REPORT ON

LOCOMOTIVE EMISSION INVENTORY:

LOCOMOTIVE EMISSIONS BY COUNTY

Revised
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Presented as a Supplement to the "Locomotive Emission Study," August 1991

For the California Air Resources Board

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PREFACE

This report is presented as a supplement to the Locomotive Emission Advisory Committee (LEAC) report entitled, "Locomotive Emission Study." The Locomotive Emission Study developed for the California Air Resources Board (CARB) and the LEAC included an estimate of the emission inventory from locomotive operations for the six non-attainment air basins having the highest levels of rail activity. This supplemental report utilizes the information on train operations contained in that report to provide the following additional detail regarding the locomotive emission inventory:

- Emission inventories by county for the original six air basins included in the prior CARB/LEAC study
- Locomotive emission inventories for all other counties outside the original six air basins that have rail activity
- Predictive estimates of rail emissions by county for the years 2000 and 2010
- Information on seasonal and daily variations in rail activity.

It should be noted that the emission estimates for the Locomotive Emission Study were based on rail activity in the year 1987. Therefore, the county-by-county estimates contained in this report were also developed using base year 1987 rail activity data. While these estimates are generally reasonable for most counties with substantial locomotive activity, rail operators in the state have made selected changes in route structures and schedules that could have a significant effect on emission inventories in some counties.

The merger of the Southern Pacific (SP) and the Denver & Rio Grande Western (D&RGW) railroads provides a good example of such traffic flow change. Prior to the D&RGW and SP merger, which occurred in 1988, the SP handled some of its eastbound trains from Oregon and Northern California to Kansas City via Southern California and El Paso. With the D&RGW/SP now one company, this traffic can be handled east from Sacramento over the "Overland Route" via Sparks and Ogden to Kansas City—a much shorter route. This change eliminated approximately four through trains into and out of the Los Angeles Basin. This shift transferred trains to a double tracked corridor where there is adequate capacity, thus removing them from a dense, single-track corridor where the growing numbers of double-stack train operations were straining existing line capacity. As a result of this change, there are now fewer trains operating over the Cajon and Tehachapi Passes on the SP line.

In addition, the D&RGW/SP merger resulted in the reactivation of the Modoc line. The SP, in an effort to maximize selected corridor usage, funnelled eastbound traffic from Oregon and north through the Sacramento/Roseville yard and avoided the Modoc line. With the previously mentioned shift of trains to the Overland Route, the Modoc line was reinstated to handle the northwest-east traffic.

Other changes in rail traffic have occurred since 1987. The SP's International Container Transfer Facility (ICTF) became operational in 1988. This facility is located just north of the Long Beach/Los Angeles ports and dispatches as many as 10 to 12 double-stack trains a day. All three major railroads have increased their intermodal business since 1987, due in part to an increase in total tonnage carried, and as a result of the conversion of existing "boxcar" traffic to intermodal traffic. As the Ports of Los Angeles and Long Beach continue to grow, the railroads continue to increase their tonnage from this area.

The SP has modified its Los Angeles terminal operations by consolidating the Taylor Yard operations into the City of Industry facility, and to a lesser degree into the West Colton yard. This has resulted in a net reduction in yard assignments and better utilization of road switcher units. Major locomotive maintenance is being relocated to the West Colton yard, potentially reducing light engine movements between this facility and various duty locations within the Los Angeles Basin.

Over 1,200 new and rebuilt diesel units have been acquired by the Atchison, Topeka and Santa Fe (ATSF), the SP, and the Union Pacific (UP) since 1987. A large number of these units are used in California daily. Although the railroads have added many new units to their rosters, the number of units per railroad has been reduced—reflecting the purging of older, less efficient diesels from service.

METHODOLOGY

The following general methodology was followed to calculate locomotive emission inventories for each county in the state:

Step 1: Determine the total emissions per train. For inventory purposes, a "train" is defined by its origin and destination, the number and type of locomotives used to provide power, and the throttle profile of those locomotives as the train moves from its origin to its destination. [Throttle profile is simply a tabulation of the total time spent in each throttle notch during the travel period.] Locomotive emission factors are expressed in mass of effluent per unit time for each throttle notch. The total emissions per train can be estimated by multiplying the time in each throttle notch by the appropriate emission factor for that notch. Since emission factors for locomotives vary by the total rated horsepower and type of locomotive unit, it is important to know the specifications of the "consist" (the set of locomotives powering the train) of the train for which emissions are being estimated. The specifications of the consist will, in turn, be influenced by several factors—most important of which are total gross tons of the train, scheduled travel time, and the profile of the track between the origin and the destination. [For a more complete description of calculating emissions per train, see the LEAC final report entitled, "Locomotive Emission Study."]

The total emissions for each train were determined from the LEAC report. It should be noted that as part of the original LEAC study, the emissions from a train were estimated for each basin by reviewing the throttle profile in each particular basin that the train passed through (e.g., origin and destination pairs for each train always matched a location at or near a basin boundary).

Train operations data, including origin and destination pairs, are presented in Appendix A. Total emissions for each train by basin are presented in Appendix B.

Step 2: Evaluate the emissions per mile for each train and for each basin. In this step the emissions per mile for each train and basin were determined, and the data is presented in Appendix C. In general, the emissions per mile were determined by dividing total train emissions by the trip length. Wherever there were significant differences in grades between basins, the train emissions per mile were modified to account for this difference. For example, emissions per mile for a train going up the Cajon Pass are much greater than on level track.

However, since trains generally travel over the same set of tracks when going to and from their origin and destination, the high emissions per mile going up a grade are partially offset by the low emissions per mile coming down the grade. Grade differences between counties and basins are then somewhat naturally compensated for. [Nevertheless, emissions from a train operating in a region with grades will be greater than from a train operating over level track, all other things being equal.]

Step 3: Determine the length of track in each county in each basin and the specific trains that operate over each track segment. Track mileage by county were determined using maps annotated and reviewed by the major railroads operating in California (the same maps used for the original LEAC study).

Step 4: Multiply emissions per mile for each train by miles of track in each county and then add together all train emissions operating over the same tracks.

Counties Outside the Original Six Air Basins Examined in the LEAC Report

The process for estimating locomotive emissions for counties outside of the original six air basins examined in the LEAC report was complicated by the fact that total emissions for those basins had not been determined.

However, most of the trains that operated outside the original six air basins also operated inside at least one, and often more than one, of the original six air basins. Therefore, it was possible to project the emissions in other counties based on the operating data for each train in "known" basins and the miles of track in each county through which these same trains operated. There were, however, certain line-haul trains that operated exclusively outside any of the original six air basins examined. For example, the SP operates trains in the Northeast Plateau basin that do not enter other basins. In 1987, there were only 2 or 3 trains a week operating through Alturas in Modoc County. Today, the activity on these lines has increased to 2 and perhaps 3 trains a day. Additionally, the former Western Pacific Railroad, now the Union Pacific Railroad, in combination with the Burlington Northern, operates 4 to 5 trains a day through Modoc and Lassen Counties—to and from Oregon.

Another complicating factor is that some railroad routes separate at junctions outside the original study area and subsequently travel into different counties. Train activity (and emissions) is known for the consolidated route (which was in the original study area) but not for branches of the route outside that area. In these cases, an estimate had to be made as to what portion of total activity proceeded along which routes. Wherever possible these estimates were based on Booz·Allen's existing database of train operations in California. In some cases, follow-up contact with railroad

operating departments was required. During these discussions, operations managers reinforced the fact that train schedules and routes have changed, sometimes significantly, since the 1987 base year inventory assessment. In most cases these changes served to reduce yard activity by consolidating operations, however total gross tonnage shipped is up from 1987 levels.

Emission Inventories for the South Coast Air Basin

The locomotive emission inventories for the counties in the South Coast Air Basin were derived somewhat differently than for the other air basins in the state. In a previous study that Booz·Allen performed for the South Coast Air Quality Management District, locomotive emissions were estimated for 300 parcels; each measuring 5 kilometers by 5 kilometers. These "gridded" emission inventories could then be used to estimate the emissions by county by determining which grids or parcels were located in which counties. [It should be noted that the original methodology for determining emissions by grid also focused on counting the miles of track in each grid and multiplying by the emissions per mile per train for each train travelling through the grid.] Because emission inventories per grid were available, we have not counted the miles of railroad track located in each county in the South Coast Basin.

Emission Inventories for Counties That Cross Over Basin Boundaries

In some instances a given county may cross over air basin boundaries so that the locomotive emission inventory for that county is actually split between two different basins. For these counties, we have developed two separate inventories, one for each basin and the county it resides in. We have noted "partial" county emission inventories next to those counties that do not completely reside in a single air basin. The following counties reside in more than one basin.

County	Basins
Sonoma	North Coast and San Francisco Bay Basins
Placer	Mountain Counties and Sacramento Valley Basins
Solano	Sacramento Valley and San Francisco Bay Basins
Los Angeles	South Coast and Southeast Desert Basins
San Bernardino	South Coast and Southeast Desert Basins
Riverside	South Coast and Southeast Desert Basins
Kern	San Joaquin and Southeast Desert Basins

RESULTS OF THE COUNTY-BY-COUNTY LOCOMOTIVE EMISSION INVENTORY

For each county, emission inventories have been segmented into "line-haul plus local" versus "yard" emissions. Yard emissions are comprised primarily of idle emissions, as well as emissions from switching operations and yard engines. The idle emissions from line-haul locomotives are not included in "yard" emissions. Emission inventories for yard operations were assigned to the specific counties in which each railroad's yard operations were located. The locomotive emission inventories for each county in the state are presented in Appendix D. A comparison of Booz·Allen's estimates versus CARB's 1987 estimates is presented in Appendix E. Total NOx emissions from locomotive operations in the state are estimated to be 160 tons per day.

Booz·Allen's estimate of total locomotive emissions for 1987 is approximately 25 percent higher than CARB's estimate for that same year. The difference appears to be primarily due to differences in estimates for the Bay Area and for the Southeast Desert Basins. Part of the discrepancy may be attributable to train operations data made available to Booz·Allen by the railroads but not listed in publicly available train schedules.

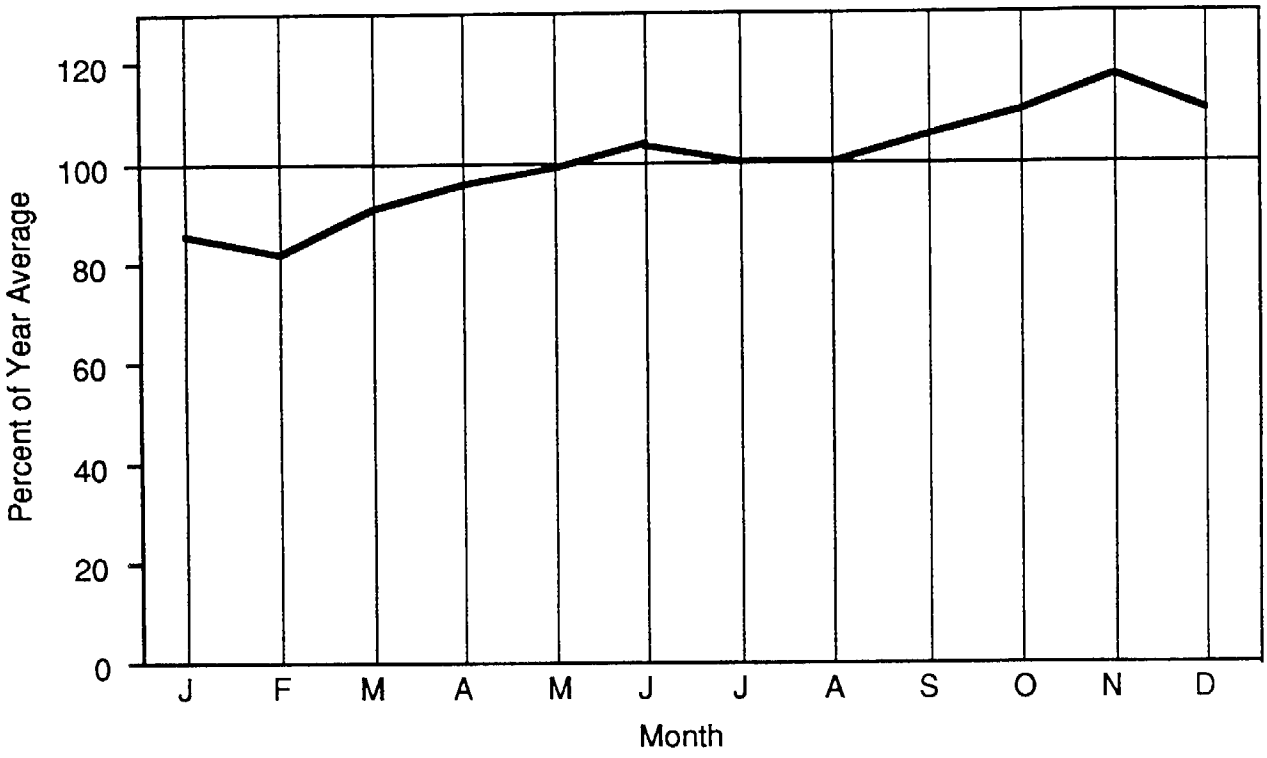
SEASONAL EFFECTS

Seasonal emission variations from railway operations are directly related to rail traffic levels. Therefore, the seasonality of rail traffic was reviewed. Different commodities have different seasonal characteristics. Agricultural and fresh food products have three peak periods, reflecting different harvests for various farm products. Automotive products show some seasonality, decreasing in the early summer and peaking in the fall. Merchandise traffic, travelling predominantly in containers on some railroads and in boxcars on others, shows variable seasonal characteristics. There is some peaking leading to the Christmas season and again in the late spring, but generally merchandise traffic is not variable on a seasonal basis. General merchandise traffic is a very broad category of traffic that includes building products, manufactured goods, clothing, and a wide variety of other goods. Shipments of general merchandise traffic tend to vary with economic conditions more than with seasonal changes. Building products are similar—there is some variation driven by differences in summer and winter activity levels in the industries producing and using these products, but in general rail traffic in the state varies more with economic activity levels than with seasonal factors.

Because of the wide range of commodities and types of freight carried in California, rail traffic tends to dampen the seasonal variability. Such traffic follows production and consumption trend lines rather than seasonal trends, which might be expected of agricultural, mining, or single industry based traffic areas.

To account for seasonal variations in freight traffic volume, a seasonality factor was developed that represents a composite estimate of the seasonal characteristics of all three major rail carriers serving California. Our analysis is based on system-wide rail traffic information for each carrier, the types of commodities carried by each, and the traditional Christmas seasonal effects. Traffic builds slowly in the beginning of the year and then declines during mid-summer (July and August). High traffic periods occur in October, November, and December. Rail traffic in the high periods averages about 10 percent higher than the annual average and about 10 percent lower in the low periods. Our estimate of seasonal variation in rail activity is summarized in Exhibit 1.

EXHIBIT 1
Estimated Seasonal Variations in California Rail Traffic Activity

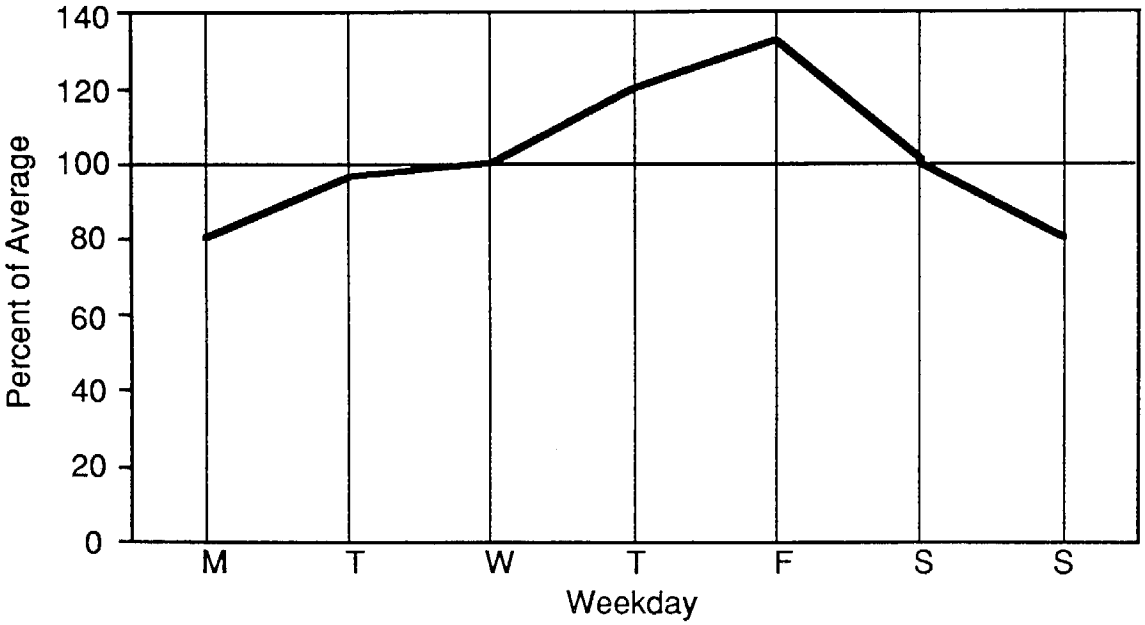


Source: Booz·Allen analysis

As is shown in Exhibit 1, maximum seasonal effects occur in November and January, with traffic level variations of plus 15 percent and minus 20 percent, respectively, from the yearly average.

Analysis of rail traffic activity shows that there is significant day-to-day variation. Rail traffic activity builds during the week, peaking on Thursday and Friday, and drops off over the weekend, and recovers from Monday onwards. This weekday variability is based on the nature of traffic shipments. Shippers tend to clear plants and shipping docks for the weekend and to rebuild inbound stocks for the start of the next work week. Such weekday variations are less important for some traffic types, agricultural products for example, and weekday variations will be less pronounced during harvest times. Our analysis of rail traffic in California results in the estimated variations in weekday rail activity levels shown in Exhibit 2. As shown, traffic on Fridays averages as much as 30 percent higher than "normal," while on Sundays traffic drops to nearly 25 percent below the average for the week.

EXHIBIT 2
Estimated Weekday Variations of California Rail Traffic Activity



Source: Booz-Allen analysis

Combining these effects (both seasonal and weekday rail activity variability) results in somewhat higher possible peaks in the late fall, and lower valleys in the late winter or early spring. The impact on daily emission inventories from both seasonal and weekday variations is shown in Exhibit 3.

EXHIBIT 3
Maximum Combined Variations in California Rail Activity

CHANGES IN RAIL ACTIVITY LEVEL FROM "AVERAGE" LEVELS	
SEASONALITY EFFECTS	
November	(+15%)
January	(- 20%)
WEEKDAY EFFECTS	
Friday	(+30%)
Sunday	(- 25%)
MAXIMUM COMBINED EFFECTS	
	(+50%)
	(- 40%)

Exhibit 3.a

Peak day rail activity is limited by the physical constraints of the rail network and the finite number of locomotives in the fleet. We estimate that single day peaks in rail activity levels in California are limited to levels about 50 percent above the annual average. Single day low rail traffic levels are not so limited—some days, such as Christmas Day and New Years Day, will be much lower than the annual average. Most of the locomotives involved in the low period will be idled or moved to other parts of the system.

FORECASTED LOCOMOTIVE EMISSION LEVELS

A significant part of Booz·Allen's assignment for this project is the development of forecasted rail emission levels for the years 2000 and 2010. In developing these forecasts we have assumed that emission levels are closely associated with changes in rail traffic levels, adjusted for changes in technology and mix of rail activities. The following section reviews our assumptions about rail activity levels, likely technology changes, as well as as changes in rail traffic mix. Several important assumptions and caveats should be noted in reviewing these forecasts:

- No changes were assumed in the locomotive emission regulatory environment for the forecast period. The forecast should be considered as a base forecast, with no radical changes in locomotive emission regulations.

- No radical changes in locomotive technology were assumed. New sources of power, such as fuel cells or gas turbines were not assumed to be implemented during the forecast period. Alternative fuels, such as methanol and natural gas were also not assumed to be implemented in the forecast period. No significant railway electrification was assumed.

- No major changes in emission regulations for other modes (including passenger cars, buses, trucks, and ships), which would tend to change the competitive environment between the various transport modes are anticipated (i.e., rail traffic growth will be linked to growth in the economy rather than a change in the fundamental competitiveness between shipping modes).

- No major economic changes are expected during the forecast years. That is, the forecast years are a natural progression from the 1987 to 2010 period, with no recession or period of unusual economic growth projected.

These assumptions do not eliminate the potential for the development of a new generation locomotive. Such locomotive developments have occurred about every 10 to 15 years, and it is likely that this development cycle will continue, absent other outside forces. The next generation locomotive is likely to be more fuel efficient, have greater internal combustion pressures, higher power output, and better combustion control and monitoring systems. The emergence of the next generation diesel-electric locomotive does not influence the emission inventory forecast for the year 2000, however it does affect the 2010 forecast. Emission and fleet size characteristics of this projected new generation locomotive are discussed with the 2010 forecast.

Further, the forecasts prepared here assumed the continuation of existing trends operating in the industry, where there is no reason to assume these trends will be reversed or accelerated. As with seasonality, a substantial part of the locomotive emission inventory forecast must be based upon projections of rail traffic and activity levels. Future rail traffic activity level is a function of population and economic growth in the state. Where significant growth is expected from a specific industrial development project that will rely on rail, that development is identified in the forecasts. The remaining part of this section describes the basis of the forecasts of locomotive emission levels for each of the time periods.

Year 2000 Forecast Basis

Emission estimates for the year 2000 are driven by changes in the competitive and industrial environment that are already underway. Further changes will be driven by changing rail traffic base, which will continue to shift towards intermodal and containerized freight movements, reducing rail switching activity. The following trends are expected:

- Continuing a long established trend, railroad yard activity will decline over the next 10 years. Yard assignments will decline by about 25 percent as a result of the continuing consolidation of yard activities and increasing containerization. These declines will be the greatest for the SP. We do not forecast much change in yard activity for the other carriers.

- Fuel efficiency will increase by about 7 percent as a result of measures to reduce train resistance. This will result both from rail lubrication techniques, as well as an increase in the use of aerodynamics to reduce container and trailer car wind resistance. Rail carriers are installing flange lubrication devices on locomotives and are finding a 5 to 10 percent reduction in fuel consumption. This arises from reduction in friction, particularly at high speeds and on curved segments. This will show itself in reduced power requirements, or moving trains with slightly higher tonnages with the same consist. The combined effect of rail lubrication and aerodynamic improvements should reduce emissions directly by about 7 percent.

- Carriers will increase the number of EMD 710 and GE Dash 8 generation locomotives. These locomotives are the current "state-of-the-art" with NOx and HC emissions approximately 12 to 18 percent lower than those of the current average unit in the combined fleets of all railroads. In 1987, EMD 710 and GE Dash 8 units comprised about 5 percent of the fleet of

line haul locomotives. By the year 2000, we expect these units to represent approximately 50 percent of the total line haul fleet. Thus, the average locomotive in the fleet in the year 2000 will have reduced emissions and improved fuel economy of about 6 to 8 percent over today's average line-haul locomotives [15 percent improvement from new locomotives (x) 45 percent increase in fleet penetration, plus the retirement of older EMD 567 units]. The switch to EMD 710 and GE Dash 8 locomotives will be motivated by increased productivity of these units in addition to improved fuel economy. The new locomotives have significantly higher horsepower and tractive effort than older units, thus facilitating the replacement of older units with the newer units at a 2 for 3, or a 3 for 4 ratio. The potential reduction in total fleet inventory will reduce maintenance requirements and simplify operations.

- Smaller local and yard engines will be rebuilt and should have the same emission characteristics as current units. Except for the reduction in switching activity levels described above, we do not project much change in the emission levels from smaller local and yard units.

- The fleet of larger local locomotive units will be replaced by newer model EMD 645E3B or GE Dash 7 units. This will result in some improvement in the emission characteristics of heavy duty local locomotives. We expect the total local unit emissions will be reduced by about 8 percent overall.

- Intermodal traffic will grow by about 17 percent. We cannot forecast the location of this growth, so all intermodal traffic has been increased by the projected 17 percent growth. Mixed and bulk freight traffic will grow by approximately 2 to 4 percent from the current levels. As a percent of total freight, there will be an erosion in some of the Class I carriers' mixed freight business. Much of this traffic will move to intermodal, and is the reason for the relatively rapid growth projected in that segment. Population and economic growth will add to the rail traffic base, balancing the diversion of rail traffic to intermodal movements. Passenger train traffic will increase by approximately 10 percent due to increases in population. (Aggressive commuter rail plans for Southern California could cause passenger train activity to increase substantially, although it is unclear whether the long term operation of commuter trains will be powered by diesel or electric locomotives.)

The net results of these changes is shown in Exhibit 4.

EXHIBIT 4
Year 2000 Forecasted Changes in Rail Emissions for the State of California
(1987 Base Year)

Train Type	Increased Rail Lubrication and Aerodynamics	Introduction of New Locomotives[1]	Changes in Traffic/Activity Levels	Net Changes in Emissions
Intermodal	- 7%	- 8%	+ 17%	+ 2%
Mixed	- 7%	- 8%	+ 2%	- 13%
Passenger	- 7%	- 8%	+ 10%	- 5%
Local	- 3%	- 3%	- 2%	- 8%
Yard	0%	- 1%	- 25%	- 26%

(1) 50 percent penetration of EMD 710s/GE Dash 8s, plus replacement of all EMD 567s with rebuilt EMD 645E3Bs and/or new GE locomotives. (Assumes high end of potential emission reduction since newer model EMD and GE locomotives could offer even lower emissions than the 710s and Dash 8s as product designs mature.)

Exhibit 4.a

Emissions associated with intermodal traffic will increase by about 2 percent. This is driven by increases in the intermodal traffic base combined with reductions from improved fuel efficiency and changes in the composition of the locomotive fleet. Mixed freight emissions will be reduced by about 13 percent, arising from improved fuel economy, reduced train resistance and changes in the road unit fleet makeup. Emissions associated with local train activity will decline by about 8 percent, reflecting changes in the local locomotive fleet, improvements in fuel efficiency and some modest reduction in local activity levels. Finally, as shown in Exhibit 4, locomotive emission levels associated with yard activity will decline by about 26 percent primarily due to changes in traffic and activity levels.

Year 2010 Forecast Basis

Our projections for the year 2010 are based on a continuation of the trends discussed above. However, a new element will be the introduction of a new generation of engine in locomotive overhaul and rebuild applications. We expect that new generation locomotives will be about 4 percent more fuel efficient than existing units. They are likely to incorporate some devices that improve the combustion process, such as electronic unit injectors, for fuel efficiency and smoke avoidance purposes. We believe that they will continue the trend of past, new model locomotives with improving emission characteristics. However, the next generation locomotives are likely to have higher specific power output arising from increases in turbocharger

pressures. This would normally increase brake-specific NOx emission levels, however, we expect that improved combustion controls and better management of traction power and auxiliary loads will keep NOx levels the same or slightly lower than current generation locomotive models. We have assumed somewhat improved particulate controls and the use of low sulfur fuels. Other forecasted changes affecting railroad based emissions are described below.

- Fuel efficiency from present locomotives will improve a further 5 percent from increasing the applicability of flange lubricators, upgrading of older units during overhaul cycles, and other miscellaneous changes. One such change is improved dispatching, resulting in lower waiting time for road locomotives. Another source of changes in fuel economy will come from widespread use of advanced train control techniques, now emerging from the signal company research work.

  All second generation locomotives (EMD 40-series and GE Dash 7 and earlier series locomotives) will be replaced by units with EMD 710 and GE Dash 8 characteristics—better traction control, better parasitic load management, and improved combustion processes. This will lead to further improvements in fleet fuel efficiency. We estimate that these improvements will result in a fleet fuel efficiency improvement of an additional 6 to 8 percent. Emission levels will be reduced by varying amounts, depending on the pollutant. Locomotive units used in road service will have the emission characteristics of third generation locomotives.

- About 15 percent of the road locomotive fleet will be made up of new model, fourth-generation locomotives. These units will have the following characteristics:

  - Horsepower ratings of about 5000 traction horsepower. This implies a brake horsepower rating of about 5200.

  - Fuel efficiency will improve by about 4 to 6 percent over the present third-generation locomotives (EMD's 710 series and GE's Dash 8 series).

  - Improved combustion controls and more efficient turbocharging will reduce CO emissions by about 10 percent and HC emissions by about 10 percent, following the trend of locomotive developments over the past 30 years.

  - NOx emissions will remain at the same level as current third generation locomotives.

Local and yard locomotives by this time will have the same efficiency characteristics as the current EMD 710s and GE Dash 8s. (Local and yard locomotives will not actually be EMD 710s and GE Dash 8s but will likely be upgraded with component and system changes that yield efficiencies similar to the EMD 710 and GE Dash 8 locomotives.) Yard assignments will decline by an additional 15 percent. Again, this will mostly be on the SP as its traffic shifts to intermodal. Local runs will be reduced by about 10 percent as traffic shifts to intermodal and local deliveries are made by truck.

Intermodal traffic will increase by another 25 percent. This is in addition to the 17 percent increase in intermodal traffic projected for the year 2000, giving an overall 46 percent increase in intermodal traffic from the levels in 1987. Again this will be a general increase, over all current routes. Mixed freight activity will remain constant due largely to an increase in bulk freight generated by the new WorldPort at Los Angeles, combined with an erosion of mixed freight to intermodal freight. The construction project for the WorldPort will be completed around the year 2000, and the Port will become a significant coal export port to the Pacific Rim countries. Passenger train activity will increase by about 15 percent over year 2000 levels, again due largely to growth in the population and a continuation of the increase in average commuting distances to and from work (commuter rail traffic is rather unpredictable due to a variety of political considerations). The net result of these changes is shown in Exhibit 5.

EXHIBIT 5
Year 2010 Forecasted Changes in Rail Emissions for the State of California (2000 Base Year)

Train Type	Increased Rail Lubrication and Aerodynamics	Improved Dispatching and Train Control	Introduction of New Locomotives (1)	Changes in Traffic/Activity Levels	Net Changes in Emissions
Intermodal	- 2%	- 3%	- 8% (- 6% NOx)	+ 25%	+12% (+14% NOx)
Mixed	- 2%	- 3%	- 8% (- 6% NOx)	0%	- 13% (- 11% NOx)
Passenger	- 2%	- 3%	- 8% (- 6% NOx)	+ 15%	+ 2% (+ 4% NOx)
Local	- 1%	0%	- 12%	- 10%	- 23%
Yard	0%	0%	- 10%	- 15%	- 25%

(1) 15 percent penetration of the fourth-generation locomotives and 85 percent penetration of EMD 710s/GE Dash 8s in line-haul fleet. Older units upgraded for yard service. Local units are equivalent to EMD 710 emission characteristics.

Exhibit 5

As shown, emissions from intermodal trains will grow by 12 percent due to an increase in traffic of 25 percent. Emissions from passenger trains will grow slightly, due to a 15 percent increase in activity levels. Emissions from local and yard trains will be reduced.

Predicted future emissions for years 2000 and 2010 are presented in Appendices F and G.

APPENDIX A

TRAIN SEGMENT DEFINITIONS AND OPERATIONS DATA FOR TRAINS OPERATING IN CALIFORNIA

SEGMENT DEFINITIONS
SOUTH COAST BASIN

Segment	From	To
AA	Beaumont	LA
AB	LA	Beaumont
AC	Cajon	LA
AD	LA	Cajon
AI	LA	Chatsworth
AP	Chatsworth	LA
AQ	Cajon	Long Beach
AR	Long Beach	Cajon
AS	LA	San Clemente
AT	San Clemente	LA
AY	LA	Chatsworth
AX	Chatsworth	LA
UAA	LA	Summit
UBB	Long Beach	Summit
UCC	Summit	LA
UDD	LA	Summit
A	Beaumont	West Colton
B	West Colton	LA
C	West Colton	Summit
D	West Colton	Long Beach
E	LA	Acton
F	LA	Chatsworth
G	LA	Long Beach
H	Long Beach	Beaumont
I	Cajon	Beaumont
J	LA	Beaumont
K	LA	Cajon
L	Beaumont	LA/Chatsworth
SFA	San Bernardino	Hobart
SFB	San Bernardino	Hobart
SFC	San Bernardino	Hobart
SFE	San Bernardino	Hobart
SFF	San Bernardino	Hobart
SFG	San Bernardino	Hobart
SFH	Hobart	San Bernardino
SFI	Hobart	San Bernardino
SFJ	Hobart	San Bernardino
SFT	Hobart	San Clemente
SFU	San Clemente	Hobart
SFK	Cajon	San Bernardino
SFL	Cajon	San Bernardino
SFM	Cajon	San Bernardino
SFN	San Bernardino	Cajon
SFO	San Bernardino	Cajon
SFP	San Bernardino	Cajon
SFQ	Hobart	Watson
SFR	Hobart	Watson
SFS	Watson	Hobart

TRAIN TYPE: LOCAL
BASIN: SOUTH COAST

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
		75	3,328	4,726	11,815	3.94	40	18	20	26	42	48	50	54	21
		75	3,687	1,899	4,022	1.39	39	28	11	18	47	53	53	47	4
		75	520	2,000	10,000	3.45	39	28	11	18	47	53	53	47	4

TRAIN TYPE: YARD
BASIN: SOUTH COAST

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
			4,433		1,500	0.87	28	14	14	14	41	41	55	69	0.01
			5,700		1,450	0.85	28	14	14	14	41	41	55	69	0.01
			21,824		1,425	0.85	47	1	15	15	42	42	57	57	0.01

TRAIN TYPE: PASSENGER
BASIN: SOUTH COAST

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
AR	E	94	156	800	6,000	2.00	29	15	14	11	11	12	20	18	0
AP	W	32	208	800	6,000	2.00	10	4	5	5	6	3	3	4	5
AX	W	32	364	400	3,000	1.00	10	4	5	5	6	3	3	4	5
AY	E	32	364	400	3,000	1.00	8	4	6	10	8	5	5	4	0
AI	E	32	208	800	6,000	2.00	8	4	6	10	8	5	5	4	0
AT	W	63	2,856	400	3,000	1.00	32	0	4	0	3	0	0	0	2
AA	W	76	156	800	6,000	2.00	18	4	1	1	7	12	14	15	33
AS	E	67	2,856	400	3,000	1.00	30	2	1	2	3	6	0	0	0
AB	E	77	156	800	6,000	2.00	49	13	1	1	7	7	11	11	0
AC	W	77	260	800	6,000	2.00	12	3	2	2	8	7	12	12	59
AD	E	77	260	800	6,000	2.00	65	14	11	13	15	12	9	13	6
AQ	W	94	156	800	6,000	2.00	10	3	3	3	6	13	23	20	48

TRAIN TYPE: INTERMODAL
BASIN: SOUTH COAST

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
J	E	78	1,824	4,398	13,000	3.90	75	3	4.5	6	9.5	7.5	7	9	15
H	W	94	1,860	4,907	13,750	4.12	18.	15	5	7.5	12.	18.	11	15	106.5
D	W	68	24	2,850	7,500	2.25	13.	11	3.6	5.4	9	13.	9	10	76
UCC	W	80.3	557	2,407	10,903	3.45	14	2	1	3	2	7	5	3	74
L	W	110	60	6,352	15,000	4.50	23	14	23	21	22	23	20	22	52
UCC	W	80.3	272	6,256	16,431	5.20	20	1	1	3	1	7	2	4	83
J	W	78	852	4,724	13,000	3.90	7	3.7	4.4	5	12	16	17	19	46.3
UAA	E	80.3	299	6,094	18,364	5.81	105	4	5	3	5	11	3	3	13
SFO	E	20	3,845	3,133	13,613	4.20	40	8	2	2	2	2	1	3	0
UAA	E	80.3	533	2,365	9,866	3.12	78	5	5	4	3	9	5	3	16
E	W	51	960	4,266	12,750	3.82	20.	12.	23	19.	13	9.4	3	5	7.8
SFF	W	63	1,361	2,868	12,693	3.91	15	3	3	4	8	6	4	6	45
I	W	44	264	5,540	12,000	3.60	59	8	3.5	3.2	5.9	7.2	7	9	15.3
G	W	18	636	1,610	4,500	1.35	10	0.3	2	3.6	2.6	3	2	2	6.5
I	E	44	480	2,729	10,500	3.15	42	2	7	3	2	5	4	5	59
SFJ	E	62	182	0	15,689	4.84	15	3	6	11	14	14	10	13	7
SFB	W	61	756	3,201	12,844	3.96	8	3	5	6	9	9	10	18	38
E	E	51	456	4,448	12,000	3.60	23.	1.5	1	0.5	1.5	2	3	3	96.5
SFI	E	62	2,202	3,156	14,400	4.44	25	6	9	11	13	10	8	11	6
H	E	94	1,644	4,720	12,900	3.87	50	1.5	11	17	13	14.	9	11	31.5
SFG	W	63	80	0	12,984	4.00	12	2	2	3	10	8	6	7	40
SFL	W	20	2,165	3,020	12,605	3.89	0	0	0	0	1	1	1	2	50
SFD	W	61	38	0	12,931	3.99	4	3	4	5	8	8	10	20	30

TRAIN TYPE: BULK
BASIN: SOUTH COAST

SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	TIME IN NOTCH PER TRAIN (MINUTES) 8	7	6	5	4	3	2	1	BRAKE
UCC	W	80.3	105	11,013	5,704	1.81	133	0.5	6	3	7	6	3	2	10
E	W	51	408	3,825	12,000	3.60	20.	12.	23	19.	13	9.4	3	5	7.8
C	E	24	216	6,413	13,500	4.05	0	0	0.5	0.5	0.5	1	1	2	56
D	E	68	180	7,486	18,000	5.39	36	1	8	12.	9.4	10.	7	8	23
E	E	51	832	7,038	13,500	4.05	23.	1.5	1	0.5	1.5	2	3	3	96.5
UAA	E	80.3	82	2,940	7,294	2.31	32	1	2	1	1	3	1	1	104
SFP	E	20	2	2,489	9,917	3.06	65	8	2	2	2	2	1	3	0
UDD	W	80.3	53	10,578	5,182	1.64	166	0.5	7.5	4.3	8.7	7.5	3.5	2.7	12.3
SFM	W	20	13	10,430	20,729	6.39	0	0	0	0	1	1	2	2	45
D	W	68	96	2,050	9,000	2.70	13.	11	3.6	5.4	9	13.	9	10	76
SFC	W	61	12	10,963	20,338	6.27	12	6	8	8	11	11	10	20	45
UBB	E	101	51	3,034	9,640	3.05	40	1	2.5	1	1.2	4	1	1	130
SFR	W	19	4	8,952	13,100	4.04	5	6	5	8	15	15	10	15	45

SEGMENT DEFINITIONS
CENTRAL COAST BASIN

Segment	From	To
A	Watsonville	Gilroy
B	Watsonville	Chatsworth
C	Gilroy	Chatsworth
D	Guadalupe	Watsonville
AJ	Chatsworth	Gilroy
AO	Gilroy	Chatsworth
AW	Santa Barbara	Chatsworth
AZ	Chatsworth	Santa Barbara

TRAIN TYPE: LOCAL
BASIN: CENTRAL COAST

SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	TIME IN NOTCH PER TRAIN (MINUTES) 8	7	6	5	4	3	2	1	BRAKE
		75	2701	4,726	11,815	3.94	40	18	20	26	42	48	50	54	21

TRAIN TYPE: MIXED
BASIN: CENTRAL COAST

SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	TIME IN NOTCH PER TRAIN (MINUTES) 8	7	6	5	4	3	2	1	BRAKE
D	E	177	134	5,500	13,400	4.02	76	24	20	28	28	20	36	36	28
B	W	345	336	5,500	13,400	4.02	115	37	37	43	43	30	55	55	43
A	E	20	258	5,500	13,400	4.02	11	3.6	3.6	4.2	4.2	3	5.4	5.4	4.2
A	W	20	251	5,500	13,400	4.02	11	3.6	3.6	4.2	4.2	3	5.4	5.4	4.2
D	W	177	312	5,500	13,400	4.02	76	24	20	28	28	20	36	36	28
C	E	365	645	5,500	13,400	4.02	125	40	40	46	46	33	59	59	46
B	E	345	400	5,500	13,400	4.02	115	37	37	43	43	30	55	55	43
C	W	365	65	5,500	13,400	4.02	125	40	40	46	46	33	59	59	46

TRAIN TYPE: PASSENGER
BASIN: CENTRAL COAST

SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	TIME IN NOTCH PER TRAIN (MINUTES) 8	7	6	5	4	3	2	1	BRAKE
AO	W	335	208	800	6,000	2.00	98	22	37	47	81	27	35	40	9
AW	E	65	364	400	3,000	1.00	30	2	1	2	3	6	0	0	0
AZ	W	65	364	400	3,000	1.00	36	0	5	0	15	0	0	0	0
AJ	E	335	208	800	6,000	2.00	91	28	29	28	46	57	55	39	32

TRAIN TYPE: INTERMODAL
BASIN: CENTRAL COAST

SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	TIME IN NOTCH PER TRAIN (MINUTES) 8	7	6	5	4	3	2	1	BRAKE
C	W	365	336	4,100	12,400	3.72	125	40	40	46	46	33	59	59	46
C	E	365	209	4,100	12,400	3.72	125	40	40	46	46	33	59	59	46

SEGMENT DEFINITIONS
BAY AREA BASIN

Segment	From	To
AE	Fairfield	Oakland
AG	Oakland	Fairfield
AK	Gilroy	Fairfield
AN	Fairfield	Gilroy
AAA	Oakland	Orwood
AAD	Orwood	Oakland
A	Bethany	Oakland
B	Fairfield	Oakland
C	Gilroy	Oakland
D	WarmSprings	Oakland
E	Fairfield	Oakland/Bethany
F	Fairfield	Oakland/Gilroy
SFE	Orwood	Richmond
UA	Oakland	Midway
UB	Oakland	Midway
UD	Midway	Oakland
UE	Midway	Oakland
UF	Midway	Milipitas

TRAIN TYPE: LOCAL
BASIN: BAY AREA

SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	TIME IN NOTCH PER TRAIN (MINUTES) 8	7	6	5	4	3	2	1	BRAKE
		75	1428	1757	3358	1.16	39	28	11	18	47	53	53	47	4
		75	3353	4,726	11,815	3.94	40	18	20	26	42	48	50	54	21

TRAIN TYPE: PASSENGER
BASIN: BAY AREA

SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	TIME IN NOTCH PER TRAIN (MINUTES) 8	7	6	5	4	3	2	1	BRAKE
AAA	E	54	714	400	3,000	1.00	5	2	5	7	11	10	7	7	17
AG	E	51	520	800	6,000	2.00	12	1	4	5	13	13	15	15	0
AAD	W	54	714	400	3,000	1.00	11	5	5	5	8	6	4	4	17
AK	E	157	208	800	6,000	2.00	30	3	9	23	26	35	50	38	0
AN	W	157	208	800	6,000	2.00	33	3	9	12	33	28	60	37	0
AE	W	55	520	800	6,000	2.00	7	1	3	5	8	14	16	17	0

TRAIN TYPE: YARD
BASIN: BAY AREA

SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	TIME IN NOTCH PER TRAIN (MINUTES) 8	7	6	5	4	3	2	1	BRAKE
			1364		1,500	0.87	28	14	14	14	41	41	55	69	0.01
			11594		1,425	0.85	47	1	15	15	42	42	57	57	0.01
			700		1450	0.85	28	14	14	14	41	41	55	69	0.01

TRAIN TYPE: MIXED
BASIN: BAY AREA

SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	TIME IN NOTCH PER TRAIN (MINUTES)								
							8	7	6	5	4	3	2	1	BRAKE
UF	W	55	494	4,608	6,882	2.18	41	1	2	1	2	5	6	0	45
UB	E	55	341	2,041	10,680	3.38	7	6	4	20	8	12	17	14	23
E	W	105	146	5,500	13,400	4.02	27	6	20	16	39	31	24	14	0
SFE	E	54	851	2,010	8,149	2.51	5	2	5	7	11	10	7	7	17
D	E	32	313	5,500	13,400	4.02	21	6	8	10	11	9	7	10	4
SFE	W	54	1,134	3,711	7,389	2.28	11	5	5	5	8	6	4	4	17
A	E	61	279	5,500	13,400	4.02	39	17	6	6	19	4	14	6	25
F	W	118	426	5,500	13,400	4.02	42	8	26	19	42	35	26	19	6
D	W	32	316	5,500	13,400	4.02	21	6	8	10	11	9	7	10	4
A	W	61	286	5,500	13,400	4.02	16	6	6	11	14	9	9	9	0
B	W	44	135	5,500	13,400	4.02	11	0	14	5	25	22	15	5	0
F	E	118	352	5,500	13,400	4.02	68	9	13	15	20	17	20	23	112
B	E	44	395	5,500	13,400	4.02	37	1	1	1	3	4	9	9	106
E	E	105	37	5,500	13,400	4.02	76	18	7	7	22	8	23	15	131
UE	W	55	22	3,636	8,536	2.70	10	10	4	2	1	9	11	11	52
C	E	74	159	5,500	13,400	4.02	31	8	12	14	17	13	11	14	6
C	W	74	11	5,500	13,400	4.02	31	8	12	14	17	13	11	14	6

TRAIN TYPE: BULK
BASIN: BAY AREA

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
UA	E	55	6	2,458	8,667	2.74	35	15	5	5	17	4	13	5	23
UF	W	55	96	6,757	5,950	1.88	41	1	2	1	2	5	6	0	45
UE	W	55	8	1,879	6,125	1.94	10	10	4	2	1	9	11	11	52

TRAIN TYPE: INTERMODAL
BASIN: BAY AREA

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
UA	E	55	80	4,942	10,833	3.43	35	15	5	5	17	4	13	5	23
B	E	44	925	4,100	12,400	3.72	37	1	1	1	3	4	9	9	106
B	W	44	881	4,100	12,400	3.72	11	0	14	5	25	22	15	5	0
UD	W	55	190	4,220	10,244	3.24	25	1	1	2	4	6	11	6	57
A	W	61	642	4,100	12,400	3.72	16	6	6	11	14	9	9	9	0
UF	W	55	687	2,591	9,731	3.08	41	1	2	1	2	5	6	0	45
E	E	105	26	4,100	12,400	3.72	76	18	7	7	22	8	23	15	131
SFE	E	54	1,349	2,278	11,861	3.66	5	2	5	7	11	10	7	7	17
SFE	W	54	488	3,060	10,417	3.21	11	5	5	5	8	6	4	4	17
E	W	105	254	4,100	12,400	3.72	27	6	20	16	39	31	24	14	0
A	E	61	390	4,100	12,400	3.72	39	17	6	6	19	4	14	6	25
UB	E	55	515	1,504	10,227	3.24	7	6	4	20	8	12	17	14	23

SEGMENT DEFINITIONS
SACRAMENTO VALLEY BASIN

Segment	From	To
A	Roseville	Fairfield
B	Roseville	Galt
C	Roseville	Auburn
D	Roseville	Dunsmuir
E	Dunsmuir	Galt
F	Fairfield	Auburn
G	Galt	Auburn
H	Fairfield	Dunsmuir
AF	Auburn	Fairfield
AH	Fairfield	Auburn
AL	Roseville	Dunsmuir
AM	Dunsmuir	Fairfield
UP	Tracy	Storrie
UQ	Tracy	Storrie
UR	Storrie	Tracy
US	Tracy	Storrie
UT	Storrie	Tracy
UU	Tracy	Storrie
UV	Tracy	Storrie

TRAIN TYPE: PASSENGER
BASIN: SACREMENTO VALLEY

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
AF	W	71	520	800	6,000	2.00	10	2	2	4	17	7	20	15	0
AL	E	212	208	800	6,000	2.00	32	6	15	41	72	33	28	20	0
AM	W	212	208	800	6,000	2.00	62	8	22	27	33	52	5	5	2
AH	E	72	520	800	6,000	2.00	10	16	5	10	19	13	11	10	0

TRAIN TYPE: YARD
BASIN: SACREMENTO VALLEY

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
			5456		1,425	0.85	47	1	15	15	42	42	57	57	0.01
			341		1,500	0.87	28	14	14	14	41	41	55	69	0.01

TRAIN TYPE: LOCAL
BASIN: SACREMENTO VALLEY

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
		75	771	1653	3347	1.16	39	28	11	18	47	53	53	47	4
		75	2507	4,726	11,815	3.94	40	18	20	26	42	48	50	54	21

TRAIN TYPE: MIXED
BASIN: SACREMENTO VALLEY

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
D	W	213	1,000	5,200	13,400	4.02	86	27	27	32	32	23	41	41	32
F	E	80	78	5,200	13,400	4.02	53	17	17	20	20	14	25	25	20
C	W	22	21	5,200	13,400	4.02	11	4	4	5	5	4	6	5	5
G	W	65	178	5,200	13,400	4.02	51	16	16	19	19	13	24	24	19
C	E	22	641	5,200	13,400	4.02	11	4	4	5	5	4	6	5	5
G	E	65	151	5,200	13,400	4.02	51	16	16	19	19	13	24	24	19
A	E	58	622	5,200	13,400	4.02	18	10	5	5	4	8	2	10	31
H	W	271	113	5,200	13,400	4.02	200	22	23	22	27	49	31	30	55
D	E	213	1,069	5,200	13,400	4.02	86	27	27	32	32	23	41	41	32
UQ	E	130	341	2,041	10,680	3.38	14	21	34	44	6	14	20	6	12
E	E	256	769	5,200	13,400	4.02	56	15	65	57	33	27	35	30	6
US	W	130	22	3,636	8,536	2.70	20	22	14	4	4	17	16	4	71
B	E	43	619	5,200	13,400	4.02	7	5	18	12	5	4	3	3	0
UV	E	130	536	3,575	11,491	3.64	40	38	7	10	39	61	18	4	11
A	W	58	355	5,200	13,400	4.02	18	10	5	5	4	8	2	10	31
UT	W	130	359	6,959	10,666	3.38	16	1	2	7	45	28	19	2	79
F	W	80	305	5,200	13,400	4.02	38	8	9	14	19	20	14	14	30
E	W	256	1,290	5,200	13,400	4.02	101	47	42	46	31	29	40	35	14
B	W	43	382	5,200	13,400	4.02	7	5	18	12	5	4	3	3	0
UT	W	130	499	5,219	8,920	2.82	16	1	2	7	45	28	19	2	79

TRAIN TYPE: BULK
BASIN: SACREMENTO VALLEY

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
US	W	130	8	1,879	6,125	1.94	20	22	14	4	4	17	16	4	71
UU	E	130	181	2,851	7,847	2.48	51	30	61	19	8	16	6	3	6
UT	W	130	196	10,379	12,021	3.81	16	1	2	7	45	28	19	2	79
UP	E	130	6	2,458	8,667	2.74	116	16	6	6	9	13	9	4	11

TRAIN TYPE: INTERMODAL
BASIN: SACREMENTO VALLEY

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
A	W	58	3	4,200	12,300	3.69	18	10	5	5	4	8	2	10	31
E	E	256	560	4,200	12,300	3.69	56	15	65	57	33	27	35	30	6
F	W	80	983	4,200	12,300	3.69	38	8	9	14	19	20	14	14	30
D	E	213	39	4,200	12,300	3.69	86	27	27	32	32	23	41	41	32
F	E	80	729	4,200	12,300	3.69	53	17	17	20	20	14	25	25	20
UR	W	130	190	4,220	10,244	3.24	42	10	10	3	5	16	13	2	76
G	E	65	18	4,200	12,300	3.69	51	16	16	19	19	13	24	24	19
E	W	256	1,109	4,200	12,300	3.69	101	47	42	46	31	29	40	35	14
H	W	271	59	4,200	12,300	3.69	200	22	23	22	27	49	31	30	55
UP	E	130	80	4,942	10,833	3.43	116	16	6	6	9	13	9	4	11
H	E	271	299	4,200	12,300	3.69	200	22	23	22	27	49	31	30	55
C	E	22	250	4,200	12,300	3.69	11	4	4	5	5	4	6	5	5
D	W	213	45	4,200	12,300	3.69	86	27	27	32	32	23	41	41	32
US	W	130	687	2,591	9,731	3.08	20	22	14	4	4	17	16	4	71
A	E	58	5	4,200	12,300	3.69	18	10	5	5	4	8	2	10	31
UQ	E	130	515	1,504	10,227	3.24	14	21	34	44	6	14	20	6	12
B	E	43	14	4,200	12,300	3.69	7	5	18	12	5	4	3	3	0
C	W	22	12	4,200	12,300	3.69	11	4	4	5	5	4	6	5	5
B	W	43	150	4,200	12,300	3.69	7	5	18	12	5	4	3	3	0

SEGMENT DEFINITIONS
SAN JOAQUIN BASIN

Segment	From	To
A	Tehachapi	Tracy
B	Tehachapi	Lodi
C	Fresno	Lodi
D	Bakersfield	Tehachapi
E	Fresno	Tehachapi
F	Bakersfield	Lodi
SFA	Mojave	Bakersfield
SFB	Bakersfield	Fresno
SFC	Fresno	Stockton
SFD	Stockton	Orwood
AAB	Orwood	Bakersfield
AAC	Bakersfield	Orwood
UG	Midway	Tracy
UH	Tracy	Stockton
UI	Tracy	Midway
UJ	Stockton	Midway
UK	Midway	Tracy
UL	Midway	Tracy
UM	Stockton	Tracy
UN	Stockton	Tracy

SOX

TRAIN	R.A.		S.C.		S.J.	S.V.	ALL
SFI			28.140				28.140
SFJ			1.962				1.962
SFK			8.907				8.907
SFL			5.180				5.180
SFM			0.049				0.049
SFN			27.613				27.613
SFO			46.614				46.614
SFP			0.026				0.026
SFQ			2.568				2.568
SFR			0.032				0.032
SFS			2.107				2.107
SFT			0.929				0.929
SFU			1.988				1.988
SJSF	22.971						22.971
UA	0.922						0.922
UAA			36.168				36.168
UB	4.935						4.935
UBB			1.836				1.836
UCC			13.738				13.738
UD	1.163						1.163
UDD			1.466				1.466
UE	0.121						0.121
UF	8.624						8.624
UG					4.993		4.993
UH					2.363		2.363
UI					1.556		1.556
UJ					3.457		3.457
UK					3.540		3.540
UL					0.562		0.562
UM					1.187		1.187
UN					0.430		0.430
UP						2.070	2.070
UQ						11.679	11.679
UR						2.242	2.242
US						6.975	6.975
UT						10.355	10.355
UU						2.942	2.942
UV						11.505	11.505
ALL	323.994	241.544	812.651	20.357	661.885	569.458	2629.889

SOX EMISSIONS PER TRAIN BY BASIN
(TONS PER YEAR)

TRAIN	BASIN						
	B.A.	C.C.	S.C.	S.D.	S.J.	S.V.	ALL
A	23.722	3.747	10.191		64.460	11.834	113.954
AA			0.736				0.736
AAA	1.198						1.198
AAB					6.321		6.321
AAC					6.464		6.464
AAD	1.398						1.398
AB			1.353				1.353
AC			1.074				1.074
AD			3.267				3.267
AE	1.725						1.725
AF						2.025	2.025
AG	2.147						2.147
AH						3.061	3.061
AI			0.755				0.755
AJ		4.844					4.844
AK	2.064						2.064
AL						2.750	2.750
AM						3.116	3.116
AN	2.075						2.075
AO		5.221					5.221
AP			0.703				0.703
AQ			0.671				0.671
AR			1.342				1.342
AS			6.965				6.965
AT			6.946				6.946
AU				6.899			6.899
AV				8.438			8.438
AW		0.888					0.888
AX			0.615				0.615
AY			0.660				0.660
AZ		1.075					1.075
B	31.124	45.187	5.575		180.275	11.368	273.528
C	3.144	79.580	38.311		6.896	7.034	134.965
D	8.271	17.810	48.824		20.045	99.617	194.567
E	10.532		37.569		11.396	190.542	250.039
F	23.814				14.308	47.668	85.789
G			2.905			9.707	12.612
H			76.248			32.154	108.401
I			21.341				21.341
J			58.408				58.408
L	114.802	83.192	149.671		149.229	83.421	580.314
LL			1.891				1.891
SFA			11.637		67.466		79.104
SFB			5.238		44.827		50.066
SFC			0.176		38.414		38.590
SFD			0.215		7.562		7.777
SFE	17.384		10.858				28.242
SFF			10.143	5.020			15.164
SFG			0.544				0.544
SFH			17.256				17.256

TRAIN			S.C.				ALL
SFI			8.598				8.598
SFJ			0.617				0.617
SFK			4.619				4.619
SFL			2.671				2.671
SFM			0.025				0.025
SFN			8.256				8.256
SFO			14.067				14.067
SFP			0.008				0.008
SFQ			0.949				0.949
SFR			0.011				0.011
SFS			0.800				0.800
SFT			0.320				0.320
SFU	B.A.		0.685				0.685
SJSF	5.369						5.369
UA	0.270						0.270
UAA			10.892				10.892
UB	1.492						1.492
UBB			0.585				0.585
UCC			5.229				5.229
UD	0.391						0.391
UDD			0.491				0.491
UE	0.042						0.042
UF	2.737				S.J.		2.737
UG					1.530		1.530
UH					0.682		0.682
UI					0.465		0.465
UJ					1.006		1.006
UK					1.101		1.101
UL					0.175		0.175
UM					0.374	S.V.	0.374
UN					0.129		0.129
UP						0.589	0.589
UQ						3.350	3.350
UR						0.720	0.720
US						2.252	2.252
UT						3.655	3.655
UU						0.852	0.852
UV						3.442	3.442
ALL	99.022	66.677	259.333	5.359	196.031	162.620	789.042

PARTICULATE

PARTICULATE EMISSIONS PER TRAIN BY BASIN
(TONS PER YEAR)

TRAIN	BASIN B.A.	C.C.	S.C.	S.D.	S.J.	S.V.	ALL
A	6.811	1.162	3.168		17.766	3.548	32.455
AA			0.179				0.179
AAA	0.291						0.291
AAB					1.476		1.476
AAC					1.502		1.502
AAD	0.338						0.338
AB			0.322				0.322
AC			0.261				0.261
AD			0.771				0.771
AE	0.424						0.424
AF						0.488	0.488
AG	0.522						0.522
AH						0.717	0.717
AI			0.181				0.181
AJ		1.142					1.142
AK	0.490						0.490
AL						0.635	0.635
AM						0.741	0.741
AN	0.496						0.496
AO		1.210					1.210
AP			0.170				0.170
AQ			0.164				0.164
AR			0.317				0.317
AS			1.699				1.699
AT			1.698				1.698
AU				1.684			1.684
AV				2.035			2.035
AW		0.216					0.216
AX			0.149				0.149
AY			0.158				0.158
AZ		0.259					0.259
B	9.511	12.387	1.612		50.691	3.388	77.589
C	0.895	21.792	11.925		1.942	2.166	38.719
D	2.406	4.925	14.537		5.988	27.473	55.329
E	2.989		11.213		3.140	52.042	69.384
F	6.770				3.957	13.503	24.231
G			0.943			2.717	3.660
H			22.506			8.902	31.408
I			6.227				6.227
J			16.831				16.831
L	32.862	23.583	43.800		42.600	23.819	166.664
LL			0.544				0.544
SFA			4.020		23.064		27.084
SFB			1.847		13.596		15.443
SFC			0.060		11.717		11.776
SFD			0.077		2.978		3.055
SFE	5.904		3.791				9.695
SFF			3.563	1.639			5.202
SFG			0.194				0.194
SFH			5.236				5.236

NOX

TRAIN			S.C.				ALL
SFI			403.378				403.378
SFJ			28.147				28.147
SFK			115.959				115.959
SFL			67.899				67.899
SFM			0.652				0.652
SFN			392.440				392.440
SFO			663.923				663.923
SFP			0.363				0.363
SFQ			35.867				35.867
SFR			0.452				0.452
SFS			29.407				29.407
SFT			13.359				13.359
SFU	B.A.		28.591				28.591
SJSF	245.803						245.803
UA	13.318						13.318
UAA			520.783				520.783
UB	72.548						72.548
UBB			26.184				26.184
UCC			191.556				191.556
UD	16.214						16.214
UDD			20.706				20.706
UE	1.698						1.698
UF	121.578				S.J.		121.578
UG					73.070		73.070
UH					35.018		35.018
UI					22.613		22.613
UJ					49.587		49.587
UK					52.742		52.742
UL					8.064		8.064
UM					16.943		16.943
UN					6.485	S.V.	6.485
UP						29.735	29.735
UQ						174.973	174.973
UR						31.713	31.713
US						99.211	99.211
UT						149.354	149.354
UU						43.507	43.507
UV						167.951	167.951
ALL	4499.672	3182.828	********	236.499	9044.630	7732.888	********

NOX EMISSIONS PER TRAIN BY BASIN
(TONS PER YEAR)

TRAIN	BASIN						
	B.A.	C.C.	S.C.	S.D.	S.J.	S.V.	ALL
A	318.737	50.661	136.449		859.652	158.141	1523.641
AA			7.889				7.889
AAA	12.982						12.982
AAB					68.243		68.243
AAC					69.767		69.767
AAD	15.013						15.013
AB			14.526				14.526
AC			11.372				11.372
AD			35.156				35.156
AE	18.943						18.943
AF						22.090	22.090
AG	23.474						23.474
AH						33.167	33.167
AI			8.182				8.182
AJ		52.464					52.464
AK	22.616						22.616
AL						30.065	30.065
AM						33.910	33.910
AN	22.707						22.707
AO		56.539					56.539
AP			7.570				7.570
AQ			7.188				7.188
AR			14.506				14.506
AS			74.891				74.891
AT			74.449				74.449
AU				74.134			74.134
AV				90.736			90.736
AW		9.545					9.545
AX			6.624				6.624
AY			7.159				7.159
AZ		11.564					11.564
B	409.531	602.162	73.916		2391.695	153.442	3630.745
C	42.171	1060.470	506.043		92.165	95.064	1795.912
D	111.270	237.643	647.264		264.962	1328.051	2589.190
E	141.107		497.099		152.276	2545.544	3336.027
F	316.241				192.336	635.956	1144.533
G			39.158			129.622	168.780
H			1007.814			424.668	1432.481
I			281.639				281.639
J			773.491				773.491
L	1533.793	1101.779	2037.463		1988.866	1112.005	7773.906
LL			25.266				25.266
SFA			164.041		944.842		1108.884
SFB			73.689		646.644		720.333
SFC			2.481		551.802		554.283
SFD			3.033		108.275		111.308
SFE	247.969		151.534				399.503
SFF			141.618	71.629			213.248
SFG			7.597				7.597
SFH			247.592				247.592

TRAIN			S.C.				ALL
SFI			56.964				56.964
SFJ			4.186				4.186
SFK			44.305				44.305
SFL			25.969				25.969
SFM			0.248				0.248
SFN			54.576				54.576
SFO			95.726				95.726
SFP			0.048				0.048
SFQ			6.695				6.695
SFR			0.079				0.079
SFS			5.763				5.763
SFT			2.577				2.577
SFU	B.A.		5.515				5.515
SJSF	13.447						13.447
UA	1.775						1.775
UAA			78.379				78.379
UB	8.621						8.621
UBB			4.221				4.221
UCC			39.378				39.378
UD	2.521						2.521
UDD			3.554				3.554
UE	0.278						0.278
UF	18.550				S.J.		18.550
UG					10.960		10.960
UH					3.976		3.976
UI					3.259		3.259
UJ					7.108		7.108
UK					6.850		6.850
UL					1.262		1.262
UM					1.712	S.V.	1.712
UN					0.774		0.774
UP						3.963	3.963
UQ						20.915	20.915
UR						4.709	4.709
US						14.779	14.779
UT						24.002	24.002
UU						5.728	5.728
UV						22.864	22.864
ALL	612.126	368.846	1718.392	24.736	1178.522	913.422	4816.044

CO

CO EMISSIONS PER TRAIN BY BASIN
(TONS PER YEAR)

TRAIN	BASIN						
	B.A.	C.C.	S.C.	S.D.	S.J.	S.V.	ALL
A	41.502	8.858	23.770		88.422	23.967	186.519
AA			0.810				0.810
AAA	1.526						1.526
AAB					3.673		3.673
AAC					3.553		3.553
AAD	1.583						1.583
AB			0.920				0.920
AC			1.418				1.418
AD			1.936				1.936
AE	2.109						2.109
AF						2.212	2.212
AG	2.247						2.247
AH						2.579	2.579
AI			0.829				0.829
AJ		2.622					2.622
AK	1.430						1.430
AL						1.609	1.609
AM						1.720	1.720
AN	1.449						1.449
AO		2.596					2.596
AP			0.828				0.828
AQ			0.852				0.852
AR			0.949				0.949
AS			6.188				6.188
AT			6.224				6.224
AU				6.148			6.148
AV				6.697			6.697
AW		0.789					0.789
AX			0.724				0.724
AY			0.725				0.725
AZ		0.853					0.853
B	60.692	61.883	9.836		256.462	23.182	412.055
C	5.172	108.249	87.434		10.432	16.118	227.405
D	15.140	25.648	91.400		38.759	140.779	311.725
E	15.877		72.165		16.226	260.264	364.532
F	36.107				20.002	74.996	131.105
G			7.833			14.861	22.695
H			135.170			44.637	179.807
I			38.050				38.050
J			98.645				98.645
L	219.636	157.349	296.150		284.588	159.126	1116.848
LL			3.081				3.081
SFA			28.595		161.619		190.214
SFB			13.566		89.714		103.281
SFC			0.415		76.374		76.790
SFD			0.597		29.082		29.679
SFE	44.470		27.176				71.647
SFF			26.055	11.891			37.946
SFG			1.430				1.430
SFH			34.276				34.276

TRAIN			S.C.				ALL
SFI			16.790				16.790
SFJ			1.309				1.309
SFK			17.490				17.490
SFL			10.198				10.198
SFM			0.097				0.097
SFN			15.420				15.420
SFO			27.343				27.343
SFP			0.013				0.013
SFQ			2.536				2.536
SFR			0.027				0.027
SFS			2.271				2.271
SFT			0.868				0.868
SFU	B.A.		1.859				1.859
SJSF	6.532						6.532
UA	0.408						0.408
UAA			19.129				19.129
UB	2.404						2.404
UBB			1.131				1.131
UCC			13.531				13.531
UD	0.748						0.748
UDD			1.034				1.034
UE	0.085						0.085
UF	4.877				S.J.		4.877
UG					2.605		2.605
UH					1.100		1.100
UI					0.743		0.743
UJ					1.580		1.580
UK					2.112		2.112
UL					0.325		0.325
UM					0.578		0.578
UN					0.155	S.V.	0.155
UP						0.827	0.827
UQ						4.449	4.449
UR						1.251	1.251
US						3.914	3.914
UT						8.559	8.559
UU						1.144	1.144
UV						5.939	5.939
ALL	204.054	115.735	562.714	9.002	378.388	280.547	1550.440

HC

HC EMISSIONS PER TRAIN BY BASIN
(TONS PER YEAR)

TRAIN	BASIN						
	B.A.	C.C.	S.C.	S.D.	S.J.	S.V.	ALL
A	12.717	2.684	7.212		27.603	7.464	57.680
AA			0.321				0.321
AAA	0.584						0.584
AAB					1.810		1.810
AAC					1.760		1.760
AAD	0.611						0.611
AB			0.401				0.401
AC			0.553				0.553
AD			0.913				0.913
AE	0.798						0.798
AF						0.859	0.859
AG	0.887						0.887
AH						1.067	1.067
AI			0.318				0.318
AJ		1.322					1.322
AK	0.664						0.664
AL						0.817	0.817
AM						0.867	0.867
AN	0.663						0.663
AO		1.366					1.366
AP			0.310				0.310
AQ			0.333				0.333
AR			0.414				0.414
AS			2.484				2.484
AT			2.481				2.481
AU				2.468			2.468
AV				2.805			2.805
AW		0.317					0.317
AX			0.271				0.271
AY			0.279				0.279
AZ		0.358					0.358
B	19.893	19.009	2.937		82.773	6.769	131.382
C	1.580	33.270	27.081		3.194	4.904	70.029
D	4.607	7.897	29.290		12.364	43.210	97.367
E	5.051		22.679		4.863	77.824	110.417
F	11.503				6.244	23.352	41.098
G			2.384			4.547	6.931
H			44.260			13.481	57.741
I			11.595				11.595
J			30.204				30.204
L	69.131	49.514	93.111		89.569	50.082	351.407
LL			0.986				0.986
SFA			9.740		52.619		62.359
SFB			4.671		25.533		30.204
SFC			0.138		22.474		22.612
SFD			0.209		10.093		10.302
SFE	14.594		9.193				23.787
SFF			8.831	3.730			12.560
SFG			0.495				0.495
SFH			10.016				10.016

APPENDIX B

TOTAL EMISSIONS BY TRAIN AND BY BASIN
–TONS PER YEAR–

TRAIN TYPE: MIXED
BASIN: SAN DIEGO

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
SFF	E	62	198	1,900	13,481	4.16	13	6	6	6	9	7	5	5	17
SFF	W	62	429	2,829	13,200	4.07	13	6	6	6	9	7	5	5	17

TRAIN TYPE: PASSENGER
BASIN: SAN DIEGO

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
AU	E	62	2,856	400	3,000	1.00	31	1	1	3	1	5	0	0	0
AV	W	63	2,856	400	3,000	1.00	36	0	5	0	15	0	0	0	0

SEGMENT DEFINITIONS
SAN DIEGO BASIN

Segment	From	To
SFF	San Clemente	San Diego
AU	San Clemente	San Diego
AV	San Diego	San Clemente

TRAIN TYPE: BULK
BASIN: SAN JOAQUIN

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
UH	W	18	196	10,379	12,021	3.81	6	0	0	3	14	1	6	3	3
UN	E	18	181	2,851	7,847	2.48	4	0	17	4	0	9	3	1	1
UJ	W	30	96	6,757	5,950	1.88	52	0	2	1	0	1	1	0	3
UL	E	53	6	2,458	8,667	2.74	17	15	3	1	1	7	9	2	18
UG	W	53	8	1,879	6,125	1.94	23	7	18	1	1	1	10	6	9
SFA	W	52	5	6,628	18,220	5.62	1	0	0	1	1	1	3	4	129

TRAIN TYPE: INTERMODAL
BASIN: SAN JOAQUIN

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
SFC	E	124	1,349	2,278	11,861	3.66	22	13	13	15	17	9	14.	19	23
B	W	308	538	4,100	12,400	3.72	80	25	39	51	44	73	49	42	80
UL	E	53	80	4,942	10,833	3.43	17	15	3	1	1	7	9	2	18
A	W	289	439	4,100	12,400	3.72	76	25	39	51	42	49	40	40	78
SFD	W	17	488	3,060	10,417	3.21	4	1	1	1	3	3	4	5	3
SFA	E	52	1,825	3,520	14,124	4.35	31	10	20	28	11	7	5	4	4
SFD	E	17	1,349	2,278	11,861	3.66	1	0	2	3	2	2	4	5	8
SFC	W	124	488	3,060	10,417	3.21	20	13	13	17	19	9	11	12	8
E	E	159	214	4,100	12,400	3.72	52	15	38	45	27	20	13	11	10
SFA	W	52	1,452	3,018	12,474	3.85	1	0	0	1	1	1	3	4	129
SFB	E	108	1,877	3,843	10,689	3.30	21	5	18	17	16	13	8	7	6
SFB	W	108	1,200	2,678	9,813	3.02	14	14	16	16	16	9	6	7	5
UG	W	53	687	2,591	9,731	3.08	23	7	18	1	1	1	10	6	9
UI	W	53	190	4,220	10,244	3.24	35	3	14	1	1	2	8	3	6
A	E	289	392	4,100	12,400	3.72	73	28	51	60	44	29	28	30	23
UK	E	53	515	1,504	10,227	3.24	6	0	1	24	3	4	13	2	16
B	E	308	630	4,100	12,400	3.72	70	9	19	26	26	32	23	23	92

TRAIN TYPE: LOCAL
BASIN: SAN JOAQUIN

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
		75	4495	4,726	11,815	3.94	40	18	20	26	42	48	50	54	21
		75	792	2298	5662	1.96	39	28	11	18	47	53	53	47	4

TRAIN TYPE: MIXED
BASIN: SAN JOAQUIN

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
SFB	W	108	1,278	4,138	7,384	2.28	14	14	16	16	16	9	6	7	5
D	W	48	601	5,500	13,400	4.02	1	0	0	1	1	1	3	4	129
D	E	48	793	5,500	13,400	4.02	31	10	20	28	11	7	5	4	4
SFA	E	52	1,128	3,978	15,201	4.69	31	10	20	28	11	7	5	4	4
E	E	159	130	5,500	13,400	4.02	52	15	38	45	27	20	13	11	10
UH	W	18	499	5,219	8,920	2.82	6	0	0	3	14	1	6	3	3
SFB	E	108	620	5,327	9,347	2.88	21	5	18	17	16	13	8	7	6
SFA	W	52	1,555	3,917	14,211	4.38	1	0	0	1	1	1	3	4	129
UH	W	18	359	6,959	10,666	3.38	6	0	0	3	14	1	6	3	3
UK	E	53	341	2,041	10,680	3.38	6	0	1	24	3	4	13	2	16
A	W	289	291	5,500	13,400	4.02	76	25	39	51	42	49	40	40	78
UJ	W	30	494	4,608	6,882	2.18	52	0	2	1	0	1	1	0	3
B	W	308	1,469	5,500	13,400	4.02	80	25	39	51	44	73	49	42	80
SFC	E	124	851	2,010	8,149	2.51	22	13	13	15	17	9	14.	19	23
C	W	149	131	5,500	13,400	4.02	24	13	13	17	21	33	20	14	10
C	E	149	137	5,500	13,400	4.02	67	8	21	20	14	22	20	20	0
SFD	E	17	851	2,010	8,149	2.51	1	0	2	3	2	2	4	5	8
SFD	W	17	1,134	3,711	7,389	2.28	4	1	1	1	3	3	4	5	3
SFC	W	124	1,134	3,711	7,389	2.28	20	13	13	17	19	9	11	12	8
UM	E	18	536	3,575	11,491	3.64	4	0	0	0	2	24	9	2	2
B	E	308	1,446	5,500	13,400	4.02	70	9	19	26	26	32	23	23	92
A	E	289	211	5,500	13,400	4.02	73	28	51	60	44	29	28	30	23
UG	W	53	22	3,636	8,536	2.70	23	7	18	1	1	1	10	6	9
F	W	260	416	5,500	13,400	4.02	38	27	29	33	37	42	26	21	15

TRAIN TYPE: PASSENGER
BASIN: SAN JOAQUIN

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
AAB	E	251	714	400	3,000	1.00	64	18	33	35	35	24	26	31	37
AAC	W	251	714	400	3,000	1.00	64	28	30	34	38	21	21	24	16

TRAIN TYPE: YARD
BASIN: SAN JOAQUIN

							TIME IN NOTCH PER TRAIN (MINUTES)								
SEGMENT	DIR	AVERAGE MILES	NO. OF TRAINS	AVERAGE TONS	AVERAGE HP	AVG # OF LOCO'S	8	7	6	5	4	3	2	1	BRAKE
			700		1450	0.85	28	14	14	14	41	41	55	69	0.01
			2728		1,425	0.85	47	1	15	15	42	42	57	57	0.01
			4092		1,500	0.87	28	14	14	14	41	41	55	69	0.01

COUNTY	1987 BASE YEAR EMISSIONS (TONS PER DAY)					YR 2000 PREDICTED EMISSIONS (TONS PER DAY)					YR 2010 PREDICTED EMISSIONS (TONS PER DAY)				
	HC	CO	NOx	PM	SOx	HC	CO	NOx	PM	SOx	HC	CO	NOx	PM	SOx
SOLANO(P)	0.031	0.095	0.680	0.015	0.054	0.028	0.086	0.617	0.014	0.049	0.026	0.081	0.602	0.013	0.047
SONOMA(P)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SAN MATEO	0.111	0.287	2.203	0.049	0.140	0.100	0.260	1.998	0.044	0.128	0.094	0.246	1.949	0.042	0.122
ALAMEDA	0.106	0.363	2.659	0.058	0.201	0.095	0.329	2.412	0.052	0.184	0.090	0.312	2.353	0.049	0.175
CONTRA COSTA	0.200	0.640	4.509	0.099	0.344	0.180	0.581	4.090	0.090	0.315	0.169	0.549	3.991	0.085	0.299
MARIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SAN FRANCISCO	0.023	0.060	0.459	0.010	0.029	0.021	0.054	0.416	0.009	0.027	0.020	0.051	0.406	0.009	0.025
NAPA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SANTA CLARA	0.089	0.233	1.818	0.040	0.119	0.080	0.212	1.649	0.036	0.109	0.075	0.200	1.609	0.035	0.103
TOTAL BAY AREA	0.559	1.677	12.328	0.271	0.888	0.503	1.522	11.183	0.246	0.812	0.473	1.440	10.910	0.233	0.771
PLACER(P)	0.123	0.403	3.371	0.071	0.253	0.111	0.366	3.057	0.064	0.231	0.104	0.346	2.983	0.061	0.220
SHASTA	0.131	0.428	3.980	0.082	0.299	0.118	0.388	3.611	0.075	0.274	0.111	0.367	3.523	0.071	0.260
TEHAMA	0.076	0.250	2.340	0.048	0.177	0.069	0.227	2.123	0.044	0.162	0.065	0.215	2.071	0.042	0.154
GLENN	0.007	0.023	0.211	0.004	0.016	0.006	0.021	0.191	0.004	0.015	0.006	0.020	0.186	0.004	0.014
BUTTE	0.119	0.404	3.402	0.071	0.249	0.107	0.367	3.086	0.064	0.227	0.101	0.347	3.011	0.061	0.216
COLUSA	0.006	0.019	0.170	0.004	0.013	0.005	0.017	0.155	0.003	0.012	0.005	0.016	0.151	0.003	0.011
YOLO	0.005	0.017	0.160	0.003	0.012	0.005	0.016	0.146	0.003	0.011	0.004	0.015	0.142	0.003	0.011
SUTTER	0.017	0.056	0.527	0.011	0.040	0.015	0.051	0.478	0.010	0.036	0.015	0.048	0.467	0.009	0.035
YUBA	0.073	0.243	1.955	0.041	0.143	0.066	0.220	1.774	0.038	0.131	0.062	0.208	1.730	0.036	0.124
SOLANO(P)	0.041	0.130	1.047	0.022	0.080	0.037	0.118	0.949	0.020	0.073	0.035	0.111	0.926	0.019	0.069
SACRAMENTO	0.170	0.531	4.022	0.087	0.279	0.153	0.482	3.648	0.079	0.255	0.144	0.456	3.559	0.074	0.242
TOTAL SACRAMENTO	0.769	2.503	21.186	0.446	1.560	0.692	2.272	19.218	0.404	1.427	0.651	2.149	18.750	0.383	1.356
SAN JOAQUIN	0.178	0.558	4.052	0.088	0.291	0.160	0.506	3.675	0.080	0.266	0.151	0.479	3.586	0.075	0.253
STANISLAUS	0.060	0.181	1.536	0.033	0.113	0.054	0.165	1.393	0.029	0.103	0.051	0.156	1.360	0.028	0.098
MERCED	0.084	0.270	2.339	0.049	0.175	0.076	0.245	2.122	0.045	0.160	0.071	0.232	2.070	0.042	0.152
MADERA	0.062	0.200	1.728	0.036	0.129	0.056	0.182	1.568	0.033	0.118	0.053	0.172	1.530	0.031	0.113
FRESNO	0.099	0.296	2.429	0.052	0.175	0.089	0.268	2.204	0.047	0.160	0.084	0.254	2.150	0.044	0.152
KINGS	0.009	0.029	0.272	0.006	0.021	0.008	0.026	0.246	0.005	0.019	0.008	0.025	0.240	0.005	0.018
TULARE	0.123	0.403	3.379	0.071	0.251	0.111	0.366	3.065	0.064	0.229	0.104	0.346	2.991	0.061	0.218
KERN(P)	0.421	1.292	9.044	0.203	0.659	0.379	1.172	8.204	0.184	0.603	0.357	1.109	8.004	0.174	0.573
TOTAL SAN JOAQUIN	1.037	3.229	24.780	0.537	1.813	0.933	2.931	22.478	0.487	1.659	0.877	2.773	21.930	0.461	1.576
LOS ANGELES(P)	0.792	2.350	16.020	0.360	1.117	0.713	2.133	14.531	0.327	1.021	0.670	2.018	14.177	0.309	0.971
ORANGE	0.108	0.336	2.354	0.052	0.178	0.097	0.305	2.135	0.048	0.162	0.091	0.288	2.083	0.045	0.154
RIVERSIDE(P)	0.174	0.541	3.558	0.080	0.246	0.157	0.491	3.227	0.073	0.225	0.147	0.465	3.149	0.069	0.214
SAN BERNARDINO(P)	0.475	1.449	9.173	0.213	0.650	0.428	1.315	8.321	0.193	0.595	0.402	1.244	8.119	0.183	0.565
TOTAL SOUTH COAST	1.549	4.676	31.104	0.706	2.191	1.394	4.244	28.215	0.640	2.004	1.311	4.015	27.527	0.606	1.904
IMPERIAL	0.288	0.899	6.101	0.159	0.482	0.259	0.816	5.535	0.144	0.441	0.244	0.772	5.400	0.136	0.419
RIVERSIDE(P)	0.263	0.847	5.564	0.134	0.460	0.237	0.768	5.047	0.122	0.421	0.223	0.727	4.924	0.115	0.400
SAN BERNADINO(P)	1.644	5.205	29.937	0.704	2.121	1.480	4.725	27.156	0.638	1.940	1.392	4.470	26.494	0.605	1.843
LOS ANGELES(P)	0.110	0.375	2.225	0.052	0.159	0.099	0.341	2.018	0.047	0.145	0.093	0.322	1.969	0.045	0.138
KERN(P)	0.151	0.493	3.014	0.071	0.216	0.136	0.448	2.734	0.065	0.198	0.128	0.423	2.667	0.061	0.188
TOTAL SOUTHEAST DESERT	2.455	7.819	46.841	1.121	3.438	2.210	7.097	42.490	1.016	3.145	2.078	6.714	41.454	0.962	2.989

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

1987 LOCOMOTIVE EMISSIONS INVENTORY
NORTH COAST AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
DEL NORTE	0	0	0	0	0
HUMBOLDT	6	19	140	10	3
TRINITY	0	0	0	0	0
MENDOCINO	9	27	205	15	5
SONOMA(P)	4	12	88	6	2
BASIN TOTAL	19	58	433	31	10

*NO YARD EMISSIONS ATTRIBUTED TO THE NORTH COAST AIR BASIN

1987 LOCOMOTIVE EMISSIONS INVENTORY
LAKE COUNTY AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
LAKE	0	0	0	0	0

1987 LOCOMOTIVE EMISSIONS INVENTORY
CENTRAL COAST AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
SANTA BARBARA	28.08	89.3	791.51	16.52	60.13
SAN LUIS OBISPO	26.33	84.19	731.49	15.28	55.33
VENTURA	16.05	50.33	451.52	9.48	34.74
MONTEREY	37.08	118.65	1014.83	21.25	76.74
SAN BENITO	5.10	16.41	117.3	2.54	8.87
SANTA CRUZ	3.09	9.97	76.16	1.62	5.74
BASIN TOTAL	115.73	368.85	3182.81	66.69	241.55

*NO YARD EMISSIONS ATTRIBUTED TO THE CENTRAL COAST BASIN

1987 LOCOMOTIVE EMISSIONS INVENTORY
SAN DIEGO AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
SAN DIEGO	9	25	236	5	20

*NO YARD EMISSIONS ATTRIBUTED TO THE SAN DIEGO AIR BASIN

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

1987 LOCOMOTIVE EMISSIONS INVENTORY
GREAT BASIN VALLEYS AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
INYO	0	0	0	0	0
MONO	0	0	0	0	0
ALPINE	0	0	0	0	0
BASIN TOTAL	0	0	0	0	0

1987 LOCOMOTIVE EMISSIONS INVENTORY
LAKE TAHOE AIR BASIN MODELING REGION
(TONS PER YEAR)

LAKE TAHOE	HC	CO	NOx	PM	SOx
	0	0	0	0	0

1987 LOCOMOTIVE EMISSIONS INVENTORY
MOUNTAIN COUNTIES AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
PLUMAS	26	98	703	15	48
SIERRA	0	0	0	0	0
NEVADA	15	48	377	8	29
PLACER(P)	28	89	691	15	53
EL DORADO	0	0	0	0	0
AMADOR	0	0	0	0	0
CALAVERAS	0	0	0	0	0
TUOLUMNE	0	0	0	0	0
MARIPOSA	0	0	0	0	0
BASIN TOTAL	69	235	1771	38	130

*NO YARD EMISSIONS ATTRIBUTED TO THE MOUNTAIN COUNTIES AIR BASIN

1987 LOCOMOTIVE EMISSIONS INVENTORY
NORTHEAST PLATEAU AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
SISKIYOU	55	183	1770	37	134
MODOC	23	82	592	13	42
LASSEN	22	78	536	12	40
BASIN TOTAL	100	343	2898	62	216

*NO YARD EMISSIONS ATTRIBUTED TO THE NORTHEAST PLATEAU AIR BASIN

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

1987 LOCOMOTIVE EMISSIONS INVENTORY
SACRAMENTO VALLEY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
PLACER(P)	44.88	147.05	1230.24	25.93	92.32
SHASTA	47.9	156.05	1452.88	30.05	109.24
TEHAMA	27.85	91.2	854.12	17.65	64.49
GLENN	2.54	8.38	76.87	1.62	5.84
BUTTE	43.4	147.46	1241.89	25.94	90.76
COLUSA	2.06	6.78	62.23	1.31	4.73
YOLO	1.94	6.38	58.57	1.23	4.45
SUTTER	6.27	20.51	192.48	3.97	14.52
YUBA	26.62	88.52	713.63	15.11	52.28
SOLANO(P)	14.88	47.38	382.03	8.21	29.09
SACRAMENTO	62.2	193.71	1467.95	31.62	101.75
BASIN TOTAL	280.54	913.42	7732.89	162.64	569.47

1987 YARD EMISSIONS
SACRAMENTO VALLEY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
PLACER(P)	0.00	0.00	0.00	0.00	0.00
SHASTA	0.96	2.52	16.74	0.38	0.87
TEHAMA	0.00	0.00	0.00	0.00	0.00
GLENN	0.00	0.00	0.00	0.00	0.00
BUTTE	0.96	2.52	16.74	0.38	0.87
COLUSA	0.00	0.00	0.00	0.00	0.00
YOLO	0.00	0.00	0.00	0.00	0.00
SUTTER	0.00	0.00	0.00	0.00	0.00
YUBA	0.96	2.52	16.74	0.38	0.87
SOLANO(P)	0.00	0.00	0.00	0.00	0.00
SACRAMENTO	16.34	42.85	284.51	6.48	14.79
BASIN TOTAL	19.22	50.41	334.73	7.62	17.40

1987 LINE HAUL LOCOMOTIVE EMISSIONS
SACRAMENTO VALLEY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
PLACER(P)	44.88	147.05	1230.24	25.93	92.32
SHASTA	46.94	153.53	1436.15	29.67	108.37
TEHAMA	27.85	91.20	854.12	17.65	64.49
GLENN	2.54	8.38	76.87	1.62	5.84
BUTTE	42.44	144.94	1225.15	25.56	89.89
COLUSA	2.06	6.78	62.23	1.31	4.73
YOLO	1.94	6.38	58.57	1.23	4.45
SUTTER	6.27	20.51	192.48	3.97	14.52
YUBA	25.66	86.00	696.90	14.72	51.41
SOLANO(P)	14.88	47.38	382.03	8.21	29.09
SACRAMENTO	45.86	150.86	1183.43	25.14	86.96
BASIN TOTAL	261.32	863.01	7398.17	155.01	552.07

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

1987 LOCOMOTIVE EMISSIONS INVENTORY
SAN FRANCISCO BAY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
SOLANO(P)	11.18	34.59	248.17	5.58	19.71
SONOMA(P)	0	0	0	0	0
SAN MATEO	40.35	104.68	803.97	17.87	51.27
ALAMEDA	38.66	132.44	970.62	21	73.28
CONTRA COSTA	73.07	233.55	1645.86	36.15	125.63
MARIN	0	0	0	0	0
SAN FRANCISCO	8.41	21.81	167.49	3.72	10.68
NAPA	0	0	0	0	0
SANTA CLARA	32.37	85.07	663.56	14.69	43.4
BASIN TOTAL	204.04	612.14	4499.67	99.01	323.97

1987 YARD EMISSIONS
SAN FRANCISCO BAY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
SOLANO(P)	0.00	0.00	0.00	0.00	0.00
SONOMA(P)	0	0	0	0	0
SAN MATEO	23.35	60.25	404.41	9.20	21.38
ALAMEDA	0.00	0.00	0.00	0.00	0.00
CONTRA COSTA	0.00	0.00	0.00	0.00	0.00
MARIN	0.00	0.00	0.00	0.00	0.00
SAN FRANCISCO	4.86	12.55	84.25	1.92	4.45
NAPA	0.00	0.00	0.00	0.00	0.00
SANTA CLARA	17.51	45.19	303.30	6.90	16.03
BASIN TOTAL	45.72	117.99	791.96	18.02	41.86

1987 LINE HAUL LOCOMOTIVE EMISSIONS
SAN FRANCISCO BAY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
SOLANO(P)	11.18	34.59	248.17	5.58	19.71
SONOMA(P)	0	0	0	0	0
SAN MATEO	17.01	44.43	399.56	8.67	29.90
ALAMEDA	38.66	132.44	970.62	21.00	73.28
CONTRA COSTA	73.07	233.55	1645.86	36.15	125.63
MARIN	0.00	0.00	0.00	0.00	0.00
SAN FRANCISCO	3.54	9.26	83.24	1.81	6.23
NAPA	0.00	0.00	0.00	0.00	0.00
SANTA CLARA	14.86	39.89	360.26	7.79	27.37
BASIN TOTAL	158.32	494.16	3707.71	81.00	282.12

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

1987 LOCOMOTIVE EMISSIONS INVENTORY
SAN JOAQUIN VALLEY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
SAN JOAQUIN	64.99	203.50	1478.93	32.04	106.17
STANISLAUS	21.78	66.22	560.70	11.87	41.14
MERCED	30.76	98.54	853.88	17.95	64.01
MADERA	22.81	73.10	630.86	13.27	47.25
FRESNO	36.07	107.93	886.65	18.83	63.85
KINGS	3.25	10.49	99.14	2.04	7.49
TULARE	44.91	147.26	1233.46	25.88	91.54
KERN(P)	153.79	471.45	3300.98	74.15	240.45
BASIN TOTAL	378.36	1178.49	9044.60	196.03	661.90

1987 YARD EMISSIONS
SAN JOAQUIN VALLEY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
SAN JOAQUIN	7.07	15.93	112.15	2.54	6.53
STANISLAUS	2.83	6.37	44.86	1.02	2.61
MERCED	0.00	0.00	0.00	0.00	0.00
MADERA	0.00	0.00	0.00	0.00	0.00
FRESNO	7.07	15.93	112.15	2.54	6.53
KINGS	0.00	0.00	0.00	0.00	0.00
TULARE	0.00	0.00	0.00	0.00	0.00
KERN(P)	11.32	25.48	179.43	4.06	10.45
BASIN TOTAL	28.29	63.71	448.59	10.16	26.12

1987 LINE HAUL LOCOMOTIVE EMISSIONS
SAN JOAQUIN VALLEY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
SAN JOAQUIN	57.92	187.57	1366.78	29.50	99.63
STANISLAUS	18.95	59.85	515.85	10.86	38.52
MERCED	30.76	98.54	853.88	17.95	64.01
MADERA	22.81	73.10	630.86	13.27	47.25
FRESNO	28.99	92.00	774.50	16.29	57.32
KINGS	3.25	10.49	99.14	2.04	7.49
TULARE	44.91	147.26	1233.46	25.88	91.54
KERN(P)	142.48	445.97	3121.55	70.09	230.00
BASIN TOTAL	350.07	1114.78	8596.02	185.88	635.76

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

1987 LOCOMOTIVE EMISSIONS INVENTORY
SOUTHEAST DESERT AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
IMPERIAL	105	328	2227	58	176
RIVERSIDE(P)	96	309	2031	49	168
SAN BERNADINO(P)	600	1900	10927	257	774
LOS ANGELES(P)	40	137	812	19	58
KERN(P)	55	180	1100	26	79
BASIN TOTAL	896	2854	17097	409	1255

1987 YARD EMISSIONS
SOUTHEAST DESERT AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
IMPERIAL	0	0	0	0	0
RIVERSIDE(P)	0	0	0	0	0
SAN BERNADINO(P)	26	70	462	11	24
LOS ANGELES(P)	0	0	0	0	0
KERN(P)	0	0	0	0	0
BASIN TOTAL	26	70	462	11	24

1987 LINE HAUL EMISSIONS
SOUTHEAST DESERT AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
IMPERIAL	105	328	2227	58	176
RIVERSIDE(P)	96	309	2031	49	168
SAN BERNADINO(P)	574	1830	10465	246	750
LOS ANGELES(P)	40	137	812	19	58
KERN(P)	55	180	1100	26	79
BASIN TOTAL	870	2784	16635	398	1231

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

1987 LOCOMOTIVE EMISSIONS INVENTORY
SOUTH COAST AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
LOS ANGELES(P)	288.97	857.70	5847.17	131.46	407.54
ORANGE	39.27	122.57	859.07	19.13	64.82
RIVERSIDE(P)	63.50	197.55	1298.56	29.31	89.88
SAN BERNARDINO(P	173.49	528.88	3348.32	77.72	237.32
BASIN TOTAL	565.2	1706.7	11353.1	257.6	799.6

1987 YARD EMISSIONS
SOUTH COAST AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
LOS ANGELES(P)	74.00	181.70	1231.00	28.20	66.60
ORANGE	0.00	0.00	0.00	0.00	0.00
RIVERSIDE(P)	7.80	19.30	131.00	3.00	7.10
SAN BERNARDINO(P	30.20	74.30	504.00	11.50	27.30
BASIN TOTAL	112.00	275.30	1866.00	42.70	101.00

1987 LINE HAUL LOCOMOTIVE EMISSIONS
SOUTH COAST AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
LOS ANGELES(P)	214.97	676.00	4616.17	103.26	340.94
ORANGE	39.27	122.57	859.07	19.13	64.82
RIVERSIDE(P)	55.70	178.25	1167.56	26.31	82.78
SAN BERNARDINO(P	143.29	454.58	2844.32	66.22	210.02
BASIN TOTAL	453.23	1431.41	9487.11	214.92	698.57

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

APPENDIX D

LOCOMOTIVE EMISSION INVENTORIES BY COUNTY

TRAIN			S.C.				ALL
SFI			0.454				0.454
SFJ			0.032				0.032
SFK			0.445				0.445
SFL			0.259				0.259
SFM			0.002				0.002
SFN			1.381				1.381
SFO			2.331				2.331
SFP			0.001				0.001
SFQ			0.135				0.135
SFR			0.002				0.002
SFS			0.111				0.111
SFT			0.022				0.022
SFU	B.A.		0.047				0.047
SJSF	0.459						0.459
UA	0.017						0.017
UAA			0.450				0.450
UB	0.090						0.090
UBB			0.018				0.018
UCC			0.171				0.171
UD	0.021						0.021
UDD			0.015				0.015
UE	0.002						0.002
UF	0.157				S.J.		0.157
UG					0.094		0.094
UH					0.131		0.131
UI					0.029		0.029
UJ					0.115		0.115
UK					0.067		0.067
UL					0.011		0.011
UM					0.066		0.066
UN					0.024	S.V.	0.024
UP						0.016	0.016
UQ						0.090	0.090
UR						0.017	0.017
US						0.054	0.054
UT						0.080	0.080
UU						0.023	0.023
UV						0.089	0.089
ALL	ERROR	1.914	ERROR	0.326	ERROR	ERROR	ERROR

S O X

SOx EMISSIONS PER TRACK MILE
(TONS PER YEAR)

BASIN

TRAIN	B.A.	C.C.	S.C.	S.D.	S.J.	S.V.	ALL
A	0.389	0.187	0.408		0.223	0.204	1.411
AA			0.010				0.010
AAA	0.022						0.022
AAB					0.025		0.025
AAC					0.026		0.026
AAD	0.026						0.026
AB			0.018				0.018
AC			0.014				0.014
AD			0.059				0.059
AE	0.025						0.025
AF						0.040	0.040
AG	0.030						0.030
AH						0.096	0.096
AI			0.002				0.002
AJ		0.031					0.031
AK	0.010						0.010
AL						0.013	0.013
AM						0.020	0.020
AN	0.006						0.006
AO		0.163					0.163
AP			0.007				0.007
AQ			0.007				0.007
AR			0.014				0.014
AS			0.104				0.104
AT			0.110				0.110
AU				0.111			0.111
AV				0.134			0.134
AW		0.014					0.014
AX			0.019				0.019
AY			0.021				0.021
AZ		0.017					0.017
B	0.707	0.074	0.107		0.585	0.264	1.738
C	0.042	0.218	1.596		0.046	0.320	2.223
D	0.258	0.101	0.718		0.418	0.468	1.962
E	0.100		0.737		0.072	0.744	1.653
F	0.202				0.055	0.596	0.853
G			0.161			0.149	0.311
H			0.811			0.119	0.930
I			0.485				0.485
J			0.749				0.749
L	1.531	1.109	1.996		1.990	1.112	7.738
LL			0.086				0.086
SFA			0.191		1.297		1.488
SFB			0.086		0.415		0.501
SFC			0.003		0.310		0.313
SFD			0.004		0.445		0.448
SFE	0.322		0.172				0.494
SFF			0.161	0.081			0.242
SFG			0.009				0.009
SFH			0.278				0.278

PARTICULATE

TRAIN	B.A.	S.C.	S.J.	S.V.	ALL
SFI		0.139			0.139
SFJ		0.010			0.010
SFK		0.231			0.231
SFL		0.134			0.134
SFM		0.001			0.001
SFN		0.413			0.413
SFO		0.703			0.703
SFP		0.000			0.000
SFQ		0.050			0.050
SFR		0.001			0.001
SFS		0.042			0.042
SFT		0.008			0.008
SFU		0.016			0.016
SJSF	0.107				0.107
UA	0.005				0.005
UAA		0.136			0.136
UB	0.027				0.027
UBB		0.006			0.006
UCC		0.065			0.065
UD	0.007				0.007
UDD		0.005			0.005
UE	0.001				0.001
UF	0.050				0.050
UG			0.029		0.029
UH			0.038		0.038
UI			0.009		0.009
UJ			0.034		0.034
UK			0.021		0.021
UL			0.003		0.003
UM			0.021		0.021
UN			0.007		0.007
UP				0.005	0.005
UQ				0.026	0.026
UR				0.006	0.006
US				0.017	0.017
UT				0.028	0.028
UU				0.007	0.007
UV				0.026	0.026
ALL	ERROR 0.533	ERROR 0.086	ERROR	ERROR	ERROR

PARTICULATE EMISSIONS PER TRACK MILE
(TONS PER YEAR)

TRAIN	BASIN						
	B.A.	C.C.	S.C.	S.D.	S.J.	S.V.	ALL
A	0.112	0.058	0.127		0.061	0.061	0.419
AA			0.002				0.002
AAA	0.005						0.005
AAB					0.006		0.006
AAC					0.006		0.006
AAD	0.006						0.006
AB			0.004				0.004
AC			0.003				0.003
AD			0.014				0.014
AE	0.006						0.006
AF						0.010	0.010
AG	0.007						0.007
AH						0.022	0.022
AI			0.001				0.001
AJ		0.007					0.007
AK	0.002						0.002
AL						0.003	0.003
AM						0.005	0.005
AN	0.001						0.001
AO		0.038					0.038
AP			0.002				0.002
AQ			0.002				0.002
AR			0.003				0.003
AS			0.025				0.025
AT			0.027				0.027
AU				0.027			0.027
AV				0.032			0.032
AW		0.003					0.003
AX			0.005				0.005
AY			0.005				0.005
AZ		0.004					0.004
B	0.216	0.020	0.031		0.165	0.079	0.511
C	0.012	0.060	0.497		0.013	0.098	0.680
D	0.075	0.028	0.214		0.125	0.129	0.571
E	0.028		0.220		0.020	0.203	0.471
F	0.057				0.015	0.169	0.241
G			0.052			0.042	0.094
H			0.239			0.033	0.272
I			0.142				0.142
J			0.216				0.216
L	0.438	0.314	0.584		0.568	0.318	2.222
LL			0.025				0.025
SFA			0.066		0.444		0.509
SFB			0.030		0.126		0.156
SFC			0.001		0.094		0.095
SFD			0.001		0.175		0.176
SFE	0.109		0.060				0.170
SFF			0.057	0.026			0.083
SFG			0.003				0.003
SFH			0.084				0.084

NOX

TRAIN			S.C.				ALL
SFI			6.506				6.506
SFJ			0.454				0.454
SFK			5.798				5.798
SFL			3.395				3.395
SFM			0.033				0.033
SFN			19.622				19.622
SFO			33.196				33.196
SFP			0.018				0.018
SFQ			1.888				1.888
SFR			0.024				0.024
SFS			1.548				1.548
SFT			0.318				0.318
SFU	B.A.		0.681				0.681
SJSF	4.916						4.916
UA	0.242						0.242
UAA			6.485				6.485
UB	1.319						1.319
UBB			0.259				0.259
UCC			2.385				2.385
UD	0.295						0.295
UDD			0.205				0.205
UE	0.031						0.031
UF	2.211				S.J.		2.211
UG					1.379		1.379
UH					1.945		1.945
UI					0.427		0.427
UJ					1.653		1.653
UK					0.995		0.995
UL					0.152		0.152
UM					0.941		0.941
UN					0.360	S.V.	0.360
UP						0.229	0.229
UQ						1.346	1.346
UR						0.244	0.244
US						0.763	0.763
UT						1.149	1.149
UU						0.335	0.335
UV						1.292	1.292
ALL	ERROR	24.884	ERROR	3.791	ERROR	ERROR	ERROR

NOX EMISSIONS PER TRACK MILE
(TONS PER YEAR)

TRAIN	BASIN						
	B.A.	C.C.	S.C.	S.D.	S.J.	S.V.	ALL
A	5.225	2.533	5.458		2.975	2.727	18.917
AA			0.104				0.104
AAA	0.240						0.240
AAB					0.272		0.272
AAC					0.278		0.278
AAD	0.278						0.278
AB			0.189				0.189
AC			0.148				0.148
AD			0.639				0.639
AE	0.271						0.271
AF						0.433	0.433
AG	0.326						0.326
AH						1.036	1.036
AI			0.024				0.024
AJ		0.334					0.334
AK	0.107						0.107
AL						0.142	0.142
AM						0.216	0.216
AN	0.068						0.068
AO		1.767					1.767
AP			0.081				0.081
AQ			0.076				0.076
AR			0.154				0.154
AS			1.118				1.118
AT			1.182				1.182
AU				1.196			1.196
AV				1.440			1.440
AW		0.147					0.147
AX			0.207				0.207
AY			0.224				0.224
AZ		0.178					0.178
B	9.308	0.987	1.421		7.765	3.568	23.050
C	0.570	2.905	21.085		0.619	4.321	29.500
D	3.477	1.343	9.519		5.520	6.235	26.093
E	1.344		9.747		0.958	9.944	21.992
F	2.680				0.740	7.949	11.369
G			2.175			1.994	4.170
H			10.721			1.567	12.288
I			6.401				6.401
J			9.917				9.917
L	20.451	14.690	27.166		26.518	14.827	103.652
LL			1.148				1.148
SFA			2.689		18.170		20.859
SFB			1.208		5.987		7.195
SFC			0.041		4.450		4.491
SFD			0.050		6.369		6.419
SFE	4.592		2.405				6.997
SFF			2.248	1.155			3.403
SFG			0.121				0.121
SFH			3.993				3.993

TRAIN

	B.A.	S.C.	S.J.	S.V.	ALL
SFI		0.919			0.919
SFJ		0.068			0.068
SFK		2.215			2.215
SFL		1.298			1.298
SFM		0.012			0.012
SFN		2.729			2.729
SFO		4.786			4.786
SFP		0.002			0.002
SFQ		0.352			0.352
SFR		0.004			0.004
SFS		0.303			0.303
SFT		0.061			0.061
SFU		0.131			0.131
SJSF	0.269				0.269
UA	0.032				0.032
UAA		0.976			0.976
UB	0.157				0.157
UBB		0.042			0.042
UCC		0.490			0.490
UD	0.046				0.046
UDD		0.035			0.035
UE	0.005				0.005
UF	0.337				0.337
UG			0.207		0.207
UH			0.221		0.221
UI			0.061		0.061
UJ			0.237		0.237
UK			0.129		0.129
UL			0.024		0.024
UM			0.095		0.095
UN			0.043		0.043
UP				0.030	0.030
UQ				0.161	0.161
UR				0.036	0.036
US				0.114	0.114
UT				0.185	0.185
UU				0.044	0.044
UV				0.176	0.176
ALL	ERROR 3.207	ERROR 0.397	ERROR	ERROR	ERROR

CO

CO EMISSIONS PER TRACK MILE
(TONS PER YEAR)

TRAIN	BASIN						
	B.A.	C.C.	S.C.	S.D.	S.J.	S.V.	ALL
A	0.680	0.443	0.951		0.306	0.413	2.793
AA			0.011				0.011
AAA	0.028						0.028
AAB					0.015		0.015
AAC					0.014		0.014
AAD	0.029						0.029
AB			0.012				0.012
AC			0.018				0.018
AD			0.035				0.035
AE	0.030						0.030
AF						0.043	0.043
AG	0.031						0.031
AH						0.081	0.081
AI			0.002				0.002
AJ		0.017					0.017
AK	0.007						0.007
AL						0.008	0.008
AM						0.011	0.011
AN	0.004						0.004
AO		0.081					0.081
AP			0.009				0.009
AQ			0.009				0.009
AR			0.010				0.010
AS			0.092				0.092
AT			0.099				0.099
AU				0.099			0.099
AV				0.106			0.106
AW		0.012					0.012
AX			0.023				0.023
AY			0.023				0.023
AZ		0.013					0.013
B	1.379	0.101	0.189		0.833	0.539	3.042
C	0.070	0.297	3.643		0.070	0.733	4.812
D	0.473	0.145	1.344		0.807	0.661	3.431
E	0.151		1.415		0.102	1.017	2.685
F	0.306				0.077	0.937	1.320
G			0.435			0.229	0.664
H			1.438			0.165	1.603
I			0.865				0.865
J			1.265				1.265
L	2.928	2.098	3.949		3.795	2.122	14.891
LL			0.140				0.140
SFA			0.469		3.108		3.577
SFB			0.222		0.831		1.053
SFC			0.007		0.616		0.623
SFD			0.010		1.711		1.721
SFE	0.824		0.431				1.255
SFF			0.414	0.192			0.605
SFG			0.023				0.023
SFH			0.553				0.553

HC

TRAIN	B.A.	C.C.	S.C.	S.D.	S.J.	S.V.	ALL
SFI			0.271				0.271
SFJ			0.021				0.021
SFK			0.874				0.874
SFL			0.510				0.510
SFM			0.005				0.005
SFN			0.771				0.771
SFO			1.367				1.367
SFP			0.001				0.001
SFQ			0.133				0.133
SFR			0.001				0.001
SFS			0.120				0.120
SFT			0.021				0.021
SFU			0.044				0.044
SJSF	0.131						0.131
UA	0.007						0.007
UAA			0.238				0.238
UB	0.044						0.044
UBB			0.011				0.011
UCC			0.169				0.169
UD	0.014						0.014
UDD			0.010				0.010
UE	0.002						0.002
UF	0.089						0.089
UG				0.049			0.049
UH				0.061			0.061
UI				0.014			0.014
UJ				0.053			0.053
UK				0.040			0.040
UL				0.006			0.006
UM				0.032			0.032
UN				0.009			0.009
UP						0.006	0.006
UQ						0.034	0.034
UR						0.010	0.010
US						0.030	0.030
UT						0.066	0.066
UU						0.009	0.009
UV						0.046	0.046

HC EMISSIONS PER TRACK MILE
(TONS PER YEAR)

BASIN

TRAIN	B.A.	C.C.	S.C.	S.D.	S.J.	S.V.	ALL
A	0.208	0.134	0.288		0.096	0.129	0.855
AA			0.004				0.004
AAA	0.011						0.011
AAB					0.007		0.007
AAC					0.007		0.007
AAD	0.011						0.011
AB			0.005				0.005
AC			0.007				0.007
AD			0.017				0.017
AE	0.011						0.011
AF						0.017	0.017
AG	0.012						0.012
AH						0.033	0.033
AI			0.001				0.001
AJ		0.008					0.008
AK	0.003						0.003
AL						0.004	0.004
AM						0.006	0.006
AN	0.002						0.002
AO		0.043					0.043
AP			0.003				0.003
AQ			0.004				0.004
AR			0.004				0.004
AS			0.037				0.037
AT			0.039				0.039
AU				0.040			0.040
AV				0.045			0.045
AW		0.005					0.005
AX			0.008				0.008
AY			0.009				0.009
AZ		0.006					0.006
B	0.452	0.031	0.056		0.269	0.157	0.966
C	0.021	0.091	1.128		0.021	0.223	1.485
D	0.144	0.045	0.431		0.258	0.203	1.080
E	0.048		0.445		0.031	0.304	0.827
F	0.097				0.024	0.292	0.413
G			0.132			0.070	0.202
H			0.471			0.050	0.521
I			0.264				0.264
J			0.387				0.387
L	0.922	0.660	1.241		1.194	0.668	4.685
LL			0.045				0.045
SFA			0.160		1.012		1.172
SFB			0.077		0.236		0.313
SFC			0.002		0.181		0.183
SFD			0.003		0.594		0.597
SFE	0.270		0.146				0.416
SFF			0.140	0.060			0.200
SFG			0.008				0.008
SFH			0.162				0.162

APPENDIX C

TRAIN EMISSIONS PER MILE BY BASIN

COUNTY	1987 BASE YEAR EMISSIONS (TONS PER DAY)					YR 2000 PREDICTED EMISSIONS (TONS PER DAY)					YR 2010 PREDICTED EMISSIONS (TONS PER DAY)				
	HC	CO	NOx	PM	SOx	HC	CO	NOx	PM	SOx	HC	CO	NOx	PM	SOx
INYO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MONO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ALPINE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL GREAT BASIN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LAKE TAHOE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
PLUMAS	0.071	0.268	1.926	0.041	0.132	0.064	0.244	1.747	0.037	0.120	0.060	0.231	1.705	0.035	0.114
SIERRA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NEVADA	0.042	0.133	1.033	0.022	0.079	0.038	0.120	0.937	0.020	0.072	0.035	0.114	0.914	0.019	0.069
PLACER(P)	0.077	0.243	1.893	0.041	0.145	0.069	0.221	1.717	0.037	0.133	0.065	0.209	1.675	0.035	0.126
EL DORADO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AMADOR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CALAVERAS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TUOLUMNE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MARIPOSA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL MOUNTAIN COUNTIE	0.190	0.645	4.852	0.105	0.356	0.171	0.585	4.401	0.095	0.326	0.161	0.553	4.294	0.090	0.309
SISKIYOU	0.151	0.501	4.849	0.101	0.367	0.136	0.455	4.399	0.092	0.336	0.128	0.431	4.292	0.087	0.319
MODOC	0.063	0.225	1.622	0.036	0.115	0.057	0.204	1.471	0.032	0.105	0.053	0.193	1.435	0.031	0.100
LASSEN	0.060	0.214	1.468	0.033	0.110	0.054	0.194	1.332	0.030	0.100	0.051	0.184	1.300	0.028	0.095
TOTAL NORTHEAST PLATEA	0.274	0.940	7.940	0.170	0.592	0.247	0.853	7.202	0.154	0.541	0.232	0.807	7.027	0.146	0.514
DEL NORTE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
HUMBOLDT	0.016	0.052	0.384	0.027	0.008	0.015	0.047	0.348	0.025	0.008	0.014	0.045	0.339	0.024	0.007
TRINITY	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MENDOCINO	0.025	0.074	0.562	0.041	0.014	0.022	0.067	0.509	0.037	0.013	0.021	0.064	0.497	0.035	0.012
SONOMA(P)	0.011	0.033	0.241	0.016	0.005	0.010	0.030	0.219	0.015	0.005	0.009	0.028	0.213	0.014	0.005
TOTAL NORTH COAST	0.052	0.159	1.186	0.085	0.027	0.047	0.144	1.076	0.077	0.025	0.044	0.136	1.050	0.073	0.024
LAKE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SANTA BARBARA	0.077	0.245	2.169	0.045	0.165	0.069	0.222	1.967	0.041	0.151	0.065	0.210	1.919	0.039	0.143
SAN LUIS OBISPO	0.072	0.231	2.004	0.042	0.152	0.065	0.209	1.818	0.038	0.139	0.061	0.198	1.774	0.036	0.132
VENTURA	0.044	0.138	1.237	0.026	0.095	0.040	0.125	1.122	0.024	0.087	0.037	0.118	1.095	0.022	0.083
MONTEREY	0.102	0.325	2.780	0.058	0.210	0.091	0.295	2.522	0.053	0.192	0.086	0.279	2.461	0.050	0.183
SAN BENITO	0.014	0.045	0.321	0.007	0.024	0.013	0.041	0.292	0.006	0.022	0.012	0.039	0.284	0.006	0.021
SANTA CRUZ	0.008	0.027	0.209	0.004	0.016	0.008	0.025	0.189	0.004	0.014	0.007	0.023	0.185	0.004	0.014
TOTAL CENTRAL COAST	0.317	1.011	8.720	0.183	0.662	0.285	0.917	7.910	0.166	0.605	0.268	0.868	7.717	0.157	0.575
SAN DIEGO	0.025	0.068	0.647	0.014	0.055	0.022	0.062	0.587	0.012	0.050	0.021	0.059	0.572	0.012	0.048
TOTAL FOR THE STATE	7.225	22.726	159.584	3.636	11.582	6.505	20.628	144.758	3.297	10.594	6.116	19.514	141.232	3.123	10.067

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

APPENDIX E

BOOZ·ALLEN VERSUS CARB LOCOMOTIVE EMISSION INVENTORY ESTIMATES

COUNTY	1987 BAH ESTIMATE NOx	1987 CARB ESTIMATE NOx
SOLANO(P)	0.68	0.90
SONOMA(P)	0.00	0.00
SAN MATEO	2.20	0.40
ALAMEDA	2.66	1.30
CONTRA COSTA	4.51	1.50
MARIN	0.00	0.00
SAN FRANCISCO	0.46	0.50
NAPA	0.00	0.00
SANTA CLARA	1.82	0.70
TOTAL BAY AREA	12.33	5.40
PLACER(P)	3.37	3.50
SHASTA	3.98	5.20
TEHAMA	2.34	1.40
GLENN	0.21	0.20
BUTTE	3.40	3.10
COLUSA	0.17	0.20
YOLO	0.16	0.60
SUTTER	0.53	0.60
YUBA	1.96	0.90
SOLANO(P)	1.05	0.90
SACRAMENTO	4.02	3.10
TOTAL SACRAMENTO	21.19	19.70
SAN JOAQUIN	4.05	3.00
STANISLAUS	1.54	2.00
MERCED	2.34	3.10
MADERA	1.73	2.10
FRESNO	2.43	1.80
KINGS	0.27	1.00
TULARE	3.38	3.40
KERN(P)	9.04	6.10
TOTAL SAN JOAQUIN	24.78	22.50
LOS ANGELES(P)	16.02	16.00
ORANGE	2.35	2.40
RIVERSIDE(P)	3.56	4.80
SAN BERNARDINO(P)	9.17	6.50
TOTAL SOUTH COAST	31.10	29.70
IMPERIAL	6.10	5.10
RIVERSIDE(P)	5.56	0.00
SAN BERNADINO(P)	29.94	26.00
LOS ANGELES(P)	2.22	0.00
KERN(P)	3.01	2.60
TOTAL SOUTHEAST DESERT	46.84	33.70
INYO	0.00	0.00
MONO	0.00	0.00
ALPINE	0.00	0.00
TOTAL GREAT BASIN	0.00	0.00
LAKE TAHOE	0.00	0.00
PLUMAS	1.93	2.00
SIERRA	0.00	0.00
NEVADA	1.03	1.30
PLACER(P)	1.89	0.50
EL DORADO	0.00	0.00
AMADOR	0.00	0.00
CALAVERAS	0.00	0.00
TUOLUMNE	0.00	0.00
MARIPOSA	0.00	0.00
TOTAL MOUNTAIN COUNTIES	4.85	3.80
SISKIYOU	4.85	3.20
MODOC	1.62	1.30
LASSEN	1.47	1.40
TOTAL NORTHEAST PLATEAU	7.94	5.90
DEL NORTE	0.00	0.00
HUMBOLDT	0.38	0.30
TRINITY	0.00	0.10
MENDOCINO	0.56	0.50
SONOMA(P)	0.24	0.20
TOTAL NORTH COAST	1.19	1.10
LAKE	0.00	0.00
SANTA BARBARA	2.17	2.10
SAN LUIS OBISPO	2.00	1.40
VENTURA	1.24	1.60
MONTEREY	2.78	2.10
SAN BENITO	0.32	0.10
SANTA CRUZ	0.21	0.00
TOTAL CENTRAL COAST	8.72	7.30
SAN DIEGO	0.65	1.00
TOTAL FOR THE STATE	154.56	130.10

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

APPENDIX F

EMISSION INVENTORIES BY COUNTY FOR YEAR 2000

2000 LOCOMOTIVE EMISSIONS INVENTORY
SOUTH COAST AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
LOS ANGELES(P)	260.19	778.54	5303.97	119.21	372.78
ORANGE	35.36	111.26	779.26	17.34	59.29
RIVERSIDE(P)	57.17	179.32	1177.92	26.58	82.22
SAN BERNARDINO(P	156.21	480.07	3037.26	70.48	217.08
BASIN TOTAL	508.9	1549.2	10298.4	233.6	731.4

2000 LOCOMOTIVE EMISSIONS INVENTORY
SOUTHEAST DESERT AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
IMPERIAL	94.54	297.73	2020.11	52.59	160.99
RIVERSIDE(P)	86.44	280.48	1842.32	44.43	153.67
SAN BERNADINO(P)	540.24	1724.63	9911.88	233.05	707.98
LOS ANGELES(P)	36.02	124.35	736.57	17.23	53.05
KERN(P)	49.52	163.39	997.81	23.58	72.26
BASIN TOTAL	807	2591	15509	371	1148

2000 LOCOMOTIVE EMISSIONS INVENTORY
GREAT BASIN VALLEYS AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
INYO	0.00	0.00	0.00	0.00	0.00
MONO	0.00	0.00	0.00	0.00	0.00
ALPINE	0.00	0.00	0.00	0.00	0.00
BASIN TOTAL	0	0	0	0	0

2000 LOCOMOTIVE EMISSIONS INVENTORY
LAKE TAHOE AIR BASIN MODELING REGION

(TONS PER YEAR)

LAKE TAHOE	HC	CO	NOx	PM	SOx
	0.00	0.00	0.00	0.00	0.00

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

2000 PREDICTED LOCOMOTIVE EMISSIONS INVENTORY
SAN FRANCISCO BAY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
SOLANO(P)	10.07	31.40	225.12	5.06	18.03
SONOMA(P)	0	0	0	0	0
SAN MATEO	36.33	95.02	729.28	16.20	46.90
ALAMEDA	34.81	120.22	880.45	19.04	67.03
CONTRA COSTA	65.79	211.99	1492.96	32.78	114.91
MARIN	0.00	0.00	0.00	0.00	0.00
SAN FRANCISCO	7.57	19.80	151.93	3.37	9.77
NAPA	0.00	0.00	0.00	0.00	0.00
SANTA CLARA	29.15	77.22	601.92	13.32	39.70
BASIN TOTAL	183.72	555.64	4081.65	89.78	296.34

2000 PREDICTED LOCOMOTIVE EMISSIONS INVENTORY
SACRAMENTO VALLEY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
PLACER(P)	40.41	133.48	1115.95	23.51	84.45
SHASTA	43.13	141.65	1317.91	27.25	99.92
TEHAMA	25.08	82.78	774.77	16.01	58.99
GLENN	2.29	7.61	69.73	1.47	5.34
BUTTE	39.08	133.85	1126.52	23.52	83.02
COLUSA	1.85	6.15	56.45	1.19	4.33
YOLO	1.75	5.79	53.13	1.12	4.07
SUTTER	5.65	18.62	174.60	3.60	13.28
YUBA	23.97	80.35	647.33	13.70	47.82
SOLANO(P)	13.40	43.01	346.54	7.44	26.61
SACRAMENTO	56.00	175.83	1331.58	28.67	93.07
BASIN TOTAL	252.60	829.11	7014.50	147.48	520.89

2000 PREDICTED LOCOMOTIVE EMISSIONS INVENTORY
SAN JOAQUIN VALLEY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
SAN JOAQUIN	58.52	184.72	1341.54	29.05	97.11
STANISLAUS	19.61	60.11	508.61	10.76	37.63
MERCED	27.70	89.44	774.55	16.28	58.55
MADERA	20.54	66.35	572.25	12.03	43.22
FRESNO	32.48	97.97	804.28	17.08	58.40
KINGS	2.93	9.52	89.93	1.85	6.85
TULARE	40.44	133.67	1118.87	23.47	83.73
KERN(P)	138.47	427.94	2994.32	67.24	219.94
BASIN TOTAL	340.68	1069.72	8204.36	177.76	605.44

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

2000 LOCOMOTIVE EMISSIONS INVENTORY
MOUNTAIN COUNTIES AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
PLUMAS	23.41	88.95	637.69	13.60	43.91
SIERRA	0.00	0.00	0.00	0.00	0.00
NEVADA	13.72	43.98	341.98	7.40	26.45
PLACER(P)	25.21	80.60	626.81	13.60	48.48
EL DORADO	0.00	0.00	0.00	0.00	0.00
AMADOR	0.00	0.00	0.00	0.00	0.00
CALAVERAS	0.00	0.00	0.00	0.00	0.00
TUOLUMNE	0.00	0.00	0.00	0.00	0.00
MARIPOSA	0.00	0.00	0.00	0.00	0.00
BASIN TOTAL	62	214	1606	35	119

2000 LOCOMOTIVE EMISSIONS INVENTORY
NORTHEAST PLATEAU AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
SISKIYOU	49.52	166.11	1605.57	33.55	122.57
MODOC	20.71	74.43	537.00	11.79	38.42
LASSEN	19.81	70.80	486.21	10.88	36.59
BASIN TOTAL	90	311	2629	56	198

2000 LOCOMOTIVE EMISSIONS INVENTORY
NORTH COAST AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
DEL NORTE	0.00	0.00	0.00	0.00	0.00
HUMBOLDT	5.40	17.25	126.99	9.07	2.74
TRINITY	0.00	0.00	0.00	0.00	0.00
MENDOCINO	8.10	24.51	185.96	13.60	4.57
SONOMA(P)	3.60	10.89	79.82	5.44	1.83
BASIN TOTAL	17	53	393	28	9

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

2000 LOCOMOTIVE EMISSIONS INVENTORY
LAKE COUNTY AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
LAKE	0	0	0	0	0

2000 PREDICTED LOCOMOTIVE EMISSIONS INVENTORY
CENTRAL COAST AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
SANTA BARBARA	25.28	81.06	717.98	14.98	55.00
SAN LUIS OBISPO	23.71	76.42	663.53	13.86	50.61
VENTURA	14.45	45.68	409.57	8.60	31.78
MONTEREY	33.39	107.70	920.55	19.27	70.19
SAN BENITO	4.59	14.90	106.40	2.30	8.11
SANTA CRUZ	2.78	9.05	69.08	1.47	5.25
BASIN TOTAL	104.20	334.81	2887.13	60.47	220.95

2000 LOCOMOTIVE EMISSIONS INVENTORY
SAN DIEGO AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
SAN DIEGO	8.10	22.69	214.08	4.53	18.29

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

APPENDIX G

EMISSION INVENTORIES BY COUNTY FOR YEAR 2010

2010 LOCOMOTIVE EMISSIONS INVENTORY
SOUTH COAST AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
LOS ANGELES(P)	244.62	736.51	5174.74	112.90	354.23
ORANGE	33.24	105.25	760.28	16.43	56.34
RIVERSIDE(P)	53.75	169.64	1149.22	25.17	78.13
SAN BERNARDINO(	146.86	454.15	2963.26	66.75	206.28
BASIN TOTAL	478.5	1465.5	10047.5	221.2	695.0

2010 LOCOMOTIVE EMISSIONS INVENTORY
SOUTHEAST DESERT AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
IMPERIAL	88.88	281.65	1970.90	49.81	152.98
RIVERSIDE(P)	81.26	265.34	1797.44	42.08	146.03
SAN BERNADINO(P	507.90	1631.53	9670.40	220.71	672.76
LOS ANGELES(P)	33.86	117.64	718.62	16.32	50.41
KERN(P)	46.56	154.57	973.50	22.33	68.67
BASIN TOTAL	758	2451	15131	351	1091

2010 LOCOMOTIVE EMISSIONS INVENTORY
GREAT BASIN VALLEYS AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
INYO	0.00	0.00	0.00	0.00	0.00
MONO	0.00	0.00	0.00	0.00	0.00
ALPINE	0.00	0.00	0.00	0.00	0.00
BASIN TOTAL	0	0	0	0	0

2010 LOCOMOTIVE EMISSIONS INVENTORY
LAKE TAHOE AIR BASIN MODELING REGION

(TONS PER YEAR)

LAKE TAHOE	HC	CO	NOx	PM	SOx
	0.00	0.00	0.00	0.00	0.00

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

2010 PREDICTED LOCOMOTIVE EMISSIONS INVENTORY
SAN FRANCISCO BAY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
SOLANO(P)	9.46	29.70	219.63	4.79	17.13
SONOMA(P)	0	0	0	0	0
SAN MATEO	34.16	89.89	711.51	15.35	44.56
ALAMEDA	32.73	113.73	859.00	18.03	63.69
CONTRA COSTA	61.85	200.55	1456.59	31.05	109.20
MARIN	0.00	0.00	0.00	0.00	0.00
SAN FRANCISCO	7.12	18.73	148.23	3.19	9.28
NAPA	0.00	0.00	0.00	0.00	0.00
SANTA CLARA	27.40	73.05	587.25	12.62	37.72
BASIN TOTAL	172.72	525.64	3982.21	85.03	281.59

2010 PREDICTED LOCOMOTIVE EMISSIONS INVENTORY
SACRAMENTO VALLEY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
PLACER(P)	37.99	126.27	1088.76	22.27	80.24
SHASTA	40.55	134.00	1285.80	25.81	94.95
TEHAMA	23.58	78.31	755.90	15.16	56.05
GLENN	2.15	7.20	68.03	1.39	5.08
BUTTE	36.74	126.62	1099.07	22.28	78.89
COLUSA	1.74	5.82	55.07	1.13	4.11
YOLO	1.64	5.48	51.83	1.06	3.87
SUTTER	5.31	17.61	170.34	3.41	12.62
YUBA	22.53	76.01	631.56	12.98	45.44
SOLANO(P)	12.60	40.69	338.10	7.05	25.29
SACRAMENTO	52.65	166.34	1299.14	27.16	88.44
BASIN TOTAL	237.48	784.35	6843.61	139.68	494.98

2010 PREDICTED LOCOMOTIVE EMISSIONS INVENTORY
SAN JOAQUIN VALLEY AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
SAN JOAQUIN	55.01	174.75	1308.85	27.52	92.28
STANISLAUS	18.44	56.86	496.22	10.19	35.76
MERCED	26.04	84.62	755.68	15.42	55.64
MADERA	19.31	62.77	558.31	11.40	41.07
FRESNO	30.53	92.68	784.69	16.17	55.50
KINGS	2.75	9.01	87.74	1.75	6.51
TULARE	38.02	126.45	1091.61	22.23	79.57
KERN(P)	130.18	404.83	2921.37	63.68	209.00
BASIN TOTAL	320.28	1011.97	8004.47	168.35	575.32

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

2010 LOCOMOTIVE EMISSIONS INVENTORY
MOUNTAIN COUNTIES AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
PLUMAS	22.01	84.15	622.16	12.88	41.72
SIERRA	0.00	0.00	0.00	0.00	0.00
NEVADA	12.90	41.60	333.65	7.01	25.14
PLACER(P)	23.70	76.25	611.54	12.88	46.07
EL DORADO	0.00	0.00	0.00	0.00	0.00
AMADOR	0.00	0.00	0.00	0.00	0.00
CALAVERAS	0.00	0.00	0.00	0.00	0.00
TUOLUMNE	0.00	0.00	0.00	0.00	0.00
MARIPOSA	0.00	0.00	0.00	0.00	0.00
BASIN TOTAL	59	202	1567	33	113

2010 LOCOMOTIVE EMISSIONS INVENTORY
NORTHEAST PLATEAU AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
SISKIYOU	46.56	157.14	1566.45	31.78	116.47
MODOC	19.47	70.41	523.92	11.16	36.51
LASSEN	18.62	66.98	474.36	10.31	34.77
BASIN TOTAL	85	295	2565	53	188

2010 LOCOMOTIVE EMISSIONS INVENTORY
NORTH COAST AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
DEL NORTE	0.00	0.00	0.00	0.00	0.00
HUMBOLDT	5.08	16.32	123.90	8.59	2.61
TRINITY	0.00	0.00	0.00	0.00	0.00
MENDOCINO	7.62	23.18	181.43	12.88	4.35
SONOMA(P)	3.39	10.30	77.88	5.15	1.74
BASIN TOTAL	16	50	383	27	9

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN

2010 LOCOMOTIVE EMISSIONS INVENTORY
LAKE COUNTY AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
LAKE	0	0	0	0	0

2010 PREDICTED LOCOMOTIVE EMISSIONS INVENTORY
CENTRAL COAST AIR BASIN MODELING REGION
(TONS/YEAR)

	HC	CO	NOx	PM	SOx
SANTA BARBARA	23.77	76.68	700.49	14.19	52.26
SAN LUIS OBISPO	22.29	72.29	647.37	13.12	48.09
VENTURA	13.59	43.22	399.60	8.14	30.20
MONTEREY	31.39	101.88	898.12	18.25	66.70
SAN BENITO	4.32	14.09	103.81	2.18	7.71
SANTA CRUZ	2.62	8.56	67.40	1.39	4.99
BASIN TOTAL	97.97	316.73	2816.79	57.27	209.96

2010 LOCOMOTIVE EMISSIONS INVENTORY
SAN DIEGO AIR BASIN MODELING REGION
(TONS PER YEAR)

	HC	CO	NOx	PM	SOx
SAN DIEGO	7.62	21.47	208.86	4.29	17.38

NOTE:(P) INDICATES COUNTY RESIDES ONLY PARTIALLY IN AIR BASIN