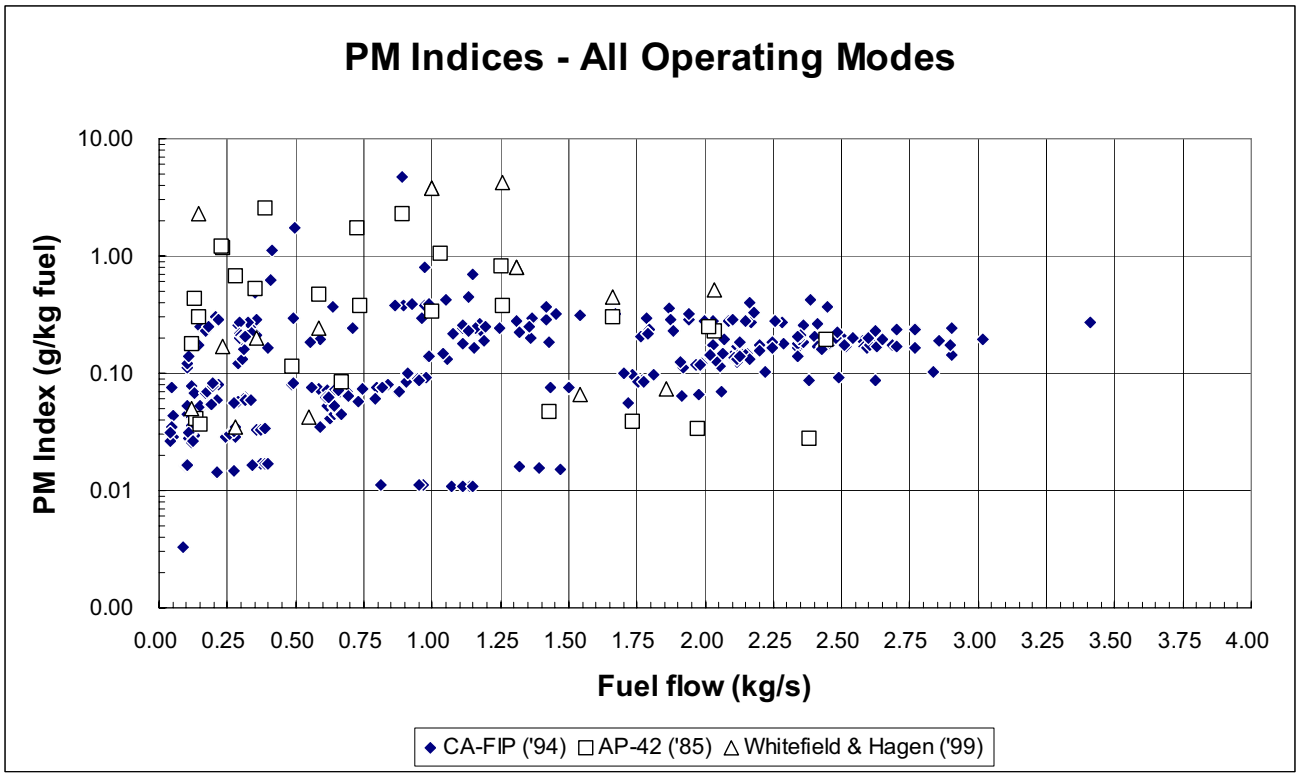

Figure 1. PM Index Data Points for All Operating Modes.

Attachment C-5B.3

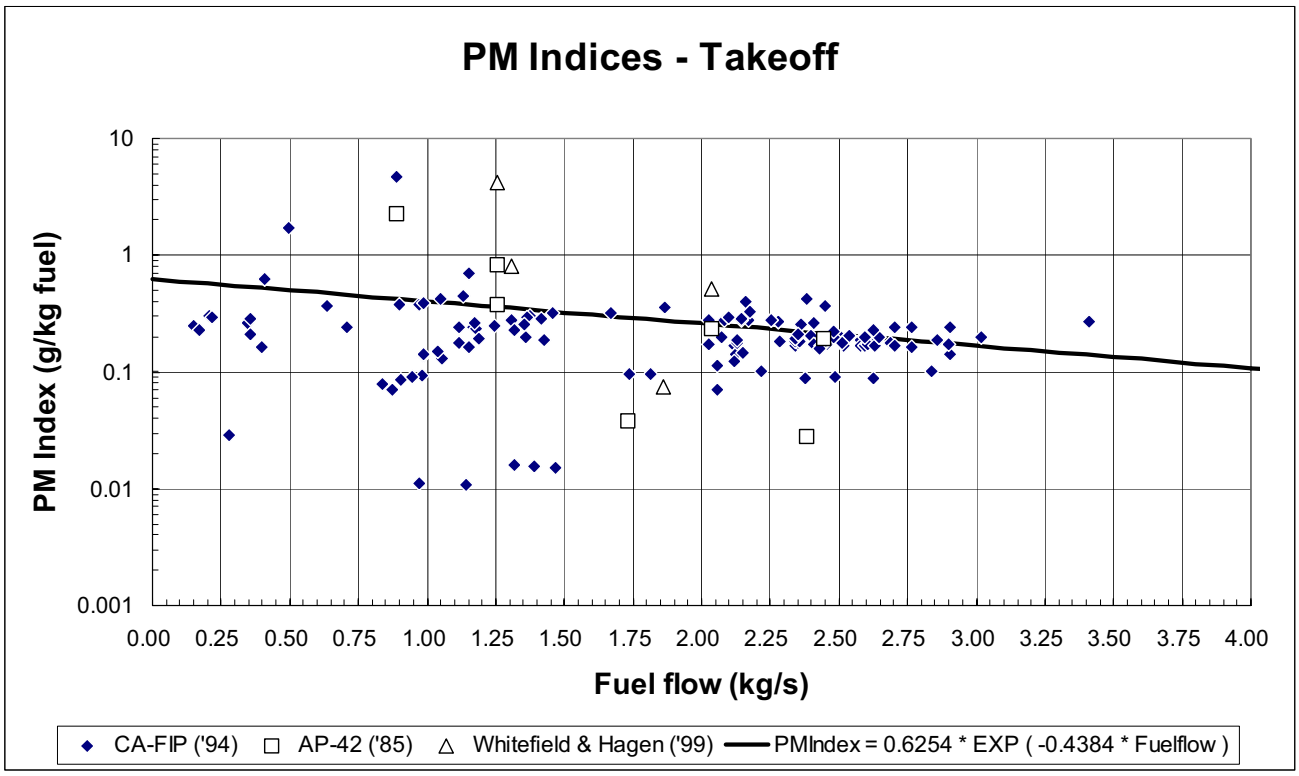

Figure 2. PM Index Data Points for Takeoff.

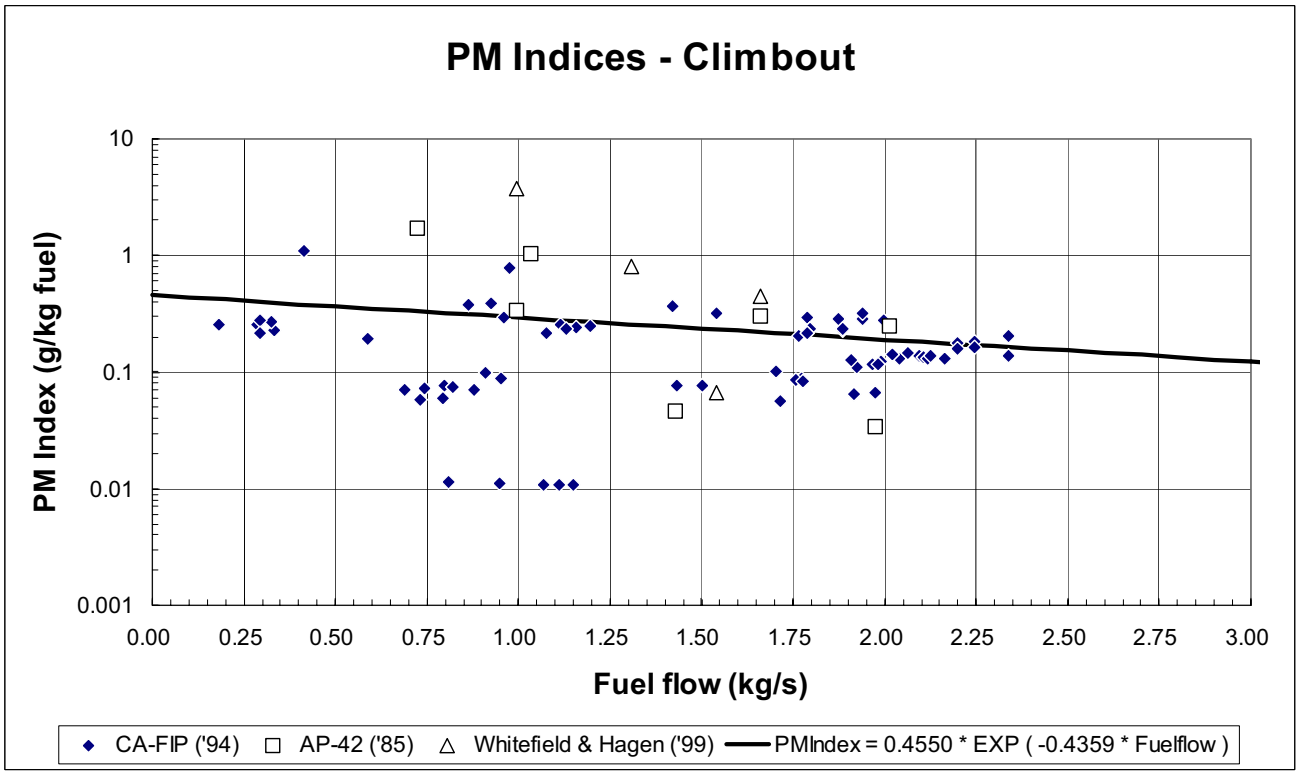

Figure 3. PM Index Data Points for Climbout.

Attachment C-5B.3

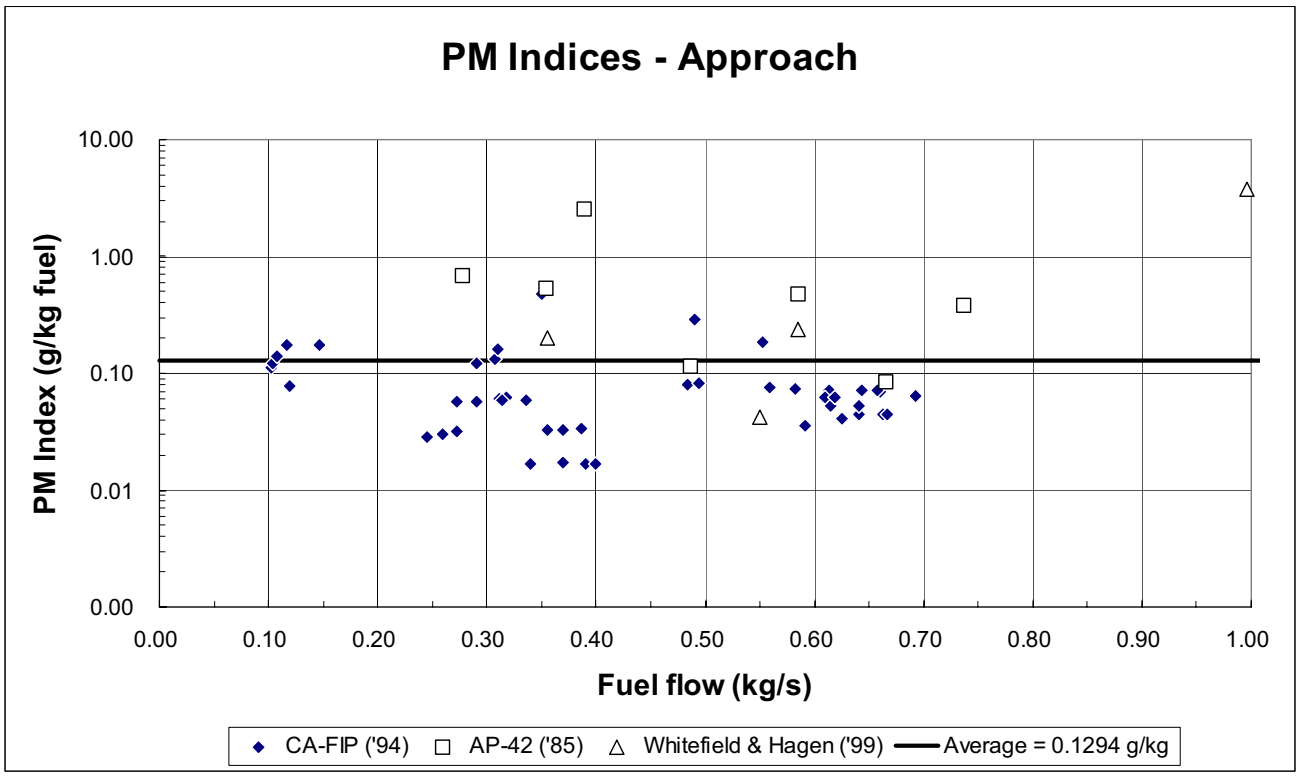

Figure 4. PM Index Data Points for Approach.

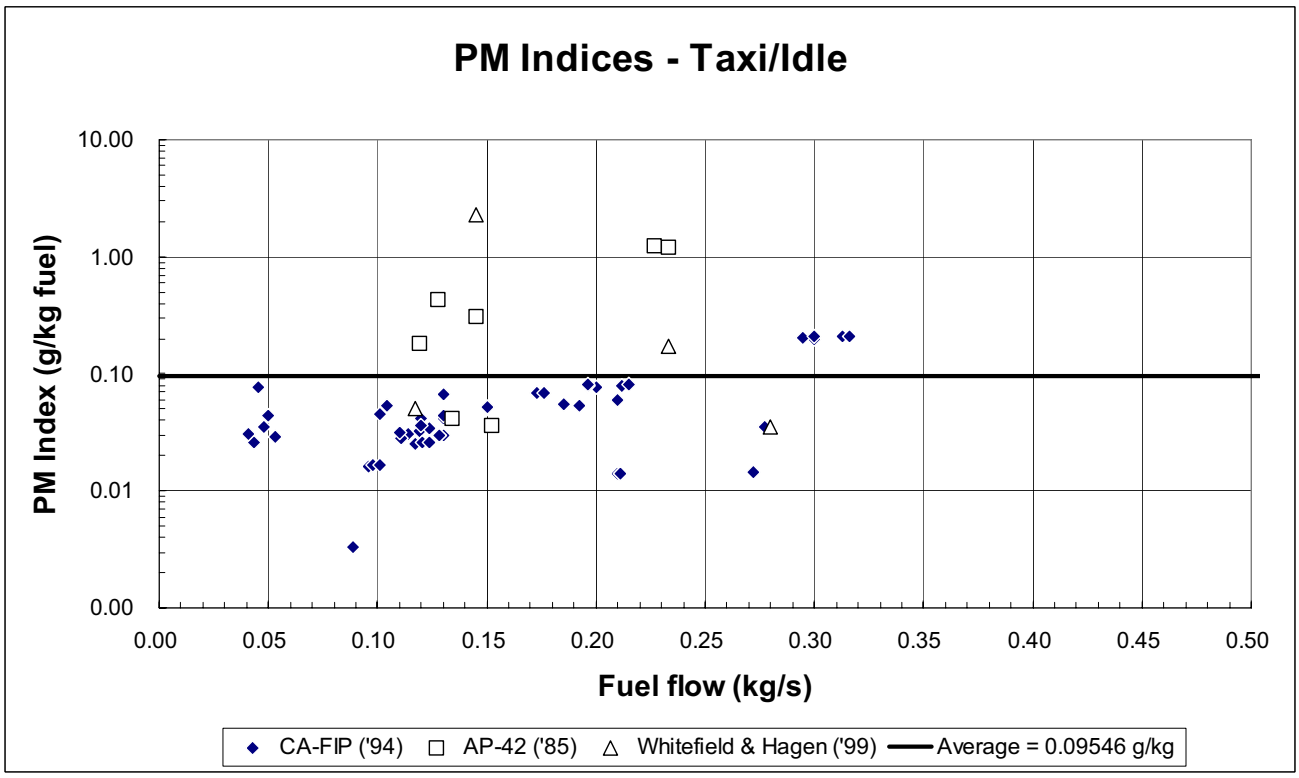

Figure 5. PM Index Data Points for Taxi/Idle.

Attachment C-5B.3

4. REFERENCES

Attachment C-5B.3

International Civil Aviation Organization (ICAO). 1995. "ICAO Engine Exhaust Emissions Data Bank," Doc 9646-AN/943, First Edition, Montreal, Canada.

U.S. Environmental Protection Agency, 1985. "Compilation of Air Pollution Emission Factors. Volume II: Mobile Sources" (AP-42, 5th Edition), U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Environmental Sciences Research Laboratory, Research Triangle Park, NC.

U.S. Environmental Protection Agency, 1994. "California FIP NPRM: Civil and Military Aviation Technical Support Document," (Docket A-94-09, Index IV-E-49), U.S. Environmental Protection Agency, Motor Vehicle Emission Laboratory, Ann Arbor, MI.

U.S. Federal Aviation Administration, 1995. FAA Aircraft Engine Emission Database (FAEED), FAA Office of Environment and Energy (AEE-110), Washington, DC.

U.S. Federal Aviation Administration and the U.S. Air Force, 1997b. "Emissions and Dispersion Modeling System (EDMS) Reference Manual," FAA-AEE-97-01, FAA Office of Environment and Energy (AEE-120), Washington, DC and USAF Armstrong Laboratory, Tyndall Air Force Base, FL.

Attachment C-5B.3

Attachment C-5B.3

LAX Master Plan EIS/EIR

Aircraft Engine Particulate Matter Emissions Data

Attachment A

Estimate Of Particle Emission Indices as a Function of Particle Size for the LTO Cycle for Commercial Jet Engines

March 1999

Prepared for:

Camp Dresser & McKee Inc.

Prepared by:

Philip D. Whitefield and Donald E. Hagen
Cloud and Aerosol Sciences Laboratory
University of Missouri - Rolla

Draft Version 1

Estimate of Particle Emission Indices as a Function of Particle Size for the LTO Cycle for Commercial Jet Engines.

1. OBJECTIVE

The objective of this study is to estimate the particle emission indices (EI's)[1] as a function of particle size and fuel sulfur content for the LTO cycle for several commercial jet engines and calculate associated mass-based emission indices. Emission indices are defined as either the number of particles produced per kilogram of fuel burned or the mass of particles produced (in grams) per kilogram of fuel burned. The engines used in this study are the Rolls Royce RB211, Pratt and Whitney JT8D and JT9D, and the General Electric CFM56-5C2 engines. To achieve this objective particle emission concentrations and their size distributions, measured for the jet engines using the UMRMASS methodology (see Appendix I or a brief description of the MASS methodology), were correlated with LTO cycle smoke numbers for the same engines reported in the ICAO database [Hagen et al 1992, Hagen et al 1996 and Paladino 1997a]. **It is important to note that this work depends on an extremely small database of MASS type measurements and any estimates reported are limited by this paucity of data.** Furthermore these estimates require that the following important assumptions be made and accepted.

(1) Non-volatile (soot) particles are essentially spherical in shape (particles < 500nm diameter).

(2) Non-volatile (soot) particles have a uniform density of 1g/cc.

(3) Particle mass can be calculated from a knowledge of total particle volume (obtained from measured size distributions) and particle density.

(4) All particles emitted by an engine have diameters ≤ 2500nm (2.5μm).

(5) The UMR measurements used in this study are representative and can be directly compared to measurements in the ICAO database.

(6) RB211, JT8D, JT9D and CFM56-5C2 engines are representative of the fleet of engines anticipated to operate at or around LAX.

(7) The ratio of non-volatile to total particle EI's at sea level will be the same as that measured at cruise.

(8) The fuel sulfur dependency observed with the RB211 engine will be the same for the other engines in this study.

(9) EI's for thrust settings not measured can be predicted using correlations between smoke number and EI established in this study.

[1] A list of abbreviations and parameters is given in Appendix IV.

Attachment C-5B.3

2. APPROACH

The ICAO data base contains much jet engine data, e.g. smoke number and fuel flow rates, on a large number of engines. Our goal is to combine this ICAO data with some UMR data on EI's (Emission Indices) for a few engines, and generate some information on mass based emissions as a function of fuel flow rate, for a large number of engines. The ICAO data base contains no direct data on particle mass emissions. The smoke number gives some information on the populations of very large emission particles, but these constitute a very small component of the total particulate population (Paladino 1997). However since large particles make a relatively large contribution to aerosol mass, there is reason to hope that the smoke number may carry some information on mass based emissions.

Ground based measurements using optical extinction-scattering measurements on a tubular combustor rig indicated that particle mass (per unit volume of sample exhaust air) is an increasing function of the fuel air ratio, FAR, (Charalampopoulos 1992; Schumann 1995). Their data is shown in Fig. 1 (circles). Also shown in Fig. 1 is a quadratic fit which indicates that the slope of this data continually increases with increasing FAR, and the coefficient of the quadratic term is positive. Now the coefficient of the quadratic term in a particle mass vs. FAR fit is proportional to the linear term in a mass based EI vs FAR fit (see Appendix II). Also in normal operation the fuel flow increases as the FAR increases. Hence it is reasonable to expect the mass based emissions to vary linearly with fuel flow rate, and to have a positive slope. This can be tested against existing data.

ICAO data on smoke number and UMR data on mass based emission indices (EIm's) was analyzed to study the emissions variation with fuel flow. Figs. 2 and 3 show plots of normalized smoke number, NSN, vs. fuel flow rate, ff, for seventeen engines taken from the ICAO data base, where NSN is defined as any smoke number for a given engine divided by the maximum smoke number for that engine as reported in the ICAO database. NSN's were used to put all smoke number calculations on the same scale. These data exhibit an interesting trend, a roughly linear behavior with slopes ranging from 0.33 - 0.85 s/kg.

Let us now consider the applicability of NSN vs. ff relationship to the commercial fleets in general. Table1 shows usage and relationship applicability data for 29 of the most widely used engines, based on distances flown. These engines represent 74% of total miles flown based on global aircraft emission inventory data for 1991/92 (Gardner et al. 1998). The table provides information on the number of miles flow by any aircraft type and the percentage of those aircraft with a given engine type. From these data two parameters are extracted and shown in the table: de, total distance flown by a given engine type, and Re, the fraction of the total miles flown by commercial aircraft associated with a given engine type. With these data we can identify which engines types do the most work in the commercial fleets. In addition a parameter "slope" is provided, which is the slope (in units of s/kg) of the normalized smoke number vs. fuel flow rate for that engine. For engines for which there was insufficient smoke number data to calculate a slope, X is recorded. A Y is recorded for cases where the NSN is roughly independent of ff, indicating these engines did not exhibit the linear dependence required for the model. The group of engines from Table 1 which exhibit a linear variation in NSN with ff represent 23.7% of total jet engine miles flown, those with insufficient data for such an analysis represent 47.6% of total miles, and the engine group for which smoke number was roughly constant represent 2.3% of total miles. These results show that for the most widely used engines, for which smoke number vs. fuel flow rate is available, representing the normalized smoke number as a linear function of fuel flow with a positive slope is a reasonable model. The weighted average slope (NSN vs. ff) is found to be 0.613 ± 0.054 s/kg.

2.1 DEMONSTRATION OF THE APPROACH FOR A SPECIFIC ENGINE - THE RB211-535C

Table 2 shows ground test and airborne sampling data for EIm's taken by UMR during NASA projects SNIF and SUCCESS (Hagen et al. 1996 and 1998). Appendix III provides short descriptions of the field campaigns from which the UMR data is drawn. These data were taken on the emissions from a Rolls Royce RB211-535C engine.

A normalized mass based EI, NEIm, , was calculated and then a linear fit of NEIm to fuel flow was undertaken. NEIm is defined as any EIm from a given engine test divided by the maximum EIm recorded in that engine test. The fit yielded a R-value (correlation coefficient) of 0.975 (which indicates that the fit is good) and a positive slope of 2.7 s/kg. The magnitude of this slope is greater than the weighted average slope given by the normalized smoke number analysis. However the large value of this slope is dictated by the large value of the EIm reported from the airborne measurements. In flight, sampling is done usually on the

order of 30-90 seconds after the engine has exhausted the soot into the atmosphere, during this time gas-to-particle conversion processes are active in the exhaust plume of an aircraft and this processing will increase the value of the EIm's measured in-situ (Fahey et al 1995 and Pueschel et al 1998). Plume processing is not involved in the ground based measurements. If only the two Project SNIF measurements (ground test data) were used in the NEIm calculations, then a slope of 0.48 s/kg is obtained, which falls into the range of slopes presented in figures2 and 3, but is slightly below the weighted average NSN vs. ff slope. Hence the two estimations of the NEIm from airborne and ground based measurements bracket the weighted average slope value for NSN. The smoke number was designed to give a measure of the visibility of the exhaust plume. Large (>>500nm diameter i.e. >> wavelength of visible light) particles have a light scattering coefficient approaching 2 (Cadle 1965). For an aerosol dominated by a single size species, the light scattering and hence the smoke number should be roughly proportional to the particle diameter squared times the particle concentration. This functional dependency is similar to that of the particle mass concentration, i.e. diameter cubed times the concentration. We therefore adopt the approximation that the slope of NSN vs. ff can be used for the slope of the NEIm vs. ff. This choice is made because it involves parameters available in the ICAO data base. It is important to note these approximations do not apply to all engines listed in the ICAO database but are reasonable for a significant number of engines currently operating in the commercial fleets.

Let us consider some exceptions:

(1) There are two GE engines the CF6-50C and CF6-50E2 where changes in their fuel injection nozzles can have a substantial impact on their emissions, in particular their LTO cycle smoke numbers. These engines are essentially the same model, with the same combustor, but with different fuel injection nozzle configurations that yield completely different smoke number behaviors. With one nozzle configuration (low emissions version) emissions increase with fuel flow and have a slope that falls into the range reported above for numerous ICAO engines; with the other fuel nozzle configuration (regular), emissions are approximately independent of fuel flow. Hence for these "regular" engines the linear normalized emissions vs. fuel flow model would not be appropriate.

(2) Extensive UMR measurements on particle emissions have been made for the Pratt F-100 engine (Wey etal 1998). This is a modern engine representing advanced combustor technology. It was found to have a smoke number of zero and its EIm does not correlate with fuel flow (average R2 = 0.063, a perfect correlation would yield R2 = 1.0). The F-100 engine has the most accurately measured EI vs engine condition data set that exists to date (see Fig.4). Particle mass density (Particle mass per unit volume) vs. FAR for the F100 is plotted in Fig. 5. This data does not show the particle mass density correlation with FAR discussed by Charalampopoulos (1992) and Schumann (1995). Hence for the F100 engine the linear normalized emissions vs. fuel flow model would not be appropriate.

Attachment C-5B.3

3. APPLICATION

We now apply the approach to a number of engines for which we have EI data from various UMR measurement campaigns. The weighted average slope of NSN vs. ff from the ICAO database has a value of 0.613 s/kg, as developed above. This slope is applied to the variation of EI with fuel flow rate, ff, for a given engine, and this linearly fitted EI, fei, is referenced to the EI measured by UMR at a particular fuel flow rate, ff_{UMR}.

$$fei = EI_{UMR} \cdot [1 + (0.613\ s/kg).(ff - ff_{UMR})]$$

Table 3 shows UMR data from projects SNIF and POLINAT, in which EI's were measured for 4 different engines.

Here ff refers to fuel flow rate and Xbarv is the mean volumetric diameter for the size distribution taken under the sampled conditions. Note that the total aerosol volume per unit volume of exhaust aerosol, V_A, is given by

$$V_A = (\pi/6).Xbarv^3.N_A \quad \text{(where } N_A \text{ is the aerosol concentration).}$$

Fuel flow rates for the LTO cycle of these engines taken from the ICAO data base, combined with the weighted average slope of NSN vs. ff and the UMR measurement data given in Table 3, were used to evaluate fitted EI's, fei, for each LTO cycle fuel flow rate. The results are shown in Table 4. The mass-based EI's, fei_m, in table 4 were determined using

$$fei\_m = (\pi/6) \cdot \rho \cdot Xbarv^3 \cdot fei.$$

The assumed density of the particles (carbonaceous) was taken to be $\rho = 1.0\ g/cm^3$. The mean volumetric diameter, Xbarv, varies from engine type to engine type, but for a given engine is generally found to be independent of thrust (Howard etal 1996, Wey etal 1998). Thus for these calculations it is reasonable to use a single diameter to represent all thrust settings in the LTO cycle. This diameter, Xbarv, is also recorded in Table 4.

The total particle EI's were obtained using the ratio of total to non-volatile particles EI's for the NASA B757 aircrafts RB211-535C engines, measured in flight under cruise conditions during NASA's field campaign SUCCESS (Hagen et al 1998). During this campaign measurements were also made in the exhaust plume with two different fuels one with low sulfur (72ppmm) and one with high sulfur (676ppmm) and total particle EI's for both sulfur conditions are given in Table 4. The particle concentration enhancement factors, including the fuel sulfur dependency, measured in situ for the RB211, were assumed to apply to the other engines described in

Attachment C-5B.3

4. DISCUSSION

The approach and its application described in this report are clearly only the first steps to be taken in the process of being able to accurately predict the environmental impact of aircraft related particulate emissions during the LTO cycle for commercial aircraft. The approach shows promise for further application and currently is mainly limited by the availability of mass-based emissions data for the type of particulates emitted by jet engines. It is important to note that a fundamental assumption in this model is that the normalized smoke number slope (derivative of normalized smoke number with respect to fuel flow rate) can be used for the slope of the normalized emission index. Arguments were made to show that this is approximately true for the Rolls Royce RB211-535C engine, a case for which measurement data on the emission index was available. This relationship should be tested for other engines, but this requires further emission index measurements.

Table 4 provides "first of a kind" estimates of number and mass-based EI's for the LTO cycle of four popular engines currently in use in the commercial fleets. The EI's are provided for both non-volatile (soot) particulates and for the total particulates for both high and low fuel sulfur contents. Table 4 reveals a number of important observations:

(1) For both number and mass-based EI's, EI increases with thrust.

(2) For number-based EI's the greatest engine-to-engine variability range is observed at idle and this variability range decreases with increasing thrust.

(3) For mass-based EI's the overall engine-to-engine variability range is much larger than that for number-based EI's, and the range also decreases with increasing thrust, although this dependency is much weaker.

(4) The difference in the engine-engine variability range for mass-based EI's compared to number-based EI's is driven by the variability of the number-based EI's and shifts in the engine size spectra. Both these factors enter into the calculation of mass-based EI's.

(5) The engine-to-engine variability demonstrated in the mass-based EI's clearly indicates a need for more size dependent measurements on a wider range of engines than is available to this report.

(6) Higher levels of sulfur in fuel result in higher mass-based EI's. This fact is measured for the RB211 engine and as stated earlier is assumed to apply to other engines.

The F100 results presented in Fig. 4 indicate that should the community that purchases jet engines require lower mass-based particulate emissions, such a goal is achievable. The data presented in Fig. 4 indicates that low EIm's can be achieved even at high fuel flow rates by the proper choice of operating conditions. There will be a trade off with thrust and the other parameters that are varied during operating condition optimization studies.

The estimates provided in this study can only be of use if their associated level of uncertainty is assessed. There are two major categories of uncertainty. The first deals with uncertainties associated with the measurement of the parameters used to develop the estimates. The second and by far the most significant are those introduced as a result of the inevitable assumptions invoked in order to develop the estimates. The validity of these assumptions can only be verified with additional experimental data. In particular a more accurate measure of soot density for jet engine produced soot is needed. A survey of the literature indicates that a value anywhere between 1-2gcm-3 can be used [Malissa 1978, Rivera-Carpio 1996, and Hitzenberger et al 1996]. In the words of Hitzenberger et al "a major problem is caused (in this type of analysis) by the fact that the density of black carbon particles is unknown." To the best of our knowledge this problem has yet to be resolved. The magnitude of the uncertainty introduced by the density factor is a factor of two. This uncertainty dwarfs all others associated with this study (see below) and is an unavoidable obstacle in the absence of any reliable measurement of the density of the soot generated by jet engines.

Measurement uncertainties, with one exception, are typically ▯ 30% with most parameters known to within ± 10-12%[Howard et al 1996, Wey et al 1998]. The exception is the problem of accounting for all of the available mass within the window of the size distribution diameter range for the MASS methodology. Historically, the scientific community has been mainly interested in number-based size distributions and the engine studies used in these analyses covered a size range sufficient to characterize number-based size distributions. Mass-based data have been determined from the number-based data using (1) volumetric size distributions derived from the measured number-based data and (2) an assumed density for soot. The UMRMASS methodology used to acquire the number-based size distributions typically operates within a

particle diameter range between 10 and 100 nm. This is perfectly adequate to account for >95% of the total concentration of particles emitted from the jet engines studied to date (see Wey et al 1998). Our analysis shows, however, that since the particle mass is related to the particle diameter cubed we are only accounting for 60-70% of the total particle mass for the engines in this study. This effect can be seen clearly in the examples of mass-based size distributions for the RB211 and JT8D engine emissions given in figure 6. As an example of how this effect is less pronounced in more recent engine developments a plot of the mass-based size distribution for an F100 engine is also provided in figure 6. The combustor in the F100 engine is considered to be representative of that for current-advanced commercial engines [Wey et al 1998]. The dm/dlogx plotting format in figure 6 is chosen since it provides a visual proportional relation between the mass and the area under the curve. Our best estimate of this effect suggests that the mass-based EI's reported in table 4 underestimate actual mass-based EI's by 35%. This result, however, is dependent entirely on the assumption that the particle mass-based distributions continue to fall smoothly at diameters beyond the MASS diameter range in a similar manner to the F100 engine.

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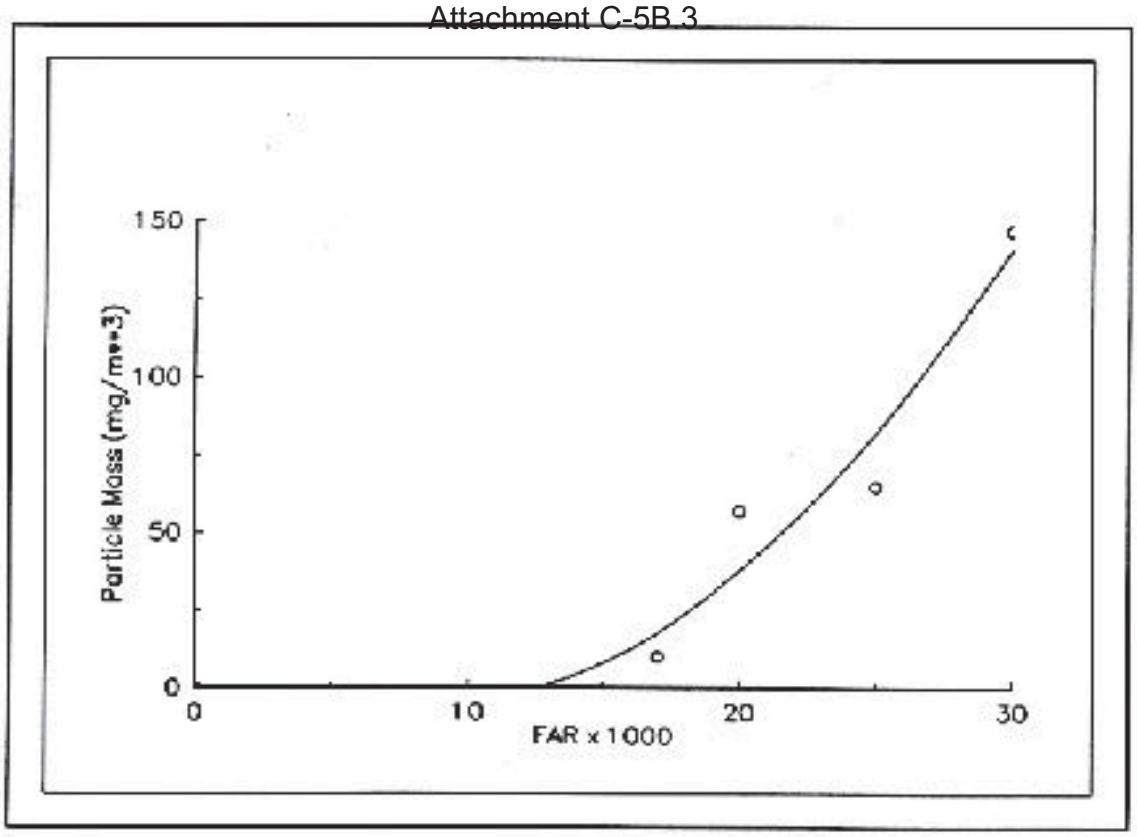


Figure 1. Particle mass versus fuel air ratio for a tubular combustor rig.

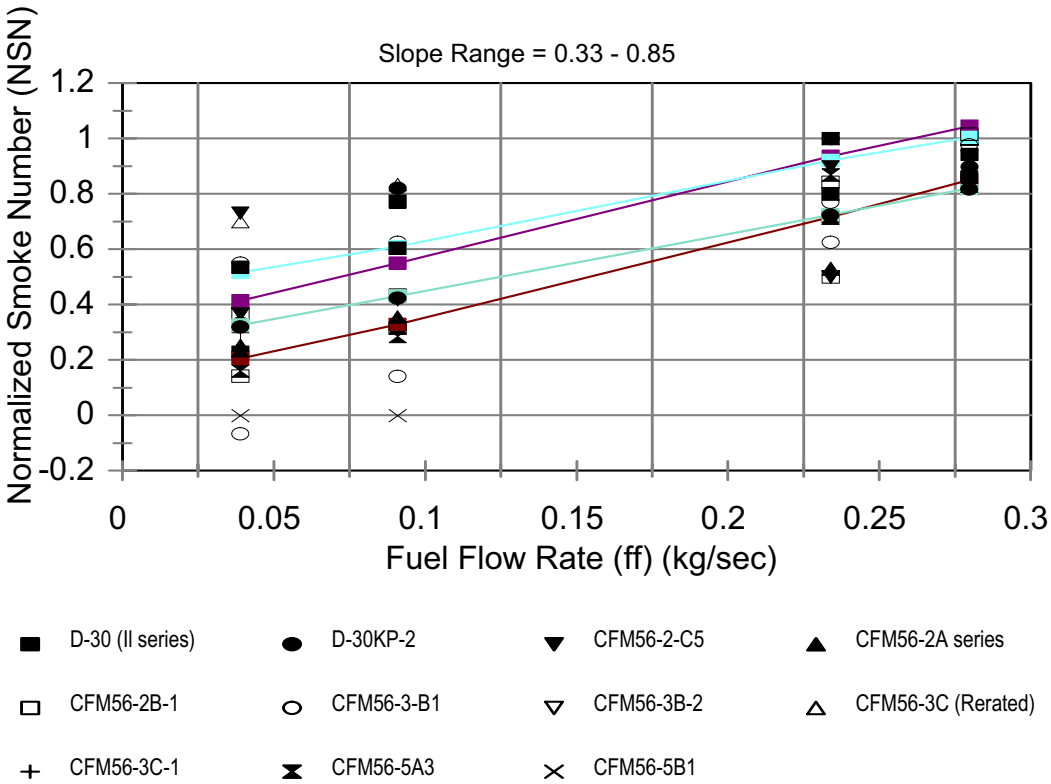


Figure 2. A plot of normalized smoke number versus fuel flow rate for 11 engines taken from the ICAO database.

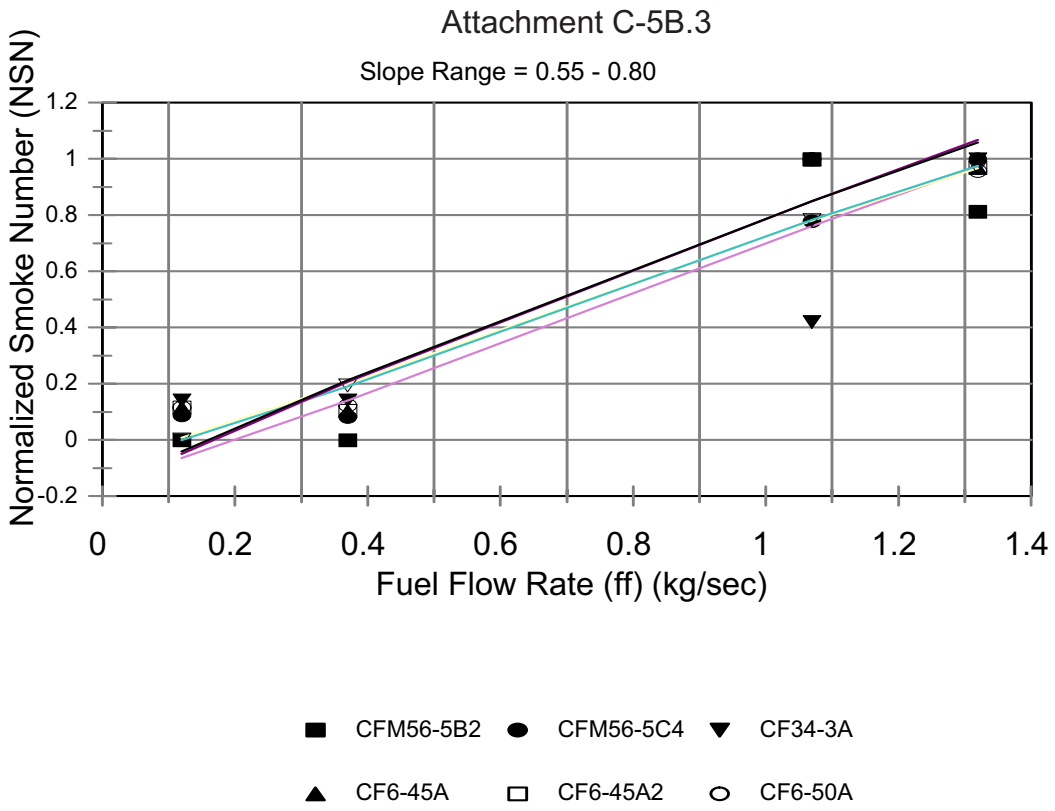


Figure 3. A plot of normalized smoke number versus fuel flow rate for 6 engines taken from the ICAO database.

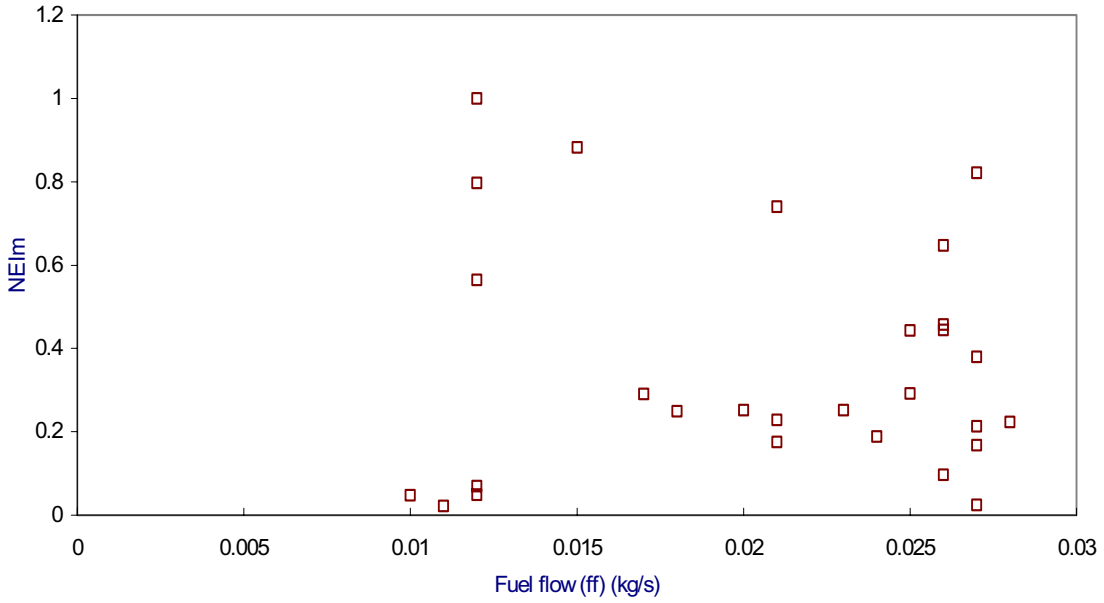


Figure 4. Normalized mass-based emission index versus fuel flow rate for the F100 engine.

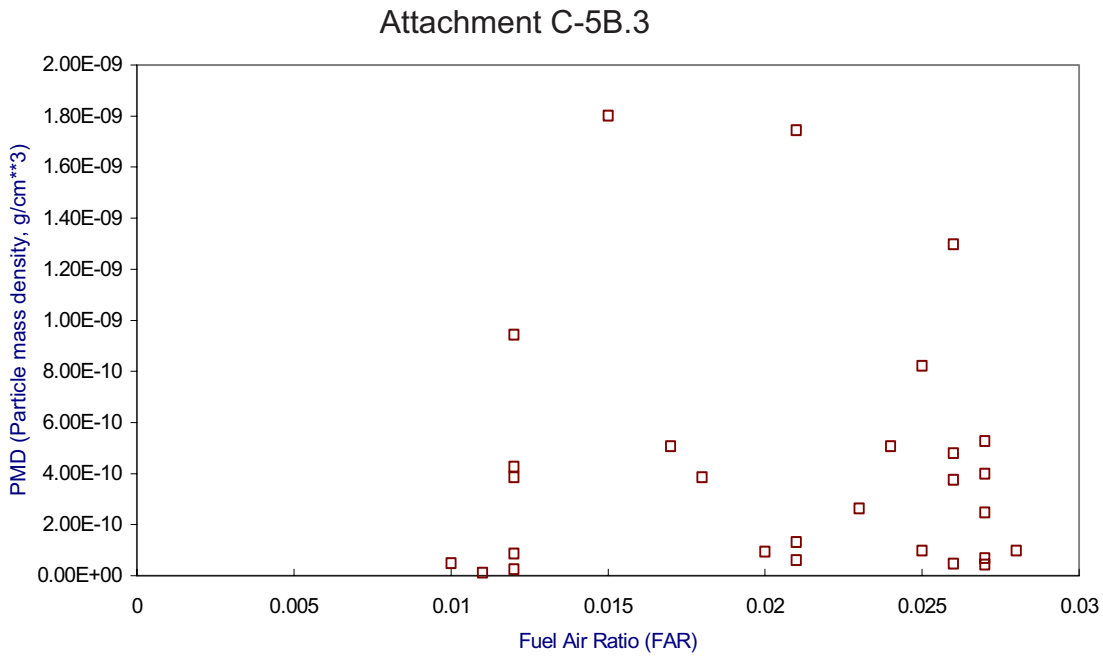
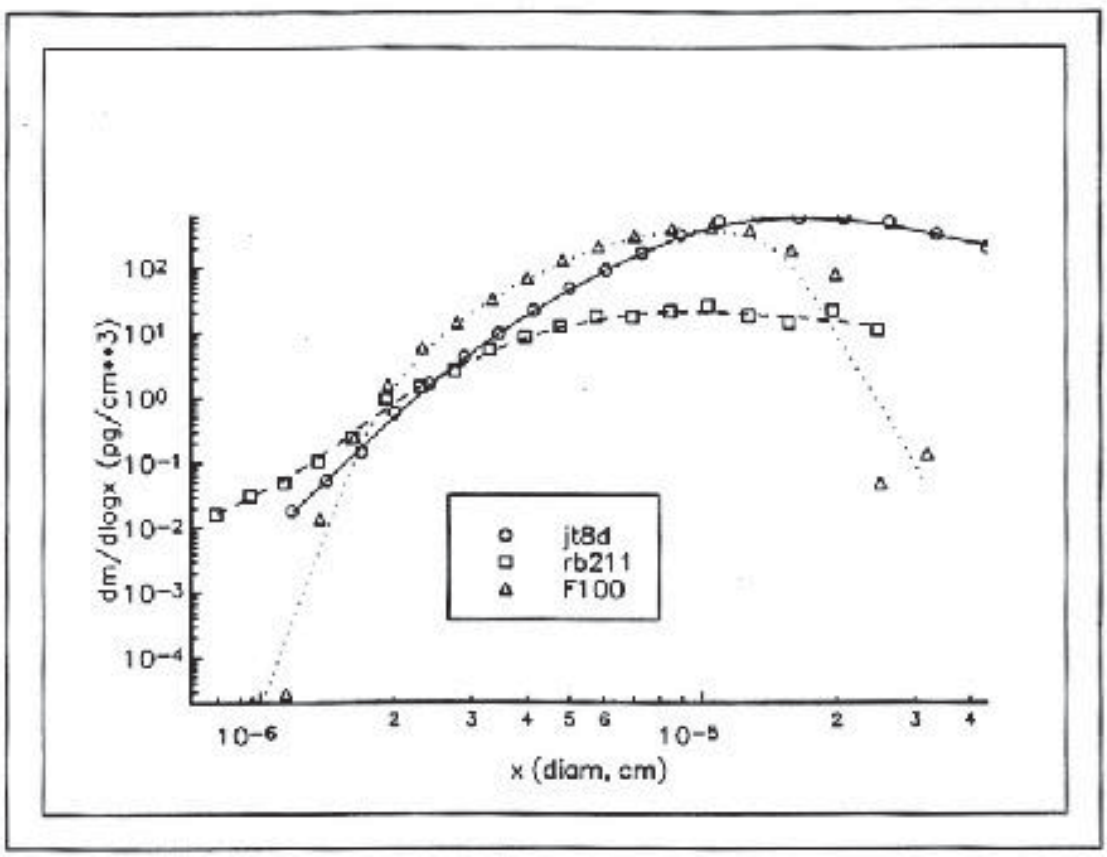


Figure 5. Particle mass density versus fuel air ratio (FAR) for the F100 engine.



Figrue 6. Aerosol mass distributions for the JT8D, RB211 and F100 engines measured with the UMR MASS.

Table 1. Usage and relationship applicability data for 29 of the most widely used engines in the commercial fleet, based on distances flown.

aircraft	distance	CFM56B1	CFM56B2	CFM56C2	PWJT8D7	PWJT8D9
727	2.43E+06				7.9	25.3
737 100/200	1.78E+06				7.2	31.3
737 300/400	1.53E+06	45.4	36.9	17.5		
747 100/300	2.18E+06					
767	1.73E+06					
DC10	1.53E+06					
DC9	1.21E+06				44.3	33.2
MD80	1.40E+06					
total	1.73E+07					
de		6.937E+05	5.638E+05	2.674E+05	8.553E+05	1.574E+06
Re		0.040	0.033	0.015	0.050	0.091
slope		0.39292	0.79406	0.57655	X	X
aircraft	distance	PWJT8D17C	PWJT8D217	PWJT8D219	GECF650C	GECF650C1
727	2.43E+06	7.6				
737 100/200	1.78E+06					
737 300/400	1.53E+06					
747 100/300	2.18E+06					17.6
767	1.73E+06					
DC10	1.53E+06				11	34.1
DC9	1.21E+06					
MD80	1.40E+06		56.9	39.7		
total	1.73E+07					
de		1.846E+05	7.982E+05	5.569E+05	1.679E+05	9.034E+05
Re		0.011	0.046	0.032	0.010	0.052
slope		X	X	X	Y	0.87464
aircraft	distance	GECF680C2B6	GECF680C2D1F	PW4060	PW4460	PWJT9D7A
727	2.43E+06					
737 100/200	1.78E+06					
737 300/400	1.53E+06					
747 100/300	2.18E+06					31.1
767	1.73E+06	11.4		16		
DC10	1.53E+06		7.5		5.4	5.1
DC9	1.21E+06					
MD80	1.40E+06					
total	1.73E+07					
de		1.968E+05	1.145E+05	2.762E+05	8.241E+04	7.546E+05
Re		0.011	0.007	0.016	0.005	0.044
slope		0.52356	0.51839	X	X	0.49459

Table 1. Usage and relationship applicability data for 29 of the most widely used engines in the

Attachment C-5B-3

commercial fleet based on distances flown. (continued)

aircraft	Distance	PWJT8D15	PWJT8D15A	PWJT8D17	PWJT8D17A	GECF66D1K
727	2.43E+06	46.6		9.8		
737 100/200	1.78E+06	21.8	15.4	13.1	11.2	
737 300/400	1.53E+06					
747 100/300	2.18E+06					
767	1.73E+06					
DC10	1.53E+06					11.5
DC9	1.21E+06	9				
MD80	1.40E+06					
total	1.73E+07					
de		1.630E+06	2.748E+05	4.718E+05	1.998E+05	1.755E+05
Re		0.094	0.016	0.027	0.012	0.010
slope		X	X	X	X	X

aircraft	Distance	GECF680A2	GECF680C2B2	PWJT9D7Q,7W(70A)	PWJT9D7R4D,D1	PWJT9D7R4G2
727	2.43E+06					
737 100/200	1.78E+06					
737 300/400	1.53E+06					
747 100/300	2.18E+06			16.9		11.6
767	1.73E+06	13.2	8.2		16.7	
DC10	1.53E+06					
DC9	1.21E+06					
MD80	1.40E+06					
total	1.73E+07					
de		2.278E+05	1.415E+05	3.677E+05	2.883E+05	2.524E+05
Re		0.013	0.008	0.021	0.017	0.015
slope		0.86011	0.35723	X	X	X

aircraft	Distance	PWJT8D11	GECF66D	PWJT9D7J,20J	GECF80A	sum
727	2.43E+06					97.2
737 100/200	1.78E+06					100
737 300/400	1.53E+06					99.8
747 100/300	2.18E+06			5.5		82.7
767	1.73E+06				14.4	79.9
DC10	1.53E+06		15			89.6
DC9	1.21E+06	8.4				94.9
MD80	1.40E+06					96.6
total	1.73E+07					
de		1.014E+05	2.289E+05	1.197E+05	2.486E+05	
Re		0.006	0.013	0.007	0.014	0.73621
slope		X	Y	X	0.27910	0.56607

Attachment C-5B.3

Table 2. UMR EIm's for the RB211-535C engine.

{PRIVATE }Test	ff (kg/s)	EIm (g/kg)	NEIm
Gnd, SNIF	.391	.131	.187
Gnd, SNIF	.479	.160	.229
Airborne, SUCCESS	.709	.70	1

Table 3. UMR data from projects SNIF and POLINAT in which emission indices for 4 different engines were measured.

{PRIVATE }Engine	ff (kg/s)	EI/1.E14 (/kg)	Test	Project	Xbarv (nm)
RB211-535C	.479	7.0	Ground	SNIF	47.8
JT8D	.391	15.8	Ground	SNIF	149
JT9D-7J	.912	4.5	Airborne	POLINAT2	106
CFM56-5C2	1.67	16	Airborne	POLINAT2	107

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Table 4. Estimates of number- and mass-based EI's for the LTO cycle of four popular engines.

Engine: RB211-22B					
Xbarv=47.8nm			fei_m		
Cond	ff	Fei	Nv	Tot_HS	Tot_LS
	(kg/s)	(#/kg_f)	(g/kg_f)	(g/kg_f)	(g/kg_f)
T/O	1.9	1.3E+15	0.074	1.1	0.19
C/O	1.5	1.2E+15	0.066	1.0	0.17
App	0.55	7.3E+14	0.042	0.61	0.11
Idle	0.28	6.2E+14	0.035	0.52	0.091

Engine: JT9D-7J					
Xbarv=106nm			fei_m		
Cond	ff	Fei	Nv	Tot_HS	Tot_LS
	(kg/s)	(#/kg_f)	(g/kg_f)	(g/kg_f)	(g/kg_f)
T/O	2.3	8.4E+14	0.52	7.7	1.3
C/O	1.9	7.2E+14	0.45	6.6	1.2
App	0.68	3.9E+14	0.24	3.5	0.62
Idle	0.24	2.6E+14	0.17	2.4	0.43

Engine: CFM56-5C2					
Xbarv=107nm			fei_m		
Cond	ff	Fei	Nv	Tot_HS	Tot_LS
	(kg/s)	(#/kg_f)	(g/kg_f)	(g/kg_f)	(g/kg_f)
T/O	1.3	1.2E+15	0.80	12	2.1
C/O	1.1	1.0E+15	0.65	10	1.7
App	0.36	3.1E+14	0.20	2.9	0.52
Idle	0.12	7.7E+13	0.050	0.73	0.13

Engine: JT8D					
Xbarv=149nm			fei_m		
Cond	ff	Fei	Nv	Tot_HS	Tot_LS
	(kg/s)	(#/kg_f)	(g/kg_f)	(g/kg_f)	(g/kg_f)
T/O	1.3	2.5E+15	4.2	62	11
C/O	1.0	2.2E+15	3.8	56	10
App	0.35	1.5E+15	2.7	39	6.9
Idle	0.15	1.3E+15	2.3	34	6.0

APPENDIX I. A BRIEF DESCRIPTION OF THE MASS METHODOLOGY.

Introduction:

The University of Missouri-Rolla (UMR) Mobile Aerosol Sampling System (MASS) has been widely deployed in over the past eight years as a particulate characterization experimental package. The versatility and comprehensive nature of the MASS system has made it an ideal platform from which to study submicron particulates.

The MASS system is a compact, versatile particulate characterization platform suitable for both ground-based and flight campaigns. The MASS is made of several modular sub-systems: the sample acquisition facility, particle profiles system and particle size distribution system. The sample acquisition facility is the most fluid part of the MASS system as its configuration changes with each test venue. Samples are analyzed either in real time or from grab-tanks. The particle profile subsystem acquires continuous data on various particulate species. Primarily, this system monitors total particle concentration and non-volatile particle concentration through a condensation nucleus counter, for non-volatile samples a thermal volatilization unit preceeds the counter. The particulate size distribution subsystem acquires size information based upon the electrical mobility of particles within an applied field (particles <700nm dia.) and light scattering (particles >500nm).

Sample Acquisition:

In order to properly evaluate particle data, one must have knowledge of the many environmental parameters that influence the particle concentration and size distribution. Within the sample acquisition facility are a number of parameters that must be taken into account, these include: sample dilution, probe effects, sample aging, and sample losses.

Sample Dilution: It is often times desirable to dilute the incoming particulate sample. The particle counters often have a saturation efficiency beyond which they no longer accurately register the correct concentration. Additionally, when sampling under high temperature conditions, it is often desirable to dilute with low humidity air to prevent condensation within the sample lines. The MASS methodology utilizes two primary methods of achieving dilution: probe tip dilution, and filter needle dilution.

Probe Tip Dilution: Probe tip dilution is accomplished by bleeding dry compressed air into the probe tip. Knowledge of the flow rates is critical to calculating the appropriate dilution factor, and the MASS system uses two slaved electronic mass flow meters to regulate the flow of dilution air to the probe tip.

Filter needle Dilution: The MASS system has a novel method of diluting the sample flow by passing the air parcel through an absolute filter that has been pierced by a capillary tube. The effective dilution is determined by the diameter of the capillary tube. With dilution rations varying between 40 and 80, multiple filter needles may be employed to achieve dramatic reductions in the ambient aerosol concentration.

Probe Effects: The method of probe sampling varies with the experimental venue. Of primary concern with particulate characterization is preferential particulate sampling and where necessary iso-kinetic sampling is employed or the deviation from non-iso kinetic conditions is modelled.

Sample Aging: Since often the particle size distributions data is acquired from tank samples, a diffusion/ coagulation model is used to predict the particulate losses, and shifts in the size distribution spectrum.

Sample Losses (line losses): There are two methods of particulate losses: impaction, and diffusion. In order to accurately correct for these losses, great care must be taken in the construction and design of the instrument.

Impaction Losses: Inertial impaction is generally not as significant of a problem as diffusional losses. The MASS system was built with large radii of curvature for sample lines.

Diffusional Losses: Diffusional losses are significant in the typical size range for MASS operations (5-250nm). To correct for these diffusional losses, several variables must be monitored, these include: sample flow rate, tubing length, temperature, and pressure. These variables can then applied to a size spectrum and the cumulative corrections results in a single value that can then be used to correct for diffusional losses. Additionally, particles may be lost at an accelerated rate due to the tubing material, or particulate charging. The materials of the MASS system have undergone testing to determine the penetration losses and appropriate calibration factors have been calculated.

Attachment C-5B.3

Particle Profiles:

The MASS system typically employs a continuous flow thermal diffusion counter, or condensation nucleus counter (CNC). CNC's are commercially available from such companies as MetOne, Inc. (Grand Pass, Oregon), or TSI, Inc. (St. Paul, Minnesota). Thermal diffusion counters general function by passing the aerosol containing sample over a pool of heated alcohol vapor, the vapor laden sample is then passed into a low temperature condenser region, where the alcohol vapor, in supersaturation, condenses on the particles rendering them large enough for optical detection. However, commercial CNC's are designed to operate under very specific conditions, i.e. one atmosphere, and they generally demand a constant flow rate for optimal performance. These conditions are difficult to meet in anything but laboratory applications. In order to operate at reduced pressures for airborne sampling, calibration curves have been constructed for the various CNC devices. As each device has minute variations from another, every device must be calibrated individually. The MASS system generally produces 3 particulate profiles: total aerosol population (TCN), nonvolatile aerosol population (NVCN), and a large particle profile by laser scattering (LCN). The nonvolatile aerosol population is determined by passing the total aerosol population stream through a known high temperature regime designed to volatilize aerosols. This sub-system operates at 350 C, and has a discrimination efficiency of better than 95% at 80nm diameter.

Particle Size Distribution:

Particulate size distributions are acquired through the use of a differential mobility analyzer (DMA). To acquire a size distribution, the particles are first passed through a bipolar charging device, either a Polonium, or krypton alpha particle emitter. This serves to ionize the air, and the statistical nature of collisions and charge transference will place a Boltzmann distribution of charges on the particles as a function of particulate diameter. The resulting particles flow possessing the Boltzmann distribution of charges can then be passed into the DMA device.The MASS DMA's are either commercially available from TSI Inc. (St. Paul, Minnesota), or are "Zalabski" type analyzers built and calibrated at UMR. The DMA consists of concentric cylinders with an applied electric field between them. The polydisperse aerosol sample with the enforced Boltzmann distribution of ambient charges is then subjected to the field. The particles then moving in the y direction by an applied sheath flow of air, also move in the x direction based upon their electrical mobility corrected for their slip coefficient. With the known geometries of the DMA's a band pass function can be calculated to determine what monodisperse size segment is passed through the DMA as a function of the applied electric field.

With this information, and the known distribution of charges for particle diameters, a system of linear equations can uniquely be solved to invert the resultant data and calculate the original aerosol concentration in the sample.

APPENDIX II. FUEL FLOW RATE DEPENDENCY OF MASS BASED EI.

Assuming that particle mass concentration is a quadratic function of fuel air ratio (FAR), with a very small constant coefficient and a positive quadratic coefficient, yields:

$$Pmc = \text{particle mass concentration} = c_0 + c_1 * FAR + c_2 * FAR^2,$$

where c_0 is small and $c_2 > 0$.

$$\text{Let } \alpha = 1/\rho_\alpha$$

where: α = air specific volume, and

ρ_α = air density.

Let $FAR = M_{fuel}/M_{air}$

Pconc = Number of particles per unit volume of air

ρ_fuel = Mass of fuel per unit volume of air

$= FAR/\alpha$

EI1 = Number of particles per g_fuel

$= Pconc/\rho\_fuel$

$= \alpha * Pconc / FAR$

EI = Number of particles per kg_fuel

$= 1000 * EI1 = 1000 * \alpha * Pconc/FAR$

$EIm = EI * (\pi/6) * \rho_p * Xbarv^3$

$= (\pi/6) * 1000 * \alpha * \rho_p * Xbarv^3 * Pconc/FAR$

$= (1000 * \alpha/FAR) * (c_0 + c_1 * FAR + c_2 * FAR^2)$

Neglect the small term c_0.

$= (1000 * \alpha) * (c_1 + c_2 * FAR)$

Let ff = fuel flow rate, which is proportional to FAR for normal operations.

$EIm = c_3 + c_4 * ff$

Mass based EI should be a linear function of fuel flow rate.

APPENDIX III. FIELD CAMPAIGN DESCRIPTIONS.

Project POLINAT – Pollution from aircraft Emissions in the North Atlantic flight Corridor.

This project encompassing three campaigns from 1994 – 1997 sponsored by the EEC and NASA was aimed at determining the distribution and transformation of pollutants emitted from aircraft in the North Atlantic flight corridor. (See EEC report EUR 16978 EN)

Project SNIFF – SASS Near Field Interactions Flight.

A project sponsored by NASA and operating out of NASA Langley with ground-based and airborne measurements of the EI's and size distributions of a range of aircraft commercial, military and NASA owned. The size dependent data was only made on the ground in this project. (See Anderson B., et al Proceedings of the NASA AEAP Meeting at Virginia Beach 1997 and 1998).

Project SUCCESS – Subsonic Aircraft: contrail and cloud Effects Special Study.

This campaign sponsored by NASA used aircraft, satellite and ground-based measurements to better understand cirrus cloud and contrail formation and whether aircraft exhaust could effect the formation process. (selected paper from GRL vol 25 Numbers 8,9,10 and 12)

APPENDIX IV. LIST OF ABBREVIATIONS AND PARAMETERS.

de	total distance flown by a given engine type
EI	number-based emission index, number of particles per kg_fuel
EI1	number-based emission index, number of particles per g_fuel
EIm	mass-based emission index
EI_{UMR}	measured EI
FAR	fuel to air ratio
fei	fitted number-based EI using model
fei_m	fitted mass-based EI using model
ff	fuel flow rate
ff_{UMR}	fuel flow rate for UMR measured EI
GE	General Electric
ICAO	International Civil Aviation Authority
LAX	Los Angeles International Airport
LTO	landing and take off
M_{fuel}	mass of fuel
M_{air}	mass of air
MASS	mobile aerosol sampling system
N_A	aerosol concentration
NEIm	normalized mass-based emission index
NSN	normalized smoke number
NV	non-volatile (soot)
Pconc	Number of particles per unit volume of air
Pmc	particle mass concentration
Re	the fraction of total miles flown by commercial aircraft associated with a given engine type
slope	slope of the NSN –vs- ff plot for a given engine
Tot_HS	mass-based EI for total particles for high sulfur fuel conditions
Tot_LS	mass-based EI for total particles for low sulfur fuel conditions
UMR	University of Missouri - Rolla
V_A	aerosol volume perunit volume of sample
Xbarv	mean volumetric diameter
α	air specific volume
ρ, ρ_p	density of soot
ρ_a	air density
ρ_fuel	mass of fuel per unit volume of air

Attachment C-5B.3

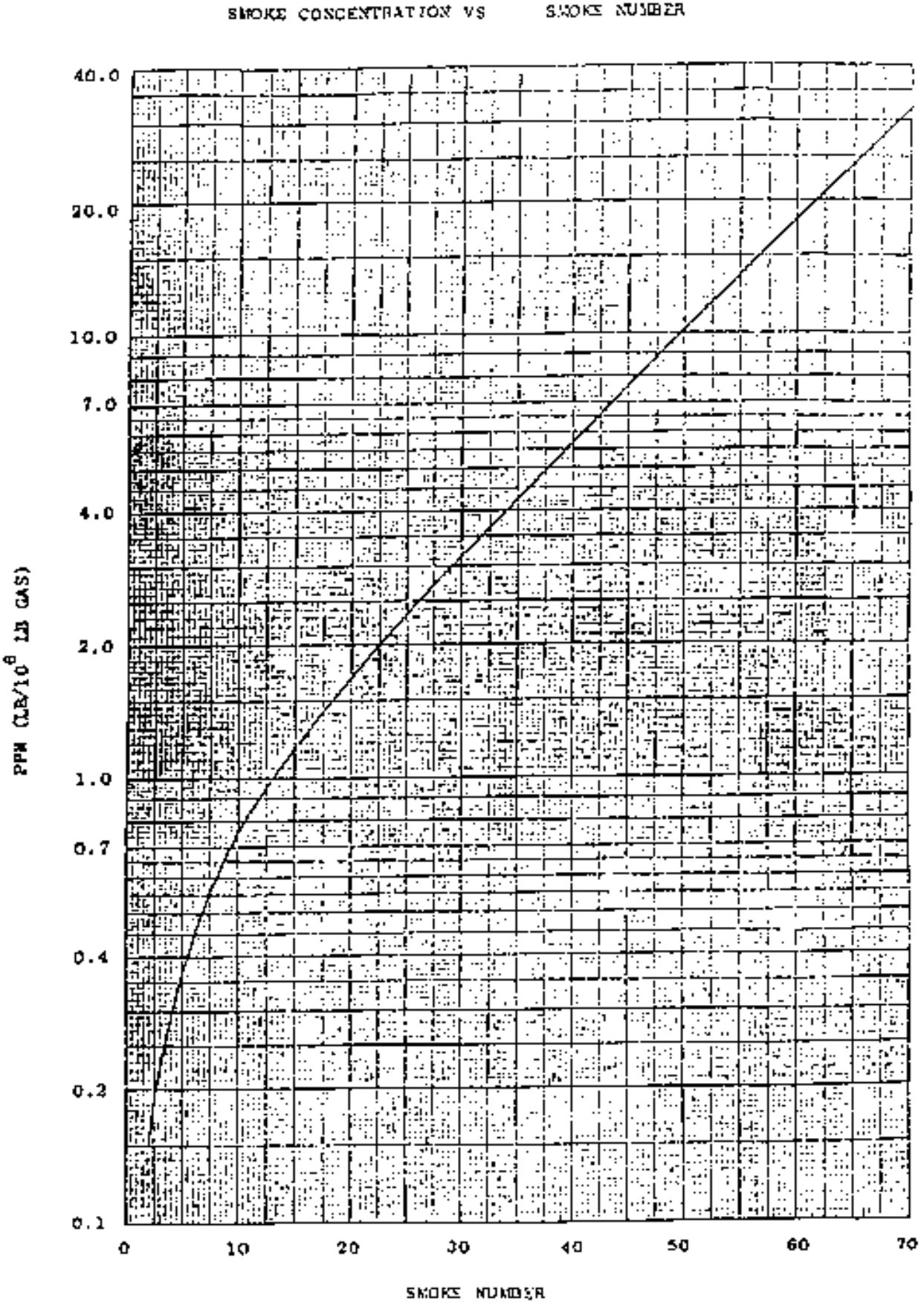
LAX Master Plan EIS/EIR

Aircraft Engine Particulate Matter Emissions Data

Attachment B

Particulate Mass Concentration Versus Smoke Number, from 1994 California FIP

Attachment C-5B.3



Particulate Mass Concentration vs. Smoke No. from 1994 California FIP.

Attachment C-5C1

Attachment C-5C.1

From: Pehrson, John
Sent: Wednesday, May 19, 2004 8:03 AM
To: Zorik Pirveysian (E-mail)
Cc: David Kessler (E-mail)
Subject: NEPA No Action Guidance

Zorik,

Per FAA, the attached documents provide guidance on what is typically included as part of the NEPA No Action analysis. Please call me if you have questions regarding these documents.

Jan25-1996_Kessler.pdf (100 KB... MEMORANDUM R FEDERAL NEPA L GenConformityGuide-NoAction.do...

Regards,
John

John R. Pehrson, P.E.
Principal
CDM
18581 Teller Avenue, Suite 200
Irvine, California 92612
(949) 752-5452 voice
(949) 752-1307 fax
PehrsonJR@cdm.com

Attachment C-5C2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

JAN 25 1996

David B. Kessler (Code AWP-611.2)
Federal Aviation Administration
P.O. Box 92007
Los Angeles, CA 90009

Dear Mr. Kessler:

This letter supplements our comments of November 9, 1995 regarding the Final Environmental Impact Statement and Clean Air Act (CAA) conformity determination for the Burbank-Glendale-Pasadena Airport Land Acquisition and Terminal Replacement Project, Los Angeles County, California.

After further discussions with Ralph Thompson and Daphne Fuller of your headquarters' office, the U.S. Environmental Protection Agency (EPA) now concurs with you that, in making an applicability determination and calculating whether your action is de minimis under 40 C.F.R. § 93.153 of EPA's conformity regulation, you may compare projected total direct and indirect emissions caused by your action with a future emissions baseline which includes growth that would occur even if your action were not constructed (i.e., growth not caused by your action). As we have previously discussed, this determination must be based on the most recent estimates of emissions derived from the most recent population, employment, travel and congestion estimates as determined by the Southern California Association of Governments (SCAG), in accordance with 42 U.S.C. § 176(c)(1) and 40 C.F.R. § 93.159.

When calculating future emissions under § 93.153(b), your analyses should include all emissions caused by the project, including construction emissions, pursuant to § 93.159(d). We note that your applicability calculations use the year 2010 as full build out of the project. You have determined in that year the emissions for all nonattainment pollutants will be the greatest. If 2010 represents the year in which the emissions are the greatest, EPA concurs that your use of this year for applicability purposes would be sufficient to determine that your project is de minimis and meet the requirements of 93.159(d), since the preceeding years would also be de minimis.

If you have any further questions regarding these issues, please feel free to contact myself at (415) 744-1207 or Robert Pallarino at (415) 744-1297.

Sincerely,

Wallace Woo
Chief, Plans Development Section
Air and Toxics Division

cc:

Thomas Greer, Executive Director, Airport Authority, Burbank
Ralph Thompson, FAA
Daphne Fuller, FAA
Terry Parker, CARB
Connie Day, SCAQMD
Arnold Sherwood, SCAG
Robert Pallarino, EPA

Attachment C-5C3

MEMORANDUM FOR FEDERAL NEPA LIAISONS, FEDERAL, STATE, AND LOCAL OFFICIALS AND OTHER PERSONS INVOLVED IN THE NEPA PROCESS

Subject: Questions and Answers About the NEPA Regulations

During June and July of 1980 the Council on Environmental Quality, with the assistance and cooperation of EPA's EIS Coordinators from the ten EPA regions, held one-day meetings with federal, state and local officials in the ten EPA regional offices around the country. In addition, on July 10, 1980, CEQ conducted a similar meeting for the Washington, D.C. NEPA liaisons and persons involved in the NEPA process. At these meetings CEQ discussed (a) the results of its 1980 review of Draft EISs issued since the July 30, 1979 effective date of the NEPA regulations, (b) agency compliance with the Record of Decision requirements in Section 1505 of the NEPA regulations, and (c) CEQ's preliminary findings on how the scoping process is working. Participants at these meetings received copies of materials prepared by CEQ summarizing its oversight and findings.

These meetings also provided NEPA liaisons and other participants with an opportunity to ask questions about NEPA and the practical application of the NEPA regulations. A number of these questions were answered by CEQ representatives at the regional meetings. In response to the many requests from the agencies and other participants, CEQ has compiled forty of the most important or most frequently asked questions and their answers and reduced them to writing. The answers were prepared by the General Counsel of CEQ in consultation with the Office of Federal Activities of EPA. These answers, of course, do not impose any additional requirements beyond those of the NEPA regulations. This document does not represent new guidance under the NEPA regulations, but rather makes generally available to concerned agencies and private individuals the answers which CEQ has already given at the 1980 regional meetings. The answers also reflect the advice which the Council has given over the past two years to aid agency staff and consultants in their day-to-day application of NEPA and the regulations. CEQ has also received numerous inquiries regarding the scoping process. CEQ hopes to issue written guidance on scoping later this year on the basis of its special study of scoping, which is nearing completion.

NICHOLAS C. YOST
General Counsel

Attachment C-5C.3

3. **No-Action Alternative.** What does the "no action" alternative include? If an agency is under a court order or legislative command to act, must the EIS address the "no action" alternative?

A. Section 1502.14(d) requires the alternatives analysis in the EIS to "include the alternative of no action." There are two distinct interpretations of "no action" that must be considered, depending on the nature of the proposal being evaluated. The first situation might involve an action such as updating a land management plan where ongoing programs initiated under existing legislation and regulations will continue, even as new plans are developed. In these cases "no action" is "no change" from current management direction or level of management intensity. To construct an alternative that is based on no management at all would be a useless academic exercise. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed. Consequently, projected impacts of alternative management schemes would be compared in the EIS to those impacts projected for the existing plan. In this case, alternatives would include management plans of both greater and lesser intensity, especially greater and lesser levels of resource development.

The second interpretation of "no action" is illustrated in instances involving federal decisions on proposals for projects. "No action" in such cases would mean the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward.

Where a choice of "no action" by the agency would result in predictable actions by others, this consequence of the "no action" alternative should be included in the analysis. For example, if denial of permission to build a railroad to a facility would lead to construction of a road and increased truck traffic, the EIS should analyze this consequence of the "no action" alternative.

In light of the above, it is difficult to think of a situation where it would not be appropriate to address a "no action" alternative. Accordingly, the regulations require the analysis of the no action alternative even if the agency is under a court order or legislative command to act. This analysis provides a benchmark, enabling decision makers to compare the magnitude of environmental effects of the action alternatives. It is also an example of a reasonable alternative outside the jurisdiction of the agency which must be analyzed. Section 1502.14(c). See Question 2 above. Inclusion of such an analysis in the EIS is necessary to inform the Congress, the public, and the President as intended by NEPA. Section 1500.1(a).

http://ceq.eh.doe.gov/nepa/regs/40/40p3.htm

Attachment C-5C4

Attachment C-5C.4

General Conformity Guidance for Airports Questions and Answers

September 25, 2002

Federal Aviation Administration Office of Airport Planning and Programming Community and Environmental Needs Division

and

Environmental Protection Agency Office of Air Quality Planning and Standards Air Quality Strategies and Standards Division

Emission Calculations

20. In evaluating "project-related" emissions, which comparison is made – a) future "Without Project" emissions subtracted from future "With Project" emissions or b) future "With Project" after subtracting the existing emissions? If the answer differs according to a specific situation, please indicate the situations that apply to each scenario. When defining the "Without Project", is the NEPA approach acceptable?

A: The total direct and indirect emissions used in the analysis are the **net** increase in emissions caused by the project/action – which is "a" above. The FAA would identify the net increase by subtracting the future emissions without the project/action from the future emission with the project/action.[59, 60] The emissions are calculated using forecast activity levels and appropriate emission factors.[61] The "without project" would be defined as the "no action" alternative[62] under NEPA (i.e., conditions in a respective year if the proposed project or activity would not take place).

[59]40 CFR 93.152 see definition of "total direct and indirect emissions, 40 CFR 93.153(b).

[60]Letter from Wallace Woo, USEPA Region IX San Francisco, CA to David Kessler, FAA, Los Angeles, CA, January 25, 1996.

[61]40 CFR 93.159.

[62]40 CFR 1502.14(d).

Attachment C-5D1

Attachment C-5D.1

From: Pehrson, John
Sent: Friday, May 21, 2004 10:36 AM
To: 'Zorik Pirveysian (E-mail)'
Cc: 'David Kessler (E-mail)'
Subject: Regional Traffic VMT

Zorik

Per FAA, attached are the No Action/No Project Alternative Regional Traffic Emission Calculation spreadsheets (in a zipped file). These spreadsheets include tabs for vehicle miles traveled (VMT) and average daily trips (ADT) used in the calculations. The CD-ROM sent to you earlier this week contains the Regional Traffic (sometimes called Off-Airport) Emission Calculations for Alternative D. The VMT and ADT contained in these spreadsheets was requested by the SCAQMD at our meeting on May 11, 2004.

Regards,
John

****

John R. Pehrson
Camp Dresser & McKee Inc.
18581 Teller Avenue, Suite 200
Irvine, California 92612
(949) 752-5452
(949) 933-1117 (cell)
(949) 752-1307 (fax)
pehrsonjr@cdm.com

****

NANP_RegionalTraf
ficEmissions....

Final GCD Note: The zipped file referenced in this email is available on CD-ROM only.

Attachment C-5E1

Attachment C-5E.1

Fugitive dust for LAX alternative D
From: Erin Sheehy [envcomp@earthlink.net]
Sent: Tuesday, May 25, 2004 10:00 PM
To: Kathy Hsiao
Cc: Pehrson, John
Subject: RE: Fugitive dust for LAX alternative D

Importance: High

Kathy - attached, please find, two files which, I hope, explain how our fugitive PM10 numbers were calculated. I've summarized in the word document the most relevant sheets in the Excel workbook in terms of explaining the fugitive PM10 numbers. I've summarized the fugitive PM10 emission assumptions in the attached Excel spreadsheet - which is taken directly from the sheet entitled, "Fugitive PM/Roads/Soil Handling"

I will be in after about 8:30 am tomorrow.

Please call with any questions. Also, I will be at SCAQMD most of the day on Thursday and am happy to bring my laptop and go over some sample calcs. with you at that time, if you would like.

Erin Sheehy
(310) 664-1396

-----Original Message-----
From: Kathy Hsiao [mailto:khsiao1@aqmd.gov]
Sent: Tuesday, May 25, 2004 3:45 PM
To: envcomp@earthlink.net
Subject: Fugitive dust for LAX alternative D

Hi Erin,

Could you provide us detail calculations (sources, activities, emission factors and assumptions….) regarding the fugitive dust emissions in the LAX Alternative D? One of the tables in the construction emissions listed the PM10 fugitive dust for different year starting 2004. Could you show us how the emissions were derived?

Thank you very much.

Kathy Hsiao
Program Supervisor
SCAQMD
Work (909) 396-3056
Fax (909) 396-3252

Attachment C-5E2

Attachment C-5E.2

Explanation of Fugitive PM10 Emission Calculations in LAX Construction Spreadsheets

In order to effectively understand the fugitive PM10 calculations contained in these spreadsheets, we recommend a review of the following sheets: #1 Crews, #2 Equipment Specifications, #3 Fugitive PM/Roads/SoilHandling and #4 Activity Alternative D. Each of these spreadsheets is explained in greater detail below. As an example, we recommend following emissions from a Scraper (CAT 631E) as scrapers contribute more fugitive PM10 than any other type of equipment expected to be used at LAX.

1. Crews

Crews are described by their various functions (ie. demolition, excavation, etc). For a sample review of fugitive PM10, Crew E5 – Airfield – Excavations/Foundations could be reviewed as that crew contains 6 scrapers (CAT 631Es). The type and quantity of equipment in each crew were based on project construction requirements and specified by project planners from either Bechtel Engineering or MARRS Engineering. A crew's daily emissions are calculated by summing the daily emissions of each equipment type and quantity of each piece of equipment.

Note: all equipment in all crews is assumed to be working full time (approximately 8.5 hours each day) at its rated load capacity. This results in an extremely conservative, worst-case emission estimate for all pollutants.

2. Equipment Specifications Sheet

This sheet summarizes equipment make, model, and horsepower rating which, in turn, are used to estimate construction emissions associated with Alternative D. Equipment types and sizes were based on construction requirements and confirmed with manufacturer data. Specific information for equipment was derived from the following sources:

- Brake horsepower ratings based on information provided by Bechtel Infrastructure Corporation, MARRS Services, and manufacturer information.

- Brake specific fuel consumption rate (0.05 gallons per brake horsepower-hour for diesel equipment) was based on Table A9-3-E of SCAQMD's 1993 CEQA Handbook.

- Load factors were based on Table A9-8-D of SCAQMD's 1993 CEQA Handbook.

- Usage factors assume equipment works at rated horsepower and load factor for an average of 50 minutes per hour (50/60 = 0.83), which accounts for inefficiencies during a construction workday, such as breaks, lunch, and downtime.

- Emissions factors for off-road construction equipment were based on CARB's OFFROAD Model (Emissions for on-road equipment were based on EMFAC2002, version 2.2, Los Angeles County). Daily emissions for off-road equipment conservatively assume that the equipment is operated at the specified load factor and usage factor for the **entire day**.

- Daily PM10 emission rates include the estimated fugitive PM10 associated with operation of the equipment. For example, the fugitive emissions associated with the action of the equipment itself (ie. the scraper scraping up dirt) and the action of the equipment moving along an unpaved surface. This was utilized in order to render a worst-case, conservative assumption of total fugitive PM10 emissions. Fugitive PM10 emissions were calculated using EPA AP-42, Chapter 13.2 (Fugitive Dust Sources) and Section 11.9 (Western Surface Coal Mining).

- For construction activities beginning in 2005, a diesel sulfur content of 15 ppmw (as S) was used to calculate the SOx emissions. Prior to 2005, the construction emissions estimates assume a diesel sulfur content of 500 ppmw.

3. Fugitive PM/Roads/SoilHandling Sheet

This sheet contains all fugitive PM10 emission factors and assumptions which were used to calculate fugitive PM10 from specific pieces of equipment (ie. excavator, loaders, scrapers, etc.). Using the scraper as an example, Column M of this sheet outlines all assumptions that were used to calculate daily emissions from the use of the scraper. PM10 emissions include emissions from the exhaust of each device and fugitive PM10 further includes: dust from the equipment's activity, dust from storage piles and dust from movement over both unpaved and paved roads. All of these emission factors are included in the calculations for each crew and activity which is ultimately summarized in the Alternative D. Activity Summary worksheet.

4. Activity Alternative D Summary

The Alternative D Activity Summary worksheet summarizes emissions from each crew, as assigned to each activity for the entire duration of the project. Total PM10 is a summation of all PM10 from both combustion of fuels as well as fugitive dust.

Attachment C-5E3

Attachment C-5E.3

LAX Master Plan - Alternative D
Construction Emissions - Fugitive PM Emissions from Roads and Soil Handling

	Excavators					Loaders				Scraper	Grader	Bulldozer	Compactor	Forklift	Flatbed/Oil trucks	Haul Truck	Water Wagon	Pickup	Automobile
	CAT 320	CAT 325L	CAT 330L	CAT 375	CAT 325L-BS	CAT 966F	CAT 980G	CAT 988F	CAT 992D	CAT 631E				M430CP					
Equipment Details/Performance																			
Job Efficiency/Usage Factor	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	30%	50%	83%	40%	30%
Vehicle weight, empty (lb)	42,770	59,690	74,380	167,070	59,690	47,333	65,765	100,492	201,982	101,370	-	-	-	15,000	17,400	17,400	68,000	6,000	3,500
Soil Capacity (yd3)	0.75	1	1.5	3.0	0	4.75	16	7.8	14	21	-	-	-	-	-	16	-	-	-
Vehicle Speed (mi/hr)	-	-	-	-	-	-	-	-	-	-	5	-	-	5	15	19	5	15	15
Cycle Time (min)	0.7	0.8	0.8	1.0	0.8	2.0	2.2	2.2	2.4	25	-	-	-	-	-	20	-	-	-
Number of Cycles/50 min-hr	72	66	61	49	66	25	22	22	20	2.0	-	-	-	-	-	1.5	-	-	-
Bucket Fill Factor	90%	90%	90%	90%	0	90%	90%	90%	90%	-	-	-	-	-	-	-	-	-	-
Volume Moved (yd3/hour)	49	59	82	132	0	107	317	154	252	42.0	-	-	-	-	-	24	-	-	-
Total Vol During Project (million yd3)	0.1	6.8	3.2	1.7	0	53.1	11.0	24.2	0.7	11.3	-	-	-	-	-	89.1	-	-	-
Travel Distance (ft/cycle)	5	5	5	5	5	80	80	80	80	3500	-	-	-	-	-	-	-	-	-
Travel Distance (ft/hr)	360	330	305	245	330	2000	1760	1760	1600	7000	-	-	-	-	-	-	-	-	-
VMT/hr	0.07	0.06	0.06	0.05	0.06	0.38	0.33	0.33	0.30	1.33	4.17	-	-	-	4.50	9.50	4.17	6.00	4.50
VMT/day	0.7	0.6	0.6	0.5	0.6	3.8	3.3	3.3	3.0	13.3	41.7	-	-	-	45.0	95.0	41.7	60.0	45.0
Transportation on Roads			Unpaved				Unpaved				-	-	-	Paved	Paved	Paved	Both	Paved	Paved
Mean Vehicle Weight (tons)	21.4	29.8	37.2	83.5	29.8	26.9	43.7	55.5	110.4	64.9	-	-	-	7.5	8.7	19.5	52.0	3.0	1.8
PM10 Emissions (lb/VMT)	1.07	1.23	1.34	1.85	1.23	1.17	1.43	1.57	2.07	1.67	0.53	-	-	0.016	0.020	0.067	1.180	0.004	0.002
Mitigation	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	95%	63%	63%
PM10 Emissions (lb/hr)	0.03	0.03	0.03	0.03	0.03	0.16	0.18	0.19	0.23	0.82	0.68	0.11	0.11	0.02	0.03	0.23	0.25	0.01	0.00
PM10 Emissions (lb/day)	0.27	0.28	0.29	0.32	0.28	1.65	1.76	1.94	2.32	8.20	6.83	1.07	1.07	0.25	0.33	2.35	2.46	0.09	0.03
Material Handling/Drop Operations																			
PM10 Emissions (lb/ton)	9E-05	9E-05	9E-05	9E-05	-	9E-05	9E-05	9E-05	9E-05	-	-	-	-	-	-	9E-05	-	-	-
Material Handling Rate (ton/hr)	66	80	111	179	-	144	428	208	340	-	-	-	-	-	-	32.4	-	-	-
Mitigation	63%	63%	63%	63%	-	63%	63%	63%	63%	-	-	-	-	-	-	63%	-	-	-
PM10 Emissions (lb/hr)	0.002	0.003	0.004	0.006	-	0.005	0.014	0.007	0.011	-	-	-	-	-	-	0.001	-	-	-
PM10 Emissions (lb/day)	0.022	0.026	0.036	0.058	-	0.047	0.140	0.068	0.111	-	-	-	-	-	-	0.011	-	-	-
Scraper Scraping Emissions:																			
TSP Emissions (lb /ton top soil)	-	-	-	-	-	-	-	-	-	0.058	-	-	-	-	-	-	-	-	-
PM10 fraction	-	-	-	-	-	-	-	-	-	0.35	-	-	-	-	-	-	-	-	-
Excavation rate (ton/hr)	-	-	-	-	-	-	-	-	-	56.7	-	-	-	-	-	-	-	-	-
Mitigation	-	-	-	-	-	-	-	-	-	63%	-	-	-	-	-	-	-	-	-
Scraping PM10 Emissions (lb/hr)	-	-	-	-	-	-	-	-	-	0.43	-	-	-	-	-	-	-	-	-
Scraping PM10 Emissions (lb/day)	-	-	-	-	-	-	-	-	-	4.3	-	-	-	-	-	-	-	-	-
Total PM10 Emissions (lb/day)	**0.29**	**0.31**	**0.32**	**0.38**	**0.28**	**1.69**	**1.90**	**2.00**	**2.43**	**12.46**	**6.83**	**1.07**	**1.07**	**0.25**	**0.33**	**2.36**	**2.46**	**0.09**	**0.03**

Attachment C-5E.3

Notes:

General

lb/VMT = pounds per vehicle mile traveled.

Job efficiency assumes a 50 minute work hour (50/60 = 0.83) because real-world operations are not 100% efficient (accounts for breaks, downtime, lunch, etc.)

Haul truck capacity estimated based on Freightliner 120SD (Chassis weight: 17,400 lb, Gross Vehicle Weight Rating = 66,000 lb)

Soil weight = 2,700 lb/yd3 (Assumption: Loose, wet excavated earth. Weight varies with moisture content, compaction, etc.)

Source: Caterpillar Performance Handbook (Edition 30, October 1999)

Unpaved Roads

Empirical formula from AP-42, Section 13.2.2 (Unpaved Roads ,9/98):

PM10 Emissions (lbs/VMT) = (k * (s / 12)^a * (w / 3)^b) / (M / 0.2)^c, where:

k =	2.6	lb/VMT (empirical constant for PM10 from Table 13.2.2-2)
s =	7.5	% (surface material silt content)
a =	0.8	(empirical constant for PM10 from Table 13.2.2-2)
b =	0.4	(empirical constant for PM10 from Table 13.2.2-2)
c =	0.3	(empirical constant for PM10 from Table 13.2.2-2)
W =	[Varies]	tons (mean vehicle weight)
M =	15	% (surface material moisture content)
		Assumption: Moist soil (Dry = 2.0%, Moist = 15.0%, Wet = 50.0%)

Paved Roads

Assumption: All roads at construction site will be paved to mitigate fugitive PM10 emissions; all haul trucks, flatbed trucks, and autos are assumed to travel on paved roads

Empirical formula from AP42, Section 13.2.1 (Paved Roads, 9/98):

PM10 Emissions (lb/VMT) = k * [(sL / 2)^(0.65)] * [(W / 3)^(1.5)]

k =	0.016	lb/VMT (particle size multiplier for PM10)
		Source: AP42, Table 13.2-1.1 (Particle Size Multipliers for Paved Road Equation)
sL =	0.24	grams/m2 (road surface silt loading)
		Source: CARB, Section 7.9, Table 3 (Silt Loadings and Emission Factors for California Entrained Paved Road Dust Estimates), Los Angeles County: Local Road = 0.24 g/m2, Freeway = 0.02 g/m2)
W =	Varies	tons (average weight of the vehicle)

Alternate source not used: CEQA Handbook (1993), Table A9-9-B (Estimating Emissions From Passenger Vehicle Travel on Paved Roads):

PM10 emissions = VMT x 0.33 lb/VMT (Default emission factor of 0.33 lb/VMT assumes no street cleaning)

Material Handling/Drop Operations:

AP42, Section 13.2.4 (Aggregate Handling and Storage Piles, 1/95):

PM10 Emissions (lb/ton) = k * (0.0032) * ((u / 5)^(1.3) / (M / 2)^(1.4)) -- Note: equation is the same as that provided in Table 9-9-G of the 1993 CEQA Handbook--, where:

k =	0.35	unitless (particle size multiplier for PM10)
u =	6.2	mi/hr (mean wind speed)
		Source: EPA Tanks v4.0 (Average wind speed for Los Angeles County = 6.2 mi/hr)
M =	15	% (material moisture content)
		Source: Assumption based on Table 9-9-G-1, 1993 CEQA Handbook (Dry = 2.0%, Moist = 15.0%, Wet = 50.0%)

Excavators and Loaders:

Performance data based on Caterpillar Performance Handbook (Edition 30, October 1999), field experience input from MARRS Services, and professional judgment.

Cycle times are calculated estimates based on construction experience and estimated hourly excavation rates.

Scraper:

Scraper emissions based on AP42, Section 13.2.3 (Heavy Construction Operations, 1/95), Table 13.2.3-1 (Recommended Emission Factors for Construction Operations)

Scrapers removing topsoil: Emission factor is 0.058 lb TSP/ton (Table 11.9-4 - Uncontrolled Particulate Emission Factors for Open Dust Sources at Western Surface Coal Mines)

Assumptions: PM10 fraction based on PM10 particle size multiplier of 0.35, per AP42, based on Section 13.2.4-3 (Aggregate Handling and Storage Piles)

Cycle time = load time (5 minutes) + maneuver and dump time (5 minutes) + travel time (10 minutes), per MARRS Services, 30 Jul 2002.

Grader:

AP42, Section 11.9 (Western Surface Coal Mining), Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98), Grading Operations:

PM10 Emissions (lbs/VMT) = 0.60 * 0.051 * (S)^(2.0), where S = mean vehicle speed in miles per hour

Bulldozer and Compactor:

AP42, Section 13.2.3 (Heavy Construction Operations), Table 13.2.3-1 (Recommended Emission Factors for Construction Operations, 1/95) and

Table 11.9-1 (Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines, 7/98, Bulldozing Operations):

PM10 emissions (lb/hr) = 0.75 * 1.0 * ([s]^1.5) / ([M]^1.4)

s = 7.5 % (surface material silt content)

Source: Table A9-9-F-1, 1993 CEQA Handbook. Assumes dirt type is "Overburden".

M = 15 % (surface material moisture content)

Source: Table 9-9-F-2, 1993 CEQA Handbook (Dry = 2.0%, Moist = 15.0%, Wet = 50.0%)

(Note: PM10 emission equation from 1993 CEQA Handbook, Table A9-9-F (Estimating Emissions from Dirt Pushing or Bulldozing Operations) is incorrect)

Water Wagon:

Calculations assume water wagon's time is split evenly between paved and unpaved surfaces.

Water tank capacity = 9,000 gallons

Mean vehicle weight accounts for weight of water carried by water wagon.

PM10 Emissions from Wind Erosion of Storage Piles

Storage piles are assumed to be generated by each activity, and each pile is assumed to be the same size.

PM10 Emissions (lb/day) = (0.85 x (s/1.5) x ((365-p)/235) x (UW/15) x A)

Silt Content (% wt) (s)	6.9	ASTM Test Method default
Days of Rain per Year (>0.01 in) (p)	34	SCAQMD Meteorological Records
l Speed (% of Time > 12 MPH) (UW)	95%	SCAQMD Assumption
Storage Pile Size (acres) (A)	2	Assumption
Mitigation:	63%	Soil Stabilizers
PM10 Emissions (lb/day/pile)	**0.26**	

Notes:

Source: EPA's Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures (September 1992)

Appendix F, Construction and Operational Emission Calculation Methodologies, Equation F-4 and Table F-4.

1993 CEQA Handbook, Table A9-9-E

Attachment C-5F1

Attachment C-5F.1

From: Pehrson, John
Sent: Wednesday, May 26, 2004 10:52 AM
To: Zorik Pirveysian (E-mail); Kathy Hsiao (E-mail)
Cc: David Kessler (E-mail)
Subject: PM10 Concentrations

Importance: High

Zorik and Kathy,

Attached is the spreadsheet we were using to generate PM10 annual concentrations for Alternative D. The analysis was actually conducted for 2005 (peak year of construction emissions). We had actually conducted three seperate runs: 1) construction sources (in ISCST3), 2) airport sources (in EDMS 4.11/AERMOD, which did not include aircraft), and 3) aircraft only (in ISCST3). We then looked at the location of the peak point of construction impacts and verified that the highest five or six operation impacts points were not the same. We also looked at the peak operational impact point and verified that highest five or six construction impact points were not nearby. In the end, we combined peak construction (12.26 ug/m3) with a relatively high airport operational value (5 ug/m3) and with the peak aircraft impact (1 ug/m3). This resulted in a value of ~18 ug/m3 from airport construction and operations. The background concentration in 2005 has been estimated at 28 ug/m3. We added 10% (2 ug/m3) to the airport value to account for variations in the actual construction phasing in the 2005 and 2006 time frame. The result was 48 ug/m3 = 28 + 18 + 2. We believe that this is a very conservative dispersion analysis. For the Final GCD we will be providing results from a single model run that includes all sources which will show the 2006 concentration to be less than estimated in the Draft GCD. We also believe that the PM10 emissions from construction are conservatively estimated, as Erin Sheehy has noted.

Regards,
John

letermine combined conc.xls (4...

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Attachment C-5F2

Annual Ops (without aircraft)

x	y	Conc (ug/m3)
0	0	11.96411
1000	0	11.29094
620	170	8.56735
300	170	7.57162
380	170	6.95479
540	170	6.70583
460	170	6.44472
2825	930	0.37791
2825	1490	0.31063
2855	-355	0.21656
2855	-275	0.16832
2855	250	0.29184
2892.93	-2405.13	0.01842
2905	930	0.35978
2905	1490	0.3032
2935	-355	0.20534
2935	-275	0.16138
2935	250	0.26915
2985	930	0.34248
2985	1010	0.34229
2985	1490	0.29558
3000	-4000	0.01026
3000	-3000	0.01421
3000	-2000	0.02085
3000	-1000	0.09562
3000	0	0.19146
3000	1000	0.33946
3000	2000	0.20165
3000	3000	0.07672
3000	4000	0.03268
3025	-610	0.14515
3025	-530	0.14918
3025	-450	0.15336
3025	-370	0.15742
3025	-290	0.15393
3025	-210	0.15541
3025	-130	0.16422
3025	-50	0.17765
3025	30	0.19434
3025	110	0.21304
3025	190	0.23257
3025	270	0.25177
3025	350	0.26969
3025	430	0.28547
3025	510	0.29888
3025	590	0.30982
3025	670	0.3186
3025	750	0.32549
3025	830	0.33057
3025	910	0.33368
3025	990	0.3346
300	250	4.94053
300	330	4.34251
300	410	3.49778
380	410	3.15794
460	410	2.87865
460	1035	0.37535
460	1115	0.30807
460	1195	0.26151
540	410	2.66725
540	1195	0.27777
575	955	0.55233
580	490	1.89917
620	1195	0.29544

Annual Construction

x	y	Conc (ug/m3)
2987	654	12.25941
3000	500	11.14928
3000	750	11.12991
3000	250	10.78982
3001	300	10.74936
3000	0	10.26164
3000	-250	8.28457
2502	925	7.78147
3001	-264	7.6851
2994	925	7.41492
250	1250	7.26218
397	1232	7.063
500	1250	6.3765
0	1500	3.98716
0	1750	2.54326
0	2000	1.7202
0	2250	1.21778
0	2500	0.89261
0	-1500	0.68264
0	2750	0.67198
0	-1750	0.58284
0	3000	0.51953
0	-2000	0.50424
0	-2250	0.44061
0	-2500	0.38802
0	-2750	0.34496
0	-3000	0.3097
889	1375	4.58417
896	-1449	0.64617
1000	-3000	0.26415
1000	-2750	0.29254
1000	-2500	0.32919
1000	-2250	0.37656
1000	-2000	0.43803
1000	-1750	0.51595
1000	-1500	0.61933
1000	1250	4.74614
1000	1500	3.98547
1000	1750	3.07667
1000	2000	2.29789
1000	2250	1.70114
1000	2500	1.27624
1000	2750	0.97823
1000	3000	0.7642
1160	1339	4.24899
-4043	876	1.36885
-4000	500	1.65266
-4000	250	1.51868
-4000	0	1.30064
-4000	1000	1.24958
-4000	-250	1.14151
-4000	1250	1.03089
-4000	-500	0.98466
-4000	1500	0.88607
-4000	-750	0.83883
-4000	1750	0.76317
-4000	-1000	0.70591
-4000	2000	0.66043
-4000	-1250	0.60327
-4000	2250	0.57969
-4000	-1500	0.52002
-4000	2500	0.51398
-4000	2750	0.45689
-4000	-1750	0.45153

Aircraft Ops

x	y	Conc	
3185	-370	0.93101	1ST HIGHEST VALUE IS
0	1000	0.57219	2ND HIGHEST VALUE IS
460	1035	0.54599	3RD HIGHEST VALUE IS
575	955	0.51289	4TH HIGHEST VALUE IS
2295	-275	0.49882	5TH HIGHEST VALUE IS
655	955	0.49637	6TH HIGHEST VALUE IS

To find the combined peak concentration from 3 separate dispersion run
- to sort by concentration in each group by decending
- to match the locations between groups to find the combined highest concentration
- Since aircraft Ops concentration has the smallest contrbution,
  the 1st highest concentration is added into the combined highest concentration
  generated between construction and airport Ops without aircraft group
- Since the receptors are far different between Airport Ops and Construction run, the matching was a little rough
- The combined peak concentration should not be able to exceed 15 ug/m3

Peak Concentration by Airport Ops	11.96411			
Possible highest matching Construction Concentration	4.74614			
Possible highest matching Aircraft-only Concentration	0.93101			
Total	17.64126			
Peak Concentration by Construction	12.25941	12.25941	2987	654
Possible highest matching Airport Ops Concentration	4.94053	5.87154		
Possible highest matching Aircraft-only Concentration	0.93101			
Total	18.13095			

The 24-hr combined peak concentration does not exceed the Federal standard,
which was simply generated by the sum up of the three peak concentrations.

Final GCD Note: Reminder of file is on CD-ROM only.

Attachment C-5G1

Attachment C-5G.1

From: Pehrson, John
Sent: Tuesday, July 06, 2004 8:35 AM
To: Kathy Hsiao (E-mail)
Cc: Zorik Pirveysian (E-mail); David Kessler (E-mail)
Subject: Tier I area for LAX Traffic and AQ analysis

Kathy,

Attached is a copy of Figure 4.3.2-1 (in both Adobe Acrobat and *.jpg formats) from the LAX Master Plan Draft EIS/EIR (January 2001) which shows the Tier I area referred to in the traffic and air quality analyses. Please call me with any questions you may have regarding the air quality impact analysis.

Regards,
John

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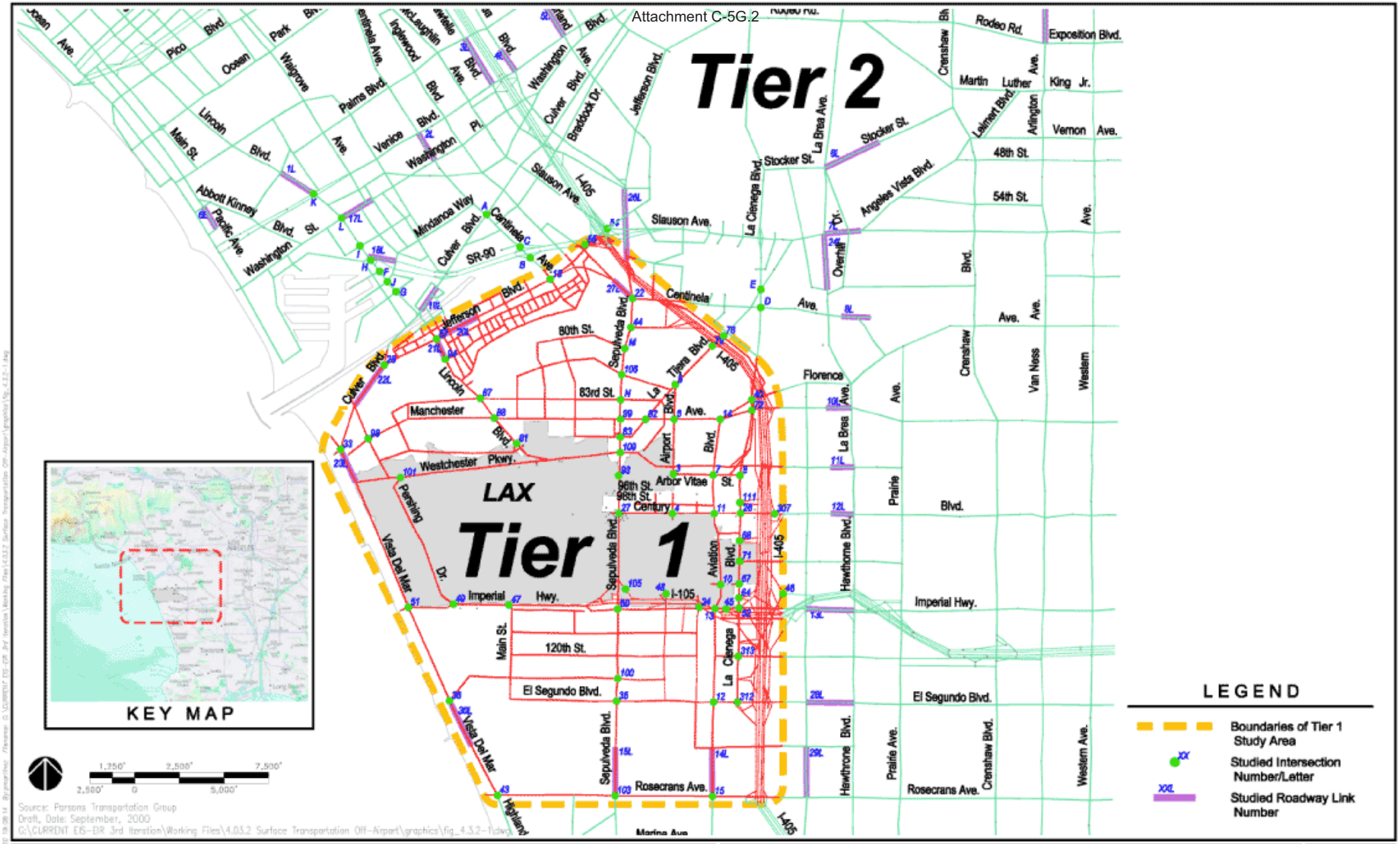
LAX DEIR Figure 4.3.2-1.jpg

LAX DEIR Figure 4.3.2-1.pdf

Attachment C-5G2



LAX Master Plan EIS/EIR

Off-Airport Surface Transportation Study Areas

Figure 4.3.2-1

Attachment C-5H

Attachment C-5H

From: Pehrson, John
Sent: Friday, July 09, 2004 8:22 AM
To: Kathy Hsiao (E-mail)
Cc: Zorik Pirveysian (E-mail); David Kessler (E-mail)
Subject: Alt D and NA/NP VMT and VHT

Kathy,

I believe you raised the following question: Why does the NA/NP Alternative have lower overall VMT than Alt D, yet NA/NP has higher emissions?

The answer is best found by looking at both the VMT and Vehicle Hours Traveled (VHT) sheets within the regional traffic data files. The ratio of VMT/VHT provides the average speed for a given alternative. This ratio can be applied to the overall regional traffic in the SCAB, or it can be applied to various subregions (such as Tier I, Remainder of LA County, Orange County, etc.). The improvements in Alternative D have resulted in a slightly higher average speed for airport-related traffic in the SCAB. Below is a table summarizing the average speeds between NA/NP in 2015 and Alternative D (mitigated) in 2015 for the Tier I area, the remaining L.A. County area, and for the SCAB region.

Region or Subregion	Speeds (mph) NA/NP	Alt D
Tier I	18	23
L.A. Co.	27	28
SCAB	26	28

Increasing the speeds when you are starting below about 40 to 45 mph has the effect of reducing the vehicle emission factors (in gram/mile). Thus, Alternative D has slightly higher overall VMT (by 2.8% [= (10,692639 - 10,404,261) / 10,404,261], but also has higher overall speeds (by 7.7% [= (28 - 26) / 26]. The increased speed (which reduces emissions) outweighs the increased VMT. Therefore, the regional traffic emissions for Alternative D are lower than those for the NA/NP Alternative.

Regards,
John

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Attachment C-6A

LAX Master Plan

General Conformity Review Meeting
April 14, 2004

South Coast Air Quality Management District Offices
21865 Copley Drive
Diamond Bar, California

Attending Agencies: SCAQMD, FAA, and LAWA

Agenda

1. **Master Plan Overview**
   a. **No Action/No Project**
   b. **Alternative D**
   c. **Project (Alt D) Emissions Change vs. No Action/No Project**
   d. **Revise General Conformity Determination**

2. **CO and VOC Emissions**

3. **Ground Transportation (Motor Vehicle) Emissions – Methodology**

4. **Ground Support Equipment (GSE) Emissions – Methodology**

5. **Aircraft Emissions**

Attendees

SCAQMD	FAA	LAWA	CDM
Elaine Chang	David Kessler	Jim Ritchie	Roger Johnson
Peter Greenwald			John Pehrson
Steve Smith			

Table S23

Recommended Air Quality Mitigation Measures

Reference	Description	Comments	Alternative A	Alternative B	Alternative C	Alternative D
Airside						
Draft EIS/EIR, Tech Report 4, Attachment X, Item #G07	Convert GSE to electric power (or extremely low emission technology, such as fuel cells).	Accelerate full conversion, beyond the requirements of the GSE MOU. LAWA to provide incentives or tenant lease requirements.	Yes	Yes	Yes	Yes
Clean Vehicle Fleets						
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F01	Promote commercial vehicles / trucks / vans using terminal areas (LAX and regional intermodal) to install SULEV / ZEV engines.	Evaluation of this measure is based on accelerated replacement of older vehicles with alternative-fueled vehicles. Engine conversion of heavy-duty vehicles can provide cost-effective emission reductions. LAWA to provide incentives.	Yes	Yes	Yes	Yes
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F04	Promote "best-engine" technology (SULEV / ZEV) for rental cars using on-airport RAC facilities.	LAWA to provide incentives.	Yes	Yes	Yes	Yes
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F07	Consolidate nonrental car shuttles using SULEV / ZEV engines.	LAWA to provide incentives.	Yes	Yes	Yes	Yes
Construction						
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F14 and public input	Specify combination of construction equipment using "cleaner burning diesel" fuel and exhaust emission controls.	Options include: diesel engines with catalytic oxidizers (CO, VOC), diesel engines with particulate traps (PM), diesel engines with exhaust gas recirculation (NOx), diesel engine with Lubrizol fuel + catalytic oxidizer (PM, CO, VOC, NOx),	Yes	Yes	Yes	Yes
Public input	Specify combination of electricity from power poles and portable diesel- or gasoline-fueled generators using "cleaner burning diesel" fuel and exhaust emission controls.	Cannot completely eliminate need for portable generators	Yes	Yes	Yes	Yes
Public input	Have construction employees work during off-peak hours.	Original suggested measure was to develop a trip reduction plan to achieve a 1.5 AVR for construction employees, but this was not feasible.	Yes	Yes	Yes	Yes
Public input	Suspend use of all construction operations during a second-stage smog alert.	There have been no Stage 2 smog alerts since 1986, so air quality benefit assumed very small.	Yes	Yes	Yes	Yes
Public input	Apply non-toxic soil stabilizer to all inactive construction areas (i.e., areas with disturbed soil).	Emission reduction credit for this measure would only account for control efficiency beyond that provided by watering required by SCAQMD Rule 403.	Yes	Yes	Yes	Yes
Public input	Following the addition of materials to, or removal of materials from, the surface of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing non-toxic soil stabilizer.	Emission reduction credit for this measure would only account for control efficiency beyond that provided by watering required by SCAQMD Rule 403.	Yes	Yes	Yes	Yes

Table S23

Recommended Air Quality Mitigation Measures

Reference	Description	Comments	Alternative A	Alternative B	Alternative C	Alternative D
Public input	The contractor or builder shall designate a person or persons to ensure the implementation of all construction mitigation measures through direct inspections, records reviews, and investigations of complaints.	Other large construction projects require an on-site inspector to ensure adherence to plan.	Yes	Yes	Yes	Yes
Public input	Post a publicly visible sign with the telephone number and person to contact regarding dust complaints; this person shall respond and take corrective action within 24 hours.	Procedural method.	Yes	Yes	Yes	Yes
Public input	Prior to final occupancy, the applicant demonstrates that all ground surfaces are covered or treated sufficiently to minimize fugitive dust emissions.	Procedural method.	Yes	Yes	Yes	Yes
Public input	All roadways, driveways, sidewalks, etc. being installed as part of project should be completed as soon as possible; in addition, building pads should be laid as soon as possible after grading.	May not be necessary as long as all inactive (soil disturbed) areas are stabilized with water or non-toxic soil stabilizer.	Yes	Yes	Yes	Yes
Public input	Prohibit staging or parking of construction vehicles (including workers' vehicles) on streets adjacent to sensitive receptors such as schools, daycare centers, and hospitals.	May not reduce emissions but may reduce exposures of sensitive receptors.	Yes	Yes	Yes	Yes
Public input	Prohibit construction vehicle idling in excess of ten minutes.	Procedural method.	Yes	Yes	Yes	Yes
Public input	Utilize construction equipment having the minimum practical engine size (i.e., lowest appropriate horsepower rating for intended job).	Use of undersized equipment could prolong construction.	Yes	Yes	Yes	Yes
Public input	Make available on-site lunch trucks during construction to minimize off-site worker vehicle trips for intended job).	Reduced vehicle trips will reduce associated vehicle emissions.	Yes	Yes	Yes	Yes
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F20	Utilize on-site rock crushing facility during construction to reuse rock / concrete and minimize off-site truck haul trips.	Reduced vehicle trips will reduce associated vehicle emissions.	Yes	Yes	Yes	Yes
Public input	Require that all construction equipment working on site is properly maintained (including engine tuning) at all times in accordance with manufacturers' specifications and schedules.	May reduce expected deterioration of emissions characteristics with age of equipment.	Yes	Yes	Yes	Yes
Public input	Prohibit tampering with construction equipment to increase horsepower or to defeat emission control devices.	Necessary to ensure air quality benefits of certain mitigation measures.	Yes	Yes	Yes	Yes

Table S23

Recommended Air Quality Mitigation Measures

Reference	Description	Comments	Alternative A	Alternative B	Alternative C	Alternative D
Public input	Pave all construction access roads at least 100 feet on to the site from the main road.	Will reduce fugitive dust from on-road construction vehicles.	Yes	Yes	Yes	Yes
Energy Conservation						
Public input	Cover any parking structures that receive direct sunlight to reduce volatile emissions from vehicle gasoline tanks and install solar panels on these roofs where feasible to supply electricity or hot water.	Would potentially apply to surface lots and the top deck of garages. Installation of solar panels may only be feasible in decentralized structures.	Yes	Yes	Yes	Yes
Highways and Roadways						
Draft EIS/EIR, Tech Report 4, Attachment X, Item #B06	Link ITS with off-airport parking facilities, with ability to divert / direct trips to these facilities.	LAWA would act as project sponsor for LADOT implementation of measure. Would reduce on-airport parking volume and potentially reduce ambient concentrations on or near LAX, but would require shuttle services between off-airport parking and CTA or GTC. May not reduce regional VMT.	Yes	Yes	Yes	Yes
Draft EIS/EIR, Tech Report 4, Attachment X, Item #B12	Expand ITS / ATCS, concentrating on I-405 and I-105 corridors, extending into South Bay and Westside surface street corridors.	LAWA would act as project sponsor for LADOT implementation of measure. May reduce regional VHT but not regional VMT.	Yes	Yes	Yes	Yes
Draft EIS/EIR, Tech Report 4, Attachment X, Item #C06	Link LAX traffic management system with airport cargo facilities, with ability to reroute cargo trips to / from these facilities.	LAWA would act as project sponsor for LADOT implementation of measure. May not reduce regional VMT.	Yes	Yes	Yes	Yes
Public input	Develop a program to minimize the use of fleet vehicles during smog alerts.	SCAQMD Rule 701 imposes requirements during Stage 2 and 3 episodes. LAWA could develop such a measure for Stage 1 episodes. There have been no Stage 1 smog alerts since 1999, so air quality benefit assumed very small.	Yes	Yes	Yes	Yes
Landside						
Public input	Contract with commercial landscapers who operate lowest emitting equipment.	LAWA to provide incentives or contract requirements.	Yes	Yes	Yes	Yes
Parking						
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F03	Provide free parking and preferential parking locations for ULEV / SULEV / ZEV in all (including employee) LAX lots; provide free charging stations for ZEV; include public outreach.	Expand current program, to encourage use of alternative-fueled vehicles by the public as well as by LAWA and tenant employees.	Yes	Yes	Yes	Yes
Draft EIS/EIR, Tech Report 4, Attachment X, Item #F18	Pay-on-foot (before getting into car) to minimize idle time at parking check out; include public outreach.		Yes	Yes	Yes	Yes

Table S23

Recommended Air Quality Mitigation Measures

Reference	Description	Comments	Alternative A	Alternative B	Alternative C	Alternative D
Public input	Implement on-site circulation plan in parking lots.	Uses intelligent system to control access within parking facilities to limit "cruising" for available space.	Yes	Yes	Yes	Yes
Public input	Promote employee rideshare opportunities.	In place for LAWA employees; LAWA to provide incentives or tenant lease requirements for tenant employees.	Yes	Yes	Yes	Yes
Draft EIS/EIR, Tech Report 4, Attachment X, Item #35	Encourage employee telecommuting.	In place for LAWA employees; LAWA to provide incentives or tenant lease requirements for tenant employees.	Yes	Yes	Yes	Yes
Public input	Provide video-conference facilities.	Video-conference facilities could be made available to LAWA employees and tenant employees to reduce regional VMT.	Yes	Yes	Yes	Yes
Transit and Intermodal						
Draft EIS/EIR, Tech Report 4, Attachment X, Item #B10 and Draft EIS/EIR, Tech Report 4, Attachment X, Item #B13	Establish network of strategically placed, off-airport intermodal check-in terminals serviced by LAX- dedicated clean-fuel buses; provide low-priced parking to LAX users of off-airport intermodal terminal facilities include public outreach.	Up to five additional facilities similar to the Van Nuys "flyaway."	Yes	Yes	Yes	Yes
Public input	Construct on-site or off-site bus turnouts, passenger benches, or shelters; include public outreach.	To encourage use of transit.	Yes	Yes	Yes	Yes
Public input	Construct on-site or off-site pedestrian improvements / include showers for pedestrian employees; include public outreach.	Could include wider sidewalks, better lighting of sidewalks, signalized crosswalks, pedestrian bridges; number of pedestrian employees is unknown but assumed small.	Yes	Yes	Yes	Yes

Source: Camp Dresser & McKee Inc., 2003.

ATTACHMENT C-6A

Comparison of 1997/99 SIP and 2003 AQMP Baseline Emissions with Alternative D [1]
(Tons/Year)

	Aircraft (2010)				GSE [2] (2010)				Ground Access [3] (2010)			
	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO
1997/99 SIP	5084	3468	4	12792	1497	620	182	13196	3335	1746	197	19671
2003 SIP	6800	605	NA	4346	482	62	28	1167	4161	2472	215	22899
Alternative D	5002	1112	56	6314	615	91	21	1294	3749	2218	1772	24515

Short-Term Reductions [1]
(Tons/Year)

	Aircraft (2010)				GSE [2] (2010)				Ground Access [3] (2010)			
	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO
1997/99 SIP	1322	729	0	0	619	382	0	11225	720	327	2	5311
2003 SIP	0	0	0	0	268	50	26	204	441	410	11	2979

Long-Term Reductions [1]
(Tons/Year)

	Aircraft (2010)				GSE [2] (2010)				Ground Access [3] (2010)			
	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO
1997/99 SIP	66	592	0	0	16	52	0	0	57	444	0	0
2003 SIP	1784	78	0	0	0	0	0	0	1098	1233	2	227

Comparison of 1997/99 SIP and 2003 AQMP Budgets with Alternative D [1]
(Tons/Year)

	Aircraft (2010)				GSE [2] (2010)				Ground Access [3] (2010)			
	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO	NOx	VOC	PM10	CO
1997/99 SIP	3696	2147	4	12792	862	186	182	1971	2558	975	195	14360
2003 SIP	5016	527	NA	4346	214	12	2	963	2622	629	202	19693
Alternative D	5002	1112	56	6314	615	91	21	1294	3749	2218	1772	24515

Notes:
(1) For GSE and ground access categories, emissions and reductions from nine 5 by 5 kilometer grid cells around the LAX airport area in the SIP are provided in these tables.
(2) GSE emissions are included in the total light-industrial and heavy-non-farm equipment in the 1997/99 SIP.
(3) SIP ground access emissions represent the total on-road emissions.
Alternative D ground access emissions represent the total from on-airport and off-airport motor vehicles.

Table 3						
LAX Master Plan Emissions for No Action/No Project Alternative Interim Years.						
	2005	2006	2008	2010	2013	2015
VOC						
Aircraft, tpy	829	858	917	975	1,064	1,122
APU, tpy	8	8	8	8	9	9
GSE, tpy	166	139	84	29	26	24
Stationary, tpy	50	50	50	50	50	51
Motor Vehicles On-Airport, tpy	372	354	318	282	228	192
Motor Vehicles Off-Airport, tpy	2,512	2,421	2,240	2,059	1,787	1,606
Construction, tpy	883	525	203	123	0	0
Total, tpy	**4,819**	**4,355**	**3,820**	**3,527**	**3,163**	**3,003**
CO						
Aircraft, tpy	5,312	5,445	5,711	5,977	6,376	6,642
APU, tpy	165	169	175	182	191	198
GSE, tpy	2,362	2,237	1,988	1,738	1,364	1,114
Stationary, tpy	112	113	114	116	118	120
Motor Vehicles On-Airport, tpy	2,805	2,665	2,384	2,103	1,682	1,402
Motor Vehicles Off-Airport, tpy	27,968	26,690	24,134	21,578	17,744	15,188
Construction, tpy	654	490	307	104	0	0
Total, tpy	**39,378**	**37,808**	**34,813**	**31,798**	**27,476**	**24,664**
NO_X						
Aircraft, tpy	4,315	4,400	4,570	4,741	4,996	5,167
APU, tpy	84	86	90	94	99	103
GSE, tpy	1,116	935	573	210	188	172
Stationary, tpy	198	200	205	209	215	220
Motor Vehicles On-Airport, tpy	365	351	323	295	253	225
Motor Vehicles Off-Airport, tpy	4,193	4,011	3,646	3,281	2,733	2,368
Construction, tpy	311	218	131	55	0	0
Total, tpy	**10,583**	**10,201**	**9,537**	**8,885**	**8,485**	**8,255**
PM_{10}						
Aircraft, tpy	46	47	51	54	59	63
APU, tpy	0	0	0	0	0	0
GSE, tpy	38	35	30	25	17	12
Stationary, tpy	34	35	36	37	38	39
Motor Vehicles On-Airport, tpy	49	49	50	51	52	53
Motor Vehicles Off-Airport, tpy	1,454	1,486	1,552	1,617	1,715	1,780
Construction, tpy	47	40	27	9	0	0
Total, tpy	**1,667**	**1,693**	**1,745**	**1,792**	**1,881**	**1,947**

Table 4

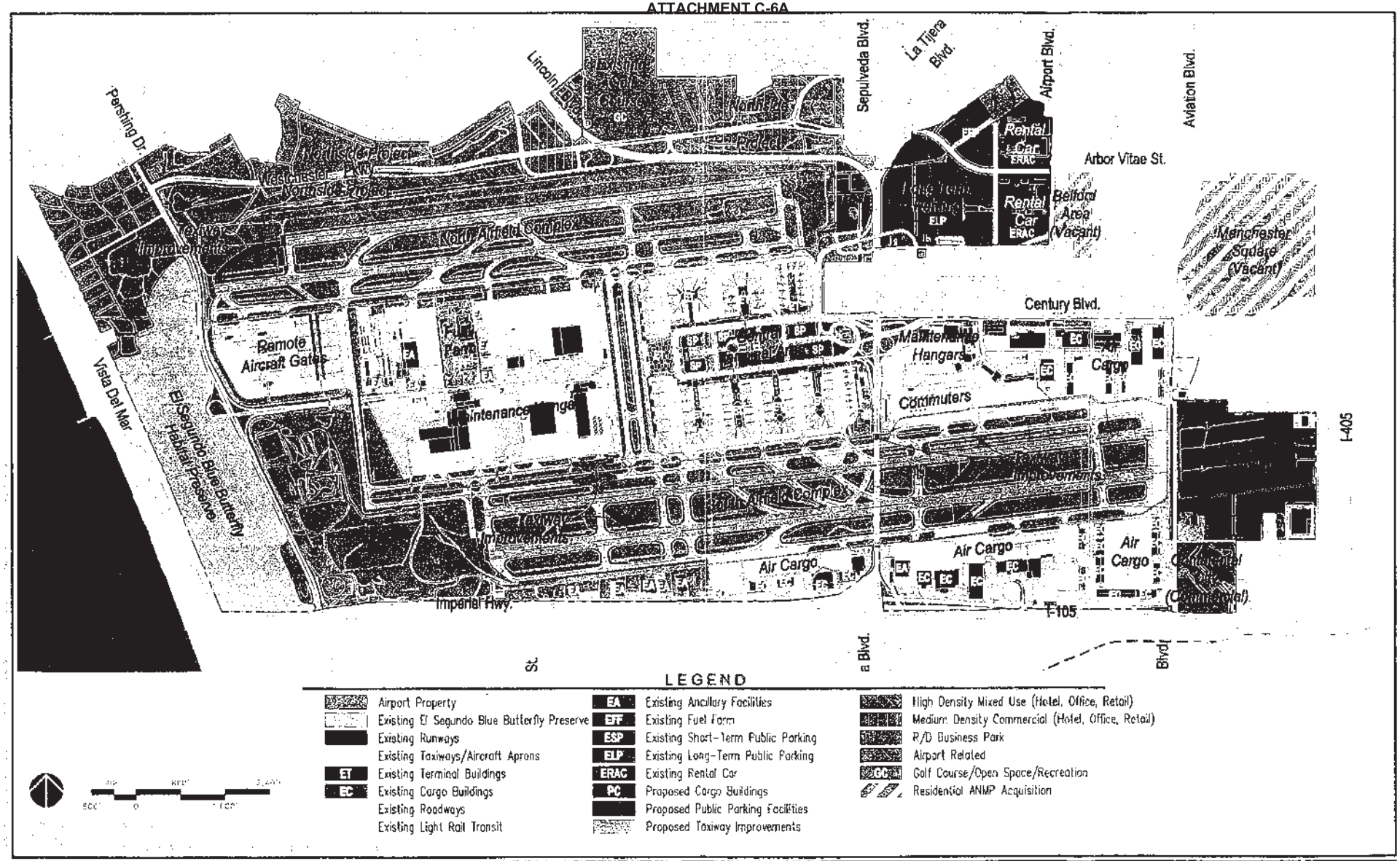
LAX Master Plan Emissions for Alternative D Interim Years.

	2005	2006	2008	2010	2013	2015
VOC						
Aircraft, tpy	829	859	919	980	1,071	1,071
APU, tpy	8	8	8	8	9	9
GSE, tpy	166	139	86	33	13	0
Stationary, tpy	50	50	50	50	51	51
Motor Vehicles On-Airport, tpy	372	358	330	302	259	248
Motor Vehicles Off-Airport, tpy	2,512	2,369	2,082	1,795	1,365	1,091
Construction, tpy	86	78	65	32	72	0
Total, tpy	**4,022**	**3,861**	**3,540**	**3,200**	**2,839**	**2,470**
CO						
Aircraft, tpy	5,312	5,437	5,688	5,938	6,314	6,314
APU, tpy	165	168	174	180	189	189
GSE, tpy	2,362	2,126	1,653	1,181	518	0
Stationary, tpy	112	113	115	117	120	120
Motor Vehicles On-Airport, tpy	2,805	2,700	2,490	2,280	1,965	1,672
Motor Vehicles Off-Airport, tpy	27,968	26,562	23,749	20,937	16,719	13,166
Construction, tpy	556	526	461	252	547	0
Total, tpy	**39,280**	**37,632**	**34,331**	**30,886**	**26,372**	**21,461**
NO_X						
Aircraft, tpy	4,315	4,424	4,643	4,862	5,190	5,190
APU, tpy	84	86	90	93	102	102
GSE, tpy	1,116	940	588	206	94	0
Stationary, tpy	198	201	206	212	220	220
Motor Vehicles On-Airport, tpy	365	360	351	341	327	287
Motor Vehicles Off-Airport, tpy	4,193	3,998	3,606	3,215	2,628	2,102
Construction, tpy	1,141	999	819	365	905	0
Total, tpy	**11,413**	**11,008**	**10,303**	**9,324**	**9,467**	**7,900**
PM_{10}						
Aircraft, tpy	46	47	51	54	59	59
APU, tpy	0	0	0	0	0	0
GSE, tpy	38	34	26	19	8	0
Stationary, tpy	34	35	36	37	39	39
Motor Vehicles On-Airport, tpy	49	53	61	68	80	79
Motor Vehicles Off-Airport, tpy	1,454	1,491	1,565	1,640	1,752	1,658
Construction, tpy	335	205	155	76	272	0
Total, tpy	**1,955**	**1,865**	**1,894**	**1,895**	**2,210**	**1,835**

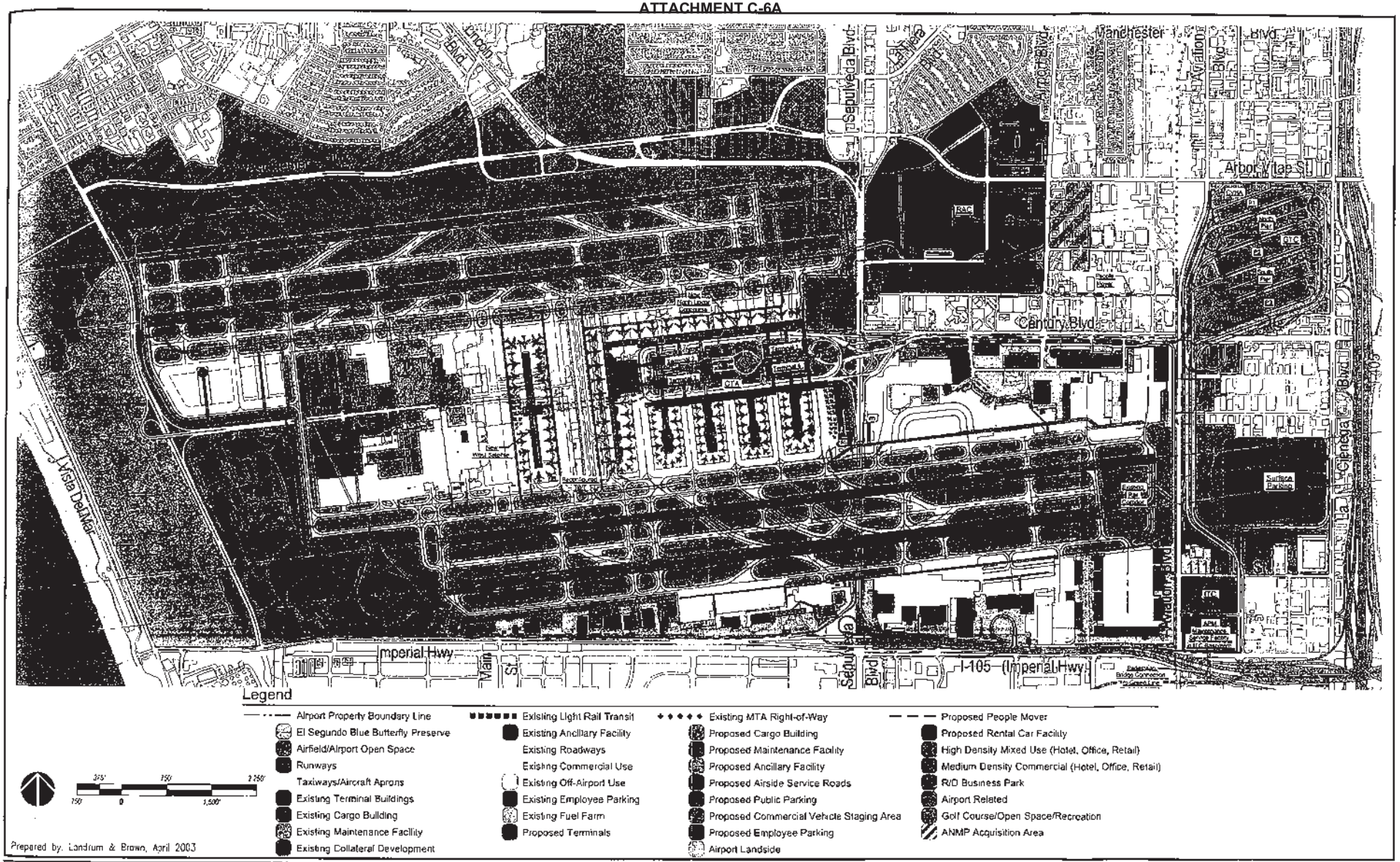
Table 5

LAX Master Plan Emissions for Alternative D Interim Years.

	2005	2006	2008	2010	2013	2015
VOC						
Aircraft, tpy	0	1	3	4	7	-52
APU, tpy	0	0	0	0	0	0
GSE, tpy	0	1	2	4	-13	-24
Stationary, tpy	0	0	0	0	0	0
Motor Vehicles On-Airport, tpy	0	4	12	20	31	57
Motor Vehicles Off-Airport, tpy	0	-53	-158	-264	-422	-514
Construction, tpy	-797	-447	-138	-91	72	0
Total, tpy	**-797**	**-494**	**-280**	**-327**	**-324**	**-533**
CO						
Aircraft, tpy	0	-8	-23	-39	-62	-328
APU, tpy	0	0	-1	-2	-3	-9
GSE, tpy	0	-111	-334	-557	-846	-1,114
Stationary, tpy	0	0	1	1	2	0
Motor Vehicles On-Airport, tpy	0	35	106	177	283	270
Motor Vehicles Off-Airport, tpy	0	-128	-384	-641	-1,025	-2,022
Construction, tpy	-98	36	154	148	547	0
Total, tpy	**-98**	**-176**	**-482**	**-912**	**-1,104**	**-3,203**
NO_X						
Aircraft, tpy	0	24	72	121	193	23
APU, tpy	0	0	0	-1	3	-1
GSE, tpy	0	5	15	26	-93	-172
Stationary, tpy	0	1	2	3	4	0
Motor Vehicles On-Airport, tpy	0	9	28	46	74	62
Motor Vehicles Off-Airport, tpy	0	-13	-39	-65	-105	-266
Construction, tpy	830	781	688	310	905	0
Total, tpy	**830**	**807**	**766**	**439**	**982**	**-355**
PM_{10}						
Aircraft, tpy	0	0	0	0	0	-4
APU, tpy	0	0	0	0	0	0
GSE, tpy	0	-1	-4	-6	-9	-12
Stationary, tpy	0	0	0	1	1	0
Motor Vehicles On-Airport, tpy	0	4	11	18	28	26
Motor Vehicles Off-Airport, tpy	0	5	14	23	37	-122
Construction, tpy	288	165	128	67	272	0
Total, tpy	**288**	**172**	**149**	**102**	**329**	**-112**



LAX Master Plan EIS/EIR	No Action/No Project Alternative (2005/2015)	Figure 3-6



LAX Master Plan - Supplement to the Draft EIS/EIR	**Alternative D - 2015 Enhanced Safety and Security Plan**	Figure **S3-8**

Attachment C-6B

CDM

Meeting Notes

Date: May 11, 2004
Time: 1:00pm
Place: South Coast AQMD, Diamond Bar, CA
Subject: LAX Master Plan General Conformity Determination

Attendees:

SCAQMD	FAA	LAWA	CDM
Elaine Chang	David Kessler	Dennis Quilliam	Roger Johnson
Zorik Pirveysian			John Pehrson

1. Purpose

The purpose of this meeting was to present information requested by the SCAQMD regarding the Draft General Conformity Determination for the LAX Master Plan Alternative D (dated January 9, 2004), and to solicit information and information requests from the SCAQMD necessary to complete a Final General Conformity Determination. The information provided to the SCAQMD included: (1) South Coast Air Basin (SoCAB) emission inventories of airport ground support equipment (GSE) prepared by the California Air Resources Board (ARB) for the 2003 Air Quality Management Plan (AQMP) (Attachment I); and (2) estimates of LAX-specific GSE emission inventories developed by using the ratio of LAX activity, in million annual passengers (MAP), to total SoCAB MAP (Attachment II).

At the time of this meeting, the 1997 AQMP includes the currently approved 1999 State Implementation Plan (SIP) emission budgets for carbon monoxide (CO), nitrogen dioxide (NO2), volatile organic compounds (VOC), oxides of nitrogen (NOx), and fine particulate matter (PM10). SCAQMD noted that the 1999 SIP is likely to be the approved SIP when the Final General Conformity Determination for the LAX Master Plan Alternative D (Alt D) is completed. CDM indicated that comparison to both the 1999 SIP and 2003 AQMP will be continued in the Final General Conformity Determination.

2. No Action/No Project Alternative

SCAQMD requested a list of citations that describe assumptions and methods that are to be used in developing federal No Action alternatives under the National Environmental Policy Act (NEPA) and the Clean Air Act General Conformity regulations. ***FAA will provide these citations.*** *[References were provided to SCAQMD (Z. Pirveysian) by J. Pehrson (CDM) via email on May 19, 2004.]*

3. Aircraft (1999 SIP)

CDM noted that a conference call with the ARB had been conducted with FAA and CDM, and that the ARB was in the process of preparing a letter stating that the NOx reduction commitments made by state and federal agencies in the 1999 SIP have been met without the development of controls for aircraft.

FAA noted that they are coordinating a conference call with the appropriate U.S. Environmental Protection Agency (EPA) Region 9 staff to discuss the results of the ARB conference call, and to solicit a similar letter from U.S. EPA.

4. Aircraft (2003 AQMP)

Aircraft NOx emissions for Alt D are less than the budgeted values for both uncontrolled and assumed controlled aircraft emissions for LAX included in the 2003 AQMP.

5. Ground Support Equipment (1999 SIP)

The method that SCAQMD used to estimate GSE emission budgets in the 1999 SIP indicated that Alt D GSE emissions for all pollutants are below the budgeted levels. CDM noted that the 1999 SIP was based on higher activity levels at LAX than Alt D will achieve.

6. Ground Support Equipment (2003 AQMP)

CDM obtained the GSE emission inventories prepared by ARB for the 2003 AQMP (see Attachment I). Since the budgets were not available by airport, CDM estimated LAX-specific GSE inventories by developing a ratio of LAX activity (in MAP) to total SoCAB activity for each year between 2000 and 2015. The total GSE pollutant inventories for the SoCAB were multiplied by these ratios to obtain the estimated LAX-specific GSE budget in the 2003 AQMP (see Attachment II).

CDM noted that Attachment II also includes a comparison of the Draft General Conformity Determination NOx inventories for Alt D to these budgets. CDM also noted that revisions to the inventories will be made to bring the assumed 2005 activity levels down to levels predicted by SCAG for 2005 (64 MAP). Also, the aircraft emission inventories will be revised to correct the mixing height from 1800 ft to 2050 ft. Once these revisions are made, the GSE inventories will be below the budgets provided by ARB. A final revision will be made to incorporate the impact that the South Coast GSE MOU (signed in December

2002) will have on future GSE emissions. These final Alt D GSE emission inventories are also below the budgets provided by ARB.

SCAQMD indicated that the 2003 AQMP likely includes short-term control measures that should be used to reduce the budgeted levels. ***SCAQMD will confirm the magnitude of those measures with ARB and provide the information to FAA and LAWA.***

7. Ground Access Vehicles (1999 SIP)

CDM noted that the 1999 SIP budgets were developed assuming a higher activity level at the airport than will be accommodated under Alt D. Therefore, the budgets should have excess capacity relative to the Alt D emissions from ground access vehicles (GAV, i.e., traffic).

8. Ground Access Vehicles (2003 AQMP)

CDM indicated that the methods used to estimate ground access vehicle (GAV) emissions included the use of EMFAC2002. In addition, the Southern California Association of Governments (SCAG), the organization responsible for transportation conformity and planning in the SoCAB, has determined that the LAX Master Plan Alternative D conforms with the 2001 Regional Transportation Plan (RTP) and Draft 2004 RTP. Since the 2003 AQMP would have included information from the 2001 RTP, NOx emissions from Alternative D are expected covered by on-road mobile source budgets in the 2003 AQMP. SCAQMD requested copies of the vehicle miles traveled (VMT) and/or trip data used to develop Alternative D and No Action/No Project Alternative emission inventories. ***CDM will provide the VMT information to SCAQMD.*** *[Regional VMT data was provided to SCAQMD (Z. Pirveysian) by CDM (J. Pehrson) via email on May 21, 2004.]*

9. PM10

CDM noted that the emissions from aircraft were not typically calculated, and that the LAX Master Plan is one of the first substantial, recent airport projects to attempt to estimate PM10 from current aircraft fleets. Since the 1999 SIP and 2003 AQMP do not provide realistic PM10 inventories for aircraft, the Draft General Conformity Determination demonstrated that future year PM10 concentrations around the airport, including secondary PM10 formation, did not exceed the PM10 National Ambient Air Quality Standards (NAAQS).

CDM

SCAQMD noted that the PM10 concentrations in 2006 were very close to the 24-hour PM10 NAAQS. CDM noted that extensive controls were being used to mitigate construction emissions. ***CDM will verify that the modeled concentrations represent the controlled (mitigated) project construction PM10 impacts. In addition, CDM will provide a CD of construction emission calculations to SCAQMD.*** *[PM10 Concentration output was provided to SCAQMD (Z. Pirveysian and K. Hsiao) by CDM (J. Pehrson) via email on May 26, 2004. Construction emissions calculations were reviewed with SCAQMD (K. Hsiao) by Environmental Compliance Solutions (E. Sheehy) via telephone on May 21, 2004, via email on May 25, 2004, and in person on June 2, 2004.]*

ATTACHMENT C-6B

ATTACHMENT I

Ground Support Equipment Emissions Inventory by County for SCAB
Date 5/10/2004 - Received from California Air Resources Boards (S. Kidd)
Emissions estimates are consistent with SCAB SIP estimates in 2003 AQMP
Calendar Year 2005

County Name	Engine Fuel Type	Equipment Name	Emissions in tons per year (TPY) TOG	CO	NOX	PM
Los Angeles						
	Diesel	*D*				
		A/C Tug Narrow Body	3.979	14.929	65.372	2.154
		A/C Tug Wide Body	2.592	14.746	40.041	1.606
		Air Conditioner	1.533	7.081	15.622	0.913
		Air Start Unit	3.139	15.549	47.049	1.716
		Baggage Tug	17.666	75.190	135.087	17.155
		Belt Loader	3.541	14.199	26.645	2.884
		Bobtail	1.205	5.366	9.381	1.278
		Cargo Loader	6.935	27.777	52.706	5.548
		Cargo Tractors	-	0.037	0.110	-
		Catering Truck	0.365	1.424	5.840	0.256
		Forklift	0.329	1.570	3.577	0.219
		Fuel Truck	1.132	6.497	17.265	1.387
		Generator	1.387	7.081	15.075	1.168
		Ground Power Unit	13.651	66.467	149.066	9.600
		Hydrant Truck	0.110	0.438	1.095	0.037
		Lav Truck	0.110	0.548	1.205	0.073
		Lift	0.511	1.935	3.468	0.365
		Other GSE	2.190	11.315	24.017	1.862
		Passenger Stand	-	0.073	0.146	-
		Service Truck	0.913	4.782	9.965	0.803
		Sweeper	-	-	-	-
	Diesel	*D Total*	*61.284*	*276.999*	*622.727*	*49.020*
	Gasoline 4-Stroke	*G4*				
		A/C Tug Narrow Body	1.643	31.427	13.177	0.073
		A/C Tug Wide Body	2.665	50.662	21.280	0.146
		Air Conditioner	-	-	-	-
		Air Start Unit	-	-	-	-
		Baggage Tug	93.224	1,762.945	337.889	2.614
		Belt Loader	22.147	394.667	78.376	0.575
		Bobtail	16.251	307.705	58.949	0.425
		Cargo Loader	6.239	107.417	22.034	0.169
		Cart	0.059	2.424	0.059	-
		Deicer	0.288	7.209	2.018	-
		Forklift	2.330	70.363	4.327	0.042
		Fuel Truck	2.666	39.995	23.997	-
		Ground Power Unit	6.150	139.021	47.567	0.420
		Lav Cart	0.037	0.913	-	-
		Lav Truck	3.276	57.682	24.621	0.149
		Lift	10.424	162.174	37.081	0.223
		Maint. Truck	2.519	40.552	20.294	0.110
		Other	21.809	521.229	43.181	0.436
		Service Truck	4.695	79.701	34.736	0.194
		Water Truck	0.487	7.407	3.898	-
	Gasoline 4-Stroke	*G4 Total*	*196.908*	*3,783.510*	*773.485*	*5.575*
	Natural Gas 4-Stroke	*C4*				
		Air Conditioner	-	0.146	0.073	-
		Baggage Tug	9.260	153.419	43.858	0.392
		Belt Loader	1.594	24.484	7.402	0.114
		Bobtail	0.110	2.044	0.584	-
		Cargo Loader	1.278	18.843	6.068	-
		Forklift	3.340	22.510	22.176	0.134
		Lav Truck	0.044	0.920	0.350	-
		Lift	0.786	9.828	3.538	-
		Other	2.667	14.667	21.334	-
		Service Truck	0.307	5.335	2.032	0.018
	Natural Gas 4-Stroke	*C4 Total*	*19.384*	*252.195*	*107.425*	*0.657*
Los Angeles	Total		277.576	4,312.703	1,503.637	55.252

ATTACHMENT C-6B

ATTACHMENT I

Ground Support Equipment Emissions Inventory by County for SCAB
Date 5/10/2004 - Received from California Air Resources Boards (S. Kidd)
Emissions estimates are consistent with SCAB SIP estimates in 2003 AQMP
Calendar Year 2005

County Name	Engine Fuel Type	Equipment Name	Emissions in tons per year (TPY) TOG	CO	NOX	PM
Orange						
	Diesel	*D*				
		A/C Tug Narrow Body	0.365	1.424	6.242	0.219
		A/C Tug Wide Body	0.256	1.387	3.833	0.146
		Air Conditioner	0.146	0.657	1.497	0.073
		Air Start Unit	0.292	1.497	4.480	0.146
		Baggage Tug	1.679	7.154	12.885	1.643
		Belt Loader	0.329	1.351	2.555	0.292
		Bobtail	0.110	0.511	0.876	0.110
		Cargo Loader	0.657	2.665	5.037	0.548
		Cargo Tractors	-	-	-	-
		Catering Truck	0.037	0.146	0.548	0.037
		Forklift	0.037	0.146	0.329	0.037
		Fuel Truck	0.110	0.621	1.643	0.146
		Generator	0.146	0.694	1.424	0.110
		Ground Power Unit	1.314	6.351	14.199	0.913
		Hydrant Truck	-	0.037	0.110	-
		Lav Truck	-	0.037	0.110	-
		Lift	0.037	0.183	0.329	0.037
		Other GSE	0.219	1.095	2.300	0.183
		Passenger Stand	-	-	-	-
		Service Truck	0.073	0.438	0.949	0.073
		Sweeper	-	-	-	-
	Diesel	***D Total***	***5.804***	***26.390***	***59.349***	***4.709***
	Gasoline 4-Stroke	***G4***				
		A/C Tug Narrow Body	0.146	3.103	1.314	-
		A/C Tug Wide Body	0.219	3.869	1.643	-
		Air Conditioner	-	-	-	-
		Air Start Unit	-	0.037	-	-
		Baggage Tug	8.079	152.074	29.147	0.238
		Belt Loader	1.941	34.155	6.759	0.072
		Bobtail	1.699	31.333	6.054	-
		Cargo Loader	0.450	7.982	1.630	-
		Cart	-	0.591	-	-
		Deicer	-	1.153	0.288	-
		Forklift	0.166	5.243	0.333	-
		Fuel Truck	-	2.666	2.666	-
		Ground Power Unit	0.420	9.986	3.416	0.053
		Lav Cart	-	0.037	-	-
		Lav Truck	0.298	5.163	2.234	-
		Lift	0.894	13.328	3.053	-
		Maint. Truck	0.219	3.395	1.679	-
		Other	1.745	39.256	3.053	-
		Service Truck	0.366	6.073	2.649	0.022
		Water Truck	-	0.682	0.390	-
	Gasoline 4-Stroke	***G4 Total***	***16.643***	***320.125***	***66.309***	***0.384***
	Natural Gas 4-Stroke	***C4***				
		Air Conditioner	-	-	-	-
		Baggage Tug	0.706	11.300	3.217	-
		Belt Loader	0.114	1.822	0.569	-
		Bobtail	-	0.146	0.037	-
		Cargo Loader	-	1.278	0.319	-
		Forklift	0.267	1.803	1.737	-
		Lav Truck	-	0.066	0.022	-
		Lift	-	2.359	0.786	-
		Other	-	1.333	1.333	-
		Service Truck	0.026	0.394	0.149	-
	Natural Gas 4-Stroke	***C4 Total***	***1.114***	***20.501***	***8.170***	-
Orange	**Total**		**23.560**	**367.016**	**133.828**	**5.092**

ATTACHMENT C-6B

ATTACHMENT I

Ground Support Equipment Emissions Inventory by County for SCAB
Date 5/10/2004 - Received from California Air Resources Boards (S. Kidd)
Emissions estimates are consistent with SCAB SIP estimates in 2003 AQMP
Calendar Year 2005

County Name	Engine Fuel Type	Equipment Name	Emissions in tons per year (TPY) TOG	CO	NOX	PM
Riverside						
	Diesel	*D*				
		A/C Tug Narrow Body	0.073	0.292	1.314	0.037
		A/C Tug Wide Body	0.073	0.292	0.840	0.037
		Air Conditioner	0.037	0.146	0.329	0.037
		Air Start Unit	0.073	0.329	0.986	0.037
		Baggage Tug	0.329	1.497	2.701	0.329
		Belt Loader	0.073	0.292	0.548	0.073
		Bobtail	0.037	0.110	0.183	0.037
		Cargo Loader	0.146	0.548	1.022	0.110
		Cargo Tractors	-	-	-	-
		Catering Truck	-	0.037	0.110	-
		Forklift	-	0.037	0.073	-
		Fuel Truck	0.037	0.146	0.365	0.037
		Generator	0.037	0.146	0.329	0.037
		Ground Power Unit	0.256	1.351	3.066	0.183
		Hydrant Truck	-	-	0.037	-
		Lav Truck	-	-	0.037	-
		Lift	-	0.037	0.073	-
		Other GSE	0.037	0.219	0.511	0.037
		Passenger Stand	-	-	-	-
		Service Truck	-	0.110	0.219	-
		Sweeper	-	-	-	-
	Diesel	*D Total*	*1.205*	*5.585*	*12.739*	*0.986*
	Gasoline 4-Stroke	*G4*				
		A/C Tug Narrow Body	0.037	0.657	0.292	-
		A/C Tug Wide Body	0.037	0.840	0.329	-
		Air Conditioner	-	-	-	-
		Air Start Unit	-	-	-	-
		Baggage Tug	1.743	32.791	6.257	0.079
		Belt Loader	0.431	7.262	1.438	-
		Bobtail	0.319	6.798	1.275	-
		Cargo Loader	0.112	1.743	0.337	-
		Cart	-	0.118	-	-
		Deicer	-	0.288	-	-
		Forklift	0.042	1.123	0.083	-
		Fuel Truck	-	-	-	-
		Ground Power Unit	0.105	2.102	0.736	-
		Lav Cart	-	-	-	-
		Lav Truck	0.050	1.092	0.496	-
		Lift	0.223	2.978	0.670	-
		Maint. Truck	0.037	0.730	0.329	-
		Other	0.436	8.724	0.872	-
		Service Truck	0.086	1.314	0.560	-
		Water Truck	-	0.195	0.097	-
	Gasoline 4-Stroke	*G4 Total*	*3.657*	*68.755*	*13.771*	*0.079*
	Natural Gas 4-Stroke	*C4*				
		Air Conditioner	-	-	-	-
		Baggage Tug	0.157	2.433	0.706	-
		Belt Loader	-	0.342	0.114	-
		Bobtail	-	0.037	-	-
		Cargo Loader	-	0.319	-	-
		Forklift	0.067	0.401	0.401	-
		Lav Truck	-	0.022	-	-
		Lift	-	0.393	-	-
		Other	-	-	-	-
		Service Truck	0.009	0.088	0.035	-
	Natural Gas 4-Stroke	*C4 Total*	*0.233*	*4.034*	*1.256*	*-*
Riverside	**Total**		**5.094**	**78.373**	**27.766**	**1.065**

ATTACHMENT C-6B

ATTACHMENT I

Ground Support Equipment Emissions Inventory by County for SCAB
Date 5/10/2004 - Received from California Air Resources Boards (S. Kidd)
Emissions estimates are consistent with SCAB SIP estimates in 2003 AQMP
Calendar Year 2005

County Name	Engine Fuel Type	Equipment Name	Emissions in tons per year (TPY) TOG	CO	NOX	PM
San Bernardino						
	Diesel	*D*				
		A/C Tug Narrow Body	0.475	1.789	7.848	0.256
		A/C Tug Wide Body	0.329	1.752	4.818	0.183
		Air Conditioner	0.183	0.840	1.862	0.110
		Air Start Unit	0.365	1.862	5.658	0.219
		Baggage Tug	2.117	9.016	16.206	2.044
		Belt Loader	0.438	1.716	3.212	0.329
		Bobtail	0.146	0.657	1.132	0.146
		Cargo Loader	0.840	3.322	6.315	0.657
		Cargo Tractors	-	-	-	-
		Catering Truck	0.037	0.183	0.694	0.037
		Forklift	0.037	0.183	0.438	0.037
		Fuel Truck	0.146	0.767	2.081	0.183
		Generator	0.183	0.840	1.825	0.146
		Ground Power Unit	1.643	7.957	17.885	1.168
		Hydrant Truck	-	0.037	0.146	-
		Lav Truck	-	0.073	0.146	-
		Lift	0.073	0.219	0.402	0.037
		Other GSE	0.256	1.351	2.884	0.219
		Passenger Stand	-	-	-	-
		Service Truck	0.110	0.584	1.205	0.110
		Sweeper	-	-	-	-
	Diesel	*D Total*	*7.373*	*33.142*	*74.752*	*5.877*
	Gasoline 4-Stroke	*G4*				
		A/C Tug Narrow Body	0.219	3.906	1.643	-
		A/C Tug Wide Body	0.256	4.891	2.044	-
		Air Conditioner	-	-	-	-
		Air Start Unit	-	0.037	-	-
		Baggage Tug	10.138	191.359	36.672	0.317
		Belt Loader	2.445	42.999	8.557	0.072
		Bobtail	2.124	39.512	7.541	0.106
		Cargo Loader	0.562	10.062	2.080	-
		Cart	-	0.769	-	-
		Deicer	-	1.442	0.288	-
		Forklift	0.208	6.616	0.416	-
		Fuel Truck	-	2.666	2.666	-
		Ground Power Unit	0.578	12.562	4.310	0.053
		Lav Cart	-	0.073	-	-
		Lav Truck	0.347	6.503	2.780	-
		Lift	1.042	16.828	3.872	-
		Maint. Truck	0.256	4.271	2.117	-
		Other	2.181	49.288	3.926	-
		Service Truck	0.452	7.645	3.338	0.022
		Water Truck	0.097	0.877	0.487	-
	Gasoline 4-Stroke	*G4 Total*	*20.906*	*402.304*	*82.736*	*0.569*
	Natural Gas 4-Stroke	*C4*				
		Air Conditioner	-	-	-	-
		Baggage Tug	0.863	14.204	4.081	-
		Belt Loader	0.114	2.391	0.683	-
		Bobtail	-	0.183	0.037	-
		Cargo Loader	-	1.597	0.639	-
		Forklift	0.334	2.204	2.204	-
		Lav Truck	-	0.088	0.022	-
		Lift	0.393	2.752	1.179	-
		Other	-	1.333	2.667	-
		Service Truck	0.026	0.499	0.193	-
	Natural Gas 4-Stroke	*C4 Total*	*1.730*	*25.251*	*11.704*	*-*
San Bernardino Total			30.010	460.697	169.192	6.446
SOUTH COAST AIR BASIN TOTAL GSE EMISSIONS			336.239	5,218.789	1,834.423	67.855

ATTACHMENT II

Ground Support Equipment Emissions Inventory by County for SoCAB
Date 5/10/2004 - Received from California Air Resources Boards (S. Kidd)
Emissions estimates are consistent with SCAB SIP estimates in 2003 AQMP

Calendar Year	SoCAB Emissions in tons per year (TPY)				Estimated LAX GSE Emissions[a] (TPY)			
	TOG	CO	NOX	PM	TOG	CO	NOX	PM
2005	336.239	5,218.789	1,834.423	67.856	224.043	3,477.396	1,222.317	45.213
2006	300.709	5,003.877	1,683.551	66.979	195.697	3,256.443	1,095.628	43.589
2008	233.753	4,614.384	1,407.195	64.463	145.458	2,871.400	875.657	40.114
2010	187.666	4,353.864	1,200.809	61.404	111.987	2,598.095	716.583	36.642
2015	130.532	4,194.963	905.819	49.396	70.905	2,278.689	492.038	26.832

[a] Based on ratios (LAX/SoCAB) of passenger data available through 2000, and the 2001 RTP Aviation Scenario No. 8.

Alternative D GSE NOx Emissions

Calendar Year	LAX SIP GSE NOx[a] (tpy)	Draft GCD GSE NOx[b] (tpy)	64 MAP '05 GSE NOx[c] (tpy)	GSE MOU GSE NOx[d] (tpy)	Incremental GSE NOx Emissions Relative to 2003 AQMP Budget		
					Draft GCD	64 MAP '05	GSE MOU
2005	1,222	1,229	1,116	1,116	7	(106)	(106)
2006	1,096	1,106	1,004	940	10	(91)	(156)
2008	876	861	781	588	(15)	(94)	(288)
2010	717	615	558	236	(102)	(159)	(481)
2015	492	0	0	0	(492)	(492)	(492)

[a] Based on ratios (LAX/SoCAB) of passenger data available through 2000, and the 2001 RTP Aviation Scenario No. 8.
[b] From Draft General Conformity Determination for LAX Master Plan Alternative D (January 9, 2004).
[c] Corrected 2005 mixing height to 2050 ft and assumed 2005 LAX activity was 64 MAP, based on SCAG documentation.
[d] Assumes GSE MOU begins affecting GSE NOx emissions after 2005; reaches average NOx emission of 2.5 g/bhp-hr in 2010.

Attachment C-6C

Meeting Notes

Date: July 29, 2004
Time: 9:30am
Place: South Coast AQMD, Diamond Bar, CA
Subject: LAX Master Plan General Conformity Determination

Attendees:
Elaine Chang (SCAQMD)
Zorik Pirveysian (SCAQMD)
David Kessler (FAA)
Dennis Quilliam (LAWA)
Roger Johnson (CDM)
John Pehrson (CDM)

1. Purpose

The purpose of this meeting was to review the July 23, 2004, letter from the California Air Resources Board (ARB) to the Federal Aviation Administration (FAA) regarding aircraft engine emission budgets in the 1997/99 South Coast SIP, and determine if any other information is needed prior to completing the Final General Conformity Determination for the LAX Master Plan Alternative D.

2. July 23, 2004, Letter from ARB to FAA

SCAQMD received a copy of the letter from ARB, and had reviewed it prior to the meeting. The SCAQMD noted that with this letter, the budgets in the 1997/99 South Coast SIP included the LAX Master Plan Alternative D emission inventories.

FAA noted that the Final Conformity Determination will continue to demonstrate conformity with both the 1997/99 SIP and 2003 AQMP

3. Monitoring of Mitigation Measure Implementation

SCAQMD was concerned with what procedures the federal agencies would use to monitor implementation of the mitigation measures listed in the EIS/EIR, since these measures were used in developing the Alternative D emission inventories for the General Conformity Determination.

LAWA noted that the mitigation measures used to develop the project emission inventories for General Conformity were included in the Mitigation Monitoring and Reporting Program (MMRP) required under California Environmental Quality Act (CEQA) statutes and guidelines. This document was issued with the Final EIR in April 2004.

FAA noted that the National Environmental Policy Act (NEPA), under which the EIS was developed, does not have the same mitigation monitoring requirements as CEQA. However, the Record of Decision (ROD) will have conditions that must be met to receive FAA approval and funding. The ROD conditions will include the mitigation measures necessary to achieve the Alternative D emission inventories contained in the Final General Conformity Determination. FAA also noted that the conditions can include periodic monitoring of mitigation measure implementation. SCAQMD indicated that they would want the ROD conditions to include mitigation monitoring provisions.

4. Acknowledgement of SCAQMD/FAA Coordination

The FAA indicated that they need a letter from SCAQMD, for the administrative record, indicating that FAA and SCAQMD have met several times and resolved the issues raised in SCAQMD's letter of February 9, 2004. FAA requested this letter by Friday, August 6, 2004, to ensure that the Final General Conformity Determination would be completed in a timely manner. SCAQMD indicated that they would prepare a letter for the Executive Officer's signature, and would attempt to have it signed by August 6, 2004.

Attachment C-7

CHAPTER 1
INTRODUCTION

Purpose

Constraints in Achieving Standards

Control Efforts

Progress in Implementing the 1997/1999 SIPs

2003 AQMP Revision

Format of This Document

TABLE 1-3
State and Federal Measures Adopted Since 1994 SIP

			ROG (tpd)		NOx (tpd)	
Near-Term Measures	**Agency**	**Adopted**	**Commit-ment**	**Achieved in 2010**	**Commit-ment**	**Achieved in 2010**
M1: Light-duty vehicle scrappage	CARB	1998	19	0	17	0
M2: Low Emission Vehicle II program	CARB	1998		4		43
M3: Medium-duty vehicles	CARB	1995	Baseline[1]	--	Baseline[1]	-
M4: Incentives for clean engines (Moyer Program)	CARB	1999	9	0	62	3
M5: California heavy-duty diesel vehicle standards	CARB	1998		5		44
M6: National heavy-duty diesel vehicle standards	USEPA	1998		1		11
M7: Heavy-duty vehicle scrappage	CARB	Withdrawn		NA		NA
M17: In-use reductions from heavy-duty vehicles	CARB	No		0		0
M8: Heavy-duty gasoline vehicle standards	CARB	1995	Baseline[1]	-	Baseline[1]	-
M9: CA heavy-duty off-road diesel engine standards	CARB	2000	4	4	47	18
M10: National heavy-duty off-road diesel engine stds	USEPA	1998		6		25
M11: CA large off-road gas/LPG engine standards	CARB	1998	32	16	17	5
M12: National large off-road gas/LPG engine stds	USEPA	2002		14		5
M13: Marine vessel standards	USEPA	1999	0	0	15	2
M14: Locomotive engine standards[4]	USEPA	1997	0	0	17	17
M15: Aircraft standards	USEPA	No	3	0	6	0
M16: Marine pleasurecraft standards	USEPA	1996	21	17	0	0
CP2: Consumer products mid-term measures	CARB	1997/1999	34	15	0	0
CP3: Aerosol paint standards	CARB	1995/1998	Baseline[1]	--	--	--
Enhanced I/M (Smog Check II)	BAR	1995	Baseline[1]	(6)	Baseline[1]	-
DPR-1: Emission reductions from pesticides	DPR	Voluntary	1	1	0	0

TABLE 1-3 (CONTINUED)

State and Federal Measures Adopted Since 1994 SIP

			ROG (tpd)		NOx (tpd)	
	Agency	**Adopted**	**Commit-ment**	**Achieved in 2010**	**Commit -ment**	**Achieved in 2010**
Adopted measures not originally included in SIP						
Clean fuels measures	CARB	Multiple		13		12
Marine pleasurecraft (reductions beyond M16)	CARB	1998/2001		7		0
Motorcycle Standards	CARB	1998		1		0
Urban transit buses	CARB	2000		0		1
Enhanced vapor recovery program[5]	CARB	2000		6		0
Medium/heavy-duty gasoline standards (beyond M8)	CARB	2000		0		1
2007 heavy-duty diesel truck standards (beyond M5/M6)	CARB/ USEPA	2001		1		16
Small off-road engine standard revisions	CARB	1998		(1)		0
Gas can requirements[2]	*CARB*	*1999*		*30[2]*		*0*
NEAR-TERM TOTAL (excluding gas cans)			**125**	**105**	**181**	**203**
Long-Term Measures (Section 182(e)(5))						
Advanced technology on-road mobile "Black Box"	CARB	No	37	0	6	-[3]
Advanced technology off-road mobile "Black Box"	CARB	No	18	0	3	-[3]
CP4: Long-term measure for consumer products	CARB	No	43	0	0	0
LONG-TERM TOTAL			**98**	**0**	**9**	-[3]
GRAND TOTAL (near-term + long-term)			**223**	**105**	**190**	**203**
Remaining State and Federal Obligations under 1999 SIP			**118**		**0**	

2010 summer planning based on 1997 AQMP inventory. Emission reductions from individual measure may not add to total due to rounding. ( ) = Emission increase relative to baseline. BAR = Bureau of Automotive Repair; DPR = Department of Pesticide Regulation

[1] Measures M3, M8, CP3, and the Smog Check II program from the 1994 SIP had already been adopted when the SIP was revised in 1997. The reductions from these measures are included in the 1997 SIP baseline. Although the Smog Check II program is achieving significant benefits, the emission reductions are less than anticipated in the 1997 SIP as indicated by the negative number under reductions achieved.

[2] Emissions from gas cans were not included in the 1997/1999 SIP baseline; reductions from this source are real, but not creditable until the SIP is revised to reflect these emissions.

[3] The NOx reductions anticipated from the long-term mobile source "Black Box" commitment have already been achieved from adopted measures.

[4] Emission reductions from locomotives represent the national emission standards for locomotive engines as well as the MOU for the South Coast Air Basin. U.S. EPA has committed to adopt a backstop commitment to ensure that the emission reductions associated with the MOU are achieved. The MOU is hereby included as part of the 2003 AQMP SIP submittal. A copy of the MOU is available at http://www.arb.ca.gov/msprog/offroad/loc/loco.htm.

[5] CARB's rule complements District Rule 461. An overall reduction of 6 tons per day of VOC reductions from this category is included in the AQMP baseline.