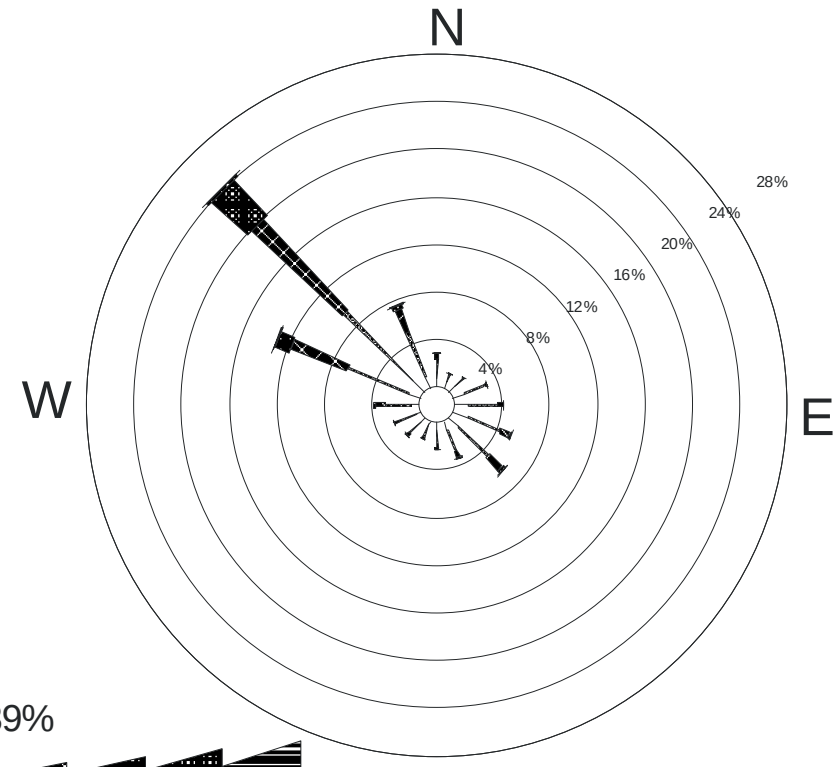
AIR QUALITY DATA

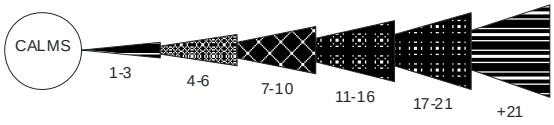
APPENDIX I AIR QUALITY SUPPORTING DATA

Attachment A	Quarterly Wind Roses for Fresno Yosemite International Airport.
Attachment B	Air Quality Data, Attachment B, Supporting Information for Estimation of Project Construction Emissions.
Attachment C	Air Quality Data, Attachment B, Supporting Information for Estimation of Project Operations Emissions.
Attachment D	Air Quality Modeling Protocol
Attachment E	BACT Assessment

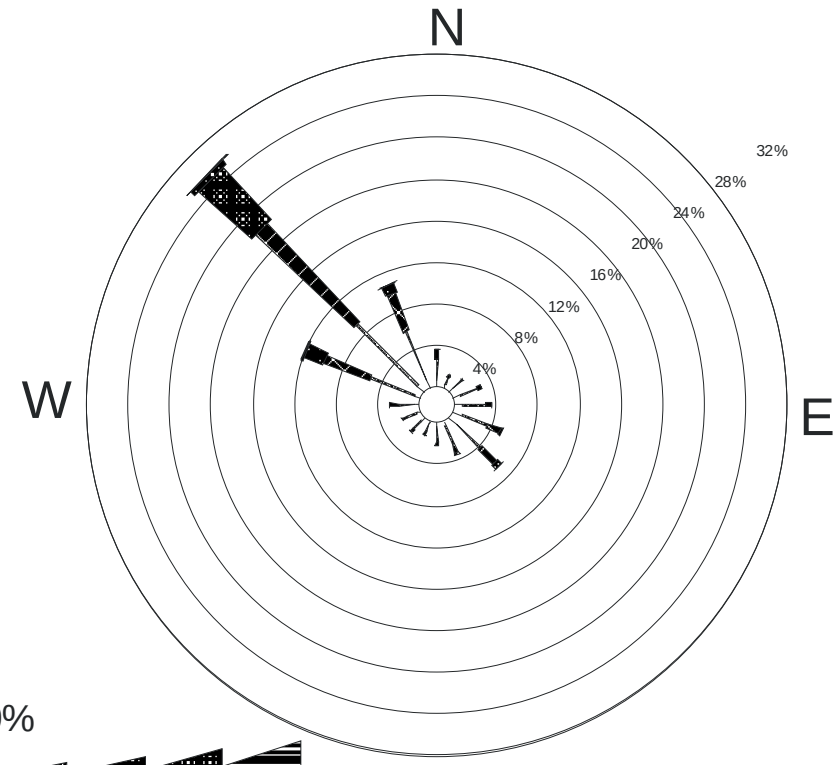


NOTE: Frequencies indicate direction from which the wind is blowing.

CALM WINDS 14.39%

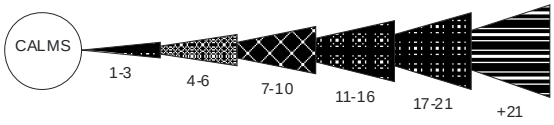


Windrose from Fresno 1987-1991 for All Months

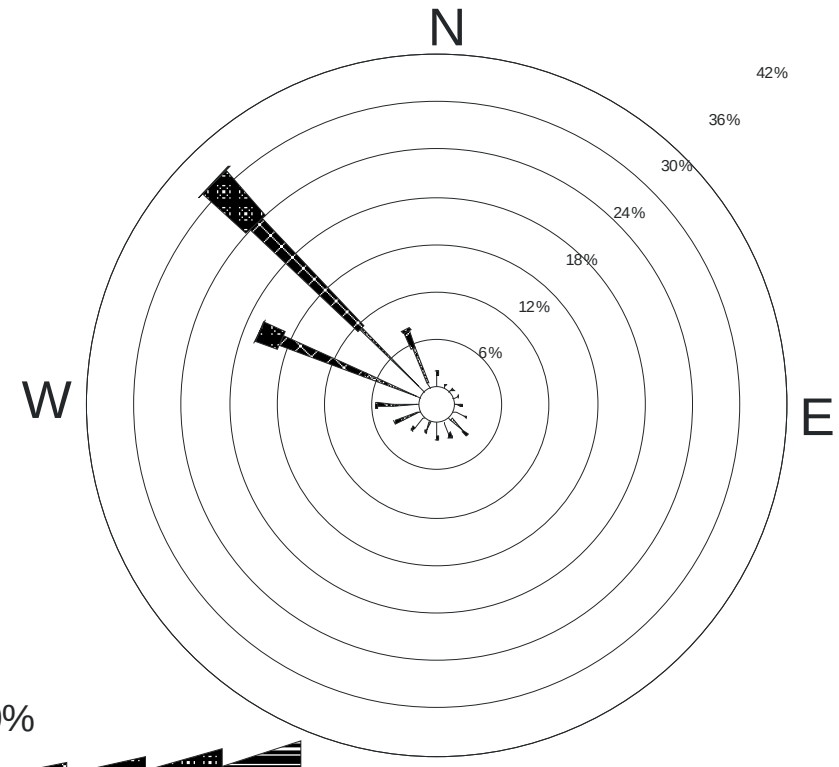


NOTE: Frequencies indicate direction from which the wind is blowing.

CALM WINDS 8.29%

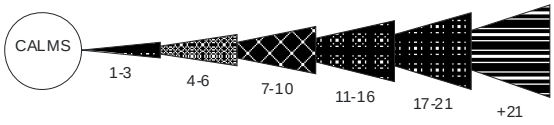


Windrose from Fresno 1987-1991 for Spring

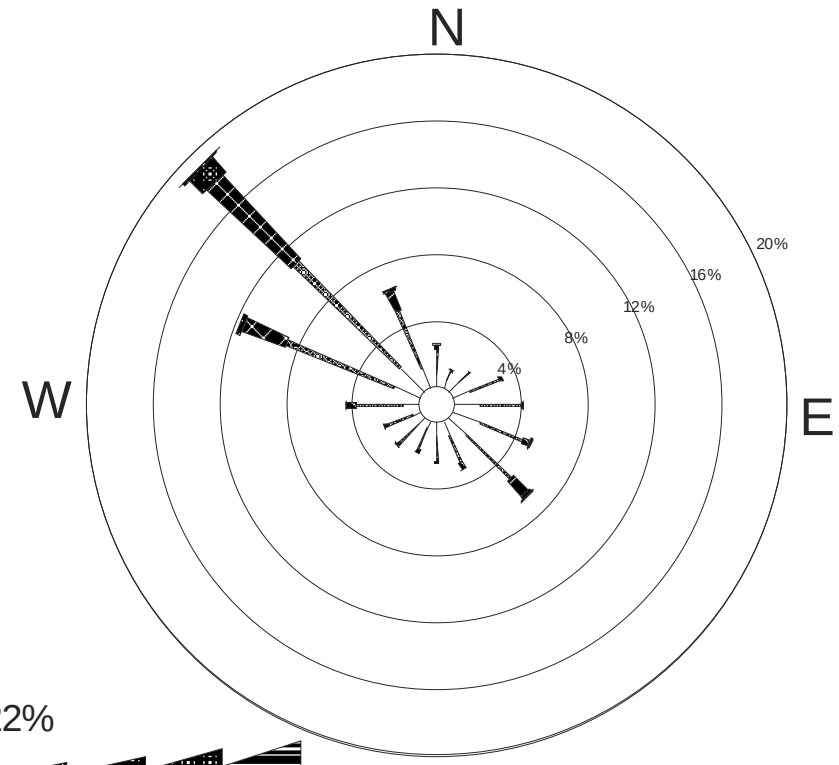


NOTE: Frequencies indicate direction from which the wind is blowing.

CALM WINDS 5.19%

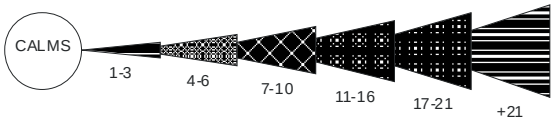


Windrose from Fresno 1987-1991 for Summer

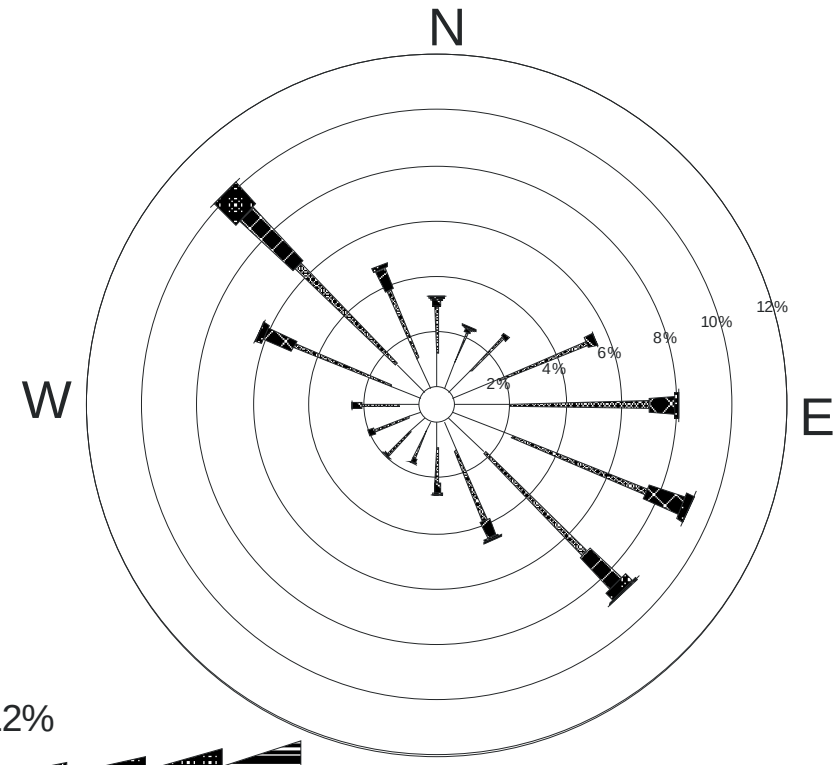


NOTE: Frequencies indicate direction from which the wind is blowing.

CALM WINDS 21.22%

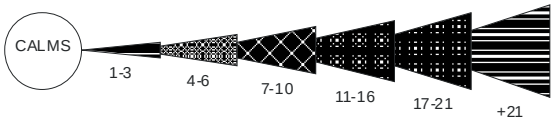


Windrose from Fresno 1987-1991 for Autumn



NOTE: Frequencies indicate direction from which the wind is blowing.

CALM WINDS 23.12%



Windrose from Fresno 1987-1991 for Winter

APPENDIX I

AIR QUALITY DATA

ATTACHMENT B

SUPPORTING INFORMATION ON ESTIMATION OF PROJECT CONSTRUCTION EMISSIONS

Construction
Equipment Usage

Equipment	Gasoline/ Diesel	Size [1] (HP)	Hrs/Day Per Unit	Number of Units	HP/Month	Number of Units	HP/Month	Number of Units	HP/Month	Number of Units	HP/Month	Number of Units	HP/Month	Number of Units	HP/Month	Number of Units	HP/Month	Number of Units	HP/Month	Number of Units
				1st month		2nd month		3th month		4th month		5th month		6th month		7th month		8th month		9th
Dozer	D	625	8	1	110,000	1	110,000	1	110,000	1	110,000	1	110,000	3	330,000		0		0	
Excavator	D	513	8		0		0		0		0		0		0		0		0	
Loader	D	210	8	1	36,960	1	36,960		0		0		0		0		0		0	
Scraper	D	485	8	4	341,440	1	85,360		0		0		0		0		0		0	
Grader	D	265	8	1	46,640	1	46,640	1	46,640	1	46,640	3	139,920	3	139,920		0		0	
Crane	D	194	8		0		0		0		0		0	1	34,144	2	68,288	3	102,432	3
Aerial Lifts	D	50	8		0		0		0	1	8,800	2	17,600	3	26,400	4	35,200	4	35,200	4
Backhoe	D	40	8	1	7,040	2	14,080	2	14,080	2	14,080	2	14,080	1	7,040	1	7,040	1	7,040	1
Dump Truck	D	330	8	1	58,080	1	58,080	1	58,080	1	58,080	1	58,080	3	174,240	3	174,240	3	174,240	3
Water Truck	D	300	8	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1
Service truck	D	300	8	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1
Fuel Truck	D	300	8	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1
Concrete Pump	D	300	8	2	105,600	3	158,400	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1
Portable Air Comp.	D	236	8		0		0	1	41,536		0		0		0	1	41,536	1	41,536	1
Portable Elec. Gen	D	314	8		0		0		0		0		0		0	1	55,264	1	55,264	1
Port Light Plant	D	170.5	8		0		0		0		0		0		0		0		0	1
Trencher	D	46	8		0		0		0		0	1	8,096	1	8,096	1	8,096	1	8,096	1
Compactor	D	354	8	1	62,304	1	62,304	1	62,304		0		0	3	186,912	3	186,912	3	186,912	3
Paver	D	153	8		0		0		0		0		0		0		0		0	
Gradeall	D	400	8		0	1	70,400	1	70,400	1	70,400	1	70,400	1	70,400		0		0	
Pile Driver	D	240	8		0		0	1	42,240	1	42,240		0		0		0		0	
Welder	D	12	8		0		0		0		0		0		0	1	2,112	2	4,224	2
Forklift	D	59	8		0		0		0		0	1	10,384	1	10,384	1	10,384	1	10,384	1
Total HP =					926,464		800,624		656,480		561,440		639,760		1,198,736		800,272		836,528	

Days per month 22

1 Size as given by Bibb (as available) or estimated based on typical values for similar use equipment

Construction
Equipment Usage

Equipment	Gasoline/ Diesel	Size [1] (HP)	Hrs/Day Per Unit	HP/Month	Number of Units	HP/Month	Number of Units	HP/Month	Number of Units	HP/Month	Number of Units	HP/Month	Number of Units	HP/Month	Number of Units	HP/Month	Number of Units	HP/Month
				month	10th month		11th month		12th month		13th month		14th month		15th month		16th month	
Dozer	D	625	8	0		0		0		0		0		0		0		0
Excavator	D	513	8	0		0		0		0		0		0		0		0
Loader	D	210	8	0		0		0		0		0		0		0		0
Scraper	D	485	8	0		0		0		0	1	85,360		0		0		0
Grader	D	265	8	0		0		0	1	46,640	1	46,640	1	46,640		0		0
Crane	D	194	8	102,432	3	102,432	2	68,288	2	68,288	1	34,144		0		0		0
Aerial Lifts	D	50	8	35,200	3	26,400	1	8,800	1	8,800	1	8,800		0		0		0
Backhoe	D	40	8	7,040		0		0		0		0		0		0		0
Dump Truck	D	330	8	174,240	3	174,240	3	174,240	1	58,080	1	58,080	3	174,240	3	174,240	3	174,240
Water Truck	D	300	8	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800		0		0
Service truck	D	300	8	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800		0		0
Fuel Truck	D	300	8	52,800	1	52,800	1	52,800	1	52,800	1	52,800	1	52,800		0		0
Concrete Pump	D	300	8	52,800	3	158,400		0		0		0		0		0		0
Portable Air Comp.	D	236	8	41,536	1	41,536	1	41,536	1	41,536	1	41,536		0		0		0
Portable Elec. Gen	D	314	8	55,264	1	55,264	1	55,264	1	55,264	1	55,264		0		0		0
Port Light Plant	D	170.5	8	30,008	1	30,008	1	30,008	1	30,008	1	30,008		0		0		0
Trencher	D	46	8	8,096	1	8,096	1	8,096	1	8,096	1	8,096		0		0		0
Compactor	D	354	8	186,912	3	186,912	3	186,912	3	186,912	1	62,304	1	62,304		0		0
Paver	D	153	8	0		0	3	80,784	3	80,784	1	26,928	1	26,928		0		0
Gradeall	D	400	8	0		0		0		0		0		0		0		0
Pile Driver	D	240	8	0		0		0		0		0		0		0		0
Welder	D	12	8	4,224	2	4,224	2	4,224	1	2,112	1	2,112		0		0		0
Forklift	D	59	8	10,384	1	10,384	1	10,384	1	10,384	1	10,384	1	10,384		0		0
Total HP =				866,536		956,296		826,936		755,304		628,056		478,896		174,240		174,240

Days per month 22

1 Size as given by Bibb (as available) or estimated based on typical values for simila

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\cferrari\Desktop\Panoche\Panoche Grading.urb
Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES

*** 2006 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (lbs/day,unmitigated)	41.80	281.28	344.33	0.01	62.24	12.21	50.03
TOTALS (lbs/day, mitigated)	41.80	242.04	344.33	0.01	7.40	4.53	2.87

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	0.00	0.00	0.00	0.00	0.00

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\cferrari\Desktop\Panoche\Panoche Grading.urb
Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Winter)

CONSTRUCTION EMISSION ESTIMATES

*** 2006 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (lbs/day,unmitigated)	41.80	281.28	344.33	0.01	62.24	12.21	50.03
TOTALS (lbs/day, mitigated)	41.80	242.04	344.33	0.01	7.40	4.53	2.87

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	0.00	0.00	0.00	0.00	0.00

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\cferrari\Desktop\Panoche\Panoche Grading.u
Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Winter)

Construction Start Month and Year: November, 2006
Construction Duration: 2
Total Land Use Area to be Developed: 22.1 acres
Maximum Acreage Disturbed Per Day: 5 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 459558

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)

Source *** 2006***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	2.84	-	2.84
Off-Road Diesel	41.40	241.05	334.84	-	4.51	4.51	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.40	0.99	9.49	0.01	0.05	0.02	0.03
Maximum lbs/day	41.80	242.04	344.33	0.01	7.40	4.53	2.87
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Bldg Const Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max lbs/day all phases	41.80	242.04	344.33	0.01	7.40	4.53	2.87

Construction-Related Mitigation Measures

Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
Phase 2: Off-Road Diesel Exhaust: Use aqueous diesel fuel
Percent Reduction(ROG 0.0% NOx 14.0% CO 0.0% SO2 0.0% PM10 63.0%)
Phase 2: On-Road Diesel Exhaust: Use aqueous diesel fuel
Percent Reduction(ROG 0.0% NOx 14.0% CO 0.0% SO2 0.0% PM10 63.0%)
Phase 2: Stockpiles: Cover all stock piles with tarps
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
Phase 2: Unpaved Roads: Water all haul roads 3x daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 45.0%)
Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 2: Soil Disturbance: Watering 3 times daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 68%)
Phase 3: Off-Road Diesel Exhaust: Use aqueous diesel fuel
Percent Reduction(ROG 0.0% NOx 14.0% CO 0.0% SO2 0.0% PM10 63.0%)
Phase 3: Off-Road Diesel Exhaust: Use aqueous diesel fuel
Percent Reduction(ROG 0.0% NOx 14.0% CO 0.0% SO2 0.0% PM10 63.0%)
Phase 3: On-Road Diesel Exhaust: Use aqueous diesel fuel
Percent Reduction(ROG 0.0% NOx 14.0% CO 0.0% SO2 0.0% PM10 63.0%)
Phase 3 - Building Construction Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Nov '06
Phase 2 Duration: 2 months

On-Road Truck Travel (VMT): 0

Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Graders	174	0.575	8.0
4	Off Highway Trucks	417	0.490	8.0
2	Other Equipment	190	0.620	8.0
1	Rollers	114	0.430	8.0
1	Rubber Tired Dozers	352	0.590	8.0
1	Rubber Tired Loaders	165	0.465	8.0
4	Scrapers	313	0.660	8.0
1	Tractor/Loaders/Backhoes	79	0.465	8.0

AREA SOURCE EMISSION ESTIMATES (Winter Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.00	0.00	0.00	0	0.00
Hearth	0.00	0.00	0.00	0.00	0.00
Landscaping - No winter emissions					
Consumer Prdcts	0.00	-	-	-	-
Architectural Coatings	0.00	-	-	-	-
TOTALS(lbs/day,unmitigated)	0.00	0.00	0.00	0.00	0.00

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
has been changed from off to on.
Phase 2 mitigation measure Off-Road Diesel Exhaust: Use aqueous diesel fuel
has been changed from off to on.
Phase 2 mitigation measure On-Road Diesel Exhaust: Use aqueous diesel fuel
has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 3x daily
has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Watering 3 times daily
has been changed from off to on.

Changes made to the default values for Area

The natural gas option switch changed from on to off.
The hearth option switch changed from on to off.
The landscape option switch changed from on to off.
The consumer products option switch changed from on to off.
The arch. coatings option switch changed from on to off.
The landscape year changed from 2005 to 2006.

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\cferrari\Desktop\Panoche\Panoche Grading.urb
Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: November, 2006
Construction Duration: 2
Total Land Use Area to be Developed: 22.1 acres
Maximum Acreage Disturbed Per Day: 5 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 459558

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)

Source *** 2006***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	2.84	-	2.84
Off-Road Diesel	41.40	241.05	334.84	-	4.51	4.51	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.40	0.99	9.49	0.01	0.05	0.02	0.03
Maximum lbs/day	41.80	242.04	344.33	0.01	7.40	4.53	2.87
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Bldg Const Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max lbs/day all phases	41.80	242.04	344.33	0.01	7.40	4.53	2.87

Construction-Related Mitigation Measures

Phase 2: Soil Disturbance: Apply soil stabilizers to inactive areas
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 30.0%)
Phase 2: Soil Disturbance: Replace ground cover in disturbed areas quickly
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 15.0%)
Phase 2: Off-Road Diesel Exhaust: Use aqueous diesel fuel
Percent Reduction(ROG 0.0% NOx 14.0% CO 0.0% SO2 0.0% PM10 63.0%)
Phase 2: On-Road Diesel Exhaust: Use aqueous diesel fuel
Percent Reduction(ROG 0.0% NOx 14.0% CO 0.0% SO2 0.0% PM10 63.0%)
Phase 2: Stockpiles: Cover all stock piles with tarps
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 9.5%)
Phase 2: Unpaved Roads: Water all haul roads 3x daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 45.0%)
Phase 2: Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 40.0%)
Phase 2: Soil Disturbance: Watering 3 times daily
Percent Reduction(ROG 0.0% NOx 0.0% CO 0.0% SO2 0.0% PM10 68%)
Phase 3: Off-Road Diesel Exhaust: Use aqueous diesel fuel
Percent Reduction(ROG 0.0% NOx 14.0% CO 0.0% SO2 0.0% PM10 63.0%)
Phase 3: Off-Road Diesel Exhaust: Use aqueous diesel fuel
Percent Reduction(ROG 0.0% NOx 14.0% CO 0.0% SO2 0.0% PM10 63.0%)
Phase 3: On-Road Diesel Exhaust: Use aqueous diesel fuel
Percent Reduction(ROG 0.0% NOx 14.0% CO 0.0% SO2 0.0% PM10 63.0%)
Phase 3 - Building Construction Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions
Start Month/Year for Phase 2: Nov '06
Phase 2 Duration: 2 months

On-Road Truck Travel (VMT): 0

Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Graders	174	0.575	8.0
4	Off Highway Trucks	417	0.490	8.0
2	Other Equipment	190	0.620	8.0
1	Rollers	114	0.430	8.0
1	Rubber Tired Dozers	352	0.590	8.0
1	Rubber Tired Loaders	165	0.465	8.0
4	Scrapers	313	0.660	8.0
1	Tractor/Loaders/Backhoes	79	0.465	8.0

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.00	0.00	0.00	0	0.00
Hearth - No summer emissions					
Landscaping	0.00	0.00	0.00	0.00	0.00
Consumer Prdcts	0.00	-	-	-	-
Architectural Coatings	0.00	-	-	-	-
TOTALS(lbs/day,unmitigated)	0.00	0.00	0.00	0.00	0.00

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

Phase 2 mitigation measure Soil Disturbance: Apply soil stabilizers to inactive areas
has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Replace ground cover in disturbed areas quickly
has been changed from off to on.
Phase 2 mitigation measure Off-Road Diesel Exhaust: Use aqueous diesel fuel
has been changed from off to on.
Phase 2 mitigation measure On-Road Diesel Exhaust: Use aqueous diesel fuel
has been changed from off to on.
Phase 2 mitigation measure Stockpiles: Cover all stock piles with tarps
has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Water all haul roads 3x daily
has been changed from off to on.
Phase 2 mitigation measure Unpaved Roads: Reduce speed on unpaved roads to < 15 mph
has been changed from off to on.
Phase 2 mitigation measure Soil Disturbance: Watering 3 times daily
has been changed from off to on.

Changes made to the default values for Area

The natural gas option switch changed from on to off.
The hearth option switch changed from on to off.
The landscape option switch changed from on to off.
The consumer products option switch changed from on to off.
The arch. coatings option switch changed from on to off.
The landscape year changed from 2005 to 2006.

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\cferrari\Desktop\Panoche\Panoche Building Alone.urb
Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES

*** 2006 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (lbs/day,unmitigated)	49.13	320.68	458.11	0.05	13.72	13.41	0.31
TOTALS (lbs/day, mitigated)	49.13	277.15	458.11	0.05	5.37	5.06	0.31

*** 2007 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (lbs/day,unmitigated)	50.36	312.67	477.68	0.06	12.35	12.04	0.31
TOTALS (lbs/day, mitigated)	50.36	270.36	477.68	0.06	4.87	4.56	0.31

*** 2008 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (lbs/day,unmitigated)	50.26	304.03	480.24	0.06	11.28	10.97	0.31
TOTALS (lbs/day, mitigated)	50.26	262.92	480.24	0.06	4.47	4.16	0.31

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	0.00	0.00	0.00	0.00	0.00

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\cferrari\Desktop\Panoche\Panoche Building Alone.urb
Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Winter)

CONSTRUCTION EMISSION ESTIMATES

*** 2006 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (lbs/day,unmitigated)	49.13	320.68	458.11	0.05	13.72	13.41	0.31
TOTALS (lbs/day, mitigated)	49.13	277.15	458.11	0.05	5.37	5.06	0.31

*** 2007 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (lbs/day,unmitigated)	50.36	312.67	477.68	0.06	12.35	12.04	0.31
TOTALS (lbs/day, mitigated)	50.36	270.36	477.68	0.06	4.87	4.56	0.31

*** 2008 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (lbs/day,unmitigated)	50.26	304.03	480.24	0.06	11.28	10.97	0.31
TOTALS (lbs/day, mitigated)	50.26	262.92	480.24	0.06	4.47	4.16	0.31

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	0.00	0.00	0.00	0.00	0.00

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\cferrari\Desktop\Panoche\Panoche Building Alone.urb
Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Tons/Year)

CONSTRUCTION EMISSION ESTIMATES

*** 2006 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (tpy, unmitigated)	0.54	3.53	5.04	0.00	0.15	0.15	0.00
TOTALS (tpy, mitigated)	0.54	3.05	5.04	0.00	0.06	0.06	0.00

*** 2007 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (tpy, unmitigated)	6.64	41.26	62.87	0.01	1.63	1.59	0.04
TOTALS (tpy, mitigated)	6.64	35.68	62.87	0.01	0.64	0.60	0.04

*** 2008 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (tpy, unmitigated)	0.27	1.67	2.64	0.00	0.06	0.06	0.00
TOTALS (tpy, mitigated)	0.27	1.44	2.64	0.00	0.02	0.02	0.00

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (tpy, unmitigated)	0.00	0.00	0.00	0.00	0.00

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\cferrari\Desktop\Panoche\Panoche Building Alone.urb
Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Winter)

Construction Start Month and Year: December, 2006
Construction Duration: 13.5
Total Land Use Area to be Developed: 22.1 acres
Maximum Acreage Disturbed Per Day: 5 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 481338

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	46.18	310.96	373.96	-	13.25	13.25	0.00
Bldg Const Worker Trips	2.95	9.72	84.15	0.05	0.47	0.16	0.31
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	49.13	320.68	458.11	0.05	13.72	13.41	0.31
Max lbs/day all phases	49.13	320.68	458.11	0.05	13.72	13.41	0.31
*** 2007***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	46.18	302.20	377.74	-	11.87	11.87	0.00
Bldg Const Worker Trips	4.18	10.47	99.95	0.06	0.48	0.17	0.31
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	50.36	312.67	477.68	0.06	12.35	12.04	0.31
Max lbs/day all phases	50.36	312.67	477.68	0.06	12.35	12.04	0.31
*** 2008***							

Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	46.18	293.61	381.37	-	10.80	10.80	0.00
Bldg Const Worker Trips	4.08	10.42	98.87	0.06	0.48	0.17	0.31
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	50.26	304.03	480.24	0.06	11.28	10.97	0.31
Max lbs/day all phases	50.26	304.03	480.24	0.06	11.28	10.97	0.31

Phase 2 - Site Grading Assumptions: Phase Turned OFF

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '06
Phase 3 Duration: 13.5 months
Start Month/Year for SubPhase Building: Dec '06
SubPhase Building Duration: 13.5 months
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Cranes	190	0.430	8.0
3	Graders	174	0.575	8.0
1	Off Highway Tractors	255	0.410	8.0
6	Off Highway Trucks	417	0.490	8.0
3	Rollers	114	0.430	8.0
1	Rough Terrain Forklifts	94	0.475	8.0
3	Rubber Tired Dozers	352	0.590	8.0
1	Tractor/Loaders/Backhoes	79	0.465	8.0
1	Trenchers	82	0.695	8.0

SubPhase Architectural Coatings Turned OFF
SubPhase Asphalt Turned OFF

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	46.18	267.43	373.96	-	4.90	4.90	0.00
Bldg Const Worker Trips	2.95	9.72	84.15	0.05	0.47	0.16	0.31
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Maximum lbs/day	49.13	277.15	458.11	0.05	5.37	5.06	0.31
Max lbs/day all phases	49.13	277.15	458.11	0.05	5.37	5.06	0.31

*** 2007***

Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	46.18	259.89	377.74	-	4.39	4.39	0.00
Bldg Const Worker Trips	4.18	10.47	99.95	0.06	0.48	0.17	0.31
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	50.36	270.36	477.68	0.06	4.87	4.56	0.31
Max lbs/day all phases	50.36	270.36	477.68	0.06	4.87	4.56	0.31

*** 2008***

Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	46.18	252.50	381.37	-	4.00	4.00	0.00
Bldg Const Worker Trips	4.08	10.42	98.87	0.06	0.48	0.17	0.31
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	50.26	262.92	480.24	0.06	4.47	4.16	0.31
Max lbs/day all phases	50.26	262.92	480.24	0.06	4.47	4.16	0.31

Construction-Related Mitigation Measures

Phase 2 - Site Grading Assumptions: Phase Turned OFF

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '06
Phase 3 Duration: 13.5 months
Start Month/Year for SubPhase Building: Dec '06
SubPhase Building Duration: 13.5 months
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Cranes	190	0.430	8.0
3	Graders	174	0.575	8.0

1	Off Highway Tractors	255	0.410	8.0
6	Off Highway Trucks	417	0.490	8.0
3	Rollers	114	0.430	8.0
1	Rough Terrain Forklifts	94	0.475	8.0
3	Rubber Tired Dozers	352	0.590	8.0
1	Tractor/Loaders/Backhoes	79	0.465	8.0
1	Trenchers	82	0.695	8.0

SubPhase Architectural Coatings Turned OFF
SubPhase Asphalt Turned OFF

AREA SOURCE EMISSION ESTIMATES (Winter Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.00	0.00	0.00	0	0.00
Hearth	0.00	0.00	0.00	0.00	0.00
Landscaping - No winter emissions					
Consumer Prdcts	0.00	-	-	-	-
Architectural Coatings	0.00	-	-	-	-
TOTALS(lbs/day,unmitigated)	0.00	0.00	0.00	0.00	0.00

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 3 mitigation measure Off-Road Diesel Exhaust: Use aqueous diesel fuel has been changed from off to on.
Phase 3 mitigation measure Off-Road Diesel Exhaust: Use aqueous diesel fuel has been changed from off to on.
Phase 3 mitigation measure On-Road Diesel Exhaust: Use aqueous diesel fuel has been changed from off to on.

Changes made to the default values for Area

The natural gas option switch changed from on to off.
The hearth option switch changed from on to off.
The landscape option switch changed from on to off.
The consumer products option switch changed from on to off.
The arch. coatings option switch changed from on to off.
The landscape year changed from 2005 to 2006.

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\cferrari\Desktop\Panoche\Panoche Building Alone.urb
Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: December, 2006
Construction Duration: 13.5
Total Land Use Area to be Developed: 22.1 acres
Maximum Acreage Disturbed Per Day: 5 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 481338

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	46.18	310.96	373.96	-	13.25	13.25	0.00
Bldg Const Worker Trips	2.95	9.72	84.15	0.05	0.47	0.16	0.31
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	49.13	320.68	458.11	0.05	13.72	13.41	0.31
Max lbs/day all phases	49.13	320.68	458.11	0.05	13.72	13.41	0.31
*** 2007***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	46.18	302.20	377.74	-	11.87	11.87	0.00
Bldg Const Worker Trips	4.18	10.47	99.95	0.06	0.48	0.17	0.31
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	50.36	312.67	477.68	0.06	12.35	12.04	0.31
Max lbs/day all phases	50.36	312.67	477.68	0.06	12.35	12.04	0.31
*** 2008***							

Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	46.18	293.61	381.37	-	10.80	10.80	0.00
Bldg Const Worker Trips	4.08	10.42	98.87	0.06	0.48	0.17	0.31
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	50.26	304.03	480.24	0.06	11.28	10.97	0.31
Max lbs/day all phases	50.26	304.03	480.24	0.06	11.28	10.97	0.31

Phase 2 - Site Grading Assumptions: Phase Turned OFF

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '06
Phase 3 Duration: 13.5 months
Start Month/Year for SubPhase Building: Dec '06
SubPhase Building Duration: 13.5 months
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Cranes	190	0.430	8.0
3	Graders	174	0.575	8.0
1	Off Highway Tractors	255	0.410	8.0
6	Off Highway Trucks	417	0.490	8.0
3	Rollers	114	0.430	8.0
1	Rough Terrain Forklifts	94	0.475	8.0
3	Rubber Tired Dozers	352	0.590	8.0
1	Tractor/Loaders/Backhoes	79	0.465	8.0
1	Trenchers	82	0.695	8.0

SubPhase Architectural Coatings Turned OFF
SubPhase Asphalt Turned OFF

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.00	0.00	0.00	0	0.00
Hearth - No summer emissions					
Landscaping	0.00	0.00	0.00	0.00	0.00
Consumer Prdcts	0.00	-	-	-	-
Architectural Coatings	0.00	-	-	-	-
TOTALS(lbs/day,unmitigated)	0.00	0.00	0.00	0.00	0.00

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 3 mitigation measure Off-Road Diesel Exhaust: Use aqueous diesel fuel has been changed from off to on.
Phase 3 mitigation measure Off-Road Diesel Exhaust: Use aqueous diesel fuel has been changed from off to on.
Phase 3 mitigation measure On-Road Diesel Exhaust: Use aqueous diesel fuel has been changed from off to on.

Changes made to the default values for Area

The natural gas option switch changed from on to off.
The hearth option switch changed from on to off.
The landscape option switch changed from on to off.
The consumer products option switch changed from on to off.
The arch. coatings option switch changed from on to off.
The landscape year changed from 2005 to 2006.

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\cferrari\Desktop\Panoche\Panoche Building Alone.urb
Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Tons/Year)

Construction Start Month and Year: December, 2006
Construction Duration: 13.5
Total Land Use Area to be Developed: 22.1 acres
Maximum Acreage Disturbed Per Day: 5 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 481338

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (tons/year)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	0.51	3.42	4.11	-	0.15	0.15	0.00
Bldg Const Worker Trips	0.03	0.11	0.93	0.00	0.01	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.54	3.53	5.04	0.00	0.15	0.15	0.00
Total all phases tons/yr	0.54	3.53	5.04	0.00	0.15	0.15	0.00
*** 2007***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	6.10	39.89	49.86	-	1.57	1.57	0.00
Bldg Const Worker Trips	0.54	1.37	13.01	0.01	0.06	0.02	0.04
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	6.64	41.26	62.87	0.01	1.63	1.59	0.04
Total all phases tons/yr	6.64	41.26	62.87	0.01	1.63	1.59	0.04
*** 2008***							

Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	0.25	1.61	2.10	-	0.06	0.06	0.00
Bldg Const Worker Trips	0.02	0.06	0.54	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.27	1.67	2.64	0.00	0.06	0.06	0.00
Total all phases tons/yr	0.27	1.67	2.64	0.00	0.06	0.06	0.00

Phase 2 - Site Grading Assumptions: Phase Turned OFF

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '06
Phase 3 Duration: 13.5 months
Start Month/Year for SubPhase Building: Dec '06
SubPhase Building Duration: 13.5 months
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Cranes	190	0.430	8.0
3	Graders	174	0.575	8.0
1	Off Highway Tractors	255	0.410	8.0
6	Off Highway Trucks	417	0.490	8.0
3	Rollers	114	0.430	8.0
1	Rough Terrain Forklifts	94	0.475	8.0
3	Rubber Tired Dozers	352	0.590	8.0
1	Tractor/Loaders/Backhoes	79	0.465	8.0
1	Trenchers	82	0.695	8.0

SubPhase Architectural Coatings Turned OFF
SubPhase Asphalt Turned OFF

CONSTRUCTION EMISSION ESTIMATES MITIGATED (tons/year)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2006***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	0.51	2.94	4.11	-	0.06	0.06	0.00
Bldg Const Worker Trips	0.03	0.11	0.93	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total tons/year	0.54	3.05	5.04	0.00	0.06	0.06	0.00
Total all phases tons/yr	0.54	3.05	5.04	0.00	0.06	0.06	0.00

*** 2007***

Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	6.10	34.31	49.86	-	0.58	0.58	0.00
Bldg Const Worker Trips	0.54	1.37	13.01	0.01	0.06	0.02	0.04
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	6.64	35.68	62.87	0.01	0.64	0.60	0.04
Total all phases tons/yr	6.64	35.68	62.87	0.01	0.64	0.60	0.04

*** 2008***

Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	0.25	1.38	2.10	-	0.02	0.02	0.00
Bldg Const Worker Trips	0.02	0.06	0.54	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total tons/year	0.27	1.44	2.64	0.00	0.02	0.02	0.00
Total all phases tons/yr	0.27	1.44	2.64	0.00	0.02	0.02	0.00

Construction-Related Mitigation Measures

Phase 2 - Site Grading Assumptions: Phase Turned OFF

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Dec '06
Phase 3 Duration: 13.5 months
Start Month/Year for SubPhase Building: Dec '06
SubPhase Building Duration: 13.5 months
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Cranes	190	0.430	8.0
3	Graders	174	0.575	8.0

1	Off Highway Tractors	255	0.410	8.0
6	Off Highway Trucks	417	0.490	8.0
3	Rollers	114	0.430	8.0
1	Rough Terrain Forklifts	94	0.475	8.0
3	Rubber Tired Dozers	352	0.590	8.0
1	Tractor/Loaders/Backhoes	79	0.465	8.0
1	Trenchers	82	0.695	8.0

SubPhase Architectural Coatings Turned OFF
SubPhase Asphalt Turned OFF

AREA SOURCE EMISSION ESTIMATES (Tons per Year, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00
Consumer Prdcts	0.00	-	-	-	-
Architectural Coatings	0.00	-	-	-	-
TOTALS (tpy, unmitigated)	0.00	0.00	0.00	0.00	0.00

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

The user has overridden the Default Phase Lengths
Phase 3 mitigation measure Off-Road Diesel Exhaust: Use aqueous diesel fuel has been changed from off to on.
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The landscape option switch changed from on to off.
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The arch. coatings option switch changed from on to off.
The landscape year changed from 2005 to 2006.

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\cferrari\Desktop\Panoche\Panoche Asphalt.urb
Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES

*** 2007 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (lbs/day,unmitigated)	18.80	117.70	154.63	0.01	4.41	4.39	0.02
TOTALS (lbs/day, mitigated)	18.80	101.29	154.63	0.01	1.65	1.63	0.02

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	0.00	0.00	0.00	0.00	0.00

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\cferrari\Desktop\Panoche\Panoche Asphalt.urb
Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Winter)

CONSTRUCTION EMISSION ESTIMATES

*** 2007 ***	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
TOTALS (lbs/day,unmitigated)	18.80	117.70	154.63	0.01	4.41	4.39	0.02
TOTALS (lbs/day, mitigated)	18.80	101.29	154.63	0.01	1.65	1.63	0.02

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	0.00	0.00	0.00	0.00	0.00

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Documents and Settings\cferrari\Desktop\Panoche\Panoche Asphalt.urb
Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Winter)

Construction Start Month and Year: January, 2007
Construction Duration: 0.5
Total Land Use Area to be Developed: 22.1 acres
Maximum Acreage Disturbed Per Day: 5 acres
Single Family Units: 0 Multi-Family Units: 0
Retail/Office/Institutional/Industrial Square Footage: 481338

CONSTRUCTION EMISSION ESTIMATES MITIGATED (lbs/day)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2007***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Bldg Const Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.48	-	-	-	-	-	-
Asphalt Off-Road Diesel	18.03	98.40	149.84	-	1.60	1.60	0.00
Asphalt On-Road Diesel	0.14	2.41	0.52	0.00	0.02	0.02	0.00
Asphalt Worker Trips	0.15	0.48	4.27	0.00	0.03	0.01	0.02
Maximum lbs/day	18.80	101.29	154.63	0.01	1.65	1.63	0.02
Max lbs/day all phases	18.80	101.29	154.63	0.01	1.65	1.63	0.02

Construction-Related Mitigation Measures

Phase 2 - Site Grading Assumptions: Phase Turned OFF

Phase 3 - Building Construction Assumptions
Start Month/Year for Phase 3: Jan '07
Phase 3 Duration: .5 months
SubPhase Building Turned OFF
SubPhase Architectural Coatings Turned OFF
Start Month/Year for SubPhase Asphalt: Jan '07
SubPhase Asphalt Duration: 0.5 months
Acres to be Paved: 2
Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
3	Off Highway Trucks	417	0.490	8.0
2	Other Equipment	190	0.620	4.0
3	Pavers	132	0.590	8.0
1	Paving Equipment	111	0.530	8.0

Changes made to the default values for Land Use Trip Percentages

Changes made to the default values for Construction

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Project Name: Panoche Construction
Project Location: San Joaquin Valley
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)

Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.00	0.00	0.00	0	0.00
Hearth - No summer emissions					
Landscaping	0.00	0.00	0.00	0.00	0.00
Consumer Prdcts	0.00	-	-	-	-
Architectural Coatings	0.00	-	-	-	-
TOTALS(lbs/day,unmitigated)	0.00	0.00	0.00	0.00	0.00

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Panoche - Calculations for inputs to ISC Model for Construction Emissions

	Grading[1] lb/day	Building[1] lb/day	Total [2] lb/day	Main Site Emissions lb/day	Substation Emissions[3] lb/day	Pipe Path Emissions[3] lb/day	Main Site Emissions for 1 to 24 hours lb/hr	Substation Emissions for 1 to 24 hours lb/hr	Pipe Path Emissions for 1 to 24 hours lb/hr	Annual Average Main Site Emissions (lb/hr) [4]	Annual Average Substation Emissions (lb/hr) [4]	Annual Average Pipe Path Emissions (lb/hr) [4]
NO_x		277.15	277.15	253.88	23.27		10.58	0.97		7.65	0.7014	
CO		480.24	480.24	439.91	40.33		18.33	1.68		13.26	1.2153	
SO_2		0.06	0.06	0.05	0.01		0.0023	0.0002		0.00	0.0002	
PM_{10} Combustion	4.53	5.06	9.59	8.78	0.81		0.37	0.03		0.26	0.0243	
PM_{10} Fugitve Dust	2.87	0.31	3.18	2.88	0.16	0.14	0.12	0.01	0.01	0.09	0.0048	0.00434
Assumed hours per day	24											

[1] *Emission totals for each phase taken from URBEMIS2002 results for estimated maximum short term conditions*

[2] *Assume grading and building overlap (worst-case scenario)*

[3] *Substation Area and Pipe Path Area each = 1.1 acres*

[4] *Annual Average = lb/day x 22 days per month x 12 months per year / 8760 hours per year*

Inputs to ISC

	Main Site Emissions 2 volume sources Annual lb/hr	Substation Emissions 2 volume sources Annual lb/hr	Pipe Path Emissions 10 area sources Annual lb/hr	Main Site Emissions 2 volume sources 1 to 24 Hours lb/hr	Substation Emissions 2 volume sources 1 to 24 Hours lb/hr	Pipe Path Emissions 10 area sources 1 to 24 Hours lb/hr
NO_x	3.83E+00	3.51E-01		5.29E+00	4.85E-01	
CO	6.63E+00	6.08E-01		9.16E+00	8.40E-01	
SO_2	8.28E-04	7.59E-05		1.15E-03	1.05E-04	
PM_{10} Combustion	1.32E-01	1.21E-02		1.83E-01	1.68E-02	

	Main Site Emissions 1 area source Annual lb/hr	Substation Emissions 1 area source Annual lb/hr	Pipe Path Emissions 10 area sources Annual lb/hr	Main Site Emissions 1 area source 1 to 24 Hours lb/hr	Substation Emissions 1 area source 1 to 24 Hours lb/hr	Pipe Path Emissions 10 area sources 1 to 24 Hours lb/hr
PM_{10} Fugitve Dust	8.67E-02	4.77E-03	4.34E-04	1.20E-01	6.60E-03	6.00E-04

Acres	
1.1	Substation Site
12	Facility Building Site (included in total below)
1	Pipe Path
20	Total Facility Site and Laydown Area

Total Area - Fugitive Dust

22.1

Total Area - Combustion Sources

13.1

EMISSION CALCULATIONS FOR CONSTRUCTION RELATED ONROAD VEHICLES

TABLE 1 EMISSION FACTOR FOR ONROAD VEHICLES

Onroad Vehicle	Fuel Type	Vehicle Count	Weight (lbs)	Vehicle Type	EF (lbs/VMT) [1]				
					TOG	CO	NOx	PM10	SO2
On-Site Vehicles									
Truck - Water	D	1	58000	HHD	3.05E-03	2.29E-02	2.65E-02	6.23E-04	3.46E-05
Dump Truck	D	3	45400	HHD	3.05E-03	2.29E-02	2.65E-02	6.23E-04	3.46E-05
Service Truck - 3 ton	D	1	24000	LHD	1.39E-02	1.41E-01	1.49E-02	9.22E-05	0.00E+00
Highway Vehicles (Off-site)									
Worker's Vehicles [2]	G/D	100	4000	LDA/LDT	1.38E-03	1.29E-02	1.28E-03	7.95E-05	9.29E-06
Light Delivery Trucks	D	5	16000	LDH	1.39E-02	1.41E-01	1.49E-02	9.22E-05	0.00E+00
Heavy Duty Delivery Trucks	D	2	30000	MDH	1.49E-03	6.02E-03	2.81E-02	6.99E-04	3.96E-05

1. To obtain the emission factors, EMFAC2002 was run in the "planning inventory" mode for the modeling year of 2008. The Fresno County average fleet information was chosen, and the inventory was run for winter. The emission factor for a given vehicle category was back calculated using the daily emissions and daily VMT for that vehicle category.
2. The emission factors for worker's vehicles are a weighted average, assuming 50% passenger cars and 50% light duty trucks.
Vehicle count takes estimated work force employee number divided by 16 month construction schedule to get an average number of employees onsite in any month.
Assumes 1.5 employees per vehicle.

TABLE 2 EMISSION CALCULATION FOR ONROAD VEHICLES

Onroad Vehicles (Access Road)	Total Days	Trips or Hours / Day / Unit	Round Trip Distance (mile)	Daily Total VMT	Daily Emissions (lbs) [1]					Project Emissions (lbs)				
					TOG	CO	NOx	PM10	SO2	TOG	CO	NOx	PM10	SO2
On-Site Vehicles														
Truck - Water	264	5	5	25	7.63E-02	5.73E-01	6.63E-01	1.56E-02	8.65E-04	20	151	175	4	0
Dump Truck	264	16	10	480	1.46E+00	1.10E+01	1.27E+01	2.99E-01	1.66E-02	386	2,902	3,358	79	4
Service Truck - 1 ton	264	1	40	40	5.56E-01	5.64E+00	5.96E-01	3.69E-03	0.00E+00	147	1,489	157	1	0
Service Truck - 3 ton	264	1	40	40	5.56E-01	5.64E+00	5.96E-01	3.69E-03	0.00E+00	147	1,489	157	1	0
Trucks - Pickup 3/4 ton	264	16	1	32	4.42E-02	4.13E-01	4.10E-02	2.54E-03	2.97E-04	12	109	11	1	0
Total				**Total**	**2.70 lbs**	**23.26 lbs**	**14.62 lbs**	**0.32 lbs**	**0.02 lbs**	**711.85**	**6139.93**	**3858.48**	**85.68**	**4.69**
Highway Vehicles (Off-site)	**Total Days**									**0.4 tons**	**3.1 tons**	**1.9 tons**	**0.0 tons**	**0.0 tons**
Worker's Vehicles [2]	264	1	40	4000	5.5	51.6	5.1	0.3	3.72E-02	1,457	13,622	1,352	84	10
Light Delivery Trucks	264	4	40	800	11.1	112.8	11.9	0.1	0.00E+00	2,936	29,779	3,147	19	0
Heavy Duty Delivery Trucks	264	4	40	320	0.5	1.9	9.0	0.2	1.27E-02	126	509	2,374	59	3
Total				**Total**	**0.48 lbs**	**1.93 lbs**	**8.99 lbs**	**0.22 lbs**	**0.01 lbs**	**4,519 lbs**	**43,910 lbs**	**6,872 lbs**	**162 lbs**	**13 lbs**
										2.3 tons	**22.0 tons**	**3.4 tons**	**0.1 tons**	**0.007 tons**

1. Based on equipment usage for the sixth construction month, which is the peak activity month.
2. The emission factors for worker's vehicles are a weighted average, assuming 50% passenger cars and 50% light duty trucks.

TABLE 3 EMISSIONS FROM VEHICLE TRAFFIC ON PAVED ROAD

Vehicle Type	Mean Vehicles Speed (mph) [Vehicles Weight (tons)]	Total No. Of Trips / Day	PM10 EF (lbs/VMT) [1]	Round Trip Distance (mile)	Daily VMT (all units)	Total No. of Days Operated	VMT/ Project	Daily Emissions (lbs)	Project Emissions (lbs)	Total Project Emissions (Tons)
Worker's Vehicles [1]	45	1	0.0388	40	40	264	10560	1.5512	409.50	
Light Delivery Trucks	8	5	0.0493	40	200	264	52800	9.8502	2600.46	
Heavy Duty Delivery Trucks	[18]	1	0.0709	40	40	264	10560	2.8376	749.14	
Total								**14**	**3,759**	1.88

1. EF are calculated using equations in AP-42, Section 13.2.2. Equation 1b is used for passenger cars; equation 1a is used for heavy duty delivery trucks.
EF calculations are based on the following assumptions:
Paved road silt content (%) 0.1348 SCAQMD CEQA Table A-9-C-1, 5% local, 5% collector, 90% freeway

Title : Fresno County Avg 2008 Winter Default Title
Version : Emfac2002 V2.2 Apr 23 2003
Run Date : 7/8/2006 18:58:00
Scen Year: 2008 -- Model Years: 1965 to 2008
Season : Winter
Area : Fresno County Average
I/M Stat : I and M program in effect
Emissions: Tons Per Day

			Light Non-cat	Duty Cat	Passenger Diesel	H Cars Total	e Non-cat	a Light Cat	v Duty Diesel	y Trucks Total	D - Non-cat	u Medium Cat	t Duty Diesel	y Trucks Total	T - Non-cat	r Gasoline Cat	u Trucks Total	c Diesel Trucks	k Total HD Trucks	s Urban Buses	- Motor-cycles	- All Vehicles	-
		Vehicles	4976	303659	835	309470	5929	199776	3208	208913	965	39356	3358	43678	1088	8235	9323	14775	24098	677	9171	596007	
		VMT/1000	63	11863	19	11944	124	7594	103	7821	18	1646	186	1850	13	204	217	1516	1733	88	79	23515	
		Trips	20426	1909190	4572	1934190	24841	1246940	19414	1291200	9589	462072	37566	509227	22659	100901	123560	218736	342295	2707	18341	4097950	
Total	Organic	Gas	Emissions																				
Run	Exh		0.44	1.23	0.01	1.68	0.88	1.26	0.02	2.16	0.15	0.37	0.09	0.6	0.12	0.27	0.39	1.06	1.45	0.25	0.35	6.5	
Idle	Exh		0	0	0	0	0	0	0	0	0	0.01	0	0.01	0	0.01	0.01	0.07	0.08	0	0	0.09	
Start	Ex		0.15	1.68	0	1.83	0.18	1.35	0	1.53	0.09	0.49	0	0.58	0.38	0.31	0.69	0	0.69	0.01	0.06	4.7	
Total	Ex		0.6	2.91	0.01	3.51	1.06	2.61	0.02	3.69	0.25	0.87	0.09	1.2	0.5	0.58	1.08	1.13	2.21	0.26	0.42	11.29	
Diurnal			0.02	0.19	0	0.21	0.02	0.15	0	0.17	0	0.03	0	0.03	0	0	0	0	0	0	0.01	0.42	
Hot Soak			0.1	0.35	0	0.44	0.12	0.27	0	0.39	0.02	0.06	0	0.08	0.02	0.02	0.03	0	0.03	0	0.01	0.96	
Running			0.47	1.63	0	2.1	0.32	2.03	0	2.35	0.07	0.55	0	0.62	0.11	0.28	0.4	0	0.4	0.01	0.08	5.56	
Resting			0.01	0.06	0	0.07	0.01	0.05	0	0.06	0	0.01	0	0.01	0	0	0	0	0	0	0	0.14	
Total			1.19	5.14	0.01	6.33	1.53	5.11	0.02	6.66	0.34	1.52	0.09	1.94	0.63	0.88	1.51	1.13	2.64	0.27	0.53	18.37	
Carbon	Monoxide	Emissions																					
Run	Exh		5.46	32.14	0.01	37.61	10.8	35.46	0.07	46.33	2.52	6.83	0.25	9.6	2.97	4.62	7.59	4.18	11.77	1.92	4.51	111.74	
Idle	Exh		0	0	0	0	0	0	0	0	0	0.07	0	0.07	0.01	0.03	0.04	0.38	0.42	0	0	0.49	
Start	Ex		0.71	18.25	0	18.96	0.87	16.73	0	17.6	0.47	5.39	0	5.86	2.32	5.35	7.67	0	7.67	0.12	0.22	50.43	
Total	Ex		6.17	50.39	0.01	56.58	11.66	52.19	0.07	63.92	2.99	12.29	0.25	15.53	5.3	10	15.3	4.56	19.85	2.05	4.73	162.66	
Oxides	of	Nitrogen	Emissions																				
Run	Exh		0.35	3.85	0.03	4.23	0.67	4.78	0.16	5.61	0.13	1.42	0.98	2.54	0.08	1.04	1.12	20.16	21.28	0.99	0.13	34.78	
Idle	Exh		0	0	0	0	0	0	0	0	0	0	0.01	0.01	0	0	0	1.15	1.15	0	0	1.16	
Start	Ex		0.03	0.98	0	1.02	0.04	0.91	0	0.95	0.01	0.72	0	0.73	0.04	0.46	0.5	0	0.5	0.01	0.01	3.23	
Total	Ex		0.38	4.83	0.03	5.25	0.71	5.69	0.16	6.56	0.15	2.15	0.99	3.28	0.12	1.51	1.62	21.32	22.94	1	0.13	39.16	
Carbon	Dioxide	Emissions	0																				
Run	Exh		0.03	4.42	0.01	4.46	0.06	3.49	0.04	3.6	0.01	1.25	0.1	1.36	0.01	0.15	0.16	3.29	3.46	0.16	0.01	13.05	
Idle	Exh		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0.06	0	0	0.06	
Start	Ex		0	0.16	0	0.16	0.01	0.12	0	0.13	0	0.04	0	0.04	0.01	0	0.01	0	0.01	0	0	0.34	
Total	Ex		0.04	4.58	0.01	4.62	0.07	3.62	0.04	3.73	0.01	1.29	0.1	1.4	0.02	0.16	0.17	3.35	3.52	0.16	0.01	13.45	
PM10	Emissions																						
Run	Exh		0	0.13	0	0.14	0	0.14	0.01	0.15	0	0.04	0.01	0.05	0	0	0	0.44	0.44	0.01	0	0.8	
Idle	Exh		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02	0.02	0	0	0.02	
Start	Ex		0	0.02	0	0.02	0	0.02	0	0.02	0	0	0	0	0	0	0	0	0	0	0	0.04	
Total	Ex		0	0.15	0	0.15	0	0.16	0.01	0.17	0	0.04	0.01	0.06	0	0	0	0.46	0.46	0.01	0	0.86	
TireWear			0	0.1	0	0.11	0	0.07	0	0.07	0	0.02	0	0.02	0	0	0	0.05	0.05	0	0	0.25	
BrakeWr			0	0.16	0	0.17	0	0.11	0	0.11	0	0.02	0	0.03	0	0	0	0.02	0.02	0	0	0.33	
Total			0	0.42	0	0.43	0.01	0.33	0.01	0.34	0	0.08	0.02	0.1	0	0.01	0.01	0.53	0.54	0.02	0.01	1.43	
Lead			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SOx			0	0.04	0	0.05	0	0.04	0	0.04	0	0.01	0	0.01	0	0	0	0.03	0.03	0	0	0.13	
Fuel	Consumptio	(000	gallons)																				
Gasoline			4.91	477.7	0	482.61	9.26	379.57	0	388.83	1.98	134.09	0	136.07	2.57	17.75	20.32	0	20.32	4.26	2.07	1034.16	
Diesel			0	0	0.68	0.68	0	0	3.56	3.56	0	0	9.25	9.25	0	0	0	301.78	301.78	10.91	0	326.18	

APPENDIX I

AIR QUALITY DATA

ATTACHMENT C

SUPPORTING INFORMATION ON ESTIMATION OF PROJECT OPERATION EMISSIONS

PEC Turbines 100%

Case	100	101	104	107
Ambient Temperature (°F)	114	114	63.3	16.8
Stack Diameter (ft)	13.5	13.5	13.5	13.5
Exhaust Flow (lb/hr)	1496922	1584697	1669071	1710622
CTG Load Level	**100%**	**100%**	**100%**	**100%**
Evap. Cooler	OFF	ON	OFF	OFF
Data from Vendor		Area =	143.14	ft^2

Expected Operation of Each Gas Turbine - Normal Operation

(Reference: Emission Summary GE LMS100 PA Turbine/Site Specific (372 elev) Information)				
Heat Consumed (MMBTU/hr)	813.8	862.5	909.7	885.2
Turbine Outlet Temperature (°F)	817	801	787	741
Exhaust Flow (acfm)	816088	854672	888554	873723
Stack Exit Velocity, ft/m	5701.4	5970.9	6207.6	6104.0
Stack Exit Velocity, m/s	28.96	30.33	31.53	31.01
Nitrogen, % Vol	71.82	71.54	71.84	72.68
Oxygen, % Vol	11.51	11.43	11.49	12.08
Carbon Dioxide, % Vol	3.95	3.95	3.96	3.78
Argon, % Vol	0.86	0.86	0.86	0.87
Water Vapor, % Vol	11.85	12.20	11.83	10.57
Molecular Weight	28.01	27.97	28.01	28.13

Data from Vendor

Average Emission Rates from Each Gas Turbine (lbs/hr) - Normal Operations

NO_X at 28 ppmvd pre-BACT level	80.60	85.40	89.90	87.20
NO_X at 2.5 ppmvd BACT level	7.20	7.63	8.03	7.79
CO at 105 ppmvd pre BACT level	183.10	196.60	206.60	200.40
CO at 6.0 ppmvd BACT level	10.46	11.23	11.81	11.45
UHC at 4-7 ppmvd pre-BACT level	4.50	4.80	6.70	8.60
VOC at 2.4-4.2 ppmvd BACT level	3.00	3.20	3.30	5.10
VOC at 2.0 ppmvd BACT level	2.00	2.67	2.20	2.43
SO_2	1.14	1.20	1.27	1.23
PM_{10}	10.00	10.00	10.00	10.00
NH_3 at 10 ppmvd tBACT level	10.70	11.30	11.90	11.50
NH_3 at 6 ppmvd BACT level	6.42	6.78	7.14	6.90
Sulfur content in fuel basis for above:	0.5	grain total S/100 scf		

Data from Vendor

Startup / Shutdown Emissions from Turbine

Startup

duration in minutes	10	20	30	30	Average	1 hour of
	Startup	SCR Warmup	Total Startup	Normal	Startup	Startup
	Emissions	Emissions	Emissions	Emissions	Emissions	Emissions
	lb/event	**lb/event**	**lb/event**	lb/hour	lb/hour	lb/hour
NO_X	5.00	17.20	22.20	8.03	26.21	44.4
CO	14.00	39.30	53.30	11.81	59.20	106.6
VOC	3.00	0.80	3.80	2.67	5.13	7.6
SO_2	0.04	0.24	0.28	1.27	0.91	0.56
PM_{10}	11.00	3.70	14.70	10.00	19.70	29.4

Assumptions:

Startup Emissions for CO, NO_2, PM_{10}, and VOC integrated from data provided by GE and Bibb.

SO_2 emissions assume complete conversion of all sulfur to SO_2.

Normal emissions are highest of four operating cases listed above (case 104), except for VOC.

PEC Turbines 100%

Shutdown

duration in minutes	10.5	49.5		1 hour of
	Shutdown	Normal	Total Shutdown	Shutdown
	Emissions	Emissions	Emissions	Emissions
	lb/event	lb/hour	lb/hr	lb/hour
NO_X	6.00	8.03	12.62	34.3
CO	47.00	11.81	56.74	268.6
VOC	3.00	2.67	5.20	17.1
SO_2	0.05	1.27	1.10	0.3
PM_{10}	11.00	10.00	19.25	62.9

Assumptions:

Shutdown Emissions for CO, NO_2, PM_{10}, and VOC integrated from data provided by GE and Bibb.

SO_2 emissions assume complete conversion of all sulfur to SO_2.

Normal emissions are highest of four operating cases listed above (case 104) except for VOC.

Commissioning Emissions

			Total Pounds Emitted			
	Hours	NO_x	CO	VOC	PM_{10}	SO_2
First Fire	28	1371.00	800.00	17.00	280.00	3
Controlled Break-in	20	1236.00	721.00	15.00	200.00	3
Dynamic AVR	24	4488.00	4553.00	98.00	240.00	18
Base Load AVR	16	1274.00	4956.00	106.00	160.00	20
SCR Commissioning	24	849.00	215.00	43.00	240.00	30
Full Load Testing	24	191.00	266.00	53.00	240.00	30
Total Commissioning Hours	136					
			Maximum Emission Rates lb/hr			
		NO_x	CO	VOC	PM_{10}	SO_2
First Fire		48.96	28.57	0.61	10.00	0.11
Controlled Break-in		61.80	36.05	0.75	10.00	0.15
Dynamic AVR		187.00	189.71	4.08	10.00	0.75
Base Load AVR		79.63	309.75	6.63	10.00	1.25
SCR Commissioning		35.38	8.96	1.79	10.00	1.25
Full Load Testing		7.96	11.08	2.21	10.00	1.25

Worst-Case 1-Hour Emissions per Turbine

Worst-Case 1-Hour Emissions are equal to the commissioning emission rates, except for SO_2 which has worst-case emissions during normal operations and PM_{10} which has worst-case emissions during startup.

Emissions per turbine	**lb/hr**											**g/s**
NO_2	187.00											23.56
CO	309.75											39.03
VOC	6.63											0.83
SO_2	1.27											0.16
PM_{10}	19.70											2.48

Worst-Case 3 Hour Emission Rate per Turbine

Only SO_2 is considered for an average 3-hour Ambient Air Quality Standard.

Worst-case 3-Hour Scenario are equal to 3 hours at normal rate.

Emissions per turbine	**Worst-case Total**	**Startup /Warmup**	**Shutdown**		**Normal Operations**	**Worst-case Total**	**Startup /Warmup**	**Shutdown**		**Normal Operations**	**Worst-case Total**
	lb/hr					**Total lbs**					**g/s**
Total Hours of Operation	3.0				3.000					3.000	
SO_2	1.27				1.27	3.81				3.81	0.16

Worst-Case 8-Hour Emission Rates

Only CO is considered for an average 8-hour Ambient Air Quality Standard.

Worst-case 8-Hour Scenario includes 8 hours of commissioning. Only one turbine will be undergoing commissioning at any one time.

Emissions per turbine	**Worst-case Total**	**Startup /Warmup**	**Shutdown**	**Commissioning**	**Normal Operations**	**Worst-case Total**	**Startup /Warmup**	**Shutdown**	**Maintenance - Uncontrolled**	**Normal Operations**	**Worst-case Total**
	lb/hr					**Total lbs**					**g/s**
Total Hours of Operation	8			8	0				8	0.00	
CO	309.75			309.75	0.00	2478.00			2478.00	0.00	39.03

PEC Turbines 100%

Worst-Case 24 Hour Emission Rate

Only SO_2 and PM_{10} are considered for an average 24-hour Ambient Air Quality Standard.

Worst-case 24-Hour Scenario for PM_{10} includes 3 Startups, 3 Shutdowns, and remaining time at normal rate.

Worst-case 24-hour scenario for SO_2 uses normal operations.

												Commissioning					
												First Fire	Controlled	Dynamic	Base Load	SCR	Full Load
													Break-in	AVR	AVR	Commissioning	
Emissions per turbine	**Worst-case Total**	**Startup /Warmup**	**Shutdown**	**Maintenance - Uncontrolled**	**Normal Operations**	**Worst-case Total**	**Startup /Warmup**	**Shutdown**	**Maintenance - Uncontrolled**	**Normal Operations**	**Worst-case Total**	Emissions	Emissions	Emissions	Emissions	Emissions	Emissions
	lb/hr					**Total lbs**					**g/s**	Total lbs					
Total Hours of Operation	24	1.50	0.525	0	21.975		1.50	0.525	0	21.975		28	20	24	16	24	24
NO_X	10.87	44.40	34.29		8.03	260.99	66.60	18.00	0.00	176.39	1.37	1371	1236	4488	1274	849	191
CO	23.35	106.60	268.57		11.81	560.33	159.90	141.00	0.00	259.43	2.94	800	721	4553	4956	215	266
VOC	3.29	7.60	17.14		2.67	79.00	11.40	9.00	0.00	58.60	0.41	17	15	98	106	43	53
SO_2	1.27				1.27	27.89	0.00	0.00	0.00	27.89	0.16	3	3	18	20	24	30
PM_{10}	12.37	29.40	62.86		10.00	296.85	44.10	33.00	0.00	219.75	1.56	308	220	264	176	264	264

SO_2 Commissioning		**PM_{10} Commissioning**	
First Fire	0.11	First Fire	10.00
Controlled Break-in	0.15	Controlled Break-in	10.00
Dynamic AVR	0.75	Dynamic AVR	10.00
Base Load AVR	1.25	Base Load AVR	10.00
SCR Commissioning	1.25	SCR Commissioning	10.00
Full Load Testing	1.25	Full Load Testing	10.00

CTG Commissioning testing could operate for 24 hours.

Average Annual Emissions

Average Operation lb/hr Emission Rates presented below for normal operations are based on the 63°F, 100% load operation scenario for 5,000 total operating hours, which includes 365 startup/warmup events, 365 shutdown events, and 20 maintenance hours. Worst-case total emission rate incorporates estimated operating hours at different temperatures.

Emissions per turbine	**Worst-case Total**	**Startup /Warmup**	**Shutdown**	**Maintenance - Uncontrolled**	**Normal Operations**	**Worst-case Total**	**Startup /Warmup**	**Shutdown**	**Maintenance - Uncontrolled**	**Normal Operations**	**Worst-case Total**
	lb/hr					**Total lbs**					**g/s**
Total Hours of Operation	5000	182.50	63.88	20	4733.63						
Number per Scenario		365	365	20							
Duration of Event (min)		30	10.5	60	60						
NO_X	5.72	44.40	34.29	89.90	8.03	50086.8	8103.0	2190.0	1798.0	37995.8	0.72
CO	11.03	106.60	268.57	206.60	11.81	96625.3	19454.5	17155.0	4132.0	55883.8	1.39
VOC	1.74	7.60	17.14	5.10	2.67	15207.0	1387.0	1095.0	102.0	12623.0	0.22
SO_2	0.70	0.56	0.29	1.27	1.27	6153.7	102.2	18.6	25.4	6007.5	0.09
PM_{10}	6.50	29.40	62.86	10.00	10.00	56916.8	5365.5	4015.0	200.0	47336.3	0.82

Note: Worst-case lb/hr is the total emissions (lbs) over 8760 hours/year

Estimated annual normal operating hours 4734

ANNUAL TOTALS	1 unit	4 units		turbines + fire pump		cooling tower + turbines + fire pump	
NO_X	25.04	100.17	tpy	100.21	tpy	100.21	tpy
CO	48.31	193.25	tpy	193.26	tpy	193.26	tpy
VOC	7.60	30.41	tpy	30.42	tpy	30.42	tpy
SO_2	3.08	12.31	tpy	12.31	tpy	12.31	tpy
PM_{10}	28.46	113.83	tpy	113.83	tpy	114.72	tpy

PEC Turbines 75%

Case	102	105	108
Ambient Temperature (°F)	114	63.3	16.8
Stack Diameter (ft)	13.5	13.5	13.5
Exhaust Flow (lb/hr)	1345262	1429908	1442911
CTG Load Level	**75%**	**75%**	**75%**
Evap. Cooler	OFF	OFF	OFF
Data from Vendor	Area =	143.14	ft^2

Expected Operation of each Gas Turbine - Normal Operation

(Reference: Emission Summary GE LMS100 PA Turbine/Site Specific (372 elev) Information)			
Heat Consumed (MMBTU/hr)	708.8	737.2	724.8
Turbine Outlet Temperature (°F)	800	766	746
Exhaust Flow (acfm)	721939	746033	737502
Stack Exit Velocity, ft/m	5043.6	5212.0	5152.4
Stack Exit Velocity, m/s	25.6	26.5	26.2
Nitrogen, % Vol	72.33	72.54	73.20
Oxygen, % Vol	12.11	12.32	12.66
Carbon Dioxide, % Vol	3.72	3.64	3.56
Argon, % Vol	0.86	0.87	0.88
Water Vapor, % Vol	10.96	10.62	9.69
Molecular Weight	28.08	28.11	28.21

Data from Vendor

Average Emission Rates from each Gas Turbine (lbs/hr/turbine) - Normal Operations

NO_X at 28 ppmvd pre-BACT level	68.50	70.80	69.30
NO_X at 2.5 ppmvd BACT level	6.12	6.32	6.19
CO at 105 ppmvd pre BACT level	155.10	161.40	157.90
CO at 6.0 ppmvd BACT level	8.86	9.22	9.02
VOC at 3-4.2 ppmvd pre-BACT level	2.70	2.90	4.30
VOC at 2.0 ppmvd BACT level	1.80	1.93	2.05
SO_2	0.99	1.03	1.01
PM_{10}	10.00	10.00	10.00
NH_3 at 10 ppmvd tBACT level	9.10	9.40	9.20
NH_3 at 6 ppmvd BACT level	5.46	5.64	5.52
Sulfur content in fuel basis for above:	0.5	grain total S/100 scf	

Data from Vendor

Part load cases assume no evap cooling

PEC Turbines 75%

Startup / Shutdown Emissions from Turbine

Startup

duration in minutes	10	20	30	30	Average	1 hour of
	Startup	CR Warmu	Total Startup	Normal	Startup	Startup
	Emissions	Emissions	Emissions	Emissions	Emissions	Emissions
	lb/event	**lb/event**	**lb/event**	lb/hour	lb/hour	lb/hour
NO_X	5.00	17.20	22.20	6.32	25.36	44.4
CO	14.00	36.30	50.30	9.22	54.91	100.6
VOC	3.00	0.80	3.80	2.05	4.82	7.6
SO_2	0.04	0.24	0.28	1.03	0.79	0.56
PM_{10}	3.00	2.00	5.00	10.00	10.00	10

Assumptions:

Startup Emissions for CO, NO_2, PM_{10}, and VOC integrated from data provided by GE and Bibb.

SO_2 emissions assume complete conversion of all sulfur to SO_2.

Shutdown

duration in minutes	10.5	49.5		1 hour of
	Shutdown	Normal	Total Shutdown	Shutdown
	Emissions	Emissions	Emissions	Emissions
	lb/event	lb/hour	lb/hr	lb/hour
NO_X	6.00	6.32	11.22	34.3
CO	47.00	9.22	54.61	268.6
VOC	3.00	2.05	4.69	17.1
SO_2	0.05	1.03	0.90	0.3
PM_{10}	1.75	10.00	10.00	10.0

Assumptions:

Shutdown Emissions for CO, NO_2, PM_{10}, and VOC integrated from data provided by GE and Bibb.

SO_2 emissions assume complete conversion of all sulfur to SO_2.

Worst-Case 1-Hour Emissions per Turbine

Worst-Case 1-Hour Emissions are equal to the uncontrolled emission rates for NO_2, CO, and SO_2. For VOC the worst-case 1-hour is shutdown and for PM_{10} the worst-case hour is startup.

Emissions per turbine	**lb/hr**										**g/s**
NO_2	70.80										8.92
CO	161.40										20.34
VOC	4.69										0.59
SO_2	1.03										0.13
PM_{10}	10.00										1.26

PEC Turbines 75%

Worst-Case 3 Hour Emission Rate per Turbine

Only SO_2 is considered for an average 3-hour Ambient Air Quality Standard.

Worst-case 3-Hour Scenario are equal to 3 hours at normal rate.

Emissions per turbine	Worst-case Total	Startup /Warmup	Shutdown		Normal Operations	Worst-case Total	Startup /Warmup	Shutdown		Normal Operations	Worst-case Total
	lb/hr					Total lbs					g/s
Total Hours of Operation	3				3		0	0		3	
SO_2	1.03				1.03	3.09	0.00	0.00		3.09	0.13

Worst-Case 8-Hour Emission Rates

Only CO is considered for an average 8-hour Ambient Air Quality Standard.

Worst-case 8-Hour Scenario includes 2 Startups, 2 Shutdown, and remaining time at Normal rate.

Emissions per turbine	Worst-case Total	Startup /Warmup	Shutdown	Maintenance - Uncontrolled	Normal Operations	Worst-case Total	Startup /Warmup	Shutdown	Maintenance- Uncontrolled	Normal Operations	Worst-case Total
	lb/hr					Total lbs					g/s
Total Hours of Operation	8	1.00	0.350		6.65		1.00	0.35		6.65	
CO	31.99	100.60	268.57		9.22	255.93	100.60	94.00	0.00	61.33	4.03

Worst-Case 24 Hour Emission Rate

Only SO_2 and PM_{10} are considered for an average 24-hour Ambient Air Quality Standard.

Worst-case 24-Hour Scenario includes 3 Startups, 3 Shutdowns, and remaining time at Normal rate.

Emissions per turbine	Worst-case Total	Startup /Warmup	Shutdown	Maintenance - Uncontrolled	Normal Operations	Worst-case Total	Startup /Warmup	Shutdown	Maintenance- Uncontrolled	Normal Operations	Worst-case Total
	lb/hr					Total lbs					g/s
Total Hours of Operation	24	1.50	0.525		21.975		1.5	0.525		21.975	
NO_X	9.31	44.40	34.29		6.32	223.51	66.60	18.00	0.00	138.91	1.17
CO	20.61	100.60	268.57		9.22	494.57	150.90	141.00	0.00	202.67	2.60
VOC	2.72	7.60	17.14		2.05	65.40	11.40	9.00	0.00	45.00	0.34
SO_2	0.98	0.56	0.29		1.03	23.59	0.84	0.15	0.00	22.60	0.12
PM_{10}	10.00	10.00	10.00		10.00	240.00	15.00	5.25	0.00	219.75	1.26

PEC Turbines 75%

Average Annual Emissions

Average Operation Emission Rates are based on the average operation scenario (63°F; 100% load) for 5,000 hours total operations which includes 365 startup/warmup events and 365 shutdown events and 20 maintenance hours. The four turbines will each have these operating conditions.

Emissions per turbine	Worst-case Total	Startup /Warmup	Shutdown	Maintenance - Uncontrolled	Normal Operations	Worst-case Total	Startup /Warmup	Shutdown	Maintenance-Uncontrolled	Normal Operations	Worst-case Total
	lb/hr					Total lbs					g/s
Total Hours of Operation	5000	182.50	63.88	20	4733.63						
Number per Scenario		365	365	20	0						
Duration of Event (min)		30	10.5	60	60						
NO_X	4.75	44.40	34.29	70.80	6.32	41632.3	8103.0	2190.0	1416.0	29923.3	0.60
CO	9.41	100.60	268.57	161.40	9.22	82400.0	18359.5	17155.0	3228.0	43657.5	1.19
VOC	1.40	7.60	17.14	4.30	2.05	12260.7	1387.0	1095.0	86.0	9692.7	0.18
SO_2	0.57	0.56	0.29	1.03	1.03	5009.7	102.2	18.6	20.6	4868.3	0.07
PM_{10}	5.71	10.00	10.00	10.00	10.00	50000.0	1825.0	638.8	200.0	47336.3	0.72

Note: Worst-case lb/hr is the total emissions (lbs) over 8760 hours/year

Estimated annual normal operating hours 4734

PEC Turbines 50%

Case	103	106	109
Ambient Temperature (°F)	114	63.3	16.8
Stack Diameter (ft)	13.5	13.5	13.5
Exhaust Flow (lb/hr)	1079315	1134608	1143414
CTG Load Level	**50%**	**50%**	**50%**
Evap. Cooler	OFF	OFF	OFF

Data from Vendor Area = 143.14 ft^2

Expected Operation of each Gas Turbine - Normal Operation

(Reference: Emission Summary GE LMS100 PA Turbine/Site Specific (372 elev) Information)

Heat Consumed (MMBTU/hr)	535.0	557.6	548.9
Turbine Outlet Temperature (°F)	804	783	765
Exhaust Flow (acfm)	578809	598001	591948
Stack Exit Velocity, ft/m	4043.7	4177.8	4135.5
Stack Exit Velocity, m/s	20.5	21.2	21.0
Nitrogen, % Vol	72.99	73.12	73.77
Oxygen, % Vol	12.89	12.97	13.28
Carbon Dioxide, % Vol	3.42	3.39	3.32
Argon, % Vol	0.87	0.87	0.88
Water Vapor, % Vol	9.82	9.63	8.73
Molecular Weight	28.18	28.20	28.29

Data from Vendor

Average Emission Rates from each Gas Turbine (lbs/hr/turbine) - Normal Operations

NO_X at 28 ppmvd pre-BACT level	50.30	51.20	51.60
NO_X at 2.5 ppmvd BACT level	4.49	4.57	4.61
CO at 105 ppmvd pre BACT level	113.30	119.10	116.10
CO at 6.0 ppmvd BACT level	6.47	6.81	6.63
VOC at 2-3 ppmvd pre-BACT level	1.10	1.10	2.30
VOC at 2.0 ppmvd BACT level	1.10	0.92	1.53
SO_2	0.75	0.78	0.77
PM_{10}	10.00	10.00	10.00
NH_3 at 10 ppmvd tBACT level	6.60	6.80	6.80
NH_3 at 6 ppmvd BACT level	3.96	4.08	4.08
Sulfur content in fuel basis for above:	0.5	grain total S/100 scf	

Data from Vendor

Part load cases assume no evap cooling

PEC Turbines 50%

Startup / Shutdown Emissions from Turbine

Startup

duration in minutes	10	20	30	30	Average	1 hour of
	Startup	SCR Warmup	Total Startup	Normal	Startup	Startup
	Emissions	Emissions	Emissions	Emissions	Emissions	Emissions
	lb/event	**lb/event**	**lb/event**	lb/hour	lb/hour	lb/hour
NO_X	5.00	17.20	22.20	4.61	24.50	44.4
CO	14.00	36.30	50.30	6.81	53.70	100.6
VOC	3.00	0.80	3.80	1.53	4.57	7.6
SO_2	0.04	0.24	0.28	0.78	0.67	0.56
PM_{10}	3.00	2.00	5.00	10.00	10.00	10

Assumptions:

Startup Emissions for CO, NO_2, PM_{10}, and VOC integrated from data provided by GE and Bibb.

SO_2 emissions assume complete conversion of all sulfur to SO_2.

Shutdown

duration in minutes	10.5	49.5		1 hour of
	Shutdown	Normal	Total Shutdown	Shutdown
	Emissions	Emissions	Emissions	Emissions
	lb/event	lb/hour	lb/hr	lb/hour
NO_X	6.00	4.61	9.80	34.3
CO	47.00	6.81	52.61	268.6
VOC	3.00	1.53	4.27	17.1
SO_2	0.05	0.78	0.69	0.3
PM_{10}	1.75	10.00	10.00	10.0

Assumptions:

Shutdown Emissions for CO, NO_2, PM_{10}, and VOC integrated from data provided by GE and Bibb.

SO_2 emissions assume complete conversion of all sulfur to SO_2.

Worst-Case 1-Hour Emissions per Turbine

Worst-Case 1-Hour Emissions are equal to the uncontrolled emission rates for NO_2, CO, and SO_2. For VOC the worst-case 1-hour is shutdown and for PM_{10} the worst-case hour is startup.

Emissions per turbine	**lb/hr**										**g/s**
NO_2	51.60										6.50
CO	119.10										15.01
VOC	4.57										0.58
SO_2	0.78										0.10
PM_{10}	10.00										1.26

PEC Turbines 50%

Worst-Case 3 Hour Emission Rate per Turbine

Only SO_2 is considered for an average 3-hour Ambient Air Quality Standard.

Worst-case 3-Hour Scenario are equal to 3 hours at normal rate.

Emissions per turbine	Worst-case Total	Startup /Warmup	Shutdown		Normal Operations	Worst-case Total	Startup /Warmup	Shutdown		Normal Operations	Worst-case Total
	lb/hr					Total lbs					g/s
Total Hours of Operation	3				3						
SO_2	0.77				0.77	2.30				2.30	0.10

Worst-Case 8-Hour Emission Rates

Only CO is considered for an average 8-hour Ambient Air Quality Standard.

Worst-case 8-Hour Scenario includes 2 Startups, 2 Shutdowns, and remaining time at Normal rate.

Emissions per turbine	Worst-case Total	Startup /Warmup	Shutdown	Maintenance - Uncontrolled	Normal Operations	Worst-case Total	Startup /Warmup	Shutdown	Maintenance- Uncontrolled	Normal Operations	Worst-case Total
	lb/hr					Total lbs					g/s
Total Hours of Operation	8	1.00	0.350		6.650						
CO	29.98	100.60	268.57		6.81	239.86	100.60	94.00	0.00	45.26	3.78

Worst-Case 24 Hour Emission Rate

Only SO_2 and PM_{10} are considered for an average 24-hour Ambient Air Quality Standard.

Worst-case 24-Hour Scenario includes 2 Startups, 2 Shutdowns, 2 hours at Maintenance rate, and remaining time at Normal rate.

Emissions per turbine	Worst-case Total	Startup /Warmup	Shutdown	Maintenance - Uncontrolled	Normal Operations	Worst-case Total	Startup /Warmup	Shutdown	Maintenance- Uncontrolled	Normal Operations	Worst-case Total
	lb/hr					Total lbs					g/s
Total Hours of Operation	24	1.50	0.525		21.98						
NO_X	7.74	44.40	34.29		4.61	185.84	66.60	18.00	0.00	101.24	0.98
CO	18.24	100.60	268.57		6.63	437.69	150.90	141.00	0.00	145.79	2.30
VOC	1.86	7.60	17.14		1.10	44.57	11.40	9.00	0.00	24.17	0.23
SO_2	0.74	0.56	0.29		0.77	17.82	0.84	0.15	0.00	16.83	0.09
PM_{10}	10.00	10.00	10.00		10.00	240.00	15.00	5.25	0.00	219.75	1.26

PEC Turbines 50%

Average Annual Emissions

Average Operation Emission Rates are based on the average operation scenario (63°F; 100% load) for 5,000 hours
which includes 365 startup/warmup events, 365 shutdown events, and 20 maintenance hours. The four turbines will each have these operating conditions.

Emissions per turbine	Worst-case Total	Startup /Warmup	Shutdown	Maintenance - Uncontrolled	Normal Operations	Worst-case Total	Startup /Warmup	Shutdown	Maintenance- Uncontrolled	Normal Operations	Worst-case Total
	lb/hr					Total lbs					g/s
Total Hours of Operation	5000	182.50	63.88	20	4734						
Number per Scenario		365	365	20	0						
Duration of Event (min)		30	10.5	60	60						
NO_X	3.78	44.40	34.29	51.60	4.61	33133.5	8103.0	2190.0	1032.0	21808.5	0.48
CO	8.00	100.60	268.57	119.10	6.81	70112.2	18359.5	17155.0	2382.0	32215.7	1.01
VOC	1.12	7.60	17.14	2.30	1.53	9786.2	1387.0	1095.0	46.0	7258.2	0.14
SO_2	0.44	0.56	0.29	0.78	0.78	3818.7	102.2	18.6	15.6	3682.3	0.05
PM_{10}	5.71	10.00	10.00	10.00	10.00	50000.0	1825.0	638.8	200.0	47336.3	0.72

Note: Worst-case lb/hr is the total emissions (lbs) over 8760 hours/year

Estimated annual normal operating hours 4734

Cooling Tower Drift Calculation

Cooling Tower			
design circulating water rate	27,600	gallons/min	
cycles of concentration	3		
TDS	1700	mg/liter	
	14.19	lb/1000 gallons	
Drift Eliminator Control	0.000005		
Operating hours per year	5000		
Drift PM emissions	0.35	lb/hr	per cell
	0.88	**tpy**	

Emissions from Emergency Diesel Firewater Pump

Rated Horsepower	**160**	**BHP**	
Testing duration	**60**	**min/week**	
Yearly testing	**52**	**week/year**	
Expected non-emergency usage	**52**	**hr/yr**	
Diesel Fired	Emision Factor	Emission Rate per Testing	Yearly Emission Rate
	g/HP/Hr	lb/hr	lb/yr
NO_X	3.90	1.38	71.54
CO	0.66	0.23	12.11
VOC (Total Hydrocarbons)	1.00	0.35	18.34
SO_X		2.26E-03	0.12
PM_{10}	0.15	0.05	2.75

Engine parameters

Flow Rate (acfm)	1235	
Exhaust Temp (degrees F)	872	
Stack Diameter (feet)	0.5052	
Stack height (feet)	17	(13 ft building + 4 ft stack)

Data from Bibb
Sulfur content 15 ppm in fuel

Plant Operating Scenarios

1-Hour Worst-Case Emission Scenario for PEC

Only NO_2, CO and SO_2 are considered for the 1-hour Ambient Air Quality Standard.

Worst-case 1-Hour Scenario for NO_2 and CO includes new turbines operating for 1 hour at highest commissioning rate.

Worst-case 1-Hour Scenario for SO_2 includes new turbines operating for 1 hour at normal rate.

Fire Pump operates 1 hour per week.

Emissions per turbine	**lb/hr**	**g/s**
NO_2	187.00	23.56
CO	309.75	39.03
SO_2	1.27	0.16
Emissions from Fire Pump		
NO_2	1.38	0.17
CO	0.23	0.03
SO_2	2.26E-03	2.85E-04

3 Hour Emissions Scenarios for PEC

Only SO_2 is considered for an average 3-hour Ambient Air Quality Standard.

The worst-case 3-hour emission rate is the maximum SO_2 rate for 100% load, normal operating case (63°F; with Evap. Cooler Off).

Fire Pump operates 1 hour per week.

Emissions per turbine	**lb/hr**	**g/s**
SO_2	1.27	0.16
Emissions from Fire Pump		
SO_2	7.53E-04	9.48E-05

8-Hour Emissions Scenarios for PEC

Only CO is considered for an average 8-hour Ambient Air Quality Standard.

Worst-case 8-Hour Scenario includes 8 hours of commissioning.

Fire Pump operates 1 hour per week.

Emissions per turbine	**lb/hr**	**g/s**
CO	309.75	39.03
Emissions from Fire Pump		
CO	2.82E-04	3.56E-05

24-Hour Emissions Scenarios for PEC

Only SO_2 and PM_{10} are considered for an average 24-hour Ambient Air Quality Standard.

Worst-case 24-Hour Scenario for PM_{10} includes 3 Startups, 3 Shutdowns, and remaining time at normal rate. SO_2 uses normal operating rate

Fire Pump operates 1 hour per week.

Emissions per turbine	**lb/hr**	**g/s**
NO_2	10.87	1.37
CO	23.35	2.94
VOC	3.29	0.41
SO_2	1.27	0.16
PM_{10}	12.37	1.56
Emissions from Cooling Tower	**lb/hr**	**g/s**
PM_{10}	0.35	0.04
Emissions from Fire Pump		
SO_2	9.41E-05	1.19E-05
PM_{10}	2.20E-03	2.78E-04

Average Annual Emissions for PEC

Average Operation Emission Rates are based on the annual operation scenarios for 5,000 hours which includes 365 startup/warmup events, 365 shutdown events, and 20 maintenance hours.

Fire Pump operates 52 hours per year. Cooling tower operates 5,000 hours per year.

Emissions per turbine	**lb/hr**	**g/s**
NO_X	5.72	0.72
CO	11.03	1.39
VOC	1.74	0.22
SO_2	0.70	0.09
PM_{10}	6.50	0.82
Emissions from Cooling Tower		
PM_{10}	0.20	0.03
Emissions from Fire Pump		
NO_2	8.17E-03	1.03E-03
CO	1.38E-03	1.74E-04
VOC	2.09E-03	2.64E-04
SO_2	1.34E-05	1.69E-06
PM_{10}	3.14E-04	3.96E-05

Note: Worst-case annual lb/hr is the total emissions (lbs) over 8760 hours/year

APPENDIX I, ATTACHMENT D
MODELING PROTOCOL

AIR QUALITY PROTOCOL

THE PANOCHE ENERGY CENTER
FRESNO COUNTY, CALIFORNIA

PREPARED FOR:

SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT AND CALIFORNIA ENERGY COMMISSION

PREPARED ON BEHALF:

PANOCHE ENERGY CENTER, LLC

URS PROJECT NO. 28906795.00020

JUNE 7, 2006

AIR QUALITY MODELING PROTOCOL

THE PANOCHE ENERGY CENTER
FRESNO COUNTY, CALIFORNIA

Prepared for

San Joaquin Valley Air Pollution Control District

And

California Energy Commission

URS Project No. 28906795.00020

June 7, 2006

URS

1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4314
619.294.9400 Fax: 619.293.7920

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Tables

Figures

Attachments

$\mu g/m^3$	Micrograms per cubic meter
μm	Micrometers
AAQS	Ambient Air Quality Standards
AERMOD	American Meteorological Society/Environmental Protection Agency regulatory model
AFC	Application for certification
AOI	Area of impact
AQRV	Air quality related values
ARB	Air Resources Board
ATC	Authority to construct
BACT	Best available control technology
BPIP	Building profile input program
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CEC	California Energy Commission
CO	Carbon monoxide
CTG	Combustion turbine generator
°C	degrees Celsius
DOC	Determination of compliance
FLAG	Federal Land Managers Air Quality Related Values Workgroup
g/s	Gram per second
GE	General Electric
GEP	Good engineering practice
H1H	High first high
H2H	High second high
H6H	Highest sixth high
HARP	Hotspots analysis and reporting program
HRA	Health risk assessment
ISCST3	Industrial Source Complex Short Term 3rd version
km	Kilometers
LORS	Laws, ordinances, regulations, and standards
MEI	Maximally exposed individual
mm	Millimeter
MW	Megawatt

NAAQS	National Ambient Air Quality Standards
NNSR	Non-attainment New Source Review
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NSR	New source review
O_3	Ozone
OEHHA	Office of Environmental Health Hazard Assessment
OLM	Ozone limiting method
Pb	Lead
PEC	Panoche Energy Center Facility
PG&E	Pacific Gas & Electric
$PM_{2.5}$	Particulate matter less than 2.5 μm in diameter
PM_{10}	Particulate matter less than 10 μm in diameter
PNM	Pinnacles National Monument
ppm	Parts per million
PSD	Prevention of significant deterioration
ROC	Reactive organic compound
SCR	Selective catalytic reduction
SIL	Significant impact level
SJVUAPCD	San Joaquin Valley Unified Air Pollution Control District
SO_2	Sulfur dioxide
TAC	Toxic air contaminants
T-BACT	Best available control technology for toxics
TPY	Tons per year
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VOC	Volatile organic compounds
ZOI	Zone of impact

SECTION 1 INTRODUCTION

1.1 BACKGROUND

Panoche Energy Center, LLC is proposing to build and operate a new natural gas-fired simple cycle peaking plant with maximum output capacity of approximately 400 megawatt (MW) in western Fresno County. The proposed generating facility will use four new General Electric (GE) LMS100 combustion turbine generators (CTG). The Panoche Energy Center (PEC) will be located in the San Joaquin Valley about 32 miles west southwest from the City of Fresno on Panoche Road (see Figure 1-1).

The PEC project is subject to the site licensing requirements of the California Energy Commission (CEC). The CEC will coordinate its independent air quality evaluations with the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) through the Determination of Compliance (DOC) process. Annual emissions of all criteria pollutants will be below the emission level thresholds specified in SJVUAPCD Regulations Rule 4201, 4301, and 4703. Also, the annual emissions of all criteria pollutants will be below the Major Source emission thresholds that would trigger the United States Environmental Protection Agency's (USEPA) Prevention of Significant Deterioration (PSD) review. Specifically, the PEC Facility will emit less than: 250 tons per year (tpy) of nitrogen oxides (NO_x), carbon monoxide (CO), reactive organic compounds (ROC), sulfur dioxide (SO_2), and less than 0.6 tons per year of lead (Pb) and less than 7.0 tons per year of sulfuric acid mist. These determinations have been made for the applicant's proposed operating limits of 5,000 hours per year per turbine plus 150 startup/shutdown cycles per year per turbine.

Even though Federal PSD regulations will not apply to the PEC, the air dispersion modeling for this project will be conducted in conformance with PSD requirements in many ways. For example, worst-case predicted impacts will be compared with the applicable monitoring exemption limits to demonstrate that the project will be exempt from the requirements relating to pre-construction ambient air quality monitoring. The PSD regulations apply only to those pollutants for which the project area is in attainment of the National Ambient Air Quality Standards (NAAQS). State and local new source review (NSR) and non-attainment NSR (NNSR) regulations potentially apply to all criteria pollutants, depending on the quantity of pollutants emitted. The area around the PEC Facility is classified as attainment with respect to the NAAQS for nitrogen dioxide (NO_2), CO, and SO_2, and non-attainment for ozone (O_3), particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$), and PM_{10}. With respect to the California Ambient Air Quality Standards (CAAQS), the area around the PEC is classified as attainment for NO_2, CO, sulfates, Pb, hydrogen sulfide, and SO_2, and non-attainment for O_3, PM_{10}, and particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$). NO_2 and SO_2 are regulated as PM_{10} precursors, and NO_2 and ROC as O_3 precursors. Project emissions of non-attainment pollutants and their precursors will be offset to satisfy state and local NNSR regulations.

1.2 PURPOSE

The CEC requires the use of atmospheric dispersion modeling to demonstrate compliance with applicable air quality standards and both CEC and SJVUAPCD require modeling to determine the potential impacts on human health from toxic air contaminants. Finally, CEC siting regulations also require that the

combined impacts of the proposed project and other reasonably foreseeable projects within 10 km of the project site be assessed via a cumulative modeling analysis.

This document summarizes the procedures to be used for the air dispersion modeling for project certification and permitting. Modeling of emission for both the construction and operational phases of the project will be performed in accordance with CEC guidance (CEC, 1997). This protocol is being submitted to the CEC and SJVUAPCD for their review and comment prior to completion of the applicable permit applications. The proposed model selection and modeling approach is based on review of applicable regulations and agency guidance documents, and discussions with agency staff.

SOURCES: Google Earth

SITE AREA MAP
PANOCHE ENERGY CENTER

URS

NO SCALE

CREATED BY: CL	DATE: 06-07-06	FIG. NO:
PM: JL	PROJ. NO: 28906795.00020	**1.1**

G:\gis\projects\157\l28906795\mxd\fig1-1.mxd (8.5x11)

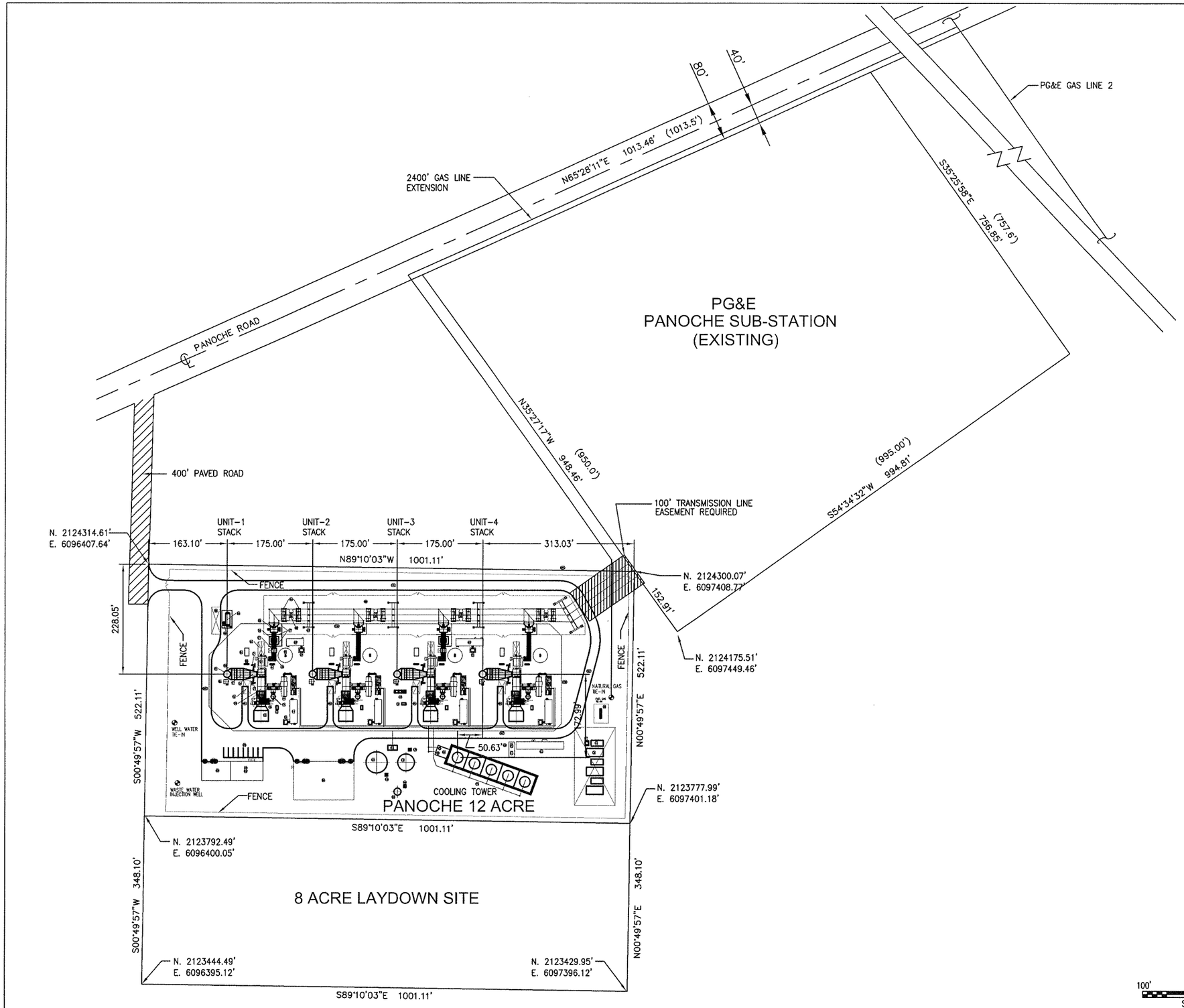
SECTION 2 PROJECT DESCRIPTION

2.1 PROJECT LOCATION

The PEC site will be located on a 20-acre parcel currently used as an orchard in western Fresno County, immediately adjacent the existing PG&E substation Valley on Panoche Road. The site is about 2.4 miles east of Interstate Highway 5 and approximately 2.9 miles west of the California Aqueduct (see Figure 1-1). The project site is within approximately two miles (3.2 km) of complex terrain (i.e., with elevation exceeding proposed stack heights) and is surrounded by agricultural land.

2.2 DESCRIPTION OF THE PROPOSED EMISSION SOURCES

The proposed project will entail the construction and operation of four GE LMS100 combustion turbines, one five-cell cooling tower, associated transformers, water tanks, and other ancillary facilities. The gas turbines will be fired exclusively on natural gas and will be equipped with water injection and selective catalytic reduction (SCR) for the control of NO_x emissions and an oxidation catalyst for control of CO and VOC emissions. Each combustion turbines will operate in simple cycle mode and will have an exhaust stack with a height of 90 feet and a diameter of 13.5 feet. There will be one five-cell cooling tower. Aqueous ammonia will be used in the SCR system. One 160-horsepower diesel engine will act as the emergency firewater pump driver. Figure 2-1 presents a preliminary plot plan of the proposed PEC identifying the relative locations of project boundaries, structures and emissions sources.



LEGEND

001	ADMINISTRATION BUILDING
002	CONTROL BUILDING
003	WATER TREATMENT BUILDING
004	WAREHOUSE BUILDING
006	FIRE WATER PUMP BUILDING
007	ELECTRICAL BUILDING
015	COOLING TOWER
016	CIRCULATING WATER PUMPS
020	COOLING TOWER XFMR'S
023	COOLING TOWER MCC AND CHEMICAL FEED BLDG
025	OIL/WATER SEPARATOR
030	DEMINERALIZED WATER PUMPS
032	DEMINERALIZED WATER STORAGE TANK (240,000 GAL)
034	RAW WATER/FIREWATER STORAGE TANK (500,000 GAL)
035	RAW WATER PUMPS
036	FIREWATER LOOP
045	WASTEWATER COLLECTION TANK (20,000 GAL)
046	WASTEWATER FORWARDING PUMPS
077	EQUIPMENT FIREWALL
078	DEADEND STRUCTURE (BY OWNER)
080	PARKING AREA
082	ROADWAY, 20' WIDTH
083	ROADWAY, 12' WIDTH
085	SITE FENCE
090	PLANT SWITCHYARD (BY OWNER)
092	SF6 BREAKER (BY OWNER)
093	SWITCHYARD DISCONNECT (BY OWNER)
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103	GENERATOR REMOVAL AREA
105	AIR INLET FILTER (BY OWNER)
114	PACKAGED ELECTRICAL ELECTRONIC CONTROL CENTER (PEECC) (BY OWNER)
116	FUEL GAS FILTER/SEPARATOR
118	ELECTRIC DEW POINT HEATER
124	PAD MOUNTED TRANSFORMER
127	13.8KV GENERATOR BREAKER
129	AUXILIARY TRANSFORMER
130	CTG STEP-UP TRANSFORMER
133	WASTE WATER DRAINS TANK
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138	FUEL GAS REGULATING AREA
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144	FUEL GAS COMPRESSOR - RECYCLE GAS FIN FAN COOLER
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164	AMMONIA STORAGE TANK
165	AMMONIA FORWARDING PUMPS
166	AMMONIA INJECTION SKID
169	AMMONIA UNLOADING CONTAINMENT AREA
171	COOLING/PURGE AIR FANS (BY OWNER)
177	CO CATALYST (BY OWNER)
228	ISO-PHASE BUS DUCT

PRELIMINARY
Not For Construction

REV.	DESCRIPTION	PREP	CHK	DATE
1	FOR PERMIT	IBR	JSG	05/10/06

Bibb and associates
8456 Lenexa Drive
Lenexa, Kansas 66214

N

100' 0 100' 200'
SCALE: 1" = 100' - 0"

PANOCHE ENERGY CENTER
L.L.C

Figure 2-1:
Panoche Energy Center Site Plan

	by	date
DESIGNED	IBR	05/10/06
DRAWN	JSG	05/10/06
CHECKED		
APPROVED		

SHEET 1 of 1
DRAWING NUMBER

SECTION 3 REGULATORY SETTING

3.1 CALIFORNIA ENERGY COMMISSION REQUIREMENTS

For projects with electrical power generation capacity of greater than 50 MW, CEC requires that applicants prepare a comprehensive Application for Certification (AFC) document addressing the proposed project's environmental and engineering features. An AFC must include the following air quality information (CEC, 1997):

- A description of the project, including project emissions, fuel type(s), control technologies and stack characteristics;
- The basis for all emission estimates and/or calculations;
- An analysis of Best Available Control Technology (BACT) according to the local air district Rules;
- Existing baseline air quality data for all regulated pollutants;
- Existing meteorological data, including temperature, wind speed and direction and mixing height;
- A listing of applicable laws, ordinances, regulations and standards (LORS) and a determination of compliance with all applicable LORS;
- An emissions offsets strategy;
- An air quality impact assessment (i.e., national and state ambient air quality standards [AAQS] and PSD review) and protocol for the assessment of cumulative impacts of the proposed project along with permitted and under construction projects within a 10 km radius; and
- An analysis of human exposure to air toxics (i.e., health risk assessment [HRA]).

For the PEC Project, the air quality impact assessment, the cumulative impacts assessment, and the HRA will be performed using dispersion models.

3.2 SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT REQUIREMENTS

The SJVUAPCD has promulgated NSR requirements under Rule 2201. In general, all equipment with the potential to emit air pollutants is subject to NSR requirements. NSR has four major requirements that potentially apply to new sources:

- Installation of BACT;
- Ambient air quality impact modeling to demonstrate compliance with NAAQS and CAAQS;
- Emission offsets; and
- Certification of statewide compliance with air quality requirements.

Assembly Bill 2588, California Air Toxics Hot Spots Program (and SJVUAPCD Rule 3110) allows a predicted incremental cancer risk from toxic air contaminants (TAC) at any receptor up to ten in one million, prior to public notification, if best available control technology for toxics (T-BACT) is implemented. A TAC analysis should include TAC emission estimates and a modeling analysis to identify the Zone of Impact (ZOI) and the Maximally Exposed Individual (MEI). The ZOI encompasses the area within which the incremental carcinogenic risk (due to the inhalation pathway only) equals or exceeds one in one million.

3.3 U.S. ENVIRONMENTAL PROTECTION AGENCY REQUIREMENTS

USEPA has promulgated PSD regulations applicable to major sources in Fresno County. The PEC facility will not be a Major Source for criteria pollutants other than PM_{10}. Many of the PSD permitting requirements are similar to the AFC and SJVUAPCD NSR requirements described above (i.e., quantification of project emissions, BACT, ambient air quality standards analysis); however, PSD requires the following additional analyses:

- A PSD increment (consumption) analysis;
- An analysis of air quality related values (AQRV) to ensure the protection of visibility of federal Class I wilderness areas within 100 km of the proposed project;
- An evaluation of potential impacts on soils and vegetation of commercial and recreational value; and
- An evaluation of potential growth-inducing impacts.

However, for the PEC, these additional PSD requirements will not apply because the new PEC Facility, with simple cycle turbines will not be one of 28 named source categories that trigger PSD review when annual emissions exceed 100 tons per year, and will not have a potential to emit more than 250 tons per year of any pollutant. Accordingly, the project will not be a Major Source as defined in the PSD rules and will not be required a separate PSD permit from EPA Region IX.

SECTION 4 MODELS PROPOSED AND MODELING TECHNIQUES

This section describes the dispersion models and modeling techniques to be used in performing the air quality analysis for the PEC. The objectives of the modeling are to demonstrate that air emissions from the PEC will not cause or contribute to a PSD increment exceedance or an ambient air quality standard violation, and will not cause a significant health risk.

In November, 2005, the USEPA officially recognized the American Meteorological Society/ Environmental Protection Agency Regulatory Model (AERMOD) as the preferred dispersion model for regulatory applications, replacing the Industrial Source Complex Short Term 3 (ISCST3) model. USEPA allowed a one-year "grace period" commencing November 9, 2005 during which the use of either model is acceptable, depending on the preference of the local air quality jurisdiction. When contacted on this point, the SJVUAPCD suggested that one or the other model be proposed with justification provided for the selection. Originally AERMOD was selected for use in this analysis since this is consistent with USEPA policy and the data needed to support its application are available in Fresno County. However, we have recently become aware of a problem with the model for this particular application that has caused us to question the wisdom of using it for PEC permit modeling.

USEPA has posted a notice on the Support Center for Regulatory Air Modeling website to warn that AERMOD may under predict maximum concentrations in receptor areas with gently downward sloping terrain. This is precisely the situation on the north, east, and northwest side of the PEC site.

Given this problem, we have decided to do the PEC permit modeling with the ISCST3 model until the problems with AERMOD can be resolved. The SJVUAPCD modeler, Leland Villalvazo, confirmed the appropriateness of ISCST3 for this application in a telephone conversation with URS on May 11, 2006 (SJVUAPCD, 2006).

4.1 SCREENING MODELING

The four gas turbines will be by far the most important sources of air pollutants for the operational PEC project. An initial screening analysis will be conducted to identify which operating mode for the proposed gas turbines will result in worst-case ambient air impacts. As explained in the previous section, the most recent version of the USEPA ISCST3 model will be used to model worst-case conditions for each of three operating modes across the load range (100, 75, or 50 percent) for each of three different ambient temperature conditions, spanning the approximate range of temperatures in the project area. A unit emission rate of 1.0 gram per second (g/s) will be modeled for both flat and elevated terrain and potential building downwash will be simulated using the dimensions and locations of buildings and other structures on the project site. Concentrations for each pollutant, expressed in units of micrograms per cubic meter ($\mu g/m^3$), will be obtained by multiplying the unit concentration (χ/Q) from the ISCST3 model results (expressed in $\mu g/m^3$ per g/s) by the emission rate calculated for each pollutant (expressed in g/s) for each operating mode. This is a streamlined process, because it allows ISCST3 to be executed only once for all pollutants for each operating mode instead of having to execute the model iteratively for all pollutants and operating modes. The operating mode that yields the highest concentrations for each averaging time pertaining to the National and California AAQS will be considered the worst-case gas turbine operating mode for that averaging time. The worst-case operating mode will be used in all modeling analyses,

screening or refined, for all short-term averaging periods throughout the modeling analysis for determining the area of impact (AOI) and impacts on any NAAQS or CAAQS. As discussed in the following section, refined modeling will be used to determine the worst case annual impacts. Screening modeling will not be used to eliminate pollutants from the refined modeling analysis.

4.2 REFINED MODELING

The purpose of the refined modeling analysis is to demonstrate that air emissions from the PEC will not cause or contribute to an AAQS violation; and will not cause a significant health risk impact. The most recent version (01228) of the ISCST3 model will be used for the refined modeling. The regulatory default option will be selected. The short-term model version will be used for modeling concentrations of pollutants having short-term (e.g., one to 24 hour) ambient standards. Modeling for pollutants having both short-term and annual standards (i.e., PM_{10} and NO_2), will be conducted using ISCST3 with the PERIOD option to predict impacts on the annual standard. Specific modeling techniques for PSD, AAQS, and HRA analyses are discussed below.

The AFC application for the PEC project will include an analysis of the land use adjacent to the project. This analysis will be conducted in accordance with Section 8.2.8 of the Guideline on Air Quality Models (EPA-450/2-78-027R and Auer [1978]).

Based on the Auer land use procedure, more than 90 percent of the area within a 10 km radius of the PEC could be classified as rural. Since the Auer classification scheme requires more than the 50 percent of the area within the 10 km radius around a source to be non-rural for an urban classification, the rural mode will be used in the ISCST3 modeling analyses.

The following ISCST3 regulatory default settings will also be used:

- Wind profile exponents of 0.7, 0.7, 0.10, 0.15, 0.35, and 0.35;
- Final plume rise;
- Stack tip downwash effects included; and
- Buoyancy-induced dispersion option used.

4.2.1 Area of Impact Analysis

Initially, the incremental ground-level concentrations caused by the project will be compared with ambient air quality impact significance levels defined by USEPA (Table 4-1). If maximum off-property pollutant concentrations for each pollutant are below these levels, then the project will not cause significant air quality impacts, and no further modeling will be performed.

If the predicted ambient concentrations for the project are above ambient air quality impact significance levels, an area of impact (AOI) will be defined for each pollutant and averaging period for which significance levels are exceeded. The receptor locations and time periods for which the project is predicted to cause a significant impact constitute *significant events*. The AOI is the area having a radius equal to the distance to the significant event located farthest from the project. The largest radius for each

pollutant, regardless of averaging period, will be used to define the AOI for the remainder of the analysis. For example, CO has both 1-hour and 8-hour averaging periods; therefore, the short-term AOI would be defined as the area having a radius equal to the distance from the project to either the 1-hour or 8-hour significant event, whichever is longer.

4.2.2 PSD Increment Analysis

As stated earlier in this protocol, a PSD increment analysis will not be required because the PEC will not be a major source. However, the monitoring exemption thresholds from the PSD regulations will be included in the analysis as justification for using agency-collected local ambient air quality monitoring data as background levels for the AAQS analysis discussed in the following section. Also, the criteria pollutant impacts from the PEC will be compared with the PSD significant impact levels (SILs) as well as the visibility *de minimis* thresholds as outlined in the *Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report,* (December 2000) document.

Table 4-1
Relevant Ambient Air Quality Standards and Significance Levels

Pollutant	Averaging Time	CAAQS (a,c)	NAAQS (b,c)	Ambient Impact Significance Levels (μg/m3)	PSD Significant Emission Rates (TPY)	Significant Monitoring Concentrations	PSD Increments (μg/m3)	
							Class I	Class II
CO	8-hour	9.0 ppm (10,000 μg/m^3)	9.0 ppm (10,000 μg/m^3)	500	100	575 μg/m^3	N/A	N/A
	1-hour	20 ppm (23,000 μg/m^3)	35 ppm (40,000 μg/m^3)	2,000		N/A		
NO_2[d]	Annual		0.053 ppm (100 μg/m^3)	1	100	14 μg/m^3	2.5	25
	1-hour	0.25 ppm (470 μg/m^3)				N/A	N/A	N/A
SO_2	Annual		0.03 ppm (80 μg/m^3)	1	100	N/A	2	20
	24-hour	0.04 ppm[e] (105 μg/m^3)	0.14 ppm (365 μg/m^3)	5		13 μg/m^3	5	91
	3-hour		0.5 ppm (1,300 μg/m^3)	25		N/A	25	512
	1-hour	0.25 ppm (655 μg/m^3)				N/A	N/A	N/A
PM_{10}	Annual	20 μg/m^3	50 μg/m^3	1	100	N/A	4	17
	24-hour	50 μg/m^3	150 μg/m^3	5		10 μg/m^3	8	30
$PM_{2.5}$	Annual	12 μg/m^3	15 μg/m^3			N/A	N/A	N/A
	24-hour		65 μg/m^3			N/A	N/A	N/A
O_3	8-hour	0.07 ppm (137 μg/m^3)	0.08 ppm (157 μg/m^3)	See footnote[f]	100 (of VOCs)	N/A	N/A	N/A
	1-hour	0.09 ppm (180 μg/m^3)	See footnote[g]			N/A	N/A	N/A

a. California standards for ozone (as volatile organic compounds, carbon monoxide, sulfur dioxide (1-hour), nitrogen dioxide, and PM_{10}, are values that are not to be exceeded. The visibility standard is not to be equaled or exceeded.
b. National standards, other than those for ozone and based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.
c. Concentrations are expressed first in units in which they were promulgated. Equivalent units are given in parentheses and based on a reference temperature of 25° C and a reference pressure of 760 mm of mercury. All measurements of air quality area to be corrected to a reference temperature of 25° C and a reference pressure of 760 mm of mercury (1,013.2 millibar).
d. Nitrogen dioxide (NO_2) is the compound regulated as a criteria pollutant; however, emissions are usually based on the sum of all oxides of nitrogen (NO_x).
e. The ambient impact significance level for 1-hour average NO_2 is an ICAPCD level only.
f. At locations where the state standards for ozone and/or PM_{10} are violated. National standards apply elsewhere.
g. Modeling is required for any net increase of 100 tons per year or more of VOCs subject to PSD.
h. New federal 8-hour ozone and fine particulate matter ($PM_{2.5}$) standards were promulgated by U.S. EPA on July 18, 1997. The federal 1-hour ozone standard was revoked by U.S. EPA on June 15, 2005.

Blanks = Not applicable
CAAQS = California Ambient Air Quality Standard
mm = millimeters
NAAQS = National Ambient Air Quality Standard
Ppm = parts per million by volume, or micromoles of pollutant per mole of gas
TPY = ton per year
μg/m^3 = micrograms per cubic meter

4.2.3 Ambient Air Quality Standard Analysis

The purpose of the ambient air quality standard analysis is to determine whether the PEC will cause or contribute to an AAQS violation. The project will not be considered to cause or contribute to an AAQS violation unless impacts from the project itself combined with the background concentration exceed the AAQS, or the project has a significant impact at the same location and time as a predicted AAQS violation. The following approach is proposed for performing the AAQS analysis:

1. The receptor grid and spacing described in Section 4.5 will be used for the AAQS analysis.
2. Short-term and annual AAQS modeling will be performed using ISCST3. Annual AAQS modeling will be performed using ISCST3 with the PERIOD option. Both short-term and annual analyses will be run using sequential hourly meteorological data for five years. For short-term standards, one exceedance is allowed per year; the second is a violation. Therefore, the maximum impact (i.e., high first high [H1H]) can exceed a short-term standard; however, a high second high (H2H) concentration must be below the standard or a violation exists and further analysis is required. Maximum impact equals modeled impact plus background. For PEC modeling, the H1H will be used.

   For CO modeling, the PLOTFILE output option in ISCST3 will be invoked to save any H1H events that, when added to background, exceed the AAQS. If 1-hour and 8-hour concentrations do not exceed the AAQS, then compliance is demonstrated and no further modeling is necessary for CO.

   For NO_2 modeling, the PLOTFILE output option in ISCST3 will be invoked to save any H1H events that exceed the AAQS (minus background). Initially, the modeling will assume full conversion of NO_x to NO_2. Should it be required, NO_2 estimates will be reduced using the USEPA ozone limiting method (OLM) (for either hourly or annual impacts). If 1-hour and annual concentrations do not exceed the applicable AAQS, then compliance is demonstrated and no further modeling is necessary for NO_2.

   For SO_2 modeling, the PLOTFILE output option in ISCST3 will be invoked to save any H1H events that, when added to background exceed the AAQS. If 3-hour and 24-hour concentrations do not exceed the AAQS, then compliance is demonstrated and no further modeling is necessary for SO_2.

   For PM_{10} modeling, the MULTYEAR processing option will not be invoked in order to determine the 24-hour, highest sixth high (H6H) concentration at each receptor over the five years modeled for comparison, when added to background, to the 24-hour AAQS. Instead the maximum of the five one-year average PM_{10} concentrations will be reported. If concentrations do not exceed the AAQS (minus background), then compliance is demonstrated and no further modeling is necessary for PM_{10}.
3. The events exceeding the AAQS will be rerun to determine if the project has a significant event during a predicted CAAQS or NAAQS exceedance event. The ISCST3 model will be used to analyze short-term events and annual events. If the project does not have a significant impact during these exceedance events, then AAQS compliance is demonstrated and no further modeling is necessary.

4. If the project has a significant event during an AAQS exceedance event, then the subject receptor locations will be analyzed to determine if they reside within another facility's boundary. The corresponding facility's contribution to the maximum concentration at that receptor will be determined and subtracted from the concentration modeled at that receptor. If the revised total predicted impact at the receptor is below the AAQS, then compliance is demonstrated and no further analysis is necessary.
5. For any remaining events, a culpability analysis using ISCST3 will be performed to determine which sources contribute the greatest impact. These sources may then be updated by contacting the facility owning the source or applicable regulatory agency and verifying the source's input parameters. For any culpable project sources, the modeling inventory, including source locations and stack parameters used to estimate emissions, will be reviewed to ensure they are reasonable. Adjustments will be made as appropriate.
6. An ISCST3 run will be performed using the revised inventory in (5) above to determine if the AAQS exceedance still exists. If no AAQS exceedance exists, then AAQS compliance is demonstrated and no further modeling is necessary.

4.2.4 Health Risk Assessment Analysis

The CEC and SJVUAPCD require a health risk assessment to evaluate the impacts of TAC emissions from the operation of the project. Contaminants with potential carcinogenic effects or chronic or acute non-carcinogenic effects will be included. This health risk assessment will be performed following the Office of Environmental Health Hazard Assessment (OEHHA), *Air Toxics Hot Spots Program Risk Assessment Guidelines* (OEHHA, 2003). As recommended by the OEHHA guidelines, the California Air Resources Board (CARB) Hotspots Analysis and Reporting Program (HARP) (CARB, 2005) will be used to perform a refined health risk assessment for the project. HARP includes two modules: a dispersion module and a risk module. The HARP dispersion module incorporates the USEPA ISCST3 air dispersion model, and the HARP risk module implements the latest Risk Assessment Guidelines developed by OEHHA.

First, ground-level impacts from the PEC will be estimated using ISCST3 atmospheric dispersion model. The HARP modeling analysis will be consistent with, and use similar source parameters as the modeling approach discussed above for the AAQS analyses using ISCST3. Based on the impacts modeled using ISCST3 (the dispersion model incorporated by HARP), the HARP model will be used to estimate health risk. The year(s) of meteorological data resulting in the highest 1-hour and annual impacts as determined above will be used and receptors will be placed at 25 meter spacing around the PEC facility fence line and 500 meter spacing outside of the fence out to 10 km. All receptors that HARP creates that are inside the fence will be excluded. HARP will also include the census receptors out to 10 km, and additional receptors will be placed at all sensitive locations (e.g., schools, hospitals, etc.) out to 1 mile from the facility boundary. The HRA will be performed using the HARP model according to the following steps:

1. Define the location of the MEI (i.e., the location where the highest carcinogenic risk may occur);
2. Define the locations of the maximum chronic non-carcinogenic adverse health effects and the maximum acute adverse health effects; and

3. Calculate concentrations and adverse health effects at locations of maximum impact for each pollutant.

The HARP model will be performed for the inhalation pathway for diesel particulate and for all applicable uptake pathways for all other TACs. A discussion of the surrounding land use, sensitive receptors and local meteorology will be provided in the AFC.

4.2.5 Air Quality Related Values and Visibility Analysis

A PSD analysis of AQRV will not be required because the PEC Project will not be a major source. However, an Authority to Construct (ATC) permit shall address the potential to impact air quality (including visibility) of any federal Class 1 area. A screening level modeling analysis will be conducted to evaluate these impacts at the only Class I area located within 100 km from the proposed project site, i.e., Pinnacles National Monument (PNM), the closest part of which is about 52 kilometers west-southwest from PEC. This analysis will be conducted using the screening version of the CALPUFF model and the same meteorological input data used for the AAQS modeling analysis.

4.3 MODELING EMISSIONS INVENTORY

4.3.1 Project Sources

Operational Emissions. The combustion turbine-generators will be the dominant emissions source for the operational project. Table 4-2 summarizes preliminary annual (combined) emission estimates for the four turbines. These estimates are based on the assumption of 5,000 operating hours and 150 startup/shutdown cycles per turbine per year, which will be the operating limits requested in the AFC. Two other small sources that will contribute small emissions that have not yet been quantified include a diesel firewater pump engine driver (periodic testing only) and a 5-cell mechanical draft cooling tower (PM_{10} only). Emissions from these sources will not increase the values shown in Table 4-2 by more than about 1%. Conceptual plant design includes SCR for NO_x and oxidation catalysts for CO that will match recent BACT determinations for similar projects. Emissions of SO_2 and PM_{10} will be low, owing to the exclusive use of interstate pipeline quality natural gas as fuel for the gas turbines.

Table 4-2
Preliminary Estimated Emissions for PEC Combustion Turbine Generators
(tpy)

NO_x	CO	SO_2	VOC	PM_{10}	Pb
85.6	133.3	12.5	27.0	110.6	<0.6

Combustion turbine generator emissions will vary with ambient temperature and turbine load. Initial screening modeling will be conducted for a range of ambient temperatures (from low ambient temperature to high ambient temperature) and a range of turbine operating loads (50, 75, and 100 percent). All combinations will be modeled to identify worst-case operating scenarios for each averaging period (i.e., 1-hour, 3-hour, 8-hour, 24-hour, and annual). Startup and shutdown scenarios will be addressed, in addition to the normal operations, as will a small number of hours of turbine operations for maintenance

activities without the SCR and CO catalyst, as well as commissioning emissions that will occur before the PEC becomes operational. The modeling emission inventory for the proposed facility will include the maximum emission rate for each source for each appropriate averaging time. The modeling analyses conducted for the AFC, DOC, and ATC permit applications will be based on the refined emissions estimates. Where applicable, emissions estimates will be provided in both stack gas concentration units (parts per million by volume or ppmv) and mass emission units (pounds per hour).

The new cooling tower will incorporate a state of the art drift eliminator system which will reduce particulate emission limits from this source to a low level. The PM_{10} emission rate used in the modeling analysis for this source will incorporate this control measure.

Construction Emissions. Temporary construction emissions will result from heavy equipment exhaust (primarily NO_x emissions and diesel particulate emissions) and fugitive dust (PM_{10}) from earthmoving activities and vehicle traffic on paved and unpaved surfaces. However, construction emission impacts are expected to be small relative to the operations emissions. For the PEC, the fugitive PM_{10} emissions from construction will be initially estimated using a spreadsheet, taking into account the effects of implementing planned mitigation measures for controlling fugitive dust and equipment exhaust emissions during construction. The air quality impacts of the heavy equipment exhaust and fugitive dust emissions will then be modeled using ISCST3. The construction site, parking area, and lay-down area will be modeled as volume sources. To the extent possible, construction equipment inventories will be reviewed to characterize a worst-case month for construction activities and fugitive dust emissions. Low sulfur diesel fuel will be utilized in any emission calculations for construction equipment used at the PEC site.

TAC Emissions. Air toxics, or TAC, will also be emitted from the PEC project due to combustion of natural gas and diesel fuels. These emissions have not been estimated at this time; however, because only natural gas will be used as fuel for the CTGs, only small quantities of TAC, including benzene, formaldehyde, and polycyclic aromatic hydrocarbons will be emitted. Emissions estimates for TAC will be based on CATEF emission factors and/or speciation profiles (for PM_{10} and ROC) available from CARB and/or vendor data, if available.

4.3.2 Contemporaneous Sources

The PEC Facility will be a new power generation project source and there are no other emission sources at the project site to be considered for the project air quality modeling analyses.

4.3.3 Cumulative Impact Analysis Using Off-Property Sources

SJVUAPCD will be requested to provide a list of all existing and planned sources located within six miles of the existing PEC. This list will be forwarded onto CEC for review. Based on this information, and consultation with CEC and SJVUAPCD, additional nearby sources may be included in a cumulative modeling analysis. It is anticipated that this cumulative analysis will need to include the existing CalPeak and Wellhead Energy peaker plants located opposite the PG&E substation from the PEC site.

4.4 BUILDING WAKE EFFECTS

The effect of building wakes (i.e., downwash) upon the stack plumes of emission sources at the PEC will be evaluated in accordance with USEPA guidance (USEPA, 1985). Direction-specific building data will be generated for stacks below good engineering practice (GEP) stack height using the most recent version of USEPA Building Parameter Input Program – Prime (BPIP-Prime). Appropriate information will be provided in the AFC and other permit applications that describe the input assumptions and output results from the BPIP-Prime model. The ISCST3 model considers direction-specific downwash using both the Huber Snyder and Schulman-Scire algorithms as evaluated in the BPIP-Prime program.

4.5 RECEPTOR GRID

The receptor grids that will be used in the ISCST3 modeling analyses described in this protocol will be as follows:

- 25-meter spacing along the property line and extending from the property line out to 1,000 meters beyond the property line;
- 100-meter spacing from 1 km to 5 km of project sources; and
- 250-meter spacing within 5 km to 10 km of project sources.
- Additional discrete receptors at sensitive receptor locations within these modeling grids.

If a maximum predicted concentration value is located in the 100-m or 250-m grid, a dense receptor grid will be placed around the maximum concentration point and the model will be rerun using additional receptors with a 25-m spacing and extending 500 meters in all directions from the point of initial point maximum concentration.

For the HRA modeling, receptors will be placed at 25 meter spacing around the fence line and 500 meter spacing outside of the fence out to 10 km. All receptors that HARP creates that are inside the fence will be excluded. HARP will also include census receptors out to 10 km. These census receptors will include the populated locations in and around the proposed PEC location. Receptors will also be placed at all sensitive locations (e.g., schools, hospitals, etc.) out to a distance of 1 mile.

A detailed project map and a 7 ½- minute U.S Geological Survey (USGS) map will be provided in the AFC. Actual Universal Transverse Mercator (UTM) coordinates will be used. The CAAQS and NAAQS apply to all locations offsite of the applicant's facility, i.e. where public access is not under the control of the applicant. The CAAQS and NAAQS are not evaluated on the property controlled by the applicant. In other words, the air within a facility's property is not considered ambient air relative to that facility's emissions.

4.6 METEOROLOGICAL AND AIR QUALITY DATA

4.6.1 Meteorological Data

Meteorological data suitable for direct input to ISCST3 were obtained from the SJVUAPCD for the Fresno Yosemite International Airport meteorological station which is located in the City of Fresno

approximately 48 miles east of the PEC site. The five years of meteorological data to be used in modeling analysis were obtained from the SJVUAPCD website and include hourly surface data from 1987 through 1991 and concurrent upper air sounding data from Oakland, California. In this data set missing data have been replaced by SJVUAPCD following USEPA approved data substitution techniques.

The meteorological data recorded at Fresno Yosemite International Airport are acceptable for use at PEC for two reasons: proximity and terrain similarity. The terrain immediately surrounding the Project site can be categorized as flat, or gradually sloping irrigated farm lands, with very little inhabited lands. The terrain around the Fresno Yosemite International Airport is also relatively flat and the area outside the urban area is flat irrigated farm lands. Thus the land use and the far field significant terrain features are similar. Additionally, there are no significant terrain features separating the Fresno County/Yosemite Airport from the PEC site that would cause differences in wind or temperature conditions in these respective areas. Therefore the 5 years of meteorological data selected from the Fresno County/Yosemite Airport were determined to be representative for purposes of evaluating the Project's air quality impacts. The Fresno County Airport is the closest full-time meteorological recording station to the PEC site, and thus meteorological conditions at the sites will be very similar.

The meteorological data used in this analysis were determined to be reasonably representative of conditions at the Project site by the modeling staff of the San Joaquin Valley Unified Air Pollution Control District who recommended this data set to the project team (SJVUAPCD, 2006) The Oakland upper air data monitoring stations is located approximately 110 miles northwest of PEC. This is the closest National Weather Service upper air station and is considered by SJVUAPCD to be the most representative data available for use in modeling analyses for sources throughout central and northern California.

Wind roses for each season of each year are provided as Attachment A to this protocol document.

4.6.2 Air Quality Monitoring Data

Available SJVUAPCD/CARB air quality data from 2001 through 2005 will be used to determine baseline air pollutant concentrations. Data from Fresno First Street and Fresno Fremont School monitoring stations will be evaluated as potentially representative of the proposed project site conditions.

The Fresno First Street monitoring station records lead, CO, NO_2, PM_{10}, $PM_{2.5}$, and O_3. The Fresno First Street monitoring station is located approximately 46 miles to the east of PEC. The Fresno First Street station is the closest station that monitors all the criteria pollutants, except SO_2. The Fresno – Fremont School station is the closest station that monitors ambient SO_2. To the extent that monitoring data from the Fresno stations have been used here to characterize conditions at the Project Site, this practice would almost certainly overestimate pollutant levels at the PEC site because of the much lower population density and level of development of the PEC area compared with the locations of these urban monitoring stations.

The modeled maximum incremental impacts from the proposed PEC site for all pollutants emitted in significant amounts will be compared with the corresponding PSD *de minimis* monitoring exemption levels. If the modeled maximum impacts exceed the *de minimis* monitoring exemption levels for a pollutant or pollutants, the AFC will include an analysis supporting the representativeness and use of the

data from the selected air monitoring station in lieu of the need for pre-construction monitoring for that pollutant. The data collected at the air monitoring stations identified in the protocol will be used to represent the background air quality when performing the AAQS analyses. The AFC will include an analysis supporting the representativeness and use of the data from the air monitoring station for AAQS evaluations. The most recent five years of air quality monitoring data will be provided (2001-2005) to ensure that recent air quality trends in the Fresno area are captured in the baseline data. The highest reported concentration that has occurred within the last five years will be used for each pollutant and averaging time corresponding to the AAQS.

These data will be added to the modeled maximum impacts from the facility for each pollutant and averaging time, and the totals will then be compared with the applicable AAQS. This is a conservative approach because it assumes that the highest recorded value and the modeled maximum impact both occur at the same time and at the same location.

SECTION 5 PRESENTATION OF MODELING RESULTS

5.1 AREA OF IMPACT

Results of the AOI analysis will be presented in a summary table. The H1H concentration will be reported for all averaging periods for all years modeled. For years that exceed *de minimis* concentrations, a figure depicting the AOI will be generated. This figure will show the locations of all receptors that exceeded the *de minimis* concentrations. The location and value of the maximum-modeled concentration will also be presented.

5.2 NAAQS AND CAAQS ANALYSIS

The AAQS analyses for the PEC will be presented in a summary table. A figure indicating the locations of the maximum predicted pollutant concentrations will be provided. For CO, NO_2, and SO_2, the H1H short-term and highest annual concentrations will be reported. For PM_{10}, the H1H 24-hour concentration for each of the five years modeled will be presented. Background concentrations will be added to yield the total concentration, which will be compared with the NAAQS and CAAQS.

5.3 HEALTH RISK ASSESSMENT ANALYSIS

Maps at a scale of 1:24,000 will depict the following data in the AFC Air Quality and Public Health sections for the PEC:

- Elevated terrain within a 10-km radius of the project;
- Distribution of population via census data with 10-km radius of the project and sensitive receptors, including schools, pre-schools, etc., within a 1-mile radius of the project;
- Current and future residential land uses;
- Locations of proposed new or modified transmission lines;
- Isopleths of any areas where predicted exposures to air toxics result in estimated chronic non-cancer impacts and acute impacts equal to or exceeding a hazard index of 1.0; and
- Isopleths of any areas where exposures to air toxics lead to an estimated carcinogenic risk equal to or exceeding one in one million.

Health risk assessment modeling results will be summarized to include maximum annual (chronic both carcinogenic and non-carcinogenic) and hourly (acute) adverse health effects from toxic air contaminant emissions. Health risk values will be calculated and presented in the summary table for the points of maximum impact and the sensitive receptors with the maximum risk values.

5.4 DATA SUBMITTAL

Electronic copies of the modeling input and output files will be provided to SJVUAPCD and the CEC.

SECTION 6 REFERENCES

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SEASONAL WIND ROSES BASED ON MEASUREMENTS AT THE FRESNO YOSEMITE INTERNATIONAL AIPORT (1987-1991)

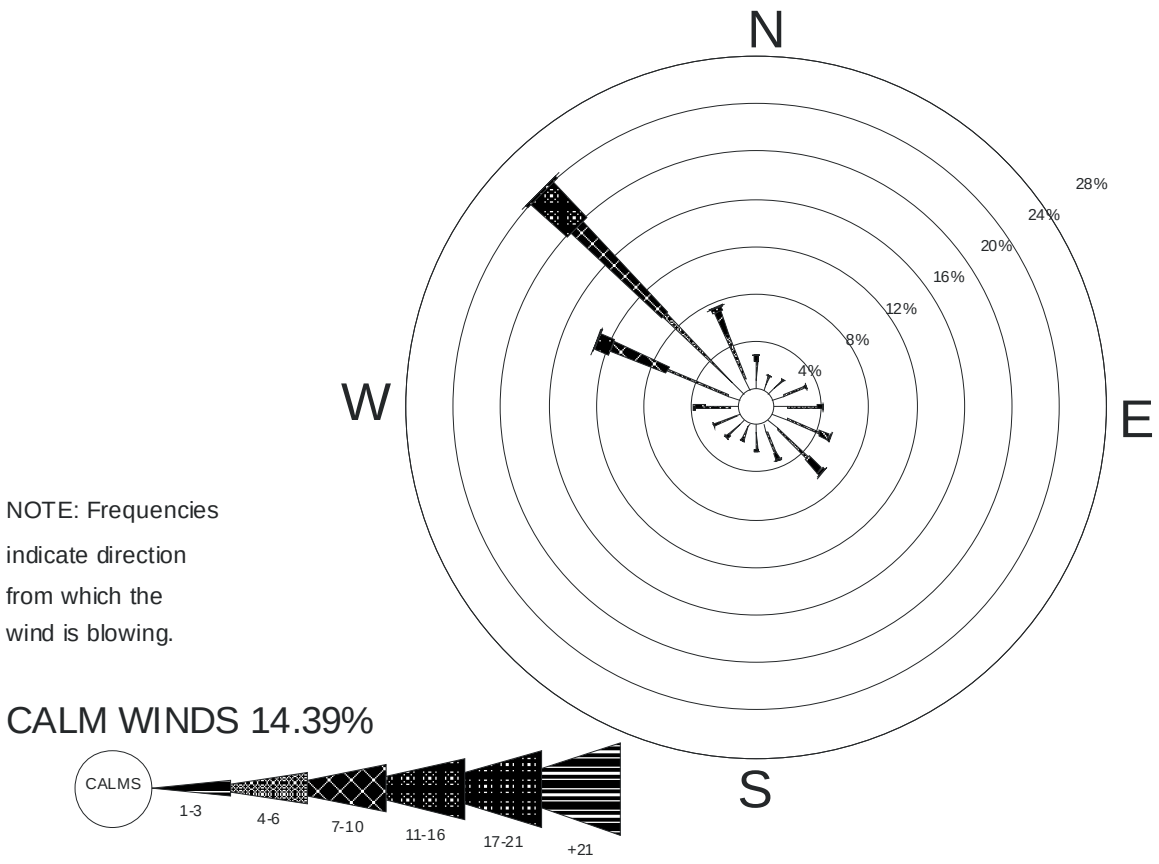

Figure A-1 Windrose from Fresno 1987-1991 for All Months

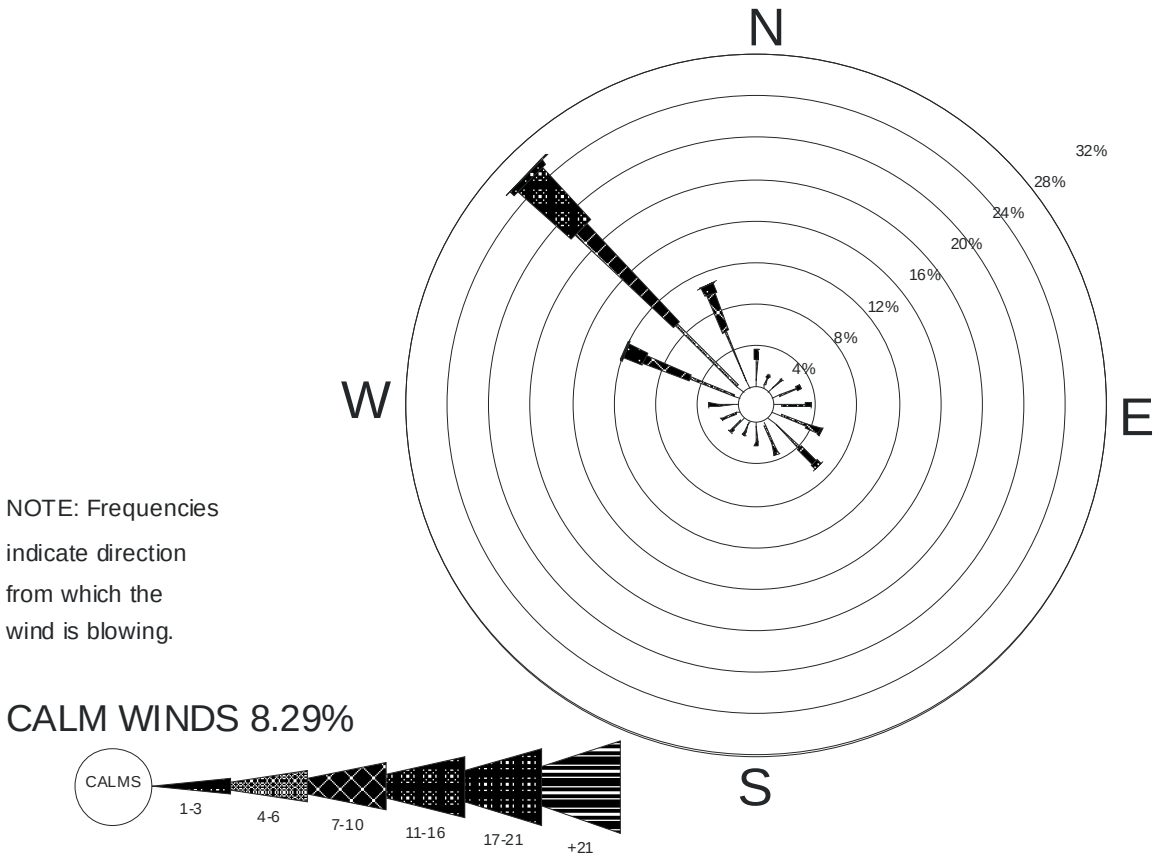

Figure A-2 Windrose from Fresno 1987-1991 for Spring

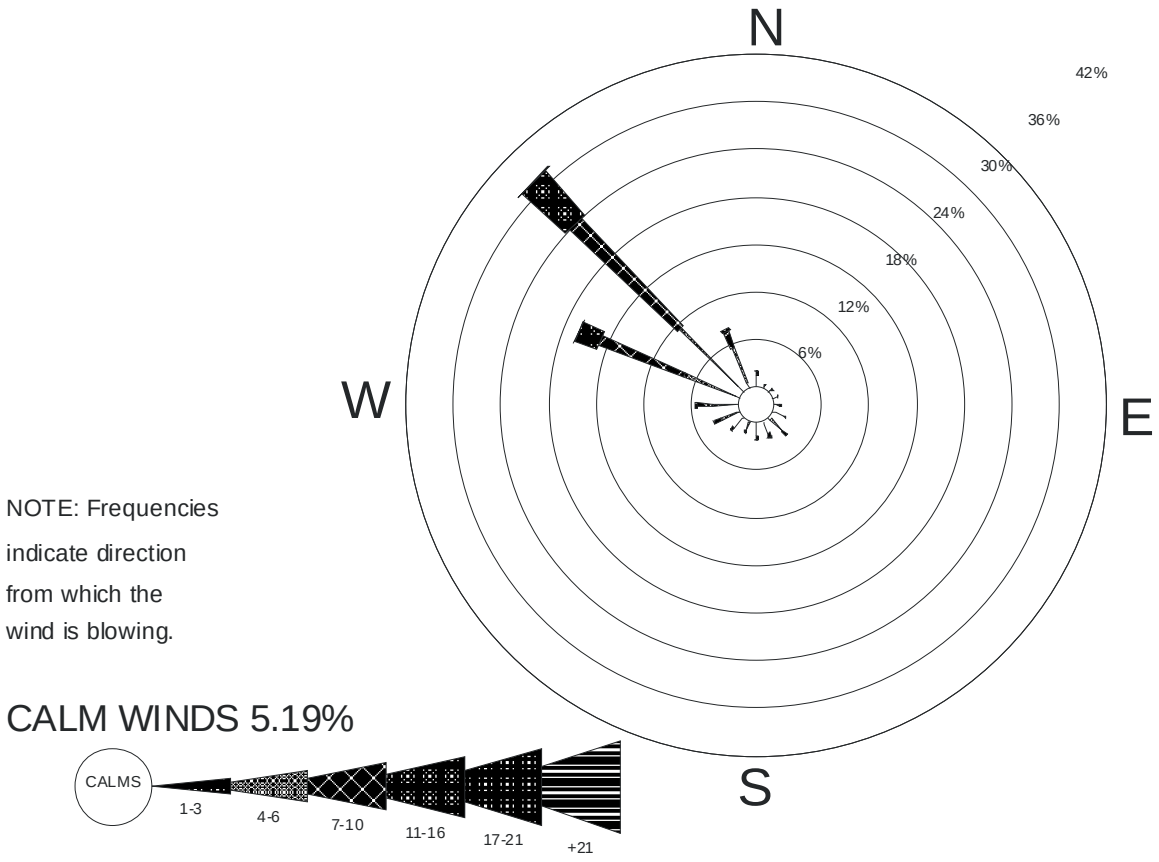

Figure A-3 Windrose from Fresno 1987-1991 for Summer

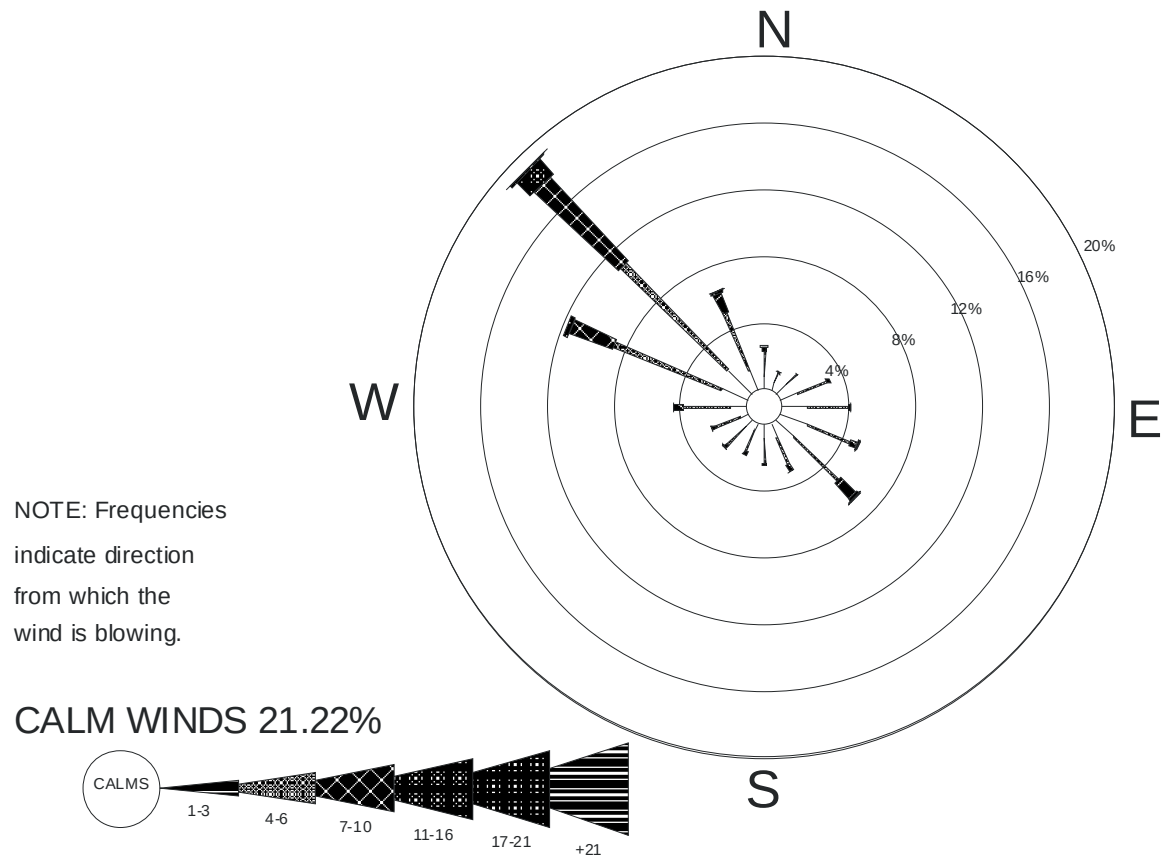

Figure A-4 Windrose from Fresno 1987-1991 for Autumn

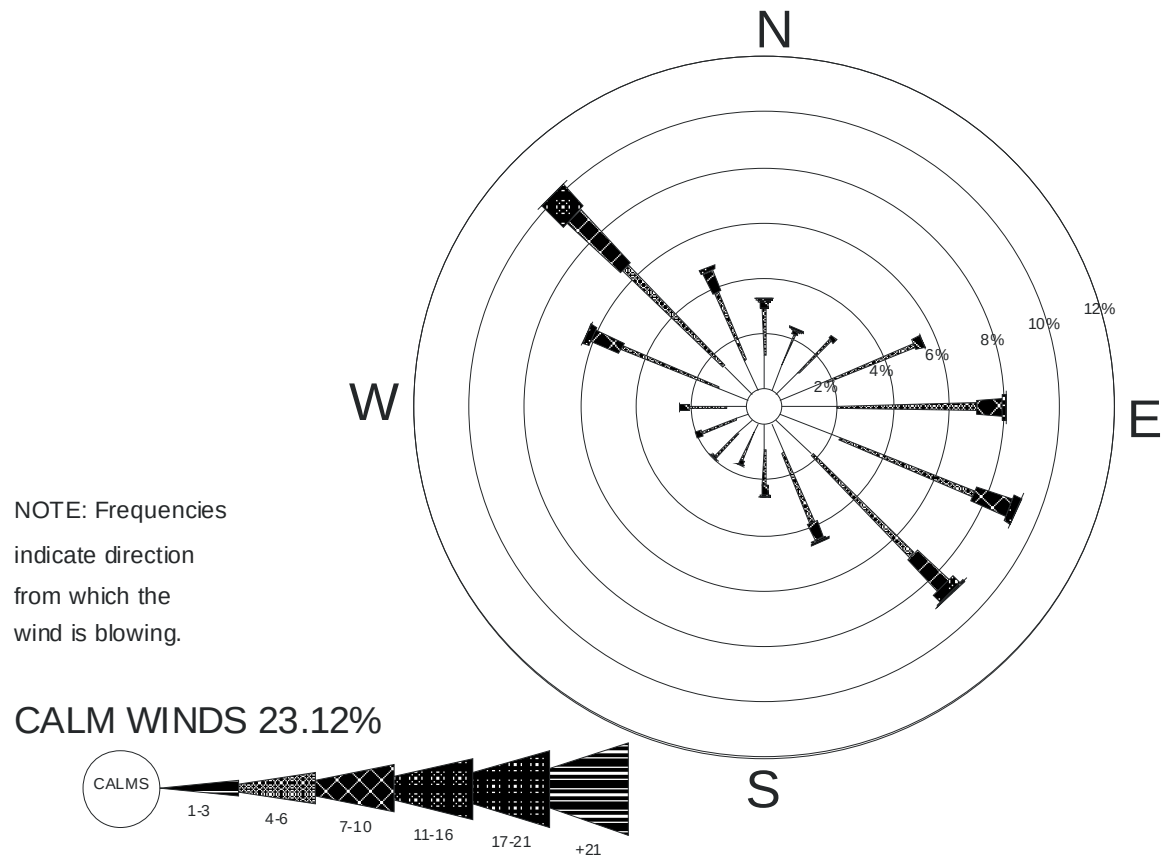

Figure A-5 Windrose from Fresno 1987-1991 for Winter

APPENDIX I, ATTACHMENT E
BACT ANALYSIS

A BACT assessment was conducted for the proposed Panoche Energy Center (PEC) which considered all NO_x and CO control technologies currently proposed or in use on natural gas-fired combustion turbines with more than 50 MMBtu per hour fuel energy input. To identify feasible emission limits for comparable turbine units, several information sources were consulted, including the following:

- USEPA RACT/BACT/LAER Clearinghouse (USEPA 1985) and updates
- CARB BACT Clearinghouse database and CARB BACT Guidelines for Power Plants (Adopted 7/22/99)
- Recent California Energy Commission (CEC) Applications for Certification

Table 1, Summary of Recent NO_x BACT Determinations for Combustion Turbine Generators Rated at Greater than 40 MW in Peaking Service, lists selected recent NO_x BACT proposals and determinations for natural gas-fired advanced technology combustion turbines in California. Nearly all recent simple-cycle turbine projects in California had a NO_x BACT level of 2.5 ppm dry volume (ppmvd) (at 15 percent oxygen [O_2]), to be achieved by means of dry low-NO_x burners and SCR with ammonia injection. However, in some cases, SCR in conjunction with water or steam injection has been selected. The combustion turbines of the PEC will achieve the BACT concentration of 2.5 ppmvd at 15 percent O_2 using steam or water injection, rather than dry low-NO_x combustor technology, and SCR, except during maintenance, startup, and shutdown events.

TABLE 1
SUMMARY OF RECENT NO_X BACT DETERMINATIONS FOR COMBUSTION TURBINE GENERATORS RATED AT GREATER THAN 40 MW IN PEAKING SERVICE

Name	Location	Rating	Vendor, Model	Emission Limit	Control(s)	Permit Date
Kings River Conservation District Peaking Plant	CA	40+ each, 2 turbines, 97 MW total	GE LM6000 Sprint PC	3.0 ppm	Water injection and SCR	5/04
Modesto Electric Generation Project	CA	40+ each, 2 turbines, 95 MW total	GE LM6000 Sprint	2.5 ppm	Water injection and SCR	2/04
Riverside Energy Resource Center	CA	40+ each, 2 turbines, 96 MW total	GE LM6000 Sprint PC NxGen	2.5 ppm	Water injection and SCR	12/04
San Francisco Electric Reliability Project	CA	40+ each, 3 turbines, 145 MW total	GE LM6000	2.5 ppm	Water injection and SCR	Tentative 4/06

DLE = Dry low emissions combustor
GE = General Electric
MW = megawatt
ppm = Parts per million by volume, dry basis, at 15 percent oxygen
SCR = Selective catalytic reduction

Similarly, most recent simple-cycle turbine projects have been approved with a CO emissions limit of 6 ppmvd and a VOC emissions limit of 2 ppmvd (both at 15 percent O_2), based on the use of an oxidation catalyst. The PEC natural gas turbines will achieve these same BACT concentrations for CO and VOC by application of oxidation catalysts. Exclusive use of natural gas fuel has been determined to be BACT for SO_x and PM_{10} in all other comparable projects for several years.

ASSESSMENT OF NO_X CONTROL TECHNOLOGIES

Based on a review of the materials described above, the following NO_x control technologies were evaluated to determine whether they are able to achieve BACT NO_x levels in practice:

- DLE and Goal Line SCONOx™
- DLE and SCR with ammonia injection

SCONOx™

SCONOx™ is a NO_x reduction system produced by Goal Line Environmental Technologies (now distributed by EmeraChem) for natural gas turbine applications within an exhaust temperature range significantly below the design operating parameters of the simple-cycle LM6000 turbines that will be employed at Niland. This system uses a coated catalyst to oxidize both NO_x and CO and thereby reduce plant emissions. As demonstrated by an initial installation on several gas turbines in co-generation applications, SCONOx™ is capable of achieving NO_x emission concentrations of 2 ppm based on a maximum inlet concentration of 25 ppm, and 90 percent CO reduction based on a maximum inlet concentration of 50 ppm. CO emissions are reduced in SCONOx™ by the oxidation of CO to CO_2. A two-step process reduces NO_x emissions. First, NO_x emissions are oxidized to NO_2 and then adsorbed onto the catalyst. In the second step, a proprietary regenerative natural gas is passed through the catalyst periodically. This natural gas de-desorbs the NO_2 from the catalyst and reduces it to N_2. The system does not use ammonia as a reagent; rather, it uses natural gas as the basis for a proprietary catalyst regeneration process.

However, the SCONOx™ technology has not been sufficiently demonstrated on higher exhaust temperature simple-cycle peaking natural gas turbines such as those proposed for the Project. The system consists of a catalyst that is installed in the flue gas at a point where the temperature is between 280°F and 650°F. The PEC CTGs operate between 741 to 817 °F; therefore, the SCONOx™ application is not appropriate for this high temperature technology.

Potential advantages of the SCONOx™ process include:

- **No Ammonia.** The SCONOx™ process does not use ammonia. This eliminates any ammonia storage and transportation safety issues and the potential for ammonia slip or ammonia-based particulate formation.
- **Carbon Monoxide Reduction.** SCONOx™ will reduce CO emissions as well as NO_x emissions.

Potential disadvantages of the SCONOx™ process include:

- **High Capital and Operating Cost.** SCONOx™ is significantly more expensive than SCR with ammonia injection, primarily due to the higher cost of initial and replacement catalyst. The SCONOx™ catalyst is a precious metal catalyst, which is very expensive.
- **Not Suitable for Exhaust Temperatures of Simple-Cycle Natural Gas Turbine Peaking Applications**. SCONOx™ has been primarily installed on small co-generation systems. The PEC facility will be a simple-cycle peaking operation. Peaking units require more rapid startup and more frequent load changes than typical co-generation systems. The main concerns are the damper systems that would be required with SCONOx™ for the units and assuring proper regeneration gas distribution. The effectiveness and longevity of these damper systems have not been demonstrated on simple-cycle natural gas turbines, and their cost of replacement would be substantial. In addition, steam is required to produce the SCONOx™ regeneration gas. The PEC facility will have no steam production.
- **Catalyst "Washing."** A proprietary catalyst washing system must be used and an on-line catalyst washing system design has not yet been fully developed. If an on-line catalyst washing system is not used, then the facility must be shut down for cleaning.

Because the low NO_x emission rates attainable on natural gas turbines in co-generation systems with SCONOx™ have not been sufficiently demonstrated as "achieved in practice" on simple-cycle natural gas turbine applications and the other factors discussed above, SCONOx™ does not represent current, technically feasible BACT for the PEC facility. Accordingly, a comparative cost analysis with the proposed NOx control technologies is not required. However, SJVAPCD staff has agreed with previous BACT evaluations that determined the use of SCONOx^{TM} for simple-cycle CTGs is not a cost effective option. These findings reinforce the elimination of SCONOx^{TM} on grounds of technical infeasibility.

SCR with Ammonia Injection

SCR with ammonia injection systems for reduction of NO_x emissions have been widely used in simple-cycle natural gas turbine applications for many years, and are considered a proven technology. SCR systems are commercially available from several vendors, unlike SCONOx™, which is available from a single vendor. The SCR process involves the injection of ammonia into the flue gas stream by means of an ammonia injection grid upstream of the catalyst. The ammonia reacts with NO_x natural gases in the presence of the catalyst. The catalyst is not regenerated and requires periodic replacement. SCR vendors typically offer a 3-year guarantee on catalyst life. SCR with ammonia injection systems have been used in numerous simple-cycle applications in California and throughout the world.

Water or steam injection has been a proven NO_x control technique for many years. Injection of water or steam into the primary combustion zone of advanced combustors of a CTG reduces the formation of thermal NO_x by decreasing the peak combustion temperature. Water injection decreases the peak flame temperature by diluting the

combustion gas stream and acting as a heat sink by absorbing heat necessary to: (a) vaporize the water (latent heat of vaporization), and (b) raise the vaporized water temperature to the combustion temperature. High purity water must be employed to prevent turbine corrosion and deposition of solids on the turbine blades. The use of water or steam injection in diffusion flame combustors firing natural gas can typically achieve NO_x exhaust concentrations of 25 ppmvd, corrected to 15 percent O_2.

The Project will use water injection and SCR with ammonia injection designed to achieve a NO_x emission limit of 2.5 ppm (at 15 percent O_2). As noted in Table 1, Summary of Recent NO_x BACT Determinations for Combustion Turbine Generators Rated at Greater than 40 MW in Peaking Service, water injection and SCR have recently been permitted at a NO_x emission level of 2.5 ppmvd (at 15 percent O_2) for numerous California turbines that are similar in capacity to the proposed PEC turbines. Accordingly, water injection with SCR with ammonia injection is considered to be BACT for the PEC facility.

OTHER TECHNOLOGIES

Technologies that cannot achieve a NO_x emissions limit of 2.5 ppmvd (at 15 percent O_2) in practice were not considered as BACT candidates for the PEC facility. These technologies include SCR without DLE, DLE without SCR, and water/steam injection without SCR.

ASSESSMENT OF CO CONTROL TECHNOLOGIES

The PEC facility CTGs are guaranteed to emit no more than 6 ppm of CO (at 15 percent O_2), with natural gas fuel and use of a CO oxidation catalyst (except during startup and shutdown). In discussions with the applicant, SJVAPCD has already confirmed that the use of a CO oxidation catalyst to achieve a stack concentration of 6 ppmvd @15% O_2 will result in emissions of CO that will conform to current SJVAPCD BACT requirements.

The following CO control technologies are evaluated:

- Combustion design/control
- Oxidizing catalyst

Combustion Design/Control

Natural gas turbine combustion technology has significantly improved over recent years with regard to lowering CO emissions. Duke Energy proposes to operate four LMS100 turbines at the PEC facility. For other installations, turbines have been guaranteed by the manufacturer to achieve a CO rate of 9 ppm (at 15 percent O_2) without post-combustion control technologies under a wide range of operating conditions (50 percent to 100 percent load) and ambient conditions (15°F to 115°F).

Oxidizing Catalyst

CO oxidizing catalysts have been used with natural gas-fired turbines for over a decade when uncontrolled CO emission levels are unacceptably high. CO catalysts operate at elevated temperatures within the exhaust stream. CO-oxidizing catalysts can be

considered technically feasible for use in simple-cycle peaking applications. Thus, installation of a CO-oxidizing catalyst on the natural gas turbines is considered to be BACT for the PEC facility.

ASSESSMENT OF VOC CONTROL TECHNOLOGIES

The proposed BACT level of 2 ppmvd (at 15 percent O_2) for VOC control with water injection, SCR, and an oxidation catalyst is consistent with the most stringent level found among recent BACT determinations for simple-cycle natural gas turbines, and is therefore considered to be BACT for the PEC facility.

ASSESSMENT OF SO_2 AND PM_{10} CONTROL TECHNOLOGIES

Sulfur dioxide and PM_{10} emissions will be controlled through the exclusive use of clean-burning pipeline quality natural gas. This control technology has been widely and uniformly implemented for control of SO_2 and PM_{10} emissions from combustion turbines in California and throughout the United States, and is considered to be BACT for the PEC facility.

ASSESSMENT OF AMMONIA SLIP CONTROL TECHNOLOGIES

Ammonia emissions will be limited to 10 ppmvd (at 15 percent O_2). This proposed BACT is consistent with SJVAPCD policy to control NO_x.

SUMMARY OF PROPOSED BACT

Table 2, Summary of Proposed BACT, presents the proposed BACT emission levels for the PEC facility, based on the assessment described in the preceding subsections.

TABLE 2
SUMMARY OF PROPOSED BACT

Pollutant	Control Technology	Concentration ppm at 15 percent O_2 dry
NO_x	Water injection and SCR with ammonia injection	2.5 (1-hour average)
CO	Catalytic oxidation	6.0 (1-hour average)
VOC	Catalytic oxidation	2.0 (1-hour average)
SO_2	Pipeline quality natural gas	NA
PM_{10}	Pipeline quality natural gas	NA
Ammonia slip		10 (1-hour average)

Notes:
BACT = Best Available Control Technology
CO = carbon monoxide
NA = not applicable
NO_x = nitrogen oxides
O_2 = oxygen
PM_{10} = particulate matter less than or equal to 10 microns in diameter
ppm = parts per million
SCR = Selective catalytic reduction
ROC = reactive organic compounds
SO2 = sulfur dioxide