Appendix C

Rollback

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Review of control strategy effectiveness using rollback modeling supported by CMAQ nitrate particulate evaluation

Summary of findings	Primary	Secondary	Effective control option	Tracking required for SIP modeling
Ammonium Nitrate		NOx	**Yes**	**Yes**
		Ammonia	No	No
Ammonium Sulfate		SOx	No	No
		Ammonia	No	No
Geologic and Construction	PM10		**Yes**	**Yes**
Carbon particulates	PM10	ROG	**PM10 Yes, ROG Yes**	PM10 Plan ROP tracks directly emitted PM10, Ozone Plan ROP tracks secondary.
Rollback modeling divides the carbon into several major contributing source types:				
Mobile exhaust, tire and brake wear	PM10	ROG		Directly emitted PM10 included in PM10 ROP, Separate category tracking not effective for ROG secondary PM10 formation
Vegetative burning	PM10	ROG		
Organic Carbon from stationary and area sources	PM10	ROG		

Evaluation of the potential effectiveness of reductions as a control option

50% modeling sensitivity tests

NOx Reduction Response

NOx, SOx and ammonia form secondary PM2.5. Reductions of NOx reduce nitrate particulate but can result in formation of small amounts of additional sulfate particulate. A61

Criteria to determine significant sources:
Annual criteria > 1 microgram
Episode criteria > 5 micrograms
NOx forms nitrate annual particulate > 1 µgm
NOx forms nitrate particulate in episodes winter and fall > 5 µgm
Contributions pass test for significant contribution to standards.

CMAQ predicted sum of particulate nitrate, sulfate and ammonia ions in response to 50% cut of NOx emissions is used to determine net response.

Finding: NOx reductions are effective for the annual standard and the winter and fall episodes.

	ARB CMAQ model Nitrate, sulfate and ammonia response (%)	Impact on rollback model Nitrate particulate (µgm)	
Annual			
BGS	35.1	**4.9**	Winter average response
BAK	35.7	**5.0**	Winter average response
Finding		> 1 µgm	Effective as control option
Winter Episode			
HAN	31.5	**28.2**	Winter average response
Finding		> 5 µgm	Effective as control option
Fall Episode			
COP	39.5	**9.2**	Winter average response (October episode response is not modeled by CMAQ, analysis provides greater than maximum potential impact of nitrates)
Finding		Probably > 5 µgm	Probably effective as control option, the effect for nitrate chemistry at this time of year may be less than the calculated value
Summer Episode			
BGS	not applicable	< 5 µgm	Not effective as control option, windblown geologic event, total secondary nitrate particulate involved approximately one microgram.

Ammonia Reduction Response

NOx, SOx and ammonia form secondary PM2.5. Reductions of ammonia can result in reduced formation of sulfate and nitrate particulate but the reduction is small when ammonia is not a limiting precursor. The sum of effects is used for this analysis.

	ARB CMAQ model Nitrate, sulfate and ammonia response (%)	Impact on rollback model Nitrate particulate (µgm)
Annual		

Criteria to determine significant sources:
Annual criteria > 1 microgram
Episode criteria > 5 micrograms
Ammonia forms nitrate and sulfate annual particulate > 1 µgm
Ammonia forms particulate nitrate and sulfate in episodes winter and fall > 5 µgm
Contributions pass test for significant contribution to standards.

CMAQ predicted sum of particulate nitrate, sulfate and ammonia ions in response to 50% cut of Ammonia emissions is used to determine net response
CMAQ establishes that ammonia is not a limiting precursor.
Reduction of ammonia by 50% results in only trace reductions of particulate.

Finding: Ammonia reduction is not effective for the annual standard or the winter and fall episodes.

BGS	1.7	0.2	Winter average response
BAK	0.8	0.1	Winter average response
Finding		< 1 µgm	Not effective as control option

Winter Episode

HAN	0.4	0.3	Winter average response
Finding		< 5 µgm	Not effective as control option

Fall Episode

COP	0.4	0.1	Winter average response (episode is October)
Finding		< 5 µgm	Not effective as control option

Summer Episode

BGS not applicable, windblown geologic event

SOx Reduction Response

NOx, SOx and ammonia form secondary PM2.5. Reductions of SOx reduce sulfate particulate but can result in formation of small amounts of additional nitrate particulate. Due to small contribution, sensitivity modeling not required.

Criteria to determine significant sources:
Annual criteria > 1 microgram
Episode criteria > 5 micrograms
SOx forms sulfate annual particulate > 1 µgm
SOx forms sulfate particulate in episodes winter and fall > 5 µgm
Contributions pass test for significant contribution to standards

Review of sulfate particulate concentrations used to determine response
Finding: SOx reduction is not effective for the annual standard or the winter and fall episodes.

	Total SOx Contribution Maximum potential response (%)	**Impact on rollback model Nitrate particulate (µgm)**	
Annual	50	1	SOx anthropogenic annual average contribution 2 µgm
		1 µgm	Not effective as control option

Winter Episode

	50	3	SOx maximum episodic anthropogenic contribution 6 µgm
		< 5 µgm	Not effective as control option

Fall and Summer Episodes

Mass contribution less than winter episode — Not effective as control option

VOC Reduction Response (for secondary particulate formation)

VOC forms carbon particles and is also involved in the secondary chemistry for nitrate and sulfate particulates. Reductions of VOC can result in reduced formation of carbon particulates and sulfate and nitrate particulate. The sum of effects predicted by CMAQ is used for this analysis.
Carbon is quantified in the rollback analysis for primary emissions and secondary VOC particle formation in the categories: mobile exhaust, tire and brake wear, organic carbon and vegetative burning.
Criteria to determine significant sources:

	ARB CMAQ model Nitrate, sulfate and ammonia response (%)	**Impact on rollback model Nitrate particulate (µgm)**	
Annual			
BGS	9.8	**1.4**	Winter average response

Annual criteria > 1 microgram
Episode criteria > 5 micrograms
Total carbon annual particulate > 1 µgm
Total carbon episode particulate in winter and fall > 5 µgm
Contributions pass test for significant contribution to standards.

CMAQ predicted sum of particulate nitrate, sulfate and ammonia ions in response to 50% cut of VOC emissions is used to determine net response for secondary particle atmospheric chemistry.
CMAQ establishes that VOC emission reductions have an influence on nitrate and sulfate particle formation.
The combined effect of VOC and NOx reductions has not been established by sensitivity analysis and cannot be included in rollback calculations at this time.

Finding: VOC reduction is effective for the annual standard and the winter episode for reduction of total carbon secondary particulates, although projecting the interaction with NOx reductions is beyond the scope of the rollback approach.

Winter Episode

BAK	9.5	**1.3**	Winter average response
Finding		> 1 µgm	Effective as control option
HAN	9.7	8.7	Winter average response
Finding		> 5 µgm	Effective as control option
COP	7.1	**1.6**	Winter average response (episode is October)
Finding		< 5 µgm	Not effective as control option

Fall Episode

Summer Episode

BGS not applicable, windblown geologic event

VOC Reduction Response (carbon particulate formation for major emission categories)

Reductions assumed to be proportional

BGS	Contribution	50% Reduction	
Annual Total Carbon	4.8	2.4	Effective as control option
Mobile Exhaust	1.8	0.9	Not effective to track separately
Tire and Break Wear	0.8	0.4	Not effective to track separately
Vegetative Burning	1.6	0.8	Not effective to track separately
Organic Carbon (other VOC particles from stationary and area sources)	0.7	0.3	Not effective to track separately

Finding: Effective in total but not effective to track at a category level.

HAN	Contribution	50% Reduction	
Winter Total Carbon	16.5	8.3	Effective as control option
Mobile Exhaust	6.2	3.1	Not effective to track separately
Tire and Break Wear	1.0	0.5	Not effective to track separately
Vegetative Burning	6.6	3.3	Not effective to track separately
Organic Carbon (other VOC particles from stationary and area sources)	2.8	1.4	Not effective to track separately

Finding: Effective in total but not effective to track at a category level.

Findings: VOC reduction is effective for the annual standard and the winter episode for reduction of total carbon particulates; however, tracking reductions at the major category level is not effective.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	**Bakersfield Golden State, Annual, Design Values: 2000-2002 57, 2002-2004 51**	**General Note**	**Geologic and Construction**	**Mobile Exhaust**		**Tire and Brake Wear**	**Organic Carbon**		**Vegetative Burning**	**Ammonium Nitrate including associated water**	**Ammonium Sulfate**	**Marine**	**Unassigned**
2	Line1 Source Contribution from Analysis	From CMB monthly analysis Feb 2000 to Dec 2000, adding January 2001 episode for chemistry equivalent to annual design value	From CMB	From CMB		From CMB	Estimated portion of mass included in Vegetative Burning =30%		From CMB minus estimated Organic Carbon from other sources	From CMB	From CMB	From CMB, if present	Unaccounted mass from CMB, if any.
3	LINE 1	57.00	26.70	3.60		1.10	1.89		4.41	14.90	3.00	0.00	1.4
4	Line2 Natural and Transport Contribution, see "Background" sheet	Portion not included in rollback analysis, removed prior to rollback as not subject to local control, added back to projected future concentrations	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations	0, no natural background, transport estimated at 0		0, no natural background, transport estimated at 0	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations. Includes biogenic emissions.		see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations. Includes wildfires and biogenic.	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations	100% because marine salts are a natural emission	0, background estimate at maximum, no additional background estimate for unexplained mass
5	LINE 2	7.89	4.0	0.0		0.0	0.6		1.3	1.0	1.0		
6	Line 3 Net for Rollback	Net for Rollback, default percentages adjustable for episode characteristics, applicable to all columns except as indicated								Net for non-linear rollback, default percentages adjustable for episode characteristics		Removed entirely from rollback, added back to result	
7	LINE 3	49.11	22.7	3.6		1.1	1.3		3.1	13.9	2.0	0.0	1.4
8	Line4 Local Contribution PM2.5-PM10 Area of Influence	Source contribution from smallest area of influence, representative of large particle primary source area, includes all PM size emissions in the area - Rolled back against local area of influence emission estimates	70%PM10 50%PM2.5 of net	70%PM10 50%PM2.5 of net		70%PM10 50%PM2.5 of net	70%PM10 50%PM2.5 of net		70%PM10 50%PM2.5 of net	70%PM10 50%PM2.5 of net, non-linear rollback	70%PM10 50%PM2.5 of net		70%PM10 50%PM2.5 of net
9	LINE 4	29.60	15.9	1.8		0.8	0.7		1.5	7.0	1.0		1.0
10	Line5 Local Contribution Area of Influence of PM2.5	Rolled back against local PM2.5 area of influence emission estimates - episode specific adjustments based on meteorology and episode duration	15%PM10 30%PM2.5	15%PM10 30%PM2.5		15%PM10 30%PM2.5	15%PM10 30%PM2.5		15%PM10 30%PM2.5	15%PM10 30%PM2.5 non-linear rollback	15%PM10 30%PM2.5		15%PM10 30%PM2.5
11	LINE 5	10.95	3.4	1.1		0.2	0.40		0.9	4.2	0.6		0.2
12	Line6 Sub regional Contribution	Rolled back against specified County(ies) emission estimates - episode specific adjustments based on meteorology and episode duration	10%PM10 15%PM2.5	10%PM10 15%PM2.5		10%PM10 15%PM2.5	10%PM10 15%PM2.5		10%PM10 15%PM2.5	10%PM10 15%PM2.5 non-linear rollback	10%PM10 15%PM2.5		10%PM10 15%PM2.5
13	LINE 6	6.11	2.3	0.5		0.1	0.20		0.5	2.09	0.30		0.1
14	Line7 Regional Contribution	Rolled back against Valleywide emission estimates - episode specific adjustments based on meteorology and episode duratior	5%PM10 5%PM2.5	5%PM10 5%PM2.5		5%PM10 5%PM2.5	5%PM10 5%PM2.5		5%PM10 5%PM2.5	5%PM10 5%PM2.5 non-linear rollback	5%PM10 5%PM2.5		5%PM10 5%PM2.5
15	LINE 7	2.46	1.1	0.2		0.1	0.07		0.2	0.70	0.10		0.1
16	Associated Emissions Categories	Based upon appropriate seasonal or annual inventory	PM10 paved roads+ PM10 unpaved roads+ PM10 off road mobile+ PM10 farm operations+ PM10 construction+ PM10 windblown	PM10, ROG & CO onroad mobile+ PM10, ROG & CO 860 offroad equipment PM10, ROG & CO 870 farm equipment CO presumed to add minimal mass		Tire and brake wear as predicted by EMFAC2002	Total ROG minus motor vehicle, OC may also include a small portion of otherwise unassigned elemental carbon PM10 & CO Area, Stationary CO presumed to add minimal mass		PM10 & CO residential burning PM10 & CO waste burning and disposal PM10 cooking PM10 & CO fires CO presumed to add minimal mass	Total E.I. NOx (+ bacterial soil NOx estimate removed as natural background)	Total SOx	None, natural emission from the ocean, bay and delta waters	Total PM10
17	2000 Emissions Inventory	(area of influence emissions inventory, each on a separate line for automated calculation							Tulare Range burning adjusted				
18	PM10	L1= 12	**11.19**	**1.97**		**0.30**	**3.54**		**2.09**				**19.38**
19	Annual CCOS 2.14	L2= Kern	**33.95**	**2.39**		**0.37**	**7.89**		**3.53**				**47.83**
20	with ARB EMFAC adjustments	Sr= Kern	**33.95**	**2.39**		**0.37**	**7.89**		**3.53**				**47.83**
21		R= SJV	**226.50**	**13.49**		**1.88**	**24.60**		**30.80**				**325.42**
22	NOx	L1= 12								**101.08**			
23	Annual CCOS 2.14	L2= Kern								**154.94**			
24	with ARB EMFAC adjustments	Sr= Kern								**154.94**			
25		R= SJV								**542.75**			
26	ROG	L1= 12			**21.85**			**31.91**					
27	Annual CCOS 2.14	L2= Kern			**29.99**			**65.33**					
28	with ARB EMFAC adjustments	Sr= Kern			**29.99**			**65.33**					
29		R= SJV			**174.52**			**249.05**					
30	SOx	L1= 12									**3.29**		
31	Annual CCOS 2.14	L2= Kern									**11.86**		
32		Sr= Kern									**11.86**		
33		R= SJV									**32.05**		
133	2010 Emissions Inventory								Tulare Range burning adjusted				
136	PM10 2010 EI with new controls	L1= 12	**9.84**	**1.63**		**0.41**	**3.84**		**1.58**				**18.07**
139		L2= Kern	**29.84**	**1.98**		**0.49**	**8.56**		**2.61**				**44.64**
140		Sr= Kern	**29.84**	**1.98**		**0.49**	**8.56**		**2.61**				**44.64**
141		R= SJV	**189.53**	**11.33**		**2.52**	**26.85**		**23.99**				**269.84**
146	NOx 2010 EI with new controls	L1= 12								**64.97**			
147		L2= Kern								**101.75**			
148		Sr= Kern								**101.75**			
149		R= SJV								**348.38**			
154	ROG 2010 EI with new controls	L1= 12			**11.29**			**28.13**					
155		L2= Kern			**15.98**			**57.60**					
156		Sr= Kern			**15.98**			**57.60**					
157		R= SJV			**96.71**			**241.09**					
162	SOx 2010 EI	L1= 12									**3.53**		
163		L2= Kern									**13.24**		
164		Sr= Kern									**13.24**		
165		R= SJV									**34.78**		
218	2010 Rollback Projection with additional controls									IMS95			
219	Local Contribution PM2.5-PM10 Area of Influence	=(2010 L1/1999 L1) * LINE 4	14.0	0.7	0.5	1.0	0.4	0.3	1.2	5.3	1.1		0.9
220	Local Contribution Area of Influence of PM2.5	=(2010 L2/1999 L2) * LINE 5	3.0	0.4	0.3	0.2	0.2	0.2	0.7	3.2	0.7		0.2
221	Sub regional Contributior	=(2010 Sr1/1999 Sr2) * LINE 6	2.0	0.2	0.1	0.1	0.1	0.1	0.3	1.6	0.3		0.1
222	Regional Contribution	=(2010 R/1999 R) * LINE 7	0.9	0.1	0.0	0.1	0.0	0.0	0.1	0.5	0.1		0.1
223	+ Natural Background contributior	= LINE 2	4.0	0.0		0.0	0.6		1.3	1.0	1.0	0.0	0.0
224	2010 projected Annual Resul	49.46	23.9	1.5	0.9	1.5	1.3	0.6	3.6	11.6	3.2	0.0	1.3
225										Linear			
226	2010 projected Annual Resul	47.83	linear nitrate projectior							4.5			
227	Modeling comparisons	49.46	IMS95 nitrate modeling							2.7			
228	Current 2002-2004 Design value = 51	49.28	CMAQ nitrate modeling							1.4			
229		48.86	Average of all three							0.4			
230		49.37	Average of CMAQ and IMS95							9.0			
231													
232										CMAQ			
233										5.2			
234										3.2			
235										1.6			
236										0.5			
237										10.5			
238	end												

	A	B	C	D	E	F
1	**Bakersfield Golden State, 05/20/02, Design Value 189, Geologic exceptional episode**	**General Note: during the months of March to June, this is the ony episode of this type detected in the last ten years**	**Geologic and Construction speciation determined from PM2.5 value**	**Mobile Exhaust speciation determined from PM2.5 value**		**Secondary sources less than one microgram contribution, de minimis and not modeled**
2	Line1 Source Contribution from Analysis	Wind related episode, atypical for time of year, not from nitrates or vegetative burning	From CMB	From CMB		
3	LINE 1	**BGS 05/20/02 189**	183.60	5.40		
4	Line2 Natural and Transport Contribution, see "Background" sheet	Portion not included in rollback analysis, removed prior to rollback as not subject to local control, added back to projected future concentrations	natural sources emoved prior to rollback as not subject to local control, added back to projected future concentrations <5%	0, no natural background, transport estimated at 0		
5	LINE 2	2.00	2.0	0.0		
6	Line 3 Net for Rollback	Net for Rollback				
7	LINE 3	187.00	181.6	5.4		
8	Line4 Local Contribution PM2.5-PM10 Area of Influence	Source contribution from smallest area of influence, representative of large particle primary source area, includes all PM size emissions in the area - Rolled back against local area of influence emission estimates	50%PM10 of net	70%PM10 50%PM2.5 of net		
9	LINE 4	93.50	90.8	2.7		
10	Line5 Local Contribution Area of Influence of PM2.5	Rolled back against local PM2.5 area of influence emission estimates - episode specific adjustments based on meteorology and episode duration	10%PM10	15%PM10 30%PM2.5		
11	LINE 5	19.78	18.2	1.6		
12	Line6 Sub regional Contribution	Rolled back against specified County(ies) emission estimates - episode specific adjustments based on meteorology and episode duration	10%PM10	10%PM10 15%PM2.5		
13	LINE 6	18.97	18.2	0.8		
14	Line7 Regional Contribution	Rolled back against Valleywide emission estimates episode specific adjustments based on meteorology and episode duration	30%PM10	5%PM10 5%PM2.5		
15	LINE 7	54.75	54.5	0.3		
16	Associated Emissions Categories	Based upon appropriate seasonal or annual inventory	PM10 paved roads+ PM10 unpaved roads+ PM10 farm operations + PM10 construction	PM10, TOG & CO onroad mobile+ PM10, TOG & CO offroad equipment PM10, TOG & CO farm equipment, includes tire and brake wear CO presumed to add minimal mass		
17	2000 Emissions Inventory	(area of influence emissions inventory, each on a separate line for automated calculations)				
18	PM10	L1= 12	**11.19**	**2.28**		
19	Annual CCOS 2.14	L2= Kern	**33.95**	**2.76**		
20	with ARB EMFAC adjustments	Sr= Kern	**33.95**	**2.76**		
21		R= SJV	**226.50**	**15.37**		
26	ROG	L1= 12			**21.85**	
27	Annual CCOS 2.14	L2= Kern			**29.99**	
28	with ARB EMFAC adjustments	Sr= Kern			**29.99**	
29		R= SJV			**174.52**	
133	2010 Emissions Inventory					
134	PM10 2010 EI with new controls	L1= 12	**9.82**	**2.04**		
135		L2= Kern	**29.78**	**2.47**		
136		Sr= Kern	**29.78**	**2.47**		
137		R= SJV	**189.13**	**13.85**		
138	PM10 2010 EI with action plan	L1= 12	**8.82**	**2.04**		
139		L2= Kern	**28.78**	**2.47**		
140		Sr= Kern	**28.78**	**2.47**		
141		R= SJV	**188.13**	**13.85**		
150	ROG 2010 EI with new controls	L1= 12			**11.29**	
151		L2= Kern			**15.98**	
152		Sr= Kern			**15.98**	
153		R= SJV			**96.71**	
154	ROG 2010 EI no action plan change	L1= 12			**11.29**	
155		L2= Kern			**15.98**	
156		Sr= Kern			**15.98**	
157		R= SJV			**96.71**	
211	2010 Rollback Projection					
212	Local Contribution PM2.5-PM10 Area of Influence	=(2010 L1/1999 L1) * LINE 4	79.6	1.2	0.7	
213	Local Contribution Area of Influence of PM2.5	=(2010 L2/1999 L2) * LINE 5	15.9	0.7	0.4	
214	Sub regional Contribution	=(2010 Sr1/1999 Sr2) * LINE 6	15.9	0.4	0.2	
215	Regional Contribution	=(2010 R/1999 R) * LINE 7	45.5	0.1	0.1	
216	+ Natural Background contribution	= LINE 2	2.0	0.0		
217	2010 projected result	162.81	159.0	2.4	1.4	
218	2010 Rollback Projection with additional controls					
219	Local Contribution PM2.5-PM10 Area of Influence	=(2010 L1/1999 L1) * LINE 4	71.5	1.2	0.7	
220	Local Contribution Area of Influence of PM2.5	=(2010 L2/1999 L2) * LINE 5	15.4	0.7	0.4	
221	Sub regional Contribution	=(2010 Sr1/1999 Sr2) * LINE 6	15.4	0.4	0.2	
222	Regional Contribution	=(2010 R/1999 R) * LINE 7	45.3	0.1	0.1	
223	+ Natural Background contribution	= LINE 2	2.0	0.0		
224	2010 projected result with action plan	153.39	149.5	2.4	1.4	
225	Current 2002-2004 Design value = 189					
226						
227		Local action plan BACM geologic reduction tons	1			
228		SJV action plan BACM geologic reduction tons (including local reductions)	1			

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	**Hanford, 1/7/01 analyzed episode 185, scaled to 11/4/02 Design Value 161**	**General Note**	**Geologic and Construction**	**Mobile Exhaust**		**Tire and Brake Wear**	**Organic Carbon**		**Vegetative Burning**	**Ammonium Nitrate including associated water**	**Ammonium Sulfate**	**Marine**	**Unassigned**
2	Line1 Source Contribution from Analysis	From CMB analysis of most similar day to design day	From CMB	From CMB		From CMB	Estimated portion of mass included in Vegetative Burning =30%		From CMB minus estimated Organic Carbon from other sources	From CMB	From CMB	From CMB, if present	Unaccounted mass from CMB, if any.
3	LINE 1	**HAN 1/7/01 185 scaled to 161 11/4/02**	35.86	12.40		1.42	6.99		16.32	81.95	6.06	0.00	0.00
4	Line2 Natural and Transport Contribution, see "Background" sheet	Portion not included in rollback analysis, removed prior to rollback as not subject to local control, added back to projected future concentrations	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations =5%	0, no natural background, transport estimated at 0		0, no natural background, transport estimated at 0	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations. Includes biogenic emissions = 20%		see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations. No wildfires except 10/21/99. Includes biogenic emissions = 20%	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations =5%	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations	100% because marine salts are a natural emission	0, background estimate at maximum, no additional background estimate for unexplained mass
5	LINE 2	11.55	1.8	0.0		0.0	1.4		3.3	4.1	1.0		
6	Line 3 Net for Rollback	Net for Rollback, default percentages adjustable for episode characteristics, applicable to all columns except as indicated								Net for non-linear rollback, default percentages adjustable for episode characteristics		Removed entirely from rollback, added back to result	
7	LINE 3	149.45	34.1	12.4		1.4	5.6		13.1	77.8	5.1	0.0	0.0
8	Line4 Local Contribution PM2.5-PM10 Area of Influence	Source contribution from smallest area of influence, representative of large particle primary source area, includes all PM size emissions in the area - Rolled back against local area of influence emission estimates	70%PM10 50%PM2.5 of net	70%PM10 50%PM2.5 of net		70%PM10 50%PM2.5 of net	70%PM10 50%PM2.5 of net		70%PM10 50%PM2.5 of net	70%PM10 50%PM2.5 of net, non-linear rollback	70%PM10 50%PM2.5 of net		70%PM10 50%PM2.5 of net
9	LINE 4	81.82	23.8	6.2		1.0	2.8		6.5	38.9	2.5		0.0
10	Line5 Local Contribution Area of Influence of PM2.5	Rolled back against local PM2.5 area of influence emission estimates - episode specific adjustments based on meteorology and episode duration	15%PM10 30%PM2.5	15%PM10 30%PM2.5		15%PM10 30%PM2.5	15%PM10 30%PM2.5		15%PM10 30%PM2.5	15%PM10 30%PM2.5 non-linear rollback	15%PM10 30%PM2.5		15%PM10 30%PM2.5
11	LINE 5	39.51	5.1	3.7		0.2	1.68		3.9	23.4	1.5		0.0
12	Line6 Sub regional Contribution	Rolled back against specified County(ies) emission estimates - episode specific adjustments based on meteorology and episode duration	10%PM10 15%PM2.5	10%PM10 15%PM2.5		10%PM10 15%PM2.5	10%PM10 15%PM2.5		10%PM10 15%PM2.5	10%PM10 15%PM2.5 non-linear rollback	10%PM10 15%PM2.5		10%PM10 15%PM2.5
13	LINE 6	20.64	3.4	1.9		0.1	0.84		2.0	11.68	0.76		0.0
14	Line7 Regional Contribution	Rolled back against Valleywide emission estimates - episode specific adjustments based on meteorology and episode duration	5%PM10 5%PM2.5	5%PM10 5%PM2.5		5%PM10 5%PM2.5	5%PM10 5%PM2.5		5%PM10 5%PM2.5	5%PM10 5%PM2.5 non-linear rollback	5%PM10 5%PM2.5		5%PM10 5%PM2.5
15	LINE 7	7.47	1.7	0.6		0.1	0.28		0.7	3.89	0.25		0.0
16	Associated Emissions Categories	Based upon appropriate seasonal or annual inventory	PM10 paved roads+ PM10 unpaved roads+ PM10 farm operations + PM10 construction	PM10, ROG & CO onroad mobile+ PM10, ROG & CO offroad equipment PM10, ROG & CO farm equipment CO presumed to add minimal mass		Tire and brake wear as predicted by EMFAC2002	Total ROG minus motor vehicle, OC may also include a small portion of otherwise unassigned elemental carbon PM10 & CO Area, Stationary CO presumed to add minimal mass		PM10 & CO residential burning + PM10 & CO waste burning and disposal reduced 98% by no burn status PM10 cooking CO presumed to add minimal mass	Total E.I. NOx (+ bacterial soil NOx estimate removed as natural background) *Previous method set aside a portion from rollback calculations due to lack of Ag E.I. NOx and ammonia sources, emissions data are now included, this set-aside is not required	Total SOx	None, natural emission from the ocean, bay and delta waters	Total PM10 minus PM10 windblown for episodes which are not high wind
17	2000 Emissions Inventory	(area of influence emissions inventory, each on a separate line for automated calculation							**Tulare Range burning adjusted**				
18	PM10	L1= Area 5	**7.56**	**0.29**		**0.05**	**0.33**		**0.38**				**8.61**
19	Seasonal CCOS 2.14	L2= Areas 5,6,7,8,10	**40.52**	**1.86**		**0.28**	**4.03**		**3.42**				**50.11**
20	with ARB November EMFAC adjustments	Sr= Kings, Tulare	**43.90**	**2.06**		**0.27**	**4.72**		**3.47**				**54.42**
21		R= SJV	**185.24**	**12.15**		**1.88**	**25.21**		**23.79**				**248.28**
22	NOx	L1= Area 5								**19.34**			
23	Seasonal CCOS 2.14	L2= Areas 5,6,7,8,10								**84.40**			
24	with ARB November EMFAC adjustments	Sr= Kings, Tulare								**73.59**			
25		R= SJV								**560.34**			
26	ROG	L1= Area 5			**4.63**			**6.06**					
27	Seasonal CCOS 2.14	L2= Areas 5,6,7,8,10			**26.08**			**19.09**					
28	with ARB November EMFAC adjustments	Sr= Kings, Tulare			**26.92**			**15.92**					
29		R= SJV			**165.41**			**150.70**					
30	SOx	L1= Area 5									**2.27**		
31	Seasonal CCOS 2.14	L2= Areas 5,6,7,8,10									**3.96**		
32		Sr= Kings, Tulare									**1.76**		
33		R= SJV									**31.09**		
133	2010 Emissions Inventory								**Tulare Range burning adjusted**				
135	PM10 2010 EI with new controls	L1= Area 5	**6.23**	**0.26**		**0.07**	**0.36**		**0.32**				**7.24**
139		L2= Areas 5,6,7,8,10	**33.23**	**1.60**		**0.39**	**4.62**		**2.80**				**42.65**
140		Sr= Kings, Tulare	**35.79**	**1.78**		**0.38**	**5.45**		**2.84**				**46.23**
141		R= SJV	**156.75**	**10.04**		**2.52**	**27.36**		**19.60**				**216.26**
146	NOx 2010 EI with new controls	L1= Area 5								**12.05**			
147		L2= Areas 5,6,7,8,10								**55.40**			
148		Sr= Kings, Tulare								**46.39**			
149		R= SJV								**362.62**			
154	ROG 2010 EI with new controls	L1= Area 5			**2.90**			**5.28**					
155		L2= Areas 5,6,7,8,10			**16.55**			**17.08**					
156		Sr= Kings, Tulare			**17.52**			**14.59**					
157		R= SJV			**92.78**			**134.93**					
162	SOx 2010 EI	L1= Area 5									**2.62**		
163		L2= Areas 5,6,7,8,10									**4.28**		
164		Sr= Kings, Tulare									**1.67**		
165		R= SJV									**33.81**		
218	2010 Rollback Projection with additional controls												
219	Local Contribution PM2.5-PM10 Area of Influence	=(2010 L1/1999 L1) * LINE 4	19.7	2.8	1.9	1.5	1.5	1.2	5.4	29.1	2.9		0.0
220	Local Contribution Area of Influence of PM2.5	=(2010 L2/1999 L2) * LINE 5	4.2	1.6	1.2	0.3	1.0	0.8	3.2	18.0	1.6		0.0
221	Sub regional Contribution	=(2010 Sr1/1999 Sr2) * LINE 6	2.8	0.8	0.6	0.2	0.5	0.4	1.6	8.8	0.7		0.0
222	Regional Contribution	=(2010 R/1999 R) * LINE 7	1.4	0.3	0.2	0.1	0.2	0.1	0.5	3.0	0.3		0.0
223	+ Natural Background contribution	= LINE 2	1.8	0.0		0.0	1.4		3.3	4.1	1.0	0.0	0.0
224	2010projected Annual Result	131.93	29.9	5.5	3.9	2.1	4.5	2.5	14.0	63.0	6.5	0.0	0.0
225										Linear			
226	2010 projected Annual Result	122.47	linear nitrate projectior							24.2			
227	Modeling comparisons	131.93	IMS95 nitrate modeling							15.3			
228	Current 2002-2004 Design value = 161	132.96	CMAQ nitrate modeling							7.4			
229		129.12	Average of all three							2.5			
230		132.45	Average of CMAQ and IMS95							49.5			
231													
232										CMAQ			
233										29.7			
234										18.3			
235										9.0			
236										3.0			
237										60.0			
238	end												

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	**Hanford, alternative site data used for 11/4/02 Design Value 161**	**General Note: Scaling used to estimate speciation due to lack of precise match of analyzed observations with design value event**	**Geologic and Construction**	**Mobile Exhaust**		**Tire and Brake Wear**	**Organic Carbon**		**Vegetative Burning**	**Ammonium Nitrate including associated water**	**Ammonium Sulfate**	**Marine**	**Unassigned**
2	Line1 Source Contribution from Analysis	From CMB analysis of most similar day to design day	Mass minus Visalia secondary	From Hanford annual CMB Nov/Dec 11.1/25.9 * total carbon		From Hanford annual CMB MV/T&B ratio	Estimated portion of mass included in Vegetative Burning =30%		From Visalia secondary minus estimated Organic Carbon from other sources	From Visalia PM2.5 secondary	From Corcoran PM10	From CMB, if present	Unaccounted mass from CMB, if any.
3	LINE 1	**Visalia 11/4/02 secondary data and Corcoran 11/4/02 PM10 sulfate data used for HAN 161 11/4/02, carbon distribution based on Hanford Nov/Dec annual**	110.80	5.13		1.08	2.49		5.80	32.25	3.45	0.00	0.00
4	Line2 Natural and Transport Contribution, see "Background" sheet	Portion not included in rollback analysis, removed prior to rollback as not subject to local control, added back to projected future concentrations	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations =5%	0, no natural background, transport estimated at 0		0, no natural background, transport estimated at 0	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations. Includes biogenic emissions = 20%		see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations. No wildfires except 10/21/99. Includes biogenic emissions = 20%	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations =5%	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations	100% because marine salts are a natural emission	0, background estimate at maximum, no additional background estimate for unexplained mass
5	LINE 2	9.81	5.5	0.0		0.0	0.5		1.2	1.6	1.0		
6	Line 3 Net for Rollback	Net for Rollback, default percentages adjustable for episode characteristics, applicable to all columns except as indicated								Net for non-linear rollback, default percentages adjustable for episode characteristics		Removed entirely from rollback, added back to result	
7	LINE 3	151.19	105.3	5.1		1.1	2.0		4.6	30.6	2.5	0.0	0.0
8	Line4 Local Contribution PM2.5-PM10 Area of Influence	Source contribution from smallest area of influence, representative of large particle primary source area, includes all PM size emissions in the area - Rolled back against local area of influence emission estimates	70%PM10 50%PM2.5 of net	70%PM10 50%PM2.5 of net		70%PM10 50%PM2.5 of net	70%PM10 50%PM2.5 of net		70%PM10 50%PM2.5 of net	70%PM10 50%PM2.5 of net, non-linear rollback	70%PM10 50%PM2.5 of net		70%PM10 50%PM2.5 of net
9	LINE 4	96.86	73.7	2.6		0.8	1.0		2.3	15.3	1.2		0.0
10	Line5 Local Contribution Area of Influence of PM2.5	Rolled back against local PM2.5 area of influence emission estimates - episode specific adjustments based on meteorology and episode duration	15%PM10 30%PM2.5	15%PM10 30%PM2.5		15%PM10 30%PM2.5	15%PM10 30%PM2.5		15%PM10 30%PM2.5	15%PM10 30%PM2.5 non-linear rollback	15%PM10 30%PM2.5		15%PM10 30%PM2.5
11	LINE 5	29.41	15.8	1.5		0.2	0.60		1.4	9.2	0.7		0.0
12	Line6 Sub regional Contribution	Rolled back against specified County(ies) emission estimates - episode specific adjustments based on meteorology and episode duration	10%PM10 15%PM2.5	10%PM10 15%PM2.5		10%PM10 15%PM2.5	10%PM10 15%PM2.5		10%PM10 15%PM2.5	10%PM10 15%PM2.5 non-linear rollback	10%PM10 15%PM2.5		10%PM10 15%PM2.5
13	LINE 6	17.36	10.5	0.8		0.1	0.30		0.7	4.60	0.37		0.0
14	Line7 Regional Contribution	Rolled back against Valleywide emission estimates - episode specific adjustments based on meteorology and episode duration	5%PM10 5%PM2.5	5%PM10 5%PM2.5		5%PM10 5%PM2.5	5%PM10 5%PM2.5		5%PM10 5%PM2.5	5%PM10 5%PM2.5 non-linear rollback	5%PM10 5%PM2.5		5%PM10 5%PM2.5
15	LINE 7	7.56	5.3	0.3		0.1	0.10		0.2	1.53	0.12		0.0
16	Associated Emissions Categories	Based upon appropriate seasonal or annual inventory	PM10 paved roads+ PM10 unpaved roads+ PM10 farm operations + PM10 construction	PM10, ROG & CO onroad mobile+ PM10, ROG & CO offroad equipment PM10, ROG & CO farm equipment CO presumed to add minimal mass		Tire and brake wear as predicted by EMFAC2002	Total ROG minus motor vehicle, OC may also include a small portion of otherwise unassigned elemental carbon PM10 & CO Area, Stationary CO presumed to add minimal mass		PM10 & CO residential burning + PM10 & CO waste burning and disposal reduced 98% by no burn status PM10 cooking CO presumed to add minimal mass	Total E.I. NOx (+ bacterial soil NOx estimate removed as natural background) *Previous method set aside a portion from rollback calculations due to lack of Ag E.I. NOx and ammonia sources, emissions data are now included, this set-aside is not required	Total SOx	None, natural emission from the ocean, bay and delta waters	Total PM10 minus PM10 windblown for episodes which are not high wind
17	2000 Emissions Inventory	(area of influence emissions inventory, each on a separate line for automated calculation							**Tulare Range burning adjusted**				
18	PM10	L1= Area 5	**7.56**	**0.29**		**0.05**	**0.33**		**0.38**				**8.61**
19	Seasonal CCOS 2.14	L2= Areas 5,6,7,8,10	**40.52**	**1.86**		**0.28**	**4.03**		**3.42**				**50.11**
20	with ARB November EMFAC adjustments	Sr= Kings, Tulare	**43.90**	**2.06**		**0.27**	**4.72**		**3.47**				**54.42**
21		R= SJV	**185.24**	**12.15**		**1.88**	**25.21**		**23.79**				**248.28**
22	NOx	L1= Area 5								**19.34**			
23	Seasonal CCOS 2.14	L2= Areas 5,6,7,8,10								**84.40**			
24	with ARB November EMFAC adjustments	Sr= Kings, Tulare								**73.59**			
25		R= SJV								**560.34**			
26	ROG	L1= Area 5			**4.63**			**6.06**					
27	Seasonal CCOS 2.14	L2= Areas 5,6,7,8,10			**26.08**			**19.09**					
28	with ARB November EMFAC adjustments	Sr= Kings, Tulare			**26.92**			**15.92**					
29		R= SJV			**165.41**			**150.70**					
30	SOx	L1= Area 5									**2.27**		
31	Seasonal CCOS 2.14	L2= Areas 5,6,7,8,10									**3.96**		
32		Sr= Kings, Tulare									**1.76**		
33		R= SJV									**31.09**		
133	2010 Emissions Inventory								**Tulare Range burning adjusted**				
138	PM10 2010 EI with new controls	L1= Area 5	**6.23**	**0.26**		**0.07**	**0.36**		**0.32**				**7.24**
139		L2= Areas 5,6,7,8,10	**33.23**	**1.60**		**0.39**	**4.62**		**2.80**				**42.65**
140		Sr= Kings, Tulare	**35.79**	**1.78**		**0.38**	**5.45**		**2.84**				**46.23**
141		R= SJV	**156.75**	**10.04**		**2.52**	**27.36**		**19.60**				**216.26**
146	NOx 2010 EI with new controls	L1= Area 5								**12.05**			
147		L2= Areas 5,6,7,8,10								**55.40**			
148		Sr= Kings, Tulare								**46.39**			
149		R= SJV								**362.62**			
154	ROG 2010 EI with new controls	L1= Area 5			**2.90**			**5.28**					
155		L2= Areas 5,6,7,8,10			**16.55**			**17.08**					
156		Sr= Kings, Tulare			**17.52**			**14.59**					
157		R= SJV			**92.78**			**134.93**					
162	SOx 2010 EI	L1= Area 5									**2.62**		
163		L2= Areas 5,6,7,8,10									**4.28**		
164		Sr= Kings, Tulare									**1.67**		
165		R= SJV									**33.81**		
218	2010 Rollback Projection with additional controls												
219	Local Contribution PM2.5-PM10 Area of Influence	=(2010 L1/1999 L1) * LINE 4	60.7	1.2	0.8	1.1	0.5	0.4	1.9	11.5	1.4		0.0
220	Local Contribution Area of Influence of PM2.5	=(2010 L2/1999 L2) * LINE 5	12.9	0.7	0.5	0.2	0.3	0.3	1.1	7.1	0.8		0.0
221	Sub regional Contribution	=(2010 Sr1/1999 Sr2) * LINE 6	8.6	0.3	0.3	0.2	0.2	0.1	0.6	3.5	0.3		0.0
222	Regional Contribution	=(2010 R/1999 R) * LINE 7	4.5	0.1	0.1	0.1	0.1	0.0	0.2	1.2	0.1		0.0
223	+ Natural Background contribution	= LINE 2	5.5	0.0		0.0	0.5		1.2	1.6	1.0	0.0	0.0
224	2010projected Annual Result	133.68	92.2	2.3	1.6	1.6	1.6	0.9	5.0	24.8	3.7	0.0	0.0
225										Linear			
226	2010 projected Annual Result	129.96	linear nitrate projection							9.5			
227	Modeling comparisons	133.68	IMS95 nitrate modeling							6.0			
228	Current 2002-2004 Design value = 161	134.09	CMAQ nitrate modeling							2.9			
229		132.58	Average of all three							1.0			
230		133.89	Average of CMAQ and IMS95							19.5			
231													
232										CMAQ			
233										11.7			
234										7.2			
235										3.5			
236										1.2			
237										23.6			
238	end												

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	**Corcoran, design value 10/29/02 168, analyzed using unscaled episode 10/21/99 174**	**General Note: Not scaled to design value because difference between observation and design value is within uncertainty range for model projection and unscaled value is higher. Also, co-located monitor provides 171 for same 10/29/02 event.**	**Geologic and Construction**	**Mobile Exhaust**		**Tire and Brake Wear**	**Organic Carbon**		**Vegetative Burning**	**Ammonium Nitrate including associated water**	**Ammonium Sulfate**	**Marine**	**Unassigned**
2	Line1 Source Contribution from Analysis	From CMB analysis of most similar day to design day	From CMB	From CMB		From CMB	Estimated portion of mass included in Vegetative Burning =30%		From CMB minus estimated Organic Carbon from other sources	From CMB	From CMB	From CMB, if present	Unaccounted mass from CMB, if any.
3	LINE 1	**COP 10/21/99 174**	92.7	15.38		0.0	5.47		12.76	24.6	3.5	0.00	19.64
4	Line2 Natural and Transport Contribution, see "Background" sheet	Portion not included in rollback analysis, removed prior to rollback as not subject to local control, added back to projected future concentrations, except for tire fire and wildfire emissions unique to this episode.	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations =5%	0, no natural background, transport estimated at 0		0, no natural background, transport estimated at 0	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations. Includes biogenic emissions = 20%		see background sheet, includes biogenic emissions = 20% removed prior to rollback as not subject to local control, added back to projected future concentrations. Wildfire and tire fire emissions estimated as 10 micrograms will not be added back to the fu	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations =5%	see background sheet for numerical estimate and episode adjustment. Removed prior to rollback as not subject to local control, added back to projected future concentrations	100% because marine salts are a natural emission	0, background estimate at maximum, no additional background estimate for unexplained mass
5	LINE 2	16.51	4.6	0.0		0.0	1.1		8.6	1.2	1.0		
6	Line 3 Net for Rollback	Net for Rollback, default percentages adjustable for episode characteristics, applicable to all columns except as indicated								Net for non-linear rollback, default percentages adjustable for episode characteristics		Removed entirely from rollback, added back to result	
7	LINE 3	157.49	88.1	15.4		0.0	4.4		4.2	23.3	2.5	0.0	19.6
8	Line4 Local Contribution PM2.5-PM10 Area of Influence	Source contribution from smallest area of influence, representative of large particle primary source area, includes all PM size emissions in the area - Rolled back against local area of influence emission estimates	70%PM10 50%PM2.5 of net	70%PM10 50%PM2.5 of net		70%PM10 50%PM2.5 of net	70%PM10 50%PM2.5 of net		70%PM10 50%PM2.5 of net	70%PM10 50%PM2.5 of net, non-linear rollback	70%PM10 50%PM2.5 of net		70%PM10 50%PM2.5 of net
9	LINE 4	100.29	61.7	7.7		0.0	2.2		2.1	11.7	1.2		13.7
10	Line5 Local Contribution Area of Influence of PM2.5	Rolled back against local PM2.5 area of influence emission estimates - episode specific adjustments based on meteorology and episode duration	15%PM10 30%PM2.5	15%PM10 30%PM2.5		15%PM10 30%PM2.5	15%PM10 30%PM2.5		15%PM10 30%PM2.5	15%PM10 30%PM2.5 non-linear rollback	15%PM10 30%PM2.5		15%PM10 30%PM2.5
11	LINE 5	31.09	13.2	4.6		0.0	1.31		1.3	7.0	0.7		2.9
12	Line6 Sub regional Contribution	Rolled back against specified County(ies) emission estimates - episode specific adjustments based on meteorology and episode duration	10%PM10 15%PM2.5	10%PM10 15%PM2.5		10%PM10 15%PM2.5	10%PM10 15%PM2.5		10%PM10 15%PM2.5	10%PM10 15%PM2.5 non-linear rollback	10%PM10 15%PM2.5		10%PM10 15%PM2.5
13	LINE 6	18.24	8.8	2.3		0.0	0.66		0.6	3.50	0.37		2.0
14	Line7 Regional Contribution	Rolled back against Valleywide emission estimates - episode specific adjustments based on meteorology and episode duratior	5%PM10 5%PM2.5	5%PM10 5%PM2.5		5%PM10 5%PM2.5	5%PM10 5%PM2.5		5%PM10 5%PM2.5	5%PM10 5%PM2.5 non-linear rollback	5%PM10 5%PM2.5		5%PM10 5%PM2.5
15	LINE 7	7.87	4.4	0.8		0.0	0.22		0.2	1.17	0.12		1.0
16	Associated Emissions Categories	Based upon appropriate seasonal or annual inventory	PM10 paved roads+ PM10 unpaved roads+ PM10 farm operations + PM10 construction	PM10, ROG & CO onroad mobile+ PM10, ROG & CO offroad equipment PM10, ROG & CO farm equipment CO presumed to add minimal mass		Tire and brake wear as predicted by EMFAC2002	Total ROG minus motor vehicle, OC may also include a small portion of otherwise unassigned elemental carbon PM10 & CO Area, Stationary, Cooking		PM10 & CO residential burning + PM10 & CO waste burning and disposal reduced 98% by no burn status PM10 & CO fires CO presumed to add minimal mass	Total E.I. NOx (+ bacterial soil NOx estimate removed as natural background) *Previous method set aside a portion from rollback calculations due to lack of Ag E.I. NOx and ammonia sources, emissions data are now included, this set-aside is not required	Total SOx	None, natural emission from the ocean, bay and delta waters	Total PM10 minus PM10 windblown for episodes which are not high wind
17	2000 Emissions Inventory	(area of influence emissions inventory, each on a separate line for automated calculation							**Tulare Range burning adjusted**				
18	PM10	L1= Area 6	**4.99**	**0.06**		**0.01**	**0.91**		**0.24**				**6.20**
19	Seasonal CCOS 2.14	L2= Areas 5,6,7,8	**40.27**	**1.43**		**0.25**	**3.44**		**3.27**				**48.66**
20	with ARB October EMFAC adjustments	Sr= Kings, Tulare	**43.90**	**2.06**		**0.27**	**4.72**		**3.47**				**54.42**
21		R= SJV	**185.24**	**12.16**		**1.88**	**25.21**		**23.79**				**248.28**
22	NOx	L1= Area 6								**4.65**			
23	Seasonal CCOS 2.14	L2= Areas 5,6,7,8								**65.46**			
24	with ARB October EMFAC adjustments	Sr= Kings, Tulare								**70.30**			
25		R= SJV								**538.81**			
26	ROG	L1= Area 6			**0.83**			**1.03**					
27	Seasonal CCOS 2.14	L2= Areas 5,6,7,8			**20.30**			**17.62**					
28	with ARB October EMFAC adjustments	Sr= Kings, Tulare			**25.57**			**15.92**					
29		R= SJV			**156.66**			**150.70**					
30	SOx	L1= Area 6									**0.10**		
31	Seasonal CCOS 2.14	L2= Areas 5,6,7,8									**3.12**		
32		Sr= Kings, Tulare									**1.76**		
33		R= SJV									**31.09**		
133	2010 Emissions Inventory								**Tulare Range burning adjusted**				
138	PM10 2010 EI with new controls	L1= Area 6	**4.23**	**0.05**		**0.01**	**0.99**		**0.20**				**5.49**
139		L2= Areas 5,6,7,8	**29.54**	**1.25**		**0.52**	**4.00**		**2.67**				**37.97**
140		Sr= Kings, Tulare	**35.79**	**1.76**		**0.38**	**5.45**		**2.84**				**46.21**
141		R= SJV	**156.75**	**10.04**		**2.52**	**27.36**		**19.60**				**216.26**
146	NOx 2010 EI with new controls	L1= Area 6								**2.86**			
147		L2= Areas 5,6,7,8								**41.68**			
148		Sr= Kings, Tulare								**44.41**			
149		R= SJV								**351.50**			
154	ROG 2010 EI with new controls	L1= Area 6			**0.54**			**0.95**					
155		L2= Areas 5,6,7,8			**12.42**			**15.99**					
156		Sr= Kings, Tulare			**16.88**			**14.59**					
157		R= SJV			**89.18**			**134.93**					
162	SOx 2010 EI	L1= Area 6									**0.09**		
163		L2= Areas 5,6,7,8									**3.22**		
164		Sr= Kings, Tulare									**1.67**		
165		R= SJV									**33.81**		
218	2010 Rollback Projection with additional controls												
219	Local Contribution PM2.5-PM10 Area of Influence	=(2010 L1/1999 L1) * LINE 4	52.3	3.8	2.5	0.0	1.2	1.0	1.7	8.7	1.1		12.2
220	Local Contribution Area of Influence of PM2.5	=(2010 L2/1999 L2) * LINE 5	9.7	2.0	1.4	0.0	0.8	0.6	1.0	5.3	0.8		2.3
221	Sub regional Contribution	=(2010 Sr1/1999 Sr2) * LINE 6	7.2	1.0	0.8	0.0	0.4	0.3	0.5	2.6	0.3		1.7
222	Regional Contribution	=(2010 R/1999 R) * LINE 7	3.7	0.3	0.2	0.0	0.1	0.1	0.2	0.9	0.1		0.9
223	+ Natural Background contribution	= LINE 2	4.6	0.0		0.0	1.1		8.6	1.2	1.0	0.0	0.0
224	2010 projected Annual Result	146.16	77.5	7.1	4.9	0.0	3.5	2.0	12.0	18.7	3.4	0.0	17.0
225										Linear			
226	2010 projected Annual Result	143.25	linear nitrate projection							7.2			
227	Modeling comparisons	146.16	IMS95 nitrate modeling							4.5			
228	Current 2002-2004 Design value = 168	145.09	CMAQ nitrate modeling							2.2			
229		144.83	Average of all three							0.8			
230		145.62	Average of CMAQ and IMS95							14.6			
231													
232										CMAQ			
233										8.1			
234										5.0			
235										2.5			
236										0.8			
237										16.4			
238	end												

Source Apportionment of PM10 Concentrations Determined by Chemical Mass Balance (in ug/m3)

Using CRPAQS Data and Fugitive Dust Profiles Selected By District

Green highlight indicates accepted results used for rollback analysis
Design Value Episodes
District and CRPAQS Episodes above standard but less severe than design value episode
CRPAQS Episodes more severe than design value
Higlighted, black text are poor performance values
Red text were rejected, retested with revised chemistry estimation

SITEID	DATE	CONC	UCONC	% Mass	RSQ	CHI SQ	Wood Burning Mass	Wood Burning Unc	MV Exhaust Mass	MV Exhaust Unc	TiresAndBrakes Mass	TiresAndBrakes Unc	Nitrate Mass	Nitrate Unc	Sulfate Mass	Sulfate Unc	Geo- logical Mass	Geo- logical Unc	Geological Profile	Unassigned
November 1999																				
BGS	11/14/99	183	9.2	91.1	1.0	1.0	16.5	7.0	6.1	4.2	1.9	1.5	85.3	6.9	6.3	0.6	50.6	10.5	FDBACNOV	16.27
Winter 2000/2001																				
BGS	1/1/01	205	10.3	93.6	1.0	0.9	23.3	6.3	6.7	4.7	1.3	1.7	95.4	7.8	7.0	0.7	58.2	9.6	FDBACJAN	13.07
BGS	1/4/01	208	10.5	93.6	1.0	0.9	23.6	6.4	6.8	4.8	1.3	1.7	96.6	7.9	7.1	0.7	58.9	9.7	FDBACJAN	13.23
BGS	1/7/01	174	8.8	93.6	1.0	0.9	19.8	5.4	5.7	4.0	1.1	1.4	81.0	6.6	6.0	0.6	49.4	8.1	FDBACJAN	11.09
COP	1/7/01	165	8.4	91.7	1.0	0.5	20.5	6.2	7.6	4.3	0.9	0.7	84.8	7.5	6.8	0.7	30.8	5.5	FDCOPJAN	13.66
HAN	1/7/01	185	9.6	102.9	1.0	0.4	27.6	9.7	14.7	7.8	1.7	1.1	96.9	7.9	7.2	0.7	42.4	7.7	FDCOPJAN	-5.38
HAN	1/7/01	185	scaled to remove overestimate				26.7850		14.2530		1.6312		94.1627		6.9605		41.2076			0.0000

Estimated PM10 Source Contributions for Corcoran During October 1999 Episode
Concentrations and Source Contributions are in ug/m3

SITEID	DATE	CONC	UCONC	% Mass	RSQ	CHI SQ	Wood Burning Mass	Wood Burning Unc	MV Exhaust Mass	MV Exhaust Unc	Nitrate Mass	Nitrate Unc	Sulfate Mass	Sulfate Unc	Geological Mass	Geological Unc	Geological Profile	Unassigned
Corcoran-Patterson							WBOakEuc											
COPC	10/21/99	174	17.4	88.7	0.8	2.9	18.2	14.9	15.4	10.2	24.6	2.7	3.5	0.6	92.7	9.1	FDCOPOCT	19.64

ANNUAL Average, based on CMB results for February to December 2000 plus the Jan 2001 Episode

SITEID	CONC	UCONC	PCMASS	Design Value	Sum of species	Burning		Motor Vehicle		Tire/Brake		Sulfate		Nitrate		Geological		Geological Profile	Unassigned
								Mass		Mass		Mass		Mass		Mass			
BGS	57.7	3.6	98.5	57.0	55.6	6.3	2.3	3.6	2.4	1.1	1.2	3.0	0.3	14.9	1.3	26.7	5.8	FDKERANN	1.4

This analysis provides a seasonally adjusted annual average, using the January episode to reflect the dominant winter chemistry.

Bakersfield Golden State Monthly

SITEID	DATE	CONC	UCONC	PCMAS	RSQ	CHISQ	Burning		Motor Vehicle		Tire/Brake		Sulfate		Nitrate		Geological	
							Mass	Unc	Mass	Unc	Mass	Unc	Mass	Unc	Mass	Unc	Mass	Unc
BGS	1/1/01	205	10.3	93.6	1.0	0.9	23.3	6.3	6.7	4.7	1.3	1.7	7.0	0.7	95.4	7.8	58.2	9.6
BGS	Feb	24.4	1.9	96.4	1.0	0.7	4.1	2.3	1.7	1.3	0.6	0.6	1.2	0.1	5.1	0.6	10.9	3.2
BGS	Mar	22.2	2.1	107.7	1.0	1.0	2.1	2.2	2.1	1.4	0.6	0.6	1.9	0.2	5.5	0.6	11.7	3.1
BGS	Apr	31.5	2.4	107.8	1.0	0.4	6.3	3.2	2.1	1.7	0.5	0.7	3.0	0.3	4.9	0.6	17.3	4.6
BGS	May*	34.6	2.5	118.5	1.0	0.5	0.3	0.4	5.3	2.6			3.1	0.3	4.5	0.5	27.8	5.7
BGS	Jun*	41.3	2.7	102.7	1.0	0.6	0.9	0.4	5.1	2.6			3.8	0.3	3.1	0.4	29.4	6.0
BGS	Jul*	37.0	2.6	101.3	0.9	2.2	7.1	1.1	0.2	1.4	2.4	1.4	2.1	0.2	2.2	0.3	23.4	5.9
BGS	Aug*	43.5	2.6	97.8	1.0	1.2	4.1	0.8	2.2	1.9	0.5	1.4	2.5	0.3	2.9	0.4	30.2	6.5
BGS	Sep*	78.6	4.7	98.3	0.9	1.2	3.5	1.4	4.5	3.3	0.8	2.7	3.0	0.4	3.6	0.4	61.9	12.5
BGS	Oct*	36.1	2.8	83.9	1.0	1.0	3.5	0.7	1.6	1.3	1.4	1.0	1.9	0.2	5.2	0.6	16.7	4.3
BGS	Nov	48.4	2.9	86.3	1.0	0.4	7.9	3.4	4.6	2.7	0.6	0.7	2.2	0.2	14.0	1.2	12.3	3.1
BGS	Dec	90.2	5.1	87.4	1.0	0.6	12.5	5.1	7.0	4.2	2.1	1.2	4.3	0.4	32.2	2.7	20.9	5.4
Min		22.2	1.9	83.9	0.9	0.4	0.3	0.4	0.2	1.3	0.5	0.6	1.2	0.1	2.2	0.3	10.9	3.1
Avg		57.7	3.6	98.5	1.0	0.9	6.3	2.3	3.6	2.4	1.1	1.2	3.0	0.3	14.9	1.3	26.7	5.8
Max		205.0	10.3	118.5	1.0	2.2	23.3	6.3	7.0	4.7	2.4	2.7	7.0	0.7	95.4	7.8	61.9	12.5

NOTES: Burning profile was switched from wood burning to agricultural burning based on ARB monthly emissions inventory estimates.
Asterisk * denotes AgBWheat profile used; ** denotes WBAlmond (some AgBWheat/WBAlmond used in April/May)

Source Profiles

	Jan-May and Nov-Dec		June-Oct		
Burning	22	WBOakEuc	27	AgBWheat*	
Sulfate	57	Amsul	57	Amsul	
Nitrate	60	Amnit	60	Amnit	
Motor Vehicle	65	CAMV	65	CAMV	
Tire/Brake	67	TireBrke	67	TireBrke	Note: (not used if run came out negative)
Geological	92	FDHANANN	92	FDHANANN	
	93	FDFREANN	93	FDFREANN	
	94	FDVCSANN	94	FDVCSANN	
	95	FDKERANN	95	FDKERANN	

Visalia observation secondary chemical composition used for Hanford alternative analysis

DATE	SITE_NAME	PM10_OBS_STD	PM25_OBS	Coarse	PM2.5Mass_Speciation	AmNitrate	Nitrate	AmmSulfateOld	OC	EC	GeologicalOld	Elements
11/4/2002	Visalia-N Church Street	105	48	57	50	32.25	25	1.794	14	0.5	2.1036	0.5495

Date	SITE_NAME	PM10Stnd			PM10Mass_Speciation	AmmNitrate	AmmSulfate	
11/4/02	Corcoran-Patterson Avenue	136				29.67	3.45	

Hanford PM10 Composition assumed based on PM2.5 chemical composition data for Visalia

			AmNitrate	AmmSulfate		OC	EC	GeologicalOld
11/4/2002								
	Hanford-S Irwin Street	161	32.25	3.45		14	0.5	110.8

Hanford carbon distribution

ANNUAL Average CMB analysis for November and December from 2003 PM SIP

Hanford Monthly							Burning		Motor Vehicle		Tire/Brake		Sulfate		Nitrate		Geological	
SITEID	DATE	CONC	UCONC	PCMASS	RSQ	CHISQ	Mass	Unc	Mass	Unc	Mass	Unc	Mass	Unc	Mass	Unc	Mass	Unc
HAN	Nov	46.4	2.8	107.6	1.0	0.4	13.5	3.6	4.8	2.9	1.0	0.5	2.4	0.3	17.7	1.5	10.5	2.7
HAN	Dec	62.8	3.6	89.4	1.0	0.5	12.4	3.4	4.4	2.5	0.9	0.5	3.7	0.4	23.9	2.1	10.7	2.8
Sum							25.9		9.1		1.9							
								Sum MV+T&B		11.1								

Proportion of Burning to MV+T&B = 11.1/25.9

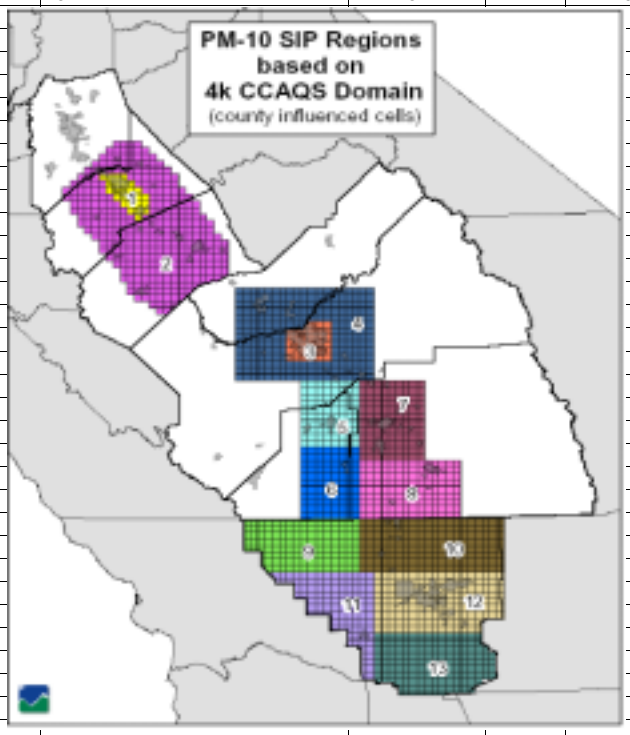
This information is used to calculate the breakdown of carbon sources for the alternative Hanford evaluation

MV to T&B ratio	MV	9.12744	T/B	1.9241	sum =	11.0515	
Vehicle fractions	MV=	0.825901	T/B=	0.1741			

This information is used to calculate the breakdown of vehicle carbon for the alternative Hanford evaluation

0.825901 0.1741

		Rollback default percentage, adjust by episode properties						
			Local	PM2.5	Sub regional	Regional	Total	
		Default 2.5-10	70	15	10	5	100	
		Default 2.5	50	30	15	5	100	
		Note: distribution of anthropogenic contribution after subtraction of background						
	Mapping of local, PM2.5-local,							
	and sub-regional based on							
	trajectory analysis		Areas used					
24-hr date	Site Name	Value	Local	PM2.5	Sub regional	Regional	# of dates	
11/6/97	Corcoran-Patterson Avenue	199						
12/31/98	Bakersfield-Golden State Highway	159						
	Visalia-N Church Street	160						
1/12/99	Oildale-3311 Manor Street	156	12	12,13	Kern	SJV	1	
10/21/99	Corcoran-Patterson Avenue	174	6	5,6,7,8	Kings-Tulare	SJV	2	
	Fresno-Drummond Street	162	3	3,4	Fresno-Madera	SJV	3	
	Turlock-S Minaret Street	157	1	1,2	Stanislaus-Merced	SJV	4	
11/14/99	Bakersfield-Golden State Highway	183	12	6,7,8,10,12	Kings-Tulare-Kern	SJV	5	
12/11/99	Hanford-S Irwin Street	183						
12/17/99	Corcoran-Patterson Avenue	174	6	6,8	Kings-Tulare	SJV	6	
12/23/99	Fresno-Drummond Street	168	3	3,4,7	Fresno-Tulare	SJV	7	
	Hanford-S Irwin Street	156	5	5,6,8	Kings-Tulare	SJV	8	
1/1/01	Bakersfield-5558 California Avenue	186	12	9,10,11,12	Kern	SJV	9	
	Bakersfield-Golden State Highway	205	12	9,10,11,12	Kern	SJV	10	
	Clovis-N Villa Avenue	155	3	3,4	Fresno-Madera	SJV	11	
	Fresno-1st Street	193	3	3,4	Fresno-Madera	SJV	12	
	Fresno-Drummond Street	186	3	3,4	Fresno-Madera	SJV	13	
	Oildale-3311 Manor Street	158	12	9,10,11,12	Kern	SJV	14	
1/4/01	Bakersfield-5558 California Avenue	190	12	10,12,13	Kern	SJV	15	
	Bakersfield-Golden State Highway	208	12	10,12,13	Kern	SJV	16	
	Fresno-Drummond Street	159	3	3,4	Fresno-Madera	SJV	17	
	Oildale-3311 Manor Street	195	12	10,12,13	Kern	SJV	18	
1/7/01	Bakersfield-5558 California Avenue	159	12	10,12	Kern	SJV	19	
	Bakersfield-Golden State Highway	174	12	10,12	Kern	SJV	20	
	Corcoran-Patterson Avenue	165	6	6,8,10,12	Kings-Tulare-Kern	SJV	21	
	Hanford-S Irwin Street	185	5	5,6,7,8,10	Kings-Tulare-Kern	SJV	22	
	Modesto-14th Street	158	1	1,2	St-Me-Ma- Fr-Tu	SJV	23	
11/9/01	Hanford-S Irwin Street	155	5	5,7,8	Kings-Tulare	SJV	24	
			Areas used					
Annual	County	Value	Local	PM2.5	Sub regional	Regional		
	Kern	57	12	Kern	Kern	SJV		



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