



EMFAC2001 WORKSHOP

Presented by:

Mobile Source Analysis Branch

Planning and Technical Support Division

May, 2001



Workshop Agenda

- 10:00-10:15 Introduction
- 10:15-10:45 Modifications to Activity
- 10:45-11:15 Modifications to Emission Rates
- 11:15-12:15 Miscellaneous Improvements
- 12:15 - 1:00 Lunch Break
- 1:00 - 1:30 Introduction of User Interface
- 1:30 – 2:00 Updates to “OFFROAD”
- 2:00 – 2:30 EMFAC2002
- 2:30 - 3:00 Wrap up and Q&A



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Modification to Activity

Incorporation of New VMT and Speed





Updated VMT and Speed

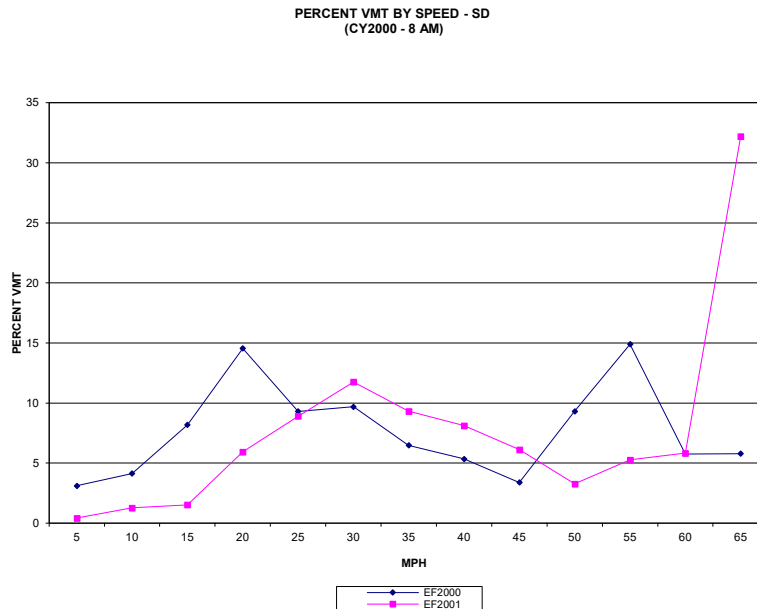
- Update with latest data from MPOs
- No obvious trends with respect to VMT
- Speeds are getting dramatically faster
- Timeliness and completeness of submissions critical for annual updates
- ARB “responsible” for accuracy of activity (SB2174)



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New Speed Distribution Trends

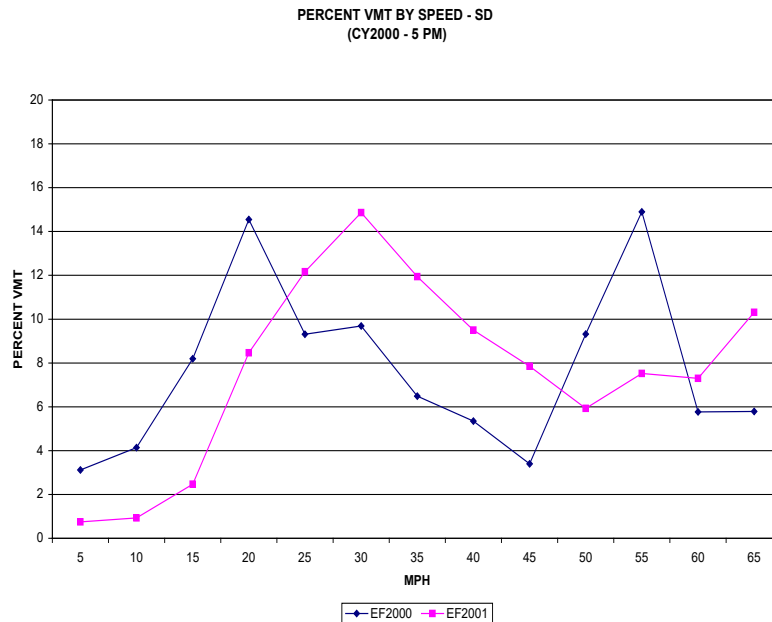


■ AM-Peak

- Less VMT at low speeds
- More VMT at intermediate speeds
- Significantly more VMT at extreme speeds



New Speed Distribution Trends



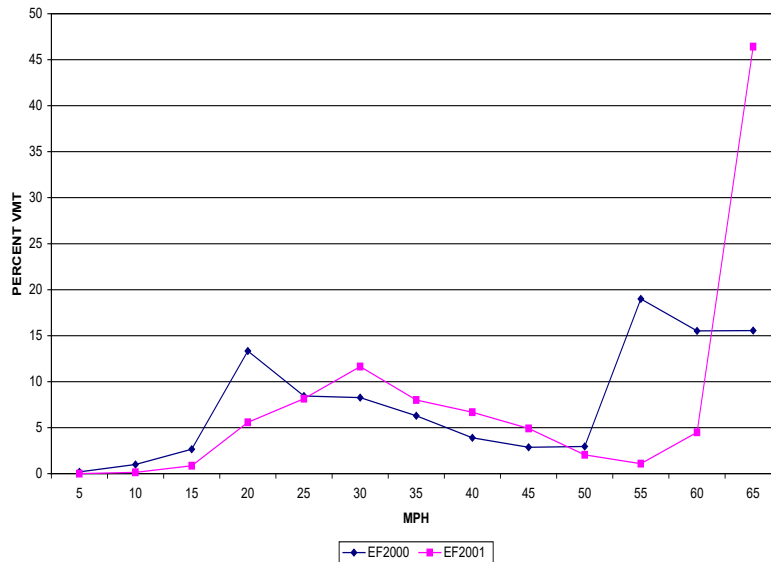
■ PM-Peak

- Less VMT at low speeds
- More VMT at intermediate speeds
- More VMT at extreme speeds



New Speed Distribution Trends

PERCENT VMT BY SPEED - SD
(CY2000 - 5 AM)

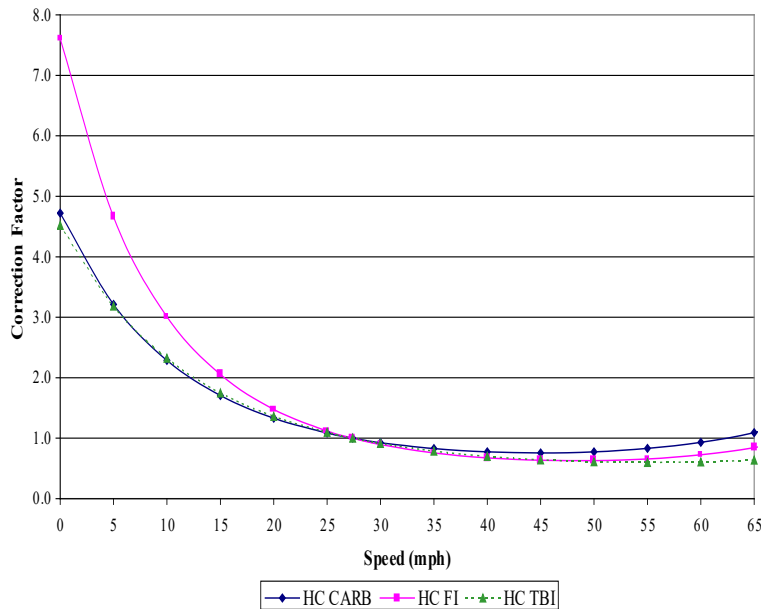


■ Off-Peak

- Less VMT at low speeds
- More VMT at intermediate speeds
- Significantly more VMT at extreme speeds



Implications of "Faster" Speeds on SCFs



- Fewer vehicles experience upturn at low/high speeds.
- Significant drop in exhaust emissions.



Other Implications

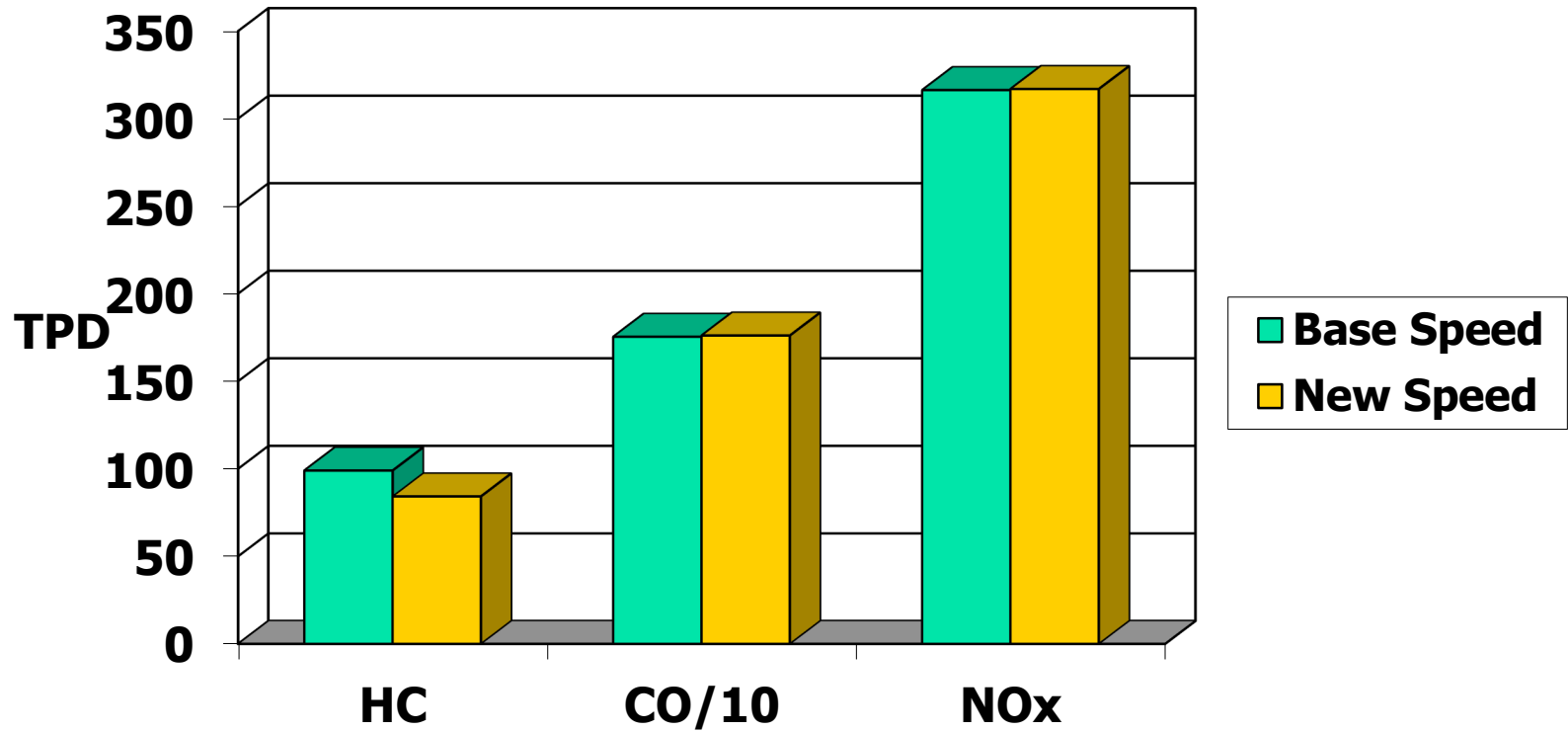
- Faster speeds imply less “on” time.
- Should reduce running losses (grams/hour).
- Should increase diurnal/resting losses because of additional “off” time.
- Should increase starts due to longer soak times.



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SFAB 2000 Exhaust Emissions Effect





Summary

- Trends in speed distribution will reduce emissions, especially HC.
- ARB will be working to standardize activity submissions and dates for annual updates.
- To address other modeling implications, ARB may ask for clarification on the nature of the changes.



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Update Estimates of Chronically Unregistered Vehicles





Project Objective

- Determine the County Specific Instantaneous and Chronic Un-registered rate.
- Instantaneous – Less than two years
- Chronic – Two years or more
 - (no benefit from Smog Check)
- Travel to each county in California and capture license plate information.



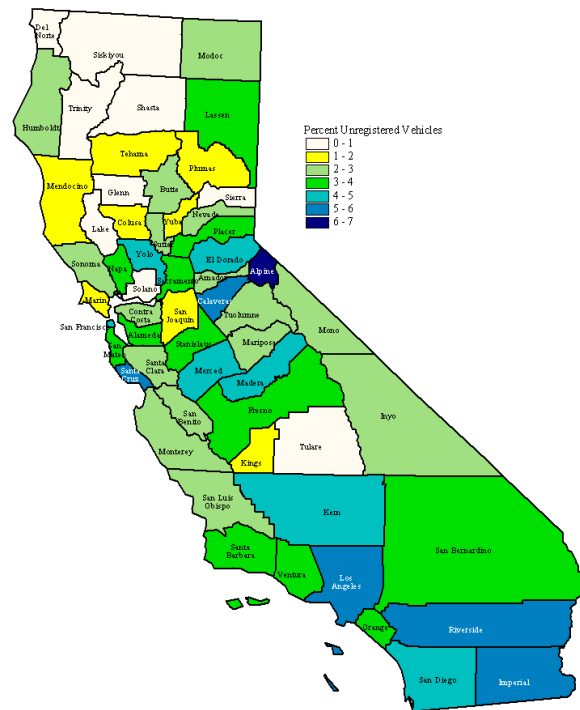
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Samples of Captured Vehicles



Unregistered Vehicles by County





Results of Analysis

- 98,817 Useable Images Captured
- Unregistered fraction ranged from 0%
 - Del Norte / Sierra / Siskiyou / Trinity
- To 6.45%
 - Alpine
- Statewide Average = 3.85%



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Un-registered Rate/Vehicles Analyzed for Select Counties

■ Imperial	■ 5.37%	411
■ Los Angeles	■ 5.12%	25,835
■ Orange	■ 3.20%	9,468
■ Riverside	■ 5.13%	4,262
■ Sacramento	■ 3.31%	3,337
■ San Diego	■ 4.15%	9,584
■ San Francisco	■ 4.37%	2,840
■ San Joaquin	■ 1.33%	1,241



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Modifications to EMFAC

- EMFAC2000 assumed a Statewide Un-Registered Vehicle fraction of:
 - 8.35% Instantaneous and
 - 0.56% Chronic
- Based on the latest information, the modified Statewide Un-Registered Vehicle fraction will be :
 - 3.85% Instantaneous and
 - ? % Chronic



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Update Out-Of-State Heavy-Duty Diesel Fraction





Out-of State HHDT VMT

- Based on a study by JFA, out-of-state heavy heavy-duty diesel truck VMT fraction increased from 25% of CA HHD trucks to 33%



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Inventory Changes Due to Changes in Out-of-State HHDT VMT

	% Change
HC	+7.1%
CO	+7.2%
NOx	+4.9%
PM	+6.3%



Update Estimates of Technology Fractions



Introduction to ARBVin Decoder



- Radian VIN Decoder
 - Refined technology fields: AIR, CAT, TWC, OXY, etc.
 - Model Years 1972 - 1999
- ARB EMFAC Algorithms and Classifications
- ARBVin Decoder
 - Outputs estimated emissions based on allocated vehicle regime
 - Outputs EMFAC2000 defined Tech Groups



Tech Group 101

Tech Group = Grouping of vehicles based upon Emission Control Configuration and Emission Control Standards.

- EMFAC2000 currently contains almost 300 Tech Groups
- Previous version of EMFAC (7G) only contained approximately 18 Tech Groups



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EMFAC2000 Tech Group Designations (Partial List Sample)

Tech Group	Description
1	<75 LDV no AIR
2	<75 LDV with AIR
3	75+ LDV noncatalyst
4	75-76 LDV OxCat with AIR
5	75-79 LDV OxCat no AIR
6	80+ LDV OxCat no AIR
7	77+ LDV OxCat with AIR
8	77-79 LDV TWC TBI/CARB
9	81-84 LDV TWC TBI/CARB 0.7 NOx
10	85+ LDV TWC TBI/CARB 0.7 NOx



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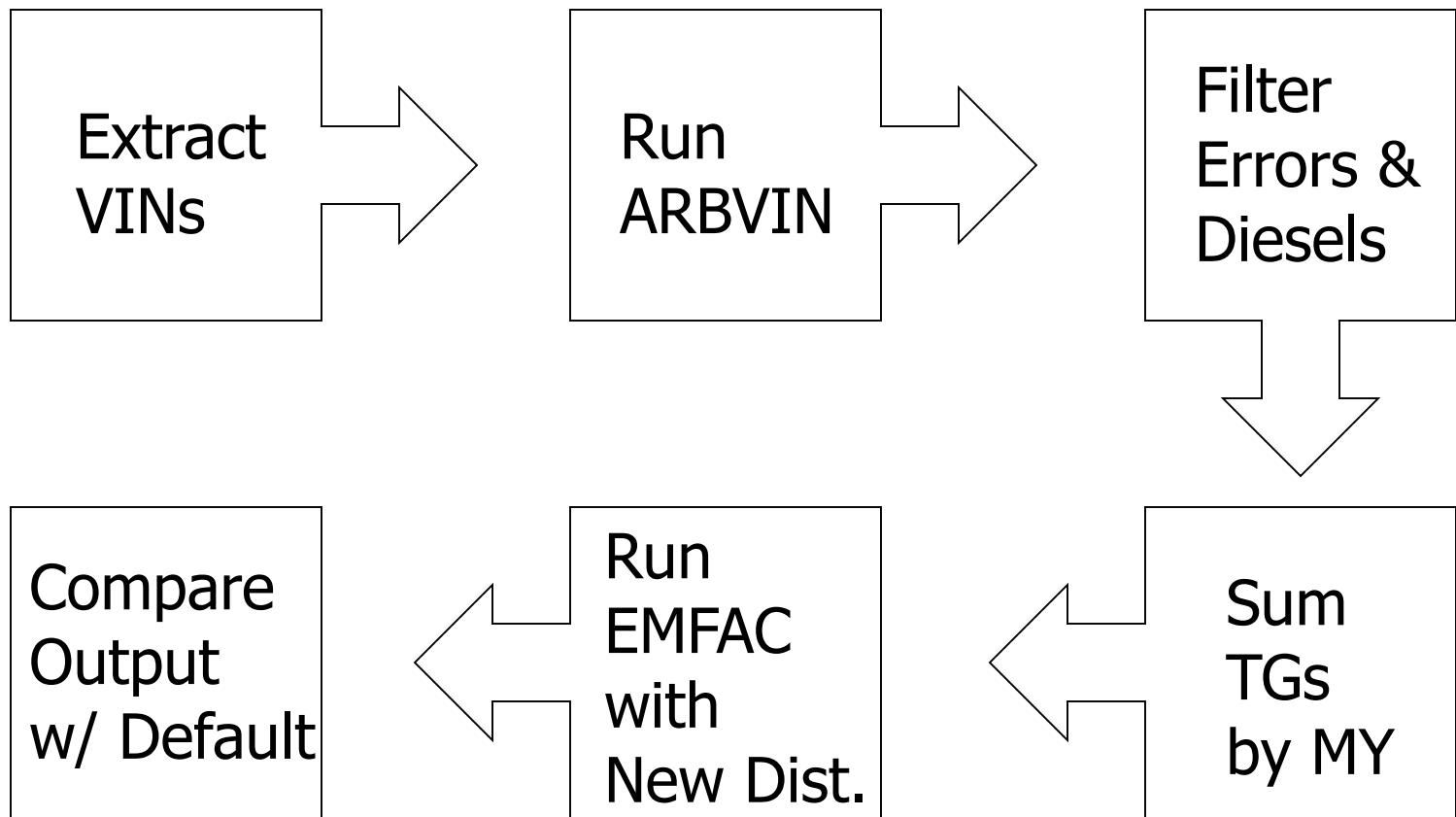
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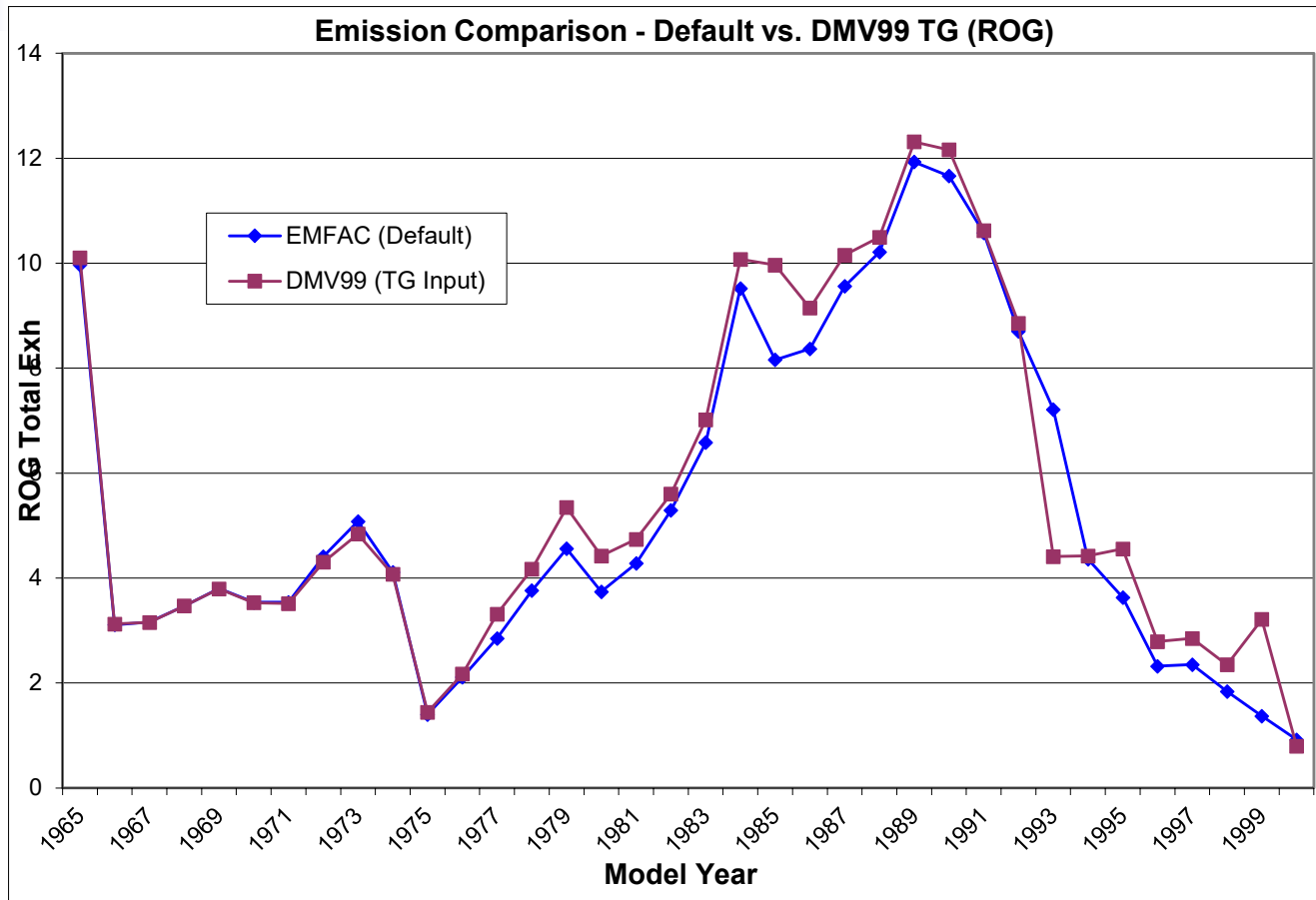
VINARB TG Analyses

- EMFAC2000 assumed a Statewide Distribution of Vehicles based upon EEA Report (1990)
 - Use more current data (1999) to perform comparison
- EMFAC2000 assumed vehicles of the same class and technology fall out of the fleet at the same rate.
 - Use one model year (1987) over multiple calendar years (1995 and 1998)

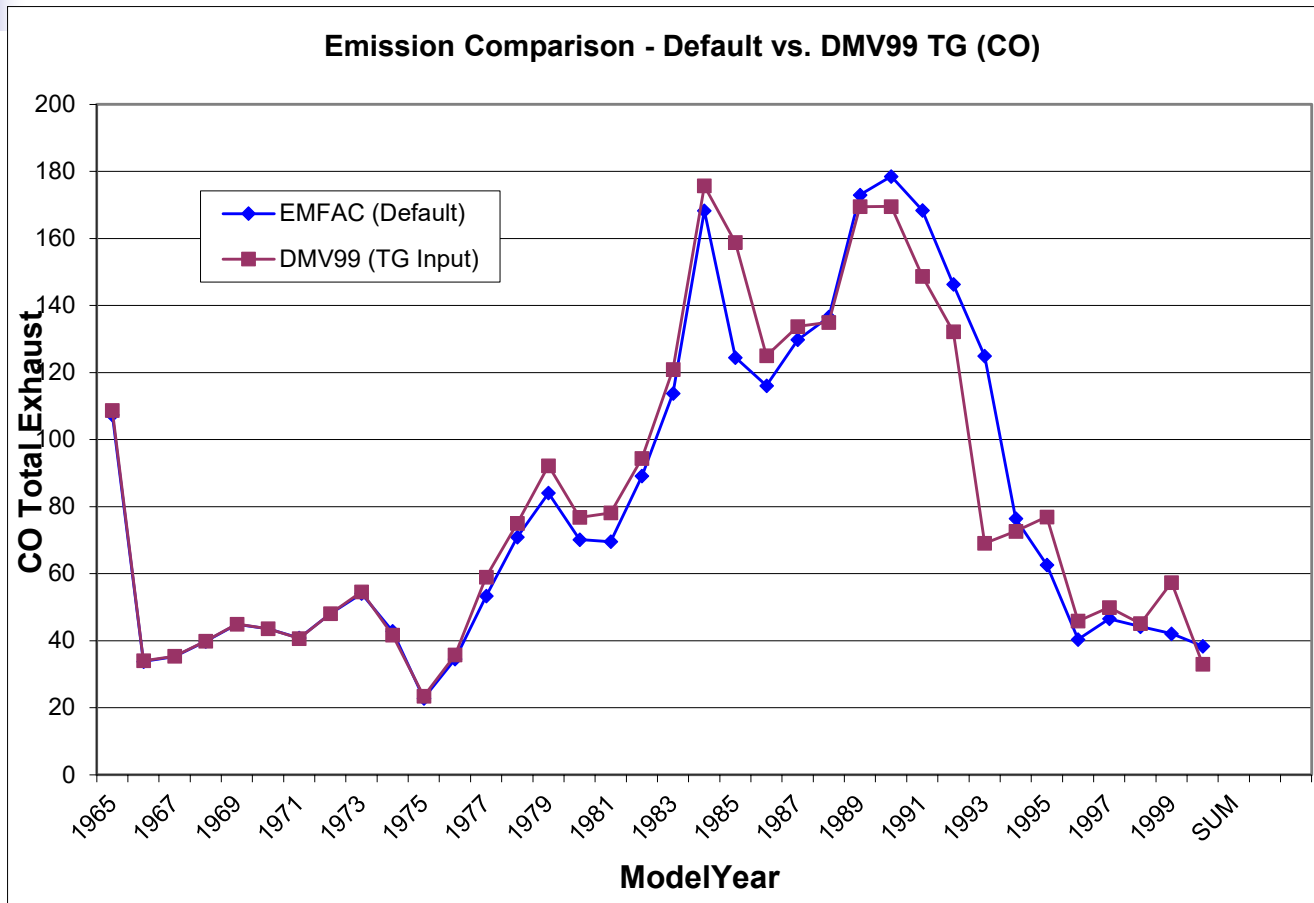
Statewide Vehicle Distribution Analysis



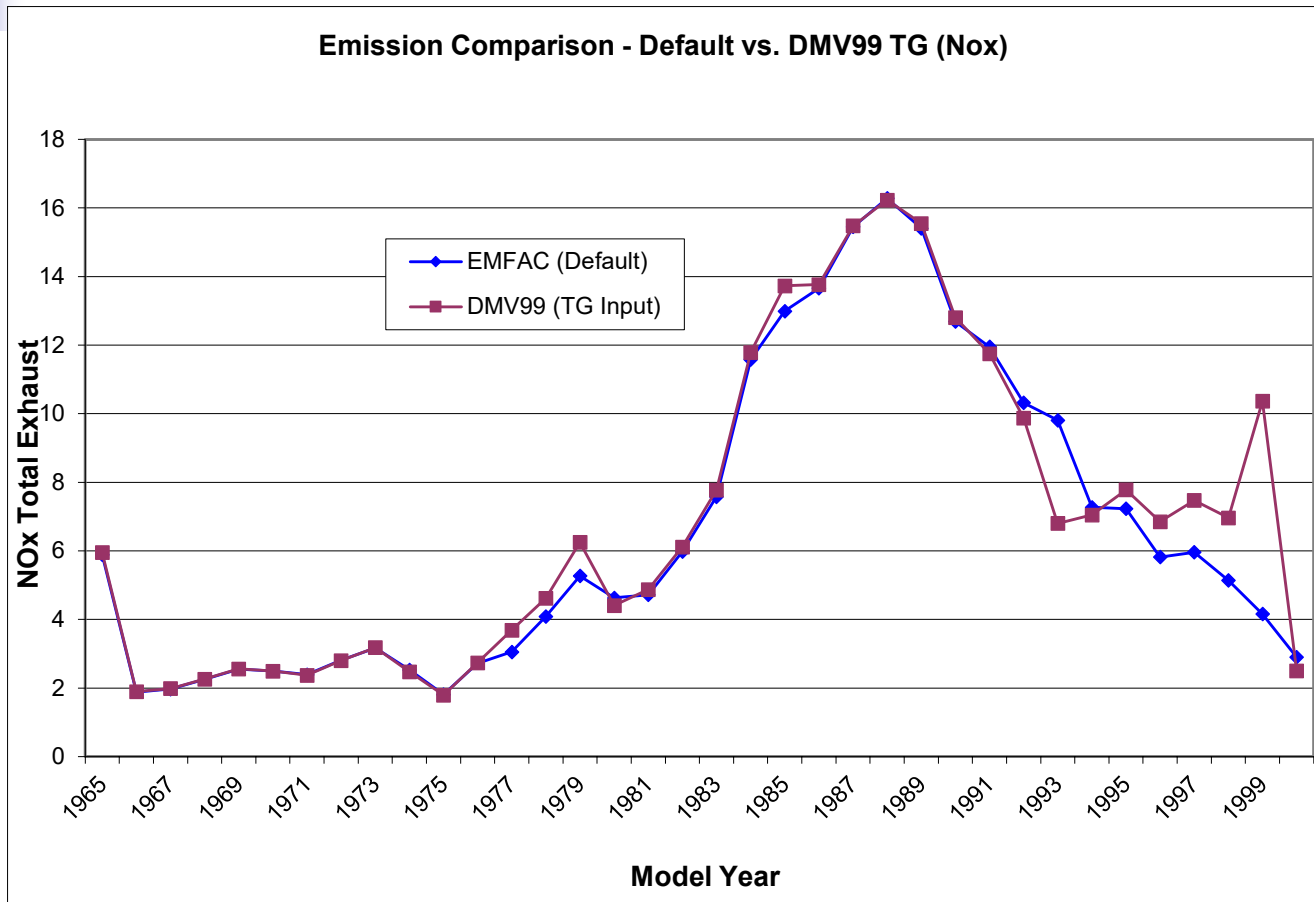
Emission Comparison (ROG) Default vs. DMV99 TG Dist.



Emission Comparison (CO) Default vs. DMV99 TG Dist.

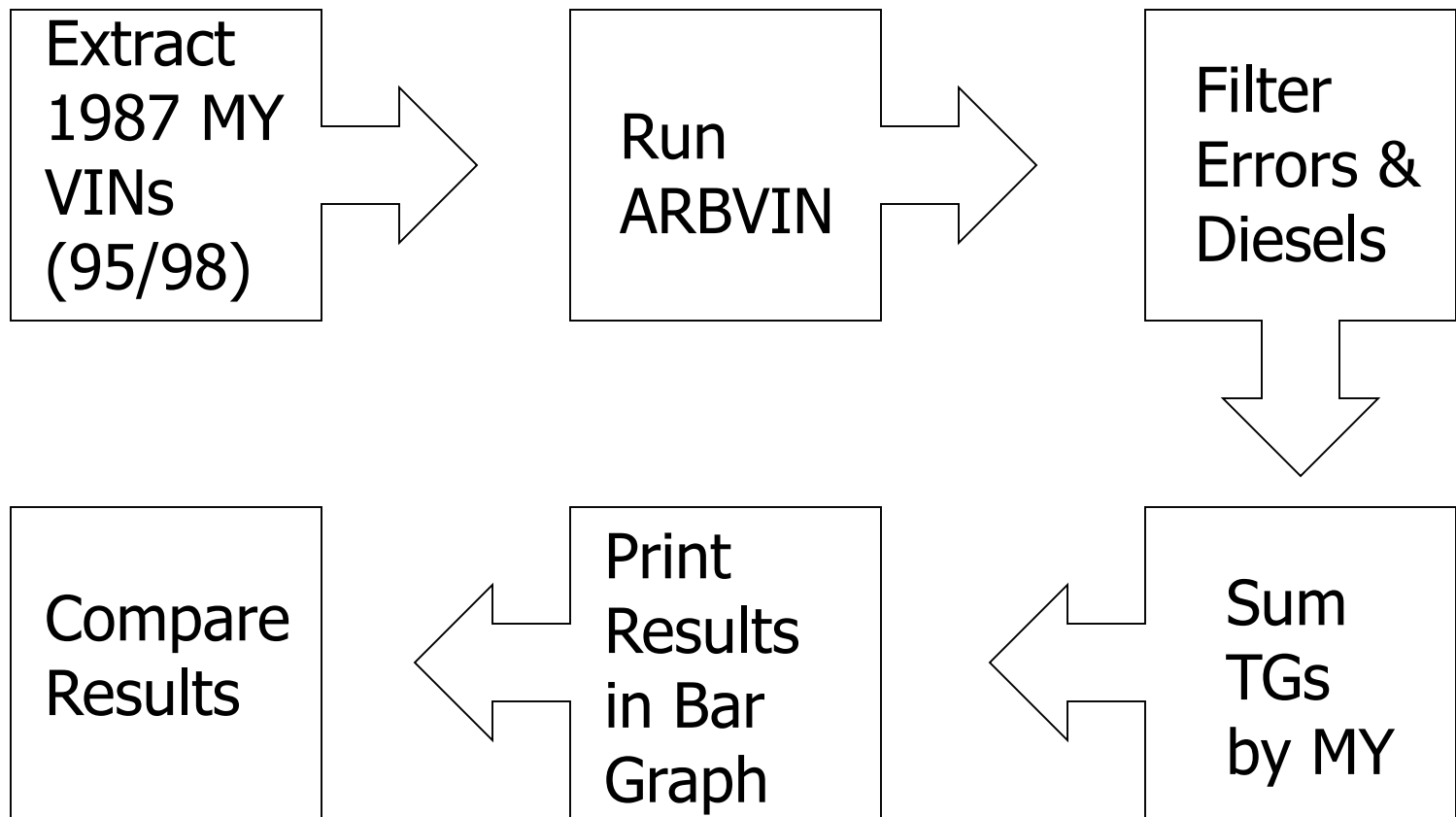


Emission Comparison (NOx) Default vs. DMV99 TG Dist.





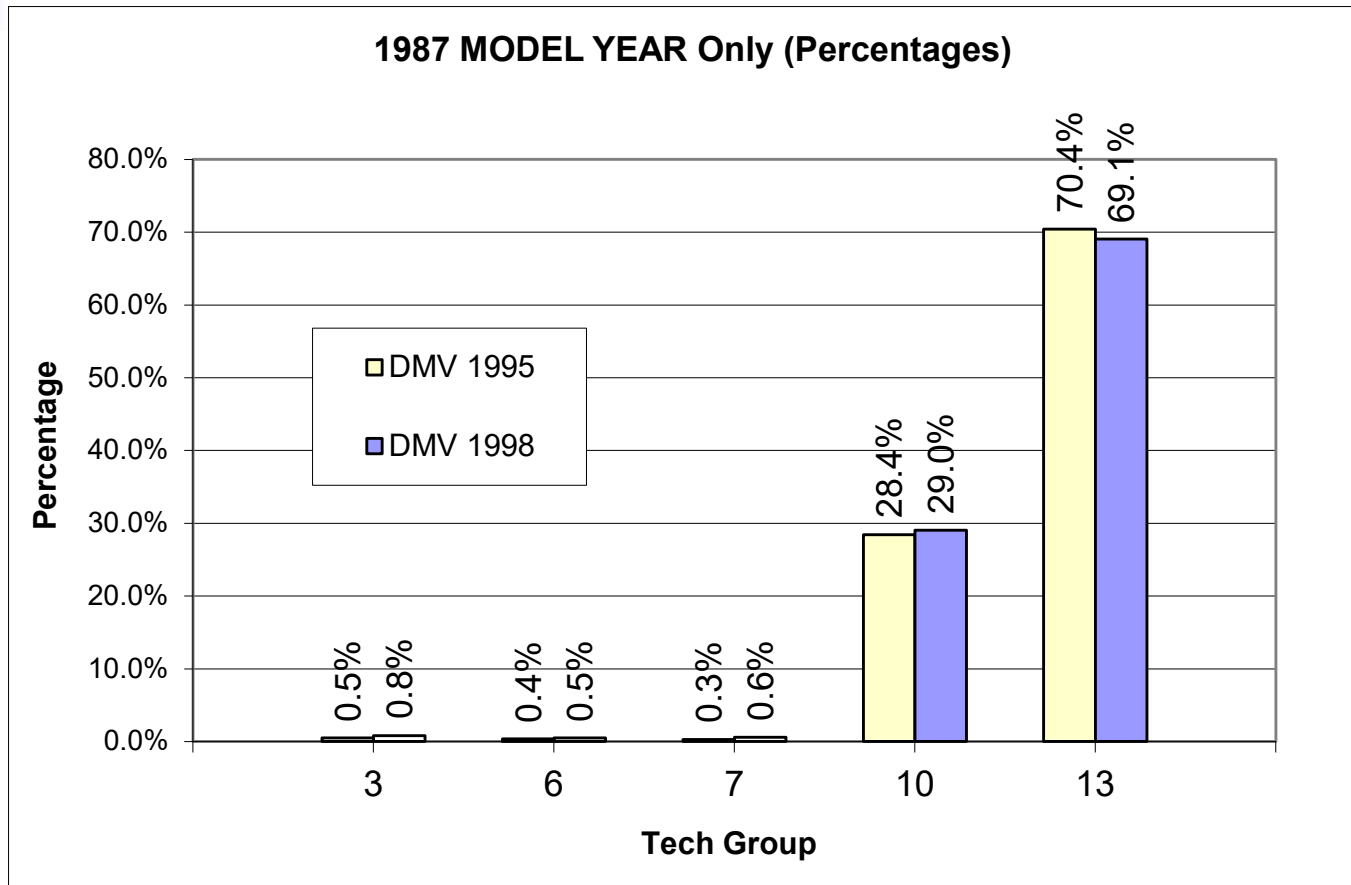
Multi-Year TG Analysis



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Tech Group Distribution Comparison (1995 vs. 1998)



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Results of Analyses

- Raises Estimates by approximately:
 - 5.1% for ROG
 - 1.0% for CO
 - 4.5% for NOx
- Assumption that Tech Group Distributions remain the same over time validated





Future Analyses

- Annual EMFAC Update using latest registration data
- Further Refined analysis of statewide TG distribution
 - MD and HD Trucks
 - Diesel Vehicles





Modifications to Emission Rates



Update LDD Emission Factors



Source:

- Data from two different diesel surveillance projects (2S82D1, 2S83D1)
- Included 139 vehicles
- Model Years from 1980-1984
- Odometer range between 11,000-125,000 miles
- FTP test cycle was used



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Analysis:

- Statistical analysis was performed on each bag to determine if emissions are a function of odometer, model year or vehicle class
- Analysis indicated emissions were not a function of odometer. Emissions showed a significant difference between the following model year groups:
 - 1980-1982
 - 1983
 - 1984



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Results:

- Based on emission standards, the final EMFAC 2001 model year specific emission rates for PC, LDV and MDV < 8,500 lbs are:

	HC		HC		CO		CO	
	Proposed		EMFAC 2000		Proposed		EMFAC 2000	
	ZM	DR	ZM	DR	ZM	DR	ZM	DR
	Gm/Mile	Gr/Mile ²	Gm/Mile	Gm/Mile ²	Gm/Mile	Gr/Mile ²	Gm/Mile	Gm/Mile ²
Pre 1982								
Bag 1	0.450	0	0.391	0.0299	1.591	0	1.226	0.0647
Bag 2	0.382	0	0.280	0.0410	1.268	0	1.060	0.0276
Bag 3	0.326	0	0.230	0.0299	1.153	0	0.958	0.0371
1983								
Bag 1	0.292	0	0.391	0.0299	1.66	0	1.660	0.0647
Bag 2	0.225	0	0.280	0.0401	1.236	0	1.236	0.0276
Bag 3	0.175	0	0.230	0.0299	1.103	0	1.103	0.0371
1984-1995								
Bag 1	0.418	0	0.520	0.0398	1.742	0	1.226	0.0647
Bag 2	0.321	0	0.374	0.0534	1.402	0	1.060	0.0276
Bag 3	0.265	0	0.307	0.0398	1.341	0	0.958	0.0371



Results: (continued...)

	CO2		CO2		NOX		NOX	
	Proposed		EMFAC 2000		Proposed		EMFAC 2000	
	ZM	DR	ZM	DR	ZM	DR	ZM	DR
	Gm/Mile	Gr/Mile ²	Gm/Mile	Gm/Mile ²	Gm/Mile	Gr/Mile ²	Gm/Mile	Gm/Mile ²
Pre 1982								
Bag 1	442.40	0	381.60	0	1.465	0	1.279	0.0409
Bag 2	385.93	0	437.55	0	1.545	0	1.402	0.0620
Bag 3	368.40	0	364.87	0	1.358	0	1.196	0.0409
1983								
Bag 1	441.11	0	381.60	0	1.386	0	1.279	0.0409
Bag 2	380.71	0	437.55	0	1.342	0	1.402	0.0620
Bag 3	365.42	0	364.87	0	1.304	0	1.196	0.0409
1984-1995								
Bag 1	397.84	0	345.72	0	1.280	0	0.853	0.0273
Bag 2	345.72	0	397.84	0	1.481	0	0.935	0.0414
Bag 3	329.88	0	329.88	0	1.081	0	0.797	0.0273

Results: (continued...)

	PM		PM	
	Proposed		EMFAC 2000	
	ZM	DR	ZM	DR
	Gm/Mile	Gr/Mile ²	Gm/Mile	Gm/Mile ²
Pre 1982				
Bag 1	0.745	0	0	0
Bag 2	0.413	0	0.2567	0
Bag 3	0.487	0	0	0
1983				
Bag 1	0.626	0	0	0
Bag 2	0.378	0	0.2567	0
Bag 3	0.401	0	0	0
1984-1995				
Bag 1	0.797	0	0	0
Bag 2	0.346	0	0.2567	0
Bag 3	0.41	0	0	0



Conclusions:

- HC emissions will decrease.
- CO and PM emissions will increase.
- NOx emissions will decrease (slightly).
- CO2 emissions will be used to calculate fuel consumption.





Inclusion of Methane Inventory



Greenhouse Gases

- Carbon Dioxide (CO₂), Methane (CH₄) and Nitrous Oxide (N₂O)

Global Warming Potential (GWP)

(100 Year Time Horizon)

Gases	GWP
CO ₂	1
CH ₄	21
N ₂ O	310

GWP is the ratio of global warming from one unit mass of greenhouse gas to one unit mass of CO₂ over a period of time

* www.epa.gov/globalwarming/emissions/national/gwp.html

- Methane molecule traps 21 times more heat than a CO₂ molecule



Methane Factors

- Developed from an analysis of exhaust gas speciation profiles
- Vary by fuel type, cat, non-cat & diesel groups, and by running and starting emissions

Methane Conversions Factors - Catalyst equipped gasoline and diesel Vehicles (*)

Cleaner Burning Gasoline	Catalyst	running	$CH_4 = TOG\{0.0356821 + 0.106396/(THC) - 0.0125986/(THC2) - 0.000613197/(THC3)\}$
" "	Catalyst	starts	$CH_4 = 0.0649 * TOG = 0.06916 * THC$
Pre- Cleaner Burning Gasoline	Catalyst	running	$CH_4 = TOG\{0.0627696 + 0.0584035/(THC) - 0.00476385/(THC2) - 0.000860145/(THC3)\}$
" "	Catalyst	starts	$CH_4 = 0.0624 * TOG = 0.06442 * THC$
Diesel	All	running	$CH_4 = 0.0408 * TOG = 0.058821 * THC$

(*) Section 4.13 HC Conversions @ www.arb.ca.gov/msei/doctabletest/doctable_test.htm



Draft Estimates

- Methane - Approximately 100 tons per day Statewide in 2001
- 12 percent of TOG (starts+running)
- Model - User can output either THC, TOG, ROG or CH₄
- Future - Greenhouse gases (CO₂, CH₄ and N₂O) will be reported separately



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Non-Fuel Related Evaporative Emissions





Non-Fuel Related Evaporative Emissions

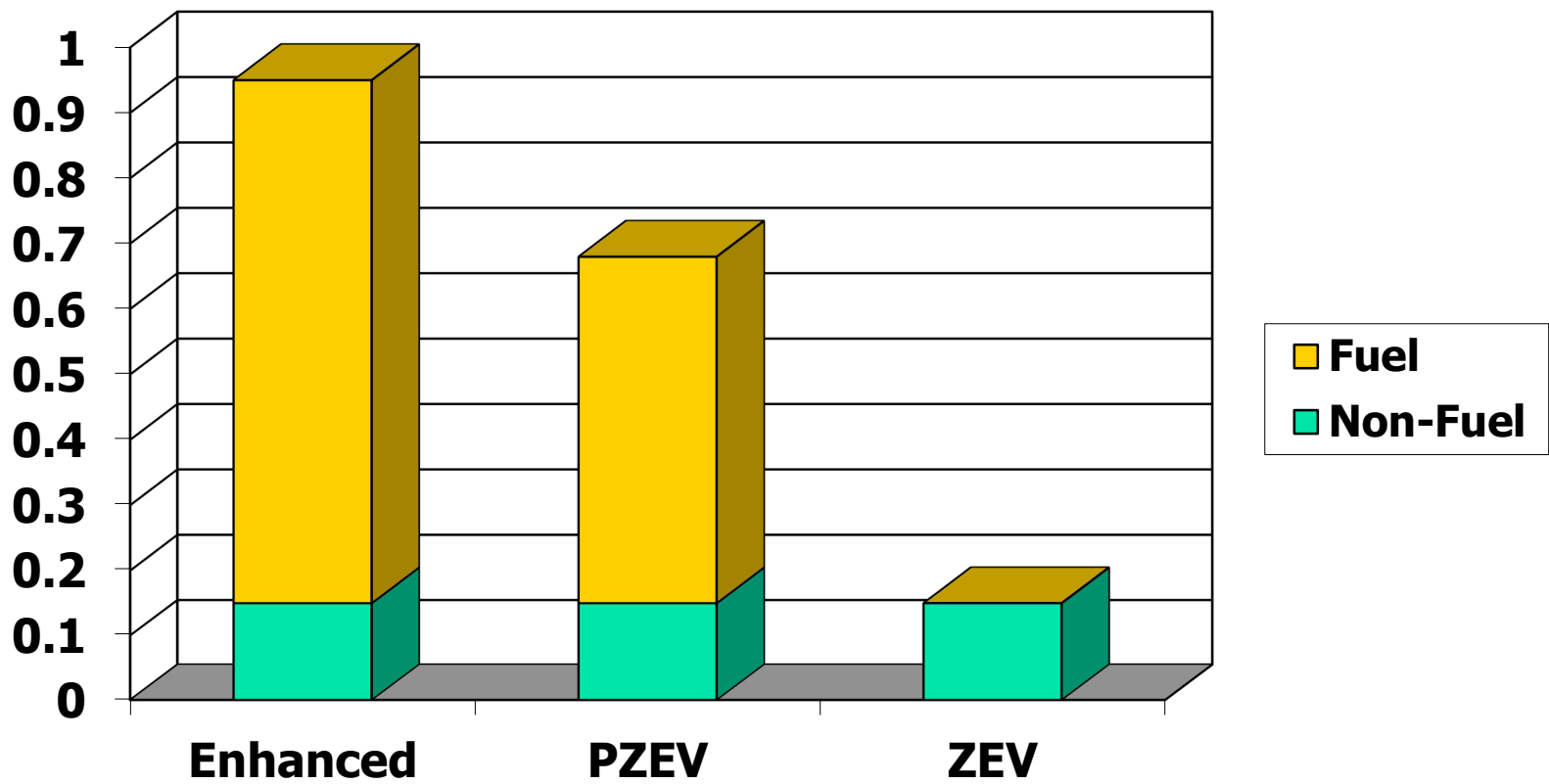
- ZEVs do have a finite amount of “evaporative” emissions from upholstery, tires, etc.
- Update necessary to be consistent with PZEVs.
- BERs set to background level (0.35 grams/test).
- Hot Soak and Diurnal adjusted, Running losses kept at zero.
- Emissions effect small, but significant for true ZEVs.
- Other technology types - assume the background emissions are implicit.



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Fuel/Non-Fuel Contribution to Evaporative Emissions



Update Mexican Vehicle Emission Rates





EMFAC2000

- In the current model, Mexican vehicle emission rates are based on the Juarez study conducted in 1995.
- Revised Mexican vehicle emission rates are based on the San Diego/Imperial study conducted in 1999.



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JUAREZ STUDY

- Data was collected in Juarez/El Paso area
- IM240, BAR90, and tampering tests performed on vehicles
- HC and CO emission levels were higher for the Juarez vehicles than comparable U.S. vehicles
- Data was used to develop a MOBILE-Mexico model





San Diego/Imperial Study

- Drivers were solicited at the Calexico, Otay Mesa, and San Ysidro POEs
- Questionnaires administered
- Incentives offered: idle tailpipe test - \$20; RG240 dyno test - \$50; GPS installation - \$50
- Tests completed: 671 underhood inspections/idle tests; 240 RG240s; 62 datalogger installations



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FTP EMISSIONS COMPARISON

SAN DIEGO/IMPERIAL FLEET EMISSIONS AVERAGES

	HC gpm	CO gpm	NO _x gpm
CARBURETED/NO CATALYST	6.31	82.66	2.83
CARBURETED/OX CATALYST	4.52	64.72	2.02
CARBURETED/THREE-WAY CATALYST	3.73	50.01	2.22
FUEL INJECTED/THREE-WAY CATALYST	2.10	25.13	1.82

JUAREZ FLEET EMISSION AVERAGES

	HC gpm	CO gpm	NO _x gpm
CARBURETED/NO CATALYST	9.23	98.22	2.08
CARBURETED/OX CATALYST	7.32	88.28	1.53
CARBURETED/THREE-WAY CATALYST	6.24	104.81	1.31
FUEL INJECTED/THREE-WAY CATALYST	3.69	37.27	1.82



CONCLUSION

- San Diego/Imperial fleet has lower HC and CO emissions than the Juarez fleet; NO_x emissions are similar in both fleets



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Heavy-Duty Idle Emission Rates



HDT Idle Emissions

- Idle emission rates only apply to idle trips
- An idle trip is a key-on to key-off event with distance traveled
- Idle emission rates revised based on Colorado School of Mines data



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Idle Emission Test Data

	THC	CO	NOx	PM
CSM Data (g/min)	0.128	1.12	1.40	0.024
<i># of Trucks Tested</i>	<i>11</i>	<i>11</i>	<i>11</i>	<i>11</i>
Altitude Corrected Rate (g/hr)	3.75	27.2	82.4	0.979
High Altitude Correction Factor*	2.05	2.46	1.02	1.47





HDT Idle Emissions

Idle Emission Rate (g/hr)

	EMFAC2000			CSM		
	HC	CO	NOx	HC	CO	NOx
LHD	44	247	396	3.75	27.2	82.4
MHD	44	247	396	3.75	27.2	82.4
HHD	44	247	396	3.75	27.2	82.4
LHG	27	155	2	--	--	--
MHG	27	155	2	--	--	--



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HDDT Idle Emissions

PM Idle Emission Rate (g/hr)

	EMFAC2000*	CSM
Pre-1988	5.370	--
1988-90	3.174	0.735**
1991-93	1.860	1.159
1994+	1.004	0.808

* From US EPA Part 5

** Result of one test vehicle



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Miscellaneous Improvements

Incorporation of Latest Standards



Update to Technology Fractions for 2003+ Model Years





Background

- Technology Groups Affected
 - LEVII, ULEVII, SULEV, ZEV
- Vehicle Classes
 - LDA, LDT, MDT less than 8500 lbs
- EMFAC2000 based on LEVII program
- Programs Adopted since
 - Changes to CA ZEV Mandate
 - CA Requires Cleaner Federal Tier2 Vehicles





LEVII

- Adopted November 1998
- Lower Exhaust & Evaporative Standards
- NMOG Fleet Average Standard
- LDA/LDT/MDT up to 8500 lbs
- LEV/ULEV/SULEV/PZEV/ZEV



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Changes to ZEV Program

- Adopted January 2001
- Reduced Number of ZEVs Near Term
- PZEV Phase-in Schedule
- Increased ZEV% through 2018+
- All Vehicles up to 8500 lbs will be included to Calculate Total Number ZEVs – beginning in 2007



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Require Cleaner Federal Tier 2 Vehicles

- Adopted December 2000
- Intermediate Truck Standard 2004-2006
- Lower Standards for Some LDAs beyond 2007
- Ensures Any Cleaner Federal Vehicles be Made Available in California



New Technology Groups from Federal Tier2 Program

Useful Life Emission Standards (120k)

	HC	CO	NOX
LEV	0.09	4.2	0.07
ULEV	0.055	2.1	0.07
TIER2-4	0.07	2.1	0.04
TIER2-3	0.055	2.1	0.03
SULEV	0.01	1.0	0.02
PZEV (150k)	0.01	1.0	0.02
ZEV	0	0	0



New Technology Groups from Federal Tier2 Program (cont)

	HC	CO	NOX
TIER2-10	0.23	6.4	0.6
TIER2-9	0.09	4.2	0.3
TIER2-8	0.156	4.2	0.2

Groups 8 and 10 Applicable to MDTs

MDT Bins use higher optional Tier2 NMOG standards

Group 9 Applicable to LDT2



Modifications to EMFAC

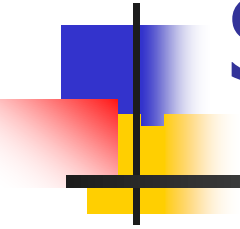
- EMFAC2001 Technology Fraction changes
 - ZEV Program
 - Inclusion of Clean Tier2 Vehicles
- Addition of PZEV Technology Group
- Addition of Tier2 Emission Groups



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Newly Adopted Heavy Truck Standards





Incorporation of Newly Adopted HDGT Standard

- California's 1.0 g/bhp-hr HC+NO_x standard for medium and heavy heavy-duty gasoline trucks to take effect beginning 2005 model year
- Decrease in HC and NO_x inventories





Incorporation of Recently Adopted Federal Standards

- US EPA's recently adopted NMHC, NO_x, and PM standards will be phased-in between 2007 and 2010 for heavy-duty diesel trucks and between 2008 and 2009 for heavy-duty gasoline engines



2007 HDDE Standards Recently Adopted by US EPA

FTP Exhaust Emission Standards

	Standard (g/bhp-hr)	Phase-in by Model Year			
		2007	2008	2009	2010
NOx	0.20	50%	50%	50%	100%
NMHC	0.14	50%	50%	50%	100%
PM	0.01	100%	100%	100%	100%



Emission Reduction from EPA 2007 HDDE Standards

Changes of HDD Truck Inventories under EPA 2007 Standards			
	LHDT	MHDT	HHDT
2010			
HC	-9%	-6%	-5%
NOx	-15%	-11%	-12%
PM	-31%	-22%	-26%
2020			
HC	-45%	-40%	-45%
NOx	-65%	-59%	-65%
PM	-90%	-70%	-75%



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2008 HDGE Standards Recently Adopted by US EPA

FTP Exhaust Emission Standards

	Standard (g/bhp-hr)	Phase-in by Model Year	
		2008	2009
NOx	0.20	50%	100%
NMHC	0.14	50%	100%
PM	0.01	50%	100%



Emission Reduction from EPA 2008 HDGE & ARB 1.0 g/bhp-hr Standards

Changes of HDG Truck Inventories under EPA 2007 & ARB 1.0 g/bhp-hr HC+NOx Standards			
	LHDT	MHDT	HHDT
2010			
HC	-4%	-2%	-2%
NOx	-30%	-15%	-16%
2020			
HC	-12%	-7%	-10%
NOx	-54%	-37%	-42%





Update to A/C Algorithms



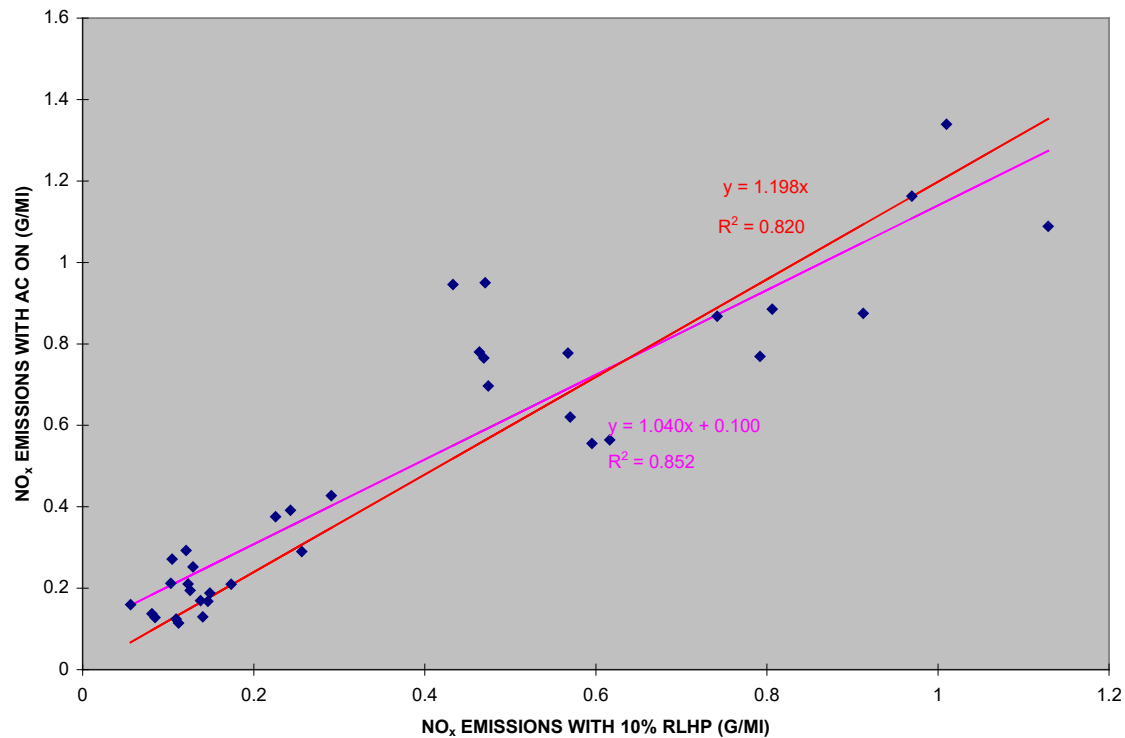
A/C Adjustment

- Issue: The predicted A/Con emissions are not sensitive to very low emitting NO_x vehicles. This occurs because of the y-intercept in the regression equation.
- Solution: Force the regression through zero (no intercept).



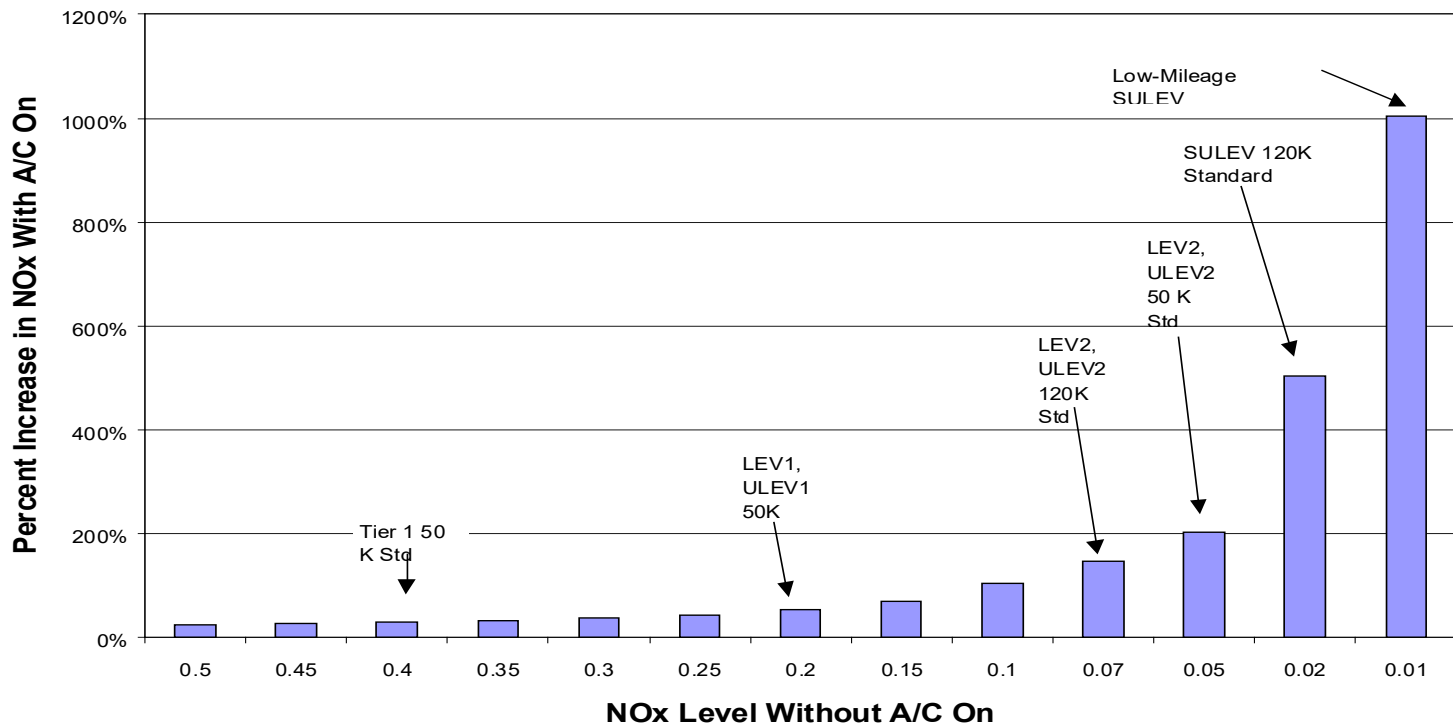
Intercept vs. No-Intercept

COMPARISON OF NO_x EMISSIONS WITH 10% RLHP TO AC ON FOR UC CYCLE

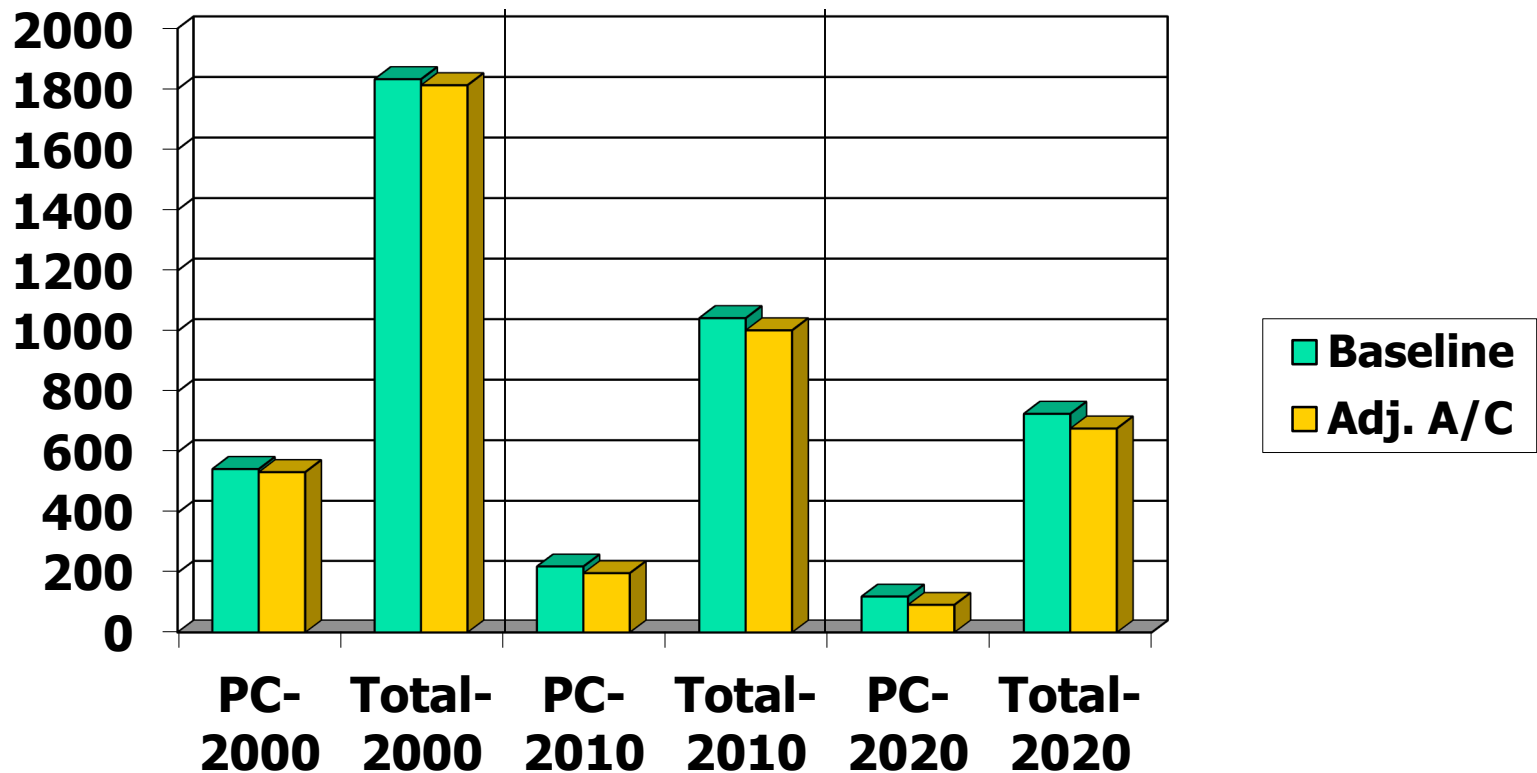


Effect on Tier I/LEVs (Air Improvement Resources)

Figure 1. Increase in NOx Emissions With Declining FTP NOx Levels



A/C Effect - Statewide





Update I&M Assumptions



Current Assumptions

- Enhanced Areas - ASM testing began in January 2001.
- ASM Cutpoints - SIP cutpoints designed to get max benefits from IM program
- BAR - Implemented cutpoints that have not yet achieved reductions agreed to in SIP
- Update - reflect IM benefits for current ASM cutpoints



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Methodology

- SIP Cutpoints (ASM_{SIP}) - Effective 01/2010
- Failure Rates for 2001-2009 - Ratio of current BAR cutpoints to SIP cutpoints applied to existing identification rates
- Ratio - Based on 1,642 vehicle dataset containing both ASM and FTP data



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Conclusion

- Current BAR cutpoints achieve 37% of HC, 50% of CO and 50% of NO_x emission reductions relative to SIP cutpoints.
- Emissions increase between 2001 and 2010 calendar years.





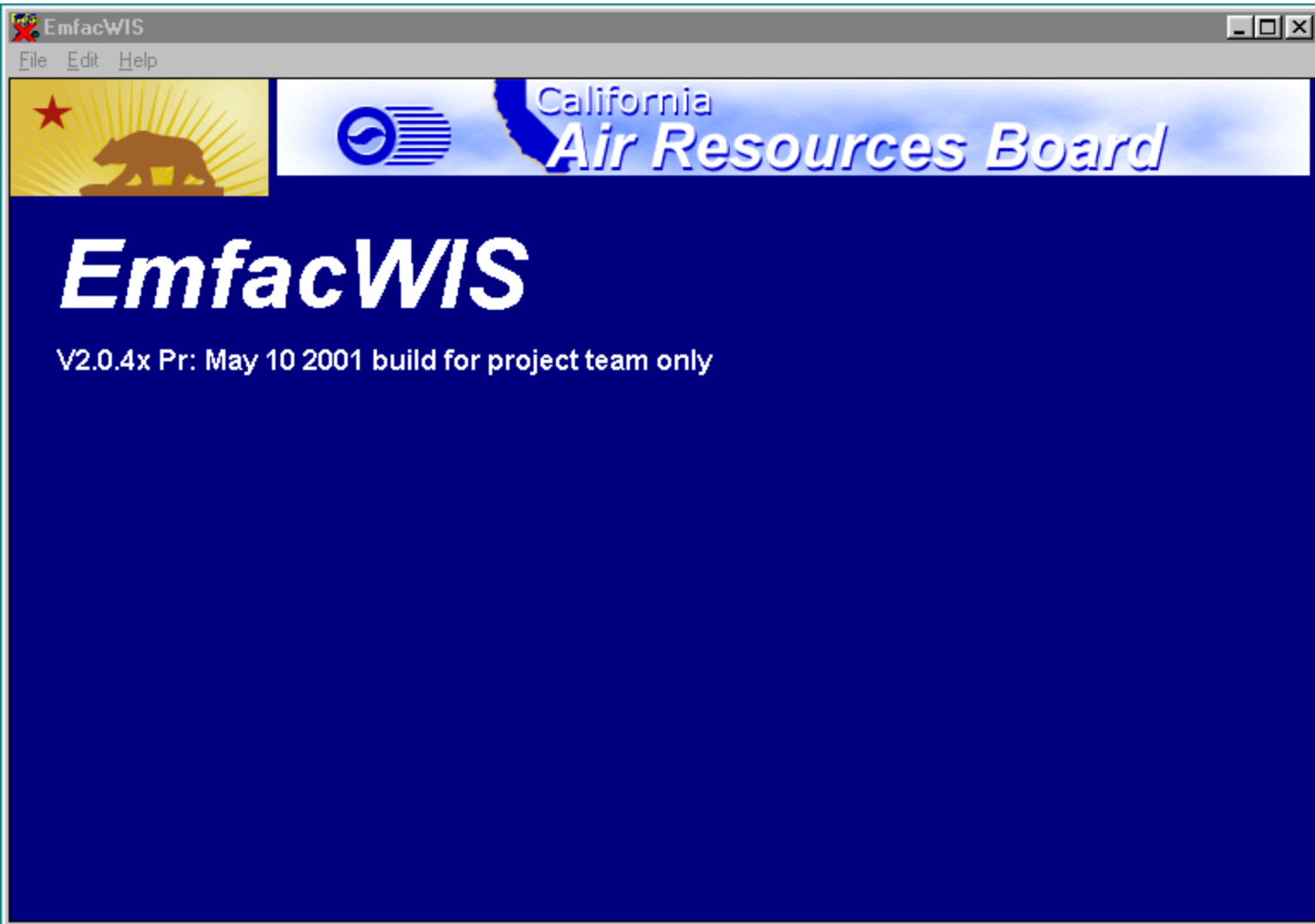
Introduction to User Interface

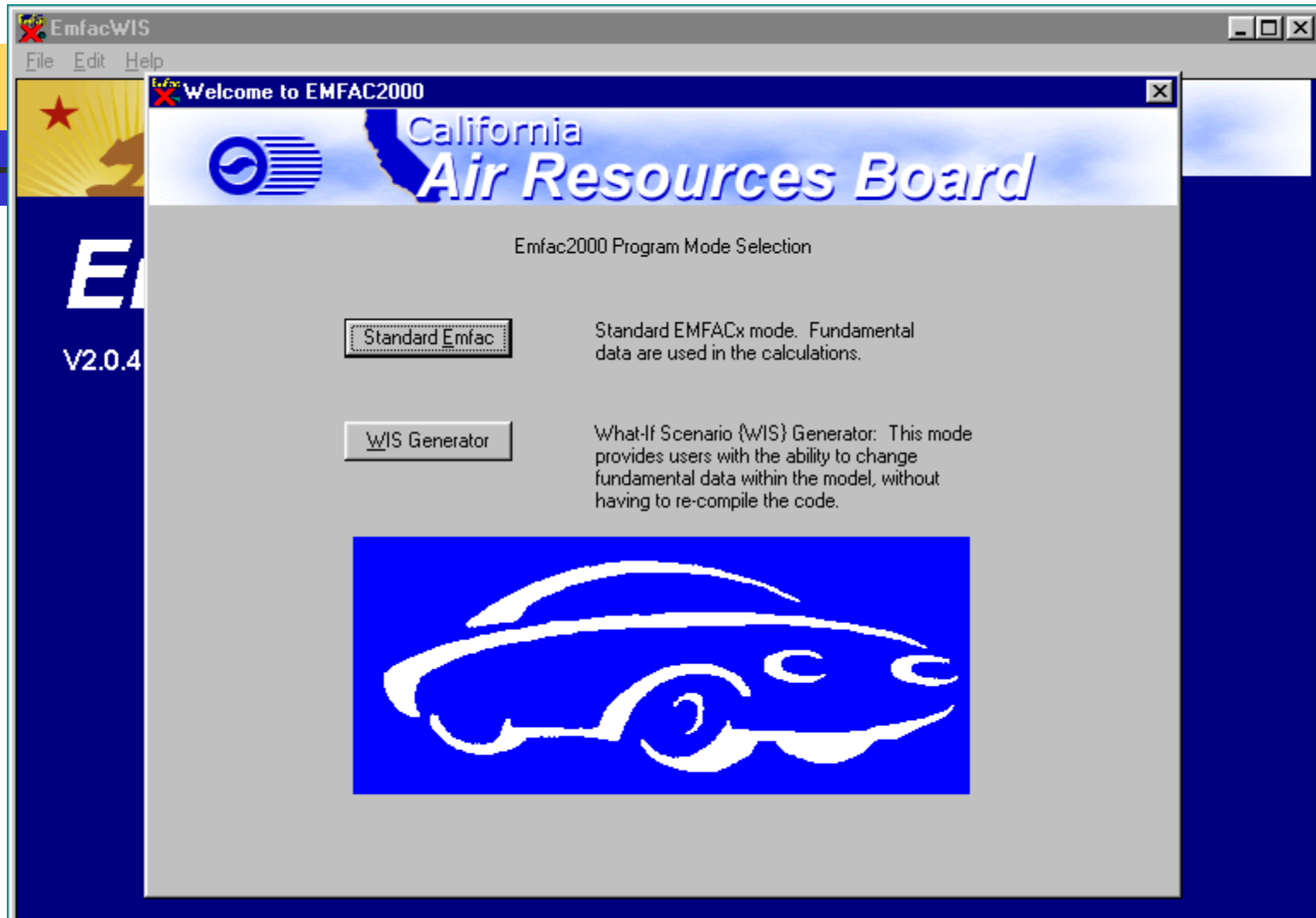


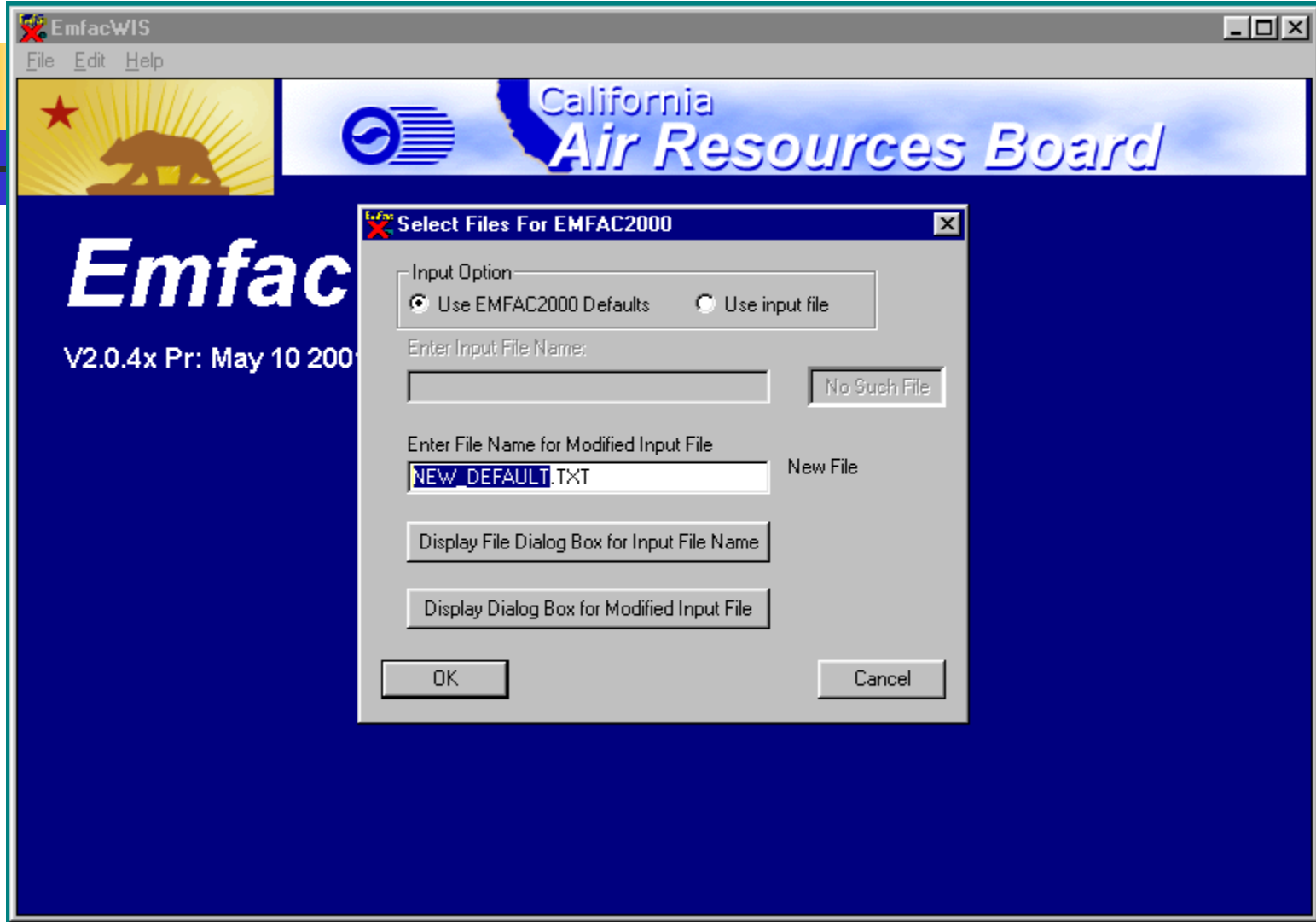
Inventory & Planning Models

- EMFAC2000 - Inventories (tons per day or g/mi) for 1970-2040 CYs & 69 areas. Uses default activity data that user cannot edit.
- MOBILE 5/6 - Planning model with g/mi estimates. Requires user to input local population/trip/speed and other estimates.
- EMFAC2001 - Inventory & Planning model
 - Standard model, default inventories
 - WIS is planning model. User can change temperature, relative humidity, fuel RVP, speed, population, trips and VMT










EmfacWIS

File Edit Help



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Emfa
V2.0.4x Pr: May 1

Welcome to EMFAC2000

List of Available Scenarios

- * EMFAC2000 Default Scenario *

Current Senario Data

Number: 1 OF 1
Name: EMFAC2000 Default Scenario
Calendar Year: 2001
Season: Summer
Type: Burden

Modify Current Scenario

Add a New Scenario

Run EMFAC2000

Write file and exit

* Denotes currently active scenario

EmfacWIS
File Edit Help

WIS Generator Options

WIS SCENARIO OPTIONS

Number: 1 of 1

Scenario Name: SCoast 2000 CY BURDEN

Calendar Year(s): Range
2000 to []

Starting model year: []

Ending model year: []

Select Season or Month: Summer

Scenario Type

- Burden - Area planning inventory (tons/day)
- Emfac - Area fleet average emissions (g/hr)
- Calimfac - Detailed vehicle data (g/mi)

WIS Option

Geographical Area Profiles: Speeds, Temps, RH

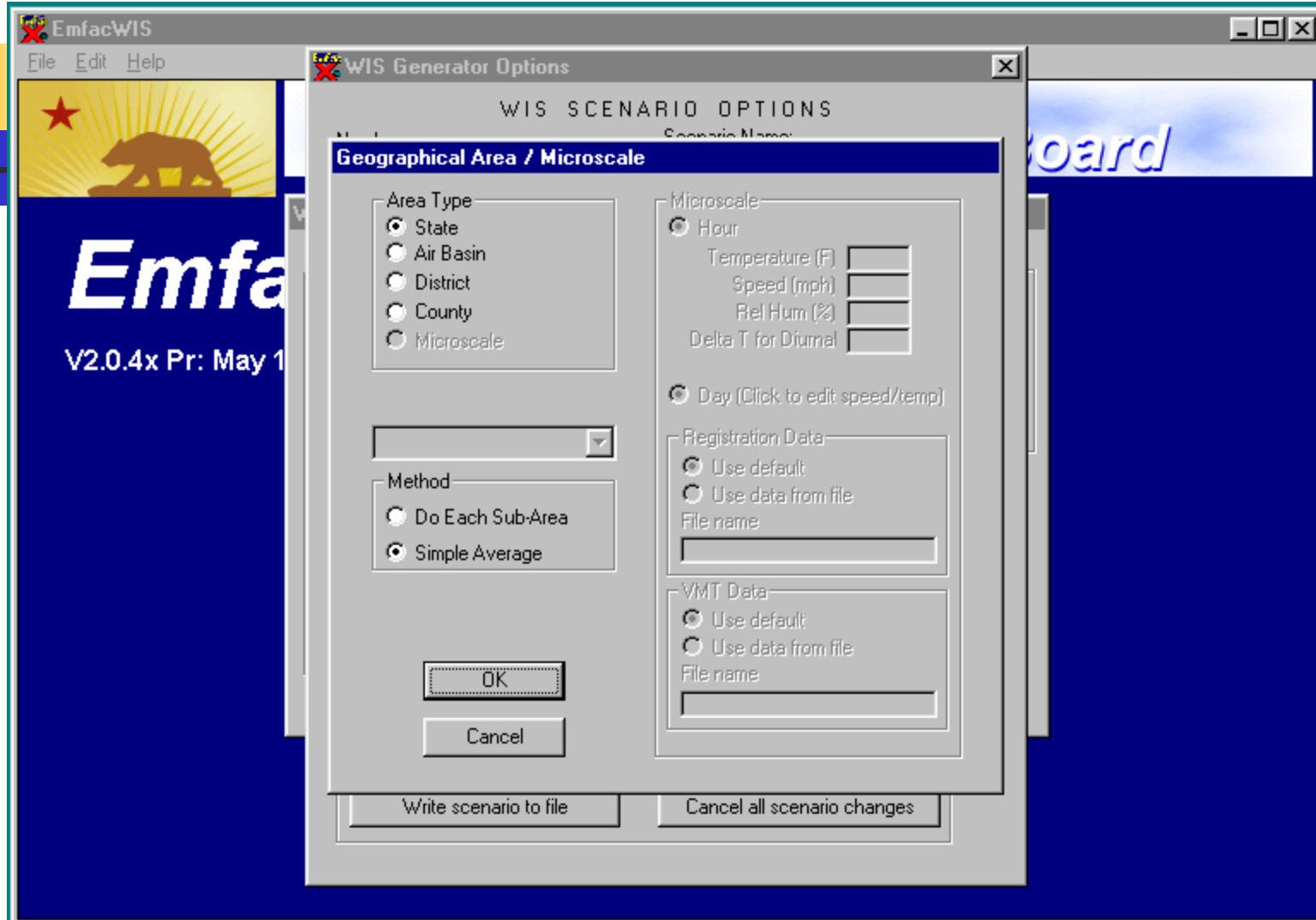
I / M Options Trips

Growth Rates Tech Fractions by Model Year

Output Options Other Options

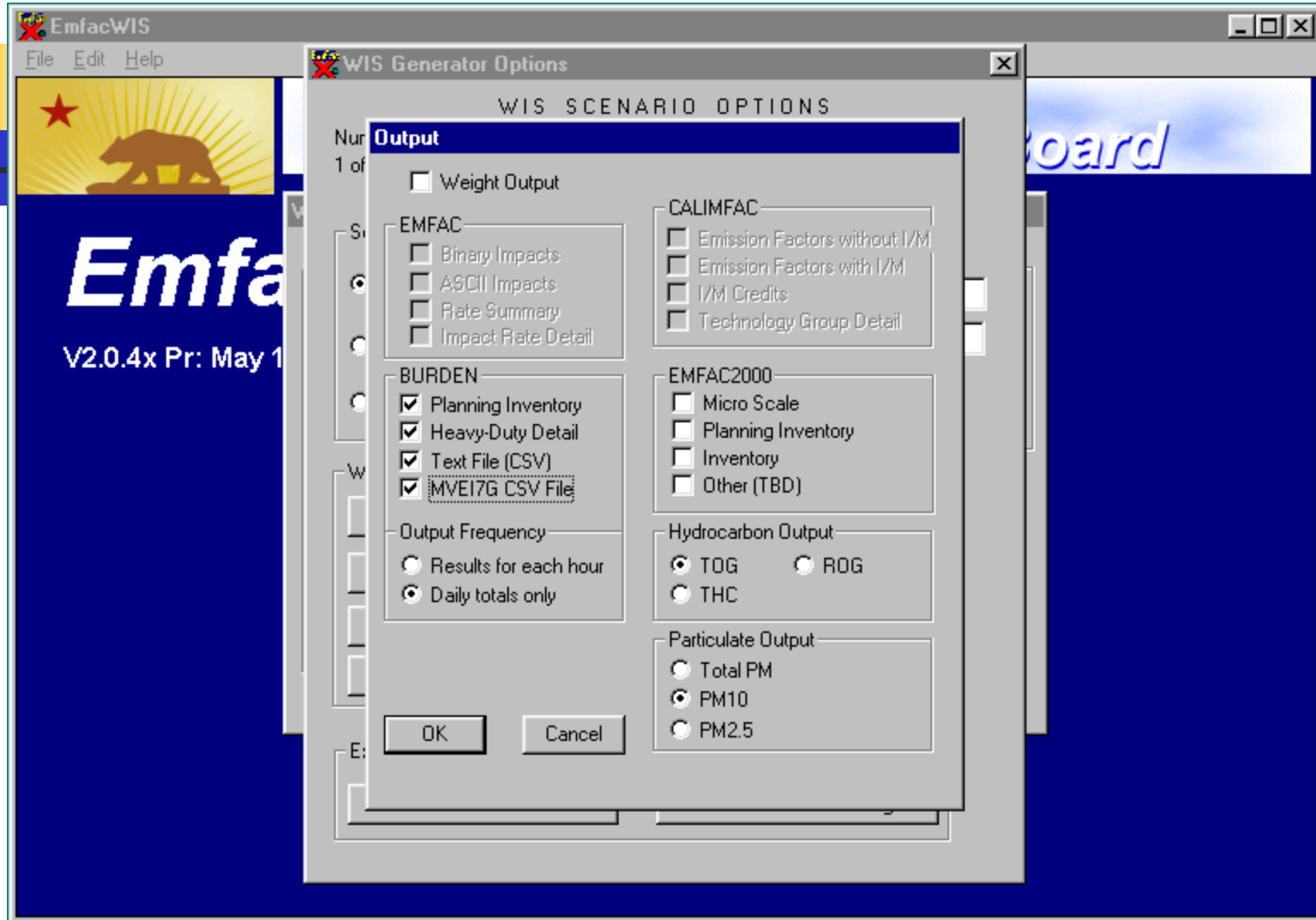
Exit scenario add/modify dialog

Write scenario to file Cancel all scenario changes



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Burden Outputs

- Planning(*.bur) - tons per day by aggregated vehicle classes. Traditional 7G format
- Heavy-Duty Truck Detail(*.bur) - Similar with expanded truck information.
- Text File (CSV)(* .csv) - tpd by vehicle class and cat, non-cat and diesel groups. Spreadsheet
- MVEI7G (CSV)(* .bcd) - columnar format
(* .XXX) filename extensions



EmfacWIS
File Edit Help

WIS Generator Options

WIS SCENARIO OPTIONS

Number: 1 of 1

Scenario Name: SCoast 2000 CY EMFAC

Calendar Year(s): Range
2000 to

Starting model year:

Ending model year:

Select Season or Month: Summer

Scenario Type

- Burden - Area planning inventory (tons/day)
- Emfac - Area fleet average emissions (g/hr)
- Calimfac - Detailed vehicle data (g/mi)

WIS Option

Geographical Area Profiles: Speeds, Temps, RH

I / M Options Irips

Growth Rates Tech Fractions by Model Year

Output Options Other Options

Exit scenario add/modify dialog

Write scenario to file Cancel all scenario changes

EmfacWIS
File Edit Help

WIS Generator Options

WIS SCENARIO OPTIONS
Scenario Name: _____

Geographical Area / Microscale

Area Type

- State
- Air Basin
- District
- County
- Microscale

Microscale

- Hour
 - Temperature (F)
 - Speed (mph)
 - Rel Hum (%)
 - Delta T for Diurnal
- Day (Click to edit speed/temp)

Registration Data

- Use default
- Use data from file
File name

VMT Data

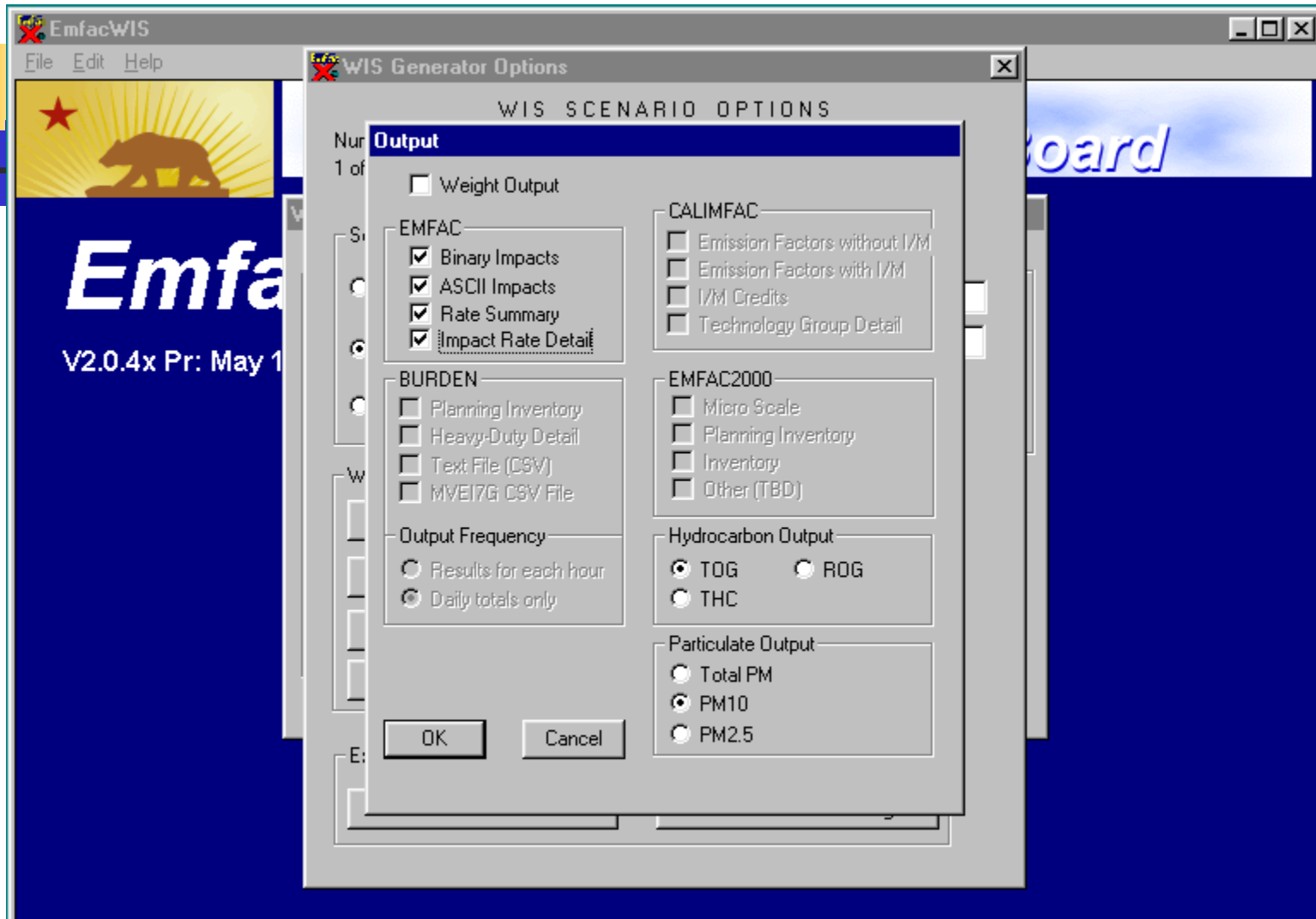
- Use default
- Use data from file
File name

Method

- Do Each Sub-Area
- Simple Average

OK Cancel

Write scenario to file Cancel all scenario changes



The screenshot displays the EmfacWIS software interface. The main window, titled 'EmfacWIS', features a menu bar with 'File', 'Edit', and 'Help'. Below the menu bar is a logo with a star and a bear silhouette, and the text 'Emfa' and 'V2.0.4x Pr: May 1'. Overlaid on this are two dialog boxes.

The first dialog box, 'WIS Generator Options', is titled 'WIS SCENARIO OPTIONS'. It contains the following fields:

- Number: 1 of 1
- Scenario Name: SCoast 2000 CY EMFAC

The second dialog box, 'Speed/Temperature/RH Entries for EMFAC Calculations', is titled 'Speed/Temperature/RH Entries for EMFAC Calculations'. It contains the following elements:

- Instruction: Enter data for speed. Click button to enable new value.
- Two columns of radio button options:
 - Left column: Delete speed 1 through 12.
 - Right column: Delete speed 13, Enter speed 14 through 24.
- Input fields for speed values: 5.00, 10.00, 15.00, 20.00, 25.00, 30.00, 35.00, 40.00, 45.00, 50.00, 55.00, 60.00, and 65.00.
- Checkboxes: 'Sort the array (done after exit)' is checked.
- Buttons: 'OK' and 'Cancel'.

At the bottom of the interface, there is a section titled 'Exit scenario add/modify dialog' with two buttons: 'Write scenario to file' and 'Cancel all scenario changes'.

EmfacWIS

File Edit Help

WIS Generator Options

WIS SCENARIO OPTIONS

Number: 1 of 1 Scenario Name: SCoast 2000 CY EMFAC

Speed/Temperature/RH Entries for EMFAC Calculations

Enter data for temperature. Click button to enable new value.

<input checked="" type="radio"/> Delete temperature 1	-20.00	<input type="radio"/> Delete temperature 13	50.00
<input type="radio"/> Delete temperature 2	-10.00	<input type="radio"/> Delete temperature 14	55.00
<input type="radio"/> Delete temperature 3	0.00	<input type="radio"/> Delete temperature 15	60.00
<input type="radio"/> Delete temperature 4	5.00	<input type="radio"/> Delete temperature 16	65.00
<input type="radio"/> Delete temperature 5	10.00	<input type="radio"/> Delete temperature 17	70.00
<input type="radio"/> Delete temperature 6	15.00	<input type="radio"/> Delete temperature 18	75.00
<input type="radio"/> Delete temperature 7	20.00	<input type="radio"/> Delete temperature 19	80.00
<input type="radio"/> Delete temperature 8	25.00	<input type="radio"/> Delete temperature 20	85.00
<input type="radio"/> Delete temperature 9	30.00	<input type="radio"/> Delete temperature 21	90.00
<input type="radio"/> Delete temperature 10	35.00	<input type="radio"/> Delete temperature 22	100.00
<input type="radio"/> Delete temperature 11	40.00	<input type="radio"/> Delete temperature 23	110.00
<input type="radio"/> Delete temperature 12	45.00	<input type="radio"/> Delete temperature 24	120.00

Sort the array (done after exit)

OK Cancel

Exit scenario add/modify dialog

Write scenario to file Cancel all scenario changes



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EmfacWIS
File Edit Help

WIS Generator Options

WIS SCENARIO OPTIONS

Number: 1 of 1 Scenario Name: SCoast 2000 CY EMFAC

Speed/Temperature/RH Entries for EMFAC Calculations

Enter data for rel hum. Click button to enable new value.

<input checked="" type="radio"/> Delete rel hum 1	<input type="text" value="0.00"/>	<input type="radio"/> Enter rel hum 13	<input type="text"/>
<input type="radio"/> Delete rel hum 2	<input type="text" value="10.00"/>	<input type="radio"/> Enter rel hum 14	<input type="text"/>
<input type="radio"/> Delete rel hum 3	<input type="text" value="20.00"/>	<input type="radio"/> Enter rel hum 15	<input type="text"/>
<input type="radio"/> Delete rel hum 4	<input type="text" value="30.00"/>	<input type="radio"/> Enter rel hum 16	<input type="text"/>
<input type="radio"/> Delete rel hum 5	<input type="text" value="40.00"/>	<input type="radio"/> Enter rel hum 17	<input type="text"/>
<input type="radio"/> Delete rel hum 6	<input type="text" value="50.00"/>	<input type="radio"/> Enter rel hum 18	<input type="text"/>
<input type="radio"/> Delete rel hum 7	<input type="text" value="60.00"/>	<input type="radio"/> Enter rel hum 19	<input type="text"/>
<input type="radio"/> Delete rel hum 8	<input type="text" value="70.00"/>	<input type="radio"/> Enter rel hum 20	<input type="text"/>
<input type="radio"/> Delete rel hum 9	<input type="text" value="80.00"/>	<input type="radio"/> Enter rel hum 21	<input type="text"/>
<input type="radio"/> Delete rel hum 10	<input type="text" value="90.00"/>	<input type="radio"/> Enter rel hum 22	<input type="text"/>
<input type="radio"/> Delete rel hum 11	<input type="text" value="100.00"/>	<input type="radio"/> Enter rel hum 23	<input type="text"/>
<input type="radio"/> Enter rel hum 12	<input type="text"/>	<input type="radio"/> Enter rel hum 24	<input type="text"/>

Sort the array (done after exit)

Exit scenario add/modify dialog



EMFAC Outputs

- ASCII Impacts(*.ERP) - Used in DTIM. Running, diurnal and resting loss rates in g/hr. Hot soak (g/trip). Starts (g/start/soak time)
- Binary (*.BIN) same info in binary format
- Impact Rate Detail(*.RTL) - Detailed info. Used in Urbemis. Running (g/mi), Hot Soak & Starts (g/trip), Diurnal/Resting (g/hr.)
- Rate Summary(*.RTS) - aggregated vehicle classes



EmfacWIS
File Edit Help

WIS Generator Options

WIS SCENARIO OPTIONS

Number: 1 of 1

Scenario Name: SCoast 2000 CY EMFAC

Calendar Year(s): Range
2000 to

Starting model year:

Ending model year:

Select Season or Month: Summer

Scenario Type

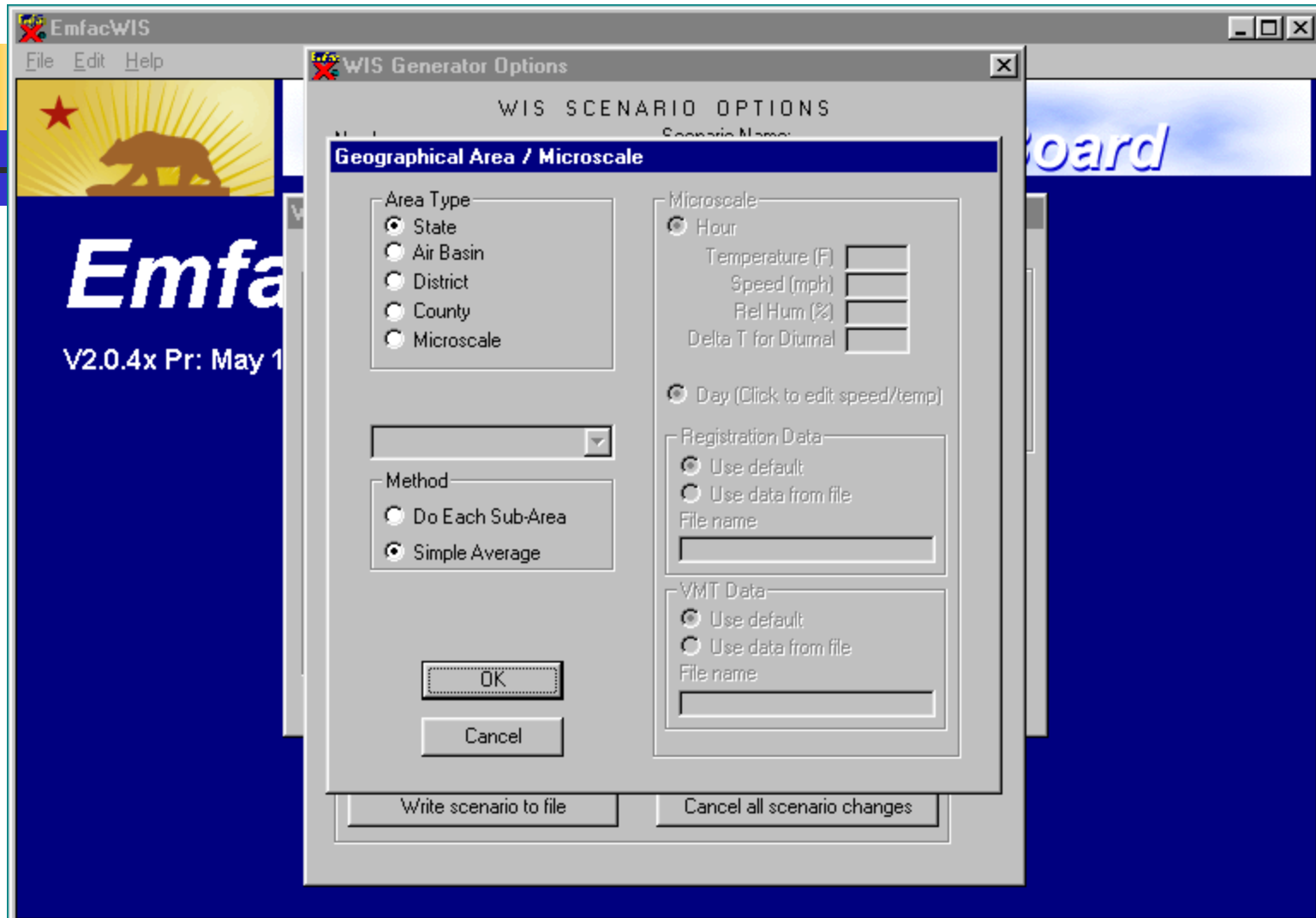
- Burden - Area planning inventory (tons/day)
- Emfac - Area fleet average emissions (g/hr)
- Calimfac - Detailed vehicle data (g/mi)

WIS Option

Geographical Area	Profiles: Speeds, Temps, RH
I / M Options	Irips
Growth Rates	Tech Fractions by Model Year
Output Options	Other Options

Exit scenario add/modify dialog

Write scenario to file	Cancel all scenario changes
------------------------	-----------------------------



EmfacWIS
File Edit Help

WIS Generator Options

WIS SCENARIO OPTIONS

Number of Scenarios: 1 of 1

Output

Weight Output

EMFAC

- Binary Impacts
- ASCII Impacts
- Rate Summary
- Impact Rate Detail

BURDEN

- Planning Inventory
- Heavy-Duty Detail
- Text File (CSV)
- MVEI7G CSV File

Output Frequency

- Results for each hour
- Daily totals only

CALIMFAC

- Emission Factors without I/M
- Emission Factors with I/M
- I/M Credits
- Technology Group Detail

EMFAC2000

- Micro Scale
- Planning Inventory
- Inventory
- Other (TBD)

Hydrocarbon Output

- TOG ROG
- THC

Particulate Output

- Total PM
- PM10
- PM2.5

OK Cancel



CALIMFAC Output

- Option - Output either corrected and uncorrected rates
- CALIMFAC(*.OUT) - Model year specific zero mile (g/mi) & deterioration (g/mi per 10k) rates. Output by mode and FTP composite



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EmfacWIS

File Edit Help

WIS Generator Options

WIS SCENARIO OPTIONS

Number: 1 of 1

Scenario Name: S Coast 2000 CY EMFAC

Program 5 and Subprogram 2 are currently active.

Program Start Date: January 2001

Change Start Date

Available Programs

- First Program
- Second Program
- Third Program
- Fourth Program
- *Fifth Program *

Available Subprograms

- Subprogram 1
- *Subprogram 2 *

Program

Add

Delete Final

Subprogram

Add

Delete Final

Edit Active Data

Return to Main Menu

Exit scenario add/modify dialog

Write scenario to file

Cancel all scenario changes

EmfacWIS
File Edit Help

WIS Generator Options

Program 5, Subprogram 2

Cost Limits

- \$50 Limit (84 IM)
- \$50-\$300 Limits (90 IM)
- \$450 Limit (97 IM)
- No Cost Limit

Exhaust Test Type

- Idle Only
- Idle plus 2500 rpm
- I/M 240
- ASM

Vehicle Inspection

Minimum Vehicle Age	0
Maximum Vehicle Age	30
First model year	1974
Last model year	2040
Years before first inspection	4
Free years after pass	0

Visual/Functional Checks

- None
- Air/EGR/O2S/Cat
- Full visual/functional test

Exhaust Test Cutpoints

- BAR cut points
- ARB cut points
-

Alternative Detection

Tamper ID Rate	0.000
Ownership Change	0.170
RSD ID Rate	0.000
Random Roadside	0.000

Mechanic Inspection Effectiveness

- 1988 & Earlier Inspections
- 1990 Inspections
- Best Inspection Effectiveness

Inspection Frequency

- Annual
- Biennial

Mechanic Repair Effectiveness

- 1988 & Earlier Repair Effectiveness
- Enhanced Repair Effectiveness
- Best Repair Effectiveness

Other Options

- Years of Annual Inspections for a Gross Polluter
- High Emitter Profile Used
- Exhaust Test Errors Considered
- Use OBD II

Vehicles Included

- Light-duty Autos
- Light-duty Trucks
- Medium-duty Vehicles
- Heavy-duty-gas
- Heavy-duty Diesels
- Urban Buses
- Motorcycles

OK Cancel

EmfacWIS
File Edit Help

WIS Generator Options

WIS SCENARIO OPTIONS

Number: 1 of 1

Scenario Name: SCoast 2000 CY Planning

Calendar Year(s): Range
2000 to

Starting model year:

Ending model year:

Select Season or Month: Summer

Scenario Type

- Burden - Area planning inventory (tons/day)
- Emfac - Area fleet average emissions (g/hr)
- Calimfac - Detailed vehicle data (g/mi)

WIS Option

Geographical Area	Profiles: Speeds, Temps, RH
I / M Options	Irps
Growth Rates	Tech Fractions by Model Year
Output Options	Other Options

Exit scenario add/modify dialog

Write scenario to file	Cancel all scenario changes
------------------------	-----------------------------


EmfacWIS

File Edit Help

WIS Generator Options

WIS Diurnal Temperature Profile

Area: South Coast AB
 Month: Summer
 Simple Average



Temperatures (F)

	Hour											
	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100
	63.8	63.2	62.7	62.2	61.9	61.5	62.5	66.2	70.7	74.4	77.6	79.9
Modify	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
	81.6	82.7	82.9	82.6	81.0	78.5	74.9	71.3	68.9	67.2	66.1	65.3
Modify	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Modify Values for Range of Hours

to Constant Value for Range

OK Cancel


EmfacWIS

File Edit Help

WIS Generator Options

WIS Diurnal Relative Humidity Profile

Area: South Coast AB
 Month: Summer
 Simple Average



Relative Humidity (%)

	Hour											
	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100
	77.4	77.8	78.8	78.8	79.5	79.3	75.0	68.2	60.5	52.1	46.0	40.6
Modify	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
	38.0	36.8	36.0	36.8	38.7	44.2	53.0	62.7	68.9	72.2	74.4	76.0
Modify	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Modify Values for Range of Hours


to Constant Value for Range

OK Cancel

EmfacWIS
 File Edit Help
 WIS Generator Options

WIS Diurnal Reid Vapor Pressure (RVP) Profile

Area: South Coast AB
 Calendar Year: 2000
 Simple Average



RVP (psia)

	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	10.4	7.6	6.9	6.8	6.8	6.8	6.8	6.8	6.8	6.8	10.5	11.1
Modify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Summer Winter Annual

	6.8	11.1	7.8
Modify	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

OK Cancel

EmfacWIS
File Edit Help

WIS Speed Fractions by Scenario Year, Hour, and Vehicle Class

Speed Fractions by Scenario Year and Vehicle Group
Area: South Coast AB
VMT-Weighted Average of 4 Sub-areas
Scenario Year: 2000

Hour: 8 Vehicle Class: 01: Light-Duty Autos (PC)

Idle Bin: 0.00 Idle minutes/hour

Apply

Exit

Speed Fractions by Bin (mph)


Bin	%	Bin	%	Total (%)
05	0.5989	50	8.6579	100.00
10	1.3892	55	8.3286	OK
15	2.7455	60	6.6918	
20	5.3524	65	2.4054	
25	9.5821	70	0.00	
30	18.6342	75	0.00	
35	14.9845	80	0.00	
40	10.5861	85	0.00	
45	10.0435	90	0.00	



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EmfacWIS
File Edit Help



Emf
V2.0.4x Pr: Ma

WIS Speed Fractions by Scenario Year, Hour, and Vehicle Class

Speed Fractions by Scenario Year and Vehicle Group
Area: South Coast AB
VMT-Weighted Average of 4 Sub-areas
Scenario Year: 2000

Hour:


Vehicle Class:

- 01: Light-Duty Autos (PC)
- 01: Light-duty Trucks (T1)
- 01: Light-duty Trucks (T2)
- 01: Medium-duty Trucks (T3)
- 02: Light HD Trucks (T4)
- 02: Light HD Trucks (T5)
- 03: Medium HD Trucks (T6)
- 04: Heavy HD Trucks (T7)
- 05: Line-Haul Vehicles (T8)
- 06: Urban Buses (UB)
- 01: Motorcycles (MC)
- 07: School Buses (SB)
- 03: Motor Homes (MH)

Bin	Sp	tal (%)
05		100.00
20	5.3524	
25	9.5821	70 0.00
30	18.6342	75 0.00
35	14.9845	80 0.00
40	10.5861	85 0.00
45	10.0435	90 0.00

Apply

Exit



EmfacWIS

File Edit Help



Emf

V2.0.4x Pr: Ma

WIS Speed Fractions by Scenario Year, Hour, and Vehicle Class

Speed Fractions by Scenario Year and Vehicle Group

Area: South Coast AB

VMT-Weighted Average of 4 Sub-areas

Scenario Year: 2000

Hour Vehicle Class

WIS Apply to Range?

Apply This Profile to a Range of Values?

Parameters

- Vehicle Class
- Hour

OK Cancel

(%) 100.00




30	11.9124	75	0.00
35	26.9508	80	0.00
40	1.7486	85	0.00
45	0.1082	90	0.00



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EmfacWIS
File Edit Help



WIS Speed Fractions by Scenario Year, Hour, and Vehicle Class

Speed Fractions by Scenario Year and Vehicle Group
 Area: South Coast AB
 VMT-Weighted Average of 4 Sub-areas
 Scenario Year: 2000



ard

WIS Apply Range Updates

Updates Will Be Applied to Settings in "Apply To:" Column.
 Note: Initial Single Change Already Shown.

Static

Selections Available		Apply To:
Heavy HD Trucks (T7)	>>	Light-Duty Autos (PC)
Light HD Trucks (T4)		
Light HD Trucks (T5)	<<	
Light-duty Trucks (T1)		
Light-duty Trucks (T2)		
Line-Haul Vehicles (T8)		

OK Cancel

35	26.9508	80	0.00
40	1.7486	85	0.00
45	0.1082	90	0.00

EmfacWIS

File Edit Help

WIS Speed Fractions by Scenario Year, Hour, and Vehicle Class

Speed Fractions by Scenario Year and Vehicle Group

Area: South Coast AB

VMT-Weighted Average of 4 Sub-areas

Scenario Year: 2000

WIS Apply Range Updates

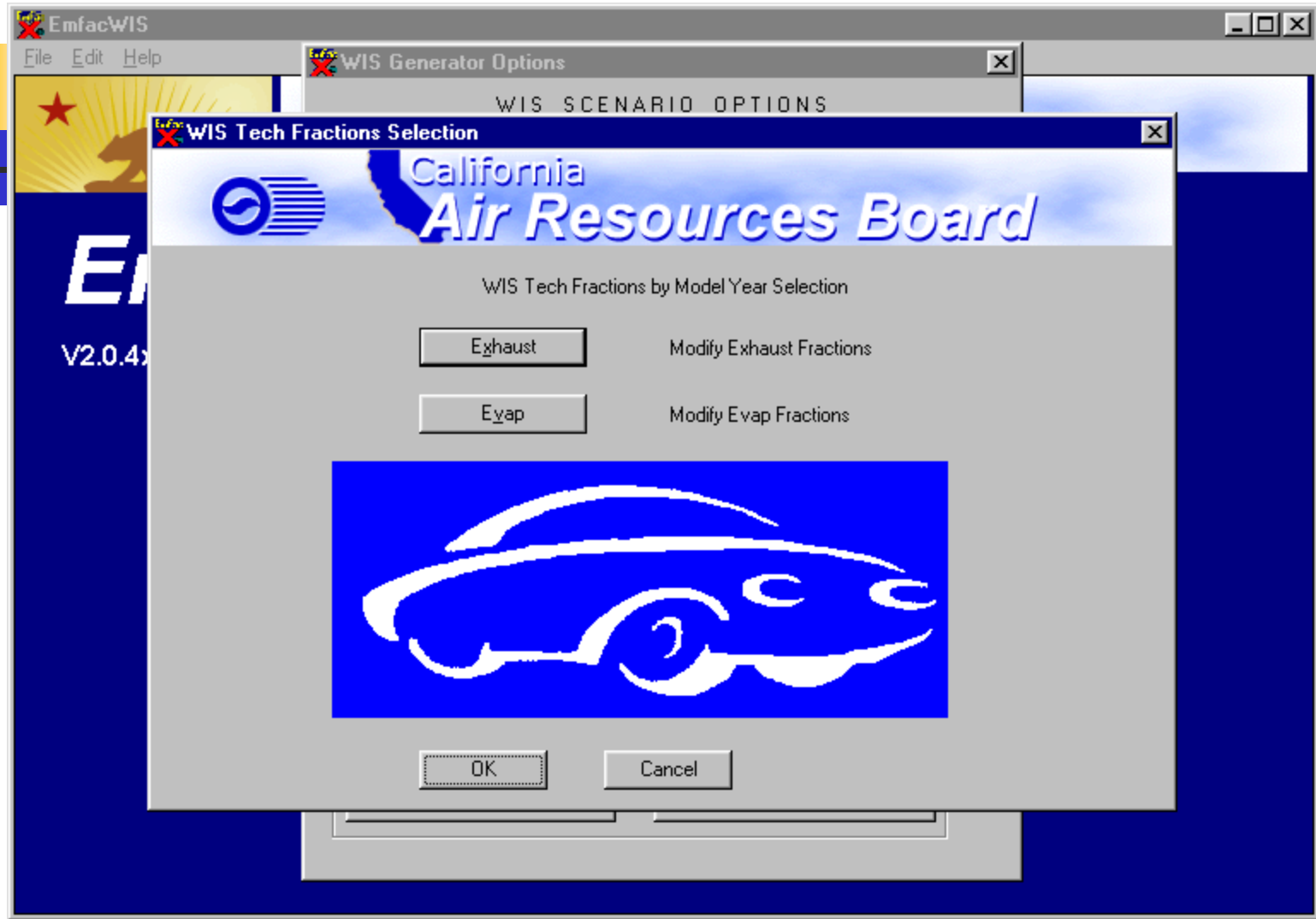
Updates Will Be Applied to Settings in "Apply To:" Column.
Note: Initial Single Change Already Shown.

Static

Selections Available	Apply To:
0500	0000
0600	0100
0700	0200
0800	0300
0900	0400
1000	

OK Cancel

35	26.9508	80	0.00
40	1.7486	85	0.00
45	0.1082	90	0.00



EmfacWIS
File Edit Help

WIS Tech F

Exhaust Tech Fractions by Model Year and Technology Group

Exhaust Tech Fractions by Model Year and Technology Group

Vehicle Class: 01: Light-Duty Autos (PC)

Model Year	#Tech Indices	EXHAUST Tech Fractions	
		Index	%
2000	3	23	93.9258
		24	6.0004
		177	0.0739
		1	
		1	
		1	
		1	
		1	
		1	
		1	
		1	
		1	
Total (%)			100.0001

Apply

OK

Exit

The screenshot displays the EmfacWIS software interface. The main window has a menu bar with 'File', 'Edit', and 'Help'. Below the menu bar is a header area with a star and a bear silhouette, and the text 'Emfac' and 'V2.0.4x Pr: May 1'. The main content area is mostly obscured by a large 'WIS Generator Options' dialog box.

The 'WIS Generator Options' dialog box contains the following fields and controls:

- Number:** 1 of 1
- Scenario Name:** SCoast 2000 CY Planning
- Scenario Type:** (Dropdown menu)
- Calendar Year(s):** Range
- WIS Op:** (List of options with checkboxes)

An 'Other Options' sub-dialog box is open, containing:

- Enter starting model year:** 1965
- Enter final model year:** 2000
- Buttons:** Unregistered Vehicles, Scrappage, Edit Population, Edit Accrual, Edit VMT, Edit Trips-per-Day, OK, Cancel.

At the bottom of the 'WIS Generator Options' dialog, there is a section for 'Exit scenario add/modify dialog' with buttons for 'Write scenario to file' and 'Cancel all scenario changes'.

EmfacWIS

File Edit Help

Editing Population data for scenario 1: SCoast 2000 CY Planning

Total Population (registered vehicles) for area

South Coast AB

Editing Mode

Total Population | By Vehicle Class | By Vehicle and Fuel | By Vehicle/Fuel/Age

Revised Total Population: 9500000

Previous Total Population: 9344133

Apply Cancel Done



EmfacWIS

File Edit Help

Editing Population data for scenario 1: SCoast 2000 CY Planning

Total Population (registered vehicles) for area

South Coast AB

Editing Mode

Total Population By Vehicle Class By Vehicle and Fuel By Vehicle/Fuel/Age

1 - Light-Duty Autos (PC)	70000000
2 - Light-duty Trucks (T1)	777924.
3 - Light-duty Trucks (T2)	1568479.
4 - Medium-duty Trucks (T3)	577229.
5 - Light HD Trucks (T4)	97896.
6 - Light HD Trucks (T5)	33293.
7 - Medium HD Trucks (T6)	103243.
8 - Heavy HD Trucks (T7)	62804.
9 - Line-Haul Vehicles (T8)	0.
10 - Urban Buses	6632.
11 - Motorcycles	112710.
12 - School Buses	10196.
13 - Motor Homes	55237.

Apply Cancel Done



EmfacWIS

File Edit Help

Editing Population data for scenario 1: SCoast 2000 CY Planning

Total Population (registered vehicles) for area

South Coast AB

Editing Mode

Total Population By Vehicle Class By Vehicle and Fuel By Vehicle/Fuel/Age

1 - Light-Duty Autos (PC)
 2 - Light-duty Trucks (T1)
 3 - Light-duty Trucks (T2)
 4 - Medium-duty Trucks (T3)
 5 - Light HD Trucks (T4)
 6 - Light HD Trucks (T5)
 7 - Medium HD Trucks (T6)
 8 - Heavy HD Trucks (T7)
 9 - Line-Haul Vehicles (T8)
 10 - Urban Buses
 11 - Motorcycles
 12 - School Buses
 13 - Motor Homes

Fuel (1=Gas/2=Diesel/3=Electric)

	1	2	3
1	69501664.0	498339.6	0.0
2	772895.9	5027.7	0.0
3	1563659.9	4819.0	0.0
4	547729.3	29500.0	0.0
5	89071.6	8824.6	0.0
6	20729.9	12562.8	0.0
7	36436.7	66806.1	0.0
8	3840.7	58963.3	0.0
9	0.0	0.0	0.0
10	2340.6	4291.0	0.0
11	112710.1	0.0	0.0
12	2038.2	8157.6	0.0
13	52651.9	2585.2	0.0

Apply Cancel Done

EmfacWIS Editing Population data for scenario 1: SCoast 2000 CY Planning

Total Population (registered vehicles) for area

South Coast AB

Editing Mode

Total Population By Vehicle Class By Vehicle and Fuel By Vehicle/Fuel/Age

Vehicle Class

	1	2	3	4	5
1	4244324.0	40860.7	147947.5	41062.6	394
2	4545160.5	37576.7	155891.5	37771.9	394
3	4656061.5	39486.5	147077.3	38847.3	416
4	4466909.0	38133.0	142411.3	37706.1	411
5	3705591.8	23066.3	115933.9	35748.6	170
6	4035771.0	23037.3	117190.7	34924.7	216
7	3480083.8	28314.6	101964.5	29932.8	196
8	3347130.0	27166.1	98322.0	21509.6	156
9	3041513.8	23662.3	76900.2	19052.7	167
10	3454593.0	27062.7	84591.3	18510.2	207
11	3612468.5	21329.3	76622.7	19793.7	290
12	3897794.5	36793.7	75534.9	21728.5	376
13	3580513.8	46804.0	52014.1	16677.7	320
14	3324331.3	54463.5	40395.8	12631.9	254
15	2899089.0	58058.1	35698.7	15983.8	300
16	2524113.3	42421.2	25416.6	15044.4	357

Age

Fuel Type

Gas

Diesel

Electric

Apply Cancel Done

EmfacWIS
File Edit Help

Editing Accrual data for scenario 1: SCoast 2000 CY Planning

Total Accrual (annual odometer mileage) for area

South Coast AB

Editing Mode

Total Accrual By Vehicle Class By Vehicle and Fuel By Vehicle/Fuel/Age

		Vehicle Class				
		1	2	3	4	5
Age	1	68676.0	68676.0	68676.0	68676.0	8700
	2	63720.0	63720.0	63720.0	63720.0	8370
	3	60182.0	60182.0	60182.0	60182.0	8040
	4	57365.0	57365.0	57365.0	57365.0	7710
	5	55004.0	55004.0	55004.0	55004.0	7390
	6	52960.0	52960.0	52960.0	52960.0	7070
	7	51155.0	51155.0	51155.0	51155.0	6760
	8	49535.0	49535.0	49535.0	49535.0	6450
	9	48066.0	48066.0	48066.0	48066.0	6140
	10	46718.0	46718.0	46718.0	46718.0	5840
	11	45476.0	45476.0	45476.0	45476.0	5540
	12	44325.0	44325.0	44325.0	44325.0	5250
	13	43251.0	43251.0	43251.0	43251.0	4970
	14	42242.0	42242.0	42242.0	42242.0	4690
	15	41297.0	41297.0	41297.0	41297.0	4410
	16	40403.0	40403.0	40403.0	40403.0	4150

Fuel Type

Gas

Diesel

Electric

Apply Cancel Done



EmfacWIS
File Edit Help

Editing Trips-per-Day data for scenario 1: SCoast 2000 CY Planning

Total Trips-per-Day (starts per weekday) for area

Editing Mode
 Total Trips-per-Day By Vehicle Class By Vehicle and Fuel By Vehicle/Fuel/Hour

		Vehicle Class				
		1	2	3	4	5
Hour	1	3654663.5	39826.7	83968.8	28525.7	1590
	2	1783823.9	19439.2	40984.8	13923.2	1500
	3	652618.5	7111.9	14994.4	5093.9	1649
	4	739634.3	8060.2	16993.7	5773.0	769
	5	1218221.1	13275.6	27989.6	9508.6	1354
	6	1957855.4	21335.8	44983.3	15281.6	970
	7	8310008.5	90558.4	190929.0	64861.9	824
	8	24799502.0	270252.9	569788.0	193566.9	1296
	9	24538454.0	267408.2	563790.3	191529.4	9749
	10	20535728.0	223788.4	471824.4	160287.0	4801
	11	22014996.0	239908.7	505811.8	171833.1	44390
	12	31282180.0	340898.0	718732.6	244166.0	40236
	13	36155064.0	394000.3	830691.0	282200.3	24770
	14	30107466.0	328096.5	691742.6	234997.1	22560
	15	32108830.0	349906.4	737725.6	250618.3	23910
	16	33849148.0	368871.5	777710.7	264201.9	24240

Fuel Type

1988 1 1 1

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V2.0.4x Pr: May 10 2001 build for project team only

Scenario 1 of 1 for calendar year 2000
SCoast 2000 CY Planning
Burden run for area: South Coast AB
Model years range from 1965 to 2000

Vehicle Class 1 of 13: Light-Duty Autos (PC)

Current model year is 1988



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Additional WIS Edits/Features

- Change I&M benefits for ASM program by CY
- Implement WEIGHT output
- Report Methane
- GUI Update - Windows look with tab strip controls.
- Program flow for managing sequence of edits
- Implement double precision
- Read/write and save WIS Scenario edits



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Future Enhancements

- Independent trip growth factor
- Multiple Scenario Model
- Output multiple calendar years and model years in one scenario
- Evaluate benefits from proposed control strategies without adding new tech. Groups
- CEIDARs and/or CEFS output formats
- Inventory estimates by vehicle speed



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System Requirements

- EMFAC2001-WIS is optimized
- Minimum system specifications

Pentium 200 MHz or better

64 MB ram, more preferred

350 MB hard disk space for swap space

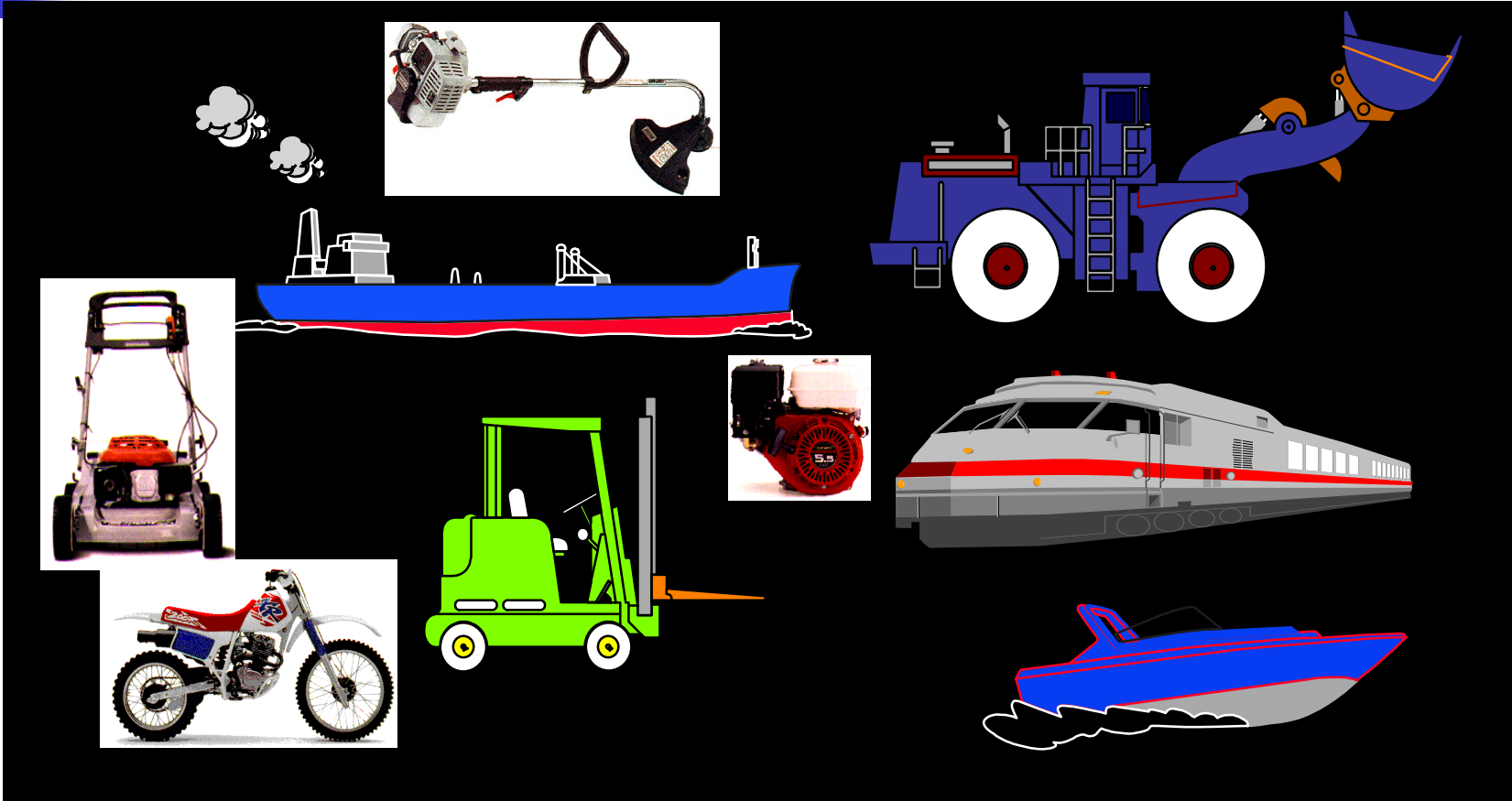
Monitor resolution of 1024 x 768

Current size 31 MB, will increase with DP



Updates to California's OFFROAD Model





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Overview:

- Inventory = Emission Rate *
Population *
Activity *
Horse Power *
Load Factor



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Overview

- 12 Categories - many subdivided by weight or HP
- Estimates by 69 geographic areas
- Same processes as the on-road model
- Tracks HC/CO/NO_x/PM and CO₂ estimates



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OFFROAD Categories

- Lawn and Garden Equipment
- Light Commercial Equipment (0-50HP)
- Recreational Equipment
- Industrial Equipment
- Construction and Mining Equipment
- Agricultural Equipment
- Logging Equipment
- Airport Ground Service
- Pleasure Craft
- Transport Refrigeration Units
- Tactical support equipment
- Portable equipment

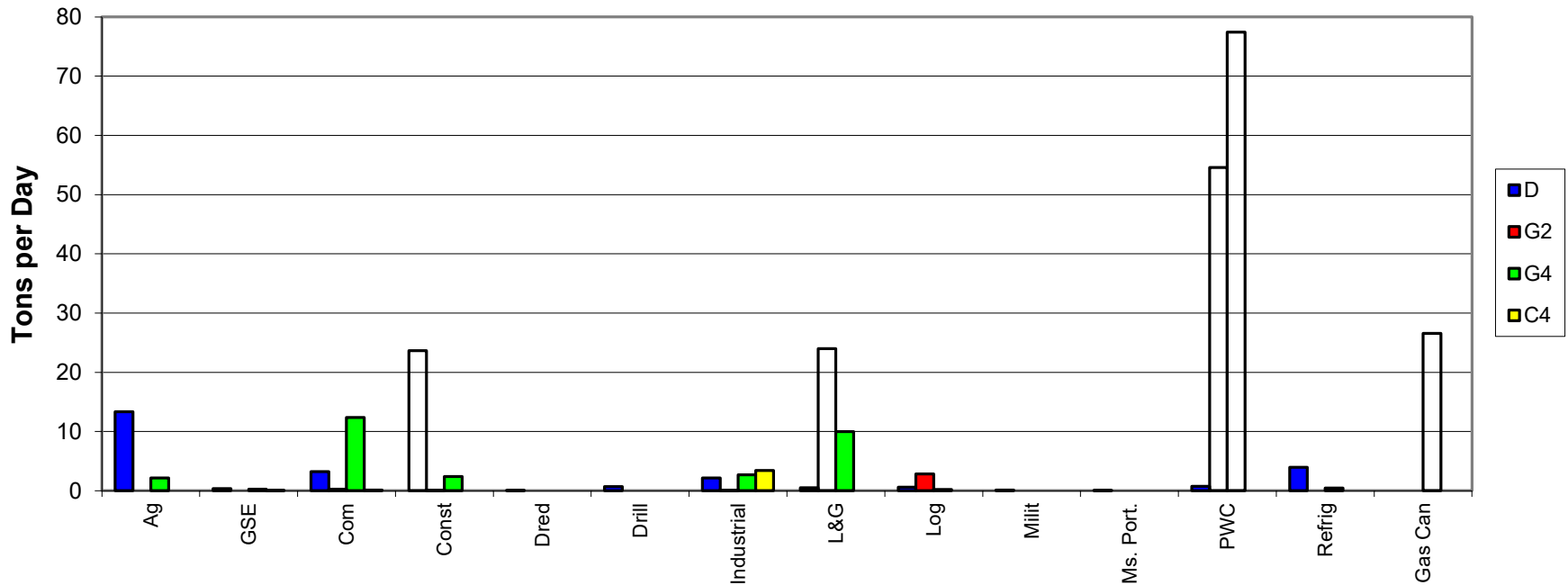


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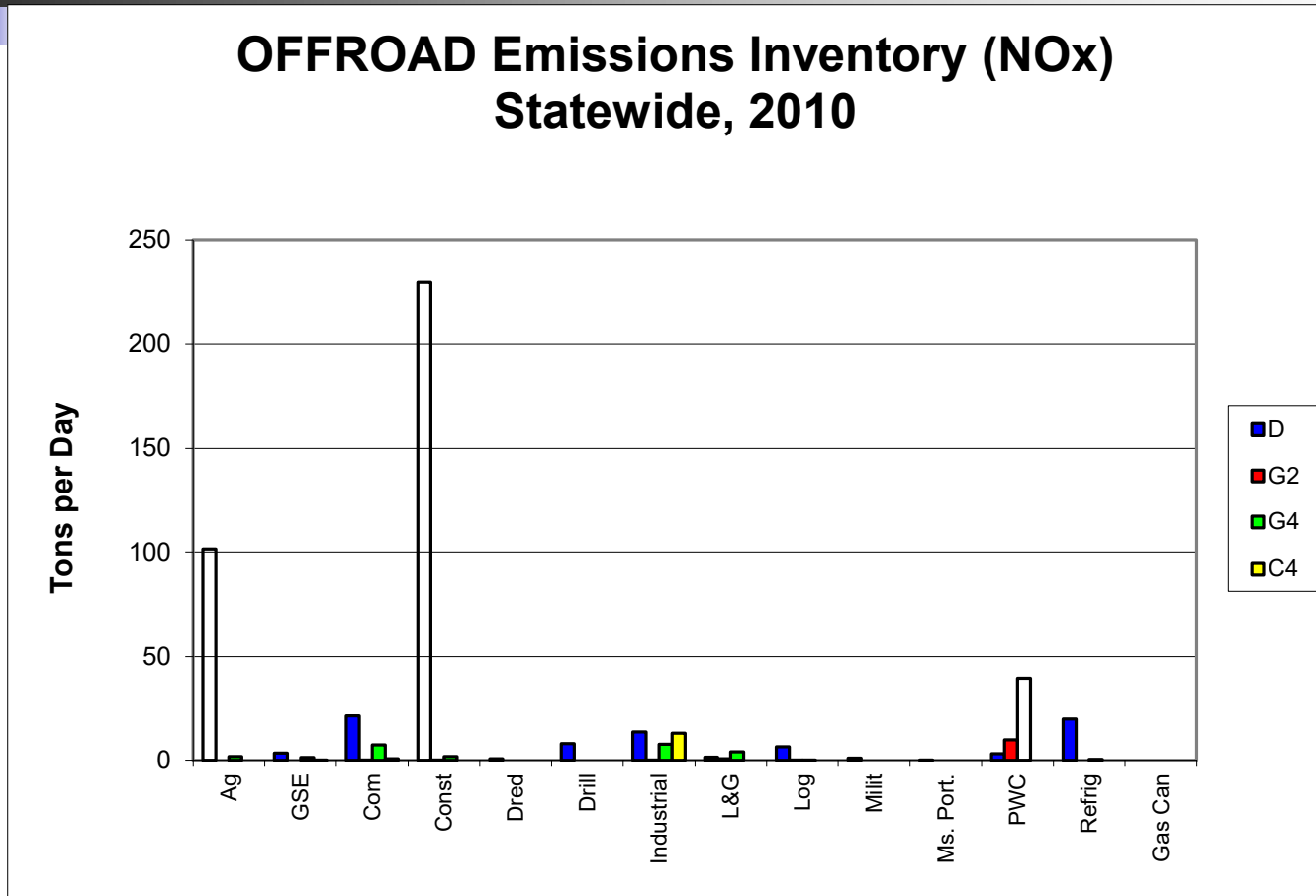
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Statewide TOG Inventory By Category in 2010

OFFROAD Emissions Inventory (TOG) Statewide, 2010



Statewide NOx Inventory by Category in 2010



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Update#1: Incorporation of New Emission Standards

- Incorporated USEPA's adopted phase 2 emissions standards for spark ignited small off-road (<25 hp) engines
- Only preempted handheld equipment affected
- No change to preempted non-handheld due to California's rule



USEPA's Phase 2 HC+NO_x Standards in g/hp-hr for ≤25 hp Handheld SI Engines

Engine Class	HP Group	2002	2003	2004	2005	2006	2007 +
Class III	0-2	176	130	84	37	37	37
Class IV	2-15	145	110	73	37	37	37
Class V	15-25			106	88	71	53



USEPA's Phase 2 HC+NOx Standards in g/hp-hr for ≤ 25 hp Non-Handheld SI Engines

Engine Class	HP Group	HC+NOx	Implementation
Class I	0-5	12	Phase-in 2003-2007
Class II	5 +	9	Phase-in 2001-2005



Update#1: Incorporation of New Emission Standards (cont.)

- Preempt spark ignited large off-road (≥ 25 hp) engines emissions revised to reflect the fact that USEPA has not adopted any rule
- Baseline inventory increased





Update#2: Changes to Recreational Marine Inventory

- Affected Equipment:
 - Inboard Engines Vessels - G4
 - Sterndrive Engine Vessels - G4
 - Jet Engine Vessels - G4





Update#2: Changes to Recreational Marine Inventory (cont.)

- Age distribution revised based on DMV's data
- Vessel turnover rate is flat
- Engine to boat ratio revised
Increase in Inboard and Jet population; Decrease in Sterndrive population





Update#2: Changes to Recreational Marine Inventory (cont.)

- Average hp values are revised upward
- Load factor has decreased from 0.38 to 0.21
- Based on more recent test data, emission factors are revised
- All of these changes have reduced the baseline inventory



Update#3: Gas Can Inventory

- Gas cans have been incorporated in the OFFROAD model



Update#4: Inclusion of Stationary Equipment which have Mobile Counterpart in the OFFROAD Model

- Compressors
- Generator sets
- Irrigation pumps
- Other industrial/commercial pumps
- Pressure Washers
- Welders



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Future Updates

- Inclusion of evaporative emissions
- Update to recreational vehicle emissions





EMFAC2002
