

Summary of Fugitive Dust and Ammonia Emission Inventory Changes for the SJVU APCD Particulate Matter SIP

Fugitive Dust and Ammonia
Emission Inventory Documentation
for the SJV 2003 SIP Revision

Revision 2.1
May 2003

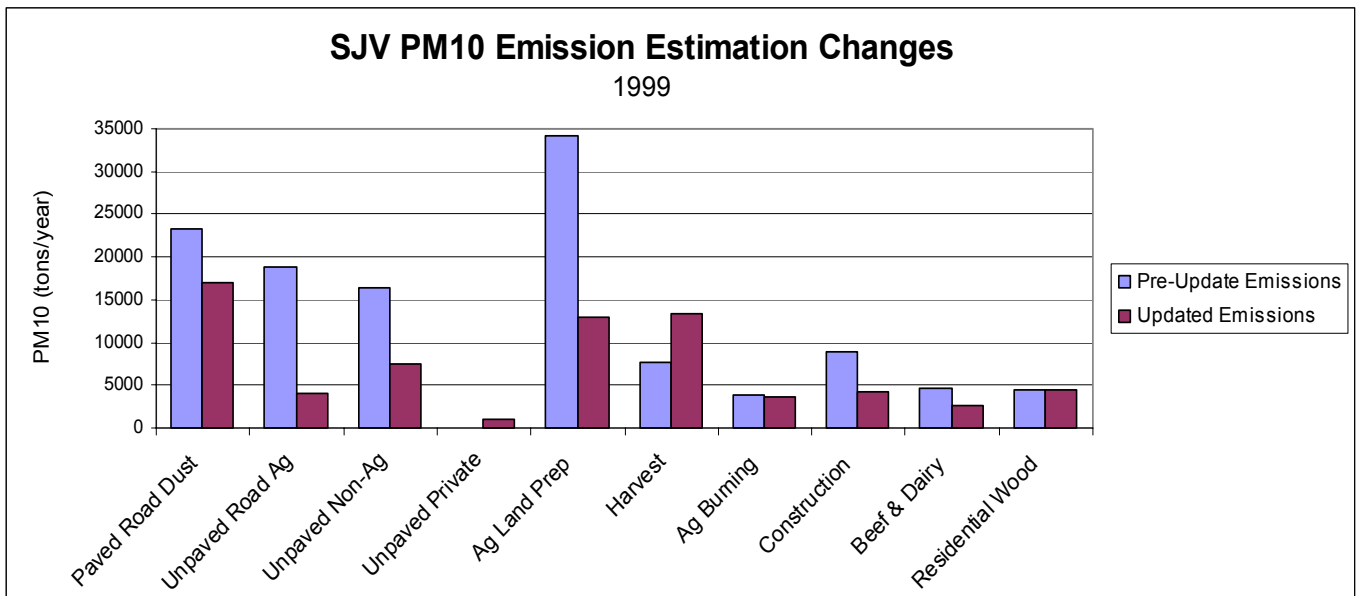
Planning and Technical Support Division
California Air Resources Board

Overview

This document describes the updates made by the California Air Resources Board’s (ARB’s) emission inventory staff to update the San Joaquin Valley’s PM10 emission inventory. These changes were made in support of the air district’s PM10 State Implementation Plan (SIP), due in mid-2003. The improvements provide substantial enhancements to the emission estimates by including the most current research data and using valley specific input data. All of the improvements are the result of extensive teamwork between the air district, the ARB, and stakeholders in the agricultural and transportation planning sectors. The U.S. EPA has also provided oversight and review of many of the inventory changes.

A large fraction of ARB’s emission inventory improvements focused on fugitive dust sources. The updated categories include construction dust, paved and unpaved road dust, and agricultural land preparation and harvesting. In general, the inventory updates produced decreases in the emission estimates. This was due to using more detailed and specific information about how much activity occurs for these processes, in addition to the incorporation of improved emission rate data.

The figure below summarizes the magnitude of the inventory changes between previously published inventories and the new emission estimates. Detailed information about the changes to the fugitive dust and ammonia emission inventory is provided in the sections that follow. Also, the specific steps and timelines used for the updates are provided in tables at the end of this document. Finally, a set of documents (over 100 pages) is also available from the air district or the ARB that includes some of the detailed thought processes and references used in developing the new emission estimates.



San Joaquin Valley

Overview of Assumptions and Changes for The 1999 Base Year PM₁₀ Emission Inventory For Fugitive Dust and Ammonia

The following sections provide information about the changes made by the California Air Resources Board (ARB) to assist the San Joaquin Valley Unified Air Pollution Control District (SJVU APCD) in preparation of the PM₁₀ SIP for the region. The ARB was responsible for providing updates to the major fugitive dust emission categories including paved and unpaved roads, agricultural land preparation and harvest, and construction activities. The ARB also provided an ammonia emission inventory.

Emission Inventory Changes – Draft versus the Final SIP

Many of the PM₁₀ emission inventory changes were incorporated in late-2002. These emission estimates are included in the draft PM₁₀ SIP released March 2003. But, further improvements were made to the emission estimates since the release of the draft SIP. Most of these changes were relatively minor refinements, creating less than a one-percent change in the emission estimates, but some were substantial. All of the most recent emission inventory changes are shown in the graph in the previous overview section.

The two source categories that underwent substantial changes are agricultural unpaved roads and private unpaved roads. PM₁₀ emissions estimates for agricultural unpaved roads decreased by about 80% based on new information. In addition, emission estimates for private unpaved roads were added to the inventory for the first time, increasing emissions for this category from zero emissions to about 1000 tons PM₁₀/year.

The fugitive dust changes made between the current draft SIP inventory and the planned final inventory are summarized below. Following this, the full assumptions and methods used to compute the overall emission estimates are provided.

Changes to Paved Road Dust Emission Estimates. For the final SIP, two small refinements were made to the draft paved road dust emission estimates. First, the estimates were updated to incorporate the latest U.S. EPA rainfall correction factor and new ARB rain data, creating about a 3% increase in the draft emission estimates. Second, the vehicle miles traveled (VMT) information was improved, creating about a 4% decrease in the emission estimates. This produces a decrease of about 1% overall between the draft SIP and proposed final emission estimates for paved road dust. Complete assumptions for the full method are provided in a later section.

Changes to Public, non-Agricultural Unpaved Road Dust Emission Estimates. For public non-agricultural unpaved road dust, the only difference between the draft estimates and the proposed final estimates is the inclusion of a more complete set of

rainfall data collected by the ARB. The rainfall data is applied to reduce unpaved road dust emissions based on the number of rainy days each month. The recent update decreased the emissions 0.2%.

Changes to Private Unpaved Road Dust Emission Estimates. The draft PM10 SIP does not include emissions for private unpaved roads. For the final draft, a methodology was developed to provide an estimate of the potential emissions from private roads such as unpaved driveways, canal roads, or oil field roads. Based on an analysis of very limited data, it appears reasonable to assume that the vehicle miles traveled (VMT) on private unpaved roads could about be about 10% of the total unpaved road VMT. Based on this assumption, these emissions were added to the emission inventory, which total about 1100 tons/year, or less than 2% of the overall PM10 emissions. As more data becomes available, the emission updates for private unpaved roads will be further refined.

Changes to the Agricultural Unpaved Road Dust Emission Estimates. The draft SIP does not include the latest estimates for agricultural unpaved roads. Through an extensive stakeholder process, we were able to update the VMT estimates for unpaved agricultural roads. The new method replaces the use of a single undocumented VMT value for all crops with an approach that applies crop-specific VMT values to each crop. Incorporation of this new VMT data decreased the emissions estimate for agricultural unpaved roads by about 80%.

Road Construction Dust Emissions. For the final SIP, the Transportation Planning Agencies provided revised estimates on the amount of paved road construction that occurs within each county. This change increased these emissions by about 2%.

Emission Inventory Change Documentation

The sections below provide the detailed assumptions used in computing the fugitive dust emission updates for the 2003 SJV PM10 SIP. Additional information including references and the rationale for many of the assumptions is included in a series of internal technical memorandums available from the ARB or the air district. Also, detailed spreadsheets or databases are available for most of the source categories described below, which can be obtained from the ARB (see contact at end of document).

Paved Road Dust Emissions

- The core methodology for estimating paved road dust emissions is based on the algorithm published in the 5th Edition of AP-42 (U.S. EPA) (<http://www.epa.gov/ttn/chief/ap42/ch13/>)
- Emissions are estimated for five roadway classes including freeways, arterials, collectors, local roads, and rural roads.
- Countywide vehicle miles traveled (VMT) information was provided for each road class by the county transportation planning agencies. This information was used to prepare the emission estimates.
- Roadway silt loading, an input to the emission estimation, is based on silt loadings measured in California, and is specific to each road class type. The table below summarizes the silt loading and base emission factors. The base emission factors do not include the rainfall correction, described below.

Paved Road Dust Emission Factors

Road Type	Silt Loading	Base EF (lbs PM10/million VMT)
Freeway	0.02	573.8
Arterial	0.035	825.5
Collector	0.035	825.5
Local	0.32	3478.8
Rural	1.6	9902.9

- The average vehicle weight used for the EPA emission factor equation is 2.4 tons.
- As an improvement for the 2003 SIP, a rainfall correction factor was applied to the base paved road dust emission factors to account for days in which there is measurable rainfall. The rainfall factor reduces the emissions rate based on the average number of rainy days in each county for each month. This correction factor reduced the overall paved road dust emissions by about 3%.
- The monthly paved road dust temporal profile is based on county specific precipitation. It is assumed that in general, the traffic is relatively consistent month to month, but the amount of rainfall will affect emission levels.
- The growth factor for paved road dust is based on VMT growth in the SJV. This projected VMT growth was provided by the SJV transportation planning agencies.

Unpaved Road Dust – Non-Agricultural

- The base methodology for estimating unpaved road dust emissions is based on an ARB methodology in which the miles of unpaved road are multiplied by the assumed vehicle miles traveled (VMT) and an emission factor.
- Emissions are estimated for five main road categories including city/county maintained roads, and roads maintained by the BLM, the USFS, the NPS, and the BIA.
- The miles of city/county maintained roads was provided by the SJV transportation planning agencies (TPAs). For the other unpaved roads (BLM, USFS, NPS, BIA), the 1993 mileage used for the 1997 SJV PM10 SIP was grown to the new 1999 base year. No new activity data was collected for these roads
- Due to the absence of other accepted information, it is assumed that all non-agricultural unpaved roads within the SJV receive 10 vehicle passes per day. Other information was explored, but it is currently inadequate to incorporate into the emission estimates.
- An emission factor of 2.0 lbs PM10/VMT was used for the unpaved road dust emission estimates. This emission factor is based on unpaved road dust emission measurements performed in the San Joaquin Valley by UC Davis and Desert Research Institute.
- As an improvement for the 2000 SIP, a rainfall correction factor was applied to the unpaved road emission factors to account for days in which there is measurable rainfall. This reduced the overall paved road dust emissions by about 10-12%. The basis for the rainfall correction is provided in the EPA methodology (<http://www.epa.gov/ttn/chief/ap42/ch13/>). However, only the rainfall correction part of the EPA methodology was used, not the full equation. This correction effectively sets the emissions to zero on days in which there is measurable rainfall.
- The monthly unpaved road dust temporal profile is based on county specific precipitation.
- The growth for city/county unpaved road dust is based on an inverse correlation between light and medium duty vehicle VMT (Pechan). Growth for other non-agricultural roads is based upon a combination of population and forestry employment data (Pechan).

Unpaved Road Dust – Private Roads

- This newly added source category is meant to include unpaved road traffic that is not estimated as part of the other unpaved road dust emission estimates. Potential sources could include travel on oil field roads, private unpaved driveways, irrigation canal roads, and non-production oriented travel on agricultural roads.
- A base emission factor of 2.0 lbs PM10/VMT was used for the private unpaved road dust emission estimates. This emission factor is based on unpaved road dust emission measurements performed by UCD and DRI in the San Joaquin Valley. The emission factor was adjusted to account for the effects of rain as described in the Unpaved Road Dust – Non-Agricultural section.
- After several attempts to collect VMT data for private roads, it was determined to currently be impractical. Therefore, an alternative approach was agreed upon in which it was assumed that private unpaved road travel is one-tenth of all of the other non-agricultural and agricultural unpaved road travel. This magnitude was somewhat confirmed for reasonableness using the limited existing available data.
- The temporal profile for private unpaved road is based on county specific precipitation.
- The growth for the private roads is set to zero. It is expected that some components of the VMT may increase, such as unpaved driveways to rural residences, but other elements, such as the agricultural component, are projected to decrease. In the absence of other information, it was decided to set the growth for the full composite category to zero.

Unpaved Road Dust – Agricultural

- Current agricultural unpaved road emission estimates are based on 2000 crop acreage data, which was backcast to 1999 acreage values.
- An emission factor of 2.0 lbs PM₁₀/VMT was used for the agricultural unpaved road dust emission estimates. This emission factor is based on unpaved road dust emission measurements performed by UCD and DRI in the San Joaquin Valley.
- A moisture correction factor is not used for the agricultural lands. It is assumed that the crop calendars, and the activities they represent, adequately account for the effects of moisture.
- The VMT estimates for agricultural unpaved road dust were substantially improved for the 2003 update. The previous estimates were based on an assumption of 175 VMT/40 acres for all crops. The new estimates are crop specific. The base VMT values are shown below. These base values were assigned to all additional crops based on similarities between cultural practices.

VMT for Agricultural Unpaved Roads

Commodity	VMT/acre/year	Reported
Grapes (All)	0.38	15 VMT/40 acres/year
Citrus	1.23	98 VMT/80 acres/year
Tree Fruit	1.24	62 VMT/50 acres/year
Tree & Citrus Fruit	1.23	Average of Citrus & Tree Fruit
Nut Crops	0.49	37 VMT/75 acres/year
Cotton (large field)	0.40	64 VMT/160 acres/year
Cotton (small field)	2.40	156 VMT/65 acres/year
Existing ARB	4.38	175 VMT/40 acres/year

- The monthly agricultural unpaved road dust temporal profile is based on land preparation and harvest activities from crop calendars. The assumption is that there is more unpaved road travel during the times of year when land preparation and harvest activities are at their highest.
- The growth for agricultural unpaved road dust is based on the projected acreage of irrigated agricultural lands.

Agricultural Land Preparation Emissions

- The base methodology for estimating geologic agricultural land preparation emissions is based on an ARB methodology. In the methodology, crop calendars are used to determine the operations needed to prepare an acre of land for each crop. Emission rates are then assigned to each operation. These are then summed to develop a per-acre PM₁₀ emission rate for each crop. Finally, the acreage for each crop in each county is multiplied by the per-acre emissions to compute overall PM₁₀ fugitive dust emissions.
- Rather than using a single emission factor for all activities, as was used in the past, we have now applied operation specific emission factors to each land preparation operation.
- Working with agricultural experts, the five factors below were applied to all agricultural land preparation activities performed within California, as shown in the second table.
- Crop acreage is based on calendar year 2000 crop acreage data for each SJV county, which was then backcast for the 1999 base year.
- The monthly agricultural land preparation fugitive dust emissions temporal profile is based on agricultural crop calendars.
- The growth for agricultural land preparation dust is based on projections of changes in irrigated acreage in the San Joaquin Valley.

Land Preparation Emission Factors

Land Preparation Activity	Emission Factor (lbs PM ₁₀ /acre-pass)
Root cutting	0.3
Discing, Tilling, Chiseling	1.2
Ripping, Subsoiling	4.6
Land Planing & Floating	12.5
Weeding	0.8

Land Preparation Emission Factor Assignments*

Land Preparation Operation	Emissions Category	Emission Factor (lbs PM ₁₀ / acre-pass)
List	Weeding	0.8
List & Fertilize	Weeding	0.8
Roll	Weeding	0.8
Spring Tooth	Weeding	0.8
Seed Bed Preparation	Weeding	0.8
Terrace	Weeding	0.8
Chisel	Discing	1.2
Plow	Discing	1.2
Mulch Beds	Discing	1.2
Disc & Stubble Disc	Discing	1.2
Disc & Furrow-out	Discing	1.2
Finish or Harrow Disc	Discing	1.2
Post Burn/Harvest Disc	Discing	1.2
Unspecified Operation	Discing	1.2
Land Preparation, Gen.	Discing	1.2
Subsoil-deep chisel	Ripping	4.6
Float	Land planing	12.5
Land Plane	Land planing	12.5
Laser Level & Leveling	Land planing	12.5

* Not complete list

Agricultural Harvest Emissions

- The base methodology for estimating geologic agricultural harvest emissions is based on an ARB methodology. In this method, the three available California harvest emission factors were assigned to all of the harvest activities performed in California. In many cases, the available factors were scaled to reflect the relative dustiness of different harvesting activities.
- The available harvest emission factors are shown below. Some of the crop assignments are shown in the next table.
- Crop acreage is based on calendar year 2000 crop acreage data for each SJV county, and then backcast for the 1999 base year.
- The monthly agricultural harvest dust temporal profile is based on agricultural crop calendars.
- The growth for agricultural harvesting dust emissions is based on projections of changes in irrigated acreage in the San Joaquin Valley.

Harvest Emission Factors

Agricultural Harvest Operation	Harvest Emission Factors (lbs PM ₁₀ /acre)
Cotton	
Cotton Picking	1.7
Cotton Stalk Cutting	1.7
Cotton Total	3.4
Almond	
Almond Shaking	0.37
Almond Sweeping	3.7
Almond Pickup	36.7
Almond Total	40.8
Wheat	
Combining	5.8

Harvest Emission Factor Assignments*

Crop Name	Crop Calendar Profile	Harvest EF Base Factor	Harvest EF Division Factor
Almonds	Almonds	Almonds	1
Beans, Dry	Dry Beans	Cotton	2
Corn, Grain	Corn	Cotton	2
Corn, Silage	Corn	Cotton	20
Cotton	Cotton	Cotton	1
Grapes, Wine	Grapes-Wine	Cotton	20
Alfalfa	Alfalfa	Zero	1
Oranges	Citrus	Cotton	40
Pistachios	Almonds	Almonds	10
Rice	Rice	Cotton	2
Safflower	Safflower	Wheat	1
Tomatoes	Tomatoes	Cotton	20
Wheat	Wheat	Wheat	1

* Not complete list

Construction Dust Emissions

- Emissions estimates are based on an ARB methodology that estimates the acreage of land disturbed by construction activities. This information is based on housing units built and economic data.
- The emission factor is unchanged from the previous estimates, which is 0.11 tons PM10/acre-month of activity.
- The emission factor includes the effects of typical control measures, such as watering, which is assumed to reduce emissions by about 50%.
- For residential construction, activity data is based on new housing units for 1999, compiled by the Department of Finance. For commercial, industrial, and institutional construction, activity data is based on project valuations compiled by the Department of Finance
- Growth is based on construction sector output
- Monthly temporal data show slightly higher activity during the spring and summer months, and somewhat lower during the winter.

Road Construction Dust Emissions

- The emission estimates are based on an ARB methodology in which the miles of new road built are converted to acres disturbed, which is then multiplied by a generic project duration and an emission rate.
- The emission factor is unchanged from the previous estimates, which is 0.11 tons PM10/acre-month of activity.
- The emission factor includes the effects of typical control measures, such as watering, which is assumed to reduce emissions by about 50%.
- Activity data, which consists of new lane miles of roadway built, were provided by the county transportation planning agencies (TPAs). This information was converted to acres of land disturbed to compute emissions.
- Current growth is based on information provided by the TPAs.
- Monthly temporal data show slightly higher activity during the spring and summer months, and somewhat lower during the winter.

Beef and Dairy Cattle Particulate Matter

- Previously, only emissions from feedlots were estimated using an U.S. EPA generic emission factor. Now, PM₁₀ fugitive dust emissions are estimated from both beef and dairy cattle using recent emissions test data and current population counts.
- The emission factor for beef feedlots is based on a recent study by UC Davis, and is 29 lbs PM₁₀/1000 head/day.
- The base emission factor for dairies is based on a study performed at Texas A&M University. To make the base emission factor of 4.4 lbs PM₁₀/1000 lactating head/day more California specific, it was multiplied by a scaling factor based on the ratio of the California feedlot emission factor to a Texas feedlot emission factor. This ratio is 29:19, which converts to a multiplier of 1.53 and produces a final dairy emission factor of 6.72 lbs PM₁₀/1000 head/day for California dairies.
- Population data for beef and dairy cattle is derived from California Department of Food and Agricultural statistical information.
- Currently it is assumed that dust production from beef and dairy feedlots is consistent throughout the year.
- Growth factors for dairies are based on information collected from the dairy industry. Currently it is assumed that there is no growth in the California feedlot populations.

Ammonia Emissions

The current ammonia emission inventory used for the SJV PM₁₀ SIP is primarily based on results of a contract sponsored by the California Regional Particulate Air Quality Study (CRPAQS). Under this contract, emissions from ammonia sources in the SJV were estimated using the best available emission factor and activity data. Emissions were estimated for all of the potentially significant ammonia sources including livestock, burning, composting, domestic sources, native animals, and landfills. The detailed documentation for these emission estimates is available from the ARB.

The fertilizer and soil ammonia estimates were generated by the ARB using the Cal/CASA model, which was modified by NASA Ames and Fresno State University to estimate emissions for these sources. The motor vehicle ammonia estimates were also generated by the ARB using existing emission factors and EMFAC VMT outputs. The ARB estimated ammonia emissions for motor vehicles, as well as for agricultural fertilizer application and natural soils.

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Tasks and Schedule for Emission Inventory Improvements

Emission Inventory Workplan for the San Joaquin Valley Unified
Air Pollution Control District Particulate Matter SIP

Appendix Last Updated

May 5, 2003

Table 1 – Areawide Emission Inventory Updates

Table 2 – Mobile Source Inventory Updates

Table 3 – Stationary Source Inventory Updates

Table 4. Ammonia Emission Inventory Development

Table 5. Natural Source Emission Inventory Updates

Key for Tables

- Denotes planned milestone or planned task completion
- Work ongoing on task, task progress
- Project completed

Grey bars indicate originally estimated start and end points for projects.

Table 1. Areawide Emission Inventory Updates

Areawide Sources	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	Responsibility (primary, secondary)
Paved Road Dust											ARB – Patrick Gaffney
Update base year VMT			<input checked="" type="checkbox"/>	<input type="checkbox"/>							ARB, district, TPAs
Update road type splits			<input checked="" type="checkbox"/>	<input type="checkbox"/>							ARB, district, TPAs
Evaluate AP-42 rainfall factor				<input type="checkbox"/>							ARB, district
Evaluate DRI & UCR EF studies			<input type="checkbox"/>								ARB, district
Update EFs if warranted				<input type="checkbox"/>							ARB, district
Update emission estimates					<input type="checkbox"/>		Emissions update complete				ARB
Unpaved Road Dust – Non-Ag											ARB – Patrick Gaffney
Update base year mileage				<input type="checkbox"/>		<input type="checkbox"/>					ARB, TPA
Evaluate seasonal profile				<input type="checkbox"/>		<input type="checkbox"/>					ARB, district
Evaluate UCD study results					<input type="checkbox"/>						ARB, district
Evaluate new AP-42 EF ¹		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							ARB, district
Update forecast/control system										<input type="checkbox"/>	ARB,
Include Reg. VIII controls										<input type="checkbox"/>	
Private unpaved roads										<input type="checkbox"/>	
Evaluate Sierra Research Data									<input type="checkbox"/>		
Update emission estimates							<input type="checkbox"/>	Update Complete			ARB
Unpaved Road Dust - Ag											ARB – Hong Yu, Gaffney
Update crop acreage		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>							ARB
Evaluate STI & UCD VMT				<input checked="" type="checkbox"/>	<input type="checkbox"/>						ARB, district
Update VMT if possible				<input type="checkbox"/>							ARB, district
Update seasonal profile			<input checked="" type="checkbox"/>				<input type="checkbox"/>				ARB
Evaluate Sierra Research Data									<input type="checkbox"/>		
Update emission estimates					<input type="checkbox"/>		<input type="checkbox"/>	Update Complete			ARB
Agricultural Operations (land preparation & harvest)											ARB – Hong Yu, Gaffney
Update crop acreage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>							ARB
Update crop calendars		<input checked="" type="checkbox"/>		<input type="checkbox"/>							ARB, district, others
Update acre-passes				<input type="checkbox"/>	<input type="checkbox"/>						ARB, district, others
Incorporate UCD EFs		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						ARB
Explore GIS based approach		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						ARB
Update emission estimates						<input type="checkbox"/>	<input type="checkbox"/>	Update Complete			ARB

Table 1. Areawide Emission Inventory Updates

Areawide Sources	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	Responsibility (primary, secondary)
Woodstoves & Fireplaces											ARB – Ray Asregadoo
Evaluate current activity data		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>							District, ARB
Update EFs if feasible			<input type="checkbox"/>		<input type="checkbox"/>						ARB, district
Evaluate existing method		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						ARB, district
Verify temporal profiles				<input type="checkbox"/>	<input type="checkbox"/>						ARB, district
Evaluate UC Berkeley data			<input checked="" type="checkbox"/>	<input type="checkbox"/>							ARB, district
Explore GIS based approach				<input type="checkbox"/>							ARB
Update emission estimates						<input type="checkbox"/>	Emissions update complete				ARB
Agricultural Burning											District – Steve Shaw
Compile activity data			<input type="checkbox"/>								District
Incorporate current EFs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								District
Update temporal profiles				<input type="checkbox"/>							District
Evaluate UC Berkeley data				<input type="checkbox"/>	<input type="checkbox"/>						District, ARB
Update emission estimates				<input type="checkbox"/>	<input type="checkbox"/>		Emissions update complete				District
Prescribed Burning											District – Steve Shaw
Compile activity data			<input type="checkbox"/>								District
Update EFs if feasible				<input type="checkbox"/>							District, ARB
Update temporal profiles				<input type="checkbox"/>							District
Update emission estimates					<input type="checkbox"/>		Emissions update complete				District
Construction											ARB – Cheryl Taylor
Update activity for structures			<input type="checkbox"/>	<input type="checkbox"/>							District, ARB
Update activity for roads built			<input type="checkbox"/>		<input type="checkbox"/>						District, TPA
Evaluate road assumptions				<input type="checkbox"/>			<input type="checkbox"/>				ARB, district, check model
Evaluate EFs			<input type="checkbox"/>	<input type="checkbox"/>							ARB, district
Update emission estimates					<input type="checkbox"/>	<input type="checkbox"/>	Emissions update complete				ARB, district
Commercial Charbroiling											District – Lead, ARB – D. Rake
Evaluate CSU SF study				<input type="checkbox"/>			<input type="checkbox"/>				ARB, district
Update activity data if feasible				<input type="checkbox"/>							District, ARB
Update emission factors			<input type="checkbox"/>								District, ARB
Update emission estimates					<input type="checkbox"/>		Emissions update complete				District, ARB

Fertilizers - Ammonia										ARB – Hong Yu	
Verify application rates			<input checked="" type="checkbox"/>								ARB
Incorporate CSUF GIS data				<input checked="" type="checkbox"/>	<input type="checkbox"/>						ARB
Update emission estimates				<input checked="" type="checkbox"/>					<input type="checkbox"/>		ARB
Livestock										ARB – Hong Yu, Gaffney	
Update population	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							<input type="checkbox"/>	ARB, district
Collect spatial data as needed					<input type="checkbox"/>						ARB
Evaluate CRPAQS ² data				<input checked="" type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>	ARB, district
Assign emission factors				<input type="checkbox"/>	<input type="checkbox"/>						ARB
Update emissions										<input type="checkbox"/>	ARB
Categories Not Scheduled for Update											
Pesticides	No changes proposed, current estimates adequate for PM inventory										
Consumer products	No changes proposed, current estimates adequate										
Architectural coatings	No changes proposed, current estimates adequate										
Refrigerants	No changes proposed; ammonia may be added if in CRPAQS study										
Solvent evaporation	No changes proposed, current estimates adequate										
Windblown dust from ag lands	No changes proposed, current estimates adequate, exceedance days stagnant										
Structure and car fires	No changes proposed, current estimates adequate										
Asphalt paving / roofing	No changes proposed, current estimates adequate										
Utility equipment	No changes proposed, current estimates adequate										

- Denotes milestone
- Task progress
- Project completed

Notes:

1. Updated AP-42 methodology includes inputs of soil silt, vehicle weight, soil moisture, and vehicle speed. Most likely, default information will not be available for parameters.
2. As part of the CRPAQS effort, a contract was awarded to develop a statewide ammonia emission inventory. It is anticipated that the results of this study (available mid-summer) can be used to populate an ammonia emission inventory for the SJV.

Table 2. Mobile Source Emission Inventory Updates

Mobile Sources	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	Responsibility
On-Road Mobile ^{1,2}											ARB – Category Lead
Light Duty Passenger					<input type="checkbox"/>		<input checked="" type="checkbox"/>				ARB
Light Duty Trucks					<input type="checkbox"/>		<input checked="" type="checkbox"/>				ARB
Medium & Heavy Duty Gas Truck					<input type="checkbox"/>		<input checked="" type="checkbox"/>				ARB
Light & Med Duty Diesel Truck					<input type="checkbox"/>		<input checked="" type="checkbox"/>				ARB
Heavy Duty Diesel Truck					<input type="checkbox"/>		<input checked="" type="checkbox"/>				ARB
Motorcycles					<input type="checkbox"/>		<input checked="" type="checkbox"/>				ARB
Heavy Duty Diesel Buses					<input type="checkbox"/>		<input checked="" type="checkbox"/>				ARB
Heavy Duty Gas Buses					<input type="checkbox"/>		<input checked="" type="checkbox"/>				ARB
School Buses					<input type="checkbox"/>		<input checked="" type="checkbox"/>				ARB
Motor Homes					<input type="checkbox"/>		<input checked="" type="checkbox"/>				ARB
Off-Road Mobile											ARB – Category Lead
Aircraft					<input checked="" type="checkbox"/>	For all off road categories, best available estimates are currently in CEIDARS					ARB
Trains					<input checked="" type="checkbox"/>						ARB
Ships and Commercial Boats					<input checked="" type="checkbox"/>						ARB
Recreational Boats					<input checked="" type="checkbox"/>						ARB
Off-Road Recreational Vehicles					<input checked="" type="checkbox"/>						ARB
Off-Road Equipment					<input checked="" type="checkbox"/>						ARB
Farm Equipment					<input checked="" type="checkbox"/>						ARB
Fuel Storage and Handling					<input checked="" type="checkbox"/>						ARB

- Denotes milestone
- Milestone completed
- Project completed

Notes:

1. The most current version of EMFAC will be used in computing the on-road emission estimates for the 1999 base year.
2. On-road mobile source categories have been summarized for this table because it is assumed that separate update steps will not be used for each specific category.

Table 3. Stationary Source Emission Inventory Updates*

Stationary Sources	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	Responsibility (CEIDARS Update)
Fuel Combustion Emission Updates											District – Category Lead
Electric Utilities	<input checked="" type="checkbox"/>										ARB
Cogeneration	<input checked="" type="checkbox"/>										ARB, district
Oil and Gas Production	<input checked="" type="checkbox"/>										District
Petroleum Refining	<input checked="" type="checkbox"/>										Update not needed, low ems
Manufacturing and Industrial	<input checked="" type="checkbox"/>										District
Food and Agricultural	<input checked="" type="checkbox"/>										District
Service and Commercial	<input checked="" type="checkbox"/>										District
Waste Disposal											District – Category Lead
Sewage Treatment	<input checked="" type="checkbox"/>										ARB, update ammonia only
Landfills, Incinerators	<input checked="" type="checkbox"/>										Update not needed, low ems
Cleaning and Coatings											District – Category Lead
Degreasing and Other	<input checked="" type="checkbox"/>										District
Coatings and Adhesives	<input checked="" type="checkbox"/>										District
Printing	<input checked="" type="checkbox"/>										Update not needed, low ems
Petroleum Production & Marketing											District – Category Lead
Oil and Gas Production	<input checked="" type="checkbox"/>										District
Petroleum Refining	<input checked="" type="checkbox"/>										District
Petroleum Marketing	<input checked="" type="checkbox"/>										District
Industrial Processes											District – Category Lead
Chemical	<input checked="" type="checkbox"/>										District
Food and Agriculture	<input checked="" type="checkbox"/>										District
Mineral Processes	<input checked="" type="checkbox"/>										District
Metal Processes, Wood & Paper	<input checked="" type="checkbox"/>										Update not needed, low ems
Glass and Related	<input checked="" type="checkbox"/>										District

- Denotes milestone
- Task progress
- Project completed

*NOTE: Most categories were updated recently as part of CCOS effort, so update not needed for PM10 SIP

Table 4. Ammonia Emission Inventory Development

Ammonia Sources	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	Responsibility
Ammonia Inventory Development											ARB – Hong Yu, V. Hughes
Evaluate CRPAQS NH3 study				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input type="checkbox"/>			ARB, district
Develop new EIC/CES codes							<input type="checkbox"/>			<input type="checkbox"/>	ARB
Provide NH3 EI									<input type="checkbox"/>		

- Denotes milestone
- Task progress
- Project completed

Table 5. Natural Source Emission Inventory Updates

Natural Sources	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	Responsibility
Natural Source Emissions											ARB – Category Lead
Geogenic Sources					<input type="checkbox"/>						Update not needed, low PM
Wildfires					<input type="checkbox"/>						ARB, district
Windblown dust					<input type="checkbox"/>						Not inventoried, no update
Biogenics					<input type="checkbox"/>					<input type="checkbox"/>	ARB – Klaus Scott

- Denotes milestone
- Task progress
- Project completed